Purpose: With FDA approval of Digital Breast Tomosynthesis (DBT), a question on its room shielding is raised. According to NCRP147, standard gypsum wallboard construction is adequate to shield the walls of a conventional mammographic unit. This recommendation may not be valid for DBT which acquires data from multiple angles therefore potentially leads to larger scattered radiation. The DBT room shielding may be reconsidered. This study is to investigate if additional room shielding is necessary for DBT.

Methods: Room shielding was first calculated following NCRP147 by adjusting recommended air kerma with the ratio of acquisition numbers. We assumed that comparable techniques were used for data acquisition of DBT and conventional mammography. Scattered radiations at locations inside and outside of the door were then measured with Ludlum 9DP survey meter for comparison with shielding design goal, e.g. 0.02 mGy/week. CIRS breast biopsy training phantom was used for the measurements. Two phantoms were overlapped (approximately 6 cm) to simulate a relatively large breast thickness. 150 patients/week was assumed for calculations.

Results: Based on both calculation and measurements, the current room without any special shielding is adequate for conventional mammography with 4 images/patient. DBT with 30 to 34 (per patient, tomosynthesis vs. combo) radiographic acquisitions requires approximately 20 mm of gypsum wallboard. Standard gypsum wallboard construction may still meet this requirement. However, DBT requires the thickness of solid wood door of approximately 170 mm according to the calculation and approximately 60mm based on the measurements, respectively, with a full occupancy factor. Most current solid wood door cannot meet this requirement. The measurement outside the door also shows high scattered radiation, approximately 0.09mGy/week, which is only acceptable for less occupied areas.

Conclusions: With the increasing data acquisitions of DBT, the room shielding needs reconsideration, although both calculation and measurements are very conservative.