



CLINICAL GUIDELINE

Infection Management Guidelines in Adults

A guideline is intended to assist healthcare professionals in the choice of disease-specific treatments.

Clinical judgement should be exercised on the applicability of any guideline, influenced by individual patient characteristics. Clinicians should be mindful of the potential for harmful polypharmacy and increased susceptibility to adverse drug reactions in patients with multiple morbidities or frailty.

If, after discussion with the patient or carer, there are good reasons for not following a guideline, it is good practice to record these and communicate them to others involved in the care of the patient.

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Important Note:

The Intranet version of this document is the only version that is maintained. Any printed copies should therefore be viewed as 'Uncontrolled' and as such, may not necessarily contain the latest updates and amendments.

Infection Management Guidelines Empirical Antibiotic Therapy in Adults

STOP AND THINK BEFORE ANTIBIOTIC THERAPY: 1 in 5 antibiotic courses associated with adverse events including *C. difficile*, drug interactions/ toxicity, device related infections and *S. aureus* bacteraemia. **THINK SEPSIS IF NEWS ≥ 5.** Send samples to microbiology before starting antibiotics. **RECORD antibiotic indication** on kardex. **REVIEW** patient and results. **RECORD clinical response and prescription daily.** Can you **SIMPLIFY, SWITCH** or **STOP**? If Clinical improvement + eating/drinking + deep seated/complex infection **not** suspected then **IVOST** and **RECORD** duration of remaining oral therapy. **RECORD the STOP date for oral antibiotic** - score kardex at appropriate date. **REVIEW all IV antibiotics DAILY** and **RECORD** review date. **INFORM** patient of reason for antibiotic and likely duration.

NB Doses recommended based on normal renal/liver function - see BNF or Renal handbook for dosing advice. For info on antibiotic contra-indications, cautions and monitoring see BNF.

Definition of SEPSIS: INFECTION (includes Systemic Inflammatory Response Syndrome (SIRS) **WITH evidence of ORGAN HYPOPERFUSION (≥ 2 of: Confusion, < 15 GCS or Resp Rate ≥ 22/ min or Systolic BP ≤ 100 mm Hg).**

Ensure SEPSIS 6 within one hour: 1. Blood cultures (& any other relevant samples), 2. IV Antibiotic administration, 3. Oxygen to maintain target saturation, 4. Measure lactate, 5. IV fluids, 6. Monitor urine output hourly.

*SIRS indicated by Temp < 36°C or > 38°C, HR > 90 bpm, RR > 20/ min & WCC < 4 or > 12 x10⁹/ L. SIRS is not specific to bacterial infection (also viral & non-infective causes).

Lower Respiratory Tract Infections

Infective Exacerbation COPD
 Antibiotics only if purulent sputum (send for culture along with viral gargle)
Dual antibiotic therapy not recommended & increases risk of harm
 Oral **Doxycycline 200mg** as a one-off single dose then 100mg daily
or Oral Amoxicillin 500mg 8 hrly **or** Oral Clarithromycin 500mg 12 hrly
Duration 5 days

Suspected COVID-19 pneumonia
Antibiotics NOT usually required
 Antibiotics only if COPD with purulent sputum (treat as above) or suspected bacterial pneumonia with Chest X-Ray changes (treat as Pneumonia below)
 Consider stopping antibiotics following review and positive SARS-CoV-2 result

Uncertain if LRTI/ UTI
 Send MSSU, sputum and viral gargle
 Oral Co-trimoxazole 960mg 12 hrly **or** Oral Doxycycline 100mg 12 hrly
 Do **NOT** prescribe Co-amoxiclav
Review/ clarify diagnosis at 48 hours
Duration if diagnosis remains uncertain **MAXIMUM 5 days**

Pneumonia

Community Acquired Pneumonia (CAP)
 Assess for SEPSIS
 Calculate CURB 65 score:
 • Confusion (new onset)
 • Urea > 7 mmol/L
 • RR ≥ 30 breaths/ min
 • BP – diastolic ≤ 60 mmHg or systolic < 90 mmHg
 • Age ≥ 65 years

Non-severe CAP
 CURB 65 score: ≤ 2 (and no sepsis)
 Oral Amoxicillin 500mg 8 hrly
or Oral Doxycycline 200mg as a one-off single dose then 100mg daily
or Oral Clarithromycin 500mg 12 hrly
Duration 5 days

Severe CAP
CURB 65 score ≥ 3
or CAP (with any CURB 65 score)
PLUS sepsis syndrome:
 IV/oral Clarithromycin 500mg 12 hrly
 PLUS either:
 IV Amoxicillin 1g 8 hrly
or requiring HDU/ ICU level care
 IV Co-amoxiclav 1.2g 8 hrly
If true penicillin/beta-lactam allergy or Legionella strongly suspected

Duration 5 days (IV/oral)
 Legionella 10-14 days

Hospital Acquired Pneumonia (HAP)
 Diagnosis of HAP is difficult and it is often over-diagnosed. Consider other causes of clinical deterioration
including hospital-onset COVID-19 and review diagnosis early.
 Seek senior advice. Assess severity based on CURB 65 score.
If within 4 days of admission
 Treat as for CAP
If ≤ 7 days post hospital discharge or ≥ 5 days after admission:
Non-severe HAP
 Oral therapy recommended
 Oral Doxycycline 100mg 12 hrly
or Oral Co-trimoxazole 960mg 12 hrly
Duration 5 days

Severe HAP
 IV Co-trimoxazole 960mg 12 hrly (or if allergy IV Co-amoxiclav 1.2g 8 hrly)
 + IV Gentamicin**Δ (max 4 days)
See BNF for dosing of co-trimoxazole in renal impairment if eGFR < 20 mL/min/1.73 m² contact infection specialist
Duration 5 days (IV/oral)
 If critically ill discuss with infection specialist

Aspiration pneumonia
 This is a chemical injury and does not indicate antibiotic treatment. **Reserve antibiotics for those who fail to improve within 48 hrs post aspiration.**
 IV Amoxicillin 1g 8 hrly
or if true penicillin/beta-lactam allergy
 IV Clarithromycin 500mg 12 hrly + IV Metronidazole 500mg 8 hrly
Duration 5 days (IV/oral)

Skin/ Soft Tissue Infections

Mild skin/soft tissue infection
 Oral Flucloxacillin 1g 6 hrly
or if true penicillin/beta-lactam allergy
 Oral Co-trimoxazole 960mg 12 hrly
or Oral Doxycycline 100mg 12 hrly
Duration 5 days

Moderate / Severe Cellulitis
 Consider OPAT/ ambulatory care (consult local management pathway).
 If requires inpatient management:
 IV Flucloxacillin 2g 6 hrly
 IV Vancomycin**
If rapidly progressive
Add IV Clindamycin 600mg 6 hrly
Duration 7-10 days (IV/oral)

Suspected Necrotising Fasciitis
 Consider in SSTI with disproportionate pain or presence of acute organ dysfunction/ hypoperfusion including hypotension.
Seek urgent surgical/ orthopaedic review.
URGENT DEBRIDEMENT/ EXPLORATION may be required
 IV Flucloxacillin 2g 6 hrly
 + IV Benzylpenicillin 2.4g 6 hrly
 + IV Metronidazole 500mg 8 hrly
 + IV Clindamycin 1.2g 6 hrly
 + IV Gentamicin**Δ (max 4 days)
If MRSA suspected or if true penicillin/ beta-lactam allergy
REPLACE Flucloxacillin + Benzylpenicillin with IV Vancomycin**
Rationalise therapy within 48-72 hours
 Based on: response, microbiology results infection specialist review
Duration 10 days (IV/oral) or as per infection specialist

Infected human/animal bite
Non-severe bite
 Oral Co-amoxiclav 625mg 8 hrly *or if true penicillin/beta-lactam allergy*
 Oral Doxycycline 100mg 12 hrly + Oral Metronidazole 400mg 8 hrly
Duration 5 days (treatment) 3 days (prophylaxis)

Severe bite
 Consider surgical review.
 IV Co-amoxiclav 1.2g 8 hrly
or if true penicillin/beta-lactam allergy
 IV Vancomycin**
 + Oral Metronidazole 400mg 8 hrly + Oral Ciprofloxacin 500mg 12 hrly
Duration 7 days (IV/oral)

Gastrointestinal Infections

Gastroenteritis
 Confirm travel history/ other risk factors
Antibiotics not usually required and may be deleterious in *E.coli* O157
 Consider viral causes including COVID-19

C. difficile infection (CDI)
 See NHS GGC CDI guidance
 Treat before lab confirmation if suspected. Discontinue if toxin negative
No severity markers
 Oral Metronidazole 400mg 8 hrly (Do not use suspension)
Any severity marker or first recurrence of CDI
 Oral Vancomycin 125mg 6 hrly
Duration 10 days
 If enteral feeding tube use Vancomycin (see full NHS GGC CDI guidance)

Intra-abdominal sepsis
 IV Amoxicillin 1g 8 hrly
 + IV/Oral Metronidazole 500/400mg 8 hrly + IV Gentamicin**Δ (max 4 days)
If eGFR < 20 mL/min/1.73 m²
 IV Piperacillin/Tazobactam 4.5g 12 hourly (Monotherapy)
If true penicillin/beta-lactam allergy
 IV Vancomycin** + IV/Oral Metronidazole 500/400mg 8 hrly + IV Gentamicin**Δ (max 4 days)
If eGFR < 20 mL/min/1.73 m²
****** IV/Oral Ciprofloxacin + IV/Oral Metronidazole 500/400mg 8 hrly
Total Duration 5 days (IV/oral)
 Assuming source control

Biliary tract infection
 As above except metronidazole not routinely required unless severe

Pancreatitis
 Does not require antibiotic therapy unless complicated by cholangitis.

Spontaneous bacterial peritonitis
 Ascites PLUS peritoneal white cell count > 500/mm³ or > 250 neutrophils/mm³
If not receiving co-trimoxazole prophylaxis:
 IV/Oral Co-trimoxazole 960mg 12 hourly
If receiving co-trimoxazole prophylaxis:
 IV Co-amoxiclav 1.2g 8 hrly *or if true penicillin/beta-lactam allergy*
Oral IV/**Ciprofloxacin 500/400mg 12 hrly + IV Vancomycin**
Duration 7 days (IV/oral)

Urinary Tract Infections

UTI in Pregnancy
 See NHS GGC Obstetric guidance

Lower UTI/cystitis
Don't treat asymptomatic bacteriuria. Obtain urine culture prior to antibiotic. In women often self-limiting, consider delayed prescribing.
 Antibiotics if significant symptoms
 Oral Nitrofurantoin 50mg 6 hrly
or Oral Trimethoprim 200mg 12 hrly
Duration: Females 3 days, Males 7 days
If eGFR < 30 mL/min/1.73 m²
 • Nitrofurantoin contraindicated
 • Trimethoprim use with caution may ↑ K⁺ and decrease renal function. Monitor

Upper UTI
Obtain urine for culture prior to antibiotic. Exclude pneumonia if loin/back pain
Non-severe/without sepsis
 Oral**Ciprofloxacin 500mg 12 hrly
or Oral Trimethoprim 200mg 12 hrly if sensitive organism.
Duration 7 days
 Trimethoprim see above re ↓ eGFR

UROSEPSIS/ Pyelonephritis with fever
 IV Gentamicin**Δ (max 4 days)
If eGFR < 20 mL/min/1.73 m²
 Oral **Ciprofloxacin
Duration 7 days

Catheter related UTI
Remove/ replace catheter and send urine for culture. Don't treat asymptomatic bacteriuria
Symptomatic bacteriuria without sepsis
 Give single dose of IV Gentamicin**Δ immediately prior to catheter removal or if IV route not available give single dose of oral **Ciprofloxacin 500mg 30 minutes before catheter change.
If eGFR 10-30 mL/min/1.73 m²
 **Ciprofloxacin 500mg single dose
Symptomatic bacteriuria with sepsis
 As above and treat as per pyelonephritis/ culture results.
Duration 7 days (IV/oral)

Suspected prostatitis
Consider in all men with lower UTI symptoms
 Refer to Urology
 Oral **Ciprofloxacin 500mg 12 hrly
or Oral Trimethoprim 200mg 12 hrly if sensitive organism.
Duration 14 days

Bone/ Joint Infections

Septic arthritis/ Osteomyelitis Prosthetic joint infection
 Obtain blood cultures prior to antibiotic therapy. If not acutely unwell/septic, also obtain synovial fluid/deep tissue samples prior to antibiotic therapy.
Native joint
 IV Flucloxacillin 2g 6 hrly
If MRSA suspected or if true penicillin/beta-lactam allergy
 IV Vancomycin**
 If considered high risk for Gram negative infection e.g. immunocompromised, recurrent UTI or sickle cell disease
ADD IV Gentamicin**Δ (max 4 days)

Duration and IVOST: discuss with microbiology at 72 hours. Usually 4 - 6 weeks (IV/oral) if diagnosis confirmed.
Prosthetic joint
 IV Vancomycin** + IV Gentamicin**Δ (max 4 days)
Duration and IVOST: discuss with microbiologist at 72 hours

Diabetic foot infection/ osteomyelitis
 Assess ulcer size, probes to bone, neuropathy, peripheral vascular disease, MRSA risk. For outpatient therapy consult diabetic clinic guidelines
 IV Flucloxacillin 2g 6 hrly + IV/Oral Metronidazole 500/400mg 8 hrly
 If SEPSIS or SIRS ≥2 **Add** IV Gentamicin**Δ (max 4 days)
If MRSA suspected or if true penicillin/beta-lactam allergy
 IV Vancomycin** + IV/Oral Metronidazole 500/400mg 8 hrly
 If SEPSIS or SIRS ≥2 **Add** IV Gentamicin**Δ (max 4 days)
 (Metronidazole oral bioavailability 80-100%)
If eGFR < 20 mL/min/1.73 m² REPLACE
 Gentamicin with Oral/IV **Ciprofloxacin
Duration/IVOST Discuss with Micro/ID

Vascular graft infection
 IV Flucloxacillin 2g 6hrly + IV Gentamicin**Δ (max 4 days)
If MRSA suspected or if true penicillin/beta-lactam allergy
 IV Vancomycin** + IV Gentamicin**Δ (max 4 days)
Discuss duration/IVOST further management with Infection specialist

CNS Infections

LP safe without CT scan UNLESS: seizures, GCS ≤ 12, CNS signs, papilloedema or immunosuppression. If CT: Blood cultures and antibiotics BEFORE CT scan.
 Use Meningitis/ Encephalitis order set on Trakcare, Blood and CSF Glucose.
LP contraindicated if: Brain shift, rapid GCS reduction, Resp/ cardiac compromise, severe sepsis, rapidly evolving rash, infection at LP site, coagulopathy, thrombocytopenia, anticoagulant drugs

Possible bacterial meningitis
 IV Ceftriaxone 2g 12 hrly
or if true penicillin/beta-lactam allergy
 IV Chloramphenicol 25mg/kg (max 2g) 6 hrly
 If age ≥ 60 years, immunosuppressed, pregnant, alcohol excess, liver disease or if listeria meningitis suspected:
ADD IV Amoxicillin 2g 4 hrly to Ceftriaxone
or if true penicillin/beta-lactam allergy
ADD IV Co-trimoxazole 30mg/kg 6 hrly to Chloramphenicol
 IF BACTERIAL MENINGITIS STRONGLY SUSPECTED **ADD** IV Dexamethasone 10mg 6 hrly (for 4 days) and refer to ID
Duration of antibiotics: Discuss with Micro/ID

Possible viral meningitis
 Usually diagnosed after empirical management and exclusion of bacterial meningitis. **Viral meningitis does NOT require antiviral prescription unless immunocompromised.**
Discuss with ID.
Confusion or reduced consciousness = Encephalitis NOT meningitis
Possible viral encephalitis
 Consider if confusion or reduced level consciousness in suspected CNS infection. Ensure CSF viral PCR is requested. May not be possible to differentiate from bacterial meningo-encephalitis.
 IV Aciclovir 10mg/kg 8 hrly
 See BNF for dosing in renal impairment.
 Discuss further management with ID/ virology. May require repeat LP or neuro-imaging to establish diagnosis.
Duration: Discuss with ID

Severe Systemic Infection Source Unknown

Community or Healthcare associated sepsis where source unknown
Review all anatomical systems, perform CXR and consider other imaging/ laboratory investigations
Consider and test for COVID-19
Review diagnosis DAILY
Add cover for S.aureus infection if: healthcare associated, recent hospitalisation, post-op wound/ line related, PWD
Add cover for MRSA infection if: recent MRSA carrier or previous infection
Add cover for Streptococcal infection if: pharyngitis/erythroderma/hypotension

Source unknown
 IV Amoxicillin 1g 8 hrly + IV Gentamicin**Δ (max 4 days)
If S.aureus suspected
ADD IV Flucloxacillin 2g 6 hrly
If MRSA suspected or if true penicillin/ beta-lactam allergy
 IV Vancomycin** + IV Gentamicin**Δ (max 4 days)
If severe Streptococcal infection suspected
ADD IV Clindamycin 600mg 6 hrly
If eGFR < 20 mL/min/1.73 m² REPLACE
 Gentamicin with Oral/IV **Ciprofloxacin
Duration: Review with response/ micro results at 72 hours

Neutropenic sepsis or immunocompromised with fever AND source of infection unknown;
 (See guideline Initial Management of Neutropenic Sepsis or Sepsis of Unknown Source in Immunocompromised Adults)
NEWS ≤ 6 Standard Risk
 IV Piperacillin/Tazobactam 4.5g 6 hourly
 + IV Gentamicin**Δ (max 4 days)
If MRSA colonised/ line infection or sign of skin and soft tissue infection
ADD IV Vancomycin**
Or if true penicillin/ beta-lactam allergy
 IV Gentamicin**Δ (max 4 days)
 + IV Vancomycin**

NEWS ≥ 7 High Risk
 IV Piperacillin/Tazobactam 4.5g 6 hourly + IV Gentamicin**Δ (max 4 days)
If MRSA colonised/ line infection or sign of skin and soft tissue infection
ADD IV Vancomycin**
Or if true penicillin/ beta-lactam allergy
 IV Gentamicin**Δ (max 4 days) + IV Vancomycin** + IV **Ciprofloxacin 400mg 8 hourly

Patients with Stem Cell Transplant or receiving chemotherapy for Acute Leukaemia
 NEWS ≤ 6 See High Risk treatment above. NEWS ≥ 7 Critical Risk. See Neutropenic Sepsis guidelines
**See Synergistic Gentamicin for Endocarditis in Adults guideline on StaffNet for dosing*

Immunocompromised Patient

Immunocompromised Patient
 Chemotherapy < 3 weeks, high dose steroids (e.g. prednisolone > 15mg/day for > 2 weeks), other immunosuppressants (e.g. anti-TNF, cyclophosphamide), Stem cell/solid organ transplant or primary immunodeficiency

Neutropenic Sepsis
 Neutrophils ≤ 0.5 x 10⁹ / L + fever (temperature > 38°C or 37.5°C on 2 occasions 30 min apart) / hypothermia < 36°C **OR** chills, shivers, sweats or other symptoms suggestive of infection.
 All patients who have received recent chemotherapy and who exhibit any of the symptoms above are presumed to be neutropenic and septic.

Immunocompromised with fever BUT normal neutrophils AND source of infection identified
 Manage as per infection management guidelines based on anatomical source.
Neutropenic sepsis or immunocompromised with fever AND source of infection unknown;
 (See guideline Initial Management of Neutropenic Sepsis or Sepsis of Unknown Source in Immunocompromised Adults)
NEWS ≤ 6 Standard Risk
 IV Piperacillin/Tazobactam 4.5g 6 hourly
 + IV Gentamicin**Δ (max 4 days)
If MRSA colonised/ line infection or sign of skin and soft tissue infection
ADD IV Vancomycin**
Or if true penicillin/ beta-lactam allergy
 IV Gentamicin**Δ (max 4 days) + IV Vancomycin**

NEWS ≥ 7 High Risk
 IV Piperacillin/Tazobactam 4.5g 6 hourly + IV Gentamicin**Δ (max 4 days)
If MRSA colonised/ line infection or sign of skin and soft tissue infection
ADD IV Vancomycin**
Or if true penicillin/ beta-lactam allergy
 IV Gentamicin**Δ (max 4 days) + IV Vancomycin** + IV **Ciprofloxacin 400mg 8 hourly

****Gentamicin/ **Vancomycin**
 Gentamicin / Vancomycin adult dosing calculators are available via "Clinical Info" icon on staff intranet / GGC Medicines App. Use GGC Prescribing, Administration, Monitoring charts
Vancomycin If creatinine not available give Vancomycin loading dose as per actual body weight
Gentamicin Δ Avoid Gentamicin in decompensated liver disease or myasthenia gravis

If creatinine not available give gentamicin as follows:			
Actual Body Weight	Gentamicin Dose	Actual Body Weight	Gentamicin Dose
< 40 kg	5 mg/kg	60 - 69 kg	320 mg
40 - 49 kg	240 mg	70 - 79 kg	360mg
50 - 59 kg	280mg	≥ 80 kg	400 mg
NB If CKDS give 2.5 mg/kg (max 180 mg)			

!! Important Antibiotic Drug Interactions & Safety Information !!
***Doxycycline/ Quinolone:** reduced absorption with iron, calcium, magnesium & some nutritional supplements. See BNF (Appendix1) or see pharmacy for advice.
***Clarithromycin/ Quinolone:** risk of serious drug interactions see BNF (appendix 1) or seek pharmacy advice. May also prolong the QTc interval, avoid (where possible) if other QTc risk factors.
**** Quinolones** e.g. Ciprofloxacin, Levofloxacin Stop treatment at first signs of a serious adverse reaction (e.g. tendonitis), prescribe with caution for people over 60 years and avoid co administration with a corticosteroid. See BNF for dosing advice in reduced renal function.