

Measured neutron fluence around multiple Varian Clinac 2100C/CD accelerators.

The fast neutron leakage fluence per photon dose was measured for the 18 MV x-ray beam around the linac head of 12 Clinac 2100C/CD's using gold foil activation. These measurements were part of the activities of Radiation Dosimetry Services and the Outreach Physics Section in the Department of Radiation Physics. The neutron fluence was measured at 6 different locations in the patient plane around the 12 accelerator heads in a reproducible manner. The accelerators were of similar design, construction and energy as indicated by similar ionization ratios (0.781-0.791). The room surface areas for the accelerators, ranging from 153-274 m², were the only significant differences between the linacs. The neutron fluence increased with decreasing distance from the target. The measured fluence is nearly independent of room surface area, suggesting a constant fluence value for each measurement position. The independent relationship observed between fluence and surface area is also observed in the neutron absorbed dose values. These data indicate that for the 18 MV x-ray beam of a Varian Clinac 2100C/CD, regardless of the size of the treatment room, the fast neutron leakage fluence and absorbed dose at a point in the patient plane are nearly constant.

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