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Maritime Military Humanitarian Civic Assistance Missions: Resource Use, Coordination, and Governance to Improve Global Health

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by

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LIST OF ABBREVIATIONS

ACMM - ASEAN Center for Military Medicine

ASEAN - Association of Southeast Asian Nations

CCDR - Geographic Combatant Commander

DHAPP - DoD HIV-AIDS Prevention Program

DoD – Department of Defense

EM-DAT – Emergency Disasters Database

FHA - Foreign Humanitarian Assistance

GEIS - Global Emerging Infectious Disease Surveillance System

GHI - Global Health Initiative

GoH - Government of Haiti

HA/DR - Humanitarian Assistance/Disaster Response

HCA – Humanitarian Civic Assistance

HHS - Department of Health and Human Services

HN – Host Nation

IFRC - International Federation of the Red Cross

IGO - International Government Organization

INFORM - Index for Risk Management

mHCA – Maritime Humanitarian Civic Assistance

MOE - Measure of Effectiveness

NDRRMC - National Disaster Risk Reduction and Management Council

NDU - National Defense University

NGO - Non-Governmental Organization

OCHA – Office for Coordination of Humanitarian Affairs

PAHO - Pan American Health Organization

PACOM - US Pacific Command

PEPFAR - President's Emergency Plan for AIDS Relief

PLAN - People's Liberation Army Navy

PRC - People's Republic of China

TCG - Tripartite Core Group

UN – United Nations

UNICEF – United Nations Children's Fund

UNISDR – United Nations International Strategy for Disaster Risk Reduction [

USAID - US Agency for International Development

USG – United States Government

USMC - United States Marine Corps

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ABSTRACT OF THE DISSERTATION

Maritime Military Humanitarian Civic Assistance Missions: Resource Use, Coordination, and Governance to Improve Global Health

by

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University of California, San Diego, 2017

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Introduction: Global health diplomacy is important in mitigating disaster severity through collaboration. Complex health emergencies resulting from rapid onset disasters frequently rely on international stakeholders to alleviate suffering of an affected population. The United States Government possesses a unique medical capability to provide humanitarian assistance within Department of Defense (DoD that conducts proactive healthcare-capacity building Maritime Humanitarian Civic Assistance (mHCA) missions. Linking HCA proactive healthcare-capacity building activities to efficiencies in reactive disaster responses is a desired outcome for the DoD.

Methods: Through examination of peer-reviewed and "grey" literature yielded (a) the manner in which HCA missions are referenced, as health-related activities or a strategic security tool; (b) identified mHCA missions process outcomes through structured web searches; and (c) the author professional affiliations referencing mHCA missions. A comparative case study of DoD military medical resources during complex disaster responses was undertaken. Disaster-affected nations where mHCAs had been conducted during 2006-2013 were systematically selected utilizing disaster risk trend and disaster tracking databases to define the unit of analysis; and (b) conduct thematic analysis of key stakeholders' post-disaster reports documenting foreign militaries' medical resources impact on disaster responses and associations with mHCAs.

Results: The literature review identified 800 citations regarding mHCA missions with 126 meeting inclusion criteria. Documents identified as grey literature represented 58% of the results and focused on national security agendas while describing maritime HCAs as a strategic security tool. No mention of mHCA mission impact on host nation health

status was noted. Several themes emerged: a) pre-disaster health engagements with foreign nations are not identified with improvements in disaster responses; b) the benefit of establishing a formalized international disaster response and preparedness framework integrating military resources is acknowledged; and (c) ongoing disaster management education of military personnel is needed.

Conclusion: This dissertation contributes to the understanding on the utility of military medical assets providing purposeful global health resources in disaster management. By examining the literature on proactive mHCAs and developing a comparative case study, the DoD's strategic perspectives in disaster mitigation are better understood to inform the design of policy solutions to synergize DoD efforts in disaster-risk-reduction through healthcare-capacity building

CHAPTER 1: INTRODUCTION

OVERVIEW

In the last century, nations and their militaries have been increasingly able to establish a global presence through naval assets and more recently with the expansion of aviation capabilities. The turn of the 20th century witnessed the US Government (USG) assert its global military presence through "gunboat" diplomacy. Euphemistically referred to as the "Great White Fleet," an armada of naval combat and support vessels consisting of over 30 ships circumnavigated the globe and visited 13 nations. While the intent was to formally demonstrate the global reach and capacity of the US Navy, happenstance would lead this fleet to render aid to a disaster-stricken Italy in 1908.[1] This episode highlighted how the US Navy could wield both "hard power and soft power" diplomacy through establishing a global presence and a willingness to assist other nations suffering through natural disasters.[2]

The seemingly increased frequency of complex emergencies over the last 12 years has resulted in events that transcend national borders and has required resources from a global set of stakeholders in order to ensure appropriate logistical and humanitarian assistance. Because of our highly globalized economy and changing political dynamics, it is no longer possible for the global community to stand idle during disasters. Response efforts have often resulted in the convergence of politically disparate bedfellows, particularly if a disaster was of a significant magnitude that affected global economy

, trade, tourism, and regional political stability. In several cases, foreign militaries have been used to support disaster response, and this intervention has become more and more common. Military resources have been deployed in response to man-made and natural disasters to include the recent Ebola outbreak.[3,4] Born of urgent necessity during extraordinary rapid-onset catastrophes, the mobilization of military medical and logistical capabilities has proved beneficial to both the nation supplying the external aid and the disaster-affected nation receiving it.

This mutual benefit has been perceived by well-resourced nations as a possible strategic policy opportunity. This has encouraged some nations to extend such military medical assistance activities to non-emergency endeavors, with one goal to build up disaster preparedness in high-risk regions. Indeed, this goal of enhancing resilience to disasters through pre-disaster international collaboration can be found in national security documents of several nations.[5-7] The US Navy has become prominent in the delivery of such pre-disaster engagement as well as in disaster response. One hoped-for outcome of this effort is to improve relations with host nations (HN) and with other donor nations through military health diplomacy beyond disaster response situations.[8]

The use of military assets to achieve non-combatant goals is not necessarily new. Military medical resources have been used during active conflicts to influence and assist local populations in combat areas. However, these activities over the last decade have been strategically geared to improving health system capacity in HN more preemptively. In fact, such military-led health engagements are frequently cited as improving a HN's

disaster response capabilities, thus alleviating some of the resource needs during active disasters.

Because several nations have shown interest in disaster-related military health missions, a need for an international coordination mechanism has become evident. Thus far, such coordination among donor nation militaries has not been common. As recent disasters have demonstrated, militaries of numerous nations will be assigned to render and distribute aid to disaster-affected nations. These same militaries would stand to gain efficiencies in a disaster response environment if standards of practice are developed for proactive, peacetime health engagements designed to improve health system capacity in advance of disaster response. Such a framework may align with existing international agreements on disaster risk reduction, the International Health Regulations, the Global Health Security Agenda, ad-hoc search and rescue operations, and other collaborative work among multi-national military health professionals. [9-12]

The overarching objective of this research is to describe the evolving global practice of military health diplomacy in the context of disaster response and use of MHCAs as a strategic platform. We will review how proactive use of military resources to support both diplomatic relationships and practical improvements in disaster preparedness may improve overall outcomes of international disaster response involving military assets; we describe a path to developing an international framework for collaboration among militaries and non-governmental organization (NGO) stakeholders.

BACKGROUND

The military role in providing humanitarian aid has historically been very complicated. In conflict settings where combatants have created a disaster situation, the responsibility to alleviate harms to civilian non-combatants is shared with humanitarian NGOs and International Government Organizations (IGOs). International standards of practice and agreements define military procedures with regard to the civilian populace and these humanitarian principles stress impartiality, neutrality, and independence from combatant roles. [10] These principles are often, however, incompatible with military missions in conflict settings.[13]

These same humanitarian principles have, to some extent, impacted and influenced expectations of military behavior in non-conflict settings to include disaster response and humanitarian missions during peacetime. In international disaster responses, foreign military behavior and resource allocation are generally defined by preexisting bilateral relations between the disaster-affected nations and the donor nation. IGOs also have provided coordination mechanisms specifically to manage the civilian-military interaction. Additionally, IGOs also have a structured coordination process, the cluster system, for managing the influx of medical aid, food, shelter, and other resources from international donors. (Figure 1)[14,15] Military representatives participate in cluster planning meetings to ensure coordinated integration into all phases of disaster response. However, a well-defined set of norms and practices for donor and HN governments that can help manage military cooperation is lacking.

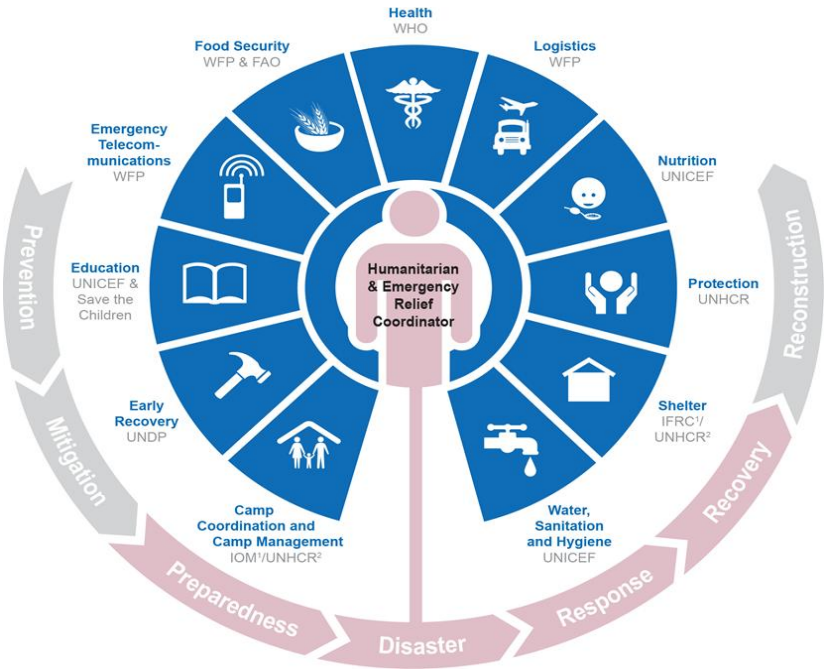

Figure 1-1. United Nations Cluster System Reproduced from United Nations Office for the Coordination of Humanitarian Affairs Official Website for Humanitarian Response Information https://www.humanitarianresponse.info/en/

Healthcare capacity building has become an active area of resource investment for several nations. The US military-sponsored has an expanding global health engagement portfolio of programs. These programs have historically sought to mitigate disaster-associated risk by global surveillance of infectious diseases and providing disaster preparedness training. The infectious disease global health programs that are frequently cited as examples of successful healthcare capacity building achieved through global health engagement. Two such DoD programs, the DoD HIV-AIDS Prevention Program (DHAPP) and the Global Emerging Infectious Disease Surveillance System (GEIS) are strategic global health engagement programs.[16] DHAPP and GEIS programs involve specific populations, diseases, and activities within their respective missions. They are

conducted under a defined management structure and congressionally-authorized funding. Both fall under the management of a DoD Executive Agent charged with ensuring program success and coordination within DoD and with other USG agencies such as the Department of Health and Human Services (HHS), as well as with other nations.[17-19]

Unlike DHAPP and GEIS programs, however, disaster preparedness programs are decentralized in their management, most often coordinated and conducted by regional military commanders as they deem appropriate. Proactive humanitarian civic assistance (HCA), which often includes clinical services, disaster preparedness regional engagements and military-to-military exchanges are more frequently are deployed from maritime platforms. HCA programs (MHCA) differ in funding sources and management. These programs are administered under the DoD Office of the Secretary/Under Secretary for Policy as Foreign Humanitarian Assistance (FHA), and they also have several internal advising bodies that provide strategic guidance. [20] The hospital ships and combatant vessels used for "goodwill" missions are managed under the broad umbrella of FHA, specifically the Humanitarian Civic Assistance (HCA) program. Maritime HCAs, include not only the direct delivery of clinical services, but engineering services (i.e., building schools, roads, digging wells, etc.), veterinary services, disaster management training, cultural exchanges, and delivery of donated supplies.[21]

The field-level and tactical management of maritime HCA missions is primarily directed by military commanders responsible for one of six global regions. (Figure 2) Regional military commanders, generally referred to as Geographic Combatant

Commanders (CCDRs), have the discretion to design maritime HCAs to meet the needs of nations within their areas of responsibility. CCDRs have numerous internal reporting requirements to document the value of HCA missions, but limited research has been done to evaluate the impact of these missions. Ultimately HCA missions are an integral component of a CCDRs Theater Security Cooperation Plan, a military program to maintain regional stability through appropriate diplomatic means, including both "hard" and "soft" power options. The Theater Security Cooperation Plan coordinates healthcare capacity building, disaster management, and delivery of humanitarian aid as conducted by the same DoD assets charged with combat functions.[21,22]

Figure 1-2. Geographic Combatant Commanders Areas of Responsibility Reproduced from https://www.defense.gov/

Coordinating maritime HCA missions is challenging due to the complex internal organization of the DoD and involvement of external organizations that support maritime

HCAs. Each branch of the DoD, the Army, Navy, and Air Force may be tasked with providing personnel to support a given HCA mission. The US Navy assigns combatant ships or naval hospital ships to transport maritime HCA personnel and supplies. A separate non-military agency, the Military Sealift Command, participates in maritime HCAs by providing crew to navigate and maintain the hospital ships. Adding to the mix of different services is the inclusion of staff from other agencies and NGOs. A host of partner nations and recipient nation personnel also are part of maritime HCAs, yielding a diverse group of professionals all brought together for a global health engagement usually spanning several months and involving several nations. Thus, there is also tremendous variability in staff composition from mission to mission. This entire process in resourcing creates significant management demands and coordination challenges from year to year.[23]

HCA missions are susceptible to budgetary variability due to political conditions and domestic budget squabbles. For example, one maritime HCA was canceled just prior to deployment to South America and the Caribbean in 2013 due to USG bipartisanship. Unexpected alterations to CCDRs' Theater Security Cooperation Plans also directly impact diplomatic relations and divert military resources that were initially planned to support HCA missions.[24] Fiscal, manpower, and resource planning vulnerabilities might be mitigated if maritime HCAs were similarly managed like DHAPP, GEIS, and other DoD global health programs. Reliably consistent funding protected from USG political instability is vital to ensuring maritime HCA mission objectives.

From Reactive Disaster Diplomacy to Proactive Military Health Diplomacy

The expanded use of maritime platforms for HCA missions and medical services is related to recent serious disaster events that have required a global community response. The magnitude of devastation and loss of life attributed to the 2004 Boxing Day Tsunami in Indonesia required nations to respond with swiftness and collaboration. The consortium of militaries responding was unlike any disaster response in recent history and more akin to a combined military exercise. A total of 17 militaries responded, and the USG expenditure alone was estimated at US$950 million.[25,26]

Two outcomes from this massive military response, including the highly visible US Navy hospital ship, USNS Mercy, would influence the conduct of DoD HCA missions and those of other nations, specifically the People's Republic of China (PRC). A post-disaster survey of the Indonesian population reported a very positive perception of the USG, and these data then factored into additional hospital and combatant ship-based HCA missions.[27] For PRC, its inability to marshal similar naval support would influence the People's Liberation Army Navy (PLAN) building of its first hospital ship as part of its efforts to establish a global naval presence, including engaging in military health diplomacy and supporting HA/DR, as strategic objectives.[28]

Linking Reactive Disaster Response and Proactive Maritime Humanitarian Civic Assistance

The Boxing Day Tsunami response would reframe how military planners and strategists would consider using military medical assets. Prior to the disaster, the DoD and allied nations, referred to as the "1,000 ship navy," was geared to protecting access to the global commons by maintaining open seas on which the global economy relied. Disaster response and health-focused engagements were still very minor elements of the 1,000 ship navy concept. [29] In fact, DoD was actively considering decommissioning its only two hospital ships at that time.[30]

Military and interagency support from the USG and international community during the Boxing Day Tsunami offered a new diplomatic tool for governments and military strategists to consider. The USG would conduct annual maritime HCAs for the following decade when resources permitted. Maritime HCAs sponsored by the USG would eventually include 14 partner nations and deliver aid to 29 HNs. These MHCAs cost an estimated USD$75 million from 2005 to 2010, but this total is likely an underestimate.[31,32] However, Humanitarian Assistance/Disaster Response (HA/DR) became prominent in USG strategic documents spanning both the Bush and Obama presidencies and was supported by four secretaries of defense and numerous senior naval leaders.

DoD research and analysis agencies began to examine global health engagements and HA/DR while maritime HCAs were being conducted, and the benefits of these missions remains an active area of consideration for DoD. For the US Navy, global health engagement was only recently (2015) and formally defined as a core deliverable service provided by its medical agency, the Bureau of Medicine and Surgery. [33]

Similarly, the DoD's most senior military advisory body to the President, the Joint Chiefs of Staff, only defined global health diplomacy in strategic doctrine and guidance in early 2013.[34]

The international community has also taken notice. For partner and allied militaries, the pooling of resources in the management of MHCAs serves as an opportunity to improve outcomes of interventions in geographic areas where several entities are working on common problems. Competing militaries have committed material and personnel resources under the HA/DR and global health engagement construct to further their security agendas. Recipient/Host nations reap the potential benefit of these health resources that might be unattainable within their own healthcare systems. However, some NGOs are hesitant or completely resistant to partnering on such military-sponsored efforts, while others are willing to participate. IGOs remain in the periphery, yet might serve as a MHCA coordinating or facilitating function (yet to be defined). Additional research is needed in order to understand how best to incorporate, coordinate, and effectively utilize military HCAs in international health development activities.

Contributions of this Research

The convergence of military operations and supportive assets, HCAs, and global engagement through military health diplomacy may lead to improved international development efforts. It is necessary to understand how this convergence will actually

work in the face of the military mission and leadership perspectives in the DoD. This dissertation will review the application of military-led engagements as a soft-power activity.

We accessed a variety of literature sources to conduct this research, as standard peer-reviewed publications would be very limited in the context of military operations. There is a large and critically important community that could utilize these findings about maritime HCA missions, and this community includes future military decision-makers who are not medical professionals but who have significant influence on the future of DoD sponsored maritime HCA missions. These military professionals will lead, fund, and plan maritime HCAs, but their exposure to or participation in actual maritime HCAs is usually minimal to non-existent. However, they often participate in mock HA/DR exercises in post-graduate level military training or are actively involved in disaster responses. Thus, there is a gap between disaster response experience and maritime HCA management that can influence how non-medical military professionals value the impact of proactive health engagement.

This research explores how militaries are utilized in complex disaster responses and contextualizes this engagement, through a comparative case analysis, the identification of maritime HCAs and military medical resources that support both maritime HCAs and disaster response. Case study units of analysis were countries receiving maritime HCA aid and were identified from an international database identifying countries at higher risk of disasters and that have limited healthcare capacity to respond to a disaster. Finally, this research contributes to the dialogue regarding

military organizations' cooperation in disaster responses and the collaborations that may be formed during maritime HCAs. A regional framework through which maritime HCAs might be coordinated might result in a greater degree of multi-lateral collaboration. Existing international frameworks and agreements on disaster risk reduction, the International Health Regulations, and the governance of military interactions could be linked to a new HCA model for proactive collaboration among key stakeholders.

STUDY AIMS

A critical evaluation of DoD and the USG experience in the conduct of its own maritime HCA model may allow other nations to benefit as they develop similar approaches. Challenges experienced by a well resourced, albeit much more complex organization like the DoD, may inform smaller nations with fewer fiscal and military resources. Developing a HCA model focusing on health system strengthening for disaster preparedness may be an outcome of this research.

Improving disaster response through disaster risk reduction programs must involve many stakeholders. The DoD has a vested interest ensuring that its health engagements with foreign governments instill a level of resilience to natural disasters. Although stakeholders might be separated from military strategic goals, future disasters will require adaptation of military and non-military resources to specific disaster response situations. Health-focused collaborations established in times of peace, calm, or adapted as part of normal diplomatic relations will likely lead to better coordinated actions during periods of disaster chaos. This research describes common gaps in knowledge and

recognized areas of success for military HCAs through a comparative case study of post-disaster reports and offers a possible diplomatic path forward for maritime HCA coordination.

The specific aims of this project are:

(1) Conduct a comprehensive review of both peer-reviewed and 'grey literature' regarding military health diplomacy within the context of maritime HCAs;

(2) Contextualize through a comparative case study analysis the experiences of maritime HCA host nations and other key stakeholders with DoD and foreign militaries during a disaster response; and

(3) Propose an international policy approach to improve and standardize collaborative military health engagement conducted from maritime platforms.

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CHAPTER 2: MARITIME HUMANITARIAN CIVIC ASSISTANCE MISSIONS: A STRATEGIC GLOBAL HEALTH POLICY TOOL

ABSTRACT

The Department of Defense (DoD) has invested substantial resources in expeditionary platforms for maritime humanitarian civic assistance (mHCA) missions including in traditional combat ships, hospital ships, and human resources. mHCA missions are structured to facilitate cooperation among agencies working with multi-level global partners. DoD involvement in international disaster responses is frequently cited as a justification for mHCA missions. A literature review was conducted using Google Scholar and select databases (PubMed, PubMed Central, JSTOR, Homeland Security Digital Library, the World Health Organization Virtual Health Library) to identify literature discussing mHCA missions with the following inclusion criteria: 1) included maritime military assets; 2) involved collaborative health engagements with multiple nations; 3) provided health assistance in countries other than the mHCA mission sponsor; and 4) occurred between 2006 - 2013. Documents identified were assessed for mHCA outcomes and the manner in which the MHCA missions were referenced, either as primarily health-related activities or as a strategic security tool.

Databases searches identified 800 possible documents regarding mHCA missions; of these, 126 met our inclusion criteria. Documents identified as “grey” literature represented the largest number of search results, 73 of 126 (58%). These documents

highlighted mHCA aggregate clinical measures as mission outcomes supporting strategic security objectives. Ninety-nine of the 126 documents (79%) were authored by individual(s) affiliated with a DoD entity or publication. Twenty-eight percent of the documents were published by military higher education institutes (i.e. service-specific war colleges). DoD-affiliated publications were evenly distributed among authors presenting both medical and non-medical perspectives on mHCA outcomes. Non- DoD authors (22/17%) were affiliated with civilian academic institutions, policy focused "think-tanks", foreign militaries, and non-military USG agencies. mHCA mission effectiveness was mainly linked to security and relationship building and as delivering a large volume of clinical services with no further assessment of enduring health outcomes.

INTRODUCTION

US Government (USG) diplomacy relies on a whole-of- government approach to ensure cooperation among agencies working with multi-level global partners.[1] The Department of Defense (DoD) has invested substantial resources in expeditionary platforms for humanitarian civic assistance (HCA) missions including in traditional combat ships, the hospital ships (USNS Comfort and Mercy), and in human resources.[2-5] However, the effectiveness of these activities is difficult to measure relative to USG foreign policy and diplomatic objectives. In addition, HN health needs and security objectives are not always accounted for in the evaluation process. These missions are expensive and may not, in fact, address recipient needs for sustainability and addressing specific population health problems. Thus far, there have been few assessments of HN

health outcomes changing due to these missions.[6-9] Documents retrieved during this literature review were assessed for mHCA outcomes and the manner in which the mHCA mission was referenced, either as primarily health-related activities or as a strategic security tool.

mHCA missions are a unique subset of the full range of military operations supporting Foreign Humanitarian Assistance (FHA) activities by the US military. These are a heritage of US relief programs implemented in Europe during and after World War I and World War II as part of reconstruction.[20] These types of medical engagement missions gained varying degrees of support through the Cold War and post-Vietnam War eras, finally being codified in US law in 1987 under Title 10, Chapter 20, Section 401.[21] Strategic guidance for HCA missions deployed from maritime platforms is also drawn from other internal military documents.[22-26]

mHCA missions' strategic duality of purpose includes both mHCA proactive health engagement and reactive humanitarian assistance/disaster response (HA/DR) during an international disaster response. In the case of HA/DR, the DoD leverages various modes of resource of delivery from across the armed services (i.e. the US Marine Corps, US Navy, US Army and the US Air Force). Numerous instances of the US Marine Corps HA/DR include deployments via airlift in the early stages of earthquake responses in 2006 to Yogyakarta, Indonesia and the 2011earthquake, tsunami and resultant nuclear industrial accident affecting the Fukushima Prefecture, Japan. The 2005 catastrophic flooding in Pakistan and the Ebola Virus Disease response in Liberia in 2012 witnessed the deployment of US Army medical and aviation personnel to support HA/DR operations. US Air Force personnel were rapidly deployed during the 2010 earthquake

devastating Haiti to expeditiously re-establish air traffic control Haiti International Airport in Port-Au-Prince. The 2010 Haitian Earthquake would also result in the first instance where an ongoing US Navy lead MHCA would be reassigned to support HA/DR mission. Ultimately, all of these HA/DR missions would incorporate more than one DoD branch.

DoD involvement in international disaster responses is frequently cited as a justification for preplanned MHCA missions.[10] Compared to combat support operations, mHCA missions involving DoD resources receive lower budgeting priority, especially in times of national fiscal austerity.[6] Yet even with lower funding priority, HCA missions are felt by many to be essential foreign policy tools and are in line with national security objectives. [14]

Allocation of military medical resources for HCA missions in permissive or non-combat environments is one of many ways the military is diversifying away from combat only operations in order to support global security.[27] As mentioned previously, these activities support the notion that military medical support for stability operations is on par with combat operations.[1] This new priority for military medical resources helps to define a subset of the growing field of health diplomacy: military medical diplomacy.

Recurring mHCA missions include USG sponsored *Pacific Partnership*, *Continuing Promise* and the People's Republic of China's *Harmonious Mission*, collectively visiting over 30 nations over the last decade. Most focus on short-term acute care and have not attended to specific sustainable HN health system development. mHCAs are not unique to the USG; other nations actively conduct or are seeking to

establish mHCA programs to assert their global 'presence' while providing humanitarian assistance. [11-13]

mHCAs that provide both acute disaster response training as well as health development activities may be utilized to support: 1) USG global health and foreign policy objectives, 2) international partner commitments, 3) and HN health needs through increase HN healthcare capacity and health systems strengthening. In addition, because of the growing interest in humanitarian and development assistance among many nations, there may be opportunities to leverage resources of other nations with USG activities in order to accomplish outcomes beyond those of only bilateral USG efforts. A fundamental question arises as to whether mHCAs can adequately serve as a tool of global health diplomacy in both proactive HCA role and reactive HA/DR capacity.

As a tool of health diplomacy, military medical resources have been deployed as a soft power instrument to support USG foreign policy.[2,14-16] However, these resources have only recently operated as such under a newly defined military medical support operations doctrine. In fact, DoD Instruction 6000.16, *Military Health Support for Stability Operations*, prioritizes military medical operations as equivalent to combat operations. This instruction defines the doctrine requiring the military health system to integrate within the full range of stability operations, spanning areas of conflict, contingency, or disaster response operations, and as well as in operating environments devoid of conflict.[17]

mHCA missions supporting foreign policy goals reside within this last component: cooperative strategic health engagement in permissive operating environments.[18] This is a significant doctrinal change from US military assistance

strategies in the past. However, this new policy requires new metrics with which to evaluate success, and this measurement need has been acknowledged by the DoD and its interagency partners: the US Agency for International Development (USAID) and the Department of State.[7,8,19] This change signifies a shift away from traditional military medical missions that intend to only support combat elements. Now, military medical activities such as mHCA missions are poised to become strategic vehicles for global health diplomacy through capacity-building engagements conducted by the US military.

DoD policy requires documentation of measures of effectiveness (MOEs) for mHCAs, but little is known on long-term public health impacts of recipient country populations or sustainable gains in security relationships.[7,28] The diplomatic role that is now expected of military medical personnel has not yet been incorporated in mHCA MOEs. Hence, there is a need to reassess current mHCA MOEs as instruments to measure population health outcomes as to assess the success of soft or smart power military health diplomacy.[7,29] Assessing the current status and availability of mHCA military assets across nations is a first step towards coordination of these diverse and valuable resources. These analyses set the stage and more efficient training for and utilization of HCA skills while better recognizing HN needs beyond acute crisis response. Ideally, assessing the global inventory of maritime assets dedicated to HCA missions from current and prospective sponsoring nations will inform the utility of mHCAs as a tool of global health.

METHODS

A literature review was conducted using Google Scholar and select databases including PubMed, PubMed Central, JSTOR, Homeland Security Digital Library, the World Health Organization Virtual Health Library to identify mHCA missions with the following inclusion criteria:

1) Maritime military assets were applied as a primary HCA platform;
2) Involved a collaborative health engagement with multiple nations (> 2);
3) Provided health or development assistance in countries other than the primary MHCA mission sponsor; and
4) Occurred during the timeframe between 2006-2013.

Search terms included free format and natural language search terms ("hospital ship", "military", "navy", "naval", "humanitarian", "humanitarian civic assistance", "host nation", "partner nation") and Boolean operators (“AND” and “OR”) were used to identify countries engaged in mHCA activities. [30]

These databases were selected specifically to conduct a multidisciplinary review of the academic literature and primary document archival research on mHCAs. Scholarly article databases included science/health related literature (MEDLINE, PubMed, PubMed Central-indexes journals that document study of life sciences and biomedical information), the social and political sciences (JSTOR- which specifically catalogues publications from the social sciences and humanities). The archival research was focused on US government specific domestic and international policies and agency-specific support of national security strategy and organizational management policies.

These databases included the Homeland Security Digital Library (a repository of government documents addressing policy-based research and the WHO Virtual Health Library (a decentralized information-source providing equitable access to scientific knowledge on health identified as relevant to international health programs.)

The review also included a search for other non-indexed articles and grey literature on the topic derived from structured natural language web searches with a similar combination of keywords on the Google Scholar. Grey literature documents retrieved and reviewed included open-source, publically accessible government documents from various agencies, technical reports, press releases, conference reports, information from non-governmental organizations, international governmental organizations and government-funded nonprofit institutions to conduct research and analysis.

Initial search results were screened by examination of title and abstract. Excluded from further review were documents focusing exclusively on HA/DR non-maritime activities, specific disaster responses, land based HCAs and literature containing no reference or not relevant to mHCAs or associated policies. Excluded documents varied from peer-reviewed journal articles, official and technical government reports, DoD specific documents and press releases and book reviews. Search results not referencing HCA missions meeting above criteria were excluded from further analysis, as were duplicate search results.

Specifically noted were mHCA process measures on total number of HN patients receiving primary care, surgical procedures, dental care, optometry care, and

prescriptions. All documents retained from Google Scholar and database searches for mHCAs were categorized as either peer-reviewed literature, grey literature or as media reports highlighting mHCA missions. mHCA process measure data were further supplemented with structured web searches using the same inclusion criteria for identified mHCA missions. Using the named missions (*Pacific Partnership, Continuing Promise* and *Harmonious Mission*) and the same inclusion criteria, we supplemented the academic literature review with structured natural language web searches using the same terms with the popular search tool Google to document reported aggregate measures of individual missions. These results included blogs, press reports, open-sourced media, presentations to professional meetings and conference reports.

RESULTS

The literature review identified 800 possible references regarding mHCA missions; of these, 126 met our inclusion criteria and retained for further analyses. The search included not only peer-reviewed reports but also "grey" literature that is frequently absent from the scientific literature, and we were able to identify within these documents DoD-specific security-oriented mission citations. Examination of title and abstract resulted in the exclusion of 602 results that failed to meet the inclusion criteria and that were not relevant to mHCAs. An additional 72 documents were excluded as they were duplicate or inaccessible publications. Summary of aggregate search results are provided in Table 1.

Documents derived from Google Scholar and included databases meeting the predetermined mHCA mission inclusion criteria are listed in Table 2 and comprise a collection of peer-reviewed and grey literature that incorporates mHCA metrics in some fashion. Documents identified as being non-medical grey literature represented the largest number of search results (40 of 126, 32%). These documents focused primarily on security agendas and international relationships while highlighting mHCA measures as strategic security tools. Of these documents, none mention the mission impact on HN health status was noted.

Within the peer-reviewed literature there was a relatively even distribution of articles from both medical and security-focused journals. Peer-reviewed articles found in both medical and non-medical journals highlighted measures of clinical services without demonstrating changes in health outcomes for HNs or how these missions contributed to health diplomacy outcomes. Peer-reviewed medical journals were more likely to recommend that mHCA planning processes be better aligned with desired health needs of HNs.

Of the 126 included documents, 79% (99 of 126) were authored by an individual(s) affiliated with a DoD entity or were written for a DoD-oriented publication. Twenty-eight percent (36 of 126) of the documents were published by military higher education institutes such as the National Defense University system or service specific war colleges. These documents predominantly consisted of graduate theses, monographs, or books and included military officer authors from medical, logistics, and combatant communities.

mHCA missions and their activities, including clinical services and partnering opportunities considered indicative of mission success, were further identified using Google Scholar results for named mHCA missions from the initial review. Results from structured web-searches of named mHCA missions are presented in Tables 3 and 4.

Clinical service measurements and process reports were identified from health journals as well as from security and military publications. Military mHCA missions have collected numerous clinical metrics that may or may not fit within the rubric of MOEs.[31,32] For example, Hartgerink et al. (2007) detailed the utilization of surgical resources during the 2007 *Provide Comfort* mission in twelve different countries. However, these data did not relate to the measurement of surgical services within DoD MOEs.[33] Nevertheless, this clinically-based, first-order assessment of mHCA activities of both military and civilian components (NGOs participating in mHCAs) is important in being able to help understand planning, personnel, and material resource needs necessary to execute future mHCA missions. Most peer-reviewed articles, grey literature, and press releases focused on the volume of patients treated or number of healthcare facilities constructed or renovated. Limited references were found linking health diplomacy and public health goals with mHCA missions. Search results not meeting inclusion criteria predominantly focused on specific disaster responses versus proactive maritime medical HCAs.

DISCUSSION

A review of the retrieved results found that mHCAs that focus upon direct clinical outcomes are most often evaluated by only process and clinical service measurements. DoD-affiliated publications were closely distributed among authors presenting both medical (56/44%) and non-medical (46/36%) perspectives on mHCA outcomes. These publications describe mHCA missions as mainly delivering clinical services without necessarily reporting on the population benefit of these services. The paucity of evidence on the impact of mHCA missions on HN health status makes it difficult to evaluate the subsequent effect on strategic health and foreign policy goals. Another observation was that 59 of the documents from the Google Search specifically referenced an international disaster where the DoD provided resources in support of a large-scale response. These references uniformly suggest the DoD's role in these responses as an impetus for continued involvement in future mHCAs and humanitarian assistance efforts in the response area. None of these articles, however, specifically referred to disaster risk reduction efforts which would improve preparedness and resilience against such disasters.

Aggregate measures of clinical services provided are cited in both DoD and the People's Republic of China (PRC) reports of mHCA missions such as *Provide Comfort, Continuing Promise,* and *Harmonious Mission* (Table 3). The large variability in mHCA metrics and the lack of any specific outcome data indicates accountability measures for mission impact and transparency of reporting should be developed in order demonstrate outcome improvement in HN health status. Mission effectiveness mainly refers to security and relationship building and is predicated on delivering a large volume of clinical services without assessing sustainable healthcare capacity building.

Lastly, another critical observation is the overlap in HNs receiving mHCA services from both DoD-sponsored mHCAs and PRC mHCA missions over the seven year timeframe considered (Table 4). This overlap in mHCAs would seem to be an opportunity to foster bilateral and multilateral relations among mHCA sponsoring nations such as the United States and PRC. The DoD and the PRC are conducting health engagement missions in the same geographic regions and in some of the same HNs. This could serve to inform the mHCA sponsoring nations on planning joint visits to HNs most in need or in distributing HN across mHCA mission sponsors to geographically maximize needed services. If sponsoring nations continue to conduct mHCAs in isolation of one another, HNs stand to miss opportunities to coordinate more efficient utilization of these services for the benefit of sponsoring nations' security objectives unrelated to health outcomes.

Given the limited number of peer-reviewed articles and evaluations focused solely on mHCAs as they attend to HN health outcomes, examination of documents from the literature review provides a contextual perspective as to how mHCAs are referenced. mHCAs are mostly reported as directly or indirectly supporting some aspect of the following areas: 1) National or Regional Security, 2) Military Strategy, 3) Humanitarian Assistance/Disaster Response, 4) Health Security, 5) Disaster Mitigation, 6) Clinical Measures of Process, 7) Global Health 8) Military Resource Development, and /or 9) Economic Development. Medical, academic, regional security and military peer-reviewed and grey literature publications indicate a board interdisciplinary spectrum of authors often citing the role of mHCAs as an essential element regarding their area of interest.

Almost uniformly, 74% (93 of 126) of the documents include some discussion of HA/DR as justification for utilization of mHCAs, either as a matter of improving disaster response capabilities or responding to a disaster. Twenty-eight percent of aggregate search results were published by the National Defense University (NDU) system and associated military service specific war colleges (i.e. the Naval War College, the Army War College, the Joint Forces Staff College, etc.), an internal graduate education body of the DoD responsible for advanced education curricula focusing on developing military strategy and planning military operations. The NDU publications include graduate student theses and faculty authored papers examining strategic military objectives, 72% (23 of 32) of which emphasize an association between HA/DR and MHCA activities. Of these 32 NDU documents, all were exclusively retrieved through the Google Scholar query. Only one of which was published in a non-medical peer-reviewed journal.

Military professionals authoring NDU documents represent a critical population of mHCA stakeholders, arguably the most influential. The preponderance of NDU students and faculty are not medical professionals. They most often are line officers, military members whose primary occupation is to ensure the realization of military strategic, operational and tactical objectives in support of the USG. All senior military leadership within the DoD attends one or more of these graduate programs at some point in their career progression. mHCAs incorporated into regional CCDR military campaigns are authorized and promulgated by NDU alumni.

Military medical professionals generally comprise a smaller number of NDU students and faculty. The planning and conduct of mHCAs relies heavily upon the advisement by military medical professionals, but authorization and funding of these

missions resides with CCDRs, who are line officers. DoD-affiliated publications in peer-reviewed and grey literature with a medical or clinical focus equally reference mHCAs with HA/DR, approximately 75%. Summarily, both sub-groups of authors from NDU and DoD medical professions offer little in the way of meaningful analysis demonstrating causality between mHCAs and HA/DR.

Analysis of the documents identified in this literature review suggests a dichotomy of perspective regarding DoD affiliated authors. Documents associated with the NDU system tend to conflate the impact of mHCA missions in light of other military operations, ranging from special warfare, information influencing operations and/or logistical operations. The most prominent recurring theme in NDU documents is the role mHCAs have played in facilitating the PRC's expeditionary naval capability or as a strategic opportunity to collaborate between the DoD and the PLAN in HA/DR activities.

Conversely, DoD affiliated authors whose documents were associated with peer-reviewed medical publications provide introspective insights into the conduct of MHCAs through clinical case studies, the operation and management of hospital ship activities, and accounting of clinical measures of process. More than half of the "grey" literature with a medical focus (18 of 33) provide critical commentary on the need to better define the benefit of mHCAs to broader global health as a strategic goal of mHCAs. Most of these authors advocate for continued research on the mHCAs missions contributions to HN health outcomes.

RECOMMENDATIONS

Search results from the selected databases and Google Scholar for this literature review of DoD sponsored mHCA missions suggests there is utility for this research to assess how various communities within the DoD view mHCA missions as they support diplomacy, security, and health improvement in HNs. The bulk of documents examined in this review were authored by DoD-affiliated authors and military academic institutions with a fairly even distribution between medical and non-medical professional communities. Students of the military graduate education system and service-specific war college system are predominantly comprised of officers from the combatant communities, with significantly fewer students from the medical professions. Curricula provided at these institutions are intended to shape the future planning and efficiency of all military operations, including mHCA and HA/DR missions. The student body of these schools progress in rank to key decision making positions that will influence how mHCA missions are funded and executed.

The broader examination of mHCA-related data found in peer-reviewed and grey literature and web-based reports indicate there is tremendous variability in reporting about HNs benefiting from mHCAs. These data are often cited by DoD personnel as describing substantial gains in diplomacy and security, but seldom are supported by studies examining the longer term health status changes in the affected population. In some cases, no information on health outcomes was readily available. As a matter of accountability and transparency, mHCA sponsoring nations should develop consistent reporting methods and consider sharing data in order to evaluate cooperative efforts.

There has been a decade of DoD mHCA missions under the paradigm of military medical diplomacy, and there is now growing interest by competitor nations such as the PRC. Thus, discernible benefits to HN health system capacity due to such activities should be considered in future evaluations of mHCAs. Improving HN health system infrastructure and instilling resiliency to disasters are a stated intent of mHCAs; however, metrics indicating sustainable gains from a HN health perspective are lacking. While much has been written supporting the need to better implement military medical diplomacy, this literature review suggests students and academics within the DoD military graduate programs might benefit from further examination of mHCA missions in a global health and health security context. Simply associating delivery of clinical services with goodwill missions belies the complexity of the global health development perspective.

Table 2-1. Maritime Humanitarian Civic Assistance Literature Review Search Results	
Total	800
Duplicate	68
Not Publically Accessible	4
Rejected Based on Review Criteria	602
Accepted Based on Review Criteria	126

Table 2-2. Literature Review Search Results by Document Type					
Grey Literature		**Peer Reviewed Literature**		**Department of Defense Affiliated**	
Medical	Non-Medical	Medical	Non-Medical	Medical	Non-Medical
33	40	25	28	56	46

Table 2-3. Maritime HCA Mission Aggregate Measures of Performance, 2006 to 2013

Sponsoring Nation	Maritime HCA Mission	Total Number Host Nations Visited	Total Number of Partner Nations	Total Number Partner of Agencies	Total Number of Non-Governmental Agencies	Total Number Patient Contacts	Total Number of Dental Patients	Total Number Surgeries	Veterinary Contacts	Prescriptions	Optometry Patient Contacts	Infrastructure Projects
United States	Pacific Partnership	13	10	3	11	311,370 - 423,583	8,991 - 20,938	2,074 - 3,150	11,922 - 17,956	42,712	15,029	116 -141
	Continuing Promise	16	4	2	5	241,677 - 401,742	23,851 - 25,823	2,931 - 5,565	52,368 - 59,419	218,001 - 281,001	20,868	46 -73
	Total	29	14	5	16	553,047 - 825,325	32,842 - 46,761	5,005 - 8,715	64,290 - 77,375	260,713 - 323,713	35,897	162 -214
Peoples Republic of China	Harmonious Mission	16	Not Available	Not Available	Not Available	53,358 - 79,669	Not Available	489 - 491	Not Available	Not Available	Not Available	Not Available

Table 2-4. Maritime HCA Host Nation Partnerships by US Military Command Region, 2006 to 2013

Regional US Military Command	Number of Host Nations	Maritime HCA Mission	Countries Receiving Maritime HCA Services from Both US and PRC
Pacific Command	19	Pacific Partnership, Harmonious Mission	Bangladesh, Myanmar, Timor-Leste, Indonesia, Cambodia
Southern Command	17	Continuing Promise, Harmonious Mission	Trinidad & Tobago, Costa Rica, Jamaica
Africa Command	4	Harmonious Mission	None
Central Command	1	Harmonious Mission	None

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CHAPTER 3 COMPARATIVE ANALYSIS OF MILITARY MEDICAL RESOURCES CONDUCTING DISASTER RESPONSE SUPPORT AND MARITIME HUMANITARIAN CIVIC ASSISTANCE

ABSTRACT

This is a comparative case study analysis of U.S. Department of Defense (DoD) and partner nations' use of military medical resources during complex disaster responses through maritime Humanitarian Civic Assistance (HCA) missions. Utilizing an international database for country specific national risk trends (the INFORM Index for Risk Management) and a disaster tracking database (the Emergency Events Database), we systematically selected disaster affected nations where maritime HCAs (mHCA) had been conducted during 2006-2013. Four countries were selected as the unit of analysis based on having experienced a large-scale disaster requiring international assistance from foreign governments and their militaries, Non-Governmental Organizations (NGOs), and International Governance Organizations (IGOs). Post-disaster reports documenting responses were reviewed for analysis of DoD and foreign militaries' impact on communication, coordination, cooperation and collaboration amongst stakeholders during disaster responses. Thematic analysis revealed that stakeholders consistently recommend improving integration of the DoD and foreign militaries into future disasters responses, establishing an international agreed upon framework for coordinating military support, continued education of military personnel in humanitarian assistance, and ensuring that the support roles of foreign militaries be maintained through all phases of the disaster response. Analysis also highlighted the lack of association between DoD-sponsored

mHCA missions to DoD-involved disaster responses, suggesting mHCAs are not utilized as a risk mitigation resource for future disaster responses. mHCAs can be strategic health capacity-building activities that include disaster risk mitigation planning. Recent post-disaster reviews have not addressed how mHCAs could improve disaster responses in vulnerable nations.

INTRODUCTION

U. S. Government (USG) security strategies have increasingly emphasized the need for improved and coordinated global humanitarian assistance and disaster response capabilities. The DoD supports USG strategic guidance via the full range of military operations in areas of conflict, as well as contingency or disaster response operations and peacetime operations.[1,2] Maritime HCA (mHCA) missions and disaster response are a unique subset of military operations supporting Foreign Humanitarian Assistance (FHA), which develop and maintain relationships with foreign partners through medical assistance operations.[3] DoD medical resources are integrated within all military operations and are critical elements of disaster response and mHCAs.[4] These missions have demonstrated positive international perceptions of the USG and DoD.[5] However, evidence for how sustainable these positive perceptions are among mHCA recipient nations is not well understood.

Often cited interchangeably, communication, cooperation, coordination, and collaboration are key attributes of inter-organizational relationships during complex health emergencies.[7] These attributes are distinct and represent a continuum of response. However, they may also be extended to pre-disaster bilateral and multilateral relationship development focusing on healthcare capacity building and disaster risk reduction planning. The DoD's ability to marshal vast medical resources to assist disaster-stricken areas has been associated with the recent increase in mHCAs. mHCA missions are a part of a foreign policy platform that has been positioned to shape geopolitical relationships through military health diplomacy.[2-4] mHCA missions often employ disaster

preparedness training and healthcare capacity building to better prepare disaster-prone nations for regional crises. [4, 6] Linking mHCA disaster preparedness training and healthcare capacity building efforts to existing development projects may also be important in minimizing resources required for future disaster responses.[6] Research is needed to understand the linkage between HCAs and disaster response preparedness in order to understand how mHCA engagements may impact resources needed for future disaster responses.

The following analysis suggests a methodical approach to assess the impact of mHCA missions on host nation (HN) disaster capacity building and risk reduction.

METHODS

A comparative case study approach using post-disaster response reports in selected HNs was used to identify commonalities between mHCA missions and disaster response outcomes. The key attributes of communication, cooperation, coordination and collaboration were used to guide the narrative with a special emphasis on DoD mHCA activities both pre, during, and post complex emergencies responses.

Using an international database for country specific national risk trends (the INFORM Index for Risk Management), we systematically selected complex emergency cases to include in this analysis. The INFORM index for risk assessment is an open source database created by the United Nations (UN) sponsored Inter-Agency Standing Committee Task Team for Preparedness and Resilience and the European Commission.

INFORM risk indices served as the primary source of risk related data. The INFORM database categorizes country-specific risk along nine major risk elements:

- specific hazards, vulnerability,
- lack of capacity to respond,
- risk of natural disaster,
- risk associated with human conditions,
- socioeconomic factors,
- vulnerable groups,
- institutional ability manage a disaster, and
- state of existing infrastructure.

These nine risk categories include more than 100 individual data elements, which in turn are normalized into an overall aggregate score of one to 10, with a score of 10 being the most at risk for the specific risk category. The comparative case study uses qualitative methods to extract relevant information from key stakeholders to retrospectively explore the relationship between risk assessment and military HCA missions during complex emergencies and disaster response.[8-10]

mHCA missions were identified via a systematic review of web-based U.S. military-sponsored activities conducted from 2006 to 2013. Aggregate mHCA data were parsed by recipient country, year of mHCA mission, total number of mHCA missions in each recipient country, and national military sponsor of mHCA event.[11] mHCA recipient country data were then extracted from the INFORM database and compiled for analysis of selected mHCA HN cases.

The flexibility of the INFORM database permitted an analysis of changes in risk trends for countries participating in HCA missions as recipient HN. HNs assigned a high or very high risk score for 2016(>4.9) were considered for inclusion. [8] This criterion for risk was used to determine HN inclusion in the unit of analysis. Four countries were chosen from this group to represent mHCA recipient countries with varied disaster response interactions with DoD based on having an overall 2016 INFORM risk index score greater than 4.9. Overall changes in risk stability scores from 2014 to 2016 were reviewed. HN risk scoring for 2016 was also examined in context of the number of mHCA visits during the study timeframe. (Figures 1 & 2)

Selected cases were Haiti, Myanmar, the Philippines, and Bangladesh. Although, these HNs have varying experiences with international disaster response and number of mHCA engagements, each has had distinct episodes of disaster responses during the period when maritime HCAs became a prominent tool of military health diplomacy (Table 1). INFORM risk categories included: lack of capacity to reduce risk to health impacts in response to disaster, risk of natural disaster, and presence of vulnerable groups. (Figure 3 & Table 2) These INFORM risk categories were selected as they are strategic themes for DoD global engagement, health diplomacy activities, security cooperation, humanitarian civic assistance, and disaster response planning documents.[2,12]

Specific disasters occurring in the selected HN cases were identified using an international emergency disasters database (EM-DAT) and the US Office of Foreign Disaster Assistance's *Annual Disaster Reports*.[13] The timeframe 2006 to 2013 was used as the defined search criteria to identify specific disasters in the selected HN cases. Disasters where mHCA-sponsoring nations responded with military resources or offered

support were selected for further review using post-disaster response reports. The emphasis of analysis is the USG mHCA efforts coordinated through the DoD. If other nations sponsored military activities similar to DoD, their efforts were noted.

A case study narrative was developed using these post-disaster reports. These reports, typically referred to as "lessons learned" or "after action reports," were sourced from specific stakeholders that were active during selected disaster responses. Key stakeholder reports from mHCA sponsoring military entities (i.e., DoD, the People's Liberation Army/Navy [PLAN]), an international governance body (i.e., U.N. International Strategy for Disaster Risk Reduction [UNISDR]), NGOs, and the mHCA HN were selected. DoD lessons learned material was drawn from the disaster after-action reports archived on the Defense Technical Information Center website.[14] The UNISDR sponsored website, PreventionWeb, and the Office for the Coordination of Humanitarian Affairs (OCHA)-sponsored ReliefWeb served as resources for HN and NGO-authored after-action disaster reports.[15,16] In the event an organization-specific post-disaster response report could not be acquired, agency-specific periodic status updates containing disaster response observations were utilized from an agency or entity known to have participated, but not have authored an official post-disaster report. mHCA engagements or other pre-disaster activities by stakeholders mentioned in these after-action reports were noted, specifically if mHCA engagements played any role in the disaster response. Conversely, if no mHCA engagement or similar activity occurred prior to a disaster response, mHCA engagements occurring post-disaster responses were noted.

Case study narratives examined key attributes of international disaster partnering considered essential for large-scale disaster responses: communication, cooperation,

coordination, and collaboration.[7] Post-disaster reports were examined for associations between mHCA mission HNs and disaster responses incorporating military assets with respect to these four attributes of international disaster partnering.

Maritime Humanitarian Civic Assistance Host Nation Case Studies

Case study HNs selected for further analysis included Bangladesh, Myanmar, Haiti, and the Philippines. HNs have varying experiences with international disaster response and number of mHCA engagements; each has had distinct episodes of disaster responses during the period when mHCAs became a prominent tool of military health diplomacy (Table 1). Each of these HNs met the INFORM risk stability inclusion criterion. INFORM risk database does not contain data to prior to 2012, providing no risk information relative to disasters occurring after 2012.

Bangladesh: Cyclone Sidr, 2007

Cyclone Sidr was reported to be the largest cyclone in recorded history, a Category-4 Super Cyclone that made landfall in Bangladesh in November 2007. Loss of life tallied 3,344 individuals, more than 53,000 injured; and two million families with 8.7 million people affected; over 3.2 million were displaced. Over 1.5 million properties were damaged with an estimated US$1.7 billion in economic loss. The cumulative economic impact was US$2.3 billion dollars. [13] A total of 14 countries, international aid agencies, and NGOs were on the ground in Cyclone Sidr-affected areas. [17]

The Bangladeshi government never formally requested assistance from the international community, but it did appeal directly to the USG. The USG committed

US$2.1 million dollars in aid and deployed two US Naval warships to provide supplies, logistical support, and aviation assets. The United States Marine Corps (USMC) also provided a Humanitarian Assistance Support Team consisting of personnel trained in rapid infrastructure damage assessment and resource need evaluations for disaster-affected populations. The USMC also provided fixed-wing large transport C-130 aircraft and medical equipment. US military staff were quickly integrated into the worst affected areas and led by Bangladeshi military personnel. Bangladesh was a mHCA recipient nation three times during 2006 – 2013, twice from the DoD and once from the PLAN.[17, 18]

Post-disaster response reports consisted of two USG after-action reports from DoD and USAID, three NGO post-disaster 'lessons learned' reports, one co-authored report by the United Nations, and the Bangladesh Ministry of Disaster Management Report. Of the six post-disaster reports, all provided positive commentary on military contributions to the overall response. The Bangladeshi Ministry of Disaster Response praised the timeliness of DoD aid and personnel. The DoD report primarily focused on the role of the Indian Navy and the lack of coordination among naval assets from responding navies. The DoD report was the only report to acknowledge previous mHCA activity of DoD with Bangladesh in 2006, but it drew no corollaries between previous mHCA and the Cyclone Sidr disaster response. The DoD report did call for establishing a regional governing body for coordinating disaster responses among multiple nations and for military exercises that include disaster response coordination. No mention of healthcare capacity building or specific mHCAs was noted in the context of improving coordinated disaster response.[19]

OXFAM and CARE International (with USAID) co-authored reports mention the Bangladeshi military serving as a primary focal point of foreign military coordination for aid distribution and integration.[18] The UN-recommended future disaster responses should strive to improve coordination of military aviation assets for resource mobilization across multiple sectors.[20] Both the UN and OXFAM emphasized the need for increased coordination and activation of the UN-sponsored cluster coordination system. The International Federation of the Red Crescent report made no mention of military contributions. There was no specific mention of DoD providing disaster response resources contribution or previous mHCAs in Bangladesh, which is stated objective of proactive mHCA missions.[21]

Myanmar: Cyclone Nargis, 2008

In May 2008 Cyclone Nargis presented the international community with a complicated crisis hampered by the reluctance of the Myanmar government to receive disaster assistance in the face an overwhelming natural disaster. Cyclone Nargis would eventually result in the deaths of 138,366 and over 20,000 injuries. An estimated 2.4 million people were affected. Cyclone Nargis resulted in an estimated loss of US$4 billion in property loss and cost of recovery.[13]

Initial response planning and resource coordination were particularly difficult due to the limited diplomatic relations with the Myanmar junta-led government prior to Cyclone Nargis. Absent a basic understanding of Myanmar disaster response capabilities and infrastructure, scant information from open sources served as the only data to inform

response planning. For USG entities, other nations offering aid, and NGOs alike, rapid assessment teams were prohibited from determining the extent of damage during the first two weeks after Cyclone Nargis. Recovery planning was further impaired by numerous conditions placed on response personnel visas and requiring the distribution of foreign aid solely by Myanmar military to the disaster-affected populations. The lack of communication significantly hampered early assessment and any coordination activities.

The Myanmar government did not grant permission for DoD entry into Myanmar. The DoD reassigned two naval vessels already in the area that were conducting international training exercises for disaster response with regional partner nations. Helicopters assigned to these naval vessels provided logistical support by transporting aid through Thailand. The USG also offered clinical services of the USNS Mercy hospital ship, which was also in the vicinity completing a maritime HCA mission. However, DoD naval vessels were not permitted to provide direct aid or disembark their personnel ashore.

In 2013, the Office of the Secretary of Defense commissioned a report on disaster responses involving the DoD in the Asia-Pacific area to include Cyclone Nargis. The comprehensive report does not mention previous mHCA missions with Myanmar as a HN. Key conclusions of the report focused on the Myanmar government prohibitions placed on the DoD and neighboring nations due to fears of foreign militaries. The combined lack of knowledge of the Myanmar disaster response infrastructure and mechanisms, the lack of diplomatic rapport or military-to-military relationships, and insistence by the Myanmar government that it control aid distribution led to a minimally effective role for the DoD. The DoD report also notes the self-imposed limitation on its

ability to provide aid to nations politically sanctioned by the USG, which Myanmar was at the time of Cyclone Nargis. The sanctioned status also impaired USAID's role in providing resources.[22]

Similar to the DoD findings, the International Federation of the Red Cross (IFRC) reported that visa restrictions imposed on their personnel by the Myanmar government greatly inhibited the delivery of aid in a timely manner at the outset of the response. The IFRC response was also limited by lack of knowledge of the Myanmar disaster response capabilities. There was no mention of DoD or any military role in the disaster response. The IFRC did highlight the establishment of the Association of Southeast Asian Nations (ASEAN) Tripartite Core Group (TCG), which consisted of Myanmar government, ASEAN, and the UN, in facilitating access for NGOs. Also reported was a lack of coordination across key civil-sectors, but there was no information pertaining to how the UN Civilian Coordinator might have been able to coordinate foreign military assets that offered support. One of the major needs underscored by the IFRC where the military might play a future role is through integration among sectors that would benefit from unique military capabilities such as aviation and logistical supply resources.[23]

In partnership with the UNISDR and the Australian aid agency AUSAID, the Myanmar government released a post-disaster report, *Cyclone Nargis 2008: Rehabilitation in Myanmar*. There is no mention of DoD or USAID offers to assist or to use aviation resources available in Thailand. Only the Thai Army's contribution of rebuilding schools was mentioned. This report recognized the initial issues with permitting NGO personnel in-country during the response, but did not acknowledge the same constraint being placed on the DoD and other militaries. [24] The TCG authored a

series of post Cyclone Nargis reviews of the response and recovery. The first review released in December 2008 contains no reference to US support or specific actions or aid provided by the DoD.[25] UNICEF also released a post disaster report that does not refer to US or DoD activities. [26]

Haiti: Earthquake, 2010

Haiti, a nation historically challenged by poverty and a perennially strained healthcare system, suffered a magnitude 7.0 earthquake on January 12, 2010. The massive earthquake resulted in approximately 229,549 deaths, 577,520 casualties, and affected over 4,314,226 citizens. The impact of the disaster was exacerbated by the loss of hundreds of key personnel in Haitian government leadership as ministerial offices were decimated. The estimated economic loss is in excess of US$8 billion.[13]

The USG "whole of government" approach, utilizing the unique capabilities of numerous USG agencies to respond to large-scale disasters and complex health emergencies, was untested at the time of this massive catastrophe. Two comprehensive post-disaster reports by the DoD and USAID offer complimentary and conflicting recommendations regarding the role of DoD/military resources during disaster responses. [26, 27] Both agencies conducted key informant interviews and subject matter expert reviews to evaluate how well USG participated and how DoD was integrated in the multi-lateral international response. Several recommendations from both DoD and USAID reports were almost verbatim, while also proffering divergent solutions for improving

disaster response by ensuring that DoD remains in a support role versus a leadership role at any point in the response.

Both USAID and DoD after-action reports agreed upon essential improvements in the education and training of military personnel to support the continued development of a Humanitarian Assistance/Disaster Response (HA/DR) competency for military personnel. The effort by the DoD to maintain information in an "unclassified" status facilitated transparent and consistent communications among military and non-military stakeholders. [26, 27]

Open, unclassified communications also permitted tailoring of military capabilities required as the response progressed and transitioned to NGOs and Haitian government agencies. USAID and the DoD both suggested establishing a broader international governance policy to integrate the unique capabilities of militaries to conduct response and recovery operations in man-made or natural disasters requiring international assistance. Establishing a formalized international framework for coordinating disaster response emerged as a common objective for future large-scale disasters. Finally, the desire of both the DoD and USAID to create a standing HA/DR DoD response capability that could deploy in times of crises was emphasized. This permanent military body would develop standards of practice and metrics to evaluate effectiveness of future responses and guide disaster response training. [27]

USAID's experience with DoD in Haiti did result in some divergent views on how the DoD could better be integrated, primarily emphasizing that the DoD should consistently act in a support role. From the outset of the response to a timely appropriate transition of responsibilities, USAID suggests the DoD coordinate resources through

USAID. USAID strongly critiqued the DoD's amassing of resources without a rapid damage assessment. DoD did acknowledge the serendipity of DoD leadership being on the ground when the earthquake struck, triggering the immediate marshalling of forces that initially overwhelmed local responders. Local responders from Government of Haiti (GoH) were not prepared to receive and coordinate the influx of DoD resources. Reserving DoD as a resource of last resort, for truly unique applications of direct humanitarian aid that non-military entities cannot provide should be the standard operating procedure.

USAID reported that as the designated lead agency for international disaster response, it was not consistently allowed to coordinate the activities of multiple US agencies, including the DoD. Competing demand for status updates on the response by DoD and USAID leadership resulted in parallel management systems for distribution of aid in-country. The lack of an overarching lead authority and multiple channels of communicating plans contributed to the DoD not identifying an appropriate time to exit Haiti. USAID concluded that civilian agencies and the GoH could have assumed responsibility prior to the eventual June, 2010 departure of the DoD. [28]

Several international governance bodies conducted evaluations of the initial disaster response with input from GoH. The "Haiti Earthquake Response: Context Analysis " report co-authored by the UN Evaluation Group and the Active Learning Network for Accountability and Performance in Humanitarian Action identified civil-military coordination as problematic in maintaining security, but not in the direct delivery of aid or clinical services. This report also noted that DoD's control of the airspace impaired the delivery of NGO supplies by assigning lower prioritization of non-military

aircraft. [29] The Pan American Health Organization (PAHO) evaluated the role of health agencies during the response, including hospital ships from participating militaries. The PAHO report indicates the hospital ships coordinated well with field hospitals and NGOs ashore. The clinical services were maximally utilized during the early stages of the response. When the DoD hospital ship arrived in Haiti, it was the only tertiary level facility available. However, patient tracking was a challenge that impacted how the DoD hospital ship received and transferred patients and ensured the delivery of post-operative care once patients were treated. [30]

Numerous NGOs engaged directly with DoD and foreign militaries in the treatment of Haitians affected by the earthquake. OXFAM, CARE International, and World Vision all drafted after action evaluations. [31, 32] Only CARE International commented on military participation in the response and identified the need to assess military policies to ensure humanitarian and human rights were equitably addressed throughout the response. Care International's survey suggested that all responding entities and their personnel should draw from experiences of recent disasters of similar or comparable magnitude to produce a unified approach. [33]

Philippines: Super Typhoon Yolanda, 2013

Super Typhoon Yolanda made landfall on November 8, 2013, in one of the poorest areas of the Philippines, and with the equivalent strength of a Category 5 hurricane. Typhoon Yolanda was considered the most intense weather system to date, with winds exceeding 200 mph and an average storm surge reaching 23 feet over normal

tidal surge in some areas for a period for almost 20 hours, surpassing the force of Cyclone Sidr. The following day the Philippine government issued a formal request to USG for assistance, which was quickly followed by the U.S. Charge d'Affaires for the Philippines issuing a disaster declaration. This permitted USAID to release funding to support disaster response activities and the DoD to relocate resources into the affected areas. [13]

Within 24 hours of the disaster declaration by the USG, DoD personnel arrived in Manila and provided coordination with USG and the Philippine military. In advance of Typhoon Yolanda striking the Philippines, the DoD had begun planning a coordinated response, Operation Damayan, on November 6. The DoD command responsible for this area of the globe, the US Pacific Command (PACOM), coordinated the DoD contribution for the response. A PACOM-sponsored post-disaster report documented the DoD response as one of the most effective to date.[34] The USG response amounted to approximately $87 million in DoD disaster aid including 12 ships, 66 aircraft, and over 13,400 military personnel, predominantly from the US Navy and Marine Corps. More than 20 other nations provided military assets to support the response, many of which had been partners on prior DoD HCA missions. This includes the Peace Ark, a Chinese military hospital ship deployed on previous mHCA missions in the Pacific.[35]

Although USAID did not publish a comprehensive after-action report, the agency published 22 USAID Fact Sheets that covered the time period of November 11, 2013, to January 24, 2014. These detailed accounts, issued daily for the first two weeks of the response, clearly indicate a high level of interaction between DoD, USAID, and the Philippine government. DoD aviation resources were immediately deployed to conduct

initial damage assessments with USAID and the Philippine disaster response agency, the National Disaster Risk Reduction and Management Council (NDRRMC). The DoD assets were rapidly dispatched for emergent infrastructure repairs critical to water supply systems in the hardest hit communities. The volume of aid transported in DoD aircraft suggests that USAID and DoD demonstrated a functional interagency collaboration that reduced the severity of disaster impact. Throughout the response, DoD aviation support provided access to remote disaster-stricken areas and transport of relief supplies, evacuation services, and logistical support to NGOs and UN staff. The monetary value of DoD services was estimated to be in excess of US$29 million, the fourth largest donation at the time of military operations began withdrawing on November 24, 2013. Only humanitarian funding from the United Kingdom, the aggregate total of USG funding, and funding from Japan exceeded the DoD's contribution.[36]

OCHA provided an initial assessment report detailing the early stages of the response and transition to recovery. Survey data were collected from the most heavily impacted regions in late November, 2013, when DoD had begun withdrawing from the area. The primary finding was that military aviation resources were the only way to access severely impacted regions. It was noted from the local village and municipality level leaders that military logistics support operations were vital: "Without their (military) support, staff, food and other humanitarian assistance including emergency telecommunications and logistics equipment would not have been able to reach Tacloban and other difficult-to-access areas like Guiuan in the early weeks of the emergency." The combined military logistical resources were enhanced through harmonized humanitarian civil-military representatives situated in key hubs under the Philippine Department of

National Defense leadership. The appropriate and effective utilization of foreign militaries was a direct result of constant dialogue between Philippine national and foreign military contingents.[37]

OCHA also issued daily situation reports during the first two weeks of the response. OCHA first reported the arrival of DoD naval assets that included an aircraft carrier and several supporting vessels and aircraft on November 13, 2013. OCHA observed that early coordination through the Philippine Department of National Defense was key to successful logistical support in remote severely impacted regions. By November 16, the burgeoning military presence of more than 20 foreign militaries, and the US establishing a Joint Task Force, required OCHA to institute a more robust civilian-military coordination mechanism. OCHA routinely facilitates disaster coordination by assigning UN Civil-Military Coordination Officers (CMCoord). The successful application of civilian-military coordination was specifically noted in the in the November 27 daily OCHA report. The Canadian Defense forces were highlighted as a model of integrated humanitarian leadership and the presence of the Chinese Hospital ship as a notable contribution. OHCA reported a total of 25 foreign militaries played essential roles through the initial response and early recovery phases. OCHA reports found that the DoD logistical support accounted for almost one quarter of all aid delivered prior to the winding down of foreign military support. The DoD delivered 3,000 M^3 /1,000 tons of the total 13,439 M^3/6,098 tons total aid delivered during the response. [38]

DoD-specific activities were not found in OXFAM and UNICEF reports.[39] UNICEF suggested the importance of projecting the number of military aircraft and

vehicles required to transport UNICEF commodities in future responses. This recommendation suggests there was coordinated action among UNICEF and military personnel in Cebu, where a military aviation and logistical coordination unit was established. The report conversely indicates the logistics cluster for coordination across international donors and responders did not permit use of civil-military transportation. Thus a NGO-only ground logistics system was required to store and distribute UNICEF aid.[40]

The OXFAM after-action report does not mention military support from DoD or HCA activities prior to Typhoon Yolanda. The OXFAM report however concluded that Philippines authorities and international donors should proactively focus on disaster risk reduction activities to reduce the need for external resources during an international disaster response. OXFAM also advocated against creation of parallel distribution systems through coordination during periods between disaster responses. Common themes from both OXFAM and UNICEF suggest stronger coordination prior to a disaster occurring, emphasizing that climate change may have an impact on future disasters in coastal regions.[39, 40] Several DoD reports echo a rising concern for climate change and sea-level rise in on naval operations associated with large scale disasters and complex health emergencies.[41, 42]

A summative report from the Philippine government assessing the initial response to Typhoon Yolanda was not available via official government or humanitarian websites. However, the NDRRMC daily situation reports covering the time period just prior to Typhoon Yolanda making landfall on November 7, 2013, to December 5, 2013, were available for review. The daily situation reports contain remarkable detail regarding

resources requested of the international community under the direction of the Philippine government. These reports provide no evaluation of aid effectiveness, but offer a robust accounting of identified needs and geographic distribution. International military support is first acknowledged in the daily situation reports on November 15, 2013, with the arrival of the USMC humanitarian assistance support team. The daily reports indicate that by November 19, 2013, the Armed Forces of the Philippines formally established a coordinating presence on the US aircraft carrier USS Washington to guide mutual Philippine and DoD relief operations.[43]

Ten publications highlighting Typhoon Yolanda's impact on healthcare capacity and infrastructure were published by the Philippine Department of Health in collaboration with the World Health Organization. The contributions from several international militaries support were prominently mentioned in these bulletins, and the coordination by DoD stationed in Manila was acknowledged in each bulletin. The arrival and positioning of the PLAN hospital ship (Peace Ark) in Tacloban harbor was featured in several bulletins. The Peace Ark's capabilities included a 300 bed hospital and clinical services that included neurosurgery, ophthalmology, and dentistry. The Singaporean Army provided support to outlying islands communities. The Japan Self-defense Force played a critical role in a multilateral immunization program in collaboration with Save the Children, the Salvation Army, and the Philippines Red Cross.[44]

mHCAs Influence on Military Resources Integrated into Disaster Response

Common Themes

The DoD, partnering militaries, and other agencies frequently participate in initial disaster responses and mHCA missions. Framing mHCA activities as facilitators of disaster response, as described by the DoD, is critical to future disaster responses and preparedness efforts.[45] Several themes emerged in examining the role the DoD played as part of the larger USG response to the four selected natural disasters. The continuum of communication, cooperation, coordination and collaboration provides a lens through which to contextualize the collective lessons learned across the numerous key stakeholder report recommendations. More formalized external analyses of military participation in disaster response and risk reduction activities should lead to organizational change that shapes and defines the role of the DoD in the global health commons. By incorporating a disaster risk reduction focus, military missions geared towards improving health systems can mitigate risk during complex health emergencies.

Communication – "**the act of transmitting a message from one organisation to another organisation or part of an organisation, is a critical ingredient of collective action"**[7]

Communicating requests for disaster assistance between HN varied significantly. (Table 3.) A stark difference between a successful international response and a non-successful response involving foreign militaries is revealed when comparing the responses to Cyclone Nargis in Myanmar and Super Typhoon Yolanda in the Philippines. There were no direct communications between the DoD and Myanmar military and disaster management teams. The lack of bilateral diplomatic relations was the primary issue for the junta-led Myanmar government and the USG. Proactive mHCA health

engagements with Myanmar were simply not feasible without the prior establishment of diplomatic relations. The Myanmar government's reluctance to communicate and cooperate with foreign militaries, even in the face of life-threatening conditions, complicated coordination with the DoD and NGOs. These constraints created a logistical burden on responding DoD military, as aviation assets were required to operate from bordering countries, and prohibited the full utilization of military medical personnel in the disaster-affected areas.[22]

Post Cyclone Nargis, the Myanmar political situation has evolved into a more open one with the dissolution of the junta-led regime. USG and Myanmar relations have progressed to more open rapport that has resulted in the observation by and participation of the Myanmar military in several multi-national military exercises with a HA/DR focus. [46,47] The PLAN has since conducted a mHCA health engagement event in Myanmar in 2013.

Super Typhoon Yolanda serves as a contrasting example where long-standing open channels of communication and pre-disaster engagements enabled coordination of numerous foreign militaries and health resources. The DoD has a long history of collaborating with the Philippine military, and in the years prior to Typhoon Yolanda had conducted four mHCA missions. The USG commitment to partnering with the Philippine people likely was significant in the ease of integrating the DoD into the Typhoon Yolanda response.[34] The role of the previous mHCAs missions is only a minor contribution to the comprehensive military to military disaster preparedness engagements. [35]

Both DoD and several NGOs advocate for military personnel to build and maintain HA/DR knowledge-base through education. In this area the DoD actively continues to refine internal educational opportunities, particularly for medical staff. Several training courses are available to DoD medical personnel, including formalized military curricula in the Military Medicine Humanitarian Assistance, Joint Officer Medical Manager, and Global Health Engagement courses. The DoD annually sponsors the IFRC-approved Health Emergencies in Large Populations and DoD-sponsored Humanitarian Assistance Response Training courses with students from military, medical, other US agencies, and NGOs. DoD medical personnel frequently take part in USAID's Joint Humanitarian Operations course as well. The individual DoD services (i.e., Navy, Air Force, and Army) have dedicated global health-related career paths for medical professionals. The US Air Force has a cadre of International Health Specialists while the US Navy recently established a Global Health career certification for medical staff. [48,49]

Consistent strategic communication internal to DoD communities not as familiar with mHCAs is warranted. Non-medical military personnel represent a community within the military that might benefit from a broader understanding of health engagement and its influence on disaster response. Senior, non-medical military personnel normally serve in a variety of capacities (i.e., combatants, logistics, engineering, etc); however, they may find themselves leading disaster responses or strategic policy activities. Many of these non-medical military personnel attend graduate education programs in the DoD's National Defense University (NDU). NDU curricula frequently offer exercises addressing reactive HA/DR activities, but provide minimal or no exposure to proactive

healthcare capacity building and health engagement strategies. The Naval War College has recently created a HA/DR department to explore how the maritime services conduct HA/DR missions and align with national security objectives. This program may also provide an opportunity to research potential relationships between HCA and HA/DR.[50] Junior personnel generally do not receive formalized instruction in health engagement activities, but they are often on the ground during disaster responses or assigned to mHCA missions delivering direct aid to disaster-affected populations. Not incorporated into this HA/DR course of training is how mHCAs are intended to influence HA/DR operations and comprehensive regional security plans of COCOMs.

Another critical observation linked to internal communication challenges germane to the DoD is the lack of acknowledgement of mHCAs in post-disaster responses reports. As HA/DR is a core strategic DoD competency on equal footing with combat operations, the lack of analysis exploring associations between mHCA and HA/DR by the DoD is striking. While other stakeholders might be unaware or not vested in this connection, the DoD should be seeking such causality for the sake of continued support of mHCA as a valid means of improving reactive HA/DR and proactive DRR efforts. Contextually, the DoD is missing an opportunity to examine mHCA and HA/DR relationship as part of a disaster diplomacy model encompassing the disaster response cycle. This disaster diplomacy framework may provide the DoD a holistic global health engagement model linking proactive efforts (i.e. disease surveillance, mHCAs, land based HCAs, healthcare capacity building efforts) and reactive disaster responses. [51]

Cooperation –" refers to short-term, often informal and voluntary relationships between organisations or parts of an organisation that are characterised by low levels of intensity and risk"[7]

The role of hospital ships from the PLAN, DoD, and several other nations is mentioned several times in reports on disaster responses in the Philippines, Myanmar, and Haiti. Consistently absent across all post-disaster response reports reviewed, regardless of stakeholder, is any assessment of linkage between proactive mHCA missions, and disaster response activities. With the DoD's strategic premise that mHCAs are a means to improve disaster response, key stakeholders are either not aware or are not examining the value of short-term cooperation and long-term collaboration to disaster response coordination. As a stated mHCA mission objective in high-level strategic planning documents, healthcare capacity-building activities as a risk mitigation tool and benefit to HN participating should be more closely examined. [12, 52]

Linking mHCAs and disaster responses becomes increasingly important when DoD HCA support is conducted from hospital ships and combat vessels. Further, the DoD has invested considerable sums in future maritime platforms such as the mobile landing -platform vessel. Humanitarian assistance is a core mission capability of these future vessels at an initial projected cost of US$1.5 billion. [53 54]The DoD is not alone in expending resources on the construction of military maritime platforms incorparting and enhancing HA/DR as a naval ission obejctive.

Large –scale complex health emergencies, such as the 2010 Haiti earthquake Boxing Day Tsunami of 2005, witnessed the convergence of naval vessles from several countries. Cooperation between navies during the conduct of mHCAs will only serve to

improve HA/DR activities when crises occur. Maritime operations are fraught with hazard if not rehearsed in a controled environment and planned in advance. Providing the opportunity for naval perosnnel, both medical staff aboard hospital ships and the sailors who navigate these vessels, will also maximize the efficency of clinical services provided in both mHCAs and disaster responses.

Coordination – *"***serves a more tactical need, and seemed to require both communication and some sense of cooperation"**[7]

Logistical support is consistently referenced as a benefit of military involvement in disaster response. Larger militaries, like the DOD, routinely rehearse logistical exercises with the objective of improving efficiency and integration in complex international settings. Common amongst the four disaster responses reviewed, the DoD's, logistical resources found within militaries were generally praised for their unique and vast distribution capability. The DoD's unparalleled ability to establish a foothold in austere and compromised environments is cited frequently as an essential life-saving contribution.

The sheer volume and immediate influx of DoD resources during the Haiti earthquake is cited by DoD, USAID, and NGOs as a source of inefficiencies, potentially burdensome for the GoH and some of the international partners. The urgency perceived by DoD in Haiti at the time the earthquake struck and the lack of a controlled rapid initial assessment is reported by reviewers as a likely source of the initially overwhelming DoD presence. This overwhelming presence, coupled with the impaired coordination with an underprepared GoH, were also found to be contributing challenges. [27, 28]

In the case of the response to Cyclone Nargis in Myanmar, the DoD adapted to prohibitions on foreign military presence by the Myanmar government. The DoD collaborated with the Thai government to situate military aircraft and personnel outside Myanmar borders, invited Myanmar military to inspect DoD operations, and retained naval vessels off the Myanmar coast in case prohibitions were lifted. The conditions imposed by the Myanmar government potentially incurred risk to both DoD military personnel and disaster-affected populations. Military personnel were deployed to locations where they were less able to distribute aid and were subject to austere and unfamiliar settings. Relief supplies delivered by DoD aircraft had to be transferred to conveyances the Myanmar military could inspect and approve of, which delayed the timely delivery of aid [22, 55].

The availability, proximity, and allocation of medical resources are a common element of both proactive mHCAs and reactive disaster responses. However, reports we examined do not identify associations between pre-and post-disaster DoD engagement with HNs. DoD mHCA missions are international collaborative efforts by design with numerous nations providing medical supplies and personnel. Pre-planning meetings involve HNs and partner donor nations before these missions deploy. In disaster response, these proactive efforts permit the establishment of true collaborations among the various involved parties. Roles and responsibilities that may be employed during actual disasters response can be established during these exercises.

Collaboration –" the most embedded, riskiest and costly activity of the partnering continuum, signaling a deep relationship that required change and strategic action within both partner organizations"[7]

Several post-disaster response reports cited a desire to establish a more formalized international disaster response and preparedness framework involving military resources. Multiple stakeholders and independent reviewers concluded that complex emergencies generally require extraordinary health resources to restore basic services. An agreed-upon framework detailing how militaries integrate with and support civilian-led disaster responses might in fact minimize the resources required in these responses while, respecting national sovereignty and ensuring that affected nations maintain control of the response. Such a framework might serve to harmonize mHCA activities with other sustainable capacity-building actions.

The hospital ships deployed by PLAN, DoD, and several nations were mentioned numerous times for the disaster responses in the Philippines, Myanmar, and Haiti. However, as mentioned above, there was no acknowledgement of the pre-disaster mHCA linkage to post-disaster outcomes. Both such missions can be conducted from hospital ships and combat vessels.

International and interagency leadership across governmental and intergovernmental organizations is vital to disaster affected populations. The time to establish organizational and leadership relationships should not be left to the disaster response timeframe. Collaborating in times of calm without the stress of a disaster response allows for consideration of risk reduction, deployment of logistical and medical

resources, and relationship building. Multilateral collaboration should be established especially in disaster-prone regions where large populations are living.

The dynamic and reactive environment of a national level emergency with HN relying on foreign militaries and their capabilities includes consideration of sovereignty issues and integration of these resources into national disaster management. Disaster-affected governments will always have the burden in managing the influx of a diverse group of organizations: each with its own procedures, leadership personalities, and organizational cultures. Regional and national political relations further necessitate that relations be periodically re-evaluated through reliable communication and proactive collaborative efforts.

LIMITATIONS

This comparative case study approach possessed certain limitations associated with the limited number of units of analysis available for investigation. This constrained the ability to conduct meaningful statistical analysis comparing the four countries selected. The sample size is contingent on real-world events occurring, with these parameters; 1) maritime HCA missions visiting a disaster affected nation and 2) a disaster of significant devastation requiring international assistance and 3) and foreign militaries being assigned to render aid to the disaster-affected nation. While this limitation is beyond the control of the authors, examination of real-world, contemporary issues affecting participants of international disaster response settings is a critical analytical undertaking. [10]

Another limitation is the inability to control potential biases introduced through the use of key stakeholders post-disaster reports. Organizational influence can temper collected data and findings to minimize numerous issues including those related to management and leadership challenges. After-action reports can focus solely on stakeholder interests, thus limiting interpretation of interactions with other responding organizations and perceptions of coordination. To minimize the impact of stakeholder reporting bias, we used triangulation through multiple stakeholder post-disaster reports, specifically from the DoD, a responding NGO, and the disaster affected governments. The convergence of common findings framed the issues related to communication, coordination, cooperation and collaboration which identified mutual opportunities to improve future disaster responses. [7] The consistent lack of acknowledgment of mHCAs from each stakeholder presents an opportunity explore a resource that is either underutilized or simply not well connected to the desired outcome of improved disaster response through integration of military medical capabilities.

When formal post-disaster reports could not be accessed, daily situation reports documenting the status of the disaster response in close to real-time conditions were utilized. This limits direct comparisons given that the methodology and collection situation report data are not scrutinized by stakeholders or evaluators for the purpose of assessing the disaster post-hoc. However, in some cases, this unadulterated collection of information allowed for documentation of the scale of and references to utility of maritime vessels and military medical support provided that were lacking in post-disaster response reports.

Additionally, the timeframe of 2006 to 2013 used to identify specific disasters in the selected HN cases itself is a limitation in the analysis. This timeframe was selected as it was the period in which DoD initiated with consistent regularity the annual conduct of mHCA missions and the 2009 PRC establishment of a similar mHCA program. This timeframe is incongruent with the 2014 to 2016 change in overall risk trends and the 2016 overall risk used to determine disaster-affected HN case selection (see Figure 2). Creators of the INFORM database, UNISDR, suggest the most recent overall risk determination scores and trend changes should be utilized as initial points of comparison for disaster risk research using aggregate INFORM metrics. Another major limitation associated with the INFORM database is it only reports disaster risk data from 2012 to present day, prior to the rise in mHCA programs as tools of military medical diplomacy. The INFORM database was only recently made publically accessible in 2014, thus precluding contemporaneous analysis of mHCA missions or disaster responses prior to 2014.

In summary, the chaotic nature of complex health emergencies amidst a disaster response itself does not allow for a complete accounting of interactions between personnel and organizations. This incomplete accounting limited the thoroughness of narrative development.

CONCLUSIONS

Disasters generate unique resource and tactical demands depending on the magnitude of devastation and the scope of the response. The extensive roster of actors

that may render aid during large-scale disasters elevates the need for collaborative pre-event planning. Disaster responses requiring external aid from the international community must adhere to rules of sovereignty regardless of the disaster effects on a nation's level of devastation. Each donor nation must understand not only its own but also other supporting nation's cultural, political, and logistical schema. Coordination is of greater importance when foreign militaries are delivering supplies or directly providing aid. Military organizations and international partners should work towards a strategically sound set of relationships and expectations. An international response framework that specifically addresses the potential involvement of military-delivered disaster assistance is critically important. The resources provided by international military-based assistance can be better utilized if pre-planning and advance cooperative missions can be conducted and involve multiple stakeholders as well as HN leadership.

While this comparative case study sought to explore the notional relationship between proactive DoD mHCAs and reactive HA/DR missions, it is clear there are continued opportunities to improve both missions. The continued evolution of mHCAs collaborations contributing to increased cooperation amongst nations and their respective militaries in the future should continue to improve efficiencies in HA/DR coordination. Regional coordinating bodies, like the recently established ASEAN Military Medical Center, offer the possibility realizing strategic and tactical benefits of mHCAs for all participants.

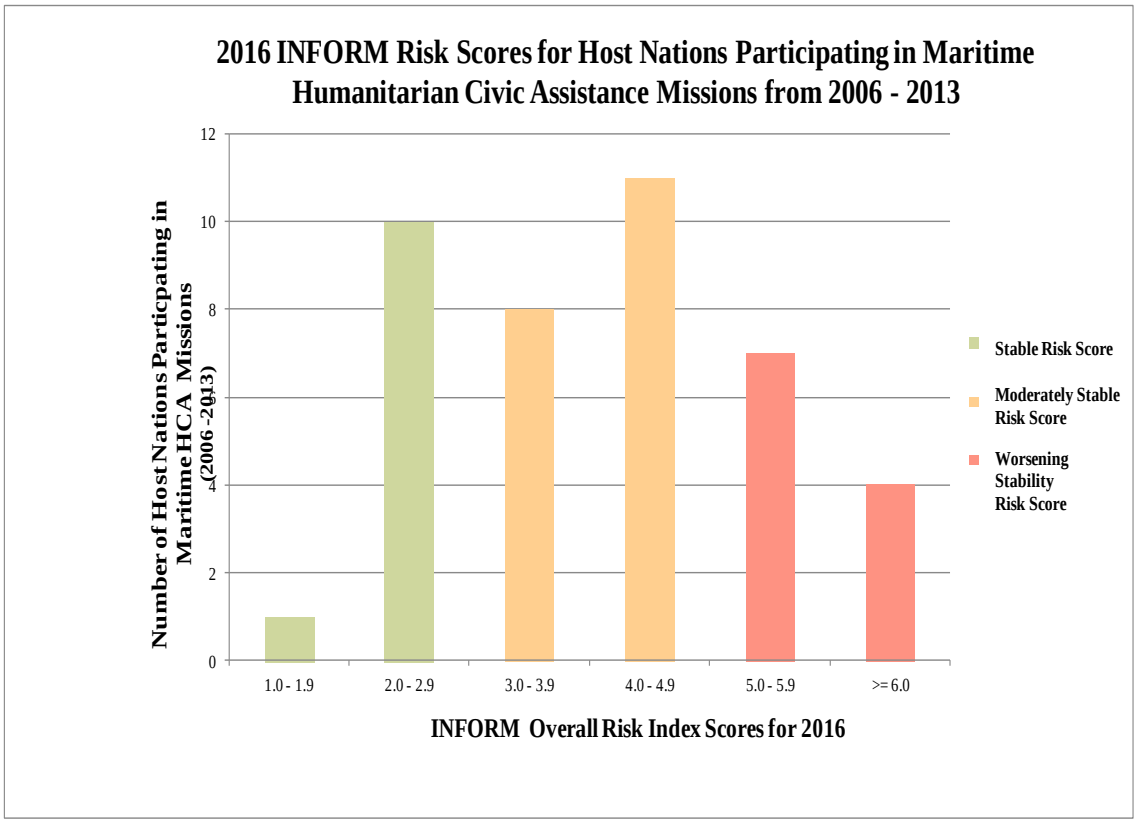

Figure 3- 1. 2016 INFORM Risk Scores for Host Nations Participating in Maritime Humanitarian Civic Assistance Missions from 2006 - 2013

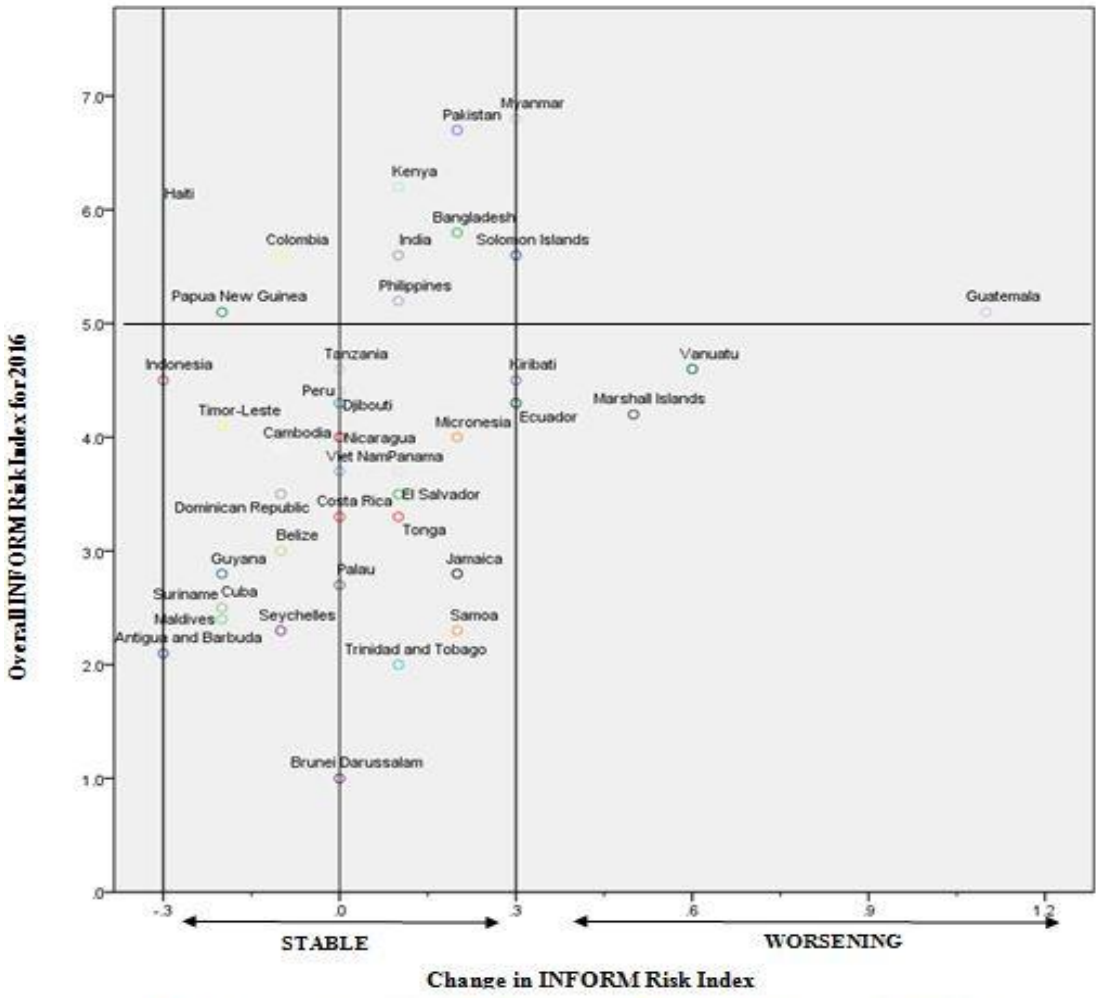

Figure 3- 2. Change in INFORM Risk Index from 2014 -2016for Maritime HCA Nations

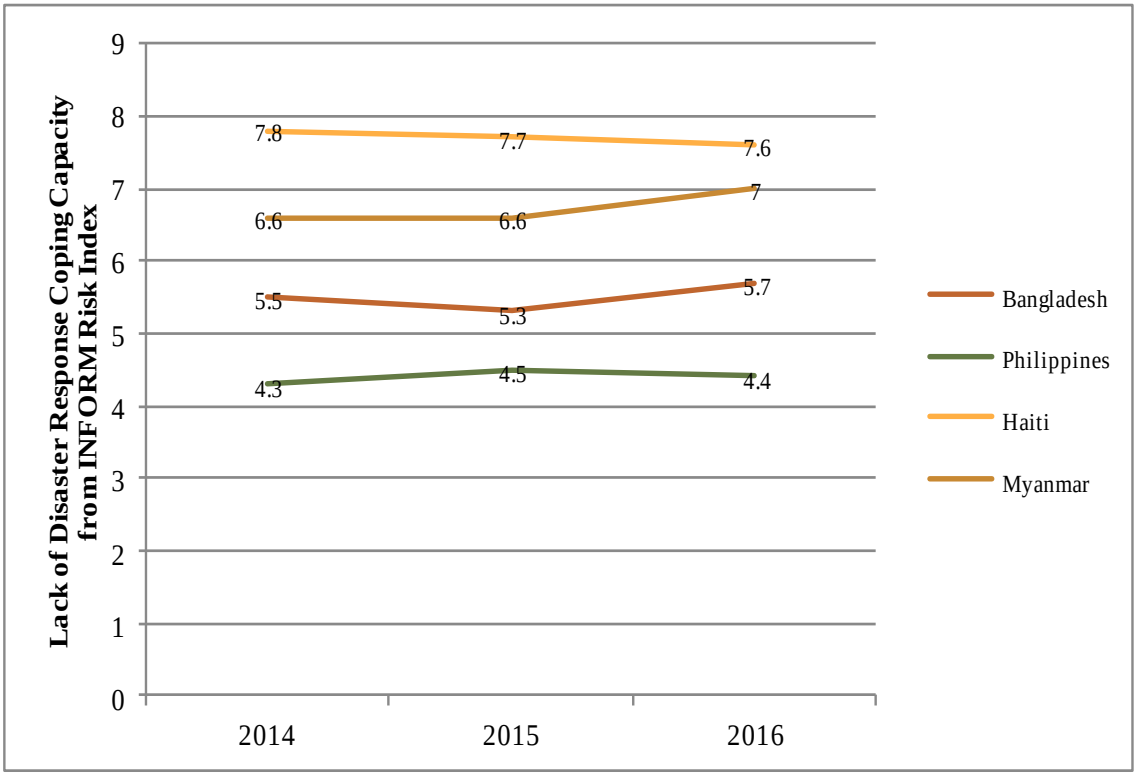

Figure 3-3. Change in INFORM Risk Index Disaster Response Coping Capacity from 2014 – 2016 for Case Study Disaster Affected Nations

Table 3-1. Scale of Damage to Disaster-Affected Nations Selected for Comparative Case Study

Disaster Affected Country/Year	Disaster Type/Name	Total deaths	Injured	Total Affected Population	Total damage (in millions USD)
Bangladesh/2007	Cyclone Sidr	5,721	55,342	23,215,116	2,414
Myanmar/2008	Cyclone Nargis	138,366	20,000	2,420,000	4,000
Haiti/2010	Earthquake	229,549	577,520	4,314,226	8,000
Philippines/2013	Super Typhoon Yolanda	7,750	29,893	25,667,133	12,422

Table 3-2. Number of Maritime Humanitarian Civic Assistance Missions and 5-Year Difference in INFORM Risk Index Scores Scale for Disaster-Affected Nations Selected for Comparative Case Study

Disaster Affected Nation	/# of HCA Mission Prior to Disaster	5-Year Difference in INFORM Hazard Score	5-Year Difference in INFORM Vulnerability Score	5-Year Difference in INFORM Capacity Score
Bangladesh, 2007	1	0.3	-0.3	-0.3
Myanmar, 2009	0	-0.9	0.7	-0.3
Haiti, 2010	3	-0.1	0.1	-0.4
Philippines, 2013	4	0.7	0.9	-0.6

Table 3-3. Request for Assistance from the United States Government & the Department of Defense by Disaster-Affected Nations Selected for Comparative Case Study

Disaster Affected Nation	/# of HCA Mission Prior to Disaster *Collaboration*	Humanitarian Support Officially Requested *Communication*	Disaster Declaration Prior to Formal DoD Resource Planning *Communication*	USAID/ OFDA Determines Unique Military Capabilities *Coordination*	DoD/ Geographic Combatant Commander Assigned *Cooperation*	DoD In-country Humanitarian Assistance *Cooperation*
Bangladesh, 2007	1	No	No	Yes	Yes	Yes
Myanmar, 2009	0	No	No	No	Yes	No
Haiti, 2010	3	No	No	No	Yes	Yes
Philippines, 2013	4	Yes	Yes	Yes	Yes	Yes

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CHAPTER 4: MARITIME HUMANITARIAN CIVIC ASSISTANCE MISSIONS AND DISASTER RESPONSES: IMPROVING PROACTIVE MEASURES FOR SUSTAINABLE OUTCOMES

ABSTRACT

The Department of Defense (DoD) regards disaster response and proactive humanitarian engagements, formerly identified as Humanitarian Civic Assistance (HCA) missions, as core functions vital to military supported diplomatic efforts. It has increased the frequency of HCA missions conducted from maritime (mHCA) platforms to Host Nations (HN), which receive mHCA clinical and educational services. HNs are envisioned to benefit short-term from mHCA missions through clinical services, professional training opportunities, and disaster response training. mHCAs need better measurement protocols, put in place at the front end of mHCA missions, to determine if health interventions are effective in improving HN health outcomes as well as achieving intended diplomacy objectives. The need for validating the contribution of mHCA missions to improved HN healthcare capacity building is critical to future mHCA missions. Essential to determining the strategic worth of such military led health diplomacy efforts is developing appropriate measures of effectiveness and mHCA coordination across the global community. Ensuring a continued path towards improving coordination of intermittent mHCA engagements and the quality of mHCA data collection should contribute to better aligning military-sponsored health engagements with preventive disaster risk reduction (DRR) efforts in the broader international global

health environment. A dedicated military medical command within the DoD can facilitate mHCA coordination, advanced planning, and data collection. Sustainable changes via healthcare capacity building, disaster response and mitigation training and programmatic evaluations are essential as are agreed upon DRR framework outcomes. Several existing international governance frameworks and agreements, such as the Sendai Framework for Disaster Risk Reduction, recognize the importance of improved disaster response as a desired outcome of DRR programs. A potential opportunity for internationally coordinating and evaluating the regional impact of mHCA mission's role in sustainable healthcare capacity-building could be in collaboration with the Association of Southeast Asian Nations (ASEAN) Center for Military Medicine (ACMM).

INTRODUCTION

The Department of Defense (DoD) regards disaster response and proactive humanitarian engagements, formally identified as Humanitarian Civic Assistance (HCA) missions, as core functions vital to military-supported diplomatic efforts.[1,2] DoD's global health engagement strategy includes DoD-led HCA missions amongst other successful programs such as the DoD HIV/AIDS Prevention Program, which is the military-focused element of the President's Emergency Plan for AIDS Relief (PEPFAR), DoD overseas disease surveillance laboratories, and several health liaison officers in Host Nations (HN)

throughout the globe and international governance bodies. The United States Agency for International (USAID) prioritizes sustainable development and health security worldwide while highlighting DoD as a strategic partner and supporting agency in health-centric diplomacy. DoD is also striving to align its strategic disaster response readiness and humanitarian mission resources through inter-departmental and inter-agency cooperation. It has increased the frequency of HCA missions and continues to commit operational resources to conduct these missions. DoD leadership also aims to support national security objectives and humanitarian needs through coordinated HN health system capacity building.

The Department of the Navy (DoN) invests significant resources in the use of ships as platforms for maritime HCA (mHCA) missions. These include traditional combat ships ('grey hulls') and hospital ships. The extensively outfitted hospital ships, USNS Comfort and Mercy, are frequently referred to as strategic assets critical to improving US international collaborations and providing appropriate health assistance to

populations in dire need. These planned mHCA missions leverage the military healthcare system, other US agency stakeholders, NGOs and multilateral partners, and help mobilize medical resources and personnel from across the US government (USG). mHCA missions also routinely include non-governmental organizations (NGOs) familiar with HNs needs, populations, and health sector limitations.[3] mHCA missions generally include clinical service delivery via in-country medical clinics, and educationally-focused events consisted of DoD and HN Subject Matter Expert Exchanges utilizing lectures, demonstrations, practical applications, and other activities.

HNs receive short-term benefits from mHCA missions through clinical services, professional training opportunities, and consultation on disaster response capabilities.[4] However, HNs could also benefit from longer-term engagements as evidence-based development projects that have the potential to promote global health. This latter goal may indicate a need for deeper humanitarian engagements and more enduring public health interventions that promote both global health and national security objectives. As currently implemented, mHCAs have little to no assessment on outcomes in the HNs in which they are conducted as elucidated in chapter 2. While DoD strategic guidance expressly states HA/DR is military mission scant evidence linking mHCAs qualitatively or quantitatively exists as reported in previous chapters.

DoD must develop valid measures of mHCA effectiveness internally as DoD policy.[5] Similarly, international agreements and frameworks such as the United Nations Sendai Framework for Disaster Risk Reduction, Paris Declaration on Aid Effectiveness and the World Health Organization's International Health Regulations all call for evaluation of effectiveness of donating aid.[6-8] DoD humanitarian efforts in mHCA would

benefit from prospective monitoring and evaluation of mission relevant to diplomatic and health outcomes. Ideally, these types of measures can inform needed improvements and alterations in mHCA preparation and implementation.[9,10] However, despite these mandates and recommendations, little work has been done to create such measurement tools and methods to assess mHCA effectiveness and sustainable benefits to HNs. While the strategic language highlighting the global health and security objectives of mHCAs is evident in DoD policies, outcome evaluations of mHCA related to these goals is limited. Like almost all other DoD missions, mHCAs require serious consideration as to how evaluation data are collected and analyzed, and therefore more robust approaches to measurement are needed in order to support future funding and stakeholder involvement.

Planning for Maritime Humanitarian Civic Assistance Monitoring & Evaluation

Many mHCA missions are designed as clinical services interventions, but they have not been structured to allow for measurement of lasting public health and diplomacy impacts. Therefore, mHCAs need better measurement protocols, put in place at the front end of mHCA missions, to determine if health interventions are effective in improving HN health outcomes as well as succeeding in their intended diplomacy efforts. Indeed, mHCAs must be justified as to whether their human and financial investments go beyond mere public relations to promote lasting and strategically important foreign policy results.

These types of evaluations are achievable and can demonstrate immediate and longer term impact on the recipient country. What is key is to ensure that acute care clinical service process measures are not the only outcome of mission effectiveness.

Population health improvement should also be assessed in these mHCAs, including 'soft power' diplomacy outcomes, such as trade agreements, mutual support in other international bodies, and security cooperation training exercises. Both are important as accountability measures to promote global health while also promoting global understanding and security. Expanding our measures of effectiveness in global humanitarian efforts can support resource allocation and international partnership development with the US military.

Patient surveys may indicate how to better design mHCA missions that provide clinical care to underserved populations. However, assessments of patient perceptions are absent from the peer-reviewed literature. Such data collection might be part of sustainable in-country partnership activities by Non-governmental organization (NGO) and local providers to follow up on the intermittent mHCA visits.[11-13] For example, 6-month and 12-month post-mHCA mission surveys, could serve to evaluate mHCA mission impacts on the local population. This would provide mHCA planners, partner organizations, and recipient country personnel with a community-level public opinion metric directly related to the mHCA mission that could also provide feedback as to its diplomatic or strategic impact. This would inform efforts to integrate local population health needs with the mHCAs, Inter-governmental Organizations (IGOs), and NGO programs. Further, such an effort would also help determine if there are negative outcomes associated with MHCA missions as well as identify geographic and economic barriers to accomplishing mission objectives. Patient-level data would provide essential quality improvement information to validate and adjust mHCA procedures as needed.

Humanitarian Civic Assistance Baseline Data

Ideally, mHCAs should first invest in data collection and planning resources to identify the specific mission-related health needs of the HN. This information could enhance cooperation and also build on previous collaborative health engagements. These kinds of data would allow mHCA planners to better staff and prepare missions with more appropriate leadership, medical specialists, support equipment, and other non-DoD partners.

Establishing HN baseline needs is essential to assessing the benefit of mHCA missions to improve health systems or infrastructure. Existing host nation population health data collected as part of USAID development programs, in conjunction with information from DoD resources, such the National Center for Medical Intelligence, might provide an initial point of comparison with which to assess population health outcomes of mHCA. The Field Operations Guide for Disaster Assessment and Response utilized by USAID to coordinate crises responses may offer some guidance for mHCA planners prior to mHCA missions.[14] The surveillance system elements found in this guide could help link interagency data across the disaster response cycle. This approach would also provide more consistency between USAID and DoD evaluation efforts. Aggregating these data, as well as data from NGOs, IGOs, and other stakeholders, might serve to enable more comprehensive information gathering prior to initiating or planning a mHCA mission.

It is also important that mHCA mission planners and partner organizations look beyond clinical outcomes alone. Shifting the metric from the volume of patients

receiving clinical care to public health and diplomatic outcomes achieved could expand the magnitude and scope of mHCA missions.[12] Diplomatic outcomes of military medical mHCA activities need appropriate MOEs and metrics.

Public Health Metrics & Healthcare Capacity Building

mHCAs integration with existing monitoring and evaluation programs could provide near-term and accessible measures of effectiveness without broad changes to mHCAs as currently conducted. Prevention efforts against infectious diseases, such as soil-transmitted helminthes, lymphatic filariasis, schistosomiasis, and certain ecto-parasites, impacting local populations may be a manageable measure of success for mHCA missions.[15] Regional disease reporting data could be used as a baseline to document their endemicity in the recipient country. These diseases would then be monitored by partner NGOs and public health entities on the ground after mHCA missions in order to evaluate mHCA interventions. Other public health issues are amenable to this cooperative strategy. For example, similar assessments can be applied to military mHCA-sponsored vaccination programs partnering with NGOs, governments, as well as private sector partners to analyze changes in prevalence or attack rates for vaccine-preventable diseases.[16]

Critically assessing local health system resources for unmet treatment needs may yield information for planning and diversifying mHCA clinical activities. Again, partnership with NGOs and other relevant entities can provide insight for military mHCA planning new as well as returning mHCA missions. Medical infrastructure improvements

that demonstrate sustainability may indicate mHCA successes.[17] However, it is important to also assess local healthcare provider and regional health officials' perceptions to ensure that military mHCA efforts do not overshadow or undermine trust in the local community and HN facilities. Geographic information systems may yield important information with which to target mHCA mission activities. Regional differences in health status and facilities may point to more effective mHCA and MOE planning, with regional targeting of services and placement of resources by military and non-military stakeholders.[18]

One approach to setting and improving MOEs for diplomatic goals is to review HN media reports prior to, after the arrival, and after the departure of mHCA missions. Although this has been utilized previously to provide some indications of HN perceptions of care delivered, expanding this assessment to include NGO websites such as ReliefWeb.org would provide additional external indicators of health diplomacy impacts.[19,20] In addition to media reports, collecting key informant data from other vested stakeholders can also add additional insights on mHCA impacts. These include allied nations supporting mHCAs, military professionals participating in mHCA missions, NGOs, and the American public. All of these could provide important insights on the perceived impact of mHCAs in US foreign policy.

Given the plethora of country-specific population health databases and healthcare system data sources available, careful selection of those most relevant to mHCA mission planning and base-lining HN health status is important in the evaluation of mission impacts on HN. Data collected during mHCA missions for later analysis linking changes to HN health status or capability to manage disaster responses will likely require unique

data collection, system architecture to manage and analyze data, and at least minimal security applications to protect patient privacy. Previous efforts to retrospectively examine mHCA health data entered into databases designed for other purposes such as cost tracking, like the Overseas Humanitarian Assistance Shared Information System or Global Theater Security Cooperation Management System, lack sufficient health-centric specificity and stakeholder accessibility to allow transparent analysis of mHCA effectiveness.[21,22]

A new HCA database could provide an opportunity to incorporate systems engineering design approaches for healthcare systems strengthening, including both land-based HCAs and mHCA missions.[23] Organization of a HCA system of networks, dynamics, and knowledge could lead to a comprehensive HCA planning and analysis framework that might be openly shared with future collaborators considering mHCA missions of their own. The individual elements of mHCA missions now disparately conducted could be examined in context of other HCA mission efforts or other regional activities conducted in the HN to minimize redundant efforts or cover gaps in clinical services delivery.

Maritime Humanitarian Civic Assistance Coordination

Aside from improving data collection to assess mHCA impacts, infrastructure improvements within military medicine may also improve collective HCA outcomes. A dedicated entity within the military medical command can facilitate coordination, advance planning, and adequate data collection for all HCA activities.[24] First, adding

permanent military medical staff to USAID-led missions in HNs where HCA engagements occur, may provide better planning and continuity of mHCA efforts.[25] Having earlier engagement of military medical personnel and designing data to capture outcomes of MOEs can assist in validating mission accomplishments. This organizational structure would also foster and maintain US interagency and NGO relationships long after mHCAs have departed a HN. Military personnel responsible for executing HCA missions would coordinate with NGOs, Department of State, and USAID, assisting in these projects under redesigned MOEs. This would assist long-term prospective monitoring and evaluation of mHCA outcomes, and the overall attainment of health diplomacy objectives.[26]

In addition, a new functional military medical command, similar to regional combatant commands in terms of resources, dedicated to support global health engagements and HCAs could be considered. A unified medical command would provide medical personnel to support HCA missions across all military services. The fairly recent establishment of the Defense Health Agency and its strategic emphasis on global health engagement could be a prelude to the proposed functional medical command.[27] Several internal reviews of mHCA missions have previously recommended further USG interagency cooperation and international cooperation with multi-national and non-governmental organizations.[5,28] The organizational foundation would build upon current efforts to integrate interagency partners and NGOs to assess mission successes and failures, a critical capability currently under development with military medicine leadership.[29]

Military planners should also consider adding active duty US Public Health Service professionals and researchers to be involved in all phases mHCA mission planning, execution, and post mission analysis. Their special skills will assure that public health science is incorporated into evaluations and that public health outcomes might be better targeted by mHCAs. At the same time, military planners should utilize existing military program management models to align military activities with the health diplomacy objectives of mHCAs.

Several existing international governance frameworks and agreements, such as the United Nations Hyogo Framework for Action for 2005-2015, the Sendai Framework for Disaster Risk Reduction (DRR) for 2015 -2030, and the Sustainable Developments Goals, recognize the importance of improved disaster response as a desired outcome of disaster risk reduction programs. These international DRR frameworks and agreements provide comprehensive guidance and standardized objectives for instilling national-level resiliency to large-scale disasters through structured disaster preparedness programs and multilateral partnerships. Sustainable changes via healthcare capacity building, disaster response and mitigation training and programmatic evaluations are essential and agreed upon DRR framework outcomes.

Similarly, mHCAs and the use of military medical resources for delivery of clinical services should be aligned to accomplish these same DRR framework goals and objectives. Coordinated disaster responses involving the international community during complex health emergencies should be a result of engagement and partnerships formed during mHCA missions.

A potential opportunity for internationally coordinating and evaluating the regional impact of MHCA mission's role in sustainable healthcare capacity building outcomes could be in collaboration with the Association of Southeast Asian Nations (ASEAN) Center for Military Medicine (ACMM). The recently created ACMM was established with the expressed purpose of coordinating military medical assets responding disasters and during complex health emergencies. ACMM is also tasked with working closely the ASEAN Coordination Center for Humanitarian Assistance.[30] The serendipitous alignment of organizational resources and interests could lend itself to support future mHCA mission's coordination and evaluation. With the DoD's operational focus aptly titled as the "pivot to the Pacific" and decade of mHCA missions in the Pacific region, professional rapports like the one proposed with ACMM might be essential to evaluating mHCAs. ACMM conceivably could implement its MHCA missions conducted as part its military medical programs across member nations under the auspices of the Sendai Framework for Disaster risk Reduction and the Sustainable Development Goals.

CONCLUSIONS

The need for validating the contribution of mHCA missions to improved HN health system capacity building is critical to future mHCA missions. Essential to determining the strategic worth of such military led health diplomacy efforts is developing the appropriate measures of effectiveness and mHCA coordination across the global community. Sharing mHCA data in a transparent manner is equally important to

maximizing the benefit to recipient HN healthcare capacity. Developing mHCA quantitative tools and databases would benefit other health engagements activities conducted solely with land based military resources. If one of the DoD's long-term intents of strategic proactive global health engagements is improve global healthcare capacity to minimize reactive responses to large-scale disasters, applying forethought to coordinating and evaluating MHCA is a logical course of action,

Short term mHCA missions are likely to continue in the near foreseeable future. The manner in which they are currently planned, executed and evaluated stands a strong possibility to follow similar manner of past missions. As such, the opportunity to evolve mHCAs impact towards sustainable healthcare capacity building outcomes may stagnant or simply provide redundant clinical services. Host Nations with limited or constrained healthcare resources and vulnerable populations in need of basic clinical services and improved disaster resiliency modalities would stand to further benefit from more efficiently coordinated mHCA activities. Ensuring a continued path towards improving coordination of intermittent mHCA engagements and the quality of mHCA data collection should contribute aligning military sponsored health engagements with preventive disaster risk reduction efforts in the broader international community.

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CHAPTER 5: DISCUSSION

OVERVIEW

Maritime Military Humanitarian Civic Assistance Missions: Resource Use, Coordination and Governance to Improve Global Health

This investigation set out to explore the application of military medical personnel and maritime vessels as influencers of global health diplomacy through international engagement and disaster responses. Over the last 10 years, the increase in cooperative health engagements by militaries is frequently highlighted as a diplomatic tool to reduce impact of large scale disasters; while improving relations between nation-states. [1] The USG through the DoD has contributed to this increase through its mHCA program. However, the association between military health diplomacy and improved disaster response and recovery is not well documented.[2] While militaries, specifically the DoD, concurrently engage in mHCAs and disaster responses, correlating strategic intent of the former with the latter requires consistent focus and commitment of resources.

Yet, even with minimal evidence to support identifiable positive gains in health system capacity or decreased reliance on foreign disaster response resources, military-sponsored global heath engagements will persist for the near future.[3] Global health engagements driven by well-intentioned leadership suffer from a disconnect between policy and outcomes. This is a critical issue in strategic global health planning for the

DoD, potentially missing important opportunities in global health development based on military medical resources.

Maritime Humanitarian Civic Assistance Missions: A Strategic Global Health Policy Tool

The focus of Chapter 2 was to review the literature mHCAs and to broadly categorize professional communities referencing mHCAs. In identifying authors and communities of interest, a broader understanding of how military-led global health engagements are viewed within and outside of the settings in which they occur can influence the future of mHCAs. This review of the literature also highlights how various author communities value the contribution of clinical interventions relative to global public heath or global security. Global health diplomacy is a field inherently borne of and depends on cross-disciplinary interactions.[4] Knowledge gaps among professional communities involved in planning, supporting, or conducting mHCAs hinder a cohesive understanding of HCA when examined in isolation.

The literature guided structured web searches for specific mHCA outcomes and associations with disaster response capability development. Measures of process were most often highlighted as a successful mission outcome. A large number of authors associated previous disaster responses to occurrences of mHCAs. Finally, we also noted that multiple nations now sponsor mHCAs. In fact, the USG and the PRC occasionally overlap in the delivery of mHCA services to the same nations.[5, 6]

Lastly, we recommended improvements to graduate education for military personnel involved in all phases of mHCA missions. We also encourage advances in the collection and transparent sharing of HCA data and the establishment of an international framework coordinating mHCAs among sponsoring nations.

Comparative Analysis of Military Medical Resources Conducting Disaster Response Support and Maritime Humanitarian Civic Assistance Missions

The last decade witnessed massive catastrophic natural and man-made disasters requiring humanitarian assistance from numerous international militaries. The Boxing Day Tsunami in 2004 was a sentinel event and harbinger of change for global health engagements for the DoD and many other militaries. The DoD would eventually assign more than 25 ships and 13,000 personnel to support the disaster response. The DoD would respond to fleeting gains in positive perceptions of the USG by the Indonesian population by re-examining the impact of the long-standing mHCA program.[7,8]

The DoD HCA program was codified into US law in 1986 in section Title 10 U.S. Code 401 of US law. [9] These sections have been modified several times since. The HCA program would increase maritime resources and iterations after the Boxing Day Tsunami, becoming a prominent centerpiece of DoD HCA global health engagement to this day. Partner nations and HNs continue to participate in HCAs with an emphasis on mHCAs conceptually improving disaster response. Concurrently, some militaries not participating in DoD-sponsored HCAs are actively building their own mHCA capabilities under the concept of HA/DR.[10, 11]

This research effort sought to explore the role of the DoD in complex health emergencies and whether mHCAs are associated with the improvement in international disaster responses. By selecting as the unit of analysis HNs with an elevated risk of disaster and a reported mHCA episode, a comparative case study narrative was developed. Elevated risk of disaster vulnerability and reduced healthcare capacity were identified from an internationally developed database used for improving disaster risk reduction programs. Finally, post-disaster reports detailing aspects of DoD and other militaries' support of disaster responses were used to thematically validate reported stakeholder observations.

Based on this case study analysis, themes of communication, coordination, cooperation, and collaboration among stakeholders varied depending on existing relationship with the disaster-affected nation. Disaster responses involving the DoD resulted in common recommendations to establish an international framework or policy tool to better coordinate militaries during disaster responses and education of military personnel. Distinctly absent in post-disaster reports was a correlation of mHCAs contributing to positive disaster responses. The lack of various key stakeholders acknowledging the possible benefit of prior mHCAs or any other military-sponsored health engagements suggests that there needs to be a communications strategy as well as a careful post-intervention evaluation to integrate the military role as a partner in mHCA missions and disaster responses.

Maritime Humanitarian Assistance Mission and Disaster Response International Framework for Cooperative Global Health Engagements

Military medical communities are at the crossroads of global health diplomacy, where hard and soft power options are utilized to both improve health outcomes and foreign policy objectives. Historically, the DoD has sought to minimize long-term commitments to humanitarian assistance and development activities.[12, 13] However, military-involved global health engagements invariably have regional and global health ramifications. Uniformly linking disparate military health engagements across the global community might lead to greater benefit to recipient populations and improved integration of military medical efforts with NGOs and IGOs.

An international approach to incorporating military health assistance outside of disaster response would also help harmonize efforts of multiple militaries that aim to provide such assistance and capacity building. This kind of cooperative framework would then help establish practices and linkages among donor nations that could facilitate disaster response as well. Linking proactive health engagement to disaster risk reduction could lead to more self-sufficient disaster responses and less reliance by HN on external resources. These gains in disaster resilience might also yield cost reduction for responding nations and their militaries. Military-sponsored mHCA missions conducted in isolation of one another will miss opportunities to reduce HNs' burden of disease and harmonize mutual health-related outcomes and gains in healthcare capacity to respond to large-scale disasters.

To achieve increased efficiencies in disaster response collaboration and coordination we propose mHCA missions 1) develop and coordinate metrics for healthcare capacity best suited to improve disaster response, 2) establish dedicated

military leadership and management to provide internal and external coordination of data collection and refinement of HCA interventions, and 3) model and integrate mHCAs into evolving multilateral military medical organizations to examine the casual relationships between mHCA engagements and complex health emergencies.

LIMITATIONS

The literature review in Chapter 2 has several limitations. The search methodology relied on an innovative search framework developed for use of search terms "disaster" and "global health". While this framework was curated and validated by recognized subject matter experts, it allows for possible interjection of bias by those initiating searches. However, the rapidity with which the global health and disaster literature is published requires adaptable search tools. The search "disaster" and "global health" framework is representative research needs of in the midst of an expanding and diverse lexicon. The advantage of tailoring search strings through addition of free text to a defined terminology permits users the ability to further specify searches. In research areas where few peer-reviewed publications are authored, this search tool captures documents defined as "grey" literature having broader interdisciplinary interests. Google Scholar does not consistently provide direct access to results generated from searches. We were able to acquire difficult-to-access documents via academic and government institutions when needed.[14]

Using Google Scholar to encompass communities beyond medical professions affords a perspective from military professionals in the graduate military education system and from those in the international security arena. Previously published

systematic literature review on mHCAs reduced selections to peer-reviewed results from traditional databases. Search results were limited.[15] While direct comparison of search methods is hampered by how search engines derive results and search patterns of users, the results similarly contribute to analyses of mHCAs.

The comparative case study approach in Chapter 3 possessed certain limitations associated with the limited number of units of analysis available for investigation. This constrained the ability to conduct meaningful statistical analysis comparing the four countries selected. The sample size is contingent on real-world events occurring, with these parameters; 1) mHCA missions visiting a disaster affected nation and 2) a disaster of significant devastation requiring international assistance and 3) and foreign militaries being assigned to render aid to the disaster-affected nation. While this limitation is beyond the control of the authors, examination of real-world, contemporary issues affecting participants of international disaster response settings is a critical analytical undertaking. [16]

Another limitation is the inability to control potential biases introduced through the use of key stakeholders post-disaster reports. Organizational influence can temper collected data and findings to minimize numerous issues including those related to management and leadership challenges. After-action reports can focus solely on stakeholder interests, thus limiting interpretation of interactions with other responding organizations and perceptions of coordination. To minimize the impact of stakeholder reporting bias, we used triangulation through multiple stakeholder post-disaster reports, specifically from the DoD, a responding NGO, and the disaster affected governments.

The convergence of common findings framed the issues related to communication, coordination, cooperation and collaboration which identified mutual opportunities to improve future disaster responses. [17] The consistent lack of acknowledgment of mHCAs from each stakeholder presents an opportunity explore a resource that is either underutilized or simply not well connected to the desired outcome of improved disaster response through integration of military medical capabilities.

When formal post-disaster reports could not be accessed, daily situation reports documenting the status of the disaster response in close to real-time conditions were utilized. This limits direct comparisons given that the methodology and collection situation report data are not scrutinized by stakeholders or evaluators for the purpose of assessing the disaster post-hoc. However, in some cases, this unadulterated collection of information allowed for documentation of the scale of and references to utility of maritime vessels and military medical support provided that were lacking in post-disaster response reports.

The chaotic nature of complex health emergencies amidst a disaster response itself does not allow for a complete accounting of interactions between personnel and organizations. This incomplete accounting limited the thoroughness of narrative development.

In Chapter 4, a major limitation to the proposed managerial and planning framework relies on mHCA-sponsoring militaries and governments to implement these recommendations. Centralizing coordination of mHCAs within the DoD requires institutional realignment of the Military Healthcare System. While this is an actively

debated option at the congressional levels of the USG, it remains unrealized.[18, 19] Barring the advent of a unified military medical command, the DoD can actively incorporate refinement of HCA mission measurement protocols and invest in HCA-specific data management systems. The recently established DoD Center for Global Health Engagement stated mission objectives include assessment, monitoring and evaluation of global health engagements. Specific analysis of mHCA mission outcomes should be a focus area. This in turn would support BUMED, which has recently recognized global health engagement as a required core capability and contributes resources to public health efforts and interventions providing during mHCAs.[3,20]

Finally, the international coordination of mHCA collaborations depends on the willingness of multiple nations and militaries to cooperate. Communication is the first critical step in strategically aligning mHCA across sponsoring-nations. The ASEAN Center for Military Medicine offers a potential regional coordination mechanism for two main sponsors, the DoD and the PRC. Both nations are member-states of the ASEAN Regional Forum and the ASEAN Center for Military Medicine. mHCAs frequently include ASEAN countries.[21] Multilateral success at this level would lend credence to the expanding mHCA coordination throughout the globe.

RECOMMENDATIONS AND FUTURE RESEARCH

In Chapter 2 we examined the state of the peer-reviewed and "grey" literature using Google Scholar. Analysis of the search results revealed distinct author

communities referencing mHCA missions within the DoD. A large majority of authors affiliated with the DoD were categorized into two broad categories: medical professional or non-medical professionals. One-third of the search results written by military members involved with the National Defense University (NDU) system. Most of the documents reporting aggregate mHCA measures of clinical services provided also cited a previous disaster response as justification for mHCA missions. These same documents almost uniformly did not correlate mHCA mission with changes in health status of HNs or improvements in healthcare capacity. The divide between mHCA mission objectives and military communities of interest warrants further investigation.

One necessity is for a comprehensive qualitative assessment via surveys and focus groups of DoD military mHCA activities. The faculty and students in the NDU system are important populations to assess with regard to perceptions of mHCAs, specifically at the Naval War College in Newport, RI, and the Joint Staff College in Norfolk, VA. These institutions have student bodies comprised mainly of military non-medical professionals who have minimal exposure to the medical component of HCA efforts. Both of these institutions also have foreign military students in attendance. Curricula at both institutions conduct some measure of HA/DR education.[22,23] These military non-medical professionals could be assigned to commands and staffs that will be responsible for funding and resourcing mHCAs. Emphasizing the potential disaster risk reduction and healthcare capacity building linkages to mHCAs is worth continued investigation. This qualitative research would also support a deeper evaluation of mHCAs missions

with respect to national security objectives and interagency health security goals, which is critically important to DoD.

As a point of comparison, these same survey instruments and focus groups should be conducted with military medical professionals who have been assigned to mHCAs. This effort could strive to include interagency, international and NGO partners who have also participated in mHCAs. Including HN personnel would yield a representative population of mHCA participants, leading to a more complete understanding of mHCA mission effectiveness from all stakeholders.

Another possible research area is the post-mission evaluation of both mHCAs and disaster responses. Findings from these evaluations would inform the design of future mHCA services and the realized impact on the disaster response environment. mHCA interventions designed with disaster risk reduction and healthcare capacity in mind can be evaluated for effectiveness following a large-scale disaster. Additionally, complimentary serious-gaming methods are a means to generate end user perspectives on the value of mHCA missions to disaster response via a more rigorous evaluation.[24]

mHCAs consistently have been referenced as requiring robust measures of effectiveness and the need to validate correlations with improved disaster response and increased HN healthcare capacity. mHCAs measures of process are most often cited as metrics of mission success. What is needed is an in-depth analysis that produces an interrelated systems model of mHCAs. More advanced serious gaming applications may provide whole-system-modeling analysis of disaster response networks utilizing military medical resources. These same methods can be used to evaluate relationships between

mHCA and disaster response missions, as well as stakeholder interactions.[24,25] These types of insights might identify issues associated with disaster response coordination and how proactive mHCA efforts can mitigate them.

Qualitative data generated from surveys, focus groups efforts and serious-gaming methodologies to evaluate what mHCA participants' value all can be used to derive requirements for developing a mHCA database. The All Partners Area Network, a DoD funded online disaster response communication and coordination tool, is an open-access tool for all stakeholders.[26] A similar approach in developing a transparent and open mHCA reporting database would provide a tool of accountability for HCA-sponsoring nations and could be integrated into other international disaster risk reduction databases.

CONCLUSIONS

This dissertation sought to explore the ramifications of mHCAs conducted by the DoD as an instrument of global health diplomacy. The methods employed provide insights to the interdisciplinary community within the DoD and how they contextualize mHCAs. Additionally, the complexity of evaluating the linkage between mHCA missions and disaster response capabilities and health system capacity of HNs requires more rigorous evaluation.

Because other nations are pursuing similar mHCA capabilities and diplomacy, this research suggests the need for an international coordinating mechanism for military HCAs. This proposed regional or global coordinating body ideally can provide coordination and advise on HN needs currently not being met by the NGO or IGO

communities. This proposed coordinating body can also minimize redundancies and waste of limited mHCA medical resources.

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