Background
Infectious causes by Streptococcus pneumoniae is one of the major causes of death of children under the age of five. There are currently two pneumococcal conjugate vaccines in Malaysia. However, pneumococcal vaccination is not currently part of the national immunization program (NIP). The cost-effectiveness and public health impact of NIP using either vaccine has not been previously studied.

Objective
To study the cost-effectiveness of a population-wide, pneumococcal vaccination program in Malaysian children with the 13-valent pneumococcal conjugate vaccine (PCV13) versus the 10-valent pneumococcal conjugate vaccine (PCV10).

Methods

- A 30-year Markov model as shown in Figure 1.0, developed by Innovus was used.
- Analysis was conducted based on payer’s perspective.
- Cost were calculated based on drug acquisition cost as well as direct medical costs only.
- 3% discount rate was applied to both costs and outcomes.
- Both direct and indirect effects of the vaccines on disease prevention were considered in the analysis.
- Deterministic sensitivity analysis was performed by varying the parameters by ±10% from base case

Model input:
- Population size was about 28 million (Year 2012).
- Local and regional epidemiology data were used when possible.
- Outpatient visits for pneumonia were estimated from reported incidence of inpatient pneumonia with an age based coefficient derived from the ratio of outpatient/inpatient visits in United States (US).
- Using the ratio of outpatient/inpatient AOM cases in US as a reference, incidences of outpatient AOM were assumed to be 5 times of that of complex AOM.

PCV 13 and PCV 10 effectiveness was extrapolated from PCV7 data, taking into consideration the local serotype distribution.

- Medical and vaccine costs were obtained from local sources while lifetime medical costs of disability were estimated from US data.
- The additional protection from non-typeable H. influenzae with PCV10 was capped at 4% for complex otitis media in children <2 years old.

Assumptions
- The analysis assumed a 3-dose vaccine series
- 96% vaccine coverage for both PCV10 and PCV13
- The private market acquisition cost for the vaccines was used
- The model assumed a lower immunogenic response for PCV10 relative to PCV13

Based on experience with the 7-valent pneumococcal vaccine, it was assumed that no cross-reactivity occurs for PCV10 with serotypes 6B and 6A as well as 19F and 19A.

Conclusion
Based on the present analysis, PCV13 appears to be a more cost-effective alternative in a NIP.