BNMS
Autumn Meeting

Future of Nuclear Medicine Services
25th - 26th September 2008

At The Arena and Convention Centre
Liverpool - European Capital of Culture 2008
The Superlambanana Story

The Superlambanana is a well-known sculpture in Liverpool, standing approximately 15 feet tall and weighing nearly 8 tons.

This sculpture was created by Manhattan-based Japanese artist Taro Chiezo for the ArtTransPenine Exhibition in 1998, in celebration of the reopening of the Liverpool branch of the Tate Gallery. It was intended as an ironic comment on the dangers of genetic engineering, utilising two of the port of Liverpool’s trade icons, the banana as a symbol of imports and the lamb as one of Liverpool’s major exports.

Chiezo actually only made a 4 inch model of the Superlambanana, and the definitive sculpture was recreated locally by Andy Small, on a scale of 1:50, using a wire-mesh frame supporting a concrete shell.

Liverpool is the European Capital of Culture in 2008, and as part of the celebrations, more than 120, 2 metre high replicas of the Superlambanana have been located around the city and surrounding areas since 16th June. These have been decorated by artists, schools and community groups and will remain in situ for 10 weeks, prior to being auctioned for charity.

Pictures of many of these Superlambananas are included in this programme to provide a sense of Liverpool as the European Capital of Culture, 2008.
Welcome to Liverpool and the Autumn Scientific Meeting of
The British Nuclear Medicine Society 2008

Location
The Arena and Convention Centre,
Monarchs Quay
Liverpool L3 4FP

Please see map & travel directions at the back of the programme

CPD
9 CPD credits approved by the RCP.

Accommodation
Visit http://www.bnms.org.uk

Car Parking
Car parking is available on site in the ACC multi-storey car park

Catering
Tea, Coffee & Lunches are provided on Level 3 in Hall 3

Registration
Registration is situated on the Galleria

Opening times:
10:00 on Thursday 25th September
08.30 on Friday 26th September

Cloakroom
A staffed cloakroom is available on the Galleria

Lectures & Posters
Lecture Theatres and Poster Display are situated on Level 3 of the BT Convention Centre

The main meeting will be held in Hall 1C

The Nuclear Cardiology Masterclass will be held in Hall 4A

Posters will be exhibited in Hall 3

Organising Committee
Prof S Vinjamuri (Chair)
Dr M L Smith
Dr R Jayan
Dr C Ramesh
Mr P Maltby

Exhibiting Companies
We are grateful to the following companies for supporting this meeting:

AG Medical, Alliance Medical, Bartec Technologies Limited, Bristol-Myers Squibb, Comecer, Covidien, GE Healthcare, Gravatom Engineering Systems Limited, Hermes Medical Solutions, IBA Molecular UK Limited, Imaging Equipment Limited, Lablogic Systems, Lodestone Patient Care, Philips Healthcare, Qados, Siemens, Southern Scientific Limited

The Organising Committee also wish to thank the following companies for their generous sponsorship:

Bristol-Myers Squibb, Covidien, Hermes Medical Solutions
Exhibition

The Exhibition is situated on Level 3 in Hall 3

Opening times:
10:00-17:30 on Thursday 25th September
09:00-14:00 on Friday 26th September

Telephone Messages

The Visitors Service Desk (telephone no: 0151 239 6001) can pass urgent telephone messages to the BNMS Registration desk for transmission to individual delegates

Social Events

The Conference Dinner will take place in the Marriott Hotel, Queen Square, Liverpool at 19:30 on Thursday 25th September

Leaflets on Liverpool tourist attractions are included in the Conference pack.

Acknowledgements

Thanks to Mr I Hufton and Mr D Adkins for the Superlambanana pictures.

Thanks also to Miss K Barnes, Medical Illustration Service, Royal Liverpool Hospital for designing the programme.

Internet Access

Internet access is available on the Galleria via the BT Open Zone website using a credit card (the Visitors Information Desk staff will help with this)
Future of Nuclear Medicine Services Autumn Meeting: 25th - 26th September 2008

Day 1 Thursday

10:00 Registration, Tea & Coffee

Opening Session - Hall 1C
Chair: Prof S Vinjamuri

11:00 Opening of Conference
Dr G Vivian
President of the BNMS

11:10 Invited talk: Hub & Spoke Model for Nuclear Medicine Services
Dr G Vivian
Dept of Nuclear Medicine, Derriford Hospital

11:40 Invited talk: Advances in Radiopharmaceuticals
Mr P Maltby
Radiopharmacy Department, Royal Liverpool University Hospital

12:10 Lunch & Visit to exhibition

Session 2: PET/CT (1) Hall 1C
Chair: Dr M L Smith

13:30 Invited talk: Paraneoplastic Syndromes & PET/CT
Dr I Hart
The Walton Centre for Neurology & Neurosurgery, Liverpool

14:00 1 Brain 18F-FDG PET CT in the Diagnosis of Early Dementia: An Evaluation of Referrer Satisfaction with a Regional PET CT Service.
Young CM
Dept of Old Age Psychiatry, Downshire Hospital Northern Ireland

14:15 2 Value of Positron Emission Tomography with [F-18] Fluorodeoxyglucose (FDG PET) in colorectal carcinoma patients with clinical or radiological findings suspicious for tumour recurrence
Amin S White D Smethurst FA Wieshmann NH
University Hospital Aintree, Liverpool

14:30 3 An Analysis of the Iterative Reconstruction Algorithms of the GE Discovery VCT PET/CT Scanner
McWilliams SR Schleyer P Marsden P Baker S
King's College, London

14:45 Tea, Coffee & Visit to exhibition

Session 3: PET/CT (2) Hall 1C
Chair: Dr C Romaniuk

15:15 Invited talk: A Cancer Manager’s Perspective of Nuclear Medicine
Mrs G Hamblin
Cancer Manager, Royal Liverpool University Hospital

15:45 4 To evaluate the accuracy of integrated fluorine 18 fluorodeoxyglucose (FDG) positron emission tomography (PET) and computed tomography (CT) (PET/CT) for the preoperative diagnosis of metastases in non-small cell lung cancer (NSCLC), with surgical and histologic results as reference standards.
Arora V1 Avery G2
1Specialist Registrar, Radiology, Hull and East Yorkshire Hospitals NHS trust. 2Consultant Radiologist, Castle Hill Hospital, Hull and East Yorkshire hospitals NHS trust.

16:00 5 Detection of occult metastasis using 18F-FDG PET/CT in potentially resectable non-small cell lung cancer (NSCLC) with disease free mediastinum
Rasul S1, 2 Khan I1 Han S1 Poon FW1
1West of Scotland PET/CT Centre, Gartnavel General Hospital, Glasgow 2Department of Radiology, Glasgow Royal Infirmary, Glasgow
16.15: 18F-FDG PET/CT characterisation of metastatic lung nodules in patients with colorectal carcinoma (CRC)
Rasul S1, 2 Han S1 Poon FW1, 2
1West of Scotland PET/CT Centre, Gartnavel General Hospital, Glasgow
2Department of Radiology, Glasgow Royal Infirmary, Glasgow

14:00-16:00 Session 3A: Parallel Session Hall 4A
Chair: Dr R Jayan & Dr P Arumugam

Nuclear Cardiology Masterclass

Session 4: Posters Hall 3

16:30-17:30 Visit Posters (P1-P19)

19:30 Conference Dinner
Marriott Hotel, Queen Square, Liverpool
An evaluation of the additional benefit of ventilation phase imaging over perfusion alone in V/Q studies for the diagnosis of PE, using krypton as the ventilation agent, in patients with clear CXR, with and without pulmonary airway disease.

Fowler JCM  Winterbottom A  Driver R

Luton and Dunstable NHS Foundation Trust

Comparison of two methods of “half-time” myocardial SPECT imaging with 3D resolution-recovery reconstruction

Armstrong IS  James J  Arumugam P  Tonge CM

Lawson RS

Nuclear Medicine Department, Manchester Royal Infirmary, Manchester

Positive H. Pylori serology does not influence gut uptake of tetrofosmin during myocardial perfusion study

Hirji HFM  Bulstrode H  Moran N  Buscombe JR

Hilson AJW

Department of Nuclear Medicine, Royal Free Hospital, London

The added value of MRI spine in addition to Technetium-99m- labelled MDP isotope bone scintigraphy in the assessment for bone metastases in patients with known primary malignancy

Chawla S  Hanlon R  Wieshmann NH

University Hospital Aintree, Liverpool

Tea, coffee & visit to exhibition

Invited talk: Advances in Diabetes Services

Prof. J Vora

Diabetes Centre, Royal Liverpool University Hospital

10:45

Ventilation & Perfusion (VQ) Imaging in the Investigation of Suspected Pulmonary Embolism (PE) during Pregnancy

Tomas Hernandez S¹  Khan I²  Dennis J¹  Han S¹

Poon F W¹, ²  Neilly JB¹

¹Nuclear Medicine Department, Glasgow Royal Infirmary, Glasgow ²Radiology Department, Glasgow Royal Infirmary, Glasgow

Exposure pathways in Nuclear Cardiology

Viana MLT  Homer L  Hallam A

Oxford Radcliffe Hospitals NHS Trust
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<thead>
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<th>Time</th>
<th>Session</th>
<th>Title</th>
<th>Speakers</th>
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<tr>
<td>12:45</td>
<td>Lunch &amp;</td>
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<td>13:45</td>
<td>Session 7</td>
<td>Miscellaneous Hall 1C</td>
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<td>13:45</td>
<td>16</td>
<td>The value of delayed post micturition data in the paediatric population.</td>
<td>James JM, Tandon L, Karunaratne D, Al-Baharni GI, Prescott MC</td>
<td>Department of Nuclear Medicine, Manchester Royal Infirmary</td>
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<td>14:00</td>
<td>17</td>
<td>A little light haemolysis, does it matter for a GFR?</td>
<td>Holmes LC, Sanders L, Pratt-Boyden N, Ryder W, Dawson A, Masoomi M</td>
<td>Dept of Radiology &amp; Nuclear Medicine, St Mary's Hospital, Portsmouth Hospitals NHS Trust</td>
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<td>14:15</td>
<td>18</td>
<td>Considering two registration algorithms for motion correction: how effective could they be?</td>
<td>Courtney J, BNMS, IPEM, BIR</td>
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<td>14:30</td>
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<td>HIDA scan in the diagnosis of acalculous cholecystitis - the DGH experience</td>
<td>Trautner MC, Smith P, Lewis M, Winter R, K Royal Glamorgan Hospital, Llantrisant CF72 8XR</td>
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<td>14:45</td>
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<td>Iodine-SPECT-CT in Differentiated Thyroid Cancer: A Local Series</td>
<td>Agrawal K, Power D, Kapse, Dave S, Dhawan R, Dept of Radiology &amp; Nuclear Medicine, St Mary's Hospital, Imperial College NHS Trust, London</td>
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<td>Dept of Oncology, St Mary's Hospital, Imperial College NHS Trust, London</td>
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<td>15:00</td>
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<td>Close of Meeting</td>
<td>Prof S Vinjamuri</td>
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Abstracts

Session 2: PET/CT (1)

1 Brain 18F-FDG PET CT in the Diagnosis of Early Dementia: An Evaluation of Referrer Satisfaction with a Regional PET CT Service.
Young CM
Specialist Registrar in Old Age Psychiatry Downshire Hospital Northern Ireland

Purpose of the Study
The clinical identification and differential diagnosis of early dementia is especially challenging. The need for early, accurate diagnosis is gaining increasing importance not least with the availability of several medications for the treatment of mild to moderate cognitive impairment associated with Alzheimer’s Disease, but also with advances in potential preventative and disease-modifying agents appearing imminent. Currently however the diagnosis of dementia remains largely clinical. The use of 18F-(Fluoro-deoxy-glucose) FDG PET CT offers improved accuracy in the diagnosis of dementia, particularly in the early stages of the disease. Few studies however have focused on referrer satisfaction.

Methods
Data was collected for 100 patients referred for Brain 18F-FDG PET CT since the establishment of a designated regional PET CT service in Northern Ireland in 2005. Referrer details were recorded for all patients. Face to face interview was conducted with twenty referrers from five sub specialities to determine referrer satisfaction with current service provision.

Results
95% of referrers found the PET CT findings helpful in terms of overall clinical care.

Conclusion
Brain 18F-FDG PET CT is a useful adjunct to the clinical assessment and differential diagnosis of dementia.

2 Value of Positron Emission Tomography with [F-18] Fluorodeoxyglucose (FDG PET) in colorectal carcinoma patients with clinical or radiological findings suspicious for tumour recurrence
Amin S White D Smethurst FA Wieshmann NH University Hospital Aintree, Liverpool

Purpose
Establish the added value of 18F Fluorodeoxyglucose Positron Emission Tomography (FDG PET) in colorectal carcinoma patients with clinical or radiological findings suspicious for tumour recurrence.

Methods
Review of 60 patients with suspected recurrent colorectal cancer who had FDG-PET in addition to conventional diagnostic methods (CDM). FDG-PET, CT and MRI findings were compared and correlated with CEA.

Results
49/60 patients had FDG positive disease and 4 different groups of patients were identified:

26/60 with an abnormality on CDM: FDG positive disease at the site of abnormality on CDM=14/26, additional FDG positive disease=10/26, FDG negative disease=2/26.

20/60 with an abnormality on CDM and rising CEA: FDG positive disease at the site of abnormality on CDM= 11/20, additional FDG positive disease = 8/20, FDG negative disease=1/20.

12/60 with an abnormality on CDM and normal CEA:FDG positive disease at the site of abnormality on CDM= 4/12, additional FDG positive disease=2/12, FDG negative disease = 6/12.

2/60 with raising CEA, no abnormality on CDM: FDG positive disease=2/2.

Conclusion
FDG PET is a valuable imaging method to differentiate isolated resectable recurrence from disseminated metastatic disease in a third of colorectal cancer patients and therefore adds value to select patients for curative surgery.
3 An Analysis of the Iterative Reconstruction Algorithms of the GE Discovery VCT PET/CT Scanner
McWilliams SR, Schleyer P, Marsden P, Baker S
King's College London

Fully 3D iterative reconstruction algorithms have the potential to provide substantial improvements in PET image quality. We evaluated the 3D ML-OSEM VUE Point™ algorithm implemented on the GE Discovery VCT PET-CT scanner in terms of image quality and quantitative accuracy. The VUE Point algorithm was demonstrated to be as good as or better than the 2D OSEM, 3D FORE Iterative and 2D FBP algorithms which are also implemented on this system.

Image quality as a function of various reconstruction parameters (notably number of iterations and number of subsets) was evaluated using the standard EU/NEMA spheres phantom. Quantification and potential variation in convergence rate over the image were investigated using specially constructed phantoms. Image quality in whole body FDG images was also evaluated in terms of image noise and spatial resolution.

The optimum reconstruction parameters were found to be slightly different to the manufacturers default values. All algorithms were found to be highly quantitatively accurate with R2 values (measured v. true activity) in excess of 0.98. VUE Point was found to be just as accurate as 2D OSEM and an improvement over the 3D FORE Iterative algorithm in terms of both image quality and quantitative accuracy.

Session 3: PET/CT (2)

4 To evaluate the accuracy of integrated fluorine 18 fluorodeoxyglucose (FDG) positron emission tomography (PET) and computed tomography (CT) (PET/CT) for the preoperative diagnosis of metastases in non-small cell lung cancer (NSCLC), with surgical and histologic results as reference standards.
Arora V1, Avery G2
1Specialist Registrar, Radiology, Hull and East Yorkshire Hospitals NHS trust. 2Consultant Radiologist, Castle Hill Hospital, Hull and East Yorkshire hospitals NHS trust.

Methods
A retrospective analysis of PET-CT examinations in patients with potentially operable Non-Small Cell lung cancer between Oct 2006 and Dec 2007 was performed. The impact of PET-CT staging in the management of these patients was assessed. The CT staging, PET staging, need for mediastinoscopy, thoracotomy findings and histologic findings were recorded.

Summary of results
FDG-PET imaging accurately staged 54 of 70 patients (77%) in our study. Understaging occurred in nine patients (13%). Seven patients were overstaged (10%). In patients with FDG uptake in the mediastinum, the presence of N2 disease in FDG-PET-CT scans was confirmed by mediastinoscopy in accordance with NICE guidance. Mediastinoscopy correctly downstaged the five patients with a false-positive FDG-PET scan result. Thus, the sensitivity, specificity, and positive and negative predictive values of FDG-PET imaging for resectable disease were 53%, 84%, 57%, and 84%, respectively.

Conclusions
Selective use of FDG-PET imaging improves staging accuracy compared to CT scanning alone. However, with a positive PET-FDG scan result, further diagnostic procedures should be pursued in order to avoid overstaging and allow better surgical patient selection.

5 Detection of occult metastasis using 18F-FDG PET/CT in potentially resectable non-small cell lung cancer (NSCLC) with disease free mediastinum
Rasul S1, Khan I2, Han S1, Poon FW1
1West of Scotland PET/CT Centre, Gartnavel General Hospital, Glasgow. 2Department of Radiology, Glasgow Royal Infirmary, Glasgow

Introduction
18F-FDG PET/CT provides a reliable staging of mediastinum and distant metastasis of NSCLC. In this study we aim to quantify those patients with no mediastinal disease but unexpected distant metastases identified by PET/CT.

Methods
255 consecutive patients had undergone 18F-FDG PET/CT for staging NSCLC in our department from December 2007 to May 2008. Those patients whose PET/CT showed normal mediastinum but identified new distant metastases were selected.

Results
13/255 patients (5%) had occult metastases with disease free mediastinum on 18F-FDG PET/CT. The sites were adrenal (5), bone (4), extra-mediastinal distant nodal (3) and widespread (1). 12/13 patients were upstaged to stage IV from stage I (n=10) and stage III (n=2). 1/13 patient was changed from single to multiple metastases.

Conclusion
This study demonstrates that a significant proportion of potentially operable lung cancer patients by conventional staging, have occult metastases identified by 18F-FDG PET/CT even though mediastinum is clear. This highlights the importance of the use of PET/CT in the staging of early NSCLC patients.
18F-FDG PET/CT characterisation of metastatic lung nodules in patients with colorectal carcinoma (CRC)

Rasul S1, 2 Han S1 Poon FW1, 2
1West of Scotland PET/CT Centre, Gartnavel General Hospital, Glasgow
2Department of Radiology, Glasgow Royal Infirmary, Glasgow

Introduction
18F-FDG PET assessment of malignant pulmonary nodules is affected by the resolution limits of the technique as well as type of the tumour. We evaluated the 18F-FDG PET/CT characterisation of metastatic pulmonary nodules of varying sizes in patients with CRC.

Methods
PET/CT reports from December 2007 to May 2008 were reviewed to identify patients with CRC and pulmonary nodules. Patients with pulmonary nodules, which were decided as benign following clinical and imaging follow-up were excluded. Each nodule was analysed by visual assessment and SUVmax compared to background lungs and mediastinal blood pool (MBP).

Results
24 patients with a total of 47 nodules (median diameter 7mm, range 4-33 mm) were identified.

17/19 nodules smaller than 7 mm (89%) were not visible on PET. 2/19 showed minimal uptake. 8/10 nodules sized 7-8mm (80%) showed FDG uptake higher than the background but lower than MBP. 2/10 nodules were not PET visible. 18/19 nodules above 8 mm (95%) had uptake higher or similar to the MBP. 1/19 had uptake lower than MBP.

Conclusion
18F-FDG PET/CT assessment of metastatic pulmonary nodules from CRC depends on their size. FDG uptake criteria are helpful in diagnosing pulmonary nodules larger than 8 mm in this group.
P8 Signs in Nuclear Imaging
McCann C Wieshmann NH
University Hospital Aintree, Liverpool, UK

P9 Artefacts on Whole-body PET-CT revisited.
Khan ZA1 Ogunremi B Adesanya O2
1 Queen Elizabeth Hospital, University Hospital Birmingham NHS Foundation Trust, Birmingham, UK 2 University Hospital Coventry & Warw., Coventry, UK.

P10 Current status of service delivery for PET-CT in the West Midlands, United Kingdom.
Khan ZA1 Ogunremi B Adesanya O2
1 Queen Elizabeth Hospital, University Hospital Birmingham NHS Foundation Trust, Birmingham, UK 2 University Hospital Coventry & Warw., Coventry, UK.

P11 FDG Uptake in the Female Pelvis: Normal Distribution and Benign Variants
Bickle IC Walker RI Lorenz E
Sheffield Teaching Hospitals NHS Foundation Trust

P12 A questionnaire survey of clinician’s awareness and attitude towards incidental pathology identified on PET-CT
Khan ZA1 Ogunremi B Adesanya O2
1 Queen Elizabeth Hospital, University Hospital Birmingham NHS Foundation Trust, Birmingham, UK 2 University Hospital Coventry & Warw., Coventry, UK.

P13 Infant dose from breast milk during early lactation following maternal 99mTc.MAA lung perfusion scan
Jefferson E Mackie A
University Hospital of North Durham, North Road, Durham, DH1 5TW

P14 An initial assessment of an alternative labelling kit for liver and GI Transit studies
Trabelsi M Maltby P
Royal Liverpool and Broadgreen University Hospitals NHS Trust

P15 Introduction of new waste management software to a radiopharmacy and nuclear medicine department.
Thom J
Radiopharmacy, Southampton General Hospital, Tremona Road, Southampton

P16 A Retrospective Analysis of Peritoneal Scintigraphy
O’Callaghan C Bartley L Facey P Rees J Jones J
1 Radiology Directorate, University Hospital of Wales, Cardiff 2 Medical Physics Department, University Hospital of Wales, Cardiff

P17 Use of individual schillings test capsules as standards
Bird NJ
Addenbrooke’s Hospital, Cambridge

P18 Investigation into the Degradation of Latex Gauntlets Using IMS and Biocidal ‘B’ Wipes
Cripps H
Royal Sussex County Hospital

P19 CSI St. Mary’s: Challenging Scan Investigation, A St. Mary’s experience
Vicente Jr AV Dave S Kiani S Agrawal KD Hawan RT
Dept of Radiology and Nuclear Medicine, St Mary’s Hospital, Imperial College NHS Trust, London

Session 5: Bone

7 Hybrid SPECT/CT in bone scanning: Already making a difference to patient management and will help to secure the future of Nuclear Medicine.
Taha N I Sandhu N P Barber HAJ Barber C J
1 Princess Alexandra Hospital NHS Trust 2 The Leventhorpe School

Purpose
An analysis of the impact of hybrid SPECT/CT bone scanning during the first year: on reporter confidence, report credibility with referrers and accuracy. To evaluate the utility of a checklist designed to allow delegation of the decision to perform SPECT/CT to the radiographer.

Methods
Interpretation of planar scans, diagnoses made and confidence were recorded numerically. SPECT/CT images were viewed and alterations to diagnoses and confidence recorded.

Where a definitive diagnosis was reached, the diagnostics databases were searched for its credibility with the referrer; and evidence of uncertainty in the immediate follow-up imaging or biopsies.

We anticipated that most SPECT/CT would be unplanned, responding to equivocal findings on planar scans. A consultant couldn’t always be available to decide on whether to perform SPECT/CT. We therefore designed a checklist for radiographers, guiding them in interrogating the planar scan and RIS/PACS and making that decision. Check list effectiveness analysed.
Results
916 bone scans. 73 went on to SPECT/CT.

In 49, diagnostic confidence was increased. In 37 of these a definitive diagnosis was reached. In all 37 that diagnosis was judged credible by the referrer. Follow up has shown all 37 diagnoses to be correct.

7 out of 916 should have had SPECT but didn’t.

6 had SPECT/CT but didn’t need it.

Conclusion
SPECT/CT made a significant difference to a minority of cases, immediately had clinician credibility and was accurate. The pilot use of a radiographer checklist performed satisfactorily in its first year and should perform better with experience.

8 Development of Nuclear Medicine and X-Ray Co-registration in Skeletal Imaging
Guy MJ1 O’Brien L2 Hinton PJ1
1Department of Medical Physics, Royal Surrey County Hospital, Guildford, Surrey, GU2 7XX 2Department of Nuclear Medicine, St Richard’s Hospital, Chichester, West Sussex, PO19 6SE

Aim
An automated co-registration technique has been developed utilising conventional planar Nuclear Medicine and x-ray imaging to aid precise localisation in areas of complex bony anatomy such as the hand and foot.

Methods
A variety of groups have developed co-registration extremity imaging. The technique described here combines the advantages of a single imaging point solution, without active patient immobilisation, and automated registration and image overlay processing.

A specially constructed jig, containing a digital x-ray cassette, is placed on the collimator. A planar NM image is acquired with the patient’s hand or foot in the jig. A Cobalt pen is used to locate five small metallic markers on the jig. Immediately post NM imaging, a mobile x-ray unit provides low-dose, high resolution x-ray data.

Both digital datasets are combined in a registration and overlay imaging package developed by this team, details of which will be presented. Four markers are used to calculate the registration transformation, whilst another is used for verification. Full control of the overlay image, which can be archived, is available to the reporting radiologist.

Results and Conclusions
Excellent registration accuracy (1-2mm) was found. The placement of digital cassette was found to have no significant impact on resolution or sensitivity of the NM data. No additional lead masking was required to protect the crystal from the x-ray beam.

9 The added value of MRI spine in addition to Technetium-99m- labelled MDP isotope bone scintigraphy in the assessment for bone metastases in patients with known primary malignancy
Chawla S Hanlon R Wieshmann NH
University Hospital Aintree, Liverpool

Purpose
Establish the diagnostic yield of 99mTc MDP bone scintigraphy and the additional diagnostic value of MRI in the diagnosis of vertebral metastases.

Methods
All patients who had a 99mTechnetium methylene diphosphonate (99mTc MDP) bone scintigraphy followed by an MRI Spine scan at the University Hospital Aintree between November 2006 and August 2007 were included.

The clinical indication, the bone-scan findings and the final MRI diagnosis were reviewed.

Results
Over the study period, 927 (F=443, M=484) patients had 99mTc MDP bone scintigraphy. Of the 927 patients, 560 had a known history of malignant tumour. 99mTc MDP bone scintigraphy identified bone metastases in 132 of 560 patients. In 65 patients an additional MRI was requested. Additional metastases were identified in 3 patients; in 14 patients the 99mTc MDP bone scintigraphy failed to demonstrate the vertebral metastases detected on MRI of the spine.
Conclusion
In the large majority of cancer patients, an investigation with 99mTc MDP bone scintigraphy by itself provided clinically acceptable information. Additional MRI scans were requested in approximately 11.6%. In patients with normal bone scan of the spine, 10.6% had vertebral metastases on MRI.

Session 6: Heart & Lung

10 Ventilation & Perfusion (VQ) Imaging in the Investigation of Suspected Pulmonary Embolism (PE) during Pregnancy
Tomas Hernandez S, Khan I, Dennis J, Han S, Poon F W, Neilly JB
1 Nuclear Medicine Department, Glasgow Royal Infirmary, Glasgow G31 2ER 2 Radiology Department, Glasgow Royal Infirmary, Glasgow

Purpose
There have been uncertainties about the optimum imaging algorithm to diagnose PE in pregnancy. The accuracy of VQ imaging in this group may differ from general population. We aim to assess the value of VQ scans in pregnant patients with suspected PE.

Methods
218 consecutive VQ scans of pregnant patients with suspected PE during January 2004 - December 2007 were retrospectively reviewed. The mean age was 29 years (range 15-46) and mean duration of pregnancy was 30 weeks (range 8-40). From the hospital information system, the clinical data including diagnostic tests and outcomes were collected. Mean follow up time was 668 days (range 61-1409).

Results
VQ scans were diagnostic in 87% (69% normal, 11% PE unlikely and 7% working diagnosis no PE); and indeterminate 13%.

22/218 patients (10%) proceeded to CTPA (previous VQ: 20 indeterminate, 2 working diagnosis no PE). Only 1/22 CTPA detected PE (indeterminate VQ).

34/218 patients (16%) were reinvestigated following initial admission. One patient was diagnosed DVT in follow up scan.

Conclusion
The incidence of PE is low in the pregnant patients referred for VQ scans. VQ scan provides very good diagnostic value in excluding PE in this particular population.

11 An evaluation of the additional benefit of ventilation phase imaging over perfusion alone in V/Q studies for the diagnosis of PE, using krypton as the ventilation agent, in patients with clear CXR, with and without pulmonary airway disease.
Fowler JCM Winterbottom A Driver R Luton and Dunstable NHS Foundation Trust

Background/Aim
Some published work advocates perfusion (Q) without ventilation (V) imaging in diagnosing pulmonary embolism in subjects with normal chest xray (CXR) when patients with coexisting pulmonary disease (PD) are excluded. An audit was performed to assess the contribution of V to V/Q interpretation in our centre, to establish whether provision of V imaging can be justified locally.

Methods
A retrospective analysis of 333 studies was performed. All had clear lungs on CXR. Each patient was allocated to one of two groups according to the presence or absence of PD. A single experienced observer classified scans by standard reporting criteria into high, intermediate, low and normal probability categories, firstly using the Q image alone, secondly using complete V/Q. Statistical analysis was performed to assess the 2 scanning strategies.

Results
In nearly one third of patients, the addition of V reduced the probability category, with patients being down graded particularly from high and intermediate categories to intermediate and low categories respectively, following consideration of V. The percentage of normal studies was unchanged. There was no significant difference between categorisation proportions in populations with and without PD.

Conclusion
The added specificity of V/Q justifies use of krypton ventilation agent in patients with clear CXR, even in those with PD. The contradiction of our findings with published data may reflect the additional benefit of krypton over other ventilation agents.

12 Comparison of two methods of “half-time” myocardial SPECT imaging with 3D resolution-recovery reconstruction
Armstrong IS James J Arumugam P Tonge CM Lawson RS Nuclear Medicine Department, Manchester Royal Infirmary, Manchester

Reducing the acquisition time of myocardial SPECT while maintaining diagnostic image quality is desirable to reduce patient discomfort. This work evaluates two approaches to
half-time SPECT achieved by either halving the time per frame or the number of view angles. The latter method is recommended by the manufacturer.

Images of an anthropomorphic cardiac phantom were acquired on a Siemens c.cam cardiac camera. Normal and four abnormal myocardial defects were simulated. Full time, "half-frame time" and "half views" acquisitions were acquired using LEAP and LEHR collimators. Half time images were reconstructed with Siemens Flash 3D, which incorporates resolution recovery, and compared to the full time images reconstructed using standard OSEM on GE Xeleris workstations. Blinded myocardial slices and polar plots were viewed independently by two observers.

LEAP Flash 3D images were considered superior to LEHR images, due to increased homogeneity in the normal regions of the myocardium. All Flash 3D images showed prominent infero-lateral reduction due to attenuation. Both sets of half time images reconstructed with Flash 3D showed increased sharpness and contrast of defects compared to standard OSEM. Of the two methods of half-time imaging, neither was found to be significantly superior to the other.

13 Positive H.Pylori serology does not influence gut uptake of tetrofosmin during myocardial perfusion study
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Background
Myocardial perfusion studies (MPS) are commonly used to assess cardiac ischaemia in patients with uncertain exercise tolerance tests and assist in differentiating cardiovascular disease from other causes of retrosternal pain.

MPS assessment of inferior wall ischemia can be complicated by artefacts from gut uptake of radiolabelled tracer.

Gastritis is another common cause of retrosternal chest pain, and may be caused by H. Pylori infection

Previous studies using 18-FDG PET imaging have shown increased gastric uptake in patients with concurrent H.Pylori infection, raising the possibility that the gut uptake in MPS might be secondary to H Pylori infection.

This study examined the implications of H.Pylori serology status on gut uptake in patients investigated by MPS with 99m-Tc-Tetrofosmin.

Methods
140 consecutive patients receiving MPS had a sample of blood taken for H.Pylori serology. Analysis was performed using a t-squared .test.
Results
RV EF measured by Terna was slightly but significantly
greater (p=0.04) than RV EF measured by MRA (0.58±0.05 vs
0.54±0.03 respectively), otherwise Terna and MRA
measures of RV ESV (67±13 vs 65±16), EDV (159±24 vs
140±25), and LV EF (0.55±0.09 vs 0.52±0.11). ESV (63±18 vs
75±36) and EDV (140±25 vs 151±47) were similar. RV
volumes (ESV and EDV combined) were highly correlated
(R=0.87) as were LV volumes (R=0.89).

Conclusions
Since Terna and MRA measurements were similar, this
study further validates Terna for accurate quantification of
RV and LV EF, ESV and EDV.

15 Exposure pathways in Nuclear Cardiology
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Introduction
A staff dose audit was carried out, in the Nuclear Cardiology
(NC) department. This was not a routine investigation but
instigated due to a member of staff receiving a whole body
dose above the monthly investigation level of 0.5mSv. We
aimed to produce recommendations regarding working
practices to reduce staff doses

Method/Results
The investigation covered past personal monitoring results,
environmental monitoring and additional personal monitoring
using an EPD and dose rate monitor (Fieldspec). We found
that full time workers received the highest doses. Environmental TLDs showed that the rest injection area had
the highest dose measurement. EPD monitoring showed that
labelling injections in radiopharmacy, carrying out rest
injections and reporting to patients gave rise to the highest
doses. Average dose rates were obtained for individual tasks
performed within the Radiopharmacy and NC Department.
Multiplying by an average time for each task we estimated the
operators daily dose. The highest doses were received from
preparing injections; 22.90ÌSv for rest and 5.21ÌSv for stress.
Reporting gave 3.50ÌSv.

Conclusion
The largest contributors to staff doses in our NC department
are: reporting to patients and dispensing in Radiopharmacy.
In order to reduce staff doses, we recommended moving the
rest injection area to a dedicated location and increasing
shielding within the radiopharmacy. Following this
investigation we have a much better understanding of the
exposure pathways within our NC Department.

Session 7: Miscellaneous

16 The value of delayed post micturition data in the
paediatric population.
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Aim
A recent collaborative study on interobserver reproducibility
in reporting paediatric MAG3 renography found disagreement
when post micturition data was not included. We reviewed
paediatric renograms over 5 years to evaluate our
performance.

Method
108 renograms were reviewed. The %dose remaining at the
department. The %dose remaining at the end of the renogram was compared to the %retained post
voiding and subdivided into erect and supine studies for the
whole group and for children under 2.5 years. For renograms
demonstrating abnormal drainage the % fall in activity post
micturition was recorded. Where serial studies had been
performed any change in relative function was noted.

Results
Post micturition data was available for 55%. 47% were
performed erect but the difference in retained activity between
erect and supine positions was not marked. In children less
than 2.5 years the post micturition image often showed a
significant fall in activity remaining but the image had to be
delayed until bladder emptying occurred. For kidneys with
abnormal drainage the post micturition data showed a fall in
retained activity in the majority. Serial studies were acquired
in 32 children; a change in relative function was seen in 2.

Conclusion
Analysis of retained activity post micturition adds significantly
to interpretation of the renogram particularly when the
drainage pattern is abnormal. The difference in drainage
between erect and supine renograms was not significant.
Post micturition/delayed images should be acquired following
all renograms.

17 A little light haemolysis, does it matter for a GFR?
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Background and aim
BNMS guidelines for Glomerular Filtration Rate (GFR)
assessment, suggests that haemolysed blood cells in plasma
samples may invalidate results (Fleming, J.S. et al., 2004,
25:759-769 Nuc Med Comm). The degree of haemolysis and
its affect on GFR measurement has been investigated in vitro (Price, J.M. et al. 2006, 27:1027 Nuc Med Comm). Haemolysis can occur due to difficult blood sampling e.g. use of small needles or osmotic fragility due to illness or medications. However, haemolysis rarely affects both blood samples and the present investigation was undertaken to determine whether haemolysis of a single blood sample impacts upon GFR measurements in vitro and which sample has the most impact.

**Method**
GFR tests were performed using 10MBq Tc99m-DTPA according to BNMS guidelines, with 2 and 4-hour sampling, each with an additional blood sample collected. GFR results were calculated for each patient. Each additional sample had 0.1ml of blood removed, placed into an ultrasound bath to haemolyse the cells, and returned to the sample, centrifuged & the plasma counted.

**Results**
The haemolysed & non-haemolysed GFR counts and results were examined graphically and statistically for each patient. Haemolysed and non-haemolysed counts were statistically significant (p<0.01) resulting in a 1.2ml/min difference from the non-haemolysed samples.

**18 Considering two registration algorithms for motion correction: how effective could they be?**
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*BNMS, IPEM, BIR*

The aim of this study was to understand the performance of two registration metrics at low signal to noise ratio.

Images were acquired of a simple phantom approximating a kidney at different target to background ratios. The registration error for 30 pairs of images at 25 levels of signal to noise ratio and 10 target to background ratios were found for each metric. The acquired data approximated the range seen in dynamic DMSA scanning and the metric performance ranged from very poor to successful.

Plots of mean and maximum errors of each set of 30 errors demonstrated the expected improvement in performance of both metrics with increasing signal to noise and target to background ratio. Also, one metric appears to be superior in this application.

This work helps decide the frame rate and an algorithm for automatic motion correction of paediatric DMSA imaging with mean registration error of better than 4mm.

**19 HIDA scan in the diagnosis of acalculous cholecystitis - the DGH experience**
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**Purpose**
To evaluate the utility of HIDA scans in diagnosis and treatment of acalculous cholecystitis in a DGH setting

**Methods**
Retrospective review of histology and clinical outcome of patients who underwent a HIDA scan for suspected acalculous cholecystitis. Gallbladder ejection fraction below 35% was considered abnormal.

**Results**
Of 34 patients with abnormal HIDA scans 25 patients were operated. 17 patients had complete resolution of symptoms, 3 partial and 5 no improvement. 20 patients had a positive histology, 3 patients had normal histology, 1 patient had missed calculous disease (1 patient histology not available).

Of 32 patients with a normal HIDA scan 9 patients were operated. 2 had calculous disease, all other 7 had abnormal histology, only 2 patients had complete resolution of symptoms (2 patients lost to FU).

**Conclusion**
HIDA scan and ejection fraction calculation is useful in decision making for patients with suspected acalculous cholecystitis. Clinical resolution of symptoms in patients with an abnormal scan was frequently achieved after surgery, however a positive outcome cannot be predicted. A positive histology is a frequent finding which was found in patients with abnormal and normal ejection fraction, vice versa we found negative histology in patients with abnormal HIDA scans. Careful clinical assessment and patient counselling is therefore advised prior to proceeding with cholecystectomy.
At least 2 transabdominal US examinations are suggested. The use of endoscopic US should also be considered.

20 Iodine-SPECT-CT in Differentiated Thyroid Cancer: A Local Series
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Aim/Purpose
A pictorial review to highlight the benefits of Iodine-123 and Iodine-131 SPECT/CT imaging compared with planar imaging in the follow-up of patients with differentiated thyroid carcinoma (DTC)

Methodology
Iodine post-therapy (I-131) or diagnostic (1-123) SPECT/CT (Hawkeye-4, GE) imaging performed in the follow up of DTC was compared with planar imaging and correlated with initial staging, thyroglobulin (Tg) levels, ultrasound (US) or other imaging and cytology/histopathology where available. Patients receiving their post-surgical ablative dose were excluded.

Results
SPECT-CT did not yield any significant benefit when planar imaging was normal in the few such cases it was undertaken. With abnormal uptake in the chest or neck region, planar imaging was not always predictive of the real site of disease as demonstrated on SPECT-CT. The template CT images, albeit low-dose had diagnostic value in some cases, beyond lesion localization.

Conclusion
Iodine-SPECT-CT improved diagnostic confidence and distinction between pathological and benign patterns of uptake. Improved lesion localization on SPECT-CT appropriately guided US sampling of lymph nodes/other imaging and surgery or radiotherapy to specific sites of disease optimizing the chances of local control in recurrent disease.
**By Car**
Take the M62 to Liverpool. Proceed straight on through traffic lights at the end of the motorway following signs for City Centre A5080 (also Albert Dock), under flyover with Jaguar garage on your left onto Edge Lane. Continue along dual carriageway (3 lanes narrow to 2). Across first traffic lights (Peugeot car dealership on left) and then left at next lights into Rathbone Road (OK Diner on left).

At roundabout turn right (signposted Wavertree Technology Park) into Wavertree Avenue. 1/4 mile then road bears round to right and then take left turn into Wavertree Boulevard. Proceed to traffic lights (T junction) and turn right onto Wavertree Road. Next lights turn left onto Tunnel Road (Netto and Iceland shops on left). Next lights turn right onto Upper Parliament Street (sign posted City Centre A562). Follow road through several sets of lights always proceeding forward. Road continues down a hill and bears right to run parallel to the river. Turn left at lights (Campanile Hotel on left, McDonald’s on right) into Queens Wharf and follow temporary road to ACC Liverpool site at bottom.

**By Train**
From Lime Street Station take a taxi from the rank immediately outside the station and ask for Queens Wharf. The journey takes 5 minutes outside peak hour. Alternatively, take the underground from Lime Street to James Street station and walk south along the riverside from the Pier Head to the site, via the Albert Dock complex.

**By Air**
From John Lennon Liverpool Airport take a No. 500 bus from the terminus and alight at the entrance to Kings Dock (20 minute direct journey). The site is at the bottom of Queens Wharf that is the main road into Kings Dock.