




Paediatric Epilepsy Research Overview 2010

Incorporating the Annual Report of
The Prince of Wales's Chair of
Childhood Epilepsy

www.ncype.org.uk

Great Ormond Street 
Hospital for Children
NHS Trust



About the NCYPE

The National Centre for Young People with Epilepsy (NCYPE) is a national charity for children and young people with epilepsy. As a centre of expertise for all young people with epilepsy, we have over 100 years' experience to share. Students with complex epilepsy and other conditions make great progress at St Piers, our residential special school, and our Further Education College.

We provide information, training and support to parents, professionals and young people themselves through our Childhood Epilepsy Information Service - from study days and masterclasses to an Epilepsy Education 4 Schools programme and family workshops.

Our award-winning, world class Neville Childhood Epilepsy Centre brings together medical, therapy and research expertise to help diagnose and treat young people with epilepsy across the UK and beyond. We also offer a rehabilitation service for young people with Acquired Brain Injury whether following accident, illness or neurosurgery.

We also campaign for better health and education services for all young people with epilepsy across the UK through our Champions for Childhood Epilepsy Campaign.

Introduction



It is with great pleasure that I introduce our research report for 2010 for the epilepsy unit across UCL-Institute of Child Health, Great Ormond Street Hospital & The National Centre for Young People with Epilepsy. It has been our first year within the Neville Childhood Epilepsy Centre at the NCYPE, now an award winning building, and we have made active efforts to forward research and teaching across the unit. Our research continues to focus on all aspects of childhood epilepsy, but specifically we have developed a research strategy, outlining key areas in which we are involved and are moving forward. We have appointed a research coordinator. New projects initiated over the past year have included a genetic study examining possible new genetic causes of complex epilepsy, a study within schools examining the prevalence of ongoing educational problems and the value of intervention, and a European study looking at new treatments for neonatal seizures.

Across the epilepsy unit there has been completion of one PhD project (The relationships between convulsive status epilepticus and cognition in children) and one MD project (Epilepsy in infancy examining incidence and outcome at 12m).

We have secured new grant monies totalling £220,000 over this period. Further we have as a unit been responsible for 31 peer reviewed publications of primary research, and a further 23 publications including reviews and commentaries of expert opinion.

Members of the research team have also been involved in international initiatives; I Co-Chair the Task Force for Global Outreach of the ILAE, which has a responsibility for collecting and disseminating information on epilepsy management around the world; I also chair the ILAE Task Force for Paediatric Epilepsy Surgery who are currently working on updating guidelines for epilepsy surgery assessment. I have been involved in publication of the update on ILAE classification of the epilepsies, and new classification of cortical dysplasia, both published in 2010. Professor Charles Newton continues his programme of research into the consequences and burden of neurological conditions, particularly epilepsy in rural tropical areas (Africa), and is planning on further work on sickle cell disease and epilepsy in Dar es Salaam. He is the secretary of the ILAE commission on Epidemiology and has been involved in the World Health Organization's mhGap initiative.

The year has culminated in the organisation of the very first 'research retreat' held in January 2011. This has given us a chance to bring all researchers in epilepsy across the unit together alongside collaborators within active research projects, an opportunity to discuss projects complete, ongoing projects and future plans. We were delighted in welcoming Professor Matthew Walker as moderator for this first of what we hope will be an annual event.

Professor Helen Cross

**The Prince of Wales's Chair
of Childhood Epilepsy**



Research Strategy for Childhood Epilepsy

UCL-Institute of Child Health, Great Ormond Street Hospital and The National Centre of Young People with Epilepsy (NCYPE)

The overriding goal of epilepsy research within this joint unit is to enable a better long outcome and to reduce the overall burden for children with epilepsy. The unit - encompassing the UCL-Institute of Child Health, Great Ormond Street Hospital for Children, the NCYPE, and the North London Epilepsy Network - is in a unique position of incorporating review of children with a range of severity from newly diagnosed to complex. Further collaboration across UCL allows continuation of work into adulthood, allowing study across the whole age range. The educational and behavioural expertise within the NCYPE 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 reduce the overall burden of epilepsy in childhood to the individual, family and agencies involved through

- Interventional behaviour programmes
- Rehabilitation

Goal 5: To develop a milieu of senior researchers working both together and independently towards overriding goals of the 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 the NCYPE
- Enhancing research across all areas of expertise

Research Governance

The Research Strategy Board works alongside the Research Development Board on Research Governance. The Research Strategy Board, chaired by Professor Helen Cross, provides a forum to ensure that all research is carried out with appropriate ethical and regulatory approval. The board also provides updates of progress on research and develops the overall strategy for monitoring of research at the NCYPE.

The Research Development Board, chaired by Dr. Rod Scott, meets on a monthly basis with meetings alternating between the NCYPE and ICH. The core members of the board are the principal investigators of research projects and the meetings serve as a way to build ideas, hypotheses and methods for grant applications. All grant applications are peer reviewed by this group. The group also advises on journals for the submission of publications and on the appropriate funders for grant applications.



The clinical research team

The clinical research team at UCL-Institute of Child Health, Great Ormond Street Hospital for Children and The National Centre for Young People with Epilepsy (for full biographies see www.ncype.org.uk/health/)

Principal investigators

Professor Helen Cross – The Prince of Wales’s Chair of Childhood Epilepsy

Dr Rod Scott – Reader in Paediatric Neuroscience

Dr Richard Chin – Clinician Scientist in Neuroepidemiology

Professor Charles Newton – Professor of Tropical Neurosciences and Paediatrics, Visiting Professor University of Oxford, leading the Tropical Neuroscience Programme

Professor Brian Neville – Emeritus Professor of Childhood Epilepsy

Dr Ronit Pressler – Consultant and Honorary Senior Lecturer in Clinical Neurophysiology

Professor Christopher Gillberg – Visiting Professor in Child and Adolescent Psychiatry

PhD students

Suresh Pujar – The outcomes 5-10 years after childhood convulsive status epilepticus: a population based study

Michael Yoong – The consequences and outcomes of convulsive status epilepticus in childhood

Tang Fosi – The neurological basis for cognitive and autistic regression in infants with West syndrome (infantile spasms)

Ben Duffy – Experimental Imaging Studies Post-Status Epilepticus

Natasha Payne (jointly with ION) – A Genetic Basis for Response to the Ketogenic Diet in Epilepsy

Sean Hughes (jointly with Biochemistry, ICH) – Elucidation of the Biochemical Mechanisms Responsible for the Efficacy of the Ketogenic Diet

Helen O’Reilly (jointly with Cognitive Neuroscience, ICH) – Epilepsy in infancy: Spectrum of aetiologies, natural history and outcome predictors



The research team and their collaborators at the first research retreat held in January 2011

Research staff

Angela Mensah Research Coordinator

Colin Reilly Research Psychologist

Marina Martinos Postdoctoral
Neuropsychologist

Georgiana Fitzsimmons Dietician

Daniel Carranza Visiting Fellow

Anna Tostevin Research Assistant

Havinder Hara NEMO Coordinator

Richard Idro Post Doctoral Research Fellow

Mike Kihara Post Doctoral Research Fellow

Clinicians in neuroscience active in epilepsy research

Dr Sarah Aylett Consultant Paediatric
Neurologist

Dr Krishna Das Consultant Paediatric
Neurologist

Dr Maria Clark Consultant Paediatric
Neurologist

Dr Sophia Varadkar Consultant Paediatric
Neurologist

Dr Christin Eltze Consultant Paediatric
Neurologist

Dr Robert Robinson Consultant Paediatric
Neurologist

Dr Cheryl Hemingway Consultant Paediatric
Neurologist

Siobhan Hannan Clinical Nurse Specialist

Dr Niteshkumar Vora Clinical Epilepsy Fellow

Dr Maria Clark Consultant Paediatric
Neurologist

Mr William Harkness Consultant Paediatric
Neurosurgeon

Dr Stewart Boyd Consultant Neurophysiologist



Current research projects include:

- Epilepsy genomics in childhood: finding the causes, directing treatment
- Epilepsy in infancy: Spectrum of aetiologies, natural history and outcome predictors
- The impact of reducing anti-epileptic drug load on quality of life in children with refractory epilepsy
- Educational problems of children with epilepsy: their identification and management
- Beyond IQ: Cognitive-behavioural profiles of children with complex epilepsy and intellectual disability
- The prevalence, nature and spectrum of epilepsies and their structural substrates five years following convulsive status epilepticus in childhood
- The consequences and outcomes of convulsive status epilepticus in childhood
- The medium term outcomes of childhood convulsive status epilepticus – an epidemiological approach
- Prevalence and clinical outcome of Rasmussen Encephalitis in children
- NEonatal seizure treatment with Medication Off-patent: evaluation of efficacy and safety of bumetanide: NEMO

Recent clinical audits include:

- Lennox Gastaut Syndrome and Therapy Input
- Rasmussens Syndrome and Rehabilitation Post Surgery
- Use of Epilim Chronospheres
- Intravenous Sodium Valproate Status Epilepticus
- Impact on Families at Night
- Educational Model for Children with Epilepsy
- Efficacy of Rufinamide in Children and Young People with Complex Epilepsy
- Short term interventions for acute increases in clusters of seizures in adolescents with Lennox Gastaut Syndrome
- Use of Epistatus – Buccal Midazolam
- Sleep Disturbances in Children/Young People with Epilepsy
- Vitamin D Levels and Bone Profiles in Students at the NCYPE

Results of these audits are available from the NCYPE via research@ncype.org.uk



Publications – 2010

Peer Reviewed Publications

1. Idro R, Gwer S, Williams TN, Otieno T, Uyoga S, Fegan G, Kager PA, Maitland K, Kirkham F, Neville BG, Newton CR (2010). Iron Deficiency and Acute Seizures: Results from children living in rural Kenya and a meta-Analysis. PLoS ONE 5(11): e14001. doi:10.1371/journal.pone.0014001.
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4. Mwaniki M, Mathenge A, Gwer S, Mturi N, Bauni E, Newton CR, Berkley J, Idro R. (2010) Neonatal seizures in a rural Kenyan District Hospital: aetiology, incidence and outcome of hospitalization. BMC Med. Mar 17;8:16.
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13. Thom, M, Mathern GW, Cross JH, Bertram EH. Mesial Temporal Lobe Epilepsy: How do we improve surgical outcome? *Ann Neurol* 2010;68:424-434.
14. Dunkley C, Kung J, Scott RC, Nicolaidis P, Neville B, Aylett SE, Harkness W, Cross JH. Epilepsy surgery in children under 3 years. *Epilepsy Research* Available online 14 December 2010.
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Guidelines/Reviews/Editorials/Letters

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Chapters in Books

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9. Yoong M, Scott RC. 'Febrile Status Epilepticus' In *Atlas of Epilepsies*, Part 8, Pages 533-536.

Better futures for young lives with epilepsy

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