

AURA: A resource for public health professionals

The World Health Organization has described antimicrobial resistance (AMR) as one of the greatest threats to human and animal health, as well as food safety and agriculture.

It threatens the ability to provide safe healthcare in the future. AMR can develop through the use of antimicrobials or exposure to AMR organisms in the environment. Unlike other medications, antibiotics can affect not only your patient but other people and the wider community.

Antibiotic use inevitably leads to resistance, but overuse of antibiotics has accelerated this process. This factsheet describes components of the AURA Surveillance System relevant to public health professionals that monitor resistance and inform actions and response.

Resistance patterns in AURA 2019

The Third Australian report on antimicrobial use and resistance in human health (AURA 2019) gives the most current and comprehensive picture of AMR in Australia.

Large increases in critical antimicrobial resistances in foodborne organisms

- Multidrug-resistant *Shigella* in CARAlert doubled between 2017 and 2018
- Ceftriaxone-nonsusceptible *Salmonella* species increased by 34.2%.

Ciprofloxacin resistance is a concern in foodborne organisms

- 6.8% of *S. sonnei* and 9.5% of *S. flexneri* isolates were resistant to ciprofloxacin
- Any resistance to ciprofloxacin in Australia is of concern, given the capacity of this organism to cause outbreaks.

Resistance in infections typically associated with overseas travel

- Ciprofloxacin resistance in *Salmonella Typhi* and *Salmonella Paratyphi* exceeded 60%. Ciprofloxacin should no longer be relied on for empirical treatment
- 15% of multidrug-resistant *Mycobacterium tuberculosis* cases in CARAlert in 2017-2018 were from patients residing overseas.

Patterns of methicillin resistance continue to evolve in *Staphylococcus aureus*.

- Clones that were previously dominant are being replaced by other clones, requiring a renewed focus on infection prevention and control in community and acute settings.

What is the AURA Surveillance System and why is it important?

The [Antimicrobial Use and Resistance in Australia \(AURA\) Surveillance System](#) monitors and reports on Australia's antimicrobial usage and resistance patterns to inform clinical and public health policy and practice. The system complements existing local surveillance systems by providing data on priority organisms across Australia, including those with critical antimicrobial resistances (CARs).

Priority organisms include those predominantly found in healthcare settings, such as carbapenemase-producing Enterobacterales (CPE), and those that are generally found within the community setting, such as some of the national notifiable organisms. Common multidrug-resistant community organisms that AURA monitors include the foodborne organisms *Shigella* species and *Salmonella* species, and others such as *Mycobacterium tuberculosis* and *Neisseria gonorrhoeae*.

Public health professionals have an important role in containing AMR. This factsheet describes components of the AURA Surveillance System that support monitor communicable diseases and resistance, and inform actions and response.



Antibiotic resistance is increasing in *Neisseria gonorrhoeae*

- Azithromycin-nonsusceptible *N. gonorrhoeae* with high level resistance (MIC \geq 256 mg/L) doubled in CARAlert between 2017 and 2019
- There were six reports of ceftriaxone-nonsusceptible *N. gonorrhoeae* in 2018. None were reported in 2017.

Carbapenemase-producing Enterobacteriales (CPE)

- CPE epidemiology continues to evolve, including an increase in CPE of the NDM type, often acquired from overseas, reported from all states and territories
- Ten different CPE types were reported in CARAlert during 2017–2018.

Table 1. Number of critical antimicrobial resistances reported in the National Alert System for Critical Antimicrobial Resistances (CARAlert), by state and territory, 1 January 2017 to 31 December 2018

Species	Critical resistance	State or territory [#]								Total
		NSW	Vic	Qld	SA	WA	Tas	NT	ACT	
<i>Neisseria gonorrhoeae</i>	Azithromycin-nonsusceptible LLR	416	538	131	24	55	3	3	8	1178
	Azithromycin-nonsusceptible HLR	5	5	1	0	0	0	0	0	11
	Ceftriaxone-nonsusceptible	0	2	1	0	0	0	0	0	3
	Ceftriaxone-nonsusceptible + azithromycin HLR	0	0	2	0	0	0	0	0	2
	Ceftriaxone-nonsusceptible + azithromycin LLR	0	1	0	0	0	0	0	0	1
Enterobacteriales	Carbapenemase-producing	305	296	380	14	81	6	5	43	1130
<i>Shigella</i> species	Multidrug-resistant*	32	29	21	6	4	1	1	2	96
<i>Salmonella</i> species	Ceftriaxone-nonsusceptible	13	40	29	2	2	2	0	1	89
<i>Mycobacterium tuberculosis</i>	Multidrug-resistant [†]	17	3	12	3	1	2	0	1	39
	Total	483	618	197	35	62	8	4	12	9

HLR = high-level resistance MIC \geq 256 mg/L; LLR = low-level resistance MIC $<$ 256 mg/L; * Resistant to any three of ampicillin, ciprofloxacin, co-trimoxazole, or ceftriaxone/cefotaxime; † Resistant to at least rifampicin and isoniazid (with or without resistance to the other two first-line agents)

Source: CARAlert as at 31 January 2019. CARAlert was established by the Commission in 2016 and captures resistance data on a number of organisms with critical antimicrobial resistances that may not be commonly reported elsewhere. Local operating procedures for laboratories and state and territory reporting requirements may differ. Further information detailing the breakdown of reports to CARAlert in 2017 and in 2018 can be found in AURA 2019.

How the AURA Surveillance System supports public health policy and practice

- Information about resistance patterns and antimicrobial use that can inform individual treatment options and public health response is available through the range of [AURA](#) and [CARAlert](#) reports
- Consider the reports on antimicrobial use when assessing patterns of local or jurisdictional resistance
- Discuss new or emerging resistances in your jurisdiction with other states and territories to assess cross-border issues
- Contact your state or territory CARAlert officers for any queries about your reports. Local officers can access confirmed CARs directly through an online portal and receive real-time email notification of each confirmed CAR in their jurisdiction. It is also possible to liaise directly with the laboratories to access further epidemiological and microbiological information for patient follow up.

Further information

For more on the AURA Surveillance System please visit <https://www.safetyandquality.gov.au/AURA>

Contact AURA@safetyandquality.gov.au with enquiries