

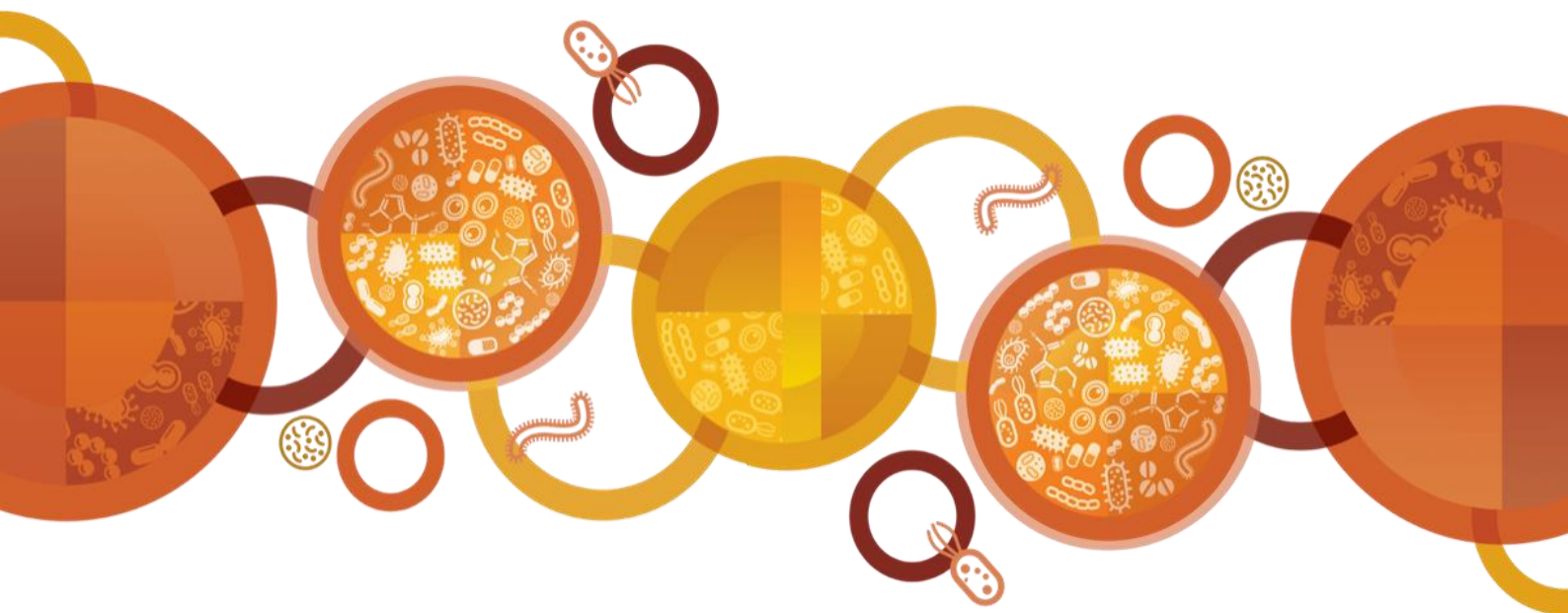
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Data Summary

This report provides an update on data submitted to the National Alert System for Critical Antimicrobial Resistances (CARAlert) for the reporting period: 1 May 2022 to 30 June 2022, and complements previous analyses of and updates on [CARAlert data](#).

National overview

- The total number of critical antimicrobial resistances (CARs) reported was up 22.3% compared to the previous two-month reporting period ($n = 247$ versus $n = 202$)
- Two-thirds of the CARs reported were carbapenemase-producing *Enterobacterales* (CPE) (including those with ribosomal methyltransferase and/or transmissible resistance to colistin) (154/247, 62.3%)
- 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 13.4% ($n = 389$ versus $n = 343$)
- Daptomycin-nonsusceptible *Staphylococcus aureus* (DNSA) was the second most reported CAR (29/247, 11.7%)
- The number of ceftriaxone- or azithromycin-nonsusceptible *Neisseria gonorrhoeae* increased by 46.7% ($n = 22$) compared with the previous two-month reporting period ($n = 15$)
- Excluding *N. gonorrhoeae*, where the setting was known, most CARs were reported from public hospitals (172/217, 79.3%). There were 31 (14.3%) reports from community settings, eight (3.7%) from private hospitals, and six (2.8%) from aged care homes.

Carbapenemase-producing *Enterobacterales*

- IMP (81/154, 52.6%), NDM (54/154, 35.1%), and OXA-48-like (10/154, 6.5%) types accounted for 94.2% of all CPE reported during this period
- The total number of CPE (either alone or in combination with other CARs) increased ($n = 154$, up 18.5%) compared to the previous two-month period ($n = 130$). The total number of IMP-types reported was similar ($n = 81$) during this reporting period compared to the previous reporting period ($n = 77$). There was an increase in reports from New South Wales ($n = 37$ versus $n = 30$) and a decrease in reports from Queensland ($n = 29$ versus $n = 37$)
- There was an increase in the total number of NDM-types ($n = 54$, up 68.8%) compared to the previous two-month period ($n = 32$). The increase was mostly seen in the reports from Victoria ($n = 21$ versus $n = 9$)
- NDM-producing *Escherichia coli* outnumbered IMP-producing *Enterobacter cloacae* complex for the first time during this reporting period ($n = 36$ versus $n = 32$)
- One KPC-producing *Klebsiella pneumoniae* was reported from Victoria
- Excluding CARs for which the setting was unknown, 14.9% (22/148) of CPE were reported from settings other than public hospitals; 8.1% (12/148), 5.4% (8/148), and 1.4% (2/148), were from community, private hospitals, and aged care homes respectively
- Eight hospitals ($n = 4$ in New South Wales; $n = 2$ in Queensland; $n = 1$ in Victoria, $n = 1$ in the Australian Capital Territory) had more than two reports of IMP-types. A further seven hospitals had two notifications of IMP-types: Queensland ($n = 4$), New South Wales ($n = 1$), Victoria ($n = 1$), and Western Australia ($n = 1$)
- Nine hospitals had more than one report of NDM-types; in Victoria ($n = 3$), Queensland ($n = 2$), New South Wales ($n = 2$), South Australia ($n = 1$), and the Australian Capital Territory ($n = 1$).

Salmonella and *Shigella* species

- Seven ceftriaxone-nonsusceptible *Salmonella* species were reported during this period: six non-typhoidal species, three from Victoria (AmpC [2], ESBL [1]), two from Queensland (AmpC [1], ESBL [1]), and one from Western Australia (ESBL); one *S. Typhi* (ESBL) was reported from New South Wales
- There were 12 multidrug-resistant *Shigella* species reported in this period: 11 *S. sonnei* and one *S. flexneri*. All *S. sonnei* had an ESBL phenotype, and six harboured *bla*_{CTX-M-27}.

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

- The total number of reports of this CAR increased by 41.7% compared with the previous two-month reporting period ($n = 17$ versus $n = 12$). Reports were from Victoria ($n = 11$), Western Australia ($n = 4$) and Queensland ($n = 2$).

Ceftriaxone- and/or azithromycin-nonsusceptible *N. gonorrhoeae*

- Five ceftriaxone-nonsusceptible *N. gonorrhoeae* were reported during this period: – three from Victoria and two from Western Australia. Two of the ceftriaxone-nonsusceptible isolates from Victoria were also low-level azithromycin resistant
- There were no reports of *N. gonorrhoeae* with high-level resistance to azithromycin.

Daptomycin-, linezolid-, or vancomycin-nonsusceptible *Staphylococcus aureus* complex

- The number of reports of daptomycin-nonsusceptible *S. aureus* (DNSA) increased 52.6% compared with the previous two-month reporting period ($n = 29$ versus $n = 19$). One DNSA from Victoria was also vancomycin-nonsusceptible
- Just over one-third of the DNSA reports were from Western Australia (10/29, 34.5%), and 69.0% (20/29) of all reports were from public hospitals
- No linezolid-nonsusceptible *S. aureus* were reported in this period.

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

- Four carbapenemase-producing *A. baumannii* complex were reported during this period. The reports were from the Northern Territory (bla_{OXA-23} , $n = 3$), and Western Australia (bla_{NDM-1} , $n = 1$)
- The number of carbapenemase-producing *P. aeruginosa* reports decreased compared to the previous two-month reporting period ($n = 9$ versus $n = 14$). Reports were from New South Wales (bla_{GES-5} , $n = 5$; bla_{NDM-1} , $n = 2$), and Victoria (bla_{GES-5} , $n = 1$; bla_{VIM-2} , $n = 1$).

Linezolid-resistant *Enterococcus*

- Four linezolid-resistant *Enterococcus* species were reported during this period, one each from Victoria (*E. faecium*), Queensland (*E. faecalis*), Western Australia (*E. faecalis*), and the Australian Capital Territory (*E. faecium*).

Candida auris

- One *Candida auris* was reported from Victoria during this period.

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

- Three *Enterobacterales* with *mcr-10* genes were reported from Victoria 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.

National summary

Table 1: Number of critical antimicrobial resistances, by state and territory, 1 May 2022–30 June 2022, and year to date 2021 and 2022

Species	Critical resistance	State or Territory (May–June 2022)								Bi-monthly			Year to date		
		NSW	Vic	Qld	SA	WA	Tas	NT	ACT	2022	2022	Relative change*	2021	2022	Relative change*
										Mar-Apr	May-Jun				
<i>Acinetobacter baumannii</i> complex	Carbapenemase-producing	0	0	0	0	1	0	3	0	4	4	0.0%	7	9	▲ 28.6%
	Carbapenemase and ribosomal methyltransferase-producing	0	0	0	0	0	0	0	0	0	0	–	1	0	▼ 100%
<i>Candida auris</i>	–	0	1	0	0	0	0	0	0	1	1	0.0%	1	3	▲ 200%
<i>Enterobacterales</i>	Carbapenemase-producing	52	28	43	8	4	2	1	5	122	143	▲ 17.2%	308	361	▲ 17.2%
	Carbapenemase and ribosomal methyltransferase-producing	0	6	0	0	1	0	0	0	3	7	▲ 133%	8	12	▲ 50.0%
	Carbapenemase-producing and transmissible resistance to colistin	3	1	0	0	0	0	0	0	5	4	▼ 20.0%	27	16	▼ 40.7%
	Carbapenemase and RMT-producing and transmissible resistance to colistin	0	0	0	0	0	0	0	0	0	0	–	0	0	–
	Ribosomal methyltransferase-producing	0	1	0	0	0	0	0	0	1	1	0.0%	6	2	▼ 66.7%
	Transmissible resistance to colistin	0	3	0	0	0	0	0	0	3	3	0.0%	3	6	▲ 100%
<i>Enterococcus</i> species	Linezolid resistant	0	1	1	0	1	0	0	1	3	4	▲ 33.3%	7	10	▲ 42.9%
<i>Mycobacterium tuberculosis</i>	Multidrug-resistant – at least rifampicin- and isoniazid-resistant strains	1	0	0	0	0	0	0	0	0	1	–	10	5	▼ 50.0%
<i>Neisseria gonorrhoeae</i>	Azithromycin-nonsusceptible (low-level) [†]	0	11	2	0	4	0	0	0	12	17	▲ 41.7%	146	42	▼ 71.2%
	Azithromycin-nonsusceptible (high-level) [§]	0	0	0	0	0	0	0	0	3	0	▼ 100%	0	3	–
	Ceftriaxone-nonsusceptible	0	1	0	0	2	0	0	0	0	3	–	0	6	–
	Ceftriaxone-nonsusceptible and azithromycin-nonsusceptible	0	2	0	0	0	0	0	0	0	2	–	0	3	–

RMT = ribosomal methyltransferase; – = not applicable

Table 1 (continued)

Species	Critical resistance	State or territory (March–April 2022)								Bi-monthly			Year to date		
		NSW	Vic	Qld	SA	WA	Tas	NT	ACT	2022	2022	Relative change*	2021	2022	Relative change*
										Mar-Apr	May-Jun				
<i>Pseudomonas aeruginosa</i>	Carbapenemase-producing	7	2	0	0	0	0	0	0	13	9	▼ 30.8%	41	32	▼ 22.0%
	Carbapenemase and ribosomal methyltransferase-producing	0	0	0	0	0	0	0	0	1	0	▼ 100%	2	2	0.0%
<i>Salmonella</i> species	Ceftriaxone-nonsusceptible	1	3	2	0	1	0	0	0	3	7	▲ 133%	13	16	▲ 23.1%
<i>Shigella</i> species	Multidrug-resistant	3	6	1	1	1	0	0	0	9	12	▲ 33.3%	24	30	▲ 25.0%
<i>Staphylococcus aureus</i> complex	Daptomycin-nonsusceptible	3	5	6	0	10	0	0	4	19	28	▲ 47.4%	131	74	▼ 43.5%
	Daptomycin- and vancomycin-nonsusceptible	0	1	0	0	0	0	0	0	0	1	–	0	1	–
	Linezolid-nonsusceptible	0	0	0	0	0	0	0	0	0	0	–	0	1	–
	Vancomycin-nonsusceptible	0	0	0	0	0	0	0	0	0	0	–	0	0	–
<i>Streptococcus pyogenes</i>	Penicillin reduced susceptibility	0	0	0	0	0	0	0	0	0	0	–	0	0	–
	Total (reported by 19 August 2022)	70	72	55	9	25	2	4	10	202	247	▲ 22.3	735	634	▼ 13.7%

MIC = minimum inhibitory concentration; – = not applicable

* Relative change = absolute change between period in 2021 and same period in 2022, for each CAR, expressed as a percentage of 2021 base

† Azithromycin MIC < 256 mg/L

§ Azithromycin MIC ≥ 256 mg/L

Note: The number of CARs for 2021 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 2022–30 June 2022

Species	Critical resistance	Setting					Total
		Public hospital	Private hospital	Aged care home	Community	Unknown	
<i>Acinetobacter baumannii</i> complex	Carbapenemase-producing	3	0	0	1	0	4
	Carbapenemase and ribosomal methyltransferase-producing	0	0	0	0	0	0
<i>Candida auris</i>	–	1	0	0	0	0	1
<i>Enterobacterales</i>	Carbapenemase-producing	119	7	2	10	5	143
	Carbapenemase and ribosomal methyltransferase-producing	3	1	0	2	1	7
	Carbapenemase-producing and transmissible resistance to colistin	4	0	0	0	0	4
	Ribosomal methyltransferase-producing	1	0	0	0	0	1
	Transmissible resistance to colistin	2	0	0	0	1	3
<i>Enterococcus</i> species	Linezolid-resistant	3	0	0	1	0	4
<i>Mycobacterium tuberculosis</i>	Multidrug-resistant – at least rifampicin- and isoniazid-resistant strains	1	0	0	0	0	1
<i>Neisseria gonorrhoeae</i>	Azithromycin-nonsusceptible (low-level)*	1	0	0	13	3	17
	Azithromycin-nonsusceptible (high-level)†	0	0	0	0	0	0
	Ceftriaxone-nonsusceptible	0	0	0	3	0	3
	Ceftriaxone-nonsusceptible and azithromycin-nonsusceptible	0	0	0	2	0	2
<i>Pseudomonas aeruginosa</i>	Carbapenemase-producing	7	0	1	1	0	9
	Carbapenemase and ribosomal methyltransferase-producing	0	0	0	0	0	0
<i>Salmonella</i> species	Ceftriaxone-nonsusceptible	4	0	0	2	1	7
<i>Shigella</i> species	Multidrug-resistant	4	0	0	8	0	12
<i>Staphylococcus aureus</i> complex	Daptomycin-nonsusceptible	19	0	3	6	0	28
	Daptomycin- and vancomycin-nonsusceptible	1	0	0	0	0	1
	Linezolid-nonsusceptible	0	0	0	0	0	0
	Vancomycin-nonsusceptible	0	0	0	0	0	0
<i>Streptococcus pyogenes</i>	Penicillin reduced susceptibility	0	0	0	0	0	0
	Total (reported by 19 August 2022)	173	8	6	49	11	247

* Azithromycin MIC < 256 mg/L

† Azithromycin MIC ≥ 256 mg/L

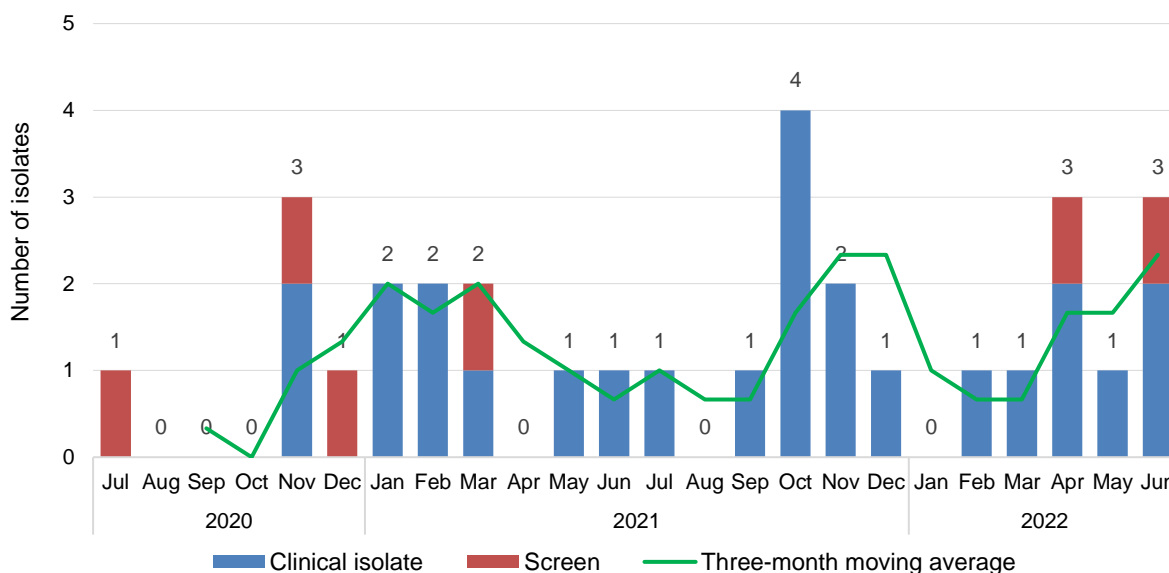
Note: Information on setting for *Neisseria gonorrhoeae* is often not available.

Summary by CAR

Acinetobacter baumannii complex

National data

Figure 1: Carbapenemase-producing *Acinetobacter baumannii* complex, 24-month trend by specimen type, national, 1 July 2020–30 June 2022



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 2022–30 June 2022

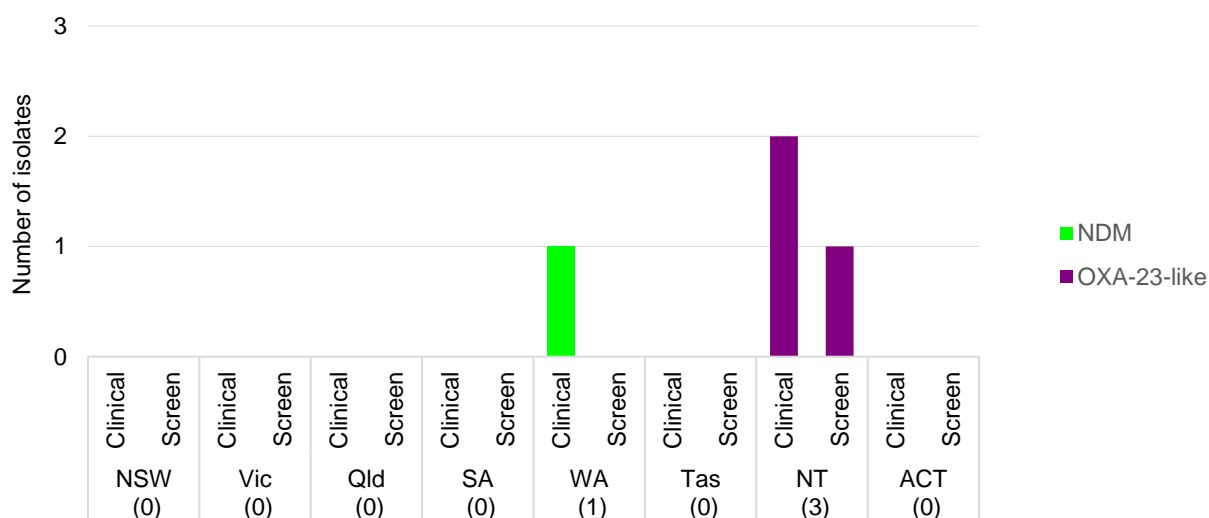


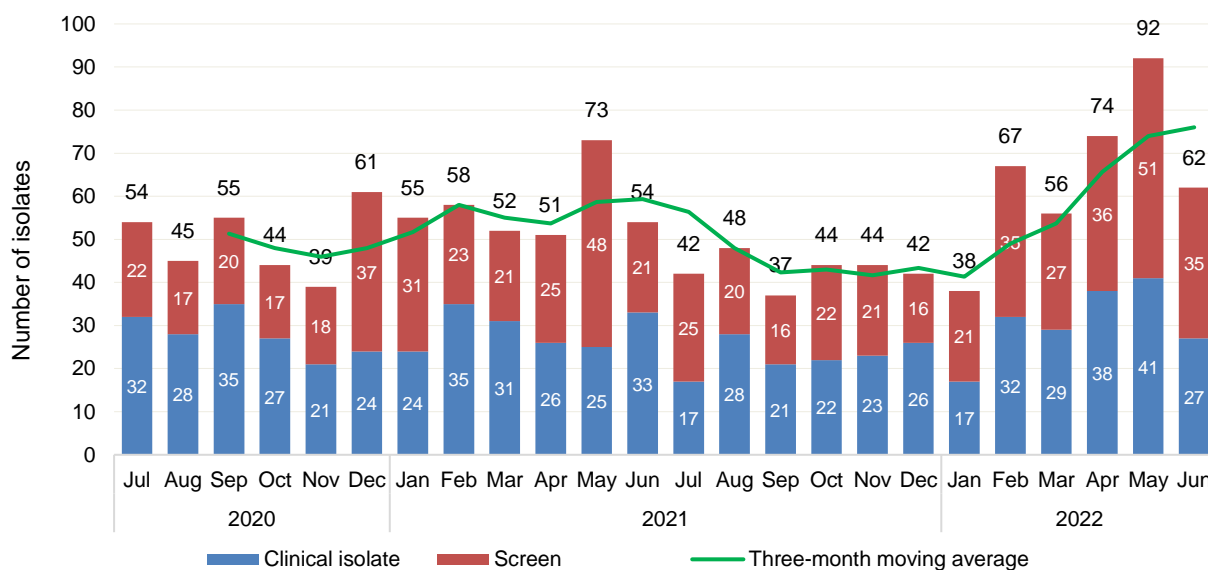
Table 3: Carbapenemase-producing *Acinetobacter baumannii* complex, number reported by setting, by state and territory, 1 May 2022–30 June 2022

Setting	State or territory								Total
	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	
Total	0	0	0	0	1	0	3	0	4
Public hospital	0	0	0	0	0	0	3	0	3
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	1	0	0	0	1
Unknown	0	0	0	0	0	0	0	0	0

Enterobacterales

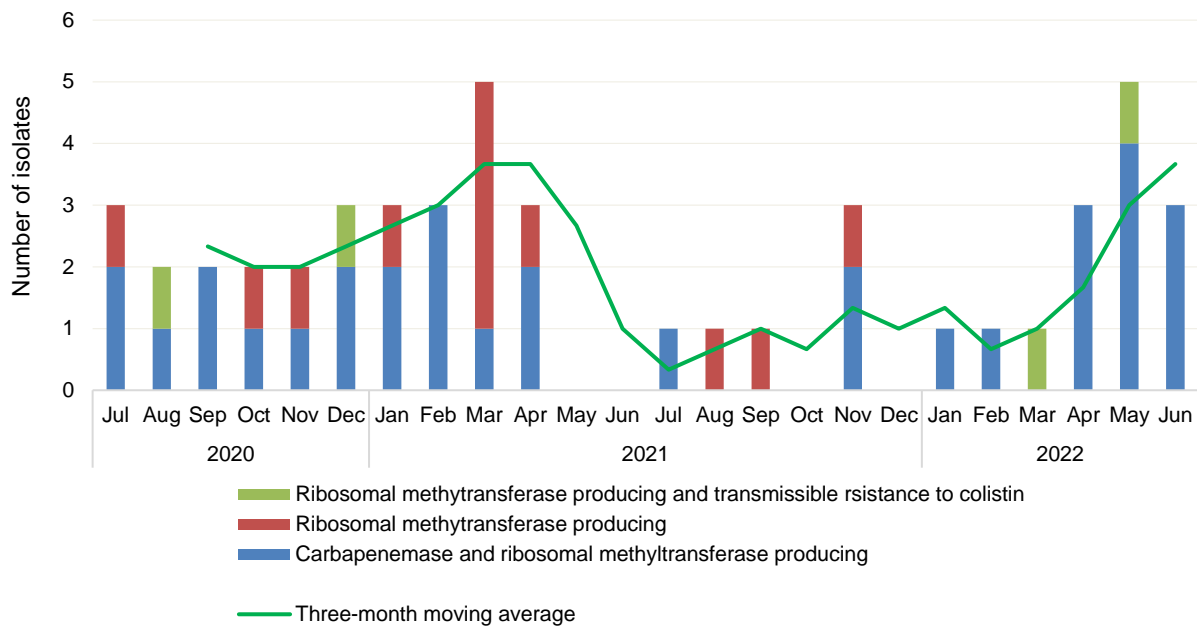
National data

Figure 3: Carbapenemase-producing *Enterobacterales**, 24-month trend by specimen type, national, 1 July 2020–30 June 2022



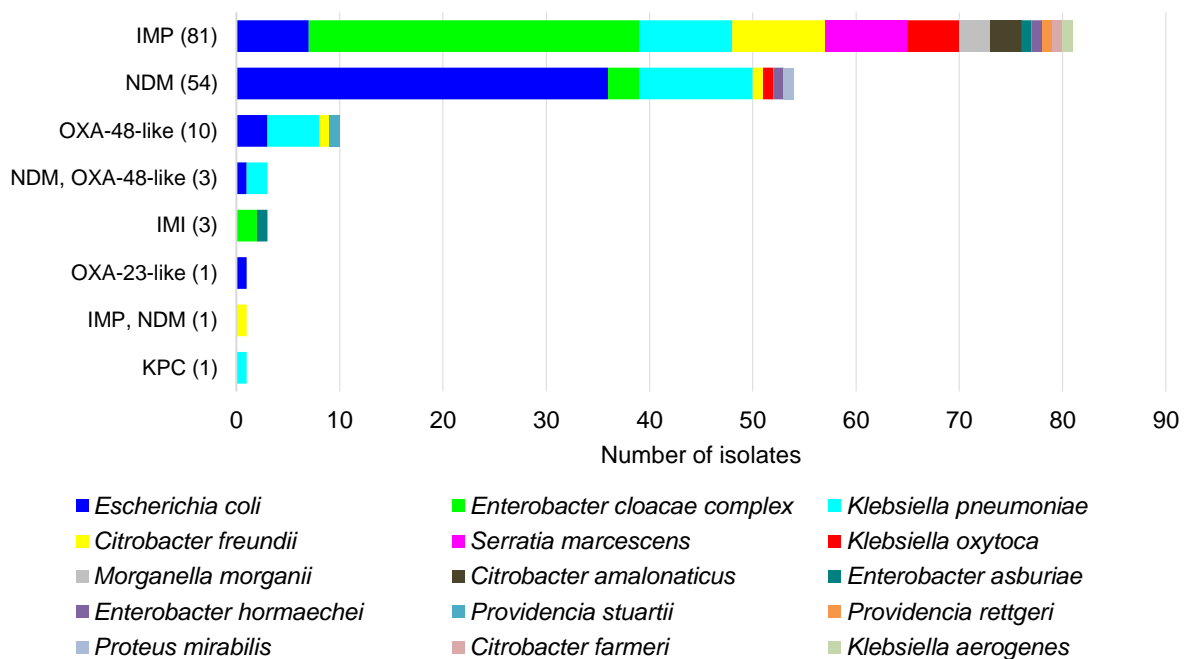
* Carbapenemase-producing alone or in combination with ribosomal methyltransferases

Figure 4: Ribosomal methyltransferase-producing *Enterobacterales**, 24-month trend, national, 1 July 2020–30 June 2022



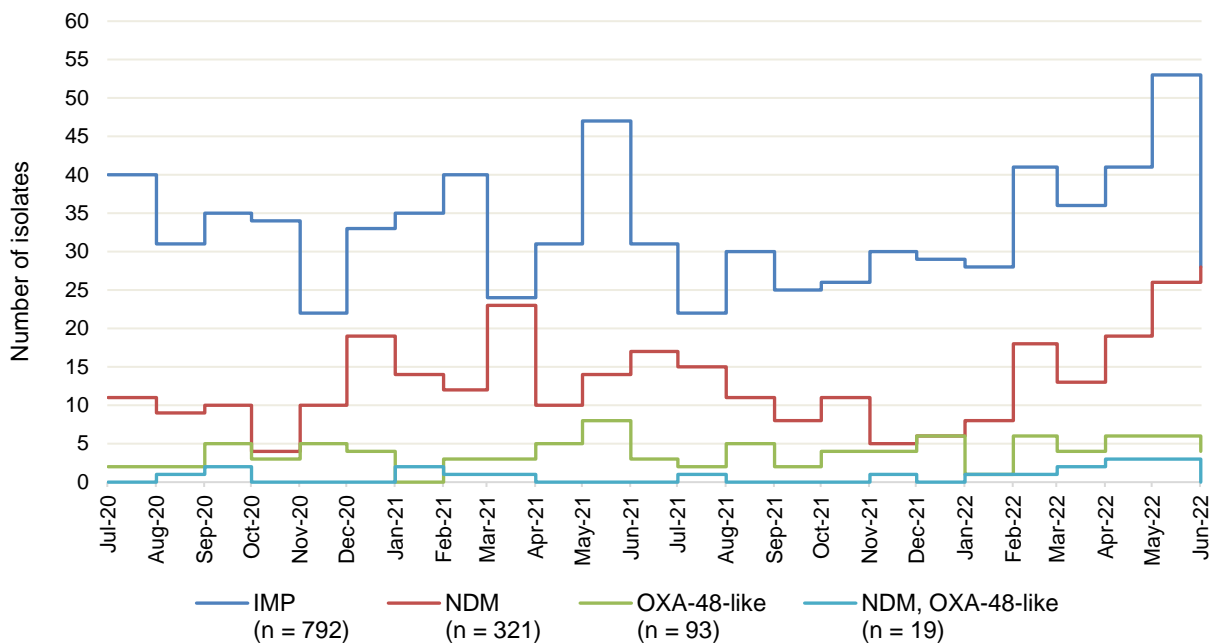
* Ribosomal methyltransferases alone, or in combination with carbapenemase(s)

Figure 5: Carbapenemase-producing *Enterobacterales**, number reported by carbapenemase type and species, national, 1 May 2022–30 June 2022



* Carbapenemase-producing ($n = 143$), carbapenemase and ribosomal methyltransferase-producing ($n = 7$), carbapenemase-producing plus transmissible resistance to colistin ($n = 4$)

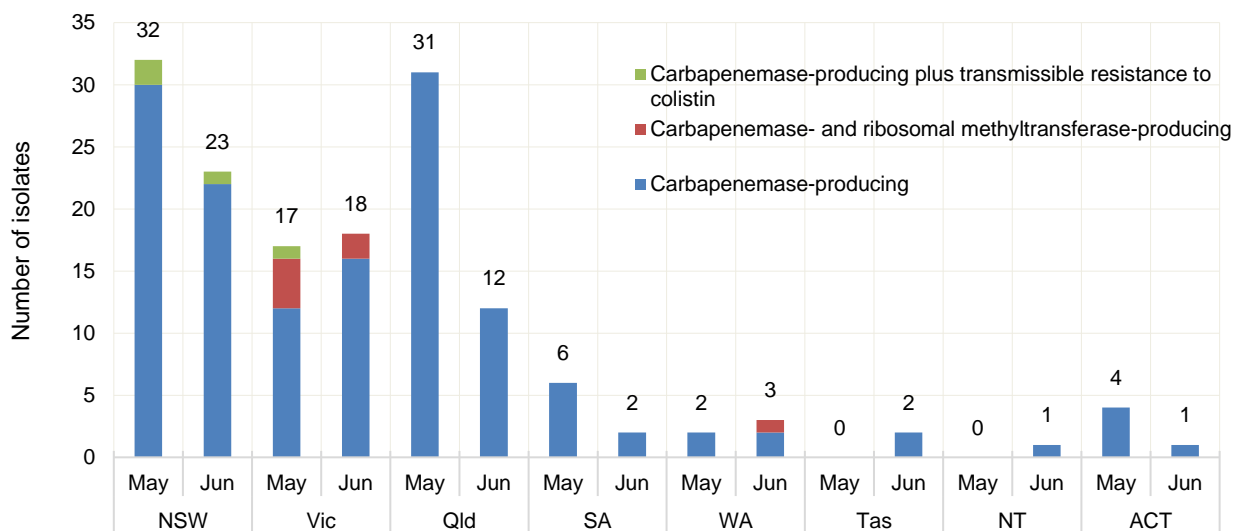
Figure 6: Top four reported carbapenemase types*, 24-month trend, national, 1 July 2020–30 June 2022



* 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 2022–30 June 2022



* Carbapenemase-producing ($n = 122$), carbapenemase-producing plus transmissible resistance to colistin ($n = 5$), carbapenemase and ribosomal methyltransferase-producing ($n = 3$)

Figure 8: Two-year trend for the top four reported carbapenemase types from *Enterobacteriales*, by state and territory and nationally, (three-month moving average), 1 July 2020–30 June 2022

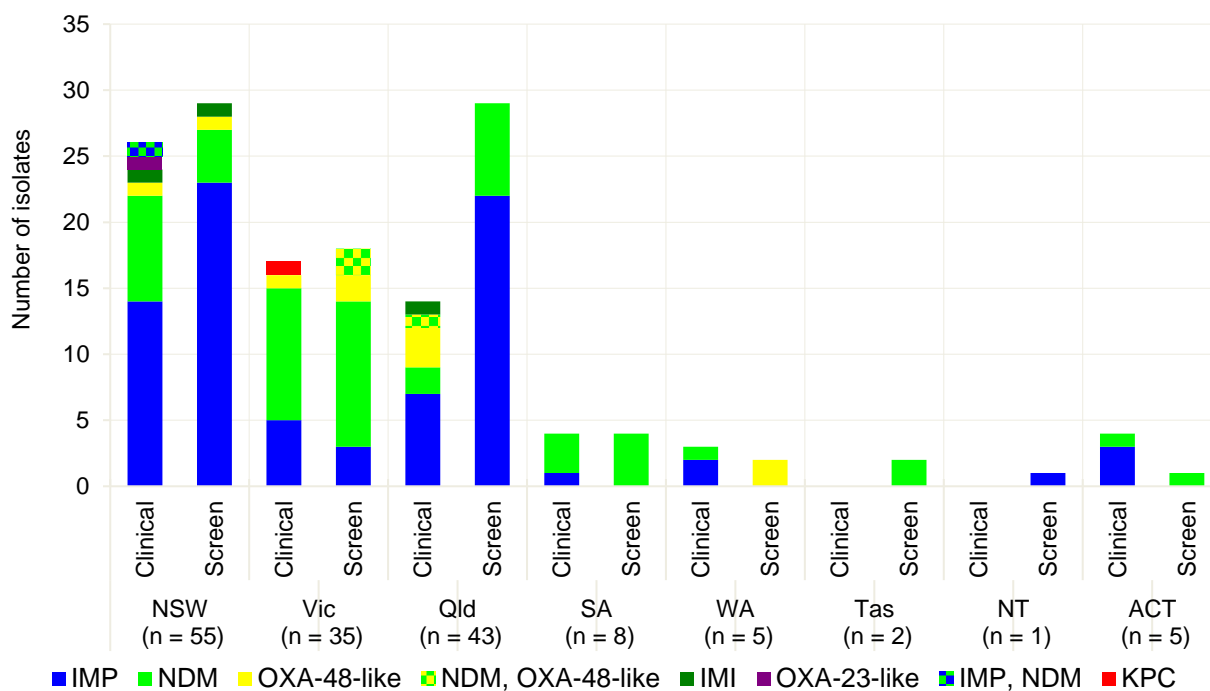
Type	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia
IMP	20 10	12 2	19 8	0 0	2 0	0 0	0 0	1 0	43 26
NDM	6 1	9 3	5 1	4 0	1 0	1 0	1 0	1 0	24 6
OXA-48-like	3 0	3 0	2 0	1 0	1 0	0 0	0 0	1 0	5 2
KPC	0 0	1 0	0 0	0 0	0 0	0 0	0 0	0 0	1 0
All types	28 14	24 1	26 10	5 1	3 1	1 0	1 0	2 0	76 41

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

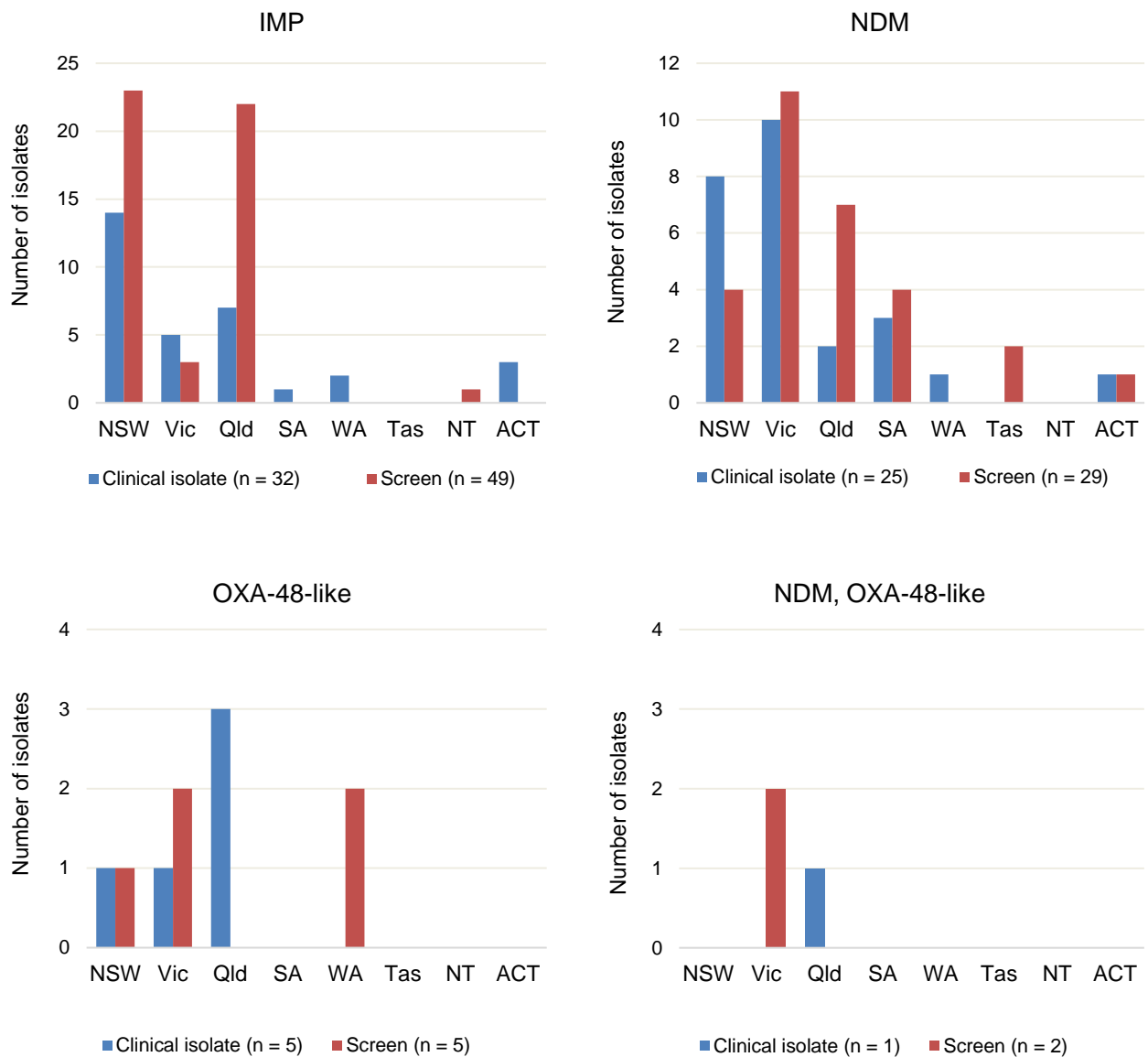
Note: Line graphs represent three-month moving average for the period 1 July 2020 to 30 June 2022, for each type, where maximum monthly average was greater than one.

Figure 9: Carbapenemase-producing *Enterobacteriales**, number reported by carbapenemase type and specimen type, by state and territory, 1 May 2022–30 June 2022



* Carbapenemase-producing ($n = 143$), carbapenemase and ribosomal methyltransferase-producing ($n = 7$), carbapenemase-producing plus transmissible resistance to colistin ($n = 4$)

Figure 10: Top four reported carbapenemase-producing *Enterobacterales* types by specimen type, by state and territory, 1 May 2022–30 June 2022



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

Table 4: Top four carbapenemase types from *Enterobacterales*, number reported by setting, by state and territory, 1 May 2022–30 June 2022

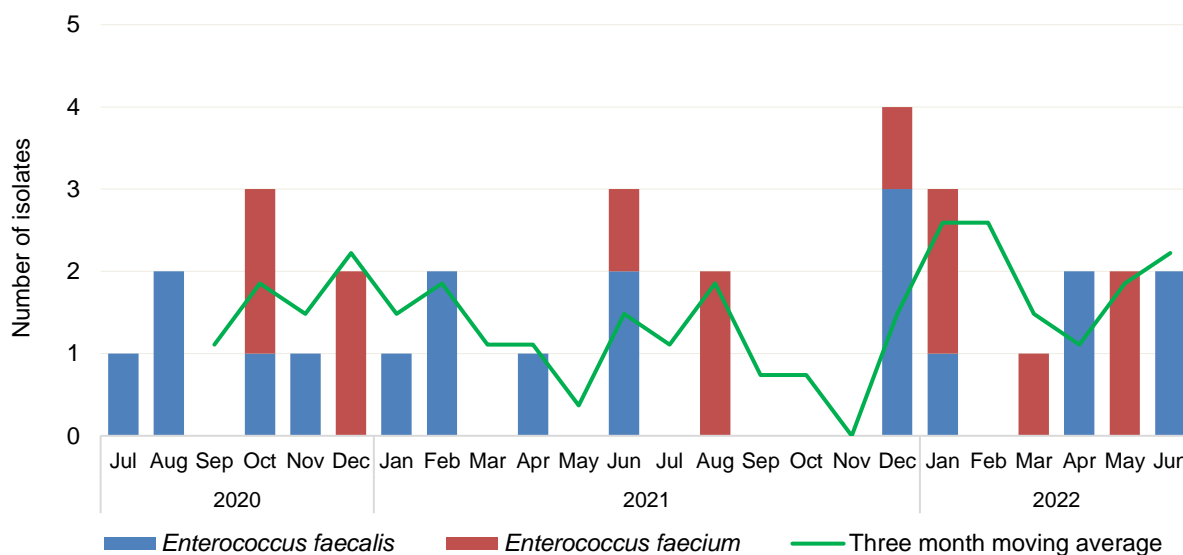
Carbapenemase type	Setting	State or territory								Total
		NSW	Vic	Qld	SA	WA	Tas	NT	ACT	
IMP	Total	37	8	29	1	2	0	1	3	81
	Public hospitals	36	7	25	1	2	0	1	3	75
	Private hospitals	1	0	2	0	0	0	0	0	3
	Aged care homes	0	0	1	0	0	0	0	0	1
	Community	0	1	0	0	0	0	0	0	1
	Unknown	0	0	1	0	0	0	0	0	1
NDM	Total	12	21	9	7	1	2	0	2	54
	Public hospitals	8	14	5	6	0	1	0	2	36
	Private hospitals	0	1	2	0	1	0	0	0	4
	Aged care homes	0	0	0	0	0	0	0	0	0
	Community	3	4	1	1	0	0	0	0	9
	Unknown	1	2	1	0	0	1	0	0	5
OXA-48-like	Total	2	3	3	0	2	0	0	0	10
	Public hospitals	2	2	3	0	1	0	0	0	8
	Private hospitals	0	0	0	0	1	0	0	0	1
	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
NDM, OXA-48-like	Total	0	2	1	0	0	0	0	0	3
	Public hospitals	0	2	0	0	0	0	0	0	2
	Private hospitals	0	0	0	0	0	0	0	0	0
	Aged care homes	0	0	1	0	0	0	0	0	1
	Community	0	0	0	0	0	0	0	0	0
	Unknown	0	0	0	0	0	0	0	0	0

Note: Top four carbapenemase types account for 96.1% (148/154) of all carbapenemase-producing *Enterobacterales* reported for this period. Other types were IMI ($n = 3$, NSW [2], Qld [1]); OXA-23-like ($n = 1$, NSW); IMP+NDM ($n = 1$, NSW); and KPC ($n = 1$, Vic).

Enterococcus species

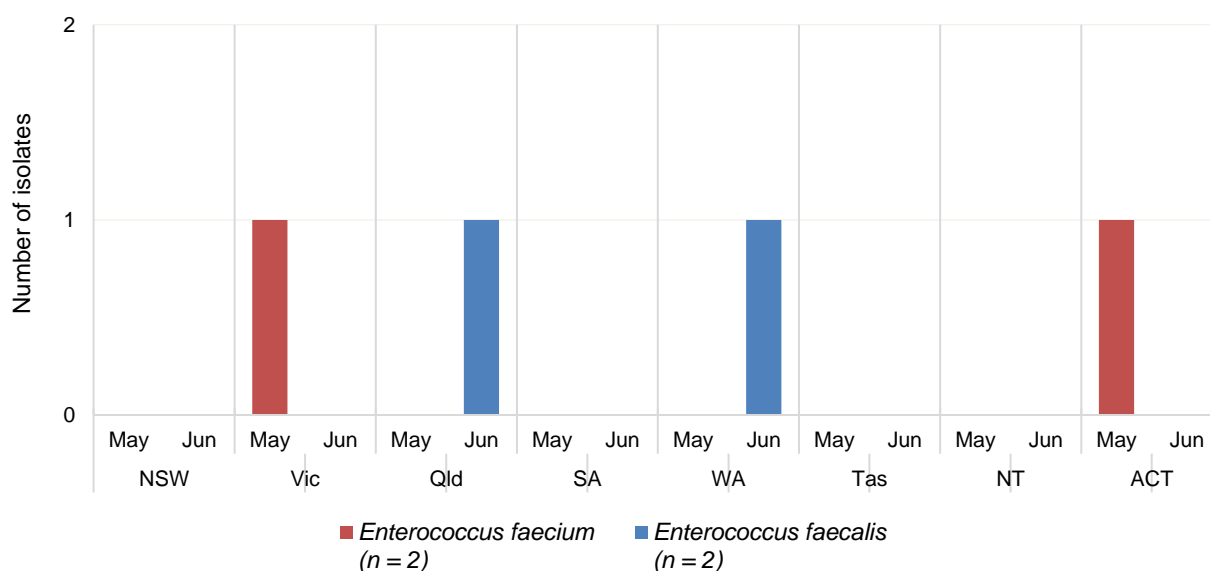
National data

Figure 11: Linezolid-nonsusceptible *Enterococcus* species, 24-month trend, national, 1 July 2020–30 June 2022



State and territory data

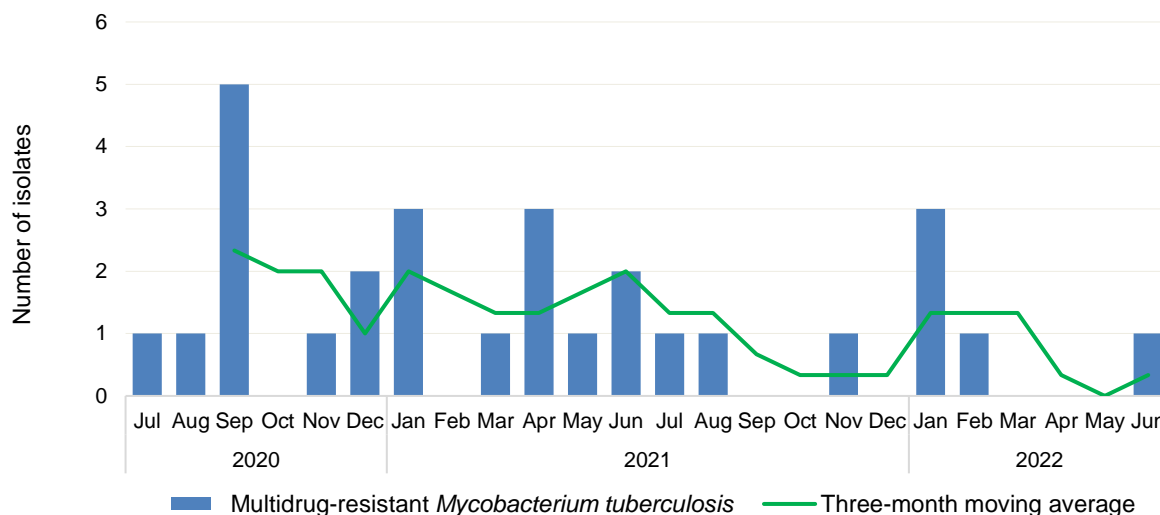
Figure 12: Linezolid-nonsusceptible *Enterococcus* species, number reported by state and territory, 1 May 2022–30 June 2022



Mycobacterium tuberculosis

National data

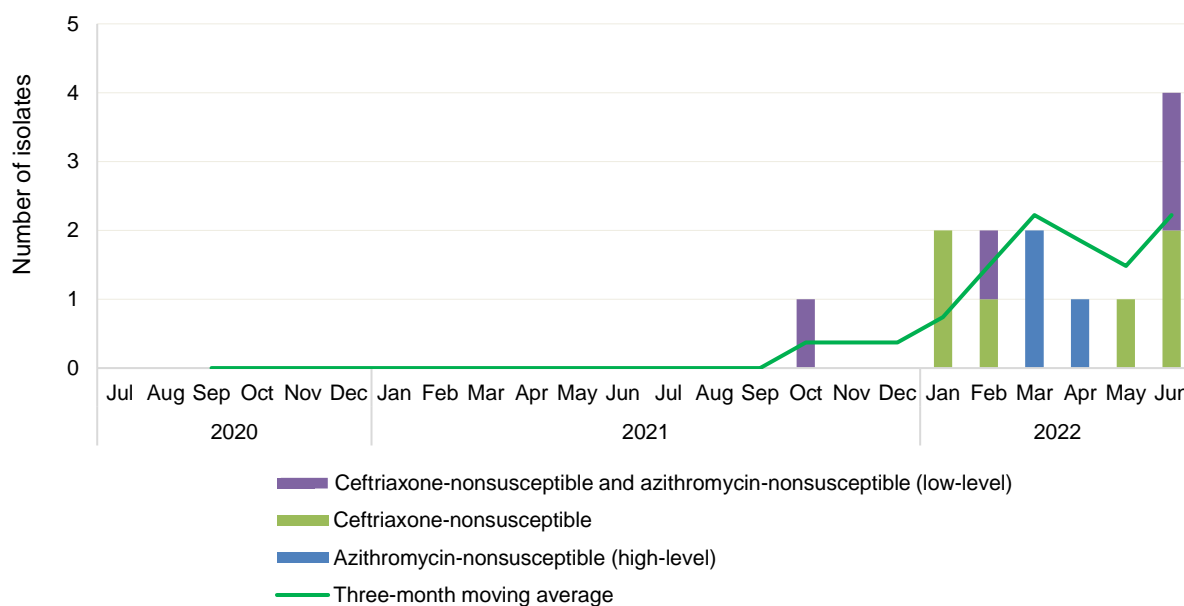
Figure 13: Multidrug-resistant *Mycobacterium tuberculosis*, 24-month trend, national, 1 July 2020–30 June 2022



Neisseria gonorrhoeae

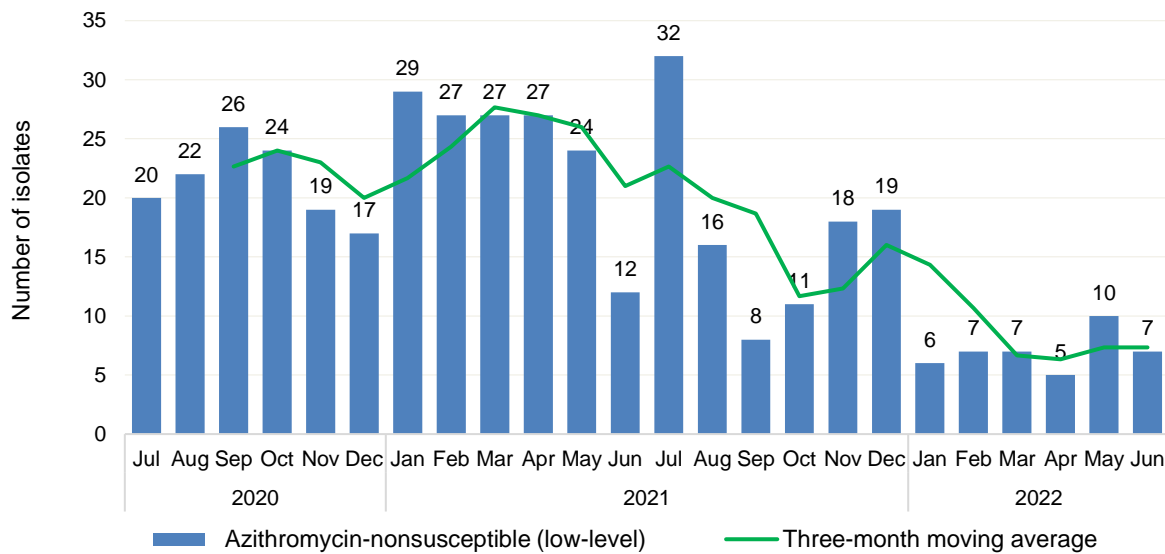
National data

Figure 14: Ceftriaxone-nonsusceptible and/or azithromycin-nonsusceptible *Neisseria gonorrhoeae*, number reported by month, national, 1 July 2020–30 June 2022



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

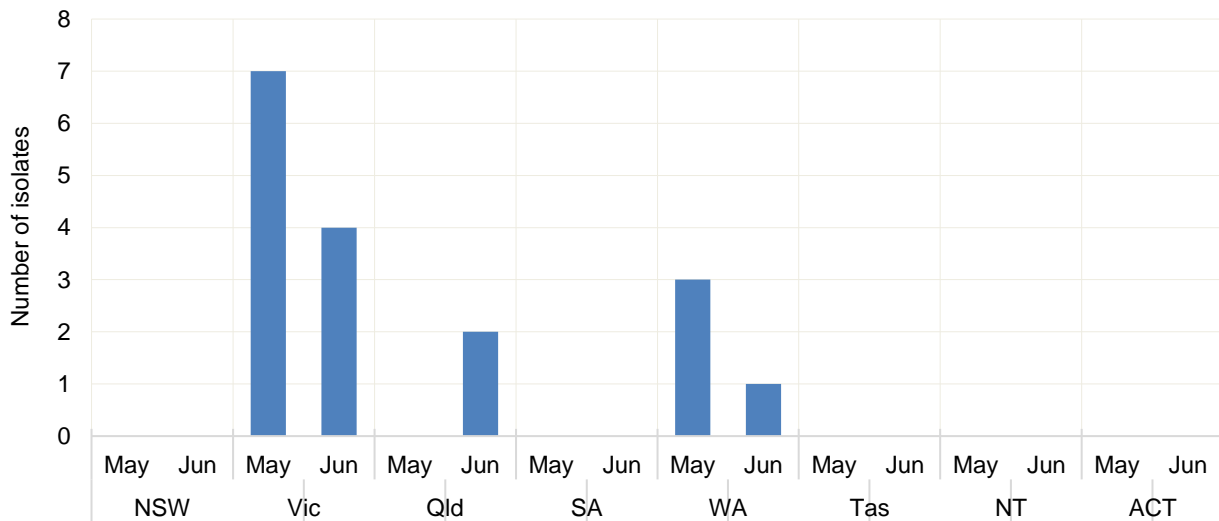
Figure 15: Azithromycin-nonsusceptible (low-level) *Neisseria gonorrhoeae*, 24-month trend, national, 1 July 2020–30 June 2022



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

State and territory data

Figure 16: Azithromycin-nonsusceptible (low-level) *Neisseria gonorrhoeae*, number reported by month, state and territory, 1 May 2022–30 June 2022

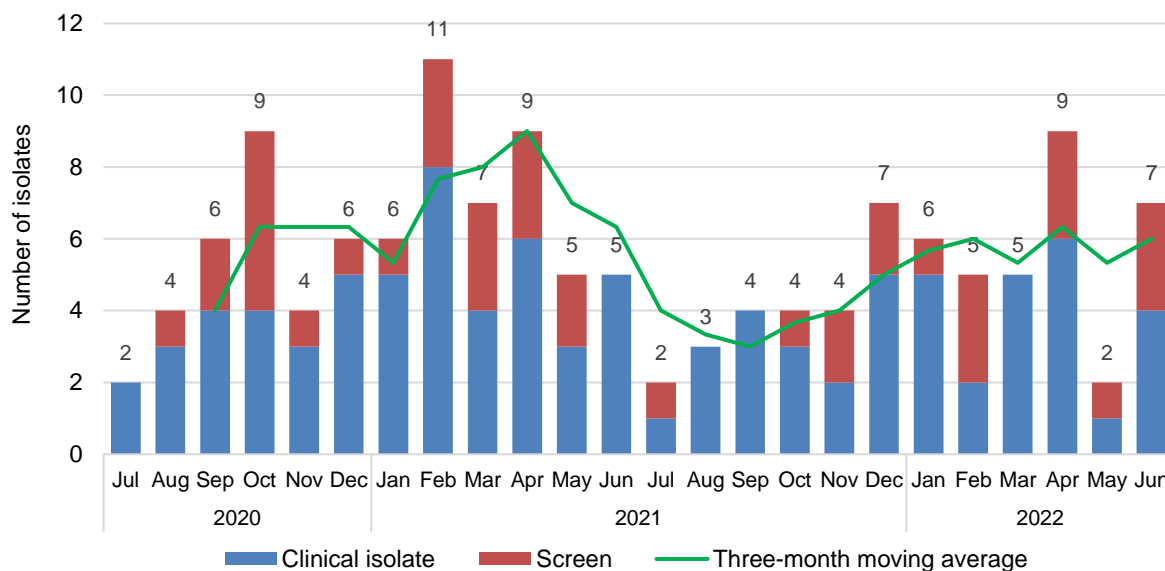


Note: Low-level = azithromycin MIC < 256 mg/L

Pseudomonas aeruginosa

National data

Figure 17: Carbapenemase-producing *Pseudomonas aeruginosa*, 24-month trend by specimen type, national, 1 July 2020–30 June 2022



State and territory data

Figure 18: Carbapenemase-producing *Pseudomonas aeruginosa*, number reported by carbapenemase type and specimen type, by state and territory, 1 May 2022–30 June 2022

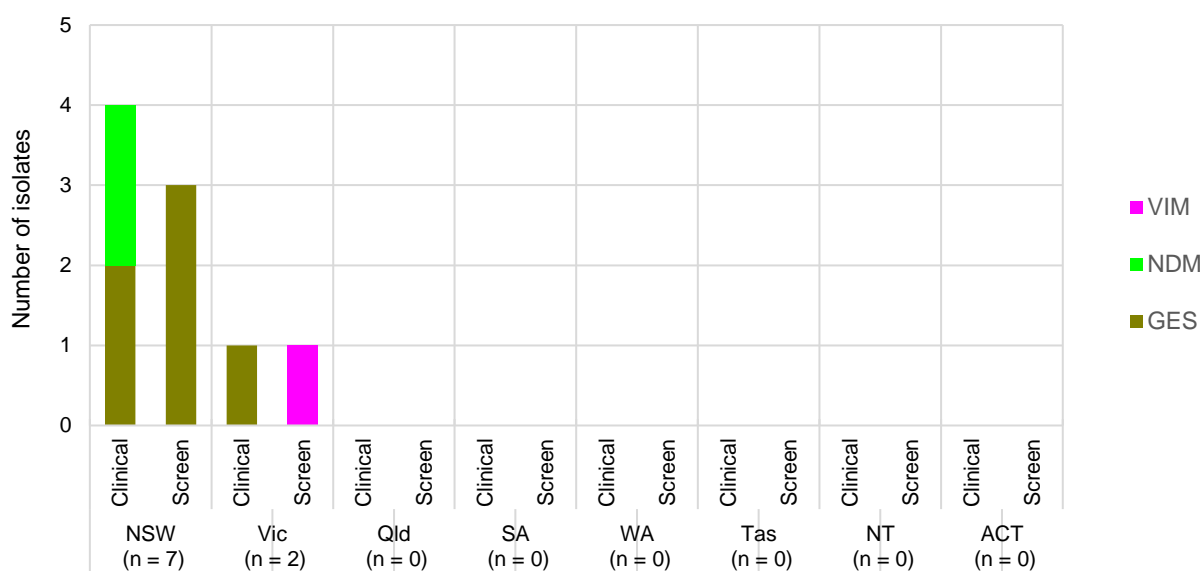


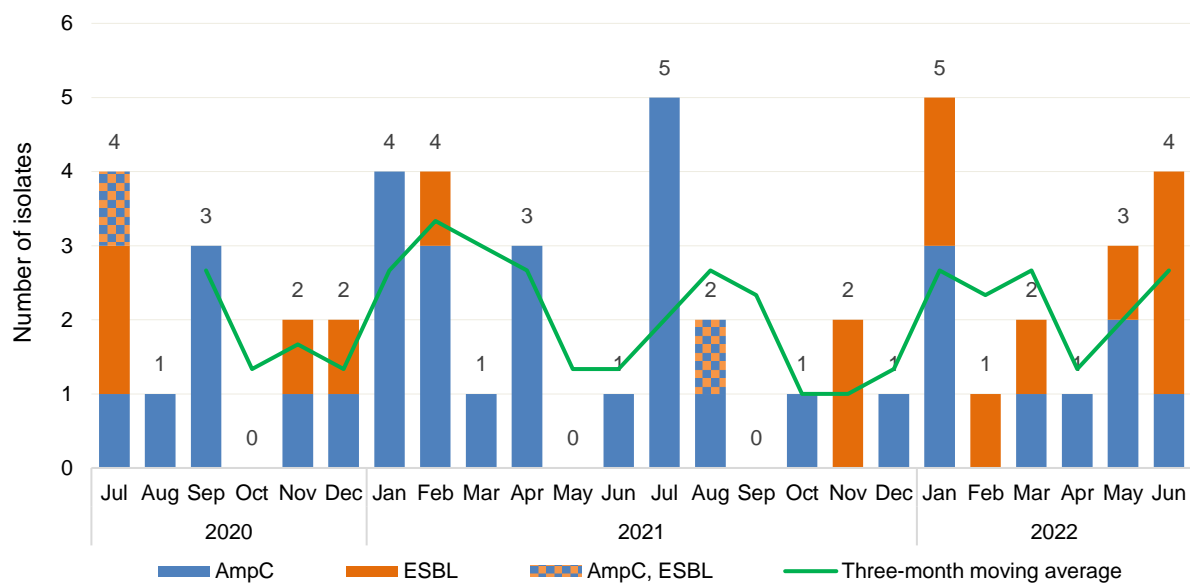
Table 5: Carbapenemase-producing *Pseudomonas aeruginosa*, number reported by setting, by state and territory, 1 May 2022–30 June 2022

Setting	State or territory								Total
	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	
Total	7	2	0	0	0	0	0	0	9
Public hospital	6	1	0	0	0	0	0	0	7
Private hospital	0	0	0	0	0	0	0	0	0
Aged care home	1	0	0	0	0	0	0	0	1
Community	0	1	0	0	0	0	0	0	1
Unknown	0	0	0	0	0	0	0	0	0

Salmonella species

National data

Figure 19: Ceftriaxone-nonsusceptible *Salmonella* species, 24-month trend, national, 1 July 2020–30 June 2022



Note: (1 May 2022–30 June 2022) non-typhoidal *Salmonella* species ($n = 6$) and typhoidal *Salmonella* species ($n = 1$).

Shigella species

National data

Figure 20: Multidrug-resistant *Shigella* species, 24-month trend, national, 1 July 2020–30 June 2022

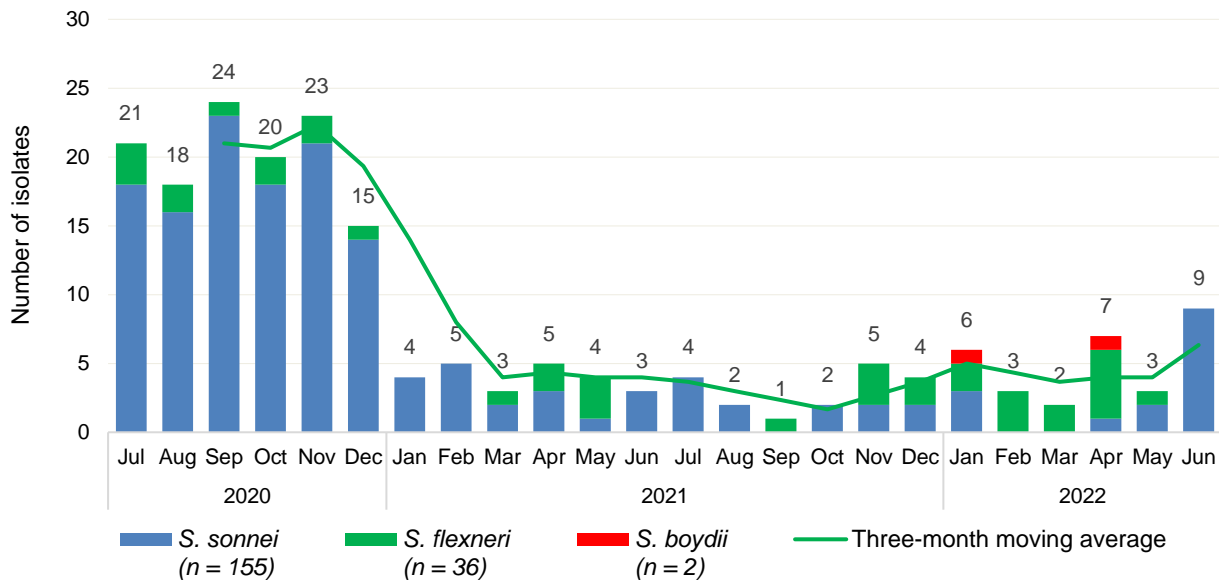
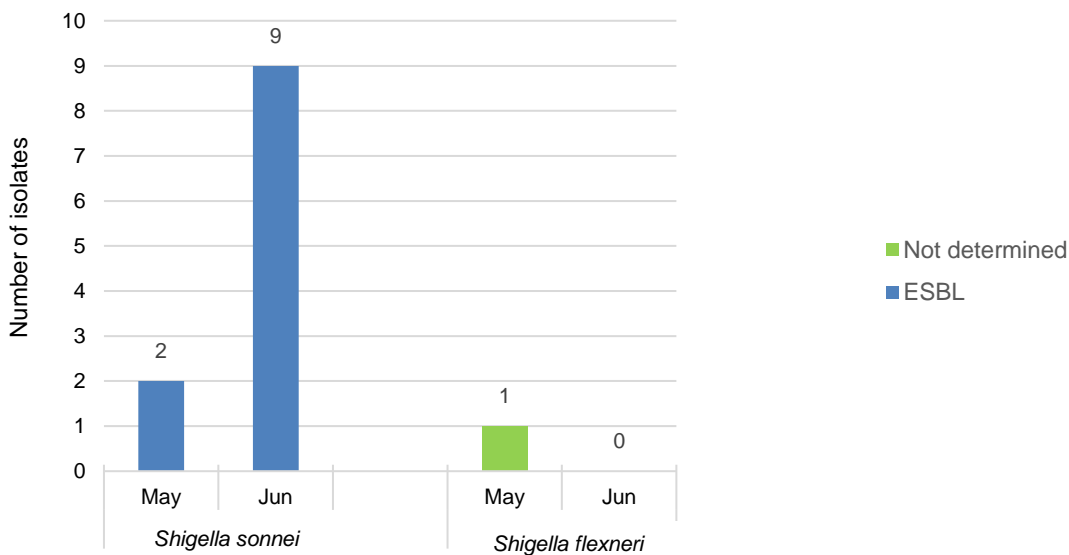


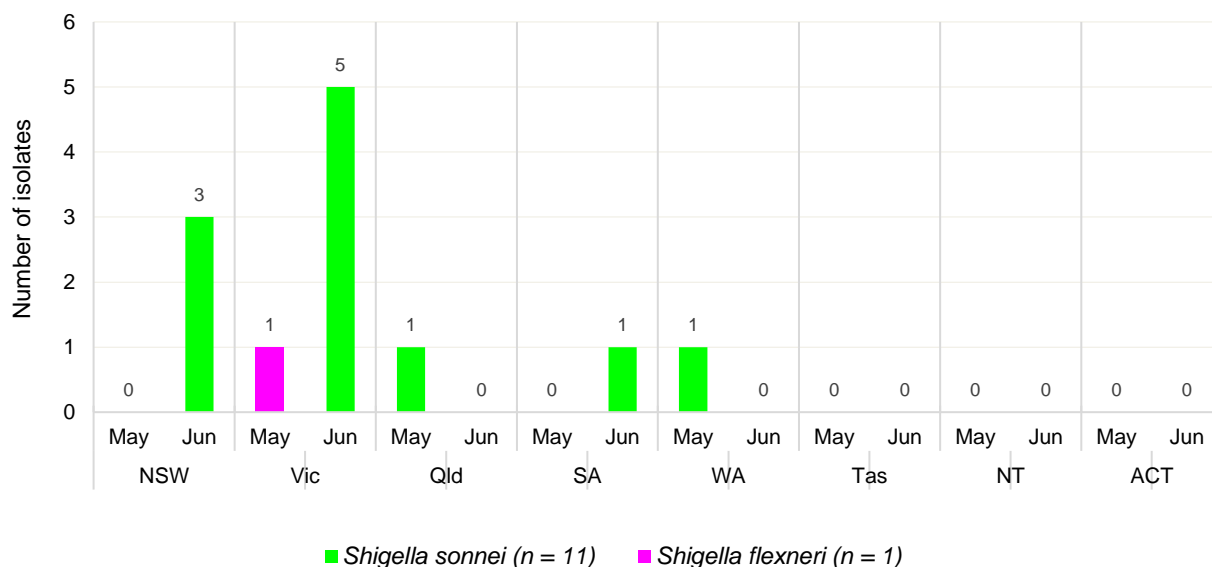
Figure 21: Multidrug-resistant *Shigella* species, number reported by month, national, 1 May 2022–30 June 2022



Note: Not determined = multidrug resistant, ceftriaxone susceptible.

State and territory data

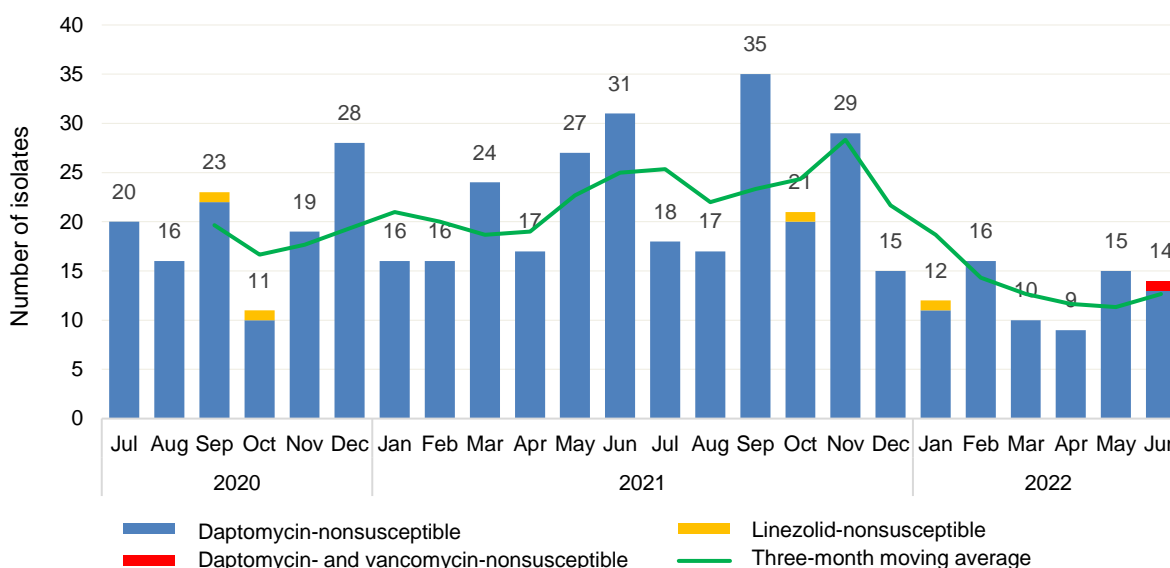
Figure 22: Multidrug-resistant *Shigella* species, number reported by state and territory, 1 May 2022–30 June 2022



Staphylococcus aureus

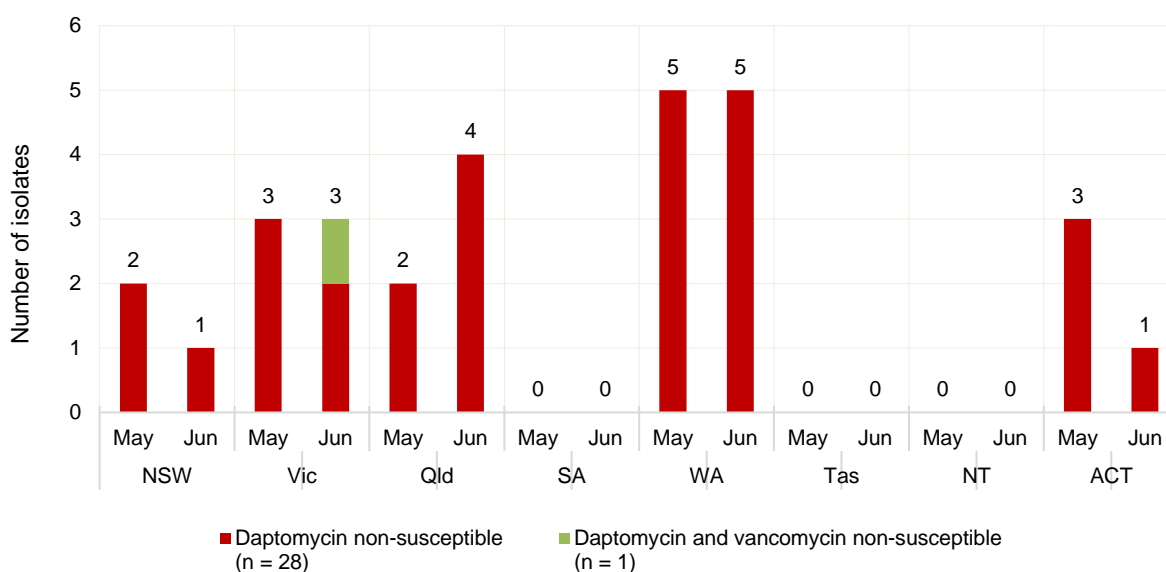
National data

Figure 23: Daptomycin-, linezolid- or vancomycin-nonsusceptible *Staphylococcus aureus*, 24-month trend, national, 1 July 2020–30 June 2022



State and territory data

Figure 24: Daptomycin-, linezolid- or vancomycin-nonsusceptible *Staphylococcus aureus*, number reported by month, state and territory, 1 May 2022–30 June 2022



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

Table 6: Daptomycin-nonsusceptible *Staphylococcus aureus*, number reported by setting and state and territory, 1 May 2022–30 June 2022

Setting	State or territory								Total
	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	
Total	3	6	6	0	10	0	0	4	29
Public hospital	1	5	2	0	9	0	0	3	20
Private hospital	0	0	0	0	0	0	0	0	0
Aged care home	2	0	1	0	0	0	0	0	3
Community	0	1	3	0	1	0	0	1	6
Unknown	0	0	0	0	0	0	0	0	0

Appendix

Data Notes

The following are important considerations for interpreting CARAlert data:

- The data are based on the date that the isolate with the confirmed 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 CARAlert

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 Antimicrobial Use and Resistance in Australia (AURA) Surveillance System.

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. Funding for CARAlert is provided by the Australian Government Department of Health, with contributions from the states and territories as part of the analysis and data submission processes.

The CARs reported to 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.¹

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](#).

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

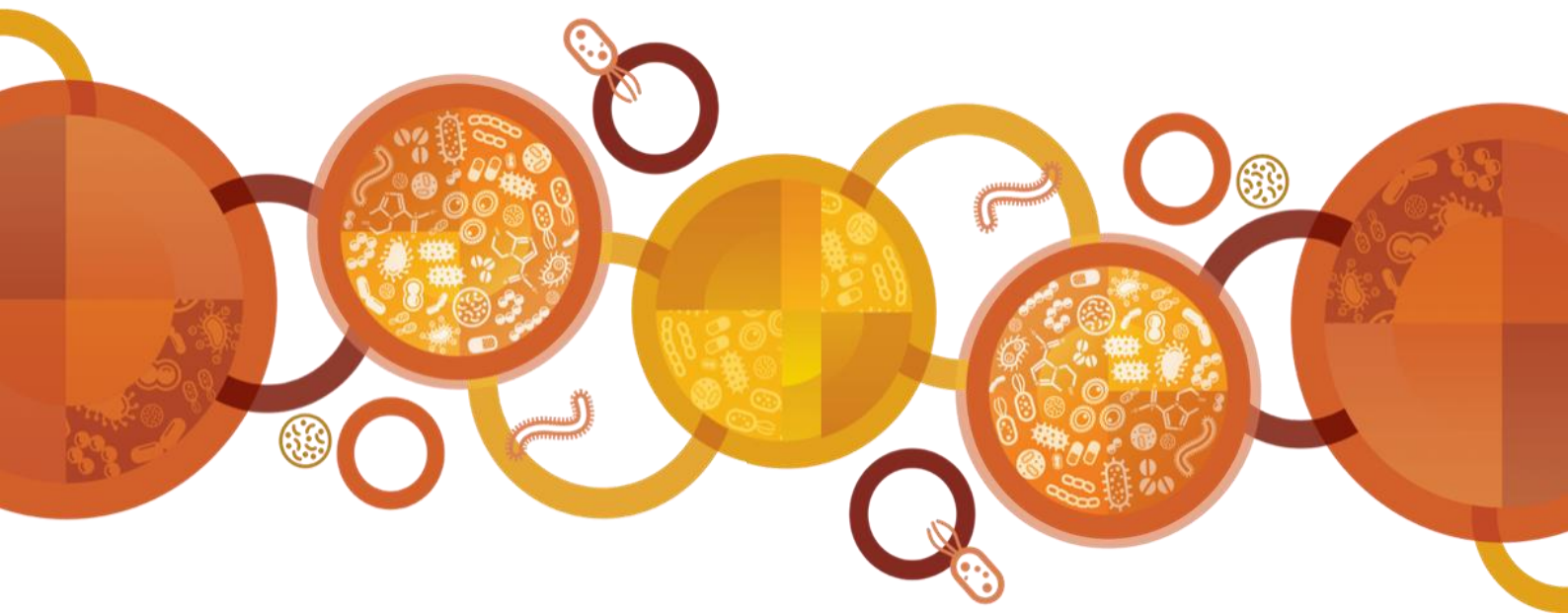
* Reported from July 2019

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

§ Low level-azithromycin-nonsusceptible *N. gonorrhoeae* excluded from the weekly digest following review in 2018

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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