
RSNA Press Release

Computers Significantly Increase Breast Cancer Detection Rate

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NEW YORK - A computer-aided detection (CAD) system can significantly increase the rate of breast cancer detection, according to a study published in the August issue of the journal *Radiology*.

Using CAD software retrospectively, breast-imaging specialists had the potential to identify 71 percent of missed cancers. CAD marked the tumors as suspicious on mammograms taken at least one year before the cancers were diagnosed.

"Our study indicates that by using a CAD system there is a potential to increase the pick-up rates of breast cancer earlier," said Stamatia Destounis, M.D., lead author of the study from The Elizabeth Wende Breast Clinic in Rochester, N.Y.

CAD is a computer algorithm that has been designed to find abnormalities in the breast. Often the abnormalities marked by CAD turn out to be benign. However, CAD consistently identifies calcifications that appear only as tiny white specks on mammography film but may be early cancers. "CAD makes the doctor take another look at what it's marking, whether it is bunched up normal tissue, a normal anatomic structure or microcalcifications," Dr. Destounis said, presenting her findings today at a Radiological Society of North America (RSNA) media briefing on women's breast health.

For the study, Dr. Destounis and colleagues reviewed the cases of 519 patients with proven breast cancer. Prior screening mammograms were available for 318 patients and yielded a total of 98 "false-negatives," or missed cancers. Three out of five reviewers identified 52 actionable cancers that, in retrospect, appeared as visible abnormalities on prior screening mammograms, but had been missed by two breast imaging specialists doing a non-blinded, double-read. The researchers, retrospectively, then used CAD to scan and analyze the "false-negative" mammograms. CAD correctly marked 37 (or 71 percent) of the 52 visible cancers missed during the double-read.

At A Glance

- CAD can help radiologists detect breast cancer earlier.
- CAD can pinpoint micro-calcifications that may be early cancer.
- In the study, CAD correctly identified 71% of cancers missed by two readers.
- A new study of 18,586 screening mammograms confirmed that by using CAD radiologists are able to identify more cancers earlier.

Overall, the false-negative rate before CAD analysis was 31 percent (98/318). The overall rate after CAD analysis was 19 percent (61/318).

While the computer is no replacement for a trained radiologist, CAD can assist in pinpointing irregularities for the physician to re-evaluate. "We all sometimes miss the forest for the trees," Dr. Destounis said. "Perception is a very difficult thing to maintain throughout a busy day, while looking at multiple films and trying to diagnose minimal abnormalities. CAD can help with these perception issues."

The Elizabeth Wende team recently finalized data from a prospective study of 18,586 screening mammograms, comparing the accuracy of one radiologist using CAD with two radiologists doing a blinded, double-read. This study found that CAD reduced the overall false-negative rate by 5 percent with the potential for an additional reduction of 16 percent had all the marked cancers been acted upon initially.

"Finding cancer earlier, we believe, is the best chance for longer cancer-free survival, resulting in less surgery, less chemotherapy and less stress on the patient and her family," Dr. Destounis said.

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Radiology is a monthly scientific journal devoted to clinical radiology and allied sciences. The journal is edited by Anthony V. Proto, M.D., School of Medicine, Virginia Commonwealth University, Richmond, Va. *Radiology* is owned and published by the Radiological Society of North America Inc. (<http://radiology.rsna.org>)

RSNA is an association of more than 35,000 radiologists, radiation oncologists and related scientists committed to promoting excellence in radiology through education and by fostering research, with the ultimate goal of improving patient care. The Society is based in Oak Brook, Ill. (<http://www.rsna.org>)

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Figure 1. Computer-aided detection (CAD) in mammography acts like a "spellchecker" and marks particular regions of interest that may be associated with breast cancer for the radiologist's review. Microcalcifications are marked by a triangle and masses are marked by an asterisk.

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Figure 2.

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Figure 3.

Figure 4. (PDF)

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Can Computer-aided Detection with Double Reading of Screening Mammograms Help Decrease the False-Negative Rate? Initial Experience. Collaborating with Dr. Destounis on this paper were Patricia DiNitto, M.D., Wende Logan-Young, M.D., Ermelinda Bonaccio, M.D., Margarita L. Zuley, M.D., and Kathleen M. Willison, R.T. Dr. Destounis is currently principal investigator for a number of CAD projects.