AUSTRALIAN COMMISSION ON SAFETY AND QUALITY IN HEALTH CARE

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CARAlert data update 4

1 November 2017–31 December 2017

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Summary

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 to collect surveillance data on priority organisms with critical resistance to last-line antimicrobial agents.

In its second year of operation CARAlert is providing regular and timely antimicrobial resistance data to states and territories and nationally.

This data update is one of a series produced by the AURA National Coordination Unit (NCU) to provide regular data updates and six-monthly detailed analyses of CARAlert data. This summary report includes information about isolates collected between 1 November 2017 and 31 December 2017, and the results reported into CARAlert by 31 January 2018.

Azithromycin non-susceptible (low-level resistance, MIC ≤256 mg/L) *Neisseria gonorrhoeae* and carbapenemase-producing Enterobacteriaceae continue to be the most commonly reported in CARAlert.

The two-month report provides data on the number and distribution of critical antimicrobial resistance isolates, by state and territory. The majority of reported cases were from the three most populous states.

Figures 3 to 5 show details of carbapenemase type and the species of CPE, and Figure 6 the distribution of azithromycin non-susceptible *Neisseria gonorrhoeae*, by state and territory.

The findings regarding CPE highlight the importance of implementation of the Commission's 2017 CPE control guidelines. The findings regarding azithromycin non-susceptible *N. gonorrhoeae* reported to CARAlert complement the comprehensive long term Commonwealth and state and territory systems that monitor and report antimicrobial resistance as part of national surveillance activities to inform treatment guidelines and sexually transmitted infection prevention and control strategies.

The next six-month report will provide more detailed analyses of each of the CARs and trends for each of the CARs, across all states and territories.

Background

The Australian Commission on Safety and Quality in Health Care (the Commission) established the National Alert System for Critical Antimicrobial Resistances (CARAlert) in March 2016 as part of the Antimicrobial Use and Resistance in Australia (AURA) Surveillance System.

Critical antimicrobial resistances (CARs) are defined as resistance mechanisms, or profiles, known to be a serious threat to the effectiveness of last-line antimicrobial agents. They can result in significant morbidity and mortality in healthcare facilities, and in the community. The CARs reported under CARAlert are listed in Table 1. The CARs were drawn from the list of high-priority organisms and antimicrobials which are the focus of the AURA Surveillance System.[1]

The CARAlert system is based on the following routine processes used by pathology laboratories for identifying and confirming potential CARs:

- Collection and routine testing – the isolate is collected from the patient and sent to the originating laboratory for routine testing
- 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
- 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.

Table 1: List of critical antimicrobial resistances

Species	Critical Resistance
Enterobacteriaceae	Carbapenemase-producing, and/or ribosomal methyltransferase-producing
Enterococcus species	Linezolid non-susceptible
Mycobacterium tuberculosis	Multidrug-resistant – resistant to at least rifampicin and isoniazid
Neisseria gonorrhoeae	Ceftriaxone 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

[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.

As there is a time-lag in confirmation for some isolates, the cut-off date for data that are included in updates and reports will be four weeks after the end of each reporting period. The data in each update and report are based on the date that the isolate with a confirmed CAR was collected.

This report provides a brief update, and complements previous analyses of and updates on CARAlert data.

The AURA NCU will produce both regular data updates and also six-monthly reports that will include more detailed analyses of CARAlert data.

Results

This data update includes information about 198 isolates collected between 1 November 2017 and 31 December 2017 and the results reported into CARAlert by 31 January 2018. From 17 March 2016 to 31 December 2017, 2,221 results from 88 originating laboratories across Australia were entered into the CARAlert system. Table 2 and Figure 1 show the number and distribution of critical antimicrobial resistance isolates, by state and territory.

There were 75 azithromycin non-susceptible (low-level resistance, MIC ≤ 256 mg/L) *Neisseria gonorrhoeae* and 69 carbapenemase-producing Enterobacteriaceae (CPE) during this two-month period. These two resistances were the most commonly reported (73%). The great majority (89%) of reported cases were from the New South Wales, Victoria and Queensland.

Figure 2 shows the CARs reported by species and month, year on year, 17 March 2016 to 31 December 2018.

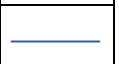
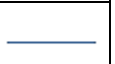
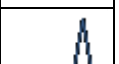
Figures 3 to 5 show details of carbapenemase type and the species of CPE, by state and territory, 1 November 2017 to 31 December 2017. IMP (51.3%), NDM (22.4%) and OXA-48 (11.8%) types accounted for 85.5% of all CPE reported during this period, with 89.5% from New South Wales, Victoria and Queensland.

The distribution of azithromycin non-susceptible *Neisseria gonorrhoeae*, by state and territory, is shown in Figure 6. There was a 63% decrease in the numbers of this CAR reported during this two-month period compared to the previous two-month reporting period.

An increase in the number of multidrug-resistant *Shigella* was seen in December 2017, however, it was not statistically significant. All were identified as *S. sonnei*, and over 62% (8/13) of these reports were from Victoria.

The next six-month report will provide more detailed analyses of trends for each of the CARs, across all states and territories.

Table 2: Number of critical antimicrobial resistance isolates, by state and territory, 1 November 2017 to 31 December 2017

Critical antimicrobial resistance	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	OS	Unk	2017 Nov–Dec	2017 YTD	2016 Nov–Dec	2016 Mar–Dec*	Trend† Jan-17 Dec-17
Azithromycin non-susceptible (LLR < 256 mg/L) *Neisseria gonorrhoeae*	41	20	10	0	3	0	1	0	0	0	75	730	73	225	
Carbapenemase-producing Enterobacteriaceae	22	20	19	0	1	0	1	5	1	0	69	528	55	312	
Daptomycin non-susceptible *Staphylococcus aureus*	4	10	3	0	3	0	0	0	0	0	20	119	13	62	
Carbapenemase and ribosomal methyltransferase-producing Enterobacteriaceae	5	2	0	0	0	0	0	0	0	0	7	33	1	21	
Ceftriaxone non-susceptible *Salmonella* species	0	3	2	0	1	0	0	0	0	0	6	35	4	17	
Ribosomal methyltransferase-producing Enterobacteriaceae	2	2	0	0	0	0	0	0	1	1	6	23	3	16	
Multidrug-resistant *Mycobacterium tuberculosis*	0	0	0	0	0	1	0	0	0	0	1	9	4	20	
Multidrug-resistant *Shigella* species	3	8	0	0	1	0	0	1	0	0	13	27	4	15	
Linezolid non-susceptible *Enterococcus* species	1	0	0	0	0	0	0	0	0	0	1	6	2	9	
Azithromycin non-susceptible (HLR > 256 mg/L) *Neisseria gonorrhoeae*	0	0	0	0	0	0	0	0	0	0	0	4	0	4	
Ceftriaxone non-susceptible *Neisseria gonorrhoeae*	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
Vancomycin non-susceptible *Staphylococcus aureus*	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Linezolid non-susceptible *Staphylococcus aureus*	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
Total (as at 31 January 2018)	**78**	**65**	**34**	**0**	**9**	**1**	**2**	**6**	**2**	**1**	**198**	**1,515**	**159**	**706**	

HLR = high-level resistance; LLR = low-level resistance; OS = overseas; Unk = unknown; YTD = year to date
* CARAlert commenced on 17 March 2016. Data for 2016 are for the period 17 March 2016 to 31 December 2016
† Trend Jan-17 Dec-17 = 12-month trend, 1 January 2017 to 31 December 2017

Figure 1: Critical antimicrobial resistances (CARs), number and distribution reported nationally, and by state and territory, 1 January 2017 to 31 December 2017

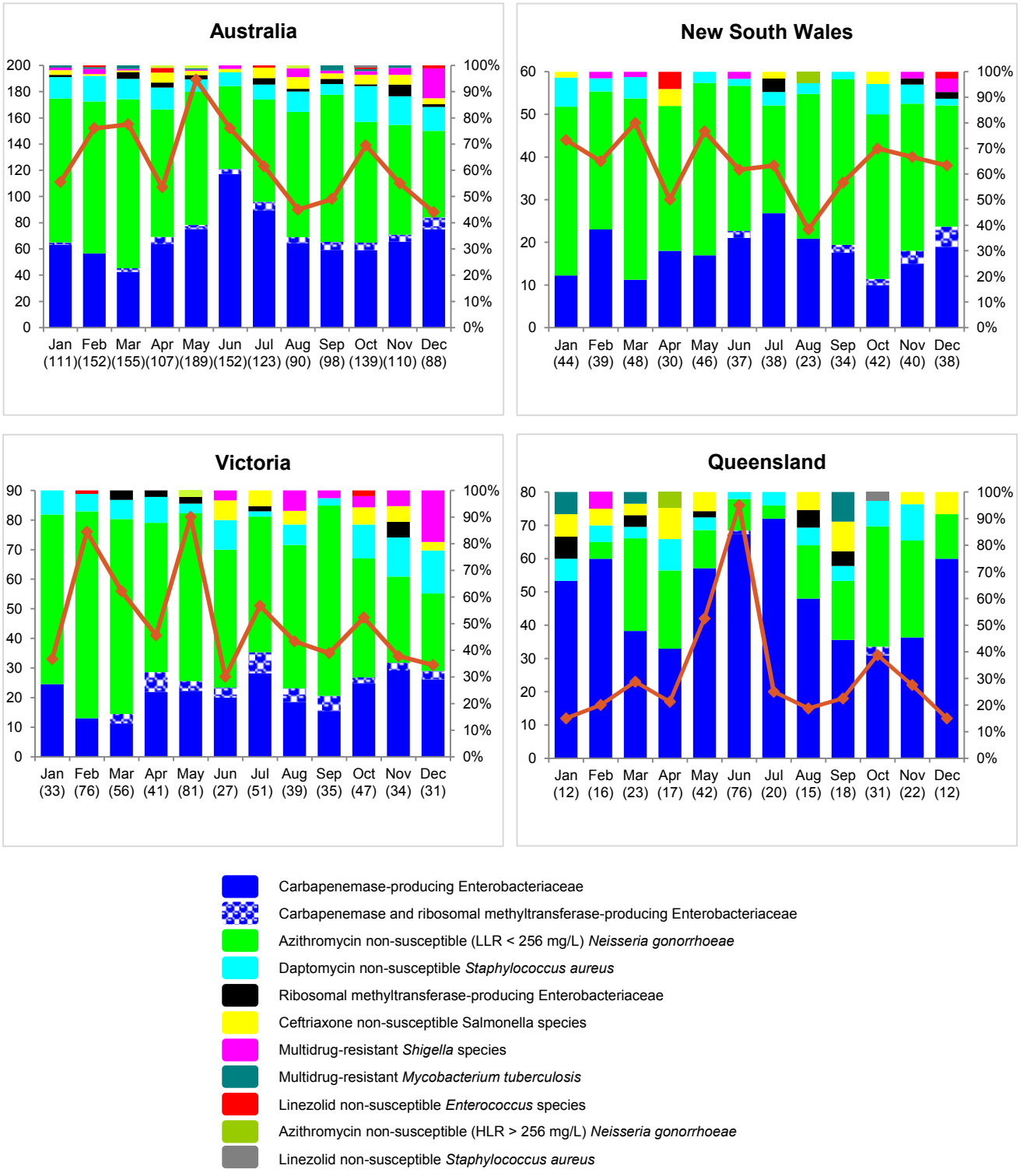


Figure 1 (continued): Critical antimicrobial resistances (CARs), number and distribution reported nationally, and by state and territory, 1 January 2017 to 31 December 2017

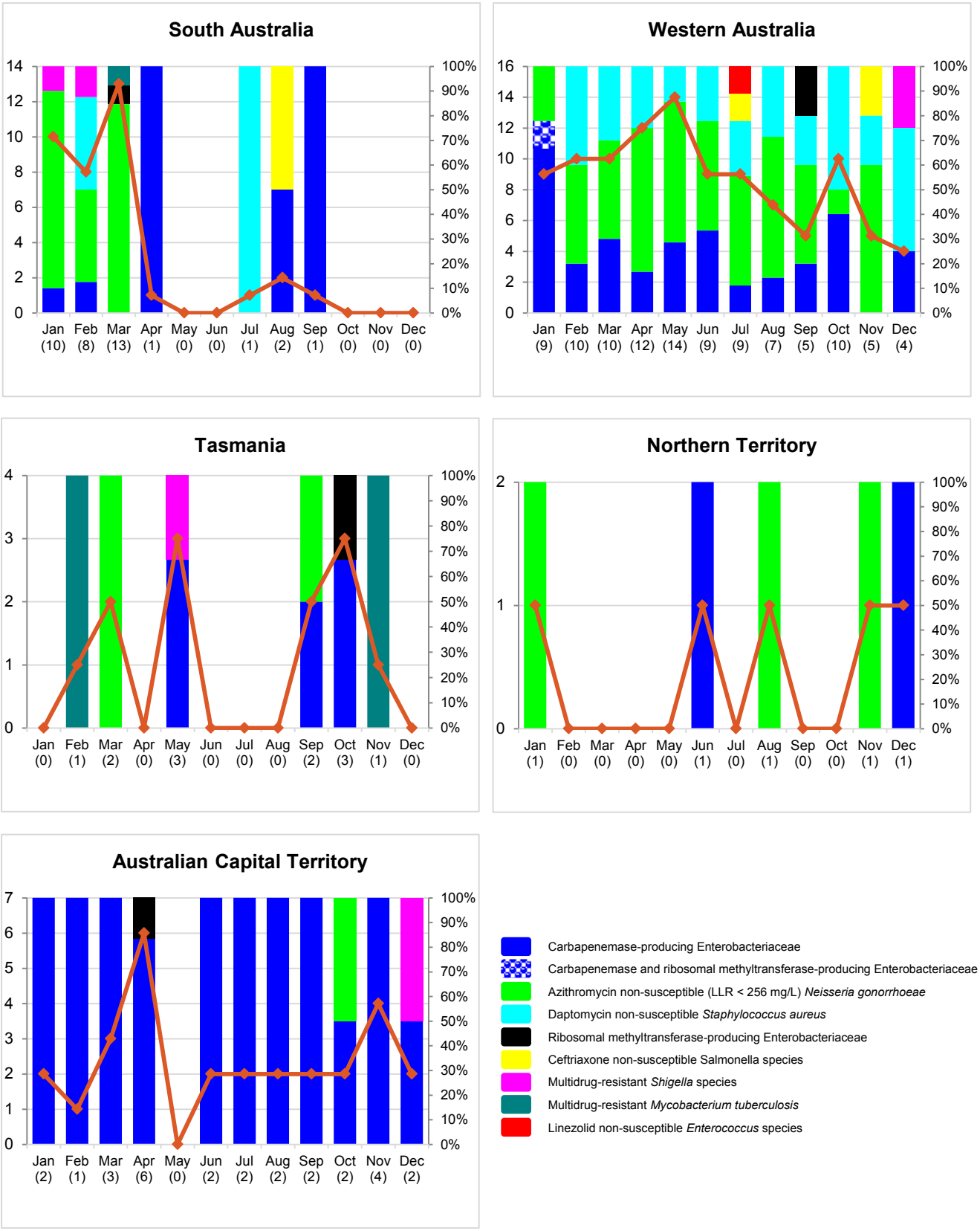


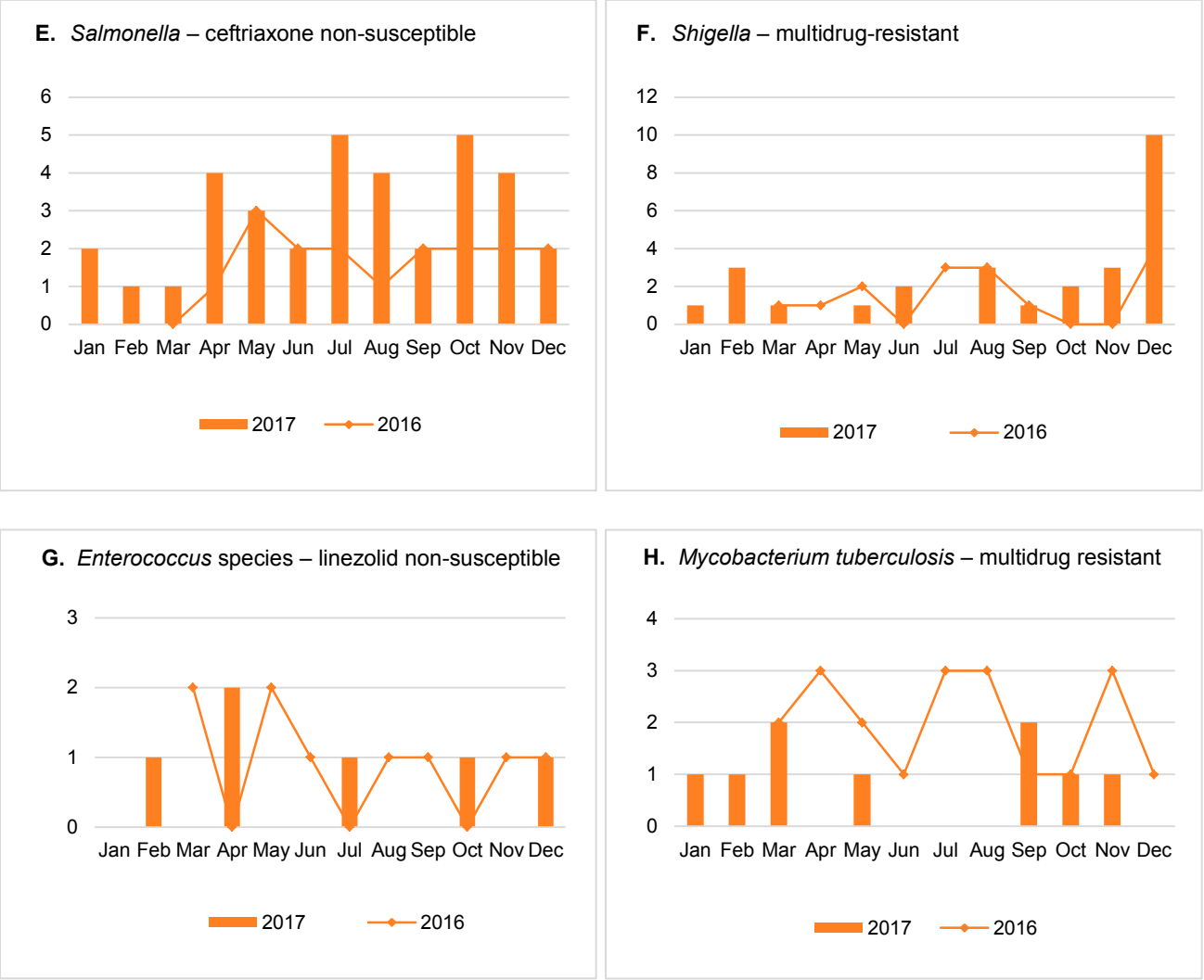
Figure 2: Critical antimicrobial resistances, number reported by species and month, year on year, 17 March 2016 to 31 December 2017

Bars: number of each CAR for 2017 (January to December)

Lines: number of each CAR for 2016 (March to December)

AZI (LLR) = azithromycin non-susceptible, low level resistance (LLR, MIC < 256 mg/L) *Neisseria gonorrhoeae*; AZI (HLR) = HLR =azithromycin non-susceptible, high level resistance (HLR, MIC > 256 mg/L) *Neisseria gonorrhoeae*; CPE =carbapenemase-producing Enterobacteriaceae; CPE+RMT = carbapenemase- and ribosomal methyltransferase-producing Enterobacteriaceae; CTR NGON = ceftriaxone non-susceptible *Neisseria gonorrhoeae*; DAP = daptomycin non-susceptible *Staphylococcus aureus*; LNZ = linezolid non-susceptible *Staphylococcus aureus*; RMT = ribosomal methyltransferase-producing Enterobacteriaceae; VAN = vancomycin non-susceptible *Staphylococcus aureus*;

Figure 2 (continued): Critical antimicrobial resistances, number reported by species and month, year on year, 17 March 2016 to 31 December 2017

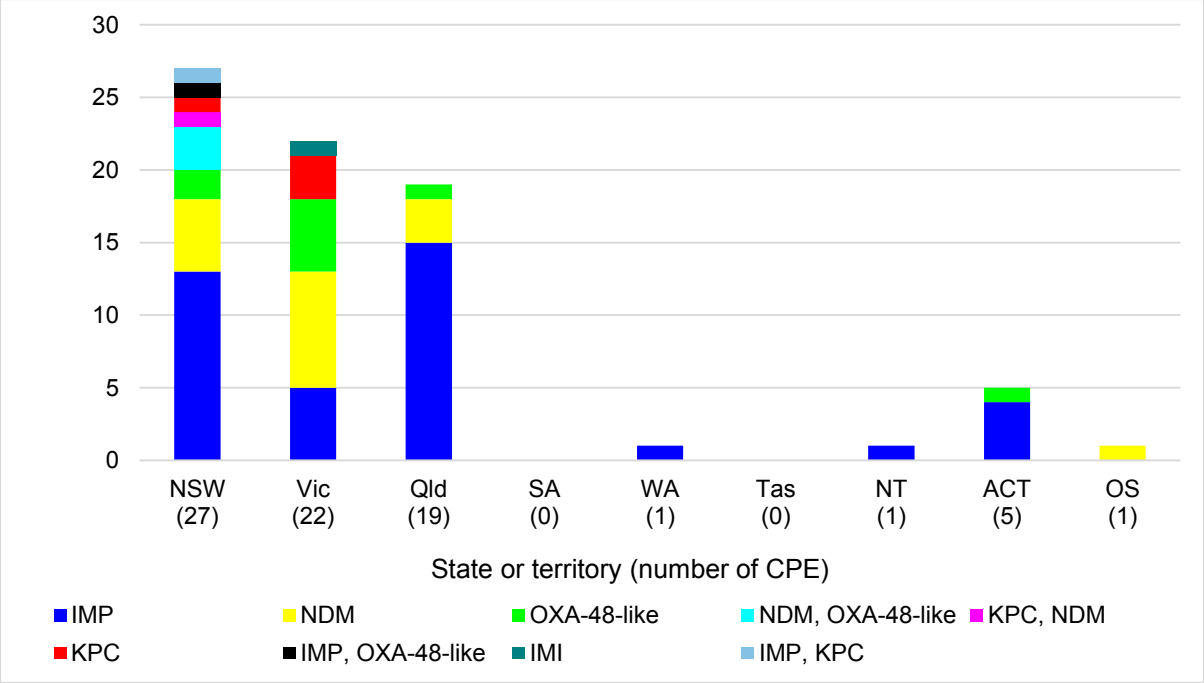


Bars: number of each CAR for 2017 (January to December)

Lines: number of each CAR for 2016 (March to December)

Carbapenemase-producing Enterobacteriaceae type, by state and territory

Figure 3: Carbapenemase-producing Enterobacteriaceae*, by carbapenemase type, number reported by state and territory, 1 November 2017 to 31 December 2017



* Carbapenemase-producing Enterobacteriaceae (n = 69), carbapenemase- and ribosomal methyltransferase-producing Enterobacteriaceae (n = 7)

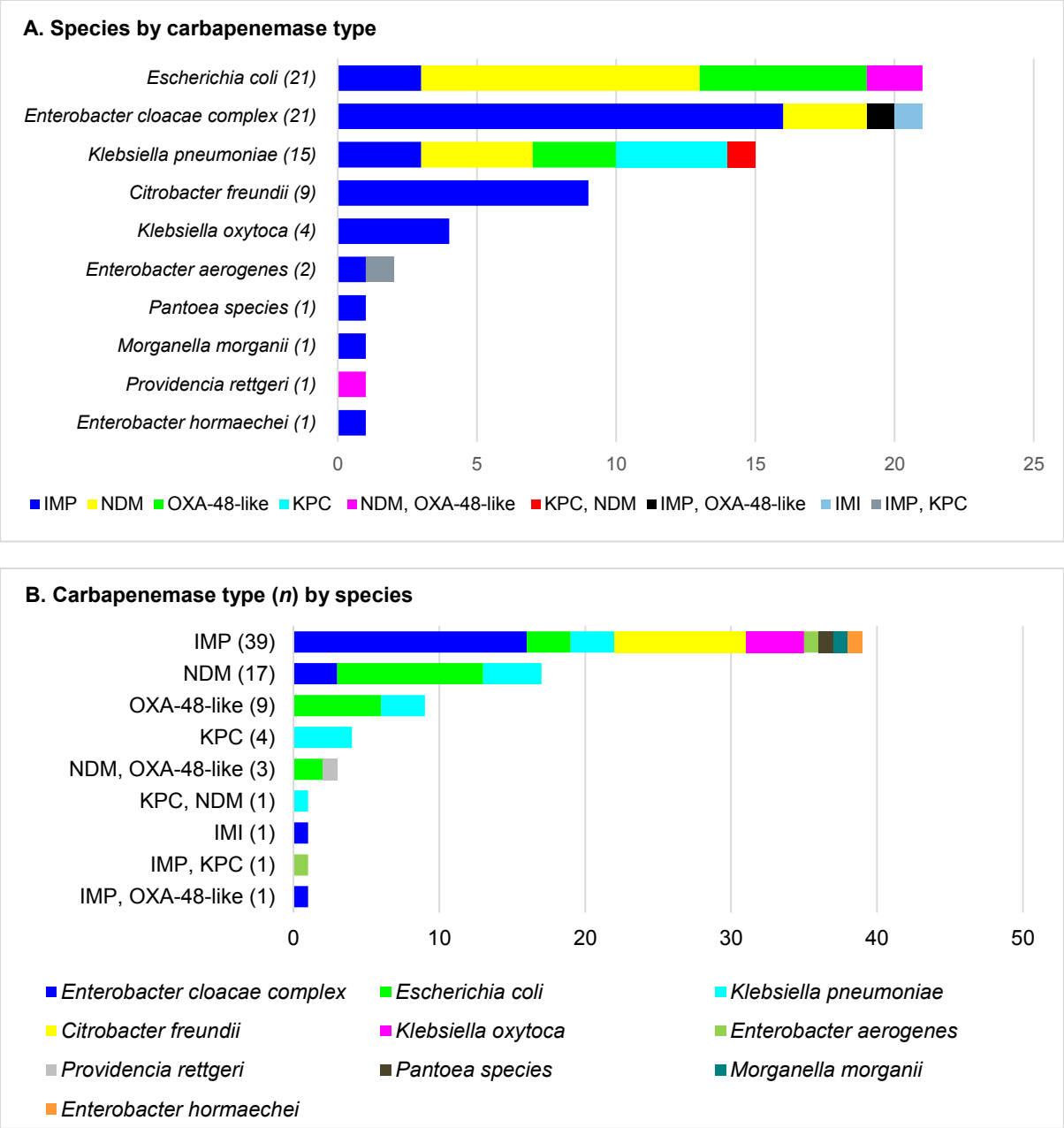
Figure 4: Trend data for the top four carbapenemase types, by state and territory and nationally, 1 January 2017 to 31 December 2017

Type	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia
IMP									
OXA-48-like									
NDM									
KPC									

Line graphs for the period 1 January 2017 to 31 December 2017, for each type

Carbapenemase-producing Enterobacteriaceae by species and carbapenemase type

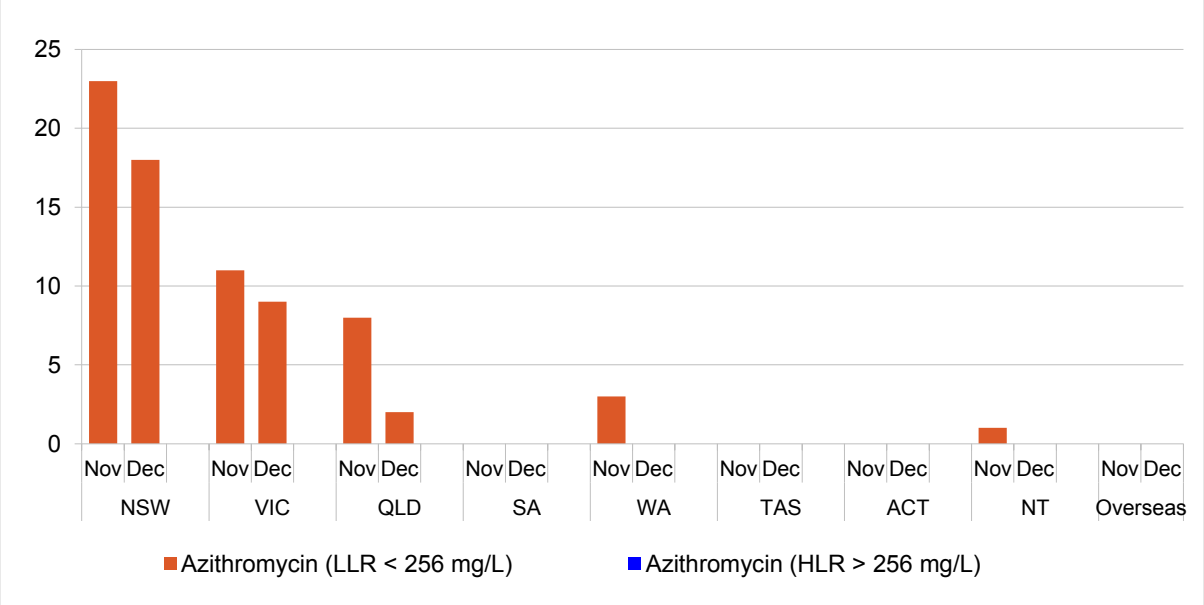
Figure 5: Carbapenemase-producing Enterobacteriaceae, number reported by (A) species and (B) carbapenemase type, 1 November 2017 to 31 December 2017



* Carbapenemase-producing Enterobacteriaceae (n = 69), carbapenemase- and ribosomal methyltransferase-producing Enterobacteriaceae (n = 7)

Neisseria gonorrhoeae by state and territory

Figure 6: *Neisseria gonorrhoeae*, number reported by state and territory, and month of collection*, 1 November 2017 to 31 December 2017



* Where state and territory of residence is unknown, the state of the originating laboratory has been assigned

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