United Nations Scientific Committee
on the Effects of Atomic Radiation

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Challenges in assessing doses and risks and in risk communication –
experience from Fukushima and Chernobyl

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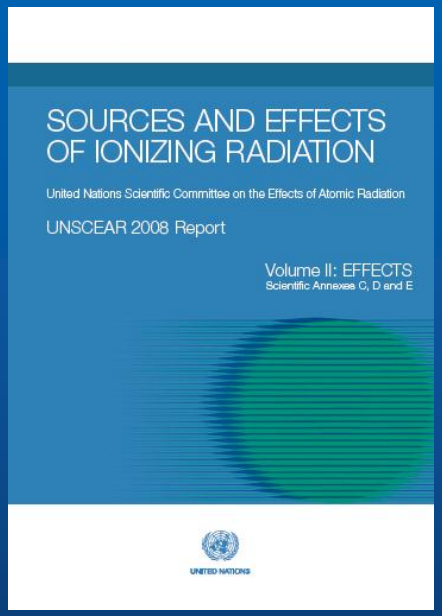
UNEP

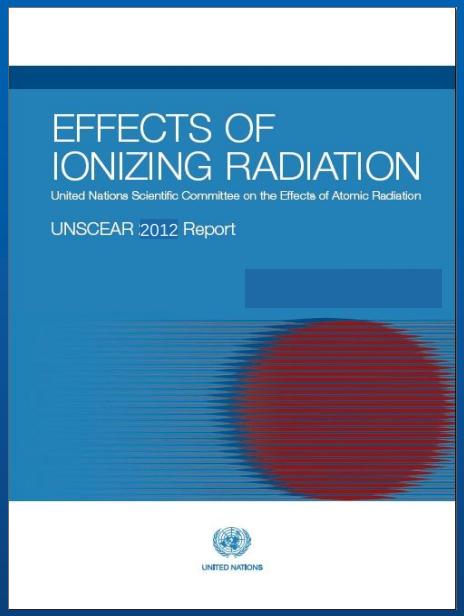
Mandate

- **Scientific** Committee of UN General Assembly
- Assess **levels, effects & risks of ionizing radiation**
  - identify emerging issues
  - evaluate levels and effects
  - improve knowledge

  for General Assembly, scientific community & public

Scientific findings





Health effects due to radiation from the **Chernobyl** accident

Attribution of increased cancer rates

Uncertainty in cancer risk estimates

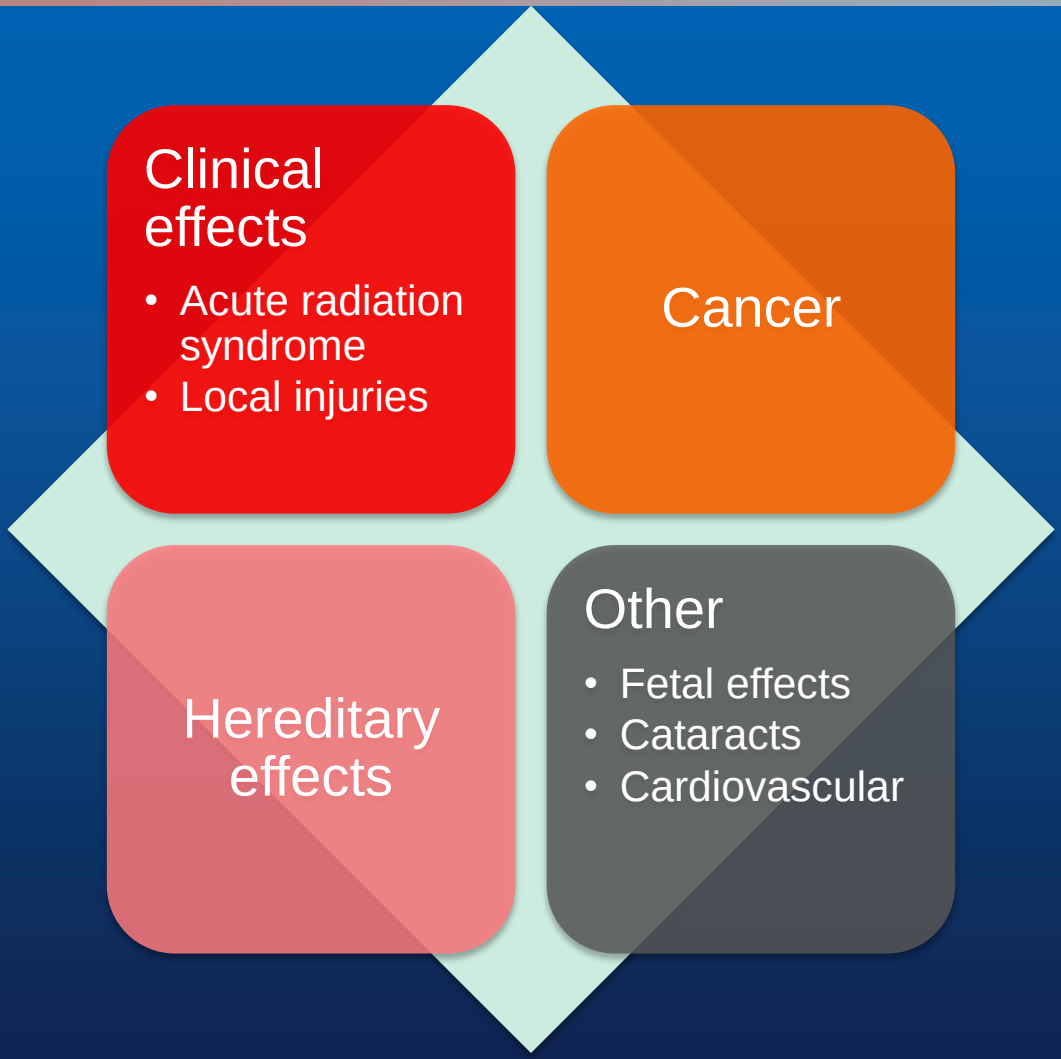
Work in progress

Radiation levels/effects from **Fukushima** accident (2013)

Radiation risks and effects on **children** (2013)

Biological effects of selected **internal** emitters (2014)

Dose-dependent effects



Scientific challenges in **dose** assessment

Retrospective assessment

Uncertainties

- time-dependent nuclide composition via relevant pathways
- representativeness of the nuclide data
- unknown behaviour of individuals in population
- model parameters

Prospective assessment

Additional uncertainties

- unknown efficiency of countermeasures

Scientific challenges in **risk** assessment

Uncertainties

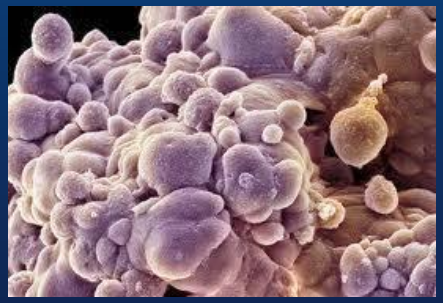
- absolute values of risk factors at low doses
- risks for specific population groups (e.g. children)
- individual attribution of cancer risks at low and medium doses (increased rates of cancer in population can only be attributed to radiation exposure if increase is larger than statistical uncertainties)
- at natural background levels, increased rates cannot be attributed reliably because of high uncertainties at very low doses

Therefore, the Committee does not recommend calculating numbers of effects at such levels

Attribution of effects for an individual

- Certain tissue reactions can be attributed to radiation exposure
  - High acute absorbed doses
  - Other possible causes eliminated

- Cancer cannot be unequivocally attributed to radiation exposure
  - Other causes possible
  - No biomarker for radiation



Fukushima accident

Preliminary information

- No radiation health effects observed among public or workers
- Six workers received doses above 250 mSv;
  170 received doses above 100 mSv;
  thyroid doses being estimated
- Six workers died in first year – not due to radiation
- Thyroid monitoring of 1,080 children:
  maximum dose reported was 35 mSv
- Highest exposures of wildlife in marine environment

Challenges in risk communication

Scientists use complex (probabilistic) concepts to describe health effects/risks – the public want to know if it is safe or dangerous

Scientists often discuss controversial scientific issues in public (e.g. uncertainties of scientific knowledge in dose and risk assessment during emergency situations). This is misinterpreted as a fundamental failure of the protection system

There is an urgent need to develop global consensus through sharing knowledge: international expert organisations should develop a common communication strategy and speak with one voice!

Independence and scientific objectivity is key for achieving public trust