TITLE: **Potential Effect on Mortality of Organized Breast Cancer Screening in Bas-Rhin (France): Evolution of the Stage at Diagnosis**

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KEYWORDS: breast cancer screening, early endpoints, stage at diagnosis

BACKGROUND: In France, population based Breast cancer Screening Program (BSP) were implemented in various administrative areas. The "department" of Bas-Rhin was the first one to organize such a BSP in 1989. The target population is women aged 50 to 64 (80000 women). Every 2 years, one view screens, double reading, are proposed. A permanent communication program leads women to perform such radiography in one of the accredited mammography units. Second reading, quality control, follow-up and data collection are performed by a coordinating center. One of the first early endpoints to evaluate the efficacy of breast cancer screening is to analyze the prognostic indicators related to the stage of the disease at the diagnosis. Such indicators are the proportions of DCIS and small size (£10 mm) invasive cancers detected, as well as the ratio of positive/negative nodes in the screened population and also the rate and type of interval cancers.

OBJECTIVE: To predict a beneficial effect of the screening programs already implemented in France the authors compared these prognosis indicators, on a one hand to the same data observed 3 years before the implementation of the program and, on the other, to the staging of the breast cancer diagnosed outside the program at the same period (1989-1996), in the same area.

METHODS: To perform such comparisons the cancer registry data of the same geographical area (Bas-Rhin) were used.

RESULTS: In Bas-Rhin the proportion of DCIS varies from 3% before, to 8.7% outside and 15.9% inside the program. The rate of histological size of 10mm or less in invasive tumors varies from 17% before, to 18.9% outside and 35.6%inside. The histological node involvement observed is 59%, 56.3% and 72% respectively. These indicators vary with the age: in women 50-65 old the differences between " in and out program" diagnosed cancer are higher for the in situ detected lesions and lower for the size of the invasive tumors and the nodes involvement. It is also interesting to compare the same indicators measured in the interval cancers. The indicators of this last category appears to be closest to the screen detected cancers than to the diagnosed cancer either before or outside the program.

CONCLUSION: The evolution "to the left" of the cancer staging at diagnosis for screened detected cancers as well as for interval cancers might predict a decrease in breast cancer mortality in this BSP.

TITLE: **Evaluation of** the Effect of Mammography Screening **on** the Breast Cancer Mortality in **Florence** City, Italy **1990-1999**

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KEYWORDS: screening mortality impact

BACKGROUND: Mortality from breast cancer has fallen in several countries in recent years. The most recently available data for women aged 50-69 in the UK and the USA, confirm a substantial, sharp reduction. Also in the Tuscany Region (Italy) mortality rates was decreasing in recent years.

OBJECTIVE: To evaluate the effects by the end of 1999 of the Florence city breast screening programme which started in 1990.

METHOD: About 60,000 women (aged 50-69) were enrolled from 1990 to 1993. Breast cancer cases diagnosed from 1990 to 1996 were partitioned by method of detection, classified by tumour size and nodal status and followed up for mortality at 3111211999. Incidence-based mortality in 50-74 year old women and advanced carcinomas rates were assessed.

RESULTS: The number of cases diagnosed was 1,122, 17% higher than the 958 expected (+17.1%) and the mortality reduction for the invited women was estimated as 19% (O/E: 0.81 95%CI: 64-100). After the prevalence screening, a reduction of advanced carcinomas was observed in the invited (OR: 0.74; 95 ^{0}/$_{0CI}$ 0.55-0.98)In the period 1990-99, 547 breast cancer deaths were observed: 78 (14%)78) occurred in women invited and half of these in never responders. The mortality reduction attributable to screening in the whole population was 3.4%.

CONCLUSION: The incidence-based mortality analysis confirmed the follow up time is short to allow an important contribution of screening to the breast cancer mortality trends. Screening performance might be improved by higher level of compliance and shorter interval times, but the programme is going towards the expected direction.

TITLE: The **Effect of Organized Screening on Late-Stage Disease in a Defined Population**

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KEYWORDS: mammography diffusion, late-stage disease, screening interval

BACKGROUND: Mammography screening programs have been widely implemented in Europe and some not-for-profit HMOs within the United States in order to pursue the potential mortality reductions the technology affords. However, justification of these programs rests upon a demonstrated impact on disease outcomes. Evaluation methods are challenging since effects on mortality may not occur for many years and require population-based estimates of rates. Consideration of other methods of evaluating effectiveness is important to assessing program impact. The not-for-profit managed care plan studied in this report implemented an organized screening program in 1986 that uses screening intervals of 1 to 2 years.

OBJECTIVE: We undertook this study to understand the implications of our choice of controls for a program evaluation of whether screening intervals wider than one year were associated with an increased likelihood of late-stage disease (i.e. tumors >3cm @ diagnosis).

METHODS: We identified the screening experience of all late-stage tumors diagnosed among women enrolled between January 1, 1993 and December 31, 1998, regardless of their program status. We also identified the screening experience of two sets of randomly sampled controls, one from the general population and matched to late-stage cases on age and length of enrollment, and one from among women with non-late-stage breast cancer matched on year of diagnosis. The controls and cases were both GHC members as of Jan 1, 1993. Using logistic regression we created 2 separate models of late-stage disease: one compared the likelihood of late-stage disease using non-late-stage breast cancer cases as the controls, and the other compared the likelihood of late-stage disease using the general population as the controls.

RESULTS: We identified 89 late-stage breast cancer cases, and respectively 407 non-late-stage breast cancers and 445 general population controls. Late-stage breast cancers were less likely to be enrolled in the program (85.4%) than women with non-late-stage (93.1%), or general population controls (91.7%) (p =0.06). Among women with late-stage disease 75.3% had ever had a mammogram, compared to 88.9% among women with non-late-stage disease, and 70.3% in the general population. Among women with late-stage breast cancers, 65.2% had a screening program mammogram in the prior three years, compared to 83.3% among non-late-stage, and 62.2% among the general population. Late-stage breast cancers were much less likely to have had screening program mammogram within 2 years (OR 0.33; 95%CI 0.2-0.54) compared to non-late-stage breast cancers, but no less likely than the general population. Among women with two screens, intervals between screens of up to 40 months had no association with late-stage disease regardless of the control chosen.

CONCLUSION: Women with late-stage breast cancer are less likely to be enrolled in the program and therefore less likely to have received a recent screening mammogram. Once in the program, women at wider screening intervals are no more likely to have late-stage disease.

IMPLICATIONS: Resource allocation should emphasize encouraging program enrollment rather than shortening screening intervals in order to reduce the likelihood of late-stage disease.

TITLE: **Interval Cancers in the Norwegian Breast Cancer Screening Program**

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KEYWORDS: mammography screening, interval cancer, breast density, HRT

BACKGROUND: The Norwegian Breast Cancer Screening Program (NBCSP) started as a pilot project in four counties in 1996. The program offers women aged 50-69 years biannual mammography screening. Two-view mammograms and double reading are standard. The women are invited by means of a personal letter.

OBJECTIVE: To quantify the interval cancers in the pilot project and to explore characteristics and factors that may be associated with interval cancer.

METHODS: The interval cancers in the screening population were identified through the Cancer Registry of Norway during the study period 1996-1999. 125,794 women were at risk of developing interval cancer, and 247 cases were diagnosed. The frequency of invasive interval cancer was calculated as cases per 10,000 screened and as observed/expected ratio. Characteristics of the interval cancers were compared with screening-detected- and clinical cancers. Breast density was assessed in a blinded review of screening mammograms. 3 categories of screening mammograms were scrutinized; screening-detected cancers, screening-normal and subsequent interval cancers. Information about HRT-use was gathered from a questionnaire that the attendees filled in at the first screening round.

RESULTS: The frequency of invasive interval cancers was 18.2 (15.9-20.7) per 10,000 screened and the observed/expected ratio was 0.49 (0.43-0.56). The median tumor size of the interval cancers was 20 millimetres and 44.0% of the patients had affected lymph nodes. The distribution of breast density differed significantly between the 3 categories of mammograms. Dense breasts were found in 10% of the screening-normal mammograms, 15% of the screening-detected cases and 28% of the subsequent interval cancers. The never/ever-use of HRT was also found to differ significantly between the three categories of mammograms. Ever-use of HRT was reported by 42% of the women with normal screening mammograms, 38% of the women with screening-detected cancers and 54% of the women with subsequent interval cancer.

CONCLUSION: The frequency of interval cancers in the pilot project of the NBCSP was similar to frequencies reported from comparable programs. The interval cancers differed markedly from the cancers detected in the first screening round and were more similar to the clinical cancers. Interval cancers were associated with dense breasts and use of HRT. Thus the effect of high breast density and use of HRT on screening performance should be kept in focus.

TITLE: **Can Late Stage Disease Be A Surrogate Outcome for Death** When **Evaluating** Mammography **Efficacy?**

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BACKGROUND: The efficacy of mammography is most effectively evaluated in a randomized trial. However, observational data may provide some insights into how mammography succeeds or fails. We evaluate whether late stage disease incidence can be a surrogate outcome for breast cancer mortality.

OBJECTIVE: This study evaluated the efficacy of screening mammography in reducing late stage cancer incidence and breast cancer mortality in a well-defined population.

METHODS: A total of 156,960 women aged 40-74 without prevalent breast cancer were included in the cohort. All women were enrolled in a large regional non-profit health maintenance organization sometime during the period 1985-2001 and completed a risk factor survey. A formal breast cancer screening program was begun in 1985, but screening outside the program is also included in this evaluation. Two outcomes were assessed: mortality following a breast cancer diagnosis and the incidence of late stage disease defined as regional, distant, or unstaged breast cancer. Screening mammography was evaluated using time-dependent covariates in a Cox regression analysis and the hazard ratio (HR) for screening in the previous three years was estimated. We adjusted for calendar time, age, a prior breast biopsy, and a reported history of breast cancer in a first degree relative.

RESULTS: We found 4,742 breast cancers including 1161 (24.5%) that were late-stage at the time of diagnosis. Of the women diagnosed with breast cancer 1106 died before the end of the study period. However, we could establish breast cancer as the cause of death in only 395 (35.7%) of the deaths since no medical record review was performed.

Measurement of efficacy of mammography screening depends on whether the index mammogram that detected the breast cancer is included in the analysis or not. For women aged 50-74 mammography screening in the prior three years (excluding index exam) is protective against late stage disease (HR = 0.81; 95% CI 0.69-0.95), death due to breast cancer (HR = 0.93; 95% CI 0.69-1.26), but not death in women with breast cancer regardless of cause of death (HR = 1.03; 95% CI 0.83-1.28). Reductions are also observed in women aged 40-49, but were not statistically significant. However if the index screening mammogram is included, the hazard ratios are greater than one. We also evaluate a statistical model for assessing late stage disease as a surrogate for mortality. All analyses are preliminary.

TITLE: Performance Parameter **Evaluation of Mammography** Screening in Women **Aged 40 to 49: A** Comparison with Women **Aged 50 to 69**

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KEYWORDS: recall rate, mammography, clinical breast examination

BACKGROUND: In Japan, clinical breast examination (CBE) was initiated as breast cancer screening modality in 1987. A recent case control study demonstrated that CBE lacks effectiveness (OR=0.93, 95%CI: 0.48-1.79), although it might be effective in an asymptomatic population (OR=0.56, 95%CI: 0.27-1.18). A national population-based mammography screening program started in 2000. Remarkable progress in imaging technologies has contributed to an improvement in the usefulness of mammography screening.

OBJECTIVE: This study has been initiated to define efficacy of mammography screening for women aged 40-49, since the age group is the highest in terms of breast cancer incidence rate in Japan.

METHODS: The national screening program, currently targeted women ages 50 and over, is consisted of 2 years of interval combined with CBE. which is performed by well-trained physicians, i.e., surgeons and gynecologists. One-view (MLO) mammography is interpreted by two physicians who has qualified an education program. Screening participants are invited by the letter from their municipality. We evaluated the performance parameters including recall rate, detection rate, and sensitivity of screening mammography with CBE in women aged 40-49, and compared the data with those obtained from screening in women aged 50-69. From 1994 to 1998, 15,271 subjects aged 40-49 and 17,755 subjects aged 50-69 were enrolled in Miyagi prefecture.

RESULTS: The recall rate, detection rate and sensitivity for women aged 40-49 were 10.4%, 0.20% and 93.8%, respectively. The data for women aged 50-69 were 7.2%, 0.21% and 95.0%. The recall rate for women aged 40-49 was higher than that of women aged 50-69, but the sensitivities and detection rates were almost equal. Node-negative rate in women aged 40-49 and those aged 50-69 were 80% and 84%.

CONCLUSION: These data suggest that mammography screening with CBE may be an appropriate modality for women aged 40-49, although strict quality control should be required to optimize the recall rate in women aged forties who have higher breast tissue density than women aged fifties.

TITLE: **Evaluation of the French National Breast Cancer Screening Programme:**
Performance Indicators

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KEYWORDS: breast cancer, screening programme, evaluation

BACKGROUND: In France a national Breast cancer screening programme was implemented in 1994. A national protocol was established to set the scientific and organisational frame of the programme. The target population is: women aged 50 to 69. One view screens are undertaken in private and public radiology clinics, with a double read and a third read for arbitration. Data collection is performed in each district. The acceptable values (AV) of the early performance indicators, defined by the Europe Against Cancer programme (EAC), are used as the reference for Impact, quality and efficacy. The InVS is mandated for this evaluation.

OBJECTIVE: To present the results of the performance indicators of the programme and their trends over time.

METHODS: A national data collection form is sent once a year for the data collection and the calculation of the specific indicators. By 31 December 1999, 32 districts were included in the programme representing a coverage of 45% (2 841 926 women) of the target population. Four districts were not included in the analysis since their programme started in 1999 (coverage 40%).

RESULTS: Quality indicators: The mean recall rate (AV £ 7%) was 7,7% (3,5% a 11,9%). The recall rate was high for the first round 9% (4,5% a 15%) and improved overtime, 8,5% (5% a 11,5%) 2nd round and 6,5% (5% a 13%) by the 3 rd round. The progress is related partly to the implementation of the quality control and of the improved single view reading skills of radiologists. The mean biopsy rate (AV £ 1,5%) was 1,1% (0,7% a 1,4%) and the biopsy positive predictive value (AV > 50%) was 52% (33% a 68%). The efficacy indicators are globally acceptable: The cancer detection rate (AV 5%o) was 5,5%0 (2,9%o a 9,2%o); the % of invasive cancers < 10mm (AV > 25%) reached 35,6% (29% a 54%); and the rate of N- invasive cancers (AV < 60%) reached 71% (61% a 87%). Efficacy data showed a 2,5 fold increase for invasive cancers < 10 mm and a 1,5 increase in rates of N- invasive cancers compared to data provided by a study in an area without screening. In contrast impact indicators such as participation rates (AV 60% over 3 years), reached 37% for the first round (26 districts: 12% a 64%). These rates improved with the different rounds (3rd = 41%,   50%).

CONCLUSION: The evaluation of the early breast cancer screening performance indicators showed a good level for quality and efficacy. Although wide variations between districts are observed these variations decease over time. The main difficulty of the programme is the participation rate of the women to the programme. In 2001 a new national programme with new screening modalities will be implemented the aim being to improve the programme's acceptance (medical profession and women) and to eliminate spontaneous screening which is currently very high.

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TITLE: **Association** of Sensitivity **and** Positive Predictive Values to Recall **Rates** From Screening Mammography

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KEYWORDS: recall rate, sensitivity, positive predictive value, screening mammography

BACKGROUND: Screening mammography performance is measured mainly by sensitivity, positive predictive value and cancer detection rates. Recall rates are also suggested as a surrogate measure.

OBJECTIVE: The main objective of this study was to measure the effect of sensitivity and positive predictive value as recall rates increase in the community practice of mammography.

MATERIALS AND METHODS: Mammography and pathology data are linked within the Carolina Mammography Registry, a population-based registry of screening mammography. Our mammography database is created from prospectively collected data at mammography facilities that includes information on the woman and the imaging studies. Our pathology database is created from prospectively collected breast pathology data received from pathology sites and the Central Cancer Registry. In North Carolina, women are recommended for screening on an annual basis. About 20% of the facilities double read their films and all screening studies are two-view. Women in the Registry, 40 years and older, receiving a screening mammogram between January 1994 and June 1998 were included. Recall rate was defined as the percent of screens where further work-up from the screening was recommended by the radiologist.

RESULTS: There were 215,665 screening mammograms. The mean age of the women was 56 years. The average practice recall rates ranged from 1.9 to 13.4%. Sensitivity rose from a mean of 65% in the lowest recall rates to 80.2% at the highest level of recall rates. The screening positive predictive value decreased from 7.2% in the lowest level of recall to 3.3% in the highest. As recall rates increased, sensitivity increased very little beyond a recall rate of 4.8% and positive predictive value began decreasing significantly at a recall rate of 5.9%.

CONCLUSION: In our population practice data, practices with recall rates between 4.9% and 5.5% achieve the best trade-off of sensitivity and positive predictive value.

TITLE: **In Search for the Optimum Accuracy of** the Dutch **Screening Program**

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KEYWORDS: accuracy in screening, subsequent screens, referral recommendations, minimal signs, cranio-caudal views

BACKGROUND: The nation-wide breast cancer screening program in the Netherlands for women aged 50-69 years has been implemented during 1989-1997. Whereas results of initial screen examinations were largely in line with the expectations, the detection rate and stage distribution of subsequently screen-detected cancers were less favorable than predicted and varied considerably between regions. Therefore, the NETB set up the so-called Optimization study in collaboration with the National Expert and Training Centre.

OBJECTIVE: To look for possibilities to optimize the accuracy of the Dutch breast cancer screening program focusing on 1) minimal signs, 2) referral strategies, and 3) criteria for additional cranio-caudal views in subsequent rounds.

METHODS: A test set of previous screening mammograms from 250 cases (interval and screen-detected cancers) and 250 controls was read (independent, blind): 1) 15 radiologists described carefully all visible mammographic findings and estimated the probability of malignancy; 2) referral recommendations of 24 radiologists were compared; for discrepant reading outcomes the final decision was obtained by different referral strategies (decision by one of two readers, arbitration, consensus); 3) 55 radiographers were asked if a second view was indicated and for what reason, reading the oblique view only.

RESULTS: Preliminary results show that in previous mammograms minimal signs can be identified that are (highly) predictive for malignancy. The number of described findings and of referral recommendations varied between radiologists. First analyses of different referral strategies suggest that with consensus a higher sensitivity may be reached.

CONCLUSION: This study provides more insight into the complexity of factors that might influence the screen performance. Only after further (cost-effectiveness) analyses it will be clear whether it is necessary to reformulate the criteria for referral and for additional cranio-caudal views.

TITLE: Breast Cancer **Screening** Program Performance Outcomes by Screening **Modality** Among Canadian Women Aged **50-69**

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KEYWORDS: mammography, mass screening, palpation, diagnosis, breast neoplasms

BACKGROUND: Canadian organized breast cancer screening programs are administered and delivered by all provincial and 2 territorial governments with regional differences in the modality of the screening examination. All twelve programs provide a bilateral two-view screening mammogram. Clinical breast examinations (CBE) are provided in five organized programs. Generally, the follow-up of screening abnormalities is coordinated by family physicians outside the screening program setting.

OBJECTIVE: To assess abnormal call rates, breast cancer detection rates and patterns of diagnostic follow-up by detection modality at screening (clinical and/or mammographic) in an organized breast cancer screening program setting.

METHODS: Data from 574,095 screening examinations among women aged 50-69 attending nine Canadian organized screening programs in 1997 and 1998 were evaluated using data from the Canadian Breast Cancer Screening Database to determine abnormal call rates, cancer detection rates and patterns of diagnostic follow-up by detection modality.

RESULTS: Among women aged 50-69 mammography alone referral rates (abnormal call rate: 4.7-9.6%) were much higher than referrals for follow-up of abnormalities detected solely by clinical means (1.0-1.6%). A small proportion was referred on the basis of abnormalities detected by both modalities (0.3-0.7%). Cancers detected following abnormalities identified exclusively by clinical means accounted for only 3-4 of every 10,000 screening examinations. Overall, for women aged 50-69 strictly clinical findings accounted for 13-18% of abnormal screens but only 5-12% of cancers detected, whereas strictly mammographic abnormalities accounted for 78-85% of abnormal screens and 79-85% of the cancers detected. Follow-up of clinical abnormalities differed substantially compared with mammographic abnormalities: diagnostic imaging and biopsies were less frequently performed (diagnostic mammography: 8.7% vs. 81.8%, ultrasound: 28.3% vs. 44.6, core biopsy: 0.9% vs. 5.5%, open biopsy: 8.6% vs. 13.4%) and fine needle aspiration was more frequently done (8.6% vs. 4.0%).

DISCUSSION: Although CBE contributes to cancer detection, this contribution also results in higher abnormal call rates. Gains in cancer detection may cost in terms of diminished positive predictive value of an abnormal screening exam, but the adequacy of follow-up of abnormal clinical findings must also be established. Additionally, the contribution of CBE to *early* detection must be assessed by evaluating the prognostic profile of breast cancers detected by mammographic versus clinical means to understand a possible role for CBE as a complement to mammography screening in reducing breast cancer mortality.

TITLE: **Evaluation of the New Zealand Breast Cancer Screening Programme**

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KEYWORDS: monitoring national breast screening programme

BACKGROUND: After 2 pilot studies in the early 1990s the national breast screening programme (BreastScreen Aotearoa) was launched in New Zealand at the end of 1998. The programme consists of 6 contractors providing regional breast screening services for asymptomatic women aged 50-64 using biennial double view mammography. The BreastScreen Aotearoa Independent Monitoring Group (BSAIMG) of the University of Otago reports quarterly about the programme to the Ministry of Health.

OBJECTIVE: To describe the performance of the national breast screening programme over the first 2 years.

METHODS: Routine monitoring against national indicators of screening programme performance will be described.

RESULTS: In the first 2 years 153,637 women were screened. This was 55% of women aged 50-64 in New Zealand. The largest population area of Auckland had the lowest coverage (45%). Only one-third of Pacific Island and Maori women were screened. Technical recall was 0.3% and 2.5% of women screened for fixed and mobile screening units, respectively. Referral to assessment was 6.8% and the false positive rate 6% of women screened. The percentage of women undergoing fine needle or core biopsy was 1.8%. The specificity of screening was 93.9%. Detection of DCIS or invasive cancer occurred for 1,080 women, a detection rate of 7 per 1000 women screened.

TITLE: Results From the First **Four** Rounds **of** the **Copenhagen** Mammography Screening **Programme**

AUTHORS: **Anne Helene Olsen and Elsebeth Lynge on behalf of the** Copenhagen **Mammography Screening Evaluation Group**

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KEYWORDS: service screening, mammography, short term indicators, interval cancers, non-attenders

BACKGROUND: The mammography screening programme in the municipality of Copenhagen started in 1991. Women in the age group 50-69 are invited every 2 years to mammography screening. At first screen two views are taken, at subsequent screen one or two views depending on the density of the breast tissue. Double reading of mammograms is applied. Women aged 50-69 and living in the municipality of Copenhagen at the beginning of each invitation round receive a personal invitation to participate in screening. Women can inform the clinic that they do not want to be invited again.

OBJECTIVE: We are reporting on short term indicators for programme success following the fourth invitation round.

METHODS: Information on target population, invitation, attendance, and results of the screening procedure were retrieved from Kommunedata in Copenhagen. The women in the target population were linked by use of their personal identification number (cpr-number) to the Danish Cancer Register and to the data files of the Danish Breast Cancer Cooperative Group to find the final diagnoses of screen detected cancers, and to find interval cancers and breast cancer cases among non-attenders.

RESULTS: The fourth invitation round started on 23 March 1997 and ended on 19 April 1999. There were 40,435 women in the target group for the 4'[th] round. 4,130 of these, or 10%, had in one of the previous rounds actively informed the clinic that they did not want to be invited to the programme again. They were therefore not invited to the 4th round. Of the remaining 36,305 women, who were invited, 25,387 participated in the screening. This means that 63% of the target population, and 70% of the invited, attended screening. Of the 36,305 women invited, 13,179 had attended all the three previous invitation rounds, and among these 91%, or 12,018 women, attended their fourth screen. Of the 25,387 participants, 762 had a positive mammography and were recalled for assessment. 759 women participated in the assessment, and 189 women had a positive result. 188 women had surgery, and 147 had a positive surgery result. Of these, 123 had invasive breast cancer, and 12 had DCIS. We do not yet have access to the final diagnoses of the remaining 12. There were 612 false positives at mammography, and 41 false positives at assessment. The detection rate (invasive+DCIS) was 5.8 per 1000 participants. Detection rates for all four rounds were on average four times the baseline incidence (before start of screening) during the prevalence screening and on average two times the baseline incidence during the incidence screening. There were 52 interval cancers between the first and second invitation round, 60 interval cancers between the second and third invitation round, and 60 between the third and fourth invitation round. The proportionate interval cancer rate was 0.34 after the first invitation round. There were 71 breast cancer cases in non-attenders following the first invitation round, 51 following the second, and 68 following the third invitation round. Note that the results mentioned above are preliminary. We are currently editing the data.

CONCLUSION: The Copenhagen mammography screening programme continues to function well: Effective early detection is reflected in high detection rates and a low interval cancer rate. This performance is obtained, however, at the price of a relatively high percentage of false positive mammographies at the first screens. A detection rate of on average four times the baseline incidence during the prevalence screening and on average two times the baseline incidence during the incidence screening indicates that the programme does not lead to over diagnosis of invasive breast cancer. Participation rates are quite low which has also been seen in other big cities. This fact as well as the extent of movements into and out of the screening area can be expected to limit the reduction of breast cancer mortality on the population level.

TITLE: **Breast** Cancer Screening in Ilia and Messinia Counties—S.Greece

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OBJECTIVE: The poster will present the tumor size of the screen-detected cancers during the 1 st 2 nd, 3 ᵈ 4th rounds of the breast cancer screening programs in Ilia and Messinia counties (S.Greece) as well as the size of these screen-detected tumors by 5 years age group (50-54, 55-59, 60-64).

METHODS: The target population of the breast cancer screening program was women aged 50-65 years, permanent residents of Ilia and Messinia, who are invited by personal invitation letter. Two-view mammography was performed for each initially screened women while each subsequently screened woman underwent a single medio-lateral oblique mammography. A centralized system of independent double reading of the performed mammographies was available. The screening interval was 2 years.

RESULTS: The Breast Cancer Screening program in Ilia and Messinia was accepted and adopted with enthusiasm by the female population, the local authorities, and mass media. There is no doubt that significant improvement in the organization, medical quality and physico-technical quality has achieved since the beginning of the screening. These reasons led the Hellenic Society of Oncology in collaboration with the Hellenic Anticancer Institute to also develop its own program, named "GREECE AGAINST CANCER.." There has been significant increase to the screen-detected tumors sized TO and T1.

TITLE: **Outcome and Experience from the Swiss Mammography Screening Pilot Programmes.**

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KEYWORDS: pilot programme, Switzerland, performance indicators, evaluation, breast cancer, mammography screening

BACKGROUND: The Swiss breast cancer screening pilot programme was conducted in 3 districts of the French-speaking canton of Vaud (ca. 300,000 resident women) between October 1993 and January 1999. Women aged 50 to 69 were invited by mail every 2 years for a free of charge screening mammography (double view, multiple reading). This first ever-organised cancer screening programme in Switzerland showed the feasibility and acceptability of this kind of public health intervention in the liberal Swiss healthcare system, which was the main objective of the pilot programme. This mammographic screening programme was extended to the whole canton in 1999, and contributed to the implementation of similar programmes in 2 neighbouring cantons.

OBJECTIVE: To appraise the use, the quality and the effectiveness of the Swiss screening pilot programme.

METHODS: About 15,000 women (aged 50-69) were enrolled. Logistic regression analyses were performed separately to identify determinants of initial and subsequent attendance. Standard indicators of quality, effectiveness and impact of the programme were assessed and compared with European recommendations. To this intent, linkage with data from the Vaud Cancer Registry was performed.

RESULTS: About half the target population was screened at least once during the pilot trial. Participation was higher among Swiss than foreigners, among widowed or married women than among single, divorced or separated ones. Attendance also increased with age and decreasing distance between residence and the dedicated screening centre. Apart from Swiss citizenship, socio-demographic factors were not associated with reattendance. Intensity of prior recruitment, outcome of previous screening test (positive vs. negative) and indicators of women's health behaviour (time of last mammography prior to initial screen, smoking status) were the main determinants of reattendance. Programme performance and quality indicators were, overall, in line with European Guidelines. They were overall more favourable among 60-69 than 50-59 year-olds and improved over time.

CONCLUSION: The objectives of the pilot programme were met. Even if participation should increase in order to reach European standards, performance indicators overall met quality requirements. Ways to improve screening use, quality and effectiveness were devised and taken into account for the generalisation of the programme.

TITLE: **National Breast Cancer Screening in Uruguay (Pronacam)**

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BACKGROUND: Breast Cancer is the most frequent cancer in Uruguay, with an adjusted incidence rate per age in the whole country of 112,03 x 100.000 women in 1991 (37,6% of the female cancers). Adjusted mortality rate (1989/93) was 25,15 x 100.000, the highest in America (North and South), and the sixth in the world (ACS, Cancer and Figures, 1996).

OBJECTIVE: Based on WHO and PAHO recommendations for developing countries with limited economical sources screening was done through Breast Self Examination (BSE) and Breast Clinical Examination (BCE) to women from 35 to 65 y.o. Simultaneously 5 risk factors are investigated, defined as 1) mother, sister or daughter with BC, 2) menarche before 12 y.o. or menopause after 55 y,o., 3) nulliparous or first birth after 30 y.o., 4) Chronic benign mastopathies, and 5) previous personal history of cancer (breast, ovary or endometrial). Mammography is done to every women with risk factors.

RESULTS: Since 1992, when Uruguay began the PRONACAM issued by the Ministry of Public Health, (National Program of Breast Cancer basically based on BSE and BCE to all women 30 to 65 y.o., with additional MMg to those who had one or more risk factors), there has been a close relationship with Pro Qualitas Salute Project which proposes breast cancer screening with high quality MMG to women older than 45 y.o. 40.1 % of all women showed one or more risk factors, being the most frequent those related to age (menarche, menopause and first birth). PRONACAM results in the period 1992-1999, compared with the previous 1963-1991 period shows a significant change in incidence and mortality rates in the population studied (tables and graphics). The implementation of a national screening program based on BSE and BCE in a country with limited economic resources has an impact not only due to an earlier detection but also to a change in the health services which are now aware of the problem and have reduced the time gap between screening, final diagnosis and treatment. Actually the efforts are directed to stress the importance of diet to all women and to improve the quality of Mmg. Actually other Latin American countries are studying the results in order to begin a similar strategy (Costa Rica, Argentina).

TITLE: **Stages of Screen-Detected Breast Cancer**

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OBJECTIVE: To present the stages and tumor size of the screen-detected breast cancers during the 1' and 2nd round of the Greek mammography screening program.

METHODS: The target population was women aged 50-64 years, permanent residents of Ilia and Messinia. During the 1st and 2nd round of our screening program, 11,909 and 13,562 women were screened respectively. 87 cases of breast cancer were detected. The required treatment was offered to women by the medical staff of 4 Reference Hospitals. Tumor size and pathological stage according to TNM classification were recorded for each patient.

RESULTS: During the 1[s'] round, 46 breast cancers cases were detected among 102 women who were operated (Benign to Malignant Ratio 1.21/1). Size of these screen-detected tumors was as follows: Tis 2, T1 22, T2 20, T3 1 and T4 1. Disease stage was : Stage 0: 2, stage I: 15, stage II: 27, stage III: 2. Of the 65 biopsied women during the 2nd round, 41 had cancer (Benign to Malignant Ratio 0.58/1). Tumor size was as follows: Tis 5, T1 26, T2 8, T3 1 and T41. Disease stage of the screen-detected cancers was : Stage 0: 5, stage I: 17, stage II: 16, stage III: 1, stage IV: 1, and unknown 1.

CONCLUSION: Screen-detected cases of ductal carcinoma in situ (DCIS) and the number of smaller tumors (<T2) in second round were increased. The percentage of DCIS/all cancers was raised from 4.3% (2/46) to 12.2% (5/41). Biopsy rate was reduced almost by half in the second round. Additionally reduction of the benign to malignant biopsy ratio was achieved. This improvement was due to the experience gained and the application of the European Guidelines for Quality Assurance in Mammography screening.

TITLE: Waiting for a Diagnosis After **an** Abnormal Breast Screen in Canada, **1996**

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KEYWORDS: mammography, mass screening, diagnosis, breast neoplasms, time factors

BACKGROUND: Delay to diagnosis following an abnormal breast screen is associated with anxiety and personal disruption. The ability of screening programs to reduce breast cancer mortality in the population depends on the adequacy of follow-up among women with abnormal screens. In Canada, generally, women and their family physicians are notified by the breast screening program that an abnormality has been found and the family physician then initiates and coordinates the assessment process.

OBJECTIVE: Analyzing data from the Canadian Breast Cancer Screening Database, we assessed the patterns and timeliness of diagnostic follow-up after an abnormal breast screen among women attending seven provincially organized screening programs.

METHODS: We identified 203,141 women aged 50-69 screened during 1996 and prospectively followed those with abnormal screens through to completion of the assessment process. Times from abnormal screen to first assessment, screen to first imaging, screen to diagnosis and from first assessment to diagnosis were evaluated in 13,958 women, stratified according to program, mode of detection, whether a biopsy was performed and whether a cancer was diagnosed.

RESULTS: Considerable between and within program variation was observed. Half the women received their first assessment more than 2.6 weeks after their initial screen. The median time from abnormal screen to diagnosis was 3.7 weeks and increased to 6.9 weeks for women undergoing biopsy. Even if no biopsy was performed, 10% of women waited 9.6 weeks or longer for a diagnosis compared with 15 weeks or more for women undergoing biopsy. Among women receiving a biopsy, core biopsy use was associated with a shorter median time to diagnosis.   Women with cancer diagnosed on biopsy had shorter intervals from screen to diagnosis than those with benign findings on biopsy.

DISCUSSION: Women undergoing assessment after an abnormal screen in Canada waited many weeks for a diagnosis, especially if a biopsy was performed.   With the existing follow-up process, the family physician remains an integral participant in the diagnostic sequence and existing referral and practice

patterns are not disrupted. However, this often means multiple visits to different health care providers and facilities increasing the time to diagnosis and the inconvenience and anxiety for women. To ensure that timeliness targets adopted nationally in 1999 are realized, improved models of care or dissemination of existing efficient techniques to reach a diagnosis will be needed.

TITLE: **The Irish National Breast Cancer Screening Programme l BreastCheck - Prevalent Screening Around Results**

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BACKGROUND: The incidence of breast cancer amongst Irish women is amongst the highest in the European Union and a significantly greater number of Irish women die from breast cancer than their counterparts in other European countries.

OBJECTIVE: To reduce mortality and promote acceptance of mammography; to encourage a multidisciplinary approach;   minimise anxiety and promote effective surgical intervention; support primary care; develop symptomatic services and encourage conservation techniques.

The stimulus for the development of an Irish National Breast Screening Programme came from the support from the Europe Against Cancer campaign that funded pilot screening programmes in those European countries without such screening facilities i.e. France, Belgium, Spain, Portugal, Greece and Ireland in 1990. The success of the Irish Pilot Screening Programme resulted in the EUREF (European Reference Centre for Quality Assurance) recognising the Irish Programme as a reference centre capable of organising a national screening programme. The key components of the Irish Screening Programme include identification and recruitment of eligible population (50 – 64), the provision of a high quality clinical service; notification and explanation of results to women; appropriate management of abnormal findings including ancillary therapeutic interventions; ongoing coordination,   monitoring, full documentation and evaluation; the introduction of stringent quality assurance guidelines.

COMMENCEMENT: The Screening Programme commenced in March of 2000 and the expected incident round will commence in Autumn of 2002. The first phase of the Programme involved the Eastern, North Eastern and Midland Health Boards, approximately 50% of the eligible population, totalling 140,000 eligible women. The Programme is centralised with local delivery through the mobile units, screening by invitation (50 – 64 yrs). There are two static units, one in Eccles Street associated with the Mater Misericordiae Hospital and one in Merrion associated with St. Vincent's University Hospital.

The recruitment of staff was aimed at providing the highest academic calibre in radiology, pathology, surgery and the introduction of proleptic appointments where training was required to ensure quality appointments. The cohort of radiographers would have attained the Diploma of Mammography from respective radiographic schools.   A full-time physicist trained and experienced in all aspects of quality assurance was appointed and a consultant epidemiologist with statistical support was a critical addition,

NATIONAL **BREAST SCREENING PROGRAMME:**   Two view mammography; double reading; two-year screening. Integrated multidisciplinary assessment; agreed national standards in integrated Q.A.

BreastCheck Results			
	Oct 2000 — March 2002	Year to Date Jan 2002 _march 2002	Targets
Invited	73,813	10,203	70,000
Screened	51,361	9,727	49,000
Recalled - Clinical	4.4%	4.8%	< 7%
Participation	73%	80%	> 70%
Technical Recalls	.2%	.2%	
Cancers Detected /I000	8.9	11.6	> 7/1000
Invasive Cancers / 1000	6.9	8.6	
DCIS %	22%	26%	25%

The non operative diagnosis ranges from 85 — 95%. There has been a precertification audit by the external quality audit (EUREF).

THE FUTURE: To extend the programme to the remainder of Ireland by the year 2003; to continue the highest standards, encourage training and research, expand the programme to include 65 years and older; cultivate and encourage networks and relations with Europe and NHS screening programmes.

TITLE: OECD Project, A Summary of Economic Issues in Breast Cancer Screening and Treatment

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KEYWORDS: breast cancer, screening, treatment, cost, cross-national, epidemiology, outcomes

BACKGROUND: As part of its Ageing-Related Disease project, the Organization for Economic Cooperation and Development (OECD), commissioned a study of cross-national comparisons of the epidemiology, screening and treatment patterns, costs and outcomes related to breast cancer. Information was collected from a network of over 70 epidemiologists, physicians and health economists, representing 12 different countries. An initial draft report was produced following a meeting of these experts in Spring 2000. A synthesis report that draws on additional consultation and clarification from each of the country expert teams is currently being finalized.

OBJECTIVE: To compare costs, screening and treatment patterns, and outcomes related to breast cancer across 12 countries: Australia, Belgium, Canada, France, Hungary, Italy, Japan, Mexico, Norway, Sweden, United Kingdom.

METHODS: Detailed data were reported to the OECD by expert teams from the twelve participating countries. OECD staff worked to ensure that data were reported using standardized definitions and formats. After an initial meeting where each country presented data, OECD staff has worked interactively with the country experts to produce a final synthesis report.

RESULTS: Overall results are forthcoming in the final report. Selected preliminary results will be presented.

TITLE: **Present Status of Breast Cancer Screening Within the European Community**

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BACKGROUND: The Europe Against Cancer (EAC) program was launched in 1989. Over the last 10 years many European countries or individual regional projects applied for membership/ funding. The European Commission asked the European Breast Screening Network (EBSN) to provide a descriptive report on activities over the 1^{s} decade.

OBJECTIVE: To present the present status of 19 breast cancer screening projects within 13 European countries between 1989-2000. To show similarities and differences; improvement and changes to policies; developments e.g. creation of national program.

METHODS: A descriptive survey was constructed comprising 6 sections with open and close questions (52). Section : 1. Relationship with EAC; 2. Information on screening project; 3. Image of breast cancer screening within region; 4. Information about health care systems; 5. Quality assurance activities; 6. Evaluation and future planning. It was circulated to all 19 projects in 13 European countries.

RESULTS: The response rate was 100%. In 1989 only 6 European breast screening projects existed. In 2000, 19 projects were implemented, a 3fold increase. The European guidelines were used as the baseline in almost all the countries to implement "quality assurance activities." 3 projects moved from a pilot projects toward a national program. Overall the EAC is a success. A final report will be presented in December 2001.

TITLE: **Patient Satisfaction with Ultrasound Guided Needle Biopsy and Excisional Biopsy for Mammographically Detected Non-Palpable Lesions**

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KEYWORDS: breast biopsy, patient satisfaction

BACKGROUND: The histologic diagnosis of a non-palpable lesion detected by mammography can be obtained with an image guided excisional or percutaneous biopsy. Approximately 500,000 to 1,000,000 breast biopsies are performed annually in the United States with about two thirds of these being benign.

OBJECTIVE: This study interviewed women who had either an excisional or ultrasound guided breast biopsy (UGB) to compare several dimensions of patient satisfaction including perceptions of convenience, comfort and confidence in the biopsy procedure.

METHODS: Women who had a breast biopsy in 1997-1999 at an academic medical center in Vermont and met eligibility criteria were invited to be interviewed within 1 month of their breast biopsy. 393 women were invited to participate, 329 (84%) were interviewed, 36 (9%) refused and 28 (7%) were unable to be reached. 10 interviews were eliminated from the analyses because women were determined not to be eligible. 234 women had an UGB and 85 women had an excisional biopsy. 201 (63%) were diagnosed with benign disease and 118 (37%) had breast cancer. Categorical data were analyzed with chi square statistics, and for continuous data, two sample t tests were used. A multivariate analysis was used to control for the effects of demographic characteristics.

RESULTS: Women in each arm of the study did not differ by age, education, race or household income but did differ by marital status. Women married or living with a partner were more likely to have had an excisional biopsy. Women who had an excisional biopsy compared with a percutaneous biopsy had statistically more hours and days off from work and reported more side effects 1 – 3 days after the biopsy. When adjustment was made for type of biopsy procedure, education, income, and marital status, younger age was associated with greater pain (p=0.004), greater limitation of activities (p $=$ .005), greater non-prescription drug use (p<.0001), more sleep loss (p=.001), more bruising (p=.001) and more swelling (p=.027).

CONCLUSION: Women reported significantly fewer side effects and needed less time off from work with UGB. Women should be given a choice of biopsy procedures and explained the cost, convenience, and risks and benefits of each.

TITLE: **Women's Attitudes To and Experiences** With the **Norwegian Breast Cancer Screening** Program

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KEYWORDS: mammography screening, attitude, experience

BACKGROUND: The Norwegian Breast Cancer Screening Program (NBCSP) started as a 4-year pilot project in 1996. The program covers women aged 50-69 years. The screening interval is 2 years and 2 view mammograms and double reading are standard. Attendance is vital in any screening program and is influenced by confidence. Thus the women's attitudes to and experiences with the program are of importance.

OBJECTIVE: To determine women's attitudes to and experiences with the NBCSP.

METHODS: A questionnaire was sent to 1221 women in 5 categories; non-attendees (300), screened negative (300), recalled due to positive mammogram (false positive)(300), recalled due to technical unsatisfied mammograms (87) and histological verified breast cancer (234). The study objects were selected randomly from all the invited women. 92.8% of the attendees and 46.7% of the non-attendees responded. The questionnaire was divided in general attitudes to the NBCSP and experiences with the screening and eventual recall examination. The questionnaire contained closed marks and was based on the program's quality assurance manual. The questionnaire was returned in a pre-paid envelope and one reminder was sent.

RESULTS: All women who screened negative or had a false positive mammogram reported a positive attitude to the program. Nearly all the negative screened women gave expression for willingness to re-attend (97.9%) and recommend others to participate (97.1%). Among women with a false positive mammogram the figures were respectively 96.2% and 99.2%. 62.4% of the non-attendees were willing to participate in the next screening round and 85.5% recommend other to participate. About 80% of the participating women felt no or just some pain during the screening mammography. Substantial pain was more often reported in connection to recall examinations compared to screening examinations. The obligingness of the personnel was interpreted as kind and confident during the screening procedure by 97.5% of the negative screened women and by 93.2% of the women with a false positive mammogram.

CONCLUSION: The women's attitude to the pilot project of the NBCSP was positive and nearly all the attended women recommend other to participate. Almost all the attendees want to re-attend and the majority of the non-attendees want to attend in the next screening round. About one fifth of the attended women reported to have experienced substantial pain during the screening mammography. Neither experienced pain nor procedures associated with false positive mammogram seemed to influence the women's willingness to re-attend. The attended women reported a high grade of satisfaction with the personnel at the screening units.