Female breast cancer is a common disease with a lifetime risk of 1:8. The incidence of breast cancer appears to be rising inexorably and, until recently, no impact had been made on breast cancer mortality despite the medical profession’s best efforts. Following the recommendations of the Forrest Report,1 a UK NHS Breast Screening Programme (NHSBSP), the first of its kind in the world, was introduced in 1988.

It envisaged a 25% reduction in population mortality for women aged between 50 and 64 invited for triennial single-view screening mammography, provided at least 70% of those invited actually turned up for screening. It soon became apparent that cancer detection rates were not as advertised, which led to the introduction of two-view mammography at the prevalent screen in 1995, two-view mammography at all screens in 2003, and more recently double reporting of screening mammograms as the norm. The age range is also being extended to cover the age span 47-73 years by 2012. Thus the cost of the programme has risen inexorably too, currently £96 million a year for England.2 National breast screening programmes have subsequently been introduced across Europe and beyond, all promoting the message that screening saves lives.

Almost from the outset there have been detractors variously claiming that the evidence for screening is shaky, women are being misinformed about the benefits of screening, that monies could be better spent elsewhere. Each published article criticising screening is met by a fierce rebuttal by screening proponents. In view of the entrenched positions held by opposing experts, in the UK an independent review of the evidence for screening is underway and will report in early 2012.2

The good
Saves lives
The NHSBSP screens 1.3 million women each year, about 75% of those invited, and diagnoses 10,000 breast cancers annually.3 Even among the detractors there is acknowledgement that screening saves lives. The debate is centered round whether the reduction in mortality due to screening is worthwhile. Mortality rates from breast cancer, having remained steadfastly static since records began, showed a dramatic decline in the early 1980s that continues, due to the introduction of screening and concurrent improvements in treatment. Determining the relative contribution of screening to this decline is problematic but it is estimated that, of the 25% reduction in population breast cancer mortality in the 50-69 age group achieved since 1990, roughly half is due to screening. For those women actually screened there is an estimated 35% reduction in mortality, which for the UK translates to saving 1,400 lives each year.

Less disfiguring surgery
Breast cancers diagnosed by screening tend to be smaller than those diagnosed when they become symptomatic, thereby allowing less disfiguring surgery and fewer mastectomies.

Improved imaging
One of the less well recognised plus points of the introduction of breast screening in the UK was the rapid phasing out of suboptimal breast imaging equipment with the requirement that replacements met stringent national quality guidelines. This ensured imaging throughout the programme was of optimal and uniform quality. As in other areas of radiology, conversion from analogue to digital breast imaging is underway and will have added benefits of reduced radiation dose, improved diagnostic capability in the dense breast and computer aided detection (CAD). CAD is currently used as a ‘second read’ in many non-UK screening services and has the advantage that it does not suffer from fatigue, does not get distracted, and does not get disheartened by all the negative press surrounding breast screening!

Specially trained staff
All staff involved in UK breast screening (clerical, radiographic, nursing, radiologists, surgeons, pathologists, oncologists, radiotherapists) are required to undergo specialised training and regularly demonstrate, by external audit, that they remain competent and up-to-date. This has ensured that the screening service has achieved and continues to maintain the highest standards. The screening service has also strengthened the multidisciplinary team approach to the management of breast disease per se, with the benefit of raising standards and reducing errors in diagnosis and management.

Improved symptomatic breast service
As a result of being recognised as being specifically trained in the diagnosis and management of breast disease, breast specialists involved in the screening programme have naturally displaced colleagues in the symptomatic service who cannot demonstrate the same degree of expertise. The symptomatic breast service is now fast becoming subject to the same stringent quality standards as the screening service, and the outcome will undoubtedly be improved outcomes for symptomatic patients.

Stimulated research into breast cancer
The introduction of National Breast Screening Programmes, and the attendant publicity that ensues, has led to a raised public profile of breast cancer. This, in turn, has stimulated extensive charity and government funded research into breast disease and its management. This has extended our knowledge base about the cause and natural history of breast cancer to an extent and with a speed that would have been impossible otherwise.

The bad
Higher risk patients get a poor deal
Approximately 85% of all breast cancers arise in women with no significant family history of breast cancer; their lifetime risk of developing the disease is approximately 12%.
Women with a moderate family history of breast cancer have a 15-20% lifetime risk of breast cancer and account for about 10% of all breast cancer cases. The remaining 5% of cancers arise in women who have a very significant family history, usually as a result of an inherited gene mutation such as BRCA1 and BRCA2; their lifetime risk of breast cancer can exceed 80%.

It is a curious anomaly that although the aim of a breast screening programme is to reduce mortality from breast cancer, woman who are at higher risk of developing the disease have not, until recently, been seen as a group requiring closer screening. The availability of family history clinics to identify women at higher risk is patchy and there is no consensus as to how best to manage them once identified.

False negative mammograms
Between 10-20% of cancers do not show on mammography. Symptoms produced by mammographically occult cancers may, in the short-term, be ignored by both patient and doctor because of the falsely reassuring normal mammogram report and thereby cause delay in diagnosis, possibly resulting in a worse outcome for the patient.

False positive mammograms
Between 5-7% of women screened are called back for further assessment of a perceived potential abnormal finding. Of these, seven out of eight will be shown to be normal or have benign changes. A proportion of these will require invasive diagnostic procedures and occasionally even surgery to come to a firm diagnosis. Apart from the considerable use of resources this entails, the anxiety and uncertainty suffered by the patient can be significant.

The ugly
Radiation dose to the breast
The breast radiation dose from a single two-view mammographic examination is typically 5.4mGy. Younger breast tissue is more sensitive to radiation. The genetic makeup of women falling into the higher risk categories for developing breast cancer may be such that their breast tissue is more sensitive to radiation damage. The temptation is to screen these higher risk women more frequently and from an earlier age, thereby potentially subjecting these women with more, not less, radiation. It is estimated that for every 100 cancers detected by screening, one radiation induced breast cancer is caused by screening. Furthermore, irradiating a breast after cancer diagnosis is thought to increase the risk of developing a contralateral breast cancer by 9%. Overdiagnosis of cancers that would not cause harm
There are different types of invasive breast cancer. Some are so aggressive that early detection by screening does not influence outcome. Some are so ‘benign’ in their behaviour they do not cause harm in the life remaining. Some cases of ductal carcinoma in situ (DCIS) are thought to be precursors of invasive cancer, some not. Currently we have no way of knowing beforehand which cases of DCIS progress, so all cases are excised. Thus, some invasive cancers and some cases of DCIS treated by surgery represent overtreatment. It is estimated that of the eight cancers detected and treated per 1,000 women screened, 2.3 will represent overtreatment. False negative interpretation of mammograms
An experienced film reader will detect 80 cancers per 10,000 cases read but will miss some cases too. Although not a requirement in the UK screening programme, double reading of screening mammograms has become the norm after research showed that the introduction of a second film reader increased cancer detection rates by between 5-15%. Thus, a solitary film reader can be expected to miss between four and 12 cancers per 10,000 cases read. It is also a very unfortunate statistic (for women and radiologists) that for every 1,000 screening cases brought back for further assessment, an estimated six cancers will be assessed as normal or benign and be returned to screening undiagnosed.

Conclusion
In recognition of the voices raised in criticism of the screening programme, the NHSBSP is to redesign its information leaflets to more clearly state the risks, as well as the benefits of screening. Calls for screening to be abandoned seem nonsensical. It is stretching credulity to think that after 23 years and massive investment, the Government will conclude it has been money wasted. Breast screening is here to stay (in some form). Why throw out an albeit imperfect test until a better one is available? Maybe the answer to some criticism is to be more clever about whom we screen. Each screening unit will have experience of screening a woman in her 90s suffering from dementia because a care giver has discovered a breast lump while washing her charge. I have no wish to appear ageist, and presumably in this politically correct age the carer didn’t either, but the point I am making is that we do have to be more sensible about when it makes sense to screen.

References
2. www.cancerscreening.nhs.uk/breastscreen/cost.html
3. www.bbc.co.uk/news/health-15444879