SAVING LIVES..... SAVING MONEY.....

AUSTRALIAN CASE STUDIES

Heart Attacks....Arthritis....Cancer....Dementia....

These are just some of the tragic medical conditions that can strike any of us, or our loved ones, at any time. Disease turns our private world upside down, and it costs the public tens of billions of dollars per year in hospital and welfare costs.

Australian medical researchers are at the forefront of the world fight against disease and illness. And our success rate is astounding, if somewhat unheralded.

We lead the way in non-invasive surgery techniques. We lead the way in bionic ear technology and treatments. We lead the way in cancer treatment regimes. We are true leaders and Australians should be proud.

But there is much work to be done. One major challenge is improving the health and wellbeing of the lower socioeconomic groups, the indigenous and elderly communities in our society.

This portfolio of case studies showcases some of the outstanding achievements by Australian medical researchers to improve the quality of life and reduce the burden of disease. It shows we can work wonders for the benefit of all Australians.

The research profiles in this series were supported by public, private and philanthropic investment. This investment has saved and improved countless lives and saved significant amounts of money for the Australian community.

The Australian Society for Medical Research urges government, corporate and public support for Australian medical research, so together we can capture the economic benefits of good health and address the significant cost and burden of disease.

Professor Peter Schofield
President, ASMR, 2002

Dr Moira Clay
President, ASMR, 2003 .

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The Australian Society for Medical Research
BRINGING HEALTH TO LIFE.

REDUCING AUSTRALIA'S $1 BILLION ANNUAL SPORTS INJURY BILL

Key Statistics

- **Hamstring strains are the most common injury in Australian sport, contributing to a $1 billion per year sports injuries bill.**
- **In the Australian Football League, "hammies" contribute to 16 percent of missed playing time.**
- **35 percent of AFL players with hamstring strains re-injure.**

Funding

- **The research team at Monash University is supported by a National Health and Medical Research Council (NHMRC) Project Grant valued at almost $190,000 over three years which supports the hamstring research and other projects.**

Netballers get them. Footballers get them. Lots of sportspeople get them and they hurt.

Hamstring strains are the most common injury in Australian sport. Whether it's the rugby half back, the Aussie Opals goal attack, or a Saturday afternoon suburban tennis player, the risk of a hamstring strain is high.

Monash University in Melbourne has filed a patent application for some ground-breaking research into hamstring strains. A team comprising Dr David Morgan, Professor Uwe Proske, Dr Camilla Brockett and Dr Paul Percival has approached the St Kilda Football Club for assistance with the research project.

The medical researchers have been regularly testing players since the 2002 pre-season to prove that a new measurement system can predict susceptibility to hamstring strains.

"If we are right, and our research is on track, the next stage will be to implement a specific exercise and monitoring program to reduce and hopefully prevent hamstring strains," Dr Brockett believes.

The work is founded on a strong, fundamental scientific basis, something that cannot always be said about research in this area. The theoretical basis may be complex, but the potential benefits to sportspeople are obvious – fewer 'hammies' and longer and better playing careers.

When a muscle is being used as a brake, absorbing energy or doing negative work, it is forced to lengthen while trying to shorten. These eccentric contractions can lead to micro damage in the muscle. That's why walking downhill, skiing and horse-riding often lead to stiffness and soreness the next day. Research findings suggest that micro damage from such eccentric actions can initiate major muscle strains or 'hammies'.

"If necessary, players will be subjected to a combination of testing and training until they are out of the danger zone. This approach promises to reduce "hammies" in all athletes and to help coaches decide when a rehabilitating athlete is ready again to take to the field," Dr Percival said.

Dr Paul Percival with St.Kilda footballer Chad Davis.

"The work with St Kilda Football Club is to measure muscles of previously injured players and to try to understand why so many re-injure.

Secondly we want to measure all other players to establish criteria for who is at risk and who isn't."

– Dr Paul Percival.

Australia currently spends more than $1 billion per year on sports injuries and rehabilitation is a major burden on the public health system. This breakthrough research could significantly reduce that bill because hamstring strains are so common.

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FOLLOWING IN THE FOOTSTEPS OF FRED HOLLOWS

Key Statistics

- Worldwide, 10 million people facing blindness would benefit from a corneal transplant, but only 100,000 corneal transplants are performed per year.
- In Australia, around 1,500 corneal transplants are performed each year.
  19% of all corneal transplant grafts are repeat grafts due to the failure of donor corneal tissue.
- Up to 46% of all grafts are considered at high risk of failure due to the complex pathology of the patient or the patient's inability to receive immuno-suppressant therapy to prevent rejection.
- The AlphaCor device has the potential to reclassify people from being legally blind to functionally sighted.

Funding

- Three grants awarded to The Lions Eye Institute of Western Australia Inc. (Centre for Ophthalmology and Visual Science, UWA) through the National Health and Medical Research Council of Australia (NHMRC) have enabled the development of the AlphaCor during its 12-year research phase and funding through the four year clinical trial phase since 1989.

- This significant funding has resulted in the establishment of clinical outcomes which may prove its widespread clinical use. The funding has also enabled Australian patients to be the first to benefit from this technology.

Medical researchers in WA are about to launch a breakthrough artificial cornea – helping to alleviate blindness in millions of patients around the world.

After 12 years of research, and four years of human clinical trials, the Lions Eye Institute and Argus Biomedical Pty Ltd will shortly release an artificial cornea that will substantially improve eyesight in patients who face blindness. The innovation may outperform traditional human donor implants in some high-risk patient groups.

The potential market for this Australian innovation is enormous. Corneal transplants are the most commonly performed and successful type of organ transplant but a significant shortfall in donor numbers exists. Researchers estimate that while 100,000 corneal transplants occur worldwide each year, there are about 10,000,000 people affected by the illness.

In Australia, there are only around 1,500 grafts performed each year. 19 percent of all grafts are repeat grafts because of the failure of donor corneal tissue. Up to 46 percent of all grafts are considered at high risk of failure because of the complex pathology of the patient or the patient's inability to receive the immunosuppressant therapy required to prevent rejection.

Many patients in the AlphaCor clinical trial have reported a visual improvement that enabled them to be reclassified from legal blindness to functionally sighted.

The new technology has been licensed to Argus Biomedical, a local company that has built a commercial production facility in Perth. The product has now been approved for use in Australia, Europe and the United States.

"People have attempted to make an artificial cornea for more than 200 years. The AlphaCor finally achieves it."

– Professor Ian Constable, The Lions Eye Institute of WA.

The AlphaCor is a new one-piece polymer device that comprises a clear core that enables vision, and a sponge rim that encourages the ingrowth of host cells to anchor it in place in the eye.

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BATTLING AUSTRALIA'S HEART FAILURE EPIDEMIC

Key Statistics

- **Heart failure is the third largest cause of cardiovascular deaths in Australia, following coronary heart disease and stroke.**
- **Heart failure is more common among elderly Australians and people who have had a heart attack.**
- **Prevalence of heart failure is likely to increase significantly as the population ages.**
- **The cost of heart failure treatment exceeds that of all types of cancers combined.**

Funding

- **Dr David Kaye's research has attracted a National Health and Medical Research Council (NHMRC) Centre for Clinical Excellence Grant for $175,000 per annum from 1998-2001, with the congestive heart failure component of the grant subsidising the cost of a research nurse.**
- **The research project was so successful, The Alfred hospital is now financing the Heart Failure Clinics.**

Australia is facing a heart health epidemic. Already 1.5 percent of the total population, 300,000 people, suffer from heart failure. This figure is predicted to double over the next 10 years as our population ages.

Medical researchers at The Alfred hospital in Melbourne have developed a world leading heart health program for survivors of heart attacks. The innovative program means that patients can reduce their likelihood of hospital admission by up to 80 percent.

The program is bringing new leases of life to heart failure patients throughout the community. These results are being achieved by a carefully co-ordinated four-step program which includes:

- Drug therapy;
- Patient education;
- Lifestyle modification; and,
- Exercise therapy.

"By adhering to the program, in most cases patients are encouraged to take greater control in managing their illness," said program leader, Dr David Kaye of The Alfred.

The Alfred has assisted in the establishment of a series of Heart Failure Clinics to implement the best of practice heart failure treatment in the community, away from the hospital. This educational activity has extended throughout Victoria and more recently to a number of national centres.

If similar programs were implemented around Australia, researchers believe it would slash more than $1 billion off the rising cost of heart failure in this country, by reducing hospital costs. Equally importantly, it has the potential to improve the lifestyle and life expectancy of thousands of Australians.

Dr David Kaye

"What we urgently need is a comprehensive strategy for the prevention, early detection and aggressive treatment of heart failure. For patients with heart failure the key aims must be to improve both survival and quality of life." – Dr David Kaye.

At present heart failure costs the Government almost $4 billion per annum, much of it on hospitalisation, drug costs and nursing home care. This makes heart failure one of the most expensive recurring components of the Commonwealth health budget.

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The Australian Society for Medical Research

BRINGING HEALTH TO LIFE.

OVERCOMING THE GREATEST LOSS OF ALL

Key Statistics

- Infertility affects 1 in 6 Australian couples attempting conception. One in every 50 babies born is now an IVF baby.
- Pregnancy pathologies are very common. Recurrent miscarriage affects 3% of women of child-bearing age and pre-eclampsia affects 5% of pregnancies.
- Approximately 10% of paediatric health costs are estimated to be the consequence of low-birth weight in children.

Funding

- Dr Sarah Robertson's research has attracted $1.25 million in funding from the National Health and Medical Research Council from 1994-2002.
- Dr Robertson is one of five investigators recently awarded a National Health and Medical Research Council Program Grant on Reproductive Health in Women, totalling $8.3 million from 2003-2007.

Infertility strikes more than one in ten Western couples. The inability to conceive a child causes heartache that is immeasurable.

Traditional in vitro fertilisation (IVF) techniques boost the chance for infertile couples to bear children. But these methods are invasive, can cause anguish to the patient and have a low success rate, usually between 20-30 percent per cycle. They are also costly. Treatments can cost up to A$12,000 per completed cycle.

Medical researchers at the University of Adelaide are working with local biotech company GroPep, to bring a new treatment to the world market that could revolutionise the medical approach to some forms of infertility.

Dr Sarah Robertson and her team at the University are planning a clinical trial for women with recurrent miscarriage and repeated IVF failure. They have identified a human protein - transforming growth factor beta (TGFB) - which could be the key to unlocking the mystery of infertility.

The TGFB protein occurs naturally at point of insemination in fertile couples, making the sperm tolerable to the woman's immune system and allowing embryo implantation to occur. With infertile couples, the woman's immune system often rejects the protein contained in her partner's sperm.

Researchers believe that TGFB can moderate the woman's immune system, reducing the risk of rejection, leading to more chance of conception.

The research program that has led up to the clinical trial has been supported by the National Health and Medical Research Council and is based on more than 10 years of molecular and cellular research at the University of Adelaide.

Dr Sarah Robertson

"Our initial findings have major ramifications in fertility treatment and diagnosis for couples.

Once we complete our research and trials, a new treatment to improve fertility might simply require the application of a gel during intercourse".
– Dr Sarah Robertson

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LOWERING CHOLESTEROL TO IMPROVE EYESIGHT

Key Statistics

- 15% of people over 50 have signs of AMD, representing a total of 750,000 Australians.
- 1 to 2% of people over 50 have lost significant vision as a result of AMD, representing between 50-100,000 Australians.
- The incidence of AMD increases exponentially with each decade of age over 50.
- By 90 years of age, two-thirds of people have signs of this disease and one in four will have lost significant vision as a result.
- Smoking is the only modifiable risk factor known for AMD
- AMD has an inherited tendency. People are much more likely to get the disease if a first degree relative has AMD.

Funding

- Dr Robyn Guymer's research has attracted over $1 million in funding from a variety of charitable and philanthropic sources over the past five years:
  - Royal Victorian Institute for the Blind
  - Ophthalmic Research Inst. of Australia
  - Potter Foundation
  - Royal Victorian Eye & Ear Hospital Rsh. Committee
  - Eye, Ear, Nose and Throat Research Institute
  - Macular Vision Loss Support Society of Australia Inc.
  - ANZ Trustees
  - Rothschild Foundation
  - Rebecca Cooper Foundation
  - John T Reid
  - Pharmacia

Australian medical researchers are about to embark on a clinical trial to investigate a link between cholesterol and blindness. If successful, the University of Melbourne scientists may find a cure for one of the most common eye diseases in Western society.

Three quarters of a million Australians currently suffer from macular degeneration - an eye disease that affects day-to-day activities like driving, reading, recognising peoples' faces and watching television.

For the past five years Dr Robyn Guymer, a senior lecturer in the Department of Ophthalmology at Melbourne University, has been building a database of sufferers of age-related macular degeneration (AMD). This is a common condition where a build up of fatty material in the retina cuts off nutrient supply to the sensory cells needed for central vision.

More than 15 percent of Australians over the age of 50, some 750,000 people, suffer from this degenerative eye disease, with 50-100,000 Australians suffering severe visual loss as a result.

Through genetic analyses of the database, Dr Guymer and her colleagues have confirmed that AMD is linked to a gene involved in managing cholesterol. They are now planning a clinical trial to investigate the possibility that the progression of the disease can be delayed by using cholesterol-lowering drugs known as "statins". The trial will actually enrol people who have normal cholesterol levels and are not already receiving cholesterol- lowering medication.

Dr Guymer's work on the link between AMD and cholesterol has already earned her the prestigious 2002 National Amgen Medical Researcher Award.

Dr Robyn Guymer

Shepparton-born Dr Guymer is a committed medical researcher.

"Growing up in regional Victoria I was all set to become a country ophthalmologist until I realised that I could sit in a clinic all day, every day and still only treat a finite number of patients. With our current research we might find a cure for a disease that affects millions and where there is an infinite benefit.

That's very exciting and that's what drives us," she said.

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