

old, at which injuries to persons would be observed.

According to these derived distances, it is assumed that a first area extending for 220 m is characterized by lethal effects of an irradiance ( $>7$  Kw/mq). A second area extending from 220 m to 285 m, shows non-reversible damages for an irradiance ( $>5$  Kw/mq), while a third area from 285 m to 385 m presents reversible damages for irradiance ( $>3$  Kw/mq).

As a result, we can draft a "map of the consequences" which can greatly help experts and responsible authorities to deal with the occurrence of such an emergency.

### 060. Medical Economic and Environmental Justification for Remediation of Functioning Rbmk (Chernobyl) Reactors

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The 1986 Chernobyl nuclear disaster near Kiev, Ukraine led to the mobilization of enormous resources across Ukraine, Russia, and Europe. Acutely, the loss of life was minimized, in part, because of the actions taken to limit exposure to ionizing radiation. The potential long-term health effects of the Chernobyl nuclear disaster are yet to be determined. Meanwhile, reactors sharing the design features of Chernobyl, in particular graphite cores with similar shielding (RBMK reactors), remain a hazard to the environment. As long as these reactors operate, the possible recurrence of a catastrophe like Chernobyl can not be ignored as a threat to environmental protection, particularly in Europe.

Remediation of functioning reactors sharing the design features of Chernobyl is justified in this presentation based on an analysis of the potential [U.S.]\$19.2 billion medical economic impact of another disaster. These costs were determined by considering medical staffing, health facilities operations, and public health actions for 10 million people, relocation costs, and energy estimates based on the reported Chernobyl experience. A \$2 billion reactor cost for remediation of the functioning RBMK reactors was based on information from engineering sources. Thus, replacing the RBMK reactors maybe the most cost-effective strategy.

### 048. Considerations for Medical Long-Term Monitoring following a Nuclear Accident

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Medical aspects of Chernobyl-type nuclear incidents may be classified into three main categories: 1) illness and physical damage; 2) dietary-related effects; and 3) mental consequences to the individuals exposed and to their relatives. There are sev-

eral aspects to be considered regarding the long-term medical follow-up of those who had been exposed to radiation resulting from Chernobyl-type accidents, such as the possible medical benefit to the individuals exposed, sociological and psychological effects of the monitoring procedures, the interest in carrying out epidemiological studies, moral and ethical issues, the existing medical infrastructure, and cost and administrative considerations. Experience based on the consequences of the Chernobyl accident indicates that these aspects must be weighted and evaluated by the decision-making authorities before a special long-term medical monitoring program is conducted. Based on a discussion of all the aspects, it is suggested to establish "follow-up criteria" for medical long-term monitoring.

### 051. Estimation of Exotoxigenic Influence on Children's Health

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**Introduction:** The Republic of Bashkortostan is the largest chemical industry center in the Confederation of Independent States and one of the major world providers of herbicides, chloric and sulfuric organic compounds, and products for synthesis. Imperfections in the technology processes causes close contact of workers with highly toxic substances and dissemination of the atmosphere of nearby territory with exotoxigens.

**Objective and Methods:** This study was undertaken to understand better the biochemical and hormonal mechanisms of air pollution and their influence on health status of children (their pro-oxidant defense and endocrine system) whose parents (one or both) deal with highly toxic substances in unhealthy working conditions.

**Results:** The status examination demonstrated negative dynamics in the basic indices. Considerable decreases of pro-oxidant defences were especially marked in those children whose parents both had occupational injury. The most pronounced changes in hormonal regulations, in concentrations of insulin, estradiol (E2), and cortisol in particular were observed in the children from air-polluted regions.

**Conclusions:** The biochemical and hormonal indices used may be adopted widely as quite sensitive bio-indicators for estimations of the anthropogenic influences of exotoxigens on children's health. They can be applied to select children with high risk possibility of different somatic pathology.

### 061. Surfactant Induced Sealing of Radiopermeabilized Mammalian Cell Membranes

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Exposure to intense (>60 Gy) ionizing irradiation rapidly leads to cell membrane permeabilization and cellular necrosis. Membrane permeabilization results from the action of radiation induced reactive oxygen intermediates that peroxidate membrane lipids. Sealing and stabilization of the cell membrane is essential to preventing immediate necrosis. We have investigated the efficacy of the biocompatible, non-ionic surfactants, poloxamer 188 (BASF, Camden N.J., USA; CMC ~ 1 mM) and 10 kDa dextran (Sigma Chemical, St. Louis, Mo., USA) at 0.1 mM concentration for sealing of radio-permeabilized, isolated adult rat, skeletal muscle fibers. Cells maintained under physiologic conditions were exposed to 160 Gy of cobalt-60 gamma irradiation over 2 seconds at 37° C which leads to rapid loss of preloaded calcein dye from the cytoplasm in an average delay of 32 minutes indicating massive membrane breakdown. Both agents were found to delay membrane breakdown. However, poloxamer 188 was found to totally prevent breakdown over a 3-hour period. Because these agents are known to cross capillary barriers in-vivo and are widely used clinically, they may be useful in the therapy of the acute radiation syndrome.

### 092. Fire Disaster and Mass Burns: Specific Aspects, Preparedness and Management

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Fire disaster differs from any other form of disaster in a number of specific ways. It differs first of all in its cause, fire, which has a particularly elevated destructive effect on material goods and living beings. Every person surviving a heat trauma presents a pathological condition, the burn, that generally is considered to be one of the most complex of all traumas that can strike the organism.

In a fire disaster, the number of burned persons always is high, and the victims usually present associated pathologies (inhalation lesions, polytraumas, etc.). The immediate effect produced in a person with extensive burns is hypovolaemic shock, which requires resuscitator therapeutic measures within 2–3 hours of the accidents.

The rescue response in a fire disaster requires an operative strategy articulated in closely related phases: immediate care, first aid, organized relief. A coordinated response depends on a high level of preparedness that must involve ordinary citizens, physicians, nurses, voluntary organization, civil protection, the police, the armed forces, etc.

For the management of the effects of a fire disasters on living person to be specific, precise well-planned and timely, it is necessarily to organize highly qualified educational campaigns.

### 093. Philosophy of a Fire Drill in Large City

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The organization of an emergency relief drill in a large city, with the simulation of a fire of vast proportion in a residential building, hospital, place of public entertainment such as a theater or disco club, etc., can represent a useful means for analyzing the various aspects of the problem of preparedness and fire disaster.

A drill makes it possible to:

- check the concrete application of plans prepared for general emergencies and fire disaster emergencies;
- assess the impact of the event on the public;
- analyze the efficiency of fire defense systems in buildings that are directly or indirectly involved;
- draw useful conclusions for the preparation or revision of emergency intervention plans in the event of a fire disaster; and
- derive guideline for the preparation of an efficient program of education of the public and the operative, medical, paramedical, and voluntary forces in order to achieve a high level of preparedness for a kind a disaster that has particular characteristics, especially as regards to the pathological effects on the victims.

The various aspect of these problems are presented analytically.

### 135. Natural or Technological Disasters: Proposals for a File for Identifying Anonymous Victims

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In large-scale disasters (explosions, fires, etc.), it may be necessary to transfer seriously injured victims in order to care for them appropriately. Burns may mean immediate damage to the patient's self-image (disfigurement), and even can lead to coma. When both problems are involved, the patient may become "anonymous," but sometimes may allow identification tests to be done.

With the aid of an identification file (of deceased persons) established by Professor Lecomte at the Medical Forensic Institute in Paris, the authors have developed a filing system for storing data on living people liable to be transferred from one region or country to another. This file from which the data would be available to any health professional, contains several types of information, and may make it possible to validate the crossing of national frontiers by anonymous patients. However, the ethical question remains as to who would be responsible for managing such files: emergency or forensic doctors

It is important to encourage the follow-up and completion of these methods of identification, and to guarantee, even in the most difficult of circumstances, the total respect of medical secrets and people.