

Identifying normal mammograms in a large screening population using artificial intelligence



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Objectives

To evaluate the potential of artificial intelligence (AI) to identify normal mammograms in a screening population.

Materials and Methods

In this retrospective study, 9581 double-read mammography screening exams including 68 screen-detected cancers and 187 false positives, a subcohort of the prospective population-based Malmö Breast Tomosynthesis Screening Trial, were analysed with a deep learning-based AI system. The AI system categorises mammograms with a cancer risk score increasing from 1 to 10. The effect on cancer detection and false positives of excluding mammograms below different AI risk thresholds from reading by radiologists was investigated. A panel of three breast radiologists assessed the radiographic appearance, type,

and visibility of screen-detected cancers assigned low-risk scores (≤ 5). The reduction of normal exams, cancers, and false positives for the different thresholds was presented with 95% confidence intervals (CI).

Results

If mammograms scored 1 and 2 were excluded from screen-reading, 1829 (19.1%; 95% CI 18.3–19.9) exams could be removed, including 10 (5.3%; 95% CI 2.1–8.6) false positives but no cancers. In total, 5082 (53.0%; 95% CI 52.0–54.0) exams, including 7 (10.3%; 95% CI 3.1–17.5) cancers and 52 (27.8%; 95% CI 21.4–34.2) false positives, had low-risk scores. All, except one, of the seven screen-detected cancers with low-risk scores were judged to be clearly visible.



Conclusion

The evaluated AI system can correctly identify a proportion of a screening population as cancer-free and also reduce false positives. Thus, AI has the potential to improve mammography screening efficiency.

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