Impact of vaccination on nasopharyngeal carriage pneumococcal genotypic diversity among children in The Gambia: a longitudinal study

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Background

- The nasopharynx serves as a reservoir for pneumococcal acquisition, carriage and transmission
- Pneumococcal conjugate vaccines (PCVs) decrease the carriage of vaccine type (VT) pneumococcal serotypes and increase the carriage of non vaccine type (NVT) serotypes
- However, the impact that vaccination has on the genotypic diversity and stability of *Streptococcus pneumoniae* (S. *pneumoniae*) in the nasopharynx remains unclear

Aim

To investigate the impact of vaccination on the genotypic diversity and stability of *S. pneumoniae* in the nasopharynyx

Method

- The villages were split into three groups of nine villages based on vaccination status, and nasopharyngeal swabs were collected over time (figure 1)
- Whole genome sequencing was performed on *S. pneumoniae* and in silico sequence type (ST) and in silico serotype derived

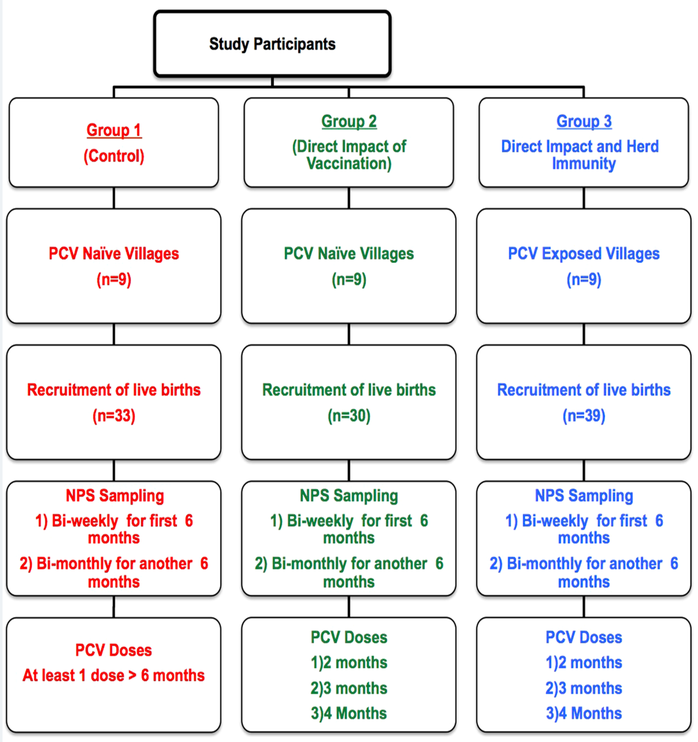


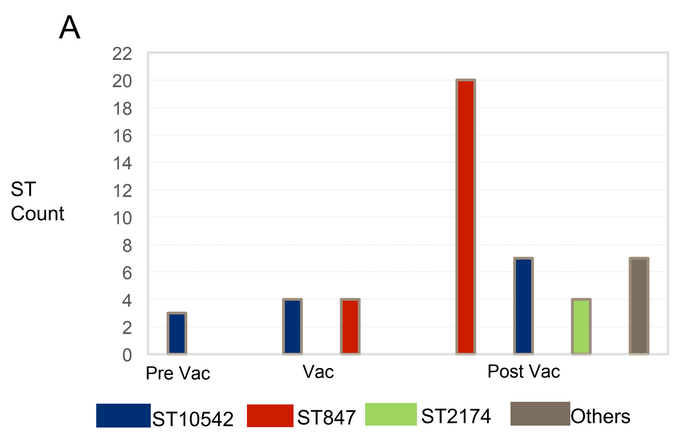
Figure 1: Flowchart of infant recruitment and sample collection

Results

- We obtained serotype and ST data for 323, 284 and 391 *S. pneumoniae* from group one, two and three respectively (Table 1)
- There was an increase in certain STs such as ST847 post vaccination (figures 1&2)
- *S. pneumoniae* from consecutive sampling points that differed in serotype also differed in genotype except in 2 cases – 15B/15C→17F: ST910 and 9L→19A: ST1735 (figure 3); indicative of serotype switching

Table 1: Serotype distribution and diversity of pneumococcal isolates in the three groups

Group 1			Group 2			Group 3		
serotype	No of specimens	No of STs	serotype	No. of specimens	No. of STs	serotype	No. of specimens	No. of STs
	n (%)			n (%)			n (%)	
4	6 (1.9)	1	4	1 (0.4)	1	4	0 (0.0)	0
6B	33 (10.2)	5	6B	16 (5.6)	3	6B	12 (3.1)	5
9V	9 (2.8)	1	9V	3 (1.1)	2	9V	1 (0.3)	1
14	22 (6.8)	2	14	12 (4.2)	1	14	1 (0.3)	1
18C	4 (1.2)	1	18C	0 (0.0)	0	18C	2 (0.5)	1
19F	22 (6.8)	6	19F	3 (1.1)	3	19F	8 (2.0)	4
23F	15 (4.6)	4	23F	6 (2.1)	1	23F	1 (0.3)	1
NVT	212 (65.6)	59	NVT	243 (85.6)	58	NVT	364 (93.1)	114
Total	323 (100)	79	Total	284 (100)	69	Undetermined	2 (0.5)	2
						Total	391 (100)	129



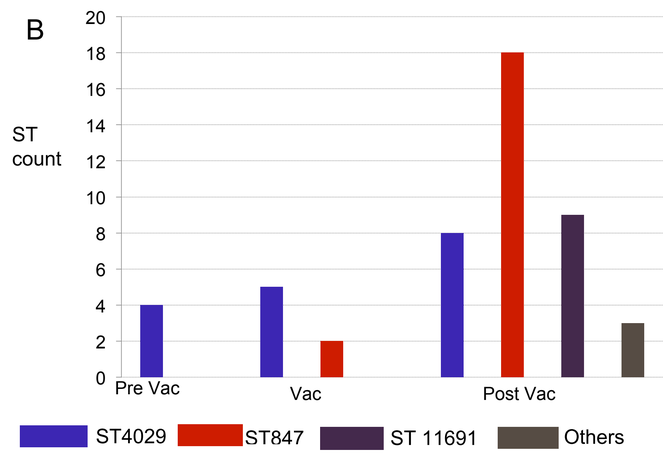


Figure 2: ST distribution of Serotype 19A in groups 2 (A) and 3 (B)

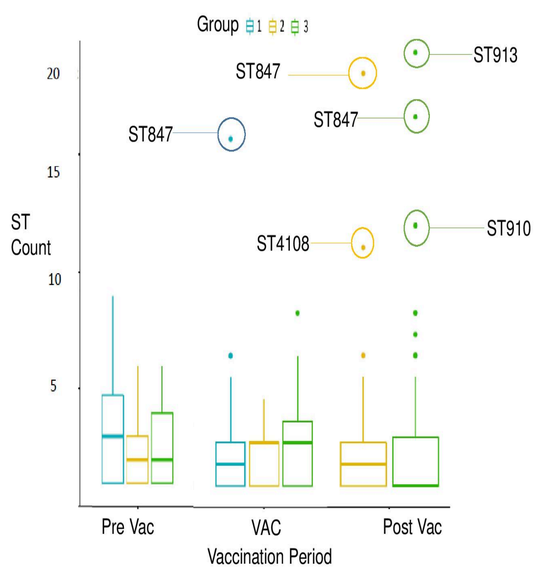


Figure 1: Box plot showing ST count plotted against vaccination period.
*pre vac: weeks 0-9, vac: weeks 10-17, post vac: weeks 18-54

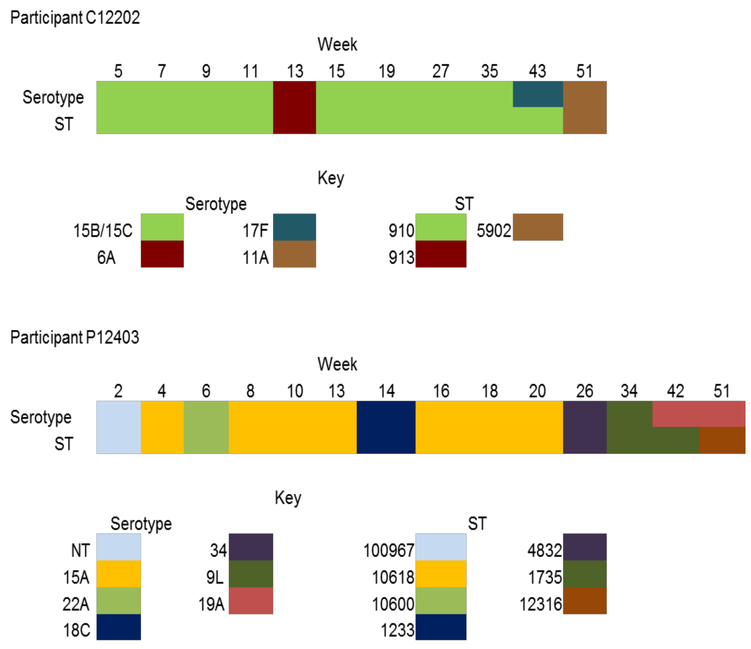


Figure 3: Serotype and ST data for participants C12202 and P12403.

Discussion

- Vaccine pressure may have lead to the rise in ST847 of serotype 19A
- Apart from two cases, a change in serotype was always associated with a change in ST indicative of the acquisition of a new strain.

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