DR SIG wide-beam CT dosimetry working party

Aim

- To recommend a method of measuring CT dose on wide-beam scanners that is practical and accurate.

Methodology – AAPM 111

- (Dixon and Boone)
  - Short ionisation chamber
  - E_{tot} instead of DLP
  - D_{eq} instead of $CTDI_{vol}$
  - 1/3 + 2/3 becomes 1/2 + 1/2
  - May require longer phantoms

Methodology – IEC / IAEA

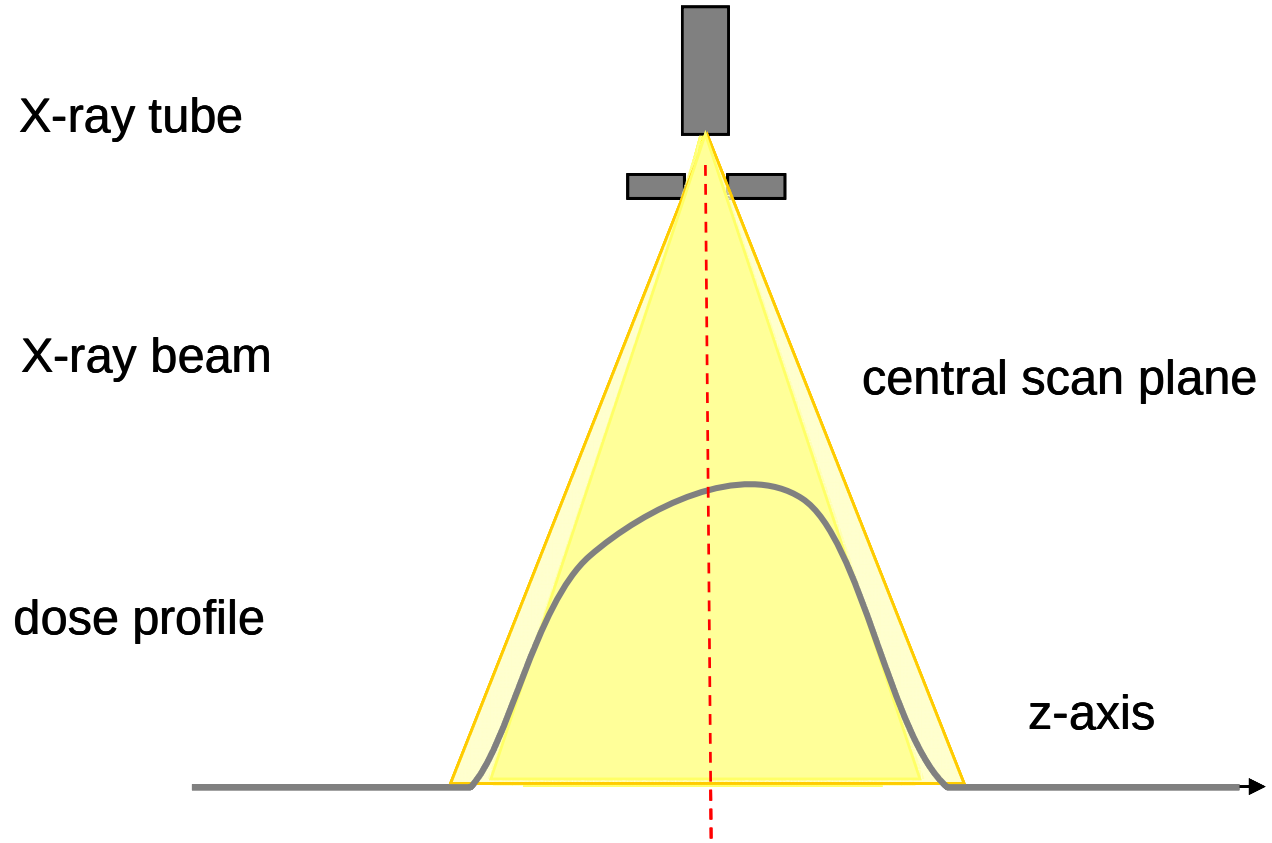
- Can use existing 100 mm chamber
- Can use existing Perspex phantoms
- Likely to be adopted by manufacturers as will become an international standard

- For beam widths 40 mm or less:
  - Measure in air as before
  - Measure in phantom as before

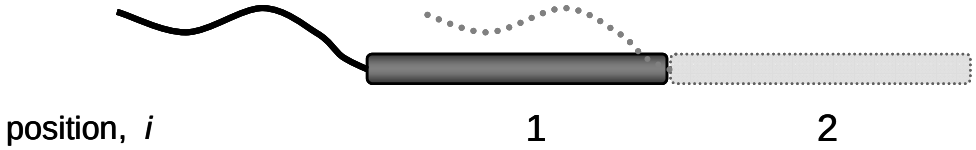
Methodology – IEC / IAEA

- For beam widths greater than 40 mm:

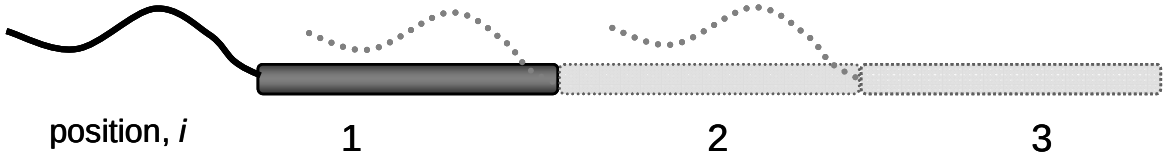
$$CTDI_{100,(N\times T)>40} = CTDI_{100,ref} \times \left(\frac{CTDI_{free-in-air,N\times T}}{CTDI_{free-in-air,ref}} \right)$$



a. 100 mm ion chamber: two contiguous positions, integration length 200 mm



b. 100 mm ion chamber: two contiguous positions, integration length 300 mm



IEC test measurements

- Toshiba Aquilion One (160 mm beam)
  - 25.3 mGy using IEC method with two positions
  - 25.9 mGy using IEC method with three positions
- Siemens Definition AS (28.8 mm beam)
  - 22.4 mGy/100 mAs using usual method
  - 22.1 mGy/100 mAs using IEC method