AUSTRALIAN COMMISSION ON SAFETY AND QUALITY IN HEALTH CARE

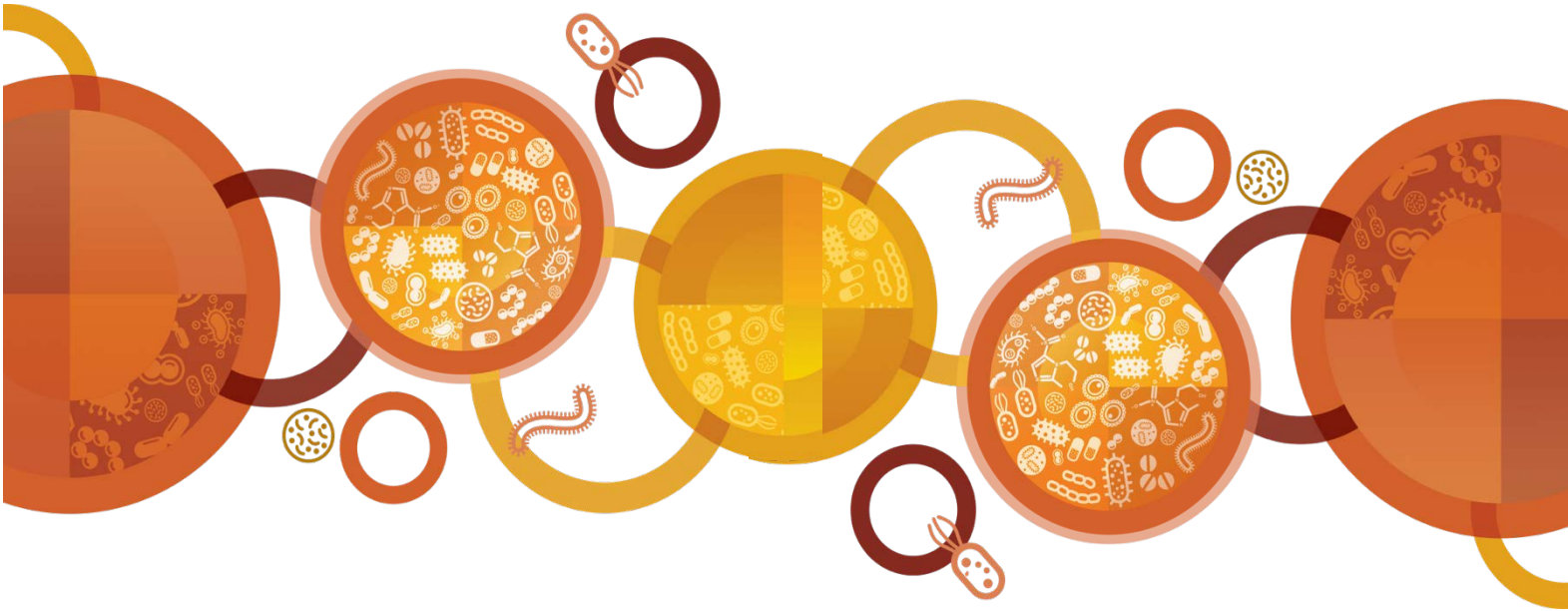
AURA Antimicrobial Use and Resistance in Australia

CARAlert THE NATIONAL ALERT SYSTEM FOR CRITICAL ANTIMICROBIAL RESISTANCE

CARAlert data update 16

1 January 2020–29 February 2020

May 2020



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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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Data Summary

This report provides an update on data submitted to CARAlert for the reporting period: 1 January 2020 to 29 February 2020, and complements previous analyses of and updates on CARAlert data.

National overview:

- There was a 10.8% increase in critical antimicrobial resistances (CARs) reported compared to the previous two-month reporting period (*n* = 369)
- Carbapenemase-producing Enterobacterales (CPE) (including those with ribosomal methyltransferase or transmissible resistance to colistin) remains the most frequently reported CAR (*n* = 135, 36.6%), followed by multidrug-resistant *Shigella* species (*n* = 102, 27.6%)
- 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 17.7% (*n* = 135 versus *n* = 164). The proportion of CPE reported from South Australia (0.7%; 1/135) and Queensland (16.3%; 22/135) decreased compared to the previous two-month period (6.8%; 10/146 and 28.1%; 41/146, respectively)
- The number of multidrug-resistant *Shigella* species (*n* = 102) increased by 64.5% compared to the previous two-month reporting period
- Azithromycin non-susceptible (low-level resistance, MIC ≤ 256 mg/L) *Neisseria gonorrhoeae* increased by 38% (*n* = 66 versus 48)
- The majority of CARs, excluding those from *N. gonorrhoeae*, were reported from public hospitals (*n* = 171, 46%). There were 58 from community settings, 14 from private hospitals, and eight from aged care homes (seven daptomycin non-susceptible *S. aureus*, and one CPE).

Carbapenemase-producing Enterobacterales:

- IMP (53.3%), NDM (27.4%), and OXA-48-like (12.6%) types accounted for 93.3% of all CPE reported during this period
- The total number of CPE declined (*n* = 135, down 7.5%), with decreases in the number of IMP-types and NDM-types (IMP: *n* = 72 versus *n* = 81; NDM: *n* = 37 versus *n* = 40) compared to the previous two-month period. However, there was an increase in the number of OXA-48-like-types (*n* = 17 versus *n* = 13)
- No NDM types were reported from South Australia, Western Australia or the Australian Capital Territory
- There were six reports of CPE that also harboured transmissible colistin resistance (mcr-9.1, *n* = 5; mcr-10.1, *n* = 1). Almost all (*n* = 5) were associated with IMP-4; one *Klebsiella oxytoca* had OXA-48+mcr-9.1. All were isolated from patients residing in New South Wales. Although found in three species, *Enterobacter cloacae* complex predominated (*n* = 4)
- There was one report of KPC-producing *K. pneumoniae* from Victoria
- Two IMI-producing Enterobacterales were reported from Victoria, one *E. cloacae* complex and one *Serratia marcescens*
- One OXA-23 producing *E. coli* was reported from Victoria
- Excluding CARs for which the setting was unknown, 15% (19/129) of CPE were reported from settings other than public hospitals; 9.3% (*n* = 12), 4.7% (*n* = 6) and 0.8% (*n* = 1) respectively from private hospitals, community and aged care
- Seven hospitals had more than two notifications of IMP-types; these institutions were in New South Wales (*n* = 3), Victoria (*n* = 3) and Queensland (*n* = 1)
- One hospital in Victoria also had more than two notifications of NDM-types.

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

- Ceftriaxone non-susceptible *Salmonella* species were reported from New South Wales (*n* = 6), Queensland (*n* = 3), Western Australia (*n* = 2), and South Australia (*n* = 1)

- Three typhoidal species producing extended-spectrum β-lactamase (ESBL) were reported from blood cultures from patients residing in New South Wales
- The majority of multidrug-resistant *Shigella* species were reported from New South Wales (*n* = 53, 52%) and Victoria (n = 28, 27%); other reports were from Queensland (*n* = 16), Western Australia (*n* = 3), South Australia (*n* = 1), and the Northern Territory (*n* = 1). The vast majority (91%, 93/102) were *S. sonnei*
- ESBL types were detected in 71% (20/28) of multidrug-resistant *Shigella* species reported from Victoria and 49% (26/53) from NSW. Where ESBL type was known, the vast majority (93%, n = 42/45) 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 (*n* = 66, up 38%). There were increases in the number or reports from New South Wales (*n* = 35 versus *n* = 26) and Queensland (*n* = 7 versus *n* = 5), and no change in the number reported from Victoria (*n* = 16) compared to the previous two-month reporting period
- The majority of cases were reported from New South Wales (*n* = 35, 53%).

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

- There was one ceftriaxone non-susceptible *N. gonorrhoeae* from Victoria, and no azithromycin non-susceptible *N. gonorrhoeae* (high-level resistance, MIC > 256 mg/L) reported during this period.

Daptomycin non-susceptible *Staphylococcus aureus*

- The total number of reports of this CAR decreased (*n* = 28, down 18%). There was a decline in the numbers from New South Wales (*n* = 3 versus *n* = 7), Victoria (*n* = 5 versus *n* = 8) and Western Australia (*n* = 3 versus *n* = 6) compared to the previous two-month reporting period; and an increase in the number from Queensland (*n* = 16 versus *n* = 12)
- Seven of 16 (43.8%) daptomycin non-susceptible *S. aureus* reported from Queensland were from aged care homes.

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

- Twelve *A. baumannii* complex were reported; six from Victoria (OXA-23-like [*n* = 5], NDM [*n* =1]), five OXA-23-like from New South Wales, and one OXA-23-like from Queensland
- Seven carbapenemase-producing *Pseudomonas aeruginosa* were reported during this period; three from Victoria (VIM [*n* = 2], IMP [*n* = 1]), and one each from New South Wales (GES), Western Australia (IMP), Tasmania (NDM), and the Australian Capital Territory (VIM).

Linezolid resistant Enterococcus

- Three *Enterococcus faecalis* (Victoria [*n* = 3]) and three *E. faecium* (Victoria [*n* = 2], Tasmania [*n* = 1]) were reported with linezolid resistance.

***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 January 2020–29 February 2020, and 2019

Species	Critical resistance	State or Territory								Bi-monthly			Year to date		
										2019	2020				
		NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Nov-Dec	Jan-Feb	Relative change*	2019	2020	Relative change*
Acinetobacter baumannii complex	Carbapenemase-producing†	5	6	1	0	0	0	0	0	16	12	▼ 25.0%	–	12†	–
Candida auris	–†	0	0	0	0	0	0	0	0	1	0	▼ 100%	–	0	–
Enterobacterales	Carbapenemase-producing	43	43	22	1	8	0	2	3	125	122	▼ 2.4%	155§	122	▼ 21.3%
	Carbapenemase and ribosomal methyltransferase-producing	1	5	0	0	1	0	0	0	8	7	▼ 12.5%	9	7	▼ 22.2%
	Carbapenemase-producing and transmissible resistance to colistin†	6	0	0	0	0	0	0	0	13	6	▼ 53.8%	–	6	–
	Ribosomal methyltransferase-producing	0	0	0	0	0	0	0	0	1	0	▼ 100%	2	0	▼ 100%
	Transmissible resistance to colistin†	0	0	0	0	0	0	0	0	1	0	▼ 100%	–	0	–
Enterococcus species	Linezolid non-susceptible	0	5	0	0	0	1	0	0	2	6	▲ 200%	5	6	▲ 20.0%
Mycobacterium tuberculosis	Multidrug-resistant – at least rifampicin- and isoniazid-resistant strains	0	0	0	0	0	0	0	0	0	0	–	3	0	▼ 100%
Neisseria gonorrhoeae	Azithromycin non-susceptible (LLR < 256 mg/L)	35	16	7	0	5	0	1	2	48	66	▲ 37.5%	104	66	▼ 36.5%
	Azithromycin non-susceptible (HLR > 256 mg/L	0	0	0	0	0	0	0	0	1	0	▼ 100%	0	0	–
	Ceftriaxone non-susceptible	0	1	0	0	0	0	0	0	0	1	–	1	1	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		
										2019	2020				
		NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Nov-Dec	Jan-Feb	Relative change*	2019	2020	Relative change*
Pseudomonas aeruginosa	Carbapenemase-producing[†]	1	3	0	0	1	1	0	1	8	7	▼ 12.5%	–	7[†]	–
Salmonella species	Ceftriaxone non-susceptible	6	0	3	1	2	0	0	0	13	12	▼ 7.7%	5	12	▲ 140%
Shigella species	Multidrug-resistant	53	28	16	1	3	0	1	0	62	102	▲ 64.5%	45	102	▲ 127%
Staphylococcus aureus	Daptomycin non-susceptible	3	5	16	0	3	0	0	1	34	28	▼ 17.6%	23	28	▲ 21.7%
	Daptomycin and vancomycin non-susceptible	0	0	0	0	0	0	0	0	0	0	–	0	0	–
	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 9 May 2020)	**153**	**112**	**65**	**3**	**23**	**2**	**4**	**7**	**333**	**369**	▲ 10.8%	**352**	**369**	▲ **4.8%**
														350[§]	▼ 0.6%

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 multidrug resistant *Shigella* species for 2019 have been updated to include additional submissions received after publication date of the previous CARAlert Data Update.

Table 2: Number of critical antimicrobial resistance isolates, by setting, national, 1 January 2020–29 February 2020

Species	Critical resistance	Setting					Total
		Public hospital	Private hospital	Aged care home	Community	Unknown	
Acinatobacter baumannii complex	Carbapenemase-producing	12	0	0	0	0	12
Candida auris	–	0	0	0	0	0	0
Enterobacterales	Carbapenemase-producing	98	12	1	5	6	122
	Carbapenemase and ribosomal methyltransferase-producing	6	0	0	1	0	7
	Carbapenemase-producing and transmissible resistance to colistin	6	0	0	0	0	6
	Ribosomal methyltransferase-producing	0	0	0	0	0	0
	Transmissible resistance to colistin	0	0	0	0	0	0
Enterococcus species	Linezolid non-susceptible	4	0	0	2	0	6
Mycobacterium tuberculosis	Multidrug-resistant – at least rifampicin- and isoniazid-resistant	0	0	0	0	0	0
Neisseria gonorrhoeae	Azithromycin non-susceptible (low-level)	13	0	0	48	5	66
	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	5	0	0	1	1	7
Salmonella species	Ceftriaxone non-susceptible	5	0	0	3	4	12
Shigella species	Multidrug-resistant	28	0	0	40	34	102
Staphylococcus aureus	Daptomycin non-susceptible	7	2	7	6	6	28
	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 9 May 2020)	**184**	**14**	**8**	**107**	**56**	**369**

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

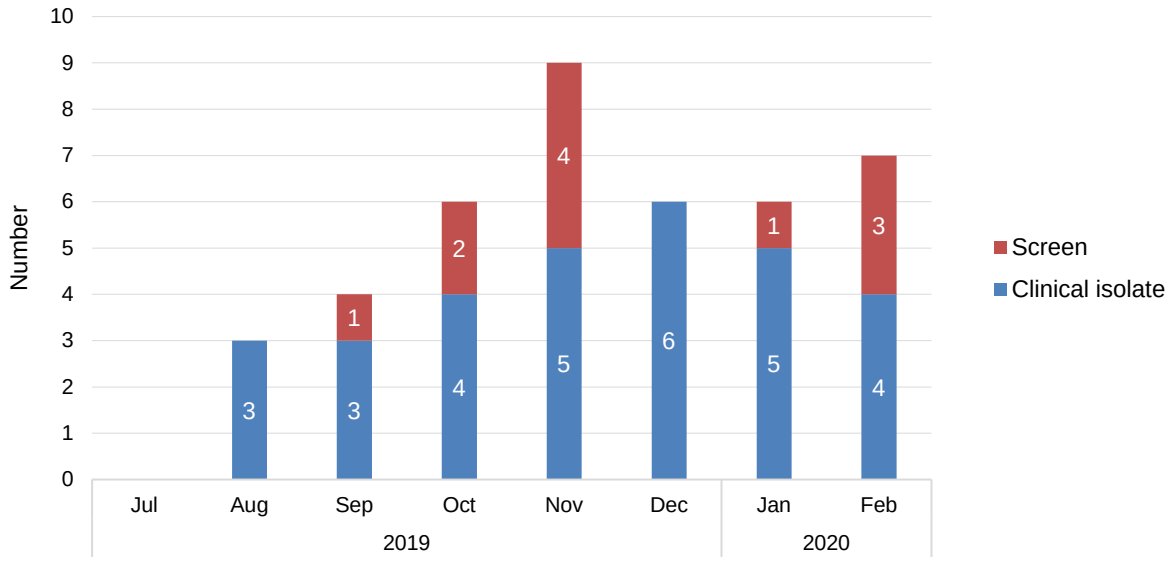
High-level = azithromycin MIC > 256 mg/L; Low-level = azithromycin MIC < 256 mg/L

Summary by CAR

Acinetobacter baumannii complex

National data

Figure 1: Carbapenemase-producing *Acinetobacter baumannii* complex*, monthly number reported by specimen type, national, July 2019–29 February 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 January 2020–29 February 2020

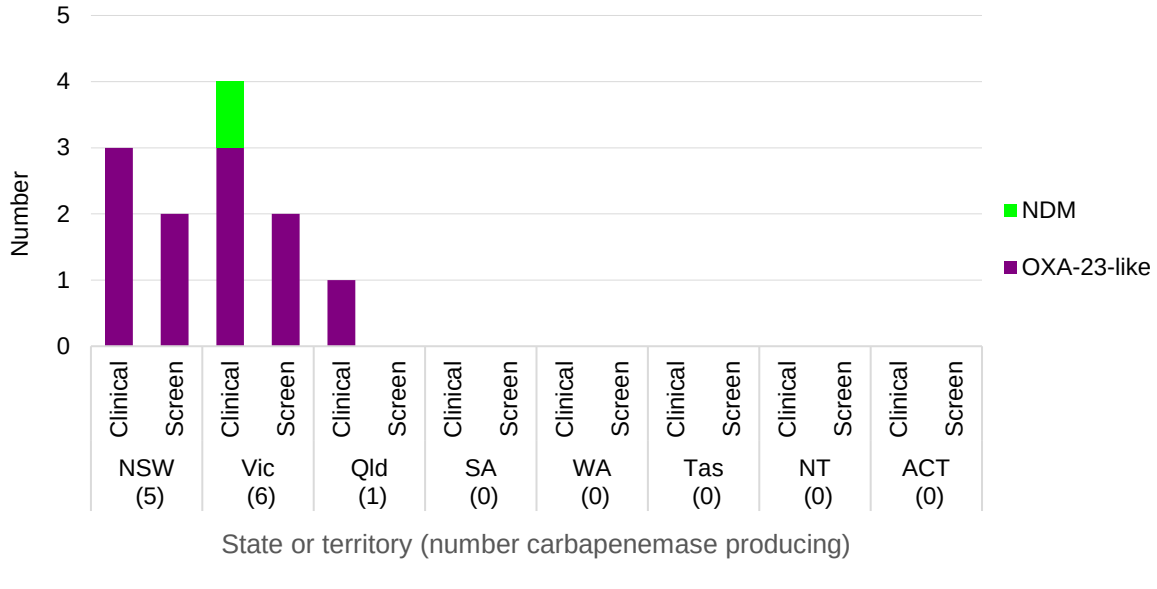


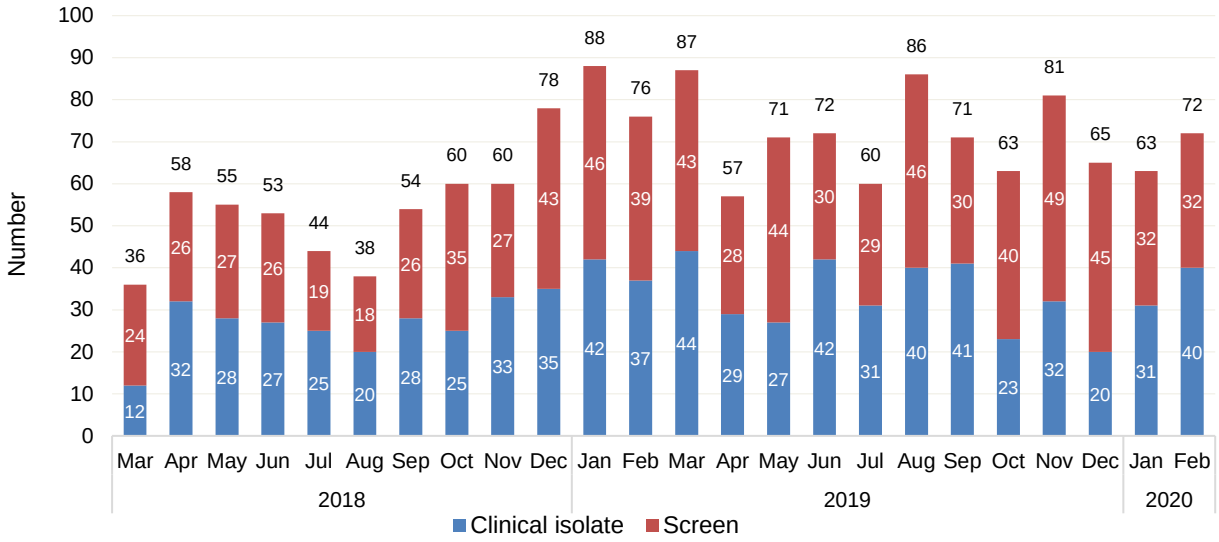
Table 3: Carbapenemase-producing *Acinetobacter baumannii* complex, number reported by setting, by state and territory, 1 January 2020–29 February 2020

Setting	State or territory								Total
	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	
Total	**5**	**6**	**1**	**0**	**0**	**0**	**0**	**0**	**12**
Public hospital	5	6	1	0	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

Enterobacterales

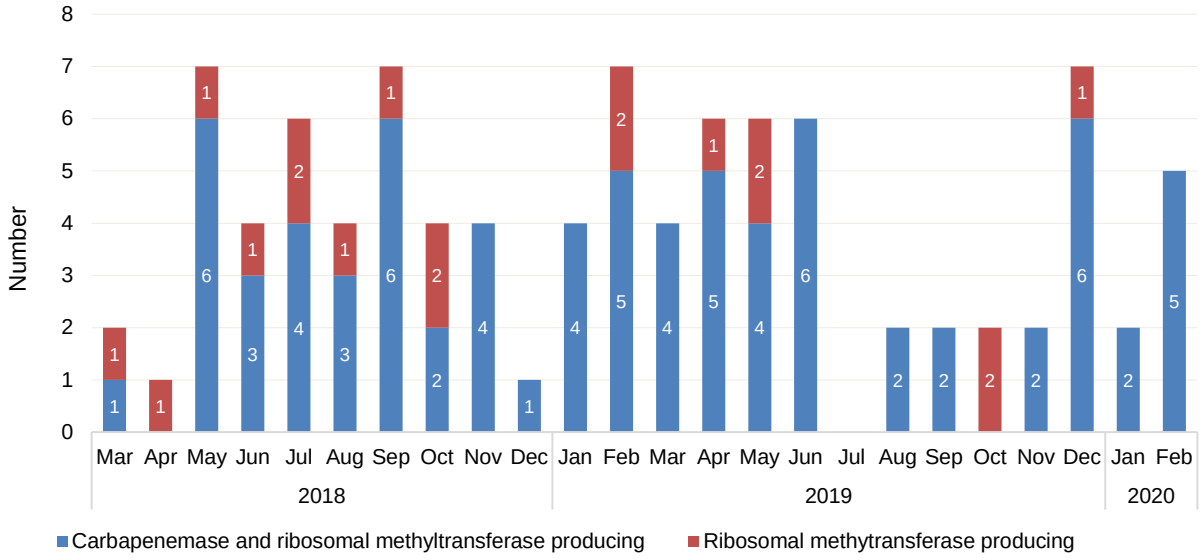
National data

Figure 3: Carbapenemase-producing Enterobacterales*, twenty-four-month trend by specimen type, national, 1 March 2018–29 February 2020



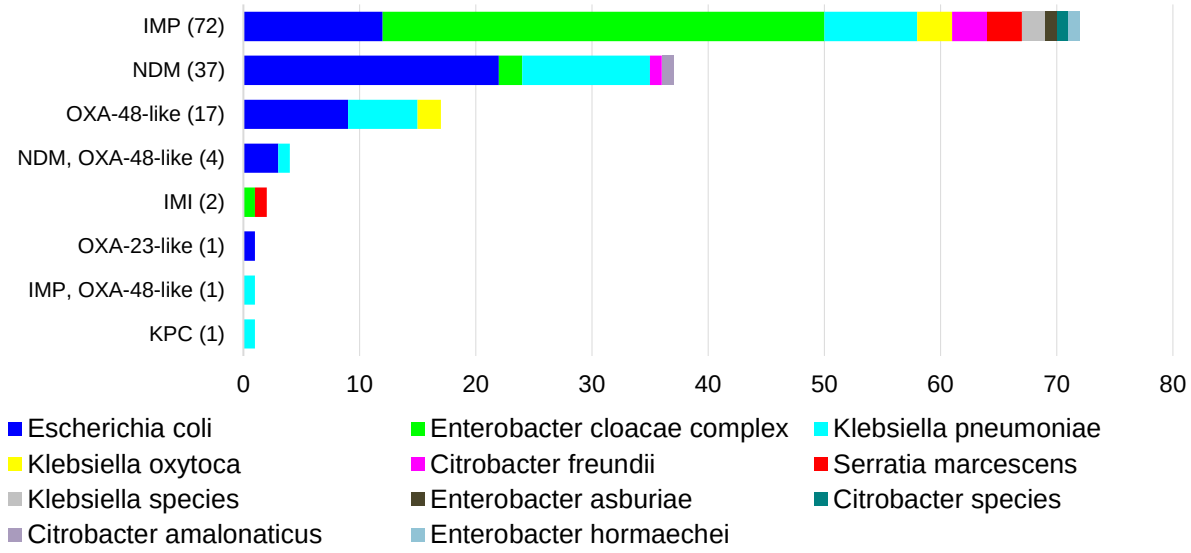
* Carbapenemase-producing alone or in combination with ribosomal methyltransferases

Figure 4: Ribosomal methyltransferase-producing Enterobacterales*, twenty-four-month trend, national, 1 March 2018–29 February 2020



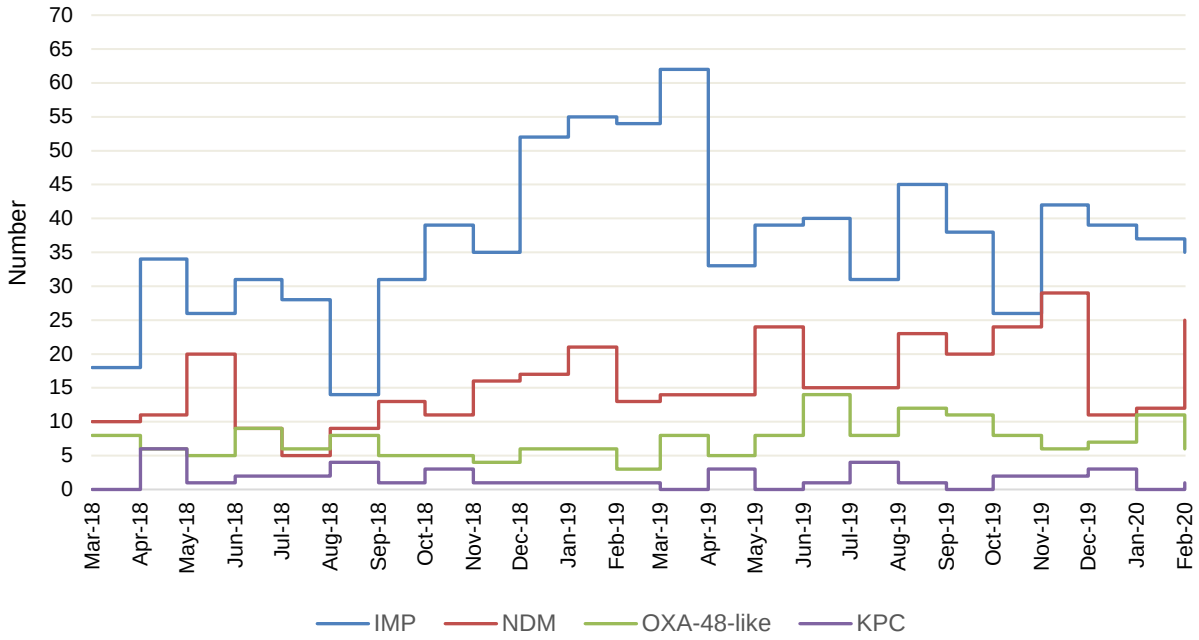
* Ribosomal methyltransferases alone, or in combination with carbapenemases

Figure 5: Carbapenemase-producing Enterobacterales*, number reported by carbapenemase type and species, national, 1 January 2020–29 February 2020



* Carbapenemase-producing Enterobacterales (*n* = 122), carbapenemase- and ribosomal methyltransferase-producing Enterobacterales (*n* = 7); carbapenemase-producing and transmissible resistance to colistin Enterobacterales (*n* = 6)

Figure 6: Top four reported carbapenemase types*, twenty-four-month trend, national, 1 March 2018–29 February 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 state and territory, 1 January 2020–29 February 2020

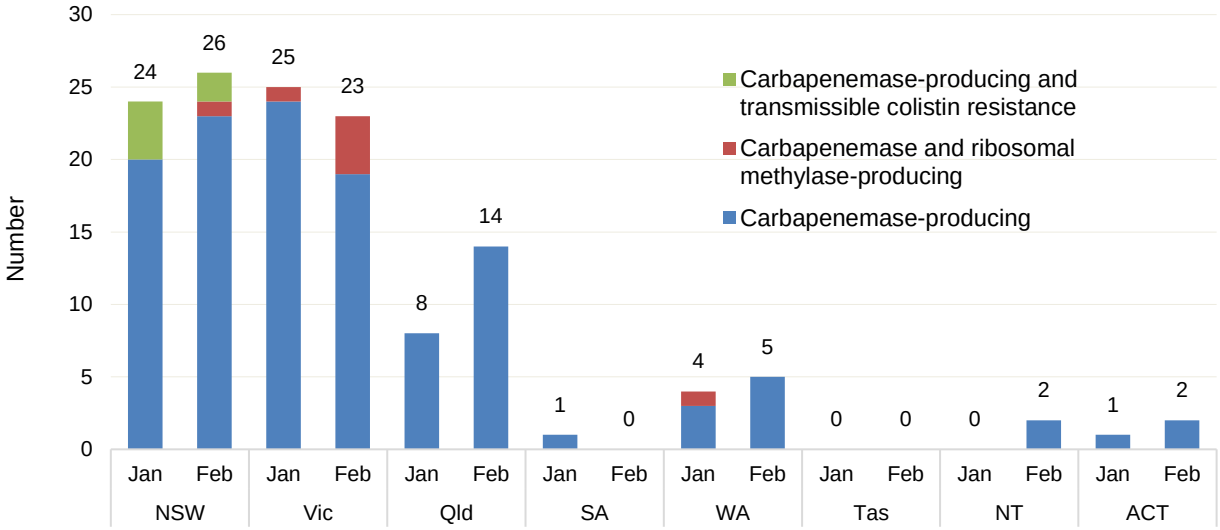


Figure 8: Two-year trend for the top four reported carbapenemase types from Enterobacterales, by state and territory and nationally, (three-month moving average), 1 March 2018–29 February 2020

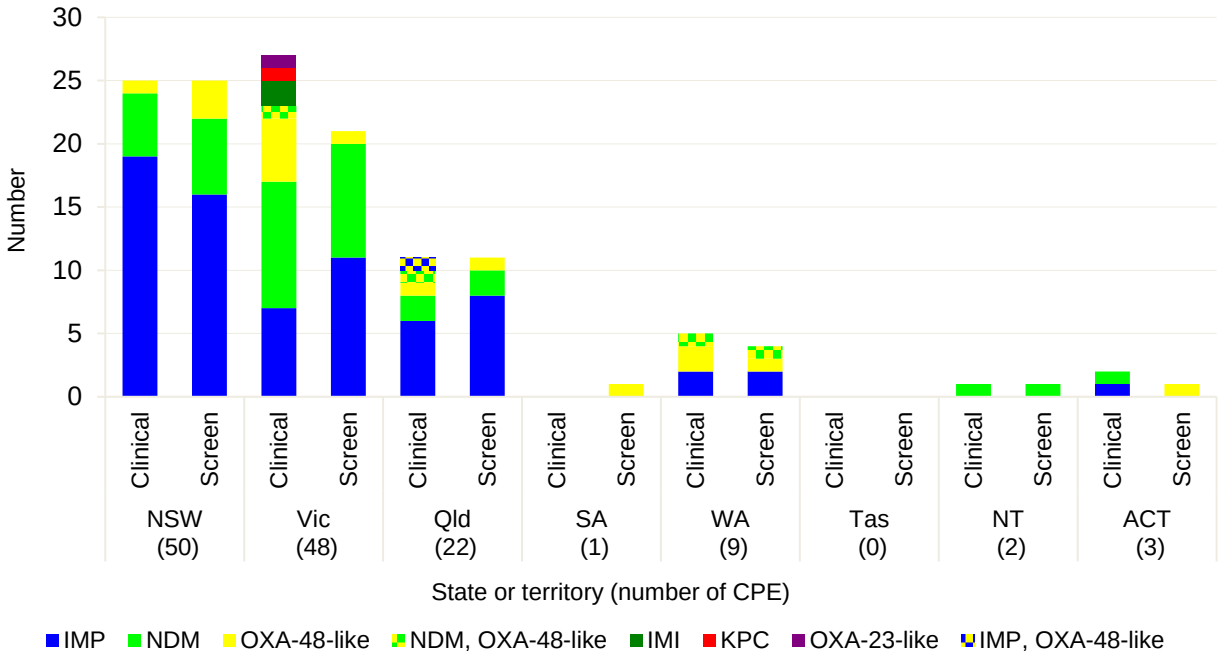
Type	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia
IMP	20 8	23 2	17 9	0 0	4 0	0 0	1 0	2 0	57 24
NDM	8 1	9 3	6 0	6 0	2 0	0 0	1 0	1 0	24 8
OXA-48-like	3 1	7 1	2 0	1 0	1 0	0 0	0 0	0 0	11 5
KPC	1 0	3 0	1 0	0 0	0 0	0 0	0 0	0 0	3 1
All types	28 13	35 11	19 13	7 0	6 1	1 0	1 0	2 0	84 45

Line graphs represent three-month moving average for the period 1 March 2018 to 29 February 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 January 2020–29 February 2020



* Carbapenemase-producing Enterobacterales (*n* = 122), carbapenemase- and ribosomal methyltransferase-producing Enterobacterales (*n* = 7); carbapenemase-producing and transmissible resistance to colistin Enterobacterales (*n* = 6)

Figure 10: Top four reported carbapenemase-producing Enterobacterales type by specimen type, by state and territory, 1 January 2020–29 February 2020

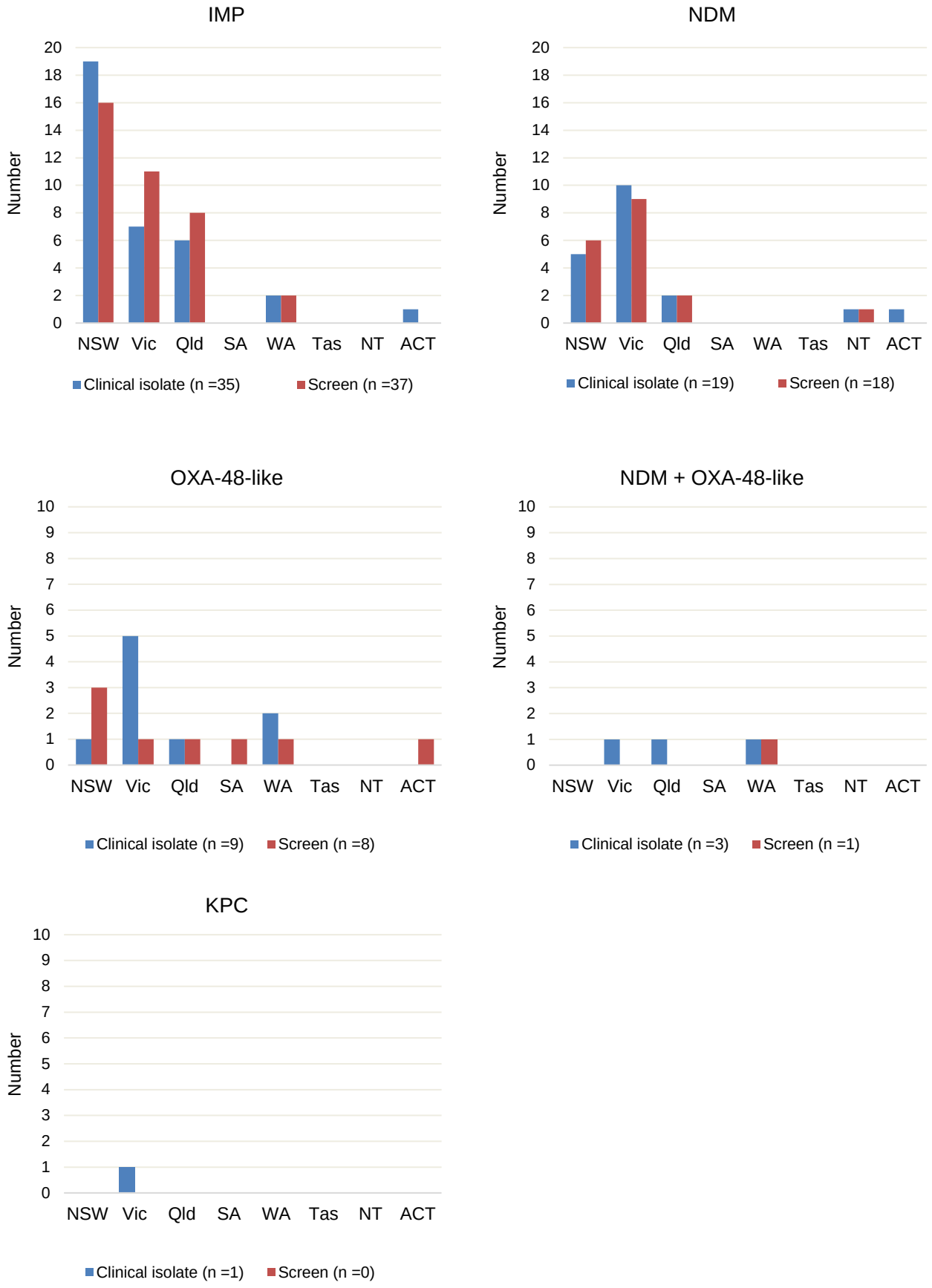


Table 4: Top four carbapenemase types from Enterobacterales, number reported by setting, by state and territory, 1 January 2020–29 February 2020

Carbapenemase type[†]	Setting	State or territory								Total
		NSW	Vic	Qld	SA	WA	Tas	NT	ACT	
IMP	**Total**	**35**	**18**	**14**	**0**	**4**	**0**	**0**	**1**	**72**
	Public hospital	34	17	9	0	0	0	0	1	61
	Private hospital	0	1	5	0	1	0	0	0	7
	Aged care home	1	0	0	0	0	0	0	0	1
	Community	0	0	0	0	1	0	0	0	1
	Unknown	0	0	0	0	2	0	0	0	2
NDM	**Total**	**11**	**19**	**4**	**0**	**0**	**0**	**2**	**1**	**37**
	Public hospital	9	14	4	0	0	0	2	1	30
	Private hospital	0	2	0	0	0	0	0	0	2
	Aged care home	0	0	0	0	0	0	0	0	0
	Community	1	3	0	0	0	0	0	0	4
	Unknown	1	0	0	0	0	0	0	0	1
OXA-48-like	**Total**	**4**	**6**	**2**	**1**	**3**	**0**	**0**	**1**	**17**
	Public hospital	4	5	2	0	1	0	0	1	13
	Private hospital	0	0	0	1	0	0	0	0	1
	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	2	0	0	0	3
NDM+OXA-48-like	**Total**	**0**	**1**	**1**	**0**	**2**	**0**	**0**	**0**	**4**
	Public hospital	0	1	1	0	2	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

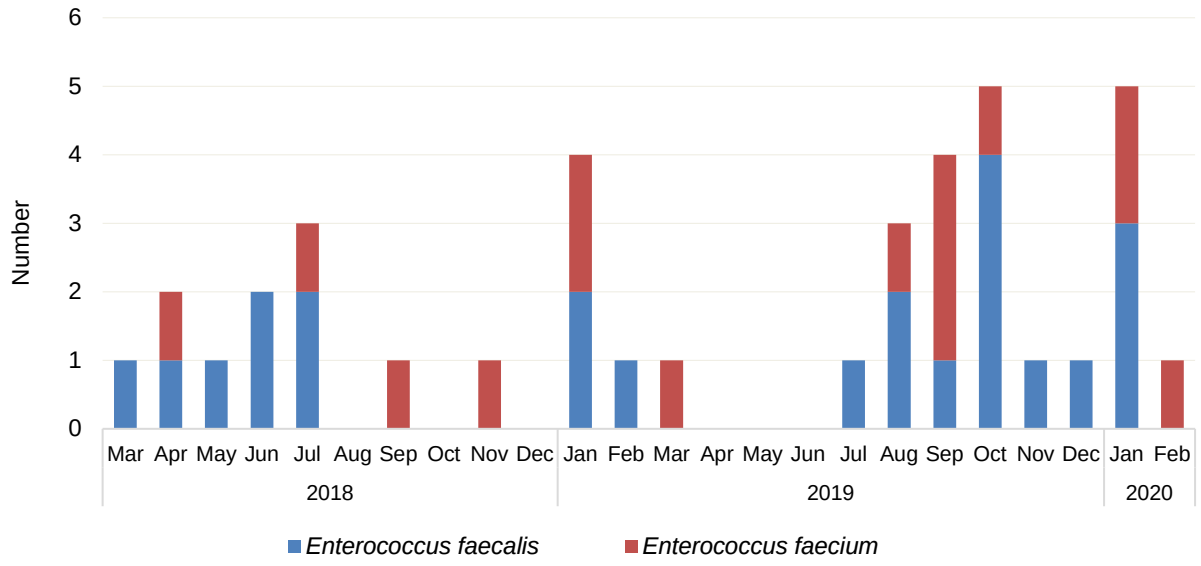
* Top four carbapenemase types account for 96% (130/135) of all carbapenemase-producing Enterobacterales reported for this period. Other types were IMI (*n* = 2, Vic), KPC (*n* = 1, Vic), IMP, OXA-48 (*n* = 1, Qld) and OXA-23-like (*n* = 1, Vic)

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

Enterococcus species

National data

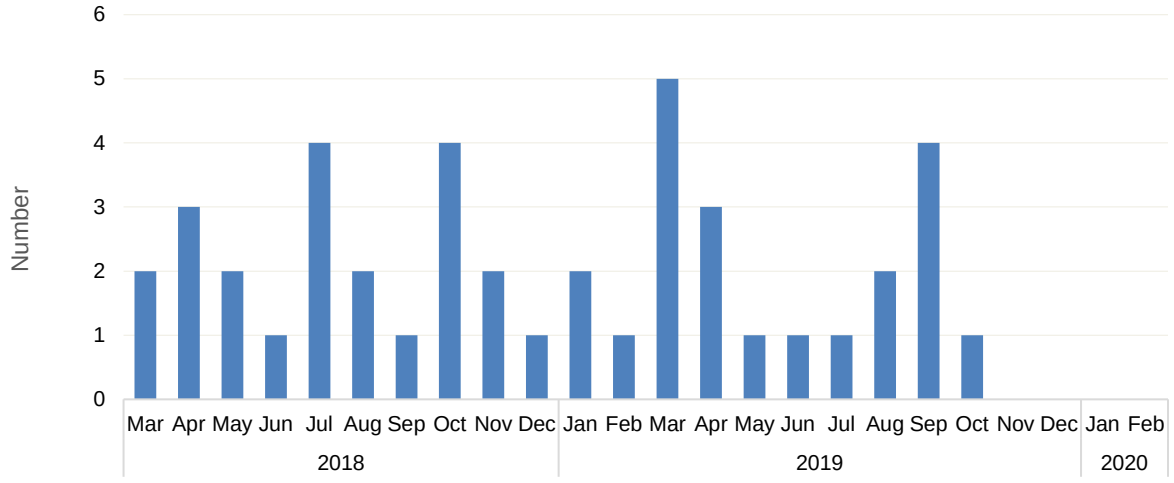
Figure 11: Linezolid non-susceptible *Enterococcus* species, twenty-four-month trend, national, 1 March 2018–29 February 2020



Mycobacterium tuberculosis

National data

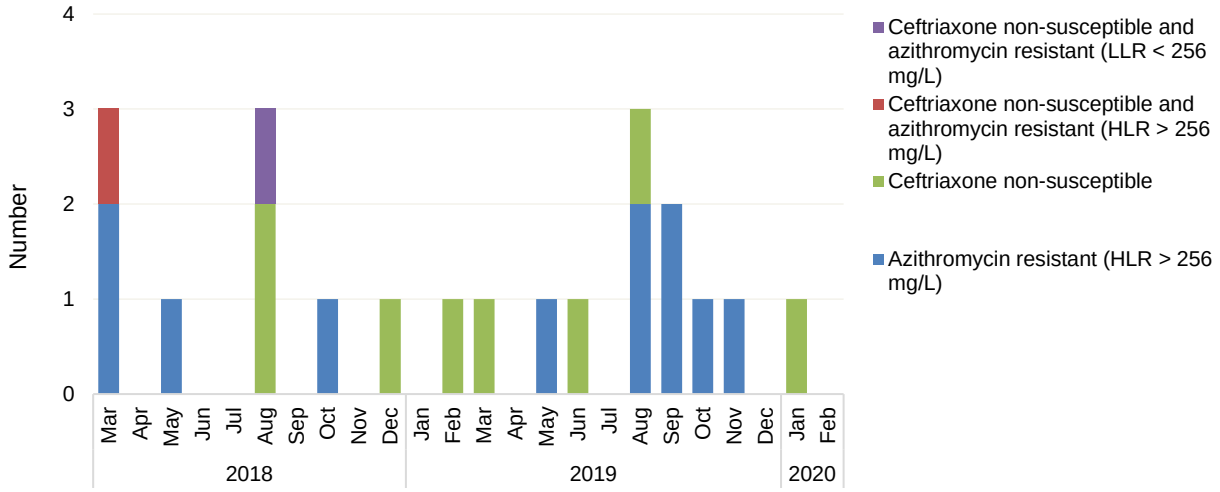
Figure 12: Multidrug-resistant *Mycobacterium tuberculosis,* twenty-four-month trend, national, 1 March 2018–29 February 2020



Neisseria gonorrhoeae

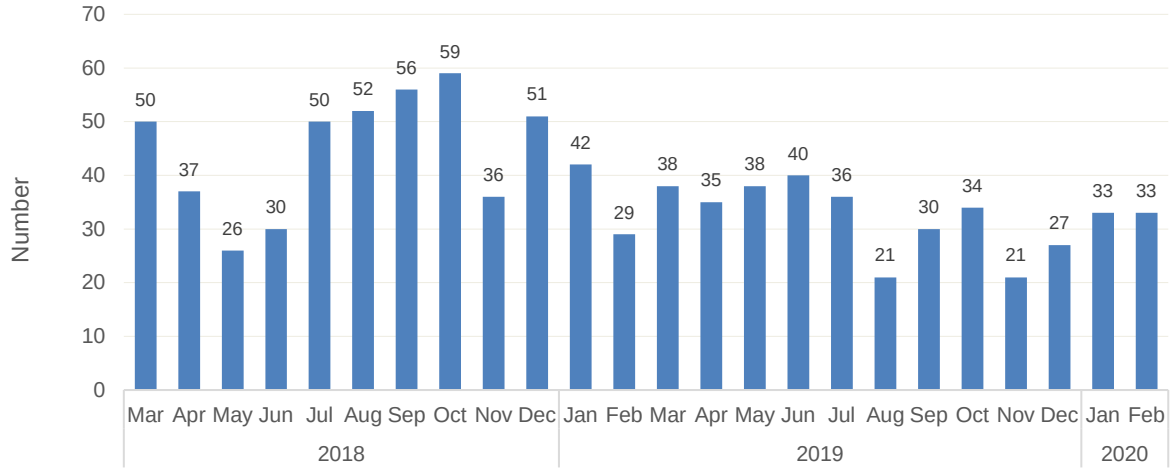
National data

Figure 13: Ceftriaxone non-susceptible and/or azithromycin non-susceptible (HLR > 256 mg/L) *Neisseria gonorrhoeae,* number reported by month, national, 1 March 2018–29 February 2020



LLR: Low level resistance; HLR: High level resistance

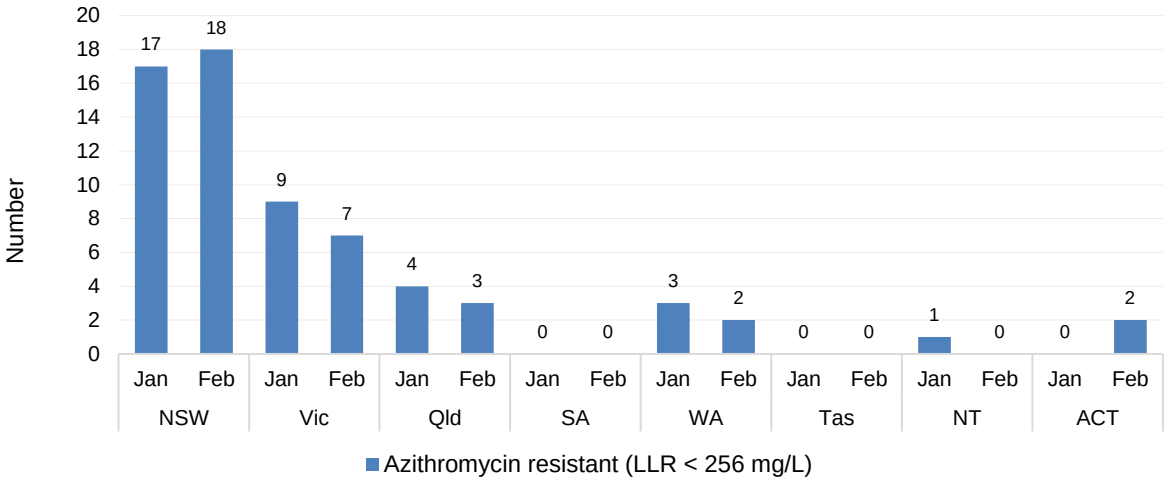
Figure 14: Azithromycin non-susceptible (LLR < 256 mg/L) *Neisseria gonorrhoeae*, twenty-four-month trend, national, 1 March 2018–29 February 2020



LLR: Low level resistance

State and territory data

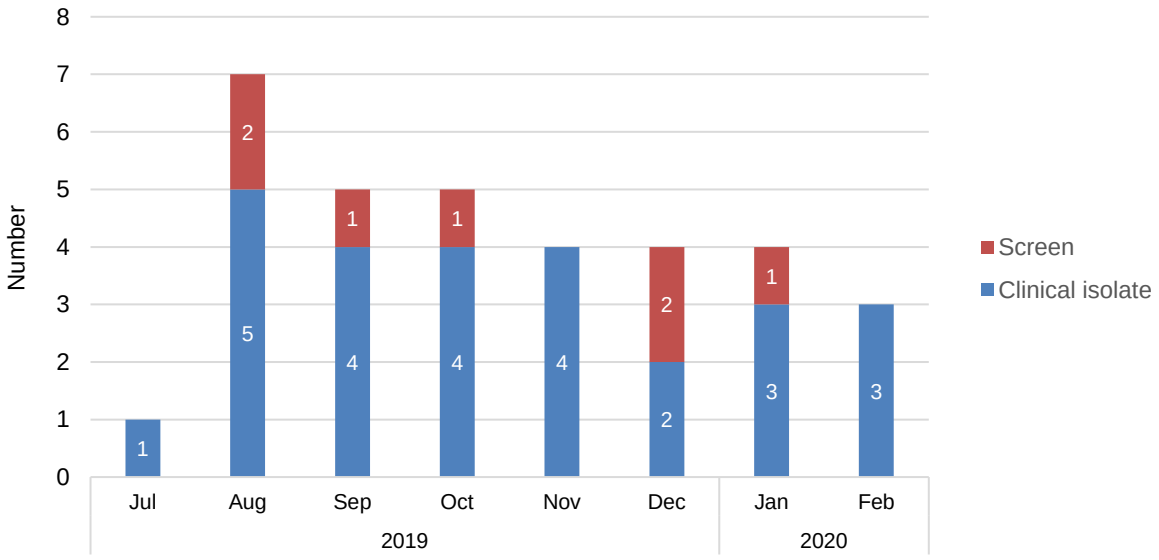
Figure 15: Azithromycin non-susceptible (LLR < 256 mg/L) *Neisseria gonorrhoeae,* number reported by month, state and territory, 1 January 2020–29 February 2020



Pseudomonas aeruginosa

National data

Figure 16: Carbapenemase-producing *Pseudomonas aeruginosa, number reported by specimen type, national, 1 July 2019–29 February 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 January 2020–29 February 2020

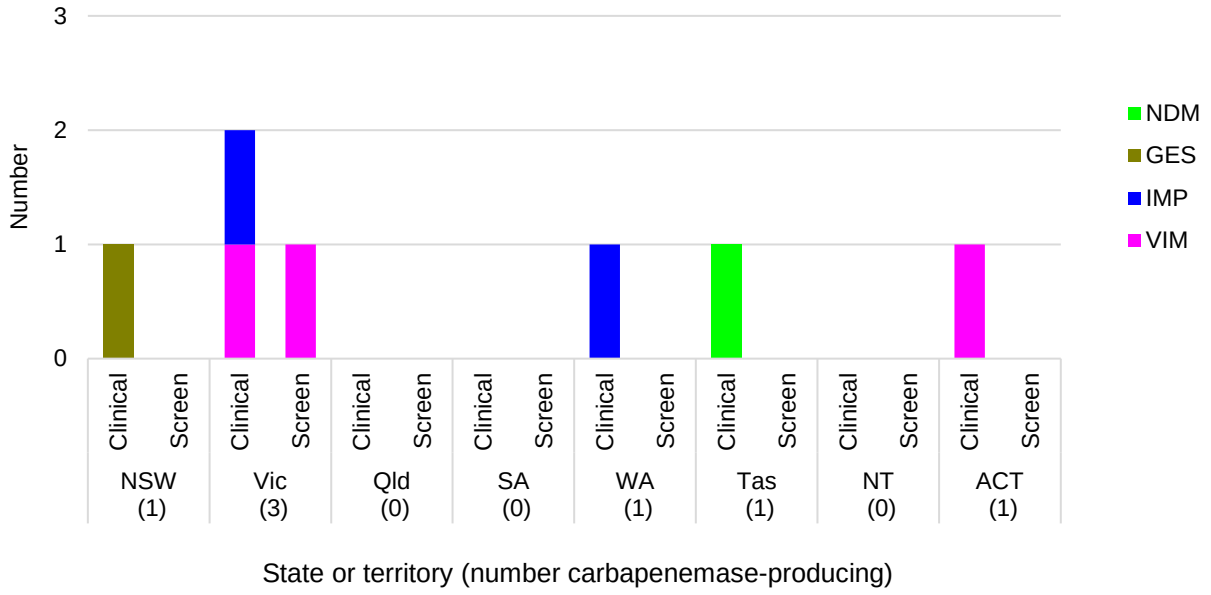


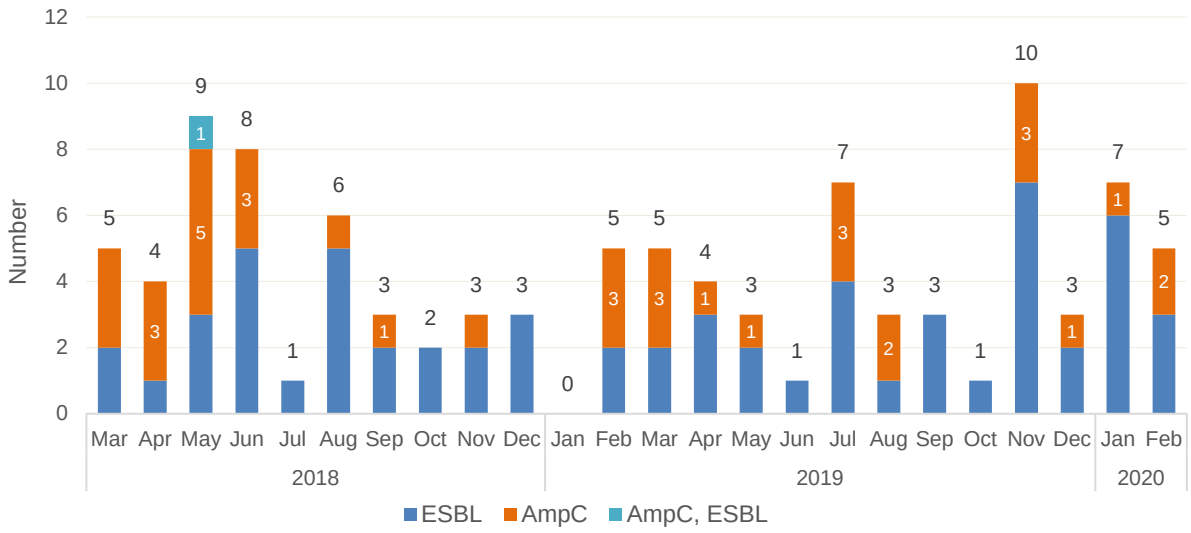
Table 5: Carbapenemase-producing *Pseudomonas aeruginosa*, number reported by setting, by state and territory, 1 January 2020–29 February 2020

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

Salmonella species

National data

Figure 18: Ceftriaxone non-susceptible *Salmonella* species, twenty-four-month trend, national, 1 March 2018–29 February 2020



Notes (1 January 2020—29 February 2020)

1. Non-typhoidal *Salmonella* species (n = 9) and typhoidal *Salmonella* species (n = 3)

Shigella species

National data

Figure 19: Multidrug-resistant *Shigella* species, twenty-four-month trend, national, 1 March 2018–29 February 2020

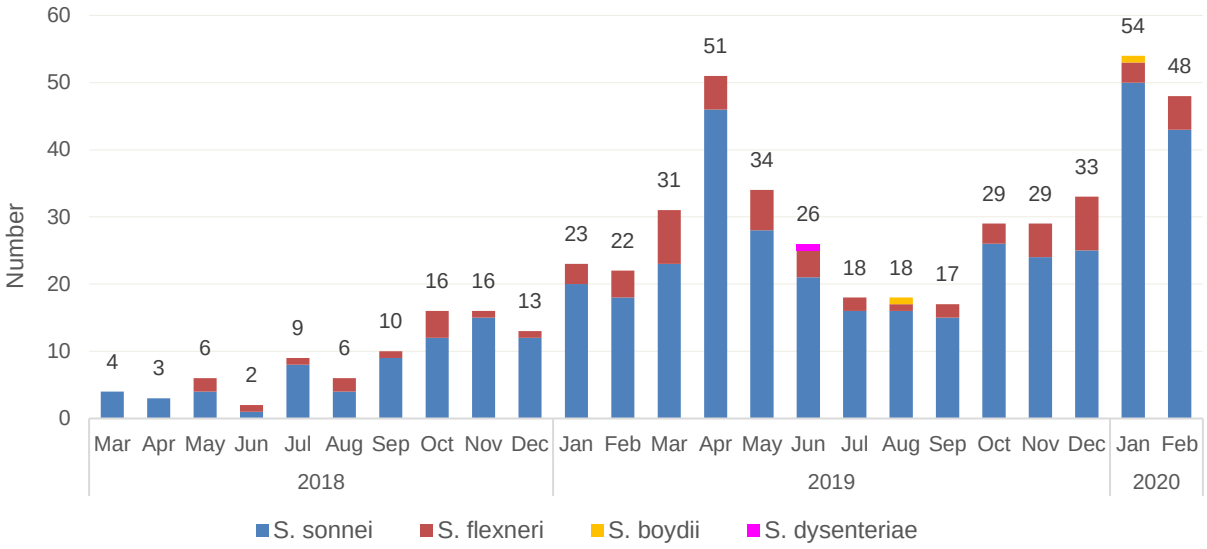
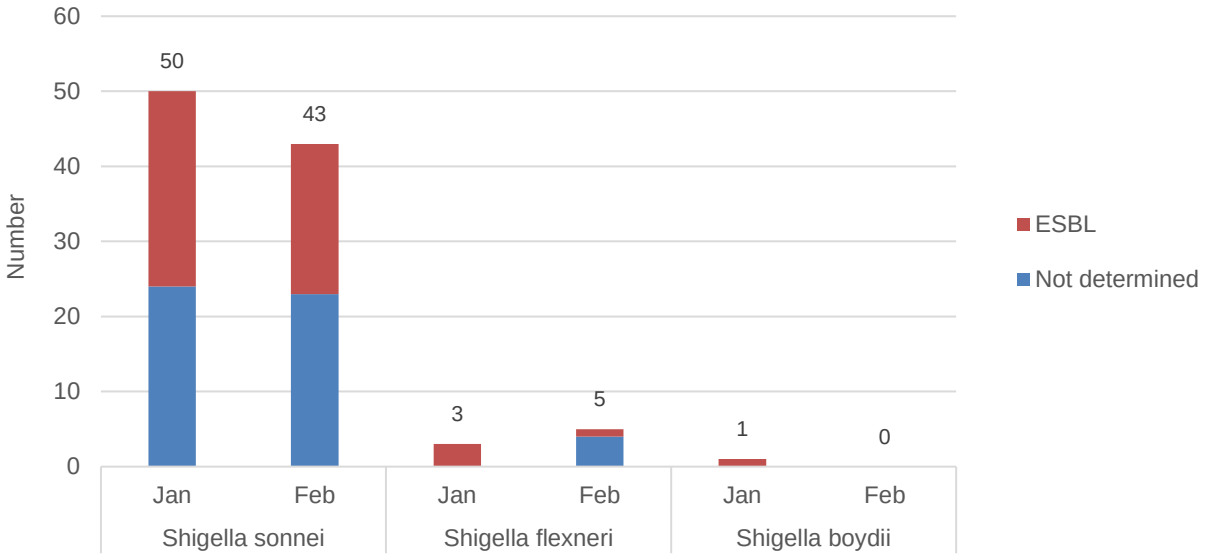


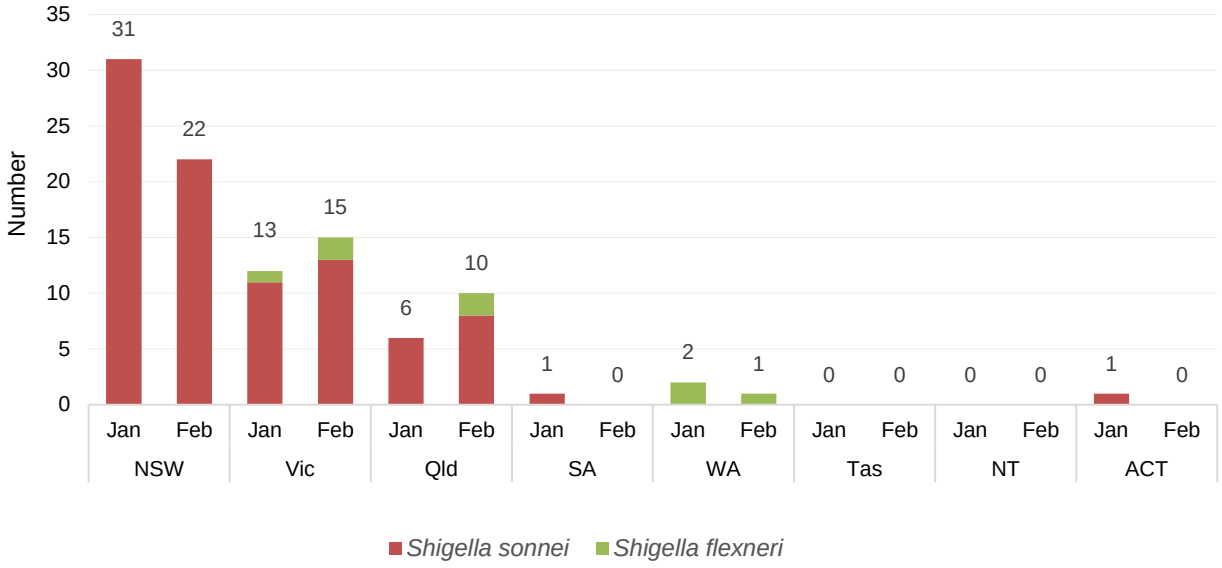
Figure 20: Multidrug-resistant *Shigella* species, number reported by month, national, 1 January 2020–29 February 2020



Not determined = multidrug resistant, ceftriaxone susceptible

State and territory data

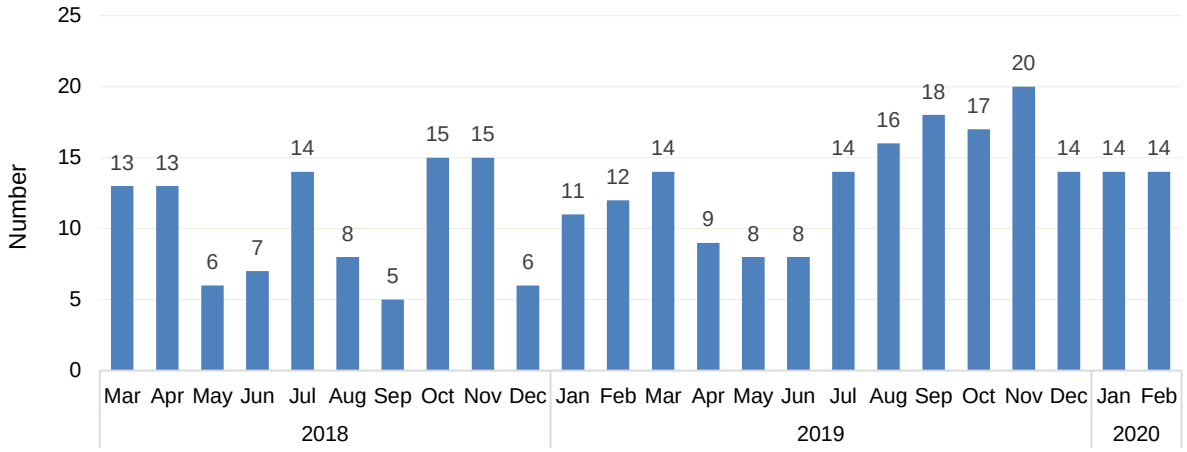
Figure 21: Multidrug-resistant *Shigella* species, number reported by state and territory, 1 January 2020–29 February 2020



Staphylococcus aureus

National data

Figure 22: Daptomycin non-susceptible *Staphylococcus aureus,* twenty-four-month trend, national, 1 March 2018–29 February 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 January 2020–29 February 2020

	State or territory								
Setting	**NSW**	**Vic**	**Qld**	**SA**	**WA**	**Tas**	**NT**	**ACT**	**Total**
Total	**3**	**5**	**16**	**0**	**3**	**0**	**0**	**1**	**28**
Public hospital	2	1	0	0	3	0	0	1	7
Private hospital	0	0	2	0	0	0	0	0	2
Aged care home	0	0	7	0	0	0	0	0	7
Community	0	4	2	0	0	0	0	0	6
Unknown	1	0	5	0	0	0	0	0	6

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†	Vancomycin, linezolid or daptomycin non-susceptible
Streptococcus pyogenes	Penicillin reduced susceptibility
Pseudomonas aeruginosa	Carbapenemase-producing*

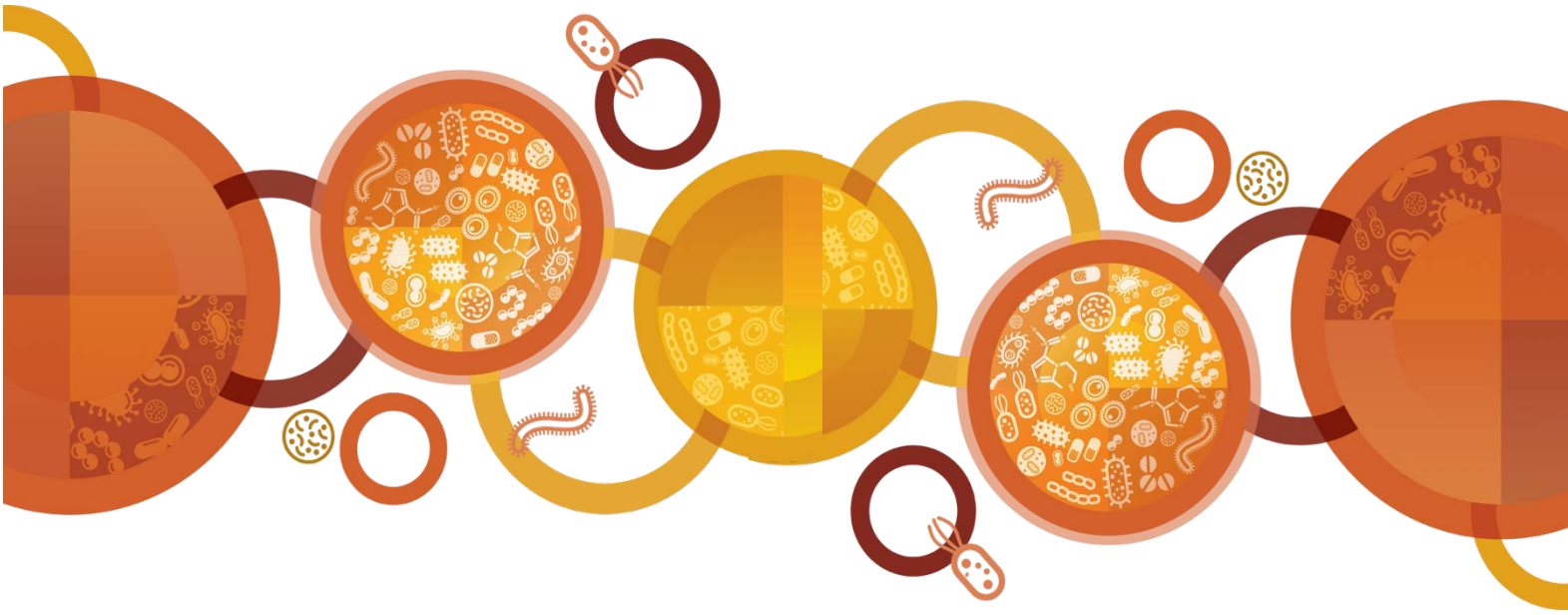
* If the specimen with a confirmed CAR was collected in 2019, it can be submitted retrospectively

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

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.



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
Fax: (02) 9126 3613

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