Was pacing appropriate on this occasion?
Septal Ablation for HOCM
Correspondence
Should cardiac physiologists be working in cath labs?
Council Meeting Summary
Membership Renewal form
Situations Vacant
Modernising Scientific Careers
On the 8th December 2009 there was a “Curriculum Stakeholder Engagement Meeting” for the Modernising Scientific Careers (MSC) programme. The Department of Health revealed the latest version of the curriculum for both the Practitioner Training Programme (PTP) and the Scientific Training programme (STP). Before discussing the curriculum, there were a number of presentations re-emphasising the need for the professions to be “flexible and sustainable”. Whilst some of the content was unpalatable, there is little doubt that there will have to be yet more changes in the way service is delivered within the NHS if the quality of service is to be maintained with the more limited budgets we are going to face over the next few years. Exactly how we are to achieve this was unclear.

The overview of the latest MSC plans revealed some positive changes when compared to the original pathway. This included a connection between the practitioner and scientist levels indicating that a move that could be achieved via ‘demonstration of equivalence’. Undoubtedly, the bar will be high but I was pleased to see this new avenue as a route up into the higher levels had been effectively blocked in the previous version.

In the discussions regarding detail of the training programmes, the issue of rotation was raised yet again. There is broad training in the 1st year of the PTP but this may be reduced in future. Cardiology has been linked with respiratory physiology and vascular technology. While there are certainly links between the groups the practicalities of a rotation with such disparate numbers required in service does not appear to be pragmatic in terms of training.

The long awaited response to the MSC consultation is expected to be released in the middle of December. It is to be released in conjunction with a UK wide policy statement and an action plan for the NHS in England. I would urge all members of SCST to consult the Chief Scientific Officers website frequently to access the publication and let Council have your thoughts on the documents.

Data Protection
The British Cardiovascular Society (BCS), to which SCST is affiliated, occasionally request access to our database to circulate information relevant to all working in cardiology. Up until now we have refused due to concerns over data protection. This year we have added opt-outs to the membership renewal form to facilitate the introduction of wider access to information produced by BCS and approved by SCST Council. This means that those members wishing to receive circulations approved by Council should leave the tick boxes blank. I would like to reassure you that Council will closely monitor this process to ensure that the membership only receive material relevant to the work that we do.

Brian Campbell BSc PhD FSCS

From the Chair
Dear Editor,

I was interested to read a few months back the two views with regards to the personnel required to fulfil the role carried out by Cardiac Physiologists within the Cardiac Catheterisation Units.

I do feel that there is still the need for input from Cardiac Physiologists and that students need to spend time there to obtain the practical experience which builds upon the theory learned at university. Their training would be incomplete without this experience. However I do agree that they should not languish there once qualified.

I feel that with the use of the Associate Practitioner we can keep our position within the Cath Lab, whilst allowing newly qualified staff a quicker rotation without “languishing”. There are certain tasks within the Catheter lab and other areas of cardiac physiology which can be done by the Associate Practitioner. Associate Practitioners have very similar levels of responsibility to those which were held by the basic grade “technician” of 15 years ago; who did amongst other tasks work within Cath. Labs. However I would also like to emphasise that Associate Practitioners should not be used as cheap labour and should be employed to do grade appropriate tasks.

It is also good to embrace the new skills within the Catheter lab settings that are now open to Cardiac Physiologists. For example, there are now centres where Cardiac Physiologists implant loop recorders, and perform pacemaker generator replacements. These new skills can be performed by the appropriately qualified and experienced Cardiac Physiologist.

In conclusion, we do need to review the skills performed by qualified staff and along with wise use of Associate Practitioners we can keep as many skills as possible within our Departments. At the same time we need to encourage appropriately qualified Cardiac Physiologists to grasp the new opportunities on offer.

If we start to let our skills go elsewhere we will begin to erode our position within the healthcare professions.

Elizabeth Bowman
Inverness

The following explanations were received in response to the ‘Pacing Challenge’ query printed in the December 2009 edition of SCST Update.

When sensing occurs during the Ventricular Refractory Period (VRP), the refractory period (and its blanking period) is restarted. The way the pacemaker functions during continuous refractory sensing in the VRP is called noise reversion. If there are multiple restarts of the VRP (continuous noise reversion) the pacemaker will pace at the lower rate interval. In the example, the interval from the S (prior to the fourth SR) to the first P is 1000ms (60bpm) and to the next P again 1000ms. Thus, the series of SR (VRP sensing) activated the noise reversion mode.

Pieter Van Zyl
Cardiac Physiologist - Certified Cardiac Device Specialist,
Poole Hospital NHS Foundation Trust

I believe the electrogram demonstrates Noise Reversion Mode. Repetitive senses in the recurrent refractory period trigger the device to this mode, which is asynchronous VOO pacing at the base rate [of 60]. In the event of this being oversensing of EMI, EMG etc, it’s protection against inappropriate inhibition with no (or inadequate) underlying rhythm. It can also be seen in an AAI(R) pacemaker in the presence of an atrial tachyarrrhythmia.

Adrian J Bottomley

I can only presume that this is safety pacing or noise reversion because the preceeding 3 beats before the first paced output all fall in the refractory period (if you measure from the last sensed beat not in refractory to the paced beat it equals the LRL) the pacemaker may not be sure if these are intrinsic complexes or noise so it safety paces slightly after the sensed complexes at the lower rate limit to avoid asystole if it is indeed noise.

Sally Owen, MSCST CCDS
Senior Cadiac Physiologist
Betsi Cadwaladra University Health Board
Should cardiac physiologists be working in cath labs?

The following article is reprinted with permission from News Pulse, the journal of the Irish Society of Cardiological Technology.

In the July edition of SCST Update, the journal from the Society for Cardiological Science and Technology in the UK contained two articles which are certainly “thought provoking” at the very least. The first article by Dave Richley asks the question “Should Cardiac Physiologists be working in Cath Labs?”. In this article he asks whether it is appropriate that graduate healthcare scientists to be working in Cath Labs?” Whilst agreeing that device implantation and electrophysiology studies may indeed need the scientific knowledge that can only be provided by a qualified Cardiac Physiologist, it could be argued that routine tasks undertaken during routine coronary angiography and intervention could be carried out by anyone with suitable practical training. Whilst conceding that hemodynamic monitoring and the setting up of Intra-aortic Balloon Pumps and Pressure Wires and other adjunctive equipment are vital he asks the question whether these things really need to be done by someone with an honours degree in physiology.

The author seems to base the argument on the shortage of staff in the areas of echocardiography and management of implantable devices and the fact that junior staff are left languishing in the cath labs whilst they want to advance their careers in more specialised and high skilled areas. His solution is to suggest that other health care professions could be trained in this area and thus move the physiologist out of the area of supervised technical work.

In the final paragraph of his article he suggests that this role could be taken over by any of the other health care professionals in the cath lab, such as nurses, radiographers, associate practitioners or bespoke Cath Lab practitioners. The final line that “perhaps it is time for cardiac physiologists to get out of the cath lab and into intellectually demanding and fulfilling work that is more befitting of their scientific status”.

This article is certainly thought provoking but speaking personally I cannot agree with the sentiments. Surely we have spent the many years as a profession trying to raise the profile of the job we do. In the Cath Lab, perhaps in my naivety, I have believed we play a vital role within a team charged with the care of the patient during angiographic and interventional procedures. Many cases are indeed routine and go smoothly, however part of the learning experience of training in the Cath Lab is learning the routine of the cases, the particular preference of physicians and the slightly different workflows of various operators.

Even the experienced physiologist experiences this “new learning curve” when they move from one centre to another. I would believe that more specialised equipment such as intra-aortic ballon pumping, pressure wires and intra-vascular ultrasound allow the physiologist to demonstrate the unique knowledge which they bring to this team. One could argue that another healthcare professional could be trained to carry out routine cases and the physiologist could be called on for such procedures or in the case of emergency procedures, I would argue that a well established team works far better than a situation where someone “drops in” in certain situations into perhaps an ill-defined role. This point is brought home when speaking to physicians who are undertaking new procedures such as Percutaneous Aortic Valve Replacement, they emphasise the need to have the same team in place for the initial twenty or so procedures. Their point being that the essence, experience and the relationship of the team is vital for the success of the procedure. One also wonders at the implication that the Cath Lab is neither stimulating, challenging or is particularly skilled when compared to areas such as echo or device management. One could make the very same arguments about echocardiography or device management. Surely given time any healthcare professional, for example a radiographer with an experience of ultrasound or a nurse could be trained in the use of the echo machine. Many device checks are routine and follow the same steps, could someone else not be trained to do these jobs also.

The Cath Lab perhaps has become automated, which may have led to a dumbing down of our knowledge. How many of us can state what is needed to work out a shunt, what level of shunt is significant, the various factors which can affect the accuracy of the measurement of Cardiac Output whether by the Fick or Thermodilution method. I know if I was forced to answer all these questions now I may struggle. I would like to think that part of our strength comes from the theoretical knowledge we have but also from the interaction of our knowledge and experience from the different areas of cardiology, including not only Echo, device management but also from our role within the Cardiac Cath Lab.

Again it may be naivety on my part but I always feel that as a physiologist I have played an important role in the care of a patient who comes into our Cath Lab and I take professional pride in that. I would hope I am not alone.

Paul Nolan
University Hospital Galway
This case concerns a 65-year old female who had a dual chamber pacemaker implanted in 2006 for complete heart block. The patient had a surgical atrial septal defect repair performed without complications when she was 27 years old and in 1996, at the age of 52, she was diagnosed with hyperthyroidism due to a large multi-nodular toxic goitre. At a routine annual thyroid check in 2003, the goitre was noted to have increased in size. The patient was treated with Carbimazole to control a variable Thyrotropin Secretion Hormone (TSH) level.

In January 2009, after the patient had complained of increasing shortness of breath, she was found to be in atrial fibrillation (AF), for which she was prescribed Warfarin. The patient also had an increase in thyrotoxicity with suppressed TSH, which may have accounted for the development of the AF. Once this was controlled with Carbimazole she underwent a successful DC cardioversion in March 2009. Also in March 2009, following her cardioversion, she attended for pacemaker follow-up, which demonstrated atrial sensing and ventricular pacing. On this occasion, as with every previous pacemaker follow-up, no R-wave was detected during testing at 30 bpm for ventricular sensing.

In July 2009, to prevent any recurrence of AF, she also underwent a total thyroidectomy and commenced thyroxine therapy. Following this, in August 2009, she came for her routine pacemaker follow-up. On this occasion, for the first time since the pacemaker was implanted, she was in sinus rhythm with intact AV conduction. We increased her AV delays and programmed on ventricular intrinsic preference (VIP) to encourage her own intrinsic conduction and gave her a 6 month appointment, when we will re-assess her rhythm.

The questions raised by this sequence of events are: what caused her CHB in the first place, and why after so long did she revert to sinus rhythm?

Research has shown that a hyperactive thyroid can cause tachyarrhythmias such as sinus tachycardia and AF, and intra-atrial conduction defects as evidenced by P-wave abnormalities. However, it has also been documented that in very rare circumstances forms of heart block, such as Mobitz II and CHB, can occur (Karakas et.al, 2009).

There are a number of possible explanations of why this patient developed CHB necessitating the insertion of a DDD pacemaker. They include:

- Long-standing conduction disturbances caused by her surgical ASD closure. This is unlikely owing to the long period of time between ASD closure and onset of CHB and does not explain the spontaneous reversion to sinus rhythm.
- Over-medication of Carbimazole, causing hypothyroidism and then leading to CHB. This is unlikely, because the patient was receiving regular annual checks, where adjustments in medication were made to maintain euthyroidism.

- Thyrotoxicosis; this is a known but very rare cause of CHB.
- The large goitre may have caused increased vagal tone, suppressing atrioventricular conduction, which then resumed following thyroidectomy. The likelihood of this is unknown.

Alternatively, there may be no causal relation between the thyroid disease or previous surgery and the complete heart block. Patients who have developed CHB as a result of thyrotoxicosis have been well documented. The following two cases closely resemble the scenario observed with the current patient.

Osman et.al (2001) presented a 60 year old female with long standing Graves disease, severe thyrotoxicosis and suppressed TSH. Their patient also demonstrated CHB on ECG and had been treated with Carbimazole, becoming euthyroid. This patient remained in CHB requiring a DDD pacemaker; thereafter she had a total thyroidectomy. Unfortunately her rhythm following total thyroidectomy is not documented.

More interestingly, Ho et.al (1998) presented a sixteen year old female diagnosed with long standing Graves disease with a palpable goitre who also developed CHB. This patient was also treated with Carbimazole and subsequently received a temporary pacemaker. When no improvement in the patient’s condition was noted, she received intravenous sodium iodide to control her hyperthyroidism and eventually received radioactive iodide therapy, after which she reverted to sinus rhythm with a normal PR interval. Temporary pacing was deemed unnecessary and stopped.

It has been suggested from the limited knowledge of thyrotoxicosis as a cause of CHB that CHB often develops as a result of severe, long standing disease. Although the mechanisms are relatively unknown, a few have been suggested.

It is thought that thyroid hormone auto-antibodies may cause interstitial inflammation of the AV node and His bundle, as well as myocyte hypertrophy, oedema and necrosis, thus causing AV nodal conduction disturbances (Ho et.al, 1998).

Osman states: “Direct metabolic effect may also cause conduction disturbances, since thyroid hormones directly influence cardiac electrophysiological function” (Osman et.al, 2001).

*Article continues at the bottom of page 6*
Links with Cardiac Physiologists in New Zealand: There has been further correspondence with the New Zealand Society regarding reciprocal Affiliate membership and mutual recognition of professional status. Dr Campbell agreed to draft a response to their Council.

BCS 2010: In the spirit of multi professional working a joint programme with British Association for Nursing in Cardiovascular Care (BANCC) has been produced. Speakers have been confirmed and a response is awaited from BANCC regarding their contribution.

SCST AGM & Scientific meeting: Council discussed cost and suitability of venue options for this meeting to be held in Birmingham during May 2010. The Novotel in Broad St was agreed as the most suitable and central for travel. Executive Business Support will organise the event. It was agreed that SCST members would have a reduced cost for attendance.

The programme is likely to include: The role of the Consultant Echocardiographer, NICE Chest Pain guidelines, a presentation on Extreme Physiology, Remote ambulatory monitoring, an update on Modernising Scientific Careers Update and a selection of case studies.

SCST and Executive Business Support (EBS): Mrs J Hutchinson, Managing Director, EBS attended the meeting to discuss potential mechanisms for improving income generation for SCST. This is important as MSC proposals are likely to result in a significant drop in income for the professional body.

Research Interest Group: Dr. Eggett and Mr Richley put forward a proposal to establish a research interest group (RIG) within the Society. They felt that a graduate profession should encourage a pro-active approach to research in the workplace and aim to improve the scientific quality of current research projects.

As little is known about CHB as a result of long standing thyrotoxicity, more research is needed. It may be that in the future, CHB patients with severe long standing thyrotoxicosis should be considered for thyroidectomy or radioactive iodide as an alternative treatment to cure bradycardic AV conduction abnormalities. This case study raises the question of whether the patient actually needed a permanent pacemaker. We will find out at her next follow-up in February 2010.

Mark Lowrey, Cardiac Physiologist,
Freeman Hospital, Newcastle upon Tyne

Workforce Questionnaire: Mrs Su Baxter agreed to compile a workforce questionnaire that will be distributed to all departments within the UK.

Education: Council received a brief update from the Education Committee. Mr Wilson McNair has been appointed as the Professional Body Moderator for Glasgow Caledonian BSc Clinical Physiology degree. The Undergraduate Part 2 exam has been reviewed for content and style. The Certificate of Electrocardiography syllabus is now under review.

Regulation: RCCP representatives recently attended a meeting with the Chief Scientific Officer, Professor Sue Hill regarding regulation and they will be updating members on the outcome forthwith.

SCST Update: Council agreed to a change in title to The Journal of the Society for Cardiological Science and Technology and a new front cover. These changes will occur as from January 2010. The Editors will continue and are keen to receive projects, audits, case studies and articles related to professional practice.

Institute of Physiological Sciences: The Department of Health has not yet produced their response to the MSC consultation however it is evident that plans are being put in place to introduce the new process, possibly from Autumn 2010.

Council discussed the proposal for a new, 3 year Healthcare Science honours degree that will replace the current Clinical Physiology degree. Students studying the new course will not be employed by the NHS and will undertake placements across the three years of their course. Consequently they will have significantly less experience in the workplace on completion of this course when compared to current trainees. No details regarding the course content are yet known, however, Council members felt it was important that employers must be made aware that the graduates from the new programme will not be at the same level of competence as current graduates.

References
Septal Ablation as Treatment for Hypertrophic Obstructive Cardiomyopathy

Septal ablation is an advancing technique carried out in cardiac catheterisation laboratories, first developed in 1995, which has grown in preference over the years and is currently exceeding septal myectomy rates for the treatment of hypertrophic obstructive cardiomyopathy (HOCM). This article aims to briefly explain HOCM and in particular the process of septal ablation in a catheter lab setting.

HOCM is characterised by the presence of left ventricular hypertrophy in the absence of other causative factors, such as aortic stenosis or hypertension, with left ventricular outflow (LVOT) obstruction. LVOT obstruction, in most cases results from one or more of the following pathology:

- Hypertrophied ventricular septum
- Small LVOT
- Elongated mitral valve leaflet (MVL) (usually anterior)

During ventricular systole, the excursion of the MV leaflet blocks the LVOT and makes contact with the ventricular septum. This is described as systolic anterior motion (SAM) of the MVL. This ultimately obstructs blood flow through the aortic valve. High intra-cavity LV pressures are generated in order to overcome the impedance to flow. LV – Ao gradients of 30mmHg and above, in the presence of symptoms would be deemed significant in accordance with the European Society of Cardiology and American Heart Association Guidelines, Maron & McKenna et al. 2003. As a result of increased LV wall stress: myocardial ischaemia, cell death and subsequent fibrosis results. If HOCM is left untreated it can result in severe heart failure, stroke and death.

The current treatment strategies for HOCM include medical management, dual chamber pacing, septal myectomy and septal ablation. Great inter-individual variability in the characteristics of HOCM means that different treatment strategies may not be suitable or successful for all patients.

Septal ablation is a technique that involves injection of absolute alcohol down the septal branch of the LAD that supplies the proximal ventricular septum. The alcohol causes infarction of this area of myocardium and occlusion of the septal perforator branch, the effects of which are similar to septal myectomy, resulting in akinetic/hypokinetic septal motion. This serves to increase LVOT size and reduce SAM of MVL, therefore reducing the LV-Ao gradient.

**Case Study**

Septal ablation was carried out at the Royal Infirmary Edinburgh (RIE) on a 60yr old gentleman diagnosed with HOCM. Prior to the procedure the patient was given a general anaesthetic and connected to an ECG, BP and SPO₂ monitor. This gentleman has a dual chamber pacemaker in situ; however in other cases a temporary pacing wire would be used prophylactically during this technique due to the possibility of AV block induction.

A 5 French (FR) pigtail catheter was inserted in the LV via the left femoral artery, and a 5 FR guide catheter capable of engaging the left coronary ostium, was inserted into the aorta via the right radial artery. A trans-oesophageal echocardiography (TOE) probe was also positioned.

Figure 1.1 shows the simultaneous LV and Ao pressures, highlighting a peak systolic LV pressure of between 161 – 167mmHg, and peak systolic Ao pressures of between 83 – 88mmHg. This patient’s LVOT gradient is in the region of approximately 80mmHg at rest.

**Pre-procedure LV-Ao pressure gradient:**

![Figure 1.1](image)

Angiographic views are then taken of the left coronary artery while the interventional cardiologist locates the septal perforator from the left anterior descending (LAD) artery that supplies the area of ventricular septum that is contributing to obstruction. This is done by feeding a guidewire through the catheter in the aorta, and manipulating it into the target septal perforator branch. A balloon is fed over the guidewire and positioned in the proximal part of the septal branch. At this point the balloon is inflated (in order to prevent fluid back flow), while echo contrast is injected through the balloon lumen. TOE images are scrutinized to see what parts of the LV the echo contrast diffuses across. The target area of LV is the point at which the SAM of the MVL meets the septum.

Once satisfied that the correct perforator has been located, ethanol infusion begins while TOE and haemodynamic measurements are monitored closely. This particular patient received 2.5mls of ethanol over five minutes. The balloon is kept inflated for a further 5 minutes post infusion in order to make sure that there is absolutely no backflow of ethanol into the LAD, and to make sure that the septal perforator becomes fully occluded, therefore preventing reperfusion of the infarcted area.
Figure 1.2 shows the simultaneous LV and Ao pressure measurements post ablation. Peak systolic LV measurements range from 114 – 120mmHg. Peak systolic Ao measurements range from 93 – 98mmHg. The new LVOT gradient is approximately 20mmHg.

**Post-procedure LV-Ao pressure gradient:**

![Figure 1.2](image)

The pressure recordings demonstrate that in this particular case, an immediate pressure gradient drop in the region of 60mmHg has occurred as a direct result of septal ablation.

Below are TOE images before and after the procedure. Figure 2.1 demonstrates the mitral valve leaflet opening and making contact with the septum, obstructing the LVOT.

**Pre-procedure TOE showing SAM of MVL image:**

![Figure 2.1](image)

Figure 2.2 is the same TOE view, immediately post procedure. As a result of the procedure there is more of a gap between the opening anterior mitral leaflet and the ventricular septum, therefore less obstruction is caused.

Other documented reactions to this procedure are a gradual drop in LVOT pressures over a period of 6 – 12 months. Other patients may demonstrate a biphasic response to treatment, encompassing an initial drop in LV pressure secondary to myocardial stunning, followed by a rise one to two days after the procedure.

**Post-procedure TOE showing SAM of MVL image:**

![Figure 2.2](image)

Then follows a progressive drop in LVOT gradient. Several anatomical changes have been demonstrated in patients post procedure, including septal wall thinning as a direct effect of ablation, and regression of LVH secondary to reduced LV pressures.

Despite emerging as a prevalent interventional treatment for HOCM, septal ablations are still a relatively uncommon procedure, and its practice is restricted to large cardiac centres. This will probably remain the case at present, as demand for the procedure is not great enough for large numbers of physicians to gain competence in the procedure. However, as developments are made in this area, demand may increase in the future, making it a more familiar procedure across more catheter labs.

Laura Brodie, Cardiac Physiologist, Western General Hospital, Edinburgh
Contact: Laura.Brodie@luht.scot.nhs.uk

**References:**

Maron BJ and McKenna WJ et al. ACC/ESC Expert Consensus Document on Hypertrophic Cardiomyopathy, JACC 2003;42(9):1687-1713

**Acknowledgements:**

Cardiac Physiologists David Cusack and Elaine Wright, Consultant Cardiologists Dr James Spratt and Dr David Northridge.

**Writing for the journal**

This publication is a professional journal which aims to publish features that are interesting, thought-provoking and of use to cardiac physiologists and support workers. We welcome your contributions in the form of letters, news and feature articles, book reviews, conference reports, summaries of research studies or audit projects.

**Submitting your contribution:** Please send articles by email to editor@scst.org.uk and include your name, postal address and a phone number. If accepted, we will publish your article in the next available publication. All articles are edited for length, style and clarity.
**THE SOCIETY FOR**

CARDIOLOGICAL SCIENCE & TECHNOLOGY

Founded 1948    Incorporated 1965

**Membership Subscription Renewal**

Due 1st JANUARY 2010

*** Please read the notes below carefully before completing ***

THIS FORM SHOULD BE COMPLETED FULLY & RETURNED TO THE ADDRESS BELOW TOGETHER WITH A SELF ADDRESSED ENVELOPE. CHEQUES/POSTAL ORDERS (IN POUNDS STERLING) SHOULD BE MADE PAYABLE TO: - THE SOCIETY FOR CARDIOLOGICAL SCIENCE & TECHNOLOGY

Members who pay subscriptions by Bank Standing Order are also required to complete this form thus indicating their wish to remain a member of The Society for Cardiological Science & Technology. New members who were registered on/after 1 November 2009 are NOT required to pay the subscription in 2010.

Please return this form to: - SCST Executive Business Support (EBS), City Wharf, Davidson Road, Lichfield, Staffordshire, WS14 9DZ

Members of SCST who take advantage of the joint SCST/BCS membership have free registration for the BCS conference.

<table>
<thead>
<tr>
<th>SURNAME (PRINT CLEARLY)</th>
<th>FORENAME (S) (PRINT CLEARLY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADDRESS FOR CORRESPONDENCE (To receive SCST UPDATE)</td>
<td></td>
</tr>
<tr>
<td>..........................................................</td>
<td></td>
</tr>
<tr>
<td>..........................................................</td>
<td></td>
</tr>
<tr>
<td>..........................................................</td>
<td></td>
</tr>
<tr>
<td>Post Town: ...................... County: ..........</td>
<td></td>
</tr>
<tr>
<td>..........................................................</td>
<td></td>
</tr>
<tr>
<td>..........................................................</td>
<td></td>
</tr>
<tr>
<td>E-Mail Address: ..................................................</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SCST MEMBERSHIP No</th>
<th>HOSPITAL/COMPANY NAME</th>
<th>HOSPITAL GRADE / COMPANY TITLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCST STATUS (Indicate as appropriate)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fellow SCST £60.00 Member SCST £45.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student £40.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-Enrolled £40.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enrolled (Certificate in ECG) £45.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>QUALIFICATIONS HELD (Please indicate year awarded)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BTEC National Certificate □ Year ...............</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BTEC Higher Certificate □ Year ...............</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree ( ) □ Year ...............</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASCST Part 1 □ Year ...............</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASCST Part 2 □ Year ...............</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MSCST □ Year ...............</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FSCST □ Year ...............</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OLD ADDRESS (If changed during past year)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SURNAME (If changed during past year)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

I currently pay my membership subscription by Bank Standing Order - Please tick if YES □

If paying by Bank Standing Order please sign .......................................................... Ensure mandate valid at appropriate subscription rate

Name and membership number will be published on the SCST website unless written request to remove is received at the above address

I do NOT wish to receive circulations from the British Cardiovascular Society – tick box □

I do NOT wish to receive circulations deemed appropriate by SCST Council - tick box □
Specialist Cardiac Physiologist
Cardio-Respiratory Department, Doncaster Royal Infirmary
Band 6, £24,831 - £33,436 pro rata
30 hours per week

This is a challenging opportunity to join our forward thinking cardiology team in our new purpose-built department, offering excellent extensive scope for clinical and professional development within a supportive environment.

As a large first wave Foundation Trust we have consistently achieved 3 star status and have featured in the list of the Top 40 hospitals retaining consecutive Government Charter Marks for excellence.

We offer an excellent pension scheme and childcare facilities and are perfectly positioned, with the major regional centres, Nottingham, Leeds and Sheffield on our doorstep, excellent Rail Links (one hour and forty minutes to London) and the Robin Hood International airport within close proximity to the Trust. We also have access to delightful countryside in North Nottinghamshire, Derbyshire and Yorkshire, as well as excellent leisure facilities and low cost housing.

The department provides a full range of cardiac procedures, including exercise stress testing, tilt-testing, transthoracic and transoesophageal echocardiography, coronary angiography, permanent pacing and follow-up.

As a training site for the South Yorkshire Clinical Physiology Supernumerary training scheme, the department offers the potential to formally develop your skills in the delivery of training and education and is fully committed to continuing professional development and further training, actively encouraging study.

A BSc Clinical Physiology, HTrc MPPM or equivalent qualification, together with proven experience at Band 5 level is essential. BSE or HRUK accreditation or an equivalent postgraduate qualification would be an advantage. You should be on the voluntary RCCP register and hold Resuscitation Council (UK) ALS/ILS certification.

Apply online at www.jobs.nhs.uk or contact Howard Briggs, Department Manager, Cardio-Respiratory Department at Doncaster Royal Infirmary on 01302 381339, email howard briggs@dbh.nhs.uk
Closing date: 15 January 2010.
Committed to Diversity, Equal Opportunities and Promotes flexible working
Royal Brompton & Harefield NHS Foundation Trust

Based in beautiful countryside yet close to the attractions of London, the Royal Brompton and Harefield NHS Foundation Trust is the largest heart and lung centre in the UK, with an international reputation for innovation and leadership in treatment and education.

Senior Chief Cardiac Physiologist
Band 6a £42,252 - £49,852 p.a. inc. Ref: 312-HH-CA-2001

Invasive Cardiology at Harefield is leading the country in providing a 24/7 primary angioplasty service to patients in the community and is involved in all other aspects of cardiac investigation and therapy. We provide an on-call service to back these investigations up. We also have a comprehensive non-invasive section and a transplant section.

Due to the rapidly expanding nature of the electrophysiology service we need an experienced and enthusiastic Cardiac Physiologist to manage technical services in this section of the department both in our current electrophysiology laboratory and in our imminent, state of the art robotic laboratory.

You will have significant experience as a Cardiac Physiologist including experience in electrophysiology, a BSc, in Cardiac Clinical Physiology, ILS/ALS, and be HCPC registered. Post qualification accreditation such as HNUK/SHRE would be an advantage.

In addition to a competitive salary, we offer a final salary pension, subsidised child care facilities, discounted canteen, discounts to local and national amenities and attractions as well as excellent training & development opportunities.

For more information or if you are interested, please contact Julie Rochelle, Principal Cardiac Physiologist on 01895 828561.

Trainee Cardiac Physiologist
Band 6 (60% - 75% of top of band)
£20,061 - £25,677 p.a. + NCPA Ref: 312-HH-CA-2449

Use your A-levels as a gateway to joining one of the most interesting and worthwhile professions in the National Health Service and earn a salary whilst we train you and pay for your University Degree.

Due to the continuing expansion and improvement of the cardiac investigation and treatment services carried out at Harefield Hospital applications are invited for the post of Trainee Cardiac Physiologist. Cardiac Physiologists carry out, or are involved in, all investigations and treatment of patients with different forms of heart disease. Applicants should have, or are expected to achieve, 2 Science A-levels (one of which may be mathematics).

Closing date for both roles: 12 January 2010.

Guy's and St Thomas’ NHS Foundation Trust

Are you preparing for
The Certificate in Electrocardiography
Accredited By The Society For Cardiological Science and Technology?

The Department of Cardiac Physiology at Guy’s and St. Thomas’ Hospital are offering a preparation course for the September 2010 Certificate examination.

Choose from:
Day release: Commencing in March 2010 on an alternate Wednesday evening between 18.00 – 20.30 hrs. Cost £350.00

or

Block release: An intensive one week course in June 2010. Cost £350.00

We are currently accepting applications for both courses. Places will be strictly limited to ensure candidates have the best possible learning environment. If you would like more information or to reserve a place and obtain an application form on either course please contact:
Jeffery.Davison@GSTT.NHS.UK

SENIOR CARDIAC PHYSIOLOGIST
Band 6 • £24,831 - £33,436

To join this young and friendly department, in a busy DGH, you should have a BSc in Cardiac Physiology or equivalent, and be eligible for state registration.

We undertake all non-invasive investigations, and also have a spacious catheter laboratory with a developing PCI service and a large pacing and ICD service.

Ideally you should have experience in all of these areas, with a bias towards pacing and ICD's, but we are happy to support further training.

Qualified staff gain experience in all investigations and play an active part in the planning of our services. We also have an excellent reputation for the training and ongoing professional development of our staff.

In return for your commitment and passion, you will be working for a forward-thinking Foundation Trust who was named as one of the top 40 hospitals in the UK in last year’s CHKS awards.

For further information and an informal discussion or visit, please contact Glenda Lambert or Michelle Rodman on 01634 835933.

To apply please visit www.jobs.nhs.uk and search for Medway NHS Foundation Trust.

Closing date: 21 January 2010.

Find out more about the Trust and Recruiting A Attitude at www.recruitingattitude.co.uk

Where we are committed to Equality of Opportunity for everyone and will guarantee an interview to any disabled applicants who meet the minimum criteria.

www.medway.nhs.uk
NO SUSPECTS

Just quality locum staff every time.

SENIOR AND EXPERIENCED ONLY.
We need experienced Cardiac Physiologists from all specialities to register with us immediately!

Whether its one or two days a week or even just a few days a month, we have opportunities across the UK and Ireland. Weekends/evenings also available.

- Earn over £55/hr
- Short and long term rolls
- Designed to fit in with your available free time

Register with us NOW at www.primarydiagnostics.org