Campus Research

Showcasing collaborative research on The Royal Children's Hospital Campus in 2009









Vision of The Royal Children's Hospital Campus

"A world-class children's hospital campus incorporating clinical care, research and teaching."

The Royal Children's Hospital Campus will fulfil its purpose by being a major contributor to the creation of knowledge for disease prevention and treatment, by educating health professionals and the community, and by applying the knowledge clinically and through appropriate population interventions. This environment will attract and retain the most talented and highly motivated staff to give effect to this vision.

Contents

Campus Leadership Campus Council Campus Research Committee

Campus Research Partners

Research Highlights

Improving sedation safety in emergency Stuttering in preschoolers Moods lifted in children with diabetes Gait analysis for cerebral palsy Overcoming chronic constipation A rotavirus vaccine

Collaboration

Examples of national and international

Campus Highlights

Publications External Research Funding Higher Degree Student Completions Commercialisation Student Accomplishments Career Mentoring Honours and Awards **Campus Events**

Ethics Committees

Human Research Ethics Committee Animal Ethics Committee

Research Enablers

Clinical Epidemiology and Biostatistics Clinical Research and Development Offi Australian Paediatric Pharmacology Res **Bioinformatics** Scientific Services

Looking Ahead A new Royal Children's Hospital Campus

	4
	2
	4
	6
	8
v departments	10
	11
	12
	13
	14
	15
	10
collaboration	10
conaboration	
	18
	18
	10
	19
	19
	20
	21
	22
	23
	24
	24
	25
	26
Unit	26
ice	27
search Unit	27
	27
	27
	28
18	28

Campus Leadership

Campus Council

On behalf of our Campus partners, The Royal Children's Hospital, the Murdoch Childrens Research Institute and the University of Melbourne Department of Paediatrics, together with The Royal Children's Hospital Foundation, I'm delighted to present our first Campus-wide Research Report.

This report is a key initiative of the Campus Council, which was established in 2007 to preside over matters of mutual interest to the Campus institutions. Council members include the CEOs and Board Chairs who meet regularly to discuss Campus strategy and develop cross-Campus opportunities.

Since inception, the Council has been a key catalyst for Campus-wide initiatives, including the establishment of a Campus Research Committee, our first Campus Research Week to be launched in 2010 and this, our Research Report.

The vision of the Council is of a world class children's hospital campus incorporating integrated clinical care, research, education and training. Together we are united in our goal to improve the health outcomes for children today and in the future.

Research and discovery are fundamental to achieving this vision. It is a key point of difference for this hospital Campus that we bring together our clinical, research, education and training bodies with a united strength that builds a reputation that's hard to challenge. The strength of the Campus relationship means that research discoveries can quickly become clinical practice to benefit all children.

I trust you enjoy these stories of vision, perseverance, discovery and success a showcase of the wonderful multidisciplinary research conducted across our Campus. Importantly, it is our people who create these stories and ultimately deliver improved health outcomes for children and their families.

Knowles

The Hon Rob Knowles, AO Chair, Campus Council

The Campus Council was established to create an overarching Campus strategy to achieve a shared purpose and vision. The Council comprises an independent Chair, and two representatives of each of the three Campus partners and The Royal Children's Hospital Foundation. The Royal Children's Hospital Foundation, the fundraising arm of the hospital, engages the community to raise funds and works with the Campus partners to identify fundraising projects or initiatives for research, training, education and medical equipment. Philanthropic funds are distributed to our research teams based on performance and research excellence.

The aspiration of Council is to develop sustainable agreements, systems and structures that enhance and advance the collaborative relationship between the three partners, supporting them in their ambition to rank as one of the best children's hospital campuses in the world. To this end, the Council has established research and education committees across Campus to align strategies and foster collaborations, and has progressed with harmonisation of branding and human resources.

Hon R Chair

Profes Dean, F the Un

Mr To Chair, T

Mr Jul Chair, T

Mr Lau Chair, N

Profes Directo Profess the Uni

Profes Chief E Profess the Un

Mr Bri Directo

Profes

Steven the Uni The Royal Children's Hospital; Group Leader, Haematology Research, Murdoch Childrens Research Institute







Campus Council Members 2009

ob Knowles AO	3
sor James Angus Faculty of Medicine, Dentistry and Health Sciences, Eversity of Melbourne	
ny Beddison AO 'he Royal Children's Hospital	
ian Clarke 'he Royal Children's Hospital Foundation	
irence G Cox AO Aurdoch Childrens Research Institute	
sor Terry Dwyer AO or, Murdoch Childrens Research Institute; orial Fellow, Department of Paediatrics, versity of Melbourne	0
sor Christine Kilpatrick xecutive Officer, The Royal Children's Hospital; orial Fellow, Department of Paediatrics, versity of Melbourne	
an Mallon r, The Royal Children's Hospital Foundation	
sor Paul Monagle son Professor and Head, Department of Paediatrics, versity of Melbourne; Director of Haematology,	



Campus Research Committee

The Campus Research Committee brings together three research representatives from each of our Campus partners with the specific goal of engaging actively and passionately to maximise our research potential and to align our research strategy priorities.

The Committee has been active in its establishment phase and has been the springboard for several initiatives including Campus Research Week, a Research Advisory Forum, the development of a Campus-wide policy on scientific research conduct and the publication of this Campus Research Report. The inaugural Campus Research Week will be launched in 2010 to highlight our research and knowledge transfer activities and engage the community, industry and government.

Looking forward, we will strengthen our research partnerships, aided by the move into the new Royal Children's Hospital Campus building now under construction, which will provide world-class research facilities. The doubling of research space will not only help us build our capacity for basic, clinical and translational research of the highest quality but also enhance our ability to recruit outstanding international and national researchers to our Campus and form one of the largest biomedical paediatric hubs in Australia.

Very Dunger

Professor Terry Dwyer AO Chair, Campus Research Committee

The Campus Research Committee is responsible to Campus Council. Its purpose is to maximise child and adolescent health research outcomes for the Campus, whilst recognising and supporting the achievement of research-related performance objectives for each Campus partner. It develops a Campus-wide research agenda and associated research performance measures; identifies high-level strategic priorities for the consideration of Campus Council; convenes and considers input from a broad-reaching Research Advisory Forum; and encourages effective communication

The Campus Research Committee comprises nine members: the executive leaders and two nominated researchers from each of the three Campus partners. Membership is balanced to include representation from clinical, public health and laboratory research disciplines.

between researchers and clinicians.

Campus Research Committee Members 2009

Professor Terry Dwyer AO (Chair) Directo Profess the Un

Profes

Profes

Profes

Profes Director, Centre for Hormone Research, and Group Leader, Hormone Research, Murdoch Childrens Research Institute

Director, Murdoch Childrens Research Institute; Professorial Fellow, Department of Paediatrics, the University of Melbourne	15
Professor Christine Kilpatrick Chief Executive Officer, The Royal Children's Hospital; Professorial Fellow, Department of Paediatrics, the University of Melbourne	
Dr Peter McDougall Executive Director – Medical Services, The Royal Children's Hospital	and the second s
Professor Paul Monagle	
Stevenson Professor and Head, Department of Paediatrics, the University of Melbourne; Director of Haematology, The Royal Children's Hospital; Group Leader, Haematology Research, Murdoch Childrens Research Institute	
Professor Terry Nolan	
Head, School of Population Health, University of Melbourne; Group Leader, Immunisation Research, Murdoch Childrens Research Institute	T
Professor Sheena Reilly	
Theme Director, Healthy Development, Murdoch Childrens Research Institute; Director of Speech Pathology, The Royal Children's Hospital; Professor of Paediatric Speech Pathology, Department of Paediatrics, the University of Melbourne	
Professor Roy Robins-Browne	
Head, Department of Microbiology and Immunology, University of Melbourne; Group Leader, Infectious Diseases and Microbiology, Murdoch Childrens Research Institute	F
Professor Andrew Sinclair	
Theme Director, Early Development and Disease, Murdoch Childrens Research Institute; Professorial Fellow, Department of Paediatrics, the University of Melbourne	3
Professor George Werther	





Campus Research Partners

The Royal Children's Hospital Campus (RCH Campus) is the premier site for paediatric research and training in Victoria and the focal point for biomedical research directed to health-related outcomes in children and adolescents. Research is conducted by the three Campus partners:

- The Royal Children's Hospital
- Murdoch Childrens Research Institute
- The University of Melbourne Department of Paediatrics.

The Campus partners are physically located on a single site at The Royal Children's Hospital, where an array of facilities and services are provided to support research, education and clinical services of national and global distinction. The delivery of innovative, high quality paediatric care is only possible with the complementary endeavours of research and education. World standard research into paediatric diseases and education of medical students and other health care professionals in paediatric health are ensured by access to a paediatric clinical environment. Hence the interdependence of the three partners.

With an outstanding concentration of more than 1,000 researchers and clinicians, many with joint appointments, the three Campus partners demonstrate high levels of collaboration, co-operation and synergy, creating benefits for children of Australia and the world. This Research Report presents an overview of the important integrated research being conducted on Campus, the services provided to support this research, and highlights from 2009.



Professor Paul Monagle, Professor Christine Kilpatrick and Professor Terry Dwyer AO



The Royal Children's Hospital

Central to the combined entity of the Campus is The Royal Children's Hospital, one of the world's great children's hospitals. The hospital is the major specialist paediatric hospital in Victoria, with care that extends to children from Tasmania, southern New South Wales and other states around Australia and overseas. The hospital is the designated major trauma centre for paediatrics in Victoria and a Nationally Funded Centre for cardiac and liver transplantation. The hospital treats an average of around 35,000 inpatients per year and close to 230,000 outpatients.

Leadership in clinical care at The Royal Children's Hospital is underpinned by clinical research and education. In its role as a leading paediatric teaching centre, the hospital has an affiliation with the University of Melbourne, spanning more than 100 years. This link has played a crucial role in the hospital's development as a major tertiary care institution with an enviable international reputation as a centre of excellence for clinical care, research and teaching. The Royal Children's Hospital also has a long-standing and strong commitment to research, merging its own Research Institute with the Murdoch Institute in 2000 to form the Murdoch Childrens Research Institute, providing a bench to bedside research process on Campus.

The Murdoch Childrens Research Institute

The Murdoch Childrens Research Institute is the largest child and adolescent medical research institute in Australia, with more than 1,200 staff and 70 large research teams. As the custodians for research on Campus, and with a focus on developing globally competitive clinical research, the Institute undertakes knowledge transfer to inform paediatric clinical practice, and drives enterprise, initiative and cross-disciplinary interaction on Campus. The research priorities of the Institute include asthma, diabetes, allergies, premature birth and mental health problems, which are on the rise in children, and conditions such as cancer and genetic disorders that remain unsolved.

The University of Melbourne Department of Paediatrics

The Department of Paediatrics is a multi-disciplinary department within the Faculty of Medicine, Dentistry and Health Sciences at the University of Melbourne, with over 200 staff and research students. The Department has established an international reputation for excellence in child and adolescent health, and leadership in paediatric teaching, research and clinical practice. The custodians for education on Campus, the Department teaches courses in child and adolescent health, paediatric surgery and other specialties in relation to children, adolescents and their families. The Department combines medicine, surgery, pathology, radiology, psychiatry and the clinical school into one department, with strong links to nursing and social work within the University.

Research Highlights

250mt

Translating our findings into clinical practice is a key priority for the RCH Campus. One of our strengths is having so many of our team sharing clinical, research and academic appointments: the results of their research pass immediately into their own clinical practice.

100

We present here a selection of research highlights, examples of Campus integration and translation of research into positive outcomes for children and adolescents. These are but a handful of the many hundreds of research studies undertaken by Campus researchers to address health issues, develop practical treatments and implement educational programmes for the benefit of children, adolescents and their families.

100

75

50

250ml



Improving sedation safety in emergency departments

A/Professor Franz Babl, Ms Theane Theophilos, Ms Trish Barrett and Dr David Krieser

Children presenting to hospital emergency departments often undergo painful and invasive procedures, requiring pain management and sedation. While generally safe, sedation can be associated with serious adverse events.



A research team led by A/Professor Franz Babl has pioneered Australia's first evidence-based sedation education and staff credentialing programme for doctors and nurses in the paediatric emergency department setting. The programme, designed as part of a multi-disciplinary collaborative effort, has improved safety and quality in sedation and has been thoroughly assessed for long-term sustainability.

In collaboration with Sunshine Hospital, training was developed, implemented and evaluated in the emergency department. Sedation practices were assessed 6 months (short term), and 3 years (long term) after the programme was introduced, with positive results. As shown by differences developing between the participating hospitals after 3 years, sustained change depends to some degree on continued education funding. A large prospective emergency department study was also conducted to determine the best way to deliver

"The key goal of the sedation programme is to allow children to undergo necessary procedures safely and with minimal pain and distress", said Ms Theane Theophilos.

sedation in children. Assessments performed on more than 2,000 patients showed sedation safety was very high and serious adverse events were rare, indicating that sedations were performed within the parameters of the sedation education programme. High-concentration continuous-flow nitrous oxide (laughing gas) was found to be a safe agent for procedural sedation and analgesia when embedded in a comprehensive sedation programme, and nitrous oxide was also deemed to be safe in children aged 1–3 years.

The programme is taught by nurse educators and has been designed to fit into the limited timeframe of education for emergency department staff. All non-educational assessment tasks are automated and stored online, and the material is updated

based on programme assessments by senior medical staff and the evolving literature. The programme has been in continuous use at The Royal Children's Hospital and Sunshine Hospital since 2003. More than 400 nurses and doctors have participated in the programme and all sedations are conducted using the sedation materials. The programme has recently been selected for roll out to all emergency departments in Victoria as a joint innovation and safety project of the Department of Human Services and the state hospital insurer, the Victorian Managed Insurance Authority.

"Roll out of the programme will allow other emergency departments to benefit from our long-term experience with a validated safety programme,' said A/Professor Franz Babl.

Stuttering in preschoolers

Professor Sheena Reilly and the Early Language in Victoria Study team

Getting stuck for words can be a struggle for some youngsters. Stuttering is associated with rapid growth in language development, most noticeably the combining of words into phrases and short sentences. Persistent stuttering beyond the preschool years can lead to long-term problems including social anxiety, emotional distress and reduced employment prospects.

Stuttering is much more common during the preschool years than previously thought, according to new research led by Professor Sheena Reilly, who has joint appointments across the three Campus partners. The Early Language in Victoria Study of 1,900 children followed from infancy, published in Pediatrics, found that 8.5% of children aged up to 3 years old stutter - almost twice that reported previously.

The positive news is that early onset of stuttering was not associated with language delay, social and environmental factors, or pre-onset shyness or withdrawal.

Children who start to stutter do not seem to be more shy or withdrawn compared with other children of the same age who do not stutter. And, as only about 1% of adults stutter, these results indicate the rate of natural recovery could be much higher than previously thought. This research is believed to be the largest study of early stuttering onset to date.

Professor Reilly said her team, which includes researchers across the RCH Campus and also from the University of Sydney and La Trobe University, will continue to study this group of children until 7 years of age to identify any stuttering predictors, to estimate the natural recovery rate during the preschool years, and to examine the emotional impacts of persistent stuttering. The team will also use brain imaging and genetic studies to understand more about the causes of stuttering.

"Parents should be reassured that there is no strong evidence that the social and environmental factors measured in this study were related to stuttering onset. Our preliminary neuroimaging studies indicate that stuttering is the result of disruption to the neurobiological pathway affecting motor speech control," said Professor Sheena Reilly.







Professor Sheena Reilly with Monty

Moods lifted in children with diabetes

A/Professor Elisabeth Northam, Professor Fergus Cameron and Professor George Werther

Each year, approximately 120 children and adolescents are diagnosed with type 1 diabetes in Australia and over 1,500 children and adolescents currently attend the diabetes clinic at The Royal Children's Hospital.

The incidence of type 1 diabetes has increased by 29% in the past decade, with Australian children among the most affected in the world. These children endure insulin injections and blood glucose tests on a daily basis and face a number of serious long-term health problems including kidney disease and stroke. Diabetes is also known to affect behaviour and cognitive skills through fluctuations in blood glucose level, with implications for mental health and educational achievement.

A 12-year prospective study by the diabetes research group found that 38% of adolescents with type 1 diabetes had been referred to mental health services since their diagnosis, a rate more than double that of healthy children. Children with behaviour problems at diagnosis were also more likely to require ongoing mental health services and to have poorer metabolic control of their diabetes.

These findings highlight the need for early intervention for children with behaviour problems to improve mental and physical health outcomes. Behavioural screening of recently diagnosed children and a randomised controlled trial of a standardised evidence-based intervention, The Triple P (Positive Parenting Program), is currently underway.

The study also documented mildly lowered IQ and working memory, reduced rates of school completion, and brain volume loss in youth with type 1



A/Professor Elisabeth Northam and Professor Fergus Cameron with Emmie

diabetes. Specific cognitive deficits were associated with early onset diabetes and history of severe hypoglycaemia. This research has provided important new knowledge about the impact of diabetes on children's brain development and function.

New research led by the group has also found children with type 1 diabetes have significantly improved psychosocial and cognitive functioning after commencing insulin pump therapy, with fewer mood-related symptoms and behavioural problems, and improved cognitive skills such as divided attention, mental flexibility and working memory. A small mechanical device worn outside the body, the pump delivers insulin at pre-programmed times via a very thin needle. These preliminary findings,

conducted in partnership with The Children's Hospital at Westmead, are the first published to study this trend systematically, after much anecdotal evidence from families and teachers.

"Our data suggests an association between improved blood sugar control after commencement of insulin pump therapy and improvements in more complex cognitive tasks, mood and behaviour,'' says Professor Fergus Cameron.

"Modifications to the learning environment, particularly for children developing diabetes very early in life, will help these children reach their educational potential," said A/Professor Elisabeth Northam.

Gait analysis for cerebral palsy Professor Kerr Graham, Professor Richard Baker, Dr Jennifer McGinley Ms Pam Thomason and Dr Oren Tirosh

Researchers at the Hugh Williamson Gait Analysis Laboratory have developed an innovative outcome measure of walking, which is attracting worldwide attention.

Gait analysis uses high technology equipment, specialised cameras, force plates and computers - like those used in the movie and computer games industries - to assess how people with disabilities walk. The ability to walk is fundamental to a person's quality of life yet a substantial portion of Australia's population has difficulty walking. This includes children with cerebral palsy, the most common cause of childhood physical disability affecting approximately 2 in every 1,000 Australian children. The Gait Laboratory, led by Professor Kerr Graham, sees more than 400 children each year with this condition.

Clinical teams rely on measurements from gait analysis to plan the most appropriate treatment for patients and to evaluate treatment success. The Laboratory research team, including Professor Richard Baker, Dr Jenny McGinley and Dr Oren Tirosh, has developed new tools to summarise this highly complex data. The Movement Analysis Profile (MAP) summarises data from each joint motion, and can be used to highlight where patients have specific problems, and also to identify the effect of interventions at different joints and in different planes. The Gait Profile Score (GPS) reduces this information further to give a single number that reflects the quality of the gait pattern. Both the MAP and GPS have been found to correlate highly with expert opinions from specialists in gait analysis from across the world, and these innovative measurement tools have already been adopted by teams in Australia, the US and Europe.

In another world first, the gait analysis team has completed a randomised clinical trial, the gold standard of clinical research, to evaluate improvements in walking of children with cerebral palsy who have undergone Single Event Multilevel Surgery (SEMLS). Researchers have used the MAP to identify major improvements in gait after this programme of corrective orthopaedic surgery and post-operative rehabilitation. The trial, co-ordinated by Pam Thomason, has the potential to improve the quality of care provided to children undergoing SEMLS, allowing families and surgeons to make more informed choices about what is best for their children.

"We are confident that the MAP and GPS will add great clinical insights to our understanding of how children's walking is changed by interventions,' said Dr Jenny McGinley.



Pam Thomason with Shaun

'The SEMLS trial, reported using the MAP and GPS tools, will set the international benchmark in study design, study reporting and quality of outcomes for years to come," said Professor Kerr Graham.

Overcoming chronic constipation

Professor John Hutson and Dr Bridget Southwell

Constipation in children is a common complaint, comprising 10% of problems seen by paediatricians and 30% of problems referred to paediatric gastroenterologists.

Over 300 children attend The Royal Children's Hospital each year with constipation requiring treatment. Most are admitted via the Emergency Department and stay for an average of 4 days. The annual cost of these hospitalisations is over \$1 million.

Food and facees move through the intestine due to coordinated contractions and relaxations of the gut muscle, controlled by the enteric nerves. Previously it was thought that the child with intractable constipation was refusing to comply with conventional therapy. New research led by Professor John Hutson and Dr Bridget Southwell has shown that the nerves are present in the bowel but are dysfunctional, leading to the recognition of slow transit constipation as a new childhood disease.

Their research team has defined many of the clinical and physiological characteristics of slow transit constipation. Electrical stimulation is commonly used to fix muscles following sporting injuries and to keep the heart beating. The research team has tested stimulation of the bowel using a new, non-invasive treatment: electrodes on the skin. In a trial of 46 children, run in conjunction with Dr Susie Gibb (Continence Clinic), Janet Chase (Physiotherapy), Dr Tony Catto-Smith (Gastroenterology), Dr Melanie Clark (Surgery) and a team of physiotherapists, this stimulation increased contractile activity in the colon by 130% and improved the speed of transit by 50%.

The team is also translating the findings from the electrical stimulation trial to daily domestic use. Dr Ian Yik is working with parents to study the use of machines at home, establishing how the machines can be integrated into everyday life with the same results as clinic-based trials. A community clinic has also been established with a continence specialist and a dietician. Good results have been achieved combining electrical stimulation with education about the bowel, control of diet and water intake, use of laxatives and stimulants, and emotional support for the patient and family. This combined approach gives children control over their bowels and helps avoid hospitalisation.

"Nervous control of the bowel is very complex. This technique activates nerves to improve quality of life for children with constipation," said Dr Bridget Southwell.



Researchers Megan French, Andre Tan and Dr Ian Yik





"There is a shift in attitude from health professionals when it is clear that the condition relates to a physical defect rather than a behavioural disorder," said Professor John Hutson.

Professor John Hutson and Dr Bridget Southwell with Laure

A rotavirus vaccine

Professor Julie Bines, Dr Carl Kirkwood, Professor Graeme Barnes, Professor Ruth Bishop, Dr Jim Buttery, Dr Margie Danchin, Professor John Carlin, Dr Vanessa Clifford, Ms Emma Watts, Ms Fran Justice and Dr Katherine Lee

Rotavirus infection is the leading cause of severe dehydrating diarrhoeal illness and deaths in children under 5 worldwide, resulting in 2 million hospitalisations and more than 500,000 deaths each year – mostly in developing countries.

In Australia more than 10,000 children are hospitalised annually due to rotavirus infection. Following the discovery of rotavirus as the cause of severe gastroenteritis by Professor Ruth Bishop, Dr Ian Holmes and colleagues at The Royal Children's Hospital in 1973, researchers across Campus have, in a worldfirst, developed a rotavirus vaccine candidate specifically for newborns. Current rotavirus vaccines are given to babies from age 6–8 weeks, which may leave newborn infants at risk of early infection and, in countries with limited health care access, may delay timely administration of the vaccine. This oral vaccine is based on a unique human neonatal strain of rotavirus discovered in Melbourne. The goal is to protect infants from birth against disease and death due to rotavirus infection.

The vaccine is being developed with the support of the National Health and Medical Research Council, the New Zealand Health Research Council, the World Health Organization and the international non-profit organisation PATH, including a key collaboration with a developing country vaccine manufacturer, BioFarma Indonesia. A low-cost rotavirus vaccine that is safe and effective when delivered at birth has the potential to dramatically limit the current barriers to effective prevention of rotavirus disease and make a significant impact on child mortality worldwide.

Babies are currently being recruited for a clinical trial of the vaccine candidate in Melbourne, which will be given in a single dose orally. If successful, it will be tested in babies in two larger international trials in Indonesia and New Zealand from 2011. The vaccine could be available in the market within 5 years. The trials follow the global recommendation by the World Health Organization in 2009 that all children be vaccinated against rotavirus infection in an effort to reduce child mortality worldwide.

"This is a contribution of major importance to global child health by Australian researchers and one that has enormous potential to reduce suffering and mortality among the most vulnerable children around the world," said lead researcher Professor Julie Bines, who has joint appointments with the three Campus partners.

"We aim to provide the RV3 vaccine at a lower cost than current vaccines available on the market. While we hope the vaccine will be available in Australia, our first priority will be the developing world, where 90% of rotavirus deaths occur," said Dr Carl Kirkwood.





Professor Graeme Barnes and Professor Ruth Bishop



Dr Carl Kirkwood and Professor Julie Bines

'The new vaccine candidate has the potential to save many thousands of lives by vaccinating babies at birth while they are still in a health care setting,'' said Professor Julie Bines.

Collaboration

For researchers, collaboration provides opportunities to move further and faster, contributing to research excellence and high impact activity. It enables researchers to participate in networks of cutting-edge, innovative activity, and gives them access to knowledge, shared resources, unique populations, and new concepts and perspectives. The RCH Campus is committed to creating and enhancing strategic links on a national and international level. We currently work with researchers from over 70 countries worldwide, and highlight here a selection of our scientific and clinical collaborations.

The Australian Early Development Index (AEDI) is a nationwide population measure of young children's development, providing a snapshot of how children in their local area have developed by the time they start school, and supporting efforts to create optimal early childhood development. The initial AEDI results were launched in 2009, with the evidence provided used across the early childhood sector to direct local and national policies. The AEDI is research of national significance and a result of collaboration between the Campus, the Commonwealth and the Telethon Institute for Child Health Research.

Our researchers are playing a leading role in the world's biggest cancer study, tracking 1 million pregnant mothers and their babies to find a preventable cause of leukaemia, examining environmental and genetic factors that differ between children who get cancer and those who don't. The project involves research teams from 15 countries including China, Japan, USA, Norway, Denmark and England.

> In collaboration with the World Health Organization, our researchers published a world-first study on the rates and causes of death in young people across 192 countries. The study found death from injury including traffic accidents, violence and suicide accounted for two in five deaths worldwide. It also found young people from developed countries including Australia were three times more likely to die in their late teens and early twenties than in earlier childhood. These findings provide evidence to inform policy makers, thereby improving adolescent health policies both in Australia and globally.

Our researchers are working with an international team of scientists to study different strains of pneumonia-causing bacteria in children from Fiji, Kenya, South Africa, The Gambia, Papua New Guinea, Bangladesh and the USA. This research, supported by a \$1.4 million grant from the Bill & Melinda Gates Foundation, aims to improve pneumonia vaccines for children.

The Australian Research Alliance for Children and Youth (ARACY) is a non-profit organisation of more than 264 individuals and 58 organisations, working to investigate the key issues confronting Australia's children and young people. Our researchers have contributed significantly to this national collaboration through their roles as Research Network Co-ordinator, mentors, advisory group members, and participants. The network of researchers is coordinated from ARACY's Melbourne office, which is hosted on the RCH Campus. The issues affecting child and youth health are varied, and the research needed to address them is complex. ARACY has created and provided seed funding for a truly national network of cross-disciplinary researchers effectively interacting with policy makers and service providers to tackle major issues affecting the wellbeing of children and young people.

Campus Highlights

Publications

The numerous government and peer-reviewed grants awarded to Campus researchers continued to advance the Campus research programmes and yielded more than 680 publications during 2009, including many in high-impact journals such as *Nature, Nature Genetics, New England Journal of Medicine, Lancet, Journal of the American Medical Association, Proceedings of the National Academy of Science* and *Pediatrics.* They demonstrate the significant efforts by Campus investigators to make an impact on the health of children worldwide.

Publications		
2007	2008	200
557	670	684

Publications include refereed journal articles and reviews only.



A representative diagram showing the strength and breadth of collaborative relationships between RCH Campus partners and other research organisations in the Parkville research precinct, expressed in publication counts. Connecting lines are weighted to represent multiples of 15 publications. Diagram courtesy of the University of Melbourne.

External Research Funding

Research funding to Campus investigators grew during 2009, a continuation of the strong trend of the past decade. This sustained, peer-reviewed support underscores the significance of research conducted by investigators and reflects its past successes and dedication to remain a world leader in paediatric research. Highlights in 2009 were the announcement of \$5 million in Federal Government funding to Professor Andrew Sinclair and his team to identify genes important in sex determination and discover how they contribute to disorders of sexual development, and a grant of \$2.5 million from the Baker Foundation awarded to Professor Susan Sawyer to develop an adolescent eating disorders clinical research programme.

Government and peer-reviewed funding

2007	2008	2009
\$39.66	\$39.54	\$43.38
million	million	million

Higher Degree Student Completions

We seek out the brightest science and medical graduates and provide them with training and facilities, support and mentorship and exciting research opportunities. In 2009 there were over 200 students engaged in research programmes across the Campus (enrolled in Advanced Medical Science, Honours or Research Higher Degree programmes at the University of Melbourne, as well as students enrolled in research programmes at universities such as La Trobe, Monash and Deakin). The number and diversity of these students, with backgrounds ranging from medicine, nursing and psychology to biochemistry, microbiology and pathology, adds to the research vibrancy of the Campus. In 2009, 23 students successfully completed higher degrees (Masters and Doctoral level degrees), and 37 students successfully completed Honours and Advanced Medical Sciences research programmes.

Ensuring that scientific discoveries in the laboratory or clinic are moved rapidly and efficiently to a patient's bedside in a scientifically rigorous, child-centred manner — the essence of translational research — is critical to the success of the Campus. The Commercial Translation office based at the Murdoch Childrens Research Institute and Melbourne Ventures based at the University of Melbourne support clinical and translational investigators to protect their clinical, public health and commercial outcomes through appropriate patenting and commercialisation.

The Murdoch Childrens Research Institute has a portfolio of 20 patent families, and Melbourne Ventures has one patent family on Campus. These include 64 patent applications, of which three patents were granted in 2009, covering hepatitis B, deafness and a molecular marker for a von Willebrand Factor A-Related Protein (WARP).

Five new invention disclosures, seven new provisional patents and seven new international patent applications were also lodged in 2009. These patents cover a wide range of clinical and basic science research including: (i)a method for treating inflammatory-based diseases; (ii) a device for treating constipation; (iii) a method for determining male/ female status in birds; (iv) a rotavirus vaccine currently in Phase I clinical trials, with Phase II clinical trials to start in New Zealand and Indonesia in 2011; and (v) a new diagnostic test for fragile X syndrome.

Commercialisation Activities

Invention disclos

New and pre-exis jurisdictions – ur

New and pre-exis jurisdictions – lic

A patent family can include a number of patent applications filed in different jurisdictions or countries.

Commercialisation



The new rotavirus vaccine could help infants in the developing world, where 90% of rotavirus deaths occur

Educating staff through regular workshops on the importance of patenting and how to translate their research into a commercial context is a core activity. The Translational Workshop facilitated by a panel of experts provides researchers with an interactive forum to present and receive feedback on their plans for commercial translation. A Patent Searching workshop provides key skills in accessing difficult to obtain patenting information.

Commercialisation activities in 2009 included the licensing of a joint research project between the Murdoch Childrens Research Institute and The Royal Children's Hospital to an overseas pharmaceutical company, as well as licensing of a diagnostic reagent. The Commercial Translation office also worked with researchers to obtain an NHMRC development grant for a device for the treatment of constipation in children and adults.

	2007	2008	2009
ures	8	6	5
patent applications	8	6	7
ting PCT applications and individual licensed	56	55	57
ting PCT applications and individual ensed	14	1	1

Student Accomplishments

University of Melbourne celebrates first lab-based nursing PhD

In 2009, Dr Fiona Newall, jointly enrolled through the School of Nursing and the Department of Paediatrics, created history at the University of Melbourne as the first laboratory-based PhD graduate in nursing. Her Masters degree was focussed on patient care, so moving into a laboratory based research PhD was a big step for Dr Newall. "It was certainly challenging, but there was support for me to negotiate it successfully."

Working with Professor Paul Monagle's Haematology Research Group at the Murdoch Childrens Research Institute, her PhD focussed on whether children receiving the anti-clotting drug Heparin are receiving optimal dose and monitoring. As well as her position as Anticoagulation Clinical Nurse Consultant at The Royal Children's Hospital, Dr Newall has an appointment as Research Officer at the Murdoch Childrens Research Institute, holds a position as a Senior Lecturer in nursing research at the University of Melbourne and is a nursing representative on the hospital's Children's Bioethics Centre, which provides a voluntary consultative service to clinicians about the management of ethically challenging clinical situations.

"Completing my PhD was an incredibly rewarding experience," said Dr Newall. "It gave me the opportunity to challenge myself on a whole new level and understand the importance of research in nursing to improve patient care."

She says there is a growing understanding among nurses and students that a research degree can complement clinical roles and other areas of practice.

"Nurses are no longer just clinicians, or researchers or educators – they can work across the fields. Multiple roles are complementary and a range of expertise ultimately benefits the patients." said Dr Fiona Newall.

Dame Elisabeth Murdoch AC DBE Nursing Leadership Scholarship

Sharon Downes, Clinical Nurse Specialist from the Neonatal Unit of The Royal Children's Hospital, was awarded the inaugural Dame Elisabeth Murdoch AC DBE Nursing Leadership Scholarship in support of her research into the rare condition of Pierre Robin Sequence.

This rare condition causes an abnormally small jaw bone at birth, often requiring delicate surgery. Sharon travelled to the US and UK to observe pioneering medical techniques in this area, and attended an international conference.

"The scholarship has enabled me to meet and collaborate with international clinicians and researchers working in the same area, and broaden my understanding of the current treatment trends. This was an amazing opportunity that is not often available to nurses without the support of a scholarship such as this," said Sharon Downes.



Professor Paul Monagle with Dr Fiona Newall



Sharon Downes with Dame Elisabeth Murdoch AC DBE on International Nurses Day, 2009

2009 Dean's Award

Dr Canny Sugiana received a 2009 Dean's Award from the Faculty of Medicine, Dentistry and Health Sciences, University of Melbourne, for her PhD thesis 'The molecular basis of Complex I deficiency'. A/Professor David Thorburn supervised her research in the Mitochondrial and Metabolic Research Laboratory at the Murdoch Childrens Research Institute. The award, judged by a panel of experts, is given to the top five graduates from the Faculty, from a potential field of around 200 research higher degree students.

Dr Sugiana's research focussed on novel genetic causes of mitochondrial energy generation disorders. Her research contributed to the identification of four new genes in which mutations cause severe childhood diseases due to mitochondrial Complex I deficiency. Her work could lead to better understanding of these diseases and improved treatment options.

After completing her PhD, Dr Sugiana commenced postdoctoral studies at the Walter and Eliza Hall Institute of Medical Research in the Molecular Genetics of Cancer division. Her postdoctoral work aims to elucidate the mechanisms of resistance to DNA-damaging drugs caused by the polycomb protein Bmi1.

"I was fortunate to work on a project that I truly enjoyed, in an encouraging and inspiring environment. I was guided by a generous and thoughtful supervisor and surrounded by helpful mentors and colleagues, who are experts in their field and who cared about my development," said Dr Sugiana.



Dr Canny Sugiana with her PhD supervisor, A/Professor David Thorburn at the award ceremony

Career Mentoring

Postgraduate Students' Association

The Postgraduate Students' Association (PSA) aims to improve professional development by encouraging interaction between students from the RCH Campus and other external organisations. Membership is open to all postgraduate students. The Association is managed by a committee of student volunteers and has representation on the Department of Paediatrics Research Higher Degree Committee. Monthly events to enrich the student experience are organised, including seminars, workshops and discussion groups, as well as providing the opportunity to socialise and network. Each year a retreat is organised where students can take a day out of their research to focus on professional and personal development, as well as networking.

In 2009 the Association initiated the Annual Student Symposium, which gives students the opportunity to present their research to a wider audience at the RCH Campus. Awards were given to the best student presentations, and many students went on to present their work at local and international conferences. The PSA also presents informal discussion groups in conjunction with the Early to Mid Career Researcher Association.

Early to Mid Career Researcher Association

The Early to Mid Career Researcher Association (EMCRA) fosters professional development for researchers, encourages and supports activities that lead to promotion, engenders the spirit of mentorship for the future and provides skills-building sessions. The Association arranges social activities to foster communication, encourages internal networking and collaborations between research groups across the campus, and recruits members to act as buddies to mentor PhD students. The Association has representation on internal and external committees and membership is open to all research staff, including postdoctoral and research fellows, senior research officers and clinical/allied health researchers.

A highlight in 2009 was the inaugural EMCRA research symposium, where two Association members were awarded a travel grant, judged and awarded by a panel of scientists. The Association also organised career development seminars in areas such as writing for publication (in conjunction with the Clinical Research Development Office) and peer reviewing of manuscripts.

Honours and Awards

Our staff continue to demonstrate outstanding commitment to our vision and our values. One indication of the impact that Campus researchers have on the scientific community is the recognition investigators receive from their peers. The prestigeous awards listed here are a sample of those that Campus researchers and clinicians received during the year.

A/Professor Katie Allen was awarded the prestigious Sylvia & Charles Viertel Charitable Foundation Senior Medical Research Fellowship.

Professor Andy Choo was elected Fellow of the Australian Academy of Science for his work on human molecular genetics, in particular chromosome stability and replication in the development of vectors for gene therapy.



Dr Peter McDougall received The Royal Children's Hospital Chairman's Medal 2009 for his passion and commitment to the hospital spanning 25 years. He has been instrumental in raising clinical standards and introducing new technology to the Neonatal Unit. He was Director of Neonates and Chief of Medicine at the hospital.

A/Professor Amanda Fosang was awarded the Basic Science Research Award by the Osteoarthritis Research Society International, recognising excellence in basic research in the field of osteoarthritis.

Professor Harry Gelber OAM was awarded the Medal of the Order of Australia for service to the community through the establishment of mental health programmes supporting children and the indigenous community. Professor Gelber, a past recipient of The Royal Children's Hospital Chairman's Medal, has made an outstanding contribution to child and adolescent mental health services in Victoria since joining the hospital in 1986.

22 | Campus Research 2009

Professor John Hutson AO received The Royal Children's Hospital Chairman's Award 2009 for his profound contribution to the hospital spanning 25 years. He has held an appointment at the University of Melbourne Department of Paediatrics since 1994, is currently Chair of Paediatric Surgery, and has



held the positions of Director of General Surgery at The Royal Children's Hospital and Associate Director of Clinical Research within the Murdoch Childrens Research Institute.

Professor George Patton was awarded the Royal Australian and New Zealand College of Psychiatrists' Schering Plough/Organon Senior Research award for 2009 for his excellence in research in psychiatry.

Professor Sheena Reilly was made a Fellow of the UK Royal College of Speech and Language Therapists for her outstanding contribution to speech pathology, particularly research investigating children's speech and language development.

Professor Ingrid Scheffer was awarded the Eric Susman Prize of the Royal Australasian College of Physicians for the most outstanding contribution to the knowledge of any branch of internal medicine.



Professor Andrew Sinclair received the Sutherland Award from the Human Genetics Society of Australasia for his contribution to human genetics.



Professor Melissa Wake received the 2009 Federal Health Minister's Award for Excellence in Health and Medical Research in recognition of her dedication to improving the health and quality of life of children.

Campus Events

50 Years Young

The 50th Anniversary of the Department of Paediatrics was celebrated in 2009, with a keynote presentation from internationally renowned scientist and humanitarian Professor Emeritus Sir Gustav Nossal. Current Head of the Department and the Stevenson Chair of Paediatrics, Professor Paul Monagle said "We are very proud to celebrate our achievements over the past 50 years. The Department plays a pivotal role in providing an environment that nurtures and challenges staff and students to achieve their full potential."

A panel of former Heads of Department, Professors Peter Phelan, Peter Smith and Glenn Bowes gave a fascinating account of the Department's history and the research and teaching achievements in infant, child and adolescent health that have made the Department of Paediatrics a national leader in advancing the health and wellbeing of young Australians.

Grand Rounds Seminars

The Grand Rounds Seminar Series is the flagship educational meeting of the RCH Campus. Over the course of the year, the weekly seminars help broaden our experiences and understanding of child and adolescent health, regardless of our clinical, research, academic or other background.

The programme is determined by the Grand Rounds Committee, comprised of representatives of the three Campus partners. Throughout 2009 a dynamic and informative programme of



seminars was delivered by internal and external speakers, ranging from topics covering the results of new research leading to positive health outcomes or new procedures, discussions of ethical and public health issues, or practical sessions to help update staff on professional issues.

Dean's Lecture 2009

In 2009 Professor Nigel Curtis, Chair of Paediatric Infectious Diseases, Department of Paediatrics, Group Leader, Infectious Diseases and Immunity at the Murdoch Childrens Research Institute, and Head of the Infectious Diseases Unit at The Royal Children's Hospital was an invited speaker for the prestigious Dean's Lecture Series. In his talk, Professor Curtis drew on examples from the clinical and laboratory research he has led to explore the interaction between pathogens and the host immune response to illustrate the ongoing and fascinating battle between 'superbugs and superhumans'.

Beattie Smith Lecture

Internationally renowned eating disorders expert Professor Daniel le Grange presented the 75th Beattie Smith Lecture at the University of Melbourne, arguing that parents are not to blame for their children's eating disorders.

Professor le Grange, who is Professor of Psychiatry and Behavioral Science and Director of the Eating Disorders Program at the University of Chicago, has strong links with the RCH Campus. He holds an honorary appointment with the University of Melbourne

Celebrating the 50th anniversary of the Department of Paediatrics. Front (L to R): Professors ames Angus, Gus Nossal, Christine Fitzpatrick.

Middle (L to R): Professors Peter Smith, Paul Monagle Peter Phelan.

Back(L to R): Professors Bob Williamson, Glenn

Department of Paediatrics and is an ongoing collaborator with The Royal Children's Hospital Eating Disorders Program.

Vernon Collins Oration

Vernon Collins was the first Medical Director of The Royal Children's Hospital and foundation professor of Child Health in the University of Melbourne. The 25th Vernon Collins Oration was delivered by Professor Kerr Graham. Professor Graham, orthopaedic surgeon at The Royal Children's Hospital, Group Leader, Orthopaedics and Gait Analysis at the Murdoch Childrens Research Institute and Professor of Orthopaedics at the University of Melbourne, is internationally renowned for his clinical research into the combination of orthopaedic surgery and Botulinum Toxin to improve walking in children with cerebral palsy.



Professor Kerr Graham

David Danks Oration

Professor Loane Skene, Professor of Law, Faculty of Law and Adjunct Professor of Law, Faculty of Medicine, Dentistry and Health Sciences at the University of Melbourne delivered the 4th David Danks Oration, an annual lecture honouring the 'father of clinical genetics' who was instrumental in establishing the Murdoch Childrens Research Institute. Professor Skene, also Deputy Chair of the high-profile Lockhart Committee on Human Cloning and Embryo Research (2005) outlined regulatory and ethical issues raised by new stem cell technology and explored legal responses in Australia, USA and UK.

Ethics Committees

Human Research Ethics Committee

The Human Research Ethics Committee (HREC) assesses the ethical principles associated with research in humans and protects the welfare and rights of participants in research. The Committee aims to facilitate research that is or will be of benefit to the community or to humankind. The HREC is constituted and operates in accordance with the NHMRC National Statement on Ethical Conduct in Human Research (2007).

The HREC is supported by the Ethics and Research Department (ERD), based at The Royal Children's Hospital, which is responsible for managing and facilitating research ethics and research management across Campus. The HREC and ERD are together responsible for research monitoring, a negligible risk and clinical audit approval process, ensuring all research meets relevant legislative and regulatory requirements, policy development, and the provision of researcher support and advice.

The National Statement sets out the minimum requirements of the composition of the Committee. In addition to the Chair, Dr Arnold Smith, core membership comprises both internal and external members. The internal members have knowledge of, and current experience in, the professional care, counselling or treatment of people or have current research experience that is relevant to research proposals under consideration. The external members comprise laypeople, lawyers and those who perform a pastoral care role in the community.

In order to decrease time to approval and increase the quality of research conducted on Campus, the ERD modified the review and approval process in 2009 to a risk-based process such that the time and resources spent submitting and reviewing a project are now proportional to the level of risk it poses to the participant and the Campus. This process allows low and negligible risk research to be approved easily and quickly, helping to build research capacity. The HREC and the ERD were successful in obtaining NHMRC accreditation. The assessors particularly commended the HREC on implementation of its new Presubmission Peer Review Process, which greatly increases the quality of research conducted, and the Monitoring and Auditing Program, which reviews how research is conducted, and aims to detect, correct and prevent potential and existing problems. Both initiatives were introduced in 2009. This accreditation is part of the Harmonisation of Multi-centre Ethical Review (HoMER) initiative, which aims to facilitate the recognition of a single ethical and scientific review of multi-centre health and medical research within and/or across Australian jurisdictions.

Project Applications

	2007	2008	2009
Clinical research (not including drug/device)	56	39	52
Clinical drug/device research	32	30	33
Other (e.g. public health, social science, genetics, psychological)	69	84	59
Negligible risk and clinical audits	160	132	184
Total	317	285	328

Clinical Trials

A clinical trial is defined as: *Any research project that prospectively assigns human subjects to intervention and comparison groups to study the cause-and-effect relationship between a medical intervention and health outcomes.* All clinical trials must be registered on a Public Trials Registry. The number of clinical trials approved by the HREC in 2009 and registered with a Public Trials Registry was 25, an increase on the 2008 and 2007 numbers, which were 23 and 20 respectively.

Tribute to Dr Arnold Smith

Dr Arnold Smith contributed immensely to the Human Ethics Research Committee, acting as Chair from 2003, when he ceased his clinical work, until his sudden death in January 2010. He brought



to the Committee a combination of real understanding about child health, a deep knowledge of genetics from his mentor David Danks, and a superb talent in working with people of all walks of life. He guided the Campus through

Animal Ethics Committee

The Animal Ethics Committee (AEC) applies a set of principles that govern the ethical conduct of people whose work involves the use of animals for scientific purposes. The Bureau of Animal Welfare, a division of the Department of Primary Industries, governs animal research in Victoria. The Prevention of Cruelty to Animals Act 1986 and Regulations (1997) require that institutions conducting research involving the use of animals comply with the Australian code of practice for the care and use of animals for scientific purposes 2004. The RCH Campus also endorses the Code of Practice for the Housing and Care of Laboratory Mice, Rats, Guinea Pigs and Rabbits (2004) and the NHMRC Code of Practice for the Care and Use of Animals for Scientific Purposes. It is the primary responsibility of the AEC to ensure that the care and use of animals on Campus is conducted in compliance with these codes. The AEC ensures that the use of animals is justified, provides for the welfare of those animals and incorporates the principles of replacement, reduction and refinement.





the early days of difficult genetic research issues, including stem cell research. His calm, competent counsel dispensed while chairing this important Committee will influence child health research for years to come. In 2001 Dr Smith was awarded a Royal Children's Hospital Chairman's Medal in recognition of his outstanding contribution to the hospital and his patients since 1978. He contributed significantly to the development of the Department of Gastroenterology from the 1970s, established hepatology as a specialty on this Campus, and initiated the liver transplant service in association with the Austin Hospital, developing a service of high quality with world-class results.

The Bureau of Animal Welfare requires that proposals to use live animals are assessed by a quorum of AEC members, meaning that at least one member from each of the following categories must be present: veterinarian, scientific, animal welfare and independent. The AEC consists of a mixture of internal and external members, and attendees (nonvoting). The scientific expertise comes from within Campus, and includes the managers of the animal facilities. The Chair, Professor John Hutson, draws on the expertise from two veterinarians, three researchers, one animal welfare representative and two attendees.

Project Applications

	2001	2008	2009
New applications	23	30	38
Project modifications	19	26	27
Project extensions	3	6	8
Applications rejected	0	0	1
Number of continuing and active projects	65	94	77



Research Enablers

Investigators and research groups throughout the RCH Campus are supported by a comprehensive range of research enabling services providing expertise in the areas of bioinformatics, disease models, tissue culture, flow cytometry and imaging, biostatistics and clinical trials. These roles are of particular importance given the increasing complexities of conducting laboratory, public health, and clinical research.

Clinical Epidemiology and Biostatistics Unit

Led by Professor John Carlin, the Clinical Epidemiology and Biostatistics Unit (CEBU) provides a range of training and methodological support and also plays an active role as a research collaborator across a wide range of research projects. CEBU provides advice and, in many cases, practical assistance to researchers on research design, protocol development, data management including database development, statistical analysis and presentation of results. Engagement with projects can take various forms ranging from one-off consultations and the development of funding proposals to on-going support and collaboration for the lifetime of a project.

In addition to its core business of collaborative research in child health, in which CEBU members provide leadership on many of the methodological aspects, CEBU conducts its own research on methodological problems in biostatistics. This research aims to develop and strengthen the biostatistical methods that underpin public health and clinical research. CEBU has strong collaborative links not only with researchers and clinicians at the RCH Campus, but also with other national and international institutions. In 2009, staff from CEBU co-authored 50 peer-reviewed research publications, and were successful co-Chief Investigators on applications for six NHMRC Project Grants and one NHMRC Partnerships Grant.



Clinical Research Education and Development Program

An important function of the Clinical Epidemiology and Biostatistics Unit and the Clinical Research Development Office is to conduct a comprehensive range of short courses in methods of quantitative research, including planning and conducting research and basic statistical analysis. The courses are designed to equip new researchers with the basic tools needed to conduct a study. The programme of courses and seminars covers protocol development, study design, data management, basic statistics, project management and good clinical practice. Courses and seminars are taught by statisticians, trialists and clinicians. They are very practically oriented, using small group settings, and are designed specifically to focus on paediatric research topics.

Clinical Research Development Office

Led by Dr Andrew Davidson, the Clinical Research Development Office (CRDO) provides resources and training to increase the capacity for high quality clinical research on Campus. Services are available to help researchers through all stages of research project development, including developing a protocol, funding options, grant writing, budget setting and management, support in complying with regulatory and ethics requirements, tips for project management and assistance with publication writing. A variety of written guidance materials has been developed, including templates for researchers developing a trial protocol or an observational study.

Staff can provide individual advice, training and guidance on many aspects of clinical research and, where appropriate, refer on to others on Campus. CRDO holds regular education sessions and is also able to offer tailored education sessions or provide mentoring for new study coordinators or novice investigators. A forum for clinical research assistants and coordinators meets monthly. CRDO also leads strategic initiatives in developing clinical research. For example, in 2009 a proposal was developed for a national network for paediatric clinical trials.



Australian Paediatric Research Unit

Led by A/Professor Noel Cranswick, the Australian Paediatric Pharmacology Research Unit (APPRU) is one of only six similarly dedicated units outside of the USA. APPRU conducts high quality clinical trials in children to investigate the safety and efficacy of prescription drugs and medications typically developed for adults, and also works to facilitate and promote paediatric labelling of new drugs or drugs already on the market. APPRU performs high quality, timely, clinical diagnoses in children that comply with local and international best practice clinical guidelines.



APPRU is run by a dynamic, multi-disciplinary team with extensive clinical trial experience, ranging from phase I to IV studies, single-centre and international multi-centre trials and issues relating to good clinical practice, case report form management and subject recruitment. Their work also includes pharmacokinetic, bioequivalence and pharmacodynamic studies. Assistance is also provided with clinical pharmacology, research and development, clinical trial design and protocol development, good clinical practice compliance, pharmacokinetic and pharmacodynamic modelling, regulatory affairs strategies, and FDA written requests and responses. In 2009, input was provided to more than 20 clinical trials. Expert advice was also provided to industry, the Australian Government and international groups including the European Union and the World Health Organization.

Bioinformatics

Led by Dr Katrina Bell, Bioinformatics provides expertise in effective experimental design, analysis and statistical validation of complex and diverse biological datasets. Major advances in the field of molecular biology, coupled with advances in genomic technologies, have led to an explosive growth in the biological information generated by the scientific community. Bioinformatics keeps abreast of emerging information technologies used to extract useful information from biological data, and adapts these technologies for the needs of specific projects, helping researchers in genetics and molecular biology to remain competitive. Bioinformatics Unit also provides seminars and advice on using the major genome browsers.

Highlights in 2009 included collaborating on 35 projects on topics ranging from leukaemia to musculoskeletal disorders and twin birth weight discordance.

Scientific Services

The Scientific Services team, led by Dr Kerry Fowler, provides expertise and training in mouse models, flow cytometry and confocal microscopy, genome resources such as BAC and PAC libraries, laboratory support, sequenom platform technology, tissue culture, and specialised shipping of laboratory goods through a centralised service.

Highlights in 2009 included the establishment of two new services. The biobanking facility assists researchers with the processing and storage of blood and body fluids such as saliva from children and family members participating in research studies including juvenile arthritis, childhood obesity and type 1 diabetes. The transgenic and embryo facility provides expertise in the long-term cryopreservation of valuable new mouse strains, and also provides state-of-the-art technology for embryo transfer of new mouse strains. Scientific Services also provides training, and in 2009 hosted workshops on sequenom platform and tissue culture technologies.

Looking Ahead

A new Royal Children's Hospital Campus

We are entering an exciting stage in our history with the design and construction of a brand new Royal Children's Hospital Campus right next door to the current site in Parkville.

Working Together

The new RCH Campus, which opens at the end of 2011, will combine innovative models of care and leading edge research and education to provide the best healthcare and environment for patients, families and staff, together with expanded, modern research facilities to support integrated bench to bedside research.

The partners have worked together to design a Campus that brings together the best in evidence-based design, construction, facilities and a vision for creating what will undoubtedly be one of the world's great children's hospitals.

Staff have been actively involved through all stages of the design and construction to develop a great children's campus uniting clinical services, research and training. The new RCH Campus has been influenced by its unique parkland setting in Royal Park, with elements and colours of nature integrated into the design.





Main image: Artist impression of the aerial view of the new Royal Children's Hospital Campus. Above left: Artist impression of Main Street, the main public thoroughfare running through the Campus from Flemington Road to Royal Park. Above right: Artist impression of the lecture theatre in the Integrated Education Precinct.

Expanded Research Facilities

The new RCH Campus boasts double the amount of space for research than at the current site. The design of the purpose-built research facility is flexible and able to respond to emerging research trends. Important for the translation of research into clinical outcomes, the new RCH Campus has research and clinical areas in close proximity, minimising travel and facilitating improved communication and collaboration.

Integrated Education Precinct

The new RCH Campus provides organisational-wide education facilities and programmes in a dedicated 3,000 square metre Integrated Education Precinct. This Precinct is a central space for all education programmes, courses, workshops and conferences. It includes a 250-seat tiered lecture theatre with function facilities, seminar rooms and separate student and staff lounges. The Precinct will incorporate a number of exciting new purpose-built spaces, such as a state-of-the-art Simulation Centre, enabling the latest innovative and progressive tertiary teaching methods. The Precinct will also encompass the Library, Archives and the Educational Resource Centre.



The paper used for this publication is certified against the FSC (Forest Stewardship Council) Standards and made totally chlorine free. The FSC label provides a credible link between responsible production and consumption of forest products.

Murdoch Childrens Research Institute

The Royal Children's Hospital 50 Flemington Road, Parkville, Victoria 3052 Australia T: +61 3 8341 6200 F: +61 3 9348 1391 www.mcri.edu.au

The Royal Children's Hospital

50 Flemington Road, Parkville, Victoria 3052 Australia T: + 61 3 9345 5522 www.rch.org.au

The University of Melbourne Department of Paediatrics

The Royal Children's Hospital 50 Flemington Road, Parkville, Victoria 3052 Australia T: +61 3 9345 4090 F: +61 3 9345 6667 www.paediatrics.unimelb.edu.au





