World Health Day 2009: Save lives. Make hospitals safe in emergencies

What are the special considerations of a chemical emergency?

Chemical production and use is continuously increasing worldwide and accounts for approximately 7% of global income and 9% of international trade. More and more chemicals are being produced and/or used in developing countries that are often lacking capacities for their sound management (including toxic waste disposal). Incidents and emergencies involving toxic chemicals happen frequently. Recent events have been witnessed in all parts of the world, including natural events (e.g. capsized ferry boat transporting pesticides during tropical storms in the Philippines; damaged chemical installation, Sichuan earthquake in China) and technological disasters (the Songhua river accident, China and the Buncefield fire, UK) and disease outbreaks (e.g. mass bromide poisoning, Angola; mass lead poisoning, Senegal):

- The International Federation of the Red Cross has estimated that between 1995 and 2004, there were 6000 disasters worldwide, half of them technological, affecting more than 2.5 billion individuals. (IFRC, 2004)¹
- The US Department for Health and Human Services reported 8603 events involving chemicals in 15 US States in 2005 with 2034 victims, 69 of whom died. Evacuations were ordered for 481 events. (ATSDR, 2006)²
- Similarly, in 2005, 1040 chemical incidents were recorded in England and Wales. Up to 27000 people were estimated to have been exposed during these incidents with up to 3000 people exhibiting symptoms. Nearly 150 events resulted in evacuation of local populations (UK HPA). (HPA, 2006)³

Chemical incidents and emergencies can cause specific challenges to health care facilities because there is the added problem of chemical contamination. Special equipment and procedures are needed to protect health facilities from becoming contaminated. Also, plans should be in place to prevent health facility personnel from becoming secondary casualties to chemical incidents. In any case, exposed patients should have undergone decontamination before entering the building, which requires special showering systems, systems for the collection of contaminated run-off water, equipment for the collection of contaminated belongings of patients as well as Personnel Protective Equipment for the staff. In addition, health facilities need to take part in broader communications to be alerted of incidents at the earliest stage possible in order to take necessary preparatory action before patients arrive. It is important that exposed persons do not enter into and

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contaminate emergency departments that need to be closed down afterwards because of this.

Classification for triage after chemical exposures usually follows the same principles as for other types of incidents. Existing symptomatology is usually the basis for classification. However, there might be victims that have been exposed to a chemical who do not present immediate symptoms, but who may present severe symptoms after a time delay of hours. These persons require proper observation and possible immediate treatment.

Medical staff need to be trained on diagnoses and treatment of poisonings. Medical staff should also be aware of sub-populations who are specifically vulnerable to the effects of chemicals, such as children who have different susceptibilities to the effects of toxic substances at different life stages, owing to their dynamic growth and developmental processes as well as physiological, metabolic, and behavioral differences. In addition, when they exist for treatment, suitable antidotes should be available at the hospital, or it should be assured that they are available from elsewhere within a short time frame. Poison Centres (set-up in advance) should be consulted (through emergency "resistant" communication lines) and should provide necessary advice to the medical teams on decontamination, diagnoses and treatment. In addition, Poison Centres might play an important role in identifying antidotes or any other emergency supplies that are needed to treat intoxicated patients.

As part of the overall emergency planning of health care facilities, there are specific elements that should be considered with regards to chemical incidents and emergencies, including to: (OECD 2003)4

- maintain an inventory of available supplies that might be needed for chemical incident response (e.g., medical supplies such as antidotes and other pharmaceuticals, Personal Protective Equipment, etc.) and have up-to-date information on how to obtain additional support;
- ensure that decontamination equipment and facilities are available (if not on-site, then by mobile units);
- maintain a register of health/medical personnel who could be called upon to assist the hospitals/facilities providing care during an emergency (including Poison Centres);
- have plans/procedures for sending intoxicated patients to other hospitals/facilities when necessary (these plans/procedures should be developed in co-operation with other public authorities);
- have access to specialized information (e.g., on toxicological properties of chemicals, case management, including availability of antidotes), and to specialists (e.g., clinical toxicologists, Poison Centres), for appropriate treatment of exposed victims;
- institute sampling procedures for the collection, storage and toxicological analysis of human samples such as blood and urine (of those who have been exposed or might

have been exposed to hazardous substances, including those who do not exhibit any immediate symptoms);
- have procedures for registering all individuals who arrive at the hospital/treatment facilities for treatment as a result of exposure to hazardous substances;
- have procedures to protect other patients and staff from contamination; and
- establish mechanisms for follow-up and monitoring.

In addition, health care facilities can be the source of uncontrolled releases of chemicals because they handle thousands of toxic substances on their premises, including instruments containing, for example, mercury, toxic hospital waste, disinfectants, and others. Therefore, health care facilities should have in place well established procedures for the management of all toxic substances that are been used and handled on their premises. Furthermore, health care facilities should be built and located in a way that they are less vulnerable to natural and technological events, e.g. they should not be built in earthquake and flood prone areas or near hazardous installations that could cause an accident.