for breast-cancer mortality reduction. *Int J Cancer* 1995, **60**, 777–780.
12. Vessey M. Breast cancer screening 1991: evidence and experience since the Forrest report. A report of the Department of Health Advisory Committee. NHS Breast Screening Programme. NHSBSP Publications, Sheffield, 1991.
13. de Koning HJ, van Ineveld BM, de Haes JCJM, van Oortmarssen GJ, Klijn JGM, van der Maas PJ. Advanced breast cancer and its prevention by screening. *Br J Cancer* 1992, **65**, 950–955.
14. Day N, McCann J, Camilleri-Ferrante C, *et al.* On behalf of the Quality Assurance Management Group of the East Anglian Breast Screening Programme. Monitoring interval cancers in breast screening programmes: the East Anglian experience. *J Med Screening* 1995, **2**, 180–185.
15. van Gessel-Dabekaussen AAMW, de Koning HJ. Participation in population screening programme for breast cancer (in Dutch). *Mndber Gezondheid* (CBS) 1995, **14**, 4–15.
16. Woodman CBJ, Threlfall AG, Boggis CRM, Prior P. Is the three year breast screening interval too long? Occurrence of interval cancers in NHS Breast Screening Programme's North Western region. *Br Med J* 1995, **310**, 224–226.
17. Chen H-H, Tabár L, Fagerberg G, Duffy SW. Effect of breast cancer screening after age 65. *J Med Screening* 1995, **2**, 10–14.
18. United Kingdom, House of Commons Health Committee. Breast cancer services, minutes of evidence. Session 1994–95, 23 March 1995. Third Report: Breast cancer services, Volume 1. Session 1994–95, 6 July 1995 + Government response, October 1995.
19. Boer R, de Koning HJ, van Oortmarssen GJ, van der Maas PJ. In search of the best upper age limit for breast cancer screening. *Eur J Cancer* 1995, **31A**, 2040–2043.
20. de Haes JCJM, de Koning HJ, van Oortmarssen GJ, van Agt HME, de Bruyn AE, van der Maas PJ. The impact of a breast cancer screening programme on quality-adjusted life-years. *Int J Cancer* 1991, **49**, 538–544.
21. Ellman R, Thomas BA. Is psychological wellbeing impaired in long term survivors of breast cancer? *J Med Screening* 1995, **2**, 5–9.
22. Nyström L, Larsson L-G. Breast cancer screening with mammography [Letter]. *Lancet* 1993, **341**, 1531–1532.
23. Tabár L, Duffy SW, Chen H-H. Quantitative interpretation of age-specific mortality reductions from the Swedish Breast Cancer-Screening Trials. *J Natl Cancer Inst* 1996, **88**, 52–53.
24. Nyström L. Update of the statistical analysis of screening women aged 40–49 in the combined Swedish trials. In *Congress Proceedings of the International Conference "The Impact of Breast Cancer Screening with Mammography in Women aged 40–49 Years"*. March 21–22 1996, Falun, Sweden.
25. Brown ML, Fintor L. Cost-effectiveness of breast cancer screening: preliminary results of a systematic review of the literature. *Breast Cancer Res Treat* 1993, **25**, 113–118.
26. US Congress, Office of Technology Assessment. Breast cancer screening for Medicare beneficiaries: Effectiveness, costs to Medicare and medical resources required. U.S. Government Printing Office, Washington DC, 1987.
27. van Ineveld BM, van Oortmarssen GJ, de Koning HJ, Boer R, van der Maas PJ. How cost-effective is breast cancer screening in different EC-countries? *Eur J Cancer* 1993, **29A**, 1663–1668.
28. Beemsterboer PMM, de Koning HJ, Warmerdam PG, *et al.* Prediction of the effects and costs of breast-cancer screening in Germany. *Int J Cancer* 1994, **58**, 623–628.
29. Boer R, Warmerdam P, de Koning H, van Oortmarssen G. Extra incidence caused by mammographic screening [Letter]. *Lancet* 1994, **343**, 979.
30. Beral V, Hermon C, Reeves G, Peto R. Sudden fall in breast cancer death rates in England and Wales [Letter]. *Lancet* 1995, **345**, 1642–1643.

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Contra: J.W.W. Coebergh, Department of Epidemiology and Biostatistics, Erasmus University Medical School, P.O. Box 1738, 3000 DR Rotterdam; and Comprehensive Cancer Centre South (IKZ), Eindhoven, The Netherlands

FEMALE HEALTH AND BREAST CANCER RISKS AND TRENDS

NEVER BEFORE in history have women in industrialised countries had a more favourable life expectancy than today; for those over 55 years of age, mortality for the major diseases is generally two to three times higher for males, so male life expectancy is 5 to 7 years shorter. Although breast cancer is the most frequent female cancer, 9 out of 10 women ultimately will not develop breast cancer and 19 out of 20 will not die from it in North-Western Europe and the U.S.A. Whereas the incidence of breast cancer in most of these countries has increased at all ages according to birth cohort, and since the mid 1970s, upon the introduction of mammography, age-adjusted mortality rates have either increased slightly or remained unchanged. They started to decline among premenopausal women (especially those born after 1950) in the high-incidence populations in the U.K., Switzerland, Holland, Scandinavia except Norway, and the U.S.A. [1]. For women over 70 years of age an increase was generally observed, while life expectancy rose by a few years. In Southern and Eastern Europe, the breast cancer rates are generally lower, but on the increase. In high incidence populations, relative 10-year survival for patients 45–74 years of age with clinically detected cancer was more than 50%, being lower in populations with low incidence rates and/or a less favourable stage distribution [2]. Smaller and less aggressive cancers have increasingly been detected since the 1970s, even without organised screening programmes [3], which probably lowers the gain of screening in the future. Moreover, wide application of effective hormonal and cytotoxic therapy is likely to affect mortality from breast cancer [4].

Correspondence to J.W.W. Coeergh at the Department of Epidemiology and Biostatistics, Erasmus University Medical School, P.O. Box 1738, 3000 DR Rotterdam, The Netherlands.

BREAST SCREENING AND MANAGEMENT OF NON-PALPABLE LESIONS IS COMPLEX

The literature on the screening and management of non-palpable lesions appears to contain more incitements of high quality than any other care programme [5], which is also relevant for the communication between the various physicians involved, and between them and the worried healthy women, whose risk perception is often determined by 'worst case' scenarios. Therefore, screening for breast cancer, together with management of non-palpable lesions, comprises a complex set of medical activities with uncertain outcome, whose final measurement demands a long period of time. Also, in view of the subjective and paradoxical nature of medical and political decision making processes, 'the' effectiveness and cost of breast cancer screening must be considered within a broader context of the health service and public health, taking the capacity of the health service and female life expectancy into account as well as 'competitive' breast cancer mortality lowering interventions. There may also be differences between screening as epidemiological research and in clinical practice, so future effectiveness may be different from past efficacy. The often-cited evaluation criteria of Wilson and Junger [6] are largely insufficient for this purpose. My evaluation occurs at different levels and comprises: desirability (values), efficacy (scientific proof), effectiveness (future efficacy in 'routine' practice), side-effects (positive and negative; for patients, doctors and care system) and, derived from this, efficiency. Finally, a screening programme, being initialised by care providers, can be weighed at these levels against other care programmes.

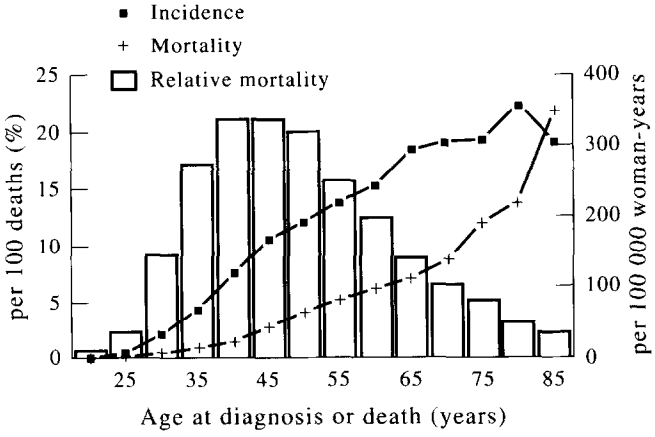
Most evaluations of mass mammographic screening show it to be an effective intervention against death from breast cancer in women above 50 years of age of which the cost per life-year saved seems reasonable. This is based on research programmes carried out in high breast cancer mortality populations within adequately functioning health care systems which were not too strained. Nonetheless, I have serious doubts about the short term side-effects and the long-terms effects and costs, even in The Netherlands, with a relatively appropriate organisation and funding of the health service, in which a nationwide screening programme of biannual double view mammography was introduced for all women between 50 and 70 years of age. Despite many years of intensive policy-making, mass breast screening was considered in isolation, instead of being just one of the tools of increasingly complex breast cancer management in which breast sparing treatment was also introduced. First, the nature of screening in medical research and medical practice will be clarified.

SCREENING IS EPIDEMIOLOGICAL RESEARCH RATHER THAN MEDICAL PRACTICE

Screening is at the beginning of the systematic observation of determinants of the course of diseases with a long preclinical phase, usually by means of a population-based survey, with regular and long-term follow-up. Sometimes minimal interventions are carried out, preferrably tested by means of controlled studies. This becomes difficult when new technologies and/or better tumour biology lead to a higher prevalence of less aggressive disease determined by more sensitive detection methods [7]. Diagnosis in chronic diseases is like uncovering the tip of an iceberg, which is always well illustrated in autopsy studies of most cancers [8]. The prevalence of (pre)malignant breast lesions was as much as 40% in women of 40 to 54 years who had died in accidents [9]. Only one in four of these women would probably ever have developed clinically relevant breast cancer and one in eight would have died from it. The study of disease progression and regression in screen-detected lesions is a virgin-like field, in which diagnoses of early phases or lesions of disease must repeatedly be revised. Apparently simple calculations of the sensitivity, specificity or predictive value of death of diagnostics are not only dependent upon the detection methods and skills of the practicing scientist (with learning curves), but also upon the shifting classification of potential lethal malignancy. Such subtleties do not work well in risk-shunning medical practice in which premalignant forms of breast cancer tend to be considered as lethal, if not by the pathologist, who unfortunately does not have the most appropriate terminology available [10], then by the surgeon and even more by worried women. This would be less of a problem if non-invasive, 'simple' treatments of DCIS lesions existed with few side-effects. Because of the long time-span needed for evaluation of mortality, the effects of screening are likely to be diluted rather than enhanced in the future by 'competitive' effects of a variety of other death-risk reducing interventions. One could argue that screening for breast cancer should not leave the research phase unless the threat of cancer (treatment) can be managed properly.

PREVENTION OF BREAST CANCER IS DESIRABLE

Should mass screening of a lethal disease, such as breast cancer, a complex and costly affair, in part due to overdiagnosis, be performed among postmenopausal women in industrialised countries whose life-expectancy has already improved dramatically in the last 50 years (at any age), and certainly compared to men? This phenomenon is even stronger among women of higher social classes. Will women, most of them already widowed for up to 15 years, not have other health worries? They are never asked. Alternatively, the desirability of preventing breast cancer, the most frequent cancer among women and a mutilating disease, is great, but the means are still far from perfect. Given current knowledge, primary prevention would have to start after menarch, but this is still in the distant future, and current knowledge of pathogenesis is insufficient for application of low-cost 'end' technologies. More research is thus desired. Avoiding breast cancer (death) in premenopausal women, i.e. by means of screening, would be more desirable because the relative mortality is high (Figure 1). However, mass screening has even less to offer women in middle age [11] when they are usually most needed by their (grand)children and/or partners and more life-years can be gained. Then there is the problem of resources: the extra expense of a screening programme must either by subtracted from other health-care activities or added to the—in the view of many policymakers—costs of the already overburdened, ever extending and unmanageable health-care system, with further risk of creating a precedent for introduction of other screening programmes, for example, for



Source: The Netherlands Cancer Registry & Central Bureau of Statistics

Figure 1. Age-specific incidence of and (relative) mortality from breast cancer in The Netherlands (1989).

colorectal and prostate cancer, which may be inefficient, as seen in cervical cancer screening.

MASS BREAST SCREENING BECOMES LESS EFFICACOUS WITH TIME

Mass screening has proved to be gradually more effective with increasing age, but the lower sensitivity and specificity of mammography in premenopausal women and the non-significantly higher mortality in the first 5 years after screening in three studies (Two-country, Malmō and Canada) remains worrying [12]. Breast cancer screening of women over 50 years of age appeared to lower mortality by approximately 30% in the group invited for screening (only affecting them at age 55 years and over); this result was based on participation rates of over 70%, the target of most screening projects [13]. However, these research projects were mostly carried out at the end of the 1970s and in the early 1980s, when breast cancer awareness was less and stage-distribution of self-referred patients less favourable. Lower effects should be expected in the future, unless the programmes improve. In the Eindhoven Cancer Registry (as in many other areas in Europe), stage distribution improved substantially between 1975 and 1992: the proportion of patients <<70 years with stage I (pTNM) tumours increased from 25 to 40% [3]. Moreover, even after adjustment for stage, the relative survival of patients has improved markedly during the period 1970–1984 [14], while adjuvant chemotherapy has only been given to node-positive women since the early 1980s [15]. Based on the meta-analysis [4], a decrease in breast cancer mortality between 6 and 12% can be expected. Such decreases may be even larger in populations with a less favourable stage distribution, which may explain the recent decline in England and Wales [16]. Quality of care for women with clinically detected tumours also seems to matter: a 16% lower risk of death (95% confidence interval 6–25%), after adjustment for age, social class and nodal status, was assessed for women treated by dedicated surgeons during the 1980s in Scotland [17]. Currently, genetic screening in very high-risk families is likely to have a modest effect, not only because less than 5% of postmenopausal patients would be involved, but also because of other risk factors.

BREAST SCREENING MAY NOT REMAIN SO EFFECTIVE

If the afore-mentioned arguments imply a dilution of effects by 'competitive' interventions, the effectiveness of current and future mass breast screening programmes may be lower than that of the scientific programmes of the past. The latter usually thrived on academic leadership and dedicated (inexpensive) young investigators, wheres mass screening programmes may sooner or later become 'routine' activities with a more diffuse responsibility shared by committees and administrators. Unless the high quality required becomes routine, the drive to achieve it may diminish sooner or later and there may not be enough eager candidates to perform such 'boring' activities such as reviewing mammograms and histological specimens. Another problem is the specific allocation of resources to the right persons doing extra work including quality control and comunication with worried women, which may jeopardise compliance for consecutive rounds. Capacity problems may also affect effectiveness negatively, for example, a lack of radiologists or pathologists.

SIDE-EFFECTS ARE NOT ONLY MEDICAL

The afore-mentioned capacity problems either do not exist (because of ample supply of specialised care etc.) or they affect the effectiveness of the screening programme due to a lack of adherence to all guidelines. Unless efficiency increases, the access to care for other patients in need of the same doctors or facilities is affected, for example, remaining longer on waiting lists. The temporary increase (25 to 50%) in hospital-based activities for patients with early breast cancer, i.e. personnel working in pathological laboratories, surgical theatres and radiotherapy units, is often not accounted for. Although hard to verify, external side-effects are then likely, especially when health-care provision is more governed by scarcity, as seen in the National Health Service (U.K.), and increasingly also in The Netherlands. The medical side-effects of breast screening remain substantial, if related to prevented deaths (Table 1). Women are generally not aware of this, even within the Dutch programme, which will certainly lead to frustation later and malpractice suits. The patient-related effects and side-effects have been simulated extensively by means of elaborate models [18]. However, the care system-related side-effects are less well known and the extent of the effects remains

Table 1. Medical side-effects of biannual breast screening at age 50–69 years

Number of women 'bothered' in order to save *one* life	Scenario	
Activity	'Best case'	'Worst case'
Mammographies of healthy women	800	1200
Follow-up diagnostics	9	12
Unnecessary treatment DCIS	0.5	1.0
Patients with longer disease duration*	4	3

* The number of life-years with (useless) knowledge of having breast cancer would equal saved life-years. DCIS, ductal carcinoma *in situ*.

not only dependent on the performance of the programme, but also on the application of other death-reducing interventions. Side-effects may further diminish by unequivocal definition and/or 'benign' control (chemoprevention?) of *in situ* lesions.

COST CALCULATIONS ARE VERY ARBITRARY

The current cost calculations have in common not only that outcomes (expenses per gained life-year) vary according to incidence, type of screening programme and the prices for (or costs of) services, but also that they arbitrarily include and exclude items. Changes in stage-distribution and severity of the disease, birth cohort effects and the differences between efficacy and effectiveness, a.o. effects of 'competitive' interventions, can be substantial, but most of these tend to lead to less favourable effects and higher costs. Alternatively, future inflation may be lower than the used 5% discount rate. The cost per gained year-of-life in The Netherlands will probably vary between $5000 and $10 000 to which expenses for health-care during the gained life-years must be added, roughly equal to the costs of the screening programme [19]. It is debatable whether explicit provisions for these costs should be made; I would propose not to hide them, because public outcries against the ever-increasing costs of health services for the ever-increasing number of elderly are always likely to arise. Even if the estimated cost-effectiveness ratios were relevant, a direct translation into the budgets of hospitals and specialists who collaborate in screening programmes, for example, money for quality control, is difficult. The substantial overhead costs of the extensive policy-making and administrative processes not only remain hidden, other care programmes may suffer from lack of attention. Moreover, in health-care systems confronted with lowering public expenses, political choices are certainly more influenced by pressure groups of the (more and more vocal) worrried healthy than by the (fewer and more modest) sick [20].

CONCLUSIONS

The research efforts of investigators of breast screening have contributed to uncovering the complexities of detection, classification, management and course of non-palpable breast tumours. Nonetheless, against the background of the very good life expectancy of postmenopausal women in industrialised countries, especially compared to men, the provision of a potentially life-saving but complex screening programme to women is less desirable than it seems. Moreover, screening is likely to yield lower results in the future, thanks to other, competing, mortality-reducing interventions and a lower expected performance of 'routine' public health programmes compared with the past scientific projects. Mass screening will probably also yield smaller effects on mortality in areas with good access to 'dedicated' breast specialists. Screening should never be initiated before the management of early breast cancer, non-palpable lesions in particular, is properly organised for women of all ages, which could mean that screening may yield lower effects and become superfluous. Women should receive less alarming information on their health and of a disease which exhibits improved survival in most countries; if screening is offered, they should be better informed about the inherent complexities and side-effects. When proposals for mass single, preventive interventions for a chronic disease are put forward, politicians should rather ask for improvements, e.g. better access, of diagnostic care, including genetic screening. If the public still insists on mass screening (for women aged 50 to 70 years), the various medical discipines should guarantee to offer screening without disturbing related health services or hampering other patients. Politicians should also verify whether research of pathogenesis and aetiology should not prevail, or be prepared to spend extra money on complex care for decades, as long as simple treatment methods are not available.

1. Coleman M, Estéve J, Darniecki P, Arslan A, Renard H. Time trends in cancer incidence and mortality. Lyon, IARC Scientific Publications, No. 121, 1993, 411–432.
2. Survival of cancer patients in Europe: the Eurocare study. Beriino F, Sant M, Verdecchia A, Capocaccia R, Hakulinen T, Estéve J, eds. Lyon, IARC Scientific Publications, No. 132, 1995, 253–265.
3. Nab HW, Voogd AC, Crommelin MA, Kluck HM, Heijden LH, van der Coebergh JWW. Breast cancer in the southeastern Netherlands, 1960–1989: trends in incidence and mortality. *Eur J Cancer* 1993, **29A**, 1557–1559.
4. Early Breast Cancer Trialists Collaborative Group. Systemic treatment of early breast cancer by hormonal, cytotoxic, or immune therapy. *Lancet* 1992, **339**, 1–15 and 71–80.
5. Tubiana M, Holland R, Kopans DB, *et al.* Management of non-palpable and small lesions found in breast cancer screening. ESO Advisory Report. *Eur J Cancer* 1994, **30A**, 538–547.
6. Wilson JMG, Jungner G. Principles and practice of screening for disease. Geneva, World Health Organization, 1968, 26–27.
7. Black WC, Welch HG. Advances in diagnostic imaging and overestimations of disease prevalence and the benefits of therapy. *N Engl J Med* 1993, **328**, 1237–1243.
8. Tulinius H. Latent malignancies at autopsy: a little used source of information on cancer biology. In Riboli E, Delendi M, eds. *Autopsy in Epidemiology and Medical Research.* Lyon, IARC Scientific Publications, No. 112, 1991, 253–262.
9. Nielsen M, Thomsen JL, Primdahl S, Dyreborg U, Andersen JA. Breast cancer and atypia among young and middle aged women: a study of 110 medicolegal autopsies. *Br J Cancer* 1987, **56**, 814–819.
10. Foucar E. Carcinoma-in-situ of the breast: have pathologists run amok? *Lancet* 1996, **347**, 707–708.
11. deKoning HJ, Boer R, Warmerdam PG, Beemsterboer PMM, van der Maas PJ. Quantitative interpretation of age-specific mortality reductions from the Swedish breast cancer-screening trials. *J Natl Cancer Inst* 1995, **87**, 1217–1223.
12. Peer PGM. Mass screening for breast cancer in women <50 years: a literature review of the anticipated effect on mortality. *Ned Tijdschr Geneeskd* 1991, **135**, 651–655 (in Dutch).
13. Nyström L, Rutqvist LE, Wall S, *et al.* Breast cancer screening with mammography: overview of Swedish randomized trials. *Lancet* 1993, **341**, 973–978.
14. Nab HW, Hop WCJ, Crommelin MA, Kluck HM, Coebergh JWW. Improved prognosis of breast cancer since 1970 in south-eastern Netherlands. *Br J Cancer* 1994, **70**, 285–288.
15. Voogd AC, van Beek MWP, Crommelin MA, Kluck HM, Repelaer van Driel OJ, Coebergh JWW. Management of early breast cancer in SE Netherlands, since 1984: a population-based study. *Acta Oncologica* 1994, **33**, 753–757.
16. Quinn M, Allen E, on behalf of the United Kingdom Association of Cancer Registries. Changes in incidence of and mortality from breast cancer in England and Wales since introduction of screening. *Br Med J* 1995, **311**, 1391–1395.
17. Gilles Ch, Hole D. Survival outcome of care by specialised surgeons in breast cancer: a study of 3786 patients in the west of Scotland. *Br Med J* 1996, **312**, 145–148.
18. van Oortmarssen GJ, Habbema JDF, van der Maas PJ, de Koning HJ. A model for breast cancer screening. *Cancer* 1990, **66**, 1601–1612.

19. de Koning HJ, van Inneveld BM, van Oortmarssen GJ, *et al.* Costs and effects of mass breast screening in The Netherlands. Rotterdam, Erasmus University, Dept of Public Health, 1990, 174–175 (in Dutch).

20. Skrabanek P. The physician's responsibility to the patient. *Lancet* 1988, **i**, 1155–1157.

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Arbiter: J.A. van Dongen, Department of Surgery, The Netherlands Cancer Institute, Antoni van Leeuwenhoek Ziekenhuis, Plesmanlaan 121, 1066 CX Amsterdam, The Netherlands

WHEN EXPERTS in health-care are asked to give an opinion on so-called controversial themes, differences of ideas are restricted to personal appreciation of uncertainties and of imponderable pros and cons, or to personal predictions of future technical developments and/or social changes in the society. In fact, the messages of both the contributions of de Koning and Coebergh above are not too divergent.

Yet we have to give careful attention to the nuances in both views, to the subtle differences in their feelings, when decisions on the start or guidance of screening actions come up for discussion. Population-based screening programmes are very expensive and such complicated undertakings need great organisational skill and have complicated ethical aspects.

The decision making involved to start screening programmes or to continue financial support is often disturbed by improper political pressure. The medical world should have a standpoint based upon an unbiased interpretation of data and an ethical, sound view of the uncertainties. Thus, both the facts and hypotheses are important.

Coebergh challenges the benefits of screening considering other needs in health-care, which should have higher priority; he also suggests methods or mechanisms other than screening which might improve survival in breast cancer, such as better primary treatment or educational activities to increase the alertness of women on early self-detection. De Koning states that screening is cost-effective, but only if the population to be screened is carefully chosen (specific age categories—in countries with high incidence of breast cancer) and if the quality of the screening process is high. Coebergh questions the theoretical benefits of screening: with early diagnosis survival will be better, but he argues that the gains claimed by the screening programmes might not be that substantial, with a strong negative effect on the cost–benefit analysis.

Assessment of the components constituting cost and benefit is complicated. The benefit should be a decrease in breast cancer mortality. This has been demonstrated in several 'randomised' trials as indicated by de Koning. We should keep in mind that methodologically optimal randomisation techniques, such as those used in testing a new pharmaceutical compound, are not possible to prove the benefit of screening. These imperfections influence the magnitude of the effect of screening, yet differences in favour of screening are seen in all these studies.

The gain in the very 'civilised' countries will be less substantial than postulated because of increasing alertness of women and better structured surveillance in risk groups. This is mentioned by de Koning, but is emphasised (used as main argument) by Coebergh. One should not forget, however, that the increased alertness leading to earlier detection outside screening programmes might also be seen as an (indirect) effect of screening programmes with their intensive publicity, and this secondary effect might fade away again when screening stops!

Better breast cancer treatment for the whole population might be seen as an indirect positive effect of screening with its quality assurance programmes. This might result in a survival benefit to an extent that surpasses that of the screening itself. To quantify all the benefit and to state what is caused by what in these inter-related systems is impossible and this leads to individual interpretations.

The costs are even more difficult to measure. The psychological harm caused by more years of 'knowledge' in the detected breast cancer cases, by overtreatment of borderline cases and by the anxiety produced by a 'false alarm' or after detection of false negative cases ('missed' or mammographically occult lesions) is fairly imponderable and difficult to quantify. These points are stressed by Coebergh and were also recently carefully described by Baum in his eloquent comment on his change of view on breast cancer screening in the U.K. [1].

It is clear that these items are difficult to weigh in the cost–benefit analysis and are certainly seen with a magnifying glass by those who are opponents of breast cancer screening, but these aspects should never be neglected. Personal feelings determine the weight to be given to such factors in the balance of pros and cons.

The pure economic costs are more easily visualised, but even this is complicated. The 'cost' per gained life-year is influenced by many details in the set-up of screening programmes; very sophisticated models have been designed to quantify all this, as is described by de Koning. The chosen interval between the screening rounds, the age limits of the