CALDose_X – a software tool for the assessment of organ and tissue absorbed doses, effective dose and cancer risks in diagnostic radiology

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CALDose_X is a software tool that enables the calculation of the Incident air kerma (INAK) based on the output curve of an X-ray tube and of the Entrance surface air kerma (ESAK) by multiplying the INAK with a backscatter factor, as well as organ and tissue absorbed doses for the adult posture-specific female FASH and the male MASH phantoms, using conversion coefficients (CCs) normalized to the INAK, the ESAK or the Kerma area product (KAP) for examinations frequently performed in X-ray diagnosis. Additionally, CALDose_X determines the risks of cancer incidence and cancer mortality for the examination selected by the user.

CALDose_X can be used

- to calculate the INAK based on the output curve of the X-ray equipment,
- to assess the ESAK in order to control compliance with diagnostic reference levels,
- to calculate organ and tissue absorbed doses for patients with anatomies similar to the MASH and the FASH base phantoms,
- to assess the effective dose based on ICRP103 and/or the patient's cancer risk,
- to demonstrate how organ and tissue absorbed doses, i.e. the radiation risk for the patient, depend on the proper selection of the exposure parameters. This information can be used in educational programs to train radiologists and technicians to understand how to perform X-ray examinations with the minimum exposure to the patient,
- to compare organ and tissue absorbed doses, effective doses or radiation risks from different radiological procedures, or from different X-ray units, or from different hospital, etc., to identify high and low risk examinations, or cases of good and bad practice and
- to make risk assessments for surveys on radiological exposures, taking into account risk factors for the age and gender distribution of the patient population under consideration.