

RESPIRATORY INFECTIONS

Bronchitis

Bronchitis or Infective exacerbation of COPD

These patients will NOT have CXR changes. The presence of **new consolidation suggests that the patient has pneumonia, NOT an infective exacerbation of COPD**, and should be treated according to the pneumonia guidelines.

Consider antibiotics if the patient has increase in volume and/or purulence of the sputum.

1st line:

Doxycycline 100mg BD **Total duration:** 5 days

Community acquired pneumonia

NOTE: Pneumonia is a radiological diagnosis and requires CXR changes

Markers of severity

Severity of community acquired pneumonia (CAP) is designated by the **CURB-65** score - 1 point for each

CURB-65 Score	
C	Confusion (mental test score \leq8 or new onset)
U	Urea $>$7mmol/L
R	Respiratory rate \geq30/minute
B	Blood Pressure (SBP $<$90mmHg or DBP \leq60mmHg)
65	Age \geq65 years

Clinical judgement is essential when deciding on the management of all patients with CAP.

Mild Community-Acquired Pneumonia (CAP)

CURB-65 score 0 - 1

1st line:

Amoxicillin 500mg PO tds **Total duration:** 5 days

Penicillin allergy:

Roxithromycin 150mg PO bd **Total duration:** 5 days

Consider managing in the community, assess for cardiac co-morbidity, multi-lobar involvement or reduced oxygen sats which may indicate need for admission

Issue Date: Sep 2017	Page 1 of 11	NOTE: The electronic version of this document is the most current. Any printed copy cannot be assumed to be the current version.
Review Date: Sep 2018	Version No: 5	
Protocol Steward: Infectious Diseases Physician	Authorised by: Medical Director	

Moderate Community-Acquired Pneumonia (CAP)
CURB-65 score 2

1st line:

Amoxicillin 1g IV 8 hourly PLUS **Azithromycin** 500mg PO daily Total duration: 5 days

Non-anaphylactic Penicillin allergy:

Cefuroxime 1.5g IV 8 hourly PLUS **Azithromycin** 500mg PO daily Total duration: 5 days

Anaphylactic penicillin allergy:

Moxifloxacin 400mg PO daily Total duration: 5 days

Send sputum for MC&S PLUS Legionella PCR. Stop azithromycin if Legionella PCR is negative.

Severe Community Acquired Pneumonia
CURB-65 score \geq 3

1st line:

Amoxicillin 1-2g IV 6-8 hourly + **Azithromycin** 500mg PO once daily

Send sputum for Legionella PCR - state "pneumonia" in clinical details - stop azithromycin if PCR negative

Use IV **Erythromycin** if patient unable to take oral medication

Review at 48 hours and switch IV to oral when clinically appropriate, (Patient able to swallow/absorb, WCC and CRP reducing, temperature improving) :

Amoxicillin 500mg PO tds + **Azithromycin** 500mg PO once daily

Total duration: beta-lactam 7 days, macrolide 5 days (discuss proven legionella treatment with infection team)

Non-anaphylactoid penicillin allergy (e.g. delayed rash):

Cefuroxime 1.5g IV 8 hourly + **Azithromycin** 500mg PO once daily

Review at 48 hours and switch IV to oral when clinically appropriate

Total duration: beta-lactam 7 days, macrolide 5 days (discuss proven legionella treatment with infection team)

Severe penicillin allergy (i.e. anaphylaxis):

Moxifloxacin 400mg PO daily Total duration: 7 days (or longer if clinically indicated)

Notes:

CAUTION - macrolide interactions e.g. amiodarone, digoxin, warfarin and statins

Issue Date: Sep 2017	Page 2 of 11	NOTE: The electronic version of this document is the most current. Any printed copy cannot be assumed to be the current version.
Review Date: Sep 2018	Version No: 5	
Protocol Steward: Infectious Diseases Physician	Authorised by: Medical Director	

Hospital acquired pneumonia

Simple Hospital-Acquired Pneumonia (HAP)

Simple HAP - Defined as pneumonia developing more than 48 hours after admission to hospital in patients who have not had complex clinical regimes / antibiotic prescriptions.

1st line:

Amoxicillin+clavulanic acid 1.2g IV tds

Switch IV to oral when clinically appropriate:

Amoxicillin+clavulanic acid 625mg PO tds

Total duration: 5 days

Non-anaphylactic Penicillin allergy:

Cefuroxime 1.5g IV tds

Switch IV to oral when clinically appropriate:

Cefaclor 500mg PO tds

Anaphylactic Penicillin allergy:

Moxifloxacin 400mg PO daily **Total duration:** 5 days

Complex Hospital-Acquired Pneumonia (HAP)

Complex HAP - Defined as pneumonia developing more than 48 hours after admission to hospital in patients with complex and prolonged hospital admissions with frequent previous treatment course of antibiotics and ITU admissions, or high risk medical conditions such as immunosuppression or known MDRO carriage

1st line:

Piperacillin-tazobactam 4.5g IV tds **Total duration:** 5 days

Penicillin allergy:

Moxifloxacin 400mg PO od **Total duration:** 5 days

If known or suspected MRSA:

Add to above regimen (following specialist advice): **Vancomycin** as per protocol MED.V5.1

Total duration: 5 days

If Gram negative MDRO suspected:

Add to above regimen (following specialist advice): **Gentamicin** as per protocol MED.G3.1

Issue Date: Sep 2017	Page 3 of 11	NOTE: The electronic version of this document is the most current. Any printed copy cannot be assumed to be the current version.
Review Date: Sep 2018	Version No: 5	
Protocol Steward: Infectious Diseases Physician	Authorised by: Medical Director	

Urinary Tract Infection

Always take an MSU prior to starting antibiotics and review treatment with result

Uncomplicated lower UTI

Uncomplicated lower UTI is defined as symptoms relating solely to the lower urinary tract, usually frequency and burning on micturition. A short course will be effective if the urinary tract is normal.

1st line:

Trimethoprim 300mg PO OD **Total duration:** 3 days (male: 7 days)

UTI with systemic features (rigors, loin pain, hypotension, sepsis)

1st line:

Co-amoxiclav 1.2g 8 hourly IV +/- **Gentamicin** as per protocol MED.G3.1

2nd line (non-anaphylactoid penicillin allergy)

Cefuroxime 750mg-1.5g IV tds +/- **Gentamicin** as per protocol MED.G3.1

Anaphylactoid penicillin allergy:

Co-trimoxazole 960mg PO bd +/- **Gentamicin** as per protocol MED.G3.1

Total duration: 7 days

Extend to 10-14 days for pyelonephritis – oral choice should be guided by susceptibilities from urine or blood cultures

Skin and Soft Tissue

Cellulitis - Mild / Moderate

See [Cellulitis Bay Navigator pathway](#)

Co-morbidity includes: peripheral vascular disease, chronic venous insufficiency or morbid obesity

Systemically well and no co-morbidity – Total duration 10 days – consider outpatient management

1st line:

Flucloxacillin 500mg - 1g PO qds or 1g BD + probenecid as per [Cellulitis Bay Navigator pathway](#)

Non-anaphylactoid penicillin allergy

Cefaclor 500mg PO tds or 1g BD + probenecid as per [Cellulitis Bay Navigator pathway](#)

Issue Date: Sep 2017	Page 4 of 11	NOTE: The electronic version of this document is the most current. Any printed copy cannot be assumed to be the current version.
Review Date: Sep 2018	Version No: 5	
Protocol Steward: Infectious Diseases Physician	Authorised by: Medical Director	

**ANTIBIOTICS &
ANTIMICROBIALS
PROTOCOL**

Anaphylactoid Penicillin allergy:

Clindamycin 450mg PO qds

Systemically unwell or systemically well with co-morbidity

1st line:

Flucloxacillin 2g IV qds

Non-anaphylactoid penicillin allergy

Cefazolin 2g IV 8 hourly

Anaphylactoid Penicillin allergy:

Clindamycin 450mg PO qds

Switch IV to oral when clinically appropriate as per above

Total duration: 10 days

Cellulitis - Severe

Significant systemic upset with co-morbidity or limb threatening infection

1st line:

Flucloxacillin 2g IV qds

Non-anaphylactoid penicillin allergy

Cefazolin 2g IV 8 hourly

Anaphylactoid Penicillin allergy:

Clindamycin 450mg PO qds

Switch IV to oral when clinically appropriate as per mild/moderate infection

Total duration: 10 days

If MRSA suspected or previously known use **Clindamycin** or **Co-trimoxazole** 960mg BD depending on susceptibilities

In diabetics consider co-amoxiclav 1.2g TDS IV to cover polymicrobial infection

Necrotising Fasciitis or Severe SSTI with shock

Urgent surgical debridement is essential. Discuss all cases with ID/microbiology

1st line:

Co-amoxiclav 1.2g IV TDS + **Clindamycin** 900mg - 1.2g IV qds

In critically ill patient use **Meropenem** 1g 8 hourly plus **Clindamycin** 900mg - 1.2g IV qds

Issue Date: Sep 2017	Page 5 of 11	NOTE: The electronic version of this document is the most current. Any printed copy cannot be assumed to be the current version.
Review Date: Sep 2018	Version No: 5	
Protocol Steward: Infectious Diseases Physician	Authorised by: Medical Director	

Skin and Soft Tissue

In both animal and human bites with broken skin, antibiotics are indicated even in the absence of overt clinical infection.

Animal bites

Most commonly isolated organisms from animal bites include *Pasteurella* (57% of dog bites and 75% of cat bites), oral mouth flora including anaerobes. Macrolides are **not** recommended for animal bites because they do not adequately cover *Pasteurella*.

Tetanus immunisation status should be checked and vaccination given if appropriate.

1st line:

Co-amoxiclav 625mg PO tds

Penicillin allergy:

Metronidazole 400mg PO tds + **Doxycycline** 100mg PO bd (avoid in pregnancy)

Total duration: 7 days

Human bites

Most commonly isolated organisms from human bites include oral streptococci, *S. aureus*, *Eikenella corrodens* and anaerobes.

1st line:

Co-amoxiclav 625mg PO tds

Total duration: 7 days

Central Nervous System Meningitis community-acquired

MUST be discussed with senior medical staff. Do NOT delay treatment. Start treatment as soon as blood cultures have been taken. Give dexamethasone IV 10 mg initially before or with first dose of antibiotic. Stop if not Pneumococcal meningitis.

Empirical Treatment

1st line:

Ceftriaxone 2g IV bd (give IM if no venous access)

If pregnant, immunocompromised, alcoholic, or aged over 50 years to cover Listeria meningitis:

Add Amoxicillin 2g IV every 6 hours

Issue Date: Sep 2017	Page 6 of 11	NOTE: The electronic version of this document is the most current. Any printed copy cannot be assumed to be the current version.
Review Date: Sep 2018	Version No: 5	
Protocol Steward: Infectious Diseases Physician	Authorised by: Medical Director	

If gram positive cocci seen in CSF, or if associated with pneumonia, sinus disease, otitis media or base of skull fracture :

Add **Vancomycin** as per protocol MED.V5.1 and continue dexamethasone every 6 hours for 4 days.

If anaphylactoid penicillin allergy:

Vancomycin as per protocol MED.V5.1 AND **Co-trimoxazole** 960mg 8 hourly IV

If features of encephalitis (confusion, behavioural changes or fluctuant level of consciousness) add aciclovir - see viral encephalitis below

Duration of therapy:

If organism not isolated but clinical findings and CSF are consistent with bacterial meningitis	7 – 14 days as per clinical response
<i>Neisseria meningitidis</i> (meningococcus)	7 days
<i>Streptococcus pneumoniae</i> (pneumococcus)	14 days
<i>Haemophilus influenzae</i>	10 days
<i>Listeria monocytogenes</i>	21 days

The total duration should be completed with IV therapy - there is NO oral switch.

Additional notes:

Patients suspected of having meningitis should have the following specimens taken:

- FBC, U&E, LFTs, CRP
- Blood cultures (this is essential)
- EDTA blood (5mL) for meningococcal PCR (send to microbiology)
- CSF, if no contra-indications, for microbiology and chemistry (send simultaneous blood for glucose)
- Throat swab requesting meningococcal culture

Viral encephalitis

Features of encephalitis (confusion, behavioural changes or fluctuant level of consciousness), GCS<15, recent seizures or suspect acute viral encephalitis.

Perform LP. **Send CSF for HSV PCR.**

IF CSF SHOWS <200 WBC and normal Glucose:

1st line:

Aciclovir 10mg/kg IV tds (use IBW for obese patients to calculate Aciclovir doses)

Total duration:

14 - 21 days – this should ALL be given IV

Issue Date: Sep 2017	Page 7 of 11	NOTE: The electronic version of this document is the most current. Any printed copy cannot be assumed to be the current version.
Review Date: Sep 2018	Version No: 5	
Protocol Steward: Infectious Diseases Physician	Authorised by: Medical Director	

Sepsis Sepsis Criteria

SUSPECTED SEPSIS IS A MEDICAL EMERGENCY. Suspicion of infection AND 2 or more of the following:

- Temperature <36°C or >38°C
- Respiratory rate >20 breaths/minute
- Heart rate >90 bpm
- WCC <4 or >12 x 10⁹/L
- Acute confusion

Antibiotics should be given within 60 minutes of recognition of sepsis. Take 2 sets of blood cultures before initiating antibiotics, however do NOT delay administration.

Sepsis of unknown source

1st line:

Co-amoxiclav 1.2g IV 8 hourly + **Gentamicin** as per protocol MED.G3.1

Non-anaphylactoid Penicillin allergy:

Cefuroxime 1.5g IV 8 hourly + **Gentamicin** as per protocol MED.G3.1

Where source known or suspected, treat as per guideline for source of infection

Resuscitate with IV fluids and monitor for signs of end-organ damage and refractory hypotension – involve your consultant and the intensivists early in management

Consider cover for resistant organisms – check previous available microbiology.

Discuss cases with infection service, review with micro results and rationalise antibiotics

Febrile neutropaenia - REFER TO FEBRILE NEUTROPAENIA GUIDELINES CPM.N3.1

Gastrointestinal *Clostridium difficile* infection

All patients with diarrhoea should be isolated and discussed with the Infection Control team

Risk factors for *Clostridium difficile* infection (CDI)

The principle risk factors are:

- Recent courses of antibiotics (especially longer courses of broad spectrum antibiotics)
- Patients >65 years and those with underlying co-morbidities
- Patients with a previous history of CDI
- The use of PPI medications in patients with diarrhoea
- Presence of nasogastric tube / enteral feeding
- Prolonged hospital stay

Issue Date: Sep 2017	Page 8 of 11	NOTE: The electronic version of this document is the most current. Any printed copy cannot be assumed to be the current version.
Review Date: Sep 2018	Version No: 5	
Protocol Steward: Infectious Diseases Physician	Authorised by: Medical Director	

Understanding *Clostridium difficile* results: Diarrhoeal stools are tested for both *C. difficile* antigen (which indicates the presence of the organism in the gut) and *C. difficile* toxin (which is produced by the organism and causes damage to the gut).

<i>C. difficile</i> GDH antigen	<i>C. difficile</i> toxin	Interpretation
NOT detected	NOT detected	<ul style="list-style-type: none"> No evidence of <i>C. difficile</i> infection. Consider other causes including viruses. Maintain infection control precautions, including isolation, whilst diarrhoea continues. Stop any <i>C. difficile</i> treatment that has been commenced. If symptoms persist, send repeat sample in 5 days.
DETECTED	NOT detected	<ul style="list-style-type: none"> This could be <i>C. difficile</i> colonisation or early disease. Stop antibiotics if possible. Correlate with the clinical picture and treat if appropriate. Repeat the toxin after 5 days if diarrhoea persists.
DETECTED	DETECTED	<ul style="list-style-type: none"> Diarrhoea is very likely to be caused by <i>C. difficile</i>. Stop antibiotics if possible. Treatment should be commenced.

Assessing severity of *Clostridium difficile* infection (CDI)

MILD	<ul style="list-style-type: none"> Typically associated with <3 diarrhoeal stools per day Not associated with raised WCC 						
MODERATE	<ul style="list-style-type: none"> Typically associated with 3 - 5 diarrhoeal stools per day Associated with raised WCC <15 x 10⁹/L 						
SEVERE (one or more of)	<ul style="list-style-type: none"> The number of stools may be a less reliable indicator of severity <table border="0"> <tr> <td>Clinical</td> <td> <ul style="list-style-type: none"> Fever (>38.5°C), rigors Haemodynamic instability Peritonitis or evidence of bowel perforation Ileus or toxic megacolon </td> </tr> <tr> <td>Laboratory</td> <td> <ul style="list-style-type: none"> White blood cell count >15 x 10⁹/L and <20% neutrophils Elevated lactate level Rise in creatinine level (>50% above baseline) Albumin level <25 mg/L </td> </tr> <tr> <td>Other</td> <td> <ul style="list-style-type: none"> Large intestine distension, colonic wall thickening, fat stranding, unexplained ascites (imaging) Pseudomembranous colitis (colonoscopy) </td> </tr> </table>	Clinical	<ul style="list-style-type: none"> Fever (>38.5°C), rigors Haemodynamic instability Peritonitis or evidence of bowel perforation Ileus or toxic megacolon 	Laboratory	<ul style="list-style-type: none"> White blood cell count >15 x 10⁹/L and <20% neutrophils Elevated lactate level Rise in creatinine level (>50% above baseline) Albumin level <25 mg/L 	Other	<ul style="list-style-type: none"> Large intestine distension, colonic wall thickening, fat stranding, unexplained ascites (imaging) Pseudomembranous colitis (colonoscopy)
Clinical	<ul style="list-style-type: none"> Fever (>38.5°C), rigors Haemodynamic instability Peritonitis or evidence of bowel perforation Ileus or toxic megacolon 						
Laboratory	<ul style="list-style-type: none"> White blood cell count >15 x 10⁹/L and <20% neutrophils Elevated lactate level Rise in creatinine level (>50% above baseline) Albumin level <25 mg/L 						
Other	<ul style="list-style-type: none"> Large intestine distension, colonic wall thickening, fat stranding, unexplained ascites (imaging) Pseudomembranous colitis (colonoscopy) 						
LIFE-THREATENING (one or more of)	<ul style="list-style-type: none"> Includes hypotension Partial or complete ileus or toxic megacolon CT evidence of severe disease 						

First episode of CDI

- Isolate the patient
- Stop precipitating antibiotic, if possible
- Avoid laxatives and anti-motility agents (e.g. loperamide, opioids)
- Review use of proton pump inhibitors (PPIs) - stop if possible
- Correct fluid and electrolytes
- Review response to therapy daily

Mild - Moderate CDI

1st line:

Metronidazole 400mg PO tds
(if oral route compromised use **Metronidazole** 500mg IV tds)

If poor response after 3-4 days switch to:

Vancomycin 125mg PO qds
(do NOT administer vancomycin intravenously - it is NOT effective)

Total duration: 10 days

Severe CDI

1st line:

Vancomycin 125mg PO qds
(do NOT administer vancomycin intravenously - it is NOT effective)

If oral route compromised, use nasogastric **Vancomycin** 125 mg QDS and **Metronidazole** 500mg IV tds

If poor response after 5 days or life-threatening CDI consider adding:

Rectal **Vancomycin** 500mg in 100mL N.saline tds - qds

Total duration: 10 days

Life threatening CDI

Treat as severe CDI.
Discuss with ID on call. ITU may need to be involved.

Second episode of CDI (i.e. first recurrence)

1st line:

Vancomycin 125mg PO qds
(do NOT administer vancomycin intravenously - it is NOT effective)

Total duration: 10 days

Issue Date: Sep 2017	Page 10 of 11	NOTE: The electronic version of this document is the most current. Any printed copy cannot be assumed to be the current version.
Review Date: Sep 2018	Version No: 5	
Protocol Steward: Infectious Diseases Physician	Authorised by: Medical Director	

Subsequent or refractory episodes

Contact ID on call

Consider **Vancomycin** retention enemas, tapering doses of **Vancomycin** or faecal microbiota transplant

Notes: Do not exceed 2 weeks of **Metronidazole** therapy owing to risk of peripheral neuropathy.

Intra-abdominal infection

Utilise Sepsis 6 bundle including IV fluid resuscitation, Take 2 sets of blood cultures 20 mins apart and start antibiotics within 1st hour of presentation

1st line:

Co-amoxiclav 1.2g 8 hourly IV + **Gentamicin** as per protocol MED.G3.1

Switch IV to oral when clinically appropriate:

Co-amoxiclav 625mg PO tds

Total duration: 7 days

or

Cefuroxime 1.5g TDS IV and **Metronidazole** 500mg TDS IV as an alternative, especially in significant renal impairment (with dose adjustments)

Penicillin allergy:

Cefuroxime 1.5g IV tds + **Metronidazole** 500mg IV tds

Switch IV to oral when clinically appropriate:

Cefaclor 500mg PO tds + **Metronidazole** 400mg PO tds

Total duration: 7 day

All the above doses assume a 70kg adult with normal renal and liver function. Impaired renal and/or liver function may require dose reduction. Severe infections and/or non-obese, bigger adults (>80kg) and/or renal hyperfiltration (ICU setting on vasopressors or large amounts of IV fluids given with normal baseline renal function) may require dose increase.

Always check for contra-indications, drug interactions, and dosage modification in renal and hepatic impairment.

Contact Infection Diseases service for advice or review via telephony:

Infectious Diseases Physicians: Kate Grimwade, Diane Hanfelt-Goade, Massimo Giola

Clinical Microbiologists: Michael Addidle, Vani Sathyendran

All Antimicrobial Guidelines are available on smartphones on the Microguide app (download from iTunes or Play store) or at <http://microguide.horizonsp.co.uk/viewer> (select BOPDHB from "Change Trust" tab dropdown menu)

Issue Date: Sep 2017	Page 11 of 11	NOTE: The electronic version of this document is the most current. Any printed copy cannot be assumed to be the current version.
Review Date: Sep 2018	Version No: 5	
Protocol Steward: Infectious Diseases Physician	Authorised by: Medical Director	