

# national evaluation of **breast cancer** screening in the Netherlands July 2017



## findings 2015

		2014
invited	1.3 mln	1.3 mln
examined	1.0 mln	1.0 mln
mean individual screen interval (months)	24.0	23.7
attendance	77.6%	78.8
total cost per screen examination (€)	66.30	66.06
recall (referral) rate*	23.2	24.5
false positive results*	16.4	17.8
positive predictive value	29%	28%
detection rate*	6.8	6.8

\* per 1000 screening examinations

Again, the **attendance** rate declined slightly

A slightly declined **recall rate** led to a decrease in **false positive results**.

Despite the small decrease in recall rate, **detection rate** remained similar



This monitor is available on:

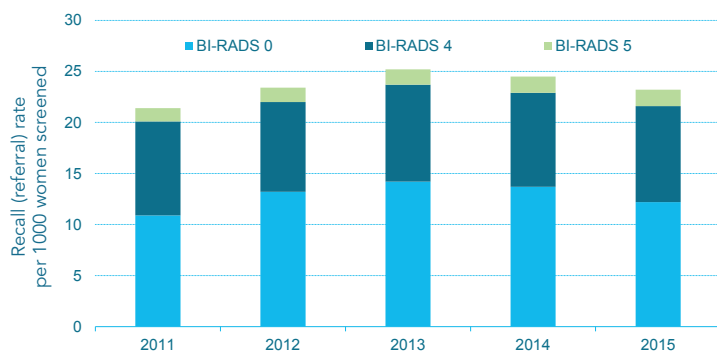
[www.iknl.nl/borstkankermonitor](http://www.iknl.nl/borstkankermonitor)

[www.rivm.nl/monitoring-evaluatie-bevolkingsonderzoek-borstkanker](http://www.rivm.nl/monitoring-evaluatie-bevolkingsonderzoek-borstkanker)

Table 1 Main results 2015 compared with previous years

	2011	2012	2013	2014	2015
<b>Targeted per year (x 1000)*1</b>	1,274	1,298	1,323	1,347	1,368
nett target population per year (x 1000)	1,225	1,244	1,263	1,283	1,299
screening examinations	985,506	1,008,450	1,017,186	995,705	1,023,088
invited	100.4%	101.8%	101.4%	98.5%	101.5%
<b>Overall attendance</b>	80.1%	79.7%	79.4%	78.8%	77.6%
- attendance initial invitations	78.4%	77.9%	77.3%	76.8%	75.6%
- attendance reminder	18.1%	18.4%	19.7%	16.8%	17.4%
re-attendance*2	92.5%	92.2%	92.2%	91.8%	91.1%
<b>Recall (referral) rate per 1000 women screened</b>	<b>21.4</b>	<b>23.5</b>	<b>25.2</b>	<b>24.5</b>	<b>23.2</b>
- recall with BI-RADS 0	10.9	13.2	14.2	13.7	12.2
- recall with BI-RADS 4	9.2	8.8	9.5	9.2	9.4
- recall with BI-RADS 5	1.3	1.4	1.5	1.6	1.6
response to recall (referral)	99.5%	99.6%	99.6%	99.1%	99.6%
<b>Breast cancer detection per 1000 women screened</b>	<b>6.4</b>	<b>6.7</b>	<b>6.9</b>	<b>6.8</b>	<b>6.8</b>
PPV recall (referral recommendation)	30%	29%	27%	28%	29%
<b>False positive results per 1000 women screened</b>	15.0	16.8	18.4	17.8	16.4
- after non-invasive assessment per 1000	9.6	10.8	11.9	11.4	9.9
- after invasive assessment per 1000	5.1	5.5	6.1	5.7	5.9
<b>BI-RADS result screening examination</b>					
BI-RADS 0	10,759	13,410	14,406	13,594	12,560
BI-RADS 1	928,588	945,812	952,644	927,708	956,861
BI-RADS 2	35,681	38,689	38,710	43,374	42,206
BI-RADS 4	9,028	8,887	9,696	9,163	9,584
BI-RADS 5	1,257	1,422	1,501	1,598	1,603
unknown	193	230	229	268	274
<b>False positive results after BI-RADS 0</b>	89%	89%	90%	89%	88%
- after non-invasive assessment*3	66%	66%	69%	69%	68%
- after invasive assessment*3	21%	20%	18%	17%	18%
<b>False positive results after BI-RADS 4</b>	57%	56%	58%	59%	58%
- after non-invasive assessment*3	26%	23%	21%	20%	17%
- after invasive assessment*3	30%	31%	36%	36%	39%
<b>False positive results after BI-RADS 5</b>	5%	4%	4%	5%	4%
- after non-invasive assessment	2%	2%	2%	1%	1%
- after invasive assessment	3%	3%	3%	3%	3%
<b>Screen-detected cancers</b>	<b>6,299</b>	<b>6,748</b>	<b>7,007</b>	<b>6,750</b>	<b>6,988</b>
ductal carcinoma in situ (DCIS)	19.5%	20.1%	21.9%	21.1%	22.7%
invasive breast cancers	80.5%	79.9%	78.1%	78.9%	77.3%
mean individual screening interval (months)	24.0	23.7	23.5	23.7	24.0
next routine invitation within 24 ± 2 months	72%	75%	79%	86%	85%
screening interval <2.5 years	94.7%	95.5%	95.4%	95.5%	95.4%
result of screening examination <10 working days	95.4%	95.7%	98.2%	98.3%	98.5%
final screening result available/known <6 months after screening	98.2%	99.2%	99.4%	98.9%	99.3%
partially-assessable screening examinations	0.3%	0.4%	0.4%	0.2%	0.1%
cost per screening examination (€)	57.68	64.05	65.05	66.06	66.30
non-responders	11.9%	12.2%	12.7%	12.8%	13.9%
non-participants	8.1%	8.3%	8.0%	8.4%	8.5%

<sup>1</sup> source: Statistics Netherlands; <sup>2</sup> calculated over last two screening rounds; <sup>3</sup> percentages do not add up to total due to missing information



- As expected, the referral (recall) rate decreased for the second year in a row. In 2015, 23.2 of 1000 women screened were referred for clinical assessment. This is a decrease of 5% compared with 2014 and was caused by a decrease in the number of women referred with BI-RADS 0.
- More than half the women referred in 2015 were referred with BI-RADS 0 (12.2 per 1000 screened women). This proportion is 11% lower than in 2014 (13.7 per 1000). Of the referred women, about 41% were referred with BI-RADS 4. Only 7% were referred with BI-RADS 5.

Table 1 **Main findings 2015**

- The target population continues to increase every year. In 2015 the target population comprised 1.3 million women aged 49-74, an increase of 1.6%.
- In 2015, more than 1.3 million women were invited for a screening examination, 4.4% more than in 2014.
- A total of 1,023,088 women attended the screening programme. Again, the attendance rate declined slightly to 77.6% in 2015.
- The decrease in overall referral rate resulted in an 8% decline in the proportion of false positive results to 16.4 per 1000 screening examination.
- Of the women referred, 99.6% followed the advice they were given and had a clinical assessment.
- With almost 7,000 cases of breast cancer detected, the detection rate remained stable at 6.8 per 1000 screening examinations. The positive predictive value was 29% in 2015.
- As expected, the proportion of false positive results was highest after referral based on BI-RADS 0 (88%). After referral based on BI-RADS 4, 6 out of 10 referrals were false positives. One out of 20 referrals were false positive after BI-RADS 5.
- Even though the stable detection rate and number of cases of breast of cancer remained the same in 2015 as in 2014, the proportion of in situ breast cancers increased to 22.7%.
- In 2015, the total cost of the screening programme was €68 million, the cost per screening examination was €66.3.

## 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 2008-2012\***

	2008	2009	2010	2011	2012
screening examinations (x1000)	918	913	963	986	1,008
screen-detected breast cancers	5,184	5,269	5,987	6,299	6,748
- breast cancer detection per 1000 women screened	5.7	5.8	6.2	6.4	6.7
interval cancers	2,111	2,033	2,227	2,101	2,161
- interval cancers per 1000 women screened	2.3	2.2	2.3	2.1	2.2
programme sensitivity	71.1%	72.2%	72.9%	75.0%	75.7%
programme specificity	98.7%	98.7%	98.6%	98.5%	98.3%

\* 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 2012 and were compared with the previous 4 years. During this period, the detection rate continued to increase. Additionally, the programme sensitivity shows a steady annual increase, particularly in 2011.

This might be due to the fact that 2011 was the first year that digital mammography only was carried out. The increase in sensitivity goes with a slight decrease in specificity and a stable number of interval cancers.

Table 3

**Incidence- and mortality rates**

	2011	2012	2013	2014	2015
<b>Incidence of breast cancer (ESR)<sup>1</sup></b>					
incidence of invasive breast cancer / 100,000 (ESR)	340.3	346.2	342.7	341.6	336.3
incidence of in situ breast cancer / 100,000 (ESR)	63.4	67.4	75.7	67.4	72.4
<b>Breast cancer mortality / 100,000 (ESR)<sup>2</sup></b>	<b>63.9</b>	<b>61.8</b>	<b>58.6</b>	<b>55.2</b>	<b>59.2</b>
breast cancer mortality compared with 1986/1988 50-74 years	-32.1%	-34.3%	-37.7%	-41.4%	-37.2%
breast cancer mortality compared with 1986/1988 55-79 years	-32.1%	-33.1%	-37.3%	-40.7%	-34.0%

<sup>1</sup> source: cijfersoverkanker.nl <sup>2</sup> source: statline.cbs.nl/statweb/

- The incidence of invasive breast cancer has declined slightly over the last few years. Despite the fact that the incidence of in situ breast cancer still appears to be increasing, a small decrease in the total incidence of breast cancer is discernible. In 2015, the drop in breast cancer mortality was less than in preceding years.

This monitor presents the main outcomes of the Dutch breast cancer screening programme in 2015 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 July 2017.

This monitor also includes data about interval cancers diagnosed within the first two years following screening in women screened up to and including 2012.

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 2015 (99%).

Data on the incidence of breast cancer were derived from the Netherlands Cancer Registry (IKNL: [www.cijfersoverkanker.nl](http://www.cijfersoverkanker.nl)). Data on breast cancer mortality originate from Statistics Netherlands (CBS; [statline.cbs.nl/Statweb/](http://statline.cbs.nl/Statweb/)). Both websites were consulted on May 1st, 2017.