Breast cancer screening is not enough

Catching incidental breast findings among younger/older women and men

Introduction

Breast cancer is the most common cancer in women [1], and if detected early, before the onset of symptoms, has an excellent prognosis. However, a recent study shows that breast cancer prevalence has increased steadily in women under age 50 over the past two decades, with steeper increases in more recent years. For most women, regular breast cancer screening does not begin until at least age 40, so younger women diagnosed with breast cancer tend to have later-stage tumors, when the disease is more advanced and more difficult to treat [2]. Breast cancer in men, while rare (occurring in 1 in 726), has double the death rate (~20%) as in women, per the American Cancer Society [3].

Background

Lifepoint Health, in collaboration with Eon, conducted a pilot study to evaluate the frequency of breast lesions incidentally identified in radiology reports. These **incidental breast findings are from exams outside of a screening program** or explicitly ordered to follow a concerning mammogram.

Method

Approximately **5.6 million radiology reports from 93 Lifepoint Health facilities*** acquired over 18 months were analyzed. These reports were from hospital-based imaging and included all modalities and anatomic regions (e.g., were not specific to the chest or breast). The Computational Linguistics (CL) model was deployed to identify breast and lymph node findings. Based on two people annotating over 1,000 records, the model has an accuracy of over 96%, a positive predictive value (PPV) of 95%, and a negative predictive value (NPV) of 97%.

The CL model was run on all imaging reports. Positive results were classified based on imaging modality and anatomy into known (e.g., breast imaging or follow-up) or unknown (e.g., potential incidental findings). The unknown findings were then categorized by patient age and gender, as well as the exam imaging modality and anatomy on which they were identified.

References:

[1] American Cancer Society (ACS). https://www.cancer.org/cancer/types/breast-cancer/about/how-common-is-breast-cancer.html

[2] American Cancer Society (ACS). https://www.cancer.org/cancer/types/breast-cancer-in-men/about/key-statistics.html

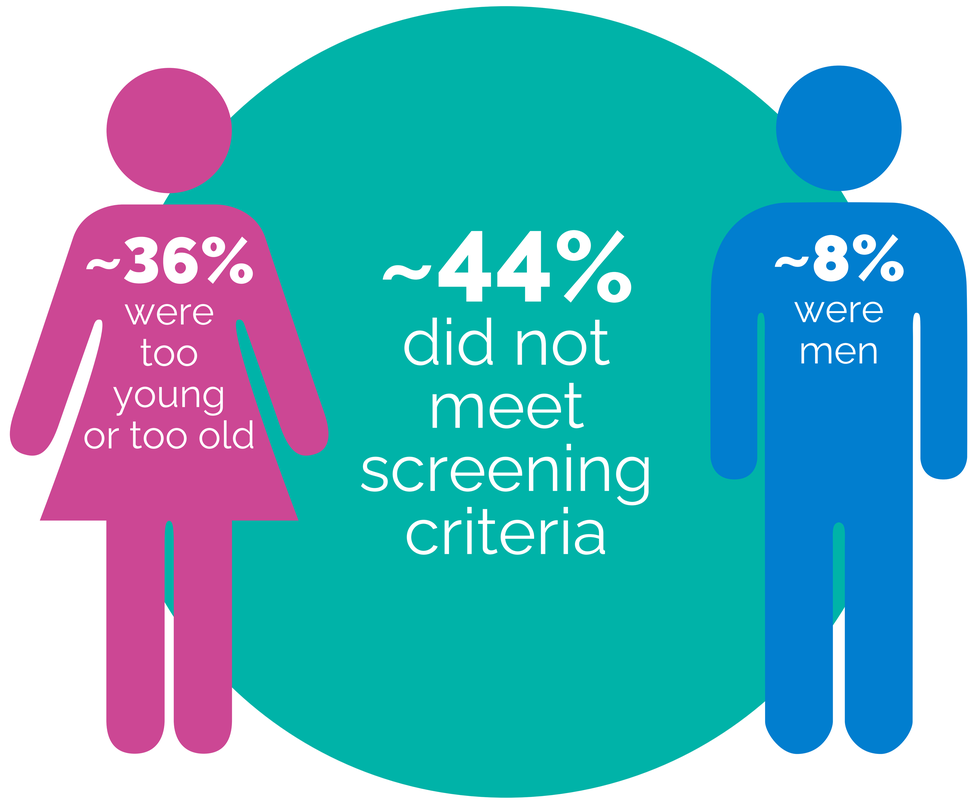
[3] American Cancer Society (ACS). https://www.cancer.org/cancer/types/breast-cancer-in-men/about/key-statistics.html

Results

Approximately 506,500 records (9%) had the breast mentioned somewhere in the report. Of these exams, only 32,693 (6.45%) positive measurements of breast lesions were identified by the CL model. The majority of these exams were screening or diagnostic mammograms, ultrasounds of the breast or axilla, or breast MRIs. The unknown ("incidental") findings were only 5.2% of the positive breast lesions, and 86% were identified in CT exams of the neck, chest, and abdomen.

Of the 1,685 incidental breast abnormalities identified in Lifepoint's study, 931 (55.3%) were within the ACS average risk breast screening age bracket of 45-75 years. However, 754 patients (44.7%) with incidental breast findings did not meet breast screening criteria. 246 (14.6%) were women below the range (i.e. too young) and 367 (21.7%) were above the range (i.e. too old) and 141 (8.4%) were men.

Patients with incidental breast lesions



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Conclusion

The incidentally identified breast lesions in **all the male patients and the female patients outside screening programs would likely not have been found until clinical symptoms appeared.** The prevalence of incidental findings in our study is much lower than the autopsy meta-analysis by Thomas et al. , which found a 19.5% prevalence of incidental invasive cancer or precursor lesion (0.85% invasive, 8.9% in situ and 9.8% atypical hyperplasia). Our findings support the need to evaluate and report on the breast if included in the imaging exam. Then, all reports, not just those CT exams of the chest, should be linguistically evaluated to identify and track patients with incidental breast lesions to ensure follow-up.

As a result, Lifepoint has begun rolling out a systemwide initiative across 58 facilities to track and manage all incidentally identified breast lesions in addition to their breast cancer screening program

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* Includes facilities that are now part of Scion Health.