22 May 2025

PCV rollout in Somaliland: modelling introduction in a low-coverage setting

*Gregory Barnsley[1], Abdirahman Ibrahim Hassan[2], Mohamed Abdi Hergeye[2], Saed Ibrahim[3], Casey Pell[4], Catherine Satzke[4], Abdikarim Mohammed Ahmed[3], Rachael Cummings[5], Bhargavi Rao[1], Francesco Checchi[1], Stefan Flasche[1], **Kevin van Zandvoort**[1]

[1]London School of Hygiene & Tropical Medicine, London, UK; [2]Republic of Somaliland Ministry of Health Development, Hargeisa, Somaliland; [3]Save the Children International, Hargeisa, Somaliland; [4]Murdoch Children's Research Institute, Parkville, VIC, Australia; [5]Save the Children UK, London, UK

* gregory.barnsley@lshtm.ac.uk

Introduction

Somaliland is a country with high childhood mortality associated with respiratory diseases, including pneumococcal disease. Pneumococcal conjugate vaccine (PCV) has not been introduced as a routine immunisation in the country and current vaccinations have a low uptake, with DTP3 coverage lower than 20%. However, in this fragile setting with nomadic populations, improved coverage might not be achievable in the short-term. We modelled the impact of PCV rollout on pneumococcal disease in this setting and explored how low coverage affects optimal choices in the vaccination programme.

Methods

We fitted a model of pneumococcal carriage to data on pneumococcal carriage prevalence in children and adults in Hargeisa, Somaliland, in 2022. We simulated the first 5 years of a PCV rollout campaign, which provides protection against carriage and disease from high-risk serotypes and calculated the number of invasive pneumococcal disease (IPD) cases averted in children younger than 5 years. We compared the effect of PCV10 (PNEUMOSIL) to PCV13, the highest valence vaccine supported by Gavi, the Vaccine Alliance. We also compared the effect of the standard 3+0 vaccination schedule to a 2+1 schedule and explored the use of catch-up campaigns to accelerate the level of protection in the short term. We linked carriage to rates of IPD using serotype-specific estimates of invasiveness.

Ethics

This analysis was specified as a secondary analysis of the collected data in the protocol for Evaluating the Effectiveness of a Pneumococcal Immunisation Campaign in a Camp for Internally Displaced People trial, which was reviewed by the ethics committee of the London School of Hygiene & Tropical Medicine.

Results

Over the first 5 years, at 30% routine coverage and using a 3+0 schedule, PCV13 rollout would avert 339 (95% CrI 216–488) IPD cases. The comparison with PNEUMOSIL is complicated by serotype replacement and will be explored in-depth in the presentation. Under a 2+1 schedule, with the booster dose achieving lower coverage but longer protection, rollout would avert 335 (216–478) IPD cases. An under-5 catch-up (at 30% coverage) would accelerate the impact of the vaccine by 3.5 years compared with a scenario without catch-up, without substantially affecting the efficiency per dose. If PCV coverage was increased to 80%, 781 (501–1090) IPD cases would be averted in the base case scenario, without affecting the trends with PCV formulation, schedule, and catch-up campaigns.

Conclusion

Even at low coverage, PCV rollout in Somaliland would prevent a significant amount of IPD cases in children younger than 5 years. Using a catch-up campaign and a suitable vaccination schedule at rollout could improve the impact, while the efficiency of vaccination would be unaffected by the lower coverage. These results show that PCVs can be moderately beneficial even in settings without high vaccination coverage, though coverage should be maximised for optimal results.

Conflicts of interest

All authors declare no competing interests.