

Doses for post-Chernobyl epidemiological studies: are they reliable?

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Abstract

Numerous epidemiological studies were conducted to evaluate the possible health consequences of the Chernobyl accident. Since the credibility of the association between radiation exposure and health outcome is highly dependent on the quality of dose assessment in these studies, it is important to view the methods used to estimate individual doses and associated uncertainties in the epidemiological studies related to the Chernobyl accident. The main emphasis is on analytical studies (either cohort or case-control), in which individual doses were estimated for all study subjects. Both environmental and occupational post-Chernobyl studies are considered. Based on a thorough analysis and comparison with other radiation studies, we conclude that individual doses for Chernobyl analytical epidemiological studies have been calculated with a relatively high degree of reliability and well-characterized uncertainties, and that they compare favorably with many other non-Chernobyl studies. The major strengths of the Chernobyl studies are: (1) doses were grounded on a large number of measurements, either performed on humans or made in the environment; and (2) extensive efforts were invested to evaluate the uncertainties associated with the dose estimates. Nevertheless, gaps in methodology are identified and suggestions for the possible improvement to properly support future epidemiological studies of the most informative exposed populations are provided.