Respiratory, Sleep and Environmental Health Research Group

Application for Academic Unit status

May, 2015

Role as a unit of SWSLHD

The service

The Liverpool Department of Respiratory and Sleep Medicine is one of the largest departments in Liverpool Hospital and one of the largest Respiratory and Sleep Departments in Australia. The Department provides

- In-patient care for approximately 1400 admitted patients and 800 – 1000 in-patient consultations per year
- Daily outpatient clinics in general respiratory medicine and sub-speciality and inter-disciplinary clinics in
    - Tuberculosis
    - Severe asthma
    - Sleep disorders
    - Pulmonary hypertension
    - Motor Neurone Disease
- Diagnostic and interventional bronchoscopy (for day-only and in-patients)
- Interventional pulmonology
- Respiratory diagnostic (lung function) laboratory
- Sleep investigation unit
- Pulmonary rehabilitation program
- Non-invasive ventilation service
- Tuberculosis (Chest) Clinic
- Outreach nursing service for patients with severe chronic respiratory disease

Service network across SWSLHD

The Department is based at Liverpool Hospital and the Ingham Institute but provides services for the local community, the SWSLHD and the State. The following services, in particular, are LHD-wide services.

Interventional pulmonology (including interventional bronchoscopy)

This service has been established within the last three years and already is nationally-recognised as leader in this field. The service receives referrals from all over the SWSLHD and from other LHDs. Interventional pulmonology is at the cutting edge of respiratory medicine and provides a fertile ground for both research and teaching.

Sleep Investigation Unit (SIU)

The SIU provides up to 960 in-lab polysomnography and treatment studies annually for the diagnosis and management of sleep apnoea and other forms of sleep disordered breathing. The high prevalence of obesity and the largely undocumented burden of sleep disorders in this area present a number of challenges. There are many opportunities for developing innovative models of care to deal with this challenge.

Tuberculosis (Chest Clinic) service

The Chest Clinic manages all aspects of TB care for SWSLHD and also provides some State-wide services. In addition to diagnosis and management of TB, the clinic undertakes: daily supervised drug therapy, contact tracing and screening, migrant and health care worker screening, BCG vaccination, and patient education. The Chest Clinic also includes a CNC with a State-wide role in TB care and a state-wide service related to TB surveillance of migrants. It has been the focal point for several large studies on tuberculosis.

Other tertiary services

The Department also receives both in-patient and out-patient referrals from across the LHD for the management of complex problems that require tertiary level care. We expect that our sub-specialty clinics will attract similar referrals from across the LHD.

Multi-professional and multi-disciplinary unit

The Department is an integrated unit comprising physicians, specialist nurses, allied health care workers, and clinical and research scientists. Most of these are involved in both clinical care and research.

Models of multi-disciplinary clinical care implemented by the Department include the weekly multi-disciplinary in-patient team meetings and ward rounds, the pulmonary rehabilitation program, the smoking cessation program, the outreach nursing service for patients with severe chronic respiratory disease, the Chest Clinic (a nursing-medical collaborative service), and the non-invasive ventilation program (which involves physicians, nurses and physiotherapists).

Academic Appointments

Senior Academics

Professor Guy Marks

- Professor of Respiratory Medicine, SWS Clinical School, UNSW Australia
- Respiratory Physician, Department of Respiratory Medicine, Liverpool Hospital
- NHMRC Senior Principal Research Fellow
- Research focus: asthma & COPD, tuberculosis, air pollution, epidemiology and biostatistics

Professor Bin Jalaludin

- Conjoint Professor, UNSW Australia
- Director, Healthy People and Places Unit, SWSLHD
- Leader, Population and Health Services Stream, Ingham Institute of Applied Medical Research
- Research focus: air pollution, public health, epidemiology and biostatistics

Professor Sheree Smith

- Professor of Nursing, School of Nursing and Midwifery, UWS.
- Research focus: asthma and COPD, patient report outcomes, health technology assessment

Other Academics

Dr Melissa Baraket

- Conjoint Senior Lecturer, SWS Clinical School, UNSW Australia
- Staff Specialist, Department of Respiratory and Sleep Medicine, Liverpool Hospital
- Research focus: asthma, pulmonary vascular disease

Dr Peter Buchanan

- Conjoint Senior Lecturer, SWS Clinical School, UNSW Australia
- Staff Specialist, Department of Respiratory and Sleep Medicine, Liverpool Hospital
- Research focus: sleep disorders

Dr Peter Collett
- Conjoint Senior Lecturer, SWS Clinical School, UNSW Australia
- Staff Specialist, Department of Respiratory and Sleep Medicine, Liverpool Hospital
- Research focus: quality assurance, models of clinical care, sleep disorders

Dr Christine Cowie
- Senior Research Fellow (Level C Academic), SWS Clinical School, UNSW Australia
- Epidemiologist
- Research focus: air pollution, environmental epidemiology

Dr Claudia Dobler
- Conjoint Senior Lecturer, SWS Clinical School, UNSW Australia
- Staff Specialist, Department of Respiratory and Sleep Medicine, Liverpool Hospital
- Research focus: tuberculosis, research translation to clinical practice

Ms Frances Garden
- Research Fellow (Level B Academic), SWS Clinical School, UNSW Australia
- Biostatistician
- Research focus: biostatistics

Dr Zinta Harrington
- Conjoint Senior Lecturer, SWS Clinical School, UNSW Australia
- Head of Department and Staff Specialist, Department of Respiratory and Sleep Medicine, Liverpool Hospital
- Research focus: COPD and bronchiectasis, models of care and management

Dr Graham Radford
- Conjoint Lecturer, SWS Clinical School, UNSW Australia
- Research focus: education and training

Dr Hima Vedam
- Conjoint Senior Lecturer, SWS Clinical School, UNSW Australia
- Staff Specialist, Department of Respiratory and Sleep Medicine, Liverpool Hospital
- Research focus: sleep disorders

Dr Jonathan Williamson
- Conjoint Senior Lecturer, SWS Clinical School, UNSW Australia
- Staff Specialist, Department of Respiratory and Sleep Medicine, Liverpool Hospital
- Research focus: interventional pulmonology, lung cancer

Members of Research Group without current academic appointments

Dr Hamish Crawford
- Senior Staff Specialist, Department of Respiratory Medicine, Liverpool Hospital
- Research focus: tuberculosis, pulmonary function testing

Ms Serena Hong
- Senior Physiotherapist
- Research focus: post-operate pain management

Dr Anthony Johnson
- Consultant Respiratory Physician
- Research focus: occupational lung disease

Dr Stephen Parsons

- Senior Staff Specialist, Department of Respiratory Medicine, Liverpool Hospital
- Research focus: pulmonary vascular disease

Ms Ana Schippers

- Senior Physiotherapist
- Research focus: pulmonary rehabilitation

Mr Craig Wainwright

- Clinical Nurse Consultant
- Research focus: models of care

Research Program

The unit's program of multi-disciplinary research is briefly summarised here. The research focuses on clinical problems that cause a high burden of disease in the SWS community, require substantial health care resources including in-patient stays and ED visits, and/or are locally-relevant problems in the South West. A diverse range of research methodologies are being employed including randomised controlled trials, cohort studies and cross-sectional studies in the community-based populations and in patient populations, and qualitative research methods.

Members of the unit are investigators or other participants in three NHMRC Centres of Research Excellence (CRE): for severe asthma, tuberculosis and air pollution.

Chronic Obstructive Pulmonary Disease and Asthma

Our research encompasses epidemiology, clinical trials and new models of care. Investigators from this group are working on the following topics

- The epidemiology of COPD in Australia
- New drug therapies, new drug combinations and novel models of care for patients with COPD, asthma and bronchiectasis
- Patient-reported outcomes (e.g. quality of life) in people with chronic respiratory disease
- Better management of oxygen therapy
- An interventional pulmonology approach to managing COPD (bronchoscopic lung volume reduction)
- Better strategies for pulmonary rehabilitation.
- Post-operative pain perception and exercise tolerance in patients undergoing thoracic surgery.
- Nursing clinical handover practices in the management of in-patients with respiratory disease.

Interventional Pulmonology

Research to elucidate the clinical role of a range of interventional pulmonology procedures is taking place at Liverpool Hospital, either as single site studies or as part of multicentre studies. These procedures, which are relevant to the management of

- cancer,
- interstitial lung disease, and
- pleural disease,

are important because they represent a minimally invasive alternative to surgery or because they allow diagnostic and therapeutic options that were not previously available for these serious, life-threatening conditions.

Sleep Disorders

Due to the large unmet need with SWSLHD, a major focus of sleep research is on improved pathways to diagnosis and care for people with sleep disordered breathing. In particular, research focuses on evaluating simple screening tools that can be used to identify those with significant sleep disordered breathing, and particularly those with respiratory failure, so that they can be fast tracked to diagnosis and treatment implementation. Specific projects include:

- assessing the utility of awake supine oximetry as a screening tool for severe sleep disordered breathing, particularly hypoventilation and respiratory failure, in super-obese patients, and
- investigating the impact that different oximetry software programs on the diagnostic utility of oximetry alone compared with full polysomnography.

Tuberculosis

Research conducted by the Chest Clinic team has significantly contributed to the understanding of the TB epidemiology in Australia and has addressed questions to improve the clinical care of patients with latent (dormant) TB infection as well as active TB. A number of Australia-wide or NSW-wide cohort studies conducted by our group have addressed the question of TB risk, including the risk of developing TB in

- refugees screened after arrival in Australia
- migrants screened on application to migrate to Australia
- people who have completed treatment for TB
- people who have been in contact with other patients with active TB
- people with diabetes or chronic renal failure.

A decision support tool has been developed to assist doctors in advising patients about the whether or not take treatment for latent TB infection.

Researchers from this Department are also actively engaged in research on global control of tuberculosis. This work focuses on Mongolia and Vietnam and is being undertaken in collaboration with the National TB Control programs (Ministries of Health) in those countries.

Environmental research

Over many years our team has undertaken research on the environmental factors that affect respiratory health. Among the environmental factors we have investigated are:

- allergens, in particular, house dust mite but also moulds (*Alternaria*)
- thunderstorms in late spring ("thunderstorm" asthma)
- dietary factors, including fatty acids in the diet
- unflued gas heaters in homes and schools
- traffic-related air pollution
- other ambient air pollution

Our research has included randomised controlled trials of environmental interventions and observational studies.

Occupational lung disease

Asbestos-related lung diseases (including mesothelioma) are a major problem in South West Sydney because of the occupational exposure of many workers in the area and also because

of the potential for domestic exposure during home renovations. We are collaborating in epidemiological and epidemiological studies on asbestos exposure and lung disease.

Biostatistics

Our research has focused on applied biostatistics, in particular, applying novel statistical models to longitudinal data. This work has enabled the identification of data-derived classes (or "phenotypes") in complex heterogeneous disease entities (such as asthma). The integration of this research expertise within this clinical and epidemiological research team will enhance the research capacity of the team as whole as well as serving as a basis for advanced biostatistical research and training.

Research Strategy

The Strategic Plan (2015-2020) for the Respiratory, Sleep and Environmental Health Research Group is attached.

The group's strategic plan is consistent with the vision, aims, principles and new directions of the District's plan. Its four key strategic objectives are:

1. Create a research environment
2. Form strategic partnerships
3. Maximise resources available for research
4. Look to minimise barriers to research engagement

Research Track Record

Several members of our research group have well established track records with several publications in peer reviewed journals. Two hold NHMRC Fellowships for research.

CVs for Senior Academics and Team Publication Track Record are attached.

Teaching and Mentorship

The unit is involved in teaching undergraduate medical students from both UNSW and UWS. The Respiratory Department is regularly involved in the one week Respiratory Teaching unit at the UNSW. Several ILP students have undertaken research within the Department.

The unit also plays an active role in postgraduate teaching, having two advanced trainees each year in the unit. They also teach respiratory and sleep medicine and also epidemiology and biostatistics in the FRACP Part 1 training program. Members of the unit supervise advanced trainees in their research projects and these are often presented as posters at international conferences. The nursing and physiotherapy members of the group are also active in teaching nursing and physiotherapy student, both at the hospital and at UWS.

The senior academics have substantial experience in supervising higher degree research students:

Guy Marks

- 15 PhD students
- 5 post-doctoral fellows
- 15 other research degree students

Bin Jalaludin

- 8 PhD / DrPH students

- 8 Masters students

Sheree Smith

- 2 Masters students
- 1 Honours students

Attachments

1. CV for Level E academic appointees
    a. Guy B. Marks
        i. Brief CV
        ii. Full CV
    b. Bin Jalaludin
        i. Brief CV
        ii. Full CV
    c. Sheree Smith
        i. Brief CV
        ii. Full CV
2. Publication list
3. Research Strategic Plan
4. Proposed Budget

Respiratory, Sleep and Environmental Health Research Group

Strategic Plan 2015-2020

(Draft)

Research Strategy for South Western Sydney Local Health District 2012-2021

Vision

Researchers in South Western Sydney have a reputation for high quality health research that improves the health and health outcomes of local communities and has broad applicability nationally and internationally

Aims

1. Support and further develop the capacity for research across the SWSLHD.
2. Enhance the profile of current research in the SWSLHD.
3. Strengthen the quality and quantity of research in the SWSLHD.
4. Encourage new researchers, including junior staff, and, sustain the commitment to research of SWSLHD personnel in management, support and research roles.
5. Identify resourcing required to implement the strategies in the Plan and potential sources of funding.
6. Develop governance arrangements which ensure accountability and responsibility for research conducted according to ethical principles, scientific, regulatory and professional standards and the principles of risk management.
7. Ensure structures support creativity and lead to research which improves health and health service provision

Principles

- Research will provide a cornerstone of the Local Health District and be an intrinsic part of normal Health business.
- Research will aim to address the health concerns of patients and local communities, whether this be through capacity building, changing behaviours, improving health or maintaining or improving quality of life.
- Research will be multi-disciplinary, multi-professional and will be undertaken in partnership with patients and communities, facilities, services and organisations. It will focus on hospital services and will also look outward into community and primary health services and local communities.
- Research will translate into everyday practice.
- Research will be undertaken in a manner that respects and protects the research participant, the researcher and the District.
- Research will provide a foundation from which we can develop our workforce and will provide a competitive advantage to attract and retain skilled and committed staff.

New Directions for Health Research in South Western Sydney

1. Strength health research leadership
2. Develop priorities and innovation for research
3. Build research capacity
4. Increase clinical trial capability
5. Build workforce capacity to undertake health research
6. Increase community interest, knowledge and communication
7. Optimise use of infrastructure support

The unit's strategic plan will be consistent with the vision, aims, principles and new directions of the District's plan.

Strategic analysis of Liverpool Respiratory, Sleep and Environmental Health

Strengths

- Large patient population
    - Diverse and advanced illness
- Physicians are all Staff Specialists or University employees
    - Two hold NHMRC Fellowships for research
    - Several hold PhDs and have research experience
- Diverse range of research interests
    - Sleep disorders
    - Asthma and airways disease
    - Interventional pulmonology
    - Pulmonary vascular disease
    - Health services research
    - Process control
- Access to medical students (including ILPs) and registrars
- Extensive clinical service provision:
    - Respiratory laboratory
    - Sleep laboratory
    - Pulmonary rehab. Program
    - Clinical Research nurse
    - Multi-disciplinary respiratory expertise (physio, nursing, SW, OT)
    - Lung cancer MDT
    - Very large TB service
- Excellent physical facilities within the new clinical building and the Ingham Institute

Weaknesses

- Lack of dedicated time that is not assigned to clinical work
- Lack of funding
- Lack of ideas - creative
- Lack of infrastructure to support research
- Barrier of having to get ethics approval
- Difficulty in recruiting patients into trials
- Most of the clinician-researchers do not yet have track records that would be competitive as lead-researchers in competitive grant applications

Opportunities

- Statistics consultation available
- TESL for research time
- Collaboration with other research groups (both clinical and non-clinical) that operate in the Liverpool campus (as well as others in SWS)
- Direct engagement between health care providers / researchers and the affected communities provides opportunities to target research to patients' needs.
- Better use of patients for research projects
- Participation in research seminars at medicine and Ingham
- Better use of video conferencing
- Opportunity to assign some meeting time to research time
- Opportunity to access funding for research within the health service
- Interaction between clinicians, scientists and engineers

- Nexus (sleep lab) database of physiological and demographic data on sleep lab patients

Threats

- Losing clinical trials nurse
- Clinical Academic distracted by activities outside Liverpool
- Reputation of the Department may suffer causing difficulties in attracting and retaining high-quality staff, trainees and students

Strategic objectives

The following is list of strategic objectives follow from the strategic analysis described above.

1. Create a research environment
    a. Stimulating ideas
    b. Engaging ALL staff (clinical, non-clinical), trainees and students
    c. Engaging patients
    d. Engaging the community
2. Form strategic partnerships
    a. Complementary expertise and resources
    b. Access to funding and research staff
    c. Engaged with the local community including patient groups (affected communities) and civil society organisations
3. Maximise resources available for research
    a. Seeks ways to release senior clinicians' time for research (if they wish to)
    b. Engagement of trainees and students
    c. Engagement with partners
    d. Applying for funding for investigator-initiated projects
    e. Supervising research students
4. Look to minimise barriers to research engagement
    a. Work with ethics committee to understand requirements
    b. Utilise videoconferencing
    c. Streamline procedures for getting consent from patients to be contacted for research projects

Research objectives

The Liverpool Respiratory, Sleep and Environmental Health Research Group's overall research objective strategy is to continue and to enhance high quality, multi-disciplinary research that answers questions that are relevant to the population of the SWSLHD and elsewhere.

Our research group is highly committed to addressing the respiratory and sleep health problems of our local community. These high burden diseases include asthma and COPD, lung cancer, sleep disordered breathing and respiratory failure associated with severe obesity, and tuberculosis. These are also key priorities for the LHD, the State and Commonwealth due the large burden of disease, their impact on avoidable morbidity and mortality and the cost of providing health services (emergency care, in-patient care, and pharmaceuticals) for these conditions.

We are also committed to addressing these problems with strategies that address the particular challenges faced by our local community: cultural, linguistic and ethnic diversity, and socioeconomic disadvantage. Some migrant groups and also indigenous people in our District are at particularly high risk of poor respiratory health outcomes. Our priorities are to optimize outcomes for patients admitted with these prevalent and burdensome conditions.

Fortunately, our research group has a wide range of research interests and experience including

- COPD
- asthma,
- tuberculosis,
- sleep disorders,
- lung cancer
- respiratory failure,
- pulmonary vascular disease, and
- health effects of air pollution

The team has expertise in clinical research, pulmonary and sleep physiology, clinical trials, interventional pulmonology, qualitative research methods, quantitative research methods, patient reported outcomes, health services research (including new models of care), and epidemiology and biostatistics.

Hence, there is a good match been the high priority targets for research and skills and experience of the research team. Some of the specific aims of our research over the next five years will be:

1. Finding evidence-based solutions to reduce avoidable hospital readmissions in patients with COPD and pneumonia, and respiratory failure, such as reducing barriers to accessing pulmonary rehabilitation programmes for patients with COPD
2. Defragmenting care for patients with chronic respiratory and sleep disorders, especially patients with COPD and OSA by implementing innovative models of integrated care
3. Evaluating the treatment burden for patients associated with chronic respiratory diseases and develop and implement tools for shared decision making in order to achieve patient-centred outcomes
4. Developing and implementing decision aids for doctors involved in the care of patients with respiratory and sleep disorders

5. Better defining the burden of disease related to sleep disordered breathing in the south west
6. Reducing readmission rates in COPD patients by better assessing and managing anxiety
7. Examining the existing sleep database to assist with phenotyping patients with sleep disordered breathing
8. Performing epidemiological studies to better define the disease burden of OSA in our area

Proposed Budget

We proposed to employ a full-time research co-ordinator to assist the Respiratory, Sleep and Environmental Health Research Group.

Health Service Manager Level 1 1.0 FTE Including on costs	$100,000 per year