

Changes in the Epidemiology of Invasive Infections with Group A Streptococcus in Time of the COVID-19 pandemic in Switzerland

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1. Introduction

Since we observed a remarkable increase of patients with invasive infections with Group A Streptococcus (GAS) in the Cantonal Hospital of Grisons since April 2022 (see SSI Poster 41) we aimed to assess the monthly occurrence of positive microbiological samples with GAS before, during and after the restrictions measures due to the COVID-19 pandemic in Switzerland.

2. Methods

We analysed the number of GAS isolates with a special focus on strains from blood cultures reported to ANRESIS, the Swiss Centre for Antibiotic Resistance. We compared the monthly number of reported samples during the following three periods: P1; from January 2016 to March 2020 (before the pandemic), P2; from April 2020 to March 2022 (during the pandemic) and P3; from April 2022 to March 2023 (after the pandemic). Only the first GAS sample per patient was included in the analysis. A negative binomial regression model with the predictors period 'pre-pandemic, pandemic, post-pandemic' and seasonality was fitted.

In a sensitivity analysis, we analysed the percentage of GAS isolates in all positive blood cultures reported to ANRESIS to correct for possible changes in coverage or blood sampling policies during the study period.

3. Results

A) Overview of all GAS isolates reported to ANRESIS

Total number of GAS isolates from January 2016 to March 2023	11'496
Origin of the isolates:	
- oral swabs	6972 (60%)
- biopsies / sterile body fluids	1865 (16%)
- blood cultures	1247 (11%)
- other sides	1412 (12%)
Median number of isolates per months:	
- P1, before the pandemic (1/2016 to 3/2020)	136
- P2, during the pandemic (4/2020 to 3/2022)	67
- P3, after the pandemic (4/2022 to 3/2023)	244

B) Bacteremia with GAS

The median number of bacteremia per month were 14.6 in P1, 5.7 in P2 and 30.7 in P3. The predictors period and seasonality were both significantly ($p < 0.01$) improving the negative binomial regression model. (see Figure 1) The decrease of positive blood cultures with GAS in P2 and the rise in P3 compared to P1 was observed in pediatric and adult age groups, with the highest increase in the age group over 65 and in all geographical regions of Switzerland. The ratio of positive blood cultures with GAS compared to the total number of GAS sample was 11% in P1, 8% in P2 and 13% in P3. The sensitivity analysis confirmed the results of the main analysis: in P1 the positive blood cultures with GAS accounted for 1.2 % of all positive blood cultures reported to ANRESIS, in P2 for 0.71 % and in P3 for 2.3%.

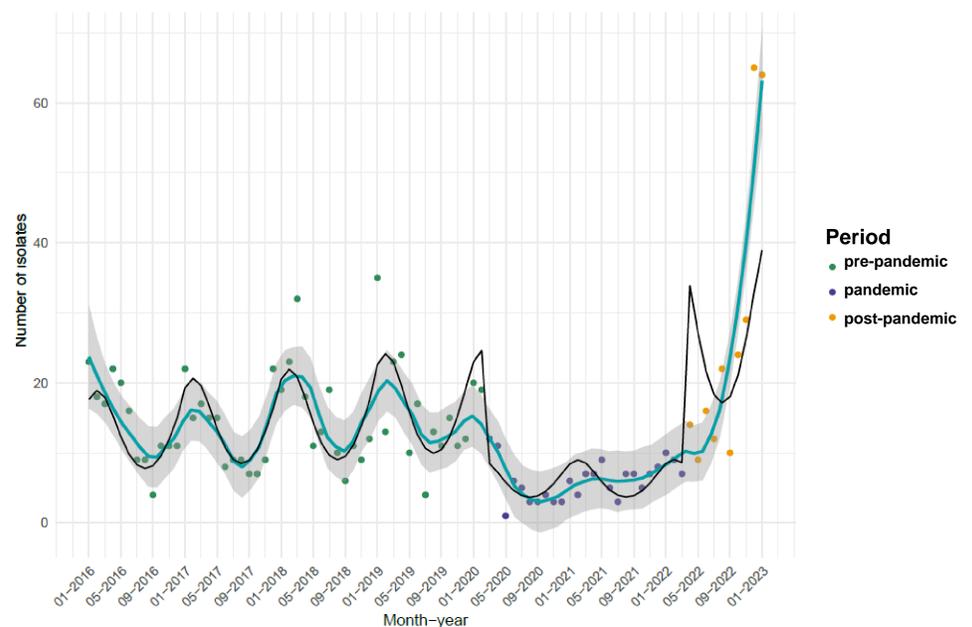


Figure 1. Number of reported blood culture with GAS from 1/2016 to 2/2023
Count data (points coloured according to the period) and negative binomial regression model estimates (black line). In addition, a LOESS smoother teal line +95% CI is added for improved visualisation.

4. Conclusions

- During the COVID-19 pandemic a significant lower monthly number of Group A Streptococcus isolates was reported to ANRESIS
- After the pandemic, there was a rapid increase of the monthly isolates, by far over the numbers reported before the pandemic.
- The increasing percentage of samples isolated in blood cultures in period 3 may be a hint that the pathogenicity of the strains changed.
- Awareness of the growing number of invasive infections with GAS is important to prompt diagnosis and treatment in suspicious cases.
- Further studies including whole-genome sequencing are needed to understand the reason of the current increase of cases.

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