Decrease of outpatient antibiotic consumption during the COVID-19 pandemic, Switzerland: an interrupted time series analysis

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Background

The COVID-19 pandemic has been a challenge for health-care systems and antibiotic stewards as uncertainty regarding treatment and bacterial coinfections raised concern [1].

AIM: to assess the effect of the COVID-19 pandemic on the outpatient antibiotic consumption in Switzerland.

Method

- Monthly consumption data were used (J01 ATC code) from IQVIA™ for the period 2018-2021 (expressed in defined daily doses per 1000 inhabitants per day (DID)). IQVIA ™ sales correspond to sell-in data from pharmaceutical industries to public pharmacies and self-dispensing physicians. Sales expressed in number of packages were converted into DDDs using the Anatomical Therapeutic Chemical Classification System (ATC/DDD, 2022) developed by the WHO Collaborating Centre for Drug Statistics Methodology.

- A generalized regression-based interrupted time series (ITS) model was used to investigate the extent to which the COVID-19 pandemic changed monthly antibiotic sales data. The first wave was defined from March to May 2020 and the second wave from October 2020 to April 2021 according to hospitalizations due to COVID-19.

- We used prescription data with antibiotic treatments from the "Sentinella" network (134 practitioners from general medicine and 27 pediatricians) during 2018 and 2021 (expressed in number of antibiotic prescriptions per 1000 consultations). Only annual data were available for prescription data.

Conclusion

A significant decrease in outpatient antibiotic use was observed during the first pandemic wave, especially in the Italian- and French-speaking regions.

Probably lockdown measures contributed to this effect by several mechanisms as:

i) decrease of overall respiratory infections due to hygiene measures and home-office
ii) fear of visiting physicians even for other illnesses
iii) obligation to restrict ambulatory consultations to emergency from March 16 to April 27
iv) early hospitalization of COVID-19-infected patients with more severe symptoms [2, 3]

Reference

[1] Huttner BD et al. COVID-19: don't neglect antimicrobial stewardship principales ! Clin Microb and Infect 2020; 26: 808-810.
[2] Cohidon Ch., Senn N. La première vague de COVID-19 en Suisse et les soins primaires. Rev Med Suisse 2020 ; 16 : 2127-30 [French]
[3] Tang HJ et al. Changing epidemiology of respiratory tract infections during COVID-19 pandemic. Antibiotics; 2022 (11): 315

Results

1 The most significant decrease of overall consumption was observed during the first wave mainly in the Italian- and French-speaking regions (- 3.15 DID per month, $p < 0.001$; - 2.76 DID per month, $p < 0.001$, resp) followed by the German-speaking region (- 1.45 DID per month, $p < 0.01$).

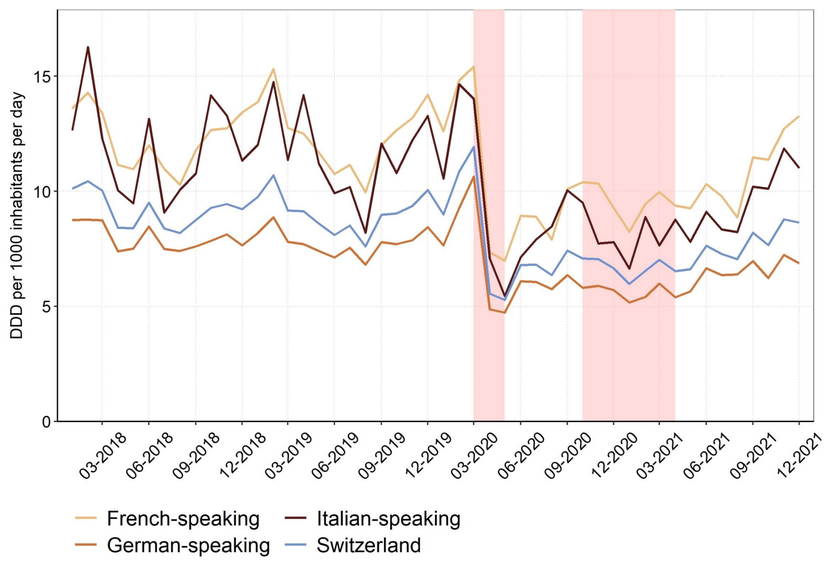

Figure 1: The plot shows the impact of each pandemic phase (reddish background) on monthly antibiotic consumption in DDD per 1000 inhabitants per day in Switzerland and in the 3 linguistic regions (datasource: IQVIA ™)

2 The most significant decrease of use was observed for combinations of penicillins and beta-lactamase inhibitors (BLI) (-0.66, $p < 0.001$) followed by macrolides (- 0.39, $p < 0.01$), penicillins with extended spectrum (-0.31, $p < 0.001$) and fluoroquinolones (-0.29, $p < 0.0001$) during the first COVID-19 wave.

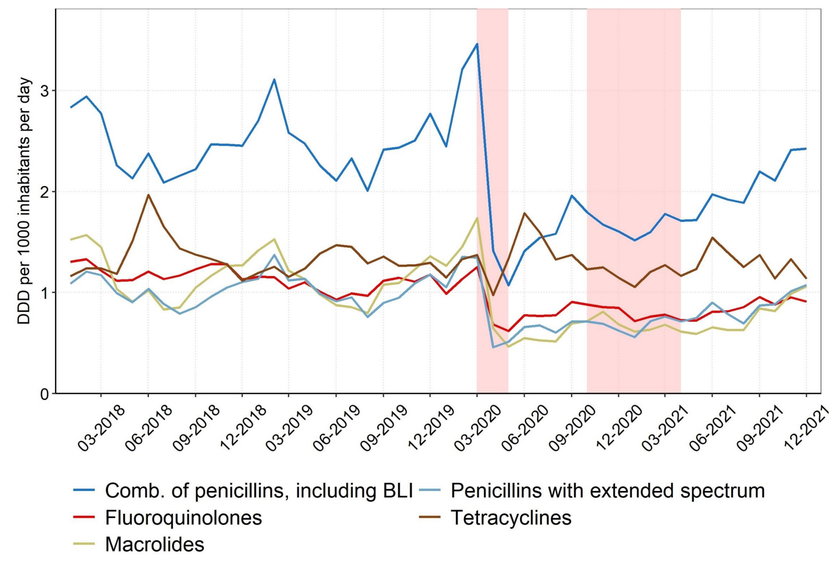

Figure 2: The plot shows the impact of each pandemic phase (reddish background) on monthly antibiotic consumption, expressed in DDD per 1000 inhabitants per day by antibiotic families (datasource: IQVIA ™)

3 The overall number of antibiotic prescriptions per 1000 consultations between 2018 and 2021 decreased by 31% in general practitioners and by 45% in pediatricians.

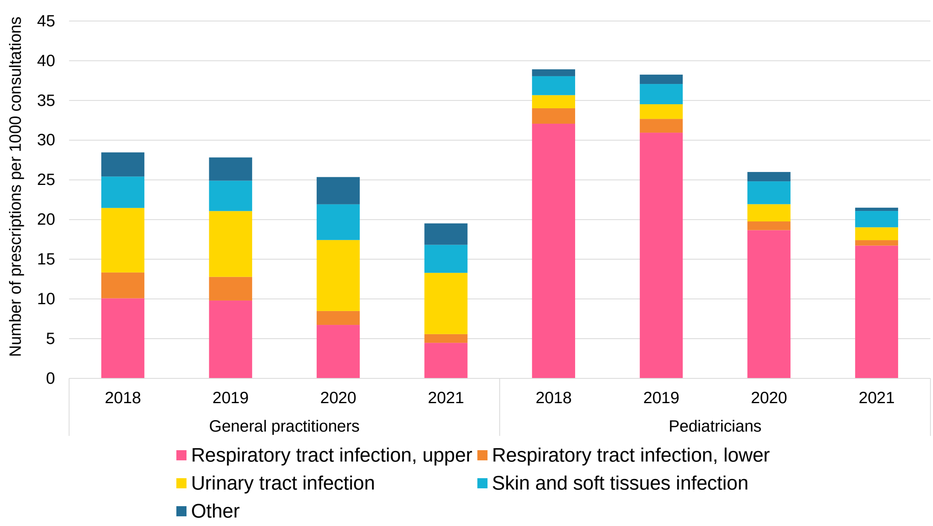

Figure 3: Antibiotic prescriptions by indications issued by general practitioners and pediatricians participating to the Sentinella network, expressed in number of prescriptions per 1000 consultations

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