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A Comprehensive Analysis of Streptococcus pneumoniae Meningitis: Serotype Distribution and Antimicrobial Resistance Patterns in Pediatric Cases across a Decade in Argentina (2013-2022)

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Background: *S. pneumoniae* (Spn) meningitis is a major health issue. Understanding the serotype distribution and antimicrobial resistance patterns is crucial for treatment and vaccination strategies. In Argentina, since 2012, PCV13 is administered in children using a 2+1 scheme. In the context of the National Surveillance Network (SIREVA II) for serotypes and antimicrobial resistance, Spn isolates from children (<6 years) with meningitis were evaluated over a 10-year period.

Methods: A retrospective analysis was conducted on microbiological surveillance data from children with Spn meningitis between 2013 and 2022. Serotyping was performed using Quellung, and antimicrobial susceptibility testing by agar dilution (CLSI).

Results: Of the 1445 cases of invasive pneumococcal disease in <6 years old, 303 (20.9%) were meningitis. 55 serotypes were identified, distributed as follows: 24 (16.2%), 12F (10.3%), 23B (4.64%), 14 and 7F (4.3%). PCV13 serotypes decreased from 37.8% (2012-2013) to 14.7% (2021-2022) (Figure 1). Figure 2 shows serotype distribution by period of time. Non-susceptibility (I+R) is shown in Table. 44% of penicillin-NS isolates were serogroup 24 (35% NS to ERY/TET/SXT (MDR)), followed by 23B (11.5%), 14 (7.4%), 19A and 15B (6.3%).

Conclusion: This study provides insights into the serotype distribution and antimicrobial resistance trends over a 10-year period. Serogroup 24 and serotype 12F decreased in 2021 and 2022, while 10A, 15A, and 15B increased. Serogroup 24 was strongly associated with penicillin NS and MDR. Third-generation cephalosporins remain the best option for meningitis. Continuous surveillance is critical to determine significant changes in the epidemiology of pneumococcal meningitis.

Table

Year	n	Penicillin NS % (n)	Cefotaxime NS % (n)	Meropenem NS % (n)	Vancomycin NS % (n)	Rifampicin NS % (n)
2013	52	25.0 (13)	3.8 (2)	5.8 (3)	0	0
2014	38	39.5 (15)	2.6 (1)	5.3 (2)	0	0
2015	31	35.5 (11)	0	0	0	0
2016	30	40.0 (12)	6.7 (2)	10.0 (3)	0	0
2017	35	28.6 (10)	5.7 (2)	5.7 (2)	0	0
2018	31	38.7 (12)	3.2 (1)	3.2 (1)	0	0
2019	28	39.3 (11)	0	0	0	0
2022	25	36.0 (9)	0	0	0	0
*2020 and 2021 were not evaluated (n<30 isolates)						

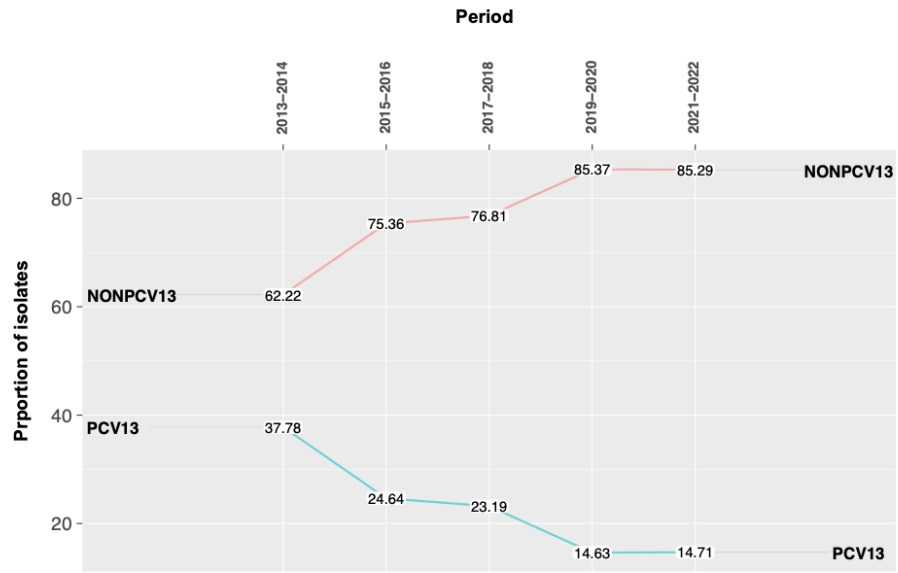


Fig1. Slopeplot. Proportion of PCV13 and NON PCV13 serotypes causing meningitis in children < 6 years old by period studied.

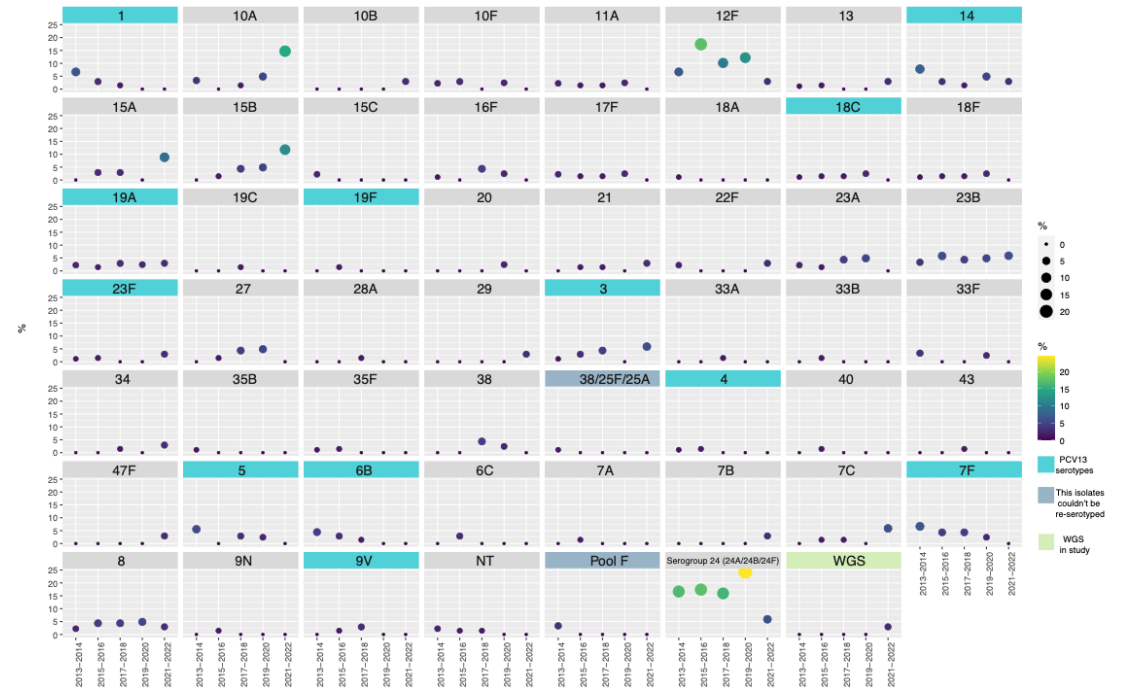


Fig2. Individual serotype distribution by period