RSNA Press Release

AI Has Potential to Flag Mammograms for Supplemental MRI

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OAK BROOK, Ill. — Artificial intelligence (AI) effectively identified women at higher breast cancer risk in a select Dutch population, according to a study published today in *Radiology*, a journal of the Radiological Society of North America (RSNA). Applying the AI tool to mammograms has the potential to improve breast cancer detection by identifying the patients that may benefit the most from breast MRI scans, this study indicates.

To achieve optimal detection accuracy, international recommendations suggest combined mammography and MRI screening for women with a lifetime risk of 20% or higher based on family history. However, in the Netherlands, women with a breast cancer risk between 20% and 50% do not typically have access to supplemental MRI screening due to limited MRI capacity, high implementation costs, and inconsistent application of eligibility criteria in clinical practice.

"Evidence demonstrating the benefits of MRI screening in this subgroup of women is accumulating," said the study's lead author, Suzanne van Winkel, R.N., M.Sc., a Ph.D. candidate at Radboud University Medical Center (Radboudumc) in Nijmegen, Netherlands. "MRI detects cancers that remain undetected by mammography and are smaller and more often lymph node negative."

Many recent studies have demonstrated the potential of AI for improving cancer detection on mammography screening, including cancers not visible on the mammogram according to radiologist interpretation. AI could, therefore, be used to triage mammograms and select women that could potentially benefit from supplemental MRI after a negative mammogram according to radiologist interpretation.

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Suzanne van Winkel, R.N., M.Sc., a Ph.D.

For the purposes of this retrospective study, women with a personal history of breast cancer, dense breasts or a history of high-risk lesions at biopsy, and women with an increased risk based upon family history but no genetic mutations were referred to as "intermediate risk."

The researchers used a commercially available AI system to analyze the 2D screening mammograms of women they classified as intermediate risk to identify patients with the greatest likelihood of mammographically occult (not visible on mammography) cancer for supplemental MRI.

The researchers extracted a cohort of 1,833 consecutive women who had at least one screening MRI combined or alternated with a screening mammogram between 2003 and 2020 from the patient breast MRI database at Radboudumc. Women with a lifetime breast cancer risk greater than 50% were excluded.

A total of 3,358 mammography exams in 875 women were performed. Of those, 2,819 (84%) exams in 760 women (mean age 48.9 years) were processed by the AI system and assigned a case-based suspicion score (0-10) that ranked the likelihood of a malignancy.

The combined exams detected 37 (1.3%) breast cancers. In 19 (51%) of these cases, the cancer was not visible on mammography.

Using a threshold score of 5 (allowing supplemental MRI-screening in 50% of the women involved), AI selected 31 (84%) of the breast cancer-positive exams for supplemental MRI, including 68% of exams with occult breast cancer based on the radiologists' reading.

"AI could potentially triage mammograms performed in the subgroup and select women that could potentially benefit from supplemental MRI after a negative mammogram," said van Winkel. "Using AI to triage the mammograms of populations who are not yet eligible for MRI may improve screening results while simultaneously reducing unnecessary costs."

Stamatia Destounis, M.D., a breast radiologist at Elizabeth Wende Breast Care, in Rochester, N.Y., added some important perspective on the findings.

"This is an interesting retrospective study that reveals by using AI a certain percentage of cancers not identifiable on mammography can be found on breast MRI," commented Dr. Destounis, who is not affiliated with the study. "However, the AI doesn't predict every patient with cancer and some cancers— whether seen on the mammogram or not—are not detected by their AI model. In the U.S., the subgroup of patients considered intermediate risk by the study authors would likely fall in the high-risk category and would be recommended to undergo a high-risk MRI, allowing the radiologist to identify all cancers, even those occult on mammography."

"Using AI to Select Women at Intermediate Breast Cancer Risk for Breast Screening with MRI." Collaborating with van Winkel were Riccardo Samperna, M.Sc., Elizabeth A. Loehrer, Ph.D., Jaap Kroes, Ph.D., Alejandro Rodriguez-Ruiz, Ph.D., and Ritse M. Mann, M.D., Ph.D.

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For patient-friendly information on breast MRI, visit *RadiologyInfo.org*.

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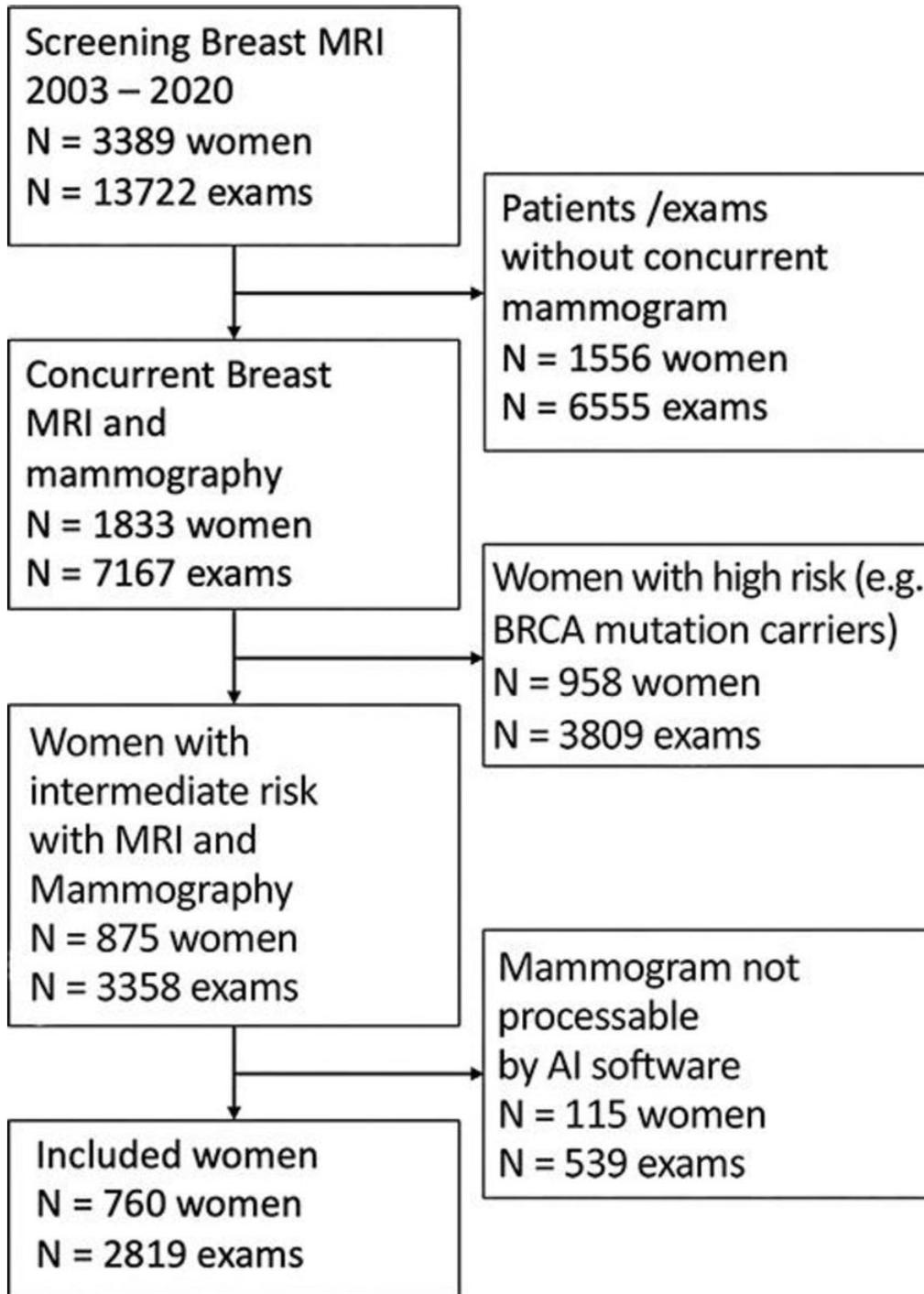Copyright ©2026 Radiological Society of North America (RSNA)

Images (JPG, TIF):

Figure 1. Flow diagram showing case selection for the intermediate-risk screening study cohort. AI = artificial intelligence.
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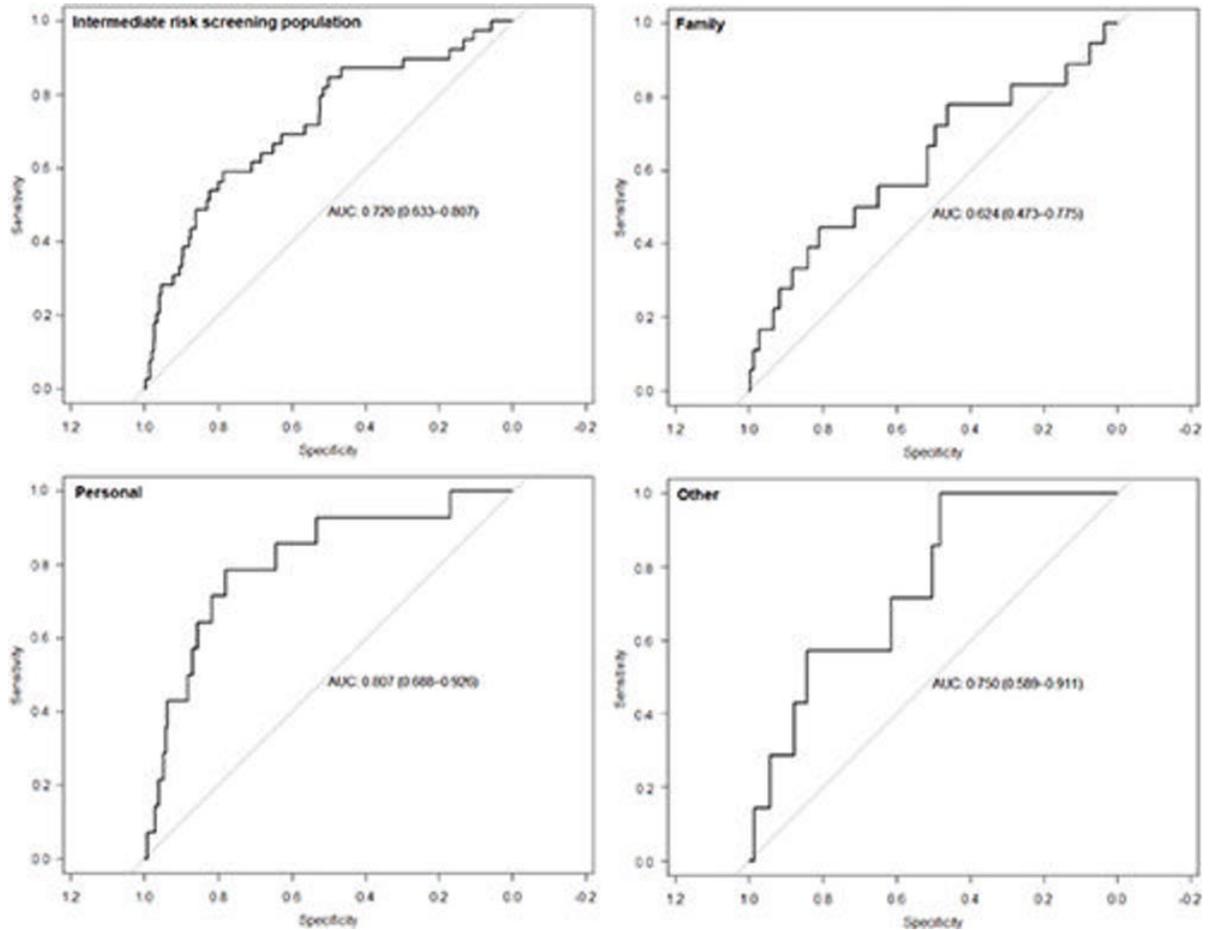Copyright ©2026 Radiological Society of North America (RSNA)

Figure 2. Receiver operating characteristic curves and area under the receiver operating characteristic curve (AUC) for the entire intermediate-risk cohort and for subgroups based on screening indication: family history of breast cancer (Family), personal history or breast cancer (Personal), or other non–high-risk screening indication (lifetime risk ≤ 50%) that prompted a referring physician to consider a woman eligible for MRI screening (Other).
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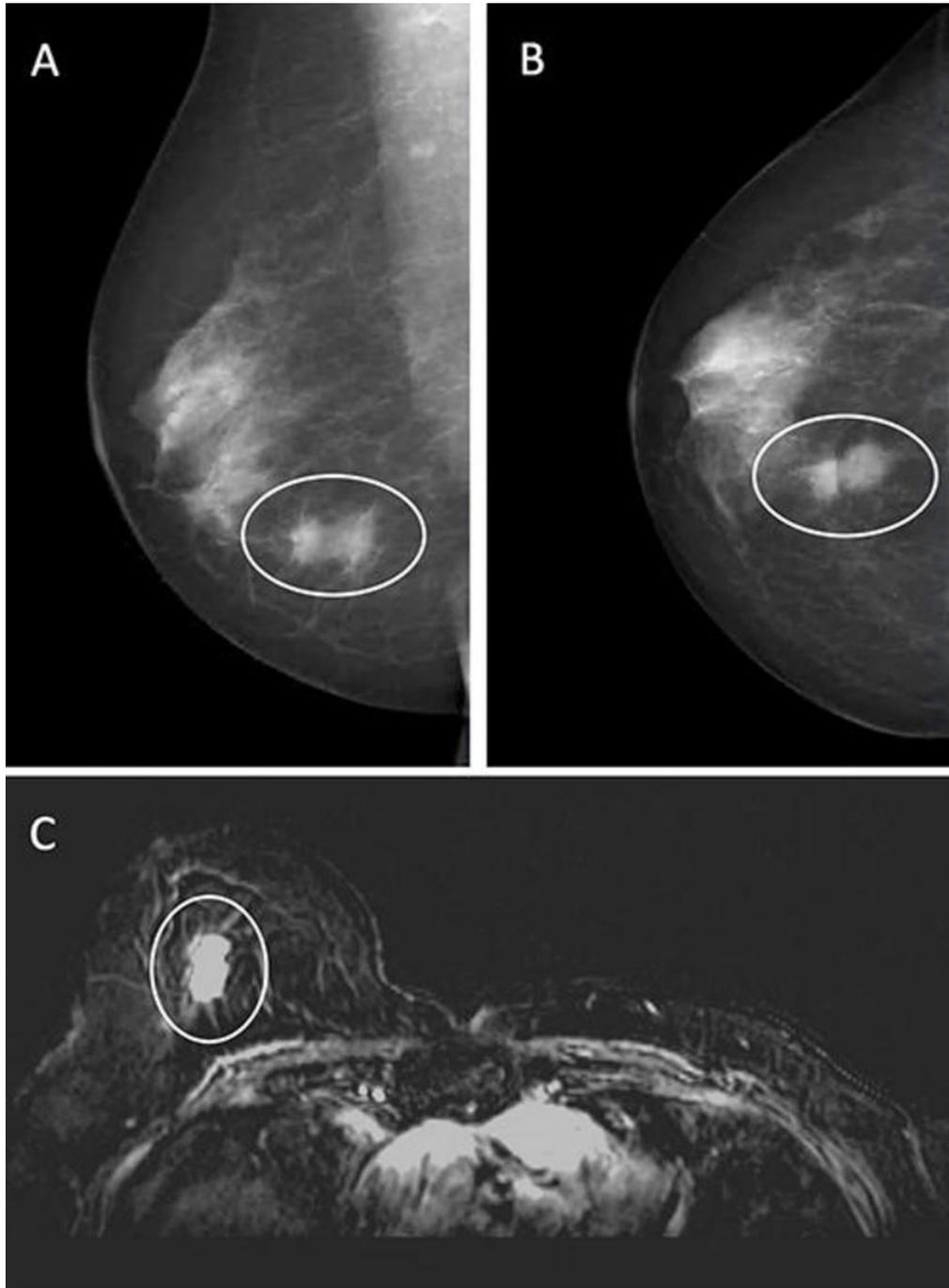Copyright ©2026 Radiological Society of North America (RSNA)

Figure 3. Images in a 67-year-old woman with a prior history of breast cancer who underwent combined mammography and MRI screening. **(A)** Mediolateral oblique and **(B)** craniocaudal mammograms and **(C)** axial subtraction MRI scan show a screen-detected second primary breast cancer (circle) in the right (contralateral) breast. In this case, the MRI was not necessary for cancer detection as the reporting radiologist recalled the woman based on the mammogram. The artificial intelligence system provided a case-based cancer suspicion score of 10 on a scale of 0–10.
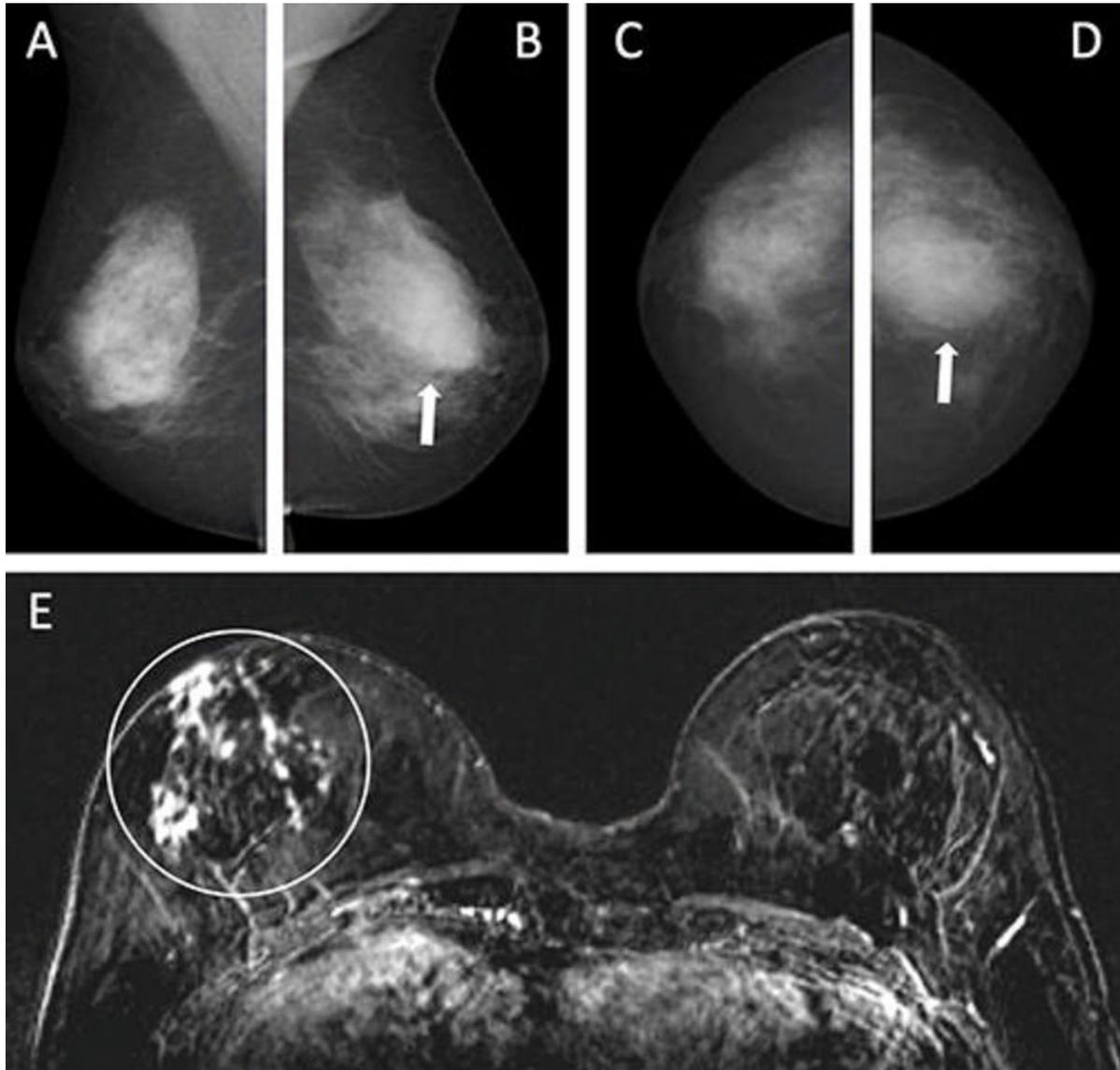
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Figure 4. Images in a 55-year-old woman with a family history of breast cancer who underwent combined mammography and MRI screening. **(A)** Right and **(B)** left mediolateral oblique and (C) right and (D) left craniocaudal mammograms show a large known cyst in the left breast (arrow in **B** and **D**) but was otherwise assessed as being unremarkable. Breast tissue was judged to be extremely dense. **(E)** Concurrent axial subtraction MRI scan shows a large, diffuse, invasive lobular cancer (circle) in the right breast. The artificial intelligence system provided a case-based cancer suspicion score of 8 on a scale of 0–10, which would have led to selection for MRI screening using both the score 5 and score 8 thresholds, but not the score 9 threshold.
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Resources:

Study abstract

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