

Prevalence and serotype distribution of *Streptococcus pneumoniae* colonization in infants too young to be immunized in Nepal

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INTRODUCTION

- In August 2015, Nepal introduced 10-valent pneumococcal conjugate vaccine (PCV10) using a 2+1 schedule as follows: 6 weeks, 10 weeks, and 9 months. Children less than 1 year were eligible for catch-up immunization at the time of introduction.
- Several studies have demonstrated the impact of PCV on vaccine-type nasopharyngeal carriage in unvaccinated individuals (i.e. indirect effects). However, such data are lacking in Asia and there is little evidence available in **children too young to be immunized**.
- To establish a comparator for assessing PCV10 indirect effects in this populations, we measured **prevalence and serotype distribution of pneumococcal colonization in young infants** prior to the introduction of PCV in Nepal.

METHODS

- **Participants:** Asymptomatic children or children with minor upper respiratory tract infections less than 8 weeks who were attending the outpatient clinic Patan Hospital for routine immunizations or accompanying a family member were recruited to the study.
- **Nasopharyngeal swabs** were obtained using updated World Health Organization methods.¹
- **Pneumococci** were cultured and identified phenotypically; serotyping was by the Quellung reaction.

RESULTS

- **600 infants** were recruited from July to December 2014. The median age was **6.4 weeks** (IQR: 6.3-6.7). Of these children, 55.7% (334/600) were male and 44.3% (266/600) were female.
- **Overall pneumococcal colonization** prevalence in this population was **18.8%** (113/600).
- We identified 38 different serotypes—see Figure 1.
- Most common serotypes among the 79 (69.9%) typeable pneumococci:
 - 19F (n=9, 8.0%)
 - 10A (n=7, 6.2%)
 - 6A (n=4, 3.5%)
- PCV10 and PCV13 serotypes accounted for **26.5%** (30/113) and **29.2%** (33/113) of isolates, respectively.

CONCLUSIONS

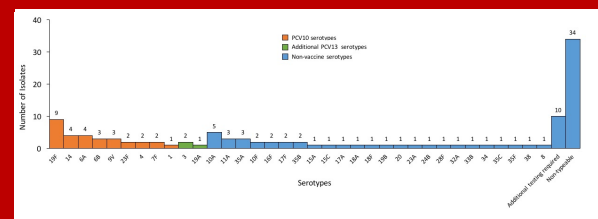
- Pneumococcal colonization among very young infants in Kathmandu is **somewhat less common** compared with that of similarly aged children in other Asian settings—see Table 1.
- Vaccine-type pneumococci accounts for a **minority** of colonizing strains in this age group.
- The data we present will form the **baseline** for an assessment of **indirect effects** on carriage among infants too young to be vaccinated in Nepal.

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FIGURE 1

Serotype distribution in children too young to be immunized from Patan Hospital



We considered 6A to be vaccine type due to cross-reactivity of the 6B component of PCV10 against 6A.

Table 1

Estimates of colonization prevalence and serotype distribution in children less than or equal to 6 weeks of age in Asia

Country	Setting	Age group	Colonization prevalence	PCV serotype coverage	Reference
Nepal	Urban	6 weeks	18.8% (113/600)	PCV10:23.9% (27/113) PCV13:29.2% (33/113)	Current study
Bangladesh	Rural	0-1 week	6.7%	Not provided*	[2]
Bangladesh	Rural	2-3 weeks	22%	Not provided*	[2]
Bangladesh	Rural	4-5 weeks	29%	Not provided*	[2]
Bangladesh	Rural	0-4 weeks	29.4% (10/34)	Not provided*	[3]
Bangladesh	Urban	0-4 weeks	18.8% (3/16)	Not provided*	[3]
India	Rural	4 weeks	3.8% (8/210)	Not provided	[4]
Papua New Guinea	Rural	0-2 weeks	39.8% (111/279)	Not provided	[5]
Philippines	Urban	6 weeks	27.7%	Not provided	[6]
Thailand	Rural	0 weeks	0.0%	N/A	[7]
Thailand	Rural	4 weeks	39.5% (93/234)	PCV13:46.2% (43/93)	[7]

* Serotype distribution data provided, but not for children less than 6 weeks of age.

Funding Statement:

The project is supported by the Gavi Alliance.

