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Meeting abstracts

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1

Breast interventional devices: how they evolve and define new subspecialities

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Breast Cancer Research 2006, **8(Suppl 1):**P1 (doi: 10.1186/bcr1416)

From 1930 to 1990 annual age-adjusted breast cancer death rates for women in the United States remained remarkably constant, oscillating around 32 deaths per 100,000 over 60 years. During this long time-frame, the surgical treatment of breast cancer evolved from radical mastectomy with mandatory lymph node dissection to lumpectomy coupled with radiation therapy. With this new paradigm, lymph node dissection was reserved for women with tumor-invaded axillary lymph nodes. Beginning in the 1970s, chemotherapy after surgery (adjuvant) and before surgery (neoadjuvant) was added to surgical treatment. The radical diminution in the scope of breast surgery did not alter the national breast cancer death rate. Doing less surgery was neither harmful nor beneficial to long-term survival from breast cancer.

In the 1980s two events changed this static picture: the addition of tamoxifen to adjuvant and neoadjuvant chemotherapy, and the introduction of mammography. Beginning in 1990 annual breast cancer death rates in the United States began to fall, and have continued to fall each year since then. In 2001, the last year of published statistics, the breast cancer death rate was 26 deaths per 100,000. Best estimates for where to credit this dramatic drop in death rate place approximately 50% of the credit with improved adjuvant chemotherapy and 50% with mammography.

Abnormal mammograms demand a breast biopsy since only one in five abnormal mammograms is actually a breast cancer. Consequently, widespread adoption of mammography has produced an image-guided breast biopsy industry in the United States. Open, surgical breast biopsy has been replaced with image-guided breast biopsy because improved breast biopsy tools have made image-guided breast biopsy equivalent in accuracy to open, surgical breast biopsy. These tools, in turn, have changed the professional lives of surgeons, pathologists, and mammographers, leading to the development of dedicated breast surgeons, breast pathologists, and interventional breast radiologists.

2

Evaluation of digital mammography: update on the UK position

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Breast Cancer Research 2006, **8(Suppl 1):**P2 (doi: 10.1186/bcr1417)

There is general acceptance that digital mammography screening will eventually replace the current analogue systems. Before this technology is introduced more widely for breast screening, however, assurances need to be made that it can improve or at least equal, the existing system in both quality and performance [1]. It is not simply a matter of replacing the existing mammography sets with digital systems. The Advisory Committee on Breast Cancer Screening supported setting up a multiprofessional Digital Steering Group to bring together the relevant expertise in breast screening and digital systems. The aim of the group was to identify areas of work required to be undertaken prior to implementation of digital systems in the screening service. The group had representation from England, Wales, Scotland and the private sector.

Six areas of work were identified: technical parameters, clinical parameters, information issues, purchasing, training, and screening on mobiles. The Digital Steering Group of the National Health Service Breast Screening Programme (NHSBSP) has concluded that all the direct digital mammography systems tested by the NHSBSP meet the image quality and dose standards in the European Guidelines for Digital Mammography [2].

Only one of the computed radiography systems tested by the NHSBSP meets these standards. However, testing and evaluation of the new designs is ongoing.

References

1. Advisory Committee on Breast Cancer Screening: *Screening for Breast Cancer in England.* NHS Cancer Screening Programmes Publication 61; February 2006.
2. Van Engen R, Young KC, Bosmans H, Thijssen M: **The European protocol for the quality control of the physical and technical aspects of mammography screening. Part B: Digital mammography.** In *European Guidelines for Breast Cancer Screening.* 4th edition. Luxembourg: European Commission; 2005, in press [www.euref.org]

3

Digital mammography in the United Kingdom: the reality

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Breast Cancer Research 2006, **8(Suppl 1):**P3 (doi: 10.1186/bcr1418)

This talk will discuss the outcomes from the sites currently piloting full-field digital screening and will outline progress on the key outstanding issues.

To date, all the equipment has been technically satisfactory and produces good image quality at an acceptable dose. Several units have been shown to work on mobile vans. Translating this into safe and affordable screening has been less successful.

No full-field digital mammography machine will work at its best without patient archiving and communications systems and a radiology information system. Integration into the current Information Technology structures has been hampered by parallel development and implementation work on the national Information Technology programme and a national reluctance to spend local money on short-term fixes.

The current differences in cost will not be offset by savings in film and film-handling processes, so improvements in throughput (i.e. shorter appointments and/or longer days) are required, and this has not been fully addressed.

4

DMISTifying digital mammography in the USA

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Breast Cancer Research 2006, **8(Suppl 1):**P4 (doi: 10.1186/bcr1419)

Principles, technique and equipment Full field digital mammography (FFDM) offers potential improvements over the limitations of screen film mammography (SFM). While film acts both as the detector and display medium for the breast, a digital technique can separate these two functions with the possibility of maximizing the performance of each independently.

Digital detectors create an electronic image of the structure radiographed as picture elements or pixels. Detectors used are typically amorphous silicon flat panels, charge-coupled devices (CCDs), or amorphous selenium.

The various approaches that have been taken to develop FFDM systems include slot scanning with indirect capture utilizing a moving row of CCDs in order to achieve the full breast coverage, flat panel designs with both direct or indirect image capture and photostimulable phosphor plates.

Clinical FFDM Lewin and colleagues conducted the first blinded prospective study comparing SFM to FFDM. The recall rate for FFDM was less than SFM ($P < 0.001$), with fewer patients sent to biopsy but with no significant difference in cancer detection. It thus appears from this study that FFDM was more effective for detecting malignancy than SFM, sending fewer women to biopsy for a similar yield of malignancy. Two other trials were also reported on SFM and FFDM in a screening situation. The Oslo I trial did not demonstrate a significant difference in cancer detection and the recall rate was 4.6% for FFDM and 3.5% for SFM. This difference was not significant. A second trial, the Oslo II study, demonstrated that the recall rates were statistically higher for FFDM than SFM. The ACRIN DMIST trial demonstrated a significant difference in favor of a digital technique for women under 50, for women with dense breasts and for premenopausal and perimenopausal women.

5

How are symptomatic services run in the United Kingdom?

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Breast Cancer Research 2006, **8(Suppl 1):**P5 (doi: 10.1186/bcr1420)

Breast clinics have developed in a fairly *ad hoc* way over the past 15 years, often led by experience from breast screening clinics. Although the concept of multidisciplinary teams is now well established, the interaction between members of the teams is much less well defined, particularly as to who is responsible for managing patients through the diagnostic pathway.

As part of the Association of Breast Surgery at BASO symptomatic audits that have been carried out over the past 6 years, some units have submitted data on all patients seen in their clinics, giving a dataset of over 100,000 patients from 58 breast units (median age 45, range 1–102). Overall 53% of patients have ultrasound and 57% mammography, with both imaging methods used in 32%. Needle biopsies (core or fine needle aspiration cytology) are carried out on 26% of patients, with 69% showing benign pathology. The preoperative cancer diagnosis rate is 91%.

This dataset has been explored to look at variation in practice across units, and shows quite wide variation in the reported use of mammography (26–100%), ultrasound (4–96%), and needle biopsy (6–57%), although this does not obviously alter the cancer diagnosis rates for individual units. These results will be presented to inform discussion on what may be best practice.

6

Symptomatic breast clinics: the radiologist's perspective

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Breast Cancer Research 2006, **8(Suppl 1):**P6 (doi: 10.1186/bcr1421)

Breast radiology, encompassing high-quality mammography, ultrasound and image-guided biopsy, is central to the aims of the modern breast clinic – to address the concerns of patients presenting with symptoms of breast disease and to make an accurate and timely diagnosis.

There has recently been increased pressure on clinics due to improved public awareness of breast disease leading to earlier patient presentation, often with subtle clinical signs. The diagnosis of breast cancer at an earlier stage, contributing to the improved outcome for breast cancer patients, has been accompanied by increased numbers of women presenting to clinics with benign conditions, increasing the workload for radiology services. Further pressure on services has come from increasing expectations from the public who would welcome rapid access to diagnostic clinics regardless of the nature of symptoms and an assurance that all necessary tests would be performed during the same session. Some services have had difficulty with meeting the challenge of both maintaining accuracy and quality at the same time as increasing capacity to meet Health Service waiting time targets.

In this presentation, different models of care for breast clinics will be presented with data from the 2006 UK Breast Clinic Survey, and methods for ensuring the most effective and efficient use of radiology resources will be discussed.

7

The 'ideal' symptomatic breast clinic

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Breast Cancer Research 2006, **8(Suppl 1):**P7 (doi: 10.1186/bcr1422)

Abstract not submitted.

8

Dominance and nondominance of the radial scar/complex sclerosing lesion and associated pathology

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Breast Cancer Research 2006, **8(Suppl 1):**P8 (doi: 10.1186/bcr1423)

Aim To establish whether there is a significant difference in the pathology associated with radial scars (RS) or complex sclerosing lesions (CSL).

Patients and methods RS or CSL were recorded in 178 specimens over a 17-year period. Three associated pathologies were noted – atypical hyperplasia, *in situ* malignancy and invasive carcinoma. The sclerosing lesions were categorised as to whether the RS/CSL was dominant (i.e. larger than the associated pathology) or nondominant (smaller than the associated pathology).

Results Sixty-four patients (36%) had RS/CSL with associated pathology: atypical hyperplasia (17), *in situ* (24) or invasive (23) malignancy. There was a significant ($P < 0.001$, chi-square 17.5)

Table 1 (abstract 8)

	RS/CSL dominant		
	Yes	No	Total
Associated pathology			
ADH/ALH	17	0	17
In situ	15	9	24
Invasive	7	16	23
Total	39	25	64

difference in proportions for histological types between lesions where the RS/CSL was dominant and lesions where they were not. Lesions with a dominant RS/CSL were associated with significantly more *in situ* malignancy and atypical hyperplasia. Invasive carcinoma was associated with nondominant RS/CSL.

Conclusion The nature of the associated pathology appears to be related to the dominance or nondominance of the RS/CSL.

9

Audit of wide bore needle biopsies graded B3: does the final pathology justify the increasing rate of benign biopsy?

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Breast Cancer Research 2006, **8(Suppl 1):**P9 (doi: 10.1186/bcr1424)

A recent national audit of the West of London Breast Screening Service showed an increased rate of benign biopsy. This may be related to the increasing rate of wide bore needle (WBN) biopsies graded as B3 (indeterminate). Common B3 pathologies include atypical ductal hyperplasia (ADH), columnar cell change with hyperplasia or atypia (CCC) and intraduct papilloma (IP). Previous studies have shown an association of these lesions with malignancy [1,2]. Our practise is to recommend excision biopsy of these B3 lesions.

We retrospectively audited surgical excision biopsies of B3 lesions between April 2004 and April 2005, recording mammogram findings, patient demographics, WBN and surgical excision pathological diagnoses.

Twenty-five women age 50–70 (mean age 58) had excision biopsy of their B3 lesions; 64% were microcalcifications, 28% masses and the remainder distortions.

The 14G core biopsy pathology included 38% ADH, 16% atypical lobular hyperplasia, 16% CCC and 12% IP.

The surgical excision pathology available in 14 of these women showed ductal carcinoma *in situ* in seven and invasive ductal carcinoma *in situ* in three, justifying our practise. We discuss how the surgical pathology correlates with that of the WBN.

References

1. Liberman L, Cohen MA, *et al.*: *Am J Roentgenol* 1995, **164:**1111-1113.
2. Simpson PT, Gale T, *et al.*: *Am J Surg Pathol* 2005, **29:**734-746.

10

Is the Mammotome excision of indeterminate impalpable lesions found incidentally on mammography best practice?

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Breast Cancer Research 2006, **8(Suppl 1):**P10 (doi: 10.1186/bcr1425)

Mammotome excision of indeterminate (B3) impalpable lesions combined with annual mammographic follow-up can be regarded as routine practice.

This quantitative study retrospectively reviewed consecutive Mammotome procedures from January 2003 to July 2005. B3 outcomes were analysed by category combined with follow-up for any evidence of histological upgrade to carcinoma.

Out of a total of 120 consecutive Mammotome procedures, 61 (58%) had a B3 outcome. The B3 category subdivided into: 37% (n = 23) atypical ductal hyperplasia, 37% (n = 23) as radial scars, with the remaining 26% (n = 15) in a mixed category containing mucoceles, lobular carcinoma *in situ*, and papillomata. A total of 42.6% (n = 26) of the B3 category underwent annual mammographic follow-up with no signs of recurrence, 41% (n = 25) proceeded to 3-yearly NHSBSP routine recall follow-up, and 9.8% (n = 6) proceeded to surgical follow-up with two patients being up-graded to carcinoma. Four patients were lost to follow-up. The incidence of carcinoma in the B3 category ranged between 3.6% and 6.3%.

Trends demonstrated that Mammotome excision for B3 lesions combined with annual mammographic follow-up can be safe practice providing each case is discussed within a multidisciplinary setting with regard to atypia, past history and concordance of imaging and results.

11

Radiological predictors of successful therapeutic wide local excision of ductal carcinoma *in situ*: findings from the Sloane project

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Breast Cancer Research 2006, **8(Suppl 1):**P11 (doi: 10.1186/bcr1426)

The aim of this analysis was to ascertain whether mammographic unidimensional measurement (UDM), bidimensional product (BDP) measurement and pathological grade are helpful in predicting which patients could be offered a successful single therapeutic wide local excision (WLE) for ductal carcinoma *in situ* (DCIS).

The study group was 505 patients with DCIS whose mammograms showed calcification, and in whom a nonoperative diagnosis had been obtained and a WLE attempted. Mammographic calcifications were measured in two planes at 90° on the oblique view and were classified pathologically as high, low or intermediate nuclear grade. In the sample, 342 patients had a successful first WLE and 163 patients had further surgery.

A UDM <35 mm and a BDP <800 mm were associated with successful excision at first operation (69% vs 54%, P = 0.02 and 70% vs 27%, P = 0.0001, respectively). If the BBP cut-off had been applied to these cases, 16 unsuccessful WLEs would have been prevented but six successful WLEs may have been replaced by mastectomies. The histological nuclear grade did not influence the chance of a successful first WLE (66%, 69% and 80% for low, intermediate and high nuclear grade, respectively). The BDP maintained significance in subgroups based on nuclear grade more frequently than UDM.

The BDP of mammographic calcification is a better predictor of successful WLE than UDM.

12

Clinical cases covering management of borderline lesions

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Breast Cancer Research 2006, **8(Suppl 1):**P12 (doi: 10.1186/bcr1427)

Lesions of uncertain malignant potential include radial scars, papillary lesions and mucoceles. Lobular neoplasia and atypical ductal hyperplasia (ADH) are often associated with such abnormalities and present similar problems. Columnar cell atypia and apocrine atypia, once their natural history has been elucidated, may join this group of lesions.

The management of lesions of uncertain malignant potential has become a more common and complex problem in recent years. The introduction of first core biopsy and then vacuum-assisted biopsy devices has led to an increase in the nonoperative diagnosis of such lesions. These lesions may be incidental findings that do not represent the clinical or radiological abnormality.

In the past, such lesions were managed by surgical excision (radial scar, papillary lesion and ADH) or by mammographic follow-up (lobular neoplasia). It is now recognised that the upgrade rates to ductal carcinoma *in situ* or invasive cancer vary in proportion to the degree of cellular atypia present and by the amount of tissue removed at percutaneous biopsy. Vacuum biopsy excision is also an option for some of these lesions.

In this session we shall discuss a number of such cases to highlight the difficulties and dilemmas found when managing these lesions.

13

Screening with digital mammography: 2-year experiences from Vestfold County, Norway

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Breast Cancer Research 2006, **8(Suppl 1):**P13 (doi: 10.1186/bcr1428)

Purpose To compare the results from high-volume screening using full-field digital mammography (FFDM) with screen film mammography (SFM) in the Norwegian Breast Cancer Screening Programme (NBCSP).

Materials and methods The NBCSP offers biennial two-view mammography screening to all Norwegian women aged 50–69. As the only county, Vestfold used FFDM during the prevalence round (2004–2005) (Lorad Selenia; Hologic, USA). Double reading was performed on soft-copy workstations (Sectra MX, Sweden). In total 18,369 women were screened and 142 cases of breast malignancies were diagnosed. The results were compared with the prevalence found in all other Norwegian counties (1996–2004), all using standard SFM.

Results *Recall rates* All reasons: FFDM, 4.9%; SFM, 5.4% ($P = 0.002$). Positive mammographic findings: FFDM, 4.1%; SFM, 4.2%. Technical reasons: FFDM, 0.2%; SFM, 0.6% ($P < 0.001$). *Detection rates* All malignancies: FFDM, 0.77%; SFM, 0.65% ($P = 0.057$). Invasive tumours: FFDM, 0.55%; SFM, 0.54%. Ductal carcinoma *in situ* (DCIS): FFDM, 0.22%; SFM, 0.11% ($P < 0.001$). No statistically significant differences were found concerning tumour size or involvement of axillary lymph nodes.

Conclusions FFDM had a higher detection rate for DCIS but no difference was observed for invasive tumours. Recall rates were lower due to fewer technically inadequate examinations. FFDM performs well in high-volume population-based screening.

14

Symptomatic and screening film-readers: a difference in reading style?

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Breast Cancer Research 2006, **8(Suppl 1):**P14 (doi: 10.1186/bcr1429)

In the United Kingdom, screening personnel (radiologists, advanced practitioners, breast physicians/clinicians and registrars) read breast screening cases and symptomatic radiologists read cases that have been referred to them. Our previous PERFORMS research has suggested that there may be differences in reading styles between these two groups owing to such differences in their real-life practice. We set out to investigate whether such previously noted trends in reading style were predictive of current performance in 2006. Consequently, we examined the proficiency of the two groups on the recent PERFORMS set of mammograms. The performance for a group of 15 symptomatic readers was examined as compared with 15 screening personnel over a set of 60 difficult mammographic cases that contained a range of features and mammographic classification types. Both groups were matched, as far as possible, on real-life factors that may affect reporting skill – such as case volume and real-life reading experience. Concentrating on the groups' specificity and sensitivity measures identified whether current tendencies in radiological reading style were comparable with those previously noted. Results indicate that, on this scheme, the symptomatic readers' tendency to 'over-read' comparative with screeners may still be evident.

15

Promoting early breast cancer presentation in women after their final routine breast screening mammogram

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Breast Cancer Research 2006, **8(Suppl 1):**P15 (doi: 10.1186/bcr1430)

The London Psychosocial Group has been funded by Cancer Research UK to develop, implement and evaluate an intervention to encourage early help seeking among older women with breast symptoms. It will be delivered at the point when the women leave the routine protection afforded by the National Health Service Breast Screening Programme. It is in line with government-recommended practice and is complementary to the breast screening programme. The intervention is designed to increase women's knowledge about breast symptoms and risk, to promote disclosure of symptoms to someone, to reduce perceptions of barriers and to increase intentions to seek help. The rationale and evidence base for the intervention will be presented.

We have shown that delayed presentation of breast cancer (≥3 months) is associated with poorer survival at all ages [1]. The intervention builds on evidence about risk factors for delayed presentation of breast cancer [2-6] and is informed by a theoretical framework about help-seeking for breast symptoms [7].

The ultimate aim of the intervention is to reduce the proportion of older women with breast cancer who delay their presentation, and thereby save lives.

References

1. Richards M, *et al.*: *Lancet* 1999, **353:**1119-1126.
2. Ramirez AJ, *et al.*: *Lancet* 1999, **353:**1127-1131.
3. Burgess C, *et al.*: *Br J Cancer* 1998, **77:**1343-1348.
4. Burgess C, *et al.*: *Br J Gen Pract* 2001, **51:**967-971.
5. Burgess C, *et al.*: *Psycho-oncology* 2006, in press.
6. Grunfeld E, *et al.*: *Br J Cancer* 2002, **86:**1373-1378.
7. Bish A, *et al.*: *J Psychosom Res* 2005, **58:**321-326.

16

Image-guided biopsy of mammographic microcalcifications

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Breast Cancer Research 2006, **8(Suppl 1):**P16 (doi: 10.1186/bcr1431)

Aims To audit the accuracy of radiographers taking stereotactic core biopsies. To study whether cluster morphology influences calcium retrieval rates. To compare radiological opinion against histological findings.

Methods and materials Retrospective analysis of all stereotactic 14G core biopsies performed in a Breast Screening Unit over an 18-month period (January 2004–June 2005). Usage of department database, mammograms and case notes.

Results Of 300 biopsies, 264 were performed by radiographers. All cases had specimen radiography. The calcium retrieval rate was 80% in early 2004 and 95% by the end of July 2005.

The calcifications were classified into cluster, tiny cluster and scattered cluster, according to the mammographic appearances. In the negative biopsies they were 32%, 43% and 25%, respectively.

The comparison between the radiologist opinion against the final core biopsy results shows 90% concordance with pathology for opinions 2 and 5, and 75% for opinions 3 and 4

Conclusion Calcium retrieval rates for radiographers initially matched, then exceeded, those for radiologists. They also showed a steady improvement during the study period, rising to 95%. The cluster morphology did influence the calcium retrieval rate. There was a good concordance of radiology and pathology opinion.

17

Experience of quality assurance across BUPA screening centres

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Breast Cancer Research 2006, **8(Suppl 1):**P17 (doi: 10.1186/bcr1432)

BUPA's mammography quality assurance programme comprises an annual audit visit to 31 hospital-based screening centres by one of a team of three quality assurance mammographers. Clinical competence and mammographic film quality are assessed and technical quality control data are also collected. Monitoring of overall image quality is also addressed by a 'quarterly' test object film. A patient dose survey

has been undertaken with exposure and breast thickness data collected from all sites.

The standard of mammography across screening centres is good and well within NHSBSP standards. Reject rates are less than 3% and are personalised to each radiographer, enabling feedback and learning. Continuing professional development is in place and sites have evidence of a system of peer review. Quality control checks are undertaken according to recommended standards and records are kept. The mean glandular dose for a lateral oblique film across all centres was 1.7 mGy, well below the recommended national reference dose level. Mean doses at individual hospitals ranged from approximately 1.1 mGy to 2.3 mGy. Image quality scores using the Leeds TORMAM are generally satisfactory and typical of elsewhere, with only a few films having scores less than optimum and driving a move to higher contrast film/screens at these sites.

18

The Dutch experience of digital mammography in screening

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Breast Cancer Research 2006, **8(Suppl 1):**P18 (doi: 10.1186/bcr1433)

In The Netherlands a number of (screening) trials with digital mammography have started. The first trial began in 1999, in which the applicability of digital mammography was tested in a clinical environment. For this purpose a GE Senographe 2000D was installed in the Radboud University Nijmegen Medical Centre. The outcome of this trial was positive. Therefore in 2002 a second trial started at a static screening site in Utrecht with a Lorad Selenia system. In this trial, digital mammography was evaluated in a screening environment with its specific demands regarding workflow. In 2004 two more trials were started with mobile digital screening units. In these trials, a Fuji FCR Profect and an Agfa DM 1000 system were installed in the screening units. This summer a new trial will start at a static screening unit in Nijmegen in which digital mammography equipment from different vendors (General Electric, IMS, Sectra, Planmed) will be installed to test connectivity. Results of all trials will be presented with emphasis on physical and technical aspects and workflow issues. Problems with the mammography systems in the trials will be discussed. Besides this, some experiences with digital mammography equipment in Dutch hospitals will be discussed with emphasis on possible pitfalls.

19

Ultrasound and fine needle aspiration assessment of the axilla in patients with operable invasive breast cancer

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Breast Cancer Research 2006, **8(Suppl 1):**P19 (doi: 10.1186/bcr1434)

Introduction Axillary lymph node dissection has been standard practice for staging invasive breast cancer. As sentinel lymph node biopsy is being performed as an alternative less invasive procedure, identification of positive axillary nodes by ultrasound (US) needle biopsy is important in identifying involved axillae and thereby excluding patients from inappropriate sentinel node procedures.

Method We evaluated the axilla of 71 patients with invasive breast cancer and sampled abnormal nodes by the fine needle aspiration (FNA) technique. Criteria for biopsy were cortex >2 mm, eccentrically thickened cortex and loss of normal morphology. The results were correlated with final histopathologic status after surgery.

Results Twenty-two out of 71 patients demonstrated abnormal nodes on US, 12 of these 22 were malignant at surgery. In total, 18/71 patients had involved nodes at time of surgery; 9/18 were identified by the US/FNA technique. Sensitivity, specificity, positive and negative predictive values were 50%, 100%, 100% and 71%, respectively.

Conclusion US-guided FNA is a convenient method for identifying involved axillary nodes. Axillary US alone would result in a significant proportion of false-positive diagnoses.

20

Wide local excision of breast carcinomas: the effect of ultrasound and wire guidance on the Surgical Precision Index

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Breast Cancer Research 2006, **8(Suppl 1):**P20 (doi: 10.1186/bcr1435)

Aim To determine the effect of ultrasound and wire guidance on the Surgical Precision Index (SPI) for wide local excision (WLE) of breast carcinomas.

Methods The SPI is calculated from the minimum excision margin being divided by the total specimen weight (sw) to tumour diameter (td) ratio (sw/td). The standard of surgical performance increases with an increase in SPI. A review of histology reports provided SPIs for 97 WLE specimens in 96 patients treated by one surgeon. The mean SPIs for palpable tumours, ultrasound-guided tumours and wire-guided tumours were calculated.

Results There was a significant difference between palpable tumours and impalpable tumours (Kruskal–Wallis test $P = 0.007$). There was no significant difference between ultrasound-guided and wire-guided WLEs (Mann-Whitney test $P = 0.153$).

Table 1 (abstract 20)

SPI by guidance technique

Technique	Number	Mean SPI	Median	Range
Palpable	44	1.91	1.67	0–8.08
Ultrasound	35	1.20	1.06	0–3.77
Wire	18	1.21	0.61	0–6.76

$P = 0.007$.

Conclusion Palpable tumours have a higher SPI than impalpable tumours. There is no statistically significant difference between the SPI of ultrasound-guided and wire-guided WLEs.

21

Audit of general practitioner referrals for breast pain to rapid access breast clinics at North Cheshire NHS Trust Hospital

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Breast Cancer Research 2006, **8(Suppl 1):**P21 (doi: 10.1186/bcr1436)

Purpose The audit was a retrospective study to examine the number of general practitioner (GP) referrals for breast pain and to assess the number of women imaged and the outcomes.

Methods Between 1 June and 31 December 2005 there were 945 referrals to the Rapid Access Breast Clinic (RABC), of which 222 were for breast pain. Data collected included age, examination requested, clinical information on imaging request, unilateral or bilateral pain, status of requesting clinician and outcome.

Results Age range of referrals: under 35 years = 10%, 35–50 years = 56%, 51+ years = 34%. Of the 945 referrals, 23% were for breast pain. Of the 222 women presenting with pain, 77% were imaged. Of the number imaged, 83% had unilateral pain and 17% had bilateral pain.

The two consultant teams, each with either a registrar or SHO, showed a significant difference in the amount of imaging requested. There were 118 mammograms and 56 ultrasound examinations requested.

Outcomes of imaging There were no malignancies detected. Ninety-three per cent had no significant findings. Of the 7% with an abnor-

mality, seven were cysts, one was a calcified fibro-adenoma, three were incidental findings of microcalcification, and two asymmetrical densities were proven normal.

Conclusion Of all the women referred to clinic, very few abnormalities were detected (no cancers). Audit results have been disseminated to Trust Consultants, and all referring GPs.

GPs should be supplied with local guidelines for the management and referral of breast pain. They should be encouraged to give out information booklets about breast pain.

There should be a consensus between all Breast Clinicians regarding imaging criteria for breast pain.

22

Feasibility of surgeon performing ultrasound in symptomatic breast clinics: the Brighton experience

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Breast Cancer Research 2006, **8(Suppl 1):**P22 (doi: 10.1186/bcr1437)

Introduction Breast ultrasound (US) is becoming increasingly used by surgeons in symptomatic breast clinics as an extended tool for diagnosis and as an adjunct to interventional procedures.

Aim To assess the feasibility of surgeons performing breast US in symptomatic breast clinics either as an adjunct to triple assessment or on their own for diagnostic and therapeutic purposes.

Method We analysed the results of one surgeon performing diagnostic and interventional US procedures after appropriate training as recommended by the Royal College of Radiologists and the support of a local radiologist between January 2004 and April 2005. One hundred and fifty-six patients underwent an US scan either on its own or as part of the triple assessment.

Results See Table 1.

Table 1 (abstract 22)

72 patients (46%) had US only without needle procedure (as not deemed necessary on clinical grounds on first visit)	69 patients (96%) had normal findings and three patients (4%) had indeterminate or suspicious results subsequently downgraded by the radiologist
50 patients (32%) had US with fine needle procedure	49 patients (98%) had benign lesions (60% cysts, 40% solid) and one patient (2%) had a suspicious lesion, downgraded
21 patients (13%) had US with wider needle procedure	14 patients (67%) had malignant lesions, three patients (14%) had indeterminate lesions and four patients (19%) had benign lesions
Nine patients (6%) had US to assess response to endocrine treatment	In addition to clinical assessment
Four patients (3%) had US not double reported by the radiologist	Two patients had normal scans, one patient had fibroadenoma removed surgically and another had gynaecomastia

Conclusion Of the three patients (2%) who had a recall by the radiologists, no cancer was missed. With appropriate training and support by the radiologist, and auditing one's performance, surgeons can safely perform US scans in the breast clinic.

23

Medico-legal aspects of delay in breast cancer diagnosis: the surgeon's perspective

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Breast Cancer Research 2006, **8(Suppl 1):**P23 (doi: 10.1186/bcr1438)

Delay in the diagnosis of breast cancer is a frequent cause of patients seeking redress through the Courts. Patients are naturally fearful that the delay has reduced their survival. If they feel that their original assessment was in some way casual or superficial, they are often angry.

In the clinic, surgeons have to decide whether a patient has a true lump or not. This is often difficult, and particularly so for trainees. Nevertheless, the surgeon or breast physician must discipline themselves to formally characterise a symptomatic breast abnormality. This should be done by using the standard breast industry classification of 1–5. In this situation, P for palpability precedes the number.

Surgeons will be assisted by their radiologists, who are able to offer a very high level of imaging support.

The problem that arises is when a surgeon or clinician identifies a lump and the radiologist is unable to identify the lump at imaging. It should be remembered that approximately 15% of breast cancers are mammographically occult.

In a recent case, a woman had an 8 cm lump in her breast. The radiologist reports a normal mammogram. Over the next 2 years five different junior doctors observe this lump. Finally, the patient sought a second opinion for her 8 cm Grade I cancer. Why did this occur?

The radiologist was a consultant, the requesting clinician was a (locum) junior. There is a natural tendency to rely on technology, which is usually better than a clinical examination – but not always.

Consultant breast radiologists can appear intimidating to junior doctors. If that junior doctor is working in a poorly organised surgical breast clinic, then there is a potential for mistakes to occur.

The solution is to have the diagnostic process in your breast unit so organised that risks such as these are reduced to a minimum.

24

Medico-legal aspects of delay in breast cancer diagnosis: the radiologists' perspective

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Breast Cancer Research 2006, **8(Suppl 1):**P24 (doi: 10.1186/bcr1439)

The increasing importance of breast imaging in the diagnosis of breast problems and the use of mammography in screening now mean that breast radiologists are very much in the front line for medico-legal action. Breast imaging is now the commonest reason for a radiologist to be involved in medico-legal investigations. The reason is almost always an alleged delay in diagnosis. In symptomatic practice this usually involves alleged failure to carry out the appropriate imaging investigation, including image-guided biopsy, while in screening practice this usually involves failure to detect the early signs of breast cancer. These arise out of the unrealistic expectations of patients about the diagnosis of breast cancer. Measures to reduce the risks of medico-legal investigation are simple and straightforward.

Recent emphasis on informed consent by the GMC means that radiologists, like all others involved in patient care, are required to provide patients with the full facts on which these patients can base their decisions. It is important to ensure that the radiological aspects of care are formally documented, including the content and results of discussions at multidisciplinary meetings.

The Bolam test increasingly cannot be considered an adequate defence; if the court considers it bad practice then it does not matter how many doctors practice the same way. However, both symptomatic and screening practice are now the subject of detailed clinical protocols; provided these are in place and are strictly followed, then proof of substandard care is difficult. In addition, double reading is now largely standard practice in screening and there is a wealth of data to inform medico-legal investigations about the limitations of screening practice.

25

Medico-legal aspects of delay in breast cancer diagnosis: the legal perspective

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Breast Cancer Research 2006, **8(Suppl 1):**P25 (doi: 10.1186/bcr1440)

In English law, there is no strict liability in relation to the failure of a doctor to diagnose breast cancer, but, in order for a Claimant to succeed, it is necessary for her to prove negligence. The courts apply

what is known as the 'Bolam' test in deciding whether a doctor has been negligent, as modified in *Bolitho v City and Hackney Health Authority*. Example: *Adekanmbi (deceased) v Allinson (2004)*.

Where there has been a delay in diagnosis of breast cancer, the challenge is often in relation to causation, showing what the outcome would have been if the diagnosis had been made when it ought to have been. English law does not recognise loss of a chance in personal injury actions and causation is decided on the balance of probabilities (*Gregg v Scott*). Where a woman dies of breast cancer after a negligent delay in diagnosis, the question is whether she would have survived had the diagnosis been made. This may depend on the appropriate staging of the carcinoma at the relevant time, again decided on the balance of probabilities. Alternatively, the claim may be that earlier diagnosis would have avoided chemotherapy, or the cosmetic outcome would have been better. Example: *K v Dr B (2005)*.

26

Image-guided breast biopsy programme quality evaluation

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Breast Cancer Research 2006, **8(Suppl 1):**P26 (doi: 10.1186/bcr1441)

Image-guided breast biopsy programs are a clinical reality at breast care centers throughout the world. Because image-guided biopsy is a departure from traditional surgical breast biopsy, the quality of each new image-guided breast biopsy program should be measured. A generalized scheme for quality evaluation will be presented.

The most complex part of this scheme is the comparison of tissue samples obtained by image-guided biopsy with tissue samples subsequently obtained during surgery. Because image-guided biopsy programs retrieve histology specimens that are microscopically as valid as histology obtained from open surgery, comparing the histology from an image-guided breast biopsy with the histology from an open surgical biopsy is complex. One cannot use the well-known method of determining false-negative and false-positive rates. In addition, breast histology, itself, is quite complex. Some benign breast disease is quite focal and specific, such as fibroadenomas. Other benign breast disease is diffuse and not very specific, such as fibrocystic abnormalities. Furthermore, malignant breast disease is part of a histology spectrum starting with normal-looking breast tissue with atypical features, progressing to carcinoma *in situ*, and ending, finally, with infiltrating breast cancer. To illustrate how histological comparisons should be made for breast tissue, published results from a large, nationally funded study will be re-examined using the proposed scheme.

Although the breast biopsy, itself, may seem like the hard work of a new breast biopsy program, it is not. After the first year of the program, follow-up of women who have been biopsied is the true, back-breaking, hard work. How a breast center should perform air-tight follow-up will be described.

27

Update on breast cancer genetics

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Breast Cancer Research 2006, **8(Suppl 1):**P27 (doi: 10.1186/bcr1442)

The breast and ovarian cancer susceptibility genes *BRCA1* and *BRCA2* were identified over 10 years ago. Development and expansion of cancer genetics services across the United Kingdom coupled with advances in genetic technology and investment from the government White Paper 'Our Inheritance, Our Future' have increased demand and access for diagnostic genetic testing of *BRCA1* and *BRCA2*. NICE guidelines from 2004 recommend that individuals with a >20% risk of having a mutation should be offered comprehensive diagnostic *BRCA1* and *BRCA2* mutation testing. This now detects over 95% of all mutations, as well as variants of unknown significance. *BRCA1* and *BRCA2* carriers face complex decisions regarding screening and risk-reducing options in a rapidly changing field and may benefit from a multidisciplinary approach to their care. However, the majority of breast-cancer-only families will have no *BRCA1* or *BRCA2* mutation identified on diagnostic gene testing. Research studies to identify further breast cancer susceptibility genes are ongoing.

28

NICE family history guidance and implementation update

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Breast Cancer Research 2006, **8(Suppl 1):**P28 (doi: 10.1186/bcr1443)

The National Institute of Clinical Excellence and Health (NICE) released guidance to the NHS on the management of familial breast cancer in May 2004. In that guidance [1] several statements of important clinical relevance were made. There seems to have been a lag between the time of release and implementation in many areas of the country. Important guidance on the detailed provision of *BRCA1* and *BRCA2* genetic testing services was included. Cancerbackup performed a survey of NHS clinical genetics services and NHS laboratory services at the end of 2005. The findings of this survey were released to the public at a workshop entitled 'BRCA testing: opening the dialogue', which was held at University College London on 14 December 2005. An update on the findings of this survey will be presented to the conference.

Several recommendations were also made about the provision of regular mammographic services for women under 50 with a family history of breast cancer. It has become clear to the team developing and leading FH01 that service provision across the United Kingdom is very patchy and there appears to be significant geographical variation in the level of service the public can expect. We will examine some of that variation and consider whether mechanisms should be put in place to monitor service provision more closely.

Reference

1. *Clinical Guidelines and Evidence Review for the Classification and Care of Women at Risk of Familial Breast Cancer.* London: National Collaborating Centre For Primary Care/University of Sheffield; May 2004.

29

Update on the FH01 study

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Breast Cancer Research 2006, **8(Suppl 1):**P29 (doi: 10.1186/bcr1444)

FH01 is a single-arm study of annual mammography in women aged 40–49 with a moderate family history of breast cancer. Originally, it was planned to recruit 10,000 women but this has been revised to 6,000. In this presentation we summarise the considerations that informed the study and its design, the problems encountered and the progress of the study so far. Implications for future studies in specific risk groups are discussed.

30

Update on magnetic resonance screening and the MARIBS trial

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Breast Cancer Research 2006, **8(Suppl 1):**P30 (doi: 10.1186/bcr1445)

Genetically predisposed women often develop breast cancer when young and when dense breast tissue reduces the sensitivity of X-ray mammography (XRM). A UK multicentre study comparing the performance of contrast enhanced magnetic resonance imaging (CE MRI) with XRM in these women commenced in 1997 and reported 2005.

In this multicentre study, CE MRI was significantly more sensitive than XRM in cancer detection for the entire cohort, but especially in the subgroup of *BRCA1* carriers. Specificity for both procedures was acceptable. Despite a high proportion of Grade 3 tumours, the tumours

were small and few women were node-positive. These findings resemble the results from the Netherlands six-centre MRISC study and a single-centre study from Toronto. These studies give support for a policy of annual screening combining CE MRI and XRM, which would detect most tumours in this risk group. These studies show evidence of effective small cancer detection, but do not have sufficient power to show whether mortality is reduced, for which there is no current evidence.

31

Workforce issues in breast imaging: radiographers as screen readers

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Breast Cancer Research 2006, **8(Suppl 1):**P31 (doi: 10.1186/bcr1446)

The expansion of the National Health Service Breast Screening Programme (NHSBSP) has increased workload, adding to existing pressure on resources due to a shortage of radiologists. As a result some units have introduced double reading by two radiographers, with arbitration by a radiologist or breast clinician. Although some experimental work has supported such a move, the Advisory Committee on Breast Cancer Screening has requested further evidence from a real-life setting to support this change in reading practice.

An observational study was initiated in 2004. A questionnaire was developed to document annually the reading practices of all screening units, and number of years of experience of individual film readers. Information gathered from the questionnaires, together with routine data from the KC62s, will allow us to compare the performance of units using radiographer-only double reading with that of other units. We will also be able to compare the performance before and after the change in reading protocol for units moving to radiographer-only double reading. The main outcome measures of performance will be cancer detection rates, standardised detection ratios and recall rates.

32

Workforce issues in breast imaging: the consultant radiographer's perspective

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Breast Cancer Research 2006, **8(Suppl 1):**P32 (doi: 10.1186/bcr1447)

In my experience the consultant radiographer within the breast services provides a similar role and clinical level of responsibility as that of the medical breast specialist. All professionals within such a role require the knowledge, skills and expertise to provide a high quality of service for all its users.

The position has provided a key person who is used as a supportive resource for all the members of the multidisciplinary team. The consultant radiographer role has helped to enhance communication not only within the team, but also for the clients and patients and across other service boundaries.

It has helped to promote the service and the sharing of good practice within the service, which in turn will enrich the service as a whole.

Recruitment and retention of the staff is essential to the continued success of the service. The new training and educational pathways and recognition of the staff can only be of benefit to the service.

33

Workforce issues in breast imaging: the consultant radiologist's perspective

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Breast Cancer Research 2006, **8(Suppl 1):**P33 (doi: 10.1186/bcr1448)

Consultant radiologists are still deeply divided in their opinions about advanced practice, many still having concerns about clinical governance and the training and supervision needed. I have used a small questionnaire to obtain a 'snapshot' of breast screening units who use radiographer advanced practitioners, what they do, whether they replace or just augment the functions of a consultant radiologist, and the opinions of the radiologists working alongside them.

Advanced practice means more than just a means to enable second reading of films. Without continuous feedback, involvement in assessment and support, this can become a boring task, with skill levels and motivation difficult to sustain. Increasingly, in many units practitioners are replacing other aspects of the traditional role of the consultant radiologist. Almost all advanced practitioners are film readers, but many have extended their roles further and now also do stereo tactic biopsy, ultrasound and ultrasound-guided biopsy, clinical examination, and localisation of impalpable tumours. We need to encourage the many eligible units who could participate in the current trial of radiographer-only screen film reading to join, in order to provide concrete evidence that radiographers are as good as radiologists in real-life practice.

With consultant radiologist posts becoming a little easier to fill than previously, we need to examine this role more carefully and decide what benefits practitioners can bring to a unit, and how to make this role a fulfilling and secure one for our radiographers in the future.

34

Hormones and radiation as risk factors for breast cancer

V Beral

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Breast Cancer Research 2006, **8(Suppl 1):**P34 (doi: 10.1186/bcr1449)

Abstract not submitted.

35

Breast surgery: state of the art

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Breast Cancer Research 2006, **8(Suppl 1):**P35 (doi: 10.1186/bcr1450)

Abstract not submitted.

36

Oncology update: what do all those acronyms mean?

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Breast Cancer Research 2006, **8(Suppl 1):**P36 (doi: 10.1186/bcr1451)

This presentation will review ongoing clinical research in breast oncology across the United Kingdom, briefly summarising the rationale for each trial and including an update on the current enrolment status. UK trials will be compared with breast cancer trials running in other countries, many of which have a similar design. Particular attention will be paid to the final results from the NEAT trial, which will have appeared in the *New England Journal of Medicine* immediately before the conference started. The NICE panel's ruling on adjuvant taxanes has also just appeared and this will be also be presented. The talk will end with a review of important questions that remain unanswered in breast oncology and a discussion of the trials that are currently on the drawing board to answer these questions.

37

A brief history of breast medicine

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Breast Cancer Research 2006, **8(Suppl 1):**P37 (doi: 10.1186/bcr1452)

Hippocrates believed that treating 'hidden cancers' did more harm than good. Today we debate whether we are over-treating some screen-detected lesions. History really does repeat itself.

A review of the history of western medicine traces the efforts of physicians to cure breast cancer: from ancient potions and poultices, through centuries of brutal but swift surgery, to the supraradical mastectomy of the early twentieth century, on to conservative surgery with adjuvant therapies. Attitudes and beliefs of patients have influenced the management of breast cancer, from quiet acceptance of extreme suffering to the vocal feminist fury against 'mutilation' by male surgeons in the 1970s.

The quest for early detection and accurate diagnosis produced a variety of imaging techniques. Some of them, thankfully, have now been forgotten. The NHS Breast Screening Programme, now in its 19th year, has brought rapid and radical change to breast cancer care in the United Kingdom.

The difference between brilliant advances and heroic failures can only be judged by history.

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Abstract withdrawn.

39

Calcification or artefact? A case study examining potential products which can mimic calcification in mammography

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Breast Cancer Research 2006, **8(Suppl 1):**P39 (doi: 10.1186/bcr1454)

This poster is a case presentation of a woman who was recalled from breast screening with suspicious microcalcifications. Follow-up mammograms revealed that it had been an artefact on the skin surface. The cause of this artefact was unknown and this poster attempts to identify a product that may have caused this calcific-like artefact.

Previous research [1,2] highlights the potential problems associated with the use of deodorants and antiperspirants on mammographic interpretation. These studies demonstrate the association of the use of underarm deodorants with calcific-like artefacts. This poster not only examines deodorant as a possible source of the artefact, but also identifies other products as probable causes. Five products in total were used: stick deodorant, talc, body scrub, paint and body glitter. Samples of each of these were individually X-rayed using an anthropomorphic breast phantom.

The subsequent films were compared with the original X-ray and one of the products was identified as the most probable cause of the artefact. As a result of this research, products not previously considered as potential causes of artefacts were identified. Our results are presented in a light-hearted format.

References

1. Young *et al*., 2002.
2. Barton, 1990.

40

An audit of preoperative magnetic resonance imaging staging of the breast

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Breast Cancer Research 2006, **8(Suppl 1):**P40 (doi: 10.1186/bcr1455)

Background In Derby, preoperative magnetic resonance imaging (MRI) breast tumour staging is used in selected cases (e.g. occult tumour on standard imaging, lobular core histology).

Methods We present 45 initial patients undergoing breast MRI for local staging identified between January 2001 and December 2004. All cases were potentially suitable for wide local excision (WLE) after standard triple assessment (using the local protocol of 30 mm size cut-off for conservative surgery).

Results Twenty-five cases were advised suitable for conservative treatment after MRI (20 undergoing WLE all showing clear margins). Five cases after MRI were not definitive (offered choice). Fifteen cases of mastectomy were suggested after MRI and further conventional imaging (nine cases tumour >30 mm at mastectomy, one undergoing neoadjuvant chemotherapy, two cases tumour <30 mm but with extensive DCIS, three cases multifocality at MRI not identified pathologically).

Adherence to available standards To date no local recurrences have been identified in conservatively treated patients (NHSBSP target 10% recurrence at 5 years for DCIS). Forty-three out of 45 (95.5%) patients underwent a single therapeutic operation (NHSBSP target 90% of women should not require more than one therapeutic operation to ensure complete excision). Results will be discussed in particular for those cases where MRI and surgical pathology did not correlate.

41

Reducing our recall to assessment rate in the prevalent round to achieve the NHSBSP QA Standard

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Breast Cancer Research 2006, **8(Suppl 1):**P41 (doi: 10.1186/bcr1456)

Since 1999, the proportion of prevalent round women recalled to assessment in the Liverpool NHSBSP has steadily increased – peaking at 17/1,000, almost double the minimum QA Standard.

We have a total of 10 film readers and have always double-reported with arbitration (by a single radiologist). Our sensitivity has been good with an SDR and a small cancer detection rate within the target QA standard.

Factors perceived as problematic were the increasing number of readers, a high proportion of inexperienced readers, combinations of cautious readers and lack of discussion.

At the beginning of 2005 we adopted a new arbitration system. All prevalent round patients recalled by at least one film reader had their films reviewed by a minimum of three film readers, including at least one radiologist. This system was extended to include all incident round patients referred to arbitration. Recall rates and cancer detection rates were audited for 12 months.

We have now achieved a recall rate of 7.1/1,000 with no reduction in the cancer detection rate. Other benefits include an increased capacity in assessment clinics to accommodate age extension, reduced patient anxiety, better team working and a complimentary reduction in recall rates for incident round women.

42

A radiographer-delivered intervention to promote early presentation of breast cancer among women as they leave the routine protection of the NHS breast screening programme

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Breast Cancer Research 2006, **8(Suppl 1):**P42 (doi: 10.1186/bcr1457)

Older age is a risk factor both for developing breast cancer and for delayed presentation of the disease. Routine breast screening on the NHSBSP, however, ends at age 70. Our aim was to develop a radiographer-delivered psycho-educational intervention to be delivered at the point when the women leave the routine protection of the NHSBSP in order to: increase women's knowledge about breast symptoms and risk, promote disclosure of symptoms to someone close, reduce perceptions of barriers and increase intentions to seek help, and counter the interpretation by older women that their risk of breast cancer diminishes once routine screening ends.

The ultimate aim of the intervention is to reduce the proportion of older women with breast cancer who delay their presentation, and to thereby save lives.

We report the development of two variants of the intervention: a booklet and a 10-minute, radiographer-delivered, interview plus the

booklet. Both variants of the intervention have been piloted within the South East London Breast Screening Programme and been shown to be acceptable and feasible to women and the Programme. A randomised controlled trial is planned to assess the effect of the intervention on delayed presentation and survival.

43

Using an aubergine as a phantom for practicing stereotactic guided core biopsy

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Breast Cancer Research 2006, **8(Suppl 1):**P43 (doi: 10.1186/bcr1458)

Introduction Practitioners learning how to perform stereotactic guided core biopsies need a nonhuman model to practice on. This presentation demonstrates a technique using contrast medium mixed with ink injected into an aubergine as a phantom to practice on, which has subsequently been used by the Jarvis Centre for teaching stereotaxis.

Equipment (1) Black ink. (2) Any water-soluble contrast medium (preferably life expired). (3) A green needle to draw up ink and contrast medium and a 2 ml syringe. (4) A long orange needle to inject into the aubergine. (5) An aubergine. (6) A biopsy device and needle.

Technique (1) Mix the ink and contrast medium. Inject the aubergine with a fine trail of black ink. Do not be heavy handed, you need very little – 0.5 ml at the most. (2) Turn the aubergine over 90° and place on the stereotactic table so that the line of ink is parallel to the table top. (3) Position as for a normal stereo and carry out the procedure as normal, including taking check pictures. (4) You will see immediately from the samples whether you have 'hit the spot' as you have black ink within the sample. It is possible to X-ray the sample to confirm this. (5) Do not send to pathology!

Pros Simple cheap and easy. Do not have to practice on a patient but become proficient at using the equipment – no pain, lots of gain!

Cons Not a perfect mimic of dots of calcification. Do not have the practice of adapting to patient movement. Risk of getting ink on hands and clothing.

44

Women's satisfaction with clinical nurse specialists at assessment clinics within the West Midlands Breast Screening Programme

J Chapman, E O'Sullivan, O Kearins, G Lawrence

West Midlands Cancer Intelligence Unit, Birmingham, UK

Breast Cancer Research 2006, **8(Suppl 1):**P44 (doi: 10.1186/bcr1459)

Due to lack of specific guidance as to how clinical nurse specialist (CNS) standards should be monitored, the West Midlands Breast Screening QA Reference Centre together with a CNS working party developed a tool to assess the role of the CNS in assessment clinics within the region. The audit was designed to determine a woman's satisfaction with the service offered by CNSs.

Survey forms were issued to all women attending a breast screening assessment clinic during March 2005, irrespective of whether or not they met with a CNS. An overall response rate of 62% was achieved.

Ninety-two per cent of women had contact with a CNS at some point during the assessment process. Of these, 99% found it to be a valuable experience. Only three women felt that talking to a CNS was of no benefit to them. Sixty-five per cent had the CNS contact details provided prior to attending the assessment clinic, and 61% were given contact details for a CNS on the day of their assessment for follow up discussions.

Five per cent stated that discussions with the CNS were not held in a private room. It would appear that women found written information easier to understand (85%) than verbal (53%).

Service-specific comments and suggestions have been fed back to assist in service improvement. The audit will be repeated in 2006.

45

Workload analysis for clinical nurse specialists working in breast screening

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Breast Cancer Research 2006, **8(Suppl 1):**P45 (doi: 10.1186/bcr1460)

To accurately evaluate the role of the clinical nurse specialists (CNS) in breast screening assessment clinics, baseline information regarding patient throughput and interactions with the CNS were required.

Following every screening assessment clinic in the West Midlands, each CNS in attendance completes a short audit form that covers the number of women attending the clinic, the number seen by the CNS, for those not seen the reason for this, and the time the CNS arrived and left the clinic.

For the period April 2004–March 2005 an average of seven women attended each assessment clinic (range: 3–14). The average time spent in the clinic was 2:31 hours (range: 0:10–9 hours). Seventy-six per cent (4,515/5,951) of women attending had contact with a CNS (range: 18–100%). Of the 1,436 women who did not have contact with a CNS, reasons were given for 1,403. The main reasons were that the CNS was occupied with another patient (44%) or it was patient choice (37%).

From research into patient satisfaction with the CNS, it is known that, for women attending for assessment, interaction with a CNS is perceived to be highly beneficial. Managers should try to ensure that sufficient CNSs are available to give all women attending for assessment the opportunity to see a CNS.

46

West Midlands Breast Screening General Practice Information Pack

J Chapman, E O'Sullivan, O Kearins, G Lawrence

West Midlands Cancer Intelligence Unit, Birmingham, UK

Breast Cancer Research 2006, **8(Suppl 1):**P46 (doi: 10.1186/bcr1461)

In 2004 the West Midlands Breast Screening Health Promotion Group developed a standardised General Practice Information Pack that can be sent out by breast screening services to all general practices, prior to their eligible women being invited for screening. The purpose was twofold. Firstly, to be an educational tool for practice staff to update their knowledge of breast screening to ensure that they can deal with women's queries. Secondly, to promote the importance and value of breast screening to practice staff in the hope that they would be proactive in encouraging women within their catchment area to attend for breast screening.

The pack consists of 11 fact sheets providing information such as: contact details for the screening service; where and when women will be screened; key facts about breast screening; statistics for the screening service, general practice and PCT; frequently asked questions; and useful contacts for information and resources.

Along with the Information Pack, services were sent an evaluation form and a pre-paid envelope addressed to the West Midlands Breast Screening QA Reference Centre. To date 52 forms have been returned. Eighty-five per cent of respondents found the pack very useful. In particular they welcomed information on age ranges, contact details, practice statistics, frequently asked questions and answers, and information about the availability of leaflets and posters.

47

Pathology quality assurance: the use of control charts

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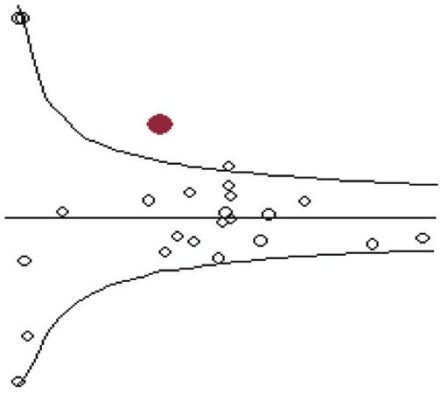
West Midlands Cancer Intelligence Unit, Birmingham, UK

Breast Cancer Research 2006, **8(Suppl 1):**P47 (doi: 10.1186/bcr1462)

Breast Screening Quality Assurance Reference Centres have a responsibility to monitor the performance of breast screening services and to feed relevant outcome data back to them. In order to be useful, this feedback has to be meaningful and easily interpretable. Past

Figure 1 (abstract 47)



experience in the West Midlands has shown that this aim was particularly difficult to achieve for pathology data using conventional analytical methods. With this in mind, it was decided to assess the usefulness of control charts.

Control charts demonstrate acceptable and unacceptable variation. Acceptable variation is known as common cause variation and is deemed to be due to natural chance. The only way to reduce this type of variation is to remodel the whole process. Special cause variation is an exceptional variation that needs to be investigated to identify the cause. When examining reasons for special cause variation, the data are first checked for accuracy. The case mix is then reviewed, followed by processes and resources, and finally the individuals involved.

In Figure 1, the dots represent the proportion of Grade 2 breast cancers reported by West Midlands pathology laboratories. The reporting rate in the laboratory represented by the larger dot lies outside the common cause variation limits when compared with other laboratories. Work will be undertaken with this laboratory to identify the reasons for the special cause variation evident in these data.

48

Audit of short-term recall in the National Health Service Breast Screening Programme in the West Midlands

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Breast Cancer Research 2006, **8(Suppl 1):**P48 (doi: 10.1186/bcr1463)

In the NHS Breast Screening Programme, cases where some diagnostic uncertainty remains following assessment may be recalled for a further appointment. Short-term recall (STR) rates and recall periods vary between screening services. There is a lack of published material to suggest who will benefit most from an STR appointment.

Data were collected from the screening folders for 110 women put on STR following assessment, and for three women put on STR from STR in the financial year 2003/2004. The data collected included radiological appearance and opinion, biopsy results, reason for STR, and outcome.

The most frequent reasons for women being put on STR were patient choice (18 cases, 16%), difficulty in biopsy (11 cases, 10%) and low yield of calcification in biopsy specimens (eight cases, 7%). The most frequent characteristics were calcification, benign or uncertain radiological appearance and a B1 (normal breast tissue) biopsy.

At STR, 92 cases (84%) were found to be benign and returned to routine recall. Four women (3.6%) had invasive cancer, one woman had ductal carcinoma *in situ*, two women had a further 12-month STR and two women had open biopsy. For nine women (8%), the outcome of the STR appointment was unknown. The four invasive tumours were all from incident screens, one each of asymmetric distortion, micro-calcification, radial mass and appearance not recorded. From the three women on STR from STR, an additional invasive cancer was found and two women were returned to routine recall.

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Modelling of the impact of replacing four-node sampling with sentinel lymph node biopsy within the NHS Breast Screening Programme

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Breast Cancer Research 2006, **8(Suppl 1):**P49 (doi: 10.1186/bcr1464)

The aim of this study was to use the Association of Breast Surgery at the British Association of Surgical Oncology audit data to model the possible consequences of the rollout of sentinel lymph node biopsy (SLNB) across the NHS Breast Screening Programme. The lymph node status, invasive size, grade and number of operations were examined for 26,431 screen-detected invasive cancers diagnosed in women who were invited for screening between 1 April 2001 and 31 March 2004.

Seventy-five per cent of screen-detected invasive breast cancer had a negative nodal status. The average number of nodes removed in these cases was 10. If these cases had had their axilla assessed using SLNB, then the majority of women diagnosed with screen-detected breast cancer would have had a minimally invasive axillary procedure. Assuming that the protocol utilised during the ALMANAC study was continued, the 25% of cases with positive lymph nodes would require a second operation to clear the axilla. This would represent a 20% increase in the number of cases requiring a second therapeutic operation. In addition, as over 80% of these cases had less than five positive nodes found, a full axillary clearance may be overtreatment.

Analysis of the variation of lymph node positivity with size and grade demonstrates that these factors could be used to determine which women with a positive sentinel lymph node require a full axillary clearance and which women could be appropriately managed with a level 1 clearance, thus reducing the possible complications of lympho-edema.

50

The Sloane Project: a UK prospective audit of screen-detected non-invasive carcinoma of the breast

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Breast Cancer Research 2006, **8(Suppl 1):**P50 (doi: 10.1186/bcr1465)

The Sloane Project is a national prospective audit of women with screen-detected non-invasive breast carcinoma, inviting participation from all 98 UK Breast Screening Units.

The aim of the Sloane Project is to gain knowledge regarding the diagnosis, treatment and clinical outcomes of screen-detected carcinoma *in situ* and atypical hyperplasias. Particular characteristics in terms of the radiological and pathological appearance and their significance in terms of outcome are collected, together with details of surgical and adjuvant treatment, via specifically designed data forms.

Currently 57 breast screening units are submitting data, and data for more than 2,000 cases have been recorded to date. Variations in the management of this disease are already apparent from these data, with varying approaches to the use of wide local excision (WLE) and mastectomy (72.8% vs 27.2%) and with nodes being removed in 5.87% of WLE cases and 72.49% of mastectomy cases. Differences in clinical management are also apparent for adjuvant therapy, with the proportion of cases being referred for radiotherapy varying between breast screening units from 0% to 76.47% and the use of hormone therapy varying from 0% to 78.87%.

These data reinforce the need for a large-scale study of DCIS so that reliable clinical protocols for the optimal management can be developed.

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Radiotherapy for screen-detected ductal carcinoma *in situ*: indications and utilization in the United Kingdom – findings from the Sloane Project

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Breast Cancer Research 2006, **8(Suppl 1):**P51 (doi: 10.1186/bcr1466)

There is an increasing use of wide local excision (WLE) in preference to mastectomy as the definitive surgical therapy. A number of randomised control trials (RCTs) have confirmed that postoperative whole-breast breast irradiation (RT) following WLE of DCIS reduces the risk of *in situ* and invasive recurrence. Available RCTs do not readily allow the identification of patients who would benefit most from RT, or conversely do not require RT.

Of 870 patients who underwent WLE for DCIS, 453 were referred for RT. The use of RT following WLE was correlated with pathological characteristics and margin status. The use of RT varied with tumour size, nuclear grade and the presence of necrosis, but not with margin size. There was a good correlation with Van Nuys Score, supporting the use of this scoring system in routine practice to predict the potential benefits of referral for RT.

Table 1 (abstract 51)

	Received radiotherapy	Did not receive radiotherapy
Margin		
<1 mm	34	36
1–9 mm	152	111
≥10 mm	129	100
Size		
≤15 mm	161	213
16–40 mm	153	58
≥41 mm	14	5
Grade		
High	243	95
Intermediate	83	126
Low	12	57

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Analysis of QA Team visit recommendation responses in order to find ways of improving the probability of completion

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Breast Cancer Research 2006, **8(Suppl 1):**P52 (doi: 10.1186/bcr1467)

The Commission for Health Improvement report into the West of London Breast Screening Service recommended that a formal structure for the follow up of recommendations made at quality assurance (QA) visits should be implemented.

In the West Midlands, breast screening services are visited every 3 years as part of a rolling programme. *Ad hoc* visits can occur during this period to a service or one or more disciplines if there are issues or concerns with a particular aspect of a service. Following a QA Team visit, a breast screening service can expect 3-month and longer term recommendations, and occasionally immediate recommendations, which highlight areas that require action to improve service delivery.

In order to allow structured follow-up, recommendations are classified into the following disciplines; administration and clerical, radiography, radiology, medical physics/user QA, pathology, surgery, nursing and management. A detailed process has been put into place that tracks the receipt of recommendation responses from the service, which allows completed recommendations to be analysed by discipline, type and time to completion.

This detailed analysis can be used to identify which recommendations are completed effectively and within the set timescale, to identify which types of recommendations take longer to complete than anticipated, and to identify ways in which the arrangement and/or wording of recommendations can be improved in order to ensure that recommendations are achieved.

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Further mammographic views: the importance of getting it right

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Breast Cancer Research 2006, **8(Suppl 1):**P53 (doi: 10.1186/bcr1468)

The accurate diagnosis of breast pathology through mammography can be enhanced by the judicious use of 'additional views' [1,2]. When carefully applied, these techniques can give definitive answers to problems indicated on the original films [3]. However, when seeking extra information it is critical that the correct techniques are applied. If additional views are taken incorrectly or inaccurately, they can produce misleading results or false-negative findings. Therefore, our aim in this poster is to delineate proper applications and to demonstrate – with the help of case studies – just when and how the taking of additional views can prove to be a valuable tool. Equally, we show that their inappropriate use can disguise real pathologies that are intimated on the original films.

References

1. Michell MJ: FNAC and core biopsy of impalpable lesions. In *Breast Cancer Diagnosis and Management*. Edited by Dixon JM. Edinburgh: Elsevier; 2001:31-41.
2. Yeowell M: Mammography positioning technique. In *Textbook of Mammography*. 2nd edition. Edited by Tucker A, Ng Y. London: Churchill Livingstone; 2001:35-78.
3. Hashimoto B, Bauermeister D: *Breast Imaging: A Correlative Atlas*. New York: Thieme; 2003.

54

To assess the clinical usefulness of radio-opaque marker insertion into malignant breast tumours in patients undergoing neo-adjuvant chemotherapy prior to consideration of breast-conserving surgery

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Breast Cancer Research 2006, **8(Suppl 1):**P54 (doi: 10.1186/bcr1469)

Introduction The study looks at our experience in the first 29 patients who were referred for marker insertion.

Method The markers were all placed by a radiologist under ultrasound guidance into the central area of the tumour. The technique is described.

Results Of the 26 patients who had a successful marker placement, 23 went on to have a good response to chemotherapy. In 15 of these the tumour was no longer clinically palpable. These patients underwent standard wire localisation with the hook of the wire placed into the 'tumour bed' using either stereotactic mammographic guidance focusing on the implanted marker (11 patients) or using ultrasound guidance if the tumour was still visible on ultrasound (four patients). This enabled the surgeon to perform a wide local excision centred on the 'marked' tumour bed even though it was no longer palpable.

Conclusion We conclude that the insertion of the radio-opaque markers into breast tumours is a useful aid to guide breast-conserving surgery following neo-adjuvant chemotherapy. These initial results require validation by larger scale studies.

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Education within the workplace: an overview – has the emphasis on education devalued the importance of experience?

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Breast Cancer Research 2006, **8(Suppl 1):**P55 (doi: 10.1186/bcr1470)

Background Radiographers have been encouraged to perform extended roles, blurring out traditional boundaries that had previously existed. Meeting the current demands within the clinical environment has coincided with dramatic changes in the provision of professional education. Qualifications gained at the beginning of a radiographer's career provide us only with an initiation period now superceded by the importance of obtaining advanced skills and knowledge.

Aim To assess the importance and value of education within the workplace and whether this undervalued the importance of experience.

Method Information was assimilated with the distribution of 120 questionnaires to the Breast Screening Units throughout Humberside/ Yorkshire regions relating to postgraduate education within the departments covering all mammographers. The results were completed when all units were undergoing assimilation onto the new banding procedures.

Conclusion Preliminary results indicate that people felt that, in order for career progression to take place, radiographers had to extend their role by entering into some sort of academic framework. The undertaking of academic qualifications on the whole had proven to be a positive experience. The Agenda for Change (HMSO, 1999) tried to address the previous absence of National Guidelines that had hindered the innovative role of radiographers and rewarding them for the job that they do. However, it was felt that experience had not been recognized and correlated to radiographers feeling a low perceived status within the department.

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Breast ultrasound training scheme

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Breast Cancer Research 2006, **8(Suppl 1):**P56 (doi: 10.1186/bcr1471)

Ultrasonography is a common follow-up procedure in breast screening to help elucidate the nature of potential abnormalities. Due to the inherent properties of the imaging modality, these images are of fairly low resolution, as compared with mammography, and therefore pose a different interpretation problem for the radiologist or imaging specialist. We describe the steps involved in the development of a PC-based training scheme for improving the interpretation of ultrasound images.

Using the existing current literature, ultrasound image features were identified. The key features and the reported difficulty that individuals had in identifying these were then logged. The construction of an image database was then undertaken with the aim of amassing both static images and video clips of imagery that posed particular interpretative challenges. Various optional interfaces that allow participants to make and record decisions are currently being assessed. Once complete, the system will be fully trialled and then will be made available freely available to UK screening personnel.

57

Digital mammography: the human factors implications

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Breast Cancer Research 2006, **8(Suppl 1):**P57 (doi: 10.1186/bcr1472)

A change is underway, with conventional film-screen mammography being surpassed by the implementation of digital mammography and the associated soft-copy digital film reporting. However, there is an allied period of changeover with implementation that requires careful consideration to ensure optimal performance and efficiency of work tasks.

To examine the human factors implications, a combination of techniques (expert walkthroughs, verbal protocol analysis, workstation assessment) was applied to examine existing working practices during the implementation of digital mammography film reading. Radiologists and advanced practitioners within a UK NHS Breast Screening Unit participated to enable a thorough understanding to be gained of strategies adopted when using: routine conventional roller viewing of analogue (film) cases with analogue priors; routine soft-copy reporting with full-field digital mammography (FFDM) priors; trial FFDM with analogue priors viewed on a multiviewer; and trial FFDM with digitised analogue cases viewed digitally.

A variety of changes in working practices were recognised to have occurred with digital implementation. There was an impact upon performance and efficiency of digital soft-copy reporting when viewing analogue priors. Subsequent recommendations for workstation design, working practices and training were produced to assist in improved implementation of digital processes in mammography.

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Mammography soft-copy reading: to digitise priors or not, that is the question

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Breast Cancer Research 2006, **8(Suppl 1):**P58 (doi: 10.1186/bcr1473)

Evidence is accumulating on the use of digital mammography. But there is relatively little published guidance on how to manage hard-copy film-screen prior images in a soft-copy reporting environment. For a population screening program, one pressing question is 'to digitise priors, or not?'.

The BreastScreen Victoria programme screens 200,000 women each year, with two-view mammography at 2-yearly intervals. Many women have completed their fifth round of screening. Ten million films are archived. Existing standards require independent double-blind reporting comparing prior and current images. As digital is introduced, each reader needs to compare soft-copy images with hard-copy priors. How do we merge the two different reading worlds, analogue and digital, or indeed should we even attempt this?

Possibilities include digitising; using a special multi-viewer; using a dental viewing box; or loading an analogue multi-viewer alongside the soft-copy 5MP monitors. Factors specific to digitising include the following: Is it possible to digitise in such numbers? Is it too time consuming or too expensive? What resolution should be used to digitise? Is the quality of digitised priors sufficient for comparative review? This poster traces the decision-making process to digitise prior images in the context of a digital mammography pilot within BreastScreen Victoria.

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Digital on the road down-under

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Breast Cancer Research 2006, **8(Suppl 1):**P59 (doi: 10.1186/bcr1474)

Digital mammography is being introduced worldwide in fixed-site screening and diagnostic clinics. BreastScreen Australia services use mobile vans to deliver screening to women in rural and remote Australia. BreastScreen Victoria (BSV) has installed a Computerised Radiology (CR) unit on a mobile van, while BreastScreen Tasmania (BST) has installed a Direct Radiology (DR) system.

Digital systems offer benefits over analogue systems on mobile vans. One benefit is image processing without chemicals. Currently, radiographers on BSV and BST mobile vans work 'blind'. They cannot process and view images due to difficulties in maintaining processor quality when vans are moving. Unprocessed films are couriered across the country and women must return if repeat views are required. Digital imaging overcomes this limitation as radiographers can view their images instantaneously.

However, digital systems in a mobile environment pose specific problems. Harsh Australian conditions affect system reliability. Movement along rural country roads and temperature fluctuations from −5°C to over 40°C can affect the stability of detectors and lasers. Limited broadband infrastructure poses difficulties in meeting IT and communication network requirements.

This poster reports on implementation challenges and compares the strengths and weaknesses of using CR and DR in a digital mobile environment in Australia.

60

Targeting Asian women results in greater uptake for breast screening

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Breast Cancer Research 2006, **8(Suppl 1):**P60 (doi: 10.1186/bcr1475)

Breast cancer is one of the most common cancers among all women in the United Kingdom. The 2001 uptake rate for invitations to attend screening at a breast screening centre was observed to be low (53%) for GP practices with a high population of Asian women.

The breast screening health promotion team plus an interpreter, who was well known in the community, held a roadshow in a shopping centre in May 2004. This brought breast screening issues to the attention of the target group with a wide range of linguistic abilities. It was found that both Asian men and women responded positively to literature and personal discussion in their own language.

In November 2004 the GP practices with a high proportion of registered Asian women were invited for breast screening, and the uptake was 80% in the 50–70 years age range. This shows that the targeted health promotion enabled the women to make informed choices about accepting the breast screening invitation, despite the obvious barriers.

Questions for future research are: Will the acceptance rate be maintained without further targeting in 2007 when the women are re-invited for screening? Should a culturally based information programme be implemented to develop cost-effective breast screening for ethnic minorities?

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Addressing pain on compression: women and radiographers working together

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Breast Cancer Research 2006, **8(Suppl 1):**P61 (doi: 10.1186/bcr1476)

Pain on compression is a major source of complaints to screening programmes. Fear of pain may affect women's participation and thus limit a programme's potential to reduce mortality. This poster describes a quality improvement project on pain in which radiographers and women worked in partnership.

BreastScreen Victoria screens over 200,000 women each year. Our Screening and Assessment Services audit complaints and provide a forum for consumer advisory groups to discuss these complaints and offer recommendations for quality improvement. A Radiography 'Q' Group is responsible for monitoring and reviewing state-wide service quality and safety.

A strategy to manage pain on compression was developed at BreastScreen Victoria's Bendigo service. The service monitored complaints about pain, consulted its Consumer Advisory Group, and devised an information-based strategy that successfully reduced complaints and improved women's experience. The Radiography Q Group has further developed the strategy and is currently overseeing its implementation at all screening sites.

The success of the Pain on Compression project confirms the value of a radiographer-specific quality group working with women to achieve improvements in our screening programme.

62

Avoiding unnecessary sentinel node biopsy

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Breast Cancer Research 2006, **8(Suppl 1):**P62 (doi: 10.1186/bcr1477)

Sentinel node biopsy is a surgical technique that identifies the first axillary node to which a breast tumour drains directly. If positive, node clearance is performed as a secondary procedure. Prior knowledge of metastatic lymphadenopathy allows primary axillary node clearance, avoiding the associated financial and psychological costs of two surgical procedures.

A retrospective study of primary breast cancer patients treated in Hope Hospital Breast Unit between April 2004 and March 2005 was performed to assess the efficacy of axillary ultrasound and clinical examination in assessing axillary node status.

Of 96 patients with 97 cancers identified, 69 had ipsilateral axillary ultrasound. Eight patients were excluded because axillary surgery was not performed.

Table 1 (abstract 62)

	Histology positive?	
	Yes	No
Palpable nodes? (six not recorded)		
Yes	13	2
No	13	27
Ultrasound positive?		
Yes	21	4
No	8	28
Either nodes palpable or ultrasound positive?		
Yes	23	5
No	6	27

The sensitivity of axillary palpation alone in detecting metastatic nodes was 50%, the specificity was 93%, the PPV was 87% and the NPV was 68%. For axillary ultrasound alone, the sensitivity was 72%, the specificity was 88%, the PPV was 84% and the NPV was 78%. The combination of clinical and ultrasound examination predicted metastases with sensitivity 79%, specificity 84%, PPV 82% and NPV 82%. Combining clinical examination and ultrasound missed only 10% of metastatic nodes. In another 8% of cases, ultrasound or axillary palpation was falsely positive and FNA of these nodes could have reduced the risk.

We recommend that routine axillary ultrasound with FNA is adopted prior to embarking on sentinel node biopsy.

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Investigation and analysis of the benign surgical biopsy rate in the prevalent screening round (2001–2002)

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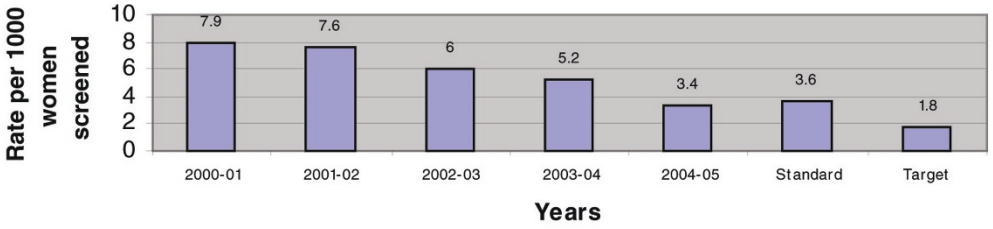
Breast Cancer Research 2006, **8(Suppl 1):**P63 (doi: 10.1186/bcr1478)

Introduction Quality assurance is a fundamental part of the National Health Service Breast Screening Programme. National quality standards are in place for all stages of screening and for all professionals involved. The performance of individual units is monitored to ensure all women have access to an excellent service.

Aim This project aims to demonstrate how the Liverpool Breast Unit addressed failure to meet the national quality standard for the benign

Figure 1 (abstract 63)



biopsy rate in the prevalent screening round. Failure to meet this standard was of concern because benign biopsies are associated with high healthcare costs and patient anxiety.

Method A retrospective review of the records of patients who had undergone benign biopsy (2001–2002) was conducted to establish reasons for surgical referral and suggest corrective measures to enable the unit to meet the standard in the future.

Results The review concluded that that the benign biopsy rate achieved (Fig. 1) did not reflect the performance of the unit and recommended an action plan to improve the standard. This plan was implemented, and as a result the standard has improved in subsequent years.

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Imaging methods in differentiation between inflammatory breast cancer and post-treatment changes

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Breast Cancer Research 2006, **8(Suppl 1):**P64 (doi: 10.1186/bcr1479)

The aim of the study is assessment of the role of non-invasive imaging methods such as mammography, ultrasound and magnetic resonance imaging in the diagnosis of inflammatory breast diseases. The study is mainly focused on the pitfalls in the diagnosis of inflammatory breast cancer and differentiation against another inflammatory lesions, including breast tissue changes after radiation therapy. Inflammatory breast cancer has a mammographic pattern of inflammatory changes, such as skin thickening and stromal coarsening and/or diffusely increased breast density with or without an associated mass and/or malignant-type microcalcifications. Ultrasound is helpful not only in depiction of masses masked by the edema pattern, but also in the demonstration of skin and pectoral muscle invasion and axillary involvement. Magnetic resonance imaging is used to differentiate residual tumor from post-treatment fibrosis and glandular tissue.

References

1. Günhan-Bilgen I, *et al.*: **Inflammatory breast carcinoma: mammographic, ultrasonographic, clinical, and pathologic findings in 142 cases.** *Radiology* 2002, **223:**829-838.
2. Hance KW, *et al.*: **Trends in inflammatory breast carcinoma incidence and survival: the Surveillance, Epidemiology, and End Results Program at the National Cancer Institute.** *JNCI* 2005, **13:**966-975.
3. Morakkabati N, *et al.*: **Breast MR imaging during or soon after radiation therapy.** *Radiology* 2003, **229:**893-901.

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Knowledge about breast cancer and attitudes to seeking help with breast cancer symptoms among older women

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Breast Cancer Research 2006, **8(Suppl 1):**P65 (doi: 10.1186/bcr1480)

Older age is a risk factor for developing breast cancer and delayed presentation; however, routine breast screening on the NHSBSP ends at age 70. The aim of this study was to examine how well-equipped older women are to seek help following symptom discovery after their final routine mammogram. We conducted a questionnaire survey among a national sample of 850 women aged 67–73 years (response rate 84%). Fifty per cent of women underestimated their lifetime risk of developing breast cancer as less than 1 in 100, and 75% believed their age decreased the likelihood of them developing breast cancer or made no difference. Identification of 11 possible breast cancer symptoms varied from 93% of women for a breast lump to 14% for nipple rash. Women with no formal education knew fewer breast cancer symptoms than those with at least O-levels ($P < 0.001$). Poorer knowledge about breast cancer symptoms was associated with less confidence in being able to detect a breast change ($P < 0.001$) and with decreased intention to seek help in the event of symptom discovery ($P = 0.02$). Increasing knowledge of breast cancer and the confidence to detect breast cancer symptoms as women leave the routine protection of the NHSBSP may reduce delays in presentation by older women with breast cancer.

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An aid to the viewing and reporting of the mammograms of the augmented breast

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Breast Cancer Research 2006, **8(Suppl 1):**P66 (doi: 10.1186/bcr1481)

We present a tool to aid in the visualisation of the breast tissue in women who have breast implants.

The tool presented is easy to use and cheap to make. A selection of different sizes and shapes of mask is used to correspond to the various shapes and sizes of implant. The tool may be customised to a suit a specific implant.

The tool is placed directly over the implant to mask the light transmitted through it. Subjectively, this gave a great improvement in the quality of the image of the breast tissue demonstrated.

A study was undertaken to accurately measure the luminance (cdm^2) in all areas of the breast demonstrated on the mammograms. A wide range of readings were achieved throughout the breast and varied considerably as we measured through glandular and fibrous tissue as well as through adipose tissue and skin.

We conclude that the relative brightness of the visualised breast tissue increases by a factor of 10,000 with the use of the tool to mask the implant. Mammographers and film readers have found this tool a useful aid to the viewing and accurate reporting of mammograms of the augmented breast.

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Comparison of outcome data for screen-detected and symptomatic breast cancers diagnosed in the West Midlands region in 2002

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Breast Cancer Research 2006, **8(Suppl 1):**P67 (doi: 10.1186/bcr1482)

Annually since 1996, screen-detected breast cancers within the NHS Breast Screening Programme have been audited at a national level.

The Breast Cancer Clinical Outcome Measures (BCCOM) Project aims to conduct a similar audit for symptomatic breast cancers. The first round of the BCCOM Project audited cancers diagnosed in 2002. For the West Midlands region, the 949 cases included in the national audit of screen-detected breast cancers and the 2,504 symptomatic cases included in the BCCOM Project were compared.

Non-invasive breast cancers formed 5% of the symptomatic cohort, compared with 23% for screening. Symptomatic cancers were larger (mean size 24.5 mm vs 16.6 mm) and more likely to be node-positive (42.7% vs 27.5%). Forty per cent of the symptomatic breast cancers had mastectomy compared with 27% of the screen-detected cohort, and small (diameter <15 mm) invasive symptomatic cancers were more likely to receive a mastectomy than comparable screening cases (31% vs 16%).

For invasive cancers with a known Nottingham Prognostic Index score, 20% of the symptomatic cancers fell into the excellent and good prognostic groups compared with 58% of screen-detected cancers. For women aged under 65, the proportion with screen-detected cancers receiving chemotherapy was lower than those with symptomatic cancer (20% vs 36%). Screening cases were also less likely to receive radiotherapy (48% vs 63%).

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Breast Cancer Clinical Outcome Measures Project: national results from year 1

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Breast Cancer Research 2006, **8(Suppl 1):**P68 (doi: 10.1186/bcr1483)

The Breast Cancer Clinical Outcome Measures (BCCOM) Project aims to audit the clinical management of symptomatic breast cancers in the United Kingdom. The information needed for the audit is obtained by tapping into existing sources such as the data currently collected by cancer registries and individual clinicians.

In collaboration with the UK cancer registries and 191 breast surgeons registered with the UK Association of Breast Surgery at BASO, data for a total of 16,407 breast cancers diagnosed in 2002 were collected. In the data for year 1 of the BCCOM Project, the proportion of patients not receiving surgery increased from 6% in those aged 50–64 to 41% in those aged 80 and above. Overall, 48% of the surgically treated cases received a mastectomy, but mastectomy rates varied between surgeons from 19% to 92%. The proportion of patients treated with radiotherapy and chemotherapy fell sharply with age, while the proportion treated with hormone therapy increased with age. The proportion of cancers with known nodal status decreased from 68% in patients aged 50–64 to 30% in those aged 80 and above. Nodal positivity varied between 12% for small cancers (diameter <10 mm) to 81% for large cancers (diameter >50 mm).

Year 2 of the BCCOM Project, which will examine clinical outcomes for symptomatic breast cancers diagnosed in 2003, was launched in January 2006.

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Breast lesion localisation wires: a change in practice

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Breast Cancer Research 2006, **8(Suppl 1):**P69 (doi: 10.1186/bcr1484)

At York Hospital, breast lesion localisation wires have routinely been inserted on the same day as the surgical operation. In August 2003, we offered an additional service where localisation wire insertion was undertaken on the day before surgery. This change in practice was necessary in order that the guidelines for patient waiting times be met.

An audit took place to assess the impact of increasing the length of time prior to surgery at which a breast lesion localisation wire is positioned. The audit compared information about patients who had surgery on the day of the localisation wire insertion with patients who had surgery on the day after.

The results of the audit suggest that, in our unit, the placement of a breast lesion localisation wire the day before surgery is a useful technique without any complications.

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Interpretation of mammographic breast microcalcification: interobserver variability between radiologists and mammographers and analysis of best mammographic predictors of histopathological outcomes

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Breast Cancer Research 2006, **8(Suppl 1):**P70 (doi: 10.1186/bcr1485)

Purpose To evaluate the interobserver variability among readers, thereby assessing the performance of radiologists versus radiographers in differentiating mammographic breast microcalcification. We also analyse the best mammographic predictors of histopathological outcome.

Materials and methods One hundred patients were randomly selected with microcalcification (MC) on their screening mammograms who underwent stereotactic core biopsy at our institution between August 2002 and August 2004. All the mammograms were retrospectively read by five readers independently. Each observer noted the various features and final analysis category for all MCs. Interobserver variabilities were calculated using Cohen's kappa statistics, Kilem Gwet's agreement coefficient 1 and the interclass agreement coefficient. The performance of radiologists and mammographers were determined using a logistic regression model. Overall best predictors of histopathology outcomes were also determined.

Results Interobserver agreement was moderate to good for distribution, moderate for the shape, moderate for final analysis category, poor for morphology, poor for variation in density of MC and poor for category on more MC on magnification. There is a significant difference in determining the benign nature of MC and the overall differentiation of MC between radiologists and mammographers favouring radiologists. There is no significant difference between them in determining malignant MC. The best predictors of histopathology were the morphology ($P < 0.0001$), distribution ($P < 0.0042$) and number of MCs ($P < 0.013$).

Conclusion There is moderate interobserver variability in assessment of the final analysis category (benign vs malignant). The radiologists are significantly better than mammographers in determining the benign nature and overall assessment but not significantly better at determining definite malignancy. The morphology, distribution and number of MCs are the best predictors of histopathological outcome.

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'What's the point of it?': radiographers, women with disability and mammography screening

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Breast Cancer Research 2006, **8(Suppl 1):**P71 (doi: 10.1186/bcr1486)

Women with disability are underutilising mammography screening, which is contributing to a higher than expected mortality rate from breast cancer. Barriers to participation experienced by women with disability include receiving information about mammography screening, communication difficulties during the procedure and staff attitudes [1]. A large study funded by the Australian National Breast Cancer Foundation investigated these barriers and determined solutions. One part of this study is reported here.

Radiographers employed by BreastScreen NSW, Australia, participated in focus groups to investigate their attitudes and perceptions of mammography screening for women with disability.

Radiographers expressed many concerns about mammography screening for these women. Issues raised included the necessity of mammography screening, legal consent, the role of carers and the need for education of BreastScreen staff. Wheelchairs, which prevented the mammography equipment from being positioned appropriately, were identified as a major barrier to producing optimally diagnostic mammography films. Importantly, radiographers indicated that the provision of relevant information in appropriate formats for these women would greatly improve the potential for a successful mammography completion.

Reference

1. Poulos A, Llewellyn G, Balandin S, Dew A: **Women with cerebral palsy and breast cancer screening by mammography.** *Arch Phys Med Rehab* 2006, **87:**304-307.

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'I want to go home': women with disability and the mammography procedure

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Breast Cancer Research 2006, **8(Suppl 1):**P72 (doi: 10.1186/bcr1487)

Women with disability are underutilising mammography screening, which is contributing to a higher than expected mortality rate from breast cancer. Barriers to successful mammography screening include the mammography procedure, which has been identified as problematic for these women [1]. A large study funded by the Australian National Breast Cancer Foundation investigated these barriers and determined solutions. One part of this study is reported here.

In situ analysis was used to identify barriers as they occur when women with disability have a mammogram. Under scrutiny was the interaction between the woman, the radiographer and the mammography equipment.

The analysis identified the need for assistive technologies such as hoists, extra personnel and extra time and space. For some women a successful completion was not possible. A dedicated centre or mobile van to provide the assistance required would greatly facilitate successful completions. Most importantly, a decision tool that would predict successful completions would avoid the trauma for women needlessly undergoing the mammography procedure. These women could then be offered alternative strategies.

Reference

1. Poulos A, Llewellyn G, Balandin S, Dew A: **Women with cerebral palsy and breast cancer screening by mammography.** *Arch Phys Med Rehab* 2006, **87:**304-307.

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Audit to assess the quality of mammograms in a symptomatic service providing family history screening

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Breast Cancer Research 2006, **8(Suppl 1):**P73 (doi: 10.1186/bcr1488)

Objective To determine whether the standard of mammography in a district general hospital's symptomatic service is equivalent to that in the NHSBSP. NICE guidance recommends that mammography for women with a family history of breast cancer should be to NHSBSP standards and should be audited [1]. The quality of mammograms is an important component of a mammography screening service.

The NHSBSP's minimum standard for mammography is that <3% of examinations should be repeated, with a target of 2% [2].

Methodology Two hundred consecutive film sets were assessed by symptomatic mammographers and 22% were reassessed by a screening mammographer, using Perfect, Good, Moderate, Inadequate (PGMI) criteria [2].

Results Seventy-three per cent of films scored by the symptomatic radiographers were assessed as 'good' or 'perfect', 3% were technically inadequate. The BSU mammographer scored fewer films as 'good' or 'perfect'. Mammograms on women up to the age of 70 were assessed with a reject rate of 1%, with 87% of films assessed as 'good' or 'perfect'.

Conclusion This audit has shown that the symptomatic mammographers produce films to a standard sufficient to provide family history mammography.

References

1. *Familial Breast Cancer.* NICE Clinical Guidelines CGO14; June 2004.
2. *Quality Assurance Guidelines for Radiographers.* NHSBSP Publication No. 30; March 2000.

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Are there lessons to learn from review of false-negative assessment interval cancers?

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Breast Cancer Research 2006, **8(Suppl 1):**P74 (doi: 10.1186/bcr1489)

Purpose To maximise the early detection of breast cancer by optimising the assessment process.

Materials and methods The notes and imaging of women who were screened and assessed between April 1995 and March 2004 but who subsequently developed breast cancer prior to their next routine screen were retrospectively reviewed. A total of 11,341 women were assessed during this time period. Twenty false-negative assessment cases were identified but three were excluded as the abnormality assessed was located at a different site in the breast (one case) or in the contralateral breast (two cases). The remaining 17 cases were examined and the reasons for failure of the assessment process postulated.

Results Six cases were recalled for assessment of stromal deformity, four cases for calcification and seven cases for asymmetry. Some mammographic signs were misinterpreted, especially cases of distortion where the focal compression view was falsely reassuring. Some cancers may have been detected earlier if a core biopsy had been included in the assessment process. However, some cases were challenging and the diagnosis was not made despite undertaking full triple assessment.

Conclusion Overall, the proportion of women undergoing false-negative assessment in this study was very low. Strategies to further improve the accuracy of screening assessment are suggested.

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Ultrasound breast imaging versus pathology; correlation of reported benign ultrasound scans with subsequent biopsy

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In the absence of any suspicious mammographic findings, lesions that appear benign with ultrasound yield benign pathology [1-5].

This retrospective study investigated the outcome of needle biopsy of ultrasonically benign appearing masses. The sample group included patients attending a symptomatic breast clinic at a busy London teaching hospital, from 2000 to 2003. Eight hundred and seventy-two cases fulfilled the following criteria: a solid mass graded U2, and an absence of any suspicious mammographic findings (M1/M2), if mammogram performed. A definitive pathological result had been obtained from fine needle aspiration cytology (FNA) or wide-bore needle biopsy (WBN). Cases also had a follow-up period of 18 months following FNA or WBN; 872 cases fulfilled this inclusion criteria. The results demonstrated 865 cases (99.2%) were true negatives and seven cases (0.8%) were false negatives.

This revealed that there is a strong positive correlation with benign appearing breast masses seen with ultrasound and their respective

pathological findings. The recommendations are to continue with further study to include all cases (not just benign). Also to develop a standardised reporting system, particularly for the training of junior staff members.

References

1. Graf O, Helbich TH, Fuchsjaeger MH, Hopf G, Morgun M, Graf C, Mallek R, Sickles EA: **Follow-up of palpable circumscribed non-calcified solid breast masses at mammography and US: can biopsy be averted?** *Radiology* 2004 [http://radiology.rsnajnls.org/cg] [Epub ahead of print].
2. Stavros AT: *Breast Ultrasound*. Lippincott Williams and Wilkins; 2004.
3. Shetty MK, Shah YP, Sharman RS: **Prospective evaluation of the value of combined mammographic and sonographic assessment in patients with palpable abnormalities of the breast.** *J Ultrasound Med* 2003, **22:**263-268.
4. Dennis MA, Parker SH, Klaus AJ, Stavros AT, Kaske TI, Clarke SB: **Breast biopsy avoidance: the value of normal mammograms and normal sonograms in the setting of a palpable lump.** *Radiology* 2001, **219:**186-191.
5. Stavros AT, Thickman D, Rapp CL, Dennis MA, Parker SH, Sisney GA: **Solid breast nodules: use of sonography to distinguish between benign and malignant lesions.** *Radiology* 1995, **196:**123-134.

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Pharmacokinetic, shape and texture parameters: comparison with breast tumour grade

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Breast Cancer Research 2006, **8(Suppl 1):**P76 (doi: 10.1186/bcr1491)

Introduction The histological tumour grade is one of the most important biological prognostic factors in breast cancer. The aim of our study was to compare pharmacokinetic, shape and texture parameters from breast DCE-MRI with the breast tumour grade.

Methods Two hundred and two malignant breast lesions for which the histological grade was available were scanned on a 1.5 T scanner. The 2D T1W FSPGR dynamic scans were followed by 3D T1W FSPGR fat-saturated post-contrast scans. Various pharmacokinetic [1], texture [2] and shape [3] parameters were calculated and the significance of each of the parameters for each of the three tumour grades was assessed.

Results The 202 lesions were 36 grade I, 110 grade II and 56 grade III malignant lesions. Pharmacokinetic parameter K^{trans} ($P = 0.025$) and shape parameter phi1 ($P = 0.039$) were significantly different between the grades of tumours. However, there was significant overlap between the tumour grades for both of these parameters. None of the texture parameters were significantly different between the tumour grades.

Conclusions Although K^{trans} and phi1 were significantly different between breast tumour grades, none of the pharmacokinetic, shape and texture parameters can be reliably used to differentiate various tumour grades at the present time.

References

1. Brix *et al.*: *J Comput Assist Tomogr* 1991, **15:**621-628.
2. Haralick *et al.*: *IEEE Trans Systems Man Cybernetics* 1973, **3:**610-621.
3. Hu M-K: *IRE Trans Information Theory* 1962, **IT-8:**179-187.

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Usefulness of magnetic resonance imaging in benign and malignant breast lesions: a pictorial review

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Breast Cancer Research 2006, **8(Suppl 1):**P77 (doi: 10.1186/bcr1492)

Magnetic resonance imaging (MRI) can play a role in the early detection of breast cancer or recurrent disease in cases when mammograms are not helpful. It is reported that malignant lesions enhance significantly following contrast injection while benign lesions show little or no enhancement. MRI has been shown to detect small breast lesions with sensitivity greater than mammography and can successfully image the dense young breast.

We would like to highlight a number of interesting cases of benign and malignant breast lesions detected with MRI in our tertiary referral centre, including intracapsular and extracapsular implant rupture, silicon leak, fibroadenoma versus fibrosarcoma and a case of extensive fat necrosis. We would also like to demonstrate the usefulness of MRI in the preoperative assessment of patients with multifocal lobular and ductal carcinoma as well as postoperative surgical change and axillary node involvement. In all our cases, MRI was a valuable adjunct in the diagnoses and subsequent management of patients with breast disease.

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Columnar cell change on core biopsy: radiological features and outcome

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Breast Cancer Research 2006, **8(Suppl 1):**P78 (doi: 10.1186/bcr1493)

Introduction Columnar cell change (CCC) is diagnosed on core biopsies performed for indeterminate microcalcification. The diagnosis of columnar cell change on stereotactic core biopsy presents a management difficulty because of uncertainty regarding the pathological and clinical significance of such lesions.

Aim The aim of this study is to describe the radiological features of lesions in which CCC is seen on core biopsy and to review the outcome.

Method Mammograms of 33 cases with established CCC on core biopsy were reviewed and the radiological features, follow-up imaging and surgical excision histology (if performed) were collated.

Results Thirty-three cases were reviewed. In 10/33 cases an associated benign histology was present. Twenty-three out of 33 patients demonstrated CCC alone on core biopsy, 14 with atypia and nine without. In 23/23 patients (100%), the radiological feature was indeterminate microcalcification (M3).

Nine patients with CCC have proceeded to surgical excision to date. The histology was upgraded to DCIS in two patients. Further excision data and follow-up of patients with CCC who did not undergo surgery will be presented.

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Use of health promotion to improve uptake in breast screening in Northamptonshire

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Breast Cancer Research 2006, **8(Suppl 1):**P79 (doi: 10.1186/bcr1494)

Objectives A reduction in mortality in breast cancer is the aim of the NHSBSP, with the uptake rate being an important factor. The quality standard is to achieve an uptake greater than 80%.

Northampton Breast Screening is a small unit covering Northampton and South Northamptonshire, with a wide social range.

With the age extension, 44,000 women will be invited for screening over a 34-month period to May 2006. Attendance rates for breast screening are a factor affecting cancer detection rates. Uptake for the previous round was 78.8%, ranging from 68.9% to 82.2% at practice level.

Aim The aim of the Forrest Centre is to improve the uptake of women invited for breast screening in Northamptonshire by health promotion and targeting of low-uptake GP practices.

Method The Forrest Centre has a radiographer dedicated to health promotion, working with the programme manager and primary care trust (PCT). GP practices were targeted by educating staff, poster displays and computerised flagging of those that did not attend. A letter written by the GP endorsing breast screening was included with

Table 1 (abstract P80)

	Number screened	Uptake rate (%)	Referral rate (%)	Number of women referred	Non-invasive cancer/1,000	Invasive cancer/1,000	Small cancer/1,000	Total cancers
2003	4206	85.4	3.04	128	2.14	9.03	4.99	48
2004	3728	85.1	3.62	135	1.61	9.92	4.02	44
2005	4350	79.6	3.03	132	1.84	7.36	4.14	40

the screening invitation. Initiatives with Northampton PCT are at surgeries in socially deprived areas.

Results and conclusion The uptake rate has risen from 78.8% to the quality assurance standard of 80% achieved through health promotion, particularly the letter endorsing screening.

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The NHSBSP age extension: completed first-round statistics from Southern Derbyshire – why it works for us!

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Breast Cancer Research 2006, **8(Suppl 1):**P80 (doi: 10.1186/bcr1495)

Southern Derby Breast Screening Service began inviting women up to the age of 70 years at the beginning of January 2003, and completed the first full round of screening for women aged 65–70 years on schedule in December 2005.

Data are presented for these women, in comparison with the 50–64 age group, and we describe briefly the simple but effective ways of working with administrative and radiographic teams to cope with the additional workload. For example, extending the skill mix, calling women numerically rather than alphabetically, introducing new mobile sites at central locations to encourage attendance, ensuring sufficient assessment slots and pre-allocating assessment appointments for smooth running clinics. The screening service has maintained all targets during this period.

The statistics show that women aged 65–70 years in Southern Derbyshire attend as well as, or better than, women aged 50–64 years. There is a similar overall recall rate, but with a high specificity for cancer. An excess of invasive cancers were detected for what is in effect a prevalent round. We are also finding that women aged >70 years are self-referring in increasing numbers, from 264 in 1999 to 503 in 2005.

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Breast screening histories: variation with time and impact on 10-year survival

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Breast Cancer Research 2006, **8(Suppl 1):**P81 (doi: 10.1186/bcr1496)

Every case of primary breast cancer diagnosed in the West Midlands since screening began until 31 March 2001 was assigned a screening status based on the woman's screening history. Eligible cases were identified from the West Midlands Cancer Intelligence Unit's cancer registration database. Screen-detected (SD) tumours were identified through regional breast screening units. The remaining tumours were allocated to one of eight screening status categories.

A total 14,625 breast cancers were classified. The number of SD, interval cancers (IC), and cancers in lapsed attenders increased over time. There was a decrease over time in the number of cancers diagnosed in women before invitation and in nonattenders. IC rates were lower 24–36 months from screening to diagnosis compared with 12–24 months. Around one-third of cancers in lapsed attenders and nonattenders were diagnosed within 8 months of their last invitation, suggesting that they may have been screening provoked.

There was a significant difference in the 10-year relative survival rates for attenders (SD, IC, lapsed attenders and nonattenders; 85.2% and 53.9%, respectively; RR = 1.58; $P < 0.00001$). Women with IC had survival rates above those of nonattenders, highlighting the benefits of screening.

Table 1 (abstract 81)

Screening status	Proportion (%)	10-year relative survival rate (%)
Screen-detected (SD) tumours	43	91.99
Interval cancer (IC)	27	75.68
Diagnosed before invitation	13	68.79
Lapsed attender	3	72.56
Nonattender	10	53.93
Unknown to NHSBSP	2	39.26

Reference

1. *J Med Screening* 2005, **12:**179-184.

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Audit of ultrasound-guided breast biopsy/fine needle aspiration, in response to increasing demand on service provision

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Breast Cancer Research 2006, **8(Suppl 1):**P82 (doi: 10.1186/bcr1497)

Aims To evaluate usage of ultrasound biopsy appointments. To elicit factors that might influence numbers referred for biopsy.

Methods A retrospective review of all patients attending for breast biopsy/FNA over a 6-month period. Ultrasounds were graded U2–U5 and were compared with pathology/cytology outcomes. The positive predictive value (PPV) for the ultrasound grade was calculated. Other factors such as age, specific ultrasound features, correlation with mammographic findings and size were obtained for U3 lesions.

Results There were 199 biopsy appointments in 179 women aged 21–93 years. Sixteen had no histopathology/cytology – either the lesion resolved or a simple cyst aspirated. Of the remaining women, 51% were graded U3, 9% U4 and 11% U5. The PPV for U3 lesions was 13%. U4 and U5 PPVs were 69% and 95%, respectively, comparable with published standards. Forty-eight cases were U2, mainly for completion of triple assessment.

Conclusions U2 and U3 lesions form the majority of the biopsy workload. The PPV for U3 lesions is lower than the expected standard. Correlation with additional imaging and demographic factors may allow for downgrading of some benign lesions previously designated U3, with concomitant freeing of capacity.

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Failsafe batches: are we optimising their effectiveness for both the screening service and the woman?

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Breast Cancer Research 2006, **8(Suppl 1):**P83 (doi: 10.1186/bcr1498)

In order that women continue to receive an invitation for screening at 3-yearly intervals when they move locations around the United Kingdom, screening services initiate 'Failsafe' batches at 3-monthly intervals or less. Currently there is a variety of practice in the specification of these failsafe batches within the NHSBSP, and variations in appointment booking practice associated with these batches.

The National Co-ordinating Group for Administration and IT in Breast Screening is reviewing these practices with the aim of producing national guidance on the most effective approach, both in terms of accessibility and acceptability for the women involved and cost-effective resource management for the service.

This poster outlines the results of the review and documents the key points in best practice.

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An audit of women attending for symptomatic recall following routine NHSBSP screening at the South West London Breast Screening Service between 1991 and 2004

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Breast Cancer Research 2006, **8(Suppl 1):**P84 (doi: 10.1186/bcr1499)

NHSBSP guidelines recommend that symptoms or signs reported at the time of mammographic screening should be evaluated by the film reader and the woman should be recalled for further assessment if appropriate.

The aim of this audit was to document the clinical features most likely to be associated with cancer and to clarify our guidelines for symptomatic recall.

We identified 1,075 women with normal screening mammograms who had breast symptoms or signs recorded at screening and were subsequently recalled for assessment between April 1991 and July 2004.

The results showed that cancer was found in 13/1,075 women. Of these, nine women had a lump (invasive cancers), two women had a skin dimple (invasive cancers), one woman had an eczematous nipple change (Paget's disease) and one woman had a bloody nipple discharge (DCIS).

Our audit shows that the majority of symptomatic recalls did not have cancer (1,062/1,075), and no cancers were detected in women with thickening, nodularity, lumpiness, breast pain/odd sensations or nonblood-stained nipple discharge. More significant symptoms, which in some cases proved to be indicative of an underlying cancer, were a lump in the breast or axilla, a skin dimple, an eczematous/weeping nipple, a bloody nipple discharge and nipple inversion.

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An audit of women attending for technical repeat mammography at the South West London Breast Screening Service between 1991 and 2004

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Breast Cancer Research 2006, **8(Suppl 1):**P85 (doi: 10.1186/bcr1500)

NHSBSP guidelines recommend that the number of women undergoing repeat examinations should be minimised.

When films are scrutinised for possible cancers, the technical quality should be evaluated and technically inadequate films should be repeated (technical recall). The purpose of this review was to show how many cancers were detected following technical recall.

A retrospective audit of cancers detected at technical recall between January 1991 and March 2004 was performed. During this time 11,149 women were recalled for repeat mammograms. Cancer was detected in 18 of the women who were assessed following technical repeat mammography.

The results showed that only 10 women in 13 years had a cancer detected on the repeat mammogram that was not visible on the initial screening mammogram.

A further eight cancers were detected because review of the initial films at the time of the technical repeat showed subtle abnormalities that had not previously been appreciated.

Our results show that very few additional cancers are detected following technical repeat mammography despite considerable effort to achieve optimal imaging.

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Barcode data entry for film reading: information loss and consequences

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Breast Cancer Research 2006, **8(Suppl 1):**P86 (doi: 10.1186/bcr1501)

Barcode data entry for screening mammography offers the attractive possibility of speeding-up a labour-intensive process. Currently, significant time is spent manipulating paper forms with the additional potential for error that this incurs. However, the barcode data entry systems introduced in some centres allow the film reader to enter only a decision. By contrast, film readers using paper forms frequently annotate the forms to record additional information.

Concerned by the possible consequences of this information loss, we conducted an ethnographically based study of film reading with paper-based data recording to investigate use of the forms, and contrasted this with barcode data entry. Results reveal that the paper forms provide an important communication tool, fostering collaboration between readers. Specifically, they are used by readers: to indicate an area of concern, and the nature of that concern, to a second reader or arbitration meeting; to indicate to another reader that they have noted a particular feature but decided that it is not of concern; for future reference as a personal learning tool; and to express uncertainty and seek reassurance from another reader. We conclude that barcode systems should either support richer data entry or continue to be supplemented with paper forms.

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Increased screening capacity by an extended working day on the mobile screening unit

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Breast Cancer Research 2006, **8(Suppl 1):**P87 (doi: 10.1186/bcr1502)

Somerset Breast Screening serves a mainly rural population, with a mobile unit visiting 22 sites throughout the county on a 3-yearly screening cycle.

The age extension of the screening programme necessitated an approximately 35% increase in the screening workload.

It was not possible to justify the expense of a second mobile unit as this would only be required 1–2 days per week. Finding additional sites for mobile units in small rural villages has become an increasing problem.

For these reasons it was decided to increase our capacity on the existing mobile unit by using a shift system and extending the working day. Initial staff consultation showed a willingness to explore this new way of working.

A full screening day now extends from 8 am until 8 pm and utilises four radiographers/assistant practitioner radiographers.

As a result of the extended day, Somerset Breast Screening has fully implemented the age extension and is achieving a 36-month screening round without the capital expenditure of a second mobile unit. Surveys show a high level of popularity with our clients, especially for early evening appointments, and high acceptance levels from our radiographers and assistant practitioners.

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