9.4 Antimicrobial Consumption

Key Points

- The overall outpatient antimicrobial consumption in Ireland for 2015 was 23.6 defined daily doses (DDD) per 1000 inhabitants per day (DID), a 7% increase on the 2014 rate of 23.9 DID. This rate is mid-to-high in comparison with other European countries
- The median rate of hospital antimicrobial consumption in Ireland for 2015 was 82.6 DDD per 100 bed days used (DBD) (range = 29.3 – 108.7), a 0.7% increase on 2014. This rate is mid-range in comparison with other European countries. In 2015, 42 acute public hospitals contributed data

Ireland participates in ECDC's European Surveillance of Antimicrobial Consumption Network (ESAC-Net), which aims to collect systemic antimicrobial usage data from the outpatient (ambulatory, community or primary care) setting and from the hospital (inpatient) setting. Antimicrobial consumption is measured in defined daily dose (DDD), which is the assumed average maintenance dose per day for a drug used for its main indication in adults. Rates are calculated in DDD per 1000 inhabitants per day (DID) for outpatients and DDD per 100 bed-days used (DBD) for inpatients. Please refer to "Antimicrobial consumption" and "Denominator data" parts of the explanatory notes section for further details.

Outpatient Antimicrobial Consumption

The overall outpatient antimicrobial consumption for Ireland in 2015 was 25.6 DID, an increase of 7% on the 2014 rate of 23.9 DID. In the latest ESAC-Net report (2015 data), the reported range of outpatient J01 (antibacterial agents for systemic use) antimicrobial usage among European countries was 10.7 to 36.1 DID; the median for 30 European countries with reliable data was 20.7 DID, with Ireland ranking as the ninth highest.

The underlying trend for outpatient antimicrobial consumption for Ireland (Figure 1) has been increasing steadily since 2000. After a decrease in 2008 and 2009, the rate increased again to the highest level so far in quarter 4 2015. There is a marked seasonal fluctuation in usage, with the highest consumption contemporaneous with periods of increased influenza activity.

In 2015, outpatient consumption of penicillins accounted for the largest class used (61% of total at 15.5 DID), followed by macrolides (17%, 4.2 DID), tetracyclines (10%, 2.6 DID), cephalosporins (5%, 1.2 DID), sulphonamides/trimethoprim (4%, 1.1 DID) and fluoroquinolones (4%, 0.9 DID). Penicillin in combination with a beta-lactamase inhibitor (such as co-amoxiclav) accounted for the largest proportion of all penicillins at 44% (6.8 DID). Broad-spectrum penicillin (such as amoxicillin) usage was also high at 35% of all penicillins (5.4 DID). See Table 1 for a detailed breakdown by pharmacological drug groups.

There was considerable variability in the overall outpatient antimicrobial usage at county level (19.2 to 35.4 DID), as shown in Figure 2.

Hospital Antimicrobial Consumption

Forty-two acute public hospitals provided valid antimicrobial usage data for 2015. The median rate of antimicrobial consumption was 82.6 DBD (range 29.3 – 108.7 DBD). This was a 0.7% increase from 2014's median rate on 82.0 DBD. The overall rate for 2015 was 84.0 DBD. These levels are mid-to-high in Europe.

The largest group of antimicrobials, penicillins at 41.2 DBD accounted for 48% of all inpatient antimicrobial usage. The use of fluoroquinolones such as ciprofloxacin (representing 6% of all inpatient antimicrobial usage) was 5.3 DBD. Consumption of cephalosporins, monobactams and carbapenems (representing 10% of all inpatient antimicrobial usage) was 8.7 DBD. Consumption of glycopeptides such as intravenous vancomycin, imidazoles such as intravenous metronidazole and nitrofurans (representing 10% of all inpatient antimicrobial usage) was 8.2 DBD. Consumption of erythromycin and related agents (macrolides, representing 3% of all inpatient antimicrobial usage) was 2.6 DBD. Less frequently used agents in hospitals are tetracyclines, sulfonamides/trimethoprim,

aminoglycosides and other systemic antimicrobials; collectively these drugs represent just less than 10% of all inpatient antimicrobial usage.

The data do not indicate whether or not the level of antimicrobial use is appropriate for a given patient population. For example, higher levels of antimicrobial consumption among tertiary hospitals may be appropriate if such hospitals have specific patient populations that are more likely to require antimicrobial therapy (e.g. organ transplant, cystic fibrosis etc). Furthermore, DDD calculations are based on adult dosing and may therefore underestimate antimicrobial consumption in paediatric settings.

While antimicrobial consumption data in Ireland are comprehensive, gaps remain. Most notably, data from private hospitals is missing. All hospitals dispense to outpatients, day cases and external long term facilities, and the data representing this volume is excluded from our analyses. Outpatient data represents 95% of wholesale-to-retail pharmacy transactions. Therefore, there is a further gap in the data. Collectively, these gaps would represent about 10% of the total antimicrobial consumption for Ireland. While HPSC provides antifungal consumption data to ESAC-Net, this report is primarily focussed on antibacterial consumption only. ESAC-Net also collects data on antiviral and antiprotozoal agents, which are not currently analysed in Ireland.

Table 1. Breakdown by pharmacological drug groups for outpatient antibiotic use in Ireland for 2014 and 2015.

	2014	Percent of 2014	2015	Percent of 2015	Percent Change 2014 to 2015
Penicillins	13.5	56.4%	15.5	60.6%	14.9%
Narrow spectrum penicillins	1.1	4.4%	1.1	4.1%	0.6%
Beta-lactamase resistant penicillins	1.9	8.0%	2.3	8.9%	19.1%
Broad spectrum penicillins	4.4	18.4%	5.4	21.1%	22.0%
Penicillin with beta-lactamase inhibitor	6.1	25.6%	6.8	26.5%	10.9%
Macrolides and related drugs	4.5	18.8%	4.2	16.5%	-5.6%
Tetracylines	2.8	11.5%	2.6	10.1%	-6.0%
Cephalosporins and other beta-lactam drugs	1.1	4.7%	1.2	4.6%	3.7%
First-generation cephalosporins	0.3	1.1%	0.3	1.1%	10.0%
Second-generation cephalosporins	0.8	3.4%	0.8	3.3%	5.2%
Third-generation cephalosporins	0.1	0.3%	0.0	0.2%	-39.0%
Quinolones	0.9	3.8%	0.9	3.6%	3.0%
Sulfonamides and Trimethoprim	1.0	4.4%	1.1	4.1%	0.8%
Other antibiotics	0.1	0.4%	0.1	0.4%	-1.2%
TOTAL	**23.9**	**100.0%**	**25.6**	**100.0%**	**7.0%**

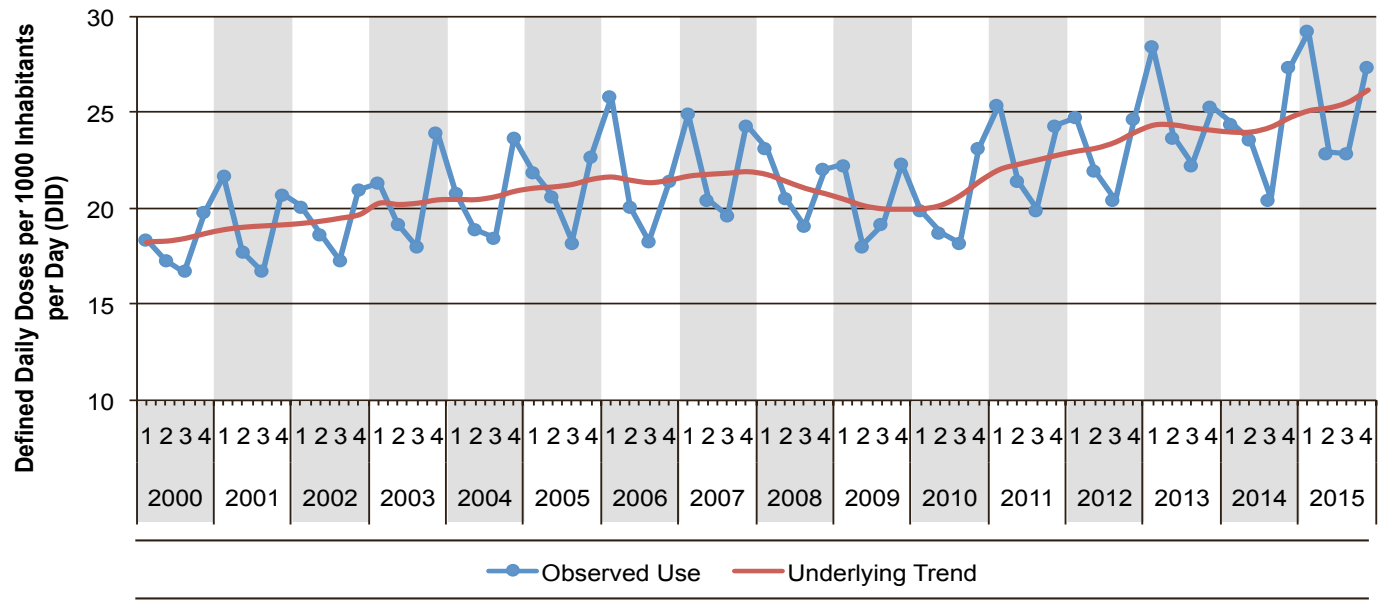
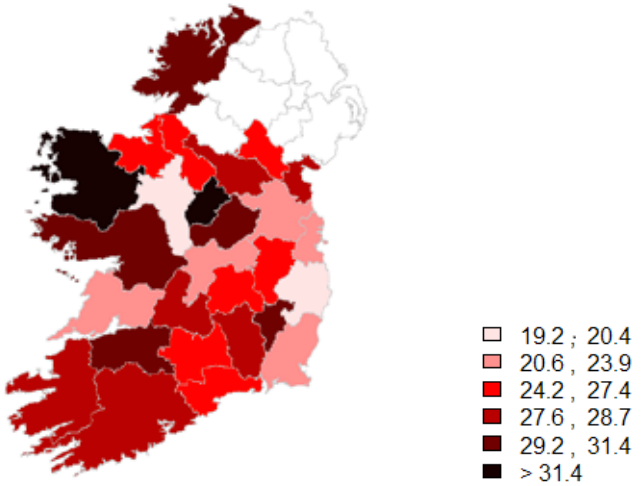


Figure 2. Outpatient antibiotic consumption in Ireland by county, in DDD per 1000 inhabitants per day for 2015.

More detailed analyses of antimicrobial usage data can be found on the www.hpsc.ie website, through "Topics A-Z", under "Antibiotic Consumption Surveillance". Details of the WHO ATC/DDD system of classifying and measuring drug consumption can be found at www.whocc.no/atc_ddd_index/. The figures presented in this report may vary from previously published levels owing to methodological changes.



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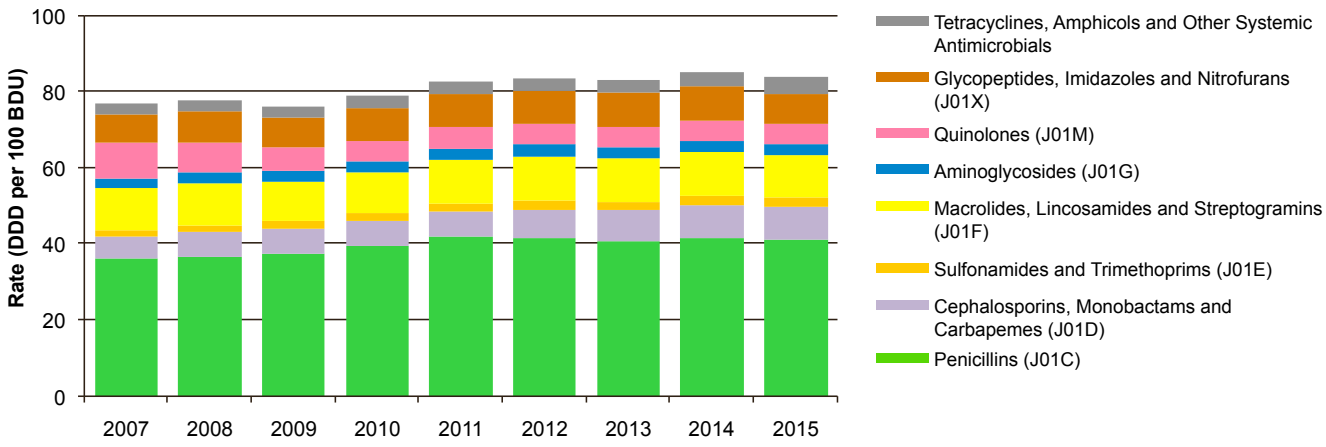

Figure 3. Overall hospital antimicrobial consumption rate in DDD per 100 BDU by pharmacological subgroup (ATC level 3) by year.