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United Nations Scientific Committee
on the Effects of Atomic Radiation

The UNSCEAR 2020 Report on Fukushima: Implications of Information Published Since the UNSCEAR 2013 Report

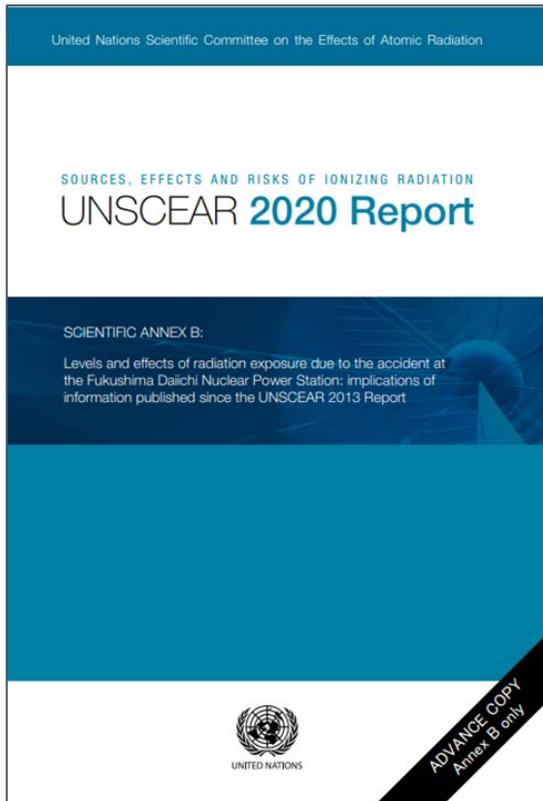
Japan's side event at the 65th IAEA General Conference:
Road to today: Progress in 10 years at Fukushima Daiichi Nuclear Power Station

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20 September 2021



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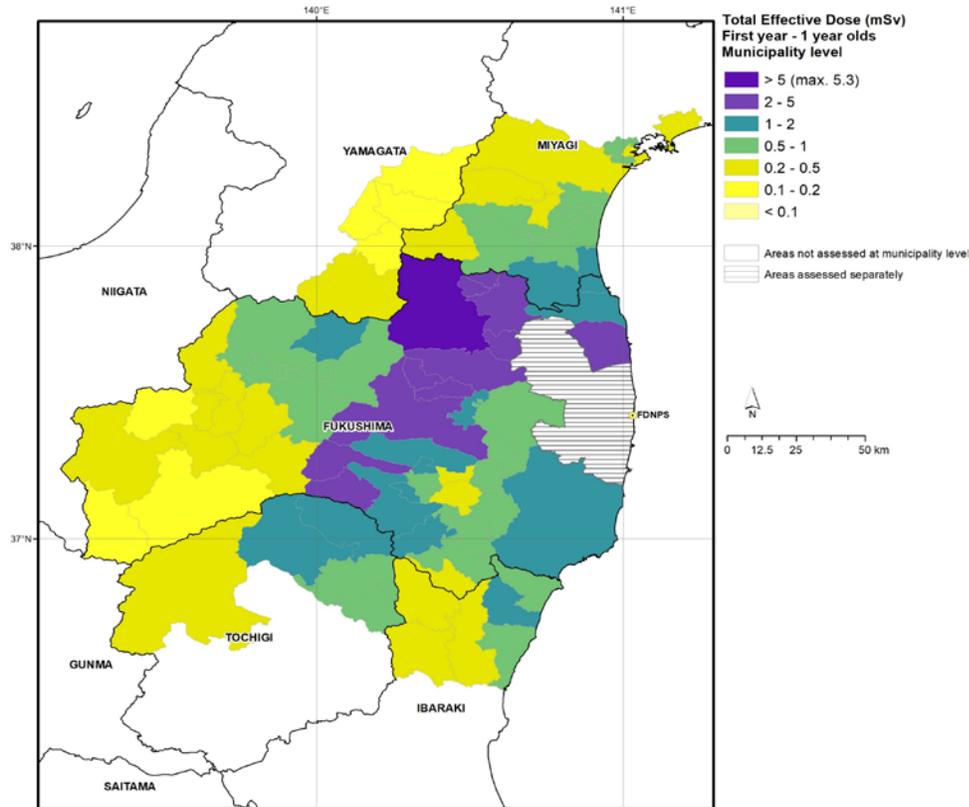
<http://www.unscear.org/unscear/en/fukushima.html>

Scope and content

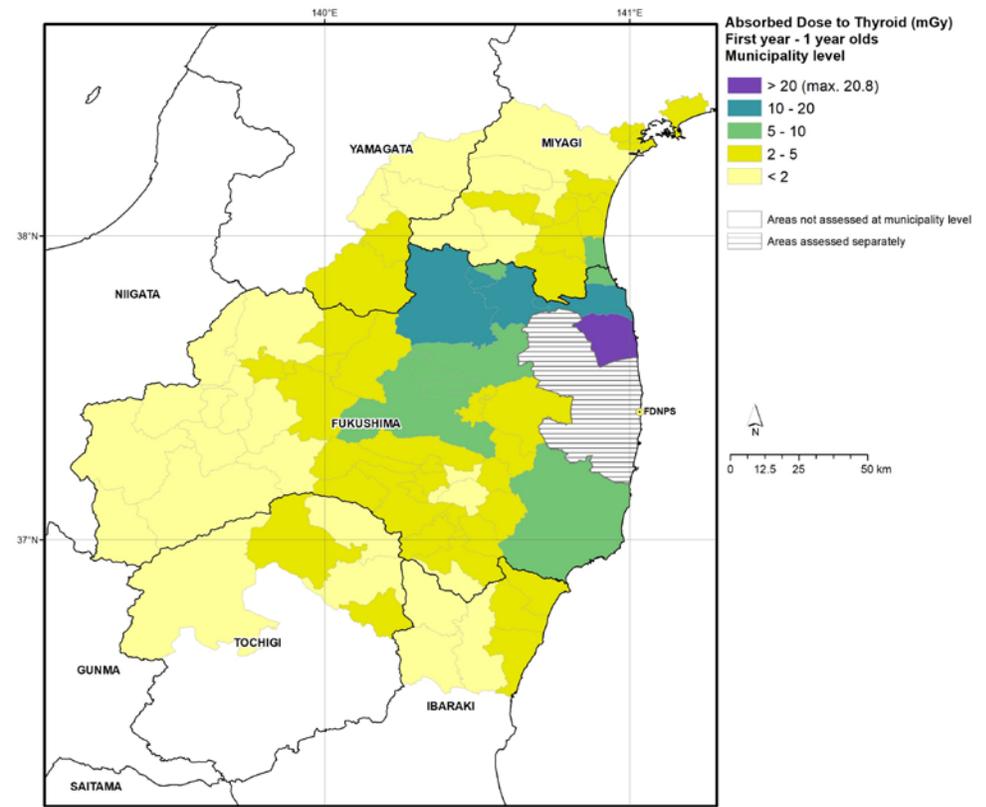
- Releases to atmosphere, dispersion and deposition
- Releases to and dispersion in the marine environment
- Transfer through the terrestrial and freshwater environments
- Doses to the public
- Doses to workers
- Health implications
- Doses and effects in non-human biota
- Validate/revise estimates of doses to the public (including variability and uncertainty) and their health implications



Updated estimates of 1st year doses to public



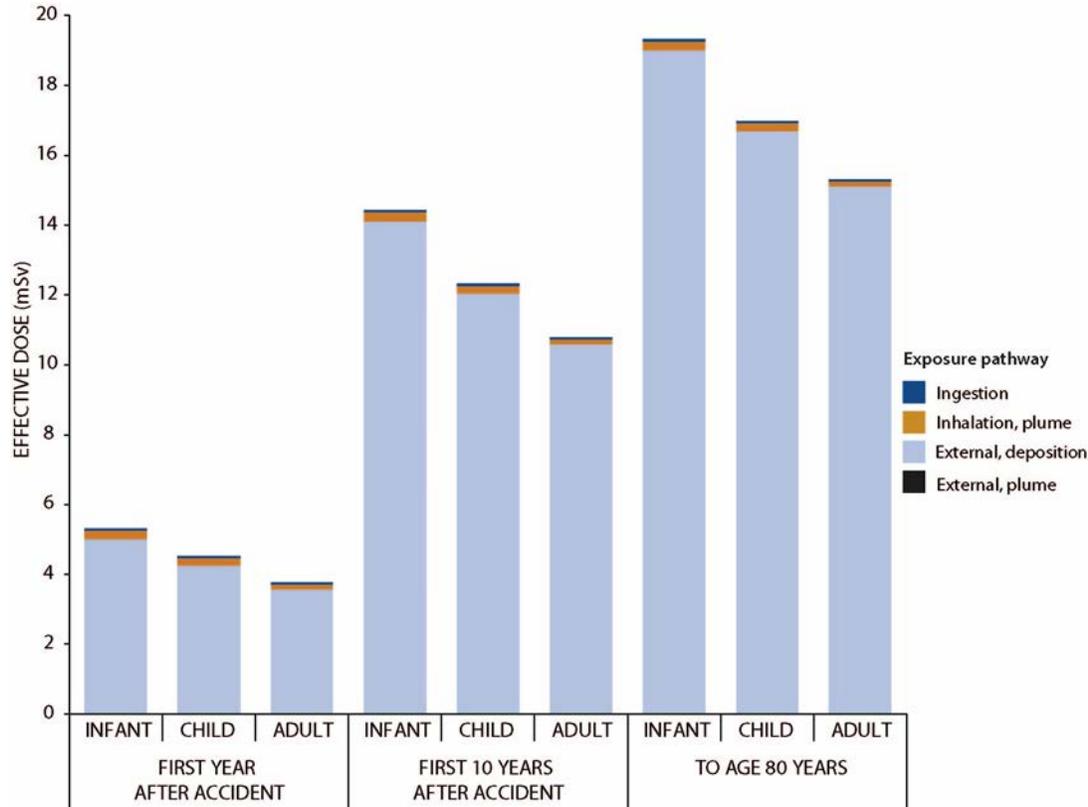
Effective dose to infants in first year



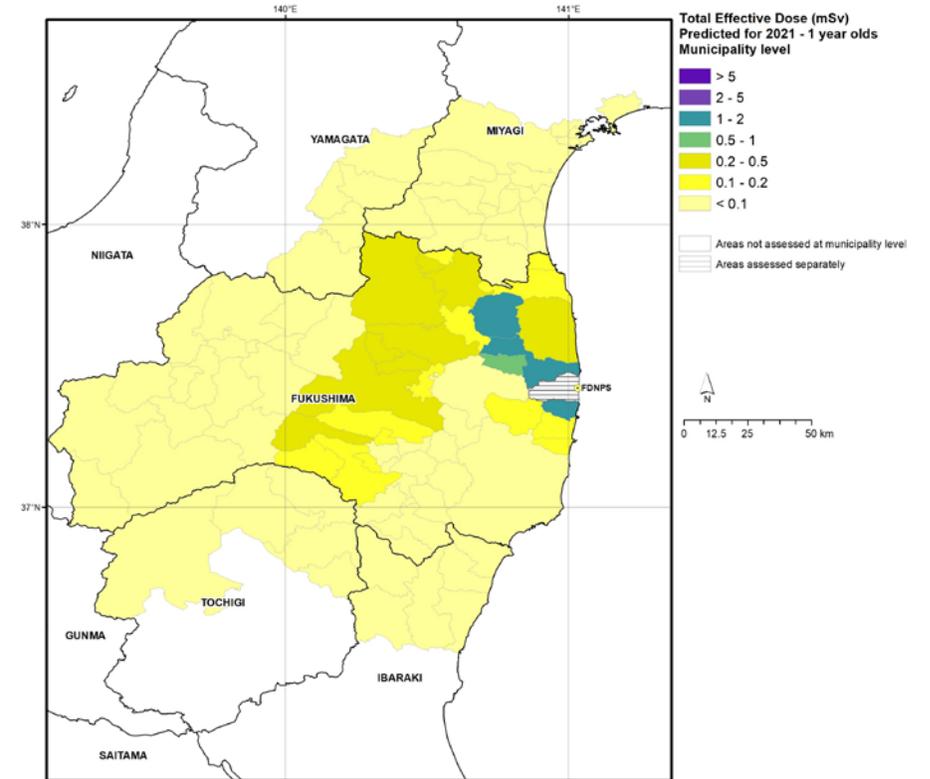
Absorbed dose to thyroid of infants in first year



Updated estimates of doses after the first year



Effective doses in Fukushima City over time



Annual effective doses in 2021



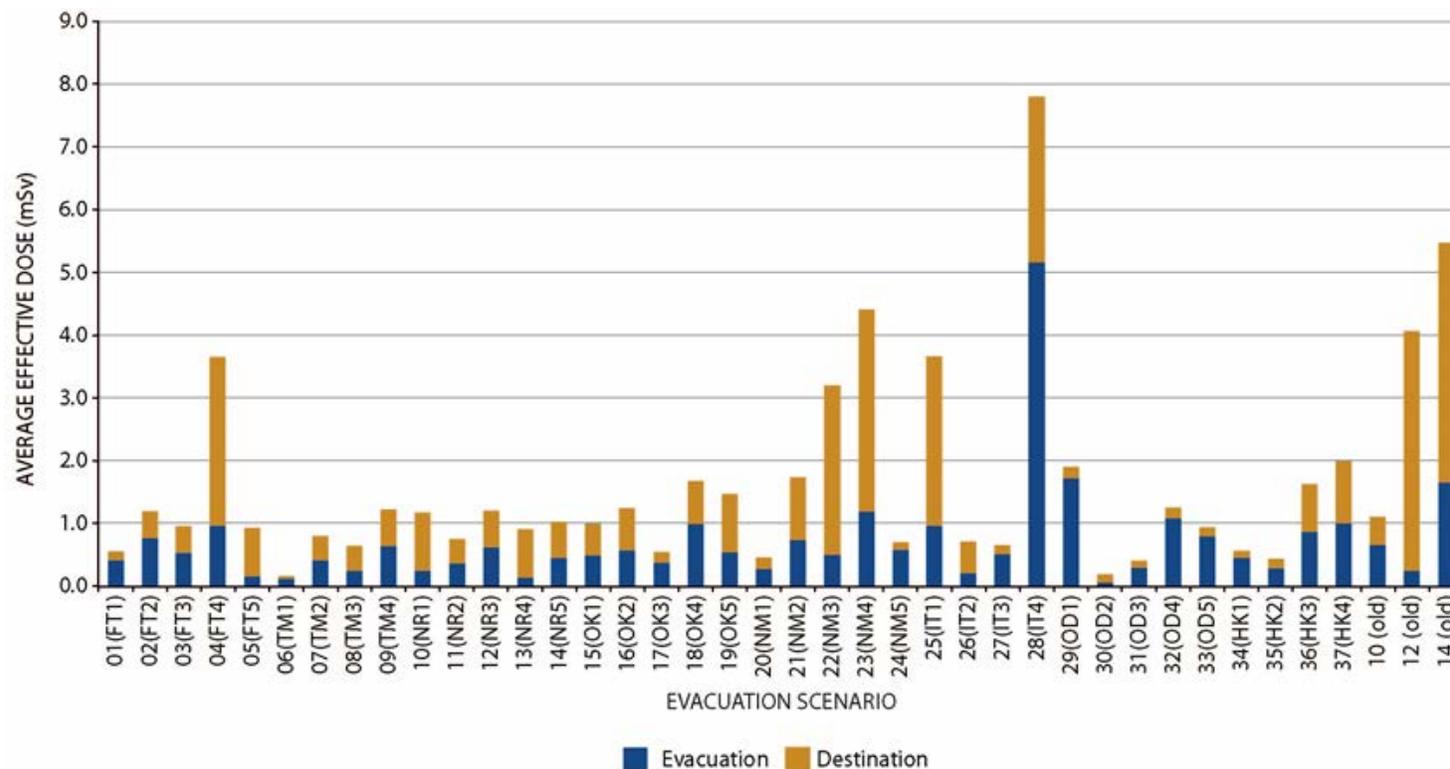
Main differences with 2013 Report – Public Exposure

- More measurement information
 - In the environment
 - From measurements made on people
- Improved and more realistic models
 - Improved description of pattern of releases and modelling of movement in environment
 - New model for external doses from deposited radionuclides
 - More realism in taking account of Japanese specific information
 - More realistic estimates of doses from eating food
 - Partial validation of models with measurement information



Main findings for estimated exposure of evacuees

- The **estimated average effective doses** to infants in the first year for the different evacuation groups ranged from about 0.2 mSv to about 8 mSv.

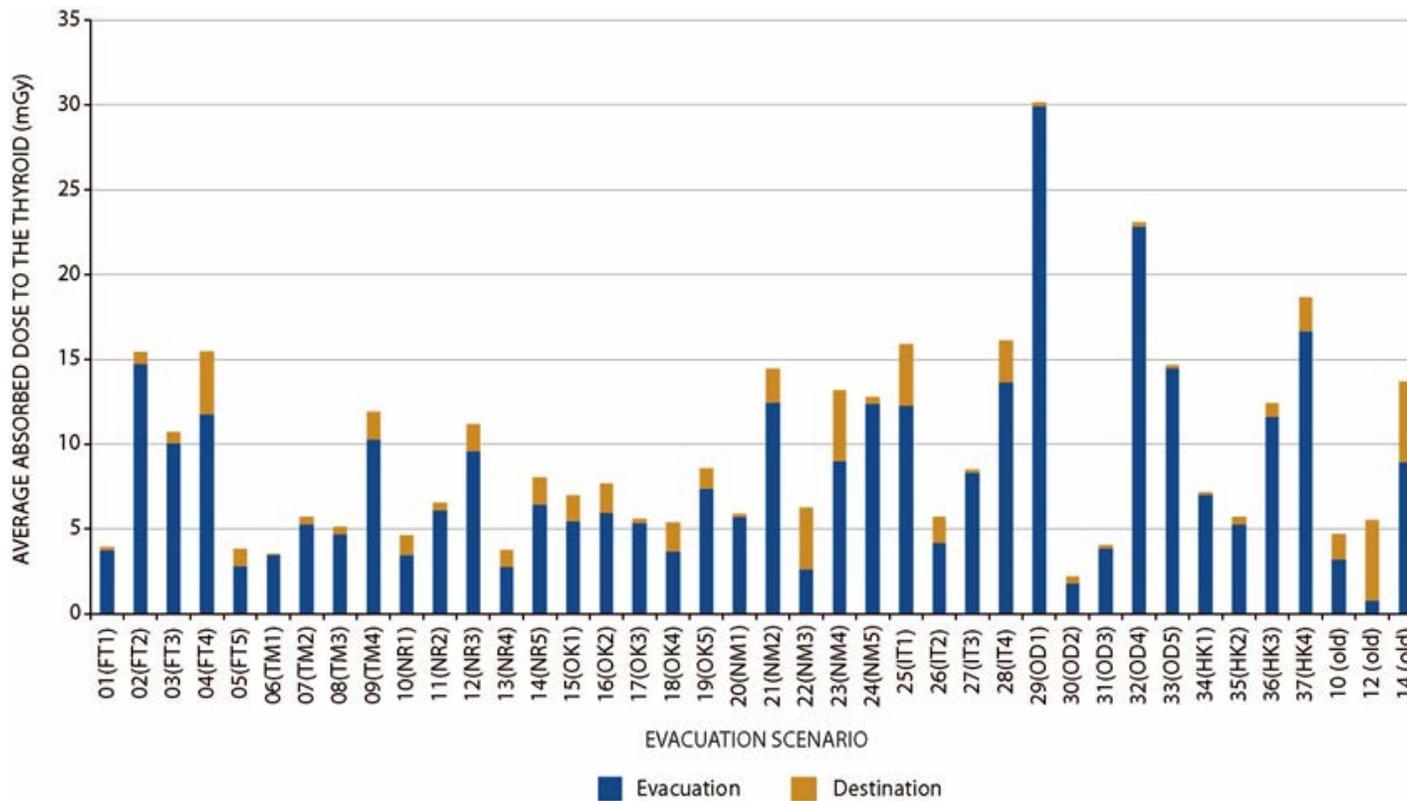


Effective dose in the first year to infants



Main findings for estimated exposure of evacuees

- Average absorbed doses to the thyroid in the first year ranged from about 2 mGy to about 30 mGy for evacuated infants.
- The **evacuation averted absorbed doses** to the thyroid of infants of **up to about 500 mGy**.



Absorbed dose to the thyroid in the first year to infants



Main findings

- Doses to Fukushima Daiichi Nuclear Power Station workers resulting from the accident
 - **24,832 on-site workers** during the period March 2011 – October 2012
 - Delays in commencing thyroid monitoring
 - **Two re-evaluations** of reported doses performed since the UNSCEAR 2013 Report
 - **General findings of the 2013 Report remain valid**

- Doses to off-site environmental remediation workers
 - There were about **77,000 remediation workers** between 2012 and 2016
 - The average cumulative dose received was 1.0 mSv
 - The results confirm that doses to remediation workers were small



Main Findings

- Radiation Exposure on General Population of Fukushima Prefecture
 - **Generally consistent with 2013 findings.**
More information now available supportive of conclusions.
 - Evaluated likelihood of future excess cancer in sensitive subgroups – children and young people

- Radiation Exposure on FDNPS Emergency Workers
 - Little information on health outcomes available to date.
 - Future discernible increases in cancer rates considered unlikely



Main Findings

- Discernible **excesses of thyroid cancer** caused by the radiation exposure are **unlikely**, up to ages 30 or 40 years, or over the entire lifespan.
- The large number of diagnosed thyroid cancers judged to be due to ultra-sensitive thyroid screening and not attributable to radiation exposure
- Future **discernible cancer excesses unlikely** in the sensitive groups exposed in childhood, given the generally low doses.
- **Adverse reproductive outcomes?** Studies showed no discernible excess of birth defects, stillbirths, preterm births, low birthweight
- Elevated prevalence of **cardiovascular and metabolic** conditions *among evacuees, but not non-evacuees*. Likely from lifestyle changes and psychosocial stresses, not from radiation exposure.



Some highlights

- No change in **total amounts** of radionuclides released to the environment – but significant changes in their **temporal pattern**
- Releases of radiocaesium to the Pacific Ocean continue from site ground water and draining of catchment areas – but **now much smaller**
- Concentrations of radiocaesium in monitored **foodstuffs since 2015 generally below limits** established by the Japanese government (ten times lower than guideline levels for international trade)
- **Decontamination**: extensive 5-year programme - reduced annual doses to less than 1 mSv in inhabited areas; and **enabled return** to many evacuated municipalities



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Key Lessons from Fukushima

- Independent Committee focussing on science, sources and exposures; health effects and mechanisms
- Roles of different bodies – health and wellbeing broadly a major issue identified (not addressed by UNSCEAR)
- Importance of measurement data (in people and environment) for as realistic dose estimates as possible – modelling tends
- Early data collection in an event of future accident is essential
- Importance of understanding baseline cancer rates in the population



Conclusion

- The 2020 report is an authoritative, independent and up to date assessment of the levels and effects of radiation exposure due to the accident at FDNPS
- The main findings are robust and unlikely to change significantly in the foreseeable future
- **Informs and affects decisions** on energy debate, radioactive waste and spent fuel management, etc.
- **Fundamental to international radiation safety framework** of radiation, protection of public, workers and environment (incl from accidents)
- **Independence, scientific objectivity, competence and quality are essential**
- **Report is being translated and planned to be presented to the Japanese public in 2022**
- Work on the **2025-2029 Programme of Work** commenced



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Thank you and sincere
appreciation to all experts!



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