national evaluation of **breast cancer** screening in the Netherlands June 2018

findings 2016

		2015
invited	1.3 mln	1.3 mln
examined	1.0 mln	1.0 mln
mean individual screen interval (months)	23.9	24.0
attendance	77.3%	77.6%
total cost per screen examination (€)	67.01	66.30
recall (referral) rate*	24.3	23.2
false positive results*	17.5	16.4
positive predictive value	28%	30%
detection rate*	6.8	6.8

* per 1000 screening examinations

The programme is in a stable state.

The **attendance** rate declined slightly, but less than before.

A slightly increased **recall rate** led to a small increase in **false positive results**.

Detection rate remained similar.

This evaluation is available on:
www.iknl.nl/borstkankermonitor
www.rivm.nl/monitoring-evaluatie-bevolkingsonderzoek-borstkanker

The breast cancer screening programme is coordinated by the National Institute for Public Health and the Environment (RIVM)

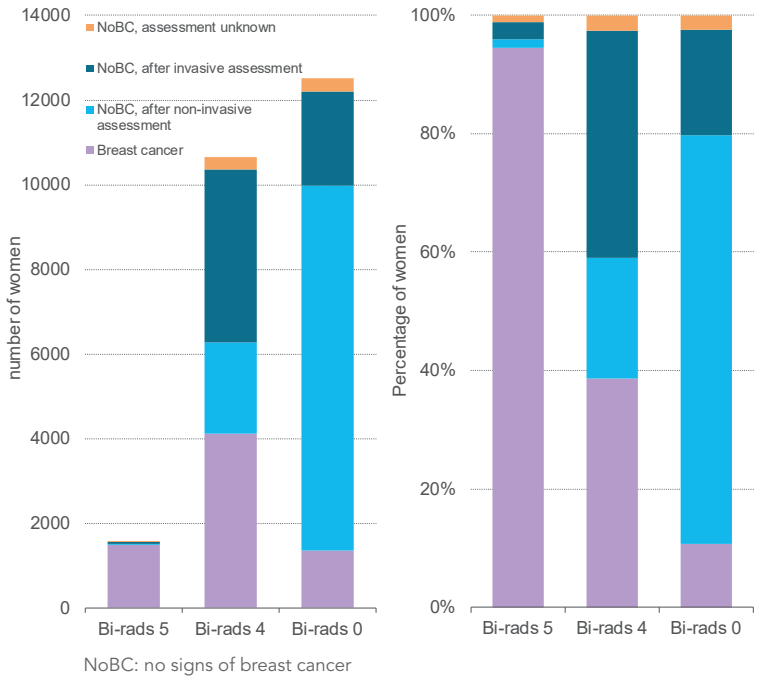
Table 1 **Main results 2016** compared with previous years

	2012	2013	2014	2015	2016
Targeted per year (x 1000)[1]	1,298	1,323	1,347	1,368	1,388
Nett target population per year (x 1000)	1,244	1,264	1,284	1,301	1,316
Screening examinations	1,008,452	1,017,187	995,708	1,023,091	1,020,983
Invited	101.7%	101.4%	98.4%	101.4%	100.3%
Overall attendance	79.7%	79.4%	78.8%	77.6%	77.3%
- attendance initial invitations	77.9%	77.3%	76.8%	75.6%	75.4%
- attendance reminder	18.4%	19.7%	16.8%	17.4%	16.5%
Re-attendance[2]	92.2%	92.2%	91.8%	91.1%	91.1%
Recall (referral) rate per 1000 women screened	**23.5**	**25.2**	**24.5**	**23.2**	**24.3**
- recall with BI-RADS 5	1.4	1.5	1.6	1.6	1.6
- recall with BI-RADS 4	8.8	9.5	9.2	9.4	10.4
- recall with BI-RADS 0	13.2	14.2	13.7	12.2	12.3
Response to recall (referral)	99.6%	99.6%	99.2%	99.6%	99.3%
Breast cancer detection per 1000 women screened	**6.7**	**6.9**	**6.9**	**6.8**	**6.8**
PPV recall (referral recommendation)	29%	27%	28%	30%	28%
False positive results per 1000 women screened	16.8	18.4	17.7	16.4	17.5
- after non-invasive assessment per 1000	10.8	11.9	11.4	9.9	10.6
- after invasive assessment per 1000	5.5	6.1	5.7	5.9	6.2
False positive results after BI-RADS 5	4%	4%	4%	4%	6%
- after non-invasive assessment[3]	2%	2%	1%	1%	2%
- after invasive assessment[3]	3%	3%	3%	3%	3%
False positive results after BI-RADS 4	56%	58%	58%	58%	61%
- after non-invasive assessment[3]	23%	21%	20%	17%	20%
- after invasive assessment[3]	31%	36%	36%	39%	38%
No signs of breast cancer after BI-RADS 0	89%	90%	89%	88%	89%
- after non-invasive assessment[3]	66%	69%	69%	68%	69%
- after invasive assessment[3]	20%	18%	17%	18%	18%
Screen-detected cancers	**6,748**	**7,008**	**6,844**	**6,999**	**6,969**
- Ductal carcinoma in situ (DCIS)	20.1%	21.9%	20.6%	22.7%	22.3%
- Invasive breast cancers	79.9%	78.1%	79.4%	77.3%	77.7%
Mean individual screening interval (months)	23.7	23.5	23.7	24.0	23.9
Next routine invitation within 24 ± 2 months	75%	79%	86%	85%	85%
Screening interval <2.5 years	95.5%	95.4%	95.5%	95.4%	95.0%
Result of screening examination < 10 working days	95.7%	98.2%	98.3%	98.5%	99.1%
Final screening result available/known < 6 months after screening	99.2%	99.4%	99.0%	99.3%	98.9%
Partially-assessable screening examinations	0.4%	0.4%	0.2%	0.1%	0.1%
Cost per screening examination (€)	64.05	65.05	66.06	66.30	67.01
Non-responders	12.2%	12.7%	12.8%	13.9%	13.9%
Non-participants	8.2%	8.0%	8.4%	8.5%	8.8%

[1] Source: Statistics Netherlands; [2] Calculated over last two screening rounds; [3] Percentages do not add up to total due to missing information

Table 1 Main findings 2016

- The target population continues to increase every year. In 2016 the target population comprised 1.388 million women aged 49-74, an increase of 1.4%.
- The attendance rate declined slightly, but less than before.
- Combined with a slight increase in overall referral rate the proportion of false positive results somewhat increased to 17.5 per 1000 screening examination. Both indicators seem to stabilize.
- With 6,969 cases of breast cancer detected, the detection rate remained stable at 6.8 per 1000 screening examinations.
- The proportion of in situ breast cancers decreased relatively with 2% to 22.3%.
- Of the women referred, 99.3% followed the advice they were given and had a clinical assessment.
- In 2016, the total cost of the screening programme was €68 million, the cost per screening examination was €67.



NoBC: no signs of breast cancer

- In 2016, 24.3 per 1000 screening examinations were referred. More than half of these women were referred based on BI-RADS 0, indicating a mammogram without sufficient information.
- In case of referral based on BI-RADS 0, 89% of the women had no signs of breast cancer.
- After referral based on BI-RADS 4, 60% were false positives. One out of 20 referrals were false positive after BI-RADS 5.

- In 2016 all women were referred to the outpatient breast clinic.
- From July 2017 onwards the women with BI-RADS 0 were referred to the Radiology department instead.

Glossary

BI-RADS: Breast Imaging Reporting and Data System, radiological classification system. BI-RADS 0: incomplete, further imaging or information required; BI-RADS 4: suspicious abnormality; BI-RADS 5: highly suggestive of malignancy

False positive results: number of referred women in whom breast cancer was not diagnosed per 1000 women screened

Final screening result known: the proportion of referred women whose final screening result is known within 6 months after screening examination

Interval cancer: breast cancer diagnosed in screened women during the interval between two screening rounds and where diagnosis did not follow from the screening examination

Invited: number of invited women from the target population

Mean individual screening interval: mean screening interval in months between previous and the current screening examination

Next routine invitation: the proportion of women invited for the current screening examination between 22-26 months after the previous screening examination

Non-participants: invited women who unsubscribed

Non-respondents: invited women who did not attend the programme and gave no notification

Overall attendance: proportion of women invited for screening who attended the screening programme as a result of this invitation

Partially-assessable screening examination: screening examination that does not meet the required quality for adequate diagnosis

Positive predictive value (PPV)**:** the proportion of women in whom referral resulted in a diagnosis of breast cancer

Programme sensitivity: the proportion of screen-detected breast cancers (of all breast cancers, screen-detected and diagnosed within the first 2 years after a screening examination)

Programme specificity: the proportion of women without breast cancer correctly not referred after a negative screening examination (of all women without breast cancer within the first 2 years after a screen examination)

Re-attendance: the proportion of attendees in the current screening round of the women who attended the previous round

Response to recall (referral): the proportion of referred women who followed the advice they were given and had a clinical assessment in hospital

Result of screening examination: the proportion of letters containing the result of the screening examination sent within 10 working days after the examination

Screening examinations: number of women who underwent a screening examination in a specific year, irrespective of the year of invitation.

Table 2

Interval cancers 2010 - 2014*

	2010	2011	2012	2013	2014
Screening examinations (x1000)	963	986	1,008	1,017	996
Screen-detected breast cancers	5,987	6,299	6,748	7,008	6,844
Breast cancer detection per 1000 women screened	6.2	6.4	6.7	6.9	6.9
Interval cancers	2,227	2,101	2,161	2,140	2,227
Interval cancers per 1000 women screened	2.3	2.1	2.1	2.1	2.2
Programme sensitivity	72.9%	75.0%	75.7%	76.6%	75.4%
Programme specificity	98.6%	98.5%	98.3%	98.1%	98.2%

* year of screening examination differs from Tables 1 and 3

- Data on interval cancers diagnosed within 2 years after a screening examination are available up to 2014 and were compared with the previous 4 years. During this period, the detection rate continued to increase.
- The proportion interval cancers remains stable.
- The programme sensitivity shows a steady annual increase, which seems to stabilize in 2014. A stabilization in sensitivity goes with a stabilization in specificity. This might be due to the fact that the transition to digital mammography was complete and the screening programme entered a stable situation.

Table 3

Incidence- and mortality rates

	2012	2013	2014	2015	2016
Incidence of breast cancer (ESR)[1]					
Incidence of invasive breast cancer / 100,000 (ESR)	346.1	342.7	341.6	335.8	330.4
Incidence of in situ breast cancer / 100,000 (ESR)	67.3	75.7	67.5	72.4	70.5
Breast cancer mortality / 100,000 (ESR)[2]	**61.8**	**58.6**	**55.2**	**59.2**	**57.4**
Breast cancer mortality compared with 1986/1988 50-74 years	-34.3%	-37.7%	-41.4%	-37.2%	-39.0%
Breast cancer mortality compared with 1986/1988 55-79 years	-33.1%	-37.3%	-40.7%	-34.0%	-39.0%

[1] Source: Netherlands Cancer Registry; [2] Source: statline.cbs.nl/statweb/

Again the incidence of invasive breast cancer declined slightly in 2016. Furthermore, the incidence of in situ breast cancer seems to stabilize. Compared to 2015, breast cancer mortality has improved in 2016, but has not returned to the level of 2014.

This monitor presents the main outcomes of the Dutch breast cancer screening programme in 2016 and compares them with previous years. The results are based on a predefined set of indicators measuring the quality of all the steps in the programme from invitation to the final outcome of screening; these data have been updated up to April 2018.

This monitor also includes data about interval cancers diagnosed within the first two years following screening in women screened up to and including 2014.

In order to interpret these results optimally, it is necessary to know the final screening results of at least 95% of referred women. This percentage was achieved in 2016 (99%).

Data on the incidence of breast cancer were derived from the Netherlands Cancer Registry (IKNL: www.cijfersoverkanker.nl). Data on breast cancer mortality originate from Statistics Netherlands (CBS; statline.cbs.nl/Statweb/). Both websites were consulted on May 2nd, 2018.

IKNL integraal kankercentrum Nederland

IKNL is the quality institute for oncological and palliative research and practice. IKNL collaborates with healthcare professionals and managers and patients on the continuous improvement of oncological and palliative care