

Study suggests it may be safe to de-escalate surgery in middle-aged breast cancer patients

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Surgery involving sentinel lymph node biopsy for middle-aged women with estrogen receptor-positive (ER+) breast cancer may do more harm than good, according to a new study led by University of Pittsburgh and UPMC Hillman Cancer Center researchers. The team used a novel artificial intelligence pipeline developed by Realyze Intelligence, a UPMC Enterprises portfolio company, to analyze electronic health records.

The findings, published in [*JCO Clinical Cancer Informatics*](#), suggest that clinical guidelines for de-escalating surgery in women aged over 70 years with early-stage ER+ breast cancer may be safely extended to post-menopausal patients 55 or older.

"This research informs the overall goal of moving away from a one-size-fits-all approach for treating breast cancer," said lead author Neil Carleton, graduate student in Pitt's Medical Scientist Training Program. "Instead, our focus is tailoring care so that treatment is at the right level for each patient, which includes doing less surgery when it's unlikely to have a benefit."

Sentinel lymph node biopsy, which involves surgically removing one or more [lymph nodes](#) that drain from a patient's primary tumor, allows oncologists to detect whether the cancer has spread. This procedure is usually standard-of-care for patients with breast cancer, but there are risks, including lymphedema, or buildup of lymphatic fluid, which causes swelling, discomfort and mobility issues.

"Even though there is a relatively low risk of lymphedema after [sentinel lymph node biopsy](#), this condition can have devastating effects on a person's quality of life," said senior author Emilia Diego, M.D., associate professor of surgery and chief of the Breast Surgery Division at Pitt and co-director of the Breast Cancer Program at Hillman Cancer Center and UPMC Magee-Womens Hospital.

"As medical professionals, we have a duty to continuously seek ways to improve care while minimizing untoward outcomes of treatment. This study points to the low likelihood of additional information from a sentinel node biopsy, suggesting it may not be necessary for care in every breast cancer case."

Women aged over 70 who are diagnosed with early-stage ER+ breast cancer have very low rates of metastasis, according to previous research. For these patients, overtreatment can have little benefit on survival but greatly decrease quality of life.

These findings have led to efforts aimed at de-escalating treatment for this patient population, and in 2016, the Society of Surgical Oncology released a recommendation as part of its [Choosing Wisely](#) initiative that advocates against routine sentinel lymph node biopsy for ER+ breast cancer patients aged over 70 with tumors less than 2cm in diameter.

To examine whether that guideline could be extended into younger patients, the researchers used Realyze Intelligence's technology to scour [electronic health records](#) of 925 patients aged 55 or older who were diagnosed with ER+ [breast cancer](#) between 2015 and 2017 and had sentinel lymph node biopsy as part of their care.

Looking across an average follow-up period of 5.5 years, they compared rates of lymph node-positivity, which indicates that the cancer has spread, with rates of lymphedema.

"There's a lot of valuable data in the electronic health care record that is hidden within unstructured physician notes," said Carleton.

"The power of Realyze is that it goes into these notes and pulls out information by looking at the language itself and, importantly, the context of that language. So, it allowed us to look not only for records of

lymphedema but also where that lymphedema was located. That's important because arm and breast lymphedema are likely to be related to lymph node biopsy, whereas leg lymphedema is likely due to other conditions."

The natural language understanding (NLU) pipeline filtered hundreds of thousands of clinical notes, including those made by patients' oncologists and other health providers.

In comparison to manually verified records, the NLU pipeline was 95% accurate in identifying cases of breast or arm lymphedema, indicating the tool was effective at extracting this valuable information, which isn't routinely documented in cancer records.

Just 13% of patients aged 55–69 and 7% of those aged 70 or older had positive sentinel lymph node biopsies, suggesting low risk of metastasis in this population. For patients who did have lymph node involvement, the vast majority had just one to three positive nodes—a result that does not impact treatment decisions without additional genetic data. Only one patient in each age group had more than three positive lymph nodes.

Notably, lymphedema rates were higher than rates of lymph node involvement.

"In [older patients](#) with small tumors, rates of lymph node positivity are very low, suggesting that sentinel lymph node biopsy does not provide additional information to guide therapy," said Carleton.

"Given the risk of [lymphedema](#) and low nodal involvement, the potential harms of this procedure may outweigh the benefits. Our study, in addition to recently published clinical trial data, suggests that recommendations aimed at de-escalating surgery could be moved to age 55 for women with small, ER+ disease."

More information: Use of natural language understanding to facilitate surgical de-escalation of axillary staging in patients with breast cancer, *JCO Clinical Cancer Informatics* (2024).

Provided by University of Pittsburgh

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