

Ukranian's Disaster Medicine Team Mission to India following the Earthquake of 2001

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Abbreviations:

EMS = emergency medical services

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Abstract

This article describes the basic principles around establishing a Disaster Medicine Camp and the organization of the Ukrainian Disaster Medicine Mobile Hospital, which provided medical aid to victims of the 2001 earthquake in India. All of the information was obtained through direct observation and estimates based on empirical data gathered in the field.

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Introduction

An earthquake measuring 7.9 on the Mercalli scale, struck the India's northwestern state of Gujarat on 26 January 2001. Its epicenter was 50 km from the city of Bhuj (Figure 1). Some 50,000 people were injured, 200,000 persons were left homeless, and 35 million people were affected. A total of 73,142 buildings were destroyed. The Indian newspaper "Business" (02 February 2001) reported that the financial losses from the earthquake were estimated at [US]\$5 billion. Some problems with the medical relief plans for the management of earthquake victims in the disaster that followed the earthquake were identified by the Ukrainian Disaster Medical Team during its mission to the region struck by the earthquake.

The 56-member Ukrainian Disaster Medicine Team arrived in India on 01 February 2001. This Team consisted of 20 physicians, 14 nurses, two laboratory technicians, and 20 search and rescue personnel with specialized training provided by the Kiev Emergency Medical Services (EMS) training center. The Team was available to the region for 24 hours per day for 30 days. A Campsite was established 1 km from center of Bhachau

city. This city is located 70 km from the epicenter of the earthquake.

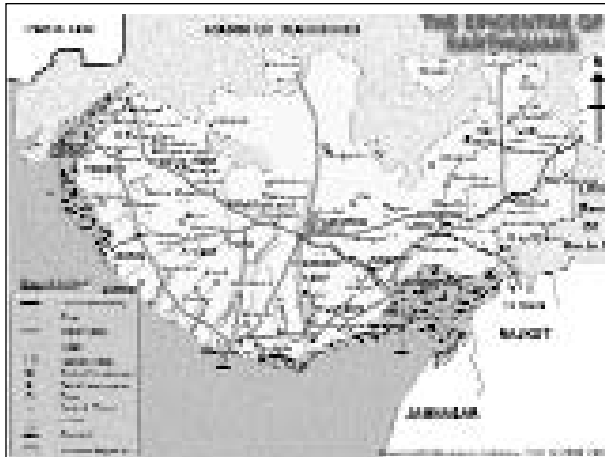
Methods

The information related to the Ukrainian Disaster Medicine Team mission in India was obtained by direct observation and estimation based on empirical data gathered in the field. The observations are limited to description. More specific information will follow in a more definitive work.

Results

Prior to the earthquake, 40,000 residents lived in Bhachau (Figure 1). Of these, 10,000 people were lost and 20,000 injured. All public health services were destroyed, and 70% of the local medical personnel were lost. There were further health risks created by the lack of sanitary facilities, clean water, and edible food. The Ukrainian Team was self sufficient, having brought food and clean water for drinking from the Ukraine.

During the mission, medical aid was provided to 5,558 people, including 1,053 (18.9%) children. 216 surgical interventions were performed (including 69 (31.9%) in children), and 13 people gave birth in the hospital.



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Figure 1—Areas affected by earthquake in Gujarat

The first task following arrival in a new rescue zone was to obtain information about:

1. The nature of the damage;
2. Progress by the local rescue workers;
3. Medical teams present at the site and their ability to provide the necessary medical aid; and
4. Availability of aircraft and helicopter landing sites.

Hospital Siting

The Ukrainian mobile hospital consists of eight inflatable sections in which the appropriate facilities were developed (Figure 2): Section N.1 – Emergency department; Section N.2 – Pharmacy; Section N.3 – Operating theatres; Section N.4 – Staff; Section N.5 – Obstetric and pediatric department; Section N.6 – Intensive Care Unit; Section N.7 – Technical; and Section N.8 – Infectious Disease. Additionally, a large tent was established for the management of 100 in-patients. Ordinary tents were used for medical and rescue team accommodations, and also to rest civilians not needing medical interventions. A field kitchen also was established.

The following factors were considered when the site for the field hospital was chosen:

1. Ease of access for the population of the city and surrounding areas (distance, presence of roads etc.);
2. Security for people at the hospital; and
3. Presence of any epidemic conditions.

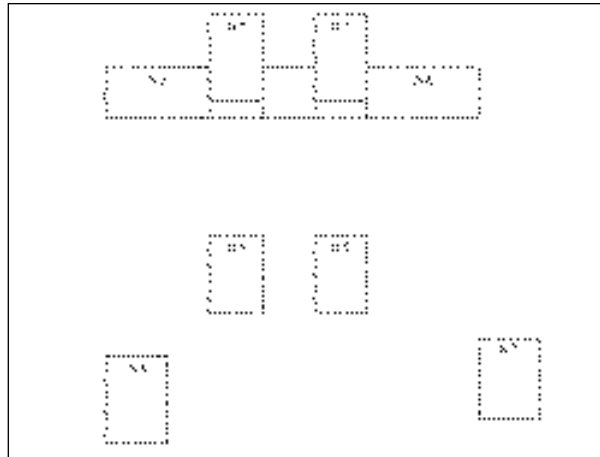
The Emergency Department section was made ready to receive patients within one hour after the Team arrived at the chosen site. The entire hospital was assembled and fully functional and began to provide medical aid within four hours of arrival at the site.

Hospital Operations

On the average, medical care was provided for 150 out-patients each day. During the 25 days that by the Team was operational at the site, medical care was provided to 2,313 out-patients, of which 513 (22.2%) were children.

Patient characteristics

The principle features associated with the out-patients who



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Figure 2—The scheme of the Ukrainian mobile hospital (Section N.1 – Emergency department; Section N.2 – Pharmacy; Section N.3 – Operating theatres; Section N.4 – Staff; Section N.5 – Obstetric and pediatric department; Section N.6 – Intensive Care Unit; Section N.7 – Technical; and Section N.8 – Infectious Disease)

sought assistance at the field hospital included:

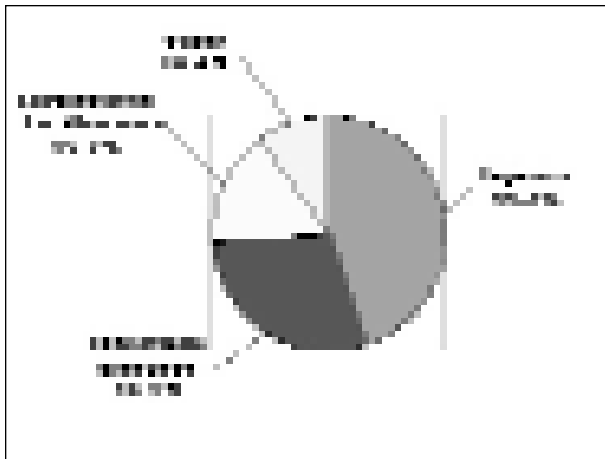
1. The local people did not comply completely with the physicians' recommendations;
2. Patient examinations had to be undertaken in the presence of relatives;
3. Women could be examined only by the female physicians in absence of any males.
4. The ambient temperature was very hot from 12:00 hours until 16:00 hours, so most people appeared for medical aid from 10:00 hours until 12:00 hours and from 16:00 until 20:00 hours. In Gujarat, local people only spoke the Gujarati dialect. Therefore, dialogue occurred through the local interpreters.

A total of 257 in-patients were treated. Of these, 115 (44.7%) were surgical and orthopedic patients. Of the admitted patients, 58 (50.4%) had sustained extremity trauma, e.g., closed fractures, open fractures, compartment syndrome, joint injury, and soft tissue injury. The majority of these injuries were complicated by infection. During the period of hospital operations, 216 surgical / orthopedic interventions were performed.

Within ten days of the mission, the patient population changed from those with traumatic injuries to patients with infectious diseases cardiovascular disease, and other medical problems. Thus, the second commonest pathology for the in-patients was infectious diseases (75, 29.2%), followed by in-patients with a cardiovascular diseases (39; 15.7%) (Figure 3). Among the children, there were cases of failure to thrive, anaemia, gastrointestinal infections, neuroinfections, and multiple complications from traumatic injuries.

The features associated with the in-patient treatments included:

1. Constant near-by presence of 1–2 relatives of the patients sometimes brought chaos;
2. The analgesic doses administered were 40–50% below the doses accepted in Ukrainian clinics; and



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Figure 3—The distribution of a pathology for the inpatient population

3. The parents of new-born infants did not possess the simple sanitary skills necessary to manage their new-born child, and needed the attention of the hospital staff to help with feeding and the provision of general care.

On the average, one of the medical teams visited two villages each day, and evaluated 150–200 patients.

Coordination

The Ukrainian Team closely collaborated with the Spanish Red Cross and Indian Military Hospital. The local physicians who survived the earthquake, and physician-volunteers who arrived from other cities of India also participated in the services provided by the hospital.

Problems Encountered

From the basis of the experiences of the medical personnel who provided emergency medical aid to the victims of the earthquake, several common problems were identified:

1. Prior to the arrival of outside assistance, there was a general lack of sufficient numbers of medical personnel for providing emergency medical aid to the injured after earthquake;
2. The medical infrastructure was destroyed by the quake;
3. There was a shortage of the supplies medical equipment and medicines required for the treatment of the victims;
4. Requirements for food and water could not be met;
5. The ability to transport the victims with severe trauma to relevant centres was severely compromised principally due to destruction of the communications network;
6. Health risks for infectious diseases was increased due to the lack of sanitary facilities, clean water, and edible food;
7. In order to function in a foreign culture, possession of information about social, medical, and sanitary conditions in area of the disaster is essential;
8. Traumatic injuries and their consequences are replaced by infectious diseases, cardiovascular diseases and other medical problems within 10–14 days after the earthquake; and
9. Coordinated joint work with the local authority,

Disaster Medical Teams from other countries, medical and charitable organizations is essential.

Discussion

The mission of the Ukrainian Disaster Team and its facilities filled a need created by the destruction of the medical infrastructure by the caused by the earthquake in India early in 2001. The services provided were similar to other missions to serve victims of other disasters that have used a mobile hospital. The greatest experience with such missions has been obtained through the use of military hospitals. Such has been the case of the field hospitals provided by the Israeli military following earthquakes in Turkey in 1999,^{1,2} Armenia in 1988, and in Rwanda 1994.³ The latter paper suggested several standards that have been reinforced by the efforts described in the current report. The effort described in this report was self-sufficient throughout its operation. This aspect of the response is essential so as not to create an additional burden on the already incapacitated local health infrastructure.

In addition, this study confirms the observations from previous deployments that depending upon the relative degree of impairment of the local medical infrastructure that between 50 and 200 patients will be encountered per day when such facilities are established.^{2,4,5} Further, it can be anticipated that between one-quarter and one-third of the patients evaluated will be children.^{4,5}

The current report raises the issue that such facilities must be prepared to meet the cultural limitations imposed by the setting. In the current report, the relationships between the patient and the relatives limited the efficiency with which such care could be provided, and additional limitations were imposed by the cultural standards for the care of women. Thus, such limitations imposed by the culture of the victims must be determined prior to the deployment of such facilities so that appropriate staffing patterns can be supplied.

As suggested by previous missions,³ the quantities of supplies provided may need to be supplemented during the mission. In the situation described in the current report, the available supplies of analgesic agents were inadequate to meet the needs of the victims treated. Thus, mechanisms for the provision of supplies and equipment necessary to meet the needs defined once the unit has been established must be included in the planning. It is unrealistic to believe that the local medical infrastructure will be able to provide such goods. Self-sufficiency must include the continuous stream of goods and services required given the circumstances in which such facilities are established.

Importantly, incorporation of local professionals into the operations of such facilities eases the burden on the medical staff of the facility. Such personnel include not only the surviving medical, nursing, and support personnel, but also persons to serve as interpreters, provide maintenance and specific tasks such as participation in the feeding of patients. Used of local survivors increases the capacity of the facility.

Conclusions

When an event inflicts sufficient damage to the medical infrastructure of a society, the deployment of mobile field

hospitals and medical teams may be required to provide medical and surgical care until the infrastructure is repaired and can again provide the levels of care available prior to the event. Such units must be self-sufficient and incorporate the

local culture into its plans. A continuous stream of essential supplies must be part of the planning process. More definitive details and analysis of this mission will be provided in a future paper.

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