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Title

UNSCEAR 2024 Report: Evaluation of Public Exposure to Ionizing Radiation – Updated Global Assessment of Radon and Thoron

Abstract

The United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) publishes scientific evaluations concerning the exposure of the population to ionizing radiation from natural and human-made sources. Following its 2008 report, UNSCEAR launched an update to incorporate new data and methodological advances to revise global estimates of public exposure to ionizing radiation from natural and human-made sources. New studies evaluating national public exposures and new peer-reviewed literature were assessed to examine any changes occurring over time and resulting from different uses and practices involving natural and human-made sources. For the 2024 report, the expert group on radon and thoron reviewed and analyzed about 2,000 publications from 2007-2022 as well as data from the UNSCEAR Global Survey (2021-2023) submitted by 61 member states, based on defined quality criteria. This presentation is focused on the findings of the expert group on radon and thoron, consisting of 15 experts from 9 countries. The results of national surveys included radon and thoron concentrations indoors and outdoors, radon concentrations in drinking water, temporal and spatial trends of indoor radon concentration, time spent indoors, and the equilibrium factor for radon. The global population-weighted average indoor radon concentration was 50 Bq/m³, the outdoor concentration had a median average of 10 Bq/m³, and radon in water showed a median of 10 Bq/L with large variability. The global average annual effective dose from natural sources was estimated at 3.0 mSv, with about 60% (1.8 mSv) resulting from the inhalation of radon, thoron and their decay products. This updated UNSCEAR 2024 report presents a comprehensive global evaluation of public exposure to radon and thoron, highlighting the need for harmonized surveys and standardized measurement protocols to address remaining data gaps.