Centre for Neonatal Research and Education
Annual Report 2013

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About the Centre

The Centre for Neonatal Research and Education was officially opened on 1 April, 2011 as a Research Centre of The University of Western Australia.

Direction of the Centre is shared by Professor Jane Pillow and Winthrop Professor Karen Simmer, and is administered by the School of Paediatrics and Child Health in the Faculty of Medicine, Dentistry and Health Sciences.

The Centre is a joint initiative between The University of Western Australia and the Womens and Newborn Health Service. The CNRE main office is located at King Edward Memorial Hospital, where 95 per cent of all high-risk deliveries in the state of Western Australia take place.

Our research is concentrated in five nodes:

- Respiratory physiology and ventilation;
- Neonatal cardiology;
- Nutrition, lactation and gastrointestinal disease;
- Infection, inflammation and immunology;
- Neurodevelopment and long term outcomes.

We place a strong emphasis on education, offering workshops and symposia for a broad audience on such topics as neonatal nutrition, neonatal ventilation, and grant writing. Our staff run a state-wide neonatal resuscitation and stabilisation program, as well as postgraduate coursework programs in neonatal nursing (Curtin University) and Neonatology (The University of Western Australia).

The Centre co-ordinates the academic activities of medical, nursing and allied health staff working in the Neonatal Clinical Care Unit based at King Edward and Princess Margaret Hospitals. The diverse professional mix creates a vibrant atmosphere in which neonatal research and education thrives.

We also have a world-class pre-clinical research group based on campus at The University of Western Australia, through the University’s Faculty of Science.
The UWA CNRE was established in 2011 with the aim of securing NHMRC funding as a Centre of Research Excellence. In 2013, we were delighted to achieve this at our first attempt when awarded a CRE for improving the immediate and long-term outcomes of preterm infants. Our CRE was one of six CREs awarded nationally in the highly competitive clinical stream.

CRE funding ($2.5 million) is for research infrastructure (including funding for coordinators of randomised controlled trials and the preclinical research laboratory, statistical and database support) and support for early career researchers (including stipends for Honours students, PhD students and seed funding for new projects).

The CRE is a national collaborative project led by UWA CNRE Co-Directors with partners at Telethon Kids Institute, Murdoch Childrens Research Institute and the Ritchie Centre, Monash Institute of Medical Research. Associate Investigators are from Sydney University, University of Queensland, University of Adelaide, Murdoch University and the University of Utah. The award by NHMRC is in recognition of our collective research achievements, our potential to contribute to new knowledge, and to translate our findings to improve health outcomes.

We now have the challenge to deliver the programs in collaborative efficient teams using the CRE and CNRE as a cohesive platform from which to achieve our aims.

These studies will include:

1. **Respiratory:**
   - artificial ventilation equipment, and protocols to reduce lung damage (Pillow, Tingay, Gill, Albertine)
   - effect of amniotic stem cells to reduce lung inflammation (Moss, Polglase, Pillow)
   - prevention and treatment of bronchopulmonary dysplasia (Pillow, Gill)
   - physiology of neonatal transition (Polglase, Hopper, Gill in collaboration with the Ritchie Centre, Monash Institute of Medical Research)

2. **Nutrition and gastroenterology:**
   - optimising processes and products in human milk banking (Hartmann, Simmer, Koorts, Davies)
   - evaluating and improving breastfeeding of very preterm babies (Geddes, Simmer)
   - high dose DHA and bronchopulmonary dysplasia, cardiovascular disease and neurodevelopment (Simmer, Burgner, French as part of NHMRC trials led by U Adelaide)
<table>
<thead>
<tr>
<th>3. Infection/inflammation:</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ treatment with antimicrobial peptides to prevent postnatal infections (Strunk, Burgner, Currie, Simmer)</td>
</tr>
<tr>
<td>✓ epidemiology of nosocomial infection (Gill)</td>
</tr>
<tr>
<td>✓ analysing the cost associated with late-onset sepsis (Strunk, Burgner, Currie)</td>
</tr>
<tr>
<td>✓ new diagnostic approaches for neonatal sepsis (Strunk, Ducuyper)</td>
</tr>
<tr>
<td>✓ RCT pentoxifylline to prevent infection, NEC and inflammation (Pattole, Strunk, Currie, Simmer)</td>
</tr>
<tr>
<td>✓ effect of chorioamnionitis on short- and long-term outcomes of very preterm infants (Strunk, Burgner, Currie, Hammond, Simmer)</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>4. Neurological development:</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ the effect of postnatal steroid therapy on the developing heart and brain (Pillow, Gill, Albertine)</td>
</tr>
<tr>
<td>✓ evaluation of neonatal erythropoietin treatment on the need for blood transfusion, protection from gut disease and recovery from brain injury (Polglase, Pillow, Gill)</td>
</tr>
<tr>
<td>✓ neurocognitive outcome and cerebral lateralisation in children born &lt;28weeks gestation (French, Anderson, Campbell)</td>
</tr>
<tr>
<td>✓ autism in preterm children-state-wide data linkage studies to explore incidence and associations aimed at future screening programs (French, Campbell, Whitehouse, Meldrum, Strunk, Simmer)</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>5. Cardiovascular</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ the influence of perinatal infection on the development of atherosclerosis (Burgner, Simmer, Strunk, Gill, Pillow)</td>
</tr>
<tr>
<td>✓ effects of deferred umbilical cord clamping on cardiac output (Gill)</td>
</tr>
</tbody>
</table>

In 2013, the CNRE has settled in the School of Paediatrics and Child Health working closely with the School of Anatomy, Physiology and Human Biology. The award of the associated CRE has consolidated our reputation nationally and facilitated solid collaborations with our interstate colleagues. Training the next generation of research leaders in our discipline is central to the CNRE and CRE. Education at both state and national levels is important to CNRE with planning and approval for the inaugural Graduate Diploma and Masters in Neonatology completed in 2013 and the first students commencing in 2014.
Staff and students

Postdoctoral Scientists
- Clinical Senior Lecturer Catherine Campbell PhD
- Clinical Senior Lecturer Ben Hartmann PhD – Manager, Perron Rotary Express Milk Bank
- Clinical Senior Lecturer Gemma McLeod PhD
- Dr Suzanne Meldrum PhD
- Research Assistant Professor Peter Noble PhD
- Research Assistant Professor Yong Song MD, PhD

PhD Students
- Ms Emma DeJong

Infants born prematurely are very prone to serious infections in the first few weeks of life. In particular, they’re at risk of infections with bacteria called *Escherichia coli* and *Staphylococcus epidermidis*. However, we still don’t know why these preterm infants can’t defend themselves against these bacteria, or even how healthy, full-term infants manage to control infection. Recent findings from studies of the immune system have suggested that our inborn (innate) immune defences are critical for preventing bacterial infections, but there is little information on the function of these defences in infants. In my
Thus, the integrity of the diaphragm muscle at birth may critically influence the development of respiratory failure after birth.

Inflammation is linked to more than 70 per cent of very preterm births. My PhD aims to determine the effect of antenatal inflammation and the timing of the inflammatory insult on the metabolic, functional and structural phenotype of the fetal and newborn diaphragm. In addition, potential treatments to ameliorate the severity of diaphragm dysfunction that contributes to respiratory failure will be investigated.

Ms Alexandra Heaton
Fish oil supplements are currently marketed to pregnant women and infants, and are commonly added to premium infant formula. They contain omega-3 long-chain polyunsaturated fatty acids, including docosahexaenoic acid (DHA). DHA is suggested to be the ‘magic’ ingredient which may make babies smarter. However, at this stage, there is insufficient evidence to clearly indicate whether infant DHA supplementation is necessary – particularly with respect to healthy term infant populations.

My project involves following-up the 6-year old children who were enrolled in the Infant Fish Oil Study which began in 2005. IFOS is a randomised control trial whereby half of the infants were given high dose fish oil, while the other half received a placebo from birth to six months. We hypothesised that fish-oil supplementation during infancy would have a positive effect on cognitive development at six years of age. Our three main areas of inquiry were: language and communication, executive functioning, and behaviour. Our results suggest that in healthy term infants, high dose fish oil supplementation provides no significant benefit at six years of age for any of the neuro-cognitive outcomes measured. Over the coming months, we will be exploring how this might be influenced by individual genetic variability, as it is possible that some people may benefit more than others.

Ms Kana Karisnan
Despite major advances in neonatal care over the last two decades, preterm birth is the leading cause of perinatal morbidity and mortality in developed countries. The incidence of respiratory distress syndrome (RDS) is higher among human infants who are born prematurely and the incidence increases with decreasing gestation. A functional diaphragm is critically important to the successful establishment of unsupported spontaneous breathing. We hypothesized that the mechanism for diaphragm failure after birth is related to increased mechanical load on the diaphragm in preterm babies.

Ms Sharon Perrella
Feeding intolerance is common in preterm infants, characterised by signs of delayed gastric emptying such as abdominal distension and large gastric aspirates that may herald the onset of necrotising enterocolitis. The detection of delayed gastric emptying is limited to the identification of gross clinical signs. In the absence of a validated method of assessing gastric emptying in the preterm population, normal patterns of emptying, and the influences of milk composition and curding are not well understood.

In my PhD study I have validated an ultrasound method for measuring gastric volume that is accurate to ±1mL. The biochemical composition of breastmilk has a small influence on gastric emptying, with higher concentrations of casein, whey proteins and medium-chain triglycerides.
Breast milk provides both nutritional and immunological benefits to babies. The immune protection provided by mothers’ milk is especially important in the first months of life when a newborn’s immune system is developing. We know that babies that are born prematurely are at a higher risk of getting infections, but the specific causes of this higher risk are not well understood. There is some evidence to suggest that the milk produced by mothers of very premature infants (<32 weeks gestation) may be different to milk produced by mothers that give birth at full term (37+ weeks gestation). However, so far there is very little research in this area.

My research investigates whether the natural antibiotic molecules, known as antimicrobial peptides and proteins, and other immune factors are in the same concentration in breast milk from mothers that give birth prematurely compared to at full term, and whether consumption of the molecules in milk that can inhibit the growth of bacteria is lower in preterm infants that develop infections. In order to answer these questions, we have collected breast milk from more than 150 mothers of preterm and full term infants in the first month after giving birth through the PREDICT and COMET studies. The findings of this research could improve breast milk feeding guidelines for preterm infants, or lead to new treatments with breast milk-derived antimicrobial molecules, resulting in lower infection rates in preterm infants.
Awards, prizes and other honours

Clinical Lecturer Barbara Carter
2013 Western Australia Nursing and Midwifery Excellence Awards – Education

Dr Stefan Minocchieri
Richard D. Rowe Award at the Society for Pediatric Research 2013 Annual Meeting, Washington, DC, USA.

Dr Kirsten Thompson
Early Research Career Award, Paediatric Society of Australia and New Zealand 2013 Annual Meeting.

Media

In 2013, CNRE research featured in the following news outlets:
- The West Australian – a feature on the Centre of Research Excellence and research studies conducted through the CNRE at King Edward Memorial Hospital
- ABC News – a feature on breakthroughs in human milk banking by CNRE researchers

Industry connections

The CNRE continues to foster strong links with our industry partners, and we are very appreciative of support received from:
- Chiesi Farmaceutica
- Draeger Medical
- Fresenium Kabi
- Medela AG
Fixing the smallest hearts
All newborns have a blood vessel that is meant to close shortly after birth, known as the ductus arteriosus. However in preterm infants, there is an increased likelihood of this vessel not closing, allowing oxygen-rich and oxygen-poor blood to mix and resulting in shortness of breath, failure to thrive, and potentially congestive heart failure.

The condition is known as ‘patent ductus arteriosus’ (PDA) and while it would seem obvious that these babies should be treated in order to close the PDA, there is no difference in death or abnormal cranial ultrasound rates among those receiving treatment versus those not treated. As a result, doctors are frequently unwilling to expose babies with a PDA to the side effects of drugs when they are unable to show benefit.

CNRE researcher Andy Gill, with colleagues from Royal North Shore Hospital and the University of Sydney, designed a study to test whether only treating babies with a large PDA would result in decreases in death and abnormal cranial ultrasound rates. These babies would be expected to benefit more from treatment.

Researchers measured the size of the PDA in preterm infants and treated those with a large PDA with the drug indomethacin. As in previous studies, however, there was no definite decrease in death or abnormal cranial ultrasound rates in those babies receiving treatment compared to those not treated.

This study was able to show that it is possible to identify babies with a large PDA and target them for treatment, and that the treatment showed no adverse effects on the gastrointestinal system or kidneys. The researchers recommend that further research be done, particularly looking at the neurodevelopmental outcomes of treatment on babies born with PDA.

Research highlights
Every year CNRE researchers publish the results of their work in major medical journals. Here are three examples of research that we published in 2013 that will result in changes to how newborn infants are treated.

Fixing the smallest hearts
All newborns have a blood vessel that is meant to close shortly after birth, known as the ductus arteriosus. However in preterm infants, there is an increased likelihood of this vessel not closing, allowing oxygen-rich and oxygen-poor blood to mix and resulting in shortness of breath, failure to thrive, and potentially congestive heart failure.
perfect emulsion. The research has led to us changing to SMOFlipid for later preterm and term infants, but continuing research in the very preterm infant where current studies are looking at supplementing the intravenous emulsion with tuna oil fed via an oro-gastric tube.

Donor breast milk for babies – keeping it safe
It is widely accepted that breast milk is the best nutritional option for babies, but frequently mothers of preterm infants do not produce enough milk. In these cases, donor human milk is the next best option and CNRE researchers are world leaders in the development of guidelines for human milk banks.

Donor milk must be pasteurised just like any other liquid food product, to ensure that any disease-causing bacteria present are killed. The worldwide standard used by human milk banks involves heat pasteurisation, which unfortunately also damages several immune proteins including one that helps babies digest fat. This may be why some research suggests that babies fed donor milk grow more slowly than those fed their mother’s own (unpasteurised) milk.

CNRE researcher and Perron Rotary Express Milk Bank Manager Ben Hartmann was involved in a study to determine if ultraviolet radiation could be an effective method of pasteurisation without damaging the heat-sensitive immune proteins. UV radiation has proven useful in surface decontamination but is limited in cases where the rays need to penetrate, such as opaque liquids. This study was designed to show whether irradiating milk in small batches would be effective at killing bacteria while retaining the actions of the immune proteins and not destroying the fatty acids in the milk.

Results have shown that indeed UV radiation meets all three targets – kills bacteria to an acceptable standard for milk banks, maintains the immune proteins, and does not negatively impact the fatty acids. While extremely promising, the study will now need to be expanded to investigate the effect of UV radiation on other components of donor human milk. In the future, we hope to be able to provide even higher quality donor milk for preterm infants as a result of this study and its extensions.

The best fats for preterm infants
The topic of omega-3 vs omega-6 fatty acids has been a hot one in recent years in adult nutrition, but it is just as important in preterm infants. Preterm babies receive a fatty acid emulsion with their intravenous feeds – until recently this was one based on soy oil. Over the last few years, babies at King Edward Memorial Hospital and Princess Margaret Hospital have received a new lipid emulsion when fed intravenously. This emulsion contains a mixture of olive oil and soy oil (Clinoleic) and our research showed that feeding this emulsion resulted in blood levels of fats more similar to a breastfed preterm infant than when feeding the soy emulsion. However, it would be even better if these patients could maintain blood levels of fats equal to those in-utero.

CNRE researchers continue to investigate this issue and studied a new commercially available lipid emulsion called SMOFLipid which contains soy, coconut, olive and fish oil. The SMOFLipid maintained fat levels in the blood of babies near to those of the fetus but only in babies born after 34 weeks gestation. In the very preterm infant, especially those born at less than 30 weeks gestation, we have still to find a
Education highlights

Postgraduate courses
2013 saw CNRE staff very actively involved in the establishment of two new postgraduate coursework courses for 2014 commencement:

- Graduate Diploma in Neonatology
- Master of Neonatology

These courses are designed for practicing doctors, and are one year and two years in duration part-time. The courses feature units in nutrition, immunology, ventilation, evidence-based medicine, transport medicine, surgery, and cardiology, as well as skills-based practicum units.

CNRE staff are involved as unit coordinators as well as guest lecturers in the courses. In the first year (2014) both courses will be classroom-based, but plans are in place to convert them both to an online format due to demand from eastern States and overseas doctors.

Perinatal Society of Australia and New Zealand
The annual PSANZ congress, themed ‘Networking – The New Frontier’ will be held in Perth in April 2014 and CNRE staff have been instrumental in the organisation of this conference. Invited speakers include Atul Singhal from University College, London; Kjersti Aagaard from Baylor College of Medicine in Texas, USA, Ofer Levy from Harvard University Medical School in Massachusetts, USA, and Kurt Albertine from University of Utah School of Medicine, USA.

Workshops and symposia
The CNRE will coordinate two workshops in 2014 during the week of the Perinatal Society of Australia and New Zealand conference:

- Scientific Writing
- Advanced Mechanical Ventilation in Neonates

Both will be supported by the NHMRC Preterm Infant Centre of Research Excellence, and will involve colleagues from the eastern States and overseas who are in Perth for the PSANZ conference – Kurt Albertine and David Tingay.
Collaborators

International Collaborators
- Professor Kurt Albertine, University of Utah School of Medicine, USA
- Dr Donald Davidson, University of Edinburgh
- A/Professor Raffaele Deliaca, Politecnico di Milano
- Professor Robert Hancock, University of British Columbia
- Professor Zoltan Hantos, Szeged University, Hungary
- Professor Alan Jobe, University of Cincinnati, USA
- A/Professor David Kaczka, University of Iowa
- Professor Berthold Koletzko, University of Munich
- Asst Professor Tobias Kollmann, University of British Columbia
- A/Professor Ofer Levy, Harvard University, Boston Children’s Hospital
- Dr Stefan Minocchieri, University of Basel, Switzerland
- Professor Neena Modi, Imperial College, London
- Professor Sven Schulzke, University of Basel, Switzerland
- Professor Bela Suki, University of Boston, USA
- Dr Mark Underwood, University of California Davis, USA

National Collaborators
- Professor David Burgner, Murdoch Children’s Research Institute, University of Melbourne
- Dr Patricia Conway, University of New South Wales
- Dr Girish Deshpande, University of Sydney
- Dr Meera E斯varan, University of New South Wales
- A/Professor Nick Evans, University of Sydney
- Professor Bob Gibson, University of Adelaide
- Dr Rod Hunt, University of Melbourne
- A/Professor Martin Kluckow, University of Sydney
- Professor Maria Makrides, University of Adelaide
- A/Professor Andy McPhee, University of Adelaide
- Dr Tim Moss, Monash Institute for Medical Research, Melbourne
- Dr Graeme Polglase, Monash Institute for Medical Research, Melbourne
- Professor William Tarnow-Mordi, University of Sydney
- Dr David Tingay, Murdoch Children’s Research Institute, Melbourne

Local Collaborators
- A/Professor Tony Bakker, School of Anatomy, Physiology and Human Biology, UWA
- Professor Dorota Doherty, School of Women’s and Infant’s Health
- Adj Professor Graham Hall, Telethon Kids Institute
- Dr Geoffrey Hammond, Telethon Kids Institute
- Assoc Professor Kathryn Hird, Faculty of Medicine, University of Notre Dame
- Dr Anthony Keil, PathWest Laboratory Medicine WA
- Dr Hannah Moore, Telethon Kids Institute
- Ms Elizabeth Nathan, Women and Infants Research Foundation and King Edward Memorial Hospital
- Dr Graham Pinney, School of Anatomy, Physiology and Human Biology, UWA
- W/Professor Susan Prescott, School of Paediatrics and Child Health
- Professor Peter Richmond, School of Paediatrics and Child Health
- Professor Andrew Whitehouse, Telethon Kids Institute
- Dr Andrew Wilson, Dept of Respiratory Medicine, Princess Margaret Hospital and School of Paediatrics and Child Health, UWA
Visitors to the Centre

Ms Mirielle Lindeman, a student at the Karolinska Institute in Sweden, visited for three months in early 2013 to conduct research with Professor Jane Pillow.

Dr Bjorn Pilstrom, Medical Director of Orphan Biovitrum, visited Professor Jane Pillow in April 2013 and spoke at the Neonatal Clinical Care Unit weekly meeting. His talk was entitled ‘Kineret (Anakinra and IL-1 Antagonist)’.

On the 16 October we welcomed Professor Zulfiqar Bhatta from the Aga Khan University in Karachi, Pakistan. He gave a talk entitled ‘Innovations to Prevent Newborn Infections: What Can We Do Everywhere?’ detailing his experience in neonatal intensive care units around the world. His visit was also supported by King Edward Memorial Hospital Postgraduate Medical Education.

Professor David Burgner from Murdoch Childrens Research Institute and Monash Medical Centre, is a paediatric infectious diseases consultant. He gave the annual Alfred Grauag Oration at the Neonatal Symposium at King Edward Memorial Hospital in February 2013. His visit was supported by Postgraduate Medical Education.

Associate Professor Ross Haslam, Chair of the Australia New Zealand Neonatal Network met with neonatal consultants and toured our Neonatal Intensive Care Unit.

Peter Aggersbery, CEO Medela Switzerland, Irene Zoppi, Medela USA visited the CNRE for research and development discussions.

Professor Ferdinand Haschke, Director, Nestle Nutrition Institute visited the Neonatal Intensive Care Unit for a research collaboration meeting.

Dr Rod Hunt, University of Melbourne, collaborator and CIA on the Neonatal Electrographic Seizures Trial investigating the effect of amplitude integrated EEG treatment of electrical and clinical seizures in term infants visited CNRE for a collaboration meeting.

We also had visits from our international collaborators Associate Professor Raffaele Dellaca from the Politecnico di Milano, and Professor Bela Suki and Professor Elizabeth Bartolak-Suki from Boston University.
Grants and research support

<table>
<thead>
<tr>
<th>Agency</th>
<th>Title</th>
<th>CIs</th>
<th>Years</th>
<th>Amount</th>
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<tbody>
<tr>
<td>NHMRC</td>
<td>Centre of Research Excellence: Improving immediate and long-term outcomes of preterm infants</td>
<td>Pillow, Simmer, Patole, Strunk, Moss, Burgner, Whitehouse, Prescott, Tingay, Gill</td>
<td>2013-17</td>
<td>$2,499,203</td>
</tr>
<tr>
<td>NHMRC</td>
<td>Project Grant: Bronchopulmonary Dysplasia: Identifying Cardiorespiratory Consequences and Targets for Prevention and Intervention</td>
<td>Pillow, Hall, Hanton, Gill, Wilson, Doherty</td>
<td>2013-17</td>
<td>$1,328,857</td>
</tr>
<tr>
<td>NHMRC</td>
<td>Project Grant: Influence of in utero environment on diaphragm structure and function</td>
<td>Pillow, Pinniger, Bakker</td>
<td>2011-13</td>
<td>$478,365</td>
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<tr>
<td>NHMRC</td>
<td>Project Grant: Consequences of waveform composition for epithelial integrity and homogeneous ventilation during HFOV</td>
<td>Pillow, Bassom, Tingay</td>
<td>2011-13</td>
<td>$395,696</td>
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<tr>
<td>NHMRC</td>
<td>Project Grant: A study of the impact of treating electrographic seizures in term or near-term infants with neonatal encephalopathy</td>
<td>Hunt, Colditz, Inder, Badawi, Simmer, Liley, Osborn, Cheong, Wright</td>
<td>2011-15</td>
<td>$1,301,309</td>
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<tr>
<td>NHMRC</td>
<td>Project Grant: Effect of high dose infant fish oil supplementation and FADS 1 &amp; 2 genetic polymorphisms on cognitive development and school giftedness</td>
<td>Simmer, Foster, Smith</td>
<td>2011-13</td>
<td>$314,865</td>
</tr>
<tr>
<td>NHMRC</td>
<td>Project Grant: Australian Placental Transfusion Study</td>
<td>Tarnow-Mordi, Evans, Neunham, Osborn, Isaacs, Simmer</td>
<td>2009-13</td>
<td>$2,696,700</td>
</tr>
<tr>
<td>NHMRC</td>
<td>Project Grant: Investigation of factors that influence Aboriginal maternal and infant health outcomes: improvements to be achieved with the introduction of Aboriginal Health Workers into tertiary care</td>
<td>Doherty, Neunham, Larson, Hornbuckle, Simmer, Henderson</td>
<td>2012-14</td>
<td>$567,101</td>
</tr>
<tr>
<td>NHMRC</td>
<td>Project Grant: Docosahexaenoic acid for the reduction of bronchopulmonary dysplasia in preterm infants born at less than 29 weeks gestational age: a RCT</td>
<td>Collins, Gibson, McPhee, Thio, Sullivan, Simmer, Rajadurai</td>
<td>2012-14</td>
<td>$1,870,914</td>
</tr>
<tr>
<td>National Institutes of Health</td>
<td>Endogenous Surfactant Therapy for the Developing Lung</td>
<td>Suki, Bartolak-Suki, Pillow</td>
<td>2013</td>
<td>USD$488,184</td>
</tr>
<tr>
<td>Women and Infants Research Foundation</td>
<td>Starter Grant: Characterisation of milk after preterm birth (COMET study)</td>
<td>Strunk, Trend</td>
<td>2013</td>
<td>$15,000</td>
</tr>
<tr>
<td>Telethon – Perth Children’s Hospital Research Fund</td>
<td>Postnatal steroids and antenatal chorioamnionitis: Between the scylla and charybdis of inflammation and apoptosis after preterm birth</td>
<td>Pillow</td>
<td>2013</td>
<td>$200,000</td>
</tr>
<tr>
<td>Telethon – Perth Children’s Hospital Research Fund</td>
<td>Antimicrobial proteins and peptides to prevent late-onset sepsis in preterm infants</td>
<td>Strunk</td>
<td>2013</td>
<td>$186,000</td>
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Clinical trials

**Types of Nutrition on GI Response**

**Trial purpose:** Study the preterm infants’ GI response to different volumes and compositions of mother’s own milk, pasteurised donor human milk, and formula milk and during the transition from IV feeding to full oral feeds

**Recruiting:** Stable infants 28-33 weeks gestational age

**Treatment/investigation:** Different volumes and compositions of mother’s own milk, pasteurised donor human milk, and formula milk

**Funded by:** Medela

**Australian Placental Transfusion Study**

**Trial purpose:** To determine if placental transfusion in very preterm babies will improve health outcomes compared to early cord clamping

**Recruiting:** Babies less than 30 weeks gestational age

**Treatment/investigation:** Placental transfusion or cord clamping

**Funded by:** National Health and Medical Research Council

**Australian Placental Transfusion Study Echo Substudy**

**Trial purpose:** To determine the effect of placental transfusion vs early clamping on systemic blood flow

**Recruiting:** Babies less than 30 weeks gestational age

**Treatment/investigation:** Echocardiogram

**Funded by:** National Health and Medical Research Council

**NEST (Neonatal Seizures)**

**Trial purpose:** To determine the effects of treating neonatal clinical and electrographic seizures

**Recruiting:** Babies 35 weeks gestational age and older; less than 48 hours old

**Treatment/investigation:** Treatment of either clinical seizures alone, or clinical plus electrographic seizures

**Funded by:** National Health and Medical Research Council

**PREDICT**

**Trial purpose:** To investigate mechanisms behind exquisite vulnerability of very preterm infants to coagulase-negative *Staphylococcus* infections

**Recruiting:** Infants born at 23 weeks and above

**Treatment/investigation:** Development of the innate immune system in very preterm infants during the period of highest life-time risk of sepsis

**Funded by:** National Health and Medical Research Council

**Novel Teat Study**

**Trial purpose:** To test the effect of a novel feeding device

**Recruiting:** Infants born at 25 to 34 weeks gestational age

**Treatment/investigation:** Use of a control teat or the test teat

**Funded by:** Medela

**DINO7**

**Trial purpose:** Randomised controlled trial investigating high vs low dose DHA in preterm infants

**Recruiting:** Previous participants in DINO, now aged seven

**Treatment/investigation:** Neurodevelopmental assessments

**Funded by:** National Health and Medical Research Council
**Preterm Infant Functional and Clinical Outcomes Study (PIFCO)**

**Trial purpose:** Measuring the contributions of the lung, respiratory muscles and the blood vessels to severity of chronic lung disease in very preterm infants.

**Recruiting:** 550 infants born <33 weeks gestational age

**Treatment/investigation:** various respiratory, cardiac, nutritional and immune measurements

**Funded by:** National Health and Medical Research Council

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**N3RO**

**Trial purpose:** To evaluate the impact of docosahexaenoic acid supplementation on the incidence of BPD in infants born less than 29 weeks gestational age compared with placebo

**Recruiting:** infants born <29 weeks gestational age

**Treatment/investigation:** docosahexaenoic acid (omega-3 fatty acid) supplement

**Funded by:** National Health and Medical Research Council

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**NIRS (Near Infrared Spectroscopy)**

**Trial purpose:** To study oxidative stress and changes in plasma pro-inflammatory cytokines, gut oxygenation and gut permeability after packed red blood cell transfusion in preterm neonates

**Recruiting:** infants born at <33 weeks gestational age, >2 weeks post-natal age

**Treatment/investigation:** Gut oxygenation and permeability, plasma cytokine measurements, and oxidative stress assessments before and after transfusion

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**GenMove**

**Trial purpose:** To describe the general movements in babies born less than 26 weeks gestation

**Recruiting:** infants born <26 weeks gestational age, studied at 38-44 weeks corrected gestational age, and 12 weeks post term age

**Treatment/investigation:** video analysis of movement
Conference presentations

Bell M., Campbell C., Reid C., McMichael J., French N., Anderson M. The role of attention, speed of information processing and working memory in the intellectual function of very preterm (VP) children. Perinatal Society of Australia and New Zealand Annual Congress, April 2013, Adelaide, Australia.


Deshpande G., Rakshasbhuvankar A., Simmer K., Ravikumar M., Mori T., Croft K., Shave M., Currie A. Efficacy and safety of a novel fish oil based emulsion (SMOF®) compared with olive oil based lipid emulsion (CLINOLEIC®) in term and near-term (>34 weeks) surgical neonates: A randomised controlled trial. Perinatal Society of Australia and New Zealand Annual Congress, April 2013, Adelaide, Australia.


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