

# UTI (catheter): antimicrobial prescribing

Urinary tract infection (catheter-associated)

- Consider removing or, if not possible, changing the catheter if it has been in place for more than 7 days. But do not delay antibiotic treatment
- Send a urine sample for culture and susceptibility testing
- Offer an antibiotic
- Advise managing symptoms with self-care

- Advise:**
- possible adverse effects of antibiotics include diarrhoea and nausea
  - seeking medical help if symptoms worsen at any time or do not start to improve within 48 hours, or the person becomes systemically very unwell

- When results of urine culture are available:
  - review choice of antibiotic
  - change antibiotic according to susceptibility results if bacteria are resistant, using narrow spectrum antibiotics when possible

- Reassess at any time if symptoms worsen or do not start to improve within 48 hours, taking account of:
- other possible diagnoses
  - any symptoms and signs suggesting a more serious illness or condition, such as sepsis
  - previous antibiotic use, which may have led to resistant bacteria

- Do not routinely offer antibiotic prophylaxis to people with a short-term or long-term catheter
- Advise seeking medical help if symptoms of acute UTI develop

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- Refer to hospital if the person has any symptoms or signs of a more serious illness or condition (for example, sepsis)
- Consider referring or seeking specialist advice for people if they:
- are significantly dehydrated or unable to take oral fluids and medicines
  - are pregnant
  - have a higher risk of developing complications
  - have recurrent catheter-associated UTIs
  - have bacteria resistant to oral antibiotics

## **i** Background

- Catheter-associated UTI is a symptomatic bladder or kidney infection in a person with a catheter
- Bacteria are more likely to be present in urine the longer a catheter is in place (after 1 month most people have bacteriuria)
- Antibiotic treatment is not routinely needed for asymptomatic bacteriuria in people with a catheter

## **i** Self-care

- Advise paracetamol for pain
- Advise drinking enough fluids to avoid dehydration

## **i** Antibiotics

- When prescribing antibiotics, take account of severity of symptoms, risk of complications, previous urine culture and susceptibility results, previous antibiotic use, which may have led to resistant bacteria, and local antimicrobial resistance data
- Give oral antibiotics first-line if people can take oral medicines, and the severity of their condition does not require intravenous antibiotics
- Review intravenous antibiotics by 48 hours and consider stepping down to oral antibiotics where possible

# UTI (catheter): antimicrobial prescribing

## Choice of antibiotic: non-pregnant women and men aged 16 years and over

Antibiotic <sup>1</sup>	Dosage and course length
First choice oral antibiotic if no upper UTI symptoms <sup>2</sup>	
Nitrofurantoin – if eGFR $\geq 45$ ml/minute <sup>3,4</sup>	100 mg modified-release twice a day for 7 days
Trimethoprim – if low risk of resistance <sup>5</sup>	200 mg twice a day for 7 days
Amoxicillin (only if culture results available and susceptible)	500 mg three times a day for 7 days
Second choice oral antibiotic if no upper UTI symptoms (first choice not suitable) <sup>2</sup>	
Pivmecillinam (a penicillin) <sup>4</sup>	400 mg initial dose then 200 mg three times a day for a total of 7 days
First choice oral antibiotic if upper UTI symptoms <sup>2</sup>	
Cefalexin	500 mg twice or three times a day (up to 1 to 1.5 g three or four times a day for severe infections) for 7 to 10 days
Co-amoxiclav (only if culture results available and susceptible)	500/125 mg three times a day for 7 to 10 days
Trimethoprim (only if culture results available and susceptible)	200 mg twice a day for 14 days
Ciprofloxacin (consider safety issues <sup>6</sup> )	500 mg twice a day for 7 days
First choice intravenous antibiotic (if vomiting, unable to take oral antibiotics or severely unwell). Antibiotics may be combined if susceptibility or sepsis a concern <sup>2,7</sup>	
Co-amoxiclav (only in combination or if culture results available and susceptible)	1.2 g three times a day
Cefuroxime	750 mg to 1.5 g three or four times a day
Ceftriaxone	1 to 2 g once a day
Ciprofloxacin (consider safety issues <sup>6</sup> )	400 mg twice or three times a day
Gentamicin	Initially 5 to 7 mg/kg once a day, subsequent doses adjusted according to serum-gentamicin concentration <sup>8</sup>
Amikacin	Initially 15 mg/kg once a day (maximum per dose 1.5 g once a day), subsequent doses adjusted according to serum-amikacin concentration (maximum 15 g per course) <sup>8</sup>

When exercising their judgement, professionals and practitioners are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or the people using their service. It is not mandatory to apply the recommendations, and the guideline does not override the responsibility to make decisions appropriate to the circumstances of the individual, in consultation with them and their families and carers or guardian.

## Choice of antibiotic: non-pregnant women and men aged 16 years and over (continued)

Antibiotic <sup>1</sup>	Dosage and course length
Second choice intravenous antibiotic - consult local microbiologist	
<sup>1</sup> See <a href="#">BNF</a> for use and dosing in specific populations, for example, hepatic and renal impairment, breastfeeding and for administering intravenous antibiotics.	
<sup>2</sup> Check any previous culture and susceptibility results, and previous antibiotic prescribing and choose antibiotics accordingly.	
<sup>3</sup> May be used with caution if eGFR 30–44 ml/minute to treat uncomplicated lower UTI caused by suspected or proven multidrug resistant bacteria and only if potential benefit outweighs risk (BNF, August 2018).	
<sup>4</sup> Nitrofurantoin and pivmecillinam are only licensed for uncomplicated lower UTIs, and are not suitable for people with upper UTI symptoms or a blocked catheter.	
<sup>5</sup> Low risk of resistance is likely if not used in the past 3 months, previous urine culture suggests susceptibility (but this was not used), and in younger people in areas where data suggests low resistance. Higher risk of resistance is likely with recent use and in older people in care homes	
<sup>6</sup> The European Medicines Agency's Pharmacovigilance Risk Assessment Committee has recommended restricting the use of fluoroquinolone antibiotics following a review of disabling and potentially long-lasting side effects mainly involving muscles, tendons, bones and the nervous system (press release October 2018), but they are an option in catheter-associated UTI with upper UTI symptoms, which is a severe infection.	
<sup>7</sup> Review intravenous antibiotics by 48 hours and consider stepping down to oral antibiotics.	
<sup>8</sup> Therapeutic drug monitoring and assessment of renal function is required (BNF, August 2018).	

## Choice of antibiotic: pregnant women aged 12 years and over

Antibiotic <sup>1</sup>	Dosage and course length
First choice oral antibiotic <sup>2</sup>	
Cefalexin	500 mg twice or three times a day (up to 1 to 1.5 g three or four times a day for severe infections) for 7 to 10 days
First choice intravenous antibiotic (if vomiting, unable to take oral antibiotics or severely unwell) <sup>2,3</sup>	
Cefuroxime	750 mg to 1.5 g three or four times a day
Second choice antibiotics or combining antibiotics if susceptibility or sepsis is a concern	
Consult local microbiologist	
<sup>1</sup> See <a href="#">BNF</a> for appropriate use and dosing in specific populations, for example, hepatic and renal impairment, and for administering intravenous antibiotics.	
<sup>2</sup> Check any previous urine culture and susceptibility results, and antibiotic prescribing, and choose antibiotics accordingly.	
<sup>3</sup> Review intravenous antibiotics by 48 hours and consider stepping down to oral antibiotics where possible.	

# UTI (catheter): antimicrobial prescribing

## Choice of antibiotic: children and young people under 16 years

Antibiotic <sup>1</sup>	Dosage and course length <sup>2</sup>
<b>Children under 3 months</b> – Refer to paediatric specialist and treat with intravenous antibiotics in line with the NICE guideline on <a href="#">fever in under 5s</a>	
<b>Children aged 3 months and over</b> – First choice oral antibiotics <sup>3</sup>	
Trimethoprim – if low risk of resistance <sup>4</sup>	3 to 5 months, 4 mg/kg (maximum 200 mg per dose) or 25 mg twice a day for 7 to 10 days; 6 months to 5 years, 4 mg/kg (maximum 200 mg per dose) or 50 mg twice a day for 7 to 10 days; 6 to 11 years, 4 mg/kg (maximum 200 mg per dose) or 100 mg twice a day for 7 to 10 days; 12 to 15 years, 200 mg twice a day for 7 to 10 days
Amoxicillin (only if culture results available and susceptible)	3 to 11 months, 125 mg three times a day for 7 to 10 days; 1 to 4 years, 250 mg three times a day for 7 to 10 days 5 to 15 years, 500 mg three times a day for 7 to 10 days
Cefalexin	3 to 11 months, 12.5 mg/kg or 125 mg twice a day for 7 to 10 days (25 mg/kg two to four times a day [maximum 1 g per dose four times a day] for severe infections) 1 to 4 years, 12.5 mg/kg twice a day or 125 mg three times a day for 7 to 10 days (25 mg/kg two to four times a day [maximum 1 g per dose four times a day] for severe infections) 5 to 11 years, 12.5 mg/kg twice a day or 250 mg three times a day for 7 to 10 days (25 mg/kg two to four times a day [maximum 1 g per dose four times a day] for severe infections) 12 to 15 years, 500 mg twice or three times a day (up to 1 to 1.5 g three or four times a day for severe infections) for 7 to 10 days
Co-amoxiclav (only if culture results available and susceptible)	3 to 11 months, 0.25 ml/kg of 125/31 suspension three times a day for 7 to 10 days (dose doubled in severe infection) 1 to 5 years, 0.25 ml/kg of 125/31 suspension or 5 ml of 125/31 suspension three times a day for 7 to 10 days (dose doubled in severe infection) 6 to 11 years, 0.15 ml/kg of 250/62 suspension or 5 ml of 250/62 suspension three times a day for 7 to 10 days (dose doubled in severe infection) 12 to 15 years, 250/125 mg or 500/125 mg three times a day for 7 to 10 days
<b>Children aged 3 months and over</b> – First choice intravenous antibiotic (if vomiting, unable to take oral antibiotics or severely unwell). Antibiotics may be combined if susceptibility or sepsis a concern <sup>3,5,6</sup>	
Co-amoxiclav (only in combination unless culture results confirm susceptibility)	3 months to 15 years, 30 mg/kg three times a day (maximum 1.2 g three times a day)
Cefuroxime	3 months to 15 years, 20 mg/kg three times a day (maximum 750 mg per dose), (50 to 60 mg/kg three or four times a day [maximum 1.5 g per dose] for severe infections)
Ceftriaxone	3 months to 11 years (up to 50 kg), 50 to 80 mg/kg once a day (maximum 4 g per day); 9 to 11 years (50 kg and above), 1 to 2 g once a day 12 to 15 years, 1 to 2 g once a day
Gentamicin	Initially 7 mg/kg once a day, subsequent doses adjusted according to serum-gentamicin concentration <sup>7</sup>
Amikacin	Initially 15 mg/kg once a day, subsequent doses adjusted according to serum-amikacin concentration <sup>7</sup>

### Children aged 3 months and over – Second choice intravenous antibiotic: Consult local microbiologist

<sup>1</sup>See [BNF for children \(BNFC\)](#) for use and dosing in specific populations, for example, hepatic impairment and renal impairment, and for administering intravenous antibiotics. For prescribing in pregnancy, refer to the table on choice of antibiotic for pregnant women aged 12 and over.

<sup>2</sup>Age bands apply to average size and, in practice, age bands will be used with other factors such as the severity of the condition and the child's size.

<sup>3</sup>Check any previous urine culture and susceptibility results, and antibiotic prescribing, and choose antibiotics accordingly. If a child or young person is receiving prophylactic antibiotics, treatment should be with a different antibiotic not a higher dose of the same antibiotic.

<sup>4</sup>Low risk of resistance is likely if not used in the past 3 months, previous urine culture suggests susceptibility (but this was not used), and in areas where data suggests low resistance. Higher risk of resistance is likely with recent use.

<sup>5</sup>Review intravenous antibiotics by 48 hours and consider stepping down to oral antibiotics where possible for a total antibiotic course of 10 days.

<sup>6</sup>If intravenous treatment is not possible, consider intramuscular treatment, if suitable.

<sup>7</sup>Therapeutic drug monitoring and assessment of renal function is required (BNFC, August 2018).