

# CONCEPT OF RADIOLOGICAL, MEDICAL AND SOCIAL PROTECTION OF THE POPULATION OF RUSSIA AFFECTED BY ACCIDENTAL EXPOSURE

I.V. OSECHINSKI

Haematological Scientific Centre of the Russian Academy of Medical Sciences,  
Moscow, Russian Federation

E.V. IVANOV, P.V. RAMZAEV, M.I. BALONOV

Institute of Radiation Hygiene,  
St. Petersburg, Russian Federation



XA9745890

A.F. TSYB

Medical Radiological Research Center (RAMS),  
Obninsk, Russian Federation

Main principles of population radiation protection from various accidental exposure, including the Chernobyl accident, have been implemented in officially approved Concept "On radiological, medical, social protection and rehabilitation of the Russian Federation population affected by accidental radiation exposure". The concept includes basic principles of radiation protection, designation of regional radionuclide contaminated territories, records and registers of exposed persons, health protection and rehabilitation, socio-economic and legal aspects.

The main task for scientists and administration in the field of health and sociology, economy and law is limitation of population harm, rehabilitation and compensation for risk and detriment at early and late stages of radiation accident. This approach is implemented in the recent Concept of radiological, medical, socio-economical and legal protection of population subjected to accidental exposure, and requirements for measures at late stage mitigation of radiation accident, accepted by Russian National Commission on Radiation Protection. The Concept is related to all major Russian radiation accidents: the Urals, Chernobyl and similar to them, such as Altai situation, with the following revision of present legislation. Earlier a Concept on rehabilitation and protection measures has been accepted in 1993.

The basic principles of this Concept present the main directions of population protection and rehabilitation. The Concept considers that in condition of practically "completed" after-accidental exposure (term used for radiation accidents and late effects of nuclear tests jointly) only the following measures to reduce population exposure are practically possible, such as justified decrease of medical exposure and exposure to radon and progeny in the houses. The introduction of such measures is actual and possible, because radiation from medical exposure and natural level of radon in the houses is rather substantial in the affected areas and higher than average Russian levels. The dose reduction in medicine is achieved by substantial limitation of reglementary examinations (reduced for last years), high frequency of X-ray - fluorography, with use of all technical means for dose reduction, but with necessary quality and quantity of diagnostic information. Optimization of such examinations could in the near future reduce the population collective dose not less than for 30 %. Of course, the higher reduction can be achieved by replacement of obsolete X-rays units for modern equipment. Experience with the reduction of diagnostic medical exposure in Bryansk region affected by the Chernobyl accident showed a possibility to decrease a collective diagnostic dose for one order of magnitude, without loss of necessary quality and quantity of diagnostic information.

Other possibility to decrease the population exposure is to reduce the radon contents in the houses. The territories with high level of radon emanation from soil and concentration in the houses exist, especially in the Altai area. Most of the houses have no radon protection. Radiohygienic inspection of the houses should be introduced with radiation control of projects and building process of the houses, the existing houses should be equipped with radon protective systems. Reduction of such exposure cannot completely compensate the post accidental overexposure, but can limit radiation effects in progeny. The proposed radiation protection measures should be introduced on the basis of socio-ethic considerations, priority should be given to the areas with extensive exposure of population in the past. For the assessment of present level of population radiation situation and effectiveness of protective countermeasures, a precise system of population dose assessment from basic radiation sources should be established in all affected areas.

The Concept introduces a legal definition of the radiation "exposed" and "suffered" to assure adequate radiological, health and social protection of population after accidental exposure. First of all, the Concept "the exposed" defines a person who has received acute radiation exposure with dose more than 5 Sv (50 mGy). As a criteria limit, excessive occupational annual dose limit is used. Higher than 25 cSv (250 mSv) dose is an accidental level which gives the basis to include such person into the group of high risk and requires a special medical care. Selected limits have a radiological basis, as well as social foundation.

"The suffered" defines a person with the established radiation injury and other radiation effects and illness for which the casual radiations with accidental exposure are established.

Population dose as a result of nuclear weapon tests is estimated by the State Russian Committee on Sanitary and Epidemiological Surveillance and assessment of health and disability causation data performed by the Ministry of Health special experts councils on basis of special instructions.

Data on all persons affected by radiation with dose more than 250 mGy should be recorded at radiological and epidemiological register, including also:

1. children born after intrauterine exposure with more than 50 mSv;
2. adults with thyroid absorbed dose more than 1.5 Gy and children with more than 0.75 Gy;
3. children born after accidental exposure of a person included in the register.

For persons who are selected by expert councils as "the affected", the dose reconstruction should be performed. For health protection and rehabilitation of persons included in radiation epidemiological register, a special medical examination should be provided in accordance with the program approved by the Ministry of Health, and other exposed persons have a possibility of annual health examination to diagnose premorbidity state, latent pathology and early diagnosis of illness for timely prevention, therapeutic and rehabilitation medical care.

Special medical teams of qualified specialists are organized for medical supervision of the exposed and affected persons. Guidelines for medical examinations and selection of a group of high risk are envisaged. Medical care of the affected and ill persons and their health rehabilitation is provided at various medical establishments, including rehabilitation centers. In addition, medical care includes the measures to increase general fitness and anticarcinogenic protection of the irradiated persons and progeny. At present new special highly effective anticarcinogenic products have been developed in Russia for the prevention of cancer, not only as drugs, but also as special food additives reducing by one order a probability of cancer induction, with increase of life span.

The Concept's recommendation envisaged the priority of medical supply and staffing of health establishments at the area where the majority of affected population is located, and especially improvement of children health care. Preventive measures against harmful environmental chemical and physical agents have been introduced in the area of high radiation exposure to minimize the health consequences of exposure by public education in health radiation protection and introduction of hygienic habits. Education and information systems are introduced for this purpose. Most difficult but important task is the promotion of health life style, e.g. limitation of smoking and alcohol use, propaganda of fitness improvements, especially for young generation. All protection and rehabilitation measures should be explained to the public to assure psychological protection of population, to prevent psychoemotional effects. For this reason a system of periodical objective, comprehensible and essentially optimistic public information should be provided with help of qualified radiation protection experts who can overcome noncompetent opinions and rumours of laymen. Publication of booklets, information bulletins and periodicals, lectures on radio and TV should be promoted. Special attention should be given to the increase of knowledge in population groups, such as mass media personnel, administrators, health personnel and teachers who are forming public opinion. Periodical studies of the public opinion and psychological population status should be performed. At present the most complicated problem is socio-economical protection of the exposed population which includes general and individual measures on the basis of qualified expert assessment of the extent of detriment and adequate volume and means of compensation. It is accepted that the exposed and suffered persons have rights to compensation for damage, such as physical and psychological health impairments. This compensation could include financial payments and privileges according to damage extent. The amount and character of compensation should be defined by legal acts of Federal administration with local authorities. The basic criteria for decision-making on the form of compensation and social rehabilitation should be defined by classification of individuals by groups of the suffered and exposed categories.

For the suffered and exposed by doses higher than 250 mGy the individual compensation measures, such as privileges and payments and general social rehabilitation measures are implemented. For lower radiation doses a general system of socio-economical rehabilitation is sufficient which includes priority supply of the affected areas, provision of sanitary and hygienic measures, water supply, adequate system of health and child care. Radiation control of housing and premises is envisaged, paid by the State.

Medical supervision, treatment and rehabilitation of persons exposed to doses higher than 250 mGy also is paid from Federal budget. Provision of adequate law protection of population by all legal services should be assured in the affected areas, and persons have a possibility for free of charge legal consultations and advice on problems related to exposure, provision of necessary documents and information. The publication of legal acts and decrees concerning the exposed population rights in the accessible information sources (local newspapers, radio and TV) is envisaged.

**Distribution of the Russian settlements and population according to soil contamination with Cs-137, annual in 1996 and accumulated in 1986-1995 effective dose**

| Radiological parameter                    |  | Number of settlements | Population, thous.pers. |
|---|--|-----------------------|-------------------------|
| Cs-137 soil contamination                 | > 0,04 MBq/m <sup>2</sup><br>(1 Ci/km <sup>2</sup> ) | <b>7.600</b>          | <b>2.600</b>            |
|   | > 0,6 MBq/m <sup>2</sup><br>(15 Ci/km <sup>2</sup> ) | <b>300</b>            | <b>93</b>               |
| Effective dose in 1996                    | > 1 mSv  | <b>200</b>            | <b>40</b>               |
|   | > 5 mSv  | <b>1 - 5</b>          | <b>2</b>                |
| Accumulated effective dose in 1986 - 1995 | > 70 mSv   | <b>120</b>            | <b>25</b>               |
|   | > 350 mSv  | <b>-</b>              | <b>&lt; 1</b>           |