

# Breast cancer pathology differences between hospitals in the Netherlands – Results from the NABON Breast Cancer Audit

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## Introduction

Accurate determination and reporting of pathological breast cancer characteristics is critical for staging, selection of patients for adjuvant treatment and estimation of prognosis. Differences between hospitals might lead to differences in care, for example in prescription of hormonal therapy.

## Objective

This study assesses the completeness of the pathology report and the degree of variation between hospitals in pathology characteristics of patients diagnosed with invasive breast cancer.

## Material and methods

### NABON Breast Cancer Audit

Breast cancer data from Dutch hospitals are continuously collected by registrars from the Netherlands Cancer Registry or the hospitals themselves, resulting in a population-based registry; the NABON Breast Cancer Audit (NBCA).

### Analyses

All primary invasive breast cancer patients without distant metastatic disease diagnosed between January 1, 2011, to September 30, 2013 were selected. Completeness of pathology report was defined as availability of grade, tumour size, surgical resection margin, number of positive nodes, oestrogen (ER), progesterone receptor (PR), and HER2 status in the report of all patients with an invasive breast tumour of  $\geq 1$ cm. Hospitals were compared on pathology report completeness and findings, whose results are presented in funnel plots.

Table 1. Breast cancer histopathological characteristics of occurrence and 95% confidence intervals (CI).

	Mean	95% CI
<b>Histology</b>		
Ductal carcinoma	82%	73 - 93%
Lobular carcinoma	11%	8 - 16%
<b>Grade</b>		
1	24%	19 - 30%
2	47%	40 - 56%
3	29%	24 - 36%
<b>Receptor group</b>		
Triple negative	11%	8 - 16%
Hormone receptor positive   HER2 negative	75%	67 - 86%
Hormone receptor positive   HER2 positive	9,0%	6 - 13%
Hormone receptor negative   HER2 positive	4,1%	2 - 7%

Figure 1. Percentage of patients with invasive breast cancer  $\geq 1$ cm with complete pathology report per hospital.

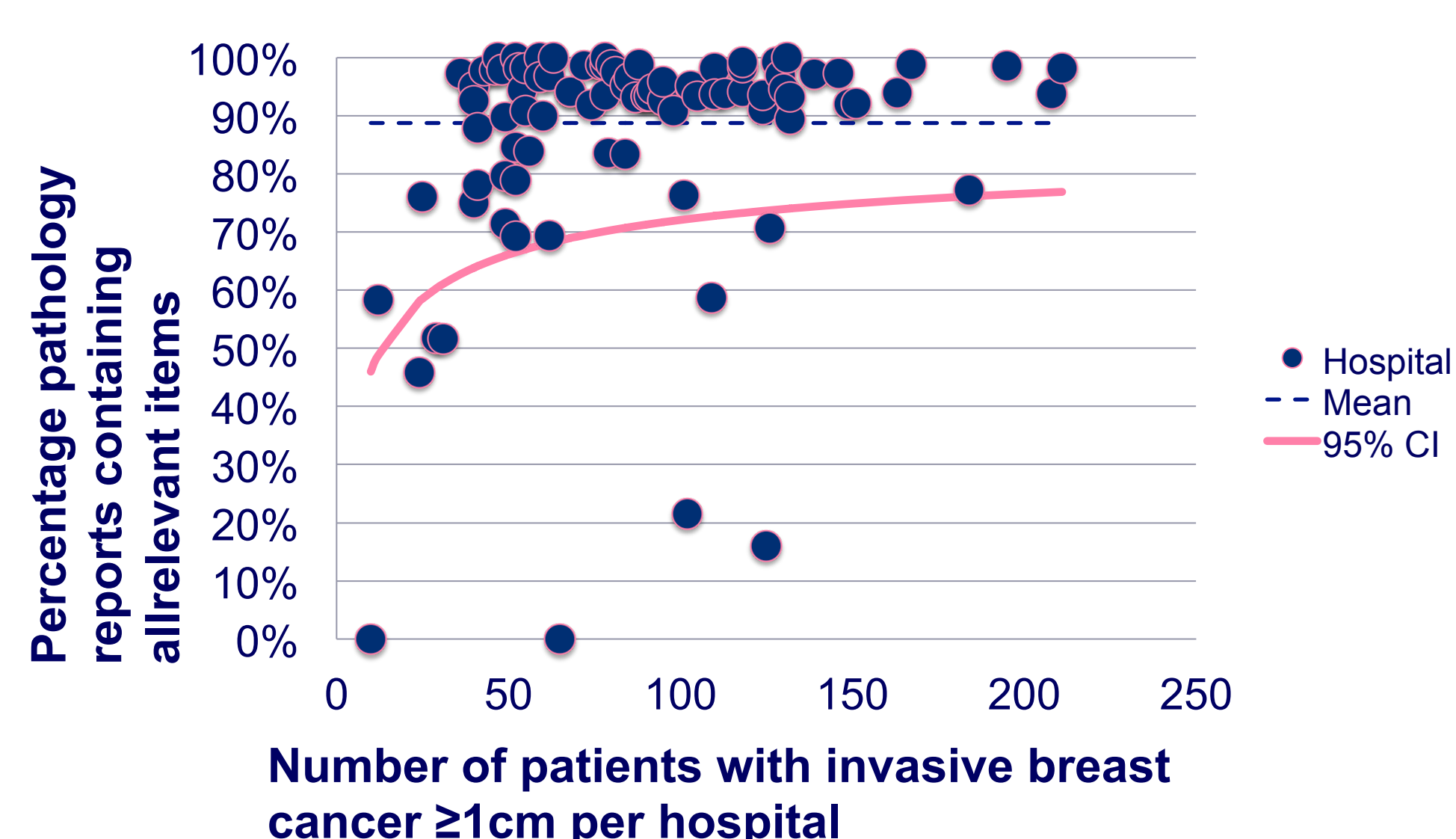


Figure 2. Percentage of patients with invasive breast cancer and a triple negative tumour per hospital.

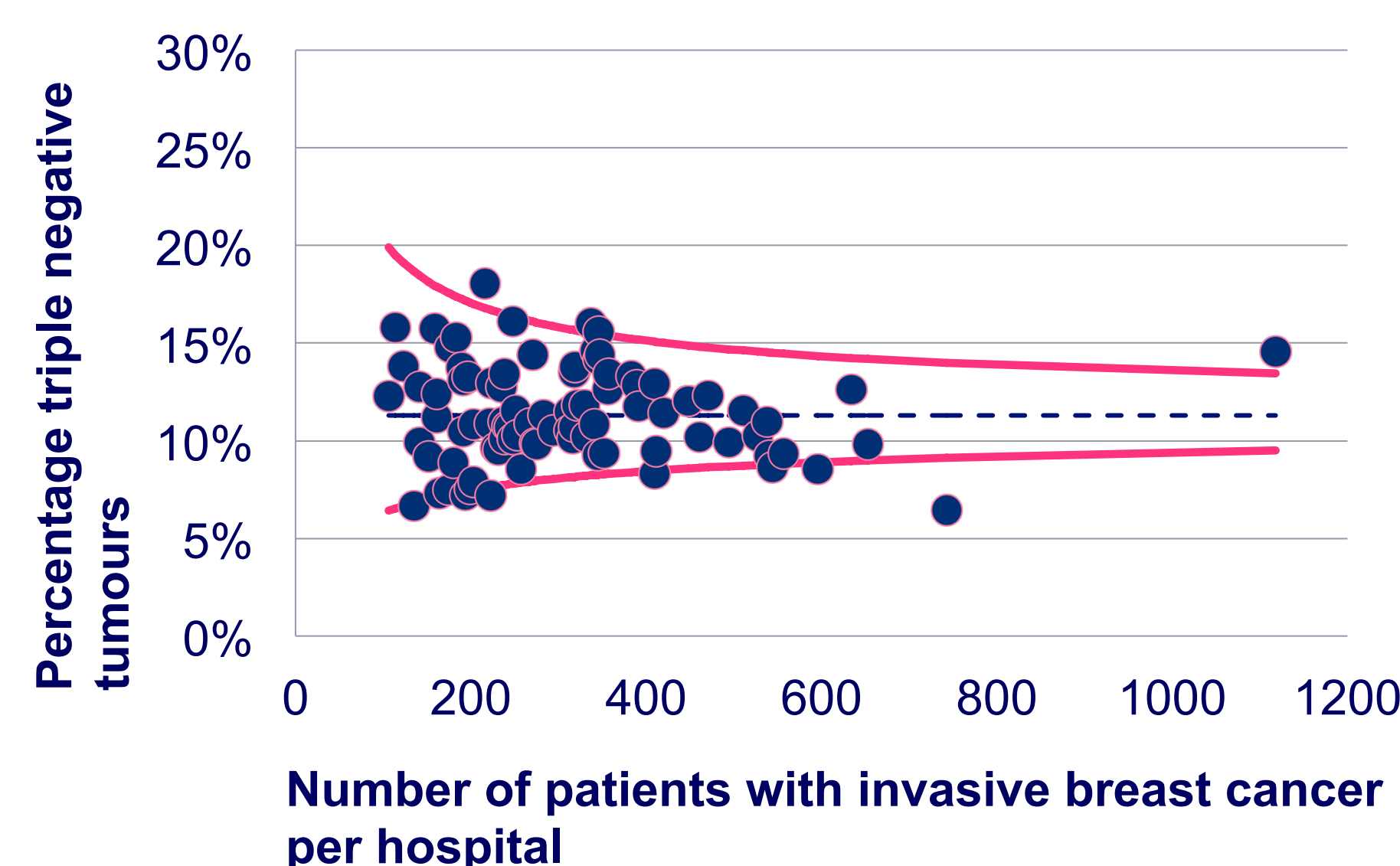


Figure 3. Percentage of patients with invasive breast cancer and a hormone receptor positive, HER2 negative tumour per hospital.

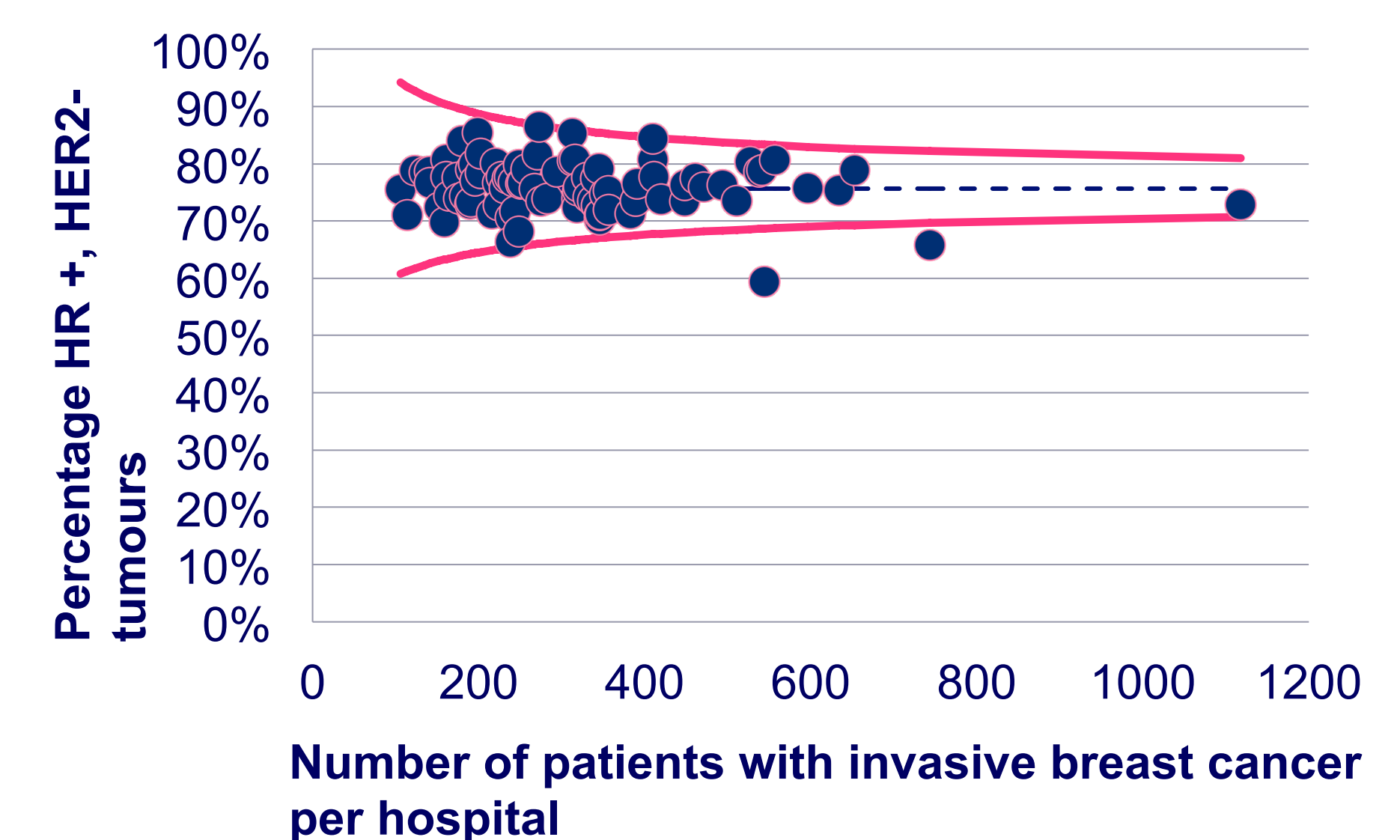


Figure 4. Percentage of patients with invasive breast cancer and a hormone receptor positive, HER2 positive tumour per hospital.

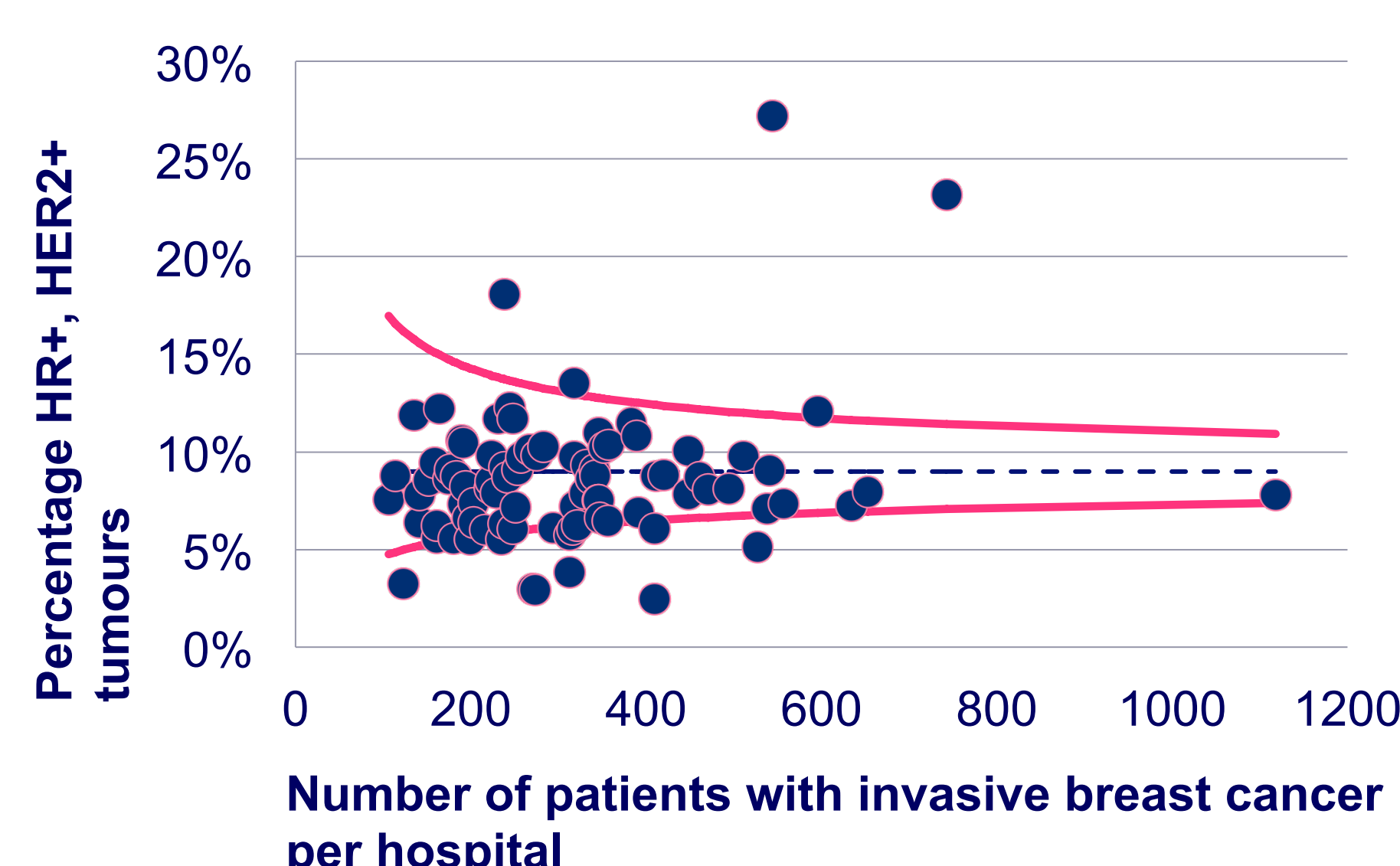
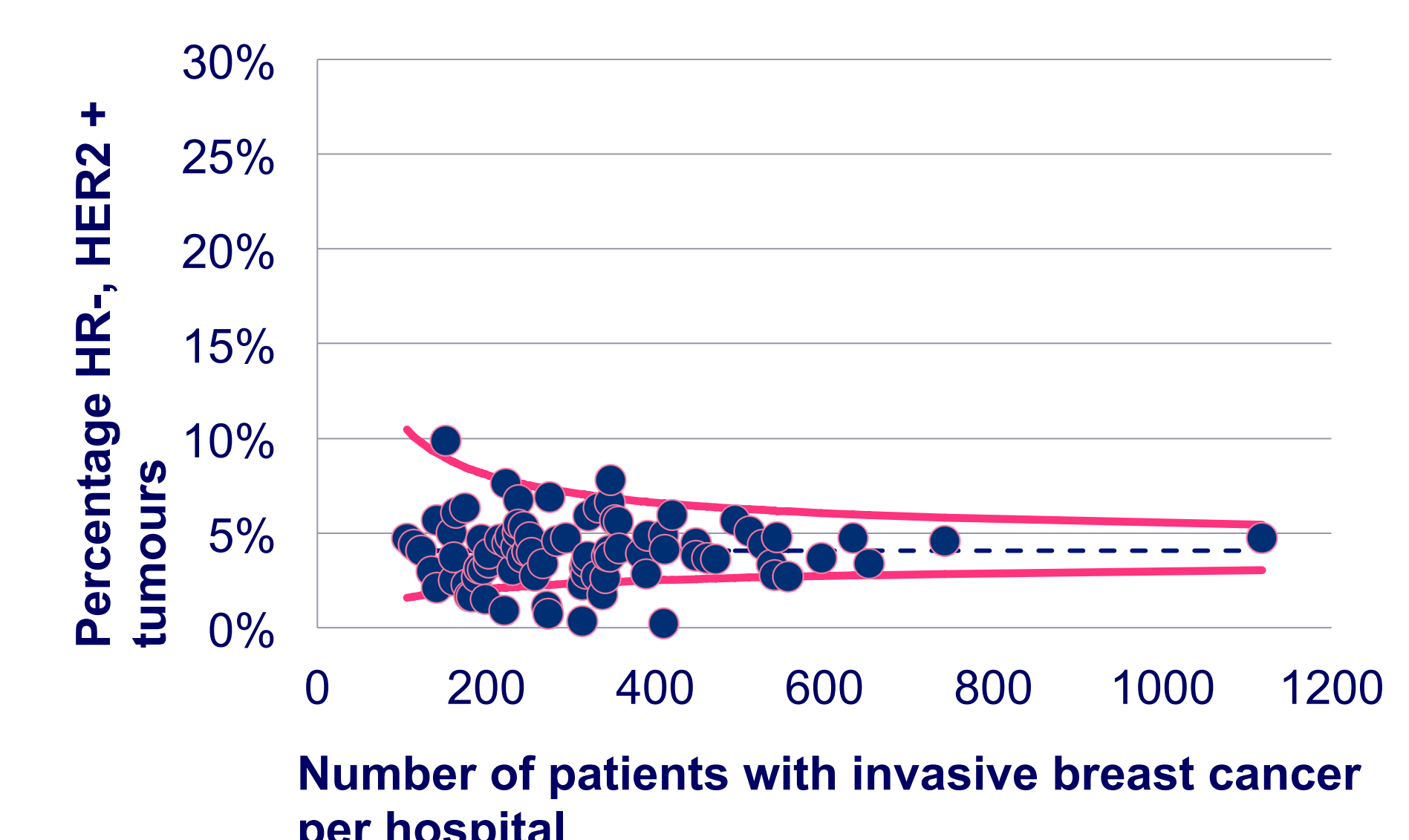


Figure 5. Percentage of patients with invasive breast cancer and a hormone receptor negative, HER2 positive tumour per hospital.



## Results

### Database and pathology report

A total of 29,407 patients were included from 89 hospitals. The histopathological characteristics are displayed in table 1.

Of the pathology reports, 88% contained all relevant items in 2013 (figure 1), this percentage has increased over time; in 2011, 75% of the pathology reports was complete.

### Histology

Ductal carcinomas not otherwise specified occurred most frequent (mean 82%). All hospitals reported data between the 95% confidence intervals (95% CI). Lobular carcinomas (mean 11%) showed a slight broader variation. However, not one hospital was a remarkable outlier.

### Grade

Most tumours are classified as a grade II tumour (47%). For grade I and III, more outliers were seen, with a mean of 24 and 29 percent respectively.

### Receptor groups

Hospitals showed no major differences for ER or PR. Most hospitals had frequencies on ER, PR and HER2 status ranked within the 95% CI of the mean. Two hospitals had significantly more HER2 positive tumours compared to the mean.

## Conclusion

The pathology laboratories report consistent results throughout the Netherlands.

It is unlikely that differences between hospitals in assessment of pathology characteristics will lead to major differences in treatment and outcome.

Four hormone receptor groups can be distinguished for clinical relevant purposes as systemic therapy:

- Triple negative
- Hormone receptor positive, HER2 negative
- HR positive, HER2 positive (HR+, HER2+)
- HR negative, HER2 positive (HR-, HER2+)

A tumour is HR positive in case it is ER or PR positive or if both ER and PR are positive. ER negative / PR positive tumours hardly occur (0,4%). Eleven percent of the tumours is a triple negative tumour. HR positive | HER2 negative tumours included 75% of the cases, HR positive | HER2 positive 9% and HR negative | HER2 positive tumour included 4,1% (table 1 and figure 2-5).