Breast Cancer Screening Factsheet

What does breast cancer screening entail?

The National Breast Cancer Screening Programme is designed for women between 50 and 75 years of age. Once every 2 years, women in this age group are invited for a mammogram. The aim is to detect breast cancer at an early stage, when the prospects for successful treatment are greatest. Since the introduction of the Breast Cancer Screening Programme in the Netherlands, mortality associated with the disease has decreased by 31 %. The decline in mortality is attributable partly to screening-based early detection and treatment, and partly to improved treatment methods.

1. Disease characteristics

Breast cancer (ICD-9 code 174; ICD-10 code C50) is the condition characterised by malignant tumours in the breast. While it is predominantly women who suffer from breast cancer, men can also develop the disease. Breast cancer is the most common form of cancer in women.

In the Netherlands, approximately 14,000 women per year are diagnosed with invasive breast cancer and approximately 2,000 with in-situ breast cancer (1,2). The average age at the time of diagnosis is approximately 61 years (2). Each year around 3,200 women die as a consequence of breast cancer. Approximately 1 in 8 women in the Netherlands will develop breast cancer at some point in their lives (2). This makes breast cancer the most prevalent type of cancer in the Netherlands, with a ten-year prevalence of 94,000 (2, 3).

Factors associated with an elevated risk of breast cancer are: a family history of prevalent breast cancer; early puberty; relatively late motherhood; relatively small number of children; use of oral contraception; dense breast tissue. Other risk factors are alcohol consumption, physical inactivity and obesity (4).

The treatment of breast cancer depends on the stage and nature of the tumour and the prospects of survival. On average, over 82% of women diagnosed with breast cancer survive at least 5 years following this diagnosis and over 72% survive at least 10 years (2).

2. Purpose and target group

The purpose of breast cancer screening is to reduce breast cancer mortality by detecting the disease at an early stage, before symptoms appear. Screening does not prevent the disease. Women between the ages of 50 and 75 are invited for screening once every 2 years; the screening involves mammography of the breasts.

3. Facts and figures from monitoring year 2010 (1,6,7)

In 2012, over 1.3 million women in the Netherlands were invited for screening. Roughly 80 % of the invited women presented themselves for screening. In 2012, more than 1,000,000 examinations were performed.

Item (figures from monitoring year 2010)	Value	Trend
Target group per year	1,300,000	Rising slightly
Participation rate	80%	Falling slightly
Referrals per 1000	23.5	Rising (partly due to digitization)
Detection rate per 1000	6.3	Rising
Screening interval	23.7 months	Minor inter-regional differences
Interval carcinoma rate per 1000	2.2	Unclear; rising/stable
Number of breast cancers in the Netherlands per year	14,2000 (invasive)	Rising
Number of breast cancer-related deaths per year	3,200	Stable
Number of breast cancer-related deaths per 100,000 women (all ages)	38	Stable to falling slightly
Number of breast cancers detected by screening	6,600	Rising
Annual number of deaths prevented by screening	775	Rising

Screening takes place at 67 predominantly mobile mammography units. Each unit screens about 60 to 70 women per day. The mammograms are performed by a workforce of 550 specially trained radiological technicians. Roughly 150 screening radiologists assess the approximately 4 million mammograms that are produced each year. About a further 300 people are involved in the screening programme in administrative, technical, ICT, communication, management, evaluation and quality control positions.

Radiation burden

The average radiation dose per examination (based on 2 exposures per breast) is estimated at 0.62 mSv. This is well within the European radiation burden standard. Research by RIVM and the National Evaluation Team for Breast Cancer Screening (LETB) has shown that the risk of dying from breast cancer caused by radiation is very small and negligible in relation to the background risk. The average person in the Netherlands receives a natural radiation dose of approximately 2.4 mSv per year from the earth and outer space.

4. Performance

Procedure

Selection

- The screening organisations use data from the Municipal Population Register to invite women for screening.

Invitation

- Once every 2 years, women aged between 50 and 75 are invited to visit a mammography unit to be screened for breast cancer. The invitation is for a specific date, time and location, but alternative appointments can be arranged on request.
- The invitation is accompanied by information about the aim of screening, about the advantages and disadvantages of screening, about the procedure and about the organisational and statutory arrangements.

Mammography

- Most of the screening takes place in mobile mammography units. Screening involves producing mammograms of the woman's breasts.
- Within a few days, the mammograms are assessed by 2 specially trained radiologists, working independently of each other.
- Within 2 weeks of screening, the woman receives a letter informing her of the assessment's result.
- Women neither attending screening nor indicating that they do not wish to participate receive a reminder a few weeks later.

Referral

The various possible assessment results and the implications of each are described below. Results are expressed in the form of BI-RADS scores; BI-RADS stands for Breast Imaging Reporting and Data System.

- BI-RADS 1: Normal; no referral.
  BI-RADS 2: Benign abnormality; no referral.
  BI-RADS 0: Insufficient information to give a BI-RADS score; further examination necessary to establish whether the woman has a pseudo-abnormality, a benign abnormality or a malign abnormality; referral.
  BI-RADS 4: Malignancy suspected but picture not typical; referral.
  BI-RADS 5: Malignancy strongly suspected; referral.
- In cases where breast cancer is suspected, the woman is advised to contact her GP and provided with information about the subsequent diagnostic procedure. In addition, the subject's GP is informed about the suspicious result and is asked to contact his/her patient.
- In cases where breast cancer is not suspected, the woman is cautioned that screening cannot guarantee the absence of cancer and is advised to contact her GP if she should experience abnormal changes before her next screening cycle.

Which parties are involved in the screening programme?

- At the national level, screening is organised on behalf of the Ministry of Health, Welfare and Sport by the RIVM's Centre for Population Screening (CvB).
- Regional implementation is in the hands of 5 regional screening organisations (SOs): the Northern Regional Screening Foundation, the Mid-West Regional Screening Foundation, the Southern Regional Screening Foundation, the South-Western Regional Screening Foundation and the Eastern Regional Screening Foundation.
- (Medical-technical) quality control is in the hands of the National Expert and Training Centre for Breast Cancer Screening (LRCB) in Nijmegen.
- Annual monitoring and evaluation of the screening programme is undertaken by the National Evaluation Team for Breast Cancer Screening (LETB), whose secretariat is at the Erasmus Medical Centre in Rotterdam.
- The Breast Cancer Screening Programme Committee, set up by RIVM-CvB, advises CvB on issues associated with the national coordination of the programme. The Programme Committee is made up of experts from the relevant professions and experts from organisations with authority on particular topics or within specific networks.

Coordination with the health care system

At present, 2.1 % of the participating women are referred to a hospital for further examination. The average interval between the date of the first outpatient's appointment and the date that the results and treatment are discussed with the patient is set at a

maximum of one week. (5). The average waiting time for surgery is currently about 4 weeks (6). Research has shown that rapid diagnosis and treatment is desirable for reasons of emotional well-being. The responsible screening organisations monitor a referred woman until the follow-up examination.

Advantages and disadvantages

Advantages

- Participation in the screening programme reduces the risk of dying from breast cancer. Women who regularly participate in the screening programme have 50% less risk of dying from breast cancer than women who do not participate.
- The screening programme enables earlier detection and subsequent treatment of breast cancer. This reduces the risk of metastasis, increases the chance of recovery, and makes it more likely that the condition can be treated by less invasive methods.
- Every year, a tumour is detected in approximately 6.600 women following screening. Participation in the screening programme reduces the annual number of breast cancer deaths by 775.

Disadvantages

- Knowing several years earlier that one has breast cancer may be a psychological burden, especially in cases where earlier diagnosis does not result in life extension. Diagnosis also implies additional hospital visits for check-ups.
- The additional psychological and physical burden will have been unnecessary, if further examination reveals that the mammogram was incorrectly assessed to be suspicious. On average, false classification as suspicious occurs in 17 out of every 1000 women screened. The false classification rate is higher (48 out of every 1000 women) for first-time participants, and lower (12 out of every 1000 women) for women undergoing a follow-up examination.
- Women who are told that screening revealed no suspicious abnormalities might be over-reassured and less inclined to consult their GPs promptly if they subsequently develop symptoms.
- Roughly 2 in every 1000 women screened develop breast cancer in the 2 years between screening cycles.
- The screening programme does not provide full assurance: it fails to detect 1 in 3 cases of breast cancer.
- In some cases, particularly in older women, breast cancer may be detected whereas these women may not live long enough to have experienced problems if the cancer had gone untreated. Retrospectively, therefore, the treatment given to such women may be classed as unnecessary. In approximately 1 in 10 women with breast cancer, the growth rate of the tumour is so slow that they will probably not experience any symptoms during their lifetime. However, it is not possible to know at the time of diagnosis whether treatment will ultimately prove to have been unnecessary.

5. History

A National Breast Cancer Screening Programme began in the Netherlands around 1988. Until 2006, the programme was coordinated by the Health Care Insurance Board and its predecessor, the National Health Insurance Fund Council. Since 2006, coordination and management have been in the hands of RIVM's Centre for Population Screening. By the end of 1996, the programme had sufficient capacity to screen all women aged 50 to 69 once every 2 years. In 1998, the target group was extended to women up to the age of 75. In 2002, a number of pilot projects were set up to investigate the feasibility of

migrating to digital screening. From 2010, all screening administration in the Netherlands will be paper-free and data will be stored centrally. Between 2008 and 2010, the 21 smaller Dutch screening organisations engaged in breast and cervical cancer screening were merged to form 5 cancer screening organisations, which are responsible for all existing cancer screening activities in their respective parts of the country.

The Health Council of the Netherlands is an independent scientific advisory board that provides scientific advice on the benefits of the Breast Cancer Screening Programme for the Minister of Health, Welfare and Sports. In June 2012, the Minister has asked the Health Council to update the recommendation on the Breast Cancer Screening Programme. Early 2014, the Health Council presented its recommendation regarding the effectiveness and the balance between the advantages and disadvantages of the Breast Cancer Screening Programme in the Netherlands. This information is presented in the report: Population screening for breast cancer: expectation and developments, and available on the website: http://www.gr.nl/en/news/population-screening-for-breast-cancer-expectations-and-developments.

6. Developments

- There are initiatives regarding reduction of adverse effects of false-positive referrals: an alternative route for women with a BIRADS 0 result is being developed. During the first phase general practitioners will refer these women to the radiology department instead of going to the breast clinic. At the radiology department the radiologist does (fast and simple) additional imaging studies. By framing a different message ('additional images are needed' instead of 'a suspicion is found') in combination with fast diagnosis the disadvantages of false positive referrals (e.g. unnecessary invasive diagnostic procedures and anxiety) are reduced.
- It is known that women with dense breast tissue have a 4 to 6 times higher risk of developing breast cancer. High tissue density also reduces the sensitivity of the mammographic assessment. It is important to improve understanding of the related issues and to investigate possible additional or alternative strategies for screening such women. LRCB is looking into the possibility of systematically gathering tissue density data. The Julius Centre at Utrecht University Medical Centre is running the 'DENSE trial' to establish whether women with high breast tissue density would benefit from additional MRI scanning.
- On a regular basis, studies are undertaken to identify methods and techniques capable of reducing pain associated with the squeezing of the breast during mammography. Examples include research into the use of special film on the paddles, and the perceived pain implications of changing to a pressure-based protocol instead of a force-based protocol. Besides the scientifically proven mammography method, there is also alternative research conducted on a breath test (Maastricht University) and pammography (Twente University). Both developments are still in the experimental stage, but are closely monitored.
- A number of studies are being carried out as part of the ongoing digitization of the screening programme. The role of computer-aideded detection is under investigation in several projects.
- Since 2014 there is also focus on the development of a new IT-system.
- Tomosynthesis is a new 3D technique. In addition to the traditional 2D mammograms 3D tomo slices of breast tissue are composed. Tomosynthesis is a promising method. Introduction is dependant on scientific progress, cost-effectivity and feasibility issues.

The developments and possibilities for the Dutch screening setting are currently investigated by the LRCB, the LETB, the Screening Organisations and the RIVM-Centre for Population Studies.

7. Financing

The screening programme is funded by the Dutch government. The screening organisations receive grants to meet the cost of screening within their respective regions. The grant payable is the number of examinations performed multiplied by a unit tariff. RIVM is paid to oversee the programme by the Ministry of Health, Welfare and Sport. RIVM's role includes commissioning and paying for LRCB's quality assurance activities (roughly 1,8 million euros per year) and the LETB's annual monitoring and evaluation activities (roughly 450,000 euros). The total cost of the breast cancer screening programme is approximately 64 million euros per year.

8. International

Organised breast cancer screening takes place in more than 30 countries worldwide. The UK, Iceland, Sweden, Denmark and Norway all have nationwide screening programmes similar to the Dutch programme. In the countries listed, between 70 and 80 % of the target group participates and screening takes place in dedicated research units, some of which are mobile. Participation rates are significantly lower in almost all countries where screening is not organised centrally. However, this is not the case in Finland, where women often have to take the initiative to arrange appointments and examinations are usually performed in radiological departments and institutes.

9. Websites

www.bevolkingsonderzoekborstkanker.nl
www.cijfersoverkanker.nl
www.zorgatlas.nl
www.nationaalkompas.nl
www.breastcancerscreening.eu
www.lrcb.nl
www.erasmusmc.nl
www.kwf.nl

10. References

1) LETB Report 2012 (www.bevolkingsonderzoekborstkanker.nl)
2) www.cijfersoverkanker.nl
3) www.nationaalkompas.nl
4) www.kwf.nl
5) http://www.soncos.org/ (http://www.oncologieenpraktijk.nl/nieuws/eerdere_nieuwsbrieven/nieuwsoverzicht_november_2012/soncos_normering)
6) Verantwoording kerngetallen bevolkingsonderzoek borstkanker
7) www.cbs.nl