AUSTRALIAN COMMISSION ON SAFETY AND QUALITY IN HEALTH CARE

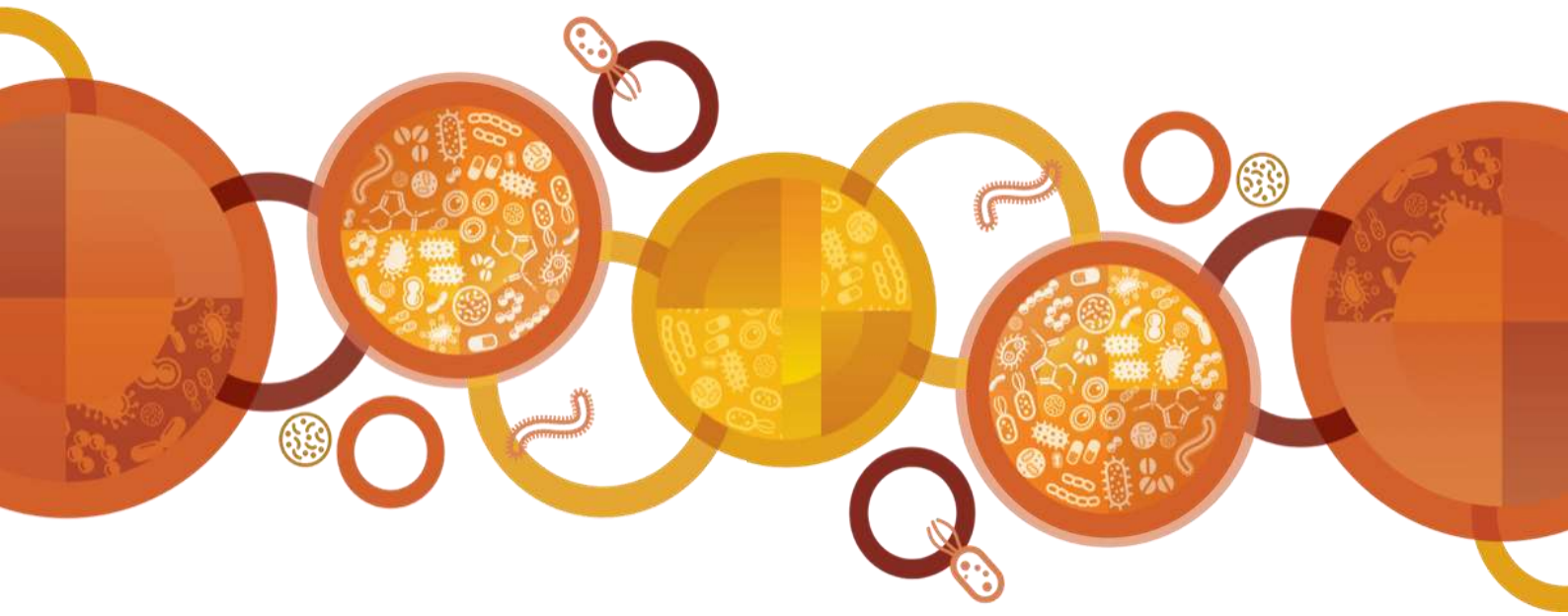
AURA Antimicrobial Use and Resistance in Australia

CARAlert

CARAlert data update 18

1 May 2020–30 June 2020

August 2020



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Contents

Data Summary

This report provides an update on data submitted to CARAlert for the reporting period: 1 May 2020 to 30 June 2020, and complements previous analyses of and updates on CARAlert data.

National overview:

- There was little change in the number of critical antimicrobial resistances (CARs) reported compared to the previous two-month reporting period
- Carbapenemase-producing Enterobacterales (CPE) (including those with ribosomal methyltransferase or transmissible resistance to colistin) remains the most frequently reported CAR (*n* = 116, 51.6%), followed by daptomycin non-susceptible *Staphylococcus aureus* (*n* = 40, 17.8%)
- The total number of CPE (either alone or in combination with other CARs) reported this year to date, compared to the same period last year, decreased by 20.0% (*n* = 348 versus *n* = 435). The proportion of CPE reported from Victoria (54.3%; 63/116) increased compared to the previous two-month period (24.5%; 24/98)
- The number of multidrug-resistant *Shigella* species (*n* = 21) decreased by 51.2% compared to the previous two-month reporting period
- The number of azithromycin non-susceptible (low-level resistance, MIC ≤ 256 mg/L) *Neisseria gonorrhoeae* remained constant (n = 36)
- The majority of CARs, excluding those from *N. gonorrhoeae*, were reported from public hospitals (*n* = 135, 60%). There were 17 reports from community settings, 12 from aged care homes and nine from private hospitals.

Carbapenemase-producing Enterobacterales:

- IMP (59.5%), NDM (23.3%), and OXA-48-like (11.2%) types accounted for 94.0% of all CPE reported during this period
- The total number of CPE increased (*n* = 116, up 18.4%), with increases in the number of IMP-types and OXA-48-like (IMP: *n* = 69 versus *n* = 53; OXA-48-like: *n* = 13 versus *n* = 10) compared to the previous two-month period
- The total number of NDM-types decreased (*n* = 27 versus *n* = 31, down 12.9%) compared to the previous two-month period. However, there was an increase in reports from Victoria (n = 17 versus n = 10, up 70%). No NDM types were reported from Tasmania, Northern Territory or the Australian Capital Territory
- There were no reports of KPC-producing Enterobacterales during this period
- Excluding CARs for which the setting was unknown, 9% (10/110) of CPE were reported from settings other than public hospitals; with 4.5% (*n* = 5), 2.7% (*n* = 3) and 1.8% (*n* = 2) from the community, private hospitals, and aged care homes, respectively
- Six hospitals had more than two notifications of IMP-types; these institutions were in Victoria (*n* = 4), and New South Wales (*n* = 2).
- One hospital in Victoria had over a four-fold increase in the number of both IMP-types (*n* = 19 versus *n* = 4) and NDM (*n* = 9 versus *n* = 2) compared to the previous two-month period. Another hospital in Victoria had four CPE-types reported from multiple species.

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

- Ceftriaxone non-susceptible *Salmonella* species were reported from Victoria (*n* = 2), and Queensland (*n* = 1)
- The majority of multidrug-resistant *Shigella* species were reported from Victoria (*n* = 11, 52%) and New South Wales (n = 6, 29%); other reports were from Queensland (*n* = 2), South Australia (*n* = 1) and Western Australia (*n* = 1). A vast majority (86%, 18/21) were *S. sonnei*
- ESBL types were detected in 73% (8/11) of multidrug-resistant *Shigella* reported from Victoria and all (6/6) from NSW. Where ESBL type was known, all (n = 10/10) were CTX-M-27 *S. sonnei.*

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

- The total number of reports of this CAR was the same as the previous two-month reporting period (*n* = 36). There was an increase in the number of reports from Western Australia (*n* = 5 versus *n* = 1); and a decrease from Queensland (*n* = 6 versus *n* = 9) compared to the previous two-month reporting period
- The majority of cases were reported from New South Wales (*n* = 21, 58%).

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

- There was one ceftriaxone non-susceptible *N. gonorrhoeae* reported in Victoria. No azithromycin non-susceptible *N. gonorrhoeae* (high-level resistance, MIC > 256 mg/L) were reported.

Daptomycin and vancomycin non-susceptible *Staphylococcus aureus* complex

- The total number of reports of this CAR increased (*n* = 41, up 41.4%). There was an increase in the numbers from New South Wales (*n* = 13 versus *n* =4), Queensland (*n* = 17 versus *n* = 12) and Western Australia (*n* = 7 versus *n* = 6) compared to the previous two-month reporting period; and a decrease in the number from Victoria (*n* = 4 versus *n* = 7)
- One daptomycin non-susceptible *S. aureus* from New South Wales was also vancomycin non-susceptible.

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

- Five *A. baumannii* complex were reported; three from Victoria (OXA-23-like [*n* = 2], NDM [*n* =1]), and two OXA-23-like from New South Wales
- Two carbapenemase-producing *Pseudomonas aeruginosa* were reported during this period; one from Victoria (NDM), and one from Queensland (VIM).

Linezolid resistant *Enterococcus*

- No linezolid resistant *Enterococcus* species was reported during this period.

***Candida auris*:**

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

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

- No cases of transmissible colistin resistance, other than that seen in combination with CPE, were 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.

National summary

Table 1: Number of critical antimicrobial resistances, by state and territory, 1 May 2020–30 June 2020, and 2019

Species	Critical resistance	State or Territory								Bi-monthly			Year to date		
										2020	2020				
		NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Mar-Apr	May-Jun	Relative change*	2019	2020	Relative change*
Acinetobacter baumannii complex	Carbapenemase-producing†	2	3	0	0	0	0	0	0	5	5	0.0%	–	22†	–
Candida auris	–†	0	0	0	0	0	0	0	0	2	0	▼ 100%	1	2	▲ 100%
Enterobacterales	Carbapenemase-producing	32	61	7	4	6	0	0	2	92	112	▲ 21.7%	407	325	▼ 20.1%
	Carbapenemase and ribosomal methyltransferase-producing	2	2	0	0	0	0	0	0	5	4	▼ 20.0%	28	16	▼ 42.9%
	Carbapenemase-producing and transmissible resistance to colistin†	0	0	0	0	0	0	0	0	1	0	▼ 100%	16	7	▼ 56.3%
	Ribosomal methyltransferase-producing	0	0	0	0	0	0	0	0	1	0	▼ 100%	5	1	▼ 80.0%
	Transmissible resistance to colistin†	0	0	0	0	0	0	0	0	0	0	–	2	0	▼ 80.0%
Enterococcus species	Linezolid resistant	0	0	0	0	0	0	0	0	3	0	▼ 100%	6	10	▲ 66.7
Mycobacterium tuberculosis	Multidrug-resistant – at least rifampicin- and isoniazid-resistant strains	0	0	0	0	0	0	0	0	0	0	–	13	0	▼ 100%
Neisseria gonorrhoeae	Azithromycin non-susceptible (LLR ≤ 256 mg/L)	21	3	6	0	5	0	0	1	36	36	0.0%	255	139	▼ 45.5%
	Azithromycin non-susceptible (HLR > 256 mg/L	0	0	0	0	0	0	0	0	1	0	▼ 100%	1	1	0.0%
	Ceftriaxone non-susceptible	0	1	0	0	0	0	0	0	1	1	0.0%	3	3	0.0%
	Ceftriaxone non-susceptible and azithromycin non-susceptible (LLR ≤ 256 mg/L)	0	0	0	0	0	0	0	0	0	0	–	0	0	–
	Ceftriaxone non-susceptible and azithromycin non-susceptible (HLR > 256 mg/L)	0	0	0	0	0	0	0	0	0	0	–	0	0	–

HLR = high-level resistance; LLR = low-level resistance; – = not applicable; † = new CAR reported from July 2019

Table 1 (continued)

Species	Critical resistance	State or territory								Bi-monthly			Year to date		
										2020	2020				
		NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Mar-Apr	May-Jun	Relative change*	2019	2020	Relative change*
Pseudomonas aeruginosa	Carbapenemase-producing†	0	1	1	0	0	0	0	0	4	2	▼ 50.0%	2	13†	▲ 550%
Salmonella species	Ceftriaxone non-susceptible	0	2	1	0	0	0	0	0	4	3	▼ 25.5%	18	20	▲ 11.1%
Shigella species	Multidrug-resistant	6	11	2	1	1	0	0	0	43	21	▼ 51.2%	187	170	▼ 9.1%
Staphylococcus aureus complex	Daptomycin non-susceptible	12	4	17	0	7	0	0	0	29	40	▲ 37.9%	62	97	▲ 56.5%
	Daptomycin and vancomycin non-susceptible	1	0	0	0	0	0	0	0	0	1	–	0	1	–
	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 7 August 2020)	**76**	**88**	**34**	**5**	**19**	**0**	**0**	**3**	**227**	**225**	**▼ 0.9%**	**1,006**	**827**	**▼ 17.8%**
														790§	**▼ 20.0%**

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

* Relative change = absolute change between period in 2019 and same period in 2020, for each CAR, expressed as a percentage of 2019 base

† = new CAR reported from July 2019 (retrospective data in 2019 included if available)

Note: The number of CARs for 2019 have been updated to include additional submissions received after previous publication date

Table 2: Number of critical antimicrobial resistance isolates, by setting, national, 1 May 2020–30 June 2020

Species	Critical resistance	Setting					Total
		Public hospital	Private hospital	Aged care home	Community	Unknown	
Acinatobacter baumannii complex	Carbapenemase-producing	5	0	0	0	0	5
Candida auris	–	0	0	0	0	0	0
Enterobacterales	Carbapenemase-producing	97	3	2	5	5	112
	Carbapenemase and ribosomal methyltransferase-producing	3	0	0	0	1	4
	Carbapenemase-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	0	0	0	0	0	0
Mycobacterium tuberculosis	Multidrug-resistant – at least rifampicin- and isoniazid-resistant	0	0	0	0	0	0
Neisseria gonorrhoeae	Azithromycin non-susceptible (low-level)	6	0	0	30	0	36
	Azithromycin non-susceptible (high-level)	0	0	0	0	0	0
	Ceftriaxone non-susceptible	0	0	0	1	0	1
	Ceftriaxone non-susceptible and azithromycin non-susceptible (low-level)	0	0	0	0	0	0
	Ceftriaxone non-susceptible and azithromycin non-susceptible (high-level)	0	0	0	0	0	0
Pseudomonas aeruginosa	Carbapenemase-producing	1	0	0	0	1	2
Salmonella species	Ceftriaxone non-susceptible	2	0	0	1	0	3
Shigella species	Multidrug-resistant	10	1	0	5	5	21
Staphylococcus aureus complex	Daptomycin non-susceptible	17	5	10	5	3	40
	Daptomycin and vancomycin non-susceptible	0	0	0	1	0	1
	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 7 August 2020)	**141**	**9**	**12**	**48**	**15**	**225**

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

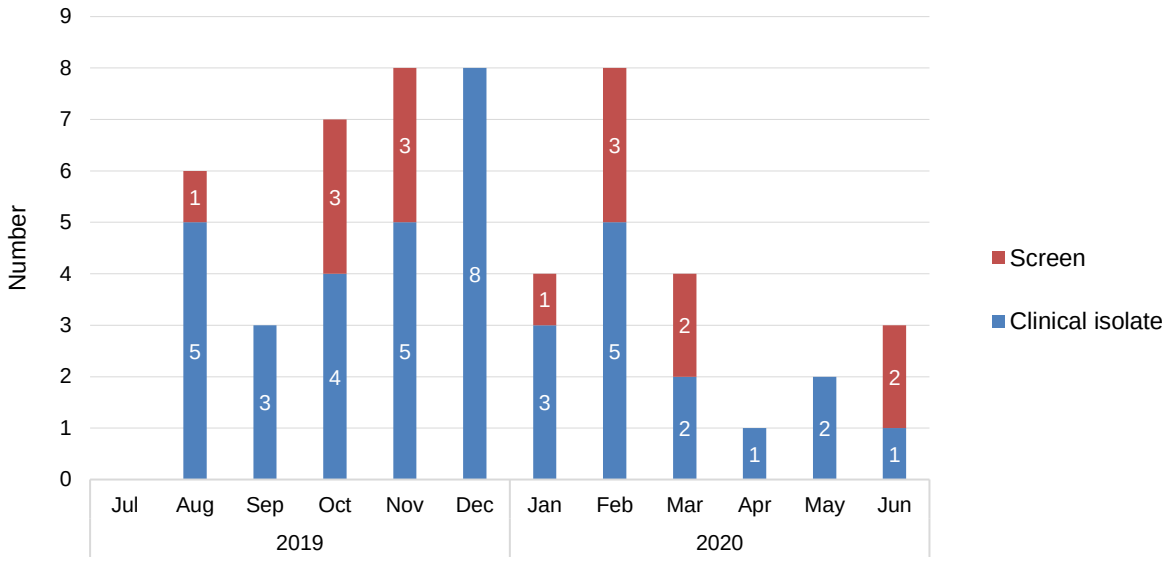
High-level = azithromycin MIC > 256 mg/L; Low-level = azithromycin MIC ≤ 256 mg/L

Summary by CAR

Acinetobacter baumannii complex

National data

Figure 1: Carbapenemase-producing *Acinetobacter baumannii* complex*, monthly number reported by specimen type, national, 1 July 2019–30 June 2020



* New CAR reported from July 2019

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 2020–30 June 2020

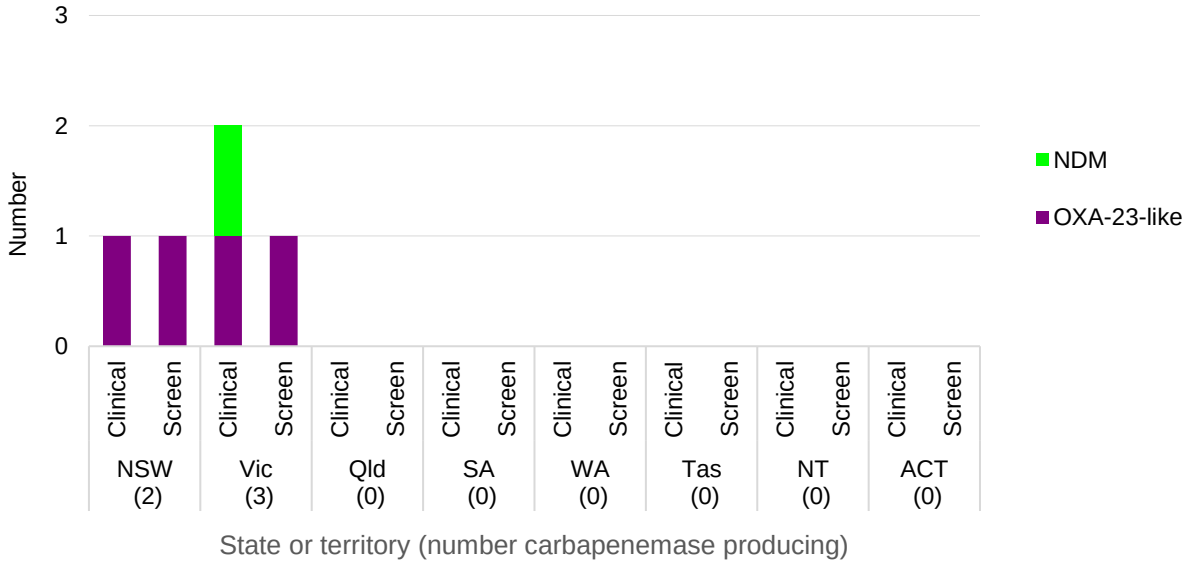


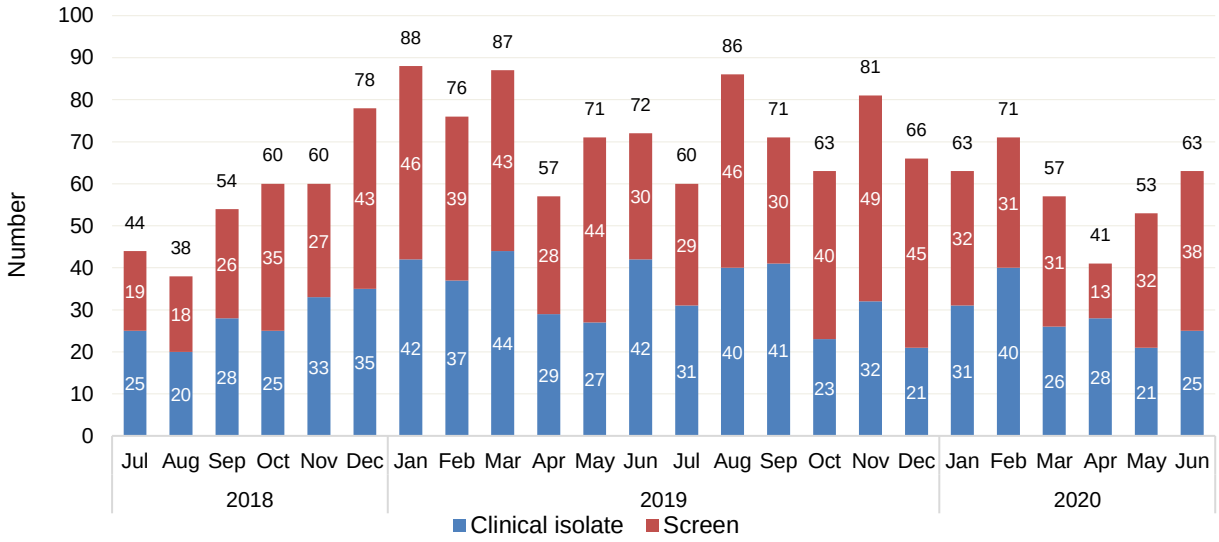
Table 3: Carbapenemase-producing *Acinetobacter baumannii* complex, number reported by setting, by state and territory, 1 May 2020–30 June 2020

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

Enterobacterales

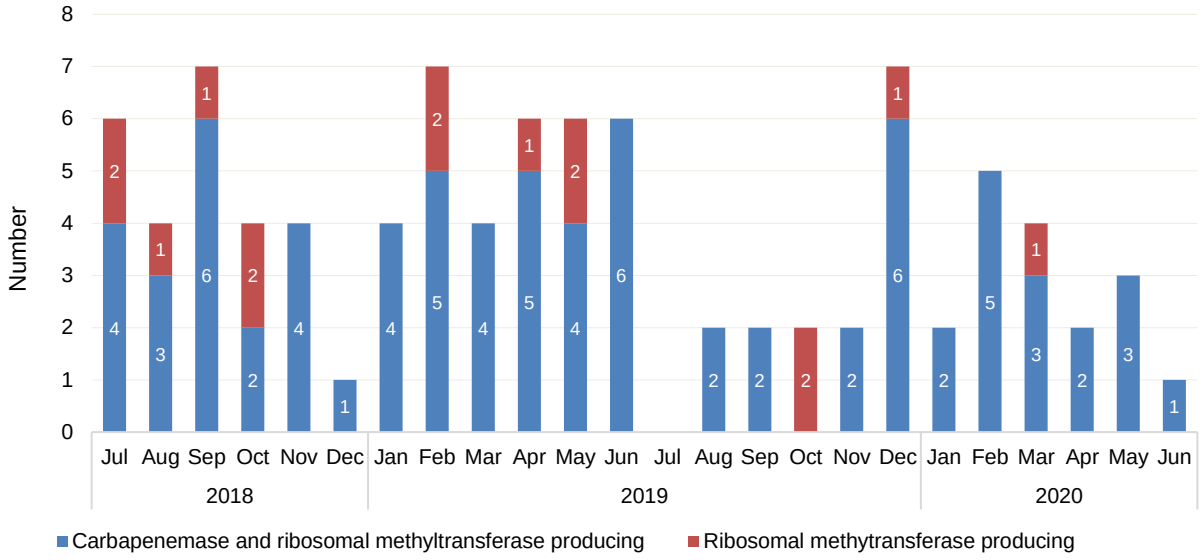
National data

Figure 3: Carbapenemase-producing Enterobacterales*, twenty-four-month trend by specimen type, national, 1 July 2018–30 June 2020



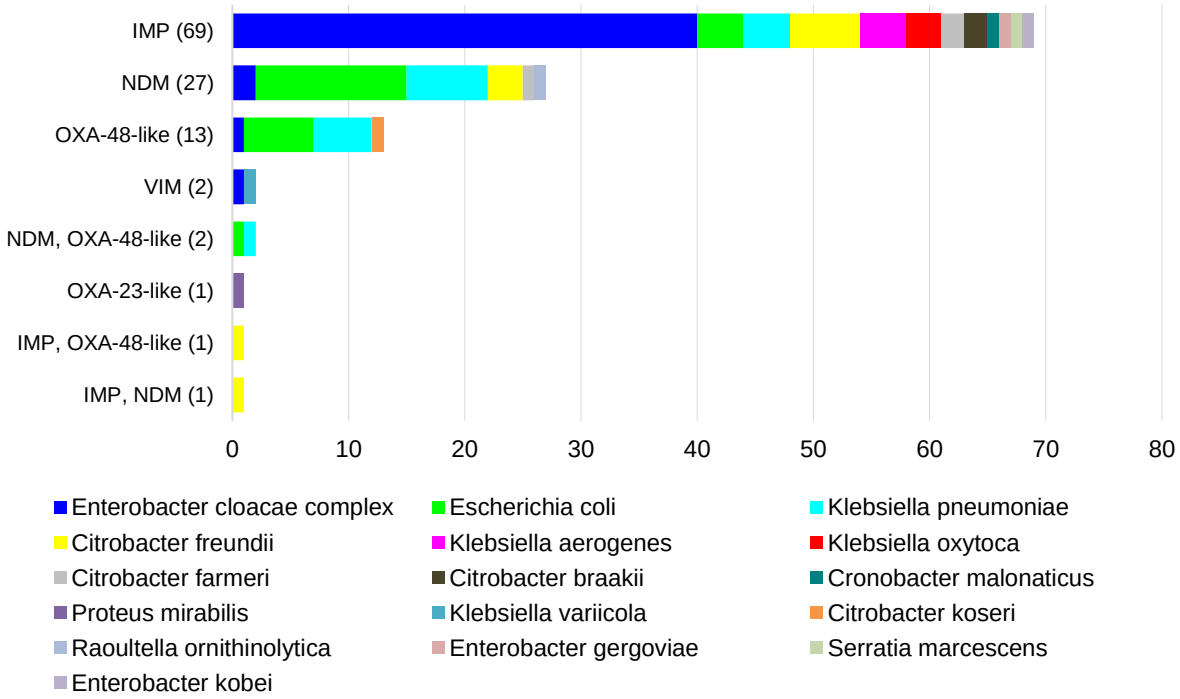
* Carbapenemase-producing alone or in combination with ribosomal methyltransferases

Figure 4: Ribosomal methyltransferase-producing Enterobacterales*, twenty-four-month trend, national, 1 July 2018–30 June 2020



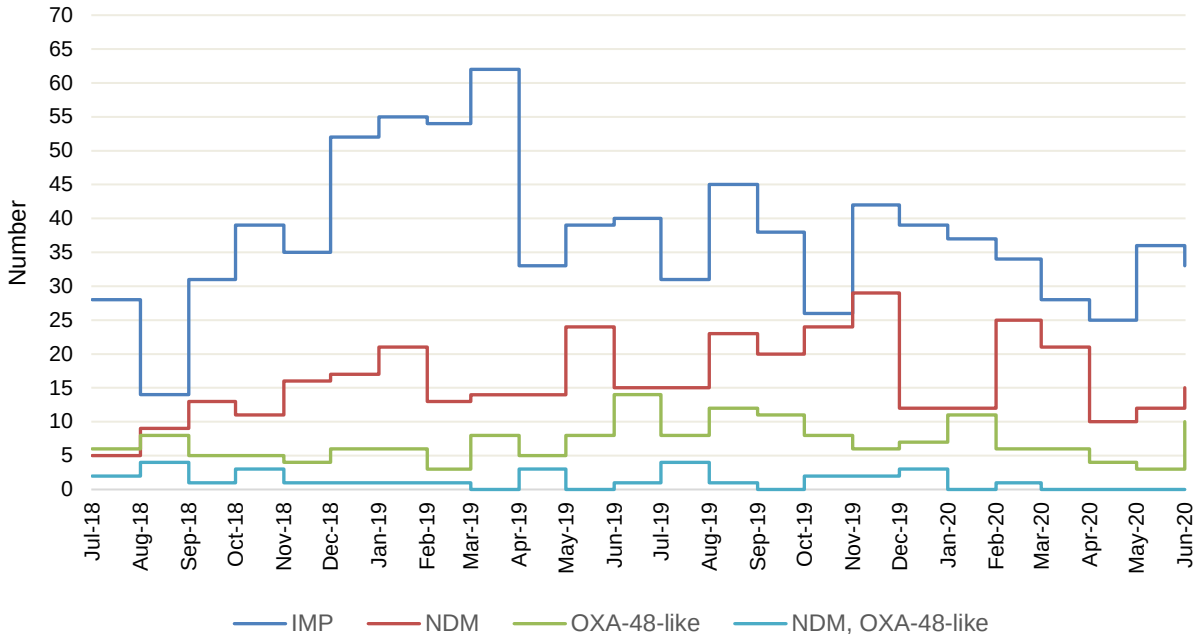
* Ribosomal methyltransferases alone, or in combination with carbapenemases

Figure 5: Carbapenemase-producing Enterobacterales*, number reported by carbapenemase type and species, national, 1 May 2020–30 June 2020



* Carbapenemase-producing Enterobacterales (*n* = 112), carbapenemase- and ribosomal methyltransferase-producing Enterobacterales (*n* = 4)

Figure 6: Top four reported carbapenemase types*, twenty-four-month trend, national, 1 July 2018–30 June 2020



* 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 2020–30 June 2020

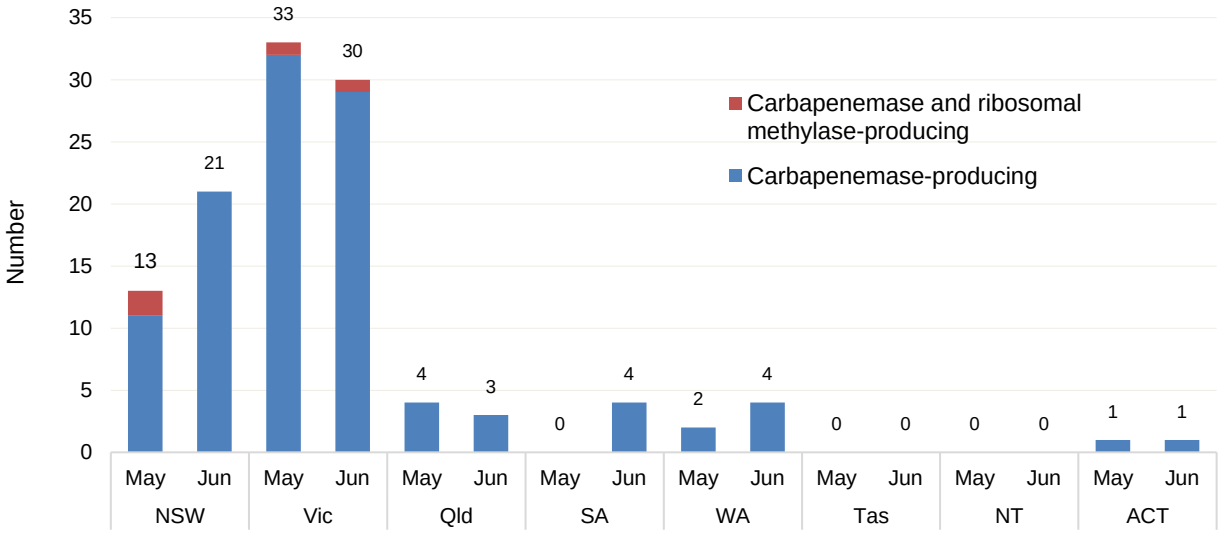


Figure 8: Two-year trend for the top four reported carbapenemase types from Enterobacterales, by state and territory and nationally, (three-month moving average), 1 July 2018–30 June 2020

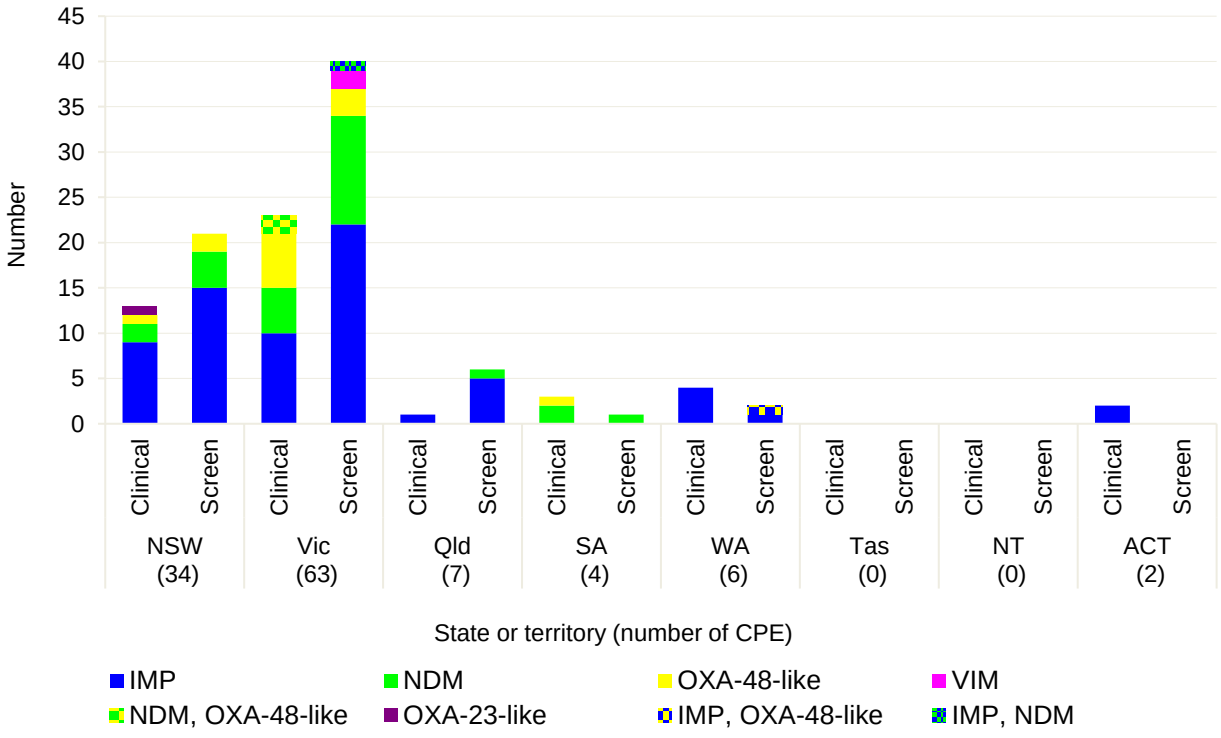
Type	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia
IMP	20 8	23 0	17 6	0 0	2 0	0 0	1 0	2 0	57 24
NDM	8 1	9 0	6 0	6 0	2 0	0 0	1 0	1 0	24 8
OXA-48-like	3 1	7 0	2 0	1 0	1 0	0 0	0 0	0 0	11 4
KPC	1 0	2 0	1 0	0 0	0 0	0 0	0 0	0 0	3 0
All types	28 13	35 1	19 8	7 0	4 1	1 0	1 0	2 0	84 45

Line graphs represent three-month moving average for the period 1 July 2018 to 30 June 2020, 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 2020–30 June 2020



* Carbapenemase-producing Enterobacterales (*n* = 112), carbapenemase- and ribosomal methyltransferase-producing Enterobacterales (*n* = 4)

Figure 10: Top four reported carbapenemase-producing Enterobacterales type by specimen type, by state and territory, 1 May 2020–30 June 2020

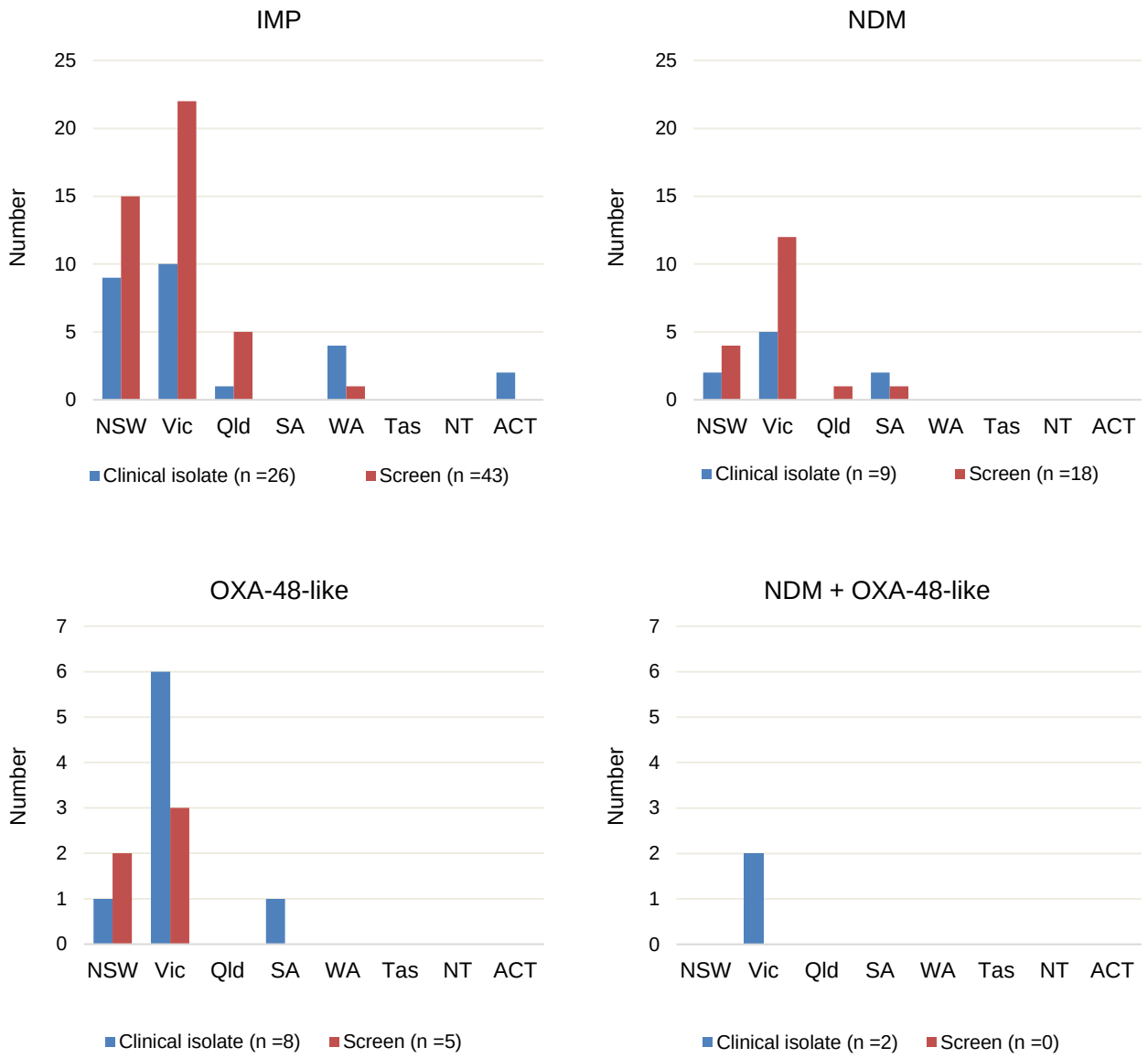


Table 4: Top four carbapenemase types from Enterobacterales, number reported by setting, by state and territory, 1 May 2020–30 June 2020

Carbapenemase type†	Setting	State or territory								Total
		NSW	Vic	Qld	SA	WA	Tas	NT	ACT	
IMP	**Total**	**24**	**32**	**6**	**0**	**5**	**0**	**0**	**2**	**69**
	Public hospital	23	27	4	0	3	0	0	2	59
	Private hospital	0	1	1	0	1	0	0	0	3
	Aged care home	0	0	0	0	0	0	0	0	0
	Community	0	4	0	0	0	0	0	0	4
	Unknown	1	0	1	0	1	0	0	0	3
NDM	**Total**	**6**	**17**	**1**	**3**	**0**	**0**	**0**	**0**	**27**
	Public hospital	5	14	1	3	0	0	0	0	23
	Private hospital	0	0	0	0	0	0	0	0	0
	Aged care home	1	1	0	0	0	0	0	0	2
	Community	0	1	0	0	0	0	0	0	1
	Unknown	0	1	0	0	0	0	0	0	1
OXA-48-like	**Total**	**3**	**9**	**0**	**1**	**0**	**0**	**0**	**0**	**13**
	Public hospital	3	8	0	1	0	0	0	0	12
	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	1	0	0	0	0	0	0	1
NDM+OXA-48-like	**Total**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**2**
	Public hospital	0	2	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

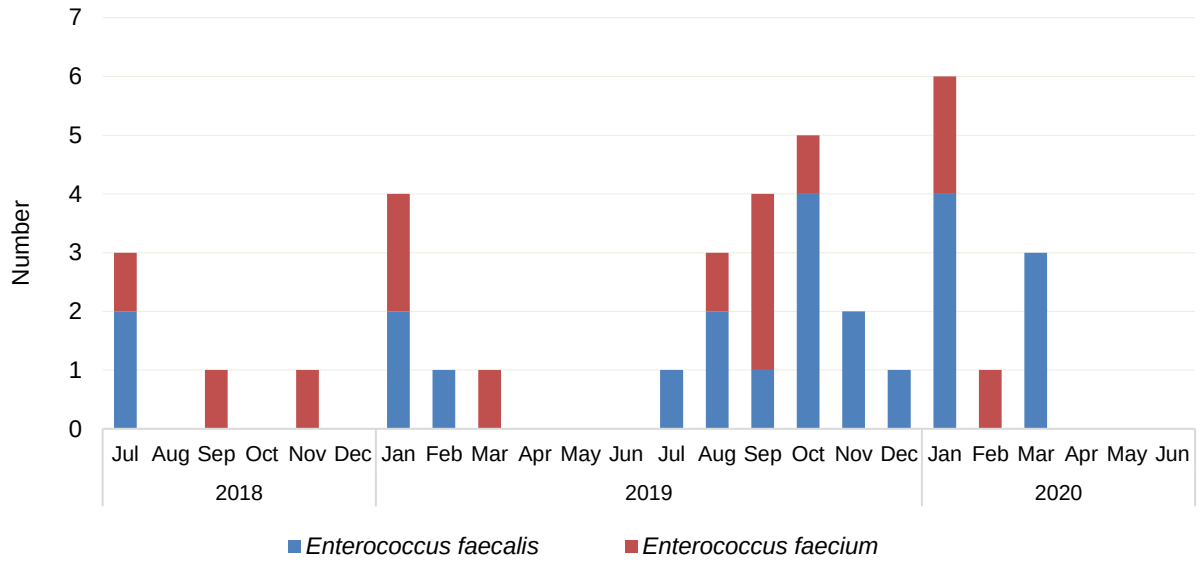
* Top four carbapenemase types account for 96% (111/116) of all carbapenemase-producing Enterobacterales reported for this period. Other types were VIM (*n* = 2, Vic), IMP, OXA-48 (*n* = 1, WA), IMP, NDM (*n* = 1, Vic), and OXA-23-like (*n* = 1, NSW)

† 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 2018–30 June 2020



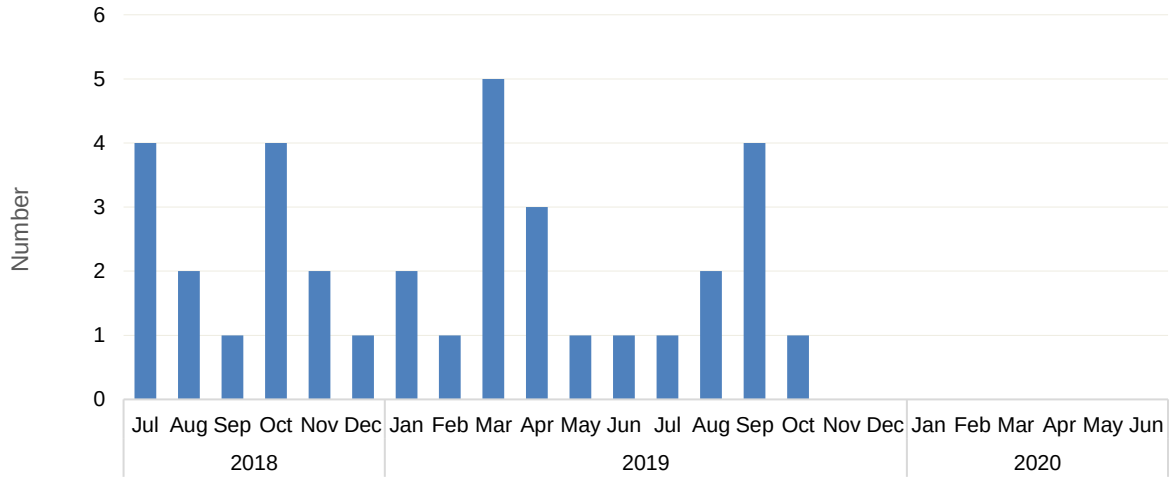
State and territory data

No linezolid non-susceptible *Enterococcus* species were reported during this period.

Mycobacterium tuberculosis

National data

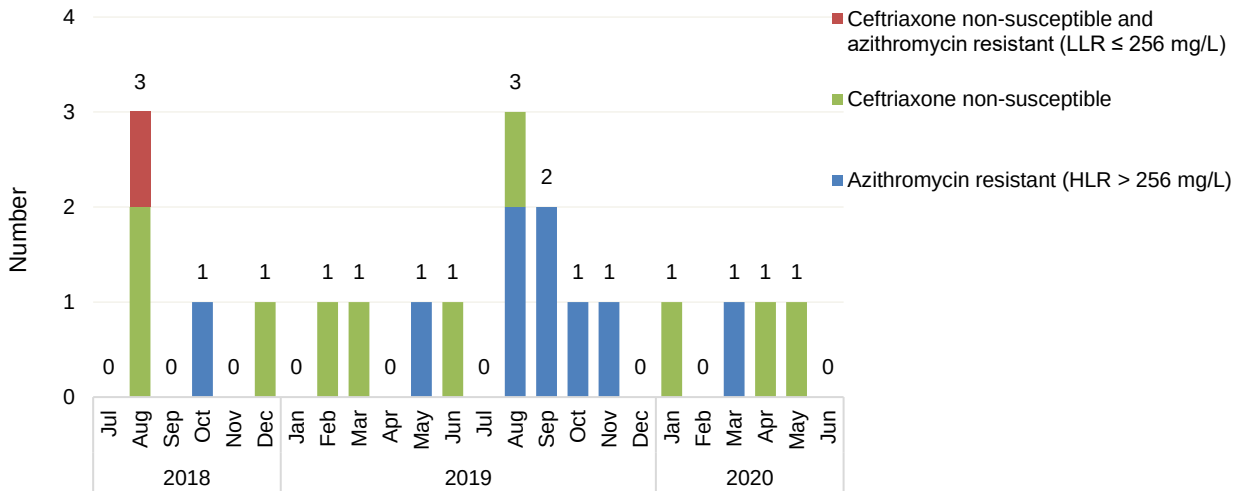
Figure 12: Multidrug-resistant *Mycobacterium tuberculosis,* twenty-four-month trend, national, 1 July 2018–30 June 2020



Neisseria gonorrhoeae

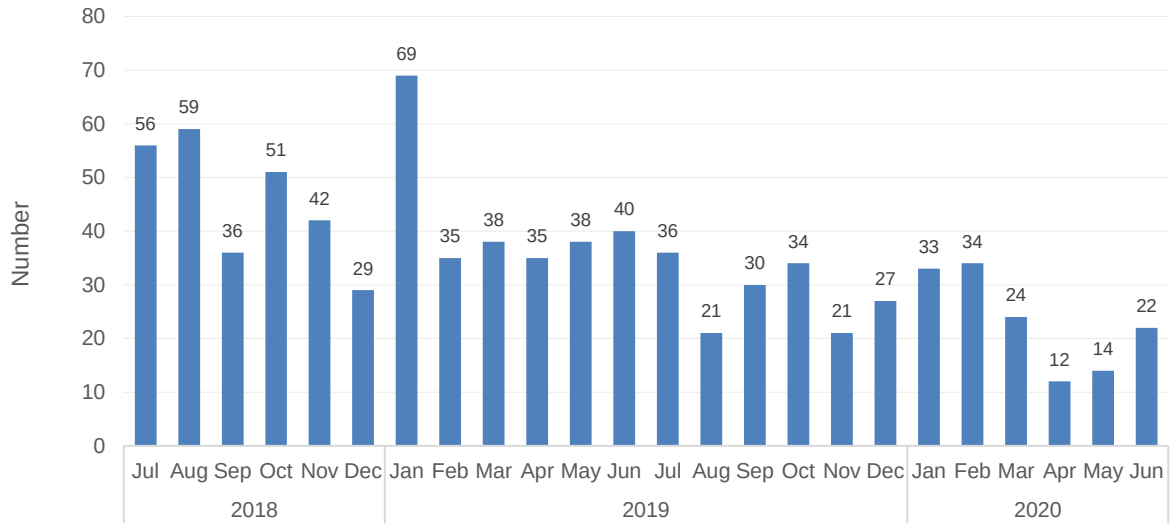
National data

Figure 13: Ceftriaxone non-susceptible and/or azithromycin non-susceptible (HLR > 256 mg/L) *Neisseria gonorrhoeae,* number reported by month, national, 1 July 2018–30 June 2020



LLR: Low level resistance; HLR: High level resistance

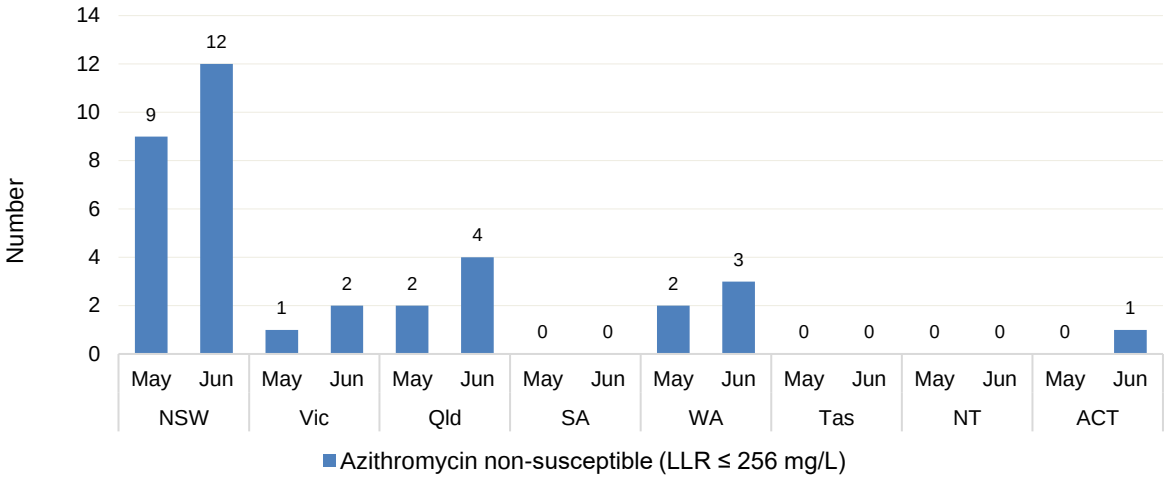
Figure 14: Azithromycin non-susceptible (LLR ≤ 256 mg/L) *Neisseria gonorrhoeae*, twenty-four-month trend, national, 1 July 2018–30 June 2020



LLR: Low level resistance

State and territory data

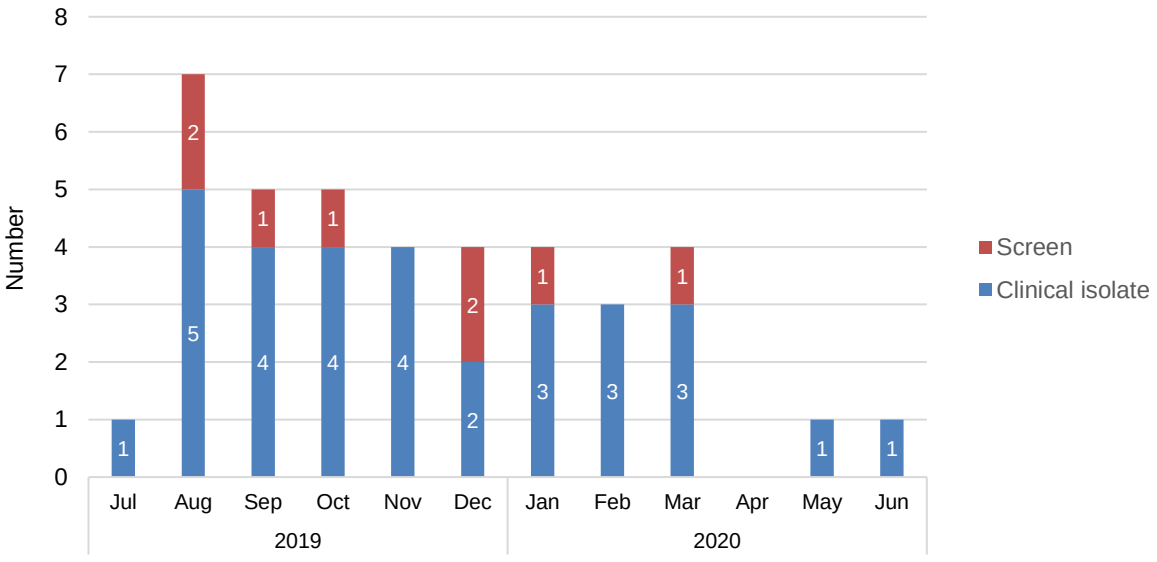
Figure 15: Azithromycin non-susceptible (LLR ≤ 256 mg/L) *Neisseria gonorrhoeae,* number reported by month, state and territory, 1 May 2020–30 June 2020



Pseudomonas aeruginosa

National data

Figure 16: Carbapenemase-producing *Pseudomonas aeruginosa, number reported by specimen type, national, 1 July 2019–30 June 2020**



* New CAR reported from July 2019

State and territory data

Figure 17: Carbapenemase-producing *Pseudomonas aeruginosa*, number reported by carbapenemase type and specimen type, by state and territory, 1 May 2020–30 June 2020

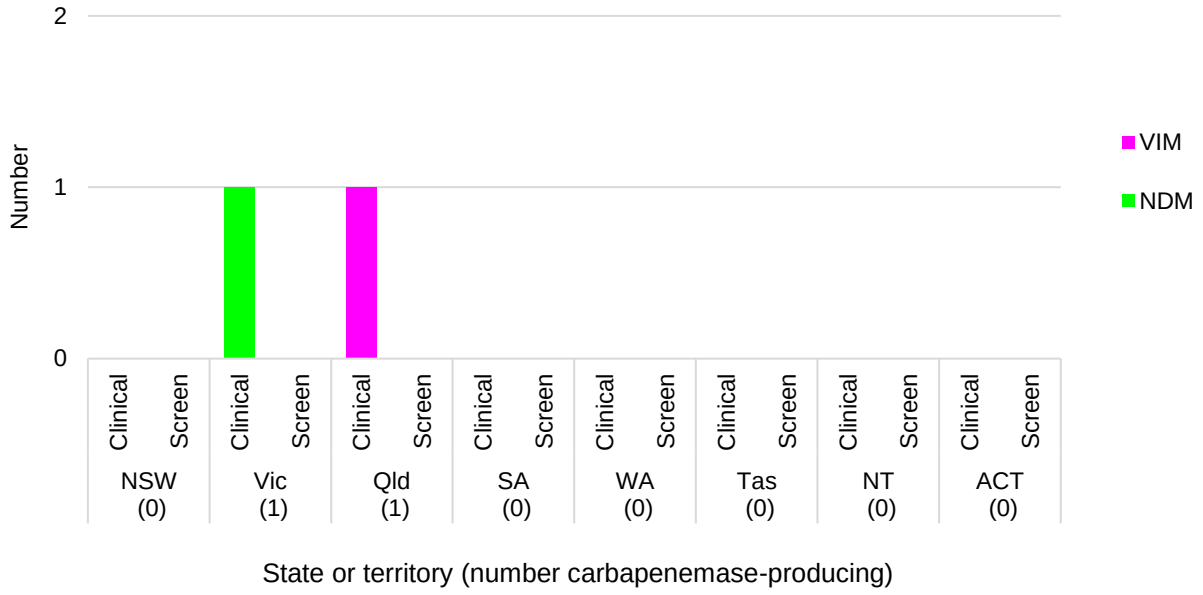


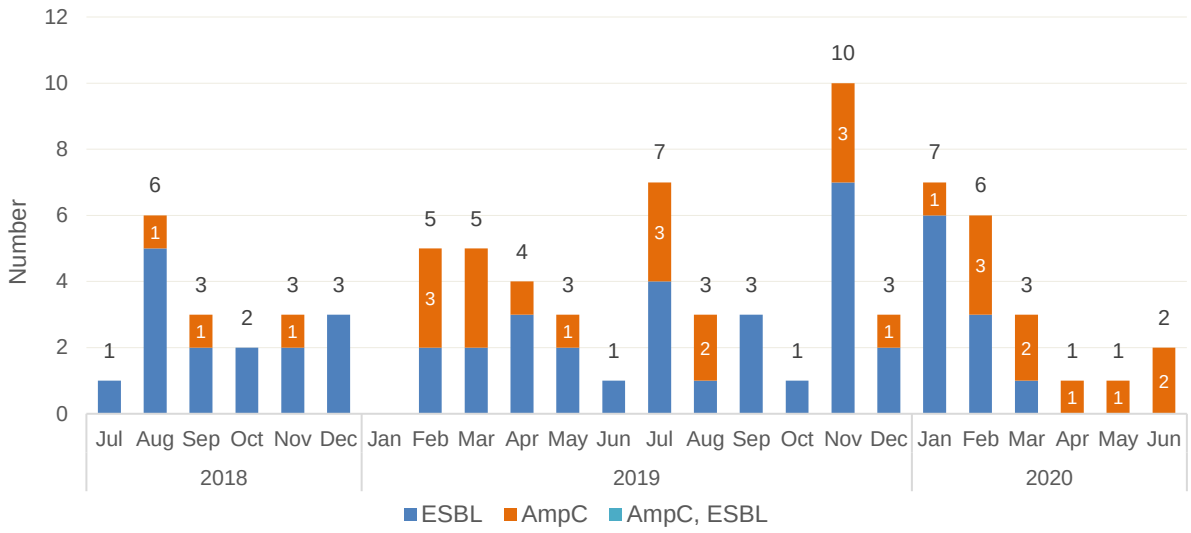
Table 5: Carbapenemase-producing *Pseudomonas aeruginosa*, number reported by setting, by state and territory, 1 May 2020–30 June 2020

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

Salmonella species

National data

Figure 18: Ceftriaxone non-susceptible *Salmonella* species, twenty-four-month trend, national, 1 July 2018–30 June 2020



Notes (1 May 2020—30 June 2020)

1. Non-typhoidal *Salmonella* species (n = 3) and typhoidal *Salmonella* species (n = 0)

Shigella species

National data

Figure 19: Multidrug-resistant *Shigella* species, twenty-four-month trend, national, 1 July 2018–30 June 2020

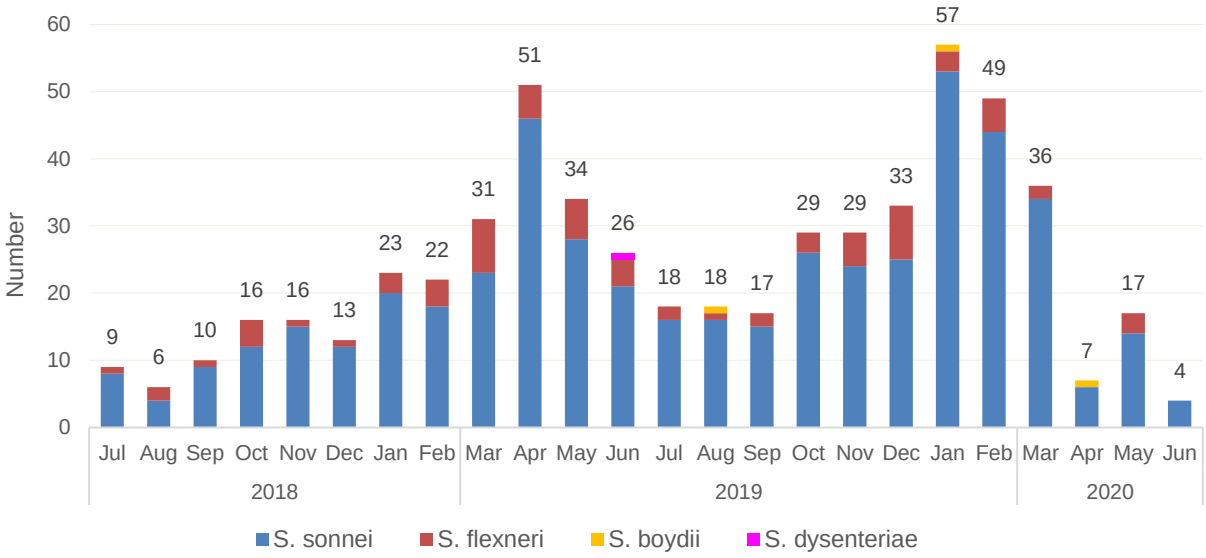
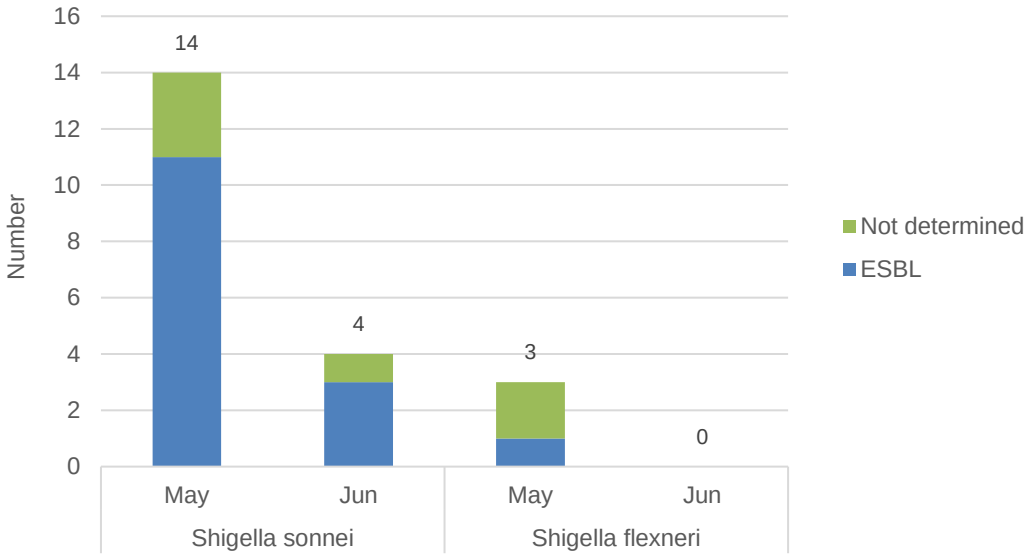


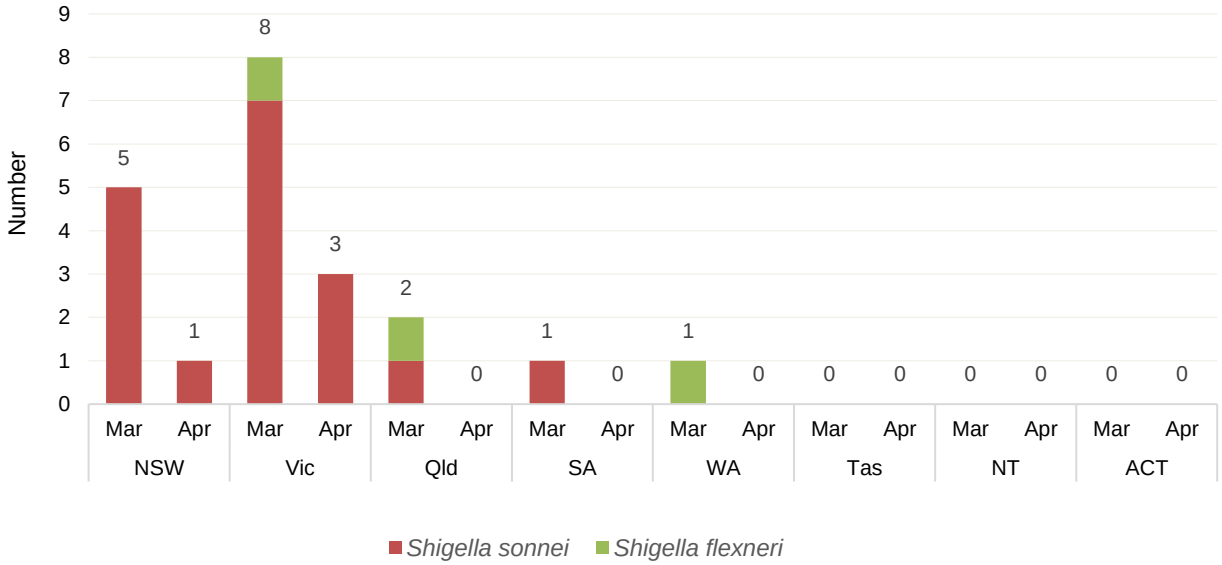
Figure 20: Multidrug-resistant *Shigella* species, number reported by month, national, 1 May 2020–30 June 2020



Not determined = multidrug resistant, ceftriaxone susceptible

State and territory data

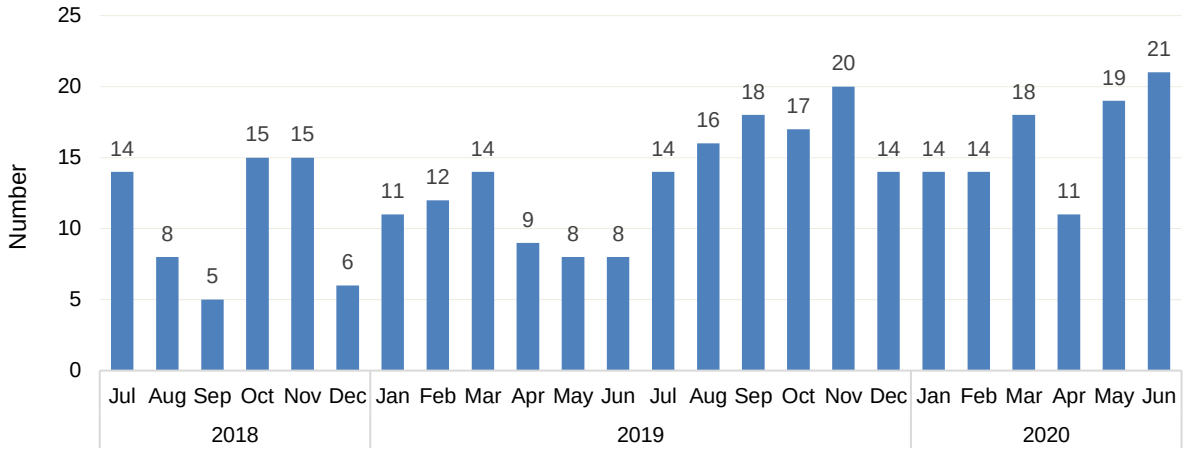
Figure 21: Multidrug-resistant *Shigella* species, number reported by state and territory, 1 May 2020–30 June 2020



Staphylococcus aureus

National data

Figure 22: Daptomycin non-susceptible *Staphylococcus aureus,* twenty-four-month trend, national, 1 July 2018–30 June 2020



Note: No linezolid non-susceptible *S. aureus* or vancomycin non-susceptible *S. aureus* were reported in the two-month period (January–February 2020).

State and territory data

Table 6. Daptomycin non-susceptible *Staphylococcus aureus,* number reported by setting and state and territory, 1 May 2020–30 June 2020

	State or territory								
Setting	**NSW**	**Vic**	**Qld**	**SA**	**WA**	**Tas**	**NT**	**ACT**	**Total**
Total	**13**	**4**	**17**	**0**	**7**	**0**	**0**	**0**	**41**
Public hospital	7	3	1	0	6	0	0	0	17
Private hospital	1	0	4	0	0	0	0	0	5
Aged care home	2	0	8	0	0	0	0	0	10
Community	2	1	2	0	1	0	0	0	6
Unknown	1	0	2	0	0	0	0	0	3

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) Standard Preventing and Controlling Healthcare-Associated Infection and Australia's National Antimicrobial Resistance Strategy (2015–2019). 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.[1]

Table A1: List of critical antimicrobial resistances reported to CARAlert

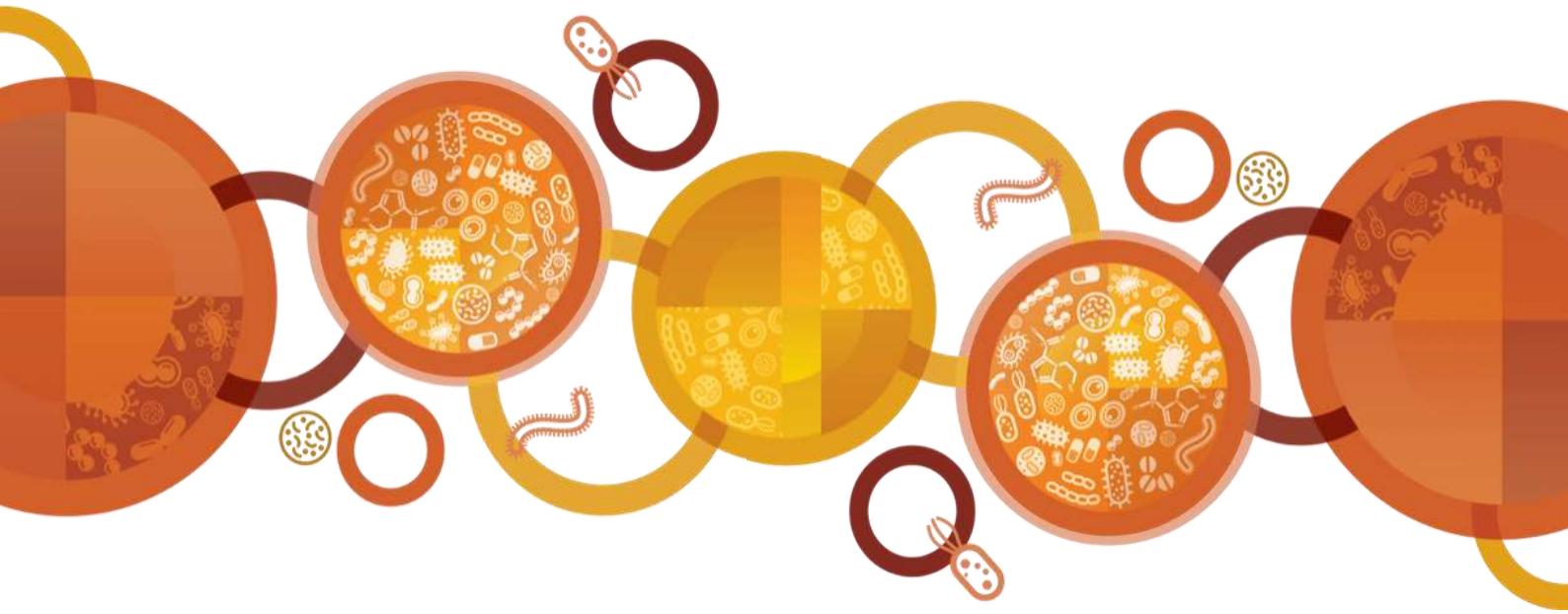
Species	Critical resistance
Acinetobacter baumannii complex	Carbapenemase-producing
Candida auris	–
Enterobacterales	Carbapenemase-producing, and/or ribosomal methyltransferase-producing
Enterobacterales	Transmissible colistin resistance
Enterococcus species	Linezolid resistant
Mycobacterium tuberculosis	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.

[1] Australian Commission on Safety and Quality in Health Care (ACSQHC). AURA 2017: Second Australian report on antimicrobial use and resistance in human health. Sydney: ACSQHC; 2017.



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