

The Haitian Earthquake Crisis: The First Responders' Perspective

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ABSTRACT

A catastrophic earthquake of the magnitude of 7 on the Richter scale hit Haiti's capital Port-au-Prince on Tuesday January 12, 2010 at a focal depth of 13 km or 8.1 miles. Four days after, a joint Ministry of Health (Jamaica)/Jamaica Medical Doctor Association (JMDA) initiated CARICOM (Caribbean Community) endeavour entered Haiti to establish a system whereby medical help could be offered to the Haitian populace. Two hospital sites were established (one for life-saving surgeries, the other for limb reconstructions), clinic facilities for walk-in wounded and other related cases, and mobile clinic services (called the Train of Hope). Within 48 hours, a total of 43 operations were performed (26 major, 17 minor). Within eight days, a total of 1229–1249 patients were seen in all the facilities established. This included a total of 106 operations (64 major, 42 minor). There were a total of 21 life-saving amputations.

Keywords: Catastrophic, earthquake, Haiti, Port-au-Prince, Richter scale

La crisis del Terremoto en Haití: Perspectiva de los Primeros Socorristas

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RESUMEN

Un terremoto catastrófico, con una magnitud de siete en la escala Richter, se desencadenó contra Puerto Príncipe, la capital de Haití, el martes 12 de enero de 2010 a una profundidad focal de 13 km u 8.1 millas. Cuatro días después, una representación conjunta del Ministerio de Salud (Jamaica) y Jamaica Medical Doctor Association, a iniciativa del CARICOM, entraba a Haití con el propósito de establecer un sistema mediante el cual podría ofrecerse ayuda médica al pueblo haitiano.

Se establecieron dos sitios hospitalarios (uno para cirugías de extrema emergencia, y otro para reconstrucción de miembros), instalaciones clínicas para heridos ambulatorios, y otros casos relacionados, incluyendo servicios clínicos móviles (llamados Tren de Esperanza).

Dentro de las primeras 48 horas, se realizaron un total de 43 operaciones (26 cirugías mayores, y 17 menores). En ocho días, se atendieron un total de 1229–1249 pacientes en las instalaciones creadas. Esto incluyó un total de 106 operaciones (64 cirugías mayores, y 42 menores). Se produjeron un total de 21 amputaciones para salvar vidas.

Palabras claves: Catastrófico, terremoto, Haití, Puerto Príncipe, escala Richter

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INTRODUCTION

A catastrophic earthquake of the magnitude of 7 on the Richter scale hit Haiti's capital Port-au-Prince on Tuesday, January 12, 2010, at a focal depth of 13 km or 8.1 miles. The earthquake left in its wake great calamity and destruction.

Four days after, a joint Ministry of Health (MOH)/Jamaica Medical Doctor Association (JMDA) initiated CARICOM endeavour entered Haiti to establish a system whereby medical help could be offered to the Haitian populous. The MOH team consisted of 21 medical personnel led by Consultant Orthopaedic Surgeon, Dr Derrick McDowell. The team was made up of five surgeons, anaesthetist, public health specialists, nurses and medical technicians and all were dispatched to Haiti.

They, along with a 9-member team from the JMDA, were deployed to two medical facilities, the Bernard Mevs Clinic and the Community Hospital in Freres. Four additional orthopaedic surgeons and one anaesthetist left the island four days later and joined the team.

A number of emergency field hospitals had been set up and it was hoped that some of the Jamaican personnel would be working at one or more of these facilities.

Four days later, as relief efforts were being marshalled and organized to ensure that aid got to the needy and injured, another earthquake of the magnitude of 6.1 on the Richter scale struck the nation on Wednesday, January 20, 2010, to cause further havoc and calamity amongst Haitians.

As of February 12, 2010, an estimated three million people were affected by the earthquake (1). The Haitian Government reported that between 217 000 and 230 000 people had died, an estimated 300 000 injured and an estimated 1 000 000 homeless. The death toll was expected to rise (2, 3). They also estimated that 250 000 residences and 30 000 commercial buildings had collapsed or were severely damaged (4).

AIMS AND OBJECTIVES

- * To set up appropriate operating sites to treat the acute injuries and their complications
- * Assist in the establishment of a clinic to offer outpatient services
- * Help to establish a mobile outreach clinic
- * Assist in preparing a protocol for the Standard Operational Procedure (SOP) for entry into a disaster zone

MATERIALS AND METHOD

To meet the first objective, the MOH group teamed up with the JMDA and opened a hospital, which we were able to commission 7 hours after landing. This hospital was located at Village Solidarity and was called Centre de Sante, Bernard Mevs (BM). This hospital had two functional operating theatres with space for two more to be commissioned. Though small and cramped, it also offered the ability to expand into other hospital services *eg* outpatient services, maternal and child health unit. This hospital was to serve primarily as a centre for life-saving surgeries *eg* amputations and debridements.

Another hospital site was established to primarily reconstruct limbs (limb-sparing surgeries). This was Hospital

de la Communate in a town called Freres. Limb-sparing surgery requires implants and other special equipment, which are expensive and would have presented us with certain challenges. It was hoped that patients who presented to BM requiring limb-sparing surgeries would be treated in that facility.

The second objective was met with the assistance of the medical wing of the Jamaica Defence Force (JDF). A location was established at the Food for the Poor (FFTP) Building in Port-au-Prince. The medical wing of the JDF, lead by Major Dr Sydney Powell and Capt Dr Mark Williams, established the clinic at the FFTP. This was established on day three of our tour of duty.

The mobile clinic was the brainchild of Major Jaime Ogilvie and Captain Jonathan Gorman and was a facility which went out to deep rural communities with aid (sheets, blankets, food and water) accompanied by a medical team with supplies. The mobile clinic was also called the "Train of Hope". There are limitations to a mobile clinic but it offered hope to the needy, letting them realize that definitive care was on its way and that they had not been abandoned.

The fourth objective was met after brainstorming the experience and in close collaboration with Dr Bullock DuCasse (Director of Emergency, Disaster Management and Special Services) in the Ministry of Health in Jamaica.

RESULTS

January 16, 2010 (Day 1)

Bernard Mevs

19 Operations

Triage – 36 (individuals waiting in the hospital yard for medical care)

Inpatients

30 admitted to ward type situation

- * Skin traction applications – 5

Outpatient Department (Not fully established)

- * Plaster of Paris applications – 4

Situational Report

- * Arrive in Haiti at 7:00 am along with team of nine doctors from the JMDA
- * Accommodation provided at the Caricom Base Camp at the Toussaint L'Overture Airport
- * Decision to view hospital after being contacted by JMDA group to determine suitability for surgeries
- * Small group of surgeons, nurses, emergency medical technicians (EMTs), public health personnel and JMDA doctors leave for reconnaissance run to assess the suitability of facility
- * Advised by JDF that one must always be accompanied by the soldiers

- * On arrival, the facility was full of patients lying all over the courtyard with obvious surgical injuries
- * Brief meeting held after review by all teams and the location passed all the required standards.
- * Structure established on the ground and operations began
- * Went out to scout for new hospital opportunities; same found at Hopital de la Communate, Freres about 45 minutes from base camp.

January 17, 2010 (Day 2)

Bernard Mevs

14 Operations

Triage: Unclear as no system instituted as yet

Inpatients

- * 36 patients
- * 6 admitted
- * 3 transfers (1 acute abdomen, 2 premature rupture of membranes)
- * Skin traction applications – 2

Outpatient Department

- * Plaster of Paris applications – 21
- * Collar and cuff sling – 1

Freres

- * Operations (orthopaedic surgeries – 4; General surgery – 6)
- * Anaesthetic procedures in addition to the above (four patients using regional anaesthesia)
- * Nursing (recovery room – 16 patients)
- * Triage – 18 patients
- * Two deliveries

Situational Report

- * Team selection for Freres and Bernard Mevs at least 12 hours before departure

January 18, 2010 (Day 3)

Bernard Mevs

Four Operations

Triage – 5 new patients

Inpatients

- * 20 patients
- * Skin traction applications – 2

Outpatient Department

- * Total 39 patients seen including 35 immunizations
- * Counselling 4 patients

Food for the Poor (FFTP) (approximate figures)

- * 100 consultations
- * Three referrals

Situational Report

- * No transportation arrived to take staff to Freres or Outreach Clinic
- * Major Dr Sydney Powell and Captain Dr Mark Williams commenced FFTP clinic: saw 100 patients and made three referrals.
- * Visited cluster meeting at the United Nations compound; met with Haitian doctors who informed us of over 150 injured individuals in Sonapi (a compound west of the Airport). Went with United Nation (UN) representative to see conditions. Decided to transport surgical patients to Bernard Mevs the next day.
- * Public health concerns becoming evident at Bernard Mevs (water for patients, adequate covering for patients and management of hospital wastes).

January 19, 2010 (Day 4)

Bernard Mevs

Eight Operations

Triage – 40 new patients

Inpatients

- * 33 patients

Outpatient Department

Total 57 patients seen including 20 immunizations
Suture removal – 7
Clean and dressing – 50

Maternity Wing

- * Spontaneous abortion – 1
- * Fresh still birth – 1
- * Live births – 2
- * Abruptio placenta – 1

Freres

- * Four operations
- * Ward round (15 patients, consultations 10)
- * Nursing (recovery room 18 patients)
- * Triage – 12 patients
- * Plaster of Paris application – 9
- * Skin traction – 2

Mobile Outreach Clinic to Killik (a rural town)

Number of patients seen – 83

- * Dressing – 73
- * Plaster of Paris application – 18
- * Procedure (reduction of paraphimosis) – 1
- * Suture removal – 3
- * Referrals – 3

FFTP (approximate figures)

- * 70 – 80 consultations
- * 5 – referrals

Situational Reports

- * Third operating theatre commissioned at Bernard Mevs
- * Labour ward and maternity wing commissioned at Bernard Mevs by Nurse Hazeline Williams, Public Health Nurse, MOH
- * Generator problems lead to failure of air conditioning in operating theatre
- * Attempts to commission X-ray Department but unstable power supply proving to be a problem
- * Local anaesthetic agents running low, needs appropriate stock for regional anaesthesia
- * Request for more nurses from Jamaica
- * New staff arrives from Jamaica; 2 Orthopaedic Surgeons, 1 Orthopaedic Technician, 1 Anaesthetist
- * Local Jamaican press arrives
- * Visitation of facility by the international press (CNN, BBC World, Sky News)
- * Quality of the translators at the BM facility proving to be a problem
- * Public health concerns increase
 - o Hospital waste management – large collection to the back of the hospital
 - o Need for cleaning agents
 - o Better disposal of body parts needed

January 20, 2010 (Day 5)**Bernard Mevs**

13 Operations

Triage – 25

Inpatients

- * 35 patients
- * 6 discharges

Outpatient Department

- * Total – 40
- * Reviews – 30
- * 1 adult and 4 children seen for dehydration

Maternity: No action**Freres**

- * Six operations
- * Three anaesthetic procedures done in addition to the operative cases
- * Nursing (16 patients, recovery area)
- * Postoperative ward round: 15 patients seen, manipulations and Plaster of Paris applications – 14, skin traction applications – 2

FFTP (approximate figures)

- * 60–70 patients
- * 5 referrals

January 21, 2010 (Day 6)**Bernard Mevs**

Nine Operations

Triage

- * 28 new
- * 9 reviews
- * 7 X-rays

Inpatients

- * 40 patients
- * 10 discharges

Outpatient Department

- * Total – 38
- * Clean and dressing – 20
- * Reviews – 12
- * Admission – 2

Maternity

- * 2 deliveries
- * 1 pre-eclampsia (stabilized and transferred)

Freres

- * Four operations
- * Nursing (recovery room – 16 patients)

Mobile Outreach Clinic to Killik

Number of Patients seen – 58

- * Clean and dressing – 37
- * Plaster of Paris application – 11
- * Procedures – 2 (incision and drainage)
- * Referrals – 7
- * Buddy splinting – 1

FFTP (approximate figures)

- * 50 consultations
- * 3 referrals

Situational Reports**Bernard Mevs**

- * No electricity for most of the day
- * Most work done in third operating theatre which was commissioned to do minor operative cases
- * Multiple groups (non-governmental organizations, [NGOs]) interested in working at facility
- * Almost out of operative cases
- * Pharmacy commissioned

Solution Proposed

- * New generator
- * Multiple groups (NGOs) issue resolved in principle
- * Visit to Sonapi for more patients

January 22, 2010 (Day 7)**Bernard Mevs**

Seven Operations

Inpatients

- * 32 patients
- * Skin traction application – 4

Outpatient Department

- * Total – 31
- * New – 19
- * Reviews – 12
- * Admission – 4
- * Transfer – 3
- * Malaria – 2
- * Plaster of Paris applications – 10, Robert Jones Ankle splint – 1

Maternal and Child Health

- * Post natal – 2
- * Delivery – nil (Female in active labour)

Child Health

- * Meningitis – 1
- * Gastroenteritis – 2
- * Immunizations – 22

FFTP (approximate figures)

- * 35 consultations
- * 4 referrals

Situational Report

- * Poor transportation arrangements Trucks promised by the UN did not arrive
- * Polytrauma patient transferred to University of Miami Field Hospital
- * New team, including six doctors, arrived today to take over

January 23, 2010 (Day 8)**Bernard Mevs**

Eight Patients

Triage – 38

- * 9 reviews
- * 28 new
- * 7 X-rays
- * 20 C&D

Inpatients

- * 37 patients
- * Skin traction applications – 1

Outpatient Department

- * Total – 29
- * Reviews – 15

- * New – 14
- * Plaster of Paris application – 12

Freres

- * No surgeries
- * Seven recovery room patients
- * 16 Post-op patients
- * Four patients triaged

Mobile Outreach Clinic to Killik

- * Number of patients seen – 62
- * Dressing – 30
- * Procedures – 1(incision and drainage of abscess)
- * Plaster of Paris applications – 6
- * Referral to hospital – 1
- * Fungal infections – 2
- * Burns – 3
- * Haematochezia – 1
- * Gastritis – 5
- * Gastroenteritis – 9
- * Lacerations/abrasions – 41

FFTP (approximate figures)

- * 35 consultations
- * 4 referrals

Situational Report

- * X-ray Department commissioned (generator borrowed)
- * Wristband Name Tag System instituted
- * OPD moved to a new location with doctors office, dressing room and hand washing facilities
- * Emphasis is changing from life-saving surgeries to limb-sparing surgeries (flap coverages, open reduction, internal fixations)
- * Postoperative patients being reviewed with good results
- * OT lists produced from the day before
- * Orthopaedic Grand Round
- * Pathologies presenting which are related to deteriorating public health conditions

Total patients seen over 8 days

BM	453 patients; 6 transfers
Freres	223 patients
FFTP	350–370 patients; 24 referrals
Train of Hope	203 patients

Total 1229 – 1249

Surgical Summary After 48 Hours

Total operations	43
Major	26
Minor	17
Amputations	9
Major Debridement	9
Minor Debridement	17
Fasciotomy	2
External Fixators	4
Chest Tube Insertion	2

Surgical Eight-day Assessment

Total operations	106
Major	64
Minor	42
Amputations	21
Plaster of Paris applications	105
Skin traction applications	18

DISCUSSION

The tour of duty in Haiti lasted for eight days. During this time the objectives were clear and achievable. The team was able to hit the ground running in Haiti because there was a strong organizational structure in place even before leaving Jamaica.

We organized ourselves in pods which were functional units that could be utilized in clinical treatment situations or if we were required to do search and rescue. As a part of the organizational structure, meetings were held nightly with pod leaders and sectional leaders. In these meetings, plans were implemented and previous ones reviewed. Daily plan of actions were instituted in these nightly meetings (5, 6).

To achieve the first objective of setting appropriate operating sites to treat the acute injuries and their complications, the BM Hospital was used to achieve this objective. As the team worked over the eight days to establish the location, there was a steady influx of patients who were victims of the earthquake.

At the BM Hospital, there were 453 patients seen of which six were transferred. At the Freres Community Hospital, 223 patients were seen. The clinic established at the FFTP facility saw between 350–370 patients and 24 referrals were made. The mobile outreach clinic saw and treated 203 patients. The overall result was that a total of about 1230 patients were seen at all of the facilities that were set up. After 48 hours, there were 43 operations performed and after eight days, 106 surgeries were done.

It was noticed as time progressed that there was a cohort of patients that had to be provided for. This cohort represented ongoing issues of domestic life in Haiti *eg vic-*

tims of road traffic accidents, victims of crime and violence, and delivery of babies.

Towards the end of the week, it was also noticed that there was a change in the types of pathology resulting from the earthquake that had to be considered in our purview of care. These were public health concerns, rehabilitation for patients who had received surgery and also the psychological aspects of the trauma victims.

Overall, at the end of the first week, there were improving general conditions in the hospital and we had to aim at formalizing operations to approximate that of a regular trauma hospital. At the Bernard Mevs Hospital, there were established clinical areas with heads of departments. These were as follows:

- * Outpatient/Triage
- * Inpatient/Ward
- * Operation theatre (including recovery)

A medical record system was introduced for better recording and follow-up.

The issue of patient care at nights remained a problem as we were under curfew orders from the Jamaica Defence Force (JDF). Operations began at 8:00 am daily and had to cease at 5:00 pm. We had to be back at base camp for the 7:00 pm curfew. A Haitian nurse who formed a part of our team took over in the evenings and was responsible for patient care until morning. Other patients would be discharged to come back for review and wound care/closure and treated on an outpatient basis.

Up to the end of the first week, an ideal screening area was not found and this had to be done in the hospital yard. A dressing area to manage wounds was established but was far from ideal.

Other problems faced at the end of the first week and the problem list generated for the relief team were:

- * Challenges posed by an unstable public power supply
- * Unreliable transportation
- * Language barrier – need for good translators
- * Securing and managing patients records
- * Normalization of the pharmacy situation
- * Patient transfer – need for ambulance and coordination with transfer centre
- * Communication problems (telephones not reliably working)
- * Coordination of the activities of the NGOs and maintaining the chain of command
- * Management of the media
- * Better system of stock requisition from Jamaica and the United Nations (UN)

Summary of situation at Bernard Mevs with NGOs during the first week – there were three delegations that offered assistance at the Bernard Mevs location:

- * Haitian Relief with paediatricians
- * Miami Group with plastic/general surgeons, nurse practitioners, family physicians, emergency medical technicians (firemen)

* Hope International with surgeons, nurses and logistics

There were two meetings with the owners of the facility, heads of Haitian Relief, Miami Group and MOH team. It was established that for clinical matters, the owners of the facility hand overall responsibility and organization to the Jamaican/CARICOM Delegation. Three clinical areas with heads' concept were reiterated and personnel were deployed to various areas through department heads. This was thought to be the best way to control activities in the hospital with the NGOs being incorporated. This was instituted from early in the week and proved effective as a management strategy (5, 6).

At the Freres Community Hospital, a medical team from the USA was primarily in charge. The MOH team successfully integrated with the operations. At this facility, the orthopaedic, general surgery and anaesthetic teams worked independently of each other. Implants were used at this location to salvage and reconstruct limbs. The visiting USA team provided these implants during the first week of the tour of duty. The nurses from the MOH team provided invaluable service in the recovery room at Freres and the EMTs/public health personnel/orthopaedic technicians were also able to integrate successfully in the Emergency Room and other areas of need in this hospital (5, 6).

The second objective of establishing a clinic to offer outpatient services was achieved in the FFTP complex. There was no infrastructural work needed to commence work. Outpatient services began briskly and were run by the medical wing of the JDF. By the end of the first week, the consultations were levelling off at about 30 to 40 patients per day. Referrals were made from this facility to Freres and Bernard Mevs.

The third objective of the mobile clinic was achieved in collaboration with the JDF team. The MOH team provided medical personnel. The mobile clinic was also called "The Train of Hope". This formed a very important facet of the medical assistance afforded to the Haitians. It was very important, as it served a rural town (Killik) which was hard hit by the earthquake. It was important not only because the mobile clinic took medical aid and supplies but offered transportation to the injured to sites for definitive care. The mobile clinic was also important by virtue of its presence in rural areas because there was a sense of hope offered to the victims of the earthquake even if definitive care could not be offered immediately. This mobile clinic was also being planned to visit Leogande, which was another rural town in need.

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