

CONCLUSIONS

3rd International Conference HEALTH EFFECTS OF THE CHERNOBYL ACCIDENT: RESULTS OF 15-YEAR FOLLOW-UP STUDIES Kiev (Ukraine), 4 to 8 June 2001

Scientists and experts from the Republic of Belarus, Russian Federation, Ukraine, and other countries, as well as representatives of international organisations [the World Health Organisation (WHO), the United Nations Office for the Co-ordination of Humanitarian Affairs (OCHA), the International Atomic Energy Agency (IAEA), the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR), the United Nations Chernobyl Programme in Ukraine], and the International Commission on Radiological Protection (ICRP)] participated in the work of the conference.

The Conference paid tribute to the medical personnel whose expertise and commitment minimised acute radiation effects in persons involved in the early stages of the accident and to the international medical community for invaluable response and humanitarian assistance.

The purpose of the conference was to communicate and discuss research, based on results arrived at 15 years after the Chernobyl accident, on medical consequences. These recommendations will serve as a basis for future decisions by the national and international organisations.

During the conference there were 88 oral presentations and 316 posters. The emphasis of the conference was on:

- Medical consequences in the Republic of Belarus, Russian Federation, and Ukraine;
- International co-operation in studying health effects;
- Radiation doses and risks of radiation-induced effects;
- Stochastic effects of ionising radiation (with emphasis on thyroid cancer and leukaemia);
- Genetic effects of radiation;
- Non-cancer effects;
- Rehabilitation and treatment of the affected population;
- Psychosocial effects and mental health of the affected population;
- Strategy of countermeasures after a large-scale radiation accident.

The Chernobyl accident was a catastrophe which affected the lives of millions of people. It resulted in significant exposures to substantial numbers of the populations of the Republic of Belarus, Russian Federation and Ukraine and to parts of some European countries. The largest individual doses were received by clean-up workers, especially those who worked during the first year after the accident within a zone of 30 km around the Chernobyl nuclear power plant. Large numbers of people are still living in contaminated areas where they receive elevated radiation exposure.

Health effects of the accident

Stochastic radiation effects

- There is no doubt that the incidence of thyroid cancer has substantially increased in children who were 0-18 years old at the time of the accident and that this is related to radiation from the accident. An increased number of cases of thyroid cancer among liquidators who worked in 1986 is expected to occur.
- There is a tendency of an increase of leukaemia among liquidators who worked on the

excess has been observed only in Russian clean-up workers. In those of the Republic of Belarus and Ukraine no significant excess has been observed to date.

- There is no significant increase of leukaemia in adults or children living on contaminated territories of the three affected countries.
- While there has been increased incidence of solid tumours, there is little significant and/or consistent evidence of a radiation-related increase in clean-up workers, evacuees, or residents of contaminated areas in the three affected countries.
- Stable changes in chromosomes of somatic cells have been identified after the accident. Research is required to determine whether similar changes may lead to increased incidence of disease in offspring.

Deterministic radiation effects

- Bone marrow syndrome was diagnosed in 134 persons who received 1-12 Gy of relatively uniform whole-body exposure during the early stages of the accident. Supportive medical care provided to these individuals resulted in substantial survival. However, 28 died during the first three months after the accident. In later years 14 additional deaths, attributable to a variety of medical conditions, have occurred.
- Various somatic disorders, including delayed neuropsychiatric complications and radiation skin damage, have been observed in survivors of bone marrow syndrome. Cataracts are seen in survivors at a level related to dose.
- It is anticipated that information on the development of cataracts in clean-up workers and others who may have received significant exposures will soon be available as well.
- There are indications that the incidence of cardiovascular, cerebrovascular and thyroid diseases in clean-up workers and possibly other non-cancer conditions may be increased; radiation exposure or other factors may play a role in this increase. Further investigations are needed.

Other health effects

At 15 years after the accident other types of health effects seem to have emerged. These are primarily neuropsychiatric and cardiovascular diseases, but also include:

- Deteriorating health of liquidators;
- Increasing invalidity among liquidators;
- Decreased birth rate;
- Diminished health of new-borns;
- Increased pregnancy complications;
- Impaired health of children.

A number of factors inherent to the Chernobyl accident, including worsening socio-economic conditions, continuing residence in contaminated territories, diminished food supply, vitamin deficiency, relocation, and psychological stress, may contribute to these effects.

Medical Rehabilitation

Capacity for rehabilitation has to be strengthened. The experience gained from the work of the centres for psychosocial rehabilitation and the use of antioxidants has resulted in improved procedures.

International co-operation

This Conference has confirmed the value of international co-operation for addressing Chernobyl problems. The success of joint efforts, supported by many countries (the Republic of Belarus, Russian Federation, Ukraine, the countries of the European Union, Japan, the United States of America, and others), international organisations, and non-governmental organisations, justifies continued support. The international organisations remain committed to the mitigation of the effects of the accident.

- The radiation protection of the population in the early period after the accident was inadequate, notably in relation to prevention of the intake of radioiodine.
- Dosimetric monitoring of clean-up workers in 1986 was not properly organised leading to significant gaps in data on individual doses of this category of affected population.
- Deficiencies in providing objective and timely information about the accident and its possible consequences contributed to development of psychosocial disorders.
- Increased incidence of various diseases was identified following the accident by intensive medical examinations and improved diagnostic capability. These increases may have been caused by a combination of radiation, non-radiological factors, and a deteriorating social and economic situation.
- Most practicing physicians had insufficient knowledge of the effects of radiation and how to advise the population to protect themselves.

Recommendations of the Conference

Attention should be focused on the groups that were significantly exposed to radiation due to the Chernobyl accident. These groups include workers who manifested clinical symptoms of acute radiation syndrome, recovery operation workers (in particular from 1986 to 1987) and their children, evacuees from the most heavily contaminated territories, those who were children and received exposure from radioiodines at the time of the accident as well as continuing low-level exposure from long-lived radionuclides afterwards, and pregnant women and children residing in contaminated territories. Some subsets of these groups require specific and continued initiatives.

The conditions experienced as a result of the accident, accompanied by the changes taking place in the Soviet Union at that time, have contributed to the development of non-radiation-related psychosocial effects that may have resulted in clinical manifestations of ill health. Provisions should be made to provide counseling and assistance to these people. Primary medical health services should be strengthened and made available to those who request them.

Recommendations for public health services

Priority areas are:

- Compatible registries should be developed in the three countries to monitor important indices of public health. By allowing continuous monitoring of the health status in various cohorts affected by the accident, such registries are a resource for identifying what changes have occurred and for investigating whether these are related to radiation or other factors from the Chernobyl accident;
- Diagnosis and treatment of all types of cancer and other diseases, in particular cardiovascular, nervous, endocrine, pulmonary, gastrointestinal disorders, and diseases of the haemopoietic system;
- Justified countermeasures to reduce exposure of people in affected areas;
- Improving the psychosocial support infrastructure for persons affected by the accident;
- Helping the affected population to improve the life style and health conditions through preventive medicine measures and improved nutrition;
- Training should be provided to all practicing physicians on radiation medicine. The subject should also be part of medical school training.

Recommendations for research

- Over the next decade, research should be focused on those who were children or *in utero* at the time of the accident and on continued follow-up of thyroid cancer in this group.
- Epidemiological research on health effects is especially relevant for recovery

- Epidemiological studies in the three countries most affected by the Chernobyl accident (the Republic of Belarus, Russian Federation and Ukraine) should seek to identify to what extent associations exist between radiation exposure attributable to Chernobyl and incidence of cancer (especially thyroid cancer and leukaemia) and other possible radiation-induced health effects. All diagnoses should be based on standard protocols and confirmed under international peer review.
- Dosimetric support is required for clinical and epidemiological studies so that dose estimates may be derived at the individual and/or group level;
- Tissue banks should be established and used as an international resource for research at the molecular genetic and cellular level targeted at identifying mechanisms and markers for cases of diseases that are radiation-related.
- International collaborative research involving scientists in the three countries is encouraged.

The scientists participating in the Conference expressed their appreciation to the Government of the Ukraine and the organisers for arranging such an important meeting. Participants are urged to disseminate the summary and recommendations contained in the present resolutions.