THE ADEQUACY OF CURRENT METHODS OF SKIN DOSE ASSESSMENT

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ABSTRACT

Irradiation of the skin is often a limiting factor in routine and accidental radiation exposures. In most situations the exposure is spatially non-uniform and in the case of subjection to radioactive participation it may be highly non-uniform. In these cases the choice of a depth and area over which to measure or calculate the skin dose is open to some controversy and is currently the topic of consideration by the NCRP and ICRP. A range of animal experiments have previously been described which shed light on these questions and this paper will present detailed dosimetry for some of the radiation sources used. A novel automated extrapolation ionisation chamber will be described which has enabled detailed isodose data to be generated for uniform and non-uniform Tm-170 beta sources which have been used to study the 'hot particle effect'. Comparisons with thermoluminescence dosimetry data and calculations will be given. The radiobiological data show no evidence of any enhanced carcinogenic response for non-uniform exposures and support the use of mean dose as a relevant parameter for evaluating the risk of late stochastic effects. Data on non-stochastic effects indicate that current procedures for estimating skin dose are likely to considerably over-estimate the risk of detrimental effects. The adequacy of currently employed skin dosimeters will be discussed in the light of these biological and dosimetric data.