Serotype distribution in invasive pneumococcal disease (IPD) among adults in Germany

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BACKGROUND

Streptococcus pneumoniae remains a leading cause of disease among children and the elderly. In September 2023, the VTC (STIKO) changed the age-based recommendation for pneumococcal vaccination of adults ≥60 years and the recommendation for individuals aged ≥18 years with risk conditions to one dose of 20-valent-pneumococcal-conjugate-vaccine (PCV20). In January 2024, the vaccination directive published a basis for reimbursement. In March 2020, IPD became a notifiable condition in Germany, resulting in increased numbers of IPD cases submitted to the RLS. Here, we analyse the serotype distribution in IPD among adults, in the seasons after the recommendation change.

METHODS

The RLS has monitored the epidemiology of invasive pneumococcal disease (IPD) in Germany since 1992. All isolates were serotyped using the Neufeld-Quellung-reaction. Pneumococcal seasons are from July in one year to June in the next year, except for 2025/26: July 2025 – March 2026. IPD surveillance in Germany was, in part, sponsored by Pfizer and Merck.

RESULTS

In the season July 2024-June 2025, 7920 IPD isolates from adults aged 18 years and older were sent to the RLS, of which 7052 were confirmed as IPD (excluded: contaminated, no growth, not pneumococcus, not invasive, no German residence). The obligatory laboratory notification system SurvStat@RKI 2.0 (survstat.rki.de) reported 10,110 cases, resulting in a submission rate to the RLS of 78.3%. When only IPD cases confirmed by the RLS were taken into account the submission rate was 69.8% (**Fig 1**).

From 2017/18 to 2025/26, serotype 3 has remained the dominant serotype among adults ≥18 years with IPD in Germany, while serotypes 8, 22F and 9N also remained prevalent. In 2024/25 these four serotypes caused 44.7% of all IPD cases. Serotype 4 has increased over the whole study period, and serotype 19A became more prevalent in the last three seasons. Serotype 12F decreased in 2020/21, whereas 38 was highly prevalent in 2023/24(**Fig 2**).

Over the last 9 seasons, serotype coverage of PCV20 has been between 60.6% and 67.7%, whereas PPV23 covered 68.6% to 75.2% (**Fig 3**). For vaccine eligible adults ≥60 years, coverage values were 58.4% to 65.9% (PCV20) and 66.1% to 73.5% (PPV23; **Fig 4**).

Considering different age groups, it becomes obvious that serotype coverage of both PCV20 and PPV23 decreases with increasing age (**Figs 5 - 8**).

Among adults ≥18 years of age, PCV7/13 serotypes have increased in the last three seasons (serotypes 3, 4, 19F, 19A), whereas PCV15-non-13 serotypes have decreased (22F, 33F). PCV20-non-15 serotypes have decreased compared to 2019/20 , mainly caused by an almost complete disappearance of serotype 12F (**Fig 9B**), but have increased again in the two most recent seasons (**Fig 3**).

PCV21 would have covered 76.6% to 84.4% in adults ≥18 years, and 77.7% to 84.8% in adults ≥60 years, over the last 9 seasons (**Figs 3 and 4**). However, among adults 18-49 years, PCV21 serotype coverage (67.7%) has decreased below PCV20 (75.5%) in 2025/26, caused by an increase of serotype 4 (not included in PCV21) in this age group (**Figs 5 and 9A**). In older adult age groups PCV21 coverage currently remains 8 to 23% higher than that of PCV20 (**Figs 6-8 and 9A**).

Serotype 12F, which almost disappeared in the pandemic season, seems to be recovering in prevalence, but has not reached pre-pandemic levels yet (**Fig 9B**).

The strong increase in serotype 38 cases observed among older adults in 2023/24, seems to have disappeared again in the current season (**Fig 9C**).

CONCLUSIONS

In the first two seasons after the recommendation change for adult vaccination to PCV20, a reduction of proportion of PCV20 serotypes among adults ≥60 years was not yet observed.

An alarming increase in PCV7 serotype IPD, in particular serotype 4 was observed, most strongly among younger adults.

Serotype 12F seems to be slowly increasing in prevalence since the pandemic season 2020/21.

The sudden increase in serotype 38 in 2023/24 has completely disappeared again in 2025/26.

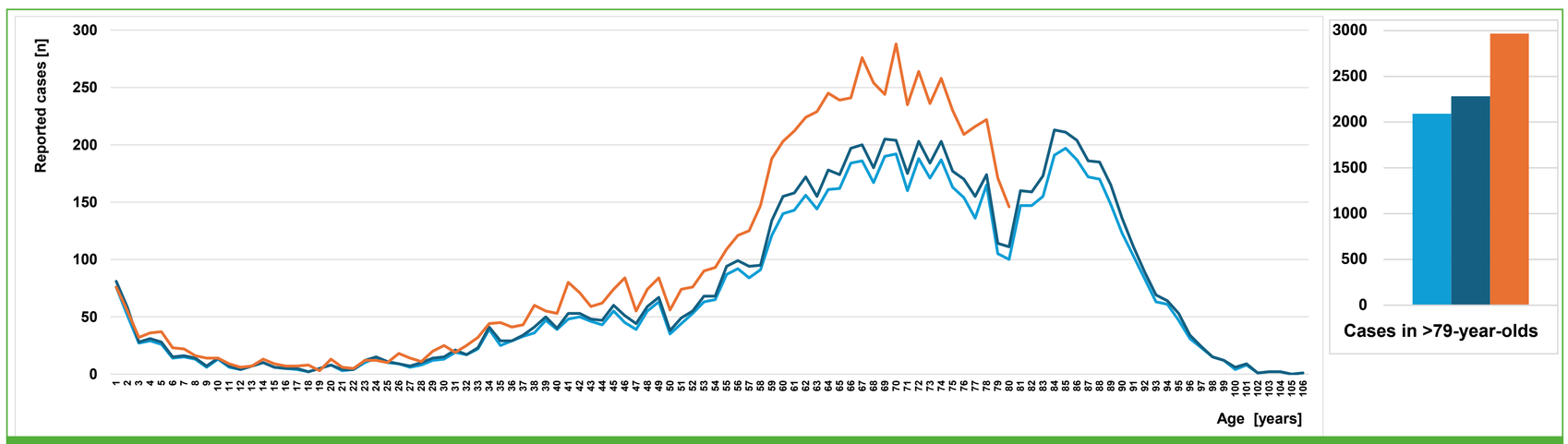

Figure 1: IPD case numbers reported to the RLS (blue), case numbers confirmed as IPD (light blue) by the RLS laboratory routine as well as case numbers from obligatory laboratory notifications (orange), by patient age, for the season 2024/25.

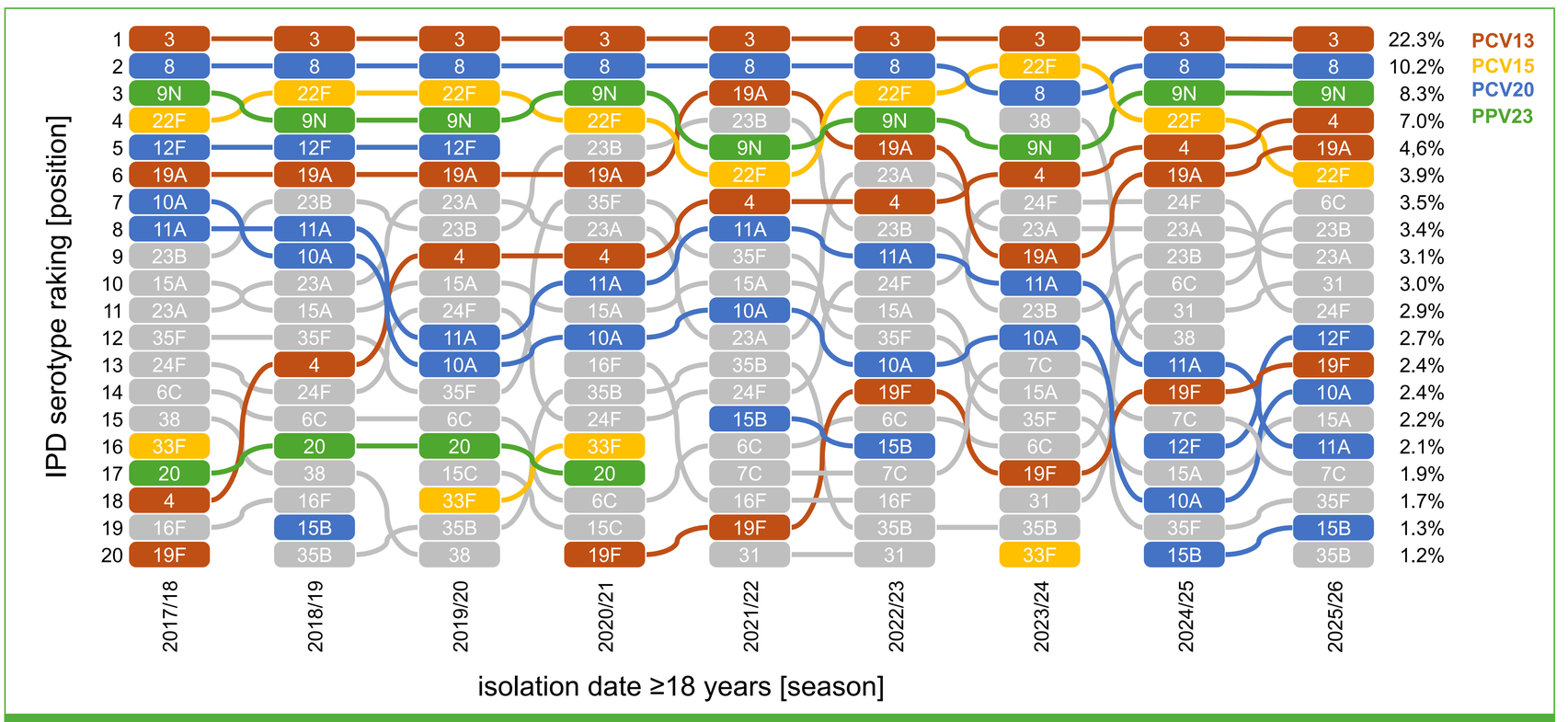

**Figure 2: Serotype dynamics among IPD in adults ≥18 years of age in Germany.
Serotype prevalence values are listed for the current season 2025/26 (data from July 2025 to March 2026, n=3731).**

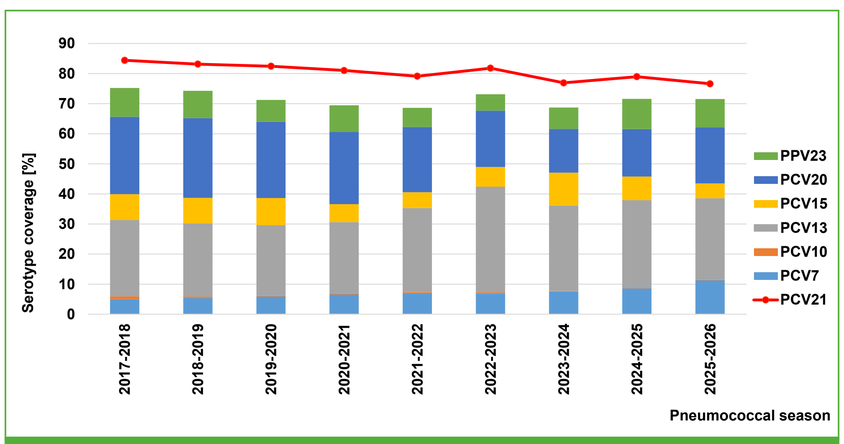

Figure 3: Serotype coverage of different vaccine formulations among IPD in adults ≥18 years of age in Germany.

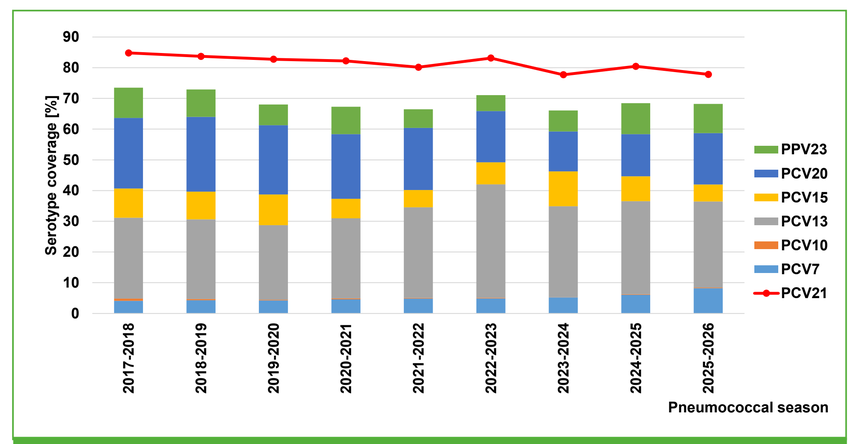

Figure 4: Serotype coverage of different vaccine formulations among IPD in adults ≥60 years of age in Germany.

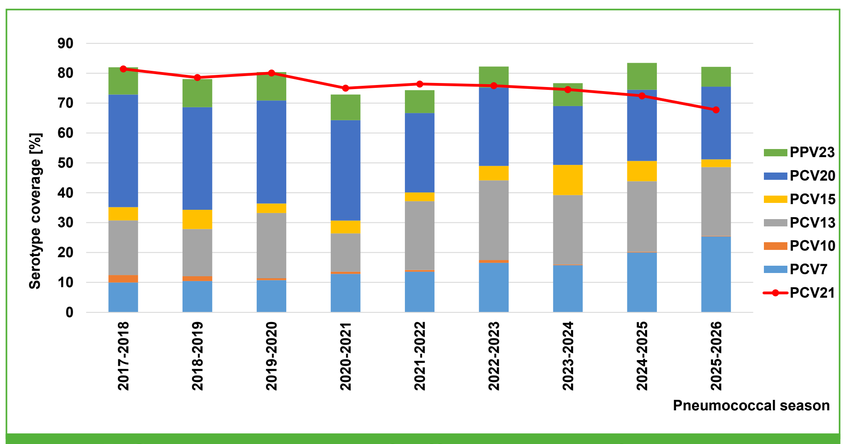

Figure 5: Serotype coverage of different vaccine formulations among IPD in adults 18-49 years of age in Germany.

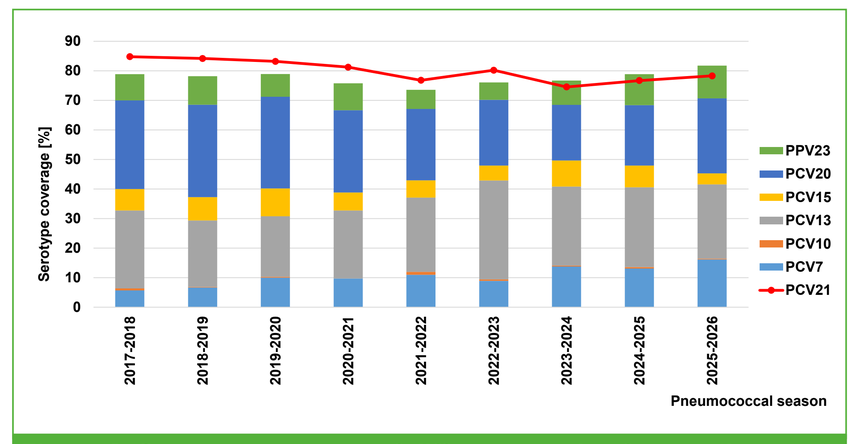

Figure 6: Serotype coverage of different vaccine formulations among IPD in adults 50-59 years of age in Germany.

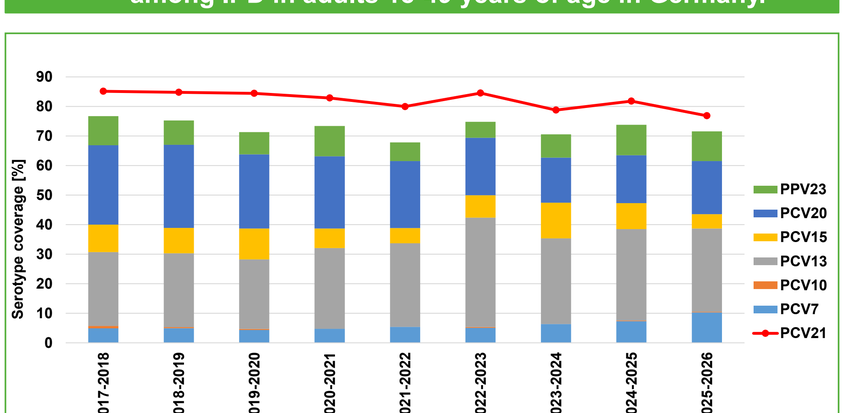

Figure 7: Serotype coverage of different vaccine formulations among IPD in adults 60-75 years of age in Germany.

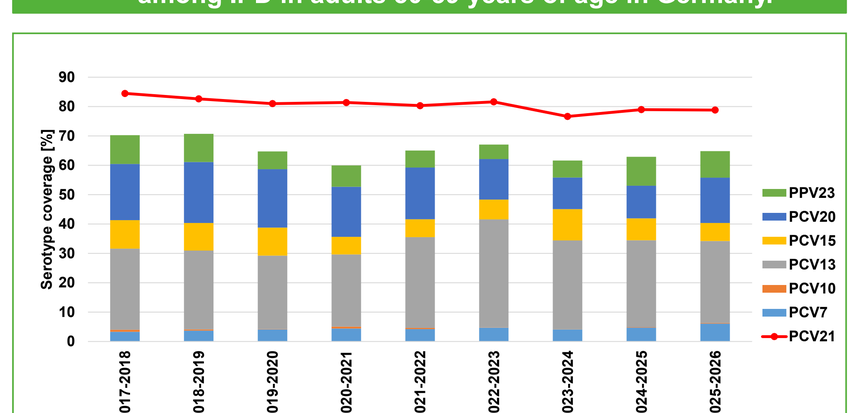

Figure 8: Serotype coverage of different vaccine formulations among IPD in adults >75 years of age in Germany.

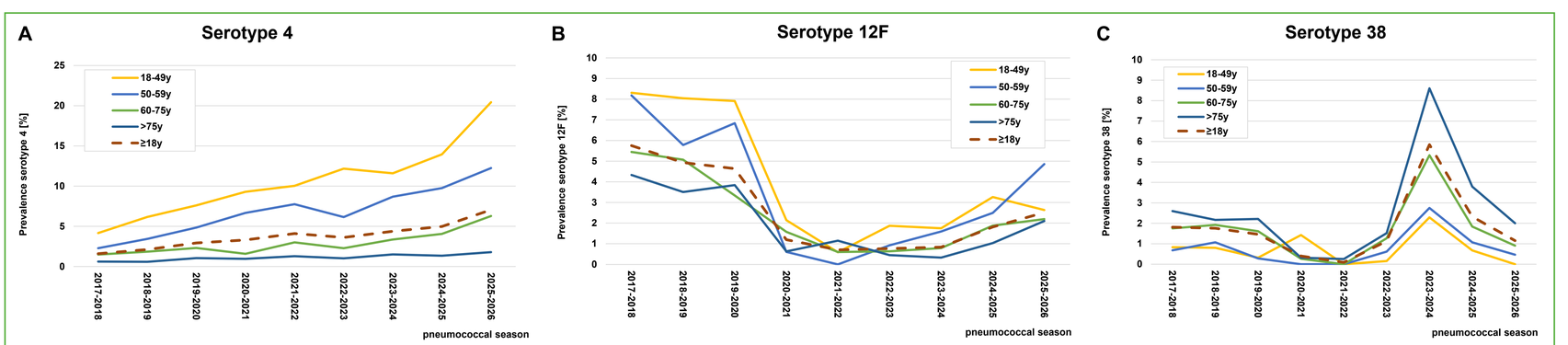

Figure 9: Prevalence of serotypes 4 (A), 12F (B) and 38 (C) among IPD in adults ≥18 years of age in Germany, over the last 9 pneumococcal seasons.