Supplementary material for Brodin FP, et al., Optimizing the radiation therapy dose prescription for pediatric medulloblastoma: Minimizing the life years lost attributable to failure to control the disease and late complication risk, Acta Oncologica, 2014;53:462–470.

Supplementary Appendix 1

Dose-response models and parameters

The dose-response models applied for estimating the excess hazard ratio (hr_{excess}) of the late complications considered in this study, with dose given in Gy, were:

Lung cancer

$$hr_{\text{excess}} = \beta_{\text{lung}} \cdot D_{\text{mean}}$$

$$\beta_{\text{lung}} = 0.141 \quad 95\% \text{ CI } (0.054 - 0.75)$$

Reference: Travis et al. Lung cancer following chemotherapy and radiotherapy for Hodgkin's disease. J Natl Cancer Inst 2002.

Breast cancer

$$hr_{\text{excess}} = \beta_{\text{breast}} \cdot D_{\text{mean}}$$

$$\beta_{\text{breast}} = 0.15 \quad 95\% \text{ CI } (0.04 - 0.73)$$

Reference: Travis et al. Breast cancer following radiotherapy and chemotherapy among young women with Hodgkin disease. JAMA 2003.

Thyroid cancer

$$hr_{\text{excess}} = \beta_{1,\text{thyroid}} \cdot D \cdot \exp(-\beta_{4,\text{thyroid}} \cdot D^2)$$

$$\beta_{1,\text{thyroid}} = 2.81 - 0.15 \cdot e \quad 95\% \text{ CI } ((1.36 - 0.074 \cdot e) - (5.79 - 0.28 \cdot e)),$$

where e is the age at exposure

$$\beta_{4,\text{thyroid}} = 0.00164$$

Reference: Bhatti et al. Risk of second primary thyroid cancer after radiotherapy for a childhood cancer in a large cohort study: An update from the childhood cancer survivor study. Radiat Res 2010.

Stomach cancer

$$hr_{\text{excess}} = \beta_{\text{stomach}} \cdot D_{\text{mean}}$$

$$\beta_{\text{stomach}} = 0.84 \quad 95\% \text{ CI } (0.12 - 15.6)$$

Reference: van den Belt-Dusebout et al. Roles of radiation dose and chemotherapy in the etiology of stomach cancer as a second malignancy. Int J Radiat Oncol Biol Phys 2009.

Heart failure

$$hr_{\text{excess}} = \beta_{\text{heart failure}} \cdot D_{\text{mean}}$$

$$\beta_{\text{heart failure}} = 0.061 \quad 95\% \text{ CI } (0.021 - 0.10)$$

Reference: Mulrooney et al. Cardiac outcomes in a cohort of adult survivors of childhood and adolescent cancer: Retrospective analysis of the Childhood Cancer Survivor Study cohort. Br Med J 2009.

Myocardial infarction

$$hr_{\text{excess}} = \beta_{\text{myocardial infarction}} \cdot D_{\text{mean}}$$

$$\beta_{\text{myocardial infarction}} = 0.045 \quad 95\% \text{ CI } (0.0 - 0.13)$$

Reference: Same as for heart failure.