

Short Report

A regional analysis of outpatient antibiotic prescribing in Germany in 2010

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The aim of this study was to investigate whether the previously reported regional variation in outpatient antimicrobial use density in Germany has persisted or changed over time and has been similar for both children and adults. Antibiotic [at least 1 Anatomical Therapeutic Chemical (ATC) Code 'J01' drug] prescription prevalence data for the year 2010 were analysed for 17 regions. The overall age-standardized antibiotic prescription prevalence ranged between 25.0 and 36.6% in the different regions. Regional prescription patterns for children differed from those seen in adults. Age-specific differences in antibiotic prescription prevalence need to be considered when comparing antibiotic consumption between regions.

Introduction

Since a number of years, international comparisons of outpatient antibiotic use have become available and have demonstrated considerable variation in antibiotic prescribing between countries.¹ Many of the observed patterns of use appear to have persisted over time, and sociocultural determinants rather than epidemiological differences may account for this variation. Within-country differences in antibiotic use have also been observed. For example, Belgium has reported significant differences between the French-speaking parts of the country and Flanders.² Switzerland shows a much higher antibiotic use density in the French-speaking part than in other regions, and in Italy antibiotic consumption increases from the south to the north.^{3,4} According to earlier estimates for prescribed defined daily doses (DDD) per population covered by the statutory health insurance (~90% of the population in Germany) it was suggested that the eastern (new) states of Germany are low antibiotic consumption areas compared with the western part of Germany, in particular regions near Luxembourg and Belgium and the states of North Rhine-Westphalia.^{5,6} We here used a full analysis set of recent outpatient drug prescription data to evaluate whether regional antibiotic use differences in both children and adults have persisted over time and whether earlier data for children and adults can be confirmed using prescription prevalence as metric rather than antibiotic use density values expressed in DDD per population.

Methods

Almost 90% of Germany's 81.7 million population (2010) are covered by statutory health insurances (*Gesetzliche Krankenkassen*, GKV) with little regional variation in coverage rates. GKV prescription data for the year 2010 with all dispensed WHO-ATC classification-code 'J01' drugs (antibiotics for systemic use) were analysed. Prescription prevalence was calculated by counting all WHO-ATC-

code 'J01' drug prescriptions in 2010 per 100 individuals covered by GKV. Overall and adult (≥ 15 years of age) prescription prevalence data were directly age-standardized by calculating a weighted average of the region's age-specific population rates where the weights represent the age-specific sizes of the 2010 reference population (KM6 statistics of the Federal Ministry of Health, www.gbe-bund.de). The regions were defined by 17 GKV physician associations (*kassenärztliche Vereinigungen*, KV) which are geographically similar to German federal states [*Länder*, one of the largest states (North Rhine-Westphalia) is separated into 2 KV regions], and were based on the location of the prescriber rather than the home address of the patient.

Results and discussion

The overall outpatient antibiotic prescription prevalence in 2010 was 31.5%. Age-standardized prescription prevalence was higher in western states compared with states in the eastern region. The highest overall annual prescription prevalence (36.6%) was in Saarland, a small state bordering France and Luxembourg. The lowest rate was observed in the new state of Brandenburg (25%) located in the eastern part of the country. The regional pattern of overall antibiotic use was similar using prescribed DDD per population. When compared with the estimated values for DDD per 1000 population and day from the year 2003,^{5,6} the data indicate that the relatively low overall antibiotic consumption in eastern and southern German obviously has persisted since that time.

The prescription prevalence was different according to age group. Patients older than 90 years showed the highest (55.7%), and children showed the second highest prescription prevalence (39.1%) while the prevalence was much lower (<30%) for the age groups 40–74 years.

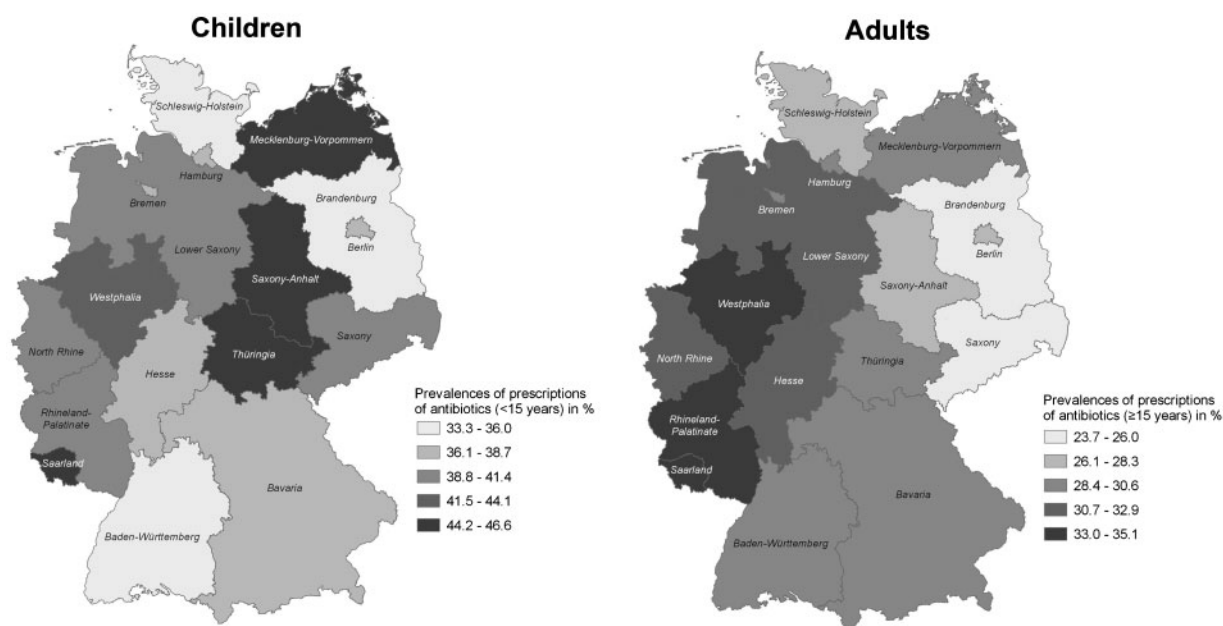


Figure 1 Antibiotic prescription prevalence for children vs. adults in different regions of Germany. Data are for 2010

As shown in figure 1 the regional pattern of antibiotic use in 2010 as measured by prescription prevalence differed between the different regions for children and adults. Surprisingly and as suggested before,^{6,7} high rates among children were observed in Thuringia and several other new eastern states that did not show this pattern for adults. In fact, the prescription prevalence in Thuringia among children (46.1%) was high and similar to the level observed in Saarland (46.1 vs. 46.6%) whereas among adults the levels in these two states were 29.0 vs. 35.1%, respectively. On the other hand, the area with the lowest antibiotic consumption in children in 2010 was the (southern) state of Baden-Wuerttemberg, and this low rank in pediatric antibiotic use was already estimated from the antibiotic use density data from the year 2003 published earlier.⁶

Previous reports used national sample data to explore regional differences in antibiotic use. In contrast, this study used a full analysis set of prescription data and therefore provides a more reliable estimate of regional differences. In addition, because of the limitations of the WHO-ATC DDD definitions specifically for childhood consumption evaluation analyses the present analysis used prescription prevalence to reassess regional use patterns in children (vs. adults) in this country. Most previous antibiotic use studies in children have used prescription prevalence as the best available and suitable metric.^{7,8} The current findings reliably demonstrate that the regional patterns of outpatient antibiotic use in Germany including the poor correlation between use levels for adults and children have remained somehow stable since >5 years.

The reason for the discrepant regional antibiotic use patterns between adults and children is unknown. Most likely the observed patterns represent sociocultural developments and particularities in the young generation of parents living in the east. There has been a discrepant evolution in fertility rates between east and west, with rates becoming higher in the east than in the west in the last decades.⁹ There are higher employment and much lower marriage rates (and many more single mothers) among women in the east compared with those living in the west and south, in particular. Also, the percentage of children in day care centres in the east is much higher than in the west.¹⁰ We speculate that these conditions could have led to an increased demand for medicines felt to perhaps more rapidly cure infections among children and, thus, allow mothers to

more rapidly go back to work and remain incapacitated for fewer days. Across the regions defined here; however, a preliminary exploratory analysis shows that there is no perfect correlation between employment, income, marriage rate or single parenthood on one side and antibiotic use on the other side. Detailed small area analyses considering sociocultural and demographic data are needed to test such and similar hypotheses and possibly better explain the regional and age-specific differences in antibiotic use patterns observed in this country.

In conclusion, the pattern of regional antibiotic prescription rates for children in Germany differs from those seen in adults. Age-specific antibiotic prescription rates need to be considered when comparing antibiotic consumption between regions and possibly countries, and before planning interventions.

Conflict of interest: None declared.

Key points

- Using antibiotic prescription prevalence data rather than WHO-ATC DDD that are essentially defined for adults we here show and confirm that regional patterns of antibiotic use differ greatly in Germany for children and adults.
- In some German states prescription prevalence was high in children but low in adults, suggesting that at least in large countries with socioeconomically and culturally diverse states or regions such regional analyses of antibiotic consumption with age-group specific DDD-unbiased prescription prevalence data are important to better define areas of possible antibiotic overuse and its correlates.
- Based on regional age-standardized data, it should be possible to better and more specifically target interventions for optimized antibiotic use.

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Short Report

Comparison of patients' experiences in public and private primary care clinics in Malta

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Demographic changes, technological developments and rising expectations require the analysis of public–private primary care (PC) service provision to inform policy makers. We conducted a descriptive, cross-sectional study using the dataset of the Maltese arm of the QUALICOPC Project to compare the PC patients' experiences provided by public-funded and private (independent) general practitioners in Malta. Seven hundred patients from 70 clinics completed a self-administered questionnaire. Direct logistic regression showed that patients visiting the private sector experienced better continuity of care with more difficulty in accessing out-of-hours care. Such findings help to improve (primary) healthcare service provision and resource allocation.

Introduction

Several international studies have shown the beneficial effect of primary care (PC) on controlling costs and reducing health disparities.^{1,2} However, the findings of these studies have included a limited number of EU countries.¹ There are no easy solutions to create healthcare sustainability across and beyond Europe.³ One option is maintaining high-quality PC.¹

In Malta, PC is provided by the state health service and by private general practitioners (GPs). The public service is free of charge at the point of use, accessible from government Health Centres, 24 h a day and 7 days a week. Private GPs work in their own offices or within community pharmacies.

This study was conducted to compare the public against the private PC patients' experiences in Malta using a validated tool to evaluate the delivery and outcomes of primary healthcare.

Methods

The target population were all patients attending PC clinics. Seventy GPs divided equally between each sector were recruited. GPs were selected randomly from the Malta Medical Council Family Medicine

register after systematically removing GPs who were retired, not practicing or practicing abroad/in another area. A small remuneration was offered to the GPs.

Using convenience sampling, 10 patients aged 18 years and older were invited to participate voluntarily, before they visited the GP. Patients filled in the questionnaire about their experience with the GP they had just visited, after the consultation. This minimized recall and information bias. Each patient's responded questionnaire was linked to the GP's questionnaire using an anonymous coding system. Exclusion criteria included attending for solely an administrative procedure and being too sick.

The survey was conducted over 8 weeks between 8 am and 9 pm to capture the whole range of service users. This enabled a quasi-random sampling procedure. The fieldworkers who were medical doctors underwent a training session to limit inter-observer bias. Using an online sample size calculator Pi-face for a confidence interval around a proportion, we considered the worst-case scenario and 50% proportion. With a sample of 700 patients, the confidence interval was $\pm 3.7\%$.

A descriptive, cross-sectional study design was applied using the QUALICOPC GP and Patients Experiences Questionnaire. These tools were developed by the QUALICOPC Consortium to evaluate