NEWSLETTER | January 2017

Queensland cerebral palsy & rehabilitation research centre

Message from Prof Ros Boyd, Scientific Director

Dear Families and Collaborators We are very excited to announce the award of two successful programs: (i) **Advance QLD Innovation Partnership** to advance the early detection and early intervention for infants at high risk of Cerebral Palsy from the QLD government for \$1.5M (\$3M matched) awarded by the Minister for Science, Innovation and the Digital Economy, Minister Enoch (see page 4).



Prof Ros Boyd is congratulated by Minister Leeanne Enoch at the launch of the Advance QLD Innovation Partnership Program

(ii) National Health and Medical Research Council (NHMRC) **Clinical Centre for Research Excellence** to lead an Australasian Cerebral Palsy clinical trials network (\$2.5M over 5 years). As our first milestone for the Advance OLD program, the QCPRRC hosted three basic and one advanced General Movements course, training 105 clinicians on the early detection of Cerebral Palsy (see page 4). In addition to our exciting program funding success, the QCPRRC team had three graduating PhD students in December. This year our team completed the trifecta of international conferences with another outstanding year at the American Academy of Cerebral Palsy and Developmental Medicine in Florida (see page 3). In December, I attended the tenth Indian Academy of Cerebral Palsy in Bangalore to help commence our new project in Kolkata, LEAP-CP (Learning through Everyday Activities with Parents); led by our post-doctoral fellow Dr Kath Benfer, funded by the Cerebral Palsy Alliance and the Endeavour Foundation (see page 6). We are looking forward to your continued support in 2017 with the launch of our two exciting new programs.

With warm regards **Ros Boyd**

The investigator team of the new NHMRC Clinical Centre for Research Excellence for an Australasian Cerebral Palsy Clinical Trials Network met to plan the 5 year program at QCPRRC in December. (See Full Report on page 5)





THE UNIVERSITY OF QUEENSLAND



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CONTACT

QCPRRC UQ Child Health Research Centre **Adress:** Centre for Children's Health Research Level 6 62 Graham Street South Brisbane QLD 4101 **Phone:** +61 7 3069 7370 **Email:** qcprrc@uq.edu.au **Website:** www.qcprrc.centre.uq.edu.au





New to **QCPRRC**

Tracey Evans - Clinical Research Coordinator

Tracey Evans completed her PhD at the University of Queensland. Her research focused on the quality of the mother-infant relationship and maternal responsiveness following the parenting intervention, Prem Baby Triple P. Tracey also investigated the effects of the preterm birth on maternal self-efficacy, depressive symptoms and trauma symptoms. Tracey joined QCPRRC in December 2016 and will coordinate the centre's research studies involving infants, including the current NHMRC project REACH.





Denise Morgan - Administration Officer

Denise is QCPRRC's admin officer and brings a wealth of experience to the role. She has worked in the education sector for the past six years. Denise is currently studying Bachelor of Arts part-time at the University of Queensland with Majors in Art History and Anthropology.

Jane Wotherspoon: PhD Student and UQ RHD Scholar

Jane recently joined us as Research Psychologist and will now commence her PhD in 2017. Jane was awarded a UQ Research Training Program Stipend (APA scholarship replacement) to conduct research into the effectiveness of an online cognitive rehabilitation program called SMART (Strengthening Mental Abilities with Relational Training) for children aged between 8-12 years old with mild to moderate congenital cerebral palsy.





Mr Noah Betar: MBBS Honors Student

Noah is a UQ Medical student, graduating in 2017. Noah is doing his honours research on the PREDICT project. He will examine existing and prospective gait lab data with respect to orthopaedic surgery and outcomes.

Miles Seidel: MD-PhD Student and UQI Scholar

Miles has a Bachelor of Science in Engineering (BSE) in mechanical engineering from Princeton University and is a current UQ-Ochsner student. Miles will complete an intercalated PhD/Medical Degree through the Ochsner program. His PhD studies will examine the effect of preterm birth on hippocampus, thalamus and related cortical structures and the relationship to neurodevelopmental outcomes. He will be supervised by Prof Boyd at QCPRRC, and Prof Stephen Rose and Dr Jurgen Fripp at CSIRO.





Congratulations to Mirka Streckhardt!

Our Admin Officer Mirka was nominated for a 2016 Faculty of Medicine "Pursuit of Excellence Award". Congratulations and well deserved.

Welcome to baby Finn who was born to proud parents Mirka Streckhardt and Sven Arnold on 9th August 2016, weighing 2.8kg. A baby brother for Timothy.



PhD Graduations

Congratulations Dr Micah Perez !

Supervisors: Prof Roslyn Boyd, Professor Jenny Ziviani, A/Prof Andrea Guzzetta.

Title of Thesis: Early reach to grasp development of infants with asymmetric brain injury on the Grasp and Reach Assessment of Brisbane (GRAB).

Micah's PhD studies focused on infants with asymmetric brain injury and healthy, term-born infants in two parallel randomised controlled trials collectively known as the UP-BEAT Study, funded by the Australian Research Council (DP110104292). Using a systematic review approach, Dr Perez identified that there was limited evidence supporting the efficacy of upper limb interventions for infants with asymmetric brain injury.

Furthermore, there are limited valid and reliable measures to: (i) accurately detect and/or predict unilateral CP and (ii) examine the efficacy of interventions. The Grasp and Reach Assessment of Brisbane (GRAB) is a new research measure to detect, quantify and evaluate early reach to grasp development in infants with asymmetric brain injury; and to predict fine motor development at six months corrected age on the Bayley Scales of Infant and Toddler Development. Micah's studies determined that the GRAB detected asymmetric unimanual reach to grasp development in infants with asymmetric brain injury. Compared to healthy infants, however, infants with asymmetric brain injury demonstrated a paucity rather than asymmetry of unimanual grasping. Further work is required to investigate the relationship of the GRAB with other validated measures of reach and grasp development and to evaluate its clinical utility. Micah published two papers from her doctoral studies, in BMJ Open (Guzzetta et al, 2013) and Infant Behaviour and Development (Perez et al., 2016). Since graduating, Micah is working as an Occupational Therapist at Medicolegal Experts Australia and is a sessional academic for UQ and the Australian Catholic University.

Congratulations Dr Stina Oftedal !

Supervisors: Dr Kristy Bell, Professor Peter Davies, Prof Roslyn Boyd.

Title of Thesis: Modifiable lifestyle factors and their influence on growth and body composition in preschool aged children with cerebral palsy

Stina's doctoral research examined the influence of habitual physical activity, sedentary behavior and energy intake on growth and body composition in children with cerebral palsy aged 18 months to 5 years. Her research forms part of two larger longitudinal cohort studies funded by NHMRC – CP Child: Growth, Nutrition and

Physical Activity (GNPA; 569605) and CP Child: Brain Structure and Motor Function (465128). Dr Oftedal's studies showed that differences in growth and body composition in children with cerebral palsy are evident at a very young age. Gross motor function classification, gestational age at birth and birth weight should be taken into consideration when assessing the growth of a child with cerebral palsy. The relationship between energy intake, physical activity and fat free mass needs to be further elucidated. The wide variability in sedentary time within GMFCS groups is concerning, and research into interventions aimed at reducing sedentary time and increasing physical activity level, and their efficacy in improving growth and health outcomes is warranted. Stina has published eight journal article (including five first-author publications) from her PhD studies.



70th Annual Meeting of the American Academy for Cerebral Palsy and Developmental Medicine (AACPDM) Conference Report

Hollywood, Florida, 20-24th September 2016

The 2016 Annual Meeting 'Making a difference-are we?' provided high-quality dissemination of information in the basic sciences, prevention, diagnosis, treatment, and technical advances as applied to persons with cerebral palsy and other childhood-onset disabilities. Videos of the general sessions are now available to view online: http://www.aacpdm.org/resources/multimedia#AM-highlights.

The 70th Annual Meeting of the AACPDM in Hollywood, Florida was an inspiring compendium of science and clinical care, hosted on the sunny coast of Florida. Ros Boyd attended a pre-conference on the "Pain in CP Symposium", funded by the Cerebral Palsy Foundation in partnership with the AACPDM. The Goals of the symposium were to develop an evidence-informed guideline/ care pathway on pain assessment and management for CP; and establish a CP pain research group. The invited attendees included eminent international researchers in the field, persons with CP and parents of children with cerebral palsy sharing their experiences on the challenges of living with chronic pain.

Dr Lee Barber and Professor Ros Boyd presented the centre's research findings, with four orals, five posters and one breakfast session. See our website for further details. <u>https://qcprrc.centre.uq.edu.au/2016</u>-aacpdm

Further information and course handouts can be downloaded at: http://www.aacpdm.org/meetings/2016/attendees/handouts





New Advance QLD Innovation Partnership

Advancing Cerebral Palsy: Early Detection and Early Intervention in Queensland

Chief Investigators: Prof Ros Boyd, Dr Koa Whittingham (QCPRRC); Prof Paul Colditz (UQCCR), Prof Stephen Rose, Dr Mohan Karunanithi (CSIRO), A/Prof Anthony Smith (UQ COH); Prof. Paul Scuffham (Griffith University); Dr Priya Edwards (CHQ); Prof Iona Novak, Prof Nadia Badawi, Dr Catherine Morgan (CP Alliance)
Partners: The University of Queensland (QCPRRC, Perinatal Research Centre at UQCCR, Centre for Online Health); Australian eHealth Research Centre (CSIRO); Griffith University (Menzies Institute); Children's Health Queensland; Cerebral Palsy Alliance; Merchant Charitable Foundation through Children's Health Foundation.

On 26th October 2016, we were delighted to have The Honourable Leeanne Enoch MP, Minister for Innovation, Science and the Digital Economy and Minister for Small Business to launch the Advancing Cerebral Palsy in Queensland partnership program at the Centre for Children's Health Research. This program is funded by the Queensland Government's Advance Queensland Innovation Partnerships (AQIP) scheme.

Minister Enoch launched the \$1.5M program, which will improve early detection of Cerebral Palsy (CP) across Queensland, through state-wide training in the General Movements Assessment (GMs), developing clinical and radiological biomarkers for earlier detection of risk of CP in infants born preterm and in high risk, term- born infants. The team at UQ's QCPRRC, Perinatal Research Centre, Centre for Online Health with partners at CSIRO, Cerebral Palsy Alliance, Children's Health Queensland, Griffith University were co-funded by the Merchant Charitable Foundation through the Children's Health Foundation.

State of the art very early brain imaging using the two MRI compatible incubators at Lady Cilento Children's Hospital and the Royal Brisbane Women's Hospital, with clinical biomarkers will improve the early detection of CP from the current delayed detection of on-average 19 months of age. Infants identified at "high risk of Cerebral Palsy" will be fast tracked to clinical trials of early neuro-rehabilitation (REACH) and a Parenting program incorporating Acceptance and Commitment therapy (PACT). Innovative digital solutions for screening and cloud based radiological reporting will be developed with the Australian e-Health Research Centre at CSIRO, and implemented using the Queensland Health Telehealth network with the UQ Centre for Online Health. The impact on families' quality of life, costs and consequences of earlier detection and health outcomes will be monitored with the Health Economics Unit at Griffith University.

Here is the launch news link at <u>https://qcprrc.centre.uq.edu.au/article/2016/10/minister</u>-enoch-launches-aqip-program

Milestone I: General Movements Training on the early detection of infants at high risk of Cerebral Palsy

One of the first milestones for the Advance QLD program is improving training on early detection of Cerebral Palsy (CP) across Queensland, through state-wide training in the General Movements Assessment (GMs), and developing clinical and radiological biomarkers for earlier detection of risk of CP in infants born preterm and in high risk, term- born infants.

In November, QCPRRC hosted 105 clinicians and researchers to participate in the Internationally Accredited General Movements Course led by Prof. Fabrizio Ferrari (from University of Modena, Italy), A/Prof Alicia Spittle (First Australian GMs trainer from the Murdoch Children's Research Institute in Melbourne), A/Professor Andrea Guzzetta and Dr Vittorio Belmonti (Stella Maris Institute, University of Pisa, Italy).



GMs training attendees with Ros Boyd and the four trainers (front centre, L-R) Fabrizio Ferrari, Andrea Guzzetta, Vittorio Belmonti and Alicia Spittle



NEW NHMRC Centre of Research Excellence Australasian Cerebral Palsy Clinical Trials Network



Chief Investigators: Prof Ros Boyd (UQ), Prof Iona Novak (USyd), Prof. Euan Wallace (Monash), Prof. Nadia Badawi (CPA, USyd), Prof. Paul Colditz (UQ), Prof. Stephen Rose (CSIRO, UQ), A/Prof Michael Fahey (Monash), Prof Jenny Ziviani (UQ, CHQ) A/Prof. Catherine Elliott (Curtin Uni.), Prof. Ngaire Stott (Uni. Auckland).

Associate Investigators: Dr Andrea Guzzetta (Uni Pisa), Dr Sarah McIntyre (CPA), Dr Koa Whittingham, Dr Leanne Sakzewski, Dr Lee Barber (UQ) Prof Robert Ware (Griffith), Prof Peter Davies (UQ), A/Prof Anthony Smith (UQ), A/Prof Ray Russo (SA). Clinical Leaders: A/Prof Jane Valentine (WA), Dr Priya Edwards, Ms Megan Kentish (QLD).

Administrative Manager: Dr Susan Sullivan, Senior Research Partnerships and Program Manager.

The Australasian CP Clinical Trials Network will uplift earlier detection of CP across Australasia, fast track children to multisite randomised clinical trials of new neuroprotectants and develop and test new rehabilitation. Knowledge translation studies will ensure effective transfer to enhanced clinical practice. The CRE will overcome known barriers to implementation by developing Clinical Care Pathways and International Clinical Practice Guidelines, guided by a consumer network. The changes in outcomes of children with CP due to the new clinical trials will be tested in Australian Cerebral Palsy Register (ACPR).

This Australasian CP Clinical Trials Network brings together international leaders in the field of Cerebral Palsy on neuroprotection, epidemiology, neuroscience, early detection, rehabilitation and e-rehabilitation with a track record of >40 randomised clinical trials of interventions and best practice implementation studies.



The Australasian CP Clinical Trials Network combines internationally recognised teams from the University of QLD; CP Alliance/University of Sydney; Ritchie Centre/Monash University, VIC; Perth Children's Hospital/ Curtin University, WA; Adelaide Children's Hospital, SA; and Starship Children's Health/the University of Auckland, NZ. These Research teams are closely linked to state-wide Cerebral Palsy clinical teams, enabling capacity building across five states and New Zealand. Recruitment from the Australasian Cerebral Palsy Register (ACPR), the largest country-wide register world-wide (n>7763), will allow faster recruitment of representative populations, enable us to test the effects of neuroprotectants, changed management practices on the incidence of CP as well as the improvement in functional outcomes at 5 years (ascertainment on the ACPR). This CRE will generate new evidence for interventions, thus compelling services to prioritize effective therapies that enhance outcomes and provide timely information for the NDIS (National Disability Insurance Scheme).

> There will be a variety of Postdoctoral and PhD opportunities for candidates linked to this research. Contact: CRE Manager: <u>susan.sullivan@uq.edu.au</u> OR: QLD: r.boyd@uq.edu.au NSW: INovak@cerebralpalsy.org.au VIC: m.fahey@monash.edu.au SA: Ray.Russo@sa.gov.au WA: Catherine.Elliott@health.wa.gov.au NZ: s.stott@auckland.ac.nz

LAUNCH of the LEAP-CP Project in Kolkata India with Dr Katherine Benfer

Project: Early intervention to improve outcomes for families of children with Cerebral Palsy in Kolkata (Parents training Parents)

Chief Investigator: Dr Katherine Benfer (UQ) QEII Endeavour Fellow

Co-investigators: Prof Roslyn Boyd (UQ), Professor Iona Novak (CP Alliance), Dr Catherine Morgan (CP Alliance); Dr Naila Khan (Bangladesh); Dr Anjan Bhattacharya (Apollo Gleneagles Hospital, Kolkata).

Cerebral palsy (CP) is the most common cause of childhood disability, with 80% of the estimated global burden in low-resource countries. The current state of evidence allows us to reliably predict children at risk of CP from 13 weeks, however children in both high- and low-resource settings are not receiving a diagnosis or intervention until after 19 months. This means we are missing a significant window of opportunity for treatment when infants' neuroplasticity is optimal. Dr Benfer will develop and test a parent-delivered community-based early detection and intervention program for children at high risk of cerebral palsy (CP) living in Kolkata, India. Dr Benfer has commenced her Endeavour Fellowship in Kolkata, India and the LEAP-CP project has received additional support from the Cerebral Palsy Alliance (\$75k over 2 years).

The Learning through Everyday Activities with Parents (LEAP)-CP project has two main aims:

Aim 1: Early detection of children at high risk of CP in low-resource settings. (i) To determine the predictive validity of General Movements (GMs) assessment administered at 3 months for detecting CP in high risk infants in India.

Aim 2: Early intervention for children at high risk of CP in low-resource settings.

(i) To determine the efficacy of the proposed intervention on children's developmental outcomes for those at risk of CP;(ii) To determine the efficacy of the proposed intervention on caregiver's mental health outcomes.

Dr Benfer is first establishing an accessible and appropriate means to detect children at risk of CP, and then determining the efficacy of an early intervention, which could be delivered at scale. A community-based intervention of enriched environments and nutritional support, delivered parent-to-parent in the home, presents a viable and sustainable solution in the low resource setting of India. 212 infants will be randomised into a community-based, parent-delivered intervention (15 fortnights of enriched environment; goal-directed motor training; and parent education, including nutrition, parenting and health) versus standard care (based on the Integrated Management of Childhood Illness). The intervention will be conducted through a 'train the trainer' model to ensure long-term sustainability and its potential to be upscaled in other low-resource settings, including Indigenous Australia.

In early December, Dr Benfer and Prof Boyd participated in the annual Indian Academy of Cerebral Palsy conference in Bangalore, and commenced meeting with the clinical teams and collaborators in Kolkata. An internationally accredited General Movements course will be conducted on 23 to 27 January, 2017.



Members of the Indian Academy of CP with invited Speakers Professors Rosenbaum, Forsberg and Boyd.

Prof Boyd with Director of the VC Roy Hospital Neonatal Unit (200 NICU beds) in Kolkata, India.

For more information, please contact Dr Katherine Benfer. E: <u>k.benfer@uq.edu.au</u> Or Professor Roslyn Boyd, E: <u>r.boyd@uq.edu.au</u> P: 07 3069 7372 <u>https://qcprrc.centre.uq.edu.au/leap-cp</u>













New project grants from NHMRC and QLD Government

GAME: Goal Directed Active Motor Training and Environmental Enrichment

(NHMRC Project Grant 1120031)

Chief Investigators: Iona Novak, Cathy Morgan, Nadia Badawi (CP Alliance, USyd) Roslyn Boyd (QCPRRC), Alicia Spittle (MCRI), Russel Dale, Adrienne Kirby (USyd), Rod Hunt (MCRI), Koa Whittingham, Kerstin Pannek (UQ) (awarded \$2.5M for 2017-2022)

Each year, 600 Australians are diagnosed with cerebral palsy with a \$4 billion annual socio-economic burden. One third never walk. The National Disability Insurance Scheme ranks early intervention to improve disability as its top priority. Staggeringly 50% get no intervention before age one, while awaiting diagnosis. Our highly cited systematic reviews have established that (a) traditional early intervention is ineffective; while (b) harnessing neuroplasticity through intensive motor training in older children produces significant motor gains. Efficacy of infant training is unknown. Neuroscience preclinical data indicates disability plausibly could be reduced if training occurs before 6-months of age. Reviews have called for early diagnosis to expedite large intervention trials.

We have a) published an international clinical guideline enabling early diagnosis; b) developed GAME (Goals–Activities–Motor– Enrichment) an infant-friendly motor training intervention; c) published pilot data showing feasibility and short-term gains; d) conducted a second pilot delivering GAME until 12 months of age, confirming sustained motor gains. Given compelling preclinical data, childhood trial findings, and favourable pilot data, we propose a randomised controlled trial of GAME from 3-24 months of age to improve motor performance in 300 infants with cerebral palsy. It will be the largest training intervention trial ever conducted in cerebral palsy. We will measure neuroplasticity using our reliable, advanced neuroimaging. Our team, which includes a parent, has extensive experience in clinical trials, motor training, neonatology, neurology and neuroradiology. We all have prior successful collaborations. Our trial will be meta-analysed with a concurrent Swedish trial, to achieve a level of evidence sufficient to transform clinical practice worldwide. GAME will recruiting 100 infants at high risk on CP in QLD, in NSW and in Victoria commencing in early 2017.

For further information in QLD contact: Ros Boyd E: <u>r.boyd@uq.edu.au</u>



Government

Measuring Spasticity in children with CP in the Clinic, Health and Medical Research Physiotherapy Fellowship Dr Steve Obst

A new and novel way to measure muscles in children with cerebral palsy

Chief Investigator: Dr Steven Obst. Associate Investigators: Dr Lee Barber, Prof Ros Boyd, Ms Megan Kentish and Dr Priya Edwards

This is a new study starting in 2017 that will test a novel device to measure muscle size and spasticity in children with cerebral palsy who are having intramuscular botulinum toxin-A (Botox) to their calf muscles. It is hoped that this new device will help physiotherapists measure spasticity and choose when to use Botox in children with cerebral palsy. The study will also look at how Botox changes the size and strength of your child's leg muscles and their ability to move.

What does my child need to do to be in this research project?

If you agree to participate your child will be seen four times by the research team (on the day of the injection and 2 weeks, 2 months and 6 months after the injection). These sessions will be held before your clinical appointments at the Lady Cilento Children's Hospital.

During each session a member of the research team will do the following assessments:

Measure your child's height, weight and leg length (5 min). Assess your child's ability to walk, run, hop, jump and go up and down stairs (15 min). Assess the size of child's leg muscles using ultrasound (15 min). Assess the strength and electrical activity of your child's leg muscles (10 min).

Who is funding the research project?

This project is funded by a Queensland Health Physiotherapy Research Fellowship to Dr Steven Obst. How can I find out more information about this study?

For more information about this study, please contact Dr Steven Obst on (Ph) 07 3069 7371 or s.obst@uq.edu.au



Australian Governmen

ational Health and Medical Research Council

This new device measures muscle spacticity using a hand-held dynamometer and electromyography

Recent Publications

Surface-based fMRI-driven diffusion tractography in the presence of significant brain pathology: A study linking structure and function in cerebral palsy. Lee Reid, Ross Cunnington, Roslyn Boyd and Stephen Rose.

PLoS ONE 11(8): e0159540. http://dx.doi.org/10.1371/journal.pone.0159540



Diffusion MRI (dMRI) allows researchers to investigate various aspects of brain connectivity - the layout and microstructure of connections between brain regions. dMRI is an important imaging tool however dMRI is not simple to apply to children with nontypical development. This is because dMRI software usually assumes that brains are a 'standard' shape, and the responsibilities of each region match a standard pattern. A novel alternative is using functional MRI (fMRI) to find which region is responsible for a given task. Once this region is identified, dMRI tractography can be applied to that region to find related white matter pathways ('brain connections'). This paper describes an innovative fMRI-guided dMRI-tractography pipeline that utilises a variety of novel methods to maximise the specificity of the fMRI-guidance and quality of the resultant white-matter pathway map. These methods include using adaptive 3D brain models ('surfaces') and machine learning (rather than expert human interaction) to local specific tissues and perform fMRI statistical analysis. This 'surface-based' fMRI-dMRI method was utilised to investigate relationships between upperlimb ability and corticospinal tract microstructure in 31 children with unilateral cerebral palsy. To determine the usefulness of this method, this was repeated with a cutting-edge fMRI-dMRI method that lacked the novel methodology incorporated into the 'surface' method, and the results compared. The surface-based approach successfully processed more participants (87%) than the voxel-based approach (65%), and provided significantly more-coherent tractography. Significant correlations between dMRI metrics and five clinical scores of function were found for the more superior regions of these tracts. These significant correlations were stronger and more frequently found with the surface-based method (15/20 investigated were significant; R2=0.43 - 0.73) than the voxelwise analysis (2 sig. correlations; 0.38 & 0.49). More restricted fMRI signal, better-constrained tractography, and the novel machine-learning modifications all appeared to contribute toward these differences.

Longitudinal growth, diet and physical activity in young children with cerebral palsy. Stina Oftedal, Peter Davies, Roslyn Boyd, Richard Stevenson, Robert Ware, Piyapa Keqwutan, Katherine Benfer, Kristie Bell . Pediatrics (2016) 138(4): e2 0161321 doi: 10.1542/peds.2016-1321

Children with cerebral palsy (CP), particularly with moderate to severe gross motor limitations, are typically shorter and grow more slowly than children with typical development. The influence of diet, physical activity, and sedentary time on growth in children with CP has not been elucidated. This study demonstrated that ambulatory status and gestational age at birth were significant predictors of height in children with CP, whereas only ambulatory status predicted growth velocity. Energy intake, habitual physical activity, and sedentary time did not explain additional variation in growth measures. For Gross Motor Function Classification System (GMFCS) level I, height and growth velocity did not differ from population-level growth standards. Children in levels II to V were significantly shorter, and those in levels III to V grew significantly more slowly than those in level I. Energy intake, habitual physical activity, sedentary time, Dysphagia Disorder Survey score, and feeding method were not significantly associated with either height or growth velocity once GMFCS level was accounted for. Research into interventions aimed at increasing active movement in GMFCS levels III to V and their efficacy in improving growth and health outcomes is warranted.

Automated, quantitative measures of grey and white matter lesion burden correlates with motor and cognitive function in children with unilateral cerebral palsy Alex Pagnozzi, Nicholas Dowson, James Doecke, Simona Fiori, Andrew Bradley, Roslyn Boyd, Stephen Rose. NeuroImage: Clinical. 11 (2016) 751-759 doi: 10.1016/j.nicl.2016.05.018



A common type of injury observed in the Magnetic Resonance Images (MRI) of children with Cerebral Palsy (CP) are lesions in the white and grey matter of the brain. It is understood that the size and location of these lesions impact the motor and cognitive ability of children with CP, however the size of lesions has not been quantified in previous CP research. Therefore in this study, we have described a method for automatically segmenting lesions from the MRIs of children with CP, allowing the size of lesions to be easily determined. We have tested and validated this approach on a large cohort (107 children with CP and 18 typically developing children), and show that the method had an accuracy of 94% in detecting lesions from MRIs. Furthermore, using statistical models, we identify locations in the brain where the presence of lesions was strongly associated with poorer outcomes in motor, cognitive and visual function. These strong associations highlight the importance of assessing both white and grey matter lesions when forming a prognosis, and the potential benefit of using these lesion characteristics for planning therapeutic interventions.



MUSCLE RESEARCH UPDATE

Investigators: Dr Lee Barber, Dr Steven Obst, Dr Chris Carty, Dr Glen Lichtwark, Prof Roslyn Boyd, Mr Jarred Gillett, Ms Felicity Read, Ms Shari O'Brien,

Individuals with cerebral palsy have muscles that have adapted and function in different ways than typically developing muscles. Our Cerebral Palsy Muscle Research group is working hard to understand how best to keep the muscles functioning. The CP muscle research group had a strong presence at the 70th Annual Meeting of the American Academy for Cerebral Palsy and Developmental Medicine (AACPDM 2016) Conference, Florida, with four Presentations and a Breakfast Session accepted. The research was very well received with many questions and discussions about our Scientific Posters reporting on the impact of Botox on improving and maintaining gait quality in children with bilateral cerebral palsy (Felicity Read) and differences in calf muscle growth in children with unilateral and bilateral cerebral palsy (Molly Hulbert). The podium presentation session including our research on habitual physical activity in adults with cerebral palsy (Ritika lohal) attracted a full house with great interest in the under-studied area of adult CP. A Breakfast Workshop was also presented by our group titled "Patient-specific modelling: incorporating advances in medical imaging to better inform musculoskeletal models". With the help of Prof David Lloyd (Griffith University, Gold Coast) and Dr Morgan Sangeux and Dr Tandy Hastings-Ison (The Royal Children's Hospital and Murdoch Childrens Research Institute, Melbourne) we demonstrated the development of patient specific muscle and skeleton models of walking in children with cerebral palsy and introduced the possibilities of performing "virtual treatments and surgeries" by manipulating the computer models to predict walking and movement changes. This a developing area of research and clinical application that our group is leading. We send a huge congratulations to Ms Ritika Johal and Ms Molly Hulbert, two Summer Scholarship Students from the Faculty of Medicine, who both had their first international conference presentations at AACPDM 2016.

We must also congratulate Ms Shari O'Brien, a research assistant on our Adult CP study and now a PhD scholar, for taking out the University wide UQuAPS Pitching Research Competition and also the People's Choice Award. Shari crafted a concise, hard-hitting research pitch for her PhD Program "Training to enhance lower limb motor control in individuals with CP", to thoroughly impress a panel of academic experts.Well done Shari!

Mr Jarred Gillett's FAST CP study is continuing through 2017. Our training program is the first of its kind for adolescents and young adults with CP. We would like to thank all of the participants and their families who have been involved with FAST CP so far. If you would like 12 weeks of one-on-one exercise training to improve your strength and fitness please contact us. Thank you very much to those that have already been involved in our projects and we look forward to meeting new interested participants.

See Jarred talking about FAST CP on vimeo: https://vimeo.com/160191299

If you would like to be involved please contact us and don't forget to keep up with information at our Facebook page: <u>www.facebook.com/CPMuscleResearch</u> Dr Lee Barber. Ph 07 3069 7334 Email <u>l.barber@uq.edu.au</u>

For further information on FAST-CP see: <u>https://qcprrc.centre.uq.edu.au/fast-cp</u> For further information on Muscle Growth and Botox, see: <u>https://qcprrc.centre.uq.edu.au/muscle-growth-and-botox</u>

Launch of SPEECHLESS

An American sitcom about the lived experiences of the family and community of a child with Cerebral Palsy is receiving wonderful reviews on the US ABC channel.

After each Viewing of the weekly sitcom, an expert in the field of CP provides some up-to-date information on an aspect of CP; you can find an interesting one by Dr Joe Dukowski with the New York Ballet here at: <u>http://yourcpf.org/speechless/the</u>-creative-spirit/ SPEECHLESS is supported by Richard Ellensen of the CPIRF.



Shari O'Brien accepting her award from the Pitch Doctor



INFANT STUDIES UPDATE

PPREMO: Prediction of Preterm Motor Outcomes

(CP Alliance IRG1413 & FMFC 2014-074)

Chief Investigators: Ms J. George (PhD scholar), Prof R. Boyd, Prof P. Colditz, Prof S. Rose, Dr K. Pannek, Dr J. Fripp Study Personnel: Ms K. McGrory (Research Nurse), Ms C. Finn (PT), Ms K. Morris (PT)

Data analysis is well underway and manuscripts are nearing completion. The findings from the PPREMO study will be presented by Ms Joanne George at the European Academy of Childhood Disabiity in Amsterdam in May 2017. The full PPREMO study protocol is available online via open access publication: (http://bmcpediatr.biomedcentral.com/articles/10.1186/s12887-015-0439-z). The encouraging early findings from the PPREMO study have been instrumental in securing funding through the Advance Qld Innovation Partnership program "Advancing Cerebral Palsy in Queensland" to support further research. Many of the families who participated in the PPREMO study have kindly agreed to return with their babies for assessment at 2 years corrected age as part of the PREBO study. This will provide valuable information regarding longer term outcomes in babies born preterm.

For further information, please contact Ms Joanne George: <u>j.george2@uq.edu.au</u> Website: <u>https://qcprrc.centre.uq.edu.au/ppremo</u>

PREBO: Preterm Brain Outcomes (NHMRC Grant 1084032)

Chief Investigators: Prof P. Colditz, Prof R. Boyd, Prof S. Rose, Prof B. Boashash, Dr K. Pannek Associate Investigators: Prof A. Coulthard, Dr B. Lingwood, Ms J. George, Prof M. Breakspear, Dr R. Ware, Dr S. Finnigan, Dr T. Bjorkman Study Personnel Qld: Ms K. McGrory (Research Nurse), Ms C. Finn (PT), Ms K. Morris (PT)

The PREBO study is a continuation of the important work undertaken in the PPREMO study that investigated whether early MRI combined with clinical assessments of babies born very prematurely can predict later outcomes. This is a critical step in the early detection of cerebral palsy and referral to early interventions. Recruitment to PREBO is now well underway with 23 babies enrolled who have completed a brain MRI (using the MR compatible incubator), EEG and clinical assessments at 30 weeks gestational age. 16 of these babies have already been seen for their assessments at term age and 9 babies have already completed their 3 month assessments. All babies will be followed up with developmental assessments at 12 months and 2 years corrected age. We would like to thank all of the families who have participated in this study so far and those who have also joined the expanded study PREBO with a follow up assessment at 2 years corrected age. We look forward to completing data analysis and publishing our study findings.

For more information, please contact Kym Morris: 07 3069 7338 or <u>k.morris@uq.edu.au</u> Website: <u>https://qcprrc.centre.uq.edu.au/prebo</u>

REACH: Randomised trial of Rehabilitation very EArly

in Congenital Hemiplegia (NHMRC Grant 1078877)

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Chief Investigators: Prof R. Boyd, Prof J. Živiani, Dr L. Šakzewski, Prof I. Novak, Prof N. Badawi, Dr K. Pannek, A/Prof C. Elliott, Dr S. Greaves, Dr A. Guzzetta, Dr K. Whittingham. Associate Investigators: A/Prof J.Valentine, Prof P. Colditz, Dr R.

Ware, Ms C. Morgan, Dr M.Wallen, Dr K.Walker, Dr R. Dale, Prof S. Rose, Dr R. Ward, Ms B. Choy, Dr M. Sharp, Dr N. French, Ms L. Findlay, Dr P. Edwards The REACH study continues to support the caregivers of babies to provide intervention in homes in QLD, NSW, VIC and WA. Babies are receiving one of two types of therapy to improve hand and arm skills and general motor development. The first one is called infant-friendly modified Constraint-Induced Movement Therapy (mCIMT). A sock or fabric glove is placed on the infants more able hand, so the child can practice movement and skills with the impaired hand and arm. mCIMT consists of play based activities carried out by parents at home, where one of the parents plays with the infant to encourage him/her to use their impaired hand/arm to interact with toys and the parent. The second intervention is called infant-friendly Bimanual Therapy (BIM). BIM also consists of daily sessions in which one of the parents plays with their infant to encourage equal use of both hands and arms in play based activities. Experienced therapists visit the homes of eligible babies monthly to support caregivers in providing the Baby CIMT or the Baby BIM intervention. The therapist and caregiver have a videoconference appointment between each home visit to help adapt the home program ideas to best suit the baby.

The intervention is completed at 12 months corrected age and four of our babies have already reached this milestone. At 12 months and 2 years corrected age a comprehensive assessment is done to measure the effects of the interventions. Parents receive a report detailing their child's results. Babies can receive therapy from the local providers in their area and these therapists take over their care at 12 months.

In QLD the REACH study is recruiting from the Lady Cilento Children's Hospital, Mater Mothers' Hospital and the Royal Brisbane and Women's Hospital. We hope to recruit soon from the Gold Coast University Hospital and Nambour General Hospital. Eligible babies are those who present with asymmetrical development of hand/arm function, often after an asymmetrical brain injury, who are between 3 and 6 months corrected age. We will be recruiting 150 infants across the four states, with 4 in QLD, 4 in NSW, 5 in VIC and 2 in WA already recruited.





Australian Government National Health and Medical Research Council

Cerebral Palsy

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CHILD STUDIES UPDATE

The Sixth and Final ParticiPAte cohort is being recruited! (CP Alliance PG 3915)

Chief Investigators: A/Prof C. Elliott, Dr L. Sakzewski, A/Prof S. Girdler, Prof R. Boyd, Ms S. Reedman, Ms C. Willis ParticiPAte CP is a study of motivational physiotherapy to get kids with CP participating in physical activities of their choice. Since April 2016, families have been busy exploring what makes it easier or harder for their child to participate in physical activities. Children and families have been exploring ways to overcome barriers to participation, which have included difficulty identifying suitable activities/programs, negative community attitudes, lack of classification status to participate at a competitive level, lack of appropriate equipment to support participation, low self-efficacy or self-confidence to achieve, limited sport-specific skills needed for participation, and low motivation to participate. Whilst barriers are important, the intervention has been strengthsbased; working to the strengths of individuals to enable self-determination and family empowerment. Therapy sessions have been conducted in a place and at a time convenient to families (including after school and weekends).

There are LIMITED places remaining in this program for the 6th and final cohort in March 2017. Potentially eligible participants are children with cerebral palsy who:

-are 8 to 12 years of age (inclusive),

-can walk with or without aids in the community or can push a manual wheelchair by themselves, -can communicate their wants, needs, desires for now and the future, and -live within 200km of South Brisbane.

If you would like more information about this study or would like to participate, please contact Enna Salama (Clinical Research Coordinator) on (07) 3069 7354 or <u>e.salama@ug.edu.au</u> The Study Physiotherapist for ParticiPAte CP is Sarah Reedman (sarah.reedman@ugconnect.edu.au)

PREDICT CP: Implementation of comprehensive surveillance to Predict

outcomes for children with Cerebral Palsy (NHMRC Grant 1077257)

Chief Investigators: Prof R. Boyd, Prof P. Davies, Prof J. Ziviani, Prof S. Trost, Dr L. Barber, Dr R. Ware, Prof S. Rose, Dr K. Whittingham, A/Prof J.Whitty, Dr K. Bell. Associate Investigators: Prof P. Scuffham, Dr C. Carty, A/Prof J. Walsh, Ms M. Kentish, Dr P. Edwards, Dr L. Copeland, Dr K. Weir, Dr L. Sakzewski, Dr A. Guzzetta, Dr D. Brookes, Prof A. Coulthard, Dr R. Pelekanos, Mr O. Lloyd.

All children, born between I January 2006 and 31 December 2009, who took part in the CP Child Studies, are invited back to participate in the Predict CP study at the Centre for Children's Health Research (next to the Lady Cilento Children's Hospital).

What is the aim of this study?

To predict future outcomes and inform the development of timely and effective interventions for children with cerebral palsy.

What does the study involve?

An MRI brain scan and a one-off clinical visit, which includes the following assessments: Motor Capacity (gross and fine motor function), Neuropsychology, Communication, Nutrition, Bone Health (DXA Scan), Pathology (blood test), Medical Imaging (brain MRI, x-ray of hips) and Questionnaires.

Parents/carers will receive a comprehensive report detailing findings derived from the above-mentioned assessments.

Magnetic Resonance Imaging (MRI)

We are now ready to commence comprehensive brain MRIs as part of the assessment day, which will be conducted at the new Herston Imaging Research Facility (HIRF).

- There are no known side-effects of MR imaging.

- The scan will take approximately 30 minutes.

- Children that have any medical implants, electronic or magnetically operated devices will be checked further as to whether they can undertake the MRI but will be eligible for the remainder of the study.

Thank You

Our research team would like to thank our remarkable participants, who have already taken part in Predict CP, for their time and valuable contribution to this study.

For more information about the Predict CP study, please contact Enna Salama (Clinical Research Coordinator) on (07) 3069 7354 or predict.qcprrc@uq.edu.au Website: https://qcprrc.centre.uq.edu.au/predict-cp-0











Upcoming Events

European Academy of Childhood Disability (EACD) Annual Meeting 17 - 20 May 2017, Amsterdam, The Netherlands

QCPRRC will be represented at this years European Academy of Childhood Disability Meeting in Amsterdam, The Netherlands. The conference's theme, 'Steps into the Future' will focus on new developments in the field of childhood onsent disability. QCPRRC's outstanding research will be shown to an international audience in ? free papers, ? workshop and ? scientific posters. For details on the conference and the program please visit the website:

www.eacd2017.org

Prechtl's Method of the Qualitative Assessment of General Movements Basic and Advanced Training: 15th - 18th March 2017 - Melbourne Proposed Basic Training in Canberra: 28th - 31st March 2017 or 29th March - 1st April 2017

The Basic Course provides an introduction into Prechtl's Method on the Qualitative Assessment of General Movements in young infants. This new assessment method has shown its merit for the prenatal and postnatal evaluation of the integrity of the nervous system. Compelling evidence is now available that qualitative assessment of General Movements (GMs) at a very early age is the best predictor for cerebral palsy. This method has become a potent supplement to the traditional kind of neurological examination.

The Advanced Course will provide an additional intensive training in correct judgement. This training will deal with the details of the assessment, the proper terminology and technique as well as with the application of individual developmental trajectories.

The course fulfills the standards specified by the GM-Trust.

All future courses will be publicised on our Website https://qcprrc.centre.uq.edu.au/events



Check out what 8-year-old Sophie had to say about her involvement in the ParticiPAte study!

What were the goals that you wanted to achieve in ParticiPAte CP? Did you achieve them?

I) Learn to skip rope (so I can play by myself or with friends)

2) Ride my bike with my family without training wheels

3) Get better at swimming backstroke and breastroke

What was the best part about being in the research study?

Learning to be awesome at skipping

What do you want to be (or do!) when you grow up? A singer

Why do you think it is important for kids with CP to participate in (and be involved in) physical activities that they enjoy?

So you can know you can do things and that shows you [that] you can do lots of other things you want to do in life.



"Dear Sarah, Thankyou for helping me do skipping, learn how to ride a bike and with my swimming! I hope your research goes well. From Sophie"

WHAT A STAR!!