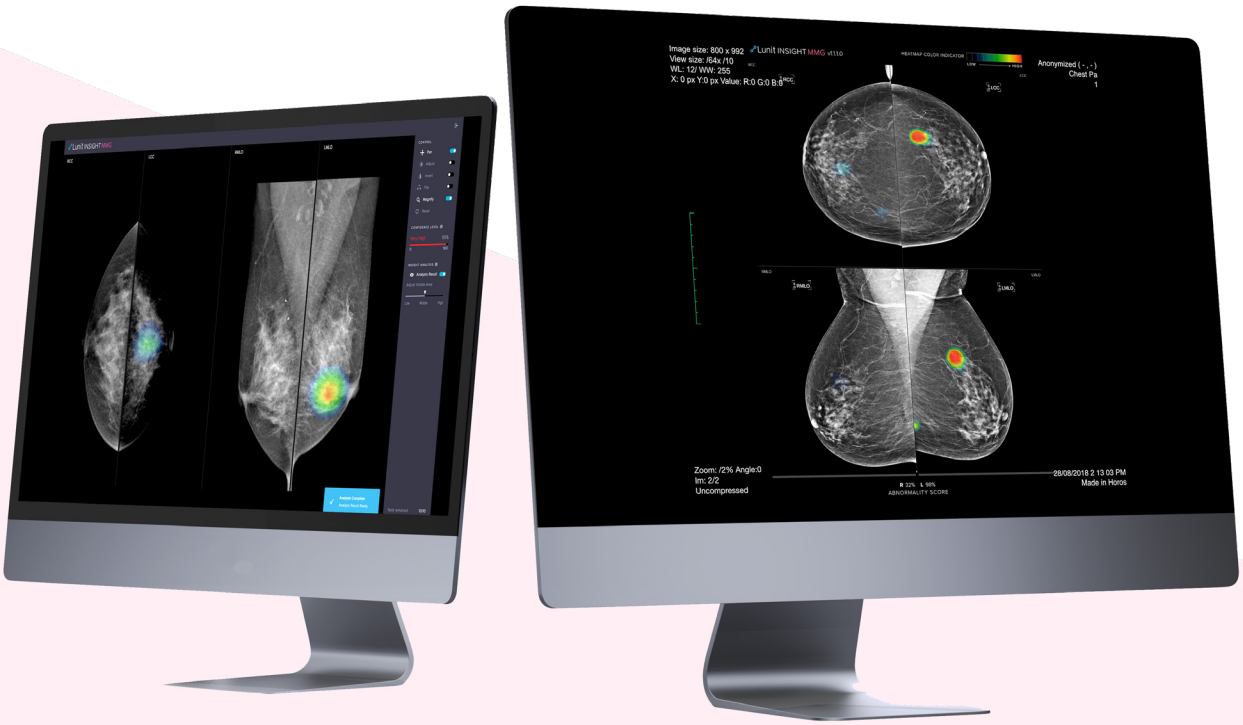
AI SOLUTION FOR MAMMOGRAPHY

AI Vision, Earlier Action

Lunit INSIGHT MMG

AI Vision, Earlier Action

AI-Aided Breast Cancer Detection



Lunit INSIGHT MMG

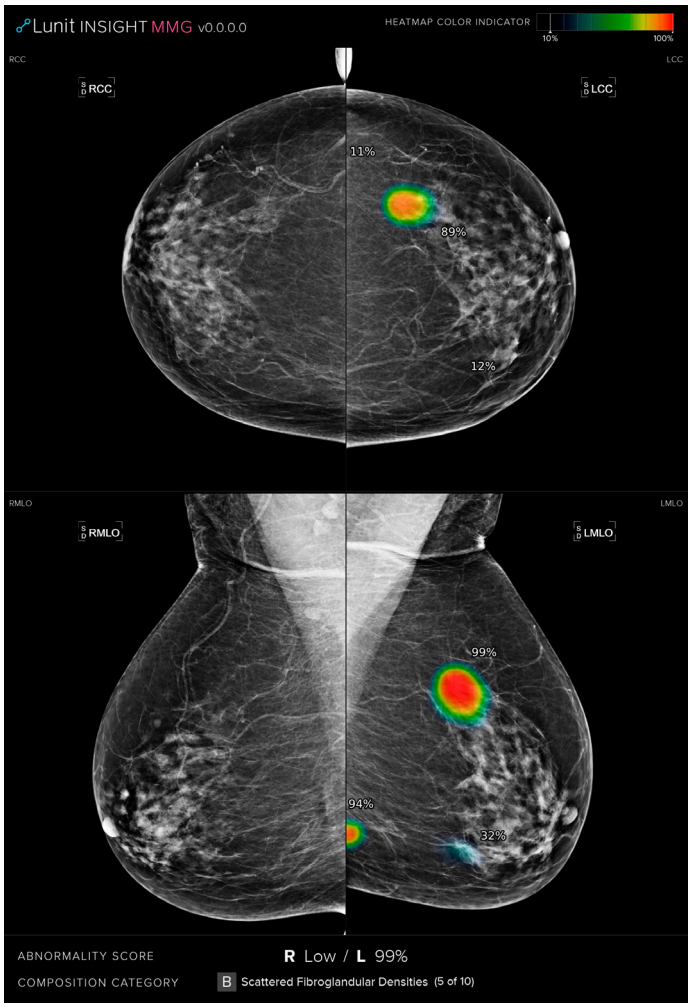
CE certified · FDA expected in 2021

You can login to **https://insight.lunit.io** to freely upload images and get real-time analysis results conducted by **Lunit INSIGHT** in no time.

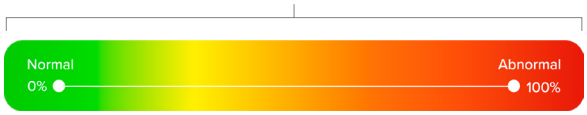
What does Lunit INSIGHT MMG analyze?

Lunit INSIGHT MMG detects breast cancer on mammograms with 96% accuracy.
Lunit INSIGHT MMG generates :

1. the location of breast cancer in the form of heatmaps and/or contour maps
2. an abnormality score reflecting the probability of the existence of breast cancer
3. assessment of breast density.



Abnormality Score



Low probability of actual breast cancer presence

High probability of actual breast cancer presence

What are the major benefits of using it?

1. Reduced false-positive and false-negative recalls

AI-aided, improved detection accuracy for mammography reduces false-positive recalls by 14%[1] and false-negative recalls by 18%[2], allowing radiologists to order breast MRI and biopsies only when it's needed. In addition, they can detect more interval and future screening-detected cancers that could have been interpreted as negative.[3]

2. Fast triage of normal cases

According to the abnormality scores generated by AI, radiologists can successfully triage up to 60% of the entire cases without human interpretation, which can reduce their workload by more than half in mammogram interpretation.[4]

3. Improved reading performance

General radiologists can use the AI analysis results to improve their reading performance by up to 18%, to a level up to that of breast specialists.[5]

4. Early diagnosis of breast cancer

Radiologists can detect T1 and node-negative breast cancer with 91% and 87% accuracy, respectively.[6]

5. Support for decision-making on BI-RADS 3 and 4 cases

For complicated, hard-to-conclude cases classified as BI-RADS 3 or 4, radiologists can compare their reading result with the abnormality scores and decide with confidence whether or not to order additional exams such as ultrasound and biopsy.

6. Improved diagnostic accuracy for dense breasts

Radiologists can improve their diagnostic accuracy for dense and fatty breasts by up to 9% and 22%, respectively.[7]

[1] [2] [5] [6] [7] [8] Kim HY, et al. Changes in cancer detection and false-positive recall in mammography using artificial intelligence: a retrospective, multireader study, The LANCET Digital Health, VOLUME 2, ISSUE 3, E138-E148, MARCH 01, 2020

[3] [4] Karin Dembrower, et al. Effect of artificial intelligence-based triaging of breast cancer screening mammograms on cancer detection and radiologist workload: a retrospective simulation study, THE LANCET Digital Health, VOLUME 2, ISSUE 9, E468-E474, SEPTEMBER 01, 2020

In which settings is it used?

- Clinical settings pressured by overflowing workload and shortage of radiologists
- Medical facilities where breast specialists are absent and general radiologists are concerned about missing breast cancer
- Health Check-up Centers
- Radiology Departments
- Imaging Clinics
- Teleradiology Centers

Lunit INSIGHT by the Numbers

150 + Reference Sites
80 + Countries Worldwide
50M + Images Analyzed

Read the testimonials from our users

Improved Detection, Improved Efficiency, More Time With Patients

Yongin Severance Hospital, Korea

> “ The reading time has reduced by up to 30%. Moreover, I am now able to spend time conducting exams such as ultrasound and biopsies where I get to meet patients in person.”
>
> Prof. Eun-kyung Kim,
> a co-developer of Lunit INSIGHT MMG

Severance Hospital is one of the largest hospital in Korea. This March, it opened a new location in Yongin, on the outskirts of Seoul. With the aim of becoming a 5G technology-based digital hospital, Yongin Severance Hospital has not only founded an IRS (Integration Response Space) center where all inpatient data is integrated and monitored, but also adopted state-of-the-art software and devices. Lunit AI analytics solutions for chest x-ray and mammography went live when the hospital opened, and it is being used in daily reading practice.

As a co-developer of Lunit AI solution for mammography and a breast specialist in the department of radiology, Prof. Eun-kyung Kim said, “The algorithm has continuously evolved since I took part in the development years ago, and now its performance in breast cancer detection has reached at a level up to that of outstanding fellow radiologists.”

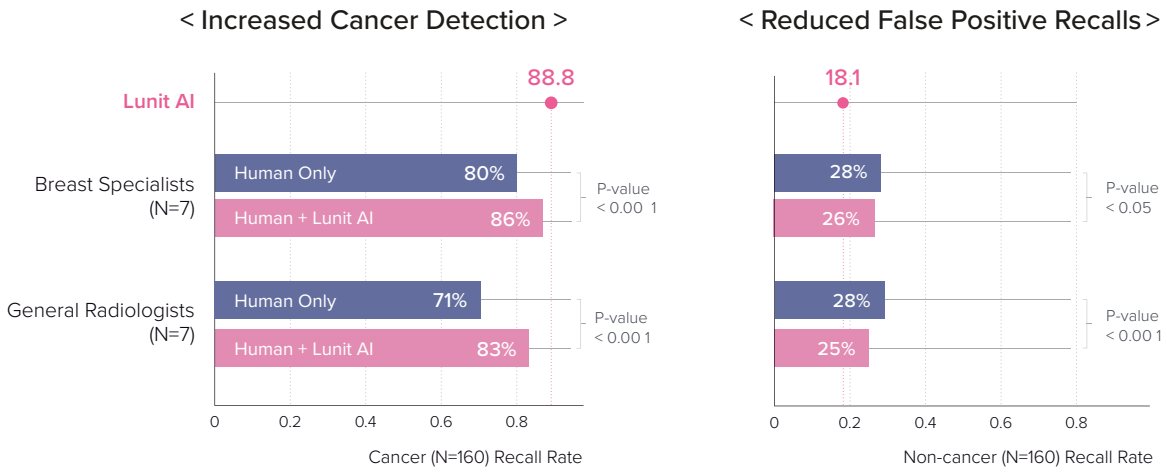
According to Prof. Kim, the overall diagnostic accuracy of the radiologists was 82%. With the assistance of Lunit AI solution, however, it went up to 89%. “It certainly gives the radiologists confidence in reading cases with subtle, minute lesions which could be invisible to the naked eye,” said Prof. Kim.

“The value of AI software as a diagnostic support tool depends on how accurately it rules out normal cases, so radiologists can spend more time reading abnormal cases. Lunit AI solution does that with about 95% accuracy. As a result, the reading time has reduced by up to 30%. Moreover, I am now able to spend time conducting exams such as ultrasound and biopsies where I get to meet patients in person.”

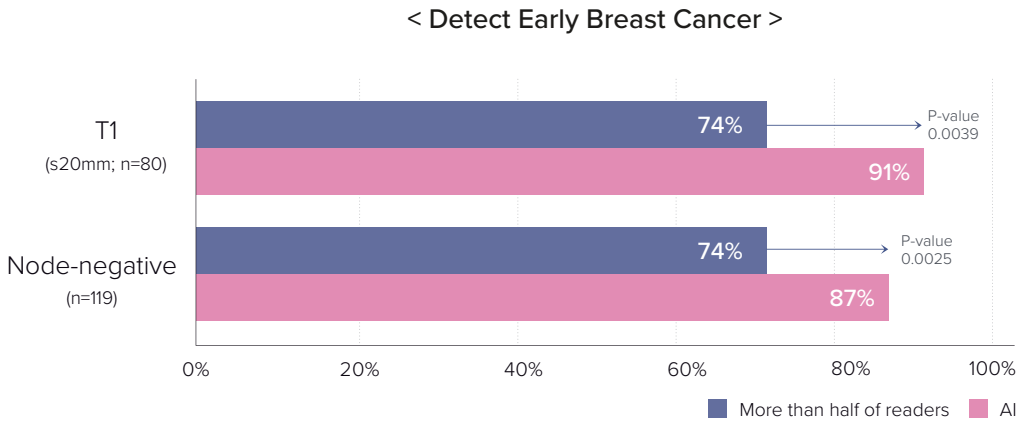
Clinical Validation of Lunit INSIGHT MMG

Below are highlights from the studies published in *JAMA Oncology* and *THE LANCET Digital Health,* which validate the performance of Lunit INSIGHT MMG and its clinical value in mammography interpretation.

Highlight #1. Increase cancer detection by 18%, while reducing false positive recalls by 14%



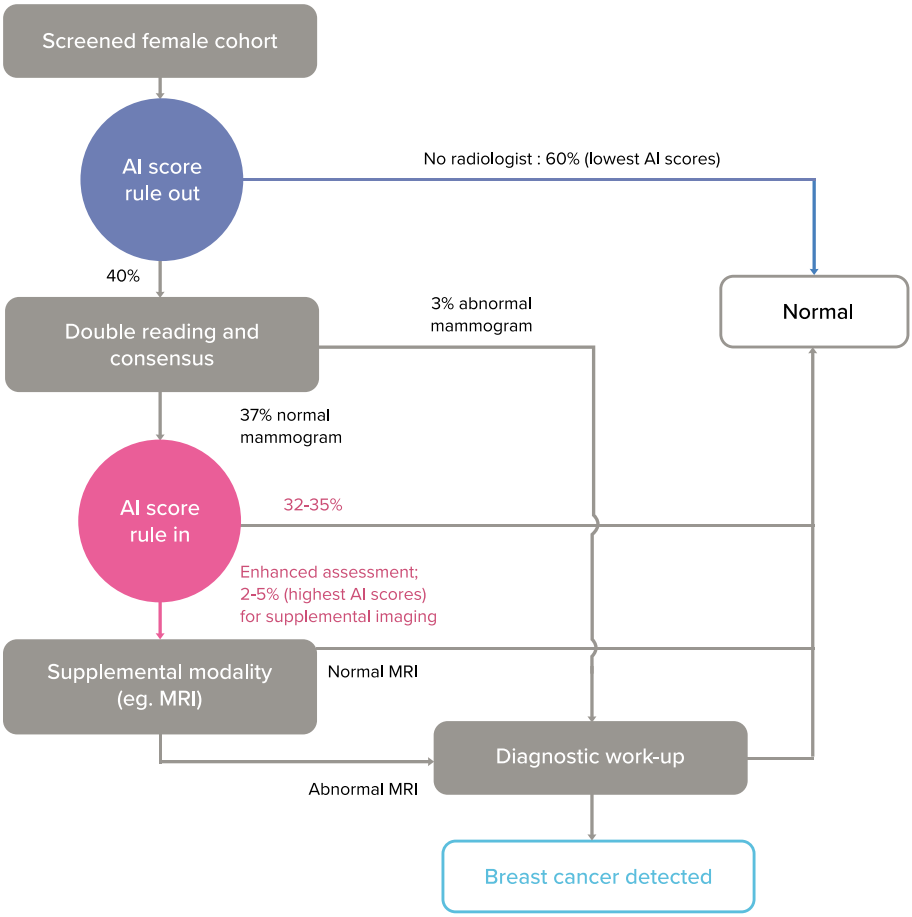
Highlight #2. Detect early breast cancer such as T1 and node-negative breast cancer



Kim HY, et al. Changes in cancer detection and false-positive recall in mammography using artificial intelligence: a retrospective, multireader study, THE LANCET Digital Health 2020

Simulated Triaging Workflow

This simulation features a triage workflow model of which the AI score functions as a supportive information that reduces radiologists' reading volume and complements their interpretations.



Highlight #3.

Triage 60% of the entire cases without missing any breast cancer

Rule Out

60% of the entire cases with scores below a rule-out threshold (e.g. AI score of 3%) could be triaged to a no radiologist work stream and interpreted as negative without missing any screen-detected cancer.

Highlight #4.

Detect more cancer cases originally interpreted by radiologists as normal

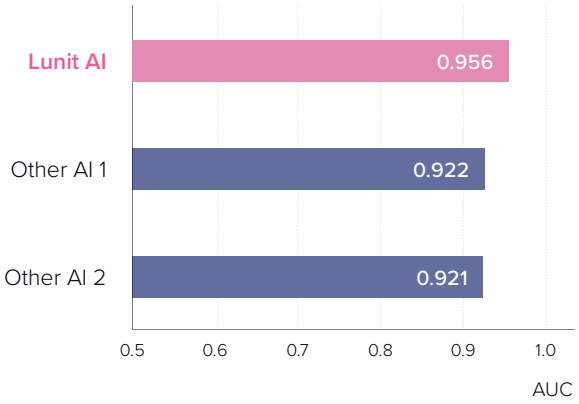
Rule In

Cases interpreted as normal but with scores above a rule-in threshold (e.g. AI scores of 2-5%) could be considered for supplementary breast imaging tests to detect more cancers that could have been missed.

Karin Dembrower, et al. Effect of artificial intelligence-based triaging of breast cancer screening mammograms on cancer detection and radiologist workload: a retrospective simulation study, THE LANCET Digital Health 2020

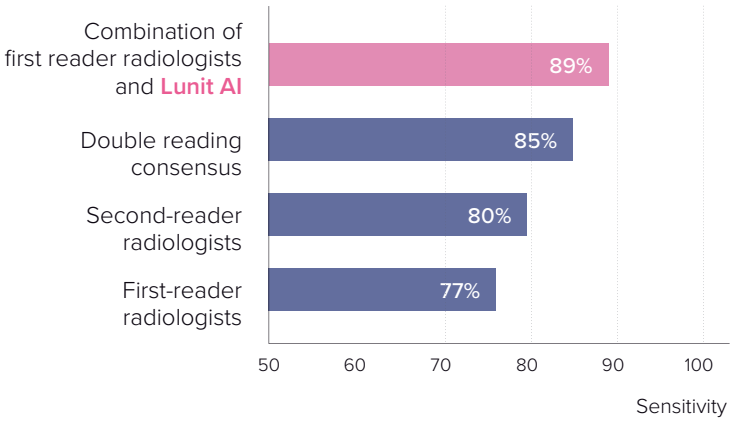
Highlight #5. Lunit best detects breast cancer compared with other commercial AI solutions

< Best performance in breast cancer detection compared with other AI solutions >



Highlight #6. Highest sensitivity when combined with first radiologist

< Highest sensitivity when combined with first radiologists >

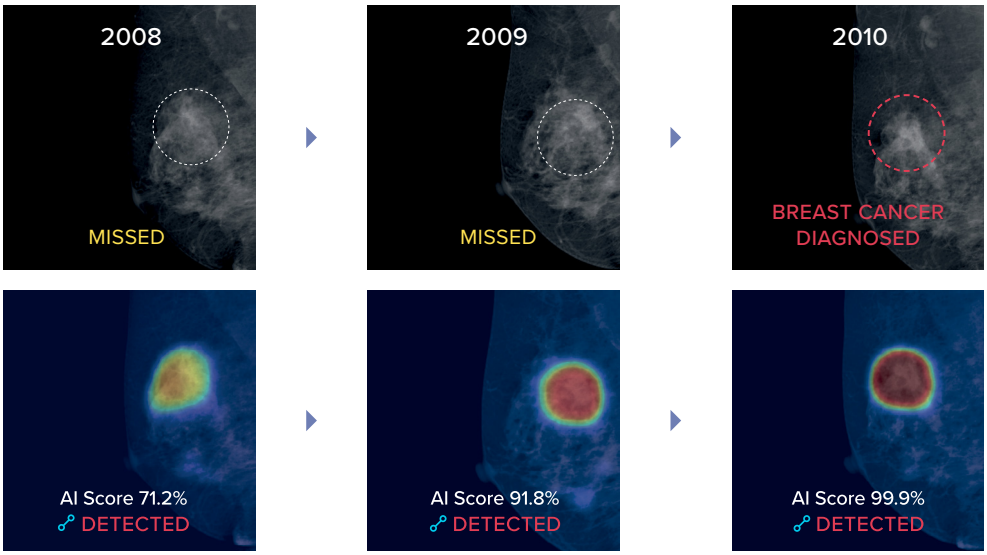


Mattie Salim, et al. External Evaluation of 3 Commercial Artificial Intelligence Algorithms for Independent Assessment of Screening Mammograms, JAMA Oncology 2020

Early-Stage Cancer Detection

40% of breast cancer patients can be diagnosed earlier with Lunit INSIGHT MMG.
Lunit INSIGHT successfully analyzed the mammogram of a 59-year-old female patient, detecting breast cancer that had been missed since 2 years ago.

Example case



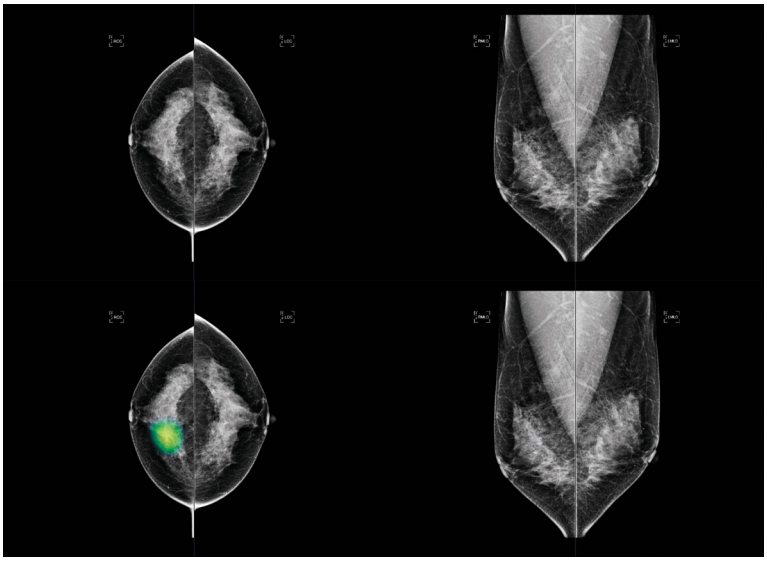
Implication

WHEN DETECTED EARLY BY AI	STAGE 1-2		5-year survival **96%**
WHEN MISSED	STAGE 3-4		5-year survival **65%**

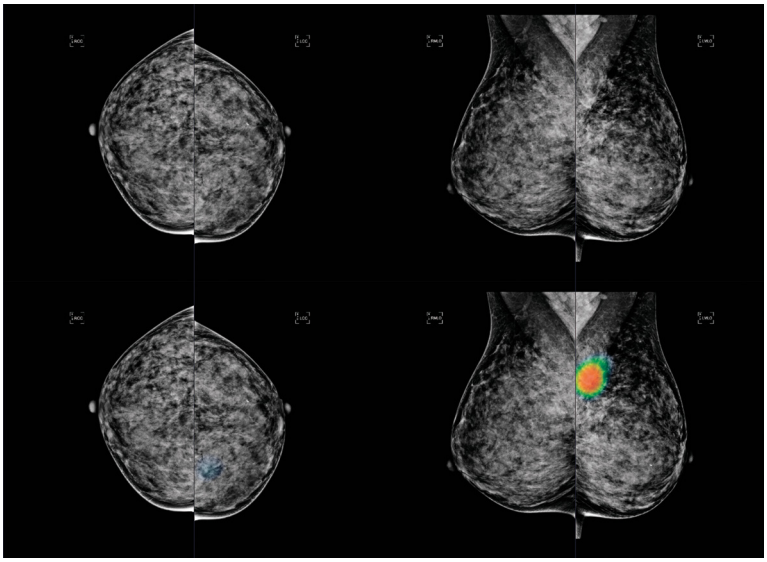
Reference: AJCC 8th Edition

Sample Cases

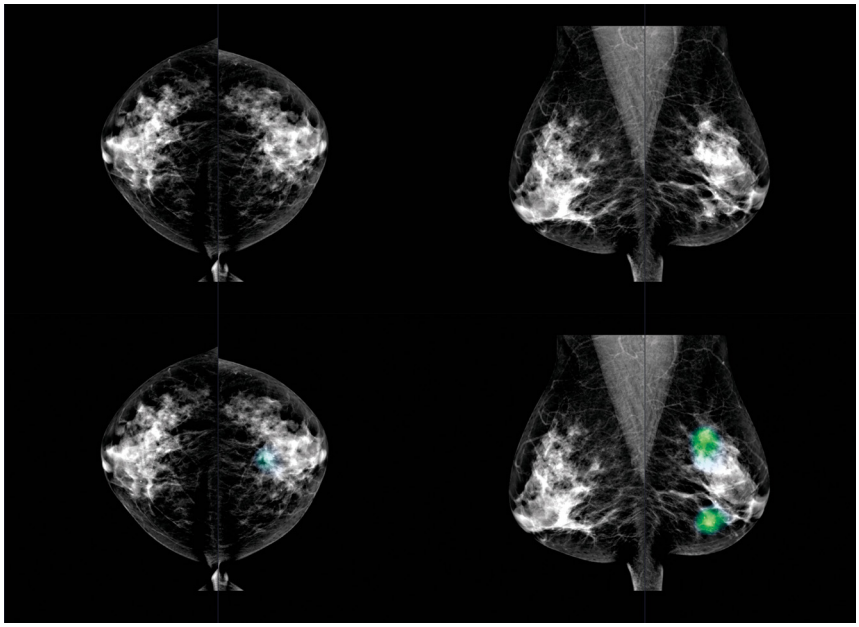
Below sample cases show how radiologists were able to detect more breast cancer after using Lunit INSIGHT MMG. In the parenthesis, on the left are the number of radiologists that detected breast cancer without any AI assistance, whereas on the right is the number of radiologists who correctly detected breast cancer with Lunit INSIGHT MMG. (Total number of radiologists = 14)



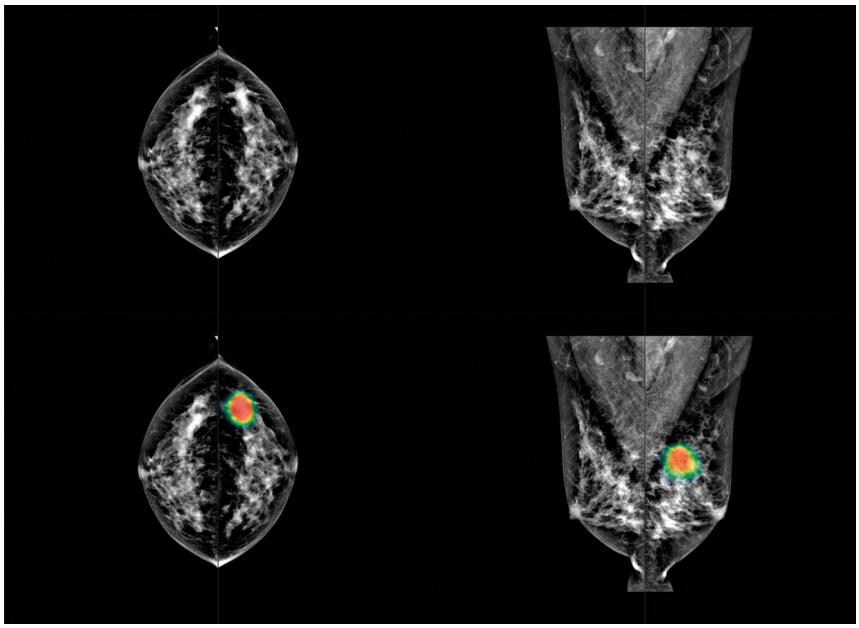
CASE 1 A small obscured mass (w/o Lunit 4 → w/ Lunit 13)



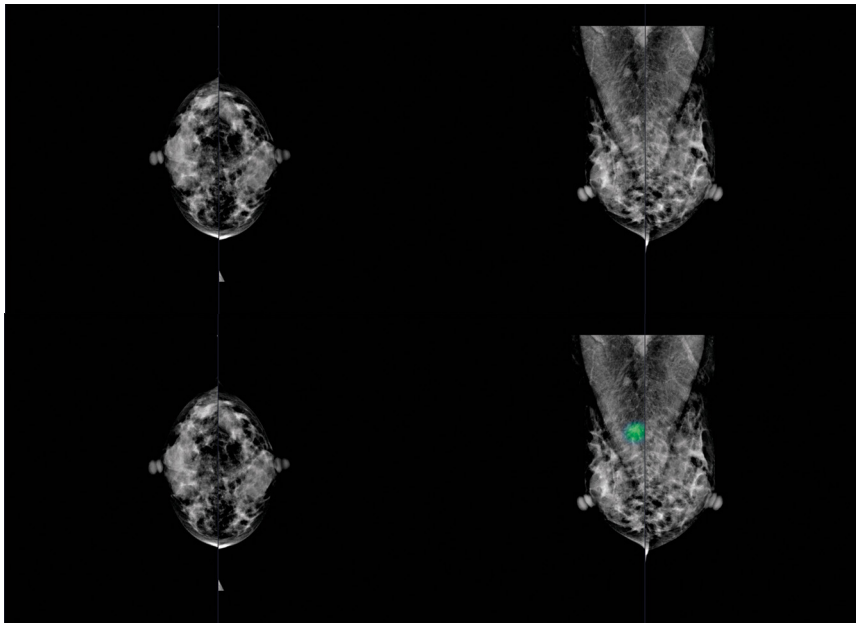
CASE 2 A small obscured mass (w/o Lunit 7 → w/ Lunit 14)



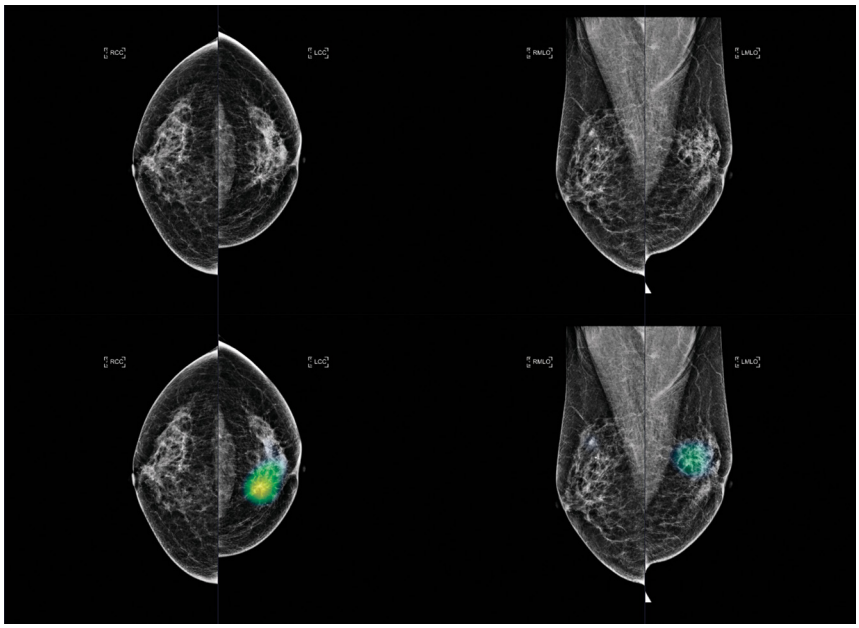
CASE 3 A small obscured mass with clustered microcalcifications
(w/o Lunit 2 → **w/ Lunit 11**)



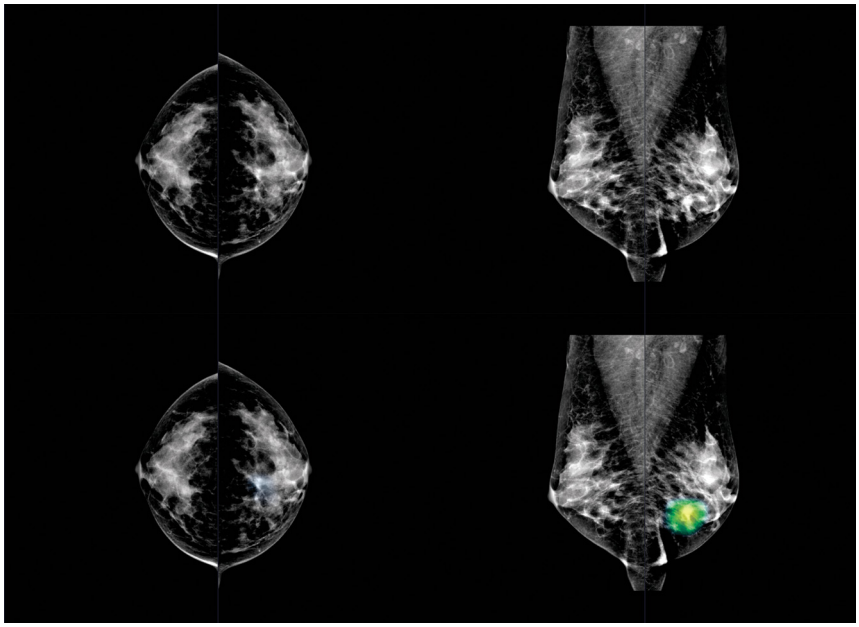
CASE 4 A small obscured mass with clustered microcalcifications
(w/o Lunit 5 → **w/ Lunit 12**)



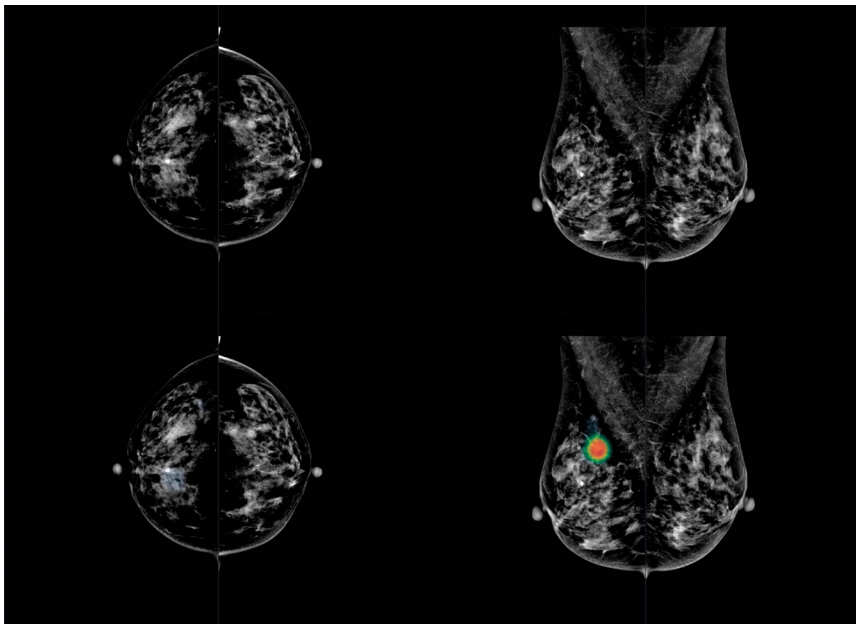
CASE 5 A small spiculated mass (w/o Lunit 7 → w/ Lunit 14)



CASE 6 Focal asymmetry (w/o Lunit 5 → w/ Lunit 13)



CASE 7 Focal asymmetry (w/o Lunit 5 → w/ Lunit 13)



CASE 8 Focal asymmetry (w/o Lunit 7 → w/ Lunit 14)

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