AUSTRALIAN COMMISSION ON SAFETY AND QUALITY IN HEALTH CARE

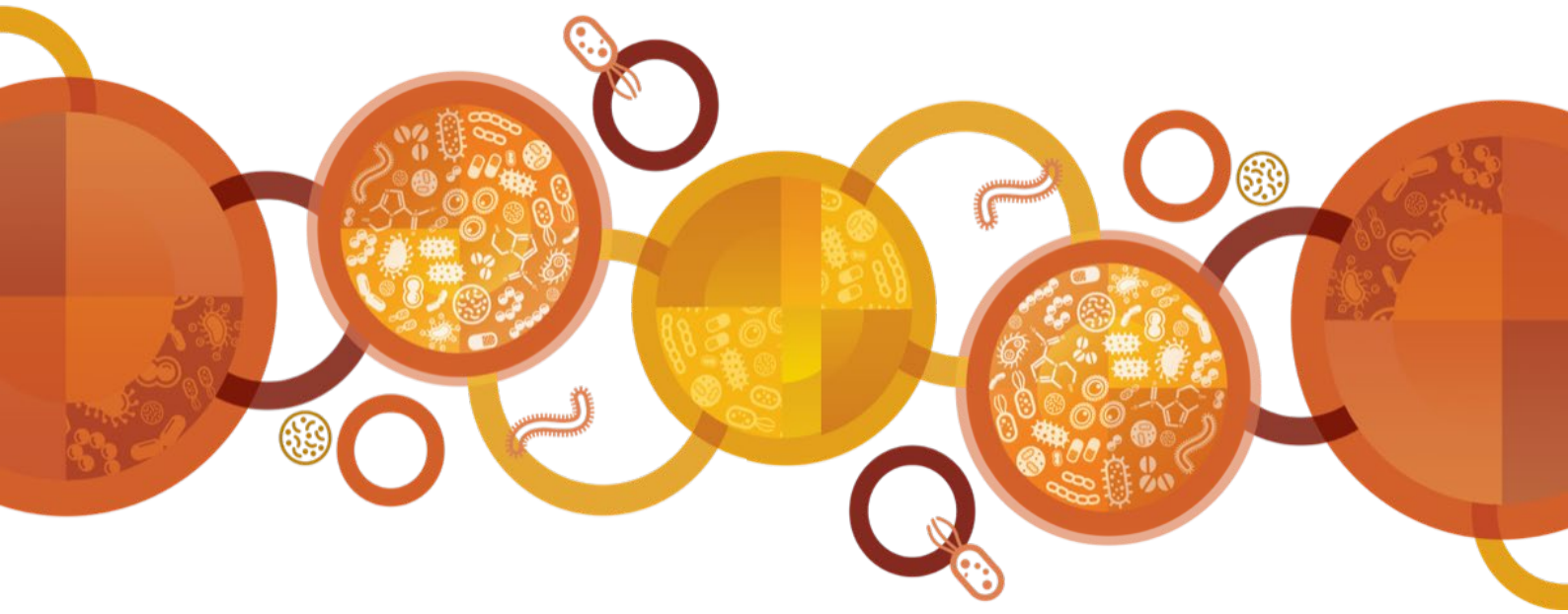
AURA Antimicrobial Use and Resistance in Australia

CARAlert THE NATIONAL ALERT SYSTEM FOR CRITICAL ANTIMICROBIAL RESISTANCE

CARAlert data update 32

1 March 2023–30 April 2023

June 2023



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Contents

Data Summary

This report provides an update on data submitted to the National Alert System for Critical Antimicrobial Resistances (CARAlert) for the reporting period: 1 March 2023 to 30 April 2023, and complements previous analyses of and updates on CARAlert data.

National overview

- The total number of critical antimicrobial resistances (CARs) reported was up 4.7% compared to the previous two-month reporting period (*n* = 401 versus *n* = 383) (excluding CARs that were introduced or removed in January 2023)
- Just under one-half of the CARs reported were carbapenemase-producing *Enterobacterales* (CPE) (including those with ribosomal methyltransferase) (180/402, 44.8%)
- The total number of CPE (either alone or in combination with other CARs) reported to date this year, compared with the same period last year, increased by 51.3% (*n* = 363 versus *n* = 240)
- Multidrug-resistant (MDR) *Shigella* species was the second most reported CAR (92/402, 22.9%). The number of reports almost doubled compared to the previous two-month reporting period (*n* = 92 versus *n* = 49, up 87.8%)
- The same number of ceftriaxone-nonsusceptible *Neisseria gonorrhoeae* was reported (either alone or with azithromycin-nonsusceptible) as the previous two-month period (*n* = 5)
- Where the setting was known, the majority of CARs (excluding *N. gonorrhoeae*) were reported from public hospitals (189/298, 63.4%). There were 86 (28.9%) reports from community settings, 23 (7.7%) from private hospitals, and no reports from aged care homes.

Carbapenemase-producing *Enterobacterales*

- IMP (85/180, 47.2%), NDM (51/180, 28.3%), OXA-48-like (20/180, 11.1%), and NDM+OXA-48-like (11/180, 6.1%) types accounted for 92.7% of all CPE reported during this period
- The total number of CPE (either alone or in combination with other CARs) was slightly lower compared to the previous two-month period (*n* = 180 versus *n* = 183, down 1.6%). The total number of IMP-types reported decreased during this reporting period (*n* = 85) compared to the previous reporting period (*n* = 92)
- The total number of NDM-types (either alone or with OXA-48-like) was the same as the number reported for previous two-month period (*n* = 65)
- Six KPC-producing *Klebsiella* species were reported: three *K. pneumoniae* from one hospital in Queensland, one *K. pneumoniae* from Victoria, one *K. aerogenes* from South Australia, and one *K. pneumoniae* from New South Wales that also harboured NDM and OXA-181
- Where the setting was known, 16.0% (28/175) of CPE were reported from the community. There were no reports from aged care homes
- Seven hospitals (*n* = 4 in NSW; *n* = 3 in Queensland) had more than two reports of IMP-types. A further 11 hospitals had two notifications of IMP-types: Queensland (*n* = 5), NSW (*n* = 4) and Victoria (*n* = 2). Two hospitals from NSW and one from Queensland had five or more reports
- Ten hospitals had more than one report of NDM-types; these were in Victoria (*n* = 6), NSW (*n* = 3) and SA (*n* = 1).

***Salmonella* and *Shigella* species**

- There were 13 ceftriaxone-nonsusceptible *Salmonella* species reported during this period: 12 non-typhoidal species from Western Australia (*n* = 6, extended-spectrum β-lactamase [ESBL]), Victoria (*n* = 4, ESBL), SA (*n* = 1, ESBL), and NSW (*n* = 1, AmpC); and one *S.* Typhi from Victoria with an ESBL
- There were 92 MDR *Shigella* species reported in this period: 76 *S. sonnei*, 15 *S. flexneri* and one *S. dysenteriae*. Almost all (74/76, 97.4%) *S. sonnei* isolates were ceftriaxone/cefotaxime resistant and produced an ESBL. A little over half (9/15, 60.0%) of MDR *S. flexneri* were susceptible to ceftriaxone/cefotaxime.

Azithromycin-nonsusceptible (low-level resistance, MIC < 256 mg/L) *Neisseria gonorrhoeae*

- The total number of reports of this CAR decreased compared with the previous two-month reporting period (*n* = 79 versus *n* = 109, down 27.5%). Reports were from NSW (*n* = 13 versus *n* = 33), Victoria (*n* = 54 versus *n* = 68), Queensland (*n* = 4 versus *n* = 3), SA (*n* = 5 versus *n* = 2), WA (*n* = 3 versus *n* = 2) and Tasmania (*n* = 0 versus *n* = 1).

Ceftriaxone- and/or azithromycin-nonsusceptible *Neisseria gonorrhoeae*

- There were five reports of ceftriaxone-nonsusceptible *N. gonorrhoeae*; one each from NSW, Queensland and WA; and two from Victoria that also had high-level resistance to azithromycin
- Three *N. gonorrhoeae* with high-level resistance to azithromycin were reported from WA (*n* = 2) and Queensland (*n* = 1).

Gentamicin-resistant *Neisseria gonorrhoeae*

- No gentamicin-resistant *N. gonorrhoeae* were reported in this period.

Ciprofloxacin-nonsusceptible *Nesiseria meningitidis*

- There was one report of ciprofloxacin-nonsusceptible *N. meningitidis* from Victoria.

Carbapenemase-producing *Acinetobacter baumannii* complex and *Pseudomonas aeruginosa*

- Five carbapenemase-producing *Acinetobacter baumannii* complex were reported during this period. The reports were from NSW (IMP, *n* = 1; IMP + OXA-23-like, *n* = 1; IMP + OXA-58, *n* = 1; OXA-24/40-like, *n* = 1) and WA (OXA-24/40-like, *n* = 1)
- The number of carbapenemase-producing *Pseudomonas aeruginosa* reports increased compared to the previous two-month reporting period (*n* = 12 versus *n* = 7). Reports were from NSW (GES, *n* = 7), Victoria ($bla_{\text{VIM-1}}$, *n* = 1; $bla_{\text{VIM-2}}$, *n* = 1; $bla_{\text{NDM-1}}$, *n* = 1), Queensland (NDM, *n* = 1) and SA (NDM, *n* = 1).

Linezolid-resistant *Enterococcus* species

- Five linezolid-resistant *Enterococcus* species were reported during this period, three *E. faecalis* (*optrA*) and two *E. faecium* (*optrA*, *n* = 1; other, *n* = 1). All were from Victoria.

Candida auris

- Six *Candida auris* were reported during this period. The reports were from WA (*n* = 3), SA (*n* = 2) and NSW (*n* = 1).

Linezolid-, or vancomycin-nonsusceptible *Staphylococcus aureus* complex

- There were no reports of linezolid- or vancomycin-nonsusceptible *S. aureus* in this period.

Transmissible colistin resistance

- There was one report from Victoria of an *Escherichia coli* with *mcr-1.1* which also harboured $bla_{\text{NDM-1}}$.

***Streptococcus pyogenes* with reduced susceptibility to penicillin**

- No cases of *Streptococcus pyogenes* with reduced susceptibility to penicillin were reported during this period.

National summary

Table 1: Number of critical antimicrobial resistances, by state and territory, 1 March 2023–30 April 2023, and year to date 2022 and 2023

Species	Critical resistance	State or Territory (March–April 2023)								Bi-monthly			Year to date		
										2023	2023				
		NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Jan-Feb	Mar-Apr	Relative change*	2022	2023	Relative change*
Acinetobacter baumannii complex	Carbapenemase-producing	4	0	0	0	1	0	0	0	5	5	0.0%	5	10	▲ 100%
	Carbapenemase- and ribosomal methyltransferase-producing	0	0	0	0	0	0	0	0	0	0	–	0	0	–
Candida auris	–	1	0	0	2	3	0	0	0	4	6	▲ 50.0%	2	10	▲ 400%
Enterobacterales	Carbapenemase-producing	68	42	44	6	8	0	0	0	168	168	0.0%	235	336	▲ 43.0%
	Carbapenemase- and ribosomal methyltransferase-producing	1	5	1	1	3	0	0	0	15	11	▼ 26.7%	5	26	▲ 420%
	Carbapenemase- producing and transmissible resistance to colistin	0	1	0	0	0	0	0	0	0	1	–	0	1	–
	Ribosomal methyltransferase-producing	0	1	0	0	0	0	0	0	3	1	▼ 66.7%	1	4	▲ 300%
	Transmissible resistance to colistin	0	0	0	0	0	0	0	0	0	0	–	0	0	–
Enterococcus species	Linezolid-resistant	0	5	0	0	0	0	0	0	4	5	▲ 25.0%	5	9	▲ 80.0%
Mycobacterium tuberculosis	Multidrug-resistant – at least rifampicin- and isoniazid-resistant strains	0	0	0	0	0	0	0	0	2	0	▼ 100%	4	2	▼ 50.0%
Neisseria gonorrhoeae	Azithromycin-nonsusceptible (low-level)[†]	13	54	4	5	3	0	0	0	109	79	▼ 27.5%	25	188	▲ 652%
	Azithromycin-nonsusceptible (high-level)[§]	0	0	1	0	2	0	0	0	1	3	▲ 200%	3	4	▲ 33.3%
	Ceftriaxone-nonsusceptible	1	0	1	0	1	0	0	0	3	3	0.0%	6	6	0.0%
	Ceftriaxone-nonsusceptible and azithromycin-nonsusceptible	0	2	0	0	0	0	0	0	2	2	0.0%	1	4	▲ 300%
	Gentamicin-resistant[#]	0	0	0	0	0	0	0	0	0	0	–	–	0	–

– = not applicable

Note: For this report, transmissible resistance to colistin refers to the presence of *mcr* genes other than *mcr-9*. This variant is not associated with a colistin resistant phenotype, but is typically found on H12 plasmids which may carry $bla_{\text{IMP-4}}$.

Table 1 (continued)

Species	Critical resistance	State or territory (March–April 2023)								Bi-monthly			Year to date		
										2023	2023				
		NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Jan–Feb	Mar–Apr	Relative change*	2022	2023	Relative change*
Neisseria meningitidis	Ciprofloxacin-nonsusceptible#	0	1	0	0	0	0	0	0	2	1	▼ 50.0%	–	3	–
Pseudomonas aeruginosa	Carbapenemase-producing	7	3	1	0	0	0	0	0	7	11	▲ 57.1%	23	18	▼ 21.7%
	Carbapenemase- and ribosomal methyltransferase-producing	0	0	0	1	0	0	0	0	0	1	–	2	1	▼ 50.0%
Salmonella species	Ceftriaxone-nonsusceptible	1	5	0	1	6	0	0	0	11	13	▲ 18.2%	12	24	▲ 100%
Shigella species	Multidrug-resistant	23	53	5	1	7	1	0	2	49	92	▲ 87.8%	18	141	▲ 683%
Staphylococcus aureus complex	Daptomycin-nonsusceptible**	–	–	–	–	–	–	–	–	–	–	–	49	–	–
	Linezolid-nonsusceptible	0	0	0	0	0	0	0	0	0	0	–	1	0	▼ 100%
	Vancomycin-nonsusceptible	0	0	0	0	0	0	0	0	0	0	–	0	0	–
Streptococcus pyogenes	Penicillin reduced susceptibility	0	0	0	0	0	0	0	0	0	0	–	0	0	–
	Total (reported by 31 May 2023)	119	172	57	17	34	1	0	2	**385**	**402**	**▲ 4.4**	**397**	**787**	**▲ 98.2%**
	Excluding CARs added or removed in 2023									**383**	**401**	**▲ 4.7**	**348**	**784**	**▲ 125%**

MIC = minimum inhibitory concentration; ▲ = increase; ▼ = decrease; – = not applicable

* Relative change = absolute change between period in 2022 and same period in 2023, for each CAR, expressed as a percentage of 2022 base
† Azithromycin MIC < 256 mg/L
§ Azithromycin MIC ≥ 256 mg/L
# Reported from January 2023
** Reporting of daptomycin-nonsusceptible *S. aureus* was suspended from January 2023

Note: The number of CARs have been updated to include additional submissions received after the previous publication date.

Table 2: Number of critical antimicrobial resistance isolates, by setting, national, 1 March 2023–30 April 2023

Species	Critical resistance	Setting					Total
		Public hospital	Private hospital	Aged care home	Community	Unknown	
Acinetobacter baumannii complex	Carbapenemase-producing	5	0	0	0	0	5
	Carbapenemase- and ribosomal methyltransferase-producing	0	0	0	0	0	0
Candida auris	–	6	0	0	0	0	6
Enterobacterales	Carbapenemase-producing	121	18	0	25	4	168
	Carbapenemase- and ribosomal methyltransferase-producing	8	0	0	3	0	11
	Carbapenemase- producing and transmissible resistance to colistin	0	0	0	0	1	1
	Ribosomal methyltransferase-producing	1	0	0	0	0	1
	Transmissible resistance to colistin	0	0	0	0	0	0
Enterococcus species	Linezolid-resistant	5	0	0	0	0	5
Mycobacterium tuberculosis	Multidrug-resistant – at least rifampicin- and isoniazid-resistant strains	0	0	0	0	0	0
Neisseria gonorrhoeae	Azithromycin-nonsusceptible (low-level)*	4	1	0	47	27	79
	Azithromycin-nonsusceptible (high-level)†	0	0	0	3	0	3
	Ceftriaxone-nonsusceptible	1	0	0	1	1	3
	Ceftriaxone-nonsusceptible and azithromycin-nonsusceptible	0	0	0	1	1	2
	Gentamicin-resistant§	0	0	0	0	0	0
Neisseria meningitidis	Ciprofloxacin-nonsusceptible§	0	0	0	0	1	1
Pseudomonas aeruginosa	Carbapenemase-producing	6	2	0	2	1	11
	Carbapenemase- and ribosomal methyltransferase-producing	0	0	0	1	0	1
Salmonella species	Ceftriaxone-nonsusceptible	2	3	0	7	1	13
Shigella species	Multidrug-resistant	35	0	0	48	9	92
Staphylococcus aureus complex	Linezolid-nonsusceptible	0	0	0	0	0	0
	Vancomycin-nonsusceptible	0	0	0	0	0	0
Streptococcus pyogenes	Penicillin reduced susceptibility	0	0	0	0	0	0
	Total (reported by 31 May 2023)	**194**	**24**	**0**	**138**	**46**	**402**

* Azithromycin MIC < 256 mg/L
† Azithromycin MIC ≥ 256 mg/L
§ Reported from January 2023

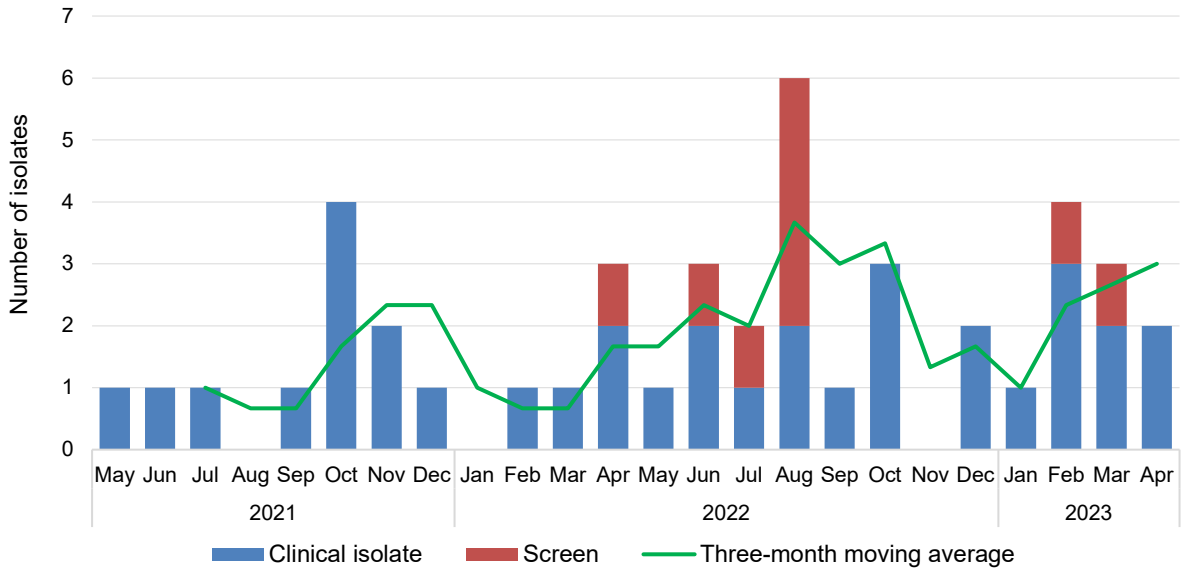
Notes:
1. Reporting of daptomycin-nonsusceptible *S. aureus* was suspended from January 2023.
2. Information on setting for *N. gonorrhoeae* is often not available.

Summary by CAR

Acinetobacter baumannii complex

National data

Figure 1: Carbapenemase-producing *Acinetobacter baumannii* complex, 24-month trend by specimen type, national, 1 May 2021–30 April 2023



State and territory data

Figure 2: Carbapenemase-producing *Acinetobacter baumannii* complex, number reported by carbapenemase type and specimen type, by state and territory, 1 March 2023–30 April 2023

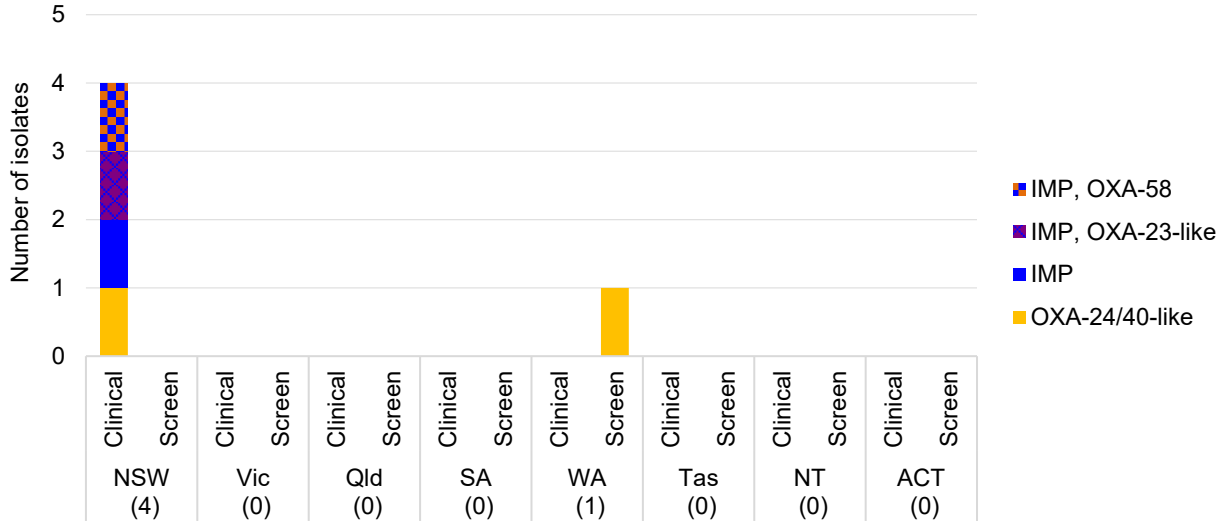


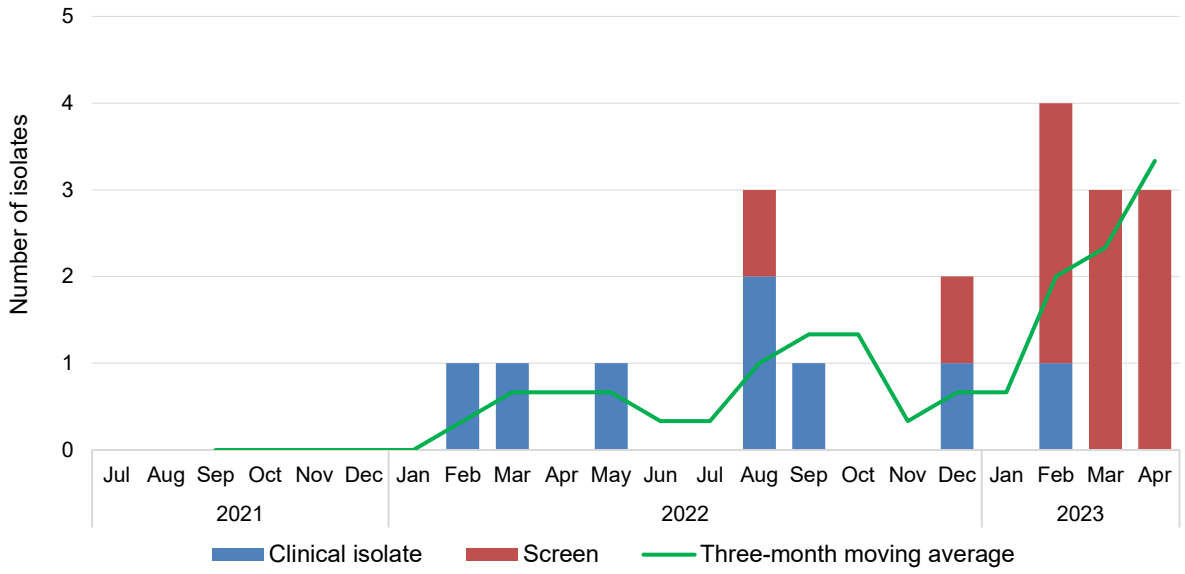
Table 3: Carbapenemase-producing *Acinetobacter baumannii* complex, number reported by setting, by state and territory, 1 March 2023–30 April 2023

Setting	State or territory								Total
	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	
Total	4	0	0	0	1	0	0	0	5
Public hospital	4	0	0	0	1	0	0	0	5
Private hospital	0	0	0	0	0	0	0	0	0
Aged care home	0	0	0	0	0	0	0	0	0
Community	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0

Candida auris

National data

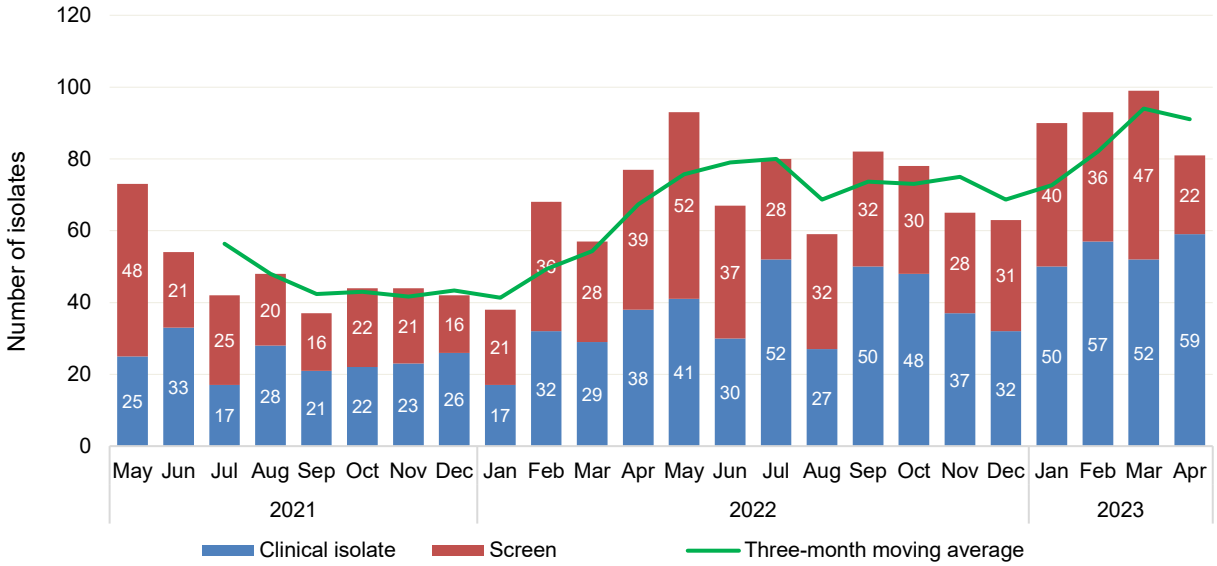
Figure 3: *Candida auris*, 24-month trend by specimen type, national, 1 July 2021–30 April 2023



Enterobacterales

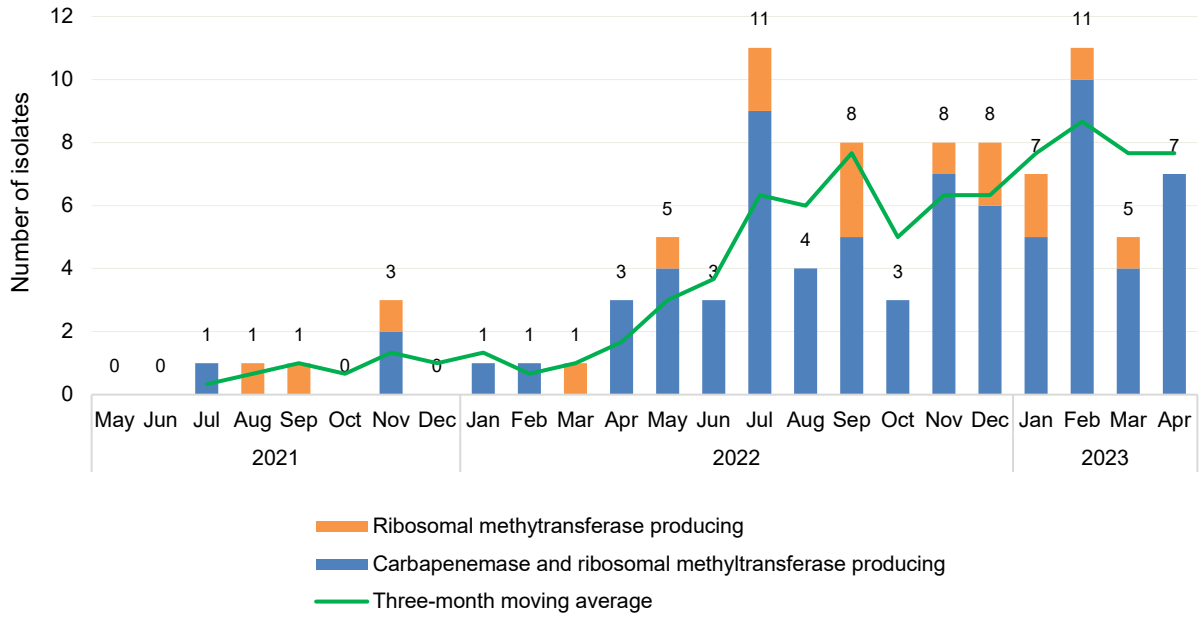
National data

Figure 4: Carbapenemase-producing *Enterobacterales**, 24-month trend by specimen type, national, 1 May 2021–30 April 2023



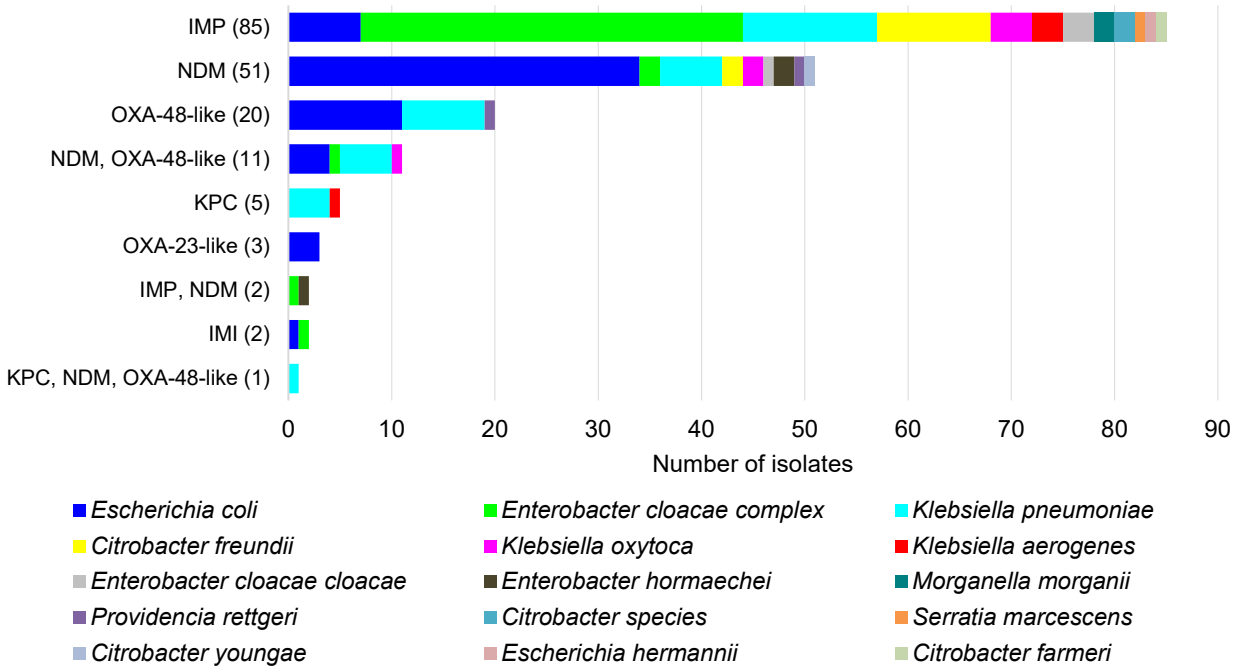
* Carbapenemase-producing alone or in combination with ribosomal methyltransferases or transmissible resistance to colistin

Figure 5: Ribosomal methyltransferase-producing *Enterobacterales**, 24-month trend, national, 1 May 2021–30 April 2023



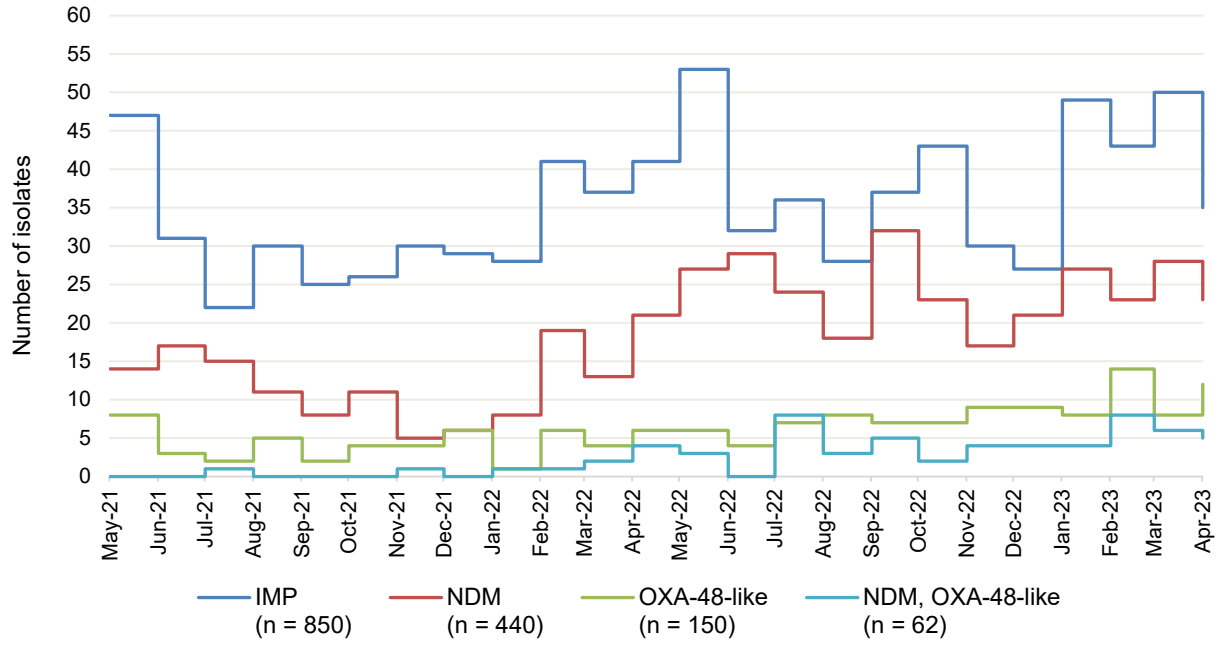
* Ribosomal methyltransferases alone, or in combination with carbapenemase(s)

Figure 6: Carbapenemase-producing *Enterobacterales**, number reported by carbapenemase type and species, national, 1 March 2023–30 April 2023



* Carbapenemase-producing (*n* = 168), carbapenemase and ribosomal methyltransferase-producing (*n* = 11), carbapenemase-producing and transmissible resistance to colistin (*n* = 1)

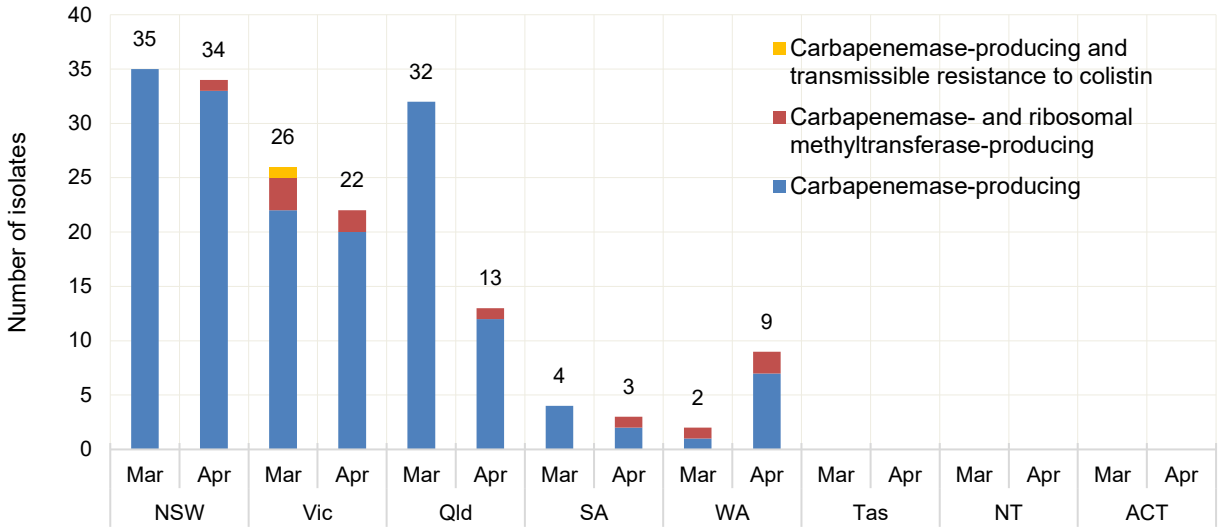
Figure 7: Top four reported carbapenemase types*, 24-month trend, national, 1 May 2021–30 April 2023



* Alone or in combination with another type for the reporting period indicated

State and territory data

Figure 8: Carbapenemase-producing *Enterobacterales*,* number reported by month, state and territory, 1 March 2023–30 April 2023



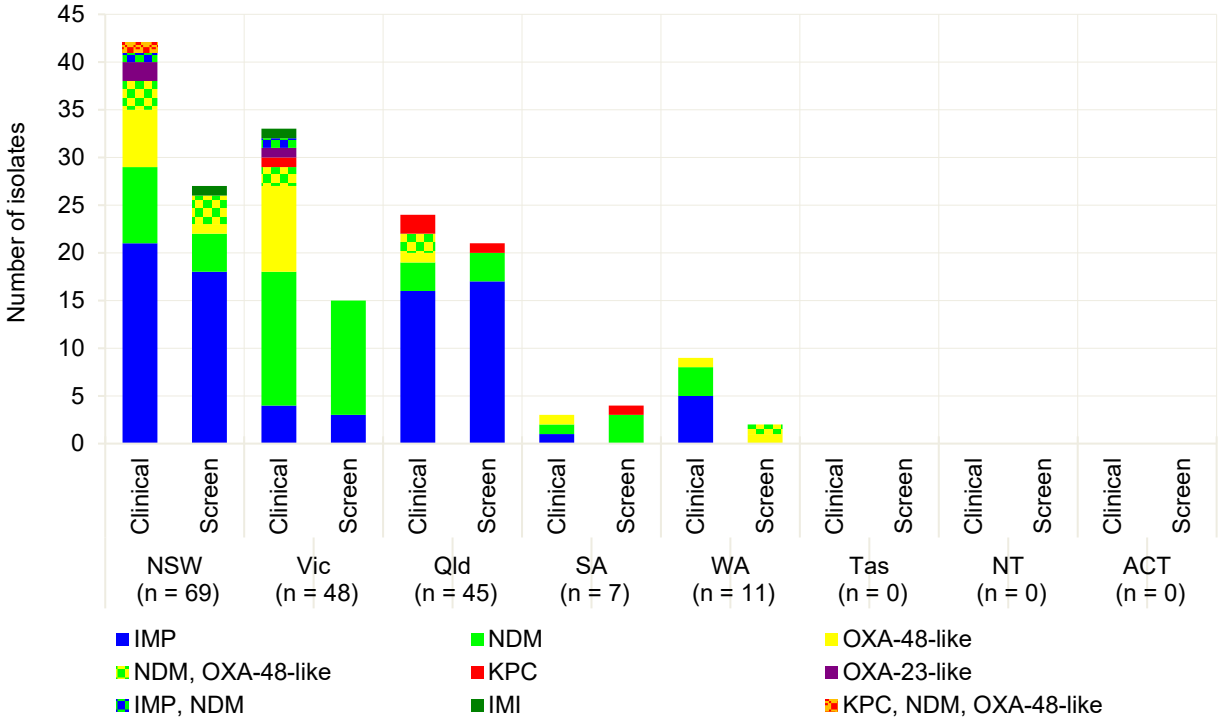
* Carbapenemase-producing (*n* = 168), carbapenemase and ribosomal methyltransferase-producing (*n* = 11), carbapenemase-producing and transmissible resistance to colistin (*n* = 1)

Figure 9: Two-year trend for the top four reported carbapenemase types from *Enterobacterales*, by state and territory and nationally, (three-month moving average), 1 May 2021–30 April 2023

Type	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia
IMP	23 10	5 1	9 8	0 0	2 1	0 0	1 0	1 0	47 26
NDM	6 1	11 1	6 1	5 0	3 0	1 0	1 0	1 0	27 6
OXA-48-like	4 0	5 0	2 0	1 0	1 0	0 0	0 0	1 0	11 3
NDM+OXA-48 -like	3 0	2 0	1 0	1 0	1 0	0 0	0 0	0 0	6 0
All types	36 14	21 2	26 10	6 1	6 1	1 0	1 0	2 0	94 41

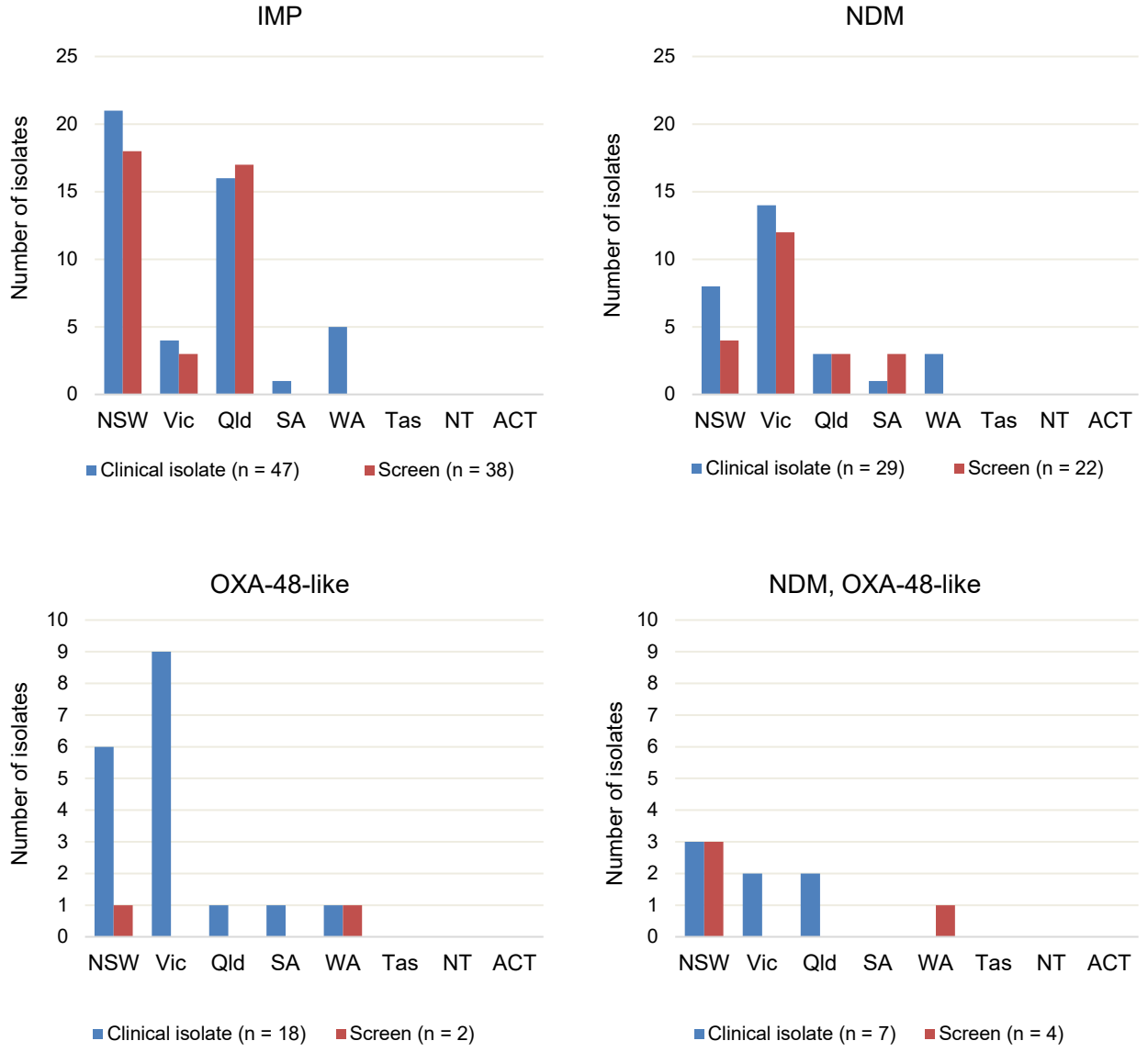
Straight green line in cell = no carbapenemase type for that state or territory during the reporting period;
Blank cell = maximum monthly average was one or less
Note: Line graphs represent three-month moving average for the period 1 May 2021 to 30 April 2023, for each type, where maximum monthly average was greater than one.

Figure 10: Carbapenemase-producing *Enterobacterales**, number reported by carbapenemase type and specimen type, by state and territory, 1 March 2023–30 April 2023



* Carbapenemase-producing (*n* = 168), carbapenemase and ribosomal methyltransferase-producing (*n* = 11), carbapenemase-producing and transmissible resistance to colistin (*n* = 1)

Figure 11: Top four reported carbapenemase-producing *Enterobacterales* types by specimen type, by state and territory, 1 March 2023–30 April 2023



Note: Other types include KPC (*n* = 5; Qld clinical [2], screen [1]; Vic clinical [1]; SA screen [1]); OXA-23-like (*n* = 3, NSW clinical [2]; Vic clinical [1]); IMP+NDM (*n* = 2; NSW clinical [1]; Vic clinical [1]); IMI (*n* = 2, NSW screen [1]; Vic clinical [1]); KPC+NDM+OXA-48-like (*n* = 1, NSW [clinical]).

Table 4: Top five carbapenemase types from *Enterobacterales*, number reported by setting, by state and territory, 1 March 2023–30 April 2023

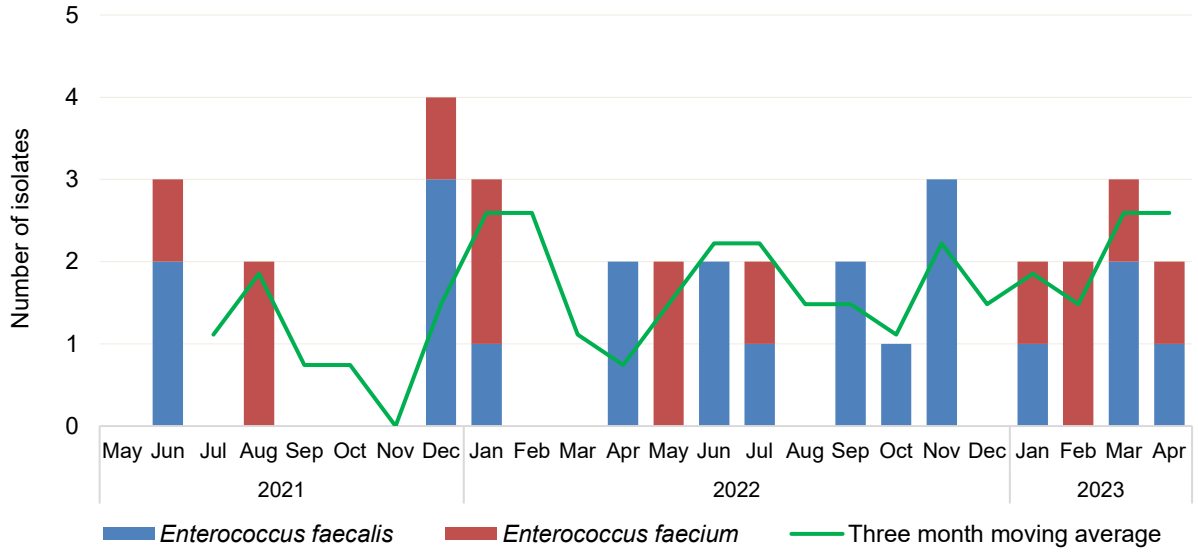
Carbapenemase type	Setting	State or territory								Total
		NSW	Vic	Qld	SA	WA	Tas	NT	ACT	
IMP	Total	39	7	33	1	5	0	0	0	85
	Public hospitals	39	5	20	0	2	0	0	0	66
	Private hospitals	0	1	12	1	1	0	0	0	15
	Aged care homes	0	0	0	0	0	0	0	0	0
	Community	0	1	1	0	2	0	0	0	4
	Unknown	0	0	0	0	0	0	0	0	0
NDM	Total	12	26	6	4	3	0	0	0	51
	Public hospitals	10	16	3	4	0	0	0	0	33
	Private hospitals	0	0	1	0	1	0	0	0	2
	Aged care homes	0	0	0	0	0	0	0	0	0
	Community	2	7	2	0	2	0	0	0	13
	Unknown	0	3	0	0	0	0	0	0	3
OXA-48-like	Total	7	9	1	1	2	0	0	0	20
	Public hospitals	4	6	0	0	1	0	0	0	11
	Private hospitals	0	0	0	0	0	0	0	0	0
	Aged care homes	0	0	0	0	0	0	0	0	0
	Community	1	3	1	1	1	0	0	0	7
	Unknown	2	0	0	0	0	0	0	0	2
NDM, OXA-48-like	Total	6	2	2	0	1	0	0	0	11
	Public hospitals	6	1	0	0	1	0	0	0	8
	Private hospitals	0	0	1	0	0	0	0	0	1
	Aged care homes	0	0	0	0	0	0	0	0	0
	Community	0	1	1	0	0	0	0	0	2
	Unknown	0	0	0	0	0	0	0	0	0
KPC	Total	0	1	3	1	0	0	0	0	5
	Public hospitals	0	0	3	1	0	0	0	0	4
	Private hospitals	0	0	0	0	0	0	0	0	0
	Aged care homes	0	0	0	0	0	0	0	0	0
	Community	0	1	0	0	0	0	0	0	1
	Unknown	0	0	0	0	0	0	0	0	0

Note: Top four carbapenemase types account for 92.8% (167/180) of all carbapenemase-producing *Enterobacterales* reported for this period. Other types were KPC (*n* = 5, Qld [3], Vic [1], SA [1]); OXA-23-like (*n* = 3, NSW [2], Vic [1]); IMP+NDM (*n* = 2, NSW, Vic); IMI (*n* = 2, NSW, Vic); KPC+NDM+OXA-48-like (*n* = 1, NSW).

Enterococcus species

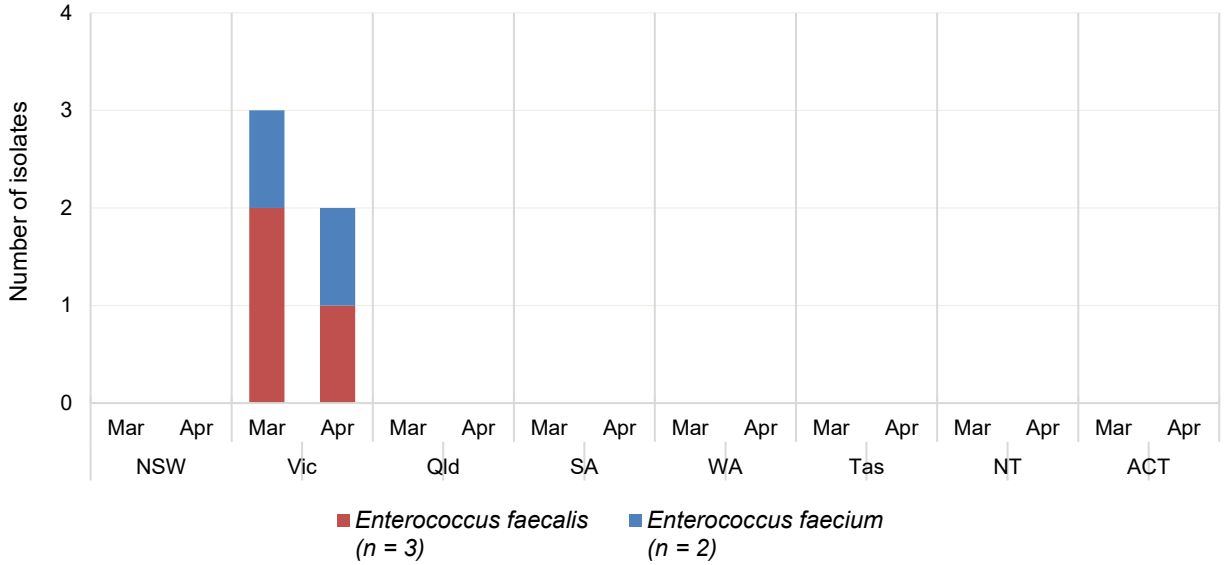
National data

Figure 12: Linezolid-nonsusceptible *Enterococcus* species, 24-month trend, national, 1 May 2021–30 April 2023



State and territory data

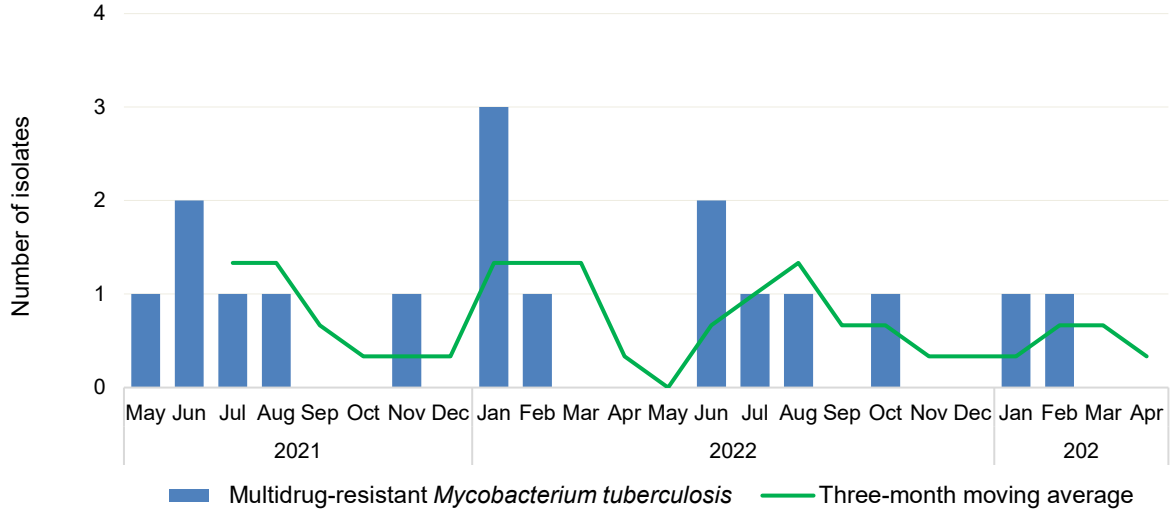
Figure 13: Linezolid-nonsusceptible *Enterococcus* species, number reported by state and territory, 1 March 2023–30 April 2023



Mycobacterium tuberculosis

National data

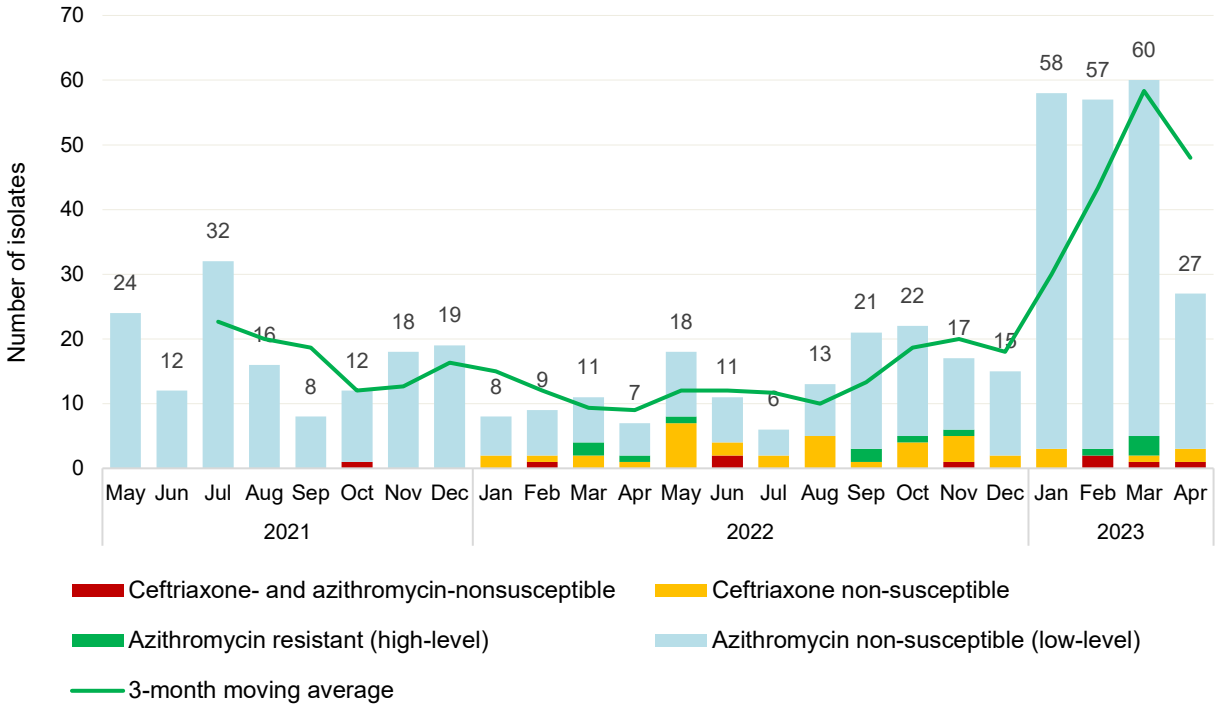
Figure 14: Multidrug-resistant *Mycobacterium tuberculosis,* 24-month trend, national, 1 May 2021–30 April 2023



Neisseria gonorrhoeae

National data

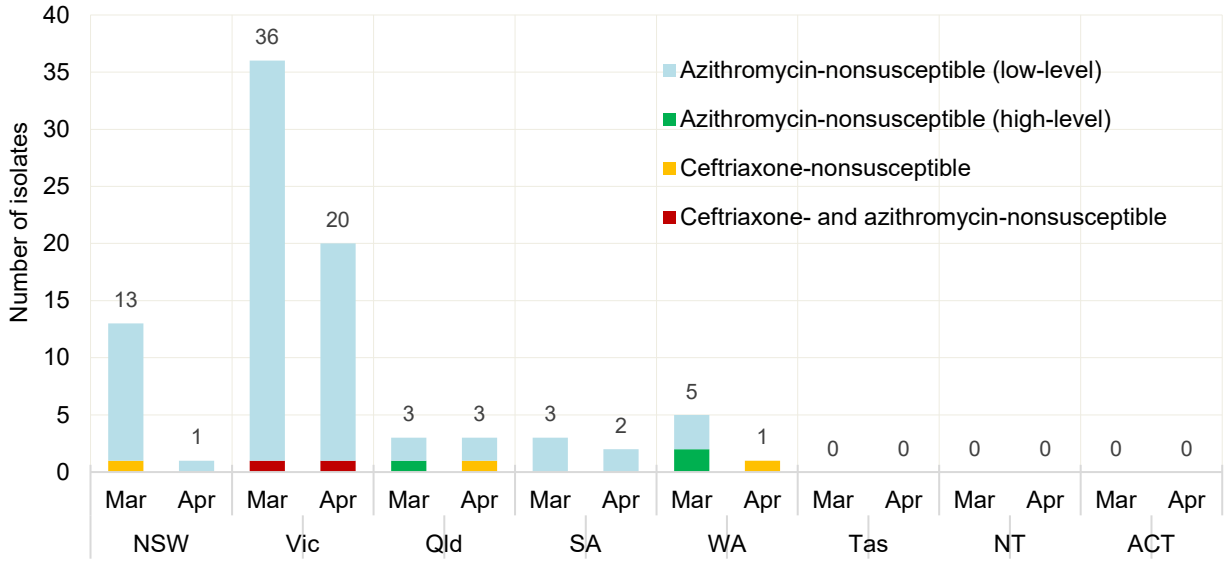
Figure 15: Ceftriaxone- and/or azithromycin-nonsusceptible *Neisseria gonorrhoeae*, 24-month trend, national, 1 May 2021–30 April 2023



Note: Low-level = azithromycin MIC < 256 mg/L; high-level = azithromycin MIC ≥ 256 mg/L.

State and territory data

Figure 16: Ceftriaxone- and/or azithromycin-nonsusceptible *Neisseria gonorrhoeae,* number reported by month, state and territory, 1 March 2023–30 April 2023

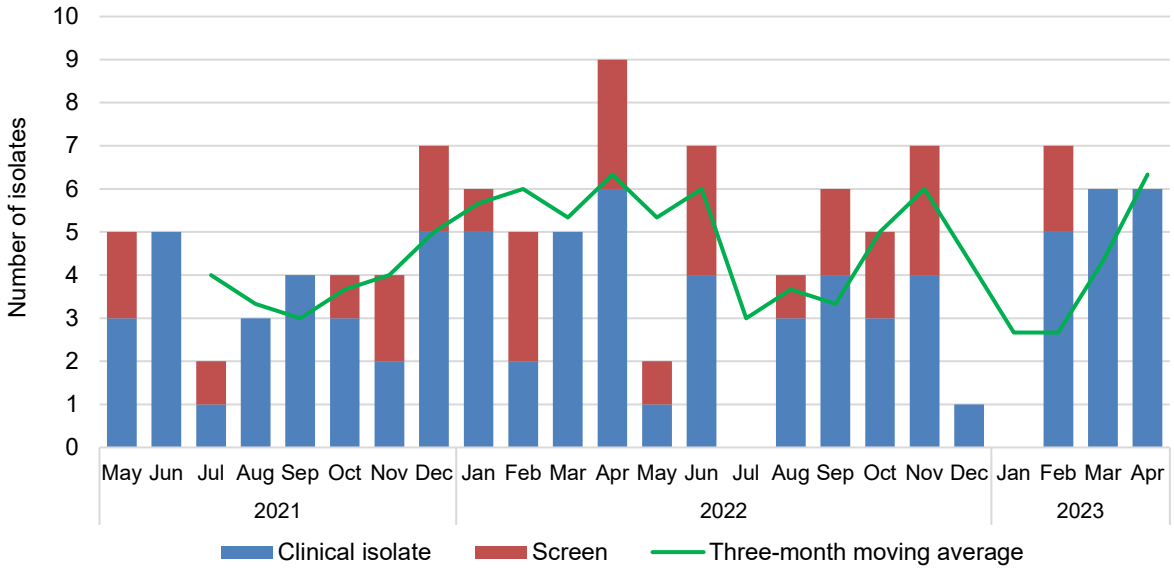


Note: Low-level = azithromycin MIC < 256 mg/L; high-level = azithromycin MIC ≥ 256 mg/L.

Pseudomonas aeruginosa

National data

Figure 17: Carbapenemase-producing *Pseudomonas aeruginosa*, 24-month trend by specimen type, national, 1 May 2021–30 April 2023



State and territory data

Figure 18: Carbapenemase-producing *Pseudomonas aeruginosa*, number reported by carbapenemase type and specimen type, by state and territory, 1 March 2023–30 April 2023

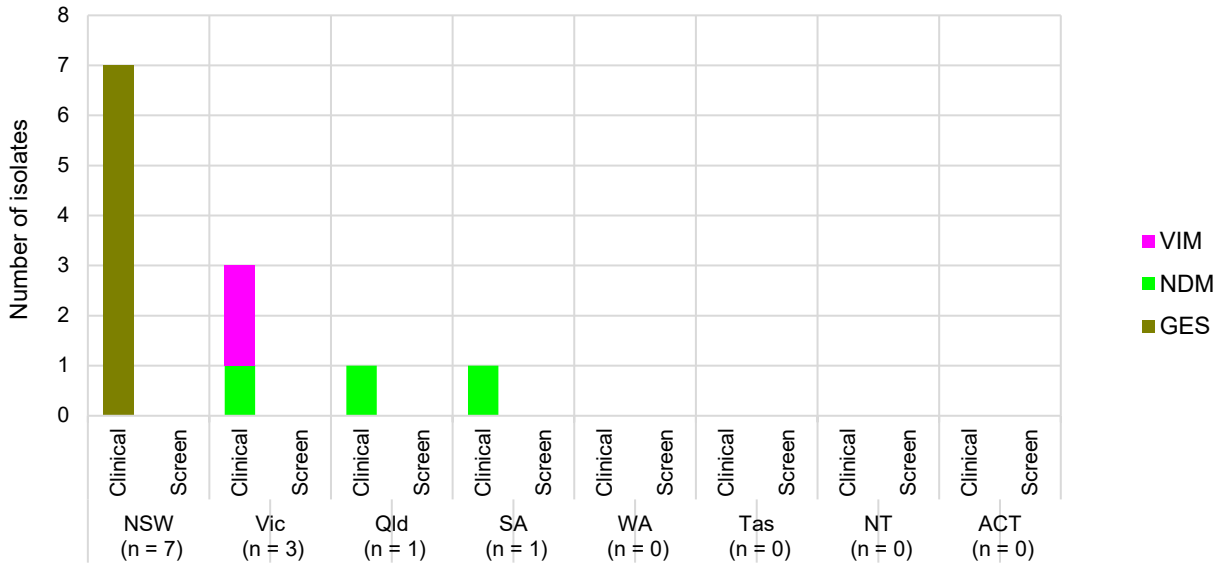


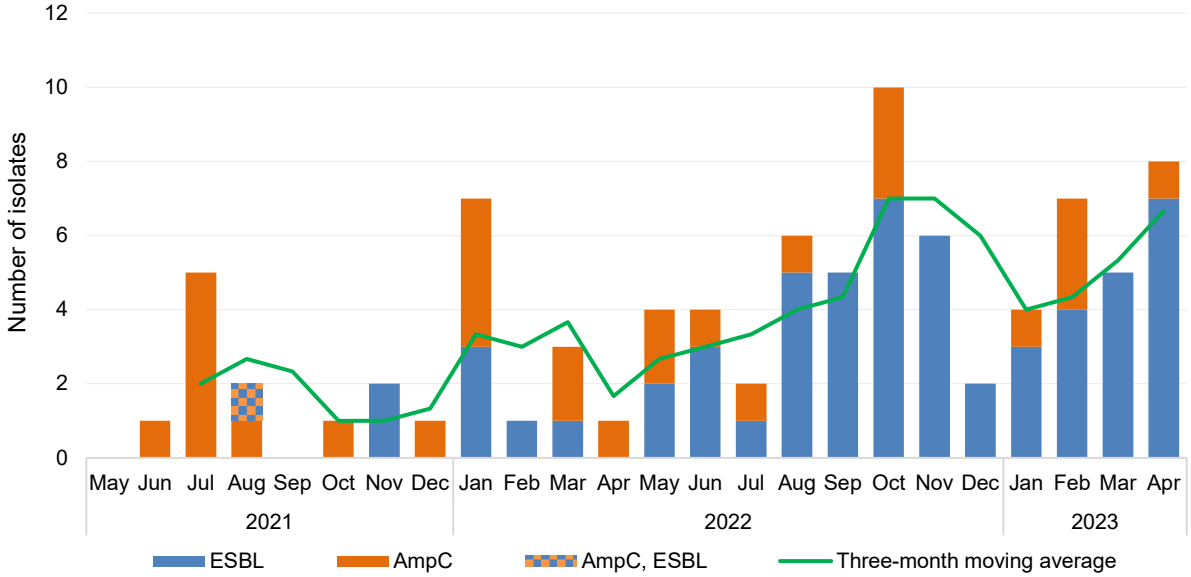
Table 5: Carbapenemase-producing *Pseudomonas aeruginosa*, number reported by setting, by state and territory, 1 March 2023–30 April 2023

	State or territory								
Setting	**NSW**	**Vic**	**Qld**	**SA**	**WA**	**Tas**	**NT**	**ACT**	**Total**
Total	7	3	1	1	0	0	0	0	12
Public hospital	5	1	0	0	0	0	0	0	6
Private hospital	2	0	0	0	0	0	0	0	2
Aged care home	0	0	0	0	0	0	0	0	0
Community	0	2	0	1	0	0	0	0	3
Unknown	0	0	1	0	0	0	0	0	1

Salmonella species

National data

Figure 19: Ceftriaxone-nonsusceptible *Salmonella* species, 24-month trend, national, 1 May 2021–30 April 2023



Note: (1 March 2023–30 April 2023) non-typhoidal *Salmonella* species (*n* = 12) and typhoidal *Salmonella* species (*n* = 1).

Shigella species

National data

Figure 20: Multidrug-resistant *Shigella* species, 24-month trend, national, 1 May 2021–30 April 2023

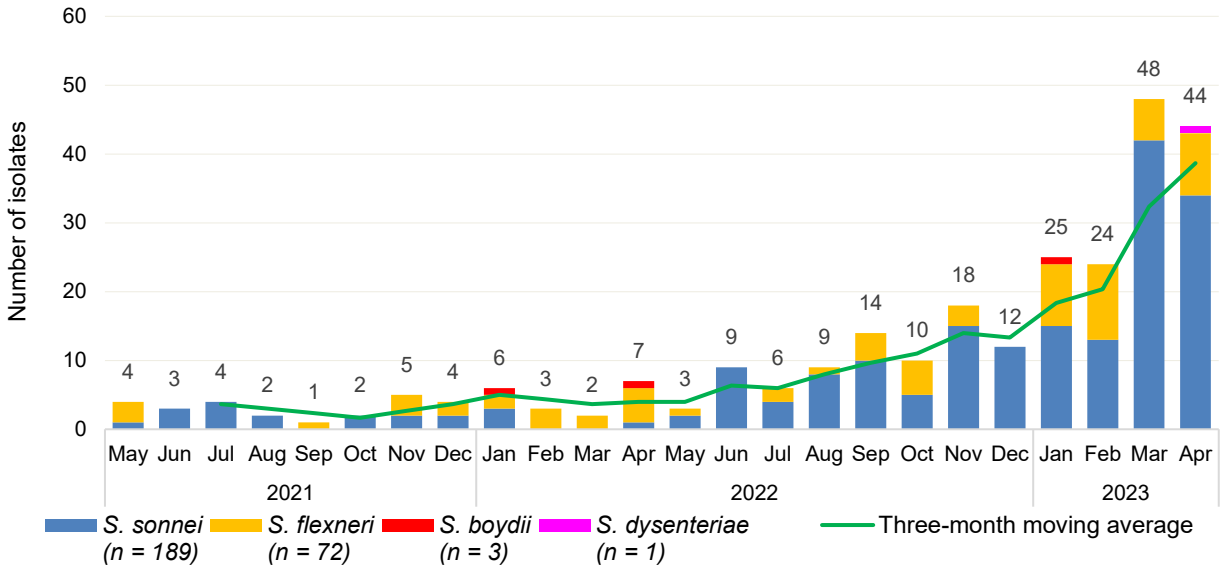
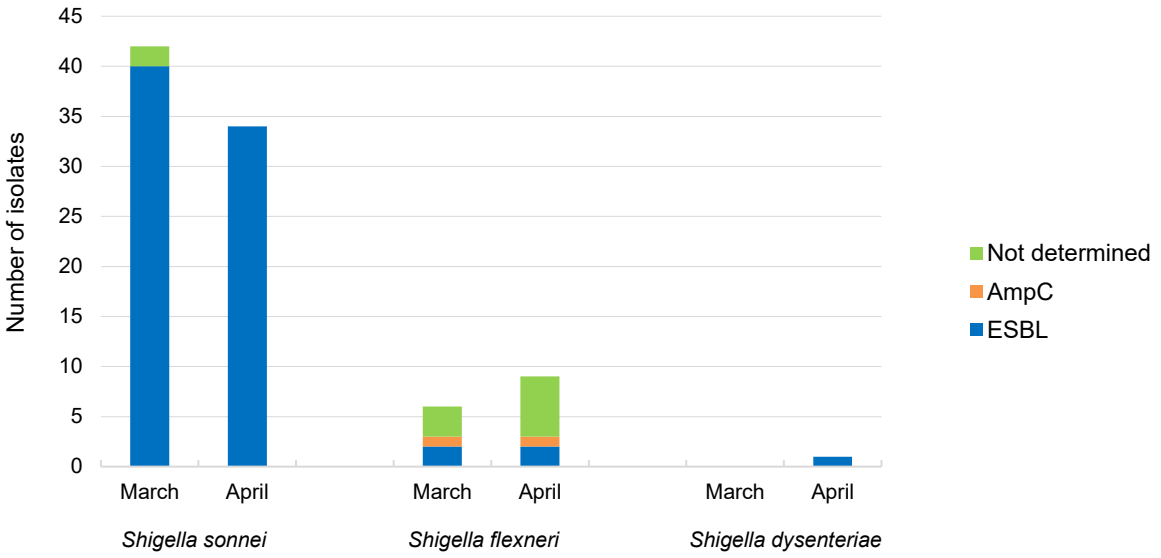


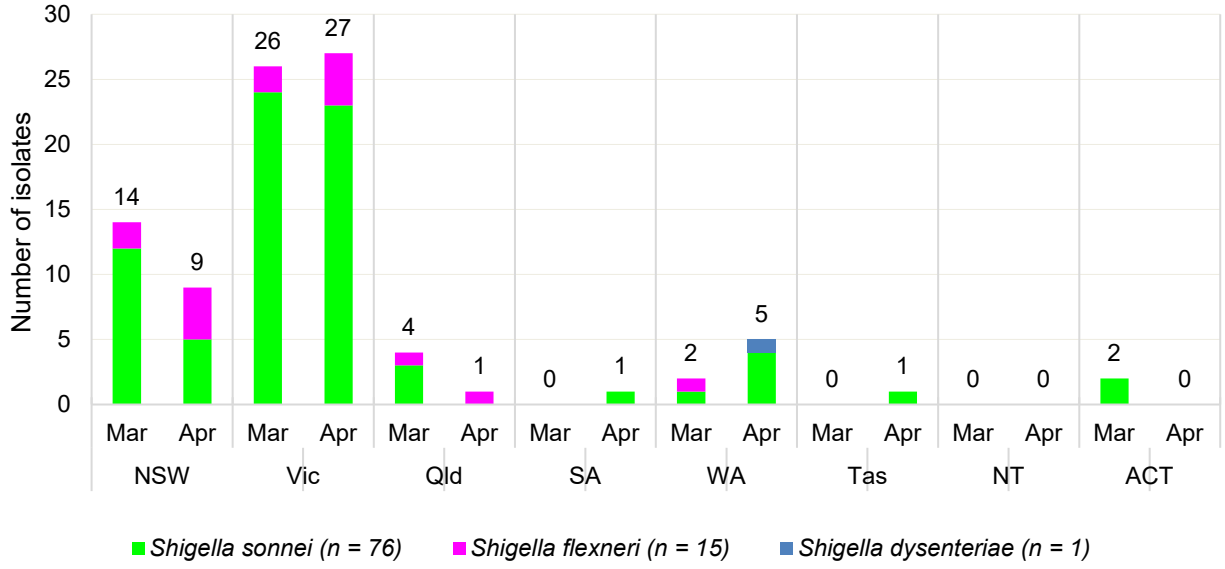
Figure 21: Multidrug-resistant *Shigella* species, number reported by month, national, 1 March 2023–30 April 2023



Note: Not determined = multidrug-resistant, ceftriaxone/cefotaxime-susceptible.

State and territory data

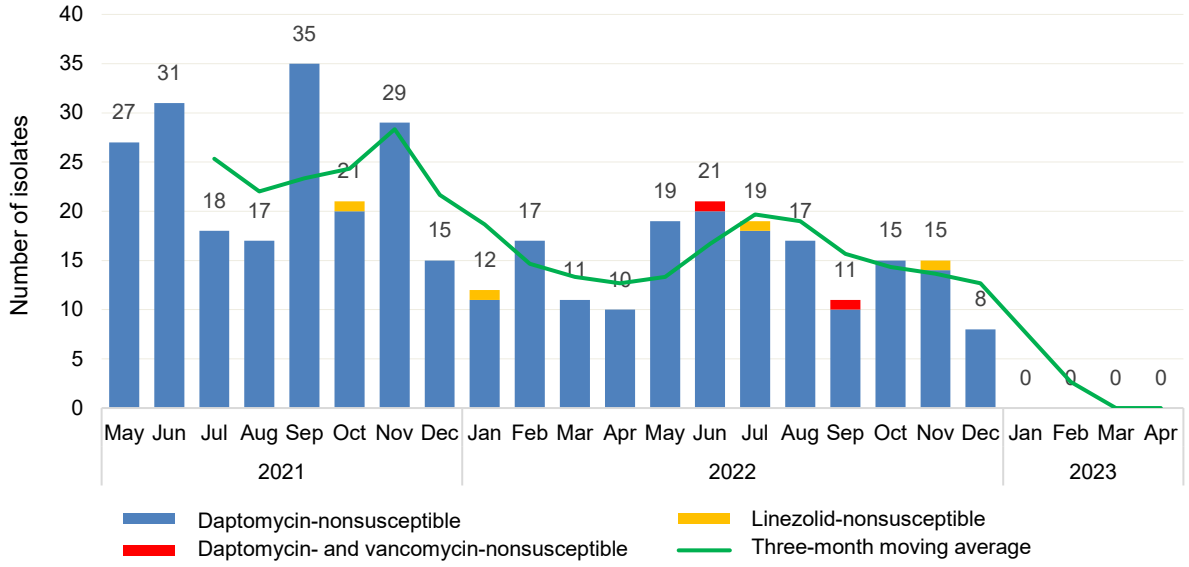
Figure 22: Multidrug-resistant *Shigella* species, number reported by state and territory, 1 March 2023–30 April 2023



Staphylococcus aureus

National data

Figure 23: Daptomycin-, linezolid- or vancomycin-nonsusceptible *Staphylococcus aureus,* 24-month trend, national, 1 May 2021–30 April 2023



Note: Reporting of daptomycin-nonsusceptible *S. aureus* was suspended from January 2023.

State and territory data

There was no linezolid- or vancomycin nonsusceptible *S. aureus* reported during this period.

Appendix

Data Notes

The following are important considerations for interpreting National Alert System for Critical Antimicrobial Resistances (CARAlert) data:

- The data are based on the date that the isolate with the confirmed critical antimicrobial resistance (CAR) was collected
- States and territories refer to the state or territory within which the hospital is located, or within which the patient resides for isolates from the community. If place of residence is unknown or overseas, the state or territory of the originating laboratory is reported
- Comparison between reports may be influenced by delayed detection or late submissions of CARs
- The same CAR/type/species is not submitted where the sample originated from the same patient who had the previous CAR, and the isolate was collected on the same day, or collected in the same admission or within three months
- Number of CARs reported does not always equal the number of patients, as patients may have more than one CAR, or species, detected in a specimen
- Cut-off date for data that are included in updates and reports is four weeks after the end of each reporting period
- National summary data is provided; comparison across states and territories is provided for organisms where there are large numbers reported and a comparison is meaningful
- Authorised officers in each state and territory health department can access the CARAlert web portal directly for further information about their jurisdiction, including the name of the public hospital in which a patient with a confirmed CAR was cared for, and to extract reports on their data.

About AURA and CARAlert

The Antimicrobial Use and Resistance in Australia (AURA) Surveillance System provides essential information to develop and implement strategies to prevent and contain antimicrobial resistance in human health and improve antimicrobial use across the acute and community healthcare settings. AURA also supports the National Safety and Quality Health Service (NSQHS) Preventing and Controlling Infections Standard and Australia's National Antimicrobial Resistance Strategy – 2020 and beyond.

The National Alert System for Critical Antimicrobial Resistances (CARAlert) was established by the Australian Commission on Safety and Quality in Health Care (the Commission) in March 2016 as a component of the AURA Surveillance System. Funding for CARAlert is provided by the Australian Government Department of Health and Aged Care, with contributions from the states and territories for the laboratory analysis and data submission processes.

Participating confirming laboratories submit data to CARAlert on priority organisms with critical resistance to last-line antimicrobial agents (CARs) which can result in significant morbidity and mortality. Isolates collected from patients are reported to CARAlert as either a clinical isolate, that is a specimen (e.g., from blood, urine, wound) taken to guide clinical diagnosis, or as a screen for infection prevention and control purposes. No patient-level data are held in the CARAlert system.

The CARs reported to CARAlert are listed in Table A1. These CARs were drawn from the list of high-priority organisms and antimicrobials which are the focus of the AURA Surveillance System.[1]

[1] Australian Commission on Safety and Quality in Health Care. AURA 2021: fourth Australian report on antimicrobial use and resistance in human health. Sydney: ACSQHC; 2021.

Table A1: List of critical antimicrobial resistances reported to CARAlert

Species	Critical resistance
Acinetobacter baumannii complex	Carbapenemase-producing*
*Candida auris**	–
Enterobacterales	Carbapenemase-, and/or ribosomal methyltransferase-producing
Enterobacterales	Transmissible colistin resistance*
Enterococcus species	Linezolid-resistant
Mycobacterium tuberculosis	Multidrug-resistant – resistant to at least rifampicin and isoniazid
Neisseria gonorrhoeae	Ceftriaxone- or azithromycin-nonsusceptible
	Gentamicin-resistant†
Neisseria meningitidis	Ciprofloxacin-nonsusceptible†
Pseudomonas aeruginosa	Carbapenemase-producing*
Salmonella species	Ceftriaxone-nonsusceptible
Shigella species	Multidrug-resistant
Staphylococcus aureus complex§	Vancomycin- or linezolid-nonsusceptible#
Streptococcus pyogenes	Penicillin reduced susceptibility

* Reported from July 2019
† Reported from January 2023
§ For CARAlert, *S. aureus* includes *S. argenteus* and *S. schweitzeri*
# Reporting of daptomycin-nonsusceptible *S. aureus* was suspended from January 2023
Note: Low level-azithromycin-nonsusceptible *N. gonorrhoeae* was excluded from the weekly digest following review in 2018.

In 2022, the Commission conducted a review of CARAlert to assess whether currently reported CARs continue to be priorities, and to identify any additional CARs for inclusion. The review followed a similar process to previous reviews in 2016 and 2018. In consultation with states and territories and a range of clinical experts, the 2022 review identified two new CARs that have been reported to CARAlert since 1 January 2023:

- Ciprofloxacin-nonsusceptible *Neisseria meningitidis*
- Gentamicin-resistant *N. gonorrhoeae*.

Additionally, reporting of daptomycin-nonsusceptible *Staphylococcus aureus* (DNSA) was suspended from 2023. Reintroduction of reporting of DNSA will be considered when more reliable testing methods are available.

The CARAlert system is based on the following routine processes used by pathology laboratories for identifying and confirming potential CARs:

1. Collection and routine testing – the isolate is collected from the patient and sent to the originating laboratory for routine testing
2. Confirmation – if the originating laboratory suspects that the isolate is a CAR, the isolate is sent to a confirming laboratory that has the capacity to confirm the CAR
3. Reporting to clinicians in accordance with usual laboratory processes – the confirming laboratory reports back to the originating laboratory, which in turn reports to the clinician who initially requested the microbiological testing

4. Submission to the CARAlert system – the confirming laboratory advises the originating laboratory of the result of the test, and the originating laboratory reports back to the health service that cared for the patient from whom the specimen was collected; the confirming laboratory then submits the details of the resistance and organism into the secure CARAlert web portal.

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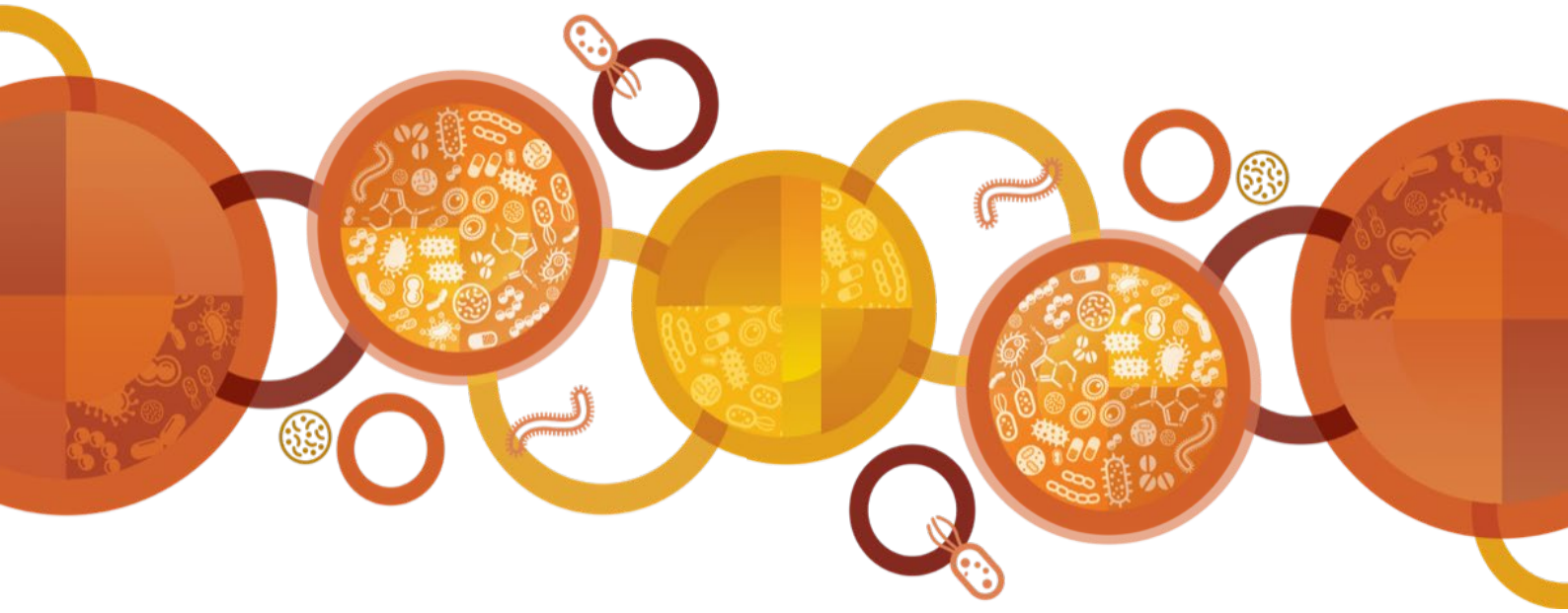

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