AUSTRALIAN COMMISSION ON SAFETY AND QUALITY IN HEALTH CARE

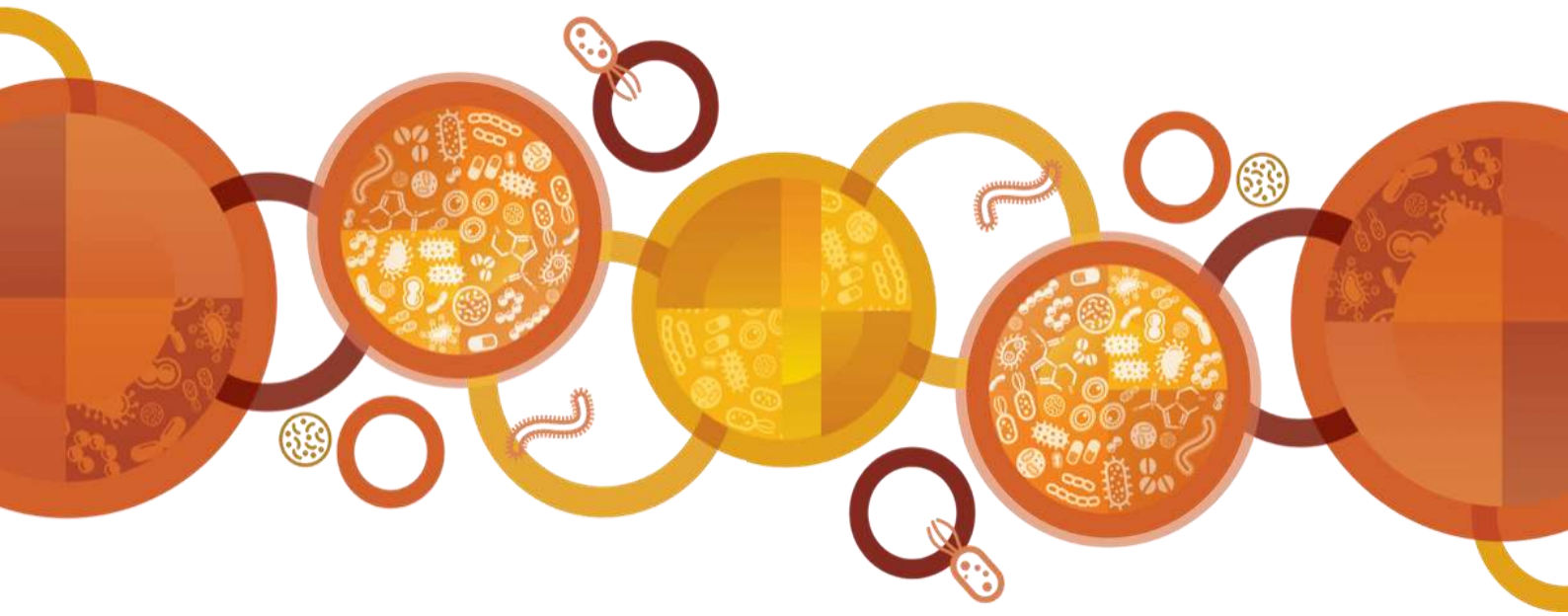
AURA Antimicrobial Use and Resistance in Australia

CARAlert

CARAlert data update 19

1 July 2020–31 August 2020

November 2020



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Contents

Data Summary

This report provides an update on data submitted to CARAlert for the reporting period: 1 July 2020 to 31 August 2020, and complements previous analyses of and updates on CARAlert data.

National overview:

- There was little change in the total 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* = 97, 42.0%), followed by azithromycin non-susceptible (low-level resistance, MIC ≤ 256 mg/L) *Neisseria gonorrhoeae* (*n* = 42, 18.2%)
- 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 25.6% (*n* = 444 versus *n* = 597). The proportion of CPE reported from Queensland (36.1%; 35/97) increased compared to the previous two-month period (6.0%; 7/116)
- The number of multidrug-resistant *Shigella* species (*n* = 21) increased by 42.3% compared to the previous two-month reporting period
- The number of daptomycin non-susceptible *Staphylococcus aureus* declined by 10% (*n* = 36)
- The first AIM (Adelaide imipenemase) carbapenemase type submitted to CARAlert was reported from a *Pseudomonas aeruginosa*
- The AIM carbapenemase was first reported from *P. aeruginosa* in 2012. It appears to be unique to Australia, with sporadic cases reported from Adelaide since 2006. The last known case was reported in 2016.
- The majority of CARs, excluding those from *N. gonorrhoeae*, were reported from public hospitals (*n* = 106, 66% where setting known). There were 36 reports from community settings, 9 from aged care homes and 10 from private hospitals.

Carbapenemase-producing Enterobacterales:

- IMP (73.2%), NDM (18.6%), and OXA-48-like (4.1%) types accounted for 96.0% of all CPE reported during this period
- The total number of CPE decreased (*n* = 97, down 16.4%), with decreases in the number of NDM-types and OXA-48-like (NDM: *n* = 18 versus *n* = 27; OXA-48-like: *n* = 4 versus *n* = 13) compared to the previous two-month period. The greatest decline in NDM-types was in Victoria (*n* = 7 versus *n* = 17, down 58.8%). No NDM types were reported from Western Australia, Tasmania, Northern Territory or the Australian Capital Territory
- The total number of IMP-types was steady (*n* = 71 versus *n* = 69, up 2.9%) compared to the previous two-month period. However, there was a five-fold increase in reports from Queensland (*n* = 33 versus *n* = 6), and a four-fold decline in reports from Victoria (*n* = 8 versus *n* = 32, down 75%).
- One KPC-producing Enterobacterales was reported from an aged care home in Victoria
- Excluding CARs for which the setting was unknown, 18% (16/89) of CPE were reported from settings other than public hospitals; 9.0% (*n* = 8), 6.7% (*n* = 6) and 2.2% (*n* = 2) respectively from the community, private hospitals, and aged care homes
- Eight hospitals had more than two notifications of IMP-types; these institutions were in Queensland (*n* = 4), New South Wales (*n* = 3) and Victoria (*n* = 1). A further four institutions had two notifications of IMP-types (New South Wales (*n* = 2), Victoria (*n* = 1), Queensland (*n* = 1)
- One institution in New South Wales had three notifications of NDM-types; a further three institutions had two notifications (one each in Victoria, South Australia and New South Wales).

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

- Ceftriaxone non-susceptible *Salmonella* species were reported from Queensland (*n* = 3), Victoria (*n* = 1), and New South Wales (*n* = 1)

- The majority of multidrug-resistant *Shigella* species were reported from New South Wales (*n* = 28, 76%) and Queensland (*n* = 5, 14%); other reports were from Western Australia (*n* = 3) and Victoria (*n* = 1). A vast majority (89%, 33/37) were *S. sonnei*
- ESBL types were detected in 89% (25/28) of multidrug-resistant *Shigella* reported from New South Wales and 60% (3/5) from Queensland. Where ESBL type was known, all (*n* = 16/16) 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 increased 16.7% compared to the previous two-month reporting period (*n* = 42 versus n = 36). There was an increase in the number of reports from New South Wales (*n* = 28 versus *n* = 21, up 33%) and Queensland (*n* = 11 versus *n* = 6, up 83%) compared to the previous two-month reporting period
- A vast majority of cases were reported from New South Wales (*n* = 28, 67%) and Queensland (*n* = 11, 26%).

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

- There was 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 decreased (*n* = 36, down 12.2%) compared to the previous two-month reporting period. The decrease was notable in New South Wales (*n* = 6 versus *n* = 13)
- No linezolid non-susceptible or vancomycin non-susceptible *S. aureus* were reported

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

- One *A. baumannii* complex (NDM-type) was reported from New South Wales
- Seven carbapenemase-producing *P. aeruginosa* were reported during this period. They were from New South Wales (GES, *n* = 3), Victoria (VIM, *n* = 1), Queensland (GES, *n* = 1), South Australia (AIM, *n* = 1), and Western Australia (IMP, *n* = 1).

Linezolid resistant *Enterococcus:*

- Three linezolid resistant *Enterococcus faecalis* were reported during this period, one each from Victoria, South Australia and Western Australia.

***Candida auris*:**

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

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

- One case of transmissible colistin resistance (*mcr-10.1*), other than that seen in combination with CPE, was 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 July 2020–31 August 2020, and 2019

Species	Critical resistance	State or Territory								Bi-monthly			Year to date		
										2020	2020				
		NSW	Vic	Qld	SA	WA	Tas	NT	ACT	May-Jun	Jul-Aug	Relative change*	2019	2020	Relative change*
Acinetobacter baumannii complex	Carbapenemase-producing†	1	0	0	0	0	0	0	0	5	**1**	▼80.0%	6	22§	–
Candida auris	–†	0	0	0	0	0	0	0	0	0	0	–	2	2§	–
Enterobacterales	Carbapenemase-producing	35	14	35	3	2	1	0	1	111	91	▼ 18.0%	542	414	▼ 23.6%
	Carbapenemase and ribosomal methyltransferase-producing	2	0	0	0	0	0	0	0	4	2	▼ 50.0%	30	18	▼ 40.0%
	Carbapenemase-producing and transmissible resistance to colistin†	1	2	0	0	0	0	0	0	1	3	▲ 200%	25	11	▼ 56.0%
	Carbapenemase and RMT-producing and transmissible resistance to colistin	0	1	0	0	0	0	0	0	0	1	–	0	1	–
	Ribosomal methyltransferase-producing	0	0	0	0	0	0	0	0	0	0	–	5	1	▼ 80.0%
	Transmissible resistance to colistin†	0	1	0	0	0	0	0	0	0	1	–	2	1§	▼ 50.0%
Enterococcus species	Linezolid resistant	0	1	0	1	1	0	0	0	0	3	–	10	13	▲ 30.0
Mycobacterium tuberculosis	Multidrug-resistant – at least rifampicin- and isoniazid-resistant strains	2	0	0	0	0	0	0	0	3	2	▼ 33.3%	17	10	▼ 41.2%
Neisseria gonorrhoeae	Azithromycin non-susceptible (LLR < 256 mg/L)	28	1	11	0	2	0	0	0	36	42	▲ 16.7%	312	181	▼ 42.0%
	Azithromycin non-susceptible (HLR > 256 mg/L	0	0	0	0	0	0	0	0	0	0	–	3	1	▼ 66.7%
	Ceftriaxone non-susceptible	0	0	0	0	0	0	0	0	1	0	▼ 100%	4	3	▼ 25.0%
	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; RMT = ribosomal methyltransferase; – = 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	May-Jun	Jul-Aug	Relative change*	2019	2020	Relative change*
Pseudomonas aeruginosa	Carbapenemase-producing†	3	1	1	1	1	0	0	0	2	7	▲ 250%	10	20§	▲ 100%
Salmonella species	Ceftriaxone non-susceptible	1	1	3	0	0	0	0	0	3	5	▲ 66.7%	28	25	▼ 10.7%
Shigella species	Multidrug-resistant	28	1	5	0	3	0	0	0	26	37	▲ 42.3%	223	212	▼ 4.9%
Staphylococcus aureus complex	Daptomycin non-susceptible	6	5	17	0	8	0	0	0	40	36	▼ 10.0%	92	134	▲ 45.7%
	Daptomycin and vancomycin non-susceptible	0	0	0	0	0	0	0	0	1	0	▼ 100%	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 12 October 2020)	107	28	72	5	15	1	0	1	**233**	**231**	**▼ 0.9%**	**1,311**	**1,070**	**▼ 18.4%**
														1,025§	**▲ 17.7%**

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)

§ = 2020 total minus new CARS introduced in 2019

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 July 2020–31 August 2020

Species	Critical resistance	Setting					Total
		Public hospital	Private hospital	Aged care home	Community	Unknown	
Acinatobacter baumannii complex	Carbapenemase-producing	1	0	0	0	0	1
Candida auris	–	0	0	0	0	0	0
Enterobacterales	Carbapenemase-producing	68	5	2	8	8	91
	Carbapenemase and ribosomal methyltransferase-producing	2	0	0	0	0	2
	Carbapenemase-producing and transmissible resistance to colistin	2	1	0	0	0	3
	Carbapenemase and ribosomal methyltransferase-producing, and transmissible resistance to colistin	1	0	0	0	0	1
	Ribosomal methyltransferase-producing	0	0	0	0	0	0
	Transmissible resistance to colistin	1	0	0	0	0	1
Enterococcus species	Linezolid resistant	2	0	0	0	1	3
Mycobacterium tuberculosis	Multidrug-resistant – at least rifampicin- and isoniazid-resistant	1	0	0	0	1	2
Neisseria gonorrhoeae	Azithromycin non-susceptible (low-level)	1	0	0	40	1	42
	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 (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	3	0	0	3	1	7
Salmonella species	Ceftriaxone non-susceptible	2	0	0	1	2	5
Shigella species	Multidrug-resistant	13	0	0	19	5	37
Staphylococcus aureus complex	Daptomycin non-susceptible	10	4	7	5	10	36
	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 12 October 2020)	**107**	**10**	**9**	**76**	**29**	**231**

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

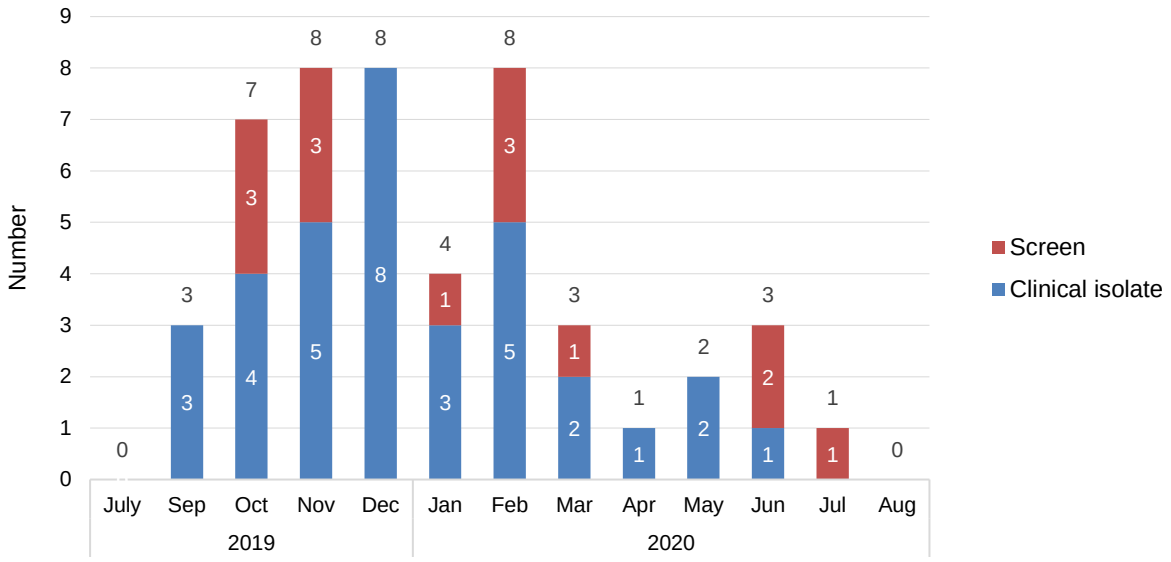
High-level = azithromycin MIC > 256 mg/L; Low-level = azithromycin MIC < 256 mg/L

Summary by CAR

Acinetobacter baumannii complex

National data

Figure 1: Carbapenemase-producing *Acinetobacter baumannii* complex*, monthly number reported by specimen type, national, 1 July 2019–31 August 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 July 2020–31 August 2020

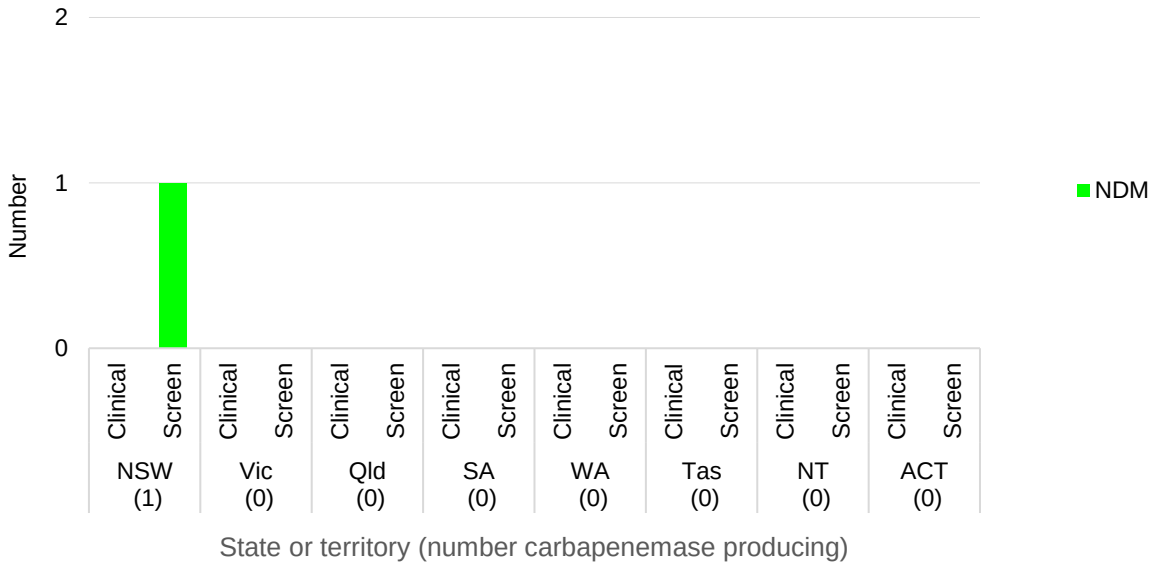


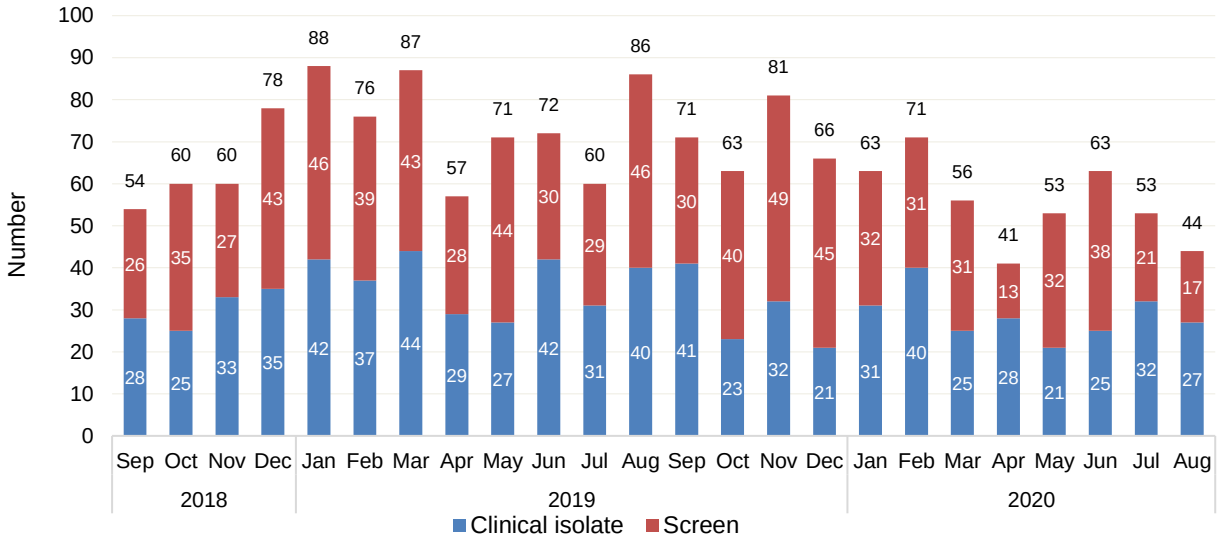
Table 3: Carbapenemase-producing *Acinetobacter baumannii* complex, number reported by setting, by state and territory, 1 July 2020–31 August 2020

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

Enterobacterales

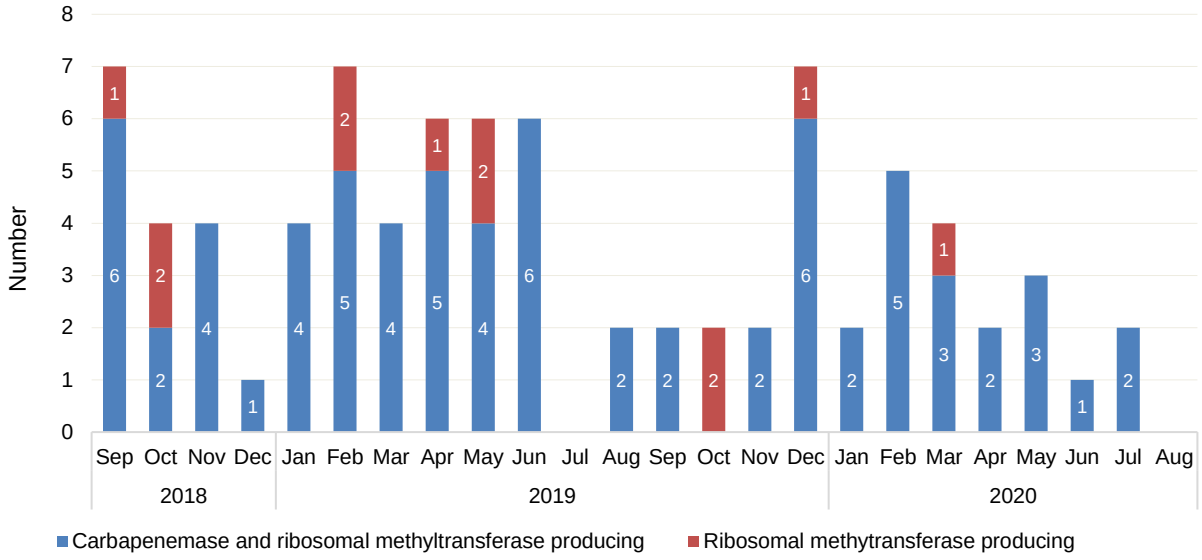
National data

Figure 3: Carbapenemase-producing Enterobacterales*, twenty-four-month trend by specimen type, national, 1 September 2018–31 August 2020



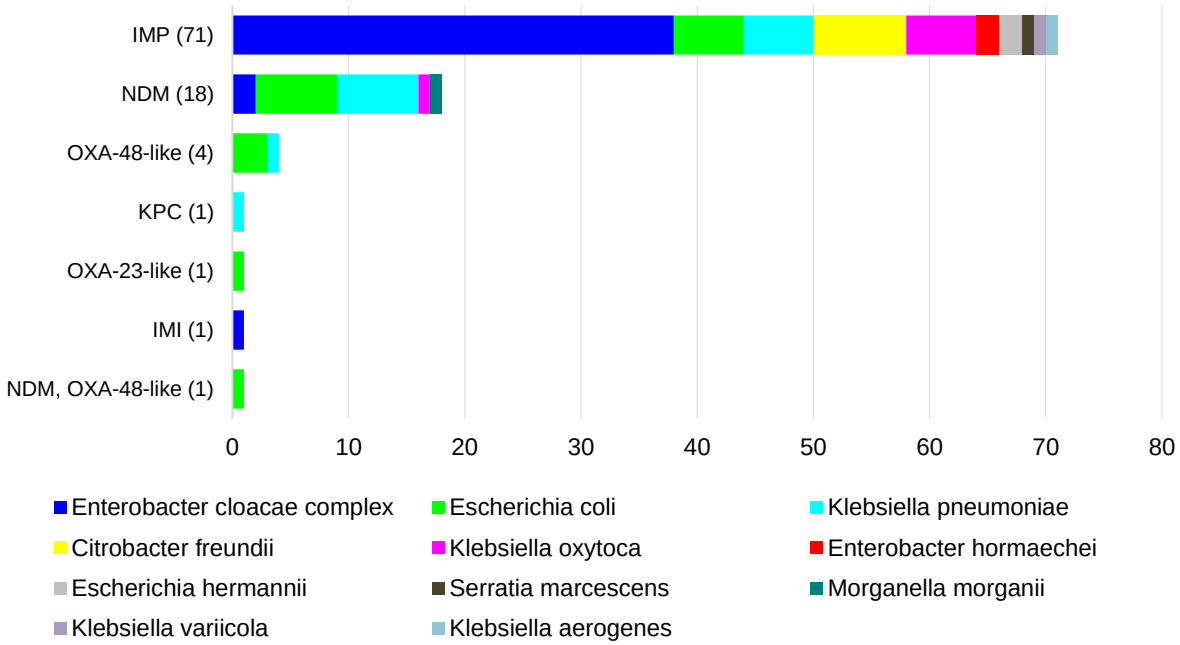
* Carbapenemase-producing alone or in combination with ribosomal methyltransferases

Figure 4: Ribosomal methyltransferase-producing Enterobacterales*, twenty-four-month trend, national, 1 September 2018–31 August 2020



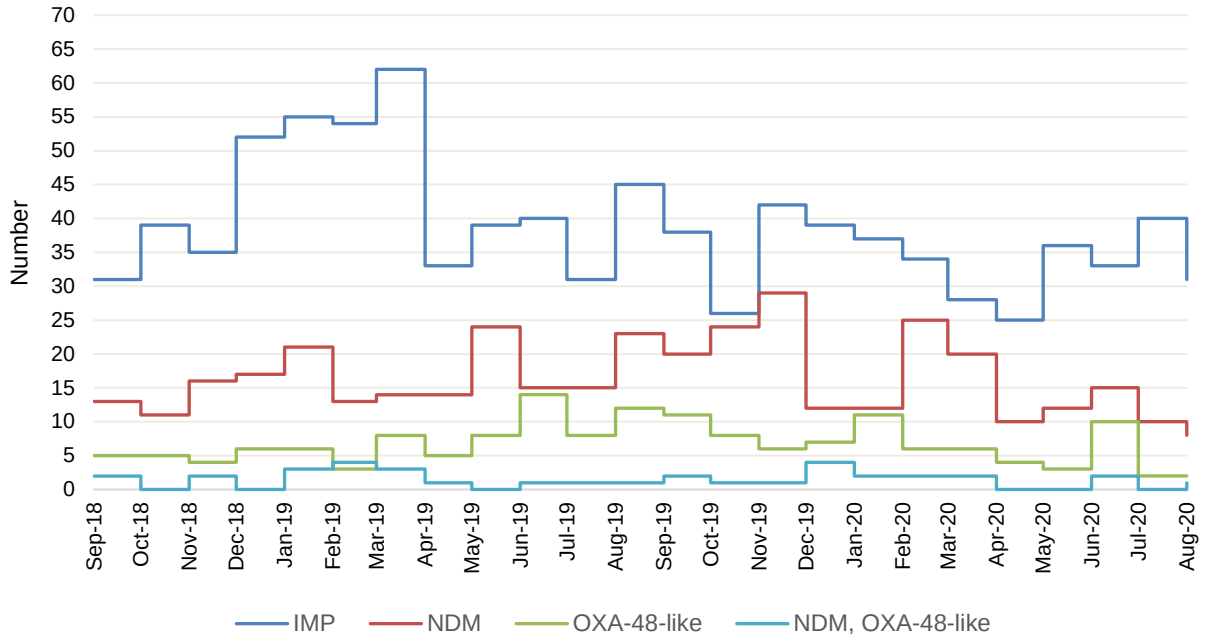
* Ribosomal methyltransferases alone, or in combination with carbapenemases

Figure 5: Carbapenemase-producing Enterobacterales*, number reported by carbapenemase type and species, national, 1 July 2020–31 August 2020



* Carbapenemase-producing (*n* = 91), carbapenemase-producing plus transmissible resistance to colistin (*n* = 3), carbapenemase- and ribosomal methyltransferase-producing (*n* = 2), carbapenemase and ribosomal methyltransferase-producing plus transmissible resistance to colistin (*n* = 1)

Figure 6: Top four reported carbapenemase types*, twenty-four-month trend, national, 1 September 2018–31 August 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 July 2020–31 August 2020

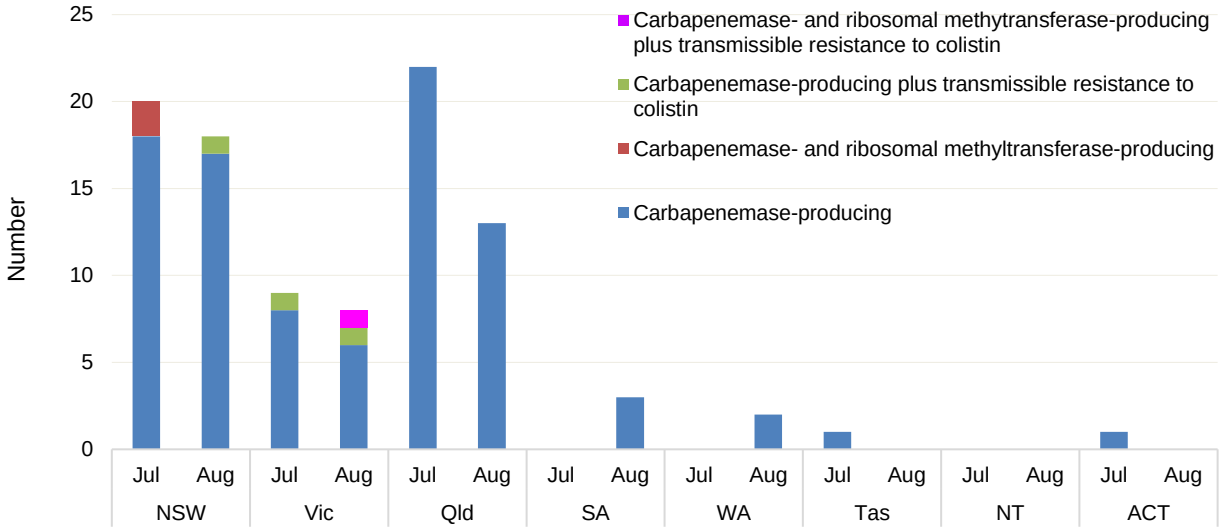


Figure 8: Two-year trend for the top four reported carbapenemase types from Enterobacterales, by state and territory and nationally, (three-month moving average), 1 September 2018–31 August 2020

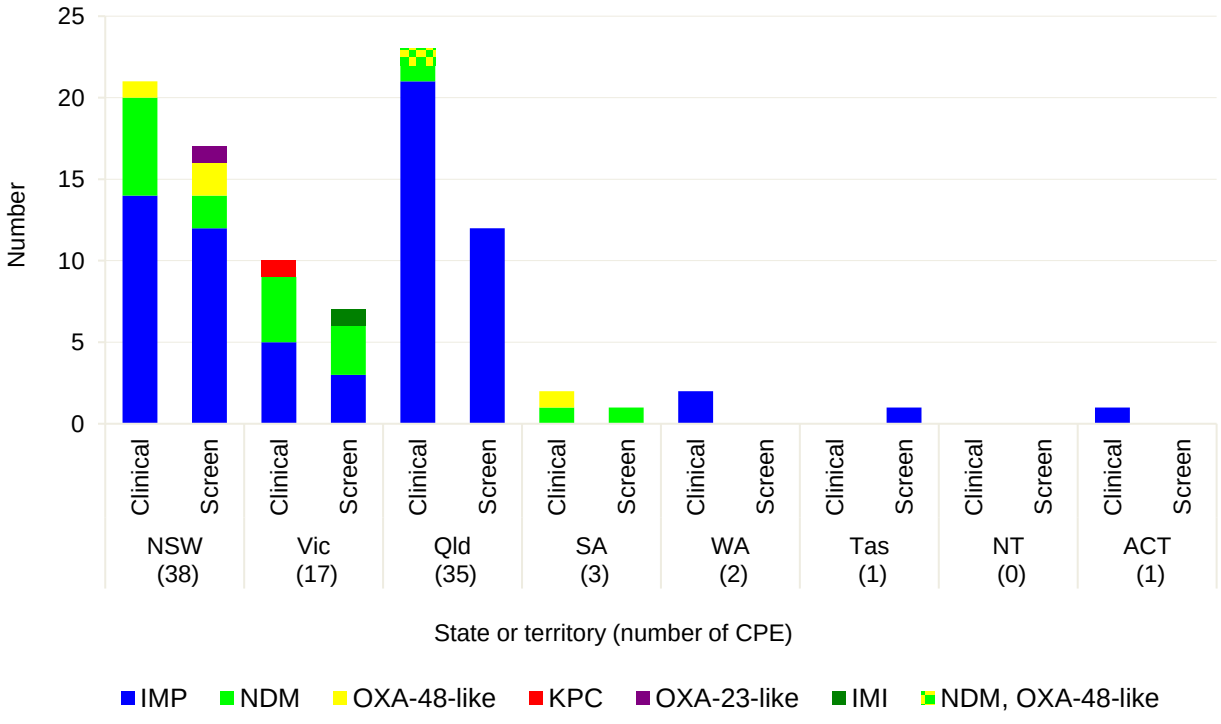
Type	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia
IMP	20 9	23 2	17 4	0 0	2 0	0 0	1 0	2 0	57 24
NDM	8 1	9 4	6 0	6 0	1 0	0 0	1 0	1 0	24 9
OXA-48-like	3 1	7 1	2 0	1 0	1 0	0 0	0 0	0 0	11 4
KPC	1 0	2 0	1 0	0 0	0 0	0 0	0 0	0 0	3 0
All types	28 13	35 11	19 5	7 0	4 1	1 0	1 0	2 0	84 45

Line graphs represent three-month moving average for the period 1 September 2018 to 31 August 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

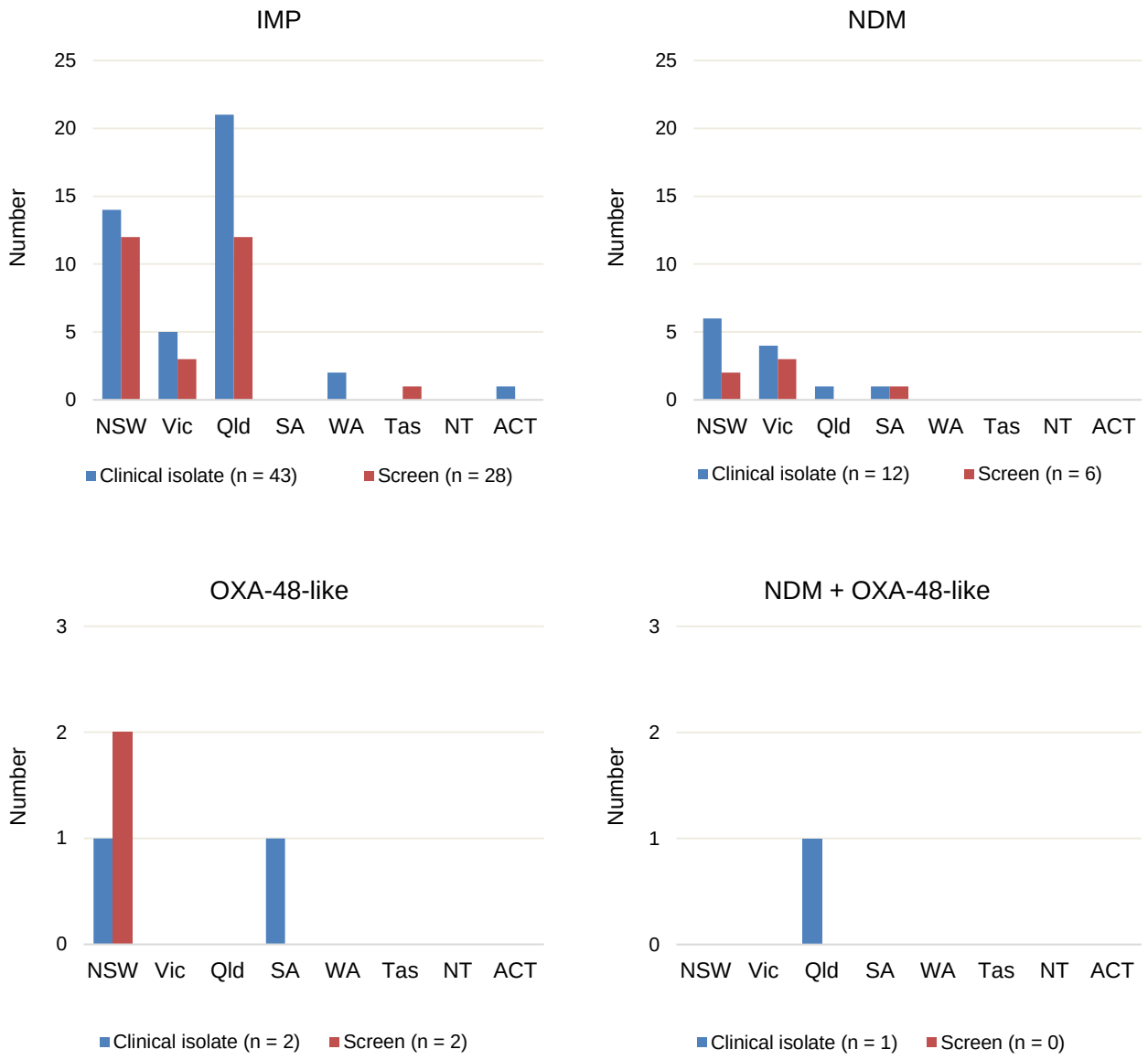
Blank cell = maximum monthly average was one or less

Figure 9: Carbapenemase-producing Enterobacterales*, number reported by carbapenemase type and specimen type, by state and territory, 1 July 2020–31 August 2020



* Carbapenemase-producing (*n* = 91), carbapenemase-producing plus transmissible resistance to colistin (*n* = 3), carbapenemase- and ribosomal methyltransferase-producing (*n* = 2), carbapenemase and ribosomal methyltransferase-producing plus transmissible resistance to colistin (*n* = 1)

Figure 10: Top three reported carbapenemase-producing Enterobacterales type by specimen type, by state and territory, 1 July 2020–31 August 2020



Other types: One each of KPC (Vic, clinical), IMI (Vic, screen), OXA-23-like (NSW, screen)

Table 4: Top four carbapenemase types from Enterobacterales, number reported by setting, by state and territory, 1 July 2020–31 August 2020

Carbapenemase type†	Setting	State or territory								Total
		NSW	Vic	Qld	SA	WA	Tas	NT	ACT	
IMP	**Total**	**26**	**8**	**33**	**0**	**2**	**1**	**0**	**1**	**71**
	Public hospital	24	6	21	0	0	1	0	1	53
	Private hospital	0	1	5	0	0	0	0	0	6
	Aged care home	0	0	0	0	1	0	0	0	1
	Community	1	1	2	0	1	0	0	0	5
	Unknown	1	0	5	0	0	0	0	0	6
NDM	**Total**	**8**	**7**	**1**	**2**	**0**	**0**	**0**	**0**	**18**
	Public hospital	8	3	0	2	0	0	0	0	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	3	0	0	0	0	0	0	3
	Unknown	0	1	1	0	0	0	0	0	2
OXA-48-like	**Total**	**3**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**4**
	Public hospital	3	0	0	1	0	0	0	0	4
	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
NDM+OXA-48-like	**Total**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**1**
	Public hospital	0	0	1	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	0	0	0	0	0	0	0

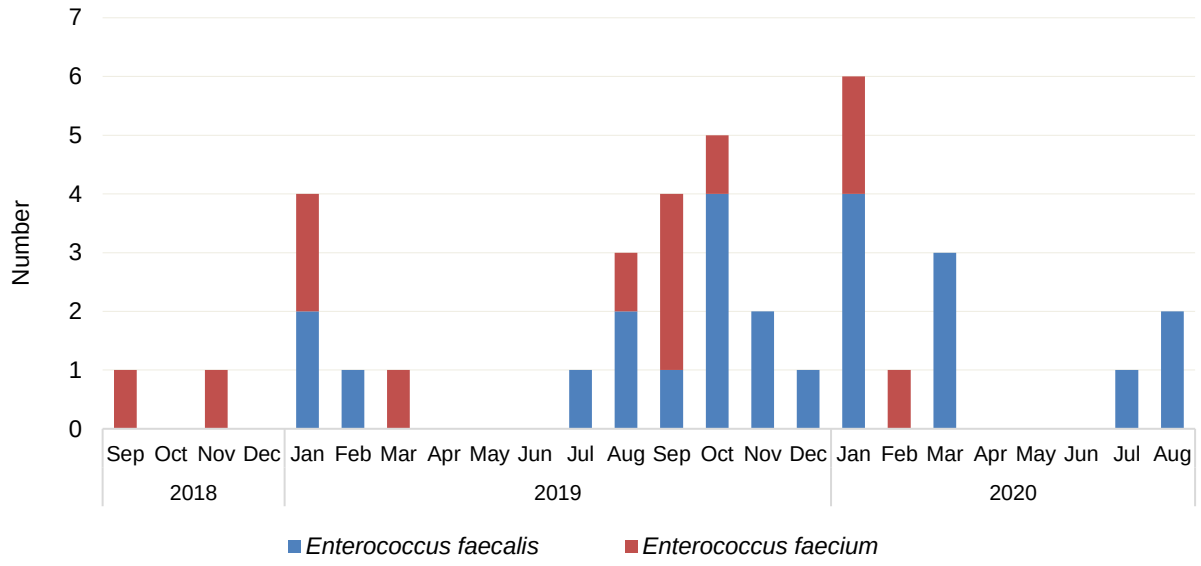
* Top four carbapenemase types account for 97% (94/97) of all carbapenemase-producing Enterobacterales reported for this period. Other types were KPC (*n* = 1, Vic), IMI (*n* = 1, Vic), and OXA-23-like (*n* = 1, NSW)

† 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 September 2018–31 August 2020



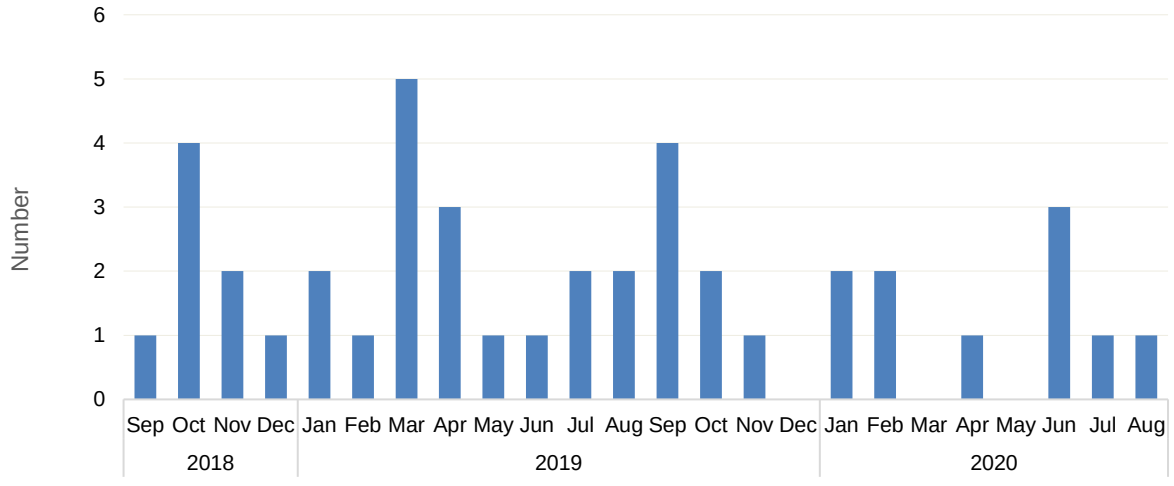
State and territory data

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

Mycobacterium tuberculosis

National data

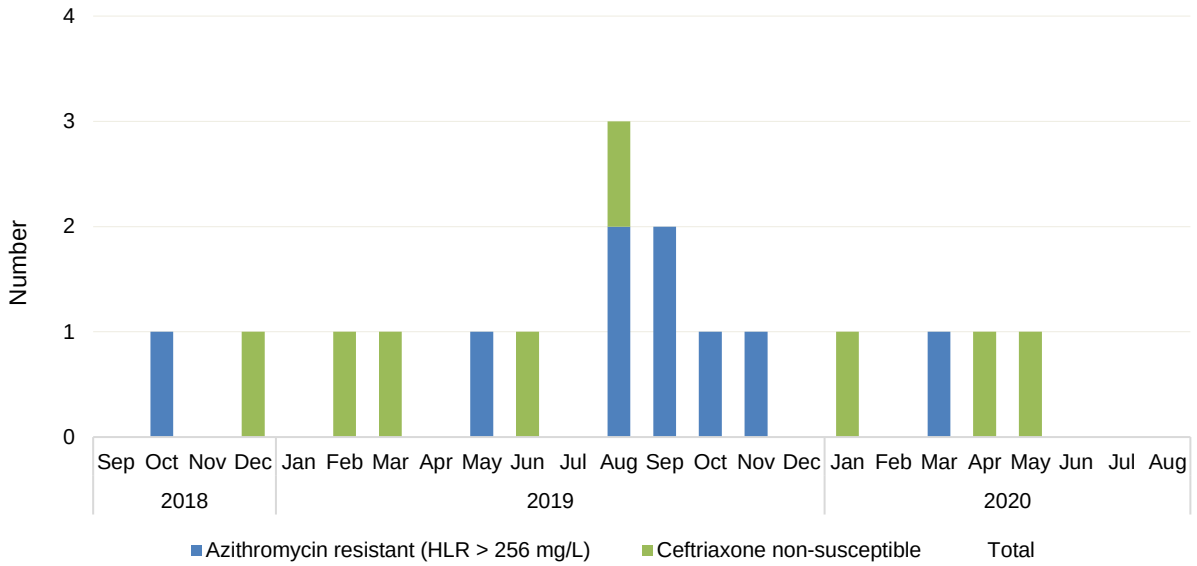
Figure 12: Multidrug-resistant *Mycobacterium tuberculosis,* twenty-four-month trend, national, 1 September 2018–31 August 2020



Neisseria gonorrhoeae

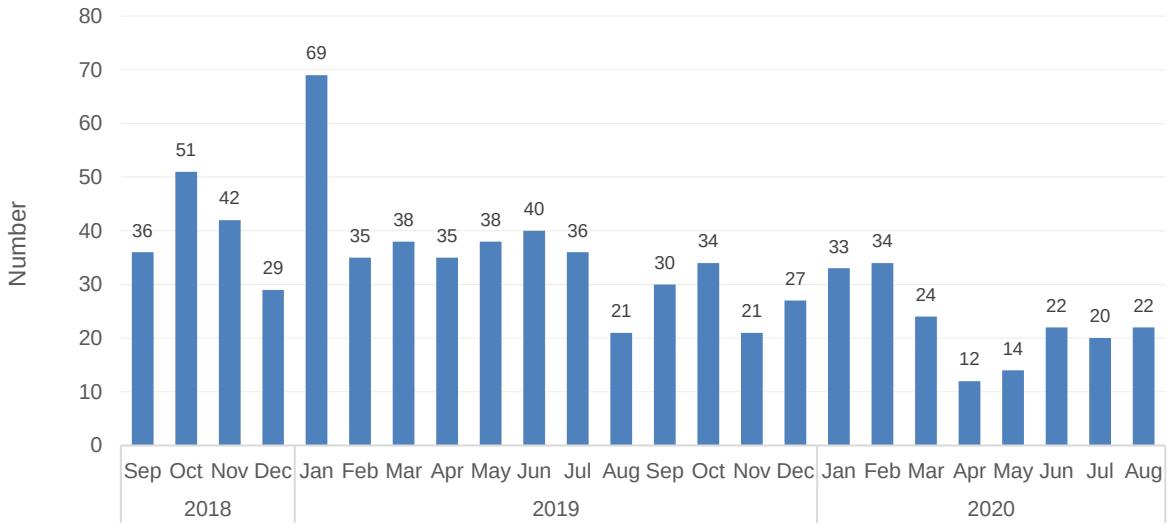
National data

Figure 13: Ceftriaxone non-susceptible and/or azithromycin non-susceptible (HLR > 256 mg/L) *Neisseria gonorrhoeae,* number reported by month, national, 1 September 2018–31 August 2020



LLR: Low level resistance; HLR: High level resistance

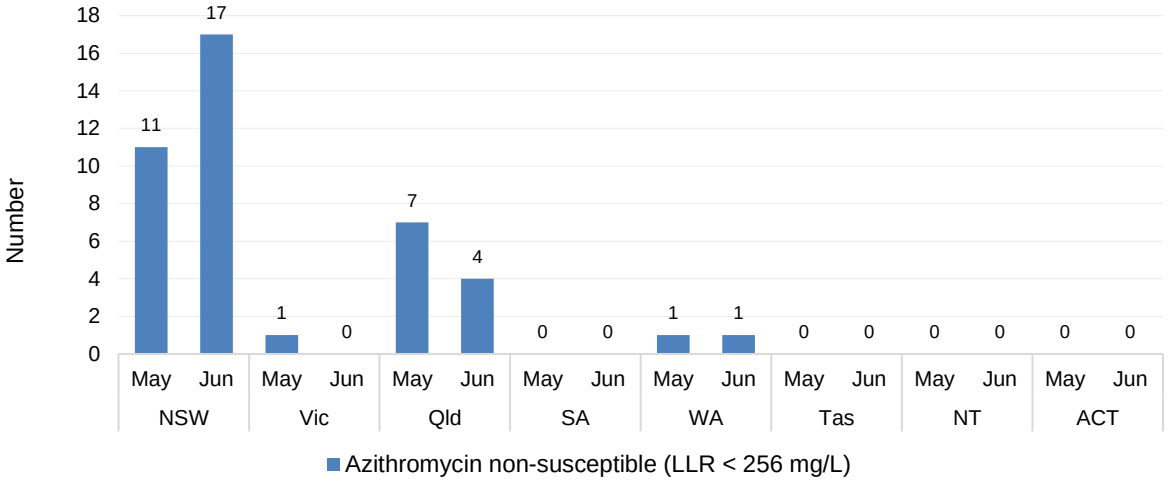
Figure 14: Azithromycin non-susceptible (LLR < 256 mg/L) *Neisseria gonorrhoeae*, twenty-four-month trend, national, 1 September 2018–31 August 2020



LLR: Low level resistance

State and territory data

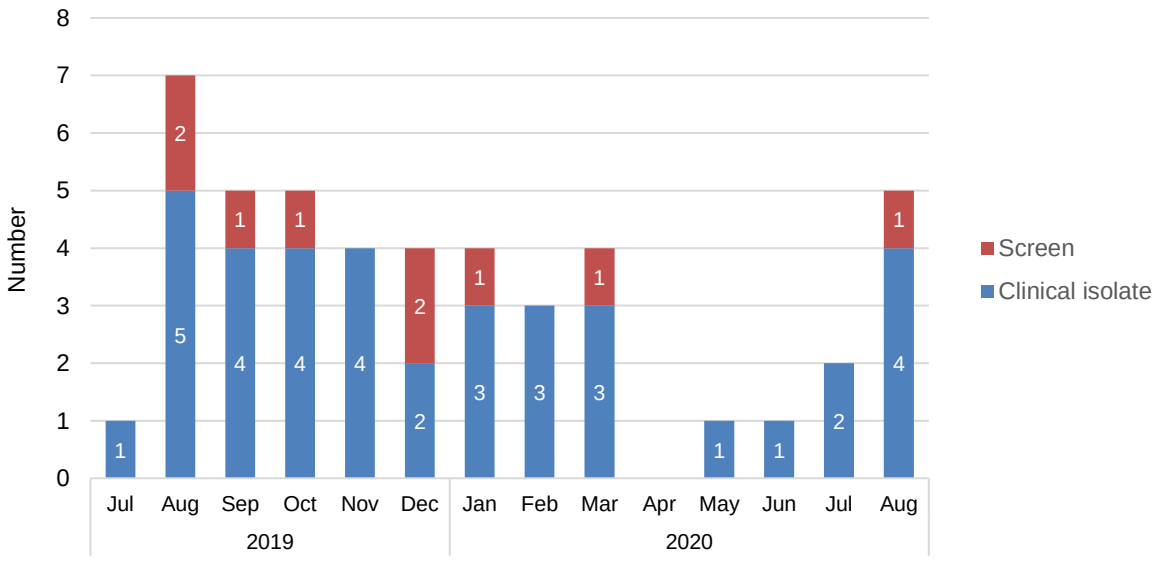
Figure 15: Azithromycin non-susceptible (LLR < 256 mg/L) *Neisseria gonorrhoeae,* number reported by month, state and territory, 1 July 2020–31 August 2020



Pseudomonas aeruginosa

National data

Figure 16: Carbapenemase-producing *Pseudomonas aeruginosa, number reported by specimen type, national, 1 July 2019–31 August 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 July 2020–31 August 2020

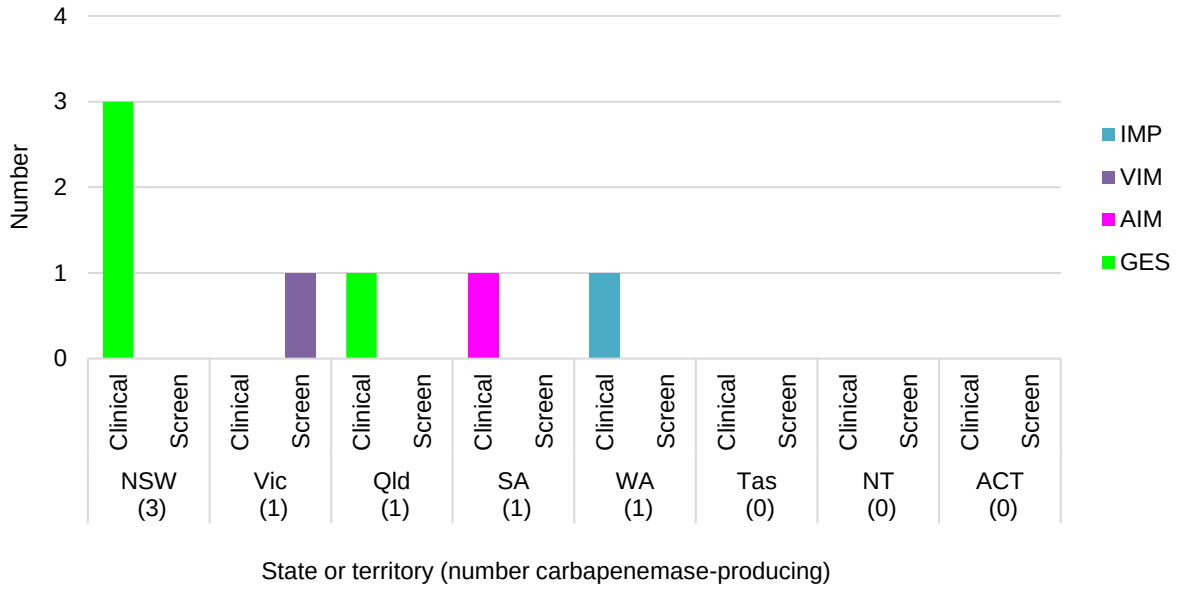


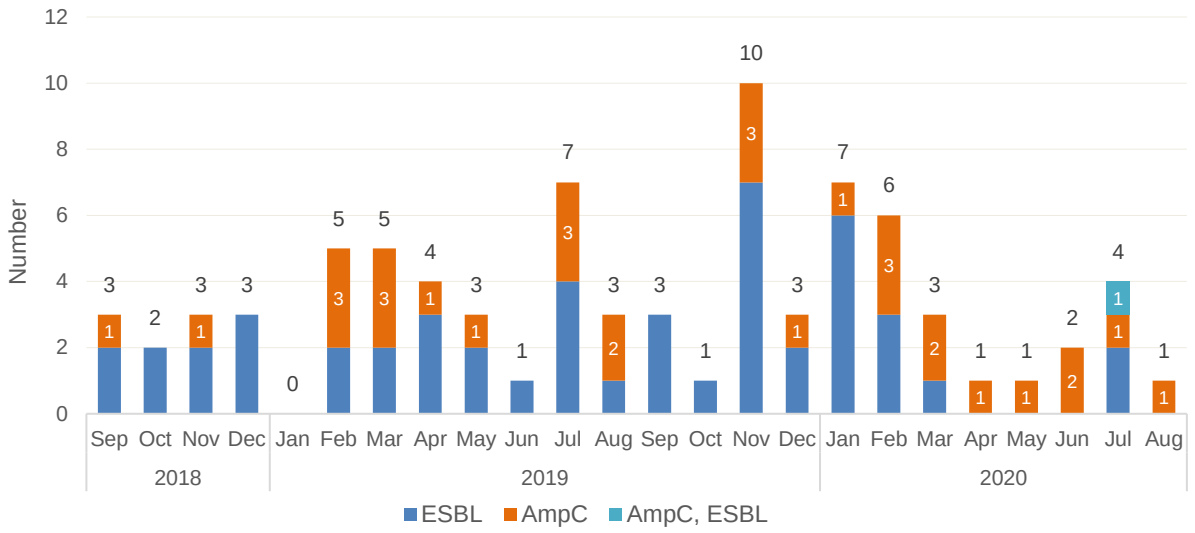
Table 5: Carbapenemase-producing *Pseudomonas aeruginosa*, number reported by setting, by state and territory, 1 July 2020–31 August 2020

Setting	State or territory								Total
	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	
Total	**3**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**7**
Public hospital	1	1	0	1	0	0	0	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	1	0	1	0	1	0	0	0	3
Unknown	1	0	0	0	0	0	0	0	1

Salmonella species

National data

Figure 18: Ceftriaxone non-susceptible *Salmonella* species, twenty-four-month trend, national, 1 September 2018–31 August 2020



Note: (1 July 2020—31 August 2020)

1. Non-typhoidal *Salmonella* species (n = 4) and typhoidal *Salmonella* species (n = 1)

Shigella species

National data

Figure 19: Multidrug-resistant *Shigella* species, twenty-four-month trend, national, 1 September 2018–31 August 2020

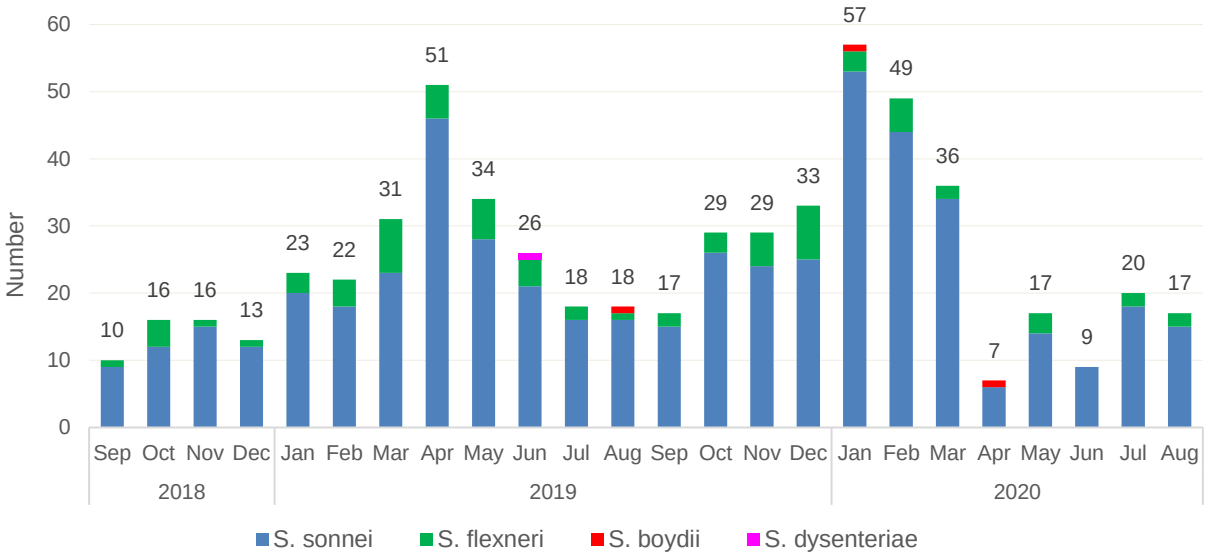
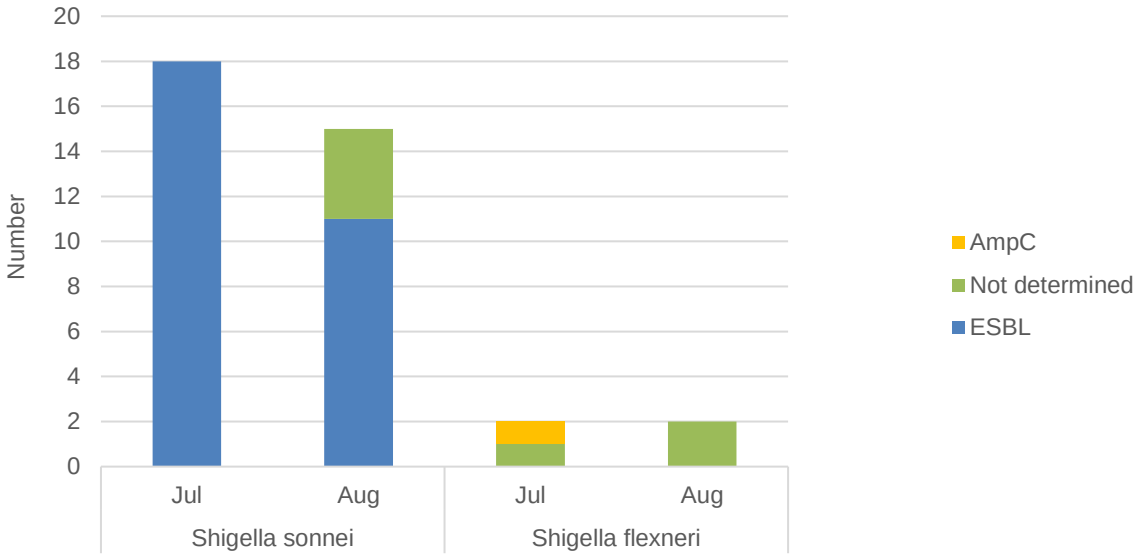


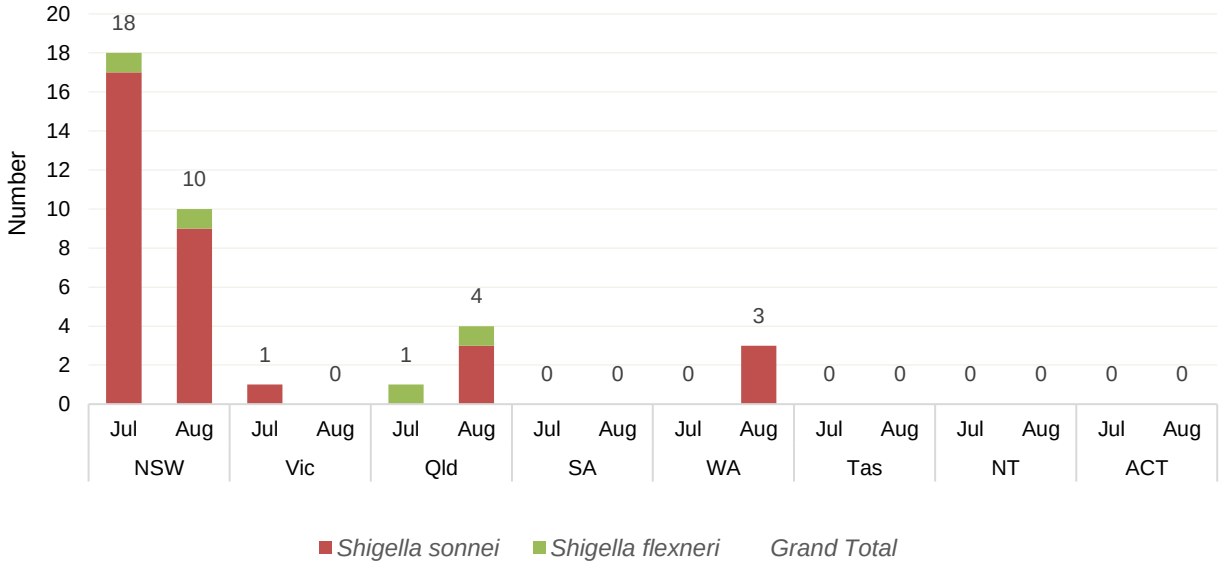
Figure 20: Multidrug-resistant *Shigella* species, number reported by month, national, 1 July 2020–31 August 2020



Not determined = multidrug resistant, ceftriaxone susceptible

State and territory data

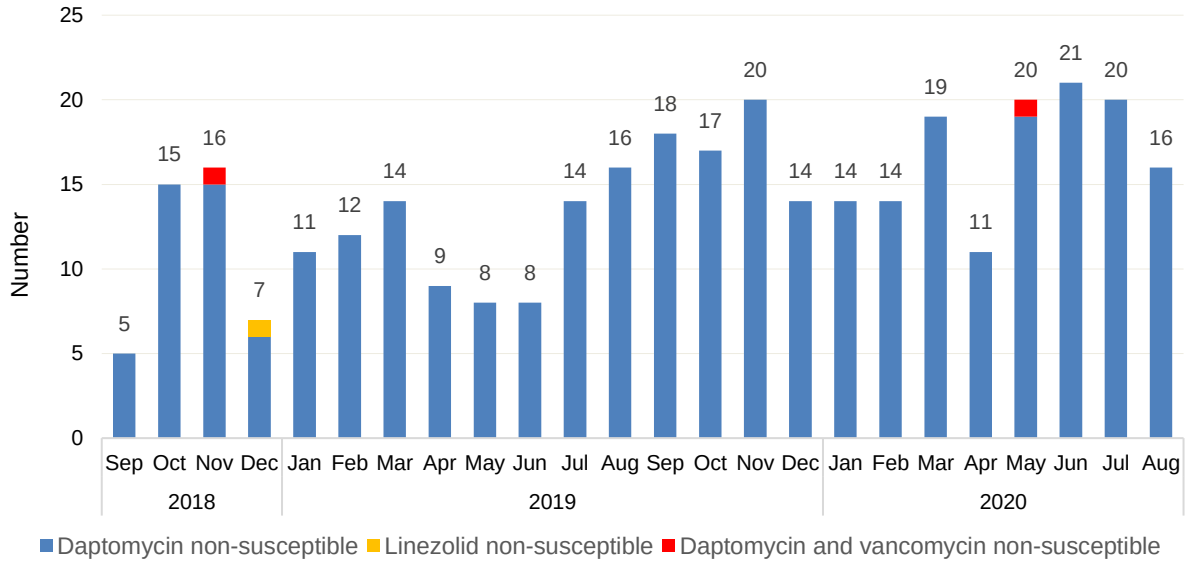
Figure 21: Multidrug-resistant *Shigella* species, number reported by state and territory, 1 July 2020–31 August 2020



Staphylococcus aureus

National data

Figure 22: Daptomycin, linezolid or vancomycin non-susceptible *Staphylococcus aureus*, twenty-four-month trend, national, 1 September 2018–31 August 2020



State and territory data

Table 6. Daptomycin non-susceptible *Staphylococcus aureus*, number reported by setting and state and territory, 1 July 2020–31 August 2020

Setting	State or territory								Total
	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	
Total	**6**	**5**	**17**	**0**	**8**	**0**	**0**	**0**	**36**
Public hospital	1	2	0	0	7	0	0	0	10
Private hospital	0	0	4	0	0	0	0	0	4
Aged care home	2	0	5	0	0	0	0	0	7
Community	0	2	3	0	0	0	0	0	5
Unknown	3	1	5	0	1	0	0	0	10

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

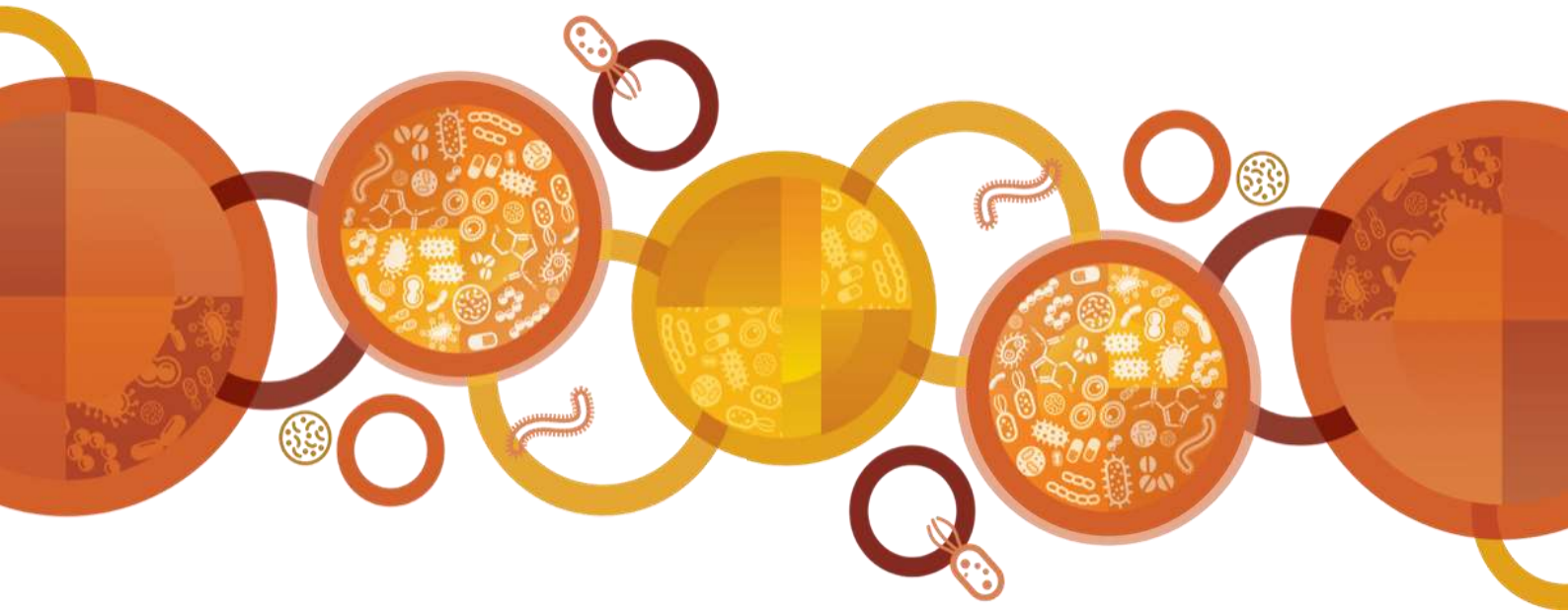
Species	Critical resistance
Acinetobacter baumannii complex	Carbapenemase-producing
Candida auris	–
Enterobacterales	Carbapenemase-producing, and/or ribosomal methyltransferase-producing
Enterobacterales	Transmissible colistin resistance
Enterococcus species	Linezolid resistant
Mycobacterium tuberculosis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