World Health Organization

REGIONAL OFFICE FOR Europe

Capacity-building for the public health management of chemical incidents and IHR implementation

Awareness-raising and training workshop for SEE countries
Belgrade, Serbia, 26-27 March 2013

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Report

Abstract

The workshop was held in Belgrade, Serbia, on 26-27 March 2013, to raise the awareness of decision-makers about the need to build capacity and partnerships in the area of chemical incidents, and provide training for health and other professionals involved in the prevention of, preparedness for and response to such events. The implementation of the International Health Regulations (IHR) in the area of chemical safety was discussed in relation to the requirements of other relevant international agreements on facilitating multisectoral cooperation.

Keywords

Capacity building
Chemical safety
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Background

Emergency events, such as explosions, fires, floods and leakages, may result in the release of a substance or substances hazardous to human health and the environment in the short or long term and may cause death and disease. Some chemical incidents are on a large scale and catastrophic, such as those in Seveso, Italy, in 1976 and Bhopal, India, in 1984, and they stimulate national and international media interest. Although the vast majority, are on a smaller scale, they are nonetheless just as serious in terms of their impact on people in the form of anxiety, illness and death. In addition, there is growing concern about the deliberate release of chemicals, another factor that needs to be considered in preparedness planning. Chemical emergencies can happen anywhere and at any time. Experience has shown that the preparedness of health and other professionals is important for the successful management of chemical incidents.

The International Health Regulations (IHR) approved by the World Health Assembly in 2005 require States Parties to develop, strengthen and maintain the capacity to detect, assess, notify and report events, as well as to respond promptly and effectively to public health risks and public health emergencies of international concern.

On 26-27 March 2012, the Ministry of Health of Serbia kindly hosted the Awareness-raising and training workshop for South-eastern European countries, “Capacity-building in the public health management of chemical incidents and IHR implementation” in Belgrade. The workshop was organized by the WHO Regional Office for Europe and the WHO Collaborating Centre for the Public Health Management of Chemical Incidents. Funding was generously provided by the Health Protection Agency of the United Kingdom (Global Health Fund).

The main aim of the workshop was to build the capacity of national public health and other allied agencies to protect human health and the environment from the negative impact of chemical incidents, and to facilitate the implementation of the relevant IHR and international agreements in this area (Annex 1).

Representatives of seven European Members States, as well as WHO temporary advisers and observers participated in the workshop (Annex 2).

Professor Slavica Djukic-Dejanovic, Minister of Health for Serbia, opened the meeting and welcomed the participants. She emphasized the importance of protecting human health and the environment from the threat of chemical emergencies, managing emerging risks and minimizing chemical threats, and being able to take proper response action in the event of a chemical incident. The need to strengthen national capacities and regional cooperation in this area was also pointed out.

Professor Djukic-Dejanovic expressed her appreciation of the support provided by the WHO Regional Office for Europe and the WHO Collaborating Centre for the Public Health Management of Chemical Incidents in organizing the workshop, and the Government of the United Kingdom in providing financial support.

Professor David Russell (United Kingdom) was elected as Chairperson.

Scope and purpose

The key objectives of the workshop were to raise the awareness of policy-makers of the potential public health impact of chemical incidents and the requirements of IHR and other international agreements in the case of such events. The workshop provided the opportunity to discuss the development of an integrated public health model for the multidisciplinary management of chemical incidents (or the enhancement of existing models), and ways of mitigating the risks at the local, regional and national levels. An important goal of the workshop was to obtain an overview of the multidisciplinary skills required for the successful management of chemical incidents.

Summary of the discussions

During the meeting, invited experts presented basic information on the requirements for and components of preparedness for and response to chemical emergencies, as well as best practices of implementing action to this end. The challenges, and opportunities experienced in the countries, as well as action taken, were discussed in working groups.

Setting the scene

Different types of chemical incidents (technological, complex, deliberate, natural, disease outbreak) collectively take place rather often. For example, in 2005 in the United States of America, there were 8603 events with 2034 victims and 69 deaths. In the United Kingdom in the same year, more than 1040 events were registered with more than 3000 victims. According to current estimations, 25% of the global burden of disease is linked to environmental factors, such as exposure to toxic chemicals and unintentional poisonings, resulting collectively in 355 000 deaths each year. Taking into account that total global production is growing rapidly (prognosis for 2020 is 85% higher than in 1995), 200-300 new chemicals enter the market each year in the European Union (EU), production in the developing countries is rising, and the potential for chemical incidents is increasing. It is necessary to develop chemical-emergency-management systems at the international, regional and national levels, including the management of deliberate releases as one of the most complex types of chemical incident.

Several legally building international agreements (global and regional) and voluntary initiatives in the area of chemical safety and emergencies have been adopted over the last three decades, such as: the International Labour Office (ILO) Convention 174; the United Nations Economic Commission for Europe (UNECE) Convention on the Transboundary Effects of Industrial Accidents; IHR; and the Strategic Approach to International Chemicals Management (SAICM). All of these require the consolidated input of all interested partners and stakeholders, as well as multisectoral coordination, the development of national plans for the prevention of,

preparedness for, and response to acute chemical events, and action to build the necessary capacity.

The health sector plays an important role in each phase of the disaster management cycle to determine the outcome of a chemical incident. This includes, for example: the detection and assessment of hazards and risk; the identification of vulnerable population groups; the development of exposure scenarios and risk-mapping; health surveillance; the collection of relevant information on, and development of, databases on chemical safety; the implementation of monitoring programmes; the development and implementation of educational and awareness-raising programmes; the training of medical and other professionals; communication with the public; health-impact assessment; rapid intervention and the removal of casualties from the scene; first-aid treatment and other generic countermeasures; recognition of clinical syndromes; symptomatic treatment and instigation of specific countermeasures; hospitalization, as appropriate; instigation of wider public health protection measures; liaison with laboratory staff and other medical professionals; the organization and coordination of clinical and public health follow-up; and other measures in accordance with national legislation. Therefore, it is necessary to ensure adequate capacity for health-sector preparedness if prompt and adequate response to chemical incidents is to be provided and the negative health impact thereof prevented or minimized.

Planning for and responding to chemical incidents

In planning response to chemical emergencies, it is recommended that the following action be included: assessment of the risks related to both current and future chemical processes; investigation into the impact of past chemical events on both the environment and public health; identification of government departments and other national bodies that have statutory responsibilities; development of close collaboration among relevant agencies; and development of national public health infrastructure.

One of the best examples of a public health infrastructure with success in responding to chemical emergencies is that of the Health Protection Agency (HPA) of the United Kingdom created in 2003. The Agency's key achievements include: the establishment of its Chemical Hazards and Poisons Division; the restructuring of the Environmental Public Health Service; the transfer of key environmental health functions to HPA; the development of an out-of-hours response service; the production and dissemination of key scientific, technical and practice-support reports and guidance notes; the development of collaborative networks with key agencies and of academic appointments in leading universities; the development of an environmental sampling strategy ; the completion of an environmental public health tracking pilot; the establishment of the multidisciplinary Contaminated Land Risk Advisory Forum; participation in multidisciplinary international research; the development of an on-line compendium of chemicals; risk assessment of the likely impact of air pollutants on public health; and the production of a report on the effects of air pollutants.

No chemical releases are without risk. Thus, hazard identification and risk assessment of a chemical incident are performed both at the planning and preparedness stages, as well as during

the response stage in order to answer the questions: What can happen? To whom? How likely is it? What are the consequences? Risk assessment is also necessary for the retrospective evaluation of incidences of illness or related concerns, the retrospective analysis of the potential impact of policy, land use, permissions or management decisions. The classic risk-assessment paradigm includes hazard identification, exposure assessment, and risk characterization followed up with risk communication and management. In building capacity for risk assessment, it is always necessary to take the complexity of these procedures into account.

Over 60 million chemical substances are recognized, 15 million of which are generally available and 4.7% produced or imported in volumes greater than 1 million pounds (weight). Many chemicals are highly toxic and hazardous and their accidental or deliberate release poses significant potential risks. The large, almost infinite, number of scenarios makes it necessary to prioritize public health risk in planning and preparedness exercises to ensure that they are optimally tailored. The use of different criteria, such as physical conditions (major threat of airborne exposure (large amounts), short latency, and possible large populations), severity of hazard(maximum toxicity, flammability, reactivity) and probability of exposure (availability plus ease of release) is a key aspect of risk prioritization, together with the history of the release and its impact. Many approaches have been developed, for example, by the North Atlantic Treaty Organization (NATO) and, more recently, the Chemical Events Working Group of the Global Health Security Initiative. Logically, risk mitigation follows risk prioritization and encompasses a suite of measures that collectively reduce the likelihood and/or impact of a chemical incident or event. This includes hazardous chemicals' labelling and inventorizing (for example, as indicated by the United Nations Globally Harmonized System of Classification and Labelling), chemical substitution and isolation, bunding and reduced storage capacity, relocating chemical industries from urban areas, diverting chemical transportation away from urban developments, and other organizational, technological and engineering measures.

Despite the best efforts to prevent risk and the reduced the likelihood of its occurrence, residual risk invariably remains and this needs to be addressed in planning and preparedness measures.

Emergency preparedness includes all of the activities undertaken in an effort to ensure the effective coordination of response to an emergency event. A continuous cycle of activities (including planning, organization, evaluation, training exercises, provision of equipment, and corrective action) results in a state of readiness. There are many different recommendations on what to include in an emergency-management plan and all of them include the following components: requirements and agreements; detection and alert; triggers for scaling up response; process and structure; command and control; inventory of capabilities; coordination with stakeholders; communications; contact list.

The most critical component of emergency planning and response is communication, which has three levels: (1) internal （a function of the incident command structure (ICS)); (2) external (coordination of measures taken by the national and local response agencies, neighbouring countries and international organizations); (3) public (risk communication before the incident, for example, on hazards in the area, and crisis communication during the incident to mitigate its consequences).

Other critical components are: health-sector preparedness planning for chemical emergencies; the organizational and functional abilities of the health-care facilities; training of staff in given areas; provision of health-care equipment, including decontamination equipment, medicine and antidotes; and toxicological and analytical laboratories.

Different type of exercises could be used in training medical and public health staff, such as: discussion-based workshops; desktop/table-top exercises; drills; and command-post, functional and field exercises. Several national and regional training and exercise sessions that took place in 2011-2012, such as the Exercise Iridium of the European Commission (EC), confirmed the effectiveness of exercises in identifying weaknesses and gaps in planning and resources, as well as in the training of personnel in emergency-management duties. They are also useful in: verifying plans; validating systems and equipment; demonstrating operational capability; fostering cooperation and information-sharing among organizations; clarifying roles and responsibilities; improving communication, coordination, command and control; and enhancing public confidence.

Following a chemical incident, all measures to minimize its impact on health and the environment must occur promptly, which underlines the importance of multidisciplinary input at the preparedness stage. The time-line of a response is conveniently divided into immediate (0-2 hours), intermediate (6-12 hours), extended (12-24 hours) and longer term (after 24 hours). The essential action to be taken during the two first hours includes: establishing command and control structures and distinct zones; gaining control of the incident; protecting the emergency services; and dealing with casualties and the public. Commonly, three zones are determined at the place of the incident: (1) the hot zone (from which people are evacuated); the warm zone (containing decontamination corridors); and the cold zone (which should be free from all contamination). The most effective public health measures of primary prevention include: avoiding or restricting the intake of contaminated food and water, and contact with contaminated air or other means of contamination; and the requirement that emergency responders use personal protective equipment (PPE) in providing first response health care. In addition, the instigation of clinical, laboratory and epidemiological studies provides the basis for understanding the potential health effects of exposure to the chemicals involved in the incident.

It was clear from the meeting that countries in the Region had made significant progress in the area of chemical safety, in general, and in relation to chemical emergencies in particular. The following are some of the many examples of good practice shared during the meeting.

In Serbia, national legislation is harmonized with the European Commission Seveso I and Seveso II Directives and requirements for risk assessment are legally based. In addition to providing Chemical Abstracts Service (CAS) numbers and chemical names, the existing list of dangerous substances provides information on toxicity classes and thresholds. Depending on how dangerous the materials are, enterprises that are dependent on them are obliged to develop policy on incident prevention or provide safety-related information and develop safety plans based on scenario modelling. Modelling the exposure scenario of a chemical incident includes

several steps: describing the incident; developing a physical model; developing a mathematical model; and evaluating the effects of the incident. Several scenarios have been developed for various types of chemical events, such as fires/explosions/releases for gases, liquids and aerosols. Practical examples of exposure scenarios for natural-gas pipeline damage have been demonstrated.

Preparedness for and response to emergency situations are priority issues of the Slovenian medical services. Bearing in mind that, during chemical incidents, rescuers can be victims themselves, it is necessary to develop a training programme for medical professionals and other categories of first responders (fire fighters and police). For a successful and safe rescue response to chemical incidents, medical staff need guidelines and protocols (harmonized with those of, and agreed by, other sectors), as well as relevant education.

A document entitled, “Medical guideline on emergency team response in the event of chemical incidents including action at the pre-hospital and hospital stages”, has been developed, approved by the Health Committee and subscribed by the Minister of Health. A training programme has been established for medical and other professionals, which includes a wide range of topics, including: the establishment of a regional protection and rescue plan; the development of guidelines on setting up an emergency team for response to chemical incidents, a fire-fighters’ plan and a police rescue plan; details on how to recognize dangerous chemicals; PPE; decontamination; triage in major incidents; communication and transportation; management of toxic trauma; and antidotes. Workshops and simulation exercises are used as means of training.

In Albania, the legislative base and infrastructure for chemical emergencies preparedness and response was developed over the last few years. The National Civil Emergency Plan (NCEP), a strategic document that includes information on policies, main principles, framework, standards, roles and responsibilities, serves as a guide for the development of sectoral emergency plans. NCEP requires the identification of industrial-activity risks and the creation of emergency units with qualified, experienced staff. A number of legislative acts have been enforced to ensure implementation of the Plan.

The National System on Chemical Emergencies is led and governed by the Council of Ministries and coordinated by the Interministerial Committee for Civil Emergencies. Relevant institutional infrastructure has been built to address chemical emergencies at the central, regional and local levels. Supportive documents, such as an inventory of installations and transportations that constitute a risk for chemical incidents, a list of 220 dangerous substances, and guidance documents, have also been developed. However, further steps are needed to establish a national poisons centre, develop a national incidents register, fill in gaps in the database of relevant industrial activities, build capacities for risk assessment, risk management and epidemiological surveillance, and increase the awareness of decision-makers and the general population.

Demonstration of the work of the Ecotoxicological Unit of Belgrade Public Health Institute

Mobile ecotoxicology units have been established in the Belgrade Public Health Institute to enable quick response to chemical emergencies 24/7/365, including: the detection of chemical substancies in the air, water, soil, sediments and wastes; the assessment of risk to human health and the environment; the development of recommendations on decontamination and protection of the environment; and communication with the public and authorities at the local and national levels.

The staff of mobile units includes medical doctors, hygiene specialists and other professionals, such as technologists, biochemists, chemists and technical assistants.

Mobile units are equipped with high-resolution analytical facilities that enable the provision of quantitative analyses of more than 70 chemical substances. Mobile-unit capacities are used in connection with large chemical incidents that pose risks to human health and the environment, (such as the overturn of tanks containing vinyl chloride at a Belgrade train station in 2003), as well in the case of small incidents.

Under the ordinary regime, mobile units serve as mobile stations for monitoring air pollution: sulfur dioxide (with convertor, hydrogen sulphide, particular matter with a diameter of less than 10 µm, nitric oxides and nitrogen dioxide, ammonia, carbon monoxide, methane, mononitrohydrocarbons, total hydrocarbons, benzene, toluene, ethylbenzene, xylenes, and meteorological indexes).

Working-group discussions

Working groups were formed to discuss gaps in and the need for capacity-building for the implementation of the IHR and to enable quick and effective response to chemical emergencies.

Regarding planning, preparedness and response capacity in the public health sector, country representatives emphasized the lack of well-trained professionals and of environmental monitoring and modelling. In addition, they reported the need to modernize equipment for toxicological and epidemiological surveillance, establish better coordination among responders, establish a proper infrastructure, and review the legislation to define the roles and responsibilities of the main responders during events of international concern and in the implementation of international agreements.

The priority areas in which there is a need to fill the gaps in human-resources capacities are risk assessment, risk communication and risk management. This could be achieved through exercises, scenarios, workshops, seminars and distance-learning sessions for a multidisciplinary audience, which would facilitate partnership-building among all interested stakeholders at the

national and international levels. Community involvement could be included in the training and exercise sessions.

Other national and international action needed to strengthen national capacities for addressing chemical emergencies and to facilitate the implementation of IHR and other relevant international agreements included:

- development of guidance documents (national and international) for the management of different types of chemical emergencies;
- development of exercise and training programmes for implementation in the countries;
- translation of guidelines, operating procedures, training manuals and toolkits into national languages;
- assistance in the accreditation of laboratories and the compilation of a list of competent laboratories;
- establishment of a network of experts to support countries during the various phases of a chemical incident.

Conclusion and recommendations

Good progress has been made in the management of acute chemical events in countries of the Region. Additional action is required to build national human and technical capacities for the management chemical incidents, in accordance with IHR and other relevant international agreements.

Coordinated bespoke training is required for the public health management of chemical incidents. Multidisciplinary training sessions emphasizing the roles and responsibilities of the main responders would help in building a harmonized approach to the management of acute chemical events at the national and regional levels, and facilitate the coherent and effective implementation of relevant international agreements, including IHR.

The training module developed for the workshop provides basic knowledge about requirements through all stages of chemical incidents, including preparedness, planning, response and recovery, and could be used in training workshops for other sub-regions and individual countries.

All forms of teaching should be explored (workshops, exercises, seminars, symposia, conferences, distance learning, teleconferences). A train-the-trainers approach was also suggested.

International support should be established for the provision of materials, guidance and guidelines as part of toolkits for chemical incidents; these could be supported by a web-site.

An international network of experts in the management of chemical incidents should be established to aid countries through the various phases of acute chemical events.

Annex 1. Programme

Tuesday, 26 March 2013

09:00 - 11:00 **Session 1. Setting the scene**

International Health Regulations and other international agreements - obligations and requirements in chemical emergencies preparedness and response: building partnerships

Fires, explosions, bursting dams and leaks - chemical incidents and health

Chemicals as weapons - the spectre of deliberate release

How do we protect the health of the public?

11:20 - 17:30 **Session 2. Planning for and responding to chemical incidents**

Building a public health infrastructure

Identifying hazards, assessing risk

Prioritizing and mitigating risks

Residual risk: planning and preparedness

Can we respond? Running exercises for major incidents

Responding to a chemical incident

Practical experience of risk assessment: natural gas pipe transportation system break (case study)

Preparedness of emergency medical staff for response to chemical accidents

Aspects of prevention, preparedness and response to chemical emergencies in Albania

Wednesday, 27 March 2013

09:00 - 11:20 An international training centre for chemical incidents

Mobile Ecotoxicological Unit, Belgrade Public Health Institute

11:20 - 16:00 **Session 3. Regional challenges, priorities and possible actions**

Discussion in contact groups, reporting results and steps ahead

Annex 2. List of participants

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