The North of England Training Programme in Congenital Cardiac Surgery

1st August 2018 to 31st July 2020

Alder Hey Children’s Hospital NHS Foundation Trust
Liverpool

Freeman Hospital, Newcastle NHS Foundation Trust
Newcastle upon Tyne

The North of England (NOE) Training Programme in Congenital Cardiac Surgery has been recently approved and accredited as one of two National Training Programmes in the UK.

The Consortium between Alder Hey Children’s Hospital and Freeman Hospital provide clinical care and training in all aspects of congenital cardiac surgery (premature, neonatal, infant, children and adult). This includes Paediatric and ACHD Mechanical Circulatory Support (Berlin Heart, VAD, ECMO) and Heart/Lung Transplantation. In addition, there are training opportunities on tracheal-airway, thoracic and chest wall deformities.

This Training Programme has been developed in order to provide training in all these areas and would offer 1 year of sub-specialty training in each hospital, with the first year in Liverpool and the second in Newcastle. Thanks to strong international links with US, Australia and Europe, there is an opportunity for complementary overseas fellowships as well as attending international medical missions.
**Alder Hey Children’s Hospital**

Alder Hey is a high volume centre performing a whole range of procedures including: Norwood Programme, Hybrid Procedures, ccTGA, Tracheal and Airway surgery, Chest wall malformations and an ECMO programme (Cardiac, Respiratory and ECPR). A dedicated Hybrid Theatre has recently been opened for intraoperative “quality control” dynoCT –Angio studies and hybrid procedures. The Innovation programme at Alder Hey is internationally recognised to be at the forefront of health care innovation. As part of this, the cardiac surgical service has developed 3D printing and Virtual Reality for pre-operative planning, training and education. A dedicated cardiac orientated Bio-sensor group work in partnership with Universities and Sensor City.

**Freeman Hospital**

The Freeman Hospital provides experience in the whole spectrum of congenital cardiac surgery from neo-natal to adult congenital heart disease. Freeman is one of the two nationally designated centres for mechanical circulatory assist as a bridge to transplantation and cardiopulmonary transplantation. It also uniquely undertakes cardio-pulmonary transplantation for complex adult congenital heart disease. The Freeman also has an international reputation for surgical management of advanced heart failure. In addition, paediatric thoracic surgery is performed, including complex tracheal reconstruction.

There are excellent training opportunities on both sites, and both centres have a track record of successfully training several UK and International congenital paediatric surgeons over the past 5 years.
Alder Hey Children’s Hospital NHS Foundation Trust
Liverpool

The Post

Alder Hey is one of Europe’s biggest and busiest children’s hospitals providing care for over 200,000 children and young people each year. It is one of only four stand-alone paediatric trusts in the UK and is staffed by 2,800 employees. This is an exciting time to join the new facilities at Alder Hey in the Park, the new hospital has won several awards for design, architecture and patient centred. The new hospital includes a dedicated hybrid theatre incorporating high-specification imaging equipment into the operating theatre alongside surgical equipment, a cardiac catheter laboratory with Carto Arrhythmia Mapping System and the largest paediatric critical care floor in Europe.

Alder Hey offers 20 specialist services including being the designated national centre for Cardiac Surgery, Cardiology, Craniofacial Surgery and a Centre of Excellence for Paediatric Oncology, Neurology and Orthopaedics. It is a teaching hospital and trains 550 medical and 400 nursing students each year. A child and adolescent mental health service is also provided with an in-patient unit based at the Trust.

Alder Hey serves a catchment area of 7.5 million, with around 60,000 children seen in A&E each year. In addition to the hospital site at West Derby, Alder Hey has a presence at more than 40 community outreach sites and its consultants hold 800 clinic sessions each year from Cumbria to Shropshire, Wales and the Isle of Man, helping deliver care closer to home. There are specialist paediatric support services in pharmacy, laboratory services and Professions Allied to Medicine.

Alder Hey hosts the UK Medicines for Children Research Network (MCRN) with a Department of Health grant worth £22m and is also the lead centre for the Cheshire, Merseyside and North Wales MCRN. It leads the field in paediatric pharmacovigilance, being recently awarded the only paediatric NHS programme grant (£2m) for work in this area.

Alder Hey serves not only the children of Liverpool but is the tertiary referral centre for children from Merseyside, Cheshire, parts of Lancashire, Shropshire and North Wales for many sub-specialties of paediatrics. The Trust provides a range of community services including school nursing, home carers and a child development centre. The hospital has over 300 beds, including day beds for surgery, a medical day care unit and observation beds in the Emergency department.

A purpose built Education, Research and Innovation Building is situated on the hospital site and is available for all postgraduate educational activity.

HEART CENTRE

All cardiothoracic patients, both medical and surgical, are cared for on Cardiac Ward 1C including dedicated HDU beds. The cardiac intensive care unit shares the facilities of a 48 bedded Critical Care Floor which includes additional HDU beds and a Burns Unit.
Alder Hey Heart Centre is the designated regional congenital cardiac centre for the North West of England, North Wales and the Isle of Man with a catchment area population of 7.5 million people. The surgical unit performs approximately 400 - 430 paediatric cardiac procedures per year and 40-60 pectus/thoracic cases. Alder Hey Children’s Hospital is a designated ELSO Centre of Excellence for Extra-Corporeal Life Support providing cardiac, respiratory and ECPR ECMO service for the North West of England and Nationally together with the other ECMO centres.

The unit performs all types of congenital cardiac procedures including Unifocalization of MAPCASs for Pulmonary Atresia, ccTGA surgery, Norwood Programme and Complex Aortic Surgery in collaboration with the Liverpool Heart and Chest Aortic Surgery Team. In addition, there is an established Programme of warm surgery, early intubation and fast tracking.

The Alder Hey Cardiac Unit imaging service provides cardiac Cardiac Ultrasound, MRI and cardiac CT in conjunction with the Radiology Department. There are three radiologists with a predominant interest in congenital cardiac diagnosis. In addition there is the opportunity to use 3D printing as an additional imaging tool and surgical planning. There are approximately 320 cardiac catheters, including diagnostic, interventional, hybrid procedures and RF ablations carried out each year.

Patients are proactively managed from diagnosis (antenatal or post-natal) throughout their childhood, and have a fully functioning transition service for adolescents transferring to adult care. The team also provides antenatal cardiac diagnosis and management at Liverpool Women’s Hospital and St. Mary’s Hospital, Manchester. The Liverpool Young People and ACHD service approach has been commended by NHSE. Following the NHSE review and recommendations the ACHD service in the North West will be expanded from 2017 between Liverpool and Manchester.

The Cardiac Unit has its own outpatient department with attached ultra-sound and ECG facilities. Approximately 6,500 outpatients are seen per year including 1,500 new patients, and the Department also provides outreach clinic services to 19 local hospitals covering the North West, North Wales and Isle of Man with approximately 225 outpatient clinics per year.

The unit also comprises six dedicated cardiac liaison nurses that serve an important role in the interaction between the families and staff in the unit. The team runs pre-admission and pre-assessment for surgery and cardiac catheters and are recognised nationally for anti-coagulation services provided.

**STAFFING**

**Medical Staffing**

**Consultants - Cardiac Surgery (ALDER HEY)**
Mr RR Guerrero Clinical Director Cardiac Services
Mr R. Dhannapuneni
Mr A. Lotto
Consultants – Cardiology (ALDER HEY)
Dr I. Peart        Dr G. Gladman
Dr R. Johnson      Dr J. Lim
Dr A. Shauq        Dr C. Jones
Dr N. Oswal

Consultants – Cardiac Anaesthesia
Covering all cardiac surgical sessions including emergencies
Dr A. Davis       Dr P. Arnold
Dr P. Corry        Dr N. Raj
Dr S. Sanaulla

Consultant Intensivists
Dr S. Kerr         Dr J. Ratcliffe
Dr P. Baines       Dr F. Potter
Dr A. Selby        Dr K. Thorburn
Dr M. Horan        Dr S. Mahoney
Dr N. Shetty       Dr K. Parkins
Dr R. Pathak       Dr B. Lakin

Consultants – Cardiac Surgery (MANCHESTER)
Mr A. Hoschtitzky

Consultants – Cardiology (MANCHESTER)
Dr G. Ciotti       Dr J. Mookerjee
Dr E. Ladusans

Junior Staff
There are four cardiac surgical registrar posts. There are ten full-time registrars in paediatric cardiology, including paediatric training rotations, dedicated paediatric cardiology trainees and Clinical Fellows. There is a surgical assistant, an advanced nurse practitioner (ANP) and a Cardiac Nurse Consultant (ANP) who contribute to the preoperative and postoperative care of the cardiac surgical patients on the ICU and the ward.

Nursing Staff
The Cardiac ward is located on the 1C level and this has a total of 36 whole time equivalents. There are six cardiac liaison nurses who provide welfare and support services for patients and parents in hospital and at home.

Support Staff
Physiological measurement technicians are available at all times. They maintain monitoring equipment throughout the intensive care unit and in catheter laboratory and provide physiological measurement services in theatre and the catheter room and ECG and echo services both in the department and throughout the hospital. There is a dedicated cardiac theatre staff on call at all times. There are four full-time, trained perfusionists and five scrub nurses for cardiac theatre. There are full office facilities with secretarial support (two surgical secretaries).
DUTIES OF THE POST

A cardiac surgical registrar is on-call at all times for surgical emergencies although non-resident after 10pm and at weekends. The on-call rota of a 48 hour working week includes nights, weekends and out of hours, the appointee will be expected to work flexibly to accommodate the unit work load.

Duties will include pre-operative assessment of children including obtaining informed consent, assisting in theatre, performing procedures under supervision in accordance with the national curriculum. There will be active involvement on ECMO procedures, providing surgical cover in the CICU and ward for exploration for bleeding, delayed chest closure, intercostal drain insertion etc. In addition, responsibility on the post-operative care of children on the ward, presentation of cases at meetings and ward rounds, involvement in the teaching, research and academic program of the Unit. The appointee is expected to participate pro-actively in audits, research, innovation and teaching.

The department holds two weekly multi-disciplinary clinical meetings, on a Monday morning and Thursday morning, where all forthcoming patients are discussed jointly by anaesthetists, cardiologists, intensivists, nursing staff, support staff and surgeons. The appointee will be expected to participate fully in these discussions. There are consultant-led monthly Quality Assessment and Quality Improvement (QAQI) meetings, regular research meetings, and a weekly multi-speciality teaching sessions which is responsibility of the senior trainee.

Educational Supervision
The post holder’s Educational Supervisor will be Mr Rafael Guerrero. An educational contract will be written at the commencement of the post and reviewed at 3 monthly intervals with regular assessment against the ISCP curriculum.

WEEKLY ACTIVITIES

MONDAY

Ward Round PICU, HDU,1C
MDT (Acute and Forthcoming Cases)
Theatre x 2 (AM &PM): Hybrid Theatre and Theatre 5
Ward Round PICU, HDU,1C

TUESDAY

Ward Round PICU, HDU,1C
Journal Club/ Research
OPD (AM)
Theatre x 1 (AM &PM): Hybrid Theatre
Ward Round PICU, HDU,1C
WEDNESDAY

Multidisciplinary Teaching
Ward Round PICU, HDU,1C
Theatre x 2 on alternate weeks (AM & PM): Hybrid Theatre and Theatre 5
Ward Round PICU, HDU,1C

THURSDAY

Ward Round PICU, HDU,1C
MDT
Cardiac Infection Control Programme MDT
OPD (PM)
Theatre x 1 (AM & PM) Hybrid Theatre
Ward Round PICU, HDU,1C

FRIDAY

Ward Round PICU, HDU,1C
Departmental Meeting / QAQI / Audit / Research
Theatre x 1 (AM & PM) Theatre 5
Ward Round PICU, HDU,1C

Ward Care
The day to day ward management is carried out by cardiology senior house officers, cardiac advanced nurse practitioners, cardiology registrars and cardiac surgical registrars all of whom attend the daily working round on the ward, supervised by a consultant cardiologist. There are twice daily working and hand over rounds on intensive care.

Consent and Communication
Background information for patients leading to surgery is usually provided by consultant cardiologists, the cardiac liaison staff, cardiac surgical registrars and the cardiac advanced nurse practitioners. In line with the Trust’s general policies on consent, the consultant cardiac surgeon is required to be available for discussions with parents about the post-operative course of their children and for personally ensuring that the informed consent process is complete. The cardiac surgeon is required to meet all parents and patients himself/herself prior to surgery.

RESEARCH

The candidate will be expected to participate in both retrospective and prospective studies in addition to contributing intellectually to all research activities. The department has a robust research program directed towards national and international meetings as well as peer-received medical journals. Basic science facilities are also available at the University of Liverpool.
The overall responsibility for the Trust’s Research Strategy lies with Mr Rick Turnock (Medical Director) and Matthew Peak (Director of Research). The Research and Development Directorate ensures that research is incorporated into the management infrastructure and is part of the Trust's overall service plan and strategy. The Trust's Research and Development Manager, along with research group leaders, promote research within the overall strategic aims. A number of operational groups and key individuals facilitate the planning coordination and support of research.

Areas of direct relevance to child health in which there exists a critical mass of expertise are focused around research subject groups. The Research and Development Manager, research group leaders and a nurse lecturer practitioner also provide support to new initiatives which fall outside the strategic focus, especially those with potential to develop into programs of research.

Quality assurance of all Trust-based research is achieved through peer review of all proposals by the Research Committee. The Trust runs a number of evidence-based medicine research teaching sessions and Research Awareness Day Workshops which are open to all Trust staff disciplines.

**TEACHING**

There are weekly teaching sessions under the format of a multidisciplinary approach involving surgical, intensivist, cardiologist and anaesthetists trainees. This approach will allow the trainee to acquire an overall knowledge for the management of congenital cardiac patients. As well there are embedded teaching during ward rounds, operating sessions and post-surgical debriefing.

Alder Hey is a teaching hospital taking students from the University of Liverpool. The University Department of Child Health is based in the hospital. The successful candidate will have the opportunity to get involved in undergraduate and postgraduate teaching, including the Department's own trainees and those of the related Departments.

**AUDIT AND QUALITY IMPROVEMENT**

The unit has its own purpose designed database. The candidate will be expected to participate in the weekly validation of the database. The unit also submits data to CCAD regularly. This data is also validated by the consultant cardiac surgeons separately on a weekly basis.

The appointee will be expected to participate in the cardiac unit's audit program which covers medical and surgical deaths, near-misses and morbidity.

The Cardiac Unit has computer records covering 25 years of patient details. There are two data input and recovery staff to assist with studies involving these records.

The Trust has regular (approximately monthly) half-day sessions to enable intra- and inter-department audit and general education programs for all staff. Presentations are made within the department from time to time and in addition, to the hospital wide audit program. All members of the department are encouraged to be actively involved in audit.
FURTHER INFORMATION

Further information concerning the post is available from:

Mr Rafael R Guerrero FRCS(CTh), FETCS, MD
Clinical Director of Cardiac Services
Consultant Congenital Cardiac Surgeon
Tel 0151 228 4811, ext 4515

Travel and subsistence expenses can be reimbursed for such visits only to those candidates selected for interview. Reimbursement is restricted to two visits whether they are made before or after a decision is reached on a short-list. In the case of candidates travelling from abroad, travelling expenses are only payable in certain circumstances and then only from the point of entry into the United Kingdom and up to the point of exit from the UK.
Freeman Hospital, Newcastle NHS Foundation Trust
Newcastle upon Tyne

The Post

This is a registrar post in paediatric Cardiothoracic Surgery. The appointee will join 3 full time paediatric cardiac surgeons and a locum consultant in the provision of surgical care for paediatric and adult patients with congenital heart disease.

Facilities and Activities

The Regional Cardiothoracic Centre is located in a separate wing of the Freeman Hospital and comprises adult cardiology, adult and paediatric cardiothoracic surgery, paediatric cardiology and respiratory medicine. A full range of paediatric cardiac and pulmonary surgery is performed including heart/lung transplantation and complex adult congenital surgery. Freeman Hospital is one of the UK centres recognised for the provision of paediatric ECMO services. There is an active paediatric mechanical ventricular assist programme. There are full support facilities including CT and MRI in the main hospital and a dedicated cardiothoracic radiology department. Paediatric cardiology and surgery share an eighteen bedded ward and a 12 bedded Paediatric Intensive Care Unit. There are currently 6 HDU beds on the main ward in addition to PICU. There is, in addition, an adult 16-bedded intensive care ward with an additional 6 HDU.

Duties of the Post

Duties will include pre-operative assessment of children, assisting in theatre, performing procedures under supervision in accordance with the national curriculum. There will be active involvement in the mechanical circulatory support (MCS) program and cardiopulmonary transplant program. The trainee will also be involved in retrieval of donor organs. In addition, responsibility on the post-operative care of children on the ward, presentation of cases at meetings and ward rounds, involvement in the teaching, research and academic program of the Unit. The appointee is expected to participate pro-actively in audits, research, innovation and teaching.

Educational Supervision

The post holder's Educational Supervisor will be Mr Asif Hasan
An educational contract will be written at the commencement of the post and reviewed at 3 monthly intervals with regular assessment against the ISCP curriculum.
WEEKLY ACTIVITIES

MONDAY

Ward Round PICU
MDT (Acute and Forthcoming Cases)
Theatre (AM &PM)

TUESDAY

Ward Round PICU
Journal Club/ Research
Theatre (AM &PM)

WEDNESDAY

FALD (Fontan associated liver disease) meeting, joint meeting with liver team
Ward Round PICU
OPD (AM)
JCC (joint cardiac and cardiology) MDT (PM)
Theatre on alternate weeks (AM &PM)
Audit meeting monthly (2nd week)

THURSDAY

Surgical teaching
Ward Round PICU
Theatre (AM &PM)

FRIDAY

ACHD/MDT meeting
Ward Round PICU
Theatre (AM &PM)

OVERVIEW

The Trust employs c. 13,000 staff, with a gross turnover nearing £900 million per annum, and operates on two major hospital sites – the Freeman Hospital and the Royal Victoria Infirmary, as well as delivering community health services to the city’s 273,000 residents.

The Newcastle upon Tyne Hospitals NHS Foundation Trust was licensed as a Foundation Trust on 1st June 2006, and this provides a robust framework and the freedom to run its own affairs at a local level. Although the Trust must comply with national standards in delivering healthcare, it can determine and influence how this is done by developing new ways of working tailored to meet the local needs and priorities.
The Trust is classified as a teaching hospital because of its close association with the Newcastle University Medical School. It also has a high nationally acknowledged research and development profile and capability, and continues to challenge and inform patient treatment and care. The Trust is a large, technically complex and diverse organisation and to ensure the delivery of a high quality and safe service to all, robust performance management systems are in place. Working closely with clinical and support services, the Trust ensures effective monitoring and review of quality, business and financial issues.

For the 11th consecutive year Newcastle Hospitals has won the prestigious CHKS Top 40 Hospitals Award – one of only five Trusts in the country to do so. This award celebrates excellence in healthcare nationally, and is based on the evaluation of 21 key performance indicators including:

- safety
- clinical effectiveness
- health outcomes
- efficiency
- patient experience
- quality of care

The Trust is regulated by Monitor; the Care Quality Commission determines the quality and standards of care.

INTRODUCTION TO THE DIRECTORATE

The Freeman Hospital’s Cardiothoracic Centre is a regional and national centre of excellence for respiratory and cardiac care. We provide specialist treatment for all types of heart and respiratory related conditions in both adults and children.

Our specialist clinicians combine medical expertise with an innovative approach to new technologies and treatments, and are dedicated to providing a safe, high quality service to all who come here.

Treatment at the Freeman Hospital is available to anyone who lives in and around the North East of England. While our highly specialist services, for example transplant surgery, are offered to anyone in the UK with more complex heart or lung related conditions.

In July 2012 the “Safe and Sustainable” national review of centres delivering cardiac surgery to children selected the Freeman Hospital as a designated surgical unit.

We currently perform in excess of 350+ cardiac cases per year, and already cover the full range of congenital cardiac surgery including that for hypoplastic left heart.

We are a designated ECMO centre and have over 25 years of experience in this specialised field. Paediatric Cardiac transplantation is another area of expertise and we are one of only 2 units in the country who carry out this work. As a result we are a supra-regional centre for the management of severe heart failure. We are a centre
of excellence for use of the Berlin Heart ventricular assist device as a bridge to transplantation. We provide teaching and training to senior clinical teams from European centres in the use of the device.

The Freeman Hospital’s Paediatric Cardiothoracic Unit is the only unit in the UK able to offer all forms of cardiac treatment, regardless of age, under one roof. Our results are excellent. The Freeman Hospital leads the way in the UK in providing end stage heart failure treatment for infants, children, and adults with congenital heart diseases. It is one of two UK centres providing mechanical cardiac support as a bridge to transplantation in children and adults.

Most of our patients come from the North of England, but patients are referred from all parts of the UK and Ireland. The majority have congenital cardiac disease. Those referred for cardiopulmonary transplantation (one of only two units in the UK), mechanical support by way ventricular assist device or Extracorporeal Membrane Oxygenation (ECMO), electrophysiological investigation and treatment are referred from throughout the UK and Ireland.

MEET THE TEAM:

Consultants Cardiologists:
Dr D Crossland (Paediatric and Adult Congenital Cardiology)
Dr JJ O’Sullivan (Paediatric and Adult Congenital Cardiology)
Dr Zdenka Reinhardt (Paediatric and Adult Congenital Cardiology)
Dr Neil Seller (Paediatric and Adult Congenital Cardiology)
Dr Katrijn Jansen (Adult Congenital Cardiology)
Dr Magda Sajnach-Menke (Paediatric Cardiology)
Dr Louise Coats (academic cardiology)

Consultant Cardiac Surgeons:
Mr. Asif Hasan – cardiac surgeon
Mr Bari Murtuza – cardiac surgeon
Mr Fabrizio De Rita – cardiac surgeon
Mr Mohammad Nassar – cardiac surgeon

Consultant Cardiac Anaesthetists:
Dr Simon Haynes
Dr John Smith
Dr Alan McCheyne
Dr Teresa Chila
Dr Andras Kelecsenyi

Consultant Cardiac Intensivists:
Dr Yam Thiru
Margarita Guillen-Ortega,
Lee Ferguson
Judit Llevadias,
Emma Simpson.
Other members of unit:  
5 Cardiology Specialist Registrars  
1 ACHD Specialist Registrar  
6 Senior House Officers

Faculty of Medical Sciences, Newcastle University:

The Faculty, one of three in the University, includes Biosciences, Dentistry, Medical Sciences Education Development and Psychology, in addition to the traditional medical disciplines.

It has focused its core research activity at the basic science/clinical interface into seven Research Institutes that contain internationally strong research in ageing, genetics, cancer, health and society, biosciences, cellular medicine and neurosciences.

The Faculty was ranked eighth in the UK overall for all “medical” units of assessment combined in the 2008 RAE. Based on research power it was ranked fifth for hospital-based clinical subjects and fourth for laboratory-based clinical subjects in the UK. It was also in the top ten in cancer studies, dentistry, psychiatry, neuroscience and clinical psychology. Cancer studies and laboratory-based subjects were also ranked third on research quality.

The Faculty has an excellent record in teaching, with Medicine coming top and 5 of the 8 subject areas in its provision achieving higher than 90% satisfaction in the National Student Survey.

Undergraduate teaching is organised in four ‘streams’ – medicine, dentistry, psychology and biosciences, with a total undergraduate population of over 3000. Dentistry, Psychology and Bioscience degrees are administered by the Schools of Dental Sciences, Psychology and Biomedical Sciences respectively, while the undergraduate medical programme is administered at Faculty level.

The Graduate School currently has over 800 postgraduate students registered for both taught and research degrees. The Faculty has benefited from a significant period of capital refurbishment, funded largely through the Science Research Infrastructure Fund (SRIF) and University investment. In addition, successful bids to Wellcome, the Department of Health and One North East (the Regional Development Agency) have resulted in strategic capital developments at the Campus for Ageing and Vitality.

The Faculty is also a key player in the development of Newcastle Science City. The Newcastle Science City initiative (http://www.newcastlesciencecity.com/) aims to establish North East England as one of the world’s premier locations for the integration of science, business and economic development, and to break down barriers between science and the wider regional community for the benefit of all.

The project targets commercialisation of research in four key areas: Stem Cells and Regenerative Medicine; Ageing and Health; Molecular Engineering; and Energy and the Environment.
The Trust and the Faculty have formed a strategic partnership – Newcastle Biomedicine – which benefits from key synergies between the two organisations, acting essentially as an Academic Health Science Allegiance. This is overseen by an Executive which includes the Chief Executive, Medical Director, Chief Operating Officer, R&D Director, Faculty Pro Vice Chancellor and Dean of Clinical Medicine. It is responsible for the continuing development of the NIHR Biomedical Research Centre and has a Joint Research Executive, Joint Business Executive and Joint Education Executive. There is also a Joint Research Office and state-of-the-art Clinical Research Platforms. For further information see http://www.ncl.ac.uk/biomedicine/clinical/.