**A comparison between direct TMR measurements and TMRs calculated from PDDs using BJR Supplement 25 data for flattened and unflattened photon beams**

B. Sutherland, N. Middlebrook, T. Kairn, B. Hill, Genesis CancerCare Queensland, Southport, QLD 4215, Australia, Queensland University of Technology, Brisbane, Australia, Australas Phys Eng Sci Med, (2013)

- Study used the 3D SCANNER TPR device to determine whether TPR factors could be accurately calculated for FFF beams and conventional flattened beams.
  
  "TPR and PDD scans were acquired using a 3D SCANNER™ water tank....This water tank allows for direct and fast TPR measurement."

- A sub-study was performed to determine the accuracy and repeatability of the scans. Results showed a maximum difference of <0.6% in repeated scans below Dmax.

- This paper (and others) have concluded that TPR factors should be measured for FFF beams for Field Sizes larger than 20 cm x 20 cm, with depths beyond 15cm.

- Conclusion - "The conversion using the BJR Supplement 25 data was not found to be accurate for 6 FFF for fields larger than 20 cm x 20 cm at depths greater than 15 cm.... The PDD to TMR conversion for FFF beams should be done with phantom scatter ratios appropriate to FFF beams, or the TMR should be directly measured...."

**SU-E-T-676: Reproducibility and Consistency of Two Sun Nuclear 3D Scanning Tanks**


- In conclusion the Sun Nuclear 3D SCANNER tank shows good reproducibility in measured data. Since the tank to tank variation in measured data is within the uncertainty of repeated single tank measurements the tanks also perform consistently.

  - Intra-Tank Comparisons
    - "reproducibility of depth of maximum dose (Dmax) of 0.38 mm for a 10 cm x 10 cm field and 0.67 mm for 30 cm x 30 cm on a single tank."
    - "PDD values at 5 cm 10 cm and 20 cm depths were reproducible within 0.26%"

  - Inter-Tank Comparisons
    - "Consistency of Dmax between tanks was 0.17 mm for a 10 cm x 10 cm field and 0.44 mm for 30 cm x 30 cm. PDD values at 5 cm 10 cm and 20 cm were consistent within 0.06%"
    - "Profiles showed reproducibility in field width within 0.4 mm for a 10 cm x 10 cm field and 0.7 mm for a 30 cm x 30 cm field."
    - "Profiles showed consistency in field width within 0.2 mm for 10 cm x 10 cm and 30 cm x 30 cm field sizes."

**Intra- and intervariability in beam data commissioning among water phantom scanning systems**

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- It is concluded the four major water phantom scanning systems provide adequate accuracy for beam data collection within 1% of dose difference or 1mm of DTA to each other. It should be noted that this error includes uncertainties due to the phantom setup and the difference of the protocol, such as step size, measurement time, and scanning methods."