

Woolcock Institute of Medical Research

BIENNIAL REPORT

2016 + 2017



Our work makes a difference to people's lives



The Woolcock Institute's mission is to improve the respiratory and sleep health of all Australians through research, education, prevention and care.

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ABOUT US

OUR VISION

A better quality of life for people with sleep, breathing and lung disorders and their families.

OUR MISSION

The Woolcock Institute of Medical Research is Australia's leading respiratory and sleep research organisation.

OUR HISTORY

The late Professor Ann Woolcock (1937–2001) established the Institute in Sydney in 1981 with a vision to become Australia's centre of excellence for respiratory research. Originally called the Institute of Respiratory Medicine, the Institute was renamed in 2002 in honour of its founder. The Woolcock Institute soon outgrew its first home at the Royal Prince Alfred Hospital, Camperdown and expanded into several locations. In 2008 the Woolcock moved to the purpose-built laboratory and clinical complex in nearby Glebe where it remains today. The move was made possible with the generous support of the state and federal governments. In recent years our activities have continued to grow and diversify into related areas such as paediatric sleep disorders, lung cancer and emphysema.

OUR AFFILIATIONS

The Woolcock Institute operates as an independent company limited by guarantee and is governed by a distinguished board made up of outstanding researchers, leaders from industry and commerce, health system experts and senior university administrators.

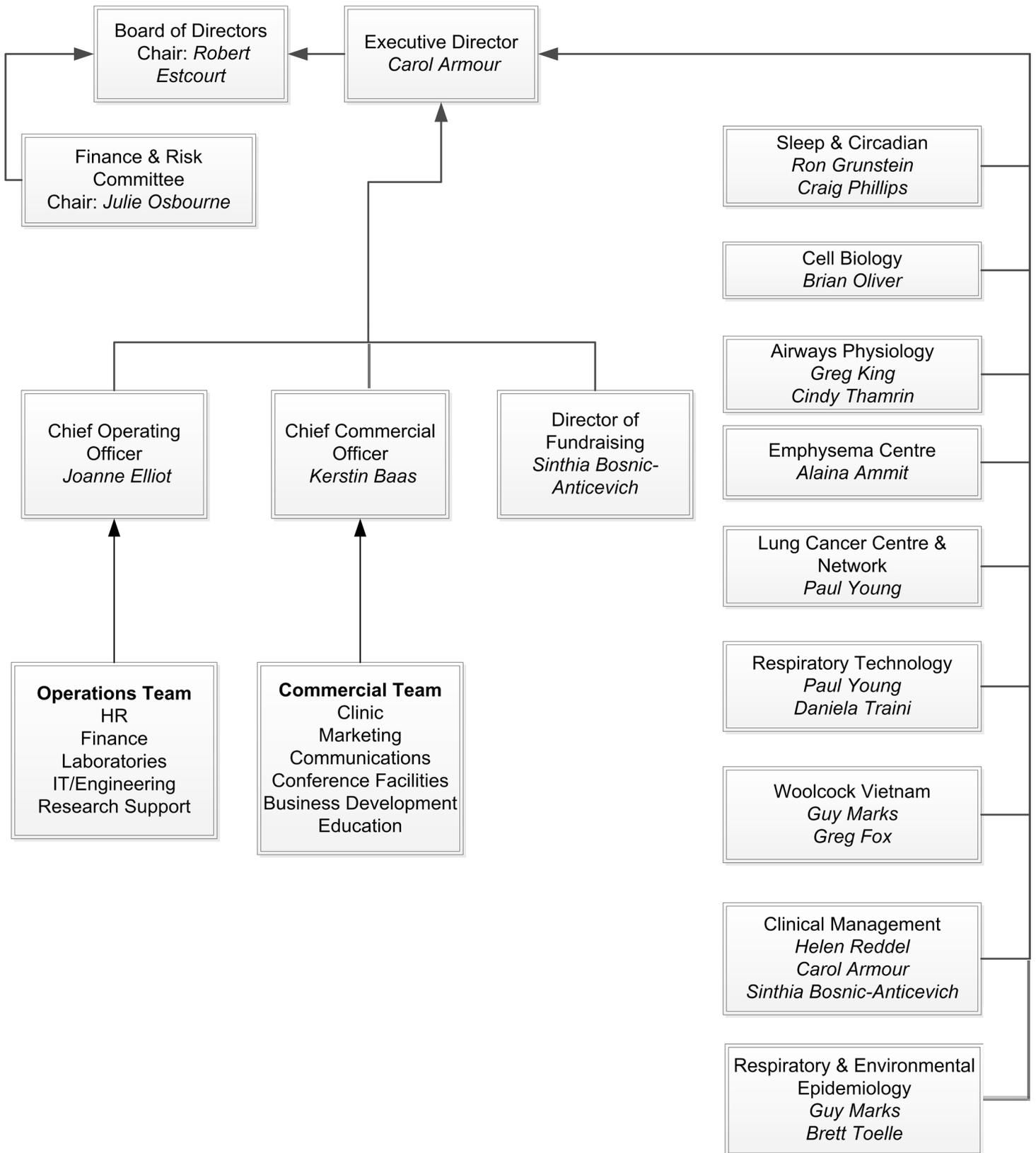
We have an Affiliation Agreement with The University of Sydney. We are a member of Sydney Research — an alliance of medical research institutes; Sydney Local Health District and The University of Sydney and we also have Memorandums of Understanding with University of Technology, Sydney and The University of NSW that all facilitate a high degree of integrated research collaboration.



THE UNIVERSITY OF SYDNEY



OUR ORGANISATION



CHAIRMAN'S REPORT



Mr Robert Estcourt

Chairman

Work in traditional areas has continued and in recent years we have entered new areas: the opening of the Breathlessness and Cough Clinics for example and just a few weeks ago, the Woolcock Centre for Lung Cancer Research.

The successful commissioning of these new activities does not come easily and one has to ask what the ingredients are for that success. An obvious answer is because of the quality of the researchers and clinicians that work here. The real question is “why do they come here?” Why has the Woolcock become a centre of excellence in sleep and respiratory work?

Certainly it is true that success begets success and researchers come here because of the expertise that the Woolcock has. But this is not sufficient. What is even more important is the collaborative atmosphere and environment they work in. Carol, the senior researchers and her management team have created an atmosphere and working environment that people want to be associated with. It is a vital ingredient for success and I congratulate all that have worked hard to create it. I will also say that this sort of culture and working environment is a very fragile flower; it needs nurturing and help all the time.

Another reason for people working here is the facilities that are available to them; but these facilities need constant care, maintenance and upgrading. The expansion of the research and translational activities has increased the pressure on the Woolcock's infrastructure and those behind the scenes that manage our facilities. If the facilities fail, all the research and translational work will slowly but surely grind to a halt. The people, who manage the facilities, maintain the facilities and upgrade them do so with minimal help and on a shoe string.

These teams are led by Joanne Elliot and Kerstin Baas. Over the years it has been remiss of me on previous occasions in not properly thanking and congratulating them. I would like to do so now.

This brings me to our future prospects. Let me be clear and

The last two years have been very, very busy and successful years for the Woolcock as our research and translational activities have continued to grow and in this report I would like to elaborate on developments and success in some of the less visible areas of our activities.

re-assure all here that the Woolcock is in a better financial state than ever before, but that is really not good enough. We can pat ourselves on the back for having righted the ship and kept its gunnel above the water line, but looking forward we have not achieved enough. Our aim must be to place ourselves in a financial position where we can materially reduce our dependence on NHMRC and other government sourced grants and undertake and sponsor research in our own right. We have not even placed ourselves in a position where we can confidently undertake the upgrading of our facilities which are all of 10 years old.

We have globally recognised research leaders, we are a globally recognised leader in our chosen fields, we have wonderful facilities but we still lead a hand to mouth existence. If a previously successful researcher loses a grant, they lose a livelihood. We have very limited resources to tide them over, let alone bring on and develop the next generation of researchers.

There is no silver bullet for this problem and I want to take this opportunity to recognise and thank all who support us. The Federal and NSW state governments, the University of Sydney, UTS and UNSW, the Royal Prince Alfred Hospital, the Area Health Boards and of course all our wonderful donors. We would not exist at all without you all but we do need to find new sources of financial support; we do need to work towards a position where we can face the future with confidence. We need to identify and call on new areas of financial support; we do need to make sure that our translational work does help support our research efforts, not the opposite. We need ideas and support to help us place the Woolcock and its activities on a truly sound long term footing.

There are a large number of people that I owe thanks to for the work and progress of the last two years. To be frank it is invidious to mention names with the exception of the Executive Director, Professor Carol Armour. The Woolcock has benefitted enormously from her enthusiasm, drive, energy and leadership. Supported by an able management team she has energetically pursued a program of change and renewal without compromising the Woolcock's continued research successes

I must express my sincere thanks to my colleagues on the Board. It has been another busy year and the tireless voluntary service and dedication they bring to the Woolcock is of great value. All have shown exceptional dedication to the job required and have my thanks.

Lastly I extend my thanks to all the team at the Woolcock. They are an outstanding group of dedicated researchers. My regard for them is enormous; it is a privilege to be associated with them. I, the Board and the community cannot thank them enough for their dedication and work.

EXECUTIVE DIRECTOR'S REPORT



Professor Carol Armour
Executive Director

leader is invited to share their leading edge research nationally and internationally. We are a thriving institute with members who share their passion for solving patient ill health. This collaboration between members of the Woolcock - be they research staff or support staff, students, clinicians involved in direct patient care, affiliates or honorary affiliates aligned with universities, health districts or other support organisations - empowers the Woolcock as an organisation.

During 2016 and 2017 we have taken a number of opportunities and realised expansion of the Woolcock into new areas of lung and sleep health.

With a major donation from Mrs Janice Gibson and the Ernest Heine Family Foundation, we have expanded our COPD/emphysema research and care. This donation has enabled the training of new researchers in this disease, seed funded projects devoted to better patient care and established a clinic focused on the lungs and breathlessness.

As a result of all this activity we have been able to join with other colleagues in collaborations, both across Australia and internationally. Our Emphysema Centre has been responsible for initiating new directions in solving the causes of this disease and undertaking clinical trials designed to benefit long term patient care.

We have trained more than 50 PhD students over 2016 and 2017 and we continue to encourage our next generation of research leaders (ECRs) to take opportunities as they arise. We have provided seed funding for these ECRs, facilitated their supervision of students and provided research training and mentoring.

Our Woolcock Clinic now has several new specialty clinics including one for chronic cough and another for breathlessness. These clinics add to our existing multidisciplinary clinics which are well established in sleep apnoea and insomnia. As well we continue to treat sleep disorders more generally. We have also increased the number of respiratory patients we see.

Collaboration throughout the Institute has enabled our world leading researchers to make significant advances in patient care over the last two years. Our researchers and our clinicians are devoted to respiratory and sleep research and patient care and many of us are involved in developing guidelines for best practice in health care.

Each research group

A major undertaking during 2016-2017 was the building of our lung cancer research laboratories. These modular laboratories can be reconfigured in future to adopt a different shape and function. The laboratories were funded by a grant from the Office of Health and Medical Research in NSW. The laboratories enable us to enter a new area of research - lung cancer - and we hope to rapidly bring new research breakthroughs to those suffering from this terrible disease. The laboratories will also serve as a focus for the Lung Cancer Research Network which includes all those working in lung cancer research across NSW. By sharing our discoveries we hope to "fast track" new cures for lung cancer.

The leader of the Cell Biology Group, Professor Judy Black has retired. Judy has been a loyal contributor to the Woolcock and has led us in the basic discovery of the mechanisms of lung disease over many years. She has trained many students and postdoctoral fellows and been constantly supported by fellowships and NHMRC grants over her career. We miss Judy but we are so glad that she has agreed to become a distinguished alumna and is helping us with our lung cancer initiatives.

All of our work is made possible by the excellent research support we have in the Woolcock. The Finance, HR and IT teams all work together to achieve these outcomes and the Clinic and Commercial team support our engagement with the community. I am supported by an Executive Management Committee that works hard on behalf of the rest of the Woolcock (members during 2017: Dr Brett Toelle, Dr Julia Chapman, Ms Anna Mullins, Dr Kanika Jetmalani, Dr Dev Bannerjee, Professor Paul Young, Professor Dani Traini, Ms Joanne Elliot and Ms Kerstin Baas). They are all invaluable to our ongoing success. My management team of Joanne Elliot (Operations), Kerstin Baas (Commercial) and Professor Sinthia Bosnic-Anticevich (Development and Fundraising) as well as our Deputy Director, Professor Paul Young, have given me enormous support and the Woolcock success depends on them. I would also like to thank the Woolcock Board members and their Chair, Mr Robert Estcourt, you have encouraged us and made critical contributions, you make my job and the Woolcock achievements possible.

Thank you to you all for working as a team and making us the success we are today.

RESEARCH LEADERS



PROFESSOR ALAINA AMMIT

Professor Ammit is a biomedical scientist recruited to UTS in early 2016 as Professor of Respiratory Pharmacology in the School of Life Sciences, Faculty of Science. This research-intensive position is held collaboratively with the Woolcock Institute of Medical Research, where Professor Ammit is Director of the newly established Woolcock Emphysema Research Centre. Professor Ammit has an international reputation for her research elucidating the mechanistic basis of inflammation in chronic respiratory diseases. Graduating with BAppSc (Biomedical Science) from UTS (then NSWIT) in 1984, Alaina went on to complete both her MSc (1990) and PhD (1996) studies through The University of Sydney. She received prestigious fellowships to support her postdoctoral studies, including an NHMRC CJ Martin Fellowship. Returning from her postdoctoral position at the University of Pennsylvania, she was appointed Lecturer at the Faculty of Pharmacy, University of Sydney in 2002 and on the strength and success of her research and teaching, was promoted to Professor in 2014 and Head of the Respiratory Research Theme (2013-2016).



PROFESSOR CAROL ARMOUR

Professor Armour has worked in the area of asthma research at a basic scientific and clinical level. Her investigations span the breadth of asthma research from the cellular mechanisms to the translation of new ways to treat asthma within the health system. She is on the Australian Respiratory Council, The National Asthma Council and has chaired the National Asthma Monitoring Advisory Committee, worked on the National Therapeutic Guidelines and the Australian Medicines Handbook. From 2003-2006 she was a member of the NHMRC Research Committee and was the Chair of the Training Awards Committee. She was Pro Vice Chancellor, Research, at The University of Sydney, from 2006-2009. In 2005 she was made a Fellow of the Pharmaceutical Society for her services to the profession, and she was awarded the Australasian Pharmaceutical Science Association (APSA) medal for research in 2007. She is currently an Associate Dean in the Faculty of Medicine and a Professor of Pharmacology in the Sydney Medical School. She is the Executive Director of the Woolcock Institute of Medical Research.



PROFESSOR SINTHIA BOSNIC-ANTICEVICH

Professor Bosnic-Anticevich is an internationally recognised leader in clinical pharmacy research in the field of respiratory medicine; in particular the quality use of respiratory medicines. She leads national and international research groups focusing on the use of respiratory medicines in different patient populations. She works across the continuum of health care settings, with a multi-dimensional and inter-professional approach to better understand and improving health outcomes for patients using respiratory medicines. She is the author of over 80 research publications and has attracted over \$11 million of research funding. She is actively involved in the mentoring and supervision of research students and early career researchers. Professor Bosnic-Anticevich is on the executive committee of Allergic Rhinitis in Asthma (ARIA), the body responsible for creating guidelines for the management of allergic rhinitis and Chair of the Pharmacy ARIA group. Professor Bosnic-Anticevich is a member of the executive committee of the Respiratory Effectiveness Group, an investigator-led, not-for-profit research initiative that has been set up in recognition of the potential value of real-life research and the need to harness real-life evidence to inform meaningful practice guidelines, drug licensing and prescribing decisions. In this capacity she provides international leadership in setting research standards and excellence in real-life research and in evaluating mechanisms for integrating real-life research into clinical guidelines and practice.



ASSOCIATE PROFESSOR GREG FOX

Associate Professor Fox is a pulmonologist and epidemiologist from the Woolcock Institute of Medical Research and the University of Sydney. His research primarily focuses upon active case-finding for tuberculosis (TB), control of drug resistant TB and the use of technology to enhance TB control. He lived in Vietnam for four years, during which time he helped to establish a multi-centre randomised controlled trial of contact investigation for TB. He subsequently completed a post-doctoral Fellowship at McGill University in Canada. Associate Professor Fox collaborates closely with the Vietnam National TB Program to undertake multi-centre studies focused upon strengthening global TB control policies. He leads the V-QUIN MDR-Trial, a clinical trial evaluating the effectiveness of levofloxacin to treat latent TB infection among contacts of patients with MDR-TB, in partnership with the Vietnam National TB Program.



PROFESSOR RON GRUNSTEIN

Professor Grunstein has been a consultant physician in sleep disorders for over 30 years and is a pioneer in improving patient care in sleep medicine in Australia and internationally. He is currently a Senior Principal Research Fellow of the National Health and Medical Research Council (NHMRC's highest level research appointment) and Professor of Sleep Medicine at the University of Sydney. Professor Grunstein heads the Sleep and Circadian Research Group at the Woolcock and the NHMRC's Centre of Research Excellence in Sleep and Circadian Translational Neurobiology aka "Neurosleep". As well, he is Program Leader in the Co-operative Research Centre in Alertness, Safety and Productivity part-funded by the Commonwealth Department of Industry of Innovation and Science to answer the challenge of poor sleep and sleepiness impacting on driving, work and society in general. From 2007-2011, Professor Grunstein served as President of the World Sleep Federation, the umbrella for sleep researchers and clinicians internationally organising successful world congresses in Cairns and Kyoto. He was awarded the Australasian Sleep Association Distinguished Achievement Award in 2010, the Kleitman Award, the premier award of the American Academy of Sleep Medicine in 2011 and the Royal Prince Alfred Foundation Medal for Excellence in Medical Research in 2012. In 2014, he received the Distinguished Professor Award from the Sydney Medical School. He has published over 250 peer reviewed articles in sleep research and 40 book chapters. He has a Bachelor of Medicine and Surgery and MD degrees from The University of Sydney and a PhD from the University of Gothenburg in Sweden.



PROFESSOR GREG KING

Professor King is a medical graduate of Otago University and a clinician-researcher at the Woolcock, The University of Sydney and Royal North Shore Hospital. He is Professor of the Sydney Medical School, The University of Sydney and Medical Director of the Respiratory Investigation Unit at Royal North Shore Hospital. He has a research interest in the mechanics of airways disease in relation to clinical aspects of disease. His expertise includes complex measurements of airway and lung function, including the forced oscillation technique, multiple breath nitrogen washout and 3-dimensional ventilation imaging and CT imaging. He currently supervises 7 PhD students (6 as primary supervisor) and postdoctoral fellows from science and medical backgrounds. He has a clinical and research interest in asthma, COPD and bronchiolitis in haemopoietic stem cell transplant recipients. Professor King maintains active participation in the activities of the TSANZ and ATS in terms of teaching, professional development and executive committee function.



PROFESSOR GUY MARKS

Professor Marks is a respiratory physician and environmental epidemiologist. His main research interests are in chronic respiratory disease (asthma and COPD), tuberculosis control and the adverse health effects of exposure to air pollution. He is Professor of Respiratory Medicine at UNSW, South Western Sydney Clinical School. He is currently an NHMRC Senior Principal Research Fellow. He is head of the Respiratory and Environmental Epidemiology group at the Woolcock and an Honorary Professor at The University of Sydney (Sydney Medical School). His other major roles include Editor-in-Chief (lung diseases) of the International Journal of Tuberculosis and Lung Disease, Vice President of the International Union Against Tuberculosis and Lung Disease, Director of the Australian Centre for Airways Monitoring (a collaborating unit of the Australian Institute of Health and Welfare), Chair of the NSW TB Advisory Committee, and Chair of the NSW Chief Health Officer's Expert Advisory Committee on Air Pollution. He also received an Achievement Award from the NHMRC in 2014 for being the top-ranked applicant for a Research Fellowship in that year.



ASSOCIATE PROFESSOR BRIAN OLIVER

Associate Professor Oliver is an NHMRC Career Development Fellow level 2 and an Associate Professor at the University of Technology, Sydney (UTS), who leads a productive team of researchers investigating the pathophysiology of respiratory diseases, with a particular emphasis on understanding mechanisms leading to disease exacerbations and progression. He is head of the Respiratory Cellular and Molecular Biology Group, at the Woolcock, the President of LAM Australia, and the Treasurer of the TSANZ NSW.



DOCTOR CRAIG PHILLIPS

Doctor Phillips is a Research Fellow at the Woolcock Institute of Medical Research and a Clinical Senior Lecturer at the Northern Clinical School. Most of his research has focused on how sleep apnoea and its treatment impact on cardio-metabolic health. A key component of this research involves intervention studies to examine the impact of treatments using rigorously designed randomised controlled trials. He was the first researcher to examine arterial stiffness in patients with sleep apnoea using a non-invasive tonometry technique. A new area of Dr Phillips' research is now also more broadly examining the impact of rotating shift work on markers of cardio-metabolic health using our unique chronobiology facilities at the Woolcock. Additional work includes examining how molecular clocks are altered in conditions of disturbed sleep and how this may adversely impact health.



CLINICAL PROFESSOR HELEN REDDEL

Professor Helen Reddel is a respiratory physician working to improve treatment for asthma and COPD. She is a Research Leader in the Clinical Management Group at the Woolcock Institute of Medical Research, Chair of the Science Committee of the Global Initiative for Asthma (GINA), Clinical Adviser for the Australian Centre for Airways Disease Monitoring (ACAM), and a member of the Australian Asthma Handbook Guidelines Committee. Professor Reddel's current research focusses on strategies to improve the management of asthma and COPD, with particular interest in improving the quality prescribing and use of respiratory medications in primary care, and population level monitoring of asthma and COPD through ACAM. She is co-chairing a multinational longitudinal study of 15,000 patients with asthma and/or COPD that aims to identify underlying disease mechanisms so that targeted treatments can be developed. Professor Reddel has a strong focus on improving communication between patients and health professionals, and on making guidelines not only evidence-based, but also practical and practice-centred.



DOCTOR CINDY THAMRIN

Dr Thamrin is a Research Leader and NHMRC Career Development Fellow at the Airway Physiology and Imaging Group, Woolcock Institute of Medical Research, and a Senior Research Fellow at the University of Sydney. She has a dual background in respiratory physiology and electronic engineering from the University of Western Australia. Her PhD in 2006 at the Telethon Institute for Child Health Research, Perth, extended a lung function test known as the forced oscillation technique to track changes in airway mechanics with lung volume. Her postdoctoral research at the University Hospital of Bern, Switzerland, focussed on assessing future risk in asthma using novel variability analyses of lung function. Her current research interests are clinical application of new lung function tests, and advanced respiratory data analytics, especially applied to home tele-monitoring of asthma and COPD.



DOCTOR BRETT TOELLE

Dr Toelle is a Senior Research Fellow working within the Respiratory and Environmental Epidemiology Group. For over 27 years he has been involved in the population studies of lung disease which have included studies of pre-school children, schoolchildren, twins, community based adults and occupational work groups. His recent work has focussed on asthma as the participants in the Childhood Asthma Prevention Study (CAPS) transition through puberty and on COPD as part of the Australian Burden of Lung Disease (BOLD) project of adults aged 40+ years from six sites around the country. He is also a psychologist and undertook a PhD investigating "Factors associated with non-adherence to prescribed asthma medication". During his psychology internship he worked with psychologists in the sleep research group and clinicians at the Royal Prince Alfred Insomnia Clinic.



PROFESSOR DANIELA TRAINI

Professor Traini is a Professor in Respiratory Science at The University of Sydney. Her research portfolio covers all areas of respiratory research, from bench to bedside and she is an international leader in pulmonary drug delivery. Professor Traini leads the Respiratory Technology group at the Woolcock and works in collaboration with Professor Paul Young. Over the last 11 years since joining the University of Sydney, and before that during her 5 years in industry, she developed a leading research program on aerosol drug delivery, from powder engineering, aerosol generation and characterisation, in vitro to in vivo lung deposition to clinical outcomes. Professor Traini has extensive experience in both academic and industrial pharmaceuticals, and still retains strong link with the pharmaceutical industry. Since 2005 she has published over 155 full peer reviewed manuscripts, has 5 patents and has attracted more than \$11M in competitive funding.



PROFESSOR PAUL YOUNG

Professor Young is a Professor in Respiratory Technology at Sydney Medical School (Discipline of Pharmacology), and Head of Respiratory Technology at the Woolcock. Professor Young has 20 years' experience in inhalation drug development with a focus on medical device engineering and industry engagement. He is an internationally recognised expert in the field of inhalation technology and has published >170 peer reviewed journal articles since 2002 (>3000 citations), 6 patents, 16 book chapters and in excess of 150 conference proceedings. He has an H-index of 32 and 5-year i10 index of 97. Professor Young has received > \$15M for projects and infrastructure since 2005 and has a proven track record in securing category 1 ARC and NHMRC funding. His research team of around 20 personnel are considered world leaders in the field of aerosol science.

DISTINGUISHED ALUMNI



PROFESSOR SANDRA ANDERSON

Professor Anderson is a world renowned Respiratory Scientist. Her research passions lie in the areas of exercise induced asthma, mucociliary clearance and innovative therapies. The culmination of Professor Anderson's passion for science has led to a diagnostic product and formulations for treatment of Cystic Fibrosis and non-CF bronchiectasis. In honour of Sandra's commitment to the field she has received numerous awards. Professor Anderson's commitment to science, mentorship, collaboration and engaging people to undertake robust and translational science is a key driver for people at the Woolcock and we are proud to have you as a Woolcock Distinguished Alumni.



PROFESSOR MARIE BASHIR

Professor Bashir has invested time and energy in the Woolcock over many years. As a medical practitioner herself, she supports the Woolcock model - care of respiratory and sleep patients as well as investigation of their disease in order to improve their lives. Professor Bashir has supported our international visitors, attended all our alumni events and donated her time to support our Institute. In 2013 the Woolcock leaders and supporters enjoyed her hospitality at Government House. On every occasion when asked for help she has been willing to give of herself. She continues to be a warm and generous supporter and we thank her for all she does for us.



PROFESSOR NORBERT BEREND

Professor Berend retired from his Chair of Thoracic Medicine and as Director of the Woolcock Institute of Medical Research on 30 June, 2012. Norbert lead the Institute through a time of great change, had oversight of the negotiations to house the whole of the Institute in one building, sought funding and achieved the dream. At the time he became Director, the Institute had fewer than 20 employees in temporary homes on the University and RPA Hospital grounds. In 2012, the Woolcock had more than 150 employees and associate staff and 55 postgraduate students all of whom work in a state-of-the-art research institute. During this period he also led the development of respiratory research within the Asia Pacific region. Professor Berend made us into what we are today.



PROFESSOR JUDY BLACK

Professor Black's leadership and research achievements in the field of airway smooth muscle, her role in career development of the next generation of research leaders and her outstanding service have been a model for us all. Professor Black has changed our thinking about the role of the airway smooth muscle in asthma. Leading by example and generously helping others to achieve success in their careers, Professor Black has been instrumental in fostering a unique environment within the Woolcock. She has fostered a culture of giving back and helping others to succeed. She has created a legacy that will foster success within the biomedical research community for years to come. Professor Black is unique and very special to us here at the Woolcock.



PROFESSOR RUTHVEN BLACKBURN

Professor Blackburn had the vision to see that Sydney needed a clinical research institute - preferably associated with the University of Sydney. At the time there was very little research being undertaken in respiratory medicine. A group of like-minded individuals led by him and Ann Woolcock started the Institute of Respiratory Medicine. From there, the Woolcock started to nurture national and international stars and we owe our existence and excellence to his vision and leadership. We remain extremely grateful to Professor Blackburn and his passing is mourned by the many in the Woolcock who knew him.



PROFESSOR CHRISTINE JENKINS

Professor Jenkins worked tirelessly with the other research leaders as a team and led them as they considered their strategy at a time of great change. Professor Jenkins ran the education program for the Woolcock especially the Think Tank program which has considerably enriched our research and scientific interchange, as well as the professional development program for health care practitioners. The invited internationally renowned speakers she hosted at the Woolcock and the facilitation of interaction with research leaders has enriched our research programs. Her guidance has led to new research directions, collaborations and grants. Christine was also a very active member of the 2 Respiratory CRC programs.



PROFESSOR CHERYL SALOME

Professor Salome has had more than 25 years' experience in respiratory research, particularly in the causes and mechanisms of asthma. Professor Salome worked very closely with Ann Woolcock during her career and was responsible for leading and facilitating epidemiology, cell biology and lung physiology. Professor Salome nurtured the lung physiology group, recruited PhD students, had oversight of all projects, made sure the research experience was a valuable one and then mentored these rising stars until they became independent research leaders. Her students have gone on to lead the world in lung physiology. Meanwhile, never one to step into the limelight, Professor Salome worked at the Woolcock facilitating the Friday research seminars, the Think Tank and continued to write manuscripts and successful grant applications which changed the way we think about airway disease.



PROFESSOR PAUL SEALE

Over the years Professor Seale has nurtured many of us, provided advice when asked, opened doors and facilitated pathways. He has been involved in grants and a multitude of clinical trials and fostered the next generation of medical and science students in terms of clinical pharmacology. However, at the Woolcock, he was particularly valued as the leader of the clinical trials unit for 10 years. Professor Seale ensured that the unit was successful, safe and governed appropriately. Finally he served for a time as our Deputy Director, and in this role he provided sage advice for the management team on all matters of governance.



ASSOCIATE PROFESSOR EUAN TOVEY

Over the many years of his scientific career Associate Professor Tovey focused on allergy research, particularly the house dust mite. He was a Senior Research Fellow of the NHMRC, an award reserved for leading health and medical researchers. He has been inducted into the Asthma NSW Hall of Fame, has delivered on a multitude of research grants to investigate asthma mechanisms. His inquisitive and innovative mind is evident by his long list of patents. He invented many novel mechanisms and devices which he also followed through with development. The Woolcock would like to thank Associate Professor Tovey for his passion and commitment to research and our Institute.



CLINICAL PROFESSOR IVEN YOUNG

Professor Young is s now a senior honorary physician in the Department of Respiratory and Sleep Medicine, Royal Prince Alfred Hospital, Sydney, after being Head of Department from 1991 to 2009. He has been in respiratory consultant practice since 1978, after he returned from a post-doctoral research fellowship at the University of California where he developed his interest in pulmonary gas exchange physiology. His major interests are the investigation and management of respiratory failure and all aspects of pulmonary function testing, occupational lung disease, asthma, chronic obstructive lung disease and interstitial lung diseases. He is a qualified sleep physician. In 2016, he was awarded the Society Medal of the Thoracic Society of Australia and New Zealand (TSANZ) and also appointed as a Member of the Order of Australia “For significant service to respiratory and sleep medicine as a clinician, administrator, researcher and mentor, and to professional societies”. He serves on the Board of Directors of the Australian Respiratory Council and retired from the Board of Directors of the Woolcock in 2017 after 20 years of service. He was appointed as a Distinguished Alumnus of the Woolcock in August 2017.

OUR RESEARCH GROUPS



Researchers at the Woolcock are part of a multidisciplinary team dedicated to understanding and treating respiratory and sleep disorders.

With over 200 research and clinical professionals we are a world leader in the area of research, clinical diagnosis and treatment.

AIRWAYS PHYSIOLOGY AND IMAGING

Group Leaders: Professor Greg King, Dr Cindy Thamrin

The Airways Physiology and Imaging Group investigates what goes wrong with the function of the airways and lungs in diseases such as asthma, chronic obstructive pulmonary disease (COPD) including emphysema, cystic fibrosis and in bone marrow transplant patients and smokers. The knowledge gained from these studies informs clinicians of better ways to understand, assess and treat patients. They provide a bridge for translating research from the “bench to bedside”, in other words, making research benefit patients.

The Group is recognised for their expertise in clinical respiratory physiology, i.e. the science of determining how the lung goes wrong and how this causes patient symptoms. They are international leaders in complex lung function methods such as multiple breath nitrogen washout and forced oscillation technique. They also combine these measurements of function with 3-dimensional lung imaging methods: high resolution Computed Tomography (HRCT), magnetic resonance imaging (MRI), single photon emission computed tomography (SPECT) and positron emission computed tomography (PET). They are a diverse, interdisciplinary team comprising clinicians, basic scientists and engineers.

GRANTS

NHMRC Fellowship. *Home telemonitoring of lung function in chronic lung diseases* – awarded 2016-2019 (\$419,180). Dr Cindy Thamrin.

NHMRC Clinical Centre of Research in Severe Asthma – awarded 2014-2019 (\$2,498,171). Professor Greg King shared with Professor Guy Marks and Professor Helen Reddel.

Mundipharma Clinical Trial. *A two armed, randomised, assessor blinded, parallel group study to evaluate the effect of fluticasone/formoterol breath actuated inhaler* – awarded 2016 – 2017 (\$50,000). Professor Greg King and Dr Kanika Jetmalani.

Woolcock Large Equipment Grant (\$48,000). Dr Cindy Thamrin shared with Professor Ron Grunstein, Professor Simon Lewis, Associate Professor Brendon Yee, Dr Angela D’Rozario, Dr Craig Phillips and others.

Woolcock Near Miss Grant. *The mechanisms of irreversible airflow obstruction in asthma* – awarded 2017 (\$30,000). Professor Greg King.

SEED GRANTS

- COPD Research Top-Up Grant to Dr Sabine Zimmerman (\$20,000)
- Sydney Medical School Kick Start Grant to Dr Claude Farah (\$24,000)

- Centre of Excellence for Severe Asthma Seed Grants to Dr Cindy Thamrin and Dr Claude Farah (\$20,000 each)

AWARDS AND PRIZES

Professor Greg King received:

- *The Excellence in HDR Supervision Award* from the Northern Clinical School, University of Sydney in 2017.

Dr David Chapman received:

- Best Poster Presentation at the TSANZ NSW annual scientific meeting in 2017
- Best Poster Presentation at the TSANZSRS Canberra, Australia in 2017
- The European Respiratory Society Short Term Research Fellowship award in 2016.

Dr Catherine Farrow received:

- The Centre of Excellence in Severe Asthma travel grant in 2017.

Dr Kanika Jetmalani received:

- The TSANZ John Read Prize for Physiological Research in 2016.

Dr Stephen Milne received:

- The TSANZ/Boehringer Ingelheim COPD International Travel Scholarship in 2016.

Dr Farid Sanai received:

- The Centre of Excellence in Severe Asthma travel grant in 2017.

Dr Katrina Tonga received:

- The award Best Oral Presentation (Airways Diseases) at the TSANZ NSW annual scientific meeting in 2017
- The Concord Hospital Research student prize in 2017
- The American Thoracic Society Trainee Award in 2017
- The American Thoracic Society Respiratory Structure and Function Assembly Abstract Scholarship in 2017
- The Concord Hospital Travel Award in 2017
- The Asthma Foundation Travel Scholarship in 2016.

Dr Sabine Zimmerman received:

- The Lung Foundation Australia / Boehringer Ingelheim COPD Research Top-Up Grant in 2016.

Student finalists for the Dean's Prize, Sydney Medical School, Summer Student Scholarships:

- 2016: Peta Hathway, Timothy Kwan, and Stella Watson
- 2017: Benjamin Zhu.

HIGHLIGHTS 2016-2017

PhD Candidates Commencing: Alice Cottee

PhD Candidates Completed: Kanika Jetmalani

Professor Greg King presented the following:

- *What the FOT is that?* TSANZSRS, Canberra, Australia. Advanced Trainee Short Course (2017)
- *FOT in asthma diagnosis and management.* TSANZSRS, Canberra, Australia. Postgraduate Course on FOT (2017)
- *Knowing about Hyperinflation can help in the management of COPD patients.* TSANZSRS Canberra, Australia. Industry Stand (AstraZeneca) (2017)
- *Ventilation distribution in Obesity.* ATS, San Francisco, USA. Scientific Symposium: Fat and Flow (2017)
- *Small Airway Function in Smokers.* ATS, San Francisco, USA. Scientific Symposium: Smokers With Preserved Spirometry: Early COPD? (2017)
- *Small Airways and Hyperresponsiveness in Asthma and COPD.* ERS, Milan, Italy. The Sadoul Lecture (honouring Dirkje Postma) (2017)
- *Optimising Inhaled Therapy.* APSR, Sydney, Australia. Postgraduate Course in Severe Asthma (2017)
- *Airway & Lung Imaging* APSR, Sydney, Australia. Symposium: Predicting progression and therapeutic responses in COPD. (2017)
- *Drug delivery to the small airways in asthma.* APSR, Sydney, Australia. Industry Stand (MundiPharma) (2017)
- *Hyperinflation in COPD.* APSR, Sydney, Australia. Industry Stand (AstraZeneca) (2017).

Professor Greg King was invited to speak at:

- 4th Annual Peter D. Paré Lecture, James Hogg Research Centre, University of British Columbia, Vancouver, Canada (2016)
- Symposium: *Thoracic training and education – in the 21st century: Pulmonary Physiology – Teaching Old Tricks To A New Generation*, TSANZSRS Perth, Australia (2016)
- Joint Master class: *Bronchial Provocation testing.*

Bronchial Provocation results: What does it mean? TSANZSRS Perth, Australia (2016)

- Concurrent Session (Physiology and Sleep SIG and Asthma and Allergy SIG): *Targeting airway stiffness to treat obstructive disease. Airway wall stiffening in asthma and COPD*, Perth, Australia (2016)
- Case discussions in severe asthma (with Vanessa MacDonald and Alan James). TSANZSRS Canberra, Australia. Postgraduate Course in Severe Asthma (2017)
- Industry sponsored breakfast Symposium (MundiPharma). *High Fine Particle Fraction Combination Rx Improves Symptoms & Small Airway Function in Uncontrolled Asthma*, APSR Sydney, Australia (2017).

Dr Claude Farah presented the following:

- *The Future of FOT: potential applications and cases.* TSANZSRS, Canberra, Australia. Postgraduate Workshop (2017).

Dr Stephen Milne presented the following:

- *Physiological Predictors of Treatment Response in COPD.* Heart Lung Institute, St Paul's/UBC, Vancouver (2017)
- *State of COPD in Australia – COPD-X Guidelines.* TSANZ COPD Short Course, Sydney, Australia (2017).

Dr Cindy Thamrin presented the following:

- *Mechanics of small airway narrowing: in vivo/clinical data.* APSR, Sydney, Australia. Scientific Symposium (2017)
- *Forced oscillation technique in home monitoring of COPD.* TSANZSRS, Canberra, Australia. Postgraduate Workshop (2017)
- *In vivo measurements of airway distensibility.* TSANZSRS, Perth, Australia (2016).

OTHER HIGHLIGHTS

- Dr Cindy Thamrin and Dr Claude Farah chaired a Scientific Symposium (*B5: Smokers with preserved Spirometry: Early COPD?*) at the ATS in May 2017, which filled a room with a capacity of 400 people. Invited speakers included Professor Greg King.
- Dr Sabine Zimmermann organised a workshop on the lung function test known as the Forced Oscillation Technique (FOT) at the TSANZ conference in Canberra in March, 2017. The workshop featured Professor Jason Bates from the University of Vermont, a world expert on FOT and an excellent speaker, as well as national speakers who are experienced FOT users, including some from the Woolcock.

CLINICAL MANAGEMENT

Group Leaders: Professor Carol Armour, Professor Helen Reddel, and Associate Professor Sinthia Bosnic-Anticevich

The Clinical Management Group investigates the care of people with asthma and COPD in the community, clinic and hospital environment. We are focused on boosting health and quality of life in patients. The members of our team are constantly working on the best possible therapy and care available. They are patient-centred, ensuring care involves the patient in decision making about their health and in day-to-day management of their respiratory condition. The group collaborates with GPs, pharmacists, nurses, research psychologists, asthma educators, physiotherapists, speech pathologists and specialist respiratory physicians in Australia and internationally to provide better respiratory care for patients in the future.

GRANTS

NHMRC Project Grant. *An integrated general practice and pharmacy-based intervention to promote the prescription and use of appropriate preventive medications among individuals at high cardiovascular risk* – awarded 2015-2019 (\$2,296,358). Professor Carol Armour and Associate Professor Bandana Saini and others.

NHMRC Clinical Centre of Research in Severe Asthma – awarded 2014-2019 (\$2,498,171). Professor Helen Reddel shared with Professor Greg King and Professor Guy Marks and others.

NHMRC Centre of Excellence in Severe Asthma. Seed Grant. *Severe asthma: identifying patterns of medication taking behavior in primary care* – awarded 2016 (\$20,000). Professor Sinthia Bosnic-Anticevich and Professor Greg King.

NHMRC Centre of Excellence in Severe Asthma. Seed Grant. *A systematic review of patient experiences of severe asthma* – awarded 2016 (\$19,800) Professor Helen Reddel and others.

NHMRC TRIP Fellowship. *Improving evidence-based*

treatment of latent tuberculosis infection in public-hospital based chest clinics – awarded 2015-2016 (\$172,911). Dr Claudia Dobler.

NHMRC ECR Fellowship. *An integrated approach to improving patient-centred care in chronic obstructive pulmonary disease* – awarded 2017-2020 (\$438,768). Dr Claudia Dobler.

Medical Research Institute of New Zealand Grant. *Novel START (Novel Symbicort Turbuhaler Asthma Reliever Therapy): RCT of the efficacy and safety of an ICS/LABA reliever therapy regimen in asthma* – awarded 2015-2019 (\$1,233,795). Professor Helen Reddel shared with Professor Guy Marks and Dr Brett Toelle and others.

Asthma Australia. Unrestricted research grant. *The experiences and perceptions of people living with severe asthma* – awarded 2014-2016 (\$77,800). Professor Helen Reddel and Dr Juliet Foster.

Asthma Australia. Competitive research grant. *Development and testing of a personalised goal-setting self-management app for adolescents with asthma* – awarded 2013-2017 (\$122,420). Dr Juliet Foster.

Commonwealth Government of Australia, Pharmacy Trial Program, Department of Health and Ageing. *Getting asthma under control using the skills of the community pharmacist* – awarded 2017-2019 (\$2,199,100). Professor Carol Armour, Professor Sinthia Bosnic-Anticevich, Associate Professor Bandana Saini and others.

Perpetual Grant. *Decreasing the burden of chronic lung diseases the community* – awarded 2017-2018 (\$77,834). Professor Sinthia Bosnic-Anticevich.

ASTRA ZENECA research grant. *Pharmacy asthma model for sustainable delivery of asthma services* – awarded 2015-2016 (\$135,000). Professor Carol Armour, Professor Sinthia Bosnic-Anticevich and Associate Professor Bandana Saini and others.



TEVA Pharmaceuticals, ISS Program). *Inhaler technique mastery and maintenance in general medical practitioners: Easy Low Instruction Over Time (Dr ELIOT)* – awarded 2017-2018 (\$150,000). Professor Sinthia Bosnic-Anticevich, Dr Vicky Kritikos, Ms Biljana Cvetkovski and others.

MEDA Pharmaceuticals. *Clinical Audit and Educational Program for Allergic Rhinitis in Primary Care* – awarded 2017 (\$201,050). Professor Sinthia Bosnic-Anticevich and others.

MEDA Pharmaceuticals. *Determining the burden of Allergic Rhinitis through medication management in the Australian context* – awarded 2016/2017 (\$50,000). Professor Sinthia Bosnic-Anticevich and others.

MEDA Pharmaceuticals. *Identifying and addressing the needs of people with allergic rhinitis in primary care in Australia (Seed Funding)* – awarded 2016-2017 (\$20,000). Professor Sinthia Bosnic-Anticevich, Dr Vicky Kritikos, Ms Biljana Cvetkovski and others.

MEDA Pharmaceuticals. *The burden of rhinitis in Australia* – awarded 2016-2017 (\$63,500). Professor Sinthia Bosnic-Anticevich and others.

SEED GRANTS

- Sydney Medical School Kick Start Grant to Dr Claudia Dobler (\$17,900)
- University of Early Career Research Top Up to Dr Claudia Dobler (\$4,400)
- 2016 Think Tank Early Career Research Grant to Dr Claudia Dobler (\$15,000)

OTHER

- Seqirus Pharmacy Practice Training Module to Professor Bosnic-Anticevich (\$3,000).

AWARDS, APPOINTMENTS AND PRIZES

- Professor Sinthia Bosnic-Anticevich was appointed the title of Professor, University of Sydney (2017)
- Professor Helen Reddel was appointed the title of Professor, University of Sydney (2016)
- Professor Helen Reddel was awarded Asthma Australia Research Excellence Award “in recognition of exceptional service to the asthma community” in 2017.

Dr Juliet Foster was awarded:

- The Winner Best Primary Care Presentation at the Thoracic Society of Australia and New Zealand Annual Scientific Meeting in 2017.

HIGHLIGHTS 2016-2017

PhD Candidates Completed: Dr Amanda Elaro, Dr Sharon Davis, Dr Janet Cheung, Dr Zaridatul Aini Ibrahim.

Professor Carol Armour received the following invitations to speak:

- *From life in the lab with Diana to? Diana Temple memorial lecture* (2017)
- *Pharmacists as Asthma educators*. Pharmaceutical Society of Australia Annual meeting (2017).

Professor Helen Reddel gave the following presentations:

- *The 2017 update of the GINA guidelines*. International Meeting on Asthma and COPD and Concomitant Disorders, Florence, Italy (2017)
- *Clinical guidelines for chronic diseases: strength weaknesses opportunities and threats – Asthma* International Meeting on Asthma and COPD and Concomitant Disorders, Florence, Italy (2017)
- *Clinical diagnosis and early interventions – Asthma*. International Meeting on Asthma and COPD and Concomitant Disorders, Florence, Italy (2017)
- *Inflammation and triggers – a perfect storm for asthma exacerbations?* Global Respiratory Leadership Forum, Sweden (2017)
- *GINA update*. Japanese Society of Allergology, Tokyo (2017)
- *GINA strategies for personalising asthma treatment*. Japanese Society of Allergology, Tokyo (2017)
- *Long term clinical outcomes of SABA overuse and ICS underuse in asthma*. European Respiratory Society International Congress, Milan, Italy (2017)
- *The Lancet Commission: where to from here. The GINA perspective*. European Respiratory Society International Congress, Milan, Italy (2017)
- *Real life research and its importance in respiratory medicine*. Asia-Pacific Society of Respirology international congress, Sydney, Australia (2017)
- *Adherence in patients with severe or difficult to treat asthma*. Asia-Pacific Society of Respirology international congress, Sydney, Australia (2017)
- *2015 Experts Forum Review*. NHMRC CRE in severe asthma Experts Forum, Sydney, Australia (2017)
- *Real life research and its importance in respiratory medicine*. Thoracic Society of Australia and New Zealand Annual Scientific Meeting, Canberra, Australia (2017)

- *Cost of asthma medications – the impact on doctor and patient decisions.* National Respiratory Leadership Summit, Sydney, Australia (2017)
 - *Adherence.* Victorian Department of Health Thunderstorm asthma symposium, Melbourne, Australia (2017)
 - *The paradox of current asthma treatment – Reliever overuse and ICS underuse.* AstraZeneca Fuze webinar (2017)
 - *Overuse of blue puffers – does it matter?* Asthma Australia National Conference, Adelaide, Australia (2017)
 - *Emerging concepts of airways disease: should the terms ‘asthma’ and ‘COPD’ be abandoned?* Global Respiratory Leadership Forum, USA (2016)
 - *COPD with features of asthma: presentation, physiology, diagnostic strategies.* American Thoracic Society International Conference, San Francisco, USA (2016)
 - *Treatment of severe asthma.* Ho Chi Minh City Asthma Allergy Clinical Immunology conference, Ho Chi Minh City, Vietnam (2016)
 - *Current guidelines about mild asthma – where are the evidence gaps?* European Respiratory Society International Conference, London, UK (2016)
 - *Inhaler skills training: Bridging the gaps between guidelines and clinical care* European Respiratory Society International Conference, London, UK (2016)
 - *Biologics in asthma therapy.* Asia Pacific Society of Respiriology, Bangkok, Thailand (2016)
 - *Update in asthma management – the GINA perspective.* Asia Pacific Society of Respiriology, Bangkok, Thailand (2016)
 - *How to manage short-acting b2-agonist over-use.* National Respiratory Leadership Summit, Melbourne, Australia (2016)
 - *The Aerobics of Asthma management – Stepping UP (Steps 1 - 3).* Thoracic Society of Australia and New Zealand, Perth, Australia (2016)
 - *How to incorporate inhaler technique into your clinical setting.* Thoracic Society of Australia and New Zealand, Perth, Australia (2016)
 - *What’s in a name: ACOS.* Thoracic Society of Australia and New Zealand, Perth, Australia (2016)
 - *Living with Severe Asthma.* Asthma Australia Symposium Series Connecting Asthma Care, Sydney, Canberra, Adelaide, Newcastle, Australia (2016)
 - *Living with Severe Asthma.* NHMRC CRE in severe asthma national webinar, Newcastle, Australia (2016).
- Dr Juliet Foster received the following invitations to speak:
- *Beliefs, behaviours & socio-cognitive theories and their relationship to medication adherence.* Online webinar presentation as part of an International five part inter-professional course in optimizing patient’s adherence to medication for the European Society for Patient Adherence, Compliance and Persistence (2017)
 - *Writing effective specific aims and objectives for dissemination and implementation science.* Workshop activity co-development and workshop co-facilitation for a one day workshop at European Society for Patient Adherence, Compliance and Persistence Conference, Budapest, Hungary (2017)
 - *Digital Technology for Promoting Medication-Taking.* Invited oral presentation at GP17 RACGP Conference [Company-sponsored session; Astra Zeneca] (2017)
 - *Approaches for developing health apps for young people: co-design and the patient as researcher.* Invited oral presentation at 6th Biennial Update in Paediatric Respiratory Medicine, Sydney Children’s Hospital, Randwick NSW (2017)
 - *Uncovering the reality – The lived experience of Australians with severe asthma.* A series of invited keynote oral presentations at Asthma Australia’s 2016 Asthma Conference in Perth, Melbourne, Brisbane and Hobart (2016)
 - *Communication approaches for stimulating behaviour change in asthma* Oral presentation at Asthma Australia’s 2016 Asthma Conference in Canberra (2016)
 - *Internet and mobile technology for promoting medication adherence* Invited oral presentation at Pain Management Research Institute (PMRI) Adherence Symposium 2016, Sydney (2016).
- Dr Juliet Foster made the following TV appearances:
- May 2nd 2017: ABC News. “Asthma app co-designed by young people with asthma”
 - March 10th 2017: Channel 7 News. “New age puffer changes asthma treatment”.
- Professor Sinthia Botic-Anticevich received the following invitations to speak:
- *An informed and motivated health care team.* Oral presentation to Primary Care Symposium, European Respiratory Society Annual Scientific Meeting, September, Milan, Italy (2017)
 - *Understanding the impact of Allergic rhinitis in the*

- *Australian Community. Webinar for Pharmacy Guild of Australia (2017)*
- *Update on Australian Initiatives in Allergic rhinitis and ARIA. AirRater Stakeholder Meeting. Hobart, Australia (2017)*
- *Continued innovation in respiratory care: The importance of inhaler devices: Asian Respiratory Symposium, Guangzhou, China (2017)*
- *Continued innovation in respiratory care: The importance of inhaler devices: Asian Respiratory Forum, Seoul, South Korea (2017)*
- *Inhaler Devices: A critical Step, Symposium Title: Asthma Challenges in Clinical Practice: European Academy of Allergy and Clinical Immunology, Helsinki, Finland (2017)*
- *Benefits of Intuitive Inhalers at the European Respiratory Society Annual Scientific Meeting Symposium "Unmet needs in asthma and COPD: scientific advances in the treatment", London (2016)*
- *The importance of intuitive inhaler devices. Symposium Presentation: European Respiratory Forum Rome, Italy (2016)*
- *Unravelling the inhaler maze: The importance of correct device use in respiratory management. Symposium Presentation at the Thoracic Society of Australasia and New Zealand, Perth (2016)*
- *Respiratory Pharmacy Services, an Interactive Workshop PSA16, Pharmaceutical Society of Australia (2016).*

OTHER HIGHLIGHTS:

- Professor Helen Reddel was invited in 2016 to become international co-chair of NOVELTY, a large multinational observational study aimed at identifying underlying mechanisms of asthma and COPD. This study, funded by AstraZeneca, will recruit 12,000 patients from 19 countries and will follow them over 3 years, with questionnaires, lung function, and biobank samples.



EMPHYSEMA CENTRE

Group Leader: Professor Alaina Ammit

The Emphysema Centre is the new 'go-to' hub for Australia's 300,000 sufferers and top researchers wanting to change the way this respiratory condition is treated. The Centre, run from our headquarters in Glebe, Sydney, works to improve the lives of patients by ensuring earlier diagnosis, better treatment options and ultimately a cure which will allow thousands of people to avoid these conditions altogether. By integrating clinical and basic research, the facility is able to innovate rapidly and revolutionise the way these respiratory diseases are both studied and treated.

The Centre has three dedicated research themes, the first theme is devoted to developing diagnostic tools that can be used to manage the disease and predict emphysema at an early stage. Work is already underway to build a test that can pick up lung changes before any wheeze or breathlessness symptoms appear. The second theme is focused on understanding how the disease operates at a molecular and genetic level with the aim of developing new approaches to halt and reverse the disease rather than just maintaining it. Breakthroughs in this field will be among the first in the world. A third theme specialises in building innovative technologies for people already suffering from emphysema. These researchers are working closely with clinicians to develop novel inhalation therapies to treat recurring chest infections and shortness of breath in patients.

The generosity of the donors who have supported the establishment of the Woolcock Emphysema Centre has enabled the direct support of a number of projects:

Seed Funding – awarded in September 2017 (\$20,000)

- *Switching tristetraprolin on to turn off inflammation in COPD.* Professor Alaina Ammit, Professor Greg King, Dr Cindy Thamrin, Dr Claude Farah, Dr Maria Comas-Soberats, Professor Paul Young, Dr Peta Bradbury (shared with others)
- *When Science and Fashion Collide: Improving Cardiac Function with an Elastic Corset in COPD.* Dr David Chapman, Professor Greg King, Dr Cindy Thamrin (shared with others)
- *Lung microbiome in COPD exacerbations.* Associate Professor Brian Oliver, Dr Claude Farah, Ms Alice Cottee, Dr Nick Stow (shared with others)
- *In vitro and in vivo effects of electronic cigarettes on small airway function and inflammation in (ex)-smokers and correlation with COPD.* Dr Hui Xin Ong, Professor Paul Young, Dr Kanika Jetmalani, Dr Cindy Thamrin, Dr David Chapman (shared with others)

Postdoctoral (clinical) researcher for 12 months – awarded in November 2017 (\$75,000)

- *Pharmacy delivered medications management and monitoring for COPD.* Associate Professor Bandana

Saini, Ms Mariam Fathima, Dr Julie Foster, Professor Carol Armour

These funds have also enabled the Centre to contribute to the support a number of existing clinical research studies at the Woolcock:

- *Home Monitoring of COPD.* Dr Cindy Thamrin, Professor Greg King, and collaborators from the Politecnico di Milano in Italy
- *Sleep Disturbances in COPD (CIRCOMED).* Professor Greg King, Professor Paul Young, Professor Ron Grunstein, Dr Craig Phillips, Dr Cindy Thamrin, Dr Claude Farah, Dr Maria Comas-Soberats
- *How do bronchodilators really work in COPD.* Dr Cindy Thamrin, Professor Greg King
- *Early COPD in Smokers (ECOS).* Dr Cindy Thamrin, Professor Greg King and in collaboration with the George Institute for Global Health
- *Comprehensive Phenotyping of Exacerbations.* Professor Greg King, Dr Cindy Thamrin, Ms Alice Cottee, Dr Claude Farah, Associate Professor Brian Oliver
- *Screening for COPD in the community.* Professor Carol Armour, Associate Professor Bandana Saini, Ms Mariam Fathima

The Woolcock Emphysema Centre has also enabled some of our researchers to participate in studies with other national and international institutions:

- *The Impact of Statins on Glucocorticoid-Induced Leucine Zipper in Human Alveolar Epithelial Cells.* Professor Alaina Ammit, in collaboration with the Universitat des Saarlandes, Germany (Linnenberger and Kiemer)
- *Examining the inflammatory effect of Cholesterol, 25-hydroxycholesterol and 27-hydroxycholesterol on ABC transporters in a COPD model in vitro.* Professor Alaina Ammit, in collaboration with the University of Sydney (Gelissen)
- *Development of novel PP2A activators.* Professor Alaina Ammit, in collaboration with the University of NSW (Morris and Taylor)
- *Development of mass spectrometric/proteomic techniques to detect phosphorylated tristetraprolin.* Professor Alaina Ammit, Moosavi, in collaboration with the University of Newcastle (Verrills, Al Mazi, Dunn)
- *In vivo experiments that show the beneficial effects of active tristetraprolin in animal models of COPD and influenza.* Professor Alaina Ammit, in collaboration with the University of Birmingham (Clark) and the University of Newcastle (Hansbro, Nair, Starkey)

- *Model the impact of chronobiology on inflammation in the petri dish.* Professor Alaina Ammit, Dr Maria Comas-Soberats, and others
- *Exploring the relationship between tropomyosin isoforms and pro-fibrotic cytokines in a context of fibrosis.* Dr Peta Bradbury, Professor Alaina Ammit, and others, in collaboration with the Children's Hospital Westmead (O'Neill)
- *Towards Better Therapeutics to Treat Infectious Exacerbations in Chronic Respiratory Disease.* Professor Alaina Ammit, Dr Peta Bradbury.

EXTERNAL GRANTS

Rebecca L Cooper Medical Research Foundation. *Switching tristetraprolin on to turn off inflammation in lung disease* – awarded 2017 (\$22,000) Professor Alaina Ammit.

DONATIONS

- Mrs Janice Gibson for the Establishment of the Centre of research excellence in Emphysema and COPD – donated 2016-2018 (\$700,000)
- Ernest Heine Family Foundation Donation for the Establishment of the Centre of research excellence in Emphysema and COPD – donated 2016-2018 (\$700,000)



WOOLCOCK INSTITUTE IN VIETNAM

Group Leaders: Professor Guy Marks and Associate Professor Greg Fox

The Woolcock offices in Vietnam were established in 2010 to support the implementation of NHMRC-funded research into tuberculosis and lung disease. Since then projects in Vietnam have been awarded \$9.9 million in NHMRC funding and have included 75,000 participants across multiple sites. The Woolcock has offices in Hanoi, Ho Chi Min City and Ca Mau and the implementation of projects across 11 Provinces is overseen by Country Director Dr Nguyen Thu Anh. The Woolcock currently employ 50 local researchers and, as activity within the projects increases, the number of employees continues to grow. This work is extremely important because it addresses a very real public health problem and develops research capacity that will provide lasting benefit to public health and respiratory medicine in Vietnam.

GRANTS

NHMRC Grant. *Reducing the prevalence of TB in a highly endemic setting by community-wide active case finding: "turning off the tap" – awarded 2013-2018. (\$3,550,077).* Professor Guy Marks and Associate Professor Greg Fox and others.

NHMRC Grant. *Prevention of multi-drug resistant tuberculosis in a high prevalence setting: 'Connecting the DOTS' in Vietnam – awarded 2015-2019 (\$3,234,514).* Professor Guy Marks and Associate Professor Greg Fox and others.

NHMRC/GADC Grant. *An integrated health sector strategy to combat COPD and asthma in Vietnam: A pragmatic stepped intervention cluster randomized trial – awarded 2017-2022 (\$1,894,348).* Professor Guy Marks and Associate Professor Greg Fox and others.

Canadian Institutes of Health Research - Foundation Scheme Live Pilot Grant. *Tackling the two greatest obstacles to Tuberculosis elimination: Treatment of latent infection and drug resistant disease – awarded 2015-2017 (\$1,128,533).* Professor Guy Marks and Associate Professor Greg Fox and others.

Australian Respiratory Council - Harry Windsor Near Miss Grant. *A new strategy to reduce the impact of tuberculosis relapse in endemic settings – awarded 2017 (\$50,000).* Associate Professor Greg Fox.

SEED GRANTS

- TB-CRE Seed Funding from Centenary Institute to Associate Professor Greg Fox (\$20,000)

PRIZES

Professor Guy Marks received the following awards:

- Vietnam National Tuberculosis program award (2017).

Associate Professor Greg Fox received the following awards:

- Vice-Chancellor's Award for Excellence in Early Career Research, Sydney University (2017)
- Sydney Young Investigator at the Sydney Research Hub (2017)
- David Serisier Memorial Award for Translational Research. Thoracic Society of Australia and New Zealand, Perth, Australia (2017)
- Vietnam National Tuberculosis program award (2017).

HIGHLIGHTS 2016-2017

PhD students completed: Dr Jennifer Ho.

Woolcock Vietnam received the Merit Award from the Vietnam National Tuberculosis Program for a poster reflecting how health workers are working to prevent tuberculosis in Vietnam

Associate Professor Greg Fox was invited to speak at the following:

- The World Lung Conference in 2016
- The Asia Pacific Regional meeting of the International Union of TB and Lung Disease in 2017.

OTHER HIGHLIGHTS

- Greg Fox was promoted to an Associated Professor at the University of Sydney in 2017
- Professor Greg Fox was an invited reviewer for American Thoracic Society / European Respiratory Society Guidelines for treatment of drug resistant tuberculosis (2016)
- Professor Greg Fox was a World Health Organization Guideline Development Group invited member for the consolidated policy guidance on drug susceptibility testing of anti-TB drugs in Montreux, Switzerland (2016).



RESPIRATORY AND ENVIRONMENTAL EPIDEMIOLOGY

Group Leaders: Professor Guy Marks and Dr Brett Toelle

The Respiratory and Environmental Epidemiology Group conducts research to investigate the prevalence and risk factors of respiratory disease in different population groups. Current projects include studies on the impact of air quality on respiratory health, primary prevention of asthma, COPD prevalence and new tuberculosis treatments. This group uses epidemiological methods to describe the amount of disease and the risk factors for disease within populations.

There are three main areas of activity:

- 1. Respiratory and Environmental Epidemiology (R&EE).** This program covers a number of areas including impact of air quality on respiratory health, primary prevention of asthma and a multicentre project to quantify COPD in the Australian community. They are also working in the areas of tuberculosis treatment and case finding.
- 2. Centre for Air quality & health Research and evaluation (CAR).** CAR is a Centre of Research Excellence funded by the National Health and Medical Research Council. This group focuses on research into the impact of air pollution on human health and translates that research into contributions to policy that aims to mitigate that impact. CAR provides an opportunity to build the capacity for early career researchers by offering post-doctoral fellowships, travel grants, PhD top-ups, seed funding grants and research specific training. CAR engages its partner organisations and the public through organising workshops, symposiums and public lectures.
- 3. Australian Centre for Airways disease Monitoring (ACAM).** ACAM was established at the Woolcock Institute in 2002 as a collaborating unit with the Australian Institute of Health and Welfare. It aims to assist in reducing the burden of chronic airways disease, including asthma and chronic obstructive pulmonary disease (COPD), in Australia by developing, collating and interpreting data relevant to prevention, management and health policy for chronic airways disease.

GRANTS

NHMRC Research Fellowship. *Interventions for improving lung health* – awarded 2014-2018 (\$897,925). Professor Guy Marks.

NHMRC Centre of Research Excellence. *Energy transitions, air pollution and health in Australia* – awarded 2016-2020 (\$2,491,229) Professor Guy Marks and others.

NHMRC Clinical Centre of Research in Severe Asthma – awarded 2014-2019 (\$2,498,171) shared with Professor Guy Marks, Professor Greg King and Professor Helen Reddel.

NHMRC Grant. *Multidimensional assessment of the health impacts of infrasound: Two RCTS* – awarded 2016-2020. (\$1,943,922). Professor Guy Marks, Dr Christine Cowie, and Dr Brett Toelle shared with Professor Ron Grunstein, Professor Delwyn Bartlett, Associate Professor Nathaniel Marshall, and Dr Craig Phillips.

Medical Research Institute of New Zealand Grant. *Novel START (Novel Symbicort Turbuhaler Asthma Reliever Therapy): RCT of the efficacy and safety of an ICS/LABA reliever therapy regimen in asthma* – awarded 2015-2019 (\$1,233,795). Professor Guy Marks and Dr Brett Toelle shared with Professor Helen Reddel.

NSW Health and NSW EPA Project Agreement. *The exposure and health impacts of wood heater and power station emissions in the NSW greater metropolitan region* – awarded 2016 (\$1,000). Professor Guy Marks.

Woolcock Near Miss Grant. *Air pollution and mortality and morbidity in adult Australians (APMMA Study): a large population based cohort study* – awarded 2017 (\$30,000). Professor Guy Marks and Dr Christine Cowie.

Woolcock Near Miss Grant. *A BOLD new model for chronic non-specific respiratory disease to enable better research, prevention, treatment and outcomes* – awarded 2016 (\$30,000). Professor Guy Marks and Dr Brett Toelle.

OTHER

- Health Protection NSW and NSW EPA Sponsorship of annual scientific conference of the International Society for Environmental Epidemiology to Dr Brett Toelle (\$50,000)
- The American Thoracic Society MECOR Program Workshops Level 1, Level 2 and Level 3 awarded to Professor Guy Marks (\$10,000)



HIGHLIGHTS 2016 - 2017

Professor Guy Marks:

- Visiting academic (on sabbatical) at World Health Organisation, Geneva, Switzerland (2016).

Dr Christine Cowie was invited to speak at:

- Imperial College, London, UK (2016)
- The Institute for Risk Assessment Sciences, Utrecht University, Utrecht, Netherlands (2016)
- The NSW Smart Sensors Network and Panel Member discussant at NSW Clean Air Forum, Sydney (2017).

Dr Brett Toelle was invited to speak at:

- The Lung Foundation of Australia 3rd Biennial Australian Rare Lung Disease Short Course and the Better Living with Your Lung Disease, Patient Seminar (2017).

RESPIRATORY CELLULAR AND MOLECULAR BIOLOGY

Group Leader: Associate Professor Brian Oliver

The Group aims to uncover the molecular and cellular mechanisms underlying chronic respiratory diseases such as asthma, chronic obstructive pulmonary disease (COPD), lymphangioleiomyomatosis (LAM) and pulmonary fibrosis.

They have three main areas of expertise:

- Molecular pathophysiology (Brian Oliver)
- Fibrosis (Dr Pawan Sharma)
- Understanding the influence of diet on airway function (Dikaia Xenaki)

These themes are investigated using genetic and molecular approaches on patient tissue samples and novel in-vitro models of the airways. The aims are to discover what drives disease processes and to discover new treatments and/or improve existing ones.

GRANTS

NHMRC Grant. *Elucidation of the Aetiology of Airway Remodelling in COPD* – awarded 2016-2018 (\$630,000). Associate Professor Brian Oliver.

NHMRC Grant. *Mechanisms of impaired bronchodilator response associated with fatty acid intake in obese asthma* – awarded 2015-2018 (\$668,469). Associate Professor Brian Oliver shared with Professor Paul Young and others.

Woolcock Large Equipment Grant (\$52,000). Associate Professor Oliver shared with Professor Daniela Traini, Dr Hui Ong and others.

DONATION

TEVA Education Grant, Charitable Contribution – donated 2016 (\$10,000).

AWARDS AND PRIZES

Dr Pawan Sharma received the following awards:

- Best abstract award at TSANZ (2017)
- Ann Woolcock Memorial Award and Stuart Hirst Award for Scientific Excellence (highest ranked abstract), Respiratory Structure and Function assembly of the ATS (2017)
- Lung Foundation of Australia Travel Award to attend American Thoracic Society International Conference, Washington DC, USA (2017).

Dr David Chapman received the following awards:

- Best Poster Presentation at the TSANZ annual scientific meeting, Title *Maternal e-cigarette vaping enhances development of allergic asthma in the offspring* (2017)

- Best Poster Presentation, NSW branch TSANZ annual scientific meeting, Title *E-cigarette Flavors and Nicotine Independently Alter Airway Inflammation in a Murine Model of Allergic Airways Disease* (2017).

Dr Yik Chan received the following awards:

- Position of research fellow iCare (Workers Compensation (Dust Diseases) Authority) for their study *Can fibrosis in silicosis be reversed?* (2017)
- Title of *Fresh Scientist* 2017, by Fresh Science (2017)
- Royal Society of New South Wales Scholarship (2017).

Keiran McAlinden received the following awards:

- Stuart J Hirst award for the top ranked scientific abstract in the RSF assembly at the ATS conference (2017).

HIGHLIGHTS 2016-2017

Professor Brian Oliver gave the following presentations:

- *Exacerbations in COPD*. COPD in the Age of Precision Medicine. (2017)
- *Everything you wanted to know about respiratory viruses*. TSANZ NSW Evening Symposia (2017).

Professor Brian Oliver was invited to speak at the following conferences:

- GSK respiratory symposium, plenary speaker (2017)
- Boehringer Ingelheim Airways Meeting, plenary speaker (2016)
- ASCPT, keynote speaker (2016)
- TEVA Australia Respiratory Summit, keynote speaker (2016).

Dr Pawan Sharma gave the following presentations:

- *Repurposing Drugs for Asthma*. National Institute of Pharmaceutical Education & Research, Guwahati, India, International Speaker's Program. (2017)
- *Maternal E-cigarette Vaping Enhances Development of Allergic Asthma in the Offspring*. European Respiratory Society International Conference, Milan, Italy. (2017)
- *Maternal E-cigarette Vaping Enhances Development of Allergic Asthma in the Offspring*. American Thoracic Society International Conference, Washington DC, USA. (2017)
- *A Bitter Pill to Relax: Insights into Novel Therapy for Treating Allergic Asthma*. Visiting Speaker Program,

Royal Adelaide Hospital, University of Adelaide, SA, Australia. (2017)

- *Maternal E-cigarette Vaping Enhances Development of Allergic Asthma in the Offspring.* New horizons Sydney Meeting. (2017)
- *Self-eating: the Pandora's box of Asthma!* Newcastle Asthma Meeting. (2016)
- *Autophagy and Fibrosis: Is There A Link?* NSW - Thoracic Society of Australia and New Zealand (TSANZ), Clinical Update. (2016).

Dr Pawan Sharma was involved in the following media coverage:

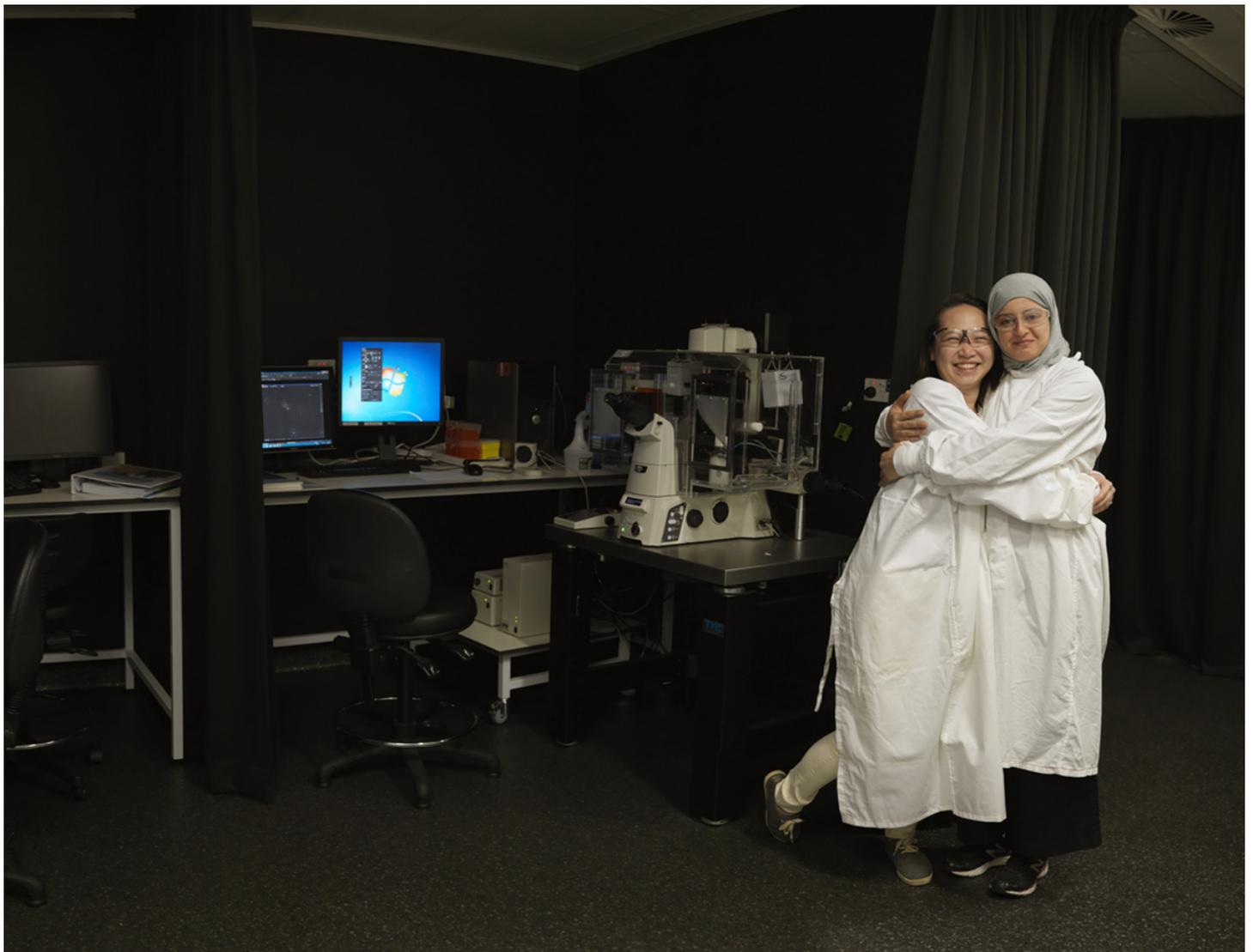
- Thoracic Society of Australia & NZ abstract cited in Parliamentary enquiry report on e-cigarettes (2017)
- *Vaping in pregnancy increases a child's risk of asthma even if the e-cigarettes are nicotine free.* Daily Mail

Australia, September (2017)

- *Research warns pregnant women against vaping.* Irish Examiner, September (2017)
- *ERS: Maternal Vaping Tied to Allergic Asthma Risk in Offspring.* RT Magazine, September (2017)
- *ASTHMA E-CIG LINK Mums who use e-cigarettes while pregnant may increase their child's risk of having asthma, study claims.* The Sun (2017).

Dr Yik Chan was invited to speak at the following conferences:

- *Effects of maternal cigarette smoke exposure on brain health in offspring.* Royal Society of New South Wales 1250th Ordinary General Meeting (2017)
- *Effects of maternal cigarette smoke exposure* Royal Society of New South Wales – Southern Highlands Branch November Lecture (2017).



RESPIRATORY TECHNOLOGY

Group Leader: Professors Daniela Traini and Paul Young

The Respiratory Technology Group was established in 2012 to bridge the gap between fundamental respiratory science (molecular pharmacology and cell biology) and clinical research (physiology, epidemiology and clinical management). The Group is a leader in the areas of drug formulation, device development, testing and delivery.

GRANTS

NHMRC Grant. *Mechanisms of impaired bronchodilator response associated with fatty acid intake in obese asthma* – awarded 2015-2018 (\$668,469). Professor Paul Young shared with Associate Professor Brian Oliver and others.

NHMRC Development Grant. *Targeting Cystic Fibrosis Using a Novel Inhalation Therapy* – awarded 2017-2018 (\$421,545). Professor Daniela Traini and Professor Paul Young.

ARC Discovery Project. Smartdrops. *Shaping the future of particle technology* – awarded 2015-2017 (\$521,800). Professor Daniela Traini and Professor Paul Young.

ARC Discovery Grant. *One for all and all for one: Engineering a drug delivery platform for DNA vaccines to the lung* – awarded 2015-2018 (\$482,738). Professor Daniela Traini and Professor Paul Young.

ARC Linkage Project. *Advanced nanotechnologies for targeting biofilm* – awarded 2017-2019 (\$420,000). Professor Daniela Traini and Professor Paul Young.

DVC Research - International Research Collaboration Award. *Nano-in-Microparticulate formulations for inhalation* – awarded 2016 (\$7,600). Professor Paul Young.

University of Sydney Bridging Grant Near Miss for ARC Discovery. *Global predictive model for the formulation of dry powder inhalers* – awarded 2017 (\$30,000). Professor Daniela Traini.

University of Sydney Equipment Grant. *Real time bio-*

impedance measurement of biological samples: Electrical Cell-substrate Impedance SPECT – awarded 2016 (\$61,048). Professor Daniela Traini and Professor Paul Young.

Balnaves Foundation and Sydney Medical School Kick Start Grant (\$25,000). Dr Hui Xin Ong.

Woolcock Near Miss Grant. *Improving therapy of acute exacerbations of asthma by repurposing PDE4 inhibitors and statins for lung delivery* – awarded 2016 (\$30,000). Professor Daniela Traini.

Woolcock Large Equipment Grant (\$52,000). Professor Daniela Traini, Professor Paul Young, and Dr Dr Hui Xin Ong shared with Associate Professor Brian Oliver.

HIGHLIGHTS IN 2016 – 2017

PhD Candidates Commencing: Zara Sheikh, Jessi Xu, and Jing Xiao

PhD Candidates Completed: Michele Pozzoli and Alaa Tulbah

Professor Daniela Traini received the following invitations to speak:

- Respiratory Drug Delivery meeting in Goa, India (2016)
- Immunology, infection and inflammation (I3) Meeting in Cardiff, UK (2016).

AWARDS AND PRIZES

Professor Daniela Traini received:

- The Award for Excellence in the category of Outstanding Mentoring and Leadership from The University of Sydney (2017)
- The Royal Society Award at the Commonwealth Science Conference in Singapore (2017)
- The Endeavour Executive Fellowship in the USA (2017).



SLEEP AND CIRCADIAN

Group Leader: Professor Ron Grunstein

CO-OPERATIVE RESEARCH CENTRE (CRC) FOR ALERTNESS, SAFETY AND PRODUCTIVITY

Theme Leader: Associate Professor Chris Gordon

The CRC commenced in 2014 with 7 years funding of \$70 million in cash and in-kind resources from 3 universities (University of Sydney, Monash University, Flinders University) and 28 industry, NGO and government participants. It aims to address the challenge of reversing the impaired productivity and safety implications of insufficient sleep and shift work.

There are four major platform projects that currently drive the activities of the Alertness CRC and these are:

1. Laboratory-based development of systems and biomarkers to assess circadian, sleep and alertness states
2. Modelling and software development for prediction of alertness and optimisation of scheduling and a data fusion system for the estimation, prediction and control of individual alertness dynamics
3. Assessing individual vulnerability to shift work and integrated interventions for alertness management in the healthcare setting
4. Sleep disorder phenotyping

HEALTH PSYCHOLOGY

Theme Leader: Associate Professor Delwyn Bartlett

This theme consists of specialists in behavioural sleep medicine who treat insomnia and related sleep disorders using evidence-based non-drug approaches. Treatment includes cognitive behavioural therapy based on a psycho-education sleep program delivered by a trained sleep psychologist. This program also includes strategies to deal with sleep anxiety and depression emphasising the need to see this as a “retraining”. This includes mindfulness along with increasing awareness of unhelpful ways of thinking.

The psychologist-led sleep clinic and research team seek to better understand, develop and treat those with poor sleep.

NEUROBIOLOGY

Theme Leader: Dr Angela d’Rozario

The research undertaken by the Sleep Neurobiology Research Team provides neurophysiology and imaging insights into cognitive deficits in sleep disorders and neurodegenerative disease. This work involves a broad program of research generated by the NeuroSleep Centre of Research Excellence. The aim is to discover new brain-based clinical biomarkers to differentiate between patient phenotypes e.g. identify those sleep-disordered patients

who are at high-risk of having a fall-asleep motor vehicle accident. They also examine how altered brain activity during sleep may be a risk factor for cognitive impairment and neurodegeneration. They investigate interventions for optimising sleep brain activity to restore normal sleeping patterns and improve sleep-dependent cognitive processes.

Technological advances in measuring brain activity using a new high-density electroencephalography (hdEEG) system, together with their neuroimaging expertise provide a powerful platform for the growing research program. They use these tools to investigate functional brain activity and neurobiological pathology in patients with sleep disorders and neurodegenerative disease, and to evaluate novel treatment approaches aimed at improving sleep, cognition and clinical outcomes.

EPIDEMIOLOGY/CLINICAL TRIALS

Theme Leader: Associate Professor Nat Marshall

The Epidemiology and Clinical Trials Team aims to investigate the prevalence, causes, risk factors and consequences of sleep disorders as well as rigorously test the effectiveness of established and emerging treatments in sleep health. They design clinical trials and also statistically analyse clinical trials in conjunction with other research teams.

They regularly conduct systematic reviews and meta-analyses on pressing clinical questions where they gather all high quality data from around the world into single documents to better help doctors and patients make evidence-based decisions about their care.

CARDIO-METABOLIC

Theme Leader: Dr Craig Phillips

The CIRUS cardiometabolic disease research team aims to understand the role of sleep in maintaining cardiovascular and metabolic health. They also look into how sleep and circadian disturbance might advance cardiometabolic diseases such as diabetes and heart disease.

Head of CIRUS, Professor Ron Grunstein is an executive committee member of the Sleep Apnoea Vascular Endpoints (SAVE) Study. The study, published in the New England Journal of Medicine in 2016, explored whether CPAP treatment of obstructive sleep apnoea reduces the rate of cardiovascular death or serious cardiovascular outcomes (such as stroke or heart attack). The trial was the largest of its kind and involved 2700 participants across 7 countries. Although the study did not establish any cardiovascular benefit from CPAP treatment, it did demonstrate that CPAP did improve quality of life and daytime sleepiness.

Previous work from this group has shown the benefits of treating sleep apnoea to lower triglycerides and cholesterol levels.

RESPIRATORY FAILURE

Theme Leaders: Associate Professor Brendon Yee and Dr Amanda Piper

Respiratory disorders that increase the effort to breathe or are associated with weakness of the respiratory muscles affect the pattern and depth of breathing.

Sleep exaggerates any abnormalities in breathing, and over time can lead to inadequate breathing identified by high levels of carbon dioxide and low levels of oxygen both at night and during the day. If left untreated or treated inappropriately, inadequate breathing can lead to reduced quality of life, unnecessary hospitalisations and even premature mortality.

Breathing during sleep can be markedly improved by applying positive pressure to the airways to assist inspiratory efforts. Understanding who is at risk, when best to start therapy and what ventilation strategy works best are important issues to ensure people with chronic respiratory disorders receive the best evidence-based care.

GRANTS

NHMRC Fellowship. *Addressing Therapeutic Challenges in Sleep Disorders* – awarded 2016-2020 (\$851,980). Professor Ron Grunstein.

NHMRC CRE. *NeuroSleep: The Centre for Translational Sleep and Circadian Neurobiology* – awarded 2014-2018 (\$2,496,740). Professor Ron Grunstein and others.

NHMRC Grant. *Improving Sleep to Reduce Dementia Risk* – awarded 2017-2021 (\$709,585) Drs Craig Phillips and Dr Yasmina Serinel.

NHMRC Scholarship. *Chronotherapy for hypertension in obstructive sleep apnoea* – awarded 2016-2017 (\$48,020). Dr Craig Phillips.

Cooperative Research Centres (DIISRTE). *CRC for Alertness, Safety and Productivity* – awarded 2013-2019 (\$14,500,000). Professor Ron Grunstein and others.

Alertness CRC. *Development of a sleep restriction therapy “Sleep Right Tonight” App for behavioural management of insomnia* – awarded 2017-2018 (\$54,281). Professor Ron Grunstein and others.

Alertness CRC. *Development of an automated multivariate and multimodal tool for detection of rapid eye movement sleep behaviour disorder* – awarded 2017-2018 (\$10,700). Professor Ron Grunstein.

Alertness CRC Postgraduate Scholarship – awarded 2014-2017 (\$113,421). Dr Haider Naqvi.

National Medical Program Grant. *Extreme phenotyping in patients with non-restorative sleep (NRS) – is there a “neuromarker” for CFS/SEID* – awarded 2016 (\$79,895).

Professor Ron Grunstein.

Diabetes Australia Near Miss Grant. *Treating sleep apnoea after weight loss to maintain cardio-metabolic health in the obese with pre-diabetes – A Randomised Controlled Trial* – awarded 2017-2018 (\$60,000). Professor Ron Grunstein, Associate Professor Brendon Yee, Dr Camilla Hoyos and Dr Craig Phillips.

Perpetual Grant. *Light therapy in elderly people to improve sleep, cognition and day time alertness* – awarded 2017-2018 (\$161,772). Associate Professor Chris Gordon and Dr Maria Comas Soberats.

Sydney Medical School Kick Start Grant. *Does altered sleep physiology mediate cognitive decline and neurodegeneration in older people with mild* – awarded 2016-2017 (\$20,000). Dr Angela D’Rozario.

Sydney Medical School Kick Start Grant. *Sleep Restriction Therapy (SRT) for chronic insomnia disorder: physiological, cognitive & objective sleep alterations after six weeks of therapy intervention – a pilot study* – awarded 2016 (\$22,375). Dr Chris Miller.

University of Sydney Bridging Grant 2017 (\$30,000). Professor Ron Grunstein.

Woolcock Postdoctoral Fellowship 2016-2018 (\$300,000). Dr Chris Miller.

Woolcock Large Equipment Grant 2017 (\$48,000). Professor Ron Grunstein, Associate Professor Brendon Yee, Dr Angela D’Rozario and Dr Craig Phillips shared with Dr Cindy Thamrin and others.

SEED GRANTS

- 2016 Think Tank ECR Seed funding to Dr Elizabeth Cayan (20,000)

AWARDS

Professor Ron Grunstein received:

- The Research Medal from Thoracic Society of Australia and New Zealand (2016).

Associate Professor Chris Gordon received:

- The Vice Chancellor’s Awards for Outstanding Educational Engagement and Innovation, Health Collaboration Challenge project team (2016).

Dr Julia Chapman received:

- The Ann Woolcock Training and Travel Award (2016)
- The Best Presentation in the Sleep Disordered Breathing Session award at the TSANZ NSW Branch Meeting (2017).

Dr Angela D'Rozario received:

- Best poster award in her category at the Australasian Sleep Association Meeting, Adelaide (2016)
- The Australasian Sleep Association Helen Bearpark Memorial Scholarship (2017)
- The Ian Potter Foundation Travel Grant to attend the 31st Annual Meeting of the Associated Professional Sleep Societies (APSS) in Boston, USA and the Sleep Research Society (SRS) Trainee Symposia Series (2017)
- The Faculty of Science at The University of Sydney Childcare Assistance Travel Support Scheme grant (2017).

Dr Camilla Hoyos received:

- The International Trainee Scholarship for ATS meeting in Washington (2016)
- The Commendation Award for the BUPA Health Foundation Emerging Health Researcher of the Year (2016).

Dr Liora Kempler received:

- The New Investigator Award at the Australasian Sleep Association Meeting, Adelaide (2016).

Dr Nathaniel Marshall received:

- The NHMRC External Assessor Outstanding Contribution Honour Roll award (2017)
- The Sentinels of Science Peer Review Award: Top 1% of peer-reviewers in Medicine (2017).

Dr Craig Phillips received:

- The HDR Best Emerging Supervisor Award – Northern Clinical School (2016).

Dr Yasmina Serinel received:

- The Sydney Medical School Deans Prize (equal first) for best publication (2017).

Ms Kirsty Dodds received:

- Best poster award in her category at the Australasian Sleep Association Meeting, Adelaide (2016).

HIGHLIGHTS 2016-2017

PhD Candidates Completed 2016: Elizabeth Cayanan, Julia Chapman.

PhD Candidates Completed 2017: Nathan Cross, Liora Kempler, Luke Roswell.

Professor Ron Grunstein, Associate Professor Delwyn Bartlett, Associate Professor Chris Gordon, and others presented the following:

- “Melatonin for improving sleep initiation and daytime impairments in Delayed Sleep Phase Disorder”. Sleep DownUnder, Adelaide (2016).

Professor Ron Grunstein, Associate Professor Delwyn Bartlett, Associate Professor Chris Gordon, Dr Angela D'Rozario, Dr Richard Lee, Dr Nathaniel Marshall, Dr Chris Miller, Dr Anna Mullins, Ms Kirsty Dodds, and others presented the following:

- “The Insomnia 100 Study: Phenotypes of Insomnia Disorder built from cluster analysis of objective sleep parameters reveal differences in neurocognitive functioning, quantitative EEG and heart rate variability”. Presented at the 30th Anniversary Meeting of the Associated Professional Sleep Societies, Denver, U.S.A. (2016).

Professor Ron Grunstein, Associate Professor Delwyn Bartlett, Associate Professor Chris Gordon, Associate Professor Brendon Yee, Dr Angela D'Rozario, Dr Chris Miller, and others presented the following:

- “A severe objective short-sleep insomnia disorder phenotype is associated with reduced brain creatine levels and impaired metabolism: an in vivo magnetic resonance spectroscopy assessment”. Presented at the 30th Anniversary Meeting of the Associated Professional Sleep Societies, Denver, U.S.A. (2016).

Professor Ron Grunstein, Associate Professor Delwyn Bartlett, Dr Angela D'Rozario, Dr Camilla Hoyos, Dr Andrew Vakulin, Dr Keith Wong, and others presented the following:

- Poster: “Sleep spindle density increases with six months of continuous positive airway pressure (CPAP) treatment and correlates with improved neurobehavioural function in obstructive sleep apnea (OSA)”. Sleep DownUnder, Adelaide (2016)
- “Six months of continuous positive airway pressure (CPAP) treatment improves neurobehavioural function and quantitative sleep electroencephalographic (EEG) parameters in obstructive sleep apnea”. Sleep DownUnder, Adelaide, (2016).

Professor Ron Grunstein, Associate Professor Delwyn Bartlett, Dr Angela D'Rozario, Dr Nathaniel Marshall, Ms Anna Mullins, and others presented the following:

- “Sleep spindle characteristics before and after sleep deprivation in obstructive sleep apnea”. Sleep DownUnder, Adelaide (2016).

Professor Ron Grunstein, Associate Professor Delwyn Bartlett, Dr Nathaniel Marshall, Dr Chris Miller, and others

presented the following:

- “Primary care management of insomnia in Australia: The BEACH study (2000-15)”. Sleep DownUnder, Adelaide (2016).

Professor Ron Grunstein, Professor Danny Eckert, and others presented the following:

- “Awake upper airway collapsibility is related to airway collapsibility during sleep (Pcrit) in obstructive sleep apnoea”. Sleep DownUnder, Adelaide (2016).

Professor Ron Grunstein, Professor Danny Eckert, Associate Professor Brendon Yee, Dr David Wang, Dr Keith Wong, and others presented the following:

- “The pharmacogenomics of morphine effect on obstructive sleep apnea: A randomised double-blind placebo-controlled crossover trial”. Sleep DownUnder, Adelaide (2016).

Professor Ron Grunstein, Professor Danny Eckert, Dr Angela D’Rozario, Mr Garry Cho, and others presented the following:

- “Effects of one month of nightly zopiclone on obstructive sleep apnoea severity and measures of alertness: A randomised controlled trial”. Sleep DownUnder, Adelaide (2016).

Professor Ron Grunstein, Professor Simon Lewis, Dr Angela D’Rozario, Dr Shantel Duffy, and others presented the following:

- Poster: “Slow spindles during afternoon napping are important for memory consolidation in patients with mild cognitive impairment”. 1st International Conference on Sleep Spindling, Budapest, Hungary (2016).

Professor Ron Grunstein, Professor Simon Lewis, Dr Maria Comas Soberats, and others presented the following:

- Poster: “Time for translational molecular chronobiology in Parkinson’s disease”. Sleep DownUnder, Adelaide (2016).

Professor Ron Grunstein, Associate Professor Bandana Saini, Dr Angela D’Rozario, Dr Andrew Vakulin, Dr Keith Wong, and others presented the following:

- “Sleep spindle activity significantly correlates with implicit memory consolidation in obstructive sleep apnoea (OSA)”. Sleep DownUnder, Adelaide (2016).

Professor Ron Grunstein, Associate Professor Brendon Yee, Dr Elizabeth Cayanan, Dr Camilla Hoyos, Dr Nathaniel Marshall, Dr Craig Phillips, Dr Yasmina Serinel, Dr Keith Wong, and others presented the following:

- “Effectiveness of Two Maintenance Diets Following

A Very Low Energy Diet To Reduce Cardio-metabolic Risk In Obese Sleep Apnea Patients: A Randomised Controlled Trial”. International Congress on Obesity, Vancouver, Canada, (2016).

Professor Ron Grunstein, Associate Professor Brendon Yee, Dr Elizabeth Cayanan, Dr Julia Chapman, Dr Camilla Hoyos, Dr Nathaniel Marshall, Dr Yasmina Serinel, and Dr Keith Wong presented the following:

- “Diet, exercise and armodafinil for obstructive sleep apnea patients unable to tolerate standard treatments (DEAR). A randomised, parallel group, placebo-controlled trial”. Sleep DownUnder, Adelaide (2016)
- “Diet, exercise and armodafinil for obstructive sleep apnea patients unable to tolerate standard treatments (DEAR): A randomised, parallel group, placebo-controlled trial”. Congress of the European Sleep Research Society, Bologna, Italy (2016).

Professor Ron Grunstein, Associate Professor Brendon Yee, Dr Camilla Hoyos, Dr Craig Phillips, Dr Keith Wong, and others presented the following:

- “The effect of CPAP therapy on levels of Troponin and pro-BNP in patients with obstructive sleep apnoea: A randomised controlled trial”. Sleep DownUnder, Adelaide (2016).

Professor Ron Grunstein, Dr Angela D’Rozario, Dr Keith Wong, Dr Andrew Vakulin, and others presented the following:

- Poster: “The utility of clinical variables for identifying OSA patients vulnerable to working memory impairment during extended wakefulness”. Sleep DownUnder, Adelaide (2016).

Professor Ron Grunstein, Dr Camilla Hoyos, Dr Craig Phillips, and others presented the following:

- “The Effect of Shift Work On Postprandial Metabolism And Food Desirability: Study Protocol”. International Congress on Obesity, Vancouver, Canada, (2016).

Associate Professor Delwyn Bartlett presented the following:

- “Individual and group treatment of insomnia at the Woolcock Institute, Sydney”. Sleep DownUnder, Adelaide (2016)
- “Education and prevention: sleep education for new parents”. Sleep DownUnder, Adelaide (2016).

Associate Professor Delwyn Bartlett, Dr Angela D’Rozario, Dr Anna Mullins, and others presented the following:

- Poster: “Slow wave activity In obstructive sleep apnoea and depression”. Sleep DownUnder, Adelaide (2016).

Associate Professor Delwyn Bartlett, Dr Liora Kempler, and others presented the following:

- “Brief sleep psychoeducation program improves sleep quality and reduces insomnia symptoms in new mothers”. Sleep DownUnder, Adelaide (2016).

Associate Professor Delwyn Bartlett, Dr Keith Wong, Ms Yael Galgut, and other presented the following:

- “Cognitive behavioural therapy for insomnia administered by practice nurses in rural NSW”. Sleep DownUnder, Adelaide (2016).

Associate Professor Chris Gordon, Dr Nathaniel Marshall, Dr Chris Miller, and others presented the following:

- “Pathophysiology, Performance and Phenotyping: 3 new Ps of objective insomnia measurement.” Sleep DownUnder Annual Scientific Meeting in Auckland, New Zealand (2017).

Associate Professor Chris Gordon, Dr Nathaniel Marshall, Dr Chris Miller, Ms Kirsty Dodds, and others presented to following:

- Poster: “The beat up on heart rate variability in insomnia patients: A critical literature review”. Sleep DownUnder, Adelaide (2016).

Dr Julia Chapman presented the following:

- Poster: “Armodafinil for Obstructive Sleep Apnea (OSA) Patients Unable To Tolerate Standard Treatments (DEAR): A Randomized, Parallel-Group, Factorial Trial”. 31st Annual Meeting of the Associated Professional Sleep Societies, APSS, Boston, Massachusetts, USA, (2017)
- “COMT genotype not predictive of response to armodafinil in OSA. Sub-study from a randomised trial”. Sleep Downunder Conference of the Australasian Sleep Association, Auckland, New Zealand (2017)
- “Lessons to be learned from the spanish sleep network – pragmatism, data sharing and generosidad”. Sleep Downunder Conference of the Australasian Sleep Association, Auckland, New Zealand (2017).

Dr Julia Chapman, Dr Camilla Hoyos presented the following:

- “Sound clinical trials practice part 2: Practical tips”. Sleep DownUnder, Adelaide (2016).

Dr Maria Comas Soberats presented the following:

- “More than ever: Time for Chronobiology: implementing chrono measures at the Woolcock Institute of Medical Research”. Woolcock Institute, Sydney (2017).

Dr Angela D’Rozario presented the following:

- “Neurophysiology (EEG) insights into cognitive deficits in sleep disorders and neurodegenerative disease”. Sleep DownUnder, Adelaide (2016)

- “The Ageing Brain: Sleep Disturbance and Risk of Dementia” Woolcock Institute, Sydney (2017).

Dr Nathaniel Marshall presented the following:

- “Sound clinical trials practice part 1: Overview and key principles”. Sleep DownUnder, Adelaide (2016).

Ms Anna Mullins presented the following:

- Oral presentation: ‘Sleep Spindle Characteristics before and after sleep deprivation in obstructive sleep apnea’. 1st International Conference on Sleep spindling. Budapest, Hungary (2016).

Dr Craig Phillips presented the following:

- “Obesity, sleep disordered breathing and atrial fibrillation - what is the link?” Australasian Sleep Association ASM, Adelaide (2016)
- “Treating OSA to improve AF management – what is the evidence?”. Sleep DownUnder, Adelaide (2016).

Dr David Wang presented the following:

- “Effects of morphine on awake ventilatory control and OSA severity”. Sleep DownUnder, Adelaide (2016),

Dr David Wang was an invited speaker at the following:

- University of Sydney, Precision Sleep Medicine Symposia (2017)
- ASA’s Annual Scientific Meeting in Auckland Symposia (2017)
- World Sleep Society Meeting in Prague Symposia (2017)
- International Sleep Forum, Xi’an, China (2017)
- Heilongjiang University of TCM in Heilongjiang, China (2017).

Dr Keith Wong presented the following:

- “Qualitative study design principles, the pharmacy/sleep research experience”. ASA conference, Auckland, New Zealand (2017).

OTHER HIGHLIGHTS

- Dr Angela D’Rozario was selected as an early career researcher Mentee by the Sleep Research Society (SRS) Trainee Education Advisory Committee to participate in the SRS Sleep Meeting Mentee/Mentor Program with a US-based leading Professor in the sleep research field. Boston USA (2017).

CENTRE FOR LUNG CANCER RESEARCH & LUNG CANCER RESEARCH NETWORK

Group Leader: Professor Paul Young

The revolutionary new Centre for Lung Cancer Research was built at the Woolcock during 2017 with the financial support of NSW Health and the Office of Health and Medical Research. This modern, purpose-built research hub will change the way a deadly cancer is diagnosed, treated and studied both in Australia and globally.

Acting as a hub for researchers working in the area of lung cancer, the facility will provide tissue, cellular material and patient-related information with a dedicated bio-bank and data centre for research project centralisation. A state-of-the-art laboratory will be available to researchers and provide tissue and cell analysis.

LUNG CANCER RESEARCH NETWORK

Data generated from the Centre's research will grow across the Lung Cancer Research Network, allowing researchers to go from "bedside to bench and back again."

With this centralised, coordinated and collaborative approach to specifically target lung cancers, the Centre and its Network will plug the gap in respiratory cancer research. And in doing so, it will save lives and change the treatment landscape for sufferers and their families.

PATIENT STORIES

During the building of the laboratories and the bringing together of the research groups who will make up the Lung Cancer Research Network the Woolcock has made contact with some fantastic, dynamic people who happen to be lung cancer sufferers. These people have given us their time and passion and helped inform plans for the future of research in the Centre. Lillian Leigh is one of those people. Here is her story.

LILLIAN LEIGH

Lillian Leigh gives thanks for every extra day she gets.

The 37-year-old Sydney mother is living with lung cancer. Thanks to drug trials, her tumours have shrunk, her energy has returned and she's been given the chance to see her daughter start kindy.

"Every time I open my eyes in the morning, I'm so grateful," says Lillian, a lawyer turned lung cancer advocate. "I'm so grateful for every breath I take, for every extra day I get with my family, every extra day I get to be a school mum. Every single day counts."

Lillian, a beneficiary of a lung cancer drug trial launched in Melbourne, says the launch of the Woolcock Centre for Lung Cancer Research can't happen soon enough. "Think of breast cancer, prostate cancer, pretty much any other cancer and there's a wealth of medical research underway into every aspect of the disease and how to beat it - but not so for lung cancer," she says. "Lung cancer is the hidden cancer. We don't have powerful lobby groups or celebrities backing our cause. Research funding opportunities are rare and the stigma, that victim-blaming mentality, is sadly alive and well in our community."

Lillian, who is working with the Woolcock to establish the Lung Cancer Research Network, says the Centre gives her hope for future lung cancer patients. "It's very exciting to see so much energy and expertise being poured into an area where it is so desperately needed," she says. "It gives me hope that our voices, the voices of people with lung cancer, will finally be heard and that we can dare to wish for a better outcome than the status quo."

"I want nothing more than to see my daughter start high school. Let's make that dream a reality."



ANN WOOLCOCK LECTURE

The Ann Woolcock Lecture series honours the contribution of Professor Ann Woolcock to the research community. Invited speakers share their ideas with industry, policy makers, doctors, specialists and patients with a view to prompting new collaborations to improving respiratory health. The program also facilitates the visit of eminent respiratory clinicians and scientists to the Woolcock for an exchange of ideas, skills and techniques with our researchers.

In October 2016 the British paediatric allergy researcher Professor Adnan Custovic delivered the lecture on his ground-breaking work that could see youngsters one day diagnosed with distinct types of asthma. Once specialists are able to diagnose sub-types of this common lung condition, work can get underway to personalise treatment for each patient, ensuring sufferers get the most effective therapy for their specific wheeze. Professor Custovic is the Clinical



Professor Custovic presenting the Ann Woolcock lecture in 2016.

Chair in Paediatric Allergy, Faculty of Medical at Imperial College London.

On International Women's Day in March 2017 world-leading respiratory physician Professor Dirkje Postma delivered the Ann Woolcock Lecture entitled *COPD: a disease with many faces*. Professor Postma is Professor of Pathophysiology at the University of Groningen in the Netherlands.

Like our own Ann Woolcock, Professor Postma enjoys international recognition as a scientist who revolutionised our understanding of respiratory illnesses and how to treat them. Thanks to their work, and the work of a growing number of influential women scientists around the world, we are closer than ever to beating these diseases.



Professor Postma with some of the Woolcock's influential women scientists at the Ann Woolcock Lecture 2017.

EDUCATION

The Woolcock Institute of Medical Research continues to play an important role in providing accredited education to health care providers. In 2016 and 2017 we held a number of symposia attracting almost 600 GPs, both local and international, from a range of health professions.

A number of topics were covered, including:

- Management of Respiratory Disorders for Healthcare Professionals
- Update for General Practitioners in Neurodegenerative disorders, Psychiatry and Psychology
- Update in Primary Care Medicine – Integrated Sleep Health
- Sleep, Mood and Neurodegenerative disorders: Identification and Management in Geriatric Patients
- Chronic nocturnal use of humidified nasal high flow with supplemental oxygen in COPD patients – effects of exacerbations and hospitalisations

- Chronic Refractory Cough
- Treating sleep deprived adolescents
- Nicotine Addiction & Smoking Cessation “Intensive Interventions”
- Accelerated ageing and cellular senescence in COPD



Breathe Easy Symposium at the Woolcock Institute of Medical Research.

OUR CLINICS

In 2016 and 2017 the Woolcock Clinics saw almost 12,000 patients and performed over 5,500 sleep studies, the highest number to date.

More than 50 clinicians now see patients at the Woolcock Clinic. The range of specialists has grown to include:

- Paediatric and adult sleep physicians
- Adolescent and ADHD psychologist providing neurofeedback treatment
- Adult psychology and psychiatry
- Dentists consulting Mandibular Advancement Splint treatment for Obstructive Sleep Apnoea
- Ear, Nose and Throat Surgeons providing nasoendoscopy for adenoids, turbinates, tonsils and upper airway occlusion in general
- Pulmonary function testing, forced oscillation technique, adult and paediatric allergy testing
- Allergy and Immunology Physician
- Sleep, Respiratory and Cardiology consultations
- Traumatic brain injury rehabilitation specialist, Geriatrician and Neurologists

NEW INITIATIVES

Two new clinics and a therapy centre opened in 2017.

The Woolcock Therapy Centre (WTC) was established to meet the growing needs of patients suffering from obstructive sleep apnoea (OSA). An expert team of sleep therapists works in conjunction with our sleep specialists to provide solid support for OSA patients. Together they ensure patients start their CPAP journey with confidence, treatment is effective and they learn to use their CPAP equipment successfully. Aside from CPAP support, the centre offers a wide range of other treatment options for OSA patients, including weight loss services, positional therapy and dental devices.

CHRONIC COUGH CLINIC

Cough lasting more than two months is typically classified as chronic cough. It is a common problem affecting almost 1 in every 10 Australian adults. The importance in identifying the correct diagnoses, which can often be an interplay of multiple causes is critical in the management of chronic cough.

At the Woolcock Cough Clinic, respiratory and sleep physicians, an ear, nose and throat surgeon and a speech therapist work together to review patients with troubling cough. This approach brings together different expertise, to deliver an integrated yet targeted treatment plan specific to patients' needs.

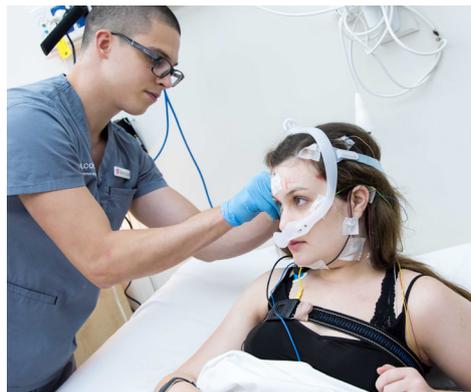
BREATHLESSNESS CLINIC

The Breathlessness Clinic cares for patients who have been breathless for more than four weeks despite treatment by their GP. Patients complete a specially-designed questionnaire and undergo some basic breathing and heart tests prior to seeing the specialist doctors. Patients will then see a heart specialist and a lung specialist at the same time. These specialists work together to devise an investigation and management plan for each patient and also correspond with their GP.

NEW INFRASTRUCTURE AND EQUIPMENT

In 2016 and 2017 we updated and installed four new Compumedics Grael 4K HD polysomnography systems, two paediatric Alice 6 G3 polysomnography systems as well as a Geodesic High Density (HD) encephalography (EEG) system capable of recording 256 channels of simultaneous EEG data.

The HD EEG system is providing us with new insights in the activity of the brain in sleep and is integral to our NeuroSleep Centre for Research Excellence (CRE) activities.



COMMITTEES

BOARD COMMITTEES

Below is a list of the Board committees that operated in 2016 and 2017 and their membership:

FINANCE AND RISK COMMITTEE

Members: Julie Osbourne (C), Oliver Frankel, Carol Armour, Robert Estcourt, Jayne Shaw.

EXECUTIVE MANAGEMENT AND COMMITTEES

Below is a list of the Woolcock committees that operated in 2016 and 2017 and their membership.

WOOLCOCK EXECUTIVE COMMITTEE

Members: Carol Armour (C), Alaina Ammit, Anna Mullins, Brett Toelle, Chris Miller, Christine Cowie, Daniela Traini, Dev Banerjee, Greg King, Joanne Elliot, Julia Chapman, Kanika Jetmalani, Kerstin Baas, Paul Young, Qi Ge.

NEXT GENERATION COMMITTEE

Members: Angela D'Rozario, Biljana Cvetkovski, Brian Oliver, Camilla Hoyos, Qi Ge (C), Christine Cowie, Cindy Thamrin, Chris Miller (C), Elizabeth Cayanan, Kanika Jetmalani (C), Louise Harkness, Maria Comas, Yang Chen, David Chapman, Julia Chapman, Maliheh Ghadiri, Peta Bradbury, Tong Gong, Camilla Hoyos, Christine Cowie, Cindy Thamrin, Joanne Fuller, Michael Guo, Roo Killick, Wing Lee.

RESEARCH COMMITTEE

Members: Greg King (C), Alaina Ammit (C), Carol Armour, Lyn Moir, Joanne Elliot, Frances Russell, Craig Phillips,

Brian Oliver, Daniela Traini, Brett Toelle, Bandana Saini, Hui Xin Ong.

OPERATIONS COMMITTEE

Members: Joanne Elliot (C), Ann Leadbitter, Gunnar Unger, Cansy Ittimani, Lyn Moir, Frances Russell, John Reynolds, Ann-Marie Gregory, Karen Edwards, Miranda Handke.

POSTGRADUATE COMMITTEE

Members: Daniela Traini (C), Julia Chapman, Elyse Guevara-Rattray, Rachel Tan, Pamela Srour, Michele Pozzoli, Alicia Mitchell, Nathan, Katrina Tonga, Larissa Gomez, Mojtaba Moosavi, Anna Mullins, Tom Bradbury, Carla Haroutonian.

CLINIC COMMITTEE

Members: Dev Banerjee (C), Delwyn Bartlett, Carla Evans, Chris Blackwell, Daniel Judge, Darren O'Brien, Liz Cayanan, Michelle Donegan, Pearl Chung, Roo Killick, Yasmina Serinel, Andrew Treptow, Roy Sweeney, Frances Clements, Kirsty Dodds, Laura Minutillo, Yuxin Kwan, Ron Grunstein, Simon Lewis.

PROFILE COMMITTEE

Members: Paul Young (C), Kerstin Baas, Maly Andersson, Joanne Elliot.

IT COMMITTEE

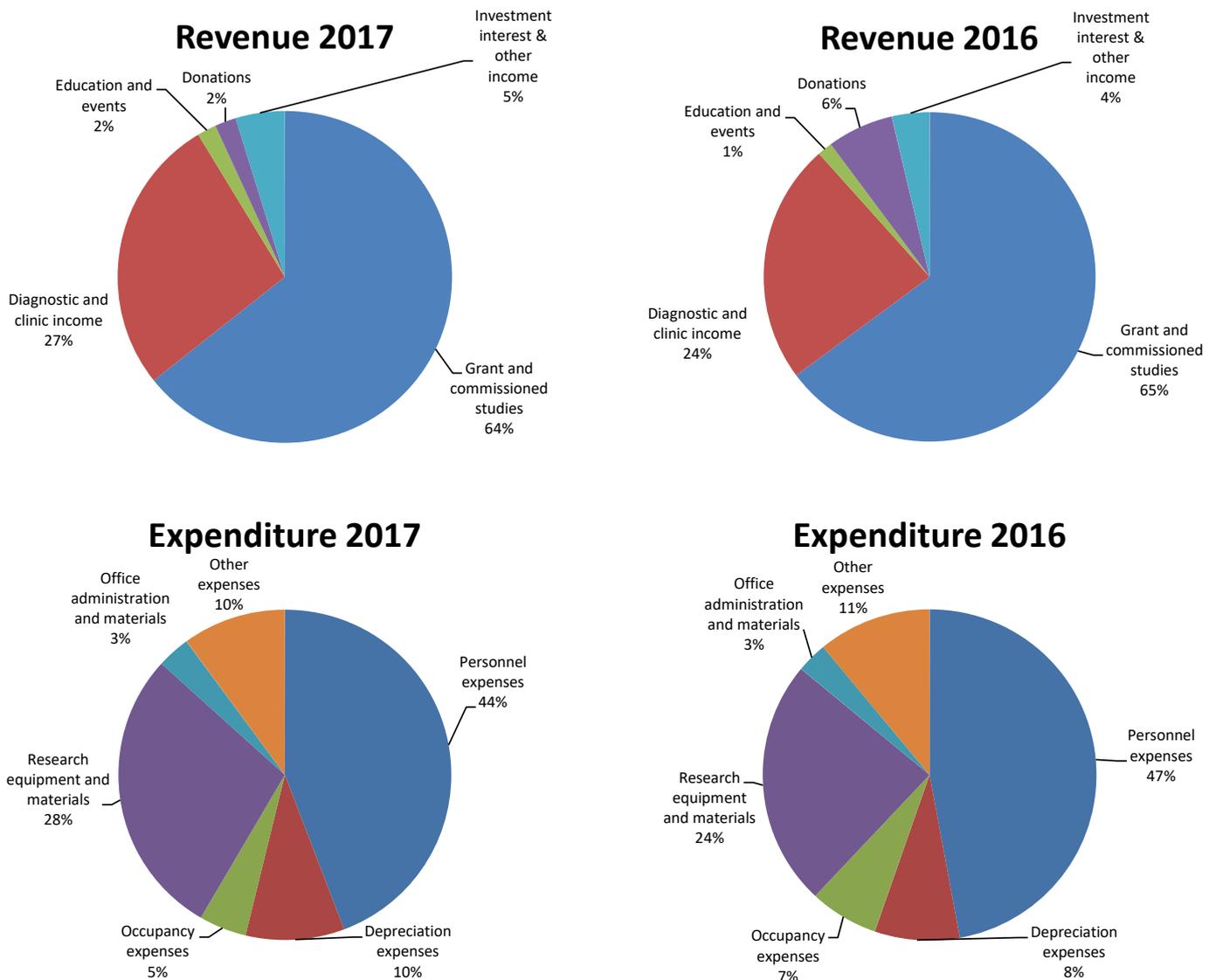
Members: Brett Toelle (C), John Reynolds, Dia Xenaki, Maly Andersson, Gunnar Unger, Anna Mullins, Ben Zhang, Joanne Elliot, Maliheh Ghadiri.

FINANCIAL PERFORMANCE

In 2016 and 2017 the Woolcock has continued to focus on responsible financial management through increased transparency of costs and responsibilities. This has enabled us to make considered administrative decisions based on reliable financial data and to improve governance and support. We have also maintained an austere budget with an ongoing focus on doing more with less.

The Woolcock has expanded its research capacity in the last 12 months. This expansion has been possible due to the acquisition of 2 large grants. The first of \$3M from NSW Health has enabled the creation of the Centre for Lung Cancer Research in a new facility at the Woolcock which will provide facilities to allow us to investigate the causes and potential cures for lung cancer. The second of \$1.4M from philanthropic donors for emphysema research has significantly expanded capacity and will accelerate research outcomes in this area.

Our financial results in 2016 and 2017 demonstrate the difficulty of using standard accounting methods to describe the vagaries of research funding. In 2017 our result was a deficit \$485,402 (compared to a surplus of \$627,425 in 2016). In accordance with the Australian accounting standards, the reported 2016 surplus of \$627,425 accounts for the receipt of grant income received in 2016. The associated project expense for that grant income was expensed in the 2017 financial year which contributed significantly to the deficit.



STATEMENT OF INCOME

	\$	\$
REVENUE	2017	2016
Revenue	14,997,635	14,957,781
Total revenue	14,997,635	14,957,781
EXPENSES	2017	2016
Personnel expenses	(6,846,537)	(6,747,398)
Depreciation expenses	(1,482,514)	(1,181,720)
Occupancy expenses	(714,976)	(952,680)
Research equipment and materials	(4,382,635)	(3,448,817)
Office administration and materials	(499,835)	(424,594)
Other expenses	(1,556,540)	(1,575,147)
Total Expenditure	(15,483,037)	(14,330,356)
Surplus/(deficit) from operating activities	(485,402)	627,425

BALANCE SHEET

	\$	\$
ASSETS	2017	2016
Cash and cash equivalents	11,530,409	11,258,777
Trade and other receivables	1,112,310	1,496,340
Inventories	14,701	
Other financial assets	1,451,662	1,448,545
Other assets	135,092	152,283
Total current assets	14,244,174	14,355,945
Property, plant and equipment	2,761,298	3,180,915
Total non current assets	2,761,298	3,180,915
Total assets	17,005,472	17,536,860
LIABILITIES	2017	2016
Trade and other payables	802,284	554,730
Provisions	413,319	369,773
Other liabilities	7,859,146	8,202,983
Total current liabilities	9,074,749	9,127,486
Provisions	217,747	210,996
Total non current liabilities	217,747	210,996
Total liabilities	9,292,496	9,338,482
Net assets	7,712,976	8,198,378
EQUITY	2017	2016
Accumulated funds	7,712,976	8,198,378
Total current liabilities	7,712,976	8,198,378

BOARD OF DIRECTORS



MR ROBERT ESTCOURT (CHAIRMAN OF THE BOARD)

Appointed 14 September 2005

MA Fin. (Exeter), BA Ec. (Hons) (University of Cape Town). Director Brookvine Pty Limited (2004), Director e-Clipse Online (2010 -), Director Innova Asset Management (2014 -), Investment Consultant to The Royal Australian & New Zealand College of Ophthalmologists (RANZCO) Board (2013 -), Independent Investment Committee Member Charter Hall Opportunity Funds (2005-2014), Chairman Austock Asset Management (2007-2009), Director & Chief Executive Officer, Retail Cube Limited, 2004-2006, Principal, Estcourt Associates, 2003, Director of AMP Portfolio Businesses, 2002-2003, Director and Head of Cobalt RunOff Services Ltd, 2000 - 2002, AMP Group GIO Task Force, 1999-2000, Director, AMP Asset Management, 1992-1999, Head of AMP Investments, New Zealand, 1990-1992, Head of Investment Strategy, Equity Research, AMP Investments, 1986-1990, Assistant General Manager, Investment Division, UAL Merchant Bank, 1974-1986.



PROFESSOR CAROL ARMOUR (EXECUTIVE DIRECTOR)

Appointed 10 April 2012

Appointed Executive Director 1 July 2012

PhD, FPS. Professor Armour has worked in the area of asthma research at a basic scientific and clinical level. Her investigations span the breadth of asthma research from the cellular mechanisms to the translation of new ways to treat asthma within the health system. She is on the Australian Respiratory Council, The National Asthma Council and has chaired the National Asthma Monitoring, Advisory Committee, worked on the National Therapeutic Guidelines and the Australian Medicines Handbook. From 2003-2006 she was a member of the NHMRC Research Committee and was the Chair of the Training Awards Committee. She was Pro Vice Chancellor, Research, at the University of Sydney, from 2006-2009. In 2005 she was made a Fellow of the Pharmaceutical Society for her services to the profession, and she was awarded the Australasian Pharmaceutical Science Association (APSA) medal for research in 2007. She is currently an Associate Dean in the Sydney Medical School and a Professor of Pharmacology in the Sydney Medical School.



PROFESSOR BRUCE ROBINSON

Appointed 30 May 2006

MD, MSc, FRACP. Fellow in Medicine, Harvard Medical School (1986–1988), Instructor in Medicine, Harvard Medical School (1988–1989), Head, Molecular Genetics Unit, Kolling Institute of Medical Research (1989 –), Professor of Medicine (Endocrinology), University of Sydney (1992), Head, Department of Medicine, University of Sydney, Northern Clinical School (1996–2001), Chairman, Department of Medicine, University of Sydney (1998–1999), Head, Division of Medicine, Royal North Shore Hospital (1998–2006), Chairman, Hoc Mai, Australia Vietnam Medical Foundation, University of Sydney (2001 –), Associate Dean (International) Sydney Medical School, University of Sydney (2003–2005), Dean, Sydney Medical School, University of Sydney (2006-2016). Currently Professor Robinson is Chair of the NHMRC Scientific Council, Chair of the MBS Taskforce and Co-Head, Cancer Genetics, Kolling Institute of Medical Research.



MS JULIE OSBORNE

Appointed 30 May 2012

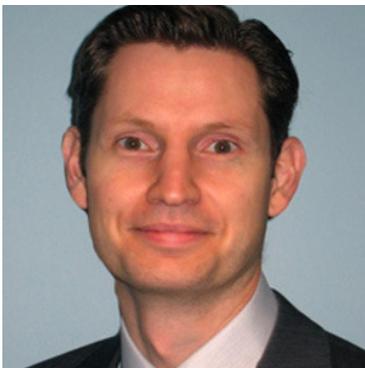
BEC, LL.M (Syd), GAICD. KPMG - Executive Director, National Business Development, Financial Services (2015 -); Non-exec director Assetinsure Holdings Pty Limited and Assetinsure Pty Limited (2014 -); Starlight Children's Foundation - NSW Advisory Board member (2011-2015); Westpac Banking Corporation - Executive Director and Head of Structured Finance, Treasury (2003–2010), Director and Head of Structured Finance (1999–2003), Director Corporate and Structured Finance (1997–1999); Associate Director Corporate and Structured Finance (1995–1997); Commonwealth Bank of Australia Senior Manager Asset and Structured Finance (1995); KPMG Consultant and Senior Manager Taxation (1987-1995).



PROFESSOR MACDONALD CHRISTIE

Appointed 1 March 2013

BSc (Hons), PhD. Professor Christie completed a PhD at The University of Sydney in 1983. He was an Australian Postdoctoral Fellow in 1985 (NHMRC), a Fogarty International Fellow at Massachusetts Institute of Technology from 1985-1987 and then Senior Research Associate at the Vollum Institute in Oregon, USA from 1987-1990. Appointed as a tenured academic in the Department of Pharmacology, The University of Sydney in June 1990, where he was Head of Department from 1998-2000, full professor (personal chair) from 1999 and Medical Foundation Senior Principal Research Fellow from 1998-2002. NHMRC Senior Principal Research Fellow since 2003. Served as Director of Basic Research at the Pain Management Research Institute (2003-2008) and Brain & Mind Research Institute (2009-2011) University of Sydney. Appointed as Professor of Pharmacology in June 2011. Associate Dean Research, Sydney Medical School (2013 -).



DR SIMON BLACKBURN

Appointed 20 September 2013

BS, Hons (Sydney), BE, Hons and University Medal (Sydney), PhD (Cambridge). Director, The Hunger Project Australia (2014 -), Senior Partner, McKinsey & Company, Sydney (2012 -), Partner, McKinsey & Company, Sydney (2008-2012), Partner, McKinsey & Company, Boston (2004-2008), Consultant, McKinsey & Company, Boston (1997-2004), Director, Parents as Teachers, USA (2007-2013), Director Massachusetts STEM collaborative, USA (2004-2007), Research Engineer, Telstra (1992-1993).



PROFESSOR MATTHEW PETERS

Appointed 8 October 2015

MD FRACP. Professor Matthew Peters is a Respiratory Physician and Head of Respiratory Medicine at Concord Hospital. He holds academic appointments at Macquarie University and The University of Sydney. He has long had an interest in preventative health and was Chair of Action on Smoking and Health (ASH) for many years. He is a past President of the Thoracic Society of Australia and New Zealand. He has research interests in respiratory physiology including aspects of physiology in breath hold divers and the pulmonary and cardiac responses to hypoxia.



MR IAN WHITE (COMPANY SECRETARY)

Appointed 1 May 2012

B.Bus, FCPA, ACIS. Ian has over 30 years' experience within the financial services industry. Ian spent twenty four years with AMP where his career spanned many administrative and financial roles, both domestic and international. Since leaving AMP, Ian has contracted to many organisations, large and small, providing finance, governance, risk and compliance support across the banking, insurance, financial planning and funds management industries. Prior to engaging with the Woolcock, Ian worked in risk assessment at the Commonwealth Bank.



PROFESSOR ARTHUR CONIGRAVE

Appointed 30 March 2016

Professor Conigrave was appointed Acting Dean of Sydney Medical School in 2016 and Dean in January 2017. Prior to these appointments, Professor Conigrave held a number of leadership roles including Head of the School of Molecular Bioscience from 2007-10 and since 2011, Deputy Dean and Associate Dean (Finance and Administration) in Sydney Medical School. Professor Conigrave is an endocrinologist specialising in the clinical management of patients with metabolic bone disease (including osteoporosis and disorders of calcium metabolism), and an internationally recognised researcher in molecular endocrinology.



MS JAYNE SHAW

Appointed 12 October 2016

Jayne Shaw trained as a Registered Nurse in the UK, on arrival in Australia she became a Director of Nursing and Chief Executive Officer of two private hospitals. Following this she established an Australian and International consulting business which was sold to Healthsouth, a large US Healthcare company. After this she became the Co-founder of Vision Group an ophthalmic doctor equity consolidation model which was successfully listed on the ASX. Jayne joined a number of private healthcare boards involved with specialist consolidation including cardiology, orthopaedics, and women's health she continued to work with Private Equity firms on local and International Healthcare transactions. Jayne was the co-owner of Sydney Breast Clinic a comprehensive diagnostic one stop shop for breast cancer. Current Board positions are BCAL diagnostic's Chair, Critical Group, Heatley's Industrial Supplies, The Hareda Foundation, and Opus Medical Pty Ltd.



MS CARMEL TEBBUTT

Appointed 22 February 2017

CEO of the NSW Mental Health Co ordinating Council (2016 -), Director, Media Super Limited (2015 -), Director, Lysicrates Foundation (2015 -), Director, NSW Kids In Need (2016 -), Member for Marrickville (2005-2015), Member of the NSW Legislative Council (1998-2005), Shadow Minister for Education and Training (2011-2013), NSW Deputy Premier, (2009-2011), Minister for Health, (2009-2011), Minister for the Environment, Minister for Commerce (2008-2009), Minister for Education and Training, (2005-2007), Minister for Community Services (2002-2005), Minister for Juvenile Justice (1999-2003).



MS FIONA CAMPBELL

Appointed 22 February 2017

Fiona Campbell was admitted to practice law as a solicitor in the Supreme Court of New South Wales in 1993. She is currently a solicitor in private practice at Vizzone Ruggero Twigg Lawyers (1997 -) specialising in plaintiff medical negligence and other personal injury litigation. Fiona has a particular interest in psychiatric injury and forensic mental health. She has conducted many cases for plaintiffs in numerous areas of medical specialties including orthopaedic surgery, obstetrics, maternal-foetal medicine, neurosurgery, infectious diseases, ophthalmic surgery and oncology. Prior to her employment with VRT Lawyers Fiona commenced her legal career at Blake Dawson Waldron (now Ashurst) where she joined the insurance (Medical Defence) practice group acting for a large medical indemnity insurer, United Medical Defence. Fiona gained wide ranging experience and medical knowledge acting for doctors in civil litigation as well as disciplinary and Health Care Complaints Commission proceedings.

OUR PUBLICATIONS

2016

Adams, R. J., S. L. Appleton, **A. Vakulin**, C. Lang, S. A. Martin, A. W. Taylor, R. D. McEvoy, N. A. Antic, P. G. Catcheside and G. A. Wittert (2016). Association of daytime sleepiness with obstructive sleep apnoea and comorbidities varies by sleepiness definition in a population cohort of men. *Respirology* 21(7): 1314-1321.

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Bajorek, B., **K. S. Lemay**, P. Magin, C. Roberts, I. Krass and **C. L. Armour** (2016). Implementation and evaluation of a pharmacist-led hypertension management service in primary care: outcomes and methodological challenges. *Pharmacy Practice (Granada)* 14(2): 723.

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Bartlett, D. and M. L. Jackson (2016). The bidirectional nature of sleep problems and psychopathology. *Medicine Today* 17(3): 23-28.

Basheti, I. A., S. A. Hamadi and **H. K. Reddel** (2016). Inter-professional education unveiling significant association between asthma knowledge and inhaler technique. *Pharmacy Practice (Granada)* 14(1):713.

Basheti, I. A., N. M. Obeidat, W. G. Ammari and **H. K. Reddel** (2016). Associations between inhaler technique and asthma control among

asthma patients using pressurised MDIs and DPIs. *International Journal of Tuberculosis and Lung Disease* 20(5): 689-695.

Beasley, R., I. Pavord, A. Papi, **H. K. Reddel**, T. Harrison, **G. B. Marks**, R. J. Hancox and M. Weatherall (2016). Description of a randomised controlled trial of inhaled corticosteroid/fast-onset LABA reliever therapy in mild asthma. *European Respiratory Journal* 47(3): 981-984.

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Bousquet, J., P. W. Hellings, I. Agache, A. Bedbrook, C. Bachert, ... **S. Bosnic-Anticevich**, ...M. Zidarn (2016). ARIA 2016: Care pathways implementing emerging technologies for predictive medicine in rhinitis and asthma across the life cycle. *Clinical and Translational Allergy* 6: 47.

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Bowatte, G., C. J. Lodge, A. J. Lowe, B. Erbas, ... **G. B. Marks**, J., ... S. C. Dharmage (2016). Do Variants in GSTs Modify the Association between Traffic Air Pollution and Asthma in Adolescence? *International Journal of Molecular Sciences* 17(4): 485.

Braido, F., H. Chrystyn, I. Baiardini, **S. Bosnic-Anticevich**, T. van der Molen, R. J. Dandurand, A. Chisholm, V. Carter and D. Price (2016). Trying, But Failing - The Role of Inhaler Technique and Mode of Delivery in Respiratory Medication Adherence. *Journal of Allergy and Clinical Immunology* 4(5): 823-832.

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- Chapman, J. L., A. Vakulin, J. Hedner, B. J. Yee and N. S. Marshall** (2016). Modafinil/armodafinil in obstructive sleep apnoea: a systematic review and meta-analysis. *European Respiratory Journal* 47(5): 1420-1428.
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- Dennis, S., **H. K. Reddel**, S. Middleton, I. Hasan, O. Hermiz, R. Phillips, A. J. Crockett, S. Vagholar, **G. B. Marks** and N. Zwar (2016). Barriers and outcomes of an evidence-based approach to diagnosis and management of chronic obstructive pulmonary disease (COPD) in Australia: a qualitative study. *Family Practice* 34(4):485-490.
- Dobler, C. C.** (2016). Screening strategies for active tuberculosis: focus on cost-effectiveness. *ClinicoEconomics and Outcomes Research* 8: 335-347.
- Dobler, C. C., A. Martin and G. B. Marks** (2016). Benefit of treatment of latent tuberculosis infection in individual patients. *European Respiratory Journal* 47(5): 1594-1595.
- Dodds, K. L., C. B. Miller, S. D. Kyle, N. S. Marshall and C. J. Gordon** (2016). Heart rate variability in insomnia patients: A critical review of the literature. *Sleep Medicine Reviews* 33:88-100.
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