

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



CARAlert data update 6

1 March 2018–30 April 2018

July 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

Website: 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.

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
March 2018–30 April 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.

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) to provide regular data updates and six-monthly detailed analyses of CARAlert data. This summary report includes information about isolates collected between 1 March 2018 and 30 April 2018, and the results reported into CARAlert by 31 May 2018.

Carbapenemase-producing Enterobacterales¹ (formerly Enterobacteriaceae) and azithromycin non-susceptible (low-level resistance, MIC \leq 256 mg/L) *Neisseria gonorrhoeae* were 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 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.

¹ Adeolu M, Alnajjar S, Naushad Sand Gupta RS. Genome-based phylogeny and taxonomy of the 'Enterobacterales': proposal for *Enterobacterales* ord. nov. divided into the families *Enterobacteriaceae*, *Erwiniaceae* fam. nov., *Pectobacteriaceae* fam. nov., *Yersiniaceae* fam. nov., *Hafniaceae* fam. nov., *Morganellaceae* fam. nov., and *Budviciaceae* fam. nov. *International Journal of Systematic and Evolutionary Microbiology* 2016; 66:5575–5599.

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.²

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
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)

² 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 191 isolates collected between 1 March 2018 and 30 April 2018 and the results reported into CARAlert by 31 May 2018. From 17 March 2016 to 30 April 2018, 2,675 results from 90 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 91 carbapenemase-producing Enterobacteriales (CPE) and 53 azithromycin non-susceptible (low-level resistance, MIC \leq 256 mg/L) *Neisseria gonorrhoeae* during this two-month period. These two resistances were the most commonly reported (75%). The great majority (84%) of reported cases were from New South Wales, Victoria and Queensland.

Figure 2 shows the CARs reported by species and month, year on year, 1 March 2017 to 30 April 2018.

Figures 3 to 5 show details of carbapenemase type and the species of CPE, by state and territory, 1 March 2018 to 30 April 2018. IMP (56.0%), NDM (23.1%) and OXA-48 (13.2%) types accounted for 92.3% of all CPE reported during this period, with 79.1% from New South Wales, Victoria and Queensland. There was a notable increase in the number of IMP types reported from Western Australia. Over 47% of CPE were from clinical specimens, although differences were seen between states and territories.

The distribution of azithromycin non-susceptible *Neisseria gonorrhoeae*, by state and territory, is shown in Figure 6. One *N. gonorrhoeae* that was both ceftriaxone non-susceptible and azithromycin non-susceptible (high-level resistance, MIC $>$ 256 mg/L) was reported for the second time in March 2018, from a patient who resided in Queensland.

The increase in multidrug-resistant *Shigella* species previously reported peaked in December 2017 and January 2018 and has continued to decline.

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

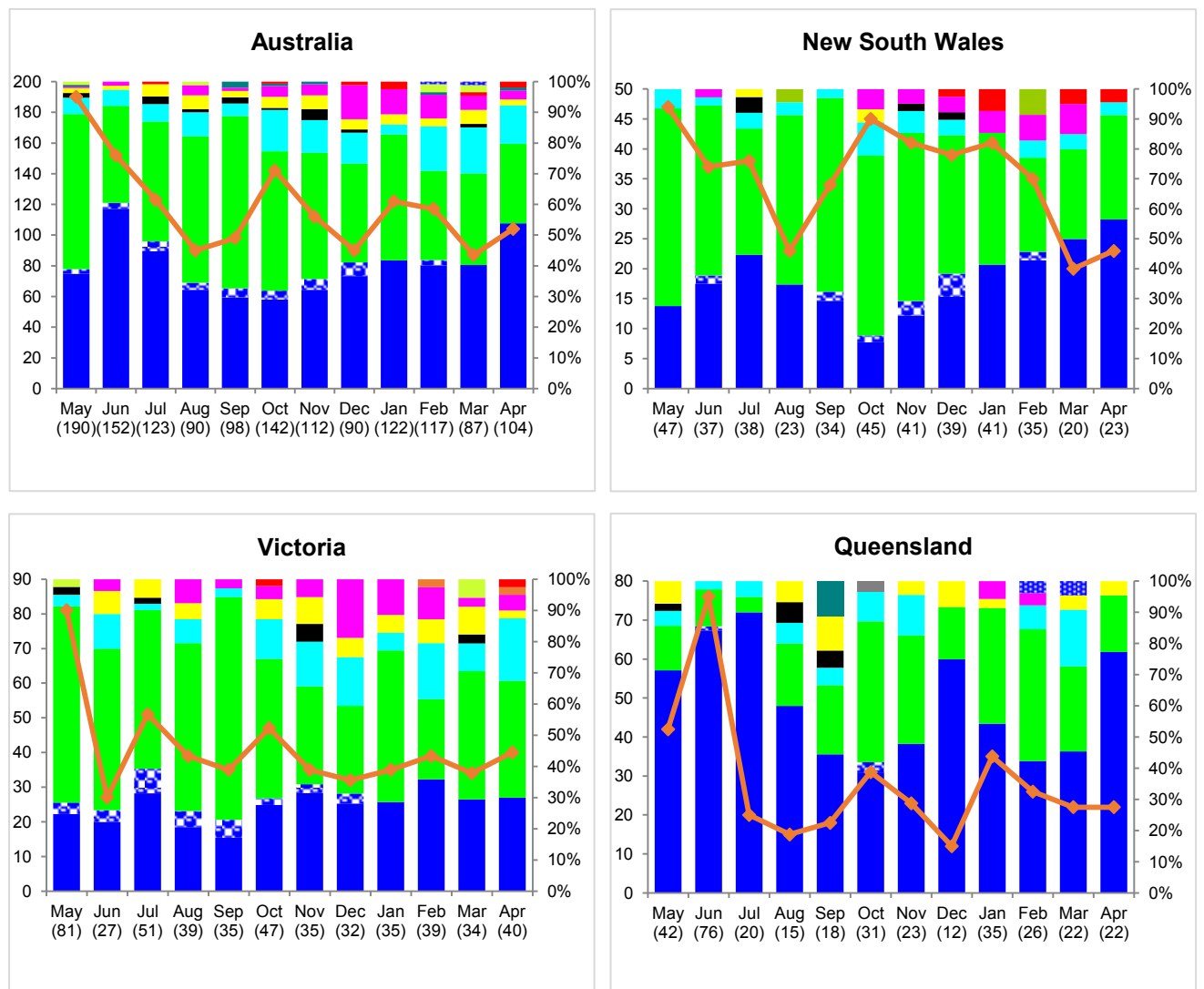
Table 2: Number of critical antimicrobial resistance isolates, by state and territory, 1 March 2018 to 30 April 2018

Critical antimicrobial resistance	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	OS	Unk	2018 Mar-Apr	2018 YTD	2017 Mar-Apr	2017	Trend† May-17 Apr-18
Carbapenemase-producing Enterobacterales	23	22	27	0	13	0	3	2	1	0	91	189	67	528	
Azithromycin non-susceptible (LLR < 256 mg/L) <i>Neisseria gonorrhoeae</i>	14	29	10	0	0	0	0	0	0	0	53	137	152	730	
Daptomycin non-susceptible <i>Staphylococcus aureus</i>	2	11	4	0	9	0	0	0	0	0	26	47	21	121	
Multidrug-resistant <i>Shigella</i> species	2	3	0	1	0	0	0	1	0	0	7	26	1	31	
Ceftriaxone non-susceptible <i>Salmonella</i> species	0	4	2	0	0	0	0	0	0	0	6	13	5	37	
Linezolid non-susceptible <i>Enterococcus</i> species	2	1	0	0	0	0	0	0	0	0	3	6	1	5	
Azithromycin non-susceptible (HLR > 256 mg/L) <i>Neisseria gonorrhoeae</i>	0	2	0	0	0	0	0	0	0	0	2	5	1	4	
Multidrug-resistant <i>Mycobacterium tuberculosis</i>	0	1	0	0	0	0	0	0	0	0	1	2	2	9	
Ceftriaxone non-susceptible and azithromycin resistant (HLR > 256 mg/L) <i>Neisseria gonorrhoeae</i>	0	0	1	0	0	0	0	0	0	0	1	2	0	0	
Ribosomal methyltransferase-producing Enterobacterales	0	1	0	0	0	0	0	0	0	0	1	1	6	22	
Carbapenemase and ribosomal methyltransferase-producing Enterobacterales	0	0	0	0	0	0	0	0	0	0	0	2	5	33	
Linezolid non-susceptible <i>Staphylococcus aureus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
Ceftriaxone non-susceptible <i>Neisseria gonorrhoeae</i>												0	0	0	
Vancomycin non-susceptible <i>Staphylococcus aureus</i>												0	0	0	
Total (as at 31 May 2018)	43	74	44	1	22	0	3	3	1	0	191	430	261	1,521	

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

† Trend May-17 Apr-18 = 12-month trend, 1 May 2017 to 30 April 2018

Figure 1: Critical antimicrobial resistances (CARs), number and distribution reported nationally, and by state and territory, 1 May 2017 to 30 April 2018



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

Figure 1 (continued): Critical antimicrobial resistances (CARs), number and distribution reported nationally, and by state and territory, 1 May 2017 to 30 April 2018

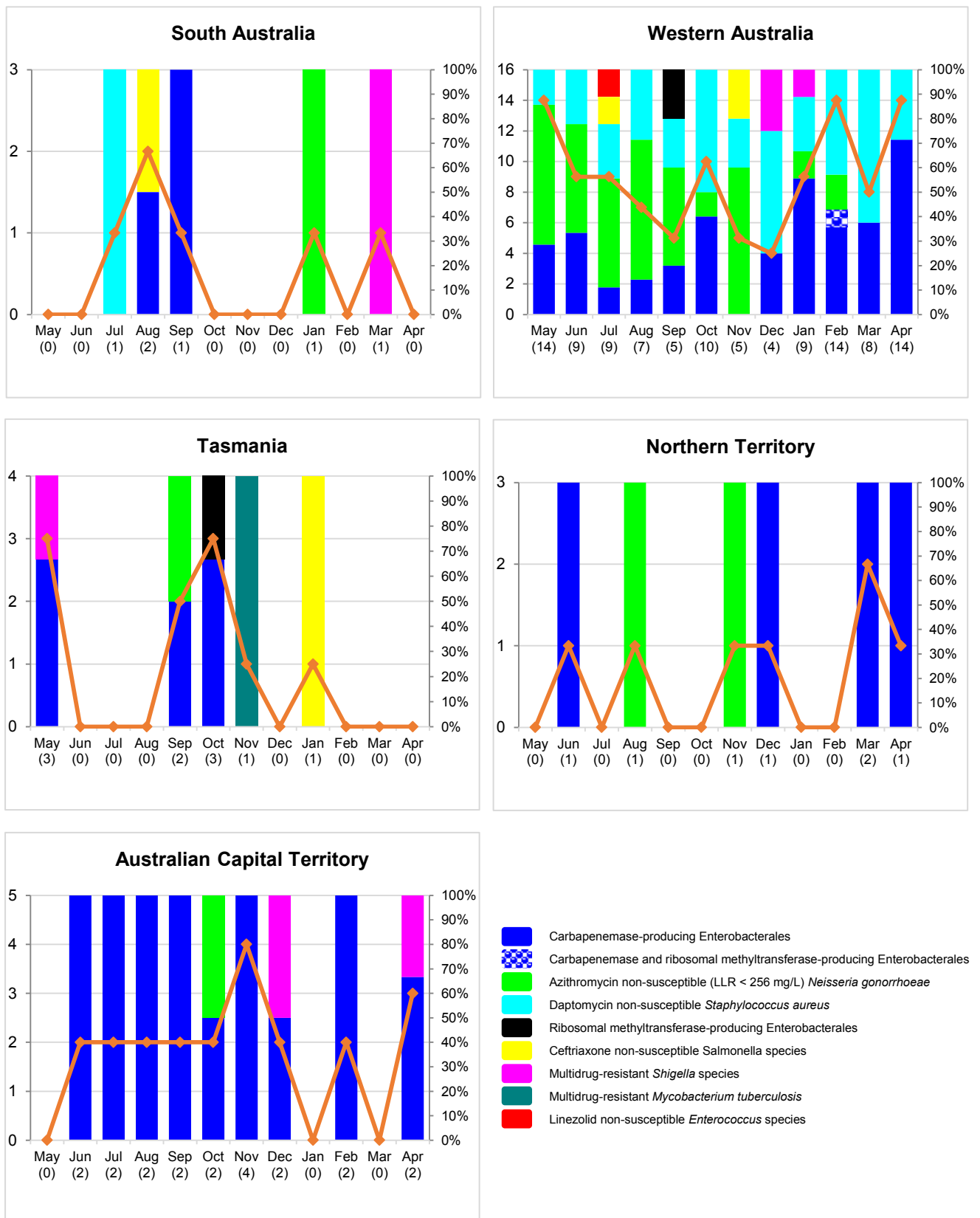
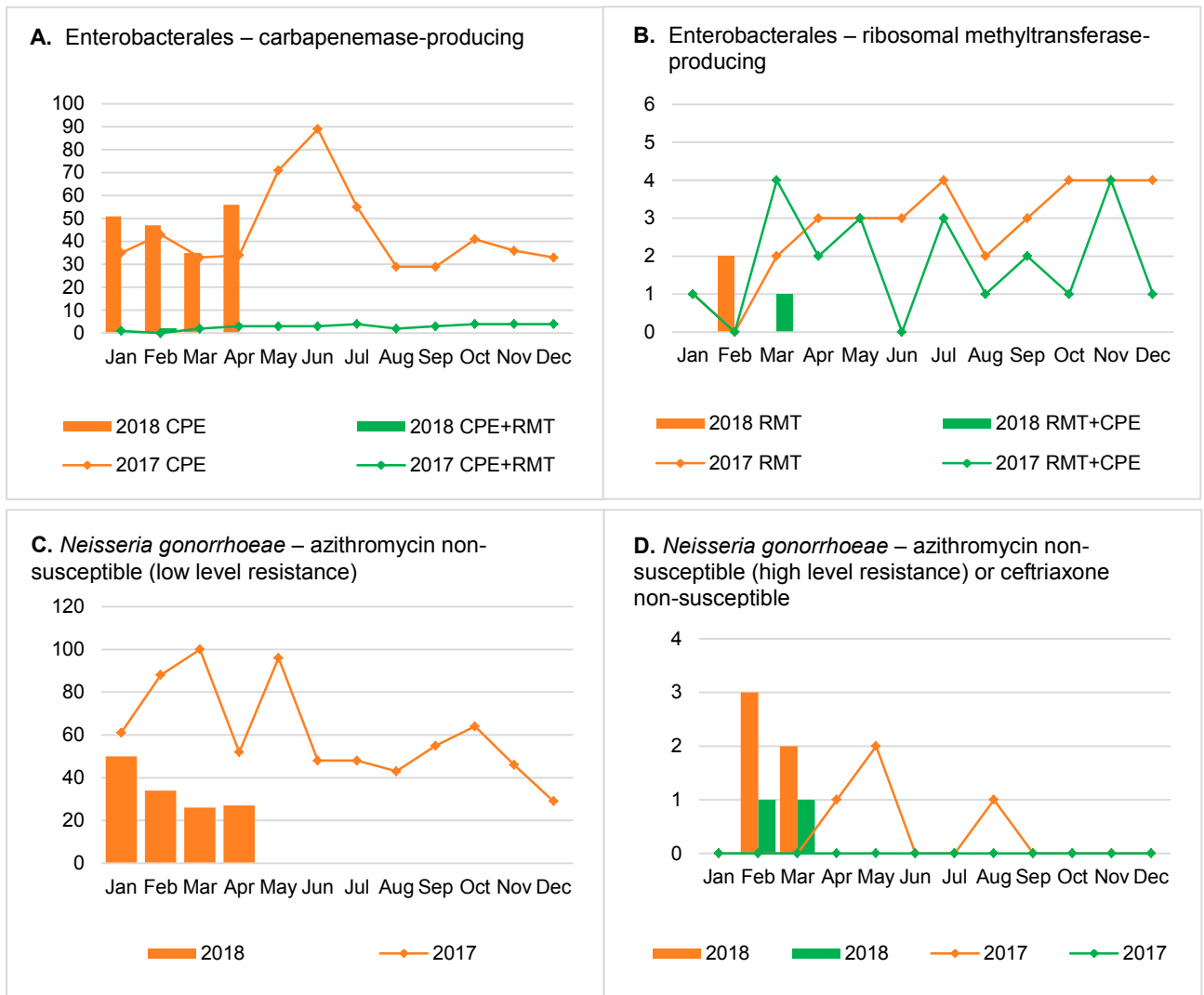


Figure 2: Critical antimicrobial resistances, number reported by species and month, year on year, 1 January 2017 to 30 April 2018

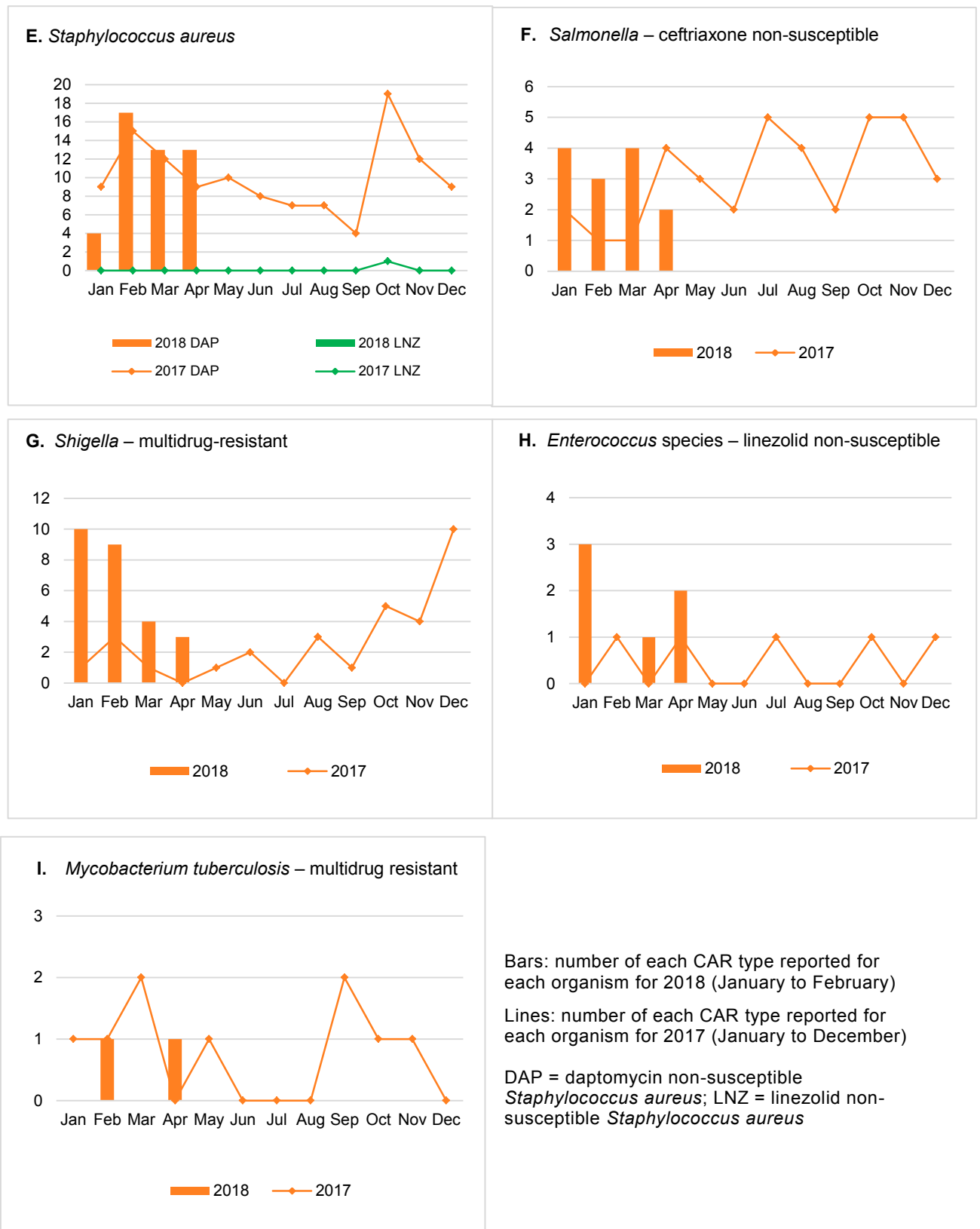


Bars: number of each CAR type reported for each organism for 2018 (January to February)

Lines: number of each CAR type reported for each organism for 2017 (January to December)

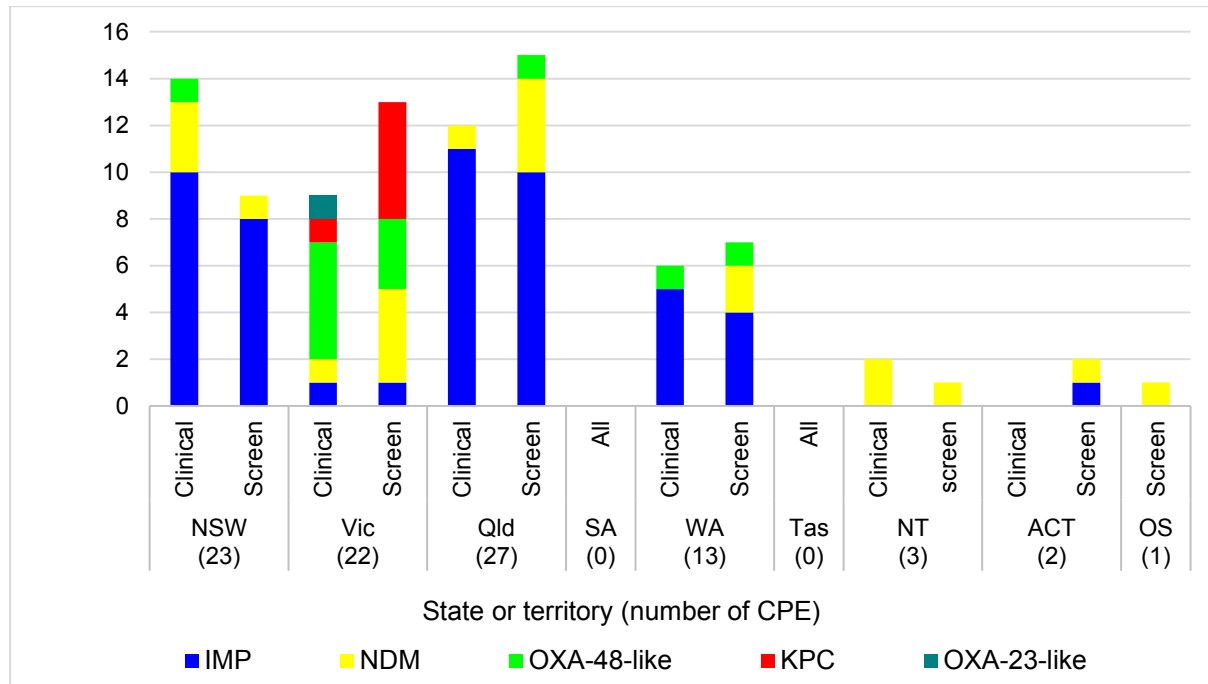
AZI (LLR) = azithromycin non-susceptible, low level resistance (LLR, MIC < 256 mg/L) *Neisseria gonorrhoeae*; AZI (HLR) = HLR = azithromycin non-susceptible, high level resistance (HLR, MIC > 256 mg/L) *Neisseria gonorrhoeae*; CPE = carbapenemase-producing Enterobacteriales; CPE+RMT = carbapenemase- 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 30 April 2018



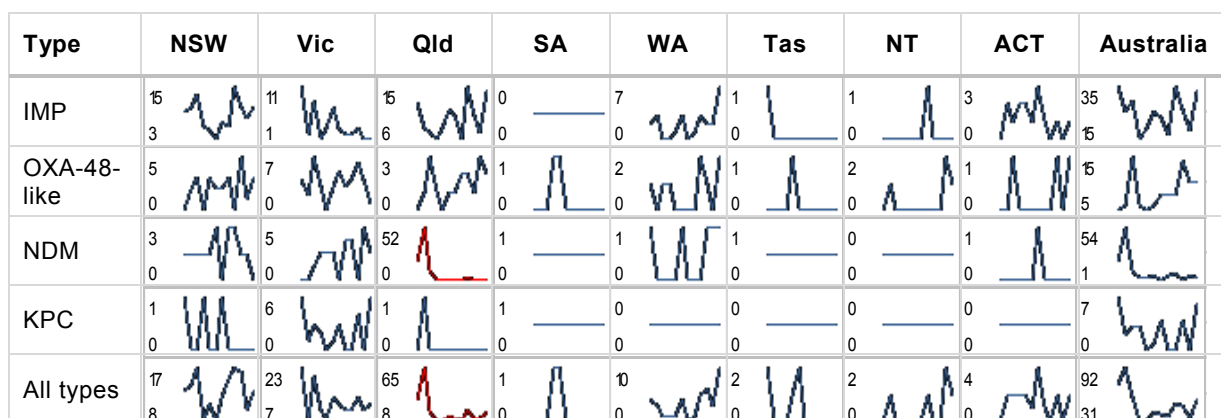
Carbapenemase-producing Enterobacteriales type, by state and territory

Figure 3: Carbapenemase-producing Enterobacteriales*, by carbapenemase type and specimen type, number reported by state and territory, 1 March 2018 to 30 April 2018



* Carbapenemase-producing Enterobacteriales (n = 91), carbapenemase- and ribosomal methyltransferase-producing Enterobacteriales (n = 0)

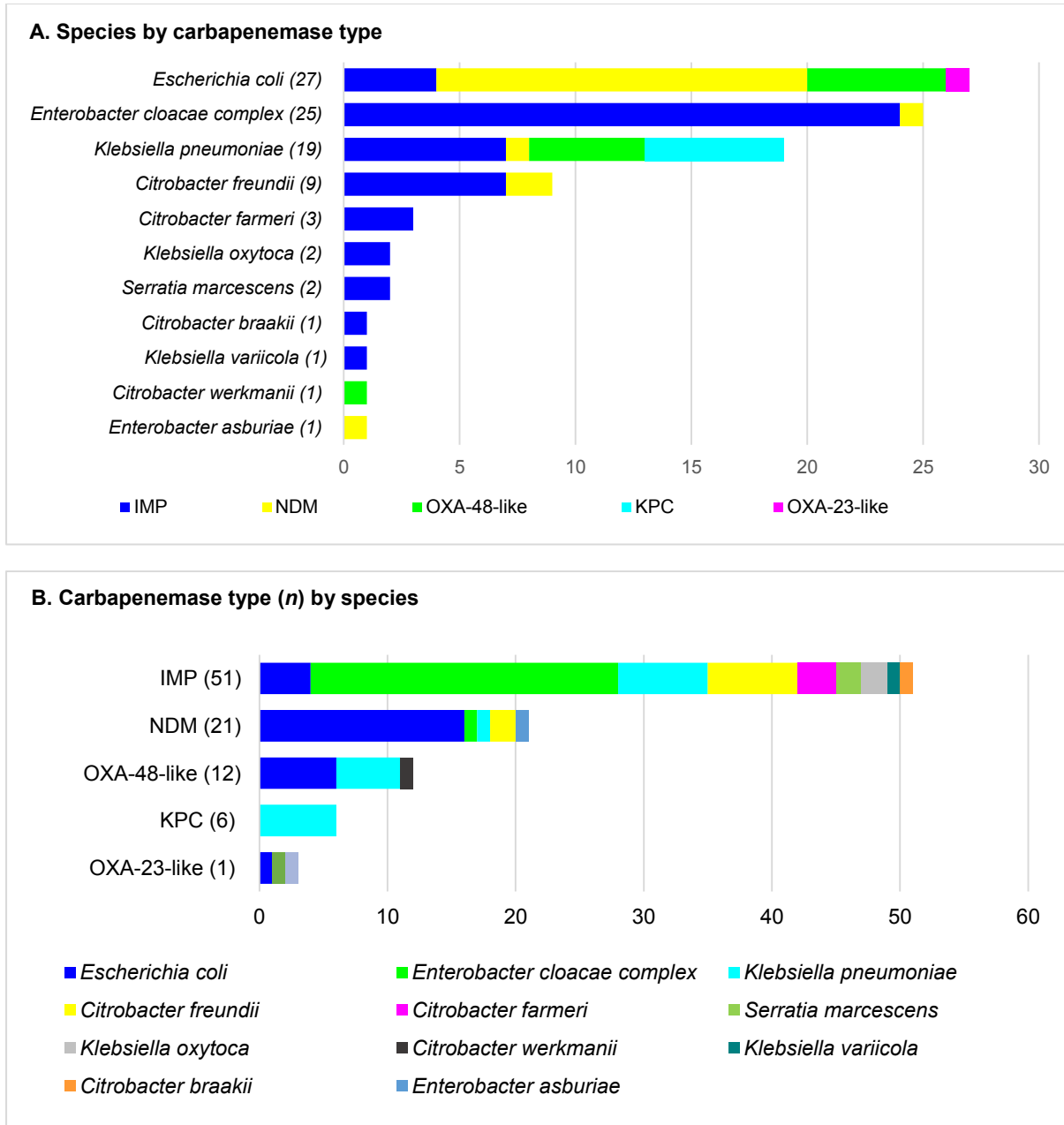
Figure 4: Trend data for the top four carbapenemase types, by state and territory and nationally, 1 May 2017 to 30 April 2018



Line graphs for the period 1 May 2017 to 30 April 2018, for each type

Carbapenemase-producing Enterobacteriales by species and carbapenemase type

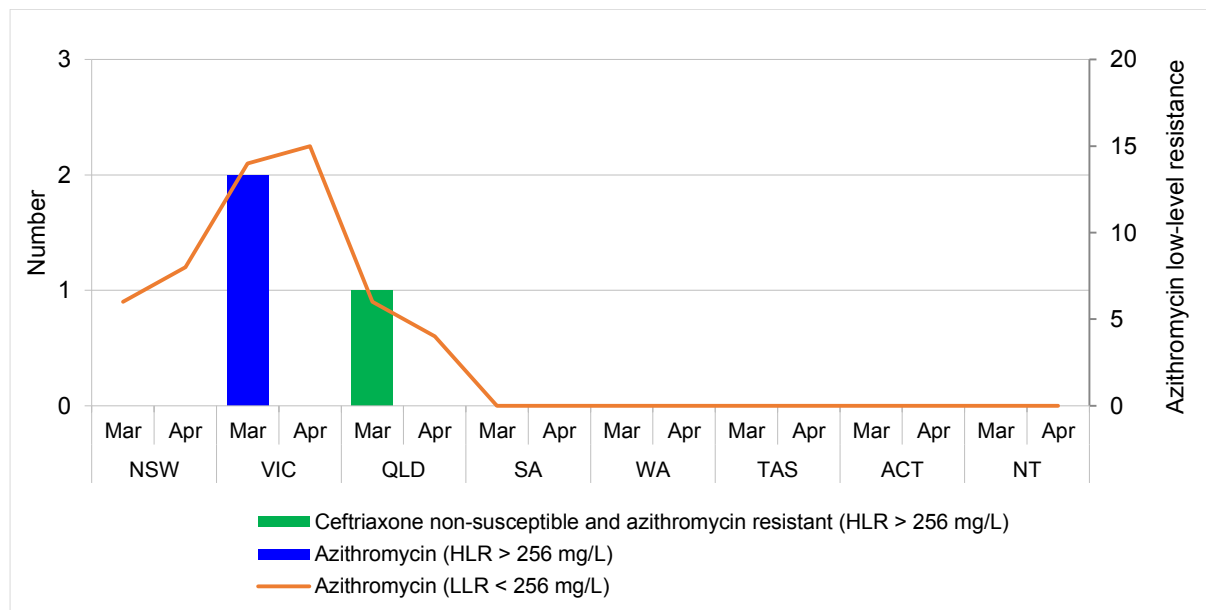
Figure 5: Carbapenemase-producing Enterobacteriales, number reported by (A) species and (B) carbapenemase type, 1 March 2018 to 30 April 2018



* Carbapenemase-producing Enterobacteriales (n = 100), carbapenemase- and ribosomal methyltransferase-producing Enterobacteriales (n = 2)

Neisseria gonorrhoeae by state and territory

Figure 6: *Neisseria gonorrhoeae*, number reported by state and territory, and month of collection*, 1 March 2018 to 30 April 2018



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

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