

Streptococcus pneumoniae nasopharyngeal carriage rates, serotype distribution and vaccine effectiveness in vaccinated and non-vaccinated healthy children in Guatemala City.

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BACKGROUND

- *Streptococcus pneumoniae* (Spn) vaccines have different efficacy rate according to setting
- Assuming colonization as a surrogate for vaccine efficacy.
- Study looked for Spn nasopharyngeal carriage in:
 - vaccinated and non vaccinated
 - healthy children under 5 years of age
 - From public and private clinics
- Conjugated pneumococcal conjugated vaccine (PCV) was available only in private practice

OBJECTIVES

- To evaluate Spn nasopharyngeal carriage, serotype distribution and vaccine effectiveness for preventing colonization in healthy children under 5 years of age from Guatemala City.

METHODS

- Study approved by ethics committee, informed consent was obtained
- Included:
 - Healthy 2- 59 months children
 - No recent history of antibiotic use
 - One public and two private well-child clinics in Guatemala City.
- A single nasopharyngeal swab was performed to all subjects.

RESULTS

- 500 nasopharyngeal swabs were performed from November 2012 to January 2013.
- Colonization rate was 32%, 40.3% in the public and 18.5% in the private clinic.
- Serotyping was performed in 134 of 158 positive samples.
- Serotype specific colonization prevention was 100% for most vaccine related serotypes, with exception of serotype 6B, prevented in 95% (22/23) and 98% (83/84) for PCV7 and PCV13 respectively; and 19F that was prevented 96% (81/84) for PCV13. Serotype 15B was prevented 75% with PPSV23.
- Overall isolation of vaccine related serotypes was:
 - 43% (57/158) of serotypes are included in PCV7
 - 44% (59/158) of serotypes are included in PCV10
 - 50% (68/158) of serotypes are included in PCV13
 - 71% (96/158) of serotypes are included in PPS23



Table 1: Colonization rates and vaccine effectiveness

Vaccine type	Positive frequency (%)	OR	CI 95%		p value, chi squared test (CC)	Effectiveness for conjugated vaccine (1-OR)	
			Upper limit.	Lower limit			
At least 1 dose (n = 111)	Less than 1 dose	142 (36.5%)	Reference category			<0.001 (0.199)	72%
	PCV 7 (Prevenar 7)	5 (21.7%)	0.483	0.176	1.329		
	PCV 13 (Prevenar 13)	10 (11.9%)	0.235	0.118	0.469		
	Any conjugated vaccine	15 (14.0%)	0.284	0.158	0.508		
	PPSV 23 (Pneumo 23 o Pneumovax)	1 (25.0%)	0.580	0.060	5.627		
At least 2 doses (n = 78)	Any vaccine	16 (14.4%)	0.293	0.167	0.514	0.001 (0.172)	74%
	Less than 2 doses	148 (35.1%)	Reference category				
	PCV 7 (Prevenar 7)	3 (15.8%)	0.3471	0.99	1.211		
	PCV 13 (Prevenar 13)	7 (11.9%)	0.249	0.110	0.562		
	Any conjugated vaccine	10 (12.8)	0.272	0.136	0.544		
At least 3 doses (n=42)	Less than 3 doses	154 (33.6%)	Reference category			0.013 (0.145)	80%
	PCV 7 (Prevenar 7)	0	-	-	-		
	PCV 13 (Prevenar 13)	4 (11.8%)	1.128	0.325	3.912		
	Any conjugated vaccine	4(9.7%)	0.213	0.075	0.610		
	PPSV 23 (Pneumo 23 o Pneumovax)	0	-	-	-		
4 doses (n=4)	Any vaccine	4 (9.5%)	0.208	0.073	0.593	0.423 (0.075)	100%
	Less than 4 doses	158 (32.0%)	Reference category				
	PCV 7 (Prevenar 7)	0	-	-	-		
	PCV 13 (Prevenar 13)	0	-	-	-		
	Any conjugated vaccine	0	-	-	-		
PPSV 23 (Pneumo 23 o Pneumovax)	0	-	-	-			

Table 2: Serotype distribution according to vaccination history

Serotype	Non Vaccinated (n = 389)		PCV 7 (n = 23)		PCV 13 (n = 84)		PPVS 23 (n = 4)	
	F	%	F	%	F	%	f	%
6B (n = 21)	19	4.90%	1	4.30%	1	1.20%	0	0.00%
19F (n = 16)	13	3.30%	0	0.00%	3	3.60%	0	0.00%
23 (n = 13)	13	3.30%	0	0.00%	0	0.00%	0	0.00%
15B (n = 9)	8	2.10%	0	0.00%	0	0.00%	1	25.00%
18C (n = 8)	8	2.10%	0	0.00%	0	0.00%	0	0.00%
G (n = 9)	8	2.10%	1	4.30%	0	0.00%	0	0.00%
14 (n = 7)	7	1.80%	0	0.00%	0	0.00%	0	0.00%
11A (n = 8)	6	1.50%	0	0.00%	2	2.40%	0	0.00%
19A (n = 6)	6	1.50%	0	0.00%	0	0.00%	0	0.00%
23F (n = 4)	4	1.00%	0	0.00%	0	0.00%	0	0.00%
20 (n = 4)	3	0.80%	0	0.00%	1	1.20%	0	0.00%
15F (n = 2)	1	0.30%	1	4.30%	0	0.00%	0	0.00%
23B (n = 2)	1	0.30%	0	0.00%	1	1.20%	0	0.00%
10B (n = 1)	0	0.00%	0	0.00%	1	1.20%	0	0.00%
19B (n = 1)	0	0.00%	0	0.00%	1	1.20%	0	0.00%
I (n = 1)	0	0.00%	1	4.30%	0	0.00%	0	0.00%
Others (n = 22)	22	5.70%	0	0.00%	0	0.00%	0	0.00%
Non viable (n = 24)	23	5.90%	1	4.30%	0	0.00%	0	0.00%
Negative for colonization	247	63.50%	18	78.30%	74	88.10%	3	75.00%

CONCLUSIONS

In our study, high vaccine effectiveness for preventing colonization was found, which could predict a good vaccine performance in our setting.

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