Radiation Risk Estimates: Underlying Uncertainties

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Abstract

Estimates of health detriment from radiation exposure are often presented as single numbers. However, it is important to recognise that there are uncertainties in estimating radiation risks. Two main sources of uncertainty can be distinguished. First, those arising within an epidemiological study, such as limitations on statistical power and possible biases or confounding, to which errors in exposure assessment may contribute. Secondly, those uncertainties associated with extrapolating epidemiological results obtained in one setting to estimate risks in another setting. Particular examples are: the projection of findings based on a limited period of follow-up to estimate risks that would arise over a lifetime; transferring risks observed in one country to estimate risks in another part of the world; and extrapolating findings from acute high dose exposures to estimate risks from low and/or low dose rate exposures. I will illustrate these points in this presentation through reference to key studies in radiation epidemiology and to analyses that have attempted to quantify the magnitude of some of these uncertainties.