AUSTRALIAN COMMISSION ON SAFETY AND QUALITY IN HEALTH CARE

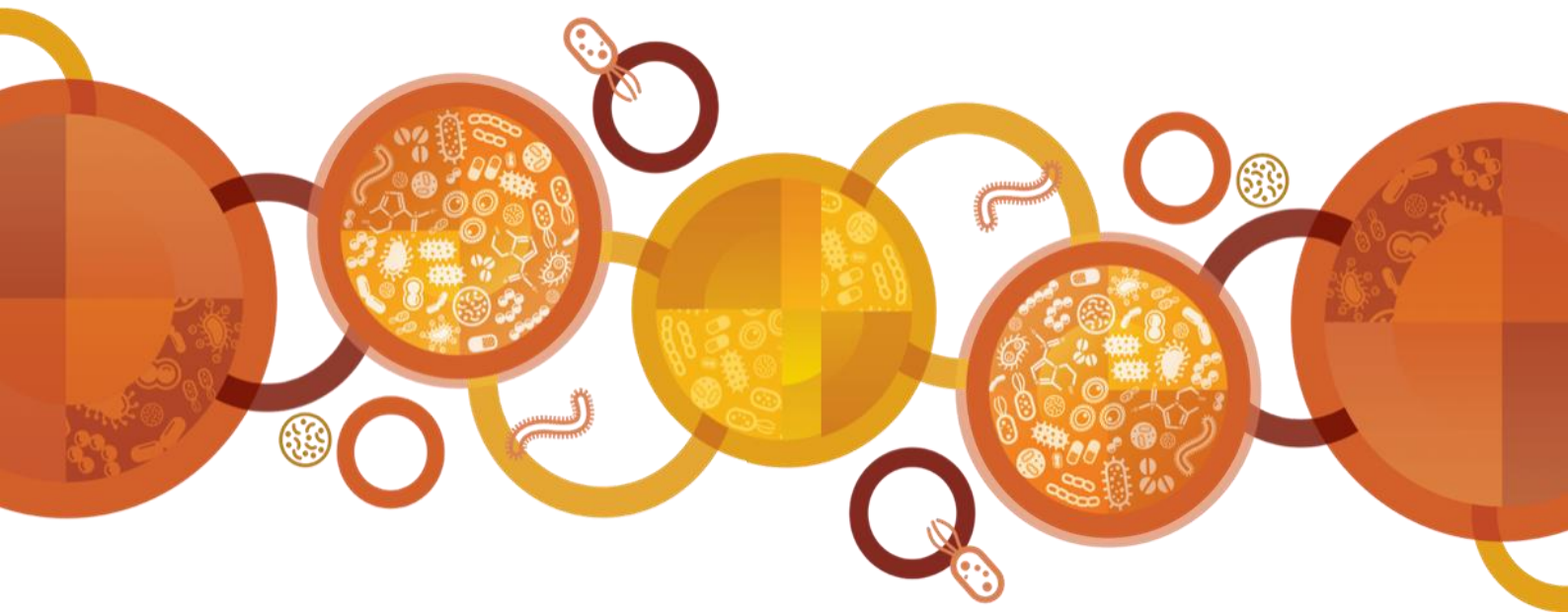
AURA Antimicrobial Use and Resistance in Australia

CARAlert THE NATIONAL ALERT SYSTEM FOR CRITICAL ANTIMICROBIAL RESISTANCE

CARAlert data update 23

1 May 2021–30 June 2021

August 2021



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Level 5, 255 Elizabeth Street, Sydney NSW 2000

Phone: (02) 9126 3600
Fax: (02) 9126 3613

Email: caralert@safetyandquality.gov.au
Website: www.safetyandquality.gov.au

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Contents

Data Summary

This report provides an update on data submitted to CARAlert for the reporting period: 1 May 2021 to 30 June 2021, and complements previous analyses of and updates on CARAlert data.

National overview:

- The total number of critical antimicrobial resistances (CARs) reported was similar to the previous two-month reporting period (*n* = 225 versus *n* = 228)
- Over one-half of the CARs reported were carbapenemase-producing *Enterobacterales* (CPE) (including those with ribosomal methyltransferase and/or transmissible resistance to colistin) (*n* = 119, 53%), followed by daptomycin non-susceptible *Staphylococcus aureus* (*n* = 50, 22%)
- The total number of CPE (either alone or in combination with other CARs) reported this year, compared with the same period last year, decreased by 4.6% (*n* = 332 versus *n* = 348)
- The number of daptomycin non-susceptible *S. aureus* increased by 28% (*n* = 50) compared with the previous two-month reporting period (*n* = 39)
- The majority of CARs, excluding those from *Neisseria gonorrhoeae*, were reported from public hospitals (*n* = 129, 70% where setting known). There were 27 reports from community settings, 15 from private hospitals, and 12 from aged care homes.

Carbapenemase-producing *Enterobacterales*:

- IMP (63.9%), NDM (22.7%), and OXA-48-like (8.4%) types accounted for 95.0% of all CPE reported during this period
- The total number of CPE increased (*n* = 119, up 19%) compared with the previous two-month period. The total number of IMP-types reported increased (*n* = 76 versus *n* = 53; the greatest increase in reports were from New South Wales (*n* = 43 versus *n* = 29), Victoria (*n* = 10 versus *n* = 7) and Western Australia (*n* = 4 versus *n* = 1)
- There was a decrease in the total number of NDM-types (*n* = 27 versus *n* = 32, down 16%) compared to the previous two-month period. The greatest decrease in number of reports was from New South Wales (*n* = 7 versus *n* = 13). There was an increase in the number of reports from Queensland (*n* = 6 versus *n* = 3)
- One KPC-producing *Enterobacterales* was reported from Western Australia
- Excluding CARs for which the setting was unknown, 18% (21/116) of CPE were reported from settings other than public hospitals; 8.6% (*n* = 10), 6.0% (*n* = 7) and 3.4% (*n* = 4) respectively from the community, private hospitals, and aged care homes
- Seven hospitals had more than two reports of IMP-types; four in New South Wales, two in Victoria, and one in Queensland. A further eight institutions had two notifications of IMP-types (New South Wales (*n* = 6), and Queensland (*n* = 2). Just over 1 in 4 reports of IMP-producing *Enterobacterales* in hospitals were from patients aged 0–4 years (17/66, 25.8%)
- Four hospitals had more than two reports of NDM-types; two in Victoria, one in South Australia, and one in New South Wales. One of the Victorian hospitals had more than two reports of both IMP and NDM-types.

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

- Only one ceftriaxone non-susceptible *Salmonella* species was reported during this period. The isolate was from Victoria, and produced AmpC ($bla_{\text{CMY-2}}$)
- Multidrug-resistant *Shigella* species were reported from Victoria (*n* = 2), New South Wales (*n* = 1) and Western Australia (*n* = 1). All three *S. sonnei* were ceftriaxone susceptible, and one *S. flexneri* harboured an extended spectrum beta-lactamase (ESBL).

Azithromycin non-susceptible (low-level resistance, MIC < 256 mg/L) *N. gonorrhoeae*:

- The total number of reports of this CAR decreased 33% compared with the previous two-month reporting period (*n* = 36 versus *n* = 54). Over 94% of the reports were from New South Wales (*n* = 28, 78%) and Western Australia (*n* = 6, 17%). Victoria was the only other state or territory to report this CAR

- Reports from New South Wales decreased (*n* = 28 versus *n* = 46, down 39%) compared to the previous two-month reporting period, although fortnightly notifications of gonococcal infections in New South Wales were relatively stable from 1 March 2021 to 20 June 2021 (*n* = 325, 386, 316, 402, 357, 358, 325, 342 respectively).[1]

Ceftriaxone non-susceptible or azithromycin non-susceptible (high-level resistance, MIC ≥ 256 mg/L) *N. gonorrhoeae:*

- There were no reports of ceftriaxone non-susceptible *N. gonorrhoeae* or azithromycin non-susceptible *N. gonorrhoeae* (high-level resistance, MIC ≥ 256 mg/L) in this reporting period.

Daptomycin and vancomycin non-susceptible *Staphylococcus aureus* complex:

- The total number of reports of this CAR increased (*n* = 50, up 28%) compared with the previous two-month reporting period (*n* = 39). There was a 2-fold increase in the number of reports from New South Wales (*n* = 14 versus *n* = 6) and Western Australia (*n* = 8 versus *n* = 4). Forty-six percent of all reports were from Queensland
- No linezolid non-susceptible or vancomycin non-susceptible *S. aureus* were reported in this period.

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

- Carbapenemase-producing *A. baumannii* complex were reported from Victoria (*bla*$_{\text{NDM-1}}$, *n* = 1) and New South Wales (OXA-23-like, *n* = 1)
- Carbapenemase-producing *P. aeruginosa* reports decreased slightly during this period compared to the previous two-month reporting period (*n* = 10 versus *n* = 15, down 33%). Reports were from New South Wales (*n* = 6), Victoria (*n* = 3), and Western Australia (*n* = 1)
- The majority of carbapenemase types in *P. aeruginosa* were *bla*$_{\text{GES-5}}$ (*n* = 7, 70%). Two isolates producing *bla*$_{\text{NDM-1}}$ co-produced with ribosomal methyltransferase (*rmtB4*), and one producing *bla*$_{\text{VIM-1}}$ were reported from Victoria.

Linezolid resistant *Enterococcus:*

- Three linezolid-resistant *Enterococcus* species were reported during this period, two from South Australia and one from Western Australia.

***Candida auris*:**

- No cases of *Candida auris* were reported during this period.

Transmissible colistin resistance (other than that seen in combination with CPE):

- Transmissible colistin resistance other than that seen in combination with CPE was not reported during this period.

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

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

[1] National Notifiable Diseases Surveillance System. Table of communicable disease notifications reported to the NNDSS by fortnight [Internet]. Canberra: Australian Government Department of Health; 2021 [cited 2021 Aug 2021.

National summary

Table 1: Number of critical antimicrobial resistances, by state and territory, 1 May 2021 to 30 June 2021, and 2020

Species	Critical resistance	State or Territory								Bi-monthly			Year to date		
										2021	2021				
		NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Mar-Apr	May-Jun	Relative change*	2020	2021	Relative change*
Acinetobacter baumannii complex	Carbapenemase-producing	1	1	0	0	0	0	0	0	1	2	▲ 100%	11	7	▼ 36.4%
	Carbapenemase and ribosomal methyltransferase-producing	0	0	0	0	0	0	0	0	1	0	▼ 100%	9	1	▼ 88.9%
Candida auris	–	0	0	0	0	0	0	0	0	1	0	▼ 100%	2	1	▼ 50.0%
Enterobacterales	Carbapenemase-producing	52	17	26	9	6	0	1	2	95	113	▲ 18.9%	280	302	▲ 7.9%
	Carbapenemase and ribosomal methyltransferase-producing	0	0	0	0	0	0	0	0	3	0	▼ 100%	23	8	▼ 65.2%
	Carbapenemase-producing and transmissible resistance to colistin	2	3	0	0	1	0	0	0	2	6	▲ 200%	45	22	▼ 51.1%
	Carbapenemase and RMT-producing and transmissible resistance to colistin	1	1	0	0	0	0	0	0	0	0	–	0	0	–
	Ribosomal methyltransferase-producing	0	0	0	0	0	0	0	0	5	0	▼ 100%	1	6	▲ 500%
	Transmissible resistance to colistin	0	0	0	0	0	0	0	0	0	0	–	1	3	▲ 200%
Enterococcus species	Linezolid resistant	0	0	0	2	1	0	0	0	1	3	▲ 200%	10	7	▼ 30.0%
Mycobacterium tuberculosis	Multidrug-resistant – at least rifampicin- and isoniazid-resistant strains	0	0	0	0	0	0	0	0	0	0	–	8	2	▼ 75.0%
Neisseria gonorrhoeae	Azithromycin non-susceptible (LLR, MIC < 256 mg/L)	28	2	0	0	6	0	0	0	54	36	▼ 33.3%	139	146	▲ 5.0%
	Azithromycin non-susceptible (HLR, MIC ≥ 256 mg/L	0	0	0	0	0	0	0	0	0	0	–	1	0	▼ 100%
	Ceftriaxone non-susceptible	0	0	0	0	0	0	0	0	0	0	–	3	0	▼ 100%
	Ceftriaxone non-susceptible and azithromycin non-susceptible	0	0	0	0	0	0	0	0	0	0	–	0	0	–

HLR = high-level resistance; LLR = low-level resistance; RMT = ribosomal methyltransferase; – = not applicable

Table 1 (continued)

Species	Critical resistance	State or territory								Bi-monthly			Year to date		
										2021	2021				
		NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Mar-Apr	May-Jun	Relative change*	2020	2021	Relative change*
Pseudomonas aeruginosa	Carbapenemase-producing	6	1	0	0	1	0	0	0	15	8	▼ 46.7%	12	41	▲ 242%
	Carbapenemase and ribosomal methyltransferase-producing	0	2	0	0	0	0	0	0	0	2	–	1	2	▲ 100%
Salmonella species	Ceftriaxone non-susceptible	0	1	0	0	0	0	0	0	4	1	▼ 75.0%	20	13	▼ 35.0%
Shigella species	Multidrug-resistant	1	2	0	0	1	0	0	0	7	4	▼ 42.9%	178	20	▼ 88.8%
Staphylococcus aureus complex	Daptomycin non-susceptible	14	1	23	0	8	1	0	3	39	50	▲ 28.2%	98	121	▲ 23.5%
	Daptomycin and vancomycin non-susceptible	0	0	0	0	0	0	0	0	0	0	–	1	0	▼ 100%
	Linezolid non-susceptible	0	0	0	0	0	0	0	0	0	0	–	0	0	–
	Vancomycin non-susceptible	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 July 2021)	**104**	**30**	**49**	**11**	**24**	**1**	**1**	**5**	**228**	**225**	**▼ 1.3%**	**843**	**702**	**▼ 16.7%**

HLR = high-level resistance; LLR = low-level resistance; MIC = minimum inhibitory concentration; – = not applicable

* Relative change = absolute change between period in 2020 and same period in 2021, for each CAR, expressed as a percentage of 2020 base

Note: The number of CARs for 2020 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 May 2021 to 30 June 2021

Species	Critical resistance	Setting					Total
		Public hospital	Private hospital	Aged care home	Community	Unknown	
Acinetobacter baumannii complex	Carbapenemase-producing	2	0	0	0	0	2
	Carbapenemase and ribosomal methyltransferase-producing	0	0	0	0	0	0
Candida auris	–	0	0	0	0	0	0
Enterobacterales	Carbapenemase-producing	90	6	4	10	3	113
	Carbapenemase and ribosomal methyltransferase-producing	0	0	0	0	0	0
	Carbapenemase-producing and transmissible resistance to colistin	5	1	0	0	0	6
	Carbapenemase and ribosomal methyltransferase-producing, and transmissible resistance to colistin	0	0	0	0	0	0
	Ribosomal methyltransferase-producing	0	0	0	0	0	0
	Transmissible resistance to colistin	0	0	0	0	0	0
Enterococcus species	Linezolid resistant	3	0	0	0	0	3
Mycobacterium tuberculosis	Multidrug-resistant – at least rifampicin- and isoniazid-resistant	0	0	0	0	0	0
Neisseria gonorrhoeae	Azithromycin non-susceptible (low-level)	7	0	0	28	1	36
	Azithromycin non-susceptible (high-level)	0	0	0	0	0	0
	Ceftriaxone non-susceptible	0	0	0	0	0	0
	Ceftriaxone non-susceptible and azithromycin non-susceptible	0	0	0	0	0	0
Pseudomonas aeruginosa	Carbapenemase-producing	7	1	0	0	0	8
	Carbapenemase and ribosomal methyltransferase-producing	1	1	0	0	0	2
Salmonella species	Ceftriaxone non-susceptible	1	0	0	0	0	1
Shigella species	Multidrug-resistant	1	1	0	1	1	4
Staphylococcus aureus complex	Daptomycin non-susceptible	19	5	8	16	2	50
	Daptomycin and vancomycin non-susceptible	0	0	0	0	0	0
	Linezolid non-susceptible	0	0	0	0	0	0
	Vancomycin non-susceptible	0	0	0	0	0	0
Streptococcus pyogenes	Penicillin reduced susceptibility	0	0	0	0	0	0
	Total (reported by 31 July 2021)	**136**	**15**	**12**	**55**	**7**	**225**

* Information on setting for *Neisseria gonorrhoeae* is often not available

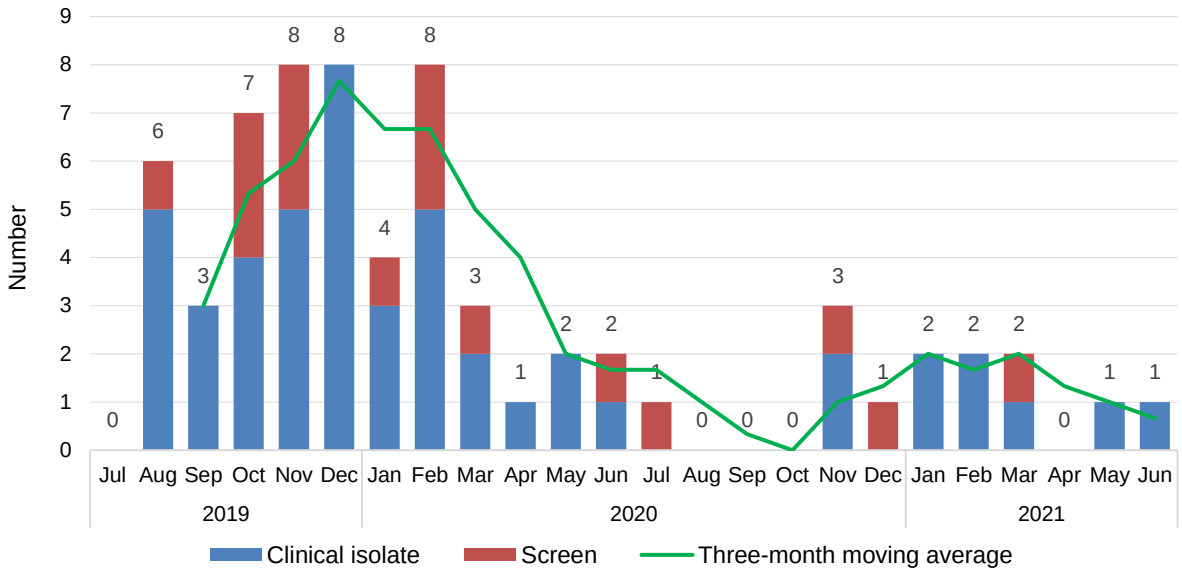
High-level = azithromycin MIC ≥ 256 mg/L; Low-level = azithromycin MIC < 256 mg/L

Summary by CAR

Acinetobacter baumannii complex

National data

Figure 1: Carbapenemase-producing *Acinetobacter baumannii* complex*, twenty-four-month trend by specimen type, national, 1 July 2019–30 June 2021



State and territory data

Figure 2: Carbapenemase-producing *Acinetobacter baumannii* complex, number reported by carbapenemase type and specimen type, by state and territory, 1 May 2021 to 30 June 2021

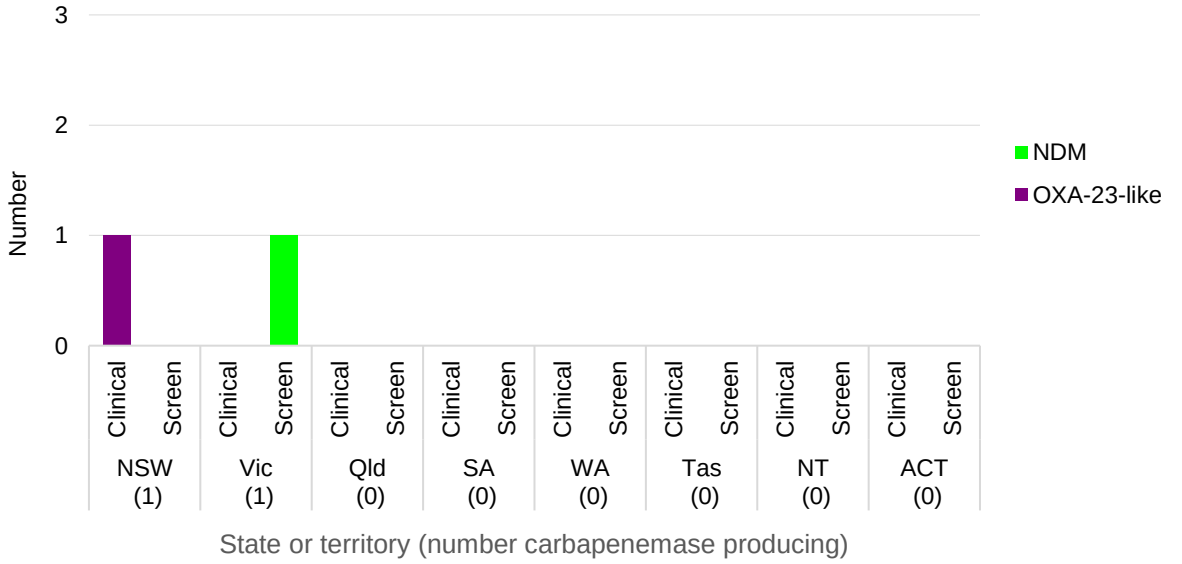


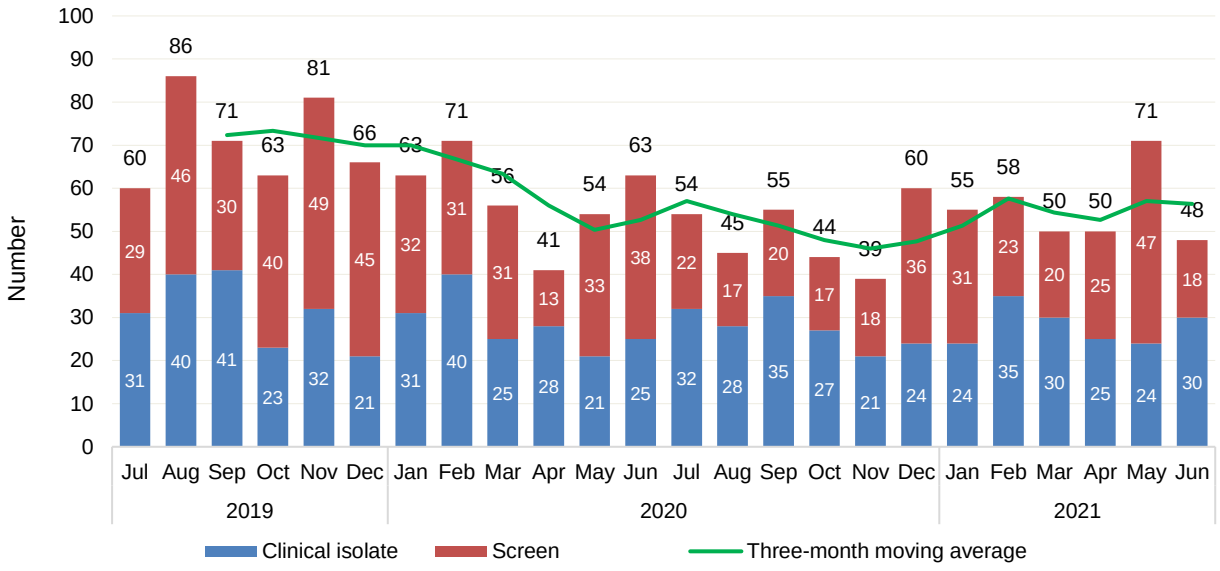
Table 3: Carbapenemase-producing *Acinetobacter baumannii* complex, number reported by setting, by state and territory, 1 May 2021 to 30 June 2021

Setting	State or territory								Total
	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	
Total	1	1	0	0	0	0	0	0	2
Public hospital	1	1	0	0	0	0	0	0	2
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

Enterobacterales

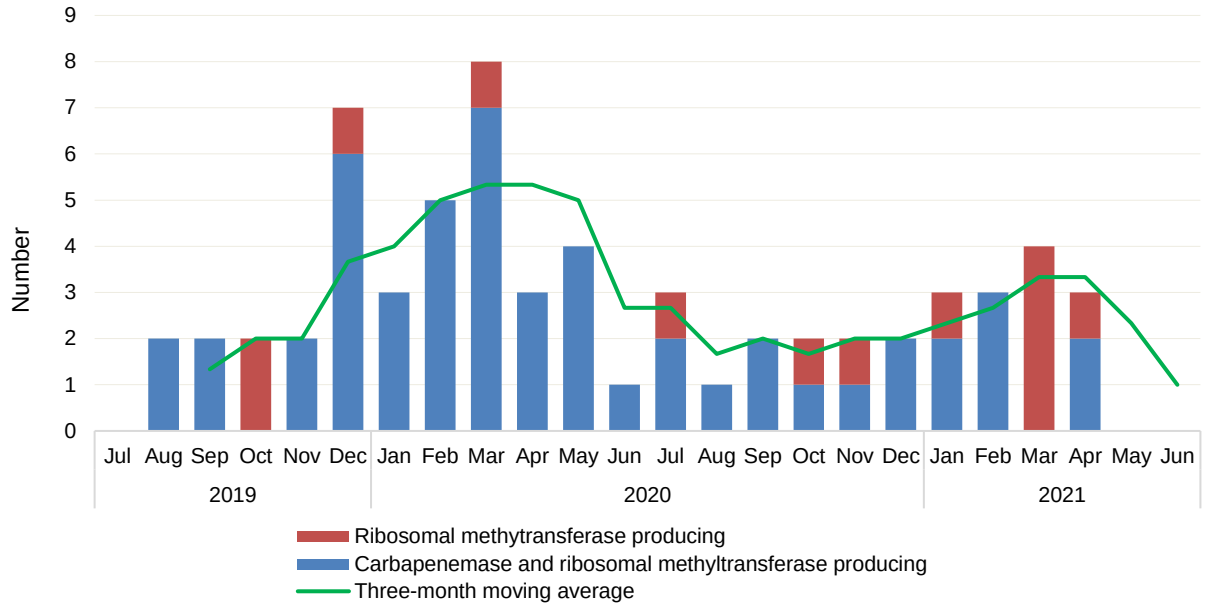
National data

Figure 3: Carbapenemase-producing *Enterobacterales**, twenty-four-month trend by specimen type, national, 1 July 2019–30 June 2021



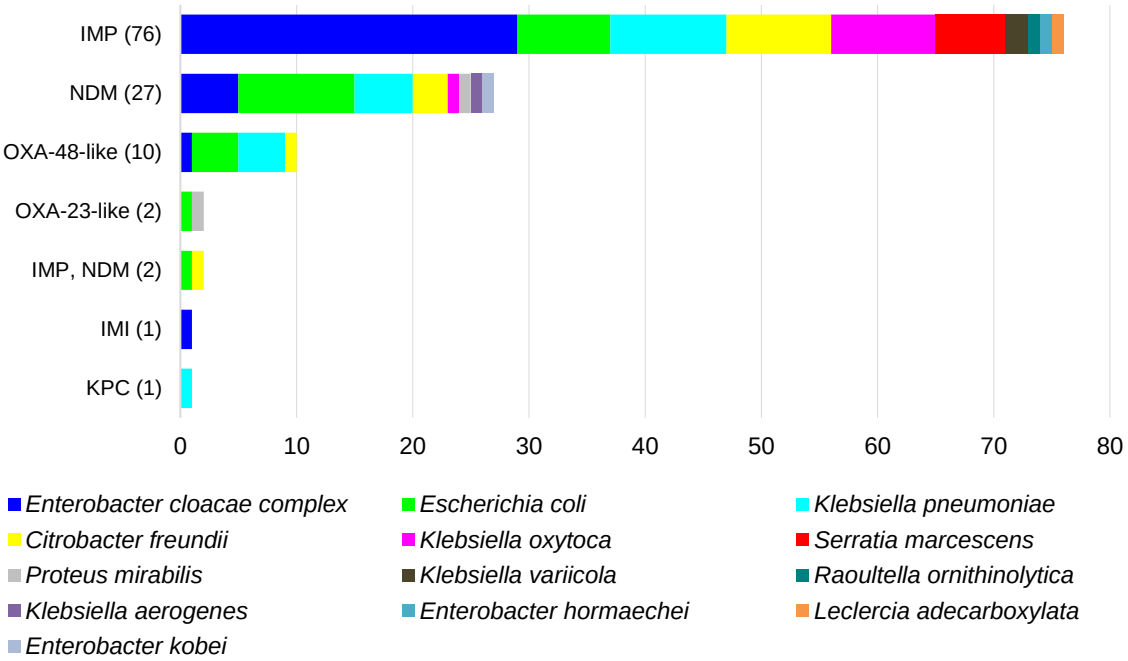
* Carbapenemase-producing alone or in combination with ribosomal methyltransferases

Figure 4: Ribosomal methyltransferase-producing *Enterobacterales**, twenty-four-month trend, national, 1 July 2019–30 June 2021



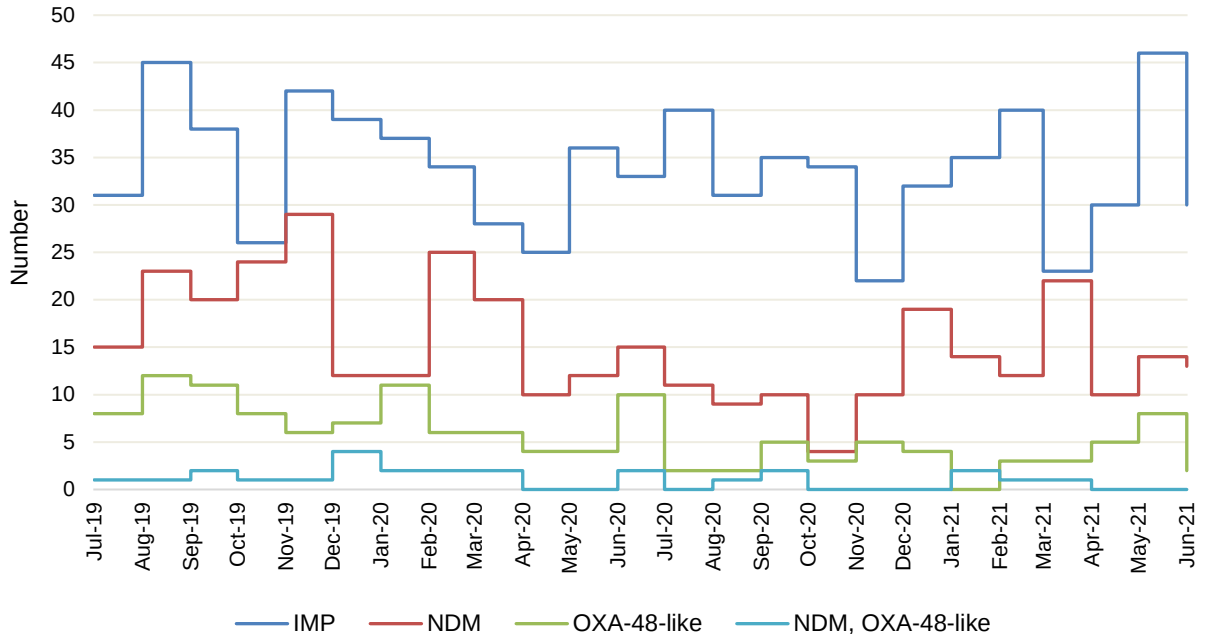
* Ribosomal methyltransferases alone, or in combination with carbapenemase(s)

Figure 5: Carbapenemase-producing *Enterobacterales**, number reported by carbapenemase type and species, national, 1 May 2021 to 30 June 2021



* Carbapenemase-producing (*n* = 113), carbapenemase-producing plus transmissible resistance to colistin (*n* = 6)

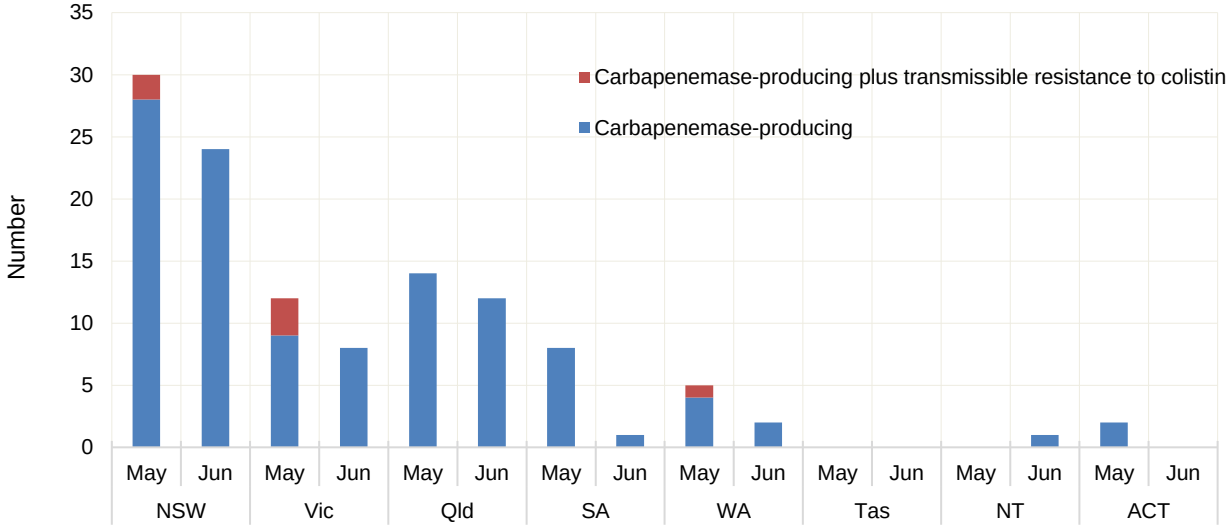
Figure 6: Top four reported carbapenemase types*, twenty-four-month trend, national, 1 July 2019–30 June 2021



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

State and territory data

Figure 7: Carbapenemase-producing *Enterobacterales,* number reported by month, state and territory, 1 May 2021 to 30 June 2021



Carbapenemase-producing (*n* = 113), carbapenemase-producing plus transmissible resistance to colistin (*n* = 6),

Figure 8: Two-year trend for the top four reported carbapenemase types from *Enterobacterales*, by state and territory and nationally, (three-month moving average), 1 July 2019–30 June 2021

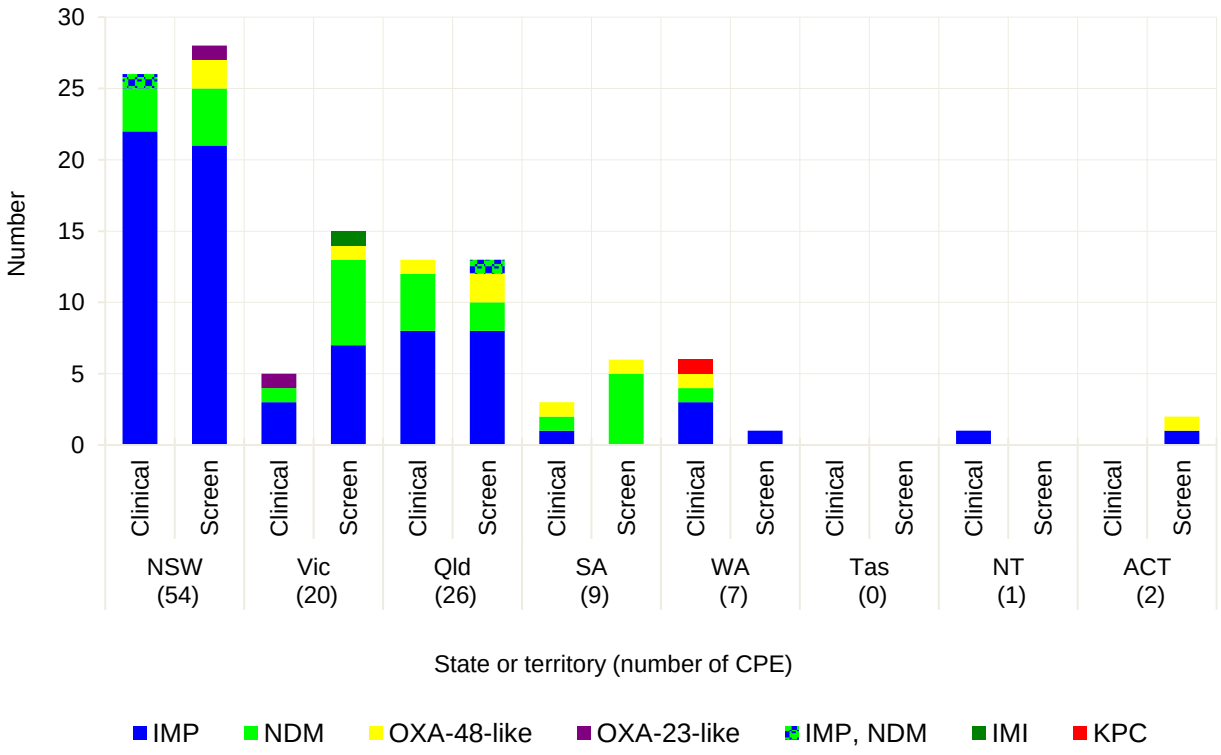
Type	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia
IMP	20 12	12 2	17 4	0 0	2 0	0 0	1 0	1 0	39 29
NDM	8 2	9 3	3 0	6 0	1 0	0 0	1 0	0 0	24 8
OXA-48-like	3 1	7 0	2 0	1 0	1 0	0 0	0 0	1 0	11 2
KPC	1 0	2 0	1 0	0 0	0 0	0 0	0 0	0 0	2 0
All types	27 16	25 10	18 5	7 0	4 1	1 0	1 0	2 0	73 46

Line graphs represent three-month moving average for the period 1 May 2019 to 30 June 2021, for each type, where maximum monthly average was greater than one.

Straight green line in cell = no carbapenemase type for that state or territory during the reporting period

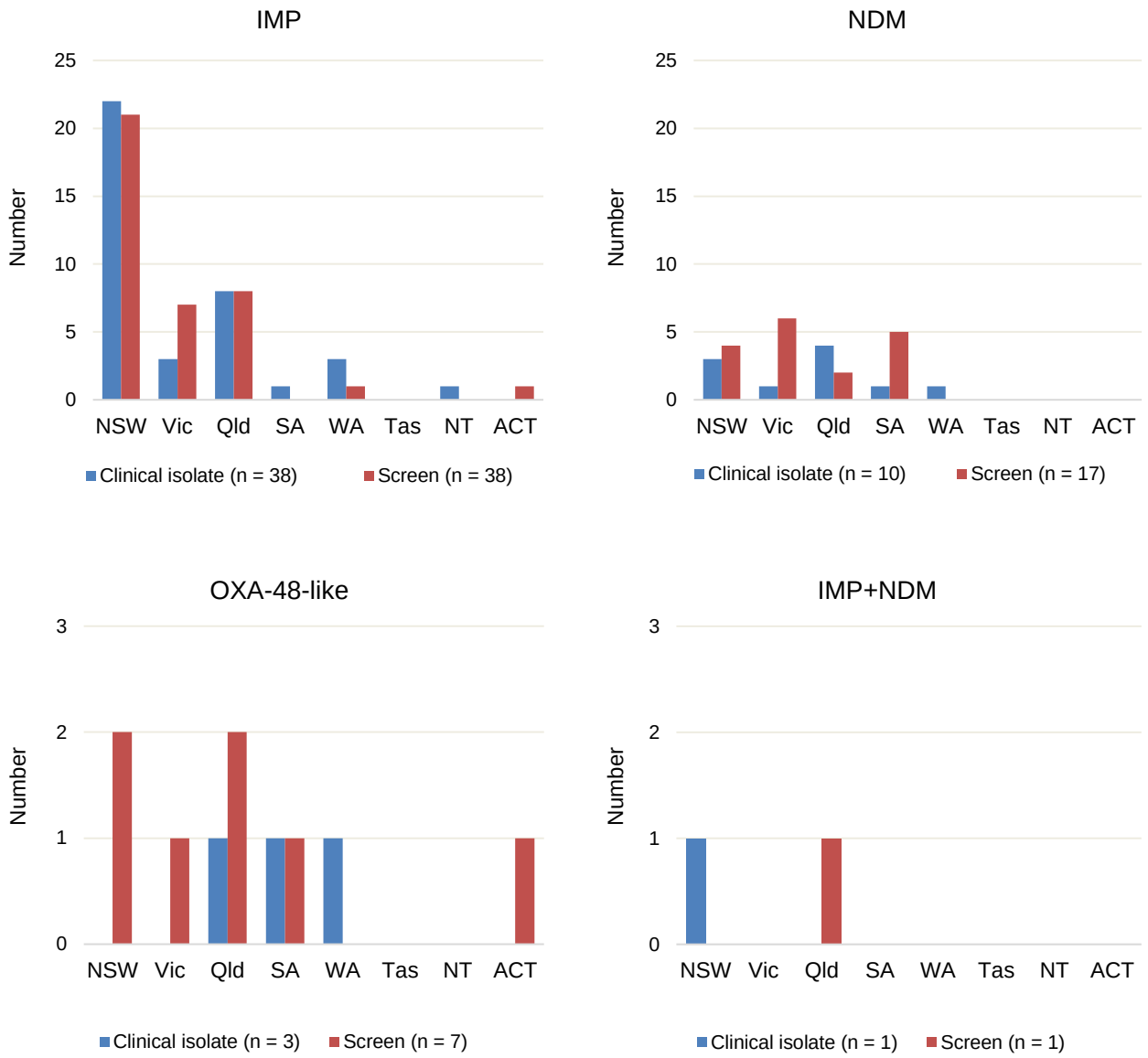
Blank cell = maximum monthly average was one or less

Figure 9: Carbapenemase-producing *Enterobacterales**, number reported by carbapenemase type and specimen type, by state and territory, 1 May 2021 to 30 June 2021



* Carbapenemase-producing (*n* = 113), carbapenemase-producing plus transmissible resistance to colistin (*n* = 6)

Figure 10: Top three reported carbapenemase-producing *Enterobacterales* types* by specimen type, by state and territory, 1 May 2021 to 30 June 2021



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

Other types: OXA-23-like (*n* = 2, NSW [screen], Vic [clinical]); KPC (*n* = 1, WA [clinical]); IMI (*n* = 1, Vic [screen])

Table 4: Top four carbapenemase types from *Enterobacterales*, number reported by setting, by state and territory, 1 May 2021 to 30 June 2021

Carbapenemase type[†]	Setting	State or territory								Total
		NSW	Vic	Qld	SA	WA	Tas	NT	ACT	
IMP	**Total**	**43**	**10**	**16**	**1**	**4**	**0**	**1**	**1**	**76**
	Public hospitals	36	10	11	1	2	0	1	1	62
	Private hospitals	2	0	2	0	0	0	0	0	4
	Aged care homes	2	0	2	0	0	0	0	0	4
	Community	3	0	0	0	2	0	0	0	5
	Unknown	0	0	1	0	0	0	0	0	1
NDM	**Total**	**7**	**7**	**6**	**6**	**1**	**0**	**0**	**0**	**27**
	Public hospitals	7	7	3	5	0	0	0	0	22
	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	0	1	1	1	0	0	0	3
	Unknown	0	0	1	0	0	0	0	0	1
OXA-48-like	**Total**	**2**	**1**	**3**	**2**	**1**	**0**	**0**	**1**	**10**
	Public hospitals	2	1	1	2	0	0	0	1	7
	Private hospitals	0	0	2	0	0	0	0	0	2
	Aged care homes	0	0	0	0	0	0	0	0	0
	Community	0	0	0	0	1	0	0	0	1
	Unknown	0	0	0	0	0	0	0	0	0
IMP+NDM	**Total**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**2**
	Public hospitals	1	0	1	0	0	0	0	0	2
	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

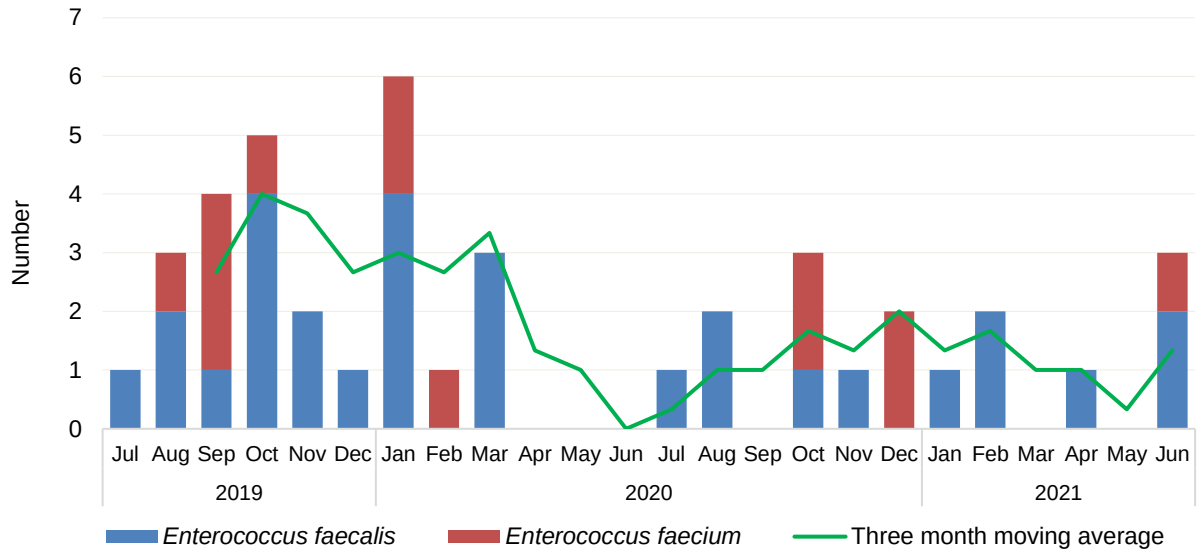
* Top four carbapenemase types account for 97% (115/119) of all carbapenemase-producing *Enterobacterales* reported for this period. Other types were OXA-23-like (*n* = 2, NSW [1] and Vic [1]), KPC (*n* = 1, WA), and IMI (*n* = 1, Vic)

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

Enterococcus species

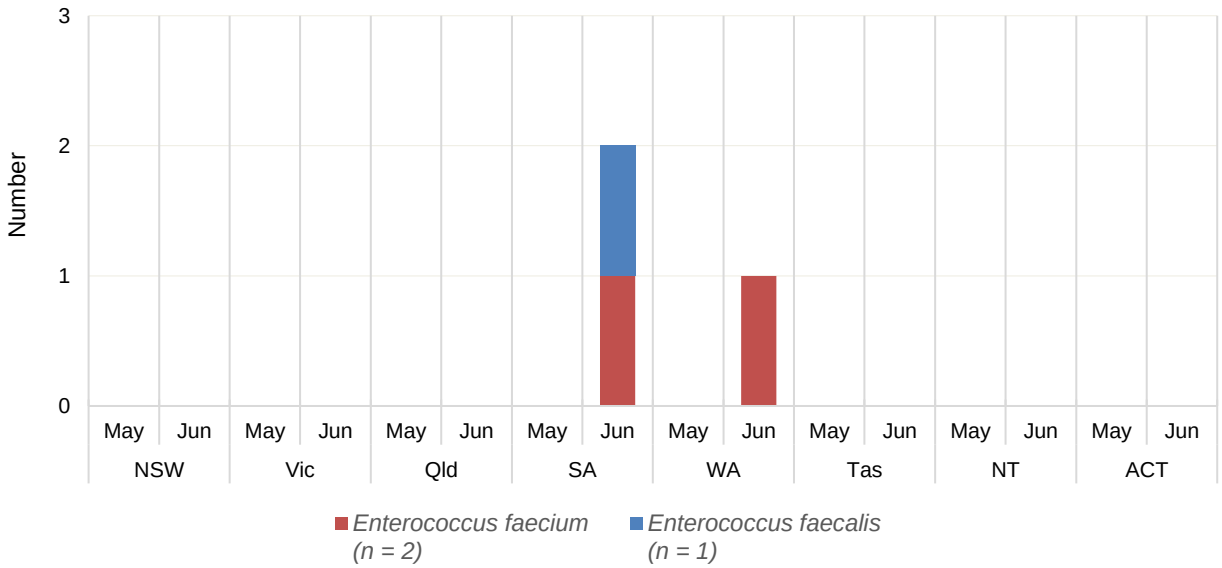
National data

Figure 11: Linezolid non-susceptible *Enterococcus* species, twenty-four-month trend, national, 1 July 2019–30 June 2021



State and territory data

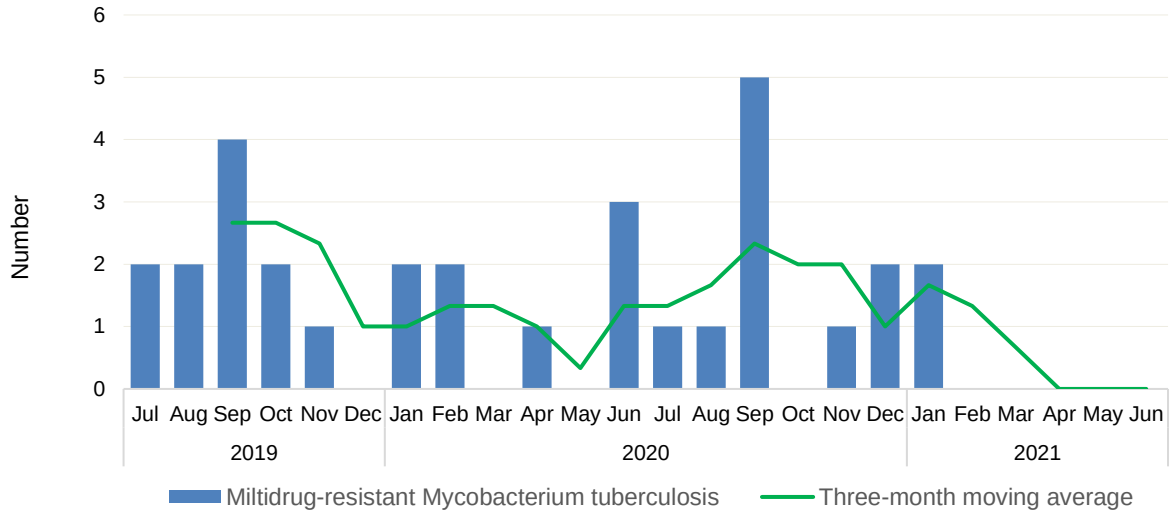
Figure 12: Linezolid non-susceptible *Enterococcus* species, number reported by state and territory, 1 May 2021 to 30 June 2021



Mycobacterium tuberculosis

National data

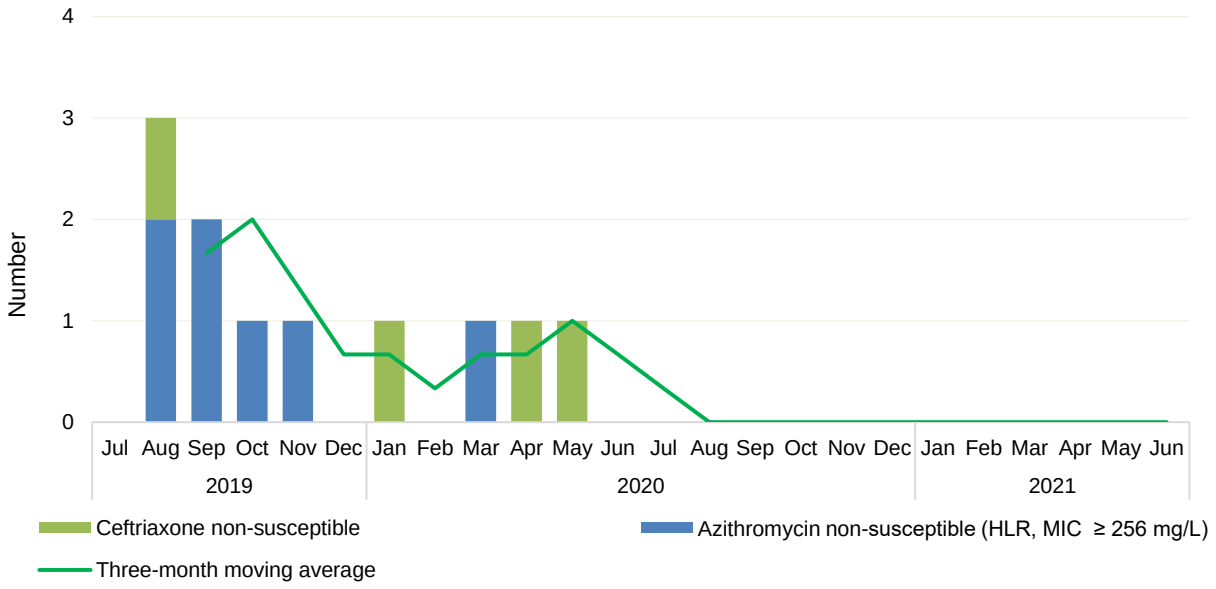
Figure 13: Multidrug-resistant *Mycobacterium tuberculosis,* twenty-four-month trend, national, 1 July 2019–30 June 2021



Neisseria gonorrhoeae

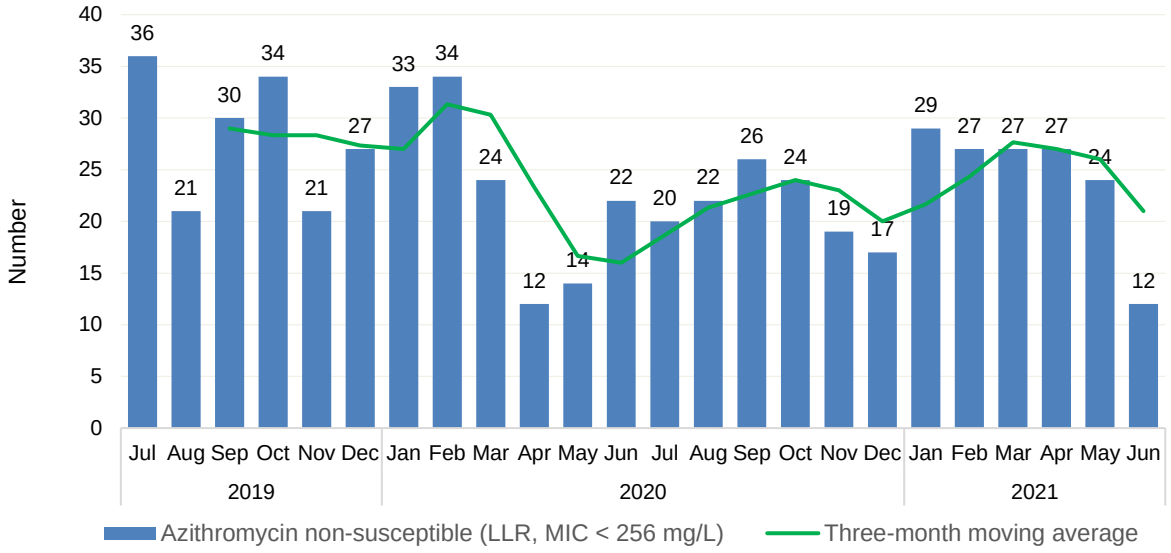
National data

Figure 14: Ceftriaxone non-susceptible and/or azithromycin non-susceptible (HLR, MIC ≥ 256 mg/L) *Neisseria gonorrhoeae,* number reported by month, national, 1 July 2019–30 June 2021



HLR: High level resistance; MIC = minimum inhibitory concentration

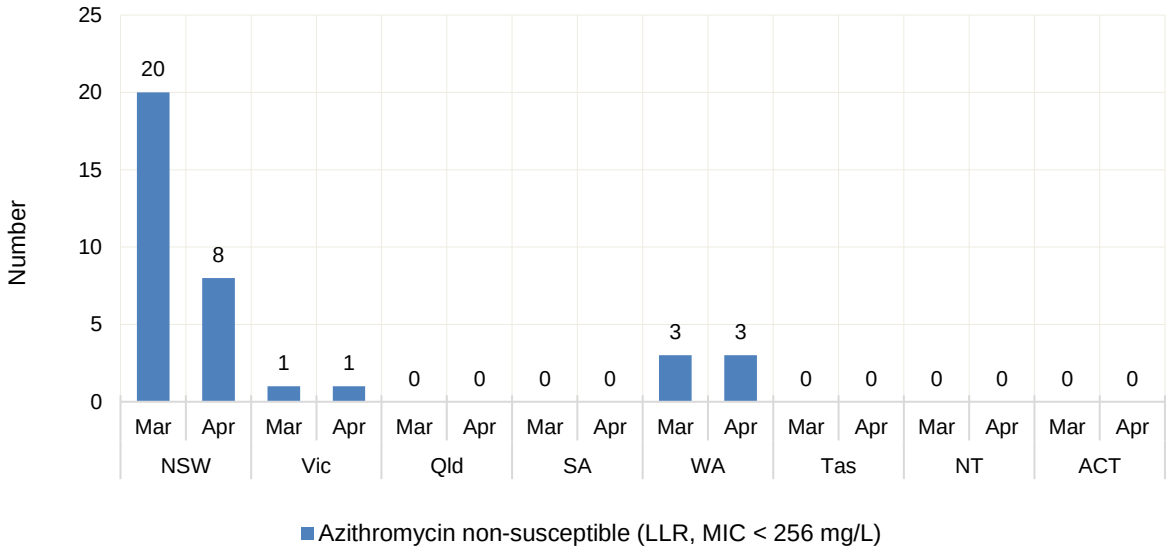
Figure 15: Azithromycin non-susceptible (LLR, MIC < 256 mg/L) *Neisseria gonorrhoeae*, twenty-four-month trend, national, 1 May 2019–30 June 2021



LLR: Low level resistance; MIC = minimum inhibitory concentration

State and territory data

Figure 16: Azithromycin non-susceptible (LLR, MIC < 256 mg/L) *Neisseria gonorrhoeae,* number reported by month, state and territory, 1 May 2021 to 30 June 2021

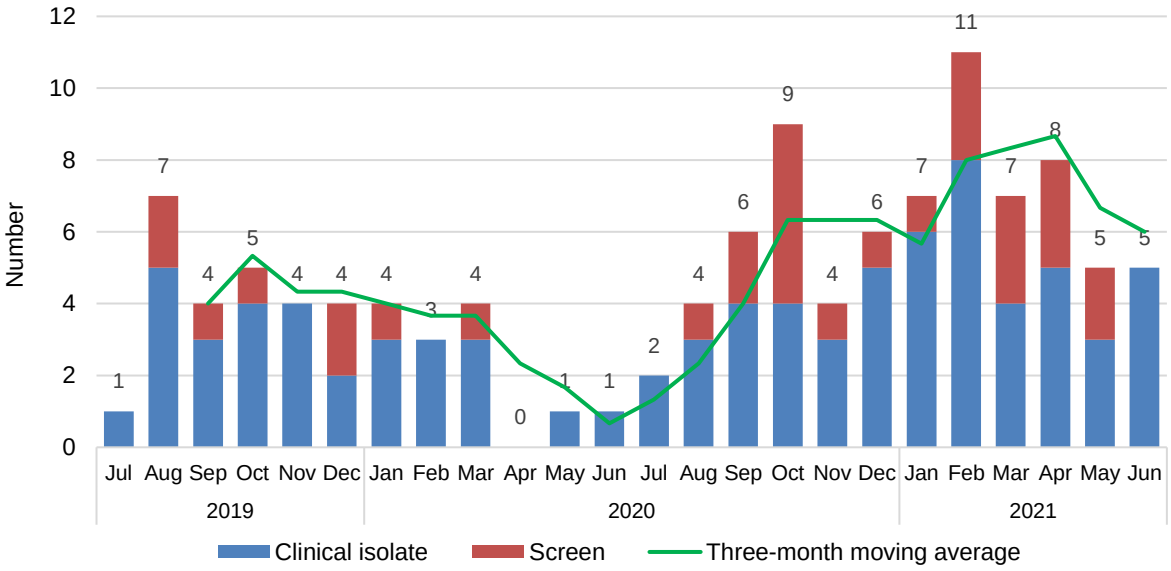


LLR: Low level resistance; MIC = minimum inhibitory concentration

Pseudomonas aeruginosa

National data

Figure 17: Carbapenemase-producing *Pseudomonas aeruginosa**, twenty-four-month trend by specimen type, national, 1 July 2019–28 February 2021



State and territory data

Figure 18: Carbapenemase-producing *Pseudomonas aeruginosa*, number reported by carbapenemase type and specimen type, by state and territory, 1 May 2021 to 30 June 2021

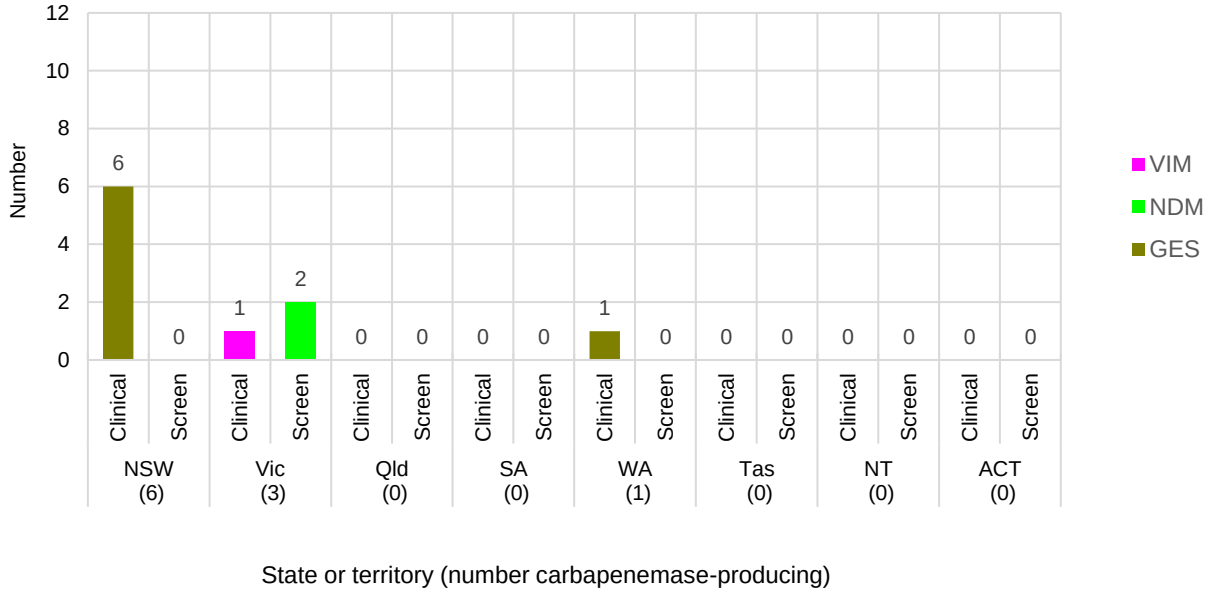


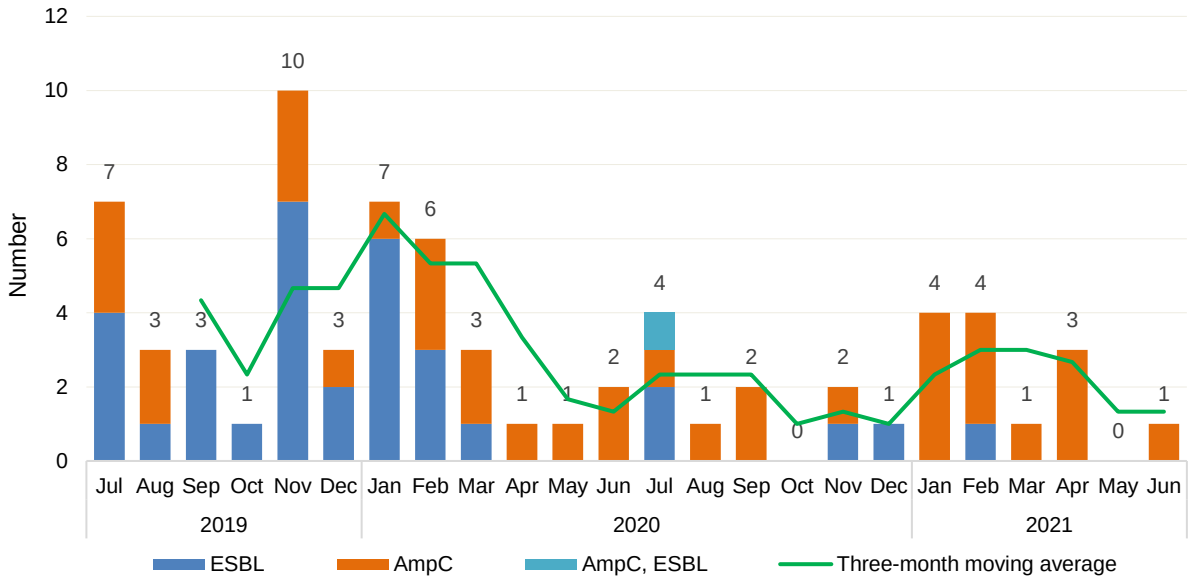
Table 5: Carbapenemase-producing *Pseudomonas aeruginosa*, number reported by setting, by state and territory, 1 May 2021 to 30 June 2021

	State or territory								
Setting	**NSW**	**Vic**	**Qld**	**SA**	**WA**	**Tas**	**NT**	**ACT**	**Total**
Total	**6**	**3**	**0**	**0**	**1**	**0**	**0**	**0**	**10**
Public hospital	5	2	0	0	1	0	0	0	8
Private hospital	1	1	0	0	0	0	0	0	2
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

Salmonella species

National data

Figure 19: Ceftriaxone non-susceptible *Salmonella* species, twenty-four-month trend, national, 1 May 2019–30 June 2021



Note: (1 May 2021—30 June 2021)

1. Non-typhoidal *Salmonella* species (*n* = 1) and typhoidal *Salmonella* species (*n* = 0)

Shigella species

National data

Figure 20: Multidrug-resistant *Shigella* species, twenty-four-month trend, national, 1 May 2019 to 30 June 2021

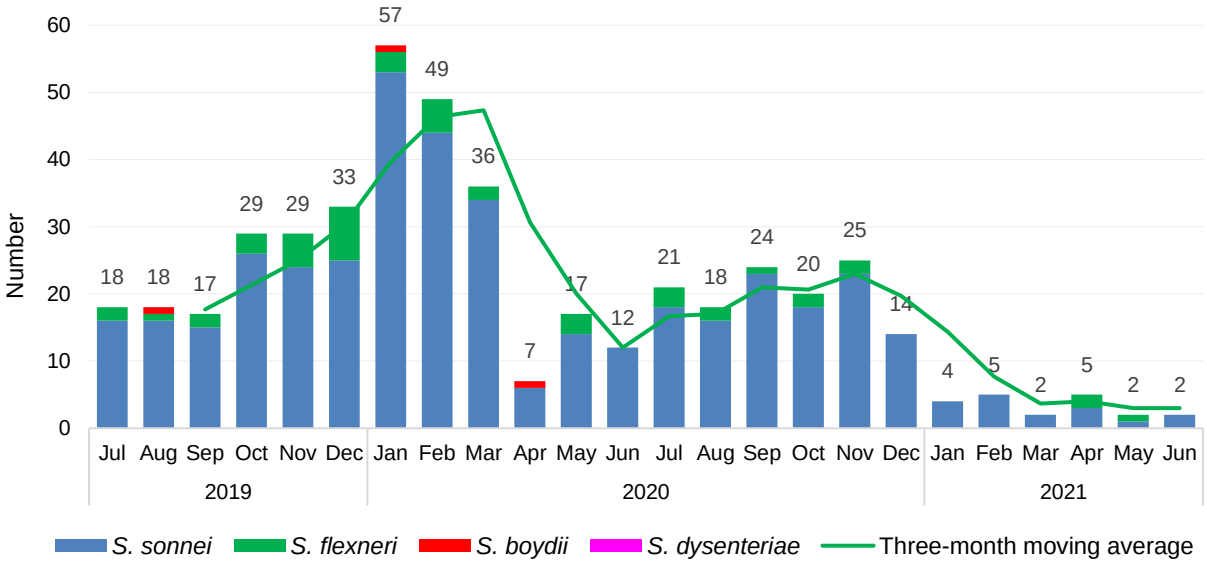
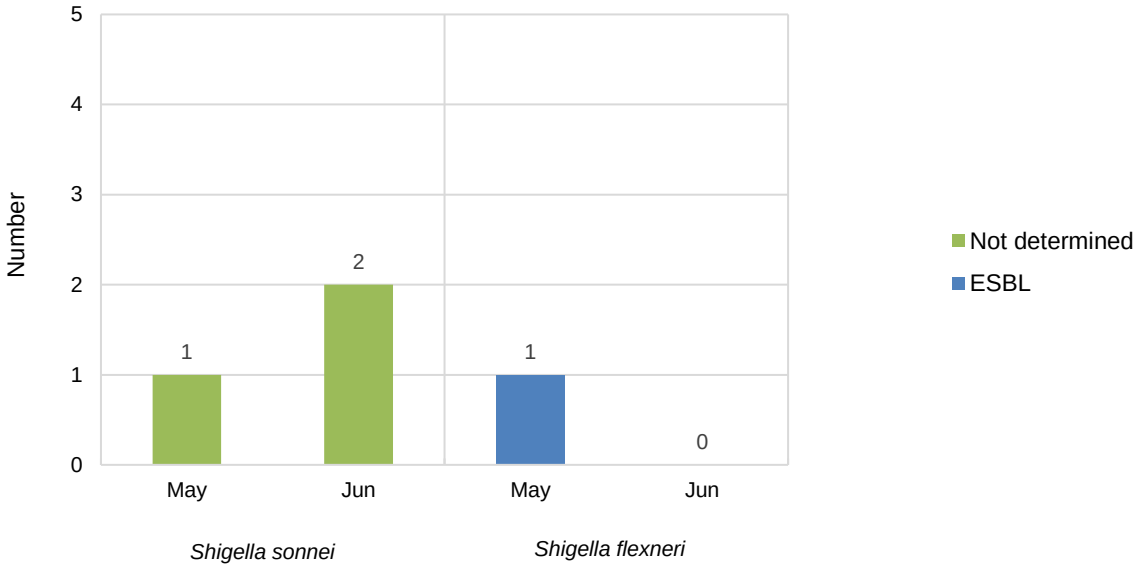


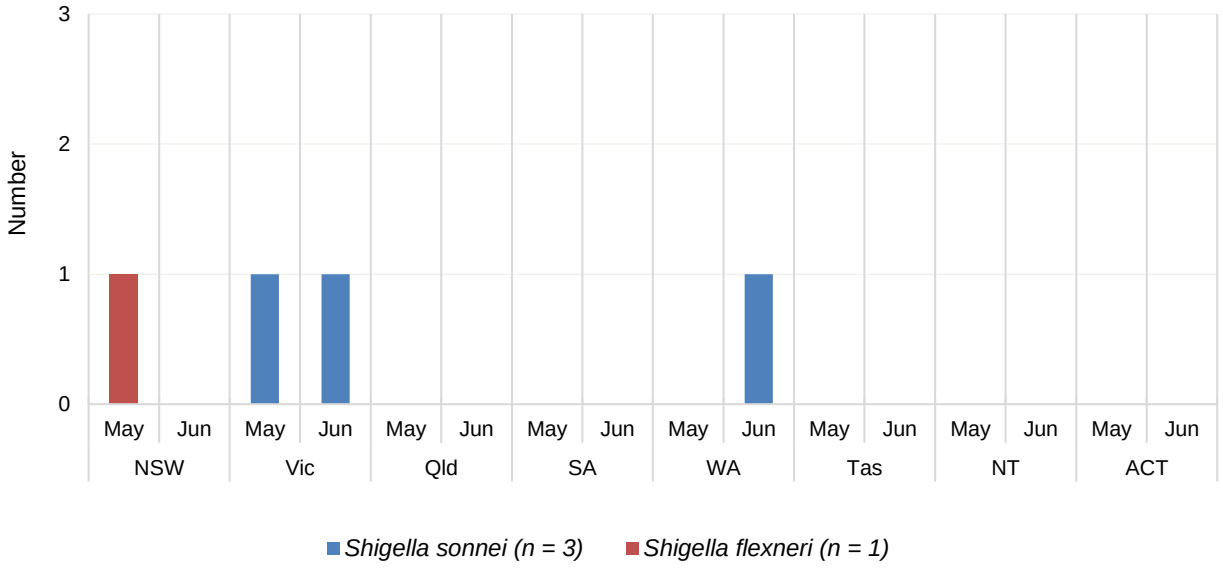
Figure 21: Multidrug-resistant *Shigella* species, number reported by month, national, 1 May 2021 to 30 June 2021



Not determined = multidrug resistant, ceftriaxone susceptible

State and territory data

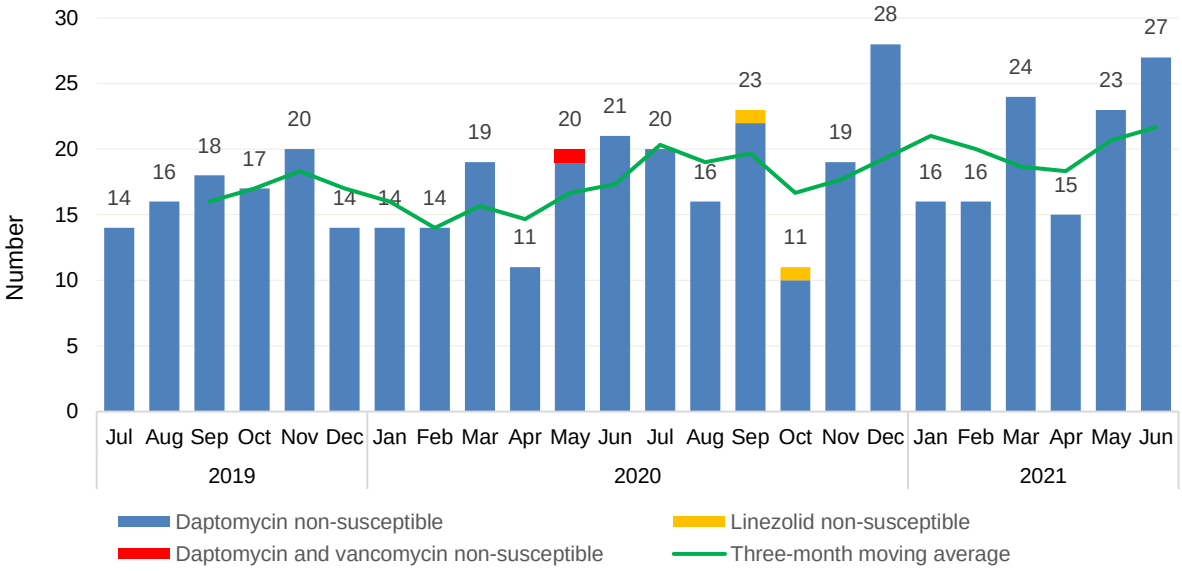
Figure 22: Multidrug-resistant *Shigella* species, number reported by state and territory, 1 May 2021 to 30 June 2021



Staphylococcus aureus

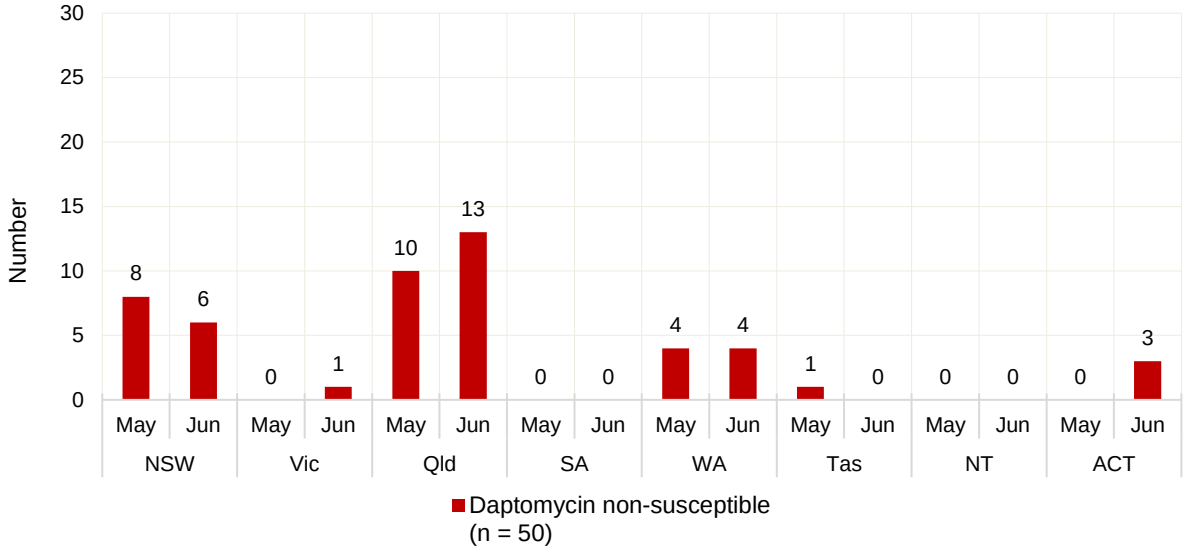
National data

Figure 23: Daptomycin, linezolid or vancomycin non-susceptible *Staphylococcus aureus,* twenty-four-month trend, national, 1 July 2019–30 June 2021



State and territory data

Figure 24: Daptomycin, linezolid or vancomycin non-susceptible *Staphylococcus aureus*, number reported by month, state and territory, 1 May 2021 to 30 June 2021



Note: No linezolid non-susceptible or vancomycin non-susceptible *S. aureus* were reported during this period.

Table 6: Daptomycin non-susceptible *Staphylococcus aureus,* number reported by setting and state and territory, 1 May 2021 to 30 June 2021

	State or territory								
Setting	**NSW**	**Vic**	**Qld**	**SA**	**WA**	**Tas**	**NT**	**ACT**	**Total**
Total	**14**	**1**	**23**	**0**	**8**	**1**	**0**	**3**	**50**
Public hospital	8	1	0	0	8	1	0	1	19
Private hospital	1	0	4	0	0	0	0	0	5
Aged care home	0	0	8	0	0	0	0	0	8
Community	5	0	9	0	0	0	0	2	16
Unknown	0	0	2	0	0	0	0	0	2

Appendix

Data Notes

The following are important considerations for interpreting CARAlert data:

1. The data are based on the date that the isolate with the confirmed CAR was collected.
2. States and territories refer to the state or territory where the CAR was detected. If place of residence is unknown or overseas, the state or territory of the originating laboratory is reported.
3. Comparison between reports may be influenced by delayed detection or late submissions of CARs.
4. 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.
5. Cut-off date for data that are included in updates and reports is four weeks after the end of each reporting period.
6. 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.
7. 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 where a patient with a confirmed CAR was cared for, and to extract reports on their data.

About CARAlert

CARAlert is a component of the Antimicrobial Use and Resistance in Australia (AURA) Surveillance System. CARAlert was established by the Australian Commission on Safety and Quality in Health Care in March 2016.

The 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. Funding for AURA is provided by the Australian Government Department of Health and state and territory health departments.

Critical antimicrobial resistances (CARs) are resistance mechanisms known to be a serious threat to the effectiveness of last-line antimicrobial agents. CARs can result in significant morbidity and mortality.

The CARs reported under CARAlert are listed in Table A1. The CARs were drawn from the list of high-priority organisms and antimicrobials which are the focus of the AURA Surveillance System.[2]

Table A1: List of critical antimicrobial resistances reported to CARAlert

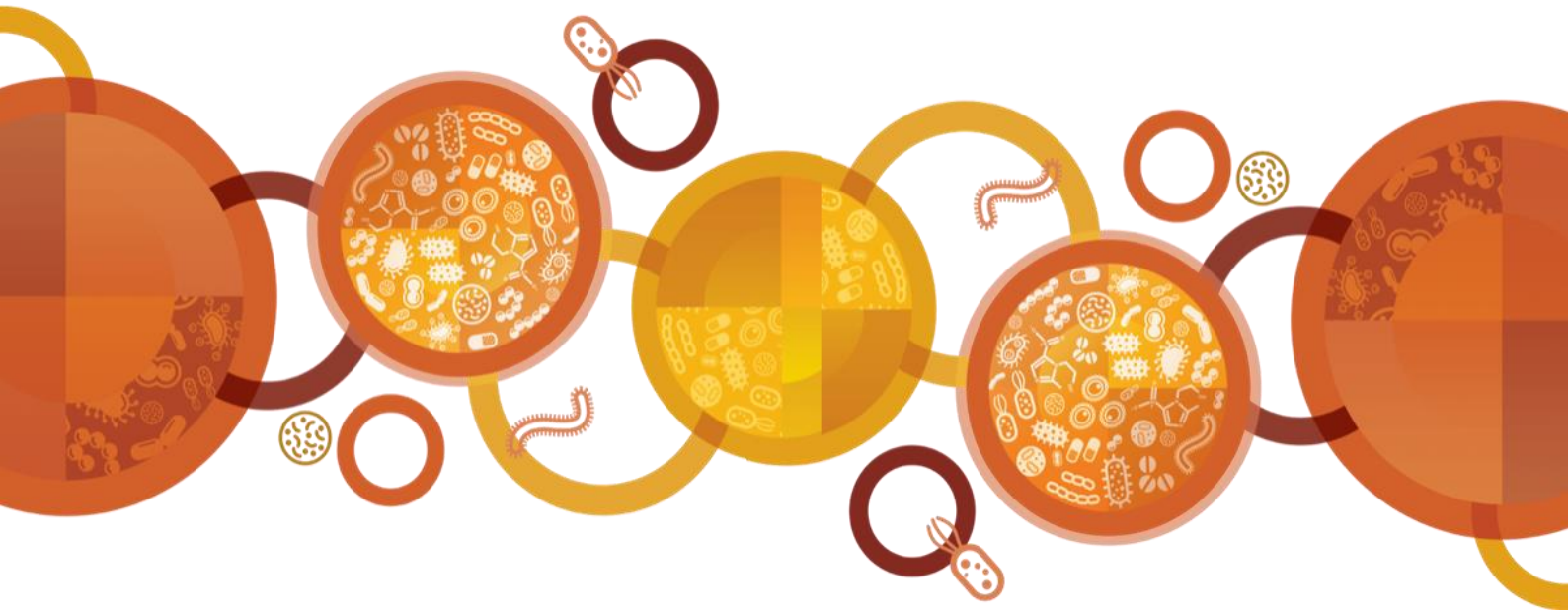
Species	Critical resistance
Acinetobacter baumannii complex	Carbapenemase-producing
Candida auris	–
Enterobacterales	Carbapenemase-producing, and/or ribosomal methyltransferase-producing
Enterobacterales	Transmissible colistin resistance
Enterococcus species	Linezolid resistant
Mycobacterium tuberculosis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

* For CARAlert, *S. aureus* complex includes *S. aureus*, *S. argenteus and S. schweitzeri*

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, it sends the isolate to a confirming laboratory that has the capacity to confirm the CAR
3. 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.

[2] Australian Commission on Safety and Quality in Health Care (ACSQHC). AURA 2019: Third Australian report on antimicrobial use and resistance in human health. Sydney: ACSQHC; 2019.



AUSTRALIAN COMMISSION
ON SAFETY AND QUALITY IN HEALTH CARE

Level 5, 255 Elizabeth Street, Sydney NSW 2000
GPO Box 5480, Sydney NSW 2001

Phone: (02) 9126 3600

Email: mail@safetyandquality.gov.au

Website: www.safetyandquality.gov.au