

**Title** Pneumococcal Conjugate Vaccine for Children Below Five Years Old

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**Reference** Health Technology Assessment Report  
<http://www.moh.gov.my/index.php/pages/view/113>

**Aim**

To undertake a systematic review on the effectiveness or efficacy, safety and cost effectiveness of using 10-valent and 13-valent pneumococcal conjugate vaccine.

**Conclusions and results**

Thirty-six studies were included in this review, where one of the studies was a systematic review; one study was a health technology assessment, eleven RCT's, three cross sectional studies and twenty economic evaluation studies. For efficacy/effectiveness, fourteen articles were included, whereby thirteen studies involved PCV13 as the main intervention, with only one study involving PCV 10 as the main intervention and only two studies directly comparing PCV13 and PCV10. For safety, nine articles were included, out of which eight studies had PCV 13 as the main intervention, with only one study that involved PCV 10 as the main intervention and only one study directly comparing PCV13 and PCV10. For cost effectiveness, twenty articles were included with twelve studies that included PCV 13 as the main intervention, six studies that involved PCV 10 as the main intervention while six studies were directly comparing PCV13 and PCV10. There was fair to good level of evidence to show that PCV7 is no longer cost effective because of increases in invasive diseases caused by nonvaccine serotypes, which reduces the overall direct effects of vaccination. The 10-valent and 13-valent pneumococcal vaccines showed better net health benefits than PCV7. Total programme costs can be lowered by reduction in vaccine prices. A national immunization program with PCV10 or PCV13 was estimated to prevent additional cases of disease among children and save additional costs due to treatment of acute otitis media (AOM) and pneumococcal diseases. Choosing between the PCV10 and PCV13 vaccines will depend on the preference of the decision maker either to prevent the severe invasive pneumococcal diseases (IPD) cases only, or prevention of AOM. There was fair to good level of evidence to show that PCV13 was predicted to provide a higher impact on IPD and CAP, while PCV10 was expected to provide a substantially greater reduction in AOM.

**Recommendations (if any)**

Based on the above review, it is recommended that regular surveillance is conducted since changes in serotypes may occur naturally with time and serotypes replacement by nonvaccine serotypes in response to vaccine pressure. The surveillance data is required to determine the usefulness of available pneumococcal vaccines and the need for new vaccine. Choosing between the PCV10 and PCV13 vaccines will depend on the preference of the decision maker / policy maker either to prevent the severe IPD cases only, or prevention of AOM. PCV13 was predicted to provide a higher impact on severe invasive pneumococcal diseases (IPD) and community acquired pneumonia (CAP), while PCV10 was expected to provide a substantially greater reduction in acute otitis media (AOM). PCV13 may be the choice to prevent death due to pneumococcal diseases in order to achieve Millenium Development Goal 4 (MDG4). Cost of PCV10 and PCV13 are expensive and our low less than 5 mortality need also to be considered before embarking on the national pneumococcal conjugate vaccination programme. Affordability and sustainability is also an important issue for any national programme. Hence, taking into account our current Malaysian scenario, PCV13 should be given for high risk group first before considering giving it for all children below 5 years old.

**Methods**

Major electronic databases such as Medline, Embase, PubMed, EBM reviews, HTA databases, Cochrane Central Register of Controlled Trials and Cochrane Database of Systematic Review, Database of Abstracts of Reviews of Effects (DARE), NHS Economic Evaluation Database (NHS EED) and Health Technology Assessment (HTA) databases were searched up to February 2014. Studies were reviewed separately according to the research questions. Retrieved records were screened for relevance. The search was limited to publication year from 2000-2014. Additional articles were identified by reviewing the bibliographies of retrieved articles and hand searching of journals. Potentially relevant papers were retrieved and independently checked against predefined criteria for inclusion by two reviewers. Included reviews and primary papers were critically appraised using the Critical Appraisal Skills Programme (CASP) and evidence was graded based on guidelines from U.S./Canadian Preventive Services Task Force and data were extracted and narratively presented.

**Further research/reviews required**

It is also recommended that local economic evaluation and research should be conducted considering our healthcare systems as well as local costing that will further provide more evidence to support the above strategies.

**Written by**

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