



## **The Australian Lung Health Alliance** **Submission to** **The Strategic Review of Health and Medical Research**

### **Executive summary**

Chronic lung disease now represents one the largest disease burdens affecting Australians. This submission has been prepared by the Australian Lung Health Alliance (LHA) the peak body representing the Thoracic Society of Australia and New Zealand, Asthma Australia, the National Asthma Council Australia, The Australian Lung Foundation, the Australian Respiratory Council and Cystic Fibrosis Australia. Lung diseases create a vast burden on health, well-being, productivity and mortality in Australia with most indicators of disease prevalence showing strong upward trends. The document considers the spectrum of research capacities, from the most basic molecular work, through allied health practises, public health and epidemiology, nursing and physiotherapy through to clinical medicine at the GP, specialist and tertiary referral levels. While Australia has outstanding achievements across these research dimensions in addressing the terms of reference of the Review the document foregrounds increasing concern over the relatively poor allocation of resources to lung disease relative to the burden of disease, the need to foster innovative cross disciplinary research utilising advanced technologies, opportunities to understand disease patterns through clinical informatics structured on a national scale; major weakness in research into early life lung development, fundamental science, clinical translation as well as nursing, physiotherapy and end-of-life palliative care. Concerns are raised regarding the forward research capacity across these disciplines, the particular problem of defining a pro-research stance for the major university teaching hospitals, issues around the lack of protected research time for hospital and clinical specialists and the impact of the negative incentive that lack of defined, funded careers structure creates for future research capacities. Special attention is given to clinical translation of research, to opportunities to better capture the commercial benefits of research and more productive engagement with the Pharmaceuticals and Biotechnology sectors.

## **Introduction**

This document has been prepared by the Australian Lung Health Alliance (LHA), the peak body representing the Thoracic Society of Australia and New Zealand, Asthma Australia, the National Asthma Council, the Australian Lung Foundation, the Australian Respiratory Council and Cystic Fibrosis Australia. In preparing this document the LHA consulted with researchers across the spectrum of activities in Australia. This included researchers at a very early career stage through to the most senior and experienced groups in the country. Attention was paid to consider not only fundamental knowledge generating basic research lead by basic scientists in universities and research institutions: but also allied health research (e.g. nursing, physiotherapy, palliative care) and clinicians from general practice through to hospital based specialist.

### **1. *Why is it in Australia's interest to have a viable, internationally competitive health and medical research sector?***

(Terms of Reference 1 and 6)

## **The current and projected burden of lung disease in Australia**

Each year lung disease causes 19,200 deaths in Australia. Notwithstanding the advantages of the Australian health care system; lung disease places a heavy burden on the Australian population. The majority of serious chronic lung diseases, which include asthma, COPD (Chronic Obstructive Lung Disease - often referred to as "emphysema"), interstitial lung disease (ILD often commonly called "fibrosis"), cystic fibrosis ("CF"), pulmonary arterial hypertension (PAH) and the lung cancers remain incurable. It is our consensus view that the total research effort on strategies to understand the nature of these diseases, their more effective treatment and the practical care and service delivery for these conditions, remain underfunded and under resourced in comparison to other disease areas.

Lung disease is a significant and growing health issue in Australia with 2.6 million cases of lung disease reported in 2007 – 2008. As lung disease profoundly affects functional capacity and quality of life, there is a large and growing cost, not only to well being but also to national productivity... especially as the majority of serious lung disease strike people still in their economically productive years.

## **COPD**

COPD is a devastating chronic inflammatory disease caused by long term inhalation of irritants, most usually cigarette smoke and industrially contaminated air. The reduction in smoking rates is encouraging, but this will not eliminate COPD. There will continue to be a large number of ex-smokers suffering from this condition given the decades long latency of the disease, and the large number of patients developing COPD, despite never having smoked, is a major concern. COPD is more prevalent in any year than most common types of cancer, road traffic accidents, heart disease or diabetes **combined** - afflicting around 2.1 million Australians . By 2050, this figure is expected to more than double to 4.5 million Australians, making it one of the great health challenges of our

time. The majority of COPD patients - around 1.2 million Australians - have disease whose severity affects their daily lives. COPD costs the Australian community billions of dollars in direct healthcare costs and loss of productivity. Around 900,000 Australians have a mild form (Stage I) of COPD where symptoms are often ignored and are at risk of progressing to much more serious and debilitating disease severity grades. No known therapy of COPD can cure, reverse or halt the progression of the disorder. Major research challenges in this condition are understanding its molecular pathogenesis, its relationship to common co-morbid conditions in particular cancer and heart/circulatory disease; the reason why a major subgroup of COPD sufferers is prone to severe life threatening chest infections; how to manage the disease better in the community, sustaining and improving quality of life; finding ways to further improve the marked benefits of pulmonary rehabilitation therapy; and research on optimising nursing care, including community management of the condition.

### **Lung cancer**

Lung cancer is so poorly responsive to treatment that it is now the most common cause of cancer death in Australia and internationally. More than 9,100 Australians are diagnosed with lung cancer each year. More women die of lung cancer than breast cancer and the number of new lung cancer cases for women has been projected to increase by 38% from 2,891 in 2001 to 4,001 in 2011. Although most people think lung cancer is entirely caused by smoking this is not the case, and an increasing number of never-smokers, especially women, are dying from the disease. Major research challenges in this area include the prospect of adding molecular screening to radiological screening to improve its small but meaningful benefit, primary prevention, targeted therapy; cancer genomics; improved radiotherapy; palliative care research to ease the end of life; integrated systems biology (computational biology); linking multi-disciplinary teams; and developing informative tissue banks and data bases on a national basis. Alarmingly, only half of all lung cancer patients receive treatment, and there is an urgent need for research to identify the systemic impediments that prevent access to care.

### **Interstitial Lung Disease and other rare or orphan lung diseases**

Until recently, there was no register of people with Interstitial Lung Disease or rare lung disease in Australasia and therefore the incidence of these conditions is unknown. These conditions are very poorly researched in Australia. The insidious onset of these conditions that lead to progressive, suffocating debilitation, causing profound suffering that can be compounded by a sense of hopelessness given the lack of any effective medicine or therapies.

### **Asthma**

Asthma is one of the most common chronic medical conditions affecting Australians with more than 2 million reported people with asthma in 2007 – 2008. The prevalence of asthma in Australia is relatively high, by international standards, with around 11% of children aged 0 to 15 having the disease and between 9-15% of adults affected. Despite research-led advances in treatment and a consequent substantial fall in death rates, hospital admissions, Emergency Department attendances and unnecessary GP visits, asthma remains under managed. The complex interactions of

factors which cause asthma are not yet fully understood so no prevention or cure has yet been developed.

People with asthma rate their health as worse than do people without the condition; asthma is associated with a poorer quality of life; most of the impact of asthma is on physical functioning and on the person's social and work life. Australians with asthma report worse psychological health than those without asthma and are significantly more likely to take days off work, school or study than people without current asthma.

### **Respiratory infectious diseases**

Viral infections of the upper airway affect nearly every Australian. Although these infections are usually just an irritation for the individual, they are associated with substantial costs to the community in terms of hospitalisation, absenteeism and loss of productivity.

Tuberculosis (TB) continues to be a significant public health priority within Australia. Whilst much has been achieved in TB prevention and control, Australia, has failed to progress toward the strategic target of TB elimination (<1 case per million population) and inequities exist between population specific subgroups. Indigenous Australians have reported rates of TB disease, 14 times greater than Australian born, non-indigenous persons, whilst those born overseas are reported to have rates 39 times greater than those who are Australian born and non-indigenous. Operational research is required to determine better ways of implementing and monitoring TB interventions

Drug resistant TB has emerged as a global problem that threatens TB control programs. In Australia, drug resistance is mainly associated with people born in high-burden TB countries within the Western Pacific and South East Asia regions. This has been recently demonstrated by the highly publicised impact of MDR-TB arising from the Papua New Guinea Torres Strait Islands' zone, almost doubling the national rate of MDR-TB disease (1.5% to 2.8%). There is good evidence that new diagnostic tools used in combination with treatment can have a significant impact on TB control. New technologies are needed for optimal prevention diagnoses and treatment of TB. These advances will require a quantum leap in our understanding of fundamental TB science underpinning the discovery and development of new diagnostics, drugs and vaccines. Building on its TB programmatic achievements, with investment in TB research (fundamental science, operational research, new diagnostics, drugs and vaccines), Australia has the capacity to contribute to local, regional and international efforts to eliminate the burden of tuberculosis.

### **Burden of lung disease**

Approximately 14% of all deaths each year in Australia are a result of lung disease.

Each year, lung disease causes nearly 350,000 hospitalisations in Australia. Much of this is attributable to COPD. COPD is the second leading cause of avoidable hospital admissions in Australia, and is also a leading cause of death and disease burden after

heart disease, stroke and cancer. Infectious diseases account for a large fraction of the burden. Upper respiratory tract infections account for 3-4 million visits to GPs each year (i.e.: six per 100 of all GP consultations) and cost more than \$A150m in direct costs. Between 50 - 90% of hospital admissions for bronchiolitis and 5 - 40% of hospital admissions for pneumonia are due to respiratory syncytial virus infection. ) The toll of lung cancer is increasingly heavy. More than 7,500 Australians die from lung cancer each year (around 20 people per day) and lung cancer has been the third leading cause of death since 1998. Lung cancer deaths have increased from 6,742 in 1998 to 7,626 in 2007, representing an increase of 13%.

### **Economic burden of lung disease in Australia**

In 2008, the total economic impact of COPD is estimated to be \$98.2 billion of which \$8.8 billion is attributed to financial costs and \$89.4 billion to the loss of wellbeing. COPD is more costly overall per case than cardiovascular disease, osteoporosis or arthritis. The total annual health expenditure on lung cancer is estimated to be \$136 million by the Australian Institute of Health and Welfare. However, given that only half of patients access care, and that the cost of therapies, especially new targeted therapies is steep, these costs will increase dramatically in coming decades. Health system expenditure on lung cancer was over \$107 million per annum in 1993-94, with hospital care alone costing the Australian economy \$81 million.

The distribution of the substantial cost for government and individuals is very different for asthma than for total health expenditure. In particular, relatively more money is spent on pharmaceuticals than hospitals. In 2004-05, asthma expenditure was \$606 million: 1.2% of total allocated health expenditure in that year, with over half (59%) attributed to prescription pharmaceuticals. This was substantially higher than the proportion of total health expenditure attributed to prescription pharmaceuticals (15%). Direct health expenditure for asthma care is only one component of the costs of asthma. There are currently few data on other aspects of the economic burden of asthma: for example, personal expenditure and costs incurred by families and carers. The impact of asthma on social and economic participation, including ability to work or study, engage in social interaction and perform other expected roles, also contributes to the economic burden of asthma. One approach to quantifying economic impact more broadly than simply measuring direct health-care expenditure, is the 'burden of disease approach'. In 2003, asthma was estimated to account for 2.4% of the total disease burden in Australia as measured by DALYs [DALY = one year lost of 'good health' due to morbidity or mortality].

Given these large and growing burdens of serious lung disease that afflict a substantial fraction of the Australian population, there is a strong case in our view for systematic funding for lung disease, from its most basic mechanisms through to improving the delivery of services for patients.

One important aspect of funding that can be overlooked is the importance of attracting and retaining high calibre researchers within Australia. Australian lung research is highly valued internationally as indicated by the number of publication citations of Australian

researchers in the international scientific literature. Retaining key experts and attracting new talent is essential to maintaining high level research capacity and the collateral benefits in terms of patient care, education and economic enrichment that flow on from this expertise. Part of this benefit is maintaining and extending the attractiveness of Australia as a locus for investments made by pharmaceutical and biotechnology firms, eager to place their enterprises in proximity to scientific and clinical experts.

These benefits have a flow-on effect, not only domestically but also internationally, especially in developing countries in the region, where Australia has an important leadership role in lung health. Important examples include endemic tuberculosis in Papua New Guinea and research coordinated through peak lung bodies across the Asia-Pacific region where Australia is also a centrally important country for basic and clinical training.

Australia has some of the world's leading researchers in the field of lung disease. New discoveries that flow from basic and applied research offer Australia the opportunity not only to build knowledge, and reduce the impact of disease, but also to derive revenue from exporting technology or medical products. A specific recent example is the development of mannitol as a diagnostic and therapeutic agent. An important ancillary benefit to the Australian economy is the attractiveness of Australia as a venue for large, high level scientific conferences. Australia for example will host the World Lung Cancer Conference in 2013 expected to bring around 7,000 visitors and an estimated \$40 Million to the economy

A vibrant and broad lung disease research sector is essential to directly inform research priorities in Australia. There is compelling evidence that centres that are research active are more likely to offer the most effective proven therapies and to be the first to access world leading treatments, which in the case of diseases like cancer and Pulmonary Arterial Hypertension, have had dramatic life-extending benefits.

Scientifically, it is essential that major research directions and findings are replicated here to ensure optimal outcomes for Australian patients, rather than drawing inferences from the overseas international literature, where the pattern of disease and its management is not necessarily well aligned with patient conditions here in Australia.

Given that early life events determine whole-of-life lung health there are striking deficiencies in understanding what can be done practically antenatally, and with infants and children, to optimize lung health and prevent disease.

There will be no cures or remissions possible without a fundamental investment of substantial resources into basic mechanisms related laboratory research which we strongly advocate. We are also strongly of the view that health and research is as much about bench top/laboratory science as it is about social policy and service delivery research. Without social research relevant to Australia, we will not be able to respond at a policy and program level to the health reform agenda and build a sustainable health system. Furthermore, there is a compelling need to ensure that consumers have a voice in this. It is important that Australian consumers inform research that in turn informs Australian social policy and public health measures.

**2. *How might health and medical research be best managed and funded in Australia?***  
**(Terms of Reference 2, 3 and 7)**

**a. Project based research, programmes, CRC Australian Research Council - NHMRC funding**

Funding via NHMRC and the Australian Research Council (ARC) remains the mainstay of project-based funding for lung disease research. However there are a number of concerns with this:

- The low proportional allocation of funding in relation to disease burden.
- The nature of the review process which provides little tangible feedback and does not offer the possibility of refining submissions between funding iterations.
- The absence of special funding initiatives for lung disease; and
- The lack of support for building and maintaining research capacity.

We believe that consideration should be given to specialised funding streams designed to help leverage access to, and success with, major international funding agencies such as the Gates Foundation, EU framework, National Institutes of Health for project and special initiatives research. A major effort needs to be funded to facilitate true cross-disciplinary research so that advanced methods, computational approaches and technologies can be brought to lung health research

**b. Development of national data and tissue collections, reformed framework for large scale collaborative projects**

A particular issue is the desire to set up national networks, databases and projects of broad utility which are often frustrated by too narrow an interpretation of conflict of interest. Future reforms should pro-actively foster cooperation on infrastructure (data bases, tissue collections, outcomes research) in a reformed framework with reconsideration of the meaning of 'conflict of interest' where cooperation on such future schemes would be declared for the public record, but not be deemed a high level conflict. We do not propose to reform the meaning of high level conflict of interest currently operating for project and program grants.

In addition to these points, we are concerned about a number of other structural impediments to research. One of the most important of these is the imperative to change the role and mandate of public teaching hospitals to include research. There is currently a major need to define a funding structure that would create Protected Research time for physicians and hospital-based fellows in the public hospital system. As we move to a greater emphasis on translational and outcomes focussed research, this problem could not be more acute. While the establishment of the Practitioner Fellowship Scheme has been welcomed, this mechanism is grossly underfunded when

balanced against staff specialist hospital salaries, let alone private practice incomes. Even so, the scheme has become so competitive that it is no longer a viable option for most mid-career physician-scientists. Within the hospitals and teaching universities, there is concern about the nature of funding structures that mitigate against building and maintaining research capacity. There is significant concern about the very low numbers of physicians entering full- time or part-time research, and additionally, grave concern about the extreme difficulty of securing NHMRC research fellowships, especially for work that has a translational imperative.

While public sector funding is the mainstay of research funding, the LHA advocates that attention should be given to reforming the regulatory and tax framework around private and corporate philanthropy to make giving easier and much more fiscally attractive

Reforms that should be considered would allow more jointly funded research effort shared between suitable charities and government funding bodies such as the NHMRC. Extending this idea, there is an untapped opportunity for leveraging translational research with commercial enterprises, which is likely to provide a substantial leverage on available public sector funding.

This would involve much stronger government / private sector and community partnerships. The LHA believes that there is an opportunity for government to develop funding programs where the private sector, philanthropy or disease-focussed charity could match dollar for dollar the government funds invested, and thus grow the pool of funding for research. Review of the tax framework to facilitate giving would aid this process.

Standardisation of grant applications to find efficiencies across sectors would be very welcome- currently the major difference in data basing applications across ARC and NHMRC is an impediment to cross disciplinary research.

**3. *What are the health and medical research strategic directions and priorities and how might we meet them?***  
***(Terms of Reference 5, 12 and 13)***

**a. Priority areas of research**

There is an urgent need to develop capacity and expertise in all levels of medical informatics from fundamental bioinformatics through to hospital and health care provision data base. These tools would provide a major part of the future evidence base for both fundamental and applied research. To date, the informatics in the lung sector is at an incipient stage of development. An allied priority is the creation of data registries for disease areas with limited information such as the disease bronchiectasis.

**Accessing advanced technology:** Australia has a sophisticated physical research infrastructure in its major research centres, but cross disciplinary research that would access these technologies remains difficult to both fund and initiate. Programs targeted at fostering strong, truly cross disciplinary research would advance the field.

Consideration should be given to actively supporting and fostering a nation-wide mentoring pool or program. It is a near universal experience for successful and productive researchers that they almost always started their research journey with a mentor.

Much further work can be done to develop trials groups around strategic health priority areas as exemplified by the work of the Australian Lung Foundation bringing together the Australian Lung Cancer Trials Group which now has 380 investigators from around the nation.

We are convinced that there is a strong need for funding of Investigator Initiated Research (as opposed to pharmaceutical industry sponsored research) on the best use of medicines.

There is also a great opportunity to reduce the burden of lung disease by early detection of disease. While we have a wealth of knowledge about early detection, it does not translate into better disease management at the grassroots level. Applied research is needed to understand the reasons for this, and to develop demonstrably effective interventions.

**Prevention:** In areas where there are known behavioural and environmental risk factors; there needs to be a strong focus on behavioural research and social and environmental determinants of health in order to develop, test and successfully implement effective strategies which modify people's behaviours and the environment to reduce health risk. This type of research is frequently viewed as low level, and is near impossible to fund through conventional project- based mechanisms, despite its considerable potential benefits.

**Air quality:** in the external environment, the workplace and the home is a major determinant of lung health. We need to undertake significant research to measure and report on the quality of the air we breathe.

**Behavioural research:** A great deal of the future lung burden is avoidable if behaviours that affect lung health could be more effectively modified, however this has proven extremely difficult. More research is needed to develop demonstrably effective programs for behavioural change that work in an Australian context. Across many diseases, there is knowledge that certain behaviours will reduce risk and symptoms; however there are barriers to people undertaking the recommended behaviours. Research is needed to better understand these barriers so effective interventions can be developed.

**4. *How can we optimise translation of health and medical research into better health and wellbeing?***  
***(Terms of Reference 4, 8, 9, 10 and 11)***

**a. The start of life and antenatal care**

There is now very good evidence that insults to the developing foetus and to the lungs of infants and young children, may exert a profound effect on later lung health. Such insults include poor nutrition, parental smoking (both genders), infection and poor air quality. These insults can retard or inhibit lung development, leaving the individual with reduced respiratory reserve, and also causing epigenetic alterations to the pattern of genes affecting lung function and immunity, that may manifest as serious diseases including asthma and COPD. There is a great need to understand the basic mechanisms of these early changes and to research the practical means by which avoidable insults can be removed from early life environment.

**b. Whole of disease: the burden of comorbidities.**

Patients suffering from serious lung diseases frequently have their condition and quality of life worsened by a substantial burden of co-morbid disease. Around half of all COPD patients die from a cardio-circulatory condition. Many severe asthmatics, COPD patients and cystic fibrosis patients suffer from bone loss, and many experience substantial loss of skeletal muscle mass and strength. There is an urgent need to understand the molecular causes of these problems so that therapeutic strategies that target all-of-disease can be developed. There is an equally urgent need to understand the practical clinical interventions that might best improve and maintain the health of lung disease patients with co-morbid conditions.

**c. Fostering true translational research, linking basic researchers with clinical experts and with consumers**

Translation of basic research into clinical and/or policy interventions that are effective, is a precondition of moving discovery to benefit. There is a pressing need to foster the development of translational networks that link the most experienced clinicians with leading basic researchers, across diverse disciplines, to enable major advances in our understanding of the nature of disease. Such clusters might best be situated in, or in close proximity to, a university teaching hospital.

Similarly, there is an urgent need to connect researchers and clinicians with consumers. In some areas, good scientific evidence exists but this is not translated into effective primary health care and self-management. In the case of asthma, health professional and consumer adherence to best practice asthma management in Australia is poor; for example, up to 90% of people on asthma medications do not use them properly.

**d. Achieving true cross-disciplinary research: linking technologies with medical problems.**

Currently, it is difficult to catalyse research that links lung expertise with disciplines not traditionally viewed as part of lung disease research, such as engineering, physical, economics, mathematics. Transformative research requires fostering multidisciplinary and unorthodox approaches that are difficult to fund within current structures,

**e. Interactions with the private sector with particular reference to the pharmaceutical and biotech industries**

Industry provides the final reduction-to-practice of research in that it creates the end-user medicines and therapies, and brings them to patients. There is a continuing strong need to foster interactions with industry so that Australian innovation can be developed into commercially viable products that enrich the local economy as they assist patients.

**f. Evidence bases and monitoring**

Australia has led the world with the quality and relevance of its asthma monitoring programs but the wider lung disease burden remains poorly understood. There is an urgent need to build on current expertise in disease monitoring so that the best evidence is at hand on the nature of disease, and so that the impact of research and policy intervention can be objectively assessed for its degree of benefit and cost effectiveness

**g. Outcomes and service delivery research**

From a national perspective, patient outcomes are poorly understood for the majority of lung diseases. There is an urgent need to develop the information systems that will allow the effects and benefits of care to be measured so that, iteratively, lung health can be continually improved.

**h. End of life and palliative care research**

Death is a frequent outcome for many of the most serious lung diseases. There is an urgent need to better understand and research end-of-life medicine so that the final stages of lung disease can be better managed.

**i. From a health perspective – initiate and increase research into quality assurance**

As part of this pattern of need for understanding the disease in communities, there is a continuing need to research and develop quality assurance measures across all aspects of lung medicine in order to most effectively improve lung health and its management.

**j. Provide assistance in patenting and similar support for research when it reaches the bedside**

The relative lack of successful commercialisation of Australian innovation domestically, and for international export, remains an area of considerable concern. There is a strong case for continuing research within the economic and legal spheres to understand the structural impediments that continue to impede commercialisation of Australian lung health research. A new and concerted approach is needed to:

- Communicate the new knowledge within a marketing and communications strategy that goes beyond publication in peer reviewed journals.
- Identify those policies, professionals and consumers for whom the new knowledge is relevant.

**k. Improving communication with patients and the community.**

Communication of medical research is at one level highly sophisticated, as Australian lung research is frequently published in journals of the highest international standing. There is a continuing need to research the means by which the recommendations from levels of evidence can be communicated, disseminated and translated into forms of information that are most useful for the spectrum of lung health stakeholders, for example, practice tips for primary care health professionals. There is a particular need to effectively communicate this information to patients and carers, and to relevant policy makers who are unlikely to have a detailed understanding of lung medicine.

Part of this effort would include working with basic and clinical researchers from the point of research design, to develop the means to integrate an implementation strategy which addresses those whom the research will benefit; and how the new knowledge will be communicated to support this process. This is not a core skill or even a valued activity which is part of basic research. Ideally, we should have partnerships from the outset of the research to ensure implementation relevance throughout, as well as strategic communication, and hence adoption of the findings.

There is a particular opportunity now to utilise existing consumer and community groups that already have reach into, and the trust of, communities. There is a practical research need to find the best methods to create face to face and online forums to bring together researchers, practitioners, consumer health organisations and consumers. There is a great need to understand how contemporary electronic communications can be best utilized in the service of lung health

**l. Linking with environmental research**

Lung health is a product of the dynamic between the individual and their environment, including air quality. Australia is well positioned to build a strong collaborative research community that brings together environmental and medical research.

#### **m. Primary care**

Research on the patterns of primary care and its role in disease management and prevention remains an area of continuing weakness in Australia. Yet, the cornerstone of primary healthcare is about prevention through the integration of all parts of the health sector - GPs, NGOs and community health groups – partnering and making use of relevant resources and channels of communication. There is a pressing need to research how this integration across the health sector can be catalysed to help bring new research and ideas into the mainstream of patient management. This need seems particularly urgent as serious lung disease are increasing managed within the community in partnership with GPs and other primary care health professionals.

#### **Conclusions**

Australia has a well developed lung research culture and in many cases outstanding achievement. However the huge burden of lung disease and the suffering it causes provide a compelling ethical and medical argument for much greater research funding. This research should continue to include a large proportion of fundamental science. This class of research increasing needs to be undertaken in a cross-platform and multidisciplinary setting. The full benefits of original research can only reach patients if there is a strong and committed clinical translation culture. The pressure for service delivery at the cost of translational research that limits the ability of physicians and allied disciplines to participate in translational research remains a fundamental challenge for future research support strategies.

Thank you for the opportunity to have our say on how Australians can work together to both achieve more meaningful outcomes and identify new types of support to underpin the future of Australia's health and medical research sector.

Please do not hesitate to contact William Darbishire on 07 3251 3600 or [williamd@lungfoundation.com.au](mailto:williamd@lungfoundation.com.au) if there are any questions or additional information required in relation to this submission from the Lung Health Alliance.

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