

MS Research Australia 5 Year Impact Report 2005–2010



**Accelerating research towards the
prevention, better treatment and a
cure for MS**



5 YEAR REPORT CARD

Letter from Jeremy Wright

When MSRA was established in late 2004, there was less than \$1m committed to MS research. In partnership with researchers and the community, MSRA has been the link between high quality research taking us closer to a cure, and the wider community eager to see this debilitating disease defeated.

As a research focused organisation, we have worked hard to change the environment. By funding the best research. By generating new national collaborations to address the questions that no one researcher can answer alone. By lifting MS research into the international spotlight. This report card reflects that change.

In the process, MSRA has increased the amount of funding available for MS research five-fold in the last five years. With our community fundraising arm, Foundation 5 million, the team has almost reached their goal of \$5mill. And this is part of \$20mill in total that MSRA has raised so far that will make a major impact in advancing Australian MS research.

I would like to thank all of our researchers, sponsors and supporters for their generosity over the years. Together, we can accelerate MS research to reach our ultimate goal – a cure for MS.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jeremy', with a long, sweeping horizontal stroke extending to the right.

Jeremy Wright
Executive Director
MS Research Australia

Our research strategy involves three elements:

1. to facilitate Australian MS research that can contribute to the world-wide effort
2. to accelerate MS research collaborations
3. to work in partnership with major medical research institutes, developing a national MS Research portfolio

This strategy translates into national collaborations called Platforms and Investigator-driven Projects. MSRA's robust governance process ensures only high quality research is funded.

Platforms

Platforms tackle the challenging research questions that no one researcher can solve alone. So far MSRA platforms have identified genes involved in MS susceptibility (ANZgene), established Australia's first MS-specific bank of human tissue (MSRA Brain Bank), demonstrated the MS latitude gradient (Ausimmune) and tracked the social, physical and economic impact of MS since 2000 (The Australian MS Longitudinal Study).

Projects

Each year MSRA funds projects across five research streams: Social and Applied Research, Genetics & Epidemiology, Neurobiology, Immunology & Virology and Clinical Trials. Often MSRA has attracted further funding to extend the project, or the results have generated larger projects that have attracted funding from the National Health & Medical Research Council (NHMRC).

Governance

MSRA and its Board are committed to the highest standards of corporate governance. The MSRA Research Review Board and Research Management Council are responsible for maintaining MSRA's rigorous and robust governance process to ensure all contributions to MSRA support the best quality MS research, that will provide the greatest impact.



"Our MSRA grant allowed us to test and expand our novel idea, and to generate enough data to obtain funding from the NHMRC. It is extremely difficult to obtain funding for early research, and without this assistance from MSRA, it would not have been possible."

Dr Melissa Gresle, Florey Neuroscience Institutes

Melissa was awarded \$26,000 that subsequently attracted \$498,625 in additional funding, and established collaborations with researchers in the US, China and Australia.



AUSTRALIAN MS LONGITUDINAL STUDY

The **Australian MS Longitudinal Study (AMSLS)** is MS Australia's national research database of People with MS, which was inaugurated in 2000.



“The AMSLS is critical to understanding the full impact of MS on Australian society, including the individual and overall community cost so that we may be able to provide this essential help. One sixth of the Australian MS population helps with this long-term research study.”

Dr Rex Simmons

Some of the key insights generated by the AMSLS include:

- MS costs Australians \$2 billion annually. According to the 2005 Access Economics Report based on the AMSLS, It set the benchmarks of \$660million in direct costs for MS in Australian and another \$1.3 billion for 'disease burden'.
- PwMS losing their employment at startling high rates: in comparison with other chronic diseases such as arthritis and diabetes, 56% of respondents were out of work, and 64% had left paid employment permanently.
- Men are more susceptible than women to employment loss because of their MS.
- The AMSLS helped to obtain new medical cooling rebates for electricity used by People with MS. AMSLS showed that Australians with MS on average spent ten times more on air conditioning than those in the general population.
- Depression is associated with fatigue and cognitive dysfunction to negatively impact the quality of life for People with MS.

Researchers worldwide have demonstrated encouraging progress towards a cure for MS. Nevertheless, there are over 20,000 Australians with MS who need practical help today. MSRA funds social and applied research to find ways to better manage the symptoms of MS.

Highlights

Prof Karen Dodd from La Trobe University has conducted the first rigorously controlled trial to examine the effects of progressive resistance exercise on People with MS with walking difficulties. The program successfully increased leg muscle strength and endurance, with no increase in muscle stiffness or sensory problems. It also reduced feelings of fatigue, and for some people eased muscle spasm.

Prof Tanya Packer from Curtin University of Technology has evaluated the effectiveness of an online fatigue self-management program to help People living with MS. Fatigue is described as one of the worst symptoms and the one most difficult to treat. One of the outcomes has been a two-day face-to-face workshop for ten MS therapists to train in the theory and practical scenarios using a range of strategies.

"My MSRA funding helped me complete my PhD training. It opened new opportunities to collaborate nationally and internationally and gain a highly sought after NHMRC postdoctoral fellowship."

Dr Phu Hoang, MS Society

Phu was awarded \$15,000 which helped develop technology to measure stiffness of muscles and tendons in MS and other neurological conditions such as stroke, and spinal cord injury.



Effective Management of Optic Neuritis



Optic neuritis is a common MS symptom. Prompt treatment can result in faster recovery. Patient knowledge and motivation is vital to ensuring optimal management. However, suitable information is not always available.

Celia was awarded the first co-funded NHMRC and MSRA Fellowship to translate published evidence into practical programs for People with MS. Her work will deliver evidence-based education, informing patients of the research that supports the available treatments and develop an action plan so patients recognise the symptoms of optic neuritis and know how to respond.

Dr Celia Chen, Flinders University



ANZgene

In November 2005 at the World Congress of Neurology in Sydney, Prof Graeme Stewart (Uni of Sydney) first suggested using an Australian Research Council (ARC) grant, with MSRA as Industry Partner, to establish a national collaboration in MS genetic research.

Then a milestone meeting in October 2006 chaired by Prof Trevor Kilpatrick (Uni of Melb), hatched a strategy to find MS susceptibility genes, so an ARC grant writing team assembled. The research group included Drs Melanie Bahlo and Justin Rubio (Uni of Melb), Prof Rodney Scott (Uni of Newcastle) and A/Prof David Booth (Uni of Sydney, Westmead) with other investigators from the Universities of Griffith, Tasmania and Sydney West Area Health Service (SWAHS).

In May, 2007, the ARC application "Identifying genes that influence clinical course and susceptibility in MS" was approved and (together with funds from the John T Reid Charitable Trusts and the Trish MS Research Foundation)

Ausgene was born.

Prof Jim Wiley (from SWAHS) was nominated as Chair, with MSRA as Secretariat, and the next stage was launched from an August 2007 meeting in Manly – including Dr Stephen Sawcer from Cambridge (UK), who led the International MS Genetic Consortium (IMSGC). It was agreed to send 2,000 MS DNA samples to the IMSGC study, and use 2,000 for the AUSgene study, also utilizing 1500 (saliva) samples collected from MS patients in New



A/Prof David Booth

Zealand (via Dr Bruce Taylor). So Ausgene became **ANZgene**.

Prof Matthew Brown's group undertook the genotyping at the Diamantina Institute (Brisbane), with gene expression and miRNA microarrays underway at Westmead and Newcastle. Dr Jim Stankovich (Menzies Institute) analysed the data, and the best 100 (gene) associations were chosen and genotyped. When these results were analysed, two hits with the required significance were identified – **we had discovered two new MS genetic regions**

Dr Rubio co-ordinated the *Nature Genetics* paper describing the discoveries, (June 2009). Further downstream studies have been implemented and a follow-on NHMRC grant awarded in 2009. The now 40-strong team has continued to meet and ANZgene data were used in a meta-analysis for the IMSGC study – that has recently identified the remaining MS genes.

From these national and international studies **we went from knowing one gene associated with MS in July 2007, to knowing nearly 50 genes by October 2010**. The ANZgene collaboration has made considerable contributions to the IMSGC and to the world's knowledge of MS.

Source: A/Prof David Booth



"My MSRA funded research suggests a small genetic change in a gene involved in immune regulation may have a large effect on the way in which it functions. MSRA has given me the opportunity to complete important research in MS genetics, both directly through this project and also through the broadening of my activities to other gene targets identified by the ANZgene discovery of two novel genetic loci associated with MS. Without this funding and support from MSRA, my involvement in this work would potentially have been diminished."

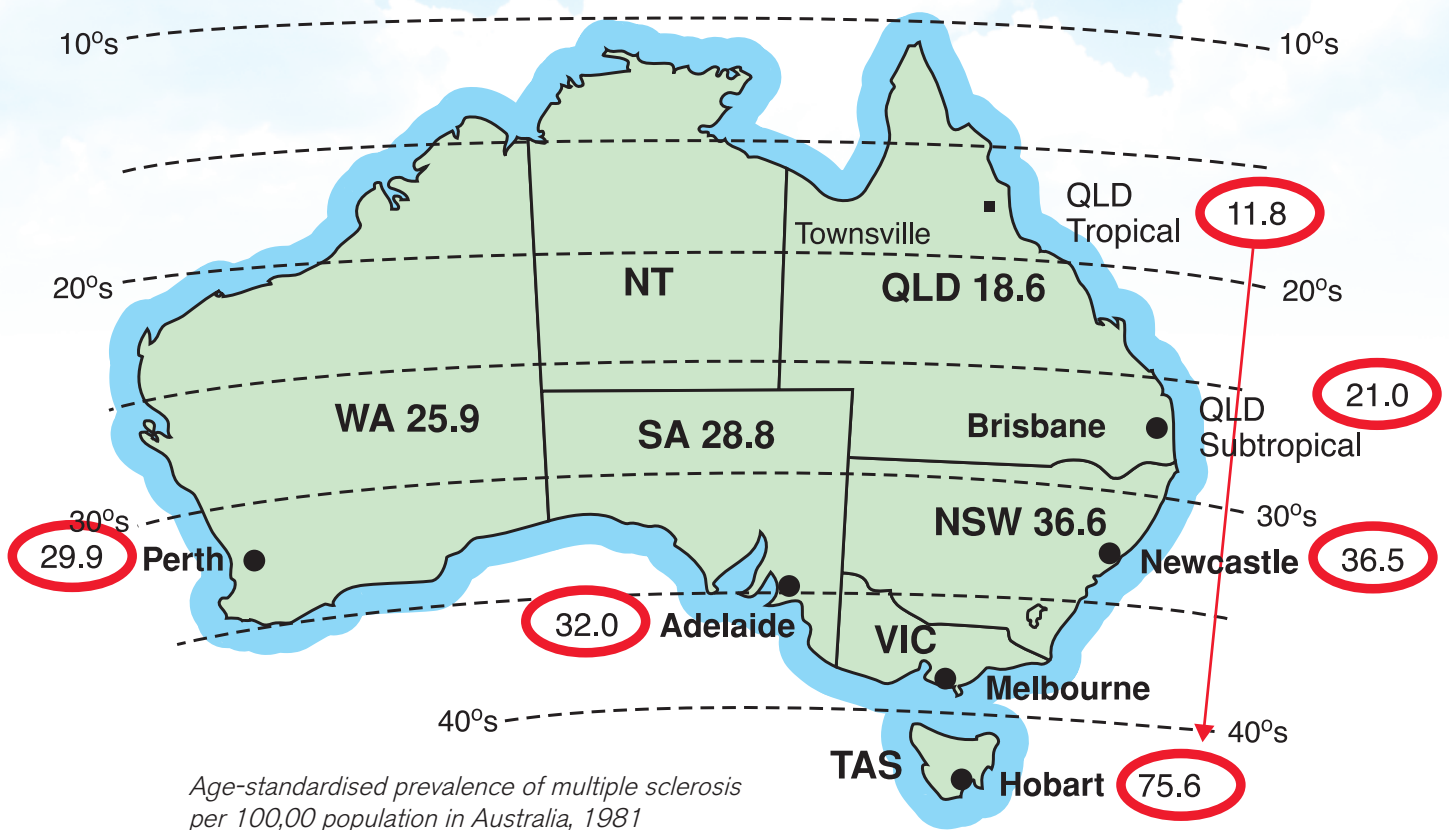
Dr Judith Field, Florey Neuroscience Institutes

Role of vitamin D and MS

The effects of environmental factors on the human immune system are not yet well-known. We do know that the immune system can be influenced by infection and exposure to sunlight.

The Ausimmune study investigated how environmental factors influence MS and how immune disorders vary by latitude across Australia. The study regions include Brisbane city, the Newcastle region, the Western Districts of Victoria and Tasmania.

MSRA's investment in the Ausimmune study has demonstrated that there is a **latitudinal gradient** in the incidence of MS, this means the further away from the equator the greater the risk of developing MS.



MSRA Prevention Trial

Ausimmune and Anzgene suggest a role for vitamin D and sunlight in MS susceptibility. This evidence has been the impetus for developing the MSRA prevention trial. This trial will determine if vitamin D can delay the onset of MS in highly susceptible individuals.

- Reducing the rate of conversion to definite MS after a first attack by 25% would markedly reduce the disease burden.

Proteomics

MSRA in partnership with the Australian Research Council are embarking on a study to discover the proteins that cause MS. The research is a major national MS collaboration between three Australian universities and the Sir Charles Gairdner Hospital, with the University of Adelaide as lead institution.

“At each of these major stages, certain genes are activated. Those genes express proteins, and we believe these could have the effect of switching the disease on and off. If we can discover the key MS proteins and their roles, we could go a long way to finding potential cures for the condition,” **Prof Shaun McColl**.

The aim is to define the pattern of proteins of immunological cells in animal models of MS. Subsequently, the work will investigate proteins that are identified to specifically cause MS in order to develop new treatments. This project will establish techniques to extract and purify proteins at three stages during the disease course: before the onset of disease, during a relapse and during remission.

MSRA in International Agreement on the Future of Stem Cell Research

International MS researchers and the MS Societies around the world, including MS Research Australia, produced an international consensus on the future stem cell – based approaches, paving the way for more coordinated global research efforts. The result is potentially better, and quicker access to stem cell clinical trials for patients.

As part of his PhD, Scott developed and tested a technique that can predict visual function and retinal degeneration associated with optic neuritis (blurry vision), a common MS symptom. By understanding the link between injury and disability it will be possible to optimise treatments for the best outcomes.

Scott has excelled in his research and has been recognised with several prestigious awards including two ECTRIMS Young Investigator Awards. His research attracting a grant from the National MS Society (US) of US\$300,000.

“MSRA funding allowed me to concentrate on my research full time and to take on greater responsibilities within the laboratory such as co-supervising junior students and organising cooperative learning and teaching events.

Dr Scott Kolbe, Florey Neuroscience Institutes





MS is a uniquely human neurological disease and studying brain tissue from people with MS is imperative to increase our understanding of the disease. As brain tissue is not available for study during a patient's lifetime, scientists rely on MS patients and their families to donate post-mortem tissue.

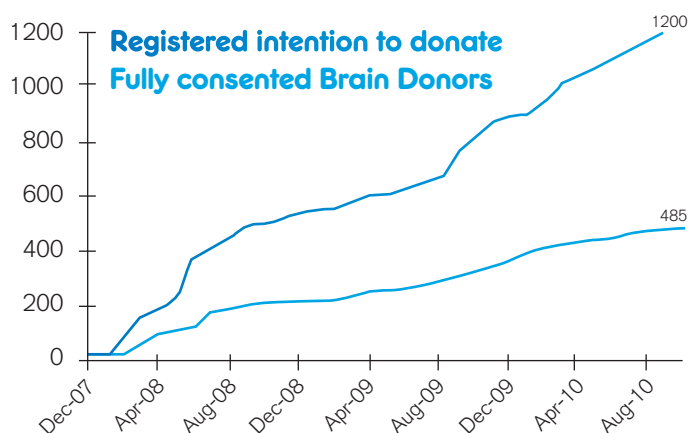
The MSRA Brain Bank gives people with MS the opportunity to make one of the most valuable donations to the next generation... their brain, which can be used for MS research to assist with finding a cure.

People with MS have rallied around the MSRA Brain Bank developing a community dedicated to finding a cure for MS.

The MSRA Brain Bank collaborates with the Australian Brain Bank Network to retrieve brains as rapidly as possible after death. Nineteen MS brains have been banked so far, twelve of which have collected in less than 24 hours making the MSRA Brain Bank one of the world's best sources of human tissue specifically for MS research.



MSRA Brain Bank teams at the MS Mega Swim & MS Fun Run



Two MS tissue requests have already been supplied to Australian researchers, with a further eight research groups expressing an interest in using MSRA Brain Bank material when more tissue becomes available. Ultimately, the success of the MSRA Brain Bank will contribute to key discoveries that impact on the lives of people with MS.

Prof Simon Hawke, Director, MSRA Brain Bank
Dr Teresa Wong, Project Manager, MSRA Brain Bank

MSRA Brain Bank Supporters



The University of Sydney

Highlights

Dr Alison Jennings from the University of Western Australia was awarded \$25,000 and showed that meaningful analysis of human MS tissue to identify the cells involved in MS neural damage (demyelination) and repair (remyelination) is possible. On the back of these positive results, MSRA awarded Alison \$210,000 to identify the cells involved in the repair process during MS with a view to promote repair or prevent the damage in the first place.



"MSRA's impact on national and international MS research has been enormous, and its funding creates leverage opportunities with NHMRC and ARC, as well as internationally."

A/Prof Helmut Butzkueven, Florey Neuroscience Institutes

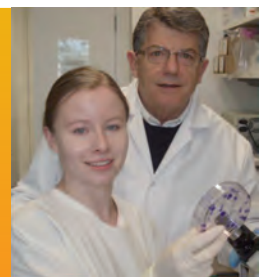
MSRA and the Trish MS Research Foundation have supported A/Prof Butzkueven from 2006 with \$160,000. He has since been able to attract \$1.91m in further funding – a twelve-fold return on investment.

Laura Gianni from the University of Melbourne's special interest in MS has driven her to great heights. Since receiving a Bachelor of Biomedical Science (Hons), Laura has begun her PhD under the supervision of MS research expert, A/Prof Anthony Purcell at the University of Melbourne, a hub for MS research.

Her focus on biomarkers has the potential to revolutionise clinical practice.

"MSRA's funding has allowed me to develop the skills to build a successful scientific career. I have presented to the scientific community at a national and international level. I will also be at the 10th International Congress of Neuroimmunology where I will meet leading world researchers that work specifically on stem cell therapy for the treatment of MS."

Natalie Payne, Monash University



Highlights

Prof Michael Pender at the Queensland Institute of Medical Research has received \$550,000 since 2007 to investigate the role of the virus that causes glandular fever (called Epstein-Barr Virus or EBV) as a potential trigger of MS.

Typically the number of EBV-infected immune cells is kept under strict control by immune regulatory cells. Prof Pender's research suggests that People with MS have reduced numbers of regulatory immune cells capable of responding to their own EBV-infected cells. Furthermore, Prof Pender has found it may potentially be due to a small genetic difference. Prof Pender's work would potentially support looking at prevention and treatment by vaccinating against EBV or boosting immunity in people susceptible to MS.

Dr David Brown at The University of NSW was awarded \$25,000 that paid for the reagents within a NHMRC grant of \$400,000 to define a new mechanism by which the central nervous system could influence immunity against itself. The outcomes from



Prof Pender and Research Officer Peter Csurhes in the laboratory.

this work may generate novel therapies to treat MS.

Dr Judith Greer from the Centre for Clinical Research, University of Queensland, is a world expert. Her focus on the brain's role in immunological responses has lead her to work on the most abundant myelin protein, myelin proteolipid protein (PLP).

Dr Greer was one of the first researchers to identify that PLP can induce different patterns of MS-like disease in animals. A research grant from MSRA has allowed her to continue her work into PLP with the hope of developing a powerful treatment for MS.

"I have had a very strong relationship with MSRA throughout this project. I am extremely grateful for the support that I have received and continue to receive"

Brett Drummond, University of Melbourne

Brett is about to submit his thesis, funded by MSRA to examine the role of protein modifications in MS.





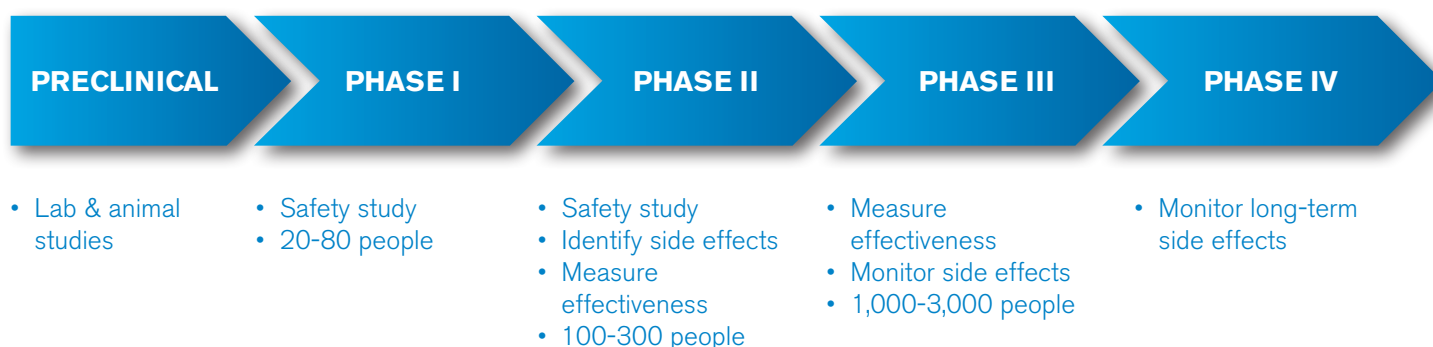
MSRA Clinical Trials Network

Clinical trials help to determine if a drug is safe and effective. People with MS who are willing to volunteer in these studies make it possible for all of us to look forward to new and better therapies.

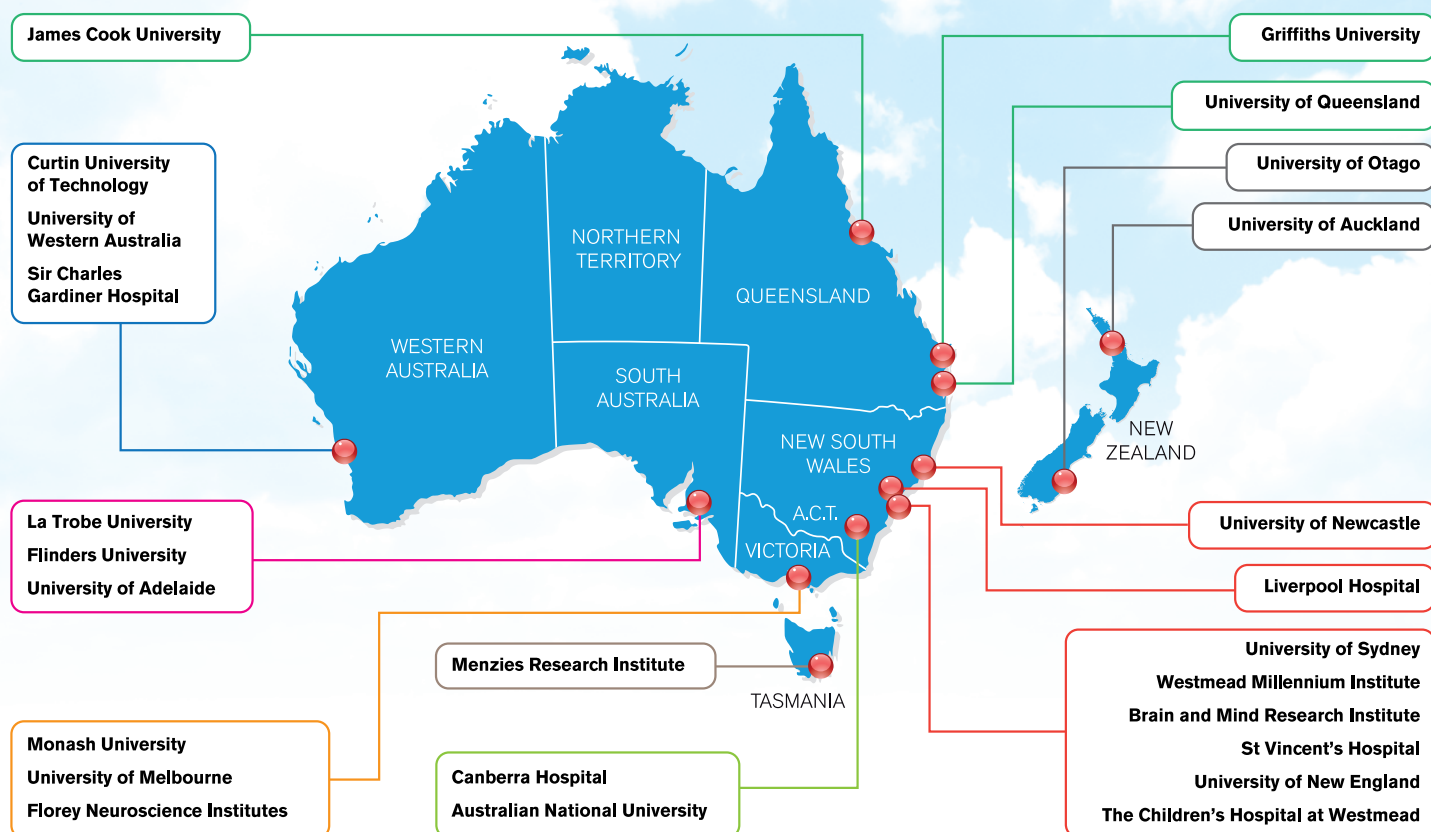
Modelled on other successful clinical trials networks, our aim is to:

- Increase patient awareness about trials
- Improve the opportunity to participate in trials for both patients and neurologists
- Enhance contact between trial centres and potential participants
- Streamline the interaction between trial sponsors, trial sites and patient communities
- Enhance trial sponsors awareness of Australia's capacity to undertake MS trials
- Assist with both industry sponsored and investigator initiated studies

Since its establishment, MSRA has connected many neurologists to new MS clinical trials quickly and easily. It has also developed an online register of MS clinical trials recruiting People with MS and established a critical mass of support including funding from the NSW Government's Office for Science and Medical Research, to accelerate clinical trial activity in Australia.



Since 2006 MSRA has played a role in expanding MS research across Australia and New Zealand



Accelerating Collaboration

MS is a complex disease requiring the attention of a variety of experts in different fields that may not naturally work together. MSRA has convened the MS community and led initiatives that have convened the research community to advance research in genetics (ANZgene), neurobiology (MSRA Brain Bank), Proteomics, Epidemiology, employment and Psychoneuroimmunology (PNI).

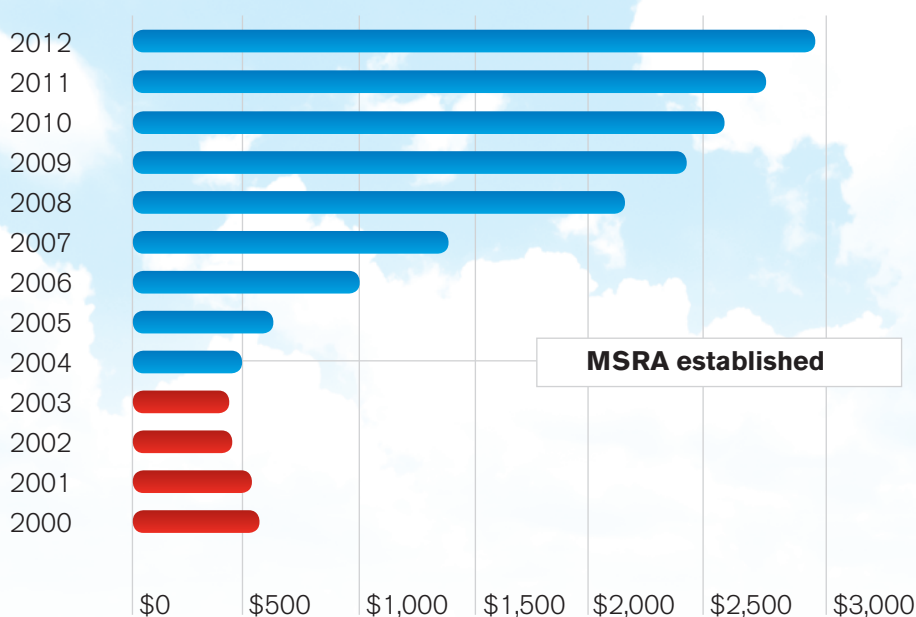
MSRA funding has been responsible for training 60 new scientists in MS research

International Standing

MSRA is also assisting to lift Australian researchers to the global stage with ANZgene now represented at the International MS Genetics Consortium, and a co-funded Macquarie Group Foundation MSRA / UK MS Society Fellow, Dr Julia Morahan from Australia working with Prof George Ebers at Oxford University.

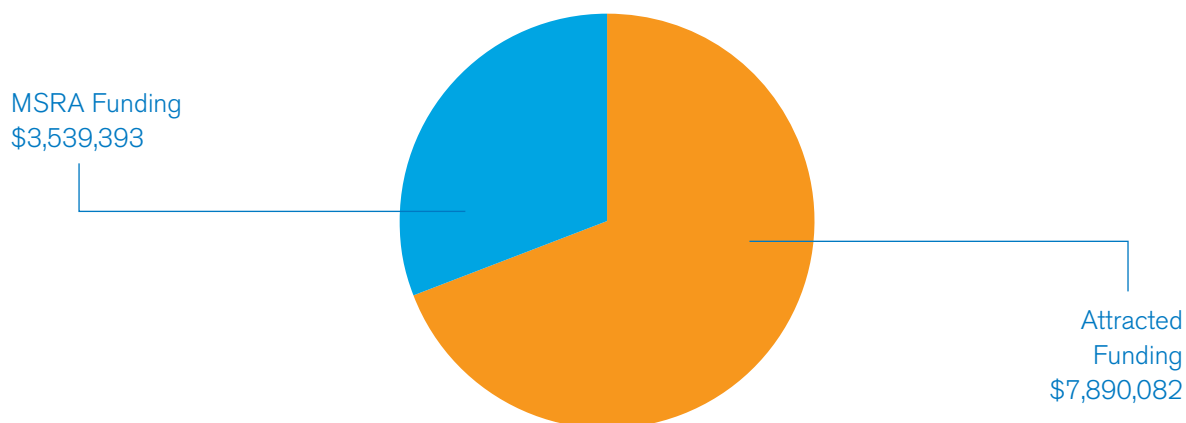
MSRA has increased the amount of funding available for MS research five-fold since 2004.

MSA/MSRA Research Spend (\$'000's)



For every \$1 raised MSRA has found alternate sources including federal and state governments, that have leveraged this up to \$3.23 worth of research activity.

Research Leverage



Based on a sample of 23 projects and 6 platforms funded by MSRA 2005 –2010

MSRA implements a rigorous governance process to select the highest quality MS research. As a result, Australian researchers have published over 22 papers in peer-reviewed journals since 2006, and these discoveries have been used in at least another 97 other publications by researchers worldwide.

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Develops MSRA's research strategy.

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Prof Marc Feldman

Director of Immunology, Kennedy Institute for Rheumatology, London, UK

Prof Trevor Kilpatrick

Professor of Neurology and Director for Neurosciences, University of Melbourne

Dr John Richert

Senior Fellow in Neurology, Research and Development, Biogen Idec, Boston, USA

Research Management Council (RMC)

Reviews proposals for MS research investment.

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Private Practice, Concord Repatriation General Hospital, Sydney

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Representing People with MS, Former Chief Research Scientist, CSIRO Division of Building, Construction and Engineering

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Petricia Augustus Administration and Communications Manager

Heather Cato Research Coordinator, Perth office

Mandy Lee Relationship and Events Manager

Christine Remediakis Research Development Manager

Neil Robertson Foundation 5 Million (F5m) Campaign Manager

Prof Simon Hawke MSRA Brain Bank Director, University of Sydney

Dr Teresa Wong MSRA Brain Bank Project Manager, University of Sydney



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