

**AUSTRALIAN COMMISSION  
ON SAFETY AND QUALITY IN HEALTH CARE**



# **CARAlert data update 8**

**1 July 2018–31 August 2018**

October 2018

Published by the Australian Commission on Safety and Quality in Health Care  
Level 5, 255 Elizabeth Street, Sydney NSW 2000

Phone: (02) 9126 3600

Fax: (02) 9126 3613

Email: [caralert@safetyandquality.gov.au](mailto:caralert@safetyandquality.gov.au)

Website: [www.safetyandquality.gov.au](http://www.safetyandquality.gov.au)

© Australian Commission on Safety and Quality in Health Care 2018

All material and work produced by the Australian Commission on Safety and Quality in Health Care (the Commission) is protected by copyright. The Commission reserves the right to set out the terms and conditions for the use of such material.

As far as practicable, material for which the copyright is owned by a third party will be clearly labelled. The Commission has made all reasonable efforts to ensure that this material has been reproduced in this publication with the full consent of the copyright owners.

With the exception of any material protected by a trademark, any content provided by third parties and where otherwise noted, all material presented in this publication is licensed under a [Creative Commons Attribution–NonCommercial–NoDerivatives 4.0 International licence](https://creativecommons.org/licenses/by-nc-nd/4.0/).



Enquiries about the licence and any use of this publication are welcome and can be sent to [communications@safetyandquality.gov.au](mailto:communications@safetyandquality.gov.au).

The Commission's preference is that you attribute this publication (and any material sourced from it) using the following citation:

Australian Commission on Safety and Quality in Health Care. CARAlert update 1 July 2018–31 August 2018. Sydney: ACSQHC; 2018

## **Disclaimer**

The content of this document is published in good faith by the Commission for information purposes. The document is not intended to provide guidance on particular healthcare choices. You should contact your healthcare provider for information or advice on particular healthcare choices.

The Commission does not accept any legal liability for any injury, loss or damage incurred by the use of, or reliance on, this document.

## 1. Summary

This data update is one of a [series](#) to provide regular data updates and six-monthly detailed analyses of data submitted to the National Alert System for Critical Antimicrobial Resistances (CARAlert). The format of this update has been changed, compared with previous updates, to make the data more accessible.

See [Appendix 1](#) for information about CARAlert and its contribution to the Antimicrobial Use and Resistance in Australia (AURA) Surveillance System.

Analyses presented in this update relate to 175 isolates collected from 1 July 2018 to 31 August 2018, where the results were reported to CARAlert by 30 September 2018. From the commencement of CARAlert (17 March 2016) to 31 August 2018, 3,154 results from 92 originating laboratories across Australia were entered into the CARAlert system.

## 2. Data highlights

[Figure 1](#) and [Table 1](#) show the number and distribution of critical antimicrobial resistance (CAR) isolates, by state and territory.

There were 75 carbapenemase-producing Enterobacterales<sup>1</sup> (CPE) and 54 azithromycin non-susceptible (low-level resistance, MIC ≤ 256 mg/L) *Neisseria gonorrhoeae* reported during this two-month period. These two resistances were the most commonly reported (74%). The great majority (88%) of reported cases were from New South Wales, Victoria and Queensland.

[Figure 2](#) shows the CARs reported by species and month, 1 July 2018 to 31 August 2018.

[Figures 3](#) to 5 show details of carbapenemase type and the species of CPE, by state and territory, 1 July 2018 to 31 August 2018. IMP (51.2%), NDM (17.1%) and OXA-48-like (17.1%) types accounted for 85.4% of all CPE reported during this period, with 90.2% from New South Wales, Victoria and Queensland. Fifty-five percent of CPE were from clinical specimens, although differences were seen between states and territories.

The distribution of azithromycin non-susceptible *N. gonorrhoeae*, by state and territory, is shown in [Figure 6](#). There was one ceftriaxone non-susceptible *N. gonorrhoeae* confirmed in August 2018 from a patient residing in Victoria.

One report of a GES-5-producing *Klebsiella pneumoniae* was submitted during this reporting period. This is the first time the GES type has been reported in CARAlert. The isolate was collected in May 2018 from a patient residing in Victoria.

## 3. Implications of key findings and response

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* highlight the importance of state and territory sexually transmitted infection control and prevention programs.

---

<sup>1</sup> Recent taxonomic studies have narrowed the definition of the family Enterobacteriaceae. Some previous members of this family are now included in other families within the Order Enterobacterales.

Each state and territory health department has designated officers who have access to the CARAlert database to enable detailed review of CARs reported for their jurisdiction, including the name of the public hospital where a patient with a confirmed CAR was cared for. This information assists states and territories to determine whether infection prevention and control and/or follow-up response action is required.

The Commission has commenced consultation with all states and territories regarding the establishment of a network for coordination of response to outbreaks of resistant organisms in Australia. CARAlert will be one of the data sources to inform this process.

A review of CARs reported to CARAlert has recently been completed. The review assessed the resistances and species that are currently reported to CARAlert to determine that they continue to be priorities, and identified additional CARs that should be captured by CARAlert.

System changes to accommodate reporting of four new CARs – transferrable resistance to colistin in Enterobacterales, carbapenemase-producing *Acinetobacter baumannii* complex, carbapenemase-producing *Pseudomonas aeruginosa* and *Candida auris* – are expected to be completed so that reporting can commence in 2019.

## 4. Data

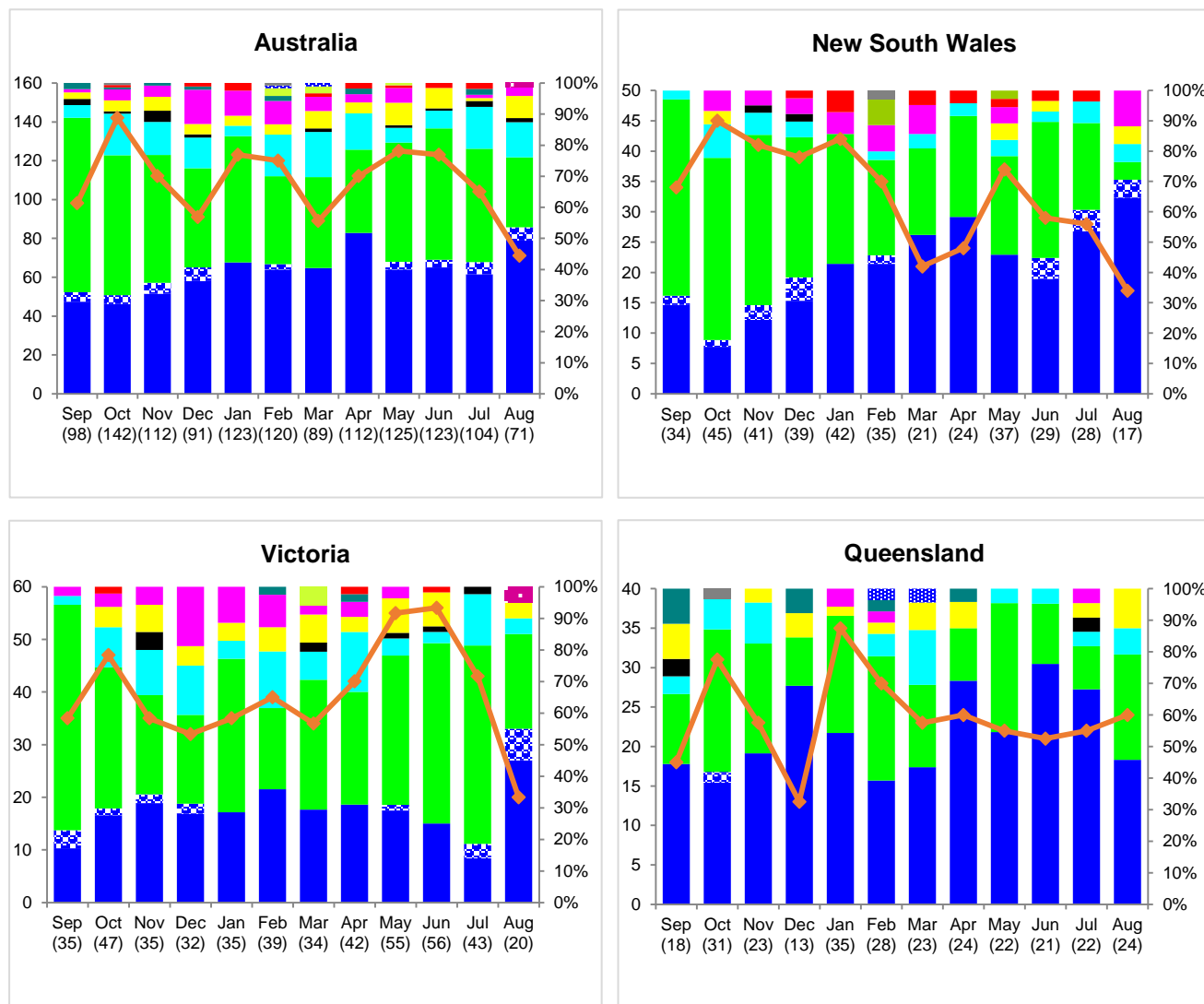
**Table 1: Number of critical antimicrobial resistance isolates, by state and territory, 1 July 2018 to 31 August 2018.**

Critical antimicrobial resistance	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	OS	Unk	2018 Jul–Aug	2018 YTD	2017 Jul–Aug	2017	Trend† Sep-17 Aug-18
Carbapenemase-producing Enterobacterales	26	15	26	1	3	1	0	2	1	0	75	369	84	528	
Azithromycin non-susceptible (LLR < 256 mg/L) <i>Neisseria gonorrhoeae</i>	9	33	11	0	1	0	0	0	0	0	54	294	91	730	
Daptomycin non-susceptible <i>Staphylococcus aureus</i>	3	8	3	0	6	0	0	1	0	1	22	81	14	121	
Carbapenemase and ribosomal methyltransferase-producing Enterobacterales	3	4	0	0	0	0	0	0	0	0	7	15	6	33	
Ceftriaxone non-susceptible <i>Salmonella</i> species	1	1	4	0	0	0	0	0	0	0	6	40	9	37	
Ribosomal methyltransferase-producing Enterobacterales	0	1	1	0	0	0	0	0	0	1	3	6	4	22	
Multidrug-resistant <i>Shigella</i> species	2	0	1	0	0	0	0	0	0	0	3	35	3	31	
Linezolid non-susceptible <i>Enterococcus</i> species	1	0	0	0	0	0	0	0	1	0	2	11	1	5	
Multidrug-resistant <i>Mycobacterium tuberculosis</i>	0	0	0	1	0	0	0	0	1	0	2	6	1	11	
Ceftriaxone non-susceptible <i>Neisseria gonorrhoeae</i>	0	1	0	0	0	0	0	0	0	0	1	1	0	0	
Azithromycin non-susceptible (HLR > 256 mg/L) <i>Neisseria gonorrhoeae</i>	0	0	0	0	0	0	0	0	0	0	0	6	1	4	
Ceftriaxone non-susceptible and azithromycin resistant (HLR > 256 mg/L) <i>Neisseria gonorrhoeae</i>	0	0	0	0	0	0	0	0	0	0	0	2	0	0	
Linezolid non-susceptible <i>Staphylococcus aureus</i>	0	0	0	0	0	0	0	0	0	0	0	1	0	1	
Vancomycin non-susceptible <i>Staphylococcus aureus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<b>Total (reported by 30 September 2018)</b>	<b>45</b>	<b>63</b>	<b>46</b>	<b>2</b>	<b>10</b>	<b>1</b>	<b>0</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>175</b>	<b>867</b>	<b>214</b>	<b>1,523</b>	

HLR = high-level resistance; LLR = low-level resistance; OS = overseas; Unk = unknown; YTD = year to date

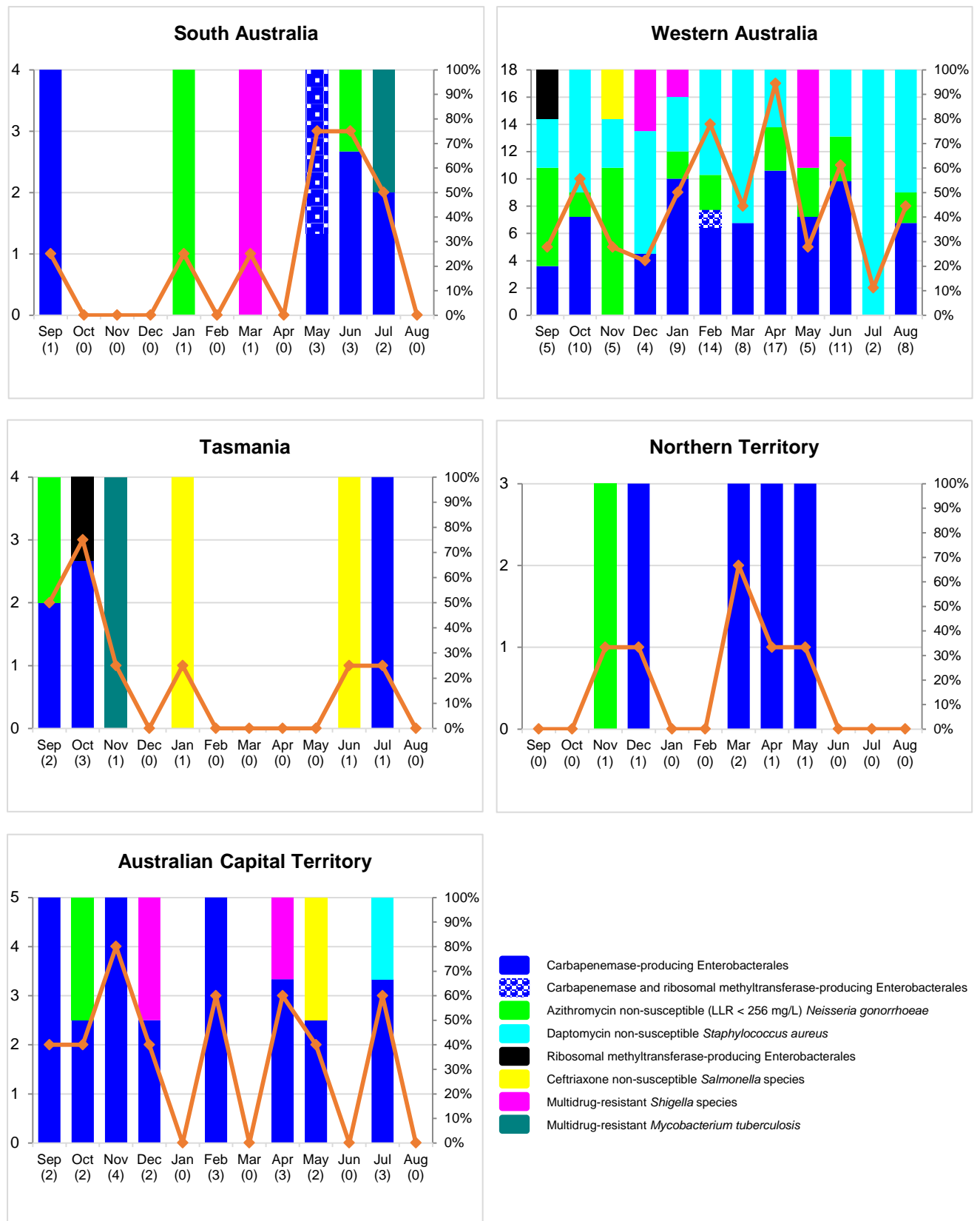
† Trend Sep-17 Aug-18 = 12-month trend, 1 September 2017 to 31 August 2018

**Figure 1: Critical antimicrobial resistances (CARs), number and distribution reported nationally, and by state and territory, 1 September 2017 to 31 August 2018**

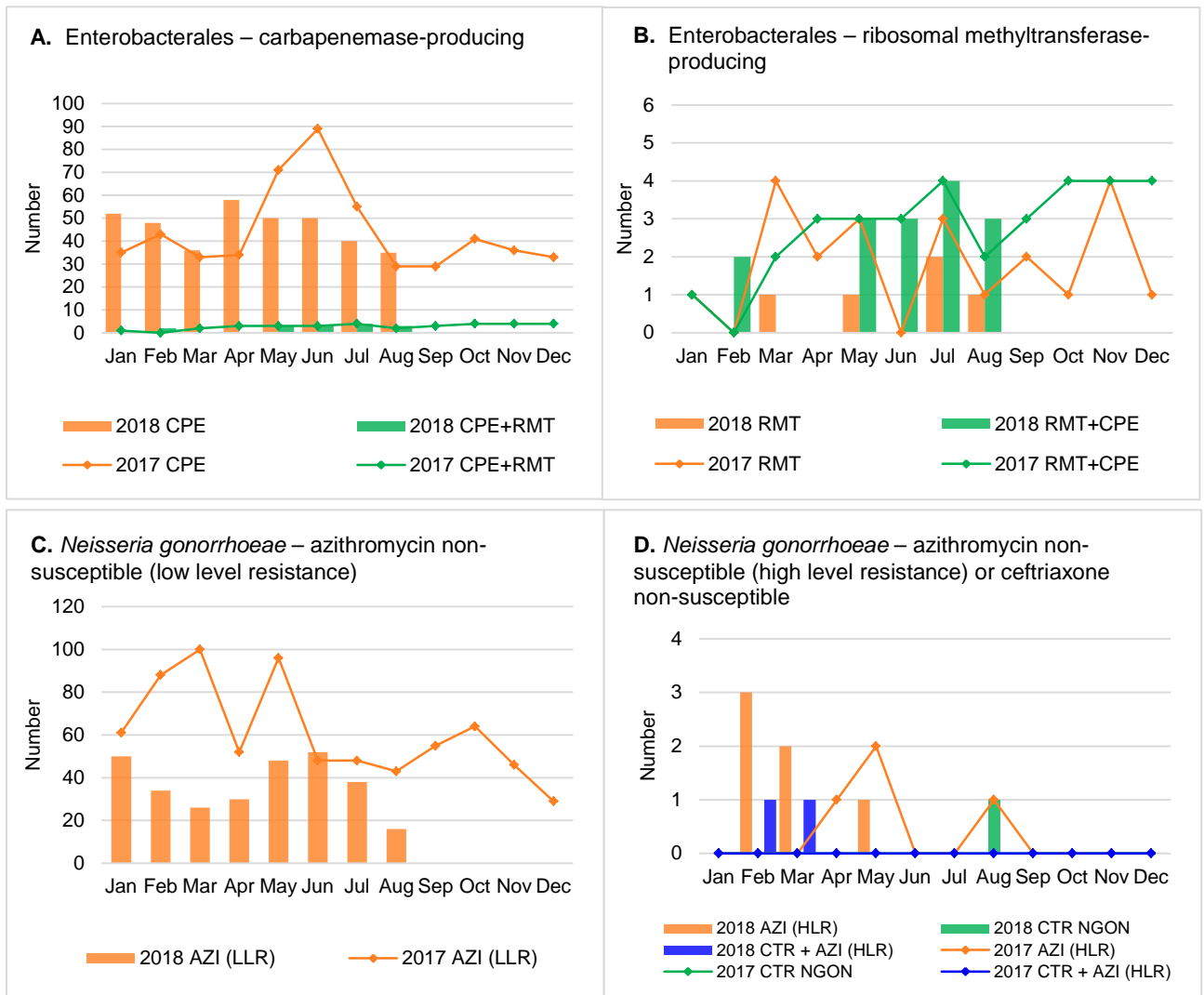


- Carbapenemase-producing Enterobacterales
- Carbapenemase and ribosomal methyltransferase-producing Enterobacterales
- Azithromycin non-susceptible (LLR < 256 mg/L) *Neisseria gonorrhoeae*
- Daptomycin non-susceptible *Staphylococcus aureus*
- Ribosomal methyltransferase-producing Enterobacterales
-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

**Figure 1 (continued): Critical antimicrobial resistances (CARs), number and distribution reported nationally, and by state and territory, 1 September 2017 to 31 August 2018**



**Figure 2: Critical antimicrobial resistances, number reported by species and month, year on year, 1 January 2017 to 31 August 2018**



Bars: number of each CAR type reported for each organism for 2018 (January to August)

Lines: number of each CAR type reported for each organism for 2017 (January 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 Enterobacteriales; CPE+RMT = carbapenemase- and ribosomal methyltransferase-producing Enterobacteriales; CTR NGON = ceftriaxone non-susceptible *Neisseria gonorrhoeae*; CTR+AZI (HLR) NGON = ceftriaxone non-susceptible and azithromycin non-susceptible, high level resistance (HLR, MIC > 256 mg/L) *Neisseria gonorrhoeae*; RMT = ribosomal methyltransferase-producing Enterobacteriales

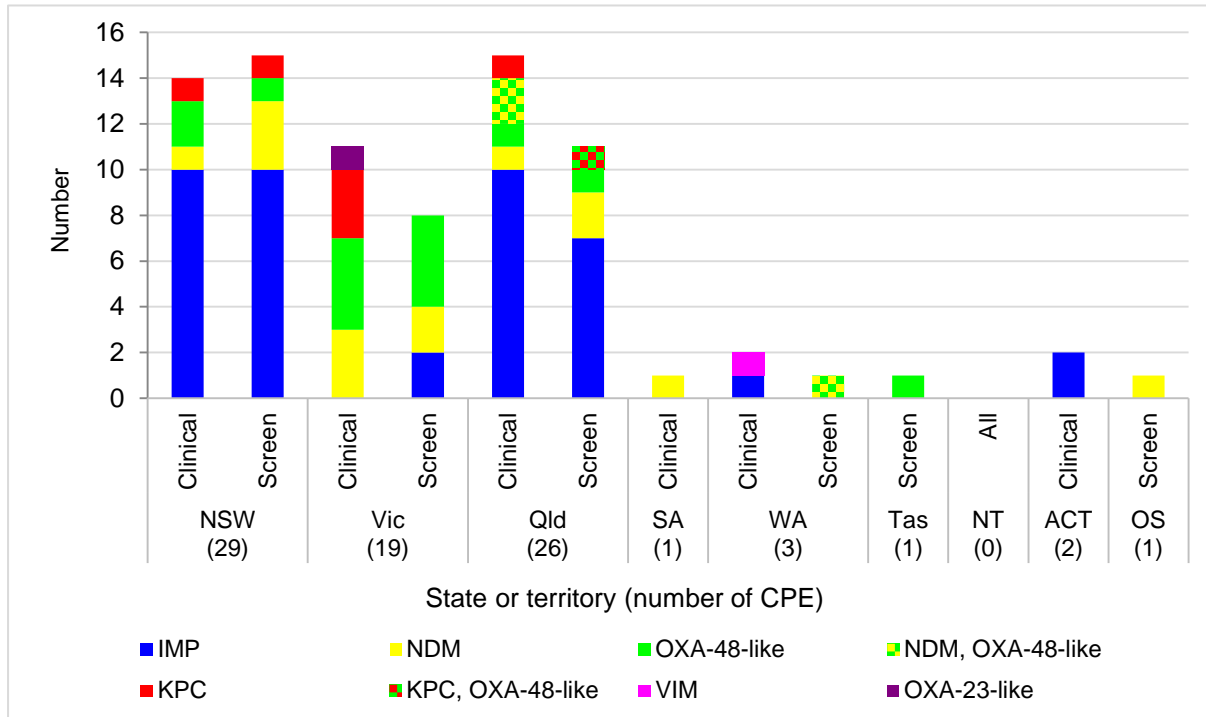


**Figure 2 (continued): Critical antimicrobial resistances, number reported by species and month, year on year, 1 January 2017 to 31 August 2018**



## 5. Carbapenemase-producing Enterobacterales type, by state and territory

Figure 3: Carbapenemase-producing Enterobacterales\*, by carbapenemase type and specimen type, number reported by state and territory, 1 July 2018 to 31 August 2018.



\* Carbapenemase-producing Enterobacterales ( $n = 75$ ), carbapenemase- and ribosomal methyltransferase-producing Enterobacterales ( $n = 7$ )

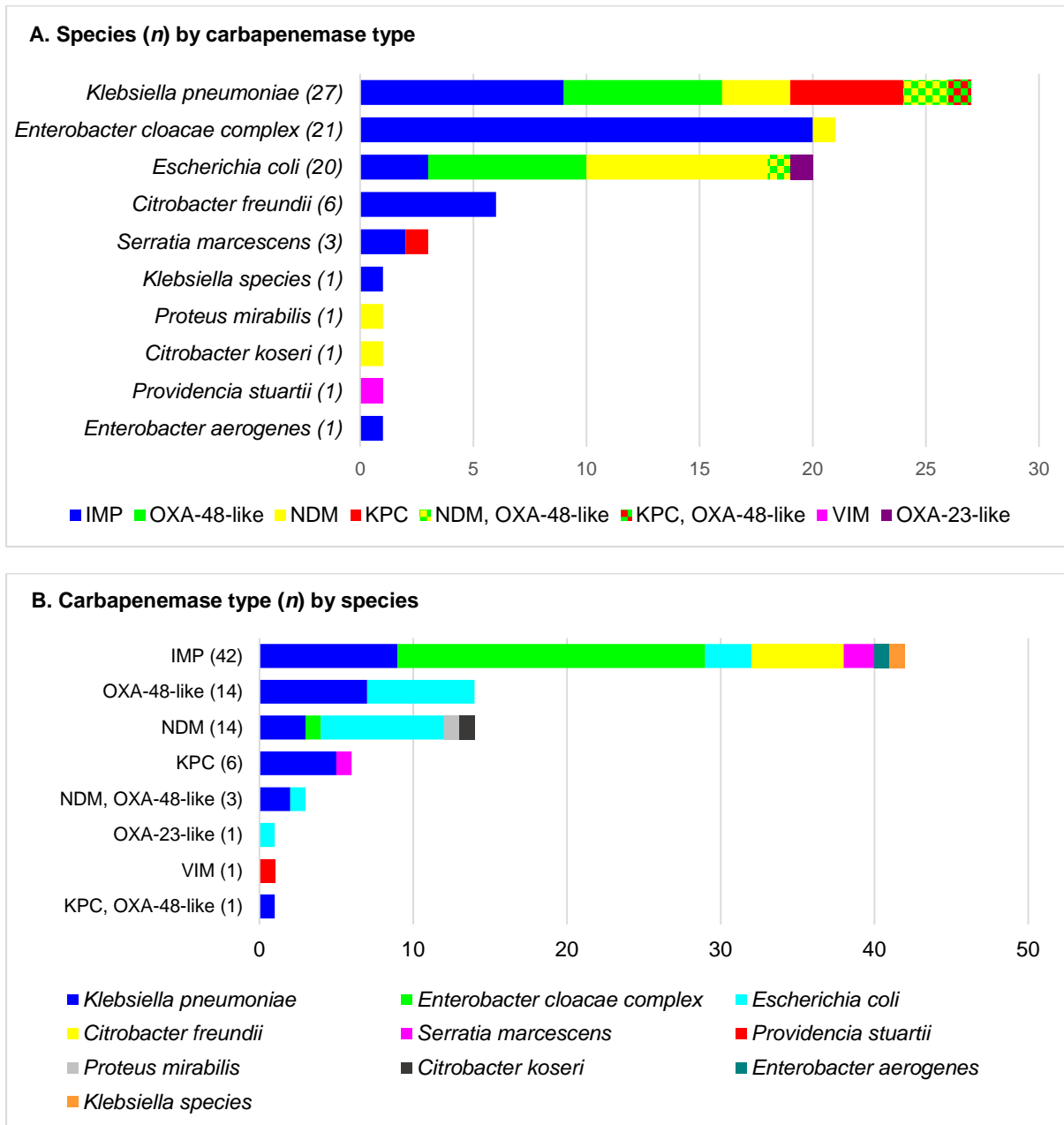
**Figure 4: Two-year trend data for the top four carbapenemase types, by state and territory and nationally, 1 July 2016 to 31 August 2018**

Type	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia
IMP	11 5	7 1	13 7	0 0	4 0	0 0	0 0	3 0	30 18
NDM	4 0	5 1	2 0	1 0	2 0	0 0	1 0	1 0	13 4
OXA-48-like	2 0	4 1	26 0	0 0	1 0	0 0	0 0	0 0	29 2
KPC	1 0	3 0	0 0	0 0	0 0	0 0	0 0	0 0	4 1
All types	16 8	17 8	38 8	2 0	6 1	1 0	1 0	3 1	74 31

Line graphs represent three-month moving average for the period 1 July 2016 to 31 August 2018, for each type, where maximum monthly average was greater than one.

## 6. Carbapenemase-producing Enterobacterales by species and carbapenemase type

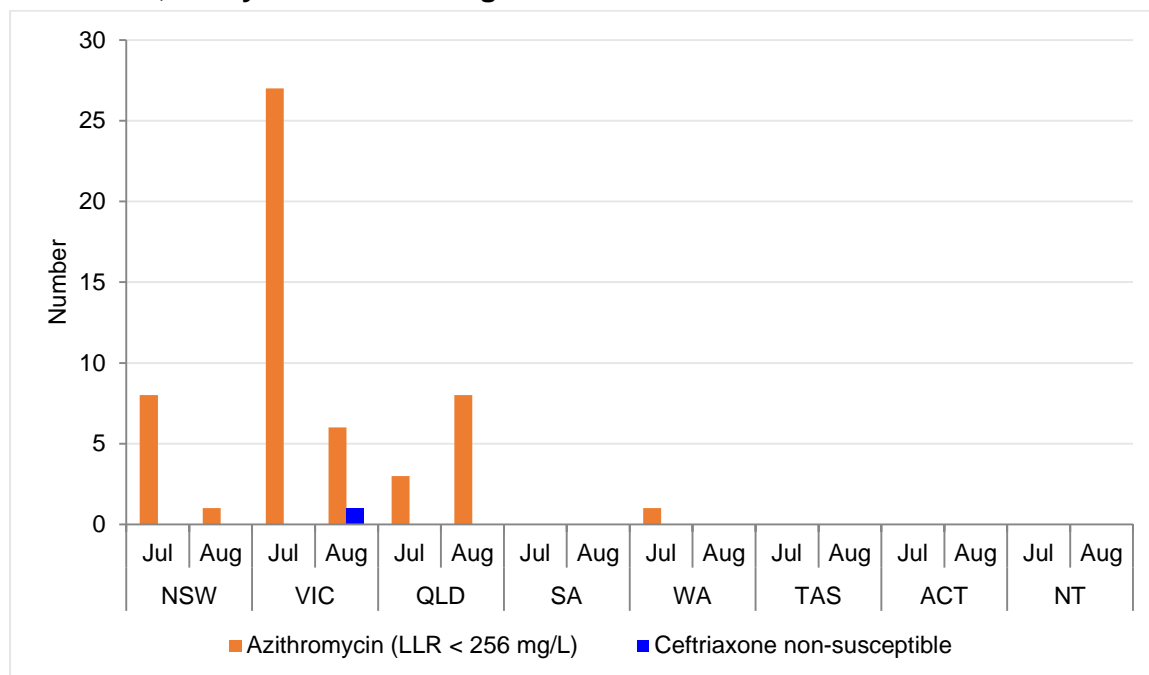
Figure 5: Carbapenemase-producing Enterobacterales, number reported by (A) species and (B) carbapenemase type, 1 July 2018 and 31 August 2018.



\* Carbapenemase-producing Enterobacterales ( $n = 75$ ), carbapenemase- and ribosomal methyltransferase-producing Enterobacterales ( $n = 7$ )

## Neisseria gonorrhoeae by state and territory

Figure 6: *Neisseria gonorrhoeae*, number reported by state and territory, and month of collection\*, 1 July 2018 and 31 August 2018.



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

## About CARAlert

CARAlert is a key 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 (the Commission) in March 2016.

The AURA Surveillance System, coordinated by the Commission, provides essential information to develop and implement strategies to prevent and contain antimicrobial resistance (AMR) 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 2. The CARs were drawn from the list of high-priority organisms and antimicrobials which are the focus of the AURA Surveillance System.<sup>2</sup>

**Table 2: List of critical antimicrobial resistances reported to CARAlert**

Species	Critical Resistance
Enterobacterales	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

Note: Enterobacterales (new taxonomy)

<sup>2</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.

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.

## **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](mailto:mail@safetyandquality.gov.au)  
Website: [www.safetyandquality.gov.au](http://www.safetyandquality.gov.au)