SARS-COV-2 PANDEMIC INDUCED CHANGES IN SEROYPE PREVALENCE AMONG CHILDREN WITH INVASIVE PNEUMOCOCCAL DISEASE (IPD) IN GERMANY

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BACKGROUND

Infant PCV vaccination was universally recommended in Germany in 2006. SARS-CoV-2 reached Germany at the beginning of March 2020. Here, we present data on the serotype distribution of invasive IPD cases among children under the age of 18 years, before, during and after the pandemic.

METHODS

IPD in children in Germany has been monitored since 1997. Isolates were serotyped using the Neufeld Quellung reaction.

RESULTS

Immediately after onset of the SARS-CoV-2 pandemic and institution of non-pharmaceutical interventions (NPIs) in Germany (March 2020), IPD case numbers among children decreased. The reduction reached a maximum of - 89%, and case numbers returned to pre-pandemic levels, when NPIs for children started to be relieved, in July 2021 (**Fig. 1**).

From June 2020 to March 2021 (**period II**), only 55 cases were reported, compared to 189 cases in the same period one year earlier (**period I**). From June 2021 to March **2022 (period III**) case numbers increased to 169, and June 2022 to March 2023 (**period IV**), 260 cases were reported .

Serotype distributions in period I, III and IV, were similar but differed from period II. Prevalence of serotypes 3 and 8 was strongly reduced, serotypes 10A, 15C, 23A and 23B increased. Serotype 24F strongly decreased only during period IV (**Fig. 2**).

PCV13-serotype prevalence was 23.8% (PCV15: 32.3%, PCV20: 55.0%) in period I, decreased to 7.3% (9.1%, 30.9%) in period II, and increased to 31.4% (35.5%, 60.9%) in period III and 37.9% (42.7%, 56.9%) in period IV (**Fig .3**).

The post pandemic increase in PCV13 serotype prevalence was highest among children 2-4y. (45.8%) and 5-17y. (37.9%). Among children 0-1y., PCV13 was closer to pre-pandemic levels (24.4%; **Fig. 3**). Most prevalent PCV13 serotypes were 3 and 19A.

From December 2022 to March 2023 a strong surge in IPD cases was observed, with an unusual high prevalence of PCV13 vaccine serotypes, mainly serotypes 3, 19A and 19F, and mainly among children 2-4 years of age (**Fig. 4** and **Fig. 5**).

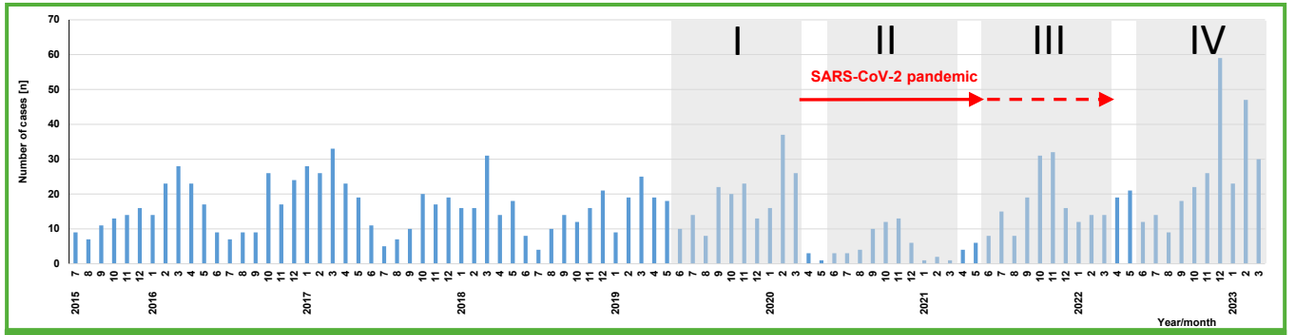

Fig. 1: Monthly numbers of IPD cases among children <18 years of age in Germany, July 2015 – March 2023

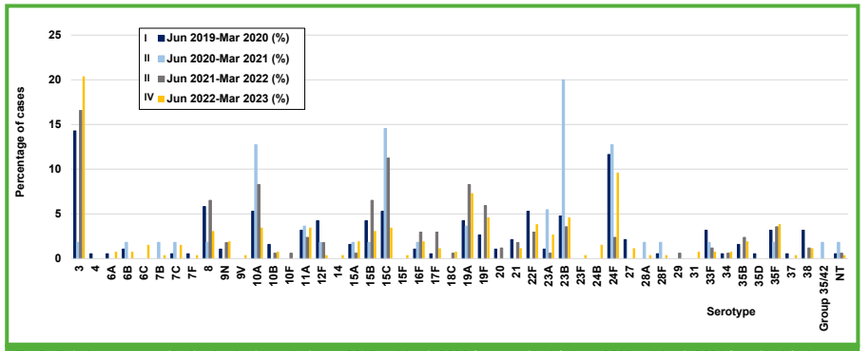

Fig. 2: Relative serotype distribution in the period June 2019 to March 2020 (pre-pandemic), June 2020 to March 2021 (pandemic), June 2021-to March 2022 (early post-pandemic) and June 2022-March 2023 (late post-pandemic)

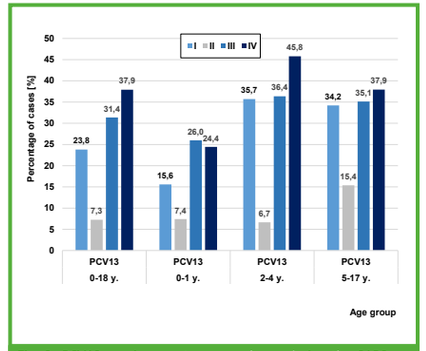

Fig. 3: PCV13 vaccine serotype prevalence during the SARS-CoV-2 pandemic, per age group

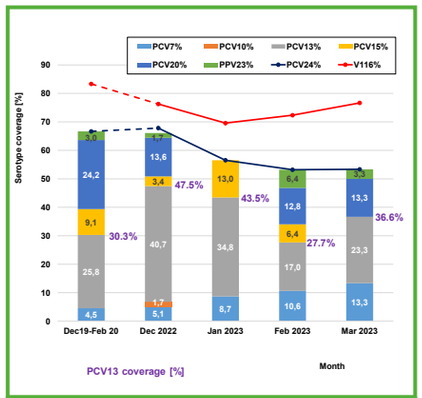

Fig. 4: Serotype coverage of current and future vaccine formulations in IPD among children <18 y. in Germany, Dec. 2019 to Feb. 2020, vs. Dec. 2022 to Mar. 2023

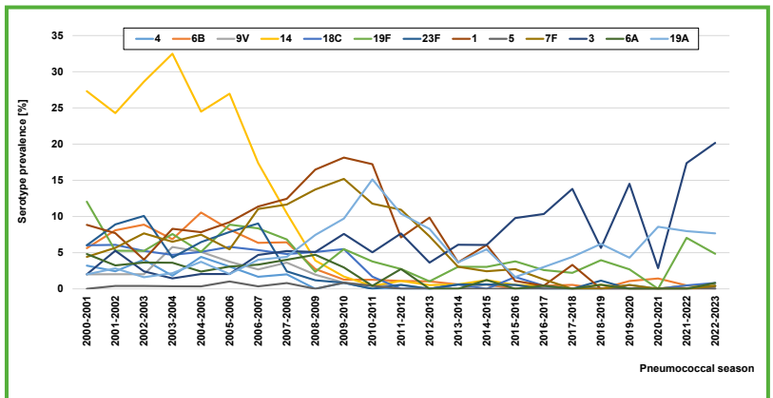

Fig. 5: Prevalence of PCV13 vaccine serotypes in IPD among children <18 years of age in Germany, from 2000-2001 till 2022-2023

CONCLUSIONS

- During the SARS-CoV-2 pandemic IPD case numbers were strongly reduced (-89%), due to non-pharmaceutical interventions (NPI).
- Numbers of reported IPD cases decreased till June 2021, when NPI were relieved, and numbers quickly increased to pre-pandemic levels.
- During the SARS-CoV-2 pandemic, serotypes 3 and 8 were less prevalent, but 10A, 15C, 23A and 23B increased.
- PCV13 serotypes were less prevalent during, but more prevalent after the pandemic, with the highest increase among children 2-4 years of age.
- From December 2022 to March 2023 a strong surge in IPD cases was observed, with an unusual high prevalence of PCV13 vaccine serotypes.