

Paediatric Epilepsy Research Annual Report 2013/14



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Introduction

It is with great pleasure that I introduce our annual research report for the period of March 2013 to February 2014 for the epilepsy unit across UCL-Institute of Child Health, Great Ormond Street Hospital and Young Epilepsy.

Our research continues to focus on all aspects of childhood epilepsy, looking toward optimising outcomes in children with epilepsy. New projects initiated over the past year have included an infancy project to study newly presenting patients, under 12 months of age, and their response to treatment, and a study which aims to develop better imaging methodology using new quantitative MRI parameter maps.

We secured new grant funding for the following projects in 2013:

- **Pilot study of cardiac rhythm in Dravet Syndrome: cause of SUDEP?**
Investigators: S Sisodiya, JH Cross, J Kaski, S Aylett, E Hughes
Funding: £41,078 (Dravet Syndrome UK, Epilepsy Action)
- **E-PILEPSY: A European pilot network of reference centres in refractory epilepsy and epilepsy surgery**
Investigators: P Rylin, JH Cross
Funding: €300,000 of total of €1,429,420 (European Commission)

- **Evaluating dietary intervention before surgical treatment for epilepsy (EDIBLE) – [a workpackage of Development and Epilepsy – Strategies for Innovative Research to improve diagnosis, prevention and treatment in children with difficult to treat Epilepsy (DESIRE)]**

JH Cross; Leader of the workpackage and chief investigator for the clinical trial of ketogenic diet in cortical dysplasia prior to surgery

Funding: €900,000 of total of €11,995,646
(FP7-HEALTH-2013-INNOVATION-1)

- **The disability complex of early onset epilepsies**

Investigators: R Scott, B Neville, C Gillberg, C Reilly, P Atkinson

Funding: £139,718 (George E Neville Foundation)

- **A randomised controlled trial of the ketogenic diet in the treatment of epilepsy in children under the age of two years**

Investigators: JH Cross, F O’Callaghan, A Parker, S Philip, R Williams, E Neal, C Ferrie, T Martland, N Freemantle, I Nazareth, L Marston, C Eltze, S Heales, R Kneen

Funding: £1,242,999.40 (NIHR EME Programme)

- **Using new quantitative MRI tissue parameter maps to detect and delineate focal cortical dysplasia (FCD)**

Investigators: D Carmichael, N Weiskopf, C Clark, T Baldeweg, JH Cross, K Shmueli, T Jacques

Funding: £164,035 (Action Medical Research)



In addition, we have as a unit, been responsible for 52 peer-reviewed publications of primary research, as well as a further 20 publications of chapters, reviews and commentaries of expert opinion.

We hosted our fourth annual research retreat for researchers and collaborators in January 2014, moderated by Professor Olivier Dulac from the Hôpital Necker-Enfants Malades in Paris. Many of our projects were presented and discussed enabling further ideas to be explored.

Our research team continues to work towards finding ways to improve recognition of epilepsy as a healthcare priority in every part of the world. We also aim to continue our focus of research into education to look at interventions following on from research into underlying mechanisms.

Professor Helen Cross

The Prince of Wales’s Chair of Childhood Epilepsy

Research Strategy

Young Epilepsy, UCL-Institute of Child Health and Great Ormond Street Hospital

The overriding goal of epilepsy research within the unit is to enable a better long-term outcome and to reduce the overall burden for children with epilepsy. The unit – which encompasses UCL-Institute of Child Health, Great Ormond Street Hospital for Children, Young Epilepsy and North London Epilepsy Network – is in a unique position of incorporating review of children with a range of severity from newly diagnosed to complex epilepsy. Further collaboration across UCL allows continuation of work into adulthood, allowing study across the whole age range. The educational and behavioural expertise within Young Epilepsy allows interventional study beyond medical treatment.

Goal 1: To gain a better understanding of underlying mechanisms and aetiologies responsible for seizures. This will be achieved by:

- Cohort epidemiological studies to determine incidence, prevalence and outcome.
- Collaborative and in-house studies to determine the molecular basis to the epilepsies, using population and family studies with the aim of further insights into new treatments.
- Enhanced structural studies using neuroimaging to increase detection of structural correlates of the epilepsies.
- Correlative studies in neurophysiology to enhance detection of origin.
- Pathological examination of tissue from surgical specimens to enhance our understanding of structural correlates and related epileptogenesis.

Goal 2: To widen our understanding of the underlying mechanisms of neurodevelopmental and behavioural compromise in childhood epilepsy by including:

- The development of experimental animal studies to examine the effects of epileptiform discharges on development.
- Cohort studies to evaluate prevalence, natural history and outcome of comorbidities in childhood epilepsy.
- Correlative neurophysiology/neuropsychology studies.
- Collaborative outcome studies across the age range.

Goal 3: To determine the benefits of early interventions in improving long-term outcome in childhood epilepsy.

- Short and long-term evaluation of outcome following early epilepsy surgery.
- Evaluation of new medical treatments.
- Evaluation of educational intervention.

Goal 4: To gain a better understanding of barriers to learning in children with epilepsy across all educational settings and to determine the benefits of newer educational interventions in improving academic achievement in epilepsy across all settings. This will be achieved by:

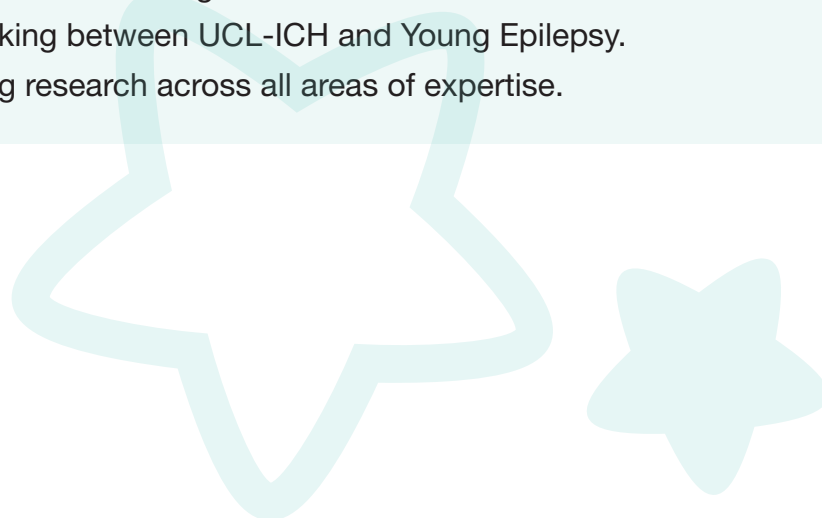
- Evaluation of measures of progress in children with severe impairments.
- Evaluation of targeted educational interventions across all settings.
- Enhance the understanding of possible impairments and interventions of those working with children with epilepsy within educational environments.

Goal 5: To reduce the overall burden of epilepsy in childhood to the individual, family and agencies involved through:

- Interventional behaviour programmes.
- Rehabilitation.

Goal 6: To develop a milieu of senior researchers working both together and independently towards overriding goals of unit, so enhancing training for academia, promoting a collegiate environment for junior staff and moving forward academic careers.

- Development of training fellowships.
- Projects involve working towards higher degrees with encouragement for independent working thereafter.
- Joint working between UCL-ICH and Young Epilepsy.
- Enhancing research across all areas of expertise.



Research Partners

Young Epilepsy

Young Epilepsy is the national charity working exclusively on behalf of children and young people with epilepsy. With over 100 years expertise it provides world-class diagnosis, assessment and rehabilitation for children and young people with epilepsy. The charity also operates internationally renowned research programme. Young Epilepsy has a specialist school and college, providing day, residential and short break services, up to the age of 25, offering education and healthcare for children and young people with epilepsy, autism and other neurological conditions.

Young Epilepsy aims to achieve better futures for young lives with epilepsy and to raise awareness and understanding of epilepsy and issues associated with the condition. The charity provides support and information for parents, children and young people, and training for professionals. It campaigns for better access to, and quality of, health and education services. It offers tailor-made training across the country for parents, teenagers and health, social care and education professionals and also work in schools.

UCL Institute of Child Health

UCL Institute of Child Health (ICH) is one of the world's pioneering paediatric research centres and represents the largest concentration of people dedicated to advancing paediatrics outside of the United States.

ICH pursues an integrated, multidisciplinary approach to enhance understanding, diagnosis, therapy and prevention of childhood disease. A broad range of paediatric issues is covered, from molecular genetics to population health sciences. All specialties as they relate to children's health are included so that ICH fulfils the role of a world-leading academic establishment in paediatrics.

In keeping with a commitment to disease prevention, ICH is active in teaching and research aimed at developing interventions to promote health both during childhood and in the later years of life.

Great Ormond Street Hospital for Children

Great Ormond Street Hospital (GOSH) is an international centre of excellence in child healthcare. The hospital is dedicated to children's healthcare and to finding new and better ways to treat childhood illnesses. There are more than 50 different clinical specialties at GOSH.

GOSH is also at the forefront of paediatric training in the UK and trains more children's nurses than any other hospital. It also plays a leading role in training paediatric doctors.

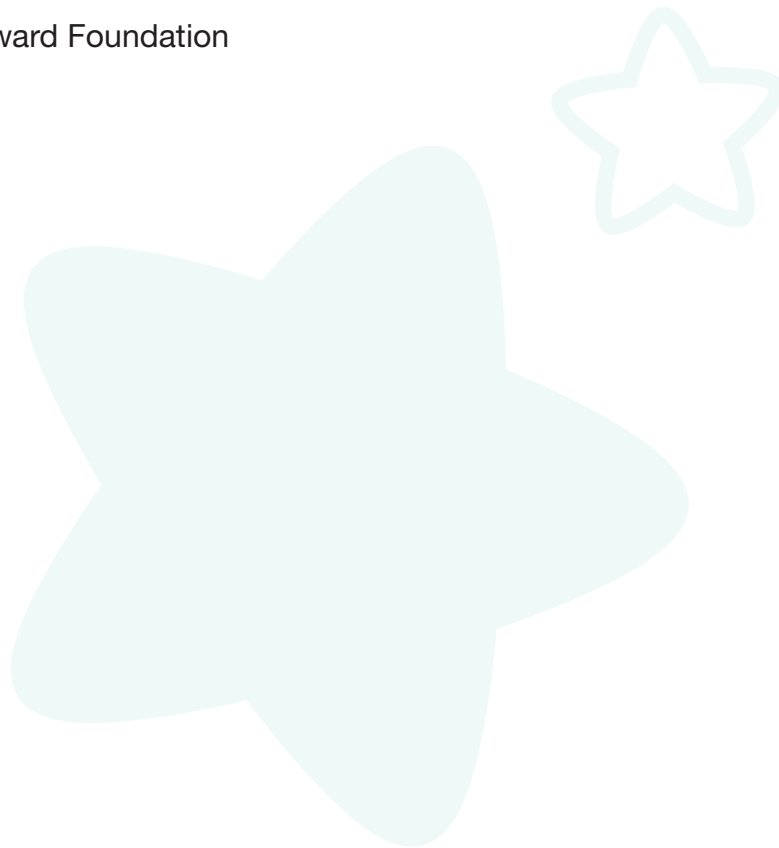
The hospital is committed to carrying out pioneering research to find treatments and cures for some of the most complex illnesses, for the benefit of children here in the UK and worldwide.

Funding

Central to the research programme is the ability to apply for and manage research grants and funding. The various research activities are funded through a combination of research grants associated with specific projects and donations from individuals and other charitable organisations.

Funders of our 2013 research programme have included the following:

- The Wolfson Foundation
- Action Medical Research
- Great Ormond Street Hospital Children's Charity
- University College London
- Kings College London
- Charles Wolfson Foundation
- McGrath Foundation
- Esmée Fairbairn Foundation
- Vitaflo Limited
- Maurice Wohl Foundation
- Reta Lila Howard Foundation



Spotlight on Principal Investigators

Professor Helen Cross



The key research interests of Professor Cross lie in improving outcomes in the epilepsies, specifically the role of early intervention. Undertaking predominantly clinical studies, she addresses outcomes from epilepsy surgery and continues to evaluate the role of the ketogenic diet (KD) having published the first randomised controlled trial (RCT) demonstrating definitive effectiveness in 2008. Further studies of the latter, with biochemical collaboration, are addressing the mode of action, and will lead to further clinical trials in the near future. Two large RCTs of the role of the KD have recently been funded, where she is the chief investigator. She also leads on the sleep and cognition study, and has initiated the epilepsy in infancy study with the aim of determining the range of causes, and their relationship to neurodevelopmental and seizure outcome. She collaborates widely across UCL and beyond.

Professor Cross continues with her national and international advocacy work. She is Clinical Advisor to the national Children's Epilepsy Surgery Service, and was recently Chair of the Evidence Update for the NICE Guidelines on Epilepsy. She is involved in international studies of hypothalamic hamartoma and Rasmussen syndrome. She started her four year term as Secretary General of the International League Against Epilepsy in June 2013, and was recently awarded an Honorary Doctorate by the University of Tartu, Estonia, for her ongoing teaching.

Professor Rod Scott



The overall goal of Professor Scott's research is to understand the mechanisms of adverse cognitive and behavioural outcomes in children with epilepsy and to develop strategies that improve those outcomes. The strategy is to use a variety of tools in disease models, epilepsy specific human cohorts and community based cohorts. This strategy aims to identify priority disease areas to drive innovative research, as well as translate research findings into clinical practice.

The work is divided into 2 main themes:

Convulsive Status Epilepticus (CSE) – This includes the evaluation of long term cognitive and behaviour outcomes, as well as the frequencies of subsequent epilepsy and long term mortality. In collaboration with Dr Mark Lythgoe, Professor Scott has also been investigating whether early treatment of inflammation following status epilepticus improves outcomes in an animal model.

Cognitive and behavioural impairments associated with epilepsy – In the laboratory based at the University of Vermont, the group use slice electrophysiology, in-vivo electrophysiology and behavioural methods in animal models of brain malformations and seizures to study the relationships between the cause of seizures, the seizures themselves and learning. This has demonstrated that cause is a major driver of impairment and there is a significant role of environment and training strategies in improving learning.

Professor Brian Neville



Professor Neville leads research on a number of topics which relate to the disabilities that occur with epilepsy. These include the CHESSE study of children with epilepsy in Sussex schools. This has shown that there is a high rate of co-existent, undiagnosed behaviour and learning problems in these children. He hopes the findings from this study will help change our whole approach to supporting children with epilepsy.

He has continued his work on febrile seizures and is a collaborator on two large African studies which specifically look at the causes and consequences of epilepsy.

Professor Neville is also pursuing his work on epileptic encephalopathy and is about to publish the first paper offering an explanation of the events surrounding epileptic encephalopathy of infantile spasms.

In addition, he has been involved in the consortium that has identified the gene causing Alternating Hemiplegia of Childhood (ATP1A3).

Dr Manju Kurian



Dr Manju Kurian's research focuses on establishing aetiologies and disease mechanisms in the early onset infantile epilepsies, with the ultimate aim of identifying novel therapeutic targets to develop more effective epilepsy treatments. Her group has identified monogenic causes of early infantile epileptic encephalopathy (EIEE), including genes implicated in West syndrome, migrating partial seizures of infancy and non-specific EIEE. Her group uses a number of techniques for gene identification, including autozygosity mapping studies, linkage and whole exome sequencing of well endophenotyped patients. Functional analysis of identified genes is undertaken using cell and animal models to study the effect of gene mutations on protein function.

Within her group, she is primary supervisor to Dr Amy McTague, a post-CCT fellow undertaking a PhD in the genetics of EIEE, and they have secured funds from the UKCNRC as well as a Medical Research Training Fellowship for Dr McTague to complete her research period. Dr McTague has recently won a number of prizes, including best oral presentation at the 2012 International Child Neurology Association (ICNA) meeting and best poster at the 2013 European Paediatric Neurology Society Meeting for her work in EIEE genetics. Dr Kurian collaborates internationally with Professor Ingrid Scheffer and Dr Ann Poduri, as well as locally with Professors Rod Scott, Dimitri Kullmann and Rob Harvey.

Research Update

Below is a brief update on the research projects currently being undertaken across the unit:

The impact of reducing antiepileptic drug load on quality of life in children with refractory epilepsy

Project Aim: To prospectively determine the effect of reducing antiepileptic drug (AED) load on the quality of life and seizure control in children with refractory epilepsy who are on AED polytherapy.

Investigators: Rod Scott, Krishna Das, Suresh Pujar, Sarah Aylett, Archana Desurkar, Kirsten McHale, Brian Neville

Update: This study has now closed. The data is being analysed and will be written up for publication.

Educational problems of children with epilepsy: their identification and management

Project Aim: To determine the prevalence of learning and behaviour difficulties in school-age children with epilepsy.

Investigators: Brian Neville, Colin Reilly, Patricia Atkinson, Rod Scott, Victoria Burch, Paul McCrone, Richard Chin, Sarah Aylett, Krishna Das, Dame Philippa Russell, Christopher Gillberg

Update: This project is now complete. The findings provide clear evidence that children with epilepsy have a high rate of difficulties in cognition and behaviour. This was presented at the American Epilepsy Society (AES) annual meeting in December 2013 and the British Paediatric Neurology Association (BPNA) conference in January 2014. A number of papers are being prepared for publication in academic journals. There will also be a full report made available to all the children, families and schools which participated in the project.

Epilepsy genomics in childhood: finding the causes, directing treatment

Project Aim: To determine the frequency of genetic deletions as a cause of epilepsy.

Investigators: Antonietta Coppola, Helen Cross, Sanjay M. Sisodiya

Update: Collection of the genetic and clinical data from 299 children with epilepsy is complete. The data is currently being analysed to look for novel genetic changes, combinations of genetic changes and the overall burden of genetic variability to see if these factors predispose to epilepsy in childhood. There has been a case report published of a novel finding, and an overall manuscript is in preparation.

The genetics of early onset epileptic encephalopathy

Project Aim: The project aims to identify novel early onset epileptic encephalopathy genes which will contribute to the understanding of the disease mechanisms involved in such epilepsies.

Investigators: Amy McTague, Manju Kurian, Helen Cross

Update: The team has already successfully identified one new gene causing a severe seizure disorder of infancy (migrating partial seizures of infancy) and is carrying out whole exome sequencing of a cohort of children with infantile spasms.

Prevalence and clinical outcome of Rasmussen Encephalitis in children

Project Aim: To collate information on the prevalence, symptomology, management and outcome of children with Rasmussen syndrome in the UK. This monitoring study of the rare but significant syndrome will provide us with information as to initial history, and response to treatment, including timing of surgery. We hope this will lead to plans for further trials.

Investigators: Kate Lamb, Will Scott, Robert Robinson, Sophia Varadkar, Helen Cross

Update: Information has been collated from clinicians across the UK who had previously managed, or were managing, a child with Rasmussen Encephalitis between March 2010 to March 2012. 21 cases were identified (12 male, 9 female) including four new diagnoses during the study period. The data is being reviewed and initial findings were presented at the BPNA 2013 and the International Epilepsy Congress 2013. Further analysis is being undertaken and the results will be published in the coming year.

Epilepsy in infancy: relating phenotype to genotype

Project Aim: To improve diagnosis and treatment outcome for young people with epilepsy by studying newly presenting patients, under 12 months of age, and their response to treatment. A clinical database will be established to be used as a resource for health practitioners when determining the best course of treatment for a particular diagnosis.

Investigators: Helen Cross, Manju Kurian, Rod Scott, Christin Eltze, Finbar O'Callaghan, Elaine Hughes, Jane Kung

Update: The clinical research fellow is now in post. Ethical approval has been received for the project and recruitment of participants will begin in autumn 2014.



Research Update (continued)

A randomised controlled trial of the ketogenic diet in the treatment of epilepsy in children under the age of two years

Project Aim: To determine the effectiveness on seizure control of the ketogenic diet compared to alternative further antiepileptic drug treatment in children with epilepsy aged 3 months to 2 years who have failed to respond to two or more pharmacological treatments.

Investigators: Christin Eltze, Colin Ferrie, Nicholas Freemantle, Simon Heales, Rachel Kneen, Louise Marston, Tim Martland, Irwin Nazareth, Elizabeth Neal, Finbar O'Callaghan, Alasdair Parker, Sunny Philip, Ruth Williams, Helen Cross

Update: Funding has been secured from the NIHR Efficacy and Mechanism Evaluation Programme. Application for ethical and MHRA approval is underway and recruitment of trial participants should begin in September 2014.

Improving epilepsy surgery in childhood using fMRI and EEG

Project Aim: To have a better understanding of the feasibility and the utility of EEG-fMRI in the presurgical evaluation of children with drug resistant focal epilepsy.

Investigators: David Carmichael, Maria Centeno, Daniel Konn, Chris Clark, Jonathan Clayden, Ronit Pressler, Helen Cross

Update: Led by the clinical research fellow, Dr Maria Centeno, 32 patients undergoing presurgical evaluation at Great Ormond Street Hospital and 14 control subjects have been scanned. Preliminary results shows EEG-fMRI maps are concordant with the presumed epileptic focus in around two thirds of cases. Tolerance of the children to EEG-fMRI is very good so far. Results will be validated with early and medium term surgical outcome.

Elucidation of the biochemical mechanisms responsible for the efficacy of the ketogenic diet

Project Aim: To determine changes seen in medium chain fatty acids in children treated with the ketogenic diet, and determine their possible role in the underlying mechanism of effect.

Investigators: Sean Hughes, Helen Cross, Simon Heales

Update: This project is in collaboration with the Department of Biochemistry, UCL-ICH. Decanoic acid has been identified as a possible candidate for proliferating mitochondria in a neural cell-line, indicating a possible mechanism of action for the ketogenic diet. The PhD thesis is being prepared, and there has been one peer reviewed publication to date. Blood from participants recruited from Great Ormond Street Hospital Ketogenic Diet Clinic is now being assessed for medium chain fatty acids. The possibility of translation of results to a clinical trial is being discussed.

The encephalopathy of infantile spasms

Project Aim: To describe the encephalopathy of infantile spasms using ERPs and MRIs with controls.

Investigators: Brian Neville, Rod Scott, Stewart Boyd, Klaus Werner, Tangunu Fosi

Update: Three papers have been written up for publication and the thesis has been submitted.

A genetic basis for response to the ketogenic diet

Project Aim: To determine whether there is a genetic basis to treatment outcome with the ketogenic diet in drug-resistant epilepsy.

Investigators: Natasha Schoeler, Helen Cross, Sanjay M. Sisodiya

Update: Common and rare variant association analyses have been completed. Candidate gene analyses (including 300 individuals) did not give significant results. Genotyping array data for 250 individuals and whole exome sequencing data for 44 individuals were also used for analysis. Some potential candidate genes have emerged and pathway analyses all point towards relevant areas, such as insulin signalling, lipid metabolism and cell cycling. A larger sample size and replication studies are needed in order to confirm our findings. We are now looking to see whether diet response rates are different in individuals with specific genetic causes of epilepsy. Gene expression analyses are pending. The PhD thesis is submitted and publications in preparation.

Sleep and memory in children with focal epilepsy

Project Aim: To evaluate the role of sleep in learning (specifically memory consolidation) in children with different types of focal epilepsy, and determine whether this is disrupted compared to healthy children. This should lead to a better understanding of the causes of cognitive impairment in epilepsy.

Investigator: Samantha Chan, Torsten Baldeweg, Stewart Boyd, Rod Scott, Krishna Das, Ronit Pressler, Helen Cross

Update: Recruitment began in July 2013. Participants are being recruited from Great Ormond Street Hospital. Recruitment of the control group is also underway.



Research Update (continued)

Neurological, cognitive and neuroimaging outcomes within 10 years after childhood status epilepticus: a population-based study

Project Aim: To determine prevalence of epilepsy, motor and cognitive problems within 10 years after an episode of status epilepticus in childhood and investigate the predictors of poor outcomes.

Investigators: Suresh Pujar, Marina Martinos, Kling Chong, Michelle De Haan, Brian Neville, Chris Clark, Richard Chin, Rod Scott

Update: The data collection for the study is now complete and data analysis is being undertaken. Draft papers are in progress for publication in peer-reviewed journals. Preliminary results suggest that the cause of status epilepticus is the main predictor of neurological and cognitive outcomes within 10 years. Children with no prior neurological impairments have a good outcome, and those with prior neurological impairments and/or epilepsy have poor neurological outcome.

EEG investigation of brain networks in Childhood Absence Epilepsy (CAE) and Juvenile Myoclonic Epilepsy (JME) using EEG-fMRI

Project Aim: The project aims to look at brain networks involved in the clinical expression of epilepsy as an approach to fully understand the common and distinct pathways existing across epilepsy syndromes.

Investigators: Suejen Perani, Maria Centeno, Helen Cross, Mark Richardson, David Carmichael

Update: This is a collaborative study with Professor Mark Richardson at Kings College. Data from CAE and JME drug naïve patients have been acquired and recruitment is ongoing. Analyses are underway and preliminary results are available.

Cerebral blood flow changes preceding epileptic events in children

Project Aim: To use the technique of simultaneous laser doppler blood flow and intracranial EEG measurements during seizures to have a better understanding of cerebral blood flow and the haemodynamic response in relation to seizures.

Investigators: Elhum Shamshiri, David Carmichael, Helen Cross

Update: Application for ethical approval is underway.

The disability complex of early onset epilepsies (Under 5s project)

Project Aim: To investigate the major cognitive and behavioural problems faced by young children under 60 months of age with epilepsy and their families.

Investigators: Brian Neville, Colin Reilly, Patricia Atkinson, Christopher Gillberg, Rod Scott

Update: The project has secured funding from the George E Neville Foundation and the team is in the process of applying for ethical approval.

Pilot study of cardiac rhythm in Dravet Syndrome: cause of SUDEP?

Project Aim: To determine whether heart rhythm abnormalities are aggravated at times of illness in children with Dravet Syndrome and establish whether this in turn has implications for management and monitoring at times of illness. We hope that this might lead to studies of acute preventative therapies at such times.

Investigators: Helen Cross, Juan Pablo Kaski, Sarah Aylett, Elaine Hughes, Sanjay Sisodiya

Update: Funding has been secured from Dravet Syndrome UK and Epilepsy Action. Application for ethical approval is underway.

Using new quantitative MRI tissue parameter maps to detect and delineate focal cortical dysplasia

Project Aim: To develop better imaging methodology by investigating whether using quantitative MRI parameter mapping together with quantitative analysis can provide improved detection, delineation and classification of FCD lesions. This application is the first application of these scanning and analysis methods to epilepsy and can lead to a change in local, national and international practice in imaging childhood epilepsy.

Investigators: Helen Cross, Nikolaus Weiskopf, Karin Shmueli, Thomas Jacques, Chris Clark, Kling Chong, Torsten Baldeweg, David Carmichael

Update: Funding has been secured from Action Medical Research and application for ethical approval is underway.



The Research Team

The research team contribute to a wide spectrum of activities from basic science working across UCL-Institute of Child Health, Great Ormond Street Hospital for

Principal investigators

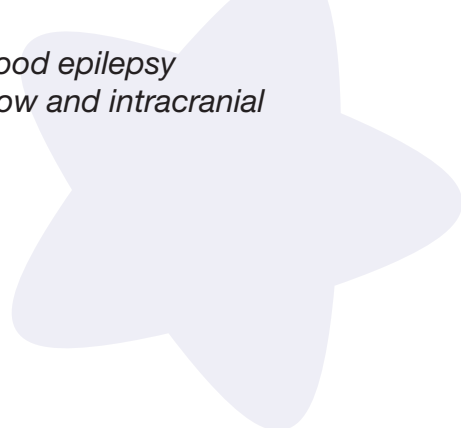
Professor Helen Cross *The Prince of Wales's Chair of Childhood Epilepsy*
Dr David Carmichael *Lecturer in Neuroimaging and Biophysics*
Professor Christopher Gillberg *Visiting Professor in Child and Adolescent Psychiatry*
Dr Manju Kurian *Consultant Paediatric Neurologist and Clinician Scientist*
Professor Brian Neville *Emeritus Professor of Childhood Epilepsy*
Dr Finbar O'Callaghan *Reader in Paediatric Neuroscience*
Dr Ronit Pressler *Consultant and Senior Lecturer in Clinical Neurophysiology*
Professor Rod Scott *Professor in Paediatric Neurology*

PhD students

Samantha Chan – *Sleep and memory in children with focal epilepsy*
Ben Duffy – *Experimental imaging studies post-status epilepticus*
Tanganu Fosi – *The neurological basis for cognitive and autistic regression in infants with West syndrome (infantile spasms)*
Sean Hughes (jointly with Biochemistry, ICH) – *Elucidation of the biochemical mechanisms responsible for the efficacy of the ketogenic diet*
Jane Kung – *Epilepsy in infancy: relating phenotype to genotype*
Amy Mctague – *The genetics of early onset epileptic encephalopathy*
Natasha Payne (jointly with ION) – *A genetic basis for response to the ketogenic diet in epilepsy*
Suejen Perani (jointly with Kings College) – *Investigation of brain networks in Childhood Absence Epilepsy and Juvenile Myoclonic Epilepsy using EEG-fMRI*
Suresh Pujar – *The outcomes 5 to 10 years after childhood convulsive status epilepticus: a population based study*
Fatma Scerif – *Identification of gene networks in childhood epilepsy*
Elhum Shamsiri – *Simultaneous laser doppler blood flow and intracranial EEG measurements during seizures*

Research staff

Cleo Chevalier *Assistant Researcher*
Antonietta Coppola *Research Fellow*
Marina Martinos *Postdoctoral Neuropsychologist*
Kirsten McHale *Research Nurse*
Leanne Menlove *Assistant Research Psychologist*
Angela Mensah *Research Coordinator*
Esther Meyer *Research Fellow*
Liz Neal *Honorary Research Dietician*
Colin Reilly *Research Psychologist*
Anna Tyler *Postdoctoral Research Fellow*



through to patient care and consists of a multidisciplinary range of experts Children and Young Epilepsy.

Clinicians in neuroscience active in epilepsy research

Dr Patricia Atkinson *Consultant Community Paediatrician*

Dr Sarah Aylett *Consultant Paediatric Neurologist*

Dr Stewart Boyd *Consultant Neurophysiologist*

Dr Maria Clark *Consultant Paediatric Neurologist*

Dr Krishna Das *Consultant Paediatric Neurologist*

Dr Christin Eltze *Consultant Paediatric Neurologist*

Mr William Harkness *Consultant Paediatric Neurosurgeon*

Dr Cheryl Hemingway *Consultant Paediatric Neurologist*

Dr Isobel Heyman *Consultant Child and Adolescent Psychiatrist*

Dr Robert Robinson *Consultant Paediatric Neurologist*

Mr Martin Tisdall *Consultant Paediatric Neurosurgeon*

Dr Sophia Varadkar *Consultant Paediatric Neurologist*

Active collaborators

Dr Torsten Baldeweg *Reader in Developmental Cognitive Neuroscience, UCL-Institute of Child Health*

Dr Richard Chin *Clinical Senior Lecturer, University of Edinburgh*

Dr Colin Ferrie *Consultant Paediatric Neurologist, Leeds Teaching Hospital*

Dr Michelle de Haan *Reader in Developmental Cognitive Neuroscience, UCL-Institute of Child Health*

Professor Simon Heales *Professor of Clinical Chemistry, UCL-Institute of Child Health, Great Ormond Street Hospital*

Professor Gregory Holmes *Professor of Neurology and Paediatrics, University of Vermont, USA*

Dr Elaine Hughes *Consultant Paediatric Neurologist, Evelina Children's Hospital*

Dr Thomas Jacques *Clinical Senior Lecturer, UCL-Institute of Child Health*

Professor Matthias Koepp *Professor of Neurology, UCL-Institute of Neurology*

Dr Rachel Kneen *Consultant Paediatric Neurologist, Royal Liverpool University Hospital*

Dr Pierre-Pascal Lenck-Santini *Assistant Professor of Neurology, University of Vermont, USA*

Dr Tim Martland *Consultant Paediatric Neurologist, Royal Manchester Children's Hospital*

Dr Alasdair Parker *Consultant Paediatric Neurologist, Cambridge University Hospital*

Dr Sunny Philip *Consultant Paediatric Neurologist, Birmingham Children's Hospital*

Professor Sanjay Sisodiya *Professor of Neurology, UCL-Institute of Neurology*

Professor Faraneh Vargha-Khadem *Professor of Developmental Cognitive Neuroscience, UCL-Institute of Child Health*

Professor Matthew Walker *Professor of Neurology, UCL-Institute of Neurology*

Professor Robin Williams *Professor of Molecular Cell Biology, Royal Holloway Hospital*

Dr Ruth Williams *Consultant Paediatric Neurologist, Evelina Children's Hospital*

Epilepsy Research Retreat

The Epilepsy Research Retreat serves as an annual gathering of researchers and centres around the world and gives researchers the opportunity to discuss ongoing

The 2014 Research Retreat took place on 23-24 January at the Felbridge Hotel in East Grinstead. The moderator was Professor Olivier Dulac, Professor of Paediatric Neurology at the Hôpital Necker-Enfants Malades in Paris.

The meeting brought together 85 researchers from Young Epilepsy, UCL-Institute of Child Health, UCL-Institute of Neurology and Great Ormond Street Hospital as well as collaborators from Evelina Children's Hospital, Matthew's Friends, Royal Holloway, Crawley Hospital, King's College Hospital and elsewhere in the UK.

Research fellows presented updates on projects currently taking place across the unit. There were 21 presentations in total and these were grouped under the following themes:

- aetiology
- cognition and behaviour
- connectivity
- interventions
- outcomes

Discussions at the end of each presentation gave investigators the opportunity to receive comments and feedback from fellow researchers and principal investigators.

The retreat also proved to be a highly social occasion. This aside, it successfully highlighted the breadth of epilepsy research being undertaken across the unit and also served as a way of motivating young researchers who may not have previously had the opportunity to meet other members of the unit.

'It was great to get an overview on all the ongoing research projects.'

Research Fellow

'You must be very proud of the whole team – truly impressive! It was really great to hear of all the varied work being done.'

Consultant Paediatric Neurologist

collaborators across the unit. This follows similar models used by other research ongoing projects, completed projects and possible future directions of research.



'Many thanks for inviting me to the Research Retreat. I found the content very stimulating and inspiring.'

Consultant Paediatrician

'Congratulations on a splendid and very well organised meeting.'

Professor of Neurology

'I really enjoyed the retreat – a real breadth of research.'

Clinical Research Fellow

Publications

Edited Books

1. M Duchowny, **J Helen Cross**, A Arzimanoglou ed. *Pediatric Epilepsy* Mcgraw Hill. China 2013.

Chapters in Books

1. **Cross JH**, Guerrini R 'Epileptic Encephalopathies' In *Handbook of Clinical Neurology: Paediatric Neurology* ed O Dulac, H Sarnat, M Lassonde *Handb Clin Neurol* 111:619-626 2013.
2. **Cross JH** 'Focal seizures in infancy' in *Pediatric Epilepsy*, ed M Duchowny, **JH Cross**, A Arzimanoglou. Mcgraw Hill. 2013; p67-74.
3. **Cross JH** 'Focal seizures in early childhood' in *Pediatric Epilepsy*, ed M Duchowny, **JH Cross**, A Arzimanoglou. Mcgraw Hill. 2013. P136-141.
4. **Cross JH** 'Focal seizures in late childhood and adolescence' in *Pediatric Epilepsy*, M Duchowny, **JH Cross**, A Arzimanoglou Mcgraw Hill. 2013 p142-147.
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