

# Using Baseline Data to Address the Lack of Hospital Beds during Mass-Casualty Incidents

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**Keywords:** beds; hospitals; mass-casualty incidents

**Abbreviations:**

ICU = intensive care unit  
MCI = mass-casualty incident

**Received:** 02 July 2007

**Accepted:** 23 July 2007

**Revised:** 07 January 2008

**Web publication:** 27 August 2008

**Abstract**

The management of victims during mass-casualty incidents (MCIs) is improving. In many countries, physicians and paramedics are well-trained to manage these incidents. A problem that has been encountered during MCIs is the lack of adequate numbers of hospital beds to accommodate the injured. In Europe, hospitals are crowded. One solution for the lack of beds is the creation of baseline data systems that could be consulted by medical personnel in all European countries. A MCI never has occurred in northeastern Europe, but such an event remains a possibility. This paper describes how the use of SAGEC 67, a free-access, information database concerning the availability of beds should help the participating countries, initially France, Germany, and Switzerland, respond to a MCI by dispatching each patient to an appropriate hospital and informing their families and physicians using their own language.

Baseline data for more than 20 countries, and for hospitals, especially those in Germany, Switzerland, and France, were collected. Information about the number of beds and their availability hour-by-hour was included. In the case of MCIs, the baseline data program is opened and automatically connects to all of the countries. In case of a necessary hospital evacuation, the required beds immediately are occupied in one of these three countries. Questions and conversations among medical staff or family members can be accomplished between hospitals through computer, secured-line chatting that automatically translates into appropriate language.

During the patient evacuation phase of a MCI, respondents acknowledged that a combination of local, state, and private resources and international cooperation eventually would be needed to meet the demand. Patient evacuation is optimized through the use of SAGEC 67, a free baseline database.

**Hadeif H, Bartier JC, Delplancq H, Dupeyron JP: Using baseline data to address the lack hospital beds during mass-casualty incidents. *Prehospital Disast Med* 2008;23(4):377-379.**

**Introduction**

Currently, emergency physicians are frustrated by a shortage of available hospital beds. Currently, the problem is compounded by: (1) an aging population; and (2) multiple intricate medical pathologies. Strasbourg, France borders Germany, is close to Luxemburg in the west, and Switzerland to the northeast. During the past three years, this location provided the opportunity to develop a free-access software program in order to optimize the occupation of beds in the hospitals in each of the three neighboring countries by promoting close relationships with each country.<sup>1</sup> Each hospital (Levels 1, 2, and 3) creates medical bridges that permit the transfer of patients from a disaster zone to the correct and adapted intensive care unit (ICU), whatever the country.<sup>2</sup>

The economic situation in relation to the Rhine and its enterprises, SEVESO, and the fact that the Council of Europe in Strasbourg aborted a terrorist attack in 2000, leads residents to fear that during a catastrophic situation, one isolated country could not manage alone (in relation to bed and staffing shortages).<sup>3,4</sup> Compared to routine practice, triage principles during a

disaster require an entirely different approach to evaluation and care, and often run counter to training and ethical values. An effective response to disasters and mass-casualty incidents (MCIs) should focus on an *all-hazards approach*, defined as the ability to adapt and apply fundamental disaster management principles universally to any MCI, whether caused by people or nature. Organizational tools such as the Incident Command System and the Hospital Incident Command System, help to ensure a rapid and coordinated response to specific situations. With the cooperation and agreement of the inter-border countries (France, Germany, and Switzerland), a free software program was created that is available 24 hours-each-day by secured data links, and shows the possibility of hospital acceptance of a given patient on a bed-by-bed basis for each country.

### Methods

This international software program initially was established in 2005. In the event of a MCI, a database line shows, in real time, the number of unoccupied beds, their medical and surgical level located in each of the countries involved, in the event of a MCI. It can be used to demonstrate the rate of occupation of the different hospital partners, with the possibility of immediate translation into the appropriate language (French to German or to English, as required). Initially, this software had been established for the care of burn patients because of the shortage of the number of beds available for this patient group. This shortage was due to the extreme difficulties in caring for these patients because of their complicated pathologies and the major risk of bacterial super-infections.<sup>5</sup> By acknowledging the fact that ICU and emergency department Levels 2 and 3 are overcrowded with elderly patients with multiple complex pathologies,<sup>6</sup> it was feared that in the event of a MCI affecting  $\geq 1$  country, the hospital may not be able to cope with the number of mass-casualty victims.<sup>7</sup> It was decided to develop the software to target and respond to such a situation quickly; knowing the difficulty after triage to dispatch victims to the correct hospital bed.<sup>8</sup> This experience is combined with the experience of these three countries in MCIs, as had been done previously in other countries.<sup>9</sup> Currently, the software indicates using global positioning systems and Google Maps®. The possibility of having a dropping zone in the chosen hospitals. The agreement currently includes 32 countries. Negotiations are in progress with various European countries.

It is hoped that in the future, as many countries as possible will be included in this free, international program. The only major difficulty will be in providing the best medical care during the transfer.

### Accessing the Program

The URL for the program is <http://sagec67.chru-strasbourg.fr/SAGEC67/langue.php>. A welcome page allows the user to choose one of three languages. After the user chooses the appropriate language, the software requests a

login and password. Currently, >300 physicians have been recruited to work on the baseline data. When identified, the secure connection is completed, the user has the possibility of knowing, in real time, the number and the type of beds occupied in each of the three countries, and the level of care. The patient is admitted to a particular bed depending on his/her specific pathology, and this information also is entered into the software program (e.g., burns, ED, ICU, psychological).

### Evacuation Decision

Once the open data baseline is completed, the type of pathology is described by selecting appropriate boxes. Then the user is notified to which hospital to send the patient, with the agreement of the participating countries and the agreement of the patient or his next of kin by e-mail. The victim then is evacuated using the most appropriate method (air, terrestrial, or by helicopter or train). A number identifying the patient, the name of the hospital, country, and the main injuries observed when the emergency medical services transported the patient to the admitting medical staff located are entered into the system.

### Conclusions

During a MCI, the management process often is up-to-date and efficient. Physicians and paramedics are well trained in their area of speciality, but the problem is in dealing with the lack of beds in the receiving hospitals. In Europe, hospitals are crowded; elderly patients occupy beds for long periods of time, and in many cases, the discharge process can be expedited. One solution in coping with this bed shortage during a MCI was to create baseline data free of charge to be used by European countries that participate in the program. A MCI never has occurred in northeast Europe, but such an event remains a possibility. This article shows that the availability of baseline information concerning the real-time occupation of beds can help European countries respond to a MCI by sharing the current occupation of their respective hospitals; especially by quickly transferring patients to the right hospital at the right time, and keeping their families and physicians up-to-date through communications using their own language.

Initially, a baseline database was created that included all the hospitals in Germany, Switzerland, and Strasbourg, France. The number of beds and their occupancy hour-by-hour were included. In case of a MCI, the program is opened and connection between all these countries is made automatically. In case of necessary evacuation, the number of beds that are occupied in each of these countries is known immediately. Information is shared between staff and family and communication is translated automatically into the appropriate language, as required.

During the patient evacuation phase, physicians acknowledged that a combination of local, state, and private resources and international cooperation eventually would be needed to meet the huge demand required. By using this baseline data software program, patient evacuation and outcome can be optimized.

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