

# Evaluation of the Efficacy of Disaster Response

by Eric K. Noji

During the foreseeable future, we will continue to witness a rapid growth in the world's population, particularly in developing countries, many of which are regularly afflicted by natural disasters and adverse climatic changes. In addition to producing immense human suffering and disease, such disasters may very well lead to increased political and social instability, which will

further erode the capacity of these countries to cope with natural and man-made disasters. A rigorous scientific, technological and intellectual approach will be required to solve this truly global problem and will involve the broadest possible range of disciplines.

Specialized or comprehensive assessments of natural (and techno-

logical) disasters call for skills from several disciplines including emergency medicine, epidemiology and engineering. These combined skills, already in short supply under normal conditions, are in great demand during disasters. All too often disaster relief consists of large, uncoordinated efforts based on what decision-makers imagine should be done, rather than what is actually



*An indicator of the number of injured is essential in terms of planning for emergency health care services. (Guatemala Earthquake, 1976).*

required. Few countries or agencies have at the same time teams with the broad multi-disciplinary professional expertise, the required knowledge, together with the logistical support needed for the rapid assessment of the needs of disaster relief.

At the Johns Hopkins University in Baltimore, Maryland, a disaster research team has been developed consisting of faculty from the Schools of Medicine, Public Health and Engineering. The goal of this research group is to develop strategies for preventing or decreasing the impact of natural disasters on human populations and to validate and develop indicators to rapidly assess the severity of a disaster. Currently, the data on damages collected in actual disasters are usually crude estimates based on superficial observations of limited technical and statistical validity. There are currently no standardized methods or indicators to rapidly determine what the needs of disaster victims and communities are. The Disaster Research Team hopes to identify those pieces of information that can be realistically gathered in the field for rapid decision-making after a disaster.

One of the most basic questions following disasters is when should outside assistance be sought? Needs are often grossly over or under-estimated with the result that an excess of resources causes wastage while lack of resources may lead to widespread suffering among the population. The Multidisciplinary Team of the Johns Hopkins University is currently developing theoretical models to answer this question based on the extent to which the damage (human and property) exceeds the capacity of local resources. After a major, devastating earthquake, such as occurred in El Salvador and Mexico City, the

number of casualties is expected to be very high. Morbidity studies for large earthquakes have indicated that the ratio of injuries to deaths is approximately 3:1. Therefore, the number of dead may serve as a useful predictive indicator of number of injured — which is really the most important piece of information that is needed in terms of planning for numbers and types of health care services required (e.g., number of paramedics, ambulances, emergency care facilities, trauma surgeons, etc.).

The development of such methods to systematically assess the effects of a disaster will be of great value to communities and local officials who will need rapidly available information in order to decide when to request outside assistance and what their greatest needs are (e.g., determining the requirements for food, medicine and clothing, the need for temporary accommodation for the homeless, as well as assessing the need for infectious disease control). By identifying variables which reflect the impact of a disaster event upon a community and those variables that measure the amount of community resources to effectively deal with that event, one can begin to quantify factors associated with the severity and magnitude of disasters. Using such a quantitative disaster severity index, one can begin to measure the ability of the local resources to respond to a disaster and how to strengthen them in the most effective fashion based on real, that is quantifiable, rather than perceived needs. A major thrust of the Team's research efforts is to validate this theoretical model by applying it retrospectively to past disasters as well as to field test this instrument during future disaster events.

What are some practical uses of such a disaster model? For one,

information on a number of disaster indicators may be helpful in establishing resource allocation priorities for donor agencies. Disasters for which injuries are a particular problem may require the concentration of more resources on provision of medical care, while disasters for which property damage is the major problem may require more attention to provision of temporary housing. Given budgetary pressures common to many developing world countries, information to guide budgetary priorities can be extremely critical. Such a disaster index can also be used to monitor the effectiveness of relief activities and to adjust the overall response as indicated by the changing nature of the affected community's needs.

Other research currently being conducted by the Hopkins team includes:

- Evaluation of the effectiveness of medical response to the disaster event (salvageability of disaster victims, evaluation of transportation, communication, hospital-based problems).

- Documentation of information on deaths and hospitalizations to evaluate selected factors that may influence why some people die from their injuries, while others do not.

- Assessment of injury outcome characteristics.

- Determination of time trends for morbidity and mortality.

- Development of improved (i.e., less biased) survey sampling methods to estimate human and property damage from large-scale disasters.

- Development of quantitative severity of injury and illness scales to determine resuscitation potentials



Guatemala Red Cross

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for mass casualties as well as to serve as a rational basis for triage of injured persons.

- Improving data collection systems to increase their utility in evaluating the response of public health services during natural disasters (development of standardized guidelines for information to be recorded, methods of rapid epidemiological surveillance).

- The development of rigorous, organizational research on the factors that facilitate or hinder emergency department effectiveness during disasters.

- Address the engineering problems associated with providing an

uncontaminated water supply immediately after an earthquake.

In order to adequately address the problems of disaster preparedness and hazard mitigation, we need to develop a rigorous, scientific approach to the organization of effective disaster services. The successful development of such services will require the application of already existent technology combined with early hazard recognition, and organized disaster planning. As additional data are added to the disaster data base and as accuracy and standardization of definitions on a wide range of indicators are attained, researchers will find this a fruitful area for investigation. Results of the Disaster Re-

search Team's investigation should foster interdisciplinary research drawing on the talents of investigators with backgrounds in the humanities, and the social and natural sciences, among others. Out of such research should come greater insight and advances which should further the overall goal of minimizing the impact of such natural catastrophes on human populations. ■

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