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Date 30<sup>th</sup> March 2021  
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Dear Colleague

This letter authorises the extended use of the following guidance until 1st October 2021:

**NHS Grampian Staff Empirical Therapy Guidance for Common Infections in Children in the Acute Sector**

This guidance remains clinically accurate and relevant, and the review of this guidance will commence shortly.

**NOTE:** For oral switch option in a penicillin allergic patient being treated for appendicitis, perianal abscess or pilonidal abscess please seek advice from duty medical microbiologist. For treatment of Acute Osteomyelitis/Septic arthritis/Acute discitis/Deep myositis seek advice from duty medical microbiologist for penicillin allergy choice in age >6 months.

If you have any queries regarding this please do not hesitate to contact the Pharmacy and Medicines Directorate.


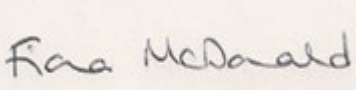
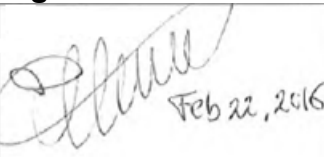
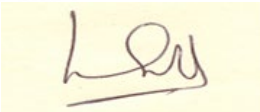
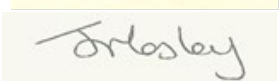

Yours sincerely

A handwritten signature in blue ink, appearing to read 'Lesley Coyle', written over a light blue rectangular background.

**Lesley Coyle**  
**Chair of Medicines Guidelines and Policies Group**

**NHS Grampian Staff Empirical Therapy Guidance For  
Common Infections In Children In The Acute Sector**

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<b>Signature:</b>    	<b>Signature:</b>   Feb 22, 2016    	<b>Signature:</b>  
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<b>Identifier:</b>  NHSG/Guid/Emp/ MGPG781	<b>Review Date:</b>  October 2017	<b>Date Approved:</b>  October 2015
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**Version 3.2 (Amended March 2021)**

**Executive Sign-Off**  
 This document has been endorsed by the Director of Pharmacy and Medicines  
 Management

Signature:  \_\_\_\_\_

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<b>Title:</b>	NHS Grampian Staff Empirical Therapy Guidance For Common Infections In Children In The Acute Sector
<b>Unique Identifier:</b>	NHSG/Guid/EmpP/MGPG781
<b>Replaces:</b>	NHSG/Guid/EmpP/MGPG781 v3.1
<b>Lead Author/Co-ordinator:</b>	Specialist Antibiotic Pharmacists
<b>Subject (as per document registration categories):</b>	Antimicrobial Guidelines
<b>Key word(s):</b>	Antibiotic, Antibiotics, Antimicrobial, Antimicrobials, Infection, Infections, Empirical, Paediatric, Paediatrics, Children, Child, RACH, neonatal, neonates
<b>Policy, Protocol, Procedure or Process Document:</b>	Guideline
<b>Document application:</b>	Whole of Sector
<b>Purpose/description:</b>	To provide guidance on empirical antibiotic therapy for common infections in children to prescribers working in acute hospitals in NHS Grampian.
<b>Responsibility:</b>	Responsibility for the effective management of the Acute Sector's policy, protocol, procedure and process documentation ultimately lies with the General Manager for the Acute Sector. Delegation for formulating, disseminating and controlling these documents falls to either a named individual or a working group.
<b>Policy statement:</b>	It is the responsibility of supervisory staff at all levels to ensure that their staff are working to the most up to date and relevant policies, protocols procedures. By doing so, the quality of the services offered will be maintained, and the chances of staff making erroneous decisions which may affect patient, staff or visitor safety and comfort will be reduced.

**Responsibilities for ensuring registration of this document on the NHS Grampian Information/ Document Silo:**

Lead Author/Co-ordinator: Specialist Pharmacist - Antibiotics

**Physical location of the original of this document:** Pharmacy and Medicines Directorate, Westholme**Job title of creator of this document:** Specialist Pharmacist - Antibiotics**Job/group title of those who have control over this document:** Specialist Pharmacist - Antibiotics**Responsibilities for disseminating document as per distribution list:**

Lead Author/Co-ordinator: Specialist Pharmacist - Antibiotics

**Responsibilities for implementation:**

Organisational: Acute Sector Operational Management Team and Acute Sector General Manager

Hospital/Interface services: Deputy General Managers and Clinical Leads  
Operational Management Unit Operational Managers

Unit:

Departmental: Clinical Leads

Area: Line Managers

**Review:** Every two years (or sooner if required)**Responsibilities for review of this document:**

Lead Author/Co-ordinator: Specialist Pharmacist - Antibiotics

**Review date:** October 2017**Revision History:**

<b>Revision Date</b>	<b>Previous Revision Date</b>	<b>Summary of Changes (Descriptive summary of the changes made)</b>	<b>Changes Marked* (Identify page numbers and section heading )</b>
March 2021	September 2015	Update to infective gastroenteritis.	Section 1 – Gastro-intestinal tract and Intra-abdominal (page 4)
March 2021	September 2015	Update to influenza treatment.	Section 3 – Respiratory (page 10)
March 2021	September 2015	Removal of Neonatal chlamydia conjunctivitis and Neonatal gonococcal conjunctivitis	Section 9 – Eye (page 21)
September 2015	May 2013	Refer to Appendix 1	Whole document
September 2015	May 2013	Update to influenza treatment.	Section 3 - Respiratory

September 2015	May 2013	Removal of 2 <sup>nd</sup> choice antibiotic for <i>staphylococcs aureaus</i>	Section 8 - Musculoskeletal
September 2015	May 2013	Removal of neonatal conjunctivitis	Section 9 - Eye

# NHS Grampian Staff Empirical Therapy Guidance for Common Infections in Children in the Acute Sector

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# NHS Grampian Staff Empirical Therapy Guidance for Common Infections in Children in the Acute Sector

## Introduction

This guidance should be used to determine the choice of initial empirical antibiotic therapy for paediatric patients in acute hospitals in NHS Grampian. This guidance does not cover the choice of empirical antibiotic therapy for all infections and does not replace the need for taking samples to determine the specific causative organism to further direct therapy. Specialist advice will be required for some infections.

This document should not be used to guide therapy if the organism is known and there are specific microbiological sensitivities or if there are other reasons that determine specific antimicrobial therapy, e.g. previous sensitivity testing. The document does not cover the treatment of infections in patients with some chronic disorders or apply in all cases, for example, patients who are immunosuppressed.

If the antibiotic recommended in the guideline is not licensed for the age or indication specified this is stated in the comments column.

Drug interactions should also be considered, for example with macrolides, quinolones, rifampicin, etc – refer to BNF for Children

<https://www.medicinescomplete.com/mc/bnfc/current/>.

## Doses

Doses have **not** been included in order to keep this policy brief and easy to read.

Prescribers should refer to the BNF for Children

<https://www.medicinescomplete.com/mc/bnfc/current/> or the manufacturers' summary of product characteristics <http://www.medicines.org.uk/emc/> for information on doses.

## Documentation

The reason for prescribing an antimicrobial must be clearly documented in the patient's medical notes together with any relevant signs and symptoms, assessment of severity, microbiology samples taken and results obtained and details of the antimicrobials prescribed. A duration, stop or review date must be clearly documented on the prescription and drug administration record (PAR) for each antimicrobial prescription. For further details please refer to the [NHS Grampian Antimicrobial Documentation Policy](#).

## IV to Oral Switch Therapy (IVOST)

Recommendations for intravenous (IV) to oral switches are included in the guidance.

Exercise caution when considering a switch to oral in neonates and infants because of the relatively high incidence of bacteraemia and the possibility of variable oral absorption.

## Penicillin Allergy

Options for patients with penicillin allergy are included in the guidance – for further information refer to the Guidance for [NHS Grampian Staff on Antibiotic Choice for Patients with Penicillin Hypersensitivity](#). Patients labelled as penicillin allergic should be carefully assessed to determine whether this is a true allergy or an intolerance – for further information refer to the full guidance above.

## Tetracyclines

Tetracyclines should **not** be given to children under 12 years as deposition of tetracyclines in growing bone and teeth (by binding to calcium) causes staining and occasionally dental

hypoplasia, (except in exceptional circumstances after discussion with Consultant in Paediatric Infectious Diseases).

### **Gentamicin and Vancomycin**

Advice on dosing and monitoring of gentamicin and vancomycin is available in their respective monographs located in the red paediatric intravenous monograph folder on each ward, on the [intranet](#) and/or from the ward pharmacist.

### **“Consider immune deficiency and testing for HIV”**

According to the UK National Guidelines for HIV Testing 2008 (<http://www.bhiva.org/HIV-testing-guidelines.aspx>) late diagnosis of HIV infection has been associated with increased mortality and morbidity, impaired response to HAART (highly active anti-retroviral therapy), and increased cost to healthcare services. Knowledge of HIV status is associated with a reduction in risk behaviour and therefore it is anticipated that earlier diagnosis will result in reduced onward transmission. One of the categories of patients where routine HIV testing should be offered are those presenting for healthcare where HIV is a possible differential diagnosis – see Table 2 in guidelines link above. Therefore, a recommendation to “consider immune status and HIV testing” has been added to ‘indicator infections’ included within these guidelines

### **Advice**

Further advice about antimicrobials is available from the on-call Medical Microbiologist, Paediatric Infectious Diseases (PID) Specialist, Ward Pharmacist or Specialist Antimicrobial Pharmacist. Information about who to contact to obtain further specialist advice regarding the treatment of specific infections is given in the relevant section.



## NHS Grampian Staff Empirical Therapy Guidance For Common Infections In Children In The Acute Sector

- |   |
|---|
| <p><b>1. Gastro-Intestinal Tract and Intra-Abdominal</b></p> <ul style="list-style-type: none"> <li>• Collect appropriate specimens for culture and virology before starting treatment – request <i>C. difficile</i> toxin, ova/cysts if clinically appropriate and note any recent travel history on form.</li> <li>• Take triplicate specimens if parasitic infection suspected.</li> </ul> |
|---|

INFECTION	Likely organisms	1 <sup>st</sup> Choice Antibiotics	2 <sup>nd</sup> Choice Antibiotics	Comments
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**INFECTION**

Infective gastroenteritis

Take infection prevention and control precautions

**Frequently self-limiting and may not be bacterial.**

**Antibacterials are not usually indicated.**

For organism specific treatment, if severe systemic upset/bloody diarrhoea or diarrhoea in an immunocompromised patient or returning traveller please treat as per microbiology or paediatric infectious diseases specialist advice.

## NHS Grampian Staff Empirical Therapy Guidance For Common Infections In Children In The Acute Sector

<b>1. Gastro-Intestinal Tract and Intra-Abdominal (continued)</b>			
<ul style="list-style-type: none"> <li>Collect appropriate specimens for culture and virology before starting treatment – request <i>C. difficile</i> toxin, ova/cysts if clinically appropriate and note any recent travel history on form.</li> </ul>			
Clostridium Difficile Infection (Antibiotic associated colitis)	<i>Clostridium difficile</i>	<ul style="list-style-type: none"> <li>Ensure infection control measures are in place – do not wait for confirmation of diagnosis</li> <li>Send stool sample</li> <li>Stop any (non-Clostridium difficile) antimicrobial treatment in patients with CDI if possible</li> <li>Review any concurrent gastric acid suppressant therapy and reduce or stop if appropriate</li> <li>Review and stop any anti-motility agents to reduce the risk of toxic megacolon development</li> <li>Stop any laxatives for the duration of symptoms</li> <li>Rehydrate patient.</li> <li>Assess symptoms and severity of disease taking into account individual risk factors for the patient</li> </ul> <ul style="list-style-type: none"> <li>Alcohol gel does not kill C difficile spores – follow hand-washing guidance.</li> <li>For further information refer to local policy or <a href="#">Health Protection Network Scottish Guidance</a> (Jan 14 &amp; update October 14).</li> </ul>	
FIRST EPISODE Mild/ Non-severe		<a href="#">Metronidazole</a> oral for 10-14 days If condition does not improve after 5 days, switch to oral vancomycin.	Assess patient daily. Observe bowel movement, symptoms (WBC and hypotension) and fluid balance. If symptoms continue to worsen, refer to gastroenterology/surgery, and discuss with microbiology.
Severe		<a href="#">Vancomycin</a> oral for 10-14 days  Consider adding IV <a href="#">Metronidazole</a> if ileus or hypotension	
SECOND OR SUBSEQUENT EPISODE		Discuss treatment options with Medical Microbiologist or Paediatric Infection Specialist	

# NHS Grampian Staff Empirical Therapy Guidance For Common Infections In Children In The Acute Sector

1 Gastro-Intestinal Tract and Intra-Abdominal (continued)				
<ul style="list-style-type: none"> <li>Collect appropriate specimens for culture and virology before considering treatment – request <i>C. difficile</i> toxin, ova/ cysts if clinically appropriate and note any recent travel history on form.</li> </ul>				
INFECTION	Likely organisms	1 <sup>st</sup> Choice Antibiotics	2 <sup>nd</sup> Choice Antibiotics	Comments
Appendicitis, Peritonitis, Penetrating abdominal trauma	Coliforms Anaerobes	<p><a href="#">Gentamicin</a> IV (see <a href="#">monographs</a>) plus <a href="#">Metronidazole</a> IV +/- <a href="#">Amoxicillin</a> IV</p> <p>Switch to oral <a href="#">Co-amoxiclav</a> when appropriate.</p> <p>Total duration (IV/oral) 3-7 days depending on degree of contamination and established infection.</p>	<p>In beta-lactam allergy: <a href="#">Clindamycin</a> IV plus <a href="#">Gentamicin</a> IV (see <a href="#">monographs</a>)</p> <p>Switch to oral <a href="#">Clindamycin</a> when appropriate.</p> <p>Total duration (IV/oral) 3 – 7 days depending on degree of contamination and established infection.</p>	<p>Send blood for culture, 2 sets if possible, and pus from operation.</p> <p>Oral switch may not be required depending on duration of IV therapy.</p> <p>Please note: antibiotic surgical prophylaxis for appendectomy should be <b>single dose</b> at induction</p> <p>NB Clindamycin is only available as capsules, not suspension</p>
Perianal abscess, Pilonidal abscess	Coliforms Anaerobes	<p>For patients with underlying pathology eg inflammatory bowel disease or immune deficiency use triple therapy as for appendicitis above.</p> <p><a href="#">Co-amoxiclav</a> oral for 3 – 7 days</p>	<p><b>In beta-lactam allergy:</b> <a href="#">clindamycin</a> oral for 3 – 7 days</p>	<p>Surgical drainage is an important part of managing infected abscesses.</p> <p>NB Clindamycin is only available as capsules, not suspension</p>
Pancreatitis	Antibiotics not indicated initially, often non-infectious origin or viral origin. Discuss with medical microbiologist. Needs culture of abscess/ infected pseudocyst to direct therapy. Send blood for culture.			
Helicobacter pylori infection – eradication therapy	<i>Helicobacter pylori</i>	<p><a href="#">Omeprazole</a> oral plus <a href="#">Clarithromycin</a> oral plus <a href="#">Amoxicillin</a> oral for 14 days</p>	<p><a href="#">Omeprazole</a> oral plus <a href="#">clarithromycin</a> oral plus <a href="#">metronidazole</a> oral for 14 days</p>	<p><a href="#">Evidence-based guidelines from ESPGHAN and NASPGHAN for Helicobacter pylori infection in children 2011</a></p> <p>Clarithromycin tablets are not licensed in children under 12 years; clarithromycin suspension is not licensed for use in infants &lt;6 months. Omeprazole capsules/tablets are not licensed for use in children except for severe ulcerating reflux oesophagitis in children &gt;1 year.</p> <p>Due to resistance issues if a patient has been treated with clarithromycin in the previous 12 months for any indication consider using a non-clarithromycin based regimen. See NICE guidance for adults (<a href="https://www.nice.org.uk/guidance/cg184">https://www.nice.org.uk/guidance/cg184</a> ) or seek local advice for alternatives.</p>

## NHS Grampian Staff Empirical Therapy Guidance For Common Infections In Children In The Acute Sector

1 Gastro-Intestinal Tract and Intra-Abdominal (continued)				
INFECTION	Likely organisms	1 <sup>st</sup> Choice Antibiotics	2 <sup>nd</sup> Choice Antibiotics	Comments
Peritoneal dialysis-associated peritonitis		Treat according to the 'Acute Peritonitis Protocol ' p17 in the Scottish Paediatric Renal and Urology Network Guidelines on the <a href="#">Management of Acute and Chronic Peritoneal Dialysis</a>		
Intestinal helminths (worms)		<a href="#">Mebendazole</a> oral – repeat dose after 2 weeks.		Treat whole family – can be advised to obtain OTC at a pharmacy. Mebendazole is unlicensed for use in children under 2 years

## NHS Grampian Staff Empirical Therapy Guidance For Common Infections In Children In The Acute Sector

2. Cardiovascular			
<ul style="list-style-type: none"> <li>Always take blood for culture before starting treatment for endocarditis – if patient is stable, ideally take a minimum of 3 separate blood cultures over a 12 – 24 hour interval before starting antibiotics; from different venepuncture sites and as close as possible to peak of pyrexia.</li> <li>Consult a Cardiologist immediately.</li> <li>Consult with paediatric ID specialist and medical microbiologist about organism specific therapy and consider need for urgent surgical intervention.</li> <li>Total course of treatment in endocarditis is 4 to 6 weeks. Duration of treatment depends on organism, patient characteristics, presence of prosthetic valve etc.</li> </ul>			
INFECTION	Presentation	Antibiotics	Comments
Infective endocarditis	Native Valve Endocarditis (NVE)	<a href="#">Amoxicillin</a> IV plus <a href="#">Flucloxacillin</a> IV plus <a href="#">Gentamicin</a> IV (see <a href="#">monographs</a> )	Gentamicin levels must be checked regularly. Age >1 month - <a href="#">multiple daily dosing protocol</a> is used and levels for endocarditis are: Pre-dose (trough ) <1mg/L and peak (1 hour post-dose) 3-5mg/L  Vancomycin levels must be checked regularly: Pre-dose (trough) level of 10-15mg/L Higher levels may be appropriate in enterococcal endocarditis/MRSA  Rifampicin helps eradicate bacteria attached to prosthetics
	Penicillin allergy	<a href="#">Vancomycin</a> IV (see <a href="#">monograph</a> ) plus <a href="#">Gentamicin</a> IV (see <a href="#">monographs</a> )	
	Intra-cardiac prosthesis	<a href="#">Vancomycin</a> IV (see <a href="#">monograph</a> ) plus <a href="#">Rifampicin</a> oral plus <a href="#">Gentamicin</a> IV (see <a href="#">monographs</a> )	

## NHS Grampian Staff Empirical Therapy Guidance For Common Infections In Children In The Acute Sector

2 Cardiovascular (continued)			
INFECTION	Presentation	Antibiotics	Comments
Sepsis in presence of Central Venous Catheter	Coagulase-negative <i>Staphylococcus spp</i> , <i>Staphylococcus aureus</i> , <i>gram-negatives</i>	<b>Haematology patients:</b> <a href="#">Piperacillin/tazobactam</a> IV	See specific local protocol
		<b>Gastroenterology patients</b> <a href="#">Gentamicin</a> IV (see <a href="#">monograph</a> ) <b>plus</b> <a href="#">Teicoplanin</a> IV  <b>Neonates</b> <a href="#">Gentamicin</a> IV (see <a href="#">monograph</a> ) <b>plus</b> <a href="#">Vancomycin</a> IV (see <a href="#">monograph</a> )  <b>All other patients:</b> <a href="#">Flucloxacillin</a> IV <b>plus</b> <a href="#">Gentamicin</a> IV (see <a href="#">monograph</a> )	<p>Blood cultures take from the CVC should be obtained before starting antibiotics. Peripheral blood cultures may help to distinguish catheter-associated infections from bacteraemia in the presence of an intravascular catheter, and may guide the decision when to remove the CVC.</p> <p>If the line is removed, the tip should be sent for culture.            If <i>S. aureus</i> is isolated in the blood, the line should be removed and 14 days of appropriate antibiotics given.            [Locking lines with antibiotics is not generally recommended – contact microbiology for advice]</p> <p>Gastroenterology patients - refer to Scottish Home Parenteral Nutrition MCN protocol</p>

## NHS Grampian Staff Empirical Therapy Guidance For Common Infections In Children In The Acute Sector

3 Respiratory System				
INFECTION	Likely organisms	1 <sup>st</sup> Choice Antibiotics	2 <sup>nd</sup> Choice Antibiotics	Comments
Influenza	<p><i>Influenza A &amp; B</i></p> <p>NB: this guidance refers to seasonal influenza and <b>not</b> pandemic strains</p>	<p>All hospitalised patients with confirmed or suspected influenza should receive treatment regardless of whether they are in a high risk group or duration since exposure.</p> <p>Please refer to:  <a href="#">HPS Influenza guidance Antivirals Section.</a></p>		Annual vaccination is essential for all those at risk of influenza.

## NHS Grampian Staff Empirical Therapy Guidance For Common Infections In Children In The Acute Sector

3. Respiratory System (continued)				
<ul style="list-style-type: none"> <li>• Samples for viral testing: nasopharyngeal secretions (or nose and throat swabs in viral transport medium), consider acute and convalescent sera.</li> <li>• Collect sputum and blood cultures in pneumonia if complications arise (eg empyema, effusion) or if patient requires high dependency care.</li> <li>• Always consider prior therapy; in patients who have not responded to a recent course of antibiotics consider an alternative agent</li> <li>• Oral therapy should be considered the norm except in patients with complications, severe sepsis or those unable to take oral therapy</li> </ul>				
INFECTION	Likely organisms	1 <sup>st</sup> Choice Antibiotics	2 <sup>nd</sup> Choice Antibiotics	Comments
Bronchiolitis	<i>Respiratory Syncytial Virus</i> <i>Human Metapneumovirus</i>	Not indicated. (Ref <a href="#">SIGN 91</a> ) If temperature >38.5°C suspect pneumonia and treat accordingly.		
Community acquired pneumonia (CAP)	Refer to the <a href="#">British Thoracic Society Guidelines for the Management of Community Acquired Pneumonia in Childhood</a> If recurrent - consider immune deficiency or HIV-infection.			
Mild to moderate	<i>Streptococcus pneumoniae</i> (lobar pneumonia)	<a href="#">Amoxicillin</a> oral Total course 5 days	In penicillin allergy: <a href="#">Clarithromycin</a> oral Total course 5 days	Consider using oral <a href="#">Penicillin V</a> if organism confirmed as sensitive.  Clarithromycin tablets are not licensed in children under 12 years; clarithromycin suspension is not licensed for use in infants <6 months.
Severe		<b>Neonates:</b> <a href="#">Benzylpenicillin</a> IV plus <a href="#">Gentamicin</a> IV (see <a href="#">monograph</a> )		
		<b>Age &gt;1month – 18 yrs</b> <a href="#">Amoxicillin</a> oral/IV  If not responding after 48 hours consider switching to <a href="#">Co-amoxiclav</a>  Treat for 7 days May need to extend depending on organisms recovered/ suspected	In penicillin allergy: <b>Age &gt;1 month</b> <a href="#">Cefuroxime</a> oral/IV  Treat for 7 days. May need to extend depending on organisms recovered/suspected	<b>Only</b> use <a href="#">Clarithromycin</a> if mycoplasma or pertussis (see below) is detected. Clarithromycin tablets are not licensed in children under 12 years; clarithromycin suspension is not licensed for use in infants <6 months.



## NHS Grampian Staff Empirical Therapy Guidance For Common Infections In Children In The Acute Sector

3. Respiratory System (continued)				
<ul style="list-style-type: none"> <li>• Samples for viral testing: nasopharyngeal secretions (or nose and throat swabs in viral transport medium), consider acute and convalescent sera.</li> <li>• Collect sputum and blood cultures in pneumonia if complications arise (eg empyema, effusion) or if patient requires high dependency care.</li> <li>• Always consider prior therapy; in patients who have not responded to a recent course of antibiotics consider an alternative agent</li> <li>• Oral therapy should be considered the norm except in patients with complications, severe sepsis or those unable to take oral therapy</li> </ul>				
INFECTION	Likely organisms	1 <sup>st</sup> Choice Antibiotics	2 <sup>nd</sup> Choice Antibiotics	Comments
Aspiration pneumonia  Consider chemical pneumonitis as a differential diagnosis – antibiotics would not be indicated.	Mouth flora including anaerobes	<a href="#">Co-amoxiclav</a> IV  Switch to oral <a href="#">Co-amoxiclav</a> . Treat for 7 days.	In penicillin allergy: <a href="#">Cefuroxime</a> IV <b>plus</b> <a href="#">Metronidazole</a> IV  Switch to oral <a href="#">Cefuroxime</a> <b>plus</b> oral <a href="#">Metronidazole</a> Treat for 7 days.	
<i>Pneumocystis jiroveci</i> ( <i>carinii</i> ) pneumonia	<i>Pneumocystis jiroveci</i>	<b>Age &gt;6 weeks</b> <a href="#">Co-trimoxazole</a> IV (in severe cases) or orally (non-severe) Treat for 14 - 21 days	Seek specialist advice from PID specialist	Send induced sputum or broncho-alveolar lavage for Pneumocystis PCR and culture to rule out other opportunistic pathogens, e.g. mycobacteria, fungi and viruses.  Seek further advice from Consultant Paediatric Infectious Diseases . Consider immune deficiency or HIV-infection if diagnosis is made in patient without known underlying risk factors..
Pertussis	<i>Bordetella pertussis</i>	<a href="#">Clarithromycin</a> oral for 7days		Antibiotics are only indicated if started within 1 week of onset of the paroxysmal cough to reduce transmission. Contact Public Health – notifiable disease.  Clarithromycin tablets are not licensed in children under 12 years; clarithromycin suspension is not licensed for use in infants <6 months.
Hospital-acquired pneumonia		<a href="#">Co-amoxiclav</a> IV <b>plus</b> <a href="#">Gentamicin</a> IV (see <a href="#">monographs</a> ) Treat for 7 – 10 days		Contact Consultant Paediatrician – Infectious Diseases for advice.
Pulmonary Tuberculosis	<i>Mycobacterium tuberculosis</i>	Refer to PID specialist Send sputum (x3) or gastric lavage (taken on 3 days in a row directly after awakening) for culture and sensitivities before starting treatment. Consider immune deficiency or HIV-infection.  Refer to <a href="#">BNFC</a> for treatment regimes and monitoring guidance. Antituberculosis medicines should be taken half an hour before breakfast to avoid absorption problems.		

## NHS Grampian Staff Empirical Therapy Guidance For Common Infections In Children In The Acute Sector

4 Central Nervous System				
<ul style="list-style-type: none"> <li>Send CSF and blood for culture. If purpuric lesions present, a biopsy for direct microscopy and culture may be considered.</li> <li>Specialist advice from medical microbiology is essential.</li> </ul>				
INFECTION	Likely organisms	1 <sup>st</sup> Choice Antibiotics	2 <sup>nd</sup> Choice Antibiotics	Comments
Bacterial meningitis or Meningococcal septicaemia  <b>Treatment should not be delayed in suspected cases of bacterial meningitis.</b>  <b>Contact Public Health Consultant for advice about secondary cases.</b>	<b>Age &lt;1 month</b> <i>Group B Streptococcus</i> <i>E. coli</i> <i>S pneumoniae</i> <i>Listeria monocytogenes</i>	<b>Age &lt;1 month</b> <a href="#">Cefotaxime</a> IV <b>plus</b> <a href="#">Amoxicillin</a> IV  Duration: refer to <a href="#">NICE</a> guideline or <a href="#">BNFC</a> for antibiotic course lengths for appropriate organism.	Seek specialist advice from Paediatric Infectious Diseases Consultant or Medical Microbiology.	<a href="#">SIGN Guideline 102</a> <a href="#">NICE Guideline CG102</a> <a href="#">NICE Guideline CG149</a> Meningitis Research Foundation algorithms - <a href="#">Bacterial Meningitis</a> - <a href="#">Meningococcal Septicaemia</a>  Amend antibiotics on the basis of microbiology results.  If recurrent - consider immune deficiency or HIV infection
	<b>Age &gt;1 month</b> <i>Neisseria meningitides</i> <i>S pneumoniae</i> <i>H. influenzae type b</i>	<b>Age &gt;1 month</b> <a href="#">Cefotaxime</a> IV  If prolonged or multiple antibiotic use in last 3 months or travel in last 3 months to areas outside UK contact Paediatric Infection Specialist or microbiology for advice.  Duration: refer to <a href="#">NICE</a> guideline or <a href="#">BNFC</a> for antibiotic course lengths for appropriate organism.		
Brain abscess	<i>Staphylococcus aureus</i> , <i>S. pneumoniae</i> , <i>Streptococcus spp</i> , oral anaerobes	<a href="#">Cefotaxime</a> IV <b>plus</b> <a href="#">Metronidazole</a> IV  Seek neurosurgical advice		Send blood and aspirate from abscess for culture. Treatment duration and switch to oral therapy is depending on culture results and response. Treatment is at least 4-6 weeks.

## NHS Grampian Staff Empirical Therapy Guidance For Common Infections In Children In The Acute Sector

4 Central Nervous System (continued)				
<ul style="list-style-type: none"> <li>Send CSF, blood for culture and PCR for neurotropic viruses</li> <li>Obtain nasopharyngeal and faeces samples for viral PCR.</li> <li>Specialist advice from medical microbiology is essential.</li> </ul>				
INFECTION	Likely organisms	1 <sup>st</sup> Choice Antibiotics	2 <sup>nd</sup> Choice Antibiotics	Comments
Encephalitis	Enteroviruses Parechoviruses Herpes simplex virus	<a href="#">Aciclovir</a> IV for 21 days (if HSV is confirmed)		Most commonly caused by enteroviruses for which no antiviral treatment is available. Always start with aciclovir until HSV is excluded. Discuss with Paediatric Infectious Diseases Specialist or Medical Microbiology.  If recurrent - consider immune deficiency or HIV infection.

## NHS Grampian Staff Empirical Therapy Guidance For Common Infections In Children In The Acute Sector

5 Urinary Tract				
<ul style="list-style-type: none"> <li>Urine sample should be taken prior to starting treatment</li> <li>Send blood for culture if pyrexial.</li> </ul>				
INFECTION	Likely organisms	1 <sup>st</sup> Choice Antibiotics	2 <sup>nd</sup> Choice Antibiotics	Comments
Lower UTI or acute cystitis  Temp <38°C + no systemic signs/symptoms	<i>Escherichia coli</i> <i>Enterobacteriaceae</i> <i>Staphylococcus saprophyticus</i>	UTI Guideline for RACH <a href="#">NICE – UTI in Children</a> Scottish Paediatric Renal Urology Network – <a href="#">Policies, Guidelines &amp; Reports</a>		
		If trimethoprim/cefalexin has been taken in the last 3 months then select an alternative antibiotic based on previous microbiology sensitivities, if available.		
		<b>Age &gt;1 month – 18 years</b> <a href="#">Trimethoprim</a> oral for 3 days	<b>Age &gt;1 month – 18 years</b> <a href="#">Cefalexin</a> oral for 3 days	Consider specialist referral for recurrent infection.  Send MSSU (carefully collected to avoid contamination.)  Results of laboratory cultures and sensitivities usually available after overnight incubation.  Trimethoprim is not licensed for children <6 weeks
Pyelonephritis/Urosepsis  Bacteriuria + temp >38°C	<i>Escherichia coli</i> <i>Proteus spp</i> <i>Klebsiella spp</i>	<b>Age &lt;6 months</b> <a href="#">Cefotaxime/ Ceftriaxone</a> * IV  Treat for 7-10 days	In penicillin allergy: <b>Age &gt;1 month</b> <a href="#">Ciprofloxacin</a> Oral/IV for 7 days  Switch to alternative oral option if indicated by microbiology sensitivities.	If >6 months, <b>IV treatment is only required if vomiting or systemically unwell.</b>  Prophylactic antibiotics may be considered if recurrent UTIs (see below)  * <b>Contraindications to <a href="#">Ceftriaxone IV</a></b> All ages: simultaneous administration of calcium-containing infusions but can be given sequentially as long as infusion line flushed between infusions or a different infusion line is used.  Children <1 month: prematurity, jaundice, acidosis  Ciprofloxacin is not licensed for children <1 year. Trimethoprim is not licensed for children <6 weeks
		<b>Age &gt;6 months</b> <a href="#">Co-amoxiclav</a> Oral/IV*  Add <a href="#">Gentamicin</a> IV (see <a href="#">monograph</a> ) if severe infection or unresponsive after 48 hours  Switch to oral ( <a href="#">Co-amoxiclav</a> ) based on sensitivities  Treat for 7-10 days		

## NHS Grampian Staff Empirical Therapy Guidance For Common Infections In Children In The Acute Sector

5 Urinary Tract (continued)				
<ul style="list-style-type: none"> <li>• Samples should be taken prior to starting treatment</li> <li>• Send blood for culture if pyrexial.</li> </ul>				
INFECTION	Likely organisms	1 <sup>st</sup> Choice Antibiotics	2 <sup>nd</sup> Choice Antibiotics	Comments
Catheter UTI	<i>Escherichia coli</i> <i>Enterobacteriaceae</i>			<p>Bacterial colonisation of long term indwelling catheters is very common.</p> <p>Antimicrobial therapy is <b>not</b> indicated unless the patient has evidence of systemic infection, e.g. pyrexia, loin pain, raised white cell count or acute confusion.</p> <p>Smelly or cloudy urine, bacteruria without systemic symptoms or catheter blockage are <b>not</b> indications for antimicrobials but are indications for changing the catheter.</p> <p>If systemic infection is likely, treat as for pyelonephritis.</p> <p>Evidence suggests that catheter change <b>prior</b> to treatment results in more rapid symptom resolution and lower rates of treatment failure. Change catheter, send catheter specimen of urine and start antibiotics if symptomatic.</p>

## NHS Grampian Staff Empirical Therapy Guidance For Common Infections In Children In The Acute Sector

6 Genital system				
<ul style="list-style-type: none"> <li>If STD is suspected patients &lt;13 years should be referred to the RACH Child Protection Team and patients &gt;13 years should be referred to Sexual Health (0845 337 9900)</li> <li>Send blood for culture if pyrexial</li> </ul>				
INFECTION	Likely organisms	1 <sup>st</sup> Choice Antibiotics	2 <sup>nd</sup> Choice Antibiotics	Comments
Vulvo and/or vaginal Candidiasis	<i>Candida albicans</i>	<a href="#">Clotrimazole</a> 1% cream  and/or  <b>Females age 12 – 16 years</b>  <a href="#">Fluconazole</a> oral for 1 – 3 days		Intravaginal treatment should generally be avoided in pre-pubertal girls; oral treatment may be more appropriate.  Oral triazoles are usually recommended for the treatment of genital candidiasis in girls aged 12 – 16 years although fluconazole is not licensed for vaginal candidiasis in girls <16 years.
Infective balanitis	Candidal	<a href="#">Clotrimazole</a> 1% cream topically twice daily until symptoms settle	For severe symptoms: <a href="#">Fluconazole</a> oral	If cellulitis develops then refer to cellulitis section and take appropriate swabs.  To reduce the risk of subsequent infections, patients/carers should be advised to avoid potential irritants and ensure good penis hygiene.
	Bacterial	Usually antibiotics not required.		

## NHS Grampian Staff Empirical Therapy Guidance For Common Infections In Children In The Acute Sector

7 Blood			
<ul style="list-style-type: none"> <li>Take blood and urine cultures before starting treatment, plus swabs from any other focus of infection, e.g. sputum, wound swabs, etc.</li> <li>Give antibiotics as soon as possible, within 1 hour of diagnosis of sepsis</li> </ul>			
INFECTION	1 <sup>st</sup> Choice Antibiotics	2 <sup>nd</sup> Choice Antibiotics	Comments
<b>Sepsis</b> or feverish illness – unknown source  Refer to Sepsis 6 guideline	<b>Neonates</b> <b>Community acquired:</b> <a href="#">Cefotaxime</a> IV plus <a href="#">Amoxicillin</a> IV  <b>Neonates</b> <b>Nosocomial:</b> <a href="#">Gentamicin</a> IV (see <a href="#">monograph</a> ) plus <a href="#">Vancomycin</a> IV (see <a href="#">monograph</a> )		Seek advice from Medical Microbiology or PID specialist. <b>Prompt diagnosis vital to allow early rationalisation of treatment.</b>  The most common causes of sepsis are <b>urinary</b> or <b>respiratory</b> sources which should be treated according to the relevant sections in this guideline  Sepsis may be masked in immunosuppression and in the presence of anti-inflammatory drugs and beta-blockers.  Give IV antibiotics to <ul style="list-style-type: none"> <li>Infants &lt;1 month with fever</li> <li>All infants aged 1- 3 months with fever who appear unwell</li> <li>Infants aged 1-3 months with WBC &lt;5 x 10<sup>9</sup>/L or &gt;15 x 10<sup>9</sup>/L</li> <li>Children &gt;3 months with fever who are shocked, unrousable or have signs of meningococcal disease (see section 4)</li> </ul> Consider IV antibiotics for <ul style="list-style-type: none"> <li>Children &gt;3 months with fever and reduced consciousness</li> </ul> If herpes simplex suspected, add <a href="#">Aciclovir</a> IV <b>If known MRSA carrier give:</b> <a href="#">Vancomycin</a> IV (see <a href="#">monograph</a> ) plus <a href="#">Gentamicin</a> IV (see <a href="#">monographs</a> )  If recurrent, consider immune deficiency or HIV infection  <a href="#">NICE Guideline 160</a> – Feverish Illness in Children May 2013 <a href="#">NICE Guideline 149</a> – Antibiotics for early-onset neonatal infection Aug 2012
	<b>Age &gt;1 month</b> <a href="#">Cefotaxime</a> IV	<b>Age &gt;1 month</b> In penicillin allergy: <a href="#">Gentamicin</a> IV (see <a href="#">monograph</a> ) plus <a href="#">Vancomycin</a> IV (see <a href="#">monograph</a> )	
<b>Toxic Shock Syndrome</b>	<a href="#">Flucloxacillin</a> IV plus <a href="#">Gentamicin</a> IV (see <a href="#">monographs</a> ) +/- <a href="#">Clindamycin</a> IV		
Meningococcal septicaemia  - Refer to <a href="#">section 4</a>			

## NHS Grampian Staff Empirical Therapy Guidance For Common Infections In Children In The Acute Sector

7 Blood (continued)				
<ul style="list-style-type: none"> <li>Take blood and urine cultures before starting treatment, plus swabs from any other focus of infection, e.g. sputum, wound swabs, etc.</li> <li>Give antibiotics as soon as possible, within 1 hour of diagnosis of sepsis.</li> </ul>				
INFECTION	Likely organisms	1 <sup>st</sup> Choice Antibiotics	2 <sup>nd</sup> Choice Antibiotics	Comments
<b>Neutropenic sepsis</b> Neutrophil count $\leq 1.0 \times 10^9/L$  Temperature: <ul style="list-style-type: none"> <li>&gt;38°C x 3 in 4-6 hours</li> <li>Or single pyrexia &gt;39°C</li> <li>Or shaking chill or rigor associated with fever</li> </ul>	Gram-negatives <i>S. aureus</i> <i>S. epidermidis</i>	<a href="#">Piperacillin/tazobactam</a> IV	In penicillin allergy: <a href="#">Meropenem</a> IV	Refer to <a href="#">NICE Guideline 151</a>  Add <a href="#">Gentamicin</a> IV (see <a href="#">monographs</a> ) if advised by consultant  Add <a href="#">Teicoplanin</a> IV if fever and/or rigors after line flushed earlier in day or soon after new line inserted.  Piperacillin/tazobactam is not licensed for children <2 years for neutropenic sepsis.



## NHS Grampian Staff Empirical Therapy Guidance For Common Infections In Children In The Acute Sector

8 Musculoskeletal				
<ul style="list-style-type: none"> <li>• These are surgical emergencies and need to be managed under the combined care of an orthopaedic surgeon and paediatric infectious diseases specialist.</li> <li>• Duration of treatment is guided by cultures and effectiveness of local drainage.</li> <li>• Septic arthritis is managed by surgical drainage supported by antibiotic treatment and drainage may be required for osteomyelitis as well.</li> <li>• Send blood and bone aspirate/joint fluid for culture prior to starting antibiotics.</li> </ul>				
INFECTION	Likely organisms	1 <sup>st</sup> Choice Antibiotics	2 <sup>nd</sup> Choice Antibiotics	Comments
Acute Osteomyelitis / Septic arthritis / Acute discitis / Deep myositis	< 6 months <i>S. aureus</i> , <i>S. pyogenes</i> <i>E. coli</i> <i>S. agalactiae</i> (GBS)	If age <6 months <a href="#">Cefuroxime</a> IV IV <b>plus</b> <a href="#">Gentamicin</a> IV (see <a href="#">monographs</a> )	In penicillin allergy: <a href="#">Vancomycin</a> IV (see <a href="#">monograph</a> ) <b>plus</b> <a href="#">Gentamicin</a> IV (see <a href="#">monographs</a> )	Immediate consultation by Orthopaedic Surgeons is essential  If MRSA likely use: <a href="#">Vancomycin</a> IV (see <a href="#">monograph</a> ) as 1 <sup>st</sup> choice.
	If age >6 months <i>Staphylococcus aureus</i>  Consider MRSA	If age > 6 months <a href="#">Flucloxacillin</a> IV +/- <a href="#">Gentamicin</a> IV (see <a href="#">monographs</a> )	In penicillin allergy: <a href="#">Clindamycin</a> IV <b>OR</b> <a href="#">Ciprofloxacin</a> IV	<i>Pseudomonas</i> likely in feet infections and sickle cell anaemia at any age  If <i>Pseudomonas</i> likely in puncture associated infections use: <a href="#">Ceftazadime</a> IV  Initial IV therapy is required but a switch to oral therapy can be considered once the patient is afebrile for 48 hours, local symptoms have improved, and inflammatory markers are decreasing. Minimum treatment duration is 4 -6 weeks.  If recurrent - consider immune deficiency or HIV-infection.

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9 Eye				
INFECTION	Likely organisms	1 <sup>st</sup> Choice Antibiotics	2 <sup>nd</sup> Choice Antibiotics	Comments
Conjunctivitis, purulent	<i>Staphylococcus aureus</i> , <i>Streptococcus pyogenes</i> , <i>Streptococcus pneumoniae</i> , <i>Haemophilus</i> spp <i>Moraxella catarrhalis</i>	<a href="#">Chloramphenicol</a> 0.5% eye drops +/- <a href="#">Chloramphenicol</a> 1% eye ointment, For 7 days or until symptom free for 48 hours	<a href="#">Fusidic acid</a> 1% viscous eye drops For 7 days or until symptom free for 48 hours	Fusidic acid has less Gram negative activity.  Remove contact lenses until all symptoms and signs of infection resolved and treatment complete for 24 hours.
Orbital cellulitis	<i>Streptococcus pneumoniae</i> , <i>Haemophilus influenzae</i> , <i>Staphylococcus aureus</i>	<a href="#">Ceftriaxone IV</a> plus <a href="#">Metronidazole IV</a> For 10 days total treatment – if intracranial pathology excluded and child responds well to IV, switch to <b>oral</b> <a href="#">Co-amoxiclav</a> after 3-5 days	In severe penicillin allergy: <a href="#">Ciprofloxacin IV</a> plus <a href="#">Clindamycin IV</a> For 10 days total treatment – if intracranial pathology excluded and child responds well to IV, switch to <b>oral</b> <a href="#">Ciprofloxacin</a> + <a href="#">Clindamycin</a> (de-escalate to one antibiotic if possible) after 3-5 days	Serious emergency – infection of soft tissues behind orbital septum.  Contact Infectious Diseases specialist for advice regarding duration if there is evidence of intracranial extension or if the child has had surgery.
Pre-septal cellulitis (peri-orbital)	<i>Staphylococcus aureus</i> , <i>Streptococcus pneumoniae</i> ,	<a href="#">Flucloxacillin</a> oral	In penicillin allergy: <a href="#">Clindamycin</a> oral	Infection anterior to the orbital septum. Clindamycin suspension is no longer available; clarithromycin may be used as an alternative for patients who require a liquid. NB Clarithromycin suspension is not licensed in infants <6 months.
Dacrocystitis		Only treat in moderate/severe cases <a href="#">Flucloxacillin</a> oral		Inflammation of the lacrimal sac.
Dacroadenitis	Viral most common, bacterial, protozoan, fungal, non-infectious	Warm compresses and analgesia if viral. <a href="#">Cephalexin</a> oral if bacterial.		Inflammation of the lacrimal gland.  Review need for antibiotic once culture results available.
Ophthalmic zoster	<i>Varicella Zoster</i>	<a href="#">Aciclovir</a> oral for 7 days	Liaise with Ophthalmology for specialist advice	

## NHS Grampian Staff Empirical Therapy Guidance For Common Infections In Children In The Acute Sector

10 Ear, nose, and oropharynx				
• Take appropriate samples for culture and/or viral PCR				
INFECTION	Likely organisms	1 <sup>st</sup> Choice Antibiotics	2 <sup>nd</sup> Choice Antibiotics	Comments
Otitis externa	If not the presenting complaint and non-severe then refer to <a href="#">primary care guidance</a> on otitis externa.			
Consider systemic antibacterial if spreading cellulitis or patient systemically unwell (flucloxacillin or erythromycin) or if pseudomonas suspected (ciprofloxacin)	<i>Staphylococcus aureus</i>	Aural toilet + <b>Analgesia</b>	Aural toilet + <b>*Betamethasone 0.1% and Neomycin 0.5%</b> (Betnesol-N®) ear/eye drops, for 7 days	Send aspirate or swab.  *Betamethasone and neomycin is contra-indicated in patients with a perforated tympanic membrane.  Products to consider in mild cases (in addition to aural toilet) include Sofradex®, Locorten-Vioform®. Consider systemic antibacterial if spreading cellulitis or patient systemically unwell (flucloxacillin or erythromycin).
	<i>Pseudomonas aeruginosa</i>	Aural toilet <b>plus</b> * <b>Gentamicin</b> 0.3% ear drops for 3-5 days	<b>Ciprofloxacin</b> 0.3% eye drops**, apply 2 drops into the ear three times daily.  More serious infection: <b>Add Ciprofloxacin</b> orally for 5 days	Seek ENT, medical microbiology advice.  *Gentamicin is contra-indicated in patients with a perforated tympanic membrane.  ** There are no licensed ciprofloxacin ear drops available in the UK. Ciprofloxacin eye drops can be used off-label in the ear. The dose is based on advice from ENT, for more information see <a href="#">SmPC</a> .  Oral ciprofloxacin is not licensed for children <1 year
	Fungal: <i>Candida</i> spp, moulds (e.g. <i>Aspergillus</i> spp.)	Aural toilet <b>plus</b> <b>Clotrimazole</b> 1% solution for at least 14 days after disappearance of infection.		
Sore Throat	<i>75% viral</i>	90% resolve in 7 days with no antibiotics and pain only reduced by 16 hours. Patients with 3 or 4 Centor criteria (history of fever, purulent tonsils, cervical lymphadenopathy, absence of cough) consider a 2-3 day delayed or immediate antibiotics. You need to give antibiotics to >4000 patients to prevent one quinsy, and to 200 patients to prevent one otitis media. Refer to <a href="#">primary care guidance</a> on sore throat and see Sore throat <a href="#">leaflet</a>  Consider antibacterial, if history of valvular heart disease, if marked systemic upset, if peritonsillar cellulitis or abscess, or if at increased risk from acute infection (eg immunosuppression, cystic fibrosis).		
Tonsillitis	<i>Streptococcus pyogenes</i>	<b>Penicillin V</b> oral, if unable to swallow use <b>Benzympenicillin</b> IV. Total duration of 10 days	In penicillin allergy: <b>Clarithromycin</b> oral , if unable to swallow then use IV. Total duration of 10 days	Send bacterial throat swab blood for EBV serology if indicated.  Clarithromycin tablets and intravenous infusion are not licensed in children under 12 years; clarithromycin suspension is not licensed for use in infants <6 months.

## NHS Grampian Staff Empirical Therapy Guidance For Common Infections In Children In The Acute Sector

10 Ear, nose, and oropharynx (continued)				
• Take appropriate samples for culture and/or viral PCR				
INFECTION	Likely organisms	1 <sup>st</sup> Choice Antibiotics	2 <sup>nd</sup> Choice Antibiotics	Comments
Quinsy (peritonsillar abscess)	<i>Polymicrobial</i>	<a href="#">Penicillin V</a> oral, if unable to swallow use <a href="#">Benzylpenicillin</a> IV Total duration of 10 days	In penicillin allergy: <a href="#">Clindamycin</a> oral, if unable to swallow then use IV. Total duration of 10 days	Consult ENT as will require aspiration and drainage.
Mastoiditis	<i>Streptococcus pneumoniae</i> <i>Moraxella catarrhalis</i> Group A Streptococcus	<a href="#">Co-amoxiclav</a> IV then switch to oral for 10 days	Contact Paediatric Infectious Diseases Consultant for advice.	
Acute otitis media (Many are viral. Illness resolves over 4 days in 80% without antibiotics)	<i>Streptococcus pneumoniae</i> <i>Moraxella catarrhalis</i> Group A Streptococcus	<b>Avoid antibiotics</b> as 60% of patients are better in 24 hours without; they only reduce pain at 2 days (NNT 15) and <b>do not prevent deafness.</b> <b>Optimise analgesia.</b> Antibacterial treatment may be started after 72 hours if no improvement and presence of systemic illness.  Consider earlier treatment if deterioration, if systemically unwell, if at high risk of serious complications (eg immunosuppression, cystic fibrosis), if otorrhoea or in children under 2 years of age with bilateral otitis media.  If recurrent and/or troublesome - consider immune deficiency or HIV-infection.		
		<a href="#">Amoxicillin</a> oral for 5 days  <b>Severe Infection</b> <a href="#">Co-amoxiclav</a> Oral/IV	In penicillin allergy: <a href="#">Clarithromycin</a> oral for 5 days  <b>Severe infection</b> <a href="#">Cefuroxime</a> IV	Send aspirate or exudates if drum is perforated. Haemophilus spp are extracellular pathogens, thus macrolides, which concentrate intracellularly, are less effective treatment.  Clarithromycin tablets are not licensed in children under 12 years; suspension is not licensed for use in infants <6 months.
Chronic otitis media - seek ENT advice				
Acute sinusitis (Many are viral)	<i>Streptococcus pneumoniae</i> <i>Moraxella catarrhalis</i> Group A Streptococcus	<a href="#">Amoxicillin</a> oral for 7 days  Use IV initially in severe/febrile cases	In penicillin allergy, <a href="#">Clarithromycin</a> oral for 5 days	In acute sinusitis prescribe <b>6 – 12 years</b> <a href="#">Xylometazoline</a> 0.05% nasal drops for 5 days. <b>12 – 18 years</b> <a href="#">Xylometazoline</a> 0.1% nasal drops for 5 days.  Send aspirate, discharge or antral washings.  Clarithromycin tablets are not licensed in children under 12 years; suspension is not licensed for use in infants <6 months.
Chronic sinusitis	<i>Streptococcus pneumoniae</i> <i>Haemophilus influenzae</i> <i>Staphylococcus aureus</i> <i>Anaerobes, Fungi</i>	Base treatment on culture results	Consult medical microbiology and ENT surgeon	Take nasopharyngeal swab if no other samples obtained.  Also consider intranasal steroids +/- decongestant see <a href="#">MHRA guidance on cough and cold treatments in children</a> . Limit treatment to one course only. Refer to ENT.

## NHS Grampian Staff Empirical Therapy Guidance For Common Infections In Children In The Acute Sector

10. Ear, nose, and oropharynx (continued)				
• Take appropriate samples for culture and/or viral PCR				
INFECTION	Likely organisms	1 <sup>st</sup> Choice Antibiotics	2 <sup>nd</sup> Choice Antibiotics	Comments
Oral thrush	<i>Candida albicans</i>	<p><a href="#">Nystatin</a> oral suspension, usually for 7 days.</p> <p>Continue for 48 hours after lesions have resolved.</p> <p>Immunocompromised; <a href="#">Fluconazole</a> oral for 7 – 14 days</p>	<p><a href="#">Miconazole</a> oral gel for 5 – 7 days.</p> <p>Continue for 48 hours after lesions have resolved.</p> <p>The gel should be placed at the front of the mouth to avoid the risk of choking – never put it at the back of the throat.</p>	<p>Send scrapings for culture.</p> <p>If recurrent - Consider immune deficiency or HIV-infection.</p> <p>NB Miconazole is not licensed for children under 4 months of age or during the first 5 – 6 months of life of an infant born pre-term. Nystatin is not licensed for neonates.</p>
Dental abscess	<i>Streptococcus</i> spp Anaerobes	<p><a href="#">Penicillin V</a> oral or <a href="#">Zmoxicillin</a> oral for 5 days</p> <p>If spreading infection or pyrexia: add <a href="#">Metronidazole</a> oral</p>	<p><a href="#">Metronidazole</a> oral for 5 days</p>	<p>Refer to <a href="#">SDCEP Drug Prescribing in Dentistry</a></p>

## NHS Grampian Staff Empirical Therapy Guidance For Common Infections In Children In The Acute Sector

11 Skin				
<ul style="list-style-type: none"> <li>Take appropriate specimens before starting therapy, consult dermatologist and medical microbiologist for patients with severe or recurrent infections</li> <li>Consider the necessity for surgical intervention, <b>tetanus</b> prophylaxis and topical cleaning</li> <li>Chronic wounds such as pressure sores and leg ulcers do not require antibiotics unless there is clinical evidence of infection, e.g. cellulitis, discharge or acute pain</li> </ul>				
INFECTION	Likely organisms	1 <sup>st</sup> Choice Antibiotics	2 <sup>nd</sup> Choice Antibiotics	Comments
Cellulitis	<i>Streptococcus pyogenes</i> <i>Staphylococcus aureus</i>	<b>Flucloxacillin</b> Oral/IV Switch to oral <b>Flucloxacillin</b> for 7-14 days	In penicillin allergy: <b>Clindamycin</b> Oral/IV, switch to oral for 7-14 days	Longer courses may be required in severe infections.  If MRSA is likely use: <b>Vancomycin</b> IV as 1 <sup>st</sup> choice (see <a href="#">monograph</a> )  Send blood for culture.  Clindamycin suspension is no longer available; clarithromycin may be used as an alternative for patients who require a liquid. Clarithromycin suspension is not licensed for use in infants <6 months.
Panton-Valentine Leukocidin (PVL) associated <i>Staphylococcus aureus</i> infections – consider in recurrent skin & soft tissue infections including boils, carbuncles, folliculitis, cellulitis, purulent eyelid infections, tissue necrosis and abscesses. Refer to HPN interim guidance: <a href="http://www.documents.hps.scot.nhs.uk/about-hps/hpn/pvl-guidance.pdf">http://www.documents.hps.scot.nhs.uk/about-hps/hpn/pvl-guidance.pdf</a>				
Neonatal Umbilical Infection – purulent discharge	<i>Staphylococcus aureus</i>	<b>Flucloxacillin</b> IV/oral If severe, add <b>Gentamicin</b> IV (see <a href="#">monograph</a> )		
Impetigo	<i>Staphylococcus aureus</i>	<b>If localised,</b> <b>Fusidic acid</b> 2% cream, for 5 days  <b>If MRSA suspected/isolated,</b> <b>Mupirocin</b> 2% ointment for 5 days	<b>If widespread,</b> <b>Flucloxacillin</b> oral for 7 days  In penicillin allergy: <b>Clarithromycin</b> oral for 7 days  If MRSA suspected/isolated seek advice from PID specialist or microbiology	Send swabs or scrapings for culture.  Clarithromycin tablets are not licensed in children under 12 years. Clarithromycin suspension is not licensed for use in infants <6 months.

## NHS Grampian Staff Empirical Therapy Guidance For Common Infections In Children In The Acute Sector

11. Skin (continued)				
<ul style="list-style-type: none"> <li>Take appropriate specimens before starting therapy, consult dermatologist and medical microbiologist for patients with severe or recurrent infections</li> <li>Consider the necessity for surgical intervention, <b>tetanus</b> prophylaxis and topical cleaning</li> <li>Chronic wounds such as pressure sores and leg ulcers do not require antibiotics unless there is clinical evidence of infection, e.g. cellulitis, discharge or acute pain</li> </ul>				
INFECTION	Likely organisms	1 <sup>st</sup> Choice Antibiotics	2 <sup>nd</sup> Choice Antibiotics	Comments
Bites – Animal	<i>Pasteurella multocida</i> <i>anaerobes</i>	<a href="#">Co-amoxiclav</a> oral for 7 days	In penicillin allergy: <b>Age &gt; 6 months and &lt;12 years</b> <a href="#">Co-trimoxazole</a> oral <b>plus</b> <a href="#">Metronidazole</a> oral for 5 days	Send blood and swabs for culture.  NB Co-trimoxazole is not licensed for the treatment of bites but it is recommended as it provides good coverage of the likely causative organisms, has a low risk of antibiotic associated diarrhoea and is available in both tablets and suspension  NB: prophylaxis tetanus and rabies
			In penicillin allergy: <b>Age &gt;12 years</b> <a href="#">Doxycycline</a> oral <b>plus</b> <a href="#">Metronidazole</a> oral for 5 days.	< 6 months: consult paediatric infectious diseases specialist or microbiology
Bites – Human	<i>Streptococcus pyogenes</i> <i>Staphylococcus aureus</i> Oral anaerobes	<a href="#">Co-amoxiclav</a> oral for 7 days	<a href="#">Clarithromycin</a> oral <b>plus</b> (if severe) <a href="#">Metronidazole</a> oral for 7 days	Send blood and swabs for culture.  Clarithromycin tablets are not licensed in children under 12 years; clarithromycin suspension is not licensed for use in infants <6 months.
Post- operative wound infections - abdominal, female genital tract, head and neck “Dirty sites”	<i>Staphylococcus aureus</i> <i>Anaerobes</i>	<a href="#">Co-amoxiclav</a> oral for 7 days	In penicillin allergy, <a href="#">Clindamycin</a> oral for 7 days	If collection present will require surgical drainage.  It is important to base treatment on microbiology sensitivities where available.
Post- operative wound infections – excluding abdominal, female genital tract, head and neck “Clean sites”	<i>Staphylococcus aureus</i>	<a href="#">Flucloxacillin</a> oral for 7 days	In penicillin allergy: <a href="#">Clindamycin</a> oral for 7 days	Route of administration is dependent on the severity of infection and ability of patient to take medication orally  Clindamycin suspension is no longer available. Clarithromycin suspension may be used as an alternative for patients who require a liquid but it is not licensed for use in infants <6 months.

## NHS Grampian Staff Empirical Therapy Guidance For Common Infections In Children In The Acute Sector

11. Skin (continued)				
• Take appropriate specimens before starting therapy, consult dermatologist and medical microbiologist for patients with severe or recurrent infections				
INFECTION	Likely organisms	1 <sup>st</sup> Choice Antibiotics	2 <sup>nd</sup> Choice Antibiotics	Comments
Scabies	<i>Sarcoptes scabiei</i>	<a href="#">Permethrin</a> 5% dermal cream, apply to the whole body (see note*), taking care to treat the webs of fingers and toes and under the nails. Wash off after 8 - 12 hours. Re-apply to hands if washed within 8 hours of application. Repeat after 7 days.		Send scrapings for culture. Treat all household contacts simultaneously.  *Manufacturers recommend that some patient groups do not require treatment above the neck but BNFC, HPA and CKS all recommend to include scalp, face, neck and ears in all patients.  Permethrin cream is not licensed for use in children <2 months and medical supervision is required for children aged < 2 years.
Crab Lice	<i>Phthirus pubis</i>	<a href="#">Permethrin</a> 5% cream, apply over whole body and should be left on the skin for 24 hours*. The treatment areas should then be thoroughly washed. Reapply after 7 days.		Pay particular attention to the pubic hair, hair around the anus, between the legs, and other hairy areas of the body. Check for involvement of more distant sites such as eyebrows. See CKS for further information: <a href="http://cks.nice.org.uk/pubic-lice">http://cks.nice.org.uk/pubic-lice</a>  Note: re-application of permethrin is based on expert opinion and has been accepted as standard practice, although not licensed. [*Also, BNFC recommends 12 hour contact time instead of licensed recommendation of 24 hours]  Permethrin cream is not licensed for use in children <2 months and medical supervision is required for children aged < 2 years.
Head Lice	<i>Pediculus humanus capitis</i>	<a href="#">Dimeticone</a> 4% lotion Apply sufficient lotion to cover dry hair from the base to the tip to ensure no part of the scalp is left uncovered. Leave on hair for a minimum of 8 hours or overnight. Wash out with normal shampoo and rinse thoroughly.  Treatment must be reapplied after 7 days to ensure any lice that hatch following the first application are killed.		NHS Grampian does not recommend rotating between insecticides.  Dimeticone 4% lotion is not licensed for use in children <6 months.



## Appendix 1: Version Control Statements Changes from Version 2 (June 2013)

### Introduction

Added note about considering drug interactions; note on carefully assessing patients to differentiate between penicillin allergy and intolerance; section recommending consideration of immune status and HIV testing for indicator infections in line with BHIVA guidelines; update of link for BNFC; amendment to tetracycline caution so that it can be used in exceptional circumstances; and deletion of quinolone warning.

### Section 1 - Gastrointestinal

- Salmonella spp: delete comment 'Treat less severe infection in children under 6 months, haemoglobinopathy or if immunocompromised' and add 'Antibiotic therapy may be considered in children under 6 months in the presence of haemoglobinopathy or if immunocompromised.' to 1<sup>st</sup> choice antibiotic column.
- Clostridium Difficile Infection: general advice updated in line with recommendations from [HPS guidance Oct 2014](#). Added 'Second or subsequent episode – Discuss treatment options with Medical Microbiologist or Paediatric Infection Specialist.'
- Appendicitis (etc): for 2<sup>nd</sup> choice antibiotics add clindamycin as oral switch and note that clindamycin is only available as capsules, not suspension.
- Perianal/Pilonidal abscess: new indication – for patients with underlying pathology eg inflammatory bowel disease or immune deficiency use triple therapy as for appendicitis. For all others: co-amoxiclav 1<sup>st</sup> line, clindamycin if beta-lactam allergy. Note in comments 'Surgical drainage is an important part of managing infected abscesses.'
- H pylori: added comment 'Due to resistance issues if a patient has been treated with clarithromycin in the previous 12 months for any indication consider using a non-clarithromycin based regimen. See [NICE guidance](#) or seek local advice for alternatives.'
- Inflammatory Bowel Disease: indication removed

### Section 2 - Cardiovascular

- Native Valve Endocarditis – Amoxicillin + Gentamicin (optional) changed to Amoxicillin + Flucloxacillin + Gentamicin based on 2015 European Society of Cardiology Guidelines for the management of infective endocarditis  
<http://eurheartj.oxfordjournals.org/content/early/2015/08/28/eurheartj.ehv319>
- Sepsis in presence of CVC: gram-negative organisms added to likely organisms. Comment about taking blood cultures expanded. Non-haematology patients changed to Gastroenterology patients: Gentamicin + Teicoplanin and refer to MCN protocol; Neonates: Gentamicin + Vancomycin; all other patients: Flucloxacillin + Gentamicin.

### Section 3 – Respiratory

- Influenza – updated with HPS guidance and confirmation that 'All hospitalised patients with confirmed or suspected influenza should receive treatment regardless of whether they are in a high risk group or duration since exposure.' Dosing information for oseltamivir removed – information in BNFC – linked. Advice regarding prophylaxis removed – link to HPS guidance should be sufficient.

- Bronchiolitis: 'not recommended routinely' changed to 'not indicated'.
- Community-acquired pneumonia – mild to moderate: deleted 'If not improving after 48 hours check for mycoplasma, add Clarithromycin oral for 10 days.' Duration changed from 3-5 days to 5 days.
- CAP - severe: oral options listed as per BTS guideline. Duration changed from 7 – 21 days to 'Treat for 7 days. May need to extend depending on organism recovered/suspected.' Comment about adding clarithromycin changed to 'Only use clarithromycin if mycoplasma or pertussis (see below) is detected. Clarithromycin removed from empirical option.
- Aspiration pneumonia: add 'Consider chemical pneumonitis as a differential diagnosis – antibiotics would not be indicated.'
- Pertussis: new indication – clarithromycin oral for 7 days. Antibiotics are only indicated if started within 1 week of onset of the paroxysmal cough to reduce transmission. Contact Public Health – notifiable disease.
- Hospital-acquired pneumonia: new indication – co-amoxiclav + gentamicin. Contact Consultant Paediatrician – Infectious Diseases.
- Meconium aspiration - indication removed
- Post-operative chest infection – indication removed
- Infected Exacerbation in a Cystic Fibrosis patient – removed as patients not treated empirically.
- Pulmonary Tuberculosis – amended advice on sputum and gastric lavage sampling.

### Section 4 – CNS

- General notes: sampling simplified to 'Send CSF and blood for culture. If purpuric lesions present, a biopsy for direct microscopy and culture may be considered.'
- Bacterial Meningitis (etc) – age ranges changed from </>3 months to </>1 month. Advice about adding vancomycin changed to seek specialist advice. Comment about switching to ceftriaxone removed. Contraindications to ceftriaxone removed.
- Brain abscess: suspected organisms – coliforms removed, S Pneumococcus changed to S pneumonia.
- Encephalitis: Sampling advice moved from comments column to general notes and amended to 'Send CSF, blood for culture and PCR for neurotropic viruses. Obtain nasopharyngeal and faeces samples for viral PCR.' Likely organisms: added enteroviruses and parechoviruses. Comments: added 'Most commonly caused by enteroviruses for which no antiviral treatment is available. Always start with aciclovir until HSV is excluded.'

### Section 5: Urinary Tract

- Lower UTI/acute cystitis: general comment changed to 'If trimethoprim/cefalexin has been taken in the last 3 months then select an alternative antibiotic based on previous microbiology sensitivities, if available.' Oral switch changed from trimethoprim to co-amoxiclav and based on sensitivities.
- Prophylactic indications removed.
- Catheter UTI: comments amended 'Smelly or cloudy urine, bacteruria without systemic symptoms or catheter blockage are not indications for antimicrobials but are indications for changing the catheter.'

### Section 6 – Genital System

- Infective balanitis: comment added 'To reduce the risk of subsequent infection, patients/carers should be

advised to avoid potential irritants and ensure good penis hygiene.' Advice about analgesia removed.

### Section 7 – Blood

- Sepsis of unknown source: advice on when to use IV antibiotics and NICE guideline links moved to comments column. 'Refer to Sepsis 6 guideline' added to first column. Neonates – community-acquired: 1<sup>st</sup> choice antibiotics changed from Benzylpenicillin + Gentamicin to Cefotaxime + Amoxicillin. (In order to cover meningitis and align with A&E sepsis 6 guideline.) 2<sup>nd</sup> choice antibiotic option removed. >1month: changed from Cefotaxime + Amoxicillin to Cefotaxime alone. (Risk of listeria is very low >1 month)
- Comments on changing to ceftriaxone and contraindications to ceftriaxone removed.
- Comment amended in line with adult guidance: 'The most common causes of sepsis are urinary or respiratory sources which should be treated according to the relevant sections in this guideline.'
- If known MRSA carrier: changed from vancomycin + gentamicin +/- metronidazole to vancomycin + gentamicin.
- Toxic Shock Syndrome: new indication – 1<sup>st</sup> choice antibiotics: flucloxacillin + gentamicin +/- clindamycin
- Neutropenic sepsis: likely organisms amended to gram-negatives, S. Aureus and S.epidermidis. Mild penicillin allergy changed to penicillin allergy and 2nd choice changed from ceftazidime to meropenem.

### Section 8 – Musculoskeletal

Indication amended to 'Acute osteomyelitis/septic arthritis/acute discitis/deep myositis'. Age range changed to <6 months: Likely organisms amended to S aureus, S pyogenes, E coli, S agalactiae (GBS); 1<sup>st</sup> choice antibiotics changed from flucloxacillin + cefuroxime to cefuroxime + gentamicin. >2 years 1<sup>st</sup> choice antibiotics changed from flucloxacillin + sodium fusidate to flucloxacillin + gentamicin and in penicillin allergy vancomycin changed to clindamycin or ciprofloxacin. Comments changed to 'Initial IV therapy is required but a switch to oral therapy can be considered once the patient is afebrile for 48 hours, local symptoms have improved, and inflammatory markers are decreasing. Amended

comment re pseudomonas to add 'in puncture associated infections' use ceftazidime IV.

### Section 9 – Eye

- Neonatal gonococcal conjunctivitis – cefotaxime IM changed to IV. Comment regarding ofloxacin eye drops removed.
- New indications: orbital cellulitis, preseptal cellulitis, dacryocystitis, dacryadenitis and ophthalmic zoster.

### Section 10 – ENT

- Otitis Externa – Gentisone HC no longer available – changed to Betamethasone 0.1% and Neomycin 0.5% ear/eye drops. Comment added to align with adult guideline 'Products to consider in mild cases (in addition to aural toilet) include Sofradex®, Locorten-Vioform®. Consider systemic antibacterial if spreading cellulitis or patient systemically unwell (flucloxacillin or erythromycin).
- Tonsillitis: removed comment regarding avoidance of amoxicillin and ampicillin in glandular fever.
- Mastoiditis: new indication
- Oral thrush – age ranges removed. Licensed age restrictions added to comments.

### Section 11 – Skin

- Cellulitis: 1<sup>st</sup> choice changed from flucloxacillin + benzylpenicillin to flucloxacillin alone; penicillin allergy changed from vancomycin IV switching to clarithromycin oral to clindamycin oral/IV
- Panton-Valentine Leukocidin associated Staphylococcus aureus infections – advice about when to consider and link to HPN guidance.
- Abscess – indication removed
- Post-op wound 'dirty sites' – penicillin allergy option added: clindamycin oral for 7 days
- Post-op wound 'clean sites' – penicillin allergy option changed from clarithromycin to clindamycin
- Scabies – notes added to align with adult guideline. Malathion removed as 2<sup>nd</sup> line option (no longer stocked in hospital.)
- Crab lice – 1<sup>st</sup> line option changed from malathion to permethrin and notes amended
- Head lice – 1<sup>st</sup> line option changed from malathion to dimeticone 4% lotion and notes amended. Link to HPS document removed as no longer available.

## Appendix 2 – Consultation Process

This policy was re-drafted by the following group:

Professor Adilia Warris	Paediatric Infectious Diseases Specialist
Dr Ian Gould	Consultant Microbiologist
Mrs Gillian Macartney	Specialist Antimicrobial Pharmacist
Mrs Fiona McDonald	Specialist Antimicrobial Pharmacist
Mrs Jenny Mosley	Clinical Pharmacy Team Leader, RACH
Mr Yatin Patel	Consultant Paediatric Surgeon
Dr Timothy Lawes	Foundation Year 2 Doctor, RACH

This policy was sent to the following via email for comment:

Dr Catherine Hauptfleisch	Consultant, Neonatal Unit
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This policy was also sent to the following groups via email for comment:

- All consultants at RACH via the Combined Child Health Senior Staff Committee – Sep 2015
- All pharmacists at RACH and Dr Gray's paediatric ward

Comments were received from:

Isobel Morrison	Clinical Pharmacist - AMH
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This policy has been reviewed and agreed by:

- NHS Grampian Antimicrobial Group September 2015
- NHS Grampian Medicines Guidelines and Policies Group October 2015