

Introduction of Ten valent Pneumococcal Vaccine imparts indirect protection to children in a rural population in Pakistan

MI Nisar¹, Sheraz Ahmed¹, Fyezah Jehan¹, Furqan Kabir¹, Shahira Shahid¹, Aneeta Hotwani¹, Ben Althouse², Cynthia Whitney³, S Asad Ali¹, Saad B Omer⁴, Anita KM Zaidi^{1,5}, Najeeha Iqbal¹

¹The Aga Khan University, Department of Pediatrics and Child Health, Karachi, Pakistan, ²Institute for Disease Modelling, Modelling, Bellevue, WA, United States of America, ³Centers for Disease Control and Prevention, Bacterial diseases, Atlanta, AL, United States of America, ⁴Yale Institute for Global Health, Yale School of Medicine, New Haven, AL, United States of America, ⁵The Bill & Melinda Gates Foundation

Introduction

- Ten valent pneumococcal vaccine PCV10 was introduced in Pakistan's Expanded Program on Immunization in 2012 as a 3+0 schedule without catchup immunization.
- Here we describe the direct and indirect effect of introduction of PCV10 on nasopharyngeal colonization in children under 2 years of age in a rural community in Pakistan.

Methodology

- From 2014 to 2018, children under the age of 2 years were randomly selected from a continually updated line listing of all children in two rural union councils of Matiari, Sindh in Pakistan.
- Nasopharyngeal swabs were collected using standard WHO guidelines by trained staff and were processed at Infectious Disease Research Laboratory at The Aga Khan University campus in Karachi using culture on sheep blood agar and Multiplex PCR methods described by CDC, USA.
- The serotypes were then classified as either vaccine type (VT) and non-vaccine type (NVT).
- We collected detailed information on sociodemographic, clinical history and vaccination status. We looked at carriage rates of VT and NVT serotypes over time in the vaccination and unvaccinated children and estimated direct, indirect, total and overall effect of the vaccine.

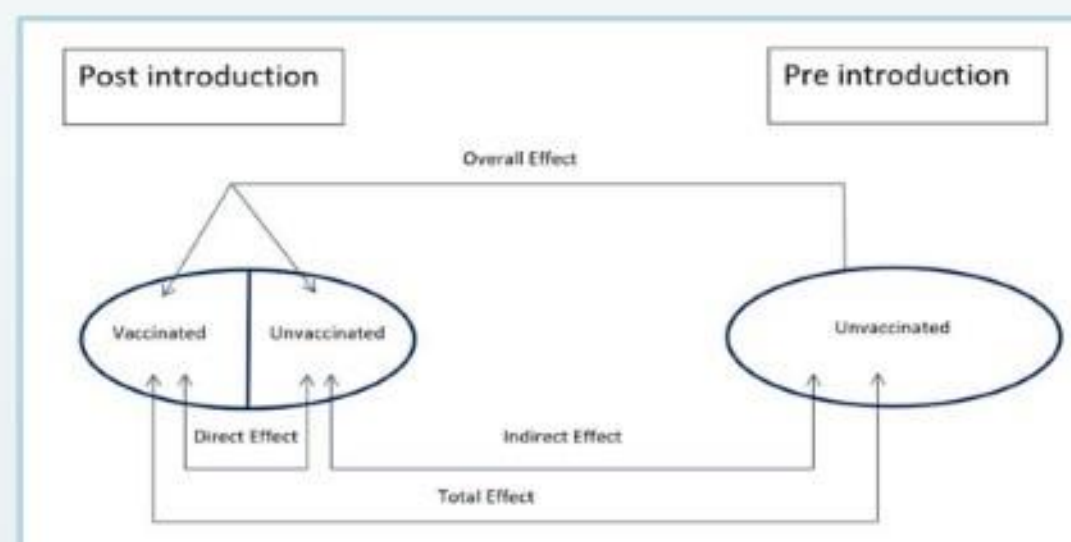


Figure 1-Schematic representation of direct, indirect, total and overall effect in two populations (modified from Halloran 2011)

Conclusion

We saw substantial decline in VT pneumococcal carriage in young children in a rural community which was evident in both vaccinated and unvaccinated groups. This is indicative of herd immunity and will potentially translate to decrease in pneumococcal disease burden in the population. Sustained increase in vaccine coverage is required for persistent benefits and close long-term surveillance is warranted to monitor seroreplacement by non-vaccine serotype.

Acknowledgements

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Results

- Of 3140 children enrolled, pneumococcal isolates were detected in 2370 (75%).
- Carriage over the period of 4 years decreased from 80.8% to 72.8% (p-value for trend 0.001).
- VT carriage decreased from 16.1% to 9.6% (p-value for trend < 0.001).
- VT carriage decreased from 11.3% to 8.1% (p-value for trend 0.031) in the vaccinated group and from 17.4% to 10.3% (p-value for trend 0.003) in the non-vaccinated group.
- Most significant decline was seen in serotypes 6B, 9V/9A and 19F.
- Proportion of fully immunized children increased from 41.0% to 68.4% (p-value for trend 0.001).
- Direct effect of the vaccine was calculated to be 33.5% (95% CI 19.5%-55.0%) and indirect effect to be 44.1% (95% CI 28.1% - 56.6%).

