Erratum of the PhD thesis:

"Dosimetry of preclinical and clinical case studies of ^{18}F-radiopharmaceuticals using Positron Emission Tomography and Computed Tomography: Methods of quantification, their improvement and considerations of critical exposures"

- **Chapter 1.2 – Units of radiation and biological effects, change, page 2:**

  "In diagnostic nuclear medicine and radiology it is under all circumstances the aim to keep the absorbed dose as low as possible to minimize the risk for any radiation related biological effects in living tissue."

- **Chapter 1.2 – Units of radiation and biological effects, addition, page 2:**

  "Because of inter-individual differences the threshold may vary (the same holds true for stochastic effects)."

- **Chapter 1.2 – Units of radiation and biological effects, addition, page 3:**

  "It is a measure of the resulting stochastic risk to a reference hermaphroditic phantom (no individual subject) by a non-uniform radiation."

- **Chapter 1.2 – Units of radiation and biological effects, addition, page 4:**

  "The weighting factors w_T were first published in ICRP publication 26 [21] (but ICRP 26 weighting factors were only used for the calculation of the outdated effective dose equivalent) and were updated twice in ICRP 60 [22] and the most recent publication 103 [20]."

- **Chapter 1.2 – Units of radiation and biological effects, addition, page 4:**

  "It is worth mentioning, that the weighting factors are only an approximation using a fixed number for each type of radiation. The resulting relative biological effectiveness of the radiation depends on a complex number of physiological properties of the tissue and physical properties of the radiation, especially for radiation that has a high linear energy transfer."

- **Chapter 1.3 – Typical clinical and preclinical exposures, addition, page 5:**

  "In a more recent literature review from 2012 by Dougeni et al. [34] the authors provided average effective doses for various CT examinations in adults and paediatric patients. They

reported an average effective dose in adults for a head CT of 2 mSv, 7.4 mSv for a chest CT and 13.5 mSv for coronary angiography. However, they also stated that the variation in the resulting dose is high for the same examination (up to 32-fold) largely depending on the scan protocol and could be reduced by protocol optimization and dose reduction techniques."

- **Chapter 1.3 – Typical clinical and preclinical exposures, addition, page 6:**

"Since the radiation dosimetry of a microCT is machine dependent, there are more publications reporting the resulting dose than for microPET, where the dose is only depending on the involved radiopharmaceutical. Kersemans et al. reported an average dose to a mouse phantom of 64 mGy to 530 mGy depending on protocol settings [16]. Carlson et al. reported an average dose of 111 mGy [39], Boone et al. an average dose of 133 mGy [40] and Winkelmann et al. a resulting dose of 80 mGy [41]. However, the protocol settings across studies differ and the listed values are intended to provide the reader with an overview."

- **Chapter 2.9 – Dosimetry in CT imaging, addition, page 34:**

"When the CTDI100 is measured in the centre of a phantom and just beneath the surface (periphery), the following formula yields the weighted CTDI representing the average dose per single slice with nominal slice thickness

$$CTDI_w = \frac{1}{3} CTDI_{100,center} + \frac{2}{3} CTDI_{100,periphery}$$

For newer CT systems such as spiral or helical CTs, where the patient table is not stationary during the scan, the CTDIvol was defined

$$CTDI_{vol} = \frac{NT}{I} CTDI_w$$

with NT being the nominal beam width and I being the table travel distance per tube rotation."

- **Chapter 3.4.1 – Radiation dosimetry for [18F]UCB-H: First-in-human study, addition, page 6:**

"Urinary excretion was modeled based on the bladder uptake derived from PET-based VOIs. The estimated excretion fraction and the biological half-life was then entered in the dynamic bladder module with voiding intervals of 2h and 4h and time-integrated activity coefficients were derived. The activity excreted was taken into account when calculating the time-integrated activity coefficient of the remainder and the human radiation dosimetry (referred to as clinical case) was calculated using OLINDA/EXM [74]. For reasons of comparison an additional dataset was created with the same urinary excretion scenarios (remainder includes excreted fraction, conservative radiation protection scenario; referred to as clinical conservative in figures) as in the preclinical study (Appendix A / [84]) with voiding every 2h or 4h and fractions of injected activity leaving via urinary pathways of 0.3 to 0.5. Human-derived results based on this additional conservative dataset and mouse-derived results were compared."

- **Chapter 4.2.1 – Absorbed dose vs. effective dose, addition, page 66:**

  "An alternative to the effective dose referred to as the effective risk R was proposed by Brenner [126]

$$R = \sum_T r_T H_T$$

  with the risk factor r_T reflecting only cancer risks and neglecting any hereditary risks. The author argues, that there is no logical way to combine cancer and hereditary risks into a single number. The risk factors r_T are organ-specific, radiation-attributable lifetime cancer risks per unit equivalent dose. Different factors exist for paediatric, adult patients and all-ages patients. Additionally, some factors for organs such as breast, uterus, ovary and prostate are not gender-averaged. The author claims that the unit is therefore scientifically more defensible than the effective dose as it is easier to interpret and takes age and gender effects into account. However, the use of the unit has not been preferentially adopted over the use of the effective dose and it has been critically discussed in the dosimetry community [127]."

- **Appendix 4 was replaced by the latest version of the manuscript, which was under review at the journal of "Molecular Imaging and Biology" at the time of printing.**

  The methodology and results in chapter 3.4 were updated accordingly. However, no major changes were made.

- **Appendix 4 was replaced by the latest version of the manuscript, which was under review at the journal of "Medical Physics" at the time of printing.**

  Consequently Figure 3.15 was updated (additional results). No major changes were made.