

Scottish Antimicrobial Prescribing Group

Guidance to Optimise Antimicrobial Use

and

Reduce *Clostridium difficile* Associated Disease

in Scottish Hospitals

Position Paper

Produced July 2008

Guidance to optimise antibiotic use and reduce *C. difficile* associated disease (CDAD) in Scottish hospitals

What is presently happening in Scotland?

Too much or inappropriate use of antibiotics is leading to the occurrence of resistance and consequently increased morbidity, mortality, increased use of health care resources and unintended consequences such as *C. difficile* infections.

In Scotland, antimicrobials account for up to one fifth of hospital drug budgets. Approximately **one third of all inpatient receive antibiotics during a period of hospitalisation and up to 50% of these prescriptions are deemed inappropriate for a variety of reasons**, but primarily due to unnecessary use of broad spectrum agents. One of the key **unintended consequences** of such use is ***C. difficile* associated disease (CDAD)**, of which significant increases have been reported combined with evidence of more severe infection and greater attendant complications and mortality.

What will help to reduce this?

The evidence base for the effectiveness of programmes or interventions restricting antibiotic use and improving the quality of prescribing (antimicrobial stewardship programmes) combined with key infection prevention measures is extensive.

The primary goal of antimicrobial stewardship is to optimize clinical outcomes while minimizing unintended consequences of antimicrobial use including toxicity, the selection of pathogenic organisms (such as *C. difficile*) and the emergence of resistance.¹

There are two core strategies, both proactive, that provide the foundation for an antimicrobial stewardship program. These strategies are not mutually exclusive.

- Prospective audit with intervention and feedback. This can result in reduced inappropriate use of antimicrobials (I-A)*
- Formulary restriction can lead to immediate and significant reductions in antimicrobial use and cost (II-A)¹

* See table for ranking recommendations in clinical guidelines page 7

What is the role of the Scottish Antimicrobial Prescribing Group (SAPG)?

The Scottish Antimicrobial Prescribing Group (SAPG), a national clinical forum, convened by the Scottish Medicines Consortium (SMC), but supported by The Scottish Government Health Directorate (SGHD) and Healthcare Associated Infection (HAI) Task Force was launched in March 2008.² The SAPG is planning to undertake important pieces of work related to antibiotic consumption and prescribing, resistance surveillance, organisational accountability for antimicrobial stewardship, antimicrobial prescribing education for healthcare professionals and infection management. One of its immediate concerns is to support the development, implementation and evaluation of good practice guidance for antimicrobial use for common infections and surgical prophylaxis. These should incorporate best evidence for patient management as well as elements to limit the inappropriate use of antibiotics, including those associated with development of CDAD and meticillin resistant *Staphylococcus aureus* (MRSA) infection. Local implementation and evaluation of these measures should be undertaken by Antimicrobial Management Teams (AMT's) recommended in the 2005, SGHD Health care associated infection task force commissioned SMC paper "Antimicrobial Prescribing Policy and Practice" (APP&P)³. Unfortunately to date many of Scotland's NHS Boards do not have these AMT's in place.

A Chief Executive Letter (CEL 30 2008 http://www.sehd.scot.nhs.uk/mels/CEL2008_30.pdf) issued by the SGHD on the 8th July has confirmed the establishment of the SAPG. At its first full meeting in June 2008 SAPG advised the SGHD that not every Board has an established AMT as set out in APP&P and ScotMARAP², and some of those which have been set up do not cover primary care prescribing. As an immediate intervention to reduce the risks from *C. difficile*, the SGHD has accepted SAPG's recommendation that all Boards should as a priority establish an AMT which covers primary and secondary care prescribing activities.

SAPG Recommendations:

In response to increasing CDAD rates and invasive infections due to resistant bacteria such as MRSA, awareness of the associated morbidity and mortality, and in order to ensure prudence in antibiotic prescribing (including surgical prophylaxis) in Scottish hospitals, SAPG recommends the following actions to complement current infection control measures;

- 1. As a minimum requirement each health board should have an AMT responsible at board level**, for the surveillance of antimicrobial usage, audit of local prescribing practice and development and dissemination of infection management guidance. AMTs should be

supported by the local Area Drugs and Therapeutics Committee (ADTC) and or antibiotic subcommittee.

The AMT should comprise a lead antimicrobial pharmacist, a lead clinician and a lead microbiologist. All key members should have dedicated resource in keeping with the size of the local organisation. The AMT should work closely with infection control teams to implement changes in prescribing and to monitor changes in Healthcare Associated Infections, antibiotic consumption and prescribing practice. The potential risks of antibiotic restriction such as increased complications, readmissions, intensive care unit (ICU) admissions or mortality from relevant infections and re-emergence of infections due to organisms that have become uncommon during the antibiotic era should also be monitored. **Resource should be available to collect these data.**

2. Regional networking should be established in order to share best practice and harness best use of resources and expertise.

3. Each AMT should develop, actively implement and audit compliance with an “Infection management guideline” for commonly encountered infections in hospitals. Guidance should incorporate the following elements;

- Specific guidance for the management of pneumonia, infective exacerbations of chronic obstructive pulmonary disease (COPD), urinary tract infection, skin and soft tissue infection, intra-abdominal infection, bone and joint infection, central nervous system infection, infection of unknown source and clinical management of CDAD (see point 5 below). Examples of existing policies within Scotland are available in appendix 1. Any policy needs to be linked to local infection and antimicrobial resistance patterns
- Clear recommendations on duration of therapy for each antibiotic indication.
- Clear recommendations on when to use intravenous (IV) or oral antibiotic therapy, when to switch from IV to oral therapy and the key components of documenting in case notes antibiotic treatment review. There is considerable evidence in the literature covering this area. Although there is as yet no formal care bundle developed for antimicrobial prescribing core elements for monitoring prescribing have been identified.⁴

- **Within local guidance there should be clear demonstration of restrictions of antibiotics associated with CDAD.** An example of how this might be done can be found in appendix 2.
- **Specific recommendations on good antibiotic stewardship to limit the spread of *C. difficile* are**
 - **Stop any (non-*Clostridium difficile*) antimicrobial treatment in patients with CDAD as soon as possible (IA)**
 - **As part of good antibiotic stewardship review frequency, duration, dose and type of antimicrobial used and avoid the use of high-risk agents in patients at risk. Use these agents only when medically needed. (IB)**

High-risk antimicrobial agents:

3rd generation cephalosporins (ceftriaxone, cefotaxime, ceftazidime)

Broad spectrum penicillins (including amoxicillin-clavulanic acid)

Clindamycin Fluoroquinolones

There is evidence that concurrent implementation of key infection control measures and antimicrobial stewardship can lead to a reduction in CDAD incidence

4. Each board is responsible for ensuring compliance with SIGN guidance on surgical antibiotic prophylaxis⁵. In particular **antibiotic prophylaxis should not be continued beyond 24 hours following an operative procedure. AMTs should audit administration of surgical prophylaxis. Recording of compliance with this recommendation should be undertaken as part of the routine data collection for mandatory surgical site infection surveillance.**

5. Each board should have in place individual patient management guidelines for when a patient is diagnosed with CDAD. These should incorporate the following;

- Patients with CDAD should have concomitant antibiotic therapy stopped or simplified.
- Patients with CDAD should have concomitant gastric acid suppressive therapy stopped whenever possible.
- Patients with CDAD should undergo severity assessment. Severe infections are defined as those with one or more of the following criteria;

Temperature > 38.5 °C

Patient has major risk factors (hospitalisation in ICU, immuno-suppression)

Hypotension (Systolic blood pressures <90 mm/Hg),

White cell count >15/ mm³,

Serum albumin <25 mg/l,

Serum creatinine >1.5 xs base line

Suspicion of PMC, toxic megacolon, ileus

Colonic dilatation in CT scan >6 cm on abdominal X ray

- Treatment of CDAD should be initiated based on assessment of symptoms and severity of disease while taking into account individual risk factors of the patient.
- Patients with non-severe CDAD should receive oral metronidazole 400mg 8 hourly for 10 days.
- Patients with non-severe CDAD who have not improved after 5 days or patients with severe CDAD should switch to oral vancomycin 125mg 6 hourly for 10 days.
- Patients with severe CDAD with hypotension or ileus should receive IV metronidazole 400mg 8 hourly in addition to oral vancomycin 250-500mg qds. If there is evidence of peritonitis secondary to colonic perforation additional anti-bacterial cover against coliforms would be necessary. In these situations urgent surgical review with a view to considering colectomy should be sought.

For further information for CDAD treatment refer to Owens RG, Valeti AJ. IDCP 2007; 15(5):299-315.

SCOTTISH ANTIMICROBIAL PRESCRIBING GROUP (SAPG) July

2008 Review July 2009

Grading system for ranking recommendations in clinical guidelines¹

| Category , grade | Definition |
|-----------------------------------|--|
| <hr/> | |
| Strength of recommendation | |
| <hr/> | |
| A | Good evidence to support a recommendation for use |
| B | Moderate evidence to support a recommendation for use |
| C | Poor evidence to support a recommendation for use |
| | |
| Quality of evidence | |
| I | Evidence from <u>> 1 properly randomised controlled trial</u> |
| II | Evidence from <u>> 1 well designed clinical trial, without randomisation; from cohort or case-controlled analytic studies (preferably from >1 centre); from multiple time series; or from dramatic results from uncontrolled experiments</u> |
| III | Evidence from opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees. |

References

1. T.H. Dellit et al Infectious diseases society of America and the society for healthcare epidemiology of America Guidelines for developing an institutional program to enhance antimicrobial stewardship. *CID* 2007;**44** 159-177
2. The Scottish Management of Antimicrobial Resistance Action Plan (ScotMARAP) 2008 <http://www.scotland.gov.uk/Publications/2008/03/12153030/0> Accessed 25th June 2008
3. Antimicrobial Prescribing Policy and Practice in Scotland: Recommendations for Good Antimicrobial Practice in Acute Hospitals <http://www.scotland.gov.uk/Publications/2005/09/02132609/26099> Accessed 25th June 2008
4. C.Pulcinin et al Design of a 'day 3 bundle' to improve the reassessment of inpatient empirical antibiotic prescriptions , *JAC* 2008; **61**, 1384-1388
5. Antibiotic prophylaxis in surgery. A national clinical guideline. Scottish Intercollegiate guidelines network July 2008 <http://www.sign.ac.uk/pdf/sign104.pdf>

Appendix 1

- **Infection Management Guideline: Empirical Antibiotic Therapy – NHS Greater Glasgow & Clyde.**

(Note this was designed to be printed A3 in size, if printing it A4 in size please ensure that in the print menu 'shrink to printable area' is selected for the 'Page Scaling' setting.)

- **Adult IV to Oral Antibiotic Switch Therapy Guidelines – NHS Dumfries & Galloway.**
- **Antibiotic Prescribing Protocol Antibiotic Traffic Light System – Dumfries & Galloway Royal Infirmary and Galloway Community Hospital, NHS Dumfries & Galloway.**

low spectrum agents (see above).

presence of +ve microbiology and specific situations (see above)
 o oral therapy when signs of sepsis are resolving and oral route is not
 mised.

observe indicated duration of therapy and stop if alternative non-infectious
 is made.

ntION FOr antIbIOTIc In case nOTes

| urinary tract | Gastro-intestinal | bone / joint infection | cns infection | severe systemic infection? source | Immunocompromised patient |
|--|---|--|---|---|--|
| <p>lower uti/cystitis</p> <p>Antibiotics if; urinary symptoms + positive urinalysis (leucocytes + nitrites in clean catch urine). Obtain urine culture. Consider delaying antibiotic therapy pending culture. Catheter specimen of urine is unreliable.</p> <p>Trimethoprim 200mg 12hrly <i>or</i> Nitrofurantoin 50mg 6hrly (avoid if renal impairment) Duration 3 days</p> <p>catheter-related uti</p> <p>Remove/replace catheter and culture urine. Give single dose IV agent as per pyelonephritis. Further antibiotic treatment may not be required. However:</p> <ul style="list-style-type: none"> - If cystitis, treat as above. - If sepsis or deterioration treat as for pyelonephritis as below. | <p>Gastroenteritis</p> <p>No antibiotic usually required</p> <p><i>Clostridium difficile</i> associated diarrhoea : Stop / simplify concomitant antibiotics and gastric acid suppressive therapy if possible. severe if; colonic dilatation >6cm or white cell count >15 or Creatinine >1.5 xs baseline or albumin ≤ 25 non-severe; oral metronidazole 400mg 8hrly severe or no improvement after 5 days of metronidazole or recurrence ; oral vancomycin 125mg 6 hrly (add IV Metronidazole 500mg 8hrly if ileus or hypotension) Total duration 10-14 days</p> | <p>septic arthritis / osteomyelitis</p> <ul style="list-style-type: none"> - Underlying metal work - Recent surgery <p>Consider orthopaedic referral</p> <p>diabetic foot sepsis</p> <ul style="list-style-type: none"> - Ulcer, probes to bone? - Neuropathy? - Peripheral vascular disease? - MRSA risk? <p>For outpatient therapy consult diabetic clinic guidelines</p> <p>Obtain synovial fluid / deep tissue as appropriate when possible</p> <p>IV therapy usually</p> <p>severe</p> <p>consider infective endocarditis – e.g. IVDU, line-related sepsis, recent dental extraction.</p> | <p>IV therapy to be administered URGeNTly on arrival at hospital and after blood cultures.</p> <p>CT scan before LP if age >60, seizures, reduced GCS, CNS signs or immunosuppression. Seek ID / microbiology advice.</p> <p>NB For patients with HIV infection</p> | <p>urgent IV therapy</p> <p>review all anatomical systems Hospital vs community-acquired infection? eColi, Staph aureus and Pneumococcus are com-monest community blood culture isolates</p> <p>consider mrsa infection – healthcare associated sepsis, recent hospital discharge, post-operative wound or line-related sepsis or sepsis in previous or consider severe streptococcal sepsis – e.g. pharyngitis, erythroderma, hypotension.</p> | <p>Which patient?</p> <p>Chemotherapy within 3 weeks, high-dose steroids (>15mg/day for >2 weeks), other immunosuppressive agents (e.g. anti-TNF, cyclophosphamide), neutrophil <0.5 or < 1.0 and falling, primary immunodeficiency.</p> <p>please discuss with the IDU, Brownlee</p> <p>Sepsis syndrome</p> <p>No defnable site of infection</p> <p>t re.</p> |

| pyelonephritis | Intra-abdominal / hepatobiliary / pelvic sepsis | septic arthritis / osteomyelitis | meningitis | source unknown | Immunocompromised plus sepsis |
|---|--|--|---|---|---|
| <p>Oral Ciprofloxacin 500mg 12hrly (750mg if <i>Pseudomonas</i> suspected) <i>or</i> IV Amoxicillin 1g 8hrly + Gentamicin** Total duration (IV/oral) 10 days</p> | <p>IV Amoxicillin 1g 8hrly + Metronidazole 500mg 8hrly + Gentamicin** or <i>If true penicillin allergy</i> Vancomycin** plus Metronidazole 500mg 8hrly plus Gentamicin** NB. Pancreatitis does not require antibiotic therapy unless complicated by gallstones</p> <p>Total duration (IV/oral) 7-10 days</p> <p>spontaneous bacteria peritonitis</p> <p>Chronic liver disease with ascites: send peritoneal aspirate in both blood culture bottles and universal container to microbiology. If</p> | <p>Flucloxacillin 2g 6hrly IV + Benzyl penicillin 1.8g 6hrly IV + / - Gentamicin** <i>or if true penicillin allergy or MRSA suspected</i> Vancomycin** + / -Gentamicin**</p> <p>diabetic foot sepsis</p> <p>as above + / - Metronidazole 400mg 8hrly po Total duration (IV/oral) depend-ent on surgical intervention. Discuss with microbiology/ID. Usually 6 weeks.</p> <p>**Gentamicin/Vancomycin**</p> | <p>IV Ceftriaxone 2g 12hrly + Dexamethasone 10mg 6hrly</p> <p>If age >55 or immunosuppression or pregnancy add Amoxicillin 2g 4hrly</p> <p>If penicillin resistant, pneumococcus suspected ADD Vancomycin**</p> <p>Duration 7 days (meningococcal), 14 days (pneumococcal), 21 days (listeria).</p> <p>Dexamethasone for 4 days. possible encephalitis Aciclovir 10mg/kg 8hrly (see prescribing guidance for dosage alteration in renal impairment) Duration 10-14 days</p> | <p>IV Amoxicillin 1g 6hrly + Flucloxacillin 2g 6hrly (Vancomycin if <i>true penicillin allergy</i>) and Gentamicin**</p> <p>possible mrsa infection IV Vancomycin** + Gentamicin**</p> <p>possible streptococcal sepsis (?source)</p> <p>ADD Clindamycin 900mg 8hrly (up to 1200mg 6hrly) to above and seek ID/microbiology advice</p> <p>possible infective endocarditis</p> <p>Seek senior specialist advice. Ben Pen 2.4g 6hrly + Fluclxacil-lin 2g 4hrly + Gentamicin** <i>or if true penicillin allergy / sus-pected resistance</i> Vancomycin** +</p> | <p>Piperacillin - Tazobactam 4.5g 6hrly + Gentamicin** <i>Consider Staphylococcal infection (e.g. line-related sepsis or ADD IV Vancomycin)**</i></p> <p>N.B. If haematology/oncology patient discuss with appropriate specialist and seek ID / microbiology advice.</p> <p>see prescribing guidance</p> |

s or severe or in IVdu

NHS DUMFRIES & GALLOWAY ADULT IV to ORAL ANTIBIOTIC SWITCH THERAPY GUIDELINES

This policy aims to:

1. Reduce hospital acquired infections by promoting early removal of IV cannulae
2. Reduce adverse events associated with parenteral antibiotic therapy
3. Improve use of resources

Patients receiving IV antibiotics **MUST** be considered for a switch to oral **WITHIN THE FIRST 48 hours** and every 24 hours thereafter **IF** the following inclusion criteria are **MET** and **NONE** of the specific exclusion criteria apply. The need for IV therapy should be reviewed after 24 hours however 48 hours will be usually be required to observe a pattern of improvement assuming the use of IV antibiotic has been appropriate initially.

| | |
|---|---|
| <ul style="list-style-type: none"> • The rationale to continue IV therapy must be clearly documented in medical notes • Be guided by culture and sensitivities. • If in doubt contact consultant microbiologist | <p>Specific exclusion criteria</p> <p>Oral route compromised</p> <ul style="list-style-type: none"> ○ Vomiting/nil by mouth ○ Unconscious without enteral feed tubes ○ Mechanical swallowing disorder ○ Oral fluids not tolerated <p>Absorption problem diarrhoea/steatorrhea Continuing severe sepsis</p> <p>2 or more from-</p> <ul style="list-style-type: none"> - Temp >38°C or <36°C - Heart beat >90bpm - Respiratory rate >20/minute - Worsening WCC and/or CRP Febrile with neutropenia - neutrophils < 1 <p>Specific indications:</p> <ul style="list-style-type: none"> ○ meningitis/encephalitis ○ endocarditis ○ immunosuppression ○ osteomyelitis ○ septic arthritis ○ deep abscess ○ cystic fibrosis ○ severe soft tissue infections such as group A streptococcal infections ○ Hickman (central) line infection No oral formulation of the drug or specified alternative available |
| <p>General inclusion criteria</p> <ul style="list-style-type: none"> ○ Able to swallow and tolerate oral fluids ○ Clinical improvement <ul style="list-style-type: none"> ○ Temperature 36°C-38°C for at least 48 hours ○ Heart rate < 90 bpm for previous 12 hours ○ Oral formulation or alternative available | |

Suitable for switch?

Yes

Switch to oral therapy (usually for 5 to 7 days)

Check contraindications, ADRs and potential drug interactions in BNF

- Change on drug kardex
- Remove IV cannula if not required

No

Continue to review the need for IV antibiotics every 24 hours. Monitor venflon site daily every time vital sign observations are made.

NHS DUMFRIES & GALLOWAY
ADULT IV to ORAL ANTIBIOTIC SWITCH THERAPY GUIDELINES

| IV agent | Oral agent with dose suggestions** | Liquid and rectal formulations available |
|--|--|---|
| Amoxicillin | Amoxicillin 500mg 8 hourly | Amoxicillin suspension 125mg/5mls a 250mg/5ml |
| Benzylpenicillin | Penicillin V 500mg-1g 6 hourly OR Amoxicillin ¹ 500mg TDS | Penicillin V oral solution 125mg/5mls a 250mg/5mls Amoxicillin suspension 125mg/5mls a 250mg/5ml |
| Cefuroxime / Ceftriaxone / Cefotaxime | Co-amoxiclav 625mg 8 hourly or 375mg 8 hourly (dependent on possible side effects) | Co-amoxiclav dispersible tabs (+ Amoxicillin suspension for higher dose) |
| Ciprofloxacin | Ciprofloxacin ¹ 500-750mg 12 hourly (if pseudomonas suspected increase to ciprofloxacin 750mg 12 hourly) | Ciprofloxacin suspension 250mg/5mls |
| Clarithromycin | Clarithromycin 500mg 12 hourly | Clarithromycin suspension 125mg/5mls a 250mg/5mls |
| Clindamycin | Clindamycin < 60kg 300mg 6 hourly > 60kg 450mg 6 hourly | No liquid formulation available |
| Co-amoxiclav | Co-amoxiclav 625mg 8 hourly or 375mg 8 hourly (dependent on possible side effects) | Co-amoxiclav dispersible tabs (+ Amoxicillin suspension for higher dose) |
| Flucloxacillin | Flucloxacillin 500mg - 1g 6 hourly | Flucloxacillin oral solution 125mg/5mls a 250mg/5mls |
| Gentamicin | Ciprofloxacin 500mg bd or 750mg bd if pseudomonas suspected ¹ | Ciprofloxacin suspension 250mg/5mls |
| Metronidazole | Metronidazole 400mg 8 hourly | Metronidazole suspension 200mg/5mls and 500mg suppositories |
| Rifampicin | Rifampicin 0.6 -1.2g daily in 2 - 4 divided doses | Rifampicin syrup 100mg/5ml |
| Tazocin | Co-amoxiclav 625mg tid | Co-amoxiclav dispersible tabs (+ Amoxicillin suspension for higher dose) |

1. Amoxicillin has slightly better tissue penetration than Penicillin V, and is better for deep seated infections.

2. Oral ciprofloxacin has excellent bioavailability, good tissue and pus penetration and is active against pseudomonas.

The table above applies only to patients with normal renal function. Doses should be adjusted according to severity of infection.

Dumfries and Galloway Royal Infirmary and Galloway Community Hospital

ANTIBIOTIC PRESCRIBING PROTOCOL

ANTIBIOTIC TRAFFIC LIGHT SYSTEM

This system, in conjunction with the antibiotic guidelines, aims to ensure that antibiotics are prescribed appropriately. The aim is to ensure patients receive optimum therapy, reduce the risk of side effects and slow down the emergence of resistance.

The traffic light system has THREE groups of antibiotics:

- **GREEN** --- Available for all prescribers in line with current antibiotic prescribing guidelines.
- **AMBER** --- Prescription restricted to approval by consultant. Consultant approval must be documented in the medical notes.
- **RED** --- Available only after discussion with consultant microbiologists or infectious diseases consultant.

GREEN

(Available to all prescribers in line with current antibiotic prescribing guidelines)

ANTIBACTERIAL AGENTS

Amoxicillin IV/PO
Ampicillin IV (For listeria meningitis only)
Azithromycin PO
Benzylpenicillin IV
Cefixime PO
Cefotaxime IV
Ciprofloxacin PO
Clarithromycin PO/IV
Clindamycin PO/IV
Co-amoxiclav (Augmentin®) PO/IV
Doxycycline PO
Flucloxacillin IV/PO
Gentamicin IV - once daily regime unless directed otherwise by microbiologists
Levofloxacin PO/IV
Metronidazole IV/PO
Phenoxymethylpenicillin (penicillin V) PO
Tazocin® IV
Trimethoprim PO
Vancomycin PO - for antibiotic associated diarrhoea/pseudomembranous colitis only

ANTIFUNGAL AGENTS

Fluconazole PO
Nystatin suspension
Terbinafine PO

ANTIVIRAL AGENTS

Aciclovir PO/IV
Valaciclovir PO

N.B Some medicines listed in the antibiotic guidelines have been placed in the amber category as additional care is required 1 in the decision to prescribe.

Issued January 2008
Review March 2009
Developed by the Antimicrobial Management Team

RED

(Only available if approved by consultant. Consultant approval should be documented in medical notes.)

(These will NOT be supplied by Pharmacy unless approved by Consultant Microbiologist/ ID physician)

| ANTIBACTERIAL AGENTS | |
|-----------------------------------|-----------------------------------|
| Liposomal Amphotericin (Ambisome) | For febrile neutropenics only |
| Ceftazidime IV | Paediatrics only |
| Cefalexin PO | Paediatrics and out of hours only |
| Ceftriaxone IV | |
| Cefuroxime IV/PO | Except Surgical Prophylaxis |
| Ciprofloxacin IV | |
| Colistin Neb/IV | |
| Erythromycin PO/IV | |
| Ethambutol PO | |
| Isoniazid PO | |
| Itraconazole PO | |
| Nitrofurantoin PO | |
| Ofloxacin PO | |
| Rifampicin PO/IV | Do not use as single agent |
| Rifater® PO | |
| Rifinah® PO | |
| Sodium Fusidate PO | |
| Vancomycin IV | |
| Tobramycin IV | |

| ANTIBACTERIAL AGENTS | |
|---------------------------------------|--|
| Aztreonam IV | |
| Chloramphenicol IV/PO | |
| Co-trimoxazole (Septrin®) PO/IV | |
| Dapsone PO | |
| Daptomycin IV | |
| Ertapenem IV | |
| Linezolid IV/PO | |
| Meropenem IV | |
| Moxifloxacin PO | |
| Pentamidine Nebulised | |
| Pivmecillinam PO | |
| Sodium Fusidate IV | |
| Synercid® IV | |
| Teicoplanin IV | |
| Tigecycline IV | |
| | |
| ANTIFUNGAL AGENTS | |
| Caspofungin IV | |
| Fluconazole IV | |
| Itraconazole IV | |
| Liposomal amphotericin (Ambisome®) IV | |
| Posaconazole PO | |
| Voriconazole IV/PO | |
| | |
| ANTIVIRAL AGENTS | |
| Famciclovir PO | |
| Zanamivir (Inhalation) | |
| | |

Penicillin Allergy

Patients with a history of anaphylaxis or urticaria or rash occurring immediately after penicillin therapy are at increased risk of immediate hypersensitivity to penicillins and should not receive beta-lactam antibiotics. This includes co-amoxiclav, cephalosporins, tazocin and meropenem

Patients with a history of rash occurring more than 72 hours after administration of penicillin are probably not allergic to penicillin.

NB Agents listed in the amber/red restricted list (shaded entries) may not be stocked in pharmacy but if requested by the consultant Microbiologist/ Infectious Diseases would be available within 24 hours.

A request for an antibiotic not listed here will follow non formulary process.

N.B Some medicines listed in the antibiotic guidelines have been placed in the amber category as additional care is required 2 in the decision to prescribe.

Appendix 2

- **Antibiotic Guidance for Hospital Inpatients – NHS Greater Glasgow & Clyde.**
(Note this was designed to be printed A3 in size, if printing it A4 in size please ensure that in the print menu ‘shrink to printable area’ is selected for the ‘Page Scaling’ setting.)

ANTIBIOTIC GUIDANCE FOR HOSPITAL INPATIENTS

THINK BEFORE YOU GIVE ANTIBIOTIC THERAPY! Antibiotics are overused in the elderly (particularly patients with suspected UTIs) and in patients with viral or non-infective exacerbations of COPD. Always obtain cultures and **consider** if there is a clear anatomical site of infection with high probability of bacterial aetiology, if sepsis syndrome is present or deterioration.

***C. difficile* infection is associated with prescribing of; Cephalosporins, Co-amoxiclav, Clindamycin and Quinolones (Ciprofloxacin, Levofloxacin and Moxifloxacin). These agents must be restricted**

“Antibiotic Management Guideline” for detailed guidance. Discuss complex infections with microbiology or ID (see below)

To contact a microbiologist:

| | | |
|--------------------------|---------------------------------|--------------------------------|
| 52246 or page 3085 | Royal | 24640/1 or page 4129 |
| 65601/2/4 or page 6137/8 | 3702 | Gartnavel 64492 (01475 504492) |
| 13015 (or phone Royal) | Southern | 61702 or page |
| | 7077 | Inverclyde |
| | Royal Alexandra / Vale of Leven | 46172 |

Contact an ID physician phone 211 3000 (Gartnavel Switchboard) and ask for the ID consultant /Specialist Registrar on call.

Section:

Community pneumonia or Exacerbation of COPD

Amoxicillin or Clarithromycin or Doxycycline
Oral if sepsis criteria present or oral route not available

Community pneumonia; (CURB-65) score

Co-amoxiclav + Clarithromycin
Co-amoxiclav +/- Vancomycin (if beta-lactam allergy)

Soft tissue infection

Amoxicillin or Clarithromycin (if beta lactam allergy)
Clindamycin if severe
Clindamycin + Gentamicin if severe + beta-lactam allergy

Urinary Tract Infection

Nitrofurantoin or Nitrofurantoin
Nitrofurantoin if present
Clindamycin if severe

Prostatitis

Fluoroquinolone (oral)
Amoxicillin + Gentamicin if severe

Genital / Pelvic sepsis

Amoxicillin + Metronidazole + Gentamicin o.
Clindamycin (if betalactam allergy) + Metronidazole +

Source and source not known

Note:

Severity Assessment for Pneumonia

Check initial CURB-65 score

Confusion (new onset)

Urea >7.0 mmol/L

Respiratory rate > 30 / min

BP systolic <90 mmHg/ diastolic < 60 mm Hg

Age > 65 years

Additional features; Hypoxaemia SaO₂ <92% or PO₂ <8kPa

bilateral or multilobe involvement on chest X ray or Sep

If CURB-65 score on admission is

> 3 or 2 criteria with one additional feature the patient has severe CAP and IV co-amoxiclav + oral/IV clarithromycin if appropriate.

Non severe if <2;

2 Admit and oral therapy (IV if Sepsis)

< 1 may be treated at home.

Sepsis criteria;

Signs of infection PLUS 2 or more of following:

Temp >38 or <36

Respiratory rate > 20 /min

Pulse > 90 beats per min

WCC <4 or >12

Infective Exacerbation of COPD

Antibiotic Rx if Purulent sputum