

Newsletter

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October 2004

Hot Topics - from NCIRS presentations at the 9th National PHAA Immunisation conference

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Hot Topic 1

Measuring vaccination coverage in Aboriginal and Torres Strait Islander children

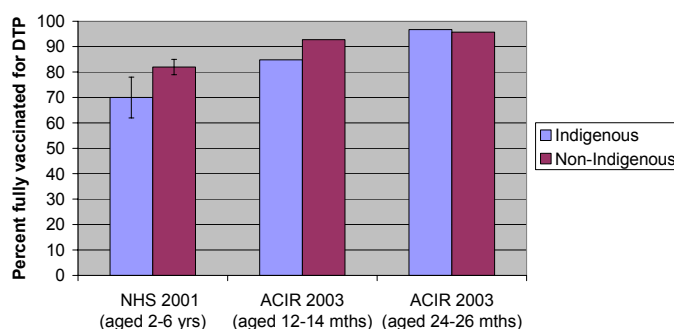
Robert Menzies

National vaccination coverage estimates for Aboriginal and Torres Strait Islander people have recently become available in Australia for the first time, from the 2001 National Health Survey (NHS) (household interview) and the Australian Childhood Immunisation Register (ACIR), and were published as a supplement for *Communicable Diseases Intelligence* entitled "Vaccine preventable diseases and vaccination coverage in Aboriginal and Torres Strait Islander people, 1999-2002". Coverage estimates from the NHS are generally lower for both Indigenous and non-Indigenous children, but this difference is greater for Indigenous children (see figure 1). This presentation examined the reasons for these differences.

NHS estimates probably underestimate true coverage for all children because they are recorded as fully immunised only if their parents can remember the number of doses their child received or refer to accurate written records. Parents of older children more frequently under-estimate the number of doses their child has received, compared to ACIR estimates. Parents of Indigenous children were less likely to be able to refer to written records and therefore more likely to report "unknown" status or number of doses and not be recorded as fully vaccinated. The ACIR probably over-

estimates coverage in Indigenous children because Indigenous coverage is measured only in the 60% of Indigenous children who are recorded on the ACIR as Indigenous. As Indigenous status can be reported to the ACIR on the same form as a vaccination, unvaccinated or under-vaccinated Indigenous children are less likely to be recorded as Indigenous compared to more highly vaccinated Indigenous children. Improvements in the rate of reporting Indigenous status on the ACIR have been made over the past 2-3 years, but more are needed to provide accurate coverage estimates for Indigenous children.

Figure 1: DTP vaccination coverage estimates for Indigenous children - NHS vs ACIR



ECONOMIC EVALUATION OF VACCINES

You are invited to express your interest in a one day short course being organised by NCIRS, in Melbourne on 6 December. There is a participation fee of A\$250 (incl GST). Topics covered include; general theory of economic evaluation, methodological issues related to vaccination and prevention, mathematical modelling of infectious disease transmission and the role of economic evaluation in Australian vaccine policy.

For further information please contact NCIRS via email at JanM4@chw.edu.au or phone 02 9845 0520

Hot Topic 2

Comparative cost-utility of meningococcal C conjugate and pneumococcal conjugate vaccination in Australia

Dr Philippe Beutels

This study compares the effectiveness and cost-utility of childhood pneumococcal conjugate (PC) with meningococcal C conjugate (MCC) vaccination. A Markovian cohort model was developed to simulate the costs and effects related to pneumococcal and meningococcal C infections in Australian cohorts followed from birth over various time spans up to 100 years, and subjected to different routine vaccination schedules (2,4,6 m for PC and 12m for MCC vaccination in the baseline). With direct costs per DALY averted of about \$100,000, PC vaccination is more cost-effective than MCC vaccination up to age 10 years, but MCC vaccination becomes more attractive for time spans of vaccine protection beyond 12 years, levelling off at \$40,000 per DALY averted after 30 years. If herd immunity

estimates are introduced - based on observed data from the US for PC, and on a population model of dynamic disease transmission for MCC, both programs show substantially lower though similar cost-utility ratios (\$10,000-\$50,000 per DALY averted, depending on the proportion of community acquired pneumonia attributable to pneumococcus). A separate population based analysis shows that the MCC vaccination program would be more cost-effective with than without a mass campaign when herd effects are considered. Scenario and multivariate sensitivity analyses indicate that although price, efficacy and incidence estimates are highly influential, the cost-utility of childhood PC vaccination is at least as attractive as that of childhood MCC vaccination under many changing assumptions.

Hot Topic 3

Age-related risk of adverse events following yellow fever vaccination in Australia

Dr Glenda Lawrence

Until recently, yellow fever (YF) vaccine had a 50 year history as very safe and highly effective vaccine. Over the past few years concerns about its safety have been raised, particularly among older vaccinees, following reports of six deaths worldwide (including one in Australia) and several other cases of severe multi-organ failure temporally associated with receipt of the vaccine. In 2002, an international committee was established to review YF vaccine safety and sought information about adverse events temporally associated with YF vaccine in Australia.

We reviewed reports to the Adverse Drug Reactions Advisory Committee (ADRAC) for 1993-2002 to investigate the relative reporting rates by age group of non-allergic serious systemic adverse events among YF vaccinees that led to hospitalisation or death. Age-

specific denominators were calculated from travel clinic immunisation registers and vaccine sales data.

The reporting rate of these serious systemic adverse events was significantly higher among YF vaccinees aged ≥ 65 years (reporting rate ratio (RRR) 8.95, 95% CI 1.49-53.5) or ≥ 45 years (RRR 5.30, 95% CI 1.33-21.2) compared with younger vaccinees. These higher reporting rates were similar to published estimates for older YF vaccinees in the USA.

The results of this study highlight the importance of assessing the destination-specific risk, particularly for older travellers to YF endemic areas, and careful monitoring of YF vaccinees for serious systemic adverse events. The study also demonstrates the value of available data, from different sources, in investigating concerns about vaccine safety in Australia.

Recent NCIRS Publications

- ◆ Menzies R, McIntyre P, Beard F. Vaccine preventable diseases and vaccination coverage in Aboriginal and Torres Strait Islander people, Australia, 1999 to 2002. *Communicable Diseases Intelligence* 2004;28(Suppl 1):S1-S45.
- ◆ Brotherton JML, McIntyre PB. Planning for human papillomavirus vaccines in Australia. Report of a research group meeting. *Communicable Diseases Intelligence* 2004;28:249-54
- ◆ McIntyre P. Vaccine strategies for prevention of neonatal pertussis. *Expert Reviews in Vaccines* 2004;3:375-8.
- ◆ McIntyre P, Wood N. Does universal hepatitis B vaccination at birth have a negative impact on breastfeeding? *Australian Midwifery* 2004;17:8-9.
- ◆ Lawrence GL, Burgess MA, Kass RB. Age-related risk of adverse events following yellow fever vaccination in Australia. *Communicable Diseases Intelligence* 2004;28:244-8.
- ◆ Beutels P. Potential conflicts of interest in vaccine economics research: a commentary with a case study of pneumococcal conjugate vaccination. *Vaccine* 2004;22:3312-22.

Recent Journal Club topics

The predicted impact of private sector MMR vaccination on the burden of Congenital Rubella Syndrome E. Vynnycky, N.J. Gay, F.T. Cutts *Vaccine* 2003;21:2708-2719

Many developing countries only have measles-mumps-rubella (MMR) vaccine available through the private sector, without a systematic program for vaccinating women of child-bearing age (19-49 years). This is despite warnings from WHO that low MMR coverage levels could increase the rate of congenital rubella syndrome (CRS) & recent experiences in Greece & Costa Rica. Previous studies have examined the impact of vaccination on CRS in developed countries. This study extended previous analyses to determine impact of vaccination in developing countries, considering different mixing patterns between vaccinated & unvaccinated populations. The authors examined the short (<20 years) & long-term (>20 years) impact of varying levels of coverage & initial forces of infection (FOI, rate of infection in susceptible individuals) on a population with the characteristics of a developing country (south India). They assumed only 1-4 year olds with access to MMR vaccine through the private sector were vaccinated.

In the short term, there was no increase in the cumulative incidence of CRS when the pre-vaccination FOI was low, but for moderate & high FOIs the cumulative incidence increased after 10-15 years depending on the coverage achieved. In the long term, for the population without access to MMR vaccination the average annual incidence of CRS increased no matter what the coverage level or mixing pattern. The greatest increase was where the pre-vaccination FOI was high. In this situation CRS incidence was predicted to increase from 2 to 252/1000/yr in the unvaccinated population at 88% vaccination coverage. In the overall population with a low pre-vaccination FOI, the long term incidence of CRS would not increase. However as the pre vaccination FOI increased & the mixing pattern became more random, the incidence of CRS increased. In the worst case scenario (high FOI, random mixing) the incidence of CRS increased for coverage up to 78%, when the rate was 20 times higher (41/100,000) than in the pre vaccine era (2/100,000). To eliminate infection, coverage above 82% is required in countries with a low FOI (Europe, Australia), but in countries with a high FOI (China, The Gambia) coverage above 95% is needed. Such levels would not be attainable if vaccination was only available through the private sector.

In conclusion, developing countries, especially those with high pre-vaccination FOI, risk increasing the burden of CRS if MMR is only available through the private sector. Such countries need to reassess their vaccination strategies & if private vaccination is to continue, also provide vaccinations free of charge to women of child bearing age.

Hot Topic 4

Attitudes and experiences of health care professionals regarding childhood immunisation:

A cross-sectional survey. Dr Nicholas Wood

Encouragement from health care professionals is a major factor influencing parents' decisions to vaccinate their children. However, information is limited about the immunisation beliefs and attitudes of Australian health care professionals, particularly nurses and midwives, and about their perceived barriers to communicating with parents.

We conducted a cross-sectional survey (self-completed questionnaire) among 645 health professionals in Western Sydney. Data were collected from 452 respondents (70% response rate): 297 nurses (155 midwives, 74 paediatric nurses and 64 community nurses) and 155 General Practitioners (GPs).

The majority (>90%) of respondents believed that childhood vaccination was "safe" and "necessary". Midwives were strongly supportive of neonatal hepatitis

B vaccination (90%). Fewer nurses than GPs were confident about answering parents' immunisation-related questions (67% vs 97%, $p<0.02$): half the nurses versus 18% of GPs disagreed or were unsure about telling parents there was no *proven* link between vaccines and autism or Sudden Infant Death Syndrome. Nurses who had witnessed an adverse event following immunisation were less likely than other nurses to agree that vaccines were "safe" ($p<0.02$) or "necessary" ($p=0.06$). The majority of nurses and GPs felt that vaccination-related education and training they had received was inadequate.

Health-care professionals surveyed in Western Sydney are supportive of childhood vaccination. However, many lack confidence in reassuring parents about specific safety concerns and support improved education and training in immunisation for health professionals.

Commonly asked immunisation questions (and answers!)

In this newsletter feature, we share some of the commonly asked questions we receive. If you have any "common questions" that you'd like to see addressed in this format, please e-mail us (karynp@chw.edu.au) & we'll publish the answer in an upcoming newsletter.

Which vaccinations are recommended following a splenectomy?

Individuals with an absent or dysfunctional spleen are at an increased risk of bacteraemia, in particular from encapsulated organisms such as pneumococcus and *Haemophilus influenzae* type b bacteria. Ideally vaccination against these organisms should be given more than 2 weeks prior to an elective splenectomy. If vaccines are not given pre splenectomy, they should be given 2 weeks after surgery. In general, previously unvaccinated adults should be given a single dose of pneumococcal polysaccharide vaccine, a single dose of meningococcal C vaccine followed 2 or more weeks later by the tetravalent meningococcal polysaccharide vaccine and a single dose of the Hib vaccine. For children who have not been previously vaccinated against these organisms, the above schedule applies. However, for those under 5 years old a single dose of pneumococcal conjugate vaccine should be given in addition to the pneumococcal polysaccharide vaccine. All splenectomy patients should receive the influenza vaccine yearly.

Ref: The Australian Immunisation Handbook 8th Edition, p 98 & Guidelines for the prevention and treatment of infection in patients with an absent or dysfunctional spleen. Working Party of the British Committee for Standards in Haematology Clinical Haematology Task Force. BMJ. 1996 Feb 17;312(7028):430-4. Review

I have a 16 year old who has received one dose of the chickenpox vaccine. Four months following vaccination he had a clinical illness compatible with chickenpox. Is he now immune? What should I do?

People aged 14 years and older who have a reliable history of chickenpox should be considered to be immune and do not need the vaccine. For those who are over 14 years old and receiving the vaccine for the first time, TWO doses, 1 to 2 months apart are needed to ensure adequate protection. This case may represent a breakthrough infection. Serologic testing to confirm the varicella immunity of this adolescent may be helpful in determining the need for the second dose of vaccine. There is no harm, however, in vaccinating those who are already seropositive.

Ref: The Australian Immunisation Handbook 8th Edition, p 282-3

Why is inactivated polio vaccine (IPV) now preferred to the oral polio vaccine (OPV) and can I still give OPV?

The major advantage of IPV over OPV is that it does not cause vaccine associated paralytic poliomyelitis (VAPP). This is a rare but serious side effect of OPV. It occurs when a mutation of one of the attenuated OPV strains

regains the capacity of the poliovirus to cause paralysis. After receiving OPV, the vaccine virus replicates in the gastrointestinal tract from where it is excreted for about six weeks. In some individuals excretion may persist for a longer period and immunodeficient patients may excrete the virus for years.

The overall risk of VAPP is approximately 1 in 2.4 million doses administered, but is six times higher after the first dose (1:750 000 doses) than subsequent doses. Immunocompromised persons have a 3000 fold higher risk of VAPP than the immunocompetent. The risk of VAPP is also much higher in populations with low vaccine coverage. Naturally occurring paralytic polio no longer occurs, so even a small risk of VAPP is considered unacceptable. As there is no risk of VAPP with IPV because the virus is inactivated by formalin, it has been recommended to replace OPV, first in the USA and subsequently in New Zealand and Australia. A number of European countries have always used IPV.

OPV is still considered an acceptable alternative until the supplies of IPV, either as a single vaccine or in combination vaccines, are more readily available.

Ref: The Australian Immunisation Handbook 8th Edition, p 234-242 & Wood N, Thorley B. Towards global poliomyelitis eradication: The successes and challenges for a developed country. J Paediatric Child Health 2003; 39: 647-650.

Can I immunise a normally healthy child who has been on 2mg/kg/day of prednisolone for 3 days for an exacerbation of asthma?

Children who receive corticosteroid therapy can become immunocompromised and the administration of live virus vaccines may be contraindicated. The minimal amount, frequency and duration of administration sufficient to cause immunosuppression in healthy children is not well defined. However, doses of prednisone or equivalent of more than 2mg/kg/day for more than 1 week or 1mg/kg/day for more than 4 weeks are associated with significant immunodeficiency. Children on daily doses of 2 mg/kg/day of prednisolone or equivalent for less than 1 week, and those on lower doses or alternate day regimens may be given live virus vaccines. Children receiving higher doses than above should not receive live virus vaccines until corticosteroid therapy has been discontinued for at least 1 month. Topical or inhaled corticosteroid therapy or local injections usually do not result in immunosuppression that would contraindicate the use of live virus vaccines.

Ref: The Australian Immunisation Handbook 8th Edition, p 94-95

Red Book 2003. Report of the Committee on Infectious Diseases. American Academy of Paediatrics

Please note that answers provided here are consistent with current recommended practice but are not a substitute for individual medical advice.