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## A Sampling of NPS Theses & Research Reports: Pandemics, Epidemics & Influenza

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**NAVAL POSTGRADUATE SCHOOL**

**MONTEREY, CALIFORNIA**

# **A SAMPLING OF NPS THESES & RESEARCH: Pandemics, Epidemics & Influenza**

Compiled by

**Greta E. Marlatt**

March 2020  
updated

<http://hdl.handle.net/10945/64452>

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## ABSTRACT

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This document presents a sampling of unclassified, unlimited distribution (public release) NPS student theses, MBA Professional reports and NPS faculty research reports. These citations were collated from Calhoun, the Dudley Knox Library's publicly accessible institutional archive <https://calhoun.nps.edu/public/> and the Homeland Security Digital Library (HSDL) <https://www.hsdl.org/c/>. The following search terms were used as well as a broad interpretation of decision-making needs in difficult situations.

Theses and report searches were generally limited to title or abstract:

- *Pandemic*
- *Influenza*
- *Quarantine*
- *Vaccine OR vaccination*
- *Infectious disease*
- *Medical surge*
- *Surge capacity*
- *Mass casualty*
- *Shelter in place*
- *Public health*
- *Man-made pathogens*

As noted, the majority of the theses were done through the National Security Affairs department and mostly done by students in the Center for Homeland Defense and Security (CHDS) Master's program who, as first responders, have a lot of firsthand experience in these types of events and related planning exercises.



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## THESES

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Alben, Sr., Timothy P. ***Compliance with Community Mitigation and Interventions in Pandemic Influenza: A Community Policing Strategy.*** Master's thesis - CHDS, Naval Postgraduate School, 2007.

<http://hdl.handle.net/10945/3344>

<https://www.hsdl.org/?abstract&did=479294>

ABSTRACT: A number of response plans and strategies have been published concerning preparation for an oncoming Pandemic Influenza. The majority of federal guidance and state planning with respect to pandemic preparation focuses excessively on the availability and distribution of effective vaccine and antiviral remedies -- pharmaceutical solutions. Effective vaccines, presently unavailable, will not be in production and available for application for at least eight months after the onset of an identified pandemic. Community mitigations and interventions such as school closures, event cancellations, limited travel, quarantine and work at home plans are traditional responses to slowing the spread of a virus. In order to effectively implement these time-tested strategies, voluntary community compliance with interventions becomes exceedingly important. The recent global experience with SARS and current mathematical modeling of virus spread characteristics support community mitigation efforts. The community policing model, having evolved over the last twenty years, provides a pre-existing framework to engage the public in grassroots pandemic education, awareness, planning and problem solving partnerships. The Incident Command System provides a structure for a collaborative, multi-agency approach to successfully implement a community awareness and compliance initiative. Community mitigations will save lives.

Bernett, Brian C. ***U.S. Biodefense and Homeland Security toward Detection and Attribution.*** Master's thesis - Naval Postgraduate School, 2006.

<http://hdl.handle.net/10945/2386>

<https://www.hsdl.org/?abstract&did=469504>

ABSTRACT: American leaders face tough decisions about the role of biodefense in homeland security. Debate centers on U.S. preparedness for biological attack, but few if any have adequately defined "preparedness." This thesis defines bioterrorism preparedness in terms of detection and attribution. Through case studies of the 1984 Rajneeshee cult and 2001 U.S. anthrax attacks, the thesis develops a notional model of biodefense that shows that nature of attack and the lethality or type of agent influence outbreak detection and biological weapons attribution. Because public health surveillance facilitates detection and interagency coordination facilitates attribution, there is a need to re-balance U.S. biodefense priorities by easing emphasis on current programs, and redirecting resources to simpler improvements in communication and organizational efficiency. Core limitations of the public health system that impede surveillance are discussed, and barriers between public health and law enforcement officials that hamper coordination are examined. Recommendations are provided to improve detection through better surveillance, and to enable attribution through better coordination and information sharing.

Biladeau, Pamela G. ***Strengthening and Expanding the Citizen Corps.*** Master's thesis - CHDS, Naval Postgraduate School, 2006.

<http://hdl.handle.net/10945/2856>

<https://www.hsdl.org/?abstract&did=461563>

ABSTRACT: The Citizen Corps (CC) is the primary Department of Homeland Security vehicle for achieving civilian preparedness. CC volunteers are included in the National Preparedness System (NPS) through various sponsoring agencies who determine the roles and functions of the volunteers within their organization. However, not defining the CC as an independent





support function within the NPS makes it difficult to isolate data for the purpose of creating Target Capabilities Lists, measuring performance, and including volunteers in operations plans. This thesis posits that to achieve adequate civilian preparedness, the CC's roles and functions need to be restructured to align with the certification systems of the professional emergency response disciplines. CC certifications will also bridge gaps in the response continuum. The CC reorganization will modularize and isolate roles and functions for the purpose of strategic planning, measuring performance levels, serving as a predeployment civilian response, typing, credentialing, and pre-registering as an independent resource capability (which will be essential in planning for a pandemic and surge capacity needs). For planning purposes, and to add visual clarity to the CC roles and functions, the CC should be positioned as an independent Emergency Response Function within the National Response Plan.

Cameron, Wendy K. **Public Health Planning for Vulnerable Populations and Pandemic Influenza**. Master's thesis - CHDS, Naval Postgraduate School, 2008.

<http://hdl.handle.net/10945/3808>

<https://www.hsdl.org/?abstract&did=232501>

ABSTRACT: This thesis addresses planning for vulnerable populations, those segments of each community that are normally independent but that may require special assistance during a health emergency such as an influenza pandemic. Analysis of plans from sixty of Georgia's 159 counties provides insight into the extent to which vulnerable populations are defined and identified; relevant agencies are engaged in planning; and opportunities are identified for improvement. Recommended strategies will enable local jurisdictions to more effectively plan for vulnerable populations. Some strategies have now been implemented and others are in progress.

Chambers, Travis L. **Optimization of Influenza Antiviral Response in Texas**. Master's thesis – Operations Analysis, Naval Postgraduate School, 2015.

<http://hdl.handle.net/10945/45167>

<https://www.hsdl.org/?abstract&did=794270>

ABSTRACT: Influenza pandemics pose a serious threat to the global population. According to the United States Department of Health and Human Services in 2014, the Spanish flu of 1918 killed almost 100 million people worldwide and Simonsen, Spreeuwenberg, and Lustig in 2013 estimated that the Swine flu more recently killed approximately 180,000 people. Government agencies, from the United States Centers for Disease Control and Prevention down to state and local regions, are prepared to respond to potential influenza pandemics with antiviral, vaccine, and social interventions. Mathematical models can guide policies to save lives. In this thesis, we create an optimization model, implemented in the online tool Texas Antiviral Release Scheduling (TAVRS) that provides the optimal geo-temporal antiviral release schedule to advise decision makers at the Texas Department of State Health Services. We input the antiviral release schedule into an independent disease-spread simulation model to measure the effectiveness of the optimal release schedule. While the TAVRS optimal antiviral release schedule performs comparably to a simple population-proportionate release schedule during a simulated mild 2009-like influenza pandemic, the TAVRS release schedules saves an additional 10,000 lives- three to four times greater- than the population-proportionate release schedule when responding to a severe 1918-like influenza pandemic.

Chamblee, Tammy. **The Perfect Model for the Perfect Storm: Creating an Effective State to Grassroots Comprehensive Public Health and Medical Strategic Communications Model**. Master's thesis - CHDS, Naval Postgraduate School, 2013.

<http://hdl.handle.net/10945/38896>

<https://www.hsdl.org/?abstract&did=750061>

ABSTRACT: Every emergency situation presents unique challenges. It is absolutely essential to have a good grasp on the specific situation to be able to make the best decisions possible for public health response and mitigation. Clear situational awareness can mean the difference between life and death, which allows all partners to collect information, collaborate, and communicate prior to making critical decisions during an emergency and applies to all



stakeholders, whether at the state, regional, or local levels. Ultimately, the communication between those who have information and those who need the information must be shared; to be most effective, the information must be timely, accurate and credible. This thesis describes the development of a strategic communications model for Emergency Support Function-8 (ESF-8) public health and medical partners from the state to comprehensive grassroots level in Mississippi (MS). The development of the MS ESF-8 Healthcare Coalition (MEHC) single model allows for information sharing across the entire medical enterprise in MS, including both public and private entities. Through case studies, events, an exercise, and workshops, the MEHC model was developed and a common operating picture was realized. This thesis filled a needed gap and will ultimately help to save lives.

Cloud, Rosemary. ***Future Role of Fire Service in Homeland Security***. Master's thesis - CHDS, Naval Postgraduate School, 2008.

<http://hdl.handle.net/10945/3935>

<https://www.hsdl.org/?abstract&did=234718>

ABSTRACT: As action-oriented organizations, fire departments have traditionally played a reactive role in public safety, responding to emergencies in progress to protect the lives, and property of their citizens. The problem is that the world has changed. Increasing terrorist threats against our homeland and the potential for pandemic or other natural disasters are shifting the mission and placing new unconventional demands on the fire department. Meeting these challenges will require strategies to identify and address the future role of the fire service in homeland security. This thesis used the Delphi method to explore what this future role might be. Information, responses, and recommendations from three groups of SMEs were examined, analyzed, and synthesized to determine key issues the fire service will face. The future role of the fire service in homeland security will demand the need for progressive leadership, effective collaboration, intelligence engagement, and the adoption of a shifting mission that supports preparedness, prevention, response, and recovery of terrorist attacks. Emerging issues and areas of responsibility to meet new asymmetrical threats require a response paradigm. This response paradigm in the fire department should include the ability to adjust service delivery to meet all hazard and homeland security demands.

Davidson, Nicholas E. ***Defining the Role of Public Health in Disaster Recovery: An Evaluation of State Public Health Planning Efforts***. Master's thesis - CHDS, Naval Postgraduate School, 2013.

<http://hdl.handle.net/10945/32809>

<https://www.hsdl.org/?abstract&did=736321>

ABSTRACT: There is very little to direct public health planning for long-term disaster recovery. This research surveyed plans from nine hurricane-prone states to determine the extent to which those plans comply with recently published standards from the Centers for Disease Control (CDC) in 2011. An abstraction form was devised to score each plan and to document novel or innovative components within each plan. Results indicate poor compliance with the CDC standards; 79 percent of the assessments of individual preparedness components resulted in a score of zero (on a scale of zero to four). Particularly notable was a lack of planning for continuity of operations and the insufficient plans for advising residents and partner agencies as to the plans and locations for providing services after a disaster. A complicating factor was the general lack of acceptance, by public health, of the fact that public health recovery should be focused on restoring community services instead of simply restoring operations of public health agencies. This research identifies smart practices that can be adopted by public health agencies in an attempt to ensure a robust level of recovery preparedness.



Delaney, John. ***Fire Fighters' Ability and Willingness to Participate in a Pandemic.*** Master's thesis - CHDS, Naval Postgraduate School, 2008.

<http://hdl.handle.net/10945/4252>

<https://www.hsdl.org/?abstract&did=484914>

ABSTRACT: Current estimates predict that 30-40 percent of the population will be infected with the flu virus during a pandemic. Fire departments should anticipate a higher attack rate for their personnel because of increased exposure risk. Additionally, many variables will negatively influence fire fighter participation rates over and above these attack rates. This thesis analyzes fire fighters' ability and willingness to participate in a pandemic through a comprehensive survey of fire fighters within the twelve National Capital Region fire departments. Issues that may influence fire fighters' ability and willingness to work include childcare, concern of family, adequate personal protective equipment, worker's compensation coverage, and availability of vaccines and antivirals. Collectively, these variables determine a workforce participation percentage (WPP) -- the share of fire fighters who will be able and willing to participate in a response during a pandemic. Results indicate that between 30-70 percent of the fire fighters will not be able or willing to work during a pandemic. Although a fire fighter's participation is situationally dependent, fire departments should take urgent steps to address five core areas. These are included in a set of recommendations. Ultimately, the priority recommendation is for fire officials and regional public policymakers to rise to the challenge of the complexity of these issues. Leadership in the face of this recognized pandemic threat, however, remains an elusive solution.

Demme, Nancy. ***Government Expectations and the Role of Law Enforcement in a Biological Incident.*** Master's thesis - CHDS, Naval Postgraduate School, 2007.

<http://hdl.handle.net/10945/3557>

<https://www.hsdl.org/?abstract&did=471868>

ABSTRACT: Currently government and public health are drafting emergency response plans regarding biological events (man-made & natural) that include responsibilities for law enforcement. Yet, police officers are unaccustomed to working with biological agents or responding to biological incidents, and have little if any experience in this area. Therefore, their expectations and concerns are unknown and their willingness to respond is untested. Through the use of focus groups, officers were asked questions about their thoughts and concerns regarding responding to a bioincident. The focus groups consisted of over forty police officers, from more than five different agencies in the National Capitol Region. The results of the research demonstrate that most police officers are willing to respond to a biological incident; however, they expect that their families will be properly cared for by their agency, which presents a problem if there is no vaccine available. Other areas that were explored were the officers' expectations of the public and of their respective agencies in a bio-incident. The research concludes with recommendations regarding ways to prepare the public to have realistic expectations of law enforcement, the need to create a Family Support Unit within each agency, as well as other recommendations.

Donovan, Colleen Mary. ***Preparing South Carolina Emergency Departments for Mass Casualties with an Emphasis on the Planning Process.*** Master's thesis - CHDS, Naval Postgraduate School, 2013.

<http://hdl.handle.net/10945/33118>

<https://www.hsdl.org/?abstract&did=736323>

ABSTRACT: This thesis addresses the role of the emergency department in planning for mass casualties during an emergency. The demand on hospital emergency departments has stretched the capacity for normal operations beyond their original design. Hospital surge capacity is not only complex, but affects every hospital emergency department in the country. Factors, such as hospital bed capacity, surge levels, staffing and the use of volunteers in time of emergency, all play a critical role in the ability and accessibility of the hospital to react during times of need. The recommendations provided are based on the analysis of county, state and federal plans along with case studies that provide a varied approach to emergency preparedness and the role of the hospital, focus on some of the facets of preparedness and



the immediate need for emergency planning, training/exercising and communication in hospitals across America, and specifically, in hospitals in South Carolina.

Duggan, Brian P. ***Enhancing Decision Making During Initial Operations at Surge Events.*** Master's thesis - CHDS, Naval Postgraduate School, 2012.

<http://hdl.handle.net/10945/27822>

<https://www.hsdl.org/?abstract&did=732026>

ABSTRACT: This thesis utilized a Delphi survey method to obtain the perspective of seasoned Incident Commanders (ICs), as they reflected on their experience responding to surge incidents. Surge events are defined as complex and chaotic emergencies that require resources well beyond normal operating capacity. These surge events are rare and of such a magnitude that the Incident Commander is confronted with a unique situation that often exceeds his/her experience and ability to improvise and adapt to changing conditions. This thesis combines the pertinent literature on decision making, situational awareness, collaboration and geospatial technology with the lens of experience provided by the Delphi panel. First, this research identifies and prioritizes 18 signals that an incident is becoming nonroutine, unfamiliar and chaotic. Second, it provides an inventory of strategic options that an Incident Commander can consider when faced with the chaos that often accompanies a surge event. Finally, this material was synthesized into a quick action guide as a reference source that can inform Incident Commanders, as they face the dynamic and unpredictable environment of surge events. The knowledge obtained through this research is offered with the desire to enhance the ability of Incident Commanders to make effective decisions when lives are most at risk.

Dunne, William J. ***Model of Creating Inpatient Hospital Surge Capacity Through Early Discharge.*** Master's thesis - CHDS, Naval Postgraduate School, 2018.

<http://hdl.handle.net/10945/60398>

<https://www.hsdl.org/?abstract&did=818118>

ABSTRACT: When catastrophic disasters strike, health care systems are often faced with overwhelming volumes of patients to treat (patient surge). While many governmental and policy organizations have outlined recommendations to build 'surge capacity,' there has been little research on specific strategies to accommodate these significant patient loads. Specifically, a concept known as 'reverse triage,' which allows clinicians to assess current patients for possible discharge or reduction in the level of their clinical care, is still poorly understood. This research study investigated the utility of a structured assessment tool to predict the ability of a current patient to be discharged or downgraded in the event of a catastrophic disaster. Clinicians were provided a mock scenario and asked to use their clinical judgment or a structured assessment tool. The charts of patients were then reviewed 96 hours after the assessments were completed to determine whether predictions were accurate. This pilot study showed that the assessment tool was slightly better at predicting which patients could be safely discharged and which needed to remain admitted. This project serves as a first foray of research into this area and will initiate broader discourse and additional studies. The goal is to provide clinicians with stronger guidance vetted in scientific evidence and supported in ethical, legal, and moral context to make difficult decisions in the face of catastrophic disaster situations.

Foley, John R. ***Pandemic Pendulum: A Critical Analysis of Federal and State Preparedness for a Pandemic Event.*** Master's thesis - CHDS, Naval Postgraduate School, 2009.

<http://hdl.handle.net/10945/4864>

<https://www.hsdl.org/?view&did=37781>

ABSTRACT: This paper explores pandemic planning efforts across federal and state jurisdictions and how the absence of collaboration could have major consequences upon the population of the United States. How adequate are state and federal pandemic plans, and what must be done nationally to address common shortfalls? The methodology used a hybrid approach by combining a secondary analysis of available data with a modified case study approach. Analyzing the individual state plans and HHS' Pandemic Influenza Plan revealed



common deficiencies, and disclosed distinct functional areas where stringent collaboration across multiple jurisdictions and functional areas would mitigate the deficiencies and provide a blueprint for potential development into an all-hazards national catastrophe plan. This resultant comprehensive plan would provide a solid template for all stakeholders to use in further development of their individual plans, and additionally provide a mechanism to propagate proactive planning efforts among international disaster preparedness partners.

Galfano, Greg T. ***Altered Standards of Care: An Analysis of Existing Federal, State, and Local Guidelines***. Master's thesis - CHDS, Naval Postgraduate School, 2011.

<http://hdl.handle.net/10945/10606>

<https://www.hsdl.org/?abstract&did=699604>

ABSTRACT: A disaster with mass casualties or event involving a weapon of mass destruction (WMD) is a profound, life-impacting event that can lead to further devastating consequences. Under austere conditions, however, the implementation of altered standards of care can greatly increase the quality of life of individuals injured by such an event. This thesis evaluates, compares, and contrasts, at the various federal, state, and local levels, guidance documents for altered standards of care and presents a policy recommendation for the inclusion of triggers, guaranteed minimums of care, and legal immunity into existing planning guidance documents for altered standards of care at the federal, state, and local levels. In formulating this policy recommendation, consideration was given to ethical values that should be used to develop policies for altered standards of care, which are recommended to guide and support decision making during both preparation and response at different levels of government.

Gregory, Joshua A. and Christine Taranto. ***Inventory Management of Cholera Vaccinations in the Event of Complex Natural Disasters***. MBA Professional report, Naval Postgraduate School, 2015.

<http://hdl.handle.net/10945/47953>

<https://www.hsdl.org/?abstract&did=790448>

ABSTRACT: This MBA Project explores the considerations and recommendations for mass vaccination campaigns in response to natural disasters and their secondary effects, specifically cholera epidemics and the vaccine stockpile necessary to effectively treat the disease. Cholera is a significant post disaster risk to an already affected population. As a first responder to these disasters, the Marine Air Ground Task Force (MAGTF) must consider an epidemic cholera outbreak as a threat to mitigate and be considered in the planning process for Humanitarian Aid/Disaster Relief (HA/DR) scenarios. This project considers these factors based on former HA/DR events as well as an inventory management model which determines optimized stock pile of vaccinations necessary in a given year in order to reduce the number of lives lost to cholera.

Guercia, Jr., Leonard H. ***Integration of Training Civilian and Military Disaster Responders***. Master's thesis - CHDS, Naval Postgraduate School, 2011.

<http://hdl.handle.net/10945/5590>

<https://www.hsdl.org/?abstract&did=691401>

ABSTRACT: In the years since the September 11 attacks of 2001, and following the Gulf Coast hurricanes and the earthquake in Haiti, research has shown that first responders and medical institutions remain insufficiently prepared to address the increased demands for emergency response during and following major disasters. The threat from terrorism and natural disasters is very real; thus, the medical 'system' will face continual challenges. A brutal recent reminder of this was the international outbreak of the H1N1 virus that caused a worldwide pandemic in 2009, resulting in an increased demand for medical services. In the wake of these disasters, Homeland Security Presidential Directives (HSPD) were issued. Among these, are HSPD 21, Public Health and Medical Preparedness, which requires the establishment of a realistic strategy at all levels of government and across all sectors in the medical response community to meet the demands of contemporary preparedness. Areas of concern include the education and training for future response. To meet these needs, joint training of responders may



enhance the efficiency of currently established training methodologies for national disaster teams, civilian hospital personnel, and National Guard and Reserve military emergency medical personnel training in domestic emergency medical deployment and response. The research question to be answered is how can the national policy enterprises design an effective model for the pre-event joint command and control training of disaster responders for both military and civilian operations? The conclusions reached in this research can be used to shape future national and local training policies and curriculum presented to response agency leaders from civil and military agencies.

Gurr, James R. ***Model for the Ordering and Distribution of the Influenza Vaccine***. Master's thesis – Systems Engineering, Naval Postgraduate School, 2006.

<http://hdl.handle.net/10945/10111>

<https://www.hsdl.org/?abstract&did=464933>

ABSTRACT: The system for the production and distribution of the United States supply of influenza vaccine has experienced disruptions during past influenza seasons. The identification of elements of the influenza vaccine is different each year and must be researched and identified each year prior to the influenza season. The manufacturing of the vaccine is a complicated process with many potential problems. This thesis identifies the requirements and constraints of the current manufacturing and distribution system including the annual demand and supply. This information is used to create an illustrative model based on operational research and operational management theory to develop a systematic approach to distribution of the influenza vaccine in a shortage situation. Two different policies are identified for use in a normal influenza season to determine how many companies are required to provide a sufficient amount of influenza vaccine with the understanding that some of the companies might have manufacturing difficulties. These two policies are the percentage distribution policy and the strict priority distribution policy. The model includes a determination of the number of companies that should be available for influenza vaccine production and the amount of vaccine that should be ordered from each company to minimize the total cost. The majority of the influenza seasons could be covered by purchasing fewer than 108 million doses, as in the percentage distribution policy, making sure that the vaccine dose orders are spread out evenly over four companies and distributed evenly by age group percentage, but could be reduced to as little as 24.5 million total vaccine doses if necessary with minimal cost and loss of life using a strict priority distribution policy.

Gutierrez, Louis Michael. ***Agent-Based Simulation of Disease Spread Aboard Ship***. Master's thesis – Modeling, Virtual Environments and Simulation (MOVES), Naval Postgraduate School, 2005. <https://www.hsdl.org/?abstract&did=453358>.

ABSTRACT: Extreme examples like the Spanish Flu pandemic of 1918 make clear the devastating impact that communicable diseases can have on military readiness. It is highly desirable to have models and tools that can be used to evaluate the course of a disease over time. These tools can help assess the effectiveness of strategies employed to contain the outbreak such as constraining movement, wearing protective gloves or masks, closing high traffic areas, etc. Armed with these tools, a medical practitioner can better assess the right course of action in a time critical situation. The primary difficulty with creating models and simulations for this purpose is that disease spread depends upon the details of human behavior and environmental variables, which are not accounted for in current mathematical models. The likelihood that a particular individual will catch a given disease depends upon such specifics as where he works, whom he interacts with, where he sleeps, what he eats, his habits of personal hygiene, etc. It is hypothesized that a software disease simulation can combine agents that mimic human behavior, a ship specific environment, and disease specific attributes to more accurately model the spread of disease aboard ship than a mathematical model.



Hagen, Katie S. ***Assessing the Effectiveness of the Early Aberration Reporting System (EARS) for Early Event Detection of the H1N1 ('Swine Flu') Virus.*** Master's thesis, Naval Postgraduate School, 2010. <https://www.hsdl.org/?abstract&did=15882>.

ABSTRACT: The Monterey County Health Department (MCHD) in California uses the Early Aberration Reporting System (EARS) to monitor emergency room and clinic data for biosurveillance, particularly as an alert system for various types of disease outbreaks. The flexibility of the system has proven to be a very useful feature of EARS; however, little research has been conducted to assess its performance. In this thesis, a quantitative analysis based on modifications to EARS' internal logic and algorithms is assessed. Logic is used as a counting tool for potential cases of outbreak, and the Early Event Detection (EED) algorithms are used to determine whether or not an outbreak is about to occur. The EED methods are compared by assessing their ability to detect the presence of a known H1N1 outbreak in Monterey County. This research found the cumulative sum (CUSUM) detection method to be the most reliable in signaling the H1N1 outbreak, across all combinations of logic explored.

Heidtke, Curtis L. ***Reducing the 'Gap of Pain': A Strategy for Optimizing Federal Resource Availability in Response to Major Incidents.*** Master's thesis - CHDS, Naval Postgraduate School, 2007.

<http://hdl.handle.net/10945/3597>  
<https://www.hsdl.org/?abstract&did=472042>

ABSTRACT: In large-scale domestic disasters, a temporal gap frequently develops between the exhaustion of state and local resources and the arrival of federal resources. To date, strategies for reducing this so-called 'gap of pain' have not been based upon scientific methodology. This thesis reviews four alternatives for ensuring continuous availability of critical commodities: pre-positioning, pre-emptive federal action, time-phased deployment, and surge transportation. For a given scenario, the optimum approach is likely to be some combination of these alternatives. Stochastic modeling using optimization techniques holds great promise for producing efficient and effective strategic solutions. This thesis evaluates one such model using two notional scenarios affecting the Washington, D.C. metropolitan area: a Category 4 hurricane and a one-kiloton nuclear explosion near the city center. The results reinforce the validity of using this method to generate viable strategic alternatives for consideration by senior decision-makers. With additional development and testing, the model may be productively applied to a range of natural and man-made incidents, in disparate locations.

Hill, Cheryl. ***EMS Response to Mass Casualty Incidents: The Critical Importance of Automatic Statewide Mutual Aid and MCI Training.*** Master's thesis - CHDS, Naval Postgraduate School, 2008.

<http://hdl.handle.net/10945/3898>  
<https://www.hsdl.org/?abstract&did=234292>

ABSTRACT: Incidence of natural and man-made disasters are increasing and expanding in scope. While these events may cause mass injuries, the pre-hospital emergency medical services (EMS) community is left out of the preparedness equation by virtue of being underrepresented on planning committees, not privy to disaster training, nor on the receiving end of preparedness funding. Additionally, for many states, outside standard mutual aid agreements a disaster declaration is required prior to other types of medical aid arriving on scene to render assistance creating a gap in response. This thesis answers the following research question: have or how have other states and jurisdictions incorporated their EMS communities in disaster planning and response and what can be learned in order to create this process elsewhere? Two case studies are reviewed to ascertain lessons learned on how other states and communities have incorporated their EMS communities into the disaster planning and response framework. Adopting automatic statewide mutual aid, supported by EMS involvement in incident pre-planning, training and exercises, will allow responders to immediately deploy upon request and close the gap in response resulting in positive outcomes for victims of the incident.



Jackson, David P. ***Intelligence-Led Risk Management for Homeland Security: A Collaborative Approach for a Common Goal***. Master's thesis - CHDS, Naval Postgraduate School, 2011.

<http://hdl.handle.net/10945/10624>

<https://www.hsdl.org/?abstract&did=699697>

ABSTRACT: The concept of risk management provides the foundation of the homeland security enterprise. The United States of America faces numerous complex risks ranging from a series of natural hazards, pandemic disease, technological hazards, transnational criminal enterprises and acts of terrorism perpetrated by intelligent adversaries. The management of these risks requires a strategic collaborative effort from the intelligence and risk analysis communities and many stakeholders at all levels of government, including the private sector. Paradoxically, a decentralized collaborative approach to homeland security risk management may produce better results than a hierarchical central approach driven by the U.S. Department of Security, as this thesis suggests. Intelligence-Led Risk Management represents the fusion of intelligence with risk management in a collaborative framework to promote effective risk management throughout the homeland security enterprise. Concepts from strategic thought and planning, such as the Cynefin Framework, Appreciative Inquiry, and Quantum Planning provide vehicles to promote collaboration and thoroughly explore the spectrum of risk management options available to the homeland security enterprise. Decentralization of homeland security risk management to states with the application of Intelligence-Led Risk Management through the network of fusion centers will promote collaboration and yield a stronger risk management culture within the homeland security enterprise.

Jones, Daniel and Christopher Tecmire. ***Cold-Chain Logistics: A Study of the Department of Defense OCONUS Pre-Pandemic Influenza Vaccine Distribution Network***. MBA

Professional report, Naval Postgraduate School, 2007.

<http://hdl.handle.net/10945/10211>

<https://www.hsdl.org/?abstract&did=835460>

ABSTRACT: The purpose of this MBA project is to suggest a standardized distribution process for the DoD of the Pandemic Influenza vaccine, filling an existing void in the National Strategy for Pandemic Influenza. Also, this project is intended to foster the communication and planning process for vaccine distribution between all stakeholders, including the DLA, COCOMs, and regional commanders. Currently, no DoD pre-pandemic vaccine distribution plan exists. This project identifies the essential infrastructure assets needed to develop a cold-chain distribution network for vaccine in a military application. Furthermore, the key communication and transportation elements needed for successful execution of this network are identified, including a discussion on information and vaccine flow through the distribution network. These ideas are organized into a model to provide an easily usable decision-making tool for cold-chain network design. Finally, an example using the model is provided, with PACOM as the example area of operation.

Khan, Sinan. ***Multi Attribute Decision Analysis in Public Health: Analyzing Effectiveness of Alternate Modes of Dispensing***. Master's thesis - CHDS, Naval Postgraduate School, 2007.

<http://hdl.handle.net/10945/3264>

<https://www.hsdl.org/?abstract&did=479349>

ABSTRACT: Local emergency planners are creating mass prophylaxis plans to prophylax entire populations within forty eight hours in order to reduce mortality after a bioterrorist attack. The Points of Dispensing (PODs) used in prophylaxis are central to an area's mass prophylaxis plans, but they are insufficient because of their staffing and security constraints. Several alternate modes of dispensing that have similar attributes and are considered best practices are presently being implemented in local health departments (LHDs). The purpose of this thesis is to develop models to evaluate alternate modes of dispensing using multi-attribute value function (MAVF), an approach that supports multi-attribute decision-making by taking into account the trade-offs a decision-maker is willing to make between attributes. Two models are created for Los Angeles County (LAC). The models showed that in LAC, the door-to-door option, pharmacy option, civil service option and Kaiser Permanente option work best. The study finds that alternate modes of dispensing can be useful in filling the gaps in the POD-





based approach by increasing critical resources or lowering the pressure on existing resources.

Latta, Jason E. ***Analysis of the Distribution of Vaccine using Department of Defense Assets versus Contracts with Private-Sector Delivery Companies.*** Master's thesis - Management, Naval Postgraduate School, 2009.

<http://hdl.handle.net/10945/4408>

<https://www.hsdl.org/?abstract&did=835458>

ABSTRACT: It is not a question of "if" the next pandemic influenza outbreak will strike, but "when." The current plan for vaccine distribution that the Department of Defense (DoD) has in place is to extend contracts to civilian delivery companies such as the United Parcel Service (UPS) or Federal Express (FedEx). According to the National Strategy for Pandemic Influenza signed by then President Bush in 2005, as much as 40% of the population could be incapacitated if a pandemic influenza were to occur in the United States. If the DoD depends on civilian delivery companies to distribute the vaccine, it will be competing with the Centers for Disease Control (CDC) (responsible for distributing vaccine to the civilian population) for use of these services. This thesis will analyze whether it might be safer and more efficient to use DoD assets to make vaccine deliveries during a pandemic situation, instead of extending the usual delivery contracts with FedEx and UPS at a time when the availability and reliability of civilian delivery companies may be compromised. This thesis will first conduct a literature review of the history of pandemic influenza outbreaks in the United States and the responses to each outbreak. It will then analyze the current plans that are in place to vaccinate the DoD, as well as the civilian populations should an outbreak occur. Next, a model will be constructed that minimizes the amount of time before all Marine Corps active duty, dependents, and DoD civilian employees receive vaccination. The scope of the model will cover the seven Marine Corps installations on the eastern seaboard of the continental United States. Constraints of the model will include the total population at each of the seven installations that must receive vaccination, the daily capacity of the numerous Medical Treatment Facilities (MTF) at each installation, the speed with which various modes of transportation can deliver the vaccine, the cargo capacity of the various modes of transportation, and the feasibility of patients travelling to other installations to receive vaccinations if their home MTF is at capacity

Logsdon, Jasie K. ***Biosurveillance Technology: Providing Situational Awareness through Increased Information Sharing.*** Master's thesis - CHDS, Naval Postgraduate School, 2011.

<http://hdl.handle.net/10945/5560>

<https://www.hsdl.org/?abstract&did=691500>

ABSTRACT: This need for the public health and medical enterprise to share information, has increased over the last decade, due to events such as the Severe Acute Respiratory Syndrome (SARS) outbreak, natural disasters, such as Hurricane Katrina, the 2009 H1N1 influenza outbreak, and other naturally occurring outbreaks, such as the recent Shiga toxin-producing E. coli O104 (STEC O104:H4) infections occurring in, and associated with, travel to Germany. This thesis explores the various ways that information sharing can be improved within the public health and medical enterprise. Through case studies and interviews, a conceptual framework, the LEAPS [Leading Edge Architecture for Prototyping Systems] model, was developed to guide the process to improve information sharing. This model is based upon the establishment of a strong foundation in health information sharing and disease surveillance. This model is centered upon leadership, policy, and strategy. The LEAPS model framework is then expanded to offer specific ways for the public health and medical enterprise to improve information sharing within jurisdictions and sectors to rapidly detect and respond to naturally occurring or intentional disease outbreaks or exposures and to create better situational awareness and a common operating picture.



Mackie, Daniel P. ***Surviving the 'Storm': Expanding Public Health's Capabilities in Response to the Increasing Threats Posed by Novel Viruses.*** Master's thesis - CHDS, Naval Postgraduate School, 2013.

<http://hdl.handle.net/10945/38972>

<https://www.hsdl.org/?abstract&did=750078>

ABSTRACT: As the planet's population continues to grow at rate that will see a global population of nine billion people by the year 2050, is an era being entered into which pandemics involving novel viruses are the new norm? If that idea is possible, then are drug therapies (approved by the FDA [Food and Drug Administration] or in the pipeline for its approval) available that either limit virus replication within a host cell, or reduce the body's hyper-immune response (also known as 'cytokine storm') to novel or pandemic strain viruses with which states could supplement their existing stockpiles? This research explores six classes of medications that could potentially assist state-level governments in expanding their state-level stockpiles, to include more treatment and prophylaxis options, in the face of pandemics involving novel viruses. The results of this research were filtered through three criteria (medical efficacy, cost, logistical considerations) that narrow the field of candidate therapies down to four specific findings: one generic version of the antiviral called Ribavirin, and generic versions of the statins called Lipitor, Zocor and Gemfibrozil. This research may be applied to state and local-level public health agencies interested in bolstering their existing stockpiles for pandemic preparedness.

Mahoney, Robert T. ***Deciding Who Lives: Considered Risk Casualty Decisions in Homeland Security.*** Master's thesis - CHDS, Naval Postgraduate School, 2008.

<http://hdl.handle.net/10945/3737>

<https://www.hsdl.org/?abstract&did=232896>

ABSTRACT: Homeland security was changed by the events of September 11, 2001, including how we make life and death decisions. Terrorism, all hazards, and public health issues increase the number of decisions involving the expenditure of civilian lives. These Considered Risk Casualties are akin to the military concept of "acceptable losses." Homeland security professionals have little or no experience, let alone guidance, in decision making under circumstances that bring this condition to the civilian population. Other disciplines such as philosophy, theology, bioethics, and the military, etc. have examined principles that are involved in the concept of accepting loss of life and have identified theoretical circumstances under which acceptance is achieved. Homeland security has had little discussion of these matters and virtually no criteria to support such decision making. Examining the observations, and how those disciplines test the concept, can inform and assist homeland security practitioners when having to make these decisions. Examining homeland security events that addressed loss of life can expand the range of scenarios those disciplines use for their analysis. An educational process that draws on other sectors' experience can serve to improve decision-making capabilities. Future research opportunities exist within and external to homeland security and those disciplines.

Marsh, Bryon. ***Implementing the National Framework for a Biothreat Field Response Mission Capability.*** Master's thesis - CHDS, Naval Postgraduate School, 2013.

<http://hdl.handle.net/10945/37668>

<https://www.hsdl.org/?abstract&did=746811>

ABSTRACT: Since the 2001 anthrax attacks, communities have been responding to a sample surge of suspicious mailings. Each event has the potential to be an act of bioterrorism involving a deadly pathogen and, thus, requires a timely response in order to evaluate the risk to public safety. Stakeholders from federal and state governments and industry have recognized the need to develop a mission capability for responding to these suspicious events. The framework for a biothreat field response mission capability advocates the use of innovative detection technology in support of a risk assessment concept of operation. Implementing the framework will require federal and state collaboration and will establish local certification training standards, field-based proficiency and competency assessment exercises, and state response plans that reflect national guidance. This research describes the critical



elements of a bioresponse framework, the current status of framework adoption at the state level, and recommendations for a three-phased implementation model.

Massey, Mary S. Hospital-Based First Responder Mass Prophylaxis Plan. Master's thesis - CHDS, Naval Postgraduate School, 2005.

<http://hdl.handle.net/10945/2220>

<https://www.hsdl.org/?abstract&did=452981>

ABSTRACT: As the United States improves its collective awareness and emergency preparedness in the face of increased terrorist activity, more efforts are being made to create and enhance community readiness for catastrophic events. There have been substantial efforts to improve the nation's bioterrorism preparedness. Better planning, equipment, training, surveillance, and pharmaceutical caches have elevated the nation's readiness for biological attacks. In order to effectively meet the challenges created by a bioterrorism attack, its first lines of defense, the first responders, must be rapidly prophylaxed to allow the continuance of their mission. Many states and localities have tackled the gigantic undertaking of mass prophylaxis plans to provide chemoprophylaxis to civilians should the need arise. Many cities have developed and tested their plans to provide general public mass prophylaxis. It is assumed, or briefly mentioned, that the mass prophylaxis of first responders will occur, but few plans have been developed. The primary objective of this research is to develop, test, and make recommendations for a straightforward, adaptable mass prophylaxis plan to meet the prophylactic requirements of local first responders in the event of a biological attack.

McElwee, Jill A. ***Taking a Regional Healthcare Coalition Approach to Mitigating Surge Capacity Needs of Mass Casualty or Pandemic Events***. Master's thesis - CHDS, Naval Postgraduate School, 2012.

<http://hdl.handle.net/10945/7383>

<https://www.hsdl.org/?abstract&did=718976>

ABSTRACT: Hospitals and healthcare facilities are not able to singularly mitigate the patient surge from a mass-casualty incident or pandemic health event. The potential volume of patients demands that regional healthcare communities be able to respond as a unified body to maintain the resiliency of their healthcare systems. The National Healthcare Preparedness Program advocates the establishment of fully functional, response-ready regional healthcare coalitions to meet this need. Establishing a regional healthcare coalition requires that an appropriate governance structure be established, a proper level of participation be solicited, and adequate funding mechanisms be put in place. This thesis offers a case study of how these factors influence the ability of three existing and distinctively different healthcare coalitions to prepare for a patient surge from a mass-casualty or pandemic health event. The thesis also shows the influence of each of the factors on a coalition's sustainability. The coalitions researched were Palm Beach County, Florida's Healthcare Emergency Response Coalition, King County, Washington's Healthcare Coalition, and Jacksonville, Florida's First Coast Disaster Council. These three coalitions highlight differences and similarities in the governance structure, participation needs, and funding mechanisms of existing regional healthcare coalitions and show how each influences catastrophic patient surge mitigation in their region.

McInerney, Joan. ***Strengthening Hospital Surge Capacity in the Event of Explosive or Chemical Terrorist Attacks***. Master's thesis - CHDS, Naval Postgraduate School, 2009.

<http://hdl.handle.net/10945/4806>

<https://www.hsdl.org/?abstract&did=37763>

ABSTRACT: Medical Care is a Public Trust. Americans expect that hospitals and healthcare providers will be available and prepared to care for their every medical need. Yet the medical community is severely challenged daily to care for the influx of patients to its Emergency Departments with current resources. Healthcare is ill-prepared to meet community needs in the event of a mass casualty event from a terrorist attack using weapons of mass destruction. This research explores the premise that clinicians have skills either current or remote that can be renewed and enhanced to provide an immediate life-saving response team in the event of



explosive or chemical events. The research identified that the medical community has the building blocks available awaiting the guidance, organization and direction to orient them into a disaster medical capability that will improve preparedness and response. This thesis proposes a strategy to leverage the clinician personnel assets already in place to improve preparedness. A transformational approach is necessary to insure healthcare preparedness. Government planners must understand the challenges and current limitations of emergency medical response and partner with the healthcare to enhance preparedness. The United States medical community must understand the realities of terrorism and war at home.

Menefee, Charity M. ***When the House Is Full, but the Guests Keep Coming: Determining the Impact of Daily Hospital Overcrowding on Disaster Response.*** Master's thesis - CHDS, Naval Postgraduate School, 2018.

<http://hdl.handle.net/10945/61227>

<https://www.hsdl.org/?abstract&did=821444>

ABSTRACT: Hospitals throughout the United States are facing overcrowding every day, with more patients than available staff and space can accommodate, yet current disaster response policy related to managing a surge of patients does not include considerations for this daily challenge. This thesis investigates the questions that need to be answered regarding the foundational principles of current U.S. surge policy and how healthcare coalitions might assist in answering such questions. A gap analysis of current healthcare coalition policy related to surge was completed that identified the need for policy makers to continue to expand the role of evidence-based decision making for surge policy. As a result, this thesis recommends that additional data points be added for hospitals receiving patients during the required annual coalition surge test-related performance measures for healthcare coalitions. The additional data points are designed to help policy makers determine whether overcrowding impacts surge response, so policy can be adjusted if needed.

Murphy, Michael F. ***Medical Operations Centers: Duplication or a Needed Innovations?*** Master's thesis - CHDS, Naval Postgraduate School, 2009.

<http://hdl.handle.net/10945/4478>

<https://www.hsdl.org/?abstract&did=30664>

ABSTRACT: The medical system in the United States is comprised of many different agencies and organizations that need coordination in order to provide optimal care for individual patients created by a mass-casualty incident or public-health emergency. This coordination of all the medical system components has been a challenge in the past, and the medical operations center (MOC) has been one relatively new concept utilized by some jurisdictions to address that challenge. The public-health system, in contrast to the medical system, focuses on the care provided to the entire community or large population group. Are the two systems different? Are they mutually exclusive? Can the medical operations center meet the coordination needs of the medical community? This thesis uses surveys of medical system leaders and a qualitative analysis of focus group discussion from jurisdictions currently using an MOC. The thesis begins with a description of the medical system and the challenges that currently exist for coordination and response. Collaboration barriers and facilitators are discussed along with the difference between the two systems. A section of the thesis examines the origins and current functions of four existing medical operations centers in Oklahoma City, Tulsa, Houston, and San Antonio. The findings support the argument that the two systems are indeed different, but not mutually exclusive. The data also strongly support the MOC as a means of coordinating the medical system if done in concert with public-health agencies. The thesis concludes with a proposal, conceptual design, and argument to build a national network of medical operations centers in order to enhance the medical system response to a mass-casualty incident or public-health emergency.



Neuert, Donald. ***Bridging the Gap: To What Extend Do Socioeconomic Barrier Impede Response to Emerging Public Health Interests?*** Master's thesis – CHDS, Naval Postgraduate School, 2017.

<http://hdl.handle.net/10945/53023>

<https://www.hsdl.org/?abstract&did=800930>

ABSTRACT: It is crucial for public health emergency planners and responders to realize and account for socioeconomic barriers and the challenges they pose when faced with a bioterrorism, infectious disease, or other emerging public health threat impacting the homeland. The study design of this research incorporated two particular paradigms, investigative and predictive. The researcher found that social and economic factors account for nearly 40 percent of health outcomes in the United States. Public health and its response partners need to plan for emergencies using a 60/40 lens. He discovered that at least 40 percent of populations may not receive the critical health care they require in emergencies because of socioeconomic status or related factors. This thesis investigated the language, culture and historical trauma barriers—and affiliated challenges, such as fear and distrust—that exist throughout the country. Given these findings, this thesis provides both policy- and strategy-level recommendations to assist public health and healthcare practitioners in their efforts to bridge the gap that exists within and between community populations in the United States. Disciplines that consider implementing these recommendations will help minimize significant, and perhaps avoidable, consequences that follow health-related emergencies or varied disasters impacting the homeland.

Ng, Kok Wah. ***Use of Twitter to Predict the Level of Influenza Activity in the United States.*** Master's thesis – Operations Research, Naval Postgraduate School, 2014.

<http://hdl.handle.net/10945/43963>

<https://www.hsdl.org/?abstract&did=760434>

ABSTRACT: Controlling the outbreak of epidemic diseases such as influenza has always been a concern for the United States. Traditional surveillance tools such as the ILINet [U.S. Outpatient Influenza-like Illnesses Surveillance Network] and Virologic provide the Centers for Disease Control and Prevention (CDC) with influenza surveillance statistics at a lag of 1 to 2 weeks. The CDC requires a tool that can forecast the level of influenza activity. The rise in the popularity of social media websites such as Flickr, Twitter and Facebook has transformed the web into an interactive sharing platform. The huge amount of generated unstructured data has become an invaluable source for detecting patterns or novelties. This research explores the correlation between Twitter messages (tweets) and CDC ILI [Influenza-Like Illnesses] and Virologic surveillance data. Using 17 months of tweets, regression models are developed to predict influenza-related statistics. The proposed approach aggregates the weekly frequencies of hand-chosen words that are indicative of an influenza attack using separate predictor variables. The predictions generated by the best models are found to have a Pearson's correlation coefficient of 0.900 (95% CI: 0.732, 0.965) and 0.833 (95% CI: 0.574, 0.940) against the CDC ILI surveillance data and CDC Virologic surveillance data, respectively

Paterson, Ryan W. ***Modeling Man-Made Epidemics.*** Master's thesis – Applied Mathematics, Naval Postgraduate School, 2002.

<http://hdl.handle.net/10945/6037>

<https://www.hsdl.org/?abstract&did=459627>

ABSTRACT: This thesis develops a mathematical model to explore epidemic spread through the Ground Combat Element (GCE) of the Marine Expeditionary Unit (MEU). The model will simulate an epidemic caused by a biological attack using an agent that has the ability to spread through person-to-person contact (small pox, hemorrhagic fever, etc.) A stochastic modeling process will be used along with widely accepted mathematical formulas for an SEIR (Susceptible-Exposed-Infectious-Removed) epidemic model. A heterogeneous population composed of numerous homogenous subgroups with varying interaction rates simulates the unique structure of military combat units. The model will be evaluated to determine which units facilitate the most rapid spread of the epidemic. The model will then test a number of different scenarios to determine the effects of varying quarantine techniques, vaccination



strategies and protective postures on the spread of the disease.

Pilkington, William. ***Risk, Politics, and Money: The Need for a Value-Based Model for Financing Public Health Preparedness and Response***. Master's thesis - CHDS, Naval Postgraduate School, 2014.

<http://hdl.handle.net/10945/44645>

<https://www.hsdl.org/?abstract&did=762427>

ABSTRACT: Our federal, state, and local governments are not investing in the design and improvement of strategies for evaluating the costs associated with natural and man-made disasters and events. In this era of fiscal conservatism, one of the biggest challenges in designing and funding public health preparedness is deciding exactly how much to invest and determining the impact of those investments. This thesis developed a rigorous scientific model to evaluate the benefit of using value-based tools to enhance the effectiveness of public health preparedness programs. The key question that framed this research was: Are public health departments that use value-based decision-making more likely to demonstrate and document higher levels of preparedness competencies? Although this research failed to demonstrate a statistically significant relationship between preparedness competency and value-based decision-making, there were some findings to indicate that VBDM may be useful in decisions that determine the financing of public health preparedness. The ability to analytically demonstrate the benefit of public health preparedness might prove beneficial in attracting additional public funding as well as private funding.

Reed, Patricia Diane. ***Integrating Local Public Health Agencies into the Homeland Security Community***. Master's thesis - CHDS, Naval Postgraduate School, 2007.

<http://hdl.handle.net/10945/3678>

<https://www.hsdl.org/?abstract&did=471918>

ABSTRACT: After more than seven years of funding through The Centers for Disease Control and Prevention, local public health agencies have made inconsistent progress in fulfilling their Homeland Security objectives. Most progress has been made in those areas in which Public Health has previous experience. However, in those activities requiring integration with other responder agencies Public Health has lagged in developing effective capabilities in prevention, preparedness, response, mitigation and recovery. This thesis argues that several factors contribute to this lack of success, including funding structures and guidelines, the reluctance on the part of other responder agencies to include Public Health in emergency planning and response activities, and the organizational isolation in which Public Health has existed. In order for local public health agencies to meet their Homeland Security objectives, funding structures and guidelines must support local Public Health and public health agencies must be better integrated with their Homeland Security partners. Public health agencies at all levels and their leadership have the opportunity to effect organizational changes designed to accelerate the transformational process, enhancing their Homeland Security partnerships. Public Health agencies can be more effectively integrate into the larger Homeland Security community by demonstrating commitment to making these changes.

Rempfer, Thomas L. ***Anthrax Vaccine as a Component of the Strategic National Stockpile: A Dilemma for Homeland Security***. Master's thesis - CHDS, Naval Postgraduate School, 2009.

<http://hdl.handle.net/10945/4356>

<https://www.hsdl.org/?abstract&did=30641>

ABSTRACT: The author explains how past problems with the Defense Department anthrax vaccine currently affect Department of Homeland Security and Department of Health and Human Service policy. The departments included the BioThrax® anthrax vaccine in the Strategic National Stockpile following the 2001 anthrax letter attacks. According to the Federal Bureau of Investigation, the vaccine's "failing" status possibly motivated the letter attacks to create demand for the vaccine. This thesis explores the Department of Defense's troubled experience with the vaccine through four methodologies. The multiprism methodological approach of 'quadrangulation' serves to 'box' in past safety, efficacy, regulatory, and legal problems. A literature review demonstrates an evolving shift in critiques of the vaccine that



parallels policy pronouncements. A case study tool offers a chronological review of the anthrax vaccine to evaluate causal events precipitating the anthrax letter attacks in 2001. A program evaluation includes process tracing through quantitative, qualitative, summative, and formative reviews. Finally, a gap analysis aids in explaining continued reliance on the old vaccine technology. To conclude, the thesis recommendations encourage formulation of a Presidential Study and Policy Directive process to reassess the vaccine, while suggesting alternative Department of Homeland Security policy courses of action centered on antibiotics and new technologies.

Russo, Thomas P. ***Strategic Policy for Pandemic Vaccine Distribution***. Master's thesis - CHDS, Naval Postgraduate School, 2010.

<http://hdl.handle.net/10945/5134>

<https://www.hsdl.org/?abstract&did=15967>

ABSTRACT: The traditional public health model for mass vaccination, which is based on the assumption that workforce will be sufficient to mount a campaign, is flawed. Funding initiatives by Congress, while addressing certain inadequacies, have failed to consider workforce capacity that continued to decline resulting from state and local budget cuts. Thus, as the nation prepared for its first pandemic in 40 years and first of the twenty-first century, it found itself unprepared for a mass vaccination campaign. This thesis explores pandemic vaccine distribution, contrasting Department of Health and Human Service guidance with pandemic gap analyses and the recent H1N1 vaccination campaign. An analysis of the literature revealed that unresolved state and federal distribution issues contributed to distribution delays during the H1N1 call for mass vaccination. Policy analysis was used to evaluate public health and private sector vaccine distribution models, and a third hybrid model was proposed to improve support for public health emergencies. Adoption of the hybrid model will enhance the vaccination process from production through distribution along with administration to support U.S national security interest in biosecurity. The hybrid model offers a strategic solution for pandemic vaccine distribution and proposes a new approach for efficient, rapid distribution of biological countermeasures.

Santiago, Denise L. ***Assessment of Public Health Infrastructure to Determine Public Health Preparedness***. Master's thesis - CHDS, Naval Postgraduate School, 2006.

<http://hdl.handle.net/10945/2962>

<https://www.hsdl.org/?abstract&did=461622>

ABSTRACT: Since September 2001, health threats associated with acts of terrorism have become an area of increasing concern. The Strategy for Homeland Security stresses the need for a robust public health component to quickly respond to and recover from attacks and other emergencies. The assumption that public health is an optimal system that simply needs to be aimed in new directions is fundamentally flawed. Public health baseline requirements for responding to threats are not as well understood as they might be. The purpose of this research is to help establish a common and accurate measure for assessing the public health infrastructure. Using the case study of Union County, New Jersey this thesis surveys the activities public health agencies are expected to perform; compares performance to target objectives; and employs a manpower matrix as a model for determining staffing requirements for local public health. This study argues that that the goal of sustainable funding for public health begins with an accurate measure of the capacities of the system in relation to demands placed upon it. Without such a measure public health will continue to fail in its primary functions and lack the capacity to meet Homeland Security goals.



Schechter, Shelly. ***Medical Reserve Corps Volunteers' Ability and Willingness to Report to Work for the Department of Health During Catastrophic Disasters.*** Master's thesis - CHDS, Naval Postgraduate School, 2007.

<http://hdl.handle.net/10945/3667>

<https://www.hsdl.org/?abstract&did=471880>

ABSTRACT: Local public health systems must have the capacity to meet the surge requirements of a health emergency that requires an extraordinary increase in activity including the rapid prophylaxis of an effected community. According to recent studies of paid healthcare professionals, approximately forty percent may be unable or unwilling to report to work during catastrophic disasters, but these questions have not yet been asked in the volunteer community. The Medical Reserve Corps (MRC) is a group of medical volunteers with a primary mission of support to the public health system during periods of surge. This thesis surveyed the members of a county health department MRC to determine their ability and willingness to volunteer in a public health emergency. The survey also elicited information on barriers and enablers to response and perceptions of community preparedness. Both significant differences in the responses of paid versus volunteer health professionals regarding their ability and willingness and striking similarities in their responses regarding barriers and enablers to report to work were identified. Volunteer motivation, cognitive dissonance and the nature of self selected volunteers are examined as they relate to these findings and strategies to strengthen the ability and willingness of MRC units to respond with the public health system are suggested.

Stanley, Sharon A.R. ***Regional Mass Fatality Management in Pandemic Surge.*** Master's thesis - CHDS, Naval Postgraduate School, 2008.

<http://hdl.handle.net/10945/3730>

<https://www.hsdl.org/?abstract&did=232901>

ABSTRACT: National and state planning documents designate public health as the lead for mass fatality management (MFM). MFM planning, however, demands multiagency participation and full public-business-government leverage. This thesis explores pathways to reach operational regional MFM capability in Ohio, but also has implications for MFM planning across the nation. Survey research was conducted with three key MFM stakeholder groups: county coroners, emergency management directors, and health commissioners. The survey addressed realistic and actionable MFM planning by: 1) identifying state guidance gaps; 2) identifying local/regional operational gaps; 3) assessing regional resource capabilities; 4) categorizing proposed solutions to address identified gaps; and 5) listing legal, financial, and organizational barriers to the solutions. Findings show that the key stakeholder communities are confused, with a willingness to build MFM capacity that is accompanied by worries about who should lead and how to coordinate efforts. Research recommendations include a three-sector collaboration (government-business-citizens) operating at the regional level and public engagement. Another recommendation calls for alignment of state guidance and regional operations with The Joint Task Force Civil Support Working Group MFM areas: command and control; body identification; medico-legal investigation; morgue operations; funeral services; final disposition; and family assistance and behavioral health services.

Stevens, Wendy L. ***Intergovernmental Unity of Effort in Support of Biological Threat Prevention.*** Master's thesis - CHDS, Naval Postgraduate School, 2013.

<http://hdl.handle.net/10945/37724>

<https://www.hsdl.org/?abstract&did=746815>

ABSTRACT: The purpose of this thesis is to examine ways to prevent the terrorist use of a biological weapon of mass destruction. Intelligence sources from around the globe report that terrorist groups are developing the capability and the intention to deliver biological weapons of mass destruction. Four coalitions of governments were studied to examine stated health security policies and reported outcome of a large biological threat incident of H1N1 global pandemic influenza of 2009--2010. This thesis presented the results and proposed methods to enhance intergovernmental connectivity and information sharing to prevent a biological threat.





Stewart, Gail A. ***Alternate Care Sites for the Management of Medical Surge in Disasters.***

Master's thesis - CHDS, Naval Postgraduate School, 2013.

<http://hdl.handle.net/10945/39017>

<https://www.hsdl.org/?abstract&did=749886>

ABSTRACT: This research compares federal and state approaches to managing disaster medical surge. The comparison identifies the varieties of regulations, assets and response methods available for federal and state responses to mass casualty incidents from which local communities can develop plans and acquire resources to create a seamless disaster medical care system. Following a disaster, survivors self-evacuate or are transported by EMS [Emergency Medical Services] to a nearby hospital. Arrival of disaster survivors, combined with an often high daily number of non-disaster patients leaves the facility overwhelmed both in terms of medical resources and personnel. The lack of local resources to manage the incident may require state and federal assets to be deployed. The time it takes for the additional resources to arrive from outside the area leaves the facility unable to respond effectively for hours and even days. A whole community approach to medical surge management organized by a collaborative regional healthcare coalition may provide a solution. Such a coalition can engage stakeholders to assess and manage resources (space, staff, and stuff) and develop surge response plans that will integrate with state and federal resources when needed. Seamless coordination will minimize the complexities of medical surge needs and lead to doing the best for the most.

Sudnik, John. ***'Dirty Bomb' Attack: Assessing New York City's Level of Preparedness from a First Responder's Perspective.*** Master's thesis - CHDS, Naval Postgraduate School, 2006.

<http://hdl.handle.net/10945/2944>

<https://www.hsdl.org/?abstract&did=461625>

ABSTRACT: Past history and recent intelligence have shown that New York City (NYC), a critical node of the U.S. economy, is clearly in the terrorist's crosshairs. In order to reduce the probability, lessen the risk, and minimize the consequences of a Radiological Dispersion Device (RDD), or 'dirty bomb,' attack, NYC's first responders must be adequately prepared for its seemingly inevitable occurrence. This particular type of attack on NYC has the potential to create immense panic and confusion on behalf of the general public. Adding to the complexity of the problem is the notion that, since 9/11, the expected actions taken by employees in NYC high-rise office buildings in response to shelter-in-place instructions can be extremely difficult to predict. Therefore, a proposed public awareness campaign and a shelter-in-place plan are two cost-effective and easily implemented terrorism preparedness programs that would build the confidence and increase the capability of the citizenry. Since an RDD incident would likely result in a major inter-agency emergency operation, the unification of command, control, and coordination among NYC's first responder community is an essential element to its overall success. Hence, an informed and collaborative response by both public and private sector entities could potentially reduce casualties and save lives.

Vardanya, Manvel. ***Implementation of Flu (Influenza) Vaccination into Armenian Armed Forces Pre-Emptive Vaccination Plan.*** MBA Professional report, Naval Postgraduate School, 2016.

<http://hdl.handle.net/10945/51631>

ABSTRACT: This project measures the influence of influenza vaccinations on Armenian Armed Forces personnel readiness. In the Republic of Armenia, neither the Ministry of Health nor the Military Medical Service of the Armed Forces conducts flu vaccinations. The flu is always highly prevalent in the Armenian Armed Forces personnel morbidity ranking. An analysis of flu morbidity data from 2006 to 2014 reveals how Armed Forces personnel readiness was affected. Preventive activities are likely beneficial in countries such as Armenia that have low economic development, where inpatient treatment costs are relatively low, where insurance companies and health care providers are still under development, and where population health care expenditures pose a heavy burden on the government. A cost-benefit analysis of the flu vaccination would assess whether conducting flu vaccination is expedient.



Wesley, Brad A. ***Connecting the Dots: How U.S. Global Health Programs Can Improve International Health Regulation Compliance.*** Master's thesis – Security Studies, Naval Postgraduate School, 2014.

<http://hdl.handle.net/10945/44687>

<https://www.hsdl.org/?abstract&did=762471>

ABSTRACT: With a 2012 deadline, the majority of the World Health Organization (WHO) member states failed to achieve the legal obligations mandated under the International Health Regulations (IHR) of 2005. This lack of compliance coincides with the increased recognition of the threats posed by pandemics and infectious diseases. As the largest contributor of foreign global health assistance, the United States can serve an instrumental role in supporting global IHR compliance. This thesis analyzes, by U.S. government agency, which current global health programs and efforts align to the core capacities WHO member states are required to develop per the IHR. The agencies analyzed are the United States Agency for International Development, the U.S. Department of Defense, and the Centers for Disease Control and Prevention. As indicated in this thesis, all three agencies have cross-cutting efforts to assist WHO member states; however, four key programs align greatly to specific IHR core capacities. Moving forward, decision makers can utilize these key U.S. global health programs to address WHO member states' core capacity deficiencies in surveillance, response, laboratory, and human resources. Finally, recommendations are given to address IHR monitoring and reporting, as well as gaps in critical core capacities and U.S. global health programs.



## FACULTY RESEARCH REPORTS

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Apte, Aruna and Keenan D. Yoho. **Strategies for Logistics in Case of a Natural Disaster.**

Technical Report. NSA-LM-11-118, Naval Postgraduate School, 2011.

<http://hdl.handle.net/10945/33824>

<https://www.hsdl.org/?abstract&did=835462>

ABSTRACT: The need to effectively and efficiently provide emergency supplies and services is increasing all over the world. We investigate four policy options "prepositioning supplemental resources, preemptive as well as phased deployment of assets, and a surge of supplies and services" as potential strategies for responding to a disaster. We illustrate the linkage between our four policy options and a disaster classification based upon disaster localization (dispersed or local) and speed of disaster onset (slow or sudden). We summarize our work by introducing a matrix that aligns logistics strategies with disaster types in order to assist policy-makers in their resource management decisions.

Gaver, Donald P., Patricia A. Jacobs, Robert Simons, and Gregory Bullock. **Models for Transmission and Control of Bioterroristic Epidemics.** Technical Report. NSA-OR-04-006, Naval Postgraduate School, 2004.

<http://hdl.handle.net/10945/744>

<https://www.hsdl.org/?abstract&did=459599>

ABSTRACT: A deterministic model for control of a bioterrorist epidemic in a large nonhomogeneous population is presented. Primary considerations in model development are the representation of a large nonhomogeneous population of individuals and the implementation of the model for quick numerical execution. The model represents the effect of mass pre-vaccination and mass vaccination during the epidemic. It is recognized that the vaccination can result in life threatening complications. The model also represents the effect of tracing and quarantining as control options. The model has been implemented in Java for a Web-based educational tool. Numerical examples (pp. 12-15) illustrate possible behavior of populations exposed to such a disease as smallpox. Various disease controls such as vaccination and case tracing are studied.

Kress, Moshe. **A Social Structure Model for Evaluating the Effect of Response Measures on the Spread of Smallpox.** Technical Report. NSA-OR-05-002, Naval Postgraduate School, 2004.

<http://hdl.handle.net/10945/749>

<https://www.hsdl.org/?abstract&did=835464>

ABSTRACT: Homogeneous mixing, where all instances of contacts between any two members of the population are equally likely, is a common assumption in modeling biodefense policies against smallpox. Such a mixing pattern is rather unlikely to represent population interaction in a modern urban setting, which typically is separated into households on one hand, and into daily meeting sites such as school and offices, on the other hand. In this paper we develop a dynamic two-level social interaction model where individuals move back and forth between home and daily meeting sites, possibly passing through a general meeting site such as a mass transit system or other crowded areas. Based on this difference-equations model, we evaluate the effect of situational awareness and response measures, such as vaccination, quarantining and movement restrictions, on the spread of smallpox in the population.

