

# Research Strategy

## Operating Services Critical Care and Anaesthesia (OSCCA) 2015-18

### Introduction

Research is the fifth pillar of the NHS and it is a priority for Sheffield Teaching Hospitals NHS Foundation Trust. The changes introduced by the formation of the NIHR have provided us with an opportunity to embrace research, despite the lack of a University Based Department. As a result alternative mechanisms and collaborations have been employed. OSCCA has achieved prominence in several national studies and international studies, both in the national leadership positions and in supporting studies originating from other centres:

#### *Portfolio projects*

We have led nationally on BUMPES with Dr Matt Wilson as national clinical lead. SALVO examining blood salvage and reuse in obstetrics has Dr Ian Wrench as a co-applicant and local lead. Recently, as part of the PROVE European Protective Ventilation Group Prof Mills has taken the role as UK lead in three studies including PROVHILO, (which was recently published in the Lancet), PROVENT (undergoing analysis) and PROBESE (in set up), as well as leading the UK in the international BALANCED study (which looks at EEG targeted depth of anaesthesia as a means of reducing postoperative complications in older patients undergoing major surgery).

We have been involved with the design of one EU FP-7 grant. This was the PREDICT EU FP7 project, which led to the European Charter on Research in the Elderly, which was presented at the EU Parliament in Brussels in 2012. This was an 11 centre, 9 nation project based in Sheffield, which was featured on BBC news, Radio 4 and across Europe. Prof Gary Mills was the Deputy European Lead. Over a similar period there have been 4 EPSRC grants in collaboration with the Sheffield University Dept of Intelligent Systems in the Automatic Systems and Control Engineering Facility.

RESPITE has been developed by Dr Matt Wilson as chief investigator. This is a comparison of PCA remifentanyl vs intramuscular pethidine on labour ward. It is a multicentre UK study, which is currently recruiting.

The department has a growing interest in preoperative assessment, especially examining cardiopulmonary exercise testing. Dr Karen Kerr has been a pioneer in this area and a leading collaborator in several UK trials including HIT-AAA (High Intensity Training in those with an Abdominal Aortic Aneurysm for intervention). Recruitment targets for Sheffield have been met.

EPAQ-PO, based on an original concept to allow the use of electronic questionnaires in gynaecological conditions with the aim of reducing stress and embarrassment for patients in

difficult areas of assessment, has been redesigned as a means of screening patients awaiting surgery to maximize the opportunities to ensure they have suitable preoperative investigations. This has allowed the development of an MD thesis and will be the source of future grant collaborations with SchARR

The department has collaborated in a number of studies led by other centres including POISE 2 (drug prophylaxis of perioperative myocardial ischaemia), Calories (enteral v parenteral feeding in ICU), PREVENTT (Iron therapy in preoperative anaemia), Las Vegas (Ventilation and perioperative respiratory complications in the operating theatre), GAINS and GENOSEPT (genomics in sepsis, UK and EU), taking a role on the management committee of the last three.

GAINS and GENOSEPT have produced the largest epidemiological studies of faecal peritonitis. This aspect of the work has been led from OSCCA and has so far produced two publications and will form the basis of a current MD.

The department is also represented on the National Specialty Group for Anaesthesia/Perioperative Medicine/Pain, specialty research societies such as the neuroanaesthesia research group, anaesthetic research society, obstetric anaesthesia society.

### ***Trainee Involvement***

We have also developed our trainee lead research network (SHARC). SHARC is an open trainee-led network that has been in existence for 2 years. It facilitates access to research for interested individuals, irrespective of their experience or seniority. SHARC has run several home-grown regional projects eg BYOD but is also providing access to national and international projects. For details please visit <http://www.sharcgroup.org.uk> SHARC has been a founding member of RAFT (Research and Audit Federation of Trainees, <http://www.rafrainees.com>), a national umbrella research group facilitating collaboration between regional networks.

SHARC has supported three PORTFOLIO studies to date. These include POPULAR: a European Study examining respiratory complications in the postop period in patients who have had intraoperative muscle relaxants. SNAP-1 a national observational study of awareness during anaesthesia and ISOS an International Surgical Outcomes Study both led locally by Dr S Sanghera and Dr I Wrench.

Undergraduate research has included 5 BMedSci's within OSCCA, all leading to 1<sup>st</sup> Class Honours Degrees. OSCAA has also been successful in applying for funding for two Academic Clinical Fellows. These posts are currently in progress. Laura Arblaster, carried out a BMedSci on the impact of frailty on critical care outcomes after community acquired pneumonia and received the Intensive Care Society Annual "Essay" Prize.

### ***Grants for submission in 2015***

This year OSCCA is preparing or has applied for 6 grants. These include: POSTER (Peri Obstetric Surgery Trial of Enhanced Recovery) – Matt Wilson Chief Investigator and Ian Wrench Chief Clinical Investigator for a grant application to HS&DR concerning

enhanced recovery for elective caesarean section. Preliminary application has been submitted for £1.2million. Planned to start June 2016.

ANALYSIS OF PULSE OXIMETER WAVEFORM MORPHOLOGY DURING CAESAREAN. Ian Wrench Chief Investigator. Grant application to the National Institute of Academic Anaesthesia – Obstetric Anaesthesia, small grant £15,000

Physical treatment strategies in critical pulmonary illness: a systems medicine approach to therapeutic optimisation and personalised treatment. This is a collaboration with the Universities of Warwick, Nottingham and London. GH Mills £900,000. (Welcome)

The PROBESE Randomized Controlled Trial (UK). PRotective Ventilation with Higher versus Lower PEEP during General Anesthesia for Surgery in OBESE Patients –NIAA/AAGBI £10,000 Professor GH Mills

Evaluation of the microstructure and functional changes in the lung before and after major non-cardiac surgery, anaesthesia and mechanical ventilation, using functional hyperpolarized helium and xenon magnetic resonance imaging. BJA/NIAA grant £25,000 Professor GH Mills

Cloud-based intelligent stress and heart disease prevention and management decision support system. EU grant Co applicant WP 5 lead Professor GH Mills. Grant €5 million.

Research taking place in OSCCA can be divided into the following 4 main themes into which research falls. Other areas may develop, but these are current areas of activity with a strong track record:

- Critical Care
- Obstetric Anaesthesia
- Neuro Anaesthesia
- Peri-operative care
- These match well with the areas of interest highlighted by the Regional Specialty Groups for Anaesthesia/Perioperative Medicine/Pain and Critical Care
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### ***“New Researchers”***

New researchers are being encouraged, including Sumayer Sanghera SNAP-1, ISOS and PREVENTT. George Eapen is currently introducing a major international head-injury follow up study via neuroanaesthesia (CENTRE-TBI). Mel Woolnough and Ruth Newton have successfully applied for a grant from the Obstetric Anaesthesia Association, which has funded a Portfolio Randomised controlled trial of warming during elective caesarean section – comparing Bair Hugger/ Inditherm/ Normal care. So far 60 out of a target 120 have been recruited.

In critical care Sarah Irving lead CALORIES and now Dr AJ Raithatha ( as renal support lead) is exploring involvement in the Epidemiology of Acute Kidney Injury in ICU. Project (lead centre: San Diego).

Paul Whiting has an interest in psychological issues after critical care. An ongoing audit with psychology is being developed as a springboard for research.

Multidisciplinary research.

Most of our work has been medically based, apart from individual nursing MSc projects. However especially in critical care, where there is a strong history of multidisciplinary working and working groups to design care guidelines there is scope for many new developments.

The psychology audit has been driven by outreach nurses and the project to inform relatives of research projects on the units has been nurse led.

## Research Priorities

<b>1. Changing the OSCCA research environment</b>			
	<b>Priority</b>	<b>Current activity</b>	<b>Actions required to achieve objectives</b>
1.1	Appointment of a departmental research coordinator	Angela Pinder is currently in post, working part-time for the directorate and part time in the research department	<ul style="list-style-type: none"> <li>Angela is about to go on maternity leave. A replacement is vital to the department.</li> </ul>
1.2	Achieve targets as set out in POF table	Predicted activity is based on knowledge of internal production of projects and knowledge of type and number of national/international projects on horizon	<ul style="list-style-type: none"> <li>Predict realistic targets and aim to achieve them, with regular review (each research exec) of related issues</li> </ul>
1.3	Space for postgraduate and BMedSci researchers	We have co-supervised 8 PhD/MD students with a range of departments and currently have 2 MD students working towards their degrees.	<ul style="list-style-type: none"> <li>Space is very tight for individual office or research space and at present we rely on hot desking areas. More permanent space is needed for storage and as a home for these researchers</li> </ul>

<b>2. Supporting researchers in OSCCA</b>			
	<b>Priority</b>	<b>Current activity</b>	<b>Actions required to achieve objectives</b>
2.1	To develop Portfolio research,	Portfolio studies listed above have and are taking place. We will widen involvement as we have done with eg Calories. Run by Sarah Irving..	<ul style="list-style-type: none"> <li>Research exec to support individuals with particular skills and interests to take on Portfolio studies in their area by seeking access to relevant support</li> </ul>
2.2	To encourage research GCP training, amongst medical and nursing staff	Now accepted as part of medical trainees program and gaining acceptance amongst band 7	<ul style="list-style-type: none"> <li>Ensure GCP training and Research Consent training develops as part of skill set</li> </ul>

		nurses	required to be gained by medical and nursing staff
2.3	To ensure OSCCA maintains Network Research Nurse support	Currently OSCCA has been able to access NIHR CRN Research Nurse support. This has led to the successful completion of studies.	<ul style="list-style-type: none"> <li>• Discussion with anaesthesia/periop medicine/pain and critical care regional specialty group.</li> </ul>
2.4	To ensure that researchers are able to focus on analysing and writing up research, resulting in publications	Large numbers of abstracts are produced and presented at meetings. We need to convert more to peer reviewed journal publications	<ul style="list-style-type: none"> <li>• The Research Executive will implement a process whereby researchers can apply for study leave to complete publications.</li> <li>• At job planning times data on manuscript completion will be highlighted.</li> </ul>
2.5	Ensure continuous succession planning in trainee group (SHARC) and maintain advisory role of Consultant Researchers	The SHARC trainee group has become more involved in research including SNAP-1, ISOS and POPULAR as well as its own projects. This is being encouraged with advice and help from Consultants where necessary.	<ul style="list-style-type: none"> <li>• A representative of the SHARC group will always be invited to take part in both the Horizon Scanning and Research Executive meetings..</li> </ul>

<b>3. Leading and collaborating in research</b>			
	<b>Priority</b>	<b>Current activity</b>	<b>Actions required to achieve objectives</b>
3.1	To collaborate on NIHR Portfolio badged studies across the OSCCA clinical themes	All new portfolio studies that are open to new sites are reviewed for relevance to OSCCA eg CALORIES and also the PROVE group studies eg PROVHILO, PROBESE, LAS VEGAS, PROVENT	<ul style="list-style-type: none"> <li>• We will continue to identify new studies that are relevant and to build relationships with research active bodies such as ICNARC.</li> </ul>
3.2	To design studies in house that are grant funded leading to adoption onto the NIHR Portfolio.	Currently the number of grant studies led by STH OSCCA are small, but this has increased in the last year with a number of grants in development	<ul style="list-style-type: none"> <li>• Further development of ideas into grant applications is required to ensure that OSCCA leads on studies and secures grant funding.</li> </ul>
3.3	To collaborate with commercial sponsors where feasible	The number of commercially led studies is low in OSCCA, however with the constant review of new studies, this is hoped to increase. Several CVVH related studies have or are being reviewed.	<ul style="list-style-type: none"> <li>• We will continue to review all new commercially led studies that are notified to OSCCA via the CRN.</li> <li>• Where a study is feasible, an expression of interest will be submitted.</li> </ul>
3.4	To develop links via the National Priority Groups and via University links	Previously collaboration has been successful in intelligent systems (EPSRC) projects and obstetric anaesthesia (BUMPES)	<ul style="list-style-type: none"> <li>• We will cooperate in project design and grant applications with other organisations, in and outside Sheffield</li> </ul>
3.5	To develop projects within STH	Current or recent examples	<ul style="list-style-type: none"> <li>• Building on reputation for</li> </ul>

	with other directorates	would include SALVO and BUMPES	<p>respiratory research we have submitted a small grant with Prof Jim Wild to look at perioperative effects of ventilation (respiratory complications are the largest source of major postop complications). This builds on previous EU project links with academic radiology.</p> <ul style="list-style-type: none"> <li>We are now looking to do the same with psychology in the follow up of ICU patients</li> </ul>
3.6	To develop membership of research groups locally, nationally and internationally	Current involvement with obstetric anaesthesia, PROVE and CPX and BREATHE (steering group)	<ul style="list-style-type: none"> <li>Maintain ability of individuals to attend relevant project planning meetings</li> </ul>
3.7	To ensure that OSCCA is adequately represented and remunerated in any studies involving collaboration outside the department	Historically OSCCA have been involved in NIHR Portfolio studies but have received no compensation.	<ul style="list-style-type: none"> <li>Where we are responsible for some research activity for an NIHR Portfolio study, we will ensure agreement is in place with the lead directorate to compensate OSCCA via the NIHR accruals.</li> </ul>
3.8	Multidisciplinary research	There is a strong precedent for multidisciplinary working especially in critical care and nurses are strongly represented on the research exec	<ul style="list-style-type: none"> <li>Further develop post critical care psychology project and develop further projects</li> </ul>

<b>4. Management of research activity</b>			
	<b>Priority</b>	<b>Current activity</b>	<b>Actions required to achieve objectives</b>
4.1	To ensure recruitment to time and target	Historically recruitment has not been an issue that was focused on in great detail. This now however has an impact on directorate funding and may also influence prioritisation for grant awards	<ul style="list-style-type: none"> <li>OSCCA should ensure that 75% of all studies recruit to time and target</li> </ul>
4.2	Achievement of POF targets as in 1.2	Set out in POF table	<ul style="list-style-type: none"> <li>Tasked contact with relevant researchers identified at exec</li> </ul>

## **Groups and support**

### **Horizon Scanning**

The Anaesthetic Horizon Scanning meeting currently takes place bimonthly. Research active staff use this forum to discuss new studies (including feasibility), ongoing studies and grant ideas. This enables investigators to suggest proposals for home based studies or involvement in studies based outside Sheffield. This has assisted speed of organization and volunteer numbers in PREVENTT and Las Vegas.

### **Research Executive**

The Research Executive meets bimonthly to discuss new research, progress of ongoing studies and to keep up to date with local and national updates. Critical Care studies are then also discussed at the Critical Care Clinical Management Group to iron out practical problems that might be encountered at implementation and to ensure local support

The format of the meeting does include a feasibility of all new studies (discussed at groups above?), with an update from the PI or delegate. Feasibility and potential issues will be discussed, with information feeding in from both the Horizon Scanning and CMG to aid discussion.

Ongoing studies that are not recruiting to time and target will be discussed with actions suggested for PIs. Examples so far have included helping SHARC (trainees research group) become involved with projects to boost recruitments, especially in time limited observational studies such as POPULAR. Other studies have prompted requests for Research Network research nursing assistance, such as Las Vegas or CALORIES.

### **Directorate Research Coordinator**

Angela Pinder has been an extremely effective Research Coordinator enabling a linkage between the practical preparation and running of research projects and the research department and IRAS process. However, Angela is soon due to leave us on maternity leave. A priority is for us to employ a replacement, because Angela has been able to facilitate many research projects and advise on practical IRAS issues, which has enabled the department to work more efficiently. At present different employment models are being looked at including sharing with another directorate.

### **Local and Regional Research Meetings**

OSCCA has and will support the meetings of the Pan-Yorkshire specialty Group. This was last hosted in Sheffield at the end of 2014. There will also be annual trainee research presentations days (Currently held annually).