The Response of Academic Medical Centers to the 2010 Haiti Earthquake: The Mount Sinai School of Medicine Experience

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Abstract. On January 12, 2010, Haiti was struck by a 7.0 earthquake which left the country in a state of devastation. In the aftermath, there was an enormous relief effort in which academic medical centers (AMC) played an important role. We offer a retrospective on the AMC response through the Mount Sinai School of Medicine (MSSM) experience. Over the course of the year that followed the Earthquake, MSSM conducted five service trips in conjunction with two well-established groups which have provided service to the Haitian people for over 15 years. MSSM volunteer personnel included nurses, resident and attending physicians, and specialty fellows who provided expertise in critical care, emergency medicine, wound care, infectious diseases and chronic disease management of adults and children. Challenges faced included stressful and potentially hazardous working conditions, provision of care with limited resources and cultural and language barriers. The success of the MSSM response was due largely to the strength of its human resources and the relationship forged with effective relief organizations. These service missions fulfilled the institution's commitment to social responsibility and provided a valuable training opportunity in advocacy. For other AMCs seeking to respond in future emergencies, we suggest early identification of a partner with field experience, recruitment of administrative and faculty support across the institution, significant pre-departure orientation and utilization of volunteers to fundraise and advocate. Through this process, AMCs can play an important role in disaster response.

INTRODUCTION

On January 12, 2010, Haiti was struck by a 7.0 earthquake 14 miles west of Port-Au-Prince, which left the country in a state of devastation. In the immediate aftermath, an outpouring of relief efforts ensued coming from individuals, emergency response organizations, medical institutions, and many others. Academic Medical Centers (AMC) played an important role in this relief effort. The response of AMCs to global health emergencies and natural disasters is nothing new. In the wake of Hurricane Katrina, a number of AMCs provided assistance in the form of both medical and mental health services.^{1,2} Others provided emergency relief after the 2004 Indian Ocean tsunami.³

Not surprisingly, the 2010 earthquake in Haiti prompted a response from many AMCs. Some of the most successful efforts came from institutions with a longstanding history of collaborative work in Haiti. The University of Miami's Project Medishare, founded in Haiti in 1995, established a field hospital to receive earthquake victims within the first 24 hours after the temblor struck.⁴ Zanmi Lasante, the Haitian branch of Partners in Health that has provided care in Haiti since 1987, used faculty from Harvard Medical School to help organize innumerable non-governmental groups located at the University Hospital in Port au Prince.⁵ Six Chicago AMCs formed the collaborative Chicago Medical Response (CMR), which sent medical teams on a weekly basis to provide aid to existing Haitian organizations. CMR sent nearly 500 personnel in the first 3 months after the disaster.⁶

At the Mount Sinai School of Medicine in New York City, we too explored ways to respond in the period immediately after the natural disaster. This piece reflects on the AMC response to the 2010 Haiti earthquake through the Mount Sinai experience. We offer a retrospective on our provision of service, challenges faced, and lessons learned. Suggestions are offered

for other institutions seeking to make similar contributions in future emergencies.

WHY DO AMCS RESPOND TO NATURAL DISASTERS?

Global health education has developed dramatically over the last decade. There are now nearly 50 United States and Canadian academically based global health programs compared with just 1 in existence a little over 10 years ago.⁷ Interest in global health among students in multiple disciplines has also increased significantly in recent years.^{8,9} Some may argue that it is not the place of AMCs to respond to natural disasters and that the response should be left to relief organizations dedicated and expert in emergency response. Nonetheless, AMCs are responding and will likely continue to do so. It is the responsibility of academic global health leaders to ensure that such responses are measured and appropriate.

The motivations for the AMC response to humanitarian emergencies include the AMC community's sense of social responsibility and commitment to service,^{10,11} a desire to provide training in advocacy and global health,¹² and the ability to provide specialized needs that other aid organizations may lack.¹³ Additionally, increased governmental and private global health funding sources for researchers at academic institutions have provided incentives for AMCs to engage in more global health activities.

Like many natural disasters before it, the Haiti earthquake appealed to all of these motivations in the Mount Sinai community. Many personnel felt an immediate desire and commitment to provide assistance. Global health leadership at the institution saw this earthquake not only as an important opportunity for service but also a chance to provide training in advocacy. Inclusive in the mission of the Mount Sinai Global Health Training Center,¹⁴ which is responsible for educating all of Mount Sinai's trainees and faculty before participation in global health field work, is a service component that encompasses a commitment to improving the health of underserved communities across the globe. In addition, the Department of Medicine at Mount Sinai has for years supported resident

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physician-based advocacy efforts through a resident-founded program called Advancing Idealism in Medicine. The response to the Haiti earthquake created an opportunity to promote residency training in advocacy. Advocacy efforts from these resident physicians included raising awareness among colleagues, faculty, and staff both before and after their service, lobbying to secure permission from the residency program and the Department of Medicine to participate, and enlisting the support of coresidents to cover their work responsibilities while away on mission trips. As part of their advocacy experience, participating residents were also expected to engage in fundraising and faculty recruitment. Mount Sinai was also able to provide a meaningful response by identifying volunteers with specialized skills to meet the specific needs of the affected population. These skills included hospital-based medicine, wound care and infectious disease management, critical care, and surgical specialties.

THE MOUNT SINAI RESPONSE

Like many institutions, Mount Sinai chose to provide assistance immediately in the wake of the devastating earthquake. Just a little more than 1 week after the earthquake struck, the institution put together a team of 27 health professionals to participate in a mission coordinated by Partners in Health (PIH).^{5,15} After this initial response, there remained a strong and ongoing desire to continue providing service to the Haitian people. Members of Mount Sinai's Global Health Training Program (GHTP) in connection with faculty from the Department of Medicine sought to provide effective service opportunities that were in keeping with the skill sets of volunteer personnel. These faculty and volunteers had limited disaster medicine experience. Because partnering existing volunteer organizations with functional relief systems already in place is an effective way to make a meaningful contribution in the post-disaster setting, Mount Sinai GHTP leaders chose to quickly identify such an organization.¹⁶

They sought collaboration with a group that had field experience in Haiti and the ability to integrate staff into an existing model of care delivery. After exploring collaboration with a number of groups, our team approached Project Medishare.⁴ The day after disaster struck, Medishare opened up a tent hospital, which they have been operating in some form ever

since the earthquake. The tent hospital relied entirely on volunteer staff who committed to participate in week-long service missions. These volunteers rotated on overlapping weekly schedules to ensure continuity. The Medishare hospital provided a hospital-based relief effort that was familiar to most of the Mount Sinai volunteers who had considerable experience with hospital-based care. Medishare also provided a faculty-supervised opportunity that accepted and placed resident physicians, which was not the case for some other relief organizations. For these reasons, Medishare seemed the most appropriate site to launch our next service mission. After the collaboration with Medishare was forged, Mount Sinai's Department of Medicine and the Mount Sinai GHTP made a financial commitment to support the first team of physicians to volunteer at Medishare's hospital. Funds would later be raised through private donations and charity events to support future trips.

Preparation and deployment. A significant effort was required to prepare and deploy the team (Table 1). Project Medishare provided a contact coordinator to aid in the preparation of the large Mount Sinai cohort. This contact aided in finalizing dates of travel for the initial mission and confirmed licensure documentation from each participant to verify their eligibility. Medishare also communicated their specific staffing needs in advance of each mission. In response to this request, Mount Sinai global health faculty recruited nurses, emergency medical technicians, resident physicians, specialty fellows, and attending physicians who, as a group, had expertise in critical care, emergency medicine, wound care, infectious diseases, and chronic disease management of adults and children. The recruitment process at Mount Sinai moved quickly. There was an overabundance of eager volunteers from the hospital staff. It quickly became clear that there would be enough interested personnel to staff multiple future service missions. Most of the hospital departments were generous in allowing providers to take time off on short notice during the first response period.

Before departure, volunteers received counseling regarding appropriate pre-trip vaccinations and malaria prophylaxis. These recommendations were based on Centers for Disease Control and Prevention (CDC) Traveler's Health guidelines and consultations with Mount Sinai's Travel Medicine Clinic. Volunteers were briefed regarding security and personal safety measures. Because this trip was the first experience for many participating providers in a resource-poor setting or a post-disaster environment, GHTP faculty felt it necessary to provide a pre-deployment orientation. The group was briefed by Mount Sinai physicians who had recently been to Haiti to provide assistance as part of the initial response team.⁵

To maximize their contribution to the relief effort, the Mount Sinai group acquired a variety of medications and supplies to bring with them. Although the World Health Organization (WHO)¹⁷ provides a recommended list of equipment and medications needed for post-disaster emergency medical care in low income countries, supply needs at the Medishare hospital changed regularly during the recovery process (e.g., increased need for oral rehydration therapy during the cholera epidemic.) For this reason, an onsite inventory was updated on a regular basis and made available through electronic communication. This inventory provided real-time needs to volunteers preparing to deploy and willing to carry down supplies. After prepared, Mount Sinai's multidisciplinary team departed to help staff the Medishare tent hospital in Port-au-Prince just 3 months after the earthquake and our initial response effort.¹⁵

TABLE 1

Preparation for an Academic Medical Center service mission in response to a natural disaster

Type of preparation	Preparation effort
Logistics	Identification of an onsite coordinator familiar with local conditions
Logistics	Determination of local medical and human resource needs
Logistics	Recruitment of personnel, equipment, and medication
Logistics	Travel coordination
Pre-departure counseling	CDC and infectious disease faculty recommendations
Pre-departure counseling	Mandatory pre-departure orientation
Pre-departure counseling	Purchase of medical evacuation insurance
Administrative support	Obtain approval from all necessary administrative bodies
Financial support	Institutional-based
Financial support	Philanthropy-based

The Mount Sinai team that traveled in this group consisted primarily of emergency medicine physicians, internal medicine residents, and subspecialty fellows. On arrival in Haiti, the Mount Sinai team joined a diverse group of physicians, nurses, physical therapists, pharmacists, and social workers from locations across the United States and around the world. The tent hospital welcomed new teams each week, relieving those people ready to go home. The Sinai internists and medicine subspecialists worked to provide direct medical care, diagnostic support, and care coordination; however, their role also included post-operative and nursing care when needed. Providers were often asked to adapt and deliver care outside of their typical practice pattern. A geriatrician skilled in wound care, for example, helped with wound debridement but also quickly learned how to operate a wound vacuum. Where Mount Sinai's personnel lacked expertise, volunteers from other institutions filled in many of the gaps. Family medicine residents from other institutions were versatile and comfortable in many roles. Physical therapists served a critical role in the rehabilitation of amputees and other patients who had suffered traumatic injuries. Collaboration between providers took place at every level, allowing the group to take care of patients with a wide variety of medical problems.

The scope of pathology observed included limb injuries and wound infections, sometimes resulting in emergent amputations and staged debridement. Fractures were, at times, complicated by bone and soft tissue infections. Spinal injuries were, sadly, quite common. Bed-bound patients were susceptible to pressure ulcers, recurrent urinary tract infections (UTIs), and muscle atrophy. Some tropical and vaccine-preventable diseases that were endemic before the earthquake became more prevalent afterwards and commonly led to hospital visits. The team encountered malaria, dengue, typhoid, tetanus, and leptospirosis. Tuberculosis of every variety, such as miliary disease, osteomyelitis, and pulmonary infection, were commonly diagnosed. In addition, the team encountered many common non-communicable disease conditions, such as congestive heart failure, bacterial pneumonia, acute cholecystitis, myocardial infarction, diabetes ketoacidosis, and a multitude of accidental injuries. Accidents from environmental hazards and lack of child supervision were also a prominent concern. For example, two young children who had lost both their parents were brought to the hospital after suffering severe electrical burns from a live wire. Motor vehicle and motorcycle accidents were common as well. When the cholera epidemic initially struck, treatment of these sickened patients became the hospital's priority.

Challenges faced. Working with Project Medishare and PIH significantly streamlined the process of service delivery in response to the earthquake. Attempting to organize an effective service response outside of their framework would have been significantly challenging, if not impossible. Nonetheless, the Mount Sinai team faced a number of hurdles during the mission. Resources were significantly limited throughout the country. Other than relying on the traditional history and physical, the providers' laboratory diagnostics were limited to hematocrit, white cell count, basic chemistries, rapid human immunodeficiency virus (HIV) testing, gram stain, and acid fast bacillus (AFB) stain. Microscopy was available for peripheral blood smears, but microbiology was not available. A single portable ultrasound device and a plain film X-ray machine were available, although they were frequently in use because of their high demand. Treatment options were also limited. For instance, the supply of

tuberculosis medications ran out on occasion, at which point infected patients would be referred to sanatoriums. At times, antiretroviral medications to treat HIV became unavailable. Operating theaters could not always achieve effective sterile conditions because of permeable walls and lack of an autoclave. As a result, many surgeons chose to operate without the use of implantable materials or hardware (e.g., mesh for hernia repairs or screws for fractures).

Because of Haiti's damaged infrastructure, the ability to obtain medical resources from outside of the hospital was often unpredictable. For instance, blood bank supplies were hard to come by and dependent on day to day knowledge of their availability and whereabouts. Because of a lack of knowledge of operational outpatient clinics and limited supplies, discharged patients often left the hospital without follow-up appointments or sufficient medications, leading to readmissions in some instances.

Remarkably, the hospital was able to recruit translators who were available 24 hours/day. Most translators, however, were untrained and unfamiliar with medical jargon, making it difficult to explain procedures and test results. Most providers also lacked a significant understanding of Haitian culture, making it challenging, at times, to effectively communicate, even with a translator. In addition, the crowded ward spaces made it nearly impossible to achieve privacy when discussing sensitive health information.

Volunteers at numerous organizations faced a number of concerns regarding their own safety and security. Providers faced occasional exposure to infectious diseases such as tuberculosis, cholera, acute viral gastroenteritis, and malaria. Fortunately, appropriate pre-departure preparation significantly reduced these risks. Political unrest, rioting, and an ineffectual police force also created concerns about the security of the facility. Although armed Haitian security personnel guarded the Medishare compound and volunteers were mandated to stay within its limits, there still remained some concern about overall personal safety. Long work hours, hot temperatures, and lack of consistent and predictable meals made heat exhaustion and dehydration an additional concern.

Providers also faced significant ethical challenges, such as the need to ration limited medications. Volunteers often felt out of their comfort zone in terms of the different disease epidemiology, and many of the volunteers experienced considerable emotional stress when facing situations in which patients, who might otherwise have been saved at their home institution, did not survive.

Sustainability. Even before the initial team departed, the organizing Mount Sinai faculty sought to provide a sustainable service response to the people of Haiti. Ensuring sustainability poses several challenges, including maintenance of interest among volunteer staff, identification of faculty stakeholders who are available to organize a service response, need to raise funds to support volunteers, and ability to maintain approval at multiple administrative levels across the institution.

Even in the face of a cholera epidemic, maintaining support and interest has been a challenge. As press coverage inevitably wanes, so too does interest and support. Although interest among volunteers has waned somewhat, there remains a steady stream of providers eager to populate ongoing service missions. Given the nature of AMC trainee turnover every 3–4 years, it remains even more necessary for AMC-supported faculty to serve as a consistent resource to maintain links with disaster stricken regions over time. Students

TABLE 2

Recommendations for Academic Medical Centers providing relief to populations affected by natural disaster

Identification of a partner with field experience is paramount before organizing a response
Administrative and faculty support should be pursued across multiple administrative levels within the institution
Volunteers can be a powerful voice in advocating for support and fundraising
Significant pre-departure orientation is a necessary part of pre-trip preparation
Academic Medical Centers should use the strength of their human resources in their relief effort

and residents expect to have these opportunities, and it is the role of AMC global health faculty to provide such experiences. Identification of dedicated faculty has been possible through recruitment from the Mount Sinai GHTP. Oversight of global health service activities is one of the responsibilities of our global health faculty. Funds have been raised from numerous sources, including the medical school, hospital departments, and general philanthropy; however, it remains a challenge to fully fund volunteers who are often asked to make a financial contribution of their own to participate. Institutional global health programs are the best resource for meeting the challenges in providing a sustained AMC service response when disaster strikes. Over time, these global health programs and faculty will serve to build an institutional memory and culture that promotes such long-term commitments.

To date, several interdepartmental Mount Sinai teams have provided service through one PIH and four Project Medishare service trips since the January of 2010 earthquake. Efforts are ongoing to provide continued assistance.

LESSONS LEARNED AND RECOMMENDATIONS FOR FUTURE AMC RESPONSES TO NATURAL DISASTERS

In response to this natural disaster, which left Haiti in ruins and over 200,000 people killed, Mount Sinai Hospital and the Mount Sinai School of Medicine contributed to the relief effort in a meaningful, appropriate, and sustained fashion. The success of our response was, in large part, because of the strength of our human resources and the relationship forged with effective relief organizations. Not only did these service missions fulfill the institution's commitment to social responsibility, but it also provided a valuable opportunity to provide training in advocacy. The experience was not without its challenges, including stressful and potentially hazardous working conditions, provision of care with limited resources, and cultural and language barriers. Lessons learned and recommendations for other AMCs seeking to respond in future emergencies include identification of a partner relief organization—one with field experience and a mechanism to funnel AMC personnel and supplies into an existing and effective relief effort. In addition, we recommend early recruitment of administrative and faculty support across the institution and use of volunteers in the fundraising and advocacy process. Finally, significant pre-departure training for both trainees and faculty is a must. We recommend a case-based format with an emphasis on clinical skills and public health assessment to approximate real-life conditions ahead of the actual relief operation. Basic concepts in cultural competency and usage of a language interpreter are also necessary skill sets that should be incorporated into

such training (Table 2). We believe that institutions desiring to make a meaningful service response in the wake of a natural disaster should prepare all of these elements in advance for rapid implementation during a time of need. With adequate preparation, AMCs can have a significant positive impact on populations of greatest need in times of crisis.

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