Are young children and women being adequately protected from radiation?

Katherine Hobbs (katherinehobbs45@gmail.com). With many thanks to my supervisors Professors Munira Kadhim and John Harrison.

Context

Purpose

Ionising radiation can induce cancer development via **damage** to DNA. This work is examining the data which suggests that young children and women are at greater **risk**, and evaluating whether current exposure legislation is sufficient.

Young children

A greater amount of time ahead for cancer to develop (Kutanzi *et al.,* 2016)

Increased tissue radiosensitivity (ICRP, 2011)

Risk of medical dose not being calculated for smaller size (Dougeni *et al.,* 2012)

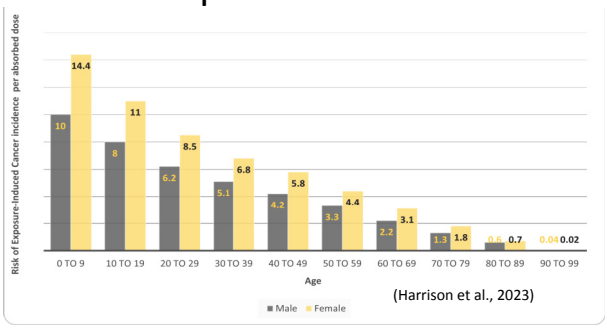
Women

Have an increased risk of thyroid cancer which is exacerbated by irradiation (Davies and Welch, 2014)

Have a higher proportion of breast tissue and reproductive tissues which are radiosensitive (Brenner *et al.*, 2018)

Findings

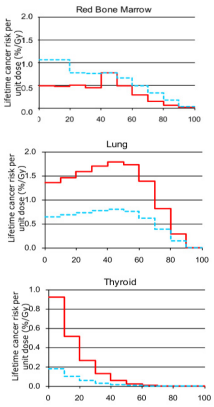
Risk of Exposure-Induced Cancer



(Harrison et al., 2023)

Correlation between radiation exposure and cancer development, by age and sex.

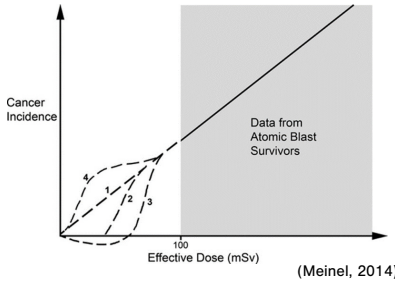
Tissue variability



Organs differ in their sensitivity to radiation -induced cancer and pattern of age dependency. Blue dashed line - males, red line - females. X-axis denotes age at exposure (years). Adapted from Wall et al., (2005).

Model

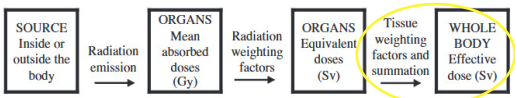
Linear No-Threshold Model



(Meinel, 2014)

These are different models of the dose and risk relationship. Line 1 represents the linear no threshold model which is used in the UK.

Conclusions



Calculation of effective dose

1. Further **study** into why these populations are additionally vulnerable is required
2. Medical dose should be calculated for each **individual**

Methods and references