The Pennine Acute Hospitals NHS Trust

Antibiotic Policy for Adult Patients

Empirical Antimicrobial therapy for common infections and surgical prophylaxis

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Pennine Acute Hospitals NHS Trust

Antibiotic Policy for Adult Patients 2011

Main Revisions from previous issue	
Name of Previous Document:	Antibiotic Policy for Adult Patients
Previous Document Number:	EDT 007
Previous Version Number:	Version 3.4
Reason for Revision:	From Version 3.4 Section 13 – Central / Long line – rephrase as follow *" Remove colonised line if feasible and send line tip to Pathology Laboratory for culture and sensitivity"* Section 25 – Diabetic Foot Infections Section 28 – Rephrase Vancomycin level monitoring recommendation for CrCL < 30ml/min or on dialysis Section 32 – MRSA decolonisation regime – added "please refer to the MRSA Policy"

CONTENTS

1. Introduction

1.1 The Pennine Acute Hospital NHS Trust (PAHT) is committed to promote safe, effective and economical use of antimicrobials. As part of our ongoing strategy to reduce the hospital-acquired associated infections (HCAIs), we are committed to reduce the cephalosporins usage in our Trust in an attempt to reduce the *C. difficile* infection rates. The 2008 version of Antibiotic Policy was reviewed to this effect. The use of cephalosporins are now restricted for use in treatment of central nervous system (CNS) infections and other exceptional cases on the advice and approval of the Microbiology Team. We are now extending the restriction to surgical prophylaxis and the newly approved guidelines are now included in this version.

Quinolones e.g. ciprofloxacin and levofloxacin are also known as a high risk class of antibiotic for causing *C. difficile* infection. Therefore, they must be used with extreme caution.

2. Policy Aims

2.1 The aim of this Policy is to provide empirical treament guidelines for infections that are commonly encountered in the hospital settings. This Policy is by no means comprehensive. In difficult, complicated situations, prescribers are advised to consult a senior colleague and/or a Microbiologist or ID Physician (contact via Switchboard during out-of-hours). Whenever possible, specimens for microbiological examination should be obtained before starting therapy. Blood cultures are an essential part of the initial work-up of a febrile patient.

2.2 In many situations antibiotics are administered empirically when the precise aetiological agent and its antimicrobial susceptibilities are unknown. The empirical choice of antimicrobial must be reviewed and modified accordingly when the definite pathogen has been identified.

2.3 A quick summary chart has been devised to illustrate the empirical therapy recommended for the commonest types of infections, (See Appendix II).

2.4 This Policy also aims at promoting timely IV to oral antibiotic switch.

2.5 This Policy includes guidelines for therapeutic drug monitorings (TDM) to ensure antibiotics that have narrow-therapeutic index and require level montorings are used safely and effectively.

2.6 The Surgical Antibiotic Prophylaxis section has now incorporated in this version.

3. Scope

3.1 This Policy refers to all adult patients in all clinical areas. Specialist advice should be sought for treatment of pregnant women as some recommended

antibiotic treatment choice may not be appropriate for this group of patients.

3.2 All doses stated are for guidance only and relate to adults of adverage body weight, normal renal and hepatic functions. Therefore, dosage adjustment may be necessary for patients with renal and hepatic impairment. Please contact the Pharmacy and/or Microbiology Departments to discuss doses for specific cases.

4. Roles And Responsibilities

4.1 All medical staff must adhere to this Policy and prescribe the most appropriate choice of antibiotic as the empirical therapy, unless the definite causative pathogen and its sensitivities are known. However, consideration must be given to recent exposure to any antibiotics, drug allergy status, renal and hepatic functions, recent Microbiology reports on sensitivities if available, MRSA status, previous histroy of *C. difficile* infection etc.

4.2 All medical staff must review the Microbiology reports and make the appropriate modification to the empirical therapy in light of the definitive sensitivity reports.

4.3 All medical staff must consider its necessity before initiating a patient on IV antibiotic. Once initiated, the medical staff must review the IV therapy daily for timely IV to oral antibiotic switch when clinically feasible, except in cases of severe high risks infections.

4.4 All medical staff must review treatment duration to avoid unduly prolonged treatment courses.

4.5 Pharmacists will assist the the medical staff for the monitoring and interpretion of drug serum levels for some antibiotics that require therapeutic drug montorings (TDM).

4.6 Medical staff and Pharmacists must ensure that antimicrobials on the Restricted List must receive appropriate approval from the Microbiology / ID Physicians.

4.7 The Antibiotic Working Group (AWG) will review the Policy every three years, in consultation with the Consultants or earlier in light of any new clinical evidence or changes of national guidance.

4.8 All Consultants must advise the AWG of any treatment changes in their specalist clinical areas to ensure the Policy is kept up-to-date.

5. Implementation

5.1 Dissemination

5.1.1 This Policy will be uploaded on the Intranet via the Document Controller,

which will be announced in the weekly bulletin.

5.2 Training Arrangements

5.2.1 It will be mentioned on Doctors' Induction days and prescribers will be encouraged to refer to the Antibiotic Policy. More intricate training sessions will be arranged in due course.

6. Monitoring Arrangement

6.1 Audits will be carried out to monitor the compliance with the Policy. They will be prioritised according to the Divisional needs and Infection Control and Prevention Agenda. The Antibiotic Working Group will be liaising with the Clincial Audit Department to ensure the priority topics will be added to the Annual Audit Forward Programme for Microbiology / Pharmacy. Examples of the ongoing audits are as follow: -

- Six monthly point prevalence audits to be carrried out by the Microbiology Team and results will be reported to the HCAI Board and Antimicrobial Management Team.

- Weekly ward visit / audits to be carried out by the Microbiology Team to assess compliance with the Antibiotic Policy and appropriateness for the selected therapy (frequency varies depending on site).

- Twice yearly C. Diffiicle Infection audit to be carried out by the Microbiology Team. Results of which will be reported to the HCAI Board, Antimicrobial Management Team and the Clinical Governance Meeting.

- In addition, other ad hoc audits will be identified and commissioned as situation arises.

6.2 Ward pharmacists must query any non-compliance with the Policy on their routine ward visit and refer to the Microbiologist for advice if necessary.

7. Review Arrangement

7.1 Three yearly as recommnended but earlier in view of any new clinical evidence changes of national guidance.

8. References

I. SIGN Guidelines (2008)

II. BNF 61 March 2011.

III. Burden HP, Ranasinghe W, Persad R. Antibiotics for Transrectal Ultrasonography-guided Prostate Biopsy: Are we practising evidence based medicine? *BJU Int*. 2008; 101: 1202 – 1204

IV. Pennine Acute Hospital NHS Trust Policy – Prescribers' Update – Penicillin Allergy May 2009 (Document No. EDT 010)

V. BTS Guideline for the management of community-acquired pneumonia in adults 2001 and 2004 update.

VI. The Green Book (Dec 2010)

VII. GMCCN Neutropenic Sepsis Policy Nov 2010 via this link: http://www.gmccn.nhs.uk/hp/OurWork/Pharmacy/Downloads

9. Contact Names & Numbers

Microbiology Secretary	Oldham	Ext 71641
Microbiology Laboratory		Ext: 78360
<u>Microbiologists</u>		
Microbiology SpR	Oldham / NMGH	Ext: 78362 / 43794 or Bleep 3007
Dr H Panigrahi Consultant Microbiologist	North Manchester	Ext: 43162 / 71644
Dr R Burman Consultant Microbiologist	Fairfield	Ext: 82429 / 75059
Dr I Cartmill Consultant Microbiologist	Rochdale	Ext: 78056
Dr N Khattak Consultant Microbiologist.	Oldham	Ext: 71643
Out-of-Hours		Contact Switchboard
<u>Others</u>		
ID Physician	North Manchester	via Switchboard
Cathy Chow Lead Antimicrobial Pharmacist	NMGH	Bleep 4468

10. Restricted List

10.1 The following antibiotics can only be prescribed following discussion with the Consultant Microbiologist or ID Physician:

- Amikacin
- Caspofungin
- IV Cephalosporins i.e. cefotaxime, cefuroxime, ceftriaxone, oral cefalexin – unless indicated in the Antibiotic Policy
- Daptomycin

- IV Ciprofloxacin (unless oral route is compromised)
- Linezolid
- Meropenem
- Tigecycline
- Tobramycin
- Voriconazole (or Haematologist approval)

11. Penicillin / Beta-Lactam Allergy (Ref: EDT 010)

The full document is available on the 'Pennine Prescribers Update' part of the 'Pharmacy' section of the 'Documents' page of the intranet or by clicking on the link below:
http://nww.pat.nhs.uk/portalVBVS/Default.aspx?tabindex=3&tabid=560&pnode=1&cnode=29&snode=0&seltype=2

11.1 It is not uncommon that patients who are labelled to be "penicillin-allergic" are not truly allergic to penicillin antibiotics. Patients who have a vague history of symptoms or symptoms of gastro-intestinal intolerance such as nausea, vomiting, diarrhoea probably do not have a true penicillin allergy. The consequence of which is that these patients will be restricted with limited choices of antibiotics for treatment of an infection. It is especially important when penicillins and other penicillin-related antibiotics are unnecessarily withheld from these patients when they are being treated for a severe infection, which may subsequently affect their clinical outcomes.Therefore, every effort should be made to establish the significance of the alleged penicillin-allergy by asking the following questions and they must be documented for future references:

a. Which antibiotic was taken?
b. When did the event happen?
c. What actually happened?
d. What are the symptoms?

11.2 General hypersensitivity reactions to penicillins, such as rashes occur in 1-10% of exposed individuals. Anaphylactic reactions, which can be fatal, occur in less than 0.05% of the treated patients. Please note that patients who have a vague a history of symptoms, or symptoms of gastro-intestinal intolerance are probably not truly allergic to penicillins.

11.3 Patients with a history of anaphylaxis, urticaria, angioedema or rash that occurs immediately after penicillin administration are at risk of further immediate hypersensitivity reactions and they should **NOT** receive further doses of penicillin or beta-lactam antibiotics. However, third generation cephalosporins and carbapenems may be used with caution.

11.4 Patients with a history of minor rash (non-confluent & restricted to a small body area), or a rash that occurs more than 72 hours after penicillin administration are probably not allergic to penicillin. In these patients, penicillins or other beta-lactam related antibiotics should not be withheld for

treatment of serious infections. In the hospital setting, using cephalosporins or carbapenems in such patients is not unreasonable. However, facilities and medications for resuscitation should be immediately available.

12. IV To Oral Antibiotic Switch Guideline

12.1 Introduction

Consider if initiating IV antibiotic is necessary as oral equivalent may suffice for most infections.

In general, I/V antibiotics should **ONLY** be started and continued when: -

- There is no equivalent oral formulation or alternative for the IV antibiotic, or
- Immediate attainment of high antibiotic serum levels is required, or
- Treating severely ill patients empirically, or
- Patients whose oral route is compromised, e.g.
  - Nil by mouth
  - Mechanical swallowing disorder
  - Unconscious
  - Intractable vomiting
  - Reduced GI absorption (e.g. severe diarrhoea, steatorrhoea, short bowel syndrome)

Review all IV antibiotic therapy at **24 hours** after starting and switch to oral therapy if the criteria listed in **Section 12.2** are fulfilled.

Please refer to the Flow Chart *(Appendix I)* for a quick guidance on IV to Oral Antibiotic Switch.

12.2 Criteria For an "Oral"Switch

The following criteria should be considered for "Oral" Switch: -

- Not suffering from any specific high-risk infection requiring prolonged course of IV antibiotic therapy e.g. Meningitis, infective endocarditis, septic arthritis, osteomyelitis, deep abscess. ***(See Section 12.4)***
- Clinically improving on IV therapy, e.g.
  - Improving WBC
  - Body temperature trending normal
  - Improving CRP
  - Improving signs and symptoms of infection
- Absorption not compromised
- Ability for oral intake of medications

Please consult *the Antibiotic Policy for Adult patients*, Micro lab results or Microbiologist on the appropriate choice of oral antibiotic for the "Switch", or see ***Section 12.3*** for common switches.

12.3 Timing of Switch

Most patients do not require any IV antibiotic therapy as oral equivalent may suffice.

The majority of patients with a severe infection requiring an IV antibiotic initially can safely be "switched" to an oral therapy after **24 hours** if they are clinical improving, unless continued I/V therapy is clinically indicated for a specific group of High-Risk Infections. ***(Refer to Section 12.4)***

Patients on IV antibiotic therapy should be reviewed daily and "switched" to an appropriate choice of oral antibiotic as soon as clinically feasible if the criteria for an oral switch are fulfilled.

The oral switch can be a direct switch to an oral formulation of the same antibiotic or an appropriate alternative choice of antibiotic - refer to the Micro sensitivity reports.

Prescribers must bear in mind that the empirical choice of IV or oral antibiotic may be affected by the Microbiology results therefore the choice of treatment may need to be modified accordingly.

Narrow-spectrum antibiotics are preferred to broad-spectrum group of antibiotics, when Microbiology sensitivity results are known.

The following table provides a guideline for common oral "Switch" but always check the Microbiology lab results and current Antibiotic Policy before the switch as the choice is dependent upon the site of infection and the sensitivities. The recommended dosages are for patients with normal renal and hepatic functions :-

IV	ORAL
Amoxicillin	Amoxicillin 500mg – 1g TDS
Benzylpenicillin	For skin and soft tissues infections: high doses of flucloxacillin 500-1g QDS alone For other conditions – Consult Microbiologists
Co-amoxiclav	Co-amoxiclav 375 - 625mg TDS

IV	ORAL
Flucloxacillin	Flucloxacillin 500mg – 1g QDS
Gentamicin	Ciprofloxacin 500mg BD, (or 750mg BD if Pseudomonal spp isolated)
Ciprofloxacin 200mg BD 400mg BD	Ciprofloxacin 250-500mg BD Ciprofloxacin 500mg BD, (or 750mg BD if Pseudomonal spp isolated)

Clarithromycin	Erythromycin 500mg QDS, *(or Clarithromycin 500mg BD if intolerant)*
Metronidazole	Metronidazole 400mg TDS
IVantibiotics for surgical prophylaxis → usually appropriate to stop without changing to oral therapy for clean or clean-contaminated surgeries if without post-operative complications	

Piperacillin / tazobactam	Seek Microbiologist advice
Teicoplanin	Seek Microbiologist advice
Vancomycin	Seek Microbiologist advice. N.B. Oral Vancomycin is **NOT** indicated for systemic infection as not absorbed from gut

12.4 Indications for Continuing IV Antibiotic Therapy

Prolonged IV duration is clinically indicated in **Specific High-Risk Infections**: *Examples:*

Meningitis	Infective Endocarditis
Septicaemia	Febrile with neutropenia / neutropenic sepsis
Infected implants/prostheses	Exacerbation of cystic fibrosis
Intracranial abscess/infection	*Deep abscess and empyema
Mediastinitis	*Liver abscess
Severe or necrotising soft tissue infection (including severe cellulitis)	*Septic arthritis
	*Osteomyelitis

* For **osteomyelitis, septic arthritis, adequately drained abscess or empyema, and liver abscess**, the IV antibiotic course may be switched to oral therapy after the **initial two weeks of IV therapy** to complete the prolonged course of treatment, if clinically improving. Please discuss with a Microbiologist for prolonged IV course or advice on the oral switch.

For immunocompromised patients and those on long term immunosuppressant therapy –
decision on IV duration is based upon patient's immune status and clinical response.

Continuing sepsis with no clinical improvement or deteriorating conditions on IV therapy as judged by the following infection indicators: -

- Body temp
- Blood pressure
- WBC
- Heart rate
- Respiratory rate
- CRP

Require Senior clinical review and seek Microbiologist advice on choice of antibiotics.

Oral route compromised with no other alternative route for administration e.g. NG tube, PEG.

12.5 Oral Route is Preferred

A number of antibiotics have **GOOD** oral bioavailability that are comparable to their IV formulation. Therefore, oral formulation is preferred to IV when oral route is not compromised, e.g.

- Clindamycin
- Co-trimoxazole
- Fluconazole
- Metronidazole
- Quinolones e.g ciprofloxacin, levofloxacin
- Rifampicin
- Sodium fusidate

} Must **NOT** be used alone due to rapid emergence of resistance

N.B. Avoid using sodium fusidate IV if possible as likely to cause LFTs disturbances.

Many antibiotics are available in liquid formulation. A pharmacist can advise on an alternative route of oral administration if necessary.

The overall decision for the "Oral Switch" is based upon clinician's clinical judgment on patients clinical conditions.
Please contact the Microbiologist for further advice and guidance.

13. Septicaemia

13.1 Assess immune status, search for focus of infection, take blood culture, MSU, stool culture and throat swab prior to starting therapy.

13.2 A single set (2 bottles) taken at any one time is sufficient to identify culture positive cases. In the event of suspected bacterial endocarditis three sets are recommended but should be taken from different sites at different times and not inoculated from the same specimen. In the event of septicaemia involving possible sepsis from a central line two sets should be inoculated; one set from blood taken through the central line and the other from a peripheral vein.

Commence antibiotic therapy within AN HOUR from diagnosis of acute sepsis – "*Door to Needle Times*"

Infections	Recommended Treatment	Alternative
Initial blind therapy for unknown origin	**Severe:** Piperacillin / tazobactam IV 4.5g TDS *Plus* Gentamicin IV 7mg / kg based on ideal body weight (see Once-daily dosing guidance) IF MRSA is of concern: Add Vancomycin IV 1g BD *Target pre-dose level = 10-15mg/L* **Moderate:** Co-amoxiclav IV 1.2g TDS *Plus* Stat dose of Gentamicin IV 7mg / kg based on ideal body weight *(then review if continuation is necessary)*	Vancomycin IV 1g BD *Caution in renal impairment* *Target pre-dose level = 10-15mg/L* *Plus* Gentamicin IV 7mg / kg based on ideal body weight (see Once-daily dosing guidance) *Plus* Metronidazole IV 500mg TDS OR Teicoplanin IV 400mg BD on day 1 then 400mg daily (if < 80 kg) or dose at 6mg/kg if > 80 kg *Plus* Gentamicin IV 7mg / kg based on ideal body weight (see Once-daily dosing guidance) *Plus* Metronidazole IV 500mg TDS
A Carbapenem can only be started after discussion with Consultant Microbiologist / ID Physician / Haematologis		

Infections	Recommended Treatment
Central / Long line **Common organism: Coagulase negative staphylococci, diphtheroid organisms**	Remove colonised line if feasible and send line tip to Pathology Laboratory for culture and sensitivity. Vancomycin IV 1g BD *Target pre-dose level = 10-15mg/L* *Plus* Gentamicin IV 7mg / kg based on ideal body weight (see Once-daily dosing guidance) Review Micro lab results

Infections	Recommended Treatment	Alternative
Immuno-suppressed / neutropenic sepsis **(See flow chart on Page 17)**	Piperacillin / tazobactam IV 4.5g TDS + / - Gentamicin IV 7mg / kg based on ideal body weight. Max 480mg. (see Once-daily dosing guidance) Avoid Gentamicin in severe renal impairment or recent platinum based chemotherapy within the last 7 days.	For penicillin allergy, poor renal function or patients receiving platinum based chemotherapy within the last 7 days: **Meropenem IV 1g TDS**
Reference: GMCCN Neutropenic Sepsis Policy Nov 2010 via this link: http://www.gmccn.nhs.uk/hp/OurWork/Pharmacy/Downloads		
Oral Therapy	Augmentin PO 625mg TDS Plus Ciprofloxacin PO 500mg BD (or according to sensitivity results)	Consult Microbiologist or Haematologist for advice
In severe abdominal/pelvic sepsis **Common Organisms Gram negative bacilli Anaerobes and faecal Streptococci**	Piperacillin / tazobactam IV 4.5g TDS + / - Gentamicin IV 7mg / kg based on ideal body weight. Max 480mg. (see Once-daily dosing guidance)	Discuss with Consultant Microbiologist.

Infections	Recommended Treatment	Alternative
Urological sepsis	Co-amoxiclav IV 1.2g TDS + / - Gentamicin IV 7mg / kg based on ideal body weight (see Once-daily dosing guidance)	Ciprofloxacin IV 400mg BD + / - Gentamicin IV 7mg / kg based on ideal body weight (see Once-daily dosing guidance)
Oral Therapy	Consult Micro lab results for choice of treatment	
Biliary Tract	Co-amoxiclav IV 1.2g TDS + / - Gentamicin IV 7mg / kg based on ideal body weight (see Once-daily dosing guidance)	Ciprofloxacin IV 400mg BD *plus* Metronidazole IV 500mg TDS
Oral Therapy	Co-amoxiclav PO 625mg TDS	Ciprofloxacin PO 500mg BD plus Metronidazole PO 400mg TDS
Soft Tissue Infection	Benzylpenicil lin IV 1.2g – 2.4g QDS plus Flucloxacillin IV 1-2g QDS + / - Gentamicin IV 7mg / kg based on ideal body weight (see Once-daily dosing guidance)	Vancomycin IV 1g BD *Target pre-dose level = 10-15mg/L* plus Clindamycin IV 600mg QDS + / - Gentamicin IV 7mg / kg based on ideal body weight (see Once-daily dosing guidance)

Management of Infection in Neutropenic Patients at Pennine Acute Hosptials NHS Trust

Suspect an infection in patients with:

Pyrexia:
>38°C on a single reading,
or
37.7°C on two occasions, 1 hour apart.

Symptoms:
Unexplainably unwell, or
Rigors, Hypotension, Confusion, or
Unexplained nausea and vomiting even in the absence of pyrexia

Investigation Required: -

1. Blood taken from peripheral vein and central line (if present) for bacterial and fungal cultures.
2. Cultures for sputum and urine
3. Swabs from any infected area on skin and from throat if any evidence of mucositis.
4. Culture for faeces if any diarrhoea. Sample for CDT if recently on antibiotic therapy.
5. Chest x-ray. (should be done during working day unless present with significant respiratory symptoms)
6. Commence antibiotic therapy within **AN HOUR** from diagnosis – "*Door to Needle Times"*

FIRST LINE:
Piperacillin/tazobactam IV 4.5G TDS
and
Gentamicin IV 7mg / kg based on ideal body weight. Max dose 480mg. (see Once-daily dosing guidance)

SECOND LINE for penicillin allergy, poor renal function or patients receiving platinum based chemotherapy within the last 7 days:
Meropenem IV 1g TDS

If there is suspicion of MRSA or line related sepsis, add **Vancomycin** IV 1g BD, dosage to be modified according to renal function and level monitoring is required – see Guidelines.

Amend antibiotics according to culture and sensitivity reports. If culture negative and pyrexia persists after 24 – 48 hours, discuss with Consultant Haematologist or Microbiologist

If cultures remain negative and pyrexia persists after further 48 hours – particularly in patients with prolonged severe neutropenia, repeat cultures and add:
Ambisome (Amphotericin) iv 3mg/kg Daily

Metronidazole IV 500mg 8 hourly may be useful in patients with evidence of oral, abdominal or perianal infections; **Vancomycin IV or Teicoplanin IV** for skin or oral infection; **Aciclovir IV/oral** if herpetic infection is evident.

G-CSF s/c should be considered in infection associated with severe neutropenia (ANC <0.5 X 10^9/L), particularly following chemotherapy and if evidence of fungal infection, pneumonia, hypotension or multi-organ dysfunction.

Patients should be monitored closely for hypotension associated endotoxaemia following initiation of antibiotic therapy. Careful attention to hydration and renal function is required.

Antibiotics should be continued until signs of infection have resolved and patient has been apyrexial for 3 consecutive days (minimum of 7 days treatment). Ambisome is to be continued until neutrophils are recovered.

Contact consulant haematologist and microbiologist for further advice on treatment, investigation and prophylaxis.

14. Central Nervous System Infections

14.1 Meningitis

Take throat swab, blood culture and CSF (if lumbar puncture can be safely done). EDTA blood specimen for PCR if meningococcal meningitis suspected.

The likely infecting organisms in adults/older children are Pneumococcus or Meningococcus.

The incidence of Haemophilus meningitis is now low due to HIB vaccination in the childhood vaccination program.

Inform Public Health Doctor on call if meningococcal meningitis/septicaemia suspected.

Causative Bacteria	Recommended Treatment	Alternative for penicillin allergy
Meningococcus	*Ceftriaxone IV 2g BD *Or* *Benzylpenicillin IV 2.4g 4 hourly in severe cases. Treat for at least 7 days *Add Dexamethasone IV 0.15mg/kg every 6 hrs for 4 days, start with or shortly before the first dose of antibiotic. Discontinue if not pneumococcal meningitis. Give Ciprofloxacin PO 500mg STAT to eliminate nasopharyngeal carriage if patients **NOT** treated with Ceftriaxone.	Chloramphenicol IV 12.5-25mg/kg every 6 hours **DISCUSS WITH MICROBIOLOGIST OR ID BEFORE INITIATING TREATMENT**

Causative Bacteria	Recommended Treatment	Alternative for penicillin allergy
Pneumococcus	*Ceftriaxone IV 2g BD Treat for 10 – 14 days *Add Dexamethasone IV 0.15mg/kg every 6 hrs for 4 days, start with or shortly before the first dose of antibiotic. Substitute Benzylpenicillin if organism is highly penicillin-sensitive. Add Vancomycin and if necessary, Rifampicin for highly penicillin - and cephalosporin resistant – Discuss with Microbiologist / ID	Chloramphenicol IV 12.5-25mg/kg every 6 hours **DISCUSS WITH MICROBIOLOGIST OR ID BEFORE INITIATING TREATMENT**
Haemophilus Influenzae	*Ceftriaxone IV 2g BD *Add Dexamethasone IV 0.15mg/kg every 6 hrs for 4 days, start with or shortly before the first dose of antibiotic. Discontinue if not pneumococcal meningitis.	
Listeria	Refer to Microbiologist or ID physician for advice	

14.2 Prophylaxis for close contacts of Meningococcal Disease

***Ref*: http://www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1194947389261**

Prophylaxis should be given to all close/household contacts of the patient. It is important that all family members should have prophylaxis at the same time, so that the organism may be eradicated 'at a stroke'. Health workers need prophylaxis only when engaged in mouth-to-mouth resuscitation of the patient. Take advice from the Microbiology or Public Health.

Ciprofloxacin is the treatment of choice for all ages and in pregnancy, but is contraindicated in patients with known hypersensitivity to ciprofloxacin. Rifampicin can be used as an alternative.

First Line for all age group & pregnancy:

Ciprofloxacin	**Dosage**
Adults and children over 12 years	500mg stat
Children aged 5-12 years	250mg stat
Children 1 month to 4 years	125 mg stat

It is the responsibility of the prescriber to supply written information for patients receiving this prescription. An information sheet can be downloaded from this link: PatientInfoLeaflet_Ciprofloxacin

Alternative:

For pregnant women	Ceftriaxone IM 250mg STAT (dissolve in 3.5ml of 1% lidocaine HCL)

Rifampicin	**Dosage**
Adults and children over 12 years	600mg BD for 2 days
Children aged 1-12 years	10mg/kg BD for 2 days
Infants under 12 months	5mg /kg BD for 2 days

It is the responsibility of the prescriber to supply written information for patients receiving this prescription. An information sheet can be downloaded from this link: PatientInfoLeaflet_Rifampicin

14.3 Brain Abscess

Take blood culture, ear swab and throat swab. Therapy may have to be modified based on infective source, intracerebral location of the abscess and culture result.

If post-trauma, post surgical, discuss with Microbiologist

Common causative organisms: streptococci/staphylococci, Anaerobes and intestinal aerobes
Post surgical: Coliform/Pseudomonas

Comments	Recommended Treatment	Alternative
	Ceftriaxone IV 2g BD *Plus* Metronidazole IV 500mg TDS *Plus* Flucloxacillin IV 1gm QDS	Discuss with Microbiologist or ID
For patients with concurrent GI infections:	Add Amoxicillin IV 2g QDS	

14.4 Herpes Encephalitis

Recommended Treatment: - Aciclovir IV10mg/kg every eight hours

15. Bone and Joint Infections

15.1 Please send aspirate or biopsy specimen if possible. Blood cultures are useful in acute infection. For post-traumatic, post-operative, vertebral, implant-associated, in complicated haemoglobinopathy or when dealing with chronic or unusual infection, discuss with Microbiologist.

Likely infecting organisms:-
ADULT: Staphylococcus, Streptococci, Coliform, Pseudomonas, Tuberculosis, Neisseria spp.

Infections	Recommended Treatment	Alternative	Treatment Duration
Osteomyelitis	Flucloxacillin IV 1-2 g QDS *Plus* Sodium Fusidate PO 500mg TDS (or 750mg TDS in liquid)	Clindamycin IV 600mg QDS *Plus* Sodium Fusidate PO 500mg TDS (or 750mg TDS in liquid)	Intravenous therapy should be continued for up to 14 days, then switch to oral therapy. Total treatment duration should be at least 6-12 weeks for osteomyelitis and 4 weeks for septic arthritis
Septic Arthritis	Flucloxacillin IV 1-2 g QDS *Plus* Sodium Fusidate PO 500mg TDS (or 750mg TDS in liquid) *Plus* Cefotaxime IV 1-2g TDS	Clindamycin IV 600mg QDS *Plus* Sodium Fusidate PO 500mg TDS (or 750mg TDS in liquid) *Plus* Ciprofloxacin IV 400mg BD (or Oral 750mg BD)	
Oral Therapy	Flucloxacillin PO 500mg – 1g QDS *Plus* Sodium Fusidate PO 500mg TDS (or 750mg TDS in liquid) + / - Ciprofloxacin PO 750mg BD	Clindamycin PO 300-450mg QDS *Plus* Sodium Fusidate PO 500mg TDS (or 750mg TDS in liquid) + / - Ciprofloxacin PO 750mg BD	
Comments	Modify treatment choices according to the infecting organisms. Discuss with Microbiologist regarding treatment duration and oral choices.		

16. Eye, Ear, Nose and Throat (ENT) and Oral Infections

Infections	Recommended Treatment	Alternative
Purulent Conjunctivitis	Chloramphenicol 0.5% eye drops or 1% eye ointment every 4-6 hours, continuing for 3 days after symptoms have resolved	Fusidic Acid (Fucithalmic®) eye drops, 1 drop BD
Orbital Cellulitis Commonest causative organism: *Haemophilus Influenzae, Staph. aureus*	Cefotaxime IV 1 - 2g TDS *Plus* Metronidazole IV 500mg TDS *Plus* Flucloxacillin IV 1g QDS	
Otitis Media Acute	Amoxicillin PO 500mg TDS for 5 days	Erythromycin PO 250-500mg QDS for 5 days
Chronic	Co-amoxiclav PO 625mg TDS for 7 days	Doxycycline 200mg stat then 100mg OD *Plus* Metronidazole PO 500mg TDS Treat for 7 days
Otitis externa	Gentisone HC Ear Drops, Instil 3 drops 3-4 times daily and at night OR Sofradex Ear Drops, Instil 3 drops 3-4 times daily OR Otomize Spray, 1 metered spray TDS for 10 days	Flucloxacillin PO 500mg QDS for 5 days
Malignant Otitis Externa Commonest causative organism: *Pseudomonal spp.*	Ceftazidime IV 1-2g TDS OR Ciprofloxacin PO 750mg BD (or IV 400mg BD if oral route is contraindicated)	Consult Microbiologist or ENT Consultants

Infections	Recommended Treatment	Alternative
Discharging Ear	Aural toilet required with astringent preparation. Topical agent may be needed. Consult ENT Consultants.	
Sinusitis (Acute and Chronic)	Treat as **Otitis Media**	
Sore Throat	Most cases are of viral aetiology. If, however, the onset is dramatic with high temperature, bacteriological investigations are indicated. Take swab exudates of pus from the inflamed area.	
Streptococcal Tonsilitis	Penicillin V PO 500mg QDS for 10 days	Erythromycin PO 250-500mg QDS for 10 days (or Clarithromycin PO 500mg BD if intolerant of erythromycin)
Epiglottitis	Cefotaxime IV 1g TDS	Discuss with Microbiologist
Dental abscess/ gingivitis	Co-amoxiclav PO 625mg TDS for 7 days	Clindamycin PO 300 – 450mg QDS for 7 days
Oral candidiasis	Fluconazole PO 50mg OD for 7-14 days	Nystatin mouth Suspension 1ml QDS for 7-14 days. Swill round the mouth for 1 min then swallow.
Angular Cheilitis	Miconazole oral gel, 5ml QDS for at least 2 weeks or until all clinical signs and symptoms have resolved	Discuss with Microbiologist

17. Gastrointestinal Infections

Obtain faecal samples for cultures.

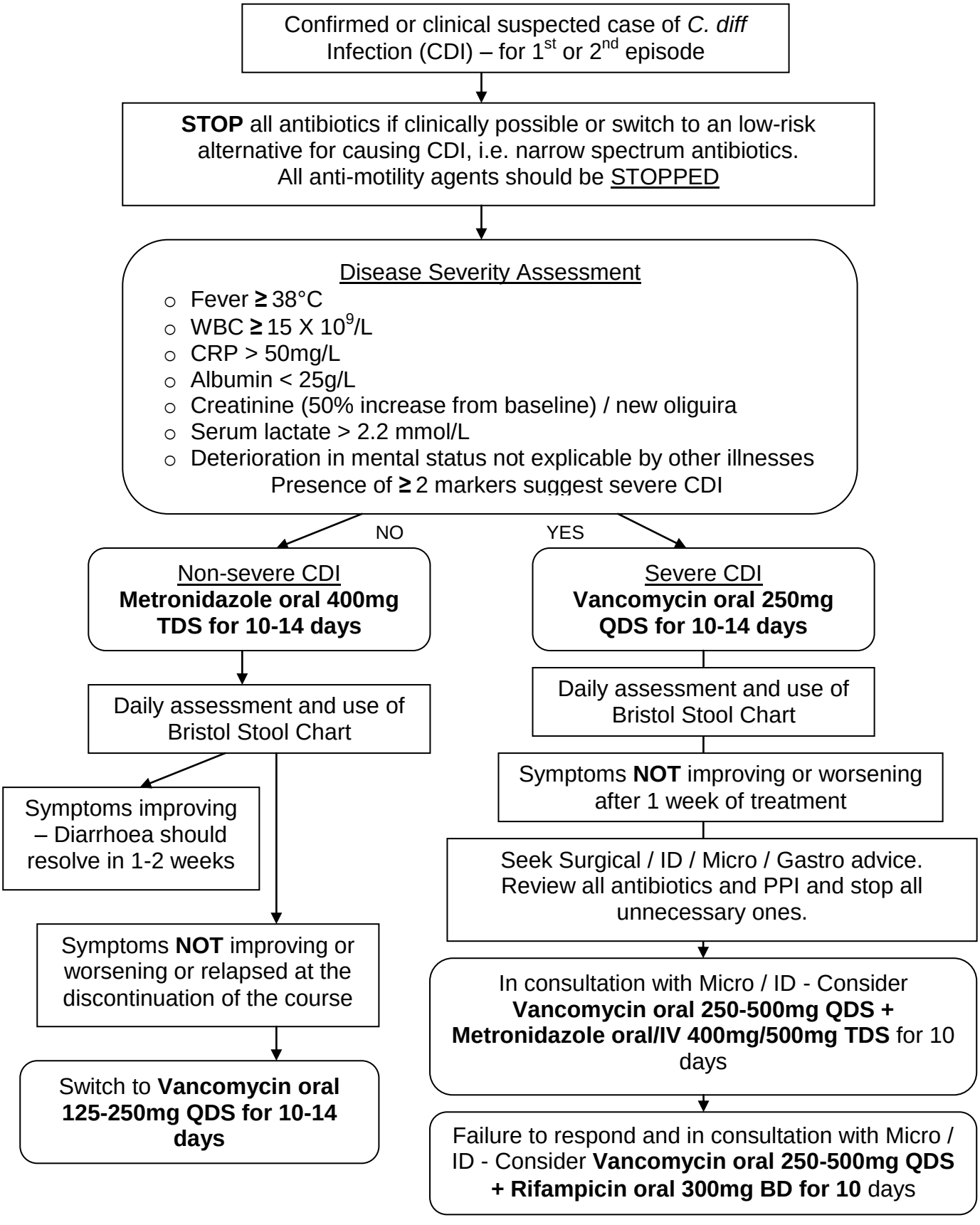
- Report previous antibiotic use or travel history on request card.
- Enteric Precaution might be indicated. Please inform/discuss with Infection Control Team

17.1 Gastroenteritis –
Antibiotics are usually not indicated.
Many cases are viral in origin. Viral cultures are occasionally required.

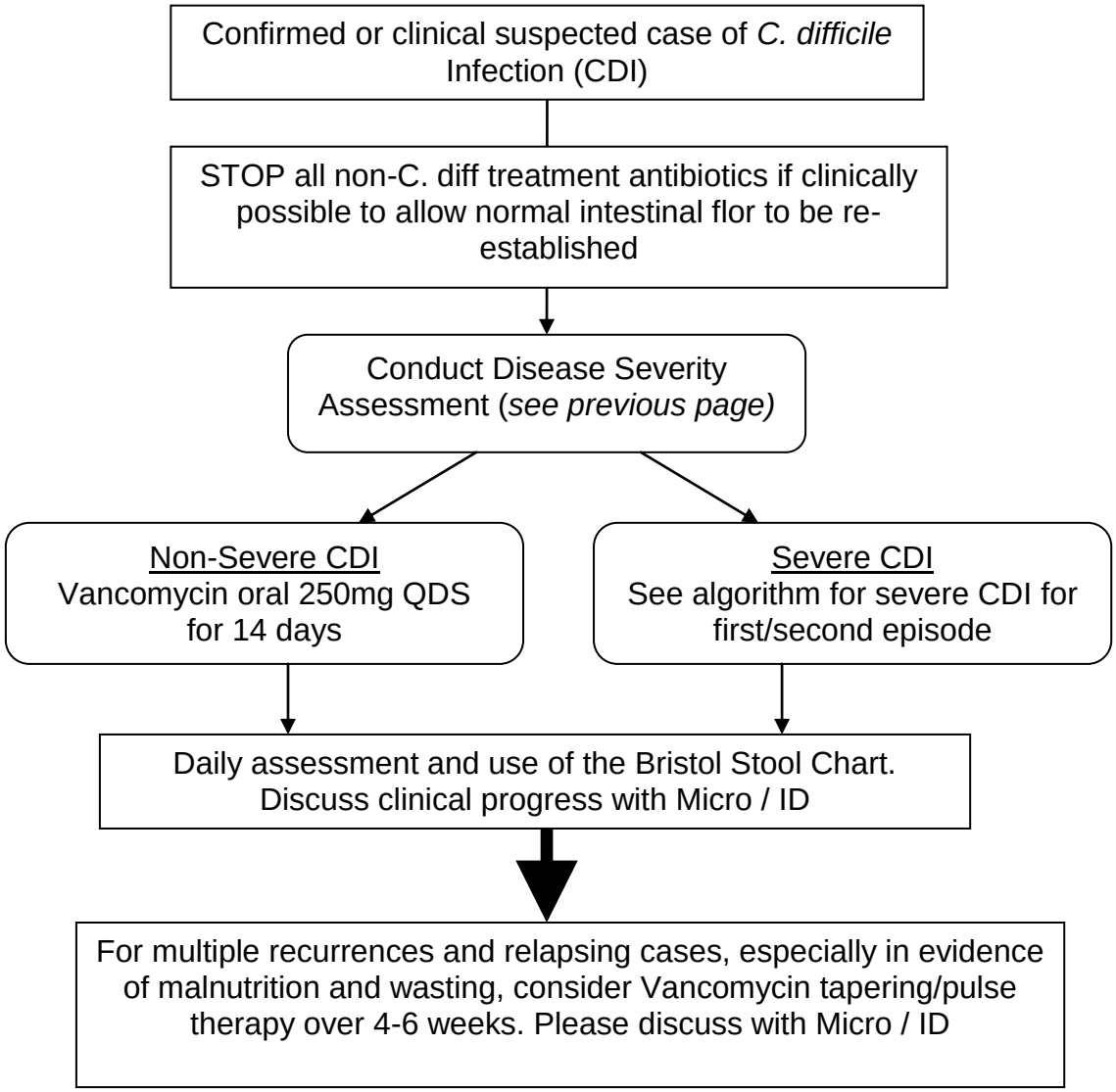
Infections	Recommended Treatment	Comments
Campylobacter Enteritis	*First line :* Erythromycin PO 500 mg QDS Or *Second line:* Ciprofloxacin PO 500mg BD Discuss with Microbiologist / ID	Treatment is not always indicated. Contact Microbiologist or ID if in doubt. Avoid Ciprofloxacin in pregnancy & children
Salmonella Infection (food poisoning)	Ciprofloxacin PO 500mg BD In severe infection, Ciprofloxacin IV 400mg BD may be indicated if patient vomits. Change to oral as soon as feasible	
Typhoid/fever paratyphoid	Ceftriaxone IV 2g OD to BD <u>BUT</u> discuss with Microbiologist or ID before starting therapy	
Pathogenic E Coli Traveller's diarrhoea Aeromonas spp.	Antibiotic not usually indicated Contact Microbiologist or ID if in doubt.	
Cryptosporidium	Self limiting. No effective antibiotic available	
Giardiasis	Metronidazole PO 400 mg TDS	Discuss with Microbiologist or ID before starting therapy
Amoebiasis	Metronidazole PO 400mg TDS followed by Diloxanide Furoate PO 500 mg TDS	Discuss with Microbiologist or ID before starting therapy
Intestinal Parasites	Discuss with Consultant Microbiologist or ID	

17.2 *Clostridium difficile* infection (CDI)

No antibiotic is exempt. The commonest predisposing antibiotics associated with CDI are ***cephalosporins, clindamycin*** and ***quinolones***.



Recurrence of *C. difficile* Infections (3rd or subsequent episode)



Please note that Vancomycin injectable solution is licensed for oral adminstration or via enteral tube.

For 125mg dosage regimen:-

- Reconstitute a **500mg**-vial with 10ml of WFI.
- Take 2.5ml and further dilute with 30ml with WFI.
- The remaining reconstituted solution must be stored in a fridge for up to 24 hours. Therefore, each vial is sufficient for one day course.

For 250 mg dosage regimen:-

- Reconstitute a **1g-**vial with 10ml of WFI.
- Take 2.5ml and further dilute with 30ml with WFI.
- The remaining reconstituted solution must be stored in a fridge for up to 24 hours. Therefore, each vial is sufficient for one day course.

For 500 mg dosage regimen:-
- Reconstitute a **1g-**vial with 10ml of WFI.
- Take 5 ml and further dilute with 30ml with WFI.
- The remaining reconstituted solution must be stored in a fridge for up to 24 hours. Therefore, each vial is sufficient for TWO doses.

17.3 *H. Pylori* Eradication Regimen

Recommended Treatment	Alternative
Amoxicillin PO 1g BD plus Clarithromycin PO 500mg BD plus Omeprazole PO 20mg BD For 7 days	Metronidazole PO 400mg BD plus Clarithromycin PO 500mg BD plus Omeprazole PO 20mg BD For 7 days

Discuss with Consultant Gastroenterologist for further advice if necessary.

17.4 Biliary Tract / GI Tract Associated Infections

Take blood culture, MSU, stool culture and pus (where possible) prior to treatment

Infections	Recommended treatment	Alternative
Cholecystitis / Cholangitis / Diverticulitis / Peri-rectal abscess	Co-amoxiclav IV 1.2g TDS *plus* Stat dose of Gentamicin IV 7mg / kg based on ideal body weight *(then review if continuation is necessary)*	Ciprofloxacin PO 500mg BD (or IV if contraindicated to oral) *Plus* Metronidazole IV 500mg TDS
For severe unresponsive cases, or consult Microbiologist	Piperacillin / tazobactam IV 4.5g TDS + / - Gentamicin IV 7mg / kg based on ideal body weight (see Once-daily dosing guidance)	
Switch to oral therapy if without contraindications and is clinically improving (Ref to IV-Oral Antibiotic Switch Guideline)	Co-Amoxiclav PO 625mg TDS	Ciprofloxacin PO 500mg-750mg BD *Plus* Metronidazole PO 400mg TDS

17.5 Intra-abdominal Infections

Take blood culture, MSU, stool culture and pus (where possible) prior to treatment.

Infections	Recommended treatment	Alternative
Liver, pelvic or abdominal abscess or faecal peritonitis	Piperacillin / tazobactam IV 4.5gm TDS + / - Gentamicin IV 7mg / kg based on ideal body weight (see Once-daily dosing guidance)	If not responding, discuss with Microbiologist

18. Urinary Tract Infections

Investigations

Take MSU before initiating treatment. Take blood culture if suspecting pyelonephritis, abscess or septicaemia.

18.1 Uncomplicated Lower UTI / Cystitis

	Recommended Treatment	Alternative Treatment	Treatment Duration
	Trimethoprim PO 200mg BD	Nitrofurantoin PO 50mg QDS (avoid in patients with suspected or known to have glucose-6-phosphate dehydrogenase (G-6-PD) deficiency	3-5 days
In pregnancy (Avoid trimethoprim and quinolones or discuss with Consultant Obs & Gynae)	Cefalexin PO 500mg TDS OR Amoxicillin PO 500mg TDS	Consult Microbiologist for true penicillin allergy	7 days

18.2 Complicated UTI

Refer to Urologist.

18.3 Pylonephritis

	Recommended Treatment	Alternative Treatment	Treatment Duration
Initial IV therapy	Co-amoxiclav IV 1.2g TDS + / - Gentamicin IV 7mg / kg based on ideal body weight (see Once-daily dosing guidance) OR Cefuroxime IV 750mg – 1.5g TDS (First line in pregnancy)	Ciprofloxacin IV 400mg BD or PO 500mg BD (avoid in pregnancy or contraindicated in epilepsy) + / - Gentamicin IV 7mg / kg based on ideal body weight (see Once-daily dosing guidance)	Total of 7-14 days Switch to oral after 24-48hr if feasible. Ref to IV-Oral Antibiotic Switch Guideline
Oral Therapy	Ciprofloxacin PO 500mg BD (avoid use in pregnancy or epilepsy)		

18.4 Acute Prostatitis

	Recommended Treatment	Alternative Treatment	Treatment Duration
	Trimethoprim PO 200mg BD	Ciprofloxacin PO 500mg BD	28 Days

18.5 Catheter-Associated Infection

In short-term catheter (e.g. catheterisation to relieve retention arising from infection), suggest removal of the catheter after 48 hours of antimicrobial therapy (if clinically feasible).

Bacteruria is inevitable in the long-term catheterised. Attempts at complete eradication by antimicrobials will lead to colonisation with more resistant organisms. Therefore antimicrobial therapy should be reserved for cases of clinical infection in the presence of fever, leucocytosis and abdominal pain. In asymptomatic patients with free flowing catheter, antibiotics not recommended.

	Recommended Treatment	**Alternative Treatment**	**Treatment Duration**
Mild to Moderate	Co-amoxiclav PO 625mg TDS OR Nitrofurantoin PO 50mg QDS (avoid in patients with suspected or known to have glucose-6-phosphate dehydrogenase (G-6-PD) deficiency	Ciprofloxacin PO 250mg BD	5 - 7 Days
	Recommended Treatment	**Alternative Treatment**	**Treatment Duration**
Severe	Co-amoxiclav IV 1.2g TDS *Plus* Gentamicin IV 7mg / kg based on ideal body weight (see Once-daily dosing guidance)	Ciprofloxacin PO 500mg BD (or Ciprofloxacin IV 200-400mg BD for patients truly contraindicated to oral therapy)	Switch to oral after 24-48hr if feasible (refer to IV-Oral Antibiotic Switch Guidelines)
Switch to oral therapy if without contraindications and is clinically improving (refer to IV Oral Antibiotic Switch Guidelines)	Ciprofloxacin PO 500mg BD		

18.6 Perinephric Abscess

	Recommended Treatment	Alternative Treatment	Treatment Duration
Initial IV therapy	Piperacillin/ tazobactam IV 4.5g TDS *Plus* Flucloxacillin IV 1-2 g QDS	Vancomycin IV 1g BD *Target pre-dose level = 10-15mg/L* OR Teicoplanin IV 400mg BD on day 1 then 400mg daily (if < 80 kg) or dose at 6mg/kg if > 80 kg *Plus* Ciprofloxacin PO 750mg BD (or IV 400mg BD only for patients truly contraindicated to oral therapy)	Depends on etiology and clinical response
Switch to oral therapy if without contraindications and is clinically improving (refer to IV Oral Antibiotic Switch Guideline)	Ciprofloxacin PO 500mg BD *Plus* Flucloxacillin PO 1g QDS	Consult Microbiologist	

19. Genital Tract Infection

ALL STI CASES MUST BE REFERRED TO GUM FOR SCREENING, TREATMENT AND CONTACT TRACING

Infections	Recommended treatment	Comments
Vaginal Thrush	Fluconazole PO 150mg STAT Or Clotrimazole 500mg pessary, insert at night as single dose	Oral Fluconazole is contraindicated in pregnancy, use Clotrimazole 500mg pessary without the applicator as the alternative.
Uncomplicated gonorrhoea **A patient with a positive TMA test for gonorrhoea should have swabs taken for culture and sensitivity as well as screening for other STI's please refer to GUM**	Cefixime PO 400mg single dose	Refer to GUM Clinic for screening and contact tracing. Appointments booking line 0161 627 8753
Trichomoniasis **This is an STI please refer to GUM for screening and contact tracing.**	Metronidazole PO 400mg BD 5 days OR Metronidazole PO 2g as a single dose	If pregnant, give Metronidazole PO 400mg BD but avoid single high dose OR Clindamycin 2% vaginal cream, insert 5g at night for 3-7 nights OR Metronidazole 0.75% vaginal gel, insert 5g at night for 7 nights
Other STIs such as syphilis, Chlamydial disease, Non Gonococcal Urethritis	The diagnosis, treatment and contact tracing of possible cases must be performed through GUM clinic. Consult local GUM Consultant. Appointments booking line 0161 627 8753	

19.1 Pelvic Inflammatory Disease (PID)

19.1.1 Testing for gonorrhoea and chlamydia in the lower genital tract in women with suspected PID is strongly recommended. A positive result strongly supports the diagnosis of PID but the absence of infection at this site does not exclude PID. Ofloxacin should be avoided be avoided in patients who are at high risk of gonococcal PID because of increasing quinolone resistance in the UK (e.g. patients's partner has gonorrhoea, clinically severe disease, sexual contact abroad).

19.1.2 Current male partners of women with PID should be contacted and offered health advice and screening for gonorrhoea and chlamydia. Suggest refer to GUM.

19.1.3 For non-severe or outpatient treatment

First choice

- Ofloxacin oral 400mg twice daily for 14 days
  Plus
- Metronidazole oral 400mg twice daily for 14 days

Caution: Ofloxacin (i.e. quinolones) should not be used in pregnancy. See below or discuss with Microbiology for alternatives

Alternatives for non-severe or outpatient treatment

- Ceftriaxone IM 250mg stat
  Plus
- Doxycycline oral 100mg twice daily for 14 days
  Plus
- Metronidazole oral 400mg twice daily for 14 days

19.1.4 For severe cases,

IV therapy is required and should be continued until 24 hours after clinical improvement and followed by oral therapy.

This includes: Intolerance to oral therapy
Lack of response to oral therapy

- Ceftriaxone IV 1g daily
  Plus
- Doxycycline IV *(unlicensed product)* 100mg twice daily (or oral may be used if tolerated)
  Plus
- Metronidazole IV 500mg three times daily

For 24-48 hours, then change to oral therapy if patient demonstrates substantial clinical improvement: -

- Doxycycline orally 100mg twice daily,
  plus

- Metronidazole orally 400mg twice daily
  For a total of 14 days

Caution: Doxycycline (i.e. tetracyclines) should not be used in pregnancy. See below or discuss with Microbiology for alternatives.

19.1.5 For treatment of PID in pregnancy

Pregnant women should NOT be treated with quinolone or tetracycline antibiotics.

- Cefixime oral 400mg stat (or Ceftriaxone IM 250mg stat for severe cases)
  Plus
- Erythromycin oral 500mg four times daily for 14 days
  Plus
- Metronidazole oral 400mg twice daily for 14 days (or IV therapy TDS for severe cases)

Reference: http://www.bashh.org/guidelines/2005/pid_v4_0205.doc

REFER to Microbiologist for other complicated infections.

20. Respiratory Tract Infections

20.1 Community-Acquired Pneumonia (CAP)
Ref: BTS Guideline for the management of community-acquired pneumonia in adults 2001 and 2004 Update

Any of:

- **C**onfusion - Defined as a Mental Test Score of 8 or less, or new disorientation in person, place or time
- **U**rea > 7mmol/L
- **R**espiratory rate ≥ 30/min
- **B**lood pressure (SBP < 90 mmHg or DBP ≤60 mmHg)
- Age ≥ **65** years

Score one point for each feature present

CURB-65 Score	**0-1**	**2**	**3**
Management Plan	Likely suitable for home treatment	Consider hospital-supervised treatment Option may include a) short inpatient stay b) hospital supervised outpatient	Manage in hospital as **severe pneumonia** Assess for ICU admission especially for CURB-65 = 4 or 5
Investigations	**CXR, Blood culture, FBC, Sputum culture, Serum for atypical pathogens, (Urine specimens for Legionella and Pneumococcal antigens for moderate to severe cases)**		

	Recommended Treatment	**Alternative Treatment**	**Treatment Duration**
Mild, Non severe pneumonia			
Oral therapy	Amoxicillin PO 500mg -1g TDS	Erythromycin PO 500mg QDS (or Clarithromycin PO 500mg BD if intolerant of erythromycin)	7 days
	Recommended Treatment	**Alternative Treatment**	**Treatment Duration**
Moderate, non-severe pneumonia			
Oral therapy	Amoxicillin PO 500mg -1g TDS *Plus* Erythromycin PO 500mg QDS (or Clarithromycin PO 500mg BD if intolerant of erythromycin)	Levofloxacin PO 500mg OD *(For true penicillin allergy and / or macrolide intolerance) (Contraindicated in epilepsy)*	7 days
In elderly patients, atypical pathogens are infrequent causes of CAP. Consider monotherapy without a macrolide in this group of patients.			

	Recommended Treatment	**Alternative Treatment**	**Treatment Duration**
Contraindicated to Oral therapy	Amoxicillin IV 1g TDS or Benzylpenicillin IV 1.2g QDS *Plus* Clarithromycin IV 500mg BD	Levofloxacin IV (on Microbiologist/Chest Physicians and ID advice) *(For true penicillin allergy and / or macrolide intolerance) (Contraindicated in epilepsy)*	Review **daily** and switch to oral therapy if feasible *(Refer to IV-Oral Antibiotic Switch Guideline)*
Severe pneumonia (include ICU admission)			
Initial IV therapy	Co-amoxiclav IV 1.2g TDS *Plus* Clarithromycin IV 500mg BD *(Add rifampicin PO/IV 600mg OD or BD for positive legionella urine antigens on Microbiologist advice)*	Levofloxacin IV (on Microbiologist/Chest Physicians and ID advice) or PO 500mg BD *(Add Benzylpenicillin IV 1.2g QDS for severe pneumococcal pneumonia on Microbiologist advice)*	Review **daily** and switch to oral therapy if feasible *(Refer to IV-Oral Antibiotic Switch Guideline)*
Switch to oral therapy if without contraindications and is clinically improving *(Refer to IV-Oral Antibiotic Switch Guideline)*	Co-amoxiclav PO 625mg TDS *Plus* Erythromycin PO 500mg QDS (or Clarithromycin PO 500mg BD if intolerant of erythromycin)	Levofloxacin PO 500mg OD or BD *(For true penicillin allergy and / or macrolide intolerance) (Contraindicated in epilepsy)*	Total of 10 days (14–21 days for Legionella, Staphylo-coccal pneumonia)

	Recommended Treatment	Alternative Treatment	Treatment Duration
20.2 Atypical pneumonia			
Initial IV therapy	Clarithromycin IV 500mg bd	Consult Microbiologist or ID at NMGH	Review **daily** and switch to oral therapy if feasible Total of 14 days
Switch to oral therapy if without contraindications and is clinically improving *(Ref to IV-Oral Antibiotic Switch Guideline)*	Erythromycin PO 500mg QDS (or Clarithromycin PO 500mg BD if intolerant of erythromycin)		

	Recommended Treatment	Alternative Treatment	Treatment Duration
20.3 Acute Bronchitis **Recommend NO antibiotic treatment but consider use in elderly, co-morbidity (e.g. heart failure, diabetes) or deteriorating clinically**			
1st line	Amoxicillin PO 500mg TDS	Erythromycin PO 500mg QDS	5 days
2nd line	Co-amoxiclav PO 625mg TDS	Doxycycline PO 200mg STAT, then 100mg OD *(Not for pregnancy or children under 12 years)*	
20.4 Exacerbation of COPD **Two or more presenting symptoms : Increased breathlessness, changed sputum colour or purulence, increased sputum volume**			
	Recommended Treatment	**Alternative Treatment**	**Treatment Duration**
Mild	Amoxicillin PO 500mg -1g TDS	1st line Erythromycin PO 500mg QDS (or Clarithromycin PO 500mg BD if intolerant of erythromycin) 2nd line Doxycycline PO 200mg stat, then 100mg OD *(Not for pregnancy or children under 12 yrs)*	5 days

	Recommended Treatment	Alternative Treatment	Treatment Duration
Moderate/Severe	Co-amoxiclav PO 625mg TDS	Erythromycin PO 500mg QDS (or Clarithromycin PO 500mg BD if intolerant of erythromycin)	7 days
Contraindicated to Oral therapy *(Ref to IV-Oral Antibiotic Switch Guideline)*	Amoxicillin IV 1g TDS Or Co-amoxiclav IV 1.2g TDS	Clarithromycin IV 500mg bd	Review **daily** and switch to oral therapy if feasible.

20.5 Hospital-Acquired Chest Infection or Pneumonia (HAP)
Empirical therapy is influenced by previous antibiotic exposure – seek Microbiologist advice

20.5.1 Non-Ventilator Associated HAP
N.B. Onset less than 48 hours after admission – treat as CAP (*Section 19.1). Consider any recent hospital admission.

	Recommended Treatment	Alternative Treatment	Treatment Duration
Non-severe or Early onset (< 5 days admission)*	Co-amoxiclav PO 625mg TDS	Levofloxacin PO 500mg OD *(For true penicillin allergy and / or macrolide intolerance)* *(Contraindicated in epilepsy)*	7 -10 days
Contraindicated to Oral therapy *(Ref to IV-Oral Antibiotic Switch Guideline)*	Co-amoxiclav IV 1.2g TDS	Consult Microbiologist	Review **daily** and switch to oral therapy if feasible.

	Recommended Treatment	Alternative Treatment	Treatment Duration
Moderate/Severe Or Late onset (≥ 5 days admission)	Piperacillin / tazobactam IV 4.5g TDS	Ciprofloxacin PO 500-750mg BD or IV 400mg BD + / - Gentamicin IV 7mg / kg based on ideal body weight (see Once-daily dosing guidance)	Switch to oral after 24-48hr if feasible
Switch to oral therapy if without contraindications and is clinically improving *(Ref to IV-Oral Antibiotic Switch Guideline)*	Co-amoxiclav PO 625mg TDS or Ciprofloxacin PO 500mg BD (Choice of the appropriate oral therapy largely depends on the Microbiology sensitivity results)		Up to 7 days
If MRSA of concern	Add Vancomycin IV 1g BD *Target pre-dose level = 10-15mg/L* OR Teicoplanin IV 400mg BD on day 1 then 400mg daily (if < 80 kg) or dose at 6mg/kg if > 80 kg	Consult Microbiologist	Depends on etiology and clinical response
Oral choice	Consult Microbiologist		

20.5.2 Ventilator Associated Pneumonia
Empirical therapy is influenced by previous antibiotic exposure – seek Microbiologist advice

	Recommended Treatment	Alternative Treatment	Treatment Duration
	Piperacillin/Tazobactam IV 4.5g TDS	Consult Microbiologist	Depends on etiology and clinical response
If MRSA of concern	Add Vancomycin IV 1g BD *Target pre-dose level = 10-15mg/L* OR Teicoplanin IV 400mg BD on day 1 then 400mg daily (if < 80 kg) or dose at 6mg/kg if > 80 kg		

20.6 Aspiration pneumonia			
	Recommended Treatment	**Alternative Treatment**	**Treatment Duration**
Initial IV therapy	Co-amoxiclav IV 1.2g TDS	Ciprofloxacin PO 500mg BD or IV 200-400mg BD *Plus* Metronidazole IV 500mg TDS	7 days Switch to oral after 24-48hr if feasible *Refer to IV-Oral Antibiotic Switch Guideline*
Switch to oral therapy if without contraindications and is clinically improving *(Ref to IV-Oral Antibiotic Switch Guideline)*	Co-amoxiclav PO 625mg TDS	Ciprofloxacin PO 250-500mg BD *Pus* Metronidazole PO 400mg TDS	

20.7 Post-operative pneumonia			
	Recommended Treatment	**Alternative Treatment**	**Treatment Duration**
Initial IV therapy	Co-amoxiclav IV 1.2g TDS	Levofloxacin IV 500mg OD *(For true anaphylactic reactions to penicillins)* *(Contraindicated in epilepsy)*	5 days
Switch to oral therapy if without contraindications and is clinically improving	Co-amoxiclav PO 625mg TDS		

20.8 Pleural Infection – empirical treatment for culture-negative

Ref: BTS guidelines for the management of pleural infection. Thorax 2003; 58 (suppl II); ii18 to ii28

20.8.1 Pleural Infection

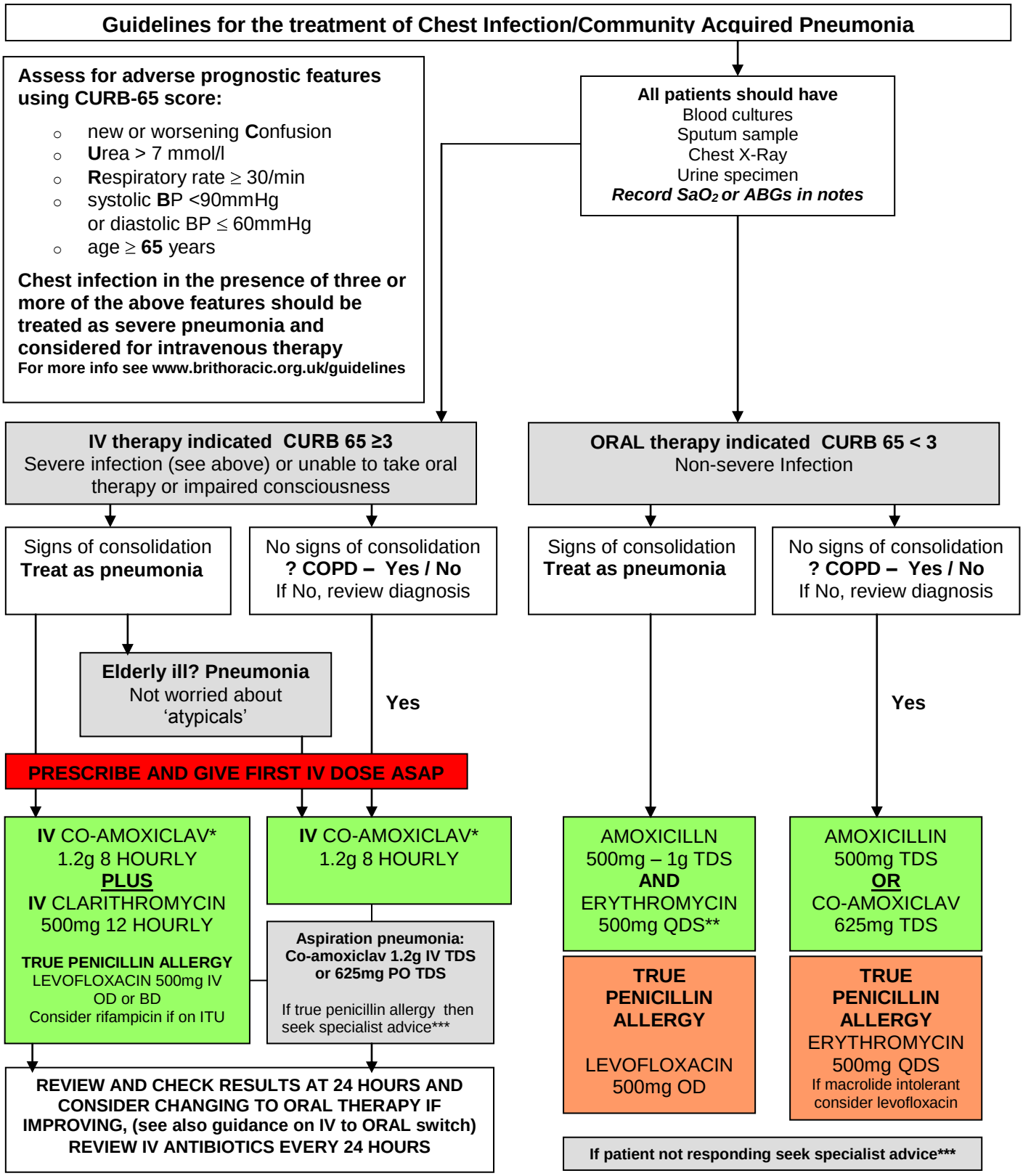
	Recommended Treatment	Alternative Treatment	Treatment Duration
Initial IV Therapy	Co-amoxiclav IV 1.2g TDS	Consult Microbiologist	Depends on etiology and clinical response
	Modify according to culture & sensitivity results		
Switch to oral therapy if without contraindications and is clinically improving *(Ref to IV-Oral Antibiotic Switch Guideline)*	According to Microbiology reports		

20.8.2 Hospital-acquired Pleural Infection

	Recommended Treatment	Alternative Treatment	Treatment Duration
	Piperacillin/Tazobactam IV 4.5g TDS *(on Microbiologist or ID approval)*	Consult Microbiologist	Depends on etiology and clinical response

Consider adding anti-staphylococcus cover for post-operative and trauma related empyema e.g. Flucloxacillin IV 1g QDS (or Vancomycin / Teicoplanin if MRSA is of concern)

21. Guidelines for the treatment of Chest Infection/Community Acquired Pneumonia



TREAT FOR 7 TO 10 DAYS (longer for 'atypical' pathogens– seek specialist advice)
+/- CHECK URINE LEGIONELLA ANTIGEN AND IF POSITIVE ADD RIFAMPICIN 600mg OD

*DOSES GIVEN ARE FOR PATIENTS WITH NORMAL RENAL FUNCTION – **DOSE ADJUSMENTS MAY BE REQUIRED IF RENALLY IMPAIRED** (SEE BNF OR DISCUSS WITH PHARMACY)

** IF PATIENT ERYTHROMYCIN INTOLERANT THEN CONSIDER CLARITHROMYCIN 500mg BD

***ALL PATIENTS WHO FAIL TO IMPROVE OR DEVELOP COMPLICATIONS SHOULD BE REFERRED TO MICROBIOLOGY (78362 or 71641 or via switchboard) AND CHEST PHYSICIANS/ ID FOR SPECIALIST ADVICE**

Offer all current smokers advice and information on smoking cessation and document in notes

Based on BTS Guidelines and Trust Antibiotic Policy June 2008

22. Antibiotic Prophylaxis For Infective Endocarditis

22.1 Following NICE Guidelines (March 2008) antibiotic prophylaxis against infective endocarditis is no longer recommended routinely, even for patients who were formerly thought to be at increased risk of endocarditis e.g. valve replacement and congenital heart disease.

22.2 However, patients at risk of endocarditis who are undergoing a gastro-intestinal or genito-urinry procedure at a site where infection is suspected, should receive an appropriate antibiotic that is effective against organisms that are likely to cause endocarditis, (please see section 23).

22.3 Patients at risk of endocarditis having a surgical procedure where antiobiotic prophylaxis is recommended should have the same antibiotic as patients who are not as risk.

23. Empirical Treatments For Infective Endocarditis (IE)

23.1 Important notes

Three sets of blood cultures should be taken from separate venepunctures at least an hour apart prior to commencing empirical antibiotic therapy.

Microbiology results should be reviewed at the earliest opportunity to modify antibiotic therapy according to the micro-organism identified and antibiotic sensitivities. Physicians are strongly encouraged to contact the Microbiologist for any provisional results available, especially for acutely-ill patients.

- **Acute presentation**
  Flucloxacillin IV 2g six hourly (or 2g four hourly if weight > 80kg)
  PLUS
  Gentamicin 1mg/kg (ideal body weight) IV bolus eight hourly, modified according to renal function. Level monitoring required – *SEE NOTE*

- **Indolent (or chronic) presentation**
  Amoxicillin IV 2g six hourly
  PLUS
  Gentamicin 1mg/kg (ideal body weight) IV bolus eight hourly, modified according to renal function. Level monitoring required – *SEE NOTE*

- **For true penicillin-allergy, intra-cardiac prosthesis and suspected MRSA e.g. in IV drug users and dialysis patients**
  Vancomycin IV 1g 12 hourly, infuse over 100 mins, dosage to be modified according to renal function and level monitoring is required – *SEE NOTE*
  PLUS
  Rifampicin PO 300 – 600mg 12 hourly
  PLUS
  Gentamicin 1mg/kg (ideal body weight) IV bolus eight hourly, modified according to renal function. Level monitoring required – *SEE NOTE*

Empirical therapy should be modified and adjusted according to the Microbiology reports once the causative organism is identified and sensitivity known. Please liaise closely with the Microbiologist.

23.2 Level monitoring:

Gentamicin pre-dose (trough) level <1mg/L. 1 hr post-dose (peak) level = 3-5mg/L. First level should be taken on the third or fourth dose and then monitored twice weekly in patient with normal renal function. Monitor more frequently in impaired renal function.

Vancomycin: pre-dose level should be taken prior to the 3rd or 4th dose. Target pre-dose level between 15-20 mg/L (higher range intended). Continue to monitor the renal function. For renally impaired patient measure levels earlier and more frequently.

Ref: Guidelines for the Antibiotic Treatment of Endocarditis in Adults: Report of the Working Party of the British Society for Antimicrobial Chemotherapy. JAC (2004) 54, 971-981.

24. Soft Tissue Infections

24.1 Take blood culture, throat swab and skin swab (if moist).

Infections	Recommended treatment	Alternative
Cellulitis – Likely caused by Group A/C Streptococci and Staph aureus	Benzylpenicillin IV 1.2g QDS PLUS Flucloxacillin IV 1g QDS	Mild: Clarithromycin IV 500mg BD OR Moderate/severe: Clindamycin IV 600mg QDS
Switch to oral therapy if without contraindications and is clinically improving (Ref to IV-Oral Antibiotic Switch Guideline)	Flucloxacillin PO 500mg – 1g QDS	Mild: Erythromycin PO 500mg QDS, (or Clarithromycin PO 500mg BD if intolerant of erythromycin) OR Moderate/severe: Clindamycin PO 300-450mg QDS
IV cannula related cellulitis Remove venflon	Flucloxacillin PO 500mg – 1g QDS	Erythromycin PO 500mg QDS, (or Clarithromycin PO 500mg BD if intolerant of erythromycin) for 5 days OR Moderate/severe: Clindamycin PO 300-450mg QDS
IF MRSA is of concern:	Vancomycin IV 1g BD *Target pre-dose level = 10-15mg/L* OR Teicoplanin IV 400mg BD on day 1 then 400mg daily (if < 80 kg) or dose at 6mg/kg if > 80 kg	

Infections	Recommended treatment	Alternative
Necrotising Fasciitis **Urgent verbal consultation with Microbiologist / ID strongly recommended**	Benzylpenicillin IV 1.2g 4-6 hourly *Plus* Gentamicin IV 7mg / kg based on ideal body weight (see Once-daily dosing guidance) *Plus* Clindamycin IV 600mg QDS	This condition requires urgent Surgical review. Consult Microbiologist / ID for appropriate alternatives
IF MRSA is of concern:	Add Vancomycin IV 1g BD *Target pre-dose level = 10-15mg/L* OR Teicoplanin IV 400mg BD on day 1 then 400mg daily (if < 80 kg) or dose at 6mg/kg if > 80 kg	
Fournier's Gangrene **Urgent verbal consultation with Microbiologist / ID strongly recommended**	Piperacillin / tazobactam IV 4.5mg TDS *Plus* Clindamycin IV 600mg QDS *Plus* Gentamicin IV 7mg / kg based on ideal body weight (see Once-daily dosing guidance)	This condition requires urgent Surgical review. Consult Microbiologist / ID for appropriate alternatives
Erysipelas **Likely caused by Group A Haemolytic Streptococci**	Benzyl Penicillin IV 1.2gm 4-6 hourly	Clarithromycin IV 500mg BD
Switch to oral therapy if without contraindications and is clinically improving (Ref to IV-Oral Antibiotic Switch Guideline)	Amoxicillin PO 500mg TDS	Erythromycin PO 500mg QDS (or Clarithromycin PO 500mg BD if intolerant of erythromycin)
Decubitus Sores **Varicose ulcers**	Limited role for antibiotics. Antibiotics only for severe cellulitis treat according to sensitivities following culture. Foul smelling excavating sore, consider Metronidazole IV/PO 500mg/400mg TDS for 7 days	
Animal / Human bites	Co-amoxiclav PO 625mg TDS for 7 days	Doxycycline PO 200mg STAT then 100mg OD PLUS Metronidazole PO 400mg TDS Treat for 7days

25. **Diabetic Foot Infections (DFIs)**

Introduction

Foot infections in people with diabetes are a common but clinically complex problem requiring expert assessment (Jeffcoate and Stuart, 2007).Diabetes related foot infections are the largest cause of non traumatic lower limb amputation. Rapid access to appropriate antibiotics is a critical aspect of preventing amputation in those with diabetes related foot infection (Reiber, 1996; Lipsky *et al,* 2004). Internationally agreed guidelines now exist for the management of foot infections in diabetes (Lipsky *et al,* 2004).

Most diabetes related foot infections seen in community will be mild to moderate in severity, but more severe ones may lead to serious sequelae including osteomyelitis and amputation (Lipsky, 1997). Where a severe infection exists the patient should have access to a specialist multi-disciplinary team with rapid access to intravenous antibiotics therapy (Putting Feet First, 2009). Acute infections in patients who have not received antibiotics within the last few months are predominantly due to aerobic Gram positive cocci (including Staphlococcus aureus, Streptococci, *Enterococci, Coagulase Negative Staphylococc*i) often as mono-microbial infection (Lipsky *et al,* 1999). Chronic wounds, however, tend to develop more complex flora (Lipsky *et al,* 1990), with *Staphlococcus aureus,* either alone or as a component of mixed infection, such as MRSA, *Enterococci, Enterobacteriaceae* and *anaerobes*.

Reports of infections by antibiotic resistant organisms including MRSA are increasing worldwide (Dang *et al*, 2003). Isolation of MRSA in diabetic foot infections (DFIs) is associated with previous antibiotic treatment and worse clinical outcomes (Dang *et al*, 2003). Hence anti-MRSA agents are needed for those at risk. Treatment of DFIs with oral antimicrobial agents is effective but few studies have compared the outcome of such route with parenteral regimens.

Wound care is also critical to the outcome of infected foot ulceration. Generally appropriate wound care will involve surgical debridement of necrotic tissue since healing will not take place in the presence of non-viable tissue and debris (Scottish Intercollegiate Network Guidelines 2010; Steed *et al*, 1999). Debridement of wounds should precede application of dressings, use of wound healing preparations or antimicrobial agents and should be supported by the provision of appropriate pressure relief (Putting Feet First, 2009; NICE 2004).

Please note the following points for consideration when using this guidance:

1. The suggested regimens for superficial and moderate infections are only for empirical therapy when the causative agents are not known. If the causative organism(s) have been identified, treatment should be targeted according to microbiological findings.
2. All severe infections must be managed with or in partnership with the specialist multi-disciplinary Diabetic Foot Team or should be referred to A&E as an emergency for patients being managed in the Community.
3. For multi-resistant organisms, including MRSA, please discuss with a Microbiologist.
4. The incidence of Clostridium difficile infection (CDI) has increased in the past decade. Prudent antibiotic prescribing is essential in preventing the acquisition of CDI and, where possible, the use of antibiotics implicated in the pathogenesis of CDI should be avoided.
5. Where there is a suspicion of a Pseudomonal infection, add Ciprofloxacin PO 750mg twice daily for both mild and moderate infections (Shannon-Lowe *et al*, 2010).

Points to consider when diagnosing infection specific to patients with diabetes

Infection in the diabetic foot requires specialist assessment and appropriate empirical therapy for the following reasons:

1. In the first instance the diagnosis of infection is clinical, and therefore examination of the foot is an essential part of management.
2. Microbiological sampling of the foot cannot be used to diagnose infection initially, but is used to identify infecting organisms. A specimen should be taken if there are clinical signs of an infection or treatment failure. Aspirations of purulent secretions, curettage of the post-debridement wound base, punch biopsy and extruded or biopsied bone are the best specimens for culture. However, microbiological sampling is not routinely required for mild infection unless recent antimicrobial therapy or previous isolation of antibiotic-resistant organisms.
3. Swabbing and deep tissue cultures appear to be equally reliable for the initial monitoring of antimicrobial treatment in severe diabetic foot infection. However, it is recommended that deep tissue might be more sensitive than swabbing for monitoring those isolates that have been selected for antibiotic resistance, i.e. those from ulcers that are still active after 30 days of treatment.
4. Clinical signs of inflammation may be less obvious in the ischaemic foot and expert assessment by a specialist is needed.
5. Critical ischaemia may be misdiagnosed as infection because of redness, swelling and pain.
6. The acute Charcot foot is also often first misdiagnosed as infection.

7. If there is clinical suspicion of osteomyelitis or bone infection, a series of investigation must be undertaken to rule out osteomyelitis as the management strategy can be quite different in terms of choice of therapy and duration of treatment – *see Section 15.*

SEVERITY	MILD INFECTION	MODERATE	SEVERE
Symptoms	- Purulent or inflamed wound present - Limited to skin and superficial soft tissues - Inflammation extends <2cm from wound - Not systemically unwell	- Purulent or inflamed wound present in a patient who is systemically unwell and/or one of the following: - - Inflammation extends >2cm from wound - Lymphangitis spread beneath superficial fascia - Localised necrosis or gangrene - Involvement of muscle, tendon, joint or bone.	- Any infection accompanied by systemic toxicity (fever, chills, shock, vomiting, confusion, metabolic instability). - Any evidence of critical ischemia of the involved limb.

Grading of severity	Recommended Treatment	Alternative	Treatment Duration
MILD Antibiotic-naïve	Flucloxacillin PO 1g QDS	Doxycycline PO 100mg BD, or Clindamycin PO 300 QDS	For 5-7 days, after which, treatment should be reviewed and continued or discontinued when clinically appropriate
Non-antibiotic-naïve	Doxycycline PO 100mg BD, or Clindamycin PO 300 QDS	Discuss with Micro/ID	

Grading of severity	Recommended Treatment	Alternative	Treatment Duration
MODERATE Antibiotic-naïve	Flucloxacillin PO/ IV 1-2g QDS +/- Metronidazole PO 400mg TDS +/- Gentamicin IV 7mg/kg based on ideal body weight *(refer to Trust Policy)*	Co-amoxiclav PO 625mg TDS, or Clindamycin PO 450mg QDS +/- Metronidazole PO 400mg TDS if anaerobes suspected	- For 5-7 days, after which treatment should be reviewed and continued or discontinued when clinically appropriate - IV antibiotics should be switched to oral preparations when clincially appropriate. - If osteomyelitis is present, treat for at least 6 weeks – *see Section 15*
Non-antibiotic-naïve	Co-amoxiclav IV 1.2g TDS **Oral Switch* Co-amoxiclav PO 625mg TDS ** or as Oral option only for use in Specialist Foot Clinics where patients are deemed to be appropriate to be treated as outpatients under close clinical monitoring.*	Ciprofloxacin IV 400mg BD, and Metronidazole IV 400mg TDS, or Gentamicin IV 7mg/kg based on ideal body weight *(refer to Trust Policy)*, and Metronidazole IV 400mg TDS **Oral Switch* Ciprofloxacin PO 500-750mg BD, and Metronidazole PO 400mg TDS, or Ciprofloxacin PO 500-750mg BD, and Clindamycin PO 300-450mg QDS	
If MRSA is suspected	Add Vancomycin IV or Teicoplanin IV Discuss with Micro/ID for oral options or treatment optimisation	Add Vancomycin IV or Teicoplanin IV Discuss with Micro/ID for oral options or treatment optimisation	

Grading of severity	Recommended Treatment	Alternative	Treatment Duration
SEVERE **Cautions: High CDT risk**	Piperacilin-tazobactam IV 4.5g TDS, plus Clindamycin IV 900mg TDS - Add Vancomycin (or Teicoplanin) IV if MRSA suspected. **Oral Switch* Ciprofloxacin PO 500-750mg BD, and Clindamycin PO 300-450mg QDS ** or as <u>Oral option</u> only for use in Specialist Foot Clinics where patients are deemed to be appropriate to be treated as outpatients under close clinical monitoring.*	Clindamycin IV 600mg QDS, plus Gentamicin IV 7mg/kg based on ideal body weight *(refer to Trust Policy)* - Add Vancomycin (or Teicoplanin) IV if MRSA suspected. **Oral Switch* Ciprofloxacin PO 750mg BD, and Metronidazole PO 400mg TDS	- For 10-14 days, after which treatment should be reviewed and continued or discontinued when clinically appropriate - IV antibiotics should be switched to oral preparations when clincially appropriate. - If osteomyelitis is present, treat for at least 6 weeks – *see Section 15*

References

Dang CN, Prasad YDM, Boulton AJM, Jude EB. Methicillin-resistant Staphylococcus aureus in the diabetic foot clinic: a worsening problem. *Diabetic Medicine 2003*: 20(2); 159-161

Leese G, Dilip Nathwani, Young M, Seaton A, Kennon B et al. Use of antibiotics in people with diabetic foot disease: A consensus statement. *The Diabetic Foot Journal 2009*; 12(2): 1-10

Lipsky BA, Berendt AR, Deery HG, Embil JM, Joseph WS, Karchmer AW, *et al*. Diagnosis and treatment of diabetic foot infections. *Clin Infect Dis 2004*; 39(7): 885-910

Lipsky BA, Pecoraro RE, Larson SA, Hanley ME, Ahroni JH. Outpatient management of uncomplicated lower-extremity infections in diabetic patients. *Arch Intern Med 1990*; 150(4):790-7

Lipsky BA. Evidence-based antibiotic therapy of diabetic foot infections. *FEMS Immunol Med Microb 1999*; 26: 267-76

Lipsky BA. Osteomyelitis of the foot in diabetic patients. *Clin Infect Dis 1997*; 25: 1318-26

National Institute for Clinical Excellence 2004. Clinical Guidelines for Type 2 Diabetes Prevention and management of foot problems (CG10). London.

Putting Feet First 2010. Commissioning specialist services for the management and prevention of diabetic foot disease in hospitals. [Accessible at http://www.diabetes.org.uk/Documents/Reports/Putting_Feet_First_010709.pdf]

Reiber GE. The epidemiology of diabetic foot problems. *Diabetic Medicine 1996*; 13 Suppl. 1: S6-11

Shannon-Lowe J, Matheson NJ, Cooke FJ and Aliyu SH. Prevention and medical management of Clostridium difficile infection. *British Medical Journal 2010*; 340: 641-646

Stuart L, Jeffcoate W. Long awaited formula for the improvement of foot care in diabetes. *Practical Diabetes International 2007*; 24(3): 1

26. Recommendations For the Prevention Of Infection In Adults With An Absent Or Dysfunctional Spleen

26.1 Patients who have conditions resulting in an absent / dysfunctional spleen are at increased risk of infection and should receive prophylactic vaccinations and lifelong antibiotic.

Patients are advised to carry a card or wear an identifying bracelet at all times.

Vaccine Schedule for Adults

<table>
<tr><th>Vaccine</th><th>Dosing schedule</th><th>Booster</th></tr>
<tr><td>(Pneumovax II®)

23-valent polysaccharide pneumococcal vaccine</td><td rowspan="2">1 DOSE of each should be given at least 2 weeks before an elective splenectomy. If this is not possible for an emergency, vaccination should be given at 14 days post-splenectomy or as soon as clinically stable prior to discharge.</td><td>(Pneumovax II®)

Re-vaccinate every 5 years or more often in immuno-suppressed patients</td></tr>
<tr><td>(Menitorix®)

Combined Haemophilus influenzae type B (Hib) and Meningococcal group C conjugate vaccine</td><td rowspan="2">Not yet determined, please check the Green Book for the most up-to-date guidance. (Dec 2010)

For an individual considering travelling to a “high risk” country with an increased risk of serogroup A, W135 or Y disease, a booster dose of Menveo® should be considered depending on the timing of the last dose.</td></tr>
<tr><td>(Menveo®)

MenACWY conjugate vaccine</td><td>All patients should be given an additional dose of MenACWY conjugate vaccine (Menveo®) TWO months after the initial vaccination.

(please advise patient’s GP)</td></tr>
<tr><td>Influenza vaccine</td><td colspan="2">1 dose annually between October and December</td></tr>
</table>

The vaccines can be administered at the same time and should be given at separate sites, preferably a separate limb. If given in the same limb, they should be given at least 2.5 cm apart

Lifelong Antibiotic Prophylaxis
Penicillin V tablets 500 mg BD, (or Erythromycin tablets 500mg BD **For penicillin allergic patients**)

Early Treatment Packs
Patients should keep a supply of suitable antibiotics at home to take immediately if

they develop raised temperature, malaise or shivering. Suitable antibiotics include Co-amoxiclav, or Levofloxacin or Clindamycin.and for penicillin allergic patients.

Advise patients to seek immediate medical attention.

Advice to patients
All patients should receive advice covering:

- Their lifelong increased risk of infection
- Recommended vaccines and antibiotic prophylaxis
- Importance of seeking help immediately should infection occur
- Recommendations for travel abroad due to increased risk i.e. malaria risk, tick bite (Babesiosis) and dog bites.
- Patients should be advised to keep a therapeutic course of antibiotics (early treatment packs)
- Advice about insect, cat and dog bites. Patients should receive a five-day course of co-amoxiclav (clindamycin plus ciprofloxacin in allergic patients) to prevent infection.

Download DoH information leaflet and patient card at
http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4113581

Travel vaccines
Meningococcal ACWY Conjugate Vaccine **(Menveo®)** should be offered to individuals travelling to countries with an increased risk of meningococcal infection e.g. sub-Saharan Africa. If an individual has recently received Men C conjugate vaccine, an interval of at least 4 weeks should be allowed before administration of the Meningococcal ACWY Conjugate Vaccine **(Menveo®).**

It is the responsibility of the Consultant Physician in charge of the patient to ensure that all patients are vaccinated, given antibiotic prophylaxis and counselled on the risk of infection. A checklist to record this information should be documented in the patients' notes and a copy sent to the General Practitioner, particularly important with the additional dose of **Menveo®** two months after the initial vaccination.

Reference: Immunisation against infectious disease (The Green Book) 2010

27. Surgical Prophylaxis

27.1 General Principles and Goals of Antibiotic Prophylaxis

- **Goals of antibiotic prophylaxis for surgical patients are: -**
  - To reduce incidence of surgical site infection (SSI)
  - To use antibiotics in a manner that is supported by evidence of effectiveness
  - To minimise the effect of antibiotics on the patient's normal bacterial flora and host defences
  - To minimise adverse effects and costs

- **General Principles of antibiotic prophylaxis**
  - **Choice** – the antibiotics selected for the operation / procedure must possess good activity against the organisms most likely to contaminate the operative site.
  - **Route** – the antibiotics should be administered **intravenously (IV)**
  - **Timing** – First dose must be given at induction, within 30 minutes before the skin is incised for all surgery except caesarean section.
  - **Duration - Single dose** of antibiotic is generally recommended for most circumstances**.** However, additional doses should be administered intra-operatively if
    - surgery has lasted over 4 hours
    - blood loss of ≥ 1.5L

  - **Penicillin Allergy –** all patients with a history of penicillin allergy must be carefully evaluated to ensure that they are not wrongly attributed with a "Penicillin Allergy", otherwise, their optimal management may be compromised.
    Patients with a history of allergic reactions, such as anaphylaxis, laryngeal oedema, bronchospasm, hypotension, local swelling, urticaria or pruritic rash occurring immediately after a penicillin therapy must NOT receive further doses of penicillins or β-lactam antibiotics (i.e. penicillins, co-amoxiclav (Augmentin®), cephalosporins, piperacilin/tazobactam *(Tazocin®), meropenem etc)

    * *Tazocin is a brand name for Piperacillin/Tazobactam. When Tazocin is indicated, it must be prescribed as* ***Piperacillin/Tazobactam.***

The recommendations contained in this guideline are based on national guidelines and BNF recommendations. Doses recommended apply to average size adult patients with normal renal and hepatic function.

The antibiotic prophylaxis guidelines apply to all elective **clean, clean-contaminated or contaminated surgeries** or procedures.

Single dose prophylactic antibiotics will be sufficient in most cases.
However, if established infection is found at surgery e.g. pus in the abdominal cavity, evidence of peritonitis, or contaminated wounds e.g in RTA, a full

treatment course of antibiotics will be required. Refer to the relevant sections in the Antibiotic Policy.

Recommendations

- The decision regarding the benefits and risks of giving prophylaxis to an individual patient is made by the anaesthetist / surgeons based on the:
  - Patient's risk of SSI
  - Potential severity of the consequences of SSI
  - Effectiveness of prophylaxis in that operation
  - Consequences of the prophylaxis for that patient
- However, if the surgeon believes that a non-risky patient is to be at a particularly high risk from SSI and is deemed to be justified to receive the prophylactic antibiotic, the criteria used for the risk assessment must be recorded clearly.
- All antibiotic prophylaxis must be prescribed on the drug chart with a STOP DATE to prevent unduly prolonged course.
- Topical MRSA eradication regimen should be completed for all elective patients who are known to be MRSA carriers prior to surgery.
- Known MRSA positive patients undergoing emergency procedures should have **Teicoplanin IV 400mg** added to the recommended regimen.
- Where **Gentamicin** is used, the total dose **should not exceed 320mg** and must be calculated according to the lean body weight. *(See formulae in section 29 of the Antibiotic Policy for Adult Patients.)*
- All doses to be given intravenously unless stated otherwise.

27.2 Prophylactic Antibiotics for Common Surgery Types

SURGERY TYPES	FIRST LINE REGIMEN	ALTERNATIVE REGIMEN
27.2.1 GASTRO-INTESTINAL PROCEDURES:		
- Oesophageal surgery - Gastroduodenal surgery - Appendicectomy - Colorectal surgery - ERCP	Co-amoxiclav IV 1.2g	Gentamicin IV 5mg/kg (max 320mg) plus Metronidazole IV 500mg
- Hernia repair **with** mesh	Co-amoxiclav IV 1.2g	Clindamycin IV 600mg
- Hernia repair **without** mesh and minor anal condition	Not Recommended	
If a patient is a known MRSA carrier or at high risk of post-operative MRSA infection, Teicoplanin IV 400mg should be included in the prophylaxis regimen.		

SURGERY TYPES	FIRST LINE REGIMEN	ALTERNATIVE REGIMEN
27.2.2 BILIARY SURGERY		
- Laparoscopic cholecystectomy - Cholangiogram or T-tube extraction - Open or endoscopic trans-anal resection	Co-amoxiclav IV 1.2g	Gentamicin IV 5mg/kg (max 320mg) Plus Metronidazole IV 500mg
- Biliary reconstruction and hepatojejunostomies	<u>At induction:</u> Piperacillin / Tazobactam IV 4.5g <u>Post-op:</u> Piperacillin / Tazobactam IV 4.5g 8 hourly for two further doses	<u>At induction:</u> Gentamicin IV 5mg/kg (max 320mg) plus Metronidazole IV 500mg <u>Post-op:</u> Metronidazole IV 500mg 8 hourly for two further doses
- Liver resection - Pancreatectomy - Whipple's procedure	<u>At induction:</u> Piperacillin / Tazobactam IV 4.5g <u>Post-op:</u> Piperacillin / Tazobactam IV 4.5g 8 hourly for 48 hours Add Metronidazole IV 500mg 8 hourly for 48 hrs if gut has been opened during surgery	<u>At induction:</u> Ciprofloxacin IV 400mg plus Metronidazole IV 500mg <u>Post-op:</u> Ciprofloxacin IV 400mg 12 hourly plus Metronidazole IV 500mg 8 hourly for 48 hours
Ablation cases (microwave and radio frequency ablation)	<u>At induction:</u> Piperacillin / Tazobactam IV 4.5g plus Metronidazole IV 500mg <u>Post-op:</u> Piperacillin / Tazobactam IV 4.5g 8 hourly plus Metronidazole PO 400mg 8 hourly for 5 days	<u>At induction:</u> Ciprofloxacin IV 400mg plus Metronidazole IV 500mg <u>Post-op:</u> Ciprofloxacin PO 500mg 12 hourly plus Metronidazole PO 400mg 8 hourly for 5 days
- Chemo-embolisation	<u>At induction:</u> Co-amoxiclav IV 1.2g <u>Post-op:</u> Co-amoxiclav PO 625mg 8 hourly for 5 days	<u>At induction:</u> Ciprofloxacin IV 400mg plus Metronidazole IV 500mg <u>Post-op:</u> Ciprofloxacin PO 500mg 12 hourly plus Metronidazole PO 400mg 8 hourly for 5 days

- Insertion of Portacath/ Denver shunt	Flucloxacillin PO 500mg 6 hourly for 24 hours (Start first dose on IV if NBM)	Clindamycin PO 450mg 6 hourly for 24 hours (Start first dose on IV if NBM)
If a patient is a known MRSA carrier or at high risk of post-operative MRSA infection, Teicoplanin IV 400mg should be included in the prophylaxis regimen.		

SURGERY TYPES	FIRST LINE REGIMEN	ALTERNATIVE REGIMEN
27.2.3 VASCULAR SURGERY		
- All major vascular procedures - Amputation of lower limb	Co-amoxiclav IV 1.2g	Teicoplanin IV 400mg plus Gentamicin IV 5mg/kg (max 320mg) plus Metronidazole IV 500mg
- Prevention of gas-gangrene in high lower-limb amputation	Benzyl penicillin IV 600mg 6 hourly for 5 days	Metronidazole 400(PO) or 500mg (IV) 8 hourly for 5 days
If a patient is a known MRSA carrier or at high risk of post-operative MRSA infection, Teicoplanin IV 400mg should be included in the prophylaxis regimen.		

27.2.4 UROLOGY **Please use Ciprofloxacin with caution to avoid risk of MRSA / *C.difficile Infections*. A single dose prophylaxis is sufficient if urine is uninfected.**		
Catheterisation (in the presence of metal work)	Gentamicin IV 160mg	
Trans-rectal prostate (TRUS) biopsy	Ciprofloxacin PO 1000mg plus Metronidazole PO 400mg 1 hour before biopsy * - see reference	Gentamicin IV 5mg /kg (max 320mg) plus Metronidazole IV 500mg
TURP (no infection)	Co-amoxiclav IV 1.2g	Gentamicin IV 5mg /kg (max 320mg)
TURP (infection, bacteriuria or catheter present)	Co-amoxiclav IV 1.2g plus Gentamicin IV 160mg before surgery, then review and treat according to sensitivity result	Gentamicin IV 5mg /kg (max 320mg), then review and treat according to sensitivity result
- Nephrectomy - Nephrostomy	Co-amoxiclav IV 1.2g	Gentamicin IV 5mg /kg (max 320mg)
If a patient is a known MRSA carrier or at high risk of post-operative MRSA infection, Teicoplanin IV 400mg should be included in the prophylaxis regimen.		

* Burden HP, Ranasinghe W, Persad R. *BJU Int*. 2008; 101: 1202 - 1204

SURGERY TYPES	FIRST LINE REGIMEN	ALTERNATIVE REGIMEN
27.2.5 MAXILLO-FACIAL SURGERY		
Nose, sinus surgery and tonsillectomy	Not Recommended	
Neck dissection / procedures with incision through the oral / pharyngeal mucosa	At induction: Co-amoxiclav IV1.2g Post-op: Co-amoxiclav IV 1.2g 8 hourly for 2 further doses	At induction: Clindamycin IV 600mg plus Gentamicin IV 5mg /kg (max 320mg) Post-op: Clindamycin PO 300mg 6 hourly for 3 further doses
Wisdom tooth extraction	At induction: Metronidazole IV 500mg or PO 400mg as single dose	
If a patient is a known MRSA carrier or at high risk of post-operative MRSA infection, Teicoplanin IV 400mg should be included in the prophylaxis regimen.		

SURGERY TYPES	FIRST LINE REGIMEN	ALTERNATIVE REGIMEN
27.2.6 OBSTETRICS		
Caesarean Section (at cord clamping)	Co-amoxiclav IV 1.2g	Clindamycin IV 600mg
Caesarean Section in women with cardiac disease	NICE guidance - **NIL** recommended for prevention of infective endocarditis. Consult Cardiologist for special cases. Routine caesarean section antibiotic prophylaxis is recommended as above.	
3rd / 4th degree tears	Co-amoxiclav PO 625mg 8 hourly for 5 days	Clindamycin PO 150mg 6 hourly for 5 days
Group B strep (mother) in labour	Benzylpenicillin IV 3g initially, then 1.5 g four hourly until delivery	Clindamycin IV 900mg 8 hourly until delivery
For preterm pre-labour rupture of membranes	Erythromycin PO 250 mg 6 hourly until delivery or for a maximum of 10 days	
Prolonged rupture of membranes at term (i.e. over 24 hrs)	New NICE guidance – **NIL** recommended unless signs of sepsis.	
	If septic – start Co-amoxiclav IV 1.2g 8 hourly. Consider IV to Oral switch if clinically feasible.	If septic – start Clindamycin IV 900mg 8 hourly plus Gentamicin IV 160mg initially then 80mg 8 hourly until delivery (monitor pre- & post-dose levels)
	If GBS positive in mother – start prophylaxis as above.	

SURGERY TYPES	FIRST LINE REGIMEN	ALTERNATIVE REGIMEN
Pyrexia / suspected chorioamnionitis / sepsis in labour	Co-amoxiclav IV 1.2g 8 hourly until clinically necessary	**For mild penicillin allergy:** Cefuroxime IV 1.5g 8 hourly, plus Metronidazole IV 500mg 8 hourly or PR 1g 12 hourly. **For severe and true penicillin allergy with anaphylaxis:** Clindamycin IV 900mg 8 hourly plus Gentamicin IV 160mg initially then 80mg 8 hourly until delivery (monitor pre- & post-dose levels)

SURGERY TYPES	FIRST LINE REGIMEN	ALTERNATIVE REGIMEN
27.2.7 GYNAECOLOGICAL		
Hysterectomy (Vaginal, abdominal, radical)	Co-amoxiclav IV 1.2g	Clindamycin IV 600mg
Surgical Termination Of Pregnancy (TOP) or Evacuation of uterus	Metronidazole PO 400mg, or PR 1g. Add Doxycycline PO 100mg BD for 7 days if genital chlamydial infection can not be ruled out.	
If a patient is a known MRSA carrier or at high risk of post-operative MRSA infection, Teicoplanin IV 400mg should be included in the prophylaxis regimen.		

<table>
<tr><th>SURGERY TYPES</th><th>FIRST LINE REGIMEN</th><th>ALTERNATIVE REGIMEN</th></tr>
<tr><td colspan="3">27.2.8 ORTHOPAEDIC SURGERY
Administer entire dose of antibiotic at least 10 minutes before tourniquet applied.
No prophylaxis required for closed clean orthopaedic procedures without implants/ prosthesis such as arthroscopy.</td></tr>
<tr><td>- Total hip replacement
- Prosthetic knee joint replacement
- Hemiarthroplasty
- Shoulder replacement or internal fixation</td><td><u>At induction:</u>
Cefuroxime IV 1.5g

<u>Post-op:</u>
Cefuroxime IV 750mg 8 hourly for two doses</td><td><u>At induction:</u>
Teicoplanin IV 400mg plus Gentamicin IV 5mg/kg (320mg)
<u>Post-op:</u>
Teicoplanin IV 400mg at 12 hours</td></tr>
<tr><td rowspan="2">- Open reduction of fractures with internal fixation
- Hip fracture repair
- Any other implant / metal work insertion</td><td>Cefuroxime IV 1.5g</td><td>Teicoplanin IV 400mg plus Gentamicin IV 5mg/kg (max 320mg)</td></tr>
<tr><td colspan="2">Consider adding Metronidazole 500mg to the above regimen for complex open fractures with extensive soft-tissue damage</td></tr>
<tr><td>Compound fracture (gross soil contamination)</td><td><u>At induction:</u>
Cefuroxime IV1.5g plus Metronidazole 500mg

<u>Post-op:</u>
CefuroximeIV 750mg 8 hourly plus Metronidazole IV 500mg for two further doses</td><td><u>At induction:</u>
Teicoplanin IV 400mg plus Gentamicin IV 5mg/kg (max 320mg) plus Metronidazole IV 500mg
<u>Post-op:</u>
Teicoplanin IV 400mg at 12 hours plus Metronidazole IV 500mg for two further doses</td></tr>
<tr><td>Elective surgery e.g. laminectomy and spinal fusion</td><td>Flucloxacillin IV 1g</td><td>Teicoplanin IV 400mg</td></tr>
<tr><td>Revision surgery</td><td colspan="2">Consult Microbiologist</td></tr>
<tr><td>Post-operative catheter insertion</td><td colspan="2">Gentamicin IV 160mg</td></tr>
<tr><td colspan="3">If a patient is a known MRSA carrier or at high risk of post-operative MRSA infection, Teicoplanin IV 400mg should be included in the prophylaxis regimen.</td></tr>
</table>

SURGERY TYPES	FIRST LINE REGIMEN	ALTERNATIVE REGIMEN
27.2.9 BREAST SURGERY		
Breast surgery	Co-amoxiclav IV 1.2g	Clindamycin IV 600mg
If a patient is a known MRSA carrier or at high risk of post-operative MRSA infection, Teicoplanin 400mg IV should be included in the prophylaxis regimen.		
27.2.10 CARDIOLOGY		
Pacemaker insertion	<u>At induction:</u> Flucloxacillin IV 1g (with additional gentamicin 80mg infiltrated into the pacemaker pocket at the time of procedure) <u>Post-op:</u> Flucloxacillin 500mg 6 hourly for 48 hours	<u>At induction:</u> Vancomycin IV 1g (at rate of 10mg/min) <u>Post-op:</u> Vancomycin IV 1g (at rate of 10mg/min) at 12 hours, for patients with moderate to normal renal function
Indwelling temporary pacing wires	Flucloxacillin PO 500mg 6 hourly until further instructions from Consultant Cardiologist	Consult Cardiologist for advice

27.3 ANTIBIOTIC PROPHYLAXIS IN GASTRO-INTESTINAL ENDOSCOPY

<table>
<tr><th>PROCEDURE TYPES</th><th>FIRST LINE REGIMEN</th><th>ALTERNATIVE REGIMEN</th></tr>
<tr><td colspan="3">GASTRO-INTESTINAL PROCEDURES:
Reference:
Antibiotic prophylaxis in gastrointestinal endoscopy. Allison et al. GUT 2009 58:869-880</td></tr>
<tr><td>- For prevention of endocarditis</td><td colspan="2">Not recommended</td></tr>
<tr><td>- Diagnostic ERCP for biliary obstruction and / or common bile duct stones and / or straightforward stent changes</td><td colspan="2">Not recommended
but consider for full antibiotic treatment course post-procedure in cases of inadequate decompression of the biliary tree during the procedure</td></tr>
<tr><td>- ERCP for patients with ongoing cholangitis or (biliary) sepsis</td><td colspan="2">No additional antibiotic required if patient is already on an established antibiotic treatment course.</td></tr>
<tr><td>- ERCP for patients undergoing biliary intervention post liver transplant</td><td>Ciprofloxacin PO 750mg STAT, 60-90 min before procedure,
plus
Amoxicillin IV 1g STAT
OR
Teicoplanin IV 400mg STAT, if penicillin allergic</td><td>Gentamicin IV 1.5mg/kg STAT by bolus injection over 3-5 min, at time of sedation,
plus
Amoxicillin IV 1g STAT
OR
Teicoplanin IV 400mg STAT, if penicillin allergic</td></tr>
<tr><td rowspan="2">- Therapeutic ERCP when complete biliary drainage unlikely to achieve (e.g. sclerosing cholangitis and /or hilar cholangiocarcinoma)

- Patients with pancreatic cyst or pseudocyst</td><td>Ciprofloxacin PO 750mg STAT, 60-90 min before procedure</td><td>Gentamicin IV 1.5mg/kg STAT by bolus injection over 3-5 min, at time of sedation</td></tr>
<tr><td colspan="2">Consider adding
Amoxicillin IV 1g TDS
OR
Vancomycin IV 1g BD, if penicillin allergic
(level monitoring required –refer to Trust Policy)
if patients become febrile post procedure</td></tr>
</table>

PROCEDURE TYPES	FIRST LINE REGIMEN	ALTERNATIVE REGIMEN
- Profound immunocompromised: - - Severe neutropenia (<0.5 x 10^9 / L), or - Advanced haematological malignancy	No additional antibiotics if already receiving adequate broad spectrum antibiotic cover. Discuss with Haematologist / Microbiologist for advice.	
- When patient has a history of prior biliary manipulations and requiring repeat biliary intervention at ERCP	If patient has been exposed to or on a prolonged course of antibiotic, suggest to change to: - Piperacillin / tazobactam IV 4.5g TDS	Discuss with Microbiology
- Endoscopic ultrasound intervention: - - Fine needle aspiration of solid lesions - Fine needle aspiration of cystic lesions in or adjacent to the pancreas, and for endoscopic transgastric or transenteric drainage of pancreatic pseudocyst	Not indicated Co-amoxiclav IV 1.2g STAT	Not indicated Ciprofloxacin PO 750mg STAT
- Variceal bleeding	No additional antibiotic required, as patients would have been established on an IV therapy prior to undergoing endoscopy. Otherwise, the following is recommended: -	
	Piperacillin / tazobactam IV 4.5g TDS	Cefotaxime IV 2g TDS
- PEG / PEJ	Co-amoxiclav IV 1.2g STAT, prior to procedure	Cefuroxime IV 750mg STAT, prior to procedure *For true anaphylactic reaction or angioedema with penicillin: -* Teicoplanin IV 400mg STAT

28. Vancomycin Dosing and Level Monitoring Guidelines

Note: level monitoring must be undertaken. Consult with Microbiologist / SpR in Microbiology for arrangement

28.1 What is Vancomycin?

- A glycopeptide antibiotic – closely related to teicoplanin
- IV Vancomycin must be given by slow IV infusion to avoid rapid infusion-related reactions (i.e. not exceeding a maximum of 10mg/min e.g. 1g over 100mins).
- Due to its potential ototoxicity and nephrotoxicity, patients receiving IV Vancomycin therapy for treatment of systemic infection require serum level monitoring to ensure efficacy and minimal toxicity.
- It is not absorbed if given orally. Therefore, Vancomycin **MUST** never be used orally for treatment of systemic infections. Oral Vancomycin is only used for treatment of *Clostridium difficile* infections (DOSE :125mg – 250mg PO QDS for 7 days)

28.2 Main clinical indications for IV Vancomycin

- Suspected or confirmed MRSA bacteraemia; severe MRSA skin and soft tissues infections; MRSA bone and joint infections; MRSA pneumonia; vascular catheter-related sepsis – Discuss with Microbiologist for appropriate management.
- Treatment for infective endocarditis for patients with true penicillin allergy and/or when positive susceptibility results available for the isolated causative organism

28.3 Initial Dosages

Criteria	Dose	Dosing Interval
Weight > 70kg with normal renal function	1.5g	12 hourly
Weight 50-70kg with normal renal function or CrCL > 70ml/min	1g	12 hourly
Weight < 50kg or CrCL 30-70 ml/min or age >65yrs	750mg	12 hourly
CrCL<30ml/min or on dialysis	1g	Take a pre-dose level after 24 hours. Wait for the result before giving the next dose

28.4 Method of administration

- Dilute with either Sodium Chloride 0.9% or glucose 5% to a concentration of 5mg/ml *(or up to a maximum of 10mg/ml for selected patients strictly in need of fluid restriction).*
- Infusion rate: Max of 10mg/min e.g. 1g over 100mins

28.5 Level Monitoring

- Initially: Take the first pre-dose (trough) level immediately before the 3rd or 4th dose after the start of therapy.
- Unless specifically advised, you do not need to wait for the level before administering the next dose (see above dosage table for severe renal *impairment or on dialysis)*

- Target pre-dose (trough) level = 10-15mg/L (*Note: a higher target range of 15-20mg/L might be recommended by a Microbiologist for highly resistant strains or for treatment of Infective Endocarditis)*
- If the pre-dose (trough) level is within the target range and renal function remains stable: **Repeat pre-dose (trough) level every 3 to 4 days**.
- If dosage adjustment is made during therapy: **Repeat pre-dose (trough) level before the 3rd or 4th dose after the change,** as above.
- If renal function changes during therapy: **Repeat pre-dose (trough) level more frequently i.e. after every 3 or 4 doses**.
- There is **NO** need to monitor peak vancomycin levels
- There is **NO** need to monitor pre-dose (trough) levels daily unless in severe renal impairment or specifically advised.

28.6 Recommendation

Discuss with Microbiologist or ID for an alternative if renal function continues to deteriorate and/or patient unable to tolerate vancomycin and/or unable to obtain blood for level monitoring and/or fail to respond.

29. Teicoplanin Dosing and Level Monitoring Guidelines – Adult Dosing

29.1 Dosages:

- <80kg: 400mg BD on day 1 then 400mg daily
- >80kg: dose at 6mg/kg BD on day 1 then 6mg/kg dose daily
- For Infective Endocarditis or other deep seated infections: dose at 10mg/kg BD on day 1 then 10mg/kg dose daily
- No dosage reduction for renal impairment – tailored by levels *(see below)*

29.2 Level Monitoring

- Regular level monitoring is not usually recommended but may be of value when treatment failure is suspected, for renally impaired patients and for deep-seated infections to ensure a therapeutic, non-toxic dose is given.
- If required, pre-dose level should be checked after Day 4 of treatment. Level is not processed locally. Advise to continue treatment until level is available for evaluation.
- Post-dose sample: Not required.

Target pre-dose level = >20mg/L (20-40mg/L for severe infection)

30. Once-Daily Gentamicin Dosing and Monitoring Guideline for all Adults

- Prescribing gentamicin as a single daily dose instead of in multiple divided doses will ensure that the target peak serum level is achieved in all adult patients
- Once-daily administration may be less toxic and it is easier to dose and monitor than the traditional multiple-daily dosing method
- Treatment duration must not **exceed 7 days**

30.1 The following conditions and patient groups are excluded from using Once-daily Gentamicin:

- Treatment for infective endocarditis
- Patients with ascites, major burns (>20%)
- Exacerbation of cystic fibrosis
- Severe renal impairment i.e. CrCl <20ml/min and/or on dialysis
- Pregnancy

  Please consult Microbiologist for an appropriate dosing regimen for the above.
- For use in **neonates** and **paediatrics**, contact Consultant Paediatrician / Pharmacy / Microbiology for advice.

30.2 Dosing Schedule

- ***Dose:*** **7mg/kg (Maximum dose of 480mg) based on the lean body weight. For obese patient, see below*.**
  Round the dose down to the nearest multiples of 40mg for ease of measuring the dose.
- ***Administration:*** *D*ilute the calculated dose of gentamicin in 100ml of Sodium Chloride 0.9% or 5% Glucose and infuse over 30 minutes.
- ****Obese patients:*** The Actual Body Weight should be used to calculate the dose unless the weight is >20% Ideal Body Weight (IBW), in which case an Adjusted Body Weight should be estimated using the following equations: -

Ideal Body Weight (IBW)

Male = 50kg + (2.3 x every inch over 5ft in height)
Female = 45.5kg + (2.3 x every inch over 5ft in height)

Adjusted Body Weight = IBW + 0.4 x (Actual Body Weight – IBW)

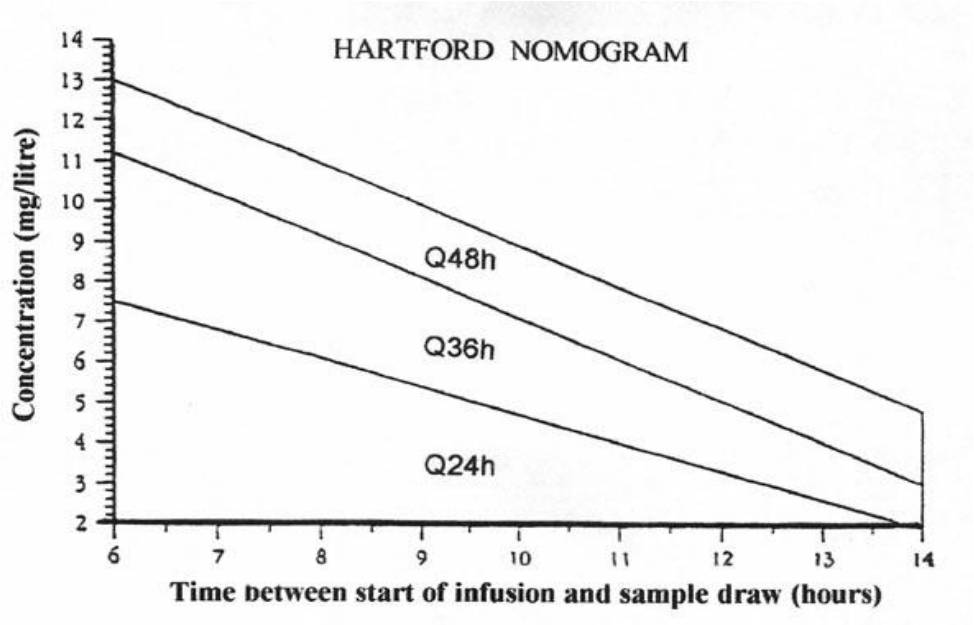
- **Patients with renal impairment:** Estimate the Creatinine Clearance (CrCL) using the Cockcroft-Gault formulae, as this can be used as a guide to determine the dosing frequency and frequency of level monitoring but level must still be checked after the first dose: -

Male: CrCL (ml/min)	**= 1.23 x (140-age) x weight (kg) / Serum creatinine (micromol/l)**
Female: CrCL (ml/min)	**= 1.04 x (140-age) x weight (kg) / Serum creatinine (micromol/l)**

Creatinine Clearance (ml/min)	Dose and Dosing Interval
≥ 60	7mg/kg every 24 hours
40-59	7mg/kg every 36 hours
20-39	7mg/kg every 48 hours
<20	Consult Microbiologist

30.3 Level monitoring after the first dose given to determine the dosing interval

- Obtain blood anytime **between 6 and 14 hours** after the start of the ***first*** gentamicin infusion
- Record the **exact time of drug administration and blood sampling** using the form on the following page and calculate the time intervals (= number of hours post-dose), and record this information on the blood request form for this first level e.g. 7 hours post dose.
- Blood specimens need to be labelled and refrigerated until they can be sent to the Biochemistry Lab, if taken out-of-hours.
- Determine the subsequent dosing frequency using the Hartford Nomogram below



The Nomogram is only applicable if the level is taken within **the 6-14 hours window** after the start of the first infusion.

If the level falls in the area designated q24hr, q36hr or q48hr, it becomes the new dosing interval, i.e, every 24hr, 36 hr or 48 hr respectively but the initial dose remains the same.

If the level falls on the dividing line, choose the longer dosing interval. If the level is off the Nomogram, withhold the dose, repeat the assay every 24 hours until the *pre-dose level falls **under 1mg/L** before the next dose can be given. This is to give time to allow the gentamicin to be eliminated without toxic accumulation.

30.4 What happen if the 6-14 hours monitoring window is missed?

Take a *pre-dose i.e. 24 hours after the initial dose (or anytime within an hour prior to the next scheduled dose), wait for the level and give the next dose **ONLY** if the level is **under 1mg/L**.

If this level is **over 1mg/L**, withhold the dose and repeat level every 12 hours until less than 1mg/L.

*Definition: *pre-dose level = anytime within an hour prior to the next scheduled dose*

30.5 Follow-on monitoring

- Continue to monitor the renal function
- Patients with normal / stable renal function and clinical conditions – Monitor *pre-dose levels (anytime within an hour prior to next dose) every three days. Give the dose if level is **under 1mg/L**.
- Patients with impaired renal function or on concurrent nephrotoxic drugs or with unstable clinical conditions – Monitor *pre-dose levels more frequently and **ONLY** give the next dose if the level is **under 1mg/L**

Consult Pharmacy or Microbiology for advice on dosing and monitoring

30.6 Recommendations

Please record the following details as much as possible when completing the blood request form for ease of level interpretation: -

- Clinical details, and
- For the first level – state ***"Once-daily gentamicin, time and date of drug administered and blood sampled" or " number of hours post dose"***
- Follow-on levels – state ***"Pre dose level, time and date of the last dose and blood sampled"***.

30.7 Cautions:

- Close monitoring of renal function

- Any changes in the auditory and vestibular functions i.e. deafness / vertigo, consider whether they could be due to Gentamicin
- Lower dose i.e. 5mg/kg may be required for frail, elderly patients as impaired renal function may not be indicated by the creatinine level. Monitor the pre-dose levels (target = under 1mg/L)
- Avoid use in patients who have received **cisplatin** and **carboplatin or other platinum based cytotoxics** as gentamicin may increase the associated risk of nephrotoxicity and ototoxicity and associated permanent hearing loss.

References:

1. Freeman CD, Nicolau DP, Beliveau PP, Nightingale CH. Once-daily dosing of aminoglycosides: review and recommendations for clinical practice. J.Antimicrob Chemother 1997; 39: 677-686.

2. Wallace AW, Jones M, Bertino J. Evaluation of Four Once-Daily Amionoglycoside Dosing Nomograms. Pharmacotherpay 22(9): 1077-1083, 2002.

Cut and staple to drug card

Gentamicin Level Monitoring Time Record Form

(For Once Daily Dosing Only)

Blood must be taken for gentamicin level any time between 6 - 14 hours after the start of the FIRST Gentamicin infusion. The information on the *number of hours post-dose* is required for level interpretation.

IMPORTANT: Please record all timings as specified.

Date	Exact time dose given	Exact time blood sampled	No. of hours post-dose (Pls transfer info to blood form)	Name of nurse in charge	Gentamicin Level	Interpreted by Dr:

Evaluate the level using the Hartford Nomogram to determine the dosing frequency for this patient when the level is known. Please check the Antibiotic Guideline/protocol for details of monitoring or speak to a Pharmacist.

Patient Name: …….. Ward: …….

31. A Guide to Therapeutic Drug Monitoring

31.1 GENTAMICIN

Once-Daily Dosing Regimen:
Level must be taken at anytime between 6-14 hours after the start of the first infusion. Interpret level using the Hartford Nomogram. Refer to **Once-daily Gentamicin dosing and monitoring guideline** on Intranet or Section 29 in the Antibiotic Policy.
Contact Pharmacy / Microbiology of your site for further advice.

Multiple-Dosing Regimen for Treatment of Infective Endocarditis *(see Section 21 for dosing)* and patients who are inappropriate for the Once-daily dosing regimen:

Time of level monitoring
Gentamicin levels must be measured on the **third** dose after the start of treatment and then **twice-weekly** for patients with normal and stable renal function. Monitor levels more frequently if renal function has deteriorated and levels being too high.

Target Levels	**For Infective Endocarditis *(see Section 21 for dosing)***	**Others indications when Once-daily dosing is inappropriate**
Trough level (pre-dose)	<1 mg/L	<2 mg/L
Peak level (1hr post dose)	3 – 5 mg/L	5-10 mg/L

31.2 AMIKACIN AND TOBRAMYCIN

Should only be used on the advice of a Microbiologist / ID Consultants

Drug	**Dosages (based on ideal body weight)**	**Target Pre-dose Levels**
Tobramycin	7mg/kg once daily	< 1mg/L
Amikacin	15mg/kg once daily OR 15mg/kg in 2 divided doses	<5mg/L OR <10mg/L

Both Tobramycin and Amikacin assays are not processed locally. Therefore, it is recommended to send blood for assays before 8am during weekdays.

Advise to take levels prior to the second dose and continue the recommended dose daily until levels are available for evaluation. Continue to monitor the renal function**.**

31.3 VANCOMYCIN – see Section 28

31.4 TEICOPLANIN – see Section 29

32. MRSA Topical Decolonisation Regime

MRSA TOPICAL DECOLONISATION REGIME

- BACTROBAN® (Mupirocin) **nasal ointment *Three times daily* in both nostrils.**

  N.B. Naseptin Nasal Cream QDS will be used where the strain of MRSA is resistant to Mupirocin.
- Hibiscrub (4% Chlorhexidine) **body wash *Once Daily***
- Chlorhexidine **0.2% mouthwash 10ml *Twice Daily***

The treatment course is FIVE days, stop for two days and re-screen. Restart second course only if screen positive for up to a maximum of two courses. For persistent positive results, contact Infection Control or Microbiology for advice.

Please refer to the MRSA Policy - CPDI023

33. Antibiotic Management Guidelines For MRSA Infections

Ref: JAC (2006) 57; 4: 589-608

This is an additional guideline for treatment of confirmed or suspected MRSA infections, which should be used in conjunction with the current Trust Antibiotic Policy for empirical management of the infections. Treatment choices should be modified according to the antibiotic susceptibility reports. Prescribers are reminded to step down to flucloxacillin from glycopeptides (or linezolid - Microbiology approval only) where possible when the antibiotic susceptibilities of the *Staphylococcus aureus* strain are known. Discussion with Microbiologist is strongly recommended.

It is important to distinct MRSA colonisation from infection. Antibiotics that are active against MRSA must not be started to treat MRSA colonisation if it is not causing an infection. The MRSA topical eradication regime should be started in order to decolonise the MRSA loads carried by the patients for the protection of themselves and other severely ill patients in areas that are categorised as high-risk.

These Guidelines provide the antibiotic treatment of MRSA infections for the following infections based on the recommendations from the Joint Working Party of the British Society for Antimicrobial Chemotherapy, Hospital Infection Society and Infection Control Nurses Association (*JAC (2006) 57; 4: 589-608)*

1. Skin and Soft Tissue Infections i.e. cellulitis and surgical site infection and IV infusion site infections
2. Bone and Joint Infections
3. Urinary Tract Infection
4. Lower Respiratory Tract Infections
5. MRSA Bacteraemia
6. Surgical Site Infection Prophylaxis

33.1 Skin and Soft Tissue Infections i.e. cellulitis and surgical site infection and IV infusion site infections

- For superficial, non-severe infections and patients who are not at risk of bacteraemia
  - Use a combination of the TWO of the following oral agents. The choice of which must be guided by the antibiotic susceptibility reports; patient's renal and hepatic functions; or other medical conditions that may render the unsuitability for using the chosen drug.

    i) *Clindamycin* PO 300mg to 450mg QDS – must not be used if MRSA is resistant to erythromycin
    ii) *Sodium Fusidate* PO 500mg TDS
    iii) *Rifampicin* PO 300mg – 600mg BD
    iv) *Trimethoprim* PO 200mg BD
    v) *Doxycycline* PO 100mg BD

- For Severe infections and/or patients at risk of bacteraemia:

  i) *Vancomycin IV 1g BD*, infuse over 100 mins, dosage to be modified according to renal function and level monitoring is required – *SEE NOTE**

OR

  ii) *Teicoplanin IV 400mg BD on day 1 then 400mg daily if <80kg, or for >80kg dose at 6mg/kg BD on day 1 then 6mg/kg dose daily.*
    - Treatment failure or slow clinical progression with monotherapy with IV glycopepetide (i.e. vancomycin and teicoplanin), consider adding *Rifampicin PO 300-600mg BD or Sodium fusidate PO 500mg TDS* to the IV glycopeptide treatment – discuss with Microbiologist.

OR

  iii) *Linezolid IV/PO 600mg BD – on Microbiologist or ID physician approval only*

*Vancomycin level monitoring: pre-dose level should be taken prior to the 3rd or 4th dose. Target pre-dose level between 10-15 mg/L. (*Note: a higher target range of 15-20mg/L might be recommended by a Microbiologist for highly resistant strains or for treatment of Infective Endocarditis)*

On the day of level monitoring, take level prior to the dose, give the dose and review level prior to giving the next dose. Continue to monitor the renal function. For normal renal function, repeat levels twice weekly. For renal impairment, check levels earlier and repeat more frequently.

Topical antibiotic preparations

- The use of topical antibiotics e.g. mupirocin, fusidic acid is discouraged due to the emergence of bacterial resistance when used in large bacterial population in the absence of any appropriate systemic therapy.
- At the discretion of the Microbiologist, appropriate topical antibiotics may be used at small superficial sites pressure sores for a maximum of 7 days – *please discuss with Microbiologist for advice.*

Differences between different Bactroban® topical products:

- Mupirocin 2% in paraffin base (Bactroban® Nasal Ointment) – used as part of the topical eradication regime for eradication of nasal carriage.
- Mupirocin 2% in polyethylene glycol base (Bactroban® ointment) – it is an effective agent against multi-resistant staphylococcal bacteria when applied to infected skin lesions such as eczema and small superficial pressure sores. However, it should not be used on large burns or large raw areas due to the potential absorption of the polyethylene glycol which can cause nephrotoxicity. It is also not suitable for the insertion sites of central venous catheters or other plastic devices due to the possible damage caused to the catheter material by the polyethylene glycol base.

33.2 Bone and Joint Infections

Consult with Microbiologist for advice

33.3 Urinary Tract Infections

For mild and moderate – treat with one of the followings. The treatment choice depends upon the susceptibility result.

i) *Trimethoprim PO 200mg BD*

OR

ii) *Nitrofurantoin PO 100mg QDS*

OR

iii) *Doxycycline PO 200mg STAT, then 100mg DAILY*

Treatment with IV glycopeptide is not usually recommended. Seek Microbiologist advice if all of the above are inappropriate.

For severe infection e.g. pyelonephritis or septicaemia – treat for 14 days

i) *Vancomycin IV 1g BD*, infuse over 100 mins, dosage to be modified according to renal function and level monitoring is required – *SEE NOTE**

OR

ii) *Teicoplanin IV 400mg BD on day 1 then 400mg daily if <80kg, or for >80kg dose at 6mg/kg BD on day 1 then 6mg/kg dose daily.*

OR

iii) *Linezolid IV/PO 600mg BD* – **on Microbiologist or ID Physician approval only**

*Vancomycin level monitoring: pre-dose level should be taken prior to the 3rd or 4th dose. Target pre-dose level between 10-15 mg/L. (*Note: a higher target range of 15-20mg/L might be recommended by a Microbiologist for highly resistant strains or for treatment of Infective Endocarditis)*

On the day of level monitoring, take level prior to the dose, give the dose and review level prior to giving the next dose. Continue to monitor the renal function. For normal renal function, repeat levels twice weekly. For renal impairment, check levels earlier and repeat more frequently.

33.4 Lower Respiratory Tract Infections

Note: MRSA isolated in sputum may represent a colonisation, as distinct from an infection. Careful clinical assessment is required in the diagnosis MRSA pneumonia / chest infection. Do not treat MRSA colonisation in sputum if patients are clinically well and have no signs of lower respiratory chest infections. Micro-organisms such as enterococci, yeasts, pseudomonas spp. and MRSA are commonly isolated as contaminants in patients previously received antibiotics.

For COPD or non-severe pneumonia without any signs of systemic infection

Doxycycline PO 200mg STAT then 100mg DAILY for 7 days

For infections in bronchiectasis without pneumonia – discuss with Microbiologist regarding antibiotic regime for MRSA

For confirmed MRSA pneumonia – in the presence of X-Ray changes and isolation of MRSA from sputum

i) *Linezolid IV/PO 600mg BD* – **on Microbiologist or ID Physician approval only**

OR

ii) *Vancomycin IV 1g BD*, infuse over 100 mins, dosage to be modified according to renal function and level monitoring is required – *SEE NOTE**

OR

iii) *Teicoplanin IV 400mg BD on day 1 then 400mg daily if <80kg, or for >80kg dose at 6mg/kg BD on day 1 then 6mg/kg dose daily.*

- Treatment failure or slow clinical progression with monotherapy with IV glycopepetide (i.e. vancomycin and teicoplanin), consider adding *Rifampicin PO 300-600mg BD or Sodium fusidate PO 500mg TDS* to the IV glycopeptide treatment – discuss with Microbiologist

*Vancomycin level monitoring: pre-dose level should be taken prior to the 3rd or 4th dose. Target pre-dose level between 10-15 mg/L. (*Note: a higher target range of 15-20mg/L might be recommended by a Microbiologist for highly resistant strains or for treatment of Infective Endocarditis)*

On the day of level monitoring, take level prior to the dose, give the dose and review level prior to giving the next dose. Continue to monitor the renal function. For normal renal function, repeat levels twice weekly. For renal impairment, check levels earlier and repeat more frequently.

33.5. MRSA Bacteraemia - Treat for a minimum of 14 days or longer for infective endocarditis

MRSA Treatment for Confirmed MRSA Infections or Criteria For Suspected MRSA Infections

- Septic patients unresponsive to current antibiotic treatment which does not cover MRSA
- Patients with multiple admission
- Patients who are admitted from a nursing home or sheltered accommodation
- Patients who have stayed in hospital for longer than 3 days on a unit with known MRSA patients
- Patients who previously colonised with MRSA despite of latest negative screen result or currently colonised with MRSA

Send blood cultures and samples for other possible foci of infection for culture and sensitivity prior to start of treatment if possible. First antibiotic dose must be prescribed and given promptly without any delay of treatment.

i) *Vancomycin IV 1g BD*, infuse over 100 mins, dosage to be modified according to renal function and level monitoring is required – *SEE NOTE* (*+ / - Rifampicin IV / PO 300-600mg BD on Microbiologist advice)

OR

ii) Teicoplanin IV 400mg BD on day 1 then 400mg daily if <80kg, or for >80kg dose at 6mg/kg BD on day 1 then 6mg/kg dose daily (+ / - Rifampicin IV / PO 300-600mg BD on Microbiologist advice)

OR

iii) Linezolid IV/PO 600mg BD – **on Microbiologist or ID Physician approval only**

- Consider adding **Gentamicin 7mg/kg based on ideal body weight (***see Trust Guideline for dosing and monitoring)* for septic shock with hypotension or sepsis with unknown cause of origin.
- Take repeat blood cultures 48 hours after start of appropriate antibiotics (suggests high risk of metastatic infection if remains positive cultures)
- Remove or replace all removable possible foci of infection e.g. venous catheter, central line send for culture and sensitivities.
- Perform echocardiography if clinical suspicion of infective endocarditis is present. Follow the treatment guideline for infective endocarditis if diagnosed.
- Once the antibiotic susceptibilities of the *Staphylococcus aureus* strain are known to be Methicillin-sensitive staphylococcal aureus organisms (MSSA), it is appropriate to step down to flucloxacillin from glycopeptides (or linezolid) where possible.

*Vancomycin level monitoring: pre-dose level should be taken prior to the 3rd or 4th dose. Target pre-dose level between 10-15 mg/L. (*Note: a higher target range of 15-20mg/L might be recommended by a Microbiologist for highly resistant strains or for treatment of Infective Endocarditis)*

On the day of level monitoring, take level prior to the dose, give the dose and review level prior to giving the next dose. Continue to monitor the renal function. For normal renal function, repeat levels twice weekly. For renal impairment, check levels earlier and repeat more frequently.

33.6 Surgical Site Infection Prophylaxis

All patients should be offered pre-operative screening for MRSA. Patients who are known to be colonised and/or infected with MRSA and are to be admitted for elective surgical and orthopaedic procedures should be given the topical

MRSA decolonisation regime pre-operatively in an attempt to eradicate the MRSA carriage to prevent subsequent MRSA infection.

Current MRSA Topical Eradication Regimen – see page 51

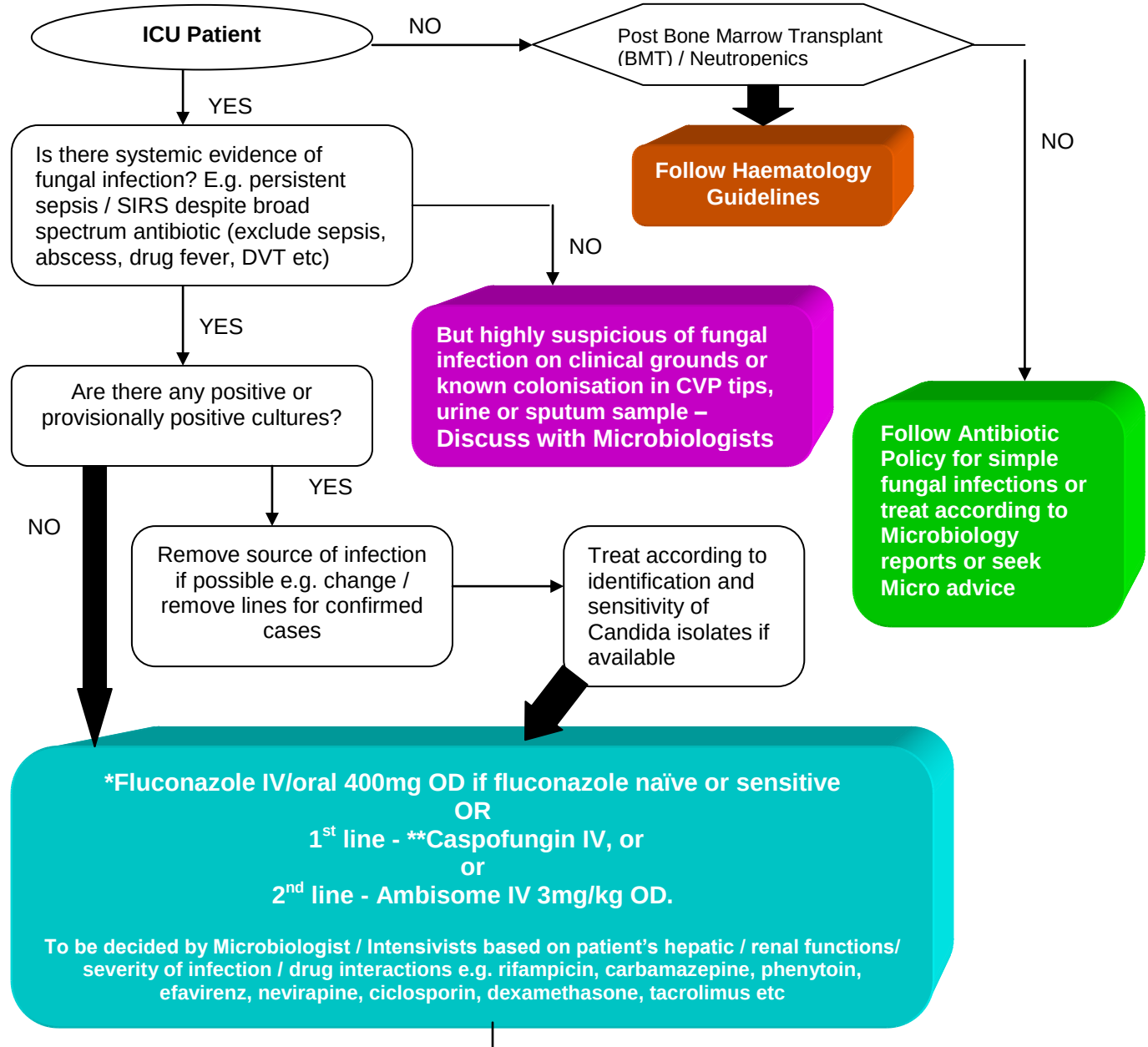
Where a patient undergoing a surgical procedure is at high risk of post-operative MRSA infection, **IV Vancomycin 1g over 100mins** or **IV teicoplanin 400mg** should be administered at induction as part of the recommended prophylaxis regimen appropriate for the procedure. For surgical procedures that last longer than 3 hours and / or with a great deal of blood loss, a further dose should be given at 2 hours.

Patients at high risk of MRSA infections include: -

- Patients known to be colonised or infected with MRSA without documented effective eradication
- Prolonged pre-operative hospital inpatient stay
- Patients who have been admitted from a long-term care facilities e.g. nursing home, sheltered accommodation

34. Empirical Treatment Guidelines for Fungal Infections

34.1 Candida Infections



Review every 3 to 4 days according to identification / sensitivity of the Candida, clinical improvement, other lab results and course length

All stop / continue / change of treatment must discuss with a Microbiologist.

* Modify fluconazole dose to 800mg OD if on HDx/Hfilt.e.g. CVVH

** Caspofungin dose: 70mg on Day 1 (loading), 50mg OD (<80kg) or 70mg OD (if >80kg) thereafter. Moderate to severe hepatic dysfunction: reduce the subsequent daily dose to 35mg OD. Check for drug interactions.

Notes: *Candida krusei* and *C. glabrata* are inherently resistant to Fluconazole.
Caspofungin is inherently inactive against *Zygomycetes, Cryptococcus, Fusarium and Tricosporin Spp*

34.2 Serious and life-threatening Aspergillosis

(To be initiated by Haematologists ONLY or in discussion with Microbiologists)

Voriconazole (Body weight > 40kg)

- **Dose:** (6mg/kg) 400mg BD (loading dose) on Day 1, then (4mg/kg) 200mg BD thereafter
- **Route:**
  - IV infusion over 2 hours, or
  - Oral (excellent oral bioavailability) - should be taken one hour before or after food
- **Interactions** with other drugs are very common. Prescribing Voriconazole with certain drugs may be a contraindication or dosage re-adjustment and level monitoring may be required. Always check before initiation.

34.3 Cryptococcosis

(To be initiated by ID Consultants ONLY)

Ambisome IV 3mg/kg OD following a 1mg test dose (See BNF for full guidance)

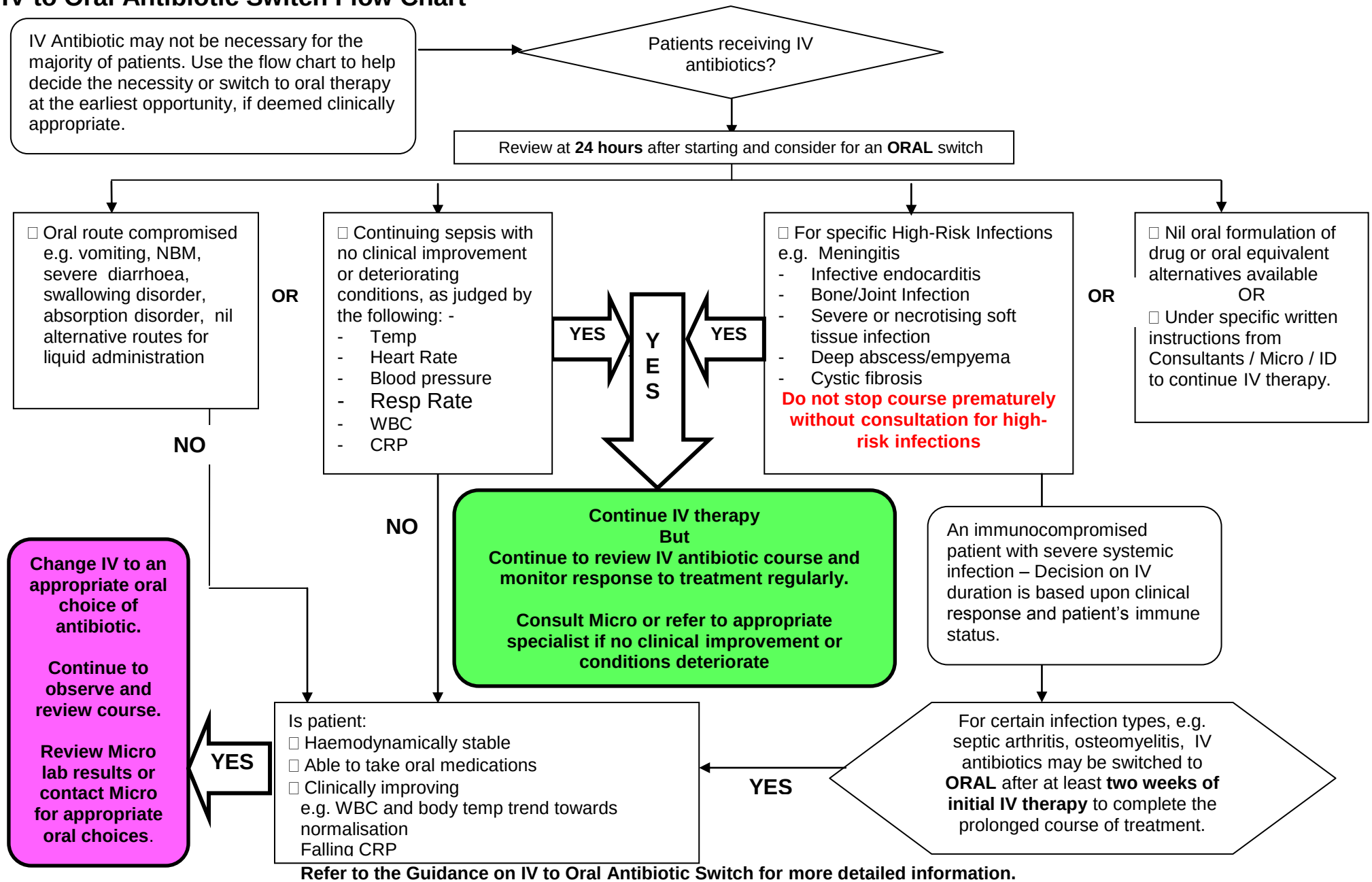
plus

Flucytosine IV 25mg/kg QDS
For at least 14 days (depending on clinical response and repeat lumbar punctures).

Monitoring requirements: renal function; FBC; flucytosine level monitoring (pre dose level 30 – 40mg/L; 30min post dose level: 70-80mg/L)

Appendix 1

IV to Oral Antibiotic Switch Flow Chart



Refer to the Guidance on IV to Oral Antibiotic Switch for more detailed information.

Quick Empirical Antimicrobial Summary Chart for Common Infections 2011

The Pennine Acute Hospitals NHS Trust

Refer to Antibiotic Policy for full and detailed Guidance

UTI

Trimethoprim PO 200mg BD for 3-5 days
OR
Nitrofurantoin PO 50mg QDS for 3-5 days

If all resistant or unsuitable:-

Cefalexin PO 500mg TDS for 5 days
(Avoid Cefalexin if previous CDT positive)

Community Acquired Pneumonia

Non-severe CURB-65 score < 3

Amoxicillin PO 500mg-1g TDS

Add Erythromycin PO 500mg QDS, *(or equivalent)* if atypical infection likely

True Penicillin Allergy – Levofloxacin PO 500mg OD

For 5-7 days

Severe CURB-65 score > 3

Co-amoxiclav IV 1.2g TDS plus clarithromycin IV 500mg BD

True Penicillin Allergy – Levofloxacin IV/PO 500mg OD/BD
For 5-7 days
If on ITU, consider add in Rifampicin

Hospital Acquired Pneumonia

Moderate to Severe, or more than 5 days of admission, or recent antibiotic exposure

NO

Co-amoxiclav PO 625mg / IV 1.2g TDS

True Penicillin Allergy – Levofloxacin IV / PO 500mg OD / BD
For 5-7 days

YES

Pip/ Tazobactam IV 4.5g TDS

True Penicillin Allergy – Ciprofloxacin IV 400mg / PO 500mg BD + / - #Gentamicin
For 5-7 days

Cellulitis *(excl. orbital cellulitis)*

MILD: Flucloxacillin PO 500mg – 1g QDS

§MODERATE TO SEVERE:
Benzylpenicillin IV 1.2g plus Flucloxacillin IV 1g QDS initially, followed by 7-10 days of oral therapy.

True Penicillin Allergy -
MILD: Erythromycin PO 500mg QDS, *(or equivalent)*

MODERATE TO SEVERE:
§Clindamycin IV 600mg QDS initially, followed by 7-10 days of oral therapy

OR
PO 300-450mg QDS

Add #Vancomycin or Teicoplanin if **MRSA** is of concern

§Sepsis

MODERATE

Co-amoxiclav IV 1.2g TDS
plus
Stat dose of #Gentamicin IV 7mg/kg (based on ideal body wt) – maximum should not exceed 480mg

If in doubt, consult Micro / ID

§Treatment duration depends on clinical response. Daily review required.

#Monitoring required. Follow Trust Guidelines.

SEVERE / NEUTROPENIC SEPSIS

Pip/ Tazobactam IV 4.5g TDS plus #Gentamicin IV 7mg/kg (based on ideal body wt) – max dose = 480mg

True Penicillin Allergy - #Vancomycin IV plus Metronidazole IV 500mg TDS plus #Gentamicin IV

2nd Line for Neutropenic Sepsis only – Meropenem IV 1g TDS

Aspiration pneumonia
Co-amoxiclav IV 1.2g TDS or PO 625mg TDS if not NBM
For 5- 7 days
True Penicillin Allergy – Please discuss with Micro / ID

REMEMBER:
- Send specimens for C&S prior to initiation of therapy
- Ensure that indication for treatment is clearly documented
- Consider oral route as first choice
- Review IV antibiotic at 24-48 hrs for timely oral switch
- Modify antibiotic in light of C&S results
- Check previous MRSA & C.diff status

Fungal Infections
Fluconazole PO 50mg OD for 7 days, or
Nystatin mouth suspension 1ml QDS for 7 days

C. difficile Diarrhoea – Review current antibiotic therapy. Prescribe Metronidazole PO 400mg TDS for 10 days (Mild), or Vancomycin Oral 250mg QDS for 7-10 days (Severe)

For Microbiology advice phone 78362 / 71641 (or on-call Microbiologist / ID via switchboard)

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Appendix III

The Pennine Acute Hospitals NHS
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DRUG INFORMATION SHEET

CIPROFLOXACIN

The antibiotic you will be given is called ciprofloxacin. The meningococcal germs that cause meningitis and septicaemia can be carried in the nose and throat. This antibiotic will kill them. Ciprofloxacin is an antibiotic that is frequently used to treat lots of different conditions. It is recommended in the national guidelines for close contacts of someone with meningococcal disease.

Your doctor will have prescribed either one or two tablets, or syrup for children. You should take your tablets or medicine as a one-off dose with a glass of water. It is important to drink plenty of fluids for the rest of the day after taking this antibiotic.

If you have taken antacid/indigestion medicines or preparations containing iron or mineral supplements, wait at least 4 hours before you take your dose of ciprofloxacin.

Avoid drinking alcohol with this medication as it may make you drowsy, affecting your ability to drive or operate machinery.

The side effects of ciprofloxacin may include:

- Tummy ache, diarrhoea and nausea
- Tiredness and headaches
- Rash and itching
- Facial swelling – very rarely breathing difficulties may occur with the facial swelling. **You should seek medical attention urgently if this occurs.**
- Pain and inflammation around the joints.

Please tell your doctor if you are:

- Allergic to ciprofloxacin
- Have epilepsy or G6PD deficiency, so they can decide whether you should receive ciprofloxacin or another treatment.

*Ciprofloxacin **does not** interfere with the contraceptive pill.*

Appendix IV

The Pennine Acute Hospitals NHS

NHS Trust

DRUG INFORMATION SHEET

RIFAMPICIN

The antibiotic you will be given is called rifampicin. It comes as either tablets or syrup. The meningococcal germs that cause meningitis and septicaemia can be carried in the nose and throat. This antibiotic will kill them. Rifampicin is an antibiotic that is frequently used to treat lots of different conditions. It is recommended in national guidelines for close contacts of someone with meningococcal disease.

Rifampicin must be taken twice a day for two days (morning and evening). The instructions will be clearly written on the box or bottle. **It is important that you take a two day course. It should be taken one hour before a meal to obtain the best effect.** If you are taking syrup, there may be some left in the bottle at the end of the course. This should be disposed of safely by pouring it down the sink or returning it to your pharmacist.

The side effects of rifampicin may include:

- Orange/reddish staining of urine, saliva and tears. *This is normal so do not be alarmed.*

  Rifampicin may permanently stain some contact lenses so you should not wear contact lenses whilst on treatment or for the following week.
- Tummy upset, diarrhoea and nausea
- Skin flushing and itching, with or without a rash
- Very rarely, jaundice (yellowing of the skin or whites of the eyes)
- Rifampicin may reduce the effect of several medicines including
  - Blood thinning medication (anticoagulants)
  - Diabetic medication
  - Some types of epilepsy medication (anticonvulsants)
- **Rifampicin can interfere with the contraceptive pill. If you use the contraceptive pill, you should use a barrier form of contraception (such as condoms) in addition to your pill until one month after your treatment.**

Please tell your doctor if you

- take any medication, or
- are allergic to rifampicin, so they can decide whether you should receive rifampicin or another treatment.

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