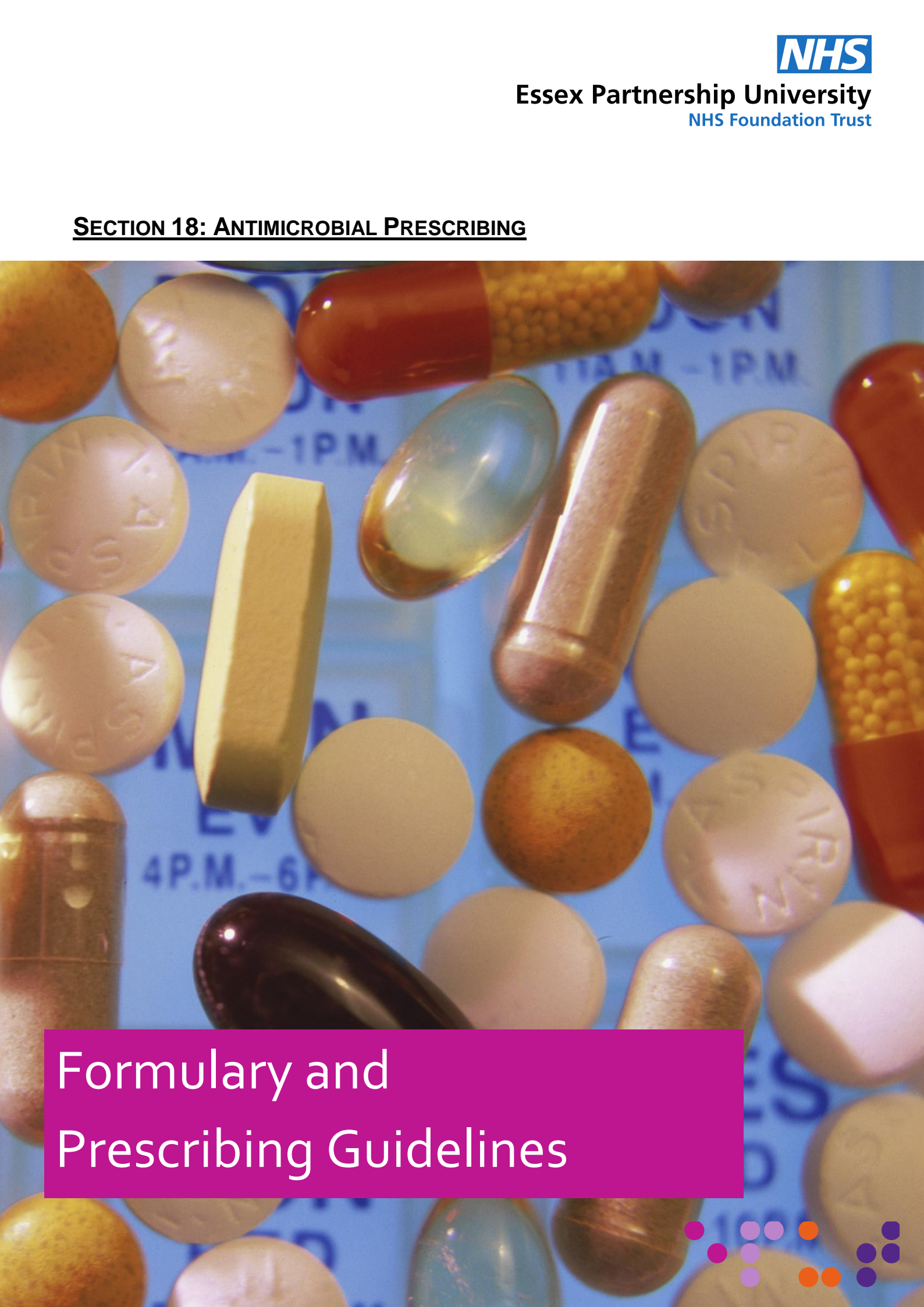


SECTION 18: ANTIMICROBIAL PRESCRIBING

A close-up photograph of various pharmaceuticals, including white, yellow, and orange tablets, and red, yellow, and blue capsules, scattered on a blue background with faint white text. A magenta rectangular box is overlaid on the bottom left of the image.

Formulary and Prescribing Guidelines



18.1 Aims

- To provide a simple, safe, effective, economical empirical and evidence based approach to the treatment of common infections
- To minimise the emergence of bacterial resistance in the community

18.2 Principles of Treatment

- 18.2.1 This guidance is based on the best available evidence but professional judgment should be used and patients should be involved in the decision.
- 18.2.2 It is important to initiate antibiotics as soon as possible for severe infection. If sepsis is suspected antibiotic treatment should be initiated within an hour preferably by transferring the patient to an acute hospital.
- 18.2.3 A dose and duration of treatment for adults is usually suggested, but may need modification for age, weight and renal function. In severe or recurrent cases consider a larger dose or longer course.
- 18.2.4 Have a lower threshold for antibiotics in immunocompromised or those with multiple morbidities; consider culture and seek advice.
- 18.2.5 Prescribe an antibiotic only when there is likely to be a clear clinical benefit. Prescriptions should state the indication and course length or review date on the medicines chart and in the medical notes.
- 18.2.6 Consider a no, or delayed, antibiotic strategy for acute self-limiting upper respiratory tract infections e.g. sore throat, sinusitis, otitis media
- 18.2.7 Limit prescribing over the telephone to exceptional cases.
- 18.2.8 Use simple generic antibiotics if possible. Avoid broad spectrum antibiotics (e.g. co-amoxiclav, quinolones and cephalosporins) when narrow spectrum antibiotics remain effective, as they increase risk of *Clostridium difficile*, MRSA and resistant UTIs. There is specific guidance for treatment of *C.difficile* infection, see main table and Appendix 18.
- 18.2.9 Avoid widespread use of topical antibiotics (especially those agents also available as systemic preparations, e.g. fusidic acid).
- 18.2.10 In pregnancy, take specimens to inform treatment; where possible AVOID tetracyclines, aminoglycosides, quinolones, *high dose* metronidazole (2 g). Short-term use of nitrofurantoin (at term, theoretical risk of neonatal haemolysis) is unlikely to cause problems to the foetus. Trimethoprim is also unlikely to cause problems unless poor dietary folate intake or taking another folate antagonist e.g. antiepileptic. Trimethoprim is unlicensed for use in pregnancy and folate supplementation is recommended particularly in the first trimester due to the theoretical risk of congenital malformations.
- 18.2.11 For information on the recognition and management of allergies, please refer to CG27 Medical Emergencies.
- 18.2.12 For further information on the antimicrobial choices below, such dosing information in renal and/or hepatic impairment, please refer to the eBNF.
- 18.2.13 Antibiotics more likely to cause *C. difficile* infection are: quinolones, co-amoxiclav, clindamycin and cephalosporins. If patients develop diarrhoea and *C.*

difficile infection is suspected, send a stool sample and treat as per the guidance below

18.2.14 Fluoroquinolone ¹⁸ antibiotics (ciprofloxacin, levofloxacin, ofloxacin) can cause disabling and long-lasting/ irreversible side effects of muscles, tendons, bones (including tendonitis and tendon rupture) and the nervous system, and should not be prescribed for:

- non-severe or self-limiting infections, or non-bacterial infections
- mild to moderate infections (such as in acute exacerbation of chronic bronchitis and chronic obstructive pulmonary disease) unless other antibiotics that are commonly recommended for these infections are considered inappropriate (for example, when first-line antibiotics are unsuitable due to resistance, contraindications, or intolerance, or if first-line treatments have failed.)
- uncomplicated cystitis (for which ciprofloxacin or levofloxacin were previously authorised) unless other antibiotics that are commonly recommended are considered inappropriate (for example, when first-line antibiotics are unsuitable due to resistance, contraindications, or intolerance, or if first-line treatments have failed.)

Avoid co-administration with corticosteroids since this could exacerbate fluoroquinolone-induced tendinitis and tendon rupture. Avoid use in patients who have previously had serious adverse reactions with a quinolone or fluoroquinolone antibiotic. Prescribe with special caution in people older than 60 years and for those with renal impairment or solid-organ transplants because they are at a higher risk of tendon injury.

Prescribers of fluoroquinolones should advise patients to stop treatment at the first signs of a serious adverse reaction, such as tendinitis or tendon rupture, muscle pain, muscle weakness, joint pain, joint swelling, peripheral neuropathy, and central nervous system effects, and to contact their doctor immediately for further advice. Fluoroquinolone treatment should be discontinued at the first sign of tendon pain or inflammation in patients and the affected limb or limbs appropriately treated (for example with immobilisation). ¹⁸

18.2.15 Erythromycin can cause QT prolongation ³⁰ and is associated with events secondary to QT interval prolongation such as cardiac arrest and ventricular fibrillation.

The following should be noted when prescribing macrolides:

- reports of cardiotoxicity (QT interval prolongation) with macrolide antibiotics, in particular with erythromycin and clarithromycin
- erythromycin **should not** be given to:

- patients with a history of QT interval prolongation (congenital or documented acquired QT interval prolongation) or ventricular cardiac arrhythmia, including torsades de pointes
- patients with electrolyte disturbances (hypokalaemia or hypomagnesaemia due to the risk of arrhythmia associated with QT interval prolongation)
- consider the potential benefit of treatment against the cardiac risks when prescribing in patients at increased risk of a cardiac event; patients in whom caution is needed are those with:
 - cardiac disease or heart failure
 - conduction disturbances or clinically relevant bradycardia
 - those concomitantly taking other medicines associated with QT interval prolongation
- direct patients to the patient information leaflet and remind at-risk patients of the importance of seeking medical attention if they develop signs or symptoms of a cardiac event
- erythromycin is widely used in children, some of whom may have QT interval prolongation; therefore, consider the child's medical history and balance the treatment benefits against the potential risks
- erythromycin may interact with rivaroxaban and increase the risk of bleeding – consider this interaction when prescribing antibiotics and follow precautions in the product information if concomitant use is necessary
- report suspected adverse drug reactions (ADRs) associated with erythromycin to the Yellow Card scheme

18.2.16 Macrolides and direct-acting oral anticoagulant (DOAC) anticoagulants.

A potential drug interaction between rivaroxaban and erythromycin resulting in increased risk of bleeding has been identified ³⁰, particularly in high-risk patients, especially in those with mild or moderate renal impairment. Erythromycin and clarithromycin can lead to an increase in the maximum blood concentration of rivaroxaban.

Rivaroxaban is not the only DOAC to interact with macrolides such as erythromycin. For edoxaban, the product information recommends a reduced dose of 30mg a day for patients on concomitant erythromycin. For dabigatran and apixaban, concomitant administration of P-gp inhibitors (and for apixaban, also CYP3A4 inhibitors) is expected to increase plasma concentrations, and raise blood concentrations when used concomitantly with another macrolide, clarithromycin.

All patients prescribed macrolides with DOACs should be informed of the signs and symptoms of bleeding and be advised to seek medical advice should they occur.

18.3 Sepsis

Please refer to NICE Guideline 51 for full information on Sepsis.

Whenever a person presents with signs or symptoms that indicate possible infection think ‘could this be sepsis?’

In particular, note the following NICE recommendations:

People with suspected sepsis are to be assessed using a structured set of observations to stratify risk of severe illness or death ²⁸.

NG51 includes the following:

- a structured set of observations to stratify risk of severe illness or death:
 - refer to the lists in “Face-to-face assessment of people with suspected sepsis”
 - refer to the lists in “Stratifying risk of severe illness or death from sepsis”
 - refer to Table 1 below

Table 1 Risk stratification tool for adults, children and young people aged 12 years and over with suspected sepsis

Category	High risk criteria	Moderate to high risk criteria	Low risk criteria
History	Objective evidence of new altered mental state	History from patient, friend or relative of new onset of altered behaviour or mental state History of acute deterioration of functional ability Impaired immune system (illness or drugs including oral steroids) Trauma, surgery or invasive procedures in the last 6 weeks	Normal behaviour
Respiratory	Raised respiratory rate: 25 breaths per minute or more New need for oxygen (40% FiO ₂ or more) to maintain saturation more than 92% (or more than 88% in known chronic obstructive pulmonary disease)	Raised respiratory rate: 21–24 breaths per minute	No high risk or moderate to high risk criteria met
Blood pressure	Systolic blood pressure 90 mmHg or less or systolic blood pressure more than 40 mmHg below normal	Systolic blood pressure 91–100 mmHg	No high risk or moderate to high risk criteria met
Circulation and hydration	Raised heart rate: more than 130 beats per minute Not passed urine in previous 18 hours. For catheterised patients, passed less than 0.5 ml/kg of urine per hour	Raised heart rate: 91–130 beats per minute (for pregnant women 100–130 beats per minute) or new onset arrhythmia Not passed urine in the past 12–18 hours For catheterised patients, passed 0.5–1 ml/kg of urine per hour	No high risk or moderate to high risk criteria met
Temperature		Tympanic temperature less than 36°C	
Skin	Mottled or ashen appearance Cyanosis of skin, lips or tongue Non-blanching rash of skin	Signs of potential infection, including redness, swelling or discharge at surgical site or breakdown of wound	No non-blanching rash

Sepsis: recognition, diagnosis and early management

NICE guideline NG51 <https://www.nice.org.uk/guidance/ng51>

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People with suspected sepsis in acute hospital settings and at least 1 of the criteria indicating high risk of severe illness or death to have an immediate review by a senior clinical decision-maker and antibiotics given within 1 hour if indicated.²⁸

People with suspected sepsis in acute hospital settings who need treatment to restore cardiovascular stability to have an intravenous fluid bolus within 1 hour of risk being stratified.²⁸

People with suspected sepsis in acute hospital settings who receive intravenous antibiotics or fluid bolus are seen by a consultant if their condition fails to respond within 1 hour of initial treatment.²⁸

Take into account that people with sepsis may have non-specific, non-localised presentations, for example feeling very unwell, and may not have a high temperature. Pay particular attention to concerns expressed by the person and their family or carers, for example changes from usual behaviour. Assess people who might have sepsis with extra care if they cannot give a good history (for example, people with English as a second language or people with communication problems).

Assess people with any suspected infection to identify:

- possible source of infection
- factors that increase risk of sepsis
- Any indications of clinical concern, such as new onset abnormalities of behaviour, circulation or respiration.

Refer all people with suspected sepsis outside acute hospital settings for emergency medical care by the most appropriate means of transport (usually 999 ambulance) if:

- they meet any high risk criteria (see tables 1, 2 and 3 of NICE Guideline 51) or
- they are aged under 17 years and their immunity is impaired by drugs or illness and they have any moderate to high risk criteria.

Assess all people with suspected sepsis outside acute hospital settings with any moderate to high risk criteria to:

- make a definitive diagnosis of their condition
- decide whether they can be treated safely outside hospital.

If a definitive diagnosis is not reached or the person cannot be treated safely outside an acute hospital setting, refer them urgently for emergency care.

Provide people with suspected sepsis, who do not have any high or moderate to high risk criteria, information about symptoms to monitor and how to access medical care if they are concerned.

18.4 Antimicrobial Prescribing Guidance

Infection	First Choice	BNF Dosage / Length of Treatment	Second Choice	BNF Dosage/ Length of Treatment	Comments
UPPER RESPIRATORY TRACT INFECTIONS: CONSIDER DELAYED ANTIBIOTIC PRESCRIPTIONS					
Acute sore throat	Penicillin V	Mild: 500mg QDS or 1g BD 5 – 10 days Severe: 500mg QDS 5 – 10 days	Clarithromycin (If Penicillin allergic)	250-500mg BD for 5 days	Majority of sore throats are viral and antibiotics are not indicated. Evidence suggests that antibiotics are clinically useful in less than 1% of cases. Note that all patients taking simvastatin should be advised to stop taking whilst receiving a course of clarithromycin. 10 days penicillin has lower relapse than 5 days in patients under 18 years Use Fever PAIN scores to guide treatment. See Appendix 1 for the NICE treatment pathway
Acute Otitis Media in children and young people under 18	Amoxicillin (refer to NICE NG91 for full list of antibiotics recommended)	Neonate 7-28 days 30mg/kg TDS 1 – 11 months: 125mg TDS 1-4 years: 250mg TDS 5-17 years: 500mg TDS FOR 5 to 7 DAYS	Erythromycin (if penicillin allergic). 1 month to 1 year 2-7 years 8-17 years	125mg QDS or 250mg BD 250mg QDS or 500mg BD 250-500mg QDS or 500mg to 1000mg BD FOR 5 to 7 DAYS	Avoid antibiotics as most get better within 3 days without; they only reduce pain at 2 days and do not prevent deafness. Advise on usual course of infection (3 to 7 days), managing symptoms, including pain, with self-care. Non antimicrobial treatment options now include eardrops containing an anaesthetic and an analgesic, for up to 7 days (see Appendix 3). Use only if an immediate oral antibiotic prescription is not given, and there is no eardrum perforation or otorrhoea. Follow NICE treatment algorithm (Appendix 3)

Infection	First Choice	BNF Dosage / Length of Treatment	Second Choice	BNF Dosage/ Length of Treatment	Comments
					to establish options, and further advice to offer (no antibiotic prescription/ back-up antibiotic prescription/ immediate antibiotic prescription/ referral of patient to hospital if severe systemic infection or acute complications, including mastoiditis, meningitis, intracranial abscess, sinus thrombosis or facial nerve paralysis.)
Acute Otitis Media in ADULTS	Amoxicillin	500mg TDS for 5 days	Clarithromycin (If Penicillin allergic)	250-500mg BD for 5 days	Evidence suggests that antibiotics are unlikely to be beneficial unless patient has systemic symptoms. E.g. fever, vomiting.
Acute Otitis Externa	1 st line: Analgesia for pain relief 2 nd line: topical acetic acid If cellulitis: Flucloxacillin	2% TDS 250mg or 500mg (if severe) QDS 7 days	Otomize® (Dexamethasone 0.1%, neomycin sulphate 3250unit/ml, glacial acetic acid 2%)	Spray THREE times daily for 7 days.	EarCalm® (acetic acid 2%) can be bought Over The Counter (OTC) Cure rates similar at 7 days for topical acetic acid (EarCalm) or antibiotic +/- steroid . If cellulitis or disease extending outside ear canal, start oral antibiotics, refer to ENT department to exclude malignant otitis externa.
Influenza For prophylaxis, see NICE. (NICE Influenza). Patients under 13 years see PHE Influenza	Oseltamivir unless pregnant	75mg BD for 5 days	Zanamivir (if there is resistance to oseltamivir or severe immunosuppression)	10mg BD (2 inhalations by diskhaler) for 5 days	Annual vaccination is essential for all those at risk of influenza. For otherwise healthy adults antivirals not recommended. Treat 'at risk' patients, ONLY within 48 hours of onset & when influenza is circulating in the community or in a care home where influenza is likely. At risk: pregnant (including up to two weeks post-

Infection	First Choice	BNF Dosage / Length of Treatment	Second Choice	BNF Dosage/ Length of Treatment	Comments
link.					partum), 65 years or over, chronic respiratory disease (including COPD and asthma) significant cardiovascular disease (not hypertension), immunocompromised, diabetes mellitus, chronic neurological, renal or liver disease, morbid obesity (BMI >40)
Acute Rhinosinusitis (Sinusitis)	Penicillin V For very unwell or worsening symptoms: Co-amoxiclav	500mg QDS for 5 days 625mg TDS for 5 days	Penicillin allergy or intolerance: Doxycycline OR Clarithromycin	200mg stat / 100mg OD for 4 days (5 days total) 500mg BD for 5 days	Symptoms < 10 days: Avoid antibiotics as 80% resolve in 14 days without, and they only offer marginal benefit after 7 days Use adequate analgesia Symptoms > 10 days: Consider delayed antibiotic when purulent nasal discharge, severe localised unilateral pain, fever, marked deterioration Systemically very unwell or more serious signs/symptoms: Immediate antibiotic Avoid doxycycline in children under 12 and pregnant women See Appendix 1 for NICE treatment algorithm
Suspected meningococcal disease	IV or IM benzylpenicillin OR IV or IM	Age 10+ years: 1200mg Children 1 - 9 yr: 600mg Children <1 yr: 300mg Age 12+ years:			Transfer all patients to hospital immediately. If time before hospital admission, and non-blanching rash, give IV benzylpenicillin or cefotaxime, unless definite history of anaphylaxis. Rash is not a contraindication (Give IM if vein cannot be found) If known anaphylaxis, do not give antibiotics prior to hospital transfer.

Infection	First Choice	BNF Dosage / Length of Treatment	Second Choice	BNF Dosage/ Length of Treatment	Comments
	Cefotaxime	2gram Child < 12 yrs: 50mg/kg			2g cefotaxime is the recommended dose for out of hospital treatment
LOWER RESPIRATORY TRACT INFECTIONS <i>Note: Low doses of penicillins are more likely to select out resistance. Do not use quinolone (ciprofloxacin, ofloxacin) first line due to poor pneumococcal activity. Reserve all quinolones (including levofloxacin) for proven resistant organisms. Fluoroquinolone antibiotics (ciprofloxacin, levofloxacin, ofloxacin) can cause disabling and long-lasting/ irreversible side effects of muscles, tendons, bones and the nervous system, and should not be prescribed for mild or moderately severe infections unless other antibiotics cannot be used.</i> ^{17, 18}					
Acute cough & bronchitis	See Appendix 9		See Appendix 9		See NICE NG120 and algorithm in Appendix 9. Avoid doxycycline in children under 12 and pregnant women. Antibiotic little benefit if no co-morbidity. Consider immediate antibiotic (or backup prescription) if higher risk of complications. Offer an immediate antibiotic if systemically very unwell. Refer to NICE guideline on pneumonia in adults, for recommendations on prescribing antibiotics according to CRP results. Symptom resolution can take 3 weeks.
Acute Exacerbation of COPD	See Appendix 8		See Appendix 8		See NICE NG114 and algorithm in Appendix 8. An acute exacerbation of chronic obstructive pulmonary disease (COPD) is a sustained worsening of symptoms from a person's stable state. A range of factors (including viral infections and smoking) can trigger an exacerbation.

Infection	First Choice	BNF Dosage / Length of Treatment	Second Choice	BNF Dosage/ Length of Treatment	Comments
					Many exacerbations (including some severe exacerbations) are not caused by bacterial infections so will not respond to antibiotics. Avoid doxycycline in children under 12, pregnant and breastfeeding women. Treat exacerbations promptly with antibiotics if purulent sputum and increased shortness of breath and/or increased sputum volume. Risk factors for antibiotic resistant organisms include co-morbid disease, severe COPD, frequent exacerbations, antibiotics in last 3 months
Community acquired pneumonia	See Appendix 10		See Appendix 10		See NICE NG138 and algorithm in Appendix 10.
Hospital acquired pneumonia	See Appendix 11		See Appendix 11		See NICE NG139 and algorithm in Appendix 11.
Pneumonia during the COVID-19 pandemic	See Appendix 16		See Appendix 16		See NICE NG173 and algorithm in Appendix 16. The purpose of this guideline is to ensure the best antibiotic management of suspected or confirmed bacterial pneumonia in adults in hospital during the COVID-19 pandemic. This includes people presenting to hospital with moderate to severe community-acquired pneumonia and people who develop pneumonia while in hospital.
COVID-19-associated pulmonary aspergillosis	<p>There is not enough evidence³² to recommend specific antifungal treatments for CAPA.</p> <p>For people who are critically ill and have, or have had, COVID-19 as part of their acute illness:</p> <ul style="list-style-type: none"> CAPA is a recognised cause of someone's condition not improving despite treatment (for example, antibiotic therapy, 				

Infection	First Choice	BNF Dosage / Length of Treatment	Second Choice	BNF Dosage/ Length of Treatment	Comments
(CAPA)	<p>ventilatory support)</p> <ul style="list-style-type: none">there are no specific combinations of signs or symptoms for diagnosing CAPAthe risk of having CAPA may increase with age and chronic lung disease. <p>When deciding whether to suspect CAPA in someone who is critically ill and has, or has had, COVID-19 as part of their acute illness:</p> <ul style="list-style-type: none">base your decisions on individual risk factors and the person's clinical conditioninvolve a multidisciplinary team, including infection specialistsrefer to local protocols on diagnosing and managing CAPA. <p>Only use antifungal treatments to treat CAPA if:</p> <ul style="list-style-type: none">diagnostic investigations support a diagnosis of CAPA orthe results of diagnostic investigations are not available yet, but CAPA is suspected, and a multidisciplinary team or local protocols support starting treatment. <p>When considering antifungal treatment for CAPA:</p> <ul style="list-style-type: none">discuss treatment options with a multidisciplinary team that includes infection specialistsfollow local protocols that include best practice guidance on treating invasive aspergillosis. <p>For people having antifungal treatment for suspected CAPA, stop treatment if the results of investigations do not support a diagnosis of CAPA and a multidisciplinary team agrees.</p>				
URINARY TRACT INFECTIONS. Refer to Public Health England UTI guidance for diagnosis information: https://www.gov.uk/government/publications/urinary-tract-infection-diagnosis ¹¹ Take urine sample if new onset of delirium or one or more UTI symptoms					
UTI (lower), including pregnancy	See Appendix 5		See Appendix 5		See NICE NG109 and algorithm in Appendix 5. People > 65 years: do not treat asymptomatic bacteriuria; it is common but is not associated with increased morbidity
UTI (catheter)	See Appendix 4		See Appendix 4		See NICE NG113 and algorithm in Appendix 4. Catheter in situ: antibiotics will not eradicate

Infection	First Choice	BNF Dosage / Length of Treatment	Second Choice	BNF Dosage/ Length of Treatment	Comments
					asymptomatic bacteriuria; only treat if systemically unwell or pyelonephritis likely Do not use prophylactic antibiotics for catheter changes unless history of catheter-change-associated UTI
UTI in children See BNF for children for dosage	See Appendix 5.		See Appendix 5.		<p>See NICE CG54, NG109 and algorithm in Appendix 5.</p> <p>Child <3 months: refer urgently for assessment Child 3 months or older but younger than 3 years, follow dipstick as per NICE CG54. Child 3 years or older:</p> <ul style="list-style-type: none"> - If leukocyte esterase and nitrite positive start antibiotics - If leukocyte esterase negative and nitrite positive, start antibiotics if tested on fresh urine sample and await cultures - If leukocyte esterase positive and nitrite negative, do not start antibiotics for UTI unless clinical evidence of UTI - If both leukocyte esterase and nitrite negative, do not start antibiotics <p>Send pre-treatment MSU for all.</p> <p>Imaging: only refer if child <6 months or atypical UTI</p> <p>Male children treat and refer If under 16 years old and presenting with unexplained fever ($\geq 38^{\circ}\text{C}$), test urine sample within 24 hours</p> <p>For infants and children 3 months or older with</p>

Infection	First Choice	BNF Dosage / Length of Treatment	Second Choice	BNF Dosage/ Length of Treatment	Comments
					acute pyelonephritis/upper urinary tract infection, treat with antibiotics in line with the NICE guideline on pyelonephritis (acute): antimicrobial prescribing. For infants and children 3 months or older with cystitis/lower urinary tract infection, treat with antibiotics in line with the NICE guideline on urinary tract infection (lower): antimicrobial prescribing. Upper UTI: Refer to paediatrics to obtain urine sample for culture, assess for signs of systemic infection and consider systemic antimicrobials
Acute pyelonephritis	See Appendix 7.		See Appendix 7.		See NICE NG111, and algorithm in Appendix 7. If admission not needed, send MSU for culture & sensitivities and offer antibiotic. If no response within 48 hours, admit. Second line agents should be dependent upon cultures and sensitivities.
Acute Prostatitis	See Appendix 6.		See Appendix 6.		See NICE NG110, and algorithm (Appendix 6). Send MSU for culture and offer antibiotic. 4-wk course may prevent chronic prostatitis. Quinolones achieve higher prostate levels.
GASTRO-INTESTINAL TRACT INFECTIONS					
Oral Candidiasis	Miconazole oral gel	20mg/ml QDs (hold in mouth after food) 7 days + 2 days after symptoms resolve			Topical azoles are more effective than topical nystatin. Oral candidiasis is rare in immunocompetent adults Consider undiagnosed risk factors, including HIV Use 50mg fluconazole if extensive/severe

Infection	First Choice	BNF Dosage / Length of Treatment	Second Choice	BNF Dosage/ Length of Treatment	Comments
	If not tolerated: Nystatin suspension Fluconazole	100,000 units/ml 1ml QDS 7 days + 2 days after symptoms resolve 50mg/100mg (see comments) OD 7-14 days			candidiasis if HIV or immunocompromised, use 100mg fluconazole.
Eradication of <i>Helicobacter pylori</i> (adults)	First-line treatment See Appendix 13.	See Appendix 13.	Second-line treatment See Appendix 13.	See Appendix 13.	See NICE CG184 and Appendix 13. If using fluoroquinolones, see warning in 18.2, “principles of treatment”, above. Seek advice from a gastroenterologist if eradication of <i>H.pylori</i> is not successful with second-line treatment. Oxytetracycline may cause an increase in serum lithium levels when taken concomitantly with lithium-containing medications. The lithium dosage should either be adjusted or concomitant treatment stopped, as appropriate. ²³
<i>Clostridioides difficile</i> infection	First-line treatment See Appendix 18.	See Appendix 18.	Second-line treatment See Appendix 18.	See Appendix 18.	See NICE NG199 and Appendix 18.
GENITAL TRACT INFECTIONS					

Infection	First Choice	BNF Dosage / Length of Treatment	Second Choice	BNF Dosage/ Length of Treatment	Comments
STI screening	People with risk factors should be screened for chlamydia, gonorrhoea, HIV, syphilis. Refer individual and partners to GUM service. Risk factors: <25yr, no condom use, recent (<12mth)/frequent change of partner, symptomatic partner, area of high HIV.				
Chlamydia trachomatis / urethritis	Doxycycline OR Azithromycin <i>Pregnant or breastfeeding:</i> Azithromycin	100mg BD for 7 days 1g as a single dose 1g (off-label use), stat			Opportunistically screen all aged 16-24yrs Treat partners and refer to GUM service Pregnancy or breastfeeding: azithromycin is the most effective option Repeat test for cure in all at 3 months Due to lower cure rate in pregnancy, test for cure at least 3 weeks after treatment Avoid doxycycline in Pregnancy & breastfeeding. Sexual partner will require concurrent treatment. For suspected epididymitis in men over 35 years or those with high risk of STI refer to GUM
For suspected epididymitis in men (>35 years, low risk of STI)	Doxycycline	100mg BD for 14days	Ofloxacin	400mg BD for 14 days	
Vaginal Candidiasis	Clotrimazole	500mg pessary stat OR 10% cream stat OR 100mg pessary for 6 days	Fluconazole (in resistant cases only) Recurrent (>4 episodes/year): Fluconazole	150mg oral capsule stat 150mg oral every 72 hours for 3 doses then weekly for 6 months	All topical and oral azoles give over 70% cure Pregnancy: avoid oral azole, use intravaginal for 7 days
Bacterial Vaginosis	Metronidazole	400mg BD for 7 days or 2g as a	Metronidazole 0.75% vaginal	One 5g applicatorful at	Oral metronidazole (MTZ) is as effective as topical treatment but is cheaper. Less relapse with 7 day

Infection	First Choice	BNF Dosage / Length of Treatment	Second Choice	BNF Dosage/ Length of Treatment	Comments
		single dose.	gel	night for 5 nights	than 2g stat at 4 weeks. Pregnant/breastfeeding: avoid 2g stat. Treating partners does not reduce relapse
Trichomoniasis	Metronidazole	2g as a single dose or 400mg BD for 7 days			Avoid metronidazole in first trimester of pregnancy. Also avoid 2g dose in pregnancy. Sexual partner will require concurrent treatment
Pelvic Inflammatory Disease	Metronidazole + Ofloxacin	400mg BD 400mg BD for 14days	For Gonorrhea: Metronidazole + Doxycycline + Ceftriaxone	400mg BD 14 days 100mg BD 14 days 500mg IM Stat	Refer woman and contacts to GUM service. Always culture for gonorrhoea and chlamydia. 28% of gonorrhoea isolates now resistant to quinolones. If gonorrhoea likely (partner has it, severe symptoms, sex abroad) use ceftriaxone or refer to GUM.
SKIN & SOFT TISSUE INFECTIONS					
Impetigo	See Appendix 15		See Appendix 15		See NICE NG153 and algorithm in Appendix 15.
Eczema	If no visible signs of infection use of antibiotics (alone or with steroids) encourages resistance and does not improve healing. In eczema with visible signs of infection, use treatment as in impetigo				
Cellulitis and erysipelas	See Appendix 12		See Appendix 12		See NICE NG141 and algorithm in Appendix 12.
Acne vulgaris	1 st Line: Self-care 2 nd line: Topical retinoid	OD or BD for at least 6 months OD	Clindamycin 1% cream If treatment failure or	BD for 12 weeks	SPC now advises that oxytetracycline may cause an increase in serum lithium levels when taken concomitantly with lithium-containing medications. The lithium dosage should either be adjusted or concomitant treatment stopped, as

Infection	First Choice	BNF Dosage / Length of Treatment	Second Choice	BNF Dosage/ Length of Treatment	Comments
	OR Benzoyl Peroxide (2.5%, 4%, 5% and 10%)	OD-BD For 6-8 weeks	severe: Oral tetracycline OR Oral doxycycline OR Erythromycin (if unresponsive or intolerant to tetracyclines)	500mg BD 100mg OD 500mg BD For 6-12 weeks	appropriate. ²³
Leg ulcers	Active infection if cellulitis/increased pain/pyrexia/purulent exudate/odour/localised warmth present				See NICE NG152 and algorithm in Appendix 14.
	See Appendix 14		See Appendix 14		Most leg ulcers are colonized. Antibiotics do not improve healing unless active infection.
MRSA					Discuss all active MRSA infection with a microbiologist
MRSA Decolonisation	Octenisan body wash (whole body, hair on days 2 & 4) If nasal colonisation: Mupirocin 2% nasal ointment	OD for 5 days BD for 3 – 5 days			High risk colonised patients (e.g patients with catheters, chronic skin lesions) without active infection refer to ICPG1 section 5 -Prevention & Management of MRSA in CHS & MH Inpatient Services.
PVL <i>S. aureus</i> HPA QRG	Panton-Valentine Leucocidin (PVL) is a toxin produced by 20.8-46% of <i>S. aureus</i> from boils/abscesses. PVL strains are rare in healthy people but severe. Send swabs if recurrent boils/abscesses. At risk: close contacts in communities, poor hygiene, close contact sports, military training camps, gyms and prisons. If found, suppression therapy should be given but only after primary infection				

Infection	First Choice	BNF Dosage / Length of Treatment	Second Choice	BNF Dosage/ Length of Treatment	Comments
	has resolved as treatment is ineffective if lesions are still leaking.				
Human/Animal Bites	Co-amoxiclav	375mg-625mg TDS for 7 days	If penicillin allergic: Metronidazole PLUS Doxycycline (animal bite) OR Metronidazole PLUS Clarithromycin (human bite) AND review at 24&48hrs. If no improvement, discuss with a microbiologist	400 mg TDS 100 mg BD 200-400 mg TDS 250-500 mg BD. All for 7 days	Human: Thorough irrigation is important Assess risk of tetanus, HIV, hepatitis B&C, rabies Antibiotic prophylaxis is advised Cat: Always give prophylaxis Dog: Give prophylaxis if dogbite/puncture wound, bite to hand, foot, face, joint, tendon, ligament, immunocompromised/ /diabetic/asplenic/cirrhotic/presence of prosthetic valve or prosthetic joint
Insect bites and stings	See Appendix 17		See Appendix 17		See NICE NG182 and algorithm in Appendix 17. First choice is self-care: <ul style="list-style-type: none"> • a community pharmacist can advise about self-care treatments • skin redness and itching are common and may last for up to 10 days • it is unlikely that the skin will become infected • avoiding scratching may reduce inflammation and the risk of infection • seek medical help if symptoms develop or

Infection	First Choice	BNF Dosage / Length of Treatment	Second Choice	BNF Dosage/ Length of Treatment	Comments
					worsen rapidly or significantly at any time, or they become systemically unwell
Scabies	Permethrin	5% cream, 2 applications 1 week apart	<i>If allergy:</i> Malathion	0.5% aqueous liquid. 2 applications 1 week apart	Treat all home & sexual contacts within 24h Treat whole body from ear/chin downwards and under nails. If under 2/elderly, also face/scalp Refer to ICPG1 – Section 8 - Infestations
Fungal infection – skin	Topical terbinafine	BD, 1-4 weeks	Topical imidazole or (<i>athlete's foot only</i>): topical undecanoates (Mycota®)	OD - BD for 4-6wks	Terbinafine is fungicidal, so treatment time shorter than with fungistatic imidazoles If candida possible, use imidazole If intractable: send skin scrapings to microbiology lab. If infection confirmed, use <i>oral</i> terbinafine/itraconazole Scalp: oral therapy and discuss with specialist
Fungal infection – fingernail or toenail	Terbinafine	250 mg OD Fingers: 6 weeks Toes: 12 weeks	Itraconazole	200 mg BD, 7 days monthly Fingers: 2 courses Toes: 3 courses	Take nail clippings: start therapy only if infection is confirmed by laboratory Terbinafine is more effective than azoles Liver reactions rare with oral antifungals If candida or non-dermatophyte infection confirmed, use oral itraconazole For children, seek specialist advice To prevent recurrence: apply weekly 1% topical antifungal to entire area. Stop treatment when continual, new, healthy, proximal nail growth
Varicella zoster/ chicken pox Consider	Aciclovir	800mg 5 times daily for 7 days			Pregnant/immunocompromised/neonate: seek urgent specialist advice Note: for patients with severe renal impairment (CKD 4-5) dose of aciclovir must be reduced

Infection	First Choice	BNF Dosage / Length of Treatment	Second Choice	BNF Dosage/ Length of Treatment	Comments
aciclovir if onset of rash <24h & one of the following: >14yrs or severe pain or dense/oral rash or 2° household case or steroids or smoker					
Herpes zoster/ Shingles Treat if >50 yrs and within 72 hrs of rash (PHN rare if <50yrs); or if active ophthalmic or Ramsey Hunt or eczema.	Aciclovir	800mg 5 times daily for 7 days			Note: for patients with severe renal impairment (CKD 4-5) dose of aciclovir must be reduced
Cold sores	Cold sores resolve after 5 days without treatment. Topical antivirals applied prodromally reduce duration by 12-18hrs If frequent, severe and predictable triggers: consider oral prophylaxis – aciclovir 400mg BD for 5-7 days				
EYE INFECTIONS					
Conjunctivitis	Chloramphenicol 0.5% drops	2 hourly for 2 days then 4 hourly (whilst awake)	Fusidic acid 1% gel	Use twice a day	Most bacterial conjunctivitis is self-limiting. 65% resolve on placebo by day five therefore treat only if severe

Infection	First Choice	BNF Dosage / Length of Treatment	Second Choice	BNF Dosage/ Length of Treatment	Comments
	or 1% ointment	3 – 4 times a day if used alone or at night if in combination with drops			Red eye with mucopurulent, not watery discharge. Usually unilateral but may spread Fusidic acid has less Gram-negative activity Treat until 48 hours after resolution of symptoms
DENTAL INFECTIONS – derived from the Scottish Dental Clinical Effectiveness Programme 2011 SDCEP Guidelines This guidance is not designed to be a definitive guide to oral conditions. It is for GPs for the management of acute oral conditions pending being seen by a dentist or dental specialist. GPs should not routinely be involved in dental treatment and, if possible, advice should be sought from the patient's dentist, who should have an answer-phone message with details of how to access treatment out-of-hours, or telephone 111.					
Mucosal ulceration and inflammation (simple gingivitis)	Simple saline mouthwash Chlorhexidine 0.12-0.2% <i>(Do not use within 30 mins of toothpaste)</i>	½ tsp salt dissolved in glass warm water Rinse mouth for 1 minute BD with 5 ml diluted with 5-10 ml water.	Hydrogen peroxide 6%	Rinse mouth for 2 mins TDS with 15ml diluted in ½ glass warm water.	Always spit out after use. Use until lesions resolve or less pain allows oral hygiene. Temporary pain and swelling relief can be attained with saline mouthwash Use antiseptic mouthwash: If more severe & pain limits oral hygiene to treat or prevent secondary infection. The primary cause for mucosal ulceration or inflammation (aphthous ulcers, oral lichen planus, herpes simplex infection, oral cancer) needs to be evaluated and treated.
Acute necrotising ulcerative gingivitis	If systemic signs/symptoms : Chlorhexidine or hydrogen peroxide as per		Metronidazole	400 mg TDS for 3 days	Commence metronidazole in the presence of systemic signs and symptoms and refer to dentist for scaling and oral hygiene advice. Use in combination with antiseptic mouthwash (Chlorhexidine 0.2% or hydrogen peroxide 6% as per mucosal ulceration) if pain limits oral hygiene

Infection	First Choice	BNF Dosage / Length of Treatment	Second Choice	BNF Dosage/ Length of Treatment	Comments
	mucosal ulceration and inflammation advice above				
Pericoronitis	Amoxicillin	500 mg TDS for 3 days	Metronidazole	400 mg TDS for 3 days	Refer to dentist for irrigation & debridement. If persistent swelling or systemic symptoms use metronidazole. Use in combination with antiseptic mouthwash (chlorhexidine or hydrogen peroxide) if pain limits oral hygiene.
Dental abscess	The empirical use of cephalosporins, co-amoxiclav, clarithromycin, and clindamycin do not offer any advantage for most dental patients and should only be used if no response to first line drugs when referral is the preferred option				
	Amoxicillin or Penicillin V Severe / spreading infection Metronidazole	500mg – 1g TDS 500mg – 1g QDS For up to 5 days review at day 3 400mg TDS For 5 days	True penicillin allergy: Clarithromycin	500mg BD For up to 5 days review at day 3	Regular analgesia should be first option until a dentist can be seen for urgent drainage, as repeated courses of antibiotics for abscess are not appropriate. Repeated antibiotics alone, without drainage are ineffective in preventing spread of infection. Antibiotics are recommended if there are signs of severe infection, systemic symptoms or high risk of complications. Severe odontogenic infections; defined as cellulitis plus signs of sepsis, difficulty in swallowing, impending airway obstruction, Ludwigs angina. Refer urgently for admission to protect airway, achieve surgical drainage and IV antibiotics

18.5 Microbiology Support

For North Essex, microbiology advice can be sought from the microbiology team at Colchester General Hospital on 01206 747374. Dr Gillian Urwin is the Lead Microbiologist. Out of hours the on-call microbiologist can be contacted via 01206 747474.

For South Essex, please contact Southend Hospital Microbiology Department / on-call microbiologist via 01702 435555 (switchboard).

18.6 References

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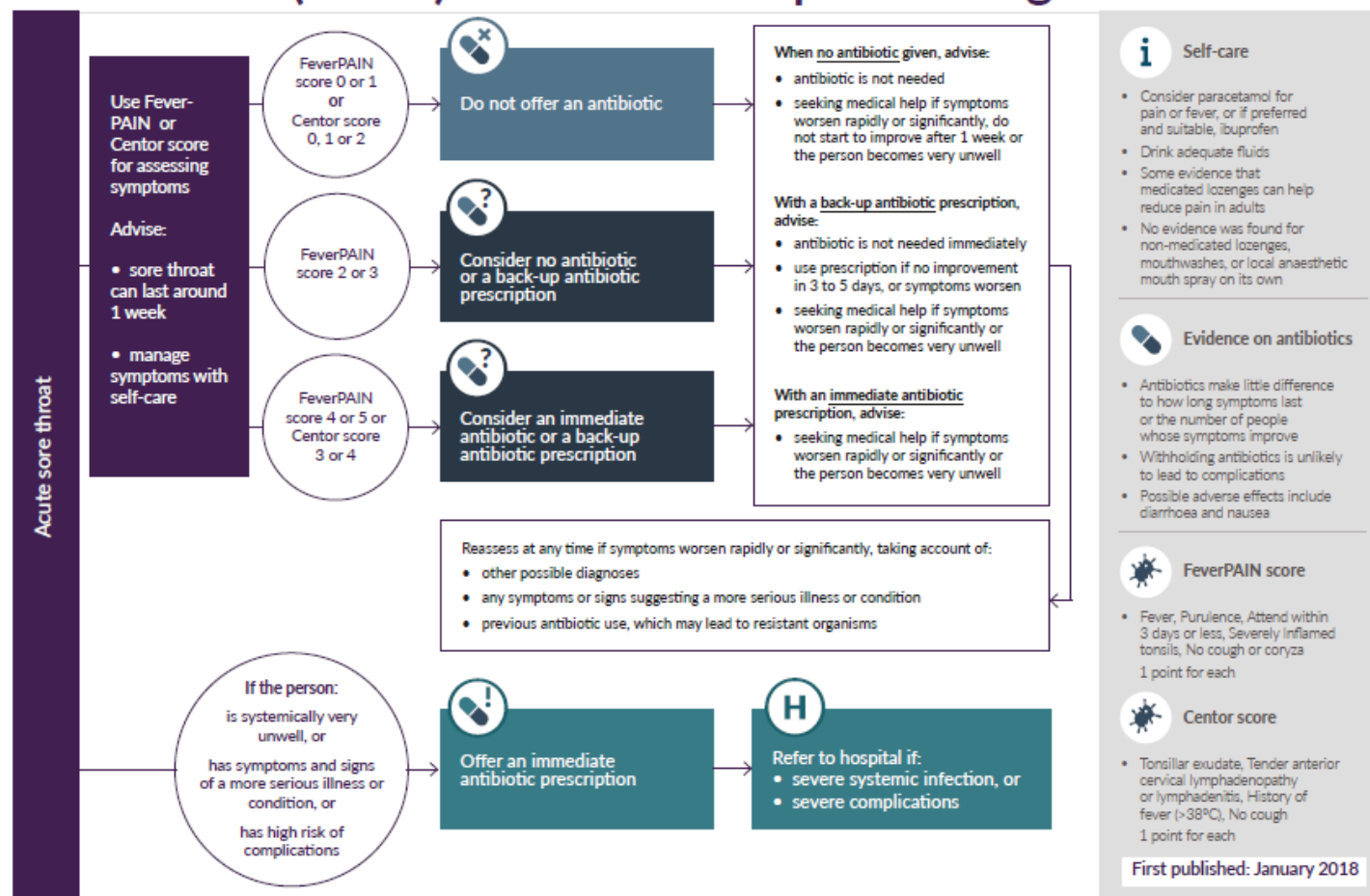
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Appendix 1 – NICE Treatment Algorithm – Acute Sore Throat

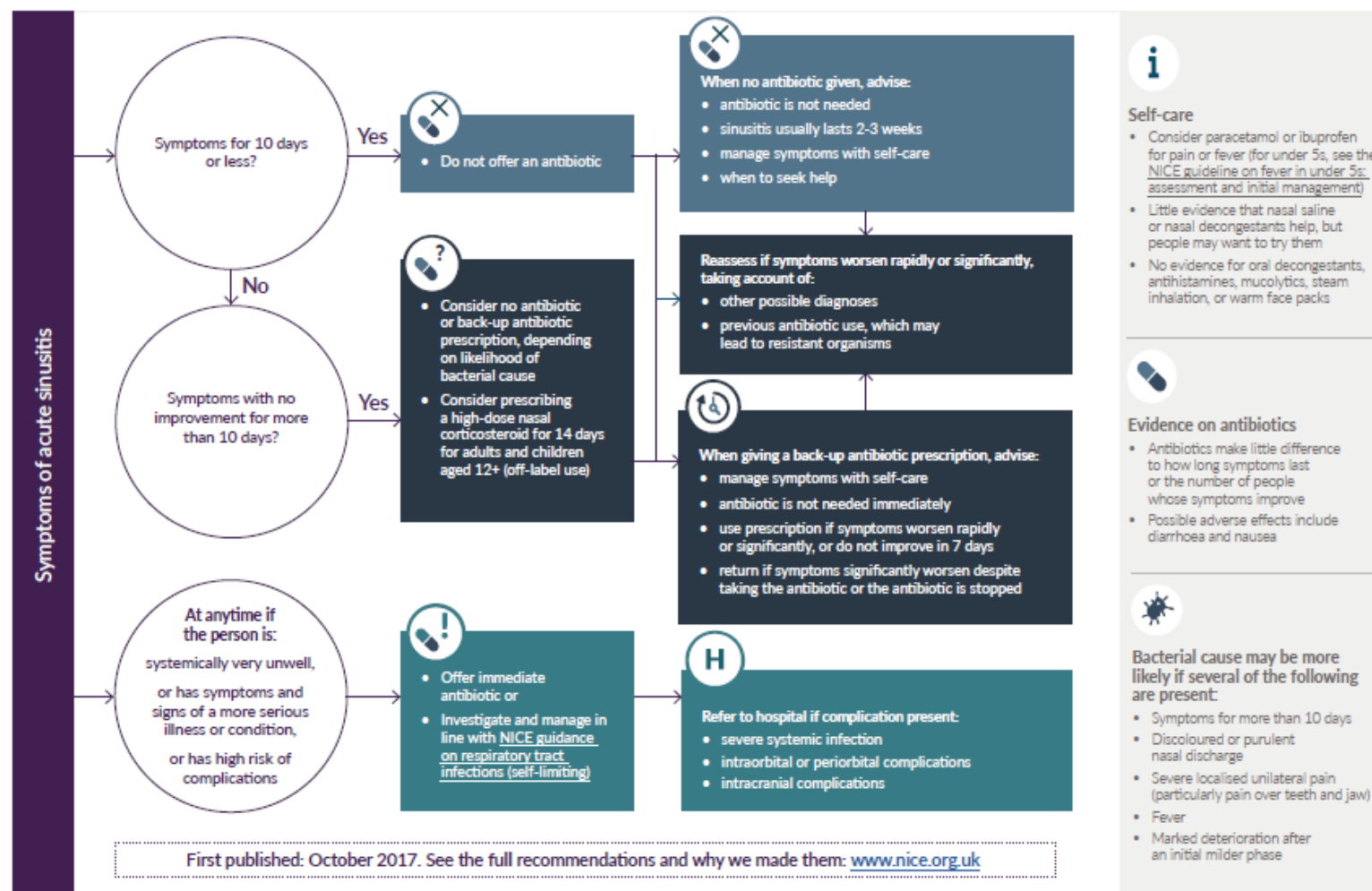
Sore throat (acute): antimicrobial prescribing

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Appendix 2 – NICE Treatment Algorithm - Sinusitis

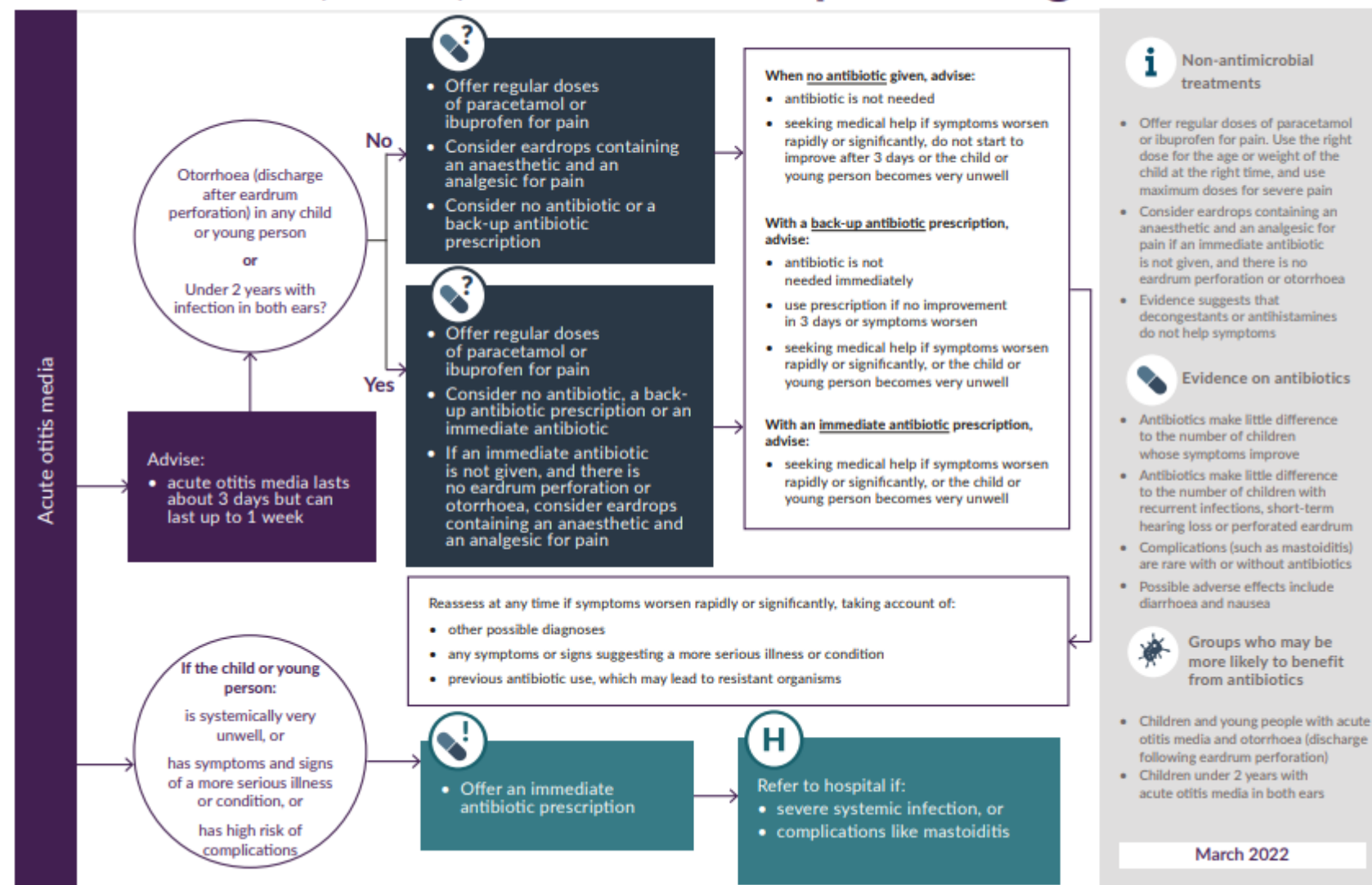
Sinusitis (acute): antimicrobial prescribing

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Appendix 3 – NICE Treatment Algorithm – Acute otitis media

Otitis media (acute): antimicrobial prescribing

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Otitis media (acute): antimicrobial prescribing **NICE** National Institute for Health and Care Excellence

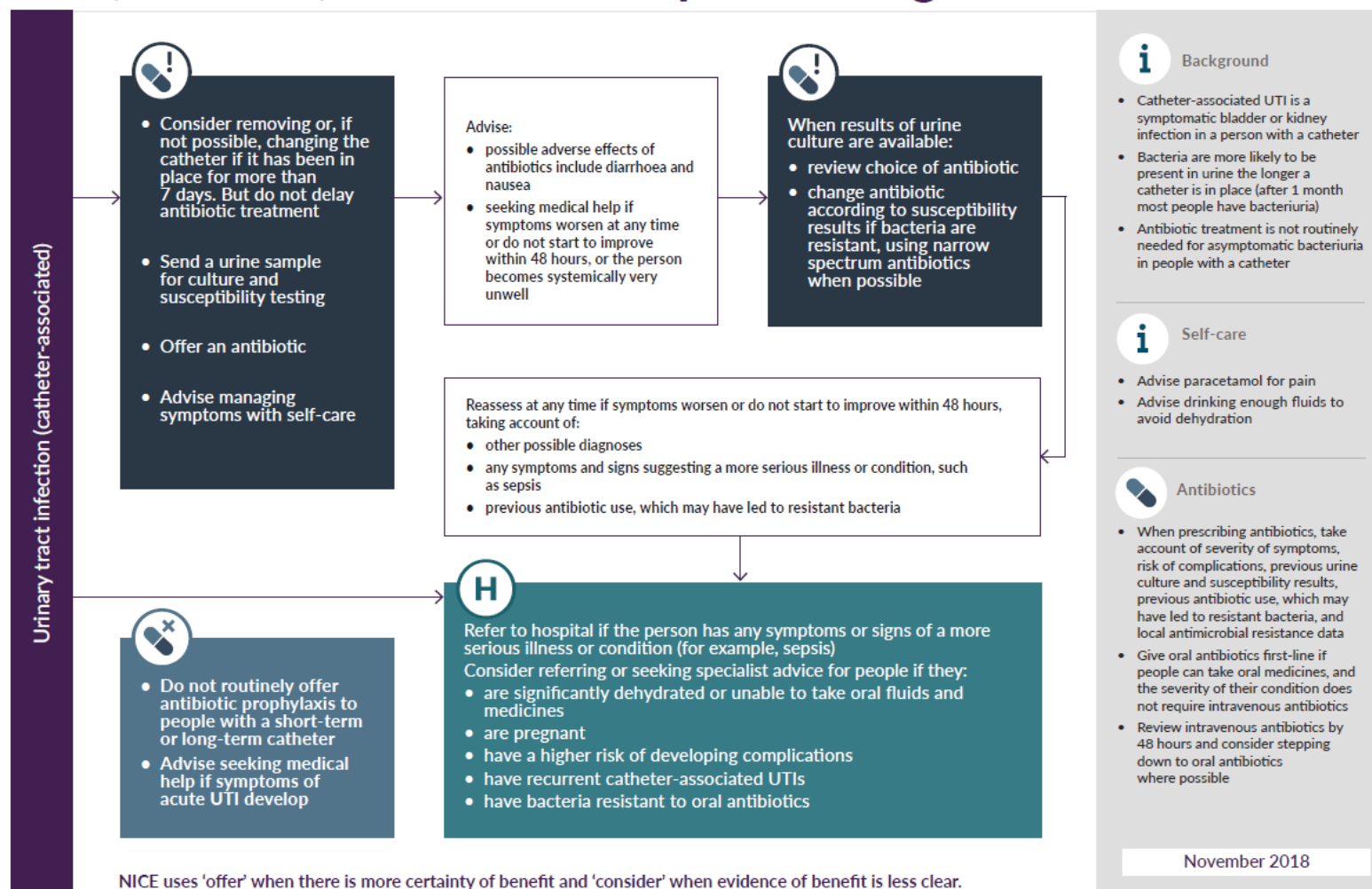
Choice of treatment: children and young people under 18 years

Treatment ¹	Dosage and course length ²
Eardrops containing an anaesthetic and an analgesic	
Phenazone 40 mg/g with lidocaine 10 mg/g	Apply 4 drops two or three times a day for up to 7 days Use only if an immediate oral antibiotic prescription is not given, and there is no eardrum perforation or otorrhoea
First choice oral antibiotic	
Amoxicillin	1 to 11 months: 125 mg three times a day for 5 to 7 days 1 to 4 years: 250 mg three times a day for 5 to 7 days 5 to 17 years: 500 mg three times a day for 5 to 7 days
Alternative first choice oral antibiotic for penicillin allergy or intolerance (for people who are not pregnant)	
Clarithromycin	1 month to 11 years: Under 8 kg: 7.5 mg/kg twice a day for 5 to 7 days 8 to 11 kg: 62.5 mg twice a day for 5 to 7 days 12 to 19 kg: 125 mg twice a day for 5 to 7 days 20 to 29 kg: 187.5 mg twice a day for 5 to 7 days 30 to 40 kg: 250 mg twice a day for 5 to 7 days or 12 to 17 years: 250 mg to 500 mg twice a day for 5 to 7 days
Alternative first choice oral antibiotic for penicillin allergy in pregnancy	
Erythromycin	8 to 17 years: 250 mg to 500 mg four times a day or 500 mg to 1,000 mg twice a day for 5 to 7 days Erythromycin is preferred if a macrolide is needed in pregnancy, for example, if there is true penicillin allergy and the benefits of antibiotic treatment outweigh the harms. See the Medicines and Healthcare products Regulatory Agency (MHRA) Public Assessment Report on the safety of macrolide antibiotics in pregnancy
Second choice oral antibiotic (worsening symptoms on first choice taken for at least 2 to 3 days)	
Co-amoxiclav	1 to 11 months: 0.25 ml/kg of 125/31 suspension three times a day for 5 to 7 days 1 to 5 years: 5 ml of 125/31 suspension three times a day or 0.25 ml/kg of 125/31 suspension three times a day for 5 to 7 days 6 to 11 years: 5 ml of 250/62 suspension three times a day or 0.15 ml/kg of 250/62 suspension three times a day for 5 to 7 days 12 to 17 years: 250/125 mg three times a day or 500/125 mg three times a day for 5 to 7 days
Alternative second choice oral antibiotic for penicillin allergy or intolerance	
Consult local microbiologist	
¹ See the BNF for children for appropriate use and dosing in specific populations, for example, hepatic impairment and renal impairment. ² The age bands apply to children of average size. In practice, the prescriber will use age bands along with other factors such as the severity of the condition and the child's size in relation to the average size of children of the same age. Doses given are by mouth using immediate-release medicines, unless otherwise stated.	

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.

UTI (catheter): antimicrobial prescribing

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UTI (catheter): antimicrobial prescribing

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

Antibiotic ¹	Dosage and course length
First choice oral antibiotic if no upper UTI symptoms ²	
Nitrofurantoin – if eGFR ≥ 45 ml/minute ^{3,4}	100 mg modified-release twice a day for 7 days
Trimethoprim – if low risk of resistance ⁵	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) ²	
Pivmecillinam (a penicillin) ⁴	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 ²	
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 ⁶)	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 ^{2,7}	
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 ⁶)	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 ⁸
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) ⁸

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 ¹	Dosage and course length
Second choice intravenous antibiotic - consult local microbiologist	
¹ See BNF for use and dosing in specific populations, for example, hepatic and renal impairment, breastfeeding and for administering intravenous antibiotics. ² Check any previous culture and susceptibility results, and previous antibiotic prescribing and choose antibiotics accordingly. ³ 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). ⁴ Nitrofurantoin and pivmecillinam are only licensed for uncomplicated lower UTIs, and are not suitable for people with upper UTI symptoms or a blocked catheter. ⁵ 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. ⁶ 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. ⁷ Review intravenous antibiotics by 48 hours and consider stepping down to oral antibiotics. ⁸ Therapeutic drug monitoring and assessment of renal function is required (BNF, August 2018).	

Choice of antibiotic: pregnant women aged 12 years and over

Antibiotic ¹	Dosage and course length
First choice oral antibiotic ²	
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) ^{2,3}	
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	
¹ See BNF for appropriate use and dosing in specific populations, for example, hepatic and renal impairment, and for administering intravenous antibiotics. ² Check any previous urine culture and susceptibility results, and antibiotic prescribing, and choose antibiotics accordingly. ³ Review intravenous antibiotics by 48 hours and consider stepping down to oral antibiotics where possible.	

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UTI (catheter): antimicrobial prescribing

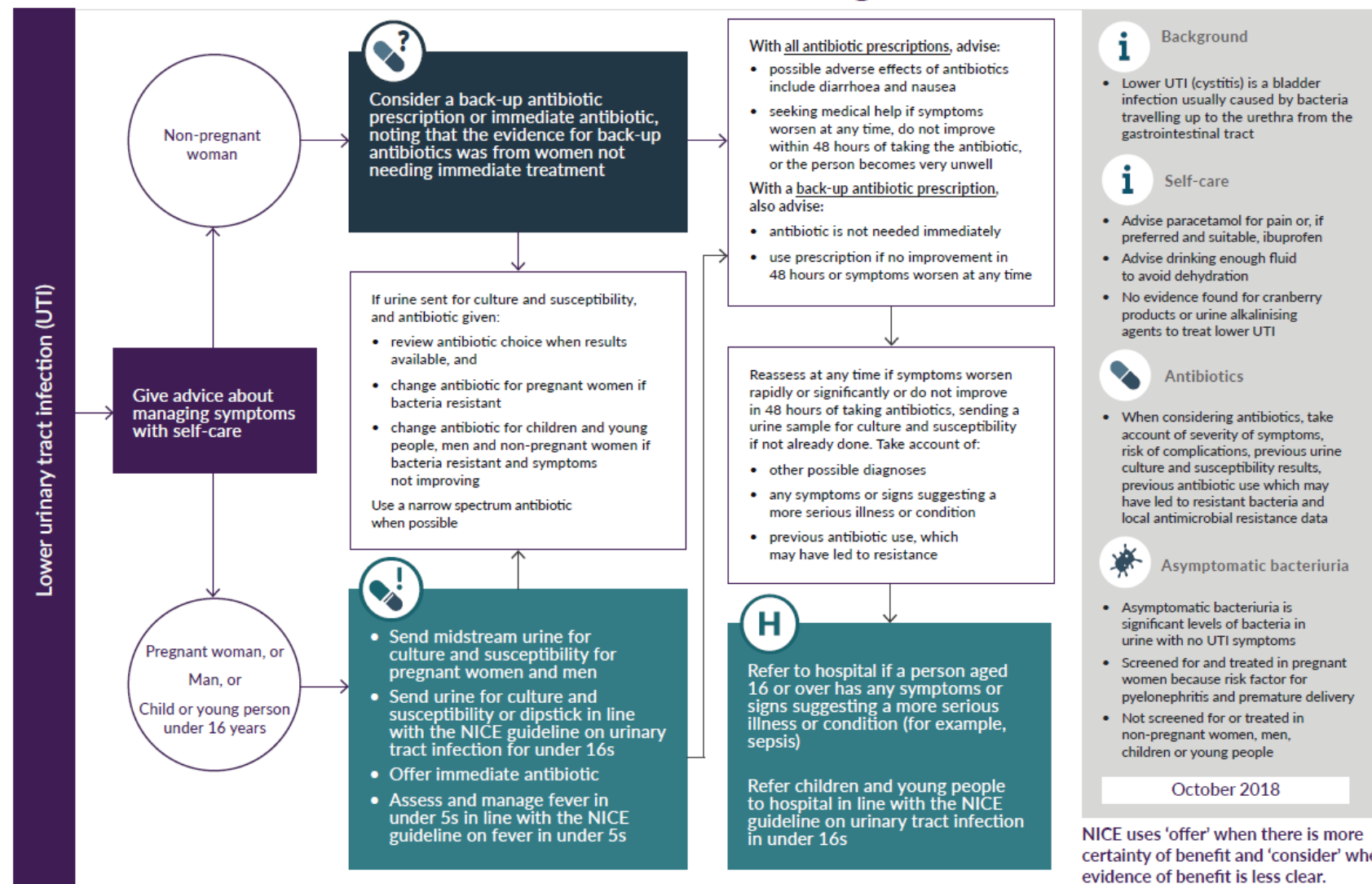
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Choice of antibiotic: children and young people under 16 years

Antibiotic ¹	Dosage and course length ²
Children under 3 months – Refer to paediatric specialist and treat with intravenous antibiotics in line with the NICE guideline on fever in under 5s	
Children aged 3 months and over – First choice oral antibiotics ³	
Trimethoprim – if low risk of resistance ⁴	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
Children aged 3 months and over – First choice intravenous antibiotic (if vomiting, unable to take oral antibiotics or severely unwell). Antibiotics may be combined if susceptibility or sepsis a concern ^{3,5,6}	
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 ⁷
Amikacin	Initially 15 mg/kg once a day, subsequent doses adjusted according to serum-amikacin concentration ⁷
Children aged 3 months and over – Second choice intravenous antibiotic: Consult local microbiologist	
¹ 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. ² 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. ³ 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. ⁴ 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. ⁵ Review intravenous antibiotics by 48 hours and consider stepping down to oral antibiotics where possible for a total antibiotic course of 10 days. ⁶ If intravenous treatment is not possible, consider intramuscular treatment, if suitable. ⁷ Therapeutic drug monitoring and assessment of renal function is required (BNFC, August 2018).	

Appendix 5 – NICE NG109 Treatment Algorithm – UTI (lower)

UTI (lower): antimicrobial prescribing

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UTI (lower): antimicrobial prescribing

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

Antibiotic ¹	Dosage and course length ²
First choice³	
Nitrofurantoin - if eGFR ≥ 45 ml/minute ⁴	100 mg modified-release twice a day for 3 days
Trimethoprim - if low risk of resistance ⁵	200 mg twice a day for 3 days
Second choice (no improvement in lower UTI symptoms on first choice taken for at least 48 hours, or when first choice not suitable)^{3,6}	
Nitrofurantoin - if eGFR ≥ 45 ml/minute ⁴ and not first choice	100 mg modified-release twice a day for 3 days
Pivmecillinam (a penicillin)	400 mg initial dose, then 200 mg three times a day for a total of 3 days
Fosfomycin	3 g single dose sachet
¹ See BNF for use and dosing in specific populations, for example, hepatic impairment, renal impairment and breast-feeding. ² Doses given are by mouth using immediate-release medicines, unless otherwise stated. ³ Check any previous urine culture and susceptibility results and antibiotic prescribing and choose antibiotics accordingly. ⁴ 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). ⁵ A lower risk of resistance may be more 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 local epidemiology data suggest resistance is low. A higher risk of resistance may be more likely with recent use and in older people in residential facilities. ⁶ If there are symptoms of pyelonephritis or the person has a complicated UTI (associated with a structural or functional abnormality, or underlying disease, which increases the risk of a more serious outcome or treatment failure), see the recommendations on choice of antibiotic in the NICE antimicrobial prescribing guideline on acute pyelonephritis .	
Abbreviations: eGFR, estimated glomerular filtration rate.	

Choice of antibiotic: children and young people under 16 years

Antibiotic ¹	Dosage and course length ²
Refer children under 3 months to paediatric specialist and treat with intravenous antibiotics in line with the NICE guideline on fever in under 5s .	
Children aged 3 months and over - First choice^{3,4}	
Trimethoprim - if low risk of resistance ⁵	3 to 5 months, 4 mg/kg (maximum 200 mg per dose) or 25 mg twice a day for 3 days; 6 months to 5 years, 4 mg/kg (maximum 200 mg per dose) or 50 mg twice a day for 3 days; 6 to 11 years, 4 mg/kg (maximum 200 mg per dose) or 100 mg twice a day for 3 days; 12 to 15 years, 200 mg twice a day for 3 days
Nitrofurantoin - if eGFR ≥ 45 ml/minute ⁶	3 months to 11 years, 750 micrograms/kg four times a day for 3 days; 12 to 15 years, 50 mg four times a day or 100 mg modified-release twice a day for 3 days
Children aged 3 months and over - Second choice (worsening lower UTI symptoms on first choice taken for at least 48 hours or when first choice not suitable)^{3,4,7}	
Nitrofurantoin - if eGFR ≥ 45 ml/minute ⁶ and not first choice	3 months to 11 years, 750 micrograms/kg four times a day for 3 days; 12 to 15 years, 50 mg four times a day or 100 mg modified-release twice a day for 3 days
Amoxicillin (only if culture results available and susceptible)	1 to 11 months, 125 mg three times a day for 3 days; 1 to 4 years, 250 mg three times a day for 3 days; 5 to 15 years, 500 mg three times a day for 3 days
Cefalexin	3 to 11 months, 12.5 mg/kg or 125 mg twice a day for 3 days; 1 to 4 years, 12.5 mg/kg twice a day or 125 mg three times a day for 3 days; 5 to 11 years, 12.5 mg/kg twice a day or 250 mg three times a day for 3 days; 12 to 15 years, 500 mg twice a day for 3 days
¹ See BNF for children (BNFC) for use and dosing in specific populations. ² Age bands apply to children of average size; in practice the prescriber will use these with other factors. Doses given are by mouth using immediate release medicines, unless otherwise stated. ³ Check previous urine culture and susceptibility results and antibiotic prescribing. If receiving prophylactic antibiotics, treatment should be with a different antibiotic. ⁴ If 2 or more antibiotics are appropriate, choose the antibiotic with the lowest acquisition cost. Some children may also be able to take a tablet or part-tablet, rather than a liquid formulation if the dose is appropriate. ⁵ A lower risk of resistance may be more 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 suggest resistance is low. Risk of resistance may be higher with recent use and in older people in care homes. ⁶ 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 (BNFC, August 2018). ⁷ If there are symptoms of pyelonephritis or the person has a complicated UTI, see the recommendations on choice of antibiotic in the NICE antimicrobial prescribing guideline on acute pyelonephritis .	
Abbreviations: eGFR, estimated glomerular filtration rate.	

UTI (lower): antimicrobial prescribing

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Health and Care Excellence

Choice of antibiotic: pregnant women aged 12 years and over

Antibiotic ¹	Dosage and course length ²
First choice for treating lower UTI ³	
Nitrofurantoin (avoid at term) - if eGFR ≥ 45 ml/minute ^{4,5}	100 mg modified-release twice a day for 7 days
Second choice for treating lower UTI (no improvement in lower UTI symptoms on first choice taken for at least 48 hours or when first choice not suitable) ^{3,6}	
Amoxicillin (only if culture results available and susceptible)	500 mg three times a day for 7 days
Cefalexin	500 mg twice a day for 7 days
Alternative second choices	Consult local microbiologist, choose antibiotics based on culture and susceptibility results
Treating asymptomatic bacteriuria	
Choose from nitrofurantoin ^{4,5} , amoxicillin or cefalexin based on recent culture and susceptibility results	
¹ See BNF for appropriate use and dosing in specific populations, for example, hepatic impairment and renal impairment. ² Doses given are by mouth using immediate-release medicines, unless otherwise stated. ³ Check any previous urine culture and susceptibility results and antibiotic prescribing and choose antibiotics accordingly. ⁴ Avoid at term in pregnancy; may produce neonatal haemolysis (BNF, June 2018). ⁵ 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). ⁶ If there are symptoms of pyelonephritis or the person has a complicated UTI (associated with a structural or functional abnormality, or underlying disease, which increases the risk of a more serious outcome or treatment failure), see the recommendations on choice of antibiotic in the NICE antimicrobial prescribing guideline on acute pyelonephritis.	
Abbreviations: eGFR, estimated glomerular filtration rate.	

Choice of antibiotic: men aged 16 years and over

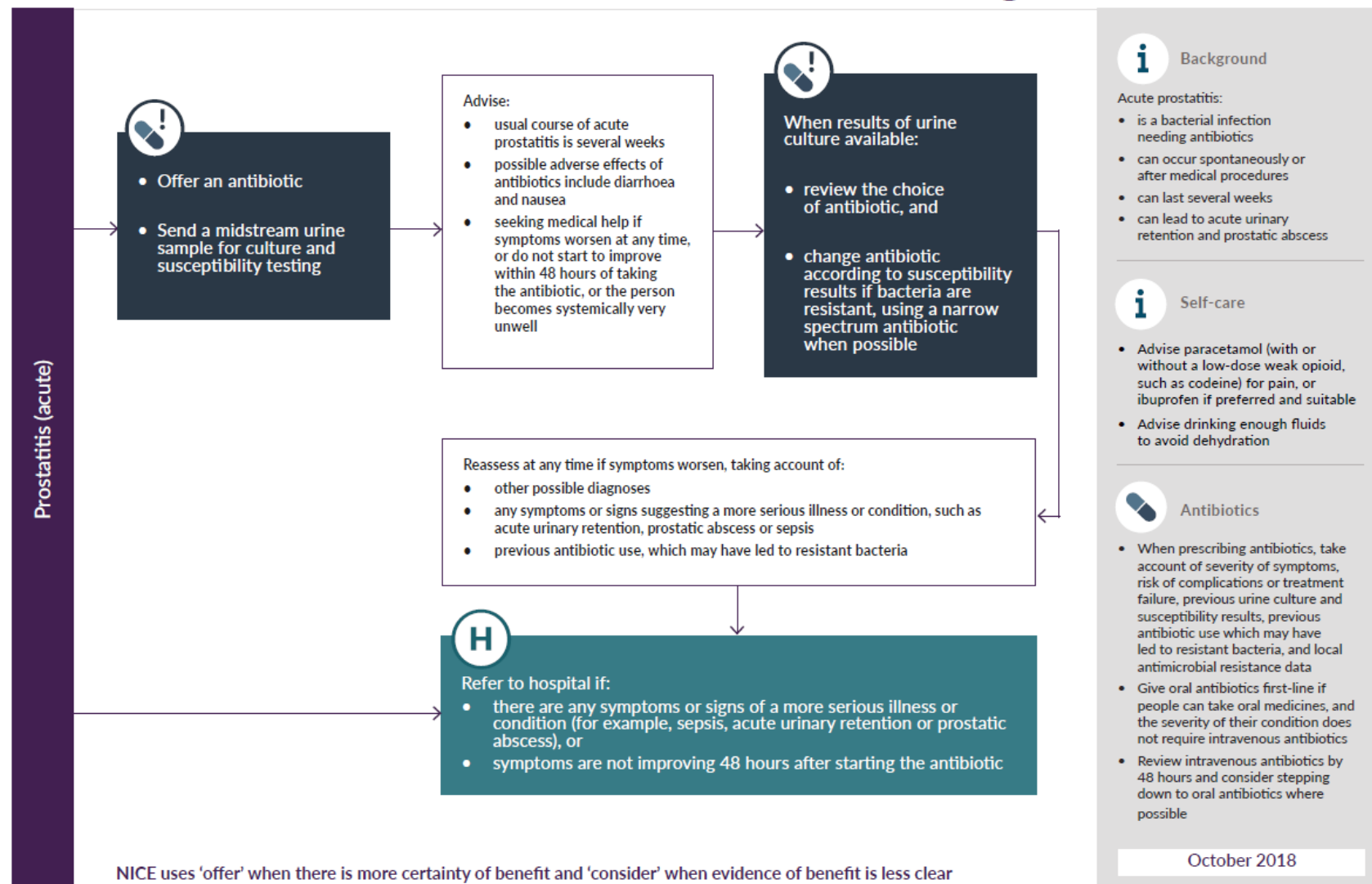
Antibiotic ¹	Dosage and course length ²
First choice ³	
Trimethoprim	200 mg twice a day for 7 days
Nitrofurantoin - if eGFR ≥ 45 ml/minute ^{4,5}	100 mg modified-release twice a day for 7 days
Second choice (no improvement in UTI symptoms on first choice taken for at least 48 hours or when first choice not suitable) ³	
Consider alternative diagnoses and follow recommendations in the NICE antimicrobial prescribing guidelines on acute pyelonephritis or acute prostatitis , basing antibiotic choice on recent culture and susceptibility results.	
¹ See BNF for appropriate use and dosing in specific populations, for example, hepatic impairment and renal impairment. ² Doses given are by mouth using immediate-release medicines, unless otherwise stated. ³ Check any previous urine culture and susceptibility results and antibiotic prescribing and choose antibiotics accordingly. ⁴ Nitrofurantoin is not recommended for men with suspected prostate involvement because it is unlikely to reach therapeutic levels in the prostate. ⁵ 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).	
Abbreviations: eGFR, estimated glomerular filtration rate.	

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.

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Appendix 6 – NICE NG110 Treatment Algorithm – Prostatitis

Prostatitis (acute): antimicrobial prescribing

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Prostatitis (acute): antimicrobial prescribing

NICE National Institute for Health and Care Excellence

Choice of antibiotic: adults aged 18 years and over

Antibiotic ¹	Dosage and course length
First choice oral antibiotic (guided by susceptibilities when available) ²	
Ciprofloxacin ³	500 mg twice a day for 14 days then review ⁴
Ofloxacin ³	200 mg twice a day for 14 days then review ⁴
Alternative first choice oral antibiotic for adults unable to take a fluoroquinolone (guided by susceptibilities when available) ²	
Trimethoprim	200 mg twice a day for 14 days then review ⁴
Second choice oral antibiotic (after discussion with a specialist)	
Levofloxacin ³	500 mg once a day for 14 days then review ⁴
Co-trimoxazole ⁵	960 mg twice a day for 14 days then review ⁴
First choice intravenous antibiotics (if unable to take oral antibiotics or severely unwell: guided by susceptibilities when available). Antibiotics may be combined if sepsis a concern ^{2,6}	
Ciprofloxacin ³	400 mg twice or three times a day
Levofloxacin ³	500 mg once a day
Cefuroxime	1.5 g three or four times a day
Ceftriaxone	2 g once a day
Gentamicin	Initially 5 to 7 mg/kg once a day, subsequent doses adjusted according to serum gentamicin concentration ⁷
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) ⁷
Second choice intravenous antibiotic - consult local microbiologist	
¹ See BNF for appropriate use and dosing in specific populations, for example, hepatic impairment and renal impairment, and administering intravenous antibiotics. ² Check previous urine culture and susceptibility results and antibiotic prescribing and choose antibiotics accordingly. ³ 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 appropriate in acute prostatitis which is a severe infection. ⁴ Review treatment after 14 days and either stop or continue for a further 14 days if needed (based on history, symptoms, clinical examination, urine and blood tests). ⁵ Only consider when there is bacteriological evidence of sensitivity and good reasons to prefer this combination to a single antibiotic (BNF, August 2018). ⁶ Review intravenous antibiotics by 48 hours and consider switching to oral antibiotics where possible for a total of 14 days, then review. ⁷ Therapeutic drug monitoring and assessment of renal function is required (BNF, August 2018).	

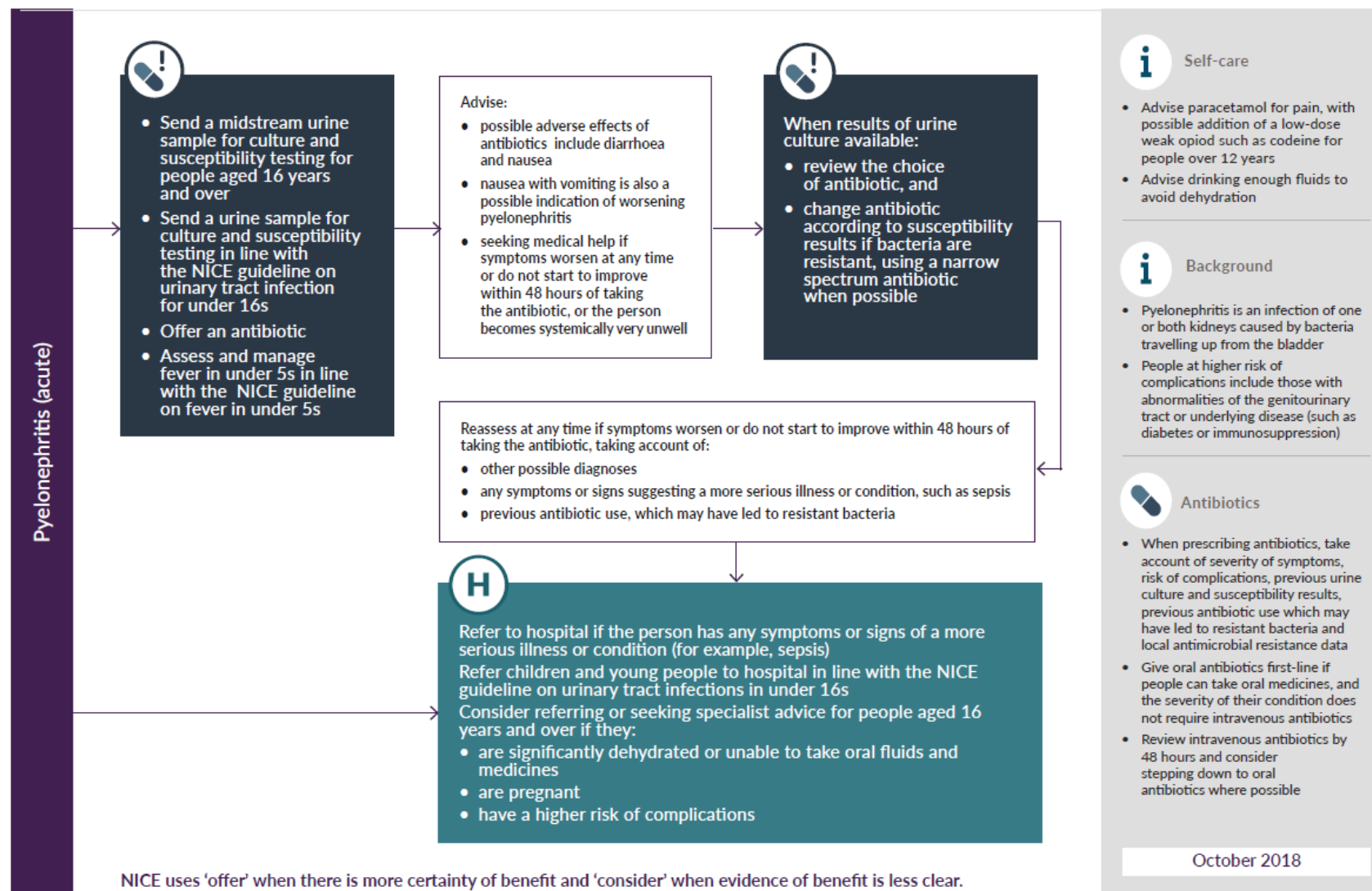
When exercising their judgement, professionals and practitioners are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or the people using their service. It is not mandatory to apply the recommendations, and the guideline does 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.

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Appendix 7 – NICE NG111 Treatment Algorithm – Acute pyelonephritis

Pyelonephritis (acute): antimicrobial prescribing

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Pyelonephritis (acute): antimicrobial prescribing

NICE National Institute for Health and Care Excellence

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

Antibiotic ¹	Dosage and course length
First choice oral antibiotic ²	
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 ³)	500 mg twice a day for 7 days
First choice intravenous antibiotics (if vomiting, unable to take oral antibiotics, or severely unwell). Antibiotics may be combined if susceptibility or sepsis a concern ^{2,4}	
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 ³)	400 mg twice or three times a day
Gentamicin	Initially 5 mg/kg to 7 mg/kg once a day, subsequent doses adjusted according to serum gentamicin concentration ⁵
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) ⁵
Second choice intravenous antibiotic - consult local microbiologist	
¹ See BNF for appropriate use and dosing in specific populations, for example, hepatic impairment, renal impairment and breast-feeding, and administering intravenous antibiotics. ² Check any previous urine culture, susceptibility and prescribing and choose antibiotics accordingly. ³ 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 acute pyelonephritis which is a severe infection. ⁴ Review intravenous antibiotics by 48 hours and consider stepping down to oral antibiotics. ⁵ Therapeutic drug monitoring and assessment of renal function is required (BNF, August 2018).	

Choice of antibiotic: pregnant women aged 12 years and over

Antibiotic ¹	Dosage and course length
First choice oral antibiotic ²	
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) ^{2,3}	
Cefuroxime	750 mg to 1.5 g three or four times a day
Second choice antibiotics or combining antibiotics if susceptibility or sepsis a concern	
Consult local microbiologist	
¹ See BNF for appropriate use and dosing in specific populations, for example, hepatic impairment and renal impairment, and administering intravenous antibiotics. ² Check any previous urine culture and susceptibility results and antibiotic prescribing and choose antibiotics accordingly. ³ Review intravenous antibiotics by 48 hours and consider stepping down to oral antibiotics where possible.	

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.

Pyelonephritis (acute): antimicrobial prescribing

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Choice of antibiotic: children and young people under 16 years

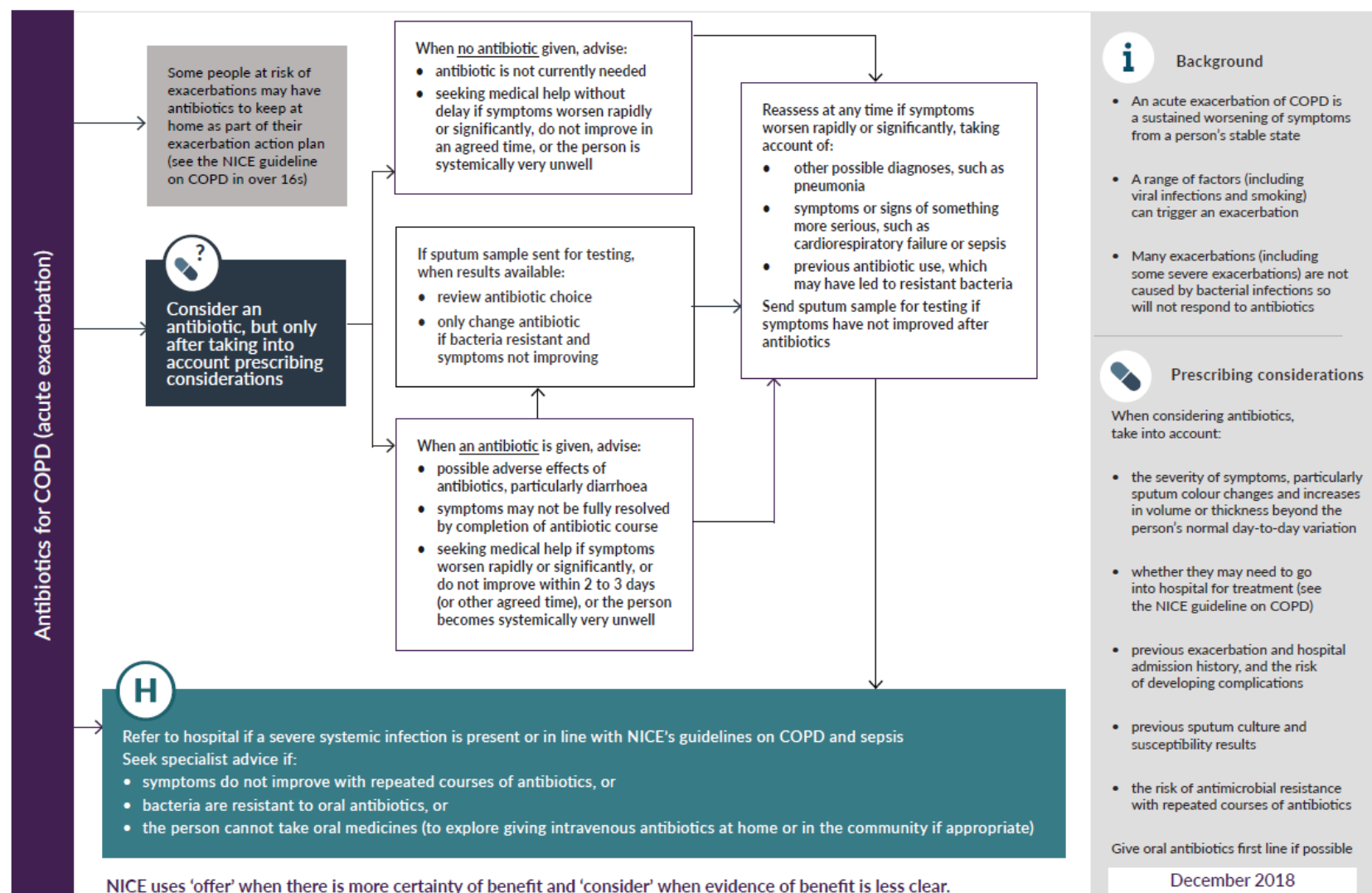
Antibiotic ¹	Dosage and course length ²
Refer children under 3 months to paediatric specialist and treat with intravenous antibiotics in line with the NICE guideline on fever in under 5s	
Children aged 3 months and over - First choice oral antibiotic ³	
Cefalexin	3 to 11 months, 12.5 mg/kg or 125 mg 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
Children aged 3 months and over - First choice intravenous antibiotics (if vomiting, unable to take oral antibiotics or severely unwell). Antibiotics may be combined if susceptibility or sepsis a concern ^{3,4,5}	
Co-amoxiclav (only in combination or if culture results available and susceptible)	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), increased to 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 ⁶
Amikacin	Initially 15 mg/kg once a day, subsequent doses adjusted according to serum amikacin concentration ⁶
Children aged 3 months and over - Second choice intravenous antibiotics - Consult local microbiologist	
¹ See BNF for children (BNFC) for appropriate use and dosing in specific populations, for example hepatic and renal impairment, and administering intravenous antibiotics. If a young woman is pregnant, refer to the prescribing table on choice of antibiotic for pregnant women aged 12 years and over. ² The age bands apply to children of average size and, in practice, the prescriber will use the age bands in conjunction with other factors such as the severity of the condition being treated and the child's size in relation to the average size of children of the same age. ³ Check any previous urine culture and susceptibility results and antibiotic prescribing and choose antibiotics accordingly. ⁴ Review intravenous antibiotics by 48 hours and consider stepping down to oral antibiotics where possible for a total of 10 days. ⁵ If intravenous treatment is not possible, consider intramuscular treatment, if suitable. ⁶ Therapeutic drug monitoring and assessment of renal function is required (BNFC, August 2018).	

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Appendix 8 – NICE NG114 Treatment Algorithm – Chronic obstructive pulmonary disease (acute exacerbation)

COPD (acute exacerbation): antimicrobial prescribing

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COPD (acute exacerbation): antimicrobial prescribing

NICE National Institute for
Health and Care Excellence

Choice of antibiotic for treating an acute exacerbation: adults aged 18 years and over

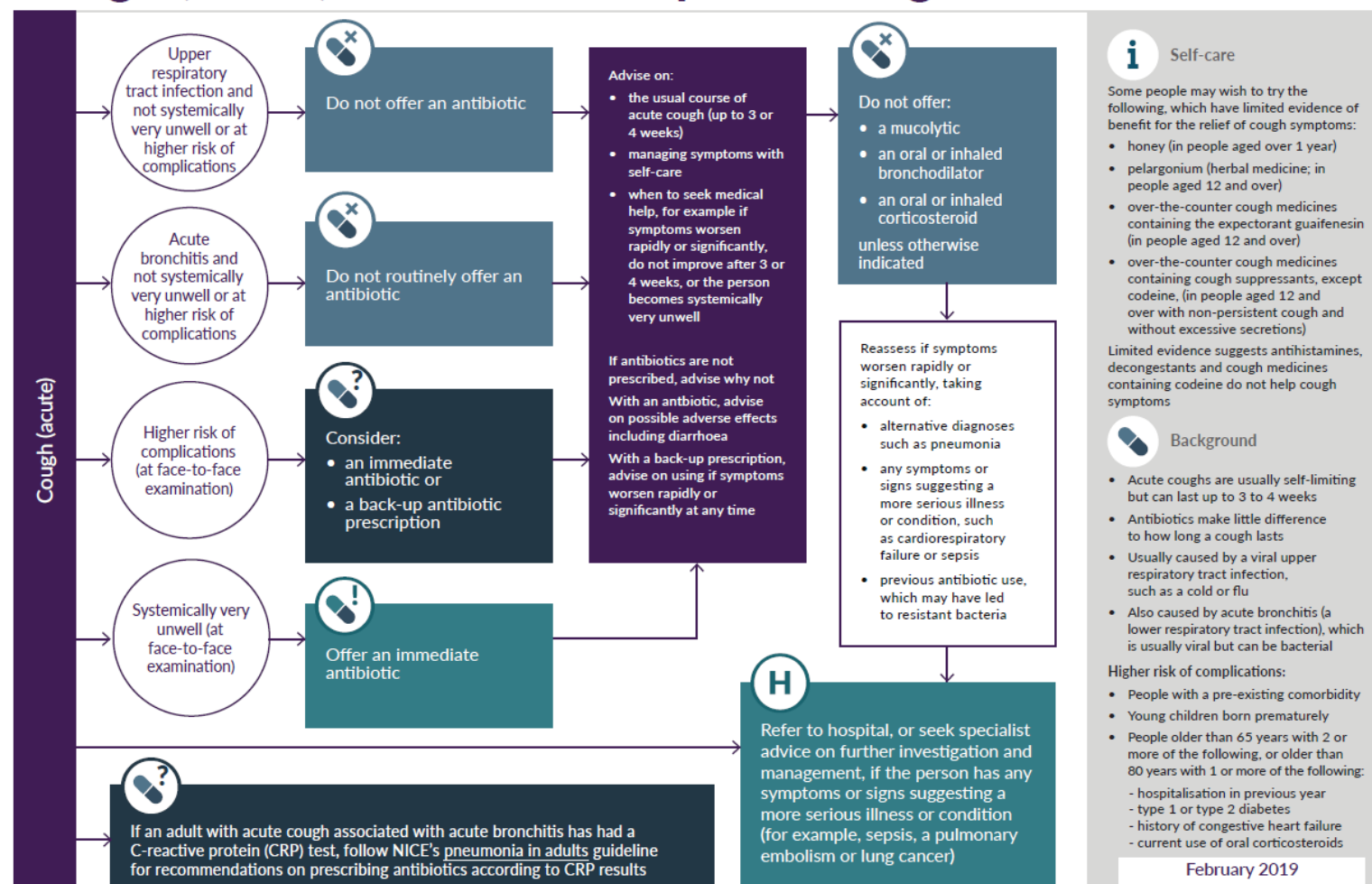
Antibiotic ^{1,2}	Dosage and course length
First choice oral antibiotics (empirical treatment or guided by most recent sputum culture and susceptibilities)	
Amoxicillin	500 mg three times a day for 5 days (see BNF for dosage in severe infections)
Doxycycline	200 mg on first day, then 100 mg once a day for 5-day course in total (see BNF for dosage in severe infections)
Clarithromycin	500 mg twice a day for 5 days (see BNF for dosage in severe infections)
Second choice oral antibiotics (no improvement in symptoms on first choice taken for at least 2 to 3 days; guided by susceptibilities when available)	
Use alternative first choice (from a different class)	As above
Alternative choice oral antibiotics (if person at higher risk of treatment failure ³ ; guided by susceptibilities when available)	
Co-amoxiclav	500/125 mg three times a day for 5 days
Levofloxacin ⁴	500 mg once a day for 5 days
Co-trimoxazole ⁵	960 mg twice a day for 5 days
First choice intravenous antibiotics (if unable to take oral antibiotics or severely unwell; guided by susceptibilities when available) ⁶	
Amoxicillin	500 mg three times a day (see BNF for dosage in severe infections)
Co-amoxiclav	1.2 g three times a day
Clarithromycin	500 mg twice a day
Co-trimoxazole ⁵	960 mg twice a day (see BNF for dosage in severe infections)
Piperacillin with tazobactam	4.5 g three times a day (see BNF for dosage in severe infections)
Second choice intravenous antibiotics	
Consult local microbiologist (guided by susceptibilities)	
¹ See BNF for appropriate use and dosing in specific populations, for example, hepatic impairment, renal impairment, and for administering intravenous antibiotics. ² Where a person is receiving antibiotic prophylaxis, treatment should be with an antibiotic from a different class. ³ People who may be at higher risk of treatment failure include people who have had repeated courses of antibiotics, a previous or current sputum culture with resistant bacteria, or people at higher risk of developing complications. ⁴ 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. This includes a recommendation not to use them for mild or moderately severe infections unless other antibiotics cannot be used (press release October 2018). ⁵ Co-trimoxazole should only be considered for use in acute exacerbations of COPD when there is bacteriological evidence of sensitivity and good reason to prefer this combination to a single antibiotic (BNF, October 2018). ⁶ Review intravenous antibiotics by 48 hours and consider stepping down to oral antibiotics where possible.	

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.

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Appendix 9 – NICE NG120 Treatment Algorithm – Cough (acute): antimicrobial prescribing

Cough (acute): antimicrobial prescribing



NICE uses 'offer' when there is more certainty of benefit and 'consider' when evidence of benefit is less clear.

Cough (acute): antimicrobial prescribing

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Choice of antibiotic: adults aged 18 years and over

Antibiotic ¹	Dosage and course length ²
First choice	
Doxycycline ³	200 mg on first day, then 100 mg once a day for 4 days (5-day course in total)
Alternative first choices ⁴	
Amoxicillin	500 mg three times a day for 5 days
Clarithromycin	250 mg to 500 mg twice a day for 5 days
Erythromycin	250 mg to 500 mg four times a day or 500 mg to 1000 mg twice a day for 5 days
¹ See BNF for appropriate use and dosing in specific populations, for example, hepatic impairment, renal impairment, pregnancy and breast-feeding ² Doses given are by mouth using immediate-release medicines, unless otherwise stated ³ Doxycycline should not be given to pregnant women, and the possibility of pregnancy should be considered in women of childbearing age (BNF , December 2018) ⁴ Amoxicillin or erythromycin are preferred in women who are pregnant	

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.

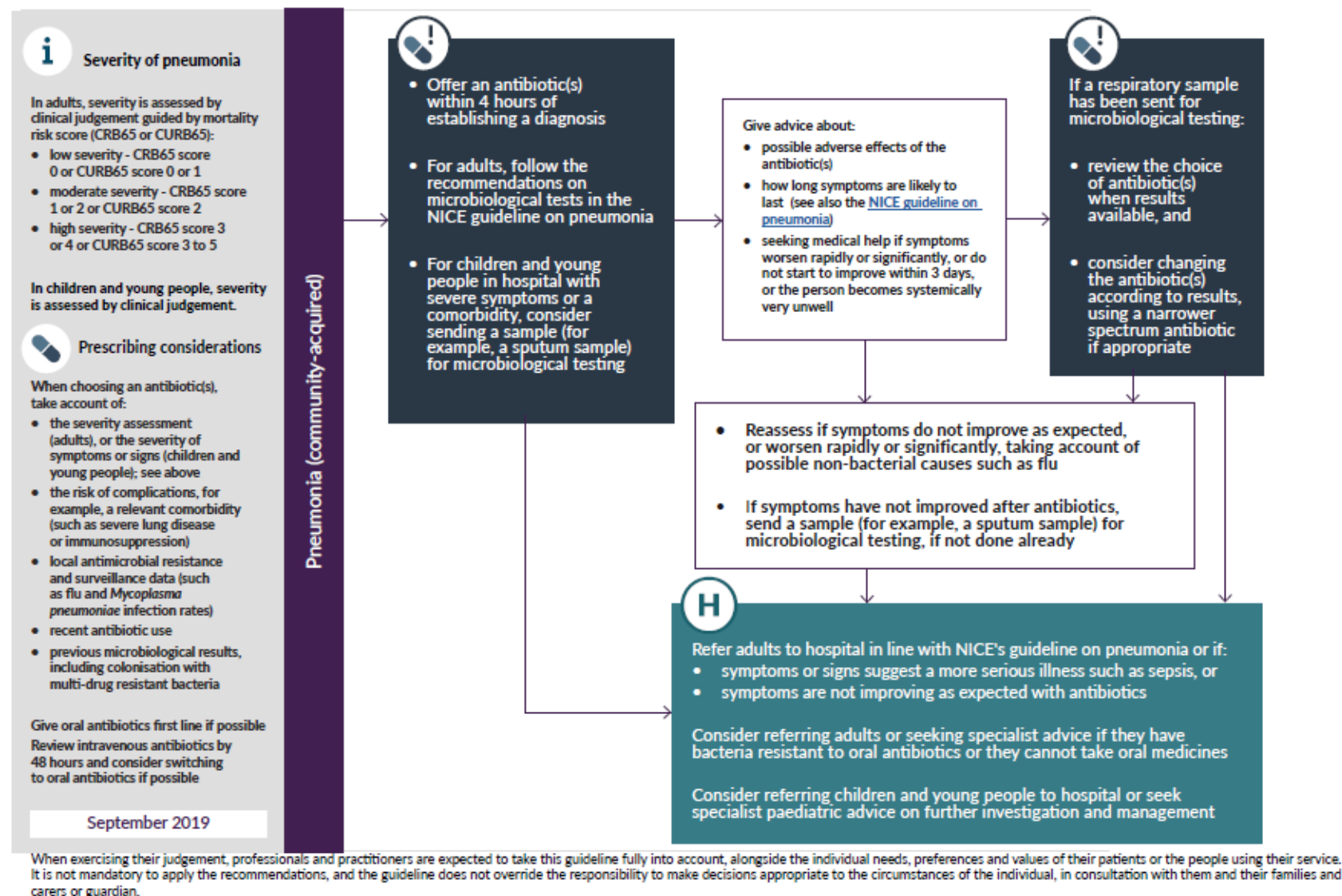
Choice of antibiotic: children and young people under 18 years

Antibiotic ¹	Dosage and course length ²
First choice	
Amoxicillin	1 to 11 months: 125 mg three times a day for 5 days 1 to 4 years: 250 mg three times a day for 5 days 5 to 17 years: 500 mg three times a day for 5 days
Alternative first choices ³	
Clarithromycin	1 month to 11 years: Under 8 kg, 7.5 mg/kg twice a day for 5 days 8 to 11 kg, 62.5 mg twice a day for 5 days 12 to 19 kg, 125 mg twice a day for 5 days 20 to 29 kg, 187.5 mg twice a day for 5 days 30 to 40 kg, 250 mg twice a day for 5 days 12 to 17 years: 250 mg to 500 mg twice a day for 5 days
Erythromycin	1 month to 1 year: 125 mg four times a day or 250 mg twice a day for 5 days 2 to 7 years: 250 mg four times a day or 500 mg twice a day for 5 days 8 to 17 years: 250 mg to 500 mg four times a day or 500 mg to 1000 mg twice a day for 5 days
Doxycycline ⁴	12 to 17 years: 200 mg on first day, then 100 mg once a day for 4 days (5-day course in total)
¹ See BNF for children for appropriate use and dosing in specific populations, for example, hepatic impairment and renal impairment ² The age bands apply to children of average size and, in practice, the prescriber will use the age bands in conjunction with other factors such as the severity of the condition and the child's size in relation to the average size of children of the same age. Doses given are by mouth using immediate-release medicines, unless otherwise stated ³ Amoxicillin or erythromycin are preferred in young women who are pregnant ⁴ Doxycycline should not be given to young women who are pregnant, and the possibility of pregnancy should be considered in young women of childbearing age (BNF for children , December 2018)	

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Appendix 10 – NICE NG138 Treatment Algorithm – Pneumonia (community-acquired): antimicrobial prescribing

Pneumonia (community-acquired): antimicrobial prescribing

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Pneumonia (community-acquired): antimicrobial prescribing

NICE National Institute for Health and Care Excellence

Choice of antibiotic: adults aged 18 years and over

Antibiotic ^a	Dosage and course length ^a
First choice oral antibiotic if low severity (based on clinical judgement and guided by CRB65 score 0 or CURB65 score 0 or 1) ³	
Amoxicillin	500 mg three times a day (higher doses can be used - see BNF) for 5 days ^a
Alternative oral antibiotics if low severity, for penicillin allergy or if amoxicillin unsuitable (for example, atypical pathogens suspected ²) ³	
Doxycycline	200 mg on first day, then 100 mg once a day for 4 days (5-day course in total) ^a
Clarithromycin	500 mg twice a day for 5 days ^a
Erythromycin (in pregnancy)	500 mg four times a day for 5 days ^a
First choice oral antibiotics if moderate severity (based on clinical judgement and guided by CRB65 score 1 or 2, or CURB65 score 2); guided by microbiological results when available ³	
Amoxicillin <i>with (if atypical pathogens suspected²)</i> :	500 mg three times a day (higher doses can be used - see BNF) for 5 days ^a
Clarithromycin ^a <i>or</i>	500 mg twice a day for 5 days ^a
Erythromycin ^a (in pregnancy)	500 mg four times a day for 5 days ^a
Alternative oral antibiotics if moderate severity, for penicillin allergy; guided by microbiological results when available ³	
Doxycycline	200 mg on first day, then 100 mg once a day for 4 days (5-day course in total) ^a
Clarithromycin	500 mg twice a day for 5 days ^a
First choice antibiotics if high severity (based on clinical judgement and guided by CRB65 score 3 or 4, or CURB65 score 3 to 5); guided by microbiological results when available ³	
Co amoxiclav <i>with</i> :	500/125 mg three times a day orally or 1.2 g three times a day IV ⁷ for 5 days ^a
Clarithromycin <i>or</i>	500 mg twice a day orally or IV ⁷ for 5 days ^a
Erythromycin (in pregnancy)	500 mg four times a day orally for 5 days ^a
Alternative antibiotic if high severity, for penicillin allergy; guided by microbiological results when available ³	
Levofloxacin ^a (consider safety issues)	500 mg twice a day orally or IV ⁷ for 5 days ^a
Consult local microbiologist if fluoroquinolone not appropriate	

^aSee [BNF](#) for appropriate use and dosing in specific populations, for example, hepatic impairment, renal impairment, pregnancy and breast-feeding, and administering intravenous (or, where appropriate, intramuscular) antibiotics.

^bOral doses are for immediate-release medicines.

^cGive oral antibiotics first-line if the person can take oral medicines, and the severity of their condition does not require intravenous antibiotics.

^dStop antibiotic treatment after 5 days unless microbiological results suggest a longer course is needed or the person is not clinically stable (fever in the past 48 hours, or more than 1 sign of clinical instability [systolic BP <90 mm Hg, heart rate >100/min, respiratory rate >24/min, arterial oxygen saturation <90% or PaO₂ <60 mmHg in room air]).

^e*Mycoplasma pneumoniae* infection occurs in outbreaks approximately every 4 years.

^fConsider adding a macrolide to amoxicillin if atypical pathogens suspected. Review when microbiological results available.

^gReview intravenous antibiotics by 48 hours and consider switching to oral antibiotics if possible.

^hSee [MHRA](#) advice for restrictions and precautions for using fluoroquinolones due to very rare reports of disabling and potentially long-lasting or irreversible side effects affecting musculo-skeletal and nervous systems. Warnings include stopping treatment at first signs of a serious adverse reaction (such as tendonitis), prescribing with special caution in people over 60 years and avoiding coadministration with a corticosteroid (March 2019).

C(U)RB65, confusion, (urea >7 mmol/l), respiratory rate ≥ 30/min, low systolic [<90 mm Hg] or diastolic [≤60 mm Hg] BP, age ≥65; IV, intravenous; PaO₂, partial pressure of oxygen

Pneumonia (community-acquired): antimicrobial prescribing

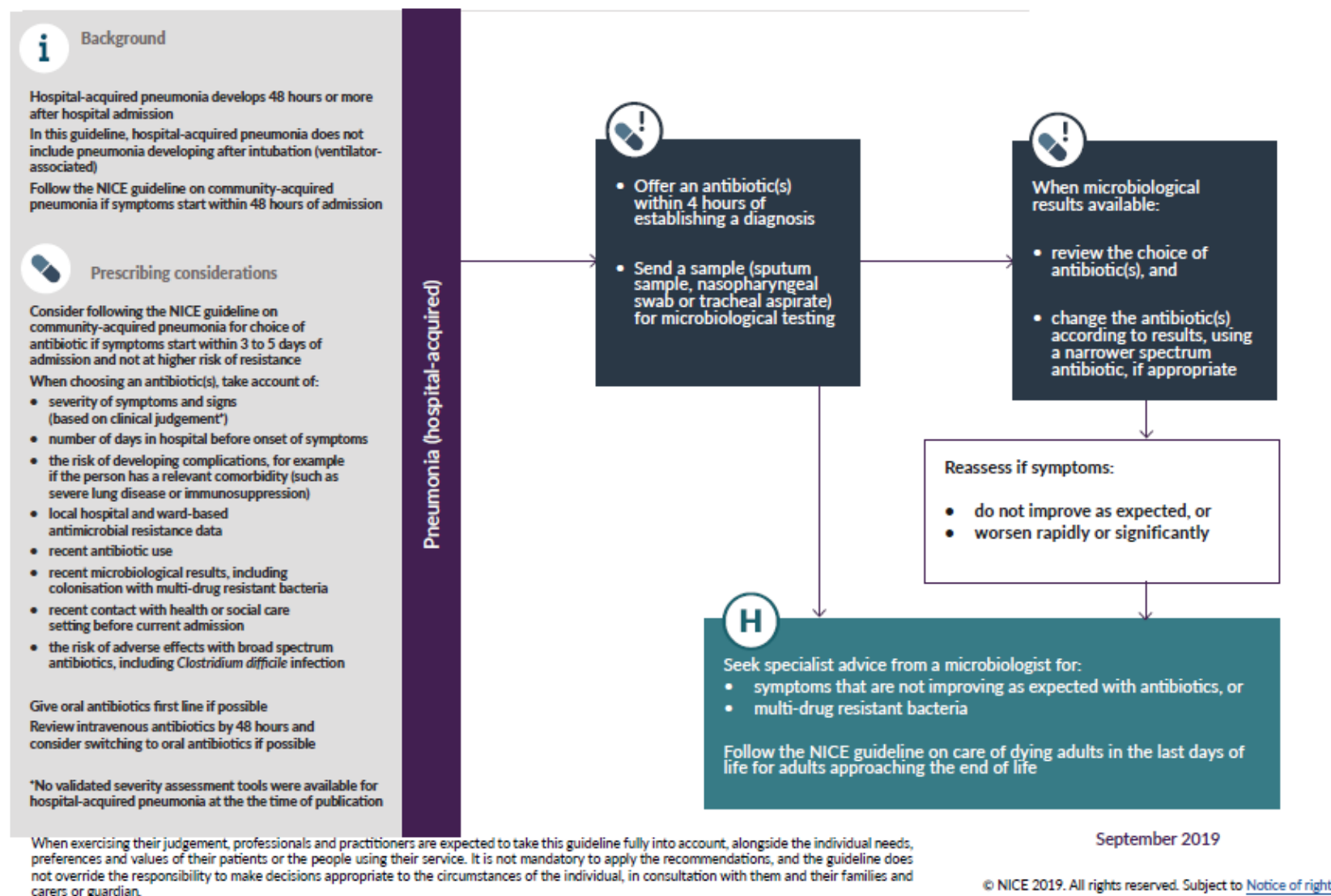
Choice of antibiotic: children and young people over 1 month and under 18 years

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Antibiotic ¹	Dosage and course length ²
First choice oral antibiotic if non-severe symptoms or signs (based on clinical judgement) ³	
Amoxicillin	1 to 11 months, 125 mg three times a day for 5 days ⁴ 1 to 4 years, 250 mg three times a day for 5 days ⁴ 5 to 17 years, 500 mg three times a day for 5 days (higher doses can be used for all ages - see BNFC) ⁴
Alternative oral antibiotics if non-severe symptoms or signs (based on clinical judgement), for penicillin allergy or if amoxicillin unsuitable (for example, atypical pathogens suspected ⁵) ²	
Clarithromycin	1 month to 11 years: Under 8 kg, 7.5 mg/kg twice a day for 5 days ⁴ 8 to 11 kg, 62.5 mg twice a day for 5 days ⁴ 12 to 19 kg, 125 mg twice a day for 5 days ⁴ 20 to 29 kg, 187.5 mg twice a day for 5 days ⁴ 30 to 40 kg, 250 mg twice a day for 5 days ⁴ 12 to 17 years: 250 mg to 500 mg twice a day for 5 days ⁴
Erythromycin (in pregnancy)	8 to 17 years, 250 mg to 500 mg four times a day for 5 days ⁴
Doxycycline ⁶	12 to 17 years, 200 mg on first day, then 100 mg once a day for 4 days (5-day course in total) ⁴
First choice antibiotic(s) if severe symptoms or signs (based on clinical judgement); guided by microbiological results when available ²	
Co-amoxiclav	Oral doses: 1 to 11 months, 0.5 ml/kg of 125/31 suspension three times a day for 5 days ⁴ 1 to 5 years, 10 ml of 125/31 suspension three times a day or 0.5 ml/kg of 125/31 suspension three times a day for 5 days ^{4,7} 6 to 11 years, 10 ml of 250/62 suspension three times a day or 0.3 ml/kg of 250/62 suspension three times a day for 5 days ⁴ 12 to 17 years, 500/125 mg three times a day for 5 days ⁴ IV dose ⁸ : 1 to 2 months, 30 mg/kg two times a day ⁴ 3 months to 17 years, 30 mg/kg three times a day (maximum 1.2 g per dose three times a day) ⁴
with (if atypical pathogen suspected ⁵): Clarithromycin or	Oral doses: see above for clarithromycin, for 5 days ⁴ IV doses ⁸ : 1 month to 11 years, 7.5 mg/kg twice a day (maximum 500 mg per dose) ⁴ 12 to 17 years, 500 mg twice a day ⁴
Erythromycin (in pregnancy)	See oral doses for erythromycin; for 5 days ⁴
Alternative antibiotics if severe symptoms or signs (based on clinical judgement), for penicillin allergy; guided by microbiological results when available ² - consult local microbiologist	
¹ See BNFC for use and dosing in hepatic impairment, renal impairment, pregnancy and breast-feeding, and administering intravenous (or, where appropriate, intramuscular) antibiotics. ² Oral doses are for immediate-release medicines. The age bands apply to children of average size and, in practice, the prescriber will use the age bands in conjunction with other factors such as the severity of the condition being treated and the child's size in relation to the average size of children of the same age. ³ Give oral antibiotics first-line if the person can take oral medicines, and the severity of their condition does not require intravenous antibiotics. ⁴ Stop antibiotic treatment after 5 days unless microbiological results suggest a longer course length is needed or the person is not clinically stable. ⁵ <i>Mycoplasma pneumoniae</i> infection occurs in outbreaks approximately every 4 years and is more common in school-aged children. ⁶ See BNFC for use of doxycycline in children under 12. ⁷ Or 5 ml of 250/62 suspension. ⁸ Review intravenous antibiotics by 48 hours and consider switching to oral antibiotics if possible.	

Appendix 11 – NICE NG139 Treatment Algorithm – Pneumonia (hospital-acquired): antimicrobial prescribing

Pneumonia (hospital-acquired): antimicrobial prescribing **NICE** National Institute for Health and Care Excellence



Pneumonia (hospital-acquired): antimicrobial prescribing **NICE** National Institute for Health and Care Excellence

Choice of antibiotic: adults aged 18 years and over

Antibiotic ^a	Dosage and course length ^a
First choice oral antibiotic for non-severe symptoms or signs and not at higher risk of resistance ³ (guided by microbiological results when available)	
Co-amoxiclav	500/125 mg three times a day for 5 days then review ^a
Alternative oral antibiotics for non-severe symptoms or signs and not at higher risk of resistance ³ , if penicillin allergy or if co-amoxiclav unsuitable. Base choice on specialist microbiological advice and local resistance data. Options include:	
Doxycycline	200 mg on first day, then 100 mg once a day for 4 days (5-day course) then review ^a
Cefalexin (caution in penicillin allergy)	500 mg twice or three times a day (can be increased to 1 to 1.5 g three or four times a day) for 5 days then review ^a
Co-trimoxazole ^{a,e}	960 mg twice a day for 5 days then review ^a
Levofloxacin ^a (only if switching from IV levofloxacin with specialist advice; consider safety issues ⁷)	500 mg once or twice a day for 5 days then review ^a
First choice IV antibiotics if severe symptoms or signs (for example, of sepsis) or at higher risk of resistance ³ . Review IV antibiotics by 48 hours and consider switching to oral antibiotics as above for a total of 5 days then review ^a . Base choice on specialist microbiological advice and local resistance data. Options include:	
Piperacillin with tazobactam	4.5 g three times a day (increased to 4.5 g four times a day if severe infection)
Ceftazidime	2 g three times a day
Ceftriaxone	2 g once a day
Cefuroxime	750 mg three or four times a day (increased to 1.5 g three or four times a day if severe infection)
Meropenem	0.5 to 1 g three times a day
Ceftazidime with avibactam	2/0.5 g three times a day
Levofloxacin ^a (consider safety issues ⁷)	500 mg once or twice a day (use higher dosage if severe infection)
Antibiotics to be added if suspected or confirmed MRSA infection (dual therapy with an IV antibiotic listed above)	
Vancomycin ³	15 to 20 mg/kg two or three times a day IV, adjusted according to serum vancomycin; loading dose of 25 to 30 mg/kg for serious illness (maximum 2 g per dose)
Teicoplanin ³	Initially 6 mg/kg every 12 hours for 3 doses, then 6 mg/kg once a day
Linezolid ³ (if vancomycin cannot be used; specialist advice only)	600 mg twice a day orally or IV
^a See BNF for appropriate use and dosing in specific populations, for example, hepatic impairment, renal impairment, pregnancy and breast-feeding, and administering intravenous (or, where appropriate, intramuscular) antibiotics. ^b Oral doses are for immediate-release medicines. ^c Higher risk of resistance includes symptoms or signs starting more than 5 days after hospital admission, relevant comorbidity such as severe lung disease or immunosuppression, recent use of broad spectrum antibiotics, colonisation with multi-drug resistant bacteria and recent contact with health or social care setting before current admission. ^d Review treatment after a total of 5 days of antibiotics and consider stopping the antibiotic if clinically stable. ^e See BNF for information on monitoring of patient parameters and therapeutic drug monitoring. ^f Not licensed for hospital-acquired pneumonia, so use is off-label. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's Good practice in prescribing and managing medicines and devices for further information. ^g See MHRA advice for restrictions and precautions for using fluoroquinolones due to very rare reports of disabling and potentially long-lasting or irreversible side effects affecting musculoskeletal and nervous systems. Warnings include stopping treatment at first signs of a serious adverse reaction (such as tendonitis), prescribing with caution for people over 60 and avoiding coadministration with corticosteroids (March 2019).	

Pneumonia (hospital-acquired): antimicrobial prescribing **NICE** National Institute for Health and Care Excellence

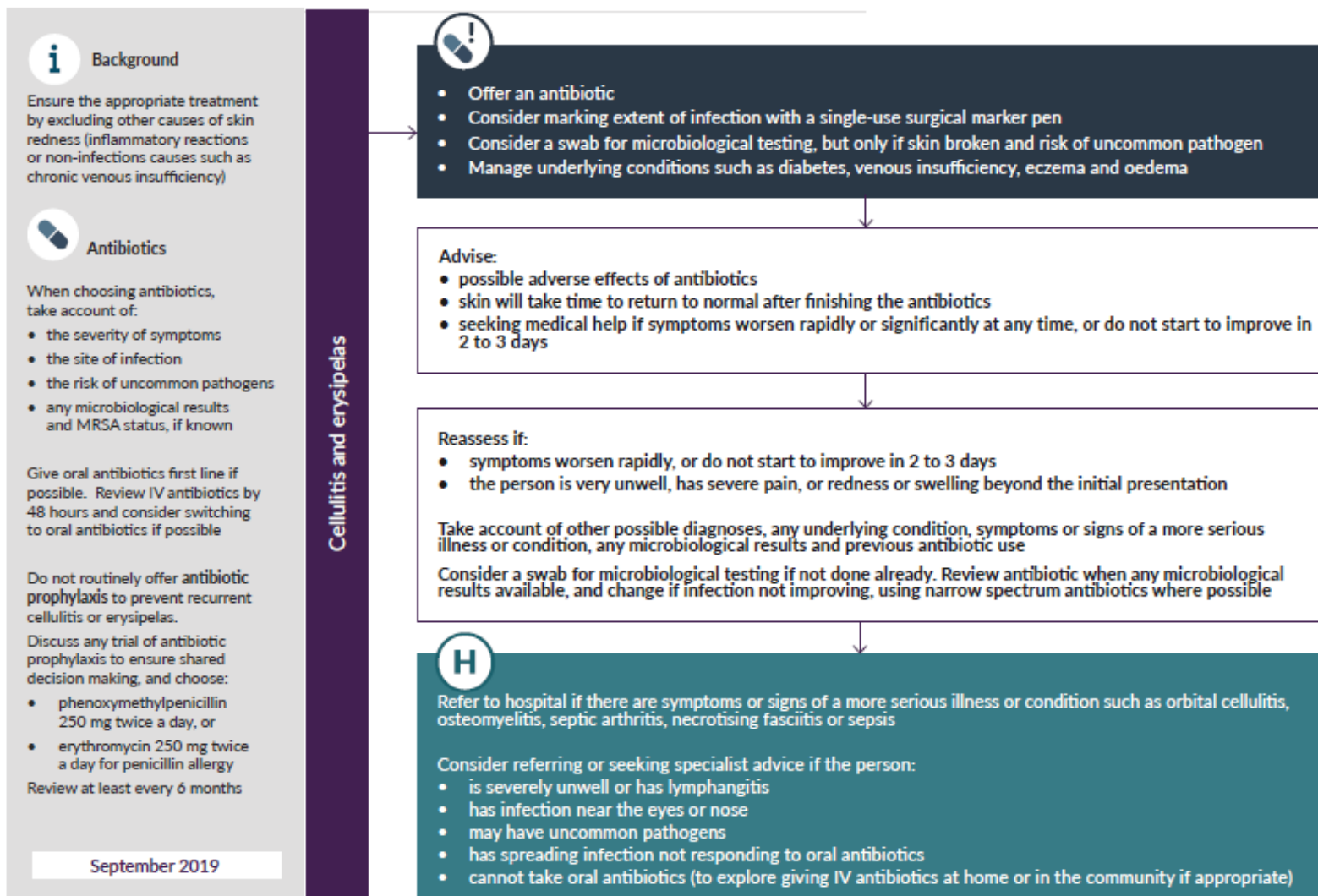
Choice of antibiotic: children and young people over 1 month and under 18 years

Antibiotic ¹	Dosage and course length ²
First choice oral antibiotic if non-severe symptoms or signs and not at higher risk of resistance ³ (guided by microbiological results when available)	
Co-amoxiclav	1 to 11 months, 0.5 ml/kg of 125/31 suspension three times a day for 5 days then review ⁴ 1 to 5 years, 10 ml of 125/31 suspension ⁵ three times a day or 0.5 ml/kg of 125/31 suspension three times a day for 5 days then review ⁴ 6 to 11 years, 10 ml of 250/62 suspension three times a day or 0.3 ml/kg of 250/62 suspension three times a day for 5 days then review ⁴ 12 to 17 years, 500/125 mg three times a day for 5 days then review ⁴
Alternative oral antibiotic if non-severe symptoms or signs and not at higher risk of resistance ³ , for penicillin allergy or if co-amoxiclav unsuitable	
Clarithromycin	1 month to 11 years: Under 8 kg, 7.5 mg/kg twice a day for 5 days then review ⁴ ; 8 to 11 kg, 62.5 mg twice a day for 5 days then review ⁴ 12 to 19 kg, 125 mg twice a day for 5 days then review ⁴ ; 20 to 29 kg, 187.5 mg twice a day for 5 days then review ⁴ 30 to 40 kg, 250 mg twice a day for 5 days then review ⁴ 12 to 17 years, 500 mg twice a day for 5 days in total then review ⁴
Other options may be suitable based on specialist microbiological advice and local resistance data	
First choice IV antibiotics if severe symptoms or signs (for example, symptoms or signs of sepsis) or at higher risk of resistance ³ . Review IV antibiotics by 48 hours and consider switching to oral antibiotics as above for a total of 5 days then review ⁴	
Antibiotic choice based on specialist microbiological advice only and local resistance data. Options include:	
Piperacillin with tazobactam	1 month to 11 years, 90 mg/kg three or four times a day (maximum 4.5 g per dose four times a day) 12 to 17 years, 4.5 g three times a day (increased to 4.5 g four times a day if severe infection)
Ceftazidime	1 month to 17 years, 25 mg/kg three times a day (50 mg/kg three times a day if severe infection; maximum 6 g per day)
Ceftriaxone	1 month to 11 years (up to 50 kg), 50 to 80 mg/kg once a day (use dose at higher end of range if severe infection; maximum 4 g per day) 9 to 11 years (50 kg and above), 2 g once a day 12 to 17 years, 2 g once a day
Antibiotics to be added if suspected or confirmed MRSA infection (dual therapy with an IV antibiotic listed above)	
Teicoplanin ^{6,7}	1 month, initially 16 mg/kg for 1 dose then 8 mg/kg once daily; subsequent dose to be given 24 hours after initial dose (doses given by IV infusion) 2 months to 11 years, initially 10 mg/kg every 12 hours IV for 3 doses, then 6 to 10 mg/kg once daily IV 12 to 17 years, initially 6 mg/kg every 12 hours IV for 3 doses, then 6 mg/kg once daily IV
Vancomycin ^{6,7}	1 months to 11 years, 10 to 15 mg/kg four times a day, adjusted according to serum vancomycin; 12 to 17 years, 15 to 20 mg/kg two or three times a day, adjusted according to serum vancomycin, loading dose of 25 to 30 mg/kg for serious illness (maximum 2 g per dose)
Linezolid ⁸ (if vancomycin cannot be used; specialist advice only)	3 months to 11 years, 10 mg/kg three times a day orally or IV (maximum 600 mg per dose) 12 to 17 years, 600 mg twice a day orally or IV
¹ See BNFC for appropriate use and dosing in specific populations, for example, hepatic impairment, renal impairment, pregnancy and breast-feeding, and administering intravenous (or, where appropriate, intramuscular) antibiotics.	
² Oral doses are for immediate-release medicines. Prescribers to use age bands with other factors such as severity and child's size in relation to the average for children of the same age.	
³ Higher risk of resistance includes onset of symptoms more than 5 days after hospital admission, relevant comorbidity such as severe lung disease or immunosuppression, recent use of broad spectrum antibiotics, colonisation with multi-drug resistant bacteria and recent contact with health or social care setting before current admission.	
⁴ Review treatment after a total of 5 days and consider stopping antibiotics if clinically stable.	
⁵ Or 5 ml of 250/62 suspension.	
⁶ See BNFC for information on monitoring of patient parameters.	
⁷ See BNFC for information on therapeutic drug monitoring.	
⁸ Linezolid is not licensed in children and young people under 18 years. The prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's Good practice in prescribing and managing medicines and devices for further information.	

Appendix 12 – NICE NG141 Treatment Algorithm – Cellulitis and erysipelas: antimicrobial prescribing

Cellulitis and erysipelas: antimicrobial prescribing

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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.

Cellulitis and erysipelas: antimicrobial prescribing

Choice of antibiotic for treatment: adults aged 18 years and over

Antibiotic ¹	Dosage and course length ²	
First choice antibiotic (give oral unless person unable to take oral or severely unwell) ³		
Flucloxacillin	500 mg to 1 g four times a day orally ⁴ for 5 to 7 days ⁵	or 1 to 2 g four times a day IV ⁶
Alternative first choice antibiotics for penicillin allergy or if flucloxacillin unsuitable (give oral unless person unable to take oral or severely unwell) ³		
Clarithromycin	500 mg twice a day orally for 5 to 7 days ⁵	or 500 mg twice a day IV ⁶
Erythromycin (in pregnancy)	500 mg four times a day orally for 5 to 7 days ⁵	
Doxycycline	200 mg on first day, then 100 mg once a day orally for 5 to 7 days in total ⁵	
First choice antibiotic if infection near the eyes or nose ⁷ (consider seeking specialist advice; give oral unless person unable to take oral or severely unwell) ³		
Co-amoxiclav	500/125 mg three times a day orally for 7 days ⁵	or 1.2 g three times a day IV ⁶
Alternative first choice antibiotics if infection near the eyes or nose ⁷ for penicillin allergy or if co-amoxiclav unsuitable (consider seeking specialist advice; give oral unless person unable to take oral or severely unwell) ³		
Clarithromycin with	500 mg twice a day orally for 7 days ⁵	or 500 mg twice a day IV ⁶
Metronidazole	400 mg three times a day orally for 7 days ⁵	or 500 mg three times a day IV ⁶
Alternative choice antibiotics for severe infection		
Co-amoxiclav	500/125 mg three times a day orally for 7 days ⁵	or 1.2 g three times a day IV ⁶
Cefuroxime	750 mg to 1.5 g three or four times a day IV ⁶	
Clindamycin	150 to 300 mg four times a day (can be increased to 450 mg four times a day) orally for 7 days ⁵	or 600 mg to 2.7 g daily IV in two to four divided doses, increased if necessary in life-threatening infection to 4.8 g daily (maximum per dose 1.2 g) ⁶
Ceftriaxone (only for ambulatory care ¹⁰)	2 g once a day IV ⁶	
Antibiotics to be added if MRSA infection suspected or confirmed (combination therapy with an antibiotic listed above) ⁸		
Vancomycin ^{9,10}	15 to 20 mg/kg two or three times a day IV (maximum 2 g per dose), adjusted according to serum vancomycin concentration ⁹	
Teicoplanin ^{9,10}	Initially 6 mg/kg every 12 hours for three doses, then 6 mg/kg once a day IV ⁹	
Linezolid (if vancomycin or teicoplanin cannot be used; specialist use only) ¹⁰	600 mg twice a day orally	or 600 mg twice a day IV ⁶

¹ See [BNF](#) for use and dosing in specific populations, for example, hepatic and renal impairment, pregnancy and breast-feeding, and administering intravenous (or intramuscular) antibiotics.

² Oral doses are for immediate release medicines.

³ Give oral antibiotics first-line if the person can take oral medicines, and the severity of their symptoms does not require intravenous antibiotics.

⁴ The upper dose of 1 g four times a day would be off-label. Prescribers should follow relevant professional guidance, taking full responsibility for the decision, and obtaining and documenting informed consent. See the GMC's [Good practice in prescribing and managing medicines](#) for more information.

⁵ A longer course (up to 14 days in total) may be needed based on clinical assessment. However, skin does take time to return to normal, and full resolution at 5 to 7 days is not expected.

⁶ If intravenous antibiotics are given, review by 48 hours and consider switching to oral antibiotics if possible for the appropriate course length.

⁷ Infection around the eyes or the nose (the triangle from the bridge of the nose to the corners of the mouth, or immediately around the eyes including periorbital cellulitis) is of more concern because of risk of a serious intracranial complication.

⁸ Other antibiotics may be appropriate based on microbiological results and specialist advice.

⁹ See [BNF](#) for information on therapeutic drug monitoring.

¹⁰ See [BNF](#) for information on monitoring of patient parameters.

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Cellulitis and erysipelas: antimicrobial prescribing

Choice of antibiotic for treatment: children and young people under 18 years

Antibiotic ^a	Dosage and course length ^a	
Children under 1 month - antibiotic choice based on specialist advice. For children and young people 1 month and over, see below		
First choice antibiotic (give oral unless person unable to take oral or severely unwell) ^a		
Flucloxacillin ^a	1 month to 1 year, 62.5 mg to 125 mg four times a day orally; 2 to 9 years, 125 mg to 250 mg four times a day orally; 10 to 17 years, 250 mg to 500 mg four times a day orally - all for 5 to 7 days ^a	Or 1 month to 17 years, 12.5 mg to 25 mg/kg four times a day IV (maximum 1 g four times a day) ^a
Alternative first choice antibiotics for penicillin allergy or if flucloxacillin unsuitable (give oral unless person unable to take oral or severely unwell) ^a		
Co-amoxiclav (not in penicillin allergy) ¹²	1 to 11 months, 0.25 ml/kg of 125/31 suspension three times a day orally 1 to 5 years, 0.25 ml/kg or 5 ml of 125/31 suspension three times a day orally 6 to 11 years, 0.15 ml/kg or 5 ml of 250/62 suspension three times a day orally All for 5 to 7 days ^a (dose doubled in severe infection) 12 to 17 years, 250/125 or 500/125 mg three times a day orally for 5 to 7 days ^a	Or 1 to 2 months, 30 mg/kg twice a day IV ^a 3 months to 17 years, 30 mg/kg three times a day IV (maximum 1.2 g three times a day) ^a
Clarithromycin	1 month to 11 years: Under 8 kg, 7.5 mg/kg twice a day orally for 5 to 7 days ^a ; 8 to 11 kg, 62.5 mg twice a day orally for 5 to 7 days ^a ; 12 to 19 kg, 125 mg twice a day orally for 5 to 7 days ^a ; 20 to 29 kg, 187.5 mg twice a day orally for 5 to 7 days ^a ; 30 to 40 kg, 250 mg twice a day orally for 5 to 7 days ^a 12 to 17 years: 250 to 500 mg twice a day orally for 5 to 7 days ^a	Or 1 month to 11 years, 7.5 mg/kg twice a day IV (maximum 500 mg per dose) ^a 12 to 17 years, 500 mg twice a day IV ^a
Erythromycin (in pregnancy)	8 to 17 years, 250 mg to 500 mg four times a day orally for 5 to 7 days ^a	
First choice antibiotic if infection near the eyes or nose ^a (consider seeking specialist advice; give oral unless person unable to take oral or severely unwell) ^a		
Co-amoxiclav ¹²	See above; for 7 days	See above
Alternative first choice antibiotics if infection near the eyes or nose ^a for penicillin allergy or if co-amoxiclav unsuitable (consider seeking specialist advice; give oral unless person unable to take oral or severely unwell) ^a		
Clarithromycin	See above	See above
with (if anaerobes suspected) Metronidazole	1 month, 7.5 mg/kg twice a day orally for 7 days ^a ; 2 months to 11 years, 7.5 mg/kg three times a day orally (maximum per dose 400 mg) for 7 days ^a ; 12 to 17 years, 400 mg three times a day for 7 days ^a	Or 1 month, loading dose 15 mg/kg, then (after 8 hours) 7.5 mg/kg three times a day IV ^a ; 2 months to 17 years, 7.5 mg/kg three times a day IV (maximum per dose 500 mg) ^a
Alternative choice antibiotics for severe infection ^a		
Co-amoxiclav ¹²	See above	See above
Cefuroxime	1 month to 17 years, 20 mg/kg three times a day IV (maximum 750 mg per dose), can be increased to 50 to 60 mg/kg three or four times a day IV (maximum 1.5 g per dose) ^a	
Clindamycin	1 month to 17 years, 3 to 6 mg/kg four times a day orally (maximum per dose 450 mg) for 7 days ^a	Or 1 month to 17 years, 3.75 to 6.25 mg/kg four times a day IV, increased if necessary in life-threatening infection to 10 mg/kg four times a day IV (maximum per dose 1.2 g); total daily dose may alternatively be given in three divided doses (maximum per dose 1.2 g) ^a
Antibiotics to be added if MRSA infection suspected or confirmed (combination therapy with an antibiotic listed above) ^a		
Vancomycin ^{9,10}	See BNFC for dosing information	
Teicoplanin ^{9,10}	See BNFC for dosing information	
Linezolid (specialist use only) ^{10,11}	See BNFC for dosing information	
See adult table for footnotes 1 to 3 and 5 to 10. ^a If solution not tolerated, consider capsules. ¹² Not licensed for under 18s, so use off label. ¹³ Consider 400/57 suspension for twice daily dosing.		

Appendix 13 – NICE CG184 – Dose schedules for *H.pylori* eradication, and PPI doses

First-line treatment

For patients who test positive for *H.pylori*, prescribe 7-day, twice-daily course of treatment with a PPI and amoxicillin (1g BD) and either clarithromycin (500mg BD) or metronidazole (400mg BD). Take into account previous exposure to clarithromycin or metronidazole.

If allergic to penicillin, prescribe 7-day, twice-daily course of a PPI, and clarithromycin and metronidazole.

If allergic to penicillin and has had previous exposure to clarithromycin, prescribe 7-day course of treatment with a PPI (appendix 13) and bismuth subsalicylate (unlicensed) and metronidazole and tetracycline (unlicensed).

Second-line treatment

If symptoms remain after first-line eradication treatment, prescribe 7-day, twice-daily course of treatment with a PPI and amoxicillin and either clarithromycin or metronidazole (whichever was not used first-line).

If has had previous exposure to clarithromycin and metronidazole, prescribe 7-day course of treatment with a PPI and amoxicillin and tetracycline (or, if a tetracycline cannot be used, levofloxacin).

If allergic to penicillin (and has not had previous exposure to a fluoroquinolone antibiotic) prescribe 7-day, twice-daily course of treatment with a PPI and metronidazole and levofloxacin (unlicensed).

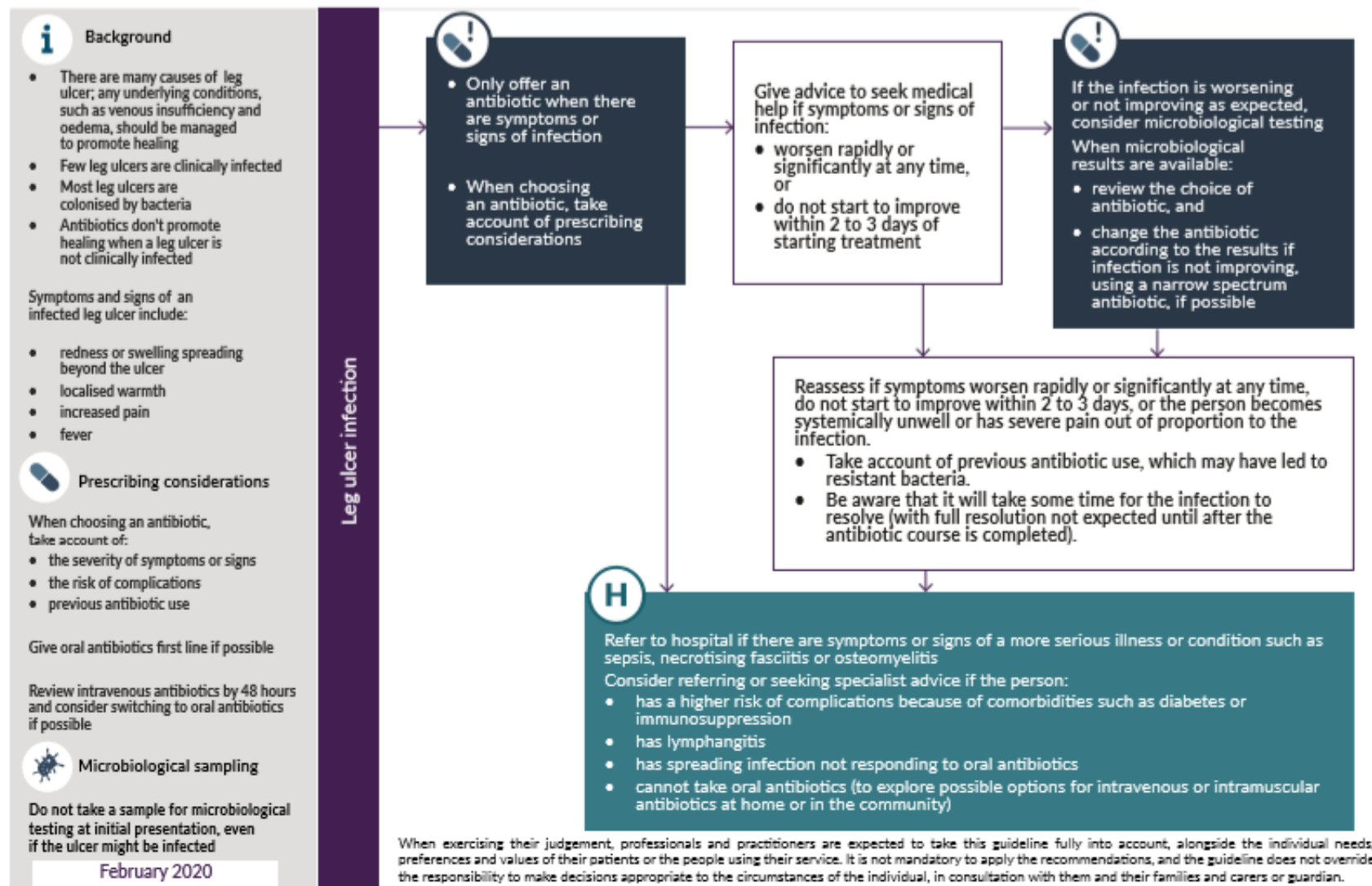
If allergic to penicillin and has had previous exposure to a fluoroquinolone antibiotic, prescribe 7-day course of a PPI and bismuth subsalicylate (unlicensed) and metronidazole and tetracycline (unlicensed).

PPI doses for *H.pylori* eradication therapy. NICE guideline CG184 update (2014)

Proton pump inhibitor	Dose
Esomeprazole	20 mg
Lansoprazole	30 mg
Omeprazole	20–40 mg
Pantoprazole	40 mg
Rabeprazole	20 mg

Appendix 14 – NICE NG152 – Leg ulcer infection

Leg ulcer infection: antimicrobial prescribing

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Leg ulcer infection: antimicrobial prescribing

Choice of antibiotic: adults aged 18 years and over

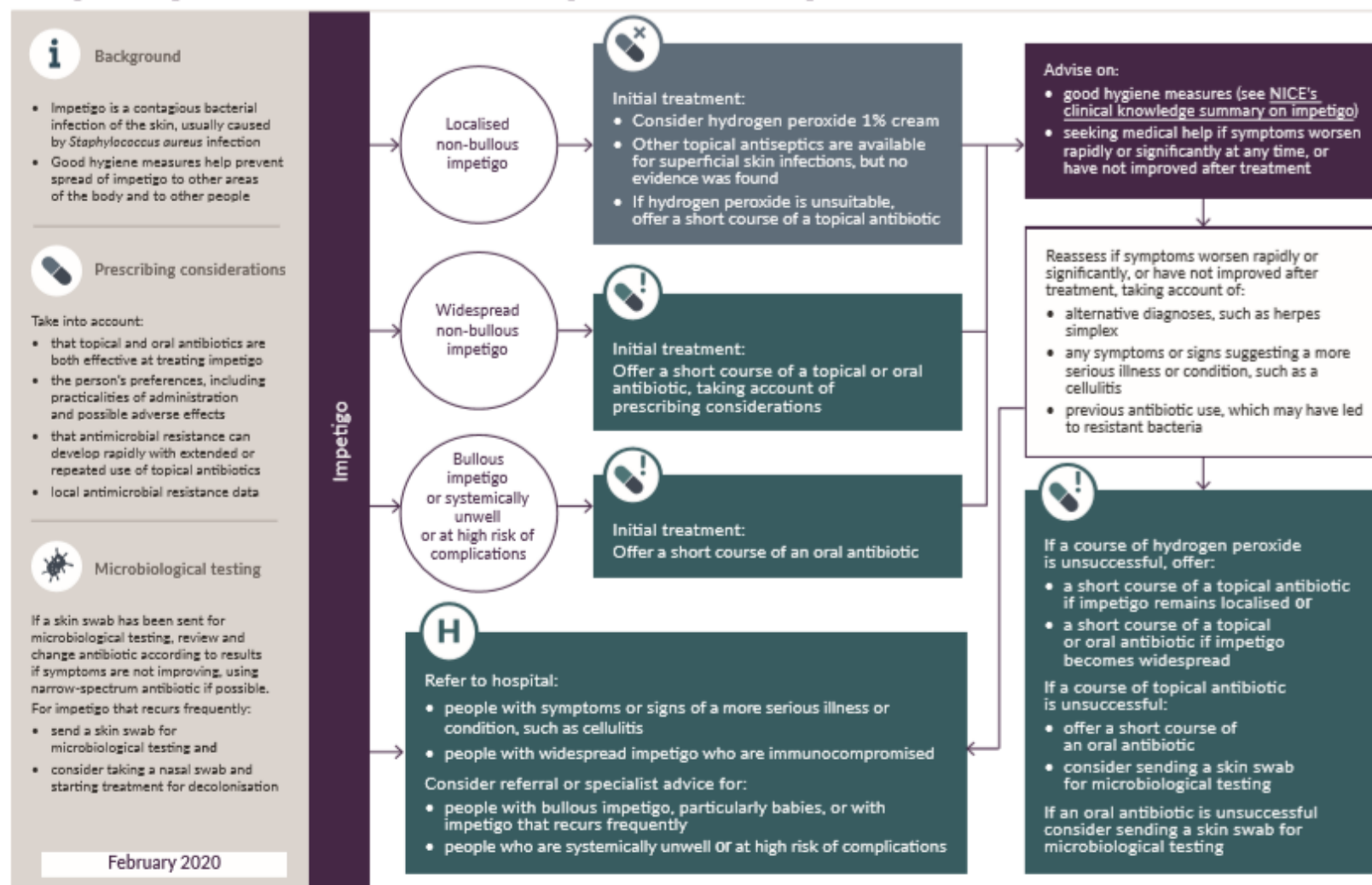
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Antibiotic ¹	Dosage and course length ²
First-choice oral antibiotic	
Flucloxacillin	500 mg to 1 g ^{3,4} four times a day for 7 days
Alternative first-choice oral antibiotics for penicillin allergy or if flucloxacillin unsuitable	
Doxycycline	200 mg on first day, then 100 mg once a day (can be increased to 200 mg daily) for 7 days in total
Clarithromycin	500 mg twice a day for 7 days
Erythromycin (in pregnancy)	500 mg four times a day for 7 days
Second-choice oral antibiotics (guided by microbiological results when available)	
Co-amoxiclav	500/125 mg three times a day for 7 days
Co-trimoxazole ^{5,6} (in penicillin allergy)	960 mg twice a day for 7 days
First-choice antibiotics if severely unwell (guided by microbiological results if available)⁷	
Flucloxacillin with or without	1 g to 2 g four times a day IV
Gentamicin ^{8,9} and/or	Initially 5 to 7 mg/kg IV, subsequent doses if required adjusted according to serum gentamicin concentration
Metronidazole	400 mg three times a day orally or 500 mg three times a day IV
Co-amoxiclav with or without	1.2 g three times a day IV
Gentamicin ^{8,9}	Initially 5 to 7 mg/kg IV, subsequent doses if required adjusted according to serum gentamicin concentration
Co-trimoxazole ^{5,6} (in penicillin allergy) with or without	960 mg twice a day IV (increased to 1.44 g twice a day in severe infection)
Gentamicin ^{8,9} and/or	Initially 5 to 7 mg/kg IV, subsequent doses if required adjusted according to serum gentamicin concentration
Metronidazole	400 mg three times a day orally or 500 mg three times a day IV
Second-choice antibiotics if severely unwell (guided by microbiological results when available or following specialist advice)⁷	
Piperacillin with tazobactam	4.5 g three times a day IV (increased to 4.5 g four times a day if severe infection)
Ceftriaxone with or without	2 g once a day IV
Metronidazole	400 mg three times a day orally or 500 mg three times a day IV
Antibiotics to be added if MRSA infection is suspected or confirmed (combination therapy with antibiotics listed above)⁷	
Vancomycin ¹⁰	15 to 20 mg/kg two or three times a day IV (maximum 2 g per dose), adjusted according to serum vancomycin concentration
Teicoplanin ¹¹	Initially 6 mg/kg every 12 hours for three doses, then 6 mg/kg once a day IV
Linezolid (if vancomycin or teicoplanin cannot be used; specialist advice only) ⁶	600 mg twice a day orally or IV
¹ See BNF for appropriate use and dosing in hepatic impairment, renal impairment, pregnancy and breastfeeding, and administering intravenous (or, where appropriate, intramuscular) antibiotics. ² Oral doses are for immediate-release medicines. ³ The upper dose of 1 g four times a day would be off-label. ⁴ The prescriber should follow relevant professional guidance, taking full responsibility for the decision, and obtaining and documenting informed consent. See the GMC's Good practice in prescribing and managing medicines and devices for more information. ⁵ Not licensed for leg ulcer infection so use would be off-label. ⁶ See BNF for information on monitoring of patient parameters. ⁷ Review intravenous antibiotics by 48 hours and consider switching to oral antibiotics if possible. ⁸ See BNF for information on therapeutic drug monitoring.	

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Appendix 15 – NICE NG153 - Impetigo

Impetigo: antimicrobial prescribing

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Impetigo: antimicrobial prescribing

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Choice of antimicrobial: adults aged 18 years and over

Antimicrobial ¹	Dosage and course length ²
Topical antiseptic	
Hydrogen peroxide 1% ³	Apply two or three times a day for 5 days ⁴
First-choice topical antibiotic ⁵ if hydrogen peroxide unsuitable (for example, if impetigo is around eyes) or ineffective	
Fusidic acid 2%	Apply three times a day for 5 days ⁴
Alternative topical antibiotic ⁵ if fusidic acid resistance suspected or confirmed	
Mupirocin 2%	Apply three times a day for 5 days ⁴
First-choice oral antibiotic	
Flucloxacillin	500 mg four times a day for 5 days ⁴
Alternative oral antibiotics if penicillin allergy or flucloxacillin unsuitable	
Clarithromycin	250 mg twice a day for 5 days ^{4,6}
Erythromycin (in pregnancy)	250 mg to 500 mg four times a day for 5 days ⁴
If MRSA suspected or confirmed – consult local microbiologist	
¹ See BNF for appropriate use and dosing in specific populations, for example, hepatic impairment, renal impairment, pregnancy and breastfeeding. ² Oral doses are for immediate-release medicines. ³ Other topical antiseptics are available for superficial skin infections, but no evidence was found. ⁴ A 5-day course is appropriate for most people with impetigo but can be increased to 7 days based on clinical judgement, depending on the severity and number of lesions. ⁵ As with all antibiotics, extended or recurrent use of topical fusidic acid or mupirocin may increase the risk of developing antimicrobial resistance. See BNF for more information. ⁶ Dosage can be increased to 500 mg twice a day, if needed for severe infections.	

Combination treatment

Do not offer combination treatment with a topical and oral antibiotic to treat impetigo

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.

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Choice of antimicrobial: children and young people under 18 years

Antimicrobial ¹	Dosage and course length ²
Topical antiseptic	
Hydrogen peroxide 1% ³	Apply two or three times a day for 5 days ⁴
First-choice topical antibiotic ⁵ if hydrogen peroxide unsuitable (for example, if impetigo is around eyes) or ineffective	
Fusidic acid 2%	Apply three times a day for 5 days ⁴
Alternative topical antibiotic ⁵ if fusidic acid resistance suspected or confirmed	
Mupirocin 2% ⁶	Apply three times a day for 5 days ⁴
First-choice oral antibiotic	
Flucloxacillin (oral solution or capsules ⁷)	1 month to 1 year, 62.5 mg to 125 mg four times a day for 5 days ⁴ 2 to 9 years, 125 mg to 250 mg four times a day for 5 days ⁴ 10 to 17 years, 250 mg to 500 mg four times a day for 5 days ⁴
Alternative oral antibiotics if penicillin allergy or flucloxacillin unsuitable (for example, if oral solution unpalatable or unable to swallow capsules)	
Clarithromycin	1 month to 11 years: under 8 kg, 7.5 mg/kg twice a day for 5 days ⁴ 8 to 11 kg, 62.5 mg twice a day for 5 days ⁴ 12 to 19 kg, 125 mg twice a day for 5 days ⁴ 20 to 29 kg, 187.5 mg twice a day for 5 days ⁴ 30 to 40 kg, 250 mg twice a day for 5 days ⁴ 12 to 17 years, 250 mg twice a day for 5 days ^{4,8}
Erythromycin (in pregnancy)	8 to 17 years, 250 mg to 500 mg four times a day for 5 days ⁴
If MRSA suspected or confirmed – consult local microbiologist	
¹ See BNF for Children for appropriate use and dosing in specific populations, for example, hepatic impairment, renal impairment, pregnancy and breastfeeding. Dosing in some age groups may be off-label. ² Oral doses are for immediate-release medicines. Age bands apply to children of average size and are used in conjunction with factors such as severity of the condition and the child's actual size. ³ Other topical antiseptics are available for superficial skin infections, but no evidence was found. ⁴ A 5-day course is appropriate for most people with impetigo but can be increased to 7 days based on clinical judgement, depending on the severity and number of lesions. ⁵ As with all antibiotics, extended or recurrent use of topical fusidic acid or mupirocin may increase the risk of developing antimicrobial resistance. See BNF for Children for more information. ⁶ Licenses for use in infants vary between products. See individual summaries of product characteristics for details. ⁷ See Medicines for Children, Helping your child to swallow tablets . ⁸ Dosage can be increased to 500 mg twice a day, if needed for severe infections.	

Appendix 16 – NICE NG173 – Pneumonia during COVID-19 pandemic

COVID-19 rapid guideline: antibiotics for pneumonia in adults in hospital

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Key messages

- To guide decision making about antibiotics, use
 - antibiotic prescribing table 1 for patients with suspected community-acquired pneumonia (that is, pneumonia that has developed before or within 48 hours of admission).
 - antibiotic prescribing table 2 for patients with suspected hospital acquired pneumonia (that is, pneumonia that develops 48 hours or more after admission and that was not incubating at admission).
- When choosing antibiotics, also take account of local antimicrobial resistance data and other factors such as their availability.
- Give oral antibiotics if the patient can take oral medicines and their condition is not severe enough to need intravenous antibiotics.
- Review all antibiotics at 24 to 48 hours or as soon as test results are available.
- Stop antibiotics if the pneumonia is due to COVID-19 and there is no evidence of bacterial infection (see section 4 in the COVID-19 rapid guideline on antibiotics for pneumonia in adults in hospital for more information).
- Review antibiotic choice based on microbiological results and switch to a narrower spectrum antibiotic when appropriate.
- If antibiotics are continued, give them for a total of 5 days, then stop them unless there is a clear indication to continue.
- Review intravenous antibiotic use within 48 hours and think about switching to oral antibiotics.
- See the [BNF for appropriate use and dosing in specific populations](#), for example, for hepatic impairment, renal impairment, pregnancy and breast-feeding, and when administering intravenous antibiotics.

Table 1 Antibiotics for people 18 and older with suspected community-acquired pneumonia

Empirical treatment	Antibiotics and dosage (oral doses are for immediate-release medicines)
Oral antibiotics for moderate or severe pneumonia	<p>Options include:</p> <p>Doxycycline: 200 mg on first day, then 100 mg once a day</p> <p>Co-amoxiclav: 500 mg/125 mg three times a day <u>with</u></p> <p>Clarithromycin: 500 mg twice a day</p> <p>In severe pneumonia, and if the other options are unsuitable:</p> <p>Levofloxacin: 500 mg once or twice a day (consider the safety issues with fluoroquinolones)</p>
Intravenous antibiotics for moderate or severe pneumonia	<p>Options include:</p> <p>Co-amoxiclav: 1.2 g three times a day <u>with</u></p> <p>Clarithromycin: 500 mg twice a day</p> <p>Cefuroxime: 750 mg three times a day (increased to 750 mg four times a day or 1.5 g three or four times a day if infection is severe) <u>with</u></p> <p>Clarithromycin: 500 mg twice a day</p> <p>In severe pneumonia, and if the other options are unsuitable:</p> <p>Levofloxacin: 500 mg once or twice a day (consider the safety issues with fluoroquinolones)</p>

There are no validated tools to assess the severity of community-acquired pneumonia in the context of the COVID-19 pandemic; severity should be based on clinical judgement.

Consult a local microbiologist for alternative options, including for pregnant women.

If there is a penicillin allergy, avoid using co-amoxiclav and use cefuroxime with caution.

For safety issues with fluoroquinolones, see the [Medicines and Healthcare products Regulatory Agency advice](#). This covers restrictions and precautions for using fluoroquinolone antibiotics because of very rare reports of disabling and potentially long-lasting or irreversible side effects affecting musculoskeletal and nervous systems. Warnings include: stopping treatment at the first signs of a serious adverse reaction (such as tendonitis), prescribing with special caution for people over 60 years and avoiding coadministration with a corticosteroid (March 2019).

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.

May 2020

COVID-19 rapid guideline: antibiotics for pneumonia in adults in hospital

Table 2 Antibiotics for people 18 and older with suspected hospital-acquired pneumonia

Empirical treatment	Antibiotics and dosage (oral doses are for immediate-release medicines)
Oral antibiotics for non-severe pneumonia when there is not a higher risk of resistance	<p>Options include:</p> <p>Doxycycline: 200 mg on first day, then 100 mg once a day</p> <p>Co-amoxiclav: 500 mg/125 mg three times a day</p> <p>Co-trimoxazole: 960 mg twice a day (see the BNF for information on monitoring of patient parameters)</p> <p>If the other options are unsuitable:</p> <p>Levofloxacin: 500 mg once or twice a day (consider the safety issues with fluoroquinolones)</p>
Intravenous antibiotics for severe pneumonia (for example, symptoms or signs of sepsis or ventilator-associated pneumonia) or when there is a higher risk of resistance	<p>Options include:</p> <p>Piperacillin with tazobactam: 4.5 g three times a day, increased to 4.5 g four times a day if infection is severe</p> <p>Ceftazidime: 2 g three times a day</p> <p>If the other options are unsuitable:</p> <p>Levofloxacin: 500 mg once or twice a day (use a higher dosage if infection is severe; consider the safety issues with fluoroquinolones)</p>
Antibiotic to be added if methicillin-resistant <i>Staphylococcus aureus</i> infection is suspected or confirmed (dual therapy with an intravenous antibiotic listed above)	<p>Vancomycin: 15 mg/kg to 20 mg/kg two or three times a day intravenously, adjusted according to serum vancomycin concentration. Maximum 2 g per dose (see the BNF for information on patient parameter and therapeutic drug monitoring)</p> <p>Teicoplanin: Initially 6 mg/kg every 12 hours for 3 doses intravenously, then 6 mg/kg once a day (see the BNF for information on patient parameter and therapeutic drug monitoring)</p> <p>Linezolid: 600 mg twice a day orally or intravenously (with specialist advice only; see the BNF for information on monitoring of patient parameters)</p>

There are no validated tools to assess the severity of hospital-acquired pneumonia in the context of the COVID-19 pandemic; severity should be based on clinical judgement.

Consult a local microbiologist for alternative options, including for pregnant women.

If there is a penicillin allergy, avoid using co-amoxiclav and piperacillin with tazobactam, and use cefuroxime and ceftazidime with caution.

Higher risk of resistance includes symptoms or signs starting more than 5 days after hospital admission, relevant comorbidity such as severe lung disease or immunosuppression, recent use of broad-spectrum antibiotics, colonisation with multidrug-resistant bacteria, and recent contact with a health or social care setting before current admission.

For antibiotics not licensed for hospital-acquired pneumonia (co-trimoxazole, levofloxacin), use would be [off-label](#). See [NICE's prescribing medicines](#) for more information.

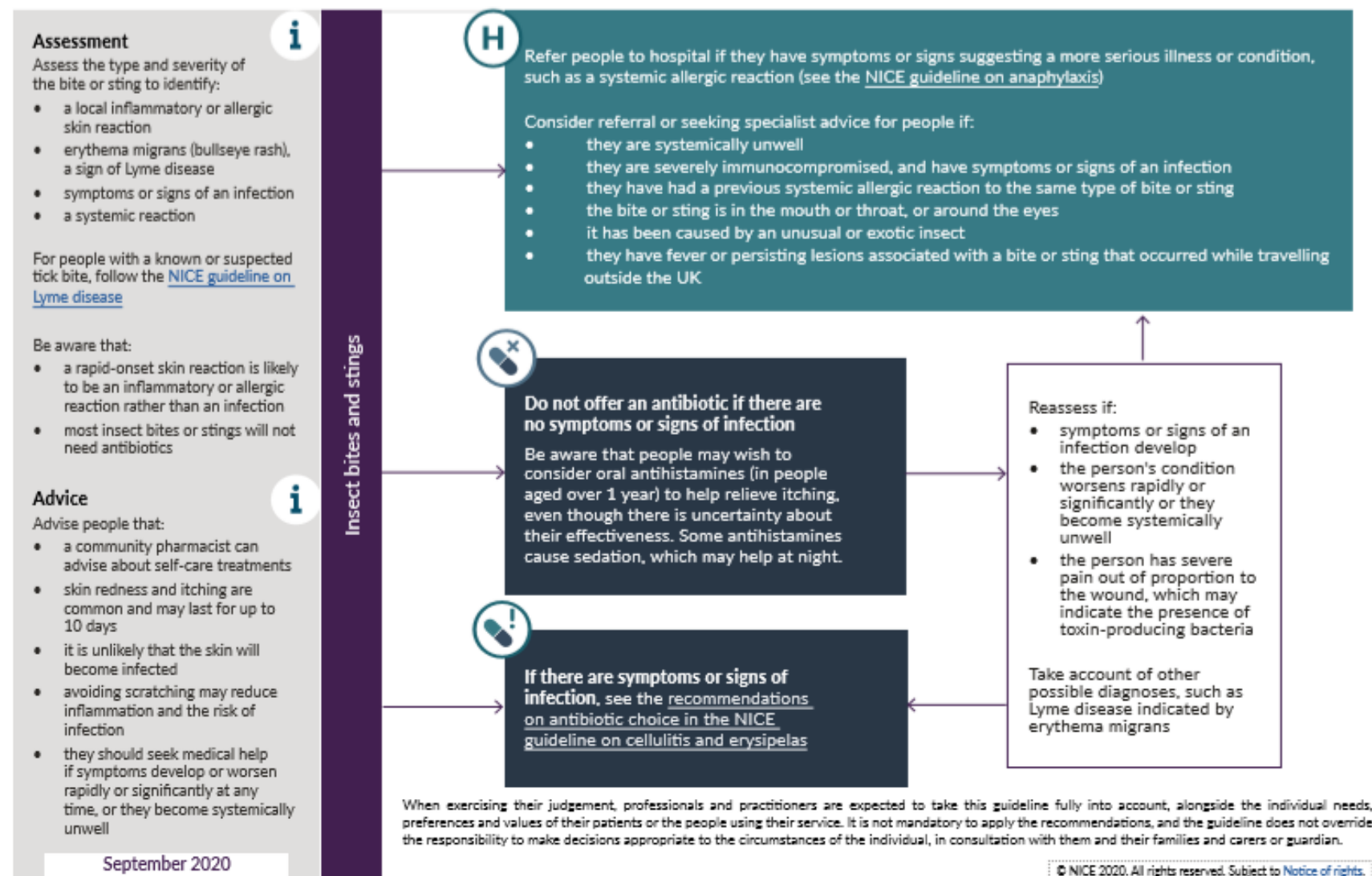
For safety issues with fluoroquinolones, see the [Medicines and Healthcare products Regulatory Agency advice](#). This covers restrictions and precautions for using fluoroquinolone antibiotics because of very rare reports of disabling and potentially long-lasting or irreversible side effects affecting musculoskeletal and nervous systems. Warnings include: stopping treatment at the first signs of a serious adverse reaction (such as tendonitis), prescribing with special caution for people over 60 years and avoiding coadministration with a corticosteroid (March 2019).

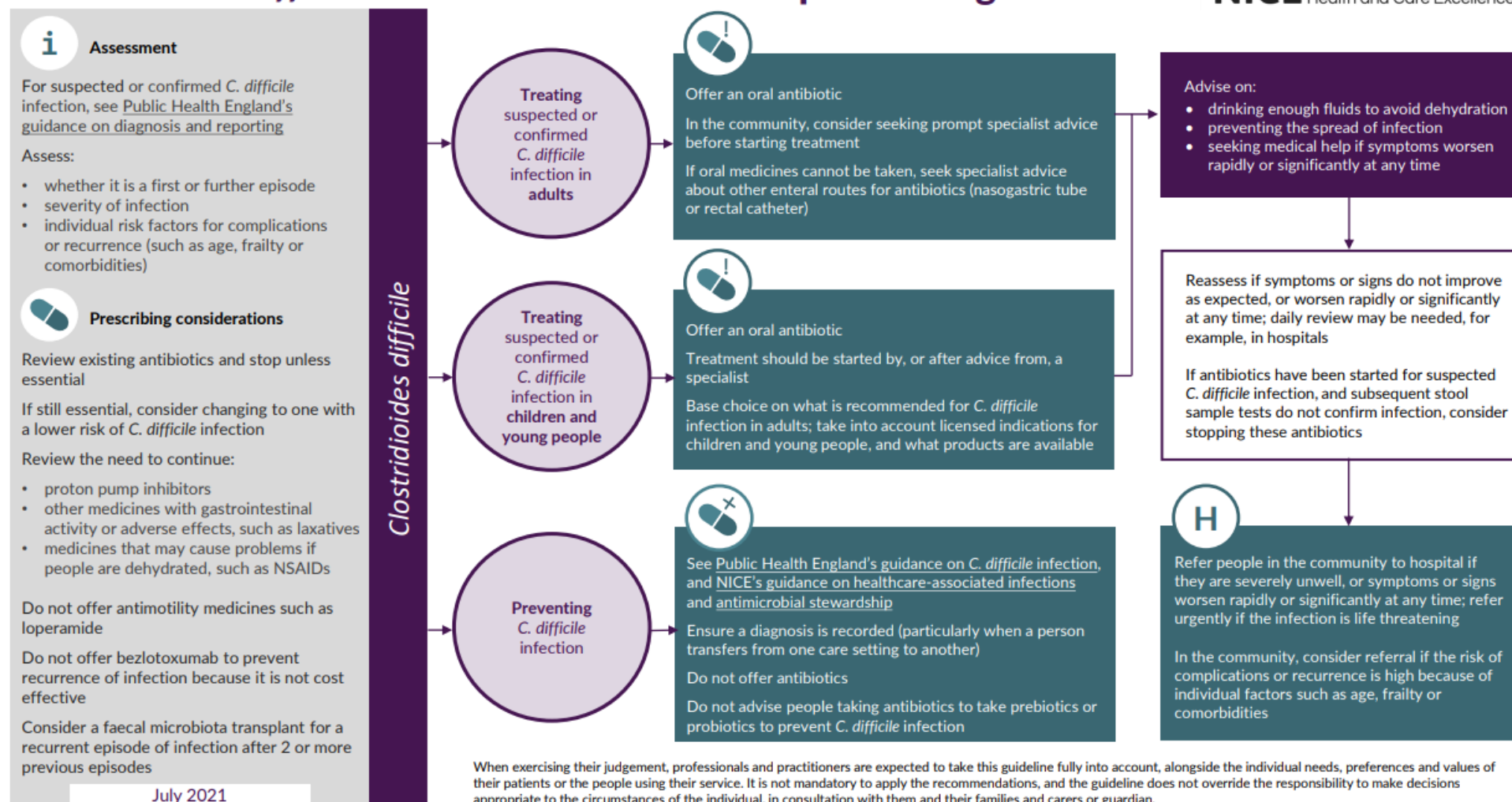
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Appendix 17 – NICE NG182 – Insect bites and stings: antimicrobial prescribing

NICE National Institute for
Health and Care Excellence

Insect bites and stings: antimicrobial prescribing



Appendix 18 – NICE NG199 – *Clostridioides difficile* infection***Clostridioides difficile* infection: antimicrobial prescribing****NICE** National Institute for Health and Care Excellence

Clostridioides difficile infection: antimicrobial prescribing

Choice of antibiotic for adults aged 18 years and over

Treatment	Antibiotic, dosage and course length
First-line antibiotic for a first episode of mild, moderate or severe <i>C. difficile</i> infection	Vancomycin: 125 mg orally four times a day for 10 days
Second-line antibiotic for a first episode of mild, moderate or severe <i>C. difficile</i> infection if vancomycin is ineffective	Fidaxomicin: 200 mg orally twice a day for 10 days
Antibiotics for <i>C. difficile</i> infection if first- and second-line antibiotics are ineffective	Seek specialist advice. Specialists may initially offer: Vancomycin: Up to 500 mg orally four times a day for 10 days With or without Metronidazole: 500 mg intravenously three times a day for 10 days
Antibiotic for a further episode of <i>C. difficile</i> infection within 12 weeks of symptom resolution (relapse)	Fidaxomicin: 200 mg orally twice a day for 10 days
Antibiotics for a further episode of <i>C. difficile</i> infection more than 12 weeks after symptom resolution (recurrence)	Vancomycin: 125 mg orally four times a day for 10 days OR Fidaxomicin: 200 mg orally twice a day for 10 days
Antibiotics for life-threatening <i>C. difficile</i> infection	Seek urgent specialist advice, which may include surgery. Antibiotics that specialists may initially offer are: Vancomycin: 500 mg orally four times a day for 10 days With Metronidazole: 500 mg intravenously three times a day for 10 days

See the [BNF](#) for appropriate use and dosing in specific populations, for example, hepatic impairment, renal impairment, pregnancy and breastfeeding.

See [Specialist Pharmacy Service guidance on choosing between oral vancomycin options](#). If ileus is present, specialists may use vancomycin rectally.

Use clinical judgement to determine whether antibiotic treatment for *C. difficile* infection is ineffective. This is not usually possible to determine until day 7 because diarrhoea may take 1 to 2 weeks to resolve. There is no agreement on the definition of relapse or recurrence in *C. difficile* infection. For this guideline, 12 weeks was agreed as the cut-off point between relapse and recurrence.

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