



# Antibiotic sensitivities of common pathogens

Isolated from community onset infections | Update 2018

In 2017, Douglass Hanly Moir Pathology identified more than 65,000 *E. coli* isolates from urine samples collected from people in the community in NSW (not including nursing homes). Thirty thousand *Staph aureus* isolates were grown from non-urine specimens. We have analysed the antibiotic sensitivities of these and other common organisms, in order to provide a guide to appropriate empiric antibiotic treatment choice.

## Urinary tract pathogens

The most common organism isolated from non-hospital urine specimens is *E. coli*. In our laboratory, only 56% are sensitive to amoxicillin, which is why it is no longer recommended for empiric treatment. Seventy-seven per cent of *E. coli* are sensitive to trimethoprim, and 93–94% are sensitive to cephalexin, nitrofurantoin (e.g. Macrochantin) and to amoxicillin plus clavulanate (e.g. Augmentin).

Other Gram-negative organisms, such as *Klebsiella*, *Serratia* and *Enterobacter*, are much less frequently isolated, and some species are intrinsically resistant to more antibiotics. Of note, *Pseudomonas* is intrinsically resistant to most oral antibiotics, except for norfloxacin and ciprofloxacin.

We increasingly isolate ESBL (extended spectrum beta-lactamase) producing strains, particularly in those who have travelled overseas and carry the organism asymptotically in their bowel for some time. These strains are resistant to all penicillin-related antibiotics and cephalosporins. If multiresistant, an antibiotic called fosfomycin can be tested on request; however prescribing this antibiotic requires SAS approval.

Ten to fifteen per cent of urine isolates are *Enterococcus* spp., which are usually sensitive to amoxicillin, nitrofurantoin and intravenous vancomycin. *Enterococcus* is intrinsically resistant to cephalosporins and trimethoprim. Occasionally, vancomycin-resistant *Enterococcus* (VRE) is isolated, particularly from nursing home residents. This does not require treatment in asymptomatic colonised patients but indicates the need for infection control precautions in an institution, as it is highly transmissible.



### Oral antibiotic sensitivity testing

Figure 1a. *Pseudomonas* only sensitive to norfloxacin (NOR)

Figure 1b. *E. Coli* resistant to ampicillin (AMP) and to trimethoprim (W)

URINARY TRACT PATHOGENS (% sensitive)						R = Always Resistant	
ORGANISM	Amoxycillin	Trimethoprim	Cephalexin	Amox/Clavulanate	Norfloxacin	Nitrofurantoin	
<i>E. coli</i>	56	77	93	94	94	94	
<i>Klebsiella</i>	R	89	95	96	97	28	
<i>Proteus</i>	87	81	98	99	98	-	
<i>Enterococcus</i>	98	R	R	98	R	99	

Amoxicillin and ampicillin have equivalent antimicrobial susceptibilities. Amoxicillin is reported because it is available for both oral and parenteral use. Ampicillin is only available for parenteral administration.

# Antibiotic sensitivities of common pathogens

Isolated from community onset infections | Update 2018

## Respiratory tract pathogens

*Streptococcus pneumoniae* is the commonest bacterial pathogen. Decreased sensitivity to penicillin may occur but this is not usually clinically significant in respiratory infections.

*Haemophilus influenzae* only causes 5% of community-acquired pneumonia, more commonly in COPD patients. Twenty-eight per cent are resistant to amoxicillin, but most remain sensitive to Augmentin. Ninety-eight per cent are sensitive to doxycycline. This organism is resistant to erythromycin, and other macrolides, such as clarithromycin and azithromycin, may be associated with treatment failure so are not recommended.

*Mycoplasma pneumoniae* has become increasingly resistant to macrolides (this cannot be tested for individual patients), so erythromycin/roxithromycin/clarithromycin are no longer recommended for treatment of community-acquired pneumonia, except in children and pregnant women – doxycycline is more appropriate.



### RESPIRATORY TRACT PATHOGENS (% sensitive)

ORGANISM		Amox/Clavulanate	Doxycycline	Eryth/Clarithromycin
<i>S. pneumoniae</i>	Penicillin 99	99	83	79
<i>H. influenzae</i>	Amoxil 72	91	98	-

## Soft tissue pathogens

*Staphylococcus aureus* is the commonest cause of wound infections. Only 5% are penicillin sensitive, while 89% remain sensitive to flucloxacillin/cephalexin. In our laboratory, 11% of *S. aureus* isolates from the community are MRSA (resistant to flucloxacillin/cephalexin). In comparison, 47% of *S. aureus* isolates recovered from nursing home residents are MRSA. MRSA is increasingly being recovered from patients who have never been hospitalised, as well as from those with past hospital

contact. Approximately one third of these MRSA are resistant to clindamycin but most remain sensitive to cotrimoxazole (e.g. Bactrim or Septrin), which is available as a syrup for treatment of children. Most of these MRSA are also susceptible to doxycycline.

Group A (*Streptococcus pyogenes*) and Group B (*Streptococcus*), which also causes cellulitis, both remain sensitive to penicillin. Thirteen per cent are resistant to erythromycin, and 21% are resistant to doxycycline.

### SOFT TISSUE PATHOGENS (% sensitive)

ORGANISM	Penicillin	Erythromycin/clindamycin	Doxycycline	Cotrimoxazole
<i>S. aureus</i>	5	80	95	97
Strep A/B/C/G	100	87	79	-

This article is written by Dr Miriam Paul (Microbiologist & Infectious Diseases Physician).  
For further information, or to discuss a patient, please contact one of our Microbiologists on (02) 9855 5312.