Cumulative Antibiograms: Non-urinary Isolate Commentary

Recent non-urinary isolate antimicrobial resistance trends

Gram negative gentamicin susceptibility remains high (93-96% susceptible) across all sites. This agent remains the best empirical Gram negative agent for severe sepsis patients who have no contraindications[a].

Gram negative quinolone (ciprofloxacin) susceptibility is declining slowly (87-94% susceptible). It is important to conserve this agent as much as possible by avoiding its use when the isolate tests susceptible to a first line agent.

Gram negative ceftriaxone resistance detects the presence of an extended betalactamase (ESBL) - producing organism. The incidence of ESBL from initial isolates remained low at all sites (91-96% susceptible; Mid North-Coast at 89%).

Incidence of methicillin resistance for *Staphylococcus aureus* (i.e. MRSA) varied from 16-21% across the sites. High susceptibility levels are retained for doxycycline, sulphamethoxazole+trimethoprim, rifampicin and fusidic acid across all *S. aureus* strains, including MRSA. For individual cases, always check the actual susceptibility result if oral therapy is planned. Clindamycin susceptibility (usually tested as erythromycin) for MRSA was lower than for other agents (63-86%).

The proportion of **community acquired *Staphylococcus aureus* bloodstream (SAB) infections** that were due to MRSA was 8.9% (varying from 7.1% (Hunter Sector) to 15.4% (Tablelands Sector). For **healthcare associated SAB,** 13.5% of 74 events across Hunter New England Health were due to MRSA. A separate SAB report will be available on the HNE Intranet. SAB data from Mid North Coast and Northern NSW are also available via Infection Control.

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[a] **Aminoglycosides should *NOT* be used in patients with:**

- a history of vestibular or auditory toxicity caused by an aminoglycoside
- a history of serious hypersensitivity reaction to an aminoglycoside (rare)
- myasthenia gravis.

Unless the infection is life-threatening, aminoglycosides should generally be avoided in patients with:

- pre-existing significant auditory impairment (hearing loss or tinnitus)
- pre-existing vestibular condition (dizziness, vertigo or balance problems)
- a family history (first-degree relative) of auditory toxicity caused by an aminoglycoside
- chronic renal impairment (creatinine clearance less than 40 mL/min) or rapidly deteriorating renal function
- advanced age (e.g. 80 years or older), depending on calculated renal function.

Treatment recommendations and commentary

Infectious Syndrome	Therapeutic Guidelines (TG) empiric recommendations	Comments relating to the local cumulative antibiogram
Severe sepsis, undiagnosed focus	1. Flucloxacillin PLUS gentamicin[b] PLUS vancomycin[c] until blood culture results are finalised. OR (if non-immediate hypersensitivity to penicillin) 2. Cefazolin PLUS gentamicin PLUS vancomycin	**In the absence of microbiology results, empirical therapy should always ADD in IV vancomycin.** ***N.B.*** *HNELHD Staphylococcus aureus bloodstream infection management guideline for essential care elements.* For current CEC Severe Sepsis first dose antibiotic recommendations, search for 'Sepsis' on the HNE PPG or go to this AIMED link. The HNE Health District Quality Use of Medicines mobile device enabled site also includes sepsis regimens.
Skin / soft tissue infection	1. Di/flucloxacillin OR (if non-immediate hypersensitivity to penicillin) 2. Cephalexin OR sulphamethoxazole+trimethoprim For severe disease consider addition of vancomycin for MRSA coverage, while culture results awaited.	**Incision and drainage of an uncomplicated < 5 cm boil without cellulitis is sufficient treatment[d].** Culture for MRSA is advised from open skin infections when relevant. For advice on management of recurrent staphylococcal skin infection, refer to the HNE HealthPathways resource or this AIMED link. **NB.** Non-severe skin infections due to MRSA require an alternative antibiotic - doxycycline or trimethoprim+sulphamethoxazole are usually appropriate. Combination oral therapy with rifampicin is often used for significant MRSA bone or joint infection. Such treatments should be only prescribed if recommended by Infectious Diseases. Rifampicin monotherapy must be always be avoided as resistance emerges quickly.

[b] For empiric dosage recommendations for aminoglycosides - see Therapeutic Guidelines: Antibiotic, Edition 15, 2014.

[c] For empiric dosage recommendations for vancomycin- see Therapeutic Guidelines: Antibiotic, Edition 15, 2014. A loading dose is advisable.

[d] Nathwani et al. Guidelines for UK practice for the diagnosis and management of methicillin-resistant *Staphylococcus aureus* (MRSA) infections presenting in the community. J Antimic Chemo (2008) 61, 976–994, recommendation 9A.

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Infectious Syndrome	Therapeutic Guidelines (TG) empiric recommendations	Comments relating to the local cumulative antibiogram
Intra-abdominal infections **(e.g. secondary peritonitis from ruptured viscus)**	1. Ampicillin PLUS gentamicin PLUS metronidazole OR 2. Piperacillin+tazobactam OR (if non-immediate hypersensitivity to penicillin), 3. Ceftriaxone (2g daily) PLUS metronidazole	Early surgical management to attain source control is paramount and underpins short-course antibiotic therapy[e]. A majority of enterococci are susceptible to ampicillin; all are resistant to ceftriaxone. However enterococci are seldom primary pathogens in this site and may not require treatment. Susceptibility of Gram negatives to piperacillin+tazobactam was high. This agent is also active against *Enterococcus faecalis*. IV amoxicillin+clavulanate is now available and has a role in certain intra-abdominal infections – see this guideline – via the HNE PPG or via AIMED.
Community-acquired pneumonia (mild-usually outpatient managed cases)	1. Amoxicillin OR (if non-immediate hypersensitivity to penicillin or suspected atypical cause), 2. Doxycycline	**HNELHD Adult Community Acquired Pneumonia Guidelines** via the HNE PPG or via AIMED. ***Always assess severity –use the CORB score system below.*** ***Streptococcus pneumoniae* isolates retain excellent susceptibility to penicillin** . Whilst susceptibility to second-line agents such as azithromycin (see erythromycin result-76-94%) and doxycycline (76-91%) was reasonable, isolates of *Streptococcus pneumoniae* and other species that are non-susceptible to these agents have high level resistance- select an alternative agent. 99-100% of *H. influenzae* were susceptible to doxycycline which is a first line treatment in acute exacerbations of COPD. Gentamicin also provides adequate empirical cover for *Haemophilus influenzae* although testing is not done routinely. ***Severe pneumonia- ensure that appropriate microbiology is collected PRIOR to antibiotics,*** including blood cultures (2 sets), testing for legionella (urinary antigen and PCR of sputum), respiratory viruses (PCR assay – nose and throat specimen) and serum for *Mycoplasma pneumoniae* IgM. Current CEC Severe Sepsis first dose antibiotic include recommendations for children with severe pneumonia. Search for 'Sepsis' on the HNE PPG or go to this AIMED link.
Community-acquired pneumonia (moderate)	1. Benzylpenicillin PLUS Doxycycline OR (if non-immediate hypersensitivity to penicillin), 2. Ceftriaxone PLUS Doxycycline	
Community-acquired pneumonia (severe as shown by presence of >= two CORB[f] criteria)	1. Benzylpenicillin PLUS Gentamicin PLUS Azithromycin OR (if non-immediate hypersensitivity to penicillin), 2. Ceftriaxone PLUS Azithromycin	

[e] See this randomised trial: Sawyer et al. Trial of Short-Course Antimicrobial Therapy for Intraabdominal Infection. N Engl J Med 2015; 372:1996-2005.

[f] **CORB**- recommended pneumonia severity classification: 4 criteria: **C**onfusion (acute), **O**xygen saturation 90% or less, **R**espiratory rate > 30 breaths per minute, **B**lood pressure < 90 mm Hg (systolic) or < 60 mm Hg (diastolic)