INVASIVE GROUP B STREPTOCOCCAL INFECTIONS IN GERMANY

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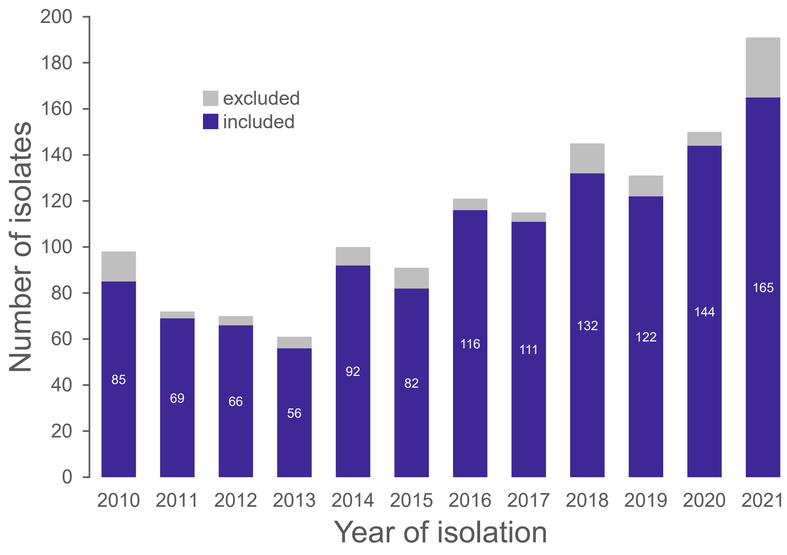
PATIENT REPORTING



BACKGROUND

The German National Reference Center for Streptococci (GNRCS) has monitored invasive infections associated with *Streptococcus agalactiae* (Group B streptococcus, GBS) in Germany since 1990. Here, we report on the progression of invasive group B-streptococcal disease (IBD) between 2010 and 2021 with special attention to serotype distribution and antimicrobial resistance.

METHODS

Species identification was based on haemolysis-assessment, Lancefield-typing, catalase-, pyrrolidonyl-arylamidase- and leucine-aminopeptidase-test. Serotype assignment was performed using two different multiplex-PCR techniques and serum-agglutination. Determination of minimum inhibitory concentration for ten antimicrobial substances was executed following CLSI guidelines.

RESULTS

In the study period, 1240 cases of IBD were reported, showing an increasing trend from 2013 to 2021 (**PATIENT REPORTING**), with more than 90% of the isolates cultivated from blood (**PATIENT MATERIAL**).

The IBD patient age showed a bimodal distribution with a strong peak in newborns and a bell shaped scattering starting at 50 years (**AGE DISTRIBUTION**). In newborns a separation into three age groups, early onset disease (EOD, day 0-3), late onset disease (LOD, day 4-31) and very late onset disease (VLOD, day 32-365) was observed (**FIRST YEAR AGE GROUPS**).

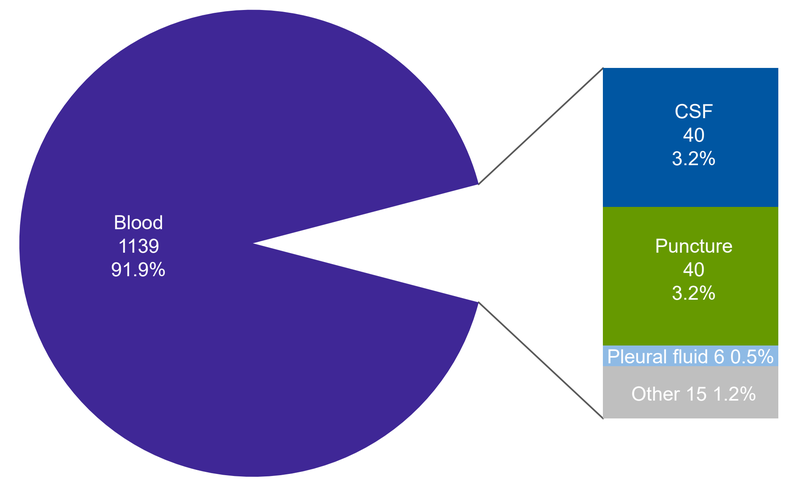
The serotype distribution of IBD isolates varied significantly between newborns <1 year of age, where IBD was dominated by serotype III, and other age groups, showing a more uniform distribution, mainly driven by Ia, Ib, II, III, IV, and V (**SEROTYPE DISTRIBUTION**). In the newborn IBD cohort, the serotype diversity peaks in EOD at the day of birth and the day after with serotypes Ia, Ib, II, III, IV, V and VI, but rapidly decreases afterwards, leading to a clear domination of serotype III in LOD and VLOD (**FIRST YEAR SEROTYPE DISTRIBUTION**). The serotype diversity in EOD, reflects to some extend the serotype distribution observed in asymptomatic vaginal swabs, but also the distribution in older age groups, while the clear domination of serotype III in LOD and VLOD represents a unique situation (**EOD SEROTYPE DISTRIBUTION**). The long term development from 2010 to 2021 shows a trend of a decreasing impact of serotype III in EOD IBD, which is compensated by increased numbers of serotypes Ia, Ib and IV (**EOD SEROTYPE DISTRIBUTION**). This trend is also observed, but to a much lower level in VLOD, while the clear domination of serotype III in LOD IBD shows no significant changes over the analysed time period from 2010 to 2021 (**LOD AND VLOD SEROTYPES**).

The analysed IBD isolates were mostly susceptible to penicillins, cefotaxime and vancomycin, while non-susceptibility to various extents was observed for tetracyclin (81%), clindamycin (23%), macrolides (30%), fluoroquinolones (3%), chloramphenicol (3%) and cotrimoxazol (6%) (**ANTIMICROBIAL SUSCEPTIBILITY**). The pronounced tetracyclin non-susceptibility remained stable over the time period 2010 to 2020, while macrolide (25% to 31%), clindamycin (21% to 23%), cotrimoxazol (1% to 10%) and fluoroquinolone (1% to 7%) non-susceptibility increased (**RESISTANCE DEVELOPMENT**). Additionally, first β-lactam (penicillin/amoxicillin) resistant IBD isolates were observed for serotypes Ia (2 in 2018) and Ib (1 in 2019) (**RESISTANCE DEVELOPMENT**).

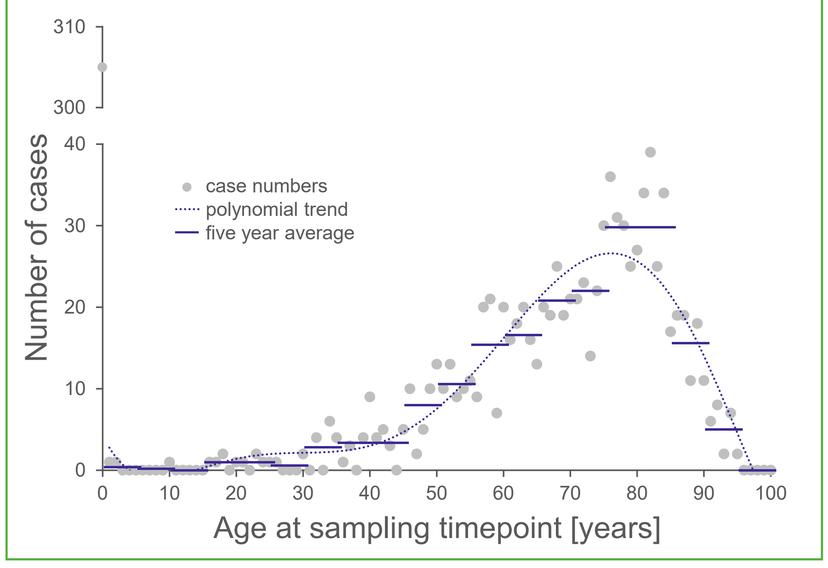
CONCLUSIONS

IBD in Germany mainly affects newborns and older people. The serotype distribution in newborn EOD reflects the situation observed in vaginal swabs and older IBD age groups, while LOD and VLOD are constantly dominated by serotype III. The analysed IBD isolates were mostly susceptible to penicillin, cefotaxime and vancomycin. Non-susceptibility was observed for tetracyclin, clindamycin, macrolides, fluoroquinolones, chloramphenicol and cotrimoxazol. A general increase in antimicrobial resistance and first β-lactam non-susceptible isolates in expanding serotypes Ia and Ib is an alarming trend.

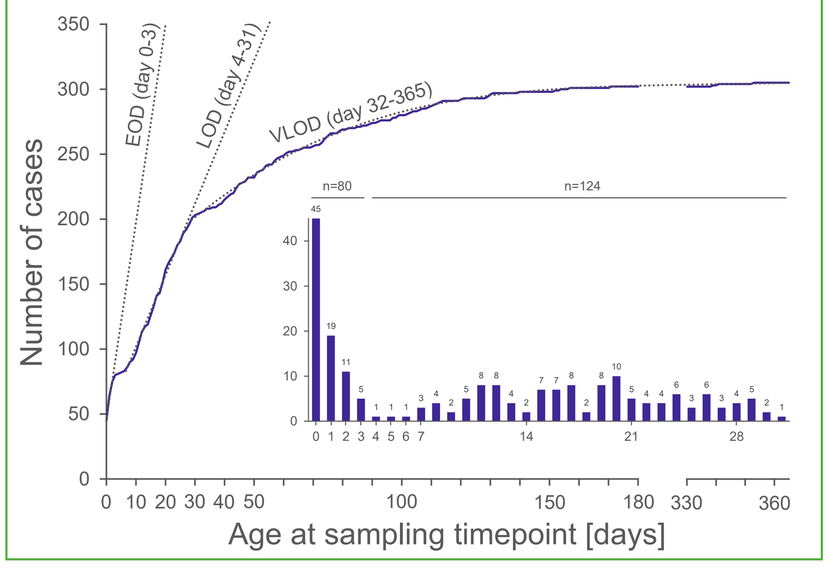
PATIENT MATERIAL



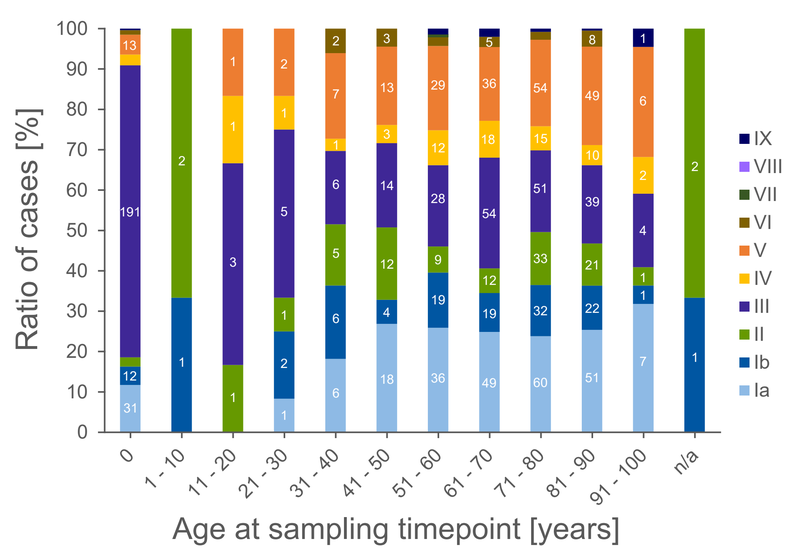
AGE DISTRIBUTION



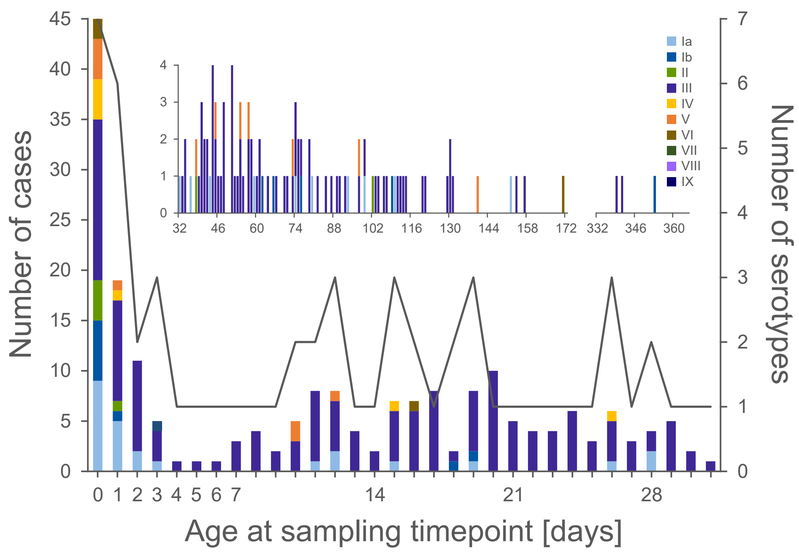
FIRST YEAR AGE GROUPS



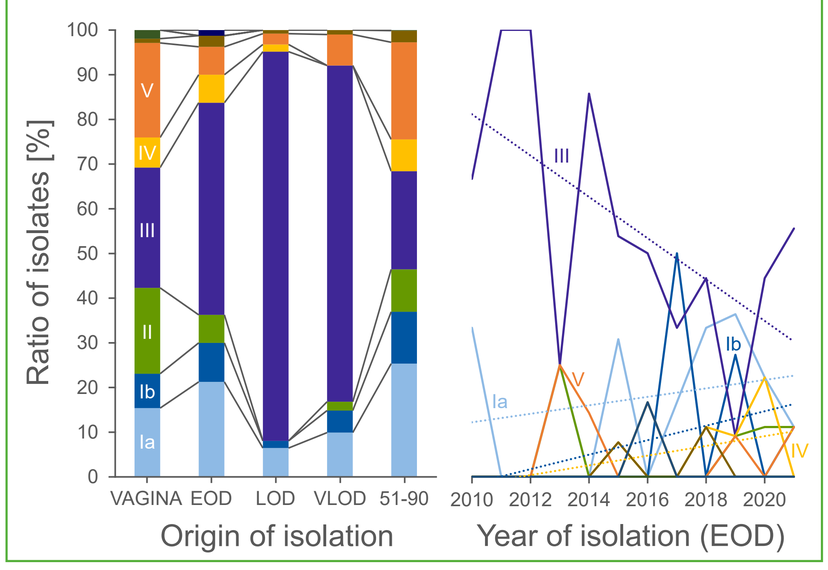
SEROTYPE DISTRIBUTION



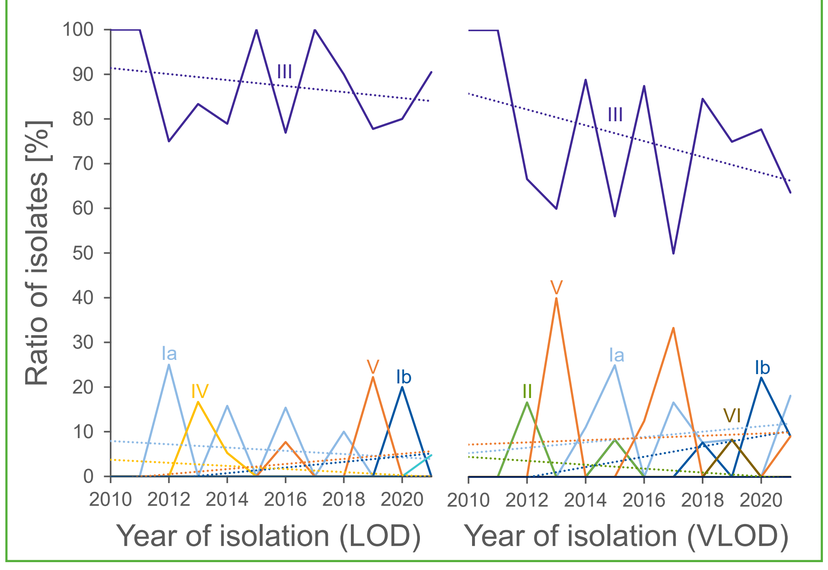
FIRST YEAR SEROTYPE DISTRIBUTION



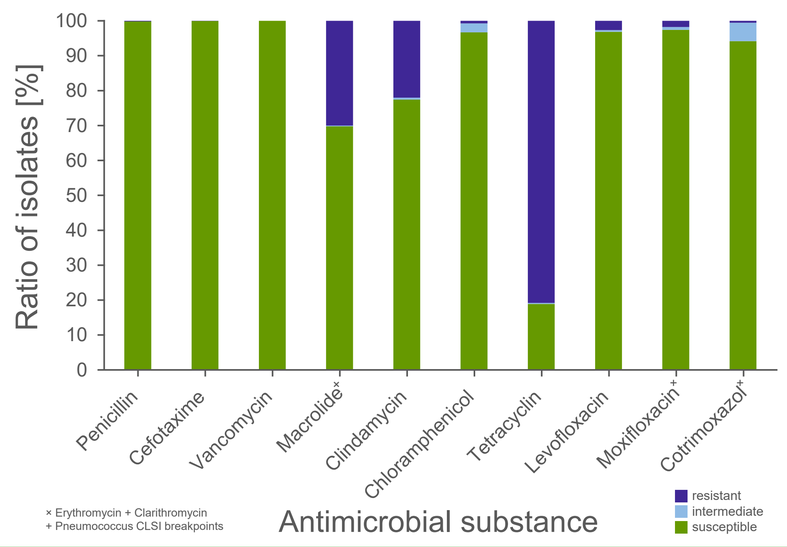
EOD SEROTYPE DISTRIBUTION



LOD AND VLOD SEROTYPES



ANTIMICROBIAL SUSCEPTIBILITY



RESISTANCE DEVELOPMENT