THE PATHCARE NEWS

ANTIMICROBIAL SURVEILLANCE DATA FOR COMMON PATHOGENS FROM THE EASTERN CAPE, 2023

Surveillance is an important tool to guide empiric therapy. Here we present the PathCare susceptibility data for the Eastern Cape for common community pathogens isolated from clinical specimens in 2023. As this data reflects the susceptibility of all isolates, including those from hospitalised patients, resistance rates in community-acquired infections may be lower than stated.

Respiratory pathogens

Streptococcus pneumoniae

Antibiotic	% Susceptible
Penicillin (MIC* ≤ 2µg/ml)	99
Ceftriaxone/cefotaxime	99
Ceftaroline	100
Erythromycin	40
Clindamycin	59
Moxifloxacin	100

*Minimum inhibitory concentration

S. pneumoniae causing respiratory tract infections maintains high susceptibility rates to penicillin and to moxifloxacin (close to 100%), but susceptibility rates to erythromycin (40%) and to clindamycin (59%) are low. Most erythromycin-resistant pneumococci will also be resistant to other macrolides such as azithromycin/clarithromycin.

Haemophilus influenzae

Antibiotic	% Susceptible
Amoxicillin/ampicillin	77
Amoxicillin-clavulanate (co-amoxiclav)	94
Cefuroxime	94
Ceftriaxone/cefotaxime	99
Ceftaroline	99
Azithromycin/clarithromycin	88
Cotrimoxazole	41
Tetracycline	96
Moxifloxacin	98

H. influenzae retains moderate susceptibility rates for amoxicillin (77%) and azithromycin/clarithromycin (88%). Susceptibility rates to co-amoxiclav, cephalosporins, doxycycline and respiratory fluoroquinolones such as moxifloxacin/levofloxacin are high (>90%). Susceptibility rates to cotrimoxazole are low.

Note that most *H. influenzae* respiratory isolates are non-typable strains as opposed to *H. influenzae* type b, which traditionally was responsible for most invasive infections prior to the introduction of Hib conjugate vaccine. Non-typable strains are part of the normal respiratory flora and most act as secondary invaders infecting respiratory mucosal surfaces already damaged by preceding viral infection.

There have not been significant changes in susceptibility profiles of these major community respiratory pathogens over past 4-5 years, and data from the Eastern Cape are similar to those from Western Cape.[1,2]

Treatment recommendations

High dose amoxicillin (1g 8h or 2g SR 12h or 90mg/kg/day divided twice daily) remains the first line antibiotic of choice for treating children and adults with mild to moderate upper and lower respiratory tract infections. Formulations of oral co-amoxiclav containing a higher dose of the amoxicillin component will also be effective if broader cover is needed, but do have more side-effects, including a direct diarrheagenic effect in up to 25% of patients, disruption of normal anaerobic organisms in the gut and other sites and predisposition to fungal overgrowth and *Clostridiodes difficile* (C. diff) disease. Oral cephalosporins do not usually attain sufficiently high concentrations in the middle ear and therefore high dose amoxicillin/co-amoxiclav is preferred for treatment of otitis media.

Respiratory fluoroquinolones are NOT recommended as first line therapy because of possible serious side-effects that generally outweigh the benefits in patient with less severe respiratory infections (FDA Drug Safety Communication 2016), but may be considered in patients with severe beta-lactam allergies.

Macrolide monotherapy is NOT recommended as empiric therapy for patients with severe respiratory infections because of the high levels of resistance.

These recommendations are in keeping with the current South African community-acquired pneumonia guidelines for adults [3] and children [4] as well as Standard Treatment Guidelines and Essential Medicines List guidelines [5 6] for the treatment of community-acquired pneumonia, acute otitis media and sinusitis.

Table 1 Empiric choice of antibiotics for CAP

Setting	Route	<65 years old, no antibiotics within 90 days and no comorbidities	≥65 years, antibiotics with 90 days or comorbidity*	Alternative
Outpatient	PO	Amoxicillin	Amoxicillin-clavulanate or a second generation cephalosporin	Moxifloxacin or levofloxacin
Inpatients (non-severe)	PO/IV	Ampicillin	Amoxicillin-clavulanate or cefuroxime or a third generation cephalosporin	Moxifloxacin or levofloxacin
Inpatients (severe/ICU)	IV	Amoxicillin-clavulanate or cefuroxime or a third generation cephalosporin plus a macrolide/azalide	Amoxicillin-clavulanate or cefuroxime or a third generation cephalosporin plus a macrolide/azalide	Moxifloxacin or levofloxacin plus amoxicillin-clavulanate or cefuroxime or a third generation cephalosporin

*, cardiovascular disease, chronic respiratory disease, chronic renal failure, diabetes mellitus, HIV infection. CAP, community-acquired pneumonia.

Extract from South African guideline for the management of community-acquired pneumonia in adults (2017) [3]

Staphylococcus aureus

The susceptibility rate of *S. aureus* to cloxacillin is high at 95% while other oral agents, such as clindamycin, erythromycin, cotrimoxazole and tetracycline, have lower susceptibility rates.

Cloxacillin or oral flucloxacillin therefore remain the antibiotics of choice for treatment of *S. aureus*. Empiric treatment for cloxacillin-resistant *S. aureus* or MRSA is rarely required outside of certain high risk hospitalised patients, e.g. patients on long-term renal dialysis, patients with prosthetic material in situ post orthopaedic procedures. Other oral agents are sometimes recommended as directed therapy (based on susceptibility results) for continuation treatment of severe infections.

The main reasons for lack of response to cloxacillin treatment of *S. aureus* infections are failure of source control e.g. abscess not drained or inadequate levels of antibiotic at site of infection rather than development of antibiotic resistance. Recurrent infections in patients in the community can also be due to persistent nasal carriage and re-infection.

Antibiotic	% Susceptible
Cloxacillin	95
Erythromycin	72
Clindamycin	80
Cotrimoxazole	76
Tetracycline	87
Moxifloxacin	95
Rifampicin*	99
Vancomycin	100
Teicoplanin	100
Linezolid	100
Daptomycin	100

*Only used in combination with another active antibiotic

Diarrhoeal pathogens

Antibiotic	% susceptible		
	Shigella spp	*Salmonella spp*	*Campylobacter spp*
Amoxycillin/ ampicillin	90	90	
Cotrimoxazole	36	96	
Ciprofloxacin	100	80	54
Ceftriaxone	100	99	
Azithromycin/ Erythromycin	100*		98
Tetracycline			50

*Of subset tested

In the Eastern Cape *Salmonella* species were the most common gastro-intestinal pathogens isolated, followed by *Campylobacter* species, in contrast to the Western Cape [1] where the order of frequency was reversed. *Shigella* species are much less frequently isolated in both provinces.

It should be noted that the majority of cases of gastro-enteritis due to these bacterial pathogens will be self-limiting and do NOT require antimicrobial therapy.

Ciprofloxacin is frequently prescribed as a first line antibiotic for gastro-enteritis. However, ciprofloxacin susceptibility rates have declined in the past few years among Salmonella (currently 80% susceptible) and *Campylobacter* species (currently 54% susceptible). Declining susceptibility rates in *Campylobacter* species have also been noted in the Western Cape.[1] In light of this it may be advisable to withhold empiric antimicrobials and rather use directed therapy only for those patients whose prolonged symptoms justify treatment. Ceftriaxone can be used for severely ill patients requiring hospitalisation.

Urinary pathogens

E. coli

E. coli is the most common urinary tract pathogen, especially in uncomplicated and community-acquired infections. Therefore, the local antimicrobial susceptibility pattern for *E. coli* should inform empiric antibiotic selection for uncomplicated urinary tract infection (UTI). Here we present data for *E. coli* urinary tract isolates divided into those submitted from general practitioners (GP) and those from non-GP practices, such as hospitals and emergency units. This division attempts the best approximation between community and hospital acquired infections, whilst recognising that some cross-over occurs, e.g. a GP may see a patient who was recently discharged from hospital now manifesting with a hospital acquired UTI. Susceptibility rates are consistently lower among non-GP providers.

Resistance rates to amoxicillin and cotrimoxazole have been high for some years and these agents are not recommended for empiric treatment. Fluoroquinolones such as ciprofloxacin and levofloxacin have in the past been used as first line options for UTIs, but approximately 30% of *E. coli* are now resistant. Fosfomycin and nitrofurantoin retain high susceptibility rates and are recommended for therapy of lower urinary tract infections. Although not routinely tested gentamicin likely retains high susceptibility rates, and is recommended as a first line agent for pyelonephritis in patients who have no contra-indications to aminoglycosides. Alternative first line agents such as co-amoxiclav or cefuroxime can be used, although beta-lactams in general are less effective for UTIs and require a longer duration of treatment (5-7 days for cystitis) compared to other agents.

In the Western Cape the percentage of ESBL- producing *E. coli* has increased over the last 10 years from 5% in 2012 to 15% in 2023. In the Eastern Cape ESBL rates in GP patients and non-GP patients were 12% and 20% respectively in 2023. No urinary E. coli were carbapenem resistant in 2023. However, UTI due to CRE producing *Klebsiella pneumoniae* (and other Enterobacterales) is a growing problem for patients recently hospitalised.

Antibiotic	% susceptible	
	Submitted from GP practice	Submitted from hospital practice
Ampicillin	33	28
Co-amoxiclav	81	75
Cefuroxime	86	79
Ceftriaxone	88	80
Ertapenem	100	100
Levofloxacin	72	66
Ciprofloxacin	71	65
Cotrimoxazole	53	44
Fosfomycin	98	97
Nitrofurantoin	98	97
ESBL production	12%	20%
CPE production	0%	0%

References

1. PathCare Laboratory Update May 2019. Antimicrobial surveillance data for common community-acquired organisms: March 2018 – February 2019.
2. PathCare Laboratory Update March 2024. Western Cape Province Antimicrobial surveillance data for organisms commonly associated with community-acquired infections: 01 November 2022- 31 December 2023.
3. South African guideline for the management of community-acquired pneumonia in adults. J Thorac Dis 2017;9(6):469-1502
4. Diagnosis and management of community-acquired pneumonia in children: South African Thoracic Society guidelines. Afr J Thorac Crit Care Med. 2020 Oct 13;26(3):10.7196/AJTCCM. 2020.v26i3.104.
5. Standard Treatment Guidelines and Essential Medicines List Hospital level (Adults).5th ed. Republic of South Africa: National Department of Health; 2019.
6. Standard Treatment Guidelines and Essential Medicines List for South Africa: Paediatric Hospital Level. 5th ed. Republic of South Africa: National Department of Health; 2023.

Compiled by Dr Colleen Bamford, PathCare Microbiologist