THE PATHCARE NEWS

WESTERN CAPE PROVINCE ANTIMICROBIAL SURVEILLANCE DATA FOR COMMON COMMUNITY-ACQUIRED ORGANISMS: MARCH 2019 – FEBRUARY 2020

We have updated the PathCare susceptibility data for common community-acquired organisms isolated from patients in the Western Cape Province from the first of March 2019 until the end of February 2020. There are minimal changes in comparison to the previous period[1], and current recommendations for empiric antimicrobial therapy for common community-acquired infections remain unchanged. However, the trend in rising resistance in gram negative organisms persists which emphasizes the need for careful stewardship and consideration of high-risk cases, where cultures are indicated in order to adjust and target therapy more precisely. An increase in resistance in certain organisms isolated from non-hospitalised patients, especially in Gram negative organisms such as *E. coli* and *Klebsiella*, with extended spectrum beta-lactamase (ESBL) producers and even carbapenemase producing Enterobacteriaceae (CPE), continues to pose a challenge to resources.

The organisms selected include those most commonly isolated from infections acquired in the community, but data presented reflects the combined susceptibility of all isolates from patients in the Western Cape: outpatients as well as hospitalised patients. The rate of infection with multi-resistant organisms is generally higher in healthcare facilities, but resistant infections may also occur in at-risk patients in the community, especially those who have been recently treated with to multiple or broad-spectrum antimicrobial agents.

Streptococcus pneumoniae (respiratory tract)

Antibiotic	% Susceptible
Penicillin (MIC≤2 µg/ml)	98.5
Ceftriaxone	99.3
Erythromycin	61.2
Clindamycin	76.9
Moxifloxacin	100

Haemophilus influenzae (respiratory tract)

Antibiotic	% Susceptible
Amoxicillin/Ampicillin	86.9
Amoxicillin-clavulanate (co-amoxiclav)	97.3
Cefuroxime	97.2
Ceftriaxone/Cefotaxime	100
Azithromycin/Clarithromycin	74.3
Sulfamethoxazole-trimethoprim	52.3
Tetracycline	96
Moxifloxacin	96

There is no major change in the current susceptibility data for the two most common respiratory bacterial pathogens when compared to data previously presented for 2019[1] and 2016[2]. With almost 99% of *S. pneumoniae* susceptible to penicillin (MIC≤2 µg/ml), high dose amoxicillin and new formulations of oral co-amoxiclav containing a higher dose of the amoxicillin component will be effective (1g amoxicillin 8h or 2g co-amoxiclav SR 12h or 90mg/kg/day of the amoxicillin component divided twice daily for weight < 40kg). For pneumococcal isolates with penicillin MIC≤0.064 µg/ml, standard doses of co-amoxiclav (45mg/kg/day divided q12h) will also be effective. The clavulanate component in co-amoxiclav inhibits the beta-lactamases produced by the majority of *Haemophilus influenzae* isolates which test resistant to amoxicillin, as it inhibits the beta lactamase produced as a resistance mechanism.

All isolates remain susceptible to ceftriaxone and cefotaxime.

Resistance to the macrolides in *H. influenzae* and macrolides and clindamycin in *S. pneumoniae* is high and these agents are only recommended for directed therapy once susceptibility is confirmed.

Fluoroquinolones with enhanced pneumococcal activity such as levofloxacin and moxifloxacin may be considered in patients with severe beta-lactam allergies, but the side-effects of these agents and activity against tuberculosis preclude the fluoroquinolones as first line therapy in respiratory tract infections.

Diarhoeal pathogens

Antibiotic	Salmonella ssp. % Susceptible	Shigella ssp. % Susceptible	Campylobacter ssp. % Susceptible
Amoxicillin/ Ampicillin	91.2	100	-
Ceftriaxone	100	100	-
Sulfamethoxazole-trimethoprim	100	33	-
Nalidixic acid	100	100	-
Ciprofloxacin	100	100	56
Erythromycin	-	-	100
Tetracycline	-	-	49

In the Western Cape, Salmonella spp. are much more commonly isolated than Shigella spp., and the validity of the figures above is compromised by the effect of a small sample size for Shigella. Nevertheless, it is of importance to note that the cultured stool pathogens in the Western Cape remains sensitive to narrow spectrum antimicrobials.

Ciprofloxacin resistance is high in Asian strains therefore a travel history should be taken into consideration when choosing empiric treatment.

The organisms reported remain fully susceptible to Ceftriaxone.

Although not routinely reported due to lack of clinical interpretative criteria for many diarrhoeal bacterial pathogens, azithromycin is an alternative agent that may be considered in cases of ciprofloxacin resistance or in consideration of the side-effect profile of the fluoroquinolones when treating infection caused by Salmonella or Shigella. This also has good activity against *Campylobacter* infections, as indicated.

Staphylococcus aureus

Antibiotic	% Susceptible
Cloxacillin	87.7
Erythromycin	75.8
Clindamycin	82.8
Sulfa-trimethoprim	81.3
Tetracycline	92.5
Moxifloxacin	87.2
Rifampicin	99
Vancomycin	100
Teicoplanin	100
Linezolid	100
Daptomycin	100

The percentage of MRSA (methicillin resistant *S. aureus*) is continuing to decrease compared to previous reports (12,3% for this time period, 14.9% in 2019[1], and 18% in 2016[2]). This follows trends occasionally reported in the international literature, where a decrease in the prevalence of MRSA is linked to antimicrobial stewardship and improved infection control[4]. MRSA is still mainly encountered in healthcare associated infections, and true community acquired infections are most likely to be cloxacillin sensitive. Sensitivity to other beta-lactam agents such as co-amoxiclav, cephalexin and cefuroxime can be extrapolated from cloxacillin sensitivity.

Urinary tract pathogens

Antibiotic	*E. Coli* % Susceptible	*Proteus* ssp. % Susceptible	*Enterococcus faecalis* % Susceptible
Amoxicillin/ Ampicillin	29.3	52.6	100
Amoxicillin-clavulanate (co-amoxiclav)	80.8	89.3	100
Cefuroxime	86.1	92.2	-
Ceftriaxone	86.3	0.1	-
Ciprofloxacin	73.3	93.3	-
Levofloxacin	73.3	93	87.9
Gentamicin	65.5	78.3	NT
Amikacin	92.5	100	-
Sulfamethoxazole-trimethoprim	47.2	62.6	-
Nitrofurantoin	96.5	-	99.7
Fosfomycin	98.7	8.3*	98.5
ESBL production	13.7	5.2	NA

- , intrinsically resistant; NT, not tested (no laboratory test criteria); NA, not applicable;
*reported for *P. mirabilis* only.

E. coli is the most common pathogen isolated from urine, especially in uncomplicated and community-acquired infections. The local antimicrobial susceptibility pattern of *E. coli* in particular should therefore be considered in empirical antibiotic selection for uncomplicated urinary tract infection (UTI). Resistance to amoxicillin and sulfa-trimethoprim is high and these agents are not recommended for empiric treatment. Nitrofurantoin is active against most *E. coli* and *E. faecalis* strains, but inactive against *Proteus, Pseudomonas* and *Serratia spp.* and should only be used for uncomplicated UTI. Other first line agents include fosfomycin, co-amoxiclav, cefuroxime, aminoglycosides or the fluoroquinolones, although resistance to the fluoroquinolones is high in *E. coli* (almost 30%) and side-effects are of concern. Fosfomycin has a broad spectrum of activity against many common uro-pathogenic bacteria, although its activity against *Proteus spp.* has been declining over the past years. The percentage of *E. coli* that are ESBL-producers are continuing to increase compared to previous data (13.7% in this dataset, 12.5% in 2019; 9% in 2016; versus 5% in 2012)[1,2,3].

We are also experiencing an increase in ESBL and CPE in other urinary tract pathogens, especially *K. pneumoniae*. Risk factors for CPE in urinary tract specimens include previous hospitalisation and admission to frail care or other support facilities, as well as advanced age and previous antimicrobial treatment.

For patients with recurrent UTIs it is therefore important to review previous culture results and antibiotic therapy when choosing an empiric agent. In these patients a good quality urine specimen should be collected for culture and susceptibility testing before starting antimicrobial therapy.

References:

1. Pathcare Laboratory Update May 2019. Antimicrobial surveillance data for common community-acquired organisms: March 2018 – February 2019.
2. PathCare Laboratory Update August 2017. Antimicrobial surveillance data for common community-acquired organisms: January – December 2016.
3. PathCare Laboratory Update August 2013. Antimicrobial surveillance data for common community-acquired organisms: July – December 2012.
4. Trends in Invasive Infection with Methicillin-Resistant *Staphylococcus aureus*, Connecticut, USA, 2001–2010 Emerging Infectious Diseases Vol. 8, No. 6, June 2012 Page 917 - 924.

Dr Elizabeth Wasserman, Clinical Microbiologist,
PathCare, 021 596 3400