Welcome to the 2015 annual PAEDS newsletter. PAEDS is in its ninth year of operation and this is our fourth newsletter. Many exciting activities continue to occur in our network and we are pleased to update you on these. In addition, more information is available via our website www.paeds.edu.au.

In 2015, PAEDS continues to conduct surveillance for six main conditions, which are either vaccine preventable diseases (VPDs), potential adverse events following immunisation (AEFI) or other conditions of importance from a public and child health perspective. These conditions are:

1. acute flaccid paralysis (AFP)
2. acute childhood encephalitis (ACE)
3. influenza (via a collaboration with FluCAN)
4. intussusception
5. pertussis
6. varicella/herpes zoster (from varicella zoster virus, VZV).

Surveillance for febrile seizures, with a particular emphasis on those occurring following vaccination with measles-containing vaccines, ceased in mid 2014 and results are discussed below. An update on key recent findings from the ACE study, influenza surveillance and pertussis surveillance are also discussed below.

PAEDS is pleased to be starting some new reporting initiatives. From May 2015 onwards we are providing monthly reports on case numbers for each condition across the network and by site to the Australian government and state health departments where PAEDS sites are located. We are also preparing the first annual PAEDS report for submission for publication in the journal Communicable Diseases Intelligence (CDI). PAEDS already provides the majority of cases of AFP to the Polio Expert Panel, a subcommittee of the Communicable Diseases Network Australia (CDNA). Data on AFP cases are also reported annually in CDI, as are cases of influenza detected by the Influenza Complications Alert Network (FluCAN) in which two of the five PAEDS hospitals participate.

PAEDS is currently undertaking new analyses on a number of these conditions. Analysis of over 500 intussusception cases is being conducted to examine clinical characteristics, management and outcomes and to assess differences between vaccine proximate and non-proximate cases. This is being led by Associate Professor Jim Buttery at MCR. A review of all 296 hospitalised varicella and zoster cases captured since August 2007 is also underway and will assess clinical outcomes, vaccine effectiveness and look at genotype of the virus in relation to disease severity. This study is led by Associate Professor Helen Marshall from the University of Adelaide.

New conditions

In May 2015, PAEDS commenced a pilot study of capturing and assessing vaccine exposure in children admitted with severe neurological events (SNE), such as encephalitis, Guillain- Barre syndrome, transverse myelitis and hospitalised febrile seizures. Vaccine history data is verified on a monthly basis for children aged <5 years with SNE, and cases are examined to assess any potential temporal relationship to vaccine administration, particularly for influenza vaccine. As case numbers accumulate, we hope to be able to use analytical methods, such as the self-controlled case series method, to confirm our hypothesis that severe neurological adverse events are not associated with receipt of influenza, and potentially other, vaccines. This surveillance can also provide reassurance to the public regarding vaccine safety, in conjunction with other systems for active prospective surveillance, such as done for influenza vaccines under the AusVaxSafety network (www.ncirs.edu.au/surveillance/ausvaxsafety).

We are also preparing to implement active prospective surveillance for invasive meningococcal disease in children. Although some data on meningococcal cases is captured under the jurisdictional and national notifiable disease reporting systems, PAEDS is working with state health departments to ensure we can obtain rich clinical, demographic and vaccine data to better understand the burden of this serious disease.
Collaborations

Certain PAEDS sites are also involved with the NHMRC funded project ‘TESTOV Pneumo’ [NHMRC Project Grant 1064841] led by Professor Adam Jaffe from UNSW. The primary aim of this study is to evaluate the effectiveness of pneumococcal conjugate vaccine in preventing hospital presentations for pneumonia and empyema confirmed as being caused by Streptococcus pneumoniae, as well as all-cause pneumonia. The project is being carried out at 13 sites nationwide.

Staff at the PAEDS coordinating centre are also assisting on another new study involving prospective collection of detailed clinical and epidemiologic data on paediatric cases of tuberculosis in Australia and New Zealand. This study, led by Associate Professor Ben Marais and Dr Philip Britton, will utilise the PAEDS WebSpirit database and involves numerous hospital-based paediatric infectious disease specialists and trainees across the two countries. The study is receiving pilot funding from the NHMRC CRE in tuberculosis control (www.tbcre.org.au).

Update on PAEDS studies

More detailed updates on three of our more recently added PAEDS conditions follow.

Febrile seizures

Febrile seizures (FS) usually occur in children aged 6 months to 6 years, peaking in the second year of life and are triggered by a sudden change in temperature. Approximately 2–5% of children in this age group will have a FS at some time. Most FS are caused by a high temperature due to a viral illness; however, in some cases FS may occur in association with recent vaccination. In July 2013, the combination measles-mumps-rubella-varicella (MMRV) vaccine was added to the National Immunisation Program at the scheduled age of 18 months. Due to concerns that this vaccine may increase the risk of FS, the PAEDS surveillance system was used to obtain retrospective and prospective real-time information to inform the risk of FS with registered measles-containing vaccines and, in particular, the new MMRV vaccine.

In our retrospective surveillance, we captured data on 2,013 FS episodes in 1,761 children. The peak age of FS was 18 months. Our surveillance confirmed the known increased risk (2-fold) of FS 5–12 days after receipt of dose one of MMR at 12 months. In our prospective surveillance, there were 1,668 unique FS episodes in 1,471 children aged 0 to <5 years. There was no significant increased risk of FS within the 5–12 day risk period following receipt of MMRV [RI =1.08 [95% CI: 0.55–2.13]]. Data (from the retrospective study) on the risk of FS post MMR and monovalent vaccine was published in 2015 (Macartney, K et al. Vaccine 2015) and a paper on the risk of FS post MMRV is in preparation.

Children with FS are also currently being recruited into a study led by Dr Nick Wood (NHMRC Project Grant 1049557) that aims to determine the risk of post vaccination FS (PVFS) and to comprehensively categorise and describe the clinical, genetic and developmental outcomes among children who have experienced a PVFS.

Acute childhood encephalitis

PAEDS is now into its second year of national surveillance for childhood encephalitis. The surveillance study [Australian childhood encephalitis ACE] is led by Professor Cheryl Jones, Professor Robert Booy and Dr Philip Britton. Over 200 cases of suspected encephalitis have been identified, and many have had clinical specimens salvaged and now banked in the Centre for Perinatal Infectious Diseases Research at The Children’s Hospital at Westmead. This resource will enable state of the art molecular testing of those cases without a known cause. The surveillance has already contributed to the public health response to two large infectious outbreaks in eastern Australia, and is well placed to identify potential emerging infectious disease risks. Several preliminary findings from this work have been or will be presented at national and international meetings (Public Health Association of Australia (PHAA) immunisation conference 2014, Australasian Society of Infectious Diseases (ASID) Annual Scientific Meeting 2014 and 2015, Infectious Diseases Society of America (IDSA) ID week 2015) and several manuscripts for publication are in development.

Clinicians should note the recent publication of an ASID, PHAA, Australasian College of Emergency Medicine (ACEM) and Australian and New Zealand Association of Neurologists (ANZAN) endorsed guideline on the investigation and management of children and adults with encephalitis in Australia (freely available from www.onlinelibrary.wiley.com/doi/10.1111/imj.12749/abstract).

Influenza

From April 2014, two PAEDS sites – The Children’s Hospital at Westmead (Sydney) and Princess Margaret Hospital (Perth) – are participating in active hospital-based surveillance for influenza with FluCAN (the Influenza Complications Alert Network). FluCAN is a rapid alert system for severe respiratory illness that commenced in 2010 and maintains a real-time sentinel hospital surveillance system for acute respiratory disease requiring hospitalisation. Inclusion of these two tertiary paediatric hospitals facilitated development of a paediatric case report form, which an additional five FluCAN general hospitals used to also capture data on cases aged <18 years. 2014 proved to be a busy flu season. Between the Sydney and Perth PAEDS sites, 284 paediatric cases of influenza were identified and added to the FluCAN surveillance system. Of the 284 cases, 22 (7.8%) were admitted to the intensive care unit. There were 125 (44%) children who had chronic conditions predisposing them to influenza infection, but only 16 (6.5%) of these had received at least one dose of influenza vaccine in the 2014 influenza season and less than two weeks prior to admission. Overall there were 401 paediatric cases captured within the FluCAN network, and vaccine effectiveness against paediatric hospitalisation in 2014 was demonstrated (Blyth et al, manuscript submitted for publication).

Prospective seasonal surveillance has commenced again in 2015. Influenza B cases are dominating, particularly in paediatric sites.
Pertussis

Since 2013 PAEDS has been actively collecting clinical and demographic information on children admitted to hospital with laboratory-confirmed pertussis. This is important surveillance given the ongoing burden of pertussis in Australia in our youngest infants and the current maternal pertussis booster program being implemented in states and territories. The aim of this surveillance is to determine the burden of disease, with special emphasis on severity. During this study we will also identify the contribution of co-morbidities including co-infections and determine the source of infection and the immunisation history of patients, family members (including mothers during pregnancy) and ‘coughing contacts’ to inform vaccine effectiveness. In addition, in selected sites, we will genotype samples of B. pertussis positive cultures to describe the clinical pattern and vaccine history with genotype. To date extensive clinical data on 130 cases has been captured by PAEDS nurses.

HOW DOES PAEDS WORK?

PAEDS surveillance is carried out by specialist research nurses at each of our five paediatric hospital sites. Emergency and inpatient admission records, along with other sources such as microbiology and radiology records, are screened daily for cases that potentially fulfill the criteria for conditions under active surveillance. Where required, consent is obtained and clinical data and immunisation history (verified on the ACIR) are obtained and recorded on a secure web-based data management system. Data is extracted and analysed by the PAEDS coordinating centre at The Children’s Hospital at Westmead. PAEDS investigators at each site clarify clinical case presentations and liaise with hospital clinicians and laboratories to ensure surveillance is optimal. Clinical specimens taken for patient management may be analysed further, such as genotyping of varicella-zoster virus and the bacterium B. pertussis.

WELCOME NEW STAFF

The PAEDS network welcomes the following new staff members:

**The Coordinating Centre**

Laura Rost is a registered nurse and has worked at The Children’s Hospital at Westmead (CHW) for the last 35 years. She specialised in neonatal intensive care until 2006 when she joined NCIRS as a clinical trials research nurse and study coordinator for vaccine preventable diseases. Her current role is with the PAEDS team as a surveillance nurse for vaccine preventable childhood diseases and adverse events following immunisation. Together with Jocelynne McRae, she has also helped strengthen working relationships between PAEDS, infection control and laboratory staff at CHW, to enhance data capture and reporting.

Natalie McLaren is a paediatric registered nurse who has worked across various specialties within paediatrics across Australia and overseas, most recently returning as part of the Ebola Medical Response Team in Sierra Leone. She is passionate about global health, in particular child and maternal health in developing countries, which led to a Masters in International Health. Natalie has joined the PAEDS team at the CHW coordinating centre as a surveillance nurse. In addition to all PAEDS conditions, she is also helping with the TESTOV Pneumo study.

Helen Quinn is a Senior Research Fellow at NCIRS and has a conjoint academic appointment as a lecturer in the Discipline of Paedics and Child Health, University of Sydney. Her background is in laboratory science (PhD in parasitology), with further training as an epidemiologist. Helen’s main interest is the epidemiology and control of vaccine preventable diseases, particularly pertussis. She is also interested in immunisation policy, vaccine safety and attitudes to immunisation in parents and providers. Helen has recently joined the PAEDS team and will be assisting with data analysis and reporting.

**Princess Margaret Hospital, Perth**

Rachel West trained in Perth as a general registered nurse and has a postgraduate qualification in paediatrics. Rachel has held a wide variety of clinical positions in Australia, the UK and the USA including emergency, ward management, intensive care, operating theatres, police forensics and now research for the past 6 years. She is currently employed by the Vaccine Trials Group (VTG) in Perth as a Clinical Research Coordinator. Rachel also manages the PAEDS-related studies such as febrile seizures, TESTOV Pneumo, Pneumo WA (in conjunction with TESTOV), and the West Australian Influenza Vaccine Effectiveness study (WAIVE).

Save The Date!

The annual PAEDS face-to-face meeting will be moving to the first half of the new year. We have tentatively scheduled the next meeting to be held on Thursday 17 and Friday 18 March 2016. Dates and venue will be confirmed in the near future. This meeting is attended by PAEDS staff and representatives of PAEDS stakeholders, including the Australian Government Department of Health.
PAEDS FACE-TO-FACE MEETING 2014

The whole PAEDS team (investigators and nurses from all five sites) as well as representatives from a number of our partnering and funding organisations met for a full day meeting on 31 October 2014. Representatives from the Australian Government Department of Health, as well as NSW, SA, and Qld Departments of Health and the RuCAN network attended. There was an excellent discussion across a range of issues.

PAEDS publications* (2014 and 2015)

* This list includes all recent primary PAEDS publications and selected studies that include PAEDS data or are related to PAEDS studies. For a full list of all PAEDS publications please visit our website: www.paeds.edu.au


