Education and Disaster Risk Reduction

Geert Seynaeve, MD

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Correspondence:
E-mail: fa082693@skynet.be

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It has been stated over and over again: preparedness is crucial to reduce the impact of events and hazards that have the potential of resulting in disaster. An exchange of experiences with preparedness has been a prominent component of almost every World Congress on Disaster and Emergency Medicine. Also, the Education Committee of the World Association for Disaster and Emergency Medicine (WADEM) has intensely studied and discussed how education and training could improve the multi-disciplinary health response to major events that threaten the health status of a community. *Prehospital and Disaster Medicine* has contributed to the discussion by publishing relevant articles, as well as a comprehensive summary of the dedicated "Issues Paper" and the conclusions of the 2004 Brussels conference on Disaster Education and Training.[1,2] The report of the latest Benelux workshop of the Education Committee will be published soon.

The damage and health impact, even of "natural" hazards largely is determined by socio-economic factors and societal development(s). While it is true that humans cannot control the occurrence of earthquakes or volcanic eruptions, their impact depends on the environment and social context (population density, quality of housing, social resilience, etc.) of the impacted community. The loss of human lives due to "natural" hazards can be linked directly to the poverty level of a given country.[3] Man and society also change nature. Human activities and "unsustainable" development can influence our planet profoundly, lead to climate change, and contribute to events like hurricanes, flooding, drought, and wildfires. On the other extreme, there is deliberate harm caused not only by so-called terrorism, but large-scale violence. This is not determined by nature, not even human nature unless one would ignore history and reject any idea of societal evolution. Project Ploughshares reported armed conflicts underway in 192 countries in 2006. The likelihood of being affected by one or more armed conflicts during the 10-year period 1997–2006 increased as the UN Human Development Index (HDI) ranking of a country declined: 1.6% of high human development countries experienced an armed conflict, vs. 30.1% of medium development status, 38.7% of low human development states.[4] Political violence and war not only lead to thousands of deaths each year (mostly unarmed civilians), but also millions of refugees and internally displaced people. It is estimated that for every violent death in the Congo's war zone, there are 62 non-violent deaths from the conflict. These are mostly due to easily preventable and treatable illnesses (such as fever and malaria, diarrhea, respiratory infections, and malnutrition). Children under five years of age account for 45.4% of the deaths even though they represent <20% of the total population.[5,6]

Most of these terrible "humanitarian crises" and "complex emergencies" only can be understood against the background of socio-economic under-/mis-development. No relief operation or short-term humanitarian intervention can make up for this.

Even in Western industrialized countries, disaster-related activities (planning, education and training, research), priorities, and allocation of resources, only partly are based on scientific assessments of the risk for the adverse impact of events. They are determined by the general rules of functioning of

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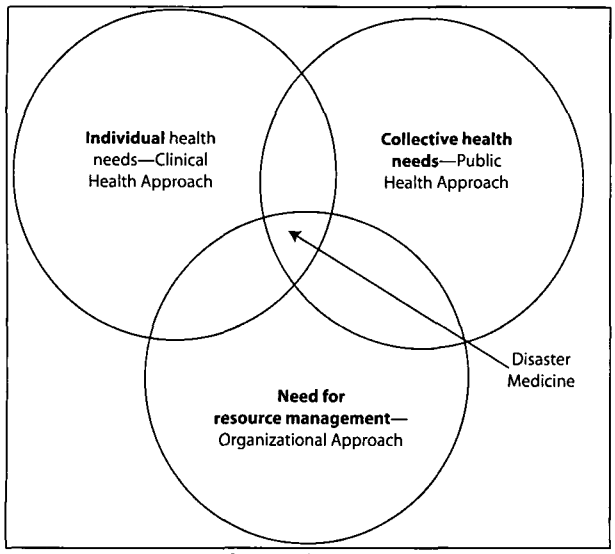


Figure 1—Major incidents: Conceptual framework

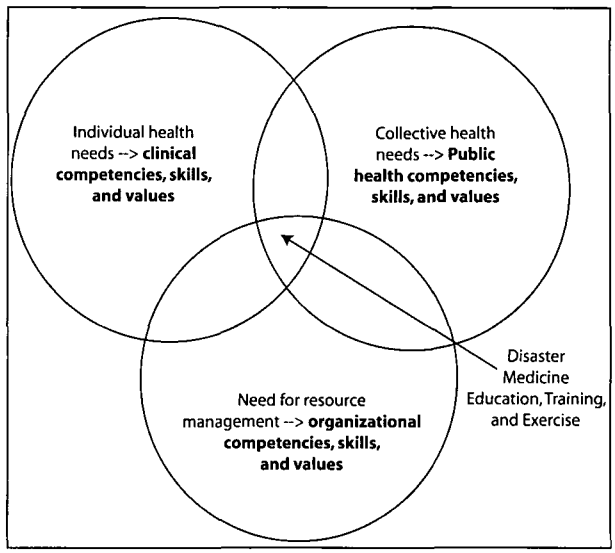


Figure 2—Conceptual framework for education and training

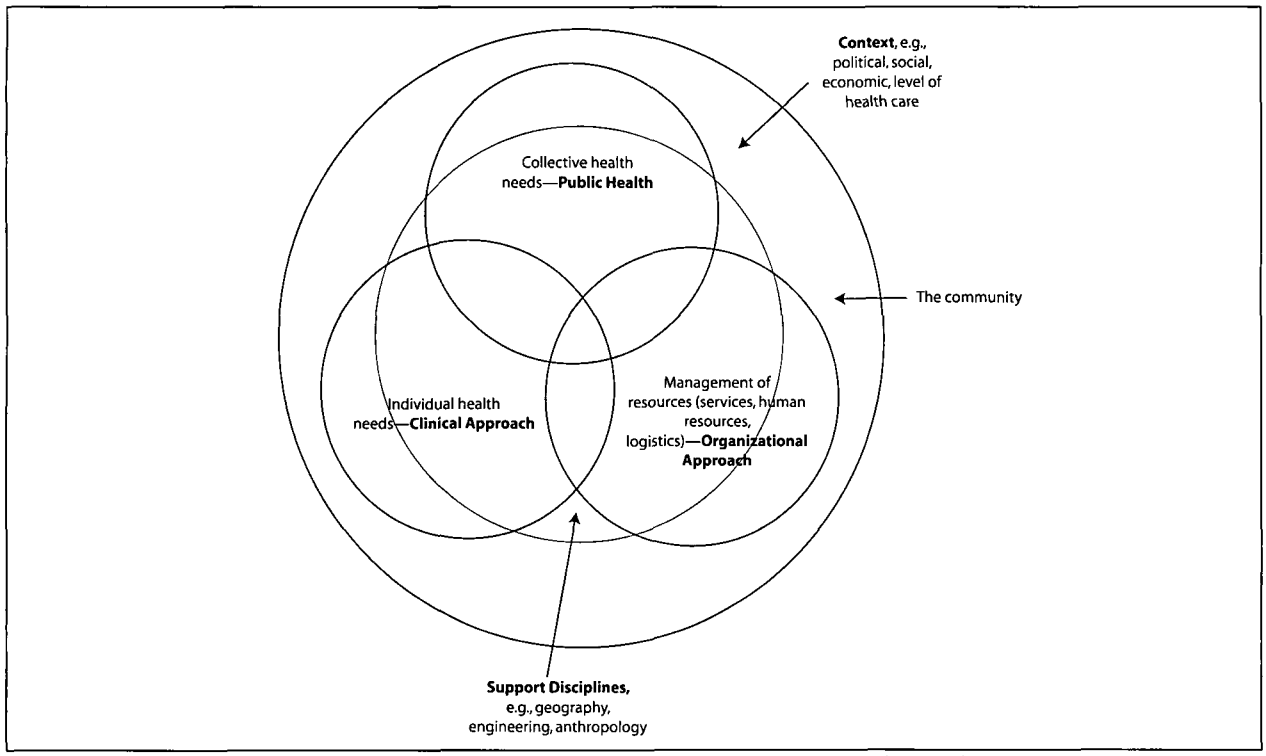


Figure 3—Conceptual framework for Disaster Health

market economies, characterized by partial rationality and global irrationality, marked by contradictions and conflicts of interest. They are politically and sometimes media-driven. So how can disaster health education, training, and exercises make a difference, given the weight of the macro-environment of socio-economic, political, and cultural factors?

Especially since the terrorism hype following 11 September 2001, courses, lectures, and curricula in disaster medicine and emergency management have multiplied. This trend was reinforced after the Indian Ocean tsunami of December 2004, the emergence of severe acute respiratory syndrome (SARS), and the attention given to the pandemic influenza threat. But, in order to be effective and to positively influence the outcome of the health responses to a disaster, important issues related to the objectives, conceptual framework, target audience, content, methodology, and evaluation of education and training must be addressed.[7,8] Is it possible and useful to integrate "core competencies" of disaster medicine in the normal curriculum of health professionals? Can generic or specific disas-

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Figure 4—Disaster risk management cycle

ter-type-related competencies effectively be incorporated into the continuing professional development and continuing medical education? How can the knowledge, skills, and attitudes necessary to enable competent practices in the eventual disaster situation be identified? How should we set priorities? Where can expertise and the necessary funds be found? What kind of teaching methods and acquisition tools can be used? We only have begun to try to find answers to these challenging questions.

There is a broad consensus on a number of key concepts and issues, which can be the basis for more formal recommendations and guidelines for disaster health education:

1. The field of Disaster Medicine cannot be reduced to Emergency Medicine on larger scale, based on the education, training, and practice of emergency physicians and triage. When using this traditional term, or the slightly broader term of Disaster Health, it should be understood that it must cover the multidisciplinary health response to major events that threaten the health status of a community;
2. Education and training in Disaster Health should focus on the specific approach, the special arrangements in planning, organization, functioning, resource management, decision-making, reporting, the particular attitudes, competencies, and skills that are required to adequately deal with events that are included in the traditional term, disaster and which are different from those related to daily routine activities;
3. Adequate management of major incidents or disasters is not limited to interventions and services provided by agencies and organizations, but considers (re)actions and activities of people affected, civil society, and communities;
4. The multi-disciplinary response to a major event comprises three major needs (Figures 1, 2, and 3):
   a. Individual health needs (clinical health approach);
   b. Collective health needs (public health approach); and
   c. The need for resource management (organizational approach);
5. An adequate response to major incidents must be:
   a. Well-prepared (in advance);
   b. Sustained from the immediate to the long-term phases, and;
   c. Evaluated (in order to allow feedback and improvements for future actions). This timeframe (pre-, during, post-event) corresponds to the disaster management cycle (Figure 4).[8,9]
6. Categorization of disasters can be based on various (theoretical) criteria, such as emphasizing the role of natural (geological, meteorological) or human-made hazards; or ranking according to the scale of the event (territory, number of people affected, extent of

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damages). With respect to effective health preparedness, however, it is crucial to focus on the hazard landscape of the relevant area (community, country) and to use a pragmatic typology of hazards and disaster scenarios based on the relevant health needs. It is possible to assess the potential health needs ("trauma" profile in a broader sense) by analyzing the pathogenesis of a disaster (type/scenario). Quantitative and qualitative parameters describing hazards as well as probability estimations of the occurrence of events (risk assessment), identifying vulnerabilities and resilience combined with explicit indications of the time frame (chronology of events and possible interventions), serve a practical objective. Based on epidemiological data for potential health impact, this can help with planning, raising awareness in the communities involved, and designing training programs and exercises;

7. A pragmatic, all-hazard, core preparedness based on a systematic health needs assessment, allows for flexible and dynamic health responses. All educational levels (from community to doctoral research levels) share a core of generic attributes and key concepts. A modular approach could allow for electives with increasing complexity or development of more specific scenarios and special competencies and skills;
8. Most health professionals are unlikely to be confronted with major emergencies during their life more than once, if at all. With respect to disaster health, this makes it impossible to individually accumulate experience, acquire professional judgment, or improve relevant competencies through repeated practice and clinical supervision as is normally the case. While systematic (international) exchanges of experience are necessary, the existing body of knowledge has a limited evidence base, lacking of (common) scientific framework, with mostly anecdotal, uncritical, and unsystematic reporting, as well as insufficient research;
9. An adequate health response to disasters must include psychosocial support for the people affected and responders, which is proactive, sustained from the acute to the long-term phase and is based on coping, respect, and social integration. But more evaluation and research is required;
10. From a health perspective, disasters involve two basic challenges:
    a. Management of inadequate human and material resources;
    b. Difficult decision-making concerning an unusual health problem. This corresponds to two major types of events: (1) mass emergencies; and (2) public health crises, with the emphasis on one of these challenges.
        1. *A mass emergency* is characterized by a disproportion (imbalance) with respect to quantity (numbers), quality (nature), and/or time (emergency) between the health needs (medical, psychosocial, sanitary, public health) and the response capacity (the available resources, their organization and coordination);
        2. *A public health crisis (PHC)* is a situation in which there is an (actual/potential) risk for a major exposure to an unusual serious health hazard for a community (or which is perceived as such). Rather than an acute disproportion between needs and resources, a PHC is characterized by inadequate information, scientific uncertainty, and/or public worry about the causes, nature or extent of an unusual health problem. Communicable disease outbreaks (BSE, severe acute respiratory syndrome), deficiencies in consumer products or contamination of the food chain, unusual toxicological syndromes as well as the deliberate use of hazardous material, are examples of public health emergencies; and
11. In each of these situations, the broader scope of disaster health, requires extraordinary competencies, skills, and attitudes, and thus, specific education and training.

Mass emergencies, like major accidents and disasters due to natural or human-made hazards, must be dealt with by structured mobilization of additional or specialized material and teams, combined with the more efficient use of the available resources (e.g., using methods of noria and triage, improved coordination, etc.).

Public health crises require surveillance with early detection and early warning, timely (proactive) and adequate exchange of information and communication, extraordinary (often cross-border) decision-making, and control strategies, as well as follow-up research and structural measures.

It is clear that the literature on disaster health education is limited. Concepts and terminology still must be clarified, the traditional general approach (doctrine) must be updated, and the scope and typology of hazards and events must be reviewed critically.

Initiatives that improve international and interdisciplinary cooperation in the field of disaster health, stimulate exchanges of experiences, and foster a collaborative network of "Centres of Excellence" in research and/or education. "Supercourse" is a global, multilingual repository of lectures on public health and prevention on a wide variety of subjects with relevant resources and references available online.[10] Permanent and open access, as well as translation into major languages, make it feasible to reach a broad international audience. Bi-directional communication, interaction, feedback, and questions from users also are possible. Here the success largely depends on the control structure of the network, on the policy of the decision-makers, the criteria regarding "expert(ise)" or differences of opinions, and on the practical question of funding. The success of Wikipedia proves that part of these problems can be solved.

However, there are limitations of pedagogy and content to the use of PowerPoint (Microsoft, Inc., Redmond, WA) presentations, even though note pages can be added or combined with audio and video. The Web also could be a powerful tool for the development of comprehensive fact sheets, compendia, and manuals widely available. It is true that nothing can replace face-to-face contact between

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teachers and students, and bullet points cannot be a substitute for scientific articles or reviews. Ideally, methods demanding more active participation of the students should be included, like theoretical course work, group discussions, or workshops, but also individual skill stations, team play, practical simulation exercises, or field experiences. Internet lectures can be a useful and stimulating complement to more classical educational programs and journals. However, they are no quick fix for inadequate preparedness and structural societal problems. It would be an illusion to think that just-in-time (JIT)-derived educational products could have an immediate operational impact or be of practical use for the public "at ground zero". Responders should not be educated in using a JIT mode. And destruction of infrastructure makes it unlikely to be able to "reach(es) the people most in need".

Media attention for a specific disaster can be an excellent opportunity to promote an educative Website. Information and communication technology can improve access and dissemination of information. However, it does not solve the problem associated with content that relies on anecdotal experiences, unsystematic collections of "lessons-learned", and reading lists of articles and *ad hoc* documents. A lot of this information already would be useful, especially for decision-makers and managers of governmental agencies and Western non-governmental organizations.

It is doubtful that even Nobel Prize lecturers, prestigious North American universities, or (well-intentioned) Superspeed courses alone can come up with best practices adapted to countries in which the socio-economic situation and health system do not even meet the basic, daily needs of the population. But, what is knowledge without means? When it comes to complex emergencies and disasters, offering adequate resources and logistic support for local health professionals in developing countries becomes urgent. In the end, only sustainable socio-economic development offers real relief.

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