Seasonal variations of outpatient antibiotic use in Austria

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Background

Large seasonal variations concerning the prescription of antibiotics for systemic use (group J01 in the Anatomical Therapeutic Chemical (ATC) classification system of the WHO) in the outpatient sector may be a sign of overuse regarding virus infections. The aim of this study is to analyse those seasonal variations in Austria concerning different age groups as well as the different ATC subgroups of antibiotics.

Method

The data comprise all filled prescriptions at the expense of the 19 statutory health insurance funds in Austria, covering more than 97% of the population. The observation period covers 2013 to 2015, on a quarterly basis. The main measures of antibiotic use are: 1) the amount of prescribed daily doses (PDD) and 2) the proportion of persons to whom at least one antibiotic drug has been prescribed (patients).

Results

Seasonal variation of patients

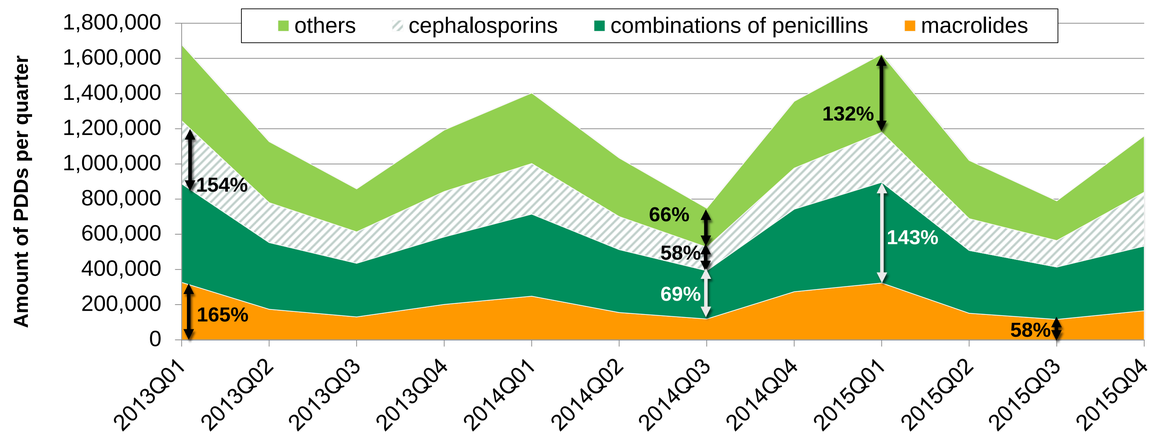
The highest number of patients was observed in the first quarter of every year, followed by the fourth and the second quarter. The number of patients was lowest in the third quarter of each year (2013: 10%, 2014: 9.8%, 2015: 9.3%) and highest in the first quarter of each year (2013: 15.3%, 2014: 13.2%, 2015: 15.2%). Quarterly variations were especially high among the youngest cohorts (age 0 to 14 years) – with a minimum of 8.5% in the third quarter 2014 and a maximum of 18.5% in the first quarter 2013. The three-year average gives the opportunity to quantify the seasonal fluctuation and represents the baseline in the following illustrations.

	2013				2014				2015				3-year average
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
all patients	15.3%	11.4%	10.0%	12.1%	13.2%	10.6%	9.8%	12.5%	15.2%	10.4%	9.3%	11.3%	11.8%
patients < 15 years	18.5%	12.5%	9.9%	13.7%	15.6%	11.4%	8.5%	14.6%	17.2%	11.0%	8.8%	11.5%	12.8%

Amount of persons filling at least one antibiotic prescription within a quarter

Analysis of PDDs in J01 subgroups, age 0-14

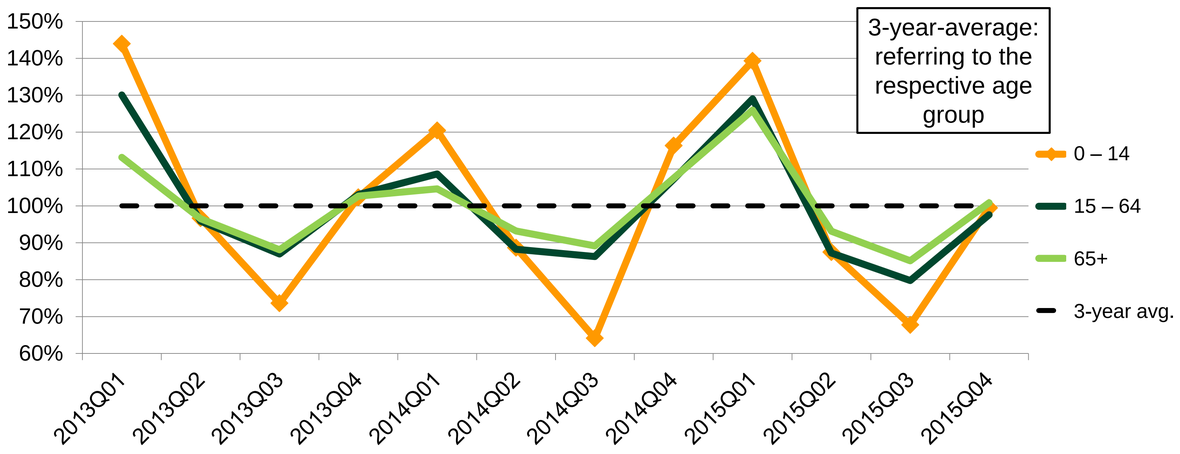
Taking a closer look at the prescribed daily doses (PDDs) of the subgroups of J01 for patients under 15 years, it appears that several ATC groups have a prominent seasonal fluctuation. It is highest for macrolides (J01FA, between 58% and 165%), combinations of penicillins (J01CR, between 69% and 143%) and cephalosporins (J01DB, J01DC, J01DD and J01DE, between 58% and 154%).



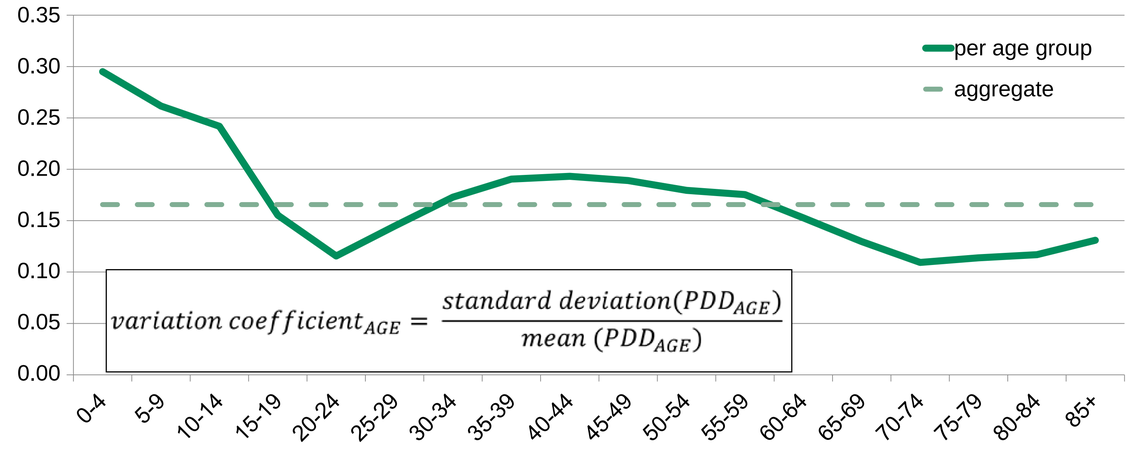
Seasonal variation by ATC subgroups, patients < 15 years, 2013 - 2015

Quarterly variation of PDDs by age group

A closer look at the age groups reveals an age-dependency within the seasonal variation. The average variation of the quarterly PDDs to the three-year average was highest for patients younger than 15 and lowest among patients of 65 years and older. Furthermore, calculating the variation coefficient for the five-year cohorts, it can be seen that the variation is highest for the youngest cohort and decreases sharply until the age of 20-24 years. Patients between the age of 35 an 59 again show a variation coefficient above average, while the minimum is among the cohort of 70-74 years. For this calculation, the PDDs were set in relation to the population in each age group to eliminate the factor that the growth of the population between 2013 and 2015 was different between the age groups.



Seasonal variation of PDDs by age group, 2013 – 2015



Variation coefficient of antibiotic use by five-year cohorts, 2013 - 2015

Conclusion

Compared to other European countries, Austria has a relatively low overall antibiotic use[1]. Nonetheless, the seasonal variations are high. This might be an indicator of suboptimal use of antibiotics. As this is a growing public health concern, the use of antibiotics in the Austrian health system should be considered more carefully by doctors as well as patients.

References: 1 European Centre for Disease Prevention and Control (ECDC) 2014: Surveillance of antimicrobial consumption in Europe 2012.

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