

dents. To be available at all levels for prevention and management, the program has been designed for an IBM-PC and compatibles, and it requires only a basic hardware configuration. The user-friendly interface allows the location of the product by use of different keys (commercial name, chemical name, symptoms, chemical, and physical properties). Information provided includes: physical and chemical characteristics; effects on humans; preventive measures; therapy; and data on other previous incidents. For each substance or group of substances, it is possible both to edit all data on the screen and to print out a report. We believe that this data bank has the fundamental feature to be made available at all levels of disaster management (factories, occupational medicine, health emergency, and poison control centers), and thus help to facilitate a quick and effective response to industrial disasters.

## 84 A Health Emergency Plan for Hazardous Chemical Industries

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**Objective:** The area around the outskirts of Milan is densely populated; near the city of Rho, there is an industrial area that includes plastics industries, an oil refinery, storage, and distribution plants for its by-products, and many chemical industries. Thus, the Health Areas, the Authorities for Civil Protection, Fire Brigade, and ISPEL decided to draw up a study for the management of possible emergencies according to the European Economic Community (EEC) directive 85.301.

**Methods:** First, a list was made of the firms with a potentially high fire hazard and/or possibility of explosions involving the release of toxic substances. The Health Area then collected figures on the type of production, the substances used, their quantity, type of usage and storage, the number of employees, types of alarm systems and existing safety measures in all the firms situated within a 1-km radius of the firms with hazardous materials, as there could be interaction in case of an accident. Using these data, an emergency plan was drawn up involving all the authorities, particularly the Health Area and its emergency services.

**Results:** In a practice exercise, the release of a large quantity of anhydrous ammonia with the formation of a gaseous cloud was simulated. During the exercise, the type of risk, the area that could be affected, and the number of people present were defined. These data then were examined in order to pinpoint a first-aid center near the site of the plant but outside the area of propagation of the cloud. In addition, other centers for health care situated in the vicinity, but outside the risk zone, have been selected to guarantee the availability of services in the case of a disaster. A major hospital in Milan with a heliport is available for casualties requiring treatment for serious burns or poisoning. The emergency plan foresees a warning signal in case of danger, plus the rapid activation of all the health ser-

vices concerned that are answerable to a single, coordinating unit. Roads and arteries inside the area also have been located for the soccours and alternative routes from the critical area for the civil traffic. The storage for the logistical equipment should be located centrally as should the places for disbursal of aid commodities.

## 86 Problems Related to Large-Scale Chemical Disasters

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As demonstrated by the Bophal tragedy, direct losses resulting from damage to chemical plants and storage facilities for fuels and chemicals may be tremendous and will not exhaust the possible consequences of this type of accident. The biological and medical implications of disasters can be classified into three groups:

- 1) damage to the human habitat resulting from the spread of a fireball or toxic cloud;
- 2) damage to the population exposed to the combustion products released during the accident; and
- 3) genetic damage and disruption of hereditary mechanisms in the offspring of living beings exposed to toxicants during and after the accident, particularly the effect of dioxin on fetuses and newborn infants.

The consequences immediately following a chemical disaster will persist for many years. Continued habitation in the affected area will bring about deteriorated health and higher morbidity rates.

This presentation will include examples and possible methods of prevention.

## 87 The Decontamination of Contaminated Chemical Casualties

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Confronted with a chemical disaster, the medical teams need to evaluate the risk of contamination; the dispersion of a toxic agent represents a risk for the environment, the intervention team, and the casualties themselves.

This risk is determined by the physico-chemical properties of the chemical agent and by environmental conditions. Only a few factors are important in the first moments after the incident. For different reasons, the decontamination of the casualties must be performed as soon as possible. This is necessary not only for therapeutic reasons, but also to avoid overloading the medical system due to the necessity of protective measures for personnel and equipment. Most importantly, the hospital staff must be able to treat the arriving casualties without special protection.