AUSTRALIAN COMMISSION ON SAFETY AND QUALITY IN HEALTH CARE

AURA 2021: A resource for medical practitioners

Antimicrobial resistance (AMR) is one of the greatest threats to human and animal health, as well as for food safety and agriculture. This has been recognised in *Australia's National Antimicrobial Resistance Strategy – 2020 and Beyond* and internationally, by the World Health Organization. AMR threatens the ability to provide safe healthcare now and 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 also other people and the wider community. Antibiotic use inevitably leads to resistance, but overuse of antibiotics has accelerated this process. The case study below demonstrates how a community-onset infection can become complicated by emerging AMR.

Case study

A 32 year old female presents with urinary frequency and dysuria. She has recently returned from Asia where she experienced a mild episode of gastroenteritis, and self-medicated with azithromycin from her travel pack. She has also been to India and Greece within the last 9 months. She is prescribed empiric cefalexin after her urine dipstick demonstrated nitrites and leukocytes.

Her mid-stream urine culture demonstrated an inflammatory urine and a multidrug-resistant *Escherichia coli*. No oral antimicrobials are reported as susceptible. After further microbiological testing and ongoing symptoms, she is admitted to a hospital-in-the-home service for intravenous (IV) ertapenem to treat her cystitis. She suffers an intravenous line soft tissue infection on day 3 of her IV therapy, with a boil at her IV insertion site.

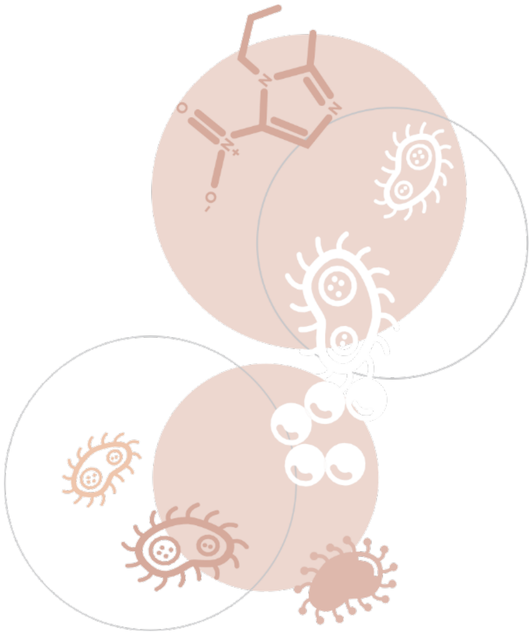
She was found to have a community-associated methicillin-resistant *Staphylococcus aureus* (MRSA) resistant to clindamycin (and ertapenem) on her wound swab.

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

Monitoring and reporting on Australia's antimicrobial usage and resistance patterns over time is important to inform clinical policy and practice. In Australia, this is coordinated through the Antimicrobial Use and Resistance in Australia (AURA) Surveillance System.

The AURA Team at the Commission works with stakeholders to inform action at the local, state and territory, and national levels to prevent and contain the spread of AMR. The *Fourth Australian report on antimicrobial use and resistance in human health* (AURA 2021) gives the most current and comprehensive picture of AMR in Australia.

This factsheet highlights some aspects of the AURA 2021 and the AURA Surveillance System relevant to medical practitioners, to support monitoring of resistance and inform actions and response.



AURA 2021 data relevant to the case study

AURA 2021 provides a wealth of information on AMR and antimicrobial use in 2019. This section provides a snapshot of these data.

Nitrofurantoin was the oral agent with the least resistance in urine samples with *E. coli*

In 2019, nitrofurantoin resistance was 1.1% in urine specimens with *E. coli*, compared to 8.7% for cefalexin and 11.4% for ciprofloxacin/norfloxacin. Whilst resistance to trimethoprim was 24%, it is still recommended in national guidelines as first line empirical therapy for acute cystitis, along with nitrofurantoin, because the risk of adverse outcomes from treatment failure is low. The Commission's AURA Team will continue to work with Therapeutic Guidelines Limited to provide resistance data to inform national guidelines.

Resistant gram-negative organisms such as *E. coli* are now commonplace in Australia

26.0% of *E. coli* bloodstream isolates had multiple acquired resistances. The extended-spectrum β-lactamase (ESBL) phenotype was present in 14.5% of bloodstream infections nationally in 2019 (AGAR Sepsis Outcome Programs 2019 Report).

Clindamycin resistance was higher than trimethoprim–sulfamethoxazole resistance in methicillin-susceptible and methicillin-resistant *S. aureus* (MRSA) isolates

In 2019, clindamycin resistance in MRSA isolates was 31.9%. Trimethoprim–sulfamethoxazole resistance was 9.3%. Clindamycin resistance in MRSA isolates from aged care homes was 33.5%.

Proportions of MRSA vary by state and territory and setting, and are highest in aged care homes and rural areas

26.3% of *S. aureus* isolates from aged care homes were methicillin-resistant. There was considerable regional variation in the distribution of resistance. For MRSA blood stream infections, the lowest proportion of resistance was reported from Tasmania (11.9%), and the highest proportion (56.3%) was reported from the Northern Territory (see AURA 2021 – Data Supplement).

Individual risk assessment for gram-negative resistance is a core element of clinical assessment

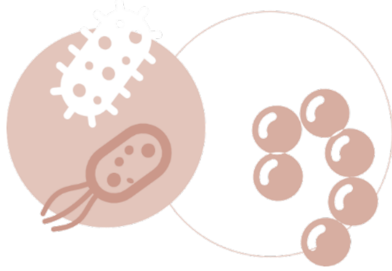
Multidrug resistance in gram-negative organisms that cause infections such as cystitis and septicaemia is now common. Hence, accurate risk assessments including travel history, recent antimicrobial exposure and personal past history of resistance, are essential before antimicrobial prescribing. Rates of AMR are higher in most Asian countries, compared to Australia.

Oral empiric clindamycin for suspected community-associated MRSA infections is now unreliable

Sulfamethoxazole–trimethoprim resistance was less common than clindamycin resistance in all *S. aureus* infections, particularly in MRSA isolates. When oral therapy is required (drainage alone is often sufficient for minor boils and carbuncles[1]), sulfamethoxazole–trimethoprim may be a more appropriate empirical choice than clindamycin, noting that severe adverse reactions, although uncommon, are more frequent with this combination agent. Treating with sulfamethoxazole–trimethoprim may result in a decreased need for an alternate script after culture results are returned, or risk of re-presentation for failure of therapy.

Rates of methicillin resistance in *S. aureus* in the community and aged care homes vary considerably, making accurate MRSA risk assessment more important

Empiric *S. aureus* treatment approaches may be different, dependent on where you work. Resistance varies geographically, from far north Australia to the eastern seaboard, and also by care setting. The risk of MRSA in a resident of an aged care home (26.3%) is quite different to a community patient in Tasmania (11.9%). You can find setting-specific data in Chapter 4 of AURA 2021.



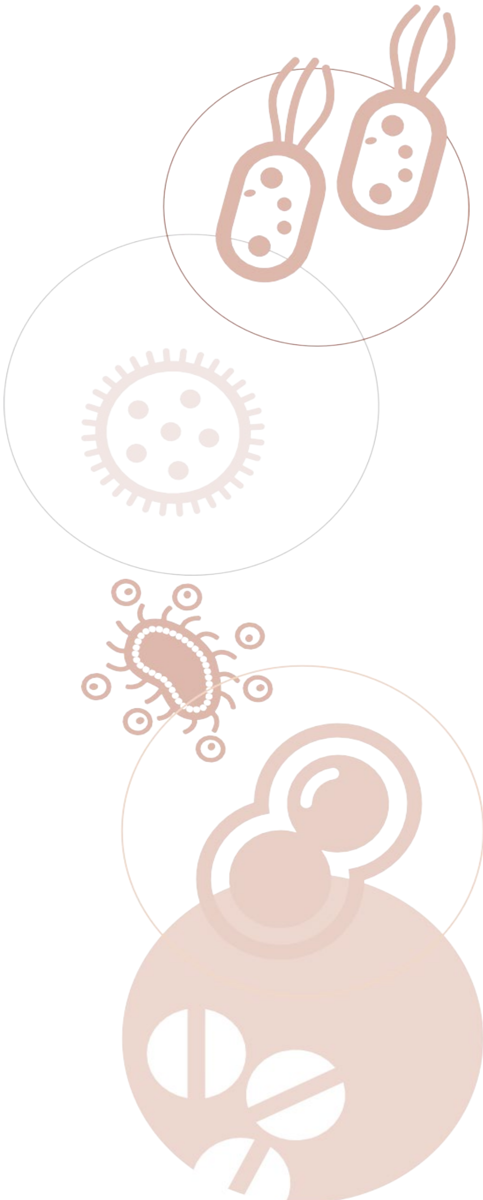
[1] Therapeutic Guidelines – Antibiotic - Boils and carbuncles - Published April 2019. © Therapeutic Guidelines Ltd (eTG March 2021 edition)

Quality improvement opportunities

All antimicrobial use can lead to increased resistance. Improving the appropriateness of antimicrobial prescriptions (necessity, duration, choice of agent) is important. Hospital-based antimicrobial stewardship teams or local microbiology laboratories will have data on your local MRSA-resistance profiles that can inform your practice.

Assess your antimicrobial prescribing in liaison with your antimicrobial stewardship team to improve practice.

Ensure your practice is informed by the *Therapeutic Guidelines: Antibiotic* as well as local guidelines, which are informed by local epidemiology and microbiological input. Provide clinical updates and support AMR risk assessment in different geographical areas and clinical situations in liaison with the local Primary Health Network, infectious diseases specialist and/or microbiologist.



Further information

AURA Surveillance System
https://www.safetyandquality.gov.au/AURA

Antimicrobial stewardship in primary care
https://www.safetyandquality.gov.au/our-work/antimicrobial-stewardship/antimicrobial-stewardship-primary-care

Contact **AURA@safetyandquality.gov.au** if you would like more information.