

# AUSTRALIAN COMMISSION ON SAFETY AND QUALITY IN HEALTH CARE



## CARAlert Update

1 April 2017–30 June 2017

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## Summary

The Australian Government funded the Australian Commission on Safety and Quality in Health Care (the Commission) to establish 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 resistance mechanisms known to be a serious threat to the effectiveness of last-line antimicrobial agents, which can result in significant morbidity and mortality.

This data update is one of a series produced by the AURA National Coordination Unit (NCU) providing regular data updates and six-monthly detailed analyses of CARAlert data. This summary report includes information about isolates collected between 1 April and 30 June 2017 and where the results were reported into CARAlert by 31 July 2017.

There were 428 CARs confirmed during this period; 194 carbapenemase-producing Enterobacteriaceae (CPE) and 186 azithromycin-resistant *Neisseria gonorrhoeae* (low-level resistance, MIC  $\leq$ 256 mg/L). These resistances are the most commonly reported in CARAlert and numbers of each have been increasing over the 12 months to June 2017.

The report provides data on the number and distribution of CAR isolates by state and territory. The majority of reported cases are from Queensland, NSW and Victoria. Around 50% of CARs were detected in community patients or residents in aged care homes.

Figures 3 to 6 show the detail of the type and species for CPE and the distribution of azithromycin-resistant *Neisseria gonorrhoeae* by state and territory. The highest numbers of CPE in this period were reported from Queensland.

The findings regarding CPE highlight the importance of implementation of the Commission's recently released CPE control guidelines. The findings regarding azithromycin non-susceptible *N. gonorrhoeae* will be followed up with states and territories in relation to their sexually transmitted infection control guidelines and implications for national and local treatment guidelines.

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.<sup>1</sup>

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
<i>Enterococcus</i> species	Linezolid non-susceptible
<i>Mycobacterium tuberculosis</i>	Multidrug-resistant – resistant to at least rifampicin and isoniazid
<i>Neisseria gonorrhoeae</i>	Ceftriaxone or azithromycin non-susceptible
<i>Salmonella</i> species	Ceftriaxone non-susceptible
<i>Shigella</i> species	Multidrug-resistant
<i>Staphylococcus aureus</i>	Vancomycin, linezolid or daptomycin non-susceptible
<i>Streptococcus pyogenes</i>	Penicillin reduced susceptibility

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<sup>1</sup> 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 data update includes information about isolates collected between 1 April 2017 and 30 June 2017 and the results reported into CARAlert by 31 July 2017. This report provides a brief update, complementing the *CARAlert First Annual Report March 2016–March 2017* (<https://www.safetyandquality.gov.au/wp-content/uploads/2017/07/CARAlert-Report-March-2016-to-March-2017.pdf>).

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

## Results

Between 17 March 2016 and 30 June 2017, 1,554 CARs from 81 originating laboratories across Australia were entered into the CARAlert system. **Table 2** and **Figure 1** show the number and distribution of CARs, by state and territory.

There were 194 CPE and 186 Azithromycin resistant *Neisseria gonorrhoeae* (low-level resistance, MIC  $\leq$ 256 mg/L) during this three month period. These resistances are the most commonly reported in CARAlert and each has shown increasing trends in numbers over the twelve months to June 2017.

**Figure 2** shows the CARs reported by species and month, year on year, 17 March 2016 to 30 June 2017.

**Figures 3 to 6** show the type and species for CPE and the distribution of azithromycin resistant *Neisseria gonorrhoeae*, by state and territory. The highest numbers of CPE in this period were reported from Queensland.

The findings regarding CPE highlight the importance of implementation of the Commission's recently released CPE control guidelines. The findings regarding azithromycin non-susceptible *N. gonorrhoeae* will be followed up with states and territories in relation to their sexually transmitted infection control guidelines, and implications for national and local treatment guidelines.

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 April 2017 to 30 June 2017**

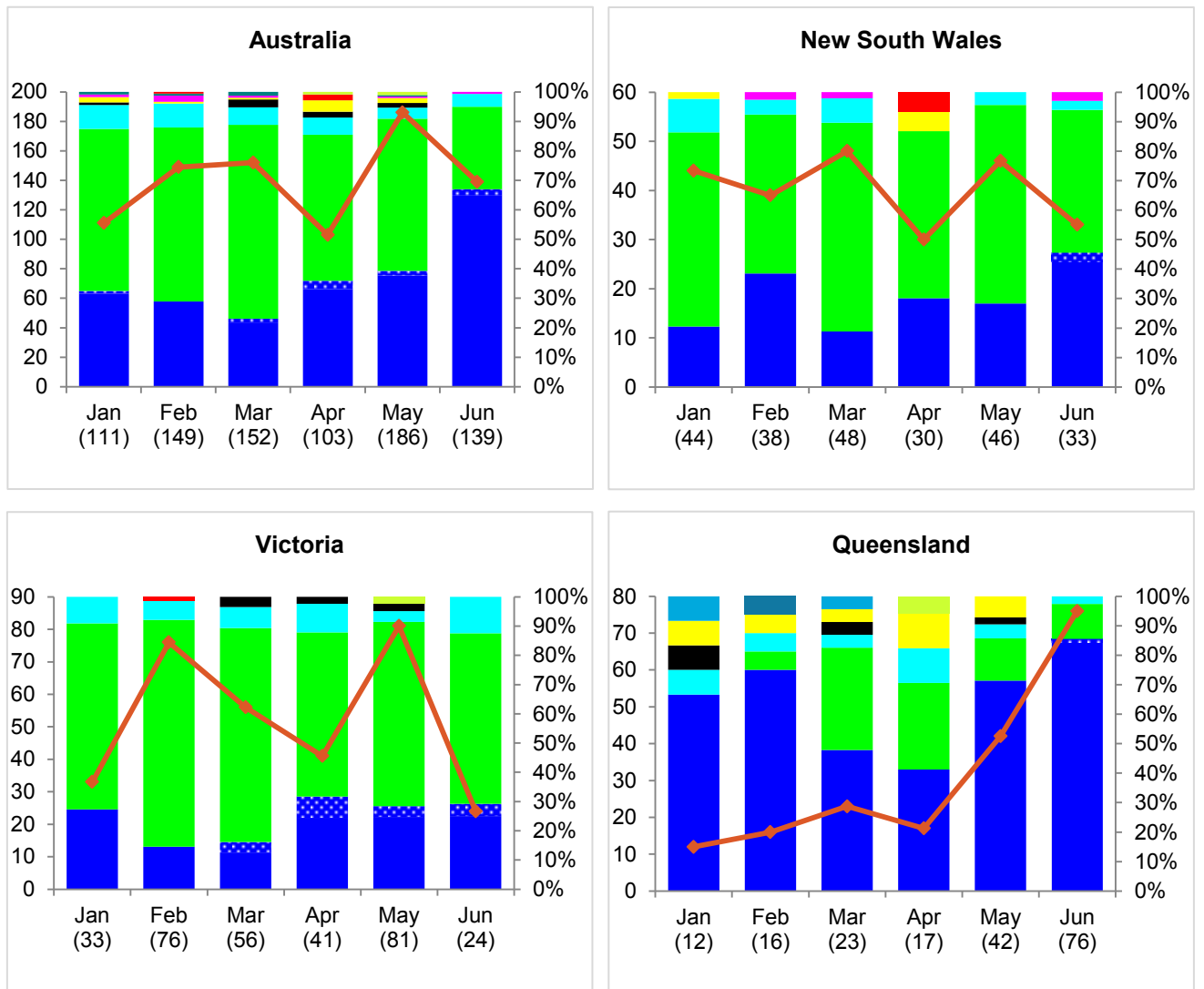
Critical antimicrobial resistance	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	OS	Unk	2017 Apr–Jun	2017 YTD	2016 Apr–Jun	2016 Mar–Dec*	Trend† 16–Q2 17–Q2
Carbapenemase-producing Enterobacteriaceae	36	36	101	1	9	1	1	7	0	2	194	305	108	312	
Azithromycin resistant (LLR < 256 mg/L) <i>Neisseria gonorrhoeae</i>	64	88	20	0	14	0	0	0	0	0	186	435	55	223	
Daptomycin non-susceptible <i>Staphylococcus aureus</i>	3	10	6	0	0	0	0	0	0	0	19	49	24	62	
Carbapenemase and ribosomal methyltransferase-producing Enterobacteriaceae	1	7	1	0	0	0	0	0	0	0	9	12	9	21	
Ceftriaxone non-susceptible <i>Salmonella</i> species	2	0	5	0	0	0	0	0	0	0	7	11	6	17	
Ribosomal methyltransferase-producing Enterobacteriaceae	0	3	1	0	0	0	0	1	0	0	5	10	3	16	
Multidrug-resistant <i>Mycobacterium tuberculosis</i>	0	0	0	0	0	0	0	0	1	0	1	5	6	20	
Multidrug-resistant <i>Shigella</i> species	1	0	0	0	0	1	0	0	0	0	2	7	3	15	
Linezolid non-susceptible <i>Enterococcus</i> species	2	0	0	0	0	0	0	0	0	0	2	3	3	9	
Azithromycin resistant (HLR > 256 mg/L) <i>Neisseria gonorrhoeae</i>	0	2	1	0	0	0	0	0	0	0	3	3	2	4	
Ceftriaxone non-susceptible <i>Neisseria gonorrhoeae</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	4	
Vancomycin non-susceptible <i>Staphylococcus aureus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
<b>Total (as at 31 July 2017)</b>	<b>109</b>	<b>146</b>	<b>135</b>	<b>1</b>	<b>23</b>	<b>2</b>	<b>1</b>	<b>8</b>	<b>1</b>	<b>2</b>	<b>428</b>	<b>840</b>	<b>219</b>	<b>704</b>	

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

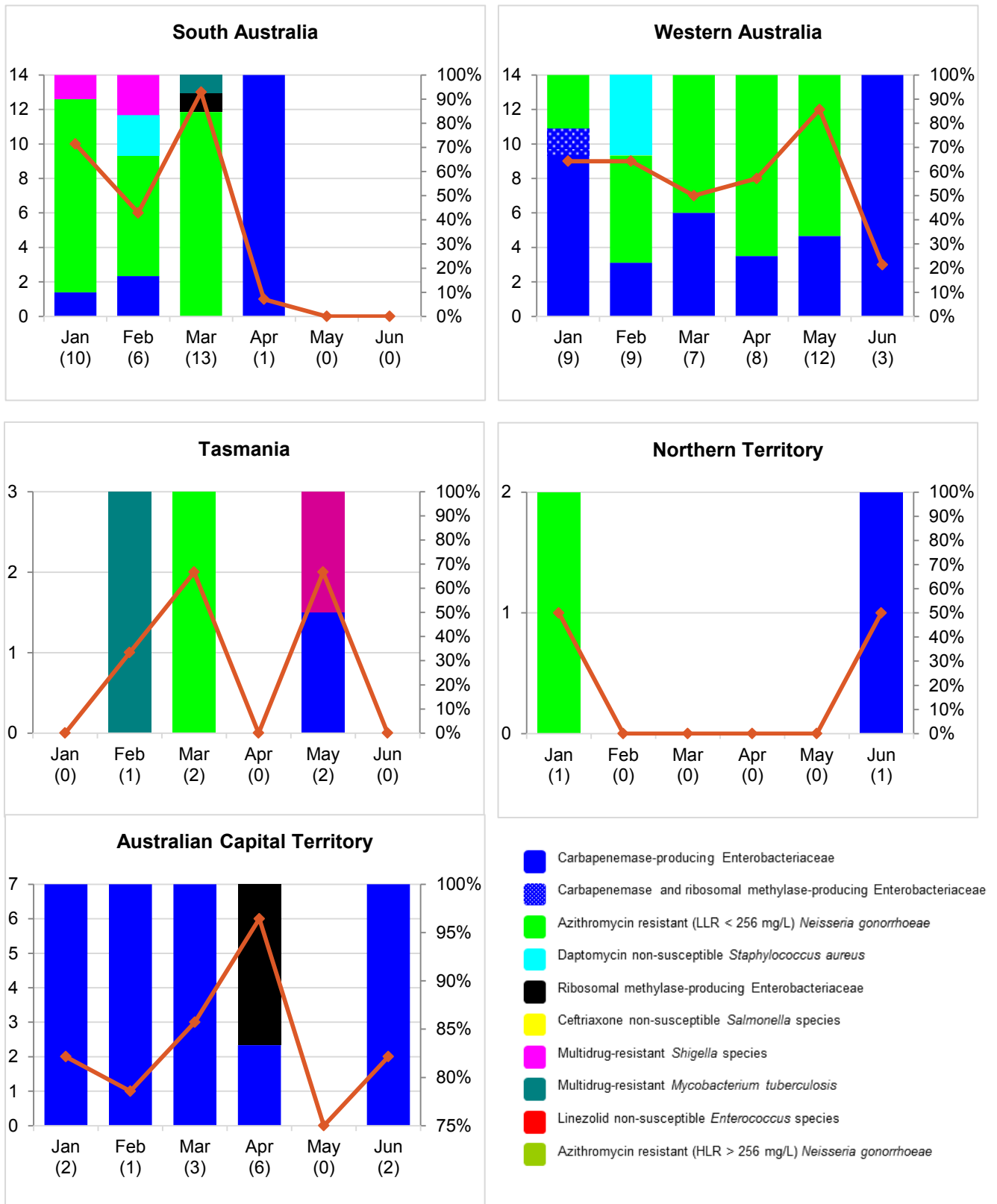
† Trend 16–Q2 17–Q2 = Trend Quarter 2 2016 to Quarter 2 2017

**Figure 1: Critical antimicrobial resistances (CARs), number and distribution reported nationally, and by state and territory, 1 January 2017 to 30 June 2017**



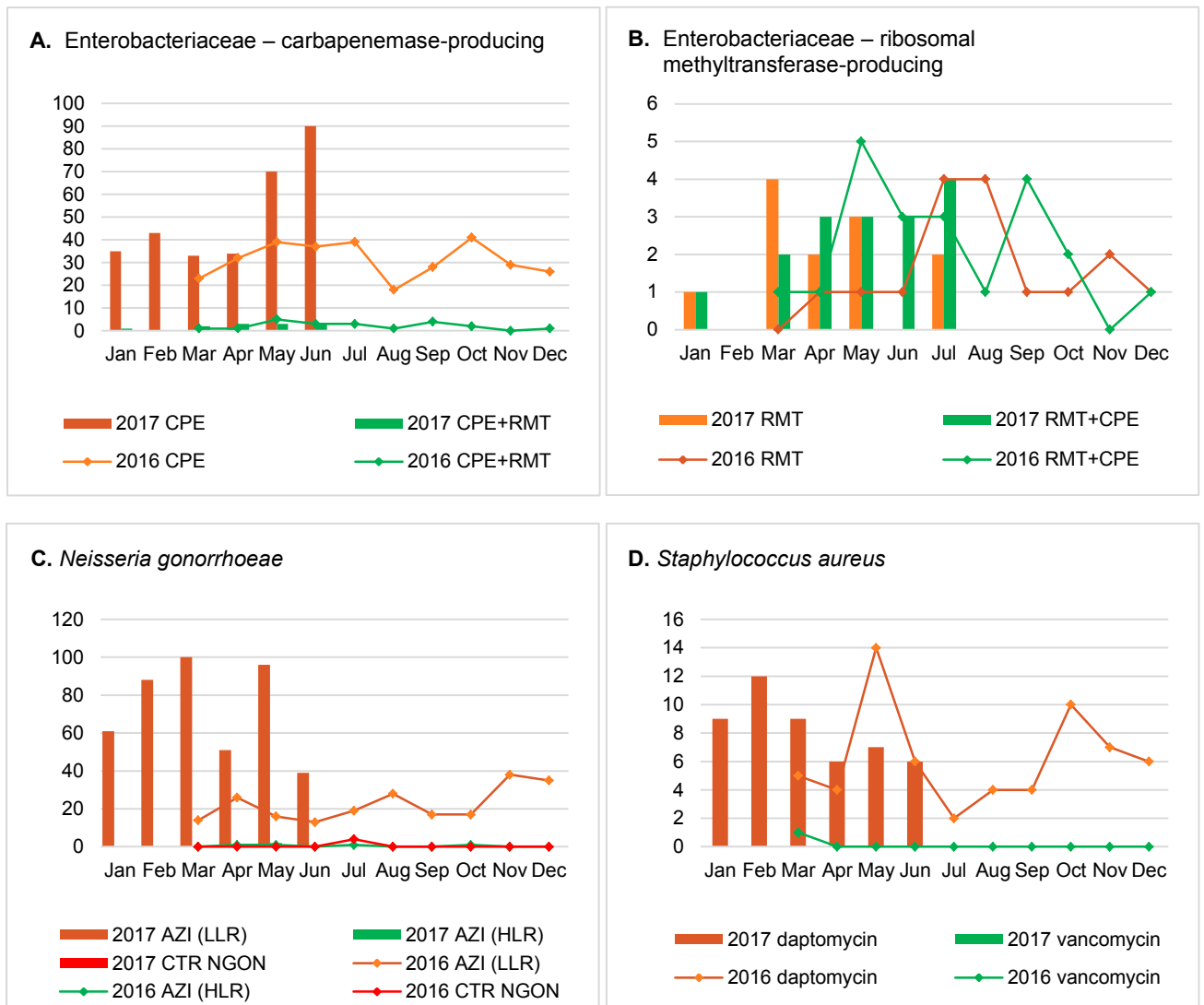
- Carbapenemase-producing Enterobacteriaceae
- Carbapenemase and ribosomal methylase-producing Enterobacteriaceae
- Azithromycin resistant (LLR < 256 mg/L) *Neisseria gonorrhoeae*
- Daptomycin non-susceptible *Staphylococcus aureus*
- Ribosomal methylase-producing Enterobacteriaceae
- Ceftriaxone non-susceptible *Salmonella* species
- Multidrug-resistant *Shigella* species
- Multidrug-resistant *Mycobacterium tuberculosis*
- Linezolid non-susceptible *Enterococcus* species
- Azithromycin resistant (HLR > 256 mg/L) *Neisseria gonorrhoeae*

**Figure 1 (continued): Critical antimicrobial resistances (CARs), number and distribution reported nationally, and by state and territory, 1 January 2017 to 30 June 2017**





**Figure 2: Critical antimicrobial resistances, number reported by species and month, year on year, 17 March 2016 to 30 June 2017**

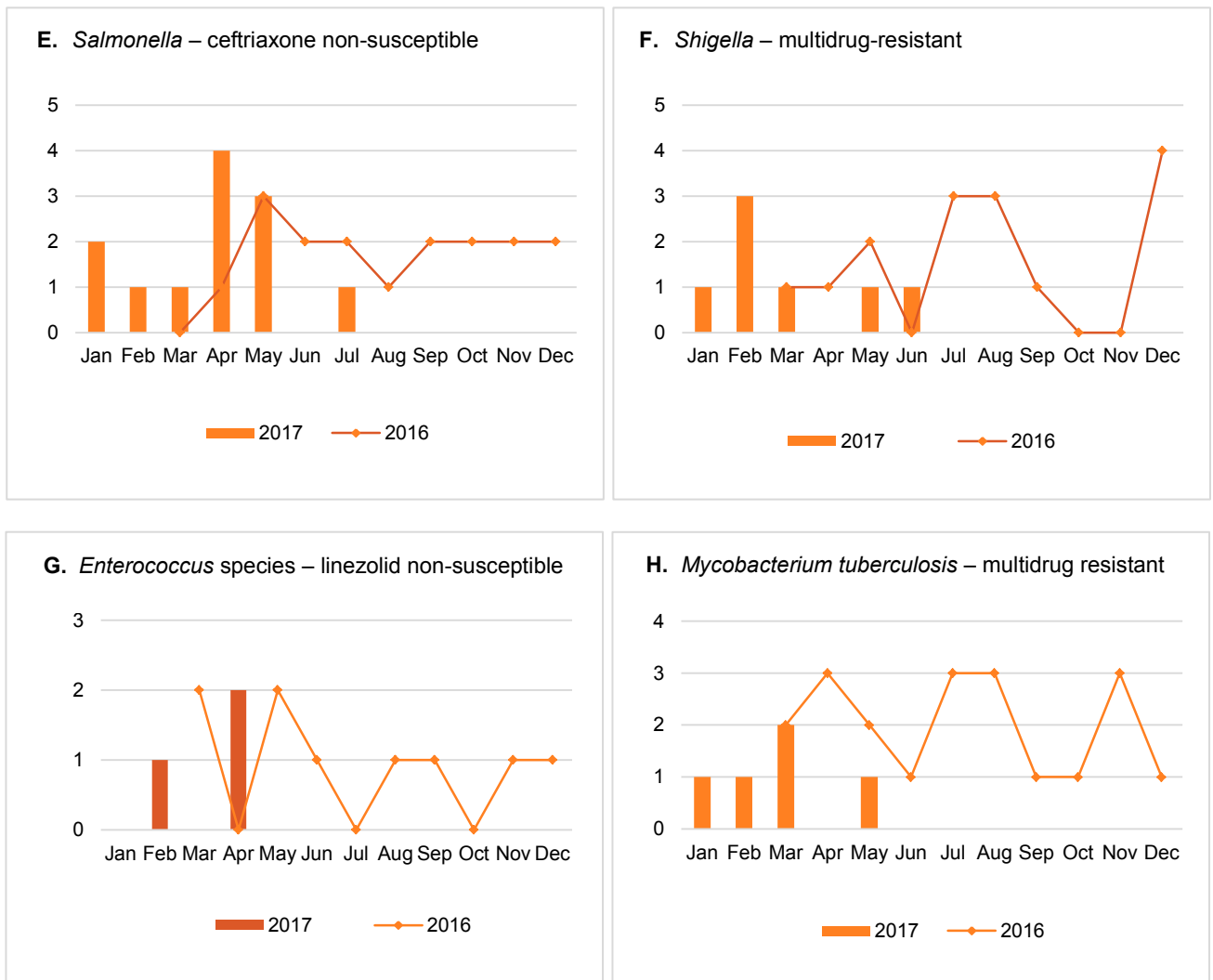


Bars: number of each CAR for 2017 (January to June)

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

AZI (LLR) = azithromycin resistant, low level resistance (LLR, MIC < 256 mg/L) *Neisseria gonorrhoeae*; AZI (HLR) = HLR = azithromycin resistant, 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*; RMT = ribosomal methyltransferase-producing Enterobacteriaceae

**Figure 2 (continued): Critical antimicrobial resistances, number reported by species and month, year on year, 17 March 2016 to 30 June 2017**

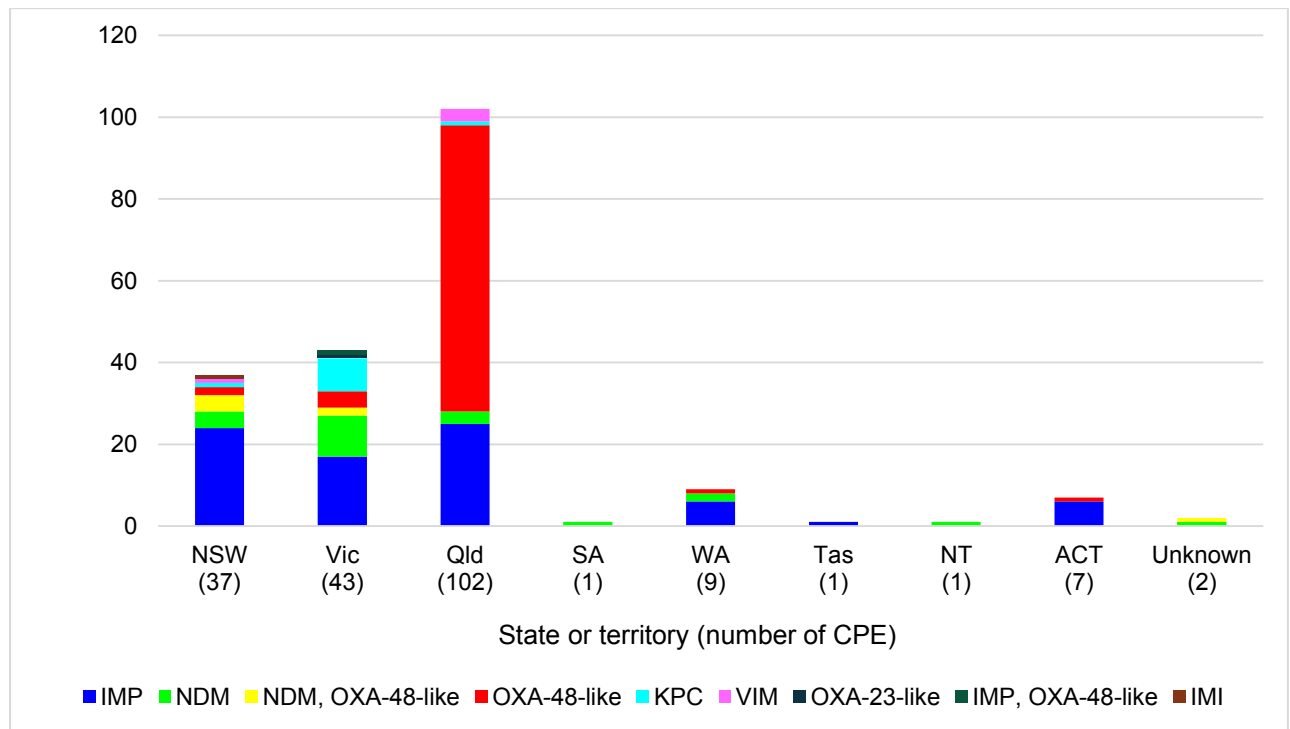


Bars: number of each CAR for 2017 (January to June)

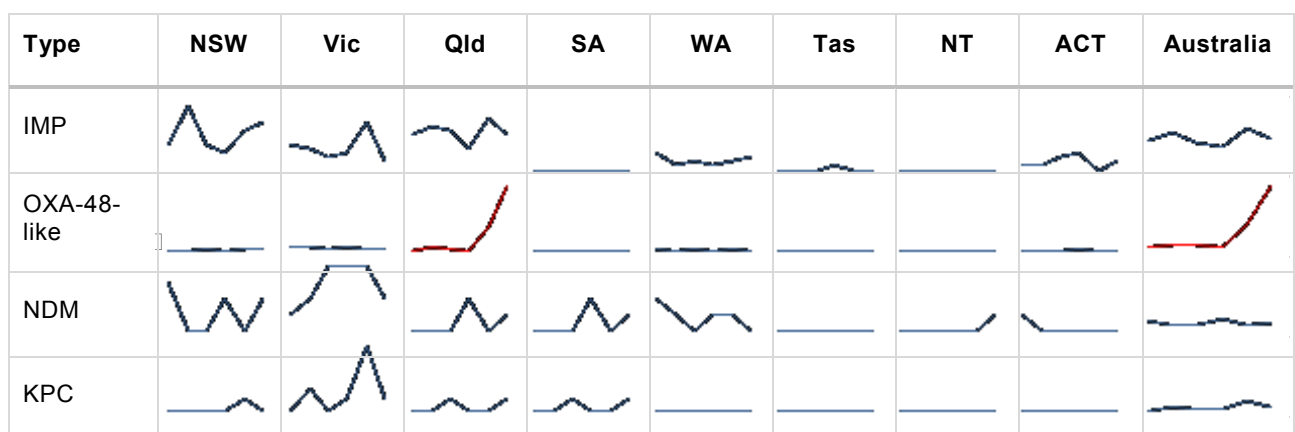
Lines: number of each CAR for 2016 (March to December)

## Carbapenemase-producing Enterobacteriaceae type, by state and territory

**Figure 3: Carbapenemase-producing Enterobacteriaceae, by carbapenemase type, number reported by state and territory, 1 April 2017 to 30 June 2017**



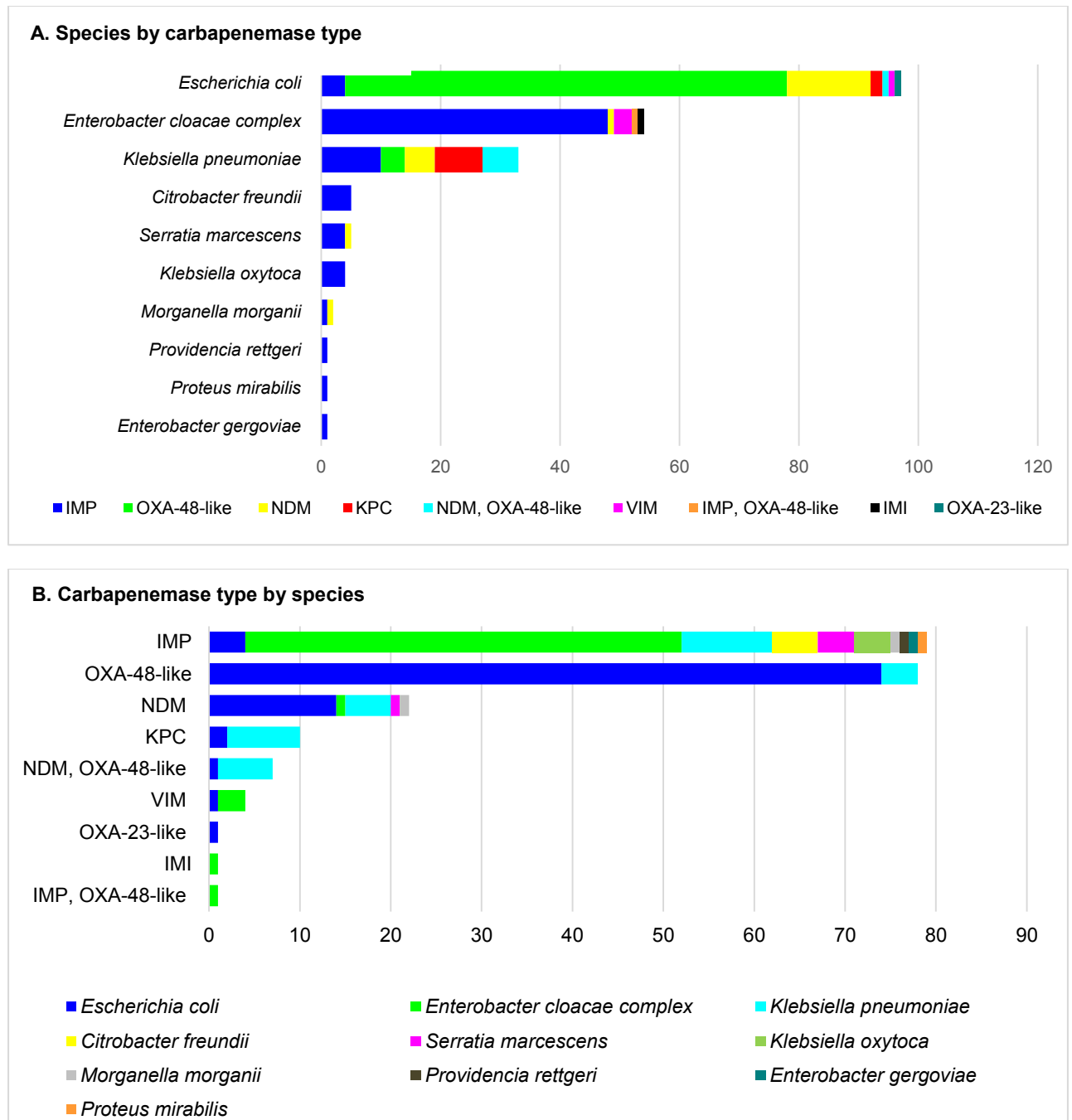
**Figure 4: Trend data for the top four carbapenemase types, by state and territory and nationally, 1 January 2017 to 30 June 2017**



Line graphs for the period 1 January 2017 to 30 June 2017, for each type, with significant trends ( $\chi^2$  for trend) shaded red.

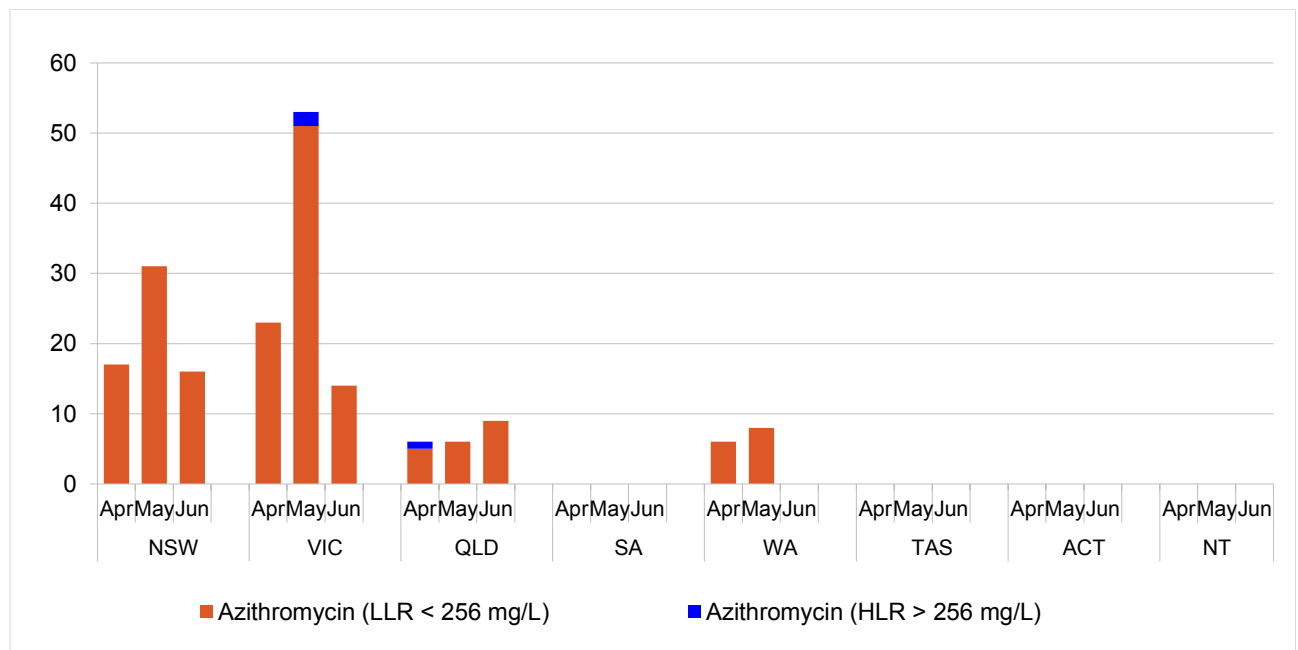
# Carbapenemase-producing Enterobacteriaceae by species and carbapenemase type

Figure 5: Carbapenemase-producing Enterobacteriaceae, number reported by (A) species and (B) carbapenemase type, 1 April 2017 to 30 June 2017



## Neisseria gonorrhoeae by state and territory

**Figure 6: *Neisseria gonorrhoeae*, number reported by state and territory, and month of collection\*, 1 April 2017 to 30 June 2017**



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

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