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# Disasters; the 2010 Haitian earthquake and the evacuation of burn victims to US burn centers☆

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ABSTRACT

Response to the 2010 Haitian earthquake included an array of diverse yet critical actions. This paper will briefly review the evacuation of a small group of patients with burns to burn centers in the southeastern United States (US). This particular evacuation brought together for the first time plans, groups, and organizations that had previously only exercised this process.

The response to the Haitian earthquake was a glimpse at what the international community working together can do to help others, and relieve suffering following a catastrophic disaster. The international response was substantial. This paper will trace one evacuation, one day for one unique group of patients with burns to burn centers in the US and review the lessons learned from this process.

The patient population with burns being evacuated from Haiti was very small compared to the overall operation. Nevertheless, the outcomes included a better understanding of how a larger event could challenge the limited resources for all involved. This paper includes aspects of the patient movement, the logistics needed, and briefly discusses reimbursement for the care provided.

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## 1. Introduction

On January 10 2010, a catastrophic 7.0 magnitude earthquake destroyed much of the Haitian capital of Port-A-Prince. It is estimated that 316,000 were killed and another 300,000 injured [1] as a result of the earthquake.

Significant earthquakes typically include burns as one of the more common injuries [2–9]. Following the Haiti earthquake, the most common surgical interventions performed at one of the larger functioning hospitals (Partners in Health/Zanmi Lasante Hospitals) for pediatric patients included ''trauma and burns'' [10]. One of the first operating field hospitals following the earthquake was provided by the Israeli Defense Forces Medical Corps. They reported approximately 10% of their more seriously injured as patients included burns [11].

One aspect of managing the patients with burns included international flights (evacuations) to US based hospitals for more complicated burn care. This paper will review the step by step evacuation of a small subset of those burn patients relying on processes that had never been used in a real world event. Other aspects of this paper include reviewing the complexities of these evacuations, a brief explanation of the groups who made this work, financing, and offer several specific lessons learned from this important example. This was a small group of patients. Yet, there are valuable process lessons learned which have implications for future burn disasters utilising international evacuations for specialty burn care.

## 2. Background

When the earthquake occurred, there were approximately 25,000 Americans living in or visiting Haiti. More than 500 [12] Americans and Haitians with complicated injuries would eventually be evacuated for medical care, primarily to Florida hospitals (in the United States [US]). By January 20 2010, the medical evacuations had pushed much of the daily and conventional surge capacity [13] for Florida hospitals to their limits. By the early morning of January 25, still more injured patients, including several Haitians with critical burns, needed evacuation from the US Naval Ship (USNS) Comfort (a hospital ship).

The overarching philosophy for US disaster operations, including medical evacuations relies on the National Response Framework (NRF) [14]. This framework includes coordination involving state (Florida) and federal (US) representatives for the Health and Medical Emergency Support Function, designated as (ESF-8) [15] and US military air resources; Transportation Command (TRANSCOM).

The process used to manage a surge of burn injured patients in the region is detailed in the Southern Region Burn Disaster Plan (SRBDP) [16,17]. The burn patients needing evacuation posed a challenge since the first wave of evacuated American and Haitian burn patients had already pushed the Miami area burn center beyond conventional capacity [13]. Florida ESF-8, requested activation for the SRBDP to aid with receiving the burn-injured patients (It should be noted, this was the first time this plan had been utilized during an actual disaster).

### 2.1. Building codes and associated injuries

Burn mass casualty incidents (commonly referred to as burn disasters) for the US from 1900 to 2000 were reviewed by Barillo et al. [18]. A similar paper by Cavallini et al. [19] examined international burn disasters over the same period. Common findings included an association of fire related mortality decreases where technology and improved building codes were more prevalent [19]. Both papers identified favorable trends of reduced morbidity and mortality over the past 50 years. Peleg et al. also noted a correlation between decreases in earthquake associated injuries where technology and improved building codes were more prevalent [20].

### 2.2. Planning for a surge of burn injured patients and several burn disasters

One of the first efforts to develop a civilian burn center disaster plan was reported by Wachtel et al. [21]. International Burn Disasters that influenced and stimulated disaster planning and preparedness efforts during the 1990s included the Bijlmermeer disaster (The Netherlands) where a 747 airliner struck an apartment building leaving 43 dead and 100 injured (1993) [22], and the Gothenburg (Sweden) disaster leaving 63 dead and 213 injured (1998) [23–27]. A similar disaster to the Gothenburg disaster occurred in Volendam (The Netherlands) resulting in 14 deaths with 245 injuries (2001) [28–32].

For the US, a major earthquake near Los Angeles (1994) included a number of burn injured patients [9]. However, it was the 9/11 attacks (2001) that changed the course and intensity of medical disaster planning in the US. One focus included building trauma and burn surge capacity [18,33–41]. Partly in response to this focus, the American Burn Association (ABA) published burn disaster guidelines and the ABA Disaster Plan (2005) [42]. Concurrently, representatives from the ABA Southern Burn Region developed the SRBDP [16,17,43]. This SRBDP serves as a framework for coordinating patient movements should one of the regional burn centers exceed capacity following a disaster.

### 2.3. Regional definition

Each geographical area of the US is recognized as a region for the purpose of working with federal partners in the aspect of disaster planning and response. The area closest to Haiti and much of what is considered the ''South'' (of the US) is known as Region IV. Region IV includes the US states of; NC, SC, GA, FL, TN, MS, AL, and KY.

### 2.4. Region IV Unified Planning Coalition (UPC)

In the aftermath of the 2004 and 2005 hurricanes that ravaged the South, Region IV ESF-8 leadership began to routinely meet to improve hurricane preparedness. By 2006, this somewhat unofficial alliance became a more organized group known as the Unified Planning Coalition (UPC), and thus the Region IV, ESF-8 UPC was created. One of the North Carolina roles with

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