The National Alert System for Critical Antimicrobial Resistances (CARAlert)

J.M. Bell, J.D. Turnidge, and K.T. Meleady

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. CARs have been detected across Australia; they can result in significant morbidity and mortality in healthcare facilities, and in the community.

CARAlert was established by the Commission in March 2016 as part of the Antimicrobial Use and Resistance in Australia (AURA) Surveillance System. CARAlert collects surveillance data on priority organisms with critical resistance (Table 1). The roles of CARAlert at the national level include collecting and analysing data to identify trends and timely communication of information concerning critical resistances to states and territories, to complement current local reporting of results. It is intended that states and territories will use the data to identify local issues, and respond to potential and proven outbreaks of CARs.

METHODS

Originating laboratories undertake routine tests of an isolate to identify whether it is a potential CAR; if suspected as a CAR, the isolate is referred to a confirming laboratory. The confirming laboratory advises the originating laboratory of the test result for reporting back to the patient from whom the specimen was collected. These reports occur before the confirming laboratory enters the details of the resistance and organism into the CARAlert web portal. Alerts are reported to the Commission, and weekly to nominated state and territory health personnel, who also have direct access to results for their jurisdiction.

RESULTS

Between 17 March 2016 and December 2016, 652 CARs have been entered into the system by 22 confirming laboratories. Isolates were referred from 70 originating laboratories. All states and territories have had at least one CAR reported (Figure 1).

There was significant variation in the proportion of carbapenemase types seen by state and territory (Box 1).

Although six types (IMP, NDM, OXA-48-like, KPC, VIM, and SME) were reported, IMP (64%) and NDM (20%) types accounted for over 84% of all confirmed carbapenemases.

Ribosomal methylases were detected in 32 Enterobacteriaceae, representing seven different species; 63% (20/32) of which also had a carbapenemase.

There were significant numbers of Neisseria gonorrhoeae with low-level resistance (LLR) to azithromycin (MIC < 256 mg/L). Although the number of LLR strains has declined in a number of states and territories, both Western Australia and Victoria have seen significant increases in the last four months (Figure 3).

N. gonorrhoeae with high level resistance to azithromycin (MIC>256 mg/L) and ceftriaxone-resistant susceptibility were reported in low numbers.

Although daptomycin non-susceptible Staphylococcus aureus were reported in low numbers, only one vancomycin-intermediate; and no linezolid non-susceptible strains were confirmed.

Ceftriaxone non-susceptible Salmonella species, multidrug-resistant Shigella species and MDR Mycobacterium tuberculosis were reported in low numbers.

CONCLUSIONS

• CARAlert has improved the timely identification of CARs nationally. It will support a systematic and coordinated approach to the identification of CARs and appropriate responses.

• Over time, the data will increasingly be useful to inform safety and quality improvement programs. CARAlert will also provide valuable guidance, and assist in regular review of the list of CARs in Australia.