AUSTRALIAN COMMISSION ON SAFETY AND QUALITY IN HEALTH CARE

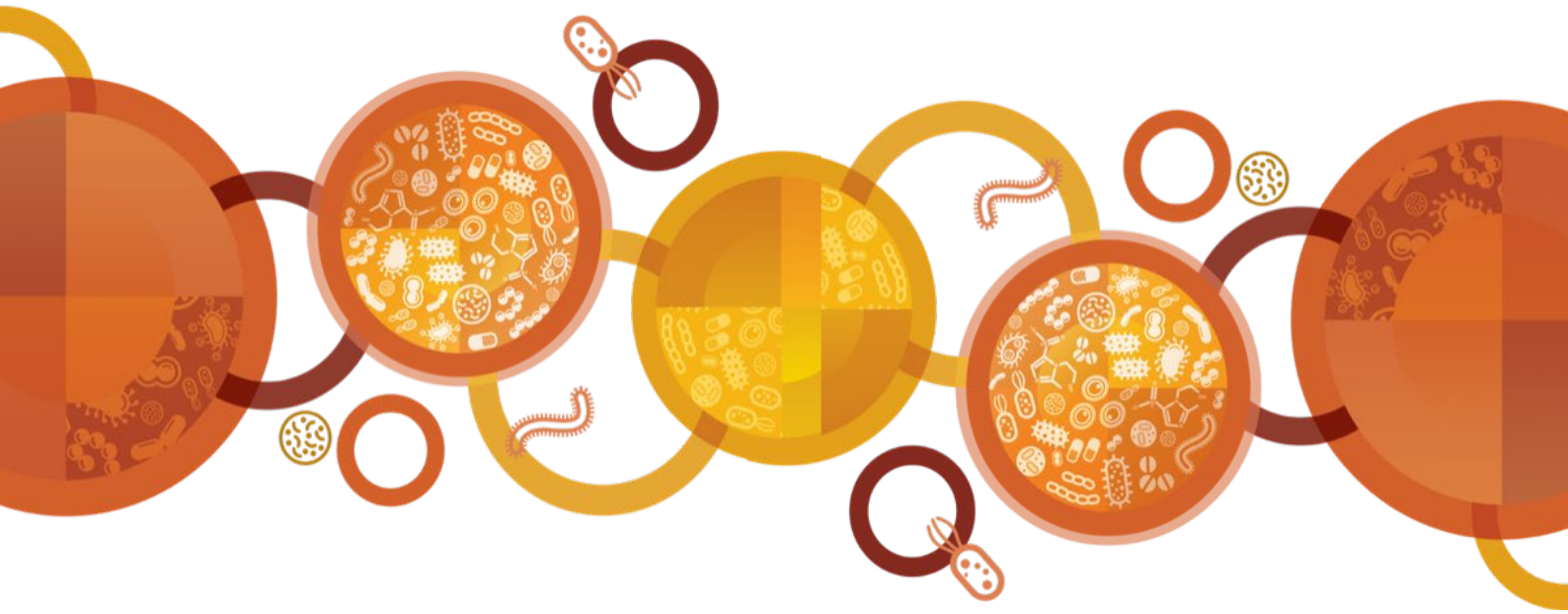
AURA Antimicrobial Use and Resistance in Australia

CARAlert THE NATIONAL ALERT SYSTEM FOR CRITICAL ANTIMICROBIAL RESISTANCE

CARAlert data update 39

1 July 2024–30 September 2024

November 2024



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Note regarding alternative descriptions

No alternative descriptions have been provided. If you need assistance with the structure of any graphs or charts, please email the Australian Commission on Safety and Quality in Health Care at CARAlert@safetyandquality.gov.au.

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 July 2024 to 30 September 2024, and complements previous analyses of and updates on CARAlert data.

National overview

- The total number of critical antimicrobial resistances (CARs) reported was down 13.6% compared to the previous three-month period (*n* = 757 versus *n* = 876).
- Just under one-half of the CARs reported were carbapenemase-producing *Enterobacterales* (CPE) (including those with ribosomal methyltransferase) (343/757, 45.3%).
- 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 28.4% (*n* = 890 versus *n* = 1,143).
- Azithromycin-nonsusceptible (low-level resistance [LLR], minimum inhibitory concentration [MIC] < 256 mg/L) *Neisseria gonorrhoeae* was the second most reported CAR (260/757, 34.3%). The number of reports decreased compared to the previous three months (*n* = 260 versus *n* = 277, down 6.1%).
- Multidrug-resistant (MDR) *Shigella* species was the third most reported CAR (66/757, 8.7%). The number of reports decreased compared to the previous three months (*n* = 66 versus *n* = 88, down 25.0%).
- Two ceftriaxone-nonsusceptible *N. gonorrhoeae* were reported (either alone or with azithromycin-nonsusceptible), there were 16 reported in the previous three months.
- Where the setting was known, one-half of CARs were reported from community settings (360/721, 49.9%). There were 357 (49.5%) reports from hospitals, and four reports from aged care homes.

Carbapenemase-producing *Enterobacterales*

- The total number of CPE (either alone or in combination with other CARs) decreased compared to the previous three-month period (*n* = 343 versus *n* = 393, down 12.7%).
- NDM (146/343, 42.6%), IMP (113/343, 32.9%), OXA-48-like (51/343, 14.9%), and KPC (8/343, 2.3%) types accounted for 92.7% of all CPE reported during this period.
- The total number of NDM-types reported (either alone or co-produced with other carbapenemase types) decreased slightly compared to the previous three months (*n* = 161 versus *n* = 170, down 5.3%), most notably in Queensland (*n* = 14 versus *n* = 23, down 39.1%).
- The total number of IMP-types reported decreased compared to the previous three months (*n* = 113 versus *n* = 156, down 27.6%).
- The total number of any OXA-48-like types reported was similar to the previous three months (*n* = 58 versus *n* = 55).
- Eight KPC-producing *Enterobacterales* were reported; five from Victoria (*Klebsiella pneumoniae n* = 4, *Citrobacter farmeri n* = 1), two *K. pneumoniae* from Queensland, and one *K. pneumoniae* from New South Wales (NSW). Five additional isolates that co-produced KPC and NDM reported from NSW (*n* = 3) and Victoria (*n* = 2).
- Where the setting was known, 80.0% (268/335) of CPE were reported from hospitals and 19.1% (64/335) were reported from the community.
- Twenty hospitals had more than one report of NDM-types; these were in NSW (*n* = 8), Victoria (*n* = 6), Queensland (*n* = 3), South Australia (SA) (*n* = 2), and Western Australia (WA) (*n* = 1). Seven hospitals from Victoria (*n* = 3), NSW (*n* = 3) and SA (*n* = 1) had five or more reports.
- One hospital from Victoria reported 26 isolates with NDM types from 24 patients.
- Nine hospitals (Queensland *n* = 5; NSW *n* = 2; Victoria *n* = 2) had more than two reports of IMP-types. A further 16 hospitals had two notifications of IMP-types: Queensland (*n* = 7), NSW (*n* = 6), Victoria (*n* = 2), and WA (*n* = 1).

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

- There were 28 ceftriaxone-nonsusceptible *Salmonella* species reported during this reporting period, from all states and territories except the Northern Territory. All non-typhoidal species (*n* = 26) were extended-spectrum β-lactamase (ESBL), one of which also produced a pAmpC. Two ESBL-producing *S*. Typhi were reported, one each from Victoria and WA.
- There were 66 MDR *Shigella* species reported in this period: 49 *S. sonnei*, 16 *S. flexneri*, and one *S. dysenteriae*. The vast majority of *S. sonnei* isolates were ceftriaxone/cefotaxime-resistant and produced an ESBL (45/49. 91.8%). Three-quarters of MDR *S. flexneri* were susceptible to ceftriaxone/cefotaxime (12/15, 75.0%).

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

- The total number of reports of this CAR decreased compared with the previous three-month reporting period (*n* = 260 versus *n* = 277, down 6.1%). A substantial majority of the reports were from Victoria (210/260, 80.8%).

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

- There were two reports of ceftriaxone-nonsusceptible *N. gonorrhoeae*; one from NSW, and one from SA, which also had low-level resistance to azithromycin [MIC < 256 mg/L].
- One azithromycin-nonsusceptible (high-level resistance, MIC ≥ 256 mg/L) *N. gonorrhoeae* was reported from SA.

Gentamicin-resistant *Neisseria gonorrhoeae*

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

Ciprofloxacin-nonsusceptible *Neisseria meningitidis*

- No ciprofloxacin-nonsusceptible *N. meningitidis* were reported during this period.

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

- Eleven carbapenemase-producing *Acinetobacter baumannii* complex were reported during this period. The reports were from Victoria (*n* = 5), NSW (*n* = 4), Queensland (*n* = 1), and SA (*n* = 1).
- The number of carbapenemase-producing *Pseudomonas aeruginosa* reports was the same as the previous three months (*n* = 17). A little over two-thirds produced VIM types (10/17, 70%).

Linezolid-resistant *Enterococcus* species

- Nineteen linezolid-resistant *Enterococcus* species were reported, down from 39 in the previous three-month reporting period. There were 11 *E. faecium* reports, from Victoria (*n* = 10) and New South Wales (*n* = 1); and eight *E. faecalis* reports, from Victoria (*n* = 4), WA (*n* = 3) and NSW (*n* = 1). A vast majority of *E. faecalis* (7/8, 87.5%) and a little over two-thirds of *E. faecium* (8/11, 72.7%) harboured *optrA* genes. Two *E. faecium* isolates from Victoria harboured *poxtA*, and one isolate from NSW harboured both *poxtA*+*cfr(D)* genes.

Candida auris

- There were five *Candida auris* reports this reporting period (up from *n* = 2 in the previous three months). The reports were from WA (*n* = 3) and Victoria (*n* = 2).

Linezolid- or vancomycin-nonsusceptible *Staphylococcus aureus* complex

- There were no reports of linezolid- or vancomycin-nonsusceptible *Staphylococcus aureus* complex isolates.

Transmissible colistin resistance

- One *E. coli* with transmissible colistin resistance (*mcr-1*) was reported from NSW. This isolate also produced a carbapenemase (NDM).

***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 July 2024–30 September 2024, and year to date 2023 and 2024

Species	Critical resistance	State or Territory (July to September 2024)								Quarterly			Year to date		
										2024	2024				
		NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Apr-Jun	Jul-Sep	Relative change*	2023	2024	Relative change*
Acinetobacter baumannii complex	Carbapenemase-producing	4	5	1	1	0	0	0	0	8	11	▲ 37.5%	28	33	▲ 17.9%
Candida auris	–	0	2	0	0	3	0	0	0	2	5	▲ 150%	16	12	▼ 25.0%
Enterobacterales	Carbapenemase-producing	110	117	62	13	16	1	1	2	370	322	▼ 13.0%	819	1068	▲ 30.4%
	Carbapenemase- and ribosomal methyltransferase-producing	0	12	2	3	3	0	0	0	23	20	▼ 13.0%	70	74	▲ 5.7%
	Carbapenemase- producing and transmissible resistance to colistin	1	0	0	0	0	0	0	0	0	1	–	1	1	0.0%
	Ribosomal methyltransferase-producing	1	3	0	0	0	0	0	0	2	4	▲ 100%	13	10	▼ 23.1%
	Transmissible resistance to colistin	0	0	0	0	0	0	0	0	0	0	–	1	0	▼ 100%
Enterococcus species	Linezolid-resistant	2	14	0	0	3	0	0	0	40	19	▼ 51.3%	30	88	▲ 193%
Mycobacterium tuberculosis	Multidrug-resistant – at least rifampicin- and isoniazid-resistant strains	0	1	0	0	0	0	0	0	2	1	▼ 50.0%	14	3	▼ 78.6%
Neisseria gonorrhoeae	Azithromycin-nonsusceptible (low-level)[†]	23	210	9	6	10	1	0	1	277	260	▼ 6.1%	468	696	▲ 48.7%
	Azithromycin-nonsusceptible (high-level)[§]	0	0	0	1	0	0	0	0	13	1	▼ 92.3%	13	26	▲ 100%
	Ceftriaxone-nonsusceptible	1	0	0	0	0	0	0	0	14	1	▼ 92.9%	13	20	▲ 53.8%
	Ceftriaxone-nonsusceptible and azithromycin-nonsusceptible	0	0	0	1	0	0	0	0	2	1	▼ 50.0%	7	7	0.0%
	Gentamicin-resistant[#]	0	0	0	0	0	0	0	0	0	0	–	0	0	–

Table 1 (continued)

Species	Critical resistance	State or territory (Jul to September 2024)								Quarterly			Year to date		
										2024	2024				
		NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Apr-Jun	Jul-Sep	Relative change*	2023	2024	Relative change*
Neisseria meningitidis	Ciprofloxacin-nonsusceptible#	0	0	0	0	0	0	0	0	0	0	–	3	3	0.0%
Pseudomonas aeruginosa	Carbapenemase-producing	3	6	2	2	3	0	0	1	17	17	0.0%	54	55	▲ 1.9%
Salmonella species	Ceftriaxone-nonsusceptible	0	3	3	0	4	0	2	0	19	28	▲ 47.4%	71	67	▼ 5.6%
Shigella species	Multidrug-resistant	12	13	2	0	23	0	0	0	88	66	▼ 25.0%	393	263	▼ 33.1%
Staphylococcus aureus complex	Linezolid-nonsusceptible	0	0	0	0	0	0	0	0	0	0	–	0	0	–
	Vancomycin-nonsusceptible	0	0	0	0	0	0	0	0	0	0	–	1	0	▼ 100%
Streptococcus pyogenes	Penicillin reduced susceptibility	0	0	0	0	0	0	0	0	0	0	–	0	0	–
	Total (reported by 15 November 2024)	**166**	**398**	**88**	**28**	**68**	**3**	**1**	**5**	**877**	**757**	**▼ 13.6%**	**2,015**	**2,426**	**▲ 20.4%**

CAR = critical antimicrobial resistances; MIC = minimum inhibitory concentration; ▲ = increase; ▼ = decrease; – = not applicable
* Relative change = absolute change between period in 2023 and same period in 2024, for each CAR, expressed as a percentage of 2023 base
† Azithromycin MIC < 256 mg/L
§ Azithromycin MIC ≥ 256 mg/L
# Reported to CARAlert from January 2023
Notes:
1. 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_{IMP-4}.
2. The number of CARs has been updated to include additional submissions received or removed after the previous publication date.

Table 2: Number of critical antimicrobial resistance isolates, by setting, national, 1 July 2024–30 September 2024

Species	Critical resistance	Setting					Total
		Public hospital	Private hospital	Aged care home	Community	Unknown	
Acinetobacter baumannii complex	Carbapenemase-producing	11	0	0	0	0	11
Candida auris	–	3	0	0	2	0	5
Enterobacterales	Carbapenemase-producing	234	19	3	56	8	320
	Carbapenemase- and ribosomal methyltransferase-producing	14	0	0	6	0	20
	Carbapenemase- producing and transmissible resistance to colistin	1	0	0	2	0	3
	Ribosomal methyltransferase-producing	3	0	0	1	0	4
	Transmissible resistance to colistin	0	0	0	0	0	0
Enterococcus species	Linezolid-resistant	13	0	0	6	0	19
Mycobacterium tuberculosis	Multidrug-resistant – at least rifampicin- and isoniazid-resistant strains	1	0	0	0	0	1
Neisseria gonorrhoeae	Azithromycin-nonsusceptible (low-level)*	8	0	0	226	26	260
	Azithromycin-nonsusceptible (high-level)†	0	0	0	1	0	1
	Ceftriaxone-nonsusceptible	0	0	0	0	1	1
	Ceftriaxone-nonsusceptible and azithromycin-nonsusceptible	0	0	0	1	0	1
	Gentamicin-resistant§	0	0	0	0	0	0
Neisseria meningitidis	Ciprofloxacin-nonsusceptible§	0	0	0	0	0	0
Pseudomonas aeruginosa	Carbapenemase-producing	13	0	0	3	1	17
Salmonella species	Ceftriaxone-nonsusceptible	9	1	1	17	0	28
Shigella species	Multidrug-resistant	27	0	0	39	0	66
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 15 November 2024)	**337**	**20**	**4**	**360**	**36**	**757**

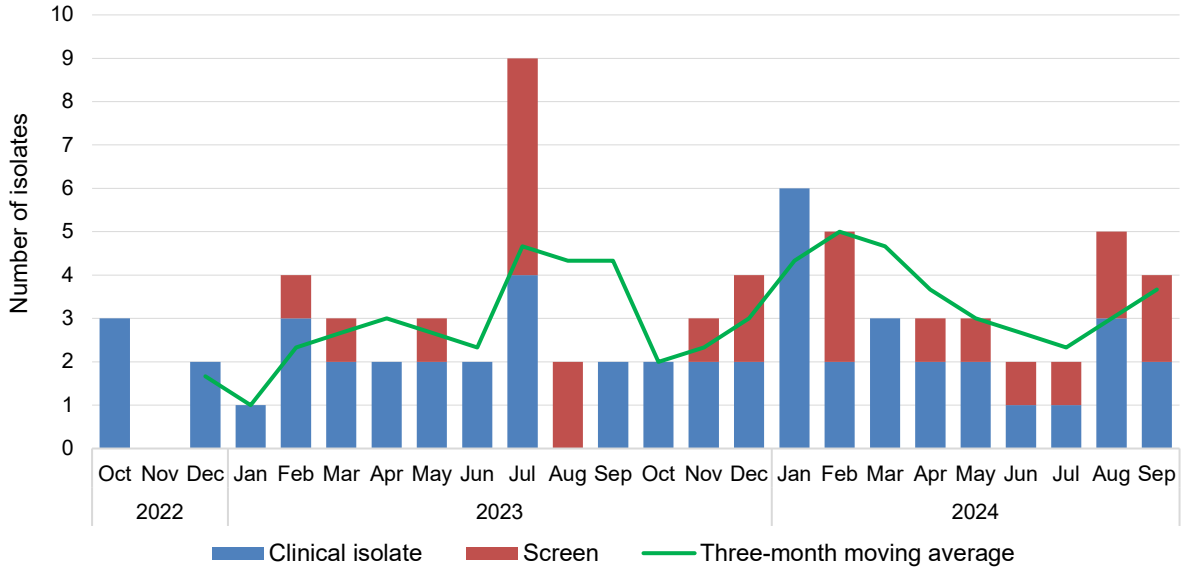
* Azithromycin MIC < 256 mg/L
† Azithromycin MIC ≥ 256 mg/L
§ Reported to CARAlert from January 2023

Summary by CAR

Acinetobacter baumannii complex

National data

Figure 1: Carbapenemase-producing *Acinetobacter baumannii* complex, 24-month trend by specimen type, national, 1 October 2022–30 September 2024



State and territory data

Figure 2: Carbapenemase-producing *Acinetobacter baumannii* complex, number reported by carbapenemase type and specimen type, by state and territory, 1 July 2024–30 September 2024

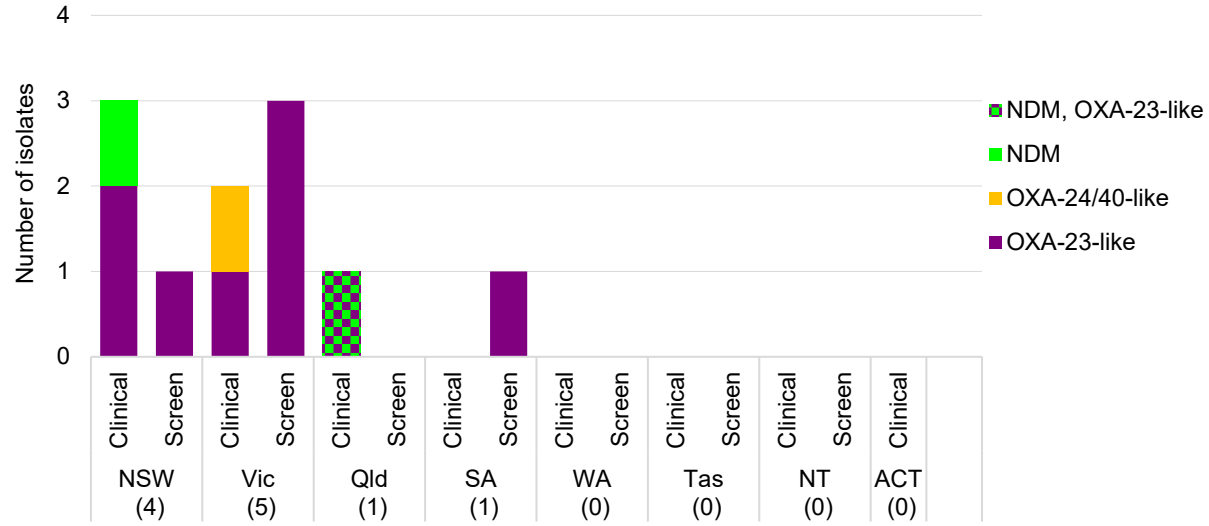


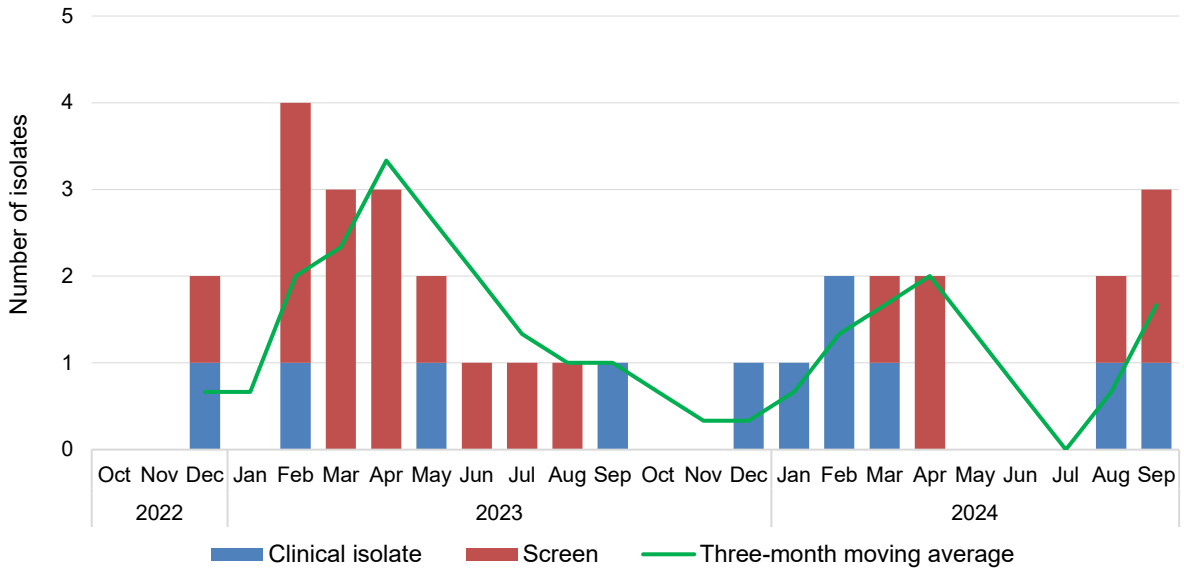
Table 3: Carbapenemase-producing *Acinetobacter baumannii* complex, number reported by setting, by state and territory, 1 July 2024–30 September 2024

Setting	State or territory								Total
	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	
Total	4	5	1	1	0	0	0	0	11
Public hospital	4	5	1	1	0	0	0	0	11
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

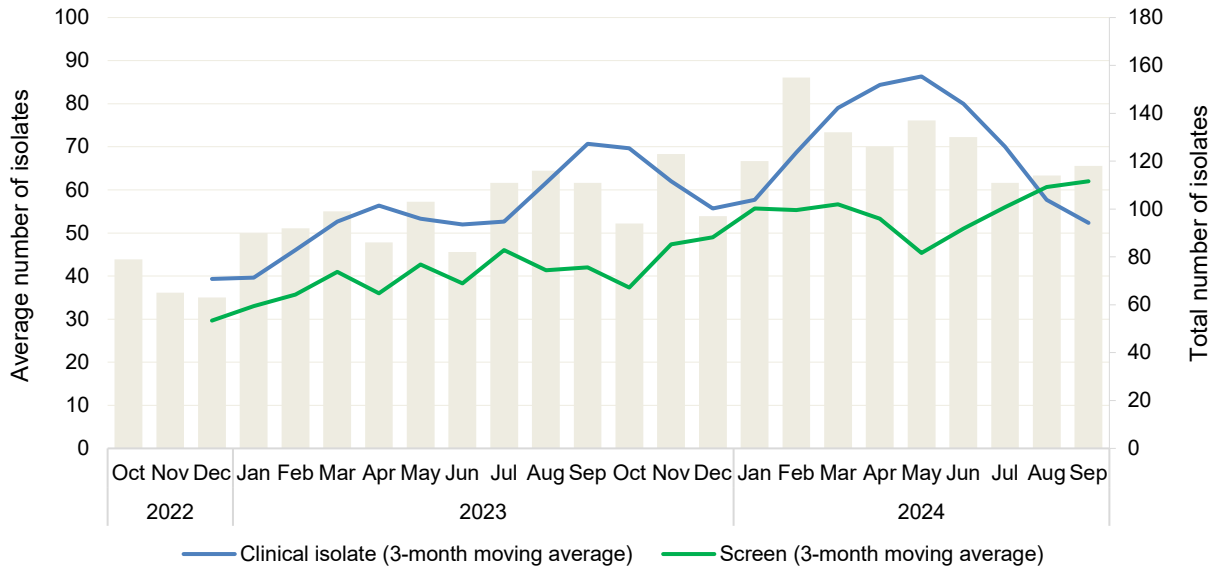
Figure 3: *Candida auris*, 24-month trend by specimen type, national, 1 October 2022–30 September 2024



Enterobacterales

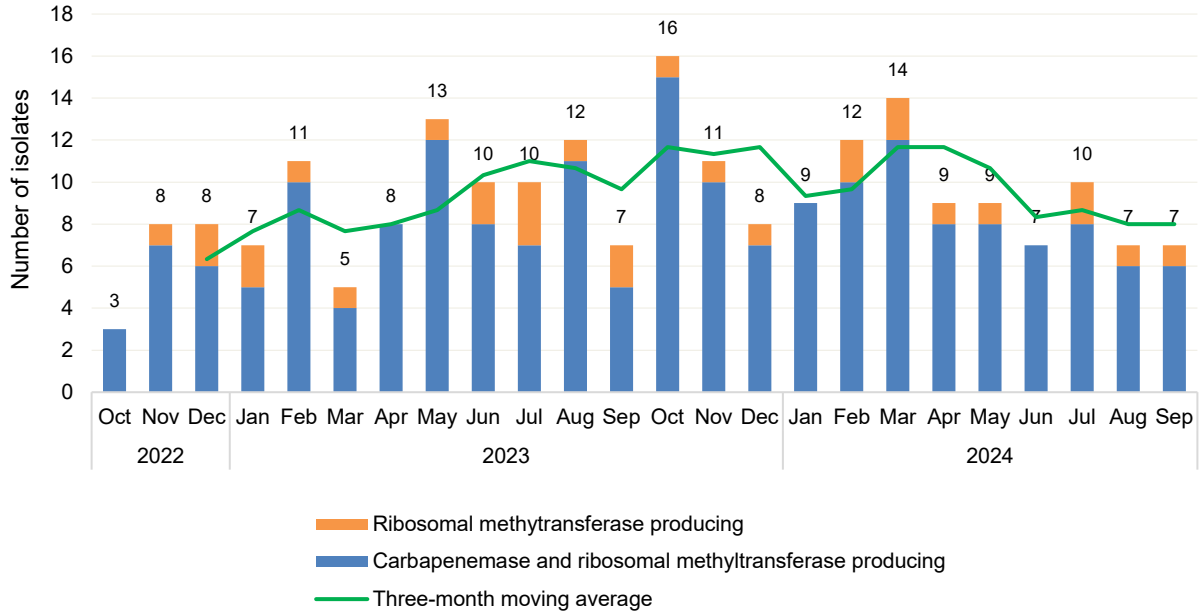
National data

Figure 4: Carbapenemase-producing *Enterobacterales**, 24-month trend by specimen type, national, 1 October 2022–30 September 2024



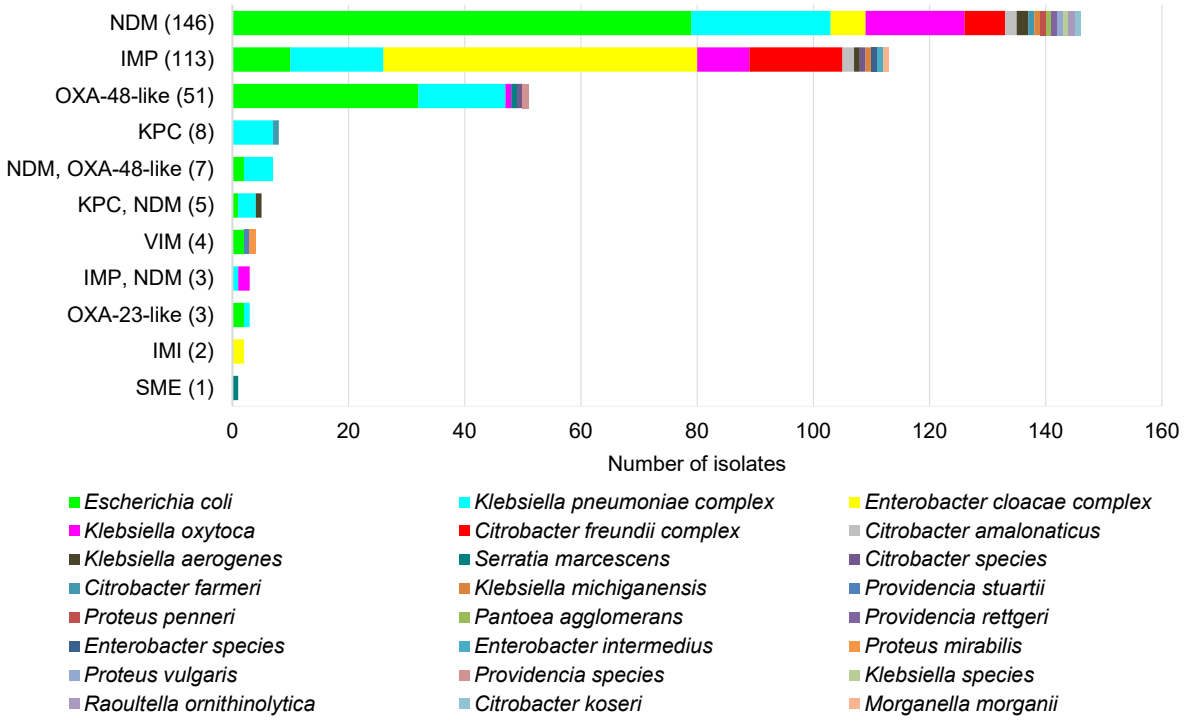
* Carbapenemase-producing alone or in combination with ribosomal methyltransferases or transmissible resistance to colistin

Figure 5: Ribosomal methyltransferase-producing *Enterobacterales**, 24-month trend, national, 1 October 2022–30 September 2024



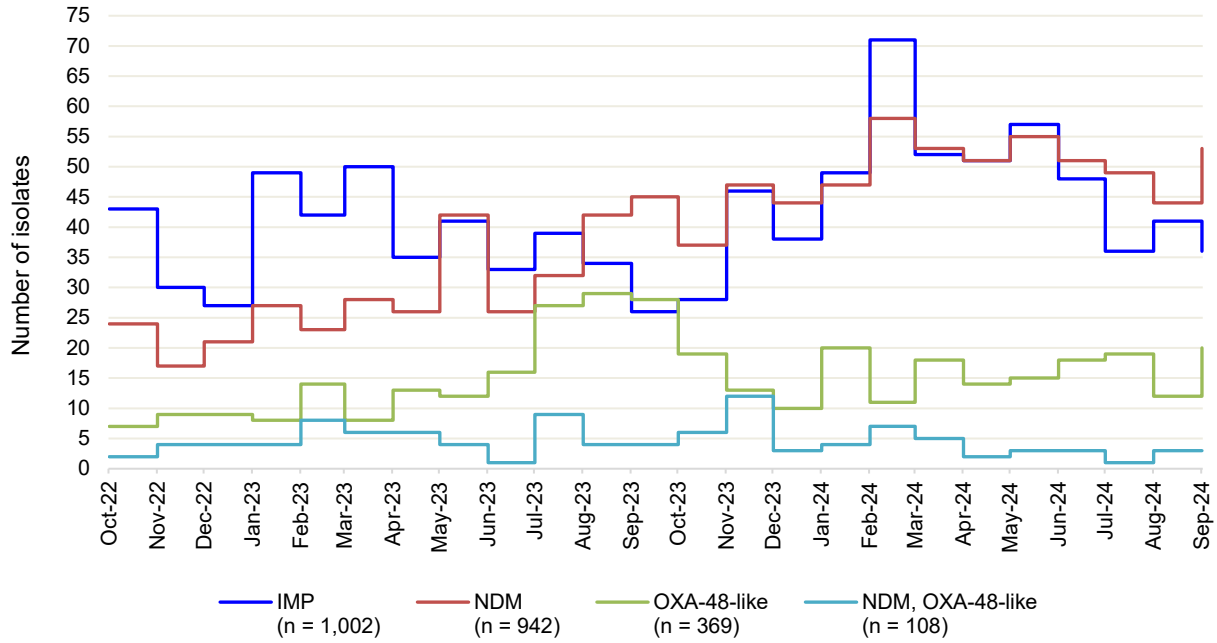
* Ribosomal methyltransferases alone, or in combination with carbapenemase(s)

Figure 6: Carbapenemase-producing *Enterobacterales**, number reported by carbapenemase type and species, national, 1 July 2024–30 September 2024



* Carbapenemase-producing (*n* = 320), carbapenemase and ribosomal methyltransferase-producing (*n* = 20), carbapenemase-producing and transmissible resistance to colistin (*n* = 3)

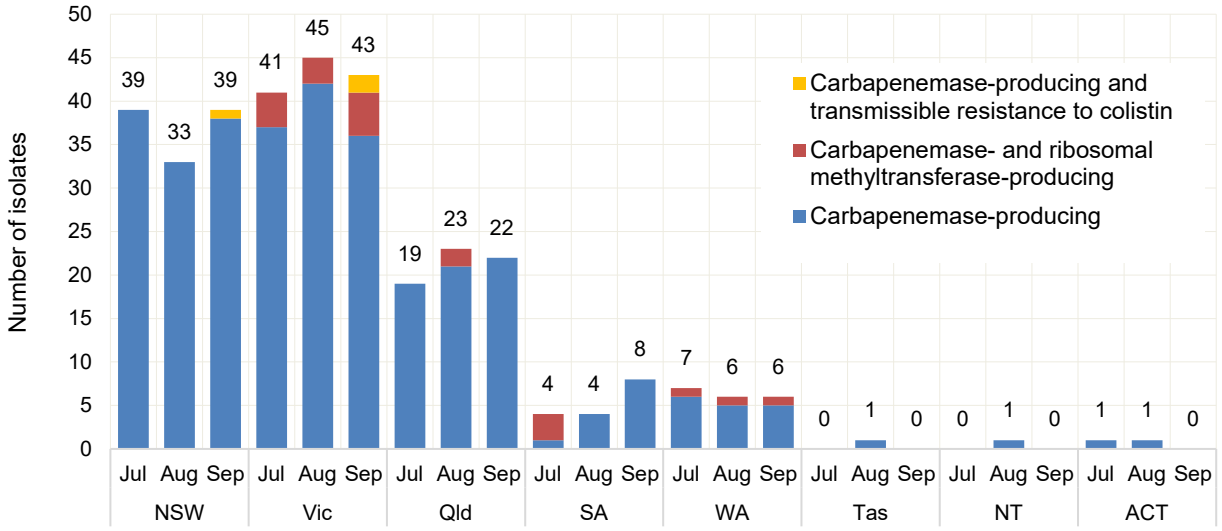
Figure 7: Top four reported carbapenemase types*, 24-month trend, national, 1 October 2022–30 September 2024



* 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 July 2024–30 September 2024



* Carbapenemase-producing (*n* = 320), carbapenemase and ribosomal methyltransferase-producing (*n* = 20), carbapenemase-producing and transmissible resistance to colistin (*n* = 3)

Note: No carbapenemase-producing *Enterobacterales* with transmissible resistance to colistin were reported during this period.

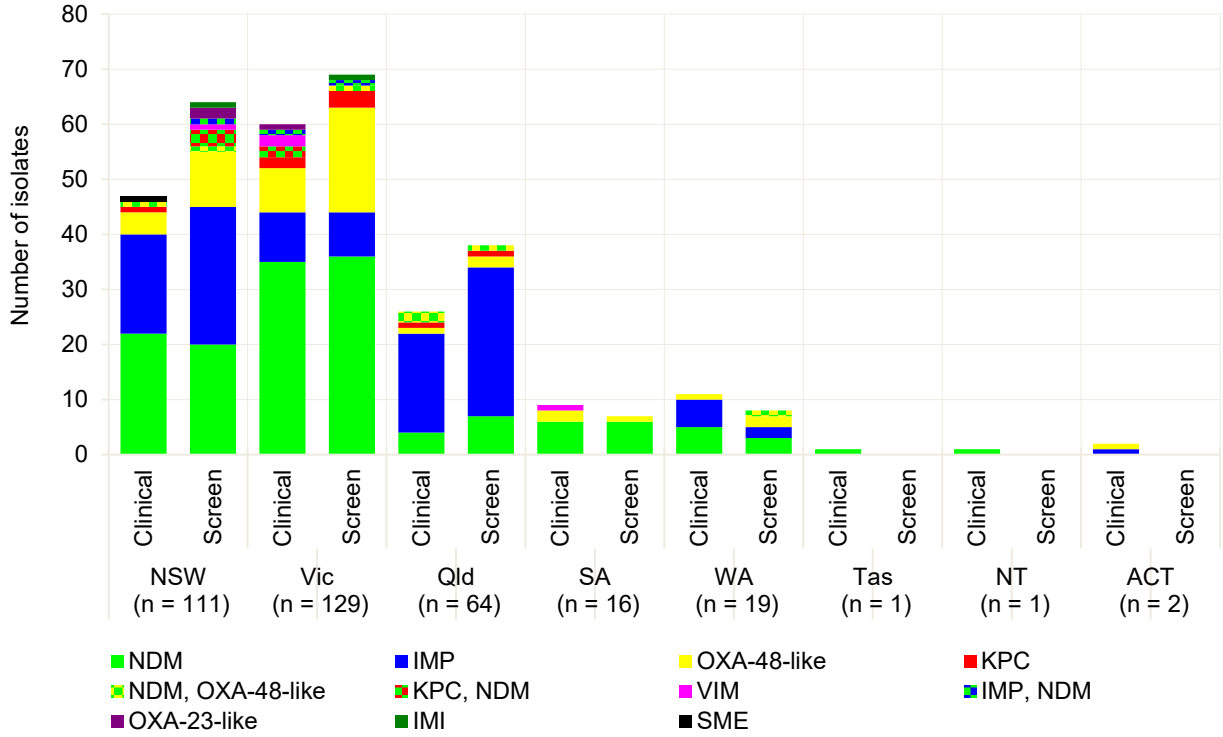
Figure 9: Top four reported carbapenemase types from *Enterobacterales*, by state and territory and nationally, 24-month trend, (three-month moving average), 1 October 2022–30 September 2024

Type	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia
IMP	34 14	7 2	18 5	0 0	3 0	0 0	1 0	1 0	58 29
NDM	18 5	26 9	7 3	4 0	3 1	2 0	1 0	1 0	54 21
OXA-48-like	6 2	18 2	2 0	2 0	1 0	0 0	1 0	1 0	28 7
NDM+OXA-48 -like	3 0	3 1	1 0	1 0	1 0	0 0	0 0	1 0	7 2
All types	58 25	44 18	25 9	6 2	8 3	2 0	2 0	2 0	138 69

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
Notes:

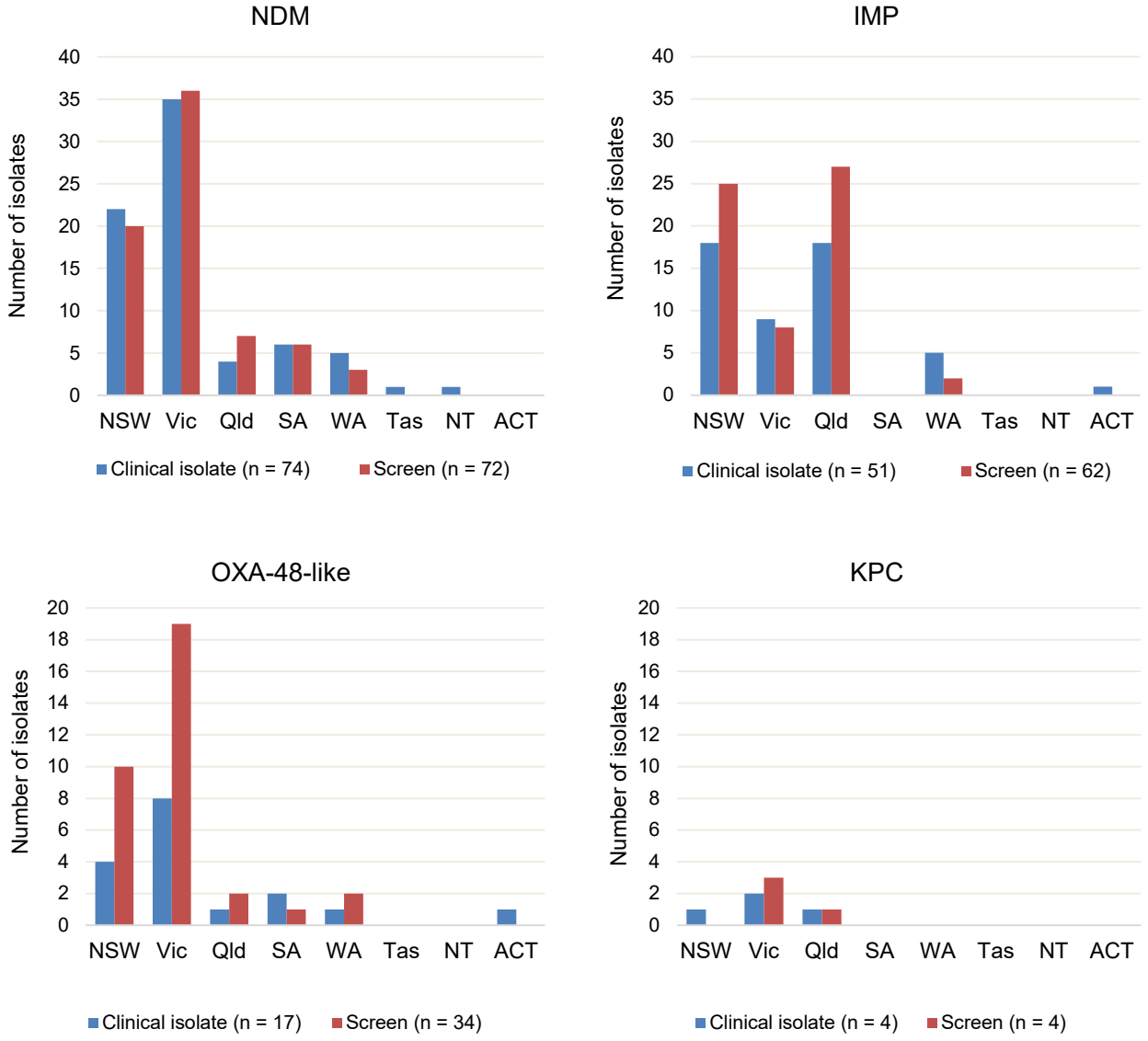
1. Line graphs represent three-month moving average for the period 1 October 2022 to 30 September 2024, for each type, where maximum monthly average was greater than one.
2. Numbers in each cell represent maximum (top) and minimum (bottom) monthly average.

Figure 10: Carbapenemase-producing *Enterobacterales**, number reported by carbapenemase type and specimen type, by state and territory, 1 July 2024–30 September 2024



* Carbapenemase-producing (*n* = 320); carbapenemase- and ribosomal methyltransferase-producing (*n* = 20); carbapenemase-producing and transferrable resistance to colistin (*n* = 3)

Figure 11: Top four reported carbapenemase-producing *Enterobacterales* types by specimen type, by state and territory, 1 July 2024–30 September 2024



Note: Other types include NDM+OXA-48-like (*n* = 7; Queensland clinical [2], screen [1]; NSW clinical [1], screen [1]; Victoria screen[1]; WA screen [1]); KPC+NDM (*n* = 5; NSW screen [3]; Victoria clinical [2]); VIM (*n* = 4; Victoria clinical [2]; NSW screen [1]; SA clinical [1]); IMP+NDM (*n* = 3; NSW screen [1]; Victoria clinical [1], screen [1]); OXA-23-like (*n* = 3; NSW screen [2]; Victoria clinical [1]); IMI (*n* = 2; NSW screen [1]; Victoria screen [1]); SME (*n* = 1; NSW clinical).

Table 4: Top five carbapenemase types from *Enterobacterales*, number reported by setting, by state and territory, 1 July 2024–30 September 2024

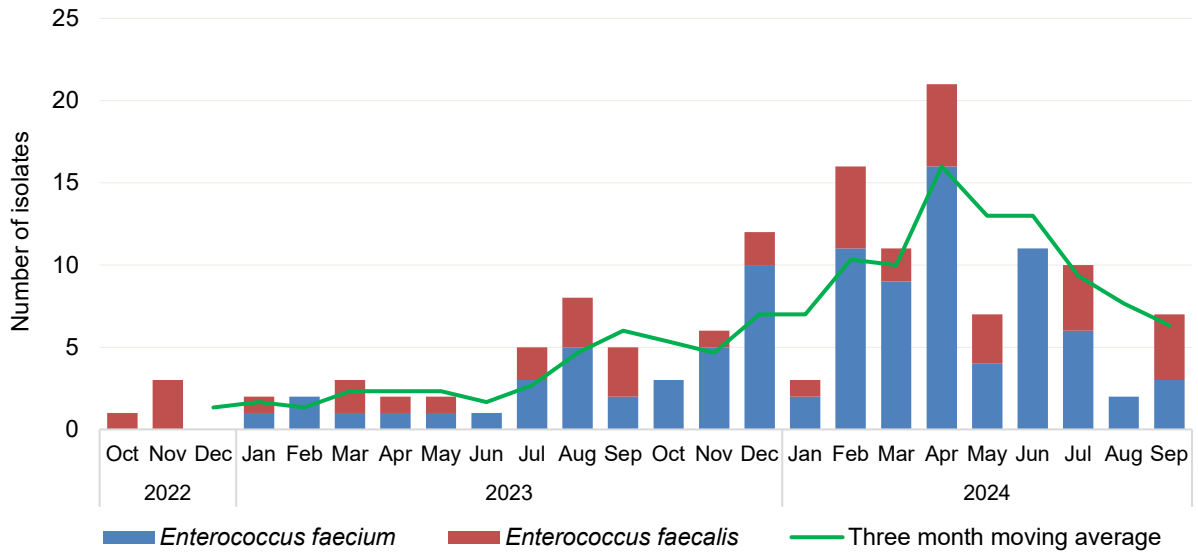
Carbapenemase type	Setting	State or territory								Total
		NSW	Vic	Qld	SA	WA	Tas	NT	ACT	
NDM	Total	42	71	11	12	8	1	1	0	146
	Public hospitals	31	48	9	9	3	1	0	0	101
	Private hospitals	1	0	1	0	0	0	0	0	2
	Aged care homes	0	1	0	0	0	0	0	0	1
	Community	7	20	1	3	5	0	1	0	37
	Unknown	3	2	0	0	0	0	0	0	5
IMP	Total	43	17	45	0	7	0	0	1	113
	Public hospitals	35	14	31	0	4	0	0	1	85
	Private hospitals	1	0	11	0	1	0	0	0	13
	Aged care homes	1	0	1	0	0	0	0	0	2
	Community	5	3	2	0	2	0	0	0	12
	Unknown	1	0	0	0	0	0	0	0	1
OXA-48-like	Total	14	27	3	3	3	0	0	1	51
	Public hospitals	11	17	2	2	1	0	0	1	34
	Private hospitals	1	2	0	0	1	0	0	0	4
	Aged care homes	0	0	0	0	0	0	0	0	0
	Community	1	8	0	1	1	0	0	0	11
	Unknown	1	0	1	0	0	0	0	0	2
KPC	Total	1	5	2	0	0	0	0	0	8
	Public hospitals	1	5	2	0	0	0	0	0	8
	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	0	0	0	0	0	0	0	0
	Unknown	0	0	0	0	0	0	0	0	0
NDM, OXA-48-like	Total	2	1	3	0	1	0	0	0	7
	Public hospitals	1	1	1	0	1	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	1	0	2	0	0	0	0	0	3
	Unknown	0	0	0	0	0	0	0	0	0

Note: Top five carbapenemase types account for 94.8% (325/343) of all carbapenemase-producing *Enterobacterales* reported for this period. Other types were KPC+NDM (*n* = 5, NSW [3], Vic [2]); VIM (n = 4, Vic [2], NSW [1], SA [1]); IMP+NDM (n = 3, Vic [2], NSW [1]); OXA-23-like (*n* = 3, Vic [2], NSW [1]); IMI (*n* = 2, NSW [1], Vic [1]); SME (*n* = 1, NSW).

Enterococcus species

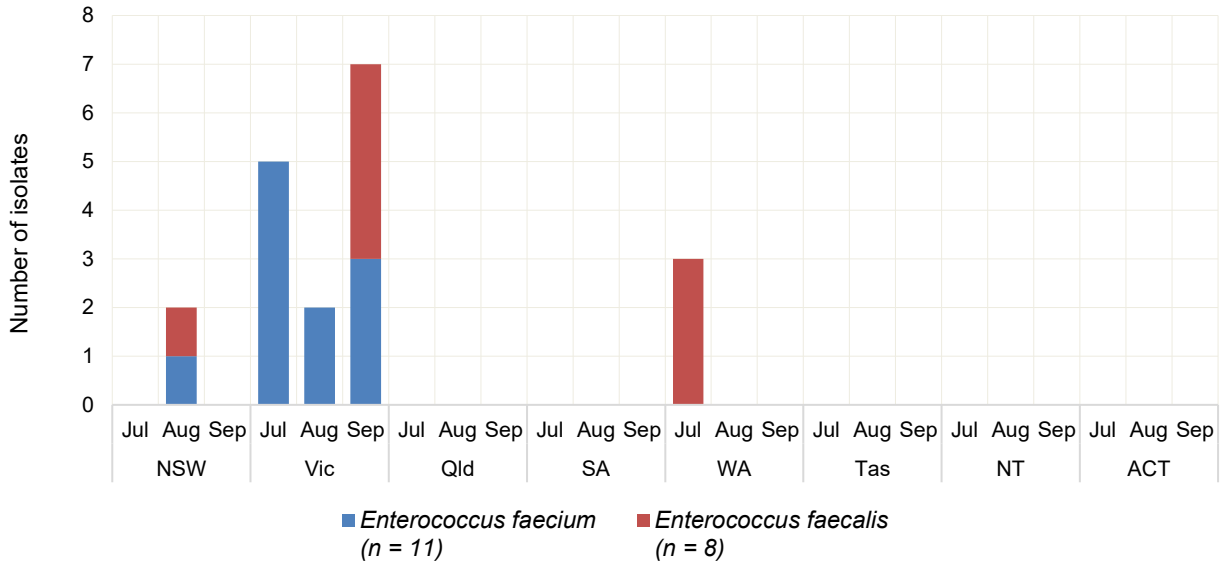
National data

Figure 12: Linezolid-nonsusceptible *Enterococcus* species, 24-month trend, national, 1 October 2022–30 September 2024



State and territory data

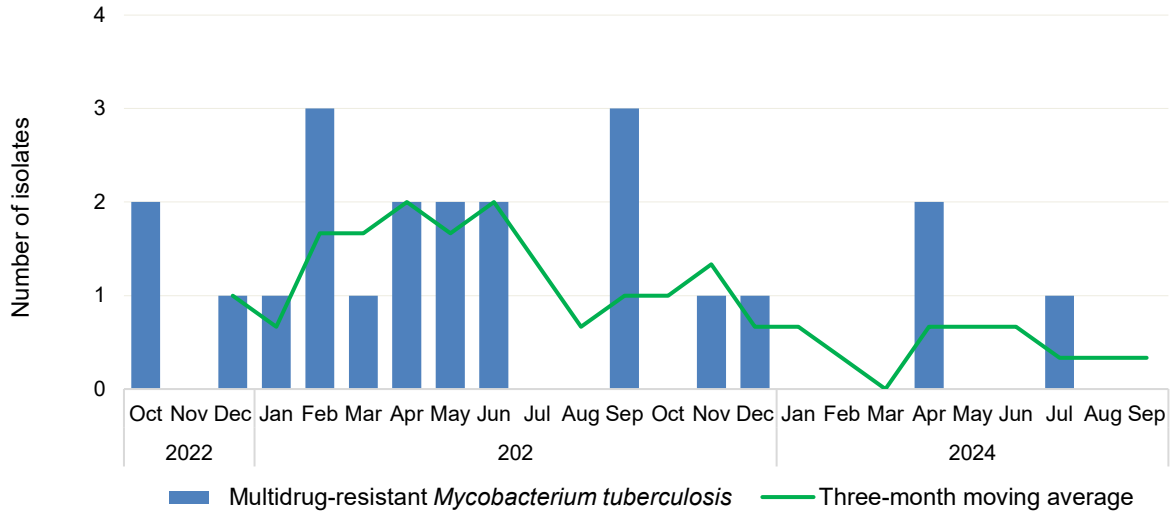
Figure 13: Linezolid-nonsusceptible *Enterococcus* species, number reported by state and territory, 1 July 2024–30 September 2024



Mycobacterium tuberculosis

National data

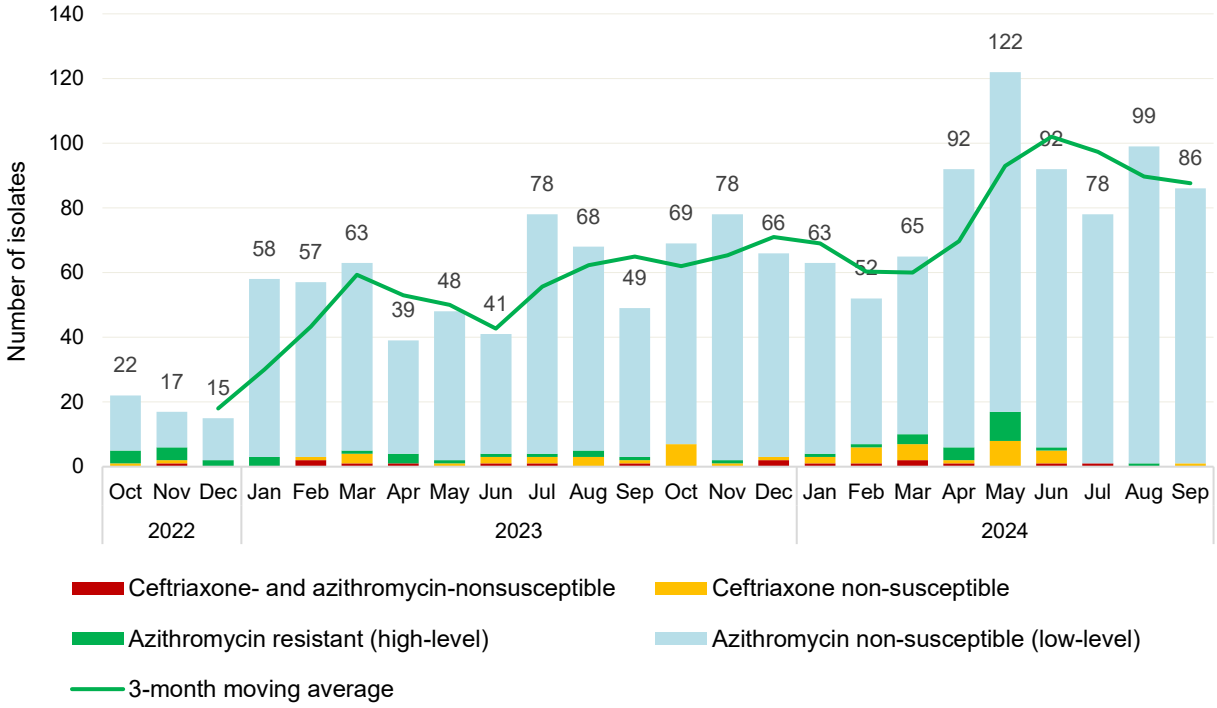
Figure 14: Multidrug-resistant *Mycobacterium tuberculosis,* 24-month trend, national, 1 October 2022–30 September 2024



Neisseria gonorrhoeae

National data

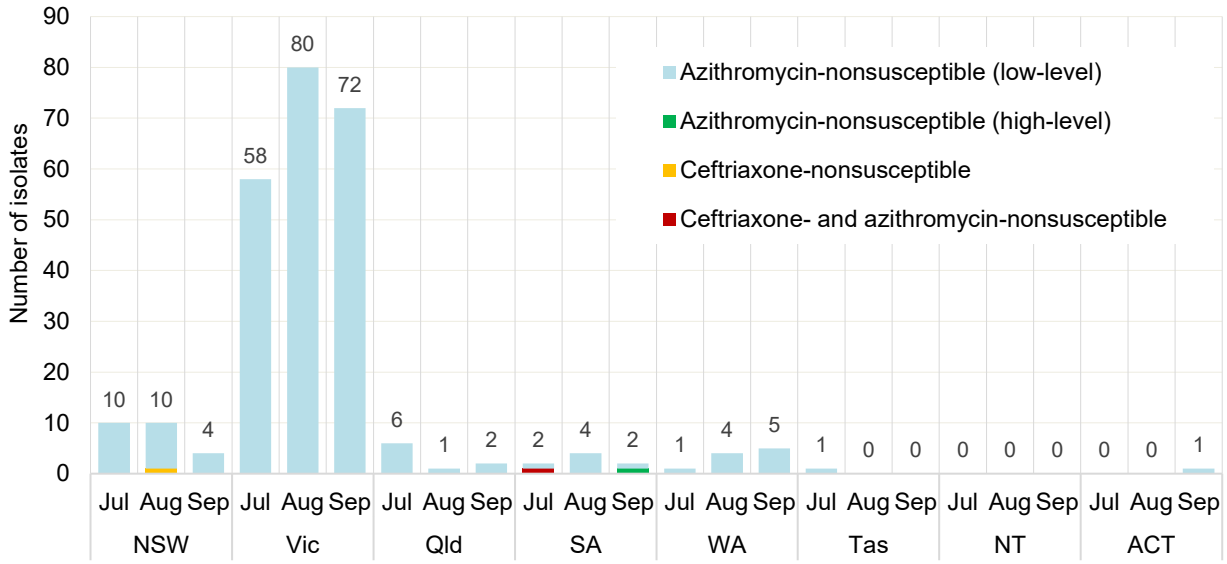
Figure 15: Ceftriaxone- and/or azithromycin-nonsusceptible *Neisseria gonorrhoeae*, 24-month trend, national, 1 October 2022–30 September 2024



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 July 2024–30 September 2024

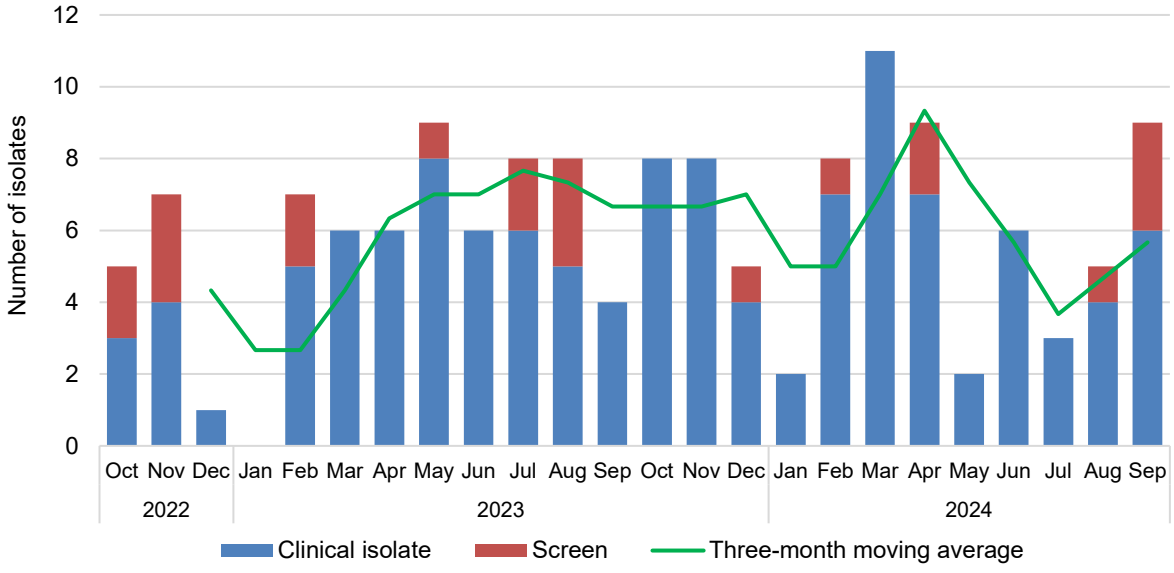


Note: Low-level = azithromycin MIC < 256 mg/L; high-level = azithromycin MIC ≥ 256 mg/L.

Pseudomonas aeruginosa

National data

Figure 17: Carbapenemase-producing *Pseudomonas aeruginosa*, 24-month trend by specimen type, national, 1 October 2022–30 September 2024



State and territory data

Figure 18: Carbapenemase-producing *Pseudomonas aeruginosa*, number reported by carbapenemase type and specimen type, by state and territory, 1 July 2024–30 September 2024

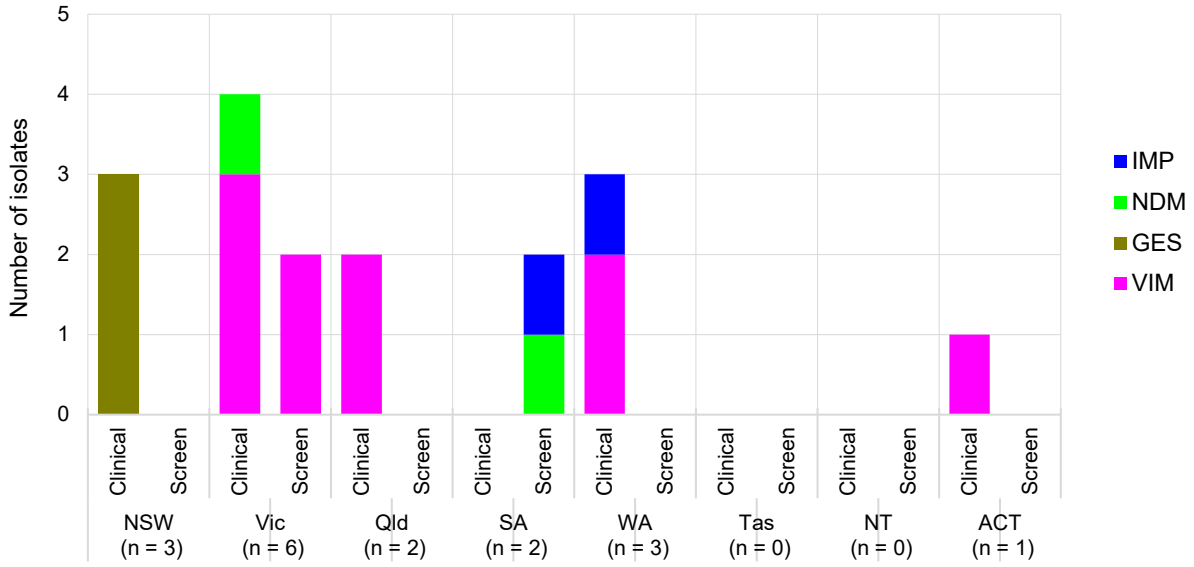


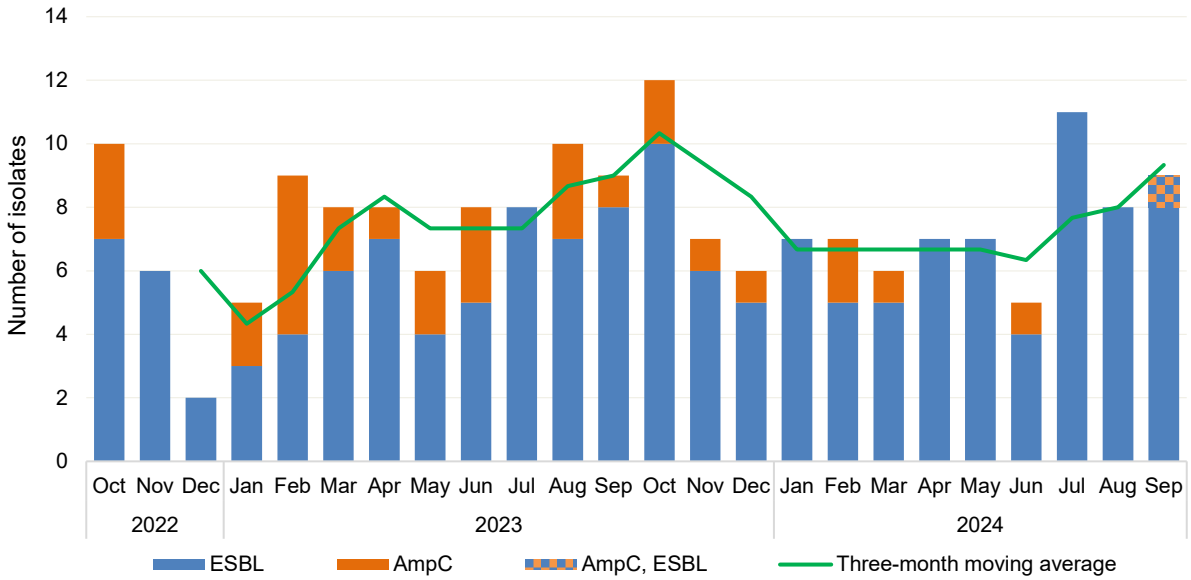
Table 5: Carbapenemase-producing *Pseudomonas aeruginosa*, number reported by setting, by state and territory, 1 July 2024–30 September 2024

	State or territory								
Setting	**NSW**	**Vic**	**Qld**	**SA**	**WA**	**Tas**	**NT**	**ACT**	**Total**
Total	3	6	2	2	3	0	0	1	17
Public hospital	2	5	1	1	3	0	0	1	13
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	1	1	1	0	0	0	0	3
Unknown	1	0	0	0	0	0	0	0	1

Salmonella species

National data

Figure 19: Ceftriaxone-nonsusceptible *Salmonella* species, 24-month trend, national, 1 October 2022–30 September 2024



Note: (1 July 2024–30 September 2024) non-typhoidal *Salmonella* species (*n* = 26) and typhoidal *Salmonella* species (*n* = 2).

Shigella species

National data

Figure 20: Multidrug-resistant *Shigella* species, 24-month trend, national, 1 October 2022–30 September 2024

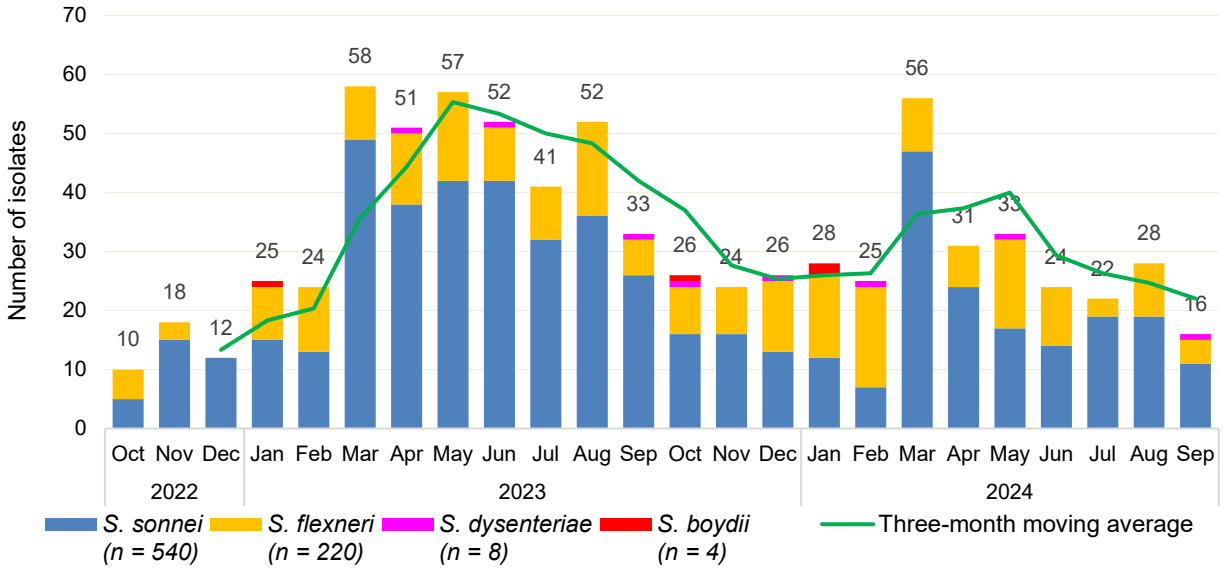
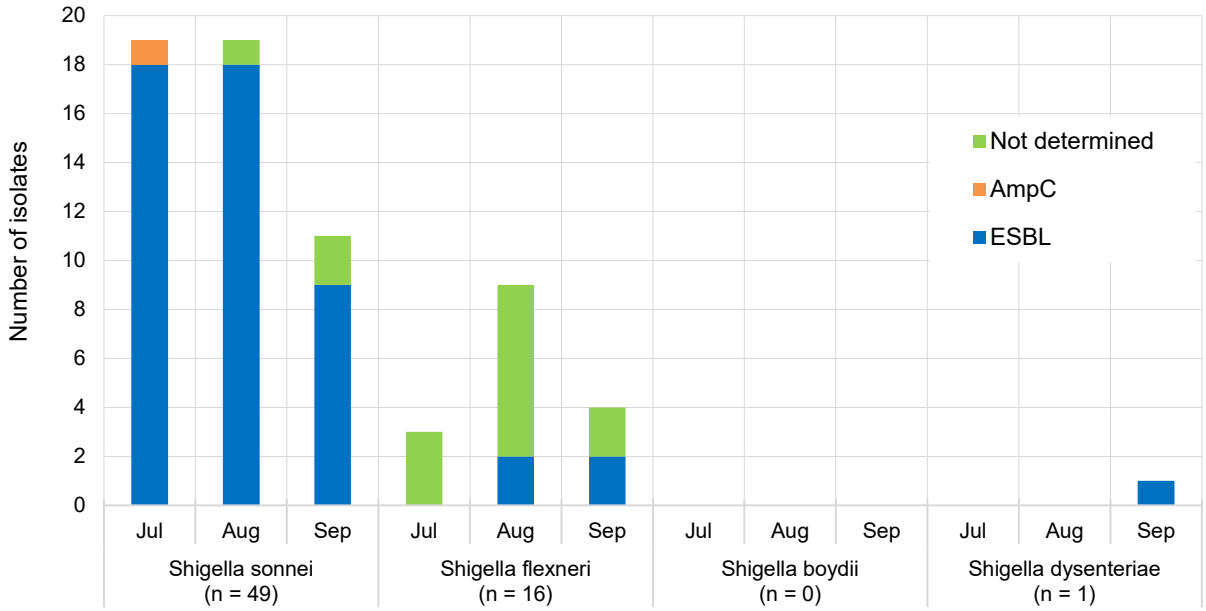


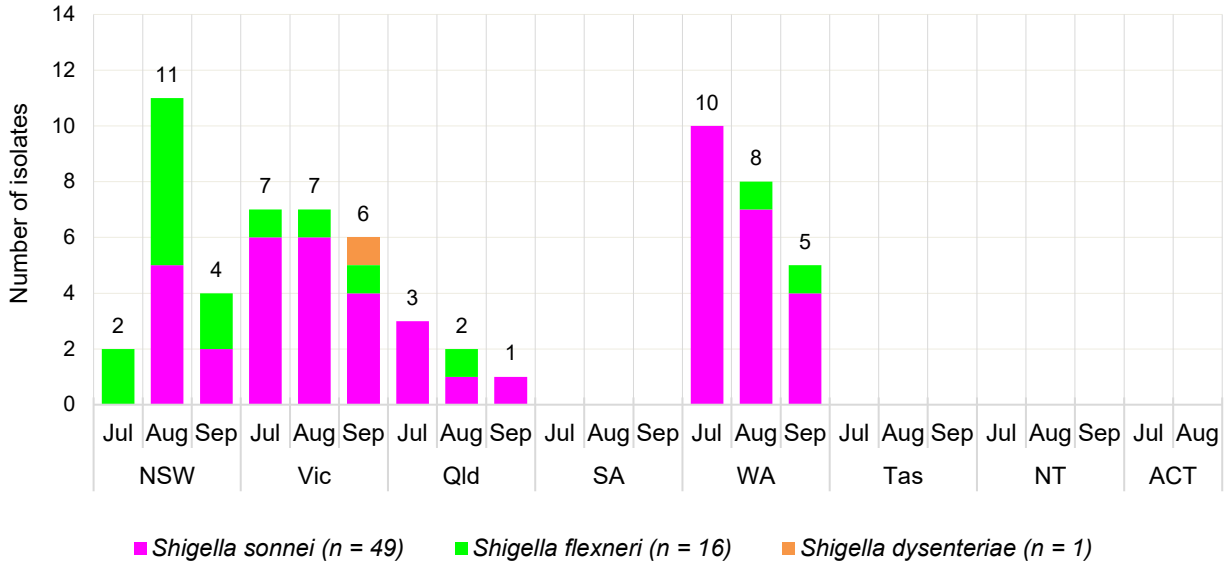
Figure 21: Multidrug-resistant *Shigella* species, number reported by month, national, 1 July 2024–30 September 2024



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

State and territory data

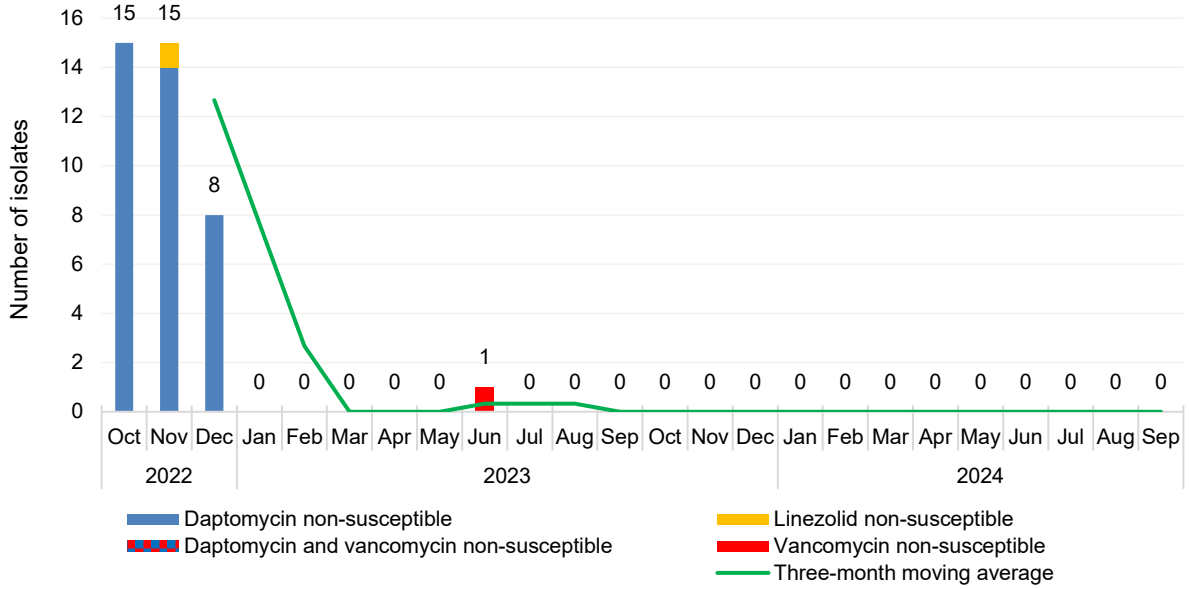
Figure 22: Multidrug-resistant *Shigella* species, number reported by state and territory, 1 July 2024–30 September 2024



Staphylococcus aureus

National data

Figure 23: Daptomycin-, linezolid- or vancomycin-nonsusceptible *Staphylococcus aureus,* 24-month trend, national, 1 October 2022–30 September 2024



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:

- Participation in CARAlert is voluntary
- 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
- 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
- Data may vary from that previously published as the reported number of CARs may have been updated to include additional submissions received or removed after the previous publication date. Comparison between reports may be influenced by delays in confirming laboratories reporting CARs to CARAlert due to late submission, which also means that the data analysed in this data update may not be complete for the time period at the time of publication
- 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
- Local operating procedures for laboratories may not currently include testing for all the critical resistances included in CARAlert; however, all laboratories are encouraged to actively screen for CARs
- 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 program 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 is coordinated by the Australian Government Department of Health and Aged Care (the Department). AURA supports the National Safety and Quality Health Service (NSQHS) Preventing and Controlling Infections Standard and Australia's National Antimicrobial Resistance Strategy – 2020 and beyond.

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 program. Funding for CARAlert is provided by the Department, with contributions from the states and territories for the laboratory analysis and data submission processes.

CARAlert is based on routine processes used by pathology laboratories for identifying and confirming potential critical antimicrobial resistances (CARs). Participating confirming laboratories submit data to CARAlert on priority organisms with critical resistance to last-line antimicrobial agents, 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.

CARAlert data on confirmed cases of CARs can be used to identify seasonal, geographic and national trends. The potential for CARAlert to act as an early warning system for CAR outbreaks to enable timely infection prevention and control responses is dependent on timely reporting of CARs by confirming laboratories.

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 program.[1]

Table A1: List of critical antimicrobial resistances reported to CARAlert, 2024

Species	Critical resistance
Acinetobacter baumannii complex*	Carbapenemase-producing†
Candida auris†	–
Enterobacterales	Carbapenemase- and/or ribosomal methyltransferase-producing
	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

* For CARAlert, *A. baumannii* complex includes *A. baumannii*, *A. calcoaceticus*, *A. dijkshoorniae*, *A. nosocomialis*, *A. pittii* and *A. seifertii*
† Reported from July 2019
§ Reported from January 2023
\# For CARAlert, *S. aureus* complex includes *S. argenteus*, *S. aureus* and *S. schweitzeri*
Note: Low level-azithromycin-nonsusceptible *N. gonorrhoeae* is reported to CARAlert but was excluded from the weekly digest following review in 2018.

[1] Australian Commission on Safety and Quality in Health Care. AURA 2023: fifth Australian report on antimicrobial use and resistance in human health. Sydney: ACSQHC; 2023.

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 CARAlert – 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.

The CARAlert system generates a weekly summary email alert to report information on confirmed CARs to authorised users from confirming laboratories, state and territory health authorities, the Department and the Commission who also have access to the CARAlert web portal.

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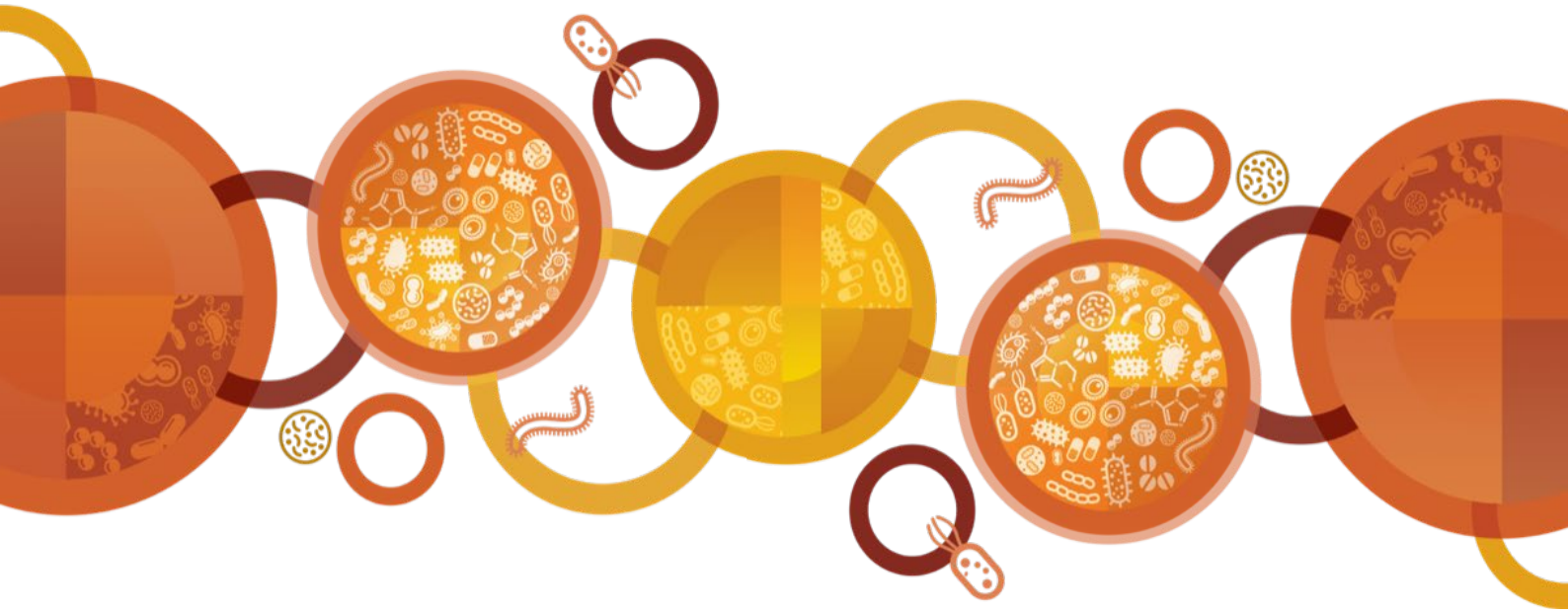

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