衞生防護中心
Centre for Health Protection

Scientific Committee on Vaccine Preventable Diseases

Updated Recommendations on the Use of Pneumococcal Vaccines for High-risk Individuals

Background

Invasive pneumococcal diseases (IPD), including sepsis, meningitis and bacteraemic pneumonia, are caused by *Streptococcus pneumoniae*. IPD can occur in persons of any age but the risk is substantially higher for people at extremes of age. In Hong Kong, the annual incidence of IPD ranged from 1.7 to 2.9 per 100,000 from 2007 to 2015. The incidence is higher in children younger than 5 years of age and adults 65 years of age and older. Other groups with a high risk of severe IPD include persons who have history of clinical IPD, are immunocompromised, have certain underlying chronic illnesses, or have cochlear implants.

2. There are two types of pneumococcal vaccines available in the market, namely a 23-valent pneumococcal polysaccharide vaccine (23vPPV) and pneumococcal conjugate vaccines (PCV). The Scientific Committee on Vaccine Preventable Diseases (SCVPD) has recommended 23vPPV to high risk individuals 2 years of age and older and elders 65 years of age and older since 2007. Moreover, SCVPD recommended to incorporate the 7-valent PCV (PCV7) in the Hong Kong Childhood Immunisation Programme (HKCIP) for children under 2 years of age since September 2009. The standard regimen includes a primary series of 3 doses at 2, 4 and 6 months and a booster dose at 12-15 months. PCV7 was later replaced by PCVs with greater serotype coverage (PCV10 in October 2010 and PCV13 in December 2011) while the vaccination schedule remains unchanged.

3. In recent years, there are several developments in the use of PCV13. First, the indication of PCV13 was extended to adults in overseas countries such as the United States, United Kingdom and Australia in 2013 and 2014. Moreover, several studies on the immunogenicity and safety of PCV13 on older adults were also published in 2013 and 2014. Furthermore, a large-scale randomized placebo-controlled trial (CAPiTA trial) conducted in the Netherlands evaluating clinical efficacy of PCV13 against pneumococcal pneumonia and IPD in over 80,000 adults 65 years of age and older was published in March 2015[1]. The CAPiTA trial demonstrated clinical efficacy of PCV13 against vaccine-type IPD and non-invasive pneumococcal pneumonia in this age group. However, PCV13 was not effective against noninvasive pneumococcal community-acquired pneumonia overall and all-cause pneumonia. Furthermore, there were no statistically significant reduction in the relative risks of death from any cause, pneumococcal community-acquired pneumonia and IPD.

4. On the other hand, previous studies on 23vPPV indicated that though the vaccine was generally effective in preventing IPD, but its efficacy against non-invasive pneumococcal pneumonia was poor[2]. In Hong Kong, a large-scale prospective cohort study showed dual vaccination of 23vPPV and trivalent influenza vaccine was effective in protecting elderly persons with chronic illness from developing complications from respiratory, cardiovascular, and cerebrovascular diseases and resulted in reduction in hospitalization, coronary or intensive care admissions and death[3].

5. Immunogenicity studies on PCV13 and 23vPPV showed that PCV13 elicited non- inferior or better immune response for serotypes commonly covered by both vaccines*. However, it is worth noting that 23vPPV contains 11 additional serotypes and theoretically offers extra protection. From 2007 to September 2015, 70% and 81% of IPD cases in adults 65 years of age and older were caused by serotypes covered by PCV13 and 23vPPV respectively.

Recommendations

6. In December 2015, the SCVPD convened a meeting to review the use of pneumococcal vaccines. Having reviewed current scientific evidence and recommendations among the international communities, the recommendation of pneumococcal vaccination for individuals aged 2 years or above was updated (Table 1).

7. The SCVPD continues to recommend either a single dose of PCV13 or a single dose of 23vPPV for elders 65 years of age and older without high risk conditions.

8. The SCVPD recommends high-risk individuals aged 2 years or above to receive a single dose of PCV13, followed by a single dose of 23vPPV 1 year later. For those who have already received 23vPPV, a single dose of PCV13 should be administered 1 year later. For those who have already received any PCV13, a single dose of 23vPPV should be administered 1 year later.

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*PCV13 consists of pneumococcal capsular polysaccharides for serotypes 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, 23F.
23vPPV consists of pneumococcal capsular polysaccharides for serotypes 1, 2, 3, 4, 5, 6B, 7F, 8, 9N, 9V, 10A, 11A, 12F, 14, 15B, 17F, 18C, 19A, 19F, 20, 22F, 23F, 33F.

Table 1: Recommended use of 13-valent pneumococcal conjugate vaccine (PCV13) and 23-valent pneumococcal polysaccharide vaccine (23vPPV) for personal protection in persons age 2 years or above*.

(Updated in July 2019 with changes highlighted yellow)

	Age 2 to 64 years[#]	Age 65 years and above[#]
Without high risk conditions[α]	Not recommended^	Either a single dose of PCV13 or a single dose of 23vPPV
Individuals with high risk conditions[α] who have not received any pneumococcal vaccines	One dose of PCV13 followed by one dose of 23vPPV 1 year after the previous PCV13 vaccination^	
Individuals with high risk conditions[α] who have received 23vPPV	Single dose of PCV13 1 year after previous 23vPPV vaccination^	
Individuals with high risk conditions[α] who have received PCV13	Single dose of 23vPPV 1 year after previous PCV13 vaccination^	

*Persons age under 2 years should follow the Hong Kong Childhood Immunisation Programme to receive age-appropriate pneumococcal vaccination.

^According to the updated schedule of PCV13 under the Hong Kong Childhood Immunisation Programme recommended by SCVPD in March 2019, children aged 1 year to less than 6 years who have not received any booster dose of PCV13 at 12 months or after should receive a single dose of PCV13 catch-up vaccination (https://www.chp.gov.hk/files/pdf/updated_recommendation_on_the_use_of_pcv3_in_hkcip_march2019_accessibility.pdf).

#Besides pneumococcal vaccination, individuals (except those with known contraindications) should also receive seasonal influenza vaccine. The clinical efficacy for dual vaccination in elderly in preventing hospitalization and death associated with respiratory, cardiovascular and cerebrovascular disease has been proven in local study[3]

[α] High risk conditions include the following:

(a) History of invasive pneumococcal disease
(b) Immunocompromised states:
- Asplenia, HIV/AIDS, primary immunodeficiency
- Immunodeficiencies related to malignancy and transplantation
- Immunodeficiencies related to use of immunosuppressive drugs / systemic steroid

(c) Chronic disease:
- Chronic cardiac, pulmonary, liver or renal disease
- Diabetes mellitus or CSF leakage

(d) With cochlear implants

(Essential hypertension per se is not considered as a high risk condition)

^For individuals who have not received any pneumococcal vaccines, it is recommended to receive PCV13 before 23vPPV for better immune response. Those who previously received 23vPPV is recommended to receive PCV13 one year later to avoid hypo-responsiveness to the vaccine antigens.

References

1. Bonten MJ, Huijts SM, Bolkenbaas M, et al. Polysaccharide conjugate vaccine against pneumococcal pneumonia in adults. *N Engl J Med.* 2015;372(12):1114-1125.
2. Moberley S, Holden J, Tatham DP, Andrews RM. Vaccines for preventing pneumococcal infection in adults. *Cochrane Database Syst Rev.* 2013;1:CD000422.
3. Hung IF, Leung AY, Chu DW, et al. Prevention of acute myocardial infarction and stroke among elderly persons by dual pneumococcal and influenza vaccination: a prospective cohort study. *Clin Infect Dis.* 2010;51(9):1007-1016.