

# Accuracy of Digital Breast Tomosynthesis for Depicting Breast Cancer Subgroups in a UK Retrospective Reading Study (TOMMY Trial)

Gilbert FJ, Tucker L, Gillan MG, Willsher P, Cooke J, Duncan KA, Michell MJ, Dobson HM, Lim YY, Suaris T, Astley SM, Morrish O, Young KC, Duffy SW.

Radiology. 2015 Dec;277(3):697-706. doi: 10.1148/radiol.2015142566.

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## Objective

In the TOMMY trial, Gilbert et al. compared the diagnostic performance of digital mammography (DM), digital mammography plus breast tomosynthesis (DM plus BT), and synthesized DM plus BT (sDM plus BT) for depicting malignant features in different subgroups of women invited for screening.

## Materials and Methods

A total of 8869 participants, with a mean age of 56 years, were recruited in this multicenter, multireader, retrospective reading study in the UK. A final dataset for analysis of 7060 cases (6020 exams in women recalled for diagnostic assessment after an abnormal DM screening exam and 1040 screening exams in asymptomatic women with a family history of breast cancer) was randomly allocated for independent blinded review of (a) DM images, (b) DM plus BT images, and (c) sDM plus BT images. Sensitivity and specificity was calculated for the overall population, as well as by age, breast density, and lesion type. All BT exams were performed with the Hologic, Selenia Dimensions system and synthesized DM images were created using the C-View™ software.

## Findings

Overall, sensitivity was 87% (95% CI: 85, 89) for DM, 89% (95% CI: 87, 91) for DM plus BT, and 88% (95% CI: 86, 90) for sDM plus BT. The addition of BT was associated with a 34% increase in the odds of depicting cancer and the difference in sensitivity between DM and DM plus BT was of borderline significance ( $P = 0.06$ ). There was no significant difference in sensitivity between DM and synthetic DM plus BT ( $P = 0.6$ ).

For patients aged 50–59 years, sensitivity was significantly higher ( $P = 0.01$ ) for DM plus BT (91% [95% CI: 88, 94]) than it was for DM alone (87% [95% CI: 84, 90]), and for those with breast density of 50% or more, sensitivity was 86% (95% CI: 82, 90) for DM and 93% (95% CI: 90, 96) for DM plus BT ( $P = 0.03$ ).

Specificity was 57% for DM, 70% for DM plus BT, and 72% for synthetic DM plus BT. Specificity was significantly higher than DM ( $P < .001$  in both cases) and was observed for all subgroups ( $P < .001$  for all cases).

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Characteristic	DM		DM + BT		sDM plus BT	
	Sensitivity	Specificity	Sensitivity	Specificity	Sensitivity	Specificity
All Subjects	87%	58%	89%	69%	88%	71%
50-59 years	87%	54%	91%	67%	88%	69%
Breast Density $\geq$ 50%	86%	57%	93%	70%	87%	72%

## Conclusion

Overall, sensitivity was 87% (95% CI: 85, 89) for DM, 89% (95% CI: 87, 91) for DM plus BT, and 88% (95% CI: 86, 90) for sDM plus BT. The addition of BT was associated with a 34% increase in the odds of depicting cancer and the difference in sensitivity between DM and DM plus BT was of borderline significance ( $P = 0.06$ ). There was no significant difference in sensitivity between DM and synthetic DM plus BT ( $P = 0.6$ ).

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