4.2 Recall rate and reader confidence in the prevalent screening round: Is there an improvement after the addition of tomosynthesis to conventional mammography?

Dr Neil Upadhyay1, Dr Neil Soneji1, Dr Victoria Stewart1, Dr Nigel Barrett1, Dr Stella Comitis1, Dr Sylvie Flais1, Dr Angela Gupta1, Dr Hema Purushothaman1, Dr Keshthra Satchithananda1, Dr Neelofar Zaman1

1West London Breast Screening Service, Imperial College Healthcare NHS Trust, UK; 2South East London Breast Screening Service, King’s College Hospital NHS Foundation Trust, UK

Purpose: To determine whether 3D tomosynthesis in addition to standard 2D screening mammography reduces single reader recall rate in women undergoing their first screening examination.

Methods: Regional ethics committee approval was obtained. 981 women undergoing first or prevalent round screen within the NHS Breast Screening Program (NHSBSP) were recruited following informed consent, for additional 3D tomosynthesis examination (Selenia Dimensions, Hologic). The age range of patients was 47-51.

Recruited patients were divided into eight groups. One of eight experienced mammography screen readers read the standard 2D examination of patients within their allocated group, and after a four week interval, read the 2D examination with the 3D tomosynthesis study for same patient. The reader made a decision on patient recall to further assessment at each sitting along with a confidence rating on their decision using a Likert scale. The recall rate and confidence ratings following evaluation of the 2D examinations were compared with the recall rate and confidence ratings following evaluation of both 2D and 3D examinations.

Results: After only 2D examination 17.1% of patients were recalled. For the 2D examination with 3D tomosynthesis 10.9% of the patients were recalled. The difference between the two groups was significant (p<0.001). Median confidence on the Likert scale was 7 for 2D examination and 8 for 2D and 3D together (p<0.001).

Conclusion: Addition of 3D tomosynthesis significantly reduces recall rate at first screen, with a modest associated increase in reader confidence and therefore could play an important future role in the NHSBSP.

4.3 The Changing Case Order to Optimize Patterns of Performance in Screening (CO-OPS) trial

Dr Sian Taylor-Phillips, Dr Matthew Wallis, Dr Alison Duncan, Ms Olive Kearins, Professor Aileen Clarke

University of Warwick, UK

Background: A vigilance decrement of decreasing sensitivity to detect visual targets with time on task has been observed in many repetitive visual tasks. [1,2] We investigated whether there is a vigilance decrement in the repetitive visual task of mammography film-reading, and whether reversing the case order for the second film-reader can reverse such a decrement.

Methods: A randomised controlled trial was conducted in English breast screening centres. [3] Batches of women’s mammograms were randomised to be read in the same order by both film readers, or in the opposite order (i.e. one examining the batch backwards). Differences in cancer detection rate, recall rate and rate of disagreements between intervention and control arms were investigated using multi-level logistic regression analyses. Patterns of cancer detection rate and recall rate with time on task were analysed by reversing the case order for the same reader.

Results: After 2D examination 17.1% of patients were recalled. For the 2D examination with 3D tomosynthesis 10.9% of the patients were recalled. The difference between the two groups was significant (p<0.001). Median confidence on the Likert scale was 7 for 2D examination and 8 for 2D and 3D together (p<0.001).

Conclusion: Addition of 3D tomosynthesis significantly reduces recall rate at first screen, with a modest associated increase in reader confidence and therefore could play an important future role in the NHSBSP.

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were proven by histology or >2 year follow-up. 230 cases were available for analysis. Eight accredited UK NHSBSP readers, blinded to assessment outcome, retrospectively read all cases with A: screening mammograms plus DBT, and B: screening mammograms plus SSM. Readings were 9 weeks apart to avoid recall bias. Reading condition order was reversed in half the readers. Statistical analysis included ROC curves, compared by Chi Squared test.

Results: Based on the area under the ROC curve, the two methods are not significantly different (auROC 0.87 for DBT vs 0.86 for SSM, p=0.49). DBT sensitivity was not significantly different from SSM sensitivity (90% vs 86%, p=0.10) whereas DBT specificity was significantly lower than SSM (59% vs 64%, p=0.0002).

Conclusions: Overall, Siemens DBT is as accurate as standard supplementary mammography for assessing screen-detected, soft-tissue, mammographic abnormalities. It is therefore suitable for optional implementation subject to practical evaluation. The accuracy of DBT in this study was driven by higher sensitivity compared with SSM, while specificity was lower.


4.6 Word of Mouth Mammogram e-Network (WOMMEn) hub: a Social Media enabled client and practitioner collaboration
Dr Leslie Robinson1, Mrs Jo Taylor2, Mr Alex Fenton3, Dr Adam Galpin1, Ms Cathy Hill2, Dr Claire Mercer2, Dr Joanne Meredith2, Mrs Beverley Scragg2, Miss Shaheeda Shaikh3, Mrs Geraldine Shires2
1University of Salford, UK; 2University Hospital of South Manchester, Nightingale Centre, UK; 3Breast Unit, Bolton Trust, UK; 4East Lancashire Hospitals NHS Trust, Breast Screening Unit, UK; 5Unemployed Patient Representative, UK

Introduction: The WOMMEn hub uses Social Media (SoMe) to engage women (service-users and practitioners) in conversations about breast screening. The hub was conceived by service-users and practitioners over the period of two years using a range of methods. The presentation describes the process and the outcomes.

Methods and Materials: Stage one concerned feasibility of concept2; Positive feedback led to stage two hub development. Women were recruited, through SoMe networks, to an on-line User Design group (UDG) hosted on a private Facebook Group. An analysis of UDG posts was carried out over a 7 month period (31/1/15-5/9/15) using GnuNet’s on-line group analytics tool. Posts were also analysed for content using a framework analysis1.

Results: 89 women were recruited over the period analysed, approximately equally split between service users and practitioners. 206 posts eliciting 1124 further comments were analysed. Framework analysis showed women want honest information and discussions about: screening in general and for breast cancer; breast anatomy; the mammographic examination mammogram results breast cancer DCIS other pathologies and research. These themes consequently informed the hub content1. The high level of engagement between service-users and practitioners, and the numerous instances demonstrating elicitation and sharing of feelings about breast screening, confirmed that the facility to network with health professionals on the final hub would be crucial.

Conclusion: Engaging practitioners and service-users in the design of the hub has been invaluable to ensure it is fit for purpose. Using on-line methods to undertake this work has been convenient for participants and provided rich data.

References: 1. Robinson L., Griffiths M., Wray J., Ure C.M., Shires G., Stein Hodgins J.R., Hill C. Preparing women for breast screening mammography: a feasibility study to determine the potential value of an on-line social network and information hub Radiography Special Issue: Breast

Content: Third reading in the NHS breast screening programme: how arbitrary is arbitration? Dr Jim Steel, Dr Simon Lloyd Plymouth Hospitals NHS Trust, UK

Purpose/Background/Objectives: Arbitration is not as closely scrutinised in Quality Assurance as first and second reading. We wished to understand the impact of arbitration variation on cancer detection and recall in our region.

Methods: We analysed NBSS records of every screening episode performed in 5 units utilising single-view DBT (Siemens MAMMOMAT Inspiration) in addition to assessment with one or more supplementary mammographic views. All outcomes were recalled and cancers detected following arbitration (all p < 0.001). There were significant differences between the recall rates of the arbitrators with the highest and lowest recall rates (p < 0.001 for all units, and p=0.009), with recall rates up to five times higher from one arbitrator to the next. There were significant differences between arbitrator cancer detection rates in 2 units (p=0.02 and p=0.098), with 3 units demonstrating a greater than two-fold difference in cancer detection rate between arbitrators.

Conclusions: The large degree of variation in the practice of solitary 3rd readers has not previously been described to our knowledge. This may have significant clinical impact. Quantitative guidelines may be helpful for new arbitrators in the NHSBSP.

4.5 Clinical performance of single-view Siemens digital breast tomosynthesis versus standard supplementary mammography for the assessment of screen-detected abnormalities – a multi-reader study
Ms Patsy Whelehan1, Professor Sylvia Heywang-Koebener2, Dr Sarah Vinnicombe1, Dr Astrid Hacker2, Dr Alexander Jaensch3, Dr Adrian Haspa4, Dr Rosie Gray5, Mrs Maggie Jenkins6, Dr Keith Lowry7, Dr Rachel Oeppen4, Dr Michael Reilly2, Dr Michaella Stahnke2, Professor Andy Evans8
1University of Dundee & NHS Tayside, UK; 2Referenzenzentrum Mammographie Muenchen, Germany; 3University Hospital of Southampton NHS Foundation Trust, UK; 4Athelagelin Hospital, UK; 5Royal Cornwall Hospital, UK; 6Belfast City Hospital, UK; 7University of Dundee, UK


Results: Based on the area under the ROC curve, the two methods are not significantly different (auROC 0.87 for DBT vs 0.86 for SSM, p=0.49). DBT sensitivity was not significantly different from SSM sensitivity (90% vs 86%, p=0.10) whereas DBT specificity was significantly lower than SSM (59% vs 64%, p=0.0002).

Conclusions: Overall, Siemens DBT is as accurate as standard supplementary mammography for assessing screen-detected, soft-tissue, mammographic abnormalities. It is therefore suitable for optional implementation subject to practical evaluation. The accuracy of DBT in this study was driven by higher sensitivity compared with SSM, while specificity was lower.


4.4 Third-reading in the NHS breast screening programme: how arbitrary is arbitration? Dr Jim Steel, Dr Simon Lloyd Plymouth Hospitals NHS Trust, UK

Purpose/Background/Objectives: Arbitration is not as closely scrutinised in Quality Assurance as first and second reading. We wished to understand the impact of arbitration variation on cancer detection and recall in our region.

Methods: We analysed NBSS records of every screening episode performed in 5 units utilising single-view reader arbitration over 5 years. We identified all episodes arbitrated and calculated associated recall and cancer detection rates. We compared the arbitrators with extremes of recall and cancer detection rates evaluating for statistical significance. We excluded episodes where either arbitrator had acted as first or second reader to reduce bias.

Results: 4.9% of 545,633 screening episodes went to arbitration. 29% of all recalls arose from arbitration. 14.7% of all cancers were detected following arbitration. There were significant differences between units in the proportions of cases going to arbitration, requirements were complete. Women screened twice, and those who had mammograms of insufficient quality were excluded from the analysis, alongside those lost to follow up. Analysis is underway.

Conclusions: This study provides an example of how pragmatic integrated randomised controlled trials can be implemented in screening.

Trial Registration: ISRCTN46603370

Introduction: How mammography is incorporated into undergraduate (UG) radiography training may influence student perception of the specialty and its potential as a future career option. We provide an overview of the academic and clinical content of UG radiography courses relating to mammography across the UK. Using mixed methods and an iterative, inductive approach supplying quantitative and qualitative data, we identify any variations and discuss possible causes which may help influence future training strategies.

Methods: A self-designed questionnaire containing open and closed questions was sent via online ‘Survey monkey’ to course leaders of all Higher Education Institutions (HEIs) offering BSc (Hons) Diagnostic Radiography Faculty of Health & Science, University of Suffolk, UK

Results: 12(63%) HEIs spent less time on mammography teaching and relationship with clinical departments. Academic teaching ranged from 3-25 hours conducted with 5 course leaders to further explore themes being categorised and coded transcribed and evaluated using a thematic analysis, semi structured telephone interviews. These were analysed for trends which were further explored by questionnaire. Follow up telephone interviews were conducted with 5 course leaders to further explore themes. Academic teaching ranged from 3-25 hours over the 3 year course. Compared to other specialties 10(53%) HEIs sent students on mammography placements, 2(12%) sent females only. Range 2 days - 2 weeks. Influences included availability of expert teaching and relationship with clinical departments. Positive engagement appeared to encourage students into mammography posts

Conclusion: Variation in undergraduate exposure to mammography appears to influence student perception of the specialty. Students views should be sought to add validity to these findings.

8b.3 Changes in enhancing tumour volumes on magnetic resonance imaging in patients undergoing neoadjuvant chemotherapy for primary breast cancer – correlation with final pathological score Dr Shelley Waugh1, Dr Nazleen Muhammad Gowdh2, Dr Sarah Vinnicombe3

1 Ninewells Hospital, NHS Tayside, UK; 2 Aberdeen Medical School, University of Aberdeen, UK; 3 Kettering General Hospital, UK

Background: Currently complex breast cancer cases are evaluated by MRI.

MRI has high sensitivity but also has high cost, long waiting time, claustrophobia and some false positivity issues.

CESM offers combined high quality digital mammograms and contrast enhanced image similar to MRI performance for diagnosis and staging of breast cancer (Fallenberg at el 2014.). The purpose of this study was to establish the sensitivity of CESM.


47 patients underwent CESM, 25 also had Breast MRI. Inclusion criteria for CESM were P4/5 finding and age 40-70 years. Exclusion criteria were diabetes, nephropathy, allergy to contrast. CESM two-view images were obtained 2 minutes after the intravenous application of iodinated contrast.

Results: 47 histopathological results were compared to CESM predicted size.

The combined CESM average lesion size – 26.2mm, histopathological – 25.1mm. One false positive and one false negative CESM result.

CESM sensitivity 97%

CESM was more accurate size prediction in 10 cases than MRI.

MRI was more accurate in 7 cases.
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Poster abstracts

P1 Pathology and Positioning in mammography
Mrs Juliet Mazarura
NHS Birmingham, UK

Content: To demonstrate the importance of correct positioning techniques in mammography towards the diagnosis of breast pathology. To remind the breast imaging reporters of the importance of image quality when reporting mammographic images.

Introduction: Mammographic image quality can influence cancer detection rates and stage of detection (Yamgeng et al 2010). Taplin et al (2002) demonstrated that poor positioning was the main reason for low cancer detection rate and that the overall quality was also associated with increased interval cancers when cases of ductal carcinoma in situ were included. Achieving high quality mammograms may improve sensitivity and possibly reduce the false positive rate (Guertin et al 2014). Clinical images must meet the radiologists needs in order to serve the patient well (Cheeseman 2006). Factors affecting the clinical image quality of a mammogram are positioning of the breast, compression, sharpness, optimum exposure and contrast (Popli et al 2014). The mammographer must have advanced positioning and clinical skills to ensure that the area of concern is appropriately imaged, clearly seen and able to be characterized by the radiologist because what is missed or obscured on clinical images is not analyzed by the radiologist (Cheeseman 2006). A good quality mammogram demonstrates all the breast tissue with maximum image detail.

References:

P2 A pictorial review of imaging in the augmented breast
Miss Clare Alison, Dr Harriet Russell, Dr Rebecca Geach, Dr Lucinda Hobson, Dr Dagmar Godden, Dr Helen Massey, Professor lain Lyburn Thirlestaine Breast Centre, UK

Content: The augmented breast historically presents problems in mammography due to obscuration
of breast tissue by the implant. This means that potential abnormalities can be missed on standard mammography.

In March 2015, following recommendations of a national audit within the National Health Service Breast Screening Programme (NHSBSP), we changed our local protocols to include an Implant Displacement Cranio-Caudal (CC) view (historically known as the Elk Lund technique CC) for women presenting for mammography with breast augmentation. This was implemented in both the screening and symptomatic services. Where the displacement view is not possible due to the implant being immobile we take a true lateral view instead.

In our experience, in most cases, the images using the displacement technique demonstrate more of the anterior breast tissue than a standard CC view.

We present a pictorial review of six cases where the implant displacement view has demonstrated breast abnormalities otherwise obscured, or only partially imaged, on the standard mammographic views.

To conclude, our impression is that the implant displacement view is a useful technique for demonstrating abnormalities in the augmented breast.

**P3 Quantitative review of Cranio-Caudal (CC) images**

*Ms Sarah Dunn*  
**St Vincent Breast Screening, UK**

**Purpose:** To review the quality of 25 CC images produced by every mammographer within St. Vincent’s Breast Screen, part of Breast Screen Victoria. This review may highlight areas to improve the quality of these images. The CC image can often be overlooked as it is seen as the easier image to produce and less time and effort may be put into the production of this image. This study will investigate the quality of CC images at this service and potentially identify training needs.

**Method:** By using a comprehensive review system, 25 images from each mammographer currently screening regularly within the service are being assessed. These images are being reviewed with any common defects in the images being noted e.g.  
- Areas such as tissue thickness  
- Pectoral muscle to nipple distance measured (PNL)
  
- Image bias  
- Nipple in profile

A summary of the findings will be presented at the second quarter Continuing Education Meeting (CEM) in May 2016.

**Results:** As this research is still being undertaken there are no results so far.

**Conclusion:** Based on this research I will feed back to the Screening Mammographers in the St. Vincent's service current quality of their CC images and highlight any training needs.

**P4 Technical assessment of a novel compression paddle – impact on technical performance**

*Ms Katy Szczepura*, 1 Mr William Mairs2,  
*Ms Catherine Taylor*, 1 Dr Claire Mercer1

1Diagnostic Radiography, University of Salford;  
2Christie Medical Physics and Engineering, Christie’s Hospital

**Background:** A novel compression paddle which measures applied pressure (kPa) rather than compression force (N) has recently been made available. Research shows that the use of this paddle could reduce patient discomfort without adversely affecting radiation dose and image quality.

This work assessed the impact of using this paddle, when compared to a standard 18 cm x 24 cm rigid paddle, on equipment performance.

**Method:** All tests performed using a GE Senographe Essential Full Field Digital Mammography system (amorphous silicon detector). Standard tests were assessed following methods described in IPEM Report 89 and NHSBSP Report 0604.

**Results:** All safety checks found the new paddle functioned correctly, and there was no impact on light quality.

**Conclusion:** Performance of pressure based paddle is comparable with the standard rigid 18x24 paddle, with no appreciable adverse effect on either patient dose or image quality.

**References:**

**P5 Mammography compression values and the effect on recall rates to assessment review in the NHS Breast Screening Programme**

*Ms Deborah Watson*  
**West of Scotland Breast Screening Centre, UK**

**Purpose:** Optimal compression in digital mammography is crucial to enable accurate image interpretation and therefore appropriate visualisation of abnormalities.

There is conflicting evidence with regards to compression applied – to encourage screening adherence, minimal compression is desirable – however to obtain a diagnostically acceptable image, compression must be sufficient to avoid false-positive recalls.

This is a retrospective analysis of 150 women recalled to the review clinic for suspected abnormality in the form of Asymmetric Density, Parenchymal Distortion or composite breast tissue.

**Method:** Compressed breast thickness and compression applied during screening will be measured against that applied at assessment review. This would ascertain whether screening compression is optimal and a true abnormality exists at review, or if compression is suboptimal and creates unnecessary call-backs.

**Results:** It is our aim to review the data within our centre using inferential statistics in March 2016, report in April 2016 and re-visit the application of adequate compression through training sessions where appropriate.

**Conclusion:** As this audit is still in progress a final conclusion has not been reached however we expect it to demonstrate that poor compression leads to false positive recalls.

Depending on results, further investigation may include analysis of flexi versus fixed paddle mammography.

**References:**
1. Mercer C, Hogg P, Cassidy S, Denton E. Does an increase in compression force...
Mammography is the gold standard for breast screening and early detection of cancer. Women are discouraged to undergo screening due to pain experienced during compression hence detection of breast cancer is detected in the late stages despite availability of mammographic facilities. As a strategy to encourage women to come forward for screening, a study was done to determine the effects of reduced compression force on pain, anxiety and image quality using digital mammography (DBT). A prospective study was done using random sampling on 130 women with standard and reduced (50%,60%,70%) compression force. A validated questionnaire of 20 items on anxiety level and a verbal rating scale-4 on the pain level was given to subjects pre and post mammography. Cranio-caudal(CC) and medio-lateral oblique projection of both breast was done using the standard but only the cc projection of one breast was done with reduced compression. Two independent radiologists evaluated the images using image criteria score and BI-RADS. Standard compression showed a significantly higher score on pain and anxiety level compared to the reduced compression (p<0.05). Two independent radiologists scored the standard and reduced compression mammogram as equal with a score of 87.5% and 92.5% respectively using ICS scoring. The BI-RADS score showed only 10% difference between standard and reduced compression for both radiologist. Minimal compression force to immobilize the breast reduced anxiety and pain level without compromising the image quality hence women would be encouraged to undergo screening for early detection of breast cancer.

References:
13. Miller, D., V. Livingstone, and P. Heribson, Interventions for relieving the pain and
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Using this approach, the optimal pressure, based on breast detector footprint and thickness, has not been identified.

Methodological Details: Ethical approval was granted for 25 participants, 5 in each age range: 20-29, 30-39, 40-49, 50-59, 60-69 and exclusion criteria applied.

Following standard mammography guidelines/each participant had their breasts compressed for 4 views (RCC/LCC/RMLO/LMLO), commencing 5kPa, stepping through 1kPa increments to toleration limit(s). No x-ray images were acquired. For each pressure level, thickness and compression force were collated. The 4 views were repeated with a pressure mat placed on the image receptor (Xsensormat) footprint, compression force and thickness readouts were recorded for each pressure level.

Results: Proposed Analysis

Data will be normalised and gradients calculated for: pressure versus thickness, force and footprint. Gradients will be used to identify the optimum pressure range for future clinical trials.

No results will be included within this presentation.

References:

P10 Comparison of 2.3 & 5 mega pixel (MP) resolution monitors when detecting mammography image blurring

Mrs Rita Borgen1, Mrs Judith Kelly2, Mrs Beverly Scrage3, Professor Peter Hogg4, Mr Vincent Ma5, Mr Rob Abigail6

1 East Lancashire Breast Screening Unit, Burnley General Hospital, UK; 2 Countess of Chester Hospital, UK; 4 University of Salford, UK

Purpose/Background/Objectives: Image blurring in Full Field Digital Mammography (FFDM) is reported to be a problem within many UK breast screening units resulting in significant proportion of technical repeats/recalls [1]. Our study investigates monitors of differing pixel resolution, and whether there is a difference in blurring detection between a 2.3 MP technical review monitor and a 5 MP standard reporting monitor.

Methods: Simulation software was created to induce different magnitudes of blur on 20 artifact free FFDM screening images. 120 blurred and non-blurred images were randomized and displayed on the 2.3 and 5 MP monitors they were reviewed by 28 trained observers. Monitors were calibrated to the DICOM Grayscale Standard Display Function [2]. T-test was used to determine whether significant differences exist in blurring detection between the monitors.

Results: The blurring detection rate on the 2.3MP monitor for 0.2, 0.4, 0.6, 0.8 and 1 mm blur was 46, 59, 66, 77 and 78% respectively and on the 5MP monitor they were reviewed by 28 trained observers. Monitors were calibrated to the DICOM Grayscale Standard Display Function [2]. T-test was used to determine whether significant differences exist in blurring detection between the monitors.

Conclusions: The results of this study and knowing that monitors as low as 1 MP are used in clinical practice, we speculate that technical recall/repeat rates because of blurring could be reduced if higher resolution monitors are used for technical review at the time of imaging. Further work is needed to determine monitor minimum specification for visual blurring detection.

References:

P11 An evaluation of image grading at the Nottingham Breast Institute

Mrs Sarah Cardno1, Miss Faye Wigley2

1 Nottingham Breast Institute, UK; 2 Nottingham International Breast Education Centre, UK

Purpose of evaluation and objectives: To maximise cancer detection one of the mammographer’s professional commitments is to monitor and maintain high standards of image quality by engaging in a peer review programme.

PEER Review is part of the NHSBSP QA framework to ensure that standards of image quality are maintained and that individual performance is monitored to see if the standards of 75% good images are achieved. In order to accurately measure this, it is important that the criteria for image quality and grading are understood and the correct grades are given. As a training centre, Nottingham Breast Institute wanted to look at the differences in grading from individuals working at the unit, so that training could be given on the grading of images in order to standardize marking.

Specific image standards are well documented in practice however there is often some level of subjectivity which could result in inconsistencies of image quality.

The purpose of this exercise was to investigate differences in individual interpretation of grading criteria and how applying these differences could result in a false reflection of the actual standards produced by the department.

Method: Films were selected and identified as the test images. These images were then graded by the staff members of the NBI, which included both Assistant
Purpose/Background/Objectives: The CDMAM phantom is the basis of the image quality standards for digital mammography [2-6]. The ideal hotelling observer theory [1] states that it is possible to calculate the expected observer response for a detector based on measurements of a system’s modulation transfer function (sMTF) and noise power spectrum (sNPS). This could be used to produce routine measurements which would overcome the known differences between CDMAM phantoms.

Methods: All the measurements are performed during routine testing. The sNPS is generated from images of a 5mm thick uniform stack of perspex imaged under AEC, using standard CDMAM exposure conditions. The sMTF is generated using a tungsten edge at 2.5mm above the breast support table sandwiched in 5cm of perspex, with the grid and compression paddle in place. Analysis of images was carried out using OBJ_IQ and the CDMAM predictions were calculated using in house software. Twelve mammography systems from four different manufacturers were tested on a number of visits, to establish short and long term consistency of the measurements.

Results: Our results have been compared with those of the CDMAM software and were found in good agreement, within the calculated errors, for all systems. The relative contrast at a given spatial frequency is called the Modulation Transfer Function (MTF). Calculating this number gives a quantitative result of the detectors resolution properties. A quantitative measurement would remove subjectivity in such a measurement. MTF can be calculated using a resolution grating. The ability to demonstrate representative calculation on biopsy specimen radiographs is crucial to ensure adequate tissue sampling when assessing calcification. We carried out a prospective review of 10 patients to evaluate and compare the visibility of calcification on specimen x-rays using both the Kubtec and Faxitron cabinet x-ray imaging systems. The images were reviewed by 7 clinicians who noted the following for each case: the number of calcium flecks seen on each of the cabinet monitors and the PACS monitor the contrast on the monitors before

References:

P15 Audit of the visibility of calcification seen on specimen x-rays using the Kubtec and Faxitron cabinet x-ray imaging systems

Ms Anusha Shrestha, Dr Catherine Morris, Dr Louise Wilkinson, Dr Rosalind Given-Wilson, Ms Mary Sinclair, Ms Charul Patel, Ms Elizabeth Muscat, Dr Basrul Haludin, Dr Wing Mok

1 Royal Free NHS Foundation Trust, UK; 2Imperial College Healthcare NHS Trust, UK

Purpose/Background/Objectives: The relative contrast at a given spatial frequency is called the Modulation Transfer Function (MTF). Calculating this number gives a quantitative result of the detectors resolution properties. A quantitative measurement would remove subjectivity in such a measurement. MTF can be calculated using a resolution grating. The ability to demonstrate representative calculation on biopsy specimen radiographs is crucial to ensure adequate tissue sampling when assessing calcification. We carried out a prospective review of 10 patients to evaluate and compare the visibility of calcification on specimen x-rays using both the Kubtec (Xpert 20) and Faxitron (MX-20) cabinet x-ray imaging systems.

Methods: The specimens of 10 patients undergoing biopsy of calcification were imaged in both the Kubtec and Faxitron. The images were reviewed by 7 clinicians who noted the following for each case: the number of calcium flecks seen on each of the cabinet monitors and the PACS monitor the contrast on the monitors before
and after windowing and which cabinet x-ray system gave best visibility of the calcium specks overall. For the results, all 7 clinicians were summed for all 10 patients.

**Results:** Kubtec and Faxitron showed 791 and 947 flecks on cabinet monitors, and 839 and 983 flecks on PACS monitor respectively. Better contrast pre-windowing was reported on Kubtec in 51 images. Faxitron in 14 images but was equal in 5 images. Better contrast post-windowing was reported on Kubtec in 4 images, Faxitron in 44 images and but was equal in 22 images. Overall calcium visibility was reported as best on Kubtec in 3 images, Faxitron in 49 images and equaled in 18 images.

**Conclusion:** Overall, with windowing, Faxitron images gave better visibility of calcium flecks than Kubtec images, both on the cabinet monitors and on PACS. However, the Kubtec images showed better contrast prior to windowing.

**P16 The detection of visual blurring in 1MP and 5MP monitors within mammography clinical practice**  
Mrs Lyndsay Kinnear1, Dr Claire Mercer2  
1University Hospital of South Manchester, UK; 2University of Salford, UK

**Background:** Over 12 months within a UK breast screening service the number of technical recalls, due to image blurring, was high. 40,954 clients imaged within annum 0.88% recalls, 1.16% repeats, 2.04% overall. Over half of clients recalled of cancer were repeated due to image blurring. Highlighting a number of ‘blurred’ images were not being identified at the first attempt. An informed decision will be made if the observer is not confident that there is no cancer present.

**Aim:** To identify if the 1MP acquisition monitor (reviewing mammograms) was adequate to identify blurring. Highlighting a number of ‘blurred’ images were not being identified at the first attempt. An informed decision will be made if the observer is not confident that there is no cancer present.

**Methods:**

- **DataSet 1:** 50 anonymised mammogram images: 35 images categorised as blurred (technically recalled) and 15 diagnostic images (not technically recalled), 2 images readers classified these images intra and Inter-observer variability measured (Cohen’s Kappa).
- **DataSet 2:** 100 anonymised mammogram images: 70 categorised as blurred, 30 categorised as not blurred (not technically recalled). 2 image readers and 4 practitioners classified these images twice with a 1 week interval on both 1MP and 5MP monitors.

**Results:**

- **DataSet 1:** Kappa: 0.70
- **DataSet 2:** Observers 1 and 2 displayed highest performance on both the 5MP (80, 82, 81 classified correctly) and 1MP (69, 76, 63, 72 classified correctly). Observer 6 performed well on both monitors, in particular 5MP (79, 83 classified correctly). Observers 3, 4 and 5 produced similar performance levels on both monitors (1MP: 60, 5MP: 53).

1MP: Four of the six observers’ level of agreement reduced between 1st and 2nd reads

5MP: All but one observer achieved good agreement between 1st and 2nd reads

**Conclusion:** Overall the ability to detect image blurring clinically was improved on the 5MP monitor.
Table 1. Uptake rates 2013/2014

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
<th>2014</th>
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<tbody>
<tr>
<td>New initial</td>
<td>68.1%</td>
<td>69.0%</td>
</tr>
<tr>
<td>Previous round non attender</td>
<td>11.3%</td>
<td>12.9%</td>
</tr>
<tr>
<td>Overall Initial</td>
<td>41.2%</td>
<td>49.7%</td>
</tr>
<tr>
<td>Subsequent</td>
<td>85.7%</td>
<td>88.8%</td>
</tr>
<tr>
<td>Overall</td>
<td>70.2%</td>
<td>76.5%</td>
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</table>

Conclusion: The combination of removal of artefactual uptake decline and measures to address real decline have resulted in a rapid improvement in uptake in all categories of invitee uptake monitoring continues.

P21 Nudging women toward their breastscreen
Ms Vicki Pridmore
Breastscreen Victoria, Australia

Purpose: Using behavioural economics (BE), a series of two-arm randomized control trials tested the content of breast screening program invitations on uptake by:

- Responders to the first screening invitation
- Long term non-responders

Background: BreastScreen Victoria (BSV) screens 250,000 women annually. 20,000 women ignore their first invitation.

Methods: The UK Nudge Unit’s successful application of BE to increase tax compliance prompted the testing of screening invitations using BE principles, to engage ‘missing’ women.

Results: For the cost of an iPad and some considered changes to the invitation letter, almost 2,000 additional women booked their first appointment during the trial period.

Conclusion: This research will be used to make recommendations for future informed choice and personalised risk communication decisions.

References:

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Symposium Mammographicum Conference 2016

The overall uptake rate increased by 6.3% uptakes by initial/subsequent also increased (Table 1).

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Conclusions: The nudges are working with statistically significant increases as evidence. Once included in business as usual, the estimated impact is 4000+ additional women screening annually.

BSV is now trialling the same approach on women returning for subsequent screening rounds.

P22 Could a pictorial breast screening invitation help to increase uptake to breast screening in a multi ethnic population?
Ms Karen Wren
University Hospitals of Coventry and Warwickshire

Study Aim: To investigate the viability of a pictorial breast screening invitation producing a higher uptake for breast screening amongst a multi ethnic population when used in conjunction with the national standard invitation. The effectiveness will be judged by the effect it had on previous non-attenders (PNAs).

Design: A non-probability sampling technique with a purposively selecting homogenous population from three preselected GP practices serving multi-ethnic populations.

Need for Study: The effectiveness of any screening programme is dependent on high acceptance. Low rates of coverage by certain populations would lead to health inequalities. Studies have established that screening coverage is not uniform across the population and that women from Black Minority Ethnic (BME) communities have lower uptakes to breast screening. Language has been cited as predominately barrier.

Methods: A modification to BSV IT infrastructure enabled rolling randomised trials to test letter variations against a control letter allowing BSV to confidently include (statistically significant) changes into business as usual.

Results: For the cost of an iPad and some considered changes to the invitation letter, almost 2,000 additional women booked their first appointment during the trial period.

Conclusions: The participation rate of BSS has remained at poor 10% since 2005, although the overall participation rate has increased from 29.7% to 39.6%, as most of these take place outside of BSS. Amongst the cancers diagnosed at our assessment centre, some denied the presence of a lump at screening only to admit to it at assessment. This may be due to the heavy subsidy of screening compared to diagnostic mammography. There are also a number of women who subsequently either decline biopsy for a suspicious lesion or default from definitive surgery after a biopsy result of cancer. These numbers would adversely affect the overall mortality benefit for apparent screen detected cancers. More has to be done about patient education to achieve any measure of success of BSS.

References:

P24 What are your statistics? – An informative guide for film readers in the NHS breast screening programme
Mrs Monica Howard, Dr Eleanor Comford
Nottingham Breast Institute, UK

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Purpose: A mammography film reader’s performance is identified and calculated using a range of assessment tools. They give the reader useful information to check and reflect on performance as an individual and in comparison to their peers.

We receive information from two main sources.

1. The National competency based assessment tool, PERFORMS, (personal performance in mammography) comprises of 60 difficult and challenging test case sets where a reader is assessed against the opinions of an expert panel of radiologists. Completion of this is mandatory and undertaken each year.

2. The NBSS computer system enables production of film reading statistics. In our region these are circulated to all film readers’ annually.

New film readers are faced with a wealth of statistical information which can initially be confusing.

But, what do the assessment statistics show and how can we use this information?

Methods: Using innovative illustrations this poster will provide an explanation of the terminology used, provide a formulae for the calculations and explain how this information relates to the NHISBSP QA standards.

Conclusions: This poster presentation aims to provide in a simple way an educational guide and reference for the mammography film reader. It will identify the assessment tools that measure a film reader’s performance and explain why and how they are calculated. In doing so the film reader can better understand his/her statistics and use them in a constructive way to promote continued professional development.

References:

P25 Review of Evidence to Support Arbitration within Breast Screening: A Narrative Synthesis

1Centre for Technology Enabled Health Research, UK; 2University Hospitals Coventry and Warwickshire NHS Trust, UK

Background: Double reading of mammography has been widely recommended to increase cancer detection rates(1). However, when discordance between readers occurs, arbitration or consensus is required.

Primary objective – To identify evidence base to support effectiveness of different arbitration processes in mammography reporting.

Secondary objectives - To identify evidence relating to impact of (i) experience, (ii) reporting volumes, and (iii) education/training on arbitrator performance.


Data extraction: Total 520 abstracts retrieved screened independently by two reviewers against inclusion criteria. Any disagreements resolved by third reviewer. Full text of 29 articles retrieved and independently assessed. Data extraction form used to collate key data relevant to objectives listed above.

Quality assessment: Two reviewers independently assessed quality of included studies using standardised quality appraisal tools, appropriate to study design. Third reviewer consulted to resolve any discrepancies.

Results: Systematic synthesis provides a narrative summary of main concepts and relationships within and between studies. Emerging themes relate to evidence on cancer detection rates, use of computer-aided detection and reading protocols. Evidence appears to be lacking regarding optimum arbitration process and attributes of personnel undertaking the task.

Final narrative synthesis to be complete June 2016.

References:
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P28 The peripheral glandular zone – an important area for mammographic review
Dr John Waugh
Monash Breastscreen, Monash University, Australia

Background: Small invasive cancers may be difficult to perceive for a wide range of reasons, during a routine mammographic screening session. Reader fatigue and visual distraction by dominant benign lesions are just two of the recognised possibilities.

At the interphase between the denser fibro-glandular elements and the retro-glandular adipose tissue the mammographic features are particularly variable. This peripheral glandular zone (PGZ) has been previously identified as the site of a significant number of cancers occurring in women under the age of fifty.

This study is a review of missed invasive cancers (referred to as One Reader CAs), by location and their mammographic characteristics. Specifically, the PGZ was the location of 74.3% of invasive carcinomas missed by one experienced Breastscreen Reader.

• Less than a quarter of One Reader CAs were located in the traditional areas of Mammographic Review
• Cancers detected by architectural distortion (alone) in the PGZ are the most challenging for readers (Table 3)
• Optimising detection of clinically significant cancers less than 20 mm diameter is a primary screening goal, and is associated with a 5 year of up to 98%.
• The Periphery of the fibro-glandular tissue is therefore an important Area of Review as readers complete their visual search of a screening mammogram.

Conclusions:
• The PGZ was the location of 74.3% of invasive carcinomas missed by one experienced Breastscreen Reader.
• The PGZ was the location of 74.3% of invasive carcinomas missed by one experienced Breastscreen Reader.

References:

Table 3: Recall category of PGZ One Reader CAs

<table>
<thead>
<tr>
<th>Recall category of PGZ One Reader CAs</th>
<th>Number n = 104</th>
<th>Fraction % of total</th>
<th>Mean size at surgery (mm)</th>
<th>Median size at surgery (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass</td>
<td>31</td>
<td>29.8</td>
<td>21.6</td>
<td>12</td>
</tr>
<tr>
<td>Asymmetric density</td>
<td>22</td>
<td>21.2</td>
<td>19.4</td>
<td>18</td>
</tr>
<tr>
<td>Architectural distortion</td>
<td>44</td>
<td>42.3</td>
<td>15.2</td>
<td>14.5</td>
</tr>
<tr>
<td>Calcification</td>
<td>7</td>
<td>6.7</td>
<td>13.6</td>
<td>5</td>
</tr>
<tr>
<td>Other (Non PGZ)</td>
<td>104</td>
<td>100</td>
<td>18</td>
<td>14</td>
</tr>
</tbody>
</table>

P29 Performance measures from the first four years of the Ontario High Risk Breast Screening Program
Dr Anna Chiarelli1, Dr Derek Muradali1, Kristina Blackmore2, Kristen O’Brien1, Vicky Majpruz1, Dr Linda Rabeneck1

Background: As regional review is problematic a 'Clinical Override' (C/O) is any significant history or observation, as specified in our Quality Manual [1], noted by the mammographer at the time of screening. A retrospective study was undertaken of C/O cases from a twelve month period (January – December 2014) within a NHSBSP Screening Centre. Number of assessment clinic (AC) appointments filled by C/O cases, rate of malignancy and mammographic presentations of these malignancies was investigated.

Method: Relevant data was extrapalated from NBSS number of women screened, number recalled to AC, details of C/O cases and outcomes.

Results: Three main themes were identified changes in practice and improved technologies, process errors and influences on the decision making process. Discussion points included the influence of improved techniques (equipment, process and practice) and the influences on decision making processes such as radiographic factors, errors in judgement, internal and external distractions and the rationalisation processes used to reach a conclusion. Timely reminders included review areas, quality assessment images, disease process and correlation of influencing factors.

Conclusion: The exercise was a valuable reflective process which encouraged debate and sharing of ideas. Action points were agreed and the key learning points disseminated to the wider team.

P31 Twelve month analysis of clinical override cases in a NHSBSP Screening Centre
Miss Ciara Dowling, Dr Dylan Wynn-Jones, Dr Jonathan Davies
Breast Test Wales, UK

Purpose/Background/Objectives: A 'Clinical Override' (C/O) is any significant history or observation, as specified in our Quality Manual [1], noted by the mammographer at the time of screening. A retrospective study was undertaken of C/O cases from a twelve month period (January – December 2014) within a NHSBSP Screening Centre. Number of assessment clinic (AC) appointments filled by C/O cases, rate of malignancy and mammographic presentations of these malignancies was investigated.

Method: Relevant data was extrapalated from NBSS number of women screened, number recalled to AC, details of C/O cases and outcomes.

Table 1: Location of One Reader CAs

<table>
<thead>
<tr>
<th>Location of One Reader CAs</th>
<th>Number n= 140</th>
<th>Percentage Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>PGZ</td>
<td>104</td>
<td>74.3</td>
</tr>
<tr>
<td>Other (Non PGZ)</td>
<td>36</td>
<td>25.7</td>
</tr>
<tr>
<td>Total</td>
<td>140</td>
<td>100</td>
</tr>
</tbody>
</table>

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Results: 116 C/O cases were recorded from 32,344 women screened in 2014. 55% (n=64) of C/O cases were recalled to AC, the remaining 45% were returned to routine recall. Of the cases recalled 24 had a mammographic abnormality on screening mammography which would have generated a recall to AC regardless of C/O. 13 malignancies were detected from these 24 cases. Of the 40 cases recalled with no mammographic abnormality on screening mammography one malignancy and one benign papilloma were detected. In both of these cases the C/O symptom was ‘lump’ and mammography depicted dense glandular parenchyma pattern.

Conclusions: This audit confirms that when a malignancy is present in C/O cases it is usually evident on screening mammography. In addition, this audit demonstrates and supports our clinical practice of having a lower threshold for recall to AC for C/O cases of ‘lump’ when there is dense parenchyma pattern.


P32 A multivariable analysis of survival in screened and symptomatic patients
Mr Richard Harland
Wrightington, Wigan & Leigh NHS Foundation Trust, UK; +2 Ramsay Euxton Hall Hospital, UK

Objective: To answer the question ‘Is a person with a screen detected cancer more or less likely to die than a person who presented symptomatically?’

Method: I reviewed records of 3210 patients who presented through the symptomatic clinic (1808) or breast screening program (1402) with new or recurrent breast cancer between September 1991 and April 2012. Patients referred from screening to their local units were not included. Estimated ascertainment was 75-82% of all patients treated in the period. 806 patients had died. Median censored survival was 8.13 years (range 0-23.65). Iterative Cox regression analysis was used to determine the hazard of death from any cause, with screen detection as one of several explanatory variables (Table). Variables were omitted where p>0.15. The model allowed for decreasing survival towards extremes of age. Private medical care was used as a surrogate for high socioeconomic class.

Table: Results of regression analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Hazard ratio</th>
<th>95% CI</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screen detection</td>
<td>0.65</td>
<td>0.54-0.78</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Non invasive only</td>
<td>0.48</td>
<td>0.33-0.69</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Invasive size &lt;16mm</td>
<td>0.77</td>
<td>0.64-0.89</td>
<td>0.0009</td>
</tr>
<tr>
<td>Invasive grade 1</td>
<td>0.74</td>
<td>0.57-0.95</td>
<td>0.0205</td>
</tr>
<tr>
<td>Nodes involved</td>
<td>1.06 per node</td>
<td>1.05-1.08</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Stage III or IV</td>
<td>1.0</td>
<td>2.48-3.62</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Oestrogen receptor -ve</td>
<td>1.30</td>
<td>1.07-1.58</td>
<td>0.0079</td>
</tr>
<tr>
<td>Progesterone receptor +ve</td>
<td>0.78</td>
<td>0.66-0.94</td>
<td>0.007</td>
</tr>
<tr>
<td>Adjuvant aromatase inhibitor</td>
<td>0.59</td>
<td>0.48-0.74</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Adjuvant taxane</td>
<td>0.49</td>
<td>0.35-0.67</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Age (Abs(age-53))</td>
<td>1.04 per year</td>
<td>1.03-1.05</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Private care</td>
<td>0.56</td>
<td>0.43-0.74</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

Conclusion: Allowing for prognostic factors and treatment, detection by screening was associated with a 35% reduction in hazard of death compared to symptomatic presentation.


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P33 Characteristics of metastatic breast cancer and the implications for breast screening
Dr Michael Crotchy-Contains
Macclesfield District General Hospital, UK

Objectives: 1. To define characteristics of lethal breast cancer.
2. Compare with screen detected cancers.
3. Develop strategies to maximise screen detection of aggressive cancers within the resources available.

Methods: Oncology imaging referrals between July 2008 and July 2015 were reviewed and those with metastatic disease identified from the clinical information provided. Data collected included age at presentation, screening history, histological characteristics and receptor status of the primary cancer. Comparative data was obtained from a separate audit of screen detected cancers from January 2014 to June 2015.

As this was a retrospective audit, ethical approval was not sought.

Statistical comparison of mean tumour size in the two groups was performed with a two sample t-test.

Results: 204 women with metastatic breast cancer were identified. Mean age at presentation was 56.5 years. 40% occurring between the ages of 48-59. Adverse features predominated in women with metastatic breast cancer 50% were grade 3 and 41% grade 2. A strong correlation with high Ki67 proliferation index was noted 82% showed a Ki67 greater than 20.

Of 247 screen detected cancers, a total of 103 cases showed at least one adverse prognostic indicator (41%).

The mean size of tumours showing at least one poor prognostic indicator was 34mmm in the metastatic group and 17mm in the screening group (p<0.0001).

Conclusions: Breast screening does have the potential to detect biologically adverse breast cancers at an earlier stage. Intensified screening at the lower age range of the programme would appear likely to give the greatest benefit.

11. Burton H et al. Public health implications from COGS and potential for risk stratification and screening. Nat Genet vol. 45 no. 4 April 2013. doi:10.1038/ng.2582

P34 Impact of staging computerised tomography scan in the management of locoregional recurrence of breast cancer
Mr Andrew Lofallah, Mr James Ball, Dr Bhavani Rangabashyam, Mr Rajgopal Achuthan, Dr Sredevi Kumar
Leeds Breast Unit, Leeds Teaching Hospitals NHS Trust, UK

Objectives: To determine the impact of staging computerised tomography (CT) scan in the management of locoregional breast cancer recurrences.

Method: Patients presenting to Leeds Hospitals Trust with locoregional breast cancer recurrence between
January 2010 and December 2014 were identified using electronic patient records. Those with complete clinico-pathological details and staging CT at the time of recurrence (breast, chest wall or ipsilateral axilla to primary site) were included. Cases were stratified as: true positive (TP) = unequivocal metastases on CT report, histopathological confirmation of metastases had been obtained or increase in size on interval (3 month) scan demonstrated true negative (TN) = still metastases free at 6 months false positive (FP) = spontaneous resolution of abnormality on 3 month interval scan false negative (FN) = detection of lesions on interval scans within 6 months.

Results: 81 patients were included. The average time between primary diagnoses to recurrence was 4.91 years (0-42). Most were grade 3 cancers (n=38) and node positive (n=65). 37 chest wall recurrences, 31 breast recurrences and 13 axillary recurrences were identified. 36/43 TN cases and 5/28 TP cases had surgery. 5 TP cases had small volume disease only, 6/7 FN cases (8.6%) had surgery inappropriately. There were no adverse impacts in the 3 FP cases. The sensitivity, specificity, positive and negative predictive values for staging CT were 80.00%, 93.48%, 90.32% and 86.00% respectively.

Conclusion: This study suggests that staging CT is a valuable stratifying tool that enables appropriate management in the vast majority of locoregional recurrences.

P35 Should shearwave elastography findings influence management of breast abnormalities in the one stop clinic?
Dr Sylvie Flais, Dr Anwen Newland
London North West Healthcare NHS Trust, UK

Background: Preliminary findings about shearwave elastography (SE) associated with ultrasound have been promising in breast imaging. We have used it as an additional imaging tool in the one stop clinic since our department purchased a GE LOGIQ E9 US machine in April 2014. SE was not done in all cases as only one probe was shared between 4 rooms. We present some interesting cases and discuss the impact as only one probe was shared between 4 rooms. We machine in April 2014. SE was not done in all cases as an additional imaging tool in the one stop clinic.

Method: We prospectively collected cases for which SE was immediately followed by biopsy. We present how the addition of SE may have altered patient management.

Results: We demonstrate cases of haematoma, fibroadenoma, diabetic mastopathy, granulomatous mastitis, local recurrence of breast carcinoma, B3 atypia and low grade DCIS demonstrated only on ultrasound. We show how the addition of SE may have altered patient management.

Conclusion: Although SE may be a useful tool, our experience demonstrates it is of limited value in deciding whether biopsy is necessary in the context of the one stop clinic.

P36 Audit of biopsy results of U3 masses
Dr Sylvie Flais, Dr Anwen Newland, Dr Nadia Uraiqat
London North West Healthcare NHS Trust, UK

Background: The UK U3 grading is considered an equivalent of BI-RADS 4a and 4b. The malignancy rate in the BI-RADS classification is better established than for the UK classification. The aim of the audit was to correlate the ultrasound grading with final histology to see whether our results were in line with expectations and review unexpected findings.

Method: All biopsies of U3 masses between November 2013 and January 2016 were prospectively recorded, along with age and histology result (core biopsy for most cases, post surgical if performed).

Results: 196 U3 masses were biopsied. Final histology was B2 in 77% (142 cases), B3 in 14% (28 cases) and B5 in 13% (16 cases). Imaging was reviewed in all B3- B5 cases to assess the accuracy of the initial grading. There was no significant disagreement, although in 2 cases the U3 grading seemed to have been influenced by the young age of the patients, and the findings could have been graded U4.

Conclusion: The result of our audit supports the U3 category being equivalent to the BI-RADS 4a grading, the expected rate for malignancy appearing lower than in the BI-RADS 4b sub category.

P37 Is a mammogram following cyst aspiration always required in the screening assessment clinic?
Mrs Ruth Fry, Dr Karen Lilton, Dr Nicholas Ridley
Wiltshire Breast Screening Unit, UK

Background: Post aspiration mammography following cyst aspiration.

Method: We prospectively collected cases for which SE was immediately followed by biopsy. We present cases of radio-clinical discrepancy, mammography ultrasound discrepancy, and finally cases which for the final decision was influenced by the elastography findings (including second look ultrasound after MRI).

Results: We demonstrate cases of haematoma, fibroadenoma, diabetic mastopathy, granulomatous mastitis, local recurrence of breast carcinoma, B3 atypia and low grade DCIS demonstrated only on ultrasound. We show how the addition of SE may have altered patient management.

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P37 Is a mammogram following cyst aspiration always required in the screening assessment clinic?
Mrs Ruth Fry, Dr Karen Lilton, Dr Nicholas Ridley
Wiltshire Breast Screening Unit, UK
experience with radiological, surgical and pathological correlation.

**Method:** Over 11-months, 19 patients had marker clips inserted into C5 metastatic axillary/intramammary nodes under ultrasound guidance either before or early after starting NAC. A specimen radiograph was performed following excision to identify the clip and pathological results analysed.

**Results:** All clips were successfully deployed. Ultrasound visualization at interval follow up was variable. 1 patient did not have surgery (metastases), 7 are still receiving NAC. 9 underwent SLNB (7/9 pCR) and 2 axillary lymph node dissection (ALND) (2/2 pCR). The clipped node was the SLN in only 2/9 cases and obtained at further targeted dissection in 6/9.

**Conclusion:** Preoperative marking of positive axillary nodes prior to NAC is feasible, demands a multidisciplinary team approach and may prevent the need for ALND. The low rate of clip presence within the SLN suggests targeted dissection will reduce false negative rates.

**References:**

**P40 Audit of marker clip migration**

**Dr Ying Chen, Dr Neil Upadhyay**

**Charing Cross Hospital, Imperial College Healthcare NHS Trust, UK**

**Purpose/Background/Objectives:** Marker clips are used to localise the biopsy site following stereotactic vacuum-assisted breast biopsy for suspicious microcalcifications to enable future wire localisation if atypical or malignant histology warrants excision and must remain accurately at the biopsy site following deployment. From our experience, clip displacement from the site of deployment is not an uncommon problem and the clip may migrate immediately after biopsy, or later on follow-up mammograms.

**Methods:** Our criteria is based on the NHS breast screening programme guidance (2009). The standard we used was that >95% of clip markers should be within 10mm of the target in any mammographic plane. Data was collected from a period of 12 months on patients who had clip deployment at the intended site after stereotactic biopsy for suspicious microcalcification, and had a planned stereotactic wire localisation.

**Results:** A total of 24 patients had a follow-up mammogram prior stereotactic wire localisation and 21/24 had immediate mammograms post biopsy, 6/21 immediate mammograms and 10/24 follow-up mammograms demonstrated clip-to-biopsy site displacement rates of 29% and 42% respectively. 2/24 patients showed adequate clip placement on initial single view mammogram but demonstrated clip migration on follow-up mammography.

**Conclusion:** The accordan effect, fatty breasts, post biopsy haematoma and resorption of air all affect the accuracy of clip location. We recommend: (a) slow release of the springing action of the compression paddle to minimise the accordan effect b) two-view mammograms to be performed immediately post biopsy.²²

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Special views were considered beneficial where they increased specificity and allowed an equivocal diagnosis to be upgraded to probable or definitive. The upgraded diagnosis had also to be consistent with any subsequent interventional diagnosis.

Results: 151 women were assessed over 2 months. Magnification views were not found to alter the radiologic opinion for any of the women assessed but increased specificity was achieved with piddle views for 36% of cases. Three of these women had cyst aspiration and seven had no intervention.

Conclusions: Changes in practice have possibly led to the reduction in usefulness of magnification views. While these were the only views that clearly aided visualisation, calcification is generally routinely biopsied.

Increased specificity was achieved with piddle views (36%), but not to the same extent as in 1991, with asymmetries and distortions realising most benefit.


P44 Marker placement accuracy following stereotactic-guided biopsy Mrs Judith Kelly, Mrs Andrea Herbert, Mrs Sara Millington Countess of Chester Hospital NHS Foundation Trust, UK

Background: It is common practice within breast imaging units following stereotactic-guided biopsy to deploy gel markers for future biopsy site location. Post insertion mammograms are performed to verify placement accuracy. We noticed some markers were not demonstrated in the desired position on occasion. Published literature discusses the ‘accordian’ hypothesis effect whereby the marker moves along a biopsy track following compression release.

Purpose: We conducted an audit to: ascertain how many markers appeared to be inaccurately sited following insertion after stereotactic-guided biopsy: marker type more prone to inaccuracy: analyse if any trends apparent, for example – 14g or 10g, breast type, patient biopsy position.

Method: No current standard marker accuracy guidance published. Royal College of Radiologists standard for wire localisation proximity to lesion was utilised 1. All 144 stereotactic-guided biopsies with marker placement from 2013-2015. Four different markers were used following either 14g, 10g vacora or EnCor vacuum-assisted biopsy. These included two types of ‘SenoMark,’1 ‘EnCor’ and ‘Hydromark.’ Post marker insertion mammograms were performed and marker proximity to lesion measured. Data regarding breast density BI-RADS score, abnormality type, location, compression thickness reading and Newtons of compression force was recorded for each case.

Results: Three of the markers showed an inaccuracy rate ranging from 37-48%. The ‘Hydromark’ proved marginally better, demonstrating an inaccuracy rate of only 6%.

Conclusion: Findings from this audit suggest ideally exclusive use of the HydroMARK following stereotactic-guided biopsies (10/14g) in the immediate future. However, these are not compatible with the ‘EnCor’ biopsy system.


P45 Surveillance of women at higher risk of developing breast cancer - Our first year Ms Celia Lucas, Dr Diane Johnston Chelmsford and Colchester Breast Screening Service, UK

Background: Chelmsford and Colchester Breast Screening Service was commissioned in September 2014 to provide surveillance of women at increased risk of breast cancer. This High Risk Screening programme was established nationally to provide a consistent and high-quality service. We present our approach and the results from our first year.

Method: We closely follow the published imaging protocol according to age and risk factors. Available mammograms are reviewed annually on the basis of background density to confirm the individual’s imaging protocol over the age of fifty. All women requiring an MRI scan are invited to the department for an initial pre-imaging counselling appointment whilst those receiving only mammograms have a telephone consultation.

Results: 62 women were imaged in the first year. Of the MRI only group 2 women were recalled: one required an MRI guided biopsy (benign), the other an early imaging recall. Of women receiving MRI plus mammography 5 were recalled: 3 were positive for cancer and 2 were recalled early resulting in return to annual surveillance. In the mammogram only group 2 cancers were diagnosed.

Conclusion: Inviting women for pre-imaging counselling has aided compliance for MRI with no abandoned studies as compared to our symptomatic population. Verbal feedback indicates appreciation of the initial consultation as it aids understanding and preparation for imaging and results. Due to the high number of cancers diagnosed in our first year we were unsurprised to miss the minimum recommended recall rate standard.²

References: 1. NHSBSP Publication 74. Protocols for the surveillance of women at higher risk of developing breast cancer. Version 4 June 2013 2. NHSBSP Publication 68. Technical guidelines for magnetic resonance imaging for the surveillance of women at higher risk of developing breast cancer December 2012

P46 Clinical evaluation of multimodal ultrasound tomography for breast imaging Dr Serafino Forte, Dr Isabella Zbinden, Dr Sophie Dellas, Dr Bram Stiletjes, Professor Georg Bongartz Clinic of Radiology and Nuclear Medicine, University of Basel Hospital, Switzerland

Purpose: We evaluated the practical implementation of multimodal ultrasound tomography (MUT) for breast imaging in a clinical setting. Twenty-four healthy volunteers and thirty-two patients referred for breast imaging were scanned and exam comfort recorded.

Methods: We evaluated feasibility, investigation time, exam comfort of MUT compared to X-ray mammography (MG, n = 31), handeld ultrasound (US, n = 27), and magnetic resonance imaging (MRI, n = 4) in thirty-two patients.

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Results: The MUT-exam was well tolerated by all 56 participants (24 volunteers and 32 patients). 55 bilateral exams were uneventful. One exam had to be repeated due to technical problems. MUT was well accepted and patient comfort (ranging from 1 to 10) was comparable to US (1.6 vs 1.5) and clearly better than MG (6.3). Total in room time was 38 +/- 6 min. 51 participants reported no discomfort (93%), four reported slight discomfort (7%). Four patients had a finding. The diagnostic biopsies showed tree malignant one benign, which were detected and correctly differentiated by MUT.

Conclusions: MUT is feasible in a clinical setting considering technical feasibility, examination time and patient comfort. Initial diagnostic findings warrant further studies in the context of possible alternative screening tool for breast cancer.

P47 Use of radioiodine seeds in localising impalpable breast cancer – how it affects surgical planning?
Dr Sue Wei Tan, Dr Carol Ellen Holmes, Dr Nerys Forester, Dr Ndhi Sibal
Royal Victoria Infirmary, UK

Newcastle is the first unit in the UK to offer radioiodine seed localisation of impalpable breast cancer. This technique has many benefits over conventional wire localisation, in particular, improved patient experience and workflow dynamics.

We present a small series of patients undergoing seed localisation in whom a second tumour was identified at the time of seed placement, without any effect on their planned surgical date.

Since September 2014 we have had over 150 radioiodine seeds, inserted 7 to 14 days prior to surgery due to technical problems. MUT was well accepted and patient comfort (ranging from 1 to 10) was comparable to US (1.6 vs 1.5) and clearly better than MG (6.3). Total in room time was 38 +/- 6 min. 51 participants reported no discomfort (93%), four reported slight discomfort (7%). Four patients had a finding. The diagnostic biopsies showed tree malignant one benign, which were detected and correctly differentiated by MUT.

Conclusions: MUT is feasible in a clinical setting considering technical feasibility, examination time and patient comfort. Initial diagnostic findings warrant further studies in the context of possible alternative screening tool for breast cancer.
Background: Tomosynthesis (DBT) creates a 3D picture of the breast, potentially providing more diagnostic information. Studies have shown it may offer improved screening, potentially identifying disease not seen on standard mammography. We decided to evaluate the performance of tomosynthesis in the setting of mammographically subtle/occult tumours identified by MRI.

Methods: Between 2014 and 2015, all patients undergoing 2nd look ultrasound following MRI for previously unidentified lesions, underwent DBT before USS. DBT analysed to identify areas of disease by two independent radiologists, without knowledge of prior outcomes. All lesions seen on MRI had confirmed pathology after USS and biopsy.

Results: 30 patients had DBT following MRI. The majority of cases had dense breast parenchyma. All had one or more lesions present. Tumour sizes ranged from 5-40mm. There were 9 benign cases and 21 cancer cases. Of 21 cancer cases 9 cases identified by both readers, 5 cases missed by both readers, 4 cases index cancer identified but both missed extra cancer foci and 3 cases where extra foci identified by one reader but not by second reader. For cancer cases, reader concordance = 18/21. From 21 cancer cases, there were 34 malignant lesions. Readers correctly identified 21/22 lesions, giving an overall PPV of 61-64%. ‘Missed’ cancer sizes ranged from 6-35mm. We have observed benefits for both the patients and the Practitioners who perform CESM. Radiographers have reported increased job satisfaction. Continuing to diversify the job roles and responsibilities of Mammographers may help in addressing the national struggle to recruit into Mammography.

Conclusions: DBT shows good reader concordance, but does have a significant tumour ‘miss’ rate. Deliberately picked cohort of difficult breasts to evaluate, but it appears that DBT suffers from similar outcomes. All lesions seen on MRI had confirmed pathology after USS and biopsy.

P53  Applications of Contrast Enhanced Spectral Mammography in the Symptomatic Setting
Mrs Rhonda Griffiths
Guys and St Thomas NHS Trust, UK

Contrast enhanced spectral mammography (CESM) is a relatively new technology, which aims to identify tumours that would otherwise be mammographically occult. It is currently in use in several European centres, in various centres in the UK and in 2015 was introduced to our unit at Guys Hospital. Our department is a large Symptomatic Breast Unit which also specialises in Breast Surgery and Oncology. We are also a regional referral unit for South East London. The majority of CESM cases undertaken at Guys have been in accordance with our local written protocols. It has however also been used as a problem solving tool in more complex cases which have been discussed through the Multi Disciplinary Meeting. This poster will be a pictorial review demonstrating both typical and atypical CESM cases. Typical cases will include a patient under 40 with dense breasts and an elderly patient with multifocal disease. The more atypical cases will include a gentleman with suspicious findings, a neo-adjuvant chemotherapy patient and a patient who attended the unit for a wire localisation prior to her surgery.

Results: ‘The Kettering model’
In order to integrate CESM into a rapid diagnosis clinic we identified the need to utilise the skills of our Mammographers and implement CESM as a Radiographer led initiative with Radiology input at a clinical supervision level only. Four Mammographers volunteered to expand their job role by undertaking training in mammography and become clinical leads for CESM.

The introduction of the Kettering Model offers Mammographers the opportunity to develop new skills without any further Masters level study, making it more widely achievable to both Band 6 and Band 7 practitioners.

Conclusion: Over the last 12 months our unit has found that CESM has proved a useful additional mammographic tool for establishing extent of disease but also has had other benefits in more complex clinical scenarios.

P54  Use of Breast MRI in women assessed at screening – is it helping?
Dr Georgina Devenish, Dr Nest Evans
Breast Test Wales Screening Centre, UK

Aim: Retrospective 2 year review of breast MRI examinations performed following recall from screening and assessment.
1. To document reasons for MRI
2. To see if MRI influenced management correctly, significantly
3. To review indications for MRI

Method: Retrospective review over 2 years.
Results: 98 women referred. 86 MRI’s performed 62% (54/86) for assessment of tumour size in lobular carcinoma which have been reviewed for this abstract. Details of the other groups will be included in the final poster.
MRI most sensitive modality for accurately sizing the tumour
Management altered by MRI in 6/54 (11.1%)
2 correctly upgraded to mastectomy
2 incorrectly upgraded to mastectomy
1 contralateral cancer detected
1 indicated multifocal disease

Discussion: In both cancers correctly upgraded and one incorrectly upgraded the cancers were easily palpable clinically and borderline for conservation
MRI incorrectly upgraded 1 patient to mastectomy. The tumour was not palpable and was small on standard imaging.
MRI assessment did not alter surgical management in 88% of screen detected lobular cancers.

Results: ‘The Kettering model’
In order to integrate CESM into a rapid diagnosis clinic we identified the need to utilise the skills of our Mammographers and implement CESM as a Radiographer led initiative with Radiology input at a clinical supervision level only. Four Mammographers volunteered to expand their job role by undertaking training in mammography and becoming clinical leads for CESM.

The introduction of the Kettering Model offers Mammographers the opportunity to develop new skills without any further Masters level study, making it more widely achievable to both Band 6 and Band 7 practitioners.

Conclusion: Over the last 12 months our unit has found that CESM has proved a useful additional mammographic tool for establishing extent of disease but also has had other benefits in more complex clinical scenarios.

P55  BREAST MRI – A district general hospital experience of service evaluation
Dr Amanjot Saravana Karuppiah, Dr Mohammad Hajaj, Mrs Natalie Wright, Dr Shafiq Gill, Mr Mohammad Ali Jahan
Kingsmill Hospital, UK

Objective: We have recently started offering contrast-enhanced breast MRI for measuring disease extent and also for measuring the size of residual invasive tumour after patients have undergone neo-adjuvant (pre-operative) chemotherapy (NAC). Tumour sizes measured on the MR images were compared with the size of disease/residual disease measured at pathology after surgery. The aim was to determine if our centre meets the acceptable standards for size concordance.

Subjects and Methods: Before undergoing surgery, 32 patients were imaged pre-operatively as selected by NICE guidelines and comparison made with the final pathological size.

Another 19 patients who underwent NAC were imaged before and after the NAC and size on final MR images compared to the pathological size.

A concordance of +/- 10mm from the final pathological size was deemed acceptable.

Results: In the non neo - adjuvant group, in 28 patients the final pathological size was within 10 mm of the preoperative MR size. In 2 patients there was extensive non-calcified low grade and intermediate grade DCIS which did not enhance. In 2 patients there was multi focal disease, which was biopsy proven pre-operatively and it was difficult to tell the exact pathological size.

In the post NAC group in 7 patients the final pathological size was within 10 mm of the final pathological size. In 5 the MR size was more than 50 mm out from the pathological size. In the remaining it was within 20 mm.

This suggests that standard imaging is adequate for lobular cancer sizing in this cohort which tend to be smaller than those presenting in the symptomatic setting

We should consider reserving MRI assessment only for those lobular cancers that appear borderline for conservation on clinical or radiological grounds.
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Conclusion: In patient’s who have not undergone NAC our MR size is within acceptable criterion when compared to final pathological size validating the sensitivity of breast MR as a tool for accurate measurement of disease extent. In post NAC patients, there is a wide variation in the accuracy, this variation is attributed to several preoperative factors.

References:

Background: Breast MRI has become a standard part of the imaging armament of the diagnostic breast imaging team. Its role is most often used for preoperative cancer staging, but also for high risk family history screening and for implant assessment. There is the impression that there are increasing numbers of MRI performed. Using the EUSOMA MRI indications guidelines, we questioned whether there was indication drift occurring.

Methods: A retrospective review of all MRI requests accepted for women with known or suspected breast cancer accepted over a 3 year period was performed.

The indications were reviewed and aligned with the EUSOBI indications from 2008. Any indication that fell outside of the guideline was highlighted and reviewed for acceptance.

Results: Of the 296 MRI studies performed, 263 (88%) were preoperative staging studies. 70 patients in this group underwent MRI to assess treatment response to neoadjuvant chemotherapy. 17 patients (6%) underwent MRI for indications listed outside the EUSOBI guidelines. 16 (5.4%) of these had MRI to confirm malignancy was unifocal.

Further assessment will be made to identify if the index lesion was difficult to visualise, seen in the context of a dense parenchymal breast pattern.

Conclusion: Breast MRI is a useful modality in patients with known breast cancer. At our institution the majority of breast MRI is performed in accordance with EUSOBI guidelines. However a minority are performed to confirm known breast cancer is unifocal, an area that EUSOMA have been clear requires further research.

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Conclusion: The majority of breast MRI is performed in accordance with EUSOBI guidelines. However a minority are performed to confirm known breast cancer is unifocal, an area that EUSOMA have been clear requires further research.

POSTER PRESENTATIONS

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References:


Further, it should be considered in the differential diagnosis of unusual presentation.

CONCLUSIONS

Background: T-Cell leukaemia/lymphoma is an aggressive lymphoma linked to infection by the human T-Cell lymphotrophic virus I and is more commonly found in South America, West and South Africa. The virus is acquired vertically from mother at birth. It affect adults with an average age of 58, M:F is 1:51.

Our patient is currently under the care of the haematology team and treatment had been established.

P59 Inflammatory breast carcinoma only seen on MR imaging-Case Report

Dr Daniela Soprencic, Dr Vanja Soprencic, Miss Jasna Davidovic

University Clinical Centre of the Republic of Srpska, Bosnia and Herzegovina

Background: The conventional imaging modalities including mammography and ultrasonography are of limited value in the diagnosis of inflammatory breast carcinoma (IBC), as it is difficult to delineate specific findings of the swollen dense breast. Pathological features of the retro mammary area showed marked interstitial edema and focal lymphatic involvement by tumor cells. These characteristic images obtained by MR imaging may be suggestive of IBC.

Methods and materials: A 40-year old female presented with a two-month history of pain and itching in her left breast followed by negative findings on both physical examination and ultrasonography. The newly obtained mammography images (CR mammography) were also negative, apart from a discrete increase in the density of the left breast. An additional MR breast examination was performed on a 1.5 T MR system.
Results: MR imaging showed an asymmetric, non-mass like segmental linear and reticular pathologic enhancement, a marked interstitial edema as well as a pathologically axillary lymph node, all indicative of IBC. The diagnosis of invasive ductal carcinoma with a pathological lymph node in the left axilla was histologically confirmed.

Conclusion: Our case report confirms greater sensitivity and specificity of MR imaging compared to ultrasonography and mammography in the early diagnosis of IBC.

References:

P61  Sternalis muscle: an important anatomical variant which may mimic a breast mass on mammography Dr Edward Goble, Dr Doreen Cox Sandwell and West Birmingham Hospitals NHS Trust, UK

Background: The sternalis muscle is an anatomical variant in which a supernumerary muscle is found in the anterior thoracic region running parallel to the sternum. Occurring in 8% of the population, the sternalis muscle exhibits wide variation in size between subjects and may be unilateral or bilateral. Sternalis may be demonstrated on mammography, typically as an opacity posteriorly in the medial breast on the craniocaudal (CC) view where it may mimic a breast mass. Studies have reported a prevalence on mammography of 0.01-0.018%1.2.

Case history: We review the imaging of two women who underwent assessment for suspected breast lesions which were subsequently demonstrated to be due to sternalis muscle. Both women were recalled from the NHS Breast Screening Programme for assessment of suspected unilateral breast masses present on the standard CC projection only. At assessment, an additional inferiorly pulled on mediolateral oblique (MLO) projection demonstrated the sternalis in one case. Targeted ultrasound was normal in both cases. Both women underwent dynamic contrast enhanced magnetic resonance imaging (MRI) which demonstrated the sternalis muscle with no evidence of a breast lesion.

Conclusions: The sternalis muscle is an uncommon but important anatomical variant which should be considered in the differential diagnosis of a postero-medial mass seen on mammogram CC views. Its presence can be confirmed with MRI. By recognising this variant unnecessary intervention can be avoided.


P62  A case of synchronous male breast cancer and lymphoma diagnosed in the axilla. A review of literature and findings of sentinel node biopsy procedure Dr Zoe Goldthorpe, Dr David Paterson Taunton and Somerset NHS Trust, UK

Background: Limited previous case studies have been published regarding synchronous diagnosis of breast carcinoma and lymphoma in the axilla. We believe this is the first reported such case in a man. Male breast cancer is associated with later presentation and more advanced stage disease1. Earlier work has suggested that sentinel node biopsy should be avoided in cases such as this due to tumour collapse and false negative results2, although other work contradicts this in cases of B cell lymphoma with sinus preservation3. This case outlines the features at presentation, the radiological findings and pathological outcome.

Results: A 69 year old male was diagnosed by core biopsy with a grade 3 ductal carcinoma of the left breast and small cell lymphoma of the left axilla at initial presentation. CT staging revealed widespread supra and infra-diaphragmatic lymphadenopathy but no visceral metastases. A sentinel node study was performed using dual technique, alongside mastectomy, and auxiliary clearance to ascertain the true nodal status. 32 nodes were removed, all of which contained lymphoma. The radioactive hot and blue node were the same node and no carcinoma was found in this at final histology.

Conclusion: In cases of high suspicion such as male presentation or high grade breast disease, with a synchronous lymphoma diagnosed in the axilla, sentinel node techniques are useful for diagnostic and prognostic purposes.

nipple discharge and P2 (clinically eccentric benign lesion 'epidermoid cyst').

Conclusions: Several published clinical guidelines suggests imaging for patients with clinical coding of P3 and above. However, our data have shown that male breast cancer could be missed if we strictly adhere to suggested guidelines. We suggest offering imaging for all male breast lesions which are eccentric, not clinically gynaecomastia or which have worrying history such as blood stained nipple discharge.

P64  Phyllodes Tumours: a review of clinical, radiological and pathological features
Dr Nerys Forrestor, Mrs Tracy Durkin, Dr Vidiya Kumaraswamy, Miss Alison Waterworth, Dr Simon Dennis
Calderdale and Huddersfield NHS Trust, UK

Phyllodes tumours are identified following core biopsy of indeterminate (M3/U3) breast masses, or excision of presumed fibroadenomas. If the latter, excision is often without margins, increasing local recurrence risk.

Retrospective review of pathology database for phyllodes identified on core or excision biopsy between January 2008 and December 2015 examining radiological and pathological features, recurrence rate and incidence of malignancy.

41 cases of phyllodes diagnosed in eight years. Age ranged from 14-80 years and size from 11–76 mm. In 34, initial core biopsy showed either phyllodes or fibroepithelial lesion with features of phyllodes. One biopsy revealed PASH. 6 were initially fibroadenomas excised for size or patient request, found to be phyllodes on excision. Final excision revealed benign phyllodes in 30, 2 malignant phyllodes, 7 fibroadenomas, one metaplastic carcinoma and one borderline phyllodes with DCIS. Six patients had a M/U score of 4 or more, however, there were no radiological indicators to distinguish between benign and malignant tumours. In 9 patients, tumours extended to margins without re-excision. One patient has had two recurrences of benign phyllodes, each one year following surgery. On both occasions margins were involved. One patient developed an incidental contralateral invasive carcinoma after 3 years.

Phyllodes tumours are rare, comprising less than 1% of breast neoplasms. However, management can be difficult when discovered in excision biopsy specimens when there was no intent to excise with margins. We have shown that recurrence rate is very low, and management strategies that mandate margin re-excision may be unnecessary.

P65  Systematic review of breast lesions of uncertain malignant potential (B3 lesions) and their risk of malignancy
Dr Nerys Forrestor1, Dr Simon Lowes1, Dr Elizabeth Mitchell1, Dr Maureen Twiddy2
1Newcastle Teaching Hospitals, UK; 2University, UK

Borderline breast lesions (B3 lesions) can coexist with malignancy. The magnitude of this risk varies between studies and lesion subtypes. Determining the true risk of invasive or in situ malignancy within each lesion sub type within the B3 lesion group allows risk stratification and improves management strategies.

Systematic review to determine the incidence of malignancy identified by surgical excision biopsy, following the diagnosis of a B3 breast lesion at core biopsy. We conducted a literature search (MEDLINE, EMBASE, HICM, Scopus and Web of Knowledge), identifying relevant studies between 1980 and 2014. We appraised the literature, and extracted data allowing meta analysis, determining malignancy risk for all lesions.

Searches returned 2289 citations, with 11 more identified from other sources. Duplicate and unsuitable articles were removed leaving 209 records. From these, 26 abstracts/reports/views and 54 full text articles did not meet inclusion criteria. Data extraction was performed from 129 studies. The table shows lesion specific malignancy rates.

<table>
<thead>
<tr>
<th>Lesion</th>
<th>Number Malignant Lesions</th>
<th>Total Number Lesions</th>
<th>Rate of Malignancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Papilloma</td>
<td>351</td>
<td>2278</td>
<td>12</td>
</tr>
<tr>
<td>ADH</td>
<td>1114</td>
<td>4031</td>
<td>27</td>
</tr>
<tr>
<td>Lobular Neoplasia</td>
<td>345</td>
<td>2014</td>
<td>17</td>
</tr>
<tr>
<td>FEA</td>
<td>179</td>
<td>1431</td>
<td>11</td>
</tr>
<tr>
<td>AIDP</td>
<td>69</td>
<td>213</td>
<td>32</td>
</tr>
<tr>
<td>All B3 lesions</td>
<td>2160</td>
<td>11423</td>
<td>17</td>
</tr>
</tbody>
</table>

Conclusion: Studies have assessed the risk of coexisting malignancy in phyllodes lesions, however, these are often small. This comprehensive review shows that papillary lesions, when associated with atypia on core biopsy, have a high rate of associated malignancy suggesting all papillary lesions with atypia should be considered for excision. Papillary lesions without atypia show a lower rate of associated malignancy, and could be safely managed with surveillance strategies.
has increased and improved ultrasound machines may have lead to better detection of small lesions. Some patients report long lasting pain following biopsy. Does biopsy always benefit patients?

**Method:** Biopsies of U2 masses performed between November 2013 and January 2016 were prospectively recorded, along with the age of the patient and the histology result (post-surgical if excised).

**Results:** 237 biopsies were performed in women aged 25 to 81. 100% of patients aged 25-29 (48 cases) had a B2 result. In the 50-34 age group (54 cases) there was one B3 result and one malignancy (incidental low-grade DCIS within an excised fibroadenoma, biopsy B2). In those aged 35 years and over, 96% of results were B2, with one malignancy (paipillary carcinoma at surgery, B4 biopsy). Imaging was reviewed in all B3-B5 cases.

**Conclusion:** The yield for malignancy is very low in this group of patients (2/237). Could strict adherence to U2 criteria and the use of new ultrasound techniques (elastography) help to avoid biopsy in some patients?

**References:**

**P69** Large Volume Biopsy in B3 lesions – does weight matter?

**Dr Nervy Forester**

Newcastle Teaching Hospital NHS Trust, UK

B3 breast lesions have an associated risk of malignancy, partly due to errors from sampling size, when small volume cores are used for diagnosis.

With the increasing use of large volume, vacuum-assisted biopsy (VAB) for first line stereotactic biopsy, larger samples can be obtained which are more representative of the whole lesion. Does weight of biopsy samples obtained predict the risk of lesion upgrade following repeat biopsy?

Single centre, prospective analysis of B3 breast lesions diagnosed by 10G stereotactic VAB between January 2012 and December 2014. Biopsy size was second line sampling by 7/8G VAB. Pathology records reviewed – initial sample weight and any malignancy at subsequent biopsy.

**Results:** We observed gradual increase in total number of stereotactic guided biopsies over time with a sharp decline in the proportion of diagnostic VAB between 2012 and 2015 with reduction of costs in 2014/15. Reduction in VAB numbers has not significantly changed the outcome of needle biopsy when compared with VAB outcomes. No non-operative diagnostic rate for all ages were consistent over three years.

**Conclusion:**

- The cost would have been significantly higher if VAB used as First Biopsy Approach (FBA) in all cases. The rate of diagnostic stereotactic guided VAB for FBA halved between 2012/13 and 2014/15. This study showed that 14G CNB can still be regarded as an effective FBA if used selectively as it demonstrated high specificity and cost effectiveness compared to VAB. The reduction in VAB numbers has not changed non-operative diagnosis for invasive and non-invasive rates of breast cancers.

- **PT7** Digital breast tomosynthesis-guided vacuum-assisted biopsy – How we do it

**Dr Bhavya Batohi,** Dr Michael Michell, Dr David Evans, Dr Jane Goligher, Dr Juliet Morel, Dr Claire Peacock, Dr Keshthira Satchithananda, Dr Reema Walton, Dr Shalini Wijesuriya, Dr Rumana Rahim

King’s College Hospital, UK

**Background:** Digital breast tomosynthesis (DBT) has revolutionized the detection of breast cancer by reducing the effect of tissue superposition. It allows for more confident assessment of lesions and is routinely used in many centres for assessment of both symptomatic and screening-detected abnormalities. DBT-guided vacuum-assisted biopsy has been shown to allow maximum precision, shorter procedure time and lower radiation exposure compared to prone stereotactic vacuum-assisted breast biopsy.

- At our institution, we have introduced the use of DBT-guided breast biopsy into daily practice to more accurately sample microcalcifications and ultrasonically-occluded soft tissue abnormalities.

- Content: There are several variations in how DBT-guided biopsy can be performed. We will demonstrate how to safely and effectively plan and perform DBT-guided biopsy using Hologic’s 3D-guided biopsy system with tomosynthesis and an ATEC-Suros, 9 Gauge biopsy kit. This can be done with the patient in an upright or decubitus position.

- The presentation will describe how to achieve technical success in lesion targeting in difficult cases such as distortions and lesions of low density. Variations in technique will be discussed. The potential complications will be explained including strategies on how to prevent such complications.

**Case examples will be used to demonstrate the technique and potential challenges.**

**Conclusion:** At the end of the presentation, the audience should have an insight into the value of DBT-guided biopsy over prone stereotactic guided biopsy and how to perform the procedure safely.

**References:**

Conclusions: There was a highlighted deficiency within this service in same-day stereotactic biopsies at first assessment visits against recognised standard and best practice guidelines. The re-audit evidenced that the changes implemented were effective and that the service now complied with standards. The changes that have been implemented are sustainable if continually managed.

P73 Initial experiences of performing DBT guided core biopsy procedures
Mrs Lynn Gustard, Miss Suzie Cooney, Mrs Gillian Sellsars, Dr Julie Cooper
York Teaching Hospital NHS Foundation Trust, UK

Interventional image guided needle core biopsy procedures are performed to achieve a non-operative definitive diagnosis, either under ultrasound, stereotactic x-ray or more recently digital breast tomosynthesis (DBT) guidance.

DBT is a form of 3D imaging of the breast, a relatively new tool in breast imaging. It can improve diagnostic accuracy by decreasing the problem of overlap as it produces volumetric images of the breast, which can be viewed sequentially in mm slices (2, 3 & 4).

In this unit DBT is used in conjunction with spot films at the discretion of the radiologist/consultant radiographer to further improve mass visibility and lesion classification accuracy (4&6). With increased conspicuity of lesions, DBT provides optimum visualisation of the area during core biopsy. It allows precise and quick targeting by eliminating the difﬁculties associated with inaccuracies in the process of triangulation encountered during stereotactic core biopsy(7).

Protocol locally recommends first line 14g core biopsy in most instances. 10G VAB is mainly used as the second line procedure following a B1, B3 or B4 result at initial core biopsy(1). The majority of these procedures are performed by advanced practitioners.

The aim of this poster is to relay our initial experiences in performing DBT guided procedures over the last 12 months in the form of a pictorial review of 3 challenging cases where the application of DBT biopsy has helped to improve patient pathway.

References:
2. NHSBSP No 69, 2010 National Health Service Breast Screening Programme (NHSBSP) publication number 69. 2010. Digital Breast Tomosynthesis. NHS Cancer Screening Programmes, Sheffield.

P74 Breast Cancer Patient Pathway – Are we meeting the 62 day target?
Mrs Maggie Fletcher, Dr Nisha Sharma, Mrs Anne Nielsen Moody
St. James’s University Hospital, UK

Background: Breast imaging has seen signiﬁcant advances both in technology and surgical oncoplastic techniques, resulting in an increased workload for imaging. With these advances the question being asked is – Is the 62 day target achievable?

Conclusions:
Pathway 1- Imaging → MDT → Surgery
Pathway 2- Imaging → MDT → Further Work-up → Surgery

Further work up included further imaging in 21 cases imaging with further biopsies in 22 cases and imaging and surgical review in one case.

Conclusion: Despite the advances in imaging and surgical techniques the 62 day target is still achievable provided processes are in place allowing for the additional work up to be performed. Just under 40% of our cancers required additional imaging +/- biopsies to aid surgical planning, highlighting the increasing complexity of managing breast cancer.

P75 Determining the cost savings associated with implementing percutaneous vacuum extractions of benign breast lesions without atypia, to possibly increase the size of lesions removed from 1.5cm up to 3cm
Miss Victoria Rhodes, Dr Tagreed Toma
Southend University Hospital, UK

Purpose: The high cost of surgical excision of benign breast lesions (BBL), the current financial concentrate and excessive demand on acute services, which results in cancelling elective surgeries not infrequently initiated this retrospective study. The aim is determining the cost savings associated with implementing percutaneous vacuum extractions of benign breast lesions without atypia, to establish the possibility of increasing the size of lesions removed via this method from the current 1.5cm up to 3cm.

Method and Results: In the last year, 561 patients underwent surgical excision of BBB without atypia, as day stay surgery, costing £2579.01/surgery. Whereas 19 patients had percutaneous vacuum extractions of BBB at a cost of £ 222.50, procedure, requiring an average 30 minutes radiology time. All the above is based on using a single chambered needle, some of the lesion might have been excluded due to their size.

With the recent acquisition of a 6 chambered vacuum needle, we calculated the cost/ procedure to be £ 245, still signiﬁcantly less than a day stay surgery.

Conclusion: Reviewing the above, we are encouraging the breast unit team to identify and refer more of benign lesions without atypia for Vacuum Extraction, following MDT discussion. We are willing to change the current practice by accepting the extraction of larger lesions up to 3 cm diameter, using the 6 chambered Needle, considering the procedure has been well tolerated by previous patients, regardless of age, and with no recorded post procedure complications X bruising. We will revisit this subject next year and re-calculate cost savings.

P76 Does an increase in referrals to a tertiary family history clinic represent more high risk women seeking genetic testing?
Dr Vian Salih, Miss Sarah Barker, Miss Jennifer Hu
Miss Serena Ledwidge
Barts Health NHS Trust, UK

Introduction: The publicity surrounding Angelina Jolie’s bilateral risk-reducing mastectomy in May 2013 increased public awareness of hereditary breast cancer which led to an increase in GP referrals to our tertiary Family History (FH) clinic. This study aimed to identify if this increase in referrals represented more high risk women seeking genetic testing.

Methods: Retrospective analysis of all referrals to FH clinic was conducted from January – April 2013

Conclusion: The above improvement in referrals to FH clinic. 2016
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Research on the Impact of Communication Method on Patient Outcomes

The aim of this project is to explore patient understanding, anxiety and preferences in relation to different communication methods in the delivery of benign biopsy results.

Methods: Current practice at UK breast screening centres (e.g. who delivers results) will be recorded using a survey. Results will be used to inform the main study.

The main study will be a survey of women, recruited during their initial assessment clinic at twelve English breast screening centres. Women with a BI2 diagnosis will be followed up with a repeat postal questionnaire, assessing the outcome measures of anxiety, understanding and preferences, alongside how their results were delivered.

Multiple regressions, adjusted for confounders, will be used to measure whether the method of communication used (telephone/in-person) affects the women’s levels of anxiety. Important confounders for consideration are individual level variables such as age, and centre level variables such as urban/rural setting.

Results will be used to inform policy guidelines for the NHS Breast Screening programme.

References:
1. Public Health Policy and Strategy Unit. PP-14
2. Bond M, Pavey T, Welch K, Cooper C, Garside R, Dean S, Hyde CJ. Psychological consequences of breast biopsy procedures and time to diagnosis by breast assessment type was estimated with logistic regression.

Conclusions: Women with breast cancer were more likely to have a timely diagnosis and fewer appropriate assessment procedures with organized assessment within and outside a BAC. They were also more likely to have a definitive diagnosis within 7 weeks after an abnormal screen (OR: 1.86, 95%CI=1.70, 2.05).

Background: Timely coordinated diagnostic assessment following an abnormal screening mammogram reduces patient anxiety and may optimize breast cancer prognosis. The Ontario Breast Screening Program has offered organized assessment through Breast Assessment Centres (BAC) that coordinate follow-up tests after an abnormal mammogram through a formal defined pathway for over 10 years. This study evaluates differences in diagnostic pathway characteristics and time to diagnosis for women undergoing assessment through and outside a BAC.

Methods: This study identified screen-detected breast cancers among two concurrent cohorts of women age 50 to 69 diagnosed through a BAC and outside a BAC between 2002 and 2010. Of the 155,866 women with an abnormal mammogram, 9,044 with breast cancer were eligible (47% BAC 53% outside BAC). The association between number and type of assessment procedures and time to diagnosis by breast assessment type was estimated with logistic regression.

Results: Women diagnosed through a BAC were more likely to have their first assessment procedure within 3 weeks of an abnormal screen (OR: 1.22 95%CI=1.10, 1.36), have three or fewer assessment procedures (OR: 1.59 95%CI=1.45, 1.73), have imaging and biopsy at their first assessment (OR: 2.00 95%CI=1.78, 2.24) and receive a core/FNA biopsy (OR: 2.01 95%CI=1.75, 2.30) compared to those diagnosed outside a BAC. They were also more likely to have a definitive diagnosis within 7 weeks after an abnormal screen (OR: 1.86, 95%CI=1.70, 2.05).

Conclusions: Women with breast cancer were more likely to have a timely diagnosis and fewer appropriate assessment procedures with organized assessment within and outside a BAC.

P78 The communication of benign biopsy results in the NHS breast screening programme
Sian Williamson1, Sian Taylor-Phillips1, Harbinder Sandhu1, Rebecca Johnson1, Jacqui Jenkins1, Margaret Casey1, Olive Kearins1

University of Warwick, UK, 1National Programme Manager – Breast Screening, UK, 1Clinical Nurse Specialist Breast Care, UK, 1National Lead Breast Screening QA, UK

Background: The national service specification for breast screening states that results should be given in-person. Although this guidance is mostly followed in the case of malignant results, some centres deliver benign biopsy results by telephone. Some patients may prefer receiving their results by telephone, as it may reduce wait time and potentially minimise distress. However, telephone results may not be as extensive as in-person encounters, which could leave patients with a lower understanding of their results. There is limited evidence on the impact of communication method on patient outcomes.

Methods: This study identified screen-detected breast cancers among two concurrent cohorts of women age 50 to 69 diagnosed through a BAC and outside a BAC between 2002 and 2010. Of the 155,866 women with an abnormal mammogram, 9,044 with breast cancer were eligible (47% BAC 53% outside BAC). The association between number and type of assessment procedures and time to diagnosis by breast assessment type was estimated with logistic regression.

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POSTER PRESENTATIONS

**P80 Investigating whether breast density is a risk factors for lower patient satisfaction after Breast Conserving Therapy**
Miss Rachel O’Connel, Dr Rosa Di Micco, Dr Elizabeth O’Flynn, Mr Peter Barry, Miss Fiona MacNeill, Miss Nicola Roche, Mr Gui Gerald, Professor Nandita de Souza, Miss Jennifer Rusby
The Royal Marsden NHS Foundation Trust, UK

**Background:** Poor cosmetic outcome is associated with psychological morbidity (1). The BREAST-Q is a validated Patient Reported Outcome Measure designed to evaluate patient satisfaction/quality of life. Anecdotally, surgeons report that closing the defect after wide local excision is easier when the breast is denser and we therefore hypothesised that increasing breast density may be independently associated with increased scores for the satisfaction with breasts domain of the BREAST-Q. This was investigated as part of a larger study of outcome of breast conservation.

**Methods:** Ethical approval was obtained. Consecutive women who had unilateral BCS were invited to complete the BREAST-Q. Satisfaction with breast score was dichotomised by median score. Univariate logistic regression analysis was undertaken. Variables with p<0.1 were taken forward to multivariate analysis.

**Results:** 200 women participated. Median age was 64.7 years (IQR:55.6-71.5). Median satisfaction score was 68 out of 100 (IQR:55-80). BMI, type of axillary surgery, size of tumour on ultrasound, weight of specimen, nodal status and delayed wound healing were all significant on univariate analysis. Size on mammogram and breast density were not significant factors. On multivariate analysis, increasing BMI and USS tumour size were independently associated with lower satisfaction.

**Conclusions:** Breast density is a risk factor for lower satisfaction. Percentage breast volume excised has previously been associated with satisfaction (2). Our hypothesis about breast density and satisfaction has not been shown to be correct.

**References:**

**P81 Differences in acute and persistent pain following ultrasound and stereotactic guided vacuum-assisted breast biopsy (VABB) – results of a pilot survey**
Dr Matthew Brown1, Professor Nandita de Souza1, Dr Elizabeth O’Flynn2, Dr Steven Allen3
The Royal Marsden Hospital, UK, 1The Institute of Cancer Research, UK

**Purpose/background/objectives:** Vacuum assisted breast biopsy (VABB) is a minimally-invasive modality enabling target lesions identified within breast tissue to be either sampled or removed. A biopsy needle is advanced percutaneously to the target under stereotactic, ultrasound or MRI guidance, whence multiple samples are harvested. This pilot-survey explored whether differences in acute and persistent pain intensity occurred between ultrasound and stereotactic guided VABBs.

**Methods:** A questionnaire-based survey was undertaken basic demographic and procedural data for patients was recorded at the time of VABB. Participants completed a pain/analgiesa diary detailing the intensity of pain experienced and analgesia taken over the 7 day post-VABB period. Participants were contacted at 3 months post-VABB to determine the presence of persistent pain.

**Results:** 49 participants were recruited and 38 completed questionnaires were returned (27 US, 11 stereotactic). Statistically significant differences were observed in the intensity of pain experienced post-biopsy by patients who underwent US and stereo VABB on day 1 (SD 2.8) vs 1.4 (SD 1.6) p=0.04, day 4 1.3 (SD1.5) vs 0.2 (SD 0.6) p=0.03, day 6 0.7 (SD 0.9) vs 0 p=0.03 and day 7 0.7 (SD 1.0) vs 0 p=0.03. No procedural differences existed between the groups. 3 patients (8%) reported persistent pain at the 3-month time point, all had undergone US guided VABB.

**Conclusions:** Patients undergoing US guided VABB experienced more intense pain in the week following biopsy than those undergoing stereotactic guided VABB and appeared to experience more persistent pain. Further work is required to determine the cause of these findings.

**P82 A study into under-breast soreness (UBS) and its impact on breast screening**
Mrs Marilyn O’Connel
The Queen Elizabeth Hospital, UK

**Background:** Mammographers frequently image women affected by UBS. When questioned, most women are unaware that a common cause is Intertrigo, and are unsure of treatment options. In some women, the problem is so severe; it can hamper the acquisition of high quality images and affect the overall breast screening programme.

**Aim:** The study aims to raise awareness of UBS in women attending breast screening, and to educate them on Intertrigo.

**Objectives:** To explore what women know about UBS, what information is available and what advice mammographers could give to maximise compliance, optimise image quality and improve the overall breast screening experience.

**Methods:** An awareness questionnaire was given to all women attending breast screening, and along with a leaflet about UBS.

**Results:** 1917 women were asked to complete a questionnaire and 1643 did so (response of 86%). 55% had not heard of UBS, and 90% had never seen a picture of UBS. 20% of women who heard about UBS, 7% had discussed the problem with a healthcare professional. 4% reported that having UBS would prevent them attending screening.

**Conclusion:** Of these women, more than half had not heard of the condition, and very few had discussed it with a healthcare professional. It appears UBS would not stop the majority of women attending screening. A limitation of this study is the bias towards health conscious women attending breast screening. Further work could examine the non-attenders knowledge on UBS.

**References:**

**P83 NHSBSP patient dose survey 2015**
Dr Jennifer Oduko, Professor Kenneth Young
NCCPM, Royal Surrey County Hospital, UK

**Purpose/Background:** The NHS Breast Screening Programme conducts patient dose surveys every three years, as part of its quality system. Data are gathered for almost every X-ray set in the programme, for 50 or more women, to ensure that doses are within the limits and to compare doses from different systems. In the 2015 survey, almost all the data is for digital systems, as the transition to digital imaging was nearing completion. Only information on digital systems is presented here.

**Methods:** Physics services in the UK provided data to the national centre for analysis. Details of exposures were recorded by radiographers during examinations, or extracted from image DICOM headers with appropriate software. Data on X-ray set performance were obtained from regular measurements carried out by physics services. All services used the same database to record information, which was loaded into a single database for analysis.

**Results:** Data were recorded for approximately 460 X-ray sets and 40,000 women. The average mean glandular dose (MGD) to the standard breast (45mm thickness of Perspex) was 1.60.1mgY. The average overall MGD for oblique views of 50-60mm thick breasts was 1.50.1mgY, but for different systems values ranged from 0.80.1mgY (Philips Microdose L30) to 1.70.2mgY (Hologic Dimensions). Further data will be included in the final presentation.

**Conclusions:** The measured doses were well below the limits, which are a remedial level of 2.5mgY for dose to the standard breast, and 3.5mgY, the national diagnostic reference level 50-60mm breasts.

**References:**
2. Miss Fiona MacNeill, Miss Nicola Roche, Mr Gui Gerald, Professor Nandita de Souza, Miss Jennifer Rusby
The Royal Marsden NHS Foundation Trust, UK

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**P84 The role of the multidisciplinary team (MDT) in developing symptomatic mammography image interpretation and reporting (MIIR) expertise**
Mrs Anne-Marie Culpan, Dr Paul Marshall
University of Leeds, UK

**Aim:** To explore how radiographers develop expertise in symptomatic mammography image interpretation and reporting (MIIR) and gain acceptance as multidisciplinary team (MDT) members.

**Methods:** A one year project was conducted within a digital mammography screening unit. The unit had 3 radiographers and the MDT consisted of a consultant, two radiographers, a clinical nurse specialist and a hospital physicist. A fully accredited MIIR service was initiated and radiographer roles and responsibilities developed.

**Results:** The role of a radiographer was developed in line with the放射学联合委员会 and the MDT. The radiographers received peer review and feedback from MDT members and were given the opportunity to develop their skills in image interpretation and MIIR. This process led to increased confidence and a positive clinical and educational environment. The radiographers developed competencies in MIIR, and gain acceptance as multidisciplinary team (MDT) members.

**Conclusion:** This project demonstrated how radiographers can develop expertise in MIIR and gain acceptance as MDT members. This is vital in order to improve patient care and reduce false positives.

**References:**

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Methods: Realist evaluation and qualitative methods, involving interviews and non-participant observation of clinical practice, were used to develop and test theories which explained how and why radiographers involved in mammographic MIIR might substitute for radiologists in diagnostic breast multidisciplinary teams.

Findings: Professional roles and responsibilities were defined by organisational boundaries and cognitive ‘task-work’ knowledge and skill. Functional success in role depended on ‘social’ status within the MDT.

Radiographers’ social status within the breast MDT was hierarchical. In the ‘community of practice’ social learning model, trainee and newly qualified MIIR radiographers had ‘peripheral’ membership of the MDT. Their journeys to ‘active’ MDT membership involved learning to perform their role ‘better’ through sustained interaction with other team members. As radiographers displayed higher level MIIR skill and knowledge within the breast care MDT they became recognised, accepted and acknowledged as radiologist substitutes who contributed to clinical decision-making. Consultant radiographers functioned as ‘core’ MDT members because they ‘proved’ they could substitute for radiologists.

Conclusion: This study highlighted the importance of ‘social’ (situated) learning in addition to cognitive learning in the development and application MIIR expertise for radiographers. Development of expertise and team contribution were inter-related radiographers achieved competent and confident MIIR through sustainable interaction with other team members. As radiographers displayed higher level MIIR skill and knowledge within the breast care MDT they became recognised, accepted and acknowledged as radiologist substitutes who contributed to clinical decision-making. Consultant radiographers functioned as ‘core’ MDT members because they ‘proved’ they could substitute for radiologists.

Purpose: Although guidelines have been produced, there is variability within European countries regarding mammography imaging practice, and staff training. The aim of this study was to systematically synthesise available evidence on European radiographers’ challenges in clinical education and practice concerning mammography.

Methodology: A systematic search was conducted in CINHAL, ERIC and MEDLINE, including qualitative and quantitative peer reviewed studies, systematic and integrative reviews, intervention or observational studies comprising Johanna Briggs Institute levels of evidence for effectiveness or meaningfulness [1]. Studies published in English language during last 5 years’ period were included (2010-2015). Investigators dual rated study quality, discrepancies were resolved through consensus.

Results: 16 papers were included in the review. Thematic analyses of selected study results produced six categories of challenges. The main challenges addressed in mammography education were related: low level of knowledge (1) mainly with multiprofessional approach, image quality assessment, new technologies and competence for patient counseling. Lack of commitment and motivation (2) in taking part of training. Finally insufficient information about training opportunities and few feedback on the performance (3). The main challenges addressed in clinical practice, were: deficient image quality (4) mainly positioning, artifacts identification and removing, exposure optimization, and breast compression, as well as quality control procedure (5) and image quality assessment (6).

Conclusion: The need for training has been highlighted in this review for multiprofessional approach for breast cancer detection. Challenges in education/training and in clinical practice were observed revealing room for improvements in both areas.

References:

Methods: The e-journal club will be piloted using three breast imaging and practice-related journal articles, distributed via email at two-monthly intervals accompanied by a set of critical questions. These will stimulate self-guided reflection which can be uploaded into an e-portfolio. In addition, discussion with other members of the initial study group will be encouraged.

Articles will be chosen to reflect the whole practitioner cohort, and group discussions will be enhanced by invited ‘guests’ and membership participation to engage the diverse cohort of practitioners within a broader concept of practice CPD.

The pilot will be evaluated with a questionnaire and verbal feed-back using a focus group technique. The results of the pilot study will be used to further develop the e-journal club.

Conclusion: Whilst the e-journal club is still at its formative stage, early evidence suggests that this innovative approach will achieve the departmental and professional objectives whilst achieving participants’ satisfaction with this flexible approach to CPD.

References:
Purpose/Background/Objectives: To establish mammography as a professional group within the social media community and establish its use for continued professional development (CPD), research dissemination and education.

Methods: Within the social media community is strong the @We twitter communities having high educational content. The development of @WeMammographers from initial concept to delivery was achieved in 6 stages:

1. Initial concept, proposal, marketing strategy
2. Design
3. Management tool
4. Delivery schedule
5. Launch
6. Future strategy

It was recognised, in the development stages, that there were blurred distinctions between personal and professional identities. The importance of maintaining strong professional judgments and established principles were used to guide individuals who were new to ‘tweeting’.

Results: Sum all activity demonstrates, since launch in June 2015, the site had 266 followers as far as Australia, USA and Europe. In July, a month after launch, the site had 70k impressions over the month. Key themes that had 70k impressions over the month. Key themes that had 70k impressions over the month.

• Launch
• Future strategy

Within nursing the social media community and establish its use for continued professional development (CPD), research dissemination and education.

Conclusion:

• Introduction of @WeMammographers into the educational delivery of the mammography module
• Introduction of ‘tweet chats’

Conclusions: @WeMammographers has a bright future within the mammography forum as a tool for sharing best practice which can be utilised for education, CPD and dissemination of research.

References:

1. Department of Health 2012 The power of information: putting all of us in control of the health and care information we need. London: DoH.

P91 MAMMO-50: Mammographic surveillance in breast cancer patients over 50 years of age–the results of the 2 year feasibility study.

JA Dunn1, PK Donnelly1, A Marshall1, M Wilcox1, E Watson1, A Young1, M Ramirez2, S Hartup3, AJ Maxwell4, AJ Evans5, on behalf of the Mammo-50 Trial Management Group

1Warwick Clinical Trials Unit, University of Warwick, Coventry, UK; 2South Devon Healthcare NHS Foundation Trust, Torquay, UK; 3Independent Cancer Patient Voices, London, UK; 4Department of Clinical Health Care, Oxford Brookes University, Oxford, UK; 5St James’s University Hospital, Leeds, UK; 6University Hospital of South Manchester NHS Foundation Trust, Manchester, UK; 7NHS Tayside, Ninewells Medical School, Dundee, UK

Introduction: For breast cancer patients 50 years and older at diagnosis, there is no evidence or consensus on the optimal frequency or duration of follow-up including mammography. Mammo-50 aims to provide sound cost-benefit evidence whilst also investigating alternative methods of follow-up.

Methods: A multi-centre, randomised controlled, phase III trial of annual mammography versus 2 yearly for conservation surgery and 3 yearly for mastectomy patients. The 2-year feasibility study aimed to set up at least 100 actively recruiting centres by month 24 and / or recruit 1400 patients. In addition user perspectives and reasons for non-participation were explored.

Results: To date (4th May 2016) 1899 patients have been randomised in 108 sites and an additional 6 sites are in set-up. The results of the feasibility phase showed that the study could recruit the required number of patients from the 100 centres. This is truly a multi-disciplinary trial with 52% of patients randomised by surgeons, 29% by radiologists and 19% by others (i.e. nurses, oncologists).

Of patients randomised, 78% have undergone conservation, 87% have invasive disease, 82% are aged 55-75 years, 83% are ER + ve and 73% are undergoing hormone therapy. Patients most commonly enter the trial due to altruism and the main reason for non-participation is that they do not wish to change their mammographic schedule.

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Conclusions: This is a feasible and important trial which will provide clinicians with valuable information to guide their future follow-up practice.

The trial team would like to acknowledge and thank all the Principal Investigators and research teams for their involvement in MAMMO-50.

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