Prediction models are helpful for patients with a biopsy diagnosis of ductal carcinoma in situ

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Background and aim
In patients with a biopsy diagnosis of ductal carcinoma in situ (DCIS) of the breast, the final diagnosis on a resection can be upstaged to invasive cancer. The NABON guideline recommends a sentinel lymph node biopsy (SLNB) in patients at increased risk for upstaging of the diagnosis to invasive breast cancer, without clear guidance on what an increased risk is. We aimed to develop and validate predictions tools for upstaging and lymph node metastasis.

Methods
Patients with a DCIS diagnosis based on biopsy were selected from the Dutch Nationwide Pathology Databank (Palga); incidence development cohort 2011-2012 and validation cohort 2016-2019. Data from the Netherlands Cancer Registry (NCR) were added. The prediction models were developed using multivariate logistic regression and evaluated with the area under the curve (AUC) of the receiver operating characteristic, a calibration plot and a decision curve analysis.

Results
Development cohort (n=2892): 20.6% upstaged, 4.4% metastasized. Validation cohort (n=2269); 17.4% upstaged, 2.2% metastasized. Predictive factors were: detected outside screening, a palpable tumour, a BI-RADS score 5, high grade DCIS at biopsy, a suspected invasive component at biopsy and for the metastases model also younger age. The AUC of the DCIS-upstage model was 0.67 (development) - 0.65 (validation) and of the DCIS-metastasis model 0.75 (development) - 0.74 (validation). The decision curve analysis of both models show that using the model would reduce the rate of in hindsight unnecessary SLNB performed in patients with pure DCIS.

Conclusion
The prediction models can be of help in the selection for SLNB of patients at increased risk of upstaging or lymph node metastasis. Representatives of clinicians can choose the threshold of predicted risk above which patients will be selected for SLNB, based on factors like predicted rate of metastases, rate of SLNB performed in patients with pure DCIS, sensitivity.