centres in quality parameters, as seen also in comparisons between other European mammography programmes, indicates differences in diagnostic criteria, costs, and adverse effects between the Finnish centres. Parallel follow-up information on the interval cancers and particularly on the mortality outcome are needed for final evaluation of the quality of the programme.

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Screening women under age 50 with a family history of breast cancer: recommendations for general practice

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Objective: To assess for which women under age 50, presenting with a family history of breast cancer in general practice, mammographic screening is indicated.

Methods: We performed a simulation study in which the following features were taken into account: incidence of breast cancer (BC) under age 50, the association between BC onset and a family history of BC, screening detection rates, sensitivity and specificity of mammography depending on age, induction of BC due to radiation, tumour growth rates depending on age, and prognostic characteristics after BC diagnosis. For this, several groups of women, 30 to 50 years of age, with varying lifetime risks for BC were simulated. The life-time risks for BC were based on the women's family history of BC among first and second degree relatives, using a genetic estimation model. BC screening with mammography was simulated in these groups of women. Both screening interval (6, 12, 18 and 24 months) and screening cohorts (30, 35, 40, and 45 to 50) were varied. Gains and losses in life years due to screening and costs of screening were compared with current screening strategies within the nation-wide BC screening programme of the Netherlands. Sensitivity analyses were performed to test assumptions regarding factors related to age, prognosis, induction of BC, and screening techniques.

Results: In about 77% of the women with a family history of BC, screening before age 50 the gains do not outweigh the costs. Thus having a single first degree relative with BC – even at young age – without any affected second degree relatives does not indicate BC screening before age 50. In about 7% (i.e. two or more first degree relatives with BC before age 40 combined with affected second degree relatives) screening before age 50 is cost-effective without any doubt, while cost-effectiveness of BC screening with mammography in the remaining group of women (i.e. 15%) depends on the assumptions made in the analyses, especially related to low sensitivity of mammography. Furthermore, screening women under age 50 at 12 months intervals is the best option, as 6 months intervals result in higher radiation doses, and intervals of 18 or 24 months result in many interval cancers.

Conclusion: Breast cancer screening with mammography before age 50 is cost-effective in only a small group of women with a strong family history of breast cancer. Further research should reveal whether other screening techniques may be more gainful than mammography in this respect.

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Breast carcinoma presenting as a benign appearing mass: a radiological–pathological pictorial review

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Background: Radiologically well defined breast masses (BI-RADS category R3) usually favour a benign diagnosis at biopsy. We present a radiological–pathological pictorial review of such lesions comparing those with malignant histology versus those which were biopsy proven benign. We analyse the radiological features which may better predict malignancy.

Materials and methods: All well defined masses from a total of 50,073 sceening mammograms reviewed in the Eccles unit of the Irish National Breast Screening Programme over a 35 month period were identified. All well defined masses were categorised R3 as per BI-RADS classification. The clinical, radiological and histological features of the malignant masses were reviewed.

Results: A total of 424 cases of malignancy were diagnosed, 24 of which were benign appearing masses. These 24 cases represent 5.7% of the total of 424 cancers diagnosed and 11.5% of the total of 209 benign appearing masses biopsied. The malignant well defined masses ranged in size from 6 mm up to 50 mm with a mean size of 14.3 mm and were situated in the upper outer quadrant in 50% of cases (n=12).

Breast clinical examination by an experienced breast surgeon revealed suspicious clinical findings in the malignant group in one patient only. The most commonly encountered histology was invasive ductal carcinoma (n=11), nine of which had either grade 2 or grade 3 histology. The next most common histology was ductal carcinoma in-situ (n=5).Invasive lobular carcinoma, tubular carcinoma, mucinous carcinoma and a phyllodes tumour represented the remainder.

Conclusion: Well defined malignant breast masses can mimic benign lesions. Although old imaging demonstrating interval development of a new mass may raise the level of suspicion, biopsy of these lesions is still mandatory in order not to overlook an underlying malignancy.

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An estimate of the overdiagnosis in service screening: an evaluation in the Florence City Program

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The increasing incidence of breast cancer in service screening has been considered indicator of overdiagnosis, defined as the detection by screening of lesions which would not have arisen in the hosts' lifetimes.

Methods: We studied incidence in Florence in 1990–99, following the introduction of screening in 1990. Incidence of breast cancer in this period was compared with the 1985–89 prior to screening. We calculated the probability that a case which has been screen-detected would have been identified clinically after a specific time point, the end of the study period for example. Of interest is the probability for the cases to be diagnosed over the duration of the study period. The expected number of cases which would have arisen clinically within the study period in the absence of screening may be estimated by applying the age specific incidence rates observed before the start of the screening programme to the age distribution of the target population during the study period. If the observed number of cases after correction for lead time is close to the expected number arising clinically, this indicates no overdiagnosis. If the observed number is greater than the expected, this suggests an element of overdiagnosis or insufficient follow up time. If the observed number of cases is substantially smaller than expected, then our estimated mean sojourn time may be incorrect. The difference between the observed number of cases adjusted for lead time and the expected number of cases in the absence of screening is the number of cases overdiagnosed. We divide this number by the expected number of cases to give the proportional excess due to overdiagnosis.

Main results: There were 2780 breast cancers diagnosed during the period of study (2626 invasive). There was no significant evidence of overdiagnosis of invasive cancers. When invasive and in situ cancers were considered together, an estimate of 5% of overdiagnosed cases was obtained.

Conclusions: There is a small amount of overdiagnosis of ductal carcinoma in situ in mammographic screening. This should not deter women from being screened. Training and practice in mammographic screening should emphasise detection of small invasive lesions. Research in natural history and treatment should aim at minimising overtreatment of those in situ lesions which are less likely to progress to invasive disease.

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Phosphor screen digital mammography: experience with 8592 screening mammographies

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Purpose: To audit the digital mammographies of 8592 cases who visited our breast center for screening between November 1999 and December 2002.

Materials and Methods: Mammographies were taken digitally using a conventional mammography (Senographe DMR, GE, Milwaukee, USA) and a Computed tomography (CR) unit. For this purpose, special mammography casettes (IP Casette 3A, Fuji, Tokio, Japan) and FCR AC-3 system (Fuji, Tokio, Japan) was used. For auditing, Positive predictive value-1 (PPV1), PPV2, PPV3 were calculated as recommended by American College of Radiology (ACR). Besides, cancer detection rate, minimal cancer rate, incidental and prevalent cancer detection rates, and recall rate was calculated. These were then compared with the desirable audit goals suggested by ACR.

Results: Parameters calculated for 8592 Phosphor-Screen digital screening mammograms were as follows: PPV1: 5%, PPV2: 30%, PPV3: 25%, cancer detection rate: 0.5%, minimal cancer rate: 40%, incidental cancer detection rate: 0.093%, prevalent cancer detection rate: 0.4%, and recall rate: 10.67%.

Conclusion: According to our knowledge, this is the first study concerning analysis of medical audit data of Phosphor-Screen digital screening mammograms. Our results are in the desired ranges recommended by ACR. Mammographic auditing is suggested to be done yearly in order to