AUSTRALIAN COMMISSION ON SAFETY AND QUALITY IN HEALTH CARE

ANTIMICROBIAL USE AND APPROPRIATENESS IN AUSTRALIA – ARE WE IMPROVING?

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OBJECTIVE

To describe trends in antimicrobial use and appropriateness in Australian hospitals using data from the Antimicrobial Use and Resistance in Australia (AURA) Surveillance System.

BACKGROUND

The Australian Commission on Safety and Quality in Health Care (the Commission) established the AURA Surveillance System in 2013 to provide a nationally coordinated system for surveillance of antimicrobial resistance and antimicrobial use in human health. Data on hospital antimicrobial usage are submitted to AURA by the National Antimicrobial Utilisation Surveillance Program (NAUSP) and the Hospital National Antimicrobial Prescribing Survey (NAPS).

METHODS

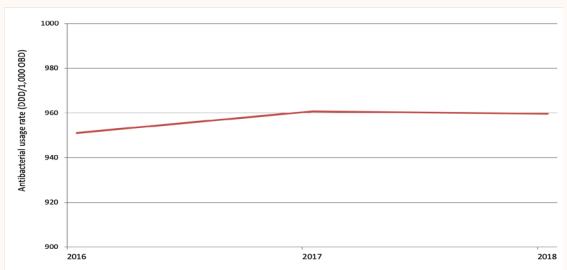
NAUSP, which is operated by South Australia Health, collects data as part of AURA on volume of antimicrobial usage in Australian public and private acute hospitals. In 2018, 201 hospitals from all states and territories, including all Principal Referral hospitals, participated in NAUSP. AURA data on appropriateness of antimicrobial prescribing are from the Hospital NAPS, which is coordinated by the National Centre for Antimicrobial Stewardship. In 2018, 324 public and private hospitals participated in NAPS. NAPS and NAUSP data from 2016 to 2018 were analysed.

RESULTS

- Overall, antibiotic use in NAUSP contributor hospitals has remained stable since 2016; in 2018, the usage rate was 959.6 DDDs per 1,000 OBDs, which is a change of less than 1% compared with 2016 (Figure 1)
- In 2018, there was substantial variation in the mean total-hospital antimicrobial usage rate for NAUSP contributor hospitals; the mean was 991 DDDs per 1,000 OBDs overall (range 212–2,457 DDDs per 1,000 OBDs; n=201)

Figure 1.

Annual aggregate total-hospital antibacterial usage rates (DDD/1,000 OBD) in NAUSP contributor hospitals, 2016–2018



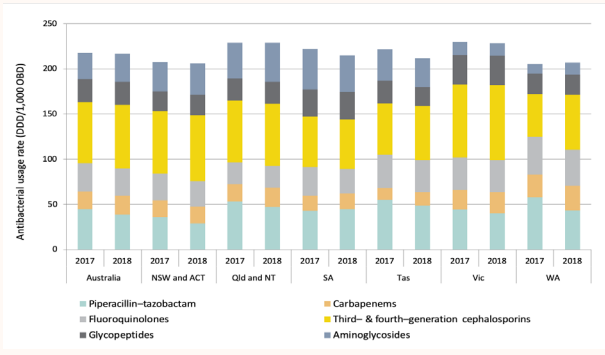
DDD = defined daily dose; NAUSP = National Antimicrobial Utilisation Surveillance Program; OBD = occupied bed day

Note: y-axis truncated to aid visibility of trend

- Principal Referral Hospitals continue to report lower rates of antibiotic usage compared to other peer groups per 1,000 OBD
- Usage of a number of antimicrobials has increased since 2016; the increases include many broad spectrum antibiotics such as carbapenems and all cephalosporins.
- Proportional use of six categories of broad spectrum antimicrobials, for 2018, varies by state and territory; comprising 23.9% of all use in Queensland and the Northern Territory versus 21.5% in New South Wales and the Australian Capital Territory (Table 1). Aminoglycosides comprised 19.0% of this broad spectrum use in Queensland and the Northern Territory compared to 6.1% in Victoria (Figure 2).
- The changes in key indicators of appropriateness of antimicrobial prescribing monitored using the Hospital NAPS from 2016 to 2018 are as follows (Table 2):
  - Improvement in documentation of indication from 75.6% to 80.3%
  - Improvement in documentation of review or stop date from 38.1% to 45.2%
  - Minimal change in the proportion of surgical prophylaxis given for greater than 24 hours from 31.1% to 28.0%
  - Minimal change in compliance with Therapeutic Guidelines: Antibiotic or local guidelines from 65.4% to 67.7%
  - Improvement in the overall appropriateness of prescribing from 76.1% to 77.7%.
- The highest rates of inappropriate prescribing in NAPS hospitals in 2018 were for: cefalexin, cefazolin, azithromycin, amoxicillin–clavulanic acid and metronidazole (Figure 3)
- The indications, based on total numbers, for which prescribing was most frequently inappropriate were: Surgical prophylaxis, pneumonia - community acquired, chronic obstructive pulmonary disease (COPD), cystitis and medical prophylaxis.
- When considering the highest rates of inappropriate prescriptions, the top three indications were COPD; surgical prophylaxis; and, wound infection-non-surgical (Figure 4)

Figure 2.

Aggregate total-hospital usage rates (DDD/1,000 OBD) in NAUSP contributor hospitals for six major antibacterial classes, by state and territory, 2017-2018



DDD = defined daily dose; NAUSP = National Antimicrobial Utilisation Surveillance Program; OBD = occupied bed day

Figure 3.

Appropriateness for the most commonly prescribed antimicrobials in Hospital NAPS contributor hospitals, 2018

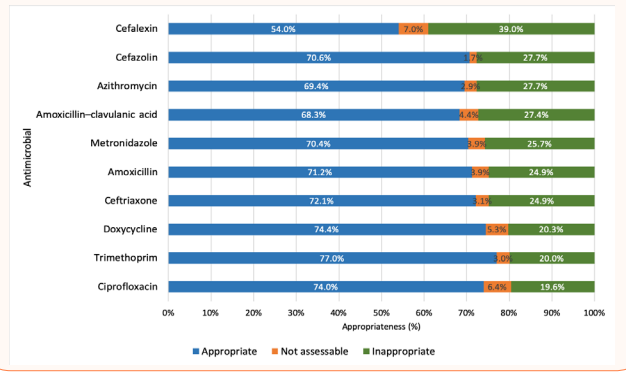


Figure 4

Appropriateness for the most commonly prescribing indications in Hospital NAPS contributor hospitals, 2018

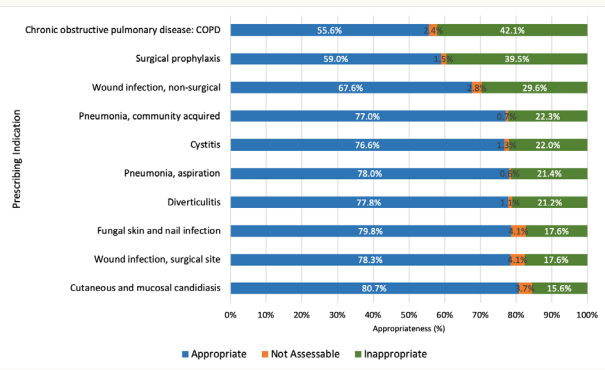


Table 2. Hospital NAPS key indicators, 2016-2018

Key indicator	2016	2017	2018
Indication documented in medical notes (best practice > 95%)	75.6	77.7	80.3
Review or stop date documented (best practice > 95%)	38.1	40.5	45.2
Surgical prophylaxis given for >24 hours (best practice < 5%)*	31.1	30.5	28.0
Compliant with Therapeutic Guidelines or local guidelines†	65.4	67.3	67.7
Appropriate (optimal and adequate)§	76.1	76.5	77.7

* Where surgical prophylaxis was selected as the indication (n = 3,628 in 2018)

† Prescriptions for which compliance was assessable (21,187 prescriptions in 2018). Excludes prescriptions for which guidelines were not available, as well as prescriptions that were 'directed therapy' or 'not assessable'.

§ Prescriptions for which appropriateness was assessable (25,706 prescriptions in 2018). Excludes prescriptions deemed to be 'not assessable'.

Table 1. Aggregate total-hospital usage rates (DDD/1,000 OBD) and percentage of total usage rates in NAUSP contributor hospitals for six major antibacterial classes, by state and territory, 2017-2018

State / territory	Aggregate usage rate of six major antibacterial classes (DDD / 1,000 OBD)		Percentage of aggregate usage rate of all classes (%)	
	2017	2018	2017	2018
NSW and ACT	207.3	205.9	21.6	21.5
Vic	230.0	228.5	23.9	23.8
Qld and NT	229.0	229.0	23.8	23.9
SA	222.1	215.1	23.1	22.4
WA	205.4	207.0	21.4	21.6
Tas	221.7	211.6	23.1	22
National	218.0	216.5	22.7	22.6

Note: Six major antibacterial classes = aminoglycosides, carbapenems, fluoroquinolones, glycopeptides, piperacillin-tazobactam and third-and-fourth-generation cephalosporins

CONCLUSIONS

The increase in total-hospital antibiotic use in 2017 & 2018 shows that trends need to be closely monitored and reviewed. This is the first increase since 2013; it is difficult to determine the cause, it may be related to the national shortage of piperacillin–tazobactam in 2017. Total-usage rates should be interpreted with caution in relation to appropriateness, as high rates of usage may involve higher ratios of narrow-spectrum to broad-spectrum antibiotics, indicating appropriate use. Focus areas for targeted improvement effort include the static rate of inappropriate prescribing seen in the Hospital NAPS; use of cefalexin and amoxicillin–clavulanic acid; ensuring that AMS programs focus on both broad- and narrow-spectrum antimicrobials; treatment of COPD and variations between and within hospital peer groups and states and territories. While monitoring appropriateness and usage are key components for evaluation, this data can be used to identify local areas for improvement and to inform action.

The AURA Program is funded by the Australian Government Department of Health and states and territories. The Commission appreciates the provision of data from participating hospitals in all states and territories to contribute their data.

AURA Antimicrobial Use and Resistance in Australia

www.safetyandquality.gov.au/our-work/antimicrobial-resistance/antimicrobial-use-and-resistance-australia-surveillance-system