

# Surgical prophylaxis prescribing in Australian hospitals

Results of the 2023 Surgical National  
Antimicrobial Prescribing Survey

2023



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## Preface

This report is best interpreted when read in conjunction with the *National Antimicrobial Prescribing Survey: technical supplement 2023*.<sup>5</sup>

# Acknowledgements

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## Contributing facilities

On behalf of the National Centre for Antimicrobial Stewardship and the Royal Melbourne Hospital Guidance Group, we would like to thank all contributing facilities and auditors for their time and effort in collecting and entering the data, in contributing data to this report, to the Antimicrobial Use and Resistance in Australia (AURA) surveillance program and for their continued commitment to improving safety and quality across the Australian healthcare system.

### National Centre for Antimicrobial Stewardship and the Royal Melbourne Hospital Guidance Group

Professor Karin Thursky

Dr Rodney James

Dr Courtney Ierano

Ms Caroline Chen

Ms Josephine Wen

Associate Professor Noleen Bennett

Professor Lisa Hall

Mr Pramode Varghese

Mr Logesh Palani

Mr Abukari Yakubu

Mr Simon Burrell

## Abbreviations

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Abbreviation	Term
ABS	Australian Bureau of Statistics
AIHW	Australian Institute of Health and Welfare
AMS	Antimicrobial stewardship
AURA	Antimicrobial Use and Resistance in Australia
EMM	Electronic medication management
NAPS	National Antimicrobial Prescribing Survey

# Summary

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The Surgical National Antimicrobial Prescribing Survey (Surgical NAPS) is key contributor towards Australia's National Antimicrobial Resistance Strategy<sup>1</sup> and the Antimicrobial Use and Resistance in Australia (AURA) surveillance program.<sup>2</sup>

The Surgical NAPS program continues to be a widely adopted and valued tool to assess the quality of antimicrobial prescribing across Australian facilities. Its focus on providing meaningful data for action with clear data visualisation for contributing facilities has led to the continued high participation from Australian facilities, representing a wide variety of funding types, peer groups and remoteness classifications.

During 2023, 201 facilities (93 public and 108 private) submitted data on 11,516 surgical episodes with 9,620 procedural doses and 4,320 post-procedural prescriptions to the Surgical NAPS database.

## Results of key indicators

- There was a slightly lower **documentation of incision time and time of antimicrobial administration** (72.5% and 89.9% respectively) than in 2022.
- There was a continued low **overall rate of appropriateness** per surgical episode (57.3%).
- There was a continued noticeable difference between **overall prophylactic procedural and post-procedural dose appropriateness** (61.5% and 42.7% respectively).
- **Procedure groups with the lowest prophylactic procedural appropriateness** were dentoalveolar (13.6%), head and neck (33.0%) and plastic and reconstructive surgery (44.2%).
- **Procedure groups with the lowest prophylactic post-procedural appropriateness** were head and neck (1.8%), dentoalveolar (2.7%) and breast surgery (10.3%).
- **Duration** remains the most pertinent issue for post-procedural prophylaxis appropriateness. Of all such prescriptions, 34.2% had a duration greater than 48 hours.

## Implications for clinical practice

### Suboptimal documentation

Documentation is important for comprehensive medical care, as it allows timely and accurate communication between members of the clinical care team and contributes to effective safety and quality of patient care. Failure to document important components of surgical care was reported for 1 in 4 surgical procedures for incision time; and 1 in 10 surgical procedures for the **time of antimicrobial administration**. This is consistent with the previous 2022 report.<sup>9</sup>

## Compliance with guidelines and appropriateness of prescribing

Compliance with guidelines for surgical antimicrobial prophylaxis and, consequently, appropriateness of prescribing continues to be poor overall but even more so for prophylactic post-procedural prescriptions. This relates to prescription of antimicrobials that are not required and prolonged duration of antimicrobial use. Procedurally, inappropriate antimicrobial use is primarily due to suboptimal timing of administration.

For many procedures, there is no evidence that prophylactic antimicrobial use, either procedurally or post-procedurally, reduces post-operative infections. Reducing inappropriate surgical antimicrobial prophylaxis balances the unintended harms of antimicrobial use with the benefits of evidence-based care.

# 1. Introduction

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The judicious use of antimicrobials is a key component of good patient care across all health settings. *Australia's National Antimicrobial Resistance Strategy – 2020 and beyond*<sup>1</sup> has recommended the adoption of antimicrobial stewardship (AMS) programs, with the aim of enhancing patient healthcare outcomes while reducing the emergence and spread of antimicrobial resistance.

Now in its eighth year, the Surgical National Antimicrobial Prescribing Survey (Surgical NAPS) has been adopted as an important platform to support the AMS programs in facilities by allowing for the meaningful measurement, reporting and benchmarking of the quality of antimicrobial prescribing. NAPS program staff also continue to provide clinical program support and training for participants. Internationally, it remains the only tool to measure appropriateness of antimicrobial prescribing.

Furthermore, participation in the Surgical NAPS assists health service organisations to demonstrate that they meet the AMS action requirements of the National Safety and Quality Health Service Standards<sup>3</sup> and the Antimicrobial Stewardship Clinical Care Standard.<sup>4</sup>

The Australian Government Department of Health, Disability and Ageing provides funding for the Royal Melbourne Hospital Guidance Group and the National Centre for Antimicrobial Stewardship to conduct the Hospital, Surgical and Aged Care NAPS and contribute data to the Antimicrobial Use and Resistance in Australia (AURA) surveillance program.<sup>2</sup>

For details on survey methodology, analyses of methodology and considerations for data interpretation, please refer to the *National Antimicrobial Prescribing Survey: technical supplement 2023*.<sup>5</sup>

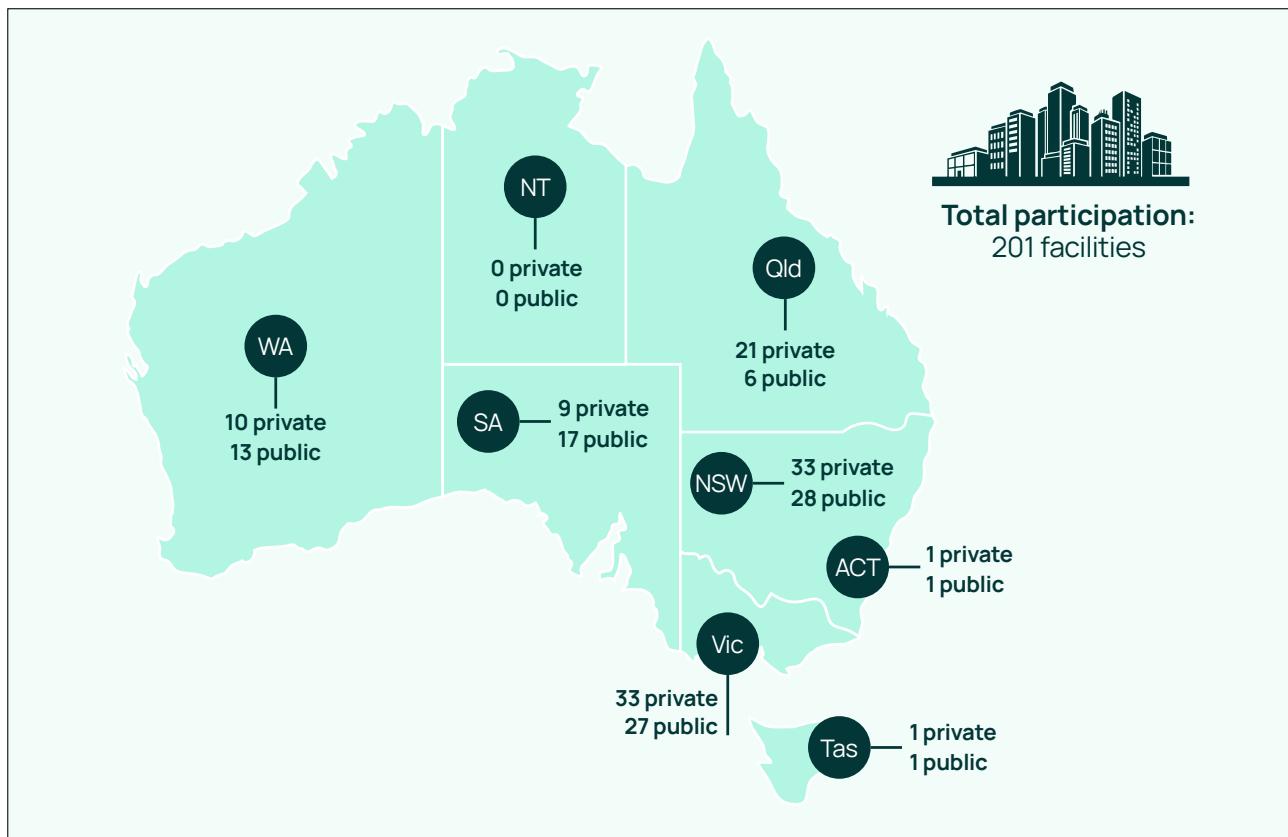
# 2. Results

## 2.1 Participation

The Surgical NAPS remains a voluntary program; nonetheless, there has been consistent participation by acute care facilities across all Australian states and territories, remoteness areas and funding types since the program's initiation.

This report analyses the data submitted by 201 facilities (93 public and 108 private) that met the Surgical NAPS inclusion criteria. Participation has remained steady the last few years, with 197 facilities (110 public and 87 private) in 2022 and 188 facilities (96 public and 92 private) in 2021. The 2023 cohort included public and private facilities from most states and territories, covering a range of Australian Institute of Health and Welfare hospital peer groups<sup>6</sup> and Australian Bureau of Statistics remoteness classifications<sup>7</sup> (Figure 1). Northern Territory did not contribute any data for 2023. For further information regarding inclusion criteria and definitions, refer to the *National Antimicrobial Prescribing Survey: technical supplement 2023*.<sup>5</sup>

**Figure 1. Facilities that contributed to the Surgical National Antimicrobial Prescribing Survey by state and territory, 2023**



ACT = Australian Capital Territory; NSW = New South Wales; NT = Northern Territory; Qld = Queensland; SA = South Australia; Tas = Tasmania; Vic = Victoria; WA = Western Australia.

## 2.2 Surgical episodes

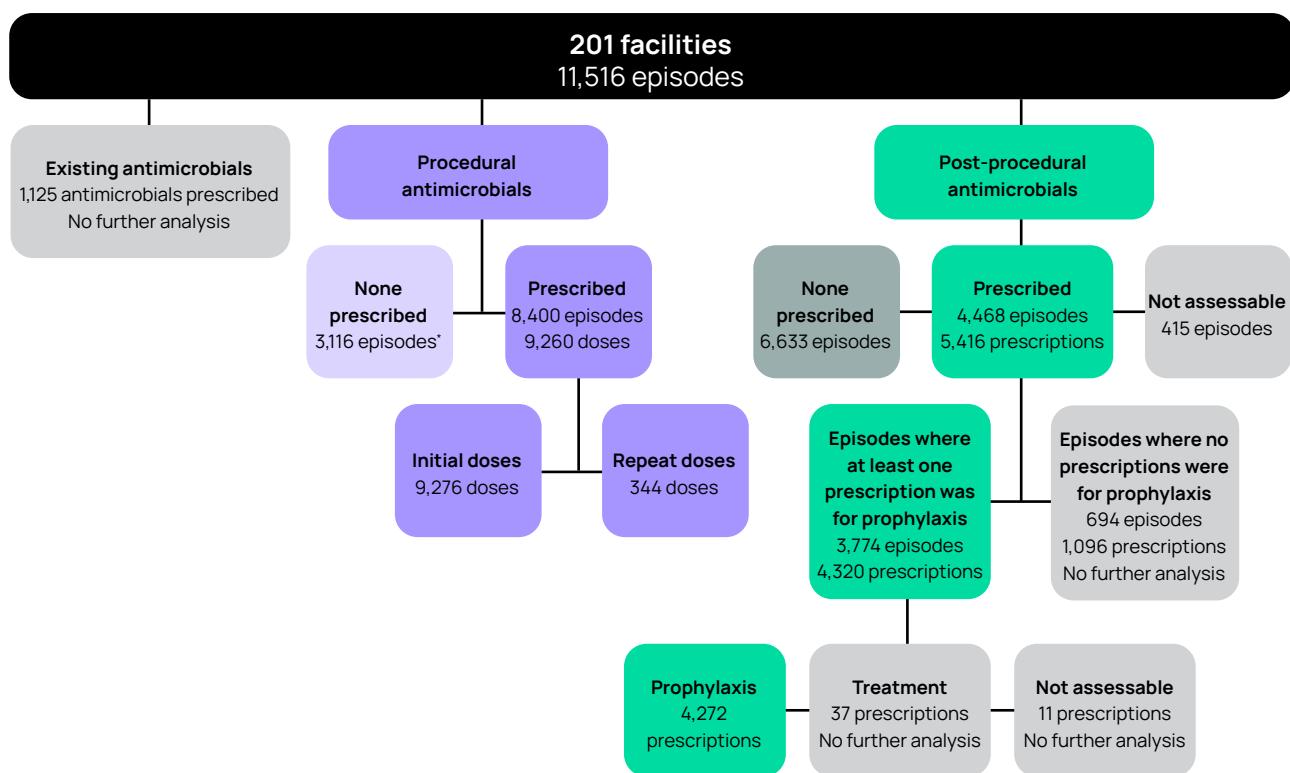
A total of 11,516 surgical episodes were included in the 2023 Surgical NAPS analyses. The majority of surgical episodes were for initial surgeries (97.4%) compared with subsequent procedures (2.6%), and this did not differ significantly when comparing public and private funded facilities (96.7% and 98.0% initial surgeries respectively). Elective surgical procedures remained the most common type for all episodes (86.8%), with a greater proportion in private facilities compared with public (97.5% and 73.8% respectively).

Procedures as a result of trauma remain low (3.9%), with a higher proportion in public facilities (7.0%) compared with private facilities (1.3%). Conversely, the removal or insertion of prosthetic material accounted for approximately one-third of all surgical episodes (32.4%), with a higher proportion in private facilities (40.4%) compared with public facilities (22.7%).

For a full breakdown of the characteristics of surgical episodes, procedural doses and prophylactic post-procedural prescriptions by funding type, state and territory, peer group and remoteness classification, refer to Table 1A in the Appendix.

Figure 2 shows the breakdown of antimicrobial prescribing for surgical episodes reported to the 2023 Surgical NAPS, by procedural and prophylactic post-procedural characteristics, to assist with understanding the analyses presented.

**Figure 2. Surgical episodes by procedural and post-procedural prescribing characteristics, Surgical National Antimicrobial Prescribing Survey, 2023**



**Notes:**

**Episode:** An individual procedure or set of procedures performed together during one surgical session and the subsequent post-procedural care (i.e. antimicrobials prescribed) associated with the procedure(s).

**Dose:** An individual antimicrobial dose administered either immediately prior to or during or after the surgical procedure.

**Prescription:** Any antimicrobial prescribed either as a single dose or as a course following the surgical procedure.

**Existing antimicrobial:** An antimicrobial prescribed for treatment or prophylaxis in the 24 hours prior (72 hours if on dialysis) to the procedure, used to determine the appropriateness of whether procedural antimicrobials were given or not given.

**Procedural antimicrobial:** An antimicrobial administered either immediately prior to or during the surgical procedure for the purpose of prophylaxis; each initial and repeat dose of the antimicrobial administered is recorded individually.

**Post-procedural antimicrobial:** An antimicrobial prescribed following, but directly relating to, the procedure; each prescription of the antimicrobial is recorded, including any inpatient or discharge scripts.

**Initial dose:** The first dose of an antimicrobial administered either immediately prior to or during the surgical procedure for the purpose of prophylaxis.

**Repeat dose:** Any subsequent dose of an antimicrobial administered during the surgical procedure for the purpose of prophylaxis.

**Prophylaxis:** An antimicrobial prescribed for the prevention of surgery-related infection.

**Treatment:** An antimicrobial prescribed for the treatment of infection related to the procedure.

**Episodes where no prescriptions were for prophylaxis:** Any episode where all prescribed antimicrobials are recorded as for 'treatment' and/or 'not assessable'.

## 2.3 Key indicators

Results of the indicators are summarised below (Table 1).

**Table 1. Surgical National Antimicrobial Prescribing Survey key indicators, for assessable prescriptions, 2023**

Key indicator	Result
Incision time documented	72.5%
Administration time documented*	89.9%
Overall appropriateness <sup>†</sup> of prescribing for surgical episodes	57.3%
Overall procedural dose appropriateness <sup>†</sup>	61.5%
Overall post-procedural prescription appropriateness <sup>†</sup>	42.7%
Post-procedural prescription duration >48 hours	34.2%

\* Calculation includes both 'exact' and to the 'nearest 15 minutes' documentation.

† Refer to *National Antimicrobial Prescribing Survey: technical supplement 2023* for definitions.<sup>5</sup>

## Documentation

A consistent theme over the last 8 years is the suboptimal documentation of surgical incision and antimicrobial administration times.

Of the 10,802 incisional procedures reported, approximately three-quarters had a time of incision documented (n=7,832, 72.5%).

Of the 9,276 initial procedural doses prescribed, 26.3% were recorded to the exact minute and 63.6% to the nearest 15 minutes. The remainder (10.1%) did not have a documented administration time.

Documentation of incision time was similar in both private facilities (77.5%) and public facilities, (76.3%). Comparatively, exact documentation of administration time was reported less frequently in private facilities (17.2%) than in public facilities (39.4%).

The timing of surgical prophylaxis is important to ensure high concentrations of antimicrobials at the time of surgical incision. Ensuring documentation of both incision and antimicrobial administration times may improve appropriateness of antimicrobial administration times and help prevent surgical site infections for those episodes in which antimicrobial prophylaxis is indicated.

As electronic medication management (EMM) systems are progressively implemented in Australia, we anticipate that this may support improvements in the documentation of surgical incision and antimicrobial administration times. In comparison to paper-based systems, EMM systems have the capacity to prompt and require information that is otherwise routinely omitted (i.e. time of surgical incision and antimicrobial administration), as identified by the Surgical NAPS, to be entered.

## Overall appropriateness

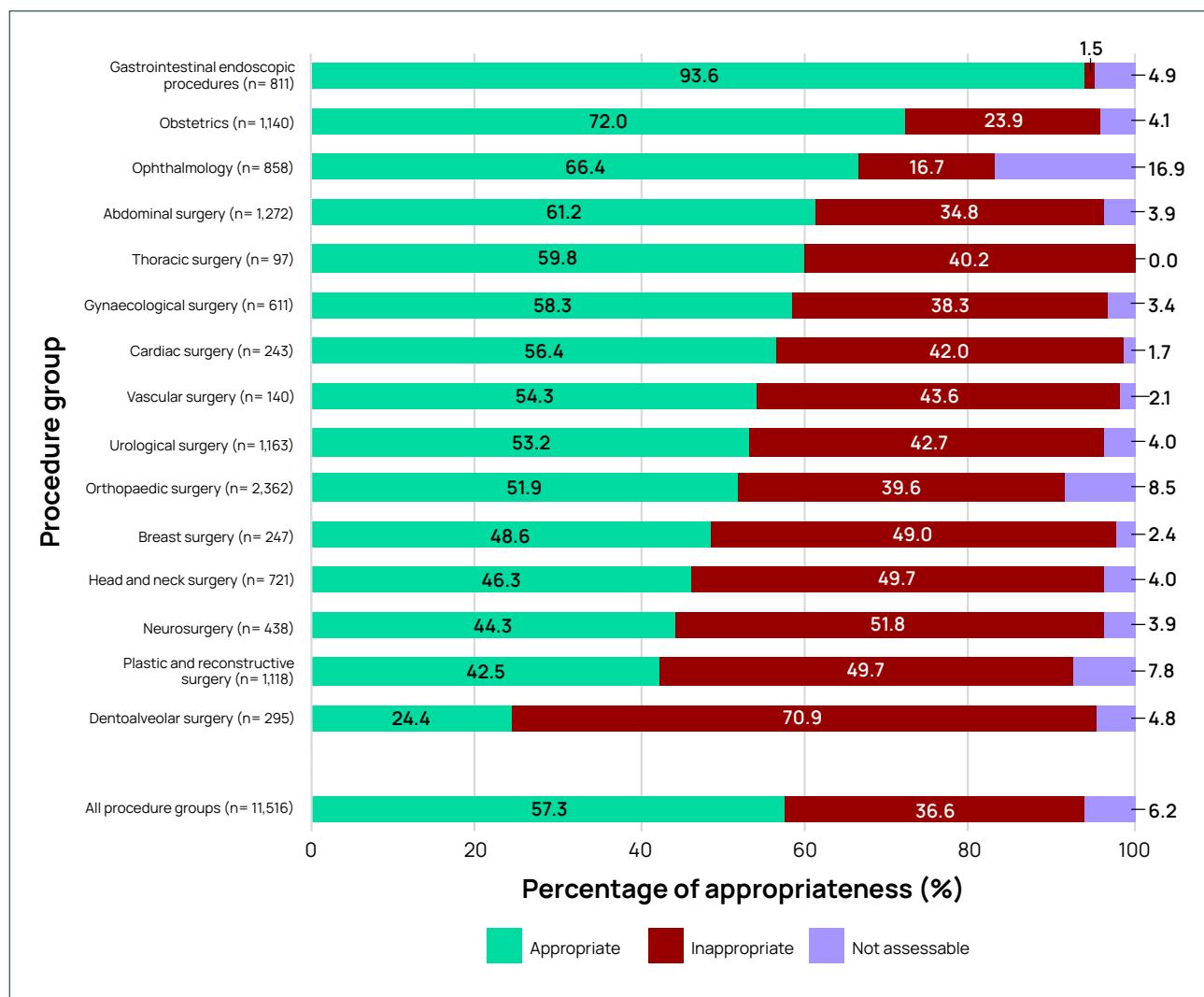
The overall appropriateness, inclusive of all procedural and post-procedural antimicrobial prescribing across a surgical episode, has not shown improvement from previous years. Of the 11,516 surgical episodes, 57.3% were deemed appropriate, similar to 2022 (55.3%). Overall appropriateness differed slightly when comparing public and private facilities separately (64.0% compared with 51.7% respectively).

The percentage of episodes deemed inappropriate varied by procedure group, ranging from 1.5% for gastrointestinal endoscopic procedures to 70.9% for dentoalveolar surgery. All procedure groups had an inappropriateness rate greater than 20%, apart from gastrointestinal endoscopic procedures (1.5%) and ophthalmology (16.7%).

High rates of appropriateness for gastrointestinal endoscopic procedures are consistent year on year (as evidenced through previous annual reports) and are expected, as surgical antimicrobial prophylaxis is not routinely required. Only 3.0% of all gastrointestinal endoscopic procedures included at least one procedural antimicrobial dose.

Ophthalmological procedures had the highest proportion of 'not assessable' episodes (16.9%), suggesting auditors may require further clarifications from guidelines and improvement in the clinical documentation to accurately assess these episodes. Dentoalveolar surgery has seen an improvement from 26.9% deemed not assessable in 2022 to 4.8% in 2023.

**Figure 3. Percentage of episodes by appropriateness\* of prescribing for each surgical procedure group, Surgical National Antimicrobial Prescribing Survey contributor facilities, 2023**



\* For appropriateness definitions, refer to *National Antimicrobial Prescribing Survey: technical supplement 2023*.<sup>5</sup>

Note: n=11,516 total surgical episodes.

The measure of appropriateness differed greatly when comparing overall procedural doses and overall post-procedural prescriptions. Of the 9,620 prescribed procedural doses, 61.5% (n=5,914) were deemed appropriate. Comparatively, of the 4,272 prescribed post-procedural prophylaxis prescriptions, 42.7% (n=1,822) were deemed appropriate.

Prolonged durations remain an issue for post-procedural prophylaxis, with 34.2% (n=1,462) of these prescriptions having a duration greater than 48 hours. There are no recommendations in Australian guidelines recommending surgical antimicrobial prophylaxis for greater than 48 hours,<sup>8</sup> with the exception of ophthalmic procedures, where up to 7 days of prophylaxis may be administered.<sup>8</sup>

## 2.4. Procedural prophylaxis prescribing

Approximately one-quarter (25.1%) of all procedural prophylaxis prescribing episodes was assessed as inappropriate (Table 2). The proportion of episodes deemed inappropriate was higher when antimicrobials were prescribed than when they were not prescribed (32.1% and 6.4% respectively). Antimicrobials were prescribed when not required in 10.6% of episodes.

When procedural antimicrobials were prescribed, appropriateness was similar for both initial and repeat doses (66.3% and 69.5% respectively). Overall, 31.2% of all procedural dose prescribing was deemed inappropriate when non-assessable doses were excluded (n=2,894/9,281).

**Table 2. Appropriateness\* of procedural prophylaxis prescribing of antimicrobials for surgical episodes and antimicrobial doses, Surgical National Antimicrobial Prescribing Survey contributor facilities, 2023**

Procedural prophylaxis	Total	Appropriate		Inappropriate		Not assessable	
	(n)	(n)	(%)	(n)	(%)	(n)	(%)
<b>Surgical episodes</b>	<b>11,516</b>	<b>8,226</b>	<b>71.4</b>	<b>2,891</b>	<b>25.1</b>	<b>399</b>	<b>3.5</b>
<b>Antimicrobial prescribed</b>	<b>8,400</b>	<b>5,832</b>	<b>64.1</b>	<b>2,692</b>	<b>32.1</b>	<b>326</b>	<b>3.9</b>
• when required	7,423	5,382	74.3	1,557	21.5	304	4.2
• when not required	1,215	0	0	1,191	98.0	24	2.0
<b>No antimicrobial prescribed</b>	<b>3,116</b>	<b>2,844</b>	<b>91.3</b>	<b>199</b>	<b>6.4</b>	<b>73</b>	<b>2.3</b>
• when required	231	46	19.9	180	77.9	5	2.2
• when not required	2,885	2,798	97.0	19	0.7	68	2.4
<b>Antimicrobial doses</b>	<b>9,620</b>	<b>6,387</b>	<b>66.4</b>	<b>2,894</b>	<b>30.1</b>	<b>339</b>	<b>3.5</b>
<b>Initial dose</b>	<b>9,276</b>	<b>6,148</b>	<b>66.3</b>	<b>2,799</b>	<b>30.2</b>	<b>329</b>	<b>3.5</b>
• when required	8,047	6,148	76.4	1,592	19.8	307	3.8
• when not required	1,229	0	0	1,207	98.2	22	1.8
<b>Repeat dose</b>	<b>344</b>	<b>239</b>	<b>69.5</b>	<b>95</b>	<b>27.6</b>	<b>10</b>	<b>2.9</b>
• when required	319	239	74.9	71	22.3	9	2.8
• when not required	25	0	0	24	96.0	1	4.0
• not given when required <sup>†</sup>	29	0	0	28	96.6	1	3.4

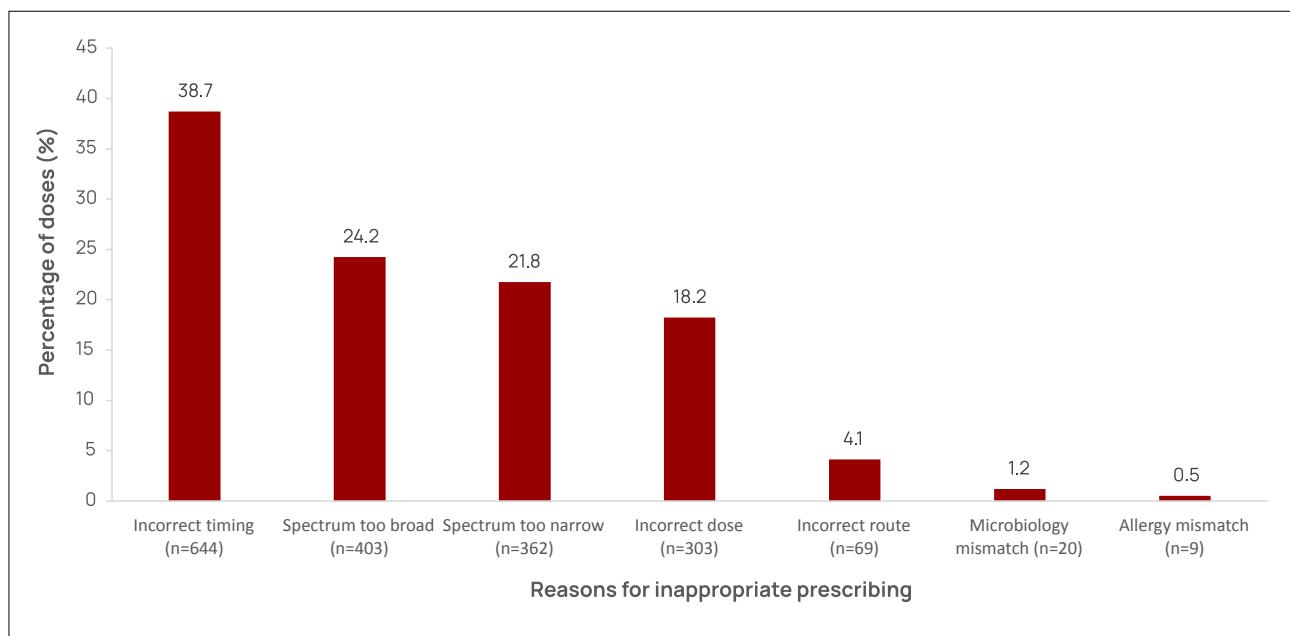
\* The overall appropriateness of prescribing for a surgical episode was determined by taking the lowest ranked assessment of the individual doses/prescriptions, including all episodes where antimicrobials were prescribed and not prescribed.

† Excluded from total antimicrobial doses, as these are doses that were not given.

## Reasons for inappropriate procedural prophylaxis prescribing

There were 2,894 procedural doses deemed inappropriate. Of these, 1,231 (42.5%) were deemed not required. For procedural doses, where antimicrobials were recommended by guidelines (n=8,366), 19.9% (n=1,663) were deemed inappropriate. A procedural prophylaxis dose can have more than one reason for inappropriateness. The most common reasons for inappropriate prescribing were incorrect timing and the prescribed antimicrobial's spectrum being deemed too broad (38.7% and 24.2% respectively) (Figure 4).

**Figure 4. Reasons for inappropriateness,\* by percentage of required procedural prophylaxis antimicrobial doses,† Surgical National Antimicrobial Prescribing Survey contributor facilities, 2023**



\* Refer to *National Antimicrobial Prescribing Survey: technical supplement 2023* for appropriateness definitions.<sup>5</sup>

† Each prescription is assessed against each quality indicator and thus can be represented in more than one category. There was a total of 1,663 inappropriate procedural prophylaxis doses (comprising of 1,810 reasons for inappropriateness).

Incorrect timing was the most common reason for inappropriateness of required procedural doses (38.7% of 1,663 doses, comprising 1,810 reasons) (Figure 4). Comparatively, incorrect timing accounted for 7.7% of all (8,335) required procedural doses (when omitting 941 doses that did not have a recorded administration time).

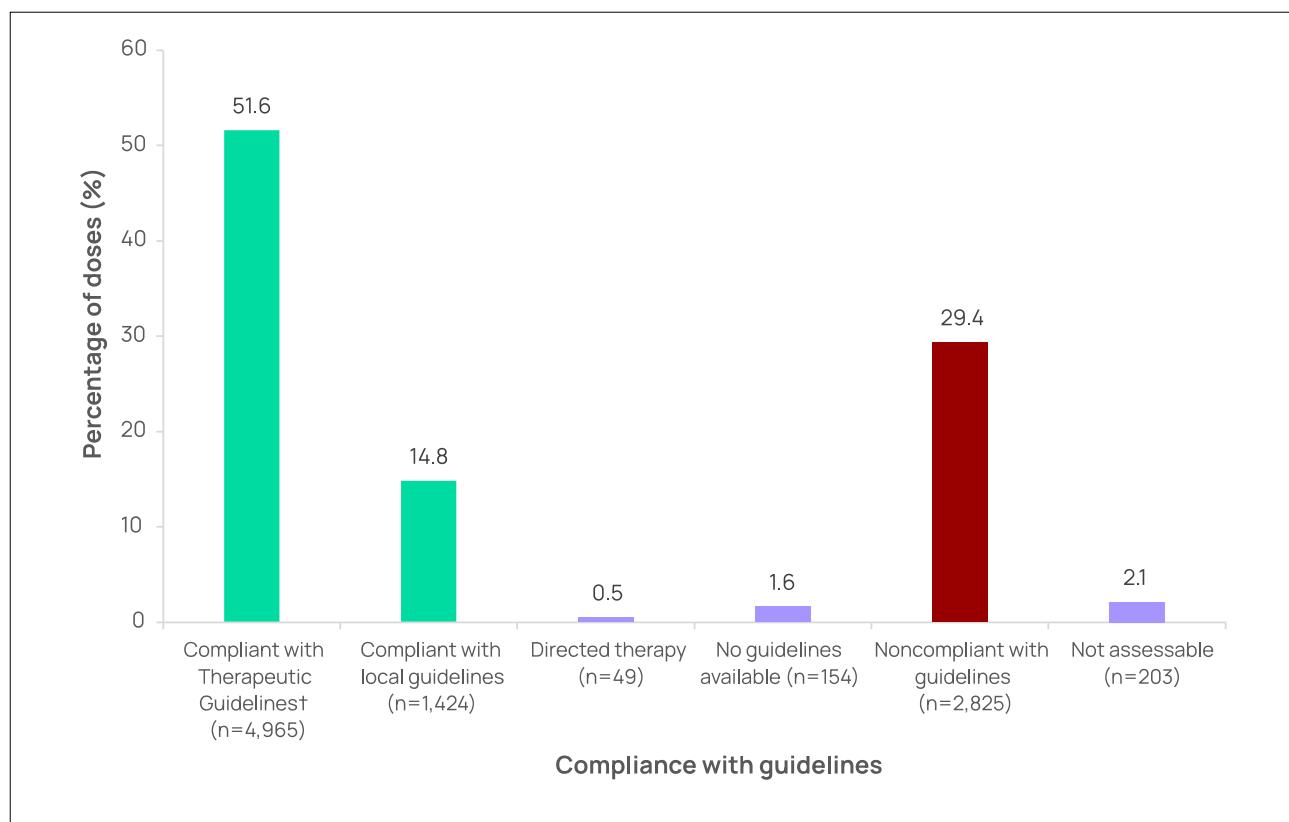
Cefazolin was the most commonly prescribed antimicrobial with an incorrect dose (61.4%), followed by gentamicin (24.4%).

## Guideline compliance

When no procedural antimicrobials were prescribed (n=3,116), guideline compliance (either with the *Therapeutic guidelines: antibiotic*<sup>8</sup> or with local guidelines) was high (91.0%). Compliance with prescribing guidelines was lower when antimicrobials were prescribed (66.4%) (Figure 5).

Compliance increased to 69.3% when 'directed therapy', 'no guidelines available' and 'not assessable' doses were excluded (n=9,214).

**Figure 5. Percentage of procedural prophylaxis antimicrobial doses\* that were compliant with guidelines, Surgical National Antimicrobial Prescribing Survey contributor facilities, 2023**



\* n= 9,620 procedural antimicrobial doses.

† See the *Therapeutic guidelines: antibiotic*.<sup>8</sup>

## Antimicrobial choice

Cefazolin was the most prescribed antimicrobial, accounting for 79.9% of prescriptions of procedural doses in 2023 (Table 3).

The top 5 procedural antimicrobials prescribed accounted for 93.2% of all antimicrobials: cefazolin (79.9%), metronidazole (5.3%), gentamicin (4.7%), vancomycin (2.1%) and clindamycin (1.1%), as shown in Table 3. Comparatively lower rates of inappropriateness were demonstrated for the most commonly prescribed antimicrobials, cefazolin and metronidazole (25.3% and 25.4% respectively). Rates of prescribing deemed inappropriate were greater than 70% for ampicillin, amoxicillin, cefoxitin, ceftriaxone and ciprofloxacin.

**Table 3. Proportion and inappropriateness of procedural prophylaxis antimicrobial doses,\* Surgical National Antimicrobial Prescribing Survey contributor facilities, 2023**

Antimicrobial	Procedural doses prescribed		Inappropriate	
	(n)	(%)	(n)	(%)
Cefazolin	7,690	79.9	1,947	25.3
Metronidazole	507	5.3	129	25.4
Gentamicin	455	4.7	222	48.8
Vancomycin	203	2.1	113	55.7
Clindamycin	108	1.1	64	59.3
Ceftriaxone	106	1.1	85	80.2
Chloramphenicol	75	0.8	19	25.3
Ampicillin	68	0.7	65	95.6
Amoxicillin	61	0.6	51	83.6
Ciprofloxacin	54	0.6	49	90.7
Piperacillin-tazobactam	41	0.4	25	61.0
Tobramycin	39	0.4	4	10.3
Amoxicillin-clavulanic acid	36	0.4	14	38.9
Teicoplanin	33	0.3	14	42.4
Cefoxitin	29	0.3	27	93.1
Lincomycin	27	0.3	17	63.0
Benzylpenicillin	17	0.2	7	41.2
Flucloxacillin	17	0.2	9	52.9
Others <sup>†</sup>	54	0.6	33	61.1
<b>Total</b>	<b>9,620</b>	<b>100</b>	<b>2,894</b>	<b>30.1</b>

\* Data are not shown for antimicrobials where n < 10.

† 'Others' comprises 17 antimicrobials.

## Procedure groups

The procedure groups with the highest rates of prescribing at least one procedural antimicrobial were orthopaedic surgery, breast surgery and neurosurgery (94.1%, 93.1% and 88.8% respectively), as shown in Table 4. Overall, the range of inappropriate prescribing varied across the procedure groups (10.1%–82.7%). The majority of prescriptions deemed inappropriate were for orthopaedic surgery (n=590 doses), urological surgery (n=501 doses), plastic and reconstructive surgery (n=403 doses) and abdominal surgery (n=386 doses). These 4 procedure groups accounted for 57.1% of all inappropriate procedural doses.

**Table 4. Percentage of surgical episodes prescribed an antimicrobial, number of doses prescribed and inappropriateness of procedural prescribing by procedure group, Surgical National Antimicrobial Prescribing Survey contributor facilities, 2023**

Procedure group	Surgical episodes	At least one antimicrobial prescribed		Total doses	Inappropriate doses	
	(n)	(n)	(%)	(n)	(n)	(%)
Orthopaedic surgery	2,362	2,222	94.1	2,526	590	23.4
Abdominal surgery	1,272	1,100	86.5	1,350	386	28.6
Urological surgery	1,163	854	73.4	999	501	50.2
Obstetrics	1,140	915	80.3	971	248	25.5
Plastic and reconstructive surgery	1,118	763	68.2	801	403	50.3
Ophthalmology	858	539	62.8	604	61	10.1
Gastrointestinal endoscopic procedures	811	24	3.0	30	10	45.5
Gynaecological surgery	611	392	64.2	539	245	33.0
Head and neck surgery	721	367	50.9	391	250	63.9
Neurosurgery	438	389	88.8	424	140	48.4
Cardiac surgery	243	208	85.6	320	155	21.6
Dentoalveolar surgery	295	211	71.5	214	177	82.7
Breast surgery	247	230	93.1	255	55	43.5
Vascular surgery	140	105	75.0	108	47	25.0
Thoracic surgery	97	81	83.5	88	22	33.3
<b>Total</b>	<b>11,516</b>	<b>8,400</b>	<b>72.9</b>	<b>9,620</b>	<b>3,290</b>	<b>34.2</b>

## 2.5. Post-procedural prescribing

Post-procedural prophylaxis was deemed inappropriate in 17.4% of the 11,516 surgical episodes audited (Table 5). The 57.6% of episodes where no post-procedural antimicrobials were prescribed were mostly deemed appropriate (98.0%). For the surgical episodes that had at least one post-procedural antimicrobial prescribed for prophylaxis, 52.3% of prescriptions were deemed inappropriate. Antimicrobials were prescribed when not required for 10.3% (n=1,186) of episodes (Table 5). Post-procedural prophylaxis was deemed inappropriate for 56.2% of prescriptions, when the non-assessable prescriptions were excluded.

**Table 5. Appropriateness\* of post-procedural prophylactic prescribing of antimicrobials for surgical episodes and antimicrobial prescriptions, Surgical National Antimicrobial Prescribing Survey contributor facilities, 2023**

Post-procedural prophylaxis	Total	Appropriate		Inappropriate		Not assessable	
	(n)	(n)	(%)	(n)	(%)	(n)	(%)
<b>Surgical episodes<sup>#</sup></b>	<b>11,516</b>	<b>8,218</b>	<b>71.4</b>	<b>2,007</b>	<b>17.4</b>	<b>182</b>	<b>1.6</b>
<b>Antimicrobial prescribed</b>	<b>3,774</b>	<b>1,719</b>	<b>45.5</b>	<b>1,973</b>	<b>52.3</b>	<b>82</b>	<b>2.2</b>
• when required	2,588	1,717	66.3	796	30.8	75	2.9
• when not required	1,186	2	0.2	1,177	99.2	7	0.6
<b>No antimicrobial prescribed</b>	<b>6,633</b>	<b>6,499</b>	<b>98.0</b>	<b>34</b>	<b>0.5</b>	<b>100</b>	<b>1.5</b>
• when required	53	37	69.8	15	28.3	1	1.9
• when not required	6,580	6,462	98.2	19	0.3	99	1.5
<b>Antimicrobial prescriptions<sup>^</sup></b>	<b>4,320</b>	<b>1,950</b>	<b>45.1</b>	<b>2,281</b>	<b>52.8</b>	<b>89</b>	<b>2.1</b>
<b>Prophylaxis</b>	<b>4,272</b>	<b>1,922</b>	<b>45.0</b>	<b>2,261</b>	<b>52.9</b>	<b>89</b>	<b>2.1</b>
• when required	2,817	1,920	68.2	816	29.0	81	2.9
• when not required	1,455	2	0.1	1,445	99.3	8	0.5
<b>Treatment</b>	<b>37</b>	<b>24</b>	<b>64.9</b>	<b>13</b>	<b>35.1</b>	<b>0</b>	<b>0.0</b>

\* The overall appropriateness of prescribing for a surgical episode was determined by taking the lowest ranked assessment of the individual post-procedural prescriptions.

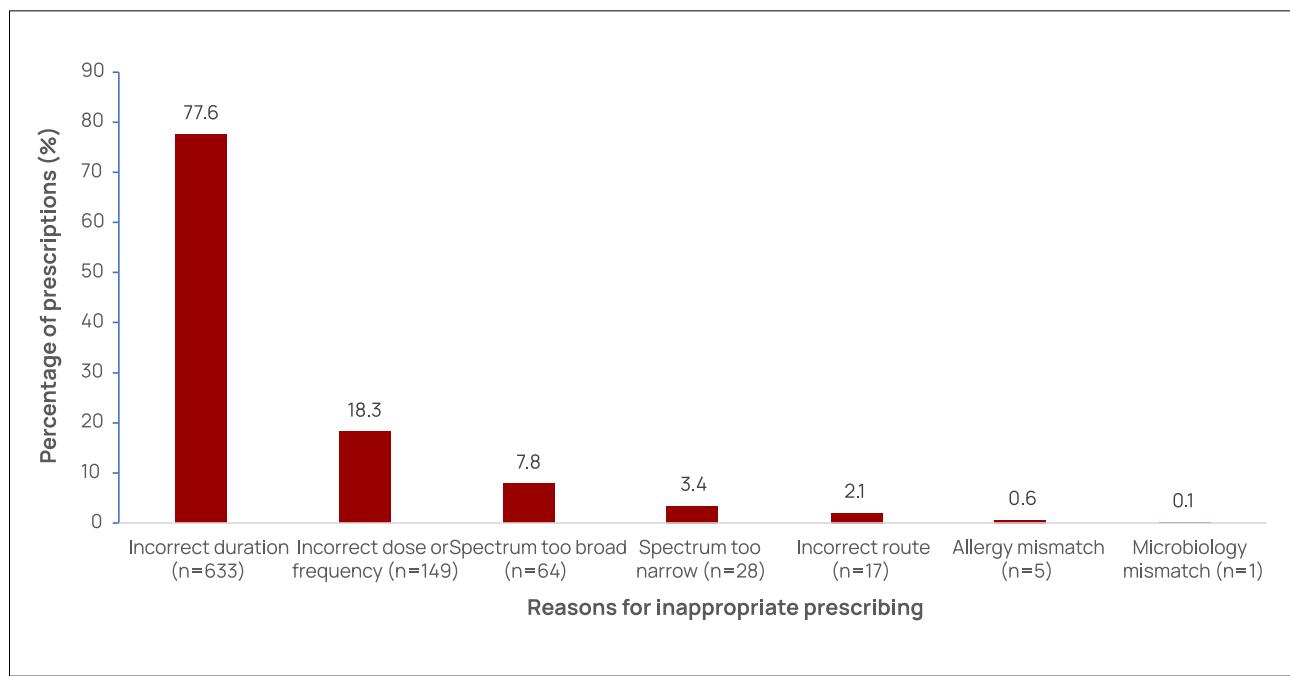
# There were 694 surgical episodes that had only post-procedural antimicrobials prescribed for treatment of infection; auditors were unable to ascertain whether antimicrobials were prescribed in 415 surgical episodes and these were excluded from the analysis.

<sup>^</sup> There were 11 antimicrobial prescriptions in which auditors were unable to ascertain whether these were for prophylaxis or treatment and these were excluded from the analysis.

## Reasons for inappropriate post-procedural prophylaxis prescribing

There were 2,261 post-procedural prophylaxis prescriptions deemed inappropriate. Of these, 1,445 (63.9%) were deemed not required. For post-procedural prophylactic prescriptions, where prophylaxis was recommended by guidelines (n=2,817), 29.0% were deemed inappropriate (n=816). A post-procedural prophylaxis prescription can have more than one reason for inappropriateness. The majority of inappropriate prescriptions were due to incorrect duration (77.6%). Dose and frequency (18.3%) was the next most common reason (Figure 6).

**Figure 6. Reasons for inappropriateness,\* by percentage of required post-procedural prophylactic antimicrobial prescriptions,† Surgical National Antimicrobial Prescribing Survey contributor facilities, 2023**



\* Refer to the *National Antimicrobial Prescribing Survey: technical supplement 2023* for appropriateness definitions.<sup>5</sup>

† Each prescription is assessed against each quality indicator and thus can be represented in more than one category. There was a total of 816 inappropriate post-procedural prophylaxis prescriptions (comprising 897 reasons for inappropriateness).

Of all post-procedural prescriptions, 51.5% involved prophylaxis for greater than or equal to 24 hours (Table 6). Of those prescribed for greater than or equal to 48 hours (34.2%), 2 of the 15 procedural groups had prescribing rates greater than 80%. These were dentoalveolar surgery (95.5%) and head and neck surgery (87.6%).

When the volume of episodes audited is considered, 52.4% of all prescriptions greater than or equal to 48 hours are accounted for by 3 procedure groups: ophthalmology (n=318 prescriptions), plastic and reconstructive surgery (n=258 prescriptions) and head and neck surgery (n=190 prescriptions).

In comparison with reports over the years, there is noticeable improvement for orthopaedic surgery, in which post-procedural antimicrobial prescriptions with a duration greater than or equal to 48 hours reduced from 39.1% (2020) to now 7.8% in 2023. In contrast, plastic and reconstructive surgery prescriptions with a duration greater than or equal to 48 hours increased from 35.9% (2020) and 74.9% (2021) to 80.3% in 2022 and has now reduced to 69.4% in 2023. Dentoalveolar surgery prescriptions with a duration greater than or equal to 48 hours increased from 39.7% (2020) to greater than 95% since 2021 and is currently 95.5% in 2023.

**Table 6. Duration of surgical prophylaxis prescribed for greater than 24 and 48 hours, by procedure group, Surgical National Antimicrobial Prescribing Survey contributor facilities, 2023**

Procedure group	Antimicrobial prescriptions	Duration range	Duration median	Duration $\geq 24$ hours		Duration $\geq 48$ hours	
				(n)	(days)	(days)	(n)
Orthopaedic surgery	1,663	1-47	1	507	30.5	129	7.8
Ophthalmology	651	1-29	1	369	56.7	318	48.8
Plastic and reconstructive surgery	372	1-28	5	292	78.5	258	69.4
Neurosurgery	236	1-14	1	99	41.9	33	14.0
Head and neck surgery	217	1-15	5	202	93.1	190	87.6
Urological surgery	201	1-35	4	145	72.1	108	53.7
Cardiac surgery	192	1-8	1	109	56.8	79	41.1
Abdominal surgery	181	1-17	2	117	64.6	80	44.2
Breast surgery	156	1-20	4	103	66.0	92	59.0
Obstetrics	112	1-19	1	42	37.5	23	20.5
Dentoalveolar surgery	112	1-7	5	110	98.2	107	95.5
Gynaecological surgery	83	1-8	1	50	60.2	29	34.9
Thoracic surgery	61	1-6	1	35	57.4	7	11.5
Vascular surgery	29	1-7	1	13	44.8	7	24.1
Gastrointestinal endoscopic procedures	6	1-6	n/a*	n/a*	n/a*	n/a*	n/a*
<b>Total</b>	<b>4,272</b>	-	-	<b>2,198</b>	<b>51.5</b>	<b>1,462</b>	<b>34.2</b>

\* Data are not shown for antimicrobial prescriptions where n < 10.

n/a = not applicable.

## Guideline compliance

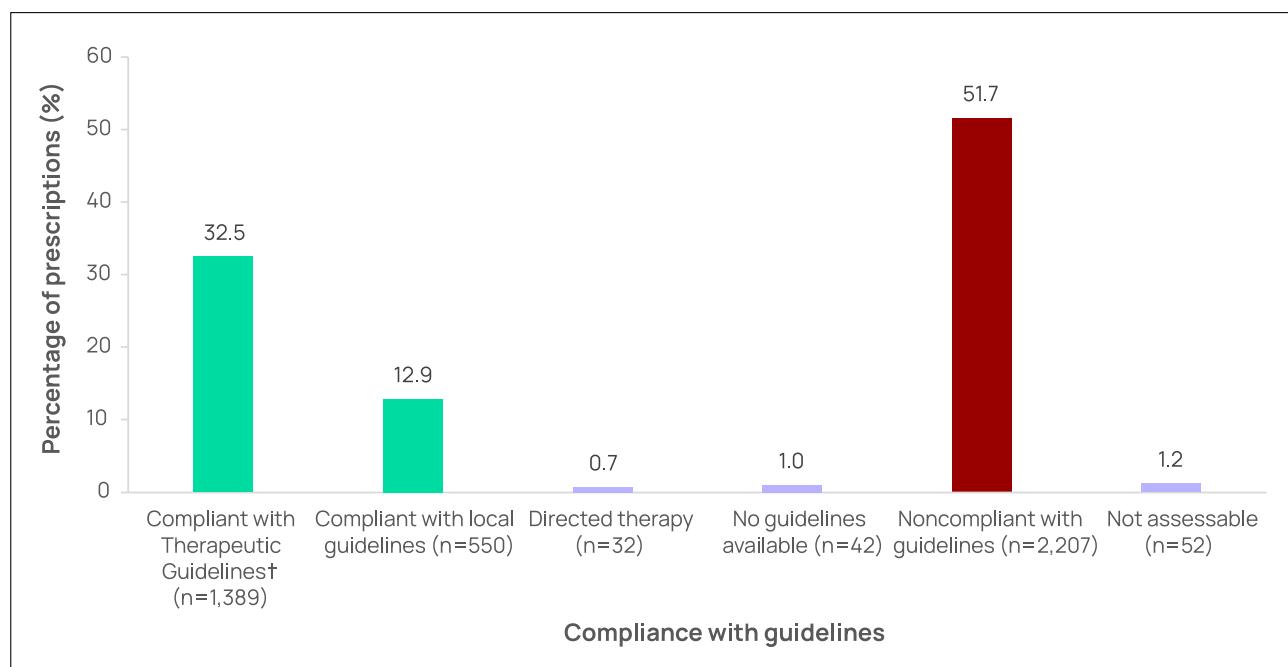
When no post-procedural antimicrobials were prescribed, noncompliance with guidelines was infrequent (0.5%). When they were prescribed, over half (51.7%) of post-procedural antimicrobial prophylaxis was noncompliant with guidelines (Figure 7). Noncompliance increased to 53.2% when 'directed therapy', 'no guidelines available' and 'not assessable' prescriptions were excluded.

Compliance with national prescribing guidelines<sup>8</sup> continues to be poor, generally due to prolonged durations of oral, ocular and topical antimicrobials post-procedurally. These represent niche targeted areas for AMS and quality improvement intervention.

Of all post-procedural prophylactic prescriptions (n=4,272), 61.9% were administered via intravenous route, followed by 20.2% oral/enteral, 9.2% topical and 8.6% ocular routes. Noncompliance with guidelines was highest for antimicrobials administered via the oral/enteral route (90.2%), followed by intravenous route (48.1%) and topical route (32.5%).

Post-procedural extended use of prophylactic oral or topical antimicrobials is not recommended by Australian guidelines<sup>8</sup> and should be discouraged. Antimicrobials should only be prescribed prophylactically when the evidence supports their use.

**Figure 7. Percentage of post-procedural prophylactic antimicrobial prescriptions\* that were compliant with guidelines, Surgical National Antimicrobial Prescribing Survey contributor facilities, 2023**



\* n=4,272 prescriptions for post-procedural prophylaxis.

† See the *Therapeutic guidelines: antibiotic*.<sup>8</sup>

## Antimicrobial choice

The 5 most commonly prescribed post-procedural antimicrobials accounted for 87.4% of all antimicrobials prescribed prophylactically: cefazolin (61.2%), cefalexin (12.1%), chloramphenicol (7.5%), amoxicillin-clavulanic acid (3.7%) and metronidazole (2.9%), as shown in Table 7.

All antimicrobials had relatively high rates of prescribing deemed inappropriate. Rates of prescribing deemed inappropriate were greater than 80% for cefalexin, amoxicillin-clavulanic acid, amoxicillin, trimethoprim, ceftriaxone, vancomycin, clindamycin and cefaclor.

**Table 7. Post-procedural prophylactic prescribing of antimicrobials and percentage inappropriate,\* Surgical National Antimicrobial Prescribing Survey contributor facilities, 2023**

Antimicrobial	Total prescriptions		Inappropriate	
	(n)	(%)	(n)	(%)
Cefazolin	2,615	61.2	1,066	40.8
Cefalexin	517	12.1	482	93.2
Chloramphenicol	319	7.5	87	27.3
Amoxicillin-clavulanic acid	159	3.7	130	81.8
Metronidazole	125	2.9	96	76.8
Amoxicillin	82	1.9	76	92.7
Ciprofloxacin	81	1.9	49	60.5
Trimethoprim	53	1.2	51	96.2
Ceftriaxone	52	1.2	46	88.5
Tobramycin	51	1.2	31	60.8
Vancomycin	50	1.2	41	82.0
Clindamycin	33	0.8	28	84.8
Ofloxacin	24	0.6	0	0.0
Mupirocin	14	0.3	9	64.3
Gentamicin	11	0.3	8	72.7
Cefaclor	10	0.2	10	100.0
Others <sup>†</sup>	76	1.8	51	67.1
<b>Total</b>	<b>4,272</b>	<b>100</b>	<b>2,261</b>	<b>52.9</b>

\* Data are not shown for antimicrobial prescriptions where n < 10.

<sup>†</sup> 'Others' comprises 21 antimicrobials.

## Procedure groups

The procedure groups with the highest rates of prescribing at least one post-procedural antimicrobial for prophylaxis were cardiac surgery, orthopaedic surgery and ophthalmology (72.4%, 67.3% and 63.9% respectively), as shown in Table 8. Three procedure groups – orthopaedic surgery (n=732 prescriptions), plastic and reconstructive surgery (n=315 prescriptions) and head and neck surgery (n=208 prescriptions) – accounted for over half (53.4%) of all inappropriate post-procedural prophylactic antimicrobial prescriptions.

**Table 8. Post-procedural prophylactic prescribing and percentage inappropriate, by procedure group, Surgical National Antimicrobial Prescribing Survey contributor facilities, 2023**

Procedure group	Surgical episodes (n)	At least one antimicrobial prescribed		Total prescriptions (n)	Inappropriate prescriptions	
		(n)	(%)		(n)	(%)
Orthopaedic surgery	2,362	1,589	67.3	1,663	732	44.0
Abdominal surgery	1,272	135	10.6	181	158	87.3
Urological surgery	1,163	160	13.8	201	173	86.1
Obstetrics	1,140	80	7.0	112	73	65.2
Plastic and reconstructive surgery	1,118	315	28.2	372	315	84.7
Ophthalmology	858	548	63.9	651	109	16.7
Gastrointestinal endoscopic procedures	811	3	n/a*	6	3	n/a*
Head and neck surgery	721	185	25.7	217	208	95.9
Gynaecological surgery	611	53	8.7	83	67	80.7
Neurosurgery	438	220	50.2	236	165	69.9
Dentoalveolar surgery	295	110	37.3	112	105	93.8
Breast surgery	247	114	46.2	156	139	89.1
Cardiac surgery	243	176	72.4	192	63	32.8
Vascular surgery	140	26	18.6	29	17	58.6
Thoracic surgery	97	60	61.9	61	25	41.0
<b>Total</b>	<b>11,516</b>	<b>3,774</b>	<b>32.8</b>	<b>4,272</b>	<b>2,352</b>	<b>55.1</b>

\* Percentages are not shown for antimicrobial prescriptions where n < 10.

n/a = not applicable.

# 3. Conclusion

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Now in its eighth year, the Surgical NAPS continues to have strong adoption from both public and private facilities from around Australia. The number of contributing facilities has more than doubled since the inception of the Surgical NAPS in 2016 (201 in 2023 compared with 84 in 2016).

As the Surgical NAPS is voluntary and is resource intensive compared with other modules, such as the Hospital NAPS, this continual increase in participation rates suggests that the survey is regarded as a valuable tool to identify opportunities to improve surgical antimicrobial prophylaxis, with a notable steady uptake and proportion of private facilities undertaking Surgical NAPS.

Ongoing annual contributions to the Surgical NAPS continue to provide benefits to end users to support further improvements and assess the efficacy and impact of implemented interventions in terms of guideline compliance and appropriateness. Despite variation in participation rates and the specialty focus between contributors, consistent themes for quality improvement are evident.

There have been some encouraging signs of continued improvement, particularly in the areas of documentation of incision and antimicrobial administration time. Similarly, noncompliance with guidelines appears to have decreased over the last several years.

Targeted improvement is required to address the ongoing issue of duration – the most pertinent issue regarding post-procedural prophylaxis appropriateness. Over one-third of post-procedural prescriptions had a duration greater than 48 hours. Procedure groups with the lowest prophylactic post-procedural appropriateness were head and neck surgery (1.8%), dentoalveolar surgery (2.7%) and breast surgery (10.3%), representative of key procedural targets for quality improvement.

In summary, and consistent with findings from previous surveys of surgical prophylaxis, the 2023 Surgical NAPS identified ongoing concerning inappropriate use of surgical prophylaxis in participating facilities. The issues involved require urgent attention from all stakeholders to improve AMS in the operative setting.

# Appendix

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**Table 1A: Prescribing patterns of Surgical National Antimicrobial Prescribing Survey contributors, by state and territory, Remoteness Area,<sup>^</sup> AIHW peer group<sup>^^</sup> and funding type, 2023**

		Number of participating facilities (n)	Percentage of participating facilities (%)	Number of surgical episodes (n)	Percentage of surgical episodes (%)	Surgical episodes with procedural dose(s) prescribed n (%)	Surgical episodes with post procedural prophylaxis prescription(s) prescribed n (%)
State or territory*							
ACT		2	1.0	43	0.4	40 (93.0)	10 (23.3)
NSW		61	30.3	3,274	28.4	2,268 (69.3)	1,205 (36.8)
Qld		27	13.4	2,306	20.0	1,990 (86.3)	1,044 (45.3)
SA		26	12.9	1,349	11.7	927 (68.7)	426 (31.6)
Tas		2	1.0	184	1.6	155 (84.2)	21 (11.4)
Vic		60	29.9	3,275	28.4	2,243 (68.5)	818 (25.0)
WA		23	11.4	1,085	9.4	777 (71.6)	250 (23.0)

**Table 1A (Continued)**

		Number of participating facilities (n)	Percentage of participating facilities (%)	Number of surgical episodes (n)	Percentage of surgical episodes (%)	Surgical episodes with procedural dose(s) prescribed n (%)	Surgical episodes with post procedural prophylaxis prescription(s) prescribed n (%)
Remoteness Area	Major Cities	116	57.7	7,570	65.7	5,572 (73.6)	2,436 (32.2)
	Inner Regional	47	23.4	2,489	21.6	1,915 (76.9)	1,008 (40.5)
	Outer Regional	33	16.4	1,044	9.1	756 (72.4)	265 (25.4)
	Remote	4	2.0	394	3.4	138 (35.0)	65 (16.5)
	Very Remote	1	0.5	19	0.2	19 (100.0)	0 (0)
Public hospital peer group	Principal referral	8	8.6	627	12.0	531 (84.7)	143 (22.8)
	Public Acute Group A hospitals	22	23.7	2,011	38.5	1,413 (70.3)	404 (20.1)
	Public Acute Group B hospitals	14	15.1	795	15.2	513 (64.5)	141 (17.7)
	Public Acute Group C hospitals	43	46.2	1,503	28.8	876 (58.3)	332 (22.1)
	Public Acute Group D hospitals	1	1.1	33	0.6	7 (21.2)	1 (3.0)
	Women's hospitals	3	3.2	162	3.1	101 (62.3)	17 (10.5)
	Other day procedure hospitals	1	1.1	58	1.1	45 (77.6)	48 (82.8)
	Unpeered hospitals	1	1.1	33	0.6	28 (84.8)	0 (0)

**Table 1A (Continued)**

		Number of participating facilities (n)	Percentage of participating facilities (%)	Number of surgical episodes (n)	Percentage of surgical episodes (%)	Surgical episodes with procedural dose(s) prescribed n (%)	Surgical episodes with post procedural prophylaxis prescription(s) prescribed n (%)
Private hospital peer group	Private Acute Group A hospitals	10	9.3	788	12.5	716 (90.9)	349 (44.3)
	Private Acute Group B hospitals	20	18.5	1,686	26.8	1,450 (86.0)	735 (43.6)
	Private Acute Group C hospitals	24	22.2	1,901	30.2	1,477 (77.7)	781 (41.1)
	Private Acute Group D hospitals	17	15.7	662	10.5	514 (77.6)	356 (53.8)
	Other acute specialised hospitals	8	7.4	238	3.8	162 (68.1)	52 (21.8)
	Eye surgery centres	12	11.1	390	6.2	228 (58.5)	259 (66.4)
	Mixed day procedure hospitals	10	9.3	445	7.1	231 (51.9)	104 (23.4)
	Mixed subacute and non-acute hospitals	1	0.9	40	0.6	9 (22.5)	22 (55.0)
	Women's hospitals	1	0.9	30	0.5	21 (70.0)	4 (13.3)
	Plastic and reconstructive surgery centres	3	2.8	69	1.1	38 (55.1)	20 (29.0)
	Endoscopy centres	1	0.9	30	0.5	30 (100.0)	0 (0)
	Private acute psychiatric hospitals	1	0.9	15	0.2	10 (66.7)	6 (40.0)
Funding type	Public	93	46.3	5,222	45.3	3,514 (67.3)	1,086 (20.8)
	Private	108	53.7	6,294	54.7	4,886 (77.6)	2,688 (42.7)
<b>Combined national result</b>		<b>201</b>	<b>100</b>	<b>11,516</b>	<b>100</b>	<b>8,400</b>	<b>3,774</b>

<sup>^</sup> Remoteness category as per the Australian Bureau of Statistics.<sup>7</sup>

<sup>^^</sup> Australian Institute of Health and Welfare peer groups.<sup>6</sup>

\* Northern Territory did not contribute any data for 2023.

ACT = Australian Capital Territory; NSW = New South Wales; Qld = Queensland; SA = South Australia; Tas = Tasmania; Vic = Victoria; WA = Western Australia.

**Table 1B: Procedural dose compliance with guidelines and appropriateness in Surgical National Antimicrobial Prescribing Survey contributors, by state and territory, remoteness area,<sup>^</sup> AIHW peer group<sup>^^</sup> and funding type, 2023**

		% Compliance with guidelines							% Appropriateness				
		Total (n)	Therapeutic Guideline <sup>8</sup> compliant	Local guideline compliant	Noncompliant	Directed therapy	Not available	Not assessable	Optimal	Adequate	Suboptimal	Inadequate	Not assessable
State or territory*	ACT	50	74.0	0	20.0	0	0	6.0	72.0	0	6.0	18.0	4.0
	NSW	2,574	41.2	22.5	32.9	0.9	1.1	1.5	60.8	2.1	6.0	28.2	2.9
	Qld	2,331	58.9	9.1	24.9	0.4	3.4	3.2	62.6	5.3	6.9	18.4	6.7
	SA	1,075	57.7	15.3	22.8	0.2	0.4	3.7	71.8	2.0	5.3	17.7	3.2
	Tas	192	70.8	0	27.1	0	1.6	0.5	59.9	15.6	4.2	19.8	0.5
	Vic	2,538	45.4	17.9	34.0	0.2	1.1	1.3	60.5	3.7	5.1	29.0	1.7
	WA	860	68.0	1.6	26.5	1.0	1.3	1.5	65.7	1.7	15.8	13.5	3.3
Remoteness Area	Major Cities	6,469	43.8	19.9	32.4	0.7	1.9	1.4	60.0	3.5	7.4	26.0	3.1
	Inner Regional	2,149	69.5	2.5	23.3	0.1	0.9	3.8	69.1	3.5	5.1	17.3	5.0
	Outer Regional	825	71.8	1.3	22.2	0.4	0.8	3.5	68.4	4.5	6.5	18.1	2.5
	Remote	158	21.5	46.8	28.5	0	1.3	1.9	65.8	0	3.8	24.7	5.7
	Very Remote	19	78.9	5.3	10.5	0	0.0	5.3	73.7	0	0	21.1	5.3
Public hospital peer group	Principal referral	624	51.1	16.0	29.6	1.1	1.9	0.2	64.4	2.9	4.2	27.1	1.4
	Public Acute Group A hospitals	1,642	52.1	13.5	30.0	0.9	2.3	1.3	63.4	4.8	7.4	22.8	1.6
	Public Acute Group B hospitals	586	49.3	24.1	23.5	0.2	1.9	1.0	69.1	2.4	5.3	20.0	3.2
	Public Acute Group C hospitals	932	61.3	8.2	26.5	0.1	0.4	3.5	65.7	1.8	6.5	23.0	3.0
	Public Acute Group D hospitals	8	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Women's hospitals	128	63.3	17.2	15.6	0	2.3	1.6	77.3	2.3	1.6	14.1	4.7
	Other day procedure hospitals	45	0	86.7	13.3	0	0	0	86.7	8.9	0	4.4	0
	Unpeered hospitals	28	46.4	21.4	25.0	0	7.1	0	67.9	0	0	25.0	7.1

**Table 1B (Continued)**

		Total (n)	% Compliance with guidelines					% Appropriateness					
			Therapeutic Guideline <sup>8</sup> compliant	Local guideline compliant	Noncompliant	Directed therapy	Not available	Not assessable	Optimal	Adequate	Suboptimal	Inadequate	Not assessable
Private hospital peer group	Private Acute Group A hospitals	923	49.4	5.4	38.1	0.4	5.1	1.5	52.0	1.8	8.1	29.9	8.1
	Private Acute Group B hospitals	1,714	41.1	21.5	35.0	0.9	0.3	1.2	61.3	1.9	6.0	29.3	1.5
	Private Acute Group C hospitals	1,608	62.9	7.7	26.7	0.2	1.1	1.2	68.7	0.9	7.1	21.0	2.3
	Private Acute Group D hospitals	572	51.9	14.0	24.5	0	0.9	8.7	63.5	3.0	5.2	16.4	11.9
	Other acute specialised hospitals	186	54.3	21.5	19.4	1.1	0	3.8	55.9	17.2	5.9	16.7	4.3
	Eye surgery centres	265	42.6	54.7	2.6	0	0	0	64.5	32.5	0.4	2.6	0
	Mixed day procedure hospitals	248	40.3	2.0	43.5	0	3.6	10.5	40.3	0.4	22.2	23.4	13.7
	Mixed subacute and non-acute hospitals	9	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Women's hospitals	23	56.5	8.7	30.4	0	0	4.3	65.2	0	17.4	13.0	4.3
	Plastic and reconstructive surgery centres	39	38.5	7.7	51.3	2.6	0	0	46.2	2.6	43.6	7.7	0
	Endoscopy centres	30	10.0	0	86.7	0	0	3.3	10.0	0	0	90.0	0
Funding type	Private acute psychiatric hospitals	10	80.0	0	20.0	0	0	0	80.0	0	0	20.0	0
	Public	3,993	53.4	15.2	27.5	0.6	1.8	1.6	65.7	3.4	6.0	22.6	2.3
	Private	5,627	50.3	14.5	30.7	0.5	1.5	2.5	60.9	3.6	7.3	23.8	4.4
<b>Combined national result</b>		<b>9,620</b>	<b>51.6</b>	<b>14.8</b>	<b>29.4</b>	<b>0.5</b>	<b>1.6</b>	<b>2.1</b>	<b>62.9</b>	<b>3.5</b>	<b>6.8</b>	<b>23.3</b>	<b>3.5</b>

<sup>^</sup> Remoteness category as per the Australian Bureau of Statistics.<sup>7</sup>

<sup>^^</sup> Australian Institute of Health and Welfare peer groups.<sup>6</sup>

\* Northern Territory did not contribute any data for 2023.

ACT = Australian Capital Territory; AIHW = Australian Institute of Health and Welfare; n/a = not applicable, as there were fewer than 10 prescriptions; NSW = New South Wales; Qld = Queensland;

SA = South Australia; Tas = Tasmania; Vic = Victoria; WA = Western Australia.

**Table 1C: Post-procedural prophylaxis prescription compliance with guidelines and appropriateness in Surgical National Antimicrobial Prescribing Survey contributors, by state and territory, remoteness area,<sup>^</sup> AIHW peer group<sup>^^</sup> and funding type, 2023**

		% Compliance with guidelines							% Appropriateness				
		Total (n)	Therapeutic Guideline <sup>8</sup> compliant	Local guideline compliant	Noncompliant	Directed therapy	Not available	Not assessable	Optimal	Adequate	Suboptimal	Inadequate	Not assessable
State or territory*	ACT	11	54.5	9.1	36.4	0	0	0	54.5	9.1	9.1	27.3	0
	NSW	1,397	24.1	20.0	52.6	1.5	1.1	0.6	42.2	2.6	12.5	41.1	1.6
	Qld	1,111	42.8	6.8	48.8	0.2	0.9	0.5	43.2	4.5	5.9	44.7	1.6
	SA	467	33.8	12.2	52.7	0.2	0.4	0.6	45.2	1.3	6.0	46.0	1.5
	Tas	21	4.8	0	95.2	0	0	0	4.8	0	0	95.2	0
	Vic	980	31.6	10.2	56.1	0	1.2	0.8	40.2	1.5	13.8	43.1	1.4
	WA	285	35.4	13.0	38.6	2.8	0.7	9.5	32.6	13.7	16.5	27.4	9.8
Remoteness Area	Major Cities	2,835	26.0	16.7	54.3	0.9	1.2	0.9	38.5	3.4	11.8	44.5	1.8
	Inner Regional	1,092	46.3	3.8	47.5	0.6	0.4	1.4	46.6	3.8	7.1	40.8	1.8
	Outer Regional	277	51.3	6.1	39.4	0	1.4	1.8	54.5	4.0	13.7	24.2	3.6
	Remote	68	5.9	26.5	58.8	0	0	8.8	32.4	0	4.4	51.5	11.8
	Very Remote <sup>†</sup>	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Public hospital peer group	Principal referral	170	12.9	9.4	70.0	0	5.3	2.4	20.0	2.4	13.5	57.6	6.5
	Public Acute Group A hospitals	473	20.3	5.7	70.6	0.4	1.7	1.3	22.8	3.0	24.3	48.4	1.5
	Public Acute Group B hospitals	167	25.1	16.8	55.7	0	0.6	1.8	35.3	2.4	24.0	35.9	2.4
	Public Acute Group C hospitals	368	42.4	8.4	43.8	0	0.5	4.9	47.3	4.1	9.0	34.2	5.4
	Public Acute Group D hospitals	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Women's hospitals	19	63.2	26.3	0	0	0	10.5	84.2	0	0	5.3	10.5
	Other day procedure hospitals	48	0	83.3	16.7	0	0	0	83.3	0	0	16.7	0
	Unpeered hospitals <sup>†</sup>	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

**Table 1C (Continued)**

		% Compliance with guidelines							% Appropriateness				
		Total (n)	Therapeutic Guideline <sup>8</sup> compliant	Local guideline compliant	Noncompliant	Directed therapy	Not available	Not assessable	Optimal	Adequate	Suboptimal	Inadequate	Not assessable
Private hospital peer group	Private Acute Group A hospitals	398	30.7	5.0	63.3	0	0.8	0.3	31.4	1.5	9.0	57.0	1.0
	Private Acute Group B hospitals	852	10.3	27.2	58.8	1.6	1.1	0.9	35.7	2.8	10.0	49.8	1.8
	Private Acute Group C hospitals	850	33.9	4.0	60.7	0.4	0.7	0.4	34.0	4.0	6.6	54.1	1.3
	Private Acute Group D hospitals	390	58.7	9.7	28.2	1.8	0.5	1.0	66.9	2.1	4.6	24.1	2.3
	Other acute specialised hospitals	56	33.9	33.9	28.6	0	1.8	1.8	39.3	12.5	26.8	17.9	3.6
	Eye surgery centres	307	78.5	19.5	2.0	0	0	0	87.3	10.4	1.0	1.3	0
	Mixed day procedure hospitals	118	44.1	0	54.2	0	0.8	0.8	44.1	0	9.3	44.9	1.7
	Mixed subacute and non-acute hospitals	22	100.0	0	0	0	0	0	100.0	0	0	0	0
	Women's hospitals	6	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Plastic and reconstructive surgery centres	21	0	0	71.4	28.6	0	0	0	0	47.6	52.4	0
Funding type	Endoscopy centres <sup>†</sup>	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Private acute psychiatric hospitals	6	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Public	1,246	26.3	11.8	57.5	0.2	1.6	2.6	34.6	3.0	16.9	42.0	3.5
Private		3,026	35.1	13.3	49.3	1.0	0.7	0.6	44.4	3.7	8.0	42.5	1.5
<b>Combined national result</b>		<b>4,272</b>	<b>32.5</b>	<b>12.9</b>	<b>51.7</b>	<b>0.7</b>	<b>1.0</b>	<b>1.2</b>	<b>41.5</b>	<b>3.5</b>	<b>10.6</b>	<b>42.3</b>	<b>2.1</b>

<sup>^</sup> Remoteness category as per the Australian Bureau of Statistics.<sup>7</sup>

<sup>^^</sup> Australian Institute of Health and Welfare peer groups.<sup>6</sup>

\* Northern Territory did not contribute any data for 2023.

† Very remote, Unpeered hospitals, and Endoscopy centres did not contribute any post-procedural prescription data for 2023.

ACT = Australian Capital Territory; AIHW = Australian Institute of Health and Welfare; n/a = not applicable, as there were fewer than 10 prescriptions; NSW = New South Wales; Qld = Queensland; SA = South Australia; Tas = Tasmania; Vic = Victoria; WA = Western Australia.

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All information in this publication is correct as at January 2025.



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