



Asbestos Diseases
Research Institute

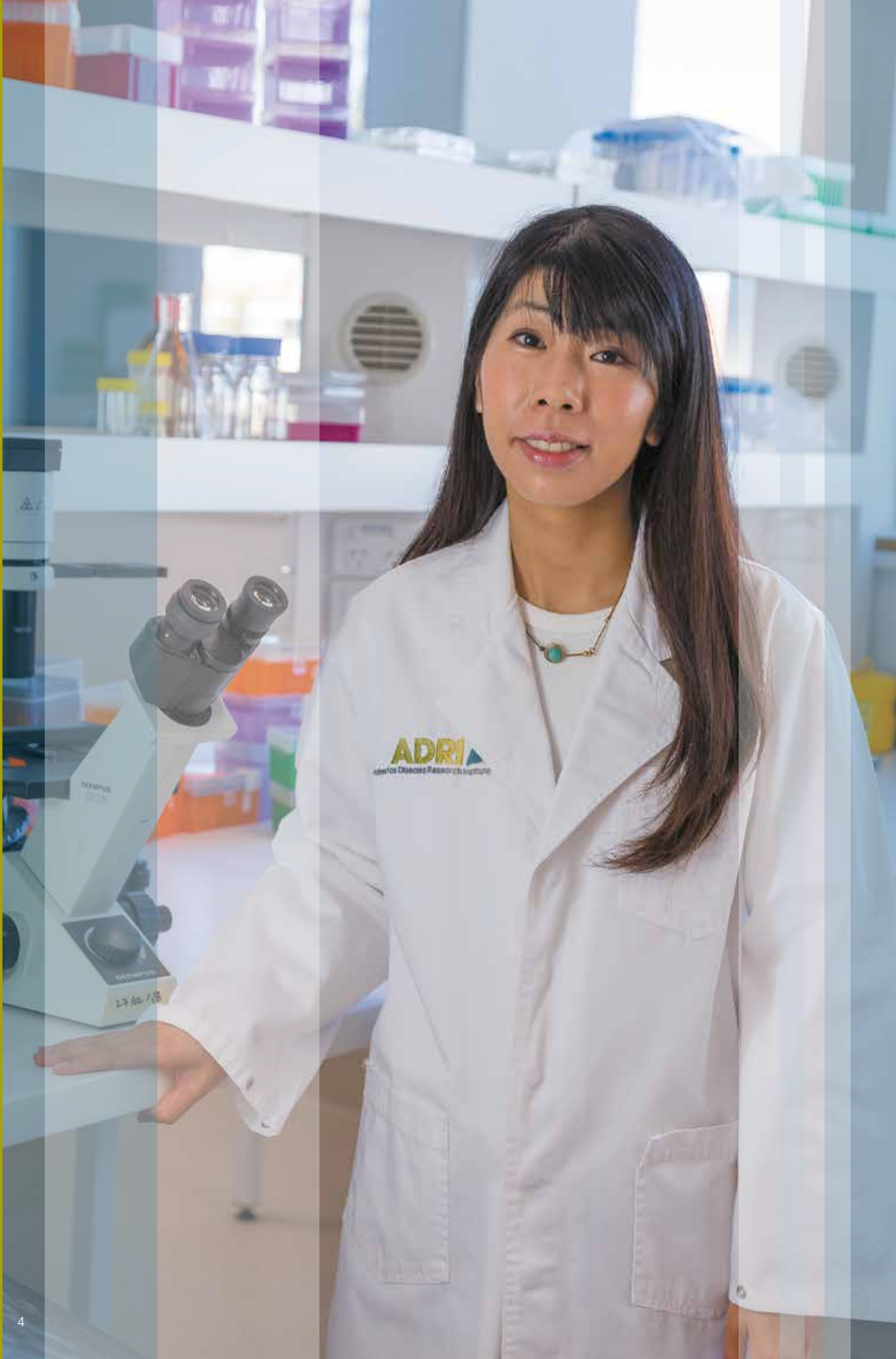
Annual Report

2020



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Who We Are, What We Do, Our Mission

The Asbestos Diseases Research Institute (ADRI) continues to conduct biomedical (preclinical), clinical and public health research into asbestos-related diseases with findings enabling improved methods of prevention, diagnostic, therapeutic procedures, and treatments.

The ADRI was established in 2006 by the Asbestos Diseases Research Foundation (ADRF), a charitable, not-for-profit organisation, dedicated to assist and support the research efforts of ADRI, the world's first stand-alone research facility for asbestos-related diseases.

Opened in 2009 in the Bernie Banton Centre on the Concord Hospital Campus and named in memory of Bernie Banton AM who campaigned vigorously for victims of asbestos-related diseases. ADRI's small but dedicated research team of 15 have built a formidable record for developing a diagnostic framework for early detection, improved understanding of mesothelioma, ground-breaking treatments to prolong life, and, invested in prevention to alert the community to the risks of exposure to asbestos.

The ADRI's mission is to improve the diagnosis and treatment of asbestos-related diseases and at the same time to contribute to more effective measures to prevent exposure to asbestos.

ADRI has a global impact across four focal areas of research: biomedicine (laboratory/preclinical research); clinical sciences; and public health (prevention), pursuing the full spectrum of asbestos-related disease research by improving methods of prevention, diagnostic, therapeutic procedures, and patient support by addressing the unmet needs of people living with an asbestos-related disease diagnosis.

Our goal is to make asbestos-related diseases history.

ADRI'S research is funded through a combination of peer-reviewed government grants and generous philanthropic support and investment from the community.

ADRI is a member of



Patrons

Her Excellency the Honourable Margaret Beazley AC QC, Governor of New South Wales and Mr Dennis Wilson, patrons of the ADRI.



Her Excellency, Margaret Beazley AO QC, Governor of New South Wales, and Mr Dennis Wilson have granted ADRI joint Vice Regal Patronage following their visit to the Institute in November 2019. Her Excellency and Mr Wilson received an update on ADRI's current research, mesothelioma support and international work on the prevention of disease in neighbouring countries. Their support and encouragement was very much appreciated, and we are looking forward to engaging with Her Excellency and Mr Wilson over the coming years.



Key Mesothelioma and Silicosis Statistics

As we have seen through the COVID-19 pandemic, public health statistics help the local and global communities understand and respond to existing and emerging public health issues.

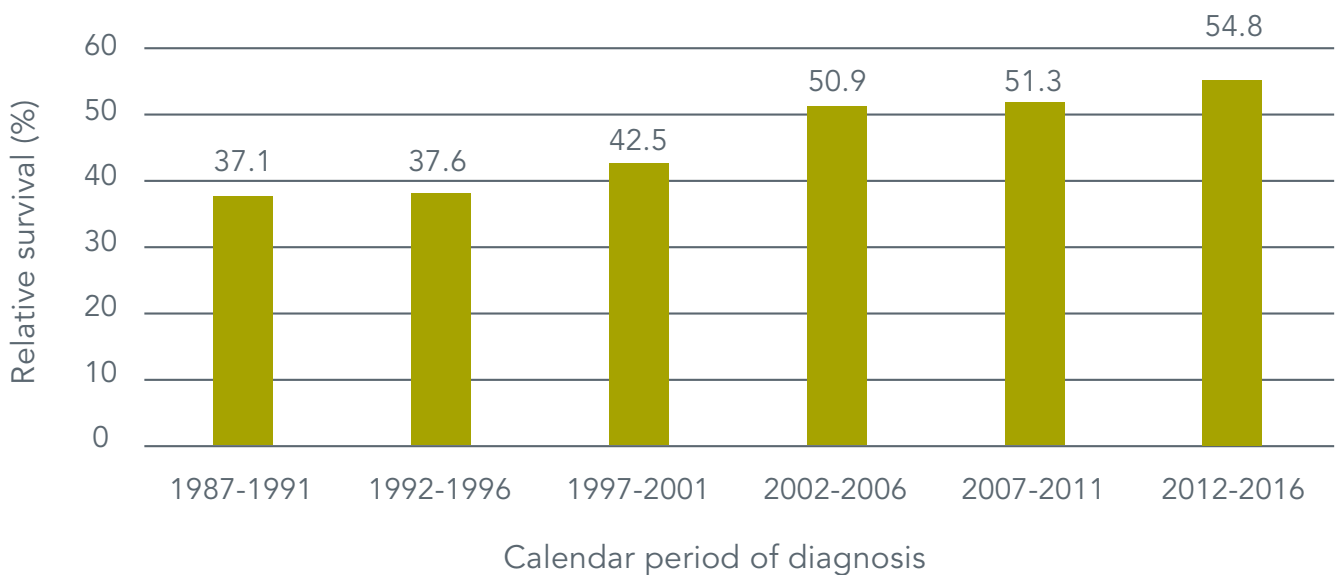
Australia’s historic consumption of asbestos means that we must continue to keep track of how many people continue to be diagnosed and have survived with asbestos-related disease and other occupational dust-related diseases such as silicosis.

Mesothelioma in Australia today

In their most recent Australian Mesothelioma Registry (AMR) report¹, the Australian Institute of Health and Welfare report that:

- 659 cases of mesothelioma diagnosed in 2019 had been reported to the AMR as at 1 April 2020 – the median age at diagnosis was 75.
- Between 1987–1991 and 2012–2016, the age-adjusted 1-year relative survival of people with mesothelioma has increased by about 18%.

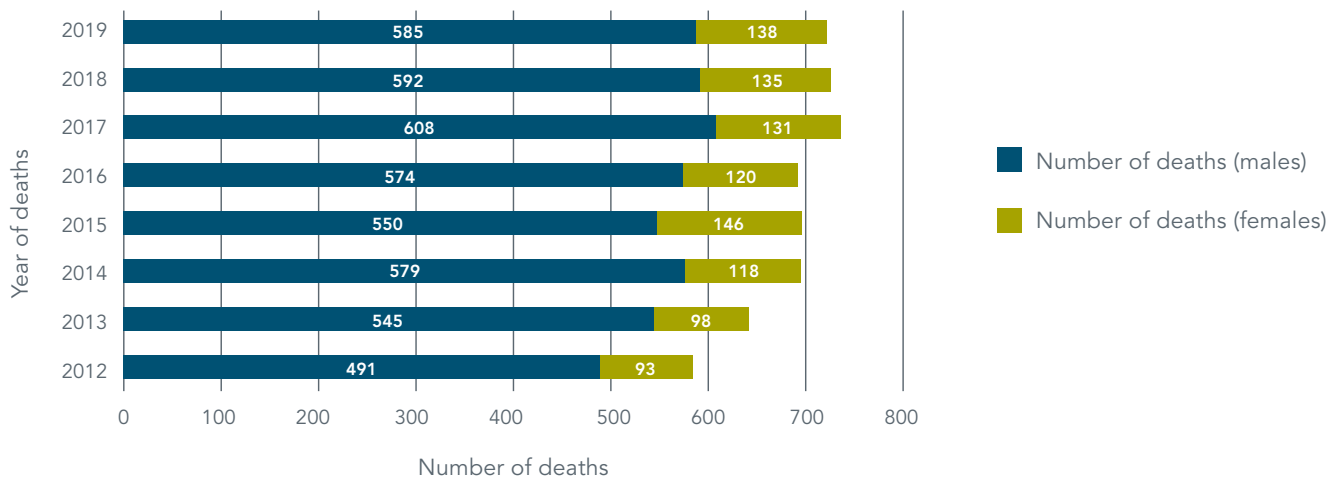
Figure 1. Relative survival of people one year after a malignant mesothelioma diagnosis by calendar period of diagnosis.



¹ Australian Institute of Health and Welfare 2020. Mesothelioma in Australia 2019. Cat. no. CAN 134. Canberra: AIHW

- In 2019, 724 deaths of people with mesothelioma (from any cause of death including mesothelioma) were recorded on the AMR – a mortality rate of 2.9 deaths per 100,000 population (Figure 2).

Figure 2. Number of mesothelioma deaths 2012-2019 by gender



Asbestos exposure in Australia

The AMR also collects and reports data on asbestos exposure. From the most recent data that were available at the time, AMR also reported² that:

More than 9 in 10 of the exposure assessment participants were assessed as having possible or probable exposure to asbestos. On the other hand, most common contexts in which non-occupational asbestos exposure was assessed as possible or probable were among those who reported ever having:

- undertaken major home renovations that involved asbestos products (including paid work) (43% assessed as possible exposure, 7.9% assessed as probable exposure)
- lived in a house undergoing renovations (39% assessed as possible exposure)
- serviced car brakes/clutch (excluding paid work) (30% assessed as probable exposure)
- lived in the same home as someone with a job where they were exposed to asbestos and who came home dusty (14% assessed as possible exposure, 6.2% assessed as probable exposure)
- lived in a house made of fibro that was built between 1947 and 1987 (10% assessed as probable exposure).

Data on the global burden of occupational dust-related disease

Tracking patterns in mesothelioma remains a key measure for understanding the public health impact of Australia's historic asbestos consumption.

However, surveillance of other occupational dust-related diseases such as silicosis is also important. Using the same surveillance methods across countries and regions helps researchers and the wider community understand the scale of these public health problems.

High-quality data on occupational exposure to both asbestos and silica has recently been reported by the Global Burden of Disease (GBD) study³.

One way in which the GBD report these data is through a metric called the disability-adjusted life year (DALY). A DALY can be thought of as a measure of the overall disease burden, expressed as the number of years lost due to ill-health, disability, or early death.

² Australian Institute of Health and Welfare 2020. Mesothelioma in Australia 2019. Cat. no. CAN 134. Canberra: AIHW

³ GBD 2019 Risk Factors Collaborators (Takahashi K, included). Global burden of 87 risk factors in 204 countries and territories, 1990-2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet*. 2020 Oct 17;396(10258):1223-49. doi: 10.1016/S0140-6736(20)30752-2. PMID: 33069327

ADRF Chair's Report



It is with great pleasure I write my second annual report on the activities of the Asbestos Diseases

Research Foundation (ADRF). In 2020 the corona virus pandemic (COVID-19) has profoundly affected us all. The impact of the pandemic created challenges in many aspects of our working, social and everyday life. Here in Australia, we have been relatively fortunate, however for vulnerable people affected by asbestos-related diseases at risk of severe illness, it has been an extremely anxious time and our work at the Asbestos Diseases Research Institute (ADRI) has never been more important. Mesothelioma patients and their families continued to be supported during 2020, however our traditional face-to-face group meetings were no longer possible, and everyone became au fait with platforms such as Zoom.

Early in the year a COVID safety plan was put in place and staff were rostered to work from home, alternating days to enable lab research projects to continue, consolidating writing and data analysis on days when working from home. Unfortunately, other aspect of the institute's activities were more significantly impacted as surgeries were cancelled or put-on hold, which limited our biobank collection. The Governments stimulus package was very important during this downturn of activity and philanthropic support. Despite the impact of COVID the Institute was successful, acquiring a number of peer reviewed grants, which is totally dependent on ADRI's small team of passionate, and very dedicated staff under the leadership of E/Professor Ken Takahashi. Through E/Professor Takahashi's commitment ADRI has earned worldwide recognition as a designated WHO Collaborating Centre for the Elimination of Asbestos-Related Diseases.



While research funding is critical it does not cover all the costs of the actual research nor the operating costs of the institute. A Strategic Planning workshop was kindly facilitated by PricewaterhouseCoopers (PwC) to identify a two-to-three-year plan to develop and strengthen the ADRF's financial position and to extend the current clinical and translational research program. As part of the plan to improve the financial outlook of the Foundation the Board resolved to appoint a dedicated fundraiser and in October Ms Kim Brislane began as the Director of Philanthropy.

On behalf of the Foundation, I would like to thank all the wonderful donors, past and present, who have so generously supported us, even during these financially difficult times. I would also like to thank our corporate supporters for their continued dedication to people impacted by asbestos-related diseases and without their commitment we could not continue our important research.

Lastly, I sincerely thank the Directors of the ADRF Board who volunteer their expertise and valuable time to the Foundation, their contributions throughout 2020 are very much appreciated. We warmly welcomed Dr Chris Colquhoun, as the iCare nominee, and Professor Stephen Clarke, representing ADFA, to the Foundation and farewellled Dr Andrew Penman and E/Prof Robert Lusby earlier in the year.

Mr Peter Tighe
Chair

ADRI Director's Report



The year 2020 has been upended by COVID and the ADRI was no exception. To briefly mention some of the affected

activities: collection of biospecimens for our biobank slowed down, support of mesothelioma patients had to go online, and plans for international workshops on asbestos-related diseases (ARDs) were paused. This annual report, however, showcases that the ADRI has been resilient in the challenging environment. Our 2020 performance was excellent in acquiring competitive grants by value (A\$988K, second highest year since ADRI's inception) and success rate (58% [7/12], historical high). Conversely, our number of publications, i.e., 15 peer-reviewed articles in 2020, has declined since 2017 although this number is on par with the historical average.

The ADRI continues to be one of the smallest, if not the smallest, iMRI (independent medical research institutes) in Australia: we were supported by 15 staff in 2020 vis-à-vis 16 staff averaged over the ADRI's 11-year history. We are a member of the Australian Association of Medical Research Institutes (AAMRI) in which we belong to the "small iMRI" category. We are also a member of the Australian Charities and Not-for-profits Commission, the ACNC. It is in this light of membership with both the AAMRI and the ACNC, that some KPIs (key performance indicators) can be applied. That is, if you consider them to be necessary. It is important to note that, even within the "small iMRI" category (defined as FTE* <100 by AAMRI), the ADRI (FTE<15) is at the extreme small end of the spectrum. Comparisons with medium (100-300 FTE) or large (>300 FTE) iMRIs are invalid. But neither is the comparison within the "small iMRI" category without problems due to qualitative differences among institutes.

*FTE means full-time equivalent; FTE of 100 is the same as having 100 full-time workers.

The qualitative differences are reflected in the revenue composition reported by institutes. Of the eight other ACNC member institutes of comparable size (of which four are also AAMRI members), six earned more than a third of revenue from "goods/services," one around 90% from "donations and bequests" and one around 80% from "other income." In contrast, the ADRI earned 36% of its revenue from "donation and bequests," 29% from "government including grants," 26% from "others" and 9% from "other income, and 0% from "goods/services" or "investment."

What this means is that, even within the group of outwardly comparable institutes, only the ADRI depends on a balanced revenue portfolio that encompasses "donations and bequests" and "government including grants." The ADRI thus occupies a unique position that is comparable to none. Needless to say, the institute objective to research ARDs, is one-of-a-kind. Standing on its own right, therefore, a sensible method to assess ADRI performance is firstly to judge against the goal and "objects" stated in our Constitution and secondly to observe time-trends. Otherwise, we become vulnerable to judgement premised on subjective standards and meaningless comparisons.

I am pleased to report other major achievements of the ADRI for 2020 and their implications:

- Employment of the Director of Fundraising
 - Optimization of revenue portfolio and expansion of donors and stakeholders
- Strengthening of collaboration
 - Joint grant applications, research projects, and personnel exchange with the National Centre for Asbestos Related Diseases (NCARD) in WA and respiratory physicians
 - Support by and collaboration with External Advisors (5 clinical, 1 public health, 1 industrial hygiene)
- On track to accreditation by NATA (National Association of Testing Authorities)
 - Creation of new revenue stream and diversification of income
 - Quality assurance of laboratory, equipment, and procedures
 - Advantage in grant applications
- On track to designation as the world's first and only WHO Collaborating Centre for ARD Elimination
 - International recognition and accolade
 - Advantage in appealing to stakeholders and potential donors.

The post-COVID world is now within our reach, and it is insufficient for the ADRI to be just "resilient." For sure we need to improve and reform, but we need not overthrow the existing order. So, let us open our mind to the positive directions that have been set and work hard on them. And let us not be single-minded so we can embark on new directions, too.

Next year will be my last year as Director of ADRI and I am determined to continue my best efforts.



E/Professor Ken Takahashi, MD, PhD, MPH
Director

ADRF Board



Mr Peter Tighe Independent Chair Invited by the Board

Appointed: 25 February 2019

Peter Tighe was the CEO of the Asbestos Safety and Eradication Agency (ASEA), appointed by the Minister of Employment as Statutory Officer for a period of five years until August 2018. ASEA was established to implement the first National Strategic Plan for the management and eradication of asbestos and asbestos containing material. Peter was National Secretary of the Communications Electrical and Plumbing Union (CEPU) and Divisional Secretary of the Electrical Trades Union (ETU). Peter was an Executive member of the Australian Council of Trade Unions (ACTU) and a ministerial appointee to Safe Work Australia. He has also served on a variety of vocational boards including the Central Trades Committee of Training Recognition Australia and was a committee member of the Ministerial Council for Tertiary Education and Employment Apprentices Action Group. He was also a member of the Climate Change and Energy Efficiency's NGO Climate change roundtable. Peter was the Chair of the National Electrical and Electronic Industry Training Council and E-Profiling Pty Ltd; Chair and Deputy Chair of Connect Superannuation (now merged with C+Bus); and Trustee and Director on the Board of the Investment Committee of CBUS Superannuation. He is currently Deputy Chair of EE-Oz Energy Skills Australia and a member of the Board of Exemplar Systems Pty Ltd and Exemplar Learning Pty Ltd.

Dr Chris Colquhoun Nominated by Dust Diseases Authority

Appointed: 15 June 2020

Dr Chris Colquhoun is an Occupational and Environmental physician and is the Chief Medical Officer of icare (Insurance and Care NSW). He has experience in clinical and corporate settings with proven skills across areas including clinical governance, health surveillance, hazardous substance and dust diseases health monitoring, fitness for work assessments, workplace injury prevention and management, healthcare management and leadership, strategic planning, and clinical research. Dr Colquhoun was the Regional Medical Director (NSW/ACT/VIC) for Sonic HealthPlus, Australia's leading provider of occupational health care and general medical services, from 2014–2016. He also worked for Medibank Health Solutions, the health management and telehealth services arm of the private health insurer Medibank Private from 2008–2014, becoming the Lead Medical Officer of the Commonwealth (2012–2014). He served as Senior Medical Officer of the Commonwealth, Immigration Services, Health Services Australia, from 2005–2007 and had a previous appointment as Intensive Care/Critical Care Registrar with the South Eastern Sydney Area Health Services from 2002–2004.

Dr Teresa Anderson AM Nominated by the Sydney Local Health District

Appointed: 21 May 2018

Dr Teresa Anderson is the Chief Executive of Sydney Local Health District, one of the leading public health services in Australia. She has more than 35 years of experience as a clinician and health service executive. She has a well-established reputation for implementing strategies to foster innovation and best practice, supporting collaboration and building partnerships. She is an internationally recognised Speech Pathologist and is passionate about developing programs and services to support and improve the health and wellbeing of all people in the community. In 2018 Dr Anderson was appointed a Member of the Order of Australia (AM). Dr Anderson is a Vice President and has been made a Fellow of the NSW Institute of Public Administration Australia, is a member of seven Medical Research, Health and PHN boards and is an active member of the Sydney Health Partners Governing Council and Executive Management Group, one of the first four centres in Australia designated by the NHMRC as an Advanced Health Research Translation Centre.

Professor Laurent Rivory Nominated by The University of Sydney

Appointed: 7 December 2018

Professor Rivory is the Pro-Vice-Chancellor (Research) at the University of Sydney. His role focuses on the areas where cross-faculty engagement and external partnerships are integral to the academic enterprise. His responsibilities include large-scale collaborations such as the Charles Perkins Centre and the Brain and Mind Centre, the Core Research Facilities and the management

of external partnerships, particularly in health. Professor Rivory is widely recognised for his research in cancer drug pharmacology and has extensive experience in the management of key research programmes in virology, immunology, cancer, RNA therapeutics and diagnostics. He has served as Senior Research Director, Research and Development, at Johnson and Johnson Research and was Director of the Research Strategy Office at the University of New South Wales. He has also had previous appointments as Clinical Senior Lecturer at the University of Sydney and as Head of the Pharmacology Laboratory, Sydney Cancer Centre at Royal Prince Alfred Hospital.

Professor Stephen Clarke OAM Nominated by the Asbestos Diseases Foundation of Australia Inc.

Appointed: 10 February 2020

Professor Stephen Clarke is a medical oncologist at Royal North Shore Hospital in Sydney and Professor of Medicine at the University of Sydney. After completing his medical oncology training at RNSH, St. Leonards, Stephen undertook a PhD at the Institute of Cancer Research/Royal Marsden Cancer Hospital, before returning to Australia in 1994. He was Professor of Medicine at Concord Hospital from 2004-2010. He has clinical and research interests in thoracic and GI cancers, including mesothelioma. He has had 2 PhD student completions in mesothelioma including Steven Kao and Anthony Linton and has one current student (Tamkin Ahmadzada) undertaking research in microvesicles in mesothelioma. His research has achieved over \$26 million in competitive grant funding that has led to over 330 publications, which have been cited 20,000 times. Stephen is an Oncology Advisor to the Department of Veteran's Affairs and is a Member of the Repatriation Pharmaceutical Review Committee.

Emeritus Professor Robert Lusby AM Nominated by the ANZAC Health and Medical Research Foundation

Appointed: 14 August 2012

Resigned: 10 February 2020

Professor Lusby is the former Head of the Clinical School at Concord Repatriation General Hospital and also former Associate Dean of the Sydney Medical School, University of Sydney. Professor Lusby was a Colonel in the Royal Australian Army Medical Corps and has served in Rwanda with the United Nations Peacekeeping Force; in Bougainville with the Peace Monitoring Group and in 1999 he served with the INTERFET forces in East Timor. In addition, he was the Consultant Surgeon to the Australian Army and the Australian Defence Force. Professor Lusby was Chair of the ANZAC Medical Research Institute and has previously served on the Macquarie and Northern Area Health Service boards. He is the proprietor of Tintilla Estate Hunter Valley Vineyard and Winery.

Mr Paul Bastian Nominated by Unions NSW

Appointed: 10 February 2020

Paul Bastian was previously the National Secretary of the Australian Manufacturing Workers' Union (AMWU) retiring from the position in September 2020. Paul commenced his employment with the AMWU in 1981 and in 1997 was elected State Secretary of the NSW Branch. He is a shipwright by trade and completed a Law Degree while studying part-time at the University of Technology, Sydney. Paul has worked throughout the manufacturing industry, in the construction, shipbuilding and metal industries, in both metropolitan and regional areas of NSW. He represented the AMWU on a number of Boards and Committees, including ACTU Executive. Paul was a member of the Asbestos Management Review Advisory Group, as well as once being on the Boards of AustralianSuper, APHEDA,

the NSW Manufacturing Council, and the NSW Workers Compensation Advisory Council. He has a long history of involvement with community and union campaigns against asbestos and has represented the AMWU and IndustriALL Global Union (previously known as the International Metalworkers Federation) at numerous international asbestos conferences.

Emeritus Professor Ken Takahashi Research Director

Appointed: 1 February 2017

Ken Takahashi was Professor of Environmental Epidemiology and Director of the WHO Collaborating Centre for Occupational Health at the University of Occupational and Environmental Health (UOEH), Japan. Ken graduated from the School of Medicine, Keio University in 1983 (MD), and after completing a 2-year residency in surgery, he received a PhD from UOEH and MPH from the University of Pittsburgh. He engages in epidemiologic research of occupational diseases, with special interest on occupational lung diseases, and asbestos-related diseases in particular. He served as consultant/advisor to the WHO and ILO on a number of occasions, examiner/advisor to academic institutes in several Asian countries, is a former Board Member of the International Commission of Occupational Health and former President of the Asian Association for Occupational Health. He currently serves as the WHO Expert on Chemical Safety/Environmental Epidemiology (International Health Regulations) and is an elected Fellow of the Collegium Ramazzini. He received the Jorma Rantanen Award from the Finnish Institute of Occupational Health in 2011 and the Irving Selikoff Lifetime Achievement Award from the Asbestos Disease Awareness Organization (USA) in 2014. Ken is Research Director (Director of ADRI) since Feb 2017 and was Professor at the University of Sydney, Concord Clinical School Feb 2017 – May 2018.

Dr Christopher Clarke Invited by the Board

Appointed: 13 March 2014

Christopher Clarke commenced practice as a Consultant Thoracic Physician in 1976. His special interest has been occupational lung disease. He has held appointments at a number of public hospitals in Sydney including Visiting Medical Officer in the Department of Thoracic Medicine at Concord Hospital until December 2008. Dr Clarke visited Aboriginal Medical Centres in far western NSW until 2016 under the MSOAP-ICD program as a thoracic physician. He was the employee nominated member on the Medical Authority of the DDA as it is now known until December 2018. He was an Authorised Medical Specialist for the NSW Workers Compensation Commission until 2019. He is a past President of the Thoracic Society of Australia and New Zealand. He now has a Marine Engine Drivers 2 Certificate of Competency (steam) and is a Chief Engineer on ST Waratah one of the vessels run by the Sydney Heritage Fleet. This has given him first-hand experience of the trades and processes that exposed workers to occupational hazards. He did not expect to see the reoccurrence of some occupational lung diseases, the cause and prevention of which were well known when he commenced practice.



Dr Andrew Penman AM Invited by the Board

Appointed: 8 October 2014

Resigned: 12 March 2020

Andrew Penman is a public health physician whose career has been focussed on the application of health and medical research in effective public policy and health programs. From 1984 to 1998 he held a succession, of senior positions as Regional Director of Public health, Pilbara Health Region, Assistant Commissioner and Chief Health Officer, WA Health Department, Director of Disease Prevention and Health Promotion, and Deputy Chief Health Officer, NSW Health. In these positions he initiated or led campaigns for example in control of sexually transmitted diseases, environmental health improvement in indigenous communities, expansion of hereditary disease services, improved parenting to reduce conduct disorder, alcohol harm minimisation, and expanded vaccination. Since 1996, he has been Chief Executive Officer of the Cancer Council NSW. In this position he has grown the organisation's revenue, and scale and scope of programs, and initiated innovative programs in liver cancer prevention, tobacco control among disadvantaged people, tobacco retail reform and expanded support services for cancer patients. He was Chair of the Steering Committee to develop guidelines for the management of malignant mesothelioma under the auspices of the Asbestos Diseases Research Institute. His work in cancer control was recognised by his appointment as a Member in the Order of Australia in 2010. His writing has been largely in the realm of departmental or organisational policy and strategy papers, and advocacy documents such as Health Goals and Targets for Western Australia and improving Radiotherapy services. These interests are reflected in his publication record.

Ms Tanya Buchanan **Vice-Chair** **Invited by the Board**

Appointed: 23 July 2019

Tanya Buchanan is the Chief Executive Officer of the Thoracic Society of Australia and New Zealand (TSANZ), the peak professional body for health professionals and researchers working in respiratory health. She has extensive senior executive and governance experience in Australia and the United Kingdom. Tanya started her health career in nursing. She has a passion for, and a commitment to, improving respiratory health. In 2011 she was awarded membership of the UK Royal College of Physicians, Faculty of Public Health by Distinction and was the winner of the Leading Wales award for her commitment to leadership in the voluntary sector. Tanya holds an MBA majoring in health services administration and is currently completing a PhD in tobacco control. She has been a reviewer for academic journals and has held advisory positions on government bodies with respect to tobacco control and public health. Tanya is also an avid fencer in her spare time and enjoys competing and coaching.

Ms Victoria Keena **Interim Company Secretary**

Appointed: 15 April 2019

Ms Victoria Keena, is the Interim Company Secretary of the Asbestos Diseases Research Foundation (ADRF) and Executive Officer the of Asbestos Diseases Research Institute (ADRI). She joined the ADRI in 2008 and has over 30 years' experience and knowledge of medical research institutes, supporting researchers, managing corporate governance, infrastructure, finances, and fundraising. At the ADRI she assists the Director in the management and development of the Institute in order to achieve the strategic and operational objectives of the Foundation. She was a founding staff member and the General Manager of the Woolcock Institute of Medical Research until 2007.





ADRI Advisors

Professor Tim Driscoll

Professor, Epidemiology and Occupational Medicine
Director, Master of Public Health
Sydney School of Public Health
The University of Sydney

Professor Driscoll is an occupational epidemiologist and a specialist in occupational and environmental medicine and public health medicine. Tim's main areas of interest include the burden of occupational disease and injury; occupational cancer and exposure to occupational carcinogens, particularly asbestos; occupational lung disease; increasing the practical application and influence of epidemiological principles and findings; and improving the communication of epidemiological principles and findings to the general public. He leads the occupational risk factors expert working group in the Global Burden of Disease study, where his work has particularly included the burden of disease from asbestos exposure.

Mr Michael Kottek

Mr Kottek has over 25 years of involvement in assessing asbestos exposure and risk in occupational, residential, and environmental settings. This has involved simulating past work practices and analytical techniques as well as archival research on historic measurements of asbestos dust levels early warnings about the hazards of asbestos.

Associate Professor Kenneth Lee

Senior Staff Specialist
Head of Department/Clinical Director,
Anatomical Pathology
Concord Repatriation General Hospital
Clinical Associate Professor
Concord Clinical School
The University of Sydney

A/Professor Lee is an anatomical pathologist and is the Royal Australasian College of Pathologists representative on COSA Council. His clinical work encompasses all aspects of anatomical pathology, but his subspecialty areas of clinical practice are in pulmonary pathology and haematopathology. His areas of research include research in potential diagnostic biomarkers and diagnostic modalities of mesothelioma in association with ADRI. Through collaboration with ADRI, his current research is in discovering potential biomarkers relating to improvement in mesothelioma diagnostic modalities and mesothelioma biology from treatment effects.



Dr Anthony Linton

Medical Oncologist
Concord Repatriation General Hospital

Dr Linton specialises in thoracic, genitourinary and brain malignancies. Dr Linton received his medical degree at the University of New South Wales before completing physician and oncology training at Concord Repatriation General Hospital. He has been involved with the Asbestos Diseases Research Institute since 2011, when he joined as the first Biaggio Signorelli Fellow and completed his PhD at ADRI investigating prognostic factors and new therapeutic targets in malignant pleural mesothelioma. He has published widely in international peer reviewed journals and continues to collaborate with ADRI researchers on a number of preclinical and clinical projects investigating mesothelioma and other asbestos related diseases. Dr Linton is the network director of physician training at the Concord hospital network and a senior clinical lecturer at the University of Sydney.

Associate Professor Brian McCaughan AM

Cardiothoracic Surgeon
Emeritus Consultant Cardiothoracic Surgeon
Royal Prince Alfred, Concord Strathfield
Hospitals
Clinical Associate Professor
The University of Sydney

A/Professor McCaughan is a renowned cardiothoracic surgeon with a clinical career with 40 years commitment and passion for the management of thoracic malignancies. He is a pioneer of extra pleural pneumonectomy (EPP) and has made an extensive contribution to lung cancer and mesothelioma research which is evident from his dynamic area in research publications. A. A/Prof Brian McCaughan was a consultant cardiothoracic surgeon at Royal Prince Alfred and Concord Hospitals (1984-2013), Canterbury, Manly, Ryde, Hornsby, and Lidcombe/Bankstown Hospitals (1985-2010) The Mater Hospital (1999-2013) Strathfield Hospital (1989-2021). He is Chair of the Clinical Excellence Commission (2010-) and the Agency for Clinical Innovation (2010-), Member, Judicial Commission of New South Wales (2010-) and Board Member, Chris O'Brien Lifehouse (2016-). He is a member of the ADRI Biobank consortium, has provided ethical approved biospecimens for research into asbestos-related diseases and has contributed his expertise to many of ADRI's research projects and publications.



Professor Anna Nowak

Medical Oncologist
Sir Charles Gairdner Hospital
Professor of Medicine
University of Western Australia
Director
National Centre for Asbestos Related Diseases
(NCARD)

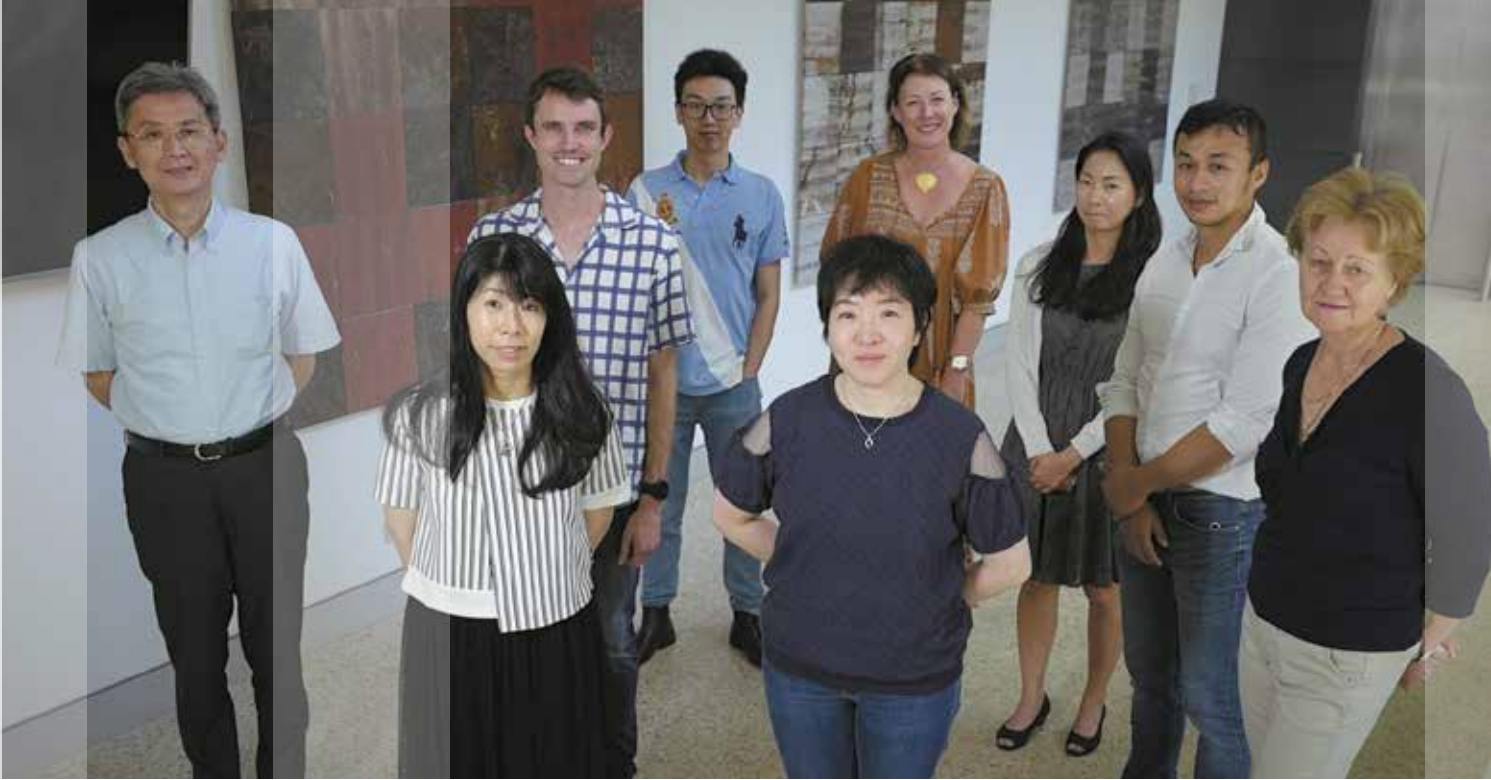
Professor Nowak treats and researches the asbestos caused cancer, mesothelioma. Since 2018 Anna has been the Director of NCARD, an NHMRC Centre for Research Excellence based at UWA. With a research team of around 35, NCARD has an international reputation for mesothelioma immunology, biomarkers, and translational clinical trials. Anna also has had a leadership role in brain tumour research and has specialised in treating malignant brain tumours. From 2017 until just recently, she was the Chair of the CoOperative trials Group for NeuroOncology (COGNO), the national brain tumour clinical trials group. In 2018 Anna was named Cancer Researcher of the Year by the Cancer Council of WA, and early in 2020 was invited to join the Cancer Council's Board. In the second half of 2020 Anna has taken on two challenging new roles with the UWA Faculty of Health & Medical Sciences: Associate Dean of Research, and Deputy Executive Dean. She is passionate about patient-doctor communication, mentoring, and women in oncology and science.

Associate Professor Deborah Yates

Senior Staff Specialist
St Vincent's Hospital,
Conjoint Associate Professor
University of NSW

A/Professor Yates has expertise in a broad spectrum of occupational lung diseases including coal workers pneumoconiosis, silicosis, asbestos-related disorders, and occupational asthma. She completed an MSc in Occupational & Environmental Medicine and also the AFOM (UK) & Diploma in Occupational Medicine from the London School of Hygiene & Tropical Medicine, while working for the London Pneumoconiosis Panel. She also holds an MD from Cambridge University on the topic of asthma, including exhaled breath testing and fractional exhaled nitric oxide, based on research performed at the National Heart & Lung Institute in London. Since permanently moving to Australia, she has continued her research and clinical interest in rare lung disorders, occupational and obstructive lung diseases. She is Co-Chair of the Coal Mine Dust Lung Disease (CMDLD) Collaborative Group and is active in the Thoracic Society of Australia and New Zealand (TSANZ) and Royal Australasian College of Physicians (RACP). She is associated with the Black Lung Center of Excellence at Chicago, Illinois and involved in the training program for examining medical practitioners in Queensland.





ADRI Staff

Mrs Vesna Aleksova
Biobank Officer

Ms Diana Arachi
International Liaison

Mrs Kim Brislane
Director of Philanthropy
(October 2020-)

Dr Yuen Yee Cheng
Principal Scientist

Mr Ross Flemons
Accountant

Ms Kim Hadley
Receptionist/EA

Dr Ben Johnson
Post-doc Fellow

Dr Steven Kao
Oncologist

Ms Victoria Keena
Executive Officer and Company
Secretary

Mrs Pam Logan
Mesothelioma Support Coordinator

Mrs Jocelyn McLean
Mesothelioma Support Coordinator

Dr Matthew Soeberg
Research Fellow

E/Prof Ken Takahashi
Director

Mr Ta-Kun Yu
Research Assistant

Mrs Ari (Man Lee) Yuen
Industrial Hygienist

Mrs Ling Zhuang
Technical Officer

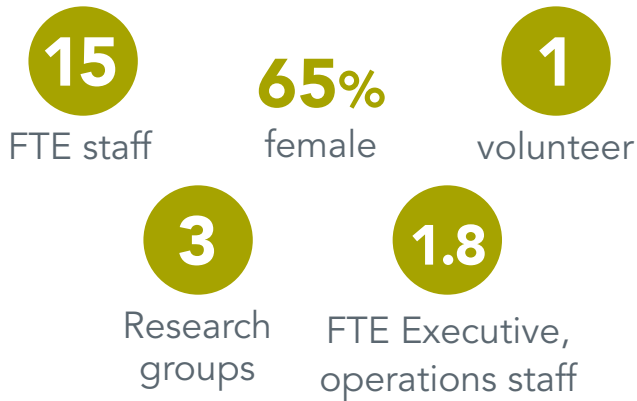
Volunteer

Jenny Weismantel

Jenny continues to be an invaluable ADRI team member. She has been working with ADRI as a volunteer for over ten years and is our Endnote, Scopus, and reference manager. She supports and carries out various administrative functions for the research team. We are forever appreciative of Jenny's hard work, attention to detail, good humour, and continuing support.

Our impact in 2020

Staff



Performance

\$988K

in new competitive grants

58%

success rate of grants



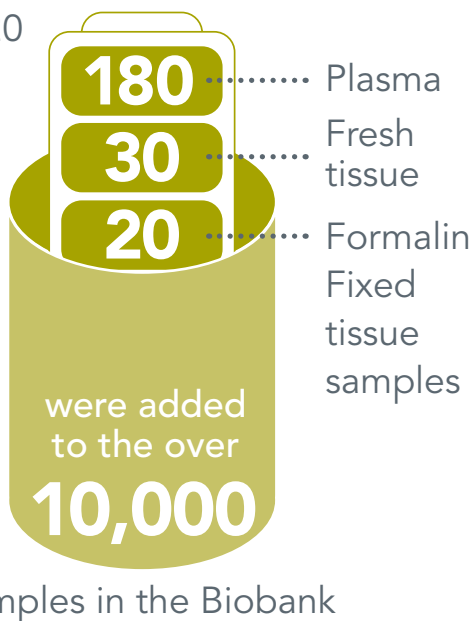
15
Peer-reviewed publications

2
Conference presentations*

**Due to COVID conferences were cancelled or postponed however 2 were attended virtually.*

Biobank

In 2020



Patient support

Actively supported over **299** patients and carers



With over **1,391** contact transactions



Research

Each year in Australia, between 700 and 800 people are diagnosed with malignant mesothelioma. There is no cure for this rare and aggressive cancer, and currently treatment is palliative, with the majority of patients losing their lives within twelve to eighteen months following diagnosis. In response to this national health crisis, ADRI's ultimate goal is to save lives, through investing our sustained, concerted efforts to create momentum a cross disciplines internally and collaborating externally. Our four priority areas are biomedical (preclinical) research, clinical and prevention and public health, and at the same time support of patients and their families affected by asbestos-related diseases.



1. Biomedical (Preclinical) Research

Our researchers are discovering new strategies for asbestos-related diseases to:

- better understand the disease mechanisms
- to discover and develop biomarkers to detect the disease, and
- to develop novel therapies to treat these diseases.

Aim

It is well known that asbestos fibres are highly pathogenic and are capable of causing a number of asbestos-related diseases including asbestosis, lung cancer and malignant pleural mesothelioma. However, there is a lack of knowledge about the molecular mechanism that can lead to the development and progression of disease once exposed to asbestos fibres. The period from exposure to the onset of symptoms can be over 40 years and usually by the time the disease is diagnosed it is in the later stages. Consequently, the prognosis is poor. Our aim is to understand the diseases mechanism, discover and develop a viable biomarker to be able to accurately detect and diagnose the disease early and to treat it with a novel treatment strategy.

Impact

The biomedical (preclinical) research team led by Dr Yuen Yee Cheng utilises cell lines and patient-derived biospecimens from ADRI's extensive biobank. The discoveries made by using these biospecimens ensures that the outcomes are biologically relevant and will provide a reliable indication of how potential biomarkers and novel treatment strategies may perform when translated into clinical practice.

Research Projects

A biomarker to predict immunotherapy responses.

In recent years, immunotherapy has become a focus in malignant pleural mesothelioma (MPM) research, however, there has been disappointing improvements in patient survival. Current chemotherapies provide MPM patients with only modest benefits and are typically associated with cytotoxicity and drug resistance issues that limit their clinical efficacy. Pembrolizumab (Keytruda) is an emerging immunotherapy that has become a major therapeutic option for patients with advanced non-small cell lung cancer and is potentially useful for MPM. However, a recent randomised trial of pembrolizumab versus conventional chemotherapy, indicated that a particular subgroup of patients may benefit from pembrolizumab more than others. Our researchers believe that finding predictive biomarkers of immunotherapy efficiency is urgently needed. In this study, collected samples from a recent immunotherapy (pembrolizumab) review and will investigate any alteration of DNA methylation and microRNA epigenetic biomarkers in these samples and to determine which biomarkers are contributing to biological response in MPM. We anticipate that a successful outcome will lead to biomarkers monitoring patients treated with pembrolizumab and in the discovery of a new treatment approach in MPM. This project is funded by an **iCare Dust Diseases Board** Discovery Grant.

Circular RNAs -potential biomarkers for malignant pleural mesothelioma

Malignant pleural mesothelioma (MPM) is especially difficult to diagnose as an invasive surgical procedure is required to obtain a biopsy. Such a procedure is not often feasible for elderly patients with declining health. Therefore, ADRI's researchers are investigating potential

blood-based biomarkers by which MPM can be identified. Such a specific test that can easily diagnose MPM will be a fundamental change in the diagnosis and treatment of MPM. Circular RNAs (circRNAs) are a type of single-stranded RNA which forms a closed continuous loop and as a type of blood-based biomarker possess desirable biochemical properties for the early detection of cancers. The involvement of abnormal circRNA expression in MPM is an uncharted area of research. However, ADRI's research have found in preliminary studies that approximately 300 circRNAs that are upregulated in MPM cell lines and therefore more sensitive, indicating their potential to be exploited as biomarker candidates for the detection of MPM. The research team anticipate that the successful completion of this project will show the reliability and validity of the circRNA biomarker candidates in relation to their specificity and sensitivity for MPM. This project is co-funded by an **iCare Dust Diseases Board** Discovery Grant in 2020 and the **Jim Tully Bequest**. Promising preliminary data has been generated on the detection of circRNAs and will be presented at the virtual iMig conference in May 2021.

Circulating RNA detected in blood

Circulating RNA are remarkably stable RNA molecules, and an emerging genetic biomarkers, that can be secreted into the circulation. It is not to be confused with circular RNA (see the project above). We are studying circulating RNAs in biospecimens collected from patients diagnosed with asbestos-related cancers. As mesothelioma is difficult to diagnose and has no effective treatment, it is important to discover biomarkers that will detect the early stages of disease and identify patients who may be at risk, so that treatment can be provided before the cancer progresses. The discovery of circulating RNAs is an attractive and innovative option to be consider in asbestos-related cancer research due to their stability in the blood circulation. This project is funded by the **Revesby Workers Club**.

A novel 3D model for drug screening in mesothelioma

Most patients with malignant pleural mesothelioma (MPM) receive chemotherapy, but almost every patient will be confronted with recurrence of disease and drug resistance. For these patients, finding more effective treatment strategies are urgently needed.

Currently, most drug screening systems rely on the 2D culture system where cells are grown as a single layer attached to a plastic surface. This 2D model is not adequate as the behaviour and characteristics of cells can be very different from the actual morphology and behaviour of cells in a natural tumour microenvironment. To aid drug screening that can be fast tracked into the clinic, we have developed a 3D model. One of the major advantages of this 3D model is that it provides a biocompatible adhesive architecture for cells to grow on. In 2018 Dr Cheng published collaborative results in the journal *Biofabrication* that showed this 3D model resembled the conditions of cells in the natural tumour microenvironment when compared to the 2D culture. To create a microenvironment akin to that of a tumour we have used decellularised porcine lung seeded with cancer cells to develop this novel 3D tumour model. When compared to 2D culture, cells grown in this 3D model exhibit markers and expression levels that are like real tumours. We hope the outcome of this project will be the characterisation of cancer biology and drug responses which may contribute to future personalised medicines for MPM patients. This project is funded by an **iCare Dust Diseases Board** Discovery Grant.

CDKN2A and MTAP useful biomarkers

Diagnosing malignant pleural mesothelioma (MPM) can be difficult. Currently there are more than 15 biomarkers that can be used by pathologists to identify MPM, however none are highly specific nor sensitive. Therefore we have been working to find biomarkers that are highly specific and sensitive for MPM and can be detected in a blood sample. In this project we have found that the co-deletion of the CDKN2A and MTAP genes frequently occurs in

MPM and are therefore highly specific for MPM. To test and validate these findings we have used a droplet digital PCR (ddPCR) process as an efficient testing method in diagnosis MPM. DdPCR is a potential alternative method in diagnosis compared to fluorescence in situ hybridisation (FISH) which is normally used. DdPCR will be utilised in the development of a blood-based test to detect MPM. This project was **co-funded by the late Mr William Jupp Bequest** and the **Regional Collaborations Programme grant** and will be presented at the International Mesothelioma Interest Group (iMig) virtual conference in May 2021. Results from a section of the project has been published in the journal *Frontiers in Oncology* in November 2020.

Other Research Outputs

Why is it important to be accredited?

Over the last few years, we have been working to develop a new malignant mesothelioma specific genetic test that will fulfill the requirements of the National Association of Testing Authorities (NATA). NATA is the recognised national accreditation authority for analytical laboratories and testing service providers in Australia.

The NATA accreditation will formally recognise ADRI as a facility to competently perform the genetic testing and overall compliance with systems and products standards. To achieve NATA accreditation will enable us to carry out molecular testing on clinical specimens obtained a diagnosis for mesothelioma patients in the near future, and in doing so will broaden ADRI's network with Australia's public healthcare system. This project has been co-funded by **Mrs Lyn Bursill**.

ADRI Laboratory Educational Videos and Toolkit

The ADRI research team have continued to assist in the production of a series of educational videos and toolkit documenting key laboratory and molecular biology techniques required for biomedical research into asbestos-related diseases. The *Toolkit for the Elimination of Asbestos-Related Diseases*, with the hyperlinked videos will serve as useful educational 'best practice' tools for medical practitioners, prospective students, visiting scientists and other visitors both nationally and internationally.



2. Clinical Research

Aim

The aim is to discover promising new therapeutic approaches to convert into clinical practice to improve outcomes for patients diagnosed with asbestos-related disease.

Impact

With limited treatment options for mesothelioma patients our clinical research aims to determine the safety and effectiveness of medications, devices, diagnostics, and treatment regimens for mesothelioma patients. These may then be used for prevention, diagnosis, relieving symptoms, or treatment.

Research Projects

Retrospective evaluation of the use of Pembrolizumab in malignant mesothelioma

Pembrolizumab is a type of immunotherapy, commercially known as Keytruda, to treat mesothelioma. In this retrospective study we investigated the efficacy and toxicity of pembrolizumab in mesothelioma patients who had been treated with pembrolizumab as part of the iCare NSW compensation scheme. We looked at the clinical factors and predictive biomarkers that could help select patients who were more likely to benefit from pembrolizumab. The results from this study were published in the journal JTO Clinical and Research Reports in November 2020 (see publications list) which were comparable to other clinical trials investigating pembrolizumab in mesothelioma in terms of response. The study was funded by iCare NSW and will be presented at the International Mesothelioma Interest Group (iMig) virtual conference in May 2021.

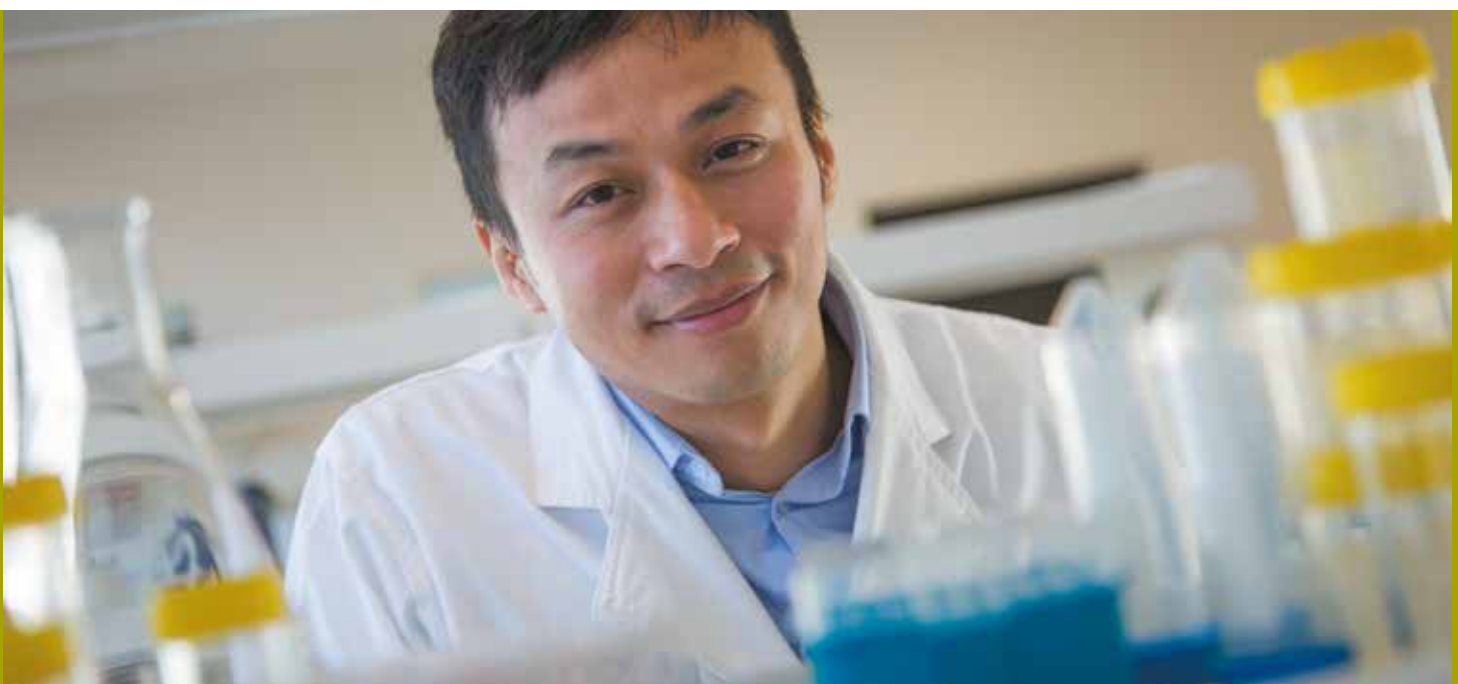
Using immuno-chemo-microRNA approach to treat malignant pleural mesothelioma

This project builds on our previous work using microRNA replacement therapy in malignant pleural mesothelioma. Several years ago, researchers at ADRI identified the downregulation of a tumour suppressor microRNA in mesothelioma. The replacement of miR-16-based tumour suppressor microRNAs demonstrated promising mesothelioma cell death in the laboratory which then led to a Phase I clinical trial. To further this research, we are looking at the activity of the microRNA to see if it contributes to the effect of immunotherapy in combination with chemotherapy. Most patients with mesothelioma will receive chemotherapy, but almost every patient will be confronted with the recurrence of disease and drug resistance. In recent years, the combination of chemo-immunotherapy has become a focus in malignant pleural mesothelioma research, however, preclinical results are yet to be translated into clinical practice.

In this project we aim to investigate chemotherapy sensitisation using a novel approach based on our recently published paper on the regulation of PD-L1 by tumour suppressor microRNAs. If cancer cells have a high amount of PD-L1 they may benefit from immunotherapy. Therefore, we plan to use antibodies that target PD-1 (RMP1-14) and PD-L1 (10F.9G2), in combination with miR-16 replacement to study their potential to sensitise malignant pleural mesothelioma to current first-line therapies using our pre-clinical immunocompetent mouse model. The intended result is to improve patient outcomes with a novel treatment modality by combining immunotherapy with miR-16 replacement therapy and it is expected that successful outcomes from this project will be rapidly translated into the clinic. This project is partially funded by **Tour De Cure**.

WEE1 inhibitor and immunotherapy as a potential treatment for mesothelioma

The prognosis for patients with malignant mesothelioma is poor, with a 12-8-month survival post diagnosis. The current standard care is chemotherapy and in efforts to find better treatment options for mesothelioma patients it was suggested in recent studies that the immunotherapy pembrolizumab was not superior to conventional single agent chemotherapy in terms of progression-free survival and overall survival in the second line setting. This continues to highlight the desperate need for new treatment approaches for malignant mesothelioma. In our preliminary study, we found that WEE1, a nuclear kinase, is up regulated in malignant pleural mesothelioma cell lines, making the cells more sensitive to a hormone or another agent, when compared with normal immortalised mesothelial cells. In this study we have explored the role of a WEE1 inhibitor in the treatment of malignant pleural mesothelioma, alone, or in combination with chemotherapy. This study was funded by **AstraZeneca**.



3. Public Health and Preventative Research

Public Health focus on the following:

- Quantifying the burden of asbestos-related diseases (ARDs)
- International cooperation on asbestos and ARDs
- Developing and applying public health/epidemiologic indicators
- Assessing the hazard and risk of asbestos exposure, e.g., epidemiologic studies

Aim

Asbestos-related diseases (ARDs) have unique aspects that arise from being an industrial, man-made, disease. By nature, they are 100% preventable. While we need to continue the search for effective diagnostic and treatment modalities to help patients, it is equally important to prevent the unnecessary burden from happening in the first place. The saying: “prevention is better than a cure” cannot be overemphasized. Contributing to the banning of asbestos in industrialising countries will be of benefit to Australia by preventing asbestos-containing products slipping through our borders as well as alleviating the risk of Australian being exposed whilst travelling/residing overseas. The aim of public health/preventative research at ADRI is to provide novel perspectives and scientific evidence that can support policies and lead to the prevention, and ultimately the elimination of ARDs.

Impact

In tackling asbestos-related disease prevention, ADRI is closely collaborating with United Nations (UN) organisations such as the World Health Organization (WHO), the UN Environmental Programme (UNEP), and the International Labour Organization (ILO). Moreover, this area of research provides context to biomedical and clinical research, from the standpoint of public health and prevention, and allows us to identify research themes that are relevant and beneficial to the community, nationally and internationally.

Research Projects

Quantifying the Burden of Asbestos-Related Diseases

ADRI researchers continue to assess the burden of asbestos-related diseases (ARDs), e.g., mesothelioma, at national, regional, and global levels based on internationally standardized as well as originally developed methods. We are a regular contributor to the internationally acclaimed Global Burden of Disease (GBD) study series. This year E/Prof Takahashi was listed as co-author in six GBD study articles published in *The Lancet* (3 articles) and *Occupational and Environmental Medicine* (3 articles). He also supervised the publication of an original article published in the *International Journal of Environmental Research Public Health* featuring the global burden of mesothelioma deaths (see *Publications list page 42*).

International Cooperation on Asbestos and ARDs

The ADRI prepared to deliver the Thailand Training Workshop on Asbestos and ARDs in March. We were to take the lead role, in coordination with the Ministry of Health of Thailand with full support from the WHO and the Basel, Rotterdam and Stockholm Convention Secretariat of the United Nations Environment Programme (UNEP). Funds were to be applied from the Regional Collaboration Programme (Australian Academy of Sciences) and the Karen Howard Grant. By late February, the meeting agenda, venue, collaborators, etc. were finalized, but the COVID environment worsened to the point where the event had to be called off. Nevertheless, all parties agreed to revive the plan as soon as conditions allowed. During the pandemic, people have become increasingly used to interacting online and virtual conferences, so until travel bans/restrictions are lifted, in-person training workshops can be reasonably substituted by online training workshops.

Regional Collaboration Programme

In 2019 the ADRI acquired the competitive **Regional Collaboration Programme (RCP)** grant administered by the Australian Academy of Sciences (AAS). The RCP encourages Australian organisations to collaborate with regional and international science, research, and innovation partners on solutions to share challenges within the Asia-Pacific region. The funded programme is entitled “Sharing preventive technologies to abate asbestos, reduce asbestos-related diseases and transition to an asbestos-free society.” Originally the grant covered the period April 2019 – end of 2020, but due to the nature of RCP (i.e., international cooperation) under the ongoing travel restrictions, the AAS offered an extension to the funding period to all grant recipients. In the case of ADRI, the funding period was extended one full year – until end of December 2021.

Our record of implementing in-person training workshops thus remains at three delivered workshops in 2019 (Philippines, Fiji, and Indonesia), and paused since the plan for the fourth in Thailand was aborted as aforementioned. In 2020, however, we advanced the preparation of the “Toolkit for the Elimination of Asbestos-Related Diseases” which is our other declared deliverable for the RCP project. So far 30 international experts have contributed chapters/ contents for the Toolkit, which aim is to provide a concise, easy-to-use reference for people of countries with limited expertise, focusing on the clinical, preclinical, and public health aspects of ARDs. Hence the Toolkit will comprise medical chapters on diagnosis, treatment (including patient support), and preclinical research on ARDs, as well as public health chapters on asbestos testing, abatement, and waste management. The Toolkit will adopt the e-book style, that is, it will be published online with hyperlinks (to dedicated audio-visual materials and external links) and will be made freely accessible by end of 2021.

The ADRI has produced six videos on laboratory techniques to research ARDs: 1) cell culture; 2) drug treatment; 3) PCR; 4) video microscopy; 5) Western Blot; and 6) Biobanking. We plan to produce several more videos that will also be hyperlinked to the Toolkit and be utilized for international training workshops (in person and virtual) funded by the **Karen Howard** grant. Importantly, several existing and planned audio-visual content featuring clinical practice and preclinical procedures are designed to showcase “best-practice” suitable for a wider audience including the Australian medical and scientific community.

Developing and Applying Public Health/Epidemiologic Indicators

In September, E/Prof Takahashi was co-presenter at the MD Research Symposium at The University of Sydney, Sydney School of Medicine, as advisor to an MD student who presented on “Estimating the mortality burden of asbestos-related lung cancer in Australia 1968-2015⁵” Justin Phang, a MD student at The University of Sydney, along with two other MD students, had been tutored by E/Prof Takahashi during 2017-2019 (supervised together with Matthew Soeberg and Yuen-Yee Cheng). With an aim to estimate the mortality of asbestos-related lung cancer (ARLC) in Australia, Justin’s study applied two different models (the “ratio-to-mesothelioma” model and the Population Attributable Fraction model) leading to estimates which were approximately a third of those reported by the GBD Study. The true burden of ARLC in Australia and other countries is yet to be fully characterized warranting various methods and indicators to be applied.

⁵ Phang JMW and Takahashi K. Estimating the mortality burden of asbestos-related lung cancer in Australia from 1968 to 2015. MD Research Symposium, Sydney School of Medicine, The University of Sydney. 30 Sept 2020.

Assessing the Hazard and Risk of Asbestos Exposure, e.g., Epidemiologic Studies

E/Prof Takahashi joined the 2019 July field study of the post-disaster response in Lombok, Indonesia, to advise on the assessment of asbestos contamination. In collaboration with the International Federation of Red Cross, he collected samples including debris and items “recycled” from damaged asbestos-containing construction materials (e.g., asbestos-cement (AC) roofs and sideboards) and which were then analysed by our industrial partner, EnviroScience Solutions. The extent of asbestos contamination has proven to be widespread not limited to debris but including the introduction of new AC roofs used to build temporary shelters and permanent houses. In 2020 the collaborative research extended to involve researchers in Indonesia, Colombia, the Netherlands, and the USA with particular attention on the potency of AC roofs. Preparation for a joint paper is in progress.

In response to a request received from the WHO Headquarters, E/Prof Takahashi contributed to commenting on the WHO Guideline for Drinking Water Quality (pending publication) with a section on asbestos. He provided his view on how the consensus view regarding the relationship between ingestion of asbestos fibres and risk for colorectal cancer documented in the IARC Monograph (2014) on Asbestos should be reflected in the new guideline. A further suggestion was made to consider the situation of developing countries where collection of rainwater from AC roofs are not uncommon and in view of the ongoing research on the potency of AC roofs. His input was later acknowledged by the WHO.

Australia’s silicosis epidemic

In late 2019, Dr. Matthew Soeberg, ADRI’s Epidemiologist, acquired a new grant from iCare’s Dust Diseases Board (DDB) on the emerging theme of silicosis. The project is entitled: *APC (Age Period Cohort) of Australia’s silicosis epidemic using national hospital and mortality data*. The objective of this project is to estimate the burden of silicosis in the Australia by analysing national data on silicosis deaths and hospitalisation. These data are held by the Australian Institute of Health and Welfare.

The project is due for completion at the end of 2021 including a final report to the DDB and a manuscript for peer-review publication. Early results were presented to the DDB Board in December 2020. The results of this project will complement a growing set of information from state-based silicosis case and silicosis exposure registers.

International cooperation on asbestos and ARD

The Asbestos Diseases Research Institute has been invited to make a presentation in early 2021 on the public health perspective and recent international evidence on asbestos exposure at a high-level workshop to plan for 2021 in moving towards a national ban on asbestos in Laos. The workshop, organised by the Ministry of Health with support of APHEDA (Union Aid Abroad) Laos Office, will be attended by all key Ministries, trade unions and NGOs and hosted by the Laos Minister of Health, the Australian Embassy in Laos and the World Health Organization (WHO).





4. ADRI Biobank

Aim

ADRI's Biobank was established in 2010 with the aim of becoming a national tissue bank of accurately documented malignant mesothelioma cases which will lead to optimal biological and molecular insight, paving the way for new treatments. The Biobank is now a unique collection and a vital resource of ethically approved high-quality biospecimens and accurate, reliable, and standardised clinical data, contributing to asbestos-related diseases research. However, it is a formidable task to collect well-characterized fresh-frozen tumour (biopsies) and blood samples. The Biobank has continued to be funded by **CSR Limited** and relies on a consortium of clinicians (including specialists in respiratory medicine, medical oncology, surgery, and pathology) involved in diagnosing and treating malignant mesothelioma patients who kindly consent to participate.

Our Impact

Due to the ubiquitous use of asbestos in the past century, Australia now has one of the world's highest incidences of malignant mesothelioma per capita with more than 700 new cases diagnosed each year. Alarming, approximately a third of older Australian houses are estimated to be significantly contaminated with asbestos containing materials.

It has been predicted that mesothelioma will be cause of over 1 million death world-wide in the next 30 years at a cost of \$300 billion. These figures do not account for the individual human costs that cannot be equated to families. Malignant mesothelioma has major economic as well as health impacts and has unfortunately been understudied in the past.

With formal governance in place ADRI's Biobank is not only contributing to our research but has allowed biospecimens to be used by other research groups nationally and internationally. These collaborative efforts have yielded multiple peer-reviewed publications, as listed on our website.

Research Projects

The Biobank continues to be vital resources for the ADRI researchers. Over the years researchers have developed mesothelioma cell lines repositors, some with have acquired resistance to chemotherapy and serve as a valuable tool to study drug resistance. As well as being integral to ADRI's primary investigation studies, the Biobank is utilised as a collaborative resource for research groups within Australia and internationally.

Highlights

Successful re-certification of the ADRI Biobank

In 2020 ADRI's Biobank Officer, Ms Vesna Aleksova, completed the online education modules as part of the requirements of the NSW Biobank Certification Program. With re-submission of ADRI's revised Standard Operating Procedures, the ADRI Biobank completed all the requirements of the University of British Columbia, Canada, and Canadian Tissue Repository Network (CTRNet). This is a voluntary certification scheme aiming to improve and harmonise biobanking standards in NSW through education and communication of best practice.

As part of the ADRI's expansion program to start collecting biospecimens from Chris O'Brien Lifehouse, the Biobank Officer also completed the Good Clinical Practice Course. This certification is designed to give researchers a basic understanding of the regulations and requirements for research projects and clinical trials. It is also required for accreditation under the National Clinical Trials Governance Framework.

COVID-19 and biospecimen collection

During 2020 the COVID-19 pandemic greatly impacted all research activities and infrastructure, and in particular biobanks found themselves in front line. There is an associated risk with the collection and processing of human specimens during pandemics. The best practice is to assume that any biospecimen collected and stored in the biobanks can be infected with COVID-19. To avoid crowded spaces in health care facilities and a patient's potential exposure to the virus during hospital visits, non-urgent surgical procedures were postponed from April 2020 and therefore there was a decrease in samples coming into biobanks.

In June 2020 with ethical approval and a COVID safety plan in place the ADRI Biobank Officer resumed the collections and added more high quality and unique samples to the collection of biospecimens for mesothelioma.



Mesothelioma Support Service



5. Patient Support

The national focus on public health and prevention includes patient support, advocacy and increasing awareness of the dangers of asbestos aimed at preventing future exposure to asbestos in the workplace, community, and the home. Patient support intersects research Clinical and Public Health research.

Aim

The aim of ADRI's Mesothelioma Support Services is to provide support, information and advice to patients and their families who have been diagnosed with mesothelioma so that they can live as full a life as possible for as long as possible.

Impact

The ADRI Mesothelioma Support Service now supports four groups of people with specific support needs:

1. Patients receiving standard (palliative) care, who experience progressive (symptomatic) disease and require complex medical and psychological needs.
2. Patients who have undergone radical (trimodality) treatment and require concentrated support to ensure appropriate recovery and rehabilitation.
3. Patients diagnosed with peritoneal mesothelioma, some having radical surgery: and
4. The bereaved - struggling with grief and loss.

Within groups 1, 2 and 3 the subcategories are patients who are newly diagnosed and want clinical information and empathetic support; and patients in a stable condition, fighting to live a 'normal' life as much as possible.

The ADRI's Mesothelioma Support Coordinator role is unchanged, however, there has been a change in staff. Pam Logan joined the ADRI on 2nd March 2020

and brought expert skills and knowledge related to aged care, chronic care, mesothelioma as well as the self-discipline of working from home. The WHO announcement of the Covid-19 pandemic prompted a sudden change in how we provided our service in practical terms. Pam and Jocelyn accepted the challenge despite the brief induction of Pam to the role, database, support groups and services in general. ADRI's Mesothelioma Support Service is funded by an **iCare Dust Diseases Board** Support Organisation Grant.

Impact of COVID-19 on Support Services

The ADRI's response to the outbreak of COVID-19 pandemic was to follow the Governments guidelines that resulted in the NSW lockdown. All ADRI staff worked from home and despite some initial glitches relating to settling into this new phenomenon and coping with technology challenges, the Mesothelioma Support Service was never interrupted other than having the annual 'Meso March in May', and 'Education Day' cancelled. Cohesion within our service required professional communication, support, and training as well as completing regular online handovers to each other. We also physically met to debrief, adhering to the COVID Safety Plan that included social distancing. The debriefing sessions usually took place in the ADRI Boardroom following a fortnightly teleconference. All face-to-face groups were converted to teleconference groups and later the option of telephone or video.

Throughout the pandemic there was much uncertainty around how the disease would play out in our work and private lives, within Australia, and across the world. Many patients, families and **staff members** were impacted which made conversations at times personal and difficult. Some staff were living with parallel experiences of having family overseas, losing loved ones overseas and not being able to visit family members, etc.

Peritoneal Mesothelioma

The Mesothelioma Support Coordinators provides support and advise to a small number of patients and their families diagnosed with peritoneal mesothelioma. We sought to improve our support for these families by networking with our nursing colleagues working in this area at Royal Prince Alfred Hospital and St George Hospital and inviting them to join an online meeting.

Support meetings

All support groups were converted to online or telephone support meetings. The number of people who took up this option was generally small, however, the conversations that took place were in depth and very meaningful and occupied a 2-hour time slot. Although the groups were advertised for special needs such as the Bereavement, EPP (extra pleural pneumonectomy) and general mesothelioma, often the groups were mixed as others chose to call in. Nobody was turned away.

Education Day

As mentioned above the Education Day was cancelled due to COVID-19 and there were constant ongoing uncertainty around when and if a meeting could be held. The Mesothelioma Support Service filled the gap by accessing online group meetings and inviting patients to engage with other online educational resources like podcasts and webinars hosted by organisations such as:

- The thing about cancer: **Podcasts | Cancer Council**
- The thing about advanced cancer: **The Thing About Advanced Cancer on Apple Podcasts Cancer Council NSW**
- Covid-19 Webinars **COVID-19 Vaccines Webinar | Lung Foundation Australia**



Meso March in May

As mentioned above, this event was cancelled due to Covid-19 restrictions. However, several families walked in isolation, posting their photos on Facebook.

Carers Day

The annual Carers Day activity which takes place during NSW Carers Week became an online Zoom event. We invited Monica Davila from Fitness2wellbing to host the activity on Tuesday 13th October 2020. Monica has attended a Carers Day function with us before so we knew we had a guest host who would provide valuable content, empathy and bring joy to those who called in.

Reaching out to patients, carers, and families

2020 was certainly an odd year. We very much missed the personal contact with people we support and felt somewhat disconnected from them. Pam has not met any of our patients in person and has not benefitted from the group meetings and memorable end of year activities as in previous years. As a way of connecting with people, reminding them of our service, and providing a practical aid we mailed out to patients and carers two hand-held fans with our service contact numbers. A fan can assist patients when they are feeling breathless.

We also printed "Thinking of you" cards and mailed these out with a personal note to the recent bereaved, rather than sending Christmas cards. Both initiatives were well received according to patient feedback.



Comment on 2020 - July to December.

The number of service transactions (that is the number of contacts we have had with those we support) over a six-month period from 1st July until 31st December 2020 was 819. This was the highest ever since the Mesothelioma Support Service began. We believe this reflects our sense that patients needed more frequent contact during Covid-19, especially while we could not meet in our usual groups.

The best way of highlighting the need for our service is by this brief story: Recently, because of our direct patient interaction, a lady who we had supported since 2015 was able to have her wish to die at home with her dog. She was assisted to reach a dignified end of life, without her family, during Covid-19, but with integrated care and services from iCare and local health services. The patient died at home with her dog. No immediate family was able to be with her because of border closures, but compassionate care providers were with her. This is why we do what we do.

The service received 20 new referrals in this six-month period. We assume this may be because people delayed consultation with their GPs about symptoms, they had been downplaying because of fears related to Covid-19. Once Covid-19 settled, and people felt more comfortable moving out and about they attended to their health. This assumption was also noted by other practices such as law firms.

Our updated promotional service brochure that included recruit Ms Pam Logan to the team was circulated to Lung Cancer Nurses and specialist doctors across NSW. Receiving certainty of funding for this service from iCare for another 2 years raised our emphasis on promoting the service.

We have updated two patient information documents that will soon be ready for publication and placement on our website: Preparing for Lung Surgery; and Diagnosis & Treatment: The Journey of a Patient with Malignant Pleural Mesothelioma.

Hopes for 2021

- a. Currently any professional development for the Support Team comes at the expense of patient interactions, and so future planning needs to consider funding for professional development and education.
- b. There is a great need for, and potential to develop a mesothelioma specific information tool for patients as well as mesothelioma education for nurses.
- c. There is an absolute need to continue to support mesothelioma affected families and it is a privilege and pleasure to do so.
- d. The role can and should only but grow.



Publications & Presentations



Publications & Presentations

1. Ahmadzada T, Cooper WA, Holmes M, Mahar A, Westman H, Gill AJ, Nordman I, Yip PY, Pal A, Zielinski R, Pavlakis N, Nagrial A, Daneshvar D, Brungs D, Karikios D, **Aleksova V**, Burn J, Asher R, Grau GE, Hosseini-Beheshti E, Reid G, Clarke S, **Kao S**. Retrospective evaluation of the use of pembrolizumab in malignant mesothelioma in a real-world Australian population. *JTO Clinical and Research Reports*. 2020 Nov 20;1(4):100075. doi: 10.1016/j.jtocrr.2020.100075.
2. **Cheng YY, Yuen ML**, Rath EM, **Johnson B, Zhuang L, Yu T-K, Aleksova V**, Linton A, **Kao S**, Clarke CJ, McCaughan BC, **Takahashi K**, Lee K. CDKN2A and MTAP are useful biomarkers detectable by droplet digital PCR in malignant pleural mesothelioma: A potential alternative method in diagnosis compared to fluorescence in situ hybridisation. *Frontiers in Oncology* 2020 Nov 13; 10:579327. doi: 10.3389/fonc.2020.579327. eCollection 2020. PMID: 33304846
3. GBD 2019 Diseases and Injuries Collaborators (**Takahashi K, included**). Global burden of 369 diseases and injuries in 204 countries and territories, 1990-2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet*. 2020 Oct 17;396(10258):1204-22. doi: 10.1016/S0140-6736(20)30925-9. PMID: 33069326
4. GBD 2019 Risk Factors Collaborators (**Takahashi K, included**). Global burden of 87 risk factors in 204 countries and territories, 1990-2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet*. 2020 Oct 17;396(10258): 1223-49. doi: 10.1016/S0140-6736(20)30752-2. PMID: 33069327
5. GBD 2019 Viewpoint Collaborators (**Takahashi K, included**). Five insights from the Global Burden of Disease Study 2019. *Lancet*. 2020 Oct 17;396(10258):1135-59. doi: 10.1016/S0140-6736(20)31404-5. PMID: 33069324
6. Chimed-Ochir O, **Arachi D**, Driscoll T, Lin RT, Takala J, **Takahashi K**. Burden of mesothelioma deaths by national income category: current status and future implications. *International Journal of Environmental Research and Public Health*. 2020 Sep 21;17(18): E6900. doi: 10.3390/ijerph17186900. PMID: 32967259
7. Rozitis E, **Johnson B, Cheng YY, Lee K**. The use of immunohistochemistry, fluorescence in situ hybridization, and emerging epigenetic markers in the diagnosis of malignant pleural mesothelioma (MPM): A Review. *Frontiers in Oncology* 2020 Sep 9;10: Article 1742. doi: doi.org/10.3389/fonc.2020.01742. PMID: 33014860
8. **Johnson TG**, Schelch K, Lai K, Marzec KA, Kennerson M, Grusch M, Reid G, Burgess A. YB-1 Knockdown Inhibits the Proliferation of Mesothelioma Cells through Multiple Mechanisms. *Cancers (Basel)*. 2020 Aug 14;12(8):2285. doi: 10.3390/cancers12082285. PMID: 32823952; PMCID: PMC7464182.
9. Lau B, Boyer M, Lee JH, **Kao S**. Clinical trials eligibility of patients with malignant pleural mesothelioma: use of novel therapies and outcomes. *Clinical Lung Cancer*. 2020 Jul;21(4):378-83 e1. doi: 10.1016/j.clcc.2020.01.007. Epub 2020 Mar 7. PMID: 32249197
10. Ahmadzada T, **Kao S**, Reid G, Clarke S, Grau GE, Hosseini-Beheshti E. Extracellular vesicles as biomarkers in malignant pleural mesothelioma: A review. *Critical Reviews in Oncology/ Hematology* 2020 Jun; 150:102949. doi: 10.1016/j.critrevonc.2020.102949. Epub 2020 Apr 9. PMID: 32330840
11. Chaw L, Chien LC, Wong J, **Takahashi K**, Koh D, Lin RT Global trends and gaps in research related to latent tuberculosis infection. *BMC Public Health*. 2020 Mar 18;20(1):352. doi: 10.1186/s12889-020-8419-0. PMID: 32183753

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13. GBD 2016 Occupational Chronic Respiratory Risk Factors Collaborators (**Takahashi K, included**). Global and regional burden of chronic respiratory disease in 2016 arising from non-infectious airborne occupational exposures: a systematic analysis for the Global Burden of Disease Study 2016. *Occupational and Environmental Medicine* 2020 Mar;77(3):142-50. doi: 10.1136/oemed-2019-106013. PMID: 32054818
14. GBD 2016 Occupational Carcinogens Collaborators (**Takahashi K, included**). Global and regional burden of cancer in 2016 arising from occupational exposure to selected carcinogens: a systematic analysis for the Global Burden of Disease Study 2016. *Occupational and Environmental Medicine*. doi: 10.1136/oemed-2019-106012. PMID: 32054819
15. GBD 2016 Occupational Risk Factors Collaborators (**Takahashi K, included**). Global and regional burden of disease and injury in 2016 arising from occupational exposures: a systematic analysis for the Global Burden of Disease Study 2016. *Occupational and Environmental Medicine* 2020 Mar;77(3):133-41. doi: 10.1136/oemed-2019-106008. PMID: 32054817
16. Reid G, **Johnson TG**, van Zandwijk N. Manipulating microRNAs for the treatment of malignant pleural mesothelioma: past, present and future. *Frontiers in Oncology*. 2020 Feb 7;10:105. doi: 10.3389/fonc.2020.00105. PMID: 32117755
17. **Cheng YY**, Rath EM, **Linton A**, **Yuen ML**, **Takahashi K**, **Lee K**. The current understanding of asbestos-induced epigenetic changes associated with lung cancer. *Lung Cancer (Auckl)*. 2020 Jan 8;11:1-11. doi.org/10.2147/LCTT.S186843 PMID: 32021524



Financial Summary



Profit and Loss Statement

	2019-20	2018-19
Revenues		
Research	659,554	633,682
Fundraising	781,942	410,796
Government Stimulus payments	208,000	0
Interest	47,458	105,170
Total	1,696,954	1,149,648
Expenses		
Employee Benefits	1,537,547	1,379,251
Research consumables/equipment	141,198	142,575
Office expenses	290,966	321,573
Depreciation	386,406	424,986
Finance costs	138	685
Total	2,356,255	2,269,070
Surplus / Deficit for the period	-659,301	-1,119,422
Balance Sheet	30/06/2020	30/06/2019
Assets		
Cash and cash equivalents incl Term Deposits	3,454,166	3,902,897
Trade and other receivables	195,215	24,254
Property Plant and Equipment	7,217,297	7,589,703
Total	10,866,678	11,516,854
Liabilities		
Trade and other payables	186,976	213,329
Employee provisions	182,642	147,164
Total	369,618	360,493
Net Assets	10,947,060	11,156,361

The figures above have been extracted from the audited Financial Statements of ADRF for the relevant periods.

The full audited financial statements are available from info@adri.org.au.

Fundraising and Partnerships

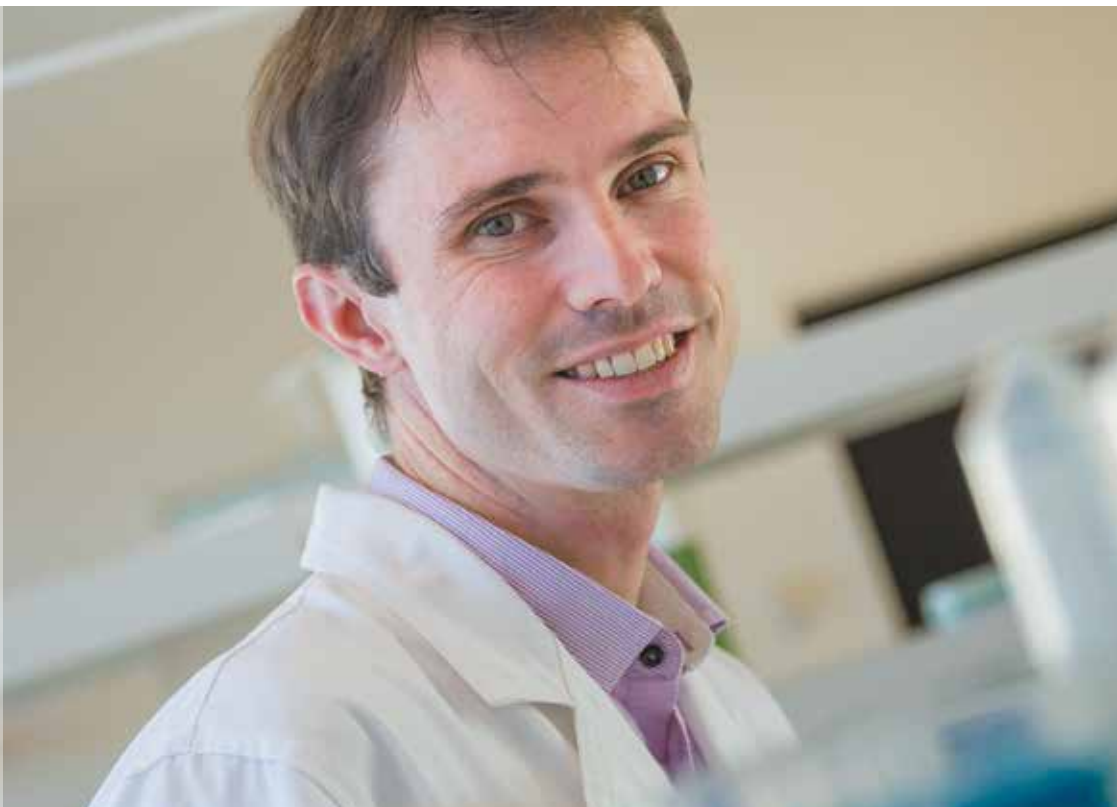


PHOTO PAGE 46 > E/Professor Ken Takahashi, Mr Dennis Hayward OAM and Mr Daryl Melham AM, President of the Revesby Workers' Club, and sponsor of a post-doctoral fellow.

"The Revesby Workers' Club Ltd is committed to supporting the Asbestos Diseases Research Institute. This is key research which, if successful, will alleviate the suffering of many Club members and members of our local community that are affected by this wretched disease. It also has implications around the World, where asbestos is still being utilised with no regard, particularly in third world countries. While asbestos continues to be a cause of concern for public health, the Revesby Workers' Club will continue to support ADRI who will continue to pursue a prevention of this life-threatening disease."

Daryl Melham, President of Revesby Workers' Club

We thank US Benefactor Karen Howard whose generous donation spearheaded our international training programs overseas. We believe that finding new ways to understand and treat diseases like mesothelioma is part of our local and international community responsibility. We reach outside our own borders to support developing countries because if we have learnt anything in Australia, it is the devastation of asbestos related diseases. If we can halt this in any way, we must.



If we are to truly beat asbestos-related diseases, we need to do it together.

The appointment of our Director of Fundraising late 2020 signalled an acceleration of our sponsorship, partnership, and awareness campaigns heading into 2021. With the numbers of those being diagnosed with mesothelioma and ARDs in Australia showing no decline, our work and our mission remain urgent and critical. Consequently, our need for state-of-the-art medical technology and skilled resources is crucial so we must actively pursue a strategic philanthropic program to meet this need.

Like many other organisations, COVID 19 brought serious resource and fiscal challenges however the committed support of our community and corporate partners - built over the years - meant we survived this very difficult climate and we thank them sincerely.

Highlights:

- Increased sponsorship of our Biobank by CSR Limited
- Secured significant funding to rollout international training workshops across 6 developing countries.
- Announced Patronage of the NSW Vice Regal Couple, Her Excellency the Honourable Margaret Beazley QC AC Governor of NSW and Mr Dennis Wilson.

“Our aim is to make asbestos-related disease history. We work day and night thinking about every angle to cure mesothelioma. We think about every possibility”.

Dr Yuen Yee Cheng, Principal Scientist.

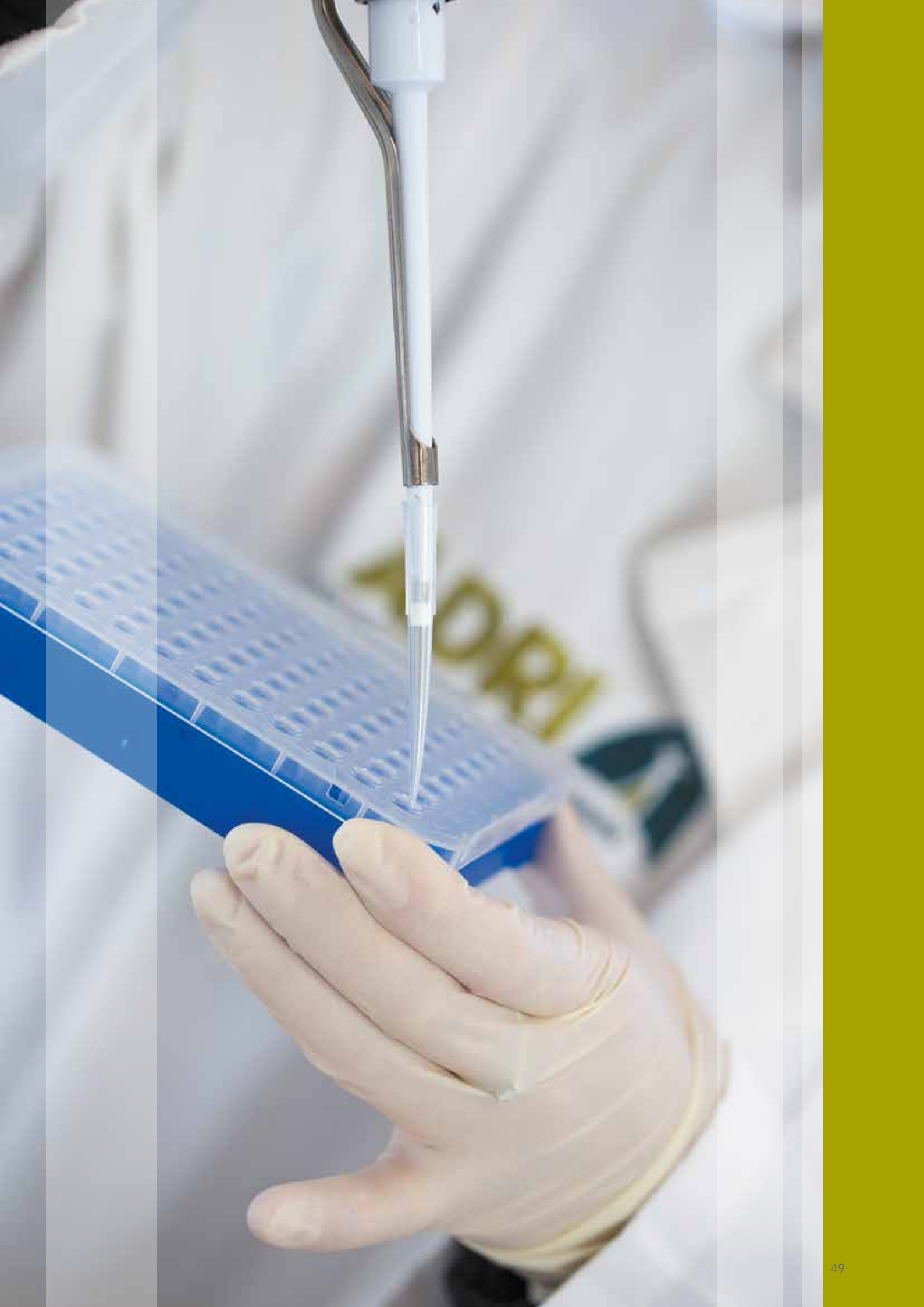
We begin at the microscope, but our end game is a world free of asbestos-related disease.

We urgently need to better understand how this disease develops once the fibres are inside the body to help us unlock clues as to what types of treatment can shift it from being a poor cancer prognosis to one where patients and their families really have something to hope for.

To achieve this, we work across 4 Pillars: Biomedicine, Clinical, Public Health and Prevention and Patient Support. Each pillar has a strategy and complex set of needs which our sponsorship program strives to meet, and we are excited about the potential partnership opportunities going forward.

Every asbestos fibre is dangerous. Every dollar is critical.







Our Supporters

Our supporters make our discoveries possible. The advances in medical research at the ADRI are made possible by our generous supporters. We are proud to acknowledge these gifts, grants and bequests received from 1 January to 31 December 2020.

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