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Building an Emergency Management Program in Vietnam
A Cost Analysis of the Strength of Global Health Capacity

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An abstract of
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Abstract

Building an Emergency Management Program in Vietnam
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Social disparities, infectious diseases, and climatic stresses illustrated the necessity for increased efficiency and communication within the public health and emergency management systems in Vietnam, including its Ministry of Health (MoH). With support of global partners the Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO), and as a consequence of potential public health emergencies, there is a requirement to build and implement the capabilities and strategies for the development of an Emergency Management Program (EMP). This requirement is set by the core capacities of the International Health Regulations, 2005. In 2013, the CDC performed a demonstration project in Vietnam, which included as one of its three goals, the development of an EMP. The intent of this project, as part of the federally supported Global Health Security Agenda (GHSA), was to prepare an analysis of how this demonstration project has been shown to increase emergency preparedness and response efforts in order to prevent, detect, and respond to disease threats on a local and global scale.

By measuring the impact of building an EMP in Vietnam, this project aims to address the following questions,

- Is the enhancement of global emergency preparedness and response systems a beneficial commitment of the workforce to the security of international public health?
- Is the cost investment, of developing an international EMP, including the global commitment and partnerships, a solid investment for the sake of increased global health security?

A cost analysis and of the cost components associated with workforce, travel, surveillance, and resources was conducted to measure the financial commitment of developing an EMP in Vietnam. The 13 qualitative interviews conducted with essential CDC personnel involved in this project provide a measure of the EMP's impact, as well as resulting lessons, challenges and recommendations.

The results of this cost analysis present a comprehensive overview of the financial costs and workforce hours needed for project success, as defined by increased health security and improved cooperation. The qualitative interviews described specific successes, challenges, and recommendations for further progress of this work in Vietnam and for the future of international EMP development.

The CDC's demonstration project in Vietnam enhanced and strengthened relationships within the existing facilities and workforce in Vietnam. It also improved Vietnam's health security, but left room for improved IHR compliance. Overall, this project was a success for emergency preparedness and global security because it created a framework of a system that may potentially be implemented in other countries in the future.

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My gratitude is boundless for the support and kindness of the professors and leaders of the Executive Masters Public Health program since my enrollment in fall 2011. The counsel and career advisement that I've received since then has been remarkable and played significantly to my complete experience as an EMPH student. I am also infinitely grateful for the commitment, support, and kind words of my thesis advisors from Emory University and the Centers for Disease Control and Prevention.

To be able to study and analyze such a vital public health topic and conduct compelling and relevant work is an honor, especially as CDC is building emergency management programs globally. The passion that exuded from the experts in emergency management, information technology, epidemiology, policy, and science, in addition to that from the Vietnamese population is astounding and contagious.

Lastly, my sincere appreciation is shared for the unending patience and support from my loving partner, Trina Je Jonesteller, and our beautiful young son, Cy David Jonesteller.

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Acronym List & Definitions

CDC	Centers for Disease Control and Prevention
CGH	Center for Global Health (CDC)
DEO	Division of Emergency Operations (CDC)
DOD	Department of Defense
DTRA	Defense Threat Reduction Agency
EMP	Emergency Management Program
EMAP	Emergency Management Accreditation Program
EOC	Emergency Operation Center
FTE	Full Time Employee
FY13	Fiscal Year 2013
GHS	Global Health Security (CDC)
GHSA	Global Health Security Agenda
IHR	International Health Regulations
IMS	Incident Management Systems
MoH	Ministry of Health
OPHPR	Office of Public Health Preparedness and Response
PEPFAR	U.S. President's Emergency Plan for AIDS Relief
SOPs	Standard Operating Procedures
WHO	The World Health Organization

Chapter I. Introduction and Background

Through partnerships and surveillance improvements with the World Health Organization (WHO) and the Centers of Disease Control and Prevention (CDC), Vietnam has made great strides toward and improving its population health status. In 2010, Vietnam attained middle income country status, indicating increased economic growth and a reduction in poverty (United Nations, 2012). However, social disparities, infectious diseases, and climatic stresses illustrate the need for increased efficiency and communication within the country's public health and emergency management systems (Phu et al., 2014). Natural disasters, such as typhoons, floods, and tropical depressions, are relatively common, resulting in death, injury, and structural damage. Vietnam experiences five to seven typhoons annually, including Typhoon Ketsana in 2009, which resulted in 172 deaths. From a public health perspective, natural disasters also impact mental health and infectious disease status, due to the resulting water quality and sanitation concerns potentially causing infectious diseases to spread (WHO;WPRO, 2011).

Despite matching health status progress of neighboring countries like Cambodia and Laos, other factors burden the health of the Vietnamese. Challenges associated with an aging population, increasing reports of non-communicable diseases, and growing transmission of infectious diseases have hampered the health of the Vietnamese (Hinh & Van Minh, 2013). For example, the spread of HIV/AIDS and Tuberculosis, while being addressed with the help of the CDC and the WHO, remain public health concerns for a country with less than optimal infrastructure, including its health surveillance system. Future efforts should focus on emergency management for global health security concerns such as Middle East Respiratory Syndrome Coronavirus (MERS-CoV), cholera and Influenza A, H7N9. For instance, in June, 2014, enhanced border surveillance was increased in Southeast Asia to help successfully combat spread of Avian Influenza (Phu et al., 2014 & CIA, 2014). In addition, with support from the U.S. President's Emergency Plan for AIDS Relief (PEPFAR), and support from the government of Vietnam, CDC has provided improved surveillance and laboratory systems to help diagnose and track the spread and treatment of HIV/AIDS and Tuberculosis (CDC, CGH, 2013). Although Vietnam is stable and has a growing economy, these diseases are a concern for the

Vietnamese government and, may present challenges to public health advancement. Because of the strict hierarchical chain of command that results from the one-party Communist state, the ability to move quickly with health care progress is often not feasible, thus potentially delaying timely action during emergency health events (personal communication, 2015). Other causes for delayed health action in Vietnam include cultural, linguistic, and conceptual differences, as discussed in the results this present report. Also, the government's apparent indifference to the human rights of its citizens, especially of ethnic minorities, does not encourage external optimism for the population's public health (CIA, 2014 & personal communication, 2015). However, the Ministry of Health (MoH) appears to sustain a healthy and prevention-based relationship with the CDC (including the in-country CDC office). This is highlighted by the CDC-Vietnam Influenza program, established in 2010, and the CDC-Vietnam Animal-Human Interface Initiative. Since 2005, CDC has had a limited cooperative agreement with the MoH for an influenza surveillance system and corresponding laboratory system. Beginning in 2006, a preparedness and training development agreement has been in effect, but only for influenza, which leaves room for expansion of this cooperative public health partnership (CDC, 2011).

The public health emergencies that threaten Vietnam support the intention of global partners, such as the CDC and the WHO. With this support and guidance from the WHO's International Health Regulations (IHR, 2005) there is a necessity to develop and implement strategic capacities for the development of an effective Emergency Management Program (EMP). As defined by the Emergency Management Accreditation Program (EMAP), an EMP is the practice of emergency management, in combination with the expertise of leading public health programs for the purposes of prevention, protection, and response to global public health emergencies. EMAP is a non-profit organization that provides standards, capacity implementation, and stakeholder buy-in checks to reliably accredit and manage emergency programs. The CDC is the primary public health agency, and is the only federally assigned agency to earn the accreditation distinction from EMAP. The CDC's EMP facilities and personnel assigned to emergency preparedness are responsible for facilitating effective communication, coordination, and response efforts before, during, and following public health emergencies. Such efforts include the need for: strategic goals, trained, competent staff, situational awareness, efficient communication capabilities, and

efficient training/exercise programs (CDC, 2013 & EMAP, 2013). In order to effectively respond to public health threats, and with the EMAP principles, the CDC has developed the Emergency Operations Center (EOC), a facility designed to carry out the strategic intentions laid out in an EMP, and a preparedness option on an international scale. While the EMP (see Appendix 1.1) provides the framework of the aforementioned IHR, including infrastructure, workforce, and procedures, the EOC is the facility that carries out the strategies, both in the U.S. and internationally. While the physical features of an EOC may vary depending on the local government and available resources, the focus and intention are consistent worldwide. To maintain this consistency, an EOC Assessment Checklist has been developed to assist local governments in their assessment of operational capabilities and relative hazards or risks to existing or proposed EMP infrastructure, including the EOC. Through a series of questions, this checklist addresses successful characteristics for EOCs such as survivability, security, sustainability, interoperability, and flexibility (CDC, nd_2).

The potential public health concerns facing Vietnam support an increased need for improved emergency preparedness and response capacities, as guided by the IHR, created and revised in 2005 by the WHO. This international document presents the core capacities to enable countries to address prevention, protection, control and public health response to the spread of disease. Specifically, these capacities serve to detect diseases that exceed expected levels within a territory, to provide support with trained staff for laboratory analysis and logistical assistance, to report all information immediately to the assigned response level, and to quickly implement prevention measures (IHR, 2005). Since several countries, including Vietnam, are unable to successfully meet all of the IHR's capacities, the CDC is committed to improving Global Health Security (GHS) in order to combat the emerging and re-emerging infectious disease threats that often result from international travel and trade. Furthermore, the CDC's Center for Global Health (CGH) and Division of Global Health Protection, in collaboration with the Office of Public Health Preparedness and Response (OPHPR)'s Division of Emergency Operations (DEO) have developed strategies to strengthen communication and collaboration with MoH, and thereby assist with emergency preparedness and response. With partial financial and workforce support of Department of Defense (DOD)'s Defense Treat Reduction Agency (DTRA), this

combined effort enabled the development of programs in select countries (including Vietnam) to aid in the prevention, detection and response of global health threats. From January to September of 2013 (the end of the U.S. government fiscal year), a demonstration project took place, beginning with the staff and event planning phase and ending with applied training and exercises. Vietnam was selected for this demonstration project based on the following criteria: (1) country logistics (security, language, distance from U.S.), (2) history and vulnerability to threats (natural disasters, disease outbreaks, and toxic events), (3) CDC in-country relationship (with MoH, activities, resources), (4) public health capacity (training, communication structure, and disease surveillance), (5) GHS-specific capacity (lab and EOC infrastructure, EMP status, IHR history and current projects, staff training, and surveillance platforms), (6) Vietnam's interest in GHS engagement (support and excitement from MoH, WHO and in-country CDC staff). These criteria, in addition to the global commitment to IHR and growing interest in EMPs, created a window of opportunity for improved global health security through laboratory improvements, EOC development, and informatics (CDC, 2013, CDC, nd_1 & personal communication, 2015).

As one of its three goals, the demonstration project included the further development of an EOC, as part of the EMP expansion. While Vietnam, with its war-torn history and persistent influenza threats, had a basic emergency system in place (located in a single room with minimal resources), it was neither sufficient in training nor space, and was not fully compliant with the IHR prior to 2013. In collaboration with the CDC in-country (Hanoi) office, the demonstration project was able to cooperatively assist the Vietnamese and their MoH, and ultimately improved global health security and emergency management. The second goal of this 2013 project included activities to fund and train the Vietnamese in improved laboratory practice. The third goal was to improve function of the public health information systems, with crossover surveillance guidance. The objectives supporting laboratory enhancements included verification of laboratory testing and assessment of performance and processing of disease samples (provided by the Vietnamese Pasteur Institute). Developing laboratories integrated with stakeholder assistance is essential for a healthy working environment and sustainability of the lab system (Nkengasong et al., 2009). The objectives supporting the public health information systems included confirmation of data transmitted across operational information systems and

ensuring that communication and reporting remained timely and appropriate during potential public health emergencies, such as infectious disease threats. The MoH staff was trained by CDC personnel in order to meet these objectives, and on-site exercises and drills were conducted in order to apply and test the newly acquired skills and procedures (Phu et al., 2013 & personal communication, 2015). In addition to the culminating drills and exercises at the end of this project in Vietnam, intensive training beforehand (summer 2013) was provided to select MoH staff at the CDC office in Atlanta for two weeks, so that these staff could transfer that training knowledge to the rest of the MoH team in Vietnam. Topics covered during this costly fellowship were: operations, logistics, and adopting CDC's Incident Management Systems (IMS). This work was intended to improve Vietnam's compliance with the IHR, which requires that public health plans for strengthening emergency preparedness must be tested through specifically applied drills and field exercises, in addition to supportive and detailed SOPs (Standard Operating Procedures) for case management and communication (WHO, 2010).

With collaborative help from the CDC (the OPHPR's DEO and the CGH), and DoD's DTRA, this project's aim was to improve the public health emergency preparedness and response capacity (guided by IHR), in order to more efficiently prevent, detect, and respond to disease threats (personal communication, 2015). Moreover, the CDC's strong collaboration with the MoH during the demonstration improved overall health diplomacy.

In order to provide further evidence in support of the need for increased emergency preparedness capacity, a cost analysis was performed with this current analysis to assess the public health and emergency capabilities in Vietnam, a country deemed by public health experts as possessing the basic framework for success (personal communication, 2015). This study also aims to assess the necessity of an EMP on an international scale, and to gain an understanding of the local challenges and the means for improving global health security. Future prevention of public health concerns on a global scale is dependent on international emergency management. Public health emergency preparedness and response initiatives, and demonstration projects such as Vietnam's, are crucial to our understanding of and planning for the next global public health threat. Whether the next threat is Ebola, Influenza or a typhoon, emergency preparedness and stakeholder cooperation are crucial to prevention, response and control.

Research Questions/Hypotheses

The present study measures the global public health contribution and effect of the 2013 CDC Global Health Security demonstration project in Vietnam. The cost of the components needed for developing an EMP, including workforce, deployments, tactical communication, surveillance and equipment, are calculated and weighed against the measurable outcomes of this current analysis. Information from in-depth qualitative interviews was used to identify the resulting lessons and challenges in order to enhance prospects for success in subsequent, similar international programs. The specific questions to be addressed are,

Is the enhancement of global emergency preparedness and response systems a beneficial workforce commitment to the security of international public health?

Is the cost investment of developing an international EMP, including the global commitment and partnerships, a solid investment for increased global health security?

Chapter II. Review of the Literature

The cited literature supports the emergency and public health capacities and regulations needed for global health security, and has guided this current analysis. This review is structured as follows: first, the documents that provide the regulatory framework to global emergency and public health management programs are presented, followed by the research and recommendations that support global public health and emergency preparedness.

1. World Health Organization. International health regulations 2005. 2nd ed. Geneva, Switzerland: World Health Organization; 2008. Available at http://whqlibdoc.who.int/publications/2008/9789241580410_eng.pdf.

   Summary

   The IHR, second edition, issued by the World Health Organization (and revised in 2005), provides the regulatory backbone for public health management and capacity-building to enable countries to self-report their progress towards minimizing the global spread of disease. Specifically, the IHR's intent is "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, and which avoid unnecessary interference with international traffic and trade (IHR, 2005 p.1)." The annex categorically lists and explains core capacity requirements. Those which are especially relevant to this project are intended to guide countries toward meeting their IHR obligations through optimal surveillance, notification, verification, response and collaboration, especially when challenged by international public health emergencies.

   Questions/Sample/Characteristics/Methodology

   Since this is an instructive resource, there are no questions to be answered, there is no sample size, nor are there methods to be reported.

   Strengths

   This document presents a streamlined and organized description of emergent scenarios that need to be addressed in order to comply with the capacities set forth to protect global public health.

   Weaknesses

Although the author's points are clear, they are too open-ended and could result in misinterpretation or response variation. Furthermore, this regulatory document provides no suggestive steps to achieve these capacities.

Relevance to this thesis

This WHO resource is the international guide for the demonstration project in Vietnam. Through the proposed capacities, it provides the regulations and goals to aid the enhancement of the EMP in Vietnam. It may also apply to other nations who decide to commit to these standards.

2. World Health Organization. 2013. Emergency Response Framework. 2nd ed. Geneva, Switzerland: World Health Organization

Summary

This document (ERF) by the World Health Organization is intended to establish and clarify the role of the WHO in global public health events and emergencies, and are in support of the WHO's International Health Regulations (2005). The roles of the ERF include: developing the WHO's primary commitments during emergencies, event risk assessment, establishing an internal grading process for emergencies, standards for response performance, vital functions during a response, the role of the WHO's Global Emergency Management Team, WHO's Emergency Response Procedures and responsibilities, and lastly, the three critical emergency policies. The first of these policies is the *surge policy*, which is the rapid deployment of qualified staff during an emergency response. The second is the *health emergency leader policy*, which outlines the need for a pre-qualified individual to act accordingly during high-grade emergencies. The third policy is the *no-regrets policy*, which avoids risking failure, and instead provides excessive resources during an emergency, and includes activation of the surge and Health Emergency Leader policies. This document is especially important for addressing pivotal global public health concerns, including disease risk, civil conflict, and human rights.

Questions/Sample/Characteristics/Methodology

Since this is an instructive resource, there are no questions to be answered there is no sample size, nor methods to be reported.

Strengths

This is an efficiently organized document and the specificity of roles and responsibilities is clear and comprehensive.

Weaknesses

Although this resource is straightforward in its recommendations, it may be too specific to be applicable to all country health program planners.

Relevance to this thesis

This document is relevant to this thesis because of the influence and support of WHO's IHR (2005), which guides the EMP efforts in Vietnam. Moreover, this essential document framework acts as an emergency assessment tool for developing countries like Vietnam, and their global stakeholders.

3. The Emergency Management Standard. 2013 Emergency Management Accreditation Program (EMAP).

Summary

The Emergency Management Standard is credited and revised by the EMAP, which defines essential elements of an EMP. Moreover, it provides the necessary guidelines and quality controls of such programs including: hazard identification and mitigation, risk assessment, prevention, operational planning, incident management, facilities, corrective actions, communications, and training.

Questions/Sample/Characteristics/Methodology

Since this is a resource of guidelines and suggestive methods, there are no questions to be answered, there is no sample size, nor are there methods to report.

Strengths

This is a comprehensive guide for emergency management. Its thorough definitions leave little room for misinterpretation, thus being a clear, applicable resource.

Weaknesses

Since this document is intended to be a comprehensive set of emergency standards across various national programs, there could be limitations in its ability to measure, and thus prepare for, specific threats to human health. With minimum requirements presented as necessary for this standard, it lacks the depth for the most extreme events.

Relevance to this thesis

This document is one of the primary regulatory resources for emergency management activities, including the CDC's EMP. Although it guides the U.S., it remains a translational resource for analyzing the Vietnam EMP.

4. Ijaz K, Kasowski E, Arthur RR, Angulo FJ, Dowell SF. International health regulations—what gets measured gets done. Emerg Infect Dis 2012;18:1054–7. http://wwwnc.cdc.gov/eid/article/18/7/12-0487_article

Summary

This is a perspective article written by authors affiliated with the WHO and CDC. This article highlights four of the eight core capacities outlined in the IHR. It discusses goals for countries to use to successfully implement their intentions. Moreover, this article discusses the weaknesses with the IHR and potential reasons for country non-compliance.

The four selected capacity keywords are human resources, surveillance, laboratory, and response. This article describes their importance, and the metrics used in measurement and implementation. For example, for human resources, it is suggested that a trained team of public health specialists be available in order to properly respond during emergencies. This workforce should have at least one trained professional per 200,000 local residents. With surveillance, it is recommended that each country have an ongoing monitoring system in place in order to identify and detect diseases as quickly as possible. Therefore, the surveillance metrics are to have such systems available for at least three of the five internationally recognized syndromes (severe acute respiratory syndrome, acute neurologic syndrome, acute hemorrhagic fever, acute watery diarrhea with dehydration, and jaundice with fever). Laboratory capacities include being able to detect pathogens in a timely manner (while supporting surveillance efforts) and to do so with core diagnostic tests. These metrics include successful ability to run 10 international standard tests for patients throughout the country. Lastly, the response capacity should be timely when responding to public health emergencies, which requires a trained response team. The metric goal is to have at least one high-functioning unit per major administrative unit, such as a district or state. Overall, this article emphasized the importance of implementing these capacities through specific goals relative to each country's needs and population.

Questions, Sample/Characteristics

Since this resource is not a traditional research article, there are no questions, no hypothesis to report, nor is there a relative sample size.

Methodology

The methods used for this constructive article include analysis of four of the eight IHR capacities (human resources, surveillance, laboratory, and response). This analysis is followed by detailed metrics suggested to countries for future use and implementation.

Strengths

The strength of this article is the concentration on four primary core capacities. By focusing attention on the foundation-building capacities, the authors present a comprehensive approach including metrics shared with the audience.

Weaknesses

This article only pertains to four of the eight IHR capacities. It would benefit from at least a brief description of the other four.

Relevance to this thesis

This article is highly relevant to this project because the authors represent two of the primary institutions in support of this project, the CDC and the WHO. The IHR capacities covered in this article, including surveillance and laboratory work, are essential to the success of this analyzed demonstration project.

5. Caceres SB. Global health security in an era of global health threats. Emerg Infect Dis 2011;17:1962–3.

Summary

The author of this letter to the editor first addresses general health security issues, and follows up with a discussion of the key issue of zoonotic infectious pathogens (i.e., of animal origin). Furthermore, all global concerns mentioned in this piece are linked to potential policy changes and/or how policymakers can collaborate with health officials to help control global security.

Questions, Sample/Characteristic & Methodology

There are no questions to be answered, no samples to be measured, nor a methodology to describe from this resource.

Strengths

This is a determined letter that describes clearly to the reader the message of global health security. Its added strength is the emphasis on the global concerns, but more so by a discussion of any resulting, effective policy change.

Weaknesses

More supportive background information would have been helpful to a reader who is less knowledgeable about this topic.

Relevance to this thesis

The emphasis on the importance global health security is relevant to this thesis because the demonstration project being analyzed is supported by the global commitment efforts of the CDC's DEO and CGH. This piece of literature emphasizes the significance of a well-trained and prepared international community in order to provide aid, especially to developing nations. The demonstration project being analyzed for this writing relies heavily on cooperation with international partners and accepted security standards.

6. Yao K, McKinney B, Murphy A, Rotz, P., Wafula, W., Sendagire, H., Okue, S., Nkengasong, J. 2010.Improving quality management systems of laboratories in developing countries: an innovative training approach to accelerate laboratory accreditation. Am J Clin Pathol, 134:401–9.

Summary

This paper, with the support of international partners including the CDC and the WHO, specifically and methodically describes the steps needed for laboratories in developing countries to successfully implement measurable improvements. Such improvements are needed to evaluate the Strengthening Laboratory Management Toward Accreditation (SLMTA) program. In order to effectively implement SLMTA into the health system of developing countries, this paper describes a rigorous laboratory management framework, complete with: a checklist, learning modules, workshops, and simulated exercises. The SLMTA program was emphasized in this paper through a pilot study performed in Uganda with support by the CDC and the American Society for Clinical Pathology. The pilot study offers lessons learned and challenges to be addressed prior to future application in other developing countries.

Questions

Though this paper does not present questions to be answered, it does present intentions to be discussed and results from the pilot study in Uganda.

Sample/Characteristics

There is no sample size, but the primary characteristic is the detailed description of the intra-supportive components that will potentially create a successful implementation and accreditation model for Uganda and similar African countries.

Methodology

The goal of this paper is to present efficient training approaches to improve laboratory accreditation. The methods are divided into two systems for this training. The first system is a thorough explanation, with outlined tasks and guidelines of the laboratory management framework, and why it exists at this functional state. An assessment checklist aids measurable results and is used by the WHO AFRO accreditation process. The second method system addressed is the task-based training and mentoring toolkit, which is a primary feature of SLMTA. Within this toolkit are the modules needed for the framework, with corresponding tasks to support the principles and methods of these management processes. As a result of these methods, there is a correlation between the assessment checklist and the assigned tasks for each activity within the framework. Lastly, in order to increase training and support, there is a model that indicates the scheduling of related workshops, which are intended to create accountability and reporting of lessons learned during collaborative processes supporting the management framework.

Strengths

This paper's strength is the complete explanation of the management framework, and the supporting components that will create successful accreditation results. Secondly, this paper is strongly supported by the authors' ability to describe the challenges and/or uncertainty of this work. This admittance of potential flaws creates trust with the audience.

Weaknesses

The weakness in this resource is that its application is only on the developing states of Africa, which may not readily transfer to developing nations elsewhere. In addition, the title of this paper gives no indication that the paper will almost exclusively focus on a single country, Uganda.

Relevance to this thesis

Since laboratory compliance is one of the three primary exercises of the 2013 Vietnam demonstration project, this resource is relevant because it explains proper techniques and accreditation methods. Moreover, its emphasis on training to improve performance and morale, in addition to the simulation exercises, are similar to these types of activities practiced in Vietnam during the 2013 project.

7. Nkengasong JN, Mesele T, Orloff S, Kebede, Y., Fonjungo, P., Timperi, R., Birx, D. 2009. Critical role of developing national strategic plans as a guide to strengthen laboratory health systems in resource-poor settings. Am J Clin Pathol,131:852–7.

Summary

This article is comprehensive and convincing in its suggested guidelines to improve laboratory health systems through the commitment of a strategic plan. The development of a national laboratory strategic plan (NLSP) will strengthen lab work (disease testing) in resource-poor countries. To aid this development the authors describe local government and funding partners, like PEPFAR. There is also presentation of the seven components for a successful laboratory plan that represent frameworks for: policy and management, human resources and training, reliable data management systems, an evaluation system, equipment maintenance, and lab infrastructure improvement. The authors also highlight the achievements and funding sources of Ethiopia's laboratory plan, established in 2005. The article concludes by emphasizing the importance of creating an integrated approach to any laboratory network, including strong leadership and partners.

Questions/Sample/Characteristics

Since this document is more a strategic guide than a research plan, there are no questions to be addressed, nor a sample size to be measured.

Methodology

This document has no traditional research methodology. However, the primary components or suggestions of this guide include a description of a functional national laboratory system (NLS), the influence of funding a successful laboratory network system, the process for establishing a NLS, and a status report on the first country (Ethiopia) to implement such a system.

Strengths

This article methodically explains the vital need for a strong, functional laboratory system, and the importance of having a plan to do so, particularly in resource-poor countries. In addition, the projected seven components of the plan are comprehensive and clear to the audience.

Weaknesses

This article describes a strong need for funding support in order to have success with this plan. This emphasis provides little hope for countries unable to receive sufficient funding. In addition, this article seems to put too much focus on HIV/AIDS, thus neglecting funding and laboratory examples of other diseases.

Relevance to this thesis

Since laboratory improvement was one of the primary goals of this Vietnam demonstration project, this article provides guidance and motivation for strengthening laboratories, along with stakeholder help. This work is particularly beneficial in resource-poor countries, like Vietnam.

8. Phu, T.D. Phu, Vu Ngoc Long, Nguyen Tran Hien, Phan Trong Lan, Wayne Lowe, Michelle S. McConnell, Michael F. Iademarco, Jeffrey M. Partridge, James C. Kile, Trang Do, Patrick J. Nadol, Hien Bui, Diep Vu, Kyle Bond, David B. Nelson, Lauren Anderson, Kenneth V. Hunt, Nicole Smith, Paul Giannone, John Klena, Denise Beauvais, Kristin Becknell, Jordan W. Tappero, Scott F. Dowell, Peter Rzeszotarski, May Chu, Carl Kinkade.2013. Strengthening Global Health Security Capacity — Vietnam Demonstration Project, 2013 Morbidity and Mortality Weekly Report, Centers for Disease Control and Prevention. Vol.63, no.4, p77-80.

Summary

This CDC report describes the need for an improved global health security program, in light of disease threats such as severe acute respiratory syndrome (SARS), Middle East respiratory syndrome coronavirus (MERS-CoV) and Influenza A (H7N9). As a result of these threats, the CDC and the Vietnamese MoH collaborated to create a pilot program to address the improvements of the public health emergency management system. The program goals included enhancement of an EOC (and EMP), and improvements with laboratory and information systems in order to improve overall emergency preparedness capacity. In addition to describing the partners of this project, and the details of the aforementioned goals, the functional drills are also described. These culminating drills were intended to verify accuracy of reporting and to provide training

for the MoH, EOC staff. The results of this project indicate an increased need for rapid information technology with surveillance reporting, and increased intra-agency coordination and collaboration.

Questions

There were no specific questions to be answered with this article. These goals, or lanes, to be achieved included making improvements to the laboratory and information systems, in addition to improving emergency capacity and creating an official Vietnamese EOC handbook.

Sample/Characteristics

There were no samples to be measured.

Methodology

This report provides moderate details of the 2013 demonstration project in Vietnam. It also describes the approximate timeline and the three overarching project goals: developing a functional EOC, improving the laboratory systems and enhancing the information systems, including surveillance. As a result of these in-country educational activities, a variety of drills were performed with CDC and the Vietnamese MoH staff in order to verify the functionality of the work.

Strengths

Though brief, this report provides a comprehensive summary of this project including the motivation for this work. Moreover, the inclusion of the resulting lessons learned is an effective observation to be used to improve international action going forward.

Weaknesses

Due to the nature of this summarized report, the weakness is in its lack of detail of the three specific goals (and activities) of the project.

Relevance to this thesis

This document is the actual summary report of activities for the demonstration project that is analyzed for this thesis.

Chapter III. Methodology

The overarching goal of this thesis project was to measure the effects of the 2013 demonstration project on the enhancement of Vietnam's EMP, thus gauging the potential for international EMP improvements. Since this study utilized (retroactive) data that originated with the Centers for Disease Control and Prevention, it provides a United States governmental perspective. The timeframe for study (data collection and implementation period) was a retroactive time period from January through September, 2013. The analytic horizon of this thesis analysis was the observation of time and effort from the end of the actual intervention, September 2013 through April 2015 (the impact to date at the time of this thesis report).

One of the components of this methodology was to conduct a cost analysis of the CDC's global capacity building efforts in Vietnam and to analyze the resulting impact within the aforementioned timeline. The backbone of this analysis is the core capacities set forth in International Health Regulations and the Emergency Response Framework. The present cost analysis included the time, cost and resources for this demonstration project, and thus enabled improved decision making for any related or continuing work. The cost components of this analysis included travel costs, resource use, and working hours related to travel, communication, training, and planning. The cost data for developing the program included, average CDC staff salaries (e.g., administration, support, & field), travel (cost and hours), and equipment. The sources of this data included CDC administration budgets, travel and resource data from the logistics team, CDC's preparedness workforce management system (PWMS), and Time Tracker database (self-reporting).

Lastly, the methodology (see Table 3 and Appendix 1.2 for question template), included 13 interviews of the project-assigned CDC staff, including personnel responsible for logistics, training, planning, and implementation, and those representative of global public health and emergency management divisions within the CDC.

Chapter IV. Results

The results of this project were collected, organized, and analyzed from the interviews of the 13 CDC personnel directly involved in this demonstration project from January through September 2013. The detailed information from the interviews (see Table 3) provided a comprehensive, first-hand account of the motivation for this project in Vietnam. This collective

information included the planning and logistics, implementation, assessment, and most importantly, the resulting impact on the public health and emergency programs in Vietnam and on global health security. The impact analysis for this report is defined through the resulting lessons learned, and the project challenges so that any necessary improvements (corrective action) can be applied to continuing work. In addition to this qualitative data, the cost, salaries and hours expended for this project (see Tables 1 and 2) helped to leverage the complexity of CDC-defined functional roles. This comprehensively measured the inputs and effects of this demonstration project on the global capacity built in Vietnam, during and following FY13.

In addition to the data presented in Table 1 and Figure 1, the first piece of cost data is the average 2013 salary (including benefits) of the CDC employees (the workforce) involved in this demonstration project. According to CDC budgetary administration permissions (2015), the average salary for the personnel involved (n=34 according to Time Tracker data) in the 2013 project was $115,688.72 (see Table 1). Figure 2 presents the proportional representation of the logged hours for each defined functional role (partnerships and policy were combined due to the low number of hours logged).

In addition each individual deployed to Vietnam was offered a laptop, cell phone, and blackberry by the CDC workforce. Although the exact cost of these items was not attainable, a fourth category was calculated to include the cost of supplies for the EOC and laboratory work, which totaled $15,000 (personal communication, 2015). Table 2 represents the total travel costs (flights, hotel, meals & incidental expenses) associated with the CDC individuals deployed (n=20) to Vietnam, which resulted in $142,617.08. Therefore, the total calculated costs are,

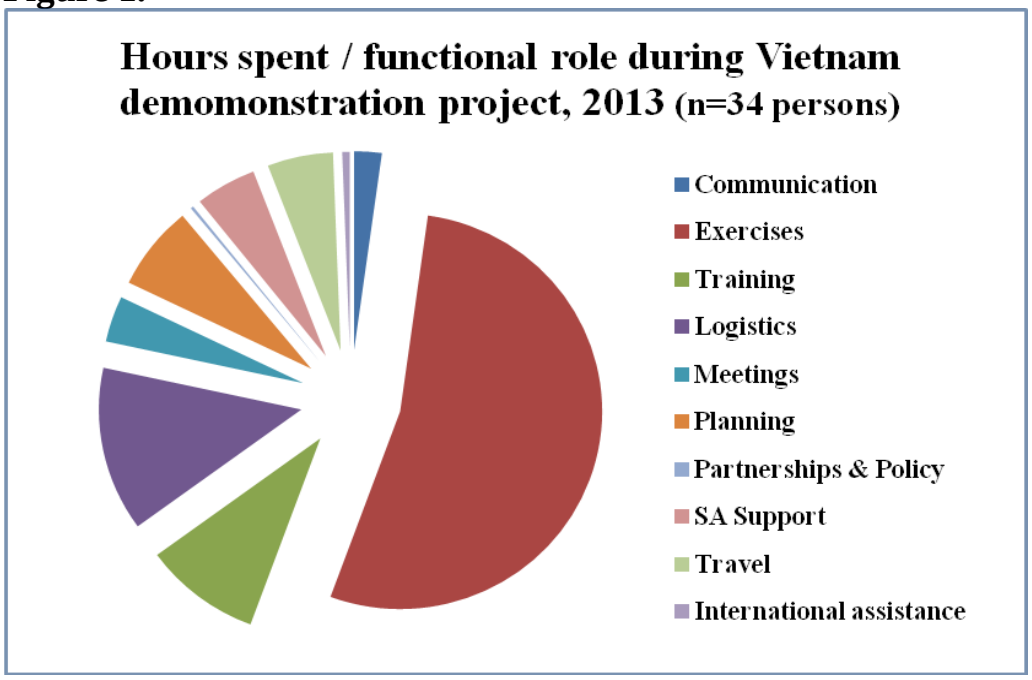
$155,958.48 (average salary*hours/role, n=34 persons) + $142,617.08 (total travel costs, n=20) + $15,000 (EOC + lab supplies) = $313,575.56

Table 1. Hours and Average Salary per CDC role during the Vietnam demonstration project, 2013.

Functional role (CDC time tracker)	Total Hours	Total average salary per role^
Communication	61.5	$ 3,420.63
Exercises	1498	$ 83,318.76
Training	262.5	$ 14,600.25
Logistics	376	$ 20,913.12
Meetings	105.5	$ 5,867.91
Planning	193	$ 10,734.66
Partnerships & Policy	6.5	$ 361.53
SA Support	137	$ 7,619.94
Travel	147	$ 8,176.14
International assistance	17	$ 945.54
Total	**2804**	**$155,958.48**

^ Total hours * $55.62 (average hourly FTE salary)
$115,688 (the average FTE cost during this project) / 2080 (total hours/year) = $55.62

Figure 1.



*Data originates from CDC time tracker database.

Table 2. Combined travel data for CDC personnel to and from Vietnam, 2013								
CDC TRAVELER	**DEPARTURE DATE**	**RETURN DATE**	**ORIGIN**	**DESTINATION COUNTRY**	**DESTINATION CITY**	**AGENCY**	**CENTER**	**TOTAL COST (Flights, hotel, meals & incidental expenses)**
Vietnam traveler 1	25-Feb	7-Mar	Atlanta	Vietnam	Hanoi	CDC	CGH	$10,598.64
Vietnam traveler 2 (interviewee 1)	25-Feb	7-Mar	Atlanta	Vietnam	Hanoi	CDC	CGH	$10,163.28
Vietnam traveler 3	1-Mar	7-Mar	Atlanta	Vietnam	Hanoi	CDC	OID	$5,684.07
Vietnam traveler 4 (interviewee 2)	1-Mar	7-Mar	Atlanta	Vietnam	Hanoi	CDC	OID	$5,391.49
Vietnam traveler 5 (interviewee 3)	1-Mar	7-Mar	Atlanta	Vietnam	Hanoi	CDC	OPHPR	$5,404.49
Vietnam traveler 6	2-May	22-Sep	Atlanta	Vietnam	Hanoi	CDC	CGH	$16,324.25
Vietnam traveler 7	25-May	8-Jun	Atlanta	Vietnam	Ho Chi Minh City	CDC	OID	$8,678.74
Vietnam traveler 8	25-May	9-Jun	Atlanta	Vietnam	Ho Chi Minh City	CDC	OID	$9,643.20
Vietnam traveler 9	25-May	9-Jun	Atlanta	Vietnam	Ho Chi Minh City	CDC	OID	$8,730.05
Vietnam traveler 10	8-Jun	31-Jul	Atlanta	Vietnam	Hanoi	CDC	CGH	$24,009.03
Vietnam traveler 11	21-Jul	29-Jul	Atlanta	Vietnam	Hanoi	CDC	OSELS	$6,457.07
Vietnam traveler 12	2-Aug	23-Aug	Atlanta	Vietnam	Hanoi	CDC	OSELS	$8,997.75
Vietnam traveler 13 (interviewee 4)	7-Aug	28-Aug	Atlanta	Vietnam	Hanoi	CDC	OPHPR	$8,765.57
Vietnam traveler 14	18-Aug	2-Oct	China	Vietnam	Hanoi	CDC	CGH	$5,414.69
Vietnam traveler 15 (interviewee 5)	19-Aug	20-Aug	Vietnam	Vietnam	Hanoi	CDC	CGH	$1,205.56
Vietnam traveler 16 (interviewee 6)	2-Sep	11-Sep	Atlanta	Vietnam	Hanoi	CDC	CGH	$6,019.14
Vietnam traveler 17 (interviewee 3)	6-Sep	19-Sep	Atlanta	Vietnam	Hanoi	CDC	OPHPR	$6,929.29
Vietnam traveler 18	9-Sep	11-Sep	Vietnam	Vietnam	Hanoi	CDC	CGH	$1,121.63
Vietnam traveler 19 (interviewee 7)	10-Sep	19-Sep	Atlanta	Vietnam	Hanoi	CDC	OPHPR	$6,122.57
Vietnam traveler 20	11-Sep	27-Sep	Atlanta	Vietnam	Hanoi	CDC	OSELS	$7,718.49
								$142,617.08

Table 3. Qualitative Interview questions with corresponding and summarized answers (March 2015)		
	Time Tracker & Logistics (n= 3 sources)	
#	**Question**	**Answer Summary**
1	How many people total were involved in the Vietnam project?	Refer to table 2
2	How many people were deployed to Vietnam/Uganda?	Refer to table 2
3	Where exactly (city/town/county) in-country were these people deployed?	Refer to table 2
4	How many hours were spent on training/other roles?	Refer to table 1
5	What were the approximate technical needs/provisions per person in each country (i.e. computer, cell phone, etc.)?	Laptop, cell phone, and blackberry
	CDC Vietnam Personnel (n=10 sources)	
	Question	**Answer Summary**
1	Can you briefly describe the Vietnam project and its specific aims?	3 objectives or lanes for assessment and improvement: EOC (aid emergency operation center operation, planning, and collaboration capabilities), labs (verify accuracy of sample testing and consistency with quality and processing) and information systems (confirm capabilities for timely and correct data reporting related to PH emergencies).
2	Could you share the precise timeframe of the steps for success?	Jan-Feb, country selection and staff planning; Feb-April, stakeholder planning and meetings with Vietnam MoH; May-July, training & exercise development based on objectives; August-September, drills and applied exercises with MoH staff.
3	At what point were you involved in this effort (deployed?) and could you please describe your specific responsibilities and relative activities?	Refer to table 2. Ranged from country planning engagements in February to applied exercises in August and September.
4	From your professional perspective, what was the most vital use of funds?	The instruction and equipment; the trained CDC staff and thus the associated travel costs; Getting MoH behind the concepts; the systems (policies and protocols) allow for the most operative payback for the long-term.

5	Could you describe the emergency management program in this country prior to project implementation?	Existent, but not optimal (a room NOT a system). Their EOC was a single long thin room within the MoH, with basic infrastructure, including a single display screen. No SOPs. A steering committee existed with MoH and MART as a solid platform for response, but no preventative meetings were held.
6	How did CDC collaborate with MoH? Did this program influence MoH policy for long-term? If so, can you explain how?	Pre/needs assessment planning meeting plus follow-up meetings with in-country CDC office; Discussed exercise training leading up to drills, but less than successful attempts made for engagement in decision-making; The CDC/MoH fellowship program (August in Atlanta), SOPs created, EOC handbook and a circular policy document were created. A strong relationship existed especially due to previously established in-country CDC office.
7	What resulting significance was made in Vietnam that you are aware of, and what metrics were/are used to determine that?	Since this project involved more qualitative data, there were no specific metrics collected for measurement. However, the qualitative data includes information collected for the resulting lessons learned and this project resulted in improved staff training, both CDC and Vietnamese MoH.
8	Were you faced with any barriers that may have challenged these efforts? Any setbacks due to cultural differences?	A project with highly ambitious objectives in a limited timeframe and funding (resulting uncertainty); the resource cooperative agreement had expired; CDC staff turnover due to pre-arranged deployment times; language and conceptual differences (EMP committees verses functional roles), slow approval time due to socialist/hierarchical government, pride and trust in system already in-place; more political than cultural differences; it's too difficult to work fast in Vietnam due to slow approvals for health; multiple stakeholders with differing interests; future progress temporarily derailed due to international Ebola virus concerns.
9	Are you involved in any post-project impact analysis/review? IF yes, how so?	While most interviewees stated "no," one individual has regular communication regarding EOC handbook reviews/edits, and another individual involved with planning for future training in Vietnam.
10	Is there anything additional you would like to add that I have not covered with these questions?	While some interviewees stated "no," others included offers to email digital copies of related material.

Chapter V. Conclusions, Implications and Recommendations

The demonstration project in Vietnam during fiscal year 2013 (FY13) resulted in net improvements for the existing Vietnam Emergency Management Program within its health system, but sustainable work remains. These remaining improvements may now continue with the assistance of the budgetary results and the challenges presented in this report. Prior to this 2013 project, Vietnam had a functional, yet minimal, Emergency Operations Center (EOC). This collaborative demonstration work was a success for emergency preparedness and global security because of the EMP improvements to this original MoH space. The permission and organization for project activation begins at the executive level and cascades down to the CDC, followed by cooperation across centers and divisions as mentioned in this report. This type of cooperation should continue in order to provide assistance and assessment for improving IHR compliance and to support international public health.

The cost data organization and analysis of this project reveals costs, including flights, hotels and meals for 20 people to be deployed to Vietnam totaling $142,617.08. The complimentary workforce hours for the 11 functional roles specific for 34 people (in Atlanta and Vietnam) totaled 2,804 hours logged into the CDC Time Tracker system during FY13. In addition, when the average FTE (Full Time Employee) salary ($115,688.70 for this 2013 demonstration period) is applied to these logged hours, the total cost of salary, wages & benefits for these hours is $155,958.48. Lastly, the supplies for the EOC and laboratory lanes totaled $15,000. Consequently, resource and workforce prioritization for future projects should consider this cost data as an effective planning tool for corresponding budget proposals. The calculated costs of these essential components contribute to understanding the funding challenges of this project. For instance, with the time constraints of such a project, it'll be pivotal to know which cost component is most vital for future work, either in Vietnam or elsewhere. At the time of this writing, personnel at CDC's CGH have indicated that, pending federal financial approval, ten developing countries have been selected for ongoing similar projects (personal communication, 2015).

The overall impact of the demonstration project can be better understood from the depth of the lessons learned from the qualitative interviews (see Table 3). The primary strengths and effects of this demonstration project are listed below.

- A stronger cooperative relationship developed between the CDC, DTRA and MoH (improved health diplomacy).
- Although improvements are needed and are in process, the creation of emergency SOPs and an EOC handbook were crucial to create for potential health threats.
- The existing disease surveillance and response system was improved, particularly through the integration of the Epi 7.0 program.
- There was increased laboratory efficiency with early and more precise disease diagnosis.
- Despite an abbreviated timeframe, the MoH EOC staff displayed a collective ability during the training and drills to address the challenges they faced.
- Through improved information systems, convincing the MoH and similar agencies about the importance of data sharing and surveillance was a key accomplishment.
- The creation of a solid base for future improvements within emergency management capacity in Vietnam (Personal Communication, 2015 & Phu et al., 2014).
- The activities supporting health diplomacy were vital for improving the diplomatic relationship with the U.S.
- The completion of this project moved Vietnam closer to achieving complete IHR capacity compliance (personal communication, 2015).

In addition to the strengths of this demonstration project, the information from the qualitative interviews indirectly overlapped with cost analysis measures with question number four (see Table 3). This question about the most vital use of funds to support the project resulted in a broad spectrum of responses, as indicated in Table 3. Responses indicated that many aspects, and costs, of this short-term project were vital and supportive of each other. These reliable responses should be considered for prioritization of future funding distribution.

When interpreting results of this analysis, several limitations should be considered. Since the CDC's Time Tracker database is a self-reporting system, and is not mandatory for all involved with this project, the working hours for the corresponding functional roles may not be accurate. Secondly, the inability to schedule interviews with some key CDC personnel, particularly those who remained in-country during the data collection period, potentially hindered valuable insight. Lastly, some federally-supportive data (cost of personal equipment)

were difficult to obtain, possibly due to the time commitment of CDC personnel to other international concerns such as the polio and Ebola response efforts.

In spite of the lessons from the invested and collaborative work of this demonstration project, there were political, cultural, and logistical challenges that should be addressed (see Table 3). The first and most frequently mentioned challenge was the limited time available for such an ambitious project, particularly in a country where it is difficult to work quickly. Due to the top-down bureaucratic system of Vietnam, extended time is needed for project approvals. The degree of expectations for training, systems, and resulting exercises, were too high to achieve, given the planned time frame and availability of funds within FY13. In addition, the previously outlined cooperative agreement with Vietnam had expired, thus creating a financial and logistical barrier for shipping resources into the country (DTRA filled in where needed).

Pre-approved deployment times of the assigned CDC staff (independent of the CDC in-country staff), placed limitations on individual efforts and cross-over training possible for the newly deployed staff. An additional challenge was weighing the complexities of working with multiple stakeholders who all had varying primary interests within this 2013 project. There were mutiple linguistic and conceptual barriers. For example, the Vietnamese MoH initially considered an EMP to be limited to the local health committees; however, the CDC defines it a system that includes the EOC infrastructure, the functional roles and processes to address emergencies. The later was successfully applied to the existing Vietnamese system during this project. Furthermore, the Vietnamese SOPs developed for the EOC were a mere collection of checklists instead of standard detailed instructions generally expected of a SOP document (personal communication, 2015 & CDC, 2013).

An ongoing challenge is that the international Ebola virus crisis and other priority CDC responses have temporarily derailed focus from the immediate continuation of improvement in Vietnam. As a result, the post-project impact and the sustaining efforts supporting infrastructure and public health emergencies in Vietnam are in a waiting period for further improvement. However, the international Ebola crisis has raised heightened awareness for the need for improved emergency capacity on a global level, thus supporting forward-thinking programs like this 2013 project.

The post-project impact recommendations include pre-arrangement of future meetings and deployments in order to continue the training of MoH staff, and thus add to the sustainability

of the initial project. A second consideration would be to arrange and extend a budgetary cooperative agreement with Vietnam and the CDC. This would allow for more efficient equipment and resource acquisitions. Another financial recommendation is funding for increased number of instructors for training, which would enhance the application of skills for the MoH staff. An additional recommendation is to build or enhance EOCs throughout the surrounding region of Vietnam to improve emergency cooperation and response. The implementation of evaluation tools would aid in tracking progress with meeting objectives and would ensure consistent IHR compliance. Lastly, there is an almost ubiquitous request by those interviewed to implement training exercises that encourage improved engagement and decision making. Although the Vietnamese appear satisfied with their basic EOC and trust their government there is room for improvement with their EMP and their information sharing system. These improvements will support similar CDC activities tentatively planned and approved in ten more countries in the coming years (personal communication, 2015 & CDC, 2013).

For Vietnamese, regional and global health, it is vital that communication with the CDC and the WHO does not deteriorate. It is crucial for the strength of health diplomacy that the relationship with the MoH remains intact. Emergency preparedness and response training is a growing global public health necessity, especially with the international threat of pandemic influenza and measles. It would be a global failure if emergency response systems were not prepared for the next epidemic. Therefore, investment in research, training, building capacity for disease surveillance, laboratory testing and response communication is essential for preventing the next global outbreak (Gates, 2015). These ambitious yet necessary preparedness actions will only succeed through common commitment, driven by efficient communication, and cooperation between countries and their global partners.

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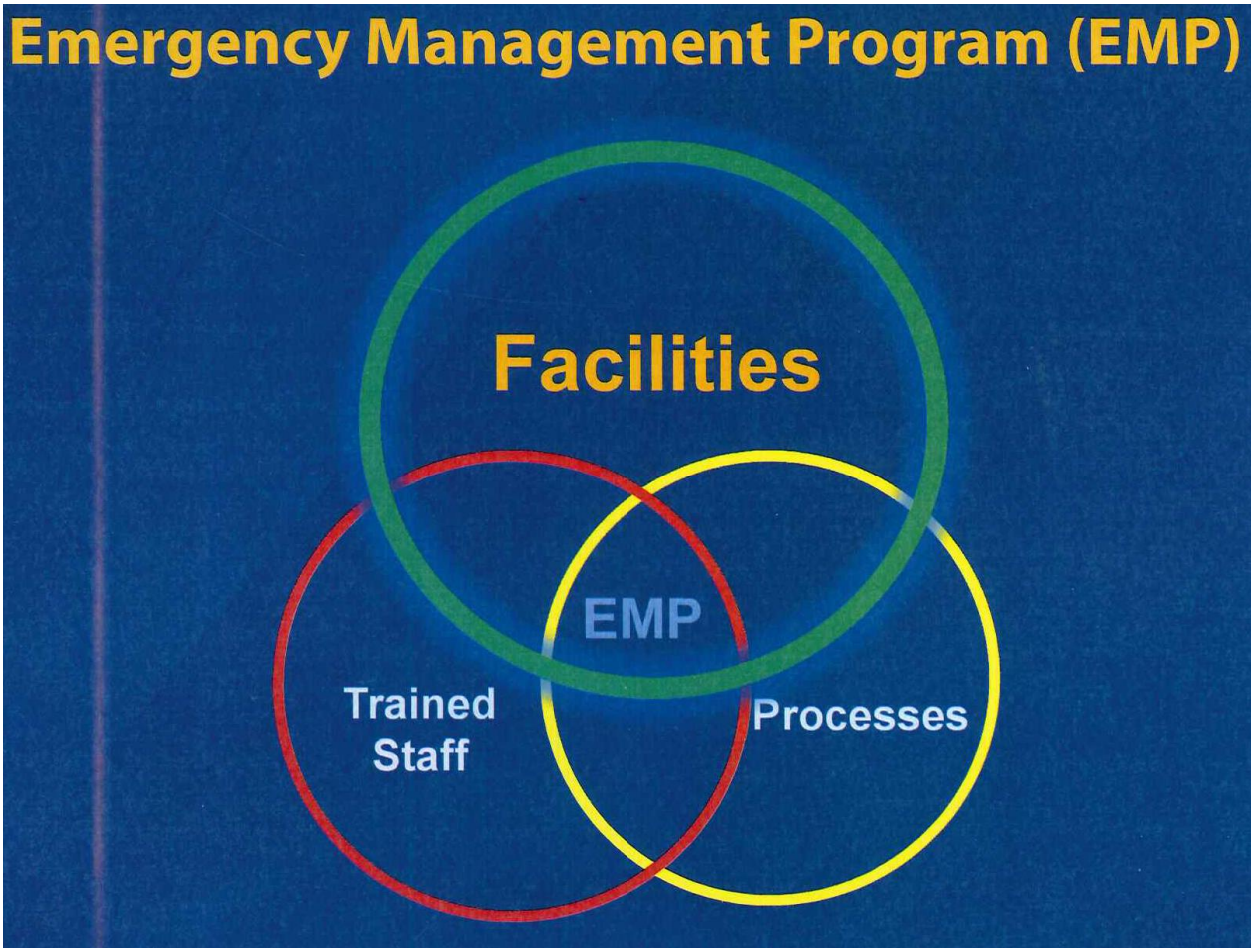
Appendix

1.1


Emergency Management Program (EMP)
Facilities
EMP
Trained Staff
Processes

1.2 Interview Questions (for CDC, Vietnam personnel)

Thank you for your time and attention in meeting with me. Within about 30 minutes we will discuss your work with the FY 2013 Global Health Security Demonstration Project. To accurately capture the information that you provide to me, I will be recording the responses of our discussion and your identity will remain anonymous. The answers you provide are in support of my MPH thesis requirements for Emory University, and I am greatly appreciative of your time and cooperation.

For this project I would like to explore the development and the impact of Vietnam's emergency management program (EMP), on behalf of the CDC's Division of Emergency Operations (DEO).

The following questions address the 2013 demonstration pilot project in Vietnam.

1. Can you briefly describe the Vietnam project and its specific aims?

2. Could you share the precise timeframe of the steps for success?

3. At what point were you involved in this effort (deployed?) and could you please describe your specific responsibilities and relative activities?

4. From your professional perspective, what was the most vital use of funds?

5. Could you describe the emergency management program in this country prior to project implementation?

6. How did CDC collaborate with MoH? Did this program influence MoH policy for long-term? If so, can you explain how?

7. What resulting significance was made in Vietnam that you are aware of, and what metrics were/are used to determine that?

8. Were you faced with any barriers that may have challenged these efforts? Any setbacks due to cultural differences?

9. Are you involved in any post-project impact analysis/review? IF yes, how so?

10. Is there anything additional you would like to add that I have not covered with these questions?