Blackpool Teaching Hospitals NHS
NHS Foundation Trust

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Blackpool Teaching Hospitals NHS Foundation Trust aims to design and implement services, policies and measures that meet the diverse needs of our service, population and workforce, ensuring that they are not placed at a disadvantage over others. The Equality Impact Assessment Tool is designed to help you consider the needs and assess the impact of your policy in the final Appendix.

26/01/2018 – TEMPORARY NOTICE: Due to a shortage of IV clindamycin, please see the notices attached here.

CONTENTS

13th Edition

Antimicrobial Formulary – for the Management of Common Infections in Adults within General Medicine and Surgery

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Approved by:
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Ratification date:
Review date:

1 ACKNOWLEDGEMENTS

On behalf of the Microbiologists, we would like to thank Mr Alastair Gibson and Professor O'Donnell for their help and support in the development and implementation of this policy.

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2 MAJOR CHANGES TO THE 13TH EDITION OF THE ANTIMICROBIAL FORMULARY

- Section on pulmonary exacerbation of cystic fibrosis added

3 CLOSTRIDIUM DIFFICILE AND ANTIMICROBIAL RESISTANCE

- Prompt and appropriate treatment of patients with sepsis should not be delayed on account of an undue anxiety regarding C. difficile infection.
- Co-amoxiclav, Quinolones, 2nd / 3rd generation Cephalosporins are considered high risk drivers for C. difficile infections [CDI]. However, CDI may be associated with most other antibiotics.
- Their use should be as per formulary after assessing patient's risk for CDI and following discussion or on advice of Consultant Microbiologist or ID physician during working hours.
- Co-amoxiclav and Ciprofloxacin will now be restricted to Consultant Microbiologist approval for non-formulary indications.
- High dose Clindamycin: Higher dose (600mg q6h) of Clindamycin has been shown to offer protective effect against C. difficile infection.
- Risk factors for C. difficile infection: (High risk if 2 or more).
    - Elderly patients (>70 years of age).
    - Long length of stay in healthcare settings.
    - Recent use of high risk antibiotics (Co-amoxiclav, Quinolones, 2nd/ 3rd generation Cephalosporins).
    - Recent major surgery (especially gastrointestinal surgery).
    - Serious underlying disease or illness.
    - Immuno- compromising conditions.
- Previous C. difficile infection (GDH+/CDT+) or C. difficile carriage (GDH+/CDT-ve) is classified as high risk. Microbiologist input for antibiotic management is essential.
- Meropenem resistant Pseudomonas and Enterobacteriaceae are a much more serious problem globally and are being encountered in the region including Blackpool Teaching Hospitals. This has resulted from unrestricted and overuse of carbapenems. Meropenem use in this formulary is hence restricted to responsible primary Consultant or Consultant Microbiologist/ID Physician approval only.

4 GUIDE TO ANTIBIOTIC USE FOR ADULT PATIENTS

The primary objective of this formulary is to ensure the appropriate selection of antimicrobials for the treatment of common infections. The choices of antimicrobials included in the formulary have been carefully selected to move to equally efficacious agents with a lower risk of precipitating health care associated infections, including MRSA, *Clostridium difficile* and multidrug / pan drug resistant *Enterobacteriaceae / Pseudomonas.*

These guidelines are evidence based and the antibiotic choices reflect local health care associated problems, epidemiology and antibiograms. These guidelines specify the recommended antimicrobial, dose, route and duration of treatment for common infections encountered in General Medicine and Surgery.

The doses mentioned in this formulary are for adults with normal renal, hepatic function and of usual normal body build. Please speak to your ward pharmacist or contact Pharmacy Medicines Information for advice on dosing in renal or hepatic impairment or in patients with extremes of weight.

5 PRINCIPLES OF GOOD ANTIMICROBIAL PRESCRIBING

- Prior to prescribing an antibiotic the prescriber MUST consult all available information on previous isolates to ensure there is no information on prior resistance which might preclude the choice of empiric organism. If this is the case please discuss with Microbiologist / ID Physician for advice on alternative agents during working hours.
- Antimicrobials should only be prescribed where there are good clinical indications.
- Every effort should be made to collect relevant specimens for microbiological investigations prior to starting antimicrobial therapy.
- ALL antimicrobials should be reviewed DAILY as best practice. Empiric antimicrobial prescriptions should be reviewed DAILY (or definitely at 48/72 hours and correlated with patient's response and/or available diagnostics). Broad spectrum antimicrobial agents should be deescalated to narrow spectrum agents and /or oral agents as per sensitivity results. All antimicrobials have an automatic stop date at 5 days so should reviewed and re-prescribed if necessary
- Writing an antibiotic prescription:
    - The Choice of agent (as per formulary), dose, route, start date, indication / working diagnosis, date of review / stop, name and contact / bleep information and GMC number of prescriber MUST be clearly printed.
    - Times of administration (e.g. 0600h, 1200h, 1800h, etc) instead of morning, midday, evening should be written.
    - Above information should be clearly documented in both the medical notes and on the prescription chart.
    - Review date must be written.
    - The stop date and anticipated course length should be clearly documented as per the formulary recommendation or otherwise specified by microbiologists.
    - The above will be considered for audit standards.
- Antimicrobial therapy should be prescribed according to the formulary which is informed by local pathogen epidemiology and local antimicrobial sensitivity patterns.
- Narrow spectrum antimicrobials should be prescribed in preference to broad spectrum antimicrobials where possible in conjunction with microbiology results or discussion with a microbiologist.

- Indications requiring longer treatment require re-writing of prescription [indicating the original start date of the antibiotic and planned duration].
- Oral agents with excellent bioavailability can be used instead of intravenous agents – discussed with microbiologists
- Responsible consultant should consider risk of *C. difficile* infection in high-risk patients. Antimicrobials with a high risk of precipitating Clostridium difficile infection (e.g. Co-amoxiclav, Cephalosporins and Quinolones) should be avoided for safer alternatives or used with caution, where benefits outweigh risks.
- Antimicrobials with a lower risk of subsequent Clostridium difficile infection (Clarithromycin, Doxycycline and Gentamicin) should be used instead.
- Do NOT prescribe from restricted list antimicrobials without Consultant Microbiologist approval and document this in the medical notes.
- Expert advice should be sought from a medical microbiologist for complicated infections, interpretation of culture and sensitivity results or in the case of failure of empiric treatment.
- Choice of antimicrobials must be carefully considered when prescribing for patients with previously/ currently known carriage/ infections with MRSA, multi-drug resistant coliforms or C. difficile. Discuss with Microbiologist during working hours if patient specific advice required.

6 ANTIBIOTIC ALLERGIES

Patients commonly report adverse reactions to antibiotics, especially the Penicillin group. It is therefore very important to clarify the nature of the adverse reaction.

Patients often report to being “allergic” to an antibiotic, when in fact they experienced a common adverse drug reaction (e.g. diarrhoea or vomiting) rather than an allergic reaction (e.g. rash, angioedema or anaphylaxis). In these cases the benefits of using a Penicillin-based regimen probably outweigh the risks.

1) When assessing whether the person is presenting with a **NEW** possible drug allergy - take a history and undertake a clinical examination as per NICE guidance on drug allergy.

Document the following:

- The generic and proprietary name of the drug or drugs suspected to have caused the reaction including the strength and formulation.
- The reaction.
- A description of the reaction.
- The indication for the drug being taken (if there is no clinical diagnosis, describe the illness).
- The date and time of the reaction.

- The number of doses taken or number of days on the drug before onset of the reaction.
- The route of administration.
- Which drugs or drug classes to avoid in future.

2) For **existing** drug allergy status, record all of the following at a minimum:

- The drug name.
- The signs, symptoms and severity of the reaction.
- The date when the reaction occurred.

For all patients reporting an adverse reaction to an antibiotic (or any drug), the above should be documented in the drug allergy box on the front of the prescription chart. Check with the patient, the patient's GP or in old medical notes to find the nature/ severity of the allergy.

The type of hypersensitivity reaction with Penicillin or other antimicrobials (e.g. rash, anaphylaxis, etc.) **MUST** be obtained (when possible) and clearly documented in case notes and drug chart.

6.1 Crossover allergy

Patients with a true allergy to penicillins should be considered allergic to other Penicillin's (e.g. Augmentin® (Co-amoxiclav), Tazocin® (Piperacillin-tazobactam) and Amoxicillin).

The risk of crossover allergy is reported as 10% for Cephalosporins, though review of published evidence suggests a much lower chance of crossover allergy. Crossover has also been reported with Carbapenems (e.g. Meropenem, Ertapenem and Imipenem), approximately 8-11%.

Use of any Cephalosporins or Carbapenems without adverse event in a Penicillin allergic patient should be clearly noted in case notes and drug chart. This can be achieved by review of notes or discussion with the GP. If the patient has a non-serious allergy to Penicillins (e.g. mild rash), Cephalosporins/ Carbapenems could still be used with caution as an alternative to Penicillins and the patient should be closely monitored.

Individuals with a history of anaphylaxis, urticaria, or rash immediately after penicillin administration are at risk of immediate hypersensitivity to a penicillin; these individuals should not receive a penicillin. As patients with a history of immediate hypersensitivity to penicillins may also react to the cephalosporins and other beta-lactam antibiotics, they should not receive these antibiotics, if no documentation of receipt of Cephalosporins is available and the patient has an anaphylactic allergy to Penicillins; then Cephalosprins or Carbapenems should not be used.

7 RESTRICTED ANTIMICROBIAL LIST

As a part of the trust antibiotic stewardship programme to reduce C. difficile, MRSA and other multi-drug resistant infections some high-risk antimicrobial agents have been designated as “restricted drugs” and their use must be discussed with microbiologist.

Pharmacy will **NOT** supply antimicrobials on the restricted list unless there is documented evidence of Consultant Microbiologist/ ID Physician approval in the medical notes and / or prescription chart.

Non-formulary antimicrobials

A Consultant may discuss with microbiologist and then obtain approval from the Chair of the Drugs and Therapeutics Committee on a named patient basis for any non-formulary antibiotics.

7.1 Red restricted antimicrobials

These antimicrobials may only be prescribed and supplied after approval from a named Consultant Microbiologist or Infectious Disease Physician. Pharmacists are required to confirm Microbiology approval before dispensing red restricted antimicrobials.

Red restricted antimicrobials are:

Amikacin
Amphotericin B (Fungizone®)
Aztreonam
Ceftaroline
Colistin IV
Chloramphenicol IV/PO
Daptomycin
Ertapenem
Fidaxomicin
Flucyctosine
Fosfomycin PO/IV
Ivermectin (unlicensed)
Levofloxacin
Linezolid
Pivmecillinam
Quinine IV
Ticarcillin- clavulanic acid (Timentin)
Tigecycline
Temocillin

7.2 Amber restricted antimicrobials

These antimicrobials maybe prescribed without discussion with a Consultant Microbiologist / ID Physician only if they are being used for an approved indication / specialty as listed below. Consultant Microbiologist/ ID Physician can authorize off-guideline use of amber restricted antimicrobials for individual patients; this should be documented in the medical notes and/ or on the prescription chart. Pharmacists will discuss with Microbiologists all unauthorized off-guideline use of amber restricted antimicrobials.

Amber restricted antimicrobials are:

Amphotericin (AmBisome®)	• Consultant Microbiologist/ Haematologist approval for Haematology / Oncology treatment of invasive fungal infections
Anti-tuberculosis drugs	• Tuberculosis as advised by Consultant Respiratory Physician
Azithromycin	• GUM and Pertussis prophylaxis
Caspofungin	• Consultant Microbiologist/ Haematologist approval for Haematology / Oncology
Cefixime	• Paediatrics/GUM/Oral cephalosporin step down if H.influenzae isolates and other agents cannot be used.
Cefotaxime	• SCBU only
Ceftazidime	• Indications specified in the antimicrobial formulary
Ceftriaxone	• GUM or indications specified in the Antimicrobial Formulary
Ciprofloxacin	• SBP prophylaxis, Meningococcal prophylaxis, prophylaxis in patients at high risk of neutropenic sepsis, indications specified in the antimicrobial formulary
Co-amoxiclav	• Indications as specified in the Antimicrobial Formulary
Colistin nebs	• Respiratory only
Co-trimoxazole	• Prophylaxis and treatment of PCP • Prophylaxis for SBP where sensitivity has been confirmed • Listeria meningitis (3nd line serious penicillin allergy) • Treatment of Stenotrophomonas
Dapsone	• Prophylaxis and treatment of PCP/Toxoplasma
Famciclovir	• GUM only
Itraconazole	• Posaconazole is now used instead for the prophylaxis in Haematology/ Oncology patients
Meropenem	• Indications specified in the antimicrobial formulary

Micafungin	• Consultant Microbiologist/ Haematologist approval for Haematology/ Oncology
Minocycline	• Dermatology only
Ofloxacin	• GUM/Prostatitis and Epididymo-orchitis as per formulary
Posaconazole	• Consultant Microbiologist/ Haematologist approval for Haematology/ Oncology
Rifaximin	• Hepatic encephalopathy - recurrence as per gastroenterology • Tuberculosis as advised by Consultant Respiratory Physician
Rifampicin	• Combination therapy for deep seated MRSA infections as advised by microbiologist
Sodium fusidate	• Combination therapy for osteomyelitis on microbiologist advice only • Combination therapy for MRSA
Tazocin (piperacillin-tazobactam)	• Specific indications as in formulary
Teicoplanin	• Specific indication listed in formulary
Terbinafine	• Dermatology only
Tobramycin	• Cystic fibrosis
Valaciclovir	• GUM only
Vancomycin (oral)	• First line in severe Clostridium difficile infection • Second line in moderate Clostridium difficile infection
Voriconazole	• Consultant Microbiologist / Haematologist approval for Haematology / Oncology

8 SEPSIS DEFINITIONS

Infection: Presence of microorganisms in a normally sterile site.

Bacteraemia: Cultivable bacteria in the bloodstream.

Systemic Inflammatory Response Syndrome (SIRS):

SIRS is the systemic response to a wide range of stresses and is defined in adult patients as Two or more of:

- Temperature >38ºC or <36ºC
- Heart rate >90 beats per minute
- Respiratory rate > 20 breaths per minute or $PaCO_2$< 4.3kPa
- WBC > 12 x 10^9 cells/L or < 4 x 10^9 cells/L

Sepsis: Sepsis is defined as SIRS associated with proven or clinically suspected infection; Sepsis Pathway.

Severe sepsis: Sepsis associated with organ dysfunction (distant from infection site), hypoperfusion or hypotension (systolic BP <90mmHg, MAP <70mmHg or reduction of 40mmHg from baseline).

Septic shock: Sepsis with hypotension requiring pressor therapy despite adequate fluid resuscitation. In addition there are perfusion abnormalities that may include lactic acidosis, oliguria, altered mental status and acute lung injury.

Septicaemia: Sepsis associated with bacteraemia.

9 INDICATIONS FOR INTRAVENOUS ANTIMICROBIAL THERAPY

- For patients who are strictly Nil-By-Mouth.
- For patients with non-functional GI tract or malabsorption.
- For life-threatening infections or severe sepsis.
- For patients with bacteraemia.
- For patients with serious deep-seated infections requiring intravenous antimicrobials to guarantee adequate drug levels at the site of infection as listed below:

Bone and joint infections
Spreading cellulitis
Lymphadenopathy and high fever
Endocarditis
Encephalitis
Febrile neutropenia
Infective gangrene
Meningitis
Peritonitis
Osteomyelitis
Septicaemia
Septic arthritis
Severe pneumonia
Staphylococcal bacteraemia

Please note some agents such as Clindamycin and Linezolid are well absorbed orally and substantially cheaper. There is little benefit to using them IV where oral route can be used.

Intravenous antimicrobial therapy must be reviewed at 48 hours and switched to oral alternatives when clinically appropriate.

Unnecessarily prolonged intravenous therapy is associated with an increased risk of superinfection, extravasation and thrombophlebitis, and has been shown to delay discharge from hospital. Switch to oral antimicrobial therapy should be considered for patients who meet the criteria outlined in the Change to ORAL Antibiotics Guideline (CHORAL).

10 CHANGE TO ORAL ANTIBIOTICS GUIDELINE (CHORAL)

10.1 Purpose

To provide guidance for the rational conversion of patients from parenteral antibiotic therapy to oral after 48 hours wherever possible.

10.2 Rationale

To reduce the risk of complications associated with parenteral antibiotic use:

- Morbidity associated with IV access (superinfection, extravasation, thrombophlebitis)
- Delayed discharge from hospital
- Increased nursing time
- Increased expenditure
- Increased adverse effects

10.3 Guideline

For most infections and most patients, intravenous antibiotic therapy can be converted to oral 24-48 hours after the start of treatment, as long as the following criteria are met:

- The infection is no longer life-threatening or able to cause major disability.
- Temperature and other signs of infection appear to be returning to normal.
- It is recommended that the following inclusion criteria are checked before a decision is taken:
  i. Signs and symptoms of infection are resolving.
  ii. Oral fluids are well tolerated.
  iii. There is a functioning GI tract, with no signs of malabsorption.
  iv. Oral formulation to be used has adequate and reliable absorption profile.

Patients presenting with any of the following should **NOT** be converted to oral antibiotics without discussing with responsible consultant / Microbiologist during working hours:

- Ongoing / potential GI absorption problems (vomiting, GI surgery or ileus)
- Immuno-compromised patients
- Patients suffering from SEVERE infections e.g.

Bone and joint infections	Peritonitis
Spreading cellulitis	Osteomyelitis
Lymphadenopathy and high fever	Septicaemia
Endocarditis	Septic arthritis
Encephalitis	Severe pneumonia
Febrile neutropenia	Staphylococcal bacteraemia
Infective gangrene	Meningitis

N.B. in **ALL** these cases targeted / planned duration of parenteral antibiotics should be used.

THINK COMMIT: Intravenous antibiotics for medically stable adult patients with any infectious condition requiring IV antibiotics is available from South Shore primary care centre based IV clinic or home administration. Please contact consultant microbiologists or ID physician to discuss and refer suitable patients.

This list is **NOT** exhaustive, but shows the step down oral therapy for commonly prescribed intravenous antibiotics. Where a dose range is stated, the dose should be selected based on the severity and site of infection.

Intravenous antibiotic	**Oral antibiotic and dose**
Amoxicillin	Amoxicillin 500mg – 1g 8 hourly
Benzylpenicillin	Phenoxymethylpenicillin 500mg 6 hourly
Cephalosporin (UTI)	Cephalexin 500mg 8 hourly
Cephalosporin (LRTI)	Cefixime 200mg 12 hourly
Clindamycin	Clindamycin 600mg 6 hourly
Clarithromycin	Clarithromycin 500mg 12 hourly
Ertapenem	Discuss with Microbiologist during working hours
Flucloxacillin	Flucloxacillin 500mg-1g 6 hourly
Gentamicin	Discuss with Microbiologist during working hours
Metronidazole	Metronidazole 400mg 8 hourly
Meropenem	Discuss with Microbiologist during working hours
Piperacillin-tazobactam	Co-amoxiclav 625mg 8 hourly
Teicoplanin	Discuss with Microbiologist during working hours
Vancomycin	Discuss with Microbiologist during working hours

Gastro-intestinal System

Microbiological specimens

- Acute diarrhoea: single stool sample (plus blood culture if pyrexial / immunocompromised or enteric fever) If the patient has travelled overseas please provide details of countries of travel as the laboratory testing protocol requires this information.
- Amoebiasis: fresh sample transported to laboratory ASAP.
- Chronic diarrhoea / Giardia / helminth infections: 3 or more stool samples maybe required.
- Stool sample (which takes the shape of the container) for all suspected cases of Clostridium difficile infection ASAP.
- The choice of agent should take into account the patient's risk for C. difficile infection.
- PLEASE note faecal samples or Blood culture are appropriate tests for enteric fever, serology is no longer used.

C. difficile infection: Discuss all cases (primary or recurrent) with Microbiologist during working hours; Where possible – stop antibiotics and PPIs; maintain daily bowel chart; fluid and electrolyte monitoring; and emphasize on nutrients intake.

Acute non-inflammatory diarrhoea

Common Pathogen(s)
Toxigenic E. coli;
Rotavirus;
Norovirus;
Enteric *adenovirus;*
Astrovirus.

Antibiotic - 1st line
No antibiotics indicated

Comment
Notify Infection Control immediately Ext. 53784.
Mainstay of treatment is fluid replacement.

Clostridium difficile infection (CDI)

C difficile infection CDT toxin positive and all GDH positive cases MUST be discussed with Microbiology/ID physician during working hours and assessed for trial eligibility. Regimes below are for dosing details as directed by the above team.
See CDI policy

- IV vancomycin is not indicated for the treatment of *C. difficile* infection.
- Oral vancomycin is reserved for severe / recurrent infections.
- Vancomycin capsules are available for oral use for C diffcile infections but after risk assessment - ward 8 (isolation ward) can use the vancomycin injections orally which is more cost effective – see protocol on ward 8 for full details.
- Vancomycin 500mg vial can be reconstituted with 10mls of water for injection to give a concentration of 125mg in 2.5ml. This may be further diluted with water to approximately 30ml before administrating. Squash may be added at the time of administration to improve taste if taken orally. Reconstituted solution should be stored in the fridge and used within 96hours.

Clostridium difficile infection – Mild / moderate infection

i.e. ≤ 5 stools in 24 hours, WCC ≤15 x 10 cells/L; and no features of severe disease* (see below).

Review signs and symptoms and follow **SEVERE** Clostridium difficile protocol if patient has severe disease.

Immunocompromised patients should be discussed with microbiologist during working hours.

Pathogen(s): *Clostridium difficile.*

Antibiotic - 1st line
Metronidazole 400mg PO q8h for 14 days. **If no improvement in stool frequency/ consistency at 6 days, discuss with microbiologist during working hours.**

2nd line
Vancomycin should only be used in the following circumstances: Severe disease; failure to respond to > 6 days Metronidazole, critically ill patients, intolerance/ allergy to Metronidazole, pregnant, severe pseudomembranous colitis. Vancomycin 125mg PO/NG q6h for 14 days

Comment
Commence bowel chart.
Daily review of nutrition, fluid and electrolyte balance.
Use Metronidazole 500mg q8h IV if Nil-By-Mouth, no NG or PEG-tube access, or if patient has ileus.(IV metronidazole is not as effective as oral for treating CDI)

Clostridium difficile infection (CDI) - Severe disease

***Severe disease (if any of the following below):**
Critically ill;
WBC > 15 x 10^9 cells/L;
Acute rise serum creatinine >50% above baseline;
Temperature > 38.5ºC;
Albumin < 25g/L;
Impending ileus;
Colonic dilatation;
Abdominal pain / distension;
Pseudomembranous colitis;
Radiology: Caecal dilatation >10cm.

Number of stools maybe a less reliable indicator of severity.

Immunocompromised patients should be discussed with microbiologist during working hours.

Pathogen(s): *Clostridium difficile.*

Antibiotic - 1st line
All cases of severe disease **MUST** be discussed with microbiologist at 1st opportunity during working hours

Vancomycin 125mg PO/NG q6h 14 days.

2nd line
Life threatening CDI must be discussed with Microbiologists at 1st opportunity during working hours

Vancomycin 125-500mg NG/PO q6h +/- metronidazole IV 500mg q8h for 14days*

Comment
Commence bowel chart.

Daily review of nutrition, fluid and electrolyte balance.
*Duration outside PHE guidelines on C difficile management due to local epidemiology

Severe cases require MDT input from Microbiologist, Gastroenterologist and General surgeon as definitive management beyond caecal dilatation >10cm is surgical.

Clostridium difficile infection (CDI) 1st recurrence

Antibiotic - 1st line
Discuss all recurrent episodes with Microbiologist during working hours before commencing treatment so that trial eligibility can be assessed. If not on trial.

Mild/ Moderate: : Vancomycin 125mg PO/NG q6h for 14 days
Severe infection: Vancomycin 125mg PO/NG q6h plus Metronidazole 500mg q8h IV for 14 days

Discuss all primary and recurrent episodes with Microbiologist at 1st opportunity during working hours.

Clostridium difficile infection (CDI) - Subsequent recurrence

Discuss with Consultant Microbiologist during working hours. Review regularly. If failure to respond to treatment, urgent Microbiology / Gastroenterology review required.

Indiscriminate vancomycin can result in selection of Vancomycin Resistant strains. Vancomycin Tapering Course should be used only after discussion with microbiologist during working hours

Further recurrences should be treated individually.

Further recurrences must be discussed with Microbiology/ Gastroenterology at 1st opportunity during working hours.

Campylobacter enteritis

Duration 7 days

MOSTLY self-limiting AND DOES NOT REQUIRE ANTIBIOTIC TREATMENT; treat if immunocompromised or if severe infection.

1st line
Clarithromycin 500mg PO q12h

2nd line
Ciprofloxacin 500mg PO q12h

Helicobacter pylori

Pathogen(s): *Helicobacter pylori.*

Antibiotic - 1st line
Omeprazole 20mg q12h PO **plus** Amoxicillin 1g q12h PO **plus** Clarithromycin 500mg q12h PO for 7days

Antibiotic –2nd line
Discuss with gastroenterologists for other choices
Or
Omeprazole 20mg q12h PO **plus** Clarithromycin 500mg q12h PO **plus** Metronidazole 400mg q12h PO for 7 days

Comment
Urea breath test for diagnosis.

If eradication therapy fails, discuss with Consultant Gastroenterologist.

Maintenance PPI regimes MAY be required as indicated by Gastroenterologist.

Giardiasis

Pathogen(s): *Giardia lamblia.*

Antibiotic - 1st line
Metronidazole 400mg PO q8h for 5 days
or
Metronidazole 2g PO q24h for 3 days.

2nd line
Discuss with Consultant Microbiologist during working hours

Amoebiasis

Pathogen(s): *Entamoeba histolytica.*

Antibiotic - 1st line
Metronidazole 400mg PO q8h for 5 days
plus
Diloxanide Furoate 500mg PO q8h for 10 days.

2nd line
Discuss with Consultant Microbiologist during working hours.

Comment
Discuss with Consultant Microbiologist during working hours if Amoebiasis suspected.

Salmonella / Shigella gastroenteritis

Common Pathogen(s)
Non-typhoidal Salmonella *(food poisoning);*
Shigella spp.

Antibiotic - 1st line
Antibiotics only recommended in immunocompromised patients, febrile neutropenia, asplenia, Sickle cell disease febrile elderly patients, immunocompetent with invasive disease or typhoid / paratyphoid.

Discuss with Consultant Microbiologist.

Diverticulitis

Duration of therapy 7 days

Common Pathogen(s)
Polymicrobial gastrointestinal flora Gram-negative bacilli, including *Enterobacteriaceae*
Anaerobes, including bacteroides.

Antibiotic - 1st line
Amoxicillin 1g IV q8h **plus** Gentamicin* 5mg/kg IV q24h (adjusted body weight if obese - i.e. if 20% over ideal body weight **plus** Metronidazole 500mg IV q8h.

Oral step down on ward: amoxicillin 500mg-1g PO q8h **plus** metronidazole 400mg PO q8h and review and discuss with microbiologist during working hours.

For discharge – co-amoxiclav (consider *C difficile* risk factor) 625mg PO q8h to complete 7 days duration

2nd line
Gentamicin* 5mg/kg IV q24h (adjusted body weight if obese - ie. if 20% over ideal body weight **plus** Metronidazole 500mg IV q8h.

Or if gentamicin contraindicated - cefuroxime 1.5g IV q8h plus metronidazole 500mg IV q8h

Comment
Gentamicin*: 5mg/ kg but for elderly patients or with moderate/severe renal impairment (CrCl <30ml/min), may require 3mg/ kg or shorter duration treatment.

Hepato-biliary System

Microbiological specimens

For complicated infections such as pancreatic necrosis and liver abscess it is important to remember that the regimes are initial recommendations and discussion with Microbiologist during working hours is essential.

- Blood culture
- Intra-abdominal pus
- Ascitic fluid tap
- Guided aspirates from abscess cavities
- MRSA screen as per policy
- **The choice of agent should take into account the patient's risk for C. difficile infection.**

Uncomplicated Cholecystitis/ biliary colic

Common Pathogen(s)

Coliforms; Enterococci; Anaerobes.

Antibiotic - 1st line

No antibiotics required unless evidence of impending sepsis.

Cholecystitis/ cholangitis

Duration of therapy 5 days

Common Pathogen(s)

Coliforms; Enterococci; Anaerobes.

Antibiotic - 1st line

Amoxicillin 1g IV q8h **plus** Gentamicin* 5mg/kg IV q24h (adjusted body weight if obese - i.e. if 20% over ideal body weight
Add Metronidazole 500mg IV q8h if stented or complex case.
Review after 48 hours.

Oral step down based on clinical response of patient. If sensitivities not available use Co-amoxiclav (consider *C difficile* risk factor) 625mg PO q8h.

2nd line

If Gentamicin contra-indicated, use Co-amoxiclav (consider C difficile risk factor)1.2g IV q8h or 625mg PO q8h

If recurrent episode: Cefuroxime IV 1.5g q8h plus Metronidazole IV 500mg q8h

If penicillin allergy – gentamicin and metronidazole may be used without amoxicillin – see above for doses

Comment

Discuss alternative regimes with Microbiologist or Gastroenterologist during working hours.
Gentamicin*: 5mg/ kg but for elderly patients or with moderate/severe renal impairment (CrCl <30ml/min), may require 3mg/ kg or shorter duration treatment.

Appendicitis

Duration of therapy based on clinical progress

Common Pathogen(s)
Coliforms; Enterococci; Anaerobes.

Antibiotic - 1st line
Amoxicillin 1g IV q8h **plus** Gentamicin IV* 5mg/kg IV q24h (adjusted body weight if obese - i.e. if 20% over ideal body weight **plus** Metronidazole 500mg IV q8h
Review after 48 hours.

Oral step down based on clinical response of patient. If sensitivities not available use Co-amoxiclav (Consider *C difficile* risk) 625mg PO q8h.

2nd line
If Gentamicin contra-indicated, use Co-amoxiclav (consider *C difficile* risk) 1.2g IV q8h or 625mg PO q8h

If recurrent episode **-** Cefuroxime IV 1.5g q8h plus Metronidazole IV 500mg q8h

If penicillin allergy – gentamicin plus metronidazole may be used without amoxicillin – see above for doses

Comment

Gentamicin*: 5mg/ kg but for elderly patients or with moderate/severe renal impairment (CrCl <30ml/min), may require 3mg/ kg or shorter duration treatment.

Acute Alcoholic (without necrosis) pancreatitis

Antibiotic - 1st line
No antibiotics required.

Acute Pancreatitis: Mild to moderate

Oedematous or mild acute pancreatitis (predominant form / self-limiting)

Antibiotic - 1st line
No antibiotics required.

Acute Pancreatitis: Severe

Duration 7 days

CT evidence of necrotising or severe acute pancreatitis (high mortality).

Antibiotic - 1st line
First Episode:
Amoxicillin 1g IV q8h **plus** Gentamicin* 5mg/kg IV q24h (adjusted body weight if obese - i.e. if 20% over ideal body weight **plus** Metronidazole 500mg IVq8h

2nd line
Penicillin allergic - start 1st line regime without Amoxicillin and contact microbiologist
Or
Cefuroxime 1.5g IV q8h (if ok with cephalosporins) **plus** metronidazole 500mg IV q8h
Or
if serious penicillin allergy (history of anaphylaxis, urticaria, or rash immediately after penicillin administration) Teicoplanin 10mg/kg IV q12h for 3 doses, then 10mg/kg q24h plus Gentamicin 5mg/kg* IV q24h plus Metronidazole 500mg IV q8h

Comment
Diagnosis requires CT scan.
Early referral to Critical Care Team recommended.
Discuss with Microbiologist during working hours if previous results show MRSA / ESBL / CDI.

Gentamicin*: 5mg/ kg but for elderly patients or with moderate/severe renal impairment (CrCl <30ml/min), may require 3mg/ kg or shorter duration treatment.

Liver abscess

Common Pathogen(s)
Enterobacteriaceae;
Streptococci;
Enterococcus;
Anaerobes;
Entamoeba histolytica; Echinococcus.

Antibiotic - 1st line
Amoxicillin 1g IV q8h **plus** Gentamicin* 5mg/ kg IV q24 (adjusted body weight if obese - ie. if 20% over ideal body weight) **plus** Metronidazole 500mg IV q8h.

Following radiological confirmation: change to Co-amoxiclav (*C difficile* risk) 1.2g q8h IV and discussion with Microbiologist during working hours.

2nd line
Discuss with Microbiologist during working hours for any oral switch or targeted therapy

Mild penicillin allergy
Cefuroxime 1.5g IV q8h plus metronidazole PO 400mg q8h
Or
if serious penicillin allergy (history of anaphylaxis, urticaria, or rash immediately after penicillin administration)
Ciprofloxacin IV 500mg q12h plus metronidazole PO 400mg q8h

Comment
Discuss **ALL** cases and duration of therapy with a microbiologist during working hours. (usually 6 weeks)

MUST review and treat as per sensitivity

For single abscesses with a diameter ≤5 cm, either percutaneous catheter drainage or needle aspiration is acceptable

For percutaneous management of single abscesses with diameter >5 cm, catheter drainage is preferred over needle aspiration.

For single abscesses with diameter >5 cm, surgical intervention over percutaneous drainage should be considered

Gentamicin*: 5mg/ kg but for elderly patients or with moderate/severe renal impairment (CrCl<30ml/min), may require 3mg/ kg or shorter duration treatment.

Please send pus for culture and sensitivity and parasitology and also Faecal sample for Ova cysts and parasites.

Spontaneous bacterial peritonitis - treatment

Duration of therapy 5 days

Common Pathogen(s)
E.coli; *Streptococci; Enterococci.* Secondary: Polymicrobial; Anaerobes.

Antibiotic - 1st line
Co-amoxiclav (consider *C difficile* risk)1.2g IV q8h or

Review after 48 hours and refer to culture results if available.

2nd line/recurrent/severe sepsis
Cefuroxime 1.5g IV q8h plus Metronidazole 500mg IV q8h

Serious penicillin allergy (history of anaphylaxis, urticaria, or rash immediately after penicillin administration)Ciprofloxacin PO 500mg q12h or IV 400mg q12h plus metronidazole IV 500mg q8h

Comment
Diagnosis:
Ascitic neutrophil count >250 cells/mm^3.

Spontaneous bacterial peritonitis – primary and secondary prophylaxis

Antibiotic - 1st line
Ciprofloxacin 500mg PO q24h indefinitely

2nd line
Co-trimoxazole 960mg PO q24h indefinitely (can be used first line where co-trimoxazole sensitivity is confirmed)

Comment
Primary = patients with ascitic fluid protein ≤10g/l AND bilirubin ≥ 50micromole/l who are potential liver transplant candidates
Secondary = all previous SBP patients

Please note that some patients who are on Liver transplant list may be receiving rifaximin for prevention of bacterial overgrowth/hepatic encephalopathy

Variceal bleeding and severe liver disease

To prevent SBP

1ST line
Cefuroxime 1.5g IV q8h +/- Metronidazole 500mg IV q8h minimum for 48hrs after variceal bleed has been controlled

Serious penicillin allergy (history of anaphylaxis, urticaria, or rash immediately after penicillin administration)
Ciprofloxacin IV 200-400mg q12 plus metronidazole IV 500mg q8h minimum for 48hrs after variceal bleed has been controlled

Respiratory System

Microbiological specimens (Where Tuberculosis is not under consideration)

- Sputum for culture and sensitivity.
- Urine sample for Pneumococcal antigen for ALL patients with CXR evidence of consolidation.
- Urinary test for Legionella is performed only for patients with CURB Score of 3, all patients admitted to critical care, or where risk factors for Legionella are present (Epidemiological link to outbreak situation, recent travel/hotel residence, exposure to aerosolised water sources, compost). The reason for test (as above) must be indicated on request while sending the sample.
- However, if Legionella test is requested for other reasons and following discussion with Microbiologist/ID physician, then this must be indicated on the request.
- Blood culture.
- Pleural fluid culture and sensitivity plus a separate sample for TB [since this is sent to reference laboratory].
- For infections in immune-compromised patients, atypical pneumonia or PCP discuss investigations with Microbiologist or ID Physician during working hours.
- The choice of agent should take into account the patient's risk for C. difficile infection.

Tuberculosis (TB)

All suspected cases of TB should be drawn to the attention of Microbiologist/IC Team and TB Lead

- If Tuberculosis suspected: 3 separate sputum samples for TB.
- For miliary TB - EMU x 3 and citrated blood/Bone Marrow for TB culture required.
- Discuss Quantiferon assay with Microbiologist during working hours.
- Discuss Mantoux test with TB Health Visitor and TB Lead.

Acute exacerbation COPD (Non-pneumonic LRTI) NO new CXR infiltrates [consolidation]

Duration of therapy 5 days

Common Pathogen(s)
Haemophilus influenzae; Streptococcus pneumoniae; Moraxella catarrhalis; *Viruses;* Occasionally *S. aureus* (post viral episode). 20-40% episodes of non-infective aetiology and up to 30% of viral origin.

Antibiotic - 1st line
Doxycycline 100mg q12h PO

2nd line
Amoxicillin 500mg q8h PO

Comment
Antibiotics **ARE** indicated in the following:
↑ sputum volume;
↑ purulence of sputum;
Dyspnoea.
Review treatment with culture and sensitivity results and switch to targeted antibiotic therapy. Consider pertussis if non-resolving cough – contact microbiologist.

CURB 65:
Confusion (Acute new onset) (AMT≤8);**U**rea*>7 mmol/L; **R**esp rate ≥30/min; **B**P <90 systolic or ≤60 diastolic; **65:** Age ≥65yrs.

***no history of renal impairment or known cause for increased urea

Assessing Severity of Community Acquired Pneumonia

- Calculate CURB-65 score (see above).
- Caution with CURB-65 scores on the borderline between non-severe and severe pneumonia classifications.
- Clinical judgment required depending on presence of additional adverse prognostic factors (see below).

Additional adverse prognostic factors

- Unstable co-morbidities;
- PaO_2< 8kPa on air;
- Multilobar or bilateral involvement on CXR;
- Positive Legionella urine antigen test;

Discuss with On Call Physician / Critical Care Physician / Respiratory Physician any patients with a CURB-65 score > 3.

Microbiological specimens for Community Acquired Pneumonia

- Blood cultures before antibiotics are given;
- Sputum cultures if bringing up purulent sputum;
- Urine for Pneumococcal and Legionella (see above) antigen;
- If not responding to 1st line treatment, discuss further investigations including serology with Consultant Microbiologist during working hours ;
- The choice of agent should take into account the patient's risk for C. difficile infection.

Community acquired pneumonia

Comment

Discuss with On Call Physician / Critical Care Physician / Respiratory Physician any patients with a CURB-65 **score > 3**

Severe Legionella / MRSA / previous C. diff or MDR Gram negatives - Discuss with Consultant Microbiologist during working hours

De-escalate therapy once microbiological results available.

Negative urinary antigen for Legionella may be used to de-escalate/ or stop Clarithromycin if on duo therapy. Start treatment as soon as possible (within 4 hours) of admission

Mild (CURB-65 score 0-1) with no adverse prognostic factors.

Duration 5 days [guided by the clinical progress]

Antibiotic - 1st line
Amoxicillin 500mg q8h PO.

2nd line
Doxycycline 100mg q12h PO.

Moderate (CURB-65 score 2)

with no adverse prognostic factors. If Legionella urine antigen negative, stop Clarithromycin if on dual therapy. If adverse prognostic factors, treat as severe.

Duration 5 days [guided by the clinical progress]

Antibiotic - 1st line
Amoxicillin 500mg- 1g q8h PO **plus** Clarithromycin 500mg q12h PO
or
If IV needed, then Benzyl-penicillin 1.2g q6h IV **plus** Clarithromycin 500mg q12h IV

2nd line
Doxycycline 100mg q12h PO
or
If IV needed, then Clarithromycin 500mg q12h IV

Severe (CURB-65 score 3-5)

Duration of therapy 7days [guided by clinical progress].

Antibiotic - 1st line
Co-amoxiclav 1.2g q8h (consider C diff risk) IV **plus** Clarithromycin 500mg q12h IV.

2nd line
Vancomycin 1g q12h IV (modified according to renal function)**plus** Clarithromycin 500mg q12h IV. Contact Microbiologist during working hours if no response in 48hours

Hospital acq. Pneumonia [Post 48h of hosp. Adm.]

Duration of therapy 7 days [guided by clinical progress].
Comment
All patients with HAP should be entered on HAP Care Bundle.

Severe HAP: RR>30/min;
Hypoxia (PaO_2 <8 kPa or <92% on any FiO_2); CXR changes;
BP systolic <90 or diastolic ≤ 60;
New mental confusion

Non-severe HAP

A. Early onset [2-5d of hosp. Adm.] & no prev. antibiotic

Antibiotic - 1st line
Amoxicillin 2g q8h IV plus **Gentamicin** 5mg/kg IV One stat dose. (adjusted body weight if obese - i.e. if 20% over ideal body weight)

2nd line
Non-serious penicillin allergy (e.g. rash) - Cefuroxime 1.5 g IV q8h

B. Late onset [>5d hosp. adm. Or Early onset and received prev. antibiotic}.

Antibiotic - 1st line
Co-amoxiclav (Consider *C difficile* risk)1.2g q8h IV

2nd line
Non-serious penicillin allergy (e.g. rash) - Cefuroxime 1.5 g IV q8h

Severe HAP

A. No previous antibiotic

Antibiotic - 1st line
Co-amoxiclav (consider C diff risk) 1.2g q8h IV

2nd line
Non-serious penicillin allergy (e.g. rash) - Cefuroxime 1.5 g IV q8h

B. Previous antibiotic and not known to be colonised with pseudomonas or other resistant organisms

1st line
Non-serious penicillin allergy (e.g. rash) - Cefuroxime 1.5 g IV q8h
Review in 24-48hours

C. Previous antibiotic and patients known to be colonized with at least 2 consecutive pseudomonas in sputum or other relevant samples

For Late onset HAP severe -
Ceftazidime IV 1-2g q8h plus flucloxacillin 1g IV q6h
This combination should be reviewed in the light of culture results particularly if no MSSA or streptococcal in sputum samples.

Serious penicillin allergy (history of anaphylaxis, urticaria, or rash immediately after penicillin administration)

Non severe HAP
Ciprofloxacin PO 500mg q12h plus Clarithromycin PO 500mg q12h

Severe HAP
Ciprofloxacin PO 500mg or IV 400mg q12h plus Vancomycin IV (dosed as per trust vancomycin guideline)

Aspiration pneumonia

Duration of therapy 5 days [guided by clinical progress]

Antibiotic - 1st line
Admission < 5 DAYS:
Amoxicillin 1g q8h IV **plus** Metronidazole 500mg q8h IV (PO if swallowing assessment is approved)
or
Clindamycin 600mg q6h IV if Penicillin allergy

Admission > 5 DAYS:
Co-amoxiclav IV 1.2g q8h
or
Cefuroxime IV 1.5g q8h plus Metronidazole IV 500mg q8h

Comments
Aspiration pneumonitis is chemical and often self-limiting. Treatment not needed unless major aspiration or if chest x-ray confirms pneumonia (new consolidation).

Comments
Aspiration pneumonitis is chemical and often self-limiting. Treatment not needed unless major aspiration or if chest x-ray confirms pneumonia (new consolidation).

Clinical Pulmonary Infection Score (CPIS)			
	0 points	**1 point**	**2 points**
Tracheal Secretions	Rare	Abundant	Abundant and purulent
Chest x-ray	No infiltrate	Diffuse	Focal infiltrate
Temperature	36.0- 38.4	38.5- 38.9	<36 or >39
White blood cell count	4 to 11	<4 or >11	<4 or >11 plus band >0.5
PaO_2/ FiO_2 mmHG	>240 or ARDS		<240 plus no ARDS
Microbiology	Negative		Positive

Ventilator associated Pneumonia

(> 48 hours of mechanical ventilation. CPIS ≥ 6)

Common Pathogen(s)

Must discuss with Microbiologist during working hours for:
Legionella, MRSA,
ESBL coliforms,
C. difficile,
Pneumocystis,
Neutropenic patients,
Multidrug resistant pathogens, and all haematology patients.

Antibiotic - 1st line
Early VAP (< 5 days on ventilation):
Co-amoxiclav (consider C diff risk) 1.2g q8h IV 5 days [guided by clinical response].

Late VAP (>5 days on ventilation)/
Cefuroxime 1.5g q8h IV

Previous C. difficile infection:
Piperacillin- tazobactam 4.5g q8h IV

Comment

All cases on ITU, HDU and Cardiac ITU should be reviewed regularly with Consultant Microbiologist.

Lung abscess

Duration of therapy should be guided by radiological and clinical response. [4- 6 weeks].

Common Pathogen(s)

Streptococcus milleri;
Anaerobes;
Staphylococcus aureus;
Aerobic/ microaerophilic Streptococci.

Antibiotic - 1st line

Community acquired:

Clindamycin 600mg q6h IV.

Hospital acquired:

Co-amoxiclav IV 1.2g q8h (contact Microbiologist during working hours for oral switch) - give PO co-amoxiclav option.

2nd line

Non-serious Penicillin allergy (e.g. mild rash)

Cefuroxime IV 1.5g q8h plus metronidazole IV 500mg q8h (contact Microbiologist during working hours for oral switch).

Comment

All cases should be discussed with Microbiologist and a Respiratory Physician during working hours.

De-escalate to appropriate narrow spectrum antibiotic once culture/ sensitivity available

Empyema

(minimum of 2 weeks depending on radiological/ surgical intervention/ clinical response).

Common Pathogen(s)
Streptococcus milleri;
Anaerobes;
Staphylococcus aureus;
Aerobic/ microaerophilic Streptococci.

Antibiotic - 1st line
Co-amoxiclav (consider C diff risk)1.2g q8h IV.

2nd line
Non-serious penicillin allergy (e.g. rash) - cefuroxime 1.5g IV q8h **plus** metronidazole 500mg IV q8h

Comment
All cases should be discussed with Microbiologist and a Respiratory Physician during working hours.
De-escalate to appropriate narrow spectrum antibiotic once culture/ sensitivity available.

Bronchiectasis

Treatment should be individualised for each patient and sputum should be sent for culture before initiating empiric antibiotic therapy – total duration 14 days (IV plus oral de-escalation if possible)

Common Pathogen(s)
Haemophilus
Influenzae;
Streptococcus
pneumoniae;
Moraxella catarrhalis;
Viruses;
Occasionally *S. aureus* (post viral episode)
Pseudomonas – see below

Antibiotic - 1st line
Doxycycline 100mg q12h PO 14 days (depending on clinical response).

If IV antibiotics indicated, treatment should be guided by previous results.
or
Amoxicillin 1g q8h IV.

2nd Line
Clarithromycin 500mg q12h PO or IV.
If poor therapeutic response, discuss with Microbiologist during working hours.

If *Pseudomonas* suspected, discuss with Microbiology / Respiratory physician during working hours.

1st line
Ceftazidime 2g IV q8h

Serious penicillin allergy (history of anaphylaxis, urticaria, or rash immediately after penicillin administration)
Ciprofloxacin PO 500-750mg q12h

Comment
IV antibiotics should be considered when patients are particularly unwell, have resistant organisms or have failed to respond to oral therapy.

Review antibiotics once culture results are available.

Pulmonary Exacerbation of Cystic Fibrosis

Pulmonary exacerbations of cystic fibrosis (CF) can be treated with oral or intravenous antibiotics. When IV therapy is needed patients are usually managed with a combination of two or more IV antibiotics. Common organisms in the sputum of CF patients are *Pseudomonas aeruginosa* and *Burkholderia cepacia*.

Ideally an aminoglycoside in combination with an anti-pseudomonal beta-lactam should be used first line. For those colonised with *Burkholderia* species, a third IV antibiotic should normally be prescribed. IV treatment is normally continued for 14 days depending on response.

Patients with CF have a high prevalance of antibiotic intolerance (check the allergy card in the medical notes) and alternative antibiotic regimens may be needed; if in doubt discuss with the CF doctors or the CF specialist pharmacist in normal working hours, or the CF consultant on call out of hours.

If the patient uses a maintenance nebulised antibiotic (e.g. tobramycin) and the same antibiotic is also being used for IV treatment, the nebulised form of the antibiotic would usually be withheld.

If you need information on how to administer a particular IV antibiotic for a patient with CF please contact the CF specialist pharmacist.

See the CF Trust's 'Antibiotic Treatment for Cystic Fibrosis' consensus document for further information.

First Line

Tobramycin IV 5mg/kg q24h

If patient is obese (20% over ideal body weight), use adjusted body weight to calculate dose – see below for details

plus

Ceftazidime IV 3g q6h (unlicensed dose)

or

Meropenem IV 2g q8h

or

Piperacillin/Tazobactam IV 4.5g q6h (max 14 days)

If colonised with *Burkholderia* **add** a 3rd IV antibiotic, preferably:

Co-trimoxazole IV 960mg q12h

Alternatives

In those with allergy, intolerance or previous failure on the above first line agents alternatives may be needed.

Other agents sometimes used for CF exacerbation

All doses assume normal renal and hepatic function - discuss with the CF pharmacist in hours, or the on call pharmacist out of hours if there is concern regarding renal or hepatic clearance of antibiotics. The list below is in alphabetical order, not order of preference.

Amikacin IV 15mg/kg q24h (do NOT use in combination with other aminoglycosides) - If patient is obese (20% over ideal body weight), use adjusted body weight to calculate dose – see below for details

Aztreonam IV 3g q6h (or 4g q8h) - both doses are unlicensed

Chloramphenicol IV 1g q6h (with alternate day FBC monitoring)

Ciprofloxacin IV 400mg q12h or q8h

Colistimethate Sodium (Colistin) IV 2MU q8h

Flucloxacillin IV 1-2g q6h

Fosfomycin IV 4g q8h (can give higher doses on discussion with consultant)

Teicoplanin IV 12mg/kg kg q12h for 3 doses then continue q24h

Temocillin IV 2g q12h

Ticarcillin with Clavulanic Acid (Timentin) IV 3.2g q6h

Tigecycline 100mg stat dose followed by 50mg q12h (12 hours after initial dose)

Vancomycin IV as per Trust guidance

Pregnancy and breastfeeding

If a patient is pregnant or breastfeeding and requires IV antibiotics please discuss treatment options with a CF consultant or the CF specialist pharmacist ***before*** commencing treatment.

Antibiotic desensitisations

These can be arranged by contacting the CF specialist pharmacist during working hours. Desensitisations should not be attempted outside of normal working hours.

Following a successful desensitisation, the patient must receive the antibiotic regularly. If the antibiotic is withheld for more than 24 hours a repeat desensitisation will be required and it must be given by intravenous infusion (not bolus).

Calculating Ideal and Adjusted Body Weight

Calculate the ideal body weight (IBW) first and then use this to calculate the adjusted body weight (AdjBW).

IBW men (kg) = 50 + (2.3 x every inch over 5 feet)

IBW women (kg) = 45.5 + (2.3 x every inch over 5 feet)

AdjBW = IBW + 0.4 x (actual body weight – IBW)

Urinary Tract

Microbiological specimens

- Urine dipstick (UTI unlikely if nitrate and leucocyte esterase are negative and urine is clear, consider alternative source of sepsis)
- Asymptomatic bacteruria in the elderly does not need treatment in the absence of symptoms
- MSSU for culture and sensitivity (if STD suspected send a first void urine for chlamydia PCR)
- EMU x3 on consecutive days if TB considered
- For diagnosis of prostatitis an MSSU post prostatic massage is indicated
- The choice of agent should take into account the patient's risk for C. difficile infection.

Uncomplicated Lower Urinary Tract Infection (Cystitis)

Duration of therapy:3 days (females) 5 days (males)

Common Pathogen(s)

E. coli;Staphylococcus saprophyticus.

Recent increase in ESBL+ve *E. coli.*

Antibiotic - 1st line

Nitrofurantoin 50mg q6h PO (caution if renal impairment - see table 13)

or

Trimethoprim 200mg q12h PO (please check prior urine sensitivity as a high proportion of isolates may be resistant)

2nd Line

Co-amoxiclav 625mg PO q8h or

Non-serious penicillin allergy (e.g. mild rash) - Cefalexin 500mg PO q8h

or

Multidrug resistant coliforms [AmpC/ ESBL+ve or others] or serious penicillin allergy (history of anaphylaxis, urticaria, or rash immediately after penicillin administration) Gentamicin* 5mg/Kg (adjusted body weight if obese - ie. if 20% over ideal body weight) IV stat and then contact Microbiologist during working hours to discuss management.

Comment

Refer to previous culture results for recurrent infections.

Refer to genital guidance system if prostatitis suspected.

Gentamicin*: 5mg/ kg but for elderly patients or with moderate/severe renal impairment (CrCl <30ml/min), may require 3mg/ kg or shorter duration treatment.

Upper Urinary Tract infection / Pyelonephritis / Septicaemia

Common Pathogen(s)
Enterobacteriacea.

Antibiotic - 1st line
Gentamicin* 5mg/Kg (adjusted body weight if obese - ie. if 20% over ideal body weight) q24 IV (max. 500mg in 24h period).

Consider restricting Gentamicin to initial 48hrs and step down to oral therapy according to sensitivities.

2nd Line
Cefuroxime IV 1.5g q8h

Comment
Gentamicin*: 5mg/ kg but for elderly patients or with moderate/severe renal impairment (CrCl <30ml/min), may require 3mg/ kg or shorter duration treatment.

Bacteruria (pregnant patients)

- Asymptomatic [3d treatment unless if using Nitrofurantoin then 5d]
- UTI [Duration 7d]

Common Pathogen(s)
Enterobacteriacea.

Antibiotic - 1st line
Nitrofurantoin 50mg q6h PO (<36 weeks).
Or
Amoxicillin 500mg q8h PO (if susceptible)

2nd Line
Cephalexin 500mg q8h PO

Or Trimethoprim 200mg q12h PO (if urine culture is sensitive to this) Caution if low folate status or on known folate antagonist (e.g. antiepileptic drugs). UKTIS recommends that high dose of folic acid (5mg) is recommended for all women treated with trimethoprim during the 1st trimester as a precaution.

Comment
REF: 1: Public Health England Management of Infection Guidance for Primary Care Oct 2014.
2: UKTIS. Trimethoprim in pregnancy 2013.

Catheterised patients

Comment

- Urine dipsticks are NOT indicated for catheter urine.
- Antibiotics are NOT required unless the patient is febrile or systemically unwell.
- Send CSU if patient systemically unwell. Treat according to culture.

Indiscriminate use of antibiotics in patients with long-term catheter leads to selection of ESBL+ve, MRSA and other multi-drug-resistant bugs.

Asymptomatic bacteruria (low risk patients)

Comment

- Asymptomatic bacteriuria is very common in elderly patients and rarely requires antibiotic treatment.

Urine samples may give positive dipsticks, but antibiotics are usually **NOT** required unless the patient is systemically unwell.

Acute prostatitis (>35 yrs)

Duration of therapy 4 weeks

Link to BASHH guidelines

Severe infection requiring parenteral therapy:

(< 35 years; follow guidance as for epididymo-orchitis but treat for 4-weeks).

Common Pathogen(s)

Enterobactericeae.

Antibiotic - 1st line

Cefuroxime 1.5g q8h IV plus gentamicin 5mg/kg adjusted body weight if obese - ie. if 20% over ideal body weight) q24h IV (for 2 doses)
Review for appropriate oral switch 48hours according to culture and sensitivity

2nd Line

Ofloxacin 200mg q12h PO for 28 days

Comment

Treat according to culture/ sensitivity results.

Refer to GUM clinic for diagnosis, treatment and contact tracing
Treat sexual partners as well.

Epididymo-orchitis (<35yrs)

Link to BASHH guidelines

Common Pathogen(s)

Gonococci;Chlamydia;
Enteric organisms (uncommon).

Antibiotic - 1st line

Doxycycline 100mg q12h PO for 10-14 days
plus
Ceftriaxone 500mg single dose IM.

2nd Line

If most probably due to chlamydia or other non-gonococcal organisms (i.e. where Gonorrhoea considered unlikely as microscopy is negative for Gram negative intracellular diplococci and no risk factors for gonorrhoea identified*) could consider

Doxycycline 100mg q12h PO for 10-14 days.
Or
Ofloxacin 200mg PO q12h for 14days

Comment

Refer to GUM.
First voided urine sample,
urethral swab, and culture.
* Common risk factors for gonorrhoea are: previous *N. gonorrhoeae* infection; known contact of gonorrhoea; presence of purulent urethral discharge, men who have sex with men and black ethnicity

Epididymo-orchitis (>35yrs)

Link to BASHH guidelines

Common Pathogen(s)

Enteric organisms.

Antibiotic - 1st line

Patients with severe symptoms or sepsis should receive
gentamicin* IV (for 24-48hours) 5mg/kg once daily or 3mg/kg once daily if renal impairment (adjusted body weight if obese - i.e. if 20% over ideal body weight)
and
ofloxacin po 200mg q12h for 14 days. Please check culture sensitivity and change to a sensitive narrow spectrum agent. If not available, consider step down to oral ofloxacin alone.

2nd Line

Ciprofloxacin 500mg PO BD for 10days

Comment

Treat according to culture/ sensitivity results.
Refer to GUM clinic for diagnosis, treatment and contact tracing
Treat sexual partners as well.

Eye, Ears, Nose, Throat

Conjunctivitis

Common Pathogen(s)
Usually viruses; Chlamydia

Antibiotic - 1st line
Chloramphenicol 0.5% eye drops 2-hourly until infection controlled, then 6 hourly until 48 hours after healing.

Chlamydia: Doxycycline 100mg q12h PO for 7- 10 days.

Comment
Viral, Chlamydia, and bacterial swabs are required

Periorbital Cellulitis – preseptal

Antibiotic - 1st line
Co-amoxiclav (consider *C difficile* risk) 1.2g q8h IV

MRSA colonised, add in Vancomycin 1g q12h IV.

Comment
Orbital cellulitis is a medical emergency requiring Ophtho/ Micro input immediately.

Acute otitis media

Common Pathogen(s)
Strep pneumoniae;
H influenzae.

Antibiotic - 1st line
Amoxicillin 500mg q8h PO for 5 days.

2nd Line
Clarithromycin 500mg q12h PO for 5 days

.
Comment
If mastoiditis, discuss with Microbiologist/ ENT during working hours.

Otitis externa

Common Pathogen(s)
Polymicrobial colonisation.

Antibiotic - 1st line
Antibiotics not usually required.

Comment
If malignant otitis externa suspected, discuss with ENT consultant.

Severe Throat infections / Quinsy

Common Pathogen(s)
Strep. Pyogenes.

Antibiotic - 1st line
Phenoxymethyl penicillin 500mg q6h PO and metronidazole 400mg PO q8h
or
Benzylpenicillin 1.2g IV q6h if NBM and metronidazole 500mg IV q8h
if
severe, replace metronidazole with Clindamycin 600mg q6h IV.

Penicillin allergy
Clindamycin IV 600mg q6h

Comment
If *Fusobacterium necroforum* (Lemierre's disease) or oesophageal perforation is suspected, discuss with microbiologist

Sinusitis– acute

Duration 7 days

Common Pathogen(s)
Commonly - Rhinovirus and other viruses
S. pneumoniae **;** *Haemophilus influenzae*
Less common pathogens include: *M. catarrhalis, S. aureus* and anaerobes; fungi are rare pathogens for acute infection.

Antibiotic - 1st line
Amoxicillin 500mg q8h PO

Antibiotic – 2nd line
Doxycycline 100mg q 12h PO
Or Clarithromycin 500mg q 12h PO

Comment
Antibacterial should usually be used only for persistent symptoms and purulent discharge lasting at least 7 days or if severe symptoms. Also, consider antibacterial for those at high risk of serious complications (e.g. in immunosuppression, cystic fibrosis).

Dental Abscess

Duration 5 days

Antibiotic - 1st line
Amoxicillin 500mg q8h PO

Antibiotic – 2nd line
Metronidazole 400mg q8h PO

Antibacterial required only in severe disease with cellulitis or if systemic features of infection.

Skin and soft tissue

Microbiological specimens

- ALL HOSPITAL ADMISSIONS MUST RECEIVE A MSSA/MRSA SCREEN. nose and perineal swab for Chromogenic culture as per hospital policy (see CORP/PROC/408)
- Deep tissue, pus/ aspirates are best specimens from wounds. Surface swabs are sub-optimal and if collected these should be obtained after cleaning wound surface with saline.
- Blood culture [if signs of systemic sepsis].
- If recurrent boils or severe sepsis present consider possibility of *PVL MRSA or MSSA.* Discuss with Consultant Microbiologist during working hours as standard regimes may be sub-optimal (see CORP/PROC/612 link)
- Gangrene/ necrotising fasciitis/ abscess: send tissue or aspirate.
- The choice of agent should take into account the patient's risk for C. difficile infection.

Cellulitis

- Duration of therapy 5-7 days [guided by clinical progress]
- Without systemic (PO)
- With systemic (IV => PO)
- Peripheral IV cannula infection

Common Pathogen(s)
Streptococcus pyogenes;
Staphylococcus aureus;
Occasionally *Strep Grp B, C, G.*

MRSA colonised must not be treated with Flucloxacillin.

Antibiotic - 1st line
Flucloxacillin 1g q6h IV/ PO.
Review after 48 hours and step down to oral therapy once margin of cellulitis begins to recede. Target treatment if significant positive culture results are available.

Addition of Benzyl Penicillin or amoxicillin to Flucloxacillin is NOT required as flucloxacillin offers Streptococcal cover as well.

Severe cases of skin/soft tissue infections/Penicillin allergy or high suspicion of MRSA - Vancomycin IV (dosed as per trust vancomycin guideline)

2nd Line
Clindamycin 600mg q6h IV/ PO.
Review after 48 hours and step down to oral therapy once margin of cellulitis begins to recede. If response is poor consider resistance and call microbiology

Comment
Local data demonstrates higher dosage reduces association with C. *difficile*. Please note that where prior results are available these should be checked. If isolate is Erythromycin resistant then clindamycin should be used with caution and response checked as in such situation resistance can emerge rapidly.

Leg ulcers and pressure sores non diabetic

Comment

- Avoid antibiotics
- Use local cleansing and topical antiseptics if required. Involve Tissue Viability Nurse.

If signs of infection, use Flucloxacillin or Clindamycin and discuss with Microbiologist during working hours. Pseudomonas or Enterobacteriaceae from surface wound swabs may represent colonisation.

Impetigo

Duration of therapy 5 days
Common Pathogen(s)
Staphylococcus aureus;
Streptococcus pyogenes.

Antibiotic - 1st line
Mupirocin 2% ointment q8h topically
or
Hydrogen peroxide 1% cream q8h topically.

If widespread:
Flucloxacillin 500mg q6h PO.

2nd Line
If widespread:
Clarithromycin 500mg q12h PO.

Comment
Do **NOT** use topical Fucidin® empirically, most community MSSA are resistant.

Animal bites

Duration of therapy 5 days

Common Pathogen(s)
P. multocida;
Capnocytophaga;
Staphylococcus aureus.

Antibiotic - 1st line
Co-amoxiclav (Consider *C difficile* risk) 625 mg q8h PO.

2nd Line
Doxycycline 100mg q12h PO
plus
Metronidazole 400mg q8h PO.

Comment
Topical cleansing, irrigation and debridement are significant and as indicated.

Is tetanus immunisation up-to-date?

Human bites

Duration of therapy 5 days

Common Pathogen(s)
Strept, Peptostrep, Bacteroides; Staphylococcus aureus

Antibiotic - 1st line
Co-amoxiclav (Consider *C difficile* risk) 625 mg q8h PO.

2nd Line
Doxycycline 100mg q12h PO
plus
Metronidazole 400mg q8h PO.

Comment
Is Hepatitis B vaccine required?

Diabetic foot ulcers PEDIS grade 1

- No symptoms or signs of infection – IDSA infection severity - uninfected

Infection present, as defined by the presence of at least 2 of the following items:

- Local swelling or induration
- Erythema
- Local tenderness or pain
- Local warmth
- Purulent discharge (thick, opaque to white or sanguineous secretion)

Common Pathogen(s)
Colonising skin flora.

Antibiotic - 1st line
No antibacterial therapy. Cleaning and topical antiseptics as advised by tissue viability team, podiatry or diabetic foot clinic.

Diabetic foot ulcer PEDIS grade 2

Local infection involving only the skin and the subcutaneous tissue (without involvement of deeper tissues and without systemic signs as described below – see PEDIS 4). If erythema, must be >0.5 cm to ≤2 cm around the ulcer.
Exclude other causes of an inflammatory response of the skin (e.g., trauma, gout, acute Charcot neuro-osteoarthropathy, fracture, thrombosis, venous stasis).
IDSA Infection Severity - mild

Duration of therapy usually 2 weeks (subject to review)

Common Pathogen(s)
Staphylococcus aureus;
Strept. grp A, occ gp *B.*

Antibiotic - 1st line
Flucloxacillin 1g q6h IV (500mg PO 6 hourly).

2nd Line
Clindamycin 600mg q6h PO/IV

Diabetic foot ulcer PEDIS grade 3

Local infection (as described above) with erythema > 2 cm, or involving structures deeper than skin and subcutaneous tissues (e.g., abscess, osteomyelitis, septic arthritis, fasciitis), and No systemic inflammatory response signs (as described below)
IDSA Infection Severity - Moderate

Duration of therapy usually 2 to 3 weeks (subject to review/ clinical response).

Common Pathogen(s)
Staphylococcus aureus
Strept. grp A, occ *B* &coliforms

Antibiotic - 1st line
Flucloxacillin 1g q6h IV
plus
Gentamicin* 5mg/Kg q24h IV. (adjusted body weight if obese - ie. if 20% over ideal body weight)
Review Gentamicin at 48Hours.

Or

Co-amoxiclav(Consider *C difficile* risk) 1.2g q8h IV if severe renal impairment or 625mg q8h PO if for discharge

2nd Line
Clindamycin 600mg q6h
plus
Gentamicin* 5mg/Kg q24h IV (adjusted body weight if obese - ie. if 20% over ideal body weight)

Comment
If MRSA colonised/high risk, please refer to Treatment of MRSA infections section of policy.

Tissue sample/ frank pus is optimal specimen.

Blood culture if systemic effects; soft tissue biopsy in neuropathic ulcers; ulcer swabs from inflamed margin.

Gentamicin*: 5mg/ kg but for elderly patients or with moderate/severe renal impairment, may require 3mg/ kg or shorter duration treatment.

Diabetic foot ulcer PEDIS grade 4

Local infection (as described above) with the signs of SIRS, as manifested by ≥2 of the following:

- Temperature >38°C or <36°C
- Heart rate >90 beats/min
- Respiratory rate >20 breaths/min or PaCO2 <32 mm Hg
- White blood cell count >12 x 10^9 or < 4 x 10^9 cells/L or ≥10% immature (band) forms

IDSA infection severity - severe

Duration of therapy6-12 weeks

Common Pathogen(s)

Staphylococcus aureus;

Possibly Polymicrobial.

Antibiotic - 1st line
Treatment based on culture/ sensitivity results

Comment

Blood culture if systemic effects; bone biopsy (whenever possible); deep soft tissue biopsy; deep soft tissue swabs (of limited use).

Necrotising fasciitis / gas gangrene

Urgent surgical review.
Debridement main stay of treatment.

Common Pathogen(s) Group A Strept; *Staphylococcus aureus*	**Common Pathogen(s)** Possibly polymicrobial
Antibiotic - 1st line Clindamycin 600mg q6h IV (900mg q8h IV) **plus** Benzylpenicillin 2.4g q6h IV. **Serious penicillin allergy** (history of anaphylaxis, urticaria, or rash immediately after penicillin administration) Clindamycin 600mg q6h IV (900mg q8h IV) **Plus** Vancomycin IV (dosed as per trust vancomycin guideline)	Amoxicillin 2g q8h IV **plus** Gentamicin*5mg/Kg q24h IV. (adjusted body weight if obese - ie. if 20% over ideal body weight) **plus** Metronidazole 500mg q8h IV **Serious penicillin allergy (**history of anaphylaxis, urticaria, or rash immediately after penicillin administration) Teicoplanin IV 10mg/kg q12h for 3 doses and then q24h **plus** Gentamicin*5mg/Kg q24h IV. (adjusted body weight if obese - ie. if 20% over ideal body weight) **plus** Metronidazole 500mg q8h IV
Review at 48 hours.	

2nd Line
Higher doses of Clindamycin/ immunoglobulin may be required in patients on intensive care. Urgent discussion with on-call microbiologist is required.

Comment
Theatre samples are precious and must be sent for culture & sensitivity.
Clindamycin has additional Group A Strept toxin blocking action.
Gentamicin*: 5mg/ kg but for elderly patients or with moderate/severe renal impairment (CrCl <30ml/min), may require 3mg/ kg or shorter duration treatment.

Surgical Site Infections

Check MRSA status and contact microbiologist if positive.

Graft/ Stump infection

****Ongoing management and duration of therapy to be discussed with Microbiology during working hours.**

Antibiotic - 1st line
Co-amoxiclav IV 1.2g q8h

Penicillin allergy and high risk of MRSA
Teicoplanin IV 10mg/kg q12h for 3 doses then q24h **plus** Gentamicin* 5mg/Kg stat.(adjusted body weight if obese - i.e. if 20% over ideal body weight) IV **plus** Metronidazole 500mg q8h IV**

Comment
Gentamicin*: 5mg/ kg but for elderly patients or with moderate/severe renal impairment (CrCl <30ml/min), may require 3mg/ kg or shorter duration treatment.

Wound infection post clean procedures

Duration of therapy5 days (guided by clinical response)

Antibiotic - 1st line
Flucloxacillin 1g q6h IV (500mg q6h PO). Review IV antibiotics at 48 hours.

2nd Line
Clindamycin 600mg q6h IV/PO

Wound infection post clean-contaminated

Duration of therapy and the need for further gentamicin after 24 hours should be guided by clinical response and discuss with microbiologist in working hours if necessary

Antibiotic - 1st line
Flucloxacilin 2g 6 hourly IV **plus** Gentamicin* 5mg/Kg stat.(adjusted body weight if obese - i.e. if 20% over ideal body weight) IV **plus** Metronidazole 500mg q8h IV.

2nd Line
Clindamycin 600mg IV/PO 6 hourly **plus** Gentamicin* 5mg/Kg IV stat (adjusted body weight if obese - i.e. if 20% over ideal body weight)

Comment
Gentamicin*: 5mg/ kg but for elderly patients or with moderate/severe renal impairment (CrCl <30ml/min), may require 3mg/ kg or shorter duration treatment.

Wound infection post contaminated procedures and dirty procedures or trauma

Duration of therapy to be discussed with Microbiology during working hours

Antibiotic - 1st line
Flucloxacilin 2g 6 hourly IV **plus** Gentamicin* 5mg/Kg q24h.(adjusted body weight if obese - i.e. if 20% over ideal body weight) IV **plus** Metronidazole 500mg q8h IV.

2nd Line
Cefuroxime 1.5g q8h IV **plus** Metronidazole 500mg q8h IV.

Comment
Clindamycin, Co-amoxiclav and Piperacillin-tazobactam usually have sufficient anaerobic cover. Addition of Metronidazole is only required for dirty trauma wounds at the discretion of the patient's Consultant.

Central Nervous System

ALL suspected cases of meningitis MUST be discussed with Consultant Microbiologist at first opportunity (during working hours)and reported to Public Health England. Meningococcal sepsis and H influenzae require prophylaxis of contacts

Microbiological specimens

- CSF
- Blood culture
- Throat swab for meningococci
- Urine for pneumococcal antigen
- EDTA blood for meningococci PCR

Serology viruses / cryptococcus [HIV / Immunocompromised] as appropriate

The choice of agent should take into account the patient's risk for C. difficile infection

Meningitis: initial blind therapy

Meningococcal meningitis suspected and accompanied with purpuric non-blanching rash or signs of meningitis

Common Pathogen(s)

Streptococcus pneumoniae;
Neisseria meningitides;
Haemophilus influenzae;
Listeria monocytogenes.

Antibiotic - 1st line

Ceftriaxone 2g q12h IV.
Add in:
Amoxicillin 2g q6h IV if high risk for Listeria e.g. immunocompromised, >55 years, pregnant or history of alcohol abuse
or
Co-trimoxazole 1.44g IV 12 hourly if high risk for Listeria as above

2nd Line

If history of anaphylaxis to penicillin or serious penicillin allergy – meropenem 2g q8h IV (but approximately 8-11% cross allergy with penicillin)

Or chloramphenicol may be used if history of immediate hypersensitivity reaction to penicillin or cephalosporins. Choramphenicol IV 25mg/kg q6h (providing high doses reduced as clinically indicated) (plasma concentration monitoring required in elderly and hepatic impairment)

Add in:
Co-trimoxazole 1.44g IV 12 hourly if high risk for Listeria. (when using chloramphenicol)

Comment

Notifiable disease

Meningitis caused by *meningococci*

Duration of therapy 7 days

Common Pathogen(s)
Meningococci

Antibiotic - 1st line
Benzylpenicillin 2.4g q4h IV.

2nd Line
Ceftriaxone 2g q12h IV.

Meningitis caused by *pneumococci*

Duration of therapy 14 days

Common Pathogen(s)
Pneumococci

Antibiotic - 1st line
Benzylpenicillin 2.4g q4h IV.
If Penicillin resistant Pneumococcus or Hx of foreign travel: Contact Microbiologist .

2nd Line
Ceftriaxone 2g IV q12h

Comment
Dexamethasone 10mg q6h PO for 4 days started with first dose of antibiotics .

Meningitis caused by Haemophilus influenzae

Duration of therapy 10days

Common Pathogen(s)
Haemophilus influenzae.

Antibiotic - 1st line
Ceftriaxone 2g q12h IV

Comment
Dexamethasone 10mg q6h PO for 4 days started with or just before the first dose of antibiotics

Meningitis caused by *Listeria*

Duration of therapy 21 days

Common Pathogen(s)
Listeria.

Antibiotic - 1st line
Amoxicillin 2g q4h IV
plus
Gentamicin* 5mg/kg q24h IV (adjusted body weight if obese - i.e. if 20% over ideal body weight) [stop gentamicin after 7-days].

2nd Line
Co-trimoxazole 1.44g q12h IV.

Comment
Gentamicin*: 5mg/ kg but for elderly patients or with moderate/severe renal impairment (CrCl <30ml/min),may require 3mg/ kg or shorter duration treatment.

Consider this as a possible cause if history of alcohol abuse

Brain abscess/ Subdural empyema/ Penetrating craniocerebral injuries

Discuss duration of therapy with Neurosurgery/Microbiology during working hours
Common Pathogen(s)

Antibiotic - 1st line
Ceftriaxone 2g q12h IV
plus
Metronidazole 500mg q8h IV (400mg q8h PO)

Comment
Refer to Neurosurgery.

Encephalitis

Duration of therapy: 14-21 days, guided by clinical response

Common Pathogen(s)
Herpes simplex;
Varicella zoster.

Antibiotic - 1st line
Aciclovir 10mg/kg q8h IV. All treatment must be IV.

Comment
If Herpes simplex positive cases:
If treating for 14days only - repeat lumbar puncture around day 14 and if PCR negative – can stop treatment or if PCR positive – continue for another 14days
Or treat for 21days and no further lumbar puncture is required.

Genital Infection

Microbiological specimens

- Please refer to individual Trust protocols and procedures for Genito-Urinary Medicine. Link to BASHH guidelines.
- High level of resistance to Penicillin and Quinolones which favour single dose Ceftriaxone for Gonorrhoea.
- The choice of agent should take into account the patient's risk for C. difficile infection.
- Most common cause of Epididymo-orchitis is Mumps. Please note this is a notifiable disease to Public Health England.

Chlamydia(uncomplicated)

Common Pathogen(s)
Chlamydia trachomatis

Antibiotic - 1st line
Azithromycin 1g PO as a single dose.

2nd Line
Doxycycline 100mg q12h PO for 7 days
(C/I in pregnancy)
or
Erythromycin 500mg q12h PO for 14 days (70% cure rate)
or
Ofloxacin 200mg q12h PO or 400mg q24h PO for 7 days (Non-pregnant).

Comment
Refer to GUM and treat sexual partners.

Swabs from women or urine from both men and women to be tested by PCR for gonorrhoea (swabs superior sample for women) and chlamydia (one yellow topped bottle)

Women:
Cervical or vulvo-vaginal swab.
First voided urine sample.

Men:
First voided urine sample.
Urethral swab.

Gonorrhoea (uncomplicated)

Often co-infected with Chlamydia dual treatment may be required

Common Pathogen(s)
Neisseria gonorrhoeae.

Antibiotic - 1st line
Ceftriaxone 500 mg IM as a single dose **plus** Azithromycin 1g PO as a single dose for both synergism and concomitant treatment of chlamydia.
or
Contact GU Medicine

2nd Line
Contact GU Medicine/ Treat on basis of susceptibility of isolate

Comment
Refer to GUM and treat sexual partners.

Swabs from women or urine from both men and women to be tested by PCR for gonorrhoea (swabs superior sample for women) and chlamydia (one yellow topped bottle)

Women:
Cervical swab.
Rectal / oropharnygeal tests if symptomatic/ at risk at these sites.

Men:
Urethral swab.
Rectal/ oropharnygeal tests if symptomatic at these sites.

Epididymo-orchitis <35y – see urinary section

Epididymo-orchitis (>35yrs) – see urinary section

Pelvic Inflammatory Disease

Common Pathogen(s)
Neisseria gonorrhoeae;
Chlamydia trachomatis;
Mixed Anaerobes;
Enteric organisms.

Antibiotic - 1st line
Ceftriaxone 2g q24h IV for 24hours after clinical improve and then switch to oral
plus
Doxycycline 100mg q12h PO.

Oral switch for total of 14days:
Doxycycline 100mg q12h PO
plus
Metronidazole 400mg q12h PO.

2nd Line
Clindamycin 900mg q8h IV
plus
Gentamicin 7mg/kg q24h IV.

IV for 24hours after clinical improve and then switch to oral:

Oral switch:
Clindamycin 450mg q6h PO to complete 14days course

Or

Doxycyline 100mg PO 12h
plus
Metronidazole 400mg q12h PO to complete14days course

Comment
As above for Chlamydia and Gonorrhoea
Doxycycline and Ofloxacin contraindicated in pregnancy.

Link to BASHH guidelines

Genital Herpes

Common Pathogen(s)
Herpes simplex virus
(HSV-1 and HSV-2).

Antibiotic - 1st line
Aciclovir 200mg PO 5 times a day for 5 days

or

Valaciclovir 500mg q12h PO for 5 days

Comment
Refer to GUM
Oral antivirals are indicated within 5 days of the start of the episode and while new lesions are forming.
Swab taken from base of lesion.

Early and Late Syphilis

Antibiotic - 1st line
Discuss with GUM Clinic

Vulvovaginal candidiasis

Common Pathogen(s)
Candida albicans.

Antibiotic - 1st line
Clotrimazole 1% cream applied 2-3 times a day for external symptoms **plus** Clotrimazole vaginal pessary insert 500mg at night as a single dose

or

Fluconazole 150mg PO as a single dose.

Bone and Joint

Microbiological specimens

- Joint aspirates
- Synovial Tissue/Bone (operative sample)
- Blood Culture
- If GC STD samples as directed by GUM
- The choice of agent should take into account the patient's risk for C. difficile infection

Septic arthritis

Duration of therapy 2- 4 weeks guided by clinical response

Common Pathogen(s)
Staphylococcus aureus.

Antibiotic - 1st line
Flucloxacillin 2g q6h IV

2nd Line
Clindamycin 600mg q6h IV.

Comment
Clarithromycin should **NOT** be used.

Osteomyelitis – acute

Duration of therapy usually 6 weeks. All cases should be discussed Consultant to Consultant Microbiologist during working hours

Common Pathogen(s)
Staphylococcus aureus.

Antibiotic - 1st line
Flucloxacillin 2g q6h IV.
Consider adding Rifampicin [600mg q12h PO] or Sodium Fusidate (If sensitive) [500mg q8h PO].

2nd Line
Clindamycin 600mg q6h IV.

Osteomyelitis - chronic

Common Pathogen(s)
Staphylococcus aureus;
Occasionally coliforms.

Antibiotic - 1st line
Empiric treatment not indicated.
If acute exacerbation, treat as acute osteomyelitis.

Prosthetic joint infections

Common Pathogen(s)
Staphylococcus;
Propionibacteria.

Antibiotic - 1st line
Discuss between primary consultant and Consultant Microbiologist during working hours

Sternum, post op

All cases should be discussed Consultant to Consultant Microbiologist during working hours.
Common Pathogen(s)
Staphylococcus *aureus.*

Antibiotic - 1st line
Vancomycin IV (dosed as per trust vancomycin guideline)

2nd Line
Clindamycin 600mg q6h IV.

Comment
All cases should be discussed with microbiologist

Compound fracture

Common Pathogen(s)

Antibiotic - 1st line
Flucloxacillin 1g q6h IV plus metronidazole 500mg q8h IV plus gentamicin* 5mg/kg q24 IV (adjusted body weight if obese - ie. if 20% over ideal body weight)

If renal failure
Co-amoxiclav IV 1.2g q8h or 625mg q8h PO if discharge

Continue 24hours after closure of wound

Comment
Gentamicin*: 5mg/ kg but for elderly patients or with moderate/severe renal impairment, may require 3mg/ kg or shorter duration treatment.

Cardiovascular System
ALL suspected/ confirmed cases of endocarditis MUST be discussed with Microbiologists and Cardiologists during working hours and entered to the IE Care Pathway form.

Discuss with Microbiologist at first opportunity in working hours and daytime during the weekend (within 24 hours of suspected diagnosis)
Microbiological specimens
Three sets of blood cultures need to be taken before initiating antibiotics. If antibiotics already started, blood culture must be collected before next dose of antibiotic. Must LABEL BC AS ENDOCARDITIS for prolonged incubation and endocarditis specific Sensitivity testing and MIC determinations
Serology for *Coxiella* and *Bartonella* if blood culture negative endocarditis.

- Valve tissue at operation in sterile dry container without saline and inform the laboratory prior to delivery and deliver by hand to member of the senior laboratory staff for 16s rRNA PCR and other specialist molecular tests
- The below recommendations are for empiric therapy only. Targeted regimes will be provided by Consultant Microbiologist and Cardiologist.
- Vancomycin plus Gentamicin may accentuate renal impairment.

Native Valve Endocarditis:
Discuss with Microbiologist at first opportunity in working hours and daytime during the weekend (within 24 hours of suspected diagnosis)

Indolent presentation

Initial "blind" therapy

Common Pathogen(s)
Streptococcal spp

Antibiotic - 1st line
Vancomycin IV (dosed as per trust vancomycin guideline)

Comment
Specific management **MUST** be based on organism isolated/ MIC.
Vancomycin target: Pre-dose 15-20mg/L level.

Native Valve Endocarditis - Severe Sepsis

Discuss with Microbiologist at first opportunity in working hours and daytime during the weekend (within 24 hours of suspected diagnosis)

Initial "blind" therapy
Acute presentation

Common Pathogen(s)
Staphylococcus aureus

1st Line
Vancomycin IV (dosed as per trust vancomycin guideline)
plus
Gentamicin as per gentamicin policy.

Comment
Discuss with Microbiologist ASAP.
Vancomycin target: Pre-dose 15-20mg/L level.

Prosthetic Valve Endocarditis or negative blood culture

Discuss with Microbiologist at first opportunity in working hours and daytime during the weekend (within 24 hours of suspected diagnosis)

Initial "blind" therapy

Common Pathogen(s)
Staphylococcal spp

Antibiotic - 1st line
Vancomycin (dosed as per trust vancomycin guideline)
plus
Rifampicin 600mg q12h PO
plus
Gentamicin as per gentamicin policy. Discuss continuation of Gentamicin beyond 48 hours with Microbiology.

Comment
Specific management **MUST** be based on organism isolated/ MIC.

Vancomycin target: Pre-dose 15-20mg/L level.

Cardiovascular System: Pacemaker Infections
ALL suspected/ confirmed cases of infected implantable cardiac electronic devices MUST be discussed with Microbiologists and Cardiologists

Microbiology specimens

1. For early (<30 days) post implantation inflammation / uncomplicated superficial wound infection without fluctuance, discharge or dehiscence AND without systemic symptoms or signs of infection – address any obvious cause and take blood cultures. Wound should be reviewed by appropriate personnel (ideally implanting physician, if unavailable on-call cardiology registrar)
2. For generator pocket infection – If evidence of severe sepsis take 3 sets of blood cultures within 1h, then give antibiotics. If no evidence of sepsis withhold antibiotics and take three sets of blood cultures at different times >6h apart, organise echocardiography and urgent cardiology review with a view to prompt removal of entire system and temporary pacing if needed. Theatre samples during extraction – lead fragments (proximal and distal), lead vegetation, generator pocket tissue (-2sq.cm) and pus aspirated from generator pocket wound (swabs are least preferred samples)

- The below recommendations are for empiric therapy only. Targeted regimes will be provided by Consultant Microbiologist and Cardiologist.

Early post implantation inflammation (<30days) and blood culture negative Uncomplicated generator pocket infection

- Early post implantation inflammation (<30days and blood culture negative) Duration 7-10days and review
- Uncomplicated generator pocket infection - Duration 10-14days and review

Antibiotic - 1st line
Vancomycin IV as per vancomycin dosing guide

Oral option- Clindamycin 600mg PO q6h (discuss with microbiologist if Erythromycin or clindamycin resistant staphylococci isolated)

Comment
Specific management **MUST** be based on organism isolated/ MIC.

Device may be left in situ.

Implantable cardiac electronic device lead infection or related infective endocarditis
Common Pathogen(s)

Antibiotic - 1st line
Discuss with microbiologist and cardiologist

Blood

Microbiological specimens

Blood Culture 2-3 samples

- For line infection blood cultures should be taken both peripherally and from all lines / lumens.
- Line tips should be sent if infected line is removed.
- Other samples as indicated under specific organ system investigations.
- The choice of agent should take into account the patient's risk for C. difficile infection.

Where source of septicaemia is known, please refer to guidance under relevant body systems.

Septicaemia from UNKNOWN origin (non-neutropenic patient)

Diagnosed – organ dysfunction with ≥ 2 of the following:
WCC <4 or >12 x 10^9/L
Temp <36°C or >38°C
Heart rate >90bpm
Respiratory rate >20/min or $PaCO_2$ <4.3kPa
Refer to Trust Guidelines and pathway on Surviving Sepsis.

Common Pathogen(s)
Multiple pathogens.

Antibiotic - 1st line
Amoxicillin 2g q8h IV **plus** Gentamicin 5mg/kg q24h IV (adjusted body weight if obese - i.e. if 20% over ideal body weight) **plus** Metronidazole 500mg q8h IV [if intrabdominal sepsis suspected].

MRSA/ MSSA colonised:
Replace Amoxicillin with Flucloxacillin 2g q6h IV (MSSA) or Vancomycin 1g q12h IV (MRSA).

2nd Line
Non-serious penicillin allergy (e.g rash) or patients with liver cirrhosis at risk of hepatorenal syndrome – cefuroxime 1.5g q8h IV plus metronidazole 500mg q8h IV +/- gentamicin 5mg/kg q24 IV (adjusted body weight if obese - ie. if 20% over ideal body weight)

If history of anaphylaxis to penicillin – Teicoplanin 10mg/kg q12h for 3 doses IV then 10mg/kg q24h IV plus metronidazole 500mg q8h IV plus gentamicin 5mg/kg q24h IV (adjusted body weight if obese - ie. if 20% over ideal body weight)

Comment
Gentamicin*: 5mg/ kg but for elderly patients or with moderate/severe renal impairment(CrCl <30ml/min), may require 3mg/ kg or shorter duration treatment.
All hospital admissions MUST receive a screen for MSSA/ MRSA as per local policy

All patients with MSSA or MRSA bacteraemia must receive an echocardiogram and at least 14 days of IV treatment with clearance blood culture after 48h.

Sepsis from UNKNOWN Origin (Obstetric Patients), any Gestation or 6 weeks Post-Partum

Duration of therapy – as per clinical response

Common pathogen(s)
Gram positive, gram negative organisms and anaerobes

Pregnant:
Cefuroxime 1.5g IV q8h [1,2]
Plus Metronidazole 500mg IV q8h [1,2]
Plus Gentamicin IV 5mg/kg* q24h (booking in weight or adjusted body weight if obese - ie. if 20% over ideal body weight) **for 24-48hours only if no improvement with cefuroxime and metronidazole or severe sepsis** [1,2]

Consider Listeriosis – consider specific treatment with microbiologist

Post Partum (Not Breast Feeding):
Amoxicillin IV 2g q8h [2,3]
Plus
Gentamicin IV 5mg/kg* q24h (adjusted body weight if obese - ie. if 20% over ideal body weight)[2,3]
Plus
Metronidazole 500mg q8h IV [if intrabdominal sepsis suspected] [2]

Post Partum (Breast Feeding):
Co-amoxiclav IV 1.2g q8h [2,4]
Plus
Stat dose of Gentamicin IV 5mg/kg* q24h (adjusted body weight if obese - ie. if 20% over ideal body weight) [2,3]

Comment
Gentamicin*: with moderate/severe renal impairment (CrCl<30ml/min), may require 3mg/kg

Gentamicin **-** Due to the limited data and the theoretical risk of ototoxicity and nephrotoxicity, the use of parenteral gentamicin in pregnancy is reserved except for the treatment of serious or life-threatening conditions unresponsive to standard antibiotic therapy. If parenteral gentamicin is required in pregnancy, close monitoring of maternal serum concentrations is advised, with the dose being adjusted as necessary.

References

- Toxbase https://www.toxbase.org/Exposure-in-pregnancy/ <accessed 23/4/15>
- Briggs G, Freeman R et al, Drugs in pregnancy and lactation. 9th ed.
- Schaefer C, Peters P, et al. Drugs during pregnancy and lactation. 3rd ed.
- UKMI,lactation,http://www.midlandsmedicines.nhs.uk/apps/ukdilas/results.asp?SearchUKdilas=co-amoxiclav, <accessed 23/4/15>

IV Line Associated infections

Microbiological specimens

Blood Culture 2-3 samples

- For line infection blood cultures should be taken both peripherally and from all lines.
- Line tips should be sent if infected line is removed.
- Other samples as indicated under specific organ system investigations.
- The choice of agent should take into account the patient's risk for C. difficile infection.

Line-associated Septicaemia (peripheral and central cannulae) and Tunnel track infections (Hickman line)

Duration of therapy 2 weeks

Common Pathogen(s)

Staphylococcus aureus;
Hickman/ long lines may have Enterobacteriaceae.

Antibiotic - 1st line

Vancomycin 1g q12h IV.

Add stat dose or once daily dose of Gentamicin 5mg/kg (adjusted body weight if obese - i.e. if 20% over ideal body weight) while awaiting culture results in patients with central line. **Use of Gentamicin post 48h must be discussed with Microbiologist during working hours.**

Comment

Remove line. Switch to Flucloxacillin if isolate proves to be MSSA.

Gentamicin*: 5mg/ kg but for elderly patients or with moderate/severe renal impairment (CrCl<30ml/min), may require 3mg/ kg or shorter duration treatment.

Neutropenic/ Immunocompromised patients

Discuss all suspected cases of neutropenic sepsis with Haematologists/acute oncology team and Microbiologists during working hours
Microbiological specimens
Please refer to individual Trust protocols and procedures for Haematology (CORP/PROT/003) and Oncology (CORP/PROT/323)
Avoid Gentamicin in patients receiving Platinum based chemotherapy, use Meropenem (in haematology patients), piperacillin-tazobactam alone can be used in oncology in this group of patients

Treatment of fever or sepsis in neutropenic patients

Fever of 38.3°C or more on one occasion, or 38.0°C or more sustained for 1 hour in a patient at risk of neutropenia e.g. post chemotherapy.

Never wait for results before starting IV antibiotics.
Refer to Trust Policy for Management of Infection in Neutropenic Patients.

Common Pathogen(s)
Gram positive pathogens; Gram negative pathogens which can lead to shock, multiorgan failure and death

Antibiotic - 1st line
Piperacillin-tazobactam 4.5g q8h IV
plus
Gentamicin* 5mg/kg q24h IV (adjusted body weight if obese - ie. if 20% over ideal body weight) (omit gentamicin in all oncology patients- unless signs of severe sepsis – see oncology policy CORP/PROT/323)
In renal impairment, use one single dose of Gentamicin only.
Review Gentamicin at 48 hours unless otherwise instructed.

Gentamicin: 5mg/ kg but for elderly patients or with moderate/severe renal impairment (CrCl<30ml/min), may require 3mg/ kg or shorter duration treatment.
Local decision to use combination of piperacillin-tazobactam and gentamicin outside NICE clinical guidance 151 on Neutropenic Sepsis due to local resistance pattern.

2nd Line/penicillin allergy of all severity as per Christie policy-link
Meropenem 1g IV 8 hourly (monitor closely if previous penicillin anaphylaxis)

11 MANAGEMENT OF MRSA INFECTIONS

All infections due to MRSA should be managed on an individual basis in discussion with Consultant Microbiologist or ID Physician during working hours and in accordance with individual sensitivity patterns. Empiric regimens are as below

Respiratory – MRSA infection

Body system	Treatment Choice	Comments
Acute exacerbation of COPD (Non-pneumonic LRTI) **Duration of therapy 7 days**	Doxycycline 100mg PO q12h **Or** Clindamycin PO 600mg q6h **plus** Sodium fusidate PO 500mg q8h	Treat according to culture and sensitivity Clindamycin should only be used if the strain is susceptible to erythromycin
Bronchiectasis **Duration of therapy 7 days**	Doxycycline 100mg PO q12h **plus** sodium fusidate PO 500mg q8h **Or** Clindamycin PO 600mg q6h **plus** Sodium fusidate PO 500mg q8h or Rifampicin PO 600mg q12h	Treat according to culture and sensitivity Clindamycin should only be used if the strain is susceptible to erythromycin Rifampicin and sodium fusidate should **NOT be used as monotherapy** but always in combination with another anti-MRSA agent. Discuss with Consultant Microbiologist before using regimes containing rifampicin
Pneumonia **Duration of therapy 2 weeks**	Vancomycin 1g q12h IV (modified according to renal function) +/- Sodium fusidate PO 500mg q8h or Rifampicin PO 600mg q12h	Consider stepping down to oral therapy once patient is clinically stable.

Urinary Tract – MRSA infection

Body system - MRSA	Treatment Choice	Comments
Urinary tract infections **Duration of therapy 7days**	Doxycycline PO 200mg q12h **Or** Trimethoprim PO 200mg q12h **Or** Nitrofurantoin PO 100mg q6h (for cystitis only)	Lack of data on the efficacy of vancomycin. Vancomycin NOT recommended due to lack of data on efficacy, cost, toxicity and availability of other oral agents

Eye Infections – MRSA infection

Body system	Treatment Choice	Comments
Superficial eye infections	Fusidic acid 1% MR eye drops One drop to be instilled into the affected eye (s) twice a day. Continue treatment for 2 days after symptoms have resolved	Discuss alternative treatment options with microbiology if failure to respond to treatment or resistance to fusidic acid.
Deep eye and CNS infections	Discuss with Ophthalmologist or Consultant Microbiologist for advice	

Skin and soft tissue infections – MRSA infection

Body system	Treatment Choice	Comments
Uncomplicated skin and soft tissue infections **Duration of therapy 7 days**	Doxycycline PO 100mg q12h	Not suitable for severe infections where there is a high risk of bacteraemia or endocarditis
Severe skin and soft tissue infections where there is a high risk of bacteraemia or endocarditis **Duration of therapy 2 weeks**	Vancomycin IV 1g q12h (modified according to renal function)	
Severe skin and soft tissue infections that have failed therapy with single active agents **Duration of therapy 2 weeks**	Vancomycin IV 1g q12h (modified according to renal function) **Or** Doxycycline PO 100mg q12h **plus** sodium fusidate PO 500mg q8h **Or** Doxycycline PO 100mg q12h **plus** rifampicin PO 600mg q12h	Treat according to culture and sensitivity results

IV infusion sites infections - MRSA

Body system	Treatment Choice	Comments
IV infusion sites infections **Line removal is the mainstay of treatment** **Duration of therapy is 2 weeks**	Remove the line Trimethoprim PO 200mg q12h **plus** rifampicin PO 600mg q12h **Or** Trimethoprim PO 200mg q12h **plus** Sodium fusidate PO 500mg q8h Or Vancomycin IV 1g q12h (modified according to renal function)	If severe infection e.g. pus, cellulitis or tunnel infection are present;urgent line removal

Bone and Joint infections - MRSA

Body system	Treatment Choice	Comments
Prosthetic Joint infection **Duration of therapy to be discussed with microbiology**	Vancomycin 1g IV q12h (modified according to renal function) **plus** rifampicin PO 600mg q12h **Or** Vancomycin IV 1g q12h (modified according to renal function) **plus** sodium fusidate PO 500mg q8h	Prolonged treatment often required
Bone and Joint Infections **Duration of therapy to be discussed with microbiology**	Vancomycin IV 1g q12h (modified according to renal function) **plus** rifampicin PO 600mg q12h **Or** Vancomycin IV 1g q12h (modified according to renal function) **plus** sodium fusidate PO 500mg q8h	Prolonged treatment often required Oral antibiotics should be chosen according to culture/sensitivity results and discussed with microbiology

For decolonisation regimes and further management of colonisation due to MRSA please follow the Procedure Management of Staphylococcus Aureus (MSSA/MRSA).

11.1 MRSA skin decolonisation regimes

The aim is not to eradicate, but to reduce the MRSA bio-burden to such a level that the cycle of colonisation to infection is prevented for the individual patient. Bio-burden reduction will also reduce patient-to-patient transmission of MRSA. The use of this regime without the removal of IV lines or urinary catheters will reduce the success. MRSA decolonisation prescription stickers are available on all wards.

11.2 Body procedure (Inpatient)

11.2.1 Chlorhexidine gluconate 4% (Hibiscrub®)

Bathe daily for 5 days. Moisten skin and apply to all areas with special attention to the axillae, groins and perineum, and any other areas with known carriage. Use as a shampoo twice in the 5 days period (day 1 and 2)

11.2.2 For patients with exfoliative skin conditions or allergy to chlorhexidine

Use Prontoderm as per (Elective Surgery)

11.3 Body procedure (Outpatient)

Prontoderm pack as per (Elective Surgery).

12 ANTIBIOTIC DOSE IN RENAL IMPAIRMENT

The following antibiotics may require dose adjustment in patients with reduced renal function. Recommendations are based on creatinine clearance (CrCl), which is an estimate of renal function (GFR).

Creatinine Clearance Calculator (click here)

Note: This calculation is based on the Cockcroft and Gault formula and is suitable for adults only. Creatinine Clearance is an estimation of GFR, but if the patient is morbidly obese, anuric or in acute renal failure, this equation will not give a true reflection of GFR.

Anuric patients can be assumed to have a CrCl<10mL/min.

For deep seated infections or multi-drug resistant organisms please discuss with a consultant microbiologist. The general advice on doses in renal impairment in the table below may not always be appropriate in these situations. Examples include, but are not limited to:

- **Meningitis**
- **Infective endocarditis**
- **Prosthetic joint infections**
- **Pacemaker infections**

Please bear in mind that sepsis can commonly cause acute kidney injuries. If this is likely, full doses of antibiotics without narrow therapeutic index may be used in the first 24hours and then adjust according to subsequent renal function.

This list is NOT exhaustive, but includes the most commonly used antibiotics at this Trust that require dose adjustment in renal impairment. Please refer to the electronic Medicines Compendium for advice on antibiotic doses in renal impairment if antibiotic not listed here.

13 TABLE OF ANTIBIOTIC DOSES IN RENAL IMPAIRMENT

The dosing regimes below are for patients who are not on dialysis. For dialysis patients, please consult pharmacy.

Antibiotic	GFR and Reduction 1	GFR and Reduction 2	GFR and Reduction 3
Aciclovir (IV)	**25-50mL/min:** 5-10mg/kg every 12 hours	**10-25mL/min:** 5-10mg/kg every 24 hours	**<10mL/min:** 2.5-5mg/kg every 24 hours
Aciclovir (oral)	**25-50mL/min:** Dose as in normal renal function	**10-25mL/min:** Herpes simplex 200mg 8 hourly or 6 hourly Herpes zoster 800mg 8 hourly or 12 hourly	**<10mL/min:** Herpes simplex 200mg 12 hourly Herpes zoster 400-800mg 12 hourly
Amoxicillin	**20-50mL/min:** Dose as in normal renal function	**10-20mL/min:** Dose as in normal renal function	**<10mL/min:** 250mg – 1g 8 hourly (max 6g per day in endocarditis)
Amphotericin (IV) Ambisome (liposomal)	**20-50mL/min:** Dose as in normal renal function	**10-20mL/min:** Dose as in normal renal function	**<10mL/min:** Dose as in normal renal function
Benzylpenicillin	**20-50mL/min:** Dose as in normal renal function	**10-20mL/min:** 600mg – 2.4g every 6 hours depending on severity of infection	**<10mL/min:** 600mg – 1.2g every 6 hours depending on severity of infection
Caspofungin	**20-50mL/min:** Dose as in normal renal function	**10-20mL/min:** Dose as in normal renal function	**<10mL/min:** Dose as in normal renal function
Cefalexin	**20-50mL/min**: Dose as in normal renal function	**10-20mL/min:** 250-500mg 8 hourly or 12hourly	**<10mL/min:** 250-500mg 8 hourly or 12hourly
Cefixime	**20-50mL/min:** Dose as in normal renal function	**10-20mL/min:** Dose as in normal renal function	**<10mL/min:** 200mg daily
Cefotaxime	**20-50mL/min:** Dose as in normal renal function	**5-20mL/min:** Dose as in normal renal function	**<5mL/min:** Reduce dose by 50% and keep the frequency the same
Ceftazidime	**31-50mL/min:** 1g-2g 12 hourly	**16-30mL/min:** 1-2g every 24hours	**6-15mL/min:** 500mg – 1g every 24hours <5ml/min: 500mg-1g 48 hourly
Ceftriaxone	**20-50mL/min**: Dose as in normal renal function	**10-20mL/min**: Dose as in normal renal function	**<10mL/min:** Dose as in normal renal function (maximum 2g daily)

Antibiotic	GFR and Reduction 1	GFR and Reduction 2	GFR and Reduction 3
Cefuroxime (IV)	**20-50mL/min**: Dose as in normal renal function	**10-20mL/min**: 750mg-1.5g 12 hourly	**<10mL/min:** 750mg-1.5g 24 hourly
Ciprofloxacin	**30-50mL/min:** Dose as in normal renal function	**10-30mL/min**: 50-100% of normal dose	**<10mL/min:** 50% of normal dose 100% of normal dose may be given for short periods in exceptional circumstances
Clarithromycin (IV)	**30-50mL/min:** Dose as in normal renal function	**10-30mLmin:** 250-500mg 12 hourly	**<10mL/min:** 250-500mg 12 hourly
Clarithromycin (oral)	**30-50mL/min:** Dose as in normal renal function	**10-30mL/min**: 250-500mg 12 hourly	**<10mL/min:** 250-500mg 12 hourly
Co-amoxiclav (IV)	**30-50mL/min:** Dose as in normal renal function	**10-30mL/min:** 1.2g 12 hourly	**<10mL/min:** 1.2g stat, then 600mg 8 hourly 1.2g BD can be used
Co-amoxiclav (oral)	**30-50mL/min:** Dose as in normal renal function	**10-30mL/min:** Dose as in normal renal function	**<10mL/min:** Dose as in normal renal function
Erythromycin	**20-50mL/min:** Dose as in normal renal function	**10-20mL/min:** Dose as in normal renal function	**<10mL/min:** Dose as in normal renal function
Ethambutol	**20-50mL/min**: Dose as in normal renal function	**10-20mL/min:** 15mg/kg every 24-36 hours Another option is 7.5-15mg/kg/day	**<10mL/min:** 15mg/kg every 48 hours Another option is 5-7.5mg/kg/day
Flucloxacillin	**20-50mL/min:** Dose as in normal renal function	**10-20mL/min:** Dose as in normal renal function	**<10mL/min:** Dose as in normal renal function up to a total daily dose of 4g
Fluconazole	**20-50mL/min:** 50-100% of normal dose	**10-20mL/min:** 50-100% of normal dose	**<10mL/min:** 50% of normal dose
Gentamicin	Refer to Gentamicin Monitoring Guidelines Summary Once Daily Gentamicin Traditional Multiple Daily Dosing gentamicin		
Isoniazid	**20-50mL/min:** Dose as in normal renal function	**10-20mL/min:** Dose as in normal renal function	**<10mL/min:** 200-300mg daily

Antibiotic	GFR and Reduction 1	GFR and Reduction 2	GFR and Reduction 3
Linezolid	**20-50mL/min:** Dose as in normal renal function	**10-20mL/min:** Dose as in normal renal function	**<10mL/min:** Dose as in normal renal function – but monitor closely
Meropenem	**26-50mL/min:** 500mg-2g 12 hourly	**10-25mL/min**: 500mg-1g 12 hourly or 500mg 8 hourly	**<10mL/min:** 500mg-1g 24 hourly
Metronidazole	**20-50mL/min:** Dose as in normal renal function	**10-20mL/min:** Dose as in normal renal function	**<10mL/min:** Dose as in normal renal function
Nitrofurantoin	**>45mL/min**: Dose as in normal renal function	**<45mL/min** - Contraindicated However, a short course (3 to 7 days) may be used with caution in certain patients with an eGFR of 30 to 44 ml/min/1.73m^2. Only prescribe to such patients to treat lower urinary tract infection with suspected or proven multidrug resistant pathogens when the benefits of nitrofurantoin are considered to outweigh the risks of side effects.	
Rifampicin	**20-50mL/min:** Dose as in normal renal function	**10-20mL/min:** Dose as in normal renal function	**<10mL/min:** 50-100% of normal dose
Sodium fusidate	**20-50mL/min:** Dose as in normal renal function	**10-20mL/min:** Dose as in normal renal function	**<10mL/min:** Dose as in normal renal function
Piperacillin-tazobactam	**40-50mL/min:** Dose as in normal renal function	**20-40mL/min**: 4.5g 8 hourly	**<20mL/min:** 4.5g 12 hourly
Teicoplanin	**>80mL/min:** Dose as in normal renal function	**30-80mL/min:** Give as normal for 4 days then on 5th day reduce dose by 50% **or** give current dose every 48 hours	**<30mL/min:** Give as normal for 4 days then on 5th day reduce dose by 66% **or** give current dose every 72 hours
Tigecycline	**20-50mL/min:** Dose as in normal renal function	**10-20mL/min:** Dose as in normal renal function	**<10mL/min:** Dose as in normal renal function
Trimethoprim	**25-50mL/min:** Dose as in normal renal function	**15-25mL/min:** Dose as in normal renal function	**<15mL/min:** 50-100% of normal dose
Vancomycin (IV)	**>70mL/min:** 1g BD	**30-70mL/min:** 1g OD	**<30mL/min:** As advised by Microbiology

14 ANTIBIOTIC ASSAYS

Patients receiving intravenous vancomycin, teicoplanin or an aminoglycoside (gentamicin, tobramycin and amikacin) need regular monitoring of serum antibiotic levels.

The Biochemistry department carry out the assays of serum antibiotic levels. All advice and enquires are dealt with by the Microbiology department, Antimicrobial Pharmacist or Pharmacy Medicines Information.

Assays for vancomycin and gentamicin are performed in house. Assays for amikacin, tobramycin and teicoplanin are currently sent away for testing at another laboratory. For assays that require sending away, try to ensure that specimens are collected during the normal working week; if specimens need to be done at weekends, prior arrangement is required.

Collection of blood for monitoring of therapeutic levels of antibiotics must be done from a peripheral vein. Specimens are collected into serum gel tubes (brown cap).

For aminoglycoside assays it is essential to indicate on the request form if the patient is on a once-daily dosing regimen, multiple-daily dosing regimen, or renal impairment regimen. The time the sample is taken and the time the last dose was administered must be stated on the sample bottle to avoid confusion and speed processing. This information should also be recorded in the patient's medical notes.

Patients receiving either aminoglycosides, vancomycin or teicoplanin MUST have their renal function checked at least twice weekly in stable renal function, or daily in patients with impaired or unstable renal function.

Vancomycin Monitoring Guidelines Summary (Adults)	
Introduction	Suspected or proven MRSA infections and other Gram positive organisms in penicillin allergic patients.
Dose regime **Creatinine clearance calculator**	CrCl >70mL/min 1g bd CrCl 30-70 mL/min 1g od CrCl <30mL/min 1g stat
Administration	Slow IV infusion in either Sodium chloride 0.9% or Glucose 5% over 2 hours (maximum rate 10mg/min).
What levels should I monitor?	**Pre-dose (trough) level** immediately prior to administration of dose There is NO need to routinely monitor peak vancomycin levels (for list of exceptions refer to policy on Intranet)
When should I take levels initially?	Twice daily dosing Check pre-dose level before 4th dose Once daily dosing Check pre-dose level before 2nd dose
When should I repeat levels?	If renal function remains stable Repeat pre-dose levels every 3-4 days If dose is adjusted Twice daily dosing – repeat trough level before 4th new dose then every 3-4 days Once daily dosing – repeat trough level before the 2nd new dose then every 3-4 days If renal function changes Contact Microbiology
Target assay levels	Pre-dose (trough) level 10-20mg/L In the case of severe infections such as endocarditis, pre-dose levels can be run at 15-20mg/L, as long a renal function is monitored regularly
Recommendations for dose adjustment	Pre-dose <10mg/L Dose increase or reduction in dosing interval (e.g. once daily to twice daily) required Pre-dose 10-20mg/L No dose adjustment necessary Pre-dose >20mg/L Dose reduction or increased in dosing interval (e.g. twice daily to once daily) required Beware of accumulation of vancomycin even though levels are still within range. This may require a dose reduction or increase in dosing interval.
Do I need to wait for the level to come back before I give the next dose?	No, not unless specifically advised
Further advice	Oncall microbiologist via bleep 774 or switchboard Antimicrobial Pharmacist bleep 448

Appendix 1: Extended interval gentamicin dosing guidelines summary (Adults) Click here for full guideline	
Introduction	**Preferred regimen for the treatment of Gram negative sepsis** Do NOT use extended interval dosing for the following groups of patients: (without discussion with pharmacist) • Bronchiectasis • Burns (>20% body surface area) • Cystic fibrosis • Ascites • Infective endocarditis • Renal impairment (Creatinine clearance <30mL/min), unstable or deteriorating renal function (see Renal dosing) • Renal dialysis
Dose regimen	Gentamicin dose = 5mg/kg (maximum 500mg) Use adjusted body weight if obese (ie. if 20% over ideal body weight) Round to nearest 20mg e.g.260mg if 50kg, 300mg if 60kg, 360mg if 70kg, 400mg if 80kg
Prescribing first dose	Check no previous dose given in last 24hours. May prescribe on regular antibiotics section and indicate on the drug chart the need to monitor Pre-dose Level before 2nd Dose
Administration	Dilute with 100mL sodium chloride 0.9% or glucose 5% and give by IV infusion over 30-60mins
What levels should I monitor?	**Pre-dose level** before 2nd dose (1-4 hours before next dose is due)
When should I take levels initially?	Check before 2nd dose due (unless single dose therapy)
Target assay levels	**Pre-dose level LESS THAN 1mg/L**
Recommendations for dose adjustment	**Normal pre-dose level (<1mg/L)** -Continue current regimen -Repeat pre-dose levels after 3-4 days if renal function remains stable **Pre-dose level 1-2mg/L (and renal function unchanged)** -Increase the dosing interval to 36-hourly **Pre-dose level greater than 2mg/L** -Omit any further doses of gentamicin and discuss with pharmacist -The need for gentamicin therapy MUST be reviewed If the patient cannot safely be maintained on an extended interval dosing regimen, consider the renal dosing regimen.
Do I need to wait for the level result?	**IF NORMAL and STABLE RENAL FUNCTION - Monitor pre-dose level before 2nd dose, GIVE 2nd dose and WAIT** for the result of the pre-dose level before prescribing and administering 3rd or subsequent doses
When should I repeat levels?	Check pre-dose levels every 3-4 days if renal function remains stable. Monitor pre-dose levels **daily** if adjustments are being made or if the patient is **renally impaired.**
How do I prescribe subsequent doses?	Subsequent doses may be prescribed on the regular section of the drug chart, and administration boxes MUST be marked to ensure the correct dosing interval is followed, and indicate when the next level is due.

Appendix 2: Renal gentamicin dosing guidelines summary (Adults) Click here for full guideline	
Introduction	This regimen should be used where the prescriber wishes to use an extended interval gentamicin dosing regimen for the treatment of Gram negative sepsis in patients WITH severe renal impairment (CrCl <30ml/min, but if <10ml/min - discuss with pharmacist) or elderly patients e.g. >70years
Dose regimen	Gentamicin dose = 3mg/kg (maximum 300mg) Use adjusted body weight if obese(ie. if 20% over ideal body weight) Round to nearest 20mg e.g.160mg if 50kg, 180mg if 60kg, 220mg if 70kg, 240mg if 80kg
Prescribing first dose	Check no previous dose given in last 24hours Prescribe the first dose on the "once only" section of the drug chart
Administration	Dilute with 100mL sodium chloride 0.9% or glucose 5% and give by IV infusion over 30-60minutes
What levels should I monitor?	**Pre-dose level** before 2nd dose (1-4 hours before next dose is due)
When should I take levels initially?	Check before 2nd dose due (unless single dose therapy)
Target assay levels	**Pre-dose level LESS THAN 1mg/L**
Recommendations for dose adjustment	**If level less than 1mg/L** • Prescribe 2nd dose on "once only" section of drug chart or regular section of the chart (but highlighting the need to wait for pre dose level before administration. • Repeat level 24 hours after dose administered (pre-dose before the next dose due) **If level 1mg/L OR greater than 1mg/L** • Do **NOT** prescribe any further doses • Repeat level 24 hours later • If level < 1mg/L, prescribe 2nd dose on "once only" section of drug chart or regular section of the chart (but highlighting the need to wait for pre dose level before administration . • If level still remains >1mg/L, keep repeating gentamicin level at periodic intervals until gentamicin level has fallen to <1mg/L **No further doses should be prescribed or administered until level is <1mg/L**
Do I need to wait for the level result?	**WAIT** for the result of the pre-dose level before prescribing and administering any subsequent doses
When should I repeat levels?	**DAILY** levels are required for patients on the renal gentamicin dosing regimen or those with unstable renal function.
How do I prescribe subsequent doses?	Subsequent doses may be prescribed on the **"once only"** section of the drug chart or regular section of the chart (but highlighting the need to wait for pre dose level before administration. Doses should only be administered once the pre-dose level is less than 1mg/L.
Continuation of treatment	If the patient requires gentamicin beyond 48 hours, this MUST be discussed with a Consultant Microbiologist during working hours. The risk of nephrotoxicity and ototoxicity increases with prolonged courses.

Appendix 3: Traditional multiple daily dosing guidelines summary (Adults) Click here for full guideline	
Introduction	Treatment of patients with endocarditis.
Dose regimen Creatinine Clearance calculator	1mg/kg (max 80mg) 12 hourly - modified according to renal function and level(round to nearest 20mg). Use adjusted body weight if obese(ie. if 20% over ideal body weight)
Prescribing first dose	Prescribe gentamicin at chosen dose and dose interval The dosing regimens recommended above are starting dose regimens only. Blood levels must be monitored to ensure target peaks and troughs are achieved.
Administration	IV bolus over 3-5 minutes. Dilution is not normally necessary.
What levels should I monitor?	Check Pre and Post dose levels around the 3rd or 4th dose. If renally impaired, check around the 2nd dose.
When should I take levels initially?	Check **pre-dose (trough) level around the 3rd or 4th dose** before administering the dose. Administer dose. There is no need to wait for pre-dose level to be reported before administering dose, unless instructed to do so by your ward pharmacist or Consultant Microbiologist. Check **one hour post-dose (peak) level around the 3rd or 4th dose**. Level to be taken one hour after completion of the bolus/infusion. If renally impaired, check around the 2nd dose. **Label your sample tubes and request form clearly with pre and post dose level as appropriate.**
Target assay levels	**Pre-dose (trough) level -less than 1mg/L for endocarditis** **One hour post dose (peak) level: 3-5mg/L for streptococcal or enterococcal infections e.g. endocarditis**
Recommendations for dose adjustment **Please contact your ward Pharmacist or Consultant Microbiologist for advice on changes to the dose and/or dosing interval.**	**Pre-dose levels:** **Normal pre-dose (<1mg/L)** - Regimen can be continued - Further pre-dose levels MUST be monitored twice weekly so long as renal function is stable **Pre-dose level is between 1-3mg/L (and renal function unchanged)** - Increase the dosing interval e.g. from 12-hourly to 24-hourly **Pre-dose greater than 3mg/L** - Further gentamicin doses MUST be withheld - Discuss with pharmacist before recommencing therapy **One-hour post-dose levels:** **Post-dose level is below the target range (<3mg/L)** - Gentamicin is sub-therapeutic - The dose should be increased **Post-dose level is above the target range (>5mg/L); pre-dose level is normal (<1mg/L)** - Reduce the dose **Both the post-dose (>5mg/L) and pre-dose (>1mg/L) levels are above the target range** - The next dose(s) MUST be omitted - Discuss with pharmacist before recommencing therapy

15 QUICK REFERENCE GUIDELINES FOR THE MANAGEMENT OF ADULTS WITH AN ABSENT OR DYSFUNCTIONAL SPLEEN

Please see separate Protocol on 'Vaccination and antimicrobial prophylaxis for patients undergoing elective or emergency splenectomy or those who are asplenic or have a dysfunctional spleen' on the trust intranet site under the document library

15.1 Adult splenectomy antibiotic prophylaxis if NBM following surgery

- If NBM following surgery give Benzylpenicillin 1.2g IV 12 hourly UNLESS allergy or patient already receiving antibiotics with appropriate cover, discuss with Microbiology if unsure during working hours.

16 ATTACHMENTS	
Appendix Number	**Title**
Appendix 1	Equality Impact Assessment

17 PROCEDURAL DOCUMENT STORAGE (HARD AND ELECTRONIC COPIES)
Electronic Database for Procedural Documents
Held by Procedural Document and Leaflet Coordinator

18 LOCATIONS THIS DOCUMENT ISSUED TO		
Copy No	**Location**	**Date Issued**
1	Intranet	21/12/2017
2	Wards, Departments and Service	21/12/2017

19 OTHER RELEVANT / ASSOCIATED DOCUMENTS	
Unique Identifier	**Title and web links from the document library**

20 SUPPORTING REFERENCES / EVIDENCE BASED DOCUMENTS
References In Full
British National Formulary. December 2014 https://www.medicinescomplete.com/mc/bnf/current/PHP3268-ear-nose-and-oropharynx.htm <accessed 18/12/14>
Public Heath England. Management of Infection Guidance for Primary Care for Consultation and Adaption Oct 2014
Public Health England. Updated guidance on the management and treatment of Clostridium difficile infection. May 2013
BTS. Guidelines for the management of community acquired pneumonia in adults update 2009 a quick reference guide
Masterton RG, Galloway A, et al. Guidelines for the management of hospital-acquired pneumonia in the UK:Report of the working party on hospital-acquired pneumonia of the british society for antimicrobial chemotherapy. JAC (2008) 62, 5-34
Gould F, Denning D, et al. Guidelines for the diagnosis and antibiotic treatment of endocarditis in adults: a report of the working party of the british society for the antimicrobial chemotherapy. http://jac.oxfordjournals.org/ <accessed 14/11/2011>
Sandoe J, Barlow G, et al. Guidelines for the diagnosis, prevention and management of implantable cardiac electronic device infection. Report of a joint working party project on behalf of the british society for antimicrobial chemotherapy , british hearth rhythm society, british cardiovascular society, british heart valve society and british society for echocardiography. http://jac.oxfordjournals.org/ <accessed 29/10/14>
BASSH guidelines. http://www.bashh.org/BASHH/Guidelines/Guidelines/BASHH/Guidelines/Guidelines.aspx accessed <12/11/14>
Drug allergy: diagnosis and management of drug allergy in adults, children and young people. NICE clinical guideline 183. September 2014. <Accessed 9.1.14> http://www.nice.org.uk/guidance/cg183/resources/guidance-drug-allergy-diagnosis-and-management-of-drug-allergy-in-adults-children-and-young-people-pdf
http://www.pharmaceutical-journal.com/learning/learning-article/penicillin-allergy-identification-and-management/20069170.article <Accessed 28/10/16>

21 CONSULTATION / ACKNOWLEDGEMENTS WITH STAFF, PEERS, PATIENTS AND THE PUBLIC

Name	Designation	Date Response Received
Dr Hendrikse	Consultant Haematologist	
Dr Sweeney	Consultant - GUM	
Dr Luckie	Consultant cardiologist	
Dr Saba	Consultant – Respiratory and CF	

22 DEFINITIONS / GLOSSARY OF TERMS

CDI	C. difficile infections
SIRS	Systemic Inflammatory Response Syndrome

23 AUTHOR / DIVISIONAL / DIRECTORATE MANAGER APPROVAL

Issued By	Michelle Wong	**Checked By**	Vanya Fidling
Job Title	Lead Pharmacist - Antibiotics, Pharmacy	**Job Title**	Deputy Director of Pharmacy
Date		**Date**	

APPENDIX 1: EQUALITY IMPACT ASSESSMENT FORM

Department	Pharmacy	**Service or Policy**	CORP/GUID/309	**Date Completed:**	October 2014

GROUPS TO BE CONSIDERED

Deprived communities, homeless, substance misusers, people who have a disability, learning disability, older people, children and families, young people, Lesbian Gay Bi-sexual or Transgender, minority ethnic communities, Gypsy/Roma/Travellers, women/men, parents, carers, staff, wider community, offenders.

EQUALITY PROTECTED CHARACTERISTICS TO BE CONSIDERED

Age, gender, disability, race, sexual orientation, gender identity (or reassignment), religion and belief, carers, Human Rights and social economic/deprivation.

QUESTION	**RESPONSE**		**IMPACT**	
	Issue	Action	Positive	Negative
What is the service, leaflet or policy development? What are its aims, who are the target audience?	Formulary for staff			
Does the service, leaflet or policy/ development impact on community safety • Crime • Community cohesion	No			
Is there any evidence that groups who should benefit do not? i.e. equal opportunity monitoring of service users and/or staff. If none/insufficient local or national data available consider what information you need.	No			
Does the service, leaflet or development/ policy have a negative impact on any geographical or sub group of the population?	No			
How does the service, leaflet or policy/ development promote equality and diversity?	No			
Does the service, leaflet or policy/ development explicitly include a commitment to equality and diversity and meeting needs? How does it demonstrate its impact?	No			
Does the Organisation or service workforce reflect the local population? Do we employ people from disadvantaged groups	No			
Will the service, leaflet or policy/ development i. Improve economic social conditions in deprived areas ii. Use brown field sites iii. Improve public spaces including creation of green spaces?	No			
Does the service, leaflet or policy/ development promote equity of lifelong learning?	No			
Does the service, leaflet or policy/ development encourage healthy lifestyles and reduce risks to health?	No			
Does the service, leaflet or policy/ development impact on transport? What are the implications of this?	No			
Does the service, leaflet or policy/development impact on housing, housing needs, homelessness, or a person's ability to remain at home?	No			
Are there any groups for whom this policy/ service/leaflet would have an impact? Is it an adverse/negative impact? Does it or could it (or is the perception that it could exclude disadvantaged or marginalised groups?	No			
Does the policy/development promote access to services and facilities for any group in particular?	No			

APPENDIX 1: EQUALITY IMPACT ASSESSMENT FORM

Does the service, leaflet or policy/development impact on the environment 3. During development 4. At implementation?	No			

ACTION:			
Please identify if you are now required to carry out a Full Equality Analysis	**Yes**	**No**	**(Please delete as appropriate)**

Name of Author: **Signature of Author:**	**Michelle Wong**	**Date Signed:**	**October 2014**
Name of Lead Person: **Signature of Lead Person:**		**Date Signed:**	
Name of Manager: **Signature of Manager**		**Date Signed:**	