Health response to the earthquake in Haiti

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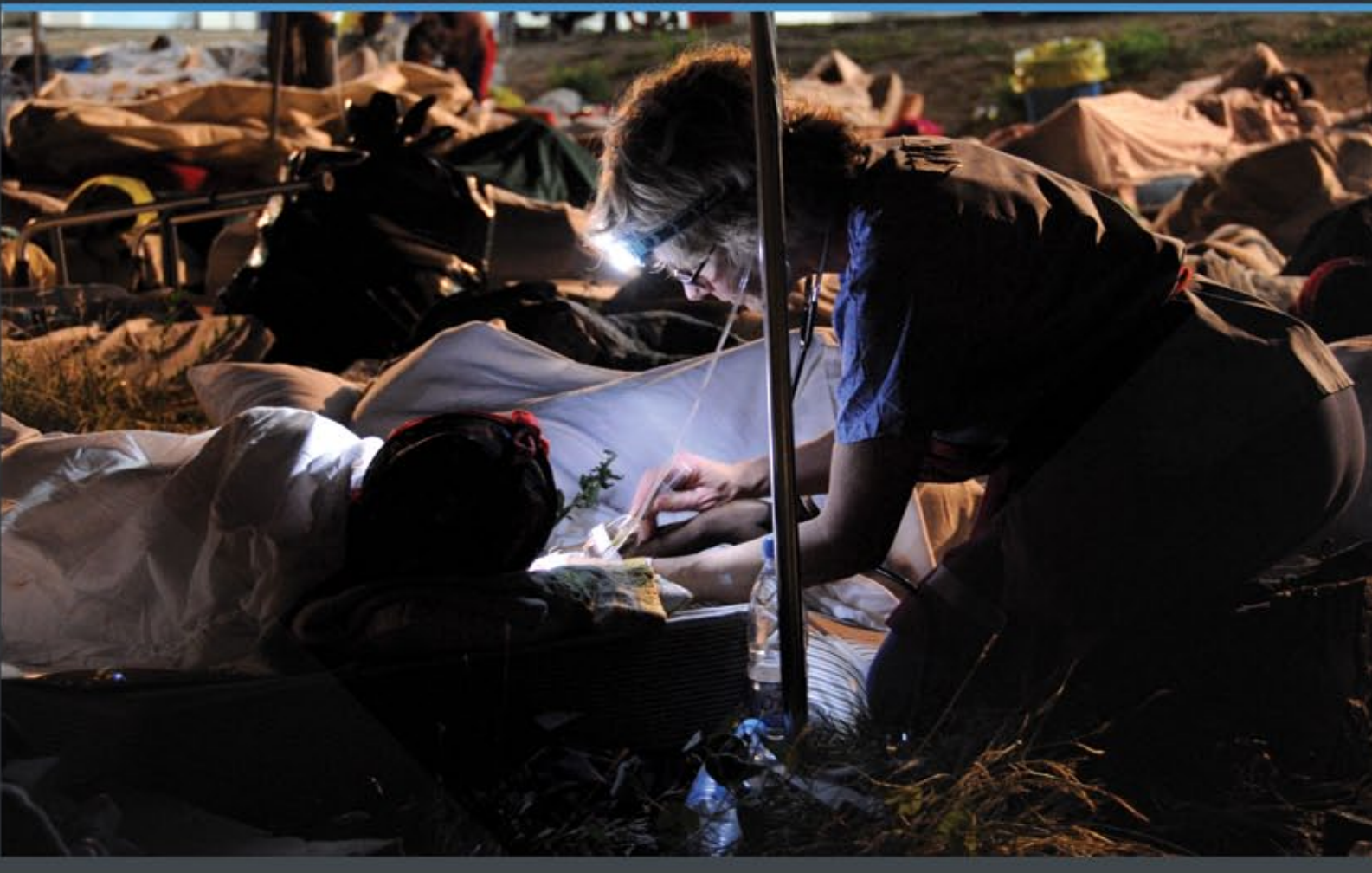

Pan American Health Organization

Regional Office of the World Health Organization

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Graphic design and cover photo: PAHO/WHO, Victor Ariscain

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Foreword

Every disaster brings new lessons of general application that we must learn before the next sudden-onset disaster strikes. The Haiti earthquake is no exception.

This publication, for practical reasons, focuses on the first three months of the response. A similar study might be needed for the mid- and long-term recovery and reconstruction process that occurs after the first three months.

The key lessons outlined in this publication are not merely the views of the author, Claude de Ville de Goyet, and co-authors, Juan Pablo Sarmiento and François Grünewald. They reflect the collective vision of a large number of partners and experts. International experts of the review group made significant contributions to the findings and conclusions of this important publication.

The 12 January 2010 earthquake could not have occurred in a more vulnerable environment than the capital of Haiti. The immediate health impact of the earthquake in absolute terms— number of dead and injured—was among the highest in recent times. When the needs are compared to the national response capacity, this disaster was truly unprecedented.

The international community responded rapidly with an outpouring of generosity. Beyond traditional global donors, relief came from Haiti's immediate neighbors, as well as from every country in Latin America and the Caribbean. Such support offered an encouraging example of solidarity in the true spirit of Pan-Americanism.

If the impact was unprecedented, the organization of the response was not. It followed the same chaotic pattern as in past disasters. Information was scarce, decisions were often not evidence-based, and overall sectoral coordination presented serious shortcomings. Management gaps noted in past crises were repeated and amplified in Haiti. The humanitarian community failed to put in practice the lessons learned.

The "proliferation of actors", to borrow an expression used in the evaluation of the tsunami, ensured a massive offer of services from competent partners. The overwhelming number of people in need of immediate assistance ensured that each minimally prepared and equipped health responder provided valuable health assistance. However, this proliferation also included a number of wholly unprepared or even incompetent health actors who bypassed the overburdened coordination mechanisms. The WHO initiative to launch a global registration process of foreign medical teams and field hospitals is most timely. It should be a first step toward national accreditation of those actors.

Information and coordination management was a challenge that was not met adequately. One of the key lessons to be re-learned from the Haiti earthquake is that coordination can only be effective if the national authorities (civil protection, health, and other line ministries) are equipped and truly assume the ultimate leadership and authority for coordination. External coordination mechanisms are most valuable when they can offer a modicum of order in the first days or weeks until the authorities recover from the impact. But only the government of an affected country has the legitimacy to establish and implement relief and recovery priorities.

Disasters are tragedies, but also provide windows of opportunities. The principle of free access to basic health care is now more widely accepted. The international focus on mental health and psychosocial support shed light on the inadequacy of institutionalization as the basis for treatment of mental health patients. The high number of amputations and other severe injuries resulting from the earthquake prompted a dramatic and positive shift in public attitudes toward those with disabilities and a strong commitment to rehabilitation programs.

This publication aims to increase the technical body of evidence. Many reports, as well as peer-reviewed articles, have been published on this disaster. This PAHO/WHO publication offers a synopsis from a public health point of view.

In conclusion, we know that other disasters will affect metropolitan areas in developing countries. It is not a matter of if, but of when. Only by incorporating those lessons into improved risk mitigation and in particular health preparedness, will we avoid repeating the same errors in the next affected country.

The maximum possible reduction of avoidable deaths, disabilities, and suffering remains our ultimate goal.

Mirta Roses Periago
Director
Pan American Health Organization

Acknowledgments

The author and co-authors of this publication express their gratitude for all those who have shared their experience, their views, and observations during numerous meetings and field visits. They helped us to appreciate the dedication of so many facing an insurmountable challenge.

Our appreciation goes first to the Haitian health professionals who candidly described their odyssey in the first weeks following the earthquake, and their gratitude but also frustration with well-intentioned but sometimes counterproductive assistance. Among those who have influenced our thinking are: Ariel Henri, Cabinet Chief of the Ministry of Health; Daniel Henrys, senior consultant; Jean Hughes Henrys, Dean of the Medical School, University of Notre Dame; Alix Lassegue, Director, University Hospital of Haiti; Claude Surena, Haitian Medical Association; and Yolene Surena, Directorate for Civil Protection/World Bank Project.

In the international community, among the many who helped us to reconstruct the complex patterns of the response, special recognition is due to Edmond Mulet, Special Representative of the UN Secretary-General. A remarkable diplomat with sound judgment on our collective lackluster coordination, Mr. Mulet reassured us in our quest for additional critical insights. The support and contributions of UNICEF staff in the initial interviews but also in the review process were also outstanding.

There were many colleagues in PAHO/WHO who guided us, correcting our interpretation of the implications and mid-term consequences of the response, and strengthening our grasp of all the relevant facts. Among them are the two PAHO/WHO representatives who conducted PAHO/WHO response, Henriette Chamouillet and Lea Guido; Dana Van Alphen, the Health Cluster coordinator; and Cristian Morales, Health Services Advisor. They helped us to navigate between the two occasionally clashing worlds of the life-saving humanitarian response and of the long-term, capacity building of the national counterparts.

This document would never have come to fruition without the visionary support from the Emergency Preparedness Area at PAHO/WHO Headquarters. Jean-Luc Poncelet's encouragement and ability to mobilize resources for the preparation and publication of this document, Sam Vigersky and Cristina Estrada's management support, and Liz Stonaker's editorial contributions were most valuable.

In addition we would like to acknowledge the contributions made by the following people who served on the review committee: Ellen Wasserman (Johns Hopkins School of Public Health); Shannon Strother (Disaster Resilience Leadership Academy, Tulane University); Alana Officer (WHO); Andre Griekspoor (WHO); Jon Andrus (PAHO); Jean Luc Poncelet (PAHO); Sylvain Aldighieri (PAHO); Cecilia Acuña (PAHO); Peter Graaff (PAHO); and Nicolas Lagomarsino (PAHO).

Naming a few can be an injustice for the many others who helped us. Few of the ideas and key findings are ours. They all have been revealed to us by one colleague or another. Our appreciation and our gratitude go to those anonymous thinkers from NGOs, UN or other agencies. We hope that these lessons, their lessons, will be learned and put in practice in future disasters.

About the authors

Claude de Ville de Goyet, MD MPH

Claude de Ville de Goyet graduated from the University of Louvain (Belgium) in 1965 and completed a BSc in Operational Research at the University of South Africa. Following six years of public health work in Africa, Dr. de Ville de Goyet became the first Director of the Disaster Epidemiology Research Center (CRED) at the University of Louvain in Belgium.

From 1977 to 2002, he was Director of the Emergency Preparedness and Disaster Relief Coordination Program of the Pan American Health Organization, Regional Office for the Americas of the World Health Organization (PAHO/WHO). Beginning in 1976, he has travelled frequently to Haiti.

Since his retirement from PAHO/WHO in 2002, Dr. de Ville de Goyet has conducted independent evaluations after most major disasters, including the Indian Ocean tsunami and the Bam and Kashmir earthquakes. Dr. de Ville is very familiar with the situation in Haiti, where he was relief coordinator after the 2004 Hurricane in Gonaives and WHO Representative and Special Advisor in early 2011 during the cholera outbreak.

Juan Pablo Sarmiento, MD MPH

Juan Pablo Sarmiento graduated from the University of Rosario (Colombia) in 1980, and completed post-graduate studies in Disaster Management (United Kingdom), Public Administration (Colombia), Medical Education (Colombia), Nutrition (United States), and Project Administration (Costa Rica).

From 1981 to 1994, Dr. Sarmiento worked for Colombian institutions in a variety of capacities, including: Head of the Health Unit, Colombian Civil Defense; Chief of Emergency Services, Central Military Hospital; National Disaster Coordinator, Ministry of Health; Professor, Javeriana University; and National Relief Director, Colombian Red Cross.

Between 1994 and 2008, Dr. Sarmiento worked for the U.S. Agency for International Development, Office for U.S. Foreign Disaster Assistance (USAID/OFDA) as Technical Manager for the Latin American and Caribbean Regional Disaster Program, based in Costa Rica.

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François Grünewald is an agricultural engineer, specializing in rural economies, and serves as Associate Professor at Paris XII University. He has worked for 30 years in development, emergency, and post-disaster rehabilitation projects in Africa, Asia, Central Europe, and Central and Latin America, serving with NGOs, UN agencies, and the International Committee of the Red Cross (ICRC).

In 1997, he became chairman of Groupe URD *(Urgence-Rehabilitation-Developpement)*, a French research, evaluation and training institute. In that capacity Grünewald has conducted research and evaluation projects for the European Union, ICRC, the UN, and NGOs. He is the author of several books and articles on complex emergencies and the management of socio-natural disasters.

Mr. Grünewald has served as team leader for the evaluation of the response to the Bahr el Ghazal famine; the NGO evaluation of Hurricane Mitch; the United Kingdom and UNICEF evaluation of the Darfur Crisis; evaluation of the French response to the Indian Ocean tsunami; IASC evaluation of international response to the crisis in the Horn of Africa; and a variety of evaluations following the earthquake in Haiti.

Preface

The 12 January 2010 earthquake was the latest and most devastating of many major sudden-impact natural disasters affecting Haiti in the last 10 years. It was also one of a series of sudden emergencies that mobilized the international community on a global scale.

The response to Haiti, especially in the health sector, has been generous, even overwhelming. This internal and external response met considerable challenges and problems, some of its own making. As was the case in the response to the Indian Ocean tsunami and the Pakistan earthquake, not all those challenges were met effectively.

The objective of this publication is to draw the lessons to be learned for improving the health response in future sudden-onset disasters. We know that massive earthquakes will occur again and some will devastate metropolitan areas or even the capital city, as was the case in Haiti. Haiti is the subject of this study, hopefully not the object, as Haiti has had her share of catastrophes.

The scope of the book is limited to the health response, health being defined in its broad sense, not merely medical care or disease control. The review is confined to the immediate and early response in the first three months, the period during which most of the international assistance was mobilized and influences, for better or worse, rehabilitation and reconstruction.

The publication focuses specially but not exclusively on those lessons that are of general interest, i.e., not specific to the special case of Haiti. The international community has much to learn from the response in Haiti where it has shown an ability to repeat its errors and shortcomings from past disasters.

The methodology used for this study is common to most evaluations: in-depth review of reports, evaluations, studies, and peer-reviewed scientific publications; over 150 interviews, half of them carried out exclusively for this study and others for similar evaluations carried out by one of the three authors; circulation of the draft to all interviewees for factual validation and comments on the authors' interpretation of the findings; and, finally, discussion with a review board convened by PAHO/WHO.

The poorest country in the Western Hemisphere, Haiti has been affected by political violence for most of its recent history. Poverty, corruption, lack of export industries, a large deficit and severe environmental deterioration and deforestation, are among Haiti's most serious disadvantages.

Photo: PAHO/WHO, Victor Ariscain

Chapter

1

Haiti prior to the earthquake

This chapter summarizes the situation in Haiti prior to the earthquake.[1] The detailed background description can be found in Annex 1.

Whenever possible, it offers a comparison with Haiti's neighbor, the Dominican Republic (to place the country in a regional context), and with three countries affected in the last decade by large, sudden-onset natural disasters and recipients of massive international assistance: Indonesia and Sri Lanka (Indian Ocean tsunami in 2004) and Pakistan (earthquake in Kashmir in 2005).

Haiti, a French- and Creole-speaking country located in the middle of the Caribbean basin, has a population estimated at 10 million inhabitants.[2] It takes up one-third of the island of Hispaniola, the rest being occupied by the Dominican Republic, which has a comparable population.

Half of the population lives in urban areas, the largest being the capital metropolitan area (Port-au-Prince "agglomeration"), with a population estimated at 2.3 million.

1 Sources for this chapter include: Institut Haitien de Statistique et Informatique (IHSI 2010); World Bank, *Haiti at a glance* (2006); PAHO/WHO, *Health in the Americas* (2007); WHO, *Haiti health profile* (2010); United Nations, *World population prospects: the 2008 revision* (2009).

2 Estimates in official and scientific documents vary from 8 to 10 million. The absence of such basic information as agreed upon census data in Haiti illustrates the lack of reliable or accurate data on many aspects of the country's public life. For this reason, figures are rounded in this publication.

Social, political, and economic determinants

Characteristics of Haiti affecting disaster response

Disadvantages for response:

- A small country, among the poorest of the world, and therefore with limited response capacity;
- Weak institutions with little control over thousands of donor-supported NGOs;
- Lack of governance and a high level of corruption;
- The absence of armed forces.

Advantages for response:

- Easy access by land and water;
- Presence of peacekeeping forces, UN agencies, and a large number of humanitarian NGOs.

In 1991, a military coup paralyzed the development of the country, leading in 1993 to an OAS/UN embargo. One of the first decisions of the newly elected, democratic Government in 1994, was to dismantle the army—the cause of so many military coups in Haiti—leaving the police force as the only national institution in charge of security.

Following a long series of political upheavals, the United Nations Stabilization Mission in Haiti (MINUSTAH) was set up in 2004.[3] While the Haitian National Police was progressively emerging as a law enforcement body, foreign military forces under MINUSTAH ensured basic security both for the population, which was increasingly ambivalent to this presence, and for an increasingly large UN humanitarian and development community. MINUSTAH was the only entity with significant assets and discipline for logistic support to the humanitarian community in case of sudden-onset disasters. However, this function was not included in its mandate. It should be noted that the presence of a peacekeeping force in absence of civil war or conflict subjected the UN actors to particularly constraining security rules.

Haiti's socio-economic situation at the time of the earthquake can be described in a nutshell:

- One of poorest and smallest countries in the world and the least developed in the American region;
- A high level of corruption, inequity, and inequality;
- Severe environmental deterioration and deforestation;
- Lack of export industries and a large deficit;
- An ongoing brain drain, primarily to the United States, Canada, and France;

3 MINUSTAH was originally established through the UN Security Council Resolution 1542 of 30 April 2004, to "support the Transitional Government in ensuring a secure and stable environment; to assist in monitoring, restructuring and reforming the Haitian National Police; to help with comprehensive and sustainable Disarmament, Demobilization and Reintegration (DDR) programmes; to assist with the restoration and maintenance of the rule of law, public safety and public order in Haiti; to protect United Nations personnel, facilities, installations and equipment and to protect civilians under imminent threat of physical violence; to support the constitutional and political processes; to assist in organizing, monitoring, and carrying out free and fair municipal, parliamentary and presidential elections; to support the Transitional Government as well as Haitian human rights institutions and groups in their efforts to promote and protect human rights; and to monitor and report on the human rights situation in the country. … In extending the mission's mandate for another year on 13 October 2009, the Security Council, by its resolution 1892, further tasked MINUSTAH with providing logistical and security assistance for elections anticipated for 2010" (UN 2011).

- Most services delivered by NGOs with token supervision and consultation from the Government. Haiti has been called a "Republic of NGOs".

Haiti stands in stark contrast to its neighbor, the Dominican Republic, and to other developing countries recently affected by sudden-onset disasters that triggered massive foreign assistance. Comparative data are shown in Table 1.1. While Haiti can be compared to Sri Lanka in terms of size, its level of development is far lower. Haiti's development level is comparable to that of Pakistan but the size of the latter country and extent of its resources are very dissimilar.

Figure 1.1 shows the ranking of Haiti in the Rule of Law Index, compared to the four same countries.

Table 1.1 Population, income, governance, and security indicators in Haiti, Dominican Republic, Sri Lanka, Pakistan, and Indonesia

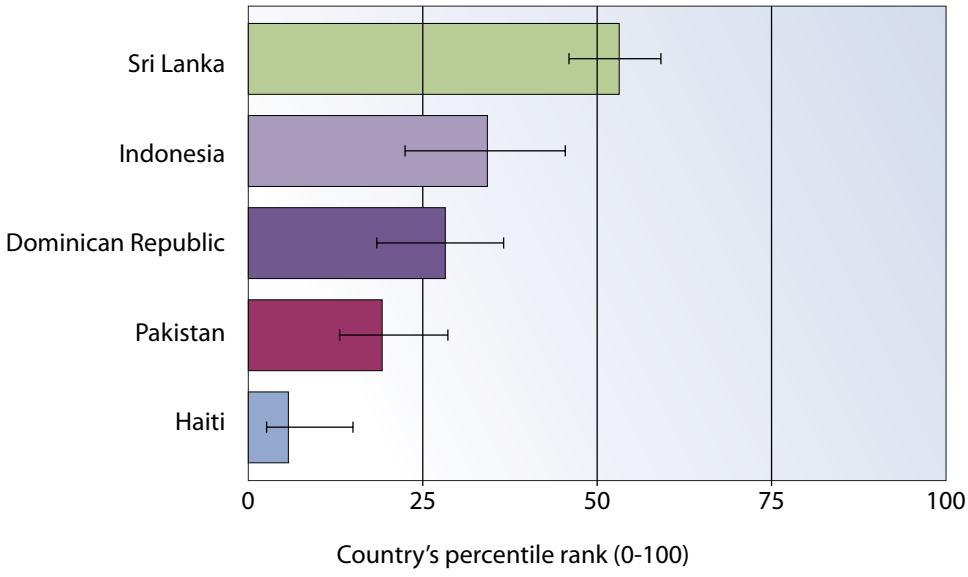
Indicator	Haiti	Dominican Republic	Sri Lanka	Pakistan	Indonesia
Population (millions)	10	10	20	161	228
GNI per capita (US$; 2010)[a]	650	4,860	2,290	1,050	2,580
Multi-dimensional Poverty Index (the lower, the better)[b]	0.31	0.05	0.02	0.28	0.1
Corruption Index (ranking 2010)[c]	2.2 (146)	3.0 (101)	3.2 (91)	2.3 (143)	2.8 (110)
Security for international staff	No ongoing civil conflict but strict restriction of movement	Good security	Ongoing civil war; restricted access to some areas	Good security; no conflict. Earthquake-affected province under military authority	Low security; civil war ongoing in Aceh
Presence of military	No national military; strong UN peacekeeping presence	National military active in civil defense	Strong presence of national military; some areas under rebel control	Strong presence of national military	Strong presence of national military
NGOs	One of the highest densities of NGOs in world; token government oversight	Significant number of NGOs with moderate government oversight	Many local NGOs, but few international NGOs active before tsunami; strong government oversight	Few international NGOs authorized in Kashmir, but large number in Pakistan; strong government oversight	No international NGOs allowed in Aceh prior to the tsunami (UN and ICRC only); strong government oversight

a Gross national income (GNI) per capita (formerly GNP per capita) is the gross national income, converted to U.S. dollars, divided by the midyear population. It comprises the value of all products and services generated within a country in one year (i.e., its gross domestic product), together with its net income received from other countries (notably interest and dividends). Figures are from World Bank Databank (2010).

b The Multidimensional Poverty Index (Alkire and Santos 2010) uses 10 indicators to measure critical dimensions of poverty at the household level. The MPI value summarizes information on multiple deprivations into a single number.

c The Corruption Index ranks countries on a scale from 10 (highly clean) to 0 (highly corrupt); ranking in world is in parentheses (Transparency International 2011).

Figure 1.1 Rule of law rankings for Haiti, Dominican Republic, Sri Lanka, Pakistan, and Indonesia (2009)



Note: The Rule of Law Index is one of six indicators used to assess the quality of governance in countries. These indicators aggregate the views on the quality of governance provided by a large number of enterprise, citizen and expert survey respondents in industrialized and developing countries. Figure compiled from the World Bank Worldwide Governance Indicators website: http://info.worldbank.org/governance/wgi/mc_countries.asp.

Health status[4]

Health characteristics of Haiti

Negative aspects:

- Lack of reliable baseline health statistics;
- High level of most communicable diseases;
- Only half of the population has access to poor quality health services, water, or sanitation;
- 75% of health services are delivered by NGOs and faith groups, most of which are unwilling to follow Ministry of Health norms and guidelines.

Positive aspects:

- A strong pharmaceutical and supply system which is internationally administered;
- On-site presence of external medical organizations (NGOs or bilateral).

A **governance** review of the health sector carried out by the Ministry of Health in 2007 shows that leadership and regulatory functions in Haiti were "weak or very weak" at the central, departmental, and periphery levels (MSPP 2007). At the cross-sectoral level, donors must share in responsibility for a situation that enables NGOs to decline to comply with norms and standards or tentative attempts of coordination from the Ministry of Health.

4 Sources for this section include: PAHO/WHO, *Health in the Americas* (2007), PAHO/WHO, *Health situation in the Americas, basic indicators 2009*; Haiti, PDNA (analytical matrix) (2010).

On the **information management** side, there is a lack of adequate information to support analysis and decision making at strategic and operational levels. The absence of acceptable baseline data complicates any monitoring effort of the response. Health indicators, when available in Haiti, show a picture of excessive morbidity/mortality with poor preventive and curative services.

For all indicators, Haiti demonstrates greater vulnerability or weakness than her neighbors. Life expectancy is over 10 years less in Haiti than in the region; mortality in children under 5 years old is twice the regional average and three times that of the Dominican Republic.

Communicable diseases include, among others, acute diarrheal disease,[5] the highest incidence of tuberculosis in the Americas, a generalized HIV epidemic, and dengue (presence of serotypes in 85% of Port-au-Prince population). Tropical diseases such as leprosy, lymphatic filariasis, and anthrax remain prevalent.

Vaccine-preventable diseases remain all too frequent due to the very low coverage that has been achieved.

Delivery of health services

The existing health system is mostly private, with a very small public sector. Health institutions linked to faith-based groups and NGOs provide most of the health care, complemented by the Cuban Medical Brigades, which supply an average of 400 doctors in rural areas. Together, these organizations provide an estimated 75% of the care. In the capital and major cities, private, for-profit health clinics and pharmacies offer health services for those who can pay. The elite often seek treatment in the United States or other foreign countries.

In real terms, 47% of the Haitian population lacks access to basic health care.[6] This figure rises to over 50% for women. Accessibility is low due to financial barriers; when accessible, services are of poor quality.

Specialized services such as rehabilitation, mental health, and blood banks are far below the level of neighboring countries. Mental health services in Haiti have been centered on two understaffed and under-equipped psychiatric hospitals, a situation that is far from the community-based approach recommended by WHO.

In addition to a striving private pharmaceutical industry, PROMESS (Programme de Médicaments Essentiels), managed by the Pan American Health Organization, serves as the national pharmacy, offering essential supplies and drugs at or below cost.

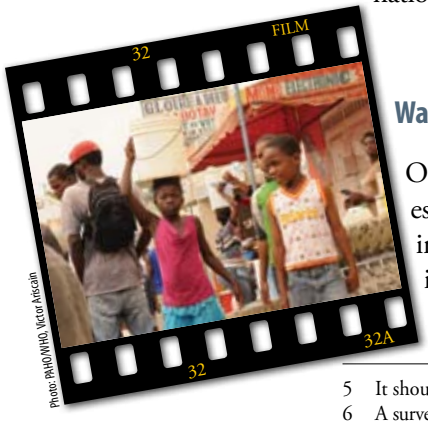


Photo: PAHO/WHO, Victor Ariscain

Water and sanitation

Only 58% of the population has some access to improved drinking-water sources (Schuftan, Hoogendoorn, Capdegelle 2007). The access is notoriously better in urban settings (70%). Access to improved sanitation and disposal of excreta is extremely poor (total 19%, urban 29%, rural 12%). In brief, 8 million of the country's population of 10 million lacks access to water and/or sanitation.

5 It should be noted that until the 2010 outbreak, cholera had been absent from the country for over 100 years.

6 A survey carried out in 2005–2006 showed that of the 24% of children with one or more episodes of diarrhea in the previous two weeks, only 40% were treated with oral rehydration salts. Similarly, of the 40% of children with fever or symptoms compatible with acute respiratory infection in the previous two weeks, only 20% were examined to receive treatment (PAHO/WHO 2007, pp. 415, 419).

Nutrition

The levels of global acute malnutrition as well as those of stunting (chronic malnutrition) are high but markedly under those considered a humanitarian emergency. The focus of ongoing projects has not been sufficiently aligned with Haiti's priority nutrition security problems or with international best practices. Above all, malnutrition in Haiti is the end result of extreme poverty associated with low education level. It is primarily an economic and equity issue rather than a health one.

Violence and criminality

The rate of violence is very high in Haiti. Reliable figures are unavailable or at best spotty. Gender-based violence is endemic and underreported. There is little follow-up, be it from law enforcement or the health services, on reported cases of gender-based violence.

Photo: PAHO/WHO

Table 1.2 Health statistics for selected countries

Indicator	Haiti	Dominican Republic	Sri Lanka	Pakistan	Indonesia
Life expectancy (years)	62	73	69	63	67
Under-5 mortality (deaths per 1,000 live births)	76	24	17	97	34
Measles immunization	58%	95%	98%	85%	83%
Physicians per 10,000	3	19	6	8	1
Hospital beds per 10,000	13	10	29	10	6

Sources: WHO, *World Health Statistics,* 2009 www.who.int/whosis/whostat/EN_WHS09_Table6.pdf; World Bank, Haiti at a glance; Dominican Republic at a glance.

The health status of Haiti prior to the earthquake is particularly bleak when compared to its neighbor or other countries affected by sudden-onset catastrophes (see Table 1.2). The services remain very poor despite considerable investment by NGOs and the higher density of medical doctors and hospitals beds in the country compared, for instance, to Indonesia.

Finally, the "singularity or exceptionality" of Haiti in the Region of the Americas should be noted. It is the only independent, French/Creole-speaking country in the Caribbean or Latin America. Haiti has a social, economic, and political culture comparable to no other. Although it is making a consistent effort to join regional institutions, few if any other members share the same challenges or background, or even understand its culture. Haiti is not fully integrated as an equal member in the Caribbean or Latin America. It is an orphan without siblings, but with many foster parents.

Disaster vulnerability, risk reduction including preparedness

Vulnerability

- Haiti is particularly vulnerable to disasters. The main factors causing this vulnerability are social and economic.
- The focus of preparedness in Haiti was overwhelmingly on seasonal climatic events. Rare, but catastrophic events were not contemplated.
- The poorest countries are the least able and willing to invest in risk reduction, including in preparedness. Considering the urgency of every day needs faced by these countries, the onus for risk reduction and disaster preparedness should be more on the international community.
- International agencies and donors should increase their efforts to focus the attention of health authorities on credible scenarios of major sudden-onset disasters.

Among the many factors affecting Haiti's vulnerability to disasters are the concentration of population (39%) and resources (66% of GDP) in and around the capital (West Department), deforestation, the presence of communities living on plains which are prone to flooding, high urban population density, and a proliferation of seismically unsafe buildings and infrastructure constructed on unstable soils.

Photo UN Logan Abassi

Environmental vulnerability and social factors like poverty, political instability, rapid urbanization, and the fragile nature of the Haitian State exacerbate the damaging effects of natural events.

These observations have been confirmed by the alarming trend in successive disasters: 56 internationally recognized disasters, including 20 major disasters in the 20th century and 3 catastrophic hurricane seasons in just the last decade (see Table 1.3).

Table 1.3 Summary of recent major disasters in Haiti

Event	Effect on GDP	Affected	Deaths
2004: Hurricane Jeanne	7%	300,000	5,000
2007: Hurricanes Dean and Noel	2%	194,000	330
2008: Tropical storms Fay and Gustav and Hurricane Ike	15%	1,000,000	800

Compiled from relevant post-disaster needs assessments.

Risk reduction

Although risk reduction includes preparedness, this aspect will be treated separately.

The risk of earthquake was not unknown by the health sector and was stressed in the country health profile developed by PAHO/WHO in 2007 (pg 414):

> *"Haiti is . . . extremely vulnerable to earthquakes. The country has eight fault lines; two of the most important are located as follows: one in the far north and the other crossing east to west. Seismic activity in Haiti in 2003–2005 has revived the specter of a possible major earthquake (7–8 on the Richter scale), which experts have been forecasting for several years. The extremely high rate of urbanization that has left the metropolitan region of Port-au-Prince with slightly more than two million inhabitants (10,000–18,000 persons per km2) will worsen the damage."*

As noted by François Grünewald, the earthquake "has taken place in a context where the most frequent problems obscure the most serious problems. Though Haiti experienced earthquakes which destroyed Cap Haïtien in 1840 and Port-au-Prince in 1700, these tragedies of the past only had a marginal influence on the national strategy for managing risks" (2010, 2).

As often is the case, important issues (preparing for major but rare events[7]) were overshadowed by more pressing immediate priorities (attending to daily and seasonal emergencies). Haiti's Directorate for Civil Protection (DPC) started to work on building standards for critical facilities before the earthquake and on a disaster risk reduction strategy. They were planning to initiate a building code project in January 2010.[8] Reduction of seismic risk through adoption and enforcement of construction norms and standards had never been enacted before.

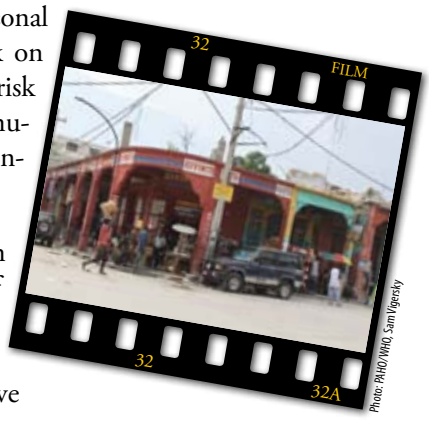


Photo: PAHO/WHO, Sam Vigesky

The easiest and least expensive way to protect health (and other) facilities from seismic risk is by including strict norms in new construction. However, few if any new health facilities had been built in Haiti in recent years. The retrofitting of existing facilities is a technically more complicated and more expensive approach and was never seriously considered as a feasible and cost-effective measure by the Ministry of Health or donor community.

No serious attention was given by the health sector to the possible scenario of a severe earthquake. The modest efforts focused on seasonal hurricanes.[9] Admittedly, Haiti has the highest index of vulnerability to cyclones of all the developing small island states.[10] An estimated 96% of the population of Haiti lives in constant danger of two or more risks. Furthermore, being part of an island in the middle of the Caribbean indeed increases the risks linked to rising sea level and those related to the possible impacts of changing patterns in the El Niño/La Niña phenomena (DARA 2010).

7 The seismic recurrence interval was estimated at about 150 years.

8 At the multisectoral level, major donors (World Bank and European donors) provided significant support at the end of the last decade to strengthen the national Directorate for Civil Protection. The focus was initially at the national level and shifted later toward decentralization and strengthening of the department level.

9 Cyclones are known as hurricanes in the Caribbean or typhoons in the Pacific Ocean.

10 Based on the estimated number of people killed per year (per million exposed) (World Bank 2005).

Health sector preparedness

In the health sector, training and other technical cooperation was regularly provided to the Haitian Ministry of Health within the limits of the modest funding allocated by donors to disaster preparedness. Principles of mass casualty management in the aftermath of earthquakes were periodically promoted in Haiti and other countries in the Caribbean.

Photo: PAHO/WHO

The outcomes and impact of regional preparedness efforts in Haiti remained limited. The disaster preparedness program in the health sector never received the priority, authority, or resources required for the task. No effective planning and preparedness measures took place in Haiti on health facilities. Then again, investing for mass casualties may seem somewhat unrealistic when daily emergencies cannot be attended properly.

On 12 January 2010, a 7.0 earthquake on the Modified Mercalli Scale shook Haiti. It was the most powerful earthquake to hit the country in 200 years. The impact was unprecedented; more so if we take into account that it affected the most densely populated area of the country and also its economic and administrative center, hindering an already meager response capacity.

Photo: PAHO/WHO, Victor Ariscain

Chapter

2

The earthquake: 12 January 2010

The impact of the Haiti earthquake was truly unprecedented among recent natural disasters:

- The magnitude of damage and losses in absolute terms, but above all compared to the size and poverty of the country precluding any backup capacity;
- The destruction of the capital and its effect on the government apparatus;
- The leadership losses incurred by the UN peacekeeping forces, UN agencies, and other potential actors;
- The impact on logistics of severe damage to both the major airport and seaport.

On 12 January 2010, shortly before 5 PM, an earthquake with a magnitude of 7.0 on the MMS scale shook Haiti for 35 seconds.[11] It was the most powerful earthquake to hit the country in 200 years. The earthquake's hypocenter was close to the Earth's surface (13 km below) and its epicenter was approximately 25 km southwest of Port-au-Prince, the capital, in the West Department. Although the South-East and Nippes Departments were also affected, only a limited, albeit densely populated, area (45 km radius) was hit by the earthquake.

11 Initial estimates indicated a magnitude of 7.3 on the Richter scale. U.S. Geological Survey and other sources suggest a magnitude of 7.0. Part of the reason for the discrepancy is the increasing use of the Moment Magnitude Scale (MMS) which differs slightly from the Richter scale. As with the Richter scale, an increase of one step on this logarithmic scale corresponds to a $10^{1.5} \approx 32$ times increase in the amount of energy released, and an increase of two steps corresponds to a 10^3 (i.e., 1,000 times) increase in energy. It should be noted that the Richter scale is notoriously less accurate in measuring severe earthquakes.

According to a study by the U.S. Geological Survey, the fault initially thought to have triggered this devastating earthquake is likely still under considerable strain and continues to pose a significant seismic hazard.[12] This puts to rest the common misconception that an area affected by a major seismic event is vulnerable to milder aftershocks but protected from more severe earthquakes.

The Port-au-Prince metropolitan area suffered enormous damage.[13] Eighty percent of the town of Léogâne (17 km southwest of Port-au-Prince) was destroyed.

The earthquake created an unprecedented situation, amplified by the fact that it affected the most densely populated area of the country and also its economic and administrative center. It also severely affected the international organizations in Haiti (including MINUSTAH, UN agencies, and NGOs).

Rural areas in the West and South-East Departments, including the mountainous areas were also badly affected. Thousands of rural houses in remote, hard-to-reach areas were destroyed and earthquake-triggered landslides were frequent.

The extent of damage and losses reflect the particularly high vulnerability of Haiti. While the U.S. Geological Survey recorded 22 magnitude-7.0 or larger earthquakes in 2010, almost all the fatalities were produced by the 12 January earthquake in Haiti. In 2010, about 227,000 people were killed due to earthquakes, with over 98% from the Haiti event.[14]

This large, shallow earthquake produced violent shaking that can cause damage even to well-built buildings anywhere in the world. In Haiti, this high-intensity shaking together with buildings vulnerable to earthquakes and high population exposure resulted in catastrophe.

The Post-Disaster Needs Assessment (PDNA)

As is systematically done after such an event, the Haitian Government and the international community launched a Post-Disaster Needs Assessment (PDNA) involving UNDP, the World Bank, the European Commission, and other donors.

"The objectives for the PDNA, a cross-sectoral exercise to provide a financial estimate of the damage and needs, were multifold, each actor stressing a particular one:

- "A tool for decision making and priority setting by donors and agencies due to meet at the Donor Conference in New York (31 March 2010);
- "A new vision for in-depth reform, making use of the window for opportunities opened briefly following major disasters; however, some questioned whether an incremental approach to 'build back better' was not more realistic than a costly new vision;
- "A step toward developing an action plan and strategy for the sectors; this is a result that was achieved in the health sector, although not fully implemented;
- "A necessary statistical record for global comparison and documentation for the significant investment in the reconstruction process" (Griekspoor 2010).

12 U.S. Geological Survey geologist Carol Prentice led a team of scientists to Haiti immediately after the earthquake to search for traces of ground rupture. The researchers sought evidence of deformation from the 2010 quake and determined that the main strand of the Enriquillo-Plantain Garden (EPG) Fault did not rupture in the January quake, as was initially thought. They also documented evidence of geologically young ground ruptures on the EPG Fault, which they believe may have formed during earthquakes that struck Haiti in 1751 and 1770. Because the EPG Fault did not rupture the surface, little, if any, accumulated strain on that fault was released during the quake and the hazard remains high ((Koontz 2010).

13 Including the communes of Port-au-Prince, Carrefour, Pétionville, Delmas, Tabarre, Cité Soleil, and Kenscoff.

14 A magnitude-8.8 offshore earthquake that hit Chile on 27 February was the largest recorded in the world in 2010. An estimated 577 died; about half of those deaths resulted from an earthquake-generated tsunami. The energy released by the Chilean earthquake was more than 500 times greater than the one that hit Haiti. However, fatalities were far lower in Chile due to that country's strict building codes and lower maximum shaking intensities (USGS 2011).

Overall impact on infrastructure

The earthquake caused massive infrastructure destruction. According to the survey carried out by the Post-Disaster Needs Assessment (PDNA),[15] (see Box) some 105,000 homes were completely destroyed and more than 208,000 damaged. Over 1,300 educational establishments and over 50 hospitals and health centers collapsed or were left unusable. Part of the country's main port was not operational. Damage to the airport guidance system limited the early arrival of essential response, leading the Government of Haiti to delegate authority over its airspace and airport to the U.S. military.

The President's Palace, Parliament, the Law Courts, many other landmarks of the Haitian nation, and most of the ministry and public administration buildings, including the Ministry of Health, were destroyed. This damage further crippled the limited capacity of the government to lead a forceful response.

The only natural disaster that came close to this level of devastating governance capacity and administrative structures was the Managua earthquake (Nicaragua, 23 December

15 The primary source for this section is: *Haiti earthquake PDNA: assessment of damages, losses, sectoral and general needs*, published by the Haitian Government, March 2010.

Photo: PAHO/WHO, Victor Ariscain

Photo: UN, Logan Abassi

1972). Two-thirds of the capital's population was displaced. However, there were significant differences from the Haiti earthquake:

- Managua had a population of 325,000 compared to the 2.5 million in Port-au-Prince;
- Fatalities were relatively few (3,000 to 7,000) compared to over 200,000 deaths in Haiti;
- There was a strong dictatorial government in Nicaragua compared to a fragile but democratic government in Haiti.

Economic impact

- The earthquake set back the economic development of Haiti by 10 years;
- The economic valuation process of damage and losses does not reflect the magnitude of human losses and suffering;
- When translated into monetary value, the social losses represent only a relatively modest economic cost.

The health sector does not operate in a vacuum. It is entirely dependent on the economic health of the country and its population. An impact of the earthquake on economic well-being is an impact on public health.

The disaster impact on economic performance, employment, and poverty can be assessed from two measures:

1. The damage: that is, the replacement value of physical assets wholly or partially destroyed;
2. The losses: the economic flows resulting from the temporary absence of damaged assets.

According to the PDNA, the total value of damage and losses caused by the earthquake on 12 January 2010 is estimated at US$ 7.804 billion, surpassing the country's GDP in 2009. This is the first time in 35 years of applying the assessment methodology developed by the UN Economic Commission for Latin America and the Caribbean[16] for estimating damage and losses that the cost of a disaster is so high in economic terms in relation to a country's GDP.

The private sector (including not-for-profit) sustained most of the damage and losses (US$ 5.722 billion, 73% of the total), whereas the public sector's share totaled US$ 2.081 billion, or 27%. There are two exceptions: the health sector, where only 40% of the health damage/losses were borne by the private sector (i.e., nongovernmental, in-

16 The Damage and Loss Assessment (DaLA) methodology was initially developed by the UN Economic Commission for Latin America and the Caribbean (UN-ECLAC) in 1972. It has since been improved through close cooperation of PAHO/WHO, the World Bank, Inter-American Development Bank, UNESCO, and ILO to capture the closest approximation of damage and losses due to disaster events. It is a flexible tool that can be adapted to specific disaster types and government ownership requirements. The DaLA methodology bases its assessments on the overall economy of the affected country.

cluding for-profit and not-for-profit) and the environment sector (primarily for waste and debris disposal) where the losses are borne almost entirely by the public sector.

The value of material assets destroyed, including housing, schools, hospitals, roads and bridges, ports, and airports, has been estimated at US$ 4.302 billion (55% of the total losses due to the disaster). The variation in economic flows (lost production, fall in turnover, job and salary losses, increased production costs, etc.) has reached US$ 3.561 billion (equivalent to 45% of the total).

Housing is the sector that has been most affected by the earthquake (damage is US$ 2.3 billion). Comparatively, the economic impact (damage and losses) in the social sector is modest in monetary terms. Health and education sectors represent only 6% each of the economic impact (see Table 2.1).

Table 2.1 Damage and losses from the 2010 Haiti earthquake (rounded to millions of US dollars)

Sectors	Public	Private	Total
Social	352 (23.2%)	1,161 (76.8%)	1,513 (19.4%)
Water and sanitation	29 (12.3%)	206 (87.7%)	235 (3%)
Health	282 (60%)	188 (40%)	470 (6%)
Education	40 (8.4%)	437 (91.6%)	477 (6.1%)
Food safety and nutrition	0	330 (100%)	330 (4.2%)
Infrastructure, including housing	1,402 (31.4%)	3,059 (68.6%)	4,461 (57.2%)
Production sectors	3	1,327 (100%)	1,330 (17%)
Environment[a]	324 (64.3%)	175 (35.7%)	499 (6.4%)
TOTAL	2,081 (26.7%)	5,722 (73.3%)	7,803 (100%)

Source: Adapted from figures presented in Table 2 of the PDNA (Haiti 2010, 7).
a Damage and losses to the environment sector mostly include solid waste removal (debris, hospital waste, hazardous substances, etc.).

The PDNA estimated that:

- The central government's overall deficit would likely rise from 4.4% of GDP for the 2008/09 financial year[17] to 7.1% of GDP during the financial year 2009/10, despite a marked increase in overall income over the years preceding the impact date.
- The earthquake will entail a loss of 8.5% of existing jobs in the immediate future.
- Poverty indices have returned to 2001 levels (71% in moderate poverty and 50% in extreme poverty), canceling all modest progress made in the last decade.[18]

All these factors bear a direct short- and long-term impact on public health.

17 The fiscal or financial year in Haiti runs from 1 October to 30 September.
18 This projection does not take into account the promising prospects of the reconstruction activities.

Impact on international and bilateral organizations

- The UN and peacekeeping forces lost their leaders and headquarters.
- Many international agencies were directly impacted by the earthquake and unable to respond as promptly as expected.

The offices of most international or bilateral agencies present in Haiti were located in Port-au-Prince. Many of them suffered infrastructure and staff losses.

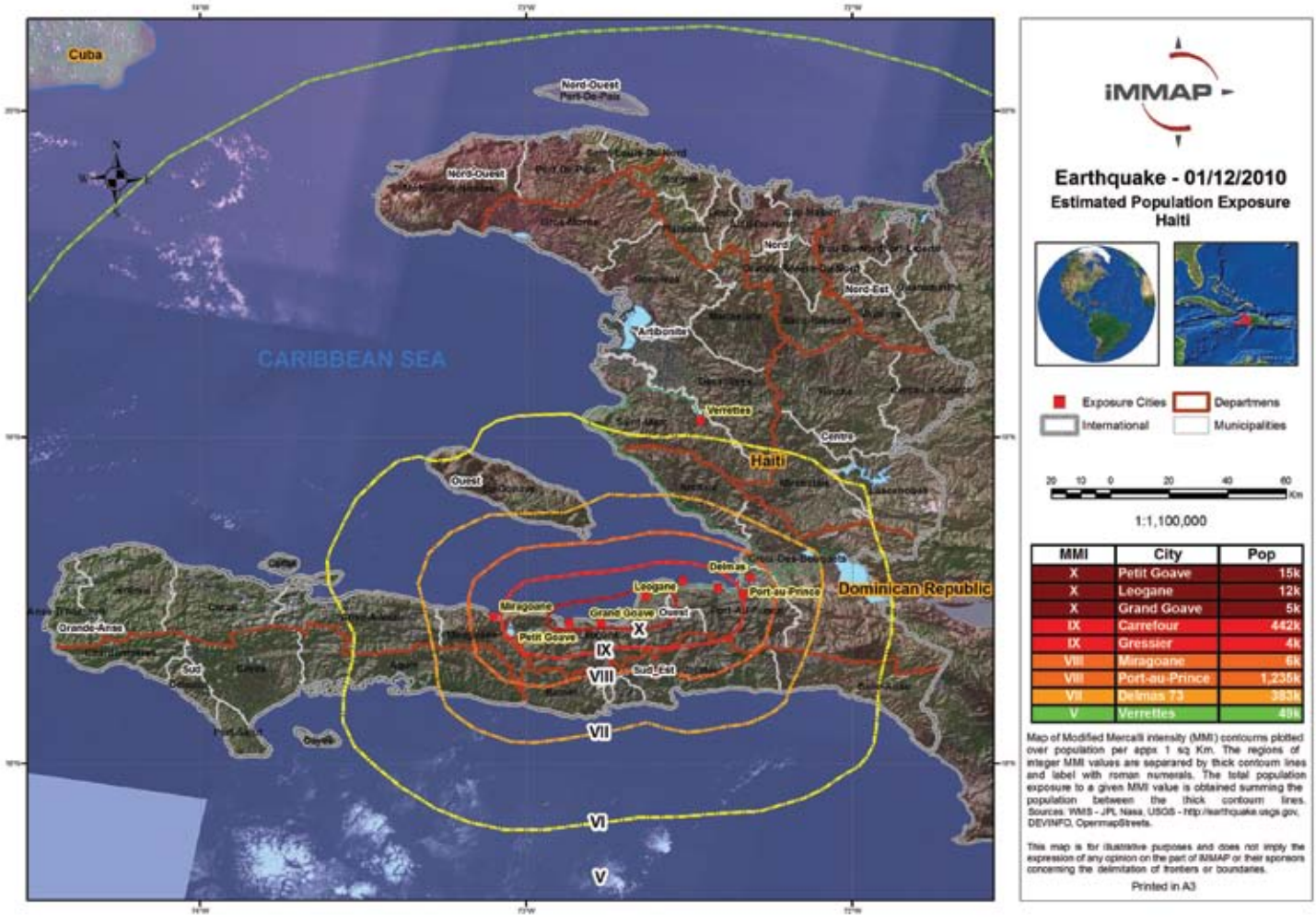
The UN mission (MINUSTAH) loss was considerable: 102 international UN employees lost their lives, among whom were the Special Representative and the Head of Mission, 7 other top civilian staff, 36 military staff, and 7 UN police officers.

Although the loss represents less than 1% of the entire UN staff in Haiti, the command structure of MINUSTAH and operating capacity of some UN agencies were temporarily affected. The destruction of the Hotel Christopher which housed the MINUSTAH Headquarters, resulted in the loss of most commanding officers and left the operations in chaos. UN Mission search and rescue efforts focused primarily on its own leaders and staff. Their transportation assets, for the most part, remained unaffected by the earthquake.

The offices of many of the UN agencies, including that of PAHO/WHO, were either damaged or deemed unsecure, while part of their staff lost their accommodations.

UN Headquarters

Photo: UN, Logan Abassi



Source: Reproduced from Information Management & Mine Action Programs (iMMAP) (2010) Earthquake in Haiti: Estimated Population Exposure. Available from www.immap.org/index.php?do=map_view&id=56&cat=12.

Several bilateral cooperation agencies as well as international NGOs suffered material as well as human losses. The building of the Delegation of the European Commission, for instance, became unsuitable and the staff was evacuated to Santo Domingo.

Losses, material and human, of such a magnitude that affected external agencies contributed to making the rapid organization of an emergency response all the more precarious and more dependent on headquarters outside of Haiti.

As noted in the PDNA, by striking at the very heart of the Haitian economy and administration, the earthquake had an acute effect on the human and institutional response capacity both of the public and the private sectors, of international technical and financial partners, and certain NGOs.

In the affected area, 30 out of 49 hospitals were damaged or destroyed. Haiti's University and Educational Hospital (HUEH), the country's largest hospital, suffered serious physical as well as functional losses. The hospital lost several staff during the earthquake.

Photo: PAHO/WHO Victor Ariscain

Chapter

3

The health impact

Most of the health losses were the result of an extreme vulnerability to disasters, the deterioration of the medical care system, and dysfunctional public health programs.

According to the Post-Disaster Needs Assessment (PDNA) carried out jointly by the Haitian Government and international partners in February–March 2010:[19]

- Some 1.5 million people, representing 15% of the nation's population, were directly affected.
- More than 220,000 lost their lives and more than 300,000 were injured.[20]
- Some 1.3 million lived in temporary shelters in the Port-au-Prince metropolitan area in the months following the impact.
- Over 600,000 left the disaster zone to seek refuge elsewhere in the country.

Problems that already existed in terms of access to health care, food, and basic services were thereby exacerbated nationwide.

The health impact in Haiti was of a much higher order of magnitude than in the tsunami-affected countries or in Pakistan (see Table 3.1).

19 It should be noted that all of these statistics have been intensely questioned and remain a matter of debate.
20 The tsunami in 2004 claimed over 228,000 lives in 14 countries (Telford, Cosgrave, Houghton 2006).

Table 3.1 Proportion of population killed or injured in major disasters

	Population (millions)	Number killed	Deaths /1,000	Number injured	Injured /1,000
Indonesia (tsunami 2004)	228	167,540 [a]	0.7	25,572 [b]	0.1
Sri Lanka (tsunami 2004)	20	35,322 [a]	1.8	21,441[c]	1.1
Pakistan (earthquake 2005)	161	73,338 [d]	0.5	128,309 [d]	0.8
Haiti (earthquake 2010)	10	From 65,275 to 300,000 [e]	6.5 to 30	>300,000	30

a Telford, Cosgrave, Houghton 2006.
b Doocy et al. 2009.
c IFRC 2005.
d CRED EM-Data.
e See the following section on mortality.

Mortality

- The international community attaches far too much importance to the mortality figure.
- Donations should not be linked to the number of fatalities but rather to the number of survivors and the extent of their needs.
- Techniques and methods are available to estimate objectively the number of persons killed. They must be used when a complete census is not possible.
- The endorsement of exaggerated official statistics by the humanitarian community is counterproductive and damaging.

If development (health or others) statistics are lacking or unreliable in normal times, data following massive disasters are notoriously inaccurate. Initial estimates of number of deaths or injuries rarely result from individual body counts, detailed listings from facilities or humanitarian organizations, or censuses or surveys conducted at a later stage.

In the aftermath of most disasters, the number of deaths is a much-sought statistic by the mass media and the public. It is the most powerful figure to elicit emotions and generosity. The usefulness of mortality statistics to gauge the magnitude of the needs (of survivors) is overstated.

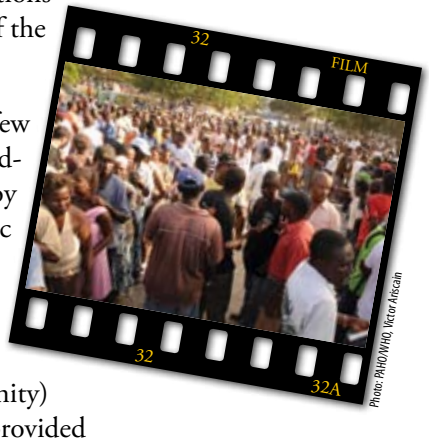
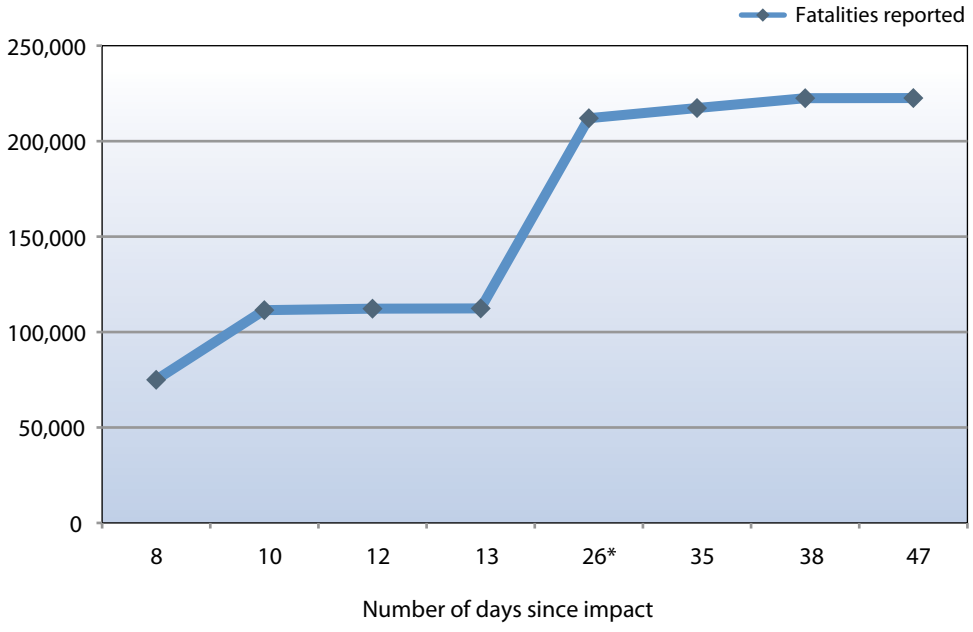


Photo: PAHO/WHO, Victor Arécain

After earthquakes, an initial rough estimate is usually announced in the first few days. Then, reported numbers rapidly increase day after day, occasionally suddenly soaring to accommodate higher and conflicting estimates advanced by humanitarian organizations (for example, the Red Cross societies) or a public statement from higher authorities.

In Haiti, the reporting of estimated numbers of deaths by the Directorate for Civil Protection (and endorsed, de facto, by the UN Office for the Coordination of Humanitarian Affairs [OCHA] and the international community) followed the same pattern. An initial rough estimate of 75,000 killed was provided after one week, progressively increasing to 112,392 on Day 13. No further official revisions were offered for another 10 days. On 4 February, Day 24 of the disaster, the Prime Minister made a public statement that "the number of killed could be as high as 200,000 and that of injured above 300,000." The tally was increased to 212,000 and the counter started rising again to reach 222,570 deaths (see Figure 3.1).

Figure 3.1 Reported deaths by days since earthquake impact



*Prime Minister made a statement increasing the death toll to over 200,000 on 4 February 2010 (Day 24).

Do estimated mortality figures reflect reality?

Scientists routinely question the accuracy of estimates of deaths following major disasters. Divergence in opinion is usually on a reasonable order and does not question the credibility of the whole process.

In the Indian Ocean tsunami, initial estimates in Indonesia and Sri Lanka calculated bodies recovered and missing persons separately. The latter figure was exceptionally high due to the number washed away by the waves or buried under tons of mud and debris. As bodies were recovered days and weeks later, the first number (dead bodies) increased rapidly while the number of missing remained unchanged, because no identification was attempted in either country. Mass media and agencies rapidly combined both figures into one. The final statistics clearly included significant double counting.

In the case of the Pakistan earthquake in 2005, the remoteness of most affected areas resulted in a very approximate figure probably reflecting the death toll within reasonable margins. There was limited opportunity for surveys or controversy.

The Bam earthquake in Islamic Republic of Iran in 2003, which was a shallow, localized earthquake of manageable size, offers us an illustration of a correct approach. As usual, initial estimates overstated the number of casualties: For months the official mortality figure was above 41,000 killed. Following a special census, the authorities formally corrected the earlier estimate down to 26,271 out of a total of 142,376 people in the affected areas. No other example of correction is reported.

In Haiti, it is accepted that the number of deaths (and missing) caused by the earthquake was extraordinarily high. How high remains an issue.

It was not until the publication of several studies carried out months after the impact that the official process of reporting mortality figures was thrown into controversy, questioning its integrity and credibility. A survey by the University of Michigan and later a study commissioned by USAID/Haiti suggested lower but statistically more credible estimates of the number killed: 149,095 (University of Michigan)[21] or 65,575 (USAID study) (see Box). It is unclear whether and when the relief authorities were informed of the results of this survey published only nine months after the impact. The Government of Haiti unexpectedly raised further the official figure to over 300,000 when commemorating the first anniversary of the earthquake, almost five times the lowest scientific estimate (see Table 3.2). Despite the methodological differences of the two studies, they offer significantly lower figures than those officially issued by national authorities.

Haitian fatalities: two surveys dispute official tolls

USAID study

The death toll was determined based on two sources of information: 1) The color-coded building assessment carried out by Haiti's Ministry of Public Works, Transport, Communication (MTPTC) through an international entity[22] and 2) the Building Assessments and Rubble Removal (BARR) survey in which people were asked how many of the residents in each of the houses assessed died, among other questions. The group calculated the deaths per residence by using average occupancy per house (5.2) and average death rate by yellow, green, and red houses. The study concludes that the number of people killed in the earthquake was 65,575 (the range of the estimate at $p < .01$ is 46,190 to 84,961 dead) (Schwartz, Pierre, Calpas 2011).

University of Michigan study

The mortality rate is established comparing two surveys: 1) a 2009 survey (pre-earthquake) carried out by the University of Michigan, sampling 1,800 households in the Port-au-Prince area; and 2) a post-earthquake survey conducted in 2010, in which 1,732 (93.1%) of the 2009 sampled household members were located. Using population estimates for the greater area of Port-Au-Prince of 2,713,599 and an average of 5.7 persons per household, they calculated 158,679 deaths: 111,794 died during or immediately after the earthquake, 37,301 died as result of the injuries, and 9,583 died of an illness in a period of six weeks following the impact (Kolbe et al. 2010).

Table 3.2 Mortality estimates for Haiti earthquake

Source	Number killed
Government (2010)	222,570
Government (Jan 2011)	300,000
Univ. of Michigan study	149,095
USAID study	65,575

It is important to note that the absence of data disaggregated by age and gender in official statistics had some impact on both the understanding of the quake and its effects, as well as on programming the relief efforts in Haiti.[23]

21 This figure does not include the estimated number of deaths from illness unrelated to the earthquake.

22 Miyamota International trained 270 Haitian engineers in building assessment techniques, using a color-coded system: Green = safe; Yellow = inhabit after repairs; and Red = unsafe for occupancy. From February 2010 to January 2011 the team evaluated 382,256 Port-au-Prince buildings with the following results: 205,539 green (54%), 99,043 yellow (26%), and 77,674 red (20%). This initiative was endorsed by the Ministry of Public Works, Transport, and Communication, UN Office for Project Services (UNOPS) and the Pan American Development Foundation (PADF).

23 Very partial data in Indonesia suggest that mortality among women resulting from the tsunami was significantly higher in some fishing villages.

The main lesson for future disasters is not what the best estimate in Haiti was, it is the need for a transparent methodology to produce the official statistics. The credibility of the international humanitarian community is also at stake: Although many international staff privately questioned the credibility of the figures, all agencies and the mass media welcomed the highest figures possible for their own purposes (for fund raising, readership, or other motives).

In many catastrophes, the management of death figures, a difficult technical task under any circumstances, is handled politically. What is new in the case of Haiti is the significant and rising discrepancy between the official figures and the scientific estimates. This has led, more than a year after the event, to a public controversy, since the amount of funding that a disaster deserves is closely linked in the public's eyes to the number of persons killed.[24] It is indeed the recognition of this linkage which incites governments and agencies to opt for the highest figures possible.

This perception needs to be changed: the main criteria for assistance should be the number of people in need (the dead are not in need of assistance) and the urgency and magnitude of their need.

Regardless of the controversy, the mortality rate was very high (almost 10% of the population in the metropolitan capital area if the official figure of 220,000 is accepted). The question is: *why*?

The Richter scale reading alone of an earthquake is a poor predictor of the expected morbidity/mortality. Everything is a matter of geological context (type of soil, epicenter, and hypocenter) and physical and socio-economic vulnerability. The triggering event is natural, the disaster itself is *not* natural.

All estimates are fairly illustrative of the gravity of the tragedy, as well as suitable for purposes of public information and fund raising. Whether fewer than 100,000 casualties or surpassing 300,000, the impact is an immense tragedy for a poor country the size of Haiti (6.5 to 30 deaths per 1,000 inhabitants according to the figure selected). Comparatively, the mortality of the Indian Ocean tsunami was 1.8/1,000 in Sri Lanka and 0.7/1,000 in Indonesia (see Table 3.1). Few families or institutions in Port-au-Prince were spared fatalities.

First, such a high mortality rate is not uncommon for a shallow earthquake directly under a densely populated area. In the Bam, Iran, earthquake in 2003, 18% of the population was killed.

Other factors affecting vulnerability are mentioned in a study by Mompelat (2010):

- Extreme vulnerability of constructions;
- High occupation density of dwellings;
- Highly instable soil (slopes);

24 See, for example, the article "U.S. Reduces Estimates of Homeless in Haiti Quake", *New York Times,* 31 May 2011.

- Severe damage to facilities with high occupancy (schools, universities, administration);
- Mortality in the narrow streets;
- Lack of access to medical care.

Most of those factors could have been minimized by the adoption of a risk-reduction approach including land use management and construction norms.

On the positive side, the timing (4:53 PM) contributed to minimize the impact. Many adults and children were in the streets. One hour earlier, public offices and schools would have been occupied; a few hours later, most Haitians would have been at home.

Immediate morbidity

- The number of injuries by type and gravity is a critical statistic lacking in most disasters.
- A very simple list detailing the type of injuries to be reported in the aftermath of disasters needs to be developed urgently at the global level.

This section reviews the immediate impact on health, that is, primarily in terms of injuries and traumas. Delayed impact such as on disease transmission, mental health, violence, and nutrition is discussed in Chapter 6.

Estimates of the number of persons injured are also notoriously inaccurate in most severe disasters in less developed countries. They offer at best a reasonable guess of the magnitude of the problem. In Haiti, offering a scientific estimate on the number of injuries was almost impossible. There was no registry of patients and no information system in most of the facilities. The situation can best be illustrated by the observation of a team arriving in Port-au-Prince 10 days after the earthquake with the mission to restore surgical services to the University Hospital (Peranteau et al. 2010):

> *"No patient identifiers were present and there were no physical reports accompanying patients to indicate their diagnoses, operations or care plan . . . At first we used scraps of papers or cardboard taped to the patient indicating name and injury . . . as paper became available, a single sheet became the makeshift chart taped to the edge of the stretcher."*

If such a situation prevailed after two weeks in the country's largest hospital, it is not surprising that, with the exception of self-sustained military facilities, no compiled data were available for overall management or reporting.

Although the number of injured is a critical indicator of the need for assistance, the external pressure for updated figures was far less than for mortality data. Consequently, those statistics were less frequently released by Haiti's Directorate for Civil Protection.

As was true for mortality, the morbidity figure evolved over time, starting with a rough estimate of more than 200,000 injured on Day 9 (20 January) to be readjusted down to 194,000 on Day 15, and increased to 196,501 the next day. On 4 February, an

estimate of "over 300,000 injured" was announced publicly by the Prime Minister and adopted officially by the Directorate for Civil Protection effective on 6 February (Day 26). These figures must be considered with caution and are only indicative of the magnitude of the impact.

The challenge of estimating the numbers and types of injuries remain:

- What defines an injured person, and the methodology used to calculate the figures are unknown.
- There was no systematic collection of data from the many medical teams attending to the injured.

Disaggregation by age, sex, or type of injuries was only available from some of the best-organized foreign medical teams or hospitals. Their patients represent a very small and biased sample. Often, these data were analyzed retrospectively after the intervention and the findings could be shared only after being published in peer-reviewed journals.

Table 3.3 shows the distribution of patients by type of injury for the patients admitted to the University of Miami Global Institute/Project Medishare field hospital in Port-au-Prince over a three-month period (CDC 2011b, 1675). This field hospital also served as a referral treatment center and the data presented may not be fully representative of the overall pathology. In particular, the most severe diagnosis groups (head/spine, crush syndrome) are probably over-represented among the patients. The rate of 5.6% crush syndrome cannot be generalized to the entire injured population although there is evidence that the incidence of crush syndrome can reach 2% to 5% overall among disaster victims (Sheng 1987).

Field Hospital

Photo: PAHO/WHO, Victor Ariscain

Table 3.3 Distribution of patients by type of injury admitted to a field hospital, 21 January–28 May 2010

Injury diagnosis groups	Number admitted	%
Head/Spine	142	16.6
Fracture: Extremity	188	21.9
Burn	40	4.7
Penetrating injury	27	3.1
Fracture: Non-extremity	43	5.0
Crush/Compartment syndrome	48	5.6
Sprain/Strain/Contusion	18	2.1
Wound infection/Abscess	158	18.4
Abrasion/Laceration/Cut	133	15.5
Traumatic avulsion/Amputation	22	2.6
Other	38	4.4
Total	857	100

Source: CDC 2011b, 1675.

The health authorities established a National Sentinel Surveillance Site (NSSS) system to complement the routine sentinel surveillance system (COSE) to address specific post-earthquake conditions. The NSSS was set up with support from PAHO/WHO and CDC. From 25 January (almost two weeks after impact) 51 surveillance sites within and outside the affected area reported new admissions segregated by main cause, diseases as well as injuries. Both NSSS and COSE continue to function. The data from NSSS are presented in Table 3.4.

Table 3.4 Reported post-earthquake injuries by age group, 25 January –24 April 2010

Type of injury	Age group (years)			Total
	< 5 years	> 5 years	Unknown	
Trauma	141	947	60	1,148 (22.7%)
Fracture	61	321	85	467 (9.2%)
Head injury	2	23	2	27 (0.5%)
Weapon or dagger injury	4	96	11	111 (2.2%)
Burns	37	99	13	149 (2.9%)
Infected wounds	195	2,691	175	3,061 (60.4%)
Crush syndrome	5	78	5	88 (1.7%)
Amputations	3	11	0	14 (0.2%)
Total	448	4,266	351	5,065

Source: Adapted from Magloire et al. 2010.

As reported by Magloire et al. (2010) the surveillance system could not describe the immediate trauma effects of the earthquake as many victims died or were treated before the reporting mechanism was established. It is important to note that the 51 reporting sites were selected from among existing facilities associated with the U.S. President's Emergency Plan for AIDS Relief (PEPFAR). They offered general care for a fee but were not equipped for emergency trauma care. Specialized field hospitals and teams were not included among reporting sites. Finally, the data include all injuries whether or not related to the earthquake. It should be noted that traffic accidents and violence are major sources of daily injuries in Haiti.

First, the 5,065 cases of trauma reported represented only 12% of the total of new patients with reportable conditions (16 additional infectious and non-infectious conditions were included). As noted by Magloire et al., in the two departments near the epicenter, injuries accounted for 9.2%, while in the eight departments further from the epicenter, they accounted for 15.2%. The migration of the population, the competing presence of trauma teams and hospitals in the affected departments, and the generally poor public attendance at the reporting sites may explain this surprising result.

Nevertheless, the data are valuable for guidance of foreign teams arriving two weeks or more after an earthquake:

- Infected wounds are the main condition past the immediate emergency;
- Fractures remain a serious burden even two weeks after the impact;
- Demand for routine normal pathology rapidly exceeds that for treatment of earthquake-related trauma.

Another source of data is the consolidated survey by Handicap International (Calvot and Shivji, forthcoming). It provides the best picture of the situation based on visits to 17 hospitals with interviews and review of almost 2,600 patients. As with any other partial data, they are not fully representative. Among their observations (Table 3.5) is the relatively higher incidence of injuries among the working age group (18–59 years old). In this group, women were particularly vulnerable (57% women versus 43% men).

Table 3.5 Sample of persons with injuries visited in hospitals in Haiti, by age group and sex, January 2010

Age group	Male	Female	Total	Percentage by age group	Distribution of age group in total population
< 5	80	52	132	5%	12%
5 to 17	188	207	395	15%	32%
18 to 59	741	1,039	1,780	69%	49%
> 60	94	193	287	11%	7%
Total	1103	1,491	2,594	100%	100%
Population with injuries	43%	57%			
Total Population	48%	52%			

Note: These figures are based on persons with injuries visited by Handicap International teams in hospitals between 15 and 29 January 2010. The team focused on persons with injuries requiring urgent post-injury or post-operative rehabilitation care, so the data cannot be interpreted as representing all injuries sustained in the earthquake. Reproduced with permission of the authors (Calvot and Shivji, forthcoming).

The same study describes the distribution by type of injury. As shown in Table 3.6, approximately half were fractures and 16% were amputations.

Table 3.6 Type of injury in persons visited in hospitals in Haiti, January 2010

Type of injury	Number	Percentage
Fractures	1,233	48%
Amputations	407	16%
Spinal cord and traumatic brain injuries	41	2%
Burns	27	1%
Eye injuries	20	1%
Other, unspecified	866	33%
Total	2,594	100%

Note: See note for Table 3.5; reproduced with permission of the authors (Calvot and Shivji, forthcoming).

Compiling the statistics from medical teams, if and when available, is further complicated by the absence of standard nomenclature and definitions of type of injuries.

Crush syndrome

Crush syndrome continues to be underreported in most disasters worldwide.

Crush syndrome is a condition caused by prolonged compression of skeletal muscles leading to renal failure. There is no consolidated single source on the incidence of this condition after the earthquake in Haiti. In addition to the 48 cases referred to the Miami University field hospital and the 88 reported by the surveillance system,[25] the Renal Disaster Relief Task Force of the International Society of Nephrology working through Médecins Sans Frontières (MSF) tallied 51 cases of acute kidney injury (AKI) (Vanholder et al. 2010). Whether those cases are distinct from those reported elsewhere is unknown.

When comparing the 51 acute kidney injury patients with crush injuries in the Haiti event with injury in other disasters, the specialized Renal Task Force found that prevalence of AKI was low in Haiti. In assessing these results, the Task Force (Vanholder et al. 2011) observed:

> *". . . several factors may have influenced this, such as: the fact that it occurred during the day, when people are up and about, favoring head and chest trauma and decreasing the compression trauma to muscles; the presence of many buildings which were not sturdy enough to cause severe muscle trauma; difficulties encountered with early rescue; the extrication of most victims by neighbors or family members resulting in a selection of less heavily wounded people, and a lack of immediate medical help for the occasional severely affected victim."*

25 While surgical trauma hospitals or specialized teams can be entrusted in this difficult diagnosis, the surveillance system's sentinel sites are general care facilities providing AIDS treatment and may not be fully familiar with this condition. This leaves some doubt about the 88 cases reported by the surveillance system several weeks after the impact.

Another plausible explanation may be high mortality associated with severe underreporting due to the absence of centralized data collection in the first two weeks.

Spinal cord injuries

There is scarce information on the number of spinal cord injury (SCI) patients who survived the first days after the earthquake. A survey by Handicap International (Calvot and Shavji, forthcoming) estimated the number to be above 100, later revised closer to 150. Information in the Haiti SCI database[26] in mid-2011 indicates over 200 beneficiaries, of which 135 sustained a SCI directly as a result of the earthquake; the majority of patients presented complete paraplegia. Statistics continue to be collected and this number will increase. The death toll amongst this group remains unknown.

Most of the severe cases (cervical lesions or multi-trauma) probably did not survive the rough handling by bystanders and the initial lack of medical care (Burns et al. 2010).

It is important to recall the fact that many injured were not sent to health facilities in time because of the difficulties of moving in the destroyed city during the first night (electricity was cut in most areas). Many may have died in the street despite the fact that neighbors and relatives removed them from the rubble. The very low level of "first aid" culture increased the on-site mortality as most simple, life-saving acts were by and large unknown.

Impact on health services

Impact on health infrastructure

- The immediate impact on the capacity of the health services has been dramatic, both in terms of infrastructure and health workers.
- The capacity of the public and private sector to offer immediate medical assistance was considerably reduced at a time when it was most needed.

Photo: PAHO/WHO, Victor Ardcain

Within the affected departments, 30 out of 49 hospitals were damaged or destroyed. The ability of the health care system to respond has been permanently affected by the destruction, and delivery of service is disorganized. The Ministry of Health was unable to fulfill its leadership role, primarily because its main building was completely destroyed.

The damage predominantly affected the secondary and tertiary facilities, while 90% of primary health care centers in the affected departments remained intact or suffered only light damage (see Table 3.7).

26 The confidential Haiti SCI Database was created in March 2010 and continues to be administered by Healing Hands for Haiti/Haiti Hospital Appeal.

Specialized facilities were also affected:

- Before the earthquake, there were at least four hemodialysis units across Haiti, treating approximately 100 chronic patients. One unit was lost during the earthquake.
- The earthquake destroyed the buildings housing the National Center for Transfusions and the National Blood Safety Program. For the first eight days after the earthquake, no Haitian blood was available for transfusion.
- The sole hospital for chronic mental disease was seriously damaged in the earthquake. Most of the 76 patients slept on the hospital grounds with no protection for a sustained period of time.

Table 3.7 Damage sustained by type of health structure

Level of damage by type of structure	No damage or very little damage	Light damage	Severe damage	Completely destroyed	Total
Secondary and tertiary hospitals	14	5	22	8	49
Health centers and clinics	215	38	12	9	274
Ministry of Health and other administrative buildings	4	8	1	10	23
University and training institutes	23	2	3	19	47
Total	256	53	38	46	393
Total as a percentage (%)	65	14	10	12	100

Source: Haiti, PDNA 2010, Table 16.

In several facilities, personnel refused to re-enter premises they deemed unsafe in spite of structurally minor or cosmetic damages and reassurance from engineers. This is not uncommon. The same reluctance to reoccupy facilities that were emptied too hastily was observed after the earthquakes in Mexico City (1985) and El Salvador (2001). It is far easier to take the decision to evacuate a hospital than to reoccupy it. The long-term solution is to carry out risk reduction prior to an earthquake through a careful structural and nonstructural assessment of critical facilities to determine which are at risk and may need evacuation. Those considered resilient to earthquakes should not be evacuated at the first sign of seismic activity. Few facilities in Port-au-Prince would fit in this category.

NGOs are major stakeholders in the provision of medical care in Haiti. They have not been spared by the impact. All MSF structures (except one emergency facility) were severely damaged, some with patients and staff members trapped inside.

Haiti's University and Educational Hospital (HUEH—also known as General Hospital), the country's largest, suffered serious physical as well as functional losses (Table 3.8).

Table 3.8 Earthquake damage to the Haiti University Hospital (HUEH)

Buildings entirely unsafe	Buildings safe and usable
Department of Surgery	Administration
Outpatient consultation	Most of internal medicine
Pediatric department	Most of emergency services
	Maternity
	New facilities (urology and dermatology)
	Radiology

The HUEH engineers ordered immediate evacuation of all premises in case of aftershock. This recommendation was reportedly confirmed later by separate assessments by USAID, U.S. Army Corps of Engineers, PAHO/WHO, and Spain's Fire Brigade experts. After the second aftershock, the use of emergency services was reduced. After the third aftershock, the patients refused to re-enter the buildings and the medical personnel expressed fear about working in the oldest buildings. Consequently, the decision was made to place all patients and most of the operating rooms under tents.[27]

This reaction was not limited to public facilities run by the Ministry of Health. Most MSF hospitals were damaged and unusable, and where still intact, patients and staff were too frightened to enter, so all MSF services and hospitals were placed in tents.

27 Abstracted and translated from a report from the HUEH director to the Minister of Health.

PROMESS, the central pharmaceutical warehouse, remained mostly intact. Fortunately, its stock had been replenished at the end of 2009.

Impact on health personnel

The earthquake did not spare Ministry of Health personnel. Very high but unconfirmed estimates of losses were circulated and occasionally published. These figures were shown to be inaccurate by a retrospective survey on the impact of the earthquake on the health staff carried out two months after the impact by the Human Services Directorate of the Ministry of Health (MSPP 2010a).

In this survey, a census was conducted in the three affected departments. Of 6,812 employees, 5,879 health workers (86%) were identified based on questionnaires sent to all Ministry of Health institutions. Of the 5,879, 61 were reported killed; 59 of these were in West Department, where the capital is located. These figures include Ministry employees only. They do not cover students (medical or nursing), whose mortality was presumably higher due to the collapse of the nursing school, among other causes.[28] The reasons for the relatively low mortality figure are simple: as mentioned earlier, at the time of the earthquake, office workers had mainly left their workplaces and were on their way home.

Most practicing doctors divide their working time between official duties in a public facility and private practice. This is a life necessity given the meager and irregular

28 The nursing school at Lumière University—one of three official nursing schools in the country—was reduced to rubble, killing an estimated 150 students (UNFPA 2010).

Local nursing staff at field hospital

Photo: PAHO/WHO, Victor Artcain

salaries paid by the Government. Relatively few physicians were present in the health facilities at the time of the impact. For instance, in the main tertiary level facility, the University Hospital, only the night shift was present.

In addition, the Ministry of Health survey found that 245 (2.2%) of Ministry staff lost a member of their immediate family (spouse or children) and 3,955 (67%) were technically homeless (30% of their houses were destroyed and 37% were damaged and potentially unsecure). The fact that many Ministry staff were reported absent for some time is largely attributed to the fact that they had to find relatives and organize for their survival before reporting to their duty stations.

It was estimated that 50% of the health workers were living under tents for a sustained period of time.

Impact on population displacement

- Reasonable estimates on size and place of displacements are essential for planning the delivery of health, water, and sanitation services.
- Statistics on displacement tend to be on the high side initially and are contested later.
- The health effects of displacement are not limited to areas physically affected by the earthquake.

The level of destruction and loss of employment and homes led many people to seek shelter in temporary settlements. The concentration of displaced families in thousands of small camps and settlements presented a health risk in itself and a challenge for the provision of health services because it caused a massive redistribution of catchment areas. The situation was quite distinct from that observed in other countries where space allowed for organized, medium-scale settlements (10,000 persons or more). There was no vacant land in Port-au-Prince itself and all small public spaces were overcrowded, initially leaving only 2 or 3 square meters per person. Common facilities (water, electricity, waste disposal) were non-existent and would compete for space.

Monitoring the constant flux of displaced households under the conditions in Haiti was particularly prone to inaccuracy. The number of camps was close to 1,200, some housing only a few hundred persons. Families (or some of their members) shifted from place to place according to the benefits (aid) to be expected. A detailed description of the registration strategy used by the Camp Coordination and Camp Management "Cluster" was circulated by the International Organization for Migration (IOM) in April 2010.

An official number of internally displaced after the earthquake (1.5 million in temporary camps) was released by IOM and accepted initially by all partners, only to be questioned one year later by scientists (and mass media). Discrepancies between sources as well as internal inconsistencies in the figures are illustrated in Table 3.9.

Table 3.9 Numbers of persons living in temporary shelters in Haiti after earthquake, by source

Source	Data
PDNA (March 2010)	1.5 M persons directly affected Around 1.3 M living in temporary shelters in the metropolitan Port-au-Prince area; 500,000 moved into the rest of the country
IOM Registration Strategy (April 2010)	450,000 households living in shelters[a] (i.e., at least 2 M persons)
IOM Press Briefing Note (Dec 2010)	Peak figure in the camps was 1.5 M
USAID survey (Schwartz et al. 2011)	Estimated number of people who went to camps in January is 866,412 to 894,588 ($p < .01$) By April 2010, approximately half of those who had gone to camps or the countryside had returned home

a According to the IOM, household size is estimated between 5.2 and 5.7 persons.

The lesson is that any statistic, not only mortality data, can only be a rough estimate likely to be subject to questioning. The key again is to resist the temptation to err systematically to the higher side and to share the methodology adopted as was done in this case. There is no real benefit for the affected population to adopt the higher end of all measurements. A middle road approach will more likely make divergence between experts a matter of scientific debate rather than a public crisis affecting the credibility of an agency.

Faced with the situation in Port-au-Prince, the Government encouraged migration to non-affected departments, and buses were rapidly made ready to transport people. Since roads in the affected area were impassable, buses were located at the periphery. Movements of people away from the capital started spontaneously, during the night of 12 January; the first arrivals of the injured were reported in the early morning of 13 January at Saint Mars and Gonaïves hospitals. The flow of "evacuated injured people" continued for a few days, rapidly overstretching the response capacities of these facilities. Health services in the receiving areas, which were already insufficient to meet the most basic needs of the local population, had to attend to a flux of reportedly between 500,000 and 600,000 disaster-affected individuals, many with injuries and emergency treatment needs. These health facilities normally charged for services, habitually saw only a few patients daily, and had no stocks of supplies to serve the increase in patients. How long the extra medical burden on non-affected departments lasted is unclear.

If efforts were made by the Government to encourage and monitor the initial movement out of Port-au-Prince, few data were sought by or provided to the humanitarian community on the return of those displaced.

The Rapid Initial Needs Assessment for Haiti (RINAH) is one of the few studies that explored this issue in some depth.[29] Another survey commissioned by UNFPA confirms that more than a quarter of the population of the metropolitan area left after the 12 January earthquake (Haiti Data Services 2010). Half migrated into urban areas of

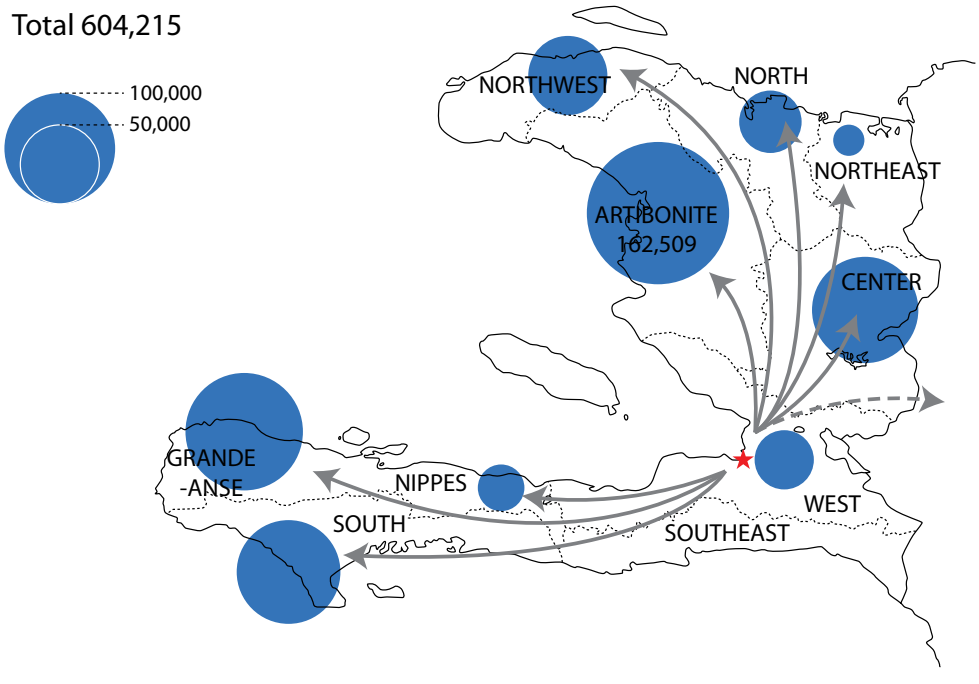
29 See: Assessment Capacities (ACAPS), 2010, *Rapid initial needs assessment for Haiti (RINAH).*

unaffected departments (Figure 3.3). However, the study went further and enquired on the duration of this displacement: "The data show that those who left after 12 January have returned soon after. Around one out of three (27.7%) have been away less than one month and 55% between one and three months. In conclusion, less than 20% stayed more than three months outside the metropolitan area."[30]

The massive international distribution of goods and services in the metropolitan area influenced or determined this reflux. Material assistance indeed became much more accessible in Port-au-Prince, inciting the return of displaced populations. As distributions were organized in temporary settlements, some of the beneficiaries were not those affected by the earthquake but actually the economically vulnerable seeking better opportunities (shelter, food, water, health, and education opportunities). What is not known is the importance of this factor.

It is rather enlightening to note another finding of the UNFPA survey: The municipality of Cité Soleil, the poorest area of the city but one of the less affected by the impact, received the smallest proportion of displaced from other municipalities (2.9%) but has the highest rate of displacement. More than 20% of the residents migrated into other (more affected) municipalities.

Figure 3.3 Internal migration following the Haiti earthquake, by department



Source: National System for Risk and Disaster Management (Système national de gestion des risques et des désastres—SNGRD) Report No 15, February 2010.

30 This is supported by the study conducted for USAID by Schwartz, Pierre, and Calpas (2011).

Local health personnel, Haitians living abroad (the 'diaspora') and neighboring countries played a significant role in the response. Humanitarian actors already working in Haiti, as well as foreign medical teams, also became a valuable asset during the relief operation.

Chapter

4

Who provided assistance?

- While the impact of the earthquake in Haiti was unprecedented, the short-term response had all the strengths and weaknesses noted in evaluations of earlier disasters.
- Lessons from the past have not been learned.

The logistical challenges faced by the responders were overwhelming:

- *International access:* The airport facility, briefly closed, was reopened thanks to U.S. military intervention. However, its use was initially reserved for U.S. military troop movement and selected bilateral relief assistance or evacuations. The harbor was severely damaged.
- *Land transportation:* The lack of vehicles, especially considering the unavailability of the MINUSTAH fleet for 7 days,[31] was compounded by chaotic traffic conditions. It often took several hours to move from one meeting place to the next within Port-au-Prince.
- *Power:* Modern relief is dependent on a reliable source of electricity, a condition rarely met even months after the impact in Haiti.

31 As noted in Chapter 1, the MINUSTAH mandate did not consider logistic support to the humanitarian agencies.

- *Communications:* Fixed telephone lines, that were unreliable in normal times, were suspended; mobile phone lines were unavailable most of the time, satellite telephone circuits were overloaded, and internet access was limited.
- *Language:* The language barrier was a significant obstacle for some foreign teams that found themselves unable to communicate properly in French or Creole with their local partners and beneficiaries.
- *Administrative obstacles:* A cumbersome process for both customs clearance in Haiti and approval of movement and arrangement for escort, when required by UN security rules, causing difficulties and delays.

Substantially increasing the number of personnel, to coordinate and manage the health sector response without increasing logistical support, would not have resulted in a more effective response.

The humanitarian actors

- If the impact of the earthquake was unprecedented, the response was not. It followed the trend observed in past disasters.
- National professionals and neighboring countries played a significant role. The foreign response was extremely generous.

The earliest and therefore most effective responders were those already in Haiti and especially in Port-au-Prince: relatives and neighbors, local health services, and the many humanitarian agencies already on site. How many lives, for instance, neighbors and relatives have saved will never be known. The local contribution was invaluable but overshadowed by international actors better skilled in public relations.

The Haitian actors

According to most accounts, the solidarity among the Haitians was massive, with people helping each other in the ruins, sharing the little they had, and trying to get as many people as they could out of the debris. Despite a few unruly incidents during supply distribution, which were overblown by the media, the many stories of solidarity confirm once more that rampant social disorder and violence after natural disasters is, indeed, just a myth.

Local health personnel

In all disasters, local health services play a key role, especially the first few days before assistance can arrive. Haiti was no exception.

A much debated issue is the conflict in roles for health workers between caring for their own families and their professional obligations. How did that play out in Haiti?

In Haiti, local health facilities and services were understaffed and some were even closed for several days. These isolated observations are overshadowed by the number of those who worked on the front lines, salvaging medicines and dressing supplies from damaged and destroyed private pharmacies or health facilities.

The early situation at the University Hospital has been well documented: "On the morning of Day 2, key staff reported to HUEH and following public announcements on the radio, nursing and support personnel progressively and partially returned."[32]

Reasons for medical staff not reporting in the first days were many:

- Some had suffered severe personal losses (family and housing) and could not contribute;
- Others were providing emergency care in their own neighborhoods;
- Transport within the city was nearly impossible (loss of vehicles, no public transport, and roads often blocked by rubble).

Those nationals who reported to work operated in extremely difficult professional and personal conditions which did not compare with those of the better equipped and self-sustained foreign teams progressively entering the area. Among the priority needs expressed by HUEH in the first days were funds for the staff ("for transport and feeding their families") as well as for tents for their accommodation.

There are no quantified data on the Haitian personnel on duty during this initial period. Two months after the event, a survey carried out by the Ministry of Health offered the first statistics on the availability of human resources (MSPP 2010a). This survey shows that 79% of the Ministry's personnel were reporting to duty seven weeks after the impact. However, in the most affected department (West), only 48% of the medical doctors were present.[33] Most of the missing medical personnel were from the three main hospitals or maternity hospital; 190 medical doctors did not report to duty at the University Hospital (HUEH). Special mention is therefore due to the nursing staff whose continuous presence was so critical.

Factors that help to explain the low number of medical doctors reporting in government facilities two months after the impact are:

- A number may have accompanied the 600,000 people who moved to the non-affected departments or migrated abroad.
- More significantly, a large number were recruited by humanitarian agencies at salaries several times above their pre-disaster incomes.[34] This practice of international "poaching" is very common in humanitarian response.[35] Although these health workers opted to work where they could get necessary equipment, supplies, and

32 Dr. Alex Larsen (HUEH), (nd), *Rapport au Ministre de la Sante publique et de la Population*. [Translated from the French.]
33 There are no data on the "normal" absenteeism rate, which should also be relatively high.
34 Remuneration by international NGOs is four or five times higher than the salary paid by the Ministry.
35 In the post-earthquake period, MSF had 372 international and 2,960 national staff. Should a large number of those local health employees be released, one can question the ability of the Ministry of Health to absorb them.

support to serve the population for a given period of time, the practice does weaken national institutions and may hamper recovery.[36]

The key point is that reduced staffing in public facilities does not necessarily mean that the missing doctors and health workers were not helping their population.

In the private, non-profit sector (NGO and faith-based organizations), absenteeism was not an issue as illustrated by one agency comment: "Despite the tremendous personal losses sustained by many national staff members, and despite the chaos that followed the earthquake, the majority of MSF's surviving Haitian staff immediately set to work helping their countrymen and continued to do so throughout this difficult period" (MSF 2011, 7).

More surprisingly in the harsh economic context of Haiti, the for-profit sector did not lag far behind in generosity. Private, for-profit hospitals and clinics opened their doors, offered their services, and shared their supplies from the time of the impact. The staff of several clinics immediately provided care at no cost and acted as field hospitals.[37]

Haitians from abroad

Associations of expatriated health personnel can play a major role. However, they should plan ahead and take the lead in coordinating and facilitating the efforts of their members.

The importance of the presence of Haitian expatriates (the so-called "diaspora") during the post-disaster period has been well documented. Their knowledge of Haitian culture, language, and customs, coupled with their wide range of technical and professional skills, gave them a unique advantage over other groups during the health response.

Though the international teams deployed to Haiti made numerous references to the work of national and expatriate Haitians, it is rare to find numbers or precise descriptions of their contribution. For example, the University of Miami Global Institute/Project Medishare (UMGI/PM), which has a 15-year relationship with Haitian physicians, observed that one of the key characteristics of this operation was the participation of Haitian professionals and technicians both living in Haiti and abroad. However, there are no specific figures regarding this phenomenon.

Table 4.1 summarizes the few data available to the authors on the participation of national staff and expatriate Haitians with selected groups involved in the post-disaster health operation.[38]

36 The Ministry of Health developed guidelines for the payment of Haitian public staff by international actors. Agencies found it difficult to change their salary scales, creating discrepancies within their local staff (based on whether the date of a contract was before or after the guidelines were issued) and were reluctant to further complicate their competitive search for scarce local skills. For the most part the guidelines were ignored.

37 The Alliance for International Medical Action (ALIMA), an international NGO arriving a few days after the disaster, had pre-earthquake contact with the private Clinique Lambert and decided to support it. The international staff involved in this operation was impressed by the sense of dedication of the clinic's Haitian staff, who worked 24 hours/day, 7days/week in very difficult conditions.

38 Although the expertise and contribution of expatriate Haitians were appreciated by the employing agencies, competing local interests (family, social, or political) did occasionally complicate their integration in the team.

Table 4.1 Participation of local and expatriate Haitians in health response following the earthquake

Organization	Local Haitians	Expatriate Haitians	International staff
Médecins Sans Frontières[a]	2,844	n/a[b]	260
USNS Comfort	n/a	70[c]	550[d]
Project Medishare/UM Global Institute	n/a	30[e]	300

a MSF 2011, pg. 6.
b n/a = Data not available.
c The American Red Cross recruited, trained, and equipped 70 Creole-speaking volunteers from across the United States who supported medical staff as translators aboard the USNS Comfort, a U.S. Navy hospital ship.
d "U.S. Navy Ship Comfort Heads to Haiti" http://medicalexecutivepost.com/2010/01/18/us-navy-ship-comfort-heads-to-haiti. Accessed on 30 May 2011.
e "Nurses from the Haitian American Nursing Association (HANA) participating in the Medishare initiative." http://theglobalinstitute.wordpress.com/2010/01/21/haitian-american-doctors-and-nurses-working-with-um-global-institute-in-haiti. Accessed on 30 May 2011.

Humanitarian actors already in Haiti

The presence in Port-au-Prince of a strong national Red Cross Society, specialized medical NGOs, a large number of Cuban doctors, and many others became a specific asset in Haiti.

Haiti is the country with one of the highest densities per capita of local or international NGOs, UN agencies, and bilateral projects. Figures of between 9,000 and 10,000 NGOs are cited. The number of local NGOs and faith-based institutions with activities in the health sector prior to the impact is also high but figures are difficult to find. As indicated earlier, an estimated 75% of the health services prior to impact were delivered by the private non-profit sector, 5% by the for-profit sector, and the rest by the Government. In other countries affected by disasters (Indonesia, Sri Lanka, and Pakistan), the balance is reversed, with the public health sector providing most of the services and the NGOs filling some of the gaps.

Photo: PAHO/WHO, Victor Ardoin

Some of those actors were affected by the earthquake but most could mobilize rapidly to meet the most immediate and pressing needs. A few hours after the quake, all sections of MSF present in the country organized their first reconnaissance mission in the city (even though it was already night time) and started to operate on the injured. The International Committee of the Red Cross (ICRC) in-country medical supplies, that were stockpiled for urban tensions and hurricane response, were immediately mobilized and put into use the following morning.

Others more directly and severely affected such as the UN Mission, some UN agencies, and others needed time to address the critical needs of their own staff and to restore their capacity (materially and psychologically). PAHO/WHO lost its office and many of the staff lost their homes. Without clinical responsibilities, skills, or equipment, the first night was spent accounting for the safety and welfare of its entire staff (national or expatriate), reestablishing contact with the health authorities, and finding facilities where it could resume operations. Not much productive work could

be done overnight by technical or coordinating agencies that were deprived of offices and communication.[39]

The direct impact on agencies that normally lead the international response was specific to the Haitian disaster. In other countries affected by sudden disasters, the UN capacity to assist, respond, and coordinate was not affected. However, planning for future scenarios of urban disaster should include this aspect.

Bilateral agencies confronted the same challenges. They faced an additional and competing priority from their obligation to care for their nationals (resident or visitors) who were missing or injured.[40] This legitimate concern influenced greatly the priorities of their strategic and operational involvement (transport, air traffic control, search and rescue, medical care, etc.). Many dispatched SAR and medical teams, funded other actors, and provided supplies.

External actors

The Tsunami Evaluation Coalition (TEC) assessment of the international response (Telford, Cosgrave, Houghton 2006, 55) remains valid for Haiti:

> *"The number of international agencies involved in the response grew unabated. Well-resourced agencies and very small ones, competent and incompetent, well-prepared and unprepared, secular and faith-based, reputable and disreputable, household names and unknown, ambitious and humble, opportunistic and committed, governmental and nongovernmental, national and international, bilateral and multilateral, well-established and just-formed—they all turned up."*

Foreign teams arriving in the country to provide health assistance in the aftermath of the earthquake belonged to one of the following groups:

- *Medical components of urban search and rescue (USAR) teams.* More than 30 countries sent USAR teams, many of them with some health equipment (from very basic stabilization boxes to full-fledged emergency field hospitals). This represented the first response of many bilateral government agencies (the traditional humanitarian donors but also Caribbean and Latin American countries and many others from around the world).
- *Bilateral government medical teams.* These arrived from many countries, including from the Caribbean. Often more than one institution from a country was present. For example, United States assistance included the Office for Foreign Disaster Assistance (State Department), the military (Department of Defense), and teams from the U.S. Health and Human Services Department, to name only a few;

39 As mentioned earlier, land-line telephone service was suspended, mobile systems were mostly unavailable, satellite phones were rapidly overloaded ("no circuit"). Only hand-held radios provided some support in most locations. Internet and Skype services were intermittently available.

40 By 19 February, an estimated 27,199 American citizens had returned to the U.S., most with the logistical assistance of the U.S. Government.

- *UN or UN related agencies*, including PAHO/WHO, UNICEF, UN Population Fund (UNFPA), World Food Programme (WFP), and the International Organization for Migration (IOM);
- *Red Cross system* (IFRC, ICRC and many participating national societies). The Red Cross system mobilized its six health Emergency Response Units (ERU) which consist of "health services in a box" to be dispatched in less than 24 hours with specialized and support (logistics) staff;
- *International NGOs* (from the most established and experienced to the small or less known);
- *Bilateral, non-State institutions* (hospitals or universities, for example), many with ongoing activities and established Haitian counterparts;
- *Teams from social or religious associations.* This category included many small actors but with the advantage of having existing, one-to-one relationships at the local level;
- *Ad hoc initiatives by individuals or groups* set up only for the event (the "mushroom" NGOs that pop up overnight after each major crisis).

Over the last decade, the number of those actors has grown rapidly and without a strategy or master plan, leading the World Disaster Report of the IFRC (2004) to call the humanitarian community the "largest unregulated industry." Mass media play an important role in this wild expansion. If the far-reaching mass media contribute to generating global generosity and compassion on behalf of the affected population, they also represent an almost irresistible incentive for politicization of the process or its exploitation for the sake of publicity (or even proselytism by some faith groups, as occurred in Haiti).

Effectiveness is a matter of context

The results of the proliferation of health responders were atypical in Haiti compared to other past (and probably most future) disasters:

- In Haiti, the magnitude of the needs, the poor state of services prior to the impact, and the absence of national back-up capacity after the event resulted in many of those actors providing significant assistance to the population.
- In other disasters (Indian Ocean tsunami, earthquakes in Iran or Pakistan), most of those teams were more a burden than assistance.

This proliferation of international organizations is far from new (as already noted in the tsunami evaluation), suggesting that not much has been learned.

The number of small, short-duration medical missions in Haiti is unknown but likely to be high due to the visibility of the earthquake and proximity to North America. In an assessment of volunteerism in Haiti, Kathleen Jobe (2011) spelled out the conditions for those teams to be effective: "Short-term medical missions should be familiar with the broader public health messages that are determined by in-country public health officials and established in-country NGOs". In the same vein, C. Bajkiewicz (2009) observes:

"Volunteers are well served by evaluating not only the personal benefit they derive from participating in the mission, but also the overall impact of the mission on local health care and public health priorities."

The close neighbors

The traditional bilateral humanitarian actors played a major role in the health response. Among them was the United States Department of Health and Human Services (HHS), an agency providing a large array of services, including the National Disaster Medical System (NDMS) and the Centers for Disease Control and Prevention (CDC), both of which were activated in Haiti. As noted in the box, the variety and extent of services was unusual compared to past disasters in the world.

Examples of support from the U.S. Department of Health and Human Services

Medical care: Deployed the medical assets of the NDMS, consisting of almost 1,000 health responders over the 42-day mission;

Evacuation: Assisted returning U.S. citizens and arranged for referral of injured Haitians to tertiary care institutions in the United States;

Disease surveillance: Provided assistance for epidemiological surveillance and laboratory support;

Dead bodies: Storage, identification, and repatriation of bodies of U.S. citizens.

Many Latin American or Caribbean countries provided substantial assistance. Of the latter, two countries were particularly well placed to play an important health role during the first days: Cuba and the Dominican Republic, due to their medical presence or geographic proximity.

Cuba

Cuba has maintained a strong medical presence in Haiti since 1998. Over this period, more than 6,000 health personnel have served in the country, often in difficult rural environments. At the time of the impact, the Cuban Medical Brigades had more than 330 primary health care professionals in the country. Those experts provided an immediate source of medical personnel familiar with the conditions of the country. They reported seeing their first patients less than 90 minutes after the impact and completed 1,000 emergency consultations within the first 24 hours. At the end, more than 1,500 personnel contributed to the response. A summary of the reported activities in the first 10 days is presented in Table 4.2.

Table 4.2 Cuban medical assistance in Haiti, 12–22 January 2010

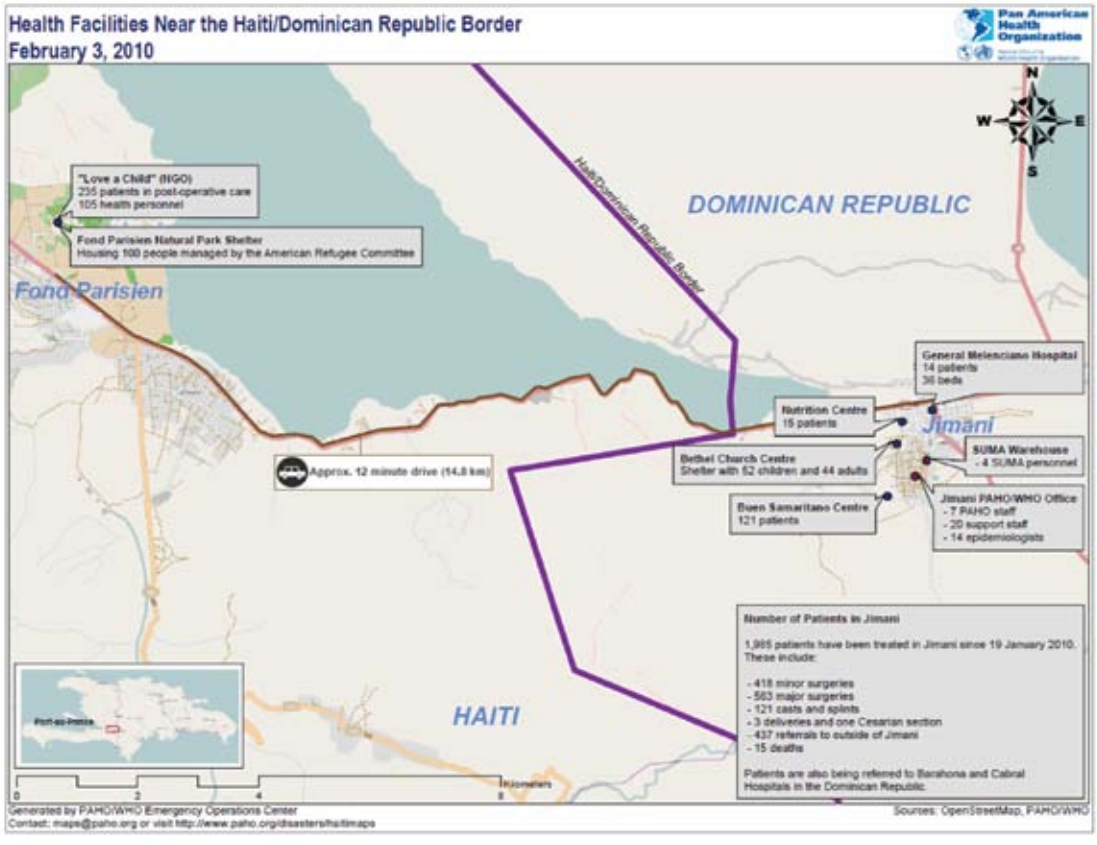
Affected area	Number of cases	Surgery			Deaths		
		Minor	Major	Total	Children	Adults	Total
Port-au-Prince	11,354	113	622	735	19	49	68
Suburban areas	3,553	63	80	143	37	28	65
Others	5,188	896	180	1,076	1	14	15
Total	20,095	1,072	882	1,954	57	91	148

Source: Report provided to PAHO/WHO by the Cuban Medical Brigade, 22 February 2011.

Dominican Republic

The Dominican Republic, a country with occasionally tense relations with its poorer neighbor, has played several roles:

- First, the Dominican Republic received tens of thousands of refugees, many seeking urgent surgical care. The country provided health assistance at all major border crossing points (especially Jimaní).
- It rapidly deployed a civil protection team to Port-au-Prince in order to provide assistance and expertise at the site of the disaster.
- For the first few weeks, the Dominican Republic was a vital lifeline for the relief operations in Haiti. Santo Domingo became a major hub for most of the foreign assistance as the access to Port-au-Prince airport was constrained by the deployment of the U.S. military, Civil Protection, and consular operations (evacuations). There were few exceptions and those that were allowed to land in Port-au-Prince had to undergo a complex clearance process. In addition, the Port-au-Prince sea port remained inaccessible due to severe damage and after repairs were made it was congested. Landing in Santo Domingo and moving overland to Haiti border crossings became the normal procedure. The Dominican Republic facilitated or waived customs and immigration procedures at both the Santo Domingo airport and at the Jimaní border crossing.



The number of people seeking shelter and medical care in the Dominican Republic was overwhelming and required the support of the entire Dominican health system. It is a few hours' drive in normal circumstances from the Haitian capital (62 km) to Jimaní, a primary border town on the Dominican side (see map). For the Dominican Republic, it was not a minor, localized emergency but a major mass casualty event that exceeded its normal response capacity. It was a local disaster that took place in parallel to the larger one in Port-au-Prince. There could be no guidance or support from the authorities of the affected country. The Dominican Republic did handle it on its own.

As we will see, the disaster in Haiti followed a now well-known pattern of shifting priorities from life-saving trauma care to post-operative concerns and welfare. The response to the "border disaster" followed a similar pattern but was greatly accelerated. The timing was closer to that observed in other disasters when a whole country stands behind the assistance to a small part of its population. For instance, epidemiological surveillance and other communicable disease measures were already adopted at the Dominican Republic's central level on Day 3, an early warning system was activated on Day 4, and field visits of epidemiologists were made to temporary settlements on Day 5 (PAHO/WHO 2010b). In Haiti, two weeks passed before the first systems for surveillance and control of communicable disease could actually be set up.

Clearly, the scale of needs was far greater in Port-au-Prince than in Jimaní. Nevertheless, the magnitude of the task faced by the Dominican health services and Civil Defense cannot be underestimated. From 18 to 23 January, reports indicate a severe overload of the health services in all border provinces in the Dominican Republic. For 10 days, key staff remained on duty without relief and on Day 15, the hospitals in the border departments still had more Haitian patients than local ones.

The exodus of affected families and people toward the Dominican Republic slowed after 10 days, and the number of new patients started to decline. During January, the Dominican health services attended to 1,985 patients, performed a high number of amputations (212), immobilized 121 fractures, and registered 15 deaths in hospitals (PAHO/WHO 2010b).

The credit for the achievements in Jimaní should be shared with the countries and NGOs backing up the Dominican Republic with teams at the border. Little outside support was received from the donors.

Other countries from the region

- Many Latin American or Caribbean countries did not report their assistance to the OCHA Financial Tracking System. They lost an opportunity for a permanent record of the nature and value of their in-kind contributions.
- Some of the countries new to international medical relief would benefit from organizing their own "lessons learned" exercise and increasing their preparedness and training.

In addition to the special roles played by Cuba and the Dominican Republic, there was probably not one country in Latin America and the Caribbean that did not contribute in one way or another to saving lives and providing care to the affected population in Haiti. The contributions took diverse forms: from the deployment of search and rescue teams, the deployment of field or ship hospitals, the dispatch of medical

teams, or the secondment of individual volunteers for the management of incoming supplies or experts to assist one of the humanitarian organizations. The response to the Haiti earthquake was global, but it was also truly regional.

Information on the regional medical response comes primarily from interviews and to a lesser extent from media reports. There is a serious lack of administrative information (reporting of in-kind donations to the UN/OCHA on-line financial tracking system, technical documentation, or scientific analysis) on these activities. Of the 280 peer-reviewed articles listed in Medline,[41] none addressed lessons learned or activities of Latin American or Caribbean medical teams.[42] This needs to be addressed both from an educational and public relations point of view.

Regional organizations

The supportive role at the operational level of the regional organizations to which Haiti belongs should be noted. Within 24 hours, the Caribbean Disaster Emergency Management Agency (CDEMA) supported the Government of Jamaica to mobilize its medical personnel. Jamaica became a staging area for further Caribbean assistance. As early as 14 January (Day 3), the Caribbean Community (CARICOM) identified the health sector as the agreed area of focus for the coordinated regional intervention. The modest Caribbean resources were complemented by Australia, which channeled AUS$ 1 million to CDEMA (i.e., 10% of the initial pledge from this country).

How much more effective would the response of the Dominican Republic and other Caribbean countries have been had other donors followed this example?

41 A literature review was conducted of articles in the U.S. National Library of Medicine's MEDLINE database on 7 August 2011.

42 An editorial on lessons learned in Haiti was published in the *West Indian Medical Journal* (Vaughan 2010).

El Buen Samaritano Hospital

Flags from the countries providing medical teams at the Haiti-Dominican border.

Photo: PAHO/WHO, Victor Ariscain

Institutional bilateral assistance

- Prior experience in the affected country or close partnership with an established, on-site NGO is essential.
- A significant commitment should be sustained both on the humanitarian but above all on the administrative, financial, and logistical sides.
- A mid-term view is critical. Improvised, overnight operations are not likely to be productive, regardless of the scientific credentials of the institution. Being a world-class academic or clinical center is not sufficient to become a major humanitarian actor.

The magnitude of the disaster and the proximity of Haiti to North America, among other factors, induced a very strong response by private (nongovernmental) health institutions, particularly from the U.S. Some but not all of these institutions had ongoing health projects in the country. A similar response was not observed after the Indian Ocean tsunami or the Pakistan (Kashmir) earthquake.

Three of the largest and best documented responses from academic institutions in the United States were organized by medical centers in Chicago, hospitals affiliated with Harvard University, and the University of Miami Project Medishare (see box). These initiatives shared many features that were critical for their success:

Medical care at the Haiti/Dominican border

Photo: PAHO/WHO, Victor Arkcain

- The participation of various global health initiatives or international emergency medicine programs at these institutions;
- Preexisting partnership with large NGOs through which the medical staff was deployed in Haiti (Chicago) or pre-existing standing projects in the country;
- A mid-term view (several months);
- Strong administrative, logistics, and communication support;[43]
- A systematic debriefing (lessons learned) process for all volunteers;
- The participation of a large number of Haitians (local or expatriate);
- Geographical proximity of Haiti (an important albeit not critical factor).

Examples of response from teaching institutions

Chicago Medical Response

This initiative was formed by six academic medical centers from the city of Chicago. As of 1 April it had deployed 158 medical volunteers to work with established NGOs in Haiti. The minimum duration of deployment required was two weeks. The initiative supported the University Hospital (HUEH), staffed several mobile clinics, and collaborated with the post-operative station in Fond Parisien near the Dominican border.

Harvard Humanitarian Program

Partners in Health (PIH), a not-for-profit Harvard affiliate with an established presence in Haiti took the lead in university-related medical assistance. The group operated nine medical sites in Haiti. By 19 June, 50 medical and surgical personnel had been deployed in Haiti from Harvard-affiliated hospitals. Harvard teaching hospitals sent planeloads of medical supplies, including surgical and anesthesia equipment.

The University of Miami Global Institute/Project Medishare (UMGI/PM)

During the first nine days after the earthquake the Project Medishare hospital functioned inside the United Nations compound with 250 beds, 12 staff, and no critical-care units or organized operating rooms. Sanitation and other working conditions in the first few days were dire. The hospital was later set up at the Port-au-Prince airport in a four-tent facility, with three fully organized operating rooms and 17 critical-care beds. It was staffed by 220 volunteers from the United States and Canada who served in 7-day rotations. There was strong administrative and logistics support in Haiti as well as in Miami. The group coordinated flights to transport medical staff, supplies, equipment, and victims between Haiti and the United States. This support included tele-medicine consultations and communications (see Ginzburg et al. 2010).

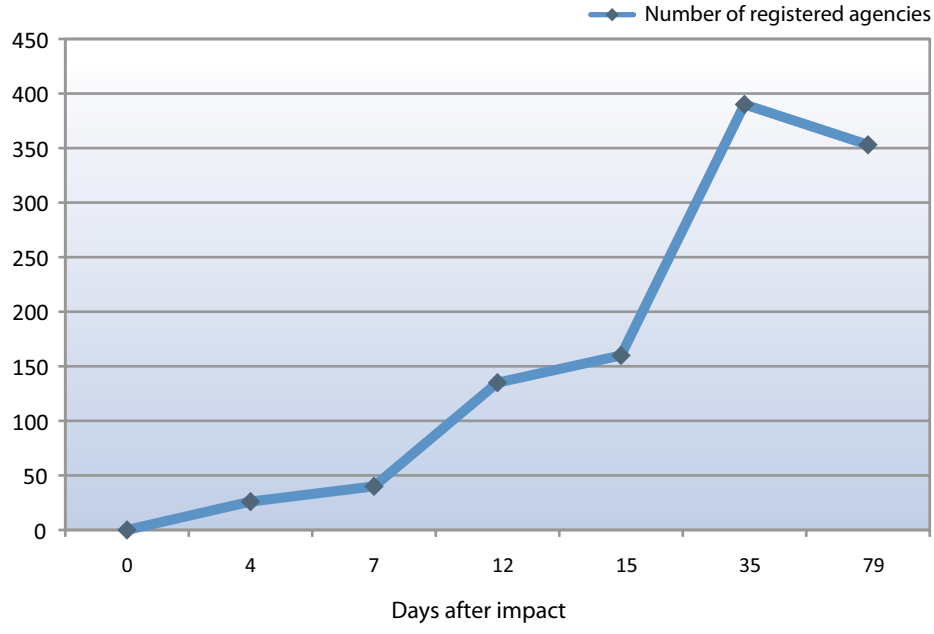
A proliferation of international organizations

In Banda Aceh, Indonesia, approximately 180 agencies (representing all sectors) registered with the UN following the tsunami. In addition, the TEC estimated that "there may have been as many as 200 small international agencies that stayed only a few weeks" (Telford, Cosgrave, Houghton 2006, 55).

43 It is estimated that Chicago institutions dedicated 1500 hours of faculty and administrative time to their operations in Haiti.

In Port-au-Prince, the proliferation of international organizations was far greater than in Banda Aceh. In the health sector alone, 390 agencies, mostly international, registered with the external coordinating mechanism (Health Cluster) (see Figure 4.2). Many more health actors did not register.

Figure 4.2 Number of international agencies registered with the Health Cluster following the Haiti earthquake



Note: Figures were compiled from situation reports and Health Cluster Bulletins.

Missionaries of Charity

Photo: PAHO/WHO, Victor Artiscain

The response to the Haiti earthquake was not an anomaly, an "unprecedented" glitch in an otherwise rational response. It was, rather, a confirmation and acceleration of a global humanitarian trend observed in recent sudden-onset disasters (the earthquake in Pakistan and the Indian Ocean tsunami). In the last decade, the only countries spared this chaotic situation were those with sufficient resources to meet most urgent needs or those able to monitor and regulate the flow of outside assistance and ensure that it complemented local efforts.

The following chart differentiates these findings according to their specificity to Haiti.

Lessons new or specific to Haiti

- A demand for medical care far exceeding the offer in the first few weeks.
- Rapid response of medical international NGOs and other humanitarian actors present prior to impact.
- Rapid arrival due to proximity (18 hours instead of 3 days).
- Large medical diaspora abroad respond as individuals.
- Lack of national military assets but massive U.S. military and UN peacekeeping intervention or presence.
- Strong and sustained health initiatives from major U.S. university hospitals.

Lessons noted in past disasters

- Very generous response leading to exponential increase in the number of health "partners".
- Significant number of unqualified or unprepared actors.
- External coordination mechanisms (Clusters) do not reflect local mandate of line ministries.
- Failure to involve and strengthen local government for timely transfer of responsibilities/ authority.
- Too much emphasis on coordination (meetings) rather than on intelligence gathering and strategic guidance.
- Increasing priority on "build back better" (linkage between relief, rehabilitation, and development).

In the Buen Samaritano hospital on the Dominican Republic border, relief priorities shifted day by day, although the disproportion between needs and resources was not as extreme as in Port-au-Prince.

Photo: PAHO/WHO Victor Ariscain

Chapter

5

The life-saving response

The response phases

The traditional disaster management cycle, from preparedness to reconstruction, as shown in Figure 5.1, has become too simplistic to describe modern humanitarian response. The respective boundaries between relief, early recovery, and reconstruction are becoming increasingly blurred. The emergency relief phase tends to linger as long as humanitarian funding is available. This is especially true in situations like Haiti, where crises succeed each other (when not overlapping), and where long-term development seems so elusive.

Figure 5.1 The disaster management cycle

Disaster relief changes considerably over time. Relief priorities shift day by day: from search and rescue and life-saving medical interventions to water, food, temporary shelters, resumption of routine programs, and meeting needs of specific groups. Priorities and their timing vary from event to event.

In smaller and less overwhelming disasters these changes are accelerated, as was seen in Jimaní, the border city in the Dominican Republic. The imbalance between needs and resources was not as extreme in Jimaní as in Port-au-Prince: more orderly planning was possible, changes could be anticipated, and a calendar was rapidly agreed upon among the main actors. In Haiti, the magnitude of the impact and of the needs ensured that, with few exceptions, saving lives, provision of food, water, and shelter, and other priorities overlapped and competed for time and attention for a much longer period than usual.

We can identify two periods in the relief phase after the earthquake:

- An "immediate" life-saving phase, which, in Haiti, lasted approximately two weeks (16 days). The crucial activities were search and rescue (10 days) and emergency trauma care. Other concerns, although present, were secondary.
- A second phase—of still undefined duration—began when the focus shifted predominantly to postoperative care, rehabilitation, primary health care for displaced populations, resumption of key programs, and the welfare priorities of food, water, and shelter (including camp management), among others. Cross-cutting priorities

such as gender issues and protection of human rights were raised in the first days after the earthquake by the relevant agencies or NGOs and progressively received the attention they deserved.

The turning point between the two phases seems to be on 28 January (Day 17)[44] when, according to the Haiti Health Cluster Bulletin (No. 9):

- "Reports indicate almost all people with injuries have received medical attention; however, some still require surgical care.[45]
- "The current priorities of the Ministry of Health include post-operative care and rehabilitation of disabled people, primary care at internally displaced persons sites, and provision of medical services outside of Port-au-Prince."

There was increasing overlap between activities and priorities. Most of the welfare needs listed under the second phase were urgent and required attention in the first few days after the event. Even in the immediate phase, all agencies carried out their activities (whether they were critical or even relevant at that time), competing for resources and facilities. The lack of a coordinating body that was able and empowered to set and enforce clear priorities allowed every actor to determine its own agenda.

The "immediate" life-saving response

As is always true, the first response in Haiti was from the local population and health workers (nationals or expatriate Haitians present in the country).

Several health priorities dominated this first phase: search and rescue, trauma care, and disposal of bodies. Many other concerns and activities were concomitant: water, food, and shelter. These issues shifted to the top of the priority list once the life-saving activities ended. All those priorities shared the same requirements (or constraints) such as availability of data from rapid assessment, efficient logistics, and supply management.

Urban Search and Rescue (USAR): its impact on health

- The impact of international USAR in terms of lives saved is relatively low compared to other measures. Strengthening local SAR capacity should be a priority for future disasters.
- There are, however, other compelling human and institutional benefits and objectives in providing this costly form of assistance.

Search and rescue activities are not part of the health sector responsibility. They are however a life-saving activity with medical components. In addition, at the international level this "sector" has been systematically organized and strengthened, which offers potential lessons for improving the management of the health response.

44 The pattern of shifting priorities (from trauma to communicable diseases and primary health care) is common to many earthquakes. However, the phases are typically much shorter. The sheer number of injured and the poor local capacity in Haiti extended the surgical phase to more than two weeks instead of a few days, as is customary.

45 A decrease in the number of urgent surgical interventions was already noted on Day 10 (Health Cluster Bulletin No. 3, 22 January).

SAR contributions to saving lives

International USAR started within 24 hours of impact and ended on 22 January, when the Government declared the search and rescue phase over. No live rescues had been reported in the preceding days. Calling off search and rescue activities is always a difficult political decision. Survivors are known to have been rescued weeks after the impact. The factors influencing the duration of survival are many, but the most critical during structural collapse is the "formation of a viable void space (i.e., a 'pocket' or 'survival space' so the survivor escapes fatal injury as the rubble settles). This void space is most likely to occur in concrete reinforced buildings and the least probable in adobe constructions" (Macintyre, Barbera, Petinaux 2011).

There were 132 live rescues reported by international USAR teams. This is the second highest number ever saved by international teams.[46] This outcome was the result of the work of over 60 USAR teams from 30 nations responding with more than 1,800 rescuers (UN/OCHA 2010).

The logistics challenges were formidable and the economic cost very high.[47] Cost-effectiveness may be a controversial issue in humanitarian response where "no cost should be spared to save one life." However, resources are limited and funds used for one relief activity may not be available for another. The expected outcome for the beneficiaries of each alternative intervention should play a greater role in deciding which type of assistance to provide.

One country, a very strong promoter of the International Search and Rescue Advisory Group (INSARAG), decided not to send its USAR team, which had been placed on standby at the departing airport. The main factor in this decision was that the expected delay in deployment was projected to be over 50 hours. The country chose instead to shift its resources to deploy a medical team specializing in pediatrics and obstetrics.[48] This pragmatic decision is credited in having saved the lives of 150 to 200 patients, many more than could have been rescued by the USAR team.

Photo: PAHO/WHO, Victor Ancalin

Cost-effectiveness does matter in relief activities but there are many important and legitimate considerations other than the number of lives saved in deciding whether or not to send a USAR team (SDC 2011).

Search and rescue is a time-sensitive activity (Macintyre et al. 2011). Its effectiveness declines rapidly hours and days after the impact. This explains why the two local teams from the Haitian Directorate for Civil Protection saved 78 persons in spite of their limited skills and lack of equipment.[49] That statistic is not mentioned in reports on USAR performance in Haiti.

USAR performance indicators ("live rescue") provoke some questions:

- Most of the foreign USAR teams concentrated their efforts on institutional venues, hotel facilities, and residential buildings. Many of these structures were built with reinforced concrete, where there is a higher chance of survival for those trapped.

46 More persons were rescued alive in the Turkey earthquake in 1999.
47 The U.S. search and rescue teams saved 34 persons at a cost over US$ 40 million.
48 It should be noted that public opinion in this donor country was initially against the decision not to send USAR teams..
49 This figure was cited in a presentation by the Director of the Haitian Directorate for Civil Protection at the INSARAG 2010 Global Meeting, Kobe, Japan, 14–16 September 2010. In addition to those 78 persons, a larger number were rescued by relatives and neighbors, although the numbers and outcomes are unknown.

The USAR teams do have an obligation to search for their own countrymen, and the occupants of these buildings were largely foreigners. No compiled information was made available regarding the nationality of the people rescued, but many local interlocutors believed that they were predominantly foreigners.

- Extricating someone alive is no guarantee that he or she will survive. Indeed, the medical capacity of the SAR teams was limited to initial care and stabilization and medical teams were overwhelmed with caring for acute patients. A few teams tracked the outcome of those survivors days or weeks later. How many of the live rescues may have succumbed to their injuries shortly after rescue is not known, but it should be kept in mind that many of the rescued are believed to have been foreigners who were rapidly evacuated by air to sophisticated medical facilities.

The most important health lesson from the international USAR process is that there must be a sustained effort to improve quality and coordination. Mechanisms used by INSARAG to address coordination challenges are described below.[50]

- INSARAG is a network of disaster-prone and disaster-responding countries and organizations dedicated to urban search and rescue (USAR) and operational field coordination. It works to develop and promote internationally accepted procedures and systems for sustained cooperation between national USAR teams operating on the international scene.

- A voluntary, independent peer-review process of international USAR teams (the INSARAG External Classification—IEC), is a feature that does not exist but is needed for foreign medical teams. IEC is seen as a capacity-building tool and a means of ensuring that international minimum standards are recognized by USAR teams. It is also a work in progress: of the 60 to 70 USAR international teams in Haiti, only 8 were IEC classified while 8 were in the IEC queue for classification (UN/OCHA 2010, 25).

- An On-Site Operations Coordination Center (OSOCC) based on a concept originally developed by UNDAC as part of the INSARAG methodology was activated in Haiti. Its objective is to assist affected countries to coordinate international search-and-rescue efforts following an earthquake.

- A "virtual" OSOCC, a component of the OSOCC, was also established by UNDAC and activated with the first alert in Haiti. It facilitated the registration of "who, what, and when" (i.e, who had what resources, who was ready to go, and when they reached the disaster site). The virtual OSOCC attempts to register all incoming USAR groups while the OSOCC itself is deployed with reception units at the entry points of the disaster-affected country (principally airports or sea ports).

- A systematic attempt to evaluate these mechanisms takes place at After-Action Reviews (AAR). Results and recommendations from the review feed into the INSARAG guidelines.

50 See the UN OCHA website for a full description of INSARAG activities: www.unocha.org/what-we-do/coordination-tools/osocc-rdc/overview.

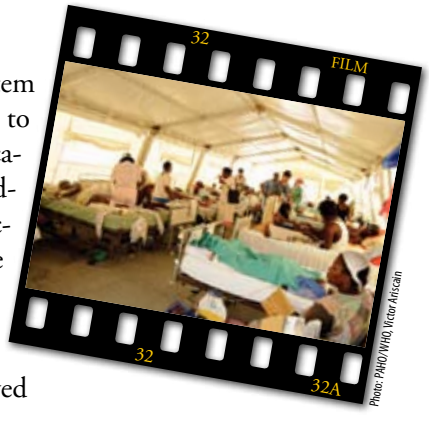
The review undertaken by UNDAC at the After-Action Review Meeting reached this encouraging conclusion: "The IEC-classified teams in Haiti demonstrated professionalism, followed the INSARAG Guidelines throughout their deployment and made a genuine difference during the response to the earthquake. The meeting suggested actions to be taken to ensure that priority was given to IEC classified teams by the affected countries during an earthquake response" (UN/OCHA 2010, 28). How effective these mechanisms were in filtering out sub-standard teams in the very difficult context of the first week in Haiti is, however, not documented.

The health sector would benefit from reviewing and, where appropriate, emulating this process of quality control.

Trauma care

In this section, several issues will be discussed: the role and contribution of foreign medical teams (FMT) and foreign field hospitals (FFH, land- or sea-based), the application of triage techniques, surgical challenges, post-operative treatment, patient referral, and evacuation issues.

Earthquakes are unique among other disasters in that they can produce an enormous number of injuries in the matter of a few seconds or minutes. In tsunamis, relatively few survivors require medical care: most in the path of the wave are killed. The challenge to the health system posed by an earthquake is significantly different from conflict situations where casualties are often announced or predictable and spread over days or weeks. In earthquakes, the emergency services are taken by surprise (whatever their level of preparedness) and may suffer themselves from the impact.



Before the 2010 earthquake, emergency medical services in the non-profit system (State or NGOs) in Haiti were ill-equipped and understaffed to respond even to a small-scale event with mass casualties. In spite of training courses on mass casualty management and other international cooperation initiatives for preparedness, they were unprepared to face large emergencies. The private for-profit sector was nearly as poorly equipped to treat more than a few patients with severe conditions. The direct impact of the earthquake further reduced this capacity.

Emergency trauma care remained the priority for over two weeks in Haiti until all patients received medical care supplied first by local personnel, followed by assistance from an increasing number of external partners.

The discrepancy between the number of injured persons (estimated at 300,000) and the data on the number of people treated (up to 173,000 "consultations" in 24 hospitals over the first four months) (Winter 2011),[51] suggests that during the first days many people may have died from the lack of immediate medical attention and later from secondary infections. The University of Michigan survey provides an order of magnitude for this delayed mortality: For an estimated 111,794 killed on impact, an additional 37,301 would not have survived their injuries in the next six weeks. That is 12% of the estimated number of injuries (over 300,000) and one of four of the deaths attributable to the earthquake (Kolbe et al. 2010).

51 This figure is approximate and only illustrative of the fact that many may not have received medical attention.

For the first 24 hours: Haiti was on its own. The immediate response, for which there are no quantified data, came from the nationals and other actors already present in Port-au-Prince. Those actors experienced the incredible stress of a major earthquake; some had personal losses.

Ambulances, barely available to the general population before the impact, were not an option. Families gathered their injured relatives and delivered them to the nearest health facility or its location if it was destroyed. Some opted to travel to the border with the Dominican Republic where intact and better-equipped facilities could be expected.

The first report from the University Hospital is illustrative of the difficult conditions of work in the remaining facilities:

> *"At the time of the earthquake, there were nearly 600 patients in the hospital. Within 30 minutes of the impact, approximately 800 persons entered the premises; most were injured, and 95% were trauma cases. All patients were on the grounds of the hospital as instructions were given to immediately evacuate the buildings. Fifteen hundred patients initially required care. At 5 PM, only night duty staff was present.*

> *"With the arrival of the Director General of the Ministry of Health it was possible for the medical staff to overcome their fear and reluctance and enter the buildings, where stocks of medicines and consumable supplies (alcohol, gauze, dressings, disinfectant, cotton, etc.) could be found. The entire stock was used during the night. The pharmaceutical stocks of the emergency services, surgery and internal medicine departments, as well as the warehouse of the central pharmacy were emptied".*[52]

This situation repeated itself in many public or NGO health facilities. With night falling, many of the most severely injured were waiting to be attended or died. Many of the Haitian doctors, who at the time of impact were at their private practice or at home, attended to their neighbors. As noted earlier, reporting to their hospitals was not feasible: roads were blocked, power was down, communications (including mobile phones) were unavailable, and the demand for their skills in their own neighborhoods was urgent and pressing.

Humanitarian organizations, after a rapid inventory of the health of their staff and the condition of their own facilities, were coping with rising numbers of casualties showing up at their doors.[53]

Admittedly, Haiti was not prepared for any type of mass casualties. But no country or system could have had an orderly response to a disaster of this magnitude that affected the political, administrative, and economic center of the country.

After the initial 24 hours, external assistance started to arrive while a flow of patients and affected population was building up at the Dominican Republic border and in non-affected departments.

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52 Dr. Alex Larsen (HUEH), (nd), Rapport au Ministre de la Sante publique et de la Population. [Translated from the French.]

53 By the end of the first week, MSF estimated it had treated more than 3,000 wounded people in the Haitian capital and performed more than 400 surgeries. Ultimately, MSF was one of the major actors in emergency surgical care among the 30 foreign field hospitals deployed during this first three-month emergency phase. MSF surgeons performed 5,707 major surgical procedures, 150 of which involved amputations (MSF 2011).

The testimony of a Handicap International expert familiar with Haiti summarizes the situation in Port-au-Prince:

> *"We spent approximately two weeks in some 17 different hospitals, clinics, and field hospitals evaluating the numbers/types of catastrophic injuries, the acute needs (for personnel and equipment/supplies), and assisting in planning longer term rehabilitation and care needs.*
>
> *"The capacity of each location serving trauma patients varied tremendously—some sites had multiple teams on the premises, other sites had one provider only. . . Most of the hospital structures in the greater Port-au-Prince area had a mixture of local staff (doctors, nurses), international aid organizations (for example: Red Cross, MSF, Merlin) and small, independent groups or individuals who arrived with or without invitation to assist (hospital groups, church-based, etc.).*
>
> *"There was—by all appearances and experience—little coordination between any of the sites. . . More often than not, an individual hospital had little idea what other facilities in the Port-au-Prince area could offer in terms of surgical services, how they could find out that information, or how to transport a patient to another site. At each hospital where multiple organizations were 'on the ground,' there was at times little communication even between those groups.*
>
> *"By the second week, many of the hospitals had established patient tracking systems; each patient remaining was in a data-base. However, it appeared that this was not coordinated nationally—each hospital did its own thing. Each organization seemed to have its own patient information form.*
>
> *"One of the issues I could see was that many responders had never been to Haiti, had no local cell phone, had no way to communicate with local authorities, and did not appear to know 'who was in charge'."*[54]

Incoming foreign medical teams and hospitals

- The number of foreign medical teams or field hospitals is increasing in every disaster as is the diversity of their place of origin.
- In Haiti, they arrived much earlier than in Indonesia or in Pakistan. Their effectiveness was also higher considering the exceptional gap between the needs and local medical resources.
- PAHO/WHO guidelines were not generally applied. A different approach toward quality control of these resources is required.

54 Personal communication with Dr. Colleen O'Connell, MD, PMR, 31 January 2011.

As is true for most of the response activities in the first few weeks, there are no official data or records on the number, timing, and role of the various foreign medical teams (FMT) or field hospitals (FFH) arriving in Haiti in the aftermath of the earthquake.[55] The PAHO/WHO *Guidelines for the use of foreign field hospitals in the aftermath of sudden-impact disasters* (2003) defined a field hospital as "a mobile, self-contained, self-sufficient health care facility capable of rapid deployment and expansion or contraction to meet immediate emergency requirements for a specified period of time".

The distinction between fully equipped medical teams and small field hospitals has progressively been blurred. Many self-sustained foreign medical teams operating under tents would indeed meet this definition of FFH. In part, this may explain why medical "teams" eager to deploy in the rare sudden-onset catastrophes in the world have often ignored those guidelines that are too specific for field hospitals.

The time lag for arrival of foreign medical teams is an essential factor in their effectiveness in saving lives. In Haiti, they did arrive and were operational relatively early (1 to 2 days) due to the proximity of major providers. In other disasters reviewed in this publication their arrival was considerably later (3 to 5 days), which significantly reduced their impact.

The time of arrival or deployment is also a matter of controversy. Many teams provide only the earliest time of arrival at the point of entry in the country, suggesting that they were operational at that time. Statements such as "We were able to offer emergency medical relief, provide medical staff, and establish the first field hospital within 24 hours after the earthquake," occur frequently in the literature.[56]

Interviews with national authorities and international experts suggest that concrete service (care) was actually provided much later. This more transparent and practical presentation of the facts was adopted by some of the responders: "The hospital started operating 89 hours after the earthquake" (Bar-On et al. 2011). As seen in past disasters, providers of medical teams are not always fully transparent in this regard.[57]

The number of foreign field hospitals (FFH) present at some point of time is shown in Table 5.1.

Table 5.1 Health facilities, including foreign field hospitals (FFH) and hospital ships operational in the departments affected by the earthquake in Haiti

Day 10	40 health facilities, including 8 FFH
Day 13	48 health facilities including 12 FFH and 2 hospital ships
Day 15	One military hospital departs; several others scheduling their departure
Day 21	2 hospital ships arrive
Day 24	91 hospitals (59 in Port-au-Prince, including 21 FFH)

Source: Reported by the Health Cluster.

55 A chronology was tentatively reconstructed by the Karolinska Insititute in Sweden (Gerdin and Von Schreeb 2011).

56 The same issue has been noted in the promotion of field hospital capacity, where the short time for deployment is from "alert," to "ready," to "board the flight" status, which is very different from the delay between request and actual provision of on-site medical care.

57 Following the Bam (Iran) earthquake, foreign teams and facilities started offering services more than three days after the impact. That is, 24 hours after almost all trauma cases had been air evacuated and distributed around the 13 provinces of the country. This fact did not stop some providers from publishing claims of having performed triage and stabilization of the victims.

Haiti may have seen the highest number of field hospitals (land-based or on ship) providing assistance. Unlike the situation in the aftermath of almost all other disasters where those external facilities were under-utilized, hospital ships were working at near full capacity in Haiti and providing a most valuable, albeit short-term, replacement for secondary and tertiary level facilities lost in the impact (or that were lacking prior to the disaster). Due to the collapse of the Haitian health infrastructure, the USNS Comfort became the main tertiary level facility.

Specifications for hospital ships for which data are available are shown in Table 5.2.

Table 5.2 Hospital ships serving in Haiti after the earthquake

	Colombia[a]	France[b]	Mexico[c]	Spain[d]	U.S.A.[e]
Ship	Cartagena de Indias	Sirico	Huasteco	Castilla	USNS Comfort
Arrival date	22 Jan (Day 10)	24 Jan (Day 12)	20 Jan (Day 8)	4 Feb (Day 23)	20 Jan (Day 8)
Departure date	14 Feb	6 Feb	n/a	4 May	10 March
Stay (no. of days)	23	10	n/a	64	36
Capacity	Multipurpose	50 beds	Multipurpose / 25 beds	70 beds	50 trauma-beds; 400 intermediate-care beds, 500 minimal-care beds
Operating rooms	1	2	1	2	10-12
ICU	No	No	n/a	8 beds	30 beds
Rx	n/a	n/a	Yes	No	Yes
Laboratory	n/a	n/a	n/a	Yes	Yes
No. of people attended	200	n/a	n/a	7,568	869
No. of surgical procedures	27	45	n/a	104	821
Comments	8 doctors from the Cartagena Navy Hospital	French Navy in partnership with a field hospital and an advanced medical unit	Mexican Navy medical professionals	A mobile health unit in Petit Goave provided PHC and referred selected patients to the ship, explaining the high number attended	U.S. Navy coordinated patient transfers with Haitian, international, and NGO health facilities

Note: Only ships for which reports or sources of information are available have been included. "n/a"= information not available.
a Radio Santa Fe Interview with Guillermo Barrera.
b Website for Sirico vessel: http://tcd.siroco.free.fr/actualites2010haiti.htm.
c Website for U.S. Navy: http://www.navy.mil/search/display.asp?story_id=50975.
d Revista Española de Defensa (2010).
e Galeckas (2011).

Some observations can be made regarding those ships:

1. All arrived a week or more after the earthquake;
2. The USNS Comfort was by far the most technically sophisticated;
3. Two ships stayed beyond 30 days.

All ships developed their own system of referral; often through one single institution (e.g., HUEH for the USNS Comfort, the French Lyceum for the French vessel Sirico). Teams at other facilities did not necessarily know the criteria used by the hospital ships for accepting patients.

In addition to the self-contained field hospitals, many foreign medical teams (FMT) built their own capacity nearly emulating that of the FFH, the only difference being that services were delivered in local facilities that were conceded or commandeered.

International claims and local reports or interviews about the numbers of FMT could not be easily reconciled. Tracking all FMTs was not feasible, but reconstructing what happened in the University Hospital, for instance, illustrates the situation in many places.

A report from HUEH clearly states that "the important and welcome assistance from the foreign humanitarians arrived the evening of 14 January with two emergency physicians, then three more arrived on 15 January but without material or medicines".[58]

Interviews with international responders and national officials do not always offer the same timeline of events, differing some times by only 24 hours. However, those 24 hours may mean the difference between life and death for some patients. These differences are important to local counterparts: they resent the exaggerated claims of foreign teams while perceiving their own efforts and contributions as being minimized or overlooked. This is representative of a serious communication problem.

Assertions that field hospitals were not operational as early as needed, by no means suggests a deferred or leisurely response. Considering all the logistical, operational, and political constraints, the deployment was massive and remarkably fast. This occurred in spite of problems caused by the restrictive military management of airport access.

Integration of foreign assets with local authorities

The pace of FMT and FFH arrival rapidly accelerated. Following again with the HUEH as example:

> *"Support from the Emergency Unit of the Association of Haitian Doctors Abroad (AMHE) arrived on 16 January (Day 4) with 60 persons. . . [This association] will set up the first section of post-traumatic emergency care at the University Hospital. . . This team brings material, equipment and medicines as required. . . Ten other NGOs with a total of 200 foreigners will succeed each other in shifts of one or two weeks until the end of March".*[59]

According to interviews conducted with hospital authorities and international actors, some of the non-Haitian teams operating in the first week in the HUEH reportedly commandeered part of the premises, recruited personnel from outside the hospital, and denied the HUEH staff the roles they considered as their own. Instead of assisting local authorities, they displaced them and took over. The same situation was reported

58 Dr. Alex Larsen (HUEH), (nd), Rapport au Ministre de la Sante publique et de la Population. [Translated from the French.] Underlined text appeared in the original.

59 Under this heading of NGO, the report included bilateral governmental teams such as the Swiss Development Cooperation. Dr. Alex Larsen (HUEH), (nd), Rapport au Ministre de la Sante publique et de la Population. [Translated from the French.]

in other facilities in Haiti. Interviews and reports on the Indian Ocean tsunami and the Pakistan earthquake indicate that the problem is common in the humanitarian community. However, it is less of an issue in larger countries where there is a strong government and institutions have not been directly affected by the event.

The issue of integrating national staff in foreign teams is complex. In fully equipped and well-established military type field hospitals, making room in a trained and homogenous team for local health personnel may cause problems. However, integrating local staff of the hosting facility should be less difficult for teams that are assembled for a specific event or those already working in the country before the event. Most agencies found it easier to recruit local personnel under their direct authority than to share management with local counterparts.

The duration of the presence of the teams and hospitals varied widely: One highly specialized military field hospital was rapidly operational, triaged and treated patients with the fastest possible turnover, and left after 10 days. Some, like the hospital ships, arrived later, specialized in the most difficult cases, and stayed longer. Others, such as the Red Cross hospital, may stay indefinitely and be administered by the local authorities. This is true in the case of some temporary emergency facilities that are built even better than existing government facilities that were intended to last for years (for example, the MSF "container" hospital in Léogâne). This is a matter of choice and the strategic decision of the donor, but that does not always coincide with the Ministry of Health plan.

There is benefit in this diversity as long as, like in an orchestra, there is a score or master plan that all follow. This was not the case in Haiti. Each "musician" played his/her instrument as well as possible with the selected score. There is no surprise that the result was "cacophony" (the term used by Zanotti, 2010).

Quality control

The quality and professionalism of the medico-surgical assistance appeared to be, in the opinion of most interlocutors, relatively satisfactory given the circumstances. There were, of course, noticeable exceptions and examples of possible unethical behavior. But they were by far the exception. As noted by the Handicap International expert who visited 17 hospitals in two weeks:

> *"The care being administered to patients in most instances appeared appropriate for the resources available. Stumps from amputations were being wrapped; patients were being fed and receiving water; fractures were being either treated by external fixators (until fixators were in short supply) or by immobilization in casts".*[60]

The issue is that there is no accepted standard or mechanism to monitor and assess the quality of the trauma care. Opinions are made based on occasional observation and conversation with colleagues. Reprehensive or dubious practices were not discouraged or penalized.[61] Relief assistance remains the "wild west" of medicine where only the

60 Personal communication, Colleen O'Connell, MD, in an e-mail of her findings while working with Handicap International.

61 Reports of a foreign religious group approaching patients in hospitals to convince them to seek cure through rituals rather than medical treatment was neither investigated nor acted on.

most experienced and professionalized groups (military, Red Cross, MSF, among others) have developed their own guidelines, standards, and procedures. This situation is not specific to Haiti but is generic in all crises where assistance is on a massive scale.

Changes are overdue, as eloquently expressed in an article by several MSF experts (Chu et al. 2001):

> *"As an increasing number of actors are becoming involved in the delivery of humanitarian surgery, the need to establish a framework for quality surgical delivery is more pressing. The quality of surgical care may be regulated through a combination of structural, process, and output measures that could include minimum standards for safe surgery, the deployment of appropriately trained surgeons and anesthesiologists for these contexts, protocols for preoperative evaluation, intraoperative management and postoperative care, and standardized databases to record postoperative infection and mortality rates. A simple checklist for each patient can be utilized to ensure compliance. Standardizing data collection can help to evaluate surgical delivery".*

As the authors noted in their article, there may be resistance to such measures.

Triage of mass casualties

- Some form of triage was used by most of the foreign medical teams. Unlike other disasters, there was no alternative in Haiti as the number of casualties waiting on the front steps of the clinics or hospitals far exceeded the available resources.
- Criteria for triage varied widely. The purpose was to maximize the use of the resources and capacity of each health care provider.

The concept of triage originated in France during the late eighteenth century.[62] It focused primarily on mass casualty situations where a systematic sorting process sought to assign priorities in care in order to save as many lives as possible.

Triage is not just one concept. Today there are at least two different scenarios during which triage is applied: 1) at the scene of the mass casualty event, also called prehospital care, and 2) in health care facilities.

In the former, the first responder community selects those injured who will be given priority for primary stabilization and transportation to health facilities. Initial medical care might be provided at an advanced health post at the site of the emergency. This is only applicable in localized mass casualty incidents where a medical command center can be established. Its effectiveness lies in the limited number of patients and control of transportation/dispatch by receiving institutions. The dilemma is who is treated first or last.

62 Robertson-Steel (2006) states that Baron Dominique Jean Larrey, Surgeon-in-Chief to Napoleon's Imperial Guard, was the first to apply a process of sorting around 1792.

In health care facilities, injured persons have reached hospitals and health facilities (or the facility's location if it has been destroyed). They are often accompanied by relatives who are vocal in demanding attention. Contrary to what happens during normal situations, in which the severity of a patient's condition determines the priority of attention, in the event of a disaster, the imbalance between the demand and the available resources requires care providers to consider not only the severity of the patient's condition, but other criteria such as the prognosis and the benefit that the action taken (care and/or transportation according to available capabilities) will afford the patient. Those with a poor prognosis (likely to die, in most instances) or those who will not suffer irreversible damage if care is delayed, are placed on hold or denied access to the facility.

Therefore, triage must be more rigorous and selective to the extent that the magnitude of the disaster increases and the disparity between needs and capabilities and resources becomes greater. The dilemma under this scenario remains: Who is going to be treated? This is something not easily understood and accepted by patients and their relatives.

For more than 72 hours in Haiti, the process of transporting injured persons was massive, spontaneous, and chaotic. Hospitals and health centers were surrounded by injured persons and corpses taken there by the population. While local health facilities were not prepared for the systematic use of triage, most of the foreign teams and hospitals had some criteria for screening patients they would accept. Table 5.3 illustrates this point with findings from three hospitals.

Transporting the injured

Photo: PAHO/WHO, Victor Ariscain

Table 5.3 Triage experiences in selected health facilities following the earthquake in Haiti

	Local health facilities supported by MSF	Field hospital (Israeli Defense Forces)	Hospital ship (USNS Comfort)
Period of performance	Operative in Haiti before the earthquake and continues to be present in Haiti [a]	Started on Day 4 and continued for 10 days	Started on Day 8 and continued for 40 days
Criteria for accepting patients	"In the immediate aftermath . . . it was not possible. . . to carry out systematic triage due to the massive numbers of wounded people flooding hospital grounds" (MSF 2011)[b]	Patients with severe injuries (including open and infected wounds); patients with anticipated short-term treatment (up to 24–48 hours); and patients who had just been rescued by USAR (Merin et al. 2010)[c]	Only patients with earthquake-related injuries (e.g., complicated extremity injuries, obstetric cases, and maxillofacial injuries) (Etienne et al. 2010; Auerbach et al. 2010)
Criteria for denying care	No patients were rejected. Some patients were referred to Santo Domingo for advanced treatment and some severe burn injuries were referred to the USNS Comfort	Patients with brain injuries; paraplegia secondary to spinal injuries; low score in the Glasgow coma score. Attention to patients with crush injuries was initially denied, but this criterion changed one week later when dialysis equipment was available	Less severely injured patients who could be attended in other health facilities in Port-au-Prince Cases not accepted included: pelvic fractures, closed head injuries, complete spinal cord lesions, and cases requiring assisted ventilation (Auerbach et al. 2010)
Patients treated	5,707 major surgical procedures (first month: 2,386; second month: 1,902; third month: 1,419)	1,100 treated patients 242 surgical procedures under anesthesia were performed on 205 patients	821 surgical procedures on 446 patients (Ray et al. 2010)

a Two of the three secondary level health care structures that Médecins Sans Frontières operated in Port-au-Prince were destroyed; only one emergency facility was still functional.
b Within a few hours of the earthquake, more than 400 critically injured and dying patients arrived at once. Personnel focused primarily on minor wound dressings of injured persons, trying to organize triage, and providing immediate life-saving surgery and end-of-life-care.
c Patients with mild injuries (ambulatory patients) and pregnant women were referred internally to different areas.

Given the shortcomings in information management, it is impossible to establish the number of injured, the number accepted, and the number rejected for injuries classified as too severe, much less to estimate the subsequent morbidity and mortality. Under this scenario, it is therefore very difficult to determine the effectiveness of the implemented triage techniques in the number of lives saved.

What the triage clearly achieved is a better use of the very scarce operating facilities. Theaters and surgeons' time were optimized in most cases. It should be emphasized that surgery is only one critical step in the treatment process.

Independent teams have improved their own performance, but these are initial and facility-centered achievements.[63] The success of one team could imply the failure of other teams not equipped to provide post-operative care or referral with the consequent increase in morbidity and mortality. The impact of triage should also be seen within a health care network that shares information, resources, and capabilities.

In Haiti, a holistic view of the flow of casualties was missing.

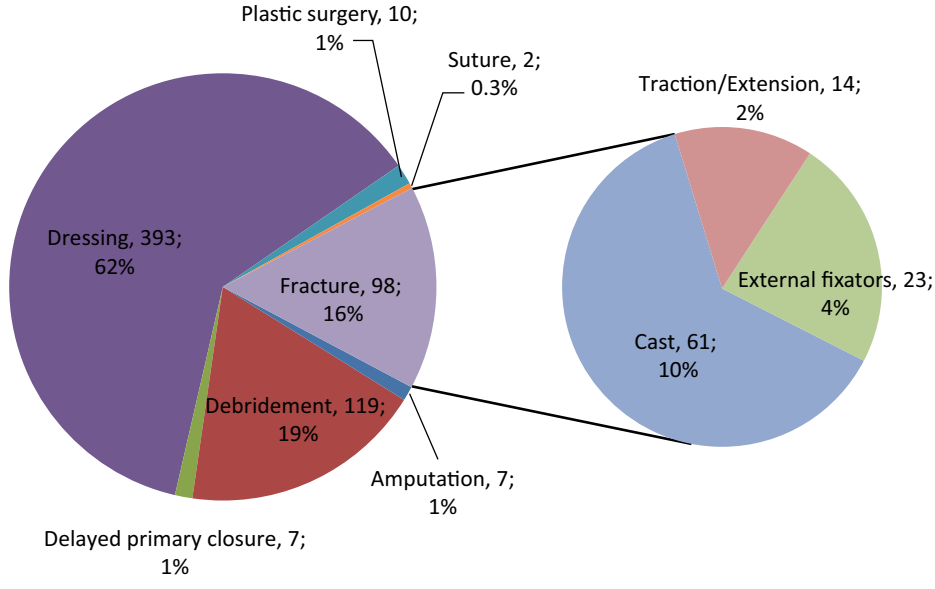
63 Government of Israel (2010), "Triage in mass causality events—taking stock of the Haitian experience" [unpublished].

Surgical approaches and issues

The 12 January earthquake generated many scientific peer-reviewed articles.[64] A significant number address the suitability of various techniques for anesthesia or surgery, subjects which are not part of the scope of this publication. Other topics include advances made in electronic management of medical files and patient registration under emergency conditions, the use of advanced laboratories, point-of-care technology for diagnosis, the application of portable diagnostic devices (ultrasound for instance).[65] The potential for robust, field-tested technologies is important for the future of disaster medicine in poor countries.

Several papers have been published that disaggregate cases by condition, but few offer details on the type of procedures or treatment. Figures 5.2 and 5.3, showing surgical and orthopedic interventions at the University Hospital and at MSF facilities, illustrate what appears to be a common pattern in the first weeks after the earthquake.

Figure 5.2 Features of trauma interventions performed at HUEH, Haiti, January–February 2010

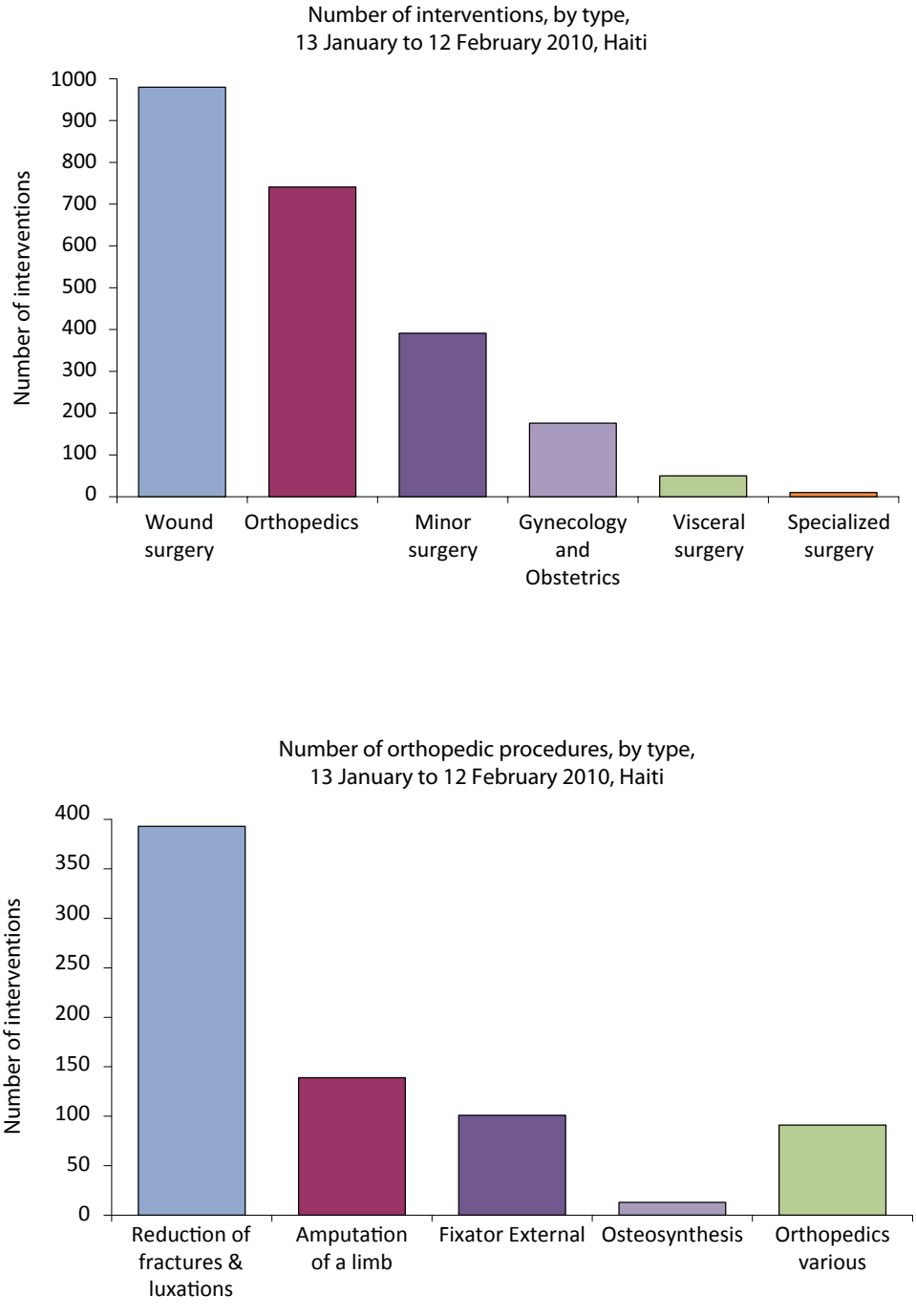


Source: Adapted from official data provided from the Swiss Development Corporation. Reproduced with permission.

64 As of August 2011, a Medline search on the Haiti earthquake produced 280 titles.

65 The use of health technology in humanitarian response was the subject of a one-day summit between civilan and military experts and NGOs. Baltimore, Maryland, 29 September 2010.

Figure 5.3 Surgical and orthopedic procedures performed in MSF facilities



Source: Axelle Ronsse, Médicins sans Frontières, "Surgical response to the 2010 Haiti earthquake" (powerpoint presentation). Used with permission.

Four medical conditions call for special attention: crush syndrome with its lethal renal failure, spinal cord injury (SCI), amputations, and, more generally, fractures. Interestingly, the general proliferation of humanitarian agencies has also resulted in the emergence of new or increasingly proactive partners offering highly specialized expertise and assistance for some of those conditions.

The "renal disaster"

The expression "renal disaster" used in a scientific article on crush syndrome (Sever, Lameire, Vanholder 2009) illustrates the potential for loss of lives due to shortcomings in diagnosing and treating severe cases of crush syndrome. As noted by the same authors: "Although many crush patients can survive within the first hours or even days until rescue, death will be inevitable for most of them after extrication if emergency measures for the prevention of [acute kidney injury] AKI… are not taken."

Crush syndrome patients and, by extension, the renal victims are usually overlooked or neglected. "According to the general perception, they constitute a relatively minor group requiring complex and labor-intensive therapeutic measures and are rarely included in governmental or local disaster plans" (Sever, Lameire, Vanholder 2009). Informal and empirical enquiries by PAHO/WHO in past disasters in Latin America have shown a lack of awareness of this condition. Either Latin American earthquakes did not produce many crush syndromes or the condition was under-diagnosed.

The Renal Disaster Relief Task Force (RDRTF) of the International Society of Nephrology was established to provide specialized care (including dialysis) for this special group of patients. Strong on expertise but weak on logistics and operational skills, the group partnered with MSF.

A dialysis center with eight units was operational in Haiti on Day 5, in time to prevent fatalities (which generally occur between 4 and 10 days after the trauma).[66] Efforts by the task force to publicize their availability and expertise to other medical partners in Port-au-Prince were limited. In particular, they did not routinely participate in the coordination meetings, and as a consequence, did not receive a large number of referrals to their facilities (only 19). Among the many important announcements of available services published in the Health Cluster Bulletin, no mention was made of crush syndrome and the existing resources for diagnosis (including point-of-care laboratory devices) and treatment. The lack of participation of the task force in the cluster meetings resulted in a facility that could accommodate up to 200 patients a day running at 20% of its capacity.[67]

As expressed in a letter to the editor of *Lancet* by the Task Force, one of the major lessons it learned from the Haiti disaster is the need for better interagency communication (Vanholder et al. 2010). In this particular case, the full-time assignment of a liaison officer/technician to participate in the numerous meetings would have been cost-effective. This is one example where it can be demonstrated that participation in coordination meetings would have saved more lives.

66 Immediate deaths following release from entrapment are caused by hyperkalemia.

67 There are no data on the number of untreated crush syndromes in Haiti, but it is estimated to be several times more than the 200-patient capacity of the dialysis center.

Another observation is the need for special tagging and medical supervision of patients undertaking periodic dialysis. When mixed with other patients, treating doctors and even visiting medical volunteers from other groups were prescribing treatment incompatible with dialysis or even selecting the patient for immediate transfer to other facilities.[68]

Spinal cord injury (SCI)

Prior to the earthquake, the mid-term survival rate of Haitian patients with SCI was believed to be almost nil. In the aftermath of this disaster, over 150 such cases reached medical facilities, passing through or bypassing the triage system designed to select those patients with more chance of survival at the lowest cost in medical resources, a criterion SCI does not meet. In past disasters, in medically under-developed countries, the prognosis of those patients would have been grim.

In Haiti, early advocacy for action was published in leading professional publications (editorials, invited comments, and forums). Appeals for specialists and physiotherapists were launched and heard. Several groups dedicated special resources to those cases. Among them were the Project Medishare of the University of Miami, which included a spinal care unit in the tent hospital (Ginzburg et al. 2010; Wang 2010); the Haiti Hospital Appeal,[69] a small NGO that transformed their soon-to-be-opened pediatric facility into an adult rehabilitation center for up to 22 SCI (Landry et al. 2010a; Stephenson 2011); Healing Hands for Haiti International, a well-established rehabilitation NGO; and finally, the U.S. Navy hospital ship, the USNS Comfort (Landry et al. 2010a; Burns et al. 2010). Later, other organizations such as the Toronto Rehabilitation Institute assisted with specialist SCI input.

While a spinal cord injury once practically condemned the patient to death within a few years, patients in Haiti are now receiving more appropriate care. It is an area where the disaster has triggered a permanent improvement of the health services.

Treatment of fractures

As noted by physicians working with Handicap International (O'Connell et al. 2010, 8), fractures were the most common diagnosis:

> *"All modes of fracture management have been reported, including: traction, closed reduction, open reduction, internal fixation, external fixator, slab cast and splint, and complete circumferential casting. Lack of imaging capacity in many facilities limited diagnostic abilities, and doctors noted that some fractures had to be diagnosed by palpation only. Other centers ran out of film and processing agents, resulting in similar limitations".*

68 In the first weeks, it was not uncommon for foreign physicians to repeatedly visit a health facility to examine a particular patient and leave instructions for the facility's local nursing personnel.

69 See www.haitihospitalappeal.org.

The result of this situation is that months after the earthquake, many of the fractures required a second operation for realignment of the bones.

One issue still debated among emergency professionals is the use of external versus internal fixators, the latter requiring sterile operating conditions rarely found in disaster conditions (Lebel et al. 2011).

Amputations

Amputations may save lives, but they also threaten the social life and economic survival of the patients. It is a procedure that should not be taken lightly. Rehabilitation and support services are below standard in Haiti, as in many countries. Disabled persons, whatever the cause of their disability and their prior status, are rejected by society. They are considered as "punished by god for their sins" and are hidden at home.[70] Undertaking an amputation has a very high social and human cost.

After the Pakistan earthquake in 2005, unpublished concern regarding possibly unnecessary amputations had already emerged. In on-site interviews, some medical teams were seemingly presenting the high number of amputations made under difficult field conditions as indicative of the heroism of their intervention.

In Haiti, this issue became publicized following the preliminary report from Handicap International projecting the number of amputees to be over 2,000 and possibly up to

70 "In a country where 10 percent of the population is disabled, you could spend a week here and never see any [disabled persons]," said Josue Joseph, a spokesperson for the Haitian Secretariat for Integration. Accessed at: www.terradaily.com/afp/100609015616.nv60byyh.html, June 2010.

Post-operative care

Photo: PAHO/WHO, Victor Ariksain

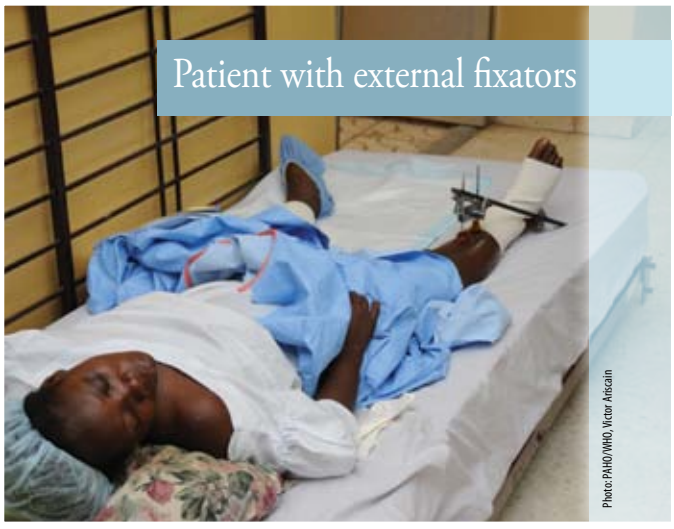

Patient with external fixators

Photo: PAHO/WHO, Victor Ariscain

4,000 (O'Connell et al. 2010). Later this figure was adjusted to 1,200–1,500. For the purpose of illustration, MSF, the largest provider of emergency surgical care in the first weeks, reported having performed 173 amputations on a total of 147 patients (16 of these patients underwent multiple interventions, possibly involving two separate limbs). Medical teams at the border with the Dominican Republic reported 217 amputations.

As noted in the preliminary survey by Handicap International (O'Connell et al. 2010), there are many reasons why amputations are performed, including: as primary intervention for complex severe wounds and fractures making the limb unviable or as "secondary treatment for infected wounds, compartment syndromes, and poorly treated fractures".

Techniques for amputations were also questioned. Use of the so-called guillotine technique guarantees the need for repeated, corrective interventions on the stump to accommodate prosthesis. This technique is much more rapid (minutes instead of hours) and does not require much skill or instrumentation. Conservative treatment of severe infection requires time-consuming and sustained nursing care (a profession under-represented in the humanitarian response), and its success is far from certain. Most of the interlocutors recognized that under the extreme workload and lack of adequate facilities, often there were no better options than to amputate a limb that could have been saved in better equipped facilities (following the principle of triage to maximize the benefits).

The level of amputation is paramount for indications for prosthesis. In 107 cases reviewed by Handicap International, above the knee amputations represented the largest proportion of lower limb amputations (63%) versus 37% for amputations below the knee (see Table 5.4). There are insufficient data for comparison with other disasters.

Table 5.4 Level of amputation in patients injured in Haiti earthquake

Level of amputation	No.	Percentage of amputees
Below knee	27	25%
Above knee	46	43%
Upper limb	17	16%
Unspecified	17	16%
Total	107	100%

Note: Data from Handicap International (O'Connell et al. 2010).

Publicity about this issue had some benefits for the population and offered some lessons:

1. First, it is crucial to centrally register the number of amputations, monitor the use of this procedure, and review their indications.

2. A key step in developing local health systems is the establishment of surgical outcomes monitoring. Such monitoring can optimize patient follow-up and foster professional accountability for the treatment of amputation patients in disaster settings and humanitarian emergencies (Knowlton et al. 2011).

3. The number of amputees is not the same as the number of those wanting or requiring prostheses. Indeed, some amputations may not be suitable for prosthesis and some amputees might prefer to capitalize on their disability. In 2010, Healing Hands for Haiti partnered with Handicap International to provide some 500 prostheses. About half of the recipients had undergone amputations prior to the impact.

4. This intervention should require second medical opinions and, when possible, informed consent of the patient. That was standard procedure for many, but not all the medical teams in Haiti.

5. Finally, rehabilitation specialists must be involved early in treatment, ideally before amputation, and should educate the surgical team in prosthetic considerations. Mental health specialists must be included to help the patient with community reintegration.

Reconstructive surgery

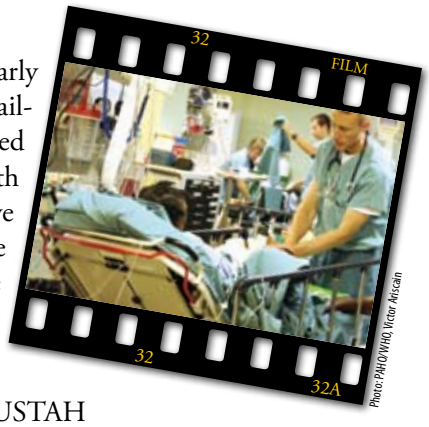


Photo: PAHO/WHO, Victor Ariscain

The surgical reconstruction of major injuries is only rarely addressed in the early response phase of earthquakes. In Haiti, this specialized service was made available but remained in short supply despite the massive level of resources deployed for this event. Rather remarkable is the contribution made to treat survivors with craniofacial injuries who required complex and multiple procedures to achieve optimal results. Thanks to the modern facilities on the USNS Comfort, some 34 cases were improved, requiring 93 craniofacial surgical procedures. Average patient hospitalization time was 17 days (ranging from 5 to 38 days) (Ray et al. 2011). These surgeries were also performed at a Brazilian field hospital.

Proximity to North America and French territories, the presence of MINUSTAH facilities, and the very rapid mobilization of some other military facilities were key factors leading to a quality of orthopedic and reconstructive care that cannot usually be expected in emergency response. It is a performance that has rarely been seen in disasters in more remote places.

Post-operative care, referral, and foreign medical evacuations

- In most disasters, there is much more assistance for surgical care than for follow-up care of surgical patients: too many doctors and not enough nurses.
- Referral of patients to different levels of care was hindered by logistical constraints but above all by a lack of information on specialty services and space available as well as the procedures and criteria for patients' referral.

Post-operative care was an issue from the first few days of the response until late during the recovery. Within a week, it was upgraded to one of the top priorities. Not all foreign field hospitals and medical teams addressed this issue in the same manner. One of the

most active field hospitals strictly applied the triage principle to take full advantage of their surgical resources. Turnover was maximized and patients were triaged to achieve the most efficient use of operating theaters. Patients who underwent surgery were discharged, on average, within 39 hours of the procedure.[71] No provision was made for post-operative care, which was not considered a function of this facility.

Field hospitals concentrated on what they do best and what they are equipped for: providing immediate or delayed surgical care. Follow-up and time consuming post-operative care were to be provided by less sophisticated teams or facilities. Unfortunately, those facilities were either not available or overburdened. Although there are no data on the impact of this situation on the outcome of patients, there were doubts about this approach under conditions prevailing in Haiti: that is, no effective coordination among actors, and local health authorities who were not in a position to assume strong leadership. Most components of the medical response system worked efficiently but independently of each other, ensuring serious problems in the overall chain for complete care. There were many examples of excellence, but they were unlinked, "bubbles" of excellence (see box).

Post-operative care is a time-consuming activity requiring a significant number of auxiliary personnel, nurses in particular. There is no lack of interest and dedication on the part of this profession, as was evident in Haiti.[72] Following the earthquake in Pakistan and the Indian Ocean tsunami there was also an insufficient number of nurses compared to the number of doctors volunteering their services. There is often a chronic shortage of nurses in donor countries and institutions providing volunteers.

A successful partnership delivers post-operative care

One success story was the partnership developed between a hospital in Jimaní (Hospital Buen Samaritano), an NGO in Haiti (Love a Child), and PAHO/WHO. It provides a model for planning follow-up of patients.

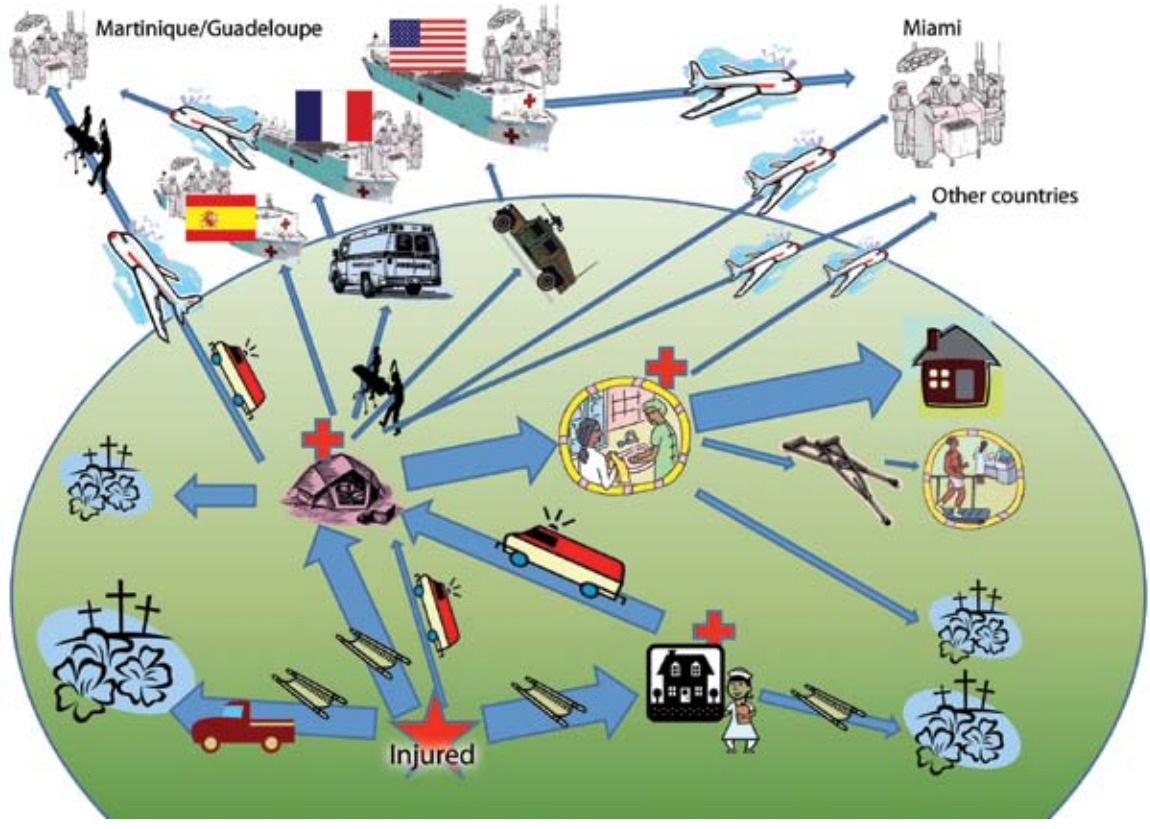
- From Day 3, the pressure on Dominican medical facilities clearly pointed to the need for arrangements for post-surgery care, preferably in Haiti.
- On Day 4, the Dominican Ministry of Health and PAHO/WHO approached NGOs established in Fond Parisien, on the Haitian side of the border, about developing a facility for discharged surgical patients and their families. A school designed for 400 students and managed by Love a Child was identified as a first-line facility for post-operative treatment of patients discharged from local and Dominican facilities.
- Over the following days, equipment, mattresses, and other supplies were provided by the Dominican Ministry of Health and PAHO/WHO.
- On Day 8, the facility received the first 65 patients.
- On Day 9, the Hospital Eau de Vie in Fond Parisien was evaluated and strengthened to serve as a back-up facility, should the 400 beds of the converted school be insufficient.

To transform an idea into a concrete achievement in the space of one week is a noteworthy accomplishment, made possible by informal partnership between a government, an NGO, and a UN organization, unhindered by bureaucratic obstacles.

71 Government of Israel, 2010 (unpublished).

72 Of the 280 articles registered in the U.S. National Library of Medicine's Medline database (searched by the author using the keywords "Haiti earthquake" on 7 August 2011), 43 were either on nursing support to Haiti or were published in a nursing journal.

Patient flow: evacuation, referral, post-operative care



Patient referral

Post-operative care is only one aspect of the broader issue of referral of patients between facilities.

The flow of patients between levels of care was particularly problematic in Haiti. Problems ranged from lack of transportation to lack of knowledge about options.

Medical teams providing primary or secondary care often did not know of the potential capacity of more sophisticated facilities. Extraordinary work pressure considerably limited the communication between medical teams and hospitals. Few could spare staff to participate in the numerous coordination meetings. The underutilization of the dialysis capacity mentioned earlier is only one example.

A testimony from a trauma expert is revealing:

> *"The most challenging aspect was a clear plan conveyed to all the responders/groups, as to who was able to manage what, and how to get the patients referred and transferred. A good example is spinal cord injury. It was my experience that at many sites where SCI patients were identified (often lying on mattresses in the street/parking lots, or even on sheets of*

plywood), the doctors/nurses caring for them did not know where to send them. Having been at many of the sites, I knew which centers were accepting SCI patients, and was able to assist in triage, referral and transport organization when I 'found' SCI patients at other sites. This was a very one-off type of approach, and even at centers accepting SCI patients, if the 'wrong' person was at triage when the SCI patient arrived, they could have been turned away." [73]

It was not until four weeks after the impact that a one-page listing of resources for referral was made available. This list offered names and sometimes addresses of specialized services such as burn treatment, pediatric surgery, dialysis, neurosurgery, ophthalmology, cranio-facial surgery, medical evacuations, or simply obstetrics, a need often overlooked in a trauma-focused environment. In future disasters, disseminating a listing of referral facilities should be one of the first priorities.

Problems were not limited to referral from lower level to tertiary level but also in the reverse. The USNS Comfort hospital ship found it difficult to identify receiving institutions for their patients requiring less acute but longer term follow-up care.

73 Personal communication with Dr. Colleen O'Connell, MD, PMR, 31 January 2011.

Flow of patients

Photos: PAHO/WHO, Victor Ariscain

Foreign medical evacuations

Evacuation abroad should be an option of last resort to be adopted cautiously and under strict oversight of the national health services. Preference should be given instead to strengthening the capacity of local counterparts.

Unlike the disasters in Indonesia, Sri Lanka, Pakistan, and Iran (Bam earthquake), there was no back-up facility inside Haiti where patients could be evacuated. Evacuating patients into foreign facilities is entirely distinct from redistributing patients within national health services as was done massively in Iran (15,000 evacuated in the matter of a couple of days)[74] and in Sri Lanka.[75]

Transfer of Haitian patients to foreign facilities (mostly in the Dominican Republic, United States, and French territories) was done extensively in the first few days. Quantified data, as for many other aspects of the relief operations, are not easily available. Recipient countries and hospitals often used medical evacuation as a back-up alternative or support for their medical facilities in the field. Criteria for selection, if articulated at all, were not broadly publicized or known.

Selective evacuations of spinal cord injury cases to foreign countries took place early after the impact, but they were soon curtailed (in part due to the realization that those patients would be occupying expensive beds for an open-ended period of time). Returning those chronic patients to Haiti where a suitable receiving facility could not be found was ethically impossible. Economic considerations, especially for institutions caring for patients requiring expensive, long-term care, should be considered at an early stage.[76]

In several instances, relatives did not have information on the whereabouts of injured family members who were evacuated. There were also the issues of immigration and subsistence for the patient's family in the host country.

Foreign medical evacuation of the injured is an expression of solidarity with the affected population but it often causes more problems than anticipated. As experienced in receiving countries/territories such as Martinique, accepting a patient requiring long-term care is the easiest part, deciding to return him/her raises ethical issues.

National authorities of the affected country or an agency they designate should play a monitoring/tracking role, if not an approval role, in this process. It is an approach that should not be left entirely to the initiative and criteria of foreign teams. Recipient institutions should remain accountable to both families and health authorities of the affected countries and be unambiguous regarding the duration of their commitment.

Photos: PAHO/WHO, Victor Ariscain

74 Almost all injured in the Bam earthquake were evacuated before the first foreign field hospitals arrived.

75 All nationals injured in the tsunami were treated and referred to third level care in departmental facilities. None needed to be evacuated to the 2,000-bed General Hospital in the capital city, Colombo.

76 In the U.S., the Government concluded a formal agreement with receiving institutions to reimburse 110% of Medicare rates for approved Haitian patients.

Disposal of bodies

- In almost all large-scale disasters, mass burials are carried out not for health reasons but for the lack of other practical alternatives. The psychological cost is unknown.
- There are no NGOs and very few bilateral teams with skills and resources for the identification and respectful management of dead bodies. It is a humanitarian niche that has not yet been filled.

There is now extensive literature about the proper disposal of bodies following sudden-impact natural disasters. The humanitarian community seems to have accepted the fact that bodies of victims killed by trauma (earthquake and conflicts) do not represent a significant risk for communicable disease. It is a major step toward more rational and effective public health management of scarce resources.

Not long after the Indian Ocean tsunami and in the aftermath of hurricanes in Haiti, officials, including from experienced relief organizations, were spreading the

Disposal of bodies and debris

Trenches for mass burials

Photos: PAHO/WHO, Victor Ariscain

fear that uncontrollable epidemics were the unavoidable result of decaying bodies. Mass burials, cremation, or other "disinfection" techniques are not justified from a health point of view. It is remarkable that, after an earthquake producing such a large number of bodies left unattended for days, no similar unfounded announcement was made locally by senior health or humanitarian officials. This should be credited to the early formal announcements by WHO that dead bodies are not a source of large epidemics. Nevertheless, this myth was still proliferated in mass media in Europe and Latin America.

Haitians hold their deceased family members in high regard and perform elaborate, costly, and extended funeral rituals to assure the goodwill of the deceased. Deceased family members are still considered to be part of the family. As stated in the WHO publication *Culture and Mental Health in Haiti* (2010a, 20), "The issue of proper death rites and burial is particularly important in the wake of the earthquake. Many people have not had the opportunity to find and bury their lost loved ones or had to abandon them, or see them buried in a mass grave with no ceremonies. As a result, there may be an increase in ambiguity and uncertainty over the fate of the dead…".

PAHO/WHO guidelines (2004) recommend that bodies be stored, identified and returned to the family to allow for grieving and ritual burial. Given the magnitude of the losses and the urgency of other life saving measures, this was *not* a practical option in Haiti. Nor was it following the disasters in Pakistan, Indonesia, and Sri Lanka. Thailand, however, was an exception.[77]

The morgue in the University Hospital which was designed to handle around 30 cadavers rapidly exceeded its capacity and was overwhelmed, according to the report of its Director, "by up to 10,000 bodies". At the same time, MINUSTAH reported on Day 3 that it had collected and buried more than 13,000 bodies in mass graves. How accurate those figures are considering the chaotic and emotional conditions remains to be seen. They are nevertheless illustrative of the overwhelming task that lay ahead. Municipal and state authorities mobilized a fleet of private trucks and worked day and night filling improvised mass burial sites outside the city.

No statistics and sparse documentary evidence (photos or documents) were collected to allow for delayed identification of the remains. The seeming acceptance of this hasty process by Haiti's deeply religious people was remarkable and reflects the sense of shock and the population's focus on the survival challenges ahead. Long-term psychological impacts are unknown.

77 In Thailand, almost 5,400 bodies were recovered after the tsunami. Special efforts, lasting over one year, were made to identify the deceased, including by photos, finger printing, and DNA analysis. One factor influencing these efforts was the presence of almost 2,000 foreigners among the victims (Sribanditmongkol et al. 2005).

Chapter

6

Beyond trauma care

The delayed response (up to 3 months)

During the first two weeks after the earthquake, there were many more health related activities than just rescuing trapped victims and providing trauma care. Water and sanitation, food and shelter, and access to primary health care were among the many needs of the affected population. They became the top priorities of humanitarian agencies once the life-saving interventions were completed, together with surveillance of communicable diseases, rehabilitation, and many-cross cutting issues.

This publication cannot review or analyze in detail the many challenges faced and solutions found for those broad social issues. This chapter addresses selected topics of particular public health interest for future mass-scale disasters.

Clinics and mobile intervention teams in settlements

The terms "clinics" and "mobile teams" covered a large range of services: from the well-established and fully staffed temporary or fixed facility in a large camp to the small tent where a nurse or a doctor occasionally provided minimal care to patients.

The Ministry of Health of Haiti, itself recovering from the impact, realized that it had in fact very little influence on the immediate trauma care process, which, as shown in Chapter 5, had its own dynamics and rules. Very early on, the Ministry centered its

attention on the establishment of "mobile clinics" to provide primary health care to the displaced populations or to provide a temporary substitute for the facilities destroyed by the earthquake. A chronology of the Ministry's statements regarding the establishment of primary health care clinics after the earthquake is included in the Box.

Ministry of Health targets for primary health care following the earthquake

Within a few days of the earthquake, the President of Haiti established a National Commission for the Management of the Crisis, which included the Ministry of Health. The Ministry's national priorities included "establishing mobile clinics in all the spontaneous camps that have been created, ensuring obstetric care and delivery kits as close to the population concentrations as possible and ensuring that the delivery of health care services is properly coordinated."

- On 21 January (Day 10), the Ministry of Health further asserted its leadership and distributed guidelines on what should be available at primary and secondary level clinics. NGOs and organizations were asked to provide their comments on the basic package proposed by the Ministry. A special working group on primary care/mobile clinics was meeting twice a week in the Ministry.
- On 25 January (Day 14), the Ministry requested partners to focus their attention on primary health care, health centers, and hospitals. The initial life-saving phase was ending. All health partners in Haiti supported this strategy, at least in principle. In practice, the decision to locate those services on the premises of existing health facilities was ignored by many NGOs.
- On 2 February (Day 22), the Ministry clarified its vision of post-earthquake care, defining the services and human resources required at the three levels of care (see Table 6.1).
- On 8 February, the Health Cluster reported: "mobile clinics are being deployed in 250 spontaneous settlements as identified by the Government."

Source: Health Cluster Bulletins, January–February 2011.

The focus on primary health care was not limited to the area directly affected by the earthquake but also addressed the needs of the many people who were displaced into other departments. On 25 January the Ministry made this statement: "health facilities in the departments outside of the capital are overwhelmed due to internally displaced persons and they do not have the capacity to treat the number of people arriving". The next day, the Ministry reiterated its message to partners: "encouraging Health Cluster partners to move outside the capital area to provide needed services as well as mid- and long-term commitments for health activities" (Health Cluster Bulletin No. 7). This was an important contribution to the linkage of relief with development.

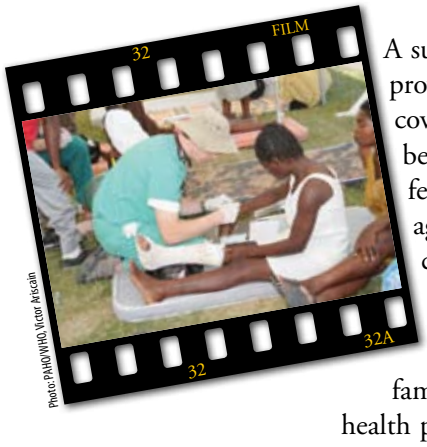
There was no shortage of plans and strategic documents in the response to the earthquake, but they were not always followed by action. Was this concept of mobile clinics implemented and put into practice?

The Ministry defined the minimum package of services it considered necessary at the primary care level (see Table 6.1). To determine the effectiveness of the mobile clinic strategy, PAHO/WHO and the International Rescue Committee (IRC) commissioned Management Science for Health (MSH) in March 2010 to identify sites where there was still a need for mobile clinics.

Table 6.1 Minimum package of services for first level clinics (mobile or fixed)

Components of care	Human resources
• Treatment of minor wounds • Prenatal care, normal deliveries, and post-partum care • Contraception • Treatment of childhood illness (diarrhea and dehydration, fever and nutritional surveillance) • Vaccination program • Treatment of malnutrition • Treatment for acute and chronic illness (e.g., asthma, hypertension) • Reception and immediate transfer of rape victims; record cases with allegations of violence • Regular treatment for HIV and distribution of ARVs	A multidisciplinary team, including: • Medical doctor (optional) • Nurses • Students completing training in the health sciences • Social worker • Psychologist/Social motivator

Note: Translated and adapted from *Provision des services dans les camps/zones de regroupement de la population* (MSPP 2010e).



A survey of 206 of the largest temporary settlements (out of a list of 400 camps provided by IOM) was carried out from 18 to 29 March to determine the existing coverage and delivery of a minimum package of services (Table 6.2). However, it became clear that none of the clinics (fixed or mobile) serving the camps was offering the full set of services. For the purpose of the survey, the minimum package was redefined to include six services: (1) general consultation, (2) prenatal consultation, (3) pediatric consultation, (4) neonatal care, (5) family planning, (6) vaccination.

The survey results were mixed. Out of the 206 settlements hosting 163,000 families, only 72 had local access to health care, i.e., 35% coverage. Of the 79 health posts, 46% of the structures were mobile clinics.[78] Only 10% offered the full minimum package (for all six services as redefined for the survey). The distribution of services is shown in Table 6.2.

78 Some of the larger settlements had two health centers/clinics.

Table 6.2 Primary health services offered at 79 health posts surveyed in Haiti, March 2010

Services provided	Point of health service delivery (%)
General consultations	96
Pediatric consultations	94
Prenatal consultations	87
Neonatal care	71
Immunizations	43
Family planning	39

Source: Management Science for Health (MSH) (2010).

Official targets may not have been reached, but there is a consensus that the level, quality, and proximity of primary health care offered were generally superior to that available to most of the affected population prior to the disaster. There were exceptions: Antenatal care was mostly done without any lab testing;[79] too many clinics used donated drugs not in the essential drug list; and foreign health workers at clinics worked with translators and did not properly understand the complaints of the patients. Much more important, mobile clinics were often not linked to existing health facilities. This situation hampered the ability to rebuild the health system and to provide care to people closer to their communities.

How sustained this effort was is another issue. A survey commissioned by the Ministry of Health in July 2010 found that out of 286 institutions/mobile clinics considered for the survey sampling, only 171 could be found or were operational at the time field data were collected (MSPP 2010b).

Free care policy

Provision of care and medicines was free of charge for the duration of the emergency.[80] This was an important departure from the government policy of fee-based care, which is promoted by international financial institutions. This policy of free care has been extended de facto for several months, although no official policy document was issued by the Ministry of Health.

Promulgating a free care policy had its down side. The fees were used by public health facilities to recruit additional staff and subsidize some of their services. Without this compensating mechanism, the free care policy was detrimental to government facilities that did not have free drugs and funding for basic supplies and services (cleaning material, paper, Internet and telephone fees). The power generators in facilities were also often paid for with these fees. This worsened the situation of public facilities. Communal health offices that received 5% of benefits were in a difficult position. The long-term implication of free basic services is addressed later in the section on the linkage between relief, rehabilitation, and development (LRRD).

79 Before the earthquake, hemoglobin and urine tests, and tests for HIV and syphilis were free of charge in many dispensaries.

80 Interviews suggested that the free availability of medicines did not have an economic effect on the private pharmacies, many of which were impacted directly by the earthquake. Most of the income of private pharmacies comes from the wealthier segment of the population. Some even believe that free access to essential drugs for the poorest sector of the population may create awareness of the value of modern drugs and, therefore, a new market.

Post-trauma rehabilitation

- Rehabilitation must be planned very early.
- A survey and campaign should be initiated in the first few days after impact.

The number of people potentially in need of rehabilitation was high; according to Handicap International estimates "at least 7,500 persons may suffer permanent disabilities if not treated correctly".[81]

The strengths of Haiti in this area at the institutional and legislative levels were considerable. Haiti ratified the UN Convention on the Rights of Persons with Disabilities, a national council for rehabilitation was established *(Conseil national pour la réhabilitation des personnes handicapées)*, and a Secretary of State for the Inclusion of Disabled Persons (SEIPH) was created in 2006, but no implementing legislation had been approved. Following the earthquake, there was a rehabilitation working group with 55 agencies declaring activities or interest in this topic.[82]

Among the obstacles was the "inadequate post-operative care. About 10% of the patients required stump revisions to enable a prosthetic to be fitted."[83] The conditions under which initial amputations were performed are frequently cited as the cause of this. A more systemic problem is the lack of data and information on disability prior or after the impact.

Disasters also provide opportunities. The public debate on amputations and the cooperation on spinal cord injury had some positive results leading to an animated but overdue discussion of the issue among professionals.

High visibility of the issue is credited for dramatic public and government support or even reversal of individual attitudes and behavior. With the earthquake, both the poor and privileged suffered from disabling injuries. Persons with disabilities who had been hidden from sight and discriminated against are now more readily accepted. Government institutions have been strengthened, and supportive legislation, in draft form before the impact, is moving toward adoption.

There are several important lessons:

1. The rapid survey carried out by Handicap International was instrumental in bringing about action on the part of the international community and the national authorities. It is one example of an assessment that carried weight in decision making.

2. Success brings its own set of challenges, and it must be managed. A decade ago, the fitting of prostheses was the domain of a very limited number of agencies (fewer than five) who were accustomed to working together. After the earthquake a reported 38 agencies entered this field in Haiti; not all were competent and well equipped. Patients visited several agencies, were discouraged by unavoidable delays in prosthetic design, or were influenced by rumors about a better provider.

81 Calvot and Shivji (article forthcoming).
82 PAHO/WHO mission report, 29 March–9 April 2010.
83 Calvot and Shivji (article forthcoming).

3. The donations from the public or donor agencies must be appropriate for local conditions. Electric wheelchairs, of great assistance in developed countries, are unsuitable for Port-au-Prince where many urban roads require four-wheel drive in normal times and are unfavorable for pedestrians, especially for the disabled.

4. International medical and allied professionals need to be prepared to provide continuity and consistency and rapidly educate local staff (especially in the newly recognized specialty of spinal cord injury). It is also imperative that educators speak the local language to reduce misinterpretation and misinformation.

Communicable diseases control

Health officials, humanitarian agencies, and mass media used to overemphasize the risk of outbreaks following sudden-onset disasters. Massive outbreaks predicted in the aftermath of past earthquakes have failed to materialize in the last 40 years. Declarations on the inevitability of devastating epidemics often result from ignorance of past history, but there are cases when calculated misinformation has been used to mobilize resources for health activities (this occurred in the response to the tsunami in 2004). Unnecessarily alarming an already traumatized public is counterproductive, and when deliberate, it is unethical.

Over the last two decades, PAHO/WHO and other agencies have conducted an educational campaign to demystify the topic of disease outbreaks after disaster and to stimulate a more objective and balanced approach to preventing them. On one side, epidemics remain a strong possibility in the absence of any preventive measures. Risk factors include displacement of populations, contamination of water, overcrowding in settlements, and deteriorating sanitation. Dead bodies are not one of those factors (Watson et al. 2007). On the other side, public health measures are implemented more effectively and efficiently because both the public and authorities have a deep-seated fear of epidemics even when these fears are not exacerbated by humanitarian actors.

Emergency surveillance and early warning systems are the first line of defense against communicable diseases and must be carried out flexibly and rapidly after the impact.

Emergency post-earthquake surveillance

An emergency surveillance system must:

- Start within the first few days of the event;
- Include sentinel stations among medical humanitarian actors;
- Be simple, by focusing on a very limited number of the most critical conditions (syndromes).

A surveillance system should be complemented by an alert system where all partners can directly report abnormal health situations.

No major outbreak was detected after the earthquakes in Haiti and Pakistan or after the tsunami in Indonesia and Sri Lanka.

Before the 12 January earthquake, the surveillance system in Haiti focused on six notifiable diseases: acute hemorrhagic fever, suspected meningococcal meningitis, suspected diphtheria, suspected acute flaccid paralysis, suspected measles, and bites by animals suspected of having rabies.

An improved system was required for the emergency. It had to be better adapted to the needs and concerns in disaster situations, more flexible, and capable of being rapidly analyzed and disseminated.

It took 13 days to launch this system: Interviews with PAHO/WHO epidemiologists present during the impact permit a reconstruction of the steps for establishing an emergency surveillance system (Table 6.3).[84]

Table 6.3 Chronology of actions establishing emergency surveillance system, January 2010

Day of emergency	Actions
Day 1, 12 January (6PM)	Evacuation of PAHO/WHO offices and recovery of key materials and communication equipment.
Day 2	No information; confirm welfare of staff (accounting for staff, food, accommodation). Decision to move PAHO office to PROMESS warehouse.
Day 3	All staff (national and international) accounted for (no casualties). Attempted visit to the National Laboratory (Epidemiology headquarters) – all roads blocked.
Day 4	Contact with public health authorities at PROMESS. Visit to the National Laboratory; found to be intact but no personnel present.
Day 5	National Laboratory premises occupied by two foreign field hospitals. Meeting with National Laboratory Director and U.S. Centers for Disease Control and Prevention (CDC).
Day 7	Formal start of an ad-hoc working group to plan a surveillance system, including Ministry of Health, PAHO/WHO, CDC, MSF (Epicentre), Cuban, Chinese, and Taiwanese epidemiologists, etc.
Day 12	Formal launch of National Surveillance System.
Day 13	Set up surveillance working group within the Health Cluster structure (40 participants in daily meetings).

An ad-hoc international working group agreed on the 25 conditions for which new occurrences must be reported nationwide (see Table 6.4). It is now recognized that the number was too high and included conditions of increasingly marginal relevance as time elapsed (for instance, new amputations or crush syndromes). This is a common result of decisions taken by consensus in committees.

84 The Dominican Republic established its own surveillance and early warning system in Jimaní and neighboring provinces. Within a few days, the system was in place. The Dominican Republic benefited from a more manageable localized emergency and the full backing of its government, which was unaffected by the earthquake.

Countrywide, 51 sentinel stations were selected from the 94 pre-existing health facilities affiliated with the U.S. President's Emergency Plan for AIDS Relief (PEPFAR). The selected sites were due to report daily by e-mail or telephone on new occurrences of the 25 specified reportable conditions. The level of reporting was variable but generally was low. Daily reporting was too demanding even for facilities not primarily involved in humanitarian response.

Table 6.4 Post-earthquake reportable conditions; Haiti

Infectious diseases	Non-infectious diseases	
	Non-trauma	Trauma related
• Fever of unknown cause • Suspected malaria • Suspected dengue fever • Acute hemorrhagic fever syndrome • Acute watery diarrhea • Acute bloody diarrhea • Suspected typhoid fever • Acute respiratory infections • Suspected measles (fever and rash) • Tuberculosis • Tetanus	• Acute malnutrition • Skin disorder • Renal failure • Pregnancy complications or 3rd trimester without previous care • Mental health or psychological health • Chronic diseases not accounted for in other conditions • Other, not specified	• Trauma • Fracture • Cerebral concussion from head injury • Laceration from weapon or dagger injury • Burns • Infected wounds • Crush injury syndrome • Amputation • Other, not specified

On 24 April (over three months after the impact), the U.S. Centers for Disease Control and Prevention (CDC) assumed responsibility for analysis of data (Magliore et al. 2010).

Considering the difficult conditions of its inception, the system inevitably had serious defects such as a late start, chronic underreporting, unclear definitions, and limited laboratory support or field supervision for quality control. More important, foreign medical teams and facilities that were providing most of the earthquake related services were not included in the reporting system, which was based on pre-existing, primary level institutions active in AIDS programs.

Nevertheless, the network did provide some basis to rule out any unexpected increase of the notifiable conditions, especially infectious syndromes. Day after day, the system reported that no unexpected or abnormal increase in diseases was detected. With the lingering concern shared by most actors of possible epidemics and a higher density of medical personnel ever seen by Haiti, the absence of any significant outbreak is worth noting.[85]

85 A major cholera epidemic started in October 2010. It was unrelated to the earthquake disaster as it started in a department not directly affected by the event. Furthermore, the morbidity/mortality of cholera was lower among the displaced populations attended by humanitarian organizations than in groups not affected by the earthquake. Had the emergence of this unrelated cholera epidemic coincided in time and place with the earthquake response, the myth of inevitable post-disaster epidemics would have been considerably more difficult to dispel.

The three most reported conditions for the period 25 January to 24 April were: acute respiratory diseases (16.3%), suspected malaria (10.3%), and fever of unknown cause (10%) (Magliore et al. 2010). These are common findings in developing countries.

Laboratory support

Strengthening the laboratory was a major success in Haiti.

The limited capacity in public health and clinical laboratory service was severely reduced by the impact. Several agencies partnered with the Haitian Government to restore capacity of the Haiti National Public Health Laboratory. Among them, CDC in collaboration with USAID began sending laboratory supplies including microscopes, rapid diagnostic tests, and other critical equipment and reagents by the end of January. Subject matter experts were also provided for the post-disaster disease surveillance (malaria, typhoid, measles, cholera, dengue, etc.).

Training of the laboratory staff began on 8 February and the National Laboratory tested the first dengue sample on 10 February, less than a month after the earthquake hit.

Two months after the impact, the National Laboratory began sending consolidated reports to the Haitian Ministry of Health.

Immunization programs

- In Haiti, the Ministry of Health refrained from endorsing improvised or indiscriminate mass immunization campaigns as had occurred following some other disasters.
- Instead, the Ministry recommended targeted vaccinations of vulnerable groups to meet specific risks. Private actors did not consistently follow these guidelines.

Because a widespread, lethal outbreak is not a reasonable scenario, improvised emergency immunizations programs generally have no place in the immediate aftermath of the disaster. This does not, however, preclude the need for specific and carefully planned immunizations to respond to a specific threat or to take advantage of population displacement to improve routine immunization coverage.

Photo: PAHO/WHO, Victor Arizaín

Specific factors required attention in Haiti:

- An increased incidence of tetanus was anticipated due to the high number of injuries (many wounds had not been cleaned and were becoming infected);
- A DPT immunization campaign had been planned for the week of the earthquake in response to an ongoing diphtheria outbreak in Port-au-Prince;
- Finally, the opportunity (and risks) of a large population with very low routine immunization coverage (the lowest in the Region of the Americas) living in temporary settlements served by NGOs or donors.

Tetanus

There are no reliable estimates of the number of post-injury tetanus cases in Haiti. As of 8 February 2010, 16 cases were reported by the surveillance system. Cuban and Dominican medical teams also periodically reported cases.

Tetanus vaccine and serum were available in sufficient amounts in PROMESS, the pharmaceutical warehouse administered by PAHO/WHO. Surprisingly, many foreign medical teams arriving to treat the injured did not have those essential products available. A campaign was initiated to inform all teams of the need for and availability of vaccine and serum.

Diptheria, pertussis, and tetanus (DPT)

In most countries, DPT is part of the routine child immunization program. In Haiti, it was estimated that 50%-60% of the new cohort (under one year old) was not covered at the time of the earthquake.

Having passed the acute emergency, the Ministry of Health decided to plan a campaign at the end of February (6 weeks after impact) for DPT and measles, mumps, and rubella (MMR). Some major NGOs opposed this move and abstained from collaborating. In addition, logistical problems appeared rapidly in the first cycle (maps of temporary settlements printed in English) followed by vaccine fatigue in the second cycle.[86]

Measles

Although there had been no confirmed cases of measles since 2001, the risk of outbreaks remained present due to low immunization coverage. In 2007 coverage was estimated at only 58% in children under one year old. New cohorts of children were potentially at risk.

In a briefing document prepared for Haiti responders, WHO recommended that all displaced persons between six months and 35 years old who were living in an overcrowded camp be vaccinated against rubella and measles (WHO 2010b). As indicated earlier, a national strategy to improve the coverage in the camps was adopted in February but was not supported by some of the largest NGOs.

No case of measles has been reported since the earthquake.

Water, sanitation, and hygiene (WASH)

- Water and sanitation are rapidly emerging as a major public health priority in all disasters where there are massive displacements of population.
- The Ministry of Health, although often not responsible for the delivery of services, should assume quality control of water and sanitation.

86 All houses in the metropolitan area were GPS-referenced prior to the earthquake. With the massive displacement of population after the earthquake, this technical prowess was of little use for immunization campaigns.

Water and sanitation is not an issue that is as popular or easily funded as providing medical care to the injured. Media coverage of the topic was modest. Out of 258 health publications listed in a Medline search (May 2011), only one specifically dealt with water and sanitation while almost 50 addressed trauma management. Fortunately, funding and donor support were more even-handed in the response.

Health implications of water, sanitation, and hygiene (WASH) are obvious. In the aftermath of disasters in Haiti prior to 2006, the management of those two public health issues—health care and WASH—was integrated under single national and international leadership for both development and humanitarian response. Recently, following the "Humanitarian Reform" adopted by the United Nations, the emergency management of these two sides of the same coin has been separated at the international level.[87] Water and, to a lesser extent, sanitation, were issues frequently debated at Health Cluster meetings.

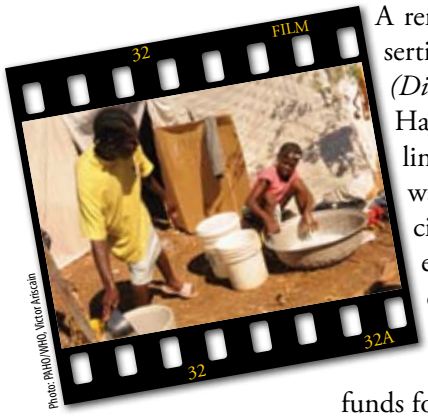


Photo: PAHO/WHO, Victor Ariscain

A remarkable feature of the response in WASH was the early leadership and assertiveness of DINEPA, the Haitian agency responsible for water and sanitation *(Direction Nationale de l'Eau Potable et de l'Assainissement)*. Unlike many other Haitian institutions such as the Ministry of Health, DINEPA suffered only very limited damage to its offices and management capacity. In addition, DINEPA was already strongly supported by development donors who had allocated specialized support staff (French Cooperation—AFD) and funds (Spanish Cooperation [AECID] and the World Bank) prior to the earthquake. These donors continued this support to ensure that DINEPA could fulfill its role during the response phase. The Inter-American Development Bank (IDB) was particularly flexible in allowing the immediate reprogramming of development funds for emergency response. DINEPA was in a better position to reclaim its role as coordinator of the international response by assuming the lead of the WASH cluster with support from UNICEF.[88] Noteworthy is the fact that within a few weeks of the impact, reports and meetings were mostly in French, facilitating the participation and leadership of a national institution in this process. In other sectors, English remained the only language used throughout the response and recovery.

Water supply

- The Haitian water authority set a positive example by asserting early on its primacy in coordination.
- Pragmatism is required in setting minimum standards for humanitarian response. The "triage" principle of providing services to the largest number of beneficiaries should apply.
- Sources of drinking water in Port-au-Prince were atypical: retail distribution outlets of mostly high quality (and expensive) water. The response primarily involved private, commercial providers.

87 This split was the result of the new coordination structure (clusters) set by the Humanitarian Reform. In the opinion of a large number of interlocutors, the selection of a clusters structure and "lead agencies" reflected and accommodated the mandates of the UN agencies rather than of the national authorities. Following is a description of WHO's role in cluster leadership after the earthquake in Haiti: "WHO is the lead agency for the Health Cluster. It is responsible for setting intervention priorities and for monitoring the situation and the health response on the ground in emergencies. UNICEF performs a similar role in the areas of water, sanitation and hygiene (WASH). However, within this Cluster, two thematic areas are coordinated by WHO, namely water quality issues and environmental health interventions at health-care facilities" (WHO 2010e).

88 PAHO/WHO lacked the required sanitary engineering expertise at that time.

The impact of the 12 January earthquake on water supply in Port-au-Prince was rather atypical. In urban earthquakes, attention normally focuses on the damage to water and sewage pipe systems resulting in a shortage of water and the risk of cross-contamination between both networks. Reports of people breaking into pipes to access water have been common in past disasters.

These were not major issues in Haiti where drinking water distribution was largely based on three systems: an extensive commercial distribution network of high quality water (reverse osmosis and other techniques); the establishment of networks delivering water at collective delivery points *(bornes et fontaines)* managed by local committees *(Comités de l'eau)*; and water delivered at the house level by networks functioning under the municipal company (CAMEP).

The challenge was therefore to restore these three networks and ensure the availability of drinking water at no cost to the beneficiaries. Four days after the impact it was estimated that the commercial sector was in the position to produce 1 million gallons of water per day. The challenge was how to distribute it. The commercial sector played a major role in this distribution, first spontaneously then later as contractors who were funded or subsidized by DINEPA and many humanitarian organizations.

On the operational level, the water response was pragmatic with the objective of providing as many people as possible with a bare minimum of water. Although all interviewees in Haiti were aware of the "minimum humanitarian standards" established by the Sphere Project (2011) (for example, 15 liters/person/day), none spontaneously mentioned them in our interviews. Instead, they focused on slowly raising the initial amount of drinking water to be made available to all (from 3 liters to 5 liters of drinking water) over a matter of weeks and months.

This approach is a considerable improvement on the frequent misuse of Sphere standards by donors as compulsory, quantified goals to be achieved under risk of penalty. This was observed in other disasters (natural or human-caused) where agencies opted to limit the number of their beneficiaries receiving an unrealistically high "minimum" standard or requirement in order to avoid criticism by evaluators or donors for not being in compliance. This was in fact exactly the contrary of the triage principle: the best benefit for the greatest number.

As reported in the Health Cluster Bulletin (No. 20) nearly five weeks after the impact:

> *"The WASH Cluster continues to provide safe drinking water (5 liters per person per day) to over 780,000 people through water tankers and water treatment plants at 300 sites across Port-au-Prince, Léogâne , and Jacmel. The Cluster aims to scale up provision of safe drinking water to a total of 1.1 million persons per day. Approximately 2.1 million liters of water are delivered per day to about 500,000 displaced persons in 184 sites."*

Photo: PAHO/WHO, Sam Vigersky

Twelve months after the earthquake, there was still a large amount of water being delivered to camps and sites with dozens of bladders being used every day, underlining the difficulties of finding solutions "beyond water trucks". Provision of safe water in Haiti is a never-ending humanitarian task.

Environmental health in temporary settlements

New approaches are needed for excreta and waste management in temporary settlements in dense urban areas.

Sanitation and hygiene (waste disposal, human excreta, etc.) often fall outside the responsibility of the Ministry of Health, but are nevertheless critical for public health. On 28 January (Day 17), the WASH Cluster shifted its priority from water to sanitation: a change reflecting the relative progress in provision of water and the lingering fear of possible outbreaks in overcrowded settlements without even rudimentary sanitation. Rapidly, the provision of latrines rather than the distribution of water became the preeminent priority and challenge.

Sanitation conditions in Haiti including in the capital were very poor prior to the earthquake. Normal overcrowding in Port-au-Prince is such that few open spaces (parks, squares, green spaces, etc.) exist. After the quake they were quickly packed with displaced populations. In an urban environment, installing traditional latrines (trenches, for instance) at a safe distance from tents and shelters was not possible. During the first three months, more than 3,000 portable latrines (chemical or not) were installed by NGOs in targeted camps in metropolitan areas. The major challenges were to find unoccupied spaces where they could be positioned, and to organize an ongoing system of collection and disposal of urban excreta. This was not solved during the period under review (Grünewald, Binder, Georges 2010).

The objective of waste disposal has largely benefitted the commercial sector. It was only partially met in part due to lengthy difficulties with customs clearance and the registration of UNICEF trucks.

Despite efforts to install latrines, progress was slow 30 days after impact:

> *"Sanitation continues to be a major challenge of utmost concern. It is currently estimated that less than 5% of the needs for latrines is being met (one latrine per 50 people). This poses huge challenges for public health in temporary settlement sites."* [89]

This challenge was, however, alleviated by a progressive reduction in the number of families in temporary settlements. However, for many of those interviewed, it appears that the services provided by the international community were ultimately better than those available to the general population, although far short of the "minimum" standard of one latrine for 20 people as set internationally.[90]

89 Reported in the Health Cluster Bulletin No. 18. The figure of one latrine for 50 persons was seen as too optimistic by some interviewees who believed that the number of users actually was around 200 per latrine for at least three months.

90 See the Sphere Project standards for excreta disposal at: www.sphereproject.org/content/view/43/83/lang,english.

Environmental health in medical facilities

Medical and hospital waste is a major problem in all disasters. It is a costly issue that must be addressed early on.

The need for safe water in hospitals (existing or new facilities) was brought to the attention of decision makers at a very early stage. Coordination between DINEPA and the Ministry of Health as well as quality control by PAHO/WHO-trained personnel ensured that this problem was addressed beginning one week after the impact.

The provision of medical care by thousands of health professionals or volunteers created a significant need for safe disposal of human as well as medical waste (dressings, syringes, needles, expired drugs, etc.). The Swedish Civil Contingency Agency (March 2010) estimated that 15%–20% of health care waste was hazardous or infectious (including discarded human tissues or limbs).

The need for "a clear strategy for dealing with health care waste" was identified as a priority from Day 6 and remained so for weeks. On Day 13, a system was launched to collect medical wastes and dispose of them in a landfill. Progress was noted in the main hospitals but the issue lingered due to the carelessness of some independent teams or facilities.

Photo: PAHO/WHO Victor Ariscain

Lack of prior planning for safe disposal of medical waste is a recurrent problem in disasters and need not be rediscovered by humanitarian organizations in each emergency situation.

Food and nutrition

No widespread malnutrition was noted in Haiti or in other disaster-affected countries. This may be due in part to the massive food distribution and strengthening of nutritional activities but also to the fact that earthquakes do not affect food availability at the national level. The issue was one of lost income that might be addressed by direct financial assistance to households.

Prior publications from PAHO/WHO on natural disasters outlined that the impact of earthquakes on food supply and malnutrition is distinct from that of hydrological disasters such as floods, hurricanes, or drought. Earthquakes do not directly affect crops or food stocks at the national level. They may have an indirect and delayed impact on nutritional levels by reducing the access of some of the affected population to existing stocks because of lost income or logistical problems.

Haiti was not an exception. Food stores and markets were closed only temporarily (1–2 weeks at most). Food and basic supplies were rapidly available provided one could afford them. Prices increased but not to the point of affecting those lucky enough to have maintained their business and income. The destruction of the harbor in Port-au-Prince and other logistical challenges (blocked roads) were only temporary, aggravating problems affecting both the humanitarian and commercial flow of goods.

The most important impact from a nutritional point of view is the fact that an already inadequate access to a proper diet for those economically most vulnerable was drastically reduced by the loss of their means of survival. Loss of meager livelihoods was only partially compensated by the sharp increase in remittances from abroad, and 89% of the recipients used those remittances before the earthquake to procure food. Some donors and experts suggested early after the impact that if the primary cause was a loss of income, cash assistance should partly replace the importation and distribution of food after the initial emergency response (WFP 2010).

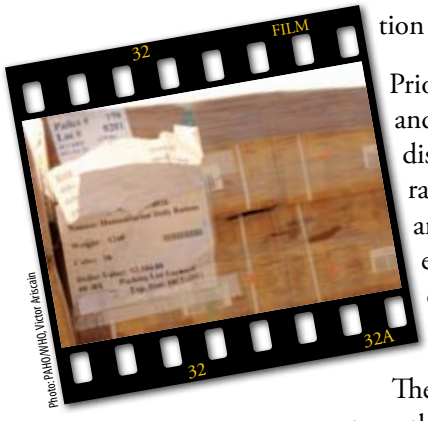


Photo: PAHO/WHO Victor Ariscain

Prior to the earthquake, the "cluster" structure was seen as very peculiar (Binder and Grünewald 2010): nutrition, food aid, and food security after sudden-onset disasters were considered distinct, albeit related, issues that are coordinated separately. The Nutrition Cluster under UNICEF, the Food Aid Cluster under WFP, and Food Security Cluster under FAO were three different and disconnected entities. Yet prevention of acute malnutrition in the aftermath of a geological disaster, the end result of food insecurity, is mostly beyond the responsibility of the health sector.

The re-activation of the Nutrition Cluster offered UNICEF an opportunity to strengthen the capacity of its counterpart in the Ministry of Health by providing an instrument to exercise leadership over humanitarian actors. The priorities as established by the Nutrition Cluster, which convened on 20 January (Day 9), included:

- Protection and support for women who are breastfeeding;
- Monitoring breast-milk substitutes and other milk products coming into the country;
- Monitoring the provision of breast-milk substitutes and other milk products;
- Complementary feeding of children above six months old;
- Treatment of global acute malnutrition.

Between 40 and 50 agencies participated in the meetings of the Nutrition Cluster. Only 25 of them had professional nutritional expertise while some 15 were regarded as "amateurs, without any idea of the nutritional value of food." Rapidly, the nutritional offers and requests were critically reviewed and filtered, ultimately focusing more on therapeutic products. The department of the Ministry dealing with nutrition was the only one that had updated guidelines in an electronic version, which were generally respected by all partners. However, specific guidelines on breast milk substitutes were often violated.

The Food Aid Cluster, led by the World Food Programme, focused in February on supplementary feeding of children (6–59 months) and pregnant or lactating women in temporary shelters in Port-au-Prince. The program was based on distribution of high-energy biscuits or ready-to-use foods to 88,000 beneficiaries. In March 2010, the supplementary feeding program was extended to the same vulnerable groups in departmental urban areas having received large numbers of internally displaced. At the same time, the biscuits and ready-to-use food were progressively and partly substituted with the usual WFP supplementary ration made of corn-soya blend (CSB), oil, and sugar (WFP 2010).

The normal activities of prevention and treatment of acute malnutrition within the Ministry of Health with UNICEF, which were inadequate prior to the impact, were resumed in March (6 weeks after impact).

General food distribution was of a much greater scope than targeted nutritional programs. At the peak of activity, food was reportedly distributed to over 4 million beneficiaries. It should be noted that the PDNA estimated the affected population at 1.5 million. According to a WFP external evaluation, "political factors influenced the input and stance the Haitian government took with respect to program implementation, including the phasing out of general food distribution to more targeted safety net activities" (WFP 2011).

Other experts are of the view that the large-scale food aid was largely a response pushed by some governments, and by and large terminated on time in order to avoid negative effects. Some donors interviewed also mentioned their only partly successful efforts to promote greater cash-based programs (not merely the traditional cash- or voucher-for-work but also direct, un-earmarked cash allocations). Yet, as recommended by some studies,[91] many aid actors finally moved away from food-based and engaged in cash-based relief activities, especially cash-for-work programs (e.g., removing debris and improving the urban environment and sanitation).

The provision of milk products was also a point of interest. The unsupervised donation of powdered milk is strongly discouraged in the aftermath of sudden-impact disasters. Its use outside well-managed programs is often unsanitary and a potential cause of diarrhea. The quality of water being a special concern in Haiti, it was necessary to repeatedly remind NGOs and health care providers not to distribute powdered milk.[92] Success was only partial.

In conclusion, further surveys indicated that malnutrition did not increase as a result of the earthquake. Considering the scale of food distribution and supplementary feeding, this outcome was to be expected. More than that, the flow of remittances from the diaspora increased significantly thus increasing the purchasing power of the affected populations and their access to food. Food markets became very active in a few weeks time and the flow of products from rural areas to affected urban zones increased rapidly. There are no data available regarding the cost-effectiveness or the possible negative impacts (for example, on local food production and markets, dependency, etc.) of the massive distribution of food compared to other measures. Whether financial assistance to households would not have been more effective from the point of view of nutrition and well-being has not been sufficiently debated in the case of Haiti. It definitely would have helped to maintain the sense of dignity and pride that is so important to Haitian culture.

91 See, for example, ALNAP/ProVention (2009), "Responding to Urban Disasters: learning from previous relief and recovery operations." Available at: www.alnap.org/pool/files/alnap-provention-lessons-urban.pdf .

92 Instead, ready-to-drink tins were provided, contributing to the tons of waste produced daily and clogging most of the drainage system in Port-au-Prince.

Mental health and psychosocial assistance

- Needs for psychosocial assistance should not be overlooked on the assumption that poor communities are more resilient.
- The psychosocial field is currently attracting too many emergency actors who may not have the necessary expertise and resources.
- Specialized programs in the aftermath of sudden-onset disasters should serve as the point of entry for the provision of mental health services at primary health care and community levels.

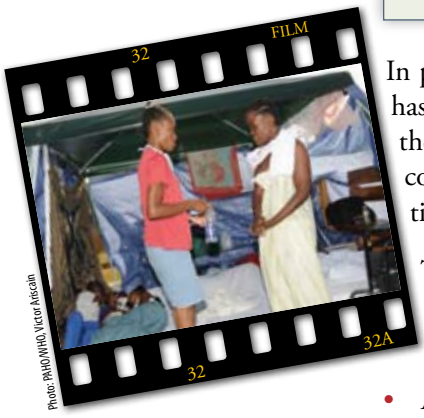


Photo: PAHO/WHO, Victor Ardcain

In past sudden-onset disasters, the mental health impact on the affected population has been the subject of debate, leading to diverse interventions.[93] These range from the dispatch of unprepared young social workers from Western urban areas into the conservative Islamic, rural environment of Bam (Iran) to the excessive medicalization of an otherwise common reaction in the aftermath of a sudden disaster.[94]

The different perspectives behind mental health intervention and psychosocial support are well articulated in WHO/IASC guidelines and are summarized below (WHO/IASC 2007):

- Aid agencies outside the health sector tend to speak of "supporting psychosocial well-being". Health sector agencies tend to speak of "mental health". Exact definitions of these terms vary between and within aid organizations, disciplines and countries.
- Mental health and psychosocial problems in emergencies are highly interconnected yet may be predominantly social or psychological in nature (rather than medical).
- Significant problems of a predominantly social nature include:
  - Pre-existing (pre-emergency) social problems (e.g., extreme poverty);
  - Emergency-induced social problems (e.g., family separation; disruption of social networks; destruction of community structures, resources, and trust; increased gender-based violence); and
  - Aid-induced social problems (e.g., undermining of community structures or traditional support mechanisms).
- Similarly, problems of a predominantly psychological nature include:
  - Pre-existing problems (e.g., severe mental disorder; alcohol abuse);
  - Emergency-induced problems (e.g., grief, non-pathological distress, depression and anxiety disorders, including post-traumatic stress disorder [PTSD]); and
  - Aid-related problems (e.g., anxiety due to a lack of information).

93 Psychosocial support to relief workers, an important topic, is not addressed in this section.

94 A survey conducted six months after the tsunami in Sri Lanka found that 56% of the internally displaced population suffered from post-traumatic stress disorder (PTSD). In other words, more than half of the population was suffering from a pathological disorder (Wickrama 2008).

The key point of the WHO/IASC guidelines is that "mental health and psychosocial problems in emergencies encompass far more than the experience of PTSD." This point was well understood by the Sri Lankan authorities who recommended "listening to victims [of the tsunami] without offering opinions and not diagnosing or labeling people as suffering from post-traumatic stress disorder" (Mahoney et al. 2006).

Disasters are highly emotional events. The State of Minnesota handbook on disaster recovery offers a layman's description of the various phases in the affected population's reaction to disasters (Table 6.5). It is noteworthy that this scenario can be applicable to most cultures.

Table 6.5 Four phases of disaster response

Phase	Usual length of time	Actions	Emotions
Heroic phase	Prior to impact and up to a week afterwards	Struggle to prevent loss of lives and minimize property damage	Fear, anxiety, stunned
Honeymoon phase	Two weeks to two months	Relief efforts lift spirits of survivors; hopes of quick recovery run high; optimism is often short-lived	Euphoria at being alive, grateful, grief, disbelief
Disillusionment phase	Several months to over a year	The realities of bureaucratic paperwork and recovery delays set in; outside help leaves; survivors realize they have lots to do themselves and their lives many never be the same	Frustration, depression, self-doubt, loss/grief, isolation
Reconstruction phase	Several years	Normal functioning is gradually reestablished	Satisfaction with progress; emotions appropriate to current events

Source: Minnesota Department of Public Safety (n.d.) *Recovery from disaster handbook* (Chapter 1).

Mental health interventions in Haiti[95]

There is a lack of quantified or objective information regarding the importance of the mental health impact on the affected Haitian population. This was also observed in the disasters in Indonesia, Sri Lanka, and Pakistan.

PAHO/WHO estimated that at one point over 110 different organizations were providing mental health and/or psychosocial services, or conducting training to health and mental health professionals (PAHO/WHO 2011a). As observed after the Indian Ocean tsunami and Pakistan earthquake, psychosocial assistance takes many forms, including activities as simple as entertaining children.

Mental health was not an orphan topic in the Haiti earthquake response; it had several parents. Immediately after the earthquake, meetings of a Cross-Cluster Working

95 Z. Abaakouk provided insight into mental health care services available prior to and following impact in Haiti. See Abaakouk, "Mental health in Haiti in 2010: a public health need, an added value within health care practice and a cornerstone for reconstruction" in PAHO/WHO, *Mental health and psychosocial support in emergencies in the Caribbean* (forthcoming).

Group on Mental Health and Psychosocial Support were convened first by UNICEF and later by IOM to assist in coordinating the many organizations present in the field. The Ministry of Health, with WHO support, also led a Mental Health Working Group with selected actors (mainly psychological and psychiatric service providers) that focused on specific strategic issues related to the mental health model for intervention at the national level. This included: essential psychotropic drug list, mental health protocols, mental health data collection, drafting a plan for training health and mental health professionals, etc.

In order to guide the initial response, WHO provided some tentative projections or estimates of what might be expected in the aftermath of disasters:

- "The percentage of people with a severe mental disorder (e.g., psychosis and severely disabling presentations of mood and anxiety disorders) increases by 1 per cent over and above an estimated baseline of 2–3 per cent.
- "In addition, the percentage of people with mild or moderate mental disorders, including most presentations of mood and anxiety disorders (such as post-traumatic stress disorder, or PTSD), may increase by 5–10 per cent above an estimated baseline of 10 per cent.
- "In most situations natural recovery over time (i.e., healing without outside intervention) will occur for many—but not all—survivors with mild and moderate disorders" (WHO/IASC 2007,123).

No attempt was apparently made to validate those figures in the context of Haiti, a country showing extraordinary resilience over the years but also submitted to a considerable shock (the earthquake, the mass casualties, the amputations, the management of dead bodies, and the side effects of an international response not always addressing the perceived priorities). Resiliency, a survival trait, does not reduce the emotional stress and need for psychosocial support.

The extent of the mental health response is better documented. In addition to local human resources, additional assistance poured into Haiti. Among them were 10 psychiatrists, 4 psychologists, professionals from the Cuban Medical Brigade working at the community level, three mental health trainers from International Medical Corps, experts and clinical practitioners from the major medical NGOs (MSF, Médecins du Monde) as well as from many Red Cross societies.[96]

Yves Lecomte (2010) gave the following account:

> *"According to a census conducted by the Working Group of the Ministry of Health, there would be 100 NGOs working in mental health, or 1% of the NGOs currently active. Seventeen intervention methods are available, [including]: psychological as individual counseling, group psychotherapy, medication, social issues advocacy, skills development, vocational training, social support, etc."*[97]

96 Basauri, V. *Rapport de Mission: La Santé mentale et le soutien psycho-social in Haïti* [PAHO/WHO Mission Report, 3-6 Feb. 2010].

97 Quotations from the article by Yves Lecomte (2010) were translated from the French.

Such a proliferation of actors is not always in the best interest of the affected population. Not all responders were as professional or effective as should be expected. The first priority in humanitarian assistance is "do no harm." External mental health and psychosocial support is an important means of helping people affected by emergencies but has the potential to cause harm because it deals with highly sensitive, cultural issues.

Lecomte expressed reservations regarding the nature of some of this assistance:

> *"Despite the fact that since the seventies, it is said that mental health is not a priority of the State and that 'Haiti does not support the mentally ill,' everybody has been doing mental health since 12 January 2010. In fact, some say, 'Haiti was invaded by a disparate variety of mental health experts who are neither doctors, psychiatrists, nor psychologists.'. . . Many do not speak French or Creole. Suddenly, mental health in Haiti has become a coveted item internationally."*

On the positive side, the same author noted that "many international organizations intervened in the camps and hospitals and provided training for mental health practitioners."

Those mixed findings were also observed in the aftermath of major disasters attracting considerable assistance and funding (earthquakes in Bam, Iran, in 2003, Pakistan in 2005, and the Indian Ocean tsunami in 2004).

In spite of those occasional excesses, the response has produced significant changes in Haiti's approach to mental health. Its effectiveness can be assessed subjectively by using the WHO/IASC list of "Dos and Don'ts" (2007, 123). The most relevant for the Haiti response can be found in Table 6.6.

More than 110 organizations provided mental health services

Photo: PAHO/WHO, Victor Ariscain

Table 6.6 Recommended "dos and don'ts" and mental health and psychosocial support activities after the earthquake in Haiti

Do	Response in Haiti
Establish one overall coordination group on mental health and psychosocial support	Two parallel processes: one managed by the UN and one by the Ministry of Health. Priority should have been given to strengthen the leadership of the Ministry.
Pay attention to gender differences	Appears to be a concern attended by most the actors.
Learn about local cultural practices and use a mix of local and external methods as appropriate	WHO published a literature review on this topic early on.[a] A genuine local approach and strategy was a priority of the working group established by the Ministry of Health.[b]
Build government capacities and integrate mental health care for survivors in general health services	International NGOs and actors stressed capacity building and training. The strategy developed by the Ministry of Health working group focuses on decentralization and integration of mental health in health services (away from specialized psychiatric hospitals). Mass media gave visibility to this approach.[c]
Integrate psychosocial considerations into all sectors of humanitarian assistance	The meetings organized by UNICEF and later by IOM included thematic sessions on education, children, religion, etc.

Don't	Response in Haiti
Do not conduct duplicate assessments or accept preliminary data in an uncritical manner	A weak point as no quantified and objective assessment was available. Lack of clear criteria on the mental health needs and more pressing, competing issues may explain this shortcoming.
Do not assume that everyone is traumatized, or that people who appear resilient need no support	The services of many seasoned agencies appeared to be tailor-made for the needs of the population. No excessive medicalization and use of PTSD definitions were noted. Emphasis was on psychosocial assistance and community approaches.
Do not use a charity model that treats people in the community mainly as beneficiaries of services	From interviews, the response has contributed to problems of dependency and frustration among "beneficiaries." The self-centered institutional focus of many actors is claimed to have contributed negatively.
Do not provide psychotropic medication without training and supervision	Except for occasional unconfirmed or undocumented observations, use of medication was limited and believed to be under supervision.
Do not institutionalize people unless institutionalization is a temporary and indisputably last resort	A major achievement was the shift from an institutionalization-based approach prior to the disaster to a community and health services focus.

Source: WHO/IASC 2007.

a See WHO (2010a).

b Observations on the strategy and local approach to mental health support were published in D. Henrys. Réflexions sur une politique de santé mentale en Haïti. *Revue haïtienne de santé mentale*. Vol 2; 217-219.

c An article published in the *New York Times* (19 March 2010) stated: "Ultimately, international experts are encouraging the Haitian Health Ministry, which they say is receptive and eager for help, to incorporate mental health care into the primary health care system and to make it available throughout the country."

All information clearly points toward a significant improvement in the approach and priority given by the Ministry of Health to a long neglected issue in Haiti. A window of opportunity has been used.

Reproductive health /gender-based violence

Reproductive health emergencies should be attended from the early days of response.

While trauma care may be the dominant and most visible concern in the immediate aftermath of an earthquake, deliveries and obstetrical emergencies continue to occur and require uninterrupted attention to save lives. Increases in gender-based violence are also routinely reported in the aftermath of most disasters. Attention to these particularly vulnerable groups is critical.

Reproductive health care

Photo: PAHO/WHO, Victor Arécain

The rate of deliveries often increases temporarily in the first days and weeks after a sudden-impact disaster (one might speculate that this is the result of stress). Although no data are available on the number of deliveries, informal reports tend to confirm this observation in Haiti. Similarly, the number of pregnancies after the impact often increases. This was noted in a survey in temporary settlements conducted by the Ministry of Health.

The reported rate of pregnancy in a post-earthquake study was 12%.[98] Prior to the earthquake, this rate was 6% nationally (4% in urban areas and 8% in rural areas) (MSPP 2006). The very high rate observed in the camps may reflect increased promiscuity in these settlements, increased incidence of unprotected sex in a context of disruption, and/or inadequate supply of family planning services. The desire for pregnancy or having a child could also be explained by psychological reasons, as is often observed after major disasters (MSPP 2010b).

Within days after the impact, the groups specializing in reproductive health intensified their efforts to ensure proper attention was given to women's health. This was in a context dominated by the dispatch of military trauma field hospitals or polemics on amputations and crush syndromes.

Within one week, the Reproductive Health Response in Crises Consortium (RHRC) urged responders "to establish services to treat pregnancy complications, including emergency C-section, to provide immediate access to clinical care for survivors of sexual violence, to resume HIV prevention, as well as to reestablish the usual family planning methods."[99]

A reproductive health working group was set up in Port-au-Prince to address these issues and a Minimum Initial Service Package for Reproductive Health was promoted through the timely distribution of emergency kits by UNFPA.

98 A sample size of 2,391 women, 15 to 49 years old was used in this study.

99 The Reproductive Health Response in Crises (RHRC) Consortium consists of seven members: American Refugee Committee (ARC), CARE, Columbia University, International Rescue Committee (IRC), John Snow Research and Training Institute (JSI), Marie Stopes International (MSI) and Women's Refugee Commission.

A survey of 171 clinics[100] serving temporary settlements in July 2010 suggests that five months after the impact, there were still significant deficits in terms of the range of services (minimum package) provided. According to the authors of the survey, the deficits observed were probably related to the disorganization of health care services and non-adherence to standards set by the Ministry of Health regarding the minimum package of services. In addition, the survey authors note that lack of availability of certain services for obstetric and neonatal emergencies and sexual health may be due to the specialized nature of these interventions (MSPP 2010b).

The same survey confirmed that access to reproductive health care although not yet meeting minimum standards had improved considerably in the temporary settlements compared to the situation prior to the earthquake.

Gender-based violence

- Increased gender-based violence is routinely reported after most disasters. Although the problem was better documented after the Haiti earthquake, the lack of quantified evidence about this issue should be addressed.
- A cross-sectoral strategy to address this chronically overlooked issue must be developed and implemented under the leadership of the Ministry of Health.

In addition to the need for urgent restoration of normal reproductive health services, an "epidemic of gender-based violence" was reported in the media and in technical reports.

How significant and evidence-based this post-earthquake outbreak of gender-based violence was is unclear.[101] Amnesty International (2010) observed: "Protection mechanisms for women and girl victims of sexual violence were deficient before the earthquake, now they are totally absent. This is a major cause for under-reporting." The report provides numerous observations of tragic cases, but it lacks quantified evidence.

Sexual violence is a much more difficult or elusive issue to document than amputations or communicable diseases, but lack of statistics is no reason for inaction. In Haiti, the magnitude of the problem before and after the earthquake prompted a large array of initiatives from provision of specialized medical care, increased policing of the camps by the UN and National Police, to the adoption of protective measures such as the installation of 200 durable streetlights in 40 of the camps.

In March 2010, the Ministry of Health launched a national program for attention to the victims of sexual violence. According to interviews, the protocol proposed by the Ministry met with resistance from some NGOs who were unwilling to change their own protocol and response kits, insisting instead that the national program be amended to adopt their approach.

100 In the survey conducted by the Ministry of Health (MSPP 2010b), 171 institutions were visited in the 12 municipalities affected by the earthquake to assess the provision of care and services. Of these, 86 were functioning inside the temporary settlements and 85 outside. The facilities were providing general health care, and not exclusively reproductive health.

101 The household survey carried out by the University of Michigan (Kolbe et al. 2010) estimated that "in the six weeks after the earthquake, 10,813 people (95% confidence interval, 6,726–14,900) were sexually assaulted, the vast majority of whom were female. In the same period 4,645 individuals (95% confidence interval 1,943–7,347) were physically assaulted."

There are valuable lessons to be learned from the efforts to respond to or prevent sexual violence in the aftermath of the earthquake.

- As noted after the tsunami, it is impossible to find out whether gender-based violence has actually increased (Felten-Biermann 2006). It does not, however, mean that it does not exist.
- A national strategy, whether for gender-based violence or other public health priorities, cannot be implemented unless all health actors, foreign or national, accept the technical leadership of the health authorities.

As is the case for other neglected problems, the high visibility of the response and funding available has shed light on ongoing deficiencies and put into motion a reform process. This reform most likely will benefit future victims of gender-based violence in Haiti.

Supplies

- Inappropriate health donations is a serious issue in all large disasters; however, this occurred to a lesser extent in the case of Haiti.
- The existence of a central pharmaceutical warehouse managed by PAHO/WHO has been an asset unmatched in other disaster-affected countries.

How did the Haiti response compare to recent global disasters in terms of incoming health supplies and procurement capacity?

Haiti response faced logistics problems similar to those in other major humanitarian deployments in the past:

- The amount of incoming supplies (and personnel) increased rapidly over the first weeks.
- Transport into Haiti was a major limiting factor. The management of the airport in Port-au-Prince and the control of Haitian air space were rapidly assumed by the U.S. military which had its own set of security and bilateral priorities, distinct from those of the humanitarian civilian community. Critically needed medical equipment, including some field hospitals and health teams, were rerouted through Santo Domingo in the Dominican Republic.
- Transport within Haiti was complicated by the destruction, rubble in the roads, and the lack of vehicles to accommodate the surge of experts and other personnel arriving in increasing numbers. The considerable transport assets of MINUSTAH were not made available to the humanitarian community or even to UN agencies until the Security Council adopted a resolution mandating MINUSTAH to assist in this regard (Day 7).[102]

102 UN Security Council Resolution 1908 was adopted on 19 January 2010 to "increase the overall force levels of MINUSTAH to support the immediate recovery, reconstruction and stability efforts".

The lack of medical supplies rapidly became a major obstacle in the treatment of the injured. The items missing were the same reported in short supply in any earthquake: dressings, gauze, disinfectant, suture material, casting supplies, and X-ray film. Standard emergency kits (including trauma kits) were rapidly made available, but according to several interlocutors they did not adequately satisfy the most common shortages in the aftermath of a massive earthquake.

One item in short supply not often mentioned in other disasters was external bone fixators. The demand for this orthopedic equipment was unexpectedly high as conditions for the use of the internal fixators (surgical skills and sterile environment) were rarely met in the first weeks. PROMESS (see below) could not meet demand for this unusual item (unusual in the sense that it is not part of the "normal" list of essential articles).[103] Stockpiling this item globally seems to be the only practical approach.

PROMESS

PROMESS, the central health procurement system managed by PAHO/WHO, was an unusual but invaluable international asset in the first weeks. PROMESS facilities had not suffered critical damage. Its stock had just been replenished at the end of 2009 and its personnel were serving not only in public institutions but also in eligible non-profit facilities or organizations. This efficient and well-tuned mechanism was in place for support to all humanitarian health actors. However, local public health offices that were running out of stocks were not universally aware of this service.

103 With the urgent and large demand for external fixators, PROMESS placed an order for 2,000 units. The amount was not excessive considering the number of fractures. However, the procurement system (centralized in PAHO/WHO HQ) was unfamiliar with sources for this specialized item, which is not routinely in stock at the usual suppliers. Ultimately, 50 units were delivered but they arrived far too late.

PROMESS distributed essential medicines and supplies to hospitals and international and local NGOs.

Photo: PAHO/WHO, Victor Ariscain

In the immediate aftermath of the earthquake, PROMESS saw an average of 30 clients per day, such as public hospitals and international and local NGOs. During the first 45 days, PROMESS distributed more than 345,000 boxes of essential medicines and supplies, including antibiotics, vaccines, drugs for mental health conditions, drugs for treatment of TB, diabetes and malaria, and anesthetics. In March, 100 mobile clinic kits were distributed in all priority areas. In early April, the Ministry of Health extended free access to medicines until 12 July 2010 and PROMESS continued to partner with the Ministry for the distribution of health packages to most mobile clinics, public hospitals, and NGOs.

Several factors limiting the effectiveness of PROMESS were addressed with the support of the U.S. Government:

- Repair of walls surrounding the facility and improved security;
- Updating the inventory of supplies;
- Organizing the chain of distribution to accommodate the increased number of clients and the urgency of the deliveries;
- Creating access to and space for storage areas by clearing rubble.

Drug donations

According to responses to specific questions during interviews and the review of technical reports, there is general consensus that the quality of drug donations has improved. WHO guidelines on donations of pharmaceuticals (WHO 1999) appear to have been followed more systematically than in past disasters or in other regions. Progress, however, does not mean satisfactory performance. On Day 15, as noted in the Health Cluster Bulletin (No. 8), "The majority of medicines arriving into Haiti are well classified; however, there are still a lot of medicines without labels, expired or arriving as assortments, thus hampering distribution."

Although PROMESS required detailed information (listing, expiration date, analysis certificate) before accepting donations, rejected supplies usually found another point of entry. The department for regulatory authority of pharmaceuticals in the Ministry of Health remained too weak to veto unsolicited and inappropriate donations. This office did not receive support from the international community.

Inappropriate donations were usually from new humanitarian actors (groups with no prior experience) or new donor countries, including from the Americas. Overall, traditional donors and established bilateral agencies seem to have exercised stronger leadership in controlling the quality of donations from their countries and constituents.

Linkage with early recovery and development

- It is never too early to initiate recovery and "build back better" in the health sector.
- Disasters offer opportunities for change, however incremental they may be. Some are being used in Haiti.

In this section, the outlook will project beyond the initial three-month period. It will attempt to determine the impact of the early response on the recovery and reconstruction process in Haiti.

Initial relief activities have a justification and dynamic of their own. Designed to save lives, they can truly do so or also evolve into development-like activities. They may be carried out in a manner that either prepares the ground for, and blends into recovery and reconstruction processes, or that complicates that process.

Early recovery represents the undefined border or transition between emergency relief and reconstruction. Whether it is an extended humanitarian function or an initial step toward post-impact development is a matter both of perspective and origin of funding: that is, humanitarian/emergency or development (World Bank 2008, 31–32).

Over the last decade, development actors have become more proactive and rapid in triggering the reconstruction process, overlapping in time with the immediate response. The economic valuation of damage developed by the Economic Commission for Latin America and the Caribbean (ECLAC) used to be launched more than a month after impact; it is now promoted within a few weeks. In Indonesia, the international financial institutions initiated economic assessment within three weeks, involving a large number of experts supported by recent local graduates. There were more experts compiling, scrutinizing, and validating financial and cost data from all sources than were employed to gather and compile response intelligence. A similar effort was launched in Sri Lanka and Pakistan.

In Haiti, the same approach resulted in early planning for a Post-Disaster Needs Assessment (PDNA). Twenty years ago, early recovery and reconstruction were an afterthought once relief was near completion; in Haiti it was pushed to early in the agenda. On 19 January (Day 7) the Early Recovery Cluster was activated in Haiti.

The two processes (response and reconstruction) may run independently or be closely linked together. The linkage between relief, rehabilitation, and development (LRRD) was a feature present in this emergency. This linkage is an asset for agencies with both a strong development mandate and an emergency response capacity.

There were strengths as well as shortcomings in this linkage.

Success stories in LRRD

Reconstruction, which is development, is meeting considerable obstacles in Haiti. The most brilliant schemes cannot succeed without some modicum of efficient government with authority regarding its partners.

While most "ambitious new ideas" articulated by the PDNA process have not been implemented, the seeds of many incremental thematic changes have been planted in Haiti. Preexisting but dormant initiatives for change were reactivated, promoted, and in some cases funded. Progress in some initiatives may not last but others will change public health in Haiti. The initial successes are listed below. Most have been discussed earlier. None is revolutionary, but development is always incremental.

- *Free access to primary health care— the SIG and the SOG:* Before the impact of the earthquake, modest efforts were under way by WHO to conclude compensation

agreements with individual non-profit institutions willing to provide free obstetric care *(Soins Obstétricaux Gratuits,* or SOG) (WHO 2010d). It was a strong departure from a rigidly enforced, albeit poorly controlled user-fee policy on which local health facilities became dependent for most of their operations. The SOG program was made operational again after February 2010 with a simplified activity reporting mechanism. It not only continued to provide free-of-charge obstetric care to pregnant women right after the earthquake, but during 2010 it expanded the content of the health package, becoming the SOG-2 in July 2010. Sixty-three health institutions are currently providing services under the program all over the country. As a result, the number of institutional deliveries has increased from an average of 2,953 per month in 2007 to an estimated 6,828 per month in 2010 in participating institutions (PAHO/WHO 2011a).[104]

The SIG program *(Soins Infantiles Gratuits)* provides free care for children under age 5 thanks to a financial agreement with public and private hospitals similar to that of the SOG. It was launched and implemented after the earthquake in order to ease the financial difficulties being experienced by both the general population and the health facilities. Twenty-seven of the largest hospitals in the country engaged in SIG between July and November 2010. During this time more than 15,000 children beyond the base line numbers had the opportunity to access quality care with dignity.

The temporary support for these programs from humanitarian funding was substituted by a development grant ensuring the sustainability of free access to care for those groups.[105]

- *Mental health:* As discussed above, a new community-based approach is complementing the traditional third level hospital-based care of mental health. This represents a change of attitude and approach which is likely to last.
- *Rehabilitation and acceptance of disabilities:* The earthquake also induced a significant change of perception and policies regarding disabilities in Haiti. It is a profound and permanent modification of public behavior. Institutional changes will follow.
- *Awareness of gender-based violence:* The emergency provided an opportunity for the Ministry of Health to develop a strategy, albeit still under debate, to provide standardized care for victims of gender-based violence. It has shed light on this long-standing problem that has largely been overlooked.
- *Communicable diseases surveillance and control:* The establishment of a surveillance system based on 51 sentinel stations is a first for Haiti. Although late and fraught with serious quality issues, this experience has reinforced the Epidemiology Department of the Ministry of Health. The importance of further strengthening this department was demonstrated in the cholera outbreak late in 2010.

104 Some NGOs, as a matter of internal policy, were delivering free care without formally adhering to the SOG.

105 On a more international scale, the SIG and SOG programs contributed to the IASC Global Health Cluster position recommending removal of user fees for primary health care during humanitarian crises. See IASC (2010b).

- *Water services:* DINEPA, a relatively strong institution responsible for water distribution in Haiti, has emerged stronger from the disaster response. The quality of services offered to internally displaced populations (IDPs) by international partners exceeded that available in non-affected areas. The long-term benefit has been shown again during the subsequent cholera outbreak. Morbidity and mortality rates in temporary settlements were considerably lower in the IDP settlements.

- *Nutrition:* According to UNICEF, the emergency gave nutrition issues higher priority at the Ministry of Health and provided opportunities to strengthen programs at the department level.

- *Decentralization of management and services:* The response to the emergency contributed to revitalizing the trend toward decentralization of services to departments and the community level. The central level may have been weakened by the international response, but the local level has probably benefitted in terms of visibility and direct access to the international community. This has led to a renewal of the debate at the national level.

- *Reduction of vulnerability to earthquakes:* As is common after major earthquakes, awareness and commitment to disaster risk reduction increased considerably. The new health facilities (repaired or reconstructed) will comply with safety norms in the process of review. A joint World Bank and PAHO/WHO project will promote and monitor the development of guidelines and the implementation of the concept of safe hospitals as part of the reconstruction process.

In Haiti, the tragedy offered an impetus for incremental change in the medium-term.

Shortcomings in LRRD

Several aspects of the response in the first months were not supportive of a successful and rapid recovery. The most noticeable were the lack of NGO support to Ministry of Health strategic and policy initiatives, the practice of "poaching" human resources, the closure of a private for-profit hospital, and the weakening of the role and potential leadership of national institutions.

- The Ministry of Health had little leverage over the immediate response by NGOs and other actors. It focused pragmatically on recovery planning. Strategies and norms were developed only to be ignored or in some instances contradicted by NGOs that were supposed to be implementers. While reconstruction and development cannot be dictated by overly detailed planning at the central level, neither can it come about when there is systematic disregard of the technical norms and standards provided by line ministries.

- The practice of recruiting national health professionals from local health services, or "poaching," is common in all major natural disasters or conflicts. In the medium-term, as indicated earlier, this practice seriously weakens the recovery capacity of the country.

  Attempts by the Ministry and the Health Cluster to agree upon a standard approach regarding this recruitment and salaries were never seriously considered by the major medical NGOs that were competing among themselves (and with the UN) for the

services of the few local health professionals available. It was a market where the demand far exceeded the local offer. Qualified personnel were recruited not only from the public sector but also from the dedicated local NGOs unable to match salaries offered by international NGOs. There is no easy solution when the humanitarian industry operates in an unregulated, free market mode.

- The bankruptcy of a major private facility has ended an era of opening the for-profit sector to poor patients. The *Centre de diagnostic et traitement intégré* (CDTI) closed on 1 April, a situation in which everyone loses. Since the first hours after the impact, this hospital offered free emergency care to the affected population. CDTI reported treating 10,500 patients and performing some 2,000 surgical interventions in 10 weeks.[106]

  In an interview with the *Nouvelliste*, the main newspaper in Haiti, the CDTI director claimed "We did not receive any emergency funds during the three months of services that we offered."[107] However, this institution did receive an important amount of assistance in the form of essential medical supplies, equipment, and human resources. In fact, CDTI experienced severe economic difficulties long before the earthquake. The issue is not one hospital's fate but the fact that the international community is ill-equipped to deal with the issue of monetary compensation for the care provided at no cost by the for-profit sector. This issue should be addressed especially in situations where the role of a particular facility is critical.

- The weakening of health institutions will be discussed in more detail in the section on national coordination in Chapter 8.

106 Interestingly, some NGO interlocutors praised the quality of care and noted that it was one of the few facilities with a proper balance in the number of doctors and nurses.

107 The Nouvelliste. 6 April 2010.

Chapter

7

Information management

- Information management, including in the health sector, appears to be one of the weakest points of response in past disasters. The situation is compounded by the proliferation of general actors as well as agencies addressing highly specific needs.
- Considerably more human resources should be dedicated to intelligence gathering: the one who is best informed is the one with the moral authority to coordinate.
- Coordination cannot be effective in the absence of actionable information.

Disaster management is essentially information management. The main difference between decision making in crises versus in normal situations is not so much the humanitarian consequences but the higher levels of uncertainty. Decisions in sudden-onset disasters need to be made with limited or no accurate factual information. Therefore, emotions, institutional interests, or political considerations often prevail.

The Global Health Cluster led by WHO developed a list of suggested core health indicators.[108] Few of them were collected and monitored before the impact, least of all under the chaotic conditions and extreme pressure for immediate action.

108 See IASC, Global Health Cluster (2009), "Global health cluster suggested set of core indicators and benchmarks by category."

Information needs

Information needs are not limited to the traditional indicators of number of dead (a figure of no practical immediate value), the number of injured (when compiled, it is often too late for action), the number of homeless or IDPs (elusive but actionable data), and the number of damaged buildings/houses. What is needed is relatively specific information on the extent of additional and critical human needs caused by the disaster, and the amount of resources already on site or in the pipeline to address them. Too often, the assumption is that local capacity is overwhelmed or non-existent. This perception was unfortunately more accurate in the case of the 12 January earthquake in Haiti than for the disasters in Indonesia, Pakistan, and Sri Lanka, where local resources and solidarity were severely underestimated or discounted by the international community.

What matters are not the needs per se, but those needs that cannot be met with existing resources.

The initial rapid assessment

- In the initial "rapid" assessment, speed should prevail over perfection.
- Democratic consensus on all indicators and inclusiveness are incompatible with speed. Leave well enough alone.
- Assessments must lead to decision-making by comparing observed needs with existing capacity in light of practical constraints.

In catastrophic disasters such as the Indian Ocean tsunami or the earthquakes in Pakistan and Haiti, humanitarian partners will immediately deploy their assistance, before any data can be compiled and validated.

Needs can take many forms and change rapidly over time and place. Response (local or international) may rapidly meet some of the needs, rendering further intervention off target or counterproductive; some life-saving needs or vulnerable groups may be overlooked. An intersectoral (interagency) initial rapid assessment (IRA) should be the first step before more decisive and specific action is taken. It is potentially a critical tool for setting up broad priority areas to guide the global humanitarian response.

Speed is more important than comprehensiveness or high accuracy. Information from a "quick and dirty survey," to borrow an epidemiological term, should be available before donors and agencies have made all their decisions. It is better to have 60% confidence in data before the decision, than to wait two weeks for 95% statistical probability.

The IRAs in Haiti and in the tsunami-affected countries present both extremes. In the case of the tsunami, the initial assessment was rapid but so sketchy (a few pages) as to be of little use. In Haiti, the pursuit of technical perfection resulted in data that were too complex and too late to assist partners with operational decision making.

In Haiti, a specific IRA, called the Rapid Initial Needs Assessment for Haiti (RINAH), was launched on 23 January. To speed up the process, pre-agreed international

templates for IRAs were developed—and not used. Attempts to achieve consensus on areas of concern and priorities of all key actors led to lengthy negotiations among partners. As often is the case, the large number of parties in the discussion resulted in an inflated questionnaire including something for every agency's concern regardless of its relevance (in terms of importance or timing) for the beneficiaries.

Committee-driven design is particularly slow, as can be seen from the sequence below:

- Day 12 (23 January): The actual fieldwork for the assessment began; it concluded on 6 February.
- Day 29 (9 February): The Health Cluster reported: "the Rapid Initial Needs Assessment for Haiti (RINAH)[109] evaluated several sectors including water, hygiene, security, and sanitation, visiting 108 locations within Port-au-Prince and 98 locations outside of Port-au-Prince. Data are still being assimilated and analyzed and will be made available soon."[110]
- Day 39 (19 February): Announcements were made that a Revised Flash Appeal (the joint process for emergency fund raising) had been issued.[111] It would be assumed that the preliminary results of RINAH, although not officially released, were used in this process. At the same time three other assessments of interest to the health sector were completed or launched:
    - Key health partners who maintain networks of service providers in Haiti conducted an assessment of the impact of the earthquake on their service delivery;
    - A rapid assessment was carried out by the Ministry of Health with support from UNAIDS on the delivery of services for prevention of mother-to-child transmission of AIDS in West Department;
    - The Post-Disaster Needs Assessment (PDNA) was being organized by the Haiti government to guide recovery.
- On Day 45 (25 February), results of the RINAH (data with hundreds of tables and graphs) were released to all partners. Meanwhile, at the request of the Ministry of Health, an "emergency health information cell" was meeting within the Health Cluster to "assemble clearer information on the health situation in the country."

The methodology suffered from some design flaws: a questionnaire unsuitable for the Haitian context and language; a list of questions that were far too long (interviews lasted three hours); and some confusion between an assessment of the impact of the earthquake or of the ongoing poverty (CDC 2010a). The "severe security restrictions imposed by the UN." were also seen as an important factor delaying this and other rapid assessments (ACAPS 2010, Grünewald and Renaudin 2010).

The financial costs (estimated at US$ 3 million) and the resources required (128 workers, 18 evaluators, 23 helicopters, and 51 vehicles) were disproportionate in view of

109 Assessment Capacities Project (ACAPS), Rapid initial needs assessment for Haiti (RINAH). Conducted 23 January-6 February 2010.
110 Health Cluster Bulletin No. 19, 11 February 2010.
111 The revised flash appeal did not make mention of the RINHA but expected more information on longer term needs to be included in the Post Disaster Needs Assessment (PDNA), which had not yet been launched.

the lack of use of the results. The RINAH was only the first of 10 cross-sector surveys.

But more serious is the fact that these exercises systematically forget that needs assessment is not enough: Capacity assessment (existing resources and those in the pipeline) and proper analysis of constraints are essential components if the initial assessments are to be of any value to decision makers. These two elements were mostly missing in initial assessments carried out in the disasters under review.

These issues and problems were not specific to Haiti. After the Indian Ocean tsunami, the evaluators for the Tsunami Evaluation Commission (TEC) found that most of the interagency assessments failed to influence decision makers and donors. It should be noted that in past disasters investments in time and resources for the rapid assessment have been far more modest. Adding resources and funds did not contribute to better information or benefit the response in Haiti.

The Post-Disaster Needs Assessment (PDNA)

- Government ownership is essential: The PDNA is a valuable exercise to the extent that it builds on the capacity of the Ministry of Health and focuses the Government and its partners on health sector reconstruction early on. It should determine the shape of the health system that will emerge after the disaster.
- Broad participation of the health sector in the cross-sectoral recovery process is critical to ensure that basic health needs and priorities receive adequate attention in the rehabilitation and recovery process.

The PDNA process is comprehensive and therefore also time-consuming.[112] It pulls together information on the physical impacts of a disaster, the economic value of the damage (replacement cost) and losses (income or services), and the human impacts as experienced by the affected population.

One of the assets of the PDNA is its ownership by the government of the affected country. Although promoted and supported by the international community (UN, the World Bank, regional financial institutions, the EC, and others), the PDNA should be requested and led by the government.

In Haiti, as early as on Day 7 initial approaches were made for a scoping mission before the end of January.[113] However, the formal request was delayed until 16 February as the Government required changes in the Terms of Reference in order to assume true ownership.

As is often the case, balance shifted excessively towards infrastructure when many of the challenges were in the development of human resources and institutional building. The PDNA was also influenced (some said "carried away") by the anticipation of pledges, which, as seen from past disasters, do not fully materialize. The effec-

112 In Haiti, the initial draft of the health section required the full time efforts of several experts from UNICEF, UNFPA, the Interim Haiti Recovery Commission (IHRC), the Clinton Foundation, and CIDA as well as three professionals from WHO for up to four weeks. Over 15 professionals from the Ministry of Health were involved on a daily basis, one almost full-time.

113 At least twice earlier than in the aftermath of other disasters (Pakistan earthquake and Indian Ocean tsunami).

tiveness of the document itself (rather than the process) in guiding and influencing donors is seen as limited. Key donors participated proactively in the process, but most had probably already established their own priorities.

According to some interlocutors, the product was an "inspirational document with ambitious new ideas and horizons." However, most of these "new" ideas were already piloted somewhere in Haiti. In the health sector, an effort was made not to introduce policy directions that were completely alien.

Success stories in recovery (LRRD) such as decentralization of services, provision of some health services at no cost (obstetric and pediatric), and others were advocated in the PDNA and therefore facilitated. A positive result of this exercise was reaching consensus in the health sector on the interim (six-month) health plan developed by the Ministry of Health.[114]

The experience gained in Haiti will be valuable to guide the health recovery process in future disasters (WHO 2010c).

Specific assessments

- Consolidated information management should be the utmost priority in future disasters.
- Considerable human resources are required to transform the numerous surveys and assessments into collective strategic planning.

In Haiti, as in countries affected by other major disasters, there was a proliferation of specific surveys and assessments, almost as many as there were actors or problems to be addressed. The challenge of compiling and interpreting the results was overwhelming. A working group on information management was established within the Health Cluster, a Google group on assessment was led by OCHA to set up and update a "Survey of Surveys,"[115] while as noted before, an "emergency health information cell" was established by the Ministry of Health.

The need for timely information was insatiable: Who is doing what, where (3Ws)? Are the existing health facilities operational? Which key supplies are needed? What donations have been received and are potentially available? Where are the field hospitals and what are their capabilities? How many temporary settlements and with how many people (when new ones were spontaneously created every day)? How many people migrated toward departments and what is the absorption capacity of their services? What is the impact on food stocks, income, and availability and needs? What is the water availability and quality in camps and hospitals?

The list of queries fluctuated and expanded day-by-day. Agencies and clusters attempted to respond separately to many of those questions. Those mini-assessments may not

114 Haiti, Ministry of Health (2010), *Plan intérimaire du secteur santé: Mars 2010 - Septembre 2011.*
115 As noted in the Health Cluster Bulletin No. 22 (22 February 2010).

have provided the comprehensive view required for strategic orientation at the macro level, but in most instances they met the needs of the agency carrying out the survey.

It remains a question as to how often the better-targeted and specific assessment reports and the information compiled were timely and convincing enough to influence operational decisions of other partners in the humanitarian community.

Information on incoming assistance and actors

Information on incoming human resources (the responders)

- Information on available (or soon to be) resources is essential to determine unmet needs.
- The capacity to monitor the arrival and potential contribution of incoming health teams (lacking in past disasters) was further weakened by the proliferation of organizations in Haiti.

As shown in Chapter 4, an unusually high number of individuals, teams, field hospitals, and organizations flooded the affected areas. Efforts made at the international level to monitor, if not influence, this flow were far from effective.

As a first measure, incoming actors were required to register. This otherwise sensible approach was complicated by a duplication of efforts and processes required by national institutions. Health organizations had to register, in principle, with the Ministry of Planning, the Ministry of Health, the Health Commission established by the President, and finally the Health Cluster. When the Health Cluster was reporting over 200 agencies registered, the number complying with registration at the Ministry of Health was only 46. A much larger but unknown number of (smaller) actors were not registered with any institution.[116]

A valuable information product is the so-called 3W list: "Who is doing What and Where" (or in the 4W version: "When" and for how long). Compiling this list is time-consuming, and depends on the collaboration and transparency of actors (in absence of pro-active surveys or systematic visits). It is in constant need of updating so as not to quickly become obsolete. For months, only very rough 3W maps were available. The compilation of these lists, however incomplete, was an appreciated achievement in Haiti, although no evaluation of the actual use made of the information (or its effectiveness) is available.

The same can be said of the numerous maps developed for the health sector with the support of WFP and OCHA. Health actors frequently cited difficulties due to the lack of precise mapping of health services present in the camps and temporary settlements.[117]

Quality assurance is indispensable for proper response management, especially in the health field. Information provided at registration or in 3W lists is based almost

116 Many of the NGOs registered with the Presidential Health Commission (or the Cluster) believed that they were automatically registered with the Ministry of Health. This was not the case, which reflects the tension between administrative and political branches of the sector.

117 This was the responsibility of the agency in charge of Camps Coordination and Camp Management, not of the health sector. It is another result of the piecemeal international approach in the health sector.

entirely on what the actors say they do (or intend to do). It does not cover information on their operational capacity or professional competence. Since there were no provisions or resources for quality control of the incoming actors, the information provided by actors could not be validated. This has been a serious issue in all recent disasters, only made worse in Haiti with the exploding number of partners.[118]

Information on incoming supplies

The Logistics Support System (LSS/SUMA) has proven its value as a management tool of humanitarian supplies in recent disasters. In Haiti, it was one of the few international instruments directly managed by national authorities.

In most disaster situations, the management of incoming supplies is one of the major bottlenecks in the humanitarian system. In the health sector, large amounts of unsolicited and inappropriate supplies (expired medicines, used and unsuitable equipment, etc.) compete for scarce storage and transportation facilities. In past conflicts or natural disasters in Haiti and elsewhere, safely discarding unwanted medical supplies has been done at significant expense.

The main challenge is not only dealing physically with those inappropriate donations, but to know what has arrived where, and for whom. In major disasters it is common for agencies and authorities to make public appeals for urgent donations of medical items that are already available in large amounts in warehouses at an airport or at government or NGO facilities. The cross-sectoral coordination agency (Directorate for Civil Protection) and Ministry of Health had no general decision-making authority on the flow of donations in Haiti.

PAHO/WHO developed and routinely implemented SUMA, a cross-sectoral initiative for inventory and management of humanitarian supplies. It has been used for over 20 years in all disasters in the Americas and in many emergencies in other regions of the world. More recently, PAHO/WHO joined forces with other UN actors (among them WFP, the lead agency for the Logistics Cluster) to move SUMA to the more powerful Logistics Support System (LSS).

LSS/SUMA offers two different services: consolidated inventory at entry points and support to warehouse management. It is dedicated to the management of information not of the supplies themselves, which is the responsibility of the Logistics Cluster.

LSS/SUMA was activated very early in the response to the Haiti earthquake (see Table 7.1). Based both in Port-au-Prince and Santo Domingo, it provided decision makers (in the Directorate for Civil Protection) with cross-sector data so that they could better monitor and coordinate the entry of supplies into their own country. In the Dominican Republic, LSS/SUMA supported the management of warehouses.

118 Many interlocutors had anecdotal horror stories of unethical or incompetent behavior, ranging from disaster "tourism" to the unannounced closure of one organization's project and office in Port-au-Prince, leaving field staff stranded in departments without information or support.

Table 7.1 Timeline of LSS/SUMA activities in Haiti; January–March 2010

12 January	Impact of the earthquake
15 January	Arrival of the advance team (Haiti and the Dominican Republic)
16 January	Begin activities in Haiti and Santo Domingo; coordinate with Logistics Cluster and OCHA
23 January	Open a warehouse in Jimaní (Dominican Republic) for medical supplies in transit
1 February	Support from the White Helmets (Argentina); cooperation with IOM
10 February	Inventory starts at Port-au-Prince port facilities (recently reopened)
17 March	Meeting with Directorate for Civil Protection about lessons learned; development project initiated
Ongoing	Project to support capacity of the Haitian Directorate for Civil Protection

An important feature is that LSS/SUMA counterparts were primarily in the Haitian Directorate for Civil Protection.[119] The Government of Haiti owned and managed the information rather than the UN or another external agency. Having some post facto information on the supplies already on site was, however, not sufficient to influence and filter the donations themselves. The Directorate for Civil Protection played the lead role in activating and installing LSS/SUMA at two entry points (the airport and later the seaport); it was one of the very few international initiatives directly managed by this Haitian institution. The organization of LSS/SUMA in Haiti and categories of supplies inventoried are shown in Figures 7.1, 7.3.

In the health sector, LSS/SUMA supported PROMESS, the main channel for distribution of medical supplies on behalf of the Ministry of Health.

LSS/SUMA operates during emergencies by mobilizing dedicated volunteers from neighboring countries (in this case from the Dominican Republic, Nicaragua, and Argentina). Its deployment capacity is impressive due to the thousands of volunteers trained in Latin America and the Caribbean (as well as outside the Americas). It is a true example of regional solidarity in action.

119 Counterparts and local experts are trained in all countries of the Americas, Haiti included. As often occurs in major disasters, trained nationals faced competing demands and few were immediately available for what was perceived a less critical (not life-saving) activity.

Figure 7.1 LSS/SUMA supply coordination in Haiti and the Dominican Republic

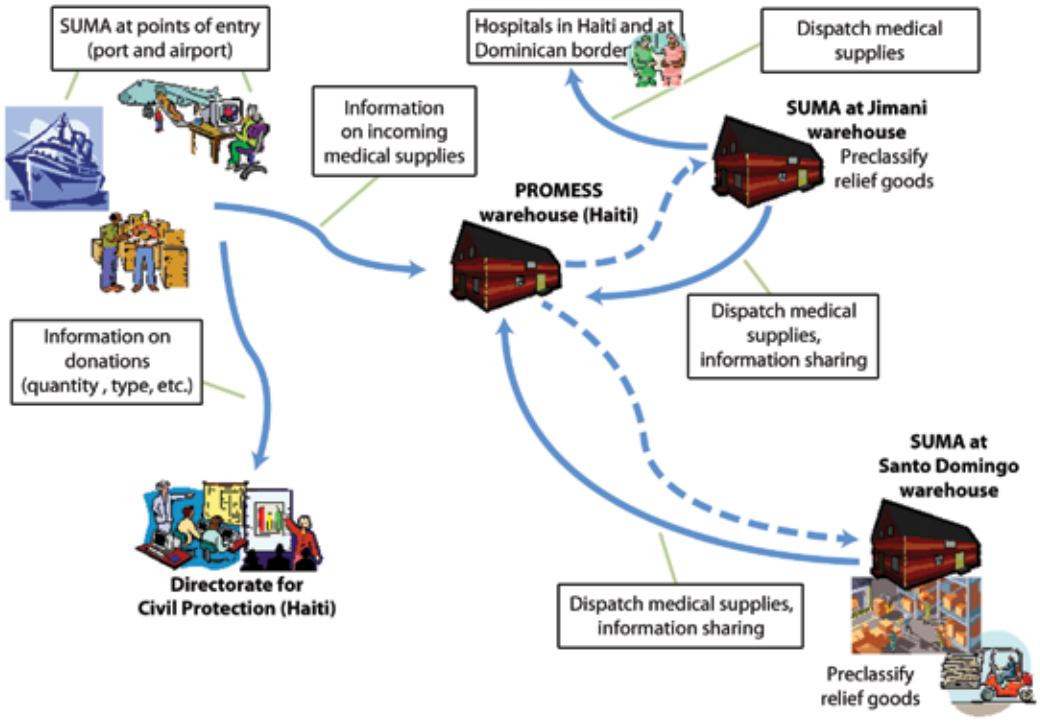
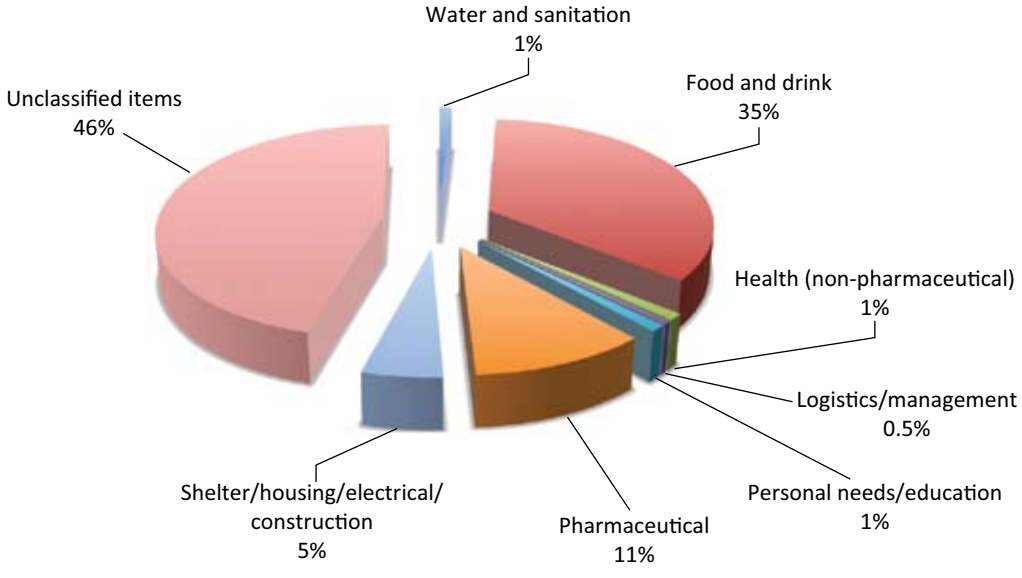
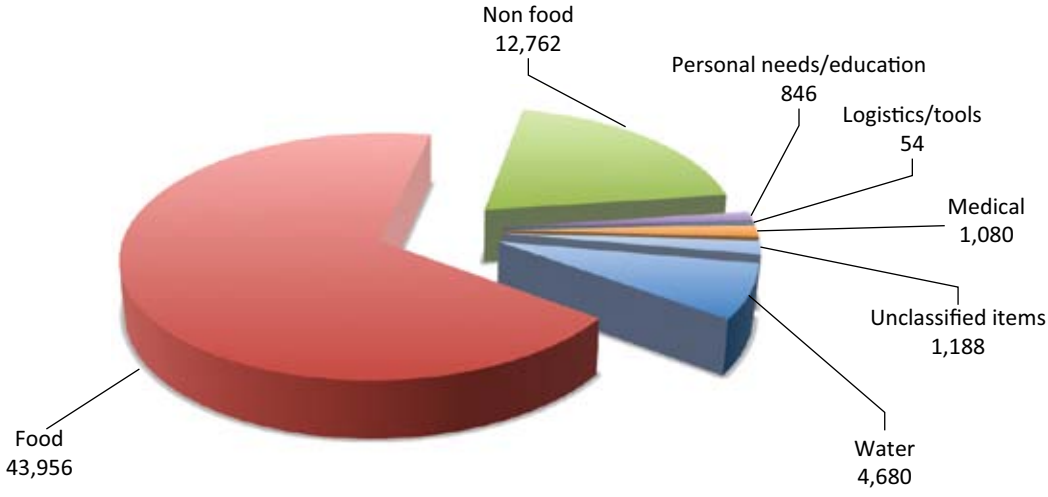


Figure 7.2 Categories of items arriving at Port-au-Prince airport, 16 January–25 February 2010



Percentages by category of supplies

Figure 7.3 Weight of supplies by category arriving at Port-au-Prince harbor



Source: Adapted from figures provided by V. Martinez and J. Venegas, PAHO/WHO, SUMA.

Dissemination of information

- Information should be available for on-site decision making as well as for institutional memory for future disasters.
- A common service information center, as was deployed after the tsunami, was lacking in Haiti.

Collecting and interpreting meaningful and timely information can be an almost impossible challenge in disasters. This has been noted in the aftermath of all disasters involving large numbers of actors. To influence decision making and effect changes, information must be available in the format that meets the specific requests and needs of the intended users.

Following the Indian Ocean tsunami, UN/OCHA established the Humanitarian Information Center (HIC), a common service information desk where newcomers could register, receive copies of existing information and maps, as well as file their own reports for dissemination.

In Haiti, the HIC was not formally activated in spite of the much greater flow of visitors and general enquiries.[120] Sectors were basically left with the task of briefing all incoming visitors regardless of their potential to contribute positively. This distracted

120 The map center set up by OCHA did provide printed and soft format maps.

health experts from more serious and productive tasks. Another significant source of distraction was the constant demand on the time of coordinators and field staff to repackage the same information (or lack of) in distinct formats and styles according to the specific purpose of the request (administrative, information for the agency's executive management, fund raising, public relations, or merely to justify a request for support).

While efforts were made to improve the immediate dissemination of information to operational partners,[121] less attention has been given to preserving this perishable data for future use. During the tsunami response, the HIC played the role of depository. There was no single point when key documents produced in the first few months in Haiti were systematically saved in electronic format for public or academic access.[122] Of particular interest would be access to the e-mail "inbox" and "sent box" of the clusters so as to appreciate the changing patterns and flow of requests and action. Early cluster e-mail exchanges were not available for research purposes (lost or corrupted files for the health sector and access not granted for others). As a matter of transparency and for the sake of collective memory, cluster files and archives should be in the public domain.

To address this lack of institutional memory, several data rescue projects have been launched, almost as an afterthought.[123] Those projects are no substitute for a policy of systematic, long-term preservation and sharing of files as initiated by the HIC in the aftermath of the tsunami.

Mass media and social media

- Haiti response confirmed the preeminent role of the mass media. In light of their influence on the flow and nature of assistance, the health sector would benefit by involving them more closely in its information management activities.
- For the first time, social media played a large role in information dissemination. Its potential should be explored and, if possible, harnessed before the next disaster.

Both traditional mass media and new social media played a critical role in encouraging generous support for Haiti. It was a double-edged sword: it was positive when it motivated the public and governments to provide financial and operational support, but negative when it incited a deluge of well-intentioned but unsuitable supplies or personnel.

121 This became the main *raison d'être* of the numerous meetings.

122 The Emergency Operations Center (EOC) of PAHO/WHO was close to filling this role internally. It has a remarkable collection of documents, situation reports, and documentation related to health. Its function, however, is not for document preservation and access.

123 The U.S. National Library of Medicine and PAHO/WHO are collaborating on the "Project for collecting, preserving and disseminating health and disaster information after the January 2010 earthquake." The University of Haiti (UEH) and Tulane University Disaster Resilience Leadership Academy (DRLA) have conducted a review of over 500 documents related to the earthquake, 94 of which have been classified in a database (available at www.drlatulane.org).

124 During the first two months after the earthquake there was no local coverage by traditional news media in Haiti (national television news or newspapers) due to the extensive damage to communications and transport infrastructure and serious deficiencies in utilities services. Foreign outlets included, among others, CNN, the *New York Times,* and *Los Angeles Times.*

Mass media

In past humanitarian crises foreign news outlets carried extensive coverage from the first day of impact.[124] Their capacity to react quickly and obtain information is impressive. Their ability to deploy resources is far superior to that of most humanitarian agencies.

It is difficult to gauge to what extent official allocations of funding and deployment were influenced by the public perceptions shaped by the rapid media coverage rather than by formal assessments from UN and other humanitarian agencies. Interviews in Haiti and similar studies of past disasters suggest that the media play the major role in this regard, although not always with the most reliable or objective information.[125]

In all major disasters, the accuracy of the information in the mass media may be determined by the need to oversimplify complex situations. The perception is that the public prefers black and white stories. Accuracy is also influenced by the quality of briefings provided by partners and stakeholders. Pacifying comments such as the "situation is under control" are generally poorly received. Alarming information even if intended to generate support for a special group or issue usually finds a more receptive audience. The responsibility to improve the quality of media coverage lies with the humanitarian actors who should give higher priority to informing the public about effective response than to securing favorable coverage for their activities.

When the objective of media briefings is to inform the public on health impacts or educate it, for example, on the need for sanitation or the absence of risk caused by dead bodies, the message is generally understood.

In Haiti, relations between health actors and the media appeared predominantly directed toward the impact on public relations (the agency image) rather than on a partnership to better inform and educate the public on what actions were likely to be effective. Greater benefit for the affected population would result from improved collaboration between humanitarian agencies and the media, for instance by embedding selected journalists in initial assessment missions.[126]

Social media

On 22 January a reporter for the BBC (MacLeod 2010) commented:

> *"New and emerging media played a key role in breaking news to the outside world of the Haiti earthquake. Citizens turned to a range of networking tools in a bid to share the news and personal stories from microblogging on Twitter and video-sharing on YouTube to the internet telephone application Skype, and the social media site Facebook. For over 24 hours after the quake, countless reports and images came not only from big, established news organisations but from ordinary people on the spot. …*

125 Authors of an evaluation of the response to the Indian Ocean tsunami make this observation: "The mass media, not the UN or another humanitarian body, was able to provide early and 'convincing' comprehensive formal assessment of immediate needs" in the aftermath of the tsunami. "The quality of this information, and especially the tendency to pick up the most negative, frightening or outrageous statements from any unqualified source, has long been a matter of legitimate complaint from responsible and professional disaster managers" (de Ville de Goyet and Morinière 2006; 14, 58).

126 This was a recommendation of the Tsunami Evaluation Coalition (recommendation No. 11) (de Ville de Goyet and Morinière 2006).

"However, aid agencies, charities and others pointed out that while news was being broken and getting out of the country via new and emerging media, such platforms were often unable to provide practical assistance to victims."

It is too early to conclude what may be the role of social media in the management of future disasters. As noted in regard to Haiti, social media were "calling into question the ingrained view of unidirectional, official-to-public information broadcasts. Social media may also offer potential psychological benefit for vulnerable populations gained through participation as stakeholders in the response" (Keim and Noji 2011).

However, this new form of peer-to-peer information collection and sharing played a significant role in identifying needs. Web-based platforms such as Ushahidi[127] became information providers linked to geographic information systems, and produced interactive maps through Google maps. There may be caveats for these emerging systems, but they proved very useful at the time to direct ambulances to the injured or sick and to allocate relief.

Official reports from the government and humanitarian organizations are unlikely to remain the only source of information (apart from the mass media) and may be increasingly challenged in the future by a "bottom-up" flow of information.

The shortcomings noted do not reflect a lack of dedication or concern on the part of the coordinators and managers, but rather the complexity of fast evolving, multifaceted needs and response unmatched by corresponding institutional investment.

The Health Cluster Coordinator in her one-month report clearly identifies information management as one of two pillars for future activities. It was defined as: "The construction of an information management system/situation room that allows for decisions on actions via a clear presentation about the initial needs, trends, service provision, epidemiologic alerts, status of the national health system (facilities, staff) and international cooperation, so as to see where are the priorities and gaps, to define actions, to monitor implementation, and to evaluate results" (Van Alphen 2010).

127 Ushahidi (which means "testimony" in Swahili) is a data-mapping platform that was first used in 2007 in Kenya. The developers used it "to collate and locate reports of unrest sent in by the public via text message, e mail and social media . . . Ushahidi quickly became the world's default platform for mapping crises, disasters and political upheaval. [By May of 2011] Ushahidi, which is free to download, had been used 14,000 times in 128 countries to map everything from last year's earthquake in Haiti to this year's Japanese tsunami. . . . "(Perry 2011).

One of the biggest challenges faced by Dr. Alex Larsen, then Minister of Health (middle), during the first months of the response was keeping track of all the different organizations that were in Haiti: by mid April, 396 international agencies registered with the Health Cluster, 50 of those were registered with the Ministry of Health. Seventy-six agencies left the country two weeks after the earthquake.

Photo: PAHO/WHO, Victor Ariscain

Chapter

8

Coordination

- The primary responsibility for coordination lies with national authorities.
- Although direct external coordination may be required for a short period after a sudden-onset natural disaster, it cannot exercise the same authority over humanitarian partners that a legitimate government can.
- A mechanism and set date for transfer of responsibility were lacking in all recent disasters.

Coordination has been discussed in several places in this publication. Overall, there is a strong consensus that the response from all sectors was chaotic and poorly coordinated in Haiti.

The same was said for the response to the tsunami and to the Pakistan earthquake. However, in the aftermath of Haiti, several editorials and articles in professional journals raised serious and fundamental issues regarding the current status of international response. Abstracts of titles are illustrative of the malaise: "Growth of aid and the decline of humanitarianism," "Unintended consequences of humanitarian volunteerism," and "Cacophonies of aid."[128] The fact that these critiques were published in peer-reviewed scientific publications and not only in the mass media is significant.

This chapter will summarize the health sector findings from many interviews and review of extensive bibliography. The alternatives and way forward will be discussed in the next chapter on key lessons.

128 See: "Editorial: Growth of aid and the decline of humanitarianism" *Lancet* (2010), 375(9711):253; Jobe K., "Disaster relief in post-earthquake Haiti: unintended consequences of humanitarian volunteerism" *Travel Med Infect Dis* (2011), 9(1):1—5; and Zanotti L., "Cacophonies of aid, failed state building and NGOs in Haiti: setting the stage for disaster, envisioning the future" *Third World Q* (2010), 31(5):755–71.

What is coordination and who is responsible?

Coordination has a distinct meaning for every actor. Some see coordination merely as a forum to learn what others are doing, while for others it is the authoritative setting of priorities by the coordinating body, with resources being allocated and activities permitted accordingly. For many, it is also a mechanism of quality control whereby the "mushroom" operators (popping up overnight) without experience and resources are weeded out.

All profess to be willing to coordinate *with* others. Few accept being coordinated. Many operational partners, while decrying the vacuum of authority as a major impediment to effective relief, in fact see it as convenient.

There is not always a clear understanding about who has the authority to coordinate the health response. That should not be the case: the UN General Assembly Resolution 46/182 acknowledges clearly that the Government has primary responsibility in organizing humanitarian assistance in a disaster. In the aftermath of a natural disaster in a country with a recognized government, the authority for all health issues should remain with the Ministry of Health of the affected country, not with international, ad hoc structures. The issue may be blurred or debatable in conflict situations or in failed states. The latter situation was not the case in Haiti.

Whether a weak institution in a country so severely crippled by a disaster could coordinate the highly complex web of agencies and actors *alone* is another matter. Specialized UN agencies and mechanisms play a key role in assisting the health authorities and in some instances *temporarily* accept the burden of de facto coordinating the response. In the same way that the Government of Haiti formally delegated its authority over airport operations and Haitian airspace to the United States, it implicitly delegated overall or sectoral coordination of the external response to the UN. As was the case in Pakistan, the authorities initially welcomed the establishment of the UN Clusters on the understanding that they would strengthen the capacity of line ministries while they readied themselves to assume leadership.

National coordination

Cross-sectoral national coordination

- Weak and poorly performing national organizations tend to be marginalized and further debilitated by the international response while the stronger ones may emerge strengthened.
- In the same way that the most vulnerable individuals among the affected population should receive special attention from the humanitarian responders, the weak or "vulnerable" national institutions should benefit early from special support from the international community and donors. This is particularly important when the mandate of those institutions is critical for survival and recovery, as in the case of the Ministry of Health.

The coordination mechanisms for dealing with disasters are relatively complex in Haiti.[129] The operational arm of the system is the Directorate for Civil Protection (DPC). DPC presence at the provincial and municipal levels is uneven.

129 In 1999, the National System for the Management of Risk and Disasters (SNGRD) was established. The SNGRD consists of 26 governmental and nongovernmental institutions involved in disaster preparedness and response. The Directorate for Civil Protection (DPC) is a central directorate of the Ministry of Interior and is the executive arm of the SNGRD.

In emergencies, the Government activates the Emergency Operations Center *(Centre d'Opération d'Urgence—COU)*, which brings together the relevant institutions. Surprisingly, this center was not activated after the earthquake. This had consequences, as many of the national institutions felt relatively lost in this "institutional vacuum."

In the first months, external funding and logistics support for overall coordination kept flowing to the UN and international agencies, bypassing the DPC coordinators. DPC staff were left almost without personal or professional means while young, inexperienced, foreign volunteers had transport facilities, internet and communication access, food, and accommodation.

The adoption of English as the working language of all coordination and briefing meetings, the location of those meetings in the MINUSTAH base ("Logbase") with restricted access for Haitian nationals, and the sheer imbalance in number of attendees ("one Haitian official versus 150 internationals" as said by an interviewee) made it extremely difficult for the DPC to reclaim leadership and assume its coordination role.

For affected populations the benefit of international agencies assuming the lead in the first weeks is not questioned. Those agencies have had greater experience and have the skills for this task.[130] Their leadership was necessary in the immediate response when speed meant lives saved. However, the fact that their control persisted throughout the recovery and rehabilitation process with only token participation of the DPC is of concern.[131]

The Presidential Commissions

An ad hoc mechanism was established a few days after the earthquake to assert Haitian State leadership in the response: the Presidential Commissions. Directly linked to the President and perceived as *"double pouvoir"* by some line ministries who felt deprived of their administrative responsibilities, these commissions contributed to blurring lines and weakening tested links of the normal mechanisms.

In the health sector, one of the added values of the Presidential Health Commission was the participation of academic and other national health actors in addition to the Ministry staff. The first location of its office in the vicinity of the airport (the de facto center of all humanitarian coordination activities and temporary headquarters of most UN agencies)[132] greatly facilitated closer contact. Opinions vary regarding the value of setting up this Health Commission in an atmosphere of protracted tensions between political decision makers and administrators within the health ministry, a problem mentioned by several key interlocutors. Some see this initiative as alleviating the problem while others see a third stakeholder as a complicating factor.

Ministry of Health

Being a line Ministry in a very specialized and regulated area (rather than a central directorate, as the DPC), one would expect that the Ministry's authority would be less challenged. It was not challenged—it was mostly ignored.

130 The caliber, seniority and experience of inter-Cluster coordinators, as well as the speed of their arrival were questioned in interviews and external evaluation reports.

131 The situation is reportedly similar 18 months after impact.

132 Being part of the military peacekeeping headquarters, access to Logbase was first denied and later merely difficult for Haitians who were not employees of international agencies, including officials of the government.

Over 70% of the health budget is externally funded. Most of the health resources (facilities, staff, and budget) are not under the control and management of the State but of donors and NGOs, who are often critical of the lack of leadership and governance in the sector. A vicious circle is sustained as key decisions are ultimately taken outside the Ministry.

The Ministry of Health had not invested seriously in its preparedness for major emergencies. The Disaster Preparedness Unit remained grossly understaffed and was ineffective and marginalized in this mega-crisis. With the loss of its main building with staff, files and equipment, the Ministry was ill-equipped to exercise leadership over an unruly humanitarian community. A weak institution further weakened by the impact was no match for financially independent NGOs that felt they had the backing of the UN, the donors (cooperation agencies and/or public opinion), and their own constituencies. NGOs could and regularly did opt out from any policy or strategy set by the Ministry.

This marginalization persisted throughout the year in spite of UNICEF and WHO support to the Ministry.[133] Strengthening the Ministry's ability for strategic planning and its capacity to deliver, areas of greatest weakness in the eyes of the partners, was not a priority for the international humanitarian community.[134] This situation was far from unique to Haiti. It was noted in Indonesia and Sri Lanka (although the Cluster approach had not yet been adopted in 2004) and in Pakistan. However, in those countries dependence on external assistance was minimal and institutions were able to reassert their authority to a considerable extent. This was due to the efforts of national authorities, not as a planned strategy by international actors.

A success story: the water and sanitation agency

As noted in Chapter 6, DINEPA, the water and sanitation institution in Haiti, offered an example of how a national entity could reclaim and assume its leadership and successfully coordinate the partners in its area of competence.

How easily this could have been duplicated in other sectors—in health in particular— is debatable. Water and sanitation is far less emotional and visible (and consequently less political internationally) than medical care. DINEPA, a relatively well organized and efficient institution prior to the earthquake, was already receiving direct funding from major donors and it did not suffer significantly from the impact of the earthquake.

To conclude, a comment published on 3 February (three weeks after impact) by an NGO working in Haiti says it best (Ivers and Cullen 2010):

> *"[T]he international community needs to prioritize medium- and long-term investment in the health care system of Haiti, which was weak before the earthquake. Support must be sustained and promises kept if Haiti is to be rebuilt not only with stronger buildings, but also with a greatly strengthened ministry of health that sets the priorities. NGOs must then adopt these priorities and work in part-*

133 In fact, WHO experience during the crisis has been one of a much closer association and more open dialogue with the highest authorities than ever before.

134 A common critique is the proliferation of strategic official documents or plans that are never implemented by the Ministry of Health. However, resources and means for implementation were often not in the control of the Ministry but of its independent minded partners.

nership with the Haitian government to achieve them. We at Partners in Health—which has worked in Haiti for 20 years—continue to believe that the Haitian people can be empowered to take care of one another if they are given monetary support and solidarity."

International coordination

Humanitarian Reform and the health sector

The Inter-Agency Standing Committee (IASC) is the inter-agency forum for coordination, policy development, and decision making involving the key external UN and non-UN humanitarian partners. It was established in June 1992 in response to United Nations General Assembly Resolution 46/182 on the strengthening of humanitarian assistance. General Assembly Resolution 48/57 affirmed its role as the primary mechanism for inter-agency coordination of humanitarian assistance.

Members are the UN operational agencies and selected non-UN humanitarian agencies are standing invitees.[135] There is no representation or input from disaster-affected countries.

In 2005, the IASC adopted an ambitious Humanitarian Reform covering several areas: financing of assistance, strengthening the function of the Humanitarian Coordinator in the UN, and more systematic and predictable attention to all main sectors of response ("the Cluster Approach") (Holmes 2007). The cluster approach is of more direct concern to the health ministries in affected countries.

The cluster approach intends to introduce a system of sectoral coordination agreed upon among external humanitarian actors. It is intended as a mechanism that can help to address identified gaps in response and enhance the quality of humanitarian action.[136]

In September 2005 the IASC agreed to designate global "cluster leads" in nine sectors or areas of activity. These global sectors (clusters) as defined by the IASC closely reflect the distribution of mandates among main UN agencies:

Technical areas:

1. Nutrition
2. Health
3. Water/Sanitation
4. Emergency Shelter

135 International Committee of the Red Cross (ICRC) and International Federation of Red Cross and Red Crescent Societies (IFRC) are standing invitees. NGOs are represented by the International Council of Voluntary Agencies (ICVA) or InterAction which are associations of NGOs.

136 Summarized from the IASC Guidance Note on Using the Cluster Approach to Strengthen Humanitarian Response (24 November 2006).

Cross-cutting areas:

5. Camp Coordination/Management
6. Protection
7. Early Recovery

Common service areas:

8. Logistics
9. Emergency Telecommunications

Health, which is an all-inclusive concept,[137] was thereby split into three technical areas (nutrition, health, and water and sanitation).

The IASC principals (the head of agencies) agreed that at country level the cluster approach should be applied, with some flexibility, in all new emergencies.

The nature of the links between clusters and the host government "will depend on the situation in each country and on the willingness and capacity of each of these actors to lead or participate in humanitarian activities."[138] According to the procedures for field activation of the clusters, the UN Resident Coordinator, following consultations with the Humanitarian Country Team, submits the decision for approval by the UN Under-Secretary-General and Emergency Relief Coordinator. The host Government and all other partners are then informed of the decision taken.

Global, regional and local coordination

- Disasters triggering a global response call for global coordination.
- Priority setting and actual coordination must take place in the affected country to ensure that the response is relevant to the unique local context.

International coordination must be done where the action is taking place and where all humanitarian partners are: at national and sub-national levels.

Regional and global levels should be in a support mode. Country offices of development agencies are designed for long-term cooperation and are not always particularly suited for managing emergency information and coordinating a massive response of "new actors" in the aftermath of a sudden-onset disaster. The national office, regardless of its sectoral mandate, should be offered and accept strong reinforcement of management staff with humanitarian experience.[139]

In Haiti, the magnitude of the disaster and the global nature of the response called for strong participation of global coordination mechanisms. In spite of their efforts to play a lead role, regional organizations (political or technical), did not have the

137 The WHO constitution defines health as "a state of complete physical, mental and social well being and not merely the absence of disease or infirmity."

138 See the One Response web site: http://oneresponse.info/Coordination/ClusterApproach/Pages/Global%20Cluster%20Leads.aspx.

139 Sending additional staff to Haiti caused some resistance in development agencies both in terms of finding the appropriate people at an agency's headquarters, and accepting the additional expertise in the country office.

critical mass to assume this leadership. The contributions of OAS, CARICOM, and CDEMA, among others, were most valuable but were dwarfed by the sheer volume of the international assistance.[140] PAHO/WHO, as a regional health body, did not have the capacity to quickly mobilize a sufficient number of experts, especially given the desirability of French language skills and familiarity with Haiti, which is uncharacteristic of other countries in the region.

The most valuable asset of a regional office remains its closeness to the health authorities, the health services, and the health conditions. This familiarity with the local context is an important asset to ensure that future coordination strengthens rather than hampers the capacity of the Ministry of Health.

Cluster application and health implications in Haiti

- Clusters in a given country should reflect the mandate of the line ministries.
- When necessary, participation should be limited to those in a position to offer a significant contribution.
- At the early stage, a small executive committee and technical work groups should be established under the leadership of the Ministry of Health.

At the global level, the normative work of the Global Clusters resulted in an array of technical guidelines that facilitated and guided the field work (for instance, on user fees in emergency situations, mental health and psychosocial assistance, gender-based violence, etc.).

At the country level, Haiti already had experience working with clusters during the response to the tropical storms and hurricanes that hit the country in August and September 2008. Many of the findings and recommendations in the Cluster Evaluation for Haiti (Binder and Grünewald 2010), which was carried out before the earthquake, remain pertinent. Some of the most relevant are:

- "Undermining of local ownership due to a top-down approach and a membership excluding local NGOs and government or donors;
- "Lack of clear criteria for activation and deactivation;
- "Improved identification of existing gaps but no evidence of those gaps being better filled;
- "Improved information sharing but poor information management (lost or untimely information);
- "Weak inter-cluster (cross-sectorial) coordination…"

In the case of the 12 January earthquake, the devastating impact on the weak capacity of the Haitian Government made activating the clusters the most promising approach for some measure of coordination at least during the first few weeks of the response.

140 An original and much appreciated initiative from CDEMA has been to sponsor short periods of rest in Jamaica for key staff of Haiti's Ministry of Health. The initiative was very similar to the statutory "Rest and Recuperation" (RR) leave with full pay granted to international UN staff who were required to work for extended periods at the duty stations under hazardous, stressful and difficult conditions.

The number of sectors/clusters activated in Haiti exceed the number initially envisaged by the Humanitarian Reform: agriculture, camp coordination/management, early recovery, education, emergency telecommunications, food distribution, health, logistics, nutrition, protection (which included two sub-clusters: child protection and gender-based violence), shelters, non-food items, and finally water, sanitation, and hygiene–a total of 12 clusters and two subsectors. All clusters were led by an international agency with the exception of the water, sanitation, and hygiene cluster, initially assigned to UNICEF but actually led by DINEPA at its own request.

The structure adopted did not seek to match the structure of the Haitian State that the system was designed to assist. For instance, the responsibilities of the Ministry of Health were distributed to the three clusters but also to a higher number of working groups, several under additional clusters (camp management, protection, etc.). This should be avoided in future disasters by matching the clusters structure to the scope of mandate of the line ministries.

The section below focuses on the Health Cluster. It was responsible for everything health related for which another cluster had not been set up.

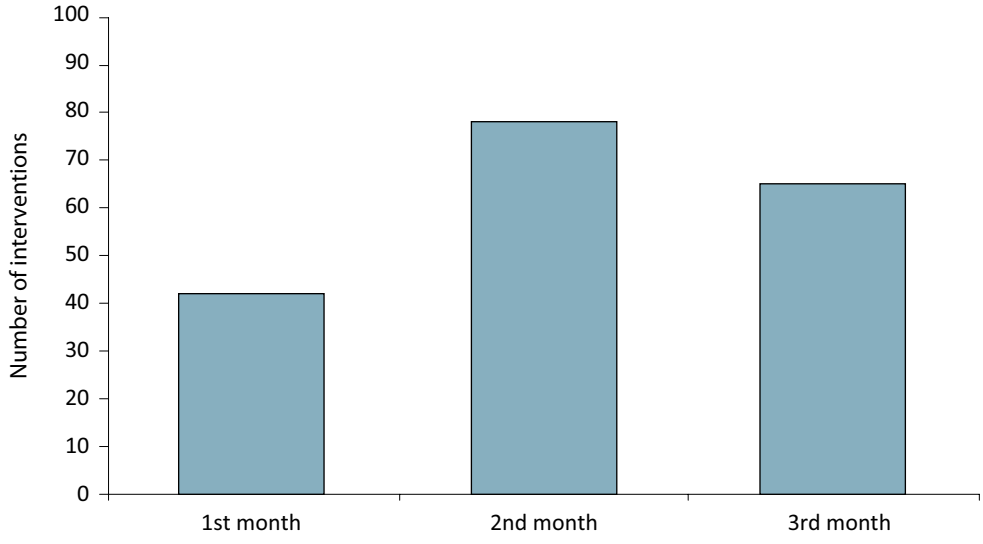
The initial implementation of the Health Cluster met considerable challenges and had a slow learning curve. The challenges included:

- Severe logistics limitations, among which were security restrictions. As noted by the UN Humanitarian Coordinator in May 2010, "there has been ongoing discussion of protecting 'humanitarian space'. Yet Haiti is not the [Democratic Republic of the Congo]; the humanitarian response is not taking place in a war zone, in an environment of civil conflict between warring factions." This statement is supported by evidence that "between 2007 and 2009 collective violence had dramatically declined even if other forms of violence—that is, sexual and gender-based—began to appear more visible" (Muggah 2010).

- A randomized household survey (n=2,940) in the months after the earthquake indicated that crime and victimization rates were lower than announced in the global media. "Contrary to media claims of widespread looting and organised theft, the vast majority of Port-au-Prince residents reported that neither they nor any members of their household had had property stolen from them or intentionally destroyed by others since the earthquake"(Muggah 2010). Only 20% of the respondents considered insecurity/crime a very serious or serious problem after the earthquake compared to 62.9% prior to the earthquake. (Kolbe 2009, Kolbe and Muggah 2010).

  These findings are supported by the lower number of gunshot wounds treated by MSF in the first month after the earthquake (see Figure 8.1). As noted by MSF, interventions for gunshot wounds are part of everyday life in Haiti, but they were less frequent in the first month following the earthquake.

Figure 8.1 Number of operations for gunshot wounds performed in MSF facilities, 13 January to 12 April 2010, Haiti



Source: Axelle Ronsse, Médicins sans Frontières, Surgical response to the 2010 Haiti earthquake (powerpoint presentation). Used with permission.

- The distinct perception at international level and the resulting restrictions, which were perhaps due to unrealisitically alarmist scenarios and extraneous considerations, further alienated the UN actors from their counterparts and the population.[141] A new UN Security Management System was intended to move decision-making away from "go/no-go" to balancing risk and opportunity.[142] Its application was not felt yet in Haiti.

- A large number of organizations performed far above expectations but a significant number were minor actors without significant experience or resources and therefore unable to offer added value. The Health Cluster meetings became an opportunity to claim visibility (flag waving) or for newcomers to collect basic information on what to do and where to go. The strategic coordination objective was lost. To keep clusters from collapsing under their own weight in future disasters, filtering or "triage" of participants may be required. Cluster support should be directed to those agencies and actors most likely to provide significant benefits for the health of the affected population.

141 The early and excellent decision of PAHO/WHO to move into PROMESS facilities rather than to the MINUSTAH base ("LogBase")—as instructed by UN security—had a positive impact on its future activities, offsetting the disadvantages of being relatively far from the clusters' meeting place.

142 This shift from risk aversion to risk management represents the culmination of the past decade's evolution in thinking and methodology for programming in insecure conditions. Key to this shift is the concept of the enabling security approach, i.e., an approach that focuses on "how to provide services" as opposed to "when to be grounded". Under this new approach, the use of military or armed escorts for humanitarian agencies is purely a security risk mitigation measure to reduce security risks from one acceptable risk level to another (rather than reducing risk from an unacceptable to an acceptable level as remained mostly the case in the response to the earthquake).

A slow learning curve resulted from the extreme pressure on the few senior staff involved in the cluster process. Responding to urgent needs delayed important decisions. Among the positive measures taken belatedly were:

- Setting up a select group of agencies working in Haiti before, during, and after the earthquake to agree upon strategic options and collectively guide the process: The cluster was initially conceived precisely to provide this guidance. Democratic consensus-building among all participants proves not to be effective in acute response management. After several weeks this "small committee," where keys options and decisions were debated, was quietly set up among 19 larger agencies that have a long-term commitment in Haiti.[143]

- Organizing technical working groups where specific thematic topics could be discussed at the level of practical details: Ultimately those working groups included the following topics: hospitals, mobile clinics, mental health and psychosocial support, vector control, epidemiology, disabilities, and information. Experience has shown in the disasters in Haiti, Indonesia, Sri Lanka, Pakistan, and others that the work in thematic sub-groups was far more concrete and productive than in the large forum. In future disasters, establishing some or all of those groups from the early stage of the emergency should be considered.

- Decentralizing the Health Cluster to departments (away from the capital): a very efficient measure that should be planned earlier in future large disasters.

In addition to coordinating the outcome from all those sub-groups, the health sector was also attempting to maintain coherence in public health activities that were being coordinated by other clusters (nutrition, hygiene and community health education, reproductive health, HIV/AIDS, and gender-based violence, among others).

As noted in the 2009 evaluation of clusters in six country studies (including Haiti, Hurricane 2008), inter-cluster coordination was ineffective in most cases and did not lead to integration of cross-cutting issues (IASC 2010a, 6). This observation was still accurate in 2010.

In spite of the serious shortcomings in terms of national ownership, this donor-supported approach has considerable value *in the first weeks* especially when those national coordinating bodies which are severely affected are still under the shock of the impact. If coordination was difficult to achieve, it is due to the absence of legal or formal authority over the "partners," normally the exclusive prerogative of the State, and the chaotic and exponential escalation of humanitarian assistance rather than to the faulty design of this gap-filling coordination model. It must be said, however, that in disasters of the scale of Haiti's, effective coordination is almost impossible to achieve.

The clusters rapidly outlived their usefulness—and their welcome—with Haitian counterparts. The failure of the humanitarian community to implement an early albeit progressive and monitored transfer of leadership and responsibility to the national Directorate for Civil Protection, the Ministry of Health and other line ministries rapidly eroded the tenuous legitimacy of the clusters in a country with an established and recognized government. The result has been a weakening of the institutions: The principle of "First, do no Harm"

143 Unfortunately the Ministry of Health was not systematically invited to participate in the "small committee" meetings.

has been overlooked. Unfortunately, the situation after the earthquake in Haiti was no exception. This has been observed and reported in past major disasters.

The argument of the inherent inability of the Haitian authorities to manage such a crisis has been proven fallacious in view of the role played by DINEPA. It demonstrated that such a transition or sharing of power was indeed possible even in the difficult environment of Haiti.

The coordination by lead agencies, mostly UN agencies, left room for considerable improvement. However, challenges and obstacles to coordination were not limited to the international system. The response taxed the coordination mechanisms of the largest donors as well. In the health sector, the U.S. Department of Health and Human Services (HHS) worked in an environment in which the Department of State served as the lead for the fatality management mission, USAID served as the lead for public health and medical care to the Haitian population, the Department of Homeland Security was the lead for repatriation of U.S. citizens, and the Department of State with the Federal Emergency Management Agency (FEMA) coordinated patient movements. That was just for Health and Human Services' own activities. In addition, health assistance was provided by the Department of Defense and Department of State agencies.

If achieving effective communication and coordination in the response from one country was difficult, the task of coordinating all actors was far more complex and ambitious.

The health sector's ultimate goal during a disaster remains reducing all possible avoidable deaths, disabilities and suffering. *(Picture taken at the pediatric ward of the HUEH hospital)*.

Photo: PAHO/WHO Victor Ariscain

Chapter

9

Key strategic lessons for the next sudden-onset disaster

In this chapter, the focus is on strategic lessons of global use. Among sudden-onset disasters, earthquakes pose a particularly difficult challenge to the international community. Speed and professionalism during the response are critical. Among earthquakes, Haiti was an exceptional situation. Consequently, not all the lessons from Haiti will be relevant to the next catastrophic earthquake.

The magnitude of international response has increased dramatically from one disaster to the next. This growth has many positive aspects:

- First, many developing countries, neighbors or not, are now joining the more traditional humanitarian donors to respond to disasters. A number of specialized

agencies are filling small niches neglected in the past and new NGOs are providing collective services to other partners (communications, information, logistics, etc.). There are now numerous organizations active in a variety of health disciplines, creating the potential for great diversity and coverage of services.

- This rapid growth has come with a lot of pain and changes. In the health sector, a two-fold process is emerging: On one side, the established humanitarian organizations are becoming more professional by developing their own standards and norms and training their staff. On the other side, the number of inexperienced newcomers (NGOs, universities, countries, and others) is rising rapidly. Some of these new actors plan to remain in the humanitarian field, which justifies the investment made by more established agencies in guiding their first steps. In the very distinctive health vacuum of Haiti, they did contribute positively and will improve their performance. However, a rising minority of new actors, with doubtful health competence or with questionable motives, were definitely more a hindrance than help. They should be filtered out by the health authorities.

Few of the lessons from the health response to the Haiti earthquake are new or groundbreaking. Most have been "learned" in a variety of regional workshops and published in formal evaluations. Consider the regional workshop following the Indian Ocean tsunami (UN 2005), the analysis of response to the Haiti earthquake published by ALNAP (2010), an evaluation of the health sector in Haiti one year after the earthquake (Merlin 2011), or the notes on preliminary lessons learned from Haiti (Fisher 2010).

The humanitarian community seems to have little institutional memory or capacity to change.

Is a better organized response possible?

Lack of information sharing and coordination (two intertwined concepts) is the most common criticism in the aftermath of disasters. It is easily documented by external evaluators, eagerly conveyed by mass media, and conveniently used by lead agencies to call for more resources and staff.

There are two relevant questions: 1) Is it possible to significantly improve the information? 2) Is it possible to effectively coordinate such an unruly world of humanitarian organizations?

Is it possible to significantly improve the information? In the health field, the response is a definite "yes."

The first step is to identify (conservatively and pragmatically) what must be known to improve relief and what can be collected in time for this information to have the proper impact (not what we would love to know). In matters of immediate trauma care, which is a rapidly changing field, perhaps not much can be known and disseminated before it becomes obsolete.

The second step is to deploy qualified human resources in time. This implies inter-agency agreements and the capacity to share rosters of experts. It supposes a significant investment in deployment of human resources and logistic support at the time of the crisis and a shift of lead agencies' priorities from visible delivery of "hard" services to "soft" information management.

Is it possible to effectively coordinate such an unruly world of organizations? In the health field, the response is a more qualified "yes."

More human and financial resources and definitely more meetings are not necessarily the solution. Coordination should not be an end in itself. Some level of chaos is an integral part of the initial response to large disasters. To what extent "more" coordination will improve the fate of the affected population deserves scrutiny. A high-level UN official in Haiti concluded privately that the lack of coordination in the first two months may have in fact permitted meaningful, community-level contributions from the many small or marginal actors. The same actors were seen as a major burden in past disasters in countries with more national capacity. Response and coordination must be determined by the context.

A particular area that may benefit from quality control and improved coordination is that of foreign medical care assistance. The next disaster may require a substantial and rapid mobilization of senior managers and thematic experts, with significant logistical support, which is very problematic in the first days when needed most. WHO and its regional offices need to seek partnerships with bilateral and other institutions to develop a roster of experts and considerably increase their surge capacity to coordinate the incoming flow of medical responders. The Global Outbreak Alert and Response Network (GOARN) may serve as a useful model. Many bilateral groups and NGOs have demonstrated a high level of technical competence and critical analysis. Their support and participation will be most valuable.

The efforts of INSARAG to improve search and rescue assistance may provide some additional clues to the way forward in the health sector. An independent review of its impact in Haiti is, however, still lacking (i.e., "What would have happened if this sustained investment had not been made by INSARAG?").

In other words, we need to shift from outcome indicators ("more coordination is better") to impact appraisal by demonstrating that diverting funds from relief activities toward coordination and quality control actually does save more lives.

Ownership of the disaster

Mobilizing more external coordinators will not, in itself, improve coordination. Coordination without meaningful participation and leadership of the national health authorities is ultimately doomed to fail.

One of the key findings of the self-evaluation of the UN Country Humanitarian Team in Haiti was the need to ensure national ownership of the disaster response. "Government, however weak, has to play a central role in humanitarian leadership

and coordination of post-natural disaster. We as humanitarian leaders and actors have to accept and facilitate this."

To follow up on those findings, the IASC recommended that:

- "Wherever possible, international humanitarian actors should then organize themselves to support or complement existing national response mechanisms rather than create parallel ones which may actually weaken or undermine national efforts.
- "Where appropriate and practical, government leads should be actively encouraged to co-chair cluster meetings with their Cluster Lead Agency counterparts. As with all co-chair arrangements, respective responsibilities should be clearly defined from the outset" (IASC 2011).

Sudden-onset disasters are creating a wave of generosity (and therefore a high number of volunteers who are in need of coordination, and strong competition for funding and visibility among actors which is in need of arbitration). In such disasters, the cluster approach must be implemented differently to ensure national ownership.

Asserting the national government's primary role in coordinating and selectively filtering external assistance is not an easy matter for national authorities even when local health resources have the capacity to respond effectively.[144] The perception held by the public that the international community is better suited to coordinate response guarantees that weaker national institutions will continue to be marginalized, and further weakened. Coordination should be a key feature of national disaster preparedness.

A formal agreement on the cluster approach with governments prior to the disaster is an indispensable preliminary step.

As part of joint preparedness efforts, a formal agreement for sectoral coordination (cluster approach) should be discussed with those countries most vulnerable to large-scale, sudden-onset natural disasters. Many potential worst-case, urban earthquake scenarios have already been identified and those countries are receiving technical co-operation in preparedness from the UN and bilateral agencies. Under this agreement:

- The Government will determine the number and scope of responsibility of the sectors/clusters at the national level in order to better reflect the organization of the government and respective mandate of the line ministries. Adjusting the clusters to national structure is a requirement to facilitate the early and smooth transfer of responsibility to the government. The sector/cluster structure at national level will vary from country to country (in line with the flexibility recommended in the 2006 IASC guidelines recognizing that "one size does not fit all").
- The Government, in consultation with the UN Humanitarian Country Team, will designate in advance one or more (co-lead) agencies to assist the national institution (line ministry) responsible for each sector. Those lead agencies may or may not be the same as those at global level (another recommendation of the IASC

144 Following the earthquake in Mexico City (1985), hospital bed occupancy never exceeded 95% and the ample resources of this large country were mobilized. The Government initially declined external medical assistance. Within one day, however, a campaign launched by the international media forced the Government to withdraw its decision and open its borders to foreign medical teams.

guidelines). It would not affect the role of the cluster lead agency at global level. It is also understood that in the immediate life-saving phase, the co-lead UN agencies may have to actually manage and coordinate the entire response in exceptional situations such as in Haiti.

- The agreement will endorse the existing 24-hour activation mechanism for the clusters but ensure explicit participation of the government in the UN decision-making process (beyond merely informing authorities).
- Finally, a clear end-date (for example, three weeks) will be set for either transfer of responsibility to the national institution or a formal request for extension of the lead role of the international agencies for a specified period, should the national authorities deem that necessary.

In brief, the humanitarian community must acknowledge that in order to strengthen the capacity of national authorities it is worth taking the risk, in the short-term, of having less "efficient" or "experienced" coordination. Indeed, the risk of additional chaos might be less than anticipated considering the poor performance of external coordination in the first few months in Haiti and other disasters. Instead of managing the crisis themselves, international partners should accompany and build the capacity of their counterparts—admittedly a more demanding and difficult task.

The Port-au-Prince metropolitan area was severely affected. Eighty percent of the town of Léogâne (17 km southwest of Port-au-Prince) was destroyed.

Photo: PAHO/WHO, Victor Ariscain

Quality control in the medical sector

Many agencies that regularly provide medical teams and field hospitals are dedicating considerable effort to improve the quality of their performance by carrying out systematic evaluations and training. Some have gone a step further to analyze the cost-effectiveness of their interventions in terms of development and relief.[145] However, not all groups have a high standard of quality assurance.

Medical care is one of the most regulated service sectors in all countries, even in less developed ones. Accrediting medical doctors, paramedical technicians, and pharmacists or licensed facilities is one of the key functions of a ministry of health in "normal" times. In the aftermath of a disaster, any medical team or individual can claim (accurately or not) competence and the qualifications to amputate limbs or undertake major surgery. The medical humanitarian business has grown too much not to be better regulated. There must be a balance between the current *laissez-faire* approach and rigid accreditation. Regulations must be adapted to fit the magnitude and urgency of needs that cannot be met nationally.

Some definitions are useful at this stage:

- *Registration* is merely a process of filing information into a register or database. It does not validate the competence of the entity registered.
- *Certification* involves a technical evaluation of compliance with pre-established requirements or criteria. An independent third party normally does this evaluation. In light of the potential liability for the certifying agency, INSARAG has adopted the term "external classification."
- *Accreditation* is "a formal process by which a recognized body recognizes that a health care organization meets applicable, pre-determined, and published standards." In normal, non-crisis situations, "An accreditation decision about a specific health care organization is made following a periodic on-site evaluation by a team of peer reviewers, typically conducted every two to three years. Accreditation is often a voluntary process in which organizations choose to participate, rather than one required by law and regulation" (Rooney and van Ostenberg 1999).
- *Licensure* is a process by which a government authority grants permission to an individual practitioner or health care organization to operate. In normal situations, organizational licensure is granted following an on-site inspection to determine if minimum health and safety standards have been met.

At this stage, registration is the only process that can be realistically considered in the medical sector.

145 According to one analysis (Gosselin et al. 2011), the costs saved per disability-adjusted life year (DALY) in short surgical missions for elective surgery and those in post-earthquake relief missions in the same country were unexpectedly very similar.

As endorsed by the Global Health Cluster, setting up a worldwide registry of providers of such services and developing predetermined and published norms and standards for deployment of medical teams and hospitals are the initial steps toward improved quality control of the health response.

The ministry of health must be provided with this basic information about the capacity of foreign medical teams and field hospitals *prior* to the occurrence of a disaster.

Learning from the past

There were many evaluations of the response to the earthquake in Haiti; more than a few interlocutors said that there were too many. Nevertheless, it is hard to note a significant improvement or change of attitude in the response. One of the main shortcomings is, perhaps, the scope of those evaluations: How efficiently and effectively are the objectives and policies pursued? How did we mobilize our resources and coordinate what we set out to accomplish?

Whether the objectives pursued were desirable and achievable, or if the policies were in the best long-term interest of the beneficiaries were beyond the scope of the terms of reference of most evaluations.

Some of those strategic and policy topics are best left to researchers rather than hired evaluators. However, to do proper research, scientists would benefit from greater access to documents and internal reports (including electronic mail) than is allowed by the current level of transparency of main actors.

Finally, to paraphrase Nigel Fisher, the Humanitarian Coordinator in Haiti, the "lessons learned tend to focus on resolving what did not work so well. But again, we should not forget the many considerable achievements of the humanitarian community." In Haiti, many lives were saved, people were fed and sheltered, and they received much better care than before. The disaster brought significant positive changes in mentality, behavior, and attitude. It is up to the Haitians and the international community to ensure that those changes endure.

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List of acronyms

AECID	Agencia Española de Cooperación Internacional para el Desarrollo (Spanish Agency for International Development Cooperation)
CARICOM	Caribbean Community
CCCM	Camp Coordination and Camp Management
CDC	Centers for Disease Control and Prevention (United States)
CDEMA	Caribbean Disaster Emergency Management Agency
CERF	United Nations Central Emergency Response Fund
DANA	Damage Assessment and Needs Analysis
ERC	Emergency Relief Coordinator (United Nations)
EU	European Union
FAO	Food and Agricultural Organization of the United Nations
FFH	Foreign Field Hospital
FMT	Foreign Medical Team
Groupe URD	Groupe Urgence-Réhabilitation-Développement
HHS	Health and Human Services (United States, Department of)
HQ	Headquarters
IASC	Inter-Agency Standing Committee
ICRC	International Committee of the Red Cross
IDP	Internally displaced person
IEC	INSARAG External Classification
IFRC	International Federation of Red Cross and Red Crescent Societies
IHRC	Interim Haiti Recovery Commission
IHR	International Health Regulations
INSARAG	International Search and Rescue Advisory Group
IRA	Initial Rapid Assessment

LRRD	Linking Relief, Rehabilitation, and Development
LSS	Logistics Support System
MINUSTAH	Mission des Nations Unies pour la Stabilisation en Haïti (United Nations Stabilization Mission in Haiti)
MOH	Ministry of Health (also MoH)
MSF	Médecins Sans Frontières (Doctors without Borders)
MSPP	Ministère de Santé Publique et Population (Haitian Ministry of Health)
NGO	Nongovernmental organization
OAS	Organization of American States
OCHA	Office for the Coordination of Humanitarian Affairs (UN)
PAHO	Pan American Health Organization
PDNA	Post-Disaster Needs Assessment
PROMESS	Programme de Médicaments Essentiels (Essential Medicines Program in Haiti)
RINAH	Rapid Initial Needs Assessment for Haiti
SOPs	Standard Operating Procedures
SUMA	Supply Management System
UN	United Nations
UNAIDS	United Nations Program on HIV/AIDS
UNDAC	United Nations Disaster Assessment and Coordination
UNDSS	United Nations Department of Safety and Security
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USGS	United States Geological Survey
WASH	Water, Sanitation, and Hygiene
WB	World Bank
WFP	World Food Programme (UN)
WHO	World Health Organization

Prior to the earthquake, nearly two-thirds of all Haitians made their living in the agricultural sector, mainly from small-scale subsistence farming, making them more vulnerable to damage from frequent natural disasters, which has been exacerbated by the country's widespread deforestation.

Photo: PAHO/WHO, Armando Waak

Annex

1

Conditions in Haiti prior to the earthquake

The Republic of Haiti occupies the western third of the Island of Hispaniola, which it shares with the Dominican Republic. The country is divided into 10 departments and has an estimated population of 10 million.

Nearly half of Haiti's population (47%) lives in urban areas, the largest being the Port-au-Prince metropolitan area (which has a population estimated at 2.3 million). The metropolitan area has expanded considerably in population but not so much in size in the last 20 years, leading to overcrowded, improvised settlements on the steep slopes surrounding the old city.

In terms of population density, Haiti ranks second after Barbados (and a few island territories in the Caribbean) in the Region of the Americas. The density is particularly high in Port-au-Prince.

Social, political, and economic determinants[146]

Haiti was the first country to gain sovereignty in Latin America and the Caribbean and in 2004 it celebrated 200 years of independence. With nearly two centuries of dictatorship and intermittent attempts at democracy beginning in the late 1980s, the country has suffered recurrent periods of political instability. Following the 1991 military coup, an OAS/UN embargo was enforced in 1993. The ousted President Aristide returned to the country in 1994. One of the first decisions of this new Government was to dismantle the army, leaving the police forces as the only national security institution.

Following a political crisis, in March 2004 a new transitional government was installed with the support of the United Nations Stabilization Mission (MINUSTAH), paving the way for presidential and parliamentary elections in February 2006. Presidential elections were scheduled to take place in 2010 and the country was entering into the electoral period at the end of 2009. The government was in a weak position when the earthquake struck in January 2010.[147]

The vast majority of Haitians continue to live under precarious conditions, in poverty and marginalization. This poverty especially affects women heads of households, as they are often the primary breadwinners.

The UNDP *Human Development Report* issued in 2010 (with data from 2007), illustrates the pre-earthquake situation in Haiti:

- Ranks 145 out of 169 countries for the human development index. This index improved slightly since 2005, but remains the lowest among Caribbean and Central American countries;
- In Latin America and the Caribbean multidimensional poverty affects from 2% of the population (Uruguay) to 57% (Haiti); [148]
- Among the few countries doing very poorly both on gender equality and human development are the Central African Republic, Haiti, and Mozambique.

Income distribution is inequitable: 4% of the population has 66% of the nation's wealth, while 10% has practically nothing. Foreign commercial investment is minimal and manufacturing or service employment is practically nonexistent for the majority of the population. Imports (including food and fuel) exceed exports by a factor of four.

Deficient farming practices on steep terrain have accelerated soil erosion, as the run-off from tropical rains flushes arable land toward the sea, further obstructing urban drain-

146 Compiled from various sources, including: Institut Haitien de Statistique et Informatique (IHSI 2010); World Bank, Haiti at a glance (2006); PAHO/WHO, *Health in the Americas* (2007); WHO, *Haiti health profile* (2010); United Nations, *World population prospects: the 2008 revision* (2009).

147 The presidential elections finally took place at the end of 2010, but there was an international challenge of the results. A second round of elections were completed in 2011.

148 The UNDP Multidimensional Poverty Index (MPI) complements income poverty measures by reflecting the deprivations that a poor person faces all at once with respect to education, health, and living standard. It assesses poverty at the individual level, with poor persons being those who are deprived in multiple areas, and the extent of their poverty being measured by the range of their deprivations.

age systems already clogged by huge quantities of urban debris. Heavy deforestation is noticeable from the air, almost delineating the border between Haiti and the Dominican Republic. Sanitation management is ineffective or nonexistent, so excreta and household waste heavily pollute surface water.

An estimated 25% to 50% of national income comes from remittances from the approximately one million Haitians living and working abroad, mostly in the United States, Canada, and France. According to the 2010 Population Survey of the U.S., in 2009 nearly one-third of Haitian immigrants in the U.S. belonged to households that earned more than US$ 60,000. In comparison, less than 15% of the immigrants from Mexico, Dominican Republic, and El Salvador in the U.S. had that level of household income. A quarter of Haitian immigrants, especially women, are reportedly in the relatively higher paying health care and education sectors; only a small number of them are in the construction sector (Ratha 2010). Emigration of highly qualified health personnel is a serious issue.

Salaries of civil servants in Haiti, health professionals included, remain unpaid for months at a time. This leaves professionals little option but moonlighting or charging fees for services to make a living.

Governance, or rather the lack of it, is often cited as one of the most serious shortcomings in Haiti. In 2008, Transparency International's "Corruption Perception Index" ranked Haiti 177 out of 180 countries (the last five were Afghanistan, Haiti, Iraq, Myanmar, and Somalia). In 2010, that score (on a scale of 10) improved from 1.1–1.7 (2008) to 2.2, moving Haiti's ranking to 146 out of 178.

It is undeniable that poor national governance is a major obstacle in Haiti, but the international community should assume its share of responsibility for bypassing the government—thereby weakening it—for most decisions and projects. An international "blank check" (financially and politically) written to NGOs that often have their own agenda and shortcomings is legitimizing a culture of unaccountability in the public service sector (Zanotti 2010). Officials who are not meaningfully consulted and have no authority over the resources assigned to foreign implementing agencies (NGOs) cannot feel responsible.

It is estimated that between 3,000 and 10,000 NGOs are operating in Haiti, one of the highest densities of NGOs per capita in the world. According to the U.S. Institute for Peace (2010), USAID budgeted some US$ 300 million for Haiti in fiscal year 2007–2008, all of which was implemented through NGOs. These projects often had more money than the entire Haitian Ministry of Planning. For this reason, Haiti has been called "the Republic of NGOs."

Health status[149]

Table A.1 offers a comparative summary of selected indicators for Haiti, Dominican Republic, and the entire Latin American and Caribbean region (excluding North America).

149 Sources for this section include: PAHO/WHO, *Health in the Americas 2007* (at www.paho.org/HIA/homeing.html); PAHO/WHO, 2009 Basic Indicators; and Haiti, PDNA analytical matrix June 2010.

Table A.1 Selected indicators for Haiti, Dominican Republic, and the Latin American and Caribbean region

Selected indicators	Haiti	Dominican Republic	Latin America & Caribbean
Population density/km²	367	211	Estimated 29
Urban population (projected % for 2010)	48.2	69.7	78.8
Life expectancy (years)	61.5	72.7	73.5
Mortality under 5 years/1,000 Pop (2007)	76	24	38
Under-registration of mortality (%, 2003–2005)	94.7	47	16.1
Malaria API /1,000 Pop (2008)	9.8	3.3	11.1
Hospital beds /10,000 (2005–2008)	13	10	18
Measles/MMR Immunization (% coverage, 2008)	58	95	94

Sources: WHO, World Health Statistics, 2009 www.who.int/whosis/whostat/EN_WHS09_Table6.pdf; World Bank, Haiti at a glance; Dominican Republic at a glance.

Core health indicators are, indeed, alarming. Mortality rates are by far the highest in the Region of the Americas, with the crude mortality rate of 12 deaths per 1,000 population; under-5 mortality rate of 76 deaths per 1,000 live births; infant mortality rate of 57 deaths per 1,000 live births—that is, 1 in every 12 children dies before her/his first birthday; and the maternal mortality rate of 670 deaths per 100,000 live births.[150] Life expectancy at birth, estimated at 61.5 years (59.7 in males and 63.2 in females) is the lowest in the Americas. Birth rate remains high, at 25 per 1,000 in urban areas and 30 per 1,000 in rural areas; the average number of children per woman is 3 in urban areas and 4 in rural areas.

Quantified data on **communicable diseases** are limited in normal times. Disaggregated data on morbidity or mortality by cause, gender or age are mostly unavailable except for malaria, which has an annual parasite incidence (API) three times that of the Dominican Republic.

Acute diarrheal disease is highly prevalent: 2 out of 5 children aged 6 to 11 (40%), and 1 out of 4 children under 5 years old (25%) experienced one or more episodes of diarrhea in any two-week period. All other age groups are also disproportionately affected. However, the last outbreak of cholera had been reported in Haiti over 100 years prior to the earthquake and the disease was totally absent until the outbreak in late 2010.[151] In spite of the poor sanitation and lack of access to safe water, Haiti was spared during the 1991–1993 cholera outbreak that started in Peru and killed over 4,000 people in the Western hemisphere.

Haiti has the highest incidence of tuberculosis in the Americas (about 30,000 new cases per year); it is reportedly the seventh leading cause of death in the country. TB/HIV co-infection rate is close to 30%.

150 Mortality statistics in normal times are very incomplete: under-registration is estimated to be 94.7%. Death certificates are filled out for only 1 in 20 deaths (5% coverage), and yet 1 in every 3 death certificates records an ill-defined cause of death.

151 A national epidemic of cholera started in October 2010 in the Artibonite department, an area that was not affected by the earthquake.

HIV/AIDS and sexually transmitted infections (STIs) are common in Haiti. According to the 2005-2006 Mortality, Morbidity, and Service Utilization Survey for Haiti (EMMUS-IV), estimates put HIV prevalence at 2.2% (2.3% among women aged 15–49 and 2% among men aged 15–59). Haiti's HIV/AIDS program is cited as one of the most successful in the world, on the way to providing universal treatment for HIV/AIDS nationwide (Koenig et al. 2010).[152]

Vaccine-preventable diseases such as diphtheria and neo-natal tetanus are all too common. Grave concern arises from the extremely low immunization coverage rates for measles (54%); diphtheria, pertussis and tetanus (68%); and polio (66%) in children under 1 year old. In 2009 an epidemic of diphtheria with 29 confirmed cases affected Port-au-Prince and rural departments. By the end of the year WHO epidemiologists feared an explosive outbreak in the shantytowns of the Port-au-Prince metropolitan area (including Carrefour). In the past, Haiti has led several measles vaccination campaigns, the last one in 2007 against measles/rubella for children and adolescents between 1 and 19 years old. The last case of indigenous measles reported in Haiti was in 2001.

Tropical diseases such as leprosy and lymphatic filariasis remained prevalent in spite of progress in their control.

Dengue was first confirmed in Haiti in 1964, but national surveillance of dengue has not taken place. According to the CDC, a study of 215 children in Port-au-Prince in 1996 showed that 85% had been previously infected with one or two dengue virus serotypes. Studies during prior foreign military operations found "minimal numbers of symptomatic community cases or hospitalizations, while high attack rate and severe cases were reported among foreign military and foreign civilian personnel in Haiti" (CDC 2010b).

The delivery of health services

Health services delivery is mostly private with a small public component. An estimated 75% of health care is provided by NGOs, faith-based groups, and other foreign medical providers.

The public health services network in Haiti is organized in three levels:

1. The primary level comprises ± 600 clinics with and without beds, and 45 community hospitals;
2. The secondary level includes nine department hospitals;[153]
3. The tertiary level represents the six university hospitals (five are in Port-au-Prince; the principal one is the University Hospital—HUEH).

152 This success is tied to a strong foundation for HIV care that was in place before external funding became available. This includes national guidelines prepared by the Ministry of Health; political commitment at the highest levels of government; NGOs that had been providing high quality care in Haiti for decades; and the assistance of the Global Fund to Fight AIDS, TB, and Malaria, the U.S. President's Emergency Plan for AIDS Relief (PEPFAR), and other private donors (Koenig et al. 2010).

153 There are 10 departments in Haiti, but the West department, where the capital is located, has only university hospitals.

Since 2009, five integrated diagnostic centers have been established to serve as a bridge between first and second care levels, but they have not yet been integrated with the rest of the system. A decentralized organization was also formulated through Communal Health Units (one CHU for 80,000–140,000 people) but this had not been effectively implemented at the time of the earthquake. Decentralization is still in its infancy and being implemented very slowly. As a result, most of the functions are still very centralized with the roles and responsibilities between levels poorly defined. There is no framework for the participation of communities in management of the CHU. There is also major confusion about roles and responsibilities among levels of care (i.e., the CHU provide primary level care as well as serving as departmental hospitals).

According to 2007 reports, nearly half of the population lacked access to basic health care. Financial barriers were seen as the main problem. There was a fee for services and local health facilities were heavily dependent on this income to pay for part of their staff and services. When accessible, services were poor due to lack of quality control, infrastructural deficiencies, poor communication equipment, electrical blackouts, water problems, and general deterioration of the facilities.

A joint initiative of the Ministry of Health, PAHO/WHO, and CIDA was launched in 2007 to provide access to free obstetric care (*Soins Obstétricaux Gratuits*, or SOG). Following the earthquake, a similar free program was instituted for children under age 5 *(Soins Infantiles Gratuits, or* SIG*)*.

Specialized services such as rehabilitation for persons with disabilities or mental health care are far behind the level and quality in neighboring countries.

The National Blood Safety Program (NBSP) was created by the Ministry of Health to establish standards for safe blood transfusions, increase voluntary blood donations, and facilitate access to safe blood for patients. Between 2004 and 2009, blood collection rose by 250%, the number of blood units increased from 9,000 to 22,000, and voluntary blood donations rose from 47% to 70%. The NBSP hoped to reach the goal of 100% voluntary donations by 2010.

Inequities are widespread in health service delivery: 68% of women in the wealthiest quintile deliver in a health facility while only 6% of the poorest quintile does. A high majority (90%) of the urban population is within 30 minutes of a health facility, but this is the case for only about 50% of people in rural areas.

In a review carried out in 2007 on **governance** of the health sector, leadership and regulation functions were seen as "weak or very weak," at central, departmental, and periphery levels. Most of the services are operated or delivered by a mix of public and private not-for-profit entities without an effective pre-existing policy dialogue/coordination mechanism with relevant development partners.

On the positive side, numerous health NGOs and faith-based organizations that have played a major role in humanitarian response in other major disasters were already present with ongoing programs in Haiti at the time of the earthquake. Their familiarity with the situation and the existence of a support and logistics mechanism will be critical as Haiti rebuilds after the impact.

The private for-profit sector is small (< 5% of services), is not regulated, and provides services to higher income patients often pending their referral to foreign facilities.

In addition to a thriving, private pharmaceutical industry, PROMESS (Programme de Médicaments Essentiels) is the central procurement facility and warehouse of essential drugs for the Ministry of Health and most of its non-profit partners. Established in 1992 during the embargo after a coup d'état, this program, managed by the Pan American Health Organization, serves as the national pharmacy, offering essential supplies and drugs at or below cost thanks to the support of donor agencies. A well-stocked and managed central warehouse has proven to be an invaluable asset in past disasters striking Haiti. However, because PROMESS is dependent on outside funding and completion of agreements between the Ministry of Health and all its partners, it has not evolved into a national system offering the complete range of items required for health care.

Governance problems in Haiti are well-known but they cannot be attributed solely to government shortcomings: As noted at the multi-sectoral level, the fragmentation of services is also due to donor policies resulting in several vertical programs being well funded while others are poorly supported if at all. Self-funded health NGOs are reluctant to respect Ministry norms and procedures because they are pursuing their own objectives in line with their own policies, standards, and protocols. "Leading" such a sector under such conditions is, indeed, almost an impossible task.

In terms of **information management**, there is inadequate information to support decision-making at strategic and operational levels. The existence of many parallel or vertical health information systems based on projects financed by specific donors has not contributed to streamlining the information.

Water and sanitation

While only 58% of the general population has some access to improved drinking-water sources, in urban settings access is estimated at 70% (Schuftan et al. 2007). In urban areas, safe drinking water is provided, for a fee, by a commercial (or in some instances subsidized) distribution network of treated water (reverse osmosis mostly). Even the poor urban population in the capital will invest their limited resources for high quality, industrially processed water sold retail, by the gallon. Small individual plastic bags sold as high quality water are believed not to come from safe industrial sources. Piped public distribution system is rudimentary and limited even in Port-au-Prince. According to the Haitian Institute for Statistics (IHSI), only 8% of houses have piped water and they are mainly located in limited areas of Port-au-Prince. Piped water in Haiti is not fit to drink.

Only 19% of Haitians have access to improved sanitation and disposal of excreta (29% in urban areas and 12% in rural). Those who have access to a septic tank or latrine use the services of a group of specialized workers called *bayakou*, who manually empty excreta. Dedicated sites for discharge are mostly absent, a situation that induces high environmental and health risks. As a sewage system is nonexistent in most poor suburban areas, accumulated solid and liquid waste are flushed away periodically by the rains through an unmaintained storm drainage system.

Nutrition

The pre-earthquake global acute malnutrition (GAM) rate was estimated at 4.5% for the affected areas, with severe acute malnutrition at 0.8%.[154] At these levels, an estimated 17,500 children under 5 years old are suffering from acute malnutrition and 3,100 of these are severely malnourished and in need of life-saving assistance. While high, these levels are markedly under those considered a humanitarian emergency (10%). Stunting rates are significant (30% in 2005).[155]

Nutrition interventions have been scarce, and the lack of coordination at central and departmental levels have had important negative effects on the efficiency of these interventions. In an article published by the World Bank, the author made the following observations about deficits in nutrition programs prior to the earthquake:

- "There was no structure in place to address nutrition security comprehensively. The approach was patchwork, with small, mostly donor- and NGO-run programs operating in distinct areas.
- "The health system had serious coverage gaps and was not oriented, nor endowed with the human and material resources, to address nutrition issues.
- "Programmatic coordination was an enormous challenge. There was little communication across implementers or with government.
- "Program focus was not sufficiently aligned with Haiti's priority nutrition security problems or with international best practices. The majority of nutrition programs in Haiti focused on the treatment of acute malnutrition because the problem is more visible" (Bassett 2010).

It should be pointed out that in 2009 national guidelines to address malnutrition were developed, including a National Protocol for the Management of Acute Malnutrition. This was undertaken through the concerted efforts of the Nutrition Department of the Ministry of Health, several NGOs, and donors (in particular the EC's Directorate-General for Humanitarian Aid). Following hurricanes that hit Haiti in 2008, a Nutrition Cluster was set up by UNICEF, which was replaced in 2009 by the National Nutrition Committee led by the Ministry of Health.

Malnutrition in Haiti is the end-result of extreme poverty associated with low education level. It is primarily an economic and equity issue rather a health one. In addition to economic and equity issues underlying causes of malnutrition such as food insecurity, infant feeding practices, maternal and child health, health care access, and water and sanitation conditions and practices are strong contributing factors.

154 Nutritional survey carried out by the Haitian Ministry of Health and Action against Hunger (December 2008–March 2009).
155 World Bank, Haiti at glance, 2010.

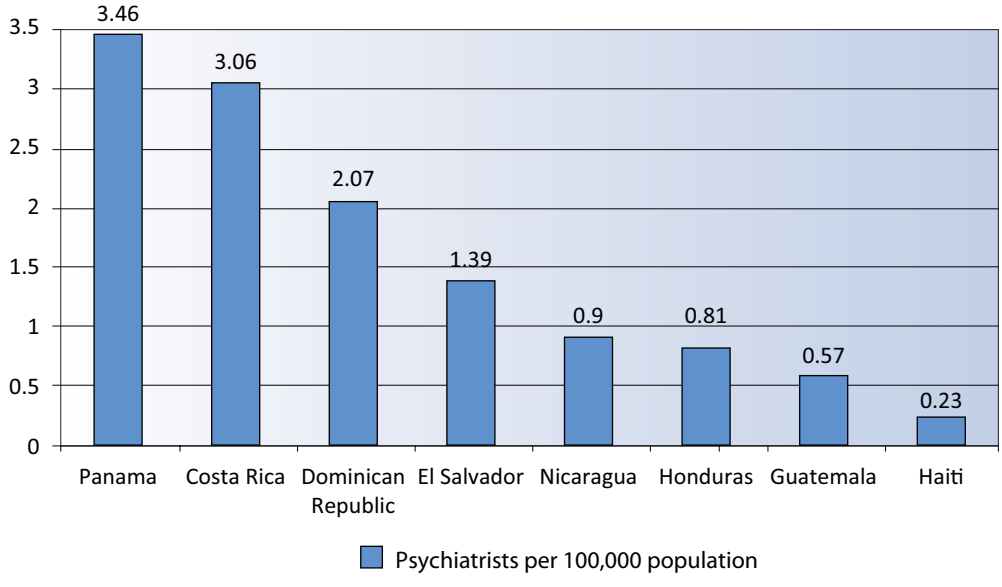
Mental health

The Centre de Psychiatrie Mars et Kline and the Hospital Psychiatrique Défilé de Beudet are the only two government-run, psychiatric facilities in metropolitan Port-au-Prince. No public institution offers mental health services outside the capital, but several small, private centers have emerged. The Mars et Kline center is the sole national facility for treatment of acute (short-term) cases while the Hospital Défilé de Beudet is dedicated to severe chronic cases.

Mental health approaches in Haiti were centered on medical and hospital interventions far from the community-based approach recommended by WHO. There is widespread belief that mental illness is caused by supernatural forces, which further complicates a modern approach.

Figure A.1 shows that the ratio of psychiatrists per 100,000 inhabitants in Haiti is the lowest in the Caribbean and Central American regions.

Figure A.1 Psychiatrists per 100,000 population in selected countries of Central America and the Caribbean



Source: Based on data collected by V. Aparicio, WHO Advisor, Mission report on mental health and psychosocial support following the Haiti earthquake (3–26 February 2011).

Gender-based violence

Gender-based violence was a well-known issue prior to the earthquake. A study carried out by the Inter-American Development Bank in Haiti in 2006 reported that one-third of women and girls reported incidents of physical or sexual violence. The Inter-American Commission on Human Rights (OAS) reports that more than 50 percent of those who had experienced violence were under the age of 18. A 2006 survey study attests to the rampant use of rape as both a tool and outcome of violence,

documenting that 35,000 women were victimized in the area surveyed (Kolbe and Hutson 2006). The real scale of the problem is not fully known because of a lack of central figures on rapes.

Gender-based violence is often considered to be most common in poor slum areas where overcrowding, poverty, and lack of education are factors. In Haiti, it is also a serious problem in more wealthy segments of the society:

> *"Poor, mostly rural families send their children to cities to live with wealthier families whom they think will provide the children with food, shelter and an education, in exchange for some work. Sadly, the parents' dream is often a nightmare for these children known as* restaveks. *...Sixty-five percent of the victims are girls between the ages of six and fourteen. They work excessive hours, receive little or no schooling, are unpaid and are often physically and sexually abused"* (Cde Baca 2010).

The importance of addressing gender-based violence in time of disaster was acknowledged during the response to the cyclones of 2008. The Inter-Agency Standing Committee issued a three-page summary of the information available on gender-based violence prior to the earthquake.[156]

156 Produced on 29 January 2010 by the IASC Sub-working Group on Gender in Humanitarian Action. http://gender.oneresponse.info.

Annex

2

Chronology of events following the Haiti earthquake

The chronology of the 90 days following the 12 January 2010 earthquake provides valuable information about the events and their sequence.

This chain of events reinforces the concept that while hazards such as earthquakes can trigger a crisis, the disasters themselves are not natural but rather the result of a series of human actions.

This annex collects the main facts recorded in one of the few reports available from the day of the quake, known as the Haiti Earthquake Situation Report (Sitrep), prepared by the United Nations Office for the Coordination of Humanitarian Affairs (OCHA), with support from national and international agencies and NGOs. The review covers the first 33 Sitreps, from 12 January to 12 April 2010.

The chronology is organized around four issues:

1. Security and access
2. Official figures issued by the Government of Haiti
3. Emergency management
4. Health situation

Date	Security and access	Official figures	Emergency management actions	Health status
12 Jan 2010 Day 1	Earthquake M. 7.0 occurred at 4:53pm local time.[1] Tsunami struck the coast 5 minutes after the earthquake. Calculated speed of the tidal wave 336Km/h.[2] At 6:45pm the tsunami watch is cancelled. [3] Caribbean Catastrophe Risk Insurance Facility (CCRIF) to make the final calculation and payout to Haiti after 14 days. [4]	There are no official reports.	OCHA releases the Earthquake Situation Report #1: The capital of Haiti, Port-au-Prince (PaP), has been severely affected including critical city infrastructure components such as electricity, water and phone services. Electricity is not available and communications are difficult. At this stage there is very limited access because of debris and other obstacles on the roads. The airport of PaP is reported to be closed. The Presidential Palace and Government buildings are reported to have been seriously damaged. According to preliminary reports, several UN as well as other national buildings have collapsed or have been damaged. Populations may also be affected in Carrefour and Jacmel. There are no impact figures nor estimates. [5]	Initial reports indicate a large number of casualties and widespread damage with an urgent need for Search and Rescue (S&R). [5]
13 Jan Day 2	The airport in PaP is reportedly operational, under control of the U.S. troops, and only open for humanitarian air flights. Roads to the capital are partly blocked. The UN Headquarters at the Christopher Hotel collapsed in the earthquake. [6]	There are no official reports.	Situation Report #2: "The number of people in need of humanitarian assistance will not be determined until the extent of the damage is known. The death toll is unknown but is expected to be high." "S&R teams are arriving from Guadeloupe, the Dominican Republic and the United States. They are being deployed to major public buildings, hotels and hospitals." [6]	"The hospital in Petionville, a hillside PaP district, is destroyed and most of the medical centres have collapsed." "MSF has reported treating about 600 people in the affected area and is looking at sending additional medical supplies." [6]
14 Jan Day 3	"The airport is operational for humanitarian and military flights. Air Traffic Control is responding to incoming aircraft, but with limited capabilities. There is very limited aircraft-handling capacity." "The port is not operational." [7]	"The Government is setting up an operations site close to the airport." [7.]	Situation Report #3: "A helicopter assessment by the UN Mission . . . found some areas with 50 percent destruction or serious damage, with many buildings completely collapsed. PaP and other urban centres, such as Jacmel and Carrefour, are affected." "The death toll remains unknown." "There is no water supply." "Communications are down and there is no electricity." [7]	The Health Cluster is led by the World Health Organization (WHO). Most of the health resources and supplies need to go to the Dominican Republic and then by land to Haiti. [7]
15 Jan Day 4	"Operations are heavily constrained due to the lack of fuel, transport, communications and handling capacity at the airport. Some flights are being re-routed through Santo Domingo airport, which is also becoming congested." "The port remains non-operational." [8]	There were no official reports.	Situation Report #4: "Identification of bodies remains a problem, in conjunction with assigning responsibility for the recovery of bodies. The Government is identifying various grave sites. No reliable figures are available on the extent of fatalities." "Phone communication remains difficult in most of the capital. However, text messages are getting through. Internet connections are possible in some areas, but constant access remains difficult." [8]	"The Pan American Health Organization (PAHO/WHO) is establishing a field office in Jimaní (Dominican Republic) to serve as a permanent bridge between this border city and to PaP (approximately a 90-minute journey). The office will be a staging/transfer point for emergency humanitarian supplies and personnel needed in the Haiti response operation." [8]

Date	Security and access	Official figures	Emergency management actions	Health status
16 Jan Day 5	"The limited capacity of the airport combined with heavy and unplanned air traffic remains a challenge, resulting in many flights being detoured and delayed. . . . However lack of transport and fuel remain a problem making it difficult to move goods to other locations. With no storage facility, the airport is now packed with goods and teams. Safety and security remains an important concern." "PaP seaport is still non-operational."[9]	"The Ministry of Interior estimates that one million people have been severely affected by the earthquake and that 250,000 are in urgent need of assistance. Authorities believe that 50,000 people have died, but so far 13,000 bodies have been accounted for." [9]	Situation Report #5: "There have been 58 live rescues so far by these teams (Search & Rescue International Teams). . . . Approximately 60% of the worst affected areas of PaP and surrounding communities have been covered." [9] The major constraints for the USAR operation are security, transport, communications and fuel.	"WHO/PAHO estimates that the number of dead ranges between 40,000 and 50,000 people. A mass burial of 3,000 bodies was reported yesterday. . . .(In PaP) at least eight hospitals and/or health centres have collapsed or sustained serious damage. …At least five hospitals are functioning. "[9] A dialysis center with 8 units was operational.
17 Jan Day 6	"The PaP airport is heavily congested. . . . Fuel remains an issue for humanitarian operations. . . The port remains unusable." [10]		Situation Report #6: "S&R teams extracted 13 live rescues on 16 January bringing the total number of lives saved by these teams to 71." [10]	"The Health Cluster (21 organizations lead by WHO) reports that seven field hospitals have arrived and three are fully operational. . . Handling of dead bodies remains an issue." [10]
18 Jan Day 7	"MINUSTAH reports that the overall security situation in PaP remains stable, with limited, localized violence and looting occurring." "Twenty-six countries, including Argentina, Canada, France, Russia and the USA, have provided significant military assets towards the emergency response. These assets included field hospitals, troops, military aircraft, hospital ships, cargo ships and helicopters. MINUSTAH currently has 3,400 troops and police on the ground."[11]	"The Government has further advised severely affected populations to leave the city if they have family or friends in non-affected areas. To this end, it provided cash and fuel to a transport company to provide free transport. . . . thousands of displaced are leaving PaP for rural areas." [11]	Situation Report #7: "Urban Search-and-Rescue teams have saved 90 lives. Two more live rescues were reported on 18 January." "An initial assessment by the United Nations Environment Programme, from 13 to 17 January, indicated no major acute environmental emergencies, but enormous issues for the anticipated recovery phase. The most urgent issues include waste management, medical waste, disposal of corpses and disposal of demolition material." [11]	"All hospitals within the PaP area are overwhelmed with incoming patients. Many fracture cases need urgent surgical intervention due to extended periods without care." "Major gaps include surgical capacity, follow-up of surgical patients, maternity care, and coverage of areas of population displacements. . . . PAHO/WHO is coordinating the health sector response from operation bases in PaP and Santo Domingo. An operations centre is also being set up in Jimaní, in the Dominican Republic." [11]
19 Jan Day 8	"Despite logistical and security constraints, the affected population is receiving an increasing number of relief supplies, including medical assistance, food, water and shelter." [12]	"The Government has devised eight zones for the distribution of humanitarian assistance. A main concern for the Government continues to be the revitalization of economic activities." [12]	Situation Report #8 "The revised total of lives saved by international search-and-rescue teams is over 121 people. . . At the peak of the search-and-rescue effort, there were 52 teams on the ground with 1,820 rescue workers and 175 dogs." "Water distribution has been constrained by limited fuel supplies. Distribution was planned for 176 distribution points on 19 January." [12]	Haiti has "49 hospitals nationwide . . . including 11 hospitals in PaP. Eight hospitals and health-care facilities in and around PaP are damaged." "The Minister of Interior has started spraying caustic soda over bodies and buildings where bodies have still not been recovered." "The provision of water to hospitals, gathering sites and common areas are the priorities for distribution." [12]

Date	Security and access	Official figures	Emergency management actions	Health status
20 Jan Day 9	The PaP airport reports about 150 planes are landing daily. Finding free slots for large aircraft is still a challenge. [13]	"DPC has estimated that the earthquake resulted in 75,000 persons killed, 200,000 injured and one million displaced. "[13]	Situation Report #9: "IOM estimates that there are more than 300 makeshift settlements scattered throughout the city, with an estimated 370,000 people living under improvised shelter with no access to water supplies, according to recent assessments." [13]	"Assessments of hospital facilities will continue to look at hospital infrastructure, referral systems and the organization of transportation of patients." "As of 19 January, the WASH Cluster has established 82 distribution sites for water, and has 180 water trucks with a total capacity to provide water to 180,000 people." [13]
21 Jan Day 10	"The road from the Dominican Republic remains the best option for the majority of incoming cargo." "The PaP port is functional." "The security situation in PaP remains stable although there are isolated cases of looting and violence. MINUSTAH currently requires military escorts for the delivery of aid by UN agencies." [14]		Situation Report #10: "The [UN] cluster estimates that the number of displaced people is between 500,000 and 700,000 (current planning figure). . . .Of the 508 makeshift sites identified by the Government, some 350 have been assessed (68%) by cluster partners. These 350 sites currently accommodate around 472,000 people and only six sites have access to water sources. A new 400-person site was established on 21 January in Delmas."[14]	"PROMESS, the main medical storage and distribution facility managed by PAHO/WHO, is providing medicines and medical supplies for free to 50 organizations working in hospitals and clinics. The supplies have been offered since 13 January and each day the number of requests increases." The removal of medical waste from hospitals and wherever health care is provided is a challenge. [14]
22 Jan Day 11	"The security situation remains stable but the potential for unrest remains. There is concern that in some Port-au-Prince neighborhoods (Belair, Martissant and Cité Soleil), formerly incarcerated criminals have returned and are attempting to reconstitute gangs."[15]	"As of 22 January, the Government has accounted for 111,481 confirmed deaths in four departments (South East, West, Nippes and West)." [15]	Situation Report #11: "The Government has declared the S&R phase over. There were 132 live rescues by international S&R teams." "So far, more than 130,000 people have been assisted. . . with transportation to leave the city, according to DPC." Artibonite department has received 50,573 people; North West department 30,000; Centre department; 20,530; North department 12,500; Grande Anse 9,000; and South department 9,000. The total number of people leaving PaP by private means remains undetermined."[15]	Currently there are 40 functioning health facilities in PaP, 8 of which are field hospitals. Urgent surgical interventions are decreasing and the follow-up of the post-surgical patients is a problem that needs to be solved. Information management is a challenge for all clusters/ sectors. [1] "At present, Haiti's immunization program is not functioning and tetanus is the disease of most immediate concern, according to WHO." [15]
23 Jan Day 12				Improved waste management (solid and health care) is taking place in hospitals, including the appropriate disposal of amputated body parts. [2]

Date	Security and access	Official figures	Emergency management actions	Health status
24 Jan Day 13		"The Government estimates the death toll from the 12 January earthquake at 112,250 deaths and 194,000 injured. The number of people in need of shelter ranges from 800,000 to one million."[16]	Situation Report #12: "The Government estimates that 235,000 people have left PaP using the free transportation being provided by the Government." "Water continues to be distributed daily at 115 sites in PaP reaching an estimated 235,000 people." [16]	"43 hospitals are functioning in the PaP area, 12 field hospitals (half of which are military hospitals) and two hospital ships (US and Mexico). There is a need for more information from areas outside of PaP. . . Important challenges remain especially in the areas of post-operative care and the adaptation of thousands of people who have lost limbs. . . No reported outbreaks of communicable diseases." [16]
25 Jan Day 14	The security situation in PaP remains stable but there have been isolated instances of looting and a recent incident where MINUSTAH troops fired warning shots and used tear gas. "More and more police officers are reporting for duty, increasing capacity to an estimated 60-70 percent of pre-earthquake levels in PaP." [17]	The Ministerial Conference on Haiti took place in Montreal on 25 January.	Situation Report #13: "The distribution of assistance continues in PaP and other affected areas such as Jacmel, Carrefour, Léogâne and Petit Goâve. Tents, food, health (post-operative care and epidemiological surveillance), sanitation and hygiene are the priorities for assistance."[17]	"The Ministry of Health of the Dominican Republic estimates that as of 22 January, 495 Haitian patients are in nine hospitals in the Dominican Republic. The majority (247 people) are in the Buen Samaritano Hospital in Jimaní. The influx of patients requiring emergency care in these hospitals is declining." [17]
27 Jan-Day 16	Commercial activities have resumed in many parts of the country. The security situation in PaP and other affected areas remains stable. Military escorts are required for UN relief distributions. [18]	"The Government is reporting that 112,392 have died and 196,501 people have been injured by the earthquake. The number of displaced people ranges from 800,000 to one million."[18]	Situation Report #14: "An increase in commodity prices has been reported further increasing the number of people who are dependent on humanitarian assistance. . . . Cash-for-work and cash-for-food programmes are starting to be used to engage Haitians in the recovery effort and to help stimulate the local economy. . . . All schools remain closed but schools in non-affected departments will reopen on 1 February." [18]	Cases of tetanus and suspected cases of measles have been reported in Léogâne . A vaccination campaign against diphtheria and tetanus, DTT and measles will begin on February 2. Water is reaching 308,000 people through 133 distribution points in PaP. The coverage in Léogâne and Jacmel has been expanded also. Additional boreholes and new contractors are being identified to increase production and distribution capacity. [18]
28 Jan Day 17			Health report indicates people with injuries have received medical attention, even though some require surgical care.	Turning point between the life-saving and the post-operative care phases.
29 Jan Day 18	"The port has been declared unsafe for incoming ships. PaP airport is operating at peak capacity with an average of 120 incoming flights per day." "While the overall security situation in PaP remains stable, crowd control at aid distribution points." [19]		Situation Report #15: "As of 28 January, the Government reported that more than 341,000 persons have departed PaP for locations outside the capital. . . . Over a third of the total – some 133,000 individuals – have arrived in Artibonite department." [19]	"Several organizations have reported cases of tetanus and chicken pox. An isolated case of typhoid has been reported. . . .In terms of medical supplies, crutches and x-ray equipment are in short supply and specialists in orthopedic and internal medicine are in high demand, according to the Cluster." [19]

Date	Security and access	Official figures	Emergency management actions	Health status
1 Feb Day 21	"The PaP airport is handling approximately 120-150 planes per day. . . . The overall security situation across the country remains stable but potentially volatile."[20]		Situation Report #16: "The Government has revised the number of people leaving PaP for outlying departments to 482,349 people, as of 31 January. "[20]	"The need for the establishment of post-operative care facilities and mobile clinics persists. Due to the large numbers of patients who are now homeless, hospitals are challenged with where to discharge patients. In collaboration with the regional waste-hauling authority, PAHO/WHO has set up a collection system to remove medical waste in all hospitals and dispose them in safe and organized landfill sites." [20]
3 Feb Day 23	"Growing gang rivalries remain a concern in PaP. UNPOL and HNP continue to maintain increased patrols in Cité Soleil and Marché de Fer. The Government decided to extend the state of emergency which was due to expire on 1 February for a further two weeks." [22]	Prime Minister says, "as angry protests over the slow arrival of aid flared on the rubble-strewn streets," to the Agence France-Presse (AFP): "There are more than 200,000 people who have been clearly identified as people who are dead," same report indicates "aid agencies have sounded the alarm that donations for Haiti relief have been desperately low compared to after the 2004 Asian tsunami, which had a death toll of about 220,000." [21]	"Situation Report # 17: Sanitation is becoming a major concern at many of the temporary sites. . . . The WFP food surge continues. Some 1 million people have been reached since the onset of the emergency; 338,000 people have received two-week rations of rice over the past 3 days." [22]	"Health Cluster partners have recorded over 1,000 amputations in PaP. There are also reports that some 50 people have been paralyzed from spinal cord injuries." "Medical waste management services are reportedly only being used by two hospitals in PaP. Some hospitals appear to be sending waste on their own to the landfill site." "Many medical supplies are still in large containers in PaP and need to be sorted and prioritized. This process is causing some delays in getting supplies distributed." [22]
5 Feb Day 25	"Some 80 to 90 flights per day are landing at PaP airport, down from the peak of 120-150 flights per day." "Contingency planning is underway to prepare for the upcoming rainy season, taking into consideration displaced populations and logistic shortcomings." [23]	"The DPC is verifying the latest figures for dead and injured (Declared by the Prime Minister on Feb 3) but has not issued an official update since 28 January when it reported that 112,405 had died and 196,595 were injured." [23]	Situation Report #18: "Seven organized settlements have been established for 42,000 displaced people; some 460,000 people remain in 315 spontaneous settlements throughout PaP, according to IOM." [23]	"Sanitation and vector control is becoming a major concern. . . ." ". . . no notification of events with epidemic potential, according to PAHO/WHO. Disease surveillance continues. There are 52 government-defined sentinel sites, 12 of which are located in the metropolitan PaP area. Investigations are also being conducted by three mobile teams from the Ministry of Health, the US Centers for Disease Control and PAHO/WHO." [23]

Date	Security and access	Official figures	Emergency management actions	Health status
8 Feb Day 28	"The security situation remains unchanged but there is growing concern over potential restiveness and crime prompted by shortages of shelter, jobs and sanitation." [24]		Situation Report #19: "Contingency planning is underway to prepare for the upcoming rainy season, taking into consideration displaced populations and logistic shortcomings." [24]	Safe drinking water (5 litres per person per day) is provided to over 780,000 people through water tankering and water treatment plants at 300 sites across Port au Prince, Léogâne , and Jacmel. [24]
11 Feb Day 31	"Commercial cargo flights have started arriving at PaP airport." "The security situation throughout the country remains stable despite increased reports of isolated incidents."[25]		Situation Report #20: "The Government reported that 211 live rescues were achieved by international and national S&R teams as of 9 February. A total of 139 live rescues were carried out by international teams and 72 by national teams."[25]	There is a decline in trauma injuries requiring treatment but the need for overall medical care is rising. The Ministry of Health's surveillance system reports acute respiratory infections as the main cause of morbidity. [25]
16 Feb Day 36	"The Office of the High Commissioner for Human Rights and the United Nations High Commissioner for Refugees are jointly urging countries to suspend all involuntary returns to Haiti due to the continuing humanitarian crisis. They have called on all countries to continue granting interim protection measures on humanitarian grounds until such time as people can return safely and sustainably." [26]	"As of 15 February, the national Civil Protection Agency estimates that 217,366 people died from the 12 January earthquake, an increase of 5,000 people since the last estimates were released on 6 February." [26]	Situation Report #21: "Provision of shelter and camp coordination continue to be challenging, including the need for debris removal and the identification of land for settlements. There is an urgent need to create adequate sanitation conditions for displaced populations, especially in congested settlement sites." [26]	
19 Feb Day 39	"The security situation remains stable, and while some demonstrations have taken place in PaP over the last days, no major incidents have been reported." [27]		Situation Report #22: "The Post-Disaster Needs Assessment (PDNA), to be carried out by the Government of Haiti and supported by development partners . . . was officially launched in PaP on 18 February. Focusing on key areas of the early recovery phase (sanitation, food security, water, debris management and removal and transitional shelter). . . ." [27]	"There are currently 396 health NGOs registered in Haiti, however, many of them are due to depart the country in the coming weeks, without sufficient new capacity planned to arrive." "There is a risk of a large-scale outbreak of diarrhea, given the present overcrowding, poor sanitation and lack of effective waste disposal systems in spontaneous settlement sites." [27]
22 Feb Day 42	"Security in displacement sites, especially in large settlements, continues to be a concern and requires a more permanent police presence." [28]	"DPC estimates that 222,517 people died following the 12 January earthquake, an increase of 5,000 people since the last estimates were released on 15 February." [28]	Situation Report #23: "The number of people who have left PaP for outlying departments has increased to 597,801 people from the previous figure of 511,405. An estimated 160,000 persons have come from PaP to the border area with the Dominican Republic." [28]	"There has been an increase in allegations of gender-based violence in general terms. Cases are being referred to health services." [28]

Date	Security and access	Official figures	Emergency management actions	Health status
25 Feb Day 45			Situation Report #24: "Together with the decongestion of spontaneous settlement sites, creating adequate sanitary conditions will be crucial in order to mitigate the risk of a large-scale outbreak of waterborne diseases in the coming weeks." [29]	"Through the ongoing vaccination campaign in temporary settlements, over 8,000 children under seven years of age have been vaccinated against diphtheria, tetanus and pertussis and over 5,000 against measles and rubella." [29]
1 Mar Day 49	"The transition from US Military assets to commercial handling at the port and airport is complete. The humanitarian cargo village at the airport is closed and all offloading is performed by privately contracted entities." [30]	The death toll has risen to 222,570 people, an increase of 53. 1.3 million people live in spontaneous settlement sites. 604,215 people have left PaP. [30]	Situation Report #25: "Heavy rainfall in Nippes and Sud departments led to flooding on 27 February, killing at least 13 people and causing the temporary evacuation of 3,428 others." [30]	
4 Mar Day 52			Situation Report #26: The Government and humanitarian actors are coordinating to determine humanitarian needs in Nippes and Sud departments following floods on 27 February. [31]	
9 Mar Day 57			Situation Report #27: "With the early onset of rains, shelter and sanitation remain the most urgent priorities; the distribution window for agricultural inputs has been reduced significantly by rain and resulting landslides in the earthquake-affected areas." [32]	"Government figures show a steady rise in reported cases of suspected malaria. This is to be expected during the current season and considering the conditions of people living in close quarters in the spontaneous settlements." [32]
11 Mar Day 59	"Preparation work is starting on two sites, Villages Des Oranges and Tabarre 2, identified by the Government for the relocation of displaced persons from other high-risk settlement sites." [33]		Situation Report #28: "Two months into the humanitarian response, more than 4.3 million people have received food assistance, 1.2 million people are receiving daily water distributions, and more than 300,000 children and adults have been vaccinated." [33]	"An estimated 494,600 children under five and 197,840 pregnant and lactating women have been affected by this disaster. All are considered at risk of malnutrition and need to be targeted in blanket supplementary feeding." "Many trucks delivering water are not chlorinated. Reports from primary health providers show insufficient quantities of water for hygiene purposes. Many smaller settlements are underserved by humanitarian assistance." [33]
15 Mar Day 63	There is an increase in reports of Gender-Based Violence (GBV) cases; MINUSTAH, UNPOL and the Haitian National Police have joined forces to patrol, monitor and evaluate security issues related to GBV and Child Protection in IDP camps in PaP and Léogâne. [34]	"Two months after the earthquake, official figures from DPC states that an estimated 222,517 people died and another 310,928 were injured." [34]	Situation Report #29: "As of 15 March, 433 sites (including spontaneous and transitional) with a total population of 682,693 individuals or 132,383 families have been identified in the PaP area and some communes in Jacmel." [34]	PAHO/WHO has facilitated coordination of 314 health partners to aid government efforts. Eight cluster subgroups have been established: health care and mobile clinics, hospital and trauma care, health information management, reproductive health, mental health and psychological support, disabilities, medical supplies, early warning of communicable diseases and reproductive health." [34]

Date	Security and access	Official figures	Emergency management actions	Health status
19 Mar Day 67		"Thereare 460 sites with a total population of 1,170,000 individuals in PaP."[35]	Situation Report #30: "The continuing increase in both the number of camps and the size of existing camps is proving quite challenging for implementing agencies. Anecdotal evidence suggests that a percentage of these increases are persons not directly affected by the earthquake." "DPC reports 40,000 displaced persons from earthquake-affected areas residing with host families in the North department. . . hosting arrangements have placed considerable economic strain on households. . . "[35]	"302,000 children have been displaced to other departments, with an additional 720,000 children affected by the earthquake but remaining in their home communities. Of this figure, 309,500 children are currently living in spontaneous temporary settlement sites, which lack basic social services." [35]
24 Mar Day 72	There is an increasing number of reports detailing tensions between displaced persons located on private land and landowners. Some cases have resulted in forceful evictions from the land. [36]	"The Post-Disaster Needs Assessment findings reveal that the total value of damage and losses caused by the earthquake is estimated at US$7.8 billion (US$4.3 billion represents physical damage and US$3.5 billion are economic losses). The damage and losses are the equivalent of more than 120% of the 2009 gross domestic product (GDP)." [36]	Situation Report #31: "Following heavy rains in Haiti last week, the DPC states that no damage to infrastructure or loss of life has been reported." "While Transitional Shelter programs have started in parts of the affected area; obtaining agreement on land remains a key obstacle to speedy response."[36]	"Many patients transported to the Dominican Republic for healthcare after the earthquake now need transportation back to Haiti. The ICRC and IOM will likely assist in coordinating repatriation. . . . Mental health problems have increased since the earthquake. With only 24 psychiatrists in the country, the lack of mental healthcare is more acute than ever. . . . Sanitation and hygiene remain top priority, particularly in the spontaneous settlement sites, where sanitation remains inadequate."[36]
31 Mar Day 79			Situation Report #32: "A large portion of emergency shelters constructed will require strengthening for the rainy season. . . . Lack of certainty regarding land tenure, potential length of stay and ultimate ownership continues to be of concern throughout the affected areas: both for relocation of priority sites and for planning of transitional shelters."[37]	"From 28 February to 20 March, 17 malaria cases, 12 dengue fever cases and 4 tuberculosis cases have been recorded within the zone of intervention which has 25 first aid units and 3 hospitals. Over last week, 3 new cases of malaria have been detected in Fond Parisien and the cases of dengue continue to rise."[37]
11 Apr Day 90		"The International Donors' Conference Towards a New Future for Haiti, at the UN headquarters in New York, yielded more than US$9 billion for Haiti's reconstruction….Of this amount, about US$5.3 billion was pledged for the next 18 months to begin Haiti's path to long-term recovery."[38]	Situation Report #33: "Figures from the latest Displacement Tracking Matrix (DTM) identified 1,373 settlement sites in PaP, Jacmel, Léogâne , Petit and Grande Goâve, which was considerably higher than initial estimates. Of these identified sites, only 289 had Camp Management agencies present, thus registering an overall coverage rate of 21%. Some 411,090 households (2,090,877 individuals) are estimated to be displaced." [38]	

Key findings

1. **Violence.** The impact of the earthquake on people was characterized by direct trauma caused by the collapse of structures. In subsequent days, injuries occurred in traffic accidents, demonstrations, robbery and assault during transport and delivery of aid, and in particular, there was an alarming increase in rape and gender-based violence in camps and temporary settlements. During the 90 days of this study there was a noted fear of civil unrest, with demonstrations and mass protests, primarily controlled by the MINUSTAH.

2. **Isolation and displacement.** The impact of the earthquake on the physical structure of the Port-au-Prince airport and port, and the obstruction of roads by debris generated extreme hardships in terms of access and mobilization within the most affected areas, aggravated by the unusual increase in traffic, by air, land, and sea. Simultaneously, a significant number of the population (estimated at more than 600,000 people) left the affected areas to other regions within the country.

3. **Mortality figures.** During the first 10 days of the aftermath an increasing number of deaths were estimated, stabilizing at 112,000. On 2 February, with the decline of international aid, the media compared Haiti's earthquake to the 2004 Indian Ocean tsunami, which immediately generated a public statement by the Prime Minister, almost doubling the official figures. The Directorate of Civil Protection (DPC) held to the original figures indicating that they would review them, and two weeks later indicated that 222,570 deaths were recorded. Thus the Haiti figure outnumbers the death toll from the Indian Ocean tsunami (220,000 deaths). This situation is similar to what happened after Hurricane Mitch in 1998, when the international community focused on the tragedy caused by the Casitas Volcano flash floods in Nicaragua with 1,212 deaths, diverting attention from the situation in Honduras. The reaction of the Honduras government was evident: the death toll rose suddenly from 334 to 6,600, a number that was repeated until it was finally accepted in the international data systems [39].

4. **Change in health care needs.** In the first two weeks, trauma care demanded nearly all the attention of the few remaining health services and all the health teams deployed to Haiti. The provision of water services, energy, and waste collection in health centers was a challenge for PAHO and health authorities. Following the initial period, there was a marked decrease in demand for earthquake-related trauma care, but an important increase in demand for general medical care. Two months after the earthquake, the health information system detected an increase in mental health problems, malaria, and dengue fever.

5. **Environmental health deterioration.** The poor sanitation conditions prior to the event, together with the high concentration of people in camps, the difficulties in the provision of potable water, inadequate systems of excreta disposal and waste collection, disruption in the regular health services, the onset of the rainy season, and the remarkably difficult logistical conditions in Haiti demanded a massive mobilization to prevent outbreaks of communicable diseases by the health authorities and the international community. But there was a risk factor that did not get any attention: the arrival to the island of thousands of individuals from different parts of the world who could introduce a communicable disease to the island. Nine months after the quake the first cases of cholera were detected. The disease was caused by *Vibrio cholerae* serogroup O1, serotype Ogawa, a strain found in South Asia [40].

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The 12 January 2010 earthquake was the most devastating of many major sudden-impact natural disasters affecting Haiti in the last 10 years. The health impact of the earthquake in absolute terms (number of dead and injured) was among the highest in recent times. When the needs are compared to the country's response capacity, this disaster was truly unprecedented.

The level of response, especially in the health sector, was generous, even overwhelming. Organization of the massive, global response was challenging, and many of the problems seen in past disasters were replayed in Haiti. Information was scarce, decisions were often not evidence-based, and there were serious gaps in overall or sectoral coordination.

This book presents lessons to be learned from Haiti with the aim of improving the health sector's response in major, sudden-onset disasters in the future. It also identifies opportunities provided by the disaster for making significant changes in health services in Haiti. One of the key lessons of the Haiti tragedy is that coordination can only be effective where national authorities are equipped to assume leadership and establish relief and recovery priorities.

The authors have drawn on their own extensive experience in international disaster management, and synthesized material from reports, evaluations, peer-reviewed scientific publications, and over 150 interviews. A review group was convened by PAHO/WHO to corroborate the findings and conclusions of this publication.

The book gives particular emphasis to those lessons that are of general interest, i.e., not specific to the case of Haiti. The international community has much to learn from the response in Haiti where it has shown an ability to repeat its errors and shortcomings from past disasters.

This document can be viewed on the Internet at:
www.paho.org/disasters

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