



Sir Charles
Gairdner Hospital



WEST AUSTRALIAN SLEEP DISORDERS RESEARCH INSTITUTE (INC.)

SUMMARY OF RESEARCH ACTIVITY

July 1 2005 – June 30 2006

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

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Fields of Work

1. Sleep-Disordered Breathing
 - Upper airway function during anaesthesia and sleep
 - Computational dynamics of the human upper airway
 - Upper airway imaging using endoscopic optical coherence tomography
 - Upper and lower oesophageal sphincter function during wakefulness and sleep
 - Non-invasive detection of gastric insufflation
 - Intramuscular recording of genioglossus myoelectric activity
 - The relationship between sleep apnoea, vascular function and erectile dysfunction
 - The relationship between travel, sleep quality and elite athletic performance
2. Chronic Lung Disease
 - The role of respiratory muscle training in chronic lung disease
 - Measuring functional capacity in chronic lung disease
 - Defining the burden of disease and benefits of exercise in moderate to severe asthma

Grants

Year	Principle Invest.	Funding Body; Project Title	\$ Awarded
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	PR Eastwood	<i>NHMRC (294404) R Douglas Wright Biomedical Career Development Award</i>	\$417 500
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
2006	PR Eastwood	<i>Medical and Health Research Infrastructure Fund (WA)</i> Department of Health, Government of Western Australia Infrastructure Grant - Round 9	\$25 553
2006-2008	PR Eastwood DD Sampson DR Hillman	<i>NHMRC (403953)</i> Mechanisms of pharyngeal collapse in obstructive sleep apnoea defined by optical coherence tomography	\$467 750

Research Personnel

Dr Jennifer Walsh	Research Officer (post-doctoral appointment)
Ms Kathleen Maddison	Research Assistant
Ms Danielle Philippe	Research Assistant
Mr Liam Coffey	Research Assistant (part-time)
Ms Kate Godde	Research Assistant (part-time)
Ms Patricia Ziegler	Administration Clerk (part-time)

Ms Kylie Hill	PhD Candidate
Ms Kelly Shepherd	PhD Candidate
Ms Kate Smith	PhD Candidate
Ms Sian Turner	PhD Candidate
Ms Melissa Giumelli	Honours Candidate
Ms Bethany Indrawan	Honours Candidate

Collaborations

Local

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

National

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

International

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

Techniques

1. Oesophageal impedance
2. Oesophageal manometry
3. Oesophageal pH monitoring
4. Administration of non-invasive ventilation
5. Polysomnography
6. Optical coherence tomography
7. Intramuscular electrodes
8. Respiratory muscle training
9. Portable metabolic gas analyser
10. Cycle ergometry
11. Treadmill ergometry

Presentations and Invited Lectures

Local

1. Turner S, Thompson P, Cook A, Eastwood P, Jenkins S. The regional distribution of asthma and COPD admissions (2000-2004) and respiratory health services for adults 40+ years in Western Australia. Thoracic Society of Australia and New Zealand (WA branch) Summer Meeting, October 2005.

Invited Speaker

1. Eastwood PR, Hillman DR. Sleep Apnoea: A Big Problem and a Problem for the Big. Sir Charles Gairdner Hospital Grand Round, April 2006.
2. Eastwood PR. Sleep and general well being. Christchurch Grammar School, May 2006.
3. Eastwood PR. Changes to NHMRC Grant Schemes. Professional Development Day – Moving your career forwards - what comes next? Australian Society for Medical Research, June 2006.

Session Chair

1. Eastwood PR. Presentation Skills. Professional Development Day – Moving your career forwards - what comes next? Australian Society for Medical Research, June 2006.

National

1. 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. Australian Physiotherapy Association, 9th National Cardiothoracic Group Conference, Melbourne VIC. *e-AJP* 2005; 52(1 Suppl): S16.
2. Camarri B, Eastwood PR, Cecins NM, Thompson PJ, Jenkins SC. Six minute walk distance (6MWD) in healthy subjects aged 55-75 years. Australian Physiotherapy Association, 9th National Cardiothoracic Group Conference, Melbourne VIC. *E-AJP* 2005; 52(1 Suppl): S10.
3. Dawson B, Richmond L, Eastwood P. Effect of interstate travel on sleep patterns and performance in elite Australian rules footballers. Proceedings of the 13th Commonwealth International Sport Conference, March 2006.
4. Philippe D, Hill K, Jenkins S, Cecins N, Shepherd K, Hillman D, Eastwood P. High-intensity muscle training (HIMT) improves inspiratory muscle power and velocity of shortening during loaded breathing in COPD. Thoracic Society of Australia and New Zealand Annual Scientific Meeting, Canberra ACT. *Respirology* 2006; 11(Suppl 2): A53.
5. Shepherd K, Holloway R, Hillman D, Eastwood P. The effect of continuous positive airway pressure on lower oesophageal sphincter function. Thoracic Society of Australia and New Zealand Annual Scientific Meeting, Canberra ACT. *Respirology* 2006; 11(Suppl 2): A17.
6. Turner S, Thompson P, Cook A, Eastwood P, Jenkins S. Regional distribution of asthma and COPD admissions (2000-2004) and respiratory health services for adults in Western Australia. Thoracic Society of Australia and New Zealand Annual Scientific Meeting, Canberra ACT. *Respirology* 2006; 11(Suppl 2): A68.

Invited Speaker

1. Eastwood PR. Exercise: protocols and measurement. The physiology of exercise in health and disease. Thoracic Society of Australia and New Zealand Advanced Course, Sydney NSW, June 2005.
2. Hillman DR. Organising committee, facilitator: Exercise Physiology in Health and Disease. The physiology of exercise in health and disease. Thoracic Society of Australia and New Zealand Advanced Course, Sydney, June 2005.

3. Hillman DR. Post-graduate course: Setting up an acute NIV service. Australasian Sleep Association Annual Scientific Meeting, Brisbane QLD, October 2005.
4. Hillman DR. Assessing upper airway structure and function with anatomic optical coherence tomography. Australasian Sleep Association Annual Scientific Meeting, Brisbane QLD, October 2005.
5. Eastwood PR. Upper airway structure and function revealed with anatomic optical coherence tomography (aOCT). Australasian Sleep Association Annual Scientific Meeting, Brisbane QLD, October 2005.
6. Eastwood PR. Increasing capacity for sleep research in Australia and New Zealand - maximising chances with NHMRC. Australasian Sleep Association Annual Scientific Meeting, Brisbane QLD, October 2005.
7. Eastwood PR. New insights into airway protection during sleep. Kaarene Fitzgerald Lecture. SIDS and Kids Victoria, Melbourne VIC, November 2005.
8. Eastwood PR. Keynote Speaker. Ritchie Colloquium. Monash Institute of Medical Research, Melbourne VIC, November 2005.
9. Eastwood PR, Walsh JW. Changes in wakeful upper airway dimensions with pressure and posture. Upper Airway Symposium on Sleep and Breathing. Barossa Valley SA, February 2006.
10. Eastwood PR. Assessing upper airway function using a novel imaging modality – anatomical optical coherence tomography (aOCT). Thoracic Society of Australia and New Zealand Annual Scientific Meeting, Canberra ACT, March 2006.
11. Eastwood PR. Probing for the causes of snoring and upper airway collapse during sleep. Research Seminar: “What you don’t know might kill you.” University of South Australia, Division of Health Sciences, SA, July 2006.
12. Eastwood PR. Behaviour of the upper and lower oesophageal sphincters during sleep – implications for gastroesophageal reflux. Research Seminar. Adelaide Institute of Sleep Health, Adelaide SA, July 2006.

Session Chair

1. Eastwood PR. Plenary session: New Investigator Award. Australasian Sleep Association Annual Scientific Meeting, Brisbane QLD, October 2005.
2. Eastwood PR. Plenary session: Ann Woolcock Young Investigator Award. Thoracic Society of Australia and New Zealand Annual Scientific Meeting, Canberra ACT, March 2006.
3. Eastwood PR. Poster session: Sleep and Physiology (Poster Mentor). Thoracic Society of Australia and New Zealand Annual Scientific Meeting, Canberra ACT, March 2006.
4. Eastwood PR. Poster session: COPD Special Interest Group (Poster Mentor). Thoracic Society of Australia and New Zealand Annual Scientific Meeting, Canberra ACT, March 2006.

International

1. Hill K, Jenkins S, Philippe D, Shepherd K, Cecins N, Green D, Hillman D, Eastwood P. High-intensity inspiratory muscle training (HIMT) improves dyspnea and health-related quality of life (QoL) in COPD. Proceedings of the 8th Congress of the APSR, 1st Joint Congress of the APSR/ACCP, Guangzhou CHINA. *Respirology* 2005; 10(Suppl): A100.
2. Eastwood PR, Shepherd KL, Hillman DR. The effect of continuous positive airway pressure on lower oesophageal sphincter function. International Conference of the American Thoracic Society, San Diego USA. *Proc Am Thor Soc* 2006; 3 (Abstracts Issue): A445.

Invited Speaker

1. Hillman DR. Anaesthetic Considerations in the Morbidly Obese. 2006 International Conference of the American Thoracic Society, San Diego USA, May 2006.
2. Eastwood PR. Optical coherence tomography as a functional lung imaging technique. Major Symposium: Acute lung injury: pathophysiologic insights from structural and functional lung imaging. 2006 International Conference of the American Thoracic Society, San Diego USA, May 2006.
3. Eastwood PR. Optical coherence tomography in the upper airway. Mini-symposium: The role of pharyngeal mechanics in apnoea pathogenesis in adults and children. 2006 International Conference of the American Thoracic Society, San Diego USA, May 2006.

Publications

1. 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.
2. 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.
** Editorialised: Littman R. Upper airway collapsibility: An emerging paradigm for measuring the safety of anaesthetic and sedative agents. *Anesthesiology* 2005; 103: 453-454.
3. Weisbrod CJ, Eastwood PR, O'Driscoll G, Green, DG. Abnormal ventilatory responses to hypoxia in type-2 diabetes. *Diab Med* 2005; 22: 563-568.
4. Hill K, Eastwood PR. Editorial. Respiratory muscle training - the con argument. *Chron Respir Dis* 2005; 2: 223-224.
5. Eastwood PR, van der Touw JT, Sturdy GS, Jenkins SC, Hillman DR. Anaerobic metabolism of inspiratory muscles in chronic obstructive pulmonary disease. *Respirology* 2006; 11: 32-40.
6. Grove JR, Wilkinson A, Dawson B, Eastwood P, Heard P. Effects of exercise on subjective aspects of sleep during tobacco withdrawal. *Aus Psych* 2006; 41: 69-76.
7. Armstrong JJ, Leigh MS, Sampson DD, Walsh JH, Hillman DR, Eastwood PR. Quantitative upper airway imaging during sleep and wakefulness with anatomical optical coherence tomography. *Am J Respir Crit Care Med* 2006; 173: 226-233.
8. Poh H, Eastwood PR, Cecins NM, Jenkins SC. Six-minute walk distance in healthy Singaporeans aged 45-85 years. *Respirology* 2006; 11: 211-216.
9. Camarri B, Eastwood PR, Cecins NM, Thompson PJ, Jenkins SC. Six minute walk distance in healthy subjects aged 55-75 years. *Respir Med* 2006; 100: 658-665.
10. Maddison K, Shepherd K, Hillman DR, Eastwood PR. The effect of high-intensity exercise on function of the lower esophageal sphincter. *Med Sci Sports Exer* 2005; 37: 1728-1733.
11. Hill K, Jenkins, SC, Philippe DL, Cecins N, Gupta R, Shepherd KL, Green DJ, Hillman DR, Eastwood PR. Effects of high-intensity inspiratory muscle training in chronic obstructive pulmonary disease. *Eur Respir J* 2006; Jun 27(6): 1119-28.
12. Hillman DR, Scott-Murphy A, Antic R, Pezzullo L. The economic cost of sleep disorders. *Sleep* 2006; 29: 299-305.
13. Richmond LK, Dawson B, Stewart G, Cormack S, Hillman DR, Eastwood PR. The Effect of Interstate Travel on the Sleep Patterns and Performance of Elite Australian Rules Footballers. *J Sci Med Sport* (in press, accepted Feb 2006).
14. Panegyres PK, Hillman DR, Dunne JW. Laryngeal dystonia causing upper airway obstruction in progressive supranuclear palsy. *J Clin Neurosci* 2006 (in press).

15. Shepherd KL, Jensen CM, Maddison KJ, Hillman DR, Eastwood PR. Relationship Between Upper Airway and Inspiratory Pump Muscle Force in Obstructive Sleep Apnea. Chest (in press, accepted June 2006).

Book Chapter

1. Hillman D, Piper A. Assisting ventilation during sleep. In: Sleep Disorders: a clinical textbook. Eds: Ambrogetti A, Hensley MJ, Olson LG. 2006. Quay Books, London, England.

DR HELEN BELL

SLEEP APNOEA

Fields of Work

1. Treatment of sleep apnoea

Grants

Year	Principle Invest.	Funding Body; Project Title	\$ Awarded
2005-2007	H Bell DR Hillman	<i>ResMed Pty Ltd</i> Home-based diagnosis of obstructive sleep apnoea in a rural setting	\$8,150 (July05- June 06)

Research Personnel

Ms Vicki McQuade

CPAP trialist

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 A James	Department of Pulmonary Physiology, West Australian Sleep Disorders Research Institute
Dr N McArdle	Department of Pulmonary Physiology, West Australian Sleep Disorders Research Institute
Mr W Noffsinger	Department of Pulmonary Physiology, West Australian Sleep Disorders Research Institute
Dr S Phung	Department of Respiratory Medicine, Royal Perth Hospital

Techniques

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

Presentations and Invited Lectures

Local

1. The symptoms of obstructive sleep apnoea. Australasian Sleep Technologists Association Annual meeting, April 2006.

**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, an international 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
 - WASDRI Sleep database and genetics study
 - Busselton Health Survey: re-survey of current population
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

Year	Principle Invest.	Funding Body; Project Title	\$ Awarded
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	NG Carroll AL James	<i>Merck Sharp and Dohme</i> Comparison of 2-dimensional versus 3-dimensional counts of inflammatory cells in thick tissue sections using the optical disector method	\$427,000
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.
2004-2006	J Upham AL James	<i>NHMRC (303161)</i> Effects of allergens on dendritic cell function in allergic asthma	\$83 500 p.a.
2005	B Musk A James J Beilby L Palmer M Knuiman	NHMRC equipment grant	\$123 915
2005	AL James PS Maxwell	<i>Hollywood Private Hospital Research Foundation</i> Lymphocyte activation in lymphoid aggregates in smokers with airflow obstruction	\$10 000
2005	AL James M Carroll	<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	J Elliot AL James	<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	AL James NC Carroll	<i>NHMRC (343601)</i> Hyperplasia and hypertrophy of airway smooth muscle in asthma	\$281 000
2005-2007	AW Musk AL James JP Beilby LJ Palmer MW Knuiman	<i>NHMRC (353532)</i> The changing prevalence of asthma and chronic obstructive disease in Australia	\$729 380
2006	J Lamb AL James	<i>Sir Charles Gairdner Hospital Research Foundation</i> Distribution of the novel smooth muscle relaxation factor, calponin homology-associated smooth muscle protein (CHASM), in airways from asthma cases	\$10 000

2006	AW Musk AL James	<i>Asthma Foundation of WA</i> Measurement of respiratory resistance by the forced oscillation technique and asthma in the general population	\$17 743
2006	J Elliot, J NG Carroll AL James	<i>Asthma Foundation of WA</i> Mast cell degranulation and time to death in fatal asthma	\$45 100
2006	AL James	<i>Medical and Health Research Infrastructure Fund (WA)</i> Department of Health, Government of Western Australia Infrastructure Grant - Round 9	\$14 803

Research Personnel

Dr Neil Carroll	Senior Research Officer
Mr John Elliot	Research Officer
Ms Jasmine Lamb	Research Officer (part-time)
Ms P Maxwell	Research Officer (part-time)
Mr Mark Carroll	PhD candidate
Ms Hiliary Hii	Honours candidate
Mr Matthew Moller	Honours candidate

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
Dr A Kicic	Institute for Child Health Research
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 J Upham	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	School of Medicine, University of Tasmania
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	Instituto di Fisopatologia, Palermo, Italy
Prof WOCM Cookson	Imperial College London, England
Dr M Dohlnikof	Department of Pathology, Sao Paulo University Medical School, Brazil
Dr F Green	Faculty of Medicine, University of Calgary, Canada
Prof J Hogg	James Hogg iCAPTURE Centre, University of British Columbia, Vancouver, Canada
Dr D Knight	James Hogg iCAPTURE Centre, University of British Columbia, 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 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. The anatomy and physiology of the respiratory system. Lecture to Nurses In-Service Program.
2. The relationship of sleep and sudden death. Clinical meeting, West Australian Sleep Disorders Research Institute, October 2005.
3. Diurnal Variation in Sleepiness and Driving. Lecture - Launch of the Sleepiness and Driving Campaign. Western Australian Government, including Police Minister and Representatives of Office of Road Safety, March 2006.
4. Did You Know there is a clock inside your head? Clinical meeting, West Australian Sleep Disorders Research Institute, March 2006
5. Normal values for Spirometry. Clinical meeting, West Australian Sleep Disorders Research Institute, April 2006.

National

1. James A, Carroll N, Abramson M, McKay K, Mauad T, Bai T, Green F, Elliot J. Multi-centre study of airway smooth muscle. Thoracic Society of Australia and New Zealand Annual Scientific Meeting, Canberra ACT. *Respirology* 2006; 11(Suppl 2): A33.
2. Carroll M, Carroll N, James A. Comparison of mast cell densities in endobronchial biopsies and adjacent airway sections. Thoracic Society of Australia and New Zealand Annual Scientific Meeting, Canberra ACT. *Respirology* 2006; 11(Suppl 2): A29.
3. Elliot J, Carroll N, Lamb J, Moller M, James A. Extracellular matrix in airway smooth muscle bundles is increased in cases of fatal asthma. Thoracic Society of Australia and New Zealand Annual Scientific Meeting, Canberra ACT. *Respirology* 2006; 11(Suppl 2): A30.

International

1. Hui J, Oka A, Musk AW, James AL, Beilby J, Inoko H. MHC Association of asthma in the Busselton Population. International Conference of the American Thoracic Society, San Diego USA. *Proc Am Thor Soc* 2006; 3 (Abstracts Issue): A349.
2. Oostveen E, James AL, Nieland H, Young S, Hantos Z. Bronchodilator response in healthy adults assessed with the forced oscillation technique and forced expiration. International Conference of the American Thoracic Society, San Diego USA. *Proc Am Thor Soc* 2006; 3 (Abstracts Issue): A875.
3. de Araujo BB, Dolhnikoff M, Silva LFF, Saldiva PHN, James A, Mauad T. Collagen content within airway smooth muscle in asthma. International Conference of the American Thoracic Society, San Diego USA. *Proc Am Thor Soc* 2006; 3 (Abstracts Issue): A260.
4. James A, Carroll N, Abramson M, McKay K, Mauad T, Bai T, Green F, Elliot J. Multi-centre study of airway smooth muscle. International Conference of the American Thoracic Society, San Diego USA. *Proc Am Thor Soc* 2006; 3 (Abstracts Issue): A260.
5. James A, Carroll N, Lamb J, Moller M, Elliot J. Extracellular matrix in airway smooth muscle bundles is increased in cases of fatal asthma. International Conference of the American Thoracic Society, San Diego USA. *Proc Am Thor Soc* 2006; 3 (Abstracts Issue): A712.
6. The Busselton studies and genetics. Presentation to AllerGen research group. St Paul's Hospital. Vancouver, British Columbia. Canada, June 2006.

Publications

1. James A. Airway remodeling in asthma. *Curr Opin Pulm Med* 2005; 11: 1-6.
2. 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.
3. James A, Maxwell P, Elliot J. Comparison of sputum induction using inhaled methacholine or hypertonic saline. *Respirology* 2005; 10: 57-62.
4. Hysi P, Kabesch M, Moffatt MF, Schedel M, Carr D, Zhang Y, Boardman B, von Mutius E, Weiland SK, Leupold W, Fritzsich 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.
5. 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; 29(5): 414-416.
6. 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.
7. 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.
8. 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.
9. James AL. "Remodeling of Airway Smooth Muscle in Asthma - what sort do you have?" *Clin Exp Allergy* 2005; 35: 703-707.
10. Hui J, Palmer LJ, James AL, Musk AW, Beilby JP. AluYMICB dimorphism within the class I region of the major histocompatibility complex is associated with asthma and airflow obstruction in the Busselton population. *Clin Exp Allergy* 2006; 36(6): 728-34.
11. Green FHY, Butt JC, James AL, Carroll NG. Abnormalities of the bronchial arteries in

asthma. *Chest* (in press, accepted Apr 2006).

12. Panizza J, James A, Ryan G, de Klerk N, Finucane KE. Mortality and airflow obstruction in asthma: a 17 year follow-up study. *Int Med J* (in press, accepted Apr 2006).
13. Carroll ML, Carroll NG, James AL. Do bronchial biopsies represent mast cell density in airways? A stereological study. *Eur Respir J* (in press, accepted Jul 2006).
14. Knuiman MK, James AL, Divitini ML, Bartholomew HC. Longitudinal study of risk factors for habitual snoring in a general adult population: The Busselton Health Study. *Chest* (in press, accepted Jun 2006).

Book Chapter

1. James A. Monitoring airway hyperresponsiveness: Pharmacological stimuli. In: *Monitoring Asthma*. Ed. Gibson PG. 2005; 207: pp 233-274. Series: Lung Biology in Health and Disease; Exec: Ed. Lenfant C. Taylor and Francis Group, Florida, USA.

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

Grants

Year	Principle Invest.	Funding Body; Project Title	\$ Awarded
2005-06	N McArdle B Singh K Gain M Murphy D Hillman	<i>ResMed Pty Ltd</i> Automatic compared to manual CPAP titration for obstructive sleep apnoea	\$58 913 pa

Collaborations

Local

Dr K Gain Royal Perth Hospital

Publications

1. Riha RL, Brander P, Vennelle M, McArdle N, Kerr SM, Anderson NH, Douglas N. Tumour necrosis factor-alpha (-308) gene polymorphism in obstructive sleep apnoea-hypopnoea syndrome. *Eur Respir J* 2005; 26(4): 673-8.
2. McArdle N. What role do adrenoceptor polymorphisms play in modifying cardiovascular responses in obstructive sleep apnoea? *Clin Sci (Lond)*. 2006; 110(1): 89-91.

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;
3. Malignant mesothelioma.

Grants

Year	Principle Invest.	Funding Body; Project Title	\$ Awarded
2005	S Mukherjee	<i>Hollywood Private Hospital Research Foundation</i> Establishment of a population-based database for sleep apnoea	\$10 000
2005	S Mukherjee	<i>Sir Charles Gairdner Hospital Research Foundation</i> Establishment of a population-based database for sleep apnoea	\$10 000

Research Personnel

Ms J Lee	Research Assistant (part-time)
Mr G Love	Research Assistant (part-time)
Ms Annette Fedson	PhD Candidate

Collaborations**Local**

Prof N de Klerk	Department of Biostatistics, Telethon Institute for Child Health Research
Clin Prof AW Musk	Department of Respiratory Medicine, Sir Charles Gairdner Hospital

International

Prof D Christiani	Harvard School of Public Health, USA
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Presentations and Invited Lectures**Local**

1. The effects of diesel fume exposure in diesel bus mechanics. WA Branch of Occupational Physicians, Perth, 2005.
2. New strategies in the management of COPD. Geraldton Division of General Practice, Geraldton, 2005.
3. The COPD Community Linkage project- a first for WA. WA Dept of Health: Innovations in chronic disease management seminar, Perth, 2006.
4. The COPD Community Linkage Initiative. Swan District Hospital Clinical Society, Kalamunda, 2006.

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

Year	Principle Invest.	Funding Body; Project Title	\$ Awarded
2005-2007	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	\$214 000

Research Personnel

Ms Karen Wills Research Assistant
Ms Gillian Vinton Research Assistant (part-time)

Collaborations

Local

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. Spirometry – use and interpretation. Pulmonary Physiology, Sir Charles Gairdner Hospital, July 2005.
2. Singh B. Management of tracheostomies. Respiratory High-Dependency Unit, Sir Charles Gairdner Hospital, July 2005.
3. Singh B. Why am I breathless? Clinical Meeting, Departments of Respiratory Medicine and Pulmonary Physiology, Sir Charles Gairdner Hospital, July and October 2005.
4. Singh B. Management of insomnia in general practice. Clinical Meeting, Dalkeith, August 2005.
5. Singh B. Making the most of posture in severe OSA: 2 cases. Clinical meeting, West Australian Sleep Disorders Research Institute, Sir Charles Gairdner Hospital, August 2005.
6. Singh B. Lung mechanics in the clinical setting. Australian and New Zealand Society of Respiratory Science (WA branch), August 2005.
7. Singh B. Diaphragm Efficiency. Research Seminar, Department of Pulmonary Physiology, Sir Charles Gairdner Hospital, September 2005.
8. Singh B. Diaphragm efficiency in COPD and the effect of tiotropium. Thoracic Society of Australia and New Zealand Annual Scientific Meeting (WA branch), October 2005.
9. Singh B. NIV titration. Clinical meeting, West Australian Sleep Disorders Research Institute, June 2006.
10. Singh B. Arterial blood gases and case studies. Non-invasive ventilation course, Sir Charles Gairdner Hospital, November 2005 and June 2006.
11. Singh B. Long-term CPAP review clinic. Clinical meeting, West Australian Sleep Disorders Research Institute, March 2006.

12. Singh B. Can I have some Modafinil on the side? Clinical Meeting, West Australian Sleep Disorders Research Institute, February 2006.
13. Singh B. Interpretation of cardiovascular parameters in incremental cardiopulmonary exercise tests. Clinical Meeting, Department of Pulmonary Physiology, Sir Charles Gairdner Hospital, June 2006.

National

1. Singh B. Titrating pressures for acute respiratory failure. Australasian Sleep Association: Post-graduate Course - NIV in acute respiratory failure. QLD, October 2005.
2. Singh B. NIV in hypoxaemic respiratory failure - case presentation. Australasian Sleep Association: Post-graduate Course - NIV in acute respiratory failure. QLD, October 2005.

Publications

1. Finucane KE, Panizza JA, Singh B. Efficiency of the normal human diaphragm with hyperinflation. *J Appl Physiol* 2005 Oct; 99(4): 1402-11.
2. Panizza JA, James AL, Ryan G, deKlerk N, Finucane KE. Mortality and airflow obstruction in asthma: a 17-year follow up study. *J Int Med*, 2006 ; 36(12): 773-780.

SUMMARY OF RESEARCH ACTIVITIES

Number of research staff	
Full-time	9
Part-time	14
Total	23
Number of students	
Honours	4
PhD	6
Total	10
Number of publications 2005/06	35
Number of presentations	
Local	28
National	27
International	11
Total	66
Grants awarded to WASDRI Researchers:	
Total of all current grants	\$4 117 932
Total for 2005/2006	\$1 377 486