

**Improvements of dose delivery accuracy and precision of breast cancer treatment protocols  
in Tanzania as studied at ocean road cancer institute**

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Accurate dose delivery to breast cancer patients is a global challenge because it is influenced by several patient and machine related parameters. In view of these concerns it was found necessary to assess the extent by which these parameters influence dose delivery accuracy in breast cancer patients that could be used to develop a protocol to improve dose delivery accuracy which is the difference between prescribed and delivered doses. Out of 50 patients used to study dose delivery accuracy in the first fraction 18 patients had deviations outside recommended value  $\pm 5\%$ . Repeated dose determination accuracy for the same patients in subsequent fractions reduced the number of patients with deviations outside this value to 12. These deviations could be have been caused by patient and machine related parameters such as patient movement and mismatch of machine related parameters during treatment to simulation values. The effects of patient movement based on phantom studies showed that movements exceeding 0.5 cm produced dose deviations outside recommended value of  $\pm 5\%$ . The effects of the mismatch of collimator and gantry angles by  $5^\circ$  each introduced deviation of delivered doses ranges from 4.84% to 0.93% for field sizes of 12 cm x 15 cm to 7 cm x 7 cm. The deviations of dose obtained by using different breast board angle of  $5^\circ$ ,  $10^\circ$  and  $15^\circ$  without bolus placed on the phantom were 4.8%, 10.9% and 15.5%. These deviations were reduced to 2.1%, 4.1% and 9.5% when bolus was placed on the phantom. The study showed that, the effect of patient movement on dose delivery accuracy is more influenced by patient movement than this machine related factors and best results were obtained at breast angle of  $5^\circ$ .