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Australian Government
National Health and Medical Research Council

INVESTING IN AUSTRALIA'S HEALTH

RESEARCH • ETHICS • ADVICE • COMPLIANCE & EVALUATION

10 of the best NHMRC funded health & medical research successes

Contents

The Australian government's commitment to medical research

Australia has a proud history of health and medical research. Australians gave the world new treatments for stomach ulcers, the bionic ear, the ultrasound scanner and the first heart pacemaker.

Australian researchers have been awarded six Nobel Prizes in physiology and medicine for research ranging from immunology, nerves and the brain, to penicillin and organ transplants.

Australia is a high achiever in medical research – on a per capita basis, our research output is twice the Organisation for Economic Cooperation & Development average.

We are now spending more on health and medical research than ever before. Current spending through the Federal health portfolio alone exceeds $500 million annually.

This is a significant investment by the Australian community and one that will contribute to better health in the future.

We can rightly celebrate and take pride in the achievements of our medical researchers. WIth continued support, these researchers will be able to keep making major contributions to medical science.

The Honourable Mr Tony Abbott MP
Federal Minister for Health

Creating a healthier future

Good physical and mental health is not only important for the individual, it is important for our nation and fundamental to our quality of life, our community and our economy. When looking at costs, it is important to remember that while health costs money, disease costs much more.

The most effective use of our health dollar comes from expenditure on prevention. Vaccination programs save lives and folate supplements before pregnancy prevent birth defects. Public health campaigns promoting diet and exercise reduces heart disease and genetic screening for haemochromatosis greatly reduces the health risks for affected people.

Interventions and treatments must be based on high quality research, to guarantee the best outcomes for patients and the community. Our new understanding of the human genome will assist our advances in research, to provide more effective preventative strategies.

I commend the Federal government's commitment to implementing the recommendations of the Wills Report, which has seen increased funding for medical research over the past five years. Health and medical research is an investment in which we will all share in the dividend.

Professor Fiona Stanley AC
Director, Telethon Institute for Child Health Research

NHMRC and the health of Australian medical research

The NHMRC is committed to funding health and medical research of the highest quality and to evaluating the outcomes of all of its funding schemes.

This publication is the result of a grant outcomes review, for grants that commenced in 1999 and were completed in 2003.

By showcasing ten of the best NHMRC funded grants, in that funding period, this document highlights the first results of the Australian Government's doubling of investment in medical research, which commenced in 1999 as a result of the adoption of the Wills Report. The results of increased funding are evident in the progress that Australian researchers have made in many fields.

The NHMRC is committed to supporting both fundamental research and research into national health priorities. We are confident that our funding schemes make a difference to the progression of health and medical knowledge and the health of all Australians.

Professor Alan Pettigrew
Chief Executive Officer
National Health and Medical Research Council

Highlighting successful Australian medical research

NHMRC has a responsibility to ensure that the research it funds is of the highest quality. Expert committees carefully review all research and only fund the best projects, representing the cream of Australia's health and medical research talent.

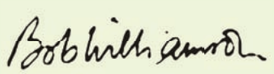
Here is a small sample of the research that came to fruition in 2003, selected by an NHMRC panel who assessed the outcome of NHMRC funded research ending that year, to determine whether excellent choices were made.

The ten projects showcased here are representative of many more that could have been selected and all are of the highest international standard.

Medical research in Australia often combines fundamental scientific research with national health priorities such as cancer, heart disease, Aboriginal health, diabetes and asthma, which are among this selection.

Women and men from many disciplines, in medical research institutes, universities, hospitals and in communities, are conducting great research across Australia.

I hope you agree these 10 projects provide a public testament to the excellent state of health of Australian medical research.



Professor Bob Williamson
Chair of Research Committee Report

1 Stem cell transplants to cure leukaemia

More than 6,000 Australian adults and children are diagnosed with leukaemia or a related blood disorder each year. Many will die.

Treatments for disease have to be based on evidence, proven by research

↓ Cancer patient Emma Millard.

The most common curative treatment for leukaemia is bone marrow transplantation. For those lucky enough to receive a transplant, many will find that the transplant rejects their body as foreign tissue, which can be fatal for as many as half the patients who receive this procedure.

This research has centred on a different type of bone marrow transplant using newly identified versions of molecules called cytokines to allow the collection of donor stem cells which, when transplanted, helps cure leukaemia while limiting the life-threatening complications.

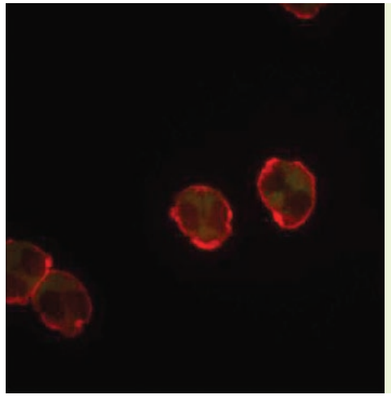
The team has initiated a world-first clinical trial based on this research and is now recruiting patients. The research developed in the project has also been the subject of numerous international patents, publications and collaborations with US based multinational biotechnology companies.

This is a good example of an NHMRC funded project in basic science, which has been quickly translated into new therapies in Australia, that are at the cutting edge of clinical medicine internationally.

ASSOCIATE PROFESSOR GEOFFREY HILL
Queensland Institute for Medical Research, Brisbane

2 Targeting asthma and allergy

Asthma affects one in ten Australian adults and one in six children. This is amongst the highest prevalence in the world. The estimated cost to the Australian community is $720 million per annum.



This research increased understanding of the role of S100 proteins in asthma, allergy and other inflammatory disorders such as rheumatoid arthritis, infection and inflammatory bowel disease.

The research results will allow the design of new strategies which target specific S100 proteins, to reduce the severity of these inflammatory diseases.

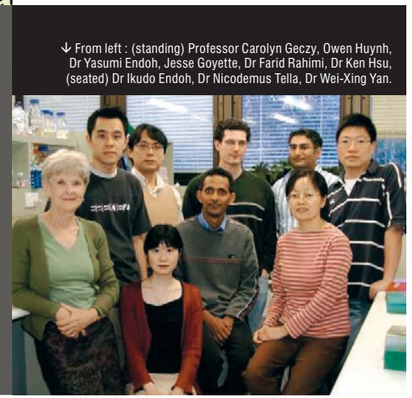
A new diagnostic test for the S100 proteins, which indicate disease severity, has been developed for commercialisation, boosting Australian biotechnology efforts.

The team also hopes to develop a drug to prevent the symptoms of asthma, allergy and inflammatory diseases, through possible collaboration with a pharmaceutical firm in the future.

Every dollar invested in medical research returns five dollars in economic benefit to Australia

Development of a new and widely useful therapy for international distribution would bring recognition to Australian research and much needed relief to asthma and allergy sufferers worldwide.

PROFESSOR CAROLYN GECZY
University of New South Wales, Sydney



↓ From left : (standing) Professor Carolyn Geczy, Owen Huynh, Dr Yasumi Endoh, Jesse Goyette, Dr Farid Rahimi, Dr Ken Hsu, (seated) Dr Ikudo Endoh, Dr Nicodemus Tella, Dr Wei-Xing Yan.

3 New hope for multiple sclerosis sufferers

Multiple sclerosis is a debilitating condition affecting around 15,000 Australians, including children and the elderly. It costs the community as much as $660 million per annum. There is no known cure for multiple sclerosis.

This disease is caused by plaques in the brain and spinal cord, which progressively reduce a patient's sensory function and ability to move.

This research, which was carried out in Tasmania, where there is a higher incidence of multiple sclerosis, identified two gene regions that may be responsible for causing the disease, offering hope for the discovery of new treatments.

Researchers found that children with younger siblings were less likely to have multiple sclerosis later in life and that viral diseases such as glandular fever could trigger multiple sclerosis in susceptible individuals.

Ongoing research aims to identify potential new therapies to prevent plaque formation in susceptible patients and to gain a greater understanding of how genes and the environment interact to cause this disease.

PROFESSORS SIMON FOOTE, TERRY DWYER & TREVOR KILPATRICK
Walter and Eliza Hall Institute, Melbourne, Menzies Institute, Hobart, Howard Florey Institute & The University of Melbourne.

4 Disease gene screening and prevention

One in 300 Australians are affected by haemochromatosis, a common genetic disease that results in abnormally high levels of iron in the body, which can cause liver cirrhosis, heart problems, diabetes, arthritis and chronic fatigue.

Photo by Richard Cisar-Wright/ The Australian

The best expenditure is on prevention, not treatment

← A/Professor Martin Delatycki with haemochromatosis patient John McMillen, who is having blood taken.

↓ Amy Niselle enters BlueScope Steel to conduct genetic testing.

Haemochromatosis is under diagnosed yet easily prevented. This research provided new evidence that genetic population screening for a preventable disease is practical and provides clear benefits.

The researchers conducted DNA testing of 12,000 adults in 60 workplaces and identified more than 50 people who would not have otherwise known they were at risk of haemochromatosis. These individuals were all provided with expert counselling by genetic counsellors.

These people can now monitor their condition and if necessary reduce their iron levels by simply donating blood, preventing permanent damage and chronic illness.

If economic analysis shows the program is cost effective, haemochromatosis screening could be offered to communities.

DR KATIE ALLEN, ASSOCIATE PROFESSOR MARTIN DELATYCKI
Murdoch Childrens Research Institute, Melbourne

5 Diabetes self-management in Aboriginal communities

Between 10 and 30 per cent of Aboriginal and Torres Strait Islander Australians have type II diabetes, which is up to four times higher than the rate for non-indigenous Australians.

Diabetes results from a combination of genetic predisposition, lifestyle factors and poor diet. Barriers to successful management of diabetes in Aboriginal communities can include remoteness and the associated lack of accessibility to frequent fresh food supplies, health education, regular primary medical care and specialist support.

As a result, Aboriginal Australians are more likely to suffer severe symptoms of diabetes and die prematurely from it. This disease is best tackled when communities are empowered to manage this escalating health condition.

This research, which involved community participatory action research, showed education of both Aboriginal elders and community health workers is a necessary and important step in preventing and managing diabetes in Aboriginal communities.

MR COLIN WEETRA
Spencer Gulf Rural Health School,
University of South Australia. Adelaide

↓ Port Lincoln Aboriginal Health Staff, (clockwise from top) Jeremy Coaby, Richard Jones and Denise Thomas.

6 Gene therapy to correct blindness

Retinal dystrophy is a progressive degeneration of the retina, which affects night vision and peripheral vision.

↓ Pluto the dog who vision has been improved, with Professor Kristina Narfstrom.

Scientists have dreamed of importing healthy copies of genes into people to correct inherited diseases such as retinitis pigmentosa (blindness), cystic fibrosis and muscular dystrophy. However, it is difficult to find safe ways to insert the new, healthy gene into cells.

Gene therapy has proven to be the most promising technology for treating hereditary disorders, when the genetic defect is known.

This research used gene therapy techniques to correct one form of childhood-onset of retinitis pigmentosa.

The research team used a small, genetically engineered and harmless virus to carry a healthy copy of the missing gene into the retinal pigment cells of the eye.

The research started in a mouse model and having proved successful, progressed to Briard dogs.

By using gene therapy the vision in a number of Briard dogs was improved and it is hoped that human gene therapy trials will begin in the next two to three years.

ELIZABETH RAKOCZY
University of Western Australia,
Lions' Eye Institute, Perth

7

Helping heart attack patients

Each year, about 50,000 Australians have heart attacks, of which half are fatal. Heart disease is the leading cause of death, accounting for 39 per cent of all deaths in Australia and it is our largest health cost item at $14.2 billion per annum.

Health costs money but disease costs more

Mitral valve failure, in which a heart valve does not close properly, causes blood to leak during each heart beat. This can lead to heart attack as the heart pumps harder to compensate.

Valve failure can be congenital or caused by heart disease, high blood pressure and atherosclerosis.

The condition is more common in elderly patients, so it will become more prevalent as our population ages.

This research used a small device to reduce the size of the valve, thereby eliminating valve failure, in a model of congestive heart disease. The procedure, which involves insertion of the device through the jugular vein under local anaesthetic, avoids the need for general anaesthesia and open-heart surgery, reducing risk and mortality.

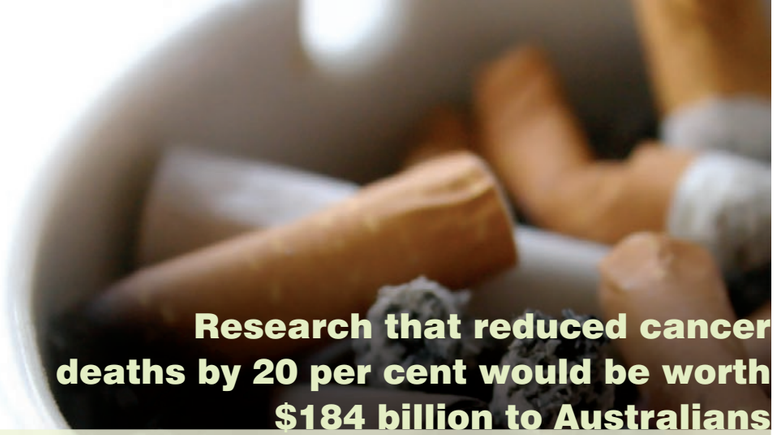
The researchers aim to slow or reverse the progression of heart failure in these patients and to improve their quality and length of life. Human clinical trials are now under way at Melbourne's Alfred Hospital and if successful, it is hoped the procedure will become available to the Australian community within a few years.

PROFESSOR DAVID KAYE, DR MELISSA BYRNE, DR JOHN POWER
The Alfred Hospital & Baker Heart Research Institute, Melbourne

↑ Dr Rodney Reddy from the Alfred Horpital checks on his heart patient.

8 The truth about tobacco

Smoking kills 19,000 Australians each year or more than 50 Australians each day, yet 2.9 million Australians aged 14 years and over smoke daily.



Research that reduced cancer deaths by 20 per cent would be worth $184 billion to Australians

This study provided important evidence about nicotine addiction and the adverse health effects of smoking, which supported the need for strong regulation of the tobacco industry.

The results were very important to public health in Australia and this is an example of a controversial yet exceptionally useful program that was funded by NHMRC.

Drawing on over 40 million pages of internal documents, the research revealed the tobacco industry's strategies to resist effective tobacco control in Australasia.

Because of the documents, the tobacco industry has acknowledged the strong link between smoking and lung cancer to government and the public.

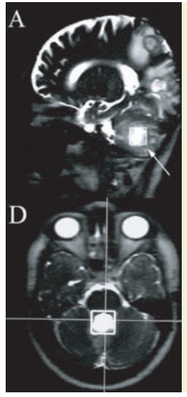
This information is being used to assist litigation for people with tobacco related diseases.

The researchers will continue their work in monitoring developments that may circumvent government regulation of nicotine.

PROFESSOR SIMON CHAPMAN
University of Sydney

9 Imaging to improve diagnosis of brain infections

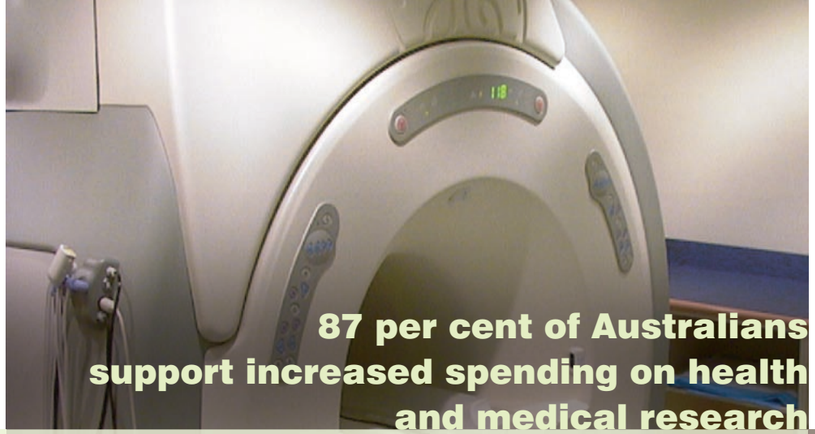
Around 250 brain abscesses, 400 brain infections and 1500 brain tumours are diagnosed every year in Australia. Correct and quick diagnosis of a brain abscess can greatly improve patient outcome and recovery.



Current tests, such as CT and magnetic resonance imaging (MRI) scans, cannot easily distinguish between brain abcesses (bacterial infection) and brain tumours.

This study showed that magnetic resonance spectroscopy (MRS) could easily distinguish between tumours and infection. It can even identify which type of bacteria caused the infection.

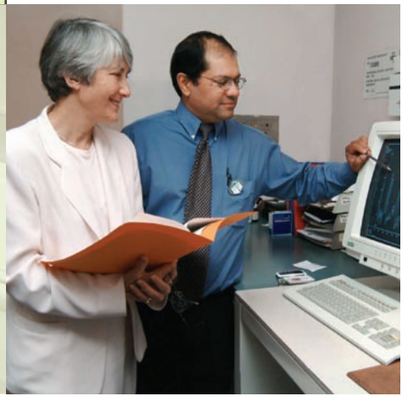
As a result those patients with abscesses can avoid risky general anaesthesia and brain surgery - the usual treatment for tumours - and instead be treated with antibiotics.



87 per cent of Australians support increased spending on health and medical research

In the future, more powerful MRI scanners will allow doctors to better discriminate between abscesses caused by different infections, further refine treatment decisions and reduce the need for invasive proceducres.

PROFESSOR TANIA SORRELL
University of Sydney



↓ Professor Tania Sorrell and Dr Lavier Gomes, reviewing an MR spectrum of a patient with a brain abscess

10 New tissues for reconstructive surgery

Tissue engineering is a new area of medicine where whole new tissues can be created from biodegradable scaffolds and stem cells, ideally obtained from the patient's own body, which means the problems of immune rejection can be avoided.

New frontiers in biomedical science are driven by Australian researchers

← Professor Wayne Morrison

When our tissues and organs are destroyed because of an accident, burns, cancer or other diseases, we currently have limited means to replace them. Microsurgery allows us to transfer skin, muscle, bone and other body components from elsewhere on our body but this can cause further injury and scarring. Implantations or transplantation of organs or tissues from another person can have complications and the availability of transplants is limited.

Using specialised microsurgery techniques, this research team has developed a special chamber in which to grow fat tissue. They are currently testing their patented chamber device, which will potentially be adapted for humans.

They have also used the same chamber to grow new muscles from adult stem cells and have successfully implanted pancreas cells to produce insulin.

The research aims to regenerate tissue for people needing reconstructive surgery after severe burns or accidents, or after cancer surgery, including mastectomy.

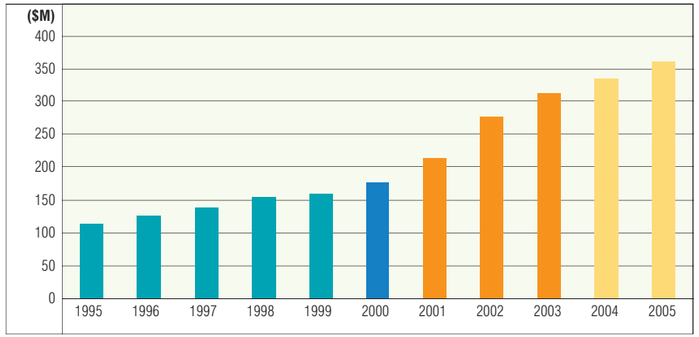
This internationally recognised study produced patents and biotechnological results that will ensure Australians have access to the best new developments in medicine.

PROFESSOR WAYNE MORRISON
University of Melbourne & Bernard O'Brien Institute of Microsurgery

The National Health and Medical Research Council

NHMRC is committed to evaluating the outcomes, in terms of Australia's knowledge, health and wealth, of all its funding schemes, to allow streamlining of its strategy for productive investment in medical research.

Growth in NHMRC funding



A first step has been to review outcomes from the project grant scheme, together with a small number of outcomes of some of the programs and block grants.

Professor Bob Williamson chaired a panel of experts who peer-reviewed final project grant reports.

From the grants highlighted as outstanding in each field, we have selected the ten projects in this report, on the basis of their merit, accessibility and relevance to Australia. These are only a small sample of the outcomes of NHMRC funded grants, which commenced funding in 1999-2000 and concluded in 2003.

It should also be noted that 2003 was the last year in which six premier Medical Research Institutes received block grants.

NHMRC expenditure on medical research increased from $161 million in 1999 to $176 million in 2000 as the first increment in funding stemming from the 1999 Health and Medical Research Strategic (Wills) Review.

This funding supported small research groups (projects), larger teams (programs) and people (scholarships and fellowships), which in 2000 included:

- 826 grants of a clinical, preventive or public health nature
- 979 grants for research into fundamental mechanisms that improve our understanding of disease and which may lead to new treatments

The highlighted grants are the first results of the doubling of investment in medical research that came about as a result of the adoption of the Wills Report. This injection of funds resulted in a substantial increase in the average size of each grant. It also allowed the appointment of new Fellows and investigators.

Thank you to Professor Bob Williamson for his expertise, enthusiasm and energy in driving this project, and to the panel of reviewers who gave freely of their time.

It is proposed that this process will be extended to include additional funding schemes in 2006.

Associate Professor Bronwyn Kingwell
Chair, Evaluations and Outcomes Committee
National Health and Medical Research Council

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