Evaluating the Impact and Cost-effectiveness of a Reduced-Dose Schedule for Pneumococcal Conjugate Vaccine in Fiji: A Modelling Study

22nd July 2025

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by Fulgence Niyibitegeka

Acknowledgements

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Funders

Melbourne Research Scholarship

NHMRC Centre of Research Excellence fo Pneumococcal Disease Control in the Asia-Pacific

DFAT funding support

Background

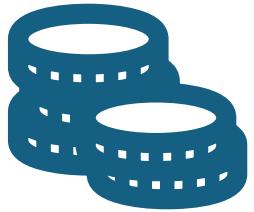
- Pneumococcal conjugate vaccine (PCV) effectively prevents pneumonia and invasive pneumococcal diseases (IPD), two leading killers of children under five.

- Commonly used schedules include 3+0 and 2+1.

Current PCV schedule in Fiji

Fiji uses 3+0 PCV schedule since 2012

High coverage and substantial disease burden reduction

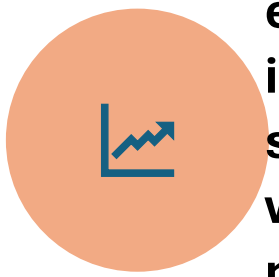


High PCV cost is questioning sustainability

Why optimize the PCV schedule ?

High cost of 3 doses PCV +

Declining donor support +



Immunization expenditure is increasing substantially with addition of new costly vaccines

The 1+1 schedule option

Reduced-dose schedules like 1+1—one primary dose and one booster—have shown promising results according to several clinical trials.

The UK adopted this in 2020, leveraging herd immunity to maintain protection.

What we evaluated

Will switching from a 3+0 to a 1+1 PCV schedule increase pneumococcal disease in Fiji?

Is the 1+1 schedule more cost-effective than the current 3+0 schedule?

How much could Fiji save by adopting the 1+1 schedule over the next decade?

Disease modelling approach

Used an age-stratified transmission model informed by local carriage and disease data to project health outcomes from 2024 to 2034 under each schedule.

Clinical endpoints: meningitis, meningitis sequelae, sepsis, invasive pneumonia, non-invasive pneumonia, acute otitis media

Cost-effectiveness modelling

Analytical framework	Details
Design	Cost-effectiveness analysis
Perspective	Provider, societal
Interventions/comparators	PCV 1+1 Vs 3+0 schedule
Model	Economic model + mathematical model (susceptible, infectious, susceptible)
Discount rate	3 %
Costs	Diseases cost, vaccine procurement cost, vaccine delivery cost and policy implementation cost
Outcome	disability-adjusted life-years (DALYs)

Key findings: Health outcomes

10-Year impact of switching to 1+1:

- 2 additional cases of IPD.
- 1 additional death
- 80 additional cases of pneumonia

40 DALYs

Financial impact – cost savings

10-Year impact of switching to 1+1:

+ $38,578 – increased disease treatment

– $1,464,010 – lower program cost

Net cost saving

= $1,425,432

Efficiency – is 3+0 worth it?

Cost/IPD = $650,749

Cost/death = $952,873

Cost/DALY = $35,913

- **Interpretation**: Continuing with the current PCV schedule would cost $650,749 to prevent one additional IPD case compared to a reduced schedule.

- Fijian GDP per capita of US$5,868 in 2023

Conclusion & policy relevance

A reduced schedule may improve efficiency while maintaining protection.

Ongoing disease surveillance will be key to validating these projections