

**Immunisation Subcommittee of PTAC**  
**Meeting held 6 March 2013**

**(minutes for web publishing)**

Immunisation Subcommittee minutes are published in accordance with the *Terms of Reference for the Pharmacology and Therapeutics Advisory Committee (PTAC) and PTAC Subcommittees 2008*.

Note that this document is not necessarily a complete record of the 6 March 2013 Subcommittee meeting; only the relevant portions of the minutes relating to Immunisation Subcommittee discussions about an Application or PHARMAC staff proposal that contain a recommendation are generally published.

The Immunisation Subcommittee may:

- (a) recommend that a pharmaceutical be listed by PHARMAC on the Pharmaceutical Schedule and the priority it gives to such a listing;
- (b) defer a final recommendation, and give reasons for the deferral (such as the supply of further information) and what is required before further review; or
- (c) recommend that PHARMAC decline to list a pharmaceutical on the Pharmaceutical Schedule.

**These Subcommittee minutes were reviewed by PTAC at its meeting on 9 & 10 May 2012, the record of which will be available in July 2013.**

## **Record of the Immunisation Subcommittee of PTAC meeting held on 6 March 2013**

### **1 Human papillomavirus vaccine**

- 1.1 The Subcommittee considered an application for widening funded access to the human papillomavirus (HPV) recombinant vaccine to include young males aged 12 years or older, as well as amending the criteria for females.
- 1.2 The Subcommittee noted that HPV is the most common sexually transmitted infection. It was noted that approximately 1.5% of female cancers (138 cases of cancer per annum) were caused by HPV genotypes. Members noted that there were ethnic disparities in the health outcomes of cancers. The Subcommittee noted that HPV infection was involved in approximately 300 deaths per annum.
- 1.3 Members noted that there were 12 oncological types of HPV and that HPV 16 and 18 were associated with around 70% of cervical cancer cases. The Subcommittee noted that HPV type 6 and 11 were responsible for 90% of genital warts cases.
- 1.4 The Subcommittee noted that HPV infection in males is usually asymptomatic but can result in a number of anogenital diseases, including anogenital warts, the precursor lesions for anal and penile cancer. HPV can also cause respiratory tract infection, and oral cavity and oropharyngeal cancer.
- 1.5 The Subcommittee noted that there are two vaccines available. The currently funded HPV vaccine from CSL Biotherapies is a quadrivalent vaccine with HPV types 6, 11, 16 and 18. The GlaxoSmithKline vaccine is a bivalent vaccine with HPV types 16 and 18. Members noted that both vaccines were highly antigenic. Members noted that there appeared to be a reduction in the number of cases of genital warts since the introduction of the HPV vaccine in 2008. Members considered that as the quadrivalent vaccine had been implemented it would be inappropriate to return to an HPV two valent vaccine.
- 1.6 The Subcommittee noted that there were no new safety concerns relating to the HPV vaccine since it was listed, and considered that the HPV vaccine had a good safety profile. Members noted that the long term immunogenicity data was not available (current data availability is up to around 8 years for both vaccines). Members considered that the vaccine may provide long acting immunity, similar to the hepatitis B vaccine.
- 1.7 The Subcommittee noted the efficacy data for HPV vaccine in males. Members considered that there was a benefit in vaccinating males provided the female vaccination rate was lower than 80%. Members noted that if female vaccine coverage was above 80% then herd immunity benefits would protect males. If herd immunity was achieved in females then the incremental gains from vaccinating all males would be much diminished. Members noted that herd immunity from increased coverage for females would provide no benefit to males

who have sex with males (MSM) and that this group would benefit from vaccination. Members also noted that males of target age (11 to 18 years) would be largely naïve to future sexual orientation, and concerns around labelling may influence uptake.

- 1.8 The Subcommittee noted that currently 51% of eligible females in New Zealand receive the 3 doses of the HPV vaccine, with higher uptake in the Maori and Pasifika populations. It was noted that coverage is similar to many other countries, with the exception of Australia which has higher coverage. The Subcommittee considered that it would be beneficial to improve coverage rates in females due to the additional benefit of further herd immunity; however, it was considered the gains of investing in campaigns are somewhat uncertain.
- 1.9 Members noted that the younger people were vaccinated, the stronger the immunogenicity. Members noted that it would be preferable to vaccinate at a younger age to reduce the chances of exposure prior to vaccination. The Subcommittee considered that it would be beneficial to lower the age of females vaccination to 11 years in order that females receive the required 3 doses prior to exposure and allowing more time to completion of the 3 dose series in their intermediate school years.
- 1.10 The Subcommittee noted the cost-utility analysis (CUA) provided by CSL. The Subcommittee considered the analysis to be very complex, and noted that the results reported were more favourable than many published international CUAs. The Subcommittee considered that it would have been useful if the analysis also included information on the cost-effectiveness of increased coverage in females as a competing public policy strategy.
- 1.11 The Subcommittee noted that the cost of widening access to all males would be substantial. The Subcommittee discussed the option of widening access to the population of those who identify as MSM, given these males would not benefit from the herd immunity of female vaccination. It was noted that MSM have a significantly higher risk of genital warts, anal cancer, and oropharyngeal cancer.
- 1.12 The Subcommittee considered it would be very difficult to target funding of the HPV vaccine to the MSM population, especially prior to exposure to HPV. The Subcommittee discussed the option of establishing a programme to offer the HPV vaccine to those who identify as being MSM. It was noted that this requires men to approach services and identify themselves and that the majority would have already been exposed to HPVs, however the Subcommittee considered that this population are at greater risk of HPV infection and therefore may receive a greater benefit from receiving the vaccine. The Subcommittee noted that in the efficacy trials of HPV (Giuliano NEJM 2011, Palefsky NEJM 2011) participants were non-virgins.
- 1.13 The Subcommittee discussed whether there were other subgroups that may benefit from receiving the HPV vaccine. It was noted that women who have had cervical lesions have a lower risk of lesion recurrence if they received the HPV vaccine. It was also noted that (male and female) paediatric oncology patients may benefit from access. Members noted that paediatric oncology patients'

vaccination requirements would be considered at the April 2013 Subcommittee meeting.

- 1.14 The Subcommittee noted that there was emerging evidence for the possibility of a two-vaccine schedule for HPV vaccination. Members considered that at this time it would not be appropriate to recommend this schedule but that this should be reviewed when new data was available.
- 1.15 The Subcommittee **recommended** that the age of female vaccination be amended to allow the first dose at age 11 with a medium priority, and allow the school based program to be initiated in year seven rather than year eight.
- 1.16 The Subcommittee **recommended** that a pilot study may be beneficial to assess the impact of a change to the school based programme prior to full rollout.
- 1.17 The Subcommittee **recommended** widening access to HPV vaccine to include males between the ages of 11 and 25 inclusive who identify as MSM with a high priority.
- 1.18 The Subcommittee **recommended** widening access to HPV vaccine to include all males between the ages of 11 and 18 with a low priority.

## 2 Rotavirus vaccine

- 2.1 The Subcommittee considered an application for listing of a rotavirus vaccine on the National Immunisation Schedule. Members noted that this had been previously reviewed by the Immunisation Technical Forum of the Ministry of Health and given a high priority.
- 2.2 The Subcommittee noted that rotaviruses are an important cause of viral gastroenteritis predominantly affecting children, but with disease also occurring in adults.
- 2.3 The Subcommittee noted there are eleven rotavirus P genotypes, ten G genotypes and forty-two P/G genotype combinations that can infect. Four combinations (P[8]G1, P[4]G2, P[8]G3, and P[8]G4) account for nearly 90% of strains worldwide, with P[8]G1 accounting for 60 to 80% of strains in most years.
- 2.4 The Subcommittee considered that exposure to rotavirus in childhood was ubiquitous internationally, with at least 95% of patients in New Zealand expected to have been infected by rotavirus at least once by age 5, and almost everyone would acquire rotaviral disease at least once in a lifetime. Members noted that children and adults could be re-infected, and that a common path for the disease was for young children to pass it onto parents and caregivers. Members noted that statistically there would be one death from rotavirus infection every 2-5 years in New Zealand.
- 2.5 The Subcommittee considered that there was a higher level of hospital admissions as a result of gastroenteritis, predominantly rotaviral gastroenteritis, in children living in localities with higher socioeconomic deprivation.

- 2.6 Members considered that rotavirus gastroenteritis could not be eliminated from the population. The Subcommittee noted that a funded vaccination program would likely reduce transmission of rotavirus in the community and on-going vaccination program would be required.
- 2.7 The Subcommittee considered that there were no funded alternatives to the rotavirus vaccine, and that the alternative treatment was supportive and precautionary with oral rehydration, bed rest and isolation to avoid transmission to others.
- 2.8 The Subcommittee considered the clinical evidence for the two vaccines. It noted that a large number of trials of varying quality had been undertaken. Members considered the pivotal trial for RotaTeq had been published as Vesikari et al. (*N Engl J Med.* 2006 Jan 5; 354(1):23-33) and for Rotarix had been published by Ruiz-Palacios et al. (*N Engl J Med.* 2006 Jan 5;354(1):11-22). The Subcommittee also noted the draft Antigen Review presented to the Ministry of Health.
- 2.9 The Subcommittee noted the findings of Vesikari et al. (*N Engl J Med.* 2006 Jan 5; 354(1):23-33) in relation to RotaTeq. In particular it noted:
- 2.9.1 The study was a randomised, double blind, placebo controlled safety and efficacy study of infants from Finland and the USA (69,274 randomised).
  - 2.9.2 Treatment was 3 oral doses of live pentavalent human-bovine (WC3 strain) reassortment rotavirus vaccine, containing human serotypes G1, G2, G3, G4 and P[8], or placebo.
  - 2.9.3 68,038 of the subjects received at least one dose, vaccine or placebo (98.2% of those randomised), of whom 59,210 received three doses (85% of randomised) and were followed for safety for 42 days after the third dose. 56,310 (81%) were followed for 1 year after the first dose.
  - 2.9.4 Rates of incidence of intussusception were not seen as significantly different between vaccination and placebo arms.
  - 2.9.5 Use of health care resources was assessed on a 'per protocol' rather than 'intention to treat basis'.
  - 2.9.6 Visits to the Emergency Room: 13 Vaccinated and 191 placebo patients (93% relative reduction);
  - 2.9.7 Hospitalisation for rotavirus: 6 vaccinated and 138 placebo patients (95.8% relative reduction); and
  - 2.9.8 Number of lost work days of parents: 65 for vaccinated vs. 4487 for placebo patients.
- 2.10 The Subcommittee noted the findings of Ruiz-Palacios et al. (*N Engl J Med.* 2006 Jan 5;354(1):11-22) in relation to Rotarix. In particular it noted:

- 2.10.1 The study was a multinational, randomised, double-blind, placebo-controlled, phase 3 trial. The study recruited 63,225 infants to receive two doses of the HRV vaccine or placebo;
- 2.10.2 The primary efficacy end point was the prevention of severe rotavirus gastroenteritis, according to the case definition, from two weeks after the second dose (i.e. after completion of the full vaccination course) until one year of age. The secondary end points were efficacy against severe rotavirus gastroenteritis defined according to the Vesikari scale, efficacy against gastroenteritis associated with specific circulating rotavirus types, and efficacy against severe rotavirus gastroenteritis occurring after the first dose. Other end points were the prevention of hospitalisation due to rotavirus gastroenteritis, of hospitalisation for any reason, and of severe gastroenteritis from any cause;
- 2.10.3 The primary and secondary safety objectives were to assess the risk of definite intussusception within 31 days after the administration of each vaccine dose and to assess the occurrence of serious adverse events, including intussusception, during the entire study period;
- 2.10.4 The study included a significant number of developing countries and so estimates of reduction in hospital resources may not be able to be adopted for New Zealand's setting;
- 2.10.5 20,169 infants were enrolled in the evaluation of efficacy and were followed until they were one year;
- 2.10.6 No statistical differences in risk of intussusception were reported (RR -0.32, 95% CI -2.91 to 2.18, P=0.78);
- 2.10.7 Significantly fewer serious adverse events were reported in the vaccine group than in the placebo group (293.0 vs. 331.8 events per 10,000 infants, P = 0.005);
- 2.10.8 The hospitalisation rate was significantly lower in the vaccine group than in the placebo group (279.7 vs. 317.9 hospitalisations per 10,000 infants, P = 0.005);
- 2.10.9 Overall mortality did not differ significantly between the vaccine recipients and the placebo recipients. Fifty-six deaths occurred in the vaccine group, and 43 in the placebo group (P = 0.20); and
- 2.10.10 There were 12 children in the vaccine group and 77 in the placebo group with severe rotavirus gastroenteritis according to the clinical definition (2.0 vs. 13.3 children with at least one episode per 1000 infant-years, P<0.001), resulting in a vaccine efficacy of 84.7 percent (P<0.001) against severe rotavirus gastroenteritis from two weeks after dose 2 until one year of age.
- 2.11 The Subcommittee considered that the two commercially available vaccines (Rotarix and RotaTeq) were of equal efficacy and PHARMAC could consider the

Subcommittee's considerations as applying equally to both vaccines. Members considered that the two vaccines had a same or similar clinical efficacy. Members considered that the evidence for RotaTeq did not support any improved clinical outcomes as a result of the G2 strain inclusion. Members considered that there was cross-protection between strains from vaccine or illness, but that it was not complete.

- 2.12 The Subcommittee considered that vaccine effectiveness would be between 80-85% for high income countries such as New Zealand.
- 2.13 The Subcommittee noted that both vaccines were oral and can be given as part of the existing vaccine schedule. Members considered that the approved dosing frequency, either 2 or 3 doses, of each vaccine would be appropriate for the New Zealand setting.
- 2.14 The Subcommittee considered some further requests from PHARMAC staff for incorporation into cost effectiveness modelling. Members noted that the paper by Valazquez et al (N Engl J Med 1996 335:1022) which described the rates of incidence of rotavirus infection and highlighted the risk of repeat as well as asymptomatic infections. The Subcommittee provided clinical advice relating to the impact on rotavirus infection on quality of life, for incorporation into cost utility analysis.
- 2.15 The Subcommittee noted that there are age restrictions (relating to risk of intussusception) on the dosing of rotavirus, indicating that patients late for vaccinations may not be deemed suitable for vaccination. Members noted that the first dose of rotavirus vaccine should be given to infants under 15 weeks of age, to avoid the age range in which intussusception is most likely to occur. Members considered that this time restriction may prompt other vaccines to be delivered in a timely manner.
- 2.16 The Subcommittee noted that there was insufficient clinical evidence and safety data for administration of rotavirus vaccination in infants over eight months of age.
- 2.17 The Subcommittee **recommended** funding rotavirus vaccination with a high priority.
- 2.18 The Subcommittee further **recommended** a restriction on rotavirus vaccination requiring the first dose to be administered in infants aged under 15 weeks of age and no vaccination being administered to children aged 8 months or over.

### **3 Varicella vaccine**

- 3.1 The Subcommittee considered an application for varicella vaccine for inclusion on the National Immunisation Schedule. The Subcommittee noted the Immunisation Technical Forum of the Ministry of Health had previously recommended funding of the varicella vaccine.
- 3.2 The Subcommittee noted that information and public policy around varicella vaccination is evolving, with the possible impact on herpes zoster disease burden

from introducing a universal childhood vaccination programme for varicella being uncertain but of concern.

- 3.3 The Subcommittee noted that varicella (or chicken pox) is the primary disease and herpes zoster (or shingles) is a reactivation disease.
- 3.4 The Subcommittee noted there are four different vaccines available. There are two mono vaccines for varicella only and two quadrivalent vaccines for measles, mumps, rubella and varicella (MMRV). The Subcommittee noted that there is also a herpes zoster vaccine; however PHARMAC has not received a proposal for the herpes zoster vaccine from a supplier at this time.
- 3.5 The Subcommittee noted that New Zealand has a temperate climate and that approximately 90% of pre-adolescents will contract the varicella virus, mainly in the later pre-school to primary school age group.
- 3.6 The Subcommittee noted that age is the most important risk factor for development of zoster. Virtually all studies conducted in numerous settings and with various study designs have indicated an association between age and increasing zoster incidence, extending to the oldest cohorts. One study indicated that zoster incidence increased with age by a factor of >10, from 0.74 per 1000 person years in children aged <10 years to 10.1 per 1000 person years in persons aged 80--89 years, with much of the increase beginning at age 50-60 years. Approximately 50% of persons who live to age 85 years will have experienced zoster.
- 3.7 The Subcommittee considered there would be approximately 50,000 cases of varicella per year. The Subcommittee considered that per 100,000 births there would be approximately 94,458 mild cases of varicella, 5,000 complicated cases, 539 hospital admissions, and 2 deaths. Members considered that severe varicella infection could result in long term morbidity, ranging from scarring to tetraplegia.
- 3.8 The Subcommittee noted that nine deaths were reported in New Zealand from varicella between 1994 and 2002 (some adults and some children). Complicated cases require hospitalisation and the Subcommittee stressed that the disease course can be severe and sometimes fatal for a small number of patients. The Subcommittee noted this contradicts the public perception that chicken pox is a benign disease.
- 3.9 The Subcommittee noted that the New Zealand Paediatric Surveillance Unit was undertaking a project to investigate the complications relating to varicella infection in New Zealand and the results should be available at the end of 2013.
- 3.10 The Subcommittee considered that congenital varicella was rare in New Zealand. The Subcommittee noted evidence cited in Ministry of Health's Immunisation Handbook 2011 suggesting that fewer than 2 percent of women acquiring varicella infection during the first 20 weeks of gestation subsequently give birth to an infant with congenital varicella.

- 3.11 The Subcommittee noted that the varicella vaccine was first licensed in 1986 for immune compromised patients. Members considered that the varicella vaccine (Oka strain varicella) has a good safety profile. The varicella vaccine was recommended by the CDC for all children in the USA in 1995, and members noted there are 17 years of safety data available. The herpes zoster vaccine was introduced in 2006 and contains 14 times the number of plaque forming units of varicella virus compared with the varicella vaccine. Members considered the herpes zoster vaccine has a good safety profile.
- 3.12 The Subcommittee noted that the one dose schedule of the varicella vaccine is 80% effective after 5 years (and 100% effective against severe disease). Members noted that those breakthrough cases that do occur tend to have mild disease.
- 3.13 The Subcommittee noted that in the USA the second dose varicella vaccine was recommended in 2006 as a response to breakthrough varicella. Members noted that the two dose schedule is stated to be 90% effective. The second dose can be administered one month apart in pre-schoolers. The Subcommittee considered it is possible that subsequent doses may be required in the future to manage waning vaccine efficacy.
- 3.14 The Subcommittee noted two areas of concern regarding the introduction of a childhood varicella vaccination programme. The first is the risk that if a vaccination programme is not universal the age distribution of varicella disease will be shifted into (more severe disease-susceptible) adolescents and adults. The second risk is the possible effect on the incidence of herpes zoster in those with previous varicella if circulating wild type virus disappears due to a universal immunisation programme.
- 3.15 The Subcommittee noted that varicella vaccination in children could shift the disease from the young to adolescents and adults, in whom disease is experienced as more severe, with a higher rate of mortality. Members noted this could increase the burden on pregnant women. Members recommended targeting a high rate of vaccination to reduce this risk. Members noted that following universal childhood vaccination there could be proportionately more adult cases of varicella but overall the absolute number of cases will be fewer.
- 3.16 The Subcommittee noted that childhood immunisation with varicella vaccine could reduce the exogenous boosting from natural wild varicella in the unvaccinated population. The Subcommittee noted that adults with a higher contact rate with children have more exposure to the wild varicella virus and have lower rates of herpes zoster (Brisson et al. Modelling the impact of immunization on the epidemiology of varicella zoster virus. *Epidemiology and Infection* 2000;125: 651–69, and Civen et al. *The Pediatric Infectious Disease Journal* 2009 ;28:954–9). Members noted predictions of increases in cases of herpes zoster. However the members considered that evidence for this potential increase was theoretical at this time.
- 3.17 The Subcommittee noted that on average cases of herpes zoster cost 4-5 times more to treat than varicella infection and have more severe symptoms of longer duration on average than varicella. Members considered that some predictions

suggest there would be an increase in rates of herpes zoster for the next 30 to 40 years following the introduction of the varicella vaccine (van Hoek et al Vaccine 30 (2012) 1225-1234), although members noted that views differ on this extrapolation.

- 3.18 The Subcommittee considered that one possible approach would be to introduce a funded herpes zoster vaccine concurrent with funding the varicella vaccine. Members considered that the age offered for herpes zoster vaccination could be from age 50 or 60 or even age 40 due to the possible earlier reactivation of herpes zoster. Members considered that herpes zoster incidence rates were likely to increase for the next 30-40 years and then fall. Members noted that there are cases of vaccine-acquired herpes zoster but the risk is 4 to 12 fold lower than the case incidence of herpes zoster from wild varicella infection (Civen R et al Ped IDJ.2009;28(11):954-9).
- 3.19 The Subcommittee noted the strength of the evidence for the use of varicella vaccine is good, although there remains a question around the impact on herpes zoster incidence. Members considered the quality of evidence was better for the effectiveness of varicella vaccination in preventing varicella than for the risks of increasing population disease burden from herpes zoster in the unvaccinated population.
- 3.20 The Subcommittee considered that the varicella vaccine would be associated with reductions in hospitalisations and GP attendances and costs relating to varicella infection. However members noted that it could increase the incidence and costs relating to herpes zoster cases.
- 3.21 The Subcommittee **recommended** the application to fund varicella vaccination for infants as part of the universal childhood vaccination programme with a high priority.
- 3.22 The Subcommittee **recommended** one dose at 15 months at the same visit as the MMR vaccine (not the MMRV vaccine), with a catch up programme at age 12-13 years.
- 3.23 The Subcommittee noted that there would be more breakthrough varicella with a one dose regime but this approach would still provide sufficient protection for the non-immune. Members noted another possibility was two doses administered close together in time. Members noted that MMRV as a first dose was associated with increased incidence rates of febrile seizures in children aged 12 to 23 months but would be acceptable for the second dose in older children.
- 3.24 The Subcommittee noted that Maori and Pacific people have a higher burden of skin and soft tissue infections such as cellulitis, for which varicella is a modifiable risk factor.
- 3.25 The Subcommittee noted that only a universal varicella vaccination programme would benefit the immune compromised population. Patients in this group are unable to have the vaccine themselves and rely on immunocompetent contacts round them to be immune to stop the transfer of infection. Members noted that a

cocooning approach alone was another option to protect this high risk population, but considered this would be less likely to be protective.

- 3.26 The Subcommittee noted the impact of the varicella vaccination programme on unvaccinated people getting varicella at a later age if only partial coverage achieved, and on people already exposed to wild varicella at an increased risk of experiencing herpes zoster. However members considered that the evidence for such an effect on herpes zoster is suppositional and that expert consensus was conflicting at this time.
- 3.27 The Subcommittee considered the uptake rate to use in modelling should be 80%, based on current New Zealand immunisation rates.

## 4 Pneumococcal vaccine

- 4.1 The Subcommittee reviewed a PHARMAC-generated application to list the 13-valent pneumococcal conjugate vaccine (PCV13) as a vaccine available to all infants.
- 4.2 The Subcommittee **recommended** that the application to fund PCV13 for infants be accepted only if cost neutral to PCV10, taking into account the early data indicating reduced acute otitis media (AOM) from PCV10 could improve the cost effectiveness of PCV10 further.
- 4.3 The Subcommittee noted that if there was an increase in invasive pneumococcal disease caused by the three serotypes not included in PCV10, then the advantage of PCV13 may be greater.
- 4.4 The Subcommittee **recommended** that the application be brought to the next Immunisation Subcommittee meeting so that the latest Environmental Science and Research (ESR) data could be considered.
- 4.5 The Subcommittee noted that the 10-valent pneumococcal conjugate vaccine (PCV10) was currently listed on the Schedule for all infants, having replaced the 7-valent pneumococcal conjugate vaccine (PCV7) since 2011. Members considered that PCV13 if funded would replace PCV10.
- 4.6 The Subcommittee considered that both PCV10 and PCV13 had the same effect on the seven serotypes in PCV7.
- 4.7 The Subcommittee discussed the possibility of crossover protection, which could lead to PCV10 protecting against serotypes not included in the vaccine. Members noted a claim by the supplier of PCV10 that it provided a 50% crossover in protecting against the 19A serotype.
- 4.8 The Subcommittee noted that since the introduction of PCV7 to the standard Immunisation Schedule, there has been an 80% reduction in reported invasive pneumococcal disease (IPD) in the under 2 year age group, though members noted that incidence rates were still high in Māori and Pasifika populations.
- 4.9 The Subcommittee noted from 2011 ESR data that there were 8 cases of IPD reported, with no deaths in the under 2 year old age group, and that about 30% of

current IPD cases are caused by the extra three serotypes (3, 6A and 19A) present in PCV13 and absent in PCV10. Members considered that only a few cases of IPD could be prevented by the change to PCV13.

- 4.10 The Subcommittee considered the evidence surrounding the prevention of acute otitis media in PCV10 and PCV13. Some members considered that, due to the protein carrier derived from non-typeable *Haemophilus influenzae* strains, PCV10 would be more effective at preventing AOM than PCV13. However, other members considered this had not been demonstrated sufficiently.
- 4.11 The Subcommittee considered that there were no strong conclusions as to which of the PCV10 or PCV13 vaccinations provides a greater reduction in all-cause pneumonia. Members did note that both the PCV10 and PCV13 vaccines have been associated with greater reductions in the incidence of pneumonia compared with the PCV7 vaccine.
- 4.12 Members considered that it was unclear if PCV13 provided a better prevention of pneumococcal diseases overall. Possible gains in IPD or pneumonia may be partially offset by a worsening in the prevention of acute otitis media. Members noted that the upcoming quarterly report from ESR might indicate if the incidence of IPD cases caused by 19A was on the rise, which might indicate a greater benefit from PCV13 and that ongoing surveillance is crucial.
- 4.13 The Subcommittee also discussed the immunisation program used for pneumococcal vaccines. Members noted the Palmu et al study (Lancet 2013; 381: 214–22) whose data indicates that for PCV10, a 2+1 immunisation program is “as good” as a 3+1 program.

## **5 Pertussis vaccine**

- 5.1 The Subcommittee noted that New Zealand had regular cyclical outbreaks of pertussis, Members noted that the epidemic periodicity has not changed in the post-vaccine compared with the pre-vaccine era and that the average annual hospital admission rate per decade for pertussis increased by 50% from the 1960s to the 1990s. Members noted that the 2000s were the first decade since the 1960s that the pertussis hospital admission rate has fallen. Members noted that this decrease in hospital admission rates coincided with the substantial increases in immunisation coverage that have occurred in New Zealand since 2007.
- 5.2 The Subcommittee noted that the current incidence of pertussis in the community is very likely to be under-reported and hence disease burden under-estimated. The Subcommittee noted that New Zealand is currently experiencing an epidemic. The Subcommittee considered the lack of community testing, case identification and notification to ESR all contribute to the current under reporting of pertussis and noted that until these issues are resolved the true disease burden caused by pertussis will be underestimated.
- 5.3 Members noted that the current acellular pertussis vaccine appeared to be less efficacious than older pertussis vaccines; however it was associated with lower rates of reactogenicity in children and, unlike whole cell vaccines, is

recommended for adults and children older than seven years. Members considered that *Bordetella pertussis* may be showing some antigenic movement as a result of the acellular vaccine. Members noted that antigenic shift was also observed in the whole cell vaccine era.

- 5.4 The Subcommittee considered that the aim of pertussis vaccination is to prevent severe disease in infants, as this group was that most at risk of death from or long term sequelae as a result of pertussis.
- 5.5 The Subcommittee noted the recent widening of access to the pertussis vaccine to include women who are between 28 and 38 weeks pregnant. Members noted the United Kingdom's Joint Committee on Vaccination and Immunisation (JCVI) draft minutes from the 30 August 2012 meeting. Members noted that the JCVI considered vaccination could be offered at 20 weeks, but that in order to maximise the protection provided to new-born infants, immunisation should be offered within the period of 28 to 38 weeks of pregnancy with immunisation between 28 to 32 weeks being optimal.
- 5.6 Members noted the Halperin et al study (Clin Infect Dis 2011; 53; 885-892) which reported that the antibody response to pertussis vaccination reached a peak 14 days after vaccination, which may not be sufficiently rapid to protect infants in the first weeks of life if the vaccine is delivered post-partum. The Subcommittee noted the Halperin study showed that there would be little or no antibody protection to the infant from breast milk.
- 5.7 The Subcommittee considered that the evidence for a cocooning strategy for pertussis was not strong. Members noted the Wiley et al study (Vaccine 2013;31:618-625) which reported that most identified sources were from the household, of which 39% (95%CI 33-45%) were mothers, 16% (95%CI 12-21%) fathers, and 5% (95%CI 2-10%) grandparents. Estimates for siblings (16-43%) and non-household contacts (4–22%) were more heterogeneous. For 32-52% of infant cases, no source was identified.
- 5.8 The Subcommittee **recommended** that PHARMAC and the Ministry of Health promote the timely and complete administration of pertussis vaccination during pregnancy, infancy (at ages 6 weeks, 3 months and 5 months) and childhood (currently aged 4 and 11 years), as vaccinating at these times are the activities most likely to prevent infants contracting pertussis infection.
- 5.9 The Subcommittee noted that there were two deaths associated with pertussis in 2012. Members noted that on average there would be one death each year associated with pertussis.
- 5.10 The Subcommittee noted that there would be a small reduction in health-sector expenditure due to reduced GP visits and hospitalisations if access was widened. The Subcommittee noted that the vaccine would take at least two weeks to become effective in close contacts.
- 5.11 The Subcommittee noted that approximately 1,000 (between 600 and 3,000) mothers would need to be vaccinated to prevent 1 hospital admission due to pertussis in an infant.

- 5.12 The Subcommittee noted that some General Practitioners were charging for the consultation and administration of pertussis vaccination to eligible women above the immunisation benefit, even though the vaccine was fully funded.
- 5.13 The Subcommittee noted that some midwives were recommending that women receive the pertussis after they have given birth rather than when they are pregnant. Members considered that more information should be provided to lead maternity carers (LMCs) to encourage more timely vaccination in this population.
- 5.14 The Subcommittee noted that the 15 month vaccination of pertussis had been removed from the National Immunisation Schedule in 2006. Members recommended PHARMAC staff approach ESR to provide pertussis notifications broken down by age group from 1996 and compare these with changes to the Immunisation Schedule. Members considered that this would help identify if a 15 month booster dose of pertussis vaccine should be re-introduced into the national immunisation Schedule. Members noted that this information should be presented at a future meeting for consideration of access to this vaccination.