

FROM THE FIELD

Ambulatory Care by Disaster Responders in the Tent Camps of Port-au-Prince, Haiti, January 2010

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ABSTRACT

On January 12, 2010, a magnitude 7.0 earthquake occurred approximately 10 miles west of Port-au-Prince, Haiti, and created one of the worst humanitarian disasters in history. The purpose of this report is to describe the types of illness experienced by people living in tent camps around the city in the immediate aftermath of this event. The data were collected by a team of medical personnel working with an international nongovernmental organization and operating in the tent camps surrounding the city from day 15 to day 18 following the earthquake. In agreement with the existing literature describing patterns of illness in refugee and internally displaced populations, the authors note a preponderance of pediatric illness, with 53% of cases being patients younger than 20 years old and 25% younger than 5 years old. The most common complaints noted by category were respiratory (24.6%), gastrointestinal (16.9%), and genitourinary (10.9%). Another important feature of illness among this population was the observed high incidence of malnutrition among pediatric patients. This report should serve as a guide for future medical interventions in refugee and internally displaced people situations and reinforces the need for strong nutritional support programs in disaster relief operations of this kind.

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Key Words: earthquake, internally displaced people, Haiti, ambulatory care, natural disaster

The earthquake that occurred near Port-au-Prince, Haiti, on January 12, 2010, was one of the most devastating recent natural disasters. The full toll in terms of loss of life from this disaster may never be accurately known. It is certain, however, that hundreds of thousands of people died and that many more were injured, left homeless, and otherwise adversely affected by the loss of infrastructure.¹ Although not unique to this disaster, the Haitian earthquake is notable for the scale of displacement and the severe loss of housing and infrastructure. The lack of emergency preparedness and the damage to all aspects of the Haitian government resulted in a lack of planning and control in the establishment of temporary shelter immediately following the earthquake. Tent camps sprang up spontaneously across the city for people displaced by structural damage to their homes or those afraid to return to their homes for fear of damage and subsequent collapse because of aftershocks. The lack of access to transportation and the pervasive poverty in Haiti may have contributed to an inability of the residents of Port-au-Prince to leave the city to meet their shelter needs. The result of this was that several hundred thousand people were living in hastily arranged camps for many weeks following the earthquake.²

Displaced people, especially those without adequate shelter and without access to sanitation and other services, are at particular risk for a variety of health problems.³ Previous studies have shown that people living in small, informal, and poorly organized camps had greater health

needs and less access to care than those living in larger, better-organized camps.⁴ The sizes of the tent camps in Port-au-Prince are difficult to estimate, but they probably ranged from around 1000 to tens of thousands, depending upon the camp.

The purpose of this report is to describe the health needs and most common presenting illnesses during the weeks following the earthquake and among the displaced people in urban tent camps. This is an important time period and population to characterize because the risk for serious medical conditions is great, as is the opportunity for successful intervention. In the hours and days immediately following an earthquake of this magnitude, it has been well demonstrated that certain traumatic injuries and illnesses prevail and contribute to significant mortality. These include acute orthopedic injuries, head injuries, and crush injuries with subsequent rhabdomyolysis.⁵⁻⁷ Intervention as early as possible in this period is crucial but often difficult in a challenging logistical environment. In disasters that displace large numbers of people, the health effects of poor shelter and lack of access to fuel, clean water, and sanitation can be expected.

The situation in Haiti has been and continues to be particularly dire because many Haitians were in poor health before the earthquake. Even before this event, life expectancy at birth was only 55 years (53 years for men, 56 years for women) and the mortality rate for children younger than 5 years was 117/1000 live births.⁸ The

leading causes of mortality in the 0 to 4 years age group include infectious disease (12.1%), perinatal infections (10.2%), malnutrition (9.1%), and respiratory infection (6.9%).⁹ Limited access to health care is a significant contributor to disease burden in Haiti, with only an estimated 60% of the population having access to formal health care.⁹ The United Nations Children's Fund estimates that for 2005–2008 only 5% of children younger than 5 years old with fever received antimalarial drugs and only 3% of children of this age group with suspected pneumonia received antibiotics.¹⁰ In addition, only 58% of the country's population had access to improved drinking water sources and only 19% had access to improved sanitation facilities.¹⁰

Much of Haiti's health care infrastructure was destroyed by the earthquake, and many health care providers were themselves affected. All of these factors contributed to a dangerous situation for the people living in the tent camps around the city in the weeks after the earthquake. Due to the large size of the city, the magnitude of the destruction and the lack of an adequate civil services network, including emergency medical services and access to clean water in Haiti even before the earthquake, this disaster presented immense logistical challenges for aid distribution and access to the displaced population.

The authors hope that these data will be useful in planning future interventions for situations similar to those faced by the international aid community in Haiti in the winter of 2010.

METHODS

The source of data for this report was information collected by medical providers participating in a medical intervention in 4 of the more than 100 medium-to-large tent camps in Port-au-Prince during the last week of January 2010. Data were collected during clinics held in these camps during 4 days from day 15 to day 18 after the earthquake. These 4 days were selected because the authors participated in the clinics on these days and thus had first-hand experience with the patient population and the environment of care. The group of medical care providers included emergency medicine physicians, family medicine physicians, internal medicine physicians, pediatricians, orthopedists, and nurses from both the United States and the Dominican Republic, and was accompanied by a large support staff of translators and logistics and security personnel.

Each day, 1 clinic was conducted in a different area of Port-au-Prince: 3 camps in the Delmas district and 1 in the Tabarre area (Figure 1). Each camp was estimated to have between 1000 and 5000 inhabitants. The people living in these camps were primarily those displaced from permanent structures in the immediate vicinity of each camp, although we suspect there was still a good deal of movement around the city at this time. The sites were selected based on a perceived need by mission staff and local authorities and the ability to ensure the safety of the medical team. An attempt was made to coordinate the arrival of the team at each site ahead of time, but because of the large

FIGURE 1

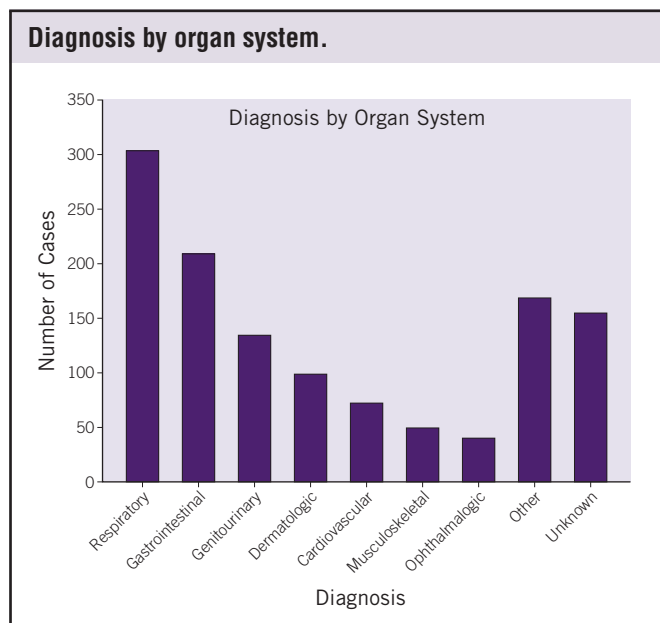
Satellite image of Port-au-Prince with clinic locations.



daily movement of people in and out of the camps, many inhabitants were not aware that the team was coming until it arrived. During the first weeks after the earthquake the health care available in Port-au-Prince fluctuated constantly, with various government and nongovernment missions arriving and leaving. Several large-scale acute care field hospitals had been established at the time of the mobile clinics described here, including those organized by the US National Disaster Medical System, Médecins Sans Frontières (Doctors Without Borders), and a large hospital run by the University of Miami Hospital. Much of this capability was centered around the airport complex, although a number of clinics and medical facilities were also spread throughout the rest of the capital city.

For each clinic, the team arrived and set up a pharmacy area where medications were distributed and an area for patient consultations. Between 8 and 10 providers at a time performed consultations, with others assisting in the pharmacy and 1 or 2 providers performing triage in the tent camps themselves. During the triage process, 1 or 2 members of the team walked systematically through the camps in an effort to identify people in need of treatment or evaluation. These triage officers included emergency medicine or family medicine physicians and the team leader, a nurse practitioner, who spoke fluent Haitian Creole and English. The criteria for selection of the people to be evaluated included a number of factors such as age, nature of illness, and clinical appearance. Although the criteria for selection were individual to each triage officer, the principle was to select those people who could most benefit from care. The triage officers made an effort to visit each tent and shelter, in many cases performing triage examinations inside the tents. Inhabitants also referred the triage officer to people who were believed to be in

FIGURE 2



need of medical attention. Patients were selected and given tickets to gain admission to the examination area, where they were registered by name. Each patient was given a sheet of paper with his or her name, age, and chief complaint, which was then taken to a provider who wrote a brief clinical note on each patient, including the symptoms, diagnosis, and treatment. This chart was then taken to the pharmacy, where medications were provided free of charge. Between 200 and 300 patients were seen each day in this way for full consultations.

Each patient-encounter record was reviewed by 1 of the medical team members and both the age of the patient and diagnosis were recorded as part of our team's evaluation of our intervention. Diagnoses were categorized as respiratory, gastrointestinal, genitourinary, dermatologic, cardiovascular, ophthalmologic, musculoskeletal, systemic, and "other," which included charts for which not enough data existed to determine a clear diagnosis or symptoms. In the case of this last group of charts, the treatment prescribed was recorded. Patients sometimes had more than 1 diagnosis recorded. These data were compiled and cross-referenced to each clinic site.

During the week before and weeks after the time period discussed in this report, these and other camps were visited by other volunteer medical teams working with the same organization. Many camps are still visited by teams on a rotating basis to provide as much continuity of care as possible. The data in this report encompass only days 15 to 18 after the earthquake.

RESULTS

During the study period, 978 patients were seen by the medical team for full consultations and 1183 diagnoses were made and illnesses/injuries treated, with a number of patients being

treated for more than 1 condition. All of these patients were included in the chart review and no charts were excluded from the analysis. The most common types of illness encountered were respiratory (304 cases), gastrointestinal (209 cases), and genitourinary (135 cases). The cases within each category were further characterized and separated by clinic day (Table 1, Figure 2) A total of 53% of patients were younger than 20 years and 25% were younger than 5 years. Of note, only a small number of cases of traumatic injury were identified (49 cases).

The impact of this disaster was compounded greatly by the lack of infrastructure in Port-au-Prince before the earthquake and the severe disruption of the limited social services that did exist. Several large hospitals were badly damaged or completely destroyed in and around Port-au-Prince, and only a portion of what had been available to the people of the city existed in a functional way in the immediate aftermath of the earthquake.¹¹⁻¹³ The number of individuals living as internally displaced people in their own city is also a striking feature of this disaster, with tent camps that were becoming more crowded by the day during the time period described in this report. The medical needs of the residents of Port-au-Prince during the period of this study are consistent with what other authors have described in long-term refugee situations, which include acute respiratory infection, diarrhea, malnutrition, and malaria.¹⁴

The mobile clinics did not have access to any on-site laboratory or other diagnostic capability. Thus, diagnoses were made clinically and based upon the clinical impression of the provider. It is important to note that malnutrition and hunger were often not specifically noted as diagnoses, although food and vitamin supplementation was given to many of the patients seen in the clinics. Because no laboratory studies were available to make a formal diagnosis of protein malnutrition, stunting, or micronutrient deficiency, a diagnosis of a specific type of malnutrition was not made in most cases. Loose, hanging skin, distended abdomens, alopecia, and thin, brittle hair were observed by all of the members of the team in a large number of patients. Some patients would likely have benefited from inpatient therapeutic feeding programs, but access to this resource was not available to our teams and in only limited ways in Port-au-Prince in general at the time of this intervention. The team distributed family food packets containing basic grains and cooking materials to patients in addition to other medications dispensed in the pharmacy. Our team also dispensed a 2- to 4-week supply of multivitamins to almost all of the patients encountered until the supply of this resource was exhausted on each clinic day.

Malnutrition was endemic among the patients treated during this intervention, and the effect of this condition will continue to amplify unless food aid continues to be aggressively distributed. The extent of malnutrition seen by this medical team is particularly striking given that it occurred relatively quickly after the disaster event. This underscores the vulnerability of this population, and it is likely that chronic poor health and

food insecurity before the event contributed to the situation. Indeed, 25% of children born in Haiti between 2003 and 2008 had low birth weight and in the same time period, 18% of those

younger than 5 years old were classified as either moderately or severely underweight, 10% had moderate to severe wasting, and 29% had moderate to severe stunting.¹⁰

TABLE

All Diagnoses					
Diagnosis	Day 1	Day 2	Day 3	Day 4	Total
Respiratory					
Upper respiratory infections	146	49	35	44	174
Otitis, sinusitis	5	21	11	21	58
Pneumonia, bronchitis	7	12	14	9	42
Pharyngitis	4	4	3	10	21
Asthma, reactive airways disease	1	0	4	2	7
Probable tuberculosis	0	0	0	2	2
Respiratory, total	63	86	67	88	304
Gastrointestinal					
Diarrhea	9	17	31	16	73
Gastritis, peptic ulcer disease, gastroesophageal reflux disease	17	14	1	29	61
Worms	0	8	24	11	43
Abdominal pain not otherwise specified	12	4	7	8	31
Constipation	1	0	0	0	1
Gastrointestinal, total	39	43	63	64	209
Genitourinary					
Vaginal infection	17	10	34	24	85
Urinary tract infection, pyelonephritis	6	3	6	16	31
Genitourinary bleeding	0	1	1	0	2
Pregnancy, postpartum	6	6	2	3	17
Genitourinary, total	29	20	43	43	135
Dermatology					
Skin injury	7	1	0	1	9
Skin Infection	7	21	18	18	64
Rash not otherwise specified	4	6	3	13	26
Dermatology, total	18	28	21	32	99
Cardiovascular					
Hypertension	22	7	9	13	51
Chest pain, palpitations	6	2	1	8	17
Other (diabetes mellitus, edema)	0	2	2	0	4
Cardiovascular, total	28	11	12	21	72
Musculoskeletal					
Contusions	2	10	0	2	14
Muscle, joint, bone pain	14	4	11	6	35
Musculoskeletal, total	16	14	11	8	49
Eye complaints					
10	8	2	20	40	
Other, systemic					
Headache	10	10	8	35	63
Dizziness	2	0	1	5	8
Dehydration	4	11	3	1	19
Anemia	5	4	4	11	24
Fever	1	8	2	8	19
Anxiety, posttraumatic stress disorder, insomnia	6	0	2	4	12
Nutrition deficiency	1	0	7	0	8
Allergic symptoms	1	2	0	1	4
Dental/oral	1	1	0	3	5
Malaria	0	0	2	0	2
Other, stroke	0	0	1	4	5
Other, systemic, total	31	36	30	72	169
Unknown symptoms or diagnosis					
Antibiotic dispensed, no information	16	24	0	10	50
Acetaminophen/ibuprofen/vitamin dispensed, no info	22	28	33	15	98
Unknown	4	0	0	3	7
Unknown symptoms or diagnosis, total	42	52	33	28	155

Ambulatory Care in Haitian Tent Camps

Fortunately, the disaster occurred at a time of year in Haiti when mosquito density is relatively low and malaria transmission is less than during the summer and fall. Our study included only 2 cases of suspected malaria and no cases of suspected Dengue fever. With the approach of the 2 regular rainy seasons in Haiti (combined May to November), however, if the internally displaced people within Port-au-Prince are not found more permanent shelter, exposure to mosquito vectors will be high and the risk for epidemics of these diseases will increase.

Finally, the condition of the camps included in this study was poor at the time of this report and, without significant improvement, the sanitation condition in the camps will likely continue to deteriorate, and water-borne diseases, already endemic in Haiti, are at risk of reaching epidemic proportions. The people in these camps have already begun experiencing the issues associated with displacement and crowding, and these problems can be expected to worsen if reorganization of the camps and programs to find permanent shelter are not undertaken immediately.

Limitations

Although this report has important implications for the care of displaced people after disasters, there are several significant limitations. First, the sample size relative to the number of people affected by this disaster is small and was only collected during a period of 4 days. This was due to the length of the intervention by the specific group of providers and this particular mission, but it may not be representative of the broader experience of the entire city of Port-au-Prince or of other medical teams before or after the time covered in this report. This report also addresses only the ambulatory care needs of the residents of these tent camps and therefore certainly underestimates the scope and severity of the overall disease burden in Port-au-Prince because many acutely ill people likely sought care in more advanced settings and likely did so soon after the event. On each clinic day, a method of patient selection was used that depended heavily upon 1 or 2 providers' clinical impression of tent camp inhabitants without access to vital sign monitoring or other diagnostic modalities. This method of patient selection certainly suffers from a lack of uniformity and may have introduced bias into the patient demographic and clinical mix. The patient records that were reviewed for this report often had minimal diagnostic and therapeutic information recorded and likely underestimate the true disease burden in the patients who were evaluated. The 4 sites for the mobile clinics were chosen with consideration of logistics and security and therefore may not reflect the situation in other similar-sized tent camps in Port-au-Prince during the same time period.

DISCUSSION

The data presented here suggest that although patterns of injury consistent with trauma may predominate immediately following an event such as the earthquake in Haiti, shortly after the actual event health care workers in this unique setting should prepare to treat infectious causes of illness such as those en-

countered in this study, with upper respiratory infection being the most prevalent. Although orthopedic injuries will continue to be an important cause of morbidity and mortality for weeks and months following such an event, the primary care needs of displaced people will likely occupy an ever larger percentage of the need in the tent camps. Many of those with more significant musculoskeletal injuries will likely seek care in more sophisticated settings if they are available, while care for respiratory, gastrointestinal, and genitourinary complaints quickly becomes an important priority in the camps.

This report also demonstrates that approximately 2 weeks after the Haitian earthquake, the need for medical attention in displaced people is likely to be greatest among young people, especially infants and children. One quarter of the patients evaluated in this study were younger than 5 years old and many of these patients required the most aggressive forms of treatment, including rehydration, parenteral antibiotics, and referral. The demographic breakdown of the patients in this study, however, should be placed in the context of preearthquake figures. Estimates by the World Health Organization suggest that approximately half of the population of Haiti is younger than 20 years old and about 12% is younger than 5 years old.¹⁵ Thus, the percentage of patients younger than 20 years of age in our study mirrors the population percentage of this age group, whereas children younger than 5 years seem to be overrepresented in our sample. Establishing referral patterns and transfer arrangements was another important part of caring for children with more serious illnesses. The importance of medical care providers with pediatric expertise or generalists who are competent in the evaluation and treatment of children cannot be overstated.

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