NCIRS National Centre For Immunisation Research and Surveillance

Newsletter

December 2006

Contents

Varicella Zoster Virus Workshop

On the 16th and 17th November, NCIRS held a workshop on the varicella zoster virus (VZV) in Sydney. The workshop was well attended with prominent international researchers and leading Australian epidemiological and clinical experts presenting various aspects of varicella and zoster disease, virology and vaccine research and development. This workshop was held at a significant stage in the control of VZV disease with the recent addition of the varicella vaccine to the National Immunisation Program schedule and the anticipated availability of both combination MMRV vaccines for use in children and a vaccine for older adults to prevent the reactivation of the virus causing shingles.

Day One – Varicella

The first day of the workshop focused on primary varicella disease (chickenpox). Attendees were reminded of the clinical consequences of primary varicella infection including the morbidity associated with congenital varicella syndrome and neonatal varicella in Australia. Primary varicella infection still poses a considerable burden in Australia, especially in young children. Vaccination coverage was reported to be improving and there is emerging evidence that the varicella vaccination program is having an impact on the varicella hospitalisation rates of those eligible for vaccination in Australia. Dr Ann Gershon, Professor of Pediatrics and Director of the Division of Pediatric Infectious Disease within the Department of Pediatrics at Columbia University Medical Center, and Dr Barbara Kuter, Executive Director, Pediatric Vaccine Medical Affairs, Merck & Co, have both had pivotal roles in the development of varicella vaccines.

Their informative presentations provided data on the impact of the 10-year one-dose varicella vaccination program in the USA, the clinical development of Merck's Varivax® varicella vaccine, a comparison of the safety and immunogenic profiles of the two MMRV vaccines and available USA data on rates of breakthrough varicella after one and two doses of varicella vaccine including data that drove the new ACIP recommendations of two doses of varicella vaccine in the USA. The first day concluded with a discussion panel, chaired by Professor Terry Nolan, ATAGI, on the issues around scheduling of varicella vaccine in Australia.

Presenters – Day 1

Presentations from both days of the Varicella Workshop are available on the NCIRS website:
http://www.ncirs.usyd.edu.au/newsevents/vzv_workshop_presentations_nov_06.doc

The Children's Hospital at Westmead
Cnr Hawkesbury Rd & Hainsworth St, Westmead
Locked Bag 4001, Westmead NSW 2145
www.ncirs.usyd.edu.au

Telephone +61 2 9845 1433
Facsimile +61 2 9845 1418
Email karynp@chw.edu.au

Day Two – Herpes zoster (HZ) and surveillance for VZV

Day two of the VZV Workshop focused on zoster disease. Opening presentations provided attendees with a comprehensive overview of the burden of HZ disease to the individual, especially the elderly, and the available epidemiological data in Australia, recognised to be three times the burden of primary varicella disease. Further presentations discussed the immunopathogenesis of the virus and current diagnostic methods and molecular tools available in the surveillance of the VZV. Dr Myron Levin, Professor of Paediatrics and Medicine, Director, Pediatric Infectious Diseases Fellowship Program University of Colorado & The Children's Hospital, presented the results of the Shingles Prevention Study trial of a vaccine to prevent HZ in older adults and the sub-studies within this trial further assessing adverse events and immune correlates of protection. Data presented provided optimistic results for the reduction in the burden caused by shingles, especially in the elderly. Dr James Pellissier, Director of Heath Economic Statistics at Merck Research laboratories, described the complex economic modelling required for determining the cost-effectiveness of a zoster vaccine for use in the elderly.

The final session focused on the surveillance of VZV disease. International surveillance was described by Dr Gershon's presentation on the surveillance of VZV in the USA and Dr Judith Breuer, Professor of Virology Centre for Infectious Disease Barts and The London School of Medicine and Dentistry, who presented data on the British Paediatric Surveillance Unit study of neonatal and congenital varicella. Data from South Australia's VZV notifications was presented and the planned surveillance to be undertaken by the other Australian states was described. The workshop concluded with representatives from all state jurisdictions participating in a discussion panel of the benefits of proposed surveillance mechanisms and how they will differ by state.

Presenters – Day 2

Recent NCIRS Publications

- MacIntyre CR. Bird flu: pandemic flu is not just about probability [letter]. *BMJ* 2006;332:913.
- Joseph T, Menzies R, McIntyre P. Vaccination for our mob. Canberra: Australian Government Department of Health and Ageing; 2006. Available at: http://www.immunise.health.gov.au/internet/immunise/publishing.nsf/Content/atsi-mob-report
- Lawrence G, Boyd I, McIntyre P, Isaacs D. Annual report: surveillance of adverse events following immunisation in Australia, 2005. *Communicable Diseases Intelligence* 2006;30:319-33.
- Lawrence G. National Vaccine Safety Workshop: summary and draft recommendations. *Communicable Diseases Intelligence* 2006;30:378-80.
- Wood N, Iskander M, Hale K, Sheikh M. Health assessment for refugee children. *In Touch*: newsletter of the Public Health Association of Australia Inc. 2006;23(9):7.
- Booy R, Sengupta N, Bedford H, Elliman D. Measles, mumps, and rubella: prevention. *Clin Evid* 2006 Jun;(15):448-68.
- Backhouse JL, Gidding HF, McIntyre PB, Gilbert GL. Evaluation of two enzyme immunoassays for detection of immunoglobulin G antibodies to mumps virus. *Clinical and Vaccine Immunology* 2006;13:764-7
- Newall AT, MacIntyre CR, Wang H, Hull B, Macartney K. Burden of severe rotavirus disease in Australia. *Journal of Paediatrics and Child Health* 2006;42:521-7
- Itzwerth RL, MacIntyre CR, Shah S, Plant AJ. Pandemic influenza and critical infrastructure dependencies: possible impact on hospitals. *Medical Journal of Australia* 2006;185:S70-2.
- Booy R, Tully J, Viner R, Coen P. Risk and protective factors for meningococcal disease in adolescents [electronic letter]. *Archives of Disease in Childhood* 2006; July: online.
- Leask J, Chapman S, Hawe P, Burgess M. What maintains parental support for vaccination when challenged by anti-vaccination messages? A qualitative study. *Vaccine* 2006;24:7238-45.

Commonly asked questions (and answers!)

Recently a question has been asked and posted on the NCIRS AIP (Australian Immunisation Professional) email list on breastfeeding and antibodies or level of immunity passed between mother and baby, specifically to counter the comments that breastfeeding gives good immunity over the long term.

Unlike other mammals, which are largely reliant on passive antibody transfer via lactation, human infants receive most of their passive antibodies via placental transfer of IgG. Transplacental IgG antibodies contribute to the fetal immune response from about 28 weeks gestation. These passive antibodies may persist for up to 12 months of age but generally wane by around 9 months of age. However, it must be kept in mind that this passive immunity benefit will only occur where the mother herself has sufficient levels of antibody.

Infant immunisation schedules are timed to provide early protection to those babies with the lowest levels of passively-acquired maternal antibodies.

Breastfeeding provides an excellent source of secretory IgA (SIgA) mediated antibody protection in infants. The SIgA mediated antibodies generally reflect antigenic stimulation of mucosal associated lymphoid tissue by common respiratory and intestinal pathogens. Therefore antibody protection from breastfeeding is most effective against some diarrhoeal illnesses and some respiratory diseases. Specific antibodies that have most commonly been identified in human milk are those targeted against the pathogens endemic in the mother's environment. Therefore, the antibody concentrations differ among populations. SIgA does not have a significant role in supporting systemic immunity in humans, except perhaps in some premature babies born prior to 28 weeks gestation. The SIgA concentration is approximately ten times higher in colostrum than in mature milk. There are numerous constituents in breast milk that further protect babies. Lysozyme, lactoferrin, peroxidase, fatty acids, mucins and oligosaccharides all have a protective function in the gut of the baby. These all combine to enhance mucosal immunity.

There have a been a few studies that suggest that breastfeeding may enhance both the serum and mucosal antibody responses to several vaccines, including *Haemophilus influenzae* type b, BCG, diphtheria, tetanus and OPV (which is no longer used in Australia).

The WHO/UNICEF **Global Strategy for Infant and Young Child Feeding** stated as one of its global aims that: "All mothers should have access to skilled support to initiate and sustain exclusive breastfeeding for 6 months and ensure the timely introduction of adequate and safe complementary foods with continued breastfeeding up to two years or beyond."

Breastfeeding, provides infants with valuable additional short term mucosal protection against diarrhoea and some respiratory illnesses.

Breastfeeding, in combination with scheduled vaccinations, will provide greater protection to infants, particularly in the early months of life. However, breastfeeding alone has not been shown to provide adequate protection against those diseases for which children are regularly immunised.

Suggested Readings include;

- Pabst HF, Spady DW. Pilarski LM, Carson MM, Beler JA *et al*. Effect of breast feeding on immune response to BCG vaccination. *Lancet* 1989;1:295-297.
- Pickering LK, Granoff DM, Erickson JR, Masor ML, Cordle CT *et al*. Modulation of the immune system by human milk and infant formula containing nucleotides. *Pediatrics* 1998;101:242-249.
- Oddy WH. Breastfeeding protects against illness and infection in infants and children: a review of the evidence. *Breastfeeding Review* 2001;9(2):11-18.
- Hanson LA, Silfverdal SA, Stromback L, Erling V, Zaman S. *et al.* The immunological role of breast feeding. *Pediatric Allergy and Immunology* 2001;12(Suppl 14):15-19.
- Van de Perre P. Transfer of antibody via mother's milk. Vaccine 2003;21:3374-3376.
- Galton Bachrach VR, Schwarz E, Bachrach LR. Breastfeeding and the risk of hospitalisation for respiratory disease in infancy. *Archives of Pediatric and Adolescent Medicine*. 2003;157:237-243.
- Brandtzaeg P Mucosal immunity: integration between mother and the breast-fed infant. *Vaccine* 2003;21:3382-3388.
- Morrow AL, Rangel JM. Human milk protection against infectious diarrhea: implications for prevention and clinical care. *Seminars in Pediatric Infectious Diseases* 2004;15:221-228.
- Labbok MH, Clark D, Goldman AS. Breastfeeding: maintaining an irreplaceable immunological resource. *Nature Reviews* 2004;4:565-572.
- Rodríguez NA, Miracle DJ, Meier PP. Sharing the science on human milk feeding with mothers of very-low-birth-weight infants. *Journal of Obstetric, Gynecologic and Neonatal Nursing*. 2005;34:109-119.
- Jackson KM, Nazar AM. Breastfeeding, the immune response and long-term health. *Journal of the American Osteopathic Association*. 2006;106:203-207.
- Silfverdal SA, Ekholm L, Bodin L. Breastfeeding enhances the antibody response to Hib and pneumococcal serotype 6B and 14 after vaccination with conjugate vaccines. *Vaccine* 2006:In press.

CDNA Satellite Workshop

A one-day workshop on **"Understanding Mathematical Models of Infectious Disease"** is being held at the Australian National University in Canberra on Friday 16th March 2007. This workshop is being coordinated by the Network of Infectious Disease Modellers of Australia (NIDMA) (an initiative supported by an NHMRC Capacity Building Grant in Population Health Research) This one-day workshop will introduce key concepts of mathematical modelling of infectious diseases, with an emphasis on practical applications.

The programme and registration form are available at http://www.ncirs.usyd.edu.au/newsevents/index.html

Recent Journal Club topics

Pertussis – comparison between Australia and the Netherlands – Kader Kurt

Pertussis has remained an endemic disease in countries such as the Netherlands and Australia, despite long established and successful vaccination programs, with high vaccine coverage. Acellular pertussis (aP) vaccines were introduced in Australia in 1997, with a later introduction in the Netherlands in 2001. Unlike many countries, Australia and the Netherlands rely on serology-based diagnostic methods, which make comparisons between them possible.

In this project, a visiting Masters of International Public Health student has been collecting and analysing notification, hospitalisation and death data, with the purpose of comparing the epidemiology in the two countries before and after the introduction of aP vaccines. Pertussis incidence in Australia and the Netherlands was similar during the study period, however, epidemic periods occurred in different years. In the Netherlands, pertussis incidence was highest among <6 month olds, 1-4 year old, and 5-9 years olds. In Australia, pertussis incidence among the 1-4 and 5-9 years old age groups was reduced after aP vaccine introduction. Nevertheless, the notification rates of infants <6 months of age is still high in Australia. Generally, hospitalisations have decreased in both countries since the introduction of aP vaccines. The hospitalisation rate continues to remain high for very young infants, particularly in Australia. The work to date was presented at NCIRS in December and will be completed and submitted as a treatise in February 2007.

Merry Christmas and A Happy New Year from the Team at NCIRS