Experience and explore this innovation in ultrasound

www.tryarietta.com

Visit us at BMUS 2014
9-11th December
We are delighted to welcome you to the 46th British Medical Ultrasound Society Annual Scientific Meeting (ASM) at The Point, Emirates Old Trafford. This unusual venue lends itself perfectly to our meeting, providing excellent lecture rooms and space for the technical exhibition. With views across the Ashes pitch to the Lancastrian hills it is a great venue to provide the mix of education and socialising that is a traditional part of any BMUS ASM.

The scientific organising committee has merged with the BMUS Scientific and Education committee in our efforts to streamline the organisation. This has enabled us to draw on a range of experts and enthusiasts to develop this fantastic programme.

The aim of the clinical streams this year is to highlight where ultrasound sits within a patient management pathway. We welcome many clinicians to this year’s meeting to help give us that understanding.

We also welcome the Association of Early Pregnancy Units (AEPU) and the Fertility Nurses Subgroup of the Royal College of Nurses. Educational streams within the programme have been developed in association with both of these groups, which we are sure delegates will find interesting and help foster new relationships between these important clinical partners.

The eponymous Donald MacVicar and Brown lecture is to be given by Dr Lol Berman. Dr Berman has been a staunch supporter of BMUS for many years and we are delighted that he accepted our invitation to present what will no doubt be an entertaining lecture.

With the introduction of the AEPU day, the dedicated obstetric stream this year is limited to just a half day session. However, the programme we are delivering is at the forefront of obstetric care. We welcome Prof Mark Kilby to the stage to deliver the Peter Twining Memorial Lecture. This will be closely followed by an ever popular look at medico-legal issues in obstetrics, resulting in a busy programme on day 3.

Not withstanding these highlights the rest of the programme is packed with interest, hot topics and education. As you browse through this programme we are certain you will be spoilt for choice; and for that we can only apologise but be pleased that we are able to deliver such a range of lectures and hands on workshops to keep you entertained. Sadly, however, for those of you in search of our four legged friends we are unable to provide a veterinary stream this year but they promise to be back with us in 2015.

In addition to this brilliant education programme there is a quiz open to all delegates. Enter this at the BMUS stand; test yourself against the experts and show yourself how much you know. Prizes are being awarded for this as well as the best poster and the superb Young Investigator Award.

No BMUS meeting is complete without the support of the manufacturers and technical exhibition. We hope you will take time to visit the stands in this glorious space and see what is on offer. In addition to the exhibition there is the advancing technology session on day 2 which will see leading manufacturers show case their latest equipment development.

Finally, we are grateful for the support of Toshiba Medical Systems who are sponsoring the delegate dinner at the Manchester United Stadium. This will be a highlight of the social programme but, unfortunately for some, has sold out as we go to press. However, the complimentary welcome reception on day 1 at the conference venue is open to all and we hope you will join us to celebrate the start of what aims to be a yet another wonderful BMUS meeting.

Pamela Parker,
Scientific Organising Committee Chair 2014

BMUS would like to thank the following members of the Scientific Organising Committee and session leads for their contribution to the planning and delivery of this meeting.

- Dr Oliver Byass, Hull
- Dr Nick Dudley, Lincoln
- Mrs Clare Drury, Hull
- Mrs Hazel Edwards, Stevenage
- Dr Rhodri Evans, Swansea
- Dr Simon Freeman, Plymouth
- Mrs Tracey Gall, Manchester
- Dr Alison Hall, Leicester
- Mrs Terry Humphrey, Leeds
- Mr Gerry Johnson, Manchester
- Dr Susanne Johnson, Southampton
- Dr Adrian Lim, London
- Dr Carmel Moran, Edinburgh
- Mr Tim Overton, Bristol
- Mr Simon Richards, CASE
- Mr Stephen Russell, Manchester
- Mrs Borsha Sarker, Gateshead
- Prof Paul Sidhu, London
- And the AEPU and Fertility nurses of RCN.
Tomorrow’s challenges aren’t known today. They
never are. Tomorrow remains unknown. But
unknown doesn’t have to mean unprepared.

The ultrasound you choose today can be the
same ultrasound you’ll need tomorrow.

The HELX™ Evolution is a new release for the
ACUSON S Family™ ultrasound system that
delivers stunning image quality, smart
operational efficiency, and cost-effective
sustainable value.

www.siemens.co.uk/HELX

Present Smart. Future Ready.
ACUSON S Family Ultrasound Systems

Join us at stand #2 to learn more

Answers for life.
General Information

Venue address
The Point, Emirates Old Trafford, Lancashire County Cricket Club, Talbot Rd, Manchester M16 0PX

Conference times

Tuesday 9th December
09:00 – 17:00
17:00 – Welcome reception, Exhibition Hall

Wednesday 10th December
09:00 – 17:00
19:00 – BMUS Drinks Reception and Annual Gala Dinner, at Old Trafford the home of Manchester United

Thursday 11th December
09:00 – 17:00

Delegate badges
Attendees are required to wear their badges at all times to gain access to any part of the event.
Please leave your badges at the registration desk at the end of your meeting attendance.

Continuing Professional Development (CPD)
The meeting has been awarded the following BMUS CPD credits and Category I RCR CPD credits:
All 3 days – 21 credits
Day 1 – 7 credits
Day 2 – 7 credits
Day 3 – 7 credits
CPD certificates will be provided in an e-format by 31st January.

Feedback
Feedback forms will be handed out and collected at the start and end of each session.
BMUS would be grateful if delegates would take time to complete these forms, as the completed forms assist with the planning of future meetings.

Catering and refreshments
Lunches and refreshments are included in the registration fee. Catering and coffee points are located in the Exhibition Hall.

Cloakroom
A manned cloakroom is located by the registration area in the main foyer.
Please do not leave bags or personal items unattended. While every effort is made to keep your belongings secure, neither the The Point, Emirates Old Trafford or BMUS can be held liable for any loss of damage.

WiFi
Free WiFi is available throughout the venue.
Username: ultrasound
Password: bmus2014
# List of Exhibitors 2014

<table>
<thead>
<tr>
<th>EXHIBITOR</th>
<th>STAND NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>BK Medical</td>
<td>14</td>
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<tr>
<td>Bracco</td>
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<td>CAE Healthcare</td>
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<td>Casmed</td>
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<td>Diagnostic Healthcare</td>
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<td>Easypay Nework</td>
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<td>Esaote</td>
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<tr>
<td>GE Healthcare</td>
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<td>Globe Locums</td>
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<td>Health Match BC</td>
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<td>Hitachi Aloka Medical Systems</td>
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<td>ID Medical</td>
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<td>Imaging First Ltd : Zonare</td>
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<td>Imaging First Ltd : Alpinion</td>
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<td>InHealth</td>
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<td>MedaPhor</td>
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<td>MIS Healthcare</td>
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<td>Multi-Medix</td>
<td>18</td>
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<tr>
<td>PFE Medical</td>
<td>29</td>
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<td>Philips Healthcare</td>
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<td>Physiological Measurements</td>
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<tr>
<td>RIG Healthcare Recruit</td>
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<tr>
<td>Sanctuary Allied Health</td>
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<td>Siemens Healthcare</td>
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<tr>
<td>Society &amp; College of Radiographers</td>
<td>19</td>
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<tr>
<td>Toshiba Medical Systems Ltd</td>
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<td>28</td>
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</table>
The Point, 2nd Floor

1. Hitachi Aloka Medical Systems
2. Siemens Healthcare
3. Toshiba Medical Systems Ltd
4. Philips Healthcare
5. GE Healthcare
6. Esaote
7. RIG Healthcare Recruit
8. MedaPhor
9. Easy Pay Network
10. Imaging First Ltd: Zonare
11. Casmed
12. Diagnostic Healthcare
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24. Health Match BC
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26. Multi-Medix
27. ID Medical
28. Tristel
29. PFE Medical
30. InHealth
# Education on the Stand

## Hitachi Aloka

**Stand 1**

**15.30**

“Arietta Launch and technology highlights”  
Come and see what the new Arietta has to offer and join Hitachi Aloka for Sake and sushi and CPD!

### Tuesday 9th December

**13.00**

“Vasa Praevia – Reducing Risks, Saving Lives”  
Visit the Hitachi Aloka stand for a presentation by Elizabeth Daly-Jones, West Middlesex University Hospital

### Wednesday 10th December

**10.30**

“How To Session @ Siemens – Liver Elastography”  
Visit the Siemens stand to learn how to integrate a liver fibrosis service into your routine practice.

### Thursday 11th December

**10.30**

“How To Session @ Siemens – 3D Gynae”  
Visit the Siemens stand to learn how to perform and manipulate 3D Gynae Volumes.

## Siemens

**Stand 2**

**13.00**

“The Role of Elastography – What, When and Why?”  
Visit the Siemens stand to learn about different Elastography technologies and their use in clinical practice.

### Tuesday 9th December

**10.30**

“How To Session @ Siemens – Liver Elastography”  
Visit the Siemens stand to learn how to integrate a liver fibrosis service into your routine practice.

### Wednesday 10th December

**15.00**

“Current Trends and Advances in 2D and 3D Transvaginal Ultrasound and Their Impact on Clinical Managements”  
- Lecture presentation outlining advanced Aplio 500 imaging technology as the platform for a “comprehensive” approach to gynaecological ultrasound.  
- Case Studies from the Aplio 500 system demonstrating cases and the value of advanced 3D-SIS procedures and Fly Thru technology.  
- Questions and Discussions  
Come and visit the Toshiba stand at 15.00 on Wednesday to see how the advances in 2D/3D TVUS and Fly Thru can help you expand the boundaries of gynaecological ultrasound.

## Toshiba

**Stand 3**

**10.45**

SMI – A Doppler Masterpiece  
See a whole new world of vascularity, using Toshiba’s SMI technology.  
This exciting, new, Doppler based modality has a number of advantages over conventional Doppler imaging techniques, namely Improved spatial resolution; Lower velocity detection; High frame rate; Lower flash artefact.  
Come to the Toshiba stand at 10.45 on Tuesday, to see how SMI can help you see the whole picture in a wide range of clinical applications, including vascular, gynaecology, abdominal and superficial imaging.

### Wednesday 10th December

**15.00**

“How To Session @ Siemens – Liver Elastography”  
Visit the Siemens stand to learn how to integrate a liver fibrosis service into your routine practice.

### Thursday 11th December

**10.30**

“How To Session @ Siemens – 3D Gynae”  
Visit the Siemens stand to learn how to perform and manipulate 3D Gynae Volumes.
### Day 1 Tuesday 9th December

<table>
<thead>
<tr>
<th><strong>AT A GLANCE</strong></th>
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<tbody>
<tr>
<td><strong>MAIN AUDITORIUM</strong></td>
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<tr>
<td>Registration from 08:00</td>
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<tr>
<td><strong>President’s Welcome 09:15 – 09:30</strong></td>
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<tr>
<td><strong>09:30 – 10:45</strong></td>
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<tr>
<td>Abdominal 1 – Imaging and Management of Benign Liver lesions</td>
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<tr>
<td><strong>Morning Refreshment Break 10:45 – 11:15</strong></td>
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<tr>
<td><strong>11:15 – 12:45</strong></td>
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<tr>
<td>Abdominal 2 – Imaging and Management of Haematuria</td>
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<td><strong>13:00 – 13:30</strong></td>
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<tr>
<td>BMUS Annual General Meeting All members welcome</td>
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<td><strong>14:00 – 15:30</strong></td>
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<tr>
<td>Abdominal 3 – Diagnosis, Treatment and Follow up of Prostate Cancer</td>
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<tr>
<td><strong>Afternoon Refreshment Break 15:30 – 16:00</strong></td>
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<tr>
<td><strong>16:00 – 17:00</strong></td>
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<tr>
<td>Donald MacVicar &amp; Brown Lecture</td>
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<td><strong>Welcome Reception 17:00</strong></td>
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</table>

Morning Refreshment Break 10:45 – 11:15

Day 1 Tuesday 9th December

Lunch 12:45 – 14:00
### Physics 1 – Safety Issues / QA

**Chairs** – Mr Stephen Russell, Christie Hospital, Manchester, Dr Jeff Bamber, The Institute of Cancer Research: Royal Marsden Hospital, Sutton

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:30</td>
<td>Ultrasound therapy for pain palliation in bone metastases,</td>
<td>Prof Gail ter Haar, The Institute of Cancer Research: Royal Marsden Hospital, Sutton</td>
</tr>
<tr>
<td>10:15</td>
<td>Magnetically targeted microbubbles for ultrasound imaging and therapy,</td>
<td>Prof Eleanor Stride¹, J Owen¹, P Rademeyer¹, D Chung¹, Q Chen¹, D Holroyd¹, C Coussios¹, P Friend¹, QA Pankhurst² ¹University of Oxford, ²Healthcare Biomagnetics Laboratory, University College London</td>
</tr>
<tr>
<td>10:35</td>
<td>Development of ultrasound equipment governance at Guy’s and St Thomas NHS Foundation Trust,</td>
<td>F Fedele, Guy’s and St Thomas NHS Foundation Trust, London</td>
</tr>
</tbody>
</table>

### Physics 2 – Doppler principles

**Chairs** – Dr Nick Dudley, Lincoln County Hospital, Dr Jeff Bamber, The Institute of Cancer Research: Royal Marsden Hospital, Sutton

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<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Authors</th>
</tr>
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<tbody>
<tr>
<td>11:15</td>
<td>Recent developments in vascular ultrasound physics and technology,</td>
<td>Prof Peter Hoskins, University of Edinburgh</td>
</tr>
<tr>
<td>11:35</td>
<td>Recent technological developments of cardiac ultrasound,</td>
<td>Dr Joseph Reiken, King’s College Hospital, London</td>
</tr>
<tr>
<td>11:55</td>
<td>The application of ASQ in the diagnosis of pelvic masses (preliminary study),</td>
<td>RH ALDahlawi¹², N Pugh¹, L Nokes¹ ¹Cardiff University, Medical Physics, Cardiff, ²King Saud University, Riyadh, Saudi Arabia</td>
</tr>
<tr>
<td>12:05</td>
<td>Development of a non-invasive B-mode motion tracking platform for the assessment of carotid wall dynamics,</td>
<td>WJ Hopkins¹, E Murghettis², O Long¹ ¹Brunel Institute of Bioengineering, Brunel University, West London, ²Univere s degli Studi Ferrara, Ferrar, Italy</td>
</tr>
<tr>
<td>12:15</td>
<td>Doppler phantoms and velocity measurements in preclinical ultrasound,</td>
<td>DA Kenwright, T Anderson, CM Moran, PW Hadoke, GA Gray, PR Hoskins, University/BHF Centre for Cardiovascular Science, University of Edinburgh</td>
</tr>
<tr>
<td>12:25</td>
<td>Can a commercial flow phantom provide useful information about the colour Doppler sensitivity of early pregnancy ultrasound systems?</td>
<td>JE Browne¹, S Cournane², AJ Fagan³ ¹School of Physics &amp; Medical Ultrasound Physics &amp; Technology Group, IEO, FOCAS Institute, Dublin Institute of Technology, Ireland, ²Medical Physics and Bioengineering, St James’s Hospital, Ireland, ³Centre for Advanced Medical Imaging, St James’s Hospital &amp; Trinity College Dublin, Ireland</td>
</tr>
<tr>
<td>12:35</td>
<td>A low budget Doppler test device,</td>
<td>DE Rowland, St George’s Hospital, London</td>
</tr>
</tbody>
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### 1864 SUITE

#### Ergonomic workshop

**Led by** – Miss Gill Harrison, Mrs Alison Harris, City University, London

**Faculty** – Ms Marlene Minhas, Dr Vivien Gibbs, Mrs Hazel Edwards, Mrs Rachel Wilson

This workshop will provide a chance to put into practice good ergonomic practice, with a facilitator to advise on how to reduce the risk of injury.

The workshop is relevant for anyone undertaking ultrasound and wanting to reduce their risk of work related injury.

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### Morning Refreshment Break 10:45 – 11:15

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### 11 SU SCIENTIFIC PROGRAMME

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### Morning Refreshment Break 10:45 – 11:15

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### DVT Integrated Training

**Led by** – Mrs Borsha Sarker, Queen Elizabeth Hospital, Gateshead

**Faculty** – Mrs Jean Bainbridge, Mrs Rachel Wilson, Mrs Christine Hooson, Mrs Alison McGuinness, Mr Simon Richards

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### Lunch 12:45 – 14:00
### MAIN AUDITORIUM

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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</thead>
<tbody>
<tr>
<td>14:00</td>
<td>The use of multiparametric MRI in the diagnosis of prostate cancer, Prof Lindsay Turnbull</td>
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<tr>
<td>14:25</td>
<td>In pursuit of the holy grail in ultrasound guided prostate biopsy, Dr Jonathan Richenberg</td>
</tr>
<tr>
<td>14:50</td>
<td>The management of prostate cancer, Dr Matthew Simms, Hull and East Yorkshire Hospitals NHS Trust</td>
</tr>
<tr>
<td>15:10</td>
<td>Sonographer-led out-patients transrectal ultrasound (TRUS)-guided prostate biopsy service – experience of a tertiary centre, A Hunter, K Khan, A Alfahad, PC Parker, KWH Chiu, Hull and East Yorkshire Hospitals NHS Trust</td>
</tr>
<tr>
<td>15:20</td>
<td>Early experience of Multiparametric MRI (mMRI) and Transrectal Ultrasound Fusion (TRUSF) guided prostate biopsy, OR Byass, PC Parker, Hull and East Yorkshire Hospitals NHS Trust</td>
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</table>

### MEMBERS LONG ROOM

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>14:00</td>
<td>Professional Issues 3 – Is education meeting clinical service needs?</td>
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<tr>
<td>14:20</td>
<td>Securing the future of the Sonography workforce in the East Midlands 2013/14, Mrs Ann Allen, Kingsmill NHS Trust</td>
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<tr>
<td>14:40</td>
<td>Should HEIs and professional bodies support practitioners taking on additional clinical roles? Mrs Hazel Edwards, East and North Hertfordshire NHS Trust</td>
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<tr>
<td>15:00</td>
<td>How professional bodies can support educational needs and change, Mr Nigel Thomson, Society and College of Radiographers</td>
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<td>15:20</td>
<td>Q&amp;A</td>
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**Donald MacVicar & Brown Lecture**

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<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>16:00</td>
<td>Chairs – Prof Paul Sidhu, King’s College Hospital, London, Dr Rhodri Evans, Morriston Hospital, Swansea</td>
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<tr>
<td>17:00</td>
<td>The nodule delusion, Dr Lol Berman, Addenbrooke’s Hospital, Cambridge</td>
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**Close 17:00**
### Physics 3 – Theory and clinical application of Elastography

**Chairs** – Mr Stephen Russell, Christie Hospital, Manchester, Prof Peter Hoskins, University of Edinburgh

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<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>14:00</td>
<td><strong>Reliability of quantitative elastography,</strong> Dr Huan Wee Chan(^1,2), The Institute of Cancer Research and Royal Marsden Hospital NHS Trust, (^2)The National Hospital for Neurology and Neurosurgery</td>
</tr>
<tr>
<td>14:30</td>
<td><strong>Reproducibility of strain ratio measurements,</strong> Dr Roald Flesland Havre, Haukeland University Hospital, Bergen, Norway</td>
</tr>
<tr>
<td>15:00</td>
<td><strong>A rapid and simple technique to plot the pulsed acoustic pressure field of clinical scanners,</strong> J Fromageau, JC Bamber, Royal Marsden Hospital and Institute of Cancer Research, London</td>
</tr>
<tr>
<td>15:10</td>
<td><strong>The applicability of plane wave imaging to poroelastography,</strong> M Theodorou, J Fromageau, N deSouza, JC Bamber, The Institute of Cancer Research and Royal Marsden Hospital, London</td>
</tr>
<tr>
<td>15:20</td>
<td><strong>The effects of scanner speed of sound settings on image quality parameters for mammography ultrasound scanning,</strong> T Quinn(^1), B Ward(^2), W Gardner(^3), PK, Verma(^1), Sheffield Teaching Hospitals NHS Foundation Trust, (^2)Freeman Hospital, Newcastle upon Tyne, (^3)Bradford Teaching Hospitals NHS Foundation Trust</td>
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### Afternoon Refreshment Break 15:30 – 16:00

### DVT Integrated Training

14:00 – 15:30

**Continuation of the morning session**

### Afternoon Refreshment Break 15:30 – 16:00

**Close 17:00**
# Scientific Programme 2014

## Day 1 Tuesday 9th December

### MAIN AUDITORIUM

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<tbody>
<tr>
<td>09:15</td>
<td><strong>Opening &amp; Presidential Address</strong></td>
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<td>Prof Paul Sidhu, BMUS President</td>
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<tr>
<td>09:30</td>
<td><strong>Abdominal 1 – Imaging and Management of Benign Liver lesions</strong></td>
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<td>Chairs – Dr Oliver Byass, Hull and East Yorkshire NHS Trust, Dr James Pilcher, St George’s Hospital, London</td>
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<td></td>
<td>Benign liver lesions are commonly detected in abdominal imaging but can cause difficulties in characterisation and management. This session will review imaging techniques and appearances of benign liver lesions which are commonly encountered in everyday ultrasound practice. Atypical appearances and alternative imaging modalities will be explored. There will be an overview of management pathways and a guide to what the surgeons need to know from diagnostic imaging. This session is aimed at Radiologists, registrars, sonographers and general interest practitioners.</td>
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<tr>
<td>09:30</td>
<td><strong>Characterisation and follow up of incidentally detected liver lesions on USS</strong>, Mrs Jane Smith, Leeds and West Yorks Radiology Academy</td>
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<tr>
<td>09:55</td>
<td><strong>Characterisation and further assessment of incidentally detected liver lesions on CT / MRI</strong>, Dr James Cast, Hull and East Yorkshire Hospitals NHS Trust</td>
</tr>
<tr>
<td>10:15</td>
<td><strong>Hepatological management of benign liver lesions</strong>, Dr Giles Toogood, St James’s University Hospital, Leeds</td>
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<tr>
<td>10:40</td>
<td><strong>Xanthogranulomatous cholecystitis: CT and MRI appearance</strong>, H Khosa, U Salati, J Feeney, W Torreggeni, The Adelaide and Meath Hospital, Dublin, Ireland</td>
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<th>Time</th>
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<tr>
<td>11:15</td>
<td><strong>Abdominal 2 – Imaging and Management of Haematuria</strong></td>
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<td>Chairs – Mrs Jane Smith, Leeds and West Yorks Radiology Academy, Dr Simon Freeman, Derriford Hospital, Plymouth</td>
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<tr>
<td></td>
<td>Haematuria is a common presenting condition which generates significant workload for radiology and urology departments alike. Traditional diagnostic pathways include ultrasound and cystoscopy although the usefulness of both tests can be questioned. This session will review what the urologist requires from diagnostic imaging. Current imaging pathways will be reviewed with an aim to present best practice guidance in this high volume and often complex field of practice</td>
</tr>
<tr>
<td>11:15</td>
<td><strong>Audit of CT urinary tract in patients referred from one stop haematuria clinic</strong>, S Reham, OR Byass, Hull and East Yorkshire Hospitals NHS Trust</td>
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<tr>
<td>11:25</td>
<td><strong>Can ultrasound replace cystoscopy in the assessment of haematuria?</strong>, R Turney, M Mossad, P Parker, K Chiu, Hull and East Yorkshire Hospitals NHS Trust</td>
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<tr>
<td>11:35</td>
<td><strong>Imaging for haematuria – what the surgeon needs to know</strong>, Dr Matthew Simms, Hull and East Yorkshire Hospitals NHS Trust</td>
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<tr>
<td>12:00</td>
<td><strong>Ultrasound imaging – is this the best we can do?</strong>, Dr James Pilcher, St George’s Hospital, London</td>
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<td>12:25</td>
<td><strong>Radiofrequency ablation of renal cell carcinoma</strong>, Dr James Cast, Hull and East Yorkshire Hospitals NHS Trust</td>
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<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tbody>
<tr>
<td>13:00</td>
<td><strong>BMUS Annual General Meeting</strong></td>
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<td>All members welcome</td>
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</table>
14:00 – 15:30 Abdominal 3 – Diagnosis, Treatment and Follow up of Prostate Cancer

Chairs – Dr Oliver Byass, Hull and East Yorkshire Hospitals NHS Trust, Dr Rhodri Evans, Morriston Hospital, Swansea

The publication of the NICE guideline for the diagnosis and Treatment of Prostate cancer in January 2014 has resulted in many departments reviewing their pathways and diagnostic procedures for this group of patients. The guideline has resulted in an increased number of patients opting for active surveillance as opposed to invasive treatment and this has had a consequence of increase referrals for prostate biopsy and imaging. This session will review the NICE guidelines with regards to what the surgeons want from imaging and biopsy diagnosis, what ultrasound can offer and where alternative imaging and diagnostic techniques will aid in patient management in the future.

This session is aimed at Radiologists, registrars, sonographers and general interest practitioners.

14:00 The use of multiparametric MRI in the diagnosis of prostate cancer, Prof Lindsay Turnbull, University of Derby

14:25 In pursuit of the holy grail in ultrasound guided prostate biopsy, Dr Jonathan Richenberg, Royal Sussex County Hospital, Brighton

14:50 The management of prostate cancer, Dr Matthew Simms, Hull and East Yorkshire Hospitals NHS Trust

15:10 Sonographer-led out-patients transrectal ultrasound (TRUS)-guided prostate biopsy service – experience of a tertiary centre, A Hunter, K Khan, A Alfahad, PC Parker, KWH Chiu, Hull and East Yorkshire Hospitals NHS Trust

15:20 Early experience of Multiparametric MRI (mMRI) and Transrectal Ultrasound Fusion (TRUSF) guided prostate biopsy, OR Byass, PC Parker, Hull and East Yorkshire Hospitals NHS Trust

16:00 – 17:00 Donald MacVicar & Brown Lecture

Chairs – Prof Paul Sidhu, King’s College Hospital, London, Dr Rhodri Evans, Morriston Hospital, Swansea

The nodule delusion, Dr Lol Berman, Addenbrooke’s Hospital, Cambridge

MEMBER’S LONG ROOM

09:30 – 10:45 Professional Issues 1 – Is the AQP contract a viable solution to meeting increasing demands?

Chairs – Mr Gerry Johnson, Tameside Hospital NHS Foundation Trust, Manchester, Mr Nigel Thomson, Society and College of Radiographers

The landscape of non-obstetric ultrasound imaging has changed significantly over recent years with the advent of the Any Qualified Provider contracts. The days of the local GP referring directly to the local hospital for ultrasound tests is rapidly diminishing as more primary care imaging facilities are being introduced. AQP brought competition and multiple providers into the imaging arena with the aim of increasing patient choice and reducing waiting times. But has AQP really made a difference? GP commissioning groups will be looking to renew contracts within the next 12 months and front line ultrasound services will be under review. The aims of this session are to review how AQP has changed the face of non-obstetric imaging, where there are elements of good practice, how CCG commission imaging and where we could do better.

This session will be of interest to any delegate involved with providing imaging as the impact of AQP is far reaching.

09:30 Commissioning Imaging services in the modern NHS landscape. The role of the CCG, Dr Daniel Roper, Chair, Hull Clinical Commissioning Group

09:50 Pre-hospital ultrasound: real-time communication technology to facilitate expert-guided support for remote and rural communities, L Eadie1, A Mort1, L Regan2, A Macaden2, P Wilson1 1Centre for Rural Health, University of Aberdeen, Inverness, 2Raigmore Hospital, NHS Highland, Inverness

10:00 The business of Sonography – The experience of an independent service provider, Mr Mike Steward, Ultrasound Direct
The impact of AQP on NHS ultrasound services. The pros and cons of managing a NHS provider service, Mrs Alison McGuinness, Mid Yoroks Hospitals NHS Trust

11:15 – 12:45 Professional Issues 2 – Is education meeting clinical service needs - in conjunction with CASE

Chairs – Mrs Terry Humphrey, Leeds Radiology Academy, Mrs Gill Dolbear, Canterbury Christ Church University

Is education meeting clinical service needs?

With increasing demand and the lure of locum salaries most clinical departments find themselves with long term vacancies and a shortage of eligible and suitable sonographers to recruit. It is clear that more sonographers are required than are currently being produced by the current education model in the UK but are there alternative solutions? The aims of the professional issues sessions 2 & 3 are to explore the educational requirements of sonographers and how these are being met. This session will explore how education is commissioned and what service requires from the education programmes delivered in the UK as well as giving the floor opportunity to air their views and questions prior to the afternoon’s response.

This session will be of interest to any delegate involved with providing ultrasound imaging in primary or secondary care.

11:15 Delivering service change via the Education Commissioning Process, Dr Kevin Moore, Health Education Yorkshire and Humber

11:40 Education requirements of a clinical department, Mr Gerry Johnson, Tameside Hospital NHS Foundation Trust, Manchester

12:05 An investigation into the role of simulation for the acquisition of clinical skills within postgraduate ultrasound education, VJ Gibbs, University of the West of England

12:15 Responding to commissioning requirements and meeting educational standards. An impossible task or an enjoyable ask? Mrs Jean Wilson, University of Leeds

12:40 Discussion

14:00 – 15:30 Professional Issues 3 – Is education meeting clinical service needs?

Chairs – Mrs Terry Humphrey, Leeds Radiology Academy, Dr Vivien Gibbs, University of the West of England, Bristol

14:00 CASE – Accreditation of ultrasound education and its role in driving change, Mrs Gill Dolbear, Canterbury Christ Church University

14:20 Securing the future of the Sonography workforce in the East Midlands 2013/14, Mrs Ann Allen, Kingsmill NHS Trust, Notts

14:40 Should HEIs and professional bodies support practitioners taking on additional clinical roles? Mrs Hazel Edwards, East and North Hertfordshire NHS Trust

15:00 How professional bodies can support educational needs and change, Mr Nigel Thomson, Society and College of Radiographers

15:20 Q&A

09:30 – 10:45 Physics 1 – Safety Issues / QA

Chairs – Mr Stephen Russell, Christie Hospital, Manchester, Dr Jeff Bamber, The Institute of Cancer Research: Royal Marsden Hospital, Sutton

The recent developments in ultrasound imaging technology for example; multi beam transmissions, 3D and elastography have changed the character of ultrasound interactions with the body. How, if at all has this impacted on the safety of ultrasound. The use of ultrasound in therapeutic treatments is expanding world wide, what is the state of the art and where is it heading?
09:30 Ultrasound therapy for pain palliation in bone metastases, Prof Gail ter Haar, The Institute of Cancer Research: Royal Marsden Hospital, Sutton

09:50 Ultrasound safety of modern systems and techniques, Mr Adam Shaw, National Physical Laboratory, Teddington, Middlesex

10:15 Magnetically targeted microbubbles for ultrasound imaging and therapy, Prof Eleanor Stride¹, J Owen¹, P Rademeyer¹, D Chung¹, Q Chen¹, D Holroyd¹, C Coussios¹, P Friend¹, QA Pankhurst²
¹University of Oxford, ²Healthcare Biomagnetics Laboratory, University College London

10:35 Development of ultrasound equipment governance at Guy’s and St Thomas NHS Foundation Trust, F Fedele, Guy’s and St Thomas NHS Foundation Trust, London

11:15 – 12:45 Physics 2 – Doppler principles

Chairs – Dr Nick Dudley, Lincoln County Hospital, Dr Jeff Bamber, The Institute of Cancer Research: Royal Marsden Hospital, Sutton

The developments in Doppler generally serve two paths the vascular and the cardiac routes. With the implicit link between computer processing speeds and the ability to image and process dynamic events where is this technology now.

11:15 Recent developments in vascular ultrasound physics and technology, Prof Peter Hoskins, University of Edinburgh

11:35 Recent technological developments of cardiac ultrasound, Dr Joseph Reiken, King’s College Hospital, London

11:55 The application of ASQ in the diagnosis of pelvic masses (preliminary study), RH ALDahlawi¹,², N Pugh¹, L Nokes¹ ‘Cardiff University, Medical Physics, Cardiff, ²King Saud University, Riyadh, Saudi Arabia

12:05 Development of a non-invasive B-mode motion tracking platform for the assessment of carotid wall dynamics, WJ Hopkins¹, E Murghettis², O Long¹ ‘Brunel Institute of Bioengineering, Brunel University, West London, ²Universita degli Studi Ferrara, Ferrar, Italy

12:15 Doppler phantoms and velocity measurements in preclinical ultrasound, DA Kenwright, T Anderson, CM Moran, PW Hadoke, GA Gray, PR Hoskins, University/BHF Centre for Cardiovascular Science, University of Edinburgh

12:25 Can a commercial flow phantom provide useful information about the colour Doppler sensitivity of early pregnancy ultrasound systems? JE Browne¹, S Cournane², AJ Fagan¹ ‘School of Physics & Medical Ultrasound Physics & Technology Group, IEO, FOCAS Institute, Dublin Institute of Technology, Ireland, ²Medical Physics and Bioengineering, St James’s Hospital, Ireland, ³Centre for Advanced Medical Imaging, St James’s Hospital & Trinity College Dublin, Ireland

12:35 A low budget Doppler test device, DE Rowland, St George’s Hospital, London

14:00 – 15:30 Physics 3 – Theory and clinical application of Elastography

Chairs – Mr Stephen Russell, Christie Hospital, Manchester, Prof Peter Hoskins, University of Edinburgh

Elastography has moved from research into practical clinical application in many areas how do we ensure that the results it is giving can be trusted. What are limitations and constraints of the technology.

14:00 Reliability of quantitative elastography, Dr Huan Wee Chan¹,², ¹The Institute of Cancer Research and Royal Marsden Hospital NHS Trust, ²The National Hospital for Neurology and Neurosurgery

14:30 Reproducibility of strain ratio measurements, Dr Roald Flesland Havre, Haukeland University Hospital, Bergen, Norway

15:00 A rapid and simple technique to plot the pulsed acoustic pressure field of clinical scanners, J Fromageau, JC Bamber, Royal Marsden Hospital and Institute of Cancer Research, London

15:10 The applicability of plane wave imaging to poroelastography, M Theodorou, J Fromageau, N deSouza, JC Bamber, The Institute of Cancer Research and Royal Marsden Hospital, London
The effects of scanner speed of sound settings on image quality parameters for mammography ultrasound scanning, T Quinn¹, B Ward², W Gardner³, PK, Verma¹, ¹Sheffield Teaching Hospitals NHS Foundation Trust, ²Freeman Hospital, Newcastle upon Tyne, ³Bradford Teaching Hospitals NHS Foundation Trust

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| 09:30 – 10:45 | **Ergonomic workshop**  
Led by – Miss Gill Harrison, Mrs Alison Harris, City University, London  
Faculty – Ms Marlene Minhas, Dr Vivien Gibbs, Mrs Hazel Edwards, Mrs Rachel Wilson  
This workshop will provide a chance to put into practice good ergonomic practice, with a facilitator to advise on how to reduce the risk of injury.  
The workshop is relevant for anyone undertaking ultrasound and wanting to reduce their risk of work related injury.  
**Aims:**  
• Improve ergonomic practice.  
**Objectives:**  
• Scan in a small group setting and gain advice about posture.  
• Review transducer grip and grip pressure  
• Look at ways to adapt scanning technique to reduce risks of work related disorders |
| 11:15 – 12:45 | **DVT Integrated Training**  
Led by – Mrs Borsha Sarker, Queen Elizabeth Hospital, Gateshead  
Faculty – Mrs Jean Bainbridge, Mrs Rachel Wilson, Mrs Christine Hooson, Mrs Alison McGuinness, Mr Simon Richards  
Introduction: Q&A session with faculty.  
Lower limb: fem-pop – paired femorals & challenging legs  
Lower limb: calf veins – a magical mystery tour  
Iliac veins and IVC – practical tips |
| 12:45 | **Lunch** |
| 14:00 – 15:30 | **DVT Integrated Training**  
Continuation of the morning session |
Have you seen the future for portable ultrasound?

The NEW MyLab Gamma from Esaote will be on show at BMUS 2014!

GE Healthcare are making four new product announcements at BMUS 2014.

We hope you’ll join us on stand 5.
Young Investigator Session

The Young Investigators Session is a showcase of the best abstracts submitted by authors who are 35 years old or younger. The best presentation from this session wins the BMUS Young Investigator of the Year award and is given the opportunity to present their work at the 2015 Euroson Meeting 6 – 8 November, Athens, Greece, on behalf of BMUS.

Andy McNeill
PET CT guided CEUS of colorectal metastasis and subsequent fusion guided microwave ablation, MAF McNeill, B Stenberg, S Saikia, Freeman Hospital, Newcastle upon Tyne
I’m 31, and a recently appointed Consultant Radiologist at the Freeman Hospital, Newcastle. I have a specialist interest in ultrasound and urology. Andrew McNeill

Cheng Fang
Role of B-mode ultrasound (US) and color Doppler ultrasound (CDUS) in the investigation of primary hyperparathyroidism: Specific features that raise the possibility of malignant change, E Konstantatou, C Fang, S Barocini, PS Sidhu, KM Schulte, King’s College Hospital, London
I am a radiology registrar at King’s College Hospital. I studied genetics and was involved in oncology research on identification of prognostic and therapeutic molecular markers.

Katie Johnston
Temporomandibular joint effusion and its relationship with perceived disability assessed using musculoskeletal ultrasound and patient-reported disability, K Johnston, LN Bird, P Bright, European School of Osteopathy
Katie is an osteopath in private practice in Bristol. She completed her Masters Degree in July 2013 and continues to be involved in the translation of research into practice. Katie has specific interests in chronic musculoskeletal conditions affecting the head and neck.

Nikhil Patel
The introduction of renal contrast enhanced ultrasound to a district general hospital – is there any benefit? N Patel, N Reed, G Rai-Tidbury, A Irvine, St Peter’s Hospital, Surrey
I graduated from UCL medical school in 2010 and I am currently an ST2 Radiology trainee in the Surrey deanery.

Nadia Jawad
A Retrospective review on the management of patients with High-Grade Prostatic Intraepithelial Neoplasia (HGPIN), N Jawad, OR Byass, PC Parker, Hull and East Yorkshire Hospitals NHS Trust
Hello my name is Nadia Jawad and I am a 2nd year radiology trainee at the Hull and East Yorkshire Training Scheme. I’ve enjoyed my training so far and there have been ample opportunities to participate in a wide range of interesting projects. See you at BMUS 2014!

Gibran Yusuf
Multi-parametric ultrasonography of testicular hematomas: features on grey scale, color Doppler, contrast enhanced sonography and real-time tissue elastography, G Yusuf, E Konstantatou, ME Sellars, DY Huang, PS Sidhu, King’s College Hospital, London
Gibran is an Interventional radiology registrar at King’s College Hospital, London. He has maintained a constant interest in ultrasound throughout his five years of radiology training. In particular Gibran is interested in contrast enhanced ultrasound which he is fortunate enough to incorporate into his routine clinical practice.

This session takes place on Day 2 – Wednesday 10th December 15:30 – 17:00 in the Library Suite.
<table>
<thead>
<tr>
<th>Time</th>
<th>Main Auditorium</th>
<th>Members Long Room</th>
<th>Library Suite</th>
<th>1864 Suite</th>
<th>Honours Suite</th>
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<tbody>
<tr>
<td>09:00 – 10:30</td>
<td>Early pregnancy – diagnosis, management and patient care</td>
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<td>09:00 – 10:30</td>
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<td></td>
<td>General Imaging 1 – Advancing Technologies in Ultrasound Imaging</td>
<td>09:00 – 10:30</td>
<td>Unusual Vascular Disorders and their Assessment</td>
<td>Head and Neck Integrated Training</td>
<td>RSI Master Class</td>
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<td>11:00 – 12:30</td>
<td>Early pregnancy – diagnosis, management and patient care</td>
<td>11:00 – 12:30</td>
<td>Vascular Ultrasound Training</td>
<td>11:00 – 12:30</td>
<td>RSI Master Class</td>
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<td></td>
<td>General Imaging 2 – Conundrums in Ultrasound</td>
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<td>Head and Neck Integrated Training continuation of morning session</td>
<td>A re-run of the morning session above.</td>
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<tr>
<td>13:30 – 15:00</td>
<td>Early pregnancy – diagnosis, management and patient care</td>
<td>13:30 – 15:00</td>
<td>Abdominal Vascular Issues</td>
<td>13:30 – 15:00</td>
<td>Ultrasound in Fertility</td>
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<td>Neck Lumps</td>
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<td>13:30 – 15:00</td>
<td>– In conjunction with the Royal College of Nursing</td>
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<tr>
<td>15:30 – 17:00</td>
<td>Early pregnancy – diagnosis, management and patient care</td>
<td>15:30 – 17:00</td>
<td>Young Investigator – Kindly sponsored by Philips Healthcare</td>
<td>15:30 – 17:00</td>
<td>Ultrasound in Fertility</td>
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<td>Advanced Techniques in Head and Neck</td>
<td>15:30 – 17:00</td>
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<td>15:30 – 17:00</td>
<td>continued post tea break</td>
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<td>15:30 – 17:00</td>
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Close 17:00

Annual Dinner & Drinks Reception at Manchester United – 19:00 till late
Sponsored by Toshiba Medical Systems
Early pregnancy – diagnosis, management and patient care
Chairs – Miss Jackie Ross, King’s College Hospital, London, Mrs Alison McGuinness, Mid Yorks Hospitals NHS Trust

09:00 Bleeding in early pregnancy, Dr Jemma Johns, King’s College Hospital, London

09:20 Incomplete miscarriage, Dr Cecilia Bottomley, Chelsea & Westminster Hospital, London

09:40 Early pregnancy loss - management and choice, Dr Caroline Overton, University Hospitals Bristol NHS Foundation Trust

10:00 Management of caesarean scar pregnancy, Dr Davor Jurkovic, University College, London

10:20 Discussion

Morning Refreshment Break 10:30 – 11:00

Ultrasound diagnosis of gestational trophoblastic disease, Dr Emma Kirk, North Middlesex Hospital, London

11:00

Gestational trophoblastic neoplasia, Prof Neil Sebire, Great Ormond Street Hospital, London and Charing Cross Hospital, London

11:20

Post partum ultrasound, Dr Jemma Johns, King’s College Hospital, London

11:40

Pregnancy of unknown location (PUL) ultrasound reporting audit, SL Morrissey¹, S Brook², A McGuinness¹, MidYorkshire Hospitals Wakefield, Singleton Hospital, Swansea

12:00

RCOG Training the Trainers eLearning Module, Dr Geraldine Masson, University Hospital of North Staffordshire

12:10 Lunch 12:30 – 13:30

General Imaging 1 – Advancing Technologies in Ultrasound Imaging
Chairs – Prof Paul Sidhu, King’s College Hospital, London, Mrs Jane Smith, Leeds and West Yorks Radiology Academy

09:00 Elastography in liver disease and the decline of the liver biopsy, Dr Ounlai Jaffer, Royal London Hospital, Barts Health, London

09:20 Fusion imaging and new technologies: their role in improving diagnostic confidence, Dr Adrian Lim, Charing Cross Hospital, London

09:40 Non-hepatic applications of contrast enhanced ultrasound, Dr Chris Harvey, Hammersmith Hospital, Imperial College NHS trust

10:00 Multi-parametric ultrasound imaging of segmental testicular infarction, PM Tantrige¹, KV Patel², PS Sidhu¹, King’s College Hospital, London, Croydon University Hospital, London

10:10 Retx- early post-surgical CEUS in the detection of rejection and in predicting subsequent kidney function, B Stenberg¹, MAF McNeill¹, Freeman Hospital, Newcastle upon Tyne

10:20 Assessment of usefulness of multi-parametric ultrasound imaging of the testis in determining malignant versus benign disease: blinded review of diagnostic capabilities, EK Konstantatou¹, I Gjalbi¹, LE Derchi², M Bertolotto³, M Valentino⁴, C Kalogeropoulou⁵, PS Sidhu¹, King’s College Hospital, London, UK, San Martino Hospital, Genoa, Italy, University Hospital of Trieste, Trieste, Italy, Tolmezzo Hospital, Tolmezzo, Italy, University Hospital of Patras, Greece
### Head and Neck Integrated Training

**Led by** – Dr Rhodri Evans, Morriston Hospital, Swansea, Dr Rhian Rhys, Royal Glamorgan Hospital

**Faculty** – Dr Steve Colley, Dr Andrew McQueen, Dr Lol Berman, Mrs Catherine Kilpatrick, Mrs Jean Bainbridge

**Morning Refreshment Break 10:30 – 11:00**

- Continuation of morning session

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### RSI Master Class

**Led by** – Miss Gill Harrison, Mrs Allison Harris, City University London

**Morning Refreshment Break 10:30 – 11:00**

- A re-run of the session above.

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### Vascular Ultrasound Training

**Chairs** – Mrs Tracey Gall, Independent Vascular Services Ltd, Dr Jeff Bamber, The Institute of Cancer, Royal Marsden Hospital, Sutton

**11:00**

- **STP – training the vascular workforce of tomorrow**, Mrs Theresa Fail, National School of Healthcare Science, Birmingham / Salisbury NHS Foundation Trust

**11:15**


**11:30**

- **Vascular u/s training for surgeons**, Dr Abdullah Jibawi, Ashford & St Peter’s Hospitals NHS Foundation Trust, Surrey

**11:45**

- **Fundamental principles of haemodynamics without the headaches**, Mrs Heather Venables, University of Derby

**12:15**

- **The importance of clinical assessment in ultrasound scanning**, D Saunders, M Subesingh, Leeds General Infirmary

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### Unusual Vascular Disorders and their Assessment

**Chairs** – Mrs Tracey Gall, Independent Vascular Services Ltd, Mrs Heather Venables, University of Derby

**09:00**

- **Trans-cranial Imaging**, Dr Colin Deane, King’s College Hospital, London

**09:20**

- **Laser speckle contrast imaging (LSCI) for hand-arm vibration syndrome (HAVS) and Raynaud’s phenomenon**, Mr Steven Rogers, Independent Vascular Services Ltd, University Hospitals of South Manchester NHS Foundation Trust

**09:40**

- **The role of ultrasound in the early diagnosis of GCA**, Dr Jennifer Piper, Oxford University

**10:00**

- **Age and gender effects on carotid arterial wall motion using non-invasive B-mode Ultrasound**, WJ Hopkins, Q Long, E Murghetti, Brunel University, West London

**10:10**

- **Cavernous transformation of the portal vein in HIV**, B Batohi, A Deganello, King’s College Hospital, London

**10:30**

- **Morning Refreshment Break 10:30 – 11:00**

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### RSI Master Class

**Led by** – Miss Gill Harrison, Mrs Allison Harris, City University London

**09:00**

- **RSI Master Class**

**10:30**

- A re-run of the session above.

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**Lunch 12:30 – 13:30**
<table>
<thead>
<tr>
<th><strong>MAIN AUDITORIUM</strong></th>
<th><strong>MEMBERS LONG ROOM</strong></th>
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<tbody>
<tr>
<td><strong>Early pregnancy – diagnosis, management and patient care</strong></td>
<td><strong>Neck Lumps</strong></td>
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<tr>
<td><strong>Chairs</strong> – Dr Caroline Overton, University Hospitals Bristol, Mrs Alison McGuinness, Mid Yorks Hospitals NHS Trust</td>
<td><strong>Chairs</strong> – Dr Rhodri Evans, Morriston Hospital, Swansea, Mr Gerry Johnson, Tameside Hospital NHS Trust</td>
</tr>
<tr>
<td><strong>13:30</strong> Diagnosis of early intrauterine pregnancy and missed miscarriage – when do we call a sac a sac and know when a pregnancy has failed? Dr Anne Marie Coady, Hull and East Yorks NHS Trust</td>
<td><strong>13:30</strong> <strong>What a surgeon needs to know</strong>, Dr Susannah Penney, Central Manchester University Hospitals NHS Foundation Trust</td>
</tr>
<tr>
<td><strong>14:00</strong> Diagnosis and management of ectopic pregnancy, Dr Davor Jurkovic, University College, London</td>
<td><strong>13:50</strong> <strong>Setting up a H&amp;N service – the sonographer’s perspective</strong>, Mrs Catherine Kirkpatrick, Lincoln County Hospital</td>
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<tr>
<td><strong>14:25</strong> Do we need 3D in EPU? Miss Jackie Ross, King’s College Hospital, London</td>
<td><strong>14:10</strong> <strong>Signs to look for in lumps and bumps – case review and interactive discussion</strong>, Dr Rhian Rhys, Royal Glamorgan Hospital</td>
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<tr>
<td><strong>14:45</strong> Discussion</td>
<td><strong>Afternoon Refreshment Break 15:00 – 15:30</strong></td>
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<tr>
<td><strong>Chairs</strong> – Miss Jackie Ross, King’s College Hospital, London, Dr Anne Marie Coady, Hull and East Yorks NHS Trust</td>
<td><strong>15:30</strong> <strong>Needsles – why when and how?</strong> Dr Rhodri Evans, Morriston Hospital, Swansea</td>
</tr>
<tr>
<td><strong>15:30</strong> The parent perspective on antenatal screening and its consequences, Mrs Cheryl Titherley, Antenatal Results &amp; Choices (ARC)</td>
<td><strong>15:55</strong> <strong>Advanced ultrasound techniques – how will they help?</strong> Dr Andrew McQueen, Freeman Hospital, Newcastle upon Tyne</td>
</tr>
<tr>
<td><strong>16:00</strong> How good is my unit? Dr Cecilia Bottomley, Chelsea &amp; Westminster Hospital, London</td>
<td><strong>16:20</strong> <strong>Ultrasound first, but what next?</strong> Dr Steve Colley, Queen Elizabeth Hospital, Birmingham</td>
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<tr>
<td><strong>16:20</strong> Hot topics, Dr Yasmin Sana, King’s College NHS Trust, Princess Royal University Hospital, Farnborough</td>
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<td><strong>16:40</strong> Do the professional and personal experiences of obstetric sonographers influence how they communicate with pregnant women? E Dyer, T Chudleigh, Cambridge University NHS Foundation Trust, Cambridge</td>
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<td><strong>Close 17:00</strong></td>
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### LIBRARY SUITE

#### Abdominal Vascular Issues

**Chairs** – Mrs Tracey Gall, Independent Vascular Services Ltd, Dr Nick Dudley, Lincoln County Hospital

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<tbody>
<tr>
<td>13:50</td>
<td>Intra-operative CEUS, a surgeon’s perspective</td>
<td>Mr Jonathan Ghosh, University Hospital of South Manchester</td>
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<tr>
<td>14:10</td>
<td>Portal vein imaging</td>
<td>Mrs Jane Smith, Leeds and West Yorks Radiology Academy</td>
</tr>
<tr>
<td>14:30</td>
<td>Soft tissue masses and lumps and bumps</td>
<td>Mrs Lorelei Rushton, University of Cumbria</td>
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</table>

#### Afternoon Refreshment Break 15:00 – 15:30

**Young Investigator** – Kindly sponsored by Philips Healthcare

**Chairs** – Dr Carmel Moran, University of Edinburgh, Mrs Hazel Edwards, East & North Hertfordshire NHS Trust

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<td>MAF McNeill, B Stenberg, S Saikia, Freeman Hospital, Newcastle upon Tyne</td>
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<td>Role of B-mode ultrasound (US) and color Doppler ultrasound (CDUS) in the investigation of primary hyperparathyroidism: Specific features that raise the possibility of malignant change</td>
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<td>Multi-parametric ultrasonography of testicular hematomas: features on grey scale, color Doppler, contrast enhanced sonography and real-time tissue elastography</td>
<td>G Yusuf, E Konstantatou, ME Sellars, DY Huang, PS Sidhu, King’s College Hospital, London</td>
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<tr>
<td>16:10</td>
<td>The introduction of renal contrast enhanced ultrasound to a district general hospital – is there any benefit?</td>
<td>N Patel, N Reed, G Rai-Tidbury, A Irvine, St Peter’s Hospital, Surrey</td>
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<tr>
<td>16:22</td>
<td>A Retrospective review on the management of patients with High-Grade Prostatic Intraepithelial Neoplasia (HGPIN)</td>
<td>N Jawad, OR Byass, PC Parker, Hull and East Yorkshire Hospitals NHS Trust</td>
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<td>16:35</td>
<td>Temporomandibular joint effusion and its relationship with perceived disability assessed using musculoskeletal ultrasound and patient-reported disability</td>
<td>K Johnston, LN Bird, P Bright, European School of Osteopathy</td>
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<td>Discussion</td>
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#### 1864 SUITE

**Advancing Technologies in Ultrasound Imaging – Integrated Training Session**

**Faculty** –

- Prof Paul Sidhu – CEUS
- Dr Adrian Lim – Fusion and SMI
- Dr Onaulu Jaffer – Liver elastography
- Mr Iain Dunbar – Where simulation becomes a reality – MedaPhor ScanTrainer

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#### HONOURS SUITE

**Ultrasound in Fertility – In conjunction with the Royal College of Nursing**

**Chairs** – Mrs Debbie Barber, Oxford University Hospitals, Dr Vivien Gibbs, University of the West of England, Bristol

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<tr>
<td>14:00</td>
<td>Knowing your machine</td>
<td>Mrs Heather Venables, University of Derby</td>
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<td>14:30</td>
<td>RCN Training and education pathway for nurse / midwife sonographers</td>
<td>Mrs Debbie Barber, Oxford University Hospitals</td>
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#### Afternoon Refreshment Break 15:00 – 15:30

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**Managing pelvic pathology** – Dr Alexander Oboh, Hull and East Yorkshire NHS Trust

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Close 17:00
Day 2 Wednesday 10th December

**MAIN AUDITORIUM**

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<tr>
<th>Time</th>
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<tr>
<td>09:00 – 17:00</td>
<td>Early pregnancy – diagnosis, management and patient care</td>
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<td>We are delighted the Early Pregnancy educational stream at this year’s BMUS Annual Scientific Meeting has been organised in conjunction with the Association of Early Pregnancy Units (AEPU). The aim of the Association of Early Pregnancy Units (AEPU) is to provide support and resources to help patient choice and maintain standards in Early Pregnancy Care. With over 200 units in the UK this service is provided by many ultrasound practitioners on a regular basis. The APEU has brought its expertise to the BMUS meeting this year to provide an educational and informative day of lectures and opportunity for discussion with providers of the service and experts in this often highly complex and emotionally stressful area of practice. The early pregnancy stream at the BMUS meeting will be of interest for sonographers, midwives, and EPU nurses as well as consultants in the fields of obstetrics gynaecology and radiology. The first two sessions of the day explore some of the clinical presentations associated with early pregnancy. In addition the renowned Consultant Gynaecologist Davor Jurkovic will present choices available for management of early pregnancy management and loss. The afternoon sessions discuss advanced techniques used to assist in diagnosis as well as exploring the impact that our diagnosis makes of patients. We are pleased to be able to announce that a representative from Antenatal Results &amp; Choices (ARC) will be joining the session to present the patient perspective of early pregnancy diagnosis and management choice. Whilst the day has been organized in conjunction with APEU all practitioners who are involved with patient care in early pregnancy are invited to join these sessions. We are certain that delegates with affiliation to either organization will find this day informative and educational as well as having the opportunity to discuss hot topics and issues with colleagues from around the UK.</td>
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| 09:00 – 10:30 | Early pregnancy – diagnosis, management and patient care               |
|              | Chairs – Miss Jackie Ross, King’s College Hospital, London, Mrs Alison McGuinness, Mid Yorks Hospitals NHS Trust |
|              | 09:00 Bleeding in early pregnancy, Dr Jemma Johns, King’s College Hospital, London |
|              | 09:20Incomplete miscarriage, Dr Cecilia Bottomley, Chelsea & Westminster Hospital, London |
|              | 09:40 Early pregnancy loss -management and choice, Dr Caroline Overton, University Hospitals Bristol NHS Foundation Trust |
|              | 10:00 Management of caesarean scar pregnancy, Dr Davor Jurkovic, University College, London |
|              | 10:20 Discussion |
|              | 10:30 Refreshment and Comfort Break |

| 11:00 – 12:30 | Early pregnancy – diagnosis, management and patient care               |
|              | Chairs – Dr Caroline Overton, University Hospitals Bristol, Dr Anne-Marie Coady, Hull & East Yorkshire NHS Trust |
|              | 11:00 Ultrasound diagnosis of gestational trophoblastic disease, Dr Emma Kirk, North Middlesex Hospital, London |
|              | 11:20 Gestational trophoblastic neoplasia, Prof Neil Sebire, Great Ormond Street Hospital, London and Charing Cross Hospital, London |
|              | 11:40 Post partum ultrasound, Dr Jemma Johns, King’s College Hospital, London |
|              | 12:00 Pregnancy of unknown location (PUL) ultrasound reporting audit, SL Morrissey¹, S Brook¹², A McGuinness¹, ¹MidYorkshire Hospitals Wakefield, ²Singleton Hospital, Swansea |
|              | 12:10 RCOG Training the Trainers eLearning Module, Dr Geraldine Masson, University Hospital of North Staffordshire |
### 13:30 – 15:00  Early pregnancy – diagnosis, management and patient care

**Chairs** – Dr Caroline Overton, University Hospitals Bristol, Mrs Alison McGuinness, Mid Yorks Hospitals NHS Trust

**13:30**  Diagnosis of early intrauterine pregnancy and missed miscarriage – when do we call a sac a sac and know when a pregnancy has failed? Dr Anne Marie Coady, Hull and East Yorks NHS Trust

**14:00**  Diagnosis and management of ectopic pregnancy, Dr Davor Jurkovic, University College, London

**14:25**  Do we need 3D in EPU? Miss Jackie Ross, King’s College Hospital, London

**14:45**  Discussion

**15:00**  Refreshment and Comfort Break

### 15:30 – 17:00  Early pregnancy – diagnosis, management and patient care

**Chairs** – Miss Jackie Ross, King’s College Hospital, London, Dr Anne Marie Coady, Hull and East Yorks NHS Trust

**15:30**  The parent perspective on antenatal screening and its consequences, Mrs Cheryl Titherley, Antenatal Results & Choices (ARC)

**16:00**  How good is my unit? Dr Cecilia Bottomley, Chelsea & Westminster Hospital, London

**16:20**  Hot topics, Dr Yasmin Sana, King’s College NHS Trust, Princess Royal University Hospital, Farnborough

**16:40**  Do the professional and personal experiences of obstetric sonographers influence how they communicate with pregnant women? E Dyer, T Chudleigh, Cambridge University NHS Foundation Trust, Cambridge

### Member’s Long Room

### 09:00 – 10:30  General Imaging 1 – Advancing Technologies in Ultrasound Imaging

**Chairs** – Prof Paul Sidhu, King’s College Hospital, London, Mrs Jane Smith, Leeds and West Yorks Radiology Academy

Ultrasound imaging rarely stands still and with the wealth of new technologies available it can be difficult for those in practice to keep up to date. Advanced technologies are being introduced in to modern everyday ultrasound practice and are proving to have a positive impact on service delivery. The presentations in this session will explore the benefits for your patients in introducing new technologies into your service. Elastography is widely replacing liver biopsy procedures in specialist centers, the presentations in this session will explore the benefits of this new technique that can be employed in any centre dealing with chronic liver disease. Fusion imaging is rapidly become an essential tool in guiding biopsies and improving diagnosis of complex lesions, this session will help you understand how this works in practice. The role of contrast enhanced ultrasound imaging is becoming widespread in liver imaging but less common in small parts. This morning’s presentation will give an insight into how the use of contrast can be extended into everyday practice.

Advanced technological development can aid these procedures and this mornings presentations will aim to give a wider understanding of new development and their benefits to patients in your care

This session is suitable for all delegates involved in high quality ultrasound imaging.

**09:00**  Elastography in liver disease and the decline of the liver biopsy, Dr Ounlai Jaffer, Royal London Hospital, Barts Health, London

**09:20**  Fusion imaging and new technologies: their role in improving diagnostic confidence, Dr Adrian Lim, Charing Cross Hospital, London

**09:40**  Non-hepatic applications of contrast enhanced ultrasound, Dr Chris Harvey, Hammersmith Hospital, Imperial College NHS trust

**10:00**  Multi-parametric ultrasound imaging of segmental testicular infarction, PM Tantrige¹, KV Patel², PS Sidhu¹, ¹King’s College Hospital, London, ²Croydon University Hospital, London
ReTx- early post-surgical CEUS in the detection of rejection and in predicting subsequent kidney function, B Stenberg¹, MAF McNeill¹, 'Freeman Hospital, Newcastle upon Tyne

Assessment of usefulness of multi-parametric ultrasound imaging of the testis in determining malignant versus benign disease: blinded review of diagnostic capabilities, EK Konstantatou¹, A Igbal¹, LE Derchi², M Bertolotto³, M Valentino⁴, C Kalogeropoulou⁵, PS Sidhu¹, 'King’s College Hospital, London, UK, ²San Martino Hospital, Genoa, Italy, ³University Hospital of Trieste, Trieste, Italy, ⁴Tolmezzo Hospital, Tolmezzo, Italy, ⁵University Hospital of Patras, Greece

I wish I had never seen that: How to report and manage common incidental findings in ultrasound

You pick up a probe to do a quick scan, see something unexpected and often unrelated to the clinical presentation and then wish you had never started. Sound familiar? All practitioners in ultrasound will regularly come across unexpected incidental findings and then be faced with writing a report. This session presents some common incidental findings; the speakers will provide an expert summary of their clinical relevance and suggest appropriate further management. At the end of this session you will have the knowledge and confidence to write a relevant and helpful report (the sort that clinicians value most highly), rather than a purely descriptive report that is frequently unhelpful and frustrating to the referrer. This will be followed by a selection of proffered case studies submitted by delegates often demonstrating unusual but significant findings in atypical presentations.

What do you do with a problem like incidentally found testicular lesions? Dr Simon Freeman, Derriford Hospital, Plymouth

What do you do with a problem like incidentally found renal lesions? Dr Catherine Gutteridge, Derriford Hospital, Plymouth

What do you do with a problem like biliary dilatation? Dr Peter Rodgers, Leicester Royal Infirmary

Superb Doppler: early clinical experience with Superb Microvascular Imaging (SMI) K Pearce, S Freeman, P Cantin, C Gutteridge, 'Derriford Hospital, Plymouth

Diagnostic accuracy of point of care lung ultrasound in pulmonary edema, MS Rehman, MA Majeed, A Alhuwaishi, A Naveed, Queen Elizabeth Hospital Birmingham

Any port in a (post operative) storm! S Neal¹, N D Grunshaw², 'Lancaster Medical School / Liverpool University, ²University Hospitals of Morecambe Bay NHS Trust

Setting up a H&N service – the sonographer’s perspective, Mrs Catherine Kirkpatrick, Lincoln County Hospital
**14:10** Signs to look for in lumps and bumps - case review and interactive discussion, Dr Rhian Rhys, Royal Glamorgan Hospital

**15:30 – 17:00** Advanced Techniques in Head and Neck

**Chairs** - Dr Rhodri Evans, Morriston Hospital, Swansea, Mr Gerry Johnson, Tameside Hospital NHS Trust

This session will look at the more advanced techniques that can be used to assess head and neck masses and the interaction of Ultrasound with other commonly used imaging modalities.

The first lecture by Dr Rhodri Evans will consider the various methods that can be used to carry out Ultrasound guided biopsies in the head and neck. Common difficulties and faults in technique will be identified and the remedial steps that should be taken will be highlighted. Common scenarios and the possible routes to obtain a diagnosis will be presented. Ultrasound guided biopsy is no longer the exclusive preserve of Radiologists, increasingly Sonographers and Surgeons/Endocrinologists are looking to develop and incorporate US guided biopsy into pathways – the consequences and implications for service provision are discussed.

The second presentation by Dr Andrew McQueen will look at the advanced Ultrasound techniques that are now available to facilitate Ultrasound assessment in the head and neck. The developing role of elastography and its likely impact on the assessment for thyroid cancer will be covered in conjunction with other new developments in Ultrasound technology. New developments and innovations that could be incorporated into our use of Ultrasound will be discussed.

Dr Steve Colley will then discuss the interaction of Ultrasound with other imaging modalities. When is Ultrasound a useful adjunct to CT or MRI? What is the role of Ultrasound in the management of thyroid nodules detected on CT PET imaging? What are the limitations of Ultrasound in the investigation of head and neck masses? These and other contemporary issues will be covered by our third presenter.

There will be allocated discussion periods to allow questioning and responses from the faculty.

**15:30** Needles – why when and how? Dr Rhodri Evans, Morriston Hospital, Swansea

**15:55** Advanced ultrasound techniques – how will they help? Dr Andrew McQueen, Freeman Hospital, Newcastle upon Tyne

**16:20** Ultrasound first, but what next? Dr Steve Colley, Queen Elizabeth Hospital, Birmingham
<table>
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<tr>
<th>Time</th>
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<tr>
<td>11:15</td>
<td>NHS Scientist Training Programme: guinea pigs or future pioneers? A new graduate’s perspective,</td>
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<td>Ms Naavalah Ngwa-Ndifor, Barts Health NHS Trust, London</td>
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<td>11:30</td>
<td>Vascular u/s training for surgeons, Dr Abdullah Jibawi, Ashford &amp; St Peter’s Hospitals NHS</td>
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<td>Foundation Trust, Surrey</td>
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<td>11:45</td>
<td>Fundamental principles of haemodynamics without the headaches, Mrs Heather Venables,</td>
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<td>University of Derby</td>
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<td>12:15</td>
<td>The importance of clinical assessment in ultrasound scanning, D Saunders, M Subesingh, Leeds</td>
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<td>General Infirmary</td>
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<td>13:30</td>
<td><strong>Abdominal Vascular Issues</strong></td>
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<td>Chairs – Mrs Tracey Gall, Independent Vascular Services Ltd, Dr Nick Dudley, Lincoln County Hospital</td>
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<td>13:30</td>
<td>3D contrast enhanced ultrasound and its role in the assessment of endovascular aneurysm repair,</td>
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<td>Mr Lee Smith, Independent Vascular Services Ltd, South Manchester University Hospital Trust</td>
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<td>13:50</td>
<td>Intra-operative CEUS, a surgeon’s perspective, Mr Jonathan Ghosh, University Hospital of South Manchester</td>
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<td>14:10</td>
<td>Portal vein imaging, Mrs Jane Smith, Leeds and West Yorks Radiology Academy</td>
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<td>14:30</td>
<td>Soft tissue masses and lumps and bumps, Mrs Lorelei Rushton, University of Cumbria</td>
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<td>15:30</td>
<td><strong>Young Investigator</strong> – Kindly sponsored by Philips Healthcare</td>
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<td>Chairs – Dr Carmel Moran, University of Edinburgh, Mrs Hazel Edwards, East &amp; North Hertfordshire</td>
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<td>Judges – Dr Jeff Bamber, The Institute of Cancer, Royal Marsden Hospital, Sutton, Mrs Borsha Sarker,</td>
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<td>Queen Elizabeth Hospital, Gateshead, Dr Peter Rodgers, Leicester Royal Infirmary</td>
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<td>The Young Investigators Session is a show case of the best abstracts submitted by authors who are</td>
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<td>35 years old or younger. The best presentation from this session wins the BMUS Young Investigator</td>
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<td>of the year award and is given the opportunity to present their work at the 2015 Euroson Meeting on</td>
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<td>behalf of BMUS.</td>
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<td>15:30</td>
<td>PET CT guided CEUS of colorectal metastasis and subsequent fusion guided microwave ablation,</td>
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<td>MAF McNeill, B Stenberg, S Saikia, Freeman Hospital, Newcastle upon Tyne</td>
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<td>15:42</td>
<td>Role of B-mode ultrasound (US) and color Doppler ultrasound (CDUS) in the investigation of</td>
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<td>primary hyperparathyroidism: Specific features that raise the possibility of malignant change,</td>
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<td>E Konstantatou, C Fang, S Barocini, PS Sidhu,KM Schulte, King’s College Hospital, London</td>
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<tr>
<td>15:56</td>
<td>Multi-parametric ultrasonography of testicular hematomas: features on grey scale, color Doppler,</td>
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<td>contrast enhanced sonography and real-time tissue elastography, G Yusuf, E Konstantatou, ME</td>
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<td>Sellars, DY Huang, PS Sidhu, King’s College Hospital, London</td>
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<tr>
<td>09:00 – 12:30</td>
<td><strong>Head and Neck Integrated Training</strong></td>
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<tr>
<td><strong>Led by</strong></td>
<td>Dr Rhodri Evans, Morriston Hospital, Swansea, Dr Rhian Rhys, Royal Glamorgan Hospital</td>
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<tr>
<td><strong>Faculty</strong></td>
<td>Dr Steve Colley, Dr Andrew McQueen, Dr Lol Berman, Mrs Catherine Kilpatrick, Mrs Jean Bainbridge</td>
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This session will follow the same successful format as in previous year’s workshops. The anatomy of the head and neck will be taught in small (max 5 delegates to each tutor/US machine) groups. Each area will be taught through a series of standard sweeps through the neck, devised and led by Dr Rhian Rhys, each area being initially demonstrated by live scanning by Dr Rhodri Evans.

Following each demonstration, the delegates will then scan the models under the supervision of a member of the head and neck faculty in their respective groups. The neck will be systematically covered, outlining the key structures that need to be identified, starting from the submental triangle and ending with the larynx. Tips and pitfalls will be highlighted allowing a comprehensive scanning technique of the neck to be mastered under the guidance of the faculty.

| 13:30 – 17:00 | **Advancing Technologies in Ultrasound Imaging – Integrated Training Session** |

Ultrasound imaging rarely stands still, and with the wealth of new technologies available, it can be difficult for those in practice to keep up to date. Advanced technologies are being introduced into modern everyday ultrasound practice, and they are proving to have a positive impact on service delivery. The presentations in this session will explore the benefits for your patients in introducing new technologies into your service.

The aim of this integrated training session is to give delegates the opportunity to use modern machines and advancing technologies with experts in their field. There will be opportunities to perform elastography and fusion imaging. In addition, delegates will have the opportunity to use the simulator scan trainer which is rapidly becoming the technology to further ultrasound training and practice.

This session is of benefit to radiologists, registrars, and sonographers in practice and who want to extend their scope of practice further to improve patient care and management pathways.

**Faculty**
- Prof Paul Sidhu – CEUS
- Dr Adrian Lim – Fusion and SMI
- Dr Onuali Jaffer – Liver elastography
- Mr Iain Dunbar – Where simulation becomes a reality – MedaPhor ScanTrainer

| 09:00 – 10:30 | **RSI Master Class** |
| **Led by** | Miss Gill Harrison, Mrs Allison Harris, City University London |

During this presentation, you will be given hints and tips on how you can reduce your risk of work-related injury. You will gain an insight into some of the issues affecting ultrasound practitioners and look at what you can do to ensure a long and healthy career.

This session is for anyone concerned about work-related injury and how they might be able to reduce their risks.

The session is being duplicated and run twice to enable delegates to attend and not miss out on such an important topic affecting all practitioners’ health and well being at work. This gives delegates the opportunity to access different streams and gain maximum benefit from their registration.

**Does the grip pressure used to hold an ultrasound probe change after training with an ergometer?**

A Harris, City University London

*Improving the knowledge of work-related MSDS amongst sonographers through analysis of some possible solutions,* J Galindo\(^1,2\), MJ Carré\(^1\), SR Bradbury\(^1\), R Lewis\(^1\), A Williams\(^2\), T Deakin\(^3\) \(^1\)The University of Sheffield, \(^2\)Knight Imaging, Sheffield, \(^3\)LabLogic Systems Ltd., Sheffield
### Ultrasound in Fertility – In conjunction with the Royal College of Nursing

The role of The Fertility Nurse Forum, both in the NHS and independent sector is expanding rapidly in response to service changes and demands for an increasing number of complex procedures and patient care. The Fertility Nursing Forum of the Royal College of Nursing has supported this development with the publication in 2013 of the RCN Training and Education framework for fertility nursing. This framework recognises the use of ultrasound for both diagnostic and for image guided procedures by this cohort of nurses and ultrasound practitioners.

Whilst the education at Ultrasound 2014 has been organised in conjunction with the RCN, all practitioners who are involved with patient care in the investigation and management of fertility are invited to join us. We are certain that delegates with affiliation to either organisation will find this meeting informative and educational as well as having the opportunity to discuss issues and training requirements with colleagues from around the UK.

**Chairs** – Mrs Debbie Barber, Oxford University Hospitals, Dr Vivien Gibbs, University of the West of England, Bristol

**13:30** *Role of scanning in infertility*, Dr Vivien Gibbs, University of the West of England

**14:00** *Knowing your machine*, Mrs Heather Venables, University of Derby

**14:30** *RCN Training and education pathway for nurse / midwife sonographers*, Mrs Debbie Barber, Oxford University Hospitals

**15:00** **Refreshment and Comfort Break**

**15:30** *Common pathological conditions in fertility investigations*, Dr Susanne Johnson, Princess Anne Hospital, Southampton

**16:00** *Making sense of report writing*, Mrs Jean Wilson, University of Leeds

**16:30** *Managing pelvic pathology*, Dr Alexander Oboh, Hull and East Yorkshire NHS Trust
Keynote speakers

Donald MacVicar Brown lecture

The Donald MacVicar and Brown Lecture has been a fixture of our Annual scientific Meeting since 1996.

It commemorates and celebrates the origins of medical ultrasound. This plenary keynote lecture honours the 1958 publication of the Ian Donald, John MacVicar and Tom Brown paper in the British journal ‘The Lancet.’ Their paper—‘Investigation of Abdominal Masses by Pulsed Ultrasound’—is credited with transforming maternity care.

The lecture is delivered by an invited speaker, recognised by BMUS for their inspirational work and contribution to medical ultrasound practice.

This year Dr Lol Berman will deliver this lecture entitled ‘The Nodule Delusion.’ He will, no doubt, bring his entertaining hard hitting opinions to life in the discussion of the diagnosis and treatment of Thyroid cancer, the role of Ultrasound in this condition and the numerous medical, philosophical and financial questions it throws up.

This talk is on Day 1 – Tuesday 9th December at 16:00 in the Main Auditorium.

Peter Twining Memorial lecture

This lecture serves as an ongoing tribute to Dr Peter Twining, who had a longstanding close affiliation with BMUS and worked tirelessly for the Society for many years. Each year a “memorial obstetric lecture” is presented by an outstanding individual selected by BMUS. Hitachi Medical Systems UK has kindly sponsored the award since its inaugural year in 2009.

This year, Professor Mark Kilby will present his talk, ‘The treatment of twin to twin transfusion syndrome: improving fetal mortality and morbidity.’

Mark Kilby DSc MD FRCOG, Hilda Lloyd Professor of Fetal Medicine
1. Lead for the Centre for Women’s and Child-ren’s Health, School of Clinical & Experimental Medicine, College of Medical & Dental Sciences, University of Birmingham, B15 2TT.
2. Clinical Lead in Fetal Medicine, Fetal Medicine Centre, Birmingham Women’s Foundation Trust, Edgbaston, Birmingham, B15 2TG.

Professor Kilby is one of five accredited Consultant subspecialists providing local, regional and supra-regional care for pregnant women at the West Midlands Fetal Medicine Centre at Birmingham Women’s Foundation Trust.

He was elected in 2011 to be the Fellow’s representative on the Council of the Royal College of Obstetricians and Gynaecologists and is immediate past-president of the BMFMS.

He produced working guidelines based upon scientific evidence for the management of multiple pregnancies, has co-authored the RCOG Green top guidelines on management of Monochorionic twins (in 2008 and 2014) and was Chairman of the NICE Working Party on Multiple Pregnancy between 2009-2012.

He has published over 300 peer reviewed scientific articles (in laboratory based, basic science and relating to clinical practice in Fetal Medicine) and has edited several books on related subjects.

This talk is on Day 3 – Thursday 11th December at 11:00 in the Main Auditorium.
ASUM 2015

Key Dates

<table>
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<tr>
<th>Date</th>
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<tr>
<td>DECEMBER 2014</td>
<td>Call for abstracts opens</td>
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<tr>
<td>JANUARY 2015</td>
<td>Registration opens</td>
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<tr>
<td>1 MAY 2015</td>
<td>Abstract submission deadline</td>
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<tr>
<td>17 JULY 2015</td>
<td>Early bird registration deadline</td>
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<tr>
<td>11 SEPTEMBER 2015</td>
<td>Conference opens</td>
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45th ANNUAL SCIENTIFIC MEETING

FOR MORE INFORMATION:
www.asumconference.com.au

INDEPENDENT ULTRASOUND SPECIALISTS

Multi-Medix are independent diagnostic imaging ultrasound specialists, offering a comprehensive range of services, designed to meet today's quality and affordability needs.

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BMUS would like to express their thanks to Toshiba Medical Systems for their support in bringing the 2014 Annual Dinner to Old Trafford, the home of Manchester United

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PHILIPS
### Day 3 Thursday 11th December

#### AT A GLANCE

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<th>Time</th>
<th>MAIN AUDITORIUM</th>
<th>MEMBERS LONG ROOM</th>
<th>LIBRARY SUITE</th>
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<tr>
<td><strong>Registration from 08:30</strong></td>
<td><strong>09:00 – 10:30</strong> Obstetric imaging – where are we now and where are we heading?</td>
<td><strong>09:00 – 10:30</strong> Fundaments of MSK Imaging and Intervention</td>
<td><strong>09:00 – 10:40</strong> The Paediatric Retroperitoneum</td>
<td><strong>09:00 – 10:30</strong> Advanced MSK ‘hands on’ workshop</td>
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<tr>
<td><strong>Morning Refreshment Break 10:30 – 11:00</strong></td>
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<tr>
<td><strong>11:00 – 12:30</strong></td>
<td><strong>11:00 – 12:30</strong> Obstetrics 2</td>
<td><strong>11:00 – 12:30</strong> Fundaments of MSK Imaging and Intervention</td>
<td><strong>11:00 – 12:30</strong> Beyond the Abdomen: Paediatric Vascular and Musculoskeletal Ultrasound</td>
<td><strong>11:00 – 12:30</strong> Advanced MSK ‘hands on’ workshop continuation of morning session</td>
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</table>
| **11:00** | | | | **Peter Twining Memorial Lecture**
Kindly sponsored by Hitachi Aloka Medical Systems |
| **Lunch Break 12:30 – 13:30** | | | | |
| **13:30 – 15:00** | **13:30 – 15:00** Imaging and management of Endometriosis and Pelvic Pain | **13:30 – 15:00** Advanced MSK imaging | **13:30 – 15:00** Reporting Skills and Quality Assessment Masterclass | **13:30 – 15:00** Fundamentals of MSK ‘hands on’ workshop (basic MSK) |
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| **Close 17:00** | | | | |
### MAIN AUDITORIUM

**Obstetric imaging – where are we now and where are we heading?**

**Chairs** – Mr Tim Overton, Dr Mark Denbow, University Hospitals Bristol, NHS Foundation Trust

09:00  **The first-trimester scan; current strategies and future developments**, Mr Tim Overton, University Hospitals Bristol, NHS Foundation Trust

09:30  **Diagnosis and surveillance of monochorionic twin pregnancies**, Dr Mark Denbow, University Hospitals Bristol, NHS Foundation Trust

10:00  **Identification and management of the growth restricted fetus**, Mr Richard Smith, Norfolk & Norwich University Hospital

### Morning Refreshment Break 10:30 – 11:00

**Obstetrics 2**

**Chairs** – Mr Tim Overton, Dr Mark Denbow, University Hospitals Bristol, NHS Foundation Trust

11:00  **Peter Twining Memorial Lecture** – Kindly sponsored by Hitachi Aloka Medical Systems

The treatment of twin to twin transfusion syndrome: improving fetal mortality and morbidity, Prof Mark Kilby, Birmingham Women’s Foundation Trust

11:45  **Medico-legal pitfalls in obstetric ultrasound**, Mr Miles Taylor, Royal Devon and Exeter NHS Foundation Trust

12:15  **Questions and discussion**

### MEMBERS LONG ROOM

**Fundamentals of MSK Imaging and Intervention**

**Chairs** – Mrs Clare Drury, Hull and East Yorkshire Hospitals NHS Trust, Mrs Sara Riley, Bradford Teaching Hospitals NHS Foundation Trust

09:00  **Upper limb ultrasound – (almost) everything but the shoulder**, Dr George Tony, University Hospitals of North Staffordshire


10:00  **Supraspinatus tendon tears**, Mrs Laura Horton, Chapel Allerton Hospital, Leeds Musculoskeletal Biomedical Research Unit

### Morning Refreshment Break 10:30 – 11:00

**Fundamentals of MSK Imaging and Intervention**

11:00  **US guided injections of the shoulder**, Mrs Clare Drury, Hull and East Yorkshire Hospitals NHS Trust

11:30  **Lower limb ultrasound – technique, clinical application and tales of the unexpected**, Mr Mark Maybury, Good Hope Hospital, Heart of England NHS Trust, Sutton Coldfield

12:00  **Lumps and bumps**, Mrs Sara Riley, Bradford Teaching Hospitals NHS Foundation Trust

**Questions and discussion**

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**Lunch 12:30 – 13:30**
### MORNING SESSION

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<td><strong>Renal and adrenal tumours in children</strong></td>
<td>Dr William Ramsden, Leeds Children's Hospital</td>
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<td>10:00</td>
<td><strong>Disorders of the pancreas in children</strong></td>
<td>Dr Neville Wright, Royal Manchester Children's Hospital</td>
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<tr>
<td>10:30</td>
<td><strong>Contrast Enhanced Ultrasound (CEUS) versus Computed Tomography (CT)</strong></td>
<td>AM Deganello, E Konstantatou, O Romanos, ME Sellars, PS Sidhu, King's College Hospital</td>
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<td><strong>Paediatric vascular anomalies</strong></td>
<td>Dr Sam Stuart, Great Ormond Street Hospital</td>
<td>1864 Suite</td>
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<tr>
<td>11:30</td>
<td><strong>MSK ultrasound in children</strong></td>
<td>Dr Jeanette Kraft, Leeds Children's Hospital</td>
<td>1864 Suite</td>
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<tr>
<td>12:00</td>
<td><strong>The diagnosis and treatment of developmental dysplasia of the hip</strong></td>
<td>Dr Graham Wilkinson, Royal Hospital for Sick Children, Edinburgh</td>
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**Lunch 12:30 – 13:30**

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**Day 3 Thursday 11th December**

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**Morning Refreshment Break 10:30 – 11:00**

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**Faculty**

- MS Kerry Green
- Dr Richard Wakefield
- Mr Lennard Funk
- Mrs Nicki Delves
- Mr Steve Savage
- Mrs Lorelei Rushton

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**Advanced MSK ‘hands on’ workshop**

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**Continuation of morning session**

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**39 SCIENTIFIC PROGRAMME**

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**LIBRARY SUITE**

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**1864 SUITE**

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**Lunch 12:30 – 13:30**

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### MAIN AUDITORIUM

**Imaging and management of Endometriosis and Pelvic Pain**

**Chairs** – Dr Susanne Johnson, Princess Anne Hospital, Southampton, Prof Gernot Hudelist, Wilhelminen Hospital, Vienna

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**Advanced MSK imaging**

**Chairs** – Mrs Alison Hall, Keele University, Mr Steve Savage, Yeovil District Hospital

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<td>Imaging of the groin – hernias &amp; more</td>
<td>Ms Kerry Green, Derriford Hospital, Plymouth</td>
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### MEMBERS LONG ROOM

**Advanced MSK imaging**

**Chairs** – Mrs Alison Hall, Keele University, Mr Steve Savage, Yeovil District Hospital

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<td>Ultrasound and UTC for the evaluation of plantaris tendon involvement in midportion Achilles tendinopathy</td>
<td>L Masci¹, C Spang², HTM van Schie³, H Alfredson¹,⁴ Pure Sports Medicine Clinic, London, Department of Integrative Medical Biology (IMB), Umea University, Sweden, UTC Imaging, Stein, the Netherlands, Sports Medicine Unit, Umea University, Sweden</td>
</tr>
<tr>
<td>16:10</td>
<td>The use of strain ratio as a reference standard in the diagnosis of supraspinatus tendinopathy</td>
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<td><strong>Led by</strong> - Mrs Pamela Parker, Hull and East Yorkshire NHS Trust</td>
<td>13:30 - 15:00</td>
</tr>
<tr>
<td><strong>Faculty</strong> - Dr Oliver Byass, Mrs Jean Wilson, Mr Peter Cantin, Dr Rhodri Evans, Mr Gerry Johnson</td>
<td><strong>Led by</strong> - Mrs Clare Drury, Hull and East Yorkshire NHS Trust</td>
</tr>
<tr>
<td>13:30 <strong>Introduction</strong>, Mrs Pamela Parker, Hull and East Yorkshire NHS Trust</td>
<td><strong>Faculty</strong> - Mr Mark Maybury, Mrs Sara Riley, Dr George Tony, Mrs Laura Horton, Mrs Rachel Wilson, Katie Simm</td>
</tr>
<tr>
<td>13:35 <strong>What is good reporting? What are the essential skills that need to be learnt in order to compose good reports?</strong> Mrs Jean Wilson, University of Leeds</td>
<td>15:30 - 17:00</td>
</tr>
<tr>
<td>13:50 <strong>Good report, bad report? Good request?</strong> Dr Rhodri Evans, Morriston Hospital, Swansea</td>
<td><strong>Fundamentals of MSK ‘hands on’ workshop (basic MSK)</strong></td>
</tr>
<tr>
<td>14:05 <strong>Interactive reporting skills session.</strong> All faculty.</td>
<td>continuation of afternoon session</td>
</tr>
<tr>
<td>14:45 <strong>Quality – how can we assess?</strong> Mr Peter Cantin, Derriford Hospital, Plymouth</td>
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<tr>
<td><strong>Afternoon Refreshment Break 15:00 – 15:30</strong></td>
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<tr>
<td>15:30 Delegates will work together in small groups, assessing cases and their associated reports in conjunction with the faculty, using the BMUS QA proforma. There will be group discussion following the initial assessment period to allow the faculty and delegates to discuss their reasoning behind their assessment/decision. The proforma will allow a standardised appraisal process to be followed, within this workshop and subsequently within your Ultrasound department.</td>
<td></td>
</tr>
<tr>
<td>16:40 <strong>Future developments – the Hull Experience,</strong> Dr Oliver Byass, Hull and East Yorkshire NHS Trust</td>
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<tr>
<td>16:55 <strong>Closing Remarks and learning outcomes,</strong> Mrs Pamela Parker, Hull and East Yorkshire NHS Trust</td>
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<td><strong>Close 17:00</strong></td>
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## Day 3 – Thursday 11th December

**MAIN AUDITORIUM**

### 09:00 – 10:30 Obstetric imaging – where are we now and where are we heading?

**Chairs** – Mr Tim Overton, Dr Mark Denbow, University Hospitals Bristol, NHS Foundation Trust

Obstetric imaging is the mainstay of many departments in the UK. Despite this with increasing pressure of demand and efficiency it can be hard to keep abreast of new developments and strategies designed to improved patient care both for mother and fetus. This session is aimed at all delegates involved in obstetric care. The presentations by the three esteemed speakers will outline where we are currently, and where we are heading in terms of imaging and pathways for the obstetric patient.

*09:00*  
The first-trimester scan; current strategies and future developments, Mr Tim Overton, University Hospitals Bristol, NHS Foundation Trust

*09:30*  
Diagnosis and surveillance of monochorionic twin pregnancies, Dr Mark Denbow, University Hospitals Bristol, NHS Foundation Trust

*10:00*  
Identification and management of the growth restricted fetus, Mr Richard Smith, Norfolk & Norwich University Hospital

### 11:00 – 12:30 Obstetrics 2

**Chairs** – Mr Tim Overton, Dr Mark Denbow, University Hospitals Bristol, NHS Foundation Trust

*11:00*  
**Peter Twining Memorial Lecture** – Kindly sponsored by Hitachi Aloka Medical Systems

The treatment of twin to twin transfusion syndrome: improving fetal mortality and morbidity, Prof Mark Kilby, Birmingham Women’s Foundation Trust

The Peter Twining Memorial Lecture this year is given by Professor Mark Kilby. Professor Kilby was appointed as an Honorary Consultant in Obstetrics at Birmingham Women’s Foundation NHS Trust and Senior Lecturer in Maternal and Fetal Medicine at the University of Birmingham in March 1996. Professor Kilby has special clinical expertise in prenatal diagnosis, the detection of fetal abnormalities, intrauterine growth restriction and its placental pathology and fetal therapy. In addition he was a co-Chair and Editor of the 2006 Royal College of Obstetricians and Gynaecologists Scientific Working Party on Multiple Pregnancy and was Chairman of the National Institute of Clinical Excellence Working Party on Multiple Pregnancy 2009-2012. With this wealth of experience this year's Peter Twining Memorial lecture will be of great interest to all practitioners practicing in the field of diagnostic ultrasound.

*11:45*  
Medico-legal pitfalls in obstetric ultrasound, Mr Miles Taylor, Royal Devon and Exeter NHS Foundation Trust

*12:15*  
Questions and discussion

### 13:30 – 17:00 Imaging and management of Endometriosis and Pelvic Pain

**Chairs** – Dr Susanne Johnson, Princess Anne Hospital, Southampton, Prof Gernot Hudelist, Wilhelminen Hospital, Vienna

The whole afternoon is dedicated to endometriosis. This is often a difficult condition to diagnose with ultrasound despite it affecting approximately 11% of the female population, often with significant affects. The aim of this session is to give an overview of causes of pelvic pain, including on endometriosis. Deep infiltrating endometriosis will be explored with Professor Gernot Hudelist. The professor is a world authority on this specialised but important subject.

The sessions will also explore other aspects that are affected by endometriosis including bladder, bowel and rectovaginal pathologies

In addition there will be the clinician perspective from a renowned gynaecologist regarding what is required from the ultrasound report.

This session is aimed at any ultrasound practitioner involved with gynaecological ultrasound and infertility imaging.
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<tr>
<td>15:30</td>
<td>Comparison of laparoscopy (video) with ultrasound images</td>
<td>Mr Dimitrios Miligkos, Princess Anne Hospital, Southampton</td>
</tr>
<tr>
<td>16:00</td>
<td>Clinical management of endometriosis</td>
<td>Mr Adam Moors, Princess Anne Hospital, Southampton</td>
</tr>
<tr>
<td>16:30</td>
<td>Rectovaginal endometriosis in pregnancy – an atypical presentation with cervical mass</td>
<td>JW Hounslow, S Johnson, A Moors, Princess Anne Hospital, University Hospitals Southampton</td>
</tr>
<tr>
<td>16:40</td>
<td>Outcomes of patients attending consultant delivered emergency gynaecology clinic: a retrospective study</td>
<td>SP Fisher, V Franklin, University Hospital Crosshouse, Kilmarnock, Scotland</td>
</tr>
<tr>
<td>16:50</td>
<td>Decidualisation of an ovarian endometrioma – imaging throughout pregnancy and into the post-partum period</td>
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<td>This session is aimed at those with an interest in MSK ultrasound, but little practical experience.</td>
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<td>The session aims to cover the common pathologies of upper and lower limb, give an insight into the terminology used in tendon pathology, introduce ultrasound guided injections of the shoulder and cover ultrasound appearances of benign and malignant ‘lumps and bumps’.</td>
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<tr>
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<td>The session would be useful for all ultrasound practitioners with a good background of ultrasound instrumentation, but little experience in musculoskeletal ultrasound. It would also be useful for those requiring more background into the common pathologies imaged.</td>
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<td>Dr George Tony, University Hospitals of North Staffordshire</td>
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<td>Rotator cuff tendinopathy: a model for the continuum of pathology and related management</td>
<td>Dr Jeremy Lewis, Central London Community Healthcare NHS Trust, London, Centre for Health &amp; Human Performance</td>
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<td>10:00</td>
<td>Supraspinatus tendon tears</td>
<td>Mrs Laura Horton, Chapel Allerton Hospital, Leeds Musculoskeletal Biomedical Research Unit</td>
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### Advanced MSK imaging

**Chairs** – Mrs Alison Hall, Keele University, Mr Steve Savage, Yeovil District Hospital

This session is aimed at those who already work in MSK ultrasound, wishing to further and broaden their experience.

The speakers in this session reflect the diversity of professions now using ultrasound both for diagnostic and therapeutic procedures.

Speakers include sonographers, physiotherapists, rheumatologists and orthopaedic surgeons/sports physicians.

This session is aimed at Radiologists, registrars, sonographers, physiotherapists, rheumatologists and orthopaedic surgeons with experience in Musculoskeletal ultrasound, wishing to expand their knowledge base in MSK ultrasound.

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### The Paediatric Retroperitoneum

**Chairs** – Mrs Terry Humphreys, Leeds Radiology Academy, Dr Jeannette Kraft, Leeds Children’s Hospital

Imaging children brings a different set of challenges and pathologies from adult practice.

This session will review several conditions centred upon the paediatric retroperitoneum. The lectures will cover both benign and malignant conditions affecting the retroperitoneal organs in children. The imaging pathways using both ultrasound and other modalities will be reviewed with emphasis on the strengths and limitations of sonography.

The session is aimed at radiologists, trainees and sonographers with a paediatric interest.

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<tr>
<td>10:30</td>
<td>Contrast Enhanced Ultrasound (CEUS) versus Computed Tomography (CT) in the follow-up of abdominal trauma in a pediatric and young adult</td>
<td>AM Deganello, E Konstantatou, O Romanos, ME Sellars, PS Sidhu, King’s College Hospital, London</td>
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11:00 – 12:30 **Beyond the Abdomen: Paediatric Vascular and Musculoskeletal Ultrasound**

**Chairs** – Mrs Terry Humphrey, Leeds Radiology Academy, Dr William Ramsden, Leeds Children’s Hospital

There are distinct pathologies which affect the vascular and musculoskeletal systems in children. This session will review both congenital and acquired conditions of both systems with emphasis upon the role of ultrasound in diagnosis, guiding and delivering treatment.

This session is aimed at radiologists, trainees and sonographers interested in paediatric, musculoskeletal and vascular imaging.

- **11:00** Paediatric vascular anomalies, Dr Sam Stuart, Great Ormond Street Hospital, London
- **11:30** MSK ultrasound in children, Dr Jeanette Kraft, Leeds Children’s Hospital
- **12:00** The diagnosis and treatment of developmental dysplasia of the hip, Dr Graham Wilkinson, Royal Hospital for Sick Children, Edinburgh

13:30 – 17:00 **Reporting Skills and Quality Assessment Masterclass**

**Led by** – Mrs Pamela Parker, Hull and East Yorkshire NHS Trust

**Faculty** – Dr Oliver Byass, Mrs Jean Wilson, Mr Peter Cantin, Dr Rhodri Evans, Mr Gerry Johnson

The BMUS Professional Standards Group has been working hard this year on producing documentation which departments and individuals can use to support case review and audit to compliment practice. With increasing competition in the field of non-obstetric ultrasound, and challenges facing departments in being awarded service contracts in the brave new world of clinical commissioning groups, there is an increasing need to measure standards of practice within a service. Linked with the continual strive to improve and support independent practitioner reporting the professional standards group are delivering a master class on day 3 at the ASM on these topics.

The speakers sharing their expertise in this Reporting and Audit master class include Mrs Pamela Parker, Dr Oliver Byass, Mrs Jean Wilson, Mr Peter Cantin, Dr Rhodri M Evans, Mr Gerry Johnson. All are highly skilled and enthusiastic members of the BMUS Professional standards group. The master class will review the essential skills that need to be learnt in order to compose good reports. The presentations will show how to assess whether a report is good or bad, what criteria need to be addressed and how to evaluate what is required in a good and accurate report. The team will also review if the same criteria can be applied to evaluate the examination requests.

In addition to the presentations there will be an interactive reporting skills session.

In this interactive session delegates will be given the opportunity to review reports, critique and assess how to evaluate their reporting skills. Discussion will be led to evaluate how skills can improve in the writing of reports and what are the standards required. A quality assessment tool, developed by the Professional Standards working group within BMUS, will be introduced. This tool can be utilised in assessing image quality, reporting quality and the quality of the clinical referral and delegates will have the opportunity to use this QA tool within the master class.

The session will conclude with a review of how the use of a QA tool can be integrated into good audit practice within an imaging department. The development of discrepancy and case review meetings incorporating QA tools will be discussed. The issues that will arise from such developments need to be considered, problems that are likely to be encountered are highlighted with potential solutions.

This master class will hopefully develop an awareness of the skills that need to be developed in order to report ultrasound examinations competently and identify the means to assess those skills easily-with a view to improving current practice.

- **13:30** Introduction, Mrs Pamela Parker, Hull and East Yorkshire NHS Trust
- **13:35** What is good reporting? What are the essential skills that need to be learnt in order to compose good reports? Mrs Jean Wilson, University of Leeds
- **13:50** Good report, bad report? Good request? Dr Rhodri Evans, Morriston Hospital, Swansea
- **14:05** Interactive reporting skills session. All faculty.
- **14:45** Quality – how can we assess? Mr Peter Cantin, Derriford Hospital, Plymouth
15:00 Refreshment and Comfort Break

15:30 Delegates will work together in small groups, assessing cases and their associated reports in conjunction with the faculty, using the BMUS QA proforma. There will be group discussion following the initial assessment period to allow the faculty and delegates to discuss their reasoning behind their assessment/decision. The proforma will allow a standardised appraisal process to be followed, within this workshop and subsequently within your Ultrasound department.

16:40 Future developments – the Hull Experience, Dr Oliver Byass, Hull and East Yorkshire NHS Trust

16:55 Closing Remarks and learning outcomes, Mrs Pamela Parker, Hull and East Yorkshire NHS Trust

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09:00 – 12:30 Advanced MSK ‘hands on’ workshop

Led by: Mrs Alison Hall, Keele University

Faculty -
Ms Kerry Green
Dr Richard Wakefield
Mr Lennard Funk
Mrs Nicki Delves
Mr Steve Savage
Mrs Lorelei Rushton

This workshop is intended for those with sound knowledge of ultrasound instrumentation and basic MSK scanning techniques, who wish to extend their scope of practice.

13:30 – 17:00 Fundamentals of MSK ‘hands on’ workshop (basic MSK)

Led by – Mrs Clare Drury, Hull and East Yorkshire NHS Trust

Faculty –
Mr Mark Maybury
Mrs Sara Riley
Dr George Tony
Mrs Laura Horton
Mrs Rachel Wilson
Katie Simm

This workshop is aimed at those with a sound knowledge of ultrasound but little or no experience in MSK ultrasound scanning.
BMUS
STUDY DAYS
2015

February 2015
Gynaecology, London : TBC

April 2015
Head and Neck, Hull : 27th April

May 2015
The Musculoskeletal Sonographers Special Interest
Group Weekend, Stratford : 9th - 10th May
Obstetrics Ultrasound, Leeds : 15th May
Gynaecology, London : TBC

June 2015
Professional Issues & Standards, Manchester - 10th June
BMUS at UKRC, Liverpool : 29th - 1st July

September 2015
BMUS at RCR Annual Meeting, London : 7th - 9th Sept
Paediatric, Leeds Radiology Academy : 25th Sept
Gynaecology, London : TBC

October 2015
Contrast EVAR : TBC
New technology in ultrasound, London

December 2015
BMUS 2015, Cardiff City Hall, Cardiff : 9th - 11th Dec

For further details
please contact:
bookings@bmus.org or
BMUS on 020 7636 3714
Education

1. **Technology to transducer-learning technologies supporting the link between theory and practice in ultrasound education**, D Dickson, Glasgow Caledonian University

   **Background:**
   Ultrasound training requires high level combination of theory and practice to provide the necessary knowledge and skills to achieve clinical competency. The translation of theory to practice is a common problem and it is well evidenced that good quality mentorship and parity of learning opportunities are a challenge for programmes of learning especially under Health Service financial and time constraints (Gilbert, 2014). The digital age of learning has seen a wide use of interactive technology used to enhance learning and teaching (JISC, 2009). Interactive learning technologies offer many benefits, particularly feedback for future learning (Beetham, 2008). Aim: Which interactive learning environments enhance the application of Ultrasound theory to practice through feedback mechanisms?

   **Methods:**
   Action research methodology. Following a review of literature, a series of interactive learning environments were constructed: 1. Smartboard activity – image optimisation 2. Clicker quiz – pathology 3. Ultrasound simulation-Orientation/anatomy. A paper based questionnaire was devised to obtain student perceptions on the learning activities supporting the link of theory to practice through feedback.

   **Results:**
   100% response rate achieved (n=14) 100% highest point agreement on supporting theory to practice via feedback. Themes centre around two key areas of subject relevancy and peer feedback.

   **Conclusion:**
   Students found all three designed and facilitated sessions valuable and relevant to their learning. Students reported positive experiences which were perceived to support the link between theory and practice through feedback. The findings from this study support the use of interactive learning technologies in Postgraduate Ultrasound education.

Professional Issues

2. **Having an outpatient ultrasound – what is the patients’ perception of quality?** JA Cuthbert, Royal Bolton Hospital

   This evaluation examines the function and effect of the use of a service user questionnaire in an outpatient diagnostic ultrasound service. The results of service user questionnaires are part of the key performance indicator (KPI) reports required by the Any Qualified Provider (AQP) commissioning process. This national health strategy was introduced in 2012 to prioritise patient choice. The intent is that the competition, which choice of provider facilitates, will promote innovative service quality improvement. The study critically evaluates the literature in an attempt to define service quality measures in an outpatient setting and produce a hierarchy of quality factors to measure user satisfaction against. It uses data acquired from three different questionnaires used historically within the service and research from the literature to create a set of criteria to evaluate the validity and robustness of the questionnaires. These criteria are then applied to the questionnaires to establish validity and robustness within the service. The study finds that only one of the questionnaires offers validity and robustness but also finds that the evaluation criteria cannot account for context which the findings from the literature suggest is highly relevant to patient perception of quality measures within a service. The evaluation concludes that further research is required to explore whether patients really want choice at every level in their healthcare journey and if so how can this be delivered through national policy.
3. **Sonographers – are you practicing autonomously?** LL Laver, N Gillhespie, The Great Western Hospital, Swindon

The Health and Care Professions Council (HCPC) state that a sonographer should “be able to practice as an autonomous individual and exercise their own professional judgment.” (Standards of Proficiency HCPC 2012). But what is the definition of autonomy and do sonographers believe that they practice autonomously? Following on from research conducted within the department, the poster will explore sonographer opinion of autonomy and identify perceived barriers to effective autonomy. It is hoped this will promote thought and discussion as to the role of the sonographer within the department and the responsibilities they face. Nicola Gillhespie and Laura Laver Sonographers at The Great Western Hospital, Swindon.

4. **Implementing a hospice based ultrasound service – the first year’s experience**, J Eastman, Saint Francis Hospice, Havering-Atte-Bower

Saint Francis Hospice offers specialist palliative care to patients with any life-limiting illness, although the vast majority have cancer. It provides ongoing support to patients and their families during the whole journey, not just terminal care. Having had first hand experience of the wonderful job provided by them, I offered my services as a volunteer, providing ultrasound scans as required (currently offering two afternoons per week).

Following the generous donation of a machine from Spire Healthcare Group, the BMUS Ultrasound Clinical Governance Guidelines (October 2008), were consulted and a ‘Service Description and Guidelines for best practice’ protocol was drawn up.

Scanning started in July 2013. In the following year 58 scans were carried out on 52 patients.

<table>
<thead>
<tr>
<th>Type</th>
<th>Positive</th>
<th>Negative</th>
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<tr>
<td>Abdomen</td>
<td>29</td>
<td>8</td>
<td>37</td>
</tr>
<tr>
<td>Chest – ? effusion</td>
<td>4</td>
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<tr>
<td>Leg ? DVT</td>
<td>1</td>
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<td>8</td>
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<td>Arm ? DVT</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>37 (63.8%)</strong></td>
<td><strong>21 (36.2%)</strong></td>
<td><strong>58 (100%)</strong></td>
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A wide range of pathologies were found, from disease progression to gallstones accounting for RUQ pain. Abdominal ascites was found in 13 people, 5 of whom had successful paracentesis. Drainage was planned in 2 other people, whose condition subsequently deteriorated and became too frail for drainage.

One person was discharged back to her home country and is lost to follow-up. Of the remaining 51 people, 36 have passed away; their post scan survival ranged from 3 – 359 days, with an average of 44 days. The surviving 15 people have a post scan survival period up to 375 days (as of 31/07/2014).
5. Improving the knowledge of work-related MSDS amongst sonographers through analysis of some possible solutions, J Galindo1,2, MJ Carré1, SR Bradbury1, R Lewis1, A Williams2, T Deakin3
1The University of Sheffield, 2Knight Imaging, Sheffield, 3LabLogic Systems Ltd., Sheffield

In recent years, there have been a number of studies into the causes[1], effects[2] and impacts[3] of work-related musculoskeletal disorders (MSDs) amongst sonographers. These studies have shown an increase in the number of cases[4] as well as the financial impact that these injuries are causing to organisations such as the NHS and the effects on the individuals[5].

Our study seeks to improve understanding of the effects related to both the workplace design and sonographer posture and assess potential solutions using a design engineering approach. A range of ergonomically-focused sonography products already exist, but they are widely dispersed in the market and difficult to be implemented in sonography workplaces and configurations. A combined design solution to implement ergonomic improvements is the ultimate goal of our work. The first stage of the study uses observations of, and interviews with sonography professionals in order to obtain first-hand feedback about work-related injuries. On-site observations were carried out at the Lozano Blesa Hospital, Zaragoza, Spain. An experiment has been designed, based on the observation and interview findings, which uses Surface Electromyography (EMG) to measure muscle activity in different ergonomic scenarios. The analysed EMG data will help to establish the optimal postures for a range of sonography procedures and also be used to select the best potential solutions to the problem of MSDs amongst sonographers. The last stage will involve a second EMG-based experiment to assess the efficacy of commercially available ergonomic products to measure their potential impact.

References:
6. Mentoring for ultrasound students, NA Brown, AL Jefferies, T Barker, University of Hertfordshire

A requirement for entry to the ultrasound programme at the University of Hertfordshire is that students are provided with a named mentor. This mentor should be familiar with the expectations and requirements of the role if they are to support the student to their fullest potential. Following a review of literature which examined the benefits and responsibilities of mentoring consideration was given to the relationship between the mentor and student. Six semi-structured interviews were undertaken with lecturers from other health courses where a mentoring relationship takes place in a clinical environment between university students and qualified healthcare professionals.

The aim of the study was to investigate best mentoring practices within an inter-professional setting with a view to sharing good practice and making changes to the mentor training provided with our ultrasound course. All respondents stated that the mentor was allocated to student by the hospital departments with the university or students having no involvement in the process, one referred to the matching process as “hit and miss”. The literature states consideration to matching is crucial for a successful mentoring relationship. Only 50% of respondents provide details to mentors regarding the mentor role. Of those that do provide guidance, this is either electronic or workshop based. All respondents reported that mentoring training is proved by the University and is offered to all mentors, however, the type, content and frequency of the training differs between disciplines.

Conclusions:
Greater consideration needs to be given to the matching of mentor and student. The mentor guidance and training offered needs to include more detailed requirements of the role of the mentor. The continuous link between the University and the mentors needs to be maintained. This is part of a work in progress towards a doctoral submission investigating mentoring for Ultrasound Students.

7. Ultrasound assessment of the fetal thyroid: a systematic technique, E Gardiner, Glasgow Caledonian University

Background:
Poorly controlled maternal thyroid disease can have serious effects for the fetus, often resulting in fetal goitre. The Endocrine Society Guidelines recommend that for those women, with elevated TSH receptor antibodies and/or anti thyroid medication, the fetal thyroid size should be monitored using high-resolution ultrasound. Review of the literature however identified discrepancies and variations in technique for this examination. Aim to develop a Sonographer scanning protocol, which promotes a systematic approach to ultrasound assessment of the fetal neck and thyroid gland.

Method:
Following a review of current literature, various modes of scan and measurement techniques were explored. A systematic assessment method was developed.

Results:
A step by step scanning protocol was introduced detailing: • Ultrasound technique • Plotting of fetal thyroid measurements • Reporting of findings • Further ultrasound investigations on discovery of fetal goitre

Conclusion:
Introduction of a fetal thyroid scanning protocol enables systematic assessment and monitoring of the fetal thyroid within the Obstetric unit in line with current guidelines. Keywords: Ultrasound, Fetal Thyroid, Protocol
8. Detecting Tetralogy of Fallot: a district general hospital experience, T Lalli, C Bailey, A Bromley, Dorset County Hospital NHS Foundation Trust

Background:
Congenital heart disease (CHD) is a leading cause of infant mortality with an incidence of 35: 10,000 live births (NICOR, 2012). Tetralogy of Fallot (TOF) is one of the most common forms of CHD with an incidence of 1:3600 (Aplitz et al. 2009). TOF can be an isolated finding, however approximately 30-50% of cases are associated with extracardiac abnormalities (Merz, 2005, Vesel et al 2006). Prenatal diagnosis and management of TOF can have significant effects on neonatal mortality and morbidity. Fetal cardiac screening forms part of the 18-21 week routine anomaly scan (D Kirwan & NHS FASP, 2010) which aims to detect virtually all major cardiac anomalies, however structural cardiac anomalies are the most frequently missed abnormalities with detection rates of only 50%,(D Kirwan & NHS FASP, 2010).

Discussion:
This presentation discusses three cases of TOF recently detected in a small rural district general hospital with approximately 2,200 deliveries per annum. The characteristic ultrasound findings of the four major components and common variations of tetralogy are reviewed. Detailed evaluation of the fetal heart at the routine scan optimises the early detection of TOF. This allows for timely tertiary referral for specialist cardiac assessment, providing appropriate prenatal and post natal planning. The fetal cardiac protocol outlines the four intra-cardiac views required, however the International Society of Ultrasound in Obstetrics & Gynaecology (IUOSG, 2013) promote a standard five view assessment of the heart which includes an additional three vessels and trachea (3VT) view and colour Doppler assessment, which are currently not routinely performed. TOF usually presents with a normal four-chamber view, however is associated with an abnormal 3 vessel view and 3VT view. This demonstrates the potential to increase detection rates using these more advanced techniques, improving the effectiveness of prenatal screening. Despite the implementation of a structured cardiac protocol, detection rates of CHD are improving but remain relatively low across the UK. With a high proportion of prenatally detectable causes of CHD occurring in patients with no risk factors, it is essential that routine screening maximises detection rates in order to ensure improvement in neonatal morbidity rates.

9. Pregnancy outcome with increased nuchal translucency in first trimester scan, D Bandyopadhyay, S Valappil, G Martin, University Hospital of South Manchester NHS Foundation Trust

Objectives:
To study the outcome of pregnancies with increased NT at the 11 to 14 weeks scan.

Methods:
Retrospective study of 50 patients with raised NT. in our unit, as a routine NT measurements was offered to all women during their dating scan. Women with Nt > 3.5 mm were counseled and offered invasive testing.

Results:
Of the 50 women included in the study, NT measurements ranged between 3.5 – 8.9 mm. Diagnostic tests were offered to all with raised NT. 70% underwent invasive testing. 60% opted for CVS while the rest underwent amniocentesis. The remaining opted for TOP without any further testing. 32% of the test results came back as abnormal. Chromosomal anomalies were the commonest – 14% T21, 4% T 18, 3% T 13 and 6% cystic hygroma. 21% of those with normal karyotype ended in spontaneous miscarriage. 30% of those with raised NT had live-births.

Conclusion:
A fetal Tt measurement above 3.5 mm is strongly associated with adverse pregnancy outcomes. Spontaneous miscarriages and chromosomal abnormalities are by far the commonest associations with raised NT. Those without any karyotype abnormality often require surveillance in pregnancy in the form of detailed anomaly scan, fetal echo and infection screening. This often has a huge impact on the woman’s emotional aspect. Counseling should be emphasized to help these parents restore hope in normal pregnancy outcome.
10. Role of different imaging modalities in female infertility, HL Khosa, D Koura, N Ramesh, Portloaise Regional Hospital, Laois County, Ireland

Female infertility is divided into primary and secondary. Primary infertility is defined as inability of a couple to conceive after one year of unprotected intercourse and is becoming increasingly common. Secondary infertility is defined as inability of a couple to conceive after already having conceived previously. The causes of primary and secondary infertility are multifactorial these include anomalies of the uterine cavity, uterus, tubes, ovaries, cervix, peritoneum and pituitary masses. Various imaging modalities are being used as part of work up for diagnosis of female infertility. The primary radiological investigation is trans abdominal pelvic ultrasound. This is nowadays frequently combined with trans vaginal scan (TVS) for better evaluation of uterus and ovaries. TVS is superior to an abdominal scan in morphological evaluation for pelvic visceras. Hysterosalpingography is frequently used to evaluate tubal patency. MRI is used for evaluation of pelvis to evaluate uterine, ovarian and tubal abnormalities. MRI is superior in evaluation of uterine congenital anomalies and is sensitive in detection of endometriosis, adenomyosis and pelvic inflammatory diseases. MRI can also help detect intra cranial lesions as a cause of infertility such as pituitary adenomas. Sonohysterosalphingogram (Sono-HSG) also allows visualisation of uterine cavity.

11. TV Scanning: an appendix to the full story! MO'Donnell1,2, DM Quinn2, T Herlihy1, 1University College Dublin, Ireland, 2St. Vincent’s University Hospital, Elm Park, Dublin 4, Ireland

Background:
A 23 year old female presented to the Accident & Emergency (A&E) department with a myriad of symptoms including acute right iliac fossa (RIF) pain, nausea and decreased appetite. These symptoms, when correlated with abnormal blood test results raised the level of clinical suspicion and a transabdominal (TA) pelvic ultrasound scan was subsequently requested.

Ultrasound findings:
An initial TA pelvic ultrasound assessment proved unsuccessful due to an under filled bladder and the examination proceeded to the transvaginal (TV) approach. The uterus and both ovaries were identified as normal on ultrasound. However, a well-delineated structure measuring 1.1cm was identified lying adjacent to the right ovary in the right adnexa. The thick-walled structure displayed the very distinctive hyperaemic ‘ring of fire’ sign on colour Doppler imaging. The typical blind-ending, aperistaltic, tubular appearance of an inflamed appendix was successfully identified. The distension of its walls and the debris seen within its fluid-filled lumen also reinforced the findings of acute appendicitis. A higher frequency transducer (9-12MHz) was then used to scan the RIF region TA which showed the pathology arising from the caecum. A definitive ultrasound diagnosis was made within thirty two minutes and the patient was expedited to theatre for a surgical appendectomy. A histopathological slide retrieved from the excised specimen determined that the appendix was indeed gangrenous.

Conclusion:
Transvaginal Ultrasound is an invaluable tool when investigating patients with acute RIF pain. This case shows that ultrasound can be used to provide a rapid and accurate diagnosis without exposing a female of child bearing age to ionising radiation.

Keywords: RIF pain; Transvaginal Ultrasound; Appendicitis
12. Ultrasound of the eye: indication, technique, anatomy and common pathological conditions, VC Chawla, R Lapham, MJ Weston, Leeds Teaching Hospitals

**Purpose:**
Ultrasound of the eye is an investigation that is not commonly requested. This poster aims to promote knowledge of the anatomy of the eye, indications for ultrasound and common pathologies. This will allow sonographers and radiologists to gain an understanding of the relevant clinical features.

**Technique:**
Ultrasound of the eye involves examining the patient with closed eyes and using a high frequency probe. The globe is examined via gentle horizontal movements and in the neutral position. The following structures are examined: lens, iris, vitreous, retina, choroid, the optic disc and nerve.

**Indication:**
• Where direct vision by an ophthalmoscope is not possible. This occurs with cataracts and haemorrhage.
• Assessing intra-ocular tumours. • Differing between serous and solid retinal detachment – this is not always possible via an ophthalmoscope. • Localisation of foreign bodies.

**Safety:**
Ultrasound of the eye has several safety implications, as the eye is extremely susceptible to thermal hazard, as the lens, the vitreous and the aqueous humour have no cooling blood supply. BMUS recommends and considers the following parameters as safe: a thermal index between 0 – 1.0 and a mechanical index between 0 – 0.3

**Conclusion:**
Ultrasound of the eye is a simple and safe technique, which is not commonly used. It provides good diagnostic images not always possible with an ophthalmoscope. It is a valuable tool in the patient pathway.

13. Case testicular lymphoma in a 56 yr old man, K Chan, A McGuinness, Mid Yorkshire Trust, Wakefield

**Background:**
56 year old man presented urgently from the GP with “hard right testicle”. The patient stated the testis had been swollen for 3 weeks. No other symptoms.

**Introduction:**
Standard testicular scan performed – LS and TS of both testes, epididymides with colour Doppler imaging. The scan showed a large diffusely abnormal hypervascular right testicle and normal left testicle suggestive of possible lymphoma. The patient was informed of the possible diagnosis and immediately seen by a urologist. Orchidectomy performed the following day. Tumour markers and a whole body PET scan were performed. Results were discussed at the Haematology MDT, PET scanned showed Stage 4-disease with 3-4 extra nodal sites, thyroid, kidney and abdominal lymphadenopathy. Pathology revealed Diffuse large B cell lymphoma (DLBCL)

**Discussion:**
Primary testicular lymphoma PLT is an aggressive, rare type of extra-nodal lymphoma in men over the age of 60. As PLT has a tendency to relapse due to extra-nodal tropism follow up of the contra-lateral testis and PET scan are required. Common sites of recurrence are skin, pleura, contralateral testis and CNS. Treatment plan for this gentleman follows the current international standard treatment of care, orchidectomy followed by 3 weekly RCHOP (Rituximab, Cyclophosphamide, Doxorubicin, Vincristine and Prednisolone) and intrathecal methotrexate. Followed by a PET scan and contra-lateral testicular ultrasound after 2 cycles of treatment. The above case shows the value of urgent access ultrasound as the patient was referred from urology and had his ultrasound immediately after his clinic appointment, with follow up that afternoon and surgery the following day. 1: Chan YC, Wirth A. Seymour J F. Primary testicular lymphoma. American Society of Haematology. 2013;DOI 10.1182/blood-2013-10-530659
14. **The use of intraoperative ultrasound in the surgical resection of brain tumours**, CJ Bamber, Lancashire Teaching Hospitals NHS Foundation Trust (Preston), University of Manchester Medical School

**Background:**
Localisation and delineation of the extent of brain lesions is fundamental for their safe maximal resection, which is important for patient outcome. Navigation by preoperative magnetic resonance imaging (pMRI) is routine but helps achieve radicality in only -12% additional cases, with brain shift (a loss of the spatial relationship between patient and pMRI) conferring an important error. Intraoperative MRI (iMRI) corrects for brain shift, but is expensive, not widely available and substantially prolongs surgery. This paper reviews the evidence for the value of intraoperative ultrasound (iUS) in aiding tumour resection.

**Methods:**
The study was conducted by literature review and personal communication with neurosurgeons. A pictorial guide was created, of the appearances of anatomical structures and pathology on iUS, and evidence was collated for efficacy and the likely impact of recent advances in iUS technology, image acquisition technique, image interpretation, and current research.

**Results:**
Numerous studies have demonstrated the utility and cost-effectiveness of iUS registered to pMRI for enhancing surgical performance without significantly prolonging surgery, with accuracy similar to other intraoperative imaging for improving the removal of residual tumour. Furthermore, Doppler allows localisation of the main blood vessels for safer resection, and elastography may further improve the delineation of lesions. Nevertheless, there may be popular misconceptions concerning image quality, size of craniotomy, difficulty of use, and difficulty of image interpretation. Few review articles, and no published meta-analyses exist; the majority of papers outline with small cohorts the experiences of individual institutions.

**Conclusions:**
Ultrasound appears to be an easy, safe, convenient, reliable, widely available, cost effective intraoperative imaging modality that probably should be an integral part of neurosurgical theatre equipment, but there is a need for education of neurosurgeons for awareness and training to take full advantage of its benefits, as well as an unbiased multicentre trial to fully define them.
15. **An assessment of the overall effectiveness and efficacy of ultrasound in diagnosing tears of the rotator cuff within an NHS Trust**, HJ Hope, North Cumbria NHS Trust

**Background:**
Ultrasound has been shown in numerous studies to be an effective method of diagnosing lesions of the rotator cuff. However, its accuracy can vary within individual trusts. It is for this reason each radiology department needs to audit their results to ensure they are performing to the high standards demonstrated in other studies.

**Objective:**
To highlight any areas of deficiency and to improve the accuracy of the shoulder ultrasound service within an NHS Trust.

**Method:**
A retrospective audit of the shoulder ultrasound service was carried out using arthroscopy as the gold standard. Also, a questionnaire was given to service users to assess their opinion of the service.

**Results:**
97 patients were included within the audit. The overall sensitivity, specificity, positive predictive value, negative predictive value and accuracy for detecting lesions of the rotator cuff was 57%, 97%, 67%, 96% and 93% respectively. These results did not compare favourably with other studies and so the results were broken down into individual tendons, types of tear and also individual operators to highlight specific problems. Of the nine questionnaires sent out five were returned: three surgeons and two physiotherapists. They highlighted the need for more concise information to be included in the ultrasound reports and to consider the development of a one-stop clinic.

**Conclusions:**
1) Analysis of the results highlighted individual operators as significantly affecting results. These practitioners must be made aware of this and procedures put in place to develop their skills. 2) An assessment of the equipment needs to be performed to highlight any potential areas for improvement. 3) The initiation of a one-stop clinic should be a serious consideration as potentially it could help to improve the detection rates by better communication with the other clinicians and by reducing the time patients have to wait before going on to surgery.

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16. **MSK ultrasound training: the InHealth approach**, S Afzal¹, F Kinsey², L Rushton¹, ¹InHealthgroup.com, ²University Cumbria

**Background and purpose of study:**
The exciting modality of MSK ultrasound is our focus as postgraduate sonographers have built up their scope of practice to independently perform a range of MSK examinations. A CASE accredited MSK course offers an academic structure that runs alongside theoretical and practical requirements to enable trainees to perform musculoskeletal ultrasound. MSK ultrasound is certainly considered a valuable and complimentary imaging modality to MRI (Nazarian 2008). The RCR (2012) recommendations outline the need for careful nurturing of the trainee MSK practitioner and the assessment of evidence of competency in MSK and these have built on existing standards for reporting and interpretation of imaging investigations. Currently, a sonographer is likely to encounter a full and a varied MSK list as part of their workload. These referrals demand sonographers utilise a wide range of skills in order to answer the clinical questions raised.

**The methods:**
Our training combined didactic and practical training supported by a clinical mentor and lecturer to prepare two experienced sonographers to be able to deliver the MSK service. Our programme included 6-8 weeks of one to one scan sessions on normal anatomy followed by abnormal pathology recognition. Over the past year, each MSK trainee sonographer was expected to perform self-learning and to build on their knowledge of pathology and anatomy and developing key clinical reasoning skills and report writing. We present the experience of the past year from the voice of the InHealth service manager, the Cumbria university lecturer and mentor and the trainee sonographers.

**The results:**
The investment of time is vital to develop academic and practical skills that are vital to grow the proficient practitioner who will engage in the complete service delivery of routine MSK referrals.
Conclusions:
A comprehensive programme of MSK training requires close sonographer and mentor liaison in order to be competent to deliver scans within regional clinics and to engage with emergent subspecialties like rheumatology referrals.

17. Imaging the hip joint in osteoarthritis: a place for ultrasound? SN Sudula, Medway Maritime Hospital, Gillingham

Introduction:
Osteoarthritis (OA) has traditionally been imaged with conventional radiographs; this has been regarded as the reference technique in OA for a long time (Moller et al 2008). However, in recent years, novel imaging techniques such as ultrasonography have been utilised to obtain a better understand of this disease (Keen et al 2009). This is mainly due to tremendous technical advances and progressive, relevant technological developments of Ultrasound (US) equipment occurring over the past decade (Iagnocco et al 2009). This poster addresses the use of US as an imaging technique for the evaluation and treatment of OA hip joint.

Conclusion:
Ultrasonography has been demonstrated to be a valuable imaging technique in the diagnosis and management of OA of hip joint (Keen et al 2009). Application of this imaging methodology to OA has aided the understanding of the disease process and may aid in the assessment of future therapies. The execution of US guided procedures with safety and reliability has a relevant value in patient management. Future improvements in US research on OA with the execution of studies investigating new aspects of the disease and using novel US tools such as 3D-US, fusion imaging and elastography will hopefully amplify the diagnostic quality of sonography, analysing early and late disease with more accuracy. The main issue with ultrasound is over diagnosis as surgical interventions in patient can lead to legal and clinical implications (Swamy et al 2012). To maintain this and the problems associated with operator dependence, the society of radiographers advocates appropriate training for all US operator to provide accurate diagnosis in conjunction with clinical findings (SOR 2008, 12).

18. Ultrasound-guided, percutaneous liver biopsy as a day-case procedure: Five-year experience at a single institution, S Liddy, A Aftab, G Courtney, P O’Sullivan, M Brannigan, C O’Riordan, K Carroll, St Luke’s General Hospital, Kilkenny, Ireland

Background:
Percutaneous liver biopsy is a commonly performed procedure and is an important tool in the diagnosis and management of parenchymal liver disease.

Purpose:
The purpose of this study was to determine the technical success and complication rates of ultrasound-guided, percutaneous liver biopsy performed as a day-case procedure at our institution over a 5-year period.

Methods:
A retrospective review was undertaken of all day-case liver biopsies performed for parenchymal liver disease at our institution between January 2009 and March 2014. Data collected included: patient demographics; needle type and size; the indication for the procedure; pathology results; and procedure-related complications.

Results:
A total of 78 biopsies were performed. The mean age was 46.6 years and 47/78 (60.3%) patients were female. An 18G automatic needle was used in all cases. In 77/78 (98.7%) cases the right lobe of the liver was biopsied. The indications for the procedure were hepatitis C (43/78, 55.1%), autoimmune hepatitis (11/78, 14.1%), primary biliary cirrhosis (4/78, 5.1%), hepatitis B (2/78, 2.6%), cryptogenic fibrosis (1/78, 1.3%), schistosomiasis (1/78, 1.3%), and abnormal liver function tests of unknown cause (16/78, 20.5%). In 77/78 (98.7%) cases the tissue sample obtained was considered adequate for histological analysis. The degree of fibrosis was none/mild in 39/77 (50.6%), moderate in 16/77 (20.8%) and severe/cirrhotic in 22/77 (28.6%) cases. Three patients (3.9%) required admission, one for severe post-procedural pain and two for symptomatic haemorrhage, one of whom required transfusion. There were no fatalities seen in this patient series.

Conclusions:
Ultrasound-guided, percutaneous liver biopsy can be safely and effectively carried out as a day-case procedure when performed by an experienced operator.
19. A pictorial review of renal pathology and fusion imaging: A help or hindrance? PC Parker, OR Byass, Hull and East Yorkshire Hospitals NHS Trust

Renal pathology ranges from simple cortical cysts to complex solid masses. Incidental renal masses are common place and it has been estimated that over half of patients over the age of 50 years will have at least one renal mass. These are often detected incidentally on either ultrasound or cross sectional CT imaging. Incidental renal lesions can pose a diagnostic dilemma for radiologists, particularly the more complex Bosniak type 2 and 3 which are often those seen on non-contrast CT imaging. In these cases it is common practice, in our institution, for patients to be referred for ultrasound evaluation of these suspicious lesions.

Ultrasound is well established as being a useful tool in differentiating between cystic and solid lesions. With its superior ability to differentiate the fine internal architecture of the more complex renal cysts ultrasound is a useful diagnostic test. However, there are repeated cases in which there is uncertainty that the correct lesion is being evaluated under ultrasound. Many patients, particularly the elderly, present with multiple renal lesions and differentiating the appropriate mass to interrogate further with either fundamental or contrast enhanced ultrasound can be difficult. The development of fusion imaging is proving to be invaluable in such cases. Real-time fusion imaging allows co-registration of previously acquired cross sectional imaging with live ultrasound scanning. Fusion imaging allows the operator to evaluate these incidental lesions in real time whilst comparing diagnostic information from both imaging parameters. We present an illustrated review of the use of real time fusion imaging, using both fundamental and contrast enhanced ultrasound, in cases of incidental renal pathology.

20. Acute Burkitt’s lymphoma, T Adlan, G Miles, JF Shirley, Derriford Hospital, Plymouth

Background:
Burkitt’s lymphoma is a high grade type of non-Hodgkin lymphoma that reportedly involves the gastrointestinal tract in approximately one fifth of cases. The majority of cases are seen in the younger age-group. It is crucial to recognise the manifestations of Burkitt’s lymphoma as early diagnosis and hence prompt commencement of treatment is paramount.

Case Report:
We present a case of a sixteen year old male admitted to the acute surgical ward with abdominal distention and a palpable mass in the left iliac fossa. His haematological/biochemical profile demonstrated anaemia and acidosis. Plain films of the abdomen showed a paucity of bowel gas but no evidence of obstruction or perforation. An emergency trans-abdominal ultrasound scan was performed which showed multifocal markedly thickened, dilated loops of bowel with a small volume of ascites and bilateral pleural effusions. A subsequent CT scan was performed at the request of the clinical team which confirmed the ultrasound findings and in addition demonstrated lymphadenopathy above and below the diaphragm. The initial diagnosis of Burkitt’s lymphoma was confirmed on immunophenotyping pleural fluid. A post treatment CT scan happily demonstrated significant response to chemotherapy.

Discussion:
This case clearly illustrates the characteristic sonographic appearances exhibited by Burkitt’s lymphoma of the bowel. Recognition of such features by practitioners of ultrasound is vital to establish timely diagnosis and avoid detrimental, potentially life threatening, consequences that could be encountered with this aggressive disease.
21. **Benign liver lesions on ultrasound**, JA Allred, T King-Mohammad, P Cantin, S Freeman, C Gutteridge, Derriford Hospital, Plymouth, Royal Cornwall Hospital, Truro

The standard abdominal ultrasound examination and in particular, focused examination of the liver, is a core skill any junior radiology registrar in training must master early on. Recognition of the liver’s normal sonographic appearance is crucial if the registrar is then to develop the ability to identify an abnormality, particularly when subtle. An understanding of the various common hepatic lesions and how they present is therefore necessary, especially where discriminating between a benign and potentially malignant lesion is concerned. Use of gray scale is the first identifier but imaging characteristics on colour Doppler is another tool in the registrar’s arsenal, as is micro-bubble contrast. Utilisation of all these aspects of ultrasound will not only enable the registrar to hopefully provide the patient with a diagnosis there and then but also expedite any potential referral and spare the patient unnecessary additional examinations in the form of CT or MRI for “further characterisation” of the lesion. The list of benign hepatic lesions the radiology registrar can expect to see is fairly limited and often guided by the patient’s history.

This poster is aimed at providing a succinct précis of the most frequently observed sonographic characteristics of benign liver lesions, but will include some less common appearances too. The poster will include the use of contrast, with a brief tutorial on the use of contrast in liver ultrasound, the hepatic angio-physiology that drives its use, and an explanation of why certain lesions enhance as they do.

22. **Malignant liver lesions on ultrasound**, JA Allred, T King-Mohammad, P Cantin, S Freeman, C Gutteridge, Derriford Hospital, Plymouth, Royal Cornwall Hospital, Truro

The standard abdominal ultrasound examination and in particular, focused examination of the liver, is a core skill any junior radiology registrar in training must master early on. Recognition of the liver’s normal sonographic appearance is crucial if the registrar is then to develop the ability to identify an abnormality, particularly when subtle. An understanding of the various common hepatic lesions and how they present is therefore necessary, especially where discriminating between a benign and potentially malignant lesion is concerned. Use of gray scale is the first identifier but imaging characteristics on colour Doppler is another tool in the registrar’s arsenal, as is micro-bubble contrast. Utilisation of all these aspects of ultrasound will not only enable the registrar to hopefully provide the patient with a diagnosis there and then but also expedite any potential referral and spare the patient unnecessary additional examinations in the form of CT or MRI “further characterisation” of the lesion. Differentiating a potentially or frankly malignant lesion from a benign lesion is essential. Whilst this is not always possible with ultrasound alone, the registrar should be aware of the “red flag” imaging features of sinister lesions.

This poster is aimed at providing a succinct précis of the most frequently observed sonographic characteristics of malignant liver lesions, but will include some less common presentations too. The poster will include the use of contrast, with a brief tutorial on the use of contrast in liver ultrasound, the hepatic angio-physiology that drives its use, and an explanation of why certain lesions enhance as they do.

23. **The clinical impact on patient care by a Surgical Assessment Unit Ultrasound facility**, W Lai, C Gutteridge, A Regan, M Edmond, A Lambert, Derriford Hospital, Plymouth

**Background/Purpose:**
Ultrasound scan (USS) is a common and important mode of investigation for emergency surgical admissions, as well as a non-invasive and relatively cheap examination. Delay in investigation often leads to delayed diagnosis and treatment, and possible extended length of stay (LOS), which has clinical, cost and service provision implications. We aim to investigate the clinical impact on patient care by a pilot Surgical Assessment Unit (SAU) USS facility.

**Methods:**
We performed a retrospective data collection on 100 consecutive SAU inpatients who had an USS investigation on the ward since the introduction of the facility (from 21st October to 13th November 2013), matched by 100 consecutive SAU inpatients who had an USS in the radiology department before the pilot study (between 27th August and 30th September 2013). Lists of patients (n=200) were generated from the radiology department database using filters of ‘investigation room’ and ‘referring location’ respectively. All outpatient and out of hours investigations were excluded from the study.
Results:
SAU USS has reduced mean LOS by 1.44 days compared to departmental USS (p = 0.0382, 95% CI of mean reduction = 2.90, 0.079), and led to more same day discharge than departmental USS (20 vs. 5, p = 0.034), thus avoiding unnecessary overnight stay. There was no difference in readmission rates between the two groups (both 0.17). It also significantly reduced mean waiting time from admission to investigation by 5.21 hours (p = 0.0112, 95% CI of difference = 1.20, 9.22), which can be translated into improved patient and staff satisfaction. All these findings are both statistically and clinically significant.

Conclusions:
SAU USS has a significant positive impact on patient care in surgical admissions by reducing LOS and investigation waiting time, as well as facilitating same day discharge. Therefore it has been recommended to the trust as a long term service provision.

24. The cost effectiveness of a Surgical Assessment Unit Ultrasound facility, W Lai, C Gutteridge, A Regan, M Edmond, A Lambert, Derriford Hospital, Plymouth

Background/Purpose:
Ultrasound scan (USS) is a common and important mode of investigation for emergency surgical admissions. Delay in investigation often leads to extended length of stay (LOS), which has clinical, cost and service provision implications. We aim to investigate the cost effectiveness of a pilot Surgical Assessment Unit (SAU) USS facility.

Methods:
We performed a retrospective data collection on 100 consecutive SAU inpatients who had an USS investigation on the ward since the introduction of the facility (from 21st October to 13th November 2013), matched by 100 consecutive SAU inpatients who had an USS in the radiology department before the pilot study (between 27th August and 30th September 2013). Lists of patients (n=200) were generated from the radiology department database using filters of ‘investigation room’ and ‘referring location’ respectively. All outpatient and out of hours investigations were excluded from the study.

Results:
SAU USS has reduced mean LOS by 1.44 days compared to departmental USS (p = 0.0382, 95% CI of mean reduction = 2.90, 0.079), with an estimated cost of each scan comparable to the average departmental USS (£29.71 vs. £30.80). Using the average cost of an excess bed day = £273 (Department of Health Reference Costs 2012-13, November 2013), SAU USS has produced an estimated saving of £394.72/patient. This does not include saved opportunistic costs such as prevented elective operation cancellations, fines incurred from surgery waiting time/A+E breaches etc. The annual running cost of SAU USS has been estimated as £50,919, with an estimated set up cost of £52,010. These can be covered by savings achieved from 129 and 132 SAU scans (19 and 20 work days) respectively.

Conclusions:
SAU USS has a significant cost benefit with a saving of nearly £400/patient. Therefore it has been recommended to the trust as a self-sustainable and economic long term service provision.

25. Evaluate the efficacy of ultrasound in diagnosis of acute appendicitis, HL Khosa, D Koura, N Ramesh, Portlaoise Regional Hospital, Ireland

Background:
Traditionally acute appendicitis has been diagnosed on the basis of clinical findings. Negative appendectomy rates of 12%–40% have been reported. It is well established that preoperative imaging can significantly reduce this rate to well under 10%. Although the majority of studies refer to the efficacy of computed tomography, the use of ultrasound as the primary test is increasingly advocated particularly in the pediatric population.

Methodology:
Sonographic findings of 41 patients presenting with right iliac fossa pain to ED between October and December 2014 were reviewed. All the patients had clinical examination and lab investigations.

Results:
Out of the 41 patients referred for ultrasound, 13 patients were negative for appendicitis on ultrasound. 6 of them were positive at surgery indicating. Seven patients were positive on Ultrasound, 5 of them were positive at surgery. 19 patients had ancillary findings on Ultrasound, which were concordant with the surgical results.
Conclusion:


Introduction:
Small renal cell carcinomas (RCC) are increasingly being found incidentally during ultrasound examinations. Classification of small renal masses can be difficult particularly if they fit into the indeterminate categories of the Bosniak cyst classification system. Once identified contrast enhanced ultrasound (CEUS) examinations are a further tool which can aid characterisation of these masses. Whilst surgery is a management option for most, when the mass is small and accessible radiofrequency ablation of the tumour can be attempted.

Case Presentation:
A 72 year old male was referral from a gastroenterologist for an upper abdominal ultrasound examination due to symptoms of nausea and reflux. The main clinical concern was of gallbladder related pathology. There were no urological symptoms.

Findings:
On examination a 2.5cm exophytic isoechoic mass arising from the left kidney was demonstrated. Following the initial examination a CEUS focussed on the left kidney was performed. This confirmed contrast enhancement of the mass consistent with a RCC. A CT examination was performed for staging which confirmed the presence of an isolated left sided RCC with no metastatic spread. Measuring only 2.5cm enabled non-surgical management and treatment of this isolated lesion with radiofrequency ablation.

Follow up:
Yearly CT and urological follow up has occurred since the diagnosis and RFA. Findings three years post RFA demonstrated atrophy of the cortex at the mass site and associated isolated calyceal dilatation but no disease recurrence has been identified.

Conclusion:
This case report clearly demonstrates that an incidental finding of a small RCC at an early stage can allow a patient’s cancer to be managed completely non-surgically. Radiofrequency ablation is minimally invasive compared to the surgical alternative resulting in a quicker recovery time and, most importantly, preserves the affected kidney protecting renal function in the long term.

27. Testicular adrenal rest tumours in congenital adrenal hyperplasia, R Naveen, D Hewitson, Leeds Teaching Hospital NHS Trust

Background:
Congenital adrenal hyperplasia (CAH) is due to inborn error of metabolism of cortisol synthesis. CAH affects between 1:10,000 and 1:18000 children born each year. Testicular adrenal rest tumours are an important complication which can lead to infertility in adulthood. Prevalence of testicular adrenal rest tumours have a reported prevalence of 0-94% in these patients, depending on the selection group(age, size, hormonal control)

Case report:
We present a case of a 25 year old male with CAH and bilateral testicular adrenal rest tumours. He was on ultrasound and hormonal surveillance for testicular adrenal rest tumours since his teenage years. We present the ultrasound images of the surveillance.

Discussion:
Testicular adrenal rest tumours are benign lesions, although if long standing they can lead to infertility. Therefore, early and correct recognition is essential as they respond well to treatment and this may avoid unnecessary orchidectomy. Both USS and MRI are effective diagnostic tools involved in the detection and follow-up of these lesions. Ultrasound is quick and reliable in experienced hands.
28. **Gallbladder perforation: an unexpected finding in a well patient**, LM Hodkin, A McGuinness, Mid Yorkshire Hospital Trust

**Background:**
Gallbladder perforation is a relatively rare complication, often arising as a result of acute cholecystitis. It carries a high mortality rate (1). Ultrasound is usually the initial investigation of choice.

**Case Report:**
An 89 year old male was referred for an ultrasound scan. He had symptoms of recurrent abdominal pain and constipation. On examination, he had a palpable gallbladder, but no tenderness. His observations were within normal limits and bloods revealed a slightly elevated WCC and CRP. Clinically, differential diagnoses included acute cholecystitis. On review of previous radiological investigations, an abdominal ultrasound had been performed 8 months prior, for suspected cholecystitis. This demonstrated a thin-walled, distended gallbladder containing biliary sludge, but no gallstones. On ultrasound, we discovered a thickened gallbladder, with an 8mm defect in the fundus, communicating with an 8 cm x 2 cm collection in the anterior abdominal wall. Debris and sludge moved freely through the defect. No gallstones were seen. There was no pericholecystic free fluid. The remainder of the examination was unremarkable. The patient was not tender on examination. Findings were in keeping with chronic cholecystitis and gallbladder perforation. CT was then performed, confirming the findings; a contracted gallbladder with a visible defect in the fundus and perforation into the anterior abdominal wall. No other collections were demonstrated. The patient was treated conservatively with intravenous antibiotics and remains stable and relatively well.

**Discussion:**
Clinical presentation of gallbladder perforation ranges from acute generalised peritonitis to non-specific abdominal symptoms. A perforation can occur 2 days- several weeks after the onset of acute cholecystitis (1). It is more often localised than generalised and ultrasound features include layering of the gallbladder wall and pericholecystic fluid collection(s) (1, 2). Localised disruption of the gallbladder wall, as was demonstrated in this case, is seen in 40% of cases on ultrasound and 80% on CT (2).

**References:**

29. **Ultrasound diagnosis of gallbladder perforation: a complication of acute cholecystitis**, JG Johnson, Tameside Hospital, Greater Manchester

**Background:**
Gallbladder perforation is a rare complication that can occur in a number of clinical situations but is often associated in acute cholecystitis. It can often happen as a result of laparscopic cholecystectomy. It occurs in 6-12% of patients with acute cholecystitis, most are subacute causing pericholecystic abscess.

**Case Study:**
This case study presents a 60 year female presenting from the surgical ward with generalised peritonitis and pyrexia with right upper quadrant pain, she also had high white cell count and positive Murphys sign with a suspicion of cholecystitis. According to Neimeier classification there are 3 main clinical sub types 1. type I: acute free perforation 2. type II subacute pericholecysitc abscess 3. type III: chronic cholecysto-enteric fistulation. With modern ultrasound scanners, this case report intends to show this interesting complication to acute cholecystitis and allow the reporting practitioner a method to suggest this as a differential diagnosis.

**Discussion:**
Ultrasound is an effective method for identifying gallbladder perforation, as it is often the first line imaging modality in right upper quadrant pain. Awareness of gallbladder perforation as a differential diagnosis is important as the complications can have a significant impact on patient care.

30. **Ultrasound and CT imaging of sclerosing encapsulating peritonitis (SEP)** PM Tantrige¹, AE Joseph², ¹King’s College Hospital, London, ²Croydon University Hospital Hospital

**Background:**
Sclerosing encapsulating peritonitis is a rare condition with multiple causes but relatively non-specific presentation such as bowel obstruction. The imaging appearances can, however, be diagnostic.
Case report:
A 74 year old man presented with a history of obstructive jaundice a year previously. Two metal stents were placed to relieve the jaundice. Brushings were obtained but there was no conclusive evidence of the source of the primary but there was a high suspicion of cholangiocarcinoma. He continued to deteriorate and developed ascites.

A follow up ultrasound scan performed a year on from the initial presentation revealed significant ascites. The striking feature, however, was an appearance of entrapment of small bowel in mid-abdomen within a clearly identifiable membrane. A diagnosis of sclerosing encapsulating peritonitis was confidently made. A CT scan performed subsequently the centrally gathered and tethered encapsulated appearance of “cocooned” loops of small bowel. The outer membrane clearly identifiable on ultrasound was not detectable on CT.

Discussion:
The precise cause of SEP is uncertain. A number have been described as idiopathic. However, it has been associated with peritoneal irritation secondary to peritoneal dialysis, ventricular peritoneal shunts, or treatment with the earlier beta-blockers. It is also associated with inflammatory pathology such as tuberculosis. It has also been reported in patients with gastrointestinal malignancy as in our patient.

On review of the case studies reported we found that the ultrasound appearances we observed in our patient were easy to interpret and were highly diagnostic of SEP.

One of the authors has experience with two other cases of equally impressive cases with the use of ultrasound. These were induced by practolol and the other had no confirmed aetiology.

Surgery has been attempted to free the loops of bowel but has a high complication rate of bowel perforation.

31. The appropriate use and record of the WHO pre-procedure safe site check list for ultrasound guided GI/GU radiological interventions – an audit cycle, J Lam, S Jepson, C Newland, University Hospitals of Leicester

Purpose:
To ensure Royal College of Radiologist Guidelines are adhered to by our interventional radiology team performing ultrasound guided GI/GU radiological interventions. The audit project sets to check that all US guided interventions have had a WHO safesite checklist which is fully completed. The standard audited against comes from the requirements of the checklist set out by the NPSA and RCR safety checklist for radiological interventions.

The 2013 round of the audit shows an 85% completion rate, but only 31% was completed fully. A meeting was held with radiographers and radiology nurses representatives to discuss the above findings. A re-audit based on these results was performed for the 2014 round looking for improvement in performance.

Methods:
We retrospectively reviewed 30 consecutive patients from the CRIS system attending for Ultrasound guided GI/GU radiological interventions. We reviewed the scanned copy of the WHO safesite checklist for each case, and examined each checklist against the 9 criterion set out by the RCR standard.

Results:
The Overall concordance rate was 87%, which shows a slight improvement from previous. However, we also identified that the WHO safesite checklist for Ultrasound guided (and other radiological interventions) needs to be reviewed and updated to fully comply with the 9 criterion set by the RCR. This has been designed and is presented in the poster.
32. **Quantification of arterial and venous blood flow in patients with carotid stenosis during follow-up of carotid endarterectomy**, AS Maximova, IL Bukhovets, MP Plotnikov, MS Kuznetsov, BN Kozlov, W Yu Ussov, Institute of Cardiology of Siberian Branch of the Russian Academy of Medical Sciences, Tomsk, Russian Federation

The most widely used technique of surgical prevention of arterio-arterial embolism in hemodynamically significant carotid stenosis remains the carotid endarterectomy (CEE).

**Purpose:**
Quantitative evaluation of arterial and venous blood flow parameters using ultrasound techniques in patients with atherosclerosis of the carotid arteries before and after carotid surgery.

**Materials and methods:**
The ultrasonic study was carried out in all patients in B-mode, color and pulsed-wave Doppler before and in the early period (7-10 days) after the CEE. Twenty six patients with stenotic lesions of the carotid arteries (20 men, 6 women, 63 ± 6.4 years) were included. Blood flow in the internal carotid, vertebral (in segments V2, V3), ophthalmic, supratrochlear, middle cerebral arteries, in the internal jugular and vertebral veins as well as Lindegard index were estimated.

**Results:**
At baseline, the skewness ratio (SR) of the linear blood flow in the internal carotid artery was revealed in patients with stenosis 56%, significantly different from the control group 31%. After CEE SR it was normalized to 36%. On the hemodynamically significant stenosis side statistically significant decrease of the peak systolic velocity, diastolic velocity, TAMAX, TAV (p<0.05) in the internal carotid artery was revealed after surgery as compared to initial values. In vertebral (segment V2), ophthalmic, supratrochlear and middle cerebral arteries velocities increased, but not statistically significant (0.05<p<0.10). In the internal jugular veins the peak flow velocity (S-peak) decreased on the affected side at all three levels. On the contralateral side velocities in the common carotid, middle cerebral and supratrochlear arteries have been increased; velocities in the internal carotid, vertebral, ophthalmic arteries and in internal jugular veins did decrease, but not statistically significant.

**Conclusions:**
The methods of quantitative ultrasonic evaluation of arterial and venous blood flow provide adequate control of cerebral hemodynamics in the course of carotid endarterectomy.

33. **Erythrocytes aggregation echogenicity as a prognostic indicator of the incidence of deep vein thrombosis (DVT)**
A Al-obaidi, Cardiff University

**Introduction:**
DVT is a severe medical condition that can happen in isolation or as a consequence of other diseases. Break-up of the thrombus can cause other serious disease called pulmonary embolism (PE). DVT has an annual incidence of about 1 to 3 individuals per 1,000. Thus, it is considered to be the third most common cause of death after coronary artery and stroke (LOPEZ, J. A., KEARON, C. & LEE, A. Y. 2004. Deep venous thrombosis. Hematology Am Soc Hematol Educ Program 1) (COLMAN, R. W., J.MARDER, V., W.CLOWES, A., N.GEORGE, J. & Z.GOLDHABER, S. 2006. Hemostasis and thrombosis: basic principles and clinical practice 2). There are many factors contributing to DVT incidence. However, it has been shown that the initial stage of thrombus formation is highly dependant on the presence of the red blood cells (RBCs).

**Purpose:**
The purpose of the literature review is to determine whether quantitative ultrasound parameters relating to RBC accumulation have the potential to be used as a prognostic indicator of the incidence of deep vein thrombosis.

**Materials:**
A systematic search was made of databases including Google scholar, Pubmed, and Scopus between 1970-2014 for publications relating to the ultrasound echogenicity of RBCs, deep vein thrombosis, flow phantoms and texture analysis.

**Results:**
Axial accumulation of the RBC at the centre of the blood vessel has been shown to increase the mural platelets, which are the main motivators of DVT formation (MORI, D., YANO, K., TSUBOTA, K., ISHIKAWA, T., WADA, S. & YAMAGUCHI, T. 2008. Computational study on effect of red blood cells on primary thrombus formation. Thromb
Res 3) Thus, measuring the RBC aggregation could help to prevent the DVT occurrence. It has been shown that the best method to measure RBC aggregation in-vivo is ultrasound (US). However, there are many problems dealing with the US images, partly relating to the sonographer or the examiner himself/herself and partly related to the device settings (KREMKAU, F. W. 2002a. Diagnostic ultrasound: principles and instruments 4) (POURCELOT, L. 2002. Towards a quantitative in vivo evaluation of venous blood echogenicity: image processing versus subjective assessment. Clin Hemorheol Microcirc 5) Interpreting the ultrasonic image by using the statistical texture descriptors would give more accurate clinical outcomes than subjective interpretation. Texture analysis is mainly divided into two parts. One is the first order statistical parameters which deal with the pixel itself without considering pixel neighborhood relationships, while the other is the so-called second order statistical parameters which deal with the pixel and its neighboring pixels (RABHI, Y. A., FABBRO-PERAY, P., DAUZAT, M., MONTESINOS, P., OLIVA-LAURAIRE, M. C., LOPEZ, F. M., QUERE, I., GRIS, J. C., BRUN, J. F. & SRINIVASAN, G. & SHOBHA, G. 2008. Statistical Texture Analysis. Proceedings of World Academy of Science: Engineering & Technology 6) Most relevant studies to-date have used the second order statistics (grey level co-occurrence matrix). However it has been shown that first order statistics (especially the gray scale median) can be used instead of the second order statistics for the evaluation of the deep vein thrombosis echogenicity. The association between RBC aggregation and DVT is uncertain, with aggregation phenomena being attributed to several different factors (extrinsic and intrinsic factors). One approach to investigating this relationship is to construct flow phantoms to link cell aggregation to ultrasonic appearance (RAMNARINE, K. V., NASSIRI, D. K., HOSKINS, P. R. & LUBBERS, J. 1998. Validation of a new blood-mimicking fluid for use in Doppler flow test objects. Ultrasound Med Biol 7) however their construction is complicated by the need to mimic flow and aggregation properties while needing acoustic properties that are close to those identified by the International Electrotechnical Commission (IEC) (SAMAVAT, H. & EVANS, J. A. 2006. An ideal blood mimicking fluid for Doppler ultrasound phantoms. J Med Phys. 8).

Conclusion:
Quantitative ultrasound parameters do have the potential to be used to predict DVT formation by analysing RBC aggregation, but significant difficulties remain in linking cell aggregation to consistent ultrasound image parameters, and proving the link between aggregation and DVT rate.

34. Extracranial internal carotid artery (ICA) stenosis in children with sickle cell disease – which transducer and what measurement? CR Deane, King’s College Hospital, London

Transcranial Doppler (TCD) is well established in screening for stroke risk in young children with sickle cell disease (SCD). There is increasing evidence that these children also have a high incidence of extracranial ICA stenosis and that this is associated with silent infarcts and stroke risk. However, there is no standard method to examine for stenosis; linear (LA), phased arrays (PA) and non-imaging TCD transducers have been used. Peak systolic velocity (PSV) and TCD mean (time averaged maximum velocity TAMX) have both been utilised to identify stenosis. The internal carotid arteries (ICAs) in 109 children with SCD were scanned with LA and PA transducers on 119 visits (238 arteries measured) to compare measured velocities. LA measurements were made with angle correction, phased array measurements were made without angle correction with a submandibular approach. In each case the highest velocity was recorded from the image. PSV ranged from 56 to 394 cm/s (median 113 cm/s) measured with a PA and 76 to 534 cm/s (median 129 cm/s) using the LA. LA PSVs in individuals ranged from -46% to 184% of PA measurements. TAMX ranged from 34 to 295 cm/s (median 72 cm/s) for the PA and 39 to 419 cm/s (median 82 cm/s) with the LA. LA velocities in individuals ranged from -44% to 167% to PA measurements. TAMX was 64% of PSV (range 44-74%). 8 children were identified with ICA stenosis based on published PA TAMX criteria, 10 based on LA PSV. There was often considerable variation when comparing velocities in an artery from the two transducers; causes include different location of maximum velocity, tortuosity and differences in spectral broadening effects. LAS provide clear images of the proximal ICA, PAs better images of the distal ICAs. Recommendations for identification of stenosis are made.
35. **Comparison of Young’s moduli: shear wave elastography versus mechanical compression testing on PVA-c phantoms**, AJ Fagan¹, S Cournane², M Elkins³, JE Browne¹ ¹Centre for Advanced Medical Imaging, St James’s Hospital/Trinity College Dublin, Ireland, ²St. James’s Hospital, Dublin, Ireland, ³Medical Ultrasound Physics and Technology Group, IEO / FOCAS Institute, School of Physics, Dublin Institute of Technology, Ireland

**Background:**
A recent innovation in ultrasound elastography is shear wave elastography (SWE), wherein the velocity of a shear wave induced in tissue by an acoustic force is detected, allowing for a quantitative measurement of the shear modulus and hence Young’s modulus of the material under investigation [1]. To gain widespread acceptance among clinicians, the accuracy and penetration depth of this relatively new technique needs to be established. The aim of this project was to prepare a series of uniform test materials of varying stiffness and attenuation values made from poly-vinyl alcohol cryogel (PVA-c) [2] and to compare measurements made on these materials by SWE and direct mechanical testing using a compression testing system.

**Methods:**
Uniform samples of PVA-c were prepared to produce a range of stiffness, speed of sound and attenuation values mimicking healthy, fibrotic and fatty liver tissue. The samples were acoustically characterised using a home-built acoustic macroscope. SWE measurements were made using an Aixplorer scanner (ver. 8, Supersonic Imagine, France), while mechanical compression testing was carried out using a Lloyd Instruments LR30KPlus system (Ametek, USA).

**Results:**
Samples with the following ranges were produced: Young’s modulus 3–25 MPa, speed of sound (1490–1570 m/s), and attenuation (0.5–1.0 dB/MHz/cm). SWE measurements of the Young’s modulus compared well with those of mechanical compression testing (correlation coefficient: \( R^2 = 0.9618 \)). The penetration depth over which SWE measurements could be made decreased with increasing attenuation, to only approximately 7cm at 1.0dB/MHz/cm.

**Conclusions:**
Good correlation was obtained between measurements of Young’s modulus made with SWE versus direct mechanical compression testing, giving confidence in the use of SWE for non-invasive in vivo tissue characterisation. Further studies to investigate the depth sensitivity of SWE are required. References. 1. Cournane et al, Ultrasound, 20,16-23, 2012 2. Cournane et al, Phys.Med.Biol, 57, 3901-3914, 2012

36. **Bridging the gap between diagnostic accuracy and test object performance**, PCJ Coulthard¹, G Doblhoff², ¹Northern Physics Services, ²Doblinger Hauptstr.64, A-1190 Vienna

I have been puzzled over the years how it is that great minds, on the subject of US QC, can be so far apart. I offer a proposal to account for this discrepancy. The term “Epistemology” breaks down knowledge, into three camps, knowledge that, knowledge how and acquired knowledge. For example knowledge that 2+2 =4, knowledge how, understanding the mathematical proof of why 2+2 = 4 and acquired knowledge, knowing your friends, family and neighbourhood.

If we apply this understanding to a clinical scientist, their physics, mathematics, experimentation and transparent discussions with clinicians, may lead to the conclusion that there is no clinical evidence of a relationship between diagnostic accuracy and current test object performance. This is seen from their perspective or frame of reference.

If we apply this understanding to an engineer who is closely involved in probe design and quality control, they too have a deep understanding of the physics, mathematics and by experimentation, has produced good and bad probes which affect the performance of equipment. They have liaised with customers to establish why their design needs improvement but not so for the design of other manufacturers. They have developed a QC system which works for their situation. Their perspective or frame of reference differs from the clinical scientist. Both can be correct. In the context of the individuals perspective, how best to explain this seeming disparity of views, I have chosen in this presentation to use a historical account built on personal observation spanning over 30 years at a major manufacturer in their day. Ambiguous clinical requirements, artefacts and misdiagnosis point to a Nemesis, unexplained by current QC methods.
We go on to discuss the Random Void (RV) phantom, which points the way as a sensitive device, when used with commercial software to show clinical effects for subtle changes in the probe parameters. Historical experience, based on theory and evidence by experiment and recent finding point to elevation side lobes as a culprit for this Nemesis. Given the QC need for a diagnostically relevant test device and from the historical discussion presented, the RV phantom we suggest, is a primary tool to give justification for remedial action and suspension from clinical use. Once the problem has been detected, it is then possible as part of the engineering task to carry out PSF tests to define the cause of the problem.

37. **Quality Assurance testing of Transoesophageal Echocardiography Probes**, C Mcleod, D Welsh, S Inglis, SD Pye, NHS Lothian, Royal Infirmary, Edinburgh

**Background:**
Transoesophageal echocardiography (TOE) probes are similar to flexible gastroscopes but contain an annular phased array ultrasound transducer at the tip. Their use in perioperative cardiac anaesthesia is considered best practice for several procedures. Edinburgh Royal Infirmary is a cardiothoracic tertiary referral centre conducting ~70 TOE procedures a month. Following concerns raised by the anaesthetic team that there was degradation in image quality since probe purchase, an investigation was carried out to assess the performance of the >20 TOE probes.

**Methods:**
Probes were inspected for signs of physical damage, followed by electrical safety tests. Image tests began by obtaining two B-mode images of structures in the Edinburgh Pipe Phantom (MacGillivray et al, PMB, 2010). As the investigation progressed further imaging tests were implemented, including: Low Contrast Penetration (LCP) measurements and Doppler function. Performance was judged against baseline results obtained at acceptance, and against a new probe that had not been used clinically.

**Results:**
A total of 22 probes were examined, including loan and replacement probes for the original compliment of 7 probes in Theatres and ICU. Of 9 probes that were replaced due to an identified imaging fault, and where LCP was measured on two occasions, there was a mean reduction in LCP of 7%. The B-mode image appeared substantially darker in affected probes. Doppler modes also showed an increase in noise, most noticeable on colour Doppler.

**Conclusion:**
The ability to perform even the basic testing described allowed for a serious problem to be corrected with the minimal cost to the Health Board. To ensure similar problems are picked up quickly in future a proactive testing procedure is now in place that incorporates visual, electrical safety and image quality checks. It is hoped 6 monthly or annual checks depending on usage catch issues earlier, reducing downtime and increasing clinician confidence in their equipment.

38. **Detecting failed elements on phased array ultrasound transducers**, D Welsh, S Inglis, SD Pye, NHS Lothian, Royal Infirmary, Edinburgh

**Background:**
Imaging faults with ultrasound transducers are common. Failed elements can sometimes be detected with a simple image uniformity or “paperclip” test on linear and curvy array transducers. However, this method is much less effective for phased array transducers. The aim of this project was to assess whether failed elements could be detected through measurement of the resolution integral using the Edinburgh Pipe Phantom, as a simple and low cost alternative to automatic probe testing systems.

**Methods:**
Failed elements were simulated using layered polymer tape as an attenuator. This approach was validated using a linear array transducer. The tape was then cut to size and affixed to the centre of a 128 element phased array transducer face. Measurements of resolution integral (R), including low contrast penetration (LCP), were made with the probe uncovered to act as a baseline, and repeated for several widths of tape (0.5 to 5 mm) to simulate varying numbers of failed elements (0.1 mm = ~1 element). The results were compared with the baseline values.
**Results:**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Baseline</th>
<th>1 SD (%)</th>
<th>5mm</th>
<th>3mm</th>
<th>2mm</th>
<th>1mm</th>
<th>0.5mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>124</td>
<td>2.7</td>
<td>-30</td>
<td>-16</td>
<td>-14</td>
<td>-9.9</td>
<td>-2.7</td>
</tr>
<tr>
<td>LCP</td>
<td>115mm</td>
<td>1.2</td>
<td>-14</td>
<td>-8.5</td>
<td>-6.6</td>
<td>-6.0</td>
<td>-2.8</td>
</tr>
</tbody>
</table>

All widths of tape resulted in a significant difference from baseline, with the exception of 0.5 mm. The measurement of low contrast penetration (LCP) also showed a similar pattern.

**Discussion:**
The results show that the measurement of \( R \) and LCP are sensitive to the presence of failed elements for phased array transducers. Particularly encouraging is the result for LCP as this is an easy measurement to make and can be done with many different test objects, thus enabling “in the field” checks. Further work should assess the sensitivity of the test for truly failed elements and other models of phased array transducer.

**Conclusion:**
Measurement of resolution integral and low contrast penetration both have the potential to be used as quick and inexpensive tests to detect failed elements on phased array transducers.

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**Complications of intravenous drug use: a pictorial review of ultrasound findings**, DG Roberts, RM Evans, Morriston Hospital, Swansea

Ultrasound can play a pivotal role in the diagnosis and management of patients presenting with complications of intravenous drug use. In this patient group, acute conditions of the skin and soft tissues are the most common cause of hospital admission. Vascular complications secondary to intravenous injection or attempted intravenous injection are common, ultrasound is usually the first line radiological investigation of choice. Ultrasound has advantages over other methods of imaging but those involved in scanning this patient group can struggle with interpretation of their findings. We present a pictorial review of ultrasound findings in patients presenting with complications of intravenous drug use. The conditions displayed will include haematoma, abscesses, thrombosis, pseudo-aneurysm and arterio-venous fistula. The aim of the pictorial presentation is to aid those scanning this difficult patient group in interpretation, highlighting the important diagnostic features.
Exhibitor Profiles

Stand No. 14 – BK MEDICAL

Analogic’s BK Medical offers a comprehensive range of premium performance ultrasound systems with special emphasis this year focused on the recently introduced bk3000 with TriCore Architecture. This console uses technology from the sphere of PC gaming to generate images using MultiChannel Synthesis; this fuses information at every depth and position to dramatically reduce noise and artefacts while increasing detail and contrast resolution.

The increased power of the Graphic Processing Unit has allowed BK Medical to build many more crystals into the new transducers further enhancing the uplift in image quality. We will be showing the new selection of probes for Interventional Radiology alongside our range of innovative transducers for various medical specialties.

Stand No. 22 – BRACCO

Bracco UK Limited is the UK subsidiary of Bracco Imaging Spa, a multinational group active in the healthcare sector with a total of 2,800 employees operating in more than 80 countries around the world. Over the years Bracco has intensified its commitment to innovative specialised research in imaging agents for diagnostic medicine alongside the further development of medical devices and advanced injection systems for radiology and cardiology.

Bracco’s business success is based on research and innovation, international growth and corporate social responsibility.

For more information please visit www.bracco.com.

Foyer - BMUS

Come and visit the BMUS team in the foyer, join in the conference quiz, and find out about our plans for BMUS, including the new website.

It is your chance to have your say on the future of the society and make suggestions for future workshops.

Stand No. 26 – CAE HEALTHCARE

CAE Healthcare delivers leading-edge simulation training solutions to hospitals, physicians, nurses, students, emergency responders and the military around the world. Each product is developed in partnership with clinicians and clinical educators whose aim is to ensure physiological accuracy and educational relevance. Visit the CAE Healthcare booth to learn about our advanced imaging simulator, VIMEDIX and our range of Blue Phantom trainers.
**Stand No. 11 – CASMED INTERNATIONAL**

For over 30 years Casmed has supplied high quality products for use in all aspects of ultrasound including needle guides and cyst aspiration needles. We offer one of the industry’s most complete selections of high quality disposable latex and latex-free probe covers for all makes of ultrasound probes together with balloons for endoscopy ultrasound in both latex and non-latex.

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Diagnostic Healthcare Limited is an established national Ultrasound service provider with over 15 years of experience tailoring to the individual sonographers and service demands.

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With an ever expanding and evolving presence in the market we can boast a flexible, stable and attractive approach to work including; contracted, temporary, locum arrangements, and attractive benefits with an option to join a reputable pension scheme. Diagnostic Healthcare offers practitioners a supportive and diverse working environment with a variety of skill mix.

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Visit www.dhc.uk.com

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EasyPay Network provides modern touch screen payment machines to hospitals throughout the UK.

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Our machines ensure a fast and safe payment process for patients whilst providing transparency for finance departments.

Our touch screen payment machines are state of the art and accept credit & debit cards, notes and coins. We provide onsite service and support as well as ‘real-time’ online monitoring of software, all as part of our service.

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**Foyer - EFSUMB**

Euroson 2015, 27th Congress of the European Federation of Societies for Ultrasound in Medicine and Biology (EFSUMB), will take place in Athens from 6 – 8 November 2015.

Please visit www.efsumb.org/eurosoncon/euroson-congress.asp for more information.

Visit www.efsumb.org
Stand No. 6 – ESAOTE

The Esaote Group is a leading player in the biomedical equipment sector, with a particular focus on ultrasound, dedicated magnetic resonance, and software for managing the diagnostic process. Esaote has over 1,335 employees, 19% of which are employed in R&D activities and it has industrial and research and development units in Italy (Genoa, Florence, Naples), the Netherlands (Maastricht) and China (Shenzhen). Esaote is internationally recognised as one of the “Top Ten” diagnostic imaging companies in the world and enjoys the co-operation of worldwide scientific and clinical research centres and universities. Within the UK Esaote has a team of people dedicated to providing the highest levels of service and support to all its customers.

Visit www.esaote.com

Stand No. 5– GE HEALTHCARE

GE Healthcare’s expertise in medical imaging and information technologies, medical diagnostics, patient monitoring systems, performance improvement, drug discovery, and biopharmaceutical manufacturing technologies is helping clinicians around the world re-imagine new ways to predict, diagnose, inform and treat disease, so their patients can live their lives to the fullest.

At BMUS 2014 we are showcasing four new products which will make a difference to the way you work. They are the new LOGIQ* S7, the latest development of this popular system, the much-awaited Voluson* E10, Shear Wave elastography capability for the LOGIQ E9 and the point of care Venue* 50.

Visit www3.gehealthcare.co.uk

* Trademarks of General Electric Company

Stand No. 21 – GLOBE LOCUMS

Since our formation in 2011, Globe Locums has become one of the preeminent specialist Sonography recruitment firms in the UK. Our Global reach encompasses UK, Ireland, Australia, New Zealand & Asia Pacific, allowing Globe Locums to source both locum and permanent Sonographers of the highest calibre. Globe Locums is clinician owned and run allowing our ethical focus to grow with our company, making us unique in a very bust marketplace. We are always available on rad@globelocums.co.uk and 0207 229 2620 for an informal chat.

Visit www.globelocums.co.uk

Stand No. 24 - HEALTH MATCH BC

Health Match BC is a free health professions recruitment service funded by the Government of British Columbia, Canada. Since 1999, we have assisted hundreds of health professionals in securing employment and relocating to BC.

Working with the seven (7) Health Authorities around the province, our experienced consultants match qualified health professionals to opportunities that suit their career and lifestyle interests. We ease the transition process by providing in-depth community information and advice in all aspects of licensing and immigration. If you are a Sonographer seeking employment in the province come visit our booth or checkout our website at www.healthmatchbc.org

Visit www.healthmatchbc.org
Stand No. 1 – HITACHI ALOKA MEDICAL SYSTEMS
Ultrasound Solutions Clearly Defined™

For over 60 years, Hitachi Aloka has led the medical industry by pioneering ultrasound systems that have advanced the standard of real time imaging. The new brand ‘ARIETTA’ has been borne out of the experience cultivated from the past and channelled into one force to create the latest generation of ultrasound platforms.

Join us on Stand 1 for Sake and Sushi and a demonstration of our symphonic Hitachi Aloka technologies: from wave generation to image display, harmonizing performance in the creation of high quality ‘sound’ with unprecedented orchestration on Tuesday 9th December at 15.30.

Visit www.hitachi-medical-systems.co.uk

Stand No. 27 – ID MEDICAL

ID Medical’s specialist AHP/HSS recruitment division covers the full range of healthcare specialties from Arts Therapy to Physiotherapy and Occupational Therapy. With ongoing contracts with over 90% of NHS Trusts nationwide, ID Medical can offer you rewarding opportunities in the locations and hospitals of your choice. Visit us at Stand 27 to meet our team and to register for the latest opportunities.

Visit www.id-medical.com

Stand No. 10 – IMAGING FIRST LTD: ZONARE

At Imaging First our aim is to bring innovative medical imaging technologies into the UK and encourage their adoption into best practice by providing expert knowledge, training and service support.

Evaluated independently in the USA the Zonare systems is two generations advanced of the current standard. Introduction by Zonare of the ZS3 platform and now the new Z.one Pro marks a crossing point, where its patented Zone Sonography technology delivers the ability to provide images with superior resolution, penetration and contrast. Zonare: Living Technology.

Visit www.imagingfirst.co.uk/products/zonare

Visit www.firstimaging.co.uk

Stand No. 13 – IMAGING FIRST LTD: ALPINION STAND

For the first time at BMUS 2014, Imaging First Ltd is proud to introduce to the UK market the Alpinion range of ultrasound systems. With outstanding quality and refined acoustics, ALPINION’s unique and flexible imaging platform, FleXcan™ architecture enhances system stability and helps to maintain system performance to the latest software versions. The reliable imaging platform guarantees uniform image quality.

Visit www.firstimaging.co.uk
Stand No. 30 – INHEALTH

InHealth is a leading independent healthcare provider, delivering an innovative range of diagnostic services to patients, offering 21 modalities across 350 static and mobile units and reaching 750,000 patients each year. In 2014, InHealth have been awarded Prime Diagnostics Provider of the Year by Health Investor and Best Primary Care Provider by Laing and Buisson.

Stand No. 20 – LAERDAL MEDICAL

Laerdal Medical, a leading provider of simulation solutions for healthcare, and SonoSim, Inc., a leading provider of ultrasound education and training, recently announced a wide-ranging agreement regarding distribution, product development and R&D collaboration. This partnership with SonoSim will provide learners with the very best learning environment for an integrated patient simulation experience, combined with the very best ultrasound learning content. The increasing adoption of ultrasound will save lives, reduce costs, and improve patient outcomes. The combined efforts of Laerdal and SonoSim will have a major impact worldwide. The SonoSim Edition solution can be viewed at stand 20 or please contact Kieran.feeney@laerdal.co.uk for more information.

Stand No. 8– MEDAPHOR

MedaPhor is a global ultrasound training company, selling the award winning ScanTrainer ultrasound training simulator. The virtual reality simulator combines ‘real-feel’ haptic simulation with real patient scans and curriculum-based interactive learning, to provide fast and effective 24/7 ultrasound training in a non-clinical environment.

ScanTrainer’s unique ScanTutor learning software provides a personalized education environment that minimizes both the time required by an expert to teach and the need for a variety of patients to learn on. This makes the ScanTrainer system both resource efficient and highly cost effective.

ScanTrainer comes with integrated core skills training modules and a wide range of advanced skills pathology modules and diagnostic case studies for the more experienced practitioner.

Stand No. 17 – MIS HEALTHCARE

MIS Healthcare and Samsung will be exhibiting the complete line up of Samsung Ultrasound products at BMUS 2014. Our focus is on providing complete healthcare solutions to the NHS, Private Hospital groups and screening programmes and supporting those solutions with gold standard after sales service. Our range includes high end portable units to state of the art premium systems boasting advanced technologies, accurate imaging and comfortable ergonomic design. Visit us on Stand 17 to see some of our exciting technology such as Elastoscan, 5D, S detect for breast, clear track and 5D stereo cine.
**Stand No. 18 – MULTI-MEDIX**

INDEPENDENT ULTRASOUND SPECIALISTS

Multi-Medix are independent diagnostic imaging ultrasound specialists, offering a comprehensive range of services, designed to meet today’s quality and affordability needs.

Services include Probe Test and Validation, Quality Assurance, Test Equipment, Repair, and access to our Loan Probe Pool.

Test & Validation utilises latest generation technology, including Aureon™, from the team that developed First Call™.

New for 2014 – Active-Z™, a new approach to testing probes, using a handheld device designed for medical engineers, measuring complex impedance of the circuit and pins, offering affordable probe testing ability under your control.

Find us on Stand 18.

Visit www.multi-medix.com

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**Stand No. 29 – PFE MEDICAL**

Probe Decontamination Specialists

As sole UK distributor, PFE Medical will be showcasing the Antigermix range. Using UV light, this range can fully disinfect the entirety of a TOE probe in a maximum of 200 seconds! This has been proven by microbiological tests carried out by University Hospital Birmingham in clean and dirty conditions.

Come and see our Product Specialists on Stand 29.

Tel: +44 (0) 172 564164

PFE Medical, Hartley House, Galveston Grove
Fenton, Stoke-on-Trent, ST4 3PE

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**Stand No. 4 – PHILIPS HEALTHCARE**

Philips is delighted to share with you our all new and exciting ultrasound for your every day. The Affiniti system addresses your need to scan quickly and deliver results efficiently. It incorporates innovations that make Philips ultrasound the choice of those who demand quality images and proven clinical applications. This year, we are also excited to be showcasing our premium solution EPIQ, offering you uncompromised levels of clinical performance so you can make definitive diagnoses even for your most difficult cases. Come and visit us on our stand and see first-hand what both systems have to offer.

Visit www.healthcare.philips.com
Stand No. 23 – PHYSIOLOGICAL MEASUREMENTS LTD

Physiological Measurements Ltd are Providers of non-invasive diagnostic tests throughout the UK, delivering NOUS, MSK, and Cardiology services from GP surgeries, health centres and community hospitals. Our community ultrasound services are aligned to our successful integrated pathway, providing patients with high quality investigations close to home supported by Consultant Radiologists. Our Consultants have special interests, which include Musculoskeletal, Gynaecological, and Vascular Ultrasound. PML are always looking to recruit healthcare professionals to join our teams across the country. For information regarding career opportunities, and information on our products and services, please visit stand 23.

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Stand No. 16 – SANCTUARY ALLIED HEALTH

Sanctuary Allied Health is a part of Sanctuary Health, a specialist recruitment consultancy offering a recruitment service as a preferred supplier to the NHS on the Crown Commercial Service (CCS). Our expert imaging team deals exclusively with locum jobs for radiographers, mammographers, sonographers, radiologists and nuclear medicine technicians. Specialisations include ultrasound, CT scanning, cath lab and angiography. With our strong client partnerships and broad talent pool, we are uniquely placed to recruit for a wide range of positions across the UK, from roles for diagnostic and therapeutic radiographers to radiography assistants and imaging support workers.

Visit www.sanctuaryalliedhealth.com

Visit www.physiologicalmeasurements.com

Visit www.righealthcare.co.uk

Visit www.sagepub.co.uk
**Stand No. 2 – SIEMENS HEALTHCARE**

Siemens Healthcare is one of the world’s largest suppliers to the healthcare industry and a trendsetter in medical imaging, laboratory diagnostics, medical information technology and hearing aids. Siemens offers its customers products and solutions for the entire range of patient care from a single source – from prevention and early detection to diagnosis, and on to treatment and aftercare. By optimising clinical workflows for the most common diseases, Siemens also makes healthcare faster, better and more cost-effective. For further information please visit: www.siemens.co.uk/healthcare.

**Stand No. 19 – THE COLLEGE OF RADIOGRAPHERS**

The College of Radiographers is committed to developing and promoting the science and practice of medical imaging and radiation therapy. We put the unified voice of sonographers in the UK to good effect in developing and promoting policy on current and emerging educational, professional and workforce issues related to sonography.

A major feature of our educational work recently has been the development of e-LfH learning units for obstetric and non-obstetric ultrasound – come and see these excellent resources on our stand.

We welcome visitors to our stand where representatives will be on hand to discuss a wide range of topics, including regulation, workforce shortages and development, work-related injuries, continuing professional development, etc. So, please visit us – members and non-members are all very welcome.

**Stands No. 3 – TOSHIBA MEDICAL SYSTEMS LTD**

Toshiba is a manufacturer of World Class medical ultrasound equipment and is market leader for cart-based systems in the UK. Toshiba ultrasound is renowned for leading innovation, unprecedented diagnostic performance, superb reliability and unrivalled support from the most experienced applications specialist team in the business. The very latest clinical innovations will be showcased on the new Aplio and Xario range of ultrasound systems [http://www.myaplio.com](http://www.myaplio.com) The Trophon EPR, a completely traceable high-level probe decontamination device, will be demonstrated. The Toshiba Imaging Academy offers a range of ‘hands-on’ CPD accredited ultrasound courses facilitated by leading UK ultrasound clinical experts [http://www.toshiba-medical.co.uk/diagnostic_medical_imaging_events.asp](http://www.toshiba-medical.co.uk/diagnostic_medical_imaging_events.asp)

**Stand No. 28 – TRISTEL**

Tristel is a global manufacturer of unique Infection Control solutions. Our lead technology is a proprietary Chlorine dioxide formulation used to disinfect instruments and surfaces in private and public hospitals. Tristel products are considered to be amongst the highest performing biocides available to hospitals and industry, destroying all organisms, including spores, in short exposure times. They are renowned for their safety, rapid action and high-level of efficacy.

Please visit stand 28 for more information about the Tristel Trio Wipes System and Stella.
Proceedings of the British Medical Ultrasound Society 46th Annual Scientific Meeting
9th – 11th December 2014,
The Point, Emirates Old Trafford,
Manchester, UK

DAY 1 – TUESDAY 9TH DECEMBER

**Abdominal 1 – Imaging and Management of Benign Liver lesions**

**Characterisation and follow up of incidentally detected liver lesions on USS**, JA Smith, Leeds and West Yorks Radiology Academy

**Characterisation and further assessment of incidentally detected liver lesions on CT / MRI**, J Cast, Hull and East Yorkshire Hospitals NHS Trust

**Learning objectives:**
1. Understand the role of multimodality imaging in the identification and characterisation of focal liver lesions.
2. Gain a basic insight into the different scanning parameters utilized in CT and MRI.
3. Identify the typical features of common focal liver lesions on CT and MRI and how these correlate with US and CEUS.
4. What test next?
5. When to biopsy.

**Hepatological management of benign liver lesions**, G Toogood, St James’s University Hospital, Leeds

**Xanthogranulomatous cholecystitis: CT and MRI appearance**, H, Khosa, U Salati, J Feeney, W Torreggeni, The Adelaide and Meath Hospital, Dublin, Ireland.

**Case Report:**
A 62 year old lady presented with a week history of vague abdominal pain associated with nausea and vomiting. No previous history of any surgical interventions or significant illness. At presentation patient had mild pyrexia of 39 degrees Celsius and mild upper abdominal tenderness. Although ultrasound is the first imaging modality for abdominal pain but in our case patient proceeded to CT of the abdomen, which was followed by MRI for further characterisation of the gall bladder abnormality. CT showed focal area of mural gall bladder wall thickening of 1cm with uniform enhancement. No evidence of acute cholecystitis. No calculi or intraluminal sludge. This was followed by MRI with T1, T2, and pre and post contrast images. The focal area of 1cm enhancing mural thickening along the right lateral fundal wall was again noted. Rest of the liver was normal. Radiological differential was either rokitankashkoff sinuse or focal gall bladder inflammation / tumour. Patient proceeded to open cholecystectomy as a fundul tumour was the consenses at MDM discussion. Pathology showed transmural inflammation, composed of foamy histiocytes admixed with acute and chronic inflammation. There were areas of fibrosis with lymphoid follicle formation. Most of the mucosa was ulcerated with no evidence of malignancy, however there were multiple stones in the inflamed purulent material distending the gall bladder wall. Features were in keeping with Xanthogranulomatous cholecystitis. There was no evidence of dysplasia or malignancy.

**Conclusion:**
Xanthogranulomatous cholecystitis is a rare inflammation and uncommon form of chronic cholecystitis, representing 0.7% and 13.2% of the gall bladder disease. Mainly affecting women between 60-70 years old. Radiologic diagnosis of Xanthogranulomatous cholecystitis is rare, and information on imaging is limited unless there are inflammatory changes
in the surrounding liver and mesentry, which were not present in our case. Diagnosis is mostly made on pathology as CT and MRI were equivocal. References: 1. Benbow EW, Taylor PM. Simultaneous xanthogranulomatous cholecystitis and primary adenocarcinoma of gallbladder. Histopathology1988;12: 672 -675 2. Ros PR, Goodman ZD. Xanthogranulomatous cholecystitis versus gallbladder carcinoma. Radiology1997;203: 10 -12

**Abdominal 2 – Imaging and Management of Haematuria**

**Audit of CT Urinary tract in patients referred from one stop haematuria clinic**, S Reham, OR Byass, Hull and East Yorkshire Hospitals NHS Trust

**Introduction:**
One stop haematuria clinic provides valuable service to patients with painless haematuria. Quite often patients with normal US and Cystoscopy are referred to CT Urinary tract.

**Method:**
We looked at the database of all patients who attended one stop haematuria clinic from Jan-April 2014 at Castle Hill Hospital. Patients who then referred for CT Urinary Tract have their findings noted and compared with US and cystoscopy results.

**Conclusion:**
Although not a huge number of patients had CT urinary tract there are still a good proportion of patients who had positive findings despite normal US or cystoscopy. Aim should be to develop guidance on how to proceed with haematuria presentation and to identify high risk patients who can directly proceed to have CT Urinary Tract instead of US to minimize delay in diagnosis.

**Can ultrasound replace cystoscopy in the assessment of haematuria?** R Turney, M Mossad, P Parker, K Chiu, Hull and East Yorkshire Hospitals NHS Trust

**Background:**
Haematuria is a common presentation and may be caused by a multitude of aetiologies ranging from UTI to urinary tract malignancy. Painless haematuria is often the sole presenting complaint in patients with bladder cancer and timely diagnosis is imperative in ensuring patients receive appropriate treatment. In recent year, one-stop clinic has been introduced to streamline the management of haematuria and meet government targets. The clinic involves clinic assessment, cystoscopy and ultrasonography of the renal tract. This study aims to assess the efficacy and accuracy of ultrasonography in the assessment of haematuria.

**Materials and Methods:**
Retrospective review of consecutive patients who attended the one-stop haematuria clinic between June and December 2012 in Hull and East Yorkshire Hospitals NHS Trust. Ultrasonographic and cystoscopy findings as well as final diagnoses were compared and analysed.

**Results:**
Within the 6 months period, 319 patients attended one-stop haematuria clinic. Malignancy was identified in 30 patients (9.4%), consisting of 24 transitional cell carcinomas (TCC), 3 renal cell carcinoma (RCC) and 3 prostatic carcinoma. Compared to cystoscopy, ultrasound was able to identified 12 cases (50%) of TCC and 2 cases of prostate cancer (66%). In additional, ultrasound also identified a further 42 bladder and 8 upper renal tract pathologies that can be attributed to the cause of patient’s haematuria. A further 10 extra-renal pathologies were also identified by ultrasound that warrant referral to other specialties.

**Conclusion:**
Despite improvement in imaging techniques and technology, ultrasonography remains suboptimal in the identifying bladder lesions, especially superficial bladder tumours. However, ultrasound was able to identify 21 cases (7%) of upper renal or extra-renal pathologies that would otherwise be missed. Our study shows that ultrasonography remains an essential part of one-stop haematuria clinic. Its role is to complement rather than compete with cystoscopy in the investigation of haematuria.

**Imaging for haematuria – what the surgeon needs to know**, M Simms, Hull and East Yorkshire Hospitals NHS Trust

**Ultrasound imaging – is this the best we can do?** J Pilcher, St George’s Hospital, London

**Radiofrequency ablation of renal cell carcinoma**, J Cast, Hull and East Yorkshire Hospitals NHS Trust
Learning objectives:
1. An overview of the demographics of renal cell carcinoma.
2. Understand the potential treatment options for the management of incidentally detected renal masses.
3. What is radiofrequency ablation and how does it work?
4. Procedure efficacy, complications and patient follow up.
5. What is the role of ultrasound?

Abdominal 3 – Diagnosis, Treatment and Follow up of Prostate Cancer

The use of multiparametric MRI in the diagnosis of prostate cancer, L Turnbull, University of Derby

The combination of a high field strength MRI system with a multi-element receiver coil for signal reception facilitates the diagnosis, staging, pre-surgical or pre-radiation planning and follow up for patients who have suspicious findings on PSA testing or biopsy. With the greater signal available at higher field strengths, MR imaging can delineate areas of abnormality for subsequent targeted biopsy, in men who have had standard sextant biopsies without conclusive findings. Random sextant biopsy fails to detect cancer in at least 50% of patients leading to delays in diagnosis with potential impact on prognosis and psychological sequelae. Multi-parametric MR imaging (mp-MRI) of the prostate is advocated in current guidelines to direct biopsy, thereby reducing the false negative biopsy rate.

Prostate cancer can be identified on T2 weighted imaging based on changes in signal intensity within the prostate. Whilst anatomic imaging is an excellent technique for assessing the spread of cancer outside the gland and can identify cancer with high sensitivity, specificity is relatively poor. As a result, it is important to obtain other functional imaging measurements to accurately identify areas of malignancy.

This talk will focus on the functional imaging techniques, in particular the use of diffusion weighted and dynamic contrast-enhanced MR imaging (DCE-MRI). Diffusion weighted imaging examines the random motion of water molecules in tissues, a phenomenon which is “restricted” in the presence of malignancy. The role of multiple b values in calculating the apparent diffusion coefficient (ADC); the use of very high b-values to improve contrast-to-noise; implementation of tailored sequence to minimise susceptibility artefact; and the correlation of ADC values with pathological grade will be discussed. DCE-MRI provides valuable information on the distribution of intravenously administered contrast agent and examines the changes in tissue microvasculature secondary to tumour angiogenesis. The role of empirical determination of contrast uptake versus pharmacokinetic modeling of source data will be discussed together with the overlap in parameters between benign and malignant pathologies. The MR protocol advocated in national and international guidelines will be presented.

The diagnostic accuracy of multi-parametric MR imaging (mp-MRI) for lesion detection, staging and surveillance will be discussed, together with the implementation of these results for fused MR-TRUS image–guided biopsy. The results of targeted biopsy of MR-detected abnormalities, the potential for a targeted only biopsy strategy, together with the current limitations of the technique will be discussed.

In pursuit of the holy grail in ultrasound guided prostate biopsy, J Richenberg, Royal Sussex County Hospital, Brighton

There has been a steady rise in the number of prostate biopsies in the UK, close to 20,000 men in 2011 if transperineal biopsies are included. Ultrasound has been the dominant – almost exclusive – modality to guide the biopsy needle, despite the widely acknowledged limitations of ultrasound in focal lesion detection and evaluation. Standard TRUS is barely better than 50% accurate in detecting focal prostate cancer, with a correspondingly poor positive predictive value of 6%. Furthermore, 30-40% of cancers are isoechoic and a small percentage are echogenic. In clinical terms this equates to (1) over diagnosis of unimportant cancers (2) missing significant disease.

Several techniques have been tried to improve conspicuity of significant cancers including Colour and Power Doppler, Contrast enhanced ultrasound and elastography. Simultaneously, there has been a trend to extended biopsy regimens under image guidance (saturation biopsies)

Recently, MRI using combined anatomical and functional information to detect and ‘grade’ prostate lesions has shown great promise as a pre biopsy tool. There are three strategies for using the MRI map during biopsy: cognitive, MR guided, and formal fusion.

The presentation will review the science and practicalities behind MRI influenced US guided prostate biopsy and then consider adoption of a new approach to ultrasound guided biopsy of focal lesions rather than the current practice of whole gland sampling.
The management of prostate cancer, M Simms, Hull and East Yorkshire Hospitals NHS Trust

Sonographer-led out-patients transrectal ultrasound (TRUS)-guided prostate biopsy service – experience of a tertiary centre, A Hunter, K Khan, A Alfahad, PC Parker, KWH Chiu, Hull and East Yorkshire Hospitals NHS Trust

Background:
Prostate cancer is the most common cancer in men, accounting for over a quarter of all male cancers in the UK. Despite advances in imaging techniques, histology remains the gold standard for diagnosis and TRUS-guided prostate biopsy is the most widely used method of histological sampling. With increasing incidence of prostate cancer in the UK, innovative ways have to be introduced to tackle the rising demands and meeting government targets and waiting time. One such initiative is to employ sonographers to carry out TRUS-guided prostate biopsies. This audit aims to look at the effectiveness and safety of an out-patients sonographer-led service.

Materials and Method:
A retrospective analysis of all out-patients TRUS-guided biopsy performed in our hospital by sonographers between January and December 2013. Patient demographics, complications, grading, radiological and histological correlation were recorded. Results: A total of 589 patients underwent 607 TRUS-guided biopsies (median age 67 years, range 38-91 years, median PSA 7.3, range 0.4-1600). Prostate cancers were confirmed in 347 (57%) biopsies and 14 biopsies (2%) had features suspicious of prostate cancer. A further 102 (17%) were found to have prostatic intraepithelial neoplasia (PIN), 8 (1%) had prostatitis and 134 (22%) were normal. 18 patients had repeat biopsies due to clinical suspicion (excluding follow-up biopsies). Of those, there were 3 discrepancies (17%) with the original diagnoses. There were 28 (4.7%) documented procedure-related complications with 8 cases of urosepsis (1%), the most common cause for delay for patient admission. There were no procedure-related mortality. 48 patients underwent prostatectomy and there were discrepancies in Gleason grading in 12 patients (25%) with 9 over-graded and 3 under-graded.

Conclusion:
Our experience has shown that a sonographer-led out-patients TRUS-guided prostate biopsy service is effective and safe. This service has not only empowered sonographers to expand their clinical practice, but also released medical staff such as radiologists and urologists to spend more time performing more complex tasks.

Early experience of Multiparametric MRI (mMRI) and Transrectal Ultrasound Fusion (TRUSF) guided prostate biopsy, OR Byass, PC Parker, Hull and East Yorkshire Hospitals NHS Trust

Multiparametric MRI, a combination of high resolution T2-weighted (T2W) morphological sequences and the multiparametric techniques of diffusion-weighted MRI (DWI), dynamic contrast-enhanced MRI (DCE-MRI), and MR spectroscopy (MRS), has become an increasingly common adjunct in the detection of prostate cancer. Currently it is mainly used in patients with prior negative Trans Rectal Ultrasound Biopsy (TRUS) and/or abnormal or increasing PSA levels. TRUS is well established in the diagnostic pathway of prostate cancer but the use of mMRI is identifying potentially clinically significant cancer in the prostate that cannot be identified for biopsy on conventional USS. These patients are currently undergoing either a repeat routine TRUS, a cognitive TRUS (with the operator guided by the mMRI information), a saturation biopsy or a transperineal template biopsy. We present our early experience of Transrectal Ultrasound Fusion (TRUSF) guided Prostate biopsy in these complex cases.

Professional Issues 1 – Is the AQP contract a viable solution to meeting increasing demands?

Commissioning Imaging services in the modern NHS landscape. The role of the CCG, D Roper, Chair, Hull Clinical Commissioning Group

Introduction:
The overall aim is to provide GPs the opportunity to directly refer to diagnostic services therefore providing patients with a choice of services that improve their experience of assessment, diagnosis and treatment based on personal, seamless, convenient, safe and reliable clinical services.

Background:
Recent guidance issued by the RCR (May 2013), states that GPs should be able to refer patients for diagnostic checks, urgent or routine; within a week, and that most test results should be available within one working day. It also calls for a rethink on the location of diagnostic imaging tools, with more moving into community settings and large practices where appropriate. Allowing the GP to bypass this gatekeeper and gain ‘direct access’ to tests can enable GPs to make more efficient use of hospital resources and reduce waiting times for patients.
Case for change:
The development of a Hull CCG ‘Access to Diagnostics’ service specification outlining which modalities were available for direct access has been implemented in September 2014.

The overarching aims of this specification are to ensure that patients receive the right test at the right time in the most clinically appropriate setting and that pathways of care are integrated to allow referring clinician’s appropriate access according to clinical need. The benefit of having this specification is that GPs can refer patients for urgent or routine diagnostic checks with the results being available in a timely manner, therefore patients may not require a secondary care referral for a diagnostic test alone.

To further support this piece of work referral pathways for each modality – X-Ray, Ultrasound, CT Scans and MRI are being reviewed to look at high volume usage and anticipate which services can be targeted first to obtain maximum impact and improved patient service and outcomes.

Pre-hospital ultrasound: real-time communication technology to facilitate expert-guided support for remote and rural communities, L Eadie1, A Mort1, L Regan2, A Macaden2, P Wilson1 1Centre for Rural Health, University of Aberdeen, Inverness, 2Raigmore Hospital, NHS Highland, Inverness

Background:
The Satellite Ultrasound for Rural Stroke project aims to facilitate prehospital diagnosis and treatment for remote and rural patients using remotely supported ultrasound (US) and a novel communications device. The ‘Omni-Hub’ technology connects to multiple 2G/3G/4G networks and/or satellites to stream live US and video images, plus two-way audio, to hospital-based specialists who can guide and advise remote clinicians regarding diagnosis and treatment options. The system is initially being tested offering support for Focused Assessment with Sonography in Trauma (FAST) and transcranial scanning to detect midline ventricle shift for stroke.

Method:
An ambulance-based demonstrator system was used to capture thoracic and head US images from 10 healthy volunteers at 16 locations across the Scottish Highlands. Volunteers were trained to perform the scans, with expert guidance via the communications link. The US images were streamed, with a video feed of the simulated patient and two-way voice data, via the Omni-Hub to reviewers at the Centre for Health Science, Inverness, for diagnosis. Two sessions were transmitted via satellite and 21 used mobile phone networks. Reviewers rated the image and communication quality, and how helpful it was in reaching a diagnosis. Details of transmission latency and bandwidth were recorded.

Results:
We were able to connect with the remote reviewers, transmitting live US and audio-visual feeds from 15 of the 16 sites trialed; the single failure being due to poor network coverage. Communication was considered adequate for remote diagnosis in >90% of cases, and >95% of US scans delivered the required views. The mean upload rate was 835 kbps and mean latency was 114 ms using mobile phone networks.

Conclusions:
This prehospital remote-support US system could facilitate early diagnosis and treatment for emergency patients. It is particularly relevant to rural areas worldwide where transport times are lengthy and communications infrastructure is often poor.

The business of Sonography – The experience of an independent service provider, M Steward, Ultrasound Direct

With increasing numbers of fragmented, independent ultrasound providers driven by the NHS AQP process and the boundaries between public and privately funded scans becoming blurred, this talk gives an overview of what owner-managers should consider when running community based, first-line ultrasound services.

Looking at topics such as business models and personal goals, the need for constant innovation, technologies enabling mobile community services and maintaining standards across a wide area, this presentation is based on first hand experience gained from delivering ¼ million scans for both private and publicly funded patients to date.

The impact of AQP on NHS ultrasound services. The pros and cons of managing a NHS provider service, A McGuinness, Mid Yorks Hospitals NHS Trust
Professional Issues 2 – Is education meeting clinical service needs?

**Delivering service change via the Education Commissioning Process**, K Moore, Health Education Yorkshire and Humber

In today’s health service the education commissioning process must not be about just counting the number of newly qualified professionals required in a given service and negotiating these requirements into a contract with a named university.

The service of today must be redesigned around the needs of patients. For some professions this will mean advancing their clinical practice or skill sharing with other professionals or handing appropriate tasks over to junior members of the team. Transformational Education commissioning has a vital role to play in driving these changes, capturing service needs and ensuring the sustainability of new models of delivery. Kevin will describe how Health Education Yorkshire and Humber is using the Calderdale Framework to review skills, role and service design, focusing on safe, effective and productive patient centred care.

**Education requirements of a clinical department**, G Johnson, Tameside Hospital NHS Foundation Trust, Manchester

**An investigation into the role of simulation for the acquisition of clinical skills within postgraduate ultrasound education**, VJ Gibbs, University of the West of England

Simulation is recognised as an innovative pedagogic approach that is gaining popularity in many areas of education. Its capacity to offer learners exposure to real-life scenarios in a safe environment, enables learners to practise skills whilst receiving feedback from a facilitator. Experiential learning, where students are actively engaged in the learning process, is generally recognised as offering the most effective learning environment. However, busy clinical ultrasound departments often struggle to allow students sufficient supervised clinical practice time. Patients are often reluctant to tolerate inexperienced operators and the associated extended examination times, particularly where this may involve uncomfortable or invasive procedures. Ultrasound simulation equipment has evolved over recent years due to technological developments, and now offers the student a realistic clinical learning experience. Research into the effectiveness of simulation in achieving clinical learning objectives and competence is, however, currently limited. In order to explore both students’ and clinical supervisors’ experiences of interacting with an ultrasound simulator, an investigation was undertaken at a HEI in 2014. A qualitative design was used for this study, employing semi-structured interviews. Data were analysed using thematic analysis. Several themes emerged relating to positive/negative aspects of working with the simulator and the transference of this experience into the clinical environment. The theory-practice gap is a recurring narrative in healthcare literature, and the findings from this study demonstrate the opportunities that ultrasound simulators can offer in the education environment.

**Responding to commissioning requirements and meeting educational standards. An impossible task or an enjoyable ask?** J Wilson, University of Leeds

Professional Issues 3 – Is education meeting clinical service needs?

**CASE – Accreditation of ultrasound education and it’s role in driving change**, G Dolbear, Canterbury Christ Church University

**Securing the future of the Sonography workforce in the East Midlands 2013/14**, A Allen, Kingsmill NHS Trust, Notts

Early in 2013, there became increasing awareness relating to the recruitment and retention of the sonography workforce across the East Midlands region and the potential impact on quality of care received by the population. The same issue is replicated nationally, stated within the Centre for Workforce Intelligence reports and on the UK National Shortage Occupation List.

Commissioners are increasingly required to outsource sonography services and hospital trusts are reliant on agency staff to provide a responsive timely service. Would this lead to potential quality risks in terms of individual sonographer qualification, experience, skills and competence?
Our project began in April 2013, with project outcomes to be delivered through collaboration and working in partnership with key stakeholders including

- East Midlands Sonography Expert Reference Group
- Provider organisations
- University providers
- East Midlands LETB, LETC and County Workforce Teams
- Professional bodies

The scope of the project was to support a solution focused approach to securing the sonography workforce supply in the immediate and longer term. Five key objectives were identified:

1. Outlining the sonography workforce issues across the East Midlands region
2. Undertaking an exploration of alternative career structures/delivery model for sonography service provision.
3. Exploring alternative training models to produce a competent sonographer and identifying recommendations for future education commissioning.
4. Identify potential solutions to clinical placements and mentorship challenges and explore the benefits of having a consistent East Midlands wide approach.
5. Coordinating an East Midlands network to support the development of the recommendations and subsequent implementation.

An East Midlands Sonography Workforce Expert Reference Group was set up to oversee the project and also an Education Sub Group was established to explore the immediate clinical placement shortfall and workforce pressures.

This presentation will provide further background to the project; the challenges faced, potential solutions identified, and give an update on the implementation of its findings. To ensure the future sustainability of the Sonography workforce to meet the needs of patients, the network will require a wider audience and champions from outside the profession.

**Should HEIs and professional bodies support practitioners taking on additional clinical roles?**

H Edwards, East and North Hertfordshire NHS Trust

This presentation will discuss the role of higher education institutions (HEIs) and professional bodies when practitioners take on new clinical roles having already gained a recognised qualification in ultrasound. Should there be an accredited short course available for every clinical area or is in-house training enough? Who determines the practitioner's competence in these situations? Should professional bodies like the Society of Radiographers support ultrasound practitioners in the absence of formal qualifications? Arguments from different angles will be presented and tips for good practice offered.

**How professional bodies can support educational needs and change**, N Thomson, Society and College of Radiographers

As a professional body with a large number of sonographer members the College of Radiographers is closely involved with supporting ultrasound educational needs and change and the many and varied influences on these. The work of the College includes the preparation and publication of professional documents, membership of CASE, organising study days and administering the Public Voluntary Register of Sonographers. The College of Radiographers also has strong links with outside agencies and organisations that can influence sonographer education and change. These include organisations such as the Department of Health, Health Education England, the Centre for Workforce Intelligence, Migrations Advisory Committee, the medical Royal Colleges and the National Screening Committee. This presentation will give an overview of the work of the College of Radiographers as it relates to ultrasound education and change.

**Physics 1 – Safety Issues / QA**

**Ultrasound therapy for pain palliation in bone metastases**, G ter Haar, The Institute of Cancer Research: Royal Marsden Hospital, Sutton

High intensity focused ultrasound (HIFU) is gradually finding its role in the clinic. The most frequent applications are still in prostate cancer, and uterine fibroids, but the range of conditions for which HIFU is being used is broadening.

Initially, any procedure that would involve the significant exposure of bone was contra-indicated, but this is no longer the case. HIFU for neurological disorders is gaining a lot of attention, with the trans-cranial treatment of essential tremor and Parkinson dyskinesia in particular, showing a lot of promise.
A HIFU Centre of Excellence has recently been established at the Institute of Cancer Research. This is a joint venture between the Focused Ultrasound Foundation, Philips and The ICR. The Royal Marsden Hospital has taken delivery of the magnetic resonance guided HIFU Sonalleve system. The first clinical trial being undertaken is for the palliation of pain from bone metastases. The promising preliminary results of this trial will be discussed.

Ultrasound safety of modern systems and techniques, A Shaw, National Physical Laboratory, Teddington, Middlesex

Magnetically targeted microbubbles for ultrasound imaging and therapy, E Stride¹, J Owen¹, P Rademeyer¹, D Chung⁰, Q Chen¹, D Holroyd¹, C Coussios¹, P Friend¹, QA Pankhurst², ¹University of Oxford, ²Healthcare Biomagnetics Laboratory, University College London

The localisation of microbubbles to a target site has been shown to be essential to their effectiveness in therapeutic applications such as targeted drug delivery and gene therapy. A variety of different strategies for achieving localisation have been investigated, including antibody and other forms of biochemical targeting, acoustic radiation force and the incorporation of super paramagnetic nanoparticles into the microbubble coating to enable them to be manipulated using an externally applied magnetic field. The last of these strategies has the advantage of concentrating microbubbles at a target site without exposing them to ultrasound which may lead to their degradation and can be used in conjunction with biochemical targeting methods to achieve greater specificity.

Magnetic microbubbles have been shown to be effective in therapeutic delivery both in vitro and in vivo in a mouse model. Whether this technique can be successfully applied in humans, however, remains an open question given the much greater tissue depths and consequently magnetic field strengths and gradients at which microbubbles must be retained. The aim of this study was to determine the range of vessel diameters, flow rates and consequently shear rates under which retention could be achieved with clinically relevant magnetic field parameters.

An ultrasound imaging phantom was designed and bubble retention tested for a range of flow rates, vessel diameters and magnetic field strengths and gradients. The results indicate that magnetic microbubbles can be retained using clinically feasible magnetic fields at shear rates -10000/s and flow rates ~200 ml/min (corresponding to conditions in the capillaries, arterioles and small-medium arteries respectively). Successful retention was also demonstrated in a perfused porcine liver model simulating conditions in vivo. This study provides further evidence for the potential of magnetic microbubbles for targeted therapeutic delivery.

Development of ultrasound equipment governance at Guy’s and St Thomas NHS Foundation Trust, F Fedele, Guy’s and St Thomas NHS Foundation Trust, London

Background:
These days ultrasound [US] imaging is at the core of clinical investigations in many specialties [1-2]. At Guy’s and St Thomas NHS Foundation Trust (GSFT) there are currently about 200 US imaging systems used daily on thousands of patients. The quality and safety of diagnosis relies on the expertise of the sonographers, but also the performance of the equipment [3]. Quality Control (QC) programs can be used to monitor equipment performance, in order to detect promptly issues that can affect clinical diagnosis [4]. This paper reports how QC information has been shared at GSFT within a network involving users, equipment managers, Medical Physics and Procurement to develop an equipment governance protocol.

Case Report:
This initiative targeted four key stages in the life of US equipment:-

a. Acquisition
b. Routine Quality Assurance
c. Maintenance
d. Disposal

A governance protocol for each stage was developed using a Plan-Do-Study-Act (PDSA) approach, which has been used successfully before in healthcare [5]. PDSA consist in implementing an initiative on a small scale and reviewing the process as it is delivered; before extending it to a larger scale [5]. The initiative was the joint effort of stakeholders: including different units within the medical physics department, the hospital procurement department and the manufacturer. It was coordinated by the principal US QC advisor a medical physicist. A review is still in progress; but clinical users have appreciated reduction in clinics down-time and maintenance savings (~10% of asset value), whilst non-clinical departments have welcomed the improvement in operational efficiency.
Discussion:
This initiative involved only 20% of the ultrasound equipment and was focused on equipment from just one manufacture.

References:

Physics 2 – Doppler principles
Recent developments in vascular ultrasound physics and technology, PR Hoskins, University of Edinburgh

A typical vascular ultrasound examination will involve B-mode and colour flow imaging along with spectral Doppler examination of the time-velocity flow waveform. This talk will describe recent developments in the technology and in measurements related to vascular ultrasound. This will be a mix of developments available commercially and developments currently being explored in research labs. Commercial developments will include 3D ultrasound including automated plaque volume measurement, vector Doppler and vector flow imaging, elastography of the vascular wall, wall motion measurement, pressure measurement from Doppler and miniature vascular ultrasound systems. Methods in development which will be described include pulse-wave imaging and patient specific modelling.

Recent technological developments of cardiac ultrasound, J Reiken, King’s College Hospital, London

The application of ASQ in the diagnosis of pelvic masses (preliminary study), RH ALDahlawi1,2, N Pugh1, L Nokes1 'Cardiff University, Medical Physics, Cardiff, 2King Saud University, Riyadh, Saudi Arabia

Background:
Acoustic Structure Quantification (ASQ) is a new technique using special software designed by Toshiba Corporation that analyses the statistical information of the received echo signal by looking at the speckle pattern from specified region of interest (ROI). Purpose: ASQ was designed initially to assess liver diseases and studies have shown that it is beneficial therefore, the aim of this study is to test ASQ applicability in the diagnosis of pelvic masses.

Methods:
A set of experiments were performed on a standard test object to determine the applicability of ASQ in a small ROI. Following this, the new pre-defined parameters were tested on pelvic organs. Results: Using the chosen pre-defined parameters, it was possible to draw a small ROI which did not differ significantly from the large ROI (P = .143). This ROI was then applied to a range of pelvic organs/pathologies. The results will be discussed.

Conclusion:
The experiments proved that the new chosen set of parameters are useful on in-homogeneous tissue and not only applicable on phantom. And variation in the ASQ values were shown in different tissue types.

Development of a non-invasive B-mode motion tracking platform for the assessment of carotid wall dynamics, WJ Hopkins1, E Murghettis2, O Long1 'Brunel Institute of Bioengineering, Brunel University, West London, 2 Universita degli Studi Ferrara, Ferrar, Italy

It was the aim of this study to development a non-invasive, B-mode motion tracking framework, dedicated to be utilized during the routine clinical scan. Methodology: A multi algorithm block matching scheme was developed, based on Matlab®. To validate the reliability of the tracking algorithm, a designed ex-vivo experiment was performed using a mechanical arm, step motor and endarterectomy specimens. This was followed by a preliminary in-vivo assessment. We focused on the factors that could influence the accuracy of the tracking such as; the image quality, the kernel size, the ROI size, the frame rate and the number of points chosen to fix the tracked region. Results: Experiments demonstrated that only the Normalized Cross-Correlation, with its three different applications (Nccpc, Nccac and Pmt) and the Maximum Likelihood Estimation Motion were suitable for B-mode tracking. It was also shown that, in general, pre-processing doesn’t improve the accuracy of the algorithms, even if the signal to noise ratio is increased and that image quality of the ROI has little effect on the results. The main influence, which was displayed in the in-vivo evaluation, was that a standard frame rate (30-40fps) results in poor tracking. This was due to the resolution of the system, which is unable to detect a continuous movement of pixels in the B-Mode image. This was corrected by applying a frame grouping
technique to limit the frame rate, yet incorporate all images from original video to enhance tracking accuracy. Conclusion: We can conclude that our results demonstrated that our modified code was able to correct the errors found in previously demonstrated algorithms. It was now possible to have a matching code that will preserve the original features and also permit progression through the remaining video, despite the variation in image.

**Doppler phantoms and velocity measurements in preclinical ultrasound**, DA Kenwright, T Anderson, CM Moran, PW Hadoke, GA Gray, PR Hoskins, University/BHF Centre for Cardiovascular Science, University of Edinburgh

**Background:**
Doppler ultrasound provides a measurement of blood velocity, from which quantities including volumetric flow and wall shear stress can be derived. This can provide powerful non-invasive data directly related to the extent and effect of various diseases on flow. It is known that clinical Doppler ultrasound velocity measurement errors may be large (>100%) if inappropriate or manufacturer-recommended protocols are used, but considerable reduction in error may be achieved using modified protocols. As preclinical, high-frequency ultrasound systems are increasingly used for measurement of blood velocity and related quantities, it is important to investigate these errors.

**Methods:**
Investigations used a VisualSonics Vevo 770 preclinical ultrasound scanner. We have developed a rotating phantom to assess errors in velocity measurements at a range of Doppler angles. We describe a method for creating a wall-less flow phantom with vessel dimensions equivalent to small animal arteries. We will also compare in vivo measurements of blood flow in small animals calculated from ultrasound with the current gold standard invasive method using flow probes.

**Results:**
We have found that the maximum velocity was overestimated by up to 158% by spectral Doppler from measurements using the rotating phantom. The flow phantom can reproduce vessel diameters 1-1.5mm at depths ~1mm with steady flow of 20cm/s, equivalent to the rat carotid and femoral arteries. Results of the in vivo comparison will also be presented and discussed.

**Discussion:**
The errors in Doppler velocity measurement are consistent with geometric spectral broadening. Due to the physically-robust nature of the flow phantom, it has the potential to be modified into more complex geometries such as stenosis and bifurcation models, providing a useful tool in preclinical ultrasound validation.

**Conclusion:**
The outcome of this work will be well-validated test tools and measurement protocols that will improve the reliability of measurements made in preclinical investigations.

**Can a commercial flow phantom provide useful information about the colour Doppler sensitivity of early pregnancy ultrasound systems?** JE Browne1, S Cournane2, AJ Fagan3 1School of Physics & Medical Ultrasound Physics & Technology Group, IEO, FOCAS Institute, Dublin Institute of Technology, Ireland, 2Medical Physics and Bioengineering, St James’s Hospital, Ireland, 3Centre for Advanced Medical Imaging, St James’s Hospital & Trinity College Dublin, Ireland.

**Background:**
Foetal cardiac activity is well documented as the earliest proof of a viable pregnancy. Ultrasound imaging, particularly Doppler imaging using a transvaginal (TV) probe, has become the main diagnostic means of examining the health and development of the foetus [1-4]. The aim of this study was to evaluate the colour Doppler sensitivity and detectability of ultrasound systems used in early pregnancy evaluation using a commercially available flow phantom.

**Methods:**
An evaluation of colour Doppler sensitivity was carried out using a Mini-Doppler Flow Phantom (Gammex-RMI), which had vessels at depths from 2–10cm and a lowest velocity of 1cm/s. The Doppler sensitivity and detectability for a range of ultrasound machines in current clinical use for foetal heartbeat detectability was evaluated using this phantom with additional layers of highly attenuating fat mimicking material (FMM) (attenuation=1dB/cm/MHz and a speed of sound =1490m/s) placed on top of the imaged region. The quality of the colour Doppler signal was analysed in terms of the signal-to-noise (SNR) ratio using an in-house developed program (MATLAB).

**Results:**
The use of the phantom alone did not sufficiently challenge any of the systems. However, the incorporation of the highly attenuating FMM layer produced a significant challenge to the majority of the ultrasound systems tested by greatly reducing the measured SNR(> 50% in some cases) due to a reduction in the signal and the distortion caused by the FMM. The Doppler detectability and sensitivity results for this range of ultrasound systems will be presented.
Conclusion:
The evaluation of colour Doppler Sensitivity and detectability using this commercial flow phantom can be evaluated by incorporating a FMM layer and through the SNR analysis of the colour Doppler signal.


A low budget Doppler test device, DE Rowland, St George’s Hospital, London

Background:
Testing of Doppler systems on medical ultrasound equipment traditionally requires the use of a string phantom, a flow phantom or an acoustic injection system. These systems have their own strengths and weakness but one of the biggest barriers to undertaking Doppler QA is the purchase and maintenance costs of phantoms and test equipment or the cost and difficulty of building effective equipment in-house.

The test device:
A new Doppler test device is proposed that can be built at the cost of a few pound sterling. The device interfaces with a PC, laptop, net-book, tablet or smart-phone. The parts are easily available from online electronics and hobby retailers such as CPC, RS or Maplin. It is easy to build requiring only a small amount of soldering and gluing. Doppler test signals can be generated using signal generator apps available to download via Google play and iTunes and using pre-recorded audio signals. Calibration can be done using any cheap hand-held oscilloscope (bandwidth > 40 KHz). The design is intended to be in the public domain so that it can be used by any Medical Physics or EBME department with a low budget.

Initial findings:
Despite some inevitable limitations, the device was found to be very easy to and was able to demonstrate differences in Doppler quality and some interesting errors in Doppler velocity calculations. Pure single frequency test signals were used to check velocity calculations and to measure the Doppler frequency resolution. Real clinical Doppler signals were used to generate test signals for the purpose of checking Doppler waveform index calculations. The clinical relevance of the tests it can perform requires further study. Some further refinements of the device will be suggested.

Physics 3 – Theory and clinical application of Elastography

Reliability of quantitative elastography, HW Chan1,2, 1The Institute of Cancer Research and Royal Marsden Hospital NHS Trust, 2The National Hospital for Neurology and Neurosurgery

Shear wave elastography (SWE) is an ultrasound-based quantitative elastography. With this technique, acoustic radiation force is emitted by the transducer to induce micrometre displacement of tissue to produce shear waves that propagate perpendicular to the plane of displacement. Using ultrafast plane wave imaging, shear waves can be imaged and tracked to estimate their propagation speed. Whilst SWE has been shown to have good reproducibility, there is a lack of literature on the validation of SWE measurements and the investigation of the factors affecting SWE measurements. Furthermore, it has been shown that small and deep lesions have lower sensitivity and higher false-negative rates for malignant lesions.

SuperSonic Aixplorer® (Aix-en-Provence, France) scanner was used for these experiments. Using gelatine phantoms and post-mortem mouse brains, SWE measurements were validated against compressive rheometer and magnetic resonance elastography, respectively. Using gelatine phantoms and ex vivo porcine brains, various factors affecting SWE measurements were studied; these include SWE gains, small inclusion sizes, attenuating layers, and transducer pressure. Other factors that do not affect SWE measurements were also demonstrated. Additionally, using gelatine phantoms, the contrast transfer efficiency (CTE) of SWE measurements for both soft and stiff small inclusions of different sizes was also calculated and Young’s modulus contrast (YMC) required to visualise inclusions was determined.

In conclusion, firstly these results showed that using two different modalities, the SWE measurements were validated. Secondly, the factors affecting SWE measurements were identified and highlighted, thereby providing better understanding for optimising the reliability and acquisition of SWE measurements. Thirdly, the CTE of SWE measurements was shown and YMC for visualising soft and stiff inclusions was demonstrated.
References:

Reproducibility of strain ratio measurements, R Flesland Havre, Haukeland University Hospital, Bergen, Norway

A rapid and simple technique to plot the pulsed acoustic pressure field of clinical scanners, J Fromageau, JC Bamber, Royal Marsden Hospital and Institute of Cancer Research, London

Background:
Measuring the spatially and temporally dependent pressure field associated with ultrasound scanning is of interest for quality assurance and is essential for a complete assessment of safety parameters such as frequency, peak pressures, intensities, beam width, and mechanical and thermal indices. Scanning the acoustic field with a calibrated hydrophone, however, is unacceptably laborious, and is often impossible because it requires the manufacturer’s cooperation to access suitable synchronization signals. We have developed a simple method to make such measurements.

Method:
We first showed that in B-mode imaging, for parts of the imaged field, the pressure field measured from a series of A-lines scanned in front of a fixed hydrophone is equivalent to that obtained by moving the hydrophone in front of a fixed A-line. We then developed a pattern recognition method, which can be semi-automated, to reconstruct the field by post-processing the unsynchronised radio frequency signal recorded by a stationary hydrophone for all A-lines over at least 3 image frames.

Results:
Tests using an ultrasound scanner for which the synchronisation signals are available, demonstrated that the acoustic output measured with the standard (scanned and synchronised hydrophone) and the new (stationary and unsynchronised hydrophone) methods are in good agreement. The new method provided an improvement in the lateral sampling interval which would require an acquisition at least 120 times longer with the standard method. When tested on three clinical scanners from different manufacturers, all of which lacked synchronisation signals, it was able to reconstruct the B-mode acoustic pressure field for all of them.

Conclusion:
Using a stationary hydrophone and a post-processing technique, the acoustic pressure field emitted by a commercial ultrasound scanner in a standard image scanning mode may be measured with a high lateral resolution, short acquisition time and relatively simple apparatus. This could allow acoustic pressure field measurement to become a routine test.

The applicability of plane wave imaging to poroelastography, M Theodorou, J Fromageau, N deSouza, JC Bamber, The Institute of Cancer Research and Royal Marsden Hospital, London

In the technique of poroelastography, the relaxation of strain within tissue is imaged with elastography by repeated scanning with ultrasound (US) under sustained strain of the sample. This can provide information on the tissues’ permeability to fluids, and its distributed-fluid volume. We have an interest in (a) characterizing faster relaxations than previously reported, over a timescale expected for vascular, as opposed to interstitial, fluid drainage, and (b) more accurately characterizing the early (rapid) part of the relaxation due to interstitial flow. For this we assessed the use of plane wave imaging for poroelastography, and compared it to conventional transmit-focused US. An Aixplorer® US scanner (SuperSonic Imagine) was used to acquire echo data from poroelastic samples of soya-bean gel and reticulated foam before, and periodically during, sustained axial compression. Frame rates ranged from 100 to 500 frames per second. RF echo-tracking was performed between consecutive frames, providing internal strain relative to the instant at which the compressor touched the surface of the sample. Plane-wave strain imaging was also compared to transmit-focused strain imaging for a non-porous gel. For this purpose the strain filter, which characterizes the strain SNR as a function of the applied strain, was used. Transmit-focused RF echo data demonstrated poroelastic behavior consistent with published results. Plane wave data obtained during the first 10 seconds produced noisy time-dependent strain images, which were consistent with a degraded peak SNR observed for the plane-wave strain filter. Although the lack of transmit focusing degrades the quality of the plane-wave strain images, the high frame rate provides the ability to follow rapid poroelastic strain relaxations. With further development, this should enable a more complete characterization of the poroelastic behavior of soft tissue.

The effects of scanner speed of sound settings on image quality parameters for mammography ultrasound scanning, T Quinn1, B Ward2, W Gardner3, PK, Verma1, Sheffield Teaching Hospitals NHS Foundation Trust, 2Freeman Hospital, Newcastle upon Tyne, 3Bradford Teaching Hospitals NHS Foundation Trust.
Ultrasound scanners traditionally assume a speed of sound in human tissue of 1540 m/s. The speed of sound value plays an important part in transmit and receive beam forming and calliper measurements and therefore in image quality. For ultrasound scanning of the post-menopausal female breast a value of 1540 m/s is generally regarded as an overestimate. In recent times ultrasound manufacturers have attempted to address this situation to improve image quality by adding extra functionality to their BREAST presets such that the operator may alter the speed of sound value that the scanner uses when forming an image. We have investigated the effect of the speed of sound setting on image quality from a number of ultrasound scanner manufacturers. The parameters assessed are axial, lateral and out of plane resolution, low contrast penetration, visibility of cysts, visibility of contrast targets and calliper measurements.

Ergonomic workshop

Led by: G Harrison, A Harris, City University, London

This practical session will explore the ergonomic features available on equipment including the examination and couch manufacturers. Faculty and manufacturer guidance will give hands-on advice and tuition on ergonomics and reduction of RSI.

DVT Training

Led by: B Sarker, Queen Elizabeth Hospital, Gateshead

Introduction: Q&A session with faculty.
Lower Limb: Fem-Pop – Paired Femorals & Challenging Legs
Lower Limb: Calf Veins – A Magical Mystery Tour
Iliac Veins and IVC – Practical Tips
Upper Limb: Arms and Neck Veins – A Pragmatic Approach

Donald MacVicar & Brown Lecture

The nodule delusion, L Berman, Addenbrooke’s Hospital, Cambridge

Although the latest British Thyroid association Guidelines for the diagnosis and treatment of Thyroid cancer have at last acknowledged the role of Ultrasound in this condition, numerous medical, philosophical and financial questions remain that have not been adequately discussed. It is proposed that our current management of this condition is illogical, inconsistent and hypocritical and may be doing more harm than good. A far more expectant “hands off” approach is discussed.
Early pregnancy – diagnosis, management and patient care

Bleeding in early pregnancy, J Johns, King’s College Hospital, London

Incomplete miscarriage, C Bottomley, Chelsea & Westminster Hospital, London

This paper, otherwise titled ‘When is a miscarriage complete (and ‘oh no’... am I really sure this woman doesn’t have an ectopic pregnancy?), addresses the evidence for the diagnosis of an incomplete miscarriage and how such women are optimally managed.

The clinical scenarios addressed are of the woman with a previously confirmed intrauterine pregnancy who undergoes ultrasound either acutely after bleeding or after an interval, and of the woman with no previous ultrasound scan who presents with heavy bleeding and heterogeneous endometrial echoes.

Endometrial thickness, use of Doppler and subjective impression are compared with histological findings of retained products.

A critical evaluation of the traditional suction evacuation for incomplete miscarriage will be presented and compared to hysteroscopic procedures or ultrasound guided retrieval of products and with medical management with misoprostol or the expectant approach.

Delegates will be encouraged to take away a modern individualised approach to assessment and management of incomplete miscarriage.

Early pregnancy loss -management and choice, C Overton, University Hospitals Bristol NHS Foundation Trust

Mrs Caroline Overton is Chair of the Association of Early Pregnancy Units and member of the NICE guideline committee on Miscarriage and Ectopic Pregnancy. Early Pregnancy loss – management and choice will cover diagnosis of miscarriage and choice of surgical, medical and expectant treatment. You will be brought up to date with the NICE guidance on miscarriage and key articles since its publication in 2012.

Management of caesarean scar pregnancy, D Jurkovic, University College, London

Ultrasound diagnosis of gestational trophoblastic disease, E Kirk, North Middlesex Hospital, London

With the increased availability of early pregnancy ultrasound, it is now possible to diagnose gestational trophoblastic disease (GTD) on ultrasound, often before there are any symptoms. Whilst ultrasound has a high sensitivity for the diagnosis of complete molar pregnancies it is less sensitive for the diagnosis of partial molar pregnancies. Whilst the gold standard for diagnosis of GTD is by histological examination of products of conception, ultrasound does play an important part in management.

Gestational trophoblastic neoplasia, N Sebire, Great Ormond Street Hospital, London and Charing Cross Hospital, London

Post partum ultrasound, J Johns, King’s College Hospital, London

Pregnancy of unknown location (PUL) ultrasound reporting audit, S L Morrissey¹, S Brook¹,², A McGuinness¹,
¹MidYorkshire Hospitals Wakefield, ²Singleton Hospital, Swansea

100% of ultrasound reports should conform to the Royal College of Obstetrics and Gynaecology (RCOG) Green-top Guideline No. 25 The Management of Early Pregnancy Loss (October 2006): “Pregnancy of unknown location: No signs of either intra- or extra uterine pregnancy or retained products of conception in a woman with a positive pregnancy test. The sonographer should record whether an ‘apparently empty’ sac is eccentrically placed in the fundus, whether it exhibits a ‘double-ring’ pattern, and so on. These findings will help to delineate whether this is likely to be an intra- or extra uterine pregnancy.

Aims & Objectives:
To assess if all Pregnancy of Unknown Location (PUL) ultrasound scans at Mid Yorkshire Hospitals NHS Trust (MY) are reported in accordance with RCOG Green top Guideline 25 by reviewing ultrasound images and associated reports.
Methodology Retrospective analysis of reports 1-10-12 to 31-3-13 and then re audit 1/2/14-30/4/14 Patients attending
EPAU at MY have outcomes recorded on a paper based log. The ultrasound reports on CRIS and the relevant images reviewed to assess if reports comply with agreed standard. Reports should state; location of cystic area, whether or not eccentrically placed in relation to endometrium, whether or not double ring appearance and shape of cystic

Results:
The reports on CRIS were reviewed and compared to the agreed standard. The review was to check that reports specifically commented on the four essential criteria and if a conclusion had been stated on report to guide patient care. Percentage meeting the reporting standard Original Audit (126pts) Repeat Audit (41pts) Eccentric 39 % 54% Location 40% 59% Double ring 37% 80% Shape 11% 24% Fully compliant report 0.8% 17%

Conclusions:
The Audit results were disseminated to all Sonographers, reiterating the required criteria, then re-audited. PUL reports at MY are still not fully compliant with the agreed standard, even when images demonstrate the required information for all 4 criteria and a conclusion could have been stated.

RCOG Training the Trainers eLearning Module, G Masson, University Hospital of North Staffordshire NHS Trust

Diagnosis of early intrauterine pregnancy and missed miscarriage – when do we call a sac a sac and know when a pregnancy has failed? AM Coady, Hull and East Yorks NHS Trust

Diagnosis and management of ectopic pregnancy, D Jurkovic, University College, London

Do we need 3D in EPU? J Ross, King's College Hospital, London

The parent perspective on antenatal screening and its consequences, C Titherley, Antenatal Results & Choices (ARC)

How good is my unit? C Bottomley, Chelsea & Westminster Hospital, London

An ultrasound based model of care in early pregnancy assessment units (since introduction nearly 25 years ago) has been shown to improve diagnostic accuracy, reduce unnecessary admissions and limit follow up examinations.

There are over 200 Early Pregnancy Units in the UK. 40,000 women required hospital admission for miscarriage and 11,000 for ectopic pregnancy in England alone in 2012-13. An estimated 3 times this number probably suffer early pregnancy loss that does not require admission. A further similar number perhaps use an early pregnancy unit for assessment or support eve where the pregnancy ultimately progresses to term.

This paper proposes that performance of our high volume Early Pregnancy Units should be reviewed by addressing a combination of activity, workforce and clinical indicators.

Activity indicators include numbers of women seen, proportions diagnosed with each pregnancy outcome and proportions managed (successfully and unsuccessfully) by different methods. Examples include the successful outpatient management of miscarriage, successful manual vacuum aspiration for miscarriage and the pregnancy of unknown location rate (a measure in part of ultrasound expertise).

Workforce indicators include the number, accessibility, and skills of the people working within the unit, reflected also in the time to assessment and treatment.

Clinical indicators include the Unit's morbidity statistics, clinical risk events and complaints. Examples include numbers of women who have adverse events despite prior assessment in the EPU or because they were not offered timely assessment.

Local governance of these indicators in the form of a 'dashboard' with standardized national benchmarks should be adopted to ensure that each unit provides measurable optimal care for their own population.

Hot topics, Y Sana, King’s College NHS Trust, Princess Royal University Hospital Farnborough

One of the hot topics to be discussed is the chorionic bump. “Chorionic bump” is a term used to describe a convex shaped bulge into the chorionic cavity on first trimester scan. The estimated prevalence of the condition is 1.5 per 1000 pregnancies. Once seen and recognized, a bump has a very striking and characteristic appearance, but when seen for the first time it can present a diagnostic dilemma for the sonographer.

The most likely underlying pathology is haemorrhage within the trophoblast beneath the chorionic membrane. Women presenting to EPU found to have chorionic bump have an increased risk of miscarriage due to excess losses in the second trimester. Correct identification of the bump helps the sonographer/clinician to counsel the women and also reduces the risk of unnecessary intervention and follows up.
Do the professional and personal experiences of obstetric sonographers influence how they communicate with pregnant women? E Dyer, T Chudleigh, Cambridge University NHS Foundation Trust, Cambridge

Aim:
To establish whether the professional and personal experiences of sonographers influence their communication with pregnant women.

Methods:
An anonymous staff questionnaire was devised with the support of the clinical audit department at a regional teaching hospital. All sonographers within the obstetric ultrasound department were given the opportunity to complete the questionnaire. The questionnaire included demographic questions but its main purpose was to explore the sonographers’ personal and professional experiences of women’s services. Sonographers were also asked to undertake the Myer-Briggs personality test.

Results:
A summary of the Myer-Briggs personality test results: Characteristic Percentage (%) Focus Extraversion 50 Introversion 50 How information is absorbed Sensing 70 Intuition 30 Decision making Thinking 40 Feeling 60 Attitude to outer life Judging 80 Perceiving 20 Analysis of the questionnaire is on-going. Conclusions The Myer-Briggs personality test indicated that the two dominant personality characteristics are sensing (a preference to deal with facts) and judging (a preference for rules, order and instruction). The small number of participants (n=12) is likely to be the main limitation of this pilot study relative to the wider sonographer population. It will, however, be useful to the local department in identifying any barriers that sonographers perceive are impacting on their effective communication with pregnant women. This questionnaire may become a pilot for surveying the wider sonographer population.

General Imaging 1 – Advancing Technologies in Ultrasound Imaging

Elastography in liver disease and the decline of the liver biopsy, O Jaffer, Royal London Hospital, Barts Health, London

Fusion imaging and new technologies: their role in improving diagnostic confidence, A Lim, Charing Cross Hospital, London

The possibility of being able to fuse ultrasound images with CT has provided a significant advantage in lesion correlation. This has been particularly effective in the liver and kidney for lesion characterisation especially for the small and isoechogenic lesions. This technology has also been advantageous for percutaneous ablative tumour treatment and provides greater accuracy at being able to distinguish treated tumour regions from adjacent haematoma and gas. This technology has also been extrapolated to enable fusion with MRI images and has shown promise within the prostate and breast where it has been reported to improve biopsy accuracy of tumour regions.

One other area which has seen a significant advancement is Doppler, where Toshiba’s latest technology termed “superb microvascular imaging” (SMI) provides visualisation of the microvasculature employing an advanced Doppler algorithm without the need for contrast enhancement. The sensitivity and finer detail of the microvessels which can be visualised appear significantly better when compared with Power Doppler, and rivals that depicted with contrast enhancement. Its potential clinical applications will be discussed.

Non-hepatic applications of contrast enhanced ultrasound, C Harvey, Hammersmith Hospital, Imperial College NHS trust

Multi-parametric ultrasound imaging of segmental testicular infarction, PM Tantrige1, KV Patel2, PS Sidhu1, 1King’s College Hospital, London, 2Croydon University Hospital, London

Background:
Segmental testicular infarction is a rare cause of scrotal pain. The sonographic appearances are variable, and may mimic a primary germ cell tumour of the testis. Contrast-enhanced ultrasound (CEUS) and real-time tissue elastography (RTE) aid in the differentiation of indeterminate intra-testicular abnormalities. We document the evolving appearances of bilateral segmental testicular infarction on CEUS and RTE, which allowed for conservative management to resolution.

Case report:
A 33-year-old healthy male presented with a history of acute onset left testicular pain. The testis was tender to palpation but otherwise clinical examination and biochemical markers were normal. At initial ultrasonography, two rounded, focal areas of mixed reflectivity, with central low reflectivity, in the left testis were identified. There was no colour Doppler flow or flow on CEUS, but peripheral hyperemia was observed. RTE demonstrated that the lesions were “soft”. The contralateral testis was normal. A urological diagnosis of focal segmental infarction was suggested. Seven days after the
onset of symptoms, the patient experienced similar pain in the right testis. A subsequent ultrasound demonstrated a further lesion within the right testis which had similar gray-scale, Doppler, CEUS and elastography appearances to the left sided lesions. The symptoms subsided within two weeks and serial sonographic imaging demonstrated resolution with only minimal grey-scale changes present after 50 days.

Discussion:
The first line imaging investigation for testicular pain is usually grey-scale sonography with colour Doppler. The sonographic appearances of segmental infarctions are extremely variable and lesions have been described with varying shapes, echogenicity, and vascularity. As a result, it is difficult to confidently differentiating segmental infarction from a hypo-vascular tumour using conventional ultrasonography alone. CEUS and RTE can improve characterization of lesions and avoid the need for unnecessary repeat imaging and orchiectomy.

ReTx- early post-surgical CEUS in the detection of rejection and in predicting subsequent kidney function,
B Stenberg1, MAF McNeill1, 1Freeman Hospital, Newcastle upon Tyne

Background:
Kidney transplantation is the most common transplant surgery in the world and despite great improvements in surgical technique and post-operative care; the complication rate is still fairly high (up to 30%). Early studies have suggested there might be a correlation between contrast ultrasound perfusion patterns in a kidney transplant and its subsequent function and complications such as rejection and ATN.

Method:
105 kidney transplants had a CEUS at day 1 following surgery. Each kidney was scanned for 60 seconds and a region of interest was placed on the artery, cortex and medulla and a perfusion graph plotted. The haemodynamic factors were calculated from these graphs and documented along side non-perfusion factors such as donor age, recipient BMI, etc.. Each patient was followed up for serum creatinine and eGFR for 3 months to demonstrate renal function. Any episodes of rejection and/or ATN were also documented.

Results:
The haemodynamic and other variables showed good correlation using linear regressions with subsequent function particularly with creatinine at 2 weeks (R=0.765, p<0.0005) and 3 months following surgery (R= 0.633, p<0.0005). Area under the curve in the cortical ROI and donor age contributing most significantly to these correlations. The difference in cortex and medulla rise time also demonstrated significant differences in groups with/without early rejection (t=2.586, p<0.0005). However, this was no greater than the differences seen in the RI between these groups (t= 3.611, p<0.0005). No significant differences were seen in the with/without ATN groups.

Conclusion:
CEUS perfusion studies in early kidney transplants could be used to inform expectation of function within the first 3 months. There is some indication that it may useful in detecting rejection but in this study does not out-perform the standard technique of measuring RI.

Assessment of usefulness of multi-parametric ultrasound imaging of the testis in determining malignant versus benign disease: blinded review of diagnostic capabilities,
EK Konstantatou1, A Igbal1, LE Derchi2, M Bertolotto3, M Valentino4, C Kalogeropoulou5, PS Sidhu1, 1King’s College Hospital, London, UK, 2San Martino Hospital, Genoa, Italy, 3University Hospital of Trieste, Trieste, Italy, 4Tolmezzo Hospital, Tolmezzo, Italy, 5University Hospital of Patras, Greece

Purpose:
The aim is to investigate whether B-mode and colour Doppler ultrasound (CDUS) in combination with adjuvant techniques such as Real Time Elastography (RTE) and Contrast Enhanced Ultrasound (CEUS) in the investigation of testicular pathology, may facilitate a more accurate diagnosis in order to provide better management.

Methods:
Over a 6-year period (2008-2014) a total of 89 patients (mean age 39y), with focal testicular or extra-testicular abnormalities were imaged with a combination of B-Mode, CDUS, RTE and CEUS; multiparametric imaging. The suggested diagnosis following the parametric ultrasound examination was correlated with the final outcome as established by histology or follow up ultrasound. Four independent blinded readers reviewed representative images. The results from the blinded reading were analyzed statistically to investigate whether or not there is a statistically significant difference in diagnostic accuracy by adding RTE or CEUS, to B-Mode and CDUS.
Results:
A total of 90 lesions in the 89 patients were analyzed; malignant n=25 and benign lesions n=65 (size range 2-50mm). The diagnosis was confirmed with histology n=51 and with sonographic follow-up n=38 including Leydig n=10 and Germ cell tumours n=17. Only two readers demonstrated significant difference between CDUS and Elastography. The diagnostic accuracy of three imaging methods as reflected by the mean (SE) of area under the curve (AUC) demonstrated that for Reader1, the difference in AUC between Doppler and Elastography was 0.0778 (p <0.014), and for Reader 2, the difference in AUC between CDUS and Elastography was 0.124 (p< 0.033), with CDUS being superior to Elastography. In all four readers there was no significant difference between Doppler and CEUS or Elastography and CEUS.

Conclusions:
The combination of RTE and CEUS as adjuvant tools in the scrotal ultrasound investigation is not always problem solving and it is reader dependent. However, it provides a unique imaging addition in cases where CDUS is indeterminate.

General Imaging 2 – Conundrums in Ultrasound

What do you do with a problem like incidentally found testicular lesions? S Freeman, Derriford Hospital, Plymouth

This talk will address two difficult issues in scrotal ultrasound and give some guidance on how to report the examination and manage the patient.

Most ultrasound practitioners are aware of the association between testicular microlithiasis (TML) and testicular germ-cell tumours but there is confusion amongst BMUS members in how best to manage patients with this condition and whether or not to recommend ultrasound surveillance. There is now an emerging consensus regarding the significance of TML and the indications for surveillance ultrasound which will be summarised.

Incidental, non-palpable, testicular masses are regularly encountered on ultrasound studies. The traditional surgical adage of “If in doubt cut it out” leads to many inappropriate orchidectomies as most of these small lesions are benign. Assuming that blood tumour markers are negative and that the patient does not have TML, then surveillance ultrasound may be an appropriate management strategy. In many other cases testis preserving surgery can be performed. Contrast enhanced ultrasound and sonoelastography are emerging techniques in characterising testicular masses; testicular biopsy is rarely performed due to fears of tumour seeding but there is little evidence to show that this is a genuine risk. A summary of the evidence and suggestions for reporting and managing incidentally discovered testicular masses will be presented.

What do you do with a problem like incidentally found renal lesions? C Gutteridge, Derriford Hospital, Plymouth

Incidental small echogenic renal lesions and complex renal cysts are common, if unwelcome findings during an ultrasound examination of the kidneys. Negotiating the minefield of what to say to the patient, and what to recommend in your report is a familiar dilemma to many of us.

With up to a third of small renal cell carcinomata being as echogenic as a ‘classical’ angiomyolipoma, what can the ultrasound practitioner do to differentiate these conditions?

How complex is ‘complex’? Do all renal cysts with complexity need ‘another test’?

I will present a review of the existing literature, and look at the different options for further imaging, including the use of contrast enhanced US. Suggestions for reporting and managing both of these common incidental findings will be presented.

What do you do with a problem like biliary dilatation? PM Rodgers, Leicester Royal Infirmary

Superb Doppler: early clinical experience with Superb Microvascular Imaging (SMI) K Pearce, S Freeman, P Cantin, C Gutteridge, ‘Derriford Hospital, Plymouth

Detection of blood flow is frequently of critical importance in assessment of a wide range of different ultrasound pathologies. Although flow is often easily demonstrated using standard colour and power Doppler applications, in some situations of very low flow velocities it can be difficult to demonstrate any flow with these conventional technologies. Contrast enhanced ultrasound (CEUS) may be used to improve the sensitivity of ultrasound in detection of tissue perfusion but CEUS studies involve additional time and expense, carry a small risk of allergic reactions and require operator experience to perform. A recent development in ultrasound, Superb Microvascular Imaging (SMI – Toshiba Medical Systems), claims to improve sensitivity to very low velocity flow in small vessels by eliminating artefacts from tissue motion; monochrome or colour images are obtained at a high frame rate and high spatial resolution. Clinical
experience with SMI is very limited to date and the indications for the use of this new technology and its diagnostic value are not yet clearly established. We present a pictorial review of our early experience with SMI in a range of different clinical applications. We will demonstrate the additional diagnostic value that SMI has provided in these cases and compare its performance with conventional colour/power Doppler and CEUS studies.

**Diagnostic accuracy of point of care lung ultrasound in pulmonary edema, MS Rehman, MA Majeed, A Alhubaishi, A Naveed, Queen Elizabeth Hospital Birmingham**

**Background:**
Acute dyspnea is one of the commonest presentations to the emergency departments (ED) and poses a diagnostic challenge to emergency physicians (EP). Pulmonary edema is a common cause for acute dyspnea, however, can be sometimes difficult to diagnose in ED with traditional history, examination and chest x-ray only.

**Objective:**
To evaluate the accuracy of point-of-care lung ultrasound, in diagnosing pulmonary edema, in patients presenting with acute dyspnea in the ED. Method: We designed a prospective observational study at the emergency department of an urban tertiary hospital. A convenience sample of adult patients presenting to the ED with acute dyspnea were included from January 2014 to March 2014. A total of 23 patients were included for this pilot study. Emergency physicians with level-1 emergency ultrasound experience were trained in lung ultrasound. A protocol was developed for scanning and diagnosis of pulmonary edema on the basis of previous literature and studies. The EP performing the ultrasound was blinded to the clinical information. The findings of the ultrasound were kept blinded from the attending EP, admitting medical team and radiologist reporting x-rays. Results of the ultrasound were retrospectively compared with chest x-ray reports and the final diagnosis by the admitting medical team.

**Results:**
Our study has clearly proven the diagnostic ability of bedside ultrasound in patients with pulmonary edema. The study showed that for diagnosing pulmonary edema, the bedside lung ultrasound has 100% (95% CI: 73.35 % to 100.00 %) sensitivity, 90.91% (95% CI: 58.67 % to 98.49 %) specificity, 92.31% (95% CI: 63.90 % to 98.72 %) positive predictive value and 100% (95% CI: 68.97 % to 100.00 %) negative predictive value.

**Conclusion:**
The results of this pilot study demonstrated that point-of-care lung ultrasound in the ED can aid the diagnosis of pulmonary edema in patients with acute dyspnea.

**Any port in a (post operative) storm! S Neal1, N D Grunshaw2, 1Lancaster Medical School / Liverpool University, 2University Hospitals of Morecambe Bay NHS Trust**

**Introduction:**
Port site hernia is a rare but recognised complication of laparoscopic surgery with a quoted incidence of 1.7%. Although it may typically present late with herniation of intraabdominal fat, in the acute post operative state it may trap small bowel and present as small bowel obstruction.

**Case Reports:**
4 cases are presented. Three of which presented in the acute post-operative period. Two were post laparoscopic cholecystectomy and clinically felt to be biliary leaks. In both of these cases ultrasound demonstrated unsuspected small bowel obstruction with ultrasound clearly demonstrating trapping of small bowel within the port site defect. A further case presented with slow progress 12 days post laparoscopic right hemicolectomy, ultrasound demonstrated trapping of a left colonic epiploic appendage in the port site. A further case is illustrated of a typical late presentation of peritoneal fat prolapsing into a port site defect.

**Discussion:**
The risk of port site hernia though small increases with BMI, trocar diameter, duration of surgery and extension of port site for gallbladder extraction. In the acute post operative state they may be clinically unsuspected as the patient presents non-specifically with abdominal pain and distension which is often thought to be a biliary leak. Typically a portion of small bowel prolapses into the defect giving a Richters type hernia. The herniation of a colonic epiploic appendage is extremely rare but was confirmed at operation with immediate resolution of symptoms. In all cases ultrasound correctly identified the hernia. Awareness of port site herniation and routine examination of trocar sites in the post operative state should allow correct diagnosis.
Neck Lumps

What a surgeon needs to know, S Penney, Central Manchester University Hospitals NHS Foundation Trust

Setting up a H&N service – the sonographer’s perspective, C Kirkpatrick, Lincoln County Hospital

This talk will highlight the experience of an Advanced Practitioner in Ultrasound in setting up a Sonographer Led One Stop Head and Neck FNA service. It looks at the difference between One Stop and Two Stop services/paradigm and why service requirements may denote which type of clinic is most suitable dependant on service needs. It reviews the role of ultrasound in the rapid access/one stop paradigm by a synopsis of a literature review of the available evidence drawing on established symptomatic clinic programs including head and neck, breast and renal. It assesses the audit process needed to demonstrate cases of need, the NICE guidelines and re-evaluation of the established service.

Signs to look for in lumps and bumps- case review and interactive discussion, R Rhys, Royal Glamorgan Hospital

Advanced Techniques in Head and Neck

Needles – why when and how? RM Evans, Morriston Hospital, Swansea

Advanced ultrasound techniques- how will they help? A McQueen, Freeman Hospital, Newcastle upon Tyne

Significant advances in conventional ultrasonography allow superb visualisation and anatomic characterisation of key neck structures; thyroid, salivary glands & lymph nodes in particular. The advent of broader bandwidths, higher frequencies, compound imaging and novel signal processing techniques will be discussed in this session. Technical factors are particularly relevant to thyroid imaging, therefore the key B mode features of thyroid pathology are discussed with reference to new guidelines, specific pitfalls and limitations. Ultrasound elastography offers a potentially useful adjunct to conventional sonography in thyroid disease with a growing evidence base indicating that thyroid malignancies are typically stiffer than benign lesions and that a ‘soft’ cut off value with a high negative predictive value is feasible. However, elastography studies have included a variety of different techniques, patient/nodule selection and assessment methods and have not been widely used in non-thyroid lesions; therefore the current role of elastography will be reviewed.

Ultrasound first, but what next? S Colley, Queen Elizabeth Hospital, Birmingham

Ultrasound is often the first imaging modality used in the investigation of palpable neck lumps, and a number of other neck disorders. As radiologists, sonographers, or non-radiology ultrasound practitioners, it is vital that we are aware of the limitations of ultrasound in the neck region – and in which settings we need to ask for help from other imaging modalities.

Firstly, we will review neck pathology where ultrasound alone may not be enough, and why CT, MRI or PET CT may be required to give additional information for complete assessment of underlying pathology.

Secondly, we will look at various scenarios where CT, MRI or PET CT needs ultrasound to provide a more complete assessment or allow a specific diagnosis to be made. The role of ultrasound in problem solving will be covered, using a number of real life clinical scenarios from our local H&N MDT.

Unusual vascular disorders and their assessment

Trans-cranial Imaging, CR Deane, King’s College Hospital, London

Laser speckle contrast imaging (LSCI) for hand-arm vibration syndrome (HAVS) and Raynaud’s phenomenon, S Rogers, Independent Vascular Services Ltd, University Hospitals of South Manchester NHS Foundation Trust

Objective testing of vasospastic disorders is challenging and diagnosis is a process of elimination as multiple differential diagnoses often exhibit the same symptom pattern.

Laser speckle contrast imaging alone cannot diagnose vasospastic disorders. Clinical examination and triplex ultrasound is required to exclude macro-vessel disease along with continuous wave Doppler assessment for thoracic outlet syndrome and Palmer arch patency. Diagnosis is often reserved for a few specialist centres and our UKAS accredited laboratory is the first in the UK to develop a dedicated one stop service using a LSCI technique specifically for HAVS.
LSCI is a rapidly developing full field non-invasive real time measure of perfusion. When tissue is illuminated by lasers a random speckle pattern is generated, this speckle becomes blurred when blood cells move within the region of interest, altering the light contrast (compared to emitted wavelength). This is a semi-quantitative measure and the imager produces a colour-coded image that correlates with the amount of perfusion.

LSCI is uniquely placed, due to its high sensitivity, for the assessment of vasospastic disorders, which are traditionally assessed using thermography and/or finger systolic blood pressure. Perfusion may be a more accurate measure of vasospasm than temperature when measured by thermography. Vasospastic disorders demonstrate a prolonged perfusion recovery time (>4min) upon cold immersion testing.

We believe objective testing of HAVS and Raynaud's phenomenon using LSCI is better suited due to its higher spatial and temporal resolution.

The role of ultrasound in the early diagnosis of GCA, J Piper, Oxford University

Giant cell arteritis (GCA) is an inflammatory vascular disease, more common in people over 50, which typically causes new, unaccustomed headache and leads to permanent blindness in 20-30% of untreated cases. Temporal artery biopsy can confirm the diagnosis but the procedure causes morbidity, has low diagnostic sensitivity (<60%) and is expensive. Increasingly Ultrasound (US) is being used as a diagnostic tool for diagnosis and management of patients.

US diagnosis of GCA can be both specific and sensitive in trained hands. Training and knowledge is the key to successfully utilising US as an early diagnostic tool. With early diagnosis we can reduce rates of steroid toxicity and potentially eliminate the need for biopsy of the temporal artery.

The arterial wall thickening is hypo-echoic and is characterized as a ‘halo’ effect around the lumen of the artery. This thickening contains tissue and so with the appropriate settings can be distinguished from that of artefact. We can also measure velocity within the vessel to establish whether the vessel is stenotic with or without a halo being present. To confirm a stenosis the velocity within the stenotic area has to be double that of the pre-stenotic velocity.

Age and gender effects on carotid arterial wall motion using non-invasive B-mode Ultrasound, WJ Hopkins, Q Long, E Murghetti, Brunel University, West London

This research concentrates on the influence of ageing and gender over the longitudinal and radial motion of the carotid artery.

Methodology:
A multi algorithm block matching scheme was developed, based on Matlab®, for B-Mode motion tracking. 773 volunteers, age ranging from 10 to 88yrs. were analysed. The objective was to assess the differences in arterial wall motion with different gender and age groups.

Results:
The results showed that the lowest arterial dynamics were demonstrated in the 10-12 and 60+ groups. There was no significant difference in the displacement of the 10-12 years compared to the oldest 60+ years (p= 0.3803). The highest values were for the 13-17 group, where values were, on average, 5.3 times higher than for 10-12 year olds. After a peak in the 13-17 age group there was a gradual decrease in values with subsequently increased age. The gender analysis indicated that males had higher motion values than females. On average, values for males were 1.3 times (or 30%) greater than for females. Males on the other hand experience an increase in arterial stiffness post puberty and a linear increase thereafter, suggesting that females have intrinsically stiffer large arteries than males. Three groups demonstrate a negative sample difference i.e. a greater displacement of the outer adventitia over the inner intima layers: male 10-12 yrs., female 10-12yrs and male 60+ yrs. The maximum positive sample difference i.e. greater displacement of the intima over the adventitia, was shown in the male 13-17yrs., followed by the female 13-17yrs. Both male and female 60+ yrs. demonstrated a statistically insignificant sample difference between the motion of the intima and adventitia (male 60+ yrs. p= 0.7935 and female 60+ yrs. p= 0.519).

Conclusion:
This study demonstrated the possible influence of developmental and gender hormones on the arterial wall.
Cavernous transformation of the portal vein in HIV, B Batohi, A Deganello, King’s College Hospital, London

Background:
Features of portal hypertension and hepatic fibrosis are unusual in patients with HIV without concurrent infection with Hepatitis B (HBV) or C virus (HCV) or alcoholic liver disease. There is an increasing subset of patients with long-lasting HIV and prolonged exposure to highly active antiretroviral therapy (HAART), particularly didanosine, that are developing non-cirrhotic portal hypertension. Potential complications of this condition are demonstrated in the following case.

Case Report:
A 21-year-old female with well-controlled HIV-1 was admitted to hospital with vomiting and abdominal pain after a recent trip to Ghana. She was diagnosed with malaria and treated appropriately. Her CD4 was >800 and viral load <40. During her admission, she had deranged liver function tests, thought to be unrelated to the antimalarials or HAART that she was taking. An ultrasound of the liver identified several dilated portal vein collaterals at the porta hepatis. The portal vein had low velocity antegrade flow and there was uncertainty regarding its patency. A follow-up CT confirmed the presence of multiple engorged periportal and peri-portomesenteric collateral vessels in keeping with cavernous transformation of the portal vein. There was also an ill-defined subcentimeter arterialised lesion seen within segment VIII of the liver which was thought to represent a hepatocellular carcinoma (HCC) on a background of a non-cirrhotic liver. This was confirmed histologically.

Discussion:
Patients with non-cirrhotic portal hypertension in HIV tend to present with features of decompensation such as bleeding gastrointestinal varices. The incidence of HCC in patients with HIV is higher than the expected incidence rate in the general population, even in the absence of cirrhosis or co-existing infection with HBV or HCV. The hypercoagulable state in HIV and presence of the HCC are thought to potential aetiologies in the development of cavernous transformation of the portal vein in this case.

Vascular ultrasound training

STP – training the vascular workforce of tomorrow, T Fail, National School of Healthcare Science, Birmingham / Salisbury NHS Foundation Trust

Scientific and technical advances as well as changes to the way healthcare is delivered have meant that healthcare scientist roles have also needed to change. New scientist education and training programmes are now in place which makes the career structure simpler and more transparent, with a framework that provides greater flexibility in skills and knowledge development.

These programmes cover the whole career framework from bands 2-4 up to consultant clinical scientist level. They cover the 3 divisions of healthcare science: life sciences, physical sciences and physiological sciences. The curriculum for each programme at each level has been developed in conjunction with the professional bodies, Royal Colleges, current professionals and lay representatives.

Following a pilot in genetics, the 3 year graduate Scientist Training Programme (STP) commenced in 2011 with a national recruitment process for 177 trainees across 20 specialisms. STPs are hosted by a training department who provides the work base component and attend university to complete an accredited MSc. Funding for STP, including the MSc fee, comes from the local LETB. The first cohort has just completed the programme. This included 9 Vascular Science trainees who are now eligible to register as Clinical Scientists with the Healthcare Professions Council.

Higher Specialist Scientific Training Programmes (HSST) are about to commence with 51 scientists across 13 specialisms. HSST is a 5 year work based and doctoral level programme which will produce very senior clinical scientists who will be eligible to apply for consultant clinical scientist posts. Accredited Scientific Programmes will also be available and for Vascular Science these are likely to be taken from modules from the STP and HSST programmes.

The National School of Healthcare Science was set up in 2011 to implements these new training programmes and to quality assure the training and delivery.

NHS Scientist Training Programme: guinea pigs or future pioneers? A new graduate’s perspective, N Ngwa-Ndifor, Barts Health NHS Trust, London

The Modernising Scientific Careers (MSC) programme developed structured training routes across the physiological sciences to ensure the future supply of clinical vascular scientists through the Scientific Training Programme (STP).
With the first cohort of STP clinical vascular scientists graduating this year, we take a look at the STP experience from a new graduate’s perspective and evaluate the success and future of the programme.

**Vascular u/s training for surgeons**, A Jibawi, Ashford & St Peter’s Hospitals NHS Foundation Trust, Surrey

**Fundamental principles of haemodynamics without the headaches**, H Venables, University of Derby

As anyone who has ever taught vascular ultrasound will know, Doppler waveform interpretation requires a good level of understanding of the fundamental principles of haemodynamics. However trainees often find some of these concepts difficult to grasp and trainers may find them difficult to explain. Making sense of complex flow patterns where this grasp of the basics is lacking can lead to frustration for both trainer and trainee.

In this session we will revisit some of the underpinning theory, explore why trainees may find it difficult to relate this to practice and explore some real life imaging examples that can help bridge this gap.

**The importance of clinical assessment in ultrasound scanning**, D Saunders, M Subesingh, Leeds General Infirmary

**Introduction:**
Imaging is playing an increasing role in patient management with a continual increase in demand and workload in Radiology departments being observed across the UK. At our centre, approximately 1900 ultrasound examinations are performed weekly, of which 90 are doppler venography studies. As with all imaging studies, application of sound clinical judgment is essential. We present a case in which patient management was significantly altered by adapting the performed examination based on a focused clinical history taken during the examination.

**Case study:**
A 68 year old man presented with a history of right hallux pain and calf swelling and was referred for an ultrasound scan to exclude DVT. There were no features to support a diagnosis of acute or chronic DVT in the right lower limb deep venous system. On further questioning, the patient reported a history of recent abdominal aortic endovascular aneurysm repair (EVAR) raising concern that the presenting clinical symptoms represented ischaemia. Examination of the right lower limb arterial system was also performed. This revealed abnormal monophasic flow in the common and superficial femoral arteries with occlusive thrombus in the proximal popliteal artery. Urgent admission under Vascular Surgery was organised and subsequent computed tomography (CT) confirmed complete occlusion of the right limb of the aortic stent graft with further distal thrombus in the popliteal and anterior tibial arteries. The patient was taken to theatre for attempted thrombectomy but eventually required surgical bypass of the thrombosed graft.

**Discussion:**
The additional clinical information gained through a short focused history significantly altered this patient’s management. Delay in diagnosis may have resulted in development of critical ischaemia in the right lower limb potentially necessitating amputation. This case illustrates the paramount importance of clinical judgment and the role of a short focused history, especially in the context of an apparent ‘negative’ examination.

**Abdominal Vascular Issues**

**3D contrast enhanced ultrasound and its role in the assessment of endovascular aneurysm repair**, L Smith, Independent Vascular Services Ltd, South Manchester University Hospital Trust

Endovascular aneurysm repair (EVAR) was first described in the 1990s and over the years since its use has revolutionised the repair of abdominal aortic aneurysms. EVARs have been shown to decrease the incidence of post-operative complications and mortality compared with open repair (1). However EVARs are seen to be associated with some significant complications and so require regular surveillance of which CT angiography is the gold standard.

Contrast enhanced ultrasound (CEUS) is a relatively new ultrasound based diagnostic technique which uses sulphur hexafluoride micro-bubbles to enhance the appearance of blood flow during an ultrasound assessment. Over recent years the role of CEUS in the ultrasound assessment of endovascular repairs has increased in acceptability and has been shown to be good at diagnosing endoleaks compared to CT, while also removing the exposure of nephrotoxic or ionising radiation to the patient (2).

Three-dimensional (3D) CEUS is a new development of this technology that utilises an advanced novel technology to record the orientation of the ultrasound transducer probe precisely in space, allowing the formation of a 3 dimensional image which can be manipulated and viewed from any angle. A recent study at our hospital has shown 3D CEUS to be as accurate or better at detecting endoleaks compared with CT and has also shown to allow for greater accuracy in classifying endoleaks compared with CEUS alone (3).
References:

Intra-operative CEUS, a surgeon’s perspective, J Ghosh, University Hospital of South Manchester

Endovascular aneurysm repair (EVAR) of the abdominal aorta is an accepted and widely adopted treatment. This technology requires use of iodinated contrast media intraoperatively to guide endograft deployment and confirm aneurysm exclusion. Postoperatively, patients require life long serial scanning using either computed tomography (CT) with iodinated contrast or Duplex ultrasound to monitor for endoleak, aneurism pressurisation or endograft deformity. These necessities create a dilemma in the subgroup of patients with established chronic kidney disease due to the requirement of nephrotoxic contrast media. Three-dimensional contrast enhanced ultrasound (3D CEUS) is a novel imaging technique that may be more sensitive to blood flow detection than CTA or standard CEUS. 3D CEUS is an evolution of convention two-dimensional contrast enhanced ultrasound using nonnephrotoxic sulphur hexafluoride micro bubble contrast, and utilises positional information from magnetic field emitters to assemble all ultrasound reflections into a high-definition image. We report our initial experience of using three-dimensional CEUS imaging intraoperatively as completion imaging after endograft deployment and during post-endovascular aneurysm repair, by comparing 3D CEUS with CT for the detection of endoleak and aneurysm expansion during follow up.

Portal vein imaging, JA Smith, Leeds and West Yorks Radiology Academy

Soft tissue masses and lumps and bumps, L Rushton, University of Cumbria

This talk will offer a brief introduction to some of the more common soft tissue masses a vascular ultrasound practitioner may encounter in their practice. It looks at the common presentations and appearances on ultrasound as well as covering some of the more complex/suspicious features one must be aware of. The aim is provide a basic background into this field of imaging and make the practitioner aware of the more concerning findings and the necessity for clear referral guidelines to be in place.

Young Investigator

PET CT guided CEUS of colorectal metastasis and subsequent fusion guided microwave ablation, MAF McNeill, B Stenberg, S Saikia, Freeman Hospital, Newcastle upon Tyne

A 79 year old male with previous Dukes B adenocarcinoma of the ascending colon and subsequent right hemo-colectomy in June 2012, attended for a PET CT to assess an indeterminate pulmonary nodule. The lung lesion was FDG avid in keeping with metastasis, but an incidental finding of a PET positive lesion was also identified in the liver which was not evident on the unenhanced CT. No metastatic disease was demonstrated elsewhere. The liver lesion was listed for ablation but could not be identified on b-mode ultrasound. The patient was recalled for fusion guided CEUS, using fused PET CT images to target the lesion for the CEUS, which clearly identified the metastasis. The same technique was used in theatre to allow the interventional radiology team to target the lesion and confirm needle position. Microwave ablation was performed successfully with no evidence of recurrence at latest follow up. The lung lesion has also been subsequently treated. Conclusion: Fusion guided ultrasound allows for percutaneous treatment of lesions under ultrasound guidance that would otherwise require a surgical approach.

Role of B-mode ultrasound (US) and color Doppler ultrasound (CDUS) in the investigation of primary hyperparathyroidism: Specific features that raise the possibility of malignant change, E Konstantatou, C Fang, S Barocini, PS Sidhu, KM Schulte, King’s College Hospital, London
Purpose:
Benign parathyroid adenomas have classical appearances on US and colour Doppler, with variant features such as calcification and cystic change rarely seen. Malignancy of the parathyroid gland is rare, with non-specific US findings. The aim of this study is to identify the variant features that are encountered in all parathyroid abnormalities and document those that suggest malignant change.

Method:
Data was collected from a cohort of patients who underwent investigation for primary hyperparathyroidism disease over a 10-year period. US features: presence of calcification, cystic changes, echogenicity, vascularity, capsular thickening and locally invasive feature were reviewed retrospectively and used to correlate with final histological findings.

Results:
A total of 152 patients with both parathyroid histological results and concurrent US scans were reviewed, and divided into nodular hyperplasia (n=44), adenoma (n=98) and parathyroid carcinoma (n=10). Only 3/152 (1.9%) parathyroid lesions contain calcification. Cystic changes were present in 9/44 (20%) of nodular hyperplasia, 19/98 (19%) in adenomas and 3/10 (30%) in carcinoma. 107/139 (77 %) of benign parathyroid lesions were hypoechoic, compared to 7/10 (70%) observed in malignant parathyroid lesions. Of the 119 benign parathyroid lesions, they were avascular, vascular and hypervascular in 38 (32%), 58 (49%), 23 (19%) of the cases respectively. Of the 10 parathyroid carcinomas, lesions were avascular, vascular and hypervascular in 4 (40%), 3 (30%) and 3(30%) of the cases respectively. 2/152 (1.4%) benign parathyroid lesions showed capsular thickening compared to 2/10 (20%) of the malignant parathyroid lesions. Definitive evidence of local infiltration on US were seen in 5/10 (50%) parathyroid carcinomas, but were not present in either nodular hyperplasia or adenoma.

Conclusions:
Ultrasound features such as calcification, cystic change, and vascularity are non-discriminatory features when deciding benign or malignant lesions. However, capsular thickening and evidence of local infiltration are observed more frequently in parathyroid carcinomas.

Multi-parametric ultrasonography of testicular hematomas: features on grey scale, color Doppler, contrast enhanced sonography and real-time tissue elastography,
G Yusuf, E Konstantatou, ME Sellars, DY Huang,
PS Sidhu, King's College Hospital, London

Purpose:
Testicular trauma results in a variety of testicular complications including an intra-testicular hematoma. A focal intra-testicular lesion following trauma may be diagnostically difficult with a primary germ cell tumor a possibility. We investigate the appearances of a series of intra-testicular hematomas on multi-parametric ultrasonography.

Methods:
Hematomas were identified from a database and retrospectively reviewed by experienced observers. All patients underwent testicular ultrasonography, by experienced sonographers, using high frequency transducers, employing standard techniques of multi-parametric ultrasonography combining grey-scale, color Doppler, and contrast enhanced ultrasound as well as real-time elastography to assess features of intra-testicular hematoma. Features recorded were; size, location, echogenicity, color Doppler signal, contrast-enhancement, elasticity score and strain ration. Follow-up was recorded.

Results:
Over a three year period, 17 hematomas (right testis n=11, left testis n=6, maximum diameter range 5–28mm) in eight patients (mean age 31 years, range 25-43 years) were analysed. Blunt trauma (n=7) and surgery (n=1) were preceding events. Greyscale sonography demonstrated well-defined, oval or round, predominantly hypoechoic and heterogeneous, peripherally (n=13) or centrally located (n=4). Three demonstrated contrast-enhanced ultrasound enhancement of septations not seen on color Doppler and four peripheral rim enhance-ment. Sixteen lesions had real-time elastography performed; mean strain ratio was 1.49 (range 0.41–2.77), elasticity score ≤3 (n=12) and 5 (n= 4). All lesions were confirmed benign on follow-up sonography.

Conclusion:
Multi-parametric ultrasonography aids the interpretation of the benign nature of intra-testicular lesions thought to be hematoma formation allowing conservative management until resolution of appearances.
The introduction of renal contrast enhanced ultrasound to a district general hospital – is there any benefit?
N Patel, N Reed, G Rai-Tidbury, A Irvine, St Peter’s Hospital, Surrey

Background:
Contrast Enhanced Ultrasound (CEUS) for renal lesions is relatively new and less well established than for hepatic lesions. This study aims to determine if CEUS is a suitable alternative to Contrast Enhanced Computed Tomography (CECT) in characterising renal lesions and whether there are any potential cost benefits. Methods: Retrospective analysis of all renal CEUS scans performed between 1/04/13 and 31/03/14 with correlation to prior imaging and histology if available.

Results:
61 renal CEUS scans were included with 33 having a prior CT, and 27 a prior ultrasound for comparison. Overall, 95% of CEUS findings were diagnostic (58/61) and required no further imaging for lesion characterization. Renal cysts accounted for 54% (33/61) of all findings, ranging from I to IIF on the modified Bosniak classification system. No abnormality was detected in 13% (8/61) of CEUS examinations, this accounted for 22% (6/27) of those referred after ultrasound. Renal cell carcinoma (RCC) was reported in 14 CEUS examinations with histological confirmation in 7 out of 9 cases, the remaining 5 were kept on surveillance with CEUS. Radiologists and sonographers were able to refer patients with indeterminate findings on ultrasound or CT to a dedicated weekly CEUS list, bypassing routine pathways. Analysis highlighted a potential reduction in cost of up to 23% if the CEUS findings necessitated outpatient referral, and up to 66% if the findings were normal and the patient discharged back to their GP.

Conclusion:
CEUS can be a useful and safe diagnostic alternative to CECT in characterizing indeterminate lesions and for follow up. It has the potential to significantly reduce patient exposure to ionising radiation and iodine based contrast agents. Additional cost benefits are possible when direct referral for CEUS by the radiology department is performed.

A Retrospective review on the management of patients with High-Grade Prostatic Intraepithelial Neoplasia (HGPIN), N Jawad, OR Byass, PC Parker, Hull and East Yorkshire Hospitals NHS Trust

A single negative prostate biopsy does not definitively exclude a malignant process. Men who have had one negative biopsy may still have prostate cancer. High-Grade Prostatic Intraepithelial Neoplasia (HGPIN) is a common histological finding following transrectal ultrasound (TRUS) biopsy. This is shown to be a significant risk factor which may indicate prostate cancer that remains undetected. Other core risk factors include a raised PSA, abnormal digital rectal examination, and other pathological features on biopsy such as atypical small acinar proliferation (ASAP). The recent NICE guidelines in January 2014 have advised reviewing an individual patient’s risk factors with the view to considering multiparametric MRI (using T2- and diffusion-weighted imaging) for men with a negative TRUS 10–12 core biopsy. Such a review will also guide our decision in determining whether another biopsy is required. We present a retrospective review of the prevalence of HGPIN identified from TRUS guided prostate biopsies performed within Hull and East Yorkshire NHS Trust from April 2010 to March 2014. We present our audit results demonstrating how HGPIN was investigated and managed during this period against the new NICE Guideline recommendations. The implications of how the recent guidelines will affect our future practice in terms of the need for repeat TRUS biopsies, as well as with regard to increased demand for multiparametric MRI are discussed.

Temporomandibular joint effusion and its relationship with perceived disability assessed using musculoskeletal ultrasound and patient-reported disability, K Johnston, LN Bird, P Bright, European School of Osteopathy

Rationale:
The relationship between effusion of the temporomandibular joint (TMJ) and patient-reported disability is poorly researched. This pilot study explored the link between TMJ inflammation as measured by ultrasound and patient disability assessed by the Steigerwald Maher TMD Disability Index (SMTDI).

Design:
Prospective correlational study involving a sample with TMJ dysfunction (TMD). Subjects: 24 patients were recruited from the European School of Osteopathy and a Kent dental practice. Participants completed the SMTDI to determine the level of TMD (symptomatic score >20).

Methods:
A hockey stick transducer was placed over the TMJ in a transverse direction and effusion was calculated indirectly by measuring capsular width. Participants’ reported SMTDI was correlated with capsular width using Pearson’s Product Moment testing and accuracy was determined using Friedman’s Z transformation and the Wilcoxon test.
Results:
Larger capsular widths were found to be positively correlated with SMTDI scores, \((r=0.803, p<0.0001)\). The patient profile matched that of previous studies and the TMD sufferer population, indicating external validity.

Conclusion:
Results suggest that the SMTDI could be integrated into practice life as a quick, cheap and easy tool to monitor patients’ progress and assess levels of inflammation, without the need for repetitive imaging. The study design proved reproducible and a larger scale study is indicated.

Head and Neck Integrated Training

Led by: RM Evans, Morriston Hospital, Swansea

The anatomy of the head and neck will be taught through a series of standard sweeps through the neck. The neck will be systematically covered outlining the key structures that need to be identified, starting with the submental triangle and ending with the larynx.

Advancing Technologies in Ultrasound Imaging Integrated Training

Led by: PS Sidhu, King’s College Hospital, London

Advance technologies are being introduced into modern everyday ultrasound practice and are proving to have a positive impact on service delivery.

The presentations in this session will explore the benefits for your patients in introducing new technologies into your service. Delegates will have the opportunity to use modern machines and advancing technologies in their field.

RSI Master Class presentation

Led by: G Harrison, A Harris, City University London

During this presentation you will be given hints and tips on how you can reduce your risk of work related injury.

You will gain an insight into some issues affecting ultrasound practitioners and look at what you can do to ensure a long and healthy career.

Does the grip pressure used to hold an ultrasound probe change after training with an ergometer? A Harris, City University London

Aims:
This was a pilot study to determine whether a relaxed grip could be taught with an ergometer to student sonographers whilst they scanned and whether the amount of force used to hold the ultrasound transducer before and after training, could be measured to test the effectiveness of the training.

Motivation:
Sonography had been demonstrated to cause WRMSD in the majority of its practitioners (80%) with multifactorial causes. The use of a relaxed hand grip could help with the prevention of hand and wrist symptoms, such as carpal tunnel syndrome, which was associated with an increased grip used to hold an ultrasound transducer, commonly demonstrated by a ‘white-knuckle’ grip.

Method:
Seven student sonographers volunteered to take part; they were randomised into an intervention and non-intervention group. A questionnaire was completed to look at additional factors. The students were taught with an ergometer to use a relaxed grip whilst they performed an ultrasound scan on a simulator. Measurement of the Matched Grip Strength (MGS) used to hold the probe was recorded before and after training. The intervention group attended for one additional training session. % Maximal Grip Force (MGF) values were used to eliminate some of the limitations of the research design.
Results:
There was a reduction in the amount of force used to hold the probe, by 6% MGF (mean value) compared to the final visit. The intervention group decreased % MGF by 4.8% (mean value) overall at the final visit and the non-intervention group showed an increase of 0.7%, but this was not a significant difference.

Conclusion:
The grip pressure used to hold the probe was reduced by the training with an ergometer and the intervention group had better results. Further research with greater participant numbers would be needed to demonstrate any significance.

Improving the knowledge of work-related MSDS amongst sonographers through analysis of some possible solutions,
J Galindo1,2, MJ Carré1, SR Bradbury1, R Lewis1, A Williams2, T Deakin3 1The University of Sheffield, 2Knight Imaging, Sheffield, 3LabLogic Systems Ltd., Sheffield

In recent years, there have been a number of studies into the causes[1], effects[2] and impacts[3] of work-related musculoskeletal disorders (MSDs) amongst sonographers. These studies have shown an increase in the number of cases[4] as well as the financial impact that these injuries are causing to organisations such as the NHS and the effects on the individuals[5].

Our study seeks to improve understanding of the effects related to both the workplace design and sonographer posture and assess potential solutions using a design engineering approach. A range of ergonomically-focused sonography products already exist, but they are widely dispersed in the market and difficult to be implemented in sonography workplaces and configurations. A combined design solution to implement ergonomic improvements is the ultimate goal of our work.

The first stage of the study uses observations of, and interviews with sonography professionals in order to obtain first-hand feedback about work-related injuries. On-site observations were carried out at the Lozano Blesa Hospital, Zaragoza, Spain. An experiment has been designed, based on the observation and interview findings, which uses Surface Electromyography (EMG) to measure muscle activity in different ergonomic scenarios. The analysed EMG data will help to establish the optimal postures for a range of sonography procedures and also be used to select the best potential solutions to the problem of MSDs amongst sonographers.

The last stage will involve a second EMG-based experiment to assess the efficacy of commercially available ergonomic products to measure their potential impact.

References:

Ultrasound in Fertility – in conjunction with the Royal College of Nursing

Role of scanning in infertility, V Gibbs, University of the West of England

This presentation will identify the many areas where ultrasound is able to assist in the diagnosis and treatment of infertility. Delegates will learn how to recognise the normal sonographic appearances of the female pelvis. New technological developments in the field will be reviewed. Diagnosis of early pregnancy will also be included in the discussion.
Knowing your machine, H Venables, University of Derby

Pre-treatment assessment, careful monitoring of interventions and correct interpretation of early pregnancy findings all require an excellent understanding of how to get the best from the ultrasound system. This is particularly important where the examination is technically challenging.

In this session we will explore equipment settings that are helpful in imaging the female pelvis, some of the compromises inherent in ultrasound image optimisation and how these relate to fertility practice.

RCN Training and education pathway for nurse / midwife sonographers, D Barber, Oxford University Hospitals

Nurse specialists working in infertility units have historically undertaken an extended role which includes performing both transvaginal and transabdominal ultrasound. Many specialists perform baseline scanning and pelvic assessment, follicular tracking, early pregnancy assessment and abdominal scanning for embryo transfer. Several specialists also undertake transvaginal ultrasound-guided oocyte retrieval.

Educational pathways and training requirements are currently under review throughout the United Kingdom with the development of the advanced nursing practitioner register being produced by the NMC. In light of the expected competencies required by the NMC and many trusts throughout the UK the RCN-FNG has developed a working group with CASE and senior lecturers in the UK to identify the training needs of specialists working in this field.

Various RCN-FNG surveys have identified that members wish to undertake HE/CASE accredited courses that are pertinent to their practice and are achievable with appropriate clinical supervision both in private and NHS fertility units. A variety of universities have identified that they now provide post grad short course specialist modules tailored to the needs of individual practitioners that are achievable and relevant to practice. The RCN Fertility Competency Framework links government initiatives such as Modernising Nursing Careers (DOH 2006) and the KSF for nurses to identify a clear pathway for career progression. This will include established CASE-registered and HE-accredited ultrasound courses which will play a pivotal role in both field-specific educational qualifications and relevant job pathways for fertility nurse specialists.

HEs specialist courses included modules called “Negotiated Specialist Ultrasound Practice” which the student can select the practice they work in such as infertility or early pregnancy assessment.

Joint working will enable nurses to access relevant and required courses to ensure they are both competent and are able to pursue the correct career and educational pathway. Entry requirements include a relevant health care qualification and or degrees from recognised institution HE.

Common pathological conditions in fertility investigations, S Johnson, Princess Anne Hospital, Southampton

This will be a presentation covering conditions which commonly impact on fertility, or which may be diagnosed incidentally. The presentation will be supported by images demonstrating congenital uterine anomalies, caesarean scar pregnancies, HyCoSy fallopian tube patency, adnexal masses including torsion and many more.

Making sense of report writing, J Wilson, University of Leeds

Managing pelvic pathology, A Oboh, Hull and East Yorkshire NHS Trust

This presentation will be focused on the clinical management of benign diseases of the female reproductive organs. Delegates will learn the treatment of diseases that impact on future fertility including ovarian dermoid cyst, endometriosis, tubal disease, uterine fibroids, adhesions and congenital anomaly.
Obstetric imaging – where are we now and where are we heading?

The first-trimester scan; current strategies and future developments, T Overton, University Hospitals Bristol, NHS Foundation Trust

When the first trimester scan was initially introduced it aimed primarily to confirm viability, provide accurate information on gestation and diagnose multiple pregnancies. With the development of high quality ultrasound machines, we are now able to identify over 80% of lethal fetal abnormalities. The addition of biochemical markers and detailed anatomical assessment allows us to currently diagnose approximately 85% of major chromosome problems. Further developments over the next few years will significantly increase our detection rate for aneuploidy and prospective detection of pregnancies at risk of growth restriction and pre-eclampsia.

Diagnosis and surveillance of monochorionic twin pregnancies, M Denbow, University Hospitals Bristol, NHS Foundation Trust

In this talk I will be discussing:

- The diagnosis of chorionicity, and its relationship with zygosity.
- First trimester screening in multiple pregnancy
- Prenatal diagnosis in multiple pregnancy
- The mechanisms of interfetal transfusion in monochorionic twins
- The implications of acute interfetal transfusion and specifically the management of TRAP, single IUD and twins discordant for anomaly.
- Discordant fetal growth restriction in MC twins.

Identification and management of the growth restricted fetus, R Smith, Norfolk & Norwich University Hospital

Richard Smith is a subspecialist in fetal medicine. He will talk about initial identification of the small fetus, referral pathways from the community, and the roles of the sonographer, obstetrician, and fetal medicine specialist. The role of Doppler will be discussed, including the role of middle cerebral artery Doppler in the late preterm and term fetus.

Obstetrics 2

Peter Twining Memorial Lecture -
The treatment of twin to twin transfusion syndrome: improving fetal mortality and morbidity, M Kilby, Birmingham Women’s Foundation Trust

Six learning points -
1. What is and what is the pathogenesis of twin to twin transfusion syndrome (TTTS).
2. What is the evidence for the optimal treatment of the condition?
3. What factors affect fetal survival?
4. What factors affect morbidity and particular neurodevelopmental handicap?
5. How can we reduce morbidity and mortality and optimise fetoscopic laser ablation?
6. How should these babies be followed up and when should they be delivered?

Monochorionic twin pregnancies complicated by twin-to-twin transfusion (TTTS) syndrome are typically treated with fetoscopic laser coagulation. In our recent Cochrane Review1, two studies compared amnioreduction with endoscopic laser coagulation (182 women). Not all trials provided outcome data that could be included in all meta-analyses. This review indicated that more babies were alive without neurological abnormality at the age of six years in the laser group than in the amnioreduction groups (RR 1.57; 95% CI 1.05 to 2.34 adjusted for clustering, one trial. The NIHCD trial2 included in this update exerts an opposite direction of effects to the Eurofetus study3. Our own prospective, single study in Birmingham4 reported in our first 164 consecutive sets of monochorionic twins with TTTS. The median gestational age (GA) at FLC was 20.4 weeks, the median interval from FLC to delivery was 88.5 days, and the median GA at delivery was 33.2 weeks. The overall survival was 62%; perinatal survival of one or more twins was 85%. These outcomes improved after about 61 procedures were performed, and after about 3.4 years of experience. Univariate logistic regression analysis indicated that Quintero stage-IV disease decreased (OR 0.26; 95% CI 0.10–0.69) and prolongation of GA at delivery increased the survival of the twins (OR 1.34; 95% CI 1.12–1.60) (P < 0.01). Increasing experience of the procedure by operator led to a significant increase in perinatal survival (P < 0.01; OR 4.59; 95% CI 1.84–11.44). Multivariate logistic
regression analysis indicated that only GA at delivery increased survival overall (OR 1.34; 95% CI 1.12–1.60; P = 0.01). There is evidence that in survivors 8% of babies have neurologic sequelae and that these may be associated with persistent ‘transfusional morbidity’. Such a complication is ‘twin anemia, polycythemia sequence (TAPS)’. We aimed to assess the efficacy and safety of a novel surgery technique that uses laser coagulation of the entire vascular equator (Solomon technique) in an attempt to reduce these complications. In pregnancies with severe TTTS, a multicentered, European RCT of 274 women were randomly assigned to either the Solomon group (n=139) or the standard treatment group (n=135). The primary outcome occurred in 94 (34%) of 274 fetuses in the Solomon group versus 133 (49%) of 270 in the standard treatment group (OR 0.54; 95% CI 0.35—0.82). The Solomon technique was associated with a reduction in twin anaemia polycythaemia sequence (3% vs 16% for the standard treatment; OR 0.16, 95% CI 0.05—0.49) and recurrence of twin-to-twin transfusion syndrome (1% vs 7%; 0.21, 0.04—0.98).

References:
7. Femke Slaghekke, Enrico Lopriore, Liesbeth Lewi, Johanna M Middeldorp, Erik W van Zwet, Anne-Sophie Weingartner, Frans J Klumper, Philip DeKoninck, Roland Devlieger, Mark D Kilby, Maria Angela Rustico, Jan Deprest, Romain Favre, Dick Oepkes


Medico-legal pitfalls in obstetric ultrasound, M Taylor, Royal Devon and Exeter NHS Foundation Trust

Imaging and management of endometriosis and pelvic pain

Ultrasound diagnosis of ovarian and deep infiltrating endometriosis, G Hudelist, Wilhelminen Hospital, Vienna

How research can improve the ultrasound examination of endometriosis, T Holland, University College Hospital, London

Other causes of pelvic pain, C Footitt, Royal Bolton Hospital

Ultrasound (US) is repeatedly first-line in the investigation of chronic pelvic pain as it is of high resolution, easily accessible and inexpensive. Furthermore, because US is non-ionising it can not only be used in the initial diagnosis but also for repeated follow-up of these patients.

Chronic pelvic pain accounts for a substantial proportion of Gynaecology referrals. Clinical history is paramount in directing the US practitioner in making the correct diagnosis, not only to try and avoid the need for additional ionising imaging modalities but also to ensure patients are subsequently managed correctly.

This presentation aims to illustrate a range of chronic gynaecologic pathologies and the role US played in their diagnosis and management.
Comparison of laparoscopy (video) with ultrasound images, D Miligkos, Princess Anne Hospital, Southampton

Ultrasoundography is the first line imaging technique for the assessment of women with endometriosis and can detect ovarian and deep infiltrating endometriosis (DIE) of the uterosacral ligaments, pouch of Douglas, rectosigmoid, urinary bladder and the vagina.

The aim of this presentation is to demonstrate the ultrasound features of ovarian and DIE and then to compare those images to the findings at laparoscopy.

Clinical management of endometriosis, A Moors, Princess Anne Hospital, Southampton

Rectovaginal endometriosis in pregnancy – an atypical presentation with cervical mass, JW Hounslow1, S Johnson1, A Moors1, 'Princess Anne Hospital, University Hospitals Southampton

Background:
Decidualisation of endometrial tissue is a well documented response to pregnancy. Corresponding changes in endometriotic tissue are less well described with decidualisation of vaginal endometriosis a rare complication of pregnancy. In this case the ultrasound and examination findings mimicked a malignant process. Our poster combines the clinical case development with corresponding imaging of the antenatal and post partum period.

Case report:
SM was a 27 year old nulliparous woman referred to our tertiary referral centre with a preliminary diagnosis of rectovaginal endometriosis made clinically and on MRI imaging. Between referral and initial consultation SM conceived spontaneously. An ultrasound scan performed following initial consultation demonstrated a large highly vascular mass with features suggestive of malignancy rather than endometriosis. Subsequent MRI confirmed the mass’ atypical appearances and a diagnostic tissue biopsy was performed. The mass bled profusely at the time of biopsy and required vaginal packing to bring under control. Histopathology was referred on for expert option and demonstrated florid endometriosis with pregnancy associated changes. The mass was managed conservatively during the pregnancy and SM delivered by an elective caesarean section with a good outcome for both mother and baby.

Discussion:
The changes that endometriotic tissue may undergo during pregnancy are often difficult to interpret and accurately diagnose both clinically and with ultrasound during pregnancy. Assessment and management of these cases required a multi-disciplinary team approach with histological diagnosis able to reassure and guide management.

Outcomes of patients attending consultant delivered emergency gynaecology clinic: a retrospective study, SP Fisher, V Franklin, University Hospital Crosshouse, Kilmarnock, Scotland

Background:
Ultrasound is a commonly used diagnostic tool in the assessment of acute gynaecological presentations. Unpublished data from our unit showed that many patients were inappropriately admitted while awaiting investigation. Studies show a consultant led ultrasound service for acute gynaecology patients improves diagnostic accuracy, allows prompt and appropriate treatment to commence and reduces overall hospital stay.1,2,3 We wanted to assess the outcomes of patients attending a newly developed consultant delivered emergency gynaecology clinic (ECG) for acute gynaecology referrals.

Methods:
A retrospective observational study was carried out over eight months at a district general hospital. Data was collected from consecutive patients attending the EGC. Patient demographics, presenting complaints, ultrasound findings and outcomes were assessed.

Results:
90 patients were included in the study with 25 in-patients and 65 outpatients. Mean age at presentation was 37 years. (Range = 15 – 85) The main presenting complaints were pain (58.9%,n=5) and bleeding (30.0%,n=27) 83 (90.2%) required ultrasound assessment. 23 patients (25.6%) had no gynaecological pathology. The commonest pathology was ovarian cysts (23.33%,n=21); the remaining patients had other gynaecological pathology or dysfunctional bleeding. Following consultation, 44 (48.9%) patients were discharged, 23 (25.8%) had out-patient follow-up, 10 (11.2%) remained inpatients and 13 (14.6%) required surgery. 38% of operations were emergencies. 3 patients required admission and 13/25 (52%) in-patients were discharged. This represents a 40% decrease in the number of inpatients following consultations.
Conclusions:
The majority of patients presented with pain or bleeding. Most acute gynaecological presentations required ultrasound examination to assist diagnosis. Ovarian cysts were the commonest gynaecological diagnosis, reinforcing the benefit of ultrasound. A large proportion had no gynaecological pathology. The majority did not require admission or ongoing in patient management. These results show that an ultrasound based model of assessment in acute gynaecology facilitates appropriate and timeous care for women while avoiding unnecessary admissions.

Decidualisation of an ovarian endometrioma – imaging throughout pregnancy and into the post-partum period,
JW Hounslow1, S Johnson1, A Moors1, 1Princess Anne Hospital, University Hospitals Southampton

Background:
Decidualisation of ovarian endometriomas is a described consequence of pregnancy. Differentiating between this phenomenon and more sinister pathology is however difficult as the ultrasound features of this type of ovarian cyst closely resemble those of malignancy outside of pregnancy. The clinical picture is further complicated by serum markers such as Ca125 being an unreliable triage tool within pregnancy.

Case report:
SS was a 28 year old nulliparous woman who presented at 12 weeks of pregnancy for a routine dating and nuchal screening ultrasound and was found to have an asymptomatic 62mm multilocular-solid ovarian cyst. The cyst had strong vascularity and several internal papillations which drew concern that this may be a malignant process. A Ca125 was performed which was raised at 73kU/L. Serial ultrasound surveillance was performed along with and MDT of the images and case history with some improvement in ultrasound features during the second trimester. The cyst was managed conservatively and the pregnancy ended with a successful outcome for both mother and baby with a vaginal delivery at term. Follow up surveillance in the post partum period has demonstrated resolution to appearances typical of an endometrioma.

Discussion:
The incidental finding of an ovarian cyst in pregnancy is now common as a result of routine first trimester screening or dating ultrasound being standard practice in the UK. Although this ovarian cyst had suspicious features throughout the pregnancy, the serial use of ultrasound to provide reassurance that this was a stable lesion allowed pregnancy to continue without the recourse to surgical removal, which in this instance would likely have been by open oophorectomy. The surgical morbidity to both mother and fetus were therefore avoided and subsequent surgery is likely to be ovary sparing via a laparoscopic approach, demonstrating the benefits of high quality ultrasound imaging and interpretation.

Fundaments of MSK imaging and intervention

Upper limb ultrasound – (almost) everything but the shoulder, G Tony, University Hospitals of North Staffordshire


Musculoskeletal disorders of the shoulder are extremely common, with reports of prevalence ranging from 1 in 3 people experiencing shoulder pain at some stage of their lives to approximately half the population experiencing at least one episode of shoulder pain annually. Pathology of the soft tissues of the shoulder including the musculotendinous rotator cuff and subacromial bursa are a principal cause of pain and suffering. Competing theories have been proposed to explain the pathoetiology of rotator cuff pathology at specific stages and presentations of the condition. This review proposes a model to describe the continuum of the rotator cuff pathology from asymptomatic tendon through full thickness rotator cuff tears. The pathoetiology of rotator cuff failure is multifactorial and results from a combination of intrinsic, extrinsic and environmental factors. Rotator cuff tendinopathy is associated with profound changes within the subacromial bursa that are strongly related to the resulting symptoms. Recently a new and generic model detailing the continuum of tendon pathology has been proposed. This model is relevant for the rotator cuff and provides a framework to stage the continuity of rotator cuff disease. Furthermore, it provides a structure to identify the substantial deficiencies in our knowledge base and areas where research would improve our understanding of the pathological and repair process, together with assessment and management. The strength of this model, adapted for the rotator cuff tendons, will be tested in its ability to incorporate and adapt to emerging research.
Main references:


**Supraspinatus tendon tears,** L Horton, Chapel Allerton Hospital, Leeds Musculoskeletal Biomedical Research Unit

Shoulder pain is one of the most common presenting symptoms to musculoskeletal (MSK) diagnostic ultrasound (US) departments.

The World Health Organisation (WHO) state that around 60% of these cases are due to rotator cuff lesions. Acute traumatic injury and degenerative tendinopathy are among the many causes of shoulder and upper arm discomfort. The principal role of the MSK diagnostic sonographer is to assess the rotator cuff tendons, bursae and US amenable ligaments in the area, as well as noting joint pathologies and arthropathies. attainment of this skill necessitates dedicated study of US anatomy and pathology, and development of the ability to visualise MSK anatomy 3-dimensionally.

One of the major areas of confusion encountered by student MSK sonographers is that of being able to accurately describe partial and full-thickness tears of the supraspinatus tendon.

This presentation, which includes the demonstration of a diagnostic shoulder scan, focuses on the author’s technique for assessing the supraspinatus tendon and has been developed over more than a decade of dedicated MSK US scanning, teaching and mentoring, and aims to help sonographers recognise, classify and confidently describe supraspinatus tendon pathology.

**US guided injections of the shoulder,** C Drury, Hull and East Yorkshire Hospitals NHS Trust

This talk focuses on the rationale behind guided injections into the shoulder, with discussion of evidence supporting use of a guided technique. The talk also includes advice on how to perform guided injections into the shoulder, with particular emphasis on the subacromial injection.

**Lower limb ultrasound – technique, clinical application and tales of the unexpected,** M Maybury, Good Hope Hospital, Heart of England NHS Trust, Sutton Coldfield

This talk covers three aspects: review of the technique of lower limb scanning concentrating on foot, ankle and knee, the clinical application of ultrasound scanning in clinical practice, and selected case studies where MSK ultrasound has played a central role in patient management.

**Lumps and bumps,** S Riley, Bradford Teaching Hospitals NHS Foundation Trust
Advanced MSK imaging

Ultrasound: new opportunities for diagnosing gout, E Roddy, Keele University / Staffordshire Rheumatology Centre

Gout is the most common inflammatory arthritis and is caused by deposition of monosodium urate crystals in and around joints. Ultrasound features of gout have been described including the “double contour” sign which is thought to be specific to gout. In addition to providing a novel method of diagnosing gout, ultrasound evidence of persistent sub-clinical synovitis has contributed to a paradigm shift in which gout is considered to be a chronic inflammatory joint disease rather than an intermittent condition and provides a potential mechanism for high rates of vascular disease seen in gout.

Don’t want to be left out in the cold: non-surgical management of frozen shoulder, J Lewis, Central London Community Healthcare NHS Trust, London, Centre for Health & Human Performance

Background:
Frozen shoulder is characterised by pain (often severe) and a substantial loss of movement and as such is associated with considerable morbidity and frustration for patients and clinicians. It is considered to be a self-limiting condition of 1 to 3 years duration. However, studies that have purported to follow sufferers, report that loss of movement and pain may still be present at 7 years. Although the term ‘frozen shoulder’ was first coined by Codman in the 1930’s, the research underpinning our understanding of the patho-aetiology and best management remains equivocal.

Objectives:
The aim of this paper is to present an evidence based care pathway for the non-surgical management of Frozen Shoulder. The care pathway was developed following being successfully awarded a competitive grant from Shine – The Health Foundation. The remit was to develop a care pathway that would reduce the need for people with frozen shoulder to be assessed and treated in secondary care. In addition to the development and analysis of the clinical pathway, an independent health economist evaluated the cost of the new service in comparison to comparable care pathways being provided in secondary care. A psychologist led focus group reported on the participants’ experiences.

Methods:
The entire pathway was developed and run by community based specialist physiotherapists. The evidence based care pathway involved:

(i) Diagnosis and health screening
(ii) Ultrasound guided intra-articular glenohumeral injections (steroid and lidocaine)
(iii) Ultrasound guided intra-articular glenohumeral hydrodistension procedures (lidocaine and NaCl)

The injection therapy was performed by physiotherapists and embedded within a physiotherapy rehabilitation programme.

Findings and Conclusions:
All stages of the pathway are supported by research evidence. Clinical outcomes were good to excellent. No patient required a referral to secondary care. An independently run focus group reported that participants were very satisfied with the care received. The health economic analysis demonstrated substantial savings when the care was delivered in the community compared with secondary care.

References:


NICE- National Institute for Health and Care Excellence. NICE Pathways
- Clinical Knowledge Summaries. http://cks.nice.org.uk/#azTab


Lewis J (2014) Frozen shoulder contraction syndrome – Aetiology, diagnosis and management.

Acknowledgements:
The Health Foundation Shine-Inspiring Improvement http://www.health.org.uk

Imaging of the groin – hernias & more, K Green, Derriford Hospital, Plymout

Requests for groin ultrasound with a clinical history of possible hernia are among the most common requests to the ultrasound department. They can occasionally be very obvious, however particularly when subclinical, they can be a challenge.

Ultrasound is the primary method for assessing the groin given its dynamic ability. MRI is useful as a problem solving tool in some cases.

This talk will firstly cover the local anatomy, tools and technique required. It will then discuss hernias of the groin including types and sub classifications and will finish with alternative pathology.

US in rheumatology, R Wakefield, University of Leeds

Ultrasound and UTC for the evaluation of plantaris tendon involvement in midportion Achilles tendinopathy, L Mascl, C Spang, HTM van Schie, H Alfredson

Introduction:
Recent cadaveric [Van Sterenberg et al, 2011], histological [Spang et al, 2013], and clinical/surgical (Alfredson, 2011) studies lend support to the theory that the plantaris tendon may be involved in the aetiology and/or pathogenesis of midportion Achilles tendinopathy. Unfortunately, it is not easy to detect a plantaris tendon, especially when it is localized close to the medial side of the Achilles tendon. Ultrasound+Doppler (US+CD) has been used for many years as a first line diagnostic tool to detect tendinosis-like changes in tendons [Ohberg et al, 2001, Fornage et al, 1986]. Although there is evidence that the plantaris tendon can be detected by ultrasound (US) [Mackay et al, 1990, Spina 2007], there are no studies comparing macroscopic findings with ultrasound findings. Recently, Ultrasound Tissue Characterisation (UTC), has been used to visualize Achilles tendon structure, and to quantify tendon matrix integrity [Van Schie et al, 2001]. The aim of this study was to compare US+CD and UTC findings with macroscopic surgical (in wound) findings in patients with chronic painful mid portion.

Method and Material:
In this study on 16 patients (11 men, mean age: 38 years and 5 women, mean age: 41 years) and 20 tendons (4 patients with bilateral tendons) with plantaris tendon involvement in mid-portion Achilles tendinopathy, we used Ultrasound and Colour Doppler (US+CD) and Ultrasound Tissue Characterisation (UTC) findings and compared these findings with the macroscopic findings (in wound). Results: At surgery, in all 20 Achilles tendinopathy tendons, we found a thickened plantaris tendon located close to, or invaginating into, the medial side of the Achilles tendon. There was richly vascularised fat tissue in between the Achilles and plantaris tendons [fig 1]. For US+CD, 16/20 tendons had a tendon-like structure interpreted to be the plantaris tendon and localised high blood flow, in close relation to the medial side of the Achilles [fig 2]. For UTC, 19/20 tendons had disorganised (type 3 and 4) echopixels in the medial part of the Achilles tendon indicating possible plantaris tendon involvement [fig 3].

Conclusions:

The use of strain ratio as a reference standard in the diagnosis of supraspinatus tendinopathy, CI Ohuegbe, P Hussain, Centre for Ultrasound Studies, Anglo European College of Chiropractic (AECC) Bournemouth
Purpose:
Sonoelastography is a real-time ultrasound technique that measures tissue elasticity to ascertain the degree of stiffness or elasticity. Tissue elasticity can be displayed in the form of colour grades and numerical quantification called strain ratio to make diagnosis. Using strain ratio, a receiver operating characteristic (ROC) curve was created for the supraspinatus tendon to obtain a reference cut-off. The purpose of this study was to use the cut-off value to measure supraspinatus tendinopathy. The results were compared with conventional ultrasound findings.

Subjects and Methods:
The study was approved by the institutional review board and informed consent was obtained. A total of 284 supraspinatus tendons of healthy volunteers (152 males and 132 females; mean age, 29.9 ± 9.5 years; range, 20 – 58 years) and 204 consecutive patients (110 males and 94 females, mean of 38.6 ± 14.7, range, 20 – 90 years) were evaluated with real-time ultrasound and sonoelastography using an experimentally proven colour grading system. A ROC curve of the symptomatic and asymptomatic strain ratio values was plotted using the Youden index to obtain a cut-off value.

Results:
The overall mean strain ratio value in healthy supraspinatus tendons was 5.6 (±1.24SD). In patients with tendinopathy, the mean strain ratio value was 3.6 (± 5.16 SD) with a significant statistical difference (p = 0.0005). The Youden index yielded a cut-off value of 4.0 which was used as a reference value to indicate the presence or absence of tendon softening. Sonoelastography showed higher accuracy, sensitivity and specificity than the ultrasound in demonstrating supraspinatus tendinopathy.

Conclusion:
Sonoelastography demonstrated tendon softening that was not seen with greyscale ultrasound which could represent early tendinopathic changes. Strain ratio values provided a quantitative value to a pathologic lesion within the tendon and can be considered to be a new reference standard in establishing supraspinatus tendinopathy.

(DRUF1) Distal radius ultrasound guided fracture identification, A AlHubashi, S Rehman, University Hospitals Birmingham

Introduction:
Distal radial fracture is one of the common presentations in the emergency department (ED). X ray is still the standard diagnostic tool for such fractures although some recent studies have shown that in children, fractures can be diagnosed safely and reliably by Ultrasound (US) alone. Objective: To evaluate the reliability of ultrasound in the diagnosis and post reduction alignment assessment in distal radial fractures.

Setting & Method:
This is a prospective cohort diagnostic study has been done at Queen Elizabeth Hospital Birmingham UK, emergency department which is a level one trauma centre. This pilot study has been conducted from January 2014 to March 2014. All patients aged > 16 years with distal radial fractures secondary to trauma were included. Patients with age < 16yrs and significant soft tissue injury on the fracture site. Pre and Post reduction alignment was checked with ultrasound, by the same senior ED physician before applying the slab. Then both US pictures were compared with classical pre- and post-reduction x rays. Results: In our pilot study we enrolled 20 patients. The emergency physician performed ultrasound assessment for the presence of a fracture has a sensitivity of 94%, specificity of 100%, PPV of 100%, NPP of 75% and accuracy of the test is 95%. The reduction success has sensitivity of 94%, specificity of 75%, PPV of 94%, NPP of 75%, and accuracy of the test is 90%.

Conclusion:
Previous studies mainly in children have proven the role of US in fracture detection. Other studies have mentioned the role of US in hematoma block and fracture identification in adults. Our study corroborates with the previous studies that EP can reliably detect the presence and adequacy of realignment for distal radial fracture using ultrasound in ED with high sensitivity and specificity.

Shoulder ultrasound scanning by the surgeon – the “one-stop shop,” L Funk, Wrightington Hospital, Wigan

Ultrasound of the shoulder is generally performed by radiologists in the UK and USA, but by surgeons and clinicians on the European mainland. This is purely historical, determined by who adopted the technology first.

With the advent of small portable ultrasound devices and the rapidly improving visualization technology of ultrasound it is becoming easier for clinicians to use ultrasound in the office. Surgeons and sports clinicians have a good understanding of the clinical findings and the underlying anatomy. Adding ultrasound to the clinical examination is a natural progression to aiding the immediate diagnosis, similar to a physician using a stethoscope.
Office ultrasound removes the additional waiting time and inconvenience of returning for a scan and then again for a follow-up visit with the clinician. It also gives the clinician the opportunity to demonstrate the pathology and anatomy to the patient, improving the treatment experience. Office ultrasound of the shoulder in the hands of a trained clinician is also as accurate as a trained musculoskeletal radiologist.

In this lecture I will discuss the use of office ultrasound in a sports shoulder practice, emphasising the benefits to the patient, clinician and sports clubs.

The Paediatric Retroperitoneum

Renal ultrasound in the neonate, T Humphrey, Leeds Radiology Academy

In this talk we will discuss the postnatal imaging of antenatally detected renal dilatation and review the ultrasound appearances of the renal pathologies that may be encountered in the neonate.

Renal and adrenal tumours in children, W Ramsden, Leeds Children's Hospital

This talk will highlight the role of ultrasound in the diagnosis and follow-up of renal and adrenal tumours in children, whilst placing sonography within the overall context of the imaging required. The imaging appearances of both Wilms' tumour and neuroblastoma will be discussed, as will those of rarer lesions such as mesoblastic nephroma. The lecture will include both typical and atypical sonographic findings in Wilms' tumour and neuroblastoma, and discuss how to distinguish them by imaging means – although this can sometimes prove challenging. The lecture will also address the diagnosis of benign lesions which may mimic tumours and show how these may be distinguished from malignancy.

Disorders of the pancreas in children, N Wright, Royal Manchester Children's Hospital

Generic Messages:

- US is usually the imaging modality of first resort, and for follow-up.
- Practical point....’Make your tummy bigger, stick it out...and relax, let it go soft”....it sometimes works to get good, but brief views.
- CT is the most expeditious method of assessing trauma and complications of pancreatitis.
- Magnetic Resonance Cholangio-pancreatography (MRCP) can be very helpful in assessing pancreatico-biliary problems.

Key messages for the Generalist:

- Pancreatitis – beware the ‘large’ child, & MRCP may help.
- Trauma; beware pancreatic transsection and remember non-accidental injury in unexplained pancreatic pseudocysts.
- Cystic Fibrosis; the pancreas is frequently small and echogenic. Cystosis is not an unusual finding.

Key messages for the Specialist:

- Pancreatic tumours are rare, the commonest primary lesion is a pancreaticoblastoma, although there are others.
- Beware inherited metabolic conditions; some children can have (lethal) pancreatitis without the amylase being raised (eg MMA).
- F-18-DOPA PET/CT is currently the imaging investigation of choice for congenital hyperinsulinism (Nationally Commissioned Service; two centres GOSH & Alder Hey/Manchester joint service).

References:

Pancreas Imaging;

E Chung, M Travis, R Conran, Pancreatic Tumours in Children: Radiologic-Pathologic Correlation. Radiographics 2006; 26: 1211-1238


BA Blomberg, Moghbel MC, Saboury B, Stanley CA, Alavi A The value of radiologic interventions and 18F-DOPA PET in diagnosing and localising focal congenital hyperinsulinism: systematic review and meta-analysis. Mol Imaging Biol 2012; on-line


Related Papers:

(Delaney L, Applegate KE, Karmazn B et al. MR Cholangiopancreatography in children: feasibility, safety; and initial experience. Ped Radio 2008; 38:64-77)


**Contrast Enhanced Ultrasound (CEUS) versus Computed Tomography (CT) in the follow-up of abdominal trauma in a paediatric and young adult**, AM Deganello, E Konstantatou, O Romanos, ME Sellars, PS Sidhu, King’s College Hospital, London

**Purpose:**
To determine the value of CEUS in the follow-up of children and young adults who sustained blunt or penetrating injuries to solid abdominal viscera in comparison to CT, which remains the gold-standard, in order to reduce the radiation exposure dose.

**Methods:**
Single-center retrospective review of CT database of children and young adults referred for abdominal trauma over a 16-year period (1998-2013). CT scans were performed with post- contrast split-bolus or dual-phase protocol depending on the indication. We documented the number of CT and CEUS scans performed at follow-up and, when both available, we compared their results. We also recorded the number of patients who had CEUS alone as follow-up investigation. CEUS scans were performed by experienced radiologists, following informed parental consent with no adverse events.

**Results:**
A total of 766 children and young adults, (Female=161, Male=605, mean age 15yrs, range 9m-20y) were referred to CT for abdominal trauma. 112/766 (14.6%) patients had at least one follow up CT scan for solid organ abdominal injury, and of these, 37/112 (33%) patients underwent CEUS: in all cases complications were correctly diagnosed on CEUS when compared to CT, and in 3 of these cases CEUS diagnosed lesions not seen on CT. After the introduction of CEUS in 2011, 30/75 (40%) patients followed-up for solid organ injury at presentation had CEUS only with no further CT evaluation. 2 additional trauma patients aged 12 and 11yrs were initially and solely investigated with CEUS due to low grade mechanism of injury.

**Conclusions:**
Our experience demonstrates the usefulness and accuracy of CEUS compared to CT in the follow up of hepatic, renal and splenic injuries. With the introduction of CEUS we were able to reduce the number of CT scans performed in the follow up of these patients, reducing substantially the high cumulative radiation burden in a particularly susceptible population.

**Beyond the abdomen: paediatric vascular and musculoskeletal ultrasound**

**Paediatric vascular anomalies**, S Stuart, Great Ormond Street Hospital, London

In recent decades a considerable amount has been learnt about the pathology, etiology, imaging and treatment of paediatric vascular anomalies. As a result the terminology used for these lesions and classification has been simplified making the imaging, diagnosis and naming of these lesions straightforward. This talk aims to demystify these lesions and provide a structured framework for identifying and diagnosing them. The classification, key clinical findings, imaging features and modern treatment will be discussed with an aim to demonstrate that approaching and imaging these lesions needn’t be as hard as it first seems. The ideas and findings discussed will also be relevant to adult practice and will be approached with a focus on ultrasound and how the ultrasound report can aid the clinician.
MSK ultrasound in children, J Kraft, Leeds Children’s Hospital

The diagnosis and treatment of developmental dysplasia of the hip, G Wilkinson, Royal Hospital for Sick Children, Edinburgh

Ultrasound of neonatal hips for dysplasia is usually reported to the referring clinician by classification according to Graf (acetabular angle) or Harcke (percentage femoral head cover). There may be a comment on stability. The clinician uses this report to make treatment decisions.

There are many pitfalls with this approach: there is substantial interobserver error in Graf classification, hips may not easily fit into one Graf type, normal a angles vary with age, sex and laterality, static measurements may be erroneous in the presence of instability and the posterior stress test is insensitive and observer dependent. Morphological abnormalities that are associated with hip instability such as notching of the acetabular margin, flattening of the femoral head and loss of concavity of the acetabulum may be ignored. Graf type 1 hips can deteriorate and most screening programs have some that have gone on to need surgery for hip dysplasia. There is risk of misinterpretation of the report by the clinician. Treatment should start by 8 weeks of age for best results.

Many sonographers fail to recognise the value of observing the hips as the baby wriggles on the couch. The majority of hips that are unstable sublux superiorly during spontaneous movement despite a negative posterior stress test.

With 25 years of experience of neonatal hip ultrasound I have moved away from Graf to a more logical approach involving only three categories. If the hip is obviously abnormal- often having a convex acetabular roof- and unstable it should be treated at the first visit. If the hip is completely normal the baby can be discharged. Indeterminate hips should be observed until six weeks of age then treated if not completely normal. We have not had a single missed hip using this simple method. Evidence for all these statements will be presented.

Reporting skills and Quality Assessment Masterclass

Led by: PC Parker, Hull and East Yorkshire NHS Trust

Measuring quality of images and reports is becoming ever more crucial but can be complex and subjective. This masterclass will give you skills in reporting and how practice can be measured against agreed benchmarks.

Delegates will work together in small groups, assessing cases and their associated reports in conjunction with the faculty, using the BMUS QA proforma. There will be group discussion following the initial assessment period to allow the faculty and delegates to discuss their reasoning behind their assessment/decision. The proforma will allow a standardised appraisal process to be followed, within this workshop and subsequently within your Ultrasound department.

What is good reporting? What are the essential skills that need to be learnt in order to compose good reports?
J Wilson, University of Leeds

Good report, bad report? Good request? RM Evans, Morriston Hospital, Swansea

Quality – how can we assess? P Cantin, Derriford Hospital, Plymouth

Future developments – the Hull Experience, OR Byass, Hull and East Yorkshire NHS Trust

Advanced MSK ‘hands on’ workshop

Led by: A Hall, Keele University

This workshop is intended for those with sound knowledge of ultrasound instrumentation and basic MSK scanning techniques, who wish to extend their scope of practice.

Fundamentals of MSK ‘hands on’ workshop (basic MSK)

Led by: C Drury, Hull and East Yorkshire NHS Trust

This workshop is aimed at those with a sound knowledge of ultrasound but little or no experience in MSK ultrasound scanning.
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