

obtained from 178 trainees revealed higher satisfaction of the DIMA in transparencies (92 ±10 points vs. 66 ±12 points,  $p < 0.001$ ) and accountability (93 ±8 points vs. 78 ±16 points;  $p < 0.01$ ) compared to the conventional methods. In phase 2, the error rate of information was about 2.4% (donor = 0.6%; consignment = 0.5%; warehouses = 0.8%; and central feedback 0.5%), which was significantly lower than that of information by conventional logistics systems (8%,  $p < 0.01$ ). **Conclusions:** The DIMA system is a transparent and efficient humanitarian management system. More practice may reduce the error rate in the future.

**Keywords:** disaster health management; logistics systems; hospitals; Humanitarian Supply Management System (SUMA); training  
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### Deploying an International Telemedicine System in a Major Active Earthquake Zone

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**Introduction:** Within three weeks of the major earthquakes in China on 12 May 2008, a medical team from a major US trauma center arrived at a major regional hospital located 50 miles from the epicenter, well within the active earthquake zone. The hospital had 140 intensive care unit (ICU) beds dedicated to earthquake victims, most of which sustained crush injuries. An international telemedicine link was requested for teleconsultation between the US trauma center and the Chinese regional hospital.

**Methods:** Several telemedicine systems were rapidly assessed for availability, accessibility and reliability. The telemedicine equipment and software also were selected based on ease-of-use, ease-of-setup, and feasibility for rapid deployment. The resulting system was tested for connection speed and proximity to the ICU in three locations inside the hospital. The tests covered settings for video frame rate, audio quality, image quality, and reliability.

**Results:** The international telemedicine system was operational within 48 hours. Sixteen people (10 located in China and six in the US; nine physicians, three nurses and four administrative leaders) attended the telemedicine session that lasted 45 minutes. The topics included the role of international medical relief team in the ICU for earthquake victims, and patterns and selected cases consultation. The

system greatly enhanced the role of international relief effort by sharing medical expertise across the globe.

**Discussion:** In general, international medical relief is limited by duration (time) and personnel. A rapidly deployable telemedicine system may provide a critical link between the disaster sites and remote medical expert resources both locally and internationally.

**Keywords:** China; earthquake; intensive care unit; international; telemedicine; trauma  
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### The Mumbai Terrorist Attacks on 26 November 2008: Another Proxy War?

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**Introduction:** Mumbai is India's largest city and the financial capital of the country. Destruction of symbolic structures in large cities has been a worldwide strategy of terrorists for spreading hopelessness, fear, and panic. The recent Mumbai terror attacks were similar and included taking foreign nationals as hostages.

**Methods:** Victims profiles were studied for mode of injury (firearm, fire, blast, fall, or combination), the type of injury, and treatment. The level of hospital preparedness was described, especially for surge capacity. Terrorist events and conflict over the last five decades in Mumbai and India were analyzed. The Indian data was compared to global terrorism in order to suggest appropriate recommendations for countering terrorism in a developing country.

**Results:** At least 173 people were killed and 308 were injured in the recent attacks. There were eight attack sites in downtown Mumbai, of which, three sites were patronized largely by western tourists and foreign delegates. Three were crowded public places, including a hospital. The most prevalent injuries were bullet wounds from automatic weapons, followed by blast, shrapnel, falls, and burns. All previous terrorist events in Mumbai are listed in the Table.

| Date         | Type of Event         | Killed | Comments                         |
|--------------|-----------------------|--------|----------------------------------|
| 12 Mar 1993  | Serial bombing        | 257    | 13 serial bombs in public places |
| 06 Dec 2002  | Bus bomb              | 2      | Single bomb in suburb            |
| 27 Jan 2003  | Bicycle bomb          | 1      | Suburb                           |
| 14 Mar 2003  | Train bomb            | 10     | Single bomb in suburb            |
| 28 July 2003 | Bus bomb              | 4      | Single bomb in suburb            |
| 25 Aug 2003  | Car bomb              | 50     | 2 crowded public places          |
| 11 July 2006 | Peak-hour train bombs | 209    | 7 serial explosions              |

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**Conclusions:** The attack of foreign nationals represents a proxy war, and the terrorists are looking for softer targets. Therefore, counter-terrorism initiatives must go beyond country-specific models. In developing countries where public health infrastructure is an issue, adopting the “all-hazards” approach to disasters may be the direction required in order to build capacity for dealing with future events. While there is a push for top-end hospitals for “medical tourism”, India has realized that it is eventually the modest public hospital that responds to all disasters, including those caused by natural hazards or conflict. The financial capital of Mumbai has moved from low to moderate risk for terrorist activities over the past 15 years. The geopolitical reasons for this shift must be researched by social scientists.

**Keywords:** counterterrorism; disaster; India; Mumbai; terrorism  
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### Public Health Safety Measures for Floods in Bihar, India

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**Introduction:** More than 21.3 million people were affected in the 2008 North Indian floods. At least 36,838 villages were flooded and 482,330 houses were destroyed. The number of lives lost to floods was 2,281 and about one million people were left homeless.

**Methods:** A six-month period of disaster relief work for the Bihar floods was evaluated for outbreaks, nutrition, and healthcare facilities. Public health issues including disaster-related illnesses, food distribution, homelessness, mass evacuation, drinking water, loss of land, and livestock were studied. Comparisons were drawn with other floods, such as New Orleans after Hurricane Katrina, especially in regards to vulnerable populations.

**Results:** More than 1,300 relief camps were run by diverse agencies. Air drops and boat rescues were the most common mode of reaching the stranded victims. There was an outbreak of cholera with 130 case fatalities, but the post-disaster illnesses were more rare than predicted. Few hand pumps for drinking water remained uncontaminated by the flooding waters. Halogen tablets and bleaching powder were the most commonly used water-purifying agents. Government agencies repaired 13,685, reconstructed 1,652, and installed 77 new hand pumps with raised platforms in the affected villages with United Nations Children’s Fund (UNICEF) support. Camp community kitchens were preferred over dry rations, as fuel availability was limited. Of the children, 2.6% in the affected area were severely malnourished. Children were immunized with measles vaccine and given Vitamin A supplementation. Remote areas were underserved.

**Conclusions:** Local healthcare workers are instrumental in implementing public health, nutrition, and clean water interventions. Community preparedness was better in areas where

flooding was a seasonal event. Livelihood diversification, rehabilitation of farmland, alternative non-farming occupations, and short-term crops were strategies implemented in the flooded areas. The immediate post-disaster financial aid and media attention can provide a boost for upgrading the basic health infrastructure in resource-poor settings.

**Keywords:** disaster relief; floods; India; outbreaks; public health  
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### Bihar Floods 2008: Benefits of Health Education and Training

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**Introduction:** In 2008, floods affected >2.3 million people in the northern part of the state of Bihar in India. Doctors For You, a non-governmental organization (NGO) set up >100 health camps in four months. Maternal and child health was the most affected due to sub-standard health infrastructure, illiteracy, and poor accessibility after the floods. Nearly all deliveries were domiciliary, conducted by untrained local dais (unskilled traditional birth attendants in the village), or remained unattended with no antenatal or postnatal care.

**Methods:** Many health camps were organized in villages. Separate health education sessions were conducted for all pregnant women and adolescent girls in various villages and relief camps. These focused on anemia, nutrition, contraception, early registration of pregnancy, importance of clean and/or hospital delivery, exclusive breast feeding, ORS preparation, and immunization. More than 70 sterile delivery kits (provided by Plan International, an NGO) were distributed to pregnant women. Training session for all local dais were conducted. All of the dais were provided with delivery kits, iron and folic acid tablets, calcium tablets/syrup, and ORS packs.

**Results:** The health status of pregnant women and adolescent girls improved. The number of clean deliveries at home, even during floods increased. The percentage of exclusively breast fed babies increased. Immunization coverage increased significantly, particularly among least developed communities after the floods. There was more awareness among females about the importance of small families, exclusive breast feeding, and immunizations.

**Conclusions:** Health education is a great tool to improve health conditions under any circumstances. Conducting health education sessions targeting pregnant women and adolescent girls in various disaster relief camps increased awareness of various health-related issues on a long-term basis.

Training, health education, and the provision of clean delivery kits to untrained local village dais can assure clean and safe deliveries of children even during disasters.

**Keywords:** camp; child health; education; flood; India; maternal health; pregnancy; training  
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