9.3 Surveillance of Antimicrobial Consumption in Outpatient and Acute Hospital Settings

Key Points

2016 Summary

- The overall outpatient antimicrobial consumption was 24.0 defined daily doses (DDD) per 1,000 inhabitants per day (DID), a 4% reduction on the updated 2015 rate of 25.0 DID. This rate is mid-to-high in comparison with other European countries
- In 2016, 42 acute public hospitals contributed data, with a median rate of hospital antimicrobial consumption of 84.8 DDD per 100 bed days used (DBD) (range = 26.8 – 114.8), representing a 3.7% increase on 2015. This rate is mid-range in comparison with other European countries

Background

Ireland participates in the European Surveillance of Antimicrobial Consumption Network (ESAC-Net), which is coordinated by the European Centre for Disease Prevention and Control (ECDC), with the aim of collecting systemic antimicrobial usage data from outpatient (ambulatory, community or primary care) and hospital (inpatient) settings. 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 1,000 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.

2016 Results

Outpatient Antimicrobial Consumption

The overall outpatient antimicrobial consumption was 24.0 DID, a 4% reduction on the updated 2015 rate of 25.0 DID. In the 2016 ESAC-Net report, the reported use of systemic antibacterial agents (termed outpatient J01) among European countries ranged from 10.5 to 36.3 DID; the median for 30 European countries with reliable data was 20.3 DID.

The underlying outpatient antimicrobial consumption trend for Ireland has increased since 2000. (Figure 1) There is a marked seasonal fluctuation in usage, with the highest consumption contemporaneous with periods of increased influenza activity.

The penicillin class accounted for majority of use (58%; 13.9 DID), followed by macrolides (18%; 4.3 DID), tetracyclines (10%; 2.5 DID), cephalosporins (5%; 1.2 DID), sulphonamides/trimethoprim (5%, 1.1 DID) and fluoroquinolones (4%, 0.9 DID).

Beta lactam-beta-lactamase inhibitor combinations [e.g., co-amoxiclav] accounted for the largest proportion of all penicillins (49%; 6.8 DID), followed by broad-spectrum penicillin [e.g., amoxicillin] (33%; 4.6 DID). Table 1 displays the breakdown by pharmacological drug groups.

There was considerable variability in the overall outpatient antimicrobial usage at county level (19.5 to 32.2 DID), as shown in Figure 2.

Hospital Antimicrobial Consumption

In 2016, 42 acute public hospitals provided antimicrobial usage data. The median rate of antimicrobial consumption was 84.8 DBD (mean = 86; range = 26.8 – 114.8), a 3.7% increase on the updated 2015 median rate of 81.8 DBD. These levels are mid-to-high in Europe.

Penicillins accounted for 50% of all hospital antimicrobial usage (43.2 DBD), followed by cephalosporins, monobactams and carbapenems combined (10%; 8.7 DBD), glycopeptides [e.g., vancomycin], imidazoles [e.g., metronidazole] and nitrofurans combined (10%; 8.4 DBD), fluoroquinolones [e.g., ciprofloxacin] at 6%; 5.1 DBD and macrolides [e.g., clarithromycin] (3%; 2.3 DBD). Tetracyclines, sulfonamides/trimethoprim, aminoglycosides and other systemic antimicrobials collectively accounted for <10% of antimicrobial use (Figure 3).

While antimicrobial consumption data in Ireland are comprehensive, gaps remain. Consumption data from

private hospitals are missing. All hospitals dispense to outpatients, day cases and may also serve external long term facilities. The data representing these groups is excluded from national hospital consumption analyses. Outpatient data is incomplete, representing 95% of wholesale-to-retail pharmacy transactions. Collectively, these gaps represent about 10% of the total antimicrobial consumption for Ireland.

While HPSC provides antifungal consumption data to ESAC-Net, this report focuses on antibacterial consumption only. ESAC-Net also collects data on antiviral and antiprotozoal agents in Europe, which are not currently analysed in Ireland.

Quarterly hospital antimicrobial consumption surveillance does 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 depending on the patient case mix. Furthermore, DDD calculations are based on adult dosing and may therefore under-estimate antimicrobial consumption in paediatric settings.

In September and October 2016, the national annual antimicrobial point prevalence survey (PPS) was undertaken, using a protocol and data entry form developed in conjunction with the Irish Antimicrobial Pharmacists Group, with 41 hospitals participating (including three private and

Table 1. Annual breakdown by pharmacological drug groups for outpatient antimicrobial use in Ireland: 2015 and 2016.

Penicillins	2015 15.1	Percent of 2015 60.6%	**2016** 13.9	Percent of 2016 58.0%	Percent Change 2015 to 2016 -8.1%
Narrow spectrum penicillins	1.0	4.1%	1.1	4.5%	5.0%
Beta-lactamase resistant penicillins	2.2	8.9%	1.5	6.3%	-32.1%
Broad spectrum penicillins	5.3	21.1%	4.6	19.1%	-13.1%
Penicillin with beta-lactamase inhibitor	6.6	26.5%	6.8	28.2%	1.9%
Macrolides and related drugs	4.1	16.5%	4.3	18.1%	4.9%
Tetracyclines	2.5	10.1%	2.5	10.5%	-0.7%
Cephalosporins and other beta-lactam drugs	1.1	4.6%	1.2	4.8%	0.8%
First-generation cephalosporins	0.3	1.1%	0.3	1.3%	15.3%
Second-generation cephalosporins	0.8	3.3%	0.8	3.3%	-3.5%
Third-generation cephalosporins	0.0	0.2%	0.0	0.1%	-11.9%
Quinolones	0.9	3.6%	0.9	3.6%	-4.5%
Sulfonamides and Trimethoprim	1.0	4.1%	1.1	4.6%	7.0%
Other antibiotics	0.1	0.4%	0.1	0.4%	-1.9%
TOTAL	**25.0**	**100.0%**	**24.0**	**100.0%**	**-4.0%**

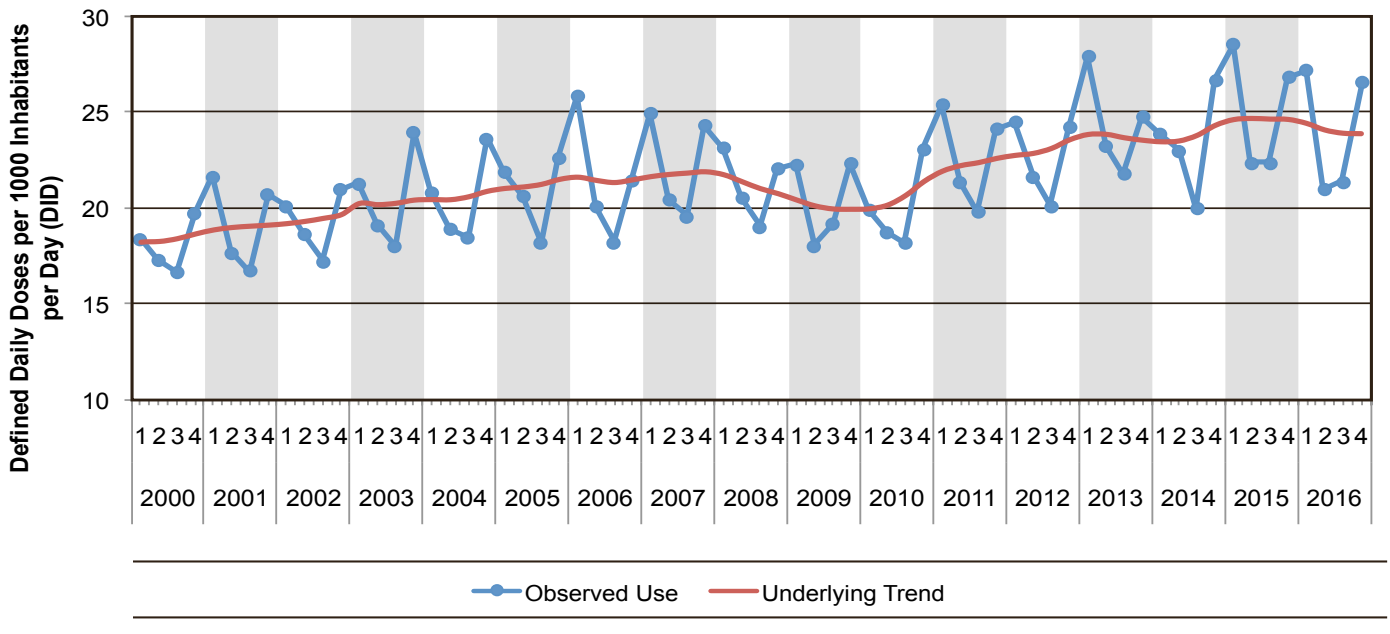

Figure 1. Quarterly outpatient antimicrobial consumption in Ireland: 2000 – 2016.

one non-acute hospital) and representing a 51% increase in participation since the first PPS in 2009. Results were similar to previous surveys. The overall antimicrobial use prevalence was 37.8%, compliance with choice was 81.6%, with dose was 94.3%, with overall restricted policy was 85.7% and specifically with meropenem restriction was 73%.

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.

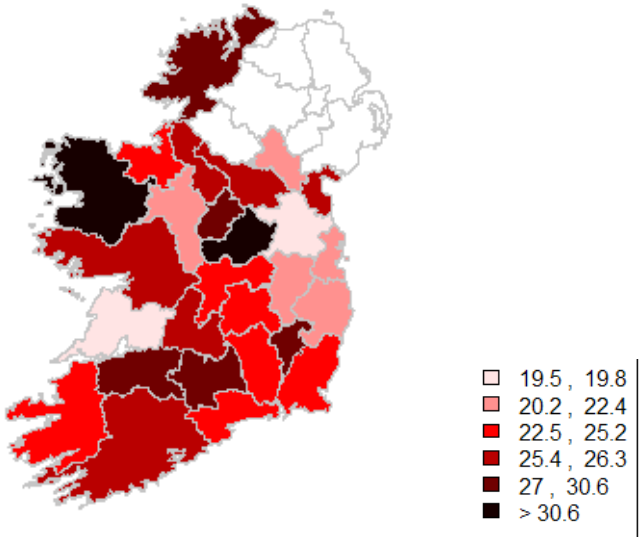

Figure 2. County-level outpatient antimicrobial consumption in Ireland in DDD per 1000 inhabitants per day (DID): 2016.

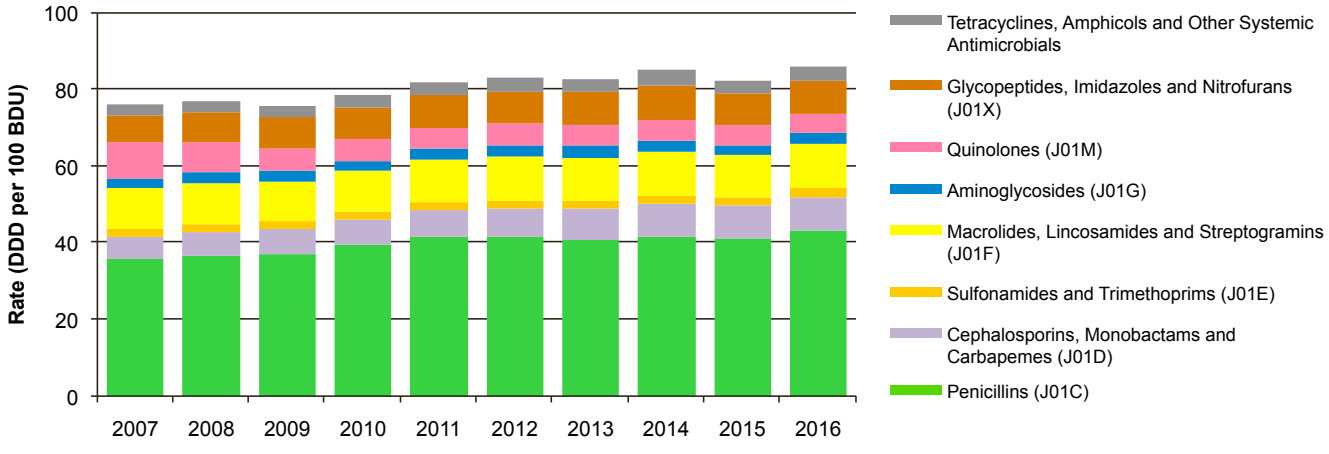

Figure 3. Annual national hospital antimicrobial consumption rate (DDD per 100 BDU) by pharmacological subgroup (ATC level 3).