



Sir Charles  
Gairdner Hospital



# **WEST AUSTRALIAN SLEEP DISORDERS RESEARCH INSTITUTE (INC.)**

## **SUMMARY OF RESEARCH ACTIVITY**

**July 1 2004 – June 30 2005**

Level 5, G Block  
Queen Elizabeth II Medical Centre  
Hospital Avenue  
Nedlands  
Western Australia 6009  
Australia

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Fields of Work

1. Neuro-mechanical efficiency of the diaphragm;
2. Respiratory failure and the chemical control of breathing in chronic obstructive lung disease.

Grants 2004-2005

2004	B Singh KE Finucane	<i>Sir Charles Gairdner Hospital Research Foundation</i> Lung Volume Reduction with tiotropium in Chronic Obstructive Pulmonary Disease (COPD): Functional Mechanisms and Clinical Implications	\$10,000
2005	B Singh KE Finucane	<i>Boehringer Ingelheim Pty Ltd</i> <i>Pfizer Pharmaceuticals</i> Lung Volume Reduction with Tiotropium in Chronic Obstructive Pulmonary Disease (COPD): Improved Dyspnoea: Mechanisms and Clinical Implications	

Research Personnel

Dr Richard Warren	Associate Investigator
Ms Karen Wills	Research Assistant
Ms Peta Maxwell	Research Officer

Collaborations

Dr R Chandrasekhar	School of Electrical, Electronic and Computer Engineering, University of Western Australia;
Mr S Dhaliwal	Department of Public Health, Curtin University.

Techniques

1. Measurement of diaphragm displacement by radiography, fluoroscopy and ultrasound;
2. Measurement of diaphragm electromyography.

Presentations and Invited Lectures

**Local**

1. Singh B. Mechanical Cough Assist. Clinical Meeting, Department of Respiratory Medicine, Jul 2004.
2. Singh B. NIPPV and Tracheotomy Care. Educational Meeting, Department of Respiratory Medicine, Jul 2004.
3. Singh B. End of Life Decisions in Motor Neuron Disease. Clinical Meeting, WASDRI, Jul 2004.
4. Singh B. New Exercise Test Report. Clinical Meeting, Department of Respiratory Medicine, Aug 2004.
5. Singh B. Pathophysiology of Respiratory Failure. Clinical Meeting, Department of Respiratory Medicine, Oct 2004.
6. Singh B. Arterial Blood Gases and Case Studies. NIV course, Nov 2004.
7. Singh B. Therapy Clinic. RSDC Clinical Meeting, Department of Pulmonary Physiology, Nov 2004.

8. Singh B. Hyperinflation, the Chest Wall and Dyspnoea in COPD. Clinical Meeting, Department of Respiratory Medicine, Nov 2004.
9. Singh B. Control of Ventilation. Respiratory Technologists' meeting, Department of Pulmonary Physiology, Feb 2005.
10. Singh B. A Model of Emphysema: the effect of hyperinflation plus respiratory loading on diaphragm efficiency in humans. Research Meeting, WASDRI, Mar 2005.
11. Singh B. Therapy Clinic. RSDC Clinical Meeting, Department of Pulmonary Physiology, Apr 2005.
12. Singh B. Obstructive Sleep Apnoea and Hypertension. WA Sleep Disorders Association, Perth, Apr 2005.
13. Singh B. Utilities and Outcomes within a Respiratory High Dependency Unit. Clinical Meeting, Department of Respiratory Medicine, May 2005.
14. Singh B. Respiratory Physiology Tutorial. FRACP Training Program, SCGH, June 2005.

### **National**

1. Singh B. Automatically adjusting CPAP devices are the way of the future-pro. Australian Sleep Association Annual Meeting Sydney NSW, Oct 2004.
2. Singh B. Hyperinflation and the Chest Wall. Airways, Adelaide, Oct 2004.
3. Singh B. Pathophysiology of Respiratory Failure-Acute and Chronic. Post Graduate Course: Practical Aspects of Non-invasive Ventilation in Adults, Sydney, Oct, 2004.
4. Singh B. Clinical Indications for Exercise Tests. Australian and New Zealand Society of Respiratory Scientists, Annual Scientific Meeting, Perth, Mar 2005.
5. Murphy M, Singh B, Hillman D. Utility of and outcomes within a respiratory high dependency unit (RH DU). Thoracic Society of Australian and New Zealand Annual Scientific Meeting, Perth WA. *Respirology* 2005; 10(Suppl): A11.
6. Singh B, Panizza JA, Wills KD, Finucane KE. A model of emphysema: the effect of hyperinflation plus respiratory loading on diaphragm efficiency in humans. Thoracic Society of Australian and New Zealand Annual Scientific Meeting, Perth WA. *Respirology* 2005; 10(Suppl): A22.
7. Thamrin C, Finucane KE, Singh B, Sly PD, Hantos Z. Broadband Oscillation mechanics in healthy and emphysematous adult human subjects. Thoracic Society of Australian and New Zealand Annual Scientific Meeting, Perth WA. *Respirology* 2005; 10(Suppl): A22.

### **International**

1. Thamrin C, Finucane KE, Singh B, Sly PD, Hantos Z. Broadband Oscillation mechanics in healthy and emphysematous adult human subjects. American Thoracic Society Annual Scientific Meeting, San Diego USA. *Am J Resp Crit Care Med* 2005; 2 (abstracts issue): A34.

### Publications

1. Singh B, Panizza J.A, Finucane K.E. Diaphragm electromyogram root mean square response to hypercapnoea and its inter-subject and day-to-day variation. *J Appl Physiol*, 2005; 98: 274-281.
2. Finucane K.E, Panizza J.A, Singh B. Efficiency of the normal human diaphragm with hyperinflation. *J Appl Physiol*, 2005; 99(4): 1402-11.

Fields of Work

1. Assessment of upper airway dimensions using optical interferometry;
2. Effect of lung volume on upper airway collapsibility;
3. Respiratory muscle training in patients with chronic lung disease;
4. Aerophagia and gastro-oesophageal reflux in non-invasive positive pressure ventilation.

Grants 2004-2005

2002-04	PR Eastwood DR Hillman SC Jenkins N Cecins D Green M Phillips	<i>NHMRC (212016)</i> Improving functional capacity in patients with chronic lung disease with high intensity respiratory muscle training.	\$340,000
2004	PR Eastwood DD Sampson DR Hillman	<i>National Health and Medical Research Council - Industry Development Grant</i> Dynamic in vivo size and shape measurement of the human upper airway using long-range optical coherence tomography	\$184,250
2004	D Green T Ackland PR Eastwood D Lloyd P Fournier B Blanksby BWaddell	<i>UWA NHMRC Equipment Grant</i> Dual energy X-ray absorptiometry (DEXA) machine	\$70,000
2004	PR Eastwood	<i>Medical and Health Research Infrastructure Fund (WA)</i> Department of Health, Government of Western Australia Infrastructure Grant - Round 7	\$18,800
2004	PR Eastwood DR Hillman	<i>Sir Charles Gairdner Hospital Research Foundation</i> Imaging of the upper airway using catheter-based optical coherence tomography	\$10,000
2004	S Jenkins PR Eastwood	<i>Asthma Foundation – Telethon Research Programme</i> Improving quality of life and functional capacity in middle-aged and older adults with moderate to severe asthma and associated disability	\$46,422
2004	PR Eastwood B Dawson G Stewart	<i>Australian Football League Research Fund</i> Sleep quality and athletic performance: the effect of interstate air travel	\$19,949
2004-2006	PR Eastwood DR Hillman	<i>NHMRC (303218)</i> Factors determining collapsibility of the human upper airway during sleep and general anaesthesia	\$259,625
2004-2008	Eastwood, PR	<i>NHMRC (294404) R Douglas Wright Biomedical Career Development Award</i>	\$417,500
2005	PR Eastwood	<i>Medical and Health Research Infrastructure Fund (WA)</i> Department of Health, Government of Western Australia Infrastructure Grant - Round 8	\$19,918

2005	PR Eastwood DR Hillman N McArdle D Green B Stuckey G Sturdy	<i>Sir Charles Gairdner Hospital Research Foundation</i> The effect of continuous positive airway pressure on blood vessel function and erectile function	\$10,000
2005-2007	AD Lucey PR Eastwood DR Hillman DD Sampson T Balint	<i>Australian Research Council (DP0559408)</i> Modeling and methods of flow-obstruction dynamics in the human upper airway	\$425,000

### Research Personnel

Dr Jennifer Walsh	Research Officer (post-doctoral appointment)
Ms Kathleen Maddison	Research Assistant
Ms Danielle Philippe	Research Assistant
Ms Suzanne Lidstone	Administration Clerk
Mr Michael Hibbard	PhD candidate
Ms Kylie Hill	PhD candidate
Ms Kelly Shepherd	PhD candidate
Ms Sian Turner	PhD candidate
Ms Cara Weisbrod	PhD candidate
Louise Richmond	Masters candidate
Ms Melissa Giumelli	Honours candidate
Mr Abdul Halim Bin Mohamed Anwar	Honours candidate

### Collaborations

#### **Local**

A/Prof S Jenkins	Department of Physiotherapy, Sir Charles Gairdner Hospital; School of Physiotherapy, Curtin University;
Dr P Platt	Department of Anaesthetics, SCGH;
Professor D Sampson	Department of Electronic and Electrical Engineering, University of Western Australia;
Professor P Thompson	Asthma and Allergy Research Institute, Queen Elizabeth II Medical Centre;
A/Prof J Pan	Department of Mechanical Engineering, University of Western Australia;
A/Prof G Allison	Centre for Musculoskeletal Studies, University of Western Australia.

#### **National**

Prof R Holloway	Department of Gastroenterology Hepatology, Royal Adelaide Hospital, SA;
Dr D McEvoy	Department of Respiratory Medicine, Repatriation Hospital, SA;
Dr R Grunstein	Sleep Disorders Centre, Royal Prince Alfred Hospital, NSW;
A/Prof J Wheatley	Department of Respiratory Medicine, Westmead Hospital, NSW;
Dr T Amis	Department of Respiratory Medicine, Westmead Hospital, NSW.

#### **International**

A/Prof A Schwartz	Johns Hopkins Medical School, Asthma and Allergy Centre, Baltimore, Maryland, USA;
Mr R Brandmeier	MAP Medizin-Technologie GmbH, Martinsreid, Germany;
Mr J Kirkness	Johns Hopkins Medical School, Asthma and Allergy Centre, Baltimore, Maryland, USA.

## Techniques

1. Oesophageal impedance
2. Oesophageal manometry
3. Administration of non-invasive ventilation
4. Polysomnography
5. Respiratory muscle training
6. Oesophageal pH monitoring
7. Cycle ergometry

## Presentations and Invited Lectures

### **Local**

1. Eastwood PR. Oral presentation. System failure during sleep - snoring and sleep apnoea. University of Western Australia, School of Anatomy & Human Biology Seminar Series, Oct 2004.
2. Eastwood PR. Oral presentation. Research updates. Thoracic Society of Australia and New Zealand Annual Scientific Meeting (Western Australian Branch) Mandurah, Oct 2004.
3. Eastwood PR. Invited lecture. Healthy sleep: insomnia and sleep apnoea. Water Corporation Head Office, Nov 2004.
4. Eastwood PR. Invited lecture. Imaging the upper airway, and beyond. Annual Scientific Meeting of Princess Margaret Hospital & Institute of Child Health Research, Rottnest, Dec 2004.
5. Eastwood PR. Invited lecture. Travel, sleep and performance. Fremantle Dockers Football Club - coaching staff, Jan 2005.
6. Eastwood PR. Invited lecture. How is the upper airway involved in sleep apnoea? Sleep Disorders Australia (Sleep Disorders Support Group), February 2005.

### **National**

1. Weisbrod CJ, Eastwood PR, O'Driscoll G, Walsh JH, Best M, Halliwill JR, Green DJ. Peripheral vasomotor responses to hypoxia in type-2 diabetes. Cardiac Society of Australia New Zealand Annual Scientific Meeting, Brisbane QLD, Aug 2004.
2. Hillman DR. Invited speaker. History of non-invasive ventilation. Australasian Sleep Association, Annual Scientific Meeting, postgraduate course, Sydney NSW, 2004.
3. Eastwood PR. Keynote speaker. Travel and Sleep: Challenges to a Good Recovery. Australian Football League Grand Final Symposium, Melbourne VIC, Sept 2004.
4. Eastwood PR. Session chair. Session Six. Institute for Breathing and Sleep, Austin Hospital Melbourne. Symposium on Sleep and Breathing, Sydney NSW, Feb 2005.
5. Eastwood PR. Oral presentations. Assessing upper airway structure and function with endoscopic optical coherence tomography and Assessing genioglossus muscle function during sleep using multiple fine-wire electrodes. Symposium on Sleep and Breathing. Sydney, February 2005.
6. Hillman DR. Invited speaker. Preparing for laboratory accreditation. Australia and New Zealand Society of Respiratory Science, Annual Scientific Meeting, Perth WA, Mar 2005.
7. Eastwood PR. Session chair. Ann Woolcock Young Investigator Award Session. Thoracic Society of Australia and New Zealand Annual Scientific Meeting. Perth, March 2005.
8. Eastwood PR. Session chair. Research Short Course- Course co-convenor. Thoracic Society of Australia and New Zealand Annual Scientific Meeting. Perth WA, Mar 2005.

9. Hill K, Jenkins S, Philippe D, Shepherd K, Cecins N, Green D, Hillman D, Eastwood P. High-intensity inspiratory muscle training (HIMT) improve dyspnoea and health-related quality of life (QoL) in COPD. Thoracic Society of Australian and New Zealand Annual Scientific Meeting, Perth WA. *Respirology* 2005; 10(Suppl): A18.
10. Hill K, Jenkins S, Philippe D, Shepherd K, Cecins N, Green D, Hillman D, Eastwood P. Measuring inspiratory muscle endurance in COPD – incremental vs. constant threshold tests. Thoracic Society of Australian and New Zealand Annual Scientific Meeting, Perth WA. *Respirology* 2005; 10(Suppl): A59.
11. Pilippe D, Hill K, Jenkins S, Cecins N, Maddison K, Hillman D, Eastwood P. Effect of prior inspiratory muscle training on pulmonary rehabilitation outcomes in patient with COPD. Thoracic Society of Australian and New Zealand Annual Scientific Meeting, Perth WA. *Respirology* 2005; 10(Suppl): A59.
12. Poh H, Eastwood PR, Cecins NM, Jenkins SC. Six minute walking distance (6MWD) in healthy Singaporeans aged 45-85 years. Thoracic Society of Australian and New Zealand Annual Scientific Meeting, Perth WA. *Respirology* 2005; 10(Suppl): A58
13. Hillman DR. Organising committee, facilitator. Exercise Physiology in Health and Disease. Thoracic Society of Australia and New Zealand, Advanced Course. Sydney NSW, Jun 2005.
14. Eastwood PR. A plenary presentation. Exercise: protocols and measurement. Thoracic Society of Australia and New Zealand Advanced Course. The physiology of exercise in health and disease. Sydney NSW, Jun 2005.

### **International**

1. Eastwood P, Armstrong JJ, Zvyagin AV, Walton ID, Alexandrov SA, Schwer S, Leigh MS, Sampson DD, Hillman DR. In vivo size and shape measurement of upper airway using endoscopic optical coherence tomography (OCT). European Respiratory Society Annual Congress Glasgow UK. *Eur Respir J* 2004; 24 (Suppl 48): P2743
2. Hill K, Jenkins S, Philippe D, Shepherd K, Cecins N, Green D, Hillman D, Eastwood P. High-intensity inspiratory muscle training (HIMT) reduces dyspnoea and improves health-related quality of life (QoL) and functional exercise capacity in COPD. *Eur Respir J* 2004; 24 (Suppl 48): 1676.
3. McArdle M, Philpott JJ, Hillman D, Beilin LJ, Watts GF. Case controlled study: sleep apnoea clinic patients have insulin resistance and dyslipidaemia. European Respiratory Society Annual Congress Glasgow UK. *Eur Respir J* 2004; 24 (Suppl 48): P2098.
4. McArdle N, Hillman D. Auto-triggering due to cardiac contraction can cause inadequate non-invasive positive pressure. European Respiratory Society Annual Congress Glasgow UK. *Eur Respir J* 2004; 24 (Suppl 48): P3526.
5. Eastwood PR. Session chair. Upper airway collapsibility - from models, to patients, to treatment. American Thoracic Society Annual Scientific Meeting, San Diego USA, May 2005.
6. Eastwood P, Platt P, Shepherd K, Maddison K, Hillman D. Propofol anesthesia- A model for study of the upper airway collapsibility devoid of neurogenic influences. American Thoracic Society Annual Scientific Meeting, San Diego USA. *Am J Resp Crit Care Med* 2005; 2 (abstracts issue): A611.
7. Eastwood P, Hill K, Jenkins S, Philippe D, Shepherd K, Cecins N, Green D, Hillman D. High-intensity inspiratory muscle training (HIMT) improves dyspnea and health-related quality of life (QoL) in COPD. American Thoracic Society Annual Scientific Meeting, San Diego USA. *Am J Resp Crit Care Med* 2005; 2 (abstracts issue): A787.



## Publications

1. Turner S, Eastwood PR, Cecins, NM, Hillman DR, Jenkins SC. Physiological responses to incremental and self-paced exercise in patients with COPD – a comparison of three different exercise tests. *Chest* 2004; 126: 766-773.  
\*\* Editorialised: Johnson JE. Which test should be used for patients with symptomatic COPD? *Chest* 2004; 126: 668-670.
2. Weisbrod CJ, Eastwood PR, O'Driscoll G, Walsh JH, Best M, Halliwill JR, Green, DG. Vasomotor responses to hypoxia in type-2 diabetes. *Diabetes* 2004; 53:2073-2078.
3. Weisbrod CJ, Eastwood PR, O'Driscoll G, Green, DG. Abnormal ventilatory responses to hypoxia in type-2 diabetes. *Diabetic Med* 2005; 22: 563-568.
4. Eastwood PR, Platt PR, Shepherd K, Maddison K, Hillman DR. Collapsibility of the upper airway at different levels of propofol anesthesia. *Anesthesiology* 2005; 103:470-477.
5. Maddison K, Shepherd K, Hillman DR, Eastwood PR. The effect of high-intensity exercise on function of the lower esophageal sphincter. *Med Sci Sports Exerc* 2005; 37: 1728-1733.
6. Pierce RJ, Hillman D, Young IH, O'Donoghue F, Zimmerman PV, West S, Burdon JG. Respiratory function tests and their application. *Respirology* 2005; 10 Suppl 2: S1-S19.
7. Armstrong JJ, Leigh MS, Sampson DD, Walsh JH, Hillman DR, Eastwood PR. Quantitative upper airway imaging with anatomical optical coherence tomography. *Am J Respir Crit Care Med* 2005 Oct 20 [Epub ahead of print].
8. Hillman DR, Scott-Murphy A, Antic R, Pezzullo L. The economic cost of sleep disorders. *Sleep* 2005 (*in press* accepted for publication).
9. Hill K, Eastwood PR. Editorial. Respiratory muscle training – the con argument. *Chron Respir Dis* (*in press*, accepted Jun 2005).

**A/PR ALAN JAMES  
DR NEIL CARROLL**

## **AIRWAY REMODELING AND INFLAMMATION**

### Fields of Work

1. Airway Remodeling
  - Hypertrophy and hyperplasia of airway smooth muscle in asthma
    - Stereological measurement of airway smooth muscle and extracellular matrix in asthma
    - Validation of methods – section orientation and image analysis
    - Relation of changes in airway smooth muscle and extracellular matrix to age and duration and severity of asthma in collaborative study
  - Assessment of smooth muscle phenotype
    - Immunohistochemistry (co-labeling with smoothelin; CHASM; actin)
    - transcription factor expression on smooth muscle (CBEP)
2. Airway Inflammation
  - Validation study of biopsy to assess airway and lung inflammation
  - Identification of dendritic cells with immunohistochemical labeling (DC-SIGN)
  - Inflammation in allergen-sensitised and exposed mice
3. Population Studies
  - Busselton Health Survey 2005-2007

- Random sample of current Busselton population (adults and children)
  - Questionnaires; morphometry; blood pressure; spirometry; exhaled nitric oxide; forced oscillation technique; airway responsiveness to methacholine; allergy prick skin tests; collection of blood for full blood counts, stored serum and DNA analysis
  - Collaborative (The Netherlands; Italy; Hungary) study of bronchodilator response of forced oscillatory technique
    - Age and gender stratified
    - Sample of Busselton Survey (1994) attendees
  - Epidemiology of obstructive sleep apnoea
    - WASDRU Sleep database and genetics study
    - Busselton Health Survey
4. Genetic influences on airway disease and allergy
    - Single nucleotide polymorphisms
    - Genome screen
    - HLA-DR
  5. SIDS
    - Influence of parental smoking on airway structure and inflammation
  6. Clinical Trials

#### Grants 2004-2005

2003-05	AL James NG Carroll	<i>Western Australian Institute for Medical Research</i> Mechanisms of persistent airway inflammation and airway remodeling	\$63,000
2003-05	AW Musk AL James PN le Souëf WOC Cookson G Waterer M Knuiman NG de Klerk J Beilby	<i>Western Australian Institute for Medical Research</i> Epidemiological and genetic studies of asthma and chronic airflow limitation: The Busselton Health Study	\$73,000 p.a.
2004	James, AL Maxwell, PS	<i>Hollywood Private Hospital Research Foundation</i> Characteristics of lymphoid aggregates in smokers with and without airflow obstruction	\$10,000
2004	Lamb, J James, AL	<i>Asthma Foundation WA</i> Fibroblasts and myofibroblasts in airway remodeling in asthma and COPD	\$30,294
2004-2006	Upham, J James, AL	<i>NHMRC (303161)</i> Effects of allergens on dendritic cell function in allergic asthma	\$83,500 p.a.
2005	Musk B James A Beilby J Palmer L Knuiman M	NHMRC equipment grant	\$123,915
2005	James, AL Maxwell, PS	<i>Hollywood Private Hospital Research Foundation</i> Lymphocyte activation in lymphoid aggregates in smokers with airflow obstruction	\$10,000

2005	James, AL Carroll, M	<i>Sir Charles Gairdner Hospital Research Foundation</i> Inflammation and hyperplasia/hypertrophy of airway smooth muscle in asthma and representativeness of bronchial biopsies – a stereological study	\$10,000
2005	Elliot, J James, AL	<i>Sir Charles Gairdner Hospital Research Foundation</i> The mean distance between airway alveolar attachments and its relationship to alveolar number in the lung	\$10,000
2005-2007	James, AL Carroll, NC	<i>NHMRC (343601)</i> Hyperplasia and hypertrophy of airway smooth muscle in asthma	\$281,000
2005-2007	Musk, AW James, AL Beilby, JP Palmer, LJ Knuiman, MW	<i>NHMRC (353532)</i> The changing prevalence of asthma and chronic obstructive disease in Australia	\$729,380

### Research Personnel

Mr John Elliot	Research Officer
Ms Jasmine Lamb	Research Officer
Ms P Maxwell	Research Officer
Mrs Cathryn Jensen	Research Assistant
Mr Mark Carroll	PhD candidate
Ms Hiliary Hii	Honours candiate
Mr Matthew Moller	Honours candiate

### Collaborations

#### **Local**

Prof A Baddeley	School of Mathematics, University of Western Australia;
Dr K Finucane	Department of Pulmonary Physiology, Sir Charles Gairdner Hospital;
Dr D Hillman	Department of Pulmonary Physiology, Sir Charles Gairdner Hospital;
Clinical Prof AW Musk	Department of Respiratory Medicine, Sir Charles Gairdner Hospital;
Mr B Noffsinger	Department of Pulmonary Physiology, Sir Charles Gairdner Hospital
Prof P Sly	Institute for Child Health Research;
A/Prof S Stick	Institute for Child Health Research;
Dr D Turner	Institute for Child Health Research;
Dr S Young	Department of Pulmonary Physiology, Sir Charles Gairdner Hospital.

#### **National**

A/Prof M Abramson	Department of Epidemiology and Preventive Medicine, Monash Medical School, Alfred Hospital, Victoria;
Prof N Berend	Woolcock Institute of Medical Research, University of Sydney, New South Wales;
Prof J Black	Woolcock Institute of Medical Research, University of Sydney, New South Wales;
Dr G King	Woolcock Institute of Medical Research, University of Sydney, New South Wales;
A/Prof R Kumar	School of Pathology, University of New South Wales;
Dr K MacKay	Department of Respiratory Medicine, Children's Chest Research Centre, Children's Hospital at Westmead, NSW;
A/Prof P Robinson	Department of Thoracic Medicine, Royal Children's Hospital, Victoria;
Dr C Salome	Woolcock Institute of Medical Research, University of Sydney, New South Wales;

Prof H Walters Department of Epidemiology and Preventive Medicine, Monash Medical School, Alfred Hospital, Victoria;  
A/Prof J Wilson Department of Respiratory Medicine, Alfred Hospital, Victoria.

### **International**

Prof T Bai MacDonald Research Laboratory, St Paul's Hospital, Vancouver, Canada;  
Prof M Bonsignore Istituto di Fisopatologia, Italy;  
Dr F Green Faculty of Medicine, University of Calgary, Canada;  
Prof J Hogg MacDonald Research Laboratory, St Paul's Hospital, Vancouver, Canada;  
Dr D Knight MacDonald Research Laboratory, St Paul's Hospital, Vancouver, Canada;  
Dr T Mauad Department of Pathology, Sao Paulo University Medical School, Brazil  
Prof P Pare MacDonald Research Laboratory, St Paul's Hospital, Vancouver, Canada;  
Prof WOCM Cookson Henry Wellcome Building for Human Genetics, Oxford University, England;  
Prof E Spindel Oregon Regional Primate Research Centre, Oregon, USA.

### Techniques

1. Morphometry and stereology
2. Immunohistochemistry
3. Physiology - airway responsiveness; forced oscillation technique
4. Exhaled nitric oxide
5. Atopy
6. Induced sputum.

### Presentations and Invited Lectures

#### **Local**

1. James A. "Respiratory Anatomy and Physiology", Nurses Lecture Series, Sir Charles Gairdner Hospital.

#### **National**

1. James A. Invited lecturer. "Asthma in the Elderly" Asthma Think Tank, Woolcock Institute, University of Sydney.
2. James A. "Asthma in the Elderly", National symposium on Asthma in the Elderly, Asthma Australia.
3. James A. "Use of Pulmonary Physiology in Practice", Advanced Course for Respiratory Trainees. Thoracic Society of Australia and New Zealand, Perth WA, Mar 2005.
4. Jensen C, Turner D, Elliot J, Malpass K, Herbert C, Kumar R, James A. Cell populations in lymphoid aggregates and airway wall in a mouse model of chronic airway inflammation. *Respirology* 2005; 10(suppl): A32.
5. Carroll ML, James AL, Chapman C, Carroll NG. Comparison of mast cell densities in endobronchial biopsies and adjacent airway sections. *Respirology* 2005; 10(suppl): A32.
6. Elliot J, Robinson P, Ford D, Beard J, Giljohann A, Fitzgerald K, James A. Parental history of asthma, airway inflammation and remodeling in the sudden infant death syndrome (SIDS). *Respirology* 2005; 10(suppl): A76.

#### **International**

1. Carroll M, James A, Chapman C, Carroll N. Comparison of mast cell densities in

endobronchial biopsies and adjacent airway sections. *Am J Respir Crit Care Med* 2005; 2:A348.

2. Elliot J, Robinson P, Ford D, Beard J, James A. Parental history of asthma, airway inflammation and remodelling in the sudden death infant syndrome (SIDS). *Am J Respir Crit Care Med* 2005; 2:A381.
3. James A, Jensen C, Turner D, Elliot J, Malpass K, Herbert C, Kumar R. Cell populations in lymphoid aggregates and airway wall area in a mouse model of chronic airway inflammation. *Am J Respir Crit Care Med* 2005; 2:A846.

### Publications

1. Bai TR, Bates JH, Brusasco V, Camoretti-Mercado B, Chitano P, Deng LH, Dowell M, Fabry B, Ford LE, Fredberg JJ, Gerthoffer WT, Gilbert SH, Gunst SJ, Hai CM, Halayko AJ, Hirst SJ, James AL, Janssen LJ, Jones KA, King GG, Lakser OJ, Lambert RK, Lauzon AM, Lutchen KR, Maksym GN, Meiss RA, Mijailovich SM, Mitchell HW, Mitchell RW, Mitzner W, Murphy TM, Pare PD, Schellenberg RR, Seow CY, Sieck GC, Smith PG, Smolensky AV, Solway J, Stephens NL, Stewart AG, Tang DD, Wang L. On the terminology for describing the length-force relationship and its changes in airway smooth muscle. *J Appl Physiol* 2004; 97: 2029-2034.
2. James A. Airway remodeling in asthma. *Curr Opin Pulm Med* 2005; 11: 1-6.
3. James A, Palmer L, Kicic E, Maxwell P, Lagan S, Ryan G, Musk AW. Decline in lung function in the Busselton Health Study: The effects of asthma and cigarette smoke. *Am J Respir Crit Care Med* 2005; 171: 109-114.
4. James A, Maxwell P, Elliot J. Comparison of sputum induction using inhaled methacholine or hypertonic saline. *Respirology* 2005; 10: 57-62.
5. Hysi P, Kabesch M, Moffatt MF, Schedel M, Carr D, Zhang Y, Boardman B, von Mutius E, Weiland SK, Leupold W, Fritzscher C, Klopp N, Musk AW, James A, Nunez G, Inohara N, Cookson WO. NOD1 variation, immunoglobulin E and asthma. *Hum Mol Genet* 2005 Apr 1; 14(7): 935-41.
6. Knuiman MW, James AL, Divitini ML, Bartholomew HC. Correlates of habitual snoring and witnessed apnoeas in Busselton, Western Australia. *Aust New Zeal J Pub Hlth* 2005; 183(1): S17-S19.
7. James AL, Knuiman MW, Bartholomew HC, Musk AW. What can the Busselton Health Surveys tell us about asthma in the elderly? *Med J Aust* 2005; 183(1): S17-S19.
8. Lamb JP, James A, Carroll N, Siena L, Elliot J, Vignola AM. Reduced apoptosis of memory T cells in the inner airway wall of mild and severe asthma. *Eur Resp J* 2005; 26: 265-270.
9. James AL. "Remodeling of Airway Smooth Muscle in Asthma - what sort do you have?" *Clin Exp Allergy* 2005; 35: 703-707.
10. James A, Elliot J, Abramson M, Walters H. Time to death, airway inflammation and remodeling in fatal asthma. *Eur Resp J* 2005 26: 429-434.

## **DR STEWART CULLEN**

## **SLEEP APNOEA**

### Fields of Work

1. Predictors of sleep apnoea using questionnaires and laser measurements of oral dimensions

2. Treatment of sleep apnoea:
  - Mandibular advancement splints: new models
  - Positional therapy: new appliances
3. Heart rate monitoring to detect psychiatric conditions and sleep apnoea
4. Validation of the radical pulse oximeter in the detection of sleep apnoea
5. Sleep studies in the Busselton Health Survey.

#### Collaborations

##### **Local**

A/Prof Hans Stampfer, Department of Psychiatry, UWA;

Mr W Noffsinger, Department of Pulmonary Physiology, West Australian Sleep Disorders Research Institute;

Dr N McArdle, Department of Pulmonary Physiology, West Australian Sleep Disorders Research Institute;

Dr Scott Phung, Department of Respiratory Medicine, Royal Perth Hospital.

#### Techniques

1. Lasers
2. Heart rate monitors
3. Radical oximeters

#### Presentations and Invited Lectures

##### **Local**

1. Invited lecture. Sleep disorders and reflux therapy. RACGP Training lecture series, April 2004.
2. Narcolepsy update. Physician Trainees Sir Charles Gairdner Hospital, June 2005.

## **DR NIGEL MCARDLE**

## **SLEEP APNOEA**

#### Fields of Work

1. Sleep Apnoea and vascular disease
2. Treatment of Sleep apnoea
3. Diagnostic strategies for Sleep apnoea

#### Collaborations

Dr Kevin Gain, Royal Perth Hospital

#### Presentations and Invited Lectures

##### **Local**

1. Clinical Update – Respiratory failure - Thoracic Society of Australia and New-Zealand, W.A. branch annual scientific meeting (Mandurah, Western Australia), 2004.
2. Management of common sleep disorders – Pharmaceutical Society of Western Australia, (Perth, Western Australia), 2005.

##### **International**

1. McArdle, N., D. Hillman. Auto-triggering due to cardiac contraction can cause inadequate non-invasive positive pressure ventilation. *Eur Respir J* 2004; S48.

2. McArdle, N., J. Philpott, D. Hillman, L. J Beilin, G.F. Watts. Case controlled study: sleep apnoea clinic patients have insulin resistance and dyslipidaemia. *Eur Respir J* 2004; S48.

## **DR SUTAPA MUKHERJEE**

## **EPIDEMIOLOGY**

### Fields of Work

1. Establishment of the WA Sleep Disorders Cohort, a population-based resource to investigate the epidemiology of obstructive sleep apnoea in WA.
2. Occupational exposures and health effects- with particular interest in asbestos and diesel exposure.

### Grants 2004-2005

2001-04	D Christiani S Mukherjee	<i>National Institutes of Health (USA) / National Cancer Institute</i>	\$160,000 total
2005	S Mukherjee	Biomarkers of carcinogen exposure and oxidative injury <i>Hollywood Private Hospital Research Foundation</i>	\$10,000
2005	S Mukherjee	Establishment of a population-based database for sleep apnoea <i>Sir Charles Gairdner Hospital Research Foundation</i>	\$10,000
		Establishment of a population-based database for sleep apnoea	

### Collaborations

#### **Local**

Clinical Prof AW Musk, Department of Respiratory Medicine, Sir Charles Gairdner Hospital; and Prof Nick de Klerk, Department of Biostatistics, Telethon Institute for Child Health Research.

#### **International**

Prof. David Christiani, Harvard School of Public Health, USA.

### Publications

1. Kim JY, Mukherjee S, Ngo L, Christiani DC. Urinary 8-Hydroxy-2'-deoxyguanosine as a biomarker of oxidative DNA damage in workers exposed to fine particulates". *Environmental Health Perspectives*, 2004; 112: 666-671.
2. Mukherjee S, Rodrigues E, Aeschliman DB, Houk RS, Palmer LJ, Woodin MA, Weker R, Christiani DC. Urinary metal and polycyclic aromatic hydrocarbon biomarkers in boilermakers exposed to residual oil fly ash. *American Journal of Industrial Medicine*, 2005; 47 (6): 484-93.
3. Kim JY, Hecht S, Mukherjee S, Carmella SG, Rodrigues E, Christiani DC. Urinary metabolite of Phenanthrene as a biomarker of polycyclic aromatic hydrocarbon metabolic activation in workers exposed to residual oil fly ash. *Cancer Epidemiology, Biomarkers and Prevention*, 2005; 14 (3): 687-92.

## SUMMARY

Number of research staff	19
Number of students	
Honours	7
Masters	1
PhD	3
Total	11
Number of publications 2004/05	22
Number of presentations	
Local	25
National	27
International	13
Total	
Grants	
Total awarded	\$3,245,558
Total 2004/2005	\$837,516