Guildford, the county town of **Surrey**, is located half way between London and Portsmouth. Guildford is situated in a gap on the **North Downs** where the River Wey breaks through the hills. The River Wey was one of the first navigable waterways in the country and stretches from Godalming to the Thames. The Hog's Back is where the North Downs narrows to a narrow ridge running from Farnham to Guildford. An extensive view of the surrounding countryside can be seen from both sides of the Hog's Back. While attending Oxford University the famous author **Lewis Carroll** spent days at a time visiting his sisters who lived in Guildford and he is now buried in the cemetery on the Mount.

Guildford began as a Saxon village and as a ford (called Guilden or Golden Ford). It is thought that it was named after the golden flowers that grew on the riverside or because of the golden sands on the banks of the river. **St Mary's Church** is the oldest surviving building in the town. **Guildford Cathedral** (built in 1961) dominates Guildford town from its location on the top of Stag Hill. At night the cathedral is floodlit which creates a spectacular display. **Guildford Museum** is located on Quarry Street, a road running just off the High Street, with part of the museum housed in the gatehouse of Guildford Castle. **Guildford Castle** was originally constructed in the late 10th century. The castle fell into disrepair after the 14th century but it was restored in 2003-2004, revealing original crenellations and other features. A roof and floor were re-instated at first floor level, and the ground floor now houses a display on the castle.

The first students passed through the doors of the **University of Surrey** in 1894 and it was awarded its charter status in 1966. The main campus is located on Stag Hill and is home to 1200 students and 3000 staff. Currently there are nearly 14,500 students who are offered over 50 subjects at undergraduate level. The University has strong links with the Royal Surrey County Hospital and the Surrey Research Park, which currently accommodates over 100 companies.

The **Royal Surrey County Hospital** serves a population of 320,000 for emergency and general hospital services. **St Luke's Cancer Centre** is the lead specialist centre for cancer patients in Surrey, West Sussex and Hampshire, serving a population of 1.2 million. The hospital is now in the final stages of applying for Foundation Trust status and hopes to receive this status in the Autumn of 2009. NHS Foundation Trust status will give us the freedom and ability to provide even better services for our patients and we want to work closely with them and the communities we serve to plan for our future.
Welcome to Guildford and the Autumn Scientific Meeting of
The British Nuclear Medicine Society 2009

Location
University of Surrey
Guildford

CPD
CPD approval has been applied for

Catering
Tea, Coffee & Lunches are provided free in Austin Pearce Building Theatres 3 and 4
Starbucks and Sorrento’s Coffee Shop are available for purchasing light refreshments

Registration
Registration is situated in the Austin Pearce Building Foyer

Registration opening times:
09:00 on Thursday 17th September
08:30 on Friday 18th September

Lectures & Posters
Main lectures will be held in the Management Building MS main theatre
All other lectures will be held in Austin Pearce Lecture Theatres 1 and 2
Posters will be exhibited in the Austin Pearce Building Foyer
AV preview room is 81MS02 in the Management Building

Exhibition
The Exhibition is situated in Austin Pearce Building Theatres 3 and 4

Exhibition opening times:
10:00-17:30 on Thursday 17th September
09:00-13:00 on Friday 18th September

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

Alliance Medical Ltd
Bartec
Cardiac Services Ltd
College of Radiographers
Covidien
Erigal
Guerbet Laboratories
Hermes

IBA
Imaging Equipment
Lablogic
Philips Healthcare
Qados
Siemens
Southern Scientific
Social Events
The Conference Dinner will take place in The Hillside Restaurant (formerly Seasons Restaurant as shown on the map) at the University of Surrey at 19:30 on Thursday 17th September. Pre-dinner drinks are being served in Roots Bar.

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

Cloakroom
No cloakroom is available, although coat rails are provided in the Austin Pearce Foyer and luggage can be left in the Austin Pearce Foyer (opposite the registration desk)

Internet Access
Free wi-fi is available in the Management Building, Austin Pearce Building and at all food outlets on site

Acknowledgements
Frimley Park Hospital Photographic Department
Felicity Horton, Sarah Kilfeather and Jim O’Doherty for help on the programme

Organising Committee
Chair: Dr JRW Hall
Dr R Clauss
A Fullbrook
J Parrot
R Morton
P Hinton
J Fieldus
<table>
<thead>
<tr>
<th>Key Buildings</th>
<th>Academic Departments: Enquiry Offices</th>
<th>Other Departments and Facilities</th>
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<tbody>
<tr>
<td>Acumen Technology Institute</td>
<td>Faculty of Arts and Human Sciences</td>
<td>Accommodation Office</td>
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<tr>
<td>Advancing Technology Building</td>
<td>Faculty of Engineering and Physical Sciences</td>
<td>Central Distribution and Goods in Care</td>
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<tr>
<td>Duke of Kent Building</td>
<td>Faculty of Health and Medical Sciences</td>
<td>Care Homes Hospital</td>
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<td>Lecture Theatre Block</td>
<td>School of Management</td>
<td>Research and Enterprise Support (RES)</td>
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<td>Business School</td>
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<td>Office Building</td>
<td>Psychologists and Allied Health Professionals</td>
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<td>School of Management Building</td>
<td>Political Studies</td>
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<td>Senate House</td>
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<td>Teaching Block</td>
<td>Adult Health and Social Care Research and Enterprise Support (RES)</td>
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<td>Security Office (open 24 hours)</td>
<td>Economics, Accounting and Finance, Housing, Food and Catering</td>
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<td>Student Centre (Unisown)</td>
<td>Humanities, Social Studies and Media Studies</td>
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<td>Sports Centre (Unisown)</td>
<td>Music and Sound Recording</td>
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<tr>
<td>Student Advice and Information Service</td>
<td>University of Surrey Business School, University of Surrey Health Studies, and University of Surrey Science and Technology</td>
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<td>Students' Union</td>
<td>University of Surrey Faculty of Arts and Humanities</td>
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<tr>
<td>Survey Design and Print</td>
<td>University of Surrey Faculty of Engineering and Physical Sciences</td>
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<tr>
<td>Restaurants, Cafes and Bars</td>
<td>University of Surrey Faculty of Health and Medical Sciences</td>
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<tr>
<td>At Our Manor Park Site</td>
<td>University of Surrey Faculty of Engineering and Physical Sciences</td>
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<td>Atrium Restaurant</td>
<td>University of Surrey Faculty of Arts and Humanities</td>
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<td>Lakeside Cafe Bar</td>
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<td>Roots Cafe Bar</td>
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<td>Stationary Restaurant</td>
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<td>Somerset Coffee Shop</td>
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<td>Starbucks Coffee Shop</td>
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<td>Water House</td>
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<tr>
<td>Varsity Centre</td>
<td>University of Surrey Faculty of Arts and Humanities</td>
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</tbody>
</table>
Map of Conference Facilities

Note: AV preview room – 81 MS 02 is on the first floor of the Management School Building but is well signed posted.
## British Nuclear Medicine Society Autumn Meeting
### Thursday September 17th

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>09:15</td>
<td>Registration</td>
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<tr>
<td>10:00</td>
<td>Welcome and introductions - Dr John R W Hall</td>
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<tr>
<td>10:15</td>
<td>How has nuclear medicine benefited my practice?</td>
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<td></td>
<td>Mr Michael Dusmet, Cardio-thoracic Surgeon, Royal Brompton</td>
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<tr>
<td>11:00</td>
<td>SeHCAT: Do you believe in miracles?</td>
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<td>Dr Jervoise Andreyev, Royal Marsden</td>
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<tr>
<td>11:30</td>
<td>Coffee/Exhibition</td>
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<tr>
<td>11:45</td>
<td>PET CT in Imaging Bone Metastases</td>
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<td>Dr Gary Cook, Royal Marsden</td>
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<td>Small FOV cameras for intra-operative imaging</td>
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<td>Prof Alan Perkins, Nottingham</td>
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<tr>
<td>12:15</td>
<td>Assessment of fracture risk on osteoporosis</td>
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<td>Prof Ignac Fogelman, Guy’s</td>
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<tr>
<td>12:45</td>
<td>Lunch/Coffee and Council Meeting</td>
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<tr>
<td>13:45</td>
<td>Sentinel Node Evaluation in Breast Disease</td>
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<td>Prof Graham Layer, Royal Surrey</td>
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<td>14:00</td>
<td>NCRI PET Research Network</td>
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<td>Dr Paul Marsden, King’s College</td>
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<td>14:15</td>
<td>Leucocyte Kinetics in the Lung</td>
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<td>Prof Mike Peters, Royal Sussex County</td>
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<td>Setting Up a Research Study</td>
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<td>Mr Paul Hinton, Royal Surrey County</td>
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<tr>
<td>14:45</td>
<td>Gallium 68 Generators</td>
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<td>Dr Michael Hofmann, Germany</td>
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<tr>
<td>15:15</td>
<td>Tea/Exhibition and Poster Viewing</td>
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<tr>
<td>15:45</td>
<td>Imaging Blood Flow and Metabolism in Tumours</td>
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<td></td>
<td>Prof Ken Miles, Brighton &amp; Sussex Medical School</td>
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<tr>
<td>16:15</td>
<td>Leukoscan in orthopaedic prosthetic infection</td>
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<td></td>
<td>P Gopalan, Doncaster</td>
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<td>16:30</td>
<td>Future Training in Nuclear Medicine</td>
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<td>Dr John Buscombe, Royal Free</td>
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<tr>
<td>17:00</td>
<td>End of Session</td>
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<tr>
<td>19:30</td>
<td>Conference Dinner</td>
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## British Nuclear Medicine Society Autumn Meeting  
**Friday September 18th**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Speaker(s)</th>
<th>Location</th>
<th>Duration</th>
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<tbody>
<tr>
<td>08:30</td>
<td>Registration</td>
<td></td>
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<tr>
<td>09:15</td>
<td>Zolpidem Therapy for patients after Brain Damage</td>
<td>Dr Ralf Clauss, Royal Surrey</td>
<td>CT Anatomy</td>
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<td>Dr James Crawshaw, Royal Surrey County</td>
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<tr>
<td>09:45</td>
<td>Update on Imaging in Dementia and Movement Disorders</td>
<td>Dr Paul Kemp, Southampton General</td>
<td>CT Theory</td>
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<td>Mr Matthew Pryor, Royal Surrey County</td>
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<tr>
<td>10:30</td>
<td>Coffee Exhibition</td>
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<td>11:00</td>
<td>Neuro Endocrine Tumours SPECT CT/MRI</td>
<td>Mr Matthew Pryor, Royal Surrey County</td>
<td>CT QC</td>
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<tr>
<td>11:30</td>
<td>SPECT/CT Imaging of Sentinel Node in Vulval Cancer</td>
<td>Dr Val Lewington, Royal Marsden</td>
<td>CT QC</td>
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<td>Mr Matthew Pryor, Royal Surrey County</td>
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<tr>
<td>11:45</td>
<td>PET/CT – Chest/Oesophagus</td>
<td>Dr Wai-lup Wong, Mt Vernon</td>
<td>PET QC</td>
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<td>Dr James Scuffham, Royal Surrey County</td>
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<tr>
<td>12:15</td>
<td>Lymphoma and PET - a global opportunity: progress in multicentre trials</td>
<td>Dr Sally Barrington, St Thomas's</td>
<td>ARSAC update</td>
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<td>Louise Homer, HPA</td>
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<tr>
<td>12:45</td>
<td>Presidential good-bye - Dr Gill Vivian</td>
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<td>Lunch and depart</td>
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</tbody>
</table>
Thursday 17th September

9:15   Registration, Tea and Coffee

10:00 Welcome and Introductions
Dr John R W Hall
Clinical Director, Frimley Park Hospital Frimley

Opening Sessions (Management Building – MS Main Theatre)
Chair: Dr John RW Hall
Frimley Park Hospital, Frimley

10:15 Invited Talk: ‘How has nuclear medicine benefited my practice?’
Mr Michael Dusmet
Cardio-thoracic surgeon, Royal Brompton Hospital, London

11:00 Invited Talk: ‘SeHCAT; Do you believe in miracles?’
Dr Jervoise Andreyev
Consultant gastroenterologist, Royal Marsden Hospital, London

11:30 Coffee and visit to exhibition (Council Meeting in 32MS01)

Session 1 (Austin Pearce – AP Theatre 1)
Chair: Dr Gill Vivian
Plymouth Hospitals NHS Trust, Plymouth

11:45 Invited Talk: PET CT in imaging bone metastases
Dr Gary Cook
Royal Marsden Hospital, Sutton

12:15 Invited Talk: Assessment of fracture risk on osteoporosis
Prof Ignac Fogelman
St Guy’s Hospital, London

12:45 Lunch and visit to exhibition

Session 2 (Austin Pearce – AP Theatre 2)
Chair: Mr Paul Hinton
Royal Surrey County Hospital, Guildford

11:45 Invited Talk: Small FOV cameras for intra-operative imaging
Prof Alan Perkins
Nottingham University Hospital, Nottingham

12:15 Invited Talk: Cardiac imaging – cameras
Dr John Dickinson
University College, London

13:45 Invited Talk: Sentinel node evaluation in breast disease
Prof Graham Layer
Consultant breast Surgeon, Royal Surrey County Hospital, Guildford

14:15 Invited Talk: Leucocyte kinetics in the lung
Prof Mike Peters
Royal Sussex County Hospital, Brighton

Session 3 (Austin Pearce – AP Theatre 1)
Chair: Prof Ken Miles
Brighton and Sussex Medical School, Brighton

13:45 Invited Talk: Sentinel node evaluation in breast disease
Prof Graham Layer
Consultant breast Surgeon, Royal Surrey County Hospital, Guildford

14:15 Invited Talk: Leucocyte kinetics in the lung
Prof Mike Peters
Royal Sussex County Hospital, Brighton

Session 4 (Austin Pearce – AP Theatre 2)
Chair: Prof Alan Perkins
Nottingham University Hospital, Nottingham

13:45 Invited Talk: NCRI PET research network
Dr Paul Marsden
King’s College Hospital, London

14:15 Invited Talk: Setting up a research study
Mr Paul Hinton
Royal Surrey County Hospital, Guildford
14:45 Invited Talk: Gallium 68 Generators
Dr Michael Hofmann
Institut für Nuklearmedizin und PET-Zentrum, Hildesheim, Germany

14:45 Invited Talk: Writing a business case
Ms Bernadette Cronin
Royal Marsden Hospital, Sutton

15:15 Tea and visit to exhibition and informal poster session in Austin Pearce Foyer

Session 5 (Austin Pearce – AP Theatre 1)
Chair: TBC
Southampton General Hospital, Southampton

15:45 Invited Talk: Imaging blood flow and metabolism in tumours
Prof Ken Miles
Brighton and Sussex Medical School, Brighton

16:15 Leukoscan in orthopaedic prosthetic infection
P. Gopalan
Doncaster Royal Infirmary, Doncaster

16:30 Invited Talk: Future training in nuclear medicine
Dr John Buscombe
Royal Free Hospital, London

15:15 Session 6 (Austin Pearce – AP Theatre 2)
Chair: Dr John Dickson
University College, London

15:45 Invited Talk: Resolution Recovery in SPECT
Dr Lefteris Livieratos
St Guy’s and St Thomas’ Hospital, London

16:15 Introduction of ventilation perfusion SPECT in a district general hospital
E. Jefferson
University Hospital of North Durham, Durham

16:30 Invited Talk: Functional Volume Delineation in PET/CT
Dr Dimitris Visvikis
National Institute of Health and Medical Research, Brest, France

17:00 End of session

19:30 Conference dinner
Friday 18th September

Session 7 (Austin Pearce – AP Theatre 1)
Chair: Dr John RW Hall
Frimley Park Hospital, Frimley

09:15 Invited Talk: Zolpidem therapy for patients after brain damage
Dr Ralf Clauss
Royal Surrey County Hospital, Guildford

Session 8 (Austin Pearce – AP Theatre 2)
Chair: Dr James Scuffham
Royal Surrey County Hospital, Guildford

Invited Talk: CT anatomy
Dr James Crawshaw
Royal Surrey County Hospital, Guildford

Invited Talk: CT theory
Mr Matthew Pryor
Royal Surrey County Hospital, Guildford

09:45 Invited Talk: Update on imaging in dementia and movement disorders
Dr Paul Kemp
Southampton General Hospital, Southampton

10:00 Invited Talk: Neuroendocrine tumours SPECT CT/MRI
Dr Val Lewington
Royal Marsden Hospital, Sutton

Invited Talk: CT QC
Mr Matthew Pryor
Royal Surrey County Hospital, Guildford

10:30 Coffee and visit to the exhibition

Session 9 (Austin Pearce – AP Theatre 1)
Chair: TBC

11:00 Invited Talk: Neuroendocrine tumours SPECT CT/MRI
Dr Val Lewington
Royal Marsden Hospital, Sutton

Invited Talk: CT QC
Mr Matthew Pryor
Royal Surrey County Hospital, Guildford

11:30 SPECT/CT imaging of sentinel node in vulval cancer
A. French
Glasgow Royal Infirmary, Glasgow

A quantitative study comparing simultaneously acquired full and half time SPECT myocardial perfusion images using resolution recovery
B. Modi
Luton & Dunstable Hospital, Luton

11:45 Invited Talk: PET/CT – chest/oesophagus
Dr Wai-Lup Wong
Mount Vernon Hospital, London

Invited Talk: PET QC
Dr James Scuffham
Royal Surrey County Hospital, Guildford

12:15 Invited Talk: Lymphoma and PET – a global opportunity: progress in multicentre trials
Dr Sally Barrington
St Thomas’ Hospital, London

Invited Talk: ARSAC update
Louise Homer
Health Protection Agency

12:45 Presidential good-bye (Austin Pearce Building – Theatre 3/4)
Dr Gill Vivian
Plymouth Hospitals NHS Trust, Plymouth

Lunch and depart
Abstracts

Session 5: Leukoscan in orthopaedic prosthesis infection
* Gopalan P1
1P Gopalan, D A Ward, J T Wilson, R Vinayagam
Department of Medical Imaging, Doncaster Royal Infirmary, UK
* Corresponding author: P Gopalan,
(minnie_doc@hotmail.com)

Aim: To evaluate the diagnostic efficacy of antigranulocyte scintigraphy using the antibody fragment 99mTc-sulesomab (Leukoscans®) for the diagnosis of prosthesis infection. To compare the sensitivity and specificity against isotope bone scan.

Methods and materials: Retrospective study of leukoscans for suspected prosthesis infection over 24 months. Dual phase study compared with 3-phase bone scan. Sensitivity, specificity, positive and negative predictive values calculated for leukoscan and isotope bone scan. Results were compared with synovial fluid culture results.

Results: 73 patients, 40 males and 33 females. 44 knee prostheses, 24 hips, 3 ankles and 2 shoulders. Clinical findings, serum inflammatory markers and plain radiographs studied. Comparison of bone scan and leukoscan showed 65% correlation. Among leukoscans, 24 were positive, 46 were negative and 3 were equivocal. The sensitivity, specificity, positive predictive value and negative predictive value of leukoscan were 92%, 76%, 48% and 97% respectively while for bone scan they were 66%, 47%, 20% and 94%.

Conclusion: Leukoscan can be used successfully to image orthopaedic infection with a high negative predictive accuracy. Doubtful cases however may require further imaging. Relatively poor sensitivity, specificity and positive predictive values of isotope bone scan suggest 'leukoscan without bone scan' is less time consuming, low radiation risk and cost effective.

Session 6: Introduction of Ventilation Perfusion SPECT in a District General Hospital
* Jefferson E1
1University Hospital of North Durham, North Road, Durham, DH1 5TW
* Corresponding author: E Jefferson,
(elizabeth.jefferson@cddft.nhs.uk)

Planar VQ imaging has been largely superseded by CTPA as the preferred technique for the diagnosis of PE. VQ SPECT offers increased sensitivity, comparable to CTPA, but the technique has not yet gained acceptance in the UK. VQ SPECT was introduced alongside VQ planar in 2006. Eleven patients underwent both techniques concurrently, allowing reporters to gain confidence in the appearance of SPECT images. 341 patients have subsequently undergone VQ SPECT; 48% of patients had a normal study, 14% had a probably normal study, 20% were consistent with PE and 18% had an indeterminate study (CTPA recommended). Forty three patients had VQ SPECT and CTPA within 5 days of each other, 13% of the total, suggesting that 87% of patients had a definitive result from VQ SPECT. Most (63%) of these had VQ SPECT results that did not exclude or were suspicious of PE therefore CTPA was recommended. VQ SPECT and CTPA disagreed in 4 of 15 patients, 2 of which had previously documented PE. VQ SPECT has been successfully implemented in a single camera department, improving the sensitivity of the diagnosis of PE.

Session 7: SPECT/CT Imaging of Sentinel Nodes in Vulval Cancer
* French A1
1Nuclear Medicine, Glasgow Royal Infirmary
* Corresponding author: A French,
(ann.mccartney@ggc.scot.nhs.uk)

Introduction: There are about 1,000 cases of vulval cancer diagnosed in the UK each year [1]. Treatment for these patients classically consisted of radical vulvectomy and inguinofemoral lymphadenectomy [2]. These procedures have a high associated rate of complications. Undetected disease in the inguinofemoral nodes is nearly always fatal. The aim was to use sentinel node mapping with spect/ct to identify and localize sentinel nodes and therefore reduce the need for such radical surgery. Method: Patients were injected peri-tumourally with Tc99m nanocolloid. They were scanned using a Symbia T gamma camera. Static images were acquired, and nodes marked. Spect images were acquired followed by CT allowing anatomical mapping of nodes seen on the spect scan. Results: To date we have scanned 13 patients, 6 with planar imaging only and 7 with planar plus spect/ct. Nodes have been identified in all patients, some uni-laterally and some bi-laterally. It is a technique tolerated well by the patients involved. Conclusions: The surgical team use blue dye in theatre, along with a gamma probe to track
sentinel nodes. This along with Spect/ct imaging has given the surgical team increased confidence at detecting and localizing node involvement. This has reduced the need for complete groin dissections in these patients. The plan is to widen the criteria to allow imaging of more patients in the future.

Session 8: A Quantitative Study Comparing Simultaneously Acquired Full and Half-Time SPECT Myocardial Perfusion Images Using Resolution Recovery

* Modi BN1 Fowler JC2 Ganesan K3 Brown J4
1Department of Medicine, Luton & Dunstable Hospital 2Department of Nuclear Medicine, Luton & Dunstable Hospital 3Department of Cardiology, Luton & Dunstable Hospital 4Department of Medical Physics, Mount Vernon Hospital
* Corresponding author: BN Modi, (bhavikmodi@hotmail.com)

Purpose: To quantify myocardial perfusion SPECT images simultaneously acquired with full (FT) and half-time (HT) parameters, processed with Resolution Recovery (OSEM-RR), Filtered Back Projection (FBP) and Iterative Reconstruction (ITR) software to establish which processing method compensates best for half time acquisition. Methods: 39 consecutive patients had concurrent 99mTc-tetrofosmin SPECT FT and HT acquisitions, each processed by OSEM-RR, FBP and ITR to give 6 datasets for each patient. The processed images were displayed using Cedar Sinai QPS software and data for each of the 20 polar plot segments was tabulated giving n=780. Results: Pearson’s correlation coefficients comparing FT with HT for each of the processing methods were: OSEM-RR: 0.966 (P<0.0001), FBP: 0.919 (P=0.007) and ITR: 0.928 (P<0.0001). OSEM-RR also gave the least difference in FT and HT correlation coefficients between the 20 different segments and also performed best in terms of Bland Altman Correlation. Conclusion: Quantification of HT and FT acquisitions showed OSEM-RR was statistically superior to FBP and ITR, indicating that faster acquisitions using standard radioisotope dose or standard acquisition times with reduced radioisotope dose may be compensated by using OSEM-RR processing. A qualitative study is underway to establish whether this quantitative superiority is reflected in clinical study quality.
Posters

Thyroid

1 Comparative evaluation of two different protocols of Iodine-131 administration in the treatment of hyperthyroidism.

* Thientunyakit Tanyaluck1 Thongmak Suchitra2 Premprapa Teerapon3
1Division of Nuclear Medicine, Department of Radiology, Siriraj hospital, Faculty of Medicine, Mahidol University, Bangkok, Thailand. 2Division of Nuclear Medicine, Department of Radiology, Songklanagarind hospital, Faculty of Medicine, Prince of Songkla University, Hat Yai, Thailand.
* Corresponding author: Tanyaluck Thientunyakit, (stanyalu@hotmail.com)

Objectives: To compare the effectiveness of radioiodine therapy in hyperthyroidism patients between estimated dose with calculated dose.

Methods: Prospective randomized study in 144 hyperthyroid patients referred for 131I treatment between June 2007-December 2007. The patients were divided into 2 groups according to the 131I dose administered: estimated group using dose base on gland size and calculated group using dose base on gland size and 24-hour 131I uptake. Outcome assessment was done at 12 months post-treatment.

Results: 11 of 144 patients were excluded due to loss follow up and 5 became euthyroid before 131I treatment. 56 of 128 patients (45.3%) experienced persistent/recurrent hyperthyroidism, 26(20.3%) developed hypothyroidism and 44(34.4%) were euthyroid. Outcome was unrelated to the dose adjustment method. Only gender and goiter size were found to be correlated with the clinical outcomes.

Conclusion: A dose method using gland size by palpation works as well as calculated method using 131I uptake. This method is more cost effective and brings greater patient convenience.

2 Neck swelling and compression symptoms after Radioactive Iodine Therapy with Thyrotropin Alfa in differentiated thyroid carcinoma (DTC)

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Background: Radioactive iodine therapy(RAI) with thyrotropin alfa(TA) is indicated in DTC pts whom TSH fail to rise after 3months of surgery or radiation therapy(XRT). Material & Methods: We included pts of DTC from Oct.2003 till May2009 & U/S or MRI neck was done prior to RAI with TA .Pts were segregated according to residual thyroid tissue size (RTT) into groups of 0.5 to1cm,-1 to1.5cm,>1.5 to2cm,>2 to2.5cm,>2.5 to3cm & >3cm.Every pt was given oral NSAID & SAID drugs. If any pt developed neck swelling with or with compression symptoms, high dose oral NSAID and I/V SAID drugs were started. Result: 15 pts were given RAI ranging from 100mCi to150mCi.10F & 5M with age b/w13to70yrs(Mean age of 34yrs). 9/15pts developed neck swelling in thyroid region while 3 also complained of dyspnea and only 1 reported dysphagia. All 3pts who were treated with XRT had thyroid tissue>3cm but only 1 developed neck swelling without any compression symptom. Out of other 8pts who develop neck swelling,RTT was in the range of>2-2.5cm in 5 while>1.5-2cm was in 2 &>1-1.5cm was in 1pt. All 3pts who complain of compression symptoms had RRT in range of>2-2.5. Conclusion: Patient who is candidate for RAI with Thyrotropin Alfa and has ResidualThyroidTissue greater then 1cm should be given prophylactic high dose oral non-steroidal and I/V high dose steroidal drugs to avoid neck swelling and compression symptoms.

3 Unsuspected solitary "cold nodules” in Graves’ disease - their significance

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Aim: The presence of solitary cold nodules (CN) in patients with Graves’ disease (GD) raises concern about associated malignancy. The objective of this study is to review our experience in order to determine the significance of solitary CN in patients with clinical and scintigraphic diagnosis of GD. Materials and methods: A retrospective review of 1536 patients who underwent thyroid scintigraphy during a 5-year-period was performed. Of these, patients with biochemical and scintigraphic diagnosis of GD and presence of a solitary CN were selected for further evaluation, which included:
wording in the report, follow-up ultrasound (US), FNA/biopsy and clinical follow-up. Results: 697/1536 (45.4%) patients had GD, of whom 43 (6.2%) patients had single CN. 40/43 reports (93%) suggested further evaluation to exclude malignancy. 21(48.8%) patients with CN had an US. 12 patients had FNA/biopsy, of whom 3 (7.0%) patients had thyroid cancer. Of 22 (51.2%) patients with CN who did not have an US, 6 patients did not require it for other reasons. In the remaining16 (37.2%) patients with CN there was no documented reason/s for not having an US or FNA. No untoward finding however was reported in these patients on 5-yr-follow-up.

Conclusion:
The solitary cold lesions associated with GD have to be taken seriously since their potential for malignancy is significant.

4 Evaluation of Radioimmunoassay and Thyroid Scintigraphy in the Diagnosis of Goitre in Sudan

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The prevalence of goitre in different regions in Sudan is significant. Definitely, Radioimmunoassay (RIA) and thyroid scan are the methods of choice for the goitre assessment. This study intended to assess the value of thyroid scan and thyroid function test (TFT) in diagnosis of thyroid goitre in Sudanese patients. Thyroid scan were evaluated for the period from July 2007 to May 2009. A total of 600 patients were studied, 11.2% males and 88.8% females. The mean age was 42 (17-65) years. The results of thyroid hormones were normal in approximately 93%, 3 % of the sample is high and 4% are low. 99m Tc distribution was homogeneous in 54%, 20% showed nodules, while 60% has regular shape, 50% of the sample showed diffuse uptake and the lowest percentage was diffuse goiter extending to supra Sternal notch (SSN) (1%). White Nile area is near the Nile, it has a significant incidence of thyroid goiter. The incidence of thyroid goiter is 3 to 5 times higher in females than males. The presence of family history of goitre does not significantly favor thyroid gland disorders. There is strong relationship between thyroid gland nodules and goitre grade. The majority of cases present with advanced conditions because illiteracy and poverty. These results are very similar to those reported by previous authors.

5 Effectiveness of combining dobutamine infusion with mild exercise for stress myocardial perfusion imaging

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PURPOSE: Current guidelines advocate supplementing dobutamine infusion with atropine, if there is failure to achieve target heart rate (THR) during stress myocardial perfusion imaging (MPI). This study assesses the effectiveness of combining mild exercise with dobutamine infusion (DI), in achieving THR. METHODS: 106 patients undergoing dobutamine stress MPI were included. Group 1 comprised of 52 patients (mean age = 64 yrs) undergoing DI without exercise, and group 2, of 54 patients (mean age = 63 yrs) undergoing DI coupled with mild hand grip and foot pedal exercise. Dobutamine was infused incrementally, starting at a dose of 10 g/kg/min increasing to 40 g/kg/min at 3-min intervals. RESULTS: 23/52 (44%) of Group 1 and 39/54 (72%) of Group 2 achieved THR (p=0.003). Average dobutamine dose administered in group 1 was 19.6 mgs with 31/52 patients continuing till stage 4, and 15.6 mgs in group 2 where 16/54 entered stage 4. Minor side effects (flushing, headache, nausea) were seen in 7/52 and 6/54 in groups 1 and 2 respectively. ST changes were demonstrated in 6/52 and 2/54 in groups 1 and 2 respectively. CONCLUSION: A protocol combining exercise with DI is safe and achieves THR in significantly more patients with a reduction in dose, side effects and procedure time.

6 Tricky Hot Spots- a pictorial review.

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Learning Objective: Review of a case that poses a diagnostic challenge in bone scan interpretation. Description: Isotope bone scan is routinely used for investigation of bone pain in patients with neoplasm. It is a highly sensitive imaging modality but has less specificity. Image interpretations of
patients with primary cancer can be tricky as there are other causes, benign or malignant that may result in increased tracer uptake and mimicking bone metastases. This poster will illustrate our experience of such a case. A patient with a past history of breast cancer had bilateral symmetrical intense tracer uptake at the adrenal region. This case brought a diagnostic challenge in the interpretation, particularly as limited Computed Tomography images of this region demonstrated normal adrenal glands. **Conclusion:** Due to high sensitivity but less specificity of bone scans, interpretation of bone scintigraphy may be tricky, particularly in patients with primary carcinoma.

**PET**

7 Pictorial review of mediastinal masses imaged with 18F FDG PET/CT.

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**Methods:** We reviewed cases with interesting mediastinal pathology, scanned at our institution 2006-2008. We collected examples of anterior, middle and posterior mediastinal masses as well as normal variants to illustrate the variety of pathology and 18F FDG uptake. **Results:** Anterior mediastinal masses ranged from high uptake in anaplastic thyroid malignancy with retrosternal extension to variable uptake in thymic tumours, depending on the Masaoka and WHO classification and low grade uptake in rebound thymic tissue. There was also high grade uptake in both B and T cell lymphomas, the latter also showing infective complications. There are several examples of germ cell tumours with variable 18F FDG uptake and a patient with a sarcoma of the chest wall where the PET/CT revealed a second, previously unknown mass in the pelvis. Middle mediastinal masses include a bronchogenic cyst, which shows no uptake. This was an incidental finding in a case of lung cancer. Posterior mediastinal masses include oesophageal tumours and neurogenic tumours. Benign neurogenic tumours demonstrate low grade uptake but when malignant transformation occurs, initial uptake may be high, but significantly, the SUV rises on delayed images. **Conclusion:** There is a wide variety of mediastinal pathology with variable 18F FDG uptake, best illustrated with a pictorial review.

8 Pre-operative staging of oesophageal carcinoma with PET-CT - a cancer unit experience

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**Background:** Evaluation by PET-CT has been made as local cancer network guideline for pre-operative staging of oesophageal carcinoma. **Aim:** To evaluate the input of PET-CT in the pre-operative workup of oesophageal carcinoma. To compare the sensitivities of diagnostic CT scan, PET-CT and Endoscopic ultrasound scan in a cancer unit. **Methods:** All biopsy proven oesophageal carcinoma patients who underwent PET-CT were studied. Images of PET-CT and reports were studied alongside diagnostic CT scan. Comparison made with Endoscopic ultrasound scan (EUS) for local staging. Sensitivities of each diagnostic modality in TNM staging were studied with evaluation of additional information provided by PET-CT and its influence on patient management. Review of histology reports, patient records and radiology reports performed. **Results:** 36 patients over 2 years, all had PET-CT and diagnostic CT scan. 24 males and 12 females, age between 39 and 76yrs. 15/36 had EUS. PET-CT added additional information over diagnostic CT in 20/36 patients with significant impact on patient management. Unrelated but significant incidental findings shown in 6 patients. PET-CT proved superior to diagnostic CT in N staging when compared with EUS. **Conclusion:** Although the study group is small, the invaluable contribution of PET-CT in oesophageal carcinoma management is clearly evident. It is therefore highly recommended before embarking on oesophagectomy, regardless of any practical difficulties such as unavailability or cost.

9 Can SUVmax in different regions within the mediastinal blood pool be used interchangeably?

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The standardised uptake value (SUV) is the measured activity of PET tracer uptake at a certain region of interest (ROI) within the body. SUVmax at the 'mediastinal blood pool' is often used as a
A reference value for background uptake. However, placement of such reference ROIs for measuring SUVmax varies among different centres. The aim of this study was to compare measurements of mediastinal blood pool SUVmax. This study was performed using retrospective analysis of 30 cancer patients 18F-FDG PET/CT data. SUVmax was measured in the thoracic aorta, pulmonary artery and abdominal aorta. Without a gold standard for comparison, statistical analysis was performed to investigate the comparability between each of the different measurements. **Results:**

<table>
<thead>
<tr>
<th>SUV max</th>
<th>Thoracic artery</th>
<th>Pulmonary artery</th>
<th>Abdominal aorta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>1.65</td>
<td>1.64</td>
<td>1.91</td>
</tr>
<tr>
<td>Min</td>
<td>1.1</td>
<td>1.0</td>
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<tr>
<td>Max</td>
<td>2.4</td>
<td>2.3</td>
<td>3.0</td>
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**Conclusion:** Statistical analysis showed that SUVmax measured in the thoracic aorta agreed with SUVmax measured in the pulmonary artery (r=0.75, p<0.05) and abdominal aorta (r=0.42, p<0.05). Likewise, SUVmax measured in the pulmonary artery agreed with SUVmax measured in the abdominal aorta (r=0.53, p<0.05).

**PET Staff Doses**

11 The influence of design of a PET-CT facility on staff radiation dose

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**Introduction:** The PET-CT scanner in Belfast was relocated into a larger purpose-built area in a new imaging centre in 2007. The aim of the study was to determine if change of departmental design had an effect on task specific staff doses. **Method:** Staff effective doses were measured using Electronic Personal Dosimeters during a range of typical FDG patient dose preparation, injection and scanning procedures. These doses were measured for three experienced clinical technologists and one nurse and results compared to similar measurements in 2004 in the old PET-CT department. **Results:** The average effective staff dose per FDG PET patient was 5.10 Sv in 2004 and 6.16 Sv in 2008. Dose preparation and injection activities accounted for less of the staff dose than previously. However there was an increase in staff dose corresponding to tasks involving close proximity to the radioactive patient. There is more space in the new department to accommodate more patients; however, distances involved in accompanying these patients to the toilet, scanner or post-scan waiting area have correspondingly increased. **Conclusion:** When planning the design of a PET facility, careful consideration should be given to local shielding and to the room layout to minimize the distance between the patient preparation area and the scanner.

12 Investigation of Staff Finger Doses Received During Routine Quality Control of FDG

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Introduction: The European Pharmacopeia and Good Manufacturing Practice define a number of quality control tests that must be performed prior to the release of FDG. The aim of this study is to determine the finger dose received whilst performing these tests. Method: The finger dose received by 4 members of staff was measured using a Unfors NED monitors placed at the tip of the index finger of both hands during routine quality control. A total of 18 readings were obtained for the dispensing of the quality control samples, bubble point test, thin layer chromatography, gas chromatography, endotoxin test, Kryptofix test, multi channel analyser test, pH and high performance liquid chromatography.

Results: The average total dose for the completion of all tests was 1.5 mSv for the left hand and 0.8 mSv for the right hand. 54% and 43% of the total dose is received from the bubble point test for the left and right hand respectively. The pH test, high performance liquid chromatography and dispensing of the QC sample also contribute significantly to the total dose. Conclusion: Staff may need to be defined as classified radiation workers as a result of the finger dose received during routine quality control. Automation of the bubble point test should be considered during the planning and design of any cyclotron production facility.

Physics

13 Development of a simple method for estimating the activity present within the lungs during ventilation imaging and an investigation into factors affecting it

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The aim of this investigation was to develop a simple method for estimating the activity present within the lungs during ventilation imaging using Tc99m DTPA. An estimate is essential to ensure compliance with the ARSAC guidelines and to establish a local DRL. The activity variation with several patient factors was investigated, including height, weight, BMI and sex. At the Royal Berkshire Hospital VQ scans are performed using Tc99m DTPA for the ventilation phase and Tc99m MAA for the perfusion phase. The SmartVent™ aerosol ventilation system was used to administer the Tc99m DTPA. The activity present in the lungs was estimated using the fact that a known activity is injected for the perfusion images. On the completed images regions of interest were drawn around the lungs and an area representative of the background count. The counts in these regions were compared along with the time per image and the total injected activity. This enabled an estimate of the lung activity to be established. Twenty three patients were assessed using this method and the mean activity present in the lungs during ventilation imaging using Tc99m DTPA was 15.2 MBq with a standard deviation of 3.9 MBq. This is significantly less than the ARSAC diagnostic reference level of 80 MBq.

Further work will aim to establish a local diagnostic reference level.

14 Choice of collimator when implementing imaging protocols for I123-mIBG

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Use of I123 (principle energy: 159 keV, higher energies, 2.5% photons with > 400 keV) in I123-MIBG imaging for neuroendocrine tumours, raises the question of optimum collimator for imaging. Images from a Philips Precedence presented mild background artefacts compared to a Toshiba 7200A/DI, even though a low-energy high-resolution (LEHR) collimator was used on both, as per EANM guidelines. The aim was to investigate this in relation to collimator choice. A SPECT phantom, containing uniform activity of 60MBq of I123, was imaged on the Philips Precedence, using both LEHR and MEGP (medium-energy general-purpose) collimators with parameters: hole size 1.40 and 2.95mm, septal thickness 0.15 and 1.14 mm respectively. Data were acquired in: 128 projections, 20 seconds/projection, using a 128 x 128 matrix; reconstructed with filtered back-projection (Butterworth, order: 2.5, cut-off:0.3 cycles/pixel). A consented patient was imaged, using both collimator types. Visual inspection of phantom and patient studies was carried out, with count-profiles obtained where necessary to assess image uniformity. Analysis of images showed poorer uniformity on the Precedence-LEHR while Precedence-MEGP displayed similar uniformity to Toshiba-LEHR. The patient data also confirmed this, where Precedence-LEHR images displayed artefacts, unlike Precedence-MEGP images. In conclusion, collimator performance may vary beyond classification as LEHR or MEGP. This is an important aspect to consider when translating clinical protocols between systems or implementing...
15 Development of a Continuous Method of Monitoring Patients Receiving Iodine Ablation Therapy

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Patients receiving high dose radionuclide therapies, e.g. I-131 ablation therapy, must remain isolated in hospital until their retained activity has fallen below 800 MBq to ensure that radiation exposure to those in the vicinity remains within dose limits. Currently at The Royal Berkshire Hospital, a relative retention method is used to determine patient release times via twice daily dose rate measurements. This method results in additional dose to staff and can provide both under- and over-estimates of restriction periods. In this study, the feasibility of using electronic personal dosimeters to measure patient activities and release times is assessed and compared to the standard method. Continuous ten minute measurements of patient dose rates were made using two dosimeters positioned at the waist and on a cord around the neck. Both sites were found to provide stable readings from which release times could be calculated. Initial data indicate release times similar to or slightly less than the standard method. Fits of the data also revealed information about the uptake and redistribution of iodine around the body. Data were used to estimate time constants for these processes which will be fed into existing compartmental models of iodine metabolism. Preliminary dosimeter results appear promising and may enable more accurate predictions of release and restrictions times to be made whilst also reducing staff doses.

16 Comparison of different methods for measuring Centre of Rotation (COR) offset using a dual head gamma camera

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Measurement of Centre of Rotation offset is an important tomographic quality assurance test for gamma cameras. For reconstruction, the position of the axis of rotation on each image needs to be known. This is typically the centre pixels in the x direction. Any deviation from this needs to be accounted for and is measured as the COR offset. The purpose of this project was to investigate different methods of calculating COR. For each projection the images were analysed to find the x and y coordinates of the centre of the point source. This was performed using two methods; linear interpolation between pixels and Gaussian fitting. The x and y coordinates of the point source were then plotted against gantry angle to allow the variation with angle to be calculated. The maximum variation from the centre is quoted as the COR offset. The gamma camera software gave a maximum COR offset of 0.50 mm, compared to 1.54 mm (linear interpolation) and 0.52 mm (Gaussian fitting). The results from this project have shown that using a linear interpolation method is not suitable due to the large errors in calculating the position of the centre of the point source. It is therefore suggested that this method should be adopted when an independent check on the COR offset calculation is required.

17 A study of maternal and foetal doses arising from V/Q and CTPA scanning during pregnancy

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Abstract: This work explores the variation in foetal and maternal dose resulting from two different imaging techniques to diagnose pulmonary embolism during pregnancy. Current published literature was used in conjunction with our centre’s protocols to estimate a foetal dose, and a maternal whole body dose, and breast dose following both CT pulmonary angiography (CTPA) and a nuclear medicine perfusion scan. These doses were used to calculate risk factors of cancer induction in both the foetus and the mother and to explore the risk of breast cancer induction in the latter following breast irradiation. It was found that both techniques have their advantages; however foetal dose during the 3rd trimester for both were the same order of magnitude, while maternal breast doses were two orders of magnitude higher for CTPA than perfusion scanning.