GUIDE TO ANTIBIOTIC USE FOR ADULT PATIENTS

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Ratified by	• NUH Antibiotic Guidelines Committee • NUH Drugs and Therapeutics Committee
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Evidence Base	• Local microbiological sensitivity surveillance • Published evidence from studies. • Recommended best practice based on clinical experience of guideline developers.
Changes from previous Guideline	Addition of guidance for Ophthalmic, ENT, Non-C.Diff diarrhoea, Empyema Genital Tract and *H.Pylori* infections. New summary of Genitourinary medicine guidelines. Update March 2009 - Replacement of oral erythromycin with oral clarithromycin. Update of antibiotics guidelines website address.
Inclusion Criteria	• Adult patients with listed infections.
Audit	• Annual Directorate Audit Plans as appropriate
Distribution	• NCH and QMC Antibiotic websites • Consultants via trust e-mail. • NCH EDL website
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This guideline has been registered with the Trust. However, clinical guidelines are 'guidelines' only. The interpretation and application of clinical guidelines will remain the responsibility of the individual clinician. If in doubt consult a senior colleague or expert. Caution is advised when using guidelines after the review date.

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This guide has been produced by Microbiology and Pharmacy services, to promote rational and cost-effective antibiotic prescribing. It includes a summary of policies, relative costs, restricted agents and spectrum of activity for a range of antibiotics.

Remember

1 Follow NUH hospital formulary and prescribing guidelines.
2 Do not prescribe restricted agents without Consultant/ Microbiology/ID advice and document this in medical notes (see antimicrobial restricted list).
3 Use narrow spectrum agents when possible and in conjunction with microbiology results
4 Always write the indication and a stop/review date for all antimicrobials on the drug chart at the point of prescribing, refer to the antibiotic Stop/Review Date and Indication Policy.
5 Review all antibiotics daily.
6 Review IV antibiotics on the post-take ward round and at 48 hours- refer to IV to oral switch guidelines.

Prescribers are reminded to adjust therapy according to individual patient's needs, renal function and culture results.

Choice of Antibiotic for Common Infections (non-Septic patients)

N.B. for Septic patients: see *Nottingham Antibiotic Guidelines for Empirical Treatment of Sepsis in Immunocompetent Adults* for treatment of: abdominal Infection, biliary sepsis, bone and joint, IV cannula sepsis, endocarditis and urosepsis and also *Antibiotic Guidelines For The Management Of Community-Acquired Bacterial Meningitis In Adults* [see antibiotics website Find under "Clinical Information" on the NUHnet, or see http://nuhnet/diagnostics_clinical_support/antibiotics/ or http://www.nuh.nhs.uk/antibiotics]

All doses are **oral** and appropriate for patients with **normal renal function**, unless otherwise stated.

	Infection	1st line	Alternative therapy & other info
URINE	Uncomplicated UTIs e.g. cystitis in women	Trimethoprim 200mg bd 3/7	Nitrofurantoin 50mg qds 3/7 (not suitable for patients with renal impairment)
	Patients with underlying renal tract abnormalities, UTI in diabetics and/or male patients, recent urinary surgery/ instrumentation (excluding urinary tract catheterisation) all need therapy for 7-10 days		
	Complicated UTIs (pyelonephritis)	Cefuroxime IV 1.5g tds (see IV-PO switch guideline) Total IV and oral treatment 10/7	Amoxicillin IV 1g tds **plus** Gentamicin IV 5mg/kg† or Ciprofloxacin 500mg bd (Total IV and oral treatment for 10/7)
	NB Patients with previous multi-resistant Gram-negative isolates (e.g. gentamicin resistant) should be discussed with microbiology		

NON-PNEUMONIC	LRTI: infective exacerbations of COPD or Asthma without chest x-ray changes.	Antibiotics not always indicated (see full guideline) Doxycycline 100mg bd for 1/7 then 100mg od for 4/7	Co-amoxiclav 625mg tds 5/7 **or** Levofloxacin 500mg od 5/7
PNEUMONIC LRTI	<u>Community-acquired pneumonia (see full guideline)</u> Non-severe (CURB-65 = 0-2)	Amoxicillin 500mg-1g tds plus Clarithromycin PO 500mg bd 7/7	• NBM – Amoxicillin IV 500-1g tds **plus** Clarithromycin IV 500mg bd (convert back to PO ASAP). • Penicillin allergy: Levofloxacin 500mg od 7/7 – If also NBM Discuss with microbiology.
	Severe (CURB-65 = 3-5)	Co-amoxiclav IV 1.2g tds plus Clarithromycin IV 500mg bd (see IV-PO switch guideline) Total IV and oral treatment 10/7	• If mild penicillin allergy (mild rash only) Cefuroxime IV 1.5g tds plus Clarithromycin IV 500mg bd • Severe allergy or risk of MRSA (see main guidance), use Levofloxacin PO 500mg bd plus Vancomycin† IV 1g bd Total IV and oral treatment 10/7
	If aspiration of concern: Add IV Metronidazole 500mg tds to cefuroxime or levofloxacin based regimens (NB Co-amoxiclav provides sufficient anaerobic cover).		
	<u>Hospital-Acquired Pneumonia</u>		
	Non-severe	Co-amoxiclav 375mg tds plus amoxicillin 250mg tds 7/7	• NBM - Co-amoxiclav IV 1.2g tds 7/7 • Penicillin allergy: Levofloxacin PO 500mg od 7/7 (or Cefuroxime IV 1.5g tds if non-anaphylactic penicillin allergy).
	Severe	Co-amoxiclav IV 1.2g tds **plus stat** Gentamicin IV 5mg/kg†	• <u>Non</u>-anaphylactic penicillin allergy: Cefuroxime 1.5g tds 7/7**plus stat** Gentamicin IV 5mg/kg† • Penicillin anaphylaxis: Levofloxacin PO 500mg bd **plus** Vancomycin IV 1g bd† 7/7
	If aspiration of concern: Add IV Metronidazole 500mg tds to cefuroxime or levofloxacin based regimens (NB Co-amoxiclav provides sufficient anaerobic cover).		
EMPYEMA	Discuss all patients suspected of empyema with the respiratory team. Send sample of fluid for urgent Gram stain / culture (inc. TB culture) and sensitivities. Early drainage via chest drain is important.		
	Community Acquired Empyema	Co-amoxiclav IV 1.2g tds Review with microbiology results.	Mild allergy to penicillins: Cefuroxime IV 1.5g tds **plus** Metronidazole IV 500mg tds Anaphylaxis to penicillins: Clindamycin 600mg PO qds with early discussion with a medical microbiologist
	Hospital Acquired Empyema	Tazocin ® IV 4.5g tds **plus** Vancomycin IV 1g bd† Review with micro. results and discuss with microbiology for oral continuation therapy.	Penicillins allergy: Discuss with a medical microbiologist

ENT	Upper Respiratory Tract Infection	Viral, antibiotics are not indicated. Send nasal-pharyngeal aspirate if influenza suspected or immuncompromised.	If Influenza virus is circulating in the community (as informed by microbiology), Oseltamivir treatment may be indicated if patient: • Has flu-like symptoms • Is in a high-risk group (see BNF 5.3.4) • And can start therapy within 48 hours of the onset of symptoms.
	Acute Tonsillitis/Sore Throat	Routine treatment of sore throats with antibiotics is not indicated. Antibiotics are more likely to be helpful in patients with • a history of otitis media • general clinical condition of concern • Group A haemolytic Strep. isolated in an inpatient (for infection control reasons) or three out of four of: • history of fever • purulent tonsils • cervical adenopathy • absence of cough 1st line: Penicillin V 500mg qds 10/7.	If penicillin allergic: Clarithromycin PO 500mg bd 10/7.
	Quinsy or Peri-tonsillar Abscess	Benzylpenicillin IV 1.2g qds **plus** Metronidazole IV 500mg tds. Converting to oral Penicillin V 500mg qds and Metronidazole PO 400mg tds, total course length IV+ PO 7/7.	Mild penicillin allergy: Cefuroxime IV 1.5g tds and Metronidazole IV 500mg tds. Converting to oral cefradine 500mg qds and Metronidazole 400mg tds, total course length 7/7 Penicillin anaphylaxis/severe allergy: Clindamycin Oral 600mg qds (IV route may be used until patient is able to swallow capsules). for 7/7
	Acute Epiglottitis	*Protect the airway* Ceftriaxone IV 2g OD	Penicillin anaphylaxis/severe allergy: Discuss with microbiologist
	Acute Otitis Media	Diagnosis can be difficult please refer all patients to ENT for review. If antibiotics indicated 1st line: Amoxicillin PO 500mg tds 3/7	Failure to respond to amoxicillin: Co-amoxiclav 375mg tds plus amoxicillin 250mg tds for 5/7 Penicillin allergy: Clarithromycin PO 500mg bd for 3/7
	Otitis Externa	Refer all patients to ENT for review.	
	Acute Bacterial Sinusitis	Diagnosis can be difficult please refer all patients to ENT for review. If antibiotics indicated 1st line Amoxicillin 500 mg tds 5/7.	Penicillin allergy: Doxycycline 100 mg bd for 1/7 then 100mg od for 4/7. or Clarithromycin PO 500mg bd for 5/7.

GENITAL TRACT	Pelvic Inflammatory Disease	Ceftriaxone 250mg IM stat **plus** Metronidazole 400 mg bd 5/7 **plus** Doxycycline 100mg bd 14/7	Swabs should be taken for investigation for chlamydia and gonococcal infection. See full guidance for advice on treatment of severe disease or when the patient is NBM/ or the 1st line regimen is contraindicated e.g. pregnancy
	Uncomplicated Chlamydial Infection	Doxycycline 100mg bd 7/7 Or if poor compliance likely Azithromycin 1g stat	**Refer to GUM clinic for follow-up** If pregnant use erythromycin 500mg qds 7/7.
	Uncomplicated Gonococcal Infection	Ceftriaxone 250 mg IM stat	If known ciprofloxacin sensitive strain and not pregnant or breastfeeding: Ciprofloxacin 500mg orally stat
OPHTHALMIC	Acute Bacterial Conjunctivitis	General approach: watch and wait for 3-4 days (see right), if treatment is required: Chloramphenicol eye drops after swabs sent for culture, 1 drop to affected eye every 2-4 hours, reduce frequency to qds after 48 hours. Total duration usually 5-7 days. If not responding to therapy or severe infections refer to ophthalmology	In the outpatient setting, treatment with antibiotics either immediately or after 3 days waiting did not reduce the severity of symptoms compared to no antibiotics. The duration of moderate symptoms was reduced by 0.9 -1.5 days by antibiotic treatment compared to no treatment.
	Chlamydial Conjunctivitis	Doxycycline 100mg bd for 2 weeks (not if pregnant)	If pregnant use erythromycin 500mg qds for 2 weeks
	Orbital Cellulitis	Refer patient to ophthalmology, Co-amoxiclav IV 1.2g tds converting to oral Co-amoxiclav 375mg + Amoxicillin 250mg tds	Mild penicillin allergy: Cefuroxime IV 1.5g tds and Metronidazole IV 500mg tds. Converting to oral Cefradine 500mg qds and Metronidazole 400mg tds. Penicillin anaphylaxis/severe allergy: Discuss with microbiology
	Herpes Zoster Ophthalmicus	Refer patient to ophthalmology, Aciclovir 800mg 5 times a day 7/7 or Valaciclovir 1g tds 7/7	
	Suspected endophthalmitis Corneal infection (keratitis)	Always serious and sight-threatening. Refer **urgently** to an ophthalmologist.	

SKIN	Mild skin/ soft tissue infection, patient not systemically unwell (not MRSA)	Flucloxacillin 500mg-1g qds 7/7	• Clarithromycin PO 500mg bd 7/7
	Mild skin/ soft tissue infection, and patient systemically unwell (not MRSA)	Flucloxacillin 1g qds	• Clindamycin 300-450mg qds
	Cellulitis - Severe (immunocompetent adults)	Flucloxacillin IV 2g qds <u>Hosp-acquired/known MRSA/ readmission:</u> Vancomycin IV 1g bd†	• High dose covers Group A Strep (ie Benzylpenicillin not required) • Penicillin allergic: clindamycin PO 450-600mg qds or if vomiting IV 600mg qds • Unresponsive infection with shock – <u>discuss with Micro</u>
	Orbital cellulitis	See ophthalmic section above.	
	Peripheral cannula infection (non-sepsis)	Doxycycline 100mg bd for 1/7 then 100mg od for 6/7	<u>Not</u> in septic patients where MRSA bacteraemia likely cause of cannula infections and vancomycin may be indicated (see **SEPSIS** guidelines)
	Chronic Leg Ulcers	Antibiotics only for clinical infection (see right).	Chronic Leg ulcers will naturally be colonised. It is important to determine where there is an infective process occurring. Infection is more likely in patients with: • <u>Spreading</u> erythema • New pain. • Purulent discharge (not just slough).
H.Pylori	*H.Pylori* Eradication Regimen	Amoxicillin 1g bd 7/7 Plus Clarithromycin 500mg bd 7/7 Plus Lansoprazole 30mg bd 7/7 then usually reduced to once daily and continued. Duration dependent on indication.	Alternative/if Penicillin allergic: Metronidazole 400mg bd 7/7 Plus Clarithromycin 500mg bd 7/7 Plus Lansoprazole 30mg bd 7/7 then usually reduced to once daily and continued. Duration dependent on indication.

DIARRHOEA	<u>Antibiotic-associated diarrhoea (see full guideline for severity criteria):</u> Mild (<4 stools/24 hours; patient not unwell) Moderate Severe	Supportive therapy Metronidazole PO 400mg tds 10/7 Vancomycin PO 125mg qds 10/7 (or Metronidazole IV 500mg tds <u>only</u> if NBM/Nasogastric tube not possible)	If *C Difficile* Toxin (CDT) positive, review and treat as below according to disease severity • Refer to diarrhoea service (via NOTIS) • If no improvement after 3/7 or clinical deterioration: change to ORAL vancomycin 125mg qds and/or seek micro/gastro advice • If a relapse pt should be treated with a second course of whichever antibiotic the original infection responded to (PO Metronidazole/PO vancomycin or combinations) unless the infection is now severe where oral vancomycin should be used. • If *C Difficile* Toxin (CDT) negative, repeat sample. If still negative, refer to gastroenterology.
	<u>Viral/Bacterial Diarrhoea (not antibiotic associated)</u>	• Management of fluid and electrolyte balance. • Most Bacterial infections are self-limiting. Antibiotics only reduce the duration by 1-2 days, can select for resistance and are contraindicated in patient with *E.Coli* 0157 where they enhance toxin release leading to haemolytic uraemic syndrome. • Avoid anti-motility agents acutely, especially for bloody diarrhoea.	• Consider antibacterial therapy only if there are clear signs of systemic spread or if the patient is elderly, immunocompromised or has prosthetic valves or joints, when blood should be taken for culture and the case should be discussed with a medical microbiologist or infectious disease physician, as antibiotic sensitivity cannot be assumed. • Inform infection control if outbreak suspected (out of hours: on-call microbiologist). • If a food source or community outbreak is suspected - contact the Consultant in Communicable Disease Control (CCDC) (Tel: 01623 819 000).

†For vancomycin (patient's > 65 yrs and/or mild renal impairment, creatinine clearance 20-50ml/min: reduce dose to Vancomycin 1g od)
For Gentamicin, calculate Creatinine clearance (using the calculator on the antibiotic website) and dose reduce if Cr Cl <40ml/min as table below:

Creatinine Clearance 10 –40ml/min	Creatinine Clearance <10 (severe)
3mg/kg *(max 300mg)* Check levels 18–24 hours after first dose and await the result. Redose only when levels < 1 mg/L	**2 mg/kg *(max 200mg)*** Redose according to levels Close monitoring of blood levels recommended and dose adjustment as necessary

- Cockcroft-Gault GFR estimates (using the creatinine clearance calculator) should be used for drug dosing rather than the automated MDRD eGFR produced by the clinical chemistry laboratory as seen on NOTIS.
- Therapeutic drug monitoring required for vancomycin and gentamicin.
- Refer to the antibiotics website for renal dosing of antibiotics and advice on taking antibiotic assays: Find under "Clinical Information" on the NUHnet, or see http://nuhnet/diagnostics_clinical_support/antibiotics/ or http://www.nuh.nhs.uk/antibiotics