

Academic Directorate of Respiratory Medicine

Research Strategy - overview 2015–17



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Summary

The Academic Directorate of Respiratory Medicine draws upon the combined strengths of Sheffield Teaching Hospitals, the University of Sheffield, and other partners to deliver internationally competitive and game-changing research. The research of our clinicians is underpinned by associations with academics in the University Departments of Infection and Immunity, Cardiovascular Science, and the School of Health and Related Research (SCHARR) who continue to deliver some of the most innovative respiratory research programmes in the UK in a number of themes:

- **Pulmonary Hypertension.** The Sheffield Pulmonary Vascular Disease Unit lead by Prof David Kiely is the UK's biggest centre for this disease. By bringing together basic science, novel imaging techniques and clinical research we aim to establish a leading international Institute for Cardiopulmonary Research with the University Department of Cardiovascular Science within the next 5 to 10 years.
- **Lung Imaging.** The Respiratory Directorate has a close association with Prof Jim Wild at the University of Sheffield, whose work in lung imaging is world-leading and supported by a recent £7.5m Medical Research Council award.
- **Health Services Research and Cystic Fibrosis.** The next 5 years will see the delivery of research supported by a £2 million Programme Grant award from the National Institute for Health Research to Dr Martin Wildman, developing new health services research that is likely to directly change and improve management and treatment of patients with cystic fibrosis.

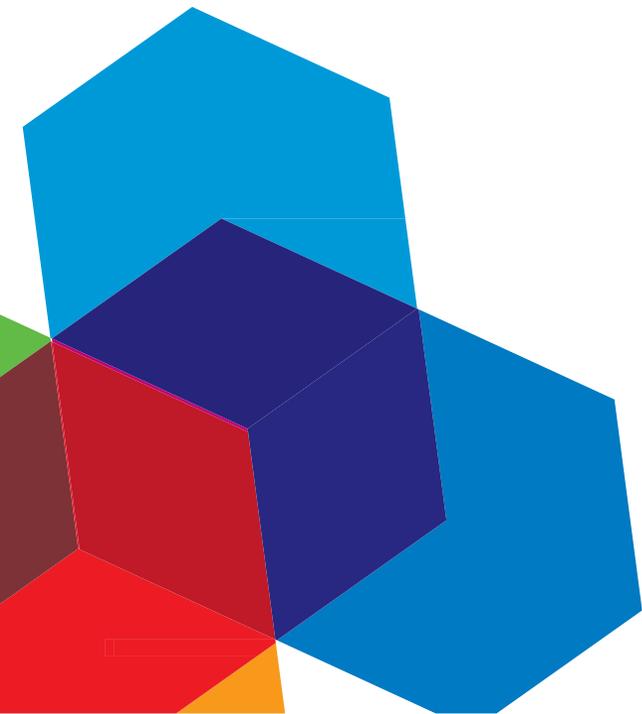
- **Immunity, Inflammation and Host-Pathogen biology.** We deliver internationally eminent programmes of research into the role of microbial infection and inflammation in respiratory disease, in association with the University of Sheffield, for whom this is a key area of focus supported at the highest strategic levels and boosted by recent successes including Prof Stephen Renshaw's recent Medical Research Council Programme Grant award, and the recent appointment of Prof Alison Condliffe as Chair of Respiratory Medicine.
- **Occupational lung disease.** Long recognised, often missed and personally disastrous, workplace-related illness can be prevented using appropriate risk management, education and health surveillance techniques. The Centre for Workplace Health led by Prof David Fishwick in collaboration with the Health & Safety Laboratory at Buxton continues to be central to UK and global research to develop solutions to workplace based health issues.

The Directorate participates in clinical trials in collaboration with many leading pharmaceutical companies involved in developing new treatments for respiratory disease, including Actelion, Astra-Zeneca, Bayer, Boehringer-Ingelheim, GSK, Novartis and Roche.

An external academic review of Sheffield Teaching Hospitals identified Respiratory Medicine as an area of major strength, international expertise and promise. We are developing a series of world-leading translational medicine strands for the future.

The Directorate Research Lead is Prof Ian Sabroe: i.sabroe@sheffield.ac.uk

For general research queries please contact Research Coordinator, Dr Jim Lithgow jim.lithgow@sth.nhs.uk



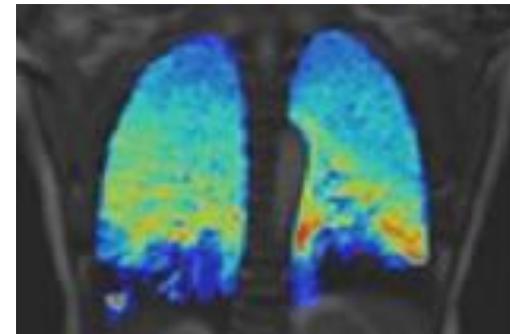
Research Themes

Our key themes of clinical research are:

- **Asthma**
- **Chronic Obstructive Pulmonary Disease (COPD)**
- **Health Services Research and Cystic Fibrosis**
- **Interstitial Lung Disease**
- **Occupational Lung Disease**
- **Pulmonary Hypertension**
- **Sleep and Ventilation**

In addition to key respiratory themes, other cross-cutting themes of research have an influence across the directorate and align with priority areas of Sheffield Teaching Hospitals and University of Sheffield research strategy, including:

- **Lung Imaging** – e.g. collaborations with the University of Sheffield POLARIS (Polarised Imaging Systems) group
- **Health Services Research** – in collaboration with the University of Sheffield School of Health and Related Research (SCHARR)
- **Experimental Medicine** – e.g. collaboration with the NIHR Sheffield Clinical Research Facility at Sheffield Teaching Hospitals
- **Lung Cancer research**, in collaboration with the STH Oncology and Cardiothoracic Directorates and the Sheffield Cancer Clinical Trials Centre
- The Directorate hosts the **Sheffield Teaching Hospitals Respiratory Physiology Department** which supports lung function, breathing and exercise testing in Respiratory Medicine and other specialties (including Neurosciences, Cardiology, and Oncology).



Research Infrastructure

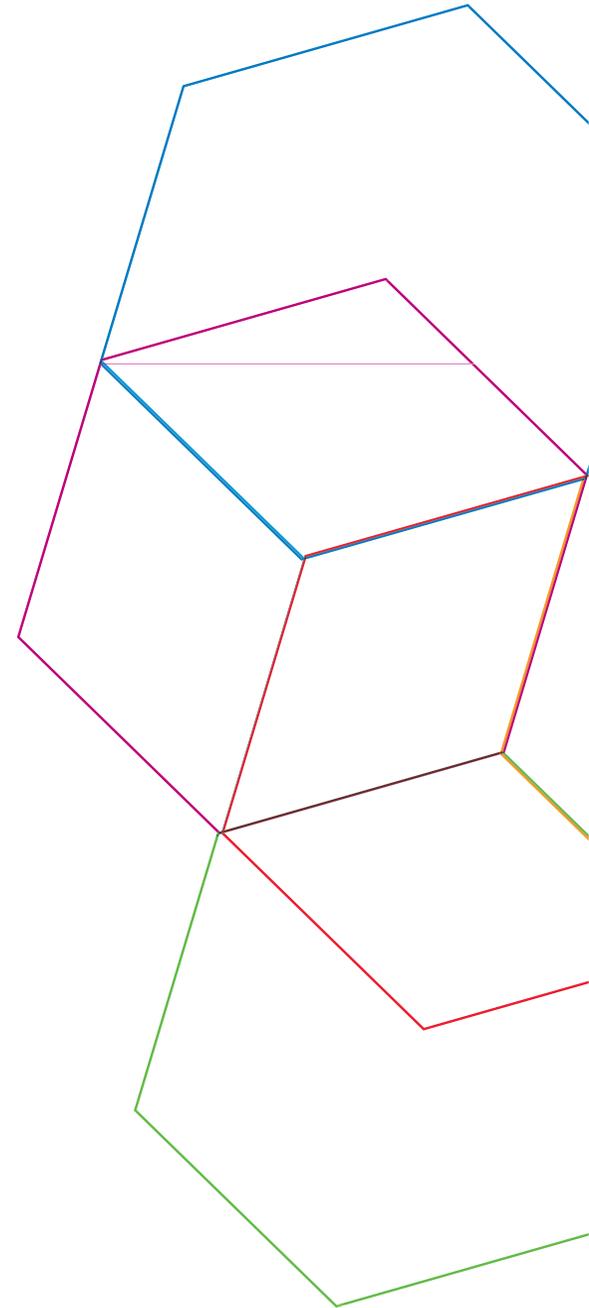
The Academic Directorate of Respiratory Medicine has a number of facilities and staff in locations across Sheffield, the two main sites being the Royal Hallamshire Hospital and the Northern General Hospital. Many of our investigators and collaborators work in the University of Sheffield. In addition our work in occupational lung disease has close links with the Centre for Workplace Health and the Health & Safety Laboratory based in Buxton.

The directorate employs a number of research active clinicians and clinical academics who are leading researchers with national and international recognition. Our research-active staff include Consultant Physicians, Nurse Specialists, and Respiratory Physiologists. In addition we employ a number of trainee doctors (Specialist Registrars and Clinical Research Fellows) who undertake research as part of their medical training, with the aim of developing leading researchers of the future in respiratory medicine.

Further details of our research locations and staff can be found on our website, www.lungsheffield.org

Research Database

The directorate uses a Research Database that has been approved by an NHS Research Ethics Committee. Patients who provide informed consent will enable us to use their anonymised clinical data for research and to help improve our clinical services. In addition, our researchers are able to contact patients who have signed up to the research database, to ask them if they are interested in participating in clinical studies for which they might be suitable.



Pulmonary Hypertension

Research Theme Lead: david.kiely@sth.nhs.uk



The Sheffield Pulmonary Vascular Disease Unit is the largest UK centre and one of the largest pulmonary hypertension centres in the world, assessing and managing all forms of adult pulmonary hypertension.

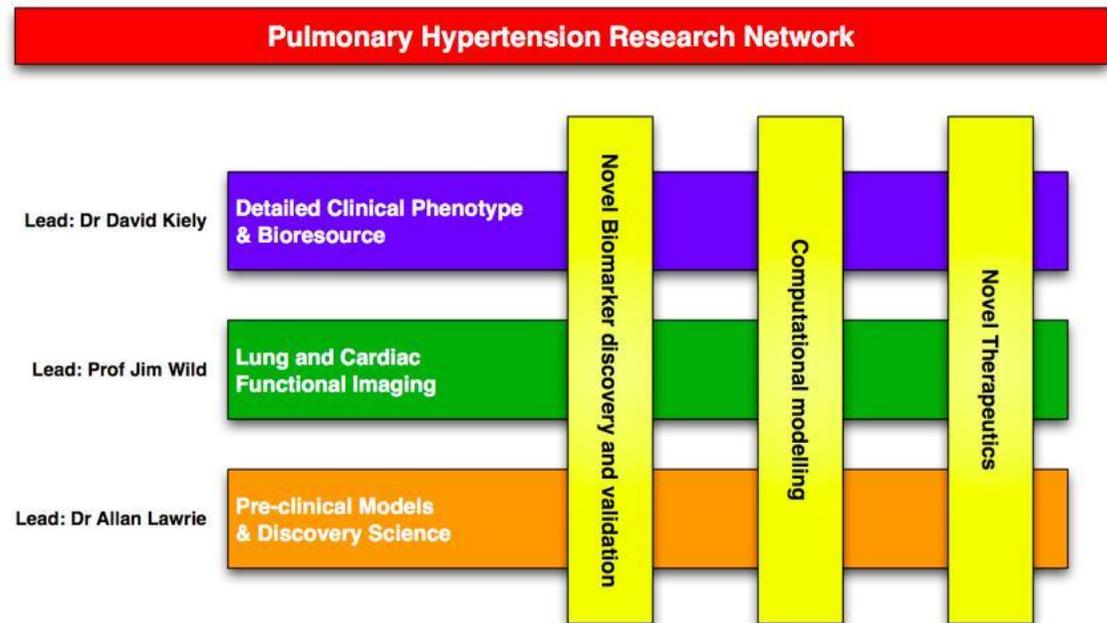
We aim to produce world-class research in cardiopulmonary medicine. We will improve our understanding of disease mechanisms using patient biobank samples, pre-clinical models, and pioneering imaging and informatics systems, to aid development of new therapies and assess their impact using new quantitative and qualitative tools.

The clinical service (Drs Kiely, Elliot, Condliffe, Sabroe, Charalampopoulos) is part of the Academic Directorate of Respiratory Medicine. Our research is closely associated to the University of Sheffield Department of Cardiovascular Science through pre-clinical models and drug discovery (Dr Allan Lawrie), the use of imaging to assess response to treatment and improve diagnostics (Prof Jim Wild), and the use of *in silico* approaches to improve our understanding of disease mechanisms (INSIGNEO/Dr Andy Swift). There is also an active programme of Qualitative Pulmonary Hypertension Research with Allied Healthcare Professionals (Dr Iain Armstrong, Dr Neil Hamilton) and Humanities research (Prof Ian Sabroe).

Our research activity will involve recruitment to investigator-led and commercially-sponsored UKCRN Portfolio drug trials and observational studies including the Sheffield PH Biobank (BHF), the UK PH COHORT study (MRC) and the NIHR Bioresource for Rare Disease study. We will also submit grant applications to major funders including NIHR and British Heart Foundation.

Our vision over the next ten years is to become a leading international Pulmonary Hypertension Institute, representing a collaboration between the University of Sheffield and Sheffield Teaching Hospitals NHS Foundation Trust.

Further information can be found at: <http://www.lungsheffield.org/clinical-services/pulmonary-vascular>



Asthma

Research Theme Lead: i.sabroe@sheffield.ac.uk

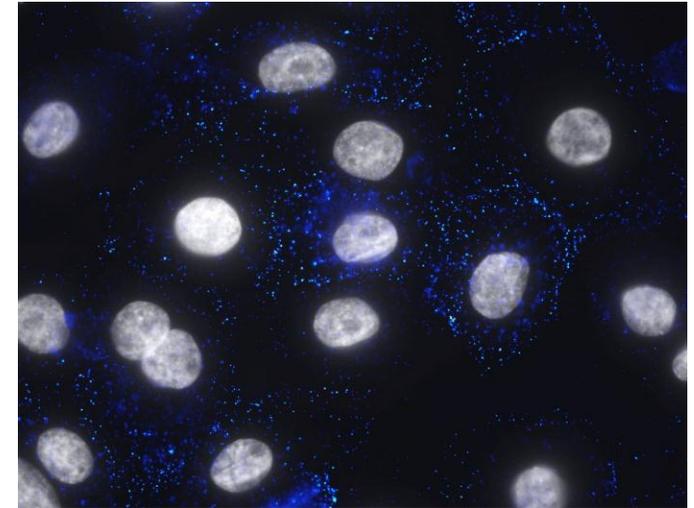
Airways disease is a central component of research in the Academic Unit of Respiratory Medicine at the University of Sheffield, with strong integration with Respiratory Medicine at Sheffield Teaching Hospitals. We continue to innovate as a leading UK centre in airways inflammation biology, and develop interdisciplinary research involving basic science, imaging, and new models of disease.

Key research themes include understanding how viral infections worsen airways inflammation, and developing new targets and treatments for asthma and COPD.

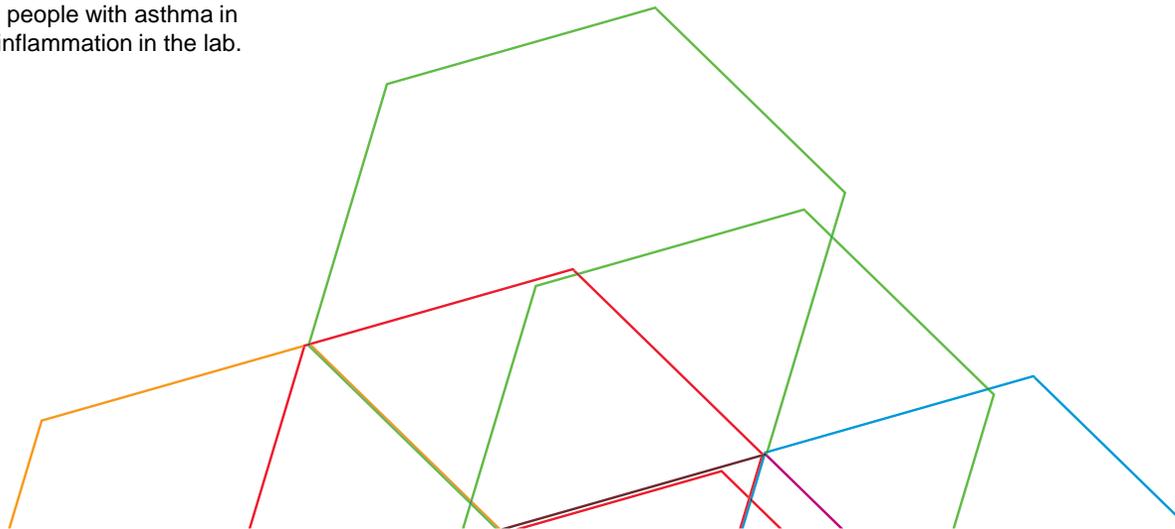
We currently have funding from Asthma UK, MRC, Wellcome Trust and the National Centre for the Replacement, Refinement and Reduction of Animals in Research (NC3R) to meet our objectives. Most of these studies do not directly access patients, but some use lung cells collected after cancer surgery, and our recent NC3R grant will use blood cells from people with asthma in new models of airways inflammation in the lab.

We also participate in clinical trials of new treatments for asthma, and support other studies of asthma genetics. Ian Sabroe is co-founder and co-lead of the Yorkshire Asthma Multi-Disciplinary Team, coordinating asthma care across the Yorkshire region. We are also working to improve clinical imaging research through collaborations with [Prof Jim Wild](#) and the POLARIS group at the University of Sheffield.

Further information can be found at: <http://www.lungsheffield.org/clinical-services/asthma>



Human lung cells (white) infected with "common cold" virus (blue)
Image courtesy of Dr Rebecca Roberts
University of Sheffield Department of Infection & Immunity



Chronic Obstructive Pulmonary Disease

Research Theme Lead: rod.lawson@sth.nhs.uk

Clinical COPD research is led by Dr Rod Lawson. His particular interests include developing research imaging together with Prof Jim Wild (University of Sheffield, Academic Radiology). He is actively involved in clinical trials, particularly where these may generate opportunities to exploit novel imaging for which Sheffield is renowned.

Dr Rodney Hughes was successful in 2014 in obtaining an NIHR Health Technology Assessment award investigating early pulmonary rehabilitation in COPD patients. This award will fund the “PRACTICE” clinical trial which will be initiated in 2015 with Dr Omar Pirzada in collaboration with the STH Physiotherapist Matthew Cox.



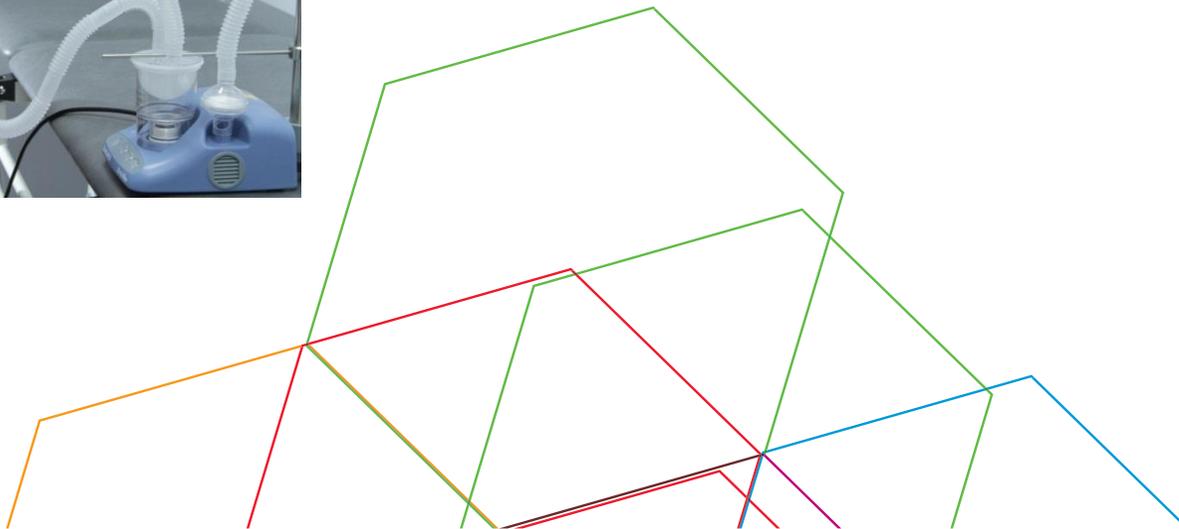
In 2015/6 we aim to conclude a pilot study of Inspiratory Muscle Training as a way of engaging patients who initially decline pulmonary rehabilitation. This study is being delivered by Cath O'Connor, a Specialist Respiratory Physiotherapist.

A collaboration with Dr Caroline Mitchell from the Academic Unit of Primary Medical Care (University of Sheffield) sees development of a pilot project being carried out in 2015/6, looking at COPD in people who abuse other drugs in addition to tobacco/nicotine. The project has initial pump priming from the NIHR CLAHRC (Collaboration for Leadership in Applied Health Research and Care) for Mental Health, Addiction and Co-Morbidities group. The group is also looking to develop wider collaborative working with primary care.

Our clinicians in Sheffield care for a number of patients with COPD in combination with another lung condition, Pulmonary Hypertension. Research using molecular profiling techniques will try to identify what is unique about such patients. Dr Roger Thompson is a clinical scientist studying mechanisms of COPD-related PH, with applications planned for the MRC and Wellcome Trust over the next 12 months.

Sheffield is a member of a major national consortium funded by the Medical Research Council, examining how COPD is affected by disease-causing microbes (host:pathogen interactions). Research has involved the study of blood and lung cells from patients and healthy volunteers, comparing their ability to deal with microbes. These studies are taking place in collaboration with Prof David Dockrell at the University of Sheffield Department of Infection and Immunity.

Further information can be found at: <http://www.lungsheffield.org/clinical-services/copd>



Health Services Research and Cystic Fibrosis

Research Theme Lead: martin.wildman@sth.nhs.uk

The Health Services Research (HSR) strategy within the Respiratory team at the Northern General Hospital aims to apply multidisciplinary research methodologies to chronic disease management and quality improvement. In particular we aim to develop an understanding of how behaviour change can support adherence in patients (i.e. help patients to keep taking their medicines and therapies), and how it can support clinical teams delivering care.

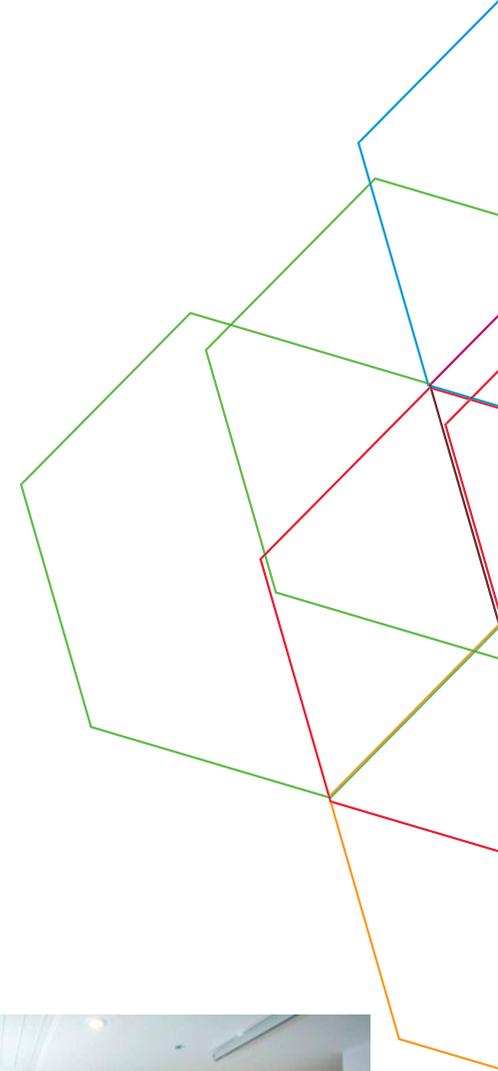
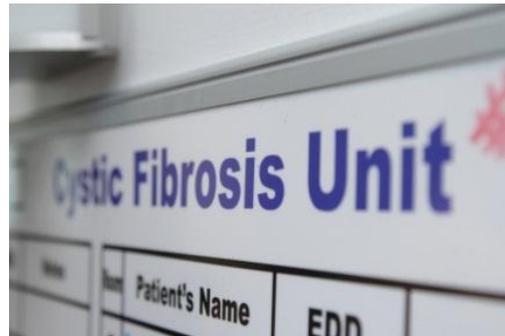
With our collaborators we intend to develop a UK adherence platform (the “CF Health Hub” website) and understand how that can be used to support pragmatic trial methodologies within chronic disease and behaviour change. Research objectives for the next 3 years will focus on delivery of:

- NIHR Programme Grant recently awarded to a team headed by Dr Martin Wildman (STH) and Prof Alicia O’Cathain (SCHARR, University of Sheffield): *Development and evaluation of an intervention to support Adherence to treatment in adults with Cystic Fibrosis (ACtiF)*. See weblink: <https://www.sheffield.ac.uk/scharr/sections/hsr/mcru/actif>

- NIHR Doctoral Research Fellowship awarded to Dr Zhe Hui Hoo (STH) and hosted by the University of Sheffield: *Exploring habit formation in CF medication adherence*.
- Dr Rachael Curley will undertake a prospective study: *“Using remote telemonitoring to detect early decline in lung function & streamline clinics in adults with cystic fibrosis”*.

The work in 2015 and 2016 will lay the foundations for a multi-centre clinical trial, including process evaluation and health economic evaluation, led by the Sheffield team with their Programme Grant collaborators. The aim will be to determine the effect of the Behaviour Change Intervention on medication adherence, respiratory exacerbations, and a cost/benefit assessment.

Further information can be found at: <http://www.lungsheffield.org/clinical-services/cystic-fibrosis>



Interstitial Lung Disease

Research Theme Lead: stephen.bianchi@sth.nhs.uk

The Sheffield Interstitial Lung Disease (ILD) Service led by Dr Stephen Bianchi is a nationally commissioned service serving the population of Sheffield and South Yorkshire and also patients from further afield. Patients receive care from a multi-professional group of dedicated staff. We provide diagnostics and treatment as well as being active in clinical trials exploring new treatments and pathways of care.

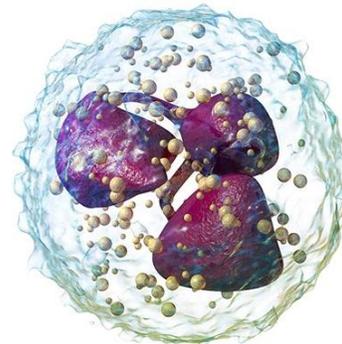
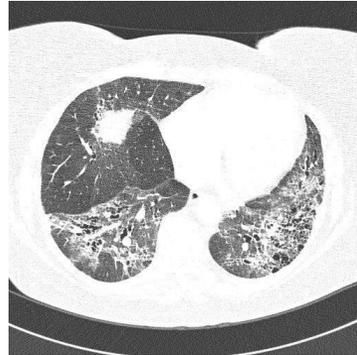
We are research active in a number of pharmaceutical driven studies exploring the impact of disease-modifying therapies. We have a proven track record for recruitment and delivery of patient targets for these and previous studies (PROFILE, TIPAC), and have recently achieved our recruitment target in a Portfolio study involving health related quality of life questionnaires in pulmonary fibrosis (HRQOL-IPF, led by Dr Andrew Wilson at University of East Anglia).

In 2015 we intend to initiate a clinical trial (EME TIPAC) investigating the drug co-trimoxazole in treatment of Idiopathic Pulmonary Fibrosis, a study funded by the National Institute for Health Research Efficacy & Mechanisms Evaluation Programme.

In 2015, the Clinical research Fellow Dr Nick Weatherley will lead a research study in collaboration with Prof Jim Wild (University of Sheffield Department of Academic Radiology) investigating how new imaging techniques can help understand the progression and treatment of idiopathic pulmonary fibrosis.

We are developing links with the Southampton and Liverpool groups exploring detailed clinical, physiological and genetic phenotyping of patients with Interstitial Lung Disease. We have close links with the occupational lung disease service in Sheffield Teaching Hospitals and have ambitions to develop local expertise-led research programmes.

Further information can be found at: <http://www.lungsheffield.org/clinical-services/interstitial-lung-disease>



Professor Stephen Renshaw is a Professor of Respiratory Medicine at the University of Sheffield and Respiratory Consultant at Sheffield Teaching Hospitals. Prof Renshaw is involved in research into the mechanisms of inflammation and infection, and how tissues are damaged in lung disease.

Further information can be found at: <http://www.sheffield.ac.uk/infectionandimmunity/staffprofiles/renshaw>

Occupational Lung Disease: the Centre for Workplace Health at Sheffield Teaching Hospitals, University of Sheffield, and the Health & Safety Laboratory

Research Theme Lead: d.fishwick@sheffield.ac.uk

The Centre for Workplace Health (CWH) was launched in 2005 and aims to work nationally and internationally in providing high quality occupational health research, training and advice.

It exists as a tripartite arrangement between the Health & Safety Laboratory (HSL), Sheffield Teaching Hospitals, and the University of Sheffield. This unique multidisciplinary model has allowed the appointment of staff including nurses, consultants and research fellows, who work across organisational boundaries.

The Centre provides medical and ethical research advice to the whole of HSL, and all staff are involved in a wide range of research across the laboratory, wherever projects include studying the health of workers, or the use of human volunteers.

CWH also works internationally, to influence health and safety policy working with organisations that include the World Health Organization, The Partnership for European Research in Occupational Safety and Health (PEROSH) and the International Commission on Occupational Health.

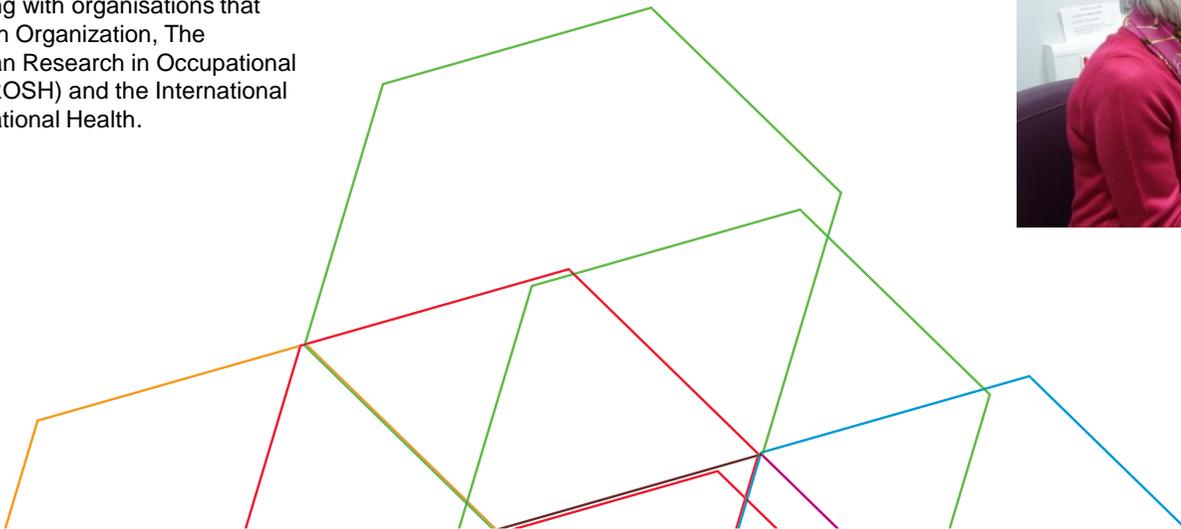
We plan to submit grant applications to investigate occupational lung disease in relation to:

- woodworking and compost workers' studies
- sedentary behaviour at work and its health consequences
- Extrinsic Allergic Alveolitis (an allergic reaction to inhaled dust)
- asbestos exposure in patients with idiopathic pulmonary fibrosis
- work aggravated asthma in the UK and the social and economic impact on the individual.

We will continue to recruit patients to our clinical studies, including the HSE woodworkers study and the STH-based respiratory research database.

We will support research fellows in further education and higher degrees to develop our research capacity, and strengthen the CWH tripartite relationship and develop links with Manchester University.

Further information can be found at: <http://www.lungsheffield.org/clinical-services/occupational-lung-disease>



Sleep and Ventilation

Research Theme Lead: stephen.bianchi@sth.nhs.uk

The sleep and ventilation service research programme has been focussed predominantly in two areas. Firstly, through collaboration with the motor neurone disease (MND) team at Sheffield Teaching Hospitals, we have explored a variety of interventions such as cough assist devices, diaphragmatic pacing (DiPALS) as well as monitoring (TOSCA) and quality of life issues in patients and carers of patients with MND in respiratory failure.

We have also been interested in the assessment of exercise capability in patients with obstructive sleep apnoea (OSA) and the effect of CPAP (Continuous Positive Airway Pressure) therapy and exercise programmes. We have published data and have delivered student MPhil and PhD projects. In the next 2-3 years we hope to apply for NIHR funding to deliver a multicentre study of exercise, dietary advice and CPAP therapy for patients with moderate to severe OSA.

We have collaborated with international physicians in vascular surgery exploring associations of peripheral vascular disease and OSA. We are also in advanced discussions with the STH departments of urology, diabetes & endocrinology to deliver collaborative research projects.



Further information can be found at: <http://www.lungsheffield.org/clinical-services/sleep-service>

Patient and Public Involvement in Research

The Directorate will continue to organise disease-specific PPI panels for our research themes.

A particularly active and successful area of PPI is the theme of Health Services Research with People With Cystic Fibrosis (PWCF). This PPI group has been central to the recent award of an NIHR Programme Grant to a research team led by Dr Martin Wildman (STH) and Prof Alicia O’Cathain (SCHARR, University of Sheffield). Over the next 5 years the PPI group will be involved in helping the research team develop and implement a behaviour change intervention with the objective of improving adherence to medication and quality of life in people with cystic fibrosis.

Our COPD specialists work closely with patients in the hospital and primary care setting. Dr Rodney Hughes was awarded an NIHR Health Technology Assessment Programme grant in pulmonary rehabilitation for COPD patients and the PPI engagement with patients was praised by NIHR and was central to the success of the application.

The STH Pulmonary Hypertension team is closely involved with the UK PH Association for patients, chaired by Dr Iain Armstrong (Nurse Consultant at STH) which is a continuing resource for PPI activity.

The Directorate website www.lungsheffield.org will be used as a platform to assist PPI, by publicising research activity and advertising PPI Panels or positions for patients that become available.



Communication and Publicity

Central to our communications strategy is the Academic Directorate of Respiratory Medicine website www.lungsheffield.org. Developed using funding from the NIHR Local Clinical Research Network, the site is a resource for patients, public and healthcare professionals, with information on our clinical services and research activity. It provides information for anyone wishing to get involved in research studies and PPI. The website will be used as a platform for research-related communications and publicity.

Difficult Lung Disease Group

The DLD group meeting is a nationally-renowned 2 day teaching meeting run in Sheffield by Prof Ian Sabroe. It brings the latest research-led best practice updates to respiratory clinicians. The meeting has been running for many years and is highly reviewed and highly regarded. For further details please visit the DLD group website: <http://dld.group.shef.ac.uk/>

