STRENGTHENING MASS CASUALTY MANAGEMENT SYSTEMS THROUGH TRAINING

Marcel Dubouloz

Human Development and Capability Association, Geneva, Switzerland

Abstract. The management of mass casualty incidents requires not only efficient systems, logistics, and resources, but also skilled staff. Recent major disasters have shown the importance of this component. Therefore, it is necessary to implement training programs aimed at developing relevant competencies among the different categories of health emergency management staff. This statement applies also to the health sector in general. In parallel to these training programs, it is also necessary to develop exercises (especially multi-disciplinary and multi-sectoral) at the community level. The training programs targeting professionals working with emergency or rescue agencies must be developed according to the concept underpinning adult learning (mainly problem solving). The learning objectives of the training should be defined according to the needs of these agencies and should be linked to their roles in the community.

INTRODUCTION

In the eighties, focus was mainly placed on the acquisition of resources (ambulances, technical equipment, etc) as the most important component of preparedness with the aim of enhancing the capacity of the health sector to manage medical operations during mass casualty incidents (US Department of Health and Human Services, 2005). At the beginning of the nineties, the development of incident management "systems" was given increasingly more attention. Linking together all the systems is a major contribution to the medical surge capacity (more recently as the threat of a major pandemic arose, the importance of the notion of "surge capacity" is given more attention). Over many years, the World Health Organization (WHO) has developed training courses in the different Regions (PHEMAP, MPHR, PHEM-EURO) for health emergency managers in order to further develop the capacity of the health sector to manage mass casualty incidents. Training of human resources is a direct contribution to the strengthening of health systems to cope with health crisis (St Clair *et al*, 2003).

THE CONCEPT OF HEALTH SYSTEMS

Essential (basic) health services (core package) (Maclean, 2004) is a concept commonly referred to, although there is no clear definition of what it is made (Pavignani and Colombo, 2007). There is no universal definition of the content of this core package; the Sphere Project does not mention the possible content of the minimum package. The concept is inspired by the Primary Health Care (PHC) concept formulated at Alma Ata. The PHC concept is right now under revision: WHO has made several proposals to readjust the concept with four new proposals: universal coverage reform; service delivery

Correspondence: Dr Marcel Dubouloz, Human Development and Capability Association, Geneva, Switzerland.
E-mail: hdca@bluewin.ch

reform; public policy reform; and health systems-leadership reform (WHO, 2008). There is no doubt that this new impetus will also influence the new roles of some traditional partners, such as the hospital in the community. The new emphasis by WHO aims to encourage health authorities to better target quality assurance and performance improvement of all the components of the global Health System (State of Florida, 2005).

The development of training programs for emergency management has not followed systematically the need to define a "core package of essential health care services," because this concept has appeared in many different health reform proposals since the 1990s. The possible objectives of the 'core package' component of health care reform in many countries are still conflicting (Söderlund, 1998). For instance, there is still no international definition of what could constitute a "hospital essential services package." In this context, the management of operations during mass casualty incidents is still not fully considered as a part of the essential package of essential services.

Several initiatives have been undertaken in the Western Pacific Region to identify the major elements of a possible template for "core package" of services, for example, a study was carried out in China in 2007 on the essential health services and national package. The essential health service function model was obtained, and it formed 4 branches, 15 sub-branches, 28 operation functions, 43 operation processes and 213 operation activity programs; which is based on the defined filtration principles (priority selection principle, cost-effectiveness or cost-utility principle, economic affordable principle, popularization principal and justice principle which considers priority to the poor population), combined with the expert consultation, to affirm the contents of the national essential health service package (Söderlund, 1998).

The concept of "Health System" refers to a set of varied, complementary programs that offer preventive, curative, and rehabilitation care to the community. Here again, there is no universal definition of what the full package should contain. The 10 Public Health Services commonly identified for serving as the reference for many National Public Health Performance Programs are as follows:

1. monitor health status to identify community health problems;

2. diagnose and investigate health problems and health hazards in the community;

3. inform, educate, and empower people about health issues;

4. mobilize community partnerships to identify and solve health problems;

5. develop policies and plans that support individual and community health efforts;

6. enforce laws and regulations that protect health and ensure safety;

7. link people to needed personal health services and assure the provision of health care when otherwise unavailable;

8. assure a competent public health and personal healthcare workforce;

9. evaluate effectiveness, accessibility, and quality of personal and population-based health services; and

10. research for new insights and innovative solutions to health problems.

Unfortunately, educational programs in emergency preparedness are not fully considered as an important part.

Health Care Facilities are also important in the management of public health programs, especially during a health crisis (*eg*, referral laboratory, outpatient clinic, mother and child care, etc) and therefore should always be considered as one of the key

elements of the component, "public health services delivery." WHO has recently defined the Health System framework as a combination of services delivery, resources generation, financing, and leadership/governance. It is now urgent to integrate the delivery of essential services during crisis (not limited to hospital services) into this broad context of Health Systems.

THE TEACHING PROGRAMS FOR EMERGENCY PREPAREDNESS IN MASS CASUALTY INCIDENT MANAGEMENT

The present situation is characterized by a wide variety of conceptual approaches and strategies for teaching and training programs in "disaster medicine." Educational programs organized by many universities and public health schools focus on some specific elements of disaster medicine, which are usually included in the curriculum of emergency medicine teaching programs. Typically stress is put on organizational issues; coordination, control, and command; and extra-resources mobilization and redistribution. Many significant issues are not adequately discussed such as the risk management process at the community level (vulnerability reduction programs, risk reduction, etc), the management of public health programs during health crisis, or the recovery phase. More and more academic bodies (universities) or international agencies offer international courses in "humanitarian medicine." primarily focusing on complex emergencies. These training programs are useful and complementary when they are relevant to the actual context in which the trainees will work (a basic requirement for any educational program).

Nevertheless, there is a major issue that is almost never discussed: the concept of "disaster medicine" as a medical discipline. Indeed, very few medical techniques are specific to disasters only. Therefore, the phrase "disaster medicine" is inappropriate and should be replaced by "management of public health and health systems during a crisis." Training programs in this science should deal with all relevant issues–from development and management of systems (Barbera and Macintyre, 2007) to the delivery of specific care–that is necessary to:

• save as many lives as possible and to preserve the function as much as possible (avoid the amputation of a hand); to reduce suffering: physical and psychological; to limit as much as possible the incidence of disabilities (physical, psychological and social); to prevent consequences such as psychological trauma;

• contribute to decreasing the level of emergency for medical care and evacuation (stabilization of fractures, securing airway, anti-shock positioning);

• facilitate and promote the community risk management process; promote preventive and mitigation activities;

• facilitate the management of health needs of the community: rehabilitation of lifeline services, psycho-social recovery process (social network, infrastructures.) by taking into consideration these issues in the response phase so as to facilitate the transition to long-term recovery activities; and

• ensure continuity of delivery of essential services (*eg*, public health, hospital) (WHO-PAHO, 2006).

In order to achieve these objectives, the teaching program should include the following elements (Joint Commission, 2006):

• policy making and the planning process (for the different phases: prevention, preparedness, mitigation, response, rehabilitation, and recovery) which includes also capacity assessment;

• community risk management process (identify risks, analyze risk, design treat-

ment options, implement options etc;

• definition of strategies necessary to ensure integrated incident management (for mobilization of extra-resources, intersectoral coordination, adjustment of the level of ambition of medical care and activities according to the evolving situation);

• damage assessment and needs analysis; and rapid health needs assessment (Inter-Agency Standing Committee, 2008);

• management of medical operations in the pre-hospital setting (including EMS Systems);

• management of health care facilities during health crisis;

• management of essential public health programs during crisis [*eg*, immunization, mental health (WHO, 2003), management of the dead and missing, etc];

• environmental health (WHO, 2002);

• communicable diseases (including surveillance systems, IHR, pandemic and epidemics); and

• practical exercises to test and train skills, competences and cooperation (intersectoral, inter-organizations).

EDUCATIONAL OBJECTIVES IN CONNECTION WITH THE ACTUAL NEEDS OF THE COMMUNITY

Teaching and training programs should be designed according to the actual needs of the community (also taking into consideration the community potential needs of foreign communities in the case of international assistance) in a problems solving-based approach, which is a key characteristic of the adult learning process. Therefore, it is not recommended to simply copy or import existing programs as good they may be in their own context. No one program can claim to be universally valid. Some components are transcultural and not systems bound, so that they can be widely replicated in many countries. Nevertheless, the designing of programs should be based on actual potential problems to be faced and solved (type of major emergencies/economical and other constraints/cultural aspects/ level of country development/access to and delivery of medical care/sectoral responsibilities, etc) by a country (WHO-HAC, 2007). Clearly identified and precisely described educational objectives are the cornerstone of any educational program, and the relevance of these objectives is a fundamental quality.

Readiness and response were for a long time the only concern of traditional "disaster medicine" teaching and training programs. Only recently has the concept of "preparedness" been considered and included by some academic bodies. Preparedness is a complex concept. The health sector is only one partner in this concept. Therefore, the teaching and training programs should be organized together with other sectors (rescue services, police, etc) (Rockenschaub, 2007). Basic skills and knowledge regarding some basic techniques and concepts, such as first aid, basic elements of disaster medicine (principle of triage, basic information on coordination, the medical rescue chain, etc) should be included in the normal curriculum of medical studies or in pre-graduate training courses of medical and paramedical staff. To prioritize educational needs, the following approach can be useful (Fig 1).

• Identify problems that are expected to be faced by the community as the consequence of a vulnerability analysis process (community and environment), hazard analysis and risk identification.

• Prioritize the problems (WHO-PAHO, 2006).

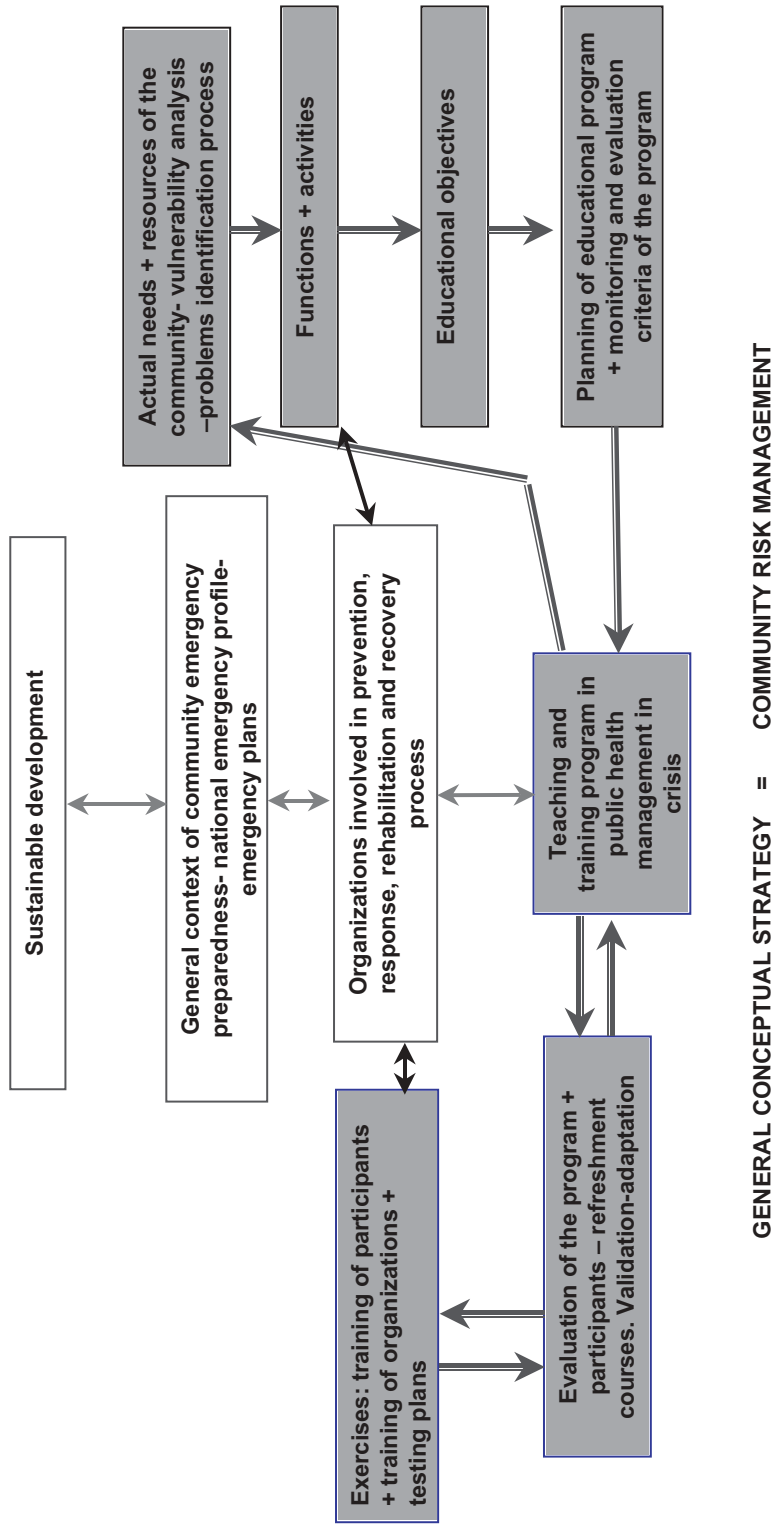• Identify the resources needed to tackle the most serious problems:

Fig 1–Conceptual framework for teaching and training in public health management in crises.

i. personnel knowledge and skills;

ii. co-ordination, communication, control, and command;

iii. equipment;

iv. logistics;

v. plans; and

vi. specific services.

• Identify the actual existing resources.

• Identify the "imbalance" between actual resources and required resources.

• Identify the possible solutions to decrease this imbalance.

• Identify the educational consequences (choose priorities in educational objectives).

EXERCISES AND TRAINING

The imbalance between available resources and actual needs is always a serious issue in major emergencies. It is always evolving in its very nature with time. Therefore, it is always necessary to adapt the level of expected delivery of care (on site, in the receiving hospital, etc) to the actual situation (available resources of every type, evolving risks and constraints, etc). Parallel to the teaching part of the programs, there is a training part, which is necessary to fully develop competencies (knowledge, skills, and abilities). Both are equally important. The training of personnel should not only focus on purely professional skills (*eg*, debridement techniques for a surgeon) but also on ability to work efficiently together with other professionals. Exercises are of paramount importance to validate, to test, and to train the plans (*eg*, alert and alarm; mobilization of personnel; activation of plans and organizations; re-distribution of available resources; co-operation between all involved partners; communication and co-operation with stakeholders; co-ordination, control, and command; and international co-operation).

There are several models to train practical skills and to test them through exercises. The choice has to be made according to the constraints (time, financial capacity, etc) and the available resources at the disposal of the community, and the teaching and training program. For example, the triage process can be trained in several ways (*eg*, computer-assisted programs or full-scale field exercises). Whatever the decision, some parameters should be present: they should be inter-disciplinary, intersectoral, respectful of "real time," and as close as possible to the conditions that will be faced in real situations, such as climatic constraints, co-ordination between organizations, availability of organizations, and so forth.

SPECIFIC ROLES AND FUNCTIONS; AND MEDICAL TEAMS

Specific roles and functions (*eg*, directors, and officers in charge of managing part of the system) should be trained within the framework of an educational program in full cooperation with the agencies employing professionals who assume these roles and functions, such as the Director of medical operations, the Chief Officer in charge of the Advanced Medical Post, the members of the hospital Incident Command Group, and so forth. These professionals should be trained on a regular basis as long as they are members of the network.

In many countries, the tendency is to develop specialized medical teams (*eg*, trauma teams, triage teams, or decontamination teams) for enhancing reliability of the response. These teams should always be as much as possible composed of professionals who carry out similar tasks in their professional lives. Many agencies are rarely required to carry out these activities except for during major emergencies. Therefore, the

ability of an agency to operate under emergency conditions should be carried out (not only the assessment of professional skills of individuals). This situation illustrates the necessity to link the educational programs with other activities, such as the emergency planning process. Any organization claiming to have the qualities (capability, durability, etc) to carry out a responsibility during major emergencies should also prove that the personnel it employs have been appropriately trained. The teaching and training are on-going processes.

Therefore, the organizations should receive a formal "accreditation" for being considered a member of the network (*eg,* volunteer organizations, statutory organizations). Accreditation should be revised to ensure that the organization follow up the training of its members and that these members have the necessary knowledge and skills (Emergency Management Australia, 2004). The "accreditation" system should be linked with the educational process also to increase the feedback of the organizations concerning their evolving needs for support from the educational program.

THE CONTRIBUTION OF TRAINING IN EMERGENCY PREPAREDNESS TO SUSTAINABLE DEVELOPMENT

During the first hours after a disaster impacts, the local community has to "organize" the administration of first aid to victims (typically the situation of a severe earthquake affecting a wide rural area). It is now well known that any efficient first aid delivered in the first hours significantly increase the survival chances of trapped victims. Active community participation is critical in all phases (prevention, response, recovery, etc). This has been stressed again in the Hyogo Framework (International Strategy for Disaster Reduction, 2005). The teaching and

training program should be developed from the perspective of their contribution to sustainable development of the community. Therefore, it is advisable that the community (different sectors) contribute to the design of the content of the educational program. Academic bodies should not be left alone in this process. Activities delivered to the community must always be coordinated and integrated to facilitate the integration of the response of the various partners, to increase the complementarities of the interventions, and to connect communities and organizations (interface systems).

REFERENCES

Barbera JA, Macintyre AG. CNA Corporation. Medical surge capacity and capability: a management system for integrating medical and health resources during large-scale emergencies. Washington DC: US Department of Health and Human Services, 2007. [Cited 2009 Jul 14]. Available from: URL: http://www.hhs.gov/disasters/discussion/planners/mscc/index.html

Emergency Management Australia. Module 5: Emergency risk management application guide. Australian Emergency Manuals Series. Dickson ACT: Emergency Management Australia, 2004.

Inter-Agency Standing Committee. Initial rapid assessment (IRA) tools: guidance notes. Geneva: IASC, 2008. [Cited 2009 Jul 14]. Available from: URL: http://www.humanitarianreform.org/humanitarianreform/Portals/1/cluster%20approach%20page/clusters%20pages/health%20cluster/capacity%20building/2008_Aug_20_IRA%20Guidance%20Notes%2012JUNE08.pdf

International Strategy for Disaster Reduction. Report of the world conference on disaster reduction. Kobe, Hyogo, Japan: World Conference on Disaster Reduction, 18-22 January 2005. [Cited 2009 Jul 14]. Available from: URL: http://www.unisdr.org/eng/hfa/docs/Final-report-conference.pdf

Joint Commission. Surge hospitals: providing safe care in emergencies. Oakbrook Terrace IL: Joint Commission on Accreditation of Healthcare Organizations, 2006. [Cited 2009 Jul 14]. Available from: URL: http://www.jointcommission.org/NR/rdonlyres/802E9DA4-AE80-4584-A205-48989C5BD684/0/surge_hospital.pdf

Maclean N. Defining a core package for NHS. London: the Social Market Foundation, 2004.

Pavignani E, Colombo A. Analysing disrupted health sectors, Module 7: Analyzing patterns of health care provision. Geneva: WHO, 2007.

Rockenschaub G, Pukkila J, Profili MC, eds. Towards health security: A discussion paper on recent health crises in the WHO European Region. Geneva: WHO, 2007.

Söderlund N. Possible objectives and resulting entitlements of essential health care packages. *Health Policy* 1998; 45: 195-208.

St Clair CF, Christie KD, Trzebiatowski S, *et al*. A systems development guide for emergency medical services: a systematic approach to funding and administration. Stillwater, OK:: Oklahoma State University, 2003.

State of Florida. Recommended core competencies and planning/mitigation strategies for hospital personnel. The Hospital Core Competency Sub Committee; and Health, Medical, Hospital, and EMS Committee, Florida State Working Group, 2005. [Cited 2009 Jul 14]. Available from: URL: http://www.emlrc.org/pdfs/disaster2005presentations/HospitalDisasterMgmtCoreCompetencies.pdf

St Clair CF, Christie KD, Trzebiatowski S, Doeksen G, Bronson R, Rogers RS, Mitchell J, Hope T, Adkerson D, Schott V. A systems development guide for emergency medical services: A systematic approach to funding and administration. Oklahoma: Oklahoma State University, 2003.

US Department of Health and Human Services, Health Resources and Services Administration, Office of Rural Health Policy. Community-based needs assessment: Assisting communities in building a stronger EMS system. Washington, DC: DHHS, 2005.

WHO. Environmental health in emergencies and disasters: a practical guide. Geneva: WHO, 2002. [Cited 2009 Jul 14]. Available from: URL: http://www.crid.or.cr/digitalizacion/pdf/eng/doc14606/doc14606. htm

WHO. Mental health in emergencies. Geneva: WHO, 2003. [Cited 2009 Jul 14]. Available from: http://www.wpro.who.int/NR/rdonlyres/6312A18D-1B1C-4F03-928C-394E24D9A7E6/0/MentalHealthinEmergencies. pdf

WHO. Primary health care: now more than ever. Geneva: WHO, 2008.

WHO-HAC. Mass casualty management systems: strategies and guidelines for building health sector capacity. Geneva: WHO-Health Action in Crises, 2007. [Cited 2009 Jul 14]. Available from: URL: http://whqlibdoc.who.int/publications/2007/9789241596053_eng.pdf

WHO-PAHO. Safe hospitals: a collective responsibility: a global measure of disaster reduction. Washington DC: WHO, 2006. [Cited 2009 Jul 14]. Available from: URL: http://www.paho.org/English/DD/PED/SafeHospitalsBooklet.pdf