RACP Foundation Research Awards

FINAL REPORT

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<tr>
<th>Project / Program Title</th>
<th>Childhood Encephalitis in Australasia: in search of new infectious aetiologies, standardised guidelines and opportunities for prevention</th>
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<tr>
<td>Name</td>
<td>Dr Philip Neil Britton</td>
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<tr>
<td>Award Received</td>
<td>2014 RACP P&amp;CHD NHMRC Award for Excellence</td>
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<td>Report Date</td>
<td>30 June 2017</td>
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<td>Chief Investigator / Supervisor</td>
<td>Professor Cheryl Jones</td>
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<td>Administering Institution</td>
<td>University of Sydney</td>
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<td>Funding Period</td>
<td>Start Date: 1 January 2014</td>
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<td>Finish Date: 12 September 2016</td>
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**PROJECT SUMMARY**

Encephalitis, or inflammation of the brain, is an important clinical syndrome that occurs most commonly in children and may result in death or life-long cognitive impairment and physical disability. It is also a marker disease for emerging infections. Dr Britton's doctoral studies initiated active, national surveillance for this challenging condition as part of the Australian Childhood Encephalitis (ACE) Study in partnership with the Paediatric Active Enhanced Disease Surveillance (PAEDS) network. He has assembled the first national, prospective cohort study of childhood encephalitis in Australia. Specific noteworthy achievements include:

1. Assembling to our knowledge the largest prospective cohort of all cause childhood encephalitis in the world;

2. Capturing and describing important outbreaks of serious infections causing neurological disease in Australian children - enterovirus 71, (HEV), parechovirus and Mycoplasma pneumoniae, as well as defining the contribution of seasonal influenza epidemics to neurological disease in children;

3. Developing and publishing a detailed practice guideline outlining the best approach to caring for children with encephalitis on behalf of four large professional societies (ASID, ANZAN, ACEM, PHAA);

4. Establishing a large ‘biobank’ of specimens from children around the country with encephalitis of unknown cause.

5. Initiating follow up studies on children included in the ACE study to better understand the effects of the disease on their learning, behaviour and development in the medium and long-term.
PROJECT AIMS / OBJECTIVES

1. To retrospectively determine the burden of encephalitis in Australian children and analyse secular trends from passive surveillance data (ICD coding national deaths and hospitalisations):
   - Achieved - see publication 12 below.

2. To develop, implement and evaluate a pilot encephalitis activate surveillance system based in a tertiary children’s hospital in NSW. To subsequently implement national surveillance in a network of children’s hospitals across Australia.
   - Achieved - see publication 11 below.

3. To prospectively characterise the aetiology and epidemiology of acute childhood encephalitis in Australia using active prospective surveillance; standardised diagnostic testing guidelines; detailed recording of exposure and vaccination history; and identify opportunities for treatment and prevention.
   - Partially achieved. Data collected on >500 children with suspected encephalitis over 3.5 years. Full description of cohort ongoing.
   - Detailed description of specific aetiological sub-groups achieved - see publications 5, 6, 10, 13, 15, 16.

4. To identify common clinical and laboratory characteristics and spatiotemporal trends in children with encephalitis of unknown aetiology compared to each of two other broad diagnostic groups (infectious, immune mediated encephalitis).
   - Partially achieved. Data collected on >500 children with suspected encephalitis over 3.5 years. Full description of cohort ongoing.

5. To establish an archive of biological samples from children with acute encephalitis for the future application of state of the art molecular technologies and later testing for novel infectious causes as these are identified.
   - Achieved. Biobank established at Kid's Research Institute, the Children's Hospital at Westmead, NSW.

SIGNIFICANCE AND OUTCOMES

These doctoral studies represent a major advance in understanding the clinical epidemiology of childhood encephalitis in Australia, and a significant contribution to global research into this “most challenging of conditions”.

Moving forward I plan to:
- evaluate fully the ACE cohort including modelling of disease burden amongst Australian children;
- extend surveillance to better understand encephalitis across all age groups and key geographic sites by developing sustainable methods for long term outbreak detection;
- integrate surveillance of encephalitis with other forms of infectious neurological disease already being undertaken in Australia.

PUBLICATIONS / PRESENTATIONS