

ANNUAL REPORT 2008/2009



VICTORIAN
NEUROTRAUMA
INITIATIVE

VNI STRATEGIC GOALS



GOAL ONE

Fund internationally competitive research



GOAL TWO

Facilitate enhanced capacity and capability within the Victorian neurotrauma research community



GOAL THREE

Facilitate the translation of research findings within the Victorian healthcare system

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CHAIRMAN & EXECUTIVE OFFICER'S REPORT



Geoff Hilton and Melinda Rockell

Brain and spinal cord injuries occurring in 2008 alone will cost Australia \$10.5 billion over the lifetime of those injured. That is the finding of an Access Economics report commissioned by the Victorian Neurotrauma Initiative (VNI). Also clearly demonstrated in the report are the significant cost savings and improvements in quality of life for individuals that can be achieved through investment in research.

Four years ago the Transport Accident Commission (TAC) and the Victorian Government had the vision to invest in the future of Victorians through dedicated funding for neurotrauma research and build upon Victoria's internationally significant neuroscience research sector. This investment is consistent with the Victorian Government's focus on investing in innovation to deliver better health, a skilled workforce, promoting greater collaboration and forging global connections in key strategic priority areas. The VNI was charged with managing this investment.

The VNI is now in a solid position supported by a well established governance structure and mature processes and procedures. This position of strength has allowed VNI to explore new strategic approaches, whilst continuing to manage our growing portfolio of projects.

As at July 2009, the VNI has committed \$42.4 million to support 53 research initiatives which are meeting our three strategic goals:

- ▶ fund internationally competitive research;
- ▶ facilitate enhanced capacity and capability within the Victorian Neurotrauma research community;
- ▶ facilitate the translation of research findings within the Victorian healthcare system.

The projects have covered the full spectrum of research phases including basic research (25%), clinical research (18%), rehabilitation research (34%), as well as education and training (7%) and other initiatives, including knowledge mobilisation activities (16%). Activities address priority issues in traumatic brain injury (38%), spinal cord injury (48%) or both (14%).

We outlined our approach to achieving our goals in our strategic plan which was released in October 2008. In this Annual Report for 2008/2009 we report on progress towards these three goals.

GOAL 1: FUND INTERNATIONALLY COMPETITIVE RESEARCH

The VNI has invested \$34.3 million to date in internationally competitive research.

This year the VNI made its most significant research funding investment to date, with the commitment of \$14.6 million to support three large multidisciplinary programs selected through a competitive evaluation process. These programs involve extensive collaborations with interstate and international experts. Each program has the potential to make tangible differences for people living with the consequences of spinal cord injury. One program explores ways to improve control of bowel and bladder function. The second program addresses another day-to-day challenge faced by individuals after a spinal cord injury - getting a good night's sleep. Nearly three out of four people with quadriplegia suffer from obstructive sleep apnoea. The third program explores the ways that exercise can improve the health and wellbeing of people in the early stages following an injury, and then during their life.

Six projects which were awarded funds in the VNI's first funding round are now completed with four completing during the past year.

GOAL 2: FACILITATE ENHANCED CAPACITY

We have invested \$2.8 million to date in fostering individuals and providing opportunities for highly talented researchers to pursue career paths in neurotrauma and establish a track record in their field of interest. This year the VNI announced five new VNI fellows, bringing the total number of fellows supported by the VNI to thirteen.

Research Fellowship opportunities have been provided to early career researchers, clinical researchers and senior experienced researchers to both develop and retain skilled researchers within Victoria. In addition we have expanded the training opportunities that we offer to the research sector.

GOAL 3: TRANSLATE RESEARCH FINDINGS

The VNI has invested \$5.3 million to date in knowledge translation activities.

Our largest investment in this area to date is a large multidisciplinary program in knowledge mobilisation. Selected through a competitive evaluation process, the program will identify and address barriers to adoption of research outcomes by health care practitioners. This program will help ensure that our investment in high quality research results in improved outcomes for people with brain injury.

OTHER ACHIEVEMENTS

The VNI has established a strong collaborative relationship with our Canadian counterpart, the Ontario Neurotrauma Foundation (ONF). Delegations between jurisdictions were held during the year to encourage dialogue between like-minded researchers in Victoria and Ontario, and to explore opportunities for the VNI and the ONF to work together to achieve our common purpose of improved outcomes for people with brain and spinal cord injury. In the coming year we will embark on a new \$2 million joint funding round, providing the opportunity for Ontarian and Victorian researchers to seek funds in one collaborative submission.

It is testament to the commitment of the VNI management team that so much has been achieved in a year that also saw the organisation move from Melbourne to new facilities in Geelong and establish a satellite office in Melbourne.

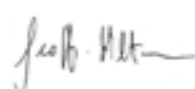
FINANCIAL POSITION

The total expenditure for the VNI during the financial year was \$7.9 million. Expenditure against the VNI's current commitments will occur over the next five years, with the last currently approved activity completing in late 2014. The full financial statements are provided towards the end of this report.

ACKNOWLEDGEMENTS

The VNI is only able to operate with the support of numerous organisations and individuals. We would like to take this opportunity to thank these supporters for their contribution throughout the year. The TAC and the Victorian Government's Department of Innovation, Industry and Regional Development have provided substantial funding. The research community has provided intellectual resources and hard work in the conduct of their VNI funded research and in preparing funding applications for the VNI. The VNI staff, Board, Committee and External Reference Panel members have committed significant time and effort in delivering on the VNI's many achievements.

Thank you all for your contribution and we look forward to working with you in the coming year.



Geoff Hilton
Chairman



Melinda Rockell
Executive Officer

ABOUT THE VNI

The Victorian Neurotrauma Initiative (VNI) is a \$63 million health research fund that supports research into traumatic brain injury (TBI) and spinal cord injury (SCI) conducted by Victorian scientists in collaboration with national and international colleagues.

The VNI was established in 2005 as a partnership between the Transport Accident Commission (TAC) and the Department of Innovation, Industry, and Regional Development (DIIRD). DIIRD and Neurosciences Victoria Ltd also provide strategic and project management support to the VNI.

Recognising the existing neuroscience expertise in Victoria, the VNI set out the following vision within its strategic plan: *That by June 2010, the VNI will be a responsive, sustainable funding agency supporting high quality, collaborative research that positively impacts the lives of those affected by neurotrauma.*

In order to achieve this vision, the organisation strives to deliver outcomes linked to three strategic goals:

- ▶ Fund internationally competitive research;
- ▶ Facilitate enhanced capacity and capability within the Victorian neurotrauma research community;
- ▶ Facilitate the translation of research findings within the Victorian healthcare system.

To achieve these goals, VNI management uses effective and innovative funding mechanisms to promote the selection of high quality research. Collaboration and partnerships are encouraged with an aim to attract, develop and retain people. Strong governance and scientific input ensure that these pathways are maintained.

As at 30 June 2009, a total of \$40.6 million in funding has been approved from five funding rounds, representing 29.9% of total funds requested:

- ▶ 22 projects receiving a total of \$15.6 million (Round 1)
- ▶ 12 projects receiving a total of \$3.2 million (Round 2)
- ▶ 8 Fellowships and 10 Skill Development Awards receiving a total of \$1.6 million (Round 3)
- ▶ 4 programs receiving a total of \$19.0 million (Round 4)
- ▶ 5 Fellowships and 11 Skill Development Awards receiving a total of \$1.2 million (Round 5)

In addition, the VNI has funded 2 targeted initiatives to an aggregate value of \$1.8 million

WHY FUND NEUROTRAUMA RESEARCH?

Traumatic brain injury and spinal cord injury are debilitating injuries with life-long impacts for the injured person, their family and the wider community. The majority of cases occur in young adults involved in transport accidents. The effects of the injury are not only physical but impact all aspects of daily functioning including the ability to go to school or work, take part in social and community activities and even maintain relationships; these are significant physical, social and emotional costs. Moreover, the economic costs are also significant since the majority of these injuries occur at a young age. The VNI aims to improve the health and quality of life of individuals living with neurotrauma by funding research. Improving quality of life means reducing these physical, social and economic costs for the individual, their family, and the community supporting them.

ECONOMIC COST OF BRAIN AND SPINAL CORD INJURY

Despite increasing knowledge of the biological, physical and social impact of brain and spinal cord injury, our understanding of the economic impact of neurotrauma has been limited. During the year, the VNI commissioned Access Economics to prepare a report to enhance our knowledge in this area.

The costs are very high. Access Economics conservatively estimated that the lifetime cost of new cases of brain and spinal cord injury occurring in 2008 as \$10.5 billion in Australia alone. In Victoria, the amount is \$2.8 billion in lifetime costs for those injured in 2008 - \$2.2 billion for traumatic brain injury and \$575.8 million for spinal cord injury. These estimates highlight the need for reducing the burden to the Australian community.

This landmark report also delivered good news, namely that two interventions for improving the lives of those affected by neurotrauma are shown to be cost-effective. Both interventions received funding from the VNI and demonstrate the vital role that the VNI plays in improving the quality of life of those impacted by neurotrauma.

2008/2009 HIGHLIGHTS AT A GLANCE



Program Grant Lead Chief Investigators with Minister Holding

- ▶ Announcement of \$19 million to be provided to support four large collaborative research programs. The announcement was made at a media event in February by the Honourable Tim Holding, Minister for the TAC, who noted that Victorians will lead teams from 30 different research departments from universities and hospitals in Victoria, across Australia and in New Zealand, the United Kingdom and Canada.
- ▶ Announcement by The Honourable Gavin Jennings, Minister for Innovation, of the recipients of the second round of VNI Fellowships with salary support of \$1.2 million provided over the coming 3 year period. These five exceptional researchers were awarded their Fellowships by VNI Chairman Geoff Hilton at a networking event.
- ▶ Further development of collaboration with the Ontario Neurotrauma Foundation including VNI hosting a delegation from Ontario in November 2008 and a reciprocal exchange to Canada in May 2009. An agreement by both organisations to hold a joint funding round in 2009/2010 for activities that will enhance neurotrauma outcomes and research capacity in both Ontario and Victoria was also established.
- ▶ Execution of a Collaboration Agreement with Neurosciences Victoria (NSV), which enables VNI to access NSV's Melbourne-based facilities for the establishment of an office for Melbourne-based VNI project staff, as well as allowing VNI to call upon NSV's substantial scientific expertise for key projects for the coming year.
- ▶ Co-hosting with the National Trauma Research Institute, the inaugural Trauma Melbourne Conference during November 2008. The conference was a success with 261 delegates in attendance. Progress is being made towards the 2009 conference.
- ▶ Completion of 4 VNI funded projects:
 - One study based at Monash University investigated the assessment of mild traumatic brain injury and trialled the use of a patient information tool;
 - A project at the University of Melbourne assessed a panel of novel molecules in the lab for their potential in spinal cord injury treatment;
 - A pilot study conducted at Bayside Health investigated the mechanisms underlying generation of new neurons following brain injury;
 - A study based at the Institute for Breathing and Sleep provided preliminary data on sleep health in tetraplegia which contributed to the development of a successful VNI Program Grant application.
- ▶ Publication of an interim summary of work to date by the VNI-initiated Global Evidence Mapping (GEM) project. The maps produced through this initiative will be of use to healthcare services and research funding agencies locally and globally.
- ▶ Completion of a Health Economic Analysis entitled: *The economic cost of spinal cord injury and brain injury in Australia* in consultation with an expert panel. The report was prepared by Access Economics and commissioned by the VNI.
- ▶ Presentation of VNI funded research at conferences held locally, nationally and internationally including conferences in five Australian states and territories and 10 countries including Canada, Germany, South Africa and the USA.
- ▶ Expansion of the VNI Scientific Advisory Committee (SAC), which now comprises 9 national experts in the area of brain and spinal cord injury. The committee is chaired by Professor Richard Smallwood, one of Australia's most respected scientists and clinicians.
- ▶ Sponsorship of peak Australian neurotrauma conferences including the 2008 Australian Society for the Study of Brain Impairment (ASSBI) Conference held in Sydney, NSW and the 2008 Australian and New Zealand Spinal Cord Society (ANZSCoS) Annual Scientific Meeting held in Christchurch, New Zealand.
- ▶ Coverage of the VNI funded Program Grants in over 50 articles in various types of media including major print media, on-line media, consumer newsletters, specialty magazines, websites, and national TV.
- ▶ Re-design of the VNI website which has increased web traffic and inquires about VNI funded research.
- ▶ Relocation of operations to Geelong from Melbourne with minimal impact on operations.

BOARD OF DIRECTORS



Geoff Hilton



Bill Burdett



Amanda Caples



Alex Collie



Peter Harcourt



Richard Smallwood

The VNI Board of Directors is responsible for the financial and strategic oversight of the VNI and meets at least quarterly. The VNI Executive reports to the Board on the progress of all initiatives and submits an annual business plan for endorsement. The Board reviews and provides final approval of all recommendations for funding from the VNI Evaluation Committee. It also reviews all recommendations from the VNI Scientific Advisory Committee.

Mr Geoff Hilton (Chair)

- ▶ Director, Transport Accident Commission and WorkSafe Victoria

Mr Bill Burdett

- ▶ Director and Chair, Neurosciences Victoria

Dr Amanda Caples

(Resigned 18 September 2008)

- ▶ Director, Biotechnology, Science and Technology Programs, Department of Innovation, Industry and Regional Development

Dr Alex Collie

- ▶ Acting CEO, Institute for Safety, Compensation and Recovery Research, Monash University

Dr Peter Harcourt

- ▶ Clinical Convenor, Transport Accident Commission/ WorkSafe Health Services Group
- ▶ Medal of the Order of Australia

Professor Richard Smallwood

- ▶ Emeritus Professor of Medicine, University of Melbourne
- ▶ President, Australian Medical Council
- ▶ Officer of the Order of Australia

EVALUATION COMMITTEE



Alex Collie



Alan Blackwood



Robert Burton



Andrew Lawrence



Rod McClure



Sandra Rees

The Evaluation Committee formulates recommendations for funding to the VNI Board of Directors. These recommendations are based on review of both the submitted applications and evaluations from an expert panel review. The Committee provides a broad level of scientific review and evaluation.

Dr Alex Collie (Chair)

- ▶ Acting CEO, Institute for Safety, Compensation and Recovery Research, Monash University

Mr Alan Blackwood

- ▶ Manager, Public Policy Program, Multiple Sclerosis Australia

Professor Robert Burton

- ▶ Professor, School of Public Health and Preventive Medicine, Monash University

Professor Andrew Lawrence

- ▶ Professorial Research Fellow, Head of Behavioural Neuroscience Division, Florey Neuroscience Institutes

Professor Rod McClure

- ▶ Director, Monash University Accident Research Centre

Professor Sandra Rees

- ▶ Professorial Fellow, Developmental Brain Research Group Head, Department of Anatomy and Cell Biology, University of Melbourne

SCIENTIFIC ADVISORY COMMITTEE



Richard Smallwood



Perry Bartlett



Ian Cameron



Mary Galea



Trevor Kilpatrick



Elsbeth McLachlan



James Middleton



Jennie Ponsford



Peter Reilly

The Scientific Advisory Committee (SAC) provides scientific advice to assist the VNI to develop its strategic research plan and funding plan as well as promote a broad spectrum of research in neurotrauma.

Professor Richard Smallwood (Chair)

- ▶ Emeritus Professor of Medicine, University of Melbourne
- ▶ President, Australian Medical Council
- ▶ Officer of the Order of Australia

Professor Perry Bartlett

- ▶ Director, Queensland Brain Institute
- ▶ Foundation Chair in Molecular Neuroscience, University of Queensland
- ▶ Fellow of the Australian Academy of Science

Professor Ian Cameron

- ▶ Professor, Rehabilitation Medicine, University of Sydney
- ▶ Director, Medical Services, Royal Rehabilitation Centre, Sydney

Professor Mary Galea

- ▶ Foundation Professor of Clinical Physiotherapy, University of Melbourne
- ▶ Director, Rehabilitation Sciences Research Centre, Austin Health
- ▶ Senior Principal Research Fellow, Centre for Neuroscience and the Howard Florey Institute, University of Melbourne

Professor Trevor Kilpatrick

- ▶ Director, Centre for Neuroscience, University of Melbourne
- ▶ Professor of Neurology, University of Melbourne
- ▶ Head, Multiple Sclerosis Unit, Royal Melbourne Hospital
- ▶ Head, MS Division, Florey Neuroscience Institutes

Professor Elspeth McLachlan

- ▶ Senior Principal Research Fellow, Prince of Wales Medical Research Institute
- ▶ Co-Director, Spinal Injuries Research Centre
- ▶ Emeritus Professor, University of NSW
- ▶ Fellow of the Australian Academy of Science

Associate Professor James Middleton

- ▶ Associate Professor, Department of Medicine, University of Sydney
- ▶ Director, NSW Statewide Spinal Cord Injury Service, Royal Rehabilitation Centre, Sydney
- ▶ Senior Medical Specialist, NSW Spinal Outreach Service

Professor Jennie Ponsford

- ▶ Professor of Neuropsychology, Monash University
- ▶ Director, Monash-Epworth Rehabilitation Research Centre
- ▶ Co-Director, Rehabilitation, National Trauma Research Institute

Professor Peter Reilly

- ▶ Clinical Professor, Neurosurgery, University of Adelaide
- ▶ Officer of the Order of Australia

VNI MANAGEMENT



VNI Team with Chairmen of the Board of Directors, Evaluation Committee, and Scientific Advisory Committee
From Left to Right: (front row) Debora Romero, Lisa Pitre, Sara Tomlin (back) Geoff Hilton, Alex Collie, Melinda Rockell, Richard Smallwood and Kenneth Dusza

Executive Officer: Melinda Rockell

Development Manager: Lisa Pitre

Senior Project Officer: Kenneth Dusza

Project Officer: Debora Romero

Administration Assistant: Sara Tomlin

Company Secretary: Angela Leahy

Public Officer: Peng Thong

The Department of Innovation, Industry & Regional Development (DIIRD) and Neurosciences Victoria (NSV) provide strategic management support to the VNI.

Senior Project Officer

Dr Fan Li

VNI Project Manager, Department of Innovation, Industry & Regional Development (DIIRD)

Simon Rabl

During 2008/2009 the following people also contributed to the VNI:

Dr Alex Collie was Executive Director until 1 April 2009 and left the VNI to head the newly created Institute for Safety, Compensation and Recovery Research at Monash University. Alexandra Johnson was Operations Manager until August 2008. Jan Harrod was Project Officer from July to December 2008. Tanya Mikhail was Administration Assistant until November 2008 and left on maternity leave. Nicholas Allitt completed a three month contract from September to December 2008 as a Communications Assistant.



GOAL ONE

Fund Internationally
Competitive Research



INTRODUCTION

The VNI provides funding to promote internationally competitive neurotrauma research and continues to build relationships with national and international partners. This has led to highly innovative research and the recognition of Victoria and Australia as a centre of excellence in the field. Promoting collaboration was a key theme for 2008/2009, particularly in the Program Grant funding round. Over 180 researchers were involved in the preparation of 12 full funding applications submitted in July 2008, including 127 Victorians, 40 interstate and 15 international researchers. The applications requested a total of \$59.1 million and underwent evaluation by an expert review panel and the VNI evaluation committee. Given that the calibre of the applications were very high, additional funds were committed to the round increasing the funds available to \$19 million from \$15 million – a highly significant financial contribution to this research sector. In February 2009, The Honourable Tim Holding, Minister for the TAC, announced that Victorians will lead four teams of researchers from over 30 departments of universities and hospitals in Victoria, across Australia and in New Zealand, the United Kingdom and Canada. Three of these large multi-disciplinary research programs are featured in this section. The fourth is featured later in this report under Goal Three: Facilitate the Translation of Research Findings theme.

The VNI team also continues to manage ongoing projects from Round 1 and Round 2 as well as two targeted initiatives – a total of 36 projects. During the year, VNI management reviewed 69 progress and final reports, and executed 12 funding agreements.

Four projects have completed during 2008/2009 and are featured here. A complete list and snapshot of all funded initiatives can be found at the end of the report.

PROGRAM GRANT

AUTONOMIC NERVOUS SYSTEM IN SPINAL CORD INJURY



From Left to Right: Professor John Furness, Associate Professor James Brock, Professor Norman Saunders, Dr Mark Habgood, Professor Albert Frauman, Dr Christopher O'Callaghan, Associate Professor Doug Brown

There is a private burden of spinal cord injury (SCI) that most people never see—loss of control of routine bodily functions. “Bladder infection and the inability to regulate the bowels and blood pressure are respectively the major causes of readmission to hospital, social isolation, and premature death among SCI patients,” says University of Melbourne neuroscientist Professor John Furness, who leads a VNI-supported \$5 million, five-year research program investigating and developing therapies for each of these conditions.

These problems result from loss of direction by the brain of the autonomic nervous system (ANS) that regulates bodily functions largely subconsciously.

“The ANS is unusual in that it has control centres within the spinal cord, but these are normally overseen by higher centres in the brain. When SCI disconnects the brain from the spinal control centres, reflexes run uncontrolled, freewheeling,” says Furness.

For instance, loss of blood pressure control means that SCI patients vary between having abnormally high blood pressure when lying down and low blood pressure to the point of fainting when upright. At night, the high blood pressure leads to large volumes of fluid being pushed through the kidneys resulting in the production of up to five times as much urine as normal. This can lead to interrupted sleep and stress on the kidney, leading to its eventual failure.

The researchers in the VNI program are working with drugs to lower night-time blood pressure. These compounds are already on the market to treat hypertension in the wider population. Having completed a small preliminary study to show their use is likely to be safe in SCI patients, the research team has now gained approval to undertake a much larger, longer and more rigorous trial. Furness hopes the therapy will become available to treat cardiovascular complications of SCI by the end of the research program.

Inability to control defecation makes it difficult if not impossible for people with SCI to go to meetings, dinners, the movies or any other public events. The research team has identified a group of compounds that trigger the bowels to empty. These drugs could provide the kind of control that will allow people with SCI to go about their daily lives without embarrassment.

The researchers have already begun animal trials to determine if spinal injury in any way changes the body's sensitivity or reaction to these compounds. The next step will be clinical trials to determine if the drugs work safely and effectively in humans.

With regard to bladder infection, however, the program has to begin almost from scratch. It is known, Furness says, that soon after the spinal nerves are cut, the lining of the bladder fails to exclude bacteria. Urinary infection or cystitis becomes the most common cause of re-hospitalisation for SCI patients.

“At present, no-one knows just what causes the deterioration of the bladder lining, but we have a few clues already,” Furness says.



Professor John Furness

A first step will be to investigate changes in gene expression that occur in the bladder after SCI, and to develop good tests of the degeneration process. "If we can understand the mechanism by the end of the program, we will have done well." The researchers hope that this knowledge will also identify ways in which the barrier can be augmented or strengthened, and molecular targets for therapy.

The VNI research program involves collaboration between the University of Melbourne and Austin Health in Melbourne and the Prince of Wales Medical Research Institute in Sydney.

"Preliminary studies are showing that work on these pharmacological innovations is a good investment for improved health outcomes," Furness says. "We expect that our research will result in improved health and quality of life for those living with SCI."

Lead Chief Investigator:

- ▶ Professor John Furness,
The University of Melbourne, VIC

Chief Investigators:

- ▶ Associate Professor Doug Brown,
Austin Health, VIC
- ▶ Associate Professor James Brock,
Prince of Wales Medical Research Institute, NSW
- ▶ Dr Christopher O'Callaghan,
Austin Health, VIC
- ▶ Professor Norman Saunders,
The University of Melbourne, VIC
- ▶ Professor Albert Frauman,
Austin Health, VIC

PROGRAM GRANT

SLEEP HEALTH IN QUADRIPLÉGIA



From Left to Right: Dr Jo Spong, Marnie Graco, Dr David Berlowitz, Jack Ross, Liz Hammond, Susan Delaney

Nearly three out of four people with spinal cord injury suffer from sleep apnoea and the consequences for their long term health are alarming.

In response to this issue the Institute for Breathing and Sleep has embarked on a comprehensive \$5 million international research program to explore the likely causes, most effective treatments and health economics of obstructive sleep apnoea (OSA) in people with quadriplegia.

The program was established by the late Professor Robert Pierce and is now being led by Dr David Berlowitz. It builds on earlier VNI-supported research that revealed the extent of OSA in people with spinal cord injury (SCI).

In OSA breathing is frequently interrupted causing sleep deprivation and leading to significantly poorer health, reduced daily functioning, and lower quality of life. This is occurring at a critical time when people with SCI need to re-learn the day to day activities of life.

In addition to studies of the causes and treatments of OSA, the program includes a health economics analysis, to document costs and benefits, and a knowledge transfer component, to ensure the findings are moved as efficiently as possible into the clinic.

OSA occurs when the upper airways leading to the lungs narrow during sleep. It is thought to be a consequence of muscle relaxation. One potential treatment involves the use of continuous positive airway pressure (CPAP) machines, which deliver a stream of compressed air through a mask or nasal tubes down the nose or throat forcing and keeping the airways open.

In earlier work, Berlowitz showed that the use of CPAP machines was both feasible and potentially beneficial for a significant proportion of the quadriplegic population. In the present program an extensive, multi-centre, randomised, controlled trial of CPAP has already begun to enrol patients in Melbourne and Christchurch, New Zealand.

Similar trials are also being undertaken in Sydney and Brisbane, in Sheffield and Stoke-Mandeville in the UK, and in Vancouver, Canada.

“The primary outcome measures will be a battery of tests of memory, concentration and learning,” says Berlowitz.

Another measure to counter OSA is a device like a mouthguard which moves the jaw forward and opens up the throat. The program includes treatment studies in Sydney and Melbourne of the effectiveness of this oral device in people with quadriplegia who are in hospital or at home.

There will also be a double-blind, randomised control study in people with complete quadriplegia of therapy with the biological clock hormone melatonin. Interruption of the supply of melatonin is a standard consequence of SCI, and with it comes an inability to regularise sleep.

While it is known that OSA is associated with muscle relaxation and airway narrowing, what provokes the condition in the first place is unclear. Nor is it clear why OSA should be associated with SCI. The research program will be investigating several ideas as to the causes of OSA in patients with SCI using sophisticated magnetic resonance imaging (MRI) and mechanical measures. The findings may well apply to OSA in the general population as well.

The MRI imaging—in collaboration with Melbourne’s Brain Research Institute and Sydney’s Prince of Wales Medical Research Institute—will provide both static and moving 3-D pictures of the relationships of all the tissues surrounding the upper airways, including bones, in the hope of determining how the narrowing happens in both able-bodied people and people with SCI. In addition, the researchers will take physical measurements during sleep of air pressures, resistance to flow and the collapsibility of the upper airways, in many of the same people that have been imaged—so the data can be combined.

“This is potentially a very powerful means of investigation,” Berlowitz says.

Throughout the research program, the evidence collected will be collated and disseminated as widely and efficiently as possible. A knowledge transfer and exchange unit is being established to perform this task. Its first job will be to collect and make available what is already known, and it will be producing guidelines for treatment as it goes. This unit will integrate with the VNI’s broader knowledge transfer initiatives.

Finally, a health economics analysis of treatment of OSA in people with quadriplegia has been built into the program grant. Two post-graduate trainees supervised by Dr Duncan Mortimer from the University of South Australia will model the economics of what emerges in the study. “For bodies such as the Transport Accident Commission,” Berlowitz says, “that will be a good thing to know.”

Lead Chief Investigator, Application:

- ▶ The Late Professor Robert Pierce,
Institute for Breathing and Sleep, Austin Health, VIC

Lead Chief Investigator, Implementation:

- ▶ Dr David Berlowitz,
Institute for Breathing and Sleep, Austin Health, VIC

Chief Investigators:

- ▶ Associate Professor Doug Brown,
Austin Health, VIC
- ▶ Professor Peter Cistulli,
Centre for Sleep Health & Research, Royal North Shore Hospital, NSW
- ▶ Professor Graeme Jackson,
Brain Research Institute, Austin Health, VIC
- ▶ Dr Fergal O’Donoghue,
Institute for Breathing and Sleep, Austin Health, VIC
- ▶ Professor Paul Kennedy,
National Spinal Injuries Centre & University of Oxford, United Kingdom
- ▶ Associate Professor Gerard Kennedy,
Victoria University, VIC
- ▶ Professor Meg Morris,
The University of Melbourne, VIC
- ▶ Professor Don Campbell,
Monash University, VIC
- ▶ Professor Simon Gandevia,
Prince of Wales Medical Research Institute, NSW



Professor Robert Pierce

VALE PROFESSOR ROBERT PIERCE

Professor Robert Pierce, the CEO and founder of the Institute for Breathing and Sleep (IBAS), died defending his property during the Victorian Black Saturday bushfires on the 7th of February, 2009. Professor Pierce, or Rob as he was known by most, was also the Director of the Department of Respiratory & Sleep Medicine at Austin Health and Professor of Respiratory Medicine at the University of Melbourne. He was 62.

After studying medicine at the University of Melbourne, Rob became a leader in the field of respiratory medicine and was one of a handful of clinicians in Australia who recognised the importance of the burgeoning field of sleep medicine.

In 2000 he founded the Institute for Breathing and Sleep (IBAS) in order to promote research, education and public advocacy in respiratory and sleep medicine. Just before his death he received major funding from the VNI for the Sleep Health in Quadriplegia research program.

Rob excelled in the roles of clinician, teacher and researcher. Despite his many professional achievements, it was Rob’s personal qualities that were most endearing and memorable. He inspired and was a role model for generations of doctors, other health professionals, research students and scientists, many of whom are now in senior positions.

PROGRAM GRANT

SPINAL CORD INJURY AND PHYSICAL EXERCISE



From Left to Right: Professor Mary Galea, Professor Sarah Dunlop and Associate Professor Garry Allison

Recent research suggests that exercise could encourage the growth and repair of nerve connections in the spinal cord.

In response, the VNI is supporting a large project that challenges traditional therapy. The project will investigate whether intensive exercise starting as soon as possible after injury can increase the independence of people with spinal cord injury (SCI).

The VNI is investing \$4.5 million in the five-year program which builds upon the huge advances in knowledge of the functioning of nerves and the nervous system, as well as vastly improved technology for intervention and management. The NSW government has also committed \$1.2 million to the program.

"It's a bottom-up approach," says program leader Professor Mary Galea, Director of the University of Melbourne's Rehabilitation Sciences Research Centre. In the past, she says, it was thought there was no recovery of movement possible from spinal cord injury. But we now know that the nervous system is far more plastic and, with appropriate stimulation, can reorganise itself to take advantage of whatever movement is possible.

The Spinal Cord Injury & Physical Activity (SCIPA) program involves four major projects to investigate aspects of using exercise to encourage neural recovery. The fundamental idea is that stimulating movement electrically in arm and leg muscles could provoke the brain and central nervous system into forming new nerve connections which would allow independent movement.

The most ambitious project is to exercise the whole body using exercise bikes fitted with electrodes that directly stimulate the muscles. Although the patient cannot direct this movement independently from the brain because of his or her spinal cord damage, receptors in the leg muscles may well be able to transmit information back to the spinal cord and brain to encourage rewiring and regeneration of the nervous system.

"Also," says Galea, "exercising will stimulate the body to keep blood circulation going and prevent wasting of the muscles".

Because this project demands a lot of preparation—buying special equipment, including exercise bikes and electrical stimulators, and training the therapists to operate them—it will be rolled out in the next 12 to 18 months. But ethics applications for a clinical trial using a similar strategy for hand movements have already been submitted to all the spinal units in Australia and New Zealand—Melbourne, Adelaide, Perth, Brisbane, Sydney and Auckland.

The 'Hands On' project focuses on the ability to open and close the hand. This involves electrical stimulation of the muscles in the forearm. Patients are fitted with a wireless stimulator which they operate by clicking their teeth, and which drives the opening and closing movement of their hands. "With hands you are not dealing so much with muscle strength, which is important in the legs, but more with dexterity," Galea says. "You need to use the hand in a functional way, to interact with objects". And patients can do that by playing computer games which demand manipulating levers on a computer workstation.

Apart from obvious problems such as wheelchair accessibility, one of the major barriers to encouraging people with SCI to become more active in the community is the lack of trained staff to assist them in gyms. So a third project is to develop a certificate program in collaboration with the YMCA to educate fitness instructors about the special needs and management of people with SCI. The course, already under development by Associate Professor Garry Allison at Curtin University in Perth, will eventually become available on-line, and will involve devising a fitness program for a person with SCI.



Professor Mary Galea

The fourth project will be to assess how early to begin muscle stimulation for the greatest benefit, particularly to keep muscles supple and maintain muscle mass. The focus of all the projects will be on promoting recovery, maintaining health, and maximising independence.

Projects will be evaluated using a wide range of outcome measures, including neurophysiological and functional assessments to examine their effects, as well as evaluation of their impact on quality of life and community participation. Economic analyses will be conducted to weigh up cost-effectiveness. "Evidence from this research program has the potential to revolutionise rehabilitation following SCI," Galea says.

"The VNI funding will enable innovative research programs critical to improving the quality of life of people living with a spinal cord injury in Australia and potentially globally."

Stephanie Williams, CEO ANZSCIN
(Australia New Zealand Spinal Cord Injury Network)

Lead Chief Investigator:

- ▶ Professor Mary Galea,
The University of Melbourne, VIC

Chief Investigators:

- ▶ Professor Sarah Dunlop,
The University of Western Australia, WA
- ▶ Associate Professor Garry Allison,
Curtin University, WA
- ▶ Dr Lisa Harvey,
The University of Sydney, NSW
- ▶ Associate Professor Glen Davis,
The University of Sydney, NSW
- ▶ Dr Linda Denehy,
The University of Melbourne, VIC
- ▶ Dr Andrew Nunn,
Austin Health, VIC
- ▶ Dr Ruth Marshall,
Hampstead Rehabilitation Centre, SA
- ▶ Dr Richard Acland,
Burwood Spinal Injuries Unit, New Zealand
- ▶ Dr Timothy Geraghty,
Princess Alexandra Hospital, QLD
- ▶ Professor Iven Mareels,
The University of Melbourne, VIC

COMPLETED PROJECTS

ASSESSMENT AND INTERVENTION FOR MILD TRAUMATIC BRAIN INJURY



Professor Jennie Ponsford

Mild brain injury is difficult to recognise so it can be missed by busy emergency room staff. A VNI-supported project examined the usefulness of early screening and intervention with advice in the form of a booklet for people attending hospital following a mild head injury.

Professor Jennie Ponsford, from Monash University, trialled an existing screening tool designed for monitoring amnesia in people with more severe head injuries (the Westmead PTA scale). It is more sensitive to the presence of post-traumatic amnesia and thinking problems than other screening measures currently in use.

The period of amnesia following a head injury is one of the strongest predictors of the severity of the injury and the eventual outcome. Ponsford and her colleagues, Professor Peter Cameron and Associate Professor Mark Fitzgerald, trialled the screening tool, modified for use in emergency rooms, in conjunction with other tests of people's thinking abilities. They found that screening did show the severity of the injury, and predicted the ongoing symptoms.

A week after the injury those who had a mild head injury had significantly more symptoms, such as headaches, dizziness, and poor memory or concentration, than the control group who had experienced trauma without a head injury.

The trial encountered challenges implementing the revised screening protocol. The lessons learnt may help address the barriers in any future dissemination of the protocol.

The information booklet told people what symptoms to expect and how to cope with them. Ponsford found that the people who were given the booklet a week after their head injury had fewer symptoms three months later. She expects the benefits will be even greater if the booklet is handed out in the emergency department. Plans are underway for routine use of the booklet at the Alfred Hospital in Melbourne.

ENHANCING ENDOGENOUS NEUROGENESIS – PILOT



Dr Nicole Bye

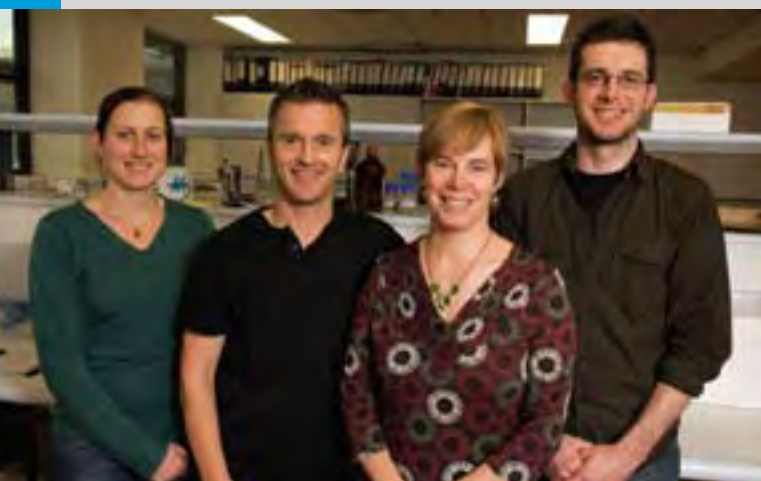
Many nerve cells divide and grow following brain injury. But few survive to maturity a VNI-funded study in mice has found. The study identifies a window for potential therapies.

Although it was traditionally thought that nerves did not regenerate, we have known for more than 40 years that nervous tissue retains a limited capacity to do so. Enhancing such regeneration could be a key to effective treatment of traumatic brain injury and spinal cord injury.

As a starting point of this strategy, under the supervision of Associate Professor Cristina Morganti-Kossmann of the National Trauma Research Institute, Dr Nicole Bye documented the progress of regeneration in mice after bruising to the left hand side of the brain. She was able to label dividing cells and follow the specialisation and maturation process using stains which could distinguish between mature and immature cells and between nerve cells and the nutritive tissue known as glial cells. What occurred in the injured brain could then be compared to intact control brains.

Bye found that after an initial flurry of activity immediately following injury, marked by a large increase in dividing cells, and their migration to the site of injury, only a limited number of these cells were able to reach maturity four to eight weeks later. It's an important observation, she says. "We have found a window of therapeutic opportunity where administration of compounds that could enhance the survival of these new cells might well improve recovery from brain injury."

DEVELOPMENT OF EphA4 PEPTIDE INHIBITORS



From Left to Right: Dr Kirsty Dixon, Dr Tony Hughes, Associate Professor Ann Turnley and Dr Kade Roberts

Spinal cord injury usually results in permanent paralysis because nerve cells are unable to regrow. One factor preventing regrowth is the presence at the injury site of molecules, such as EphA4, that inhibit nerve growth.

Preliminary research findings show that turning off the action of these molecules results in nerve cell regrowth. In cell culture certain peptides (small protein fragments) have been shown to block EphA4.

Associate Professor Ann Turnley, from the University of Melbourne, designed a study to test if these peptides would allow nerve cells in mice to regrow if given as treatment following spinal cord injury.

Turnley and her team designed and synthesised 35 peptides and tested their effectiveness in blocking EphA4 on cells in culture, and their stability in blood plasma. Turnley tested one peptide therapeutically but it had no effect on mobility, or the amount of nerve growth, following injury. It is likely, however, that the peptide did not reach the injury site because when the most promising peptides were administered to mice, they were taken up by the kidneys.

This study has shown that these peptides are not good candidates for EphA4 inhibitors. However, the approach remains valid and other candidates are providing promising results.

SLEEP HEALTH IN TETRAPLEGIA



Dr David Berlowitz

Nearly three out of four people with tetraplegia suffer from clinically significant obstructive sleep apnoea (OSA), where breathing is interrupted so often as to lead to sleep deprivation, reduced brain function, poorer general health and lower quality of life.

That's the major finding of the largest ever survey of sleep disorders in people with tetraplegia, an 18-month study completed earlier this year by Dr David Berlowitz of the Institute for Breathing and Sleep at the Austin Hospital.

The study built on earlier work in which Berlowitz first demonstrated the link between spinal cord injury and OSA. The trends identified are clear enough to support the VNI's decision to fund a comprehensive program of research into the likely causes, most effective treatments and health economics of OSA in people with quadriplegia (see page 14).

Of 424 questionnaires on sleep habits and quality of life sent out to people with tetraplegia in Victoria, 163 were returned. The researchers then backed up the information in the surveys by performing sleep studies on 92 of the respondents. They found rates of OSA as high as 91 per cent in people with complete tetraplegia and more than 56 per cent—about three times the level in the general population—for people with partial tetraplegia. People with tetraplegia who also had OSA displayed demonstrably poorer health.

A photograph of three people standing outdoors. In the foreground, a woman with short, curly grey hair and red-rimmed glasses is looking towards the camera. She is wearing a green jacket. Behind her to the left is a man with dark hair and glasses, wearing a dark blue sweater over a light blue shirt. To the right is a younger man with dark hair, wearing a white t-shirt and holding a small blue and white cup. The background consists of a light green wall with horizontal slats.

GOAL TWO

Facilitate Enhanced Capacity



INTRODUCTION

The VNI builds capacity and capability by creating opportunities where gaps exist and promotes collaboration, mentorship and information sharing. This has enhanced the highly skilled Victorian neurotrauma research sector and led to growth in research output and an increase in the knowledge shared. During 2008/2009 the VNI awarded Fellowships to five exceptional researchers. They join the eight talented researchers who received Fellowships the previous year, bringing the total number of VNI fellows supported to thirteen. The variety of Fellowships offered in both Round 3 and Round 5 attracted a wide range of clinicians and researchers to neurotrauma research. Training Fellowships are designed for active clinicians and public health practitioners with little or no research experience to undertake neurotrauma research that is linked to their practice. This Fellowship is designed to attract new researchers to the field of neurotrauma. Early Career Practitioner Fellowships are designed for active clinicians and public health practitioners, who have some research experience, whilst Early Career Research Fellowships are designed to support basic neurobiological and clinical researchers in the early stages of their career, providing an opportunity to establish a track record in the field. Both of these Early Career Fellowships are designed to attract and retain early career researchers within the field of neurotrauma. Finally, the Senior Research Fellowship provides an opportunity to undertake competitive research and to develop research leadership within the neurotrauma field. This Fellowship is designed to attract and retain senior basic neurobiological and clinical researchers within the neurotrauma field. Eleven Skill Development Awards were also awarded in 2008/2009 allowing researchers to build their skills with short courses to a maximum value of \$2,000 each.

In addition to the formal funding rounds, the VNI offers a variety of opportunities for its funded researchers and the wider neurotrauma community to build capacity through networking opportunities, seminars, conference sponsorship, mentoring, and training. 2008/2009 was an exciting year with many new initiatives launched for the first time: Co-hosting the Trauma Melbourne Conference in November, Media Training for fellows, Mentoring Youth Ambassadors as part of Research Australia's 'Thank You' Day public awareness campaign and two research exchanges with the Ontario Neurotrauma Foundation (ONF).

2009 VNI NEUROTRAUMA FELLOWSHIPS



2009 VNI Neurotrauma Fellows with Melinda Rockell and Geoff Hilton

TRAINING FELLOWSHIP

Kathleen Bakker,
Murdoch Childrens Research Institute

How does loss of smell affect children?

Up to 60 per cent of adults with traumatic brain injury (TBI) have impaired smell or anosmia. Loss of appetite and problems with detecting gas leaks and spoiled food are just some of the challenges they face. And the condition can be a sign of deeper problems affecting planning and decision-making. Yet we know almost nothing about how common anosmia is in children after TBI, its impact on them, and how well they recover.

VNI training fellow Kathleen Bakker is filling the information gap, so that children with anosmia can be managed better clinically. She is particularly interested in the link between loss of smell and damage to the orbitofrontal cortex above the eyes and nose, an area of the brain that is involved in the control of behaviour.

"The VNI Fellowship has given me the time and opportunity to undertake research that will further our understanding of anosmia in children with TBI and its impact on their day-to-day lives," says Kathleen. "Without their financial support and the structure of the research mentor system it would be difficult to complete such a large scale project."

After completing a postgraduate degree in clinical neuropsychology at the University of Melbourne, Kathleen worked for more than a decade in clinical research and the rehabilitation of children with brain injury at The Children's Hospital in Westmead. During this time she also taught at Macquarie University. At present she is the senior clinical neuropsychologist in the Victorian Paediatric Rehabilitation Service at the Royal Children's Hospital.

EARLY CAREER PRACTITIONER FELLOWSHIP

Alistair Nichol,
Australian and New Zealand Intensive Care Research Centre

Does body cooling reduce brain damage?

Could lowering body temperature as soon as someone is diagnosed with head injury prevent long-term brain damage? The evidence base for use of this early prophylactic hypothermia is limited. And without certainty few doctors are likely to prescribe such treatment.

VNI early career practitioner fellow Dr Alistair Nichol is part of the team managing a large randomised study to decide the question once and for all.

The trial involves early prophylactic hypothermia in 512 patients with severe traumatic brain injury. Paramedics will inject cold fluid into patients at the scene of an accident, and they will subsequently be kept cool for three days in hospital using pads on their chest, back and legs. Alistair and his colleagues will then determine the proportion of favourable neurological outcomes after six months.

"The VNI support has helped me to realise my ambition to continue research in tandem with my clinical work," says Alistair. "This unique opportunity has allowed me to work with world leading researchers on top flight research projects which aim to improve outcomes in head-injured patients."

Originally an anaesthetist, Alistair is an intensive care doctor, and a senior lecturer in the Australian and New Zealand Intensive Care Research Centre at Monash University. He is on the management committee of numerous multi-centre trials and two single-centre trials in intensive care. Alistair has already received over \$6 million dollars in research grants and been awarded several prizes for his research including the Matt Spence medal of the Australian and New Zealand Intensive Care Society.



From Left to Right: Dr Alistair Nichol with Mentor Professor Jamie Cooper, Dr Cheryl Soo, Kathleen Bakker and Mentor Professor Vicki Anderson

EARLY CAREER RESEARCH FELLOWSHIPS

Nicole Bye, National Trauma Research Institute Enhancing nerve cell growth after brain injury

Dr Nicole Bye is investigating ways of stimulating the growth and survival of nerve cells after brain injury.

In a recent VNI-funded project Nicole showed that nerve cells in the brains of mice can reproduce and migrate to the site of injury after traumatic brain injury (TBI). But she also found that most of them fail to mature (see page 18). Yet work by other researchers has shown that increasing the numbers of nerve cells after injury can lead to improvements in movement and behaviour. In addition, nerve cells can be encouraged to divide and grow, and are nourished and protected at specific stages of their life, by compounds known as neurotrophins.

Putting that all together, Nicole is using her VNI Fellowship to study whether treatment with a combination of neurotrophins can lead to greater survival and recruitment of regenerative nerve cells to the brain.

The compounds she will use include erythropoietin (EPO), which has an impact immediately after injury, epidermal growth factor (EGF), and brain-derived neurotrophic factor (BDNF), which has a strong effect in later growth stages.

“The Fellowship has given me the security and confidence to establish myself as an independent researcher,” she says.

Nicole has been particularly interested in the inflammation process following TBI, and has recently been exploring its impact on the injured brain’s regenerative response. She has also been testing the therapeutic potential of novel anti-inflammatory drugs.

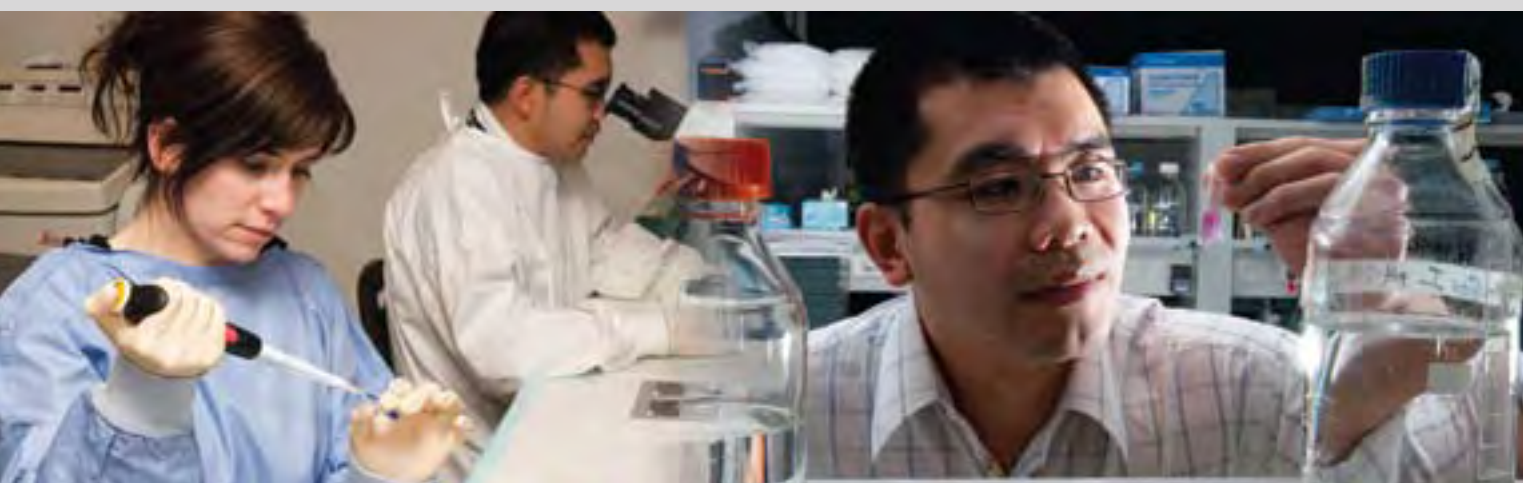
Nicole has been a research officer at the Neurotrauma Research Group at the National Trauma Research Institute at The Alfred since its establishment in 2002. She completed a PhD in medicine at Monash University in 2007, and has published several papers in well-regarded peer-reviewed journals on neuroscience and neurotrauma.

Cheryl Soo, Murdoch Childrens Research Institute Helping teenagers to “hang out” with their friends

Having friends over, going to the movies, attending school, just “hanging out”—normal socialising is a real issue for teenagers recovering from traumatic brain injury (TBI). Social anxiety associated with TBI is a well documented problem, although the cause can vary. It may be a direct result of the injury or more indirectly a consequence of adjusting to it.

Dr Cheryl Soo is evaluating cognitive behavioural therapy (CBT) as a means of treating this sort of difficulty. Her interest arose from talking with adolescents affected by TBI about the problems they faced in everyday life.

“The structured nature of CBT and its focus on concrete behaviours and thoughts,” Cheryl says, “suggest it is well suited to the needs of people with TBI”.



From Left to Right: Dr Nicole Bye and Dr Edwin Yan

She is taking an existing CBT program for adolescents with social anxiety, and adapting it specifically for those impacted by TBI. She will focus on the difficulties typically associated with their condition, such as impairment of memory or difficulty with phoning a friend. Cheryl is planning a randomised, controlled trial comparing 25 teenagers undertaking the tailored CBT program with 25 others in standard care. The outcomes will be used to develop a manual for therapy of adolescents with TBI.

“I’ve wanted to explore these issues for many years. The VNI grant has made it possible,” Cheryl says.

Cheryl is a post-doctoral research fellow at the Australian Centre for Child Neuropsychology Studies in the Murdoch Childrens Research Institute at the Royal Children’s Hospital, and holds a joint appointment with the Rehabilitation Studies Unit at the University of Sydney. She is a registered psychologist and has acted as project manager for more than 10 clinical research projects in the field of TBI since 2001. Cheryl is particularly interested in rehabilitation and emotional functioning following TBI in childhood. She has published widely on her research.

Edwin Yan, National Trauma Research Institute Reducing damaging reactions in the brain

Traumatic brain injury (TBI) activates a cascade of biochemical reactions in the brain. One of them, known as the kynurenine pathway, breaks down the essential amino acid tryptophan. This pathway leads to two end products, one results in kynurenic acid which protects brain cells. The other leads to quinolinic acid which is a nerve cell toxin. This can have a significant impact on brain injury, according to VNI early career research fellow Dr Edwin Yan.

Edwin has designed a research project to understand kynurenine pathway activation in humans following TBI with the aim of developing and testing therapies that shift it into producing a higher proportion of protective kynurenic acid. By analysing the levels of key compounds of the kynurenine pathway in fluid taken from the brains of TBI patients, he has found there is a delay of at least a day before the cascade starts. Now, Edwin is confirming these findings by studying the enzymes involved in the pathway in post mortem human tissues.

The next stage is to determine how similar human kynurenine pathway activation is to that in rats. Eventually Edwin hopes to be able to use rats to test drugs that can block the branch of the kynurenine pathway leading to quinolinic acid, and shift it towards the branch that produces the protective kynurenic acid.

“The VNI support is helping to link our research between the clinic and laboratory bench for new treatments of TBI,” he says.

Edwin is well equipped for his work. After a PhD in physiology and neuroscience, he has spent two years as a researcher in the National Trauma Research Institute. He has published widely in internationally recognised journals, and has a particular interest in commercialisation.

ONGOING FELLOWSHIPS ANNOUNCED IN 2008



From Left to Right: Jane Galvin (right) with colleague, Susan Berney

TRAINING FELLOWSHIPS

Jane Galvin,
Murdoch Childrens Research Institute
Making therapy fun for children

Jane Galvin hopes to find the best therapies for helping children recover from a brain injury. Not much is known about how brain injury affects motor skills. Jane hopes to understand how children regain skills such as grasping, manipulation, hand-eye coordination and arm movement after a brain injury. She is also investigating how these skills affect daily life, such as getting dressed or writing. Her aim is to create a fun way of helping children to practise using their hands in therapy, helping children return to playing and using their hands more quickly.

“I’m now applying my 15 years practical experience in traumatic brain injury to research, and that’s a transition that wouldn’t have happened without the support of the VNI,” says Jane.

Jane has worked in Australia, the USA and UK and has spent the last 12 years focussing on children. She is the senior occupational therapist in the Paediatric Rehabilitation Service at the Royal Children’s Hospital. She is also the Neuro-Rehabilitation Stream leader for the Murdoch Childrens Research Institute and a lecturer at LaTrobe University. Jane also has a Masters in occupational therapy and is leading a VNI-supported investigation into using virtual reality to help children recover from brain injury.

Susan Berney, Austin Health
Who needs help breathing?

Susan Berney wants to get people with spinal injuries out of intensive care sooner. A key factor for those with quadriplegia is who is able to breathe by themselves and who isn’t. Specialists disagree on this. Some patients may have surgery to insert a breathing tube unnecessarily, while others have tubes removed too early.

Sue aims to identify the factors that influence decisions and develop guidelines to streamline the process. She hopes her work will reduce how long mechanical ventilation is used and the length of stay in intensive care.

Sue says the VNI support has allowed her to combine clinical work and research and has led to collaborations with other researchers in the area of spinal cord injury

Sue joined the Austin Hospital in 1994, after working overseas and interstate. She now leads the cardio-respiratory physiotherapy stream at Austin Health and is the Deputy Director of Physiotherapy. Sue has specialised in intensive care for 16 years and is particularly interested in clinical research into acute respiratory management of spinal cord injury and using physiotherapy in intensive care units. She is currently working on her PhD and has Masters and Bachelor degrees in physiotherapy.



From Left to Right: Dr Gavin Williams, Dr Steven Miller

EARLY CAREER PRACTITIONER FELLOWSHIPS

Gavin Williams, Epworth Hospital

Helping people walk as well as they used to

While a person recovering from a coma may be pleased to walk again at all, Dr Gavin Williams' research focuses on helping them to walk as well as they did before their accident.

Biomechanical analysis, such as that used by sports people and video game animators, allows Gavin to assess the gait of people recovering from traumatic brain injury. He has found that people can compensate for lack of balance, traditionally the major focus of recovery, by walking with their feet further apart. But poor mobility often arises because they lack the strength required to walk normally. What prevents people from recovering their mobility completely following traumatic brain injury is not fully understood, and that is the focus of Gavin's research.

Gavin has been working at the Epworth Hospital for 14 years. Although the people he works with are severely injured, he enjoys the fact that many of them are young, dynamic and fun.

"The Fellowship has given me the opportunity to undertake my research as a post-doctoral research fellow at the University of Melbourne," he says. "It's also helping me publicise my work, to practitioners and the broader community, as a way of encouraging everyone to set high goals for mobility rehabilitation."

**Steven Miller,
Caulfield Pain Management and Research
Centre and Monash University**

Testing a simple treatment for chronic pain

Many people recovering from neurotrauma face chronic pain. It has a significant impact on their quality of life, poses a barrier to rehabilitation, and is often very difficult to treat. Dr Steven Miller, Head of the Perceptual and Clinical Neuroscience Group at Monash University, is researching the use of an approach called caloric vestibular stimulation (CVS) to treat chronic pain. CVS is a cheap, non-invasive procedure that involves irrigating the ear canal with cold water for approximately 30 seconds. It temporarily reduces pain, but has not yet been assessed for the sustained management of chronic pain.

Steven is currently collecting data at two hospitals, Caulfield and the Austin, from people who are suffering pain from one of three causes: post-amputation, spinal cord injury and complex regional pain syndrome. If the treatment is effective it has the potential to change clinical practice and may be especially useful in rural areas and developing countries.

Steven has a medical degree, a PhD in neuroscience and psychiatry, and is currently completing a Masters in Occupational and Environmental Health.

"The VNI Fellowship has allowed me to change my research direction to focus on pain," he says, "and there are synergies with my clinical work in occupational medicine, where chronic pain is a major problem".



From Left to Right: Dr Jerome Maller, Dr Yona Goldshmit

**David Berlowitz,
Institute for Breathing and Sleep**
Better sleep for people with quadriplegia

Dr David Berlowitz's doctoral studies indicated that an unusually high proportion of people with spinal cord injury suffer from obstructive sleep apnoea (OSA)—where breathing is interrupted so often that it leads to sleep deprivation, reduced brain function, poor health and lower quality of life.

“The VNI and its predecessor, the Victorian Trauma Foundation, recognised the importance of the finding and encouraged me to expand the work,” he says. “They agreed to support a study into the feasibility of treating people with quadriplegia who had OSA and a population survey to document the extent of the problem (see page 14).”

Last year David was awarded a VNI Early Career Practitioner Fellowship which has helped him develop the skills needed for his newest challenge. David has stepped up to lead a comprehensive \$5 million dollar VNI-funded research program exploring OSA in quadriplegics. The program was initiated by the late Professor Robert Pierce (see page 15).

David's research career grew from 18 years clinical experience as a physiotherapist, in particular as the founding physiotherapist of the Victorian Respiratory Support Service at Austin Health.

EARLY CAREER RESEARCH FELLOWSHIPS

Yona Goldshmit, Monash University
Reducing scar formation after brain injury

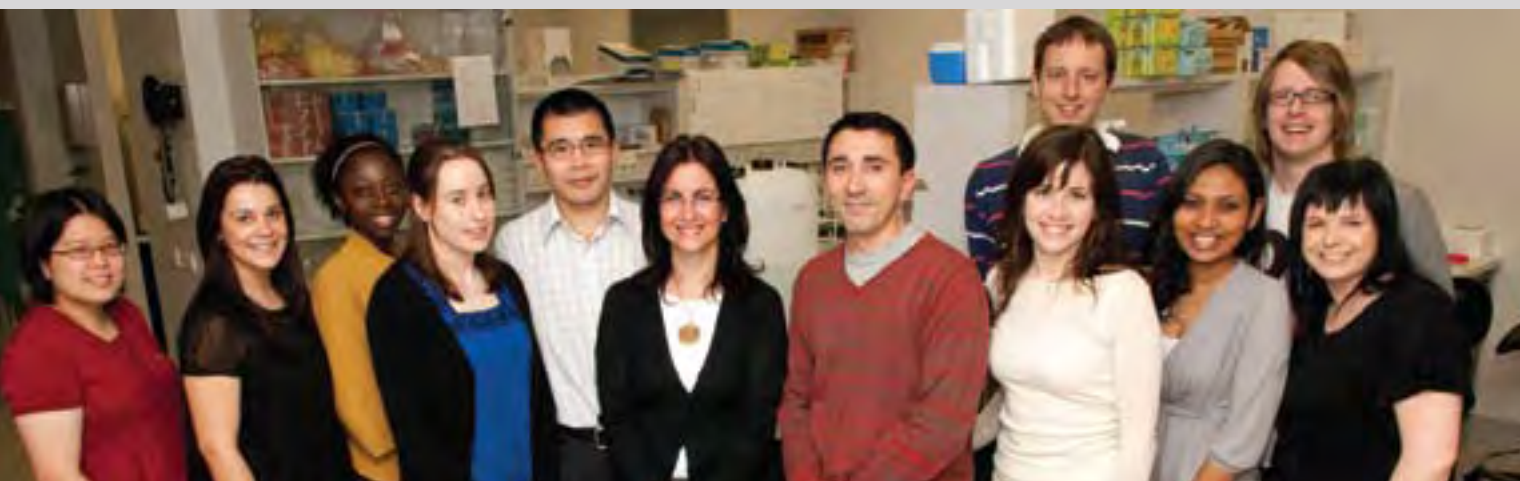
Dr Yona Goldshmit is working to reduce the scar produced by traumatic brain injury.

At the moment of impact, blood flows to the brain causing cell death at the injury site. But damage continues in the days, weeks and months after the injury as inflammation leads to more cell death and a scar forms at the injury site.

Yona is studying ephrins: molecules involved in scar formation that prevent cells regenerating. She hopes that by blocking these molecules at the injury site, the area affected by the brain injury will be smaller, leaving the person with fewer disabilities.

“The Fellowship has given me a great opportunity to examine the hypothesis for the inhibitory role of these molecules that was shown in mice, in models that are closer to human injury,” says Yona.

Yona has been a neuroscientist for eight years and is a research project leader in Dr James Bourne's laboratory at Monash University. She has a PhD from the University of Melbourne, and was awarded a SpinalCure Australia Research Fellowship. She has extensive experience in tissue culture, small animal surgery and biochemistry methods and has also worked as a physiotherapist with brain injury and spinal cord injury clients.



Associate Professor Cristina Morganti-Kossmann and Team

Jerome Maller, Monash University

Who will have depression after brain injury?

Many people develop major depression after a traumatic brain injury, and most do not respond to the usual anti-depressant treatments.

Dr Jerome Maller thinks he can predict who is most likely to develop depression.

He is using an advanced magnetic resonance imaging-based brain imaging technique that shows subtle changes in the white matter (connecting fibres) in the brain. This technique, known as diffusion tensor imaging, could shed light on who will develop depression. If so, then individuals at greater risk will be able to receive early intervention treatment.

Jerome is a neuroscientist in the Brain Stimulation and Neuroimaging laboratory at the Monash Alfred Psychiatry Research Centre. His 15 years training and experience in the field includes a Bachelor of Science, Graduate Diploma of Psychology, Master of Science in Psychology, and a PhD in Psychology and Neuroimaging.

“The VNI support has allowed me to test my hypothesis by recruiting and brain scanning many people with and without a traumatic brain injury, and with and without major depression,” says Jerome. “This has fast-tracked my research and opened the way for me to make significant advances in our understanding of traumatic brain injury and its relationship to major depression.”

SENIOR RESEARCH FELLOWSHIP

Cristina Morganti-Kossmann, National Trauma Research Institute

What happens to the brain after injury?

Associate Professor Cristina Morganti-Kossmann heads a team of researchers studying brain inflammation following traumatic brain injury (TBI). In particular, her team is investigating the potential role of immune cells and inflammatory molecules in contributing to delayed brain and neurological damage or aiding repair processes. Her team is also investigating the effects of oxygen deprivation, which often occurs following severe TBI when the injured person stops breathing.

“The Fellowship has given my team financial security to develop further my neurotrauma research at the National Trauma Research Institute and it also increased the opportunity for future NHMRC funding,” she says

Two of her team members have also been awarded VNI Fellowships.

Cristina is the Associate Director of Basic Research at the NTRI and lectures regularly at Monash University. She has always been fascinated by clinical research. Throughout her neuroscience career in Europe, the USA and now Australia, she has focussed on the problems faced daily by physicians treating patients with TBI in order to build up clinically relevant experimental research.

One of her goals is to foster interest in scientific research in young medical graduates so that the new generation of physicians approach the treatment of diseases with a scientific mindset.

OTHER SUPPORT



From Left to Right: Kenneth Dusza, Gary Allsop, Simon Rabi

CONFERENCES AND SEMINARS

Conferences and seminars are key events for researchers to learn about other research, share novel ideas with others, and general networking. They are particularly useful for new and junior researchers to meet potential mentors. They are a key component of VNI support for capacity building.

Trauma Melbourne

In November 2008, the VNI co-hosted with the National Trauma Research Institute (NTRI), the inaugural Trauma Melbourne Conference. The conference attracted 261 delegates. As part of its collaboration with the Ontario Neurotrauma Foundation (ONF), the VNI also sponsored Professor Keith Hayes from the University of Western Ontario to give a keynote presentation at the conference. He joined Professor Colin MacKenzie from the Shock Trauma Center of the University of Maryland School of Medicine in sharing his international perspective. Plenary Speakers also included: Associate Professor Stephen Bernard, Mr Patrick Chan, Professor Jamie Cooper, Dr Henry V Crock, Ms Janet Dore, Associate Professor Mark Fitzgerald, Associate Professor Russell Gruen, Dr Martin Lum and Dr Sandy Zalstein.

The pre-conference workshop "Research Methods" was also well attended. Peter Trethewey, CEO, A.Q.A. Victoria Limited, and Nick Rushworth, Executive Officer, Brain Injury Australia presented on consumer input into research from the perspective of their organisations to over 70 workshop participants as part of the VNI sponsored session.

"The Trauma Melbourne Conference brought together the country's most influential researchers and clinicians to present and debate the essential issues in trauma research and patient management today. The critical success factor for hosting this conference was the generous funding support from the Victorian Neurotrauma Initiative. Without this support, some of the best trauma research being conducted in the world today could not have been presented in what is now the leading national trauma research forum."

Louise Lyons, General Manager, National Trauma Research Institute

ANZSCoS & ASSBI Sponsorships

In November 2008, the VNI provided sponsorship and attended the 2008 ANZSCoS (Australian New Zealand Spinal Cord Society) Annual Scientific Meeting held in Christchurch, New Zealand. The conference attracted 260 delegates with an interest in spinal cord injury.

In May 2008, the VNI provided sponsorship and attended the 2008 Australian Society for the Study of Brain Impairment (ASSBI) Conference held in Sydney, NSW. A record number of 380 delegates with an interest in brain injury attended the conference.

"The VNI support helped keep the cost of the conference to an affordable level for all delegates who attended, especially the students. We had 380 people from 5 countries attend the conference which I think was in part due to the low cost of the conference as well as the high calibre of speakers."

Margaret Eagers, Executive Officer, ASSBI



From Left to Right: Jenna Ziebel, Si Yun Ng, Tom Woodcock

Conference Support Scheme for VNI Funded Researchers

VNI funded researchers gave presentations at conferences held locally, nationally and internationally including conferences in five Australian states and territories and 10 countries including the Canada, Germany, South Africa, and the USA. Below is a list of conferences for which the VNI provided financial support in 2008/2009 enabling researchers to attend and present their research:

- ▶ 5th Satellite Symposium on Neuropsychological Rehabilitation, Iguacu Falls, Brazil 7–8 July 2008
- ▶ 31st Annual Meeting of the Japan Neuroscience Society, Tokyo, Japan, 9–11 July 2008
- ▶ ISCOS 2008, International Spinal Cord Association 47th Annual Scientific Meeting, Durban, South Africa, 1–4 September 2008
- ▶ 20th Annual Scientific Meeting of the Australasian Sleep Association, Perth, Western Australia, 2–4 October 2008
- ▶ 16th Cochrane Colloquium, Freiberg, Germany, 3–7 October, 2008
- ▶ ISOQOL (International Society for Quality of Life) Annual Conference, Montevideo, Uruguay, 22–25 October 2008
- ▶ 14th Annual Conference of APS College of Clinical Neuropsychologists, Glenelg, South Australia, 13–15 November 2008
- ▶ Neuroscience 2008, 38th Annual Meeting of the Society for Neuroscience, Washington, USA, 15–19 November 2008.
- ▶ Australian and New Zealand Spinal Cord Society (ANZSCoS) Annual Scientific Meeting 2008, Christchurch, New Zealand, 26–28 November 2008.

- ▶ Australian Neuroscience Society, Canberra, ACT, 27–30 January 2009
- ▶ Australian Society for the Study of Brain Impairment (ASSBI) 32nd Annual Brain Impairment Conference, Sydney, NSW, 7–9 May 2009

VNI Seminar Series

A Seminar as part of the VNI Seminar Series was held in June 2009 with over 60 individuals in attendance including researchers, clinicians and the wider neurotrauma community. The seminars provide an opportunity for other colleagues to learn more about VNI funded research and researchers the opportunity to disseminate their findings to the wider community. The topics included:

- ▶ **Traumatic Brain Injury (TBI):** Innovative basic science solutions to improve quality of life after injury, Chair: Dr Damian Myers, The University of Melbourne
 - Associate Professor Graeme Hawthorne, The University of Melbourne: *Measuring the impacts of Traumatic Brain Injury on people's lives*
 - Associate Professor Robert Medcalf, Monash University: *The role of tissue-type plasminogen activator in TBI*
 - Associate Professor Cristina Morganti-Kossmann, National Trauma Research Institute: *Cerebral inflammation in diffuse and focal brain trauma, differences and similarities*
- ▶ **Spinal Cord Injury (SCI):** Assisting in recovery through basic science and rehabilitation, Chair: Dr David Berlowitz, Institute for Breathing and Sleep, Austin Health
 - Dr Peter New, Bayside Health: *Comparison of the demographic characteristics and outcomes for patients admitted into specialist and non-specialist SCI rehabilitation units*
 - Associate Professor Ann Turnley, The University of Melbourne: *EphA4 Inhibitors for neurotrauma treatment*
 - Ms Jeanette Tamplin, Institute for Breathing and Sleep, Austin Health: *Singing in Spinal Cord Injury*

“I liked the opportunity to be exposed to the range of research being funded by the VNI and the opportunity to network with experts in the field.”

Anonymous survey respondent

TRAINING AND SKILL BUILDING

In 2008/2009, the VNI offered eleven more Skill Development Awards. In addition to these, two new training opportunities were made available to Fellowship recipients. Both received extremely positive support from participants.

Skill Development Awards

Successful applicants of the Skill Development Award funding chose to follow an array of courses which included, among others:

- ▶ Applied Analysis of Clinical Trials
- ▶ Epidemiology and Analytic Methods 1 & 2
- ▶ Injury Epidemiology & Prevention
- ▶ Introductory Biostatistics
- ▶ Neuroimaging for Clinical Research
- ▶ Principles of Questionnaire Design
- ▶ Structural Equation Model Education

“The aim of the 1:1 training was to develop a structural equation model predicting employment outcome after traumatic brain injury. I am now feeling confident to perform the remaining analyses independently and to publish the results... It was fantastic to have a week during which I could focus solely on acquiring statistical skills.”

Dr Michael Schönberger

Media Training for Fellowship Recipients

During 2008/2009, ten VNI fellows participated in a one day workshop on *Media Training for Scientists* offered by Science in Public. All ten participants found the hands-on workshops and practice with working journalists valuable in increasing their capacity and comfort in speaking about their research to media. A few have subsequently had a chance to put the training into practice.

*“I gained two things [from this training]:
1) concise delivery of a message in a language which can be digested by the general public;
2) a much better insight into how the various forms of media work and the pressures they are under. This allows me to get my message across in a more effective manner.”*

Dr Gavin Williams

Mentoring Youth Ambassadors for Research

In November 2008 four VNI fellows mentored emerging young researchers as part of Research Australia's 'Thank You' Day public awareness campaign. Dr David Berlowitz, Jane Galvin, Dr Jerome Maller, and Dr Gavin Williams each had a Research Australia Youth Ambassador Program participant shadow their research. The secondary students were selected due to their strong interest in health and medical research. This pilot project was such an overwhelming success, it has been formally added to the Youth Ambassador Program organised by Research Australia.

“I relished the chance to observe a senior physiotherapist conducting his own research, and needless to say, I loved having the opportunity to learn about a field that I hadn't ever been exposed to!”

Madeleine Barrow, Victorian Research Australia National Youth Ambassador for Health Research Winner 2008

INTERNATIONAL EXCHANGES

In November 2008, the VNI hosted a delegation in Melbourne from the Ontario Neurotrauma Foundation as part of the VNI-ONF Research Exchange. Delegates included: Kent Bassett-Spiers, CEO, ONF; Professor Keith Hayes, The University of Western Ontario; Professor Kathleen Martin-Ginis, McMaster University; and Dr Jamie Hutchison, The Hospital for Sick Children. Highlights of the visit included an in-service presentation and visit at the Talbot Rehabilitation Centre, attendance at the Trauma Melbourne Conference and meetings with Victorian counterparts on VNI funded projects.

In May 2009, the VNI offered a reciprocal exchange to Victorian researchers as part of the second phase of the VNI-ONF Research Exchange Program. Participants travelled to Toronto, Hamilton, and Ottawa and met with researchers and stakeholders from various organisations in Ontario. The delegates included: Melinda Rockell, Executive Officer, VNI; Professor Mary Galea, University of Melbourne and Austin Health; Jane Galvin, Royal Children's Hospital and the Murdoch Childrens Research Institute; Associate Professor Russell Gruen, The University of Melbourne and The Royal Melbourne Hospital; Dr Jerome Maller, Alfred Psychiatry Research Centre, Monash University; and Professor Jennie Ponsford, Monash University, Monash - Epworth Rehabilitation Research Centre, and the National Trauma Research Institute.



GOAL THREE

Facilitate the Translation
of Research Findings





INTRODUCTION

Facilitating the translation of research findings into clinical policy and practice requires funding projects that have the potential for translation. It also requires engaged communication with stakeholders and links with health policy agencies. Recognising the day to day reality of busy clinicians, translation also means making the research easier to find and use. To this end, during 2008/2009 the VNI funded the program grant, Knowledge Transfer and Exchange, that will focus on maximising the impact of traumatic brain injury research into the clinical setting. The details of that program grant are featured in this section.

During 2008/2009, the VNI Targeted Initiative Global Evidence Mapping (GEM) Project was extended for a further 18 months beyond its initial three year funding period. The project published an interim summary of work to date as well as several evidence maps for patients with traumatic brain injury or spinal cord injury including: *Pre-hospital Care*, *Acute Care*, and *Rehabilitation*. These maps will be of use to healthcare services, assisting in decision making about appropriate clinical policy and practice.

PROGRAM GRANT

KNOWLEDGE TRANSFER AND EXCHANGE



Associate Professor Russell Gruen and Professor Sally Green

Researchers are continually publishing findings that can be used to improve health care. But that can only happen if the results are clearly communicated to health professionals and health services in a form that makes it easy to incorporate the new information into clinical practice and policy.

"You always find gaps between the evidence base and health care practices," says trauma surgeon Russell Gruen, who leads a \$4.4 million VNI research program to determine and plug those gaps for the traumatic brain injury (TBI) area. "The gaps exist for many reasons, for example, the sheer volume of the discoveries and the busy lives of practitioners."

The VNI research program brings together an experienced international team of experts in knowledge transfer and exchange, evidence-based medical practice and neurotrauma. They will be working on a five-year study based around four themes: how best to gather and provide information; where the gaps between knowledge and practice lie; strategies for overcoming the problem; and how to promote a culture that incorporates research outcomes.

The whole program, and in particular its first theme, will build upon the work of the Global Evidence Mapping (GEM) project (see page 35), where members of the trauma treatment community were encouraged to frame the 120 most significant questions of their practice. A team of researchers, using the latest information science techniques, has been constructing evidence maps around them. In other words, they have searched the world literature for relevant studies and screened those papers for the latest evidence relating to the problem. Preliminary results of this work are available on the web at www.evidencemap.org.

The second theme will scrutinise practice—how people actually treat neurotrauma. The object is to determine the actual gaps between the most up-to-date research and how patients are typically treated.

The third theme will take a specific problem—mild TBI—and explore the barriers to employing evidence-based medicine. "Mild TBI is very common," Gruen says, "from falls, knocks on the footy field, car crashes. People are taken to hospital for tests and observation, and then typically sent home. But up to 13 per cent of them suffer on-going problems—headaches, lack of concentration—which lead to time off work or even break up relationships".

So researchers will undertake a clinical trial of a specific strategy or set of strategies. Staff in several emergency departments will be encouraged to handle patients according to a specific protocol on how to identify or screen for patients at risk, and how to treat them in the early stages. The patient outcomes will be compared with standard treatment. As well as testing useful approaches to treating mild TBI, the researchers will also be investigating how to create behavioural change in emergency departments.

This work leads directly into the fourth theme which will look at how to instil the use of evidence into routine medical practice. Under this theme, the researchers will establish a Fellowship program to encourage practising clinicians to join them in their studies. The practitioners will be trained in the techniques of seeking out and handling evidence. The hope is that, by getting the clinicians involved in the research program, using evidence in their daily practice will become second-nature.

There are also plans to create a neurotrauma knowledge community of people from different disciplines and diverse backgrounds, from policy makers to occupational therapists. The community would come complete with its own newsletters, web alerts and conferences to bring people together to exchange knowledge.

"Investigators in this program are an international team," Gruen says, "with expertise in neurotrauma management and knowledge translation research, spanning many academic institutions, patient and policy stakeholders and clinical service providers. The whole idea is to increase the uptake of research into policy and practice, leading to improved outcomes for people after traumatic brain injury."

Lead Chief Investigator:

- ▶ Associate Professor Russell Gruen, *The University of Melbourne and The Royal Melbourne Hospital, VIC*

Chief Investigators:

- ▶ Professor Sally Green, *Monash University, VIC*
- ▶ Dr Claire Harris, *Southern Health, VIC*
- ▶ Professor Andrew Kaye, *The University of Melbourne and The Royal Melbourne Hospital, VIC*
- ▶ Associate Professor Shawn Marshall, *The Ottawa Hospital, Canada*
- ▶ Dr Lisa Sherry, *Transport Accident Commission, VIC*

TARGETED INITIATIVE

GLOBAL EVIDENCE MAPPING (GEM) PROJECT



Members of the GEM Project team: Haifa Sekkouah, Loyal Pattuwage, Emma Tavender, Associate Professor Russell Gruen, Ornella Clavisi, Dr Peter Bragge, Jennifer Burchill, and Marisa Chau (Absent: Jason Wasiak and Anne Parkhill)

What works in the early management of severe head injury? Is it better for example for paramedics to use a breathing tube to force oxygen down the throat, or a mask over the face? That's exactly the kind of question that the Global Evidence Mapping (GEM) initiative for traumatic brain injury and spinal cord injury is addressing.

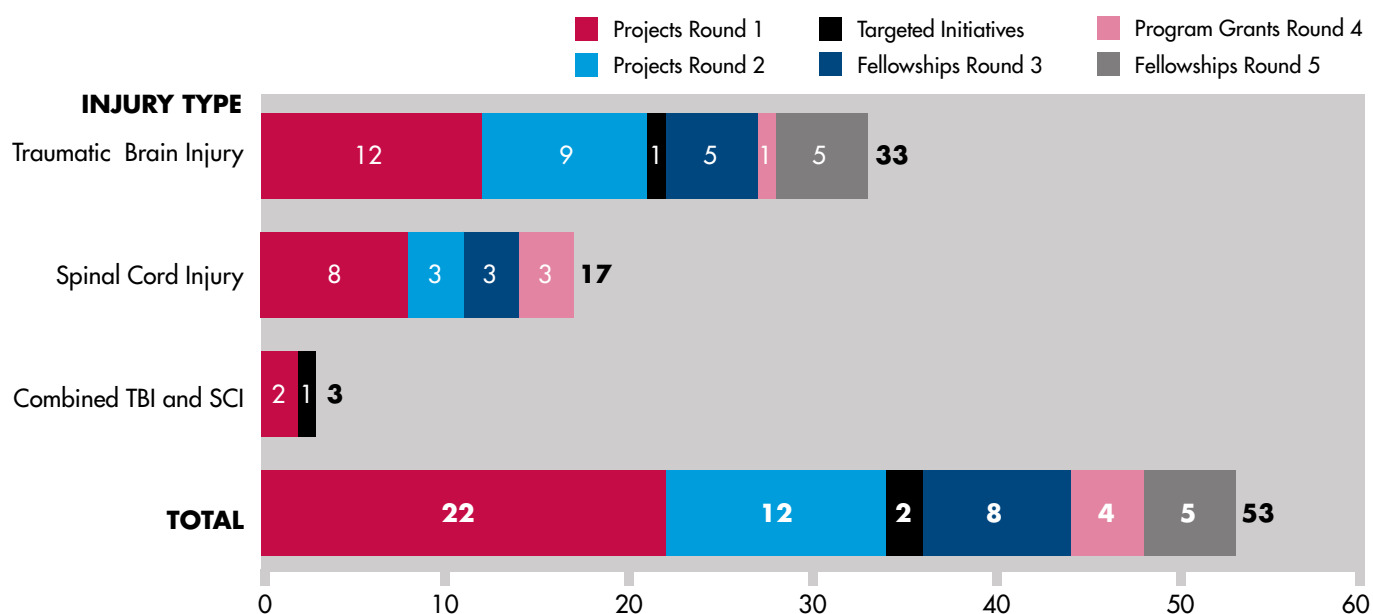
The VNI-supported research team, led by trauma surgeon Russell Gruen, set out to investigate the evidence behind particular treatment practices—what studies had been done, what they revealed and where the gaps in knowledge were. Initially, the team assembled a set of 120 important questions of practice that research might usefully inform.

They did so by drawing the trauma treatment community at all levels into a conversation about what works and what does not, by means of meetings, interviews and questionnaires. Then, a specialist group of researchers well versed in information technology set about prioritising the questions, searching the literature worldwide for relevant studies, and screening the papers they found for evidence.

The preliminary sets of results or evidence maps are already available on the web at www.evidencemap.org, and the GEM project team is now seeking feedback and looking at alternatives for displaying the information they found. Gruen hopes these documents will be used to develop evidence-based policies and guidelines. Already they form an important part of a much wider VNI research program into knowledge transfer and exchange (see page 34). The work has generated much interest internationally, and is at the forefront of its field.

SNAPSHOT OF VNI FUNDED ACTIVITIES

NUMBER OF PROJECTS BY INJURY TYPE



APPROVED FUNDING BY INJURY TYPE

	PROJECTS ROUND 1	PROJECTS ROUND 2	TARGETED INITIATIVES	FELLOWSHIPS ROUND 3	PROGRAM GRANTS ROUND 4	FELLOWSHIPS ROUND 5	TOTAL
Traumatic Brain Injury	\$6.0M	\$2.4M	\$0.9M	\$1.2M	\$4.4M	\$1.2M	\$16.1M
Spinal Cord Injury	\$4.6M	\$0.8M	-	\$0.4M	\$14.6M	-	\$20.4M
Combined TBI and SCI	\$5.0M	-	\$0.9M	-	-	-	\$5.9M
TOTAL	\$15.6M	\$3.2M	\$1.8M	\$1.6M	\$19.0M	\$1.2M	\$42.4M

APPROVED FUNDING BY RESEARCH CATEGORY

RESEARCH CATEGORY	PROJECTS ROUND 1	PROJECTS ROUND 2	TARGETED INITIATIVES	FELLOWSHIPS ROUND 3	PROGRAM GRANTS ROUND 4	FELLOWSHIPS ROUND 5	TOTAL
Basic	\$10.8M	-	-	-	-	-	\$10.8M
Clinical	\$1.5M	\$1.3M	-	-	\$4.9M	-	\$7.7M
Rehabilitation	\$2.1M	\$1.9M	\$0.9M	-	\$9.7M	-	\$14.6M
Education and Training	-	-	-	\$1.6M	-	\$1.2M	\$2.8M
Other	\$1.3M	-	\$0.9M	-	\$4.4M	-	\$6.6M
TOTAL	\$15.6M*	\$3.2M	\$1.8M	\$1.6M	\$19.0M	\$1.2M	\$42.4*M

* Minor variations in totals may result from rounding

APPROVED FUNDING BY VNI STRATEGIC GOAL*

	PROJECTS ROUND 1	PROJECTS ROUND 2	TARGETED INITIATIVES	FELLOWSHIPS ROUND 3	PROGRAM GRANTS ROUND 4	FELLOWSHIPS ROUND 5	TOTAL
Fund Internationally Competitive Research	\$15.6M	\$3.2M	\$0.9M	-	\$14.6M	-	\$34.3M
Facilitate Enhanced Capacity	-	-	-	\$1.6M	-	\$1.2M	\$2.8M
Facilitate the Translation of Research Findings	-	-	\$0.9M	-	\$4.4M	-	\$5.3M
TOTAL	\$15.6M	\$3.2M	\$1.8M	\$1.6M	\$19.0M	\$1.2M	\$42.4M

* Some initiatives involve aspects that are relevant to more than one strategic goal – where this is the case the initiatives have been allocated to the most relevant goal only.

LIST OF VNI FUNDED INITIATIVES



From Left to Right: Professor Jamie Cooper, Dr Larry Abel, Dr Grace Couchman and Professor Jennie Ponsford

PROGRAM GRANTS

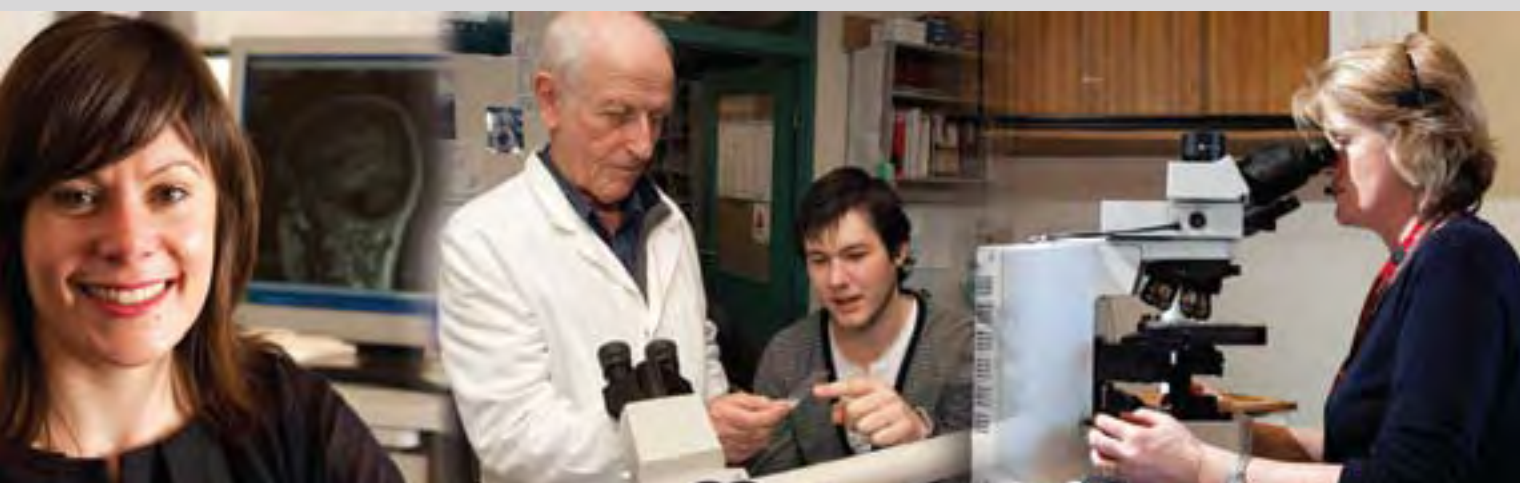
SHORT TITLE	CHIEF INVESTIGATOR A	LEAD ORGANISATION	START DATE	END DATE	COMMITTED AMOUNT	VNI ROUND
A Program to Facilitate Knowledge Transfer and Exchange in Traumatic Brain Injury	Associate Professor Russell Gruen	The University of Melbourne	1/11/2009	31/10/2014	\$4,399,539	4
Autonomic Nervous System in Spinal Cord Injury	Professor John Furness	The University of Melbourne	1/07/2009	1/07/2014	\$4,949,117	4
Spinal Cord Injury and Physical Exercise (SCIPA)	Professor Mary Galea	The University of Melbourne	1/07/2009	1/07/2014	\$4,676,832	4
Sleep Health in Quadriplegia (SHiQ)	Dr David Berlowitz	Institute for Breathing and Sleep	1/06/2009	1/06/2014	\$4,999,978	4

TBI PROJECTS

SHORT TITLE	CHIEF INVESTIGATOR A	LEAD ORGANISATION	START DATE	END DATE	COMMITTED AMOUNT	VNI ROUND
Assessment and Intervention for Mild TBI	Professor Jennie Ponsford	Monash University	1/11/2006	Completed 2008/2009	\$229,955	1
Can Eye Movements Predict Persistent Problems in Paediatric Mild TBI?	Dr Larry Abel	The University of Melbourne	1/11/2008	30/04/2011	\$332,828	2
DECRA (DECompressive CRAniectomy Trial)	Professor Jamie Cooper	Bayside Health	1/01/2008	29/06/2011	\$89,769	2
Detrimental Effects of Albumin Resuscitation (SAFE TBI II)	Professor Jamie Cooper	Bayside Health	15/06/2007	31/09/2009	\$227,700	1

TBI PROJECTS CONTINUED

SHORT TITLE	CHIEF INVESTIGATOR A	LEAD ORGANISATION	START DATE	END DATE	COMMITTED AMOUNT	VNI ROUND
Enhancing Endogenous Neurogenesis Post TBI (pilot)	Associate Professor Cristina Morganti-Kossmann	Bayside Health	1/07/2007	Completed 2008/2009	\$164,899	1
Headstart: Multi-family Groups for Traumatic Brain Injury	Dr Grace Couchman	Monash University	1/03/2008	28/02/2011	\$380,180	2
Hypothermia in Childhood TBI (HiTBIC)	Dr John Beca	Royal Children's Hospital - Melbourne	1/07/2007	31/03/2010	\$205,524	1
Improving the Functional Communication Ability of Adults with TBI	Associate Professor Jacinta Douglas	La Trobe University	1/06/2008	31/08/2010	\$343,802	2
In Vivo Hippocampal Studies in Rats	Associate Professor Terence O'Brien	The University of Melbourne	9/10/2006	8/10/2009	\$973,324	1
Measuring the Impact of Traumatic Brain Injury on People's Lives	Associate Professor Graeme Hawthorne	The University of Melbourne	1/01/2007	15/04/2011	\$194,820	2
Mobility Following Childhood TBI	Anne Kissane	Murdoch Childrens Research Institute	1/01/2007	15/07/2010	\$62,605	1
The Neural Basis of Communication Disorder in Children	Dr Angela Morgan	Murdoch Childrens Research Institute	1/04/2008	31/03/2011	\$292,279	2
Neuronal Cell Death Post-trauma	Professor Seong-Seng Tan	Howard Florey Institute	1/11/2006	31/10/2009	\$1,662,375	1
Normoglycaemia in Intensive Care Traumatic Brain Injury Study (NICE-TBI)	Associate Professor Simon Finfer	Monash University Dept of Epidemiology & Preventive Medicine	1/11/2007	1/04/2011	\$98,797	2
Prevention and Treatment of Social Problems in Childhood / Adolescent TBI	Professor Vicki Anderson	Murdoch Childrens Research Institute	1/07/2007	30/06/2010	\$1,295,135	1
Role of Plasminogen Activator in TBI	Associate Professor Robert Medcalf	Monash University	5/04/2007	4/04/2010	\$578,064	1
TBI in Older Adults: Does Age Matter?	Professor Glynda Kinsella	La Trobe University	8/01/2007	31/12/2009	\$303,188	1
TBI Rehabilitation Using Methylphenidate	Catherine Willmott	Monash University	1/11/2006	Completed 2007/2008	\$35,979	1



From Left to Right: Dr Angela Morgan, Professor Norman Saunders, Professor Catriona McLean

TBI PROJECTS CONTINUED

SHORT TITLE	CHIEF INVESTIGATOR A	LEAD ORGANISATION	START DATE	END DATE	COMMITTED AMOUNT	VNI ROUND
Transcranial Magnetic Stimulation (TMS) Treatment in Depression after Traumatic Brain Injury	Professor Paul Fitzgerald	Monash University	10/06/2008	9/06/2011	\$502,950	2
Traumatic Hypoxia and Cerebral Inflammation	Associate Professor Cristina Morganti-Kossmann	Bayside Health	1/03/2007	28/02/2010	\$232,794	1
Virtual Reality and Upper Limb Function Following TBI in Children	Jane Galvin	Murdoch Childrens Research Institute	5/05/2008	4/05/2011	\$162,388	2

SCI PROJECTS

SHORT TITLE	CHIEF INVESTIGATOR A	LEAD ORGANISATION	START DATE	END DATE	COMMITTED AMOUNT	VNI ROUND
Bone Marrow Grafts for Spinal Cord Repair	Professor Paul Simmons	StepAhead Australia Limited	14/08/2007	13/08/2010	\$856,246	1
Corticospinal Regeneration	Associate Professor David Howells	The University of Melbourne	1/01/2007	31/12/2009	\$626,560	1
Development of EphA4 Peptide Inhibitors for the Treatment of Neurotrauma	Associate Professor Ann Turnley	The University of Melbourne	7/05/2007	Completed 2008/2009	\$573,647	1



From Left to Right: Dr Peter New, A/Professor Graeme Hawthorne and Professor Andrew Kaye, A/Professor Terence O'Brien

SCI PROJECTS CONTINUED

SHORT TITLE	CHIEF INVESTIGATOR A	LEAD ORGANISATION	START DATE	END DATE	COMMITTED AMOUNT	VNI ROUND
Functional Electrical Stimulation for Hand Function in Quadriplegia	Professor Mary Galea	The University of Melbourne	2/01/2008	14/07/2011	\$452,177	2
Macrophage Cytotoxicity Post Spinal Cord Injury	Associate Professor David Howells	The University of Melbourne	1/05/2007	30/04/2010	\$547,052	1
Matrix Technology for Spinal Cord Repair	Dr Kathy Traianedes	Australian Stem Cell Centre Ltd	30/10/2007	29/10/2010	\$412,993	1
National Study of Spinal Cord Injury Rehabilitation Outcomes	Dr Peter New	Bayside Health	1/05/2007	26/03/2010	\$29,372	2
Singing in Spinal Cord Injury	Dr David Berlowitz	Institute for Breathing and Sleep	21/01/2008	19/02/2010	\$307,129	2
Sleep Health in Tetraplegia - Population Survey & Home Monitoring	Dr David Berlowitz	Institute for Breathing and Sleep	16/10/2006	Completed 2008/2009	\$358,688	1
Sodium Channel Blockers in Rat Models	Professor Bevyn Jarrott	Howard Florey Institute	1/12/2006	Completed 2007/2008	\$126,341	1
Spinal Cord Recovery in the Opossum	Professor Norman Saunders	The University of Melbourne	1/02/2007	15/07/2010	\$1,095,114	1

BOTH TBI & SCI PROJECTS

SHORT TITLE	CHIEF INVESTIGATOR A	LEAD ORGANISATION	START DATE	END DATE	COMMITTED AMOUNT	VNI ROUND
Neurotrauma Tissue/Fluid Bank	Professor Catriona McLean	Bayside Health	1/08/2007	31/07/2010	\$811,148	1
New Treatments for Brain and Spinal Cord Injuries	Professor Norman Saunders	The University of Melbourne	1/09/2006	31/08/2009	\$4,186,012	1

TARGETED INITIATIVES

SHORT TITLE	CHIEF INVESTIGATOR A	LEAD ORGANISATION	START DATE	END DATE	COMMITTED AMOUNT	VNI ROUND
GEM for TBI and SCI	Associate Professor Russell Gruen	The University of Melbourne	1/08/2007	16/08/2010	\$943,825	0
Longitudinal Head Injury Outcomes Study	Professor Jennie Ponsford	Monash University	25/09/2007	8/10/2009	\$933,657	0

FELLOWSHIPS

TYPE OF FELLOWSHIP	RECIPIENT	LEAD ORGANISATION	START DATE	END DATE	COMMITTED AMOUNT	VNI ROUND
Training	Kathleen Bakker	Murdoch Childrens Research Institute	1/05/2009	1/05/2011	\$63,648	5
Early Career Practitioner	Dr David Berlowitz	Institute for Breathing and Sleep	1/10/2008	30/09/2011	\$188,232	3
Training	Susan Berney	Austin Health	5/05/2008	4/05/2010	\$46,180	3
Early Career Research	Dr Nicole Bye	National Trauma Research Institute	1/02/2009	1/02/2012	\$326,270	5
Training	Jane Galvin	Murdoch Childrens Research Institute	31/03/2008	30/03/2010	\$61,200	3
Early Career Research	Dr Yona Goldshmit	Monash University	18/02/2008	17/02/2011	\$305,719	3
Early Career Research	Dr Jerome Maller	Monash University	1/02/2008	31/01/2011	\$313,721	3
Early Career Practitioner	Dr Steven Miller	Monash University	5/05/2008	4/05/2011	\$125,488	3
Senior Research	Associate Professor Cristina Morganti-Kossmann	Bayside Health	1/01/2008	31/12/2010	\$281,880	3
Early Career Practitioner	Dr Alistair Nichol	Monash University	2/02/2009	15/02/2012	\$163,135	5
Early Career Research	Dr Cheryl Soo	Murdoch Childrens Research Institute	2/03/2009	29/02/2012	\$326,270	5
Early Career Practitioner	Dr Gavin Williams	Epworth Hospital	24/03/2008	23/03/2011	\$188,232	3
Early Career Research	Dr Edwin Yan	National Trauma Research Institute	1/01/2009	1/01/2012	\$326,270	5

FINANCIAL REPORT

OPERATING STATEMENT

For the year ended 30 June 2009

	NOTE	2009 \$	2008 \$
Revenue from operating activities			
Service fee	2	7,311,846	7,497,085
Funding Contribution	3	570,300	-
Expenses from operating activities			
Salary and related costs		(416,029)	(439,883)
Operating		(231,081)	(159,636)
Contractors		(317,535)	(344,847)
Project funding		(6,917,501)	(6,552,719)
Surplus from operating activities before income tax		-	-
Income tax expense	1 (a)	-	-
Net surplus		-	-

BALANCE SHEET

As at 30 June 2009

	NOTE	2009 \$	2008 \$
Current assets			
Cash		1	1
Total assets		1	1
Equity			
Share capital	4	1	1
Total equity		1	1

CASH FLOW STATEMENT

For the year ended 30 June 2009

	2009 \$	2008 \$
Cash flows from operating activities	-	-
Cash flows from investing activities	-	-
Cash flows from financing activities	-	-
Cash at the beginning of the financial year	1	1
Cash at the end of the financial year	1	1

NOTES TO AND FORMING PART OF THE FINANCIAL STATEMENT

For year ended 30 June 2009

1. Summary of significant accounting policies

Statement of compliance

This general purpose financial report has been prepared in accordance with Australian Accounting Standards and Interpretations. Australian Accounting Standards include Australian equivalent to International Financial Reporting Standards (A-IFRS).

Basis of preparation

The financial report has been prepared on the basis of accrual accounting and the historical cost convention.

Significant accounting policies that have been adopted in the preparation and presentation of the financial report are:

(a) Income tax

The VNI is exempt from income tax.

(b) Cash flow

There are no cash transactions during the year as all costs and expenses incurred by the VNI are paid by the Transport Accident Commission (TAC) and are offset by the service fee payable by the TAC to the VNI.

(c) Comparatives

Where necessary, comparative figures have been adjusted to conform with changes in presentation in the current year.

2. Service fee

In accordance with the service agreement between the TAC and the VNI, the TAC agrees to pay the VNI a service fee for delivering the Initiative and achieving the VNI's objective. The service fee is calculated to fully compensate the VNI for costs incurred.

3. Funding Contribution

In accordance with the funding agreement between the State of Victoria (the State) and the TAC, the State agrees to provide funding to the TAC, to be provided to VNI to assist in delivering the Initiative.

4. Share capital

	2009 \$	2008 \$
Issued capital		
1 ordinary share of \$1.00 each, fully paid	1	1

5. Remuneration of auditor

	2009 \$	2008 \$
Audit fee payable to the Auditor-General's Office	11,000	7,000

6. Directors' remuneration

The total fees payable to the directors for the year ended 30 June 2009 were \$27,478 (2008: \$23,803).

	2009	2008
The number of directors of the Company whose remuneration falls within the following bands:		
• \$1 - \$10,000	2	1
• \$10,001 - \$20,000	1	1

7. Responsible persons

Directors

The names of persons who were directors of the VNI at any time during the financial period are as follows:

- ▶ Bill Burdett
- ▶ Alexander Collie
- ▶ Peter Harcourt
- ▶ Geoff Hilton (Chair)
- ▶ Richard Smallwood (appointed 17 February 2009)
- ▶ Amanda Caples (resigned 18 September 2008)

There are no transactions with director related-parties during the financial year.

Other related parties

Bill Burdett is the Chairman of Neurosciences Victoria Limited, which has provided consultancy services to the VNI during the year on normal commercial terms and conditions.

Geoff Hilton is a director of the TAC, which has received reimbursement of salaries and other relevant expenses incurred on behalf of the VNI under a service agreement.

Richard Smallwood is a director of the Australian Stem Cell Centre and the Murdoch Childrens Research Institute, which have received project funding from the VNI during the year on normal commercial terms and conditions.

8. Segment information

The VNI supports and funds research into neurotrauma and its effects in Victoria.

9. Commitments

At balance date, the total expenditure contracted for research projects but not provided for in the financial report is as follows:

	2009 \$M	2008 \$M
- No later than one year	7.081	6.332
- later than one year but not later than five years	12.428	4.627
	19.509	10.959

10. Economic dependency

The VNI will continue to receive funding from the TAC in accordance with the agreement to cover the liability and delivery of the commitments of the Victorian Neurotrauma Initiative up to 30 May 2011.

DIRECTORS' DECLARATION

In the opinion of the directors of Victorian Neurotrauma Initiative Pty Ltd

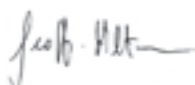
- (a) the operating statement, balance sheet, cash flow statement and notes set out on pages 44 - 46 are drawn up so as to:
 - (i) give a true and fair view of the financial position of the VNI as at 30 June 2009 and of its performance, as represented by the results of its operations, for the year ended 30 June 2009; and
 - (ii) comply with Australian Accounting Standards and Interpretations; and
- (b) there are reasonable grounds to believe the VNI will be able to pay its debts as and when they become due and payable.

Dated at Geelong this 25th day of September 2009.

Signed in accordance with a resolution of the directors:



Alex Collie
Director



Geoff Hilton
Chair

VAGO

Victorian Auditor-General's Office

INDEPENDENT AUDITOR'S REPORT

To the Members of Victorian Neurotrauma Initiative Pty Ltd

The Financial Report

The accompanying financial report for the year ended 30 June 2009 of the Victorian Neurotrauma Initiative Pty Ltd which comprises an operating statement, balance sheet, cash flow statement, a summary of significant accounting policies and other explanatory notes to and forming part of the financial report, and the directors' declaration has been audited.

The Director's Responsibility for the Financial Report

The Director's of the Victorian Neurotrauma Initiative Pty Ltd are responsible for the preparation and the fair presentation of the financial report in accordance with Australian Accounting Standards (including the Australian Accounting Interpretations). This responsibility includes:

- ▶ establishing, implementing and maintaining internal controls relevant to the preparation and fair presentation of the financial report that is free from material misstatement, whether due to fraud or error
- ▶ selecting and applying appropriate accounting policies
- ▶ making accounting estimates that are reasonable in the circumstances.

Auditor's Responsibility

As required by the *Audit Act 1994*, my responsibility is to express an opinion on the financial report based on the audit, which has been conducted in accordance with Australian Auditing Standards. These Standards require compliance with relevant ethical requirements relating to audit engagements and that the audit be planned and performed to obtain reasonable assurance whether the financial report is free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial report. The audit procedures selected depend on judgement, including the assessment of the risks of material misstatement of the financial report, whether due to fraud or error. In making those risk assessments, consideration is given to the internal control relevant to the entity's preparation and fair presentation of the financial report in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of the accounting policies used, and the reasonableness of accounting estimates made by the Directors, as well as evaluating the overall presentation of the financial report.

I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my audit opinion.

Level 24, 35 Collins Street, Melbourne Vic. 3000

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Auditing in the Public Interest

VAGO

Victorian Auditor-General's Office

INDEPENDENT AUDITOR'S REPORT (CONTINUED)

Matters Relating to the Electronic Presentation of the Audited Financial Report

This auditor's report relates to the financial report published in both the annual report and on the website of the Victorian Neurotrauma Initiative Pty Ltd for the year ended 30 June 2009. The Directors of the Victorian Neurotrauma Initiative Pty Ltd are responsible for the integrity of the website. I have not been engaged to report on the integrity of the website. The auditor's report refers only to the statements named above. An opinion is not provided on any other information which may have been hyperlinked to or from these statements. If users of this report are concerned with the inherent risks arising from electronic data communications, they are advised to refer to the hard copy of the audited financial report to confirm the information included in the audited financial report presented on the website of the Victorian Neurotrauma Initiative Pty Ltd.

Independence

The Auditor-General's independence is established by the *Constitution Act 1975*. The Auditor-General is not subject to direction by any person about the way in which his powers and responsibilities are to be exercised. In conducting the audit, the Auditor-General, his staff and delegates complied with all applicable independence requirements of the Australian accounting profession.

Audit Opinion

In my opinion, the financial report presents fairly, in all material respects, the financial position of the Victorian Neurotrauma Initiative Pty Ltd as at 30 June 2009 and its financial performance and cash flows for the year then ended in accordance with applicable Australian Accounting Standards (including the Australian Accounting Interpretations).

MELBOURNE
29 September 2009


D D R Pearson
Auditor-General

Level 24, 35 Collins Street, Melbourne Vic. 3000
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Auditing in the Public Interest

CONTACT INFORMATION

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Photo of Professor Sarah Dunlop and
Associate Professor Garry Allison (page 16)
courtesy of Royal Perth Hospital Medical
Illustrations

Photo of Dr Yona Goldshmit (page 27)
courtesy of Monash University

Board of Directors, Evaluation
Committee, Scientific Advisory
Committee photos courtesy of the individuals


Cover Image: Computer generated illustration:
Rendered fractal having the human brain
shape in longitudinal section

Inside Front Cover Images

Goal One: Dr Kade Roberts,
The University of Melbourne

Goal Two: Professor Glynda Kinsella and Team,
La Trobe University

Goal Three: Jeanette Tamplin,
*Institute for Breathing and Sleep,
Austin Health*



Funding research
to improve the health and quality of life
of individuals living
with brain and spinal cord injury

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