The NHS breast screening programme

This article reviews the NHS breast screening programme and outlines some of the issues it currently faces.

The NHS breast screening programme was set up by the Department of Health in 1988 in response to the Forrest report. The NHS breast screening programme started sending invitations for screening to women in 1988.

The Forrest (1987) review determined that a screening programme should have the following factors:

- The condition that is being screened for should pose a significant health problem
- The natural history of the disease and the 'lead time', i.e. period between the detection of a cancer at screening and when it would have presented clinically, should be understood
- Detecting the disease early and treating it should have a positive impact on survival
- The test used to detect the disease should be acceptable to the public
- If the disease is of insidious onset, the duration between testing should be based on the natural history of the disease
- There should be adequate facilities for diagnosis and treatment
- The benefit to the person should outweigh any harm (physical or psychological) caused by the screening test
- The cost of the screening programme should be balanced by the money saved and benefit of early diagnosis.

How does the programme work?

The NHS breast screening programme started screening in 1988. Initially women were screened every 3 years from the age of 50–64 years with a single mammographic view of each breast. A mediolateral oblique view which covers from the nipple anteriorly to the pectoral muscle and infra-mammary fold posteriorly (essentially including the entire breast on a single view) was performed. This single view was routinely performed until 1999, at which stage the results of a large randomized controlled trial undertaken by the UK Coordinating Committee on Cancer Research had shown that two-view mammography was better. Using both a mediolateral oblique and a craniocaudal view in the prevalent (first) round detected 24% more cancers and resulted in a 15% lower recall rate (Wald et al, 1995). From 2003 women routinely underwent two-view mammography. The second view was used in the confirmation of an abnormality which helped to reduce the number of unnecessary recalls to assessment and localized the apparent lesion in the breast. In 2000 the screening age was extended to 50–70 years.

More recently, in 2010, the programme has seen another extension in age, involving women aged 47–50 years and 70–73 years. This is considered a trial and should be fully completed by 2016 and further guidance from the NHS breast screening programme is awaited to see if it is beneficial to screen women in these age bands. However, it is important to note that this information will not be available for some years to come. Women are invited through their registered GP practice for screening on a 3-yearly cycle, so will be screened at some time during that 3-year period. With this age extension this will result in two extra screens per patient, now with nine screens in their lifetime.

Screening results procedure

It is important to remember that mammograms are not infallible. Some lesions, either extremely laterally or medially placed or in the infra-mammary fold, may not be included in the field of the mammogram and therefore if the patient mentions she has a 'lump' to the radiographer at the time of screening she may be recalled for a clinical review.

Screening mammograms are read by two readers (radiologists, advanced practitioner radiographers or computer-assisted detection). If there is a disagreement in opinion, then a third person will arbitrate (have the final say).

Patients will be sent a letter to say either that their mammogram is normal, or else to recall them for assessment. They should ideally receive this information within 2 weeks to reduce unnecessary psychological stress. They are sent an information leaflet explaining what to expect at the visit. At recall they will be examined, usually have extra mammographic views and an ultrasound performed. Biopsies of any suspicious abnormalities will be performed. The aim is to have a low recall of benign lesions (to reduce unnecessary stress) and to recall cases of malignancy to make a diagnosis while lesions are small and treatable.

The NHS breast screening programme has a significant quality assurance programme to ensure the highest standards are met. Quality assurance provides an annual report on screening centres and performs a 3-yearly visit to each centre to ensure that all standards are being met. Regular audit is essential to ensure ongoing standards.

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'Interval cancers' are the symptomatic presentation of a breast cancer at some stage in the 3 years between screening mammograms. This may result from a 'false negative' assessment – where a woman has been recalled and assessed but no cancer has been detected or a cancer has been missed, and the patient presents later symptomatically. Or this may be a new cancer which has occurred and presented after the last screening mammogram but before the next scheduled screening mammogram. All such cases are reviewed internally by the screening department to assess for learning points and ensure quality assurance. Women who find themselves in this category are invited to meet with a radiologist and discuss their individual case.

Other issues for patients include pain associated with mammography and the negative effect this may have, with patients failing to continue on the screening programme. Psychological stress is associated with a recall to assessment, benign biopsies and waiting times for appointments and then for results.

In the early years analogue mammogram images (hard copy radiographs) were performed. This resulted in issues of reviewing old images and storage. With the advent of digital imaging, images should be more readily available for review and comparison, but new problems exist regarding electronic storage, including storage capacity, the ability to archive images electronically and be able to retrieve them when needed, and the cost of electronic or digital systems and storage and their upkeep.

Between April 2010 and March 2011 2.8 million women aged 45–74 years were invited for screening. Across the UK an average of 73% of women accepted their invitation. Historically there is a lower uptake in London at 59%, because of the diverse and mobile nature of the population. Of the 2 188 608 women screened, 90 141 (4.1%) women were recalled for assessment. A total of 17 258 cancers were detected, with 7053 measuring <15 mm and 3527 cases of in situ cancer. There were 1620 benign biopsies.

Over-diagnosis and over-treatment

Much debate exists concerning the benefits of reduced breast cancer mortality resulting from breast screening and the harms caused by screening, i.e. over-diagnosis and/or over-treatment. This prompted the organization of a review of the UK breast screening programme to answer these questions, known as the Marmot review (Independent UK Panel on Breast Cancer Screening, 2012).

The Marmot review consisted of a panel of independent reviewers, experts in their fields but without any perceived bias (not previously published on the topic of breast screening), who focused on the effects of screening on mortality and over-diagnosis in the UK breast screening programme. They reviewed all the available data.

'Over-diagnosis' is a significant concern and represents the detection of cancers which are detected at screening and treated but would not have manifested themselves if not detected at screening or would not have been the cause of death of the women, i.e. not have become clinically apparent in the women's lifetime (Independent UK Panel on Breast Cancer Screening, 2012). It is not currently possible to determine which cancer treated by conventional means (surgery, radiotherapy, chemotherapy and endocrine therapy) would have presented clinically without screening and possibly contributed to the patient's death if not detected by screening.

The Marmot review (Independent UK Panel on Breast Cancer Screening, 2012) stated that the evidence suggests that there is a 20% relative risk reduction in breast cancer mortality in the groups invited for screening (95% confidence interval 11–27). For every 10 000 women invited to screening from 50 years of age, for 20 years, 681 cancers will be found, 129 of which will represent over-diagnosis and 43 deaths from breast cancer will be prevented (Independent UK Panel on Breast Cancer Screening, 2012).

The detection and treatment of ductal carcinoma in situ and minimally invasive lesions has also been a source of criticism directed at the NHS breast screening programme. The question arises as to whether these cases are over-diagnosis or over-treatment. More cases of ductal carcinoma in situ are detected at screening than symptomatically. It is difficult to tell which cancer will progress and cause death. It is likely that the small <10 mm, grade 1 tubular cancers and cases of small-sized low grade ductal carcinoma in situ will be less aggressive than high grade tumours. Prospective studies looking at these issues are required to guide radiologists, surgeons and oncologists in the future.

Conclusions

It is accepted that the NHS breast screening programme saves lives. However, with the benefits come some risks. For every one death prevented, three women will be over-diagnosed (disease identified and treated). Hence the topic remains a contentious subject with ongoing debate.

In breast screening the aim is to diagnose early and have a positive impact on outcome, with minimal harm to the patient. This may be achieved with better patient education to ensure informed decisions. **BJHM**

Conflict of interest: none.

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KEY POINTS

- Breast screening saves lives.
- There is a risk of over-diagnosis.
- More education is needed for women to make informed decisions.
- Aim to diagnose cancers early to have a positive impact on outcome, with minimal harm to the patient.