

# Fewer lymph node operations for breast cancer patients with new prediction models

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In recently published studies, researchers at Lund University and Skåne University Hospital in Sweden have produced new prediction models for improved personalized treatment of lymph nodes in breast cancer patients. The latest results that have now been published in *Clinical Cancer Research* and *BMC Cancer* show that up to one in every three operations could be avoided.

Breast cancer is the most common tumor disease in women, and it is estimated that one in every eight women in the Western world will suffer from the disease during their lifetime.

"It is well known that knowledge of the spread of breast cancer to the [axillary lymph nodes](#) provides important information on the course of the disease, and lymph nodes are routinely removed for investigation. Around 70 percent of patients are found to have healthy lymph nodes, and surgery could be avoided if they could instead be assessed in a different way," says Lisa Rydén, professor of surgery with a focus on breast cancer at Lund University and consultant at Skåne University Hospital.

Gene expressions from approximately 3 000 breast tumors have been studied together with other

tumor- and patient-related factors concerning the link between the spread of disease to the lymph nodes. The results were published in *Clinical Cancer Research*, and showed that the size of the tumor and the invasion of cancer cells into vessels were significant factors in predicting the spread of disease.

In patients with hormone-sensitive breast tumors (approximately 80 percent of all [breast cancer](#)), a developed [prediction model](#), based on the tumor's genetic profile and routinely collected data on tumor characteristics, was able to identify 6-7 percent more women with healthy lymph nodes than other models.

"It would therefore be possible to reduce the number of lymph node operations by up to 30 percent in this group if the model were used to predict the spread of disease to the lymph nodes," noted the authors of the article.

Through [artificial neural networks](#), three prediction models have been produced in a separate study published in *BMC Cancer*; one to identify healthy lymph nodes (where diagnostic surgery could potentially be avoided), one to identify limited disease in the lymph nodes (where the removal of a small number of diagnostic lymph nodes is sufficient) and one for widespread lymph node disease indicating more extensive surgery or primary oncological treatment with chemotherapy. This study also showed that the prediction model for healthy [lymph nodes](#) could have reduced the number of surgical interventions by 30 percent.

"The results indicate that we may be a step closer to more personalized surgical treatment by using the prediction models as a decision support tool. In order to ascertain the results for clinical use, further studies are required on other patient material to be able to confirm the reliability and precision of the models and independently evaluate our results," concludes Lisa Rydén.

**More information:** Looket Dihge et al. Prediction of lymph node metastasis in breast cancer by gene expression and clinicopathological models: Development and validation within a population based cohort, *Clinical Cancer Research* (2019). DOI: [10.1158/1078-0432.CCR-19-0075](https://doi.org/10.1158/1078-0432.CCR-19-0075)

Looket Dihge et al. Artificial neural network models to predict nodal status in clinically node-negative breast cancer, *BMC Cancer* (2019). DOI: [10.1186/s12885-019-5827-6](https://doi.org/10.1186/s12885-019-5827-6)

Provided by Lund University

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