

# **DRAFT GENERAL GUIDANCE DOCUMENT: HUMAN HEALTH AND CHEMICAL ACCIDENTS**

## **INTRODUCTION**

The Draft General Guidance Document has been prepared as a basis for discussion at the IPCS/UNEP/WHO/OECD Workshop on Health Aspects of Chemical Accidents. Once revised, following the Workshop, it is expected to be used as policy guidance for managers and other decision-makers involved in prevention, emergency preparedness and response activities. As this document focuses on the health aspects of chemical accidents, it is primarily directed to officials in the health sector including, for example, those at ministries of health, regional and local health authorities, hospitals, poison information centres and occupational health centres. It also addresses other organisations and officials with responsibilities in the area of chemical accident prevention, preparedness and response who will need to consider health aspects and who will need to work with health professionals.

By reviewing the Draft Document at the Workshop, the text will be improved through the collective experience of the approximately 100 professionals expected to attend the Workshop, representing a cross-section of experts from around the world. Thus, once revised, the Guidance Document should provide sound, up-to-date and practical advice, applicable world-wide.

The final Guidance Document will be used by the four organisations collaborating in the Workshop in their respective activities to improve national and international efforts to improve accident prevention, preparedness and response efforts. The work of these four organisations and how they intend to utilize the documentation from the Workshop is described in the "Draft Practical Guides: Human Health and Chemical Accidents" and the "Draft Introductory Document". The final Guidance Document will also be made available to other international organisations, as well as national and local organisations (in both the public and private sectors), for use as appropriate in their activities.

For purposes of this Document, the terms "chemical accidents" or "chemical emergencies" are used to refer to events or dangerous occurrences resulting in accidental releases of a substance or substances hazardous to human health and/or the environment. These events include fires, explosions, leakages or releases of hazardous substances that can cause the death of, or injury to, a large number of people.

This Document has purposely been prepared as policy guidance. More detailed and technical information on the subjects addressed herein can be found in the "Draft Practical Guides: Human Health and Chemical Accidents" as well as in documents referenced in the Practical Guides. For example, this document addresses only in a very preliminary way the treatment of victims of chemical accidents. Since this document is primarily focused on providing guidance for policymakers, and is not intended as a technical guide for the medical profession, only general information concerning triage and specific medical response is included. The subject of victim treatment is addressed in greater detail in chapter 4 of the Draft Practical Guides.

The guidance in this Document has been developed with the recognition that there must be flexibility in its application due to the significant differences which exist among countries and regions with respect to, for example, legal and regulatory infrastructures, culture, and resource availability.

It should be noted that this document does not include policy guidance which is not specific to the health field. General guidance which applies to health professionals as well as others involved in prevention, preparedness and response activities is available in documents previously published by the four co-operating organisations, such as the OECD Guiding Principles for Chemical Accident Prevention, Preparedness and Response and the UNEP APELL ("Awareness and Preparedness for Emergencies at Local Level") materials.

## **DRAFT GENERAL GUIDANCE**

### **A. Preparedness Planning - General**

1. One of the aims of emergency planning should be minimising the human health effects in the event of a chemical accident.
2. Public authorities at the regional/state and national levels generally have the main responsibility for protecting the health of the population.
  - (i) Public health authorities should take the lead in developing the health sector components of emergency plans at national, regional and local levels as part of overall emergency preparedness plans.
  - (ii) Emergency planning is a multidisciplinary task. There must be close co-operation among the various parties involved in emergency planning and response, including both medical and non-medical organisations.
3. In the emergency plans, the roles and responsibilities of the individuals and organisations who would be involved in an emergency response, well as the lines of authority, should be clearly established. From the health sector, the organisations which should be involved include:
  - health ministries;
  - local authorities;
  - medical professionals and institutions, including hospitals;
  - occupational health and factory inspectorates;
  - information providers including, e.g., poison information centres; and
  - suppliers of pharmaceuticals and equipment.
4. Emergency plans should identify information providers and sources of emergency response assistance.
5. Health care professionals should make it their responsibility to be aware of local emergency medical plans and their roles within them.
6. Those involved in emergency planning should have access to information concerning the nature and extent of hazardous substances in the relevant installations and, to the extent possible, the substances being transported in the region. In addition, they should have information concerning the nature of the accidents which could occur and the population potentially effected in the event of an accident. This information is needed in order to, inter

alia ensure that appropriate response capability including medical personnel, equipment and supplies, can be made available.

7. In emergency planning, it should be recognized that, in addition to possible biological effects of accidents, there could also be psychological and psychiatric effect.

- (i) Thus, preparations should include the identification of groups at risk for stress reactions, an assessment of information available to the public, an assessment of networks through which information is likely to pass and plans for an information network that can be put into place if needed.
- (ii) In high-risk areas, epidemiological data and internationally accepted instruments for the assessment of mental health impacts should be available so that monitoring can take place in the event of an accident.

**B. Preparedness Planning - Availability of Equipment, Supplies and Facilities**

8. As part of the emergency planning process, the types of emergency medical equipment and facilities needed to deal with different types of emergencies should be established. These include transportation facilities, decontamination equipment for on-site and hospital use, and personal protective equipment for response and decontamination personnel.

- (i) It should be assured that there is sufficient access to such equipment and facilities.
- (ii) This may require, in an emergency, the rapid transformation of facilities normally used for other purposes. For example, if the hospital and/or the transport route to the hospital lie within the accident area, it may prove impossible to transport the injured for some time. Alternative premises such as schools, sports facilities, and tents to which the injured may be taken and medical care can be provided until the hospital can receive patients should be planned for.
- (iii) All emergency equipment should be in working order, reliable, effective and available in the event of an emergency.

9. As part of emergency planning, it should also be ensured that up-to-date antidotes are available, as well as other pharmaceutical substances including oxygen, that might be necessary for the treatment of persons injured during a chemical accident.

- (i) If the public health authorities are unable to ensure the availability of adequate supplies of suitable antidotes, the industry which uses or produces the chemicals should be required to make the antidotes available.
- (ii) Relevant emergency medicines, in adequate supplies, kept updated should be available at installations handling hazardous chemicals.
- (iii) Emergency treatment facilities, medical centres or hospitals in proximity to hazardous installation, or PICs in the region, should

also stock appropriate emergency medicines and antidotes to deal with the consequences of major accidents.

10. Since resources and equipment available for medical response to a chemical accident will often be limited, consideration should be given to pooling resources among neighbouring communities. Such resources could include, for example, ambulances, intensive care facilities and emergency medical personnel.

11. As part of the emergency planning process, hospitals and other treatment facilities should develop arrangements for receiving and handling large numbers of patients at one time, including arrangements for patient identification and documentation.

- (i) Hospitals and other treatment facilities should maintain an inventory of available equipment that might be needed and how to obtain additional equipment (e.g. ventilators). Plans should be in place for sending patients to other hospitals or facilities when the necessary equipment is not available.
- (ii) These facilities should maintain a designated telephone line manned 24 hours a day all year for use by emergency services in the event of an accident. This line, not available for general use, should be listed in emergency control centres.
- (iii) These facilities should also maintain a register of health professionals who would be called on to respond to emergencies in a pre-planned way.
- (iv) These facilities should have a system in place to allow them to alert other relevant medical practitioners, as needed in the event of an accident, especially those active in the fields of toxicology and critical care, as well as general practitioners.
- (v) These facilities should also establish mechanisms for case follow-up after a significant accident.

### C. Preparedness Planning - Sources of Information

12. Each country should ensure that there is established national centre(s) to organise the collection, collation and dissemination of data for use in emergency planning and during an emergency response. The centre(s) could include poison information centres and/or national response centres.

- (i) The centre(s) should be capable of providing relevant information in an emergency on the diagnosis, treatment and rehabilitation of persons injured by chemicals. This information should be available on a 24-hour basis throughout the year.

13. Poison information and national response centres in different countries or regions should undertake to share information and experience.

- (i) Where there is a possibility of an accident with transboundary effects, or where there is international movement of chemicals, such co-operation is particularly important.
- (ii) Efforts should be undertaken to overcome any problems associated with language differences among centres, which might hinder co-operation. This could be done, for example, through the use of numeric codes or the adoption of standardized expressions.

14. Industry has the principal responsibility for providing reliable information on the chemical(s) it stores, handles, reprocesses, manufactures, distributes or which are otherwise used in the workplace.

- (i) Industry should ensure that the information needed for emergency planning and response is easily available and is provided to emergency services as well as poison information and response centres, as appropriate. This includes information on the composition and toxicological and other relevant properties of the chemicals.
- (ii) Arrangements should be made to guarantee the confidentiality of information, where appropriate.

15. Health care providers (hospitals, medical emergency planners, poison information centres, etc.) should actively contact local industries to discuss their information needs as well as the type of advice the health sector is able to provide.

16. In the process of emergency planning, communication links should be established in order to ensure the availability and dissemination of information needed by emergency response personnel, including health officials, to protect the health of those exposed to hazardous substances during an accident.

- (i) The communication links should include the establishment of channels of communication with poison information/chemical emergency centres as well as with local industry, customs and transport officials, and medical and surgical suppliers.
- (ii) Access to necessary information could be furthered through the use of computer information systems.
- (iii) Planning should take into account that the normal channels of communication (e.g. phone or fax lines) may not function completely during emergency situations.

17. Systems should be in place to continuously update the information available to health professionals as the response progresses.

18. The information provided for emergency preparedness and response activities should be clear and concise and geared to the audience to which it is addressed. For example, the

nature of the information will be different if the target audience is the fire/police services or health professionals.

19. All information systems should be regarded as tools, to be used by the professionals, as an aid to their judgement, and not as a substitute for their expert judgements. Reliance on computer systems cannot replace the experts.

20. During transport of chemicals, vehicles should have placards identifying the type of chemical (hazard class) being carried.

- (i) These placards should be easily readable from a distance and utilize an internationally accepted marking system.
- (ii) Where there is a risk to human health from the release of the cargo, vehicles should also carry additional information on the nature of the substance being carried and safety measures which need to be taken to avert any hazards. This should include, as appropriate, treatments for persons coming into contact with the substances carried; emergency response actions in the event of an accident, for example a fire or spillage; and an emergency response contact number.

#### D. Emergency Response

21. Medical personnel should never, in principle, enter a contaminated area. They should only work at casualty assembly points, to which the injured are brought after decontamination.

- (i) Only exceptionally should medical personnel need to enter the accident area, for example to carry out triage or give life-saving treatment.
- (ii) If medical personnel are needed to assist in decontamination procedures, they should be properly equipped. When indicated, they should wear protective equipment when they are working under adverse or toxic conditions. They may also need protective equipment at hospitals or other treatment facilities especially during decontamination of victims.
- (iii) As a rule, medical personnel should be guided by rescue personnel who have been trained to work in this environment.

22. Health professionals at or near the scene of the accident should become part of the information chain. The following information should be made available and updated regularly:

- identification of the chemicals involved or, if unavailable, information on the category of chemicals involved together with information on the symptoms of victims, in order to give clues as to the possible course of action to follow;
- the number and type of patients expected and their degree of exposure;

- risk possibilities at the accident site;
- the need for personal protection;
- first aid possibilities and limitations;
- additional medical information from poison information centres and hospitals, such as symptomology, antidote therapy or specific treatments;
- resources available (e.g. decontamination and hospital facilities, biological monitoring services, poison information centres).
- the registration (triage) system being used.

23. Based on available preliminary information concerning the site and the chemicals, and on the interpretation of this information, the on-site co-ordinator should decide on actions to take immediately including those intended to avoid or limit exposure of individuals. The co-ordinator should also take measures to avoid the contamination of rescue workers if there is a possibility of continuing exposure.

- (i) In this regard, the on-site co-ordinator should determine whether there is a contaminated area that should be entered only by personnel wearing protective clothing. This may need to be made in co-operation with a medical co-ordinator or industrial hygienist, if available.
- (ii) There should also be a determination at an early stage whether there is a need for decontamination facilities at the accident site or at hospitals and whether there is a danger that rescuers will be contaminated by exposure to accident victims.

24. Triage for chemical accident victims should follow the rules that apply generally to emergency situations.

- (i) It is important for triage to be a continuous process; each victim should be re-evaluated at regular intervals, as the victim's condition may change as will available resources.
- (ii) As a general rule, children are more sensitive to toxic substances and therefore normally should be given higher priority for medical care.

25. Hospitals and other receiving facilities should put their emergency plans into effect the moment that they are informed that a possibility exists that patients will arrive.

26. Hospitals and poison information centres which may be involved should be provided with information on the chemicals and the type of accident (chemical spill, fire, etc.) as soon as possible.

- (i) The information should be used to make an early determination of possible toxic effects as well as what therapy or care is required.



- (ii) It is desirable that protocols supplied by the poison information centre be followed particularly if patients are taken to a number of hospitals.

27. If a hospital lies within the accident area, it is important to shut doors, windows and ventilation systems immediately. These considerations should be included in the preparedness planning of the hospital.

#### E. Treatment of Victims

28. In general, the treatment of victims exposed to chemicals should follow generally accepted principles for the management of emergency situations. However, these principles need to be adjusted to take account of the special conditions in effect following chemical accidents.

29. The purpose of the initial care given at the site should be to give the patients the treatment needed in order for them to be in the best possible condition for being taken to the hospital or other treatment facility.

- (i) This is especially important where patients may have to be transported for considerable distances or in mass casualty situations where it may take time to get victims to treatment facilities.
- (ii) In addition to general first aid measures, it may be necessary to begin other treatment at the accident site. For this reason, special equipment and drugs should be made available there, as necessary.

30. The treatment of acute poisoning should be based on four main principles that may be utilized to varying degrees depending on the circumstances of the exposure and the characteristics of the toxic agent. These principles are: (i) the removal of the toxic agent to prevent further local damage or absorption into the body; (ii) symptomatic and supportive therapy; (iii) specific ("antidotal") therapy; and (iv) enhancement of (poison) elimination.

31. Decisions concerning decontamination of victims should be based on the type and severity of the injury and the nature of the chemical contaminants.

- (i) If decontamination does not interfere with essential treatment, it should be performed. If it cannot be performed the victim should be wrapped to reduce contamination of other personnel and off-site emergency medical personnel should be alerted to potential contamination or to specific decontamination procedures.
- (ii) Before a patient who has been exposed to chemicals is admitted to a hospital, decontamination generally should be performed, if necessary. Otherwise, the hospital unit may be rendered unusable. Decontamination stations should be located at every hospital or other treatment facility where patients exposed to chemical might be admitted.

32. Following exposure to certain chemicals, relatively unaffected persons may need to be placed under observation for one or more days. Plans should be made for setting up suitable observation units in, for example, hotels, schools, etc.

**F. Training and Education**

33. Public health and education authorities should ensure that medical and paramedical professionals involved in emergency response activities are well trained and educated in order to be able to function effectively under stressful circumstances.

- (i) The training of medical and paramedical professionals should include, for example, training in principles of medical toxicology and emergency medicine, including the use of antidotes. Relevant health professionals should also be made familiar with: the chain of command during a chemical emergency; models of in-hospital command and control; the identification of decontaminated and non-decontaminated patients; the use of triage; the psychological reaction of victims, emergency responders and the public; and the methodology for diagnosing and treating a large number of potential patients.
- (ii) Education and training of emergency response personnel should include the development of an understanding of the meaning of the health related information likely to be available at the site of an accident including, for example, placards on trucks and their implications for emergency response.
- (iii) The health sector, in addition to training its own people in their professional responsibilities and in understanding the responsibilities of other professionals, should also contribute, where appropriate, in the training of those outside the health sector who will be involved in the emergency response activities.
- (iv) The training of health sector professionals should be repeated periodically in order to keep knowledge up-to-date and to supply special information concerning local conditions and procedures.

34. The medical aspects of on-site as well as off-site emergency plans should be tested under simulated conditions. Public health authorities should take part in regular exercises with other relevant authorities involved in emergency response, in order to test emergency plans and train medical emergency response staff.

- (i) Unannounced tests of the total plans, or relevant parts of the plans, should be carried out, even under adverse conditions.
- (ii) Attention should be paid to specific elements of the plan such as: the availability of equipment; the availability of needed information; and the availability of communications between, and co-ordination of, the various parties involved.

- (iii) Following each exercise, a full evaluation and critique should be made and the findings circulated to all the parties concerned. Feedback on training sessions and simulation exercises should be used to review and revise emergency plans, as appropriate.

35. Emergency medical personnel should familiarize themselves with the types of injuries which might occur as the result of exposure to hazardous chemicals, including variations which might occur depending on routes of exposure (and the possible routes of exposure depending on the nature of the accident).

36. First responders (police, fire and ambulance personnel) should be educated and trained to be able to take appropriate actions to minimize the human health effects of an accident.

- (i) The training and education should, as a minimum, allow the first responders to be familiar with: the characteristics of different types of chemical accidents; protective measures, including the use of protective clothing and equipment; contamination hazards and decontamination indications and procedures; specific first aid measures; and the psychological effects of major chemical accidents on patients and emergency personnel.
- (ii) Detailed information should be provided to first responders concerning, inter alia, how the various organisations, including medical personnel should work together; and the identification, triage and initial treatment of victims.
- (iii) Training should be repeated at regular intervals.
- (iv) While it is the responsibility of the management of the response services to ensure that their personnel are fully trained, members of the health professions should be prepared to advise and assist where appropriate.

37. The training and education of the potentially affected public should emphasize the avoidance of exposure or any type of direct contact with chemicals, through staying indoors with windows or vents closed and the mouth and nose covered with a wet towel. Members of the health professions should be prepared to contribute to the education and training of the community.

38. Industry should provide initial, as well as regular follow-up, training of workers on how to avoid, and react to, different types of chemical emergencies. Occupational health and safety specialists should play an important role, where they are available. Members of the health professions should be prepared to provide advice and assistance on how to incorporate health information into the safety training of workers.

#### G. Communication with the Public

39. Emergency planning should take into account the need to ensure that accurate and appropriate medical-related information is provided to the public. For example, the public potentially affected in the event of an accident should be provided with information

concerning what they should do if there is an accident or an imminent threat of an accident in order to protect their health.

40. Co-ordination by health professionals with the media should be developed in order to ensure that medical information disseminated concerning chemical accidents is accurate and consistent. Public health authorities should be consulted when statements are issued to the media concerning health aspects of chemical accidents.

#### H. Accident Investigation and Follow-up

41. All persons exposed to toxic chemicals during an accident, whether they have symptoms or not, should be properly registered to allow for the short and long-term follow-up. The onset of symptoms may be delayed for hours or days after exposure and it may be necessary to seek out individuals in different ways so that adequate observation and, where necessary, treatment can be given.

- (i) The follow-up of those exposed to chemicals is very important from a scientific, as well as therapeutic, point of view since for many chemicals, little or no information is available regarding their effects on human health.

42. During accident investigations, the injured person(s) should be interviewed as soon as possible to get their account of the events.

43. Emergency teams who deal with the aftermath of an accident involving the risk of exposure to toxic chemicals should preferably include a psychiatrist or psychologist in order to, inter alia:

- provide emotional support for rescue workers;
- collaborate closely with information services;
- assist in screening activities for mental health problems in risk groups;
- assist in setting up a network for treatment of cases of stress syndromes.

#### I. Research and Development

44. Research into new antidotes and decontamination procedures for hazardous chemicals should be encouraged by the health authorities and industry.