

Reconstruction of organ dose for Japanese Epidemiological Study on Low-Dose Radiation Effects: J-EPISODE

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Background: J-EPISODE, a cohort study for Japanese nuclear workers, has been conducted since 1991 and analysed health effects in association with radiation exposure evaluated in $H_p(10)$.

Aim: To compile conversion coefficients from dosimeter readings (Sv) to organ dose (Gy).

Methods: The reconstruction method of organ dose principally followed the approach adopted in the IARC 15-Country Collaborative Study [1]. However, the method was modified considering usage practice of dosimeters in Japan and body size of Japanese. Despite the IARC's framework with $H_p(10)$ being the common quantity, it was simplified using air kerma as common quantity.

Results:

- 1) Findings of the preceding studies on Japanese NPPs in 1980's provided evidences that the assumptions of distribution of energy and geometry of photon exposure in IARC study were applicable for Japanese workers.
- 2) Dosimeter response data under a specific energy and a specific geometry were newly experimented in the same way as IARC study for recently used personal dosimeters in Japan; glass badge, electronic personal dosimeter and optically stimulated luminescence dosimeter, while those for film badge and thermoluminescence dosimeter referred IARC study data.
- 3) Conversion coefficients from air kerma to organ dose were developed for Japanese adult male voxel phantom, revealing small differences from Caucosoid model.

Conclusions: Combining the above results, conversion coefficients from dosimeter readings to organ dose by nuclear facility, calendar year and organ/tissue were compiled, which will be used for reconstructing organ dose and applied for risk analysis on cancer morbidity and mortality.

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References: [1] Thierry-Chef, et al., The 15-country collaborative study of cancer risk among radiation workers in the nuclear industry: Study of errors in dosimetry, Radiation Research, 2007

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