



ELSEVIER

The
American Journal of
Emergency Medicine

www.elsevier.com/locate/ajem

Correspondence

Operative care after the Haiti 2010 earthquake: implications for post-disaster definitive care

To the Editor,

On January 12, 2010, a 7.0 earthquake struck Haiti, affecting 3 million people and causing 220 000 deaths and more than 300 000 injuries [1]. In response to a request from Hopital Saint Francois de Sales in Port-au-Prince, a series of surgical teams were deployed from the Shock Trauma Center at the University of Maryland Medical Center (STC-UMMC) to operate 2 operating rooms and provide postoperative care. The STC-UMMC teams operated alongside the staff of Hopital Saint Francois de Sales from January 30 through June 27, 2010. After reviewing the teams' operative records and reports of other foreign medical teams (FMTs) responding the Haiti earthquake (see Table and Fig.), we have explored the potential implications of these experiences regarding disaster preparedness and FMT response.

Although the injury pattern of the Haiti 2010 earthquake closely resembled that seen after other recent disasters [2,3], foreign medical and surgical support teams were engaged in the treatment of traumatic injuries in Haiti for a substantially longer period than previously recognized [2,4]. In Haiti, STC-UMMC and other FMTs were fully occupied with the treatment of traumatic injuries for 6 weeks after the disaster [4]. STC-UMMC performed operations treating solely fractures and wounds for the initial six weeks. After this point, STC-UMMC continued to treat predominantly soft tissue and orthopedic injuries. Although the cause of injury was not listed in operative reports, the vast majority of these injuries were reported to be earthquake-related.

A number of factors likely contributed to this prolonged role of the FMTs: roadway damage delayed patients' access to care, widespread confusion persisted regarding the availability of treatment facilities, limited relative capacity for patient evacuation, and local residents' hesitation to seek treatment from FMTs [5]. Likely the most significant reason for a prolonged FMT presence was that local health care services were extremely limited before and after the earthquake. Haiti is the most impoverished country in the western hemisphere with some of the poorest public health indicators in the region, and the limited health services that were available in Haiti were

devastated by the earthquake [1,6]. There existed a limited capacity to transition care back to non-functioning or impaired local health care counterparts. FMTs also became responsible for much of the long-term surgical care typically required for the high incidence of non-union, mal-union, and postoperative infection following disaster-related surgery for musculoskeletal injury [2,5]. Additionally, in the experience of the authors, patients with chronic and non-emergent complaints presented for evaluation and treatment from Week 3 onward, because free health care was available from the FMTs. Eventually a dual system emerged with the Haitian providers managing routine care and STC-UMMC or other FMTs maintaining their focus on the trauma and surgical patient. Still, FMTs' exit strategies were significantly complicated by the ongoing demand and need for their services.

This experience emphasizes the need for more focused and stronger programs to build local acute care capacity and strengthen surgical systems at the national level. Such programs would function to enable a more expedient transition of care to local providers following a disaster response. These would serve as a fundamental mechanism for disaster preparedness. Additionally, the experience of STC-UMMC highlights the importance of FMTs leveraging local partnerships. FMT coordination with local partners, as seen in the STC-UMMC response, limits many of the hazards observed in prior long-term disaster response efforts, such as creating a new health-gap or inattentiveness to local concerns.

The Guidelines for the Use of Foreign Field Hospitals in the Aftermath of Sudden-Impact Disasters state that foreign field hospitals (FFHs) be established within 24 hours after a disaster and that FMTs operate them for up to 15 days, unless otherwise requested by local authorities [7]. In the aftermath of the earthquake in Haiti though, the need for FMTs with surgical capacity continued far beyond 15 days. Cooperating with local health care providers, international medical and surgical teams treated high volumes of patients in temporary field hospitals and surviving medical facilities for up to 6 months and longer after the earthquake [4]. It has been suggested that the 15-day exit guideline for FFHs should be revised to better reflect local context and needs, as well as the diverse modalities of health disaster responders [3,8,9]. This aspect of FMT efforts in disaster response is the subject of much discussion, and further study is needed to elucidate the appropriate exit strategy for FMTs in

t1.1
t1.2
t1.3

t1.4
t1.5
t1.6
t1.7
t1.8
t1.9
t1.10
t1.11
t1.12
t1.13

	Internal fracture treatment	External fracture treatment	Wound care	Amputation	Extraneous
Week 3	1	4	9	0	0
Week 4	12	9	22	1	0
Week 5	12	9	21	0	0
Week 6	14	2	15	3	0
Week 7	13	3	4	2	10
Week 8	19	1	5	0	13
Week 9	7	6	9	2	19
Week 10	6	6	11	1	14
Week 11	4	2	9	0	6
Total	88	42	105	9	62

^a STC-UMMC operations in Haiti began during week 3 post earthquake, so no data is provided for Week 1 and Week 2. Data reviewed for initial 2 months of operations.

t1.14

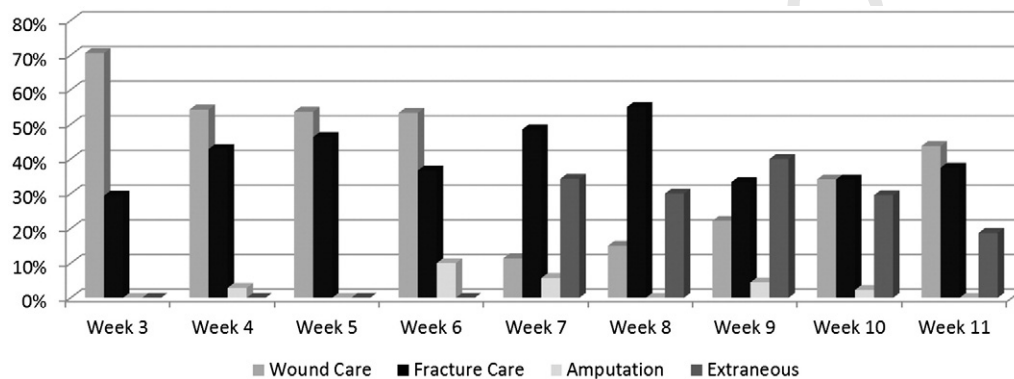


Fig Procedures performed by week and type during STC-UMMC operations in Haiti, January 30 through March 25, 2010 (weeks 3–11).

88 such situations. The experience of STC-UMMC as well as the
89 extended timeline realized by other FMTs in this particular
90 response effort could potentially suggest a longer deployment
91 period for FMTs than previously set for FFHs, but certainly
92 supports a more context-specific end point.

93 On the whole, with an extended demand for international
94 medical and surgical support in Haiti due to the limited
95 baseline health care capacity and further complicated by the
96 earthquake, the experience of STC-UMMC emphasizes the
97 importance of national acute care capacity building as an
98 essential component of emergency preparedness, the role of
99 local partnerships in FMT response, and the need to further
100 evaluate exit guidelines for FMTs in disaster response.

101 Lucas C. Carlson BA
102 *University of Maryland School of Medicine*
103 *Baltimore, MD 21201, USA*
104 *E-mail address: lucas.carlson@som.umaryland.edu*

105 Jon Mark Hirshon MD, MPH, PhD
106 *National Study Center for Trauma and Emergency*
107 *Medical Systems, University of Maryland School of*
108 *Medicine, Baltimore, MD 21201, USA*
109 *E-mail address: jhirs001@umaryland.edu*
110

Emilie J.B. Calvello MD, MPH 111
Department of Emergency Medicine, University of
Maryland School of Medicine, 110 South Paca Street
6th Floor, Baltimore MD 21201, USA 112
E-mail address: emiliejbc@gmail.com 113
114
115

Andrew N. Pollak MD 116
R Adams Cowley Shock Trauma Center, University of
Maryland Medical Center, Baltimore, MD 21201, USA 117
E-mail address: apollak@umoa.umm.edu 118
119
120

<http://dx.doi.org/10.1016/j.ajem.2012.10.020>

References


- 121
122
123
124
125
- [1] Haiti: One Year Later, January 18, 2011. United Nations Office for the
Coordination of Humanitarian Affairs Website. [www.unocha.org/
issues-in-depth/haiti-one-year-later](http://www.unocha.org/issues-in-depth/haiti-one-year-later). Accessed March 14, 2012. 126
127
 - [2] Phalkey R, Reinhardt JD, Marx M. Injury epidemiology after the 2001
Gujarat earthquake in India: a retrospective analysis of injuries treated at
a rural hospital in the Kutch district immediately after the disaster. *Glob*
Health Action 2011;4:7196. 128
129
130
131
132
 - [3] von Schreeb J, Riddez L, Samnegård H, Rosling H. Foreign field
hospitals in the recent sudden-onset disasters in Iran, Haiti, Indonesia,
and Pakistan. *Prehosp Disaster Med* 2008;23(2):144-53. 133
134
135

- 136 [4] Centers for Disease Control and Prevention. Post-earthquake injuries
137 treated at a field hospital—Haiti, 2010. *MMWR Morb Mortal Wkly*
138 *Rep* 2011;59(51):1673-7.
- 139 [5] Redmond AD, Mardel S, Taithe B, Calvot T, Gosney J, Duttine A, et al.
140 A qualitative and quantitative study of the surgical and rehabilitation
141 response to the earthquake in Haiti, January 2010. *Prehosp Disaster*
142 *Med* 2011;26(6):449-56.
- 143 [6] McIntyre T, Hughes CD, Pauyo T, Sullivan SR, Rogers Jr SO,
144 Raymonville M, et al. Emergency surgical care delivery in post-
145 earthquake Haiti: Partners in Health and Zanmi Lasante experience.
146 *World J Surg* 2011;35(4):745-50.
- 147 [7] Department of Emergency and Humanitarian Action, the World Health
148 Organization, Area on Emergency Preparedness and Disaster Relief, the
149 Pan-American Health Organization. Guidelines for the use of foreign
150 field hospitals in the aftermath of sudden-impact disaster. *Prehosp*
151 *Disaster Med* 2003;18(4):278-90.
- 152 [8] de Ville de Goyet C. Editorial comments: surgery under extreme
153 conditions in the aftermath of the 2010 Haiti earthquake. *Prehosp*
154 *Disaster Med* 2011;25(6):494-5.
- 155 [9] Gerdin M, Wladis A, von Schreeb J. Foreign field hospitals after the
156 2010 Haiti earthquake: how good were we? *Emerg Med J* 2012 [Epub
157 ahead of print]. 158 **Q1**

Q1: There are no page numbers, as this is still just and Epub.

UNCORRECTED PROOF

AUTHOR QUERY FORM

 ELSEVIER	Journal: YAJEM Article Number: 53386	Please e-mail or fax your responses and any corrections to: Elsevier E-mail: corrections.esi@elsevier.spitech.com Fax: +1 619 699 6721
---	---	--

Dear Author,

Please check your proof carefully and mark all corrections at the appropriate place in the proof (e.g., by using on-screen annotation in the PDF file) or compile them in a separate list. Note: if you opt to annotate the file with software other than Adobe Reader then please also highlight the appropriate place in the PDF file. To ensure fast publication of your paper please return your corrections within 48 hours.

For correction or revision of any artwork, please consult <http://www.elsevier.com/artworkinstructions>.

Any queries or remarks that have arisen during the processing of your manuscript are listed below and highlighted by flags in the proof. Click on the 'Q' link to go to the location in the proof.

Location in article	Query / Remark: click on the Q link to go Please insert your reply or correction at the corresponding line in the proof
Q1	Please provide page range here. <div style="border: 1px solid black; padding: 5px; display: inline-block;"> Please check this box if you have no corrections to make to the PDF file. <input checked="" type="checkbox"/> </div>
	Fig. 1 - (BW in print and web) If you wish to pay for the figure(s) to be printed in color, please indicate so on your proofs and an estimate will be emailed to you.

Thank you for your assistance.