Erratum: “Secondary neutron spectra from modern Varian, Siemens, and Elekta linacs with multileaf collimators” [Med. Phys. 36(9), 4027–4038 (2009)]

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In this work, an incorrect equation was used to relate fluence and source strength to derive the shielding parameter Q . Equation (3), as previously reported in the text, applies to the neutron fluence inside the treatment maze. However, our measurements were conducted inside the treatment room, and therefore, the coefficients on the scattered and thermal contributions to the total fluence should not have been scaled by a factor of $1/2\pi$. Equation (3) should therefore be

$$\Phi_{\text{total}} = \frac{\beta Q_n}{4\pi d_1^2} + \frac{5.4\beta Q_n}{S_r} + \frac{1.3Q_n}{S_r}, \quad (3)$$

which rearranges to solve for Q as follows:

$$Q_n = \frac{\Phi_{\text{total}}}{\frac{\beta}{4\pi d_1^2} + \frac{5.4\beta}{S_r} + \frac{1.3}{S_r}}. \quad (4)$$

Recalculated values of Q are presented in the revised Table III. These values are 73% of their original values (a 27% reduction), and are the values that should be used for shielding calculations.

Similarly, the direct (dir), scattered (sc), and thermal (th) components of the neutron fluence should be solved by the following three equations, again removing the factor of $1/2\pi$ from the scattered and thermal components

$$\Phi_{\text{dir}} = \frac{\beta Q_n}{4\pi d^2}, \quad (5)$$

TABLE III. Neutron source strength (Q) calculated for the linacs and photon beam energies investigated in this study.

Linac model	Energy (MeV)	Q (n/Gy)
Varian 21EX	15	7.42×10^{11}
	18	1.26×10^{12}
	20	1.80×10^{12}
Elekta ONCOR	15	1.44×10^{11}
	18	4.28×10^{11}
Siemens primus	15	3.14×10^{11}
	18	3.71×10^{11}

$$\Phi_{\text{sc}} = \frac{5.4\beta Q_n}{S_r}, \quad (6)$$

$$\Phi_{\text{th}} = \frac{1.3Q_n}{S_r}. \quad (7)$$

However, the previously reported distribution of fast, scattered, and thermal neutrons was correct. The majority (68%) of the neutrons were direct, while 26% were scattered, and only 6% were thermal. The direct neutrons are the dominant component of dose equivalent for all accelerators and energies.

In addition to this, there was a typographical error in Table II. For the Varian 21 EX accelerator at 15 MV, the value of $H^*(10)$ per MU based on the ICRP-74 formalism should be 1.1×10^{-5} Sv/MU, not 1.1×10^{-6} .