

# International Breast Cancer Screening Network (IBSN)

## Biennial Meeting

Crowne Plaza Ottawa ♦ May 10–11, 2006

### ABSTRACTS

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- TITLE:** Evaluating the UK Breast Screening Programme: Choice of Study Design and the Practical Realities of Evaluating Service Screening
- AUTHORS:** L Johns L, S Moss, A Swerdlow
- WORK AFFILIATION:** Department of Health Cancer Screening Evaluation Unit, Section of Epidemiology, Institute of Cancer Research
- ADDRESS:** Cotswold Road, Sutton, Surrey SM2 5NG, UK
- KEYWORDS:** breast screening, evaluation, cohort study
- BACKGROUND:** The National Health Service Breast Screening Programme (NHSBSP) was introduced in 1988—a decision based on the findings of published randomised controlled trials and population demonstration projects. Debate over the cause, or causes, of the fall in UK breast cancer mortality since the early 1990s and over whether the NHSBSP is an effective use of NHS resources underlines the need for proper evaluation of the programme in terms of its effect on breast cancer mortality.
- OBJECTIVE:** To estimate the effectiveness of the NHSBSP, as operated in recent years, in reducing the risk of death from breast cancer in women invited and screened by the programme.
- METHODS:** Our evaluation study has a retrospective and prospective cohort design linking individual-level breast screening data to breast cancer incidence and mortality information held by cancer registries and the Office for National Statistics. Estimates of effect will be based on a combination of data derived from the early years of the programme and from more recent years, involving a cohort in excess of 2 million women. The study makes use of the NHSBSP's staggered implementation period to identify a contemporary uninvited comparison group, allowing estimation of the difference between nonresponders and a baseline uninvited group. Data from defined periods will be used to estimate the effect of specific components of screening such as film density, number of mammographic views, and improvements in film-reading skill.
- RESULTS:** To date, we have exposure data on over 2 million women and are finalizing the mechanism for ascertainment of outcome data. The choice of design and the process of setting up this study serve to illustrate some of the general issues surrounding evaluation of service screening and, in particular, the practicalities of conducting a large individual-based cohort study in the current climate of data confidentiality and recent reorganisation of health areas in the UK.

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- TITLE:** Breast Cancer Mortality in Copenhagen After Introduction of Mammography Screening
- AUTHOR:** AH Olsen
- WORK AFFILIATION:** Institute of Public Health University of Copenhagen
- ADDRESS:** Øster Farimagsgade 5 Opg. B, Postboks 2099, DK-1014 Copenhagen K, Denmark
- KEYWORDS:** breast cancer, mammography, screening
- BACKGROUND:** The overview of the Swedish randomised trials of mammography screening demonstrated a reduction of 29% in breast cancer mortality in women aged 50–69 after 5–13 years of follow-up. Mammography service screening was introduced in Copenhagen in 1991.
- OBJECTIVE:** To evaluate the effect on breast cancer mortality during the first 10 years of the mammography service screening programme in Copenhagen.
- METHODS:** The study group consisted of all women ever invited to mammography screening in the first 10 years of the programme. Historical, national, and historical national control groups were used. We compared breast cancer mortality rates in the study group with rates in the control groups, adjusting for age, time period, and region.
- RESULTS:** Breast cancer mortality in the screening period was reduced by 25% (relative risk 0.75, 95% confidence interval 0.63–0.89) compared with what we would expect in the absence of screening. For women actually participating in screening, breast cancer mortality was reduced by 37%.

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- TITLE:** Breast Cancer Mortality After Screening Mammography in Women Aged 40–69 in British Columbia
- AUTHORS:** A Coldman, N Phillips, L Warren, L Kan
- WORK AFFILIATION:** Surveillance and Outcomes Unit, British Columbia Cancer Agency
- ADDRESS:** 800–686 West Broadway, Vancouver, BC V5Z 4E6, Canada
- BACKGROUND:** Mammographic screening is a proven method for the early detection of breast cancer. We analysed the impact of service mammographic screening on breast cancer mortality among British Columbia women.
- METHODS:** A cohort of women having a first mammographic screen between the ages of 40–69 in the period 1989–2002 was identified from the Screening Mammography Program of British Columbia. Cases and deaths from breast cancer were identified from the British Columbia Cancer Registry (BCCR) using probabilistic record linkage. Expected deaths in the cohort were calculated using incidence and survival rates from women not in the cohort (non-participants) for the same period using the method described by Sasieni. The breast cancer mortality ratio was calculated by dividing observed by expected breast cancer deaths. Adjustment was made for the effect of age and socioeconomic status (SES) of region of residence on the rate of survival.
- RESULTS:** There were 510,625 women in the cohort who underwent a total of 1,696,391 mammograms. Record linkage identified 8,078 cases of breast cancer in the cohort in the study period with a further 10,186 cases of breast cancer reported to the BCCR in non-participants. Both age and SES influenced the probability of breast cancer survival in non-participants. After adjustment, the breast cancer mortality ratio was 0.59 after 10 years for all ages combined ( $p < 0.0001$ ). The mortality ratio in women aged 40–49 at first screening was 0.58, similar to that in women over 50 ( $p = 0.78$ ). Exclusion of mortality associated with breast cancers diagnosed after age 50 in women starting screening in their 40s increased the mortality ratio to 0.62, but it remained statistically significant.
- CONCLUSION:** Breast cancer mortality was lower for women aged 40–69 participating in screening.

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- TITLE:** A Population-Based Case-Cohort Study of the Outcomes of Screening Mammography Among Ontario Women 40–49 Years of Age
- AUTHORS:** LF Paszat, SJ Bondy, V Mai, AM Chiarelli, V Benk, R Jong, C Holloway, J Ringash, M Mamdani
- WORK AFFILIATION:** Institute for Clinical Evaluative Sciences, Toronto
- ADDRESS:** 2075 Bayview Avenue (#G1-58), Toronto, Ontario M4N 3M5, Canada
- KEYWORDS:** screening mammography, women 40–49, case-cohort study
- BACKGROUND:** There is no consensus on the value of screening mammography before age 50. Canada has assigned category 'C' to this procedure (insufficient evidence to recommend for or against). Women under age 50 do not participate in the Ontario Breast Screening Programme; however, women under age 50 may undergo mammography paid by the Ontario Health Insurance Plan (covers all permanent residents of Ontario), on referral by any physician, for any indication, including screening.
- METHODS:** The goal is to examine the association between periodic mammography before age 50, and overall survival, among women between the ages of 40 and 43. Mammographic billing claims, breast surgery billing claims, breast cancer diagnoses, comorbidity, and socioeconomic status were extracted on the entire cohort from administrative databases. Mammogram reports, breast surgery, and information about cancer diagnosis were abstracted and photocopied from original health records at over 140 institutions across Ontario. Screening mammography was operationalized by calculating the proportion of survival time consisting of 365-day periods, between the first mammography date and the date of breast cancer diagnosis or death, whichever came first, and also by calculation of the mean interval between episodes of periodic mammography.
- RESULTS:** The cohort comprised 387,125 women. Up to December 31, 2002, over 7,000 breast cancers occurred in the cohort. By December 31, 2000, over 40% of the cohort had received two or more periodic mammograms. Survival will be modeled using a cox model modified for underestimation of the standard error of parameter estimates, among a population consisting of all cancer cases and a random sample of the entire cohort. Exposure variables are the proportion of uncensored survival time following mammography and the mean intermammographic interval per woman. Adjustment for prior history of mammography and/or breast surgery, comorbidity, socioeconomic status, and residential area will be made.

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- TITLE:** UK Randomised Controlled Trial of Mammographic Screening from Age 40: Breast Cancer Mortality at 10 Years Follow-up
- AUTHORS:** SM Moss, H Cuckle, A Evans, L Johns, M Waller, L Bobrow for the Trial Management Group\*
- WORK AFFILIATION:** Cancer Screening Evaluation Unit, Genetic Epidemiology Branch, Institute of Cancer Research, The Trial Management Group
- ADDRESS:** Cotswold Road, Sutton, Surrey, SM2 5NG UK
- KEYWORDS:** screening, mammography, age
- BACKGROUND:** The effectiveness of screening by mammography in women aged 50 and over has been demonstrated by randomised controlled trials. The effectiveness in younger women remains less clear; long-term follow-up in the randomised trials suggests a benefit, but this may at least in part be due to screening after women reach the age of 50.
- METHODS:** The age trial was a randomised controlled trial designed to study the effect of inviting women for mammography from age 40 compared with the current National Health Service (NHS) policy under which women are invited for 3 yearly screening from age 50. A total of 160,921 women were randomised in the ratio 1:2 to an intervention arm offered annual mammography to age 48 and a control arm that received usual medical care, with all women eligible for the NHS breast screening programme from age 50. All women have been followed up to determine breast cancer incidence and mortality from all causes.
- RESULTS:** In an interim analysis using surrogate outcome measures to compare predicted breast cancer mortality in the two arms, based on 1,287 cases diagnosed to December 31, 1999, there was an 8% excess of invasive breast cancers in the intervention arm. The ratio of predicted deaths at 10 years in the intervention arm relative to the control arm, adjusted for this excess diagnosis ranged from 0.89 (95% CI 0.78–1.01) to 0.90 (95% CI 0.80–1.01). The analysis of observed breast cancer mortality in the two arms at an average of 10 years of follow-up is currently in progress.

\*Trial Management Group—Professor H Cuckle (Chair), Professor TJ Anderson, Dr. M Cohen, Dr. A Evans, Ms. J Hayes, Dr. E Kutt, Dr. SM Moss, Dr. B Muir, Dr. C Record, Dr. BA Thomas, Ms. I Thomas (trial co-ordinator).

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**TITLE:** Modeled Estimates of the Effect of Screening

**AUTHOR:** K Cronin

**WORK AFFILIATION:** National Cancer Institute, Division of Cancer Control & Population Sciences, Surveillance Research Program, Statistical Research and Applications Branch

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The Cancer Intervention and Surveillance Modeling Network (CISNET) utilized modeling techniques to assess the impact of mammography screening and adjuvant treatment on breast cancer mortality in the United States from 1975 to 2000. The consortium of investigators developed seven independent statistical models of breast cancer incidence and mortality. All seven groups used similar information to model the background trend in breast cancer incidence rates (trends without the influence of screening), dissemination and use of screening mammography, and the use of multi-agent chemotherapy and tamoxifen. Approaches to modeling the benefits of early detection and adjuvant treatment varied. The percentage decline in mortality attributed to the interventions varied from 8% to 23% for screening and 12% to 21% for adjuvant therapy. The variability across models in the contribution of screening was larger than the contribution of adjuvant therapy, reflecting the greater uncertainty associated with estimating the benefits of screening. All seven models showed that screening and adjuvant treatment have reduced mortality from breast cancer in the United States.