9.2.0 Antimicrobial Consumption

Key Points

- The overall outpatient antimicrobial consumption in Ireland for 2013 was 23.8 DID, an increase from the 2012 rate of 22.9 DID. This rate is mid-to-high in comparison with other European countries
- The median rate of hospital antimicrobial consumption in Ireland for 2013 was 84.9 DBD (range 32.8 – 114.8 DBD), a 2.5% decrease from 2012. This rate is mid-range in comparison with other European countries. Forty-two public acute hospitals contributed data in 2013

Ireland participates in ECDC's European Surveillance of Antimicrobial Consumption (ESAC-Net) project 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 see "Antimicrobial consumption" and "Denominator data" parts of the explanatory notes section for further details. In 2013, the analysis and management of data were moved to the HPSC online service, MicroB.

Outpatient Antimicrobial Consumption

The overall outpatient antimicrobial consumption for Ireland in 2013 was 23.8 DID, an increase of 4% from the previous year's rate of 22.9 DID. In the latest interim ESAC-Net report (provisional 2013 data), the reported range of outpatient antimicrobial usage among European countries was 10.8 to 30.1 DID. The median for 27 European countries with reliable data was 19.0 DID, with Ireland ranking as the seventh highest.

The underlying trend for outpatient antimicrobial consumption for Ireland (Figure 1) has been increasing steadily since 2000. After a decrease in 2009, the rate increased again to the highest level so far in 2013. There is a marked seasonal fluctuation in usage, with the highest levels occurring during periods of increased influenza activity.

In Ireland in 2013, outpatient consumption of penicillins accounted for the largest class used (55.1% of total at 13.1 DID), followed by macrolides (18.5%, 4.4 DID), tetracyclines (12.5%, 3.0 DID), cephalosporins (5.7%, 1.4 DID), sulphonamides/trimethoprim (4.1%, 1.0 DID) and fluoroquinolones (3.7%, 0.9 DID). Other antimicrobial classes accounted for less than 1% of total use. Penicillin in combination with a beta-lactamase inhibitor (such as co-amoxiclav) accounted for the largest proportion of all penicillins at 53% (7.0 DID). Broad-spectrum penicillin (such as amoxicillin) usage was also high at 29.7% of all penicillins (3.9 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 (18.2 to 32.6 DID) as shown in Figure 2.

Hospital Antimicrobial Consumption

Forty-two public acute hospitals provided valid antimicrobial usage data for 2013. The median rate of antimicrobial consumption was 84.9 DBD (range 32.8 – 114.8 DBD). This was a 2.5% decrease from the previous year's rate of 89.1 DBD. The overall rate for 2013 was 84.4 DBD. These levels are mid-to-high in Europe.

The largest group of antimicrobials, penicillins at 41.8 DBD accounted for 50% of all inpatient antimicrobial usage. The use of fluoroquinolones such as ciprofloxacin (representing 7% of all inpatient antimicrobial usage) was 5.5 DBD. Consumption of cephalosporins, monobactams and carbapenems (representing 10% of all inpatient antimicrobial usage) was 8.1 DBD. Consumption of glycopeptides such as intravenous vancomycin, imidazoles such as intravenous

metronidazole and nitrofurans (representing 10% of all inpatient antimicrobial usage) was 8.8 DBD. Consumption of erythromycin and related agents (representing 14% of all inpatient antimicrobial usage) was 11.7 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. All consumptions levels remained proportionately the same as those seen 2012 (see Figure 3).

Hospital function was the main driver for the differences in the rates of antimicrobial consumption between hospitals. The rates for regional/tertiary and general hospitals (medians 84.4 and 87.5 DBD) centred around the median for Ireland, while the rate for single specialist facilities (maternity, orthopaedic or paediatric) was much lower (median 47.2 DBD). The lower median consumption in single speciality hospitals probably reflects differences in case-mix, compared to other hospitals. However it may also reflect the fact that DDDs are based on adult dosing and may therefore underestimate antimicrobial consumption in paediatric settings.

It should be noted that the data do not indicate whether or not the level of antimicrobial use is

Table 1. Breakdown by pharmacological drug groups for outpatient antibiotic use in Ireland for 2012 and 2013.

	2012	Percent of 2012	2013	Percent of 2013	Percent Change 2012 to 2013
Penicillins	12.5	54.6%	13.1	55.1%	5.0%
Narrow spectrum penicillins	1.0	4.4%	1.1	4.5%	7.2%
Beta-lactamase resistant penicillins	1.0	4.6%	1.2	5.0%	13.6%
Broad spectrum penicillins	3.7	15.9%	3.9	16.4%	6.8%
Penicillin with beta-lactamase inhibitor	6.8	29.7%	7.0	29.2%	2.4%
Macrolides and related drugs	4.2	18.2%	4.4	18.5%	5.7%
Tetracylines	2.9	12.8%	3.0	12.5%	1.6%
Cephalosporins and other beta-lactam drugs	1.2	5.2%	1.4	5.7%	14.6%
First-generation cephalosporins	0.2	0.8%	0.2	0.8%	10.9%
Second-generation cephalosporins	0.9	4.0%	1.1	4.5%	17.9%
Third-generation cephalosporins	0.1	0.4%	0.1	0.4%	-8.5%
Quinolones	0.9	3.8%	0.9	3.7%	0.3%
Sulfonamides and Trimethoprim	1.2	5.0%	1.0	4.1%	-14.5%
Other antibiotics	0.1	0.5%	0.1	0.4%	-8.1%
TOTAL	**22.9**	**100.0%**	**23.8**	**100.0%**	**4.0%**

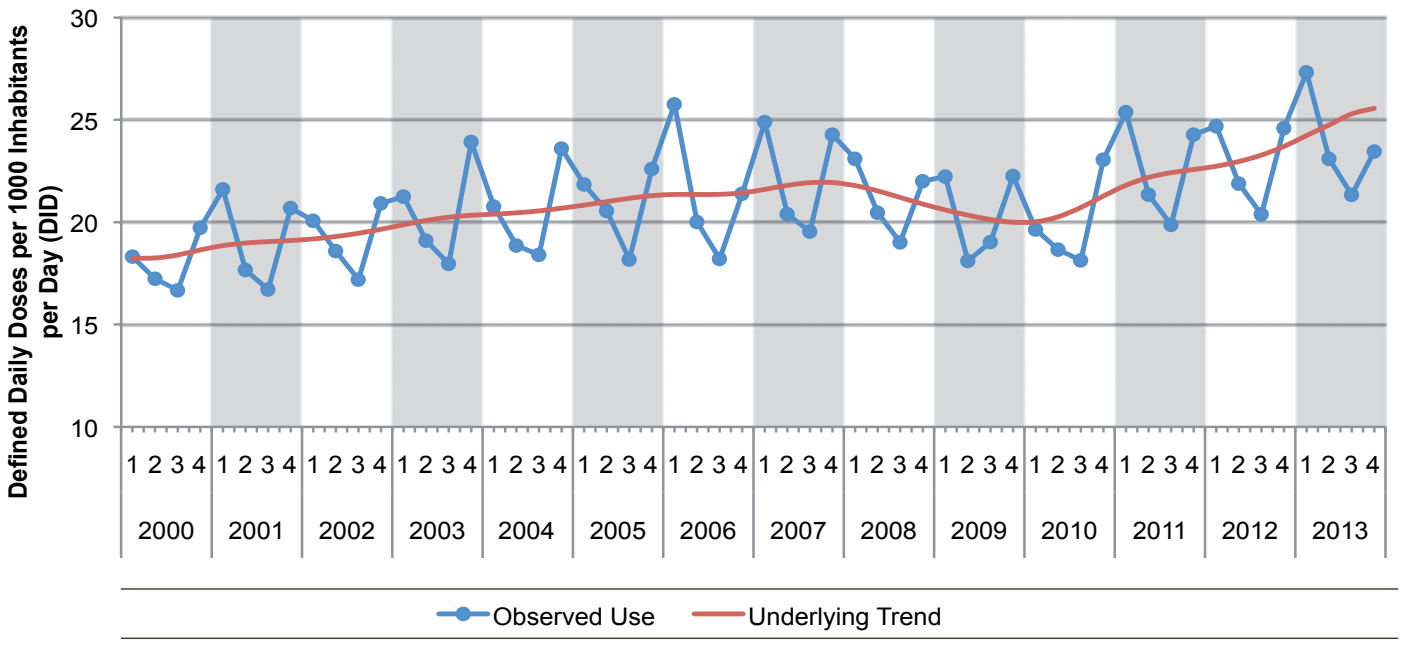

Figure 1. Outpatient antibiotic consumption in Ireland by quarter, 2000-2013.

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).

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.

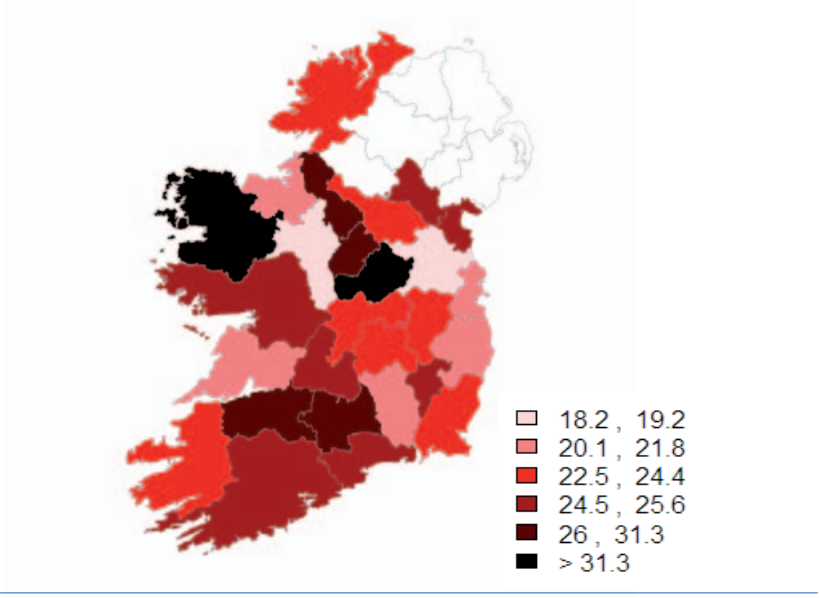

Figure 2. Outpatient antibiotic consumption in Ireland by county, in DDD per 1000 inhabitants per day for 2013.

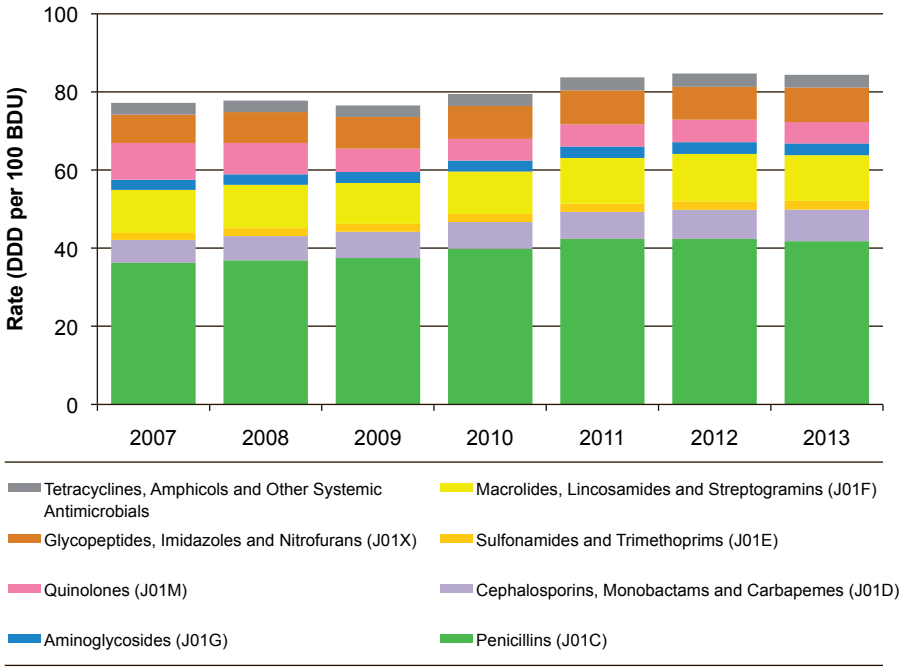

Figure 3. Overall hospital antibiotic consumption rate in DDD per 100 BDU by pharmacological subgroup (ATC level 3) by year.