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Implementing the National Incident Management System as a Framework for Travel Medicine in Haiti

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Abstract

Introduction: For the past 7 years, a nursing school has conducted biannual medical missions in a virtually inaccessible area in Haiti. Each medical mission team provides primary care, pediatric and gynecological examinations for up to 6 days in the impoverished island nation.
Methods: To improve the safety of participants engaged in this humanitarian travel medicine endeavor and enhance efficiency, the United States National Incident Management System (NIMS) has been implemented as a framework. This integrated system has 5 components: (1) Preparedness, (2) Communication/Information Management, (3) Resource Management, (4) Command and Management, and (5) Ongoing Management/Maintenance. This system was originally designed for government agencies and non-governmental organizations responding to disasters and other global health emergencies. A structural plan using the framework can be implemented as an effective model for future international missions.
Results: Implementation of the framework increased efficiency. While missions previously averaged approximately 100 patients daily, after incorporation of NIMS, this figure rose to 140 patients. Additionally, student feedback indicated increases in perceptions of safety and security.
Conclusion: The NIMS framework applied by the Haiti medical missions team provided organizational structure and leadership for this humanitarian effort in travel medicine. Integrating NIMS into the mission has extended the outreach of global medical systems to the most rural areas of Haiti and improved care for vulnerable populations with limited access to healthcare. This framework may be used to assist other academic institutions organize safe and effective travel medicine endeavors.
Keywords: Haiti, Medical Mission, Primary Care, Travel Medicine

Introduction

Since 2010, [BLINDED FOR REVIEW] has provided primary care health services biannually in Haiti. These efforts, in collaboration with the non-governmental organization Project Medishare, consist of approximately week-long mobile healthcare clinics organized and conducted by nursing faculty and nurse practitioner students. The goals of these medical missions are to provide needed healthcare services and supplies for those who might not otherwise receive them; to enhance health infrastructure within Haiti by offering educational resources and health promotion; and to provide nurse practitioner students with an opportunity to conduct fieldwork by engaging in a humanitarian travel medicine endeavor.[1]

An essential component used to facilitate achievement of these goals is the implementation of the United States National Incident Management System (NIMS) as the framework for medical missions.[1] This integrated system has five components: (1) Preparedness, (2) Communication/Information Management, (3) Resource Management, (4) Command and Management, and (5) Ongoing Management/Maintenance, as shown in Figure 1.

The ultimate goal of any healthcare mission is to ensure the benefits it provides endure and remain sustainable over time. This concept of sustainability in a healthcare program is a "best practice principle" introduced by the World Health Organization (WHO) in 2002.[2] This article will illustrate how one nursing school created an organizational template that can be utilized by academic institutions and other non-governmental organizations as a guideline for future medical
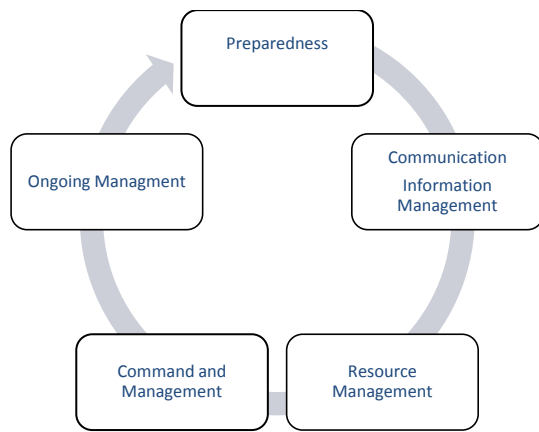
Figure 1. Components of NIMS Adapted From the National Incident Management System, 2008.

missions. The purpose of this paper is to demonstrate how the framework can be implemented as an effective model for future international missions.

The island nation of Haiti is located in the Caribbean on the western region of the island Hispaniola. Haiti has a population of 10.9 million inhabitants.[3] The average lifespan per person is 65 years for women and 61 years for men, and infant mortality is 42 per 1000 live births.[3] Haiti is the poorest country in the Northern Hemisphere; estimated per capita income is less than $1750.[3,4]

Presently in Haiti, there is little basic health infrastructure, as the 2010 earthquake devastated what had already been the frailest public health system in the Americas.[5] In Haiti, approximately 40% of the population lacks essential healthcare[6]; easily treatable and preventable diseases such as tetanus, malaria and cholera can lead to death.[7-9] Of its gross domestic product in 2013, Haiti spent only 9% on healthcare, of which almost 90% was earmarked for salaries, with an emphasis on curative care rather than preventive care.[10] There is an ongoing crisis of human resources with only 4 health professionals (doctors, nurses, and midwives) per 10 000 people in Haiti.[6] In comparison, Zimbabwe has 9, Zambia has 8, and Bangladesh has 6 health professionals per 10 000 people.[11] This scarcity poses an extreme hardship for the population, as the World Health Organization (WHO) identifies 23 health professionals per 10 000 people as the critical threshold.[11] Furthermore, it is estimated that less than a quarter (23%) of Haiti's population lives within geographic access, or 5 km, of a facility with good overall quality of care.[12]

Review of Literature

In recent years there has been increased emphasis among health professional schools on global health and the implementation of international missions. According to a 2016 survey-based study by Lasker, schools may be motivated by multiple goals, including humanitarian drive, along with organizational motives such as financial incentives.[13] A 2014 systematic review by Sykes noted literature on short term-mission medical service trips has not kept pace with the rising interest in this field.[14] As the focus of the review was to examine outcomes of medical mission trips, the paper noted the absence of a consistent structure or process of implementation. The author recommended future emphasis on the planning of future medical mission endeavors.

Previous studies have examined the impact of cross-cultural immersion on student perspectives utilizing qualitative research methods. Ortega et al found students from the United States gained greater appreciation for cooperation and teamwork after participating in an immersion experience abroad.[15] Another qualitative analysis conducted by Tjoflat et al described the process of interaction among nurses from disparate cultures and educational backgrounds together as "colliding worlds."[16] This 2016 study found language barriers and differing nursing practices made it difficult for expatriate nurses to collaborate with nurses with whom they worked on humanitarian assignments overseas.

While medical missions may bring positive impacts to communities they serve, they may also bring harm. A concern noted in a 2015 paper by Bartelme is that without careful coordination with long-term partners, short-term medical missions can undermine the existing infrastructure in recipient countries.[17] Additionally, medical personnel with inadequate training may be asked to provide care beyond their level of expertise. In a 2015 paper describing the benefits of international programs for surgical residents, Rodriguez et al observed that a fundamental ethical concern is ensuring competence of those providing care.[18] The authors recommended requiring supervision of clinical personnel as well as subsequent assessment to ensure competency. Another consideration highlighted in a paper on post-earthquake Haiti by Jobe is that medical volunteers should avoid creating unrealistic expectations in communities they serve.[19]

To reduce the likelihood of a medical mission causing inadvertent negative impacts upon its intended beneficiaries, Melby et al proposed to standardize the process for international missions.[20] The authors outlined 4 principles for short-term experiences in global health service: emphasis on cross-cultural effectiveness skills and cultural humility, bidirectional participatory relationships, local capacity building, and long-term sustainability. To reduce the possibility of harm, the authors recommended educating participants in these aspects prior to the mission.

Methods

[BLINDED] has implemented the NIMS framework for its last 6 medical missions to Haiti because of concerns regarding safety and struggles with effectiveness and productivity. Each medical mission team of 4 faculty members and 25 nurse practitioner students provides primary care, pediatric and gynecological examinations for up to 6 days in a virtually inaccessible area in Haiti. Approval for this project was received from the University of Miami Institutional Review Board.

Preparedness. This component of NIMS emphasizes organizational elements conducted prior to the incident response activities, in this case the medical mission. NIMS indicates that all preparation should be conducted as a unified approach, and that all plans for an endeavor should be realistic, scalable, and applicable to a range of incidents.

Much of this component is implemented prior to departure to Haiti. Required protocols for mutual aid include having all medical mission participants register with an international risk mitigation organization. Additionally, participants must receive all vaccines recommended by the Centers for Disease Control and Prevention and undergo malaria prophylaxis before departure, as chemoprophylaxis and mosquito protection is considered essential for travelers to Haiti.[21] In addition, the faculty emphasizes the importance of mental and emotional preparedness with student medical mission participants.

Preparing the necessary equipment, medications, and supplies is another aspect of this component. The faculty keeps a running list of needed items to purchase (and request as in-kind donations) prior to each departure. Priority medications include antifungals, antibiotics, antipyretics such as ibuprofen and acetaminophen, and vitamins. Other medical supplies brought on the mission are glucose strips, syringes, gloves, gauze pads, batteries, and water filters. All articles are systematically assembled and packed in accordance with a checklist prior to departure.

Communication/Information Management. Maintaining an effective and repetitive communication routine is considered an essential component of enhancing safety for participants. As outlined by the NIMS framework, a key aspect of implementing the communication component is redundancy. Repeating information and procedures on a daily basis enables participants to synthesize and, as needed, disseminate specific details related to ongoing operations. For example, information about faculty, team leaders, and student roles for each day is initially distributed on a poster board visible in a central location the night before and remains accessible throughout the following day. The personnel list is then recapitulated in a team debriefing each morning. This procedure is part of the NIMS strategy of continuously creating a common operating picture for all participants. The goal is for each person to be aware of his or her role and responsibilities as well as the correct chain of command in event of any potential problems. Additionally, communication, and in turn safety, are further enhanced by ensuring each of the three teams is provided its own English/Creole interpreter to remain alongside the group on a daily basis.

Resource Management. Resource Management is one of the most critical aspects of the framework because of the scarcity of resources in Haiti and the vast need. The resources afforded to the mission, such as medications and medical supplies, are a combination of those provided by [BLINDED] and Project Medishare. Project Medishare is a collaboration of health and business professionals who have engaged in an ongoing effort to improve health conditions in Haiti since its founding in 1999. The organization employs more than 150 people in Haiti, including doctors, nurses, midwives, and drivers.[22]

According to NIMS, a consistent system must be established and maintained to manage and sometimes ration the limited available supplies. Although failing to provide a patient in need with medication can be exceptionally difficult, a predetermined protocol allows participants to follow uniform guidelines. Specifically, potential recipients who are pregnant women, children, and the elderly will have first priority for medications. As a secondary criterion, patients who are ill will receive precedence over those who are otherwise healthy.

A crucial priority in ongoing Resource Management is fostering sustainability. To this end, mission leaders are tasked with managing capital expenses devoted to health resources. For example, due to the number of gynecological visits provided during medical missions, a decision was made to purchase non-expendable items such as lighted speculums, rechargeable batteries, and a Doppler for ultrasounds. Investing in items that can be used repeatedly reduces waste and long-term costs and frees up funds for other necessary expenses.

As indicated by the NIMS framework, at the conclusion of each mission all remaining resources are demobilized. Those items the return of which to the United States is impractical are dispatched to the closest clinic. The remaining goods are inventoried for use in a subsequent medical mission.

Command. The medical mission management structure is organized according to the Command component of NIMS. This structure provides a chain and unity of command to maintain an orderly line of authority throughout the entirety of operations. For the [BLINDED] Haiti missions, the incident command consists of a lead faculty member who is supported by 3 additional faculty members with secondary authority. The incident command is responsible for organizing daily patient flow into adult, pediatric, gynecological care categories. The next tier of command consists of 3 student leaders selected on a daily basis by faculty members. The medical mission also works with local doctors, nurses, and pharmacists sponsored by Project Medishare, and supporting staff members also manage public information and safety as suggested by NIMS.
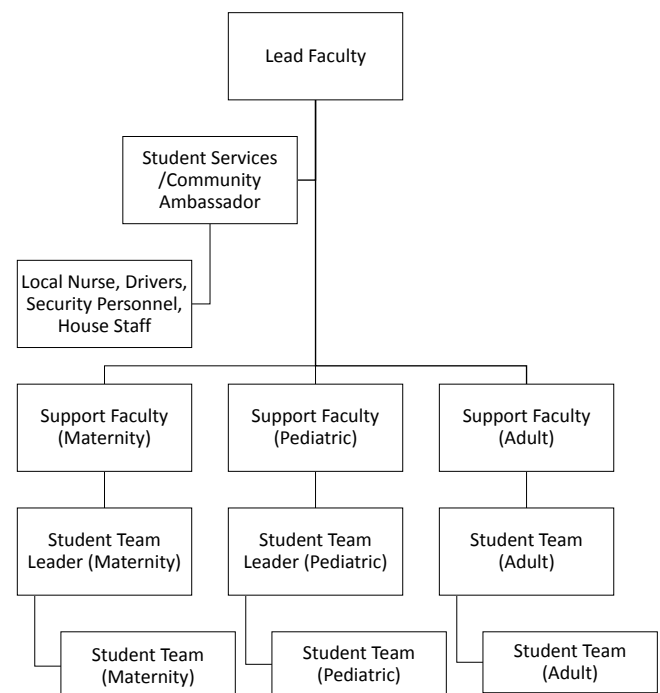

Figure 2. Incident Command System Adapted From the National Incident Management System, 2008.

See Figure 2 for details.

An essential feature of this command structure is safety, which is promoted throughout the mission. A precise routine is followed daily, including morning briefings and 360s, or thorough evaluations of care sites by incident command and designation of a rally point in the event of an emergency. Evening protocols include nightly debriefings and the gathering of supplies for the following day. At all times, participants are required to travel in groups of 2 or more for security.

Ongoing Management/Maintenance. According to the NIMS framework, utilizing supporting technologies is an essential aspect of the ongoing management/maintenance component. One way [BLINDED] implements this aspect into its medical mission efforts is to ensure complete and accurate documentation of each clinical encounter. Each day, the student leaders are responsible for ensuring their team keeps up with the required documentation of all patients. When a patient returns to the mission for a follow-up visit, the records for previous examinations are visible electronically and provide the basis for continuity of care. Implementing this management/maintenance component has ongoing benefits for the patient population; one literature review[23] concluded that having electronic medical records available for mobile medical trips enhances organizational accountability, management of clinical data, and evidence-based decision making. The members of the mission also collaborate with healthcare workers in each local community. These individuals follow up with patients who need additional specialized care or try to find solutions for patients who need to be transferred to the nearest medical facility.

Results

Implementation of the NIMS framework has impacted the Haiti medical mission in a number of ways. The most salient result was the increase in efficiency of the care provided by the team. Prior to utilizing the structure of NIMS, the mission cared for an average of 100 patients each day; after incorporating the NIMS framework, this figure rose to 140 patients. This increase was accomplished without sacrificing time spent with each patient. Instead, having the necessary materials and information on hand reduced unnecessary wait times and transitions during and between patient encounters.

Additionally, student evaluation forms indicated increases in perceptions of safety and security during the mission trip. Among students participating in the March 2017 mission, which was organized according to NIMS, 63% reported feeling "extremely safe" during the mission. In October 2015, prior to NIMS, only 28% of students reported feeling "extremely safe." Additionally, 84% of students reported the daily objectives of the mission were "extremely clear" in 2017; only 48% did so in 2015. Finally, the trip was described as "extremely organized" by 53% of students in 2017, an increase compared to 32% in 2015.

Discussion

By incorporating the NIMS framework into the Haiti medical missions, [BLINDED] faculty and students were able to work more effectively as a team to provide organizational structure and leadership for this ongoing effort. Maintaining organization and chain-of-command is especially important for students and faculty in a travel medicine context in which unfamiliar environments can prove especially challenging.

It should be noted that the concepts of the framework are designed to be wide-ranging and adaptable to many different scenarios. As a result, NIMS may be an effective tool in managing other nursing efforts in global health. Keys to maintaining such efficiency include ensuring a collaborative effort among all stakeholders, and maintaining the organizational structure implemented under its design, and allowing flexibility to expand and contract operations as needed to meet mission objectives. The best practices for each component of the NIMS framework are summarized in Table 1.

Implementing these 5 components has enabled the mission to extend the outreach of current medical systems into the

Table 1. Components of NIMS and Description (National Incident Management System, 2008)

Components of NIMS	Description of Components/Best Practice
Preparedness	– Prepare team for activity before actual incident – Include assessment, planning, procedure, and protocols – Allow for training exercises, personnel licensure, and certification – Equipment tested and certified
Communication/Information Management	– Common system of communication team can rely on – Recommends standardized framework and common operating picture for communication – Interoperability, reliability, and portability – Focuses on redundancy
Resource Management	– Limited resource management and sustainability – Identifying, ordering, tracking, inventory, mobilization and demobilization of recourses – Pre-assignment of resources and personnel to certain areas
Command and Management	– Delineate the chain of command of the operation to participants – Structure to facilitate activities in major functional areas of the operation – Span of control of any individual with incident management supervisory role is 3-7 subordinates – Allow operation to establish an incident command center
Ongoing Management	– Emphasizes continuity of the mission or operation – Relies on lessons learned from actual incidents – Best practices from different agencies in government and private sectors

most rural areas of Haiti and to vulnerable populations with limited access to primary healthcare. The priority for this medical mission is to go to rural areas where access to healthcare is extremely limited. To receive care, most patients of the mission would need to walk 2 to 4 hours; instead, the population in this region relies on intermittent medical missions to provide care locally.

In addition to the immediate practical benefits of utilizing NIMS, a generalized response system intended to enhance the safety and efficacy of an incident response endeavor, the framework's guidelines may be especially constructive in the context of a medical mission. One study[24] examining motivating factors among international health volunteers concluded that among the best predictors of volunteer satisfaction and sustained volunteerism was assigning specific roles and responsibilities to volunteers, a key element followed by the Haiti medical mission based on the *Command* component.

Conclusion

Conducting a major effort such as a medical mission has an intrinsic component of uncertainty for all participants. However, organizing and implementing biannual Haiti trips based on the 5 concepts of the NIMS framework has provided an essential structure that substantially increased the effort's safety, efficacy, and reproducibility. Applying this framework may be useful for other nursing schools who wish to conduct medical missions, disaster relief, or other service endeavors.

Limitations

These lessons using NIMS were learned in the context of short-term medical mission trips to Haiti with faculty and nurse practitioner students. While these experiences may be applicable to many other settings, it is possible they may not be generalizable to all environments. Further studies should be conducted to evaluate long-term outcomes for the use of this model in future medical mission trips to Haiti as well as in other travel medicine contexts.

Future Implications

The ultimate goal of this medical mission is for the healthcare advances being achieved in Haiti to become part of the sustainable infrastructure of this community. At this time, both qualitative and quantitative research is being pursued to assess how implementing specific aspects of NIMS has benefited mission participants and influenced health outcomes in Haiti. Members of the mission team at [BLINDED] train physicians and nurses who work for Project Medishare in Haiti as well as year-round at the school of nursing; thus, they will be equipped to follow-up with the patient population. Additionally, faculty leaders of the medical mission team are developing a Field Operations Guide utilizing the NIMS framework to organize this ongoing series of short-term medical missions. This manual will be donated to Project Medishare for use by other schools' mission trips. The objective is to systematize the procedure and assist others in organizing and implementing safe and successful endeavors in travel medicine.

Research Highlights

What Is Already Known?
The United States National Incident Management System (NIMS) provides an integrated method for emergency response used by government agencies and non-governmental organizations. A nursing school with an ongoing medical mission to a remote region of Haiti applied NIMS to improve care for the vulnerable populations in this region.

What This Study Adds?
Implementing the NIMS framework in a humanitarian travel medicine endeavor such as a medical mission in Haiti can improve the experience for both participants and recipients of care. The NIMS framework utilized as a model by academic institutions and other non-governmental organizations to improve safety and efficiency during global health endeavors.

Authors' Contributions

JO conceived of the project, collected and analyzed data, and prepared the results. JG prepared the literature review and figures. SPS prepared the methodology. KS prepared the background. LDT revised and edited all sections and prepared the discussion/conclusion.

Conflict of Interest Disclosures

The authors declare they have no conflicts of interest.

Ethical Approval

This project was approved by the University of Miami Institutional Review Board.

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