

# International Breast Cancer Screening Network (IBSN)

## Biennial Meeting

Crowne Plaza Ottawa ♦ May 10–11, 2006

### ABSTRACTS

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- TITLE:** Effect of Process Indicators on the Episode Sensitivity of Mammography
- AUTHORS:** T Sarkeala, M Hakama, I Saarenmaa, T Hakulinen, H Forsman, A Anttila
- WORK AFFILIATION:** Mass Screening Registry, Finnish Cancer Registry
- ADDRESS:** Liisankatu 21 B, 00170 Helsinki, Finland
- KEYWORDS:** epidemiology, screening, mammography, interval cancer
- BACKGROUND:** Episode sensitivity refers to the capability of a screening test with (or without) further assessments to identify breast cancers in the screened population.
- OBJECTIVE:** We assessed the episode sensitivity of the Finnish mammography programme and explored effects of process indicators on the episode sensitivity for women aged 50–59 (60–64) years in 1991–2001.
- METHODS:** For the study period, data was available from ten screening centres. Records of 721,000 screening visits were linked at an individual level to the files of the nationwide Finnish Cancer Registry. The episode sensitivity was determined as a proportion of interval cancers out of all cancers detected (detection method) and by contrasting the incidence of interval cancers with the expected population incidence rate without screening (incidence method).
- RESULTS:** At the subsequent screens, the episode sensitivity determined by the detection method was 65%, and by the incidence method 54%, respectively. The sensitivity estimates 0–11 and 12–23 months after the screening were 70% and 38%. Compared to centres with recall rates lower than 2%, the episode sensitivity was 26% higher (CI 1.07–1.48) in centres with recall rates from 2.8 to 3.5%. Overall, the episode sensitivity increased 13% per 1% absolute increase in the recall rate.
- CONCLUSION:** The average episode sensitivity estimates were comparable with those from other European service screening programs. The centre-specific variation in sensitivity estimates was large, however, and was connected with variation in process indicators. The increase in recall rates up to 4% at the subsequent screens seems to improve the episode sensitivity of screening. The large variation in sensitivity and its possible impact on the effectiveness of mammography requires further evaluation.

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- TITLE:** Histological and Radiological Tumor Characteristics in Missed and True Interval Breast Cancers
- AUTHORS:** S Hofvind, P Skaane, H Bjørndal, B Vitak, A Bråten, L Eriksen, S Thoresen, N Bjurstam
- WORK AFFILIATION:** Department of Screening Based-Research, The Cancer Registry of Norway
- ADDRESS:** Montebello, 0310 Oslo, Norway
- BACKGROUND:** Following the rate and characteristics of interval cancer can be regarded as a quality assurance in a breast cancer screening program. The Norwegian Breast Cancer Screening Program (NBCSP) was established in four counties in 1995–96, and has gradually expanded to be nationwide. The program performs biennial screening in women aged 50–69 years, and is run according to its own quality assurance manual.
- OBJECTIVE:** To analyse histological and radiological tumor characteristics in missed and true interval breast cancers.
- METHOD:** This study was based on 231 interval breast cancers categorized into missed and true interval cancers in a retrospective mixed, blind review performed by six experienced radiologists. The interval cancers were diagnosed after the prevalent screening round in women resident in four counties that started the NBCSP.
- RESULTS:** Among those 231 interval breast cancers, 47 were regarded as missed (20%). A total of 23.1% of the missed cases and 2.7% of the true interval cancers had a recall in the screening prior to the interval cancer. The proportion of ductal carcinoma in situ did not differ statistically significant between the missed (7.7%) and true (5.5%) interval cancers. The proportion of invasive ductal carcinoma tended to be lower (66.7%) and invasive lobular cancers higher (20.5%) in the group of missed interval cancers compared with the group of true interval cancers (77.9% and 10.7%, respectively, for invasive ductal and lobular cancer). Mean histological tumor size was 24.1 mm in the group of missed, and 18.6 mm in the group of true interval cancers. Positive lymph nodes were seen in 48.5% of the missed cases and in 40.9% of the true interval cases. The tumors were characterized as radiological speculated masses in about 45%, both in missed and true interval cancers. Calcification were more common in the group of missed cases (24.1%) compared to the group of true interval cancers (6.4%), while well-defined masses were more common among true intervals (36.2%) as among missed (27.6%).

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- TITLE:** Mammographic Screening Performance Over Time: Influence of Breast Density and Hormone Replacement Therapy
- AUTHORS:** MJM Broeders, JDM Otten, N van der Zee, ALM Verbeek
- WORK AFFILIATION:** Department of Epidemiology and Biostatistics (133 EPIB)
- ADDRESS:** Radboud University, Nijmegen Medical Centre, P.O. Box 9101, 6500 HB Nijmegen, The Netherlands
- KEYWORDS:** breast density, hormone replacement therapy, sensitivity, specificity, positive predictive value
- BACKGROUND:** Given that mammographic imaging techniques have improved considerably over the years, we wondered whether screening performance still differs between women with dense and lucent breast patterns. A trend that could have worked against the improvement of screening performance is the increased use of hormone replacement therapy (HRT) among women invited for screening. HRT has repeatedly been associated with higher breast density but also with breast pain, both of which may lead to a reduction in sensitivity of screening.
- OBJECTIVE:** To compare screening performance for women aged 49–69 years with dense and lucent breast patterns in two time periods and study the possible interaction with use of HRT.
- METHODS:** Data on screening outcomes and use of HRT were collected from the regional screening programme in the east of the Netherlands for women referred in the screening rounds 1994–95 (n=642) and 2001–2002 (n=107). In addition, we sampled control women for both periods that were not referred (n=1,927 and n=2,121, respectively) and all women diagnosed with an interval cancer (n=164 and n=25 respectively). Mammograms of all women were digitized and computer-assisted methods used to measure mammographic density. Sensitivity, specificity, recall rate, detection rate and screening odds ratio were calculated to describe screening performance.
- RESULTS:** Screening performance in recent years has improved slightly, but the difference between women with dense and lucent breast patterns still exists (e.g., sensitivity 62% and 78%, respectively). Use of HRT has increased over the years and is associated with a decrease in screening performance. Sensitivity of screening mammography was particularly low (38%) in the group of women with dense breast patterns on HRT.
- CONCLUSIONS:** The results of this study warrant further investigation, especially into the interaction of HRT and breast density on screening performance. In the coming year we will increase the sample sizes for the period 2001–02 to establish firmer conclusions.

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- TITLE:** GIS as a Tool to Evaluate Access to Breast Screening
- AUTHOR:** JS Caines, GH Schaller, JI Payne, D Chakravartty
- WORK AFFILIATION:** Nova Scotia Breast Screening Program & Department of Diagnostic Imaging, Queen Elizabeth II Health Sciences Centre
- ADDRESS:** Victoria General Site, Room 3-3212 Dickson Bldg, 1278 Tower Road, Halifax, NS B3H 2Y9 Canada
- KEYWORDS:** breast screening, Geographic Information Systems, GIS, access, equity
- BACKGROUND:** The Nova Scotia Breast Screening Program (NSBSP) was established in 1991 and now consists of seven fixed screening sites and three mobile screening units. The schedules of the three mobile units need to be evaluated to determine whether they can better meet the screening needs of the population.
- OBJECTIVE:** The purpose of this study was to use Geographic Information Systems (GIS) to map the availability of breast screening, using both fixed and mobile screening sites, against the need for breast screening, as defined by both the population size and the rates of breast cancer.
- METHODS:** The NSBSP partnered with the Office of Public Health Practice of the Public Health Agency of Canada to carry out geographic mapping of data from the NSBSP for the years 2002 to 2004. Population estimates were drawn from the 2001 census at the level of subdivision and the following information was available from the NSBSP: the age and postal code of the woman being screened; the volume of screens by fixed and mobile site; and the cancer diagnoses by age and postal code. The data were used to compare the volume of screening against the need for screening.
- RESULTS:** Preliminary analyses indicate that the variations in target population size by census subdivision did not correspond to the volume of screens. In addition, one of the mobiles travelled far more than the other two, making many more stops but performing fewer screens at each stop. The mapping indicated that there remain areas in the province that are underserved in spite of the presence of the mobile units.
- CONCLUSION:** The results of this study will be used to develop criteria that can be used to regularly evaluate the schedules of the mobiles to ensure equitable access to breast screening services in the province.

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- TITLE:** Characteristics of Radiologists and Screening Centers Associated with Interval Breast Cancer Among First Participants to the Quebec Breast Cancer Screening Program (PQDCS)
- AUTHORS:** N Hébert-Croteau, I Théberge, A Langlois, D Major, J Brisson
- WORK AFFILIATION:** Direction des Systèmes de Soins et Services, Institut National de Santé Publique du Québec
- ADDRESS:** 4835 Avenue Christophe-Colomb, Montréal, Québec H2J 3G8 Canada
- KEYWORDS:** screening mammography, interval cancer, volume, performance, evaluation
- BACKGROUND:** Interval cancers are diagnosed after a negative screen before the next participation to screening. According to the Canadian Working Group on Indicators of Performance of Screening Programs, the frequency of such cases should not exceed 6 and 12 invasive tumors per 10,000 person-years within 12 and 24 months after a negative screening episode.
- OBJECTIVE:** Identify characteristics of radiologists and screening centers related to variations in the rate of early ( $\leq 12$  months) or late (13–24 months) interval tumors or in the breast cancer detection rate.
- METHODS:** Only the first participants to the PQDCS between 1998 and 2000 who gave written consent to the use of their personal data for evaluation purposes were eligible. Four groups of women were studied: all those with screen-detected breast cancer ( $n=1,699$ ), all women with a normal mammogram and interval cancer diagnosed  $\leq 12$  months ( $n=165$ ) or in the period 13–24 months after screening ( $n=404$ ), and a random sample of controls free of cancer with normal screening mammography ( $n=48,200$ ). Cases and controls were matched for trimester of screening. Data were extracted from the PQDCS information system (SI-PQDCS) and supplemented by pathology reports and central administrative databases (Med Echo and RAMQ). The analysis used logistic regression, correcting for intra-radiologist and intra-center correlations.
- RESULTS:** The rate of invasive interval cancer was 6.4 and 11.60 per 10,000 person-years in the periods  $\leq 12$  and  $\leq 24$  months post-normal screen. These estimates correspond to proportional incidence rates of 23.3% and 42.0%, respectively, using year 1997 as baseline. Although individual reading volume of the radiologist had little influence on cancer detection and interval cancer rates, these indicators varied with the screening volume of facilities. Centers with 4,000 or more participants to screening

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#### **RESULTS, continued**

mammography each year had detection rates 41% higher (OR: 1.41, 95% CI: 1.15, 1.72;  $\chi^2$  for trend: 14.08,  $p = 0.0002$ ) and interval cancer rates  $\leq 12$  months post-normal screen 37% lower (OR: 0.63, 95% CI: 0.37, 1.06;  $\chi^2$  for trend: 3.70,  $p = 0.0546$ ) than facilities with less than 2,000 screening mammograms.

#### **CONCLUSIONS:**

Interval cancer rates within the PQDCS in 1998–2000 met Canadian standards. Centers with larger volume of screening have better cancer detection rates and lower interval cancer rates, especially in the period  $\leq 12$  months post-screen. This supports the notion that the sensitivity of screening mammography is better in larger centers. Future studies should attempt to identify the mechanisms underlying this relationship.

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- TITLE:** The Evaluation of Community-Based Service Screening in Italy
- AUTHOR:** E Paci, D Puliti, F Falcini, A Pontii, M Zorzi, and the IMPACT working group
- WORK AFFILIATION:** Center for the Study and Prevention of Cancer Research Institute Tuscany Region
- ADDRESS:** Via di San Salvi 12, 50125 Florence, Italy
- KEYWORDS:** breast cancer screening, impact, detection modality, stage
- INTRODUCTION:** Service screening in many European countries is community-based, and population-based cancer registries offer the opportunity of a collection of tumor characteristics and survival data for all incident cases in the target population. The implementation of screening has changed the occurrence of breast cancer, the stage at presentation, and the surgical treatment for women invited in the screening program.
- MATERIALS AND METHODS:** We collected population data on areas from six Italian regions on all incident cases of in situ and invasive breast cancer in women aged 40–79 years from 1997 to 2001. We classified breast cancer cases according to method of detection in screen detected (SD) at first test, SD at subsequent tests, cases in women with a previous screening test, never-responders to the invitation, and not-yet invited. We also evaluated screening by intention to treat according to invited and noninvited categories. All cases were classified by TNM stage, grade, and surgical intervention.
- RESULTS:** We enrolled 2,234 in situ and 22,200 invasive breast cancer cases. Of all incident cases, 46.2% were Stage = 0 or I, and 44.6% were Stage II+ (9.2% missing). Among women 50–69 years old, the target of service screening, over the period 1997–2001, 36.6% of cases were in not-yet invited women, 39.6% were screen-detected at first or repeated test, and 9.6% were diagnosed in previously screened women and 14.2% in never-responders to screening invitation. Breast cancer cases in screened women were subclassified according to the time since last negative screening, as less than 2 years, interval cases, and more than 2 years/irregulars. Parameters to evaluate the population-based performance of service screening will be discussed. Overall, 61.1% of cases underwent breast conserving surgery, with a constant increase during the period of study.
- CONCLUSION:** Service screening started in the early nineties in Italy in some areas and in the late nineties, a large population in North Central Italy has been enrolled. The use of cancer registries for the evaluation of the screening impact allows for knowledge of the change of the presentation of breast cancer; parameters for the evaluation of the impact of screening on the target population will be proposed.