PriorityVax

PCV PRODUCT SELECTION: PAPUA NEW GUINEA

REQUEST

Application to Gavi (2011) to introduce PCV13 into routine childhood vaccinations, with the secondary option of PCV10.

BACKGROUND

Pneumonia was the most common cause of death and hospitalizations in children under 5 years old in PNG.[1] Infection pressure was particularly high with carriage rates for *S. pneumoniae* peaking at nine months (84% of children positive for *S. pneumoniae*).[2] Having already introduced Hib, pneumococcus was the most important cause of pneumonia.

In the absence of serotype/-group data for PNG, the Gavi application included summary data from Oceania to identify the proportion of serotypes covered by the two vaccines.[2] Two RCTs have been conducted on PCV in PNG, one prior to the application, examining the scheduling of PCV7,[3] but reporting later (2005-2009) and one comparing PCV10 and -13 (2011-2016).[4]

PNG had high rates of pneumonoccocal carriage and a large number of circulating serotypes (n=65)[4], but the RCTs concluded that all three PCV vaccines were safe, immunogenic and compatible with an accelerated schedule (at 1, 2 and 3 months).

PCV10 additionally offers protection against non-typeable *Haemophilus influenzae* (NTHi) hence otitis media, although the 2011 RCT concluded that there was no difference in carriage of NTHi between children receiving PCV10 or -13.[4]

A 2008 review of the storage concluded that there was adequate space at both local and national levels and that an accelerated schedule of either formulation, to protect children in early infancy, fits within the EPI.

[1] Papua New Guinea Department of Health. 2009. “Papua New Guinea Child Health Policy and Plan 2009–2020.” Port Moresby: Department of Health.
[2] Johnson, Hope L., Maria Deloria-Knoll, Orin S. Levine, et al. 2010. PLoS Medicine 7 (10): e1000348.
[3] Aho, Celestine, Audrey Michael, Mition Yoannes, et al. 2016. Vaccine Reports 6 (December): 36–43.
[4] Pomat, William S, Anita H J van den Biggelaar, et al. 2019. Clinical Infectious Diseases 68 (9): 1472–81.

SCENARIO

The two vaccines are similar across most criteria, however key criteria selected in this case study include the proportion of serotypes covered (53% weight), storage requirements (27%), the cost per dose (14%), and protection against Otis media (6%). Weights were based on a rank-centroid approach, biasing weights (most to the first, second, etc) attributes.

Not that multiple sources exist for the serotype coverage and cost can be assessed both assuming Gavi co-funding and full costs.

Criteria	PCV10	PCV13	Source
Serotypes covered (%)	75	79	[2]
	31	46	[3]
	44.1	45.4	[5]
Cost, (USD with co-funding)	3.5	3.5	UNICEF (2018)
(USD without co-funding)	21.41	23.99	MI4A (2018)
Storage/dose (cm^3)	4.8	12	WHO
Protection against Otis media	Yes	No	[6]

OUTCOMES

The two vaccines are very similar, and despite putting greatest weight on coverage of serotypes, PCV10 is prioritized.

Assuming Gavi co-funding, there is no difference in the cost of the vaccine and this is therefore not likely to be a significant consideration.

Storage was considered adequate; however, the relative importance of storage space may depend on other activities.

[5] Greenhill, Andrew R., Suparat Phuanukoonnon, et al. 2015. BMC Infectious Diseases 15 (1): 485.
[6] Prymula R, Peeters P, Chrobok V, et al. (2006) The Lancet 367(9512): 740–8.