RE-EMERGENCE OF PREVIOUSLY PREVALENT SEROTYPES (PCV7/PCV13) IN IPD AMONG CHILDREN AND ADULTS IN GERMANY

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BACKGROUND

Invasive Pneumococcal Disease (IPD) in Germany has been monitored by the GRLS since 1992. Since the SARS-CoV-2 pandemic, a strong increase in IPD cases with PCV7 and PCV13 serotypes (also included in PCV15 and PCV20) has been observed in Germany.

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. Species identification was confirmed using bile-test, optochin-test and PCR-tests. Pneumococcal seasons are from July in one year to June in the next year, except for 2025/26: July 2025 – April 2026. IPD surveillance in Germany was, in part, sponsored by Pfizer and Merck.

RESULTS

Serotype coverage of PCV7 and PCV13 among IPD in children < 18 years was as low as 4.3% (PCV7) and 23.7% (PCV13; **Fig 1**) in the pneumococcal season 2019/20. In 2020/21, serotype coverage decreased to 1.4% (PCV7) and 12.9% (PCV13). In the four seasons afterwards (2021/22-2024/25), a substantial increase of PCV7 and PCV13 serotypes to 9.6% and 33.0% in 2024/25 was observed. In 2025/26, prevalence of these serotypes increased even more to 12.1% (PCV7) and 34.8% (PCV13).

Looking at the separate childhood age groups 0-1 years, 2-4 years and 5-17 years, several differences were observed. In children 0-1 years, PCV13 coverage was even lower in 2019/10 and 2010/21 (**Fig 2**). In children 2-4 years and 5-17 years, PCV13 coverage was two times higher compared to children 0-1 years in 2019/20 and PCV7 serotypes were not found at all in 2020/21 (**Fig 3 and Fig 4**). Also, the increase in PCV13 coverage in recent seasons was higher in these two age groups.

PCV20 covered 53.0 % of all serotypes in children <18 years in 2015/16 (0-1 years: 49.3, 2-4 years: 46.7%, 5-17 years: 62.7%). PCV21 serotypes covered 70-80% of all serotypes in children <18 years, with a reducing trend over the last eleven seasons (2015/16: 78.8%, 2025/26: 71.2%)

Among adults ≥18 years, PCV7 and PCV13 coverage were 5.9% and 29.6%, respectively, in 2019/20, and remained on these levels in 2020/21: 6.6% and 30.6%, respectively (**Fig 5**). From 2021/22 to 2024/25, the respective coverage of PCV7 and PCV13 increased to 8.7% and 37.9% in 2024/25. A further coverage increase to 11.0% (PCV7) and 38.2% (PCV13) was observed in 2025/26. A similar picture was seen among adults 60 years and older (**Fig 6**).

The changes in PCV7 and PCV13 coverage are different depending on adult age group. Among adults 18-49 years, PCV7 coverage was higher then in older adults: 10.8% in 2019/20, 12.9% in 2020/21 and reaching as high as 25.5% in 2025/26 (**Fig 7**). PCV13 coverage in this age group was 47.5% in 2025/26. In the age groups 50-59 years, 60-75 years and >75 years coverage of PCV7 and PCV13 was lower with increasing age, but still considerably higher in 2025/26 than in 2019/20 (50-59 years: 16.2% and 41.3%; 60-75 years: 9.8% and 38.2% and >75 years: 6.0% and 34.0%, respectively; **Fig 8, Fig 9 and Fig 10**).

In 2025/26, PCV20 coverage was 62.5% in adults ≥18 years and 59.0% in adults ≥60 years. Coverage was much higher in younger adults (18-49 years: 75.8%, 50-59 years: 71.2%) than in the elderly (60-75 years: 62.2%, >75 years: 55.7%). PCV21 coverage was between 84.7% in 2015/16 and 76.9% in 2025/26 for adults ≥18 years and between 84.7% and 78.2% for vaccine eligible adults ≥60 years. Among adults 18-49 years, PCV21 coverage decreased over time to 68.0% in 2025/26.

The increase of PCV7 serotypes is mainly caused by 14 and 19F in children (**Fig 11**) and 4, 14 and 19F in adults (**Fig 13**), but all other PCV7 serotypes were found as well. The main PCV13-non-PCV7 serotypes were 3 and 19A in all age groups. Serotype replacement within vaccine formulations currently used in Germany, shows an antagonism between PCV13non7 and PCV20non15 serotypes (**Fig 12 and Fig 14**).

CONCLUSIONS

- In the pneumococcal seasons after the pandemic PCV7/PCV13-serotypes have re-emerged in IPD in Germany.
- Increase in PCV7 serotypes is caused by serotypes 4 (adults), 14 and 19F, while persisting PCV13non7 serotypes are 3 and 19A.
- It is unclear whether this is related to changes in vaccine uptake, schedule change, waning protection of the vaccines, or to clonal expansion.

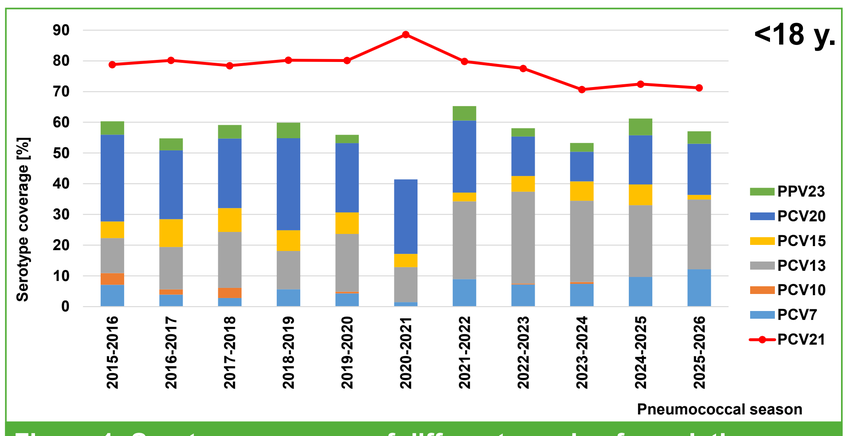

Figure 1: Serotype coverage of different vaccine formulations among IPD in children <18 years of age in Germany.

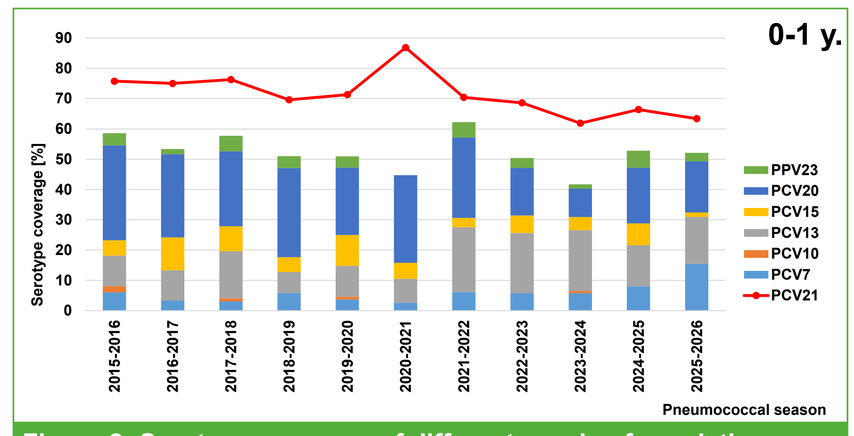

Figure 2: Serotype coverage of different vaccine formulations among IPD in children 0-1 years of age in Germany.

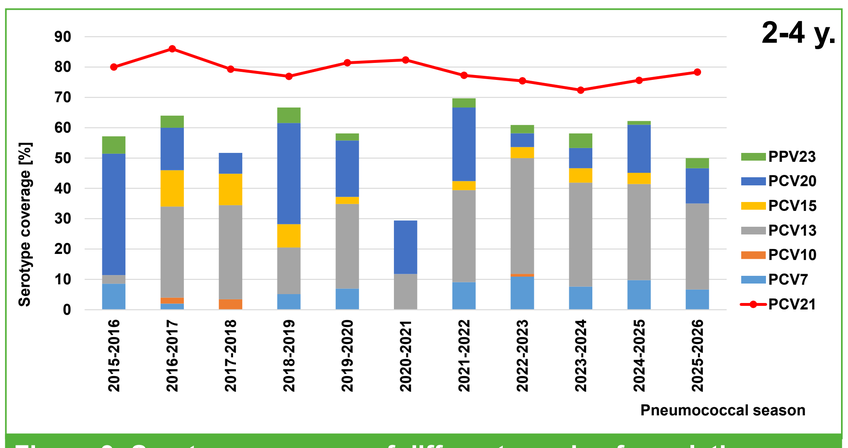

Figure 3: Serotype coverage of different vaccine formulations among IPD in children 2-4 years of age in Germany.

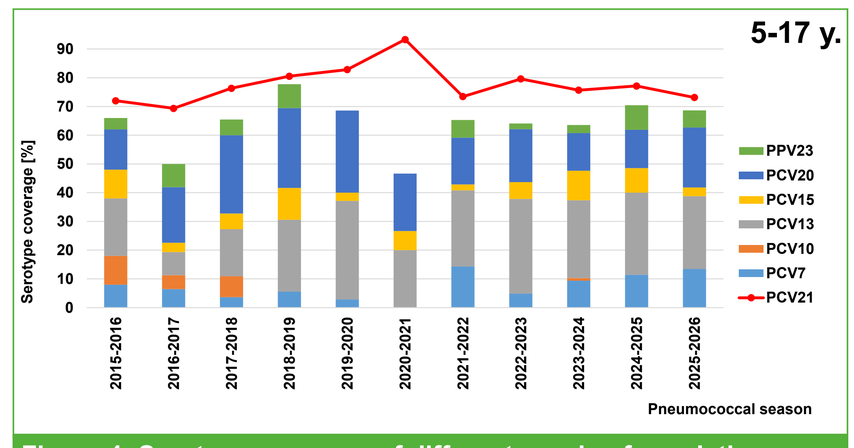

Figure 4: Serotype coverage of different vaccine formulations among IPD in children 5-17 years of age in Germany.

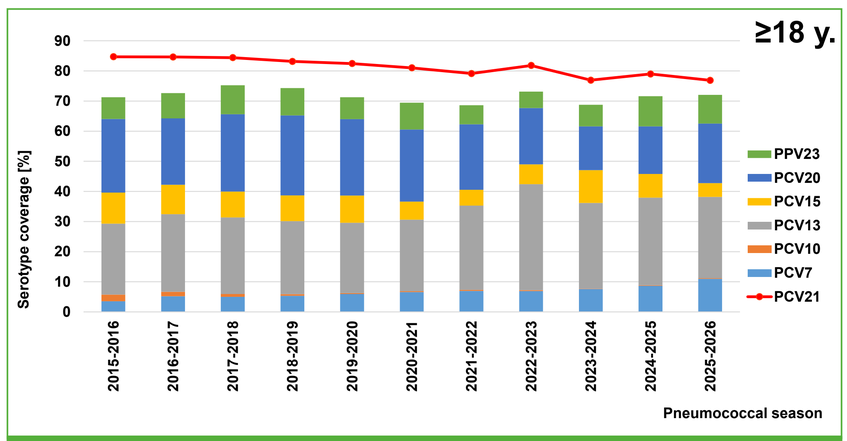

Figure 5: Serotype coverage of different vaccine formulations among IPD in adults ≥18 years of age in Germany.

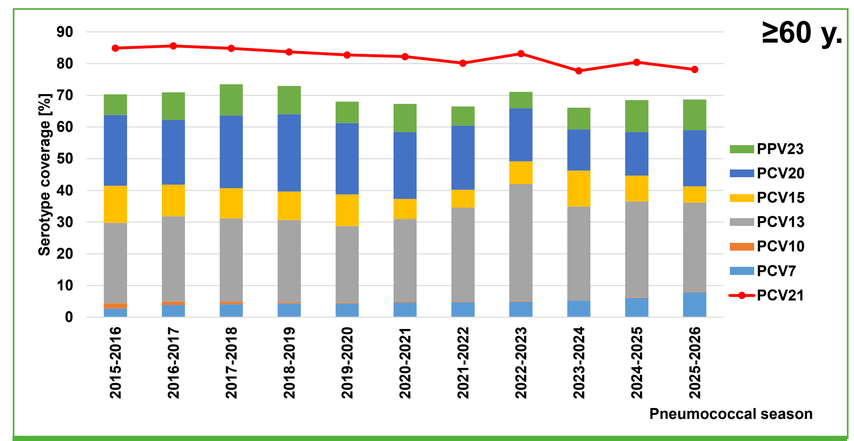

Figure 6: Serotype coverage of different vaccine formulations among IPD in adults ≥60 years of age in Germany.

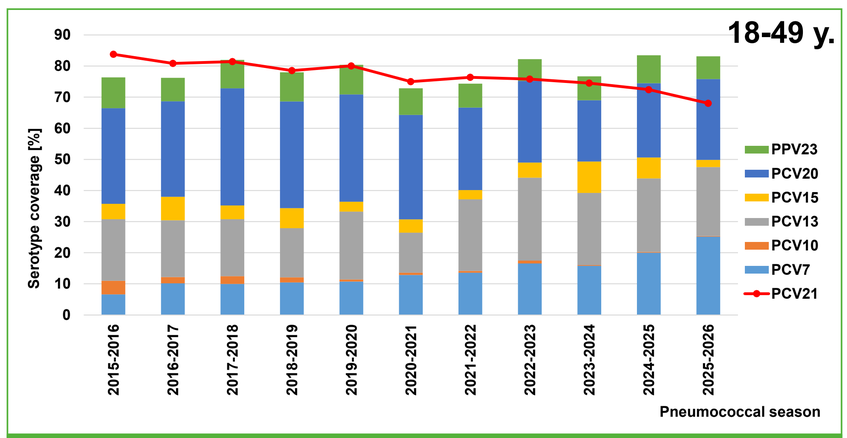

Figure 7: Serotype coverage of different vaccine formulations among IPD in adults 18-49 years of age in Germany.

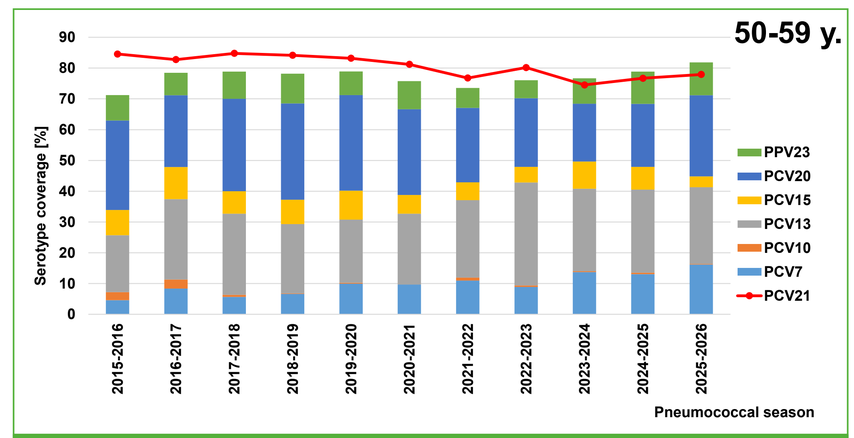

Figure 8: Serotype coverage of different vaccine formulations among IPD in adults 50-59 years of age in Germany.

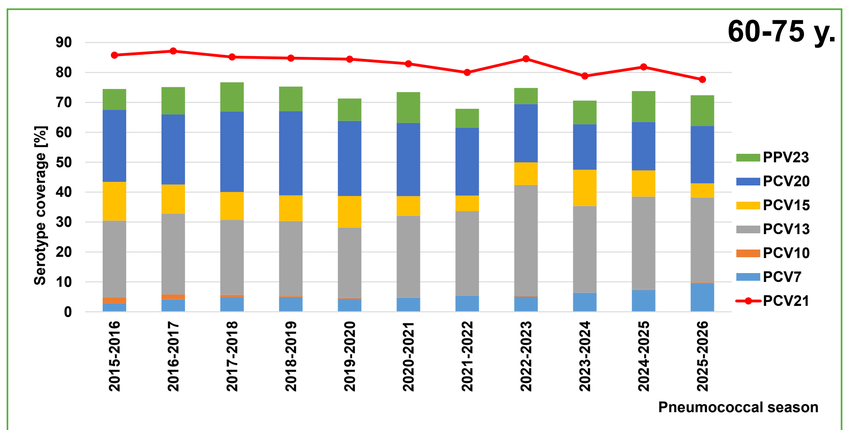

Figure 9: Serotype coverage of different vaccine formulations among IPD in adults 60-75 years of age in Germany.

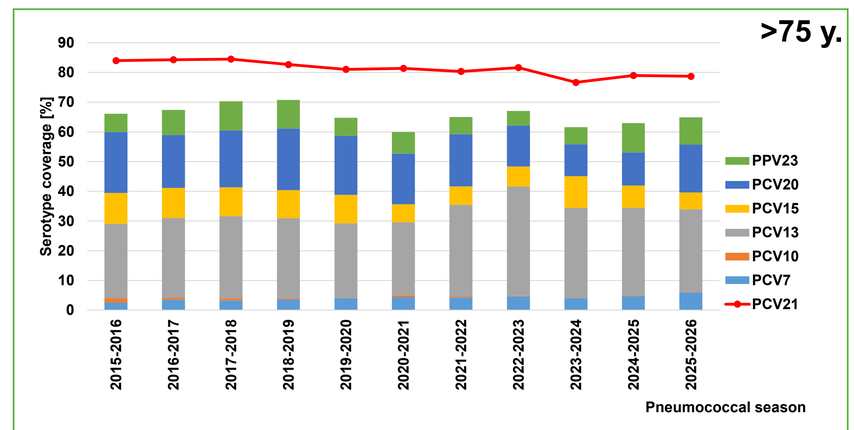

Figure 10: Serotype coverage of different vaccine formulations among IPD in adults >75 years of age in Germany.

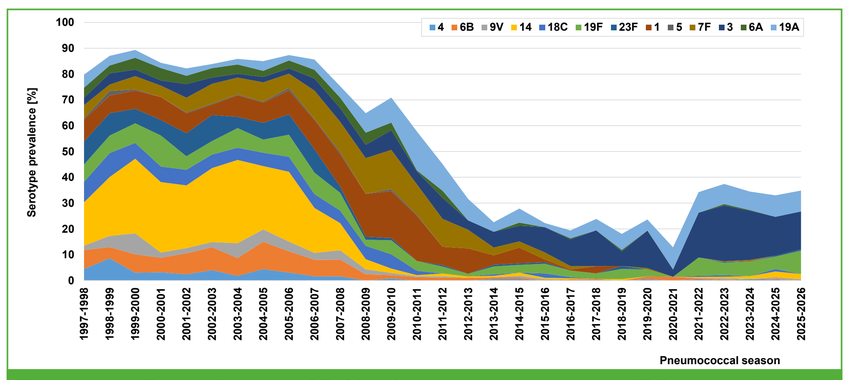

Figure 11: Prevalence of PCV13 serotypes among IPD in children <18 years in Germany (1997-2026).

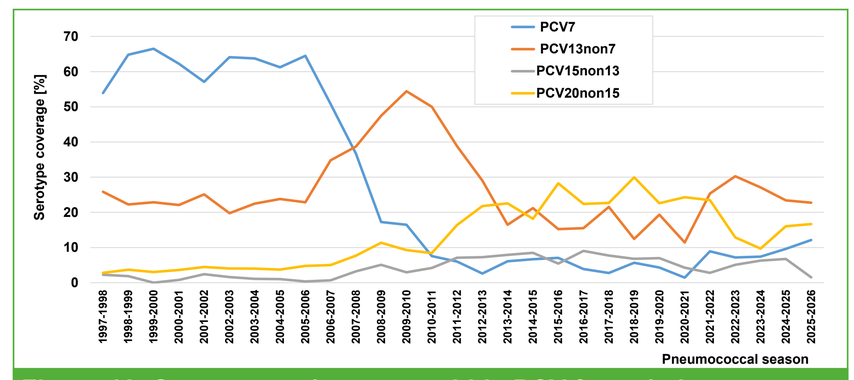

Figure 12: Serotype replacement within PCV formulations among IPD in children <18 years of age in Germany (1997-2026).

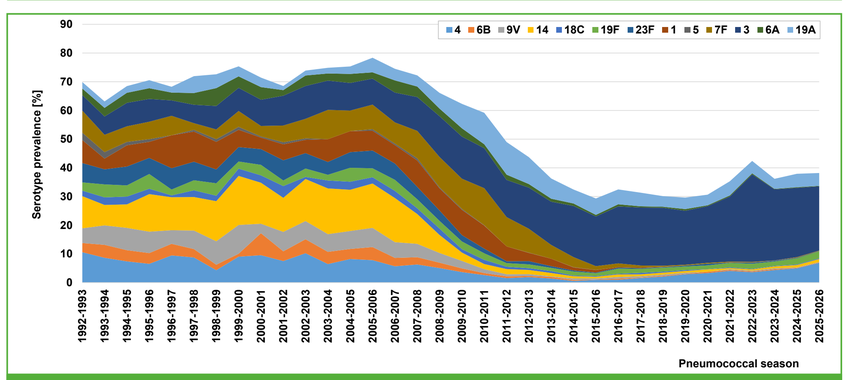

Figure 13: Prevalence of PCV13 serotypes among IPD in adults ≥18 years in Germany (1992-2026).

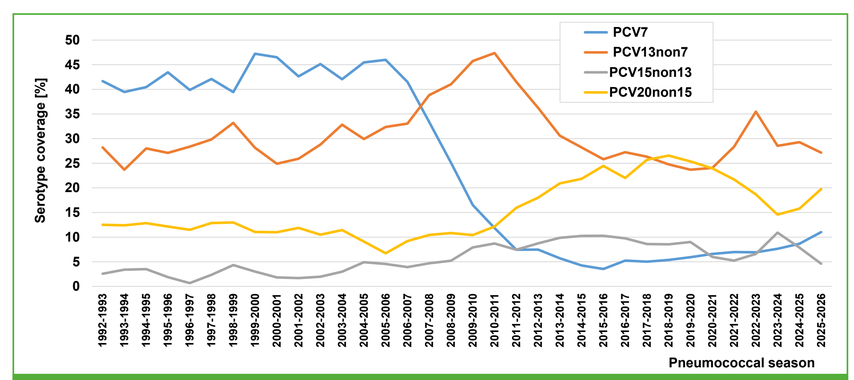

Figure 14:: Serotype replacement within PCV formulations among IPD in adults ≥18 years of age in Germany (1992-2026).