



CLINICAL PRACTICE GUIDELINE

Infections: Urinary tract infection in pregnant women

This document should be read in conjunction with this [Disclaimer](#)

Contents

Screening for bacteriuria in pregnancy³⁻⁶	1
Asymptomatic bacteriuria in pregnant women ³⁻⁵	2
Acute cystitis in pregnant women ^{1, 3-5}	2
Table 1- Antibiotic choices for asymptomatic bacteriuria and acute cystitis	3
Options for multi-drug resistant infections	4
Pyelonephritis in pregnant women²⁻⁵	4
Table 2- Antibiotic choices for pyelonephritis: Initial IV therapy	5
Table 3 -Antibiotic prophylaxis choices	6
References	6

This Guideline focuses on urinary tract infection in pregnancy. For advice regarding urinary tract infection in non- pregnant women refer to electronic [Therapeutic Guidelines Australia](#)¹:

- Use the search term “cystitis” or “pyelonephritis”²

Screening for bacteriuria in pregnancy³⁻⁶

- Pregnant women with asymptomatic bacteriuria are at higher risk of acute cystitis, pyelonephritis and pre-labour premature rupture of membranes.
- Asymptomatic bacteriuria occurs in 2-10% of pregnancies and up to 30% will develop UTI if left untreated⁵
- Results from a Dutch study found a low rate of pyelonephritis in women with untreated asymptomatic bacteriuria, however only low risk pregnancies were

included and the results are unlikely to be generalizable to the KEMH population⁶

- All women should be offered screening for asymptomatic bacteriuria at 12-16 weeks gestation or first antenatal visit
- Send a midstream urine specimen (dipstick is NOT sufficient to rule out asymptomatic bacteriuria)

Asymptomatic bacteriuria in pregnant women³⁻⁵

- Asymptomatic bacteriuria is the presence of greater than 10⁸ CFU/L of bacteria, with no evidence of contamination (contamination is suggested by the presence of epithelial cells or vaginal flora on microscopy) without accompanying clinical symptoms
- Ideally the presence of bacteriuria should be confirmed with a second urine culture, particularly with difficult to treat organisms e.g. multi-resistant bacteria, *Pseudomonas aeruginosa*
- It is recommended to treat all pregnant women with asymptomatic bacteriuria with antibiotics to prevent acute cystitis and pyelonephritis
- Treatment should be based on the susceptibility results. If the isolate is reported susceptible to amoxicillin then amoxicillin 500mg orally 8 hourly should be the first choice. Otherwise use an antibiotic listed in Table 1
- Standard treatment duration is 5 days
- Perform a test of cure midstream urine 7 days (or at least 48 hours) after cessation of antibiotics. If bacteriuria persists give a repeat course of antibiotics based on susceptibility results and consider a longer duration of 7 days.
- Women with confirmed bacteriuria should have repeat cultures sent at each antenatal visit or monthly to monitor for recurrent bacteriuria
- Consider offering ongoing prophylaxis for the duration of the pregnancy to women with persistent bacteriuria after two or more treatment courses (see Table 3)
- If group B Streptococcus (GBS) is isolated in urine prophylactic antibiotics must be offered during labour, as GBS bacteriuria indicates high colonisation levels

Acute cystitis in pregnant women^{1, 3-5}

- Acute cystitis is defined by the presence of greater than 10⁸ CFU/L of bacteria, with no evidence of contamination (contamination is suggested by the presence of epithelial cells or vaginal flora on microscopy) and symptoms of cystitis, which include dysuria, frequency, urgency and suprapubic pain
- Collect a midstream urine specimen prior to commencement of antibiotic therapy
- Commence an antibiotic listed in Table 1

- Standard treatment duration is 5-7 days, but may be extended if there is a slow clinical response or a recurrent episode
- Perform a test of cure midstream urine 7 days (or at least 48 hours) after cessation of antibiotics
- Due to the high risk of recurrence, repeat cultures should be sent at each antenatal visit or monthly to detect and treat bacteriuria. In women at higher risk of recurrence (e.g. history of UTIs, maternal co-morbidities, underlying renal tract abnormality) ongoing prophylaxis should be considered after the first UTI for the duration of the pregnancy. Otherwise suppressive therapy should be offered if bacteriuria is found on any follow up culture (see Table 3). Postcoital prophylaxis may be used if UTIs are sexually related.
- If recurrent cystitis occurs then consider imaging to exclude urinary tract abnormalities
- If GBS is isolated in urine prophylactic antibiotics must be offered during labour, as GBS bacteriuria indicates high colonisation levels

Table 1- Antibiotic choices for asymptomatic bacteriuria and acute cystitis

Note: dose adjustment may be required in renal failure.

Antibiotic	Dose	Notes
Nitrofurantoin	100mg orally, 12 hourly	Try to avoid close to delivery if another option available as there is a small risk of haemolytic anaemia in the mother and fetus who are G6PD deficient
Cefalexin	500mg orally, 12 hourly	Considered safe in pregnancy at any trimester, but this is a broad spectrum antibiotic and if possible nitrofurantoin should be used in preference
Amoxicillin/ clavulanate	875/125mg orally, 12 hourly	Generally considered to be safe in pregnancy, but there may be an increased risk of necrotising enterocolitis in the neonate.** This is a broad spectrum antibiotic and if possible nitrofurantoin should be used in preference
Trimethoprim	300mg orally, 24 hourly	Avoid in the 1 st trimester where possible. Trimethoprim, a folic acid antagonist, has been associated with an increased risk of congenital malformations. If no other oral antibiotic option is appropriate, concurrent maternal supplementation with folic acid 5 mg

		daily is recommended
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**The ORACLE trials demonstrated an increased risk of necrotising enterocolitis in women with preterm, premature rupture of membranes (and to a lesser extent those with preterm labour) who received amoxicillin/clavulanate compared to those who did not⁶. A much smaller study also reported an increased risk of necrotising enterocolitis with amoxicillin/clavulanate⁷, but a retrospective study of ampicillin/sulbactam + amoxicillin/clavulanate compared with cephazolin/cephalexin/erythromycin demonstrated no difference in rates of necrotising enterocolitis⁸. Many expert sources do not suggest avoiding amoxicillin/clavulanate in pregnancy¹⁻⁵.

Follow up microbiology results and adjust antimicrobial therapy appropriately.

Options for multi-drug resistant infections

- Depending on the resistance profile of the isolate other oral treatment options include: co-trimoxazole, [ciprofloxacin](#), [norfloxacin](#), [fosfomycin](#). Note: ciprofloxacin and norfloxacin are generally avoided in pregnancy due to animal studies demonstrating adverse effects on cartilage development. However human studies have not shown toxic effects on cartilage or congenital malformations, so they may be used if there is no other appropriate antibiotic choice^[3].
- For multi-drug resistant organisms or complex treatment situations such as multiple antibiotic allergies the microbiology registrar or on call clinical microbiologist may be contacted for advice.

Pyelonephritis in pregnant women²⁻⁵

- Pyelonephritis is suggested by fever, nausea/vomiting and flank pain and positive urine microscopy and culture, with or without symptoms of cystitis
- All pyelonephritis in pregnancy should be treated with IV therapy initially, irrespective of severity
- Send a midstream urine specimen and, if febrile, a blood culture specimen
- Follow up the microbiology results and change treatment as required
- Switch to oral therapy once patient is afebrile for 48 hours and has definite clinical improvement
- If there is ongoing fever or symptoms at 48 hours then send another urine culture and perform an ultrasound of the urinary tract

- Standard treatment duration is a total of 14 days (of both IV and PO therapy), but may be extended e.g. if there is a slow clinical response, renal abscess/nephronia or presence of foreign body (e.g. stent)
- Due to the risk of recurrence (6 to 8% during the pregnancy⁵), women with one episode of pyelonephritis should be offered ongoing prophylaxis for the duration of the pregnancy (see Table 3). If prophylaxis is declined then monthly urine specimens should be sent to monitor and treat asymptomatic bacteriuria.
- A midstream urine may be sent in third trimester to ensure breakthrough bacteriuria has not occurred
- If GBS is isolated in urine prophylactic antibiotics must be offered during labour, as GBS bacteriuria indicates high colonisation levels

Table 2- Antibiotic choices for pyelonephritis: Initial IV therapy

Antibiotic	Dose	Notes
Ceftriaxone	1g IV, 24 hourly	Considered safe in pregnancy at any trimester Does not cover <i>Pseudomonas</i> or <i>Enterococcus</i> species
Amoxicillin plus gentamicin	Amoxicillin 2g IV 6 hourly and Gentamicin 5mg/kg IV. Refer to Gentamicin dosing and monitoring	Prolonged gentamicin may cause ototoxicity/nephrotoxicity in the woman. All gentamicin use should be reviewed at 72 hours and consider changing to an alternative agent if ongoing IV therapy required ⁹
Piperacillin with tazobactam	4.5g IV 8 hourly	2 nd line agent. Option for therapy where gentamicin is unsuitable. Considered safe in pregnancy at any trimester

- Follow up microbiology results and adjust antimicrobial therapy appropriately.
- For multi-drug resistant organisms please contact the microbiology registrar or the on call clinical microbiologist for treatment options.
- Please note that, although suitable for cystitis, nitrofurantoin and fosfomycin are not recommended for use in pyelonephritis due to low levels outside the bladder.

Table 3 -Antibiotic prophylaxis choices

Antibiotic	Dose	Notes
Nitrofurantoin	50 to 100mg orally, at night	Try to avoid close to delivery if another option available as there is a small risk of haemolytic anaemia in the mother and fetus who are G6PD deficient
Cefalexin	250mg orally, at night	Considered safe in pregnancy at any trimester, but this is a broad spectrum antibiotic and if possible nitrofurantoin should be used in preference
Trimethoprim	150mg orally, at night	Avoid in the 1 st trimester where possible. Trimethoprim, a folic acid antagonist, has been associated with an increased risk of congenital malformations. If no other oral antibiotic option is appropriate, concurrent maternal supplementation with folic acid 5 mg daily is recommended

- Follow up microbiology results and adjust antimicrobial therapy appropriately.
- For multi-drug resistant organisms or complex clinical cases please contact the microbiology registrar or on call clinical microbiologist for treatment options.

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Related WNHS policies, procedures and guidelines

See KEMH Clinical Guidelines:

Obstetrics & Gynaecology: Infections

Pharmacy:

- Gentamicin Dosing and Monitoring
- Medication guidelines- see links in guideline above

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