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Rising antibiotic resistance in *E. coli*, the commonest cause of bloodstream infection

The bacterium *Escherichia coli (E. coli)*, often thought of as a stomach bug, is in fact the most common bacterial cause of potentially dangerous bloodstream infections – and new data shows the germ responsible is becoming more resistant to the antibiotics doctors rely on to treat it.

A report published today by the Australian Commission on Safety and Quality in Health Care shows that *E. coli* heads the list of bacteria found to cause bloodstream infections, accounting for 4,106 of the 11,163 cases (36.8%) reported to a national surveillance system.

However, as with several other types of bacteria mentioned in the report, an increasing number of *E. coli* samples are proving less susceptible to the medicines used to control them. Nearly one in eight *E. coli* samples (12.7%) now have reduced susceptibility to the antibiotics ceftriaxone and ciprofloxacin.

In addition, the Australian Group on Antimicrobial Resistance Sepsis Outcomes Programs: 2016 report finds *E. coli* is also increasingly resistant to another group of ‘last resort’ antibiotics called fluoroquinolones – a key treatment for infections that do not respond to other antibiotics.

The report finds that the percentage of *E. coli* infections that started while the patient was in hospital, and which were found to be resistant to fluoroquinolones, has increased by half in just three years – from 13.7% of invasive *E. coli* cases reported to AGAR in 2013, to 20.2% in 2016.

The report suggests that the widespread and potentially excessive use in the community of other types of antibiotics, namely cephalosporins and penicillins, may be helping to drive this resistance to fluoroquinolones in *E. coli*. Resistance to fluoroquinolones is often linked to other resistance mechanisms seen in these more commonly used medicines.

The report also warns that if the resistance mechanisms involved in resistance to cephalosporins continues to spread, this may require changes to treatment guidelines for some severe infections.

About 75% of the episodes of bloodstream infection reported to have been caused by *Staphylococcus aureus* were found to originate in the community rather than in hospitals, and of these, 19% were antibiotic-resistant – indicating substantial bacterial resistance circulating in the community setting.

The report was prepared by AGAR, which is a key partner in the Commission’s Antimicrobial Use and Resistance in Australia (AURA) Surveillance System. AGAR conducts targeted surveillance of selected harmful organisms, as well as analyses of trends in resistance rates and other data.

While less common, accounting for 413 of the 11,163 bacterial bloodstream infections identified in the report, infections caused by *Enterococcus faecium* are also a cause for concern. Nearly one in three (27.1%) patients with this infection die within 30 days.

Almost half (46.5%) of the reported *E. faecium* bloodstream infections were found to be resistant to the antibiotic vancomycin, a rate the report says is ‘now much higher in Australia than in almost all European countries’. As a result, it says vancomycin ‘can no longer be
recommended as the mainstay of therapy with \textit{E. faecium} bacteraemia, and that agents with less certain efficacy are the alternative’.

Professor John Turnidge, Senior Medical Advisor for the Commission’s AURA Surveillance System, said the report was a clear warning that antibiotic resistance posed a growing threat and needed to be taken seriously by the public.

‘We are on the verge of losing a class of drugs, fluoroquinolones, that Australia has put a lot of effort into protecting over the past 25 years,’ Professor Turnidge said.

‘If these drugs lose their effectiveness, then many more people will end up being hospitalised, because only injectable drugs given intravenously will be effective.

‘The surveillance in this and other reports has identified that the very high use of antibiotics in the community is helping to driving this problem, and reducing the unnecessary use of antibiotics in the community is a national priority.’

Publication of the \textit{AGAR Sepsis Outcomes Programs: 2016 report} follows the recent release by the Commission of its latest six-monthly analyses of data from the CARAlert national alert system for critical antimicrobial resistances, which is another core component of the AURA Surveillance System.

This AGAR report will be available on the Commission’s website alongside the CARAlert report and other reports on antimicrobial resistance in Australia.

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**The AURA Surveillance System**

The Commission established the Antimicrobial Use and Resistance in Australia (AURA) Surveillance System to collect and analyse information and provide reports to inform policy and practice. The AURA National Coordination Unit (NCU) of the Commission works with a range of stakeholders to inform action at the local, state and territory, and national levels to prevent and contain the spread of antimicrobial resistance.

**The Australian Group on Antimicrobial Resistance (AGAR)**

The Australian Group on Antimicrobial Resistance (AGAR) is a component of the Australian Society for Antimicrobials. The Commission funds AGAR to conduct targeted surveillance of selected pathogens; collect demographic, treatment and outcome data, and data on antimicrobial resistance rates; and analyse and report on these data. AGAR operates three sepsis outcomes programs: the Gram-negative Sepsis Outcomes Program, the Australian Enterococcal Sepsis Outcomes Program, and the Australian Staphylococcus Outcomes Program. The \textit{AGAR Sepsis Outcomes Programs: 2016 report} discussed in this media release includes analysis of the key findings of the three AGAR sepsis outcomes programs, and was commissioned by the AURA National Coordinating Unit of the Australian Commission on Safety and Quality in Health Care. Detailed AGAR sepsis outcomes program annual reports are available on the AGAR website.