



United Nations Scientific Committee  
on the Effects of Atomic Radiation

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# The System of Protection: Current and future Developments UNSCEAR perspective

Wolfgang Weiss, Chair, UNSCEAR (58<sup>th</sup> and 59<sup>th</sup> sessions)

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# UNSCEAR assessments of recent years

- 2006
  - Epidemiological studies of **radiation and cancer**
  - Epidemiological evaluation of **cardiovascular disease** and other **non-cancer** diseases following radiation exposure
  - **Non-targeted** and delayed effects of exposure to ionizing radiation
  - Effects of ionizing radiation on the **immune system**
  - Sources-to-effects assessment for **radon** in homes and workplaces
- 2008
  - **Medical radiation exposures**
  - **Exposures of the public and workers** from various sources of radiation
  - Radiation exposures in **accidents**
  - Health effects due to radiation from the **Chernobyl** accident
  - Effects of ionizing radiation on **non-human biota**
- 2010
  - Summary of **low-dose radiation effects** on health



- **Strategic objective:**
  - Increase awareness and deepen understanding among authorities, scientific community and civil society with regard to levels of radiation and related health and environmental effects as sound basis for informed decision-making on radiation-related issues
- **Thematic priorities:**
  - Medical exposures
  - Radiation levels from energy production
  - Natural sources
  - Effects from low-dose-rate exposures
- **Strategic shifts** to improve:
  - Operational processes
  - Data management
  - Results-based management and coordination
  - Outreach

# Resolution adopted by the General Assembly (A/66/424; 9 December 2011)

## The General Assembly

- Decides to increase the membership of the Scientific Committee from twenty-one to twenty-seven States;
- Invites **Belarus, Finland, Pakistan, the Republic of Korea, Spain and Ukraine** to become members of the Scientific Committee, and requests the Government of each of those States to designate one scientist, with alternates and consultants, as appropriate, to be its representative in the Committee;

# Resolution adopted by the General Assembly (A/66/424; 9 December 2011)

## The General Assembly

- Endorses the intentions and plans of the Scientific Committee for conducting its programme of work of scientific review and assessment on behalf of the General Assembly, in particular its decision to conduct a **full assessment of the levels of exposure and radiation risks attributable to the accident following the great east-Japan earthquake and tsunami**, calls upon the Scientific Committee to submit to the Assembly at its sixty-seventh session the report requested by the Assembly on the **attributability of health effects from radiation exposure**, encourages the Scientific Committee at its earliest convenience to submit the other related reports, including on assessments of **levels of ionizing radiation from electrical energy production**, as well as on the effects on human health and the environment, and requests the Scientific Committee to submit plans for its ongoing and future programme of work to the Assembly at its sixty-seventh session;

# Resolution adopted by the General Assembly (A/66/424; 9 December 2011)

## The General Assembly

- Welcomes the strategy of the Scientific Committee to improve data collection, encourages in this regard Member States, the organizations of the United Nations system and non-governmental organizations concerned to provide further relevant data about doses, effects and risks from various sources of radiation, which would greatly help in the preparation of future reports of the Scientific Committee to the General Assembly, and further encourages the **International Atomic Energy Agency, the World Health Organization and other relevant organizations** to establish and coordinate with the Secretariat the arrangements for periodic collection and exchange of data on radiation exposures of workers, the general public, and, in particular, medical patients;

# Current programme of work

- **Attribution** of health effects to radiation
- **Uncertainties** in cancer risk estimates for radiation
- Biological effects of selected **internal emitters**
- Radiation risks and effects on **children**
- Epidemiology of **low dose rate** radiation risks
- **Mechanisms** of radiation actions at low doses
- Methodology for assessing **discharges**
- Radiation exposure from **electricity generation**
- Radiation levels/effects from **Fukushima accident**
- **Public information** material
- Improved mechanisms for **data collection**

*Next session 21-25 May 2012*

# Documents to be discussed by the Committee

(*next session 21-25 May 2012*)

## MECHANISMS OF RADIATION ACTIONS AT LOW DOSES

It is evident from the selective review (post 2006 data) that there are now significantly more data available on the biological consequences of low-dose radiation exposure and non-targeted effects such as bystander phenomena and transmissible genomic instability. While mechanistic understanding of non-targeted effects is increasing, **many studies remain primarily observational**. As noted, reports remain mixed in outcome and there is little of the coherence required of robust data that can be used confidently in risk estimation. Similarly there is as yet no indication of a causal association of non-targeted phenomena with radiation-related disease. The systems-level framework should provide a useful guide to future integration of mechanistic data into risk estimation methods.



## THE ABILITY TO ATTRIBUTE RISKS AND EFFECTS TO RADIATION EXPOSURE

It is known that exposure to ionizing radiation is capable of causing many different health effects in humans through a multitude of different mechanisms. Whether a specific observation in an individual or a population can be attributed to the radiation to which it has been exposed is a complex issue. Generally, attribution is determined through an analysis of the nature and amount of the exposure, the surrounding circumstances and the development of subsequent findings, and coherence of observations with existing scientific knowledge, as well as through professional experience in radiopathology and radioepidemiology, taking into account potential biases and uncertainties.

# Documents to be discussed by the Committee

(*next session 21-25 May 2012*)

## UNCERTAINTIES IN RISK ESTIMATES FOR CANCER DUE TO EXPOSURE TO IONIZING RADIATION

Differing estimates of radiation risks from low-dose exposures frequently give rise to controversy about the safe use of radionuclides and ionizing radiation in society. If uncertainties are not addressed properly by the scientific community, apparent differences in risk estimates can cause anxiety and undermine confidence among the public, decision-makers and professionals.

There are two general areas of interest: (1) The first involves characterization and quantification of uncertainties that arise in developing estimates of risk from a specific study or group of studies. (2) The second area of interest concerns risk projection, that is when radiation risk estimates derived from specific studies are used to describe potential effects of radiation exposure in other populations of interest, such as workers with occupational radiation exposures, people affected by an accidental release of radioactive material, or participants in a disease screening programme involving radiation exposure.

## EFFECTS OF RADIATION EXPOSURE ON CHILDREN

While there are a number of population groups who are more sensitive to ionizing radiation risks than the general population, children are the largest and most easily identifiable group. In fact, childhood is a stage that every person on earth passes through. Examination of the scientific data regarding the effects of childhood exposure allows a logical allocation of efforts and resources in radiation protection as well as a focus on important issues in the follow-up of exposed populations.

# Proposed new programme of work (*next session 21-25 May 2012*)

## **UNSCEAR Global Survey of Radiation Usage and Exposures in Medicine (2013–2014)**

- **Revision of the UNSCEAR medical exposure questionnaire.**
- **Collaboration with international and intergovernmental organizations (WHO, IAEA and EC).**
- **Use of web-based databases and other electronic mechanisms to collect data.**
- **Establish national UNSCEAR contact points.**
- **Establish an expert group on medical exposures.**

Thank you for your attention

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