exhibited, κ = 0.470. There were significant differences between the levels of agreement amongst the ratings of the radiologists, advanced practitioners and others (all P <0.05).
Conclusions The low agreement rates between participants for density ratings were surprising. That there were differences between the occupational groupings may reflect breast screening experience.

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Seeding of tumour cells following breast biopsy: a literature review

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Introduction This literature review examines evidence relating to needle biopsy of the breast and the potential for later tumour cell migration into adjacent tissues.
Methods A literature search was undertaken, using Medline, Embase and the Cochrane Library.
Results The results were analysed by the following: (1) Histological evidence of spread (seven papers addressing this were scrutinised; number of patients reviewed was 1,046). Tumour cell displacement occurs in about one-third of patients, the majority do not survive displacement. Vacuum biopsy techniques may reduce seeding potential. (2) Clinical evidence of recurrent disease (nine papers were scrutinised; number of patients reviewed was 1,575). Sporadic reports of tumour recurrence suspected to be a consequence of a biopsy procedure are described. Care to excise the site of needle biopsy is advised by some, especially if outside the radiotherapy field. (3) Likelihood of seeding dependent upon tumour type (three papers were scrutinised; number of patients reviewed was 258). There is limited evidence to suggest lobular carcinoma is less likely to seed than ductal.
Conclusions There is histological evidence of seeding of tumour cells from the primary neoplastic site into adjacent breast tissue, following biopsy. However, clinical recurrence at the site of a needle biopsy is uncommon. This event may be lessened by use of vacuum biopsy techniques. The site of needle biopsy should be considered at the time of surgery.

P44

How can the prevalent round recall rate be reduced?

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Introduction The prevalent round recall rate is higher than the incident recall rate. Implementation of age extension will lead to two prevalent rounds and with this increased clinical and financial pressure on screening units. Any processes that help reduce the recall rate will be of benefit to screening units.
Methods Retrospective data were collected from April 2008 to March 2009 of prevalent round ladies recalled to assessment clinics. The data recorded included reason for recall, imaging findings and needle test results.
Results A total of 7,627 women were invited for screening in April 2008 to March 2009, of which 5,341 attended. Four hundred and eighty-one ladies were recalled to assessment; 451/481 of the packets available were reviewed. Forty cancers were identified in 39 patients. All cases of malignancy were coded as RU, RS or RM at the time of film reading. Thirty-two patients were recalled for both sides, four patients recalled for two lesions within the same breast. Nineteen patients were clinical recalls (BA). All solitary RB masses thought to be benign at the time of film reading proved to be benign (91/215 masses). Ten cases recalled for bilateral RB masses were benign. Thirty-six out of 140 asymmetries thought to be benign at the time of film reading were benign.
Conclusions The recall rate may be reduced in the prevalent round by not recalling solitary RB masses, bilateral RB masses, and asymmetry that appears physiological/benign on two views. In this unit this would have reduced the recall rate without adversely affecting the cancer detection rate.

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Educational abstract

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P46

Breast histoscanning: the development of a novel technique to improve tissue characterization during breast ultrasound

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Introduction Imaging alone cannot reliably distinguish benign/malignant breast disease or assess the extent of cancer. This study assesses the feasibility of using additional information obtained at US (BHS) to aid diagnosis and preoperative assessment.
Methods 3D US scans at 8 MHz, 12 MHz, 15 MHz were obtained of breast tissue in normal volunteers in two planes and with/without harmonics. Five volumes of sagittal scans at 8 MHz from three individuals were used to identify normal characteristics and define the baseline. The 3D volume was divided into voxels (0.1 x 2 x 1.5 mm) and raw data from each voxel were analysed by applying linear and nonlinear classifiers to assess 29 statistical characteristics (BHS). The training dataset contained 300,000 voxels. After training, the classifier's output showed 3% error on both normal and abnormal tissue. The algorithm was tested on 32 further volumes representing 6,000,000 voxels of normal and abnormal tissue from 20 individuals. Abnormal tissue included various biopsy-proven lesions: malignancy (six), papilloma (one), hamartoma (one), fibroadenoma (two), cyst (two), fibrosis (one). Subclassifiers were developed to distinguish between cancer and benign voxels.
Results In 17 normal testing volumes, 3% of isolated voxels were classified as abnormal. In 15 abnormal testing volumes, the subclassifiers differentiated between malignant and benign tissue. BHS in benign tissue showed <1% abnormal voxels in cyst, hamartoma, papilloma and benign fibrosis. The fibroadenomas differed showing <5% and <24% abnormal voxels. Abnormal voxels in cancers increased with the volume of cancer at pathology.
Conclusions Histoscanning reliably discriminated normal from abnormal tissue and could distinguish between benign and malignant lesions.

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Single voxel proton magnetic resonance spectroscopy of breast cancer at 3T

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Introduction *In vivo* detectability of a signal (tCho) from choline containing molecules at ~3.2 ppm by MR spectroscopy (MRS) can be useful as a biomarker for malignancy. tCho has also been observed in benign, normal, and lactating breast, therefore quantitation is vital. The aim is to assess whether tCho detectability can differentiate between benign and malignant breast disease and to implement internal water-referenced choline quantitation at 3T.
Methods Women with histologically confirmed breast cancer or suspicious features were identified either at MDT or following referral for clinical breast MRI and recruited following informed consent. Studies were performed on 3T Philips Achieva (the Netherlands). Contrast-enhanced MRI localised the region for point-resolved spectroscopy (PRESS) evaluation. Spectral processing was performed with jMRUI. The choline concentration was determined using the unsuppressed intravoxel water resonance as a reference. tCho detectability and choline concentration were correlated with known pathological information. Results were analysed by JKPB.
Results Nine participants (age range, 38 to 73 years) were successfully examined. tCho was detected at ~3.2 ppm in four of nine lesions (lesion size, 0.8 to 7.0 cm; mean, 3.0 cm), providing a sensitivity and specificity of 67% and 100%, respectively. The two quantitative values of 2.13 and 5.59 mmol/kg are consistent with previously reported findings.
Conclusions MRS is a non-invasive and non-ionising means of analysing lesion metabolism as an adjunct to clinical MRI. Whilst potentially useful for differentiating between benign and malignant breast diseases, implementation is challenging. Using clinical 3T systems, internal water referencing can successfully quantify choline in patients with breast cancer.