Pneumococcal Disease in People with HIV: Epidemiological Trends and Vaccination Perspectives

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BACKGROUND

Pneumococcal disease (PD) remains a frequent bacterial infection in people with HIV (PWH). Considering available and upcoming pneumococcal vaccines, accurate knowledge of epidemiological trends and serotype distribution of PD in PWH is essential to guide prevention strategies.

METHODS

We performed a retrospective cohort study of all culture-confirmed episodes of PD in PWH aged ≥18 years at a tertiary hospital in the southern metropolitan area of Barcelona from 2010 to 2024.

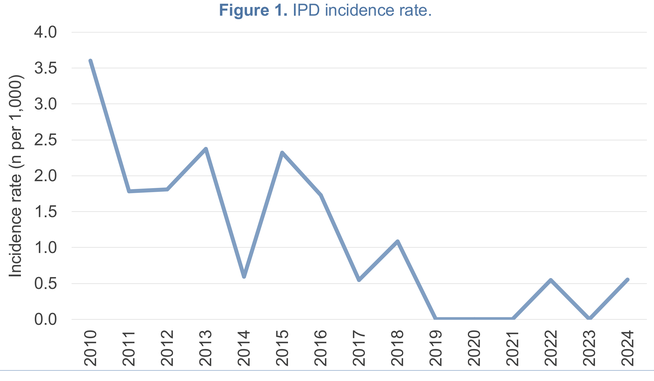
Clinical data were extracted from medical records and pneumococcal isolates were classified by Global Pneumococcal Cluster Sequence (GPSC) and serotype.

We used logistic regression to examine associations with invasive pneumococcal disease (IPD; with sandwich estimator) and vaccine failure, and Poisson regression to assess temporal trends.

Table 1. Individual characteristics at episode onset (n = 119).

Age (years), median (Q1–Q3)	49 (42-55)
Assigned male at birth, n (%)	91 (76.5%)
History of injecting drug use, n (%)	76 (63.9%)
Current tobacco use, n (%)	87 (73.1%)
Current alcohol use, n (%)	33 (27.7%)
Diabetes mellitus, n (%)	10 (8.4%)
Chronic lung disease, n (%)	39 (32.8%)
Liver cirrhosis, n (%)	13 (10.9%)
Charlson comorbidity index, median (Q1–Q3)	7 (4–9)
Pneumococcal vaccination, n (%)	80 (67.2%)
Cotrimoxazole prophylaxis, n (%)	23 (19.3%)
Antiretroviral therapy, n (%)	106 (89.1%)
CD4 count ≥200 cells/mm3	80 (67.2%)
Undetectable viral load, n (%)	83 (69.7%)

Figure 1. IPD incidence rate.



IPD still causes high mortality in PWH.

Novel conjugate vaccines may cover a broader range of serotypes causing pneumococcal disease in PWH.

RESULTS

A total of 119 episodes in 95 individuals were included. Individual characteristics at episode onset are presented in Table 1, and clinical presentation and outcomes in Table 2.

Invasive Pneumococcal Disease

IPD incidence rate decreased 18.0% annually (IRR [95% CI] 0.82 [0.73–0.90]; Figure 1), and overall mortality was 17.2%.

Variables associated with IPD (OR [95% CI]) were:

- Detectable viral load (3.52 [1.44–8.62]).
- CD4 count <200 cells/mm³ (2.43 [1.01–5.88]).
- No pneumococcal vaccination (2.43 [1.01–5.88]).

Outcomes associated with IPD (OR [95% CI]) were:

- Hospitalization (5.02 [1.35–18.62]).
- Death (9.17 [1.62–51.88]).

Table 2. Clinical presentation and outcomes (n = 119).

Clinical presentation	
IPD, n (%)	29 (24.4%)
Bacteriemia, n (%)	28 (23.5%)
Pneumonia, n (%)	63 (52.9%)
Other lower respiratory tract infections, n (%)	45 (37.8%)
Pleural empyema, n (%)	2 (1.7%)
Spontaneous bacterial peritonitis, n (%)	5 (4.2%)
Outcomes	
Hospitalization, n (%)	83 (69.7%)
Length of stay (days), median (Q1–Q3)	8 (5–14)
Intensive care unit admission, n (%)	14 (11.8%)
Invasive mechanical ventilation, n (%)	6 (5.0%)
Death, n (%)	7 (5.9%)

Figure 2. Serotype distribution by vaccine inclusion and IPD status.

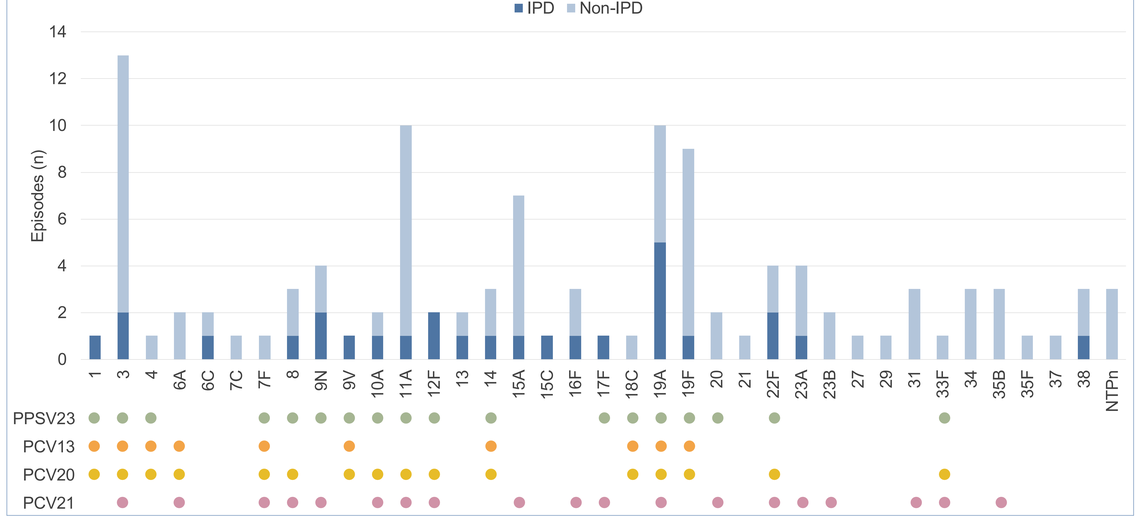
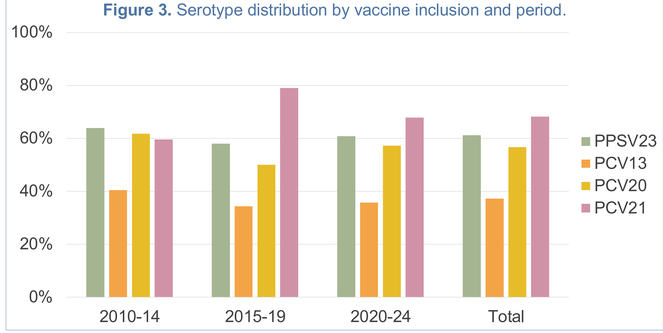


Figure 3. Serotype distribution by vaccine inclusion and period.



GPSC and Serotype Distribution

GPSC and serotypes were obtained for 100 (84.0%) and 113 (95.0%) isolates, respectively. GPSC3 (9 [7.6%]) and GPSC12 (8 [6.7%]) were predominant.

Isolate serotype distribution by vaccine inclusion and IPD status is shown in Figure 2, and evolution of isolate serotype distribution by vaccine inclusion in Figure 3.

Vaccine Failure

Vaccine failure occurred in 28/52 (53.8%) 23-valent pneumococcal polysaccharide vaccine (PPSV23) recipients in the previous 5 years, and in 13/34 (38.2%) 13-valent pneumococcal conjugate vaccine (PCV13) recipients.

Chronic lung disease was associated with a lower risk of both PPSV23 and PCV13 failure (OR [95% CI] 0.18 [0.04–0.63] and 0.13 [0.00–0.88], respectively). PPSV23 failure was associated with a higher risk of IPD (OR [95% CI] 4.82 [1.05–38.0]).

CONCLUSIONS

IPD incidence in PWH has decreased over the last 15 years, but overall mortality remains high. Poor HIV control and lack of vaccination were associated with IPD. Despite heterogeneous serotype distribution, novel PCVs may cover a broader range of serotypes causing PD in PWH.

PLAIN LANGUAGE SUMMARY

Pneumococcus causes respiratory and widespread infections and is more common in people with HIV. Our study identifies circulating types in this group to help choose the vaccines most likely to protect them.

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