examination (CBE), annual mammography and annual contrast-enhanced breast magnetic resonance imaging (MRI). However, false positive rate of MRI is high, leading to further investigations, patient burden, and extra costs. Therefore, we evaluated the results of such intensive surveillance, including the medical consequences and costs of false positive results.

Methods: 196 women carrying a BRCA1 or BRCA2 mutation underwent the intensive surveillance program between September 1999 and 2005. In case of an abnormal investigation, further examinations (consultation, ultrasound, biopsy, MRI, mammography) were performed. An abnormal finding was defined as a suspected palpable mass or abnormal lesion on mammography or MRI.

Results: In 6 years 196 women were controlled with a median follow up of 2 years (544 woman years). For standard surveillance procedures were performed: 1149 (2% abnormal) CBE's, 494 (9% abnormal) mammograms and 436 (14% abnormal) MRI scans. Abnormal result led to the following additional investigations: 32 CBE's, 114 ultrasounds, 17 mammograms, and 64 MRI scans. Invasive breast examination by histological biopsy was performed 48 times: 31 guided by ultrasound, 10 by MRI, 4 stereotactic, and 3 by surgical procedure.

The costs of the standard (clinical and radiographic) surveillance amounted €138,169.− (€254.− per woman year). The extra costs of the further (radiographic and histological) investigations amounted €33,022.− (€61.− per woman year). During the period of 6 years 13 cancers were detected: 11 invasive cancers (9 by surveillance and 2 interval cancers) and 2 in situ ductal cancers.

Conclusions: Total (clinical, radiographic and histological) costs of intensive surveillance of BRCA mutation carriers are only €315.− per woman year. However, the total costs to detect 1 breast cancer are high (€13,168.−).

162 Poster

Radiographer gender in a population breast screening programme – would it matter?

P. Fitzpatrick[1], T. Mooney[1], A. Winston[1]. [1]*BreastCheck, National Cancer Screening Service, Dublin 1, Ireland*

BreastCheck, the National Breast Screening Programme, screens women aged 50–64 years in the Republic of Ireland. Radiographer recruitment has been a challenge for the programme; expansion of the programme to the south and west of the country has just commenced and a doubling of numbers is now required. There has been little research regarding attitudes to male radiographers for mammography, particularly in the screening rather than symptomatic setting. The aim of this study was to document attitudes to male radiographers and effect on the programme performance parameters.

A postal questionnaire was completed by 85.8% of a random sample of 2,000 women recently screened by BreastCheck with 'normal' outcome.

The commonest reaction women felt they would have if there were a male radiographer was embarrassment; significantly greater among those attending a static unit (45.6%) than mobile (38.4%) and in younger women (46%) than older (38.7%). Almost 9% would not have proceeded if the radiographer was male and 9% would only have proceeded if female chaperone present. 17.5% (95% CI 15.7%-19.4%) agreed with the statement "If there were male radiographers I would not return for another screening appointment"; 18.3% were unsure. One-quarter agreed that "if I heard there could be male radiographers it would change my opinion of BreastCheck for the worse". However 78% (95% CI 76%-80%) agreed that "having my breast screening performed is more important to me than any concern about the gender of staff dealing with me". The proportions agreeing with these statements did not vary significantly by screening unit or mobile, age group, area of residence or insurance status.

To-date female radiographers have been employed BreastCheck. Male radiographer recruitment would impact on screening uptake, which must surpass 70% in order to achieve desired mortality reduction. This is the largest international study to date of this issue; the correct balance between equality and programme performance must be identified.

163 Poster

The results of 9,439 screening telemammography using computed radiography (CR) softcopy

H. Ogata[1], T. Sugimoto[1], S. Nakauchi[2], F. Suehiro[2], E. Tsubosaki[2], Y. Okamoto[3], W. Hamada[3], Y. Okada[3], T. Funakoshi[1], K. Hanazaki[1]. [1]*Kochi Medical School, Surgery, Kochi, Japan;* [2]*Kochi Kenshin Clinic, Screening, Kochi, Japan;* [3]*Kochi Kenshin Clinic, Radiology, Kochi, Japan*

Background: Resent progress of digital technology has overcome the problems of digital mammography including the resolution of monitor. The results of several large clinical trials demonstrated the equality of digital and film screen (F/S) mammography in breast cancer screening. The number of digital mammography is increasing in Japan and the majority of them are computed radiography (CR) systems because introduction cost of CR is cheaper than that of full field digital mammography (FFDM). We have started telemammography screening using CR softcopy since 3 years ago.

Materials and Methods: Since Jun 2005, using high resolution monitor (5M pixels), the expert mammographers have interpreted screening mammograms of about 15,000 cases, transmitted over optical fiber from the screening clinic where mammograms were taken with CR mammography system and compressed softcopy was made according to DICOM standard. And now, we are constructing a new telemammography network connecting 4 more screening facilities to our institute, funded by Japanese ministry of welfare and labor.

Results: In the first two years, we had interpreted the mammograms of 9,439 cases in this system, and the recall rate, breast cancer detection rate and positive predictive value were 6.79%, 0.36% and 5.3%, respectively. These results were not inferior to those of the other screening programs using film-screen mammography in Japan.

Conclusions: The preliminary result of our screening telemammography system using CR softcopy was adequate. This telemammography system might be a good model to utilize the situation that the majority of digital mammography is CR in Japan.

164 Poster

Breast MRI screening in Asian women with high familial risk of breast cancer

L. Sim[1], P. Ang[2], G.H. Ho[3], P.H. Tan[4]. [1]*Singapore General Hospital, Diagnostic Radiology, Singapore, Singapore;* [2]*National Cancer Centre, Medical Oncology, Singapore, Singapore;* [3]*National Cancer Centre, Surgical Oncology, Singapore, Singapore;* [4]*Singapore General Hospital, Surgical Oncology, Pathology, Singapore*

Background: The purpose of this study is to assess the feasibility and performance of breast MRI screening in Asian women with high familial risk of breast cancer.

Materials and Methods: Forty-two asymptomatic women attending our centre in the last 3 years (Dec 2004 to April 2007) who had a cumulative lifetime risk of breast cancer of 15 percent or more, were recruited. They underwent mammography, breast ultrasound and breast MRI which were interpreted prospectively and independently; and scored using the ACR BI-RADS reporting system. Confirmation of imaging results was obtained via histopathology for BI-RADS categories 4 and 5 and subsequent follow-up breast imaging for BI-RADS categories 1−3.

Results: The mean age of the subjects was 40.4 years. The youngest candidate was 24 years and the oldest 52 years. The average length of follow-up at this juncture was 17 months with the longest follow up period being 27 months. No interval cancer has occurred in the interim. One cancer was detected solely by MRI while another cancer was visible on all 3 modalities. The sensitivity of mammography, ultrasound and MRI for detecting breast cancer was 50 percent, 50 percent, and 100 percent respectively, and the specificity was 95.1 percent, 85 percent, and 95.1 percent respectively. The overall discriminating capacity of MRI was significantly better than that of mammography or ultrasound ($P < 0.05$). Analyzing the receiver operator characteristic curves plotted from the BI-RADS score for each modality, the area under the curve for MRI was the largest, indicating it was the best test ($P < 0.05$).

Conclusion: Despite the small sample size, preliminary results show that breast MRI screening in the context of high familial risk Asian women is feasible with a cancer detection rate of 0.047%. This compares favorably with that achieved by breast MRI screening trials performed in Caucasian women. In addition, the better performance of MRI highlights the poor sensitivity of mammography and ultrasound in screening for breast cancer in this category of women.

165 Poster

Benefits and risks of breast cancer screening among women with a familial or genetic predisposition: validation of a simulation model using published data

M.C. Jansen-van der Weide[1], G.H. de Bock[2], M.J.W. Greuter[1], N.J.D. Nagelkerke[3], M. Oudkerk[1]. [1]*University Medical Center Groningen, Radiology, Groningen, The Netherlands;* [2]*University Medical Center Groningen, Epidemiology, Groningen, The Netherlands;* [3]*Al Ain University, Community Medicine, Al Ain, UAE*

Background: Women at increased risk of breast cancer are often screened with mammography at relatively young ages during which the sensibility for x-rays is higher and the risk of radiation-induced tumours therefore is increased. Regarding the aim of regular screening to reduce the incidence and mortality rate, it is important to know, whether screening protocols

using MRI or mammography or a combination thereof at young ages provide a balanced benefit versus risk ratio. For that, we constructed a simulation model aiming at the provision of accurate benefits and risks of screening scenarios. Radiation risk was calculated using the new health risks from BEIR VII phase 2 report. The purpose of this study is to validate the outcomes of our model using published data on women at increased risk of breast cancer.

Materials and Methods: A study simulating screening was conducted among a simulated population of women with breast cancer family histories. The model parameters were derived from published estimates of population incidence and relative risks. The outcomes of our model were validated by comparing these to data reported in a study on breast cancer screening among high-risk women in Italy (Cortesi, BMC Cancer, 2006).

Preliminary results: During the study period of Cortesi et al. 5 tumours developed (95% CI: 0.85−9.15) among mutation carriers (n = 48), of which 2 were found through the screening program. Among women with a family history of breast cancer (n = 931) 33 tumours (95% CI: 21.9−44.1) were found, of which 23 were detected with screening.

When using our model, the same screening scenario revealed 2.4 tumours among mutation carriers (SE: ±0.02) of which 1.0 was found through the screening program. Among women with a family history of breast cancer, 33.4 tumours (SE: ±0.3) developed, of which 20.0 were detected through screening.

Conclusions: Our model outcomes are comparable with the results of data published by Cortesi et al. Therefore, our model seems to be suitable for the provision of accurate benefit-risk ratios, useful for the refinement of the screening guidelines, concerning women at increased risk of breast cancer.

166 Poster

Simultaneous education and clinical breast examination in a screening for breast cancer in Iran

N. Alavi[1], F. Alaeddini[2]. [1]*Iranian Center for Breast Cancer, Surgery, Tehran, Iran;* [2]*Health Researchers Institute, Epidemiology, Tehran, Iran*

Background: Screening mammography is recommended for early detection of breast cancer; however, because of the lack of acceptance among women and lack of available resources for all women who are eligible for screening, screening rate in developing countries is low, also many of patients in Iran are premenopausal and mammographic screening is not so effective. In the present study education with clinical breast examination for simultaneous screening and increase breast awareness is considered and women satisfaction is determined.

Materials and Methods: In a cross-sectional study, 27,985 teachers with the mean age of 38.8±5.5 years were randomly selected from all schools in Tehran between October 2003 and February 2004. Subjects were examined for breast clinical signs and also educated for both manifestations of breast cancer and breast self examination by trained G.Ps.

Results: Among studied women, 6.8% of them had the family history of breast cancer. In breast examination, mass was detected in 8.3% of teachers and almost 2.8% of them had breast thickening. Furthermore, breast examination in 88.9% of subjects was normal. About 91% of cases were satisfied from breast examination and education program. The most common causes of unsatisfaction were anxiety and a little knowledge about the effectiveness of this program. During a two years follow up after screening, 64% of teachers repeated breast self examination regularly.

Conclusion: In developing countries with a few resources of mammography screening, education programs for breast self examination is optimal method for the screening of breast cancer.

167 Poster

Breast cancer screening programme for paediatric cancer survivors after chest wall radiotherapy

M. Gennaro[1], G. Scaperrotta[2], P. Lepera[1], C. Meazza[3], M. Podda[3], L. Gandola[3], M. Greco[1], A.R. Conti[1], F. Spreafico[3], M. Terenziani[3]. [1]*Istituto Nazionale Tumori, Surgery, Milan, Italy;* [2]*Istituto Nazionale Tumori, Radiology, Milan, Italy;* [3]*Istituto Nazionale Tumori, Paediatry, Milan, Italy*

Introduction: High number of long term survivors after chest wall irradiation develop a second cancer that may be the leading cause of death. The aim of this prospective study was to evaluate the long-term risk to develop breast cancer following exposure to ionizing radiation either at childhood or adolescence and to compare the sensitivity of Clinical Breast Examination (CBE), Mammography (MX) and Ultrasonography (US) for screening of such young women.

Material and methods: This study was approved by the Independent Ethical Committee of the National Cancer Institute of Milan. We identified 86 patients from an institutional database that received chest wall radiotherapy for paediatric cancer. They accepted to be enrolled for an intensive surveillance programme and represent the subject of this study. CBE, US and MX were yearly performed for breast cancer screening. A screening event or round, that is constituted by all three diagnostic procedures (two under 25 years old), take placed in a single day. Overall detection rate of breast cancer per year and sensitivity of each of the three diagnostic procedures was calculated.

Results. Among these women, from April 2004 to May 2007, we identified 8 breast cancers. The age at diagnosis ranged between 26 to 49 yrs. Two cases were stage 0, four were stage I and the remaining two were stage II or higher. One death was due to breast cancer. All but two cases were treated with a total mastectomy because of multifocal disease or extensive intraductal cancer. Overall detection rate of breast cancer was 3% per year, ten-fold higher than expected in older women from screening mammography. We found a sensitivity of 50%, 83% and 67% for CBE, MX and US respectively.

Conclusion. This group of female should be considered at increased risk to develop a breast cancer that occurs earlier than expected in general population, when screening programmes are not applied for early detection. A specific screening programme for such patients should be warranted. We further continue this investigation by adding yearly Magnetic Resonance (MR) as additional tool to improve the tumour detection, especially in dense breast.

168 Poster

Active screening allowing to compare breast cancer staging and its impact at population survival between Brazil and developed countries

A.G.Z. Matthes[1], E.C. Mauad[2], R.A.C. Vieira[1], R.L. Haikel[1], R.A.D. Michelli[1], G.H.F.P. Ribeiro[1], A.T. Tsunoda[1], R.L. Haikel Junior[2], J.S.C. Mattos[2]. [1]*Hospital de Cancer de Barretos, Senology and Breast Reconstruction, Barretos, Brazil;* [2]*Hospital de Cancer de Barretos, Prevention, Barretos, Brazil*

Background: Advances in early breast cancer (BC) diagnosis has not been extended to the Brazilian public health on contrast to that observed in developed countries. In recent decades, Barretos' Cancer Hospital (BCH) has begun an active screening of patients using mobile units (MU) equipped with mammographics to increase early BC diagnosis and reduce mortality.

Material and Methods: This retrospective study was done using data base from the BCH, between 1986 and 2006. It compared tumor stages in three periods of 7 years each, and evaluated 6,551 patients. The period from 2000 to 2001 analysis assed the impact of staging on survival including 619 patients. Staging and survival data from BCH were compared with data from the SEER-Surveillance Epidemiology End Results of the National Cancer Institute-USA.

The groups were analyzed with chi-square test, Kaplan and Meyer model and log-rank test.

Results: Of the 6,551 patients examined clinical stages 0, I, II, III, IV and not classified were 5.1%; 10.7%; 35.6%; 24.1%;11.7% and 12.8%, respectively. When assessing changes over 21 years, it was observed that there was a change in clinical stage at diagnosis ($p < 0001$), with increase of patients with early stage (EC0-I), going on 8.1% to 21.8%, due to a decrease in advanced cases (ECIV), that reduced from 16.5% to 11.9%.

At the end of the study the 619 patients' situation was: 65% survival without disease, 1.1% alive with illness, 9% associated with death by other disease, 22% of deaths by cancer, and 2.9% of patients lost follow up. Clinical stage at diagnosis was 6.6%, 9%, 41%, 26%, 17.3% respectively the clinical stages 0, I, II, III and IV. Overall survival was 78% in 60 months, living in this period as a function of clinical staging 0, I, II, III and IV, about 100%, 94.2%, 89.4%, 68%, 2% and 49.3% of patients. This analysis showed survival correlation depending on clinical stage at diagnosis ($p < 0.0001$).

Conclusions: (1) There was an increase in the early BC diagnosis to the current value of 21.8%, however is still insufficient to 50.0% observed in developed countries. (2) Survival curves at BCH were similar to those observed in SEER. (3) Active screening with MU, improving regional service, diagnosis and treatment, changed the story of BC in Barretos' region during this period. (4) Survival of BC in the Brazilian population is based on clinical staging display that had the same characteristics of the USA but with marked differences at the moment of the diagnosis. (5) The establishment of organized screening programs at national level are a good strategy to change this context.