TRENDS IN ANTIBACTERIAL CONSUMPTION IN BELGIAN HOSPITALS 2017-2021 : ASSESSING THE IMPACT OF THE COVID-19 PANDEMIC

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Context

Excessive antimicrobial consumption (AMC) is one of the most important drivers of antimicrobial resistance (AMR). AMR reduces the effectiveness of antimicrobial agents in treating infectious diseases in humans and animals, leading to increased morbidity and mortality, as well as higher economic costs.

Accordingly to the Belgian One-Health annual report (BELMAP 2023), Belgian hospitals have a major contribution to total human AMC (20.9% in 2021), surpassing the European average of 10%.

The impact of COVID-19 on hospital AMC at national level remains inadequately described. This study aims to assess the specific impact of the COVID-19 pandemic on antibacterials in Belgian hospitals.

Methods

- **ESAC-Net** European Surveillance of Antimicrobial Consumption Network
- **BeH-SAC** Belgian Hospitals Surveillance of Antimicrobial Consumption

- **Reimbursed antibacterials** from the National Institute for Health and Disability Insurance
- Classified according to the **WHO Anatomical Therapeutic Chemical (ATC) system**: *Antibacterials for systemic use (J01)*
- Volume quantified in **Defined Daily Doses (DDDs)**
- Consumption expressed in **DDDs/1000 inhabitants/day** (ESAC-Net), **DDDs/1000 patient days** and **DDDs/1000 admissions** (BeH-SAC)
- **Broad-spectrum antibacterials** included combinations of penicillins, incl. beta-lactamase inhibitors (J01CR), second-generation cephalosporins (J01DC), third-generation cephalosporins (J01DD), macrolides, lincosamides and streptogramins (J01F, excluding erythromycin J01FA01) and fluoroquinolones (J01MA)

- **Linear regressions** analysis performed to assess the five year consumption trend of ATC J01 group in total, by ATC-3 level and broad-spectrum antibacterials
- **Compound Annual Growth Rate (CAGR)** analysis used to forecast consumption in the years following the pandemic (2020-2021)

Results

Evolution of actual and predicted consumption of *Antibacterials for systemic use* (J01, ATC-3 level subclasses & broad-spectrum) between 2017 and 2021 in all Belgian hospitals (n=170) expressed in DDDs/1000 inhabitants/day (A), in acute care hospitals (n=103) expressed in DDDs/1000 patient days (B) and DDDs/1000 admissions (C)
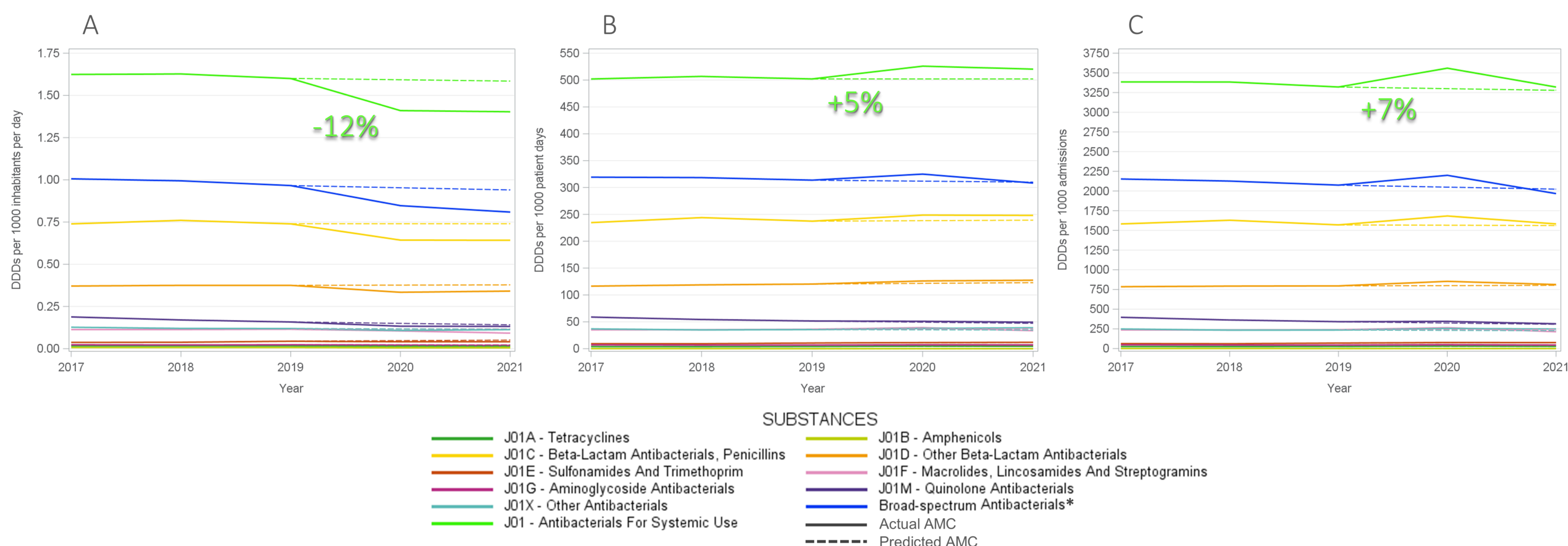
* Broad-Spectrum Antibacterials include Combinations Of Penicillins, Incl. Beta-Lactamase Inhibitors (J01CR), Second-Generation Cephalosporins (J01DC), Third-Generation Cephalosporins (J01DD), Macrolides, Lincosamides And Streptogramins (J01F) except Erythromycin (J01FA01) and Fluoroquinolones (J01MA).

Trends in the consumption of antibacterials for systemic use (ATC group J01) in Belgian hospitals when expressed in

DDDs/1000 inhabitants/day

→ J01, J01M and broad-spectrum experienced **significant decline** over 5 years

→ The use of J01 antibacterials decreased by **-12%** between 2019 and 2020

→ All ATC-3 subclasses and broad-spectrum antibacterials **deviated negatively from the predicted use** in both 2020 and 2021

DDDs/1000 patient days   DDDs/1000 admissions

→ J01M and J01B experienced a **significant decline** in use over 5 years

→ J01E and J01D* showed a **significant increase** over 5 years (*only in patient days)

→ Between 2019 and 2020, the use of J01 antibacterials increased by **5%** and **7%** in patient days and admissions, respectively

→ All subclasses **deviated positively from the predicted use** in both 2020 and 2021 except for J01F

→ The observed use of broad-spectrum antibacterials **exceeded the forecasted values** in 2020 but regressed below the forecasted levels in 2021

Conclusion

Contrary to results obtained using the widely applied country's population as the denominator, a notable surge in AMC particularly for broad-spectrum antibacterials, was observed in 2020 when using hospital's population denominators. This increase coincided with the onset of the COVID-19 crisis.

These findings underscore the necessity of establishing a national hospital surveillance system that utilizes denominators accurately representing the population under monitoring. Implementing robust hospital-specific surveillance mechanisms would enhance the precision of evaluations and facilitate targeted interventions aimed at optimizing antimicrobial utilization.

BELMAP 2023