Republic of Kenya

COUNTY GOVERNMENT OF KAKAMEGA

MINISTRY OF HEALTH

KAKAMEGA COUNTY GENERAL HOSPITAL

ANTIMICROBIAL TREATMENT GUIDELINES AND PROTOCOLS

Revised Edition 2022

FOREWARD

Antimicrobial resistance (AMR) threatens the very core of modern medicine and the sustainability of an effective, global public health response to the enduring threat from infectious diseases. Effective antimicrobial drugs are prerequisites for both preventive and curative measures, protecting patients from potentially fatal diseases and ensuring that complex procedures, such as surgery and chemotherapy, can be provided at low risk. Yet systematic misuse and overuse of these drugs in human medicine puts patients at risk due to development of resistance.

Few replacement products are in the pipeline. Without harmonized and immediate action on both local and global scale, the world is heading towards a post-antibiotic era in which common infections could once again kill.

Health care workers have a vital role in preserving the power of antimicrobial medicines. Inappropriate prescribing and dispensing can lead to their misuse and overuse if medical staff lack up-to-date information, cannot identify the type of infection, yield to patient pressure to prescribe antibiotics, or benefit financially from supplying the medicines.

Inadequate hygiene and infection prevention and control in hospitals help to spread infections. Better hygiene and infection prevention measures are essential to limit the

development and spread of antimicrobial-resistant infections and multidrug-resistant bacteria.

This empiric antibiotic use guide seeks to promote appropriate and effective antimicrobial prescribing to enhance quality of patient care and improve clinical outcomes. We encourage all healthcare workers to adhere to these guidelines.

Signed

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Dr Victor Zimbulu

Medical Superintendent

Kakamega County General Hospital

EDITORIAL NOTE

This guideline has been developed by a multidisciplinary team comprising medical specialists, microbiologist, clinical pharmacists, infection prevention and control specialists, ASP sub-committee members and the medicine and therapeutics committee.

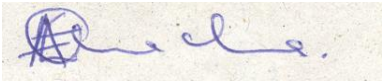
The hospital antibiogram has been used to identify the most common pathogens and profile their antimicrobial susceptibility patterns. The aim of this guide is to rationalise antibiotic use and optimise patient outcomes in various in-patient and out-patients units.

The guide does not apply to all patients uniformly. Patient care must be individualised and the choice of antimicrobials may need to be modified in special groups such as pregnant and lactating mothers, renal and hepatic dysfunction, recent antimicrobial therapy, and history of hypersensitivity and the presence of significant drug interactions.

The periodic revision of this guide will be informed by changes in the local antibiogram, availability of new antimicrobials and new recommendations on antibiotic use.

This guideline should be implemented by all the relevant health care providers and where there is need for significant variation in antimicrobial choice, the antimicrobial stewardship team at the hospital should be consulted.

Signed



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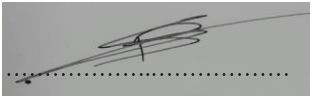
Dr Eric Anyira

Chairman ASP



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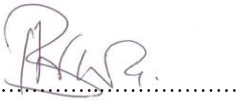

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Dr Wambulwa Benard

Secretary ASP

List of abbreviations

ASP	Antimicrobial Stewardship Program
AMR	antimicrobial resistance
IV	intravenous
MRSA	Methicillin-Resistant *Staphylococcus aureus*
PO	Per Oral
SPP	Species
HAI	Hospital Acquired Infections
TB	Tuberculosis
CRP	C -reactive protein
BNF	British National Formulary
ESR	Erythrocyte Sedimentation Rate
CSF	Cerebrospinal Fluid
TMP-SMX	Trimethoprim/ Sulfamethoxazole
HACEK	Heamophilus, Actinobacillus, Cardiobacterium, Eikinella, Kingella *spp*
VAP	ventilator-associated pneumonia
ICU	intensive care unit
PCP	Pneumocytis Carinii Pneumonia
MTC	Medicines and Therapeutics Committee

Table of Content

Key Antimicrobial Stewardship Principles:

1. An Antimicrobial Stewardship Programme (ASP) aims to improve the safety and quality of patient care and contribute significantly to reductions in the emergence and spread of Antimicrobial Resistance (AMR) and is a key component in the reduction of Healthcare Associated Infections (HAIs).
2. Antibiotics do not merely treat infections but affect the microbial environment within and beyond the patient, therefore, must be used appropriately and with care.
3. Do not start antimicrobial therapy unless there is clear evidence of infection. Antimicrobial resistance is a threat to the effective treatment of infections. To lower the risk of developing antibiotic resistance, antibiotics which are likely to be bactericidal to the pathogen at the site of infection should be chosen.
4. Use adequate antibiotic doses and for an adequate duration.
5. Inappropriate use of broad spectrum antibiotics must be avoided because it promotes the overgrowth of *Clostridium difficile*. Always choose the narrowest spectrum antibiotic if possible.
6. Antibiotics must be prescribed for the shortest duration necessary. All antibiotic prescriptions must therefore be for a defined duration.
7. For all infections document in the medical notes the specific diagnosis and the indicators for making the diagnosis (↑WBC count, ↑Procalcitonin, temp >38°C evidence of inflammation, fluid collection, ↑CRP etc).
8. If possible review all sensitivity results daily and always change to the sensitive antibiotic with the narrowest spectrum and most efficacious and cost effective option.

9. Antibiotic doses should not be missed unless unavoidable. Missed doses are everyone's responsibility and should be investigated and the treatment route, formulation or dose reviewed as necessary to ensure administration and compliance.

Recommended Good Practice on Antimicrobial Use

1. Not all admitted patients require antibiotics; fever does not necessarily mean presence of a bacterial infection

2. Appropriate investigations are recommended for all infections- for diagnosis, treatment and follow up. (Employ rapid diagnostic tests such as CRP,ESR as well as differential WBC count where applicable)

3. Microbiological specimens should be collected before initiating antimicrobial therapy

4. Prescribe antimicrobials contained in the Pharmacy drug availability list.

5. Check for factors that will affect drug choice and dosage such as age, renal and hepatic impairment, pregnancy, lactation, infection severity, and hypersentivity and drug interactions.

6. Ensure that an appropriate dose is prescribed; if uncertain consult a pharmacists or check in the BNF or latest Drug index or hospital formulary.

7. For the under five children use the basic paediatric protocol 2016

8. The need for antimicrobial therapy should be reviewed at 48 hours and regularly thereafter. If investigations do not suggest an infection, antibiotics should be stopped and other appropriate management instituted

9. For most infections 5 days of antimicrobial therapy is sufficient. Exceptions include: Meningitis, deep seated abscesses, infective endocarditis, osteomyelitis, pyelonephritis, blood and stream infections

Specimen Collection

1. Blood - should be taken from 2 sites e.g. from a central line and a peripheral site or 2 peripheral sites. When taking a blood culture sample from a peripheral site, clean the site with an alcohol swab and allow 30 seconds to dry before puncture, do not palpate the vessel before puncture unless sterile gloves are worn. For adults draw 10-15ml of blood from each site, for children under 5 years, collect 1-5ml

2. Urine - should be a clean catch midstream sample, from a freshly inserted catheter or cleaned catheter hub where urine will be collected directly from the tubing. Do not collect urine from a urine bag or an indwelling catheter. Urine catheter tip cultures are not acceptable. Morning sample is preferred as it is more concentrated.

3. Abdominal fluid - should be taken straight from the abdomen or from a newly placed drain. Do not collect specimens from existing drains

4. Wound swabs are often not useful due to contamination, to collect a swab, first clean the wound with normal saline and attempt to get a swab from the base or alternatively, get a tissue specimen for culture. Do not collect a superficial sample from the surface of a wound

5. CSF-A sterile procedure should always be used for collection of CSF; a mask should be worn to avoid respiratory contamination. Clean the skin over the selected area using 70% alcohol, followed by povidone –iodine. Specimen to be collected in two bottles, 2ml CSF in container NO. 1 and about 2-3mls in Container NO.2.Deliver the samples to the laboratory immediately.

6. Abscesses, bullae, blisters - aspirate directly from the abscess with a sterile needle and syringe.

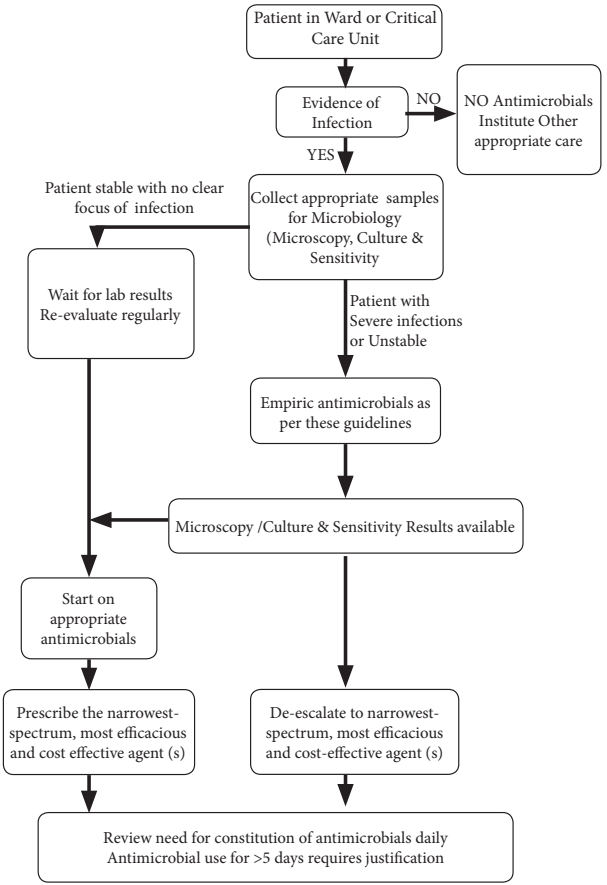


Figure 1.0 Antibiotic Prescribing Algorithm

Table 1: Infection prevention measures for invasive procedures

Central line insertion	Peripheral cannula insertion	Urinary catheter insertion
1. Perform hand hygiene 2. Put on sterile Personal Protective Equipment 3. Prepare skin with 4% chlorhexidine gluconate solution 4. Insert the central line avoiding the femoral site 5. Secure line with sterile gauze or transparent dressing. Gauze should be changed after 48hrs and transparent dressing after 7 days or when visibly soiled. 6. Label date of insertion and document procedure. 7. Use aseptic technique while flushing the line 8. Remove central venous lines when no longer required and no longer than 2 weeks	1. Perform hand hygiene 2. Use aseptic technique 3. Prepare skin with 4% chlorhexidine gluconate solution 4. Secure line with transparent dressing 5. Change dressing when visibly soiled 6. Use aseptic technique while flushing the line 7. Remove when no longer required	1. Perform hand hygiene 2. Use aseptic technique 3. Prepare skin with 4% chlorhexidine gluconate solution 4. Insert catheter after applying sterile lubricating gel. Use the appropriate size catheter to minimize bladder neck and urethral trauma 5. Secure catheter to prevent movement and urethral traction. 6. Maintain a closed drainage system. 7. Drain the urine bags observing standard precautions always 8. Clean the metal surface during daily routine bathing - don't use antiseptic baths

Patient Risk Stratification

Category One: No contact with healthcare system in the last 90 days, no prior antibiotic treatment in the last 90 days, patient young with no co-morbidities and no organ failure.
Category Two: Patient with recent hospital admission, invasive procedure and/or recent exposure to antibiotic
Category Three: Patient who has had long hospitalisation with invasive procedure, recent and multiple antibiotic therapies or severe neutropenia.
Category Four: Patient unresponsive to antibacterial agents consider multi drug resistant organisms or invasive Candida infections

How to use this guideline

1. Identify the site of infection –bloodstream,intra-abdominal, lower respiratory tract, urinary tract and skin &soft tissue etc.
2. Stratify the patient type based on described parameters – category 1, 2, 3 & 4.
3. Send specimens for culture before initiating antimicrobial therapy.
4. Choose empiric therapy based on patient category and site of infection.
5. Empiric antibiotic therapy should be de-escalated once culture and sensitivity report is available. If possible switch from intravenous to oral medication as soon as possible.

Table 2: URINARY TRACT INFECTIONS ANTIBIOTIC PROTOCOL

	Category one	Category two	Category three
Description	No contact with health care system No prior antibiotic treatment Patient young with no co-morbidities No organ failure	Recent hospital admission, dialysis etc. without other invasive procedure Recent antibiotic therapy Patient old with co-morbidities Single organ failure	Long hospitalization With multiple invasive procedures Recent and multiple antibiotic therapies Advanced immunodeficiency, severe neutropenia Multiple organ failure
Common pathogens	E.coli, S. saprophyticus (young women)	E. Coli, Stapylococcus spp, Klebsiella, Proteus, Enterococci	E.Coli, Pseudomonas, Staphylococcus Spp, Proteus, Klebsiella. Proteus, Enterococci, GBS

Empiric therapy	**Preferred:** Nitrofutantoin **Alternative:** Ciprofloxacin Cefuroxime TMP-SMX	Nitrofutantoin OR Piperacillin/Tazobactam/ Meropenem OR Gentamicin	Piperacillin/tazobactam/ Meropenem + Amikacin OR IV Ciprofloxacin
Comments	1.Remove/change urinary catheter for all category 2 and 3 patients 2. Cystitis should be treated for 3 days in women and 7 days in men 3.Pyelonephritis should be treated for 7 days in women and 14 days in men 4. Nitrofurantoin is to be used in cystitis only. Do not use it in pyelonephritis or in urosepsis 5. Do not use Nitrofutantoin in renal insufficiency		

Table 3.SKIN AND SOFT TISSUE ANTIBIOTIC PROTOCOL

	Category one	Category two	Category three
Description	No contact with health care system No prior antibiotic treatment Patient young with no co-morbidities No organ failure	Recent hospital admission, dialysis etc. without other invasive procedure Recent antibiotic therapy Patient old with co-morbidities Single organ failure	Long hospitalization With multiple invasive procedures Recent and multiple antibiotic therapies Advanced immunodeficiency, severe neutropenia Multiple organ failure
Common pathogens	Staphylococcus aureus, Streptococcus Spp	Staphlococcus Spp, Enterobacteriaceae	Pseudomonas ,Enterobacteriaceae

Empiric therapy	Flucloxacillin OR Amoxicillin/ clavulanic acid OR Clindamycin	Clindamycin OR Ceftriaxone OR Vancomycin	Piperacillin/Tazobactam/ Meropenem + Amikacin OR Ceftazidime+ Amikacin
Comments	1.Incision & drainage and debridement remain the cornerstone of management; for chronic wounds, use antibiotics only if there are features of cellulitis and sepsis 2. Incision and drainage without antibiotics is adequate for small abscesses (<5cm) 3. Use Clindamycin or add metronidazole where anaerobic infection is suspected. 4. Obtain a tissue culture for infected wounds. 5.Duration of treatment should be 5-7 days 6.use vancomycin in suspected MRSA or when its isolation is common		

Table 4.INTRA-ABDOMINAL INFECTIONS ANTIBIOTIC PROTOCOL

	Category one	Category two	Category three
Description	No contact with health care system No prior antibiotic treatment Patient young with no co-morbidities No organ failure	Recent hospital admission, dialysis etc. without other invasive procedure Recent antibiotic therapy Patient old with co-morbidities Single organ failure	Long hospitalization With multiple invasive procedures Recent and multiple antibiotic therapies Advanced immunodeficiency, severe neutropenia Multiple organ failure
Common pathogens	E.coli, Bacteroides, Klebsiella spp, Enterococcus, Pseudomonas Spp, HACEK		

Empiric therapy	Ceftriaxone + Metronidazole OR Ciprofloxacin + Metronidazole OR Doxycycline + Metronidazole	Piperacillin / Tazobactam/ meropenem + Amikacin OR Ceftazidime + Gentamicin + metronidazole	Ceftazidime + Amikacin + Metronidazole OR IV Ciprofloxacin + Metronidazole
Comments	Source control is key in management of complicated intra-abdominal infections • Duration of treatment is 5 days • With multiple abdominal surgeries consider Candida infections, and consider adding azoles •Piperacillin/Tazobactam provide adequate anaerobic cover, do not add metronidazole or Clindamycin when using these agents		

Table 4: BLOOD STREAM INFECTIONS ANTIBIOTIC PROTOCOL

	Category one	Category two	Category three
Description	No contact with health care system No prior antibiotic treatment Patient young with no co-morbidities No organ failure	Recent hospital admission, dialysis etc. without other invasive procedure Recent antibiotic therapy Patient old with co-morbidities Single organ failure	Long hospitalization With multiple invasive procedures Recent and multiple antibiotic therapies Advanced immunodeficiency, severe neutropenia Multiple organ failure
Common pathogens	Staphylococcus aureus, CONS, E.coli	E .coli, Klebsiella, Proteus, Pseudomonas	Multidrug resistant organisms including: Pseudomonas, Escherichia coli, Klebsiella, Enterobacter, Citrobacter Acinetobacter (in ICU)

Empiric therapy	Ceftriaxone OR Amoxicilin/Clavulanic acid +/- Gentamicin	**Preferred:** Piperacillin / Tazobactam/meropenem + Gentamicin **Alternate:** Ceftazidime + Gentamicin	Preferred: Piperacillin/Tazobactam/ Meropenem + Amikacin Alternate: Ceftazidime+ Amikacin

Table 5: PNEUMONIA ANTIBIOTIC PROTOCOL

	Category One	Category Two	Category Three
Description	No contact with health care system No prior antibiotic treatment Patient young with no co-morbidities No organ failure	Recent hospital admission, dialysis etc. without other invasive procedure Recent antibiotic therapy Patient old with co-morbidities Single organ failure	Long hospitalization With multiple invasive procedures Recent and multiple antibiotic therapies Advanced immunodeficiency, severe neutropenia Multiple organ failure
Common pathogens	Streptococcus pneumoniae, Staphylococci Spp	Escherichia coli Klebsiella Pneumoniae	Acinetobacter, Klebsiella pneumoniae, Pseudomonas Spp (E.g. VAP in ICU)

Empiric therapy	**For low severity illness, treated as out-patient :** Amoxicillin OR Amoxicillin /clavulanic Acid OR Cefuroxime axetil + Azithromycin **For in-patients:** Amoxicilin/ clavulanicAcid, OR Cefuroxime Sodium OR Ceftriaxone + Azithromycin	Piperacillin/Tazobactam/ Meropenem OR Ceftazidime + Gentamicin	Piperacillin/Tazobactam/ Meropenem OR Ceftazidime + Amikacin (Use Vancomycin, if suspecting MRSA)

Comments	1. All these patients should have a sputum for ZN stain/gene Xpert to rule out TB.Also consider PCP 2. Duration of treatment is no more than 5 days. 3. In renal dysfunction, consider respiratory quinolone in place of an amino glycoside 4. In allergy to penicillins, use a respiratory quinolone e.g. Levofloxacin 5 For pneumonia in children under five use the Basic Paediatric Protocol 2016

Note: The CURB-65 scoring can be used to assess for severity of illness: score of 0-1 - low severity, 2 - moderate severity requiring ward admission, 3-4 - high severity requiring HDU/ ICU admission.

CURB-65: C – Confusion (1 point), U- Urea >7mmol/l (1 point), R- Respiratory rate >30bpm (1 point), B-Blood pressure <90mmHg systolic or <60mmHg diastolic (1 point) 65 - Age > 65 (1 point)

For PCP: Give high dose Cotrimoxazole equivalent to 15 mg/kg/day of Trimethoprim (TMP) and 75 mg/kg/day of Sulfamethoxazole (SMX) in 2-4 divided doses for 14 days and (21 days in HIV/AIDS patients). For those at risk of serious adverse reactions give 10mg/kg/day TMP and 50mg/kg/day SMX.

NB: One Double strength tablet of Cotrimoxazole has 160 mg TMP and 800mg SMX.

Table 6: ACUTE BACTERIAL MENINGITIS

Likely Pathogens	Antibiotics	
S. pneumoniae N.meningitidis H.influenzae S.aureus	**Preferred:** Ceftriaxone 2g twice daily **Alternative**: Ceftazidime 1 - 2g IV 8 to 12 hourly **Note:** Age>50 yrs +/- recurrent meningitis; Use Ceftriaxone plus vancomycin for 10 to 14 days	

CATEGORY FOUR

Consider invasive candidiasis in category 3 patients with fever despite broad spectrum antibiotic therapy for more than three days with no obvious source/after appropriate source control; +/- Sepsis/septic shock

Plus ≥ one of th-e following risk factors to fungal infections:

- Haemodialysis,
- Central venous catheter,
- recent gastrointestinal surgery,
- multi focal Candida colonization,
- diabetes mellitus/steroid use,
- Neutropenia/ other severe immunosuppression,
- Mechanical ventilation and parenteral nutrition use.

Note: Adequate specimens of at least 30ml MUST be taken for blood culture

Table 7: CANDIDAEMIA

Pathogen	Hemodynamically stable with no prior exposure to azoles	Hemodynamically stable with prior exposure to azoles	Hemodynamically unstable
Candida albicans	High dose Fluconazole	Caspofungin or Amphotericin B (liposomal)	Caspofungin
Non - albicans candida	Voriconazole For C. glabrata - caspofungin	AmphotericinB or Caspofungin	Caspofungin

If the blood culture turns out to be positive for Candida, take repeat blood cultures every 2-3 days, continue treatment until 2 weeks after the first negative blood culture.

Table 8: CRYPTOCOCCAL MENINGITIS

Intensive phase (2 weeks)	Amphotericin B and high dose Fluconazole (800mg)
Continuation phase (8 weeks)	Fluconazole 400mg OD
Maintenance phase (until CD4 >200)	Fluconazole 200mg OD

Table 9: HELICOBACTER PYLORI ERADICATION THERAPY

Esomeprazole 20mg BD OR Omeprazole 20mg BD po PLUS Amoxicillin 1g BD po and Clarithromycin 500mg twice daily

A. Do **NOT** use Clarithromycin if used in the last 6 months for treating an infection.
B. Treatment should last **10**-**14 days**.
C. When Clarithromycin resistance is >20% replace it with Levofloxacin 500mg BD po.
D. Routine re-testing to confirm eradication is not necessary unless patient has gastric MALT lymphoma or complicated H pylori associated peptic ulcer

Table 10: HUMAN OR ANIMAL BITES

Human bites includes teeth-to-knuckle injuries and dog/cat bites

Likely pathogens	Pasteurella Multocida (animal bites) Anaerobes Staphylococcus aureus
Antibiotic	Amoxicillin/clavulanic acid OR Doxcycline 200mg stat then 100mg BD **PLUS** Metronidazole 400mg Three times daily for 5 days

SURGICAL PROPHYLAXIS

The goals of surgical antibiotic prophylaxis are to reduce the incidence of surgical site infection using evidence-based practice, while at the same time minimising adverse effects, reducing the development of resistance and keeping disruptions to normal bacterial flora as low as possible. Even a single dose of antibiotic increases the risk of C. difficile infection.

General Principles

Prophylactic antibiotics should be given in the 60 minutes before skin incision, as close to the time of incision as possible (at induction). Antimicrobial cover may be sub-optimal if given more than 1 hour prior to skin incision or post skin incision. Additionally;

1. Antibiotic prophylaxis should be prescribed on the anaesthetic chart.

2. The time the antibiotic is administered should be clearly documented.

3. The time of skin incision should be clearly documented.

If the procedure requires antibiotic prophylaxis, a **SINGLE DOSE** of antibiotic(s) is adequate for all surgical procedures, except in exceptional cases, when a further intra-operative dose may be required .The finding of pus or a perforated viscus at surgery implies that infection was present before surgery and warrants a course of treatment, rather than extended prophylaxis.

Indication for additional doses

Reason for antibiotic administration beyond one dose should be documented and comply with the criteria below:

1. Intra operative blood loss more than 1.5 litres in adults or 25ml/kg in children

2. Re-dose following fluid replacement.

· no need to re-dose Gentamicin

· consider antibiotic duration of action e.g. Flucloxacillin should be re-dosed after 4 hours

3. Prolonged procedure (more than 4hours.

National Research Council (NRC) Wound Classification Criteria

1. **Clean:** Elective, primarily closed procedure; respiratory, gastrointestinal, biliary, genitourinary, or oropharyngeal tract not entered; no acute inflammation and no break in technique; expected infection rate ≤ 2%.

2.**Clean contaminated:** Urgent or emergency case that is otherwise clean; elective, controlled opening of respiratory, gastrointestinal, biliary, or oropharyngeal tract; minimal spillage or minor break in technique; expected infection rate≤ 10%.

3.**Contaminated:** Acute non-purulent inflammation; major technique break or major spill from hollow organ; penetrating trauma less than 4 hours old; chronic open wounds to be grafted or covered; expected infection rate about 20%.

4. **Dirty:** Purulence or abscess; preoperative perforation of respiratory, gastrointestinal, biliary, or oropharyngeal tract; penetrating trauma more than 4 hours old; expected infection rate about 40%.

NB: For dirty surgery or infected wounds full course of antibiotic therapy should be given **NOT** prophylaxis.

Table 11: ORTHOPAEDICS AND TRAUMA

Orthopaedics	Prophylaxis	Comments
Elective joint replacement	Flucloxacillin 2g IV and Gentamicin 5mg/kg IV	-administer within 60 minutes of surgery -use clindamycin if patient is allergic to penicillin - ct post op cefazolin 1.5g IV 8 hourly 72 hours
Gustillo Grade 1&2	Cefazolin 1g 8 hrly	-for 72 hours post op
Gustillo Grade 3	Cefazolin 1.5g IVstat then 8 hourly ; Gentamicin 5mg/kg IV in three divided doses. (Add a penicillin for farm injuries e.g floxapen)	Continue for 72 hrs after surgical toileting
Open surgery for closed fractures	Flucloxacillin 2g IV and Gentamicin 5mg/kg IV	-Give within 60 min of surgery -Use Cefazolin 1g IV 8 hourly post op for 72 hours
	NB	Use ceftriaxone 2g when Gentamicin cannot be used

Table 12: GENERAL SURGERY

Gastrointestinal &Hepato-biliary	Prophylaxis	Comments
Gastric and small bowel	Gentamicin 5mg/kg IV and metronidazole 500mg IV	Correct timing of induction dose is important in all cases
Colorectal elective and emergency	Co-amoxyclav 1.2 g IV and metronidazole 500mg IV	
Laparoscopic Cholecystectomy	Not recommended (NB. Consider in bile spillage / cholecystitis)	
Open Cholecystectomy (Primary or conversion)	Co-amoxyclav 1.2 g IV and metronidazole 500mg IV	

Table 13: ABDOMINAL SURGERY

Abdominal surgery	prophylaxis	comments
Hernia repair: Prophylaxis is now recommended if risk factors present. Prophylaxis now recommended for emergency surgery, WITH or WITHOUT mesh.		
Inguinal hernia/incisional hernia repair	Not recommended	Unless risk factors present e.g. Age >75 yrs,Obesity and /or Urinary catheter(Give as per emergency guidance below)
Any Emergency hernia repair	Flucloxacillin 2g IV and Gentamicin 5mg/Kg IV	-
Ventral Mesh Rectopexy	Co-amoxyclav 1.2 g IV and metronidazole 500mg IV	-
Diagnostic endoscopic procedures	Not recommended	-
Splenectomy	Consider for high risk only Co-amoxyclav 1.2g IV	only recommended in high risk **:** immunosuppression

Table 14: LOWER GASTROINTESTINAL SURGERY

Lower gastrointestinal surgery	prophylaxis	comments
Appendicectomy	Co-amoxyclav 1.2 g IV and metronidazole 500mg IV	
Appendicectomy -perforated or gangrenous	Co-amoxyclav 1.2 g IV and metronidazole 500mg IV	then continue every 8 hours for 72 hours
Stapled haemorrhoidectomy	Co-amoxyclav 1.2 g IV and metronidazole 500mg IV	
Incision and drainage of pilonidal or perianal abscess	Co-amoxyclav 1.2 g IV and metronidazole 500mg IV	
Incision and drainage of gluteal abscess	Flucloxacillin 2g IV	
GI Procedures NOT routinely requiring antibiotic prophylaxis: Examination Under Anaesthetic (EAU) Digital Rectal Examination (DRE) Banding haemorrhoids Open haemorrhoidectomy Colonoscopy, Sigmoidoscopy, Proctoscopy, biopsies		

Table 15: PROPHYLAXIS IN CAESAREAN SECTION

Procedure	Antibiotic	Comments
Emergency or elective caesarean section (no labour, no rupture of membranes)	Cefazolin IV 15 to 60 minutes prior to skin incision	Dose at induction of anaesthesia or after cord clamping, repeated if surgery lasts >3 hrs
Repair third or fourth degree laceration	Cefazolin or Ceftriaxone IV 1-2 g	-

Table 16: STANDARD DOSAGES OF COMMONLY USED ANTIMICROBIALS

ANTIBIOTIC	DOSES
AMIKACIN	Adult and Paediatric : 15 – 20mg/kg IV daily in two divided doses Once daily dosing for all ages 15mg/kg Dosing interval in renal impairment CrCl≥ 60ml/min: Administer every 8 hours CrCl 40-60 ml/min: Administer every 24 hours CrCl 20-40 ml/min: Loading dose then monitor levels Haemodialysis: Dialyzable (50-100%) administer dose post dialysis or administer two thirds of normal dose as a supplemental dose post dialysis and follow up levels Peritoneal dialysis: Dose as CrCl<20ml/min
AMOXICILLIN	Oral Adult or Child over 10 years: 250mg every 8 hours Child upto 10 years: 20-50 mg/kg/day in 3 divided doses Doses doubled in severe infection Otitis media (short course) Adult :500mg every 8 hours, Child aged 3-10 years 750mg every 12 hours for 2 days Dosing interval in renal impairment Crcr 10-50ml/min: Administer every 12 hours Clcr <10ml/min: Adminster every 24 hours Hemodialysis: Moderately dialyzable (20-50%)

AMOXICILLIN-CLAVULINIC ACID	Doses calculated based on amoxicillin Oral Adult and Child over 12 years: 250 mg every 8 hours, doubled in severe infections Child under 1 year: 20mg/kg/day in 3 divided doses 1-6 years: 125mg every 8 hours 6-12 years: 250mg every 8 hours Severe dental infections ADULT 250mg (up to 500mg) every 8 hours for 5 days IV Injection (administered over 3-4 minutes) ADULT and CHILD over 12 years 1 g every 8 hours increased to 1 g every 6 hours in severe infections CHILD 3 months -12 years: 30-50 mg/kg every 8 hours increased to 30-50 mg every 6 hours in more severe infections INFANT upto 3 months: 30mg/kg every 8 hours NEONATES: 30mg/kg every 12 hours Dosing interval in renal impairment Clcr 10-30 ml/min: Administer every 12 hours Clcr <10ml/min; Administer every 24 hours Haemodialysis: Moderately dialyzable (20-50%)
AZITHROMYCIN	Uncomplicated genital chlamydia infections and trachoma,respiratory tract infections, otitis media ADULT over 45 kg: 1 g as a single daily dose Under 45kg: 20mg/kg as a single dose

CASPOFUNGIN	IV infusion ADULT 70 mg on day 1 then 50mg once daily (70mg Once daily if body weight over 80kg) Paediatric: 70mg/m2 (maximum 70 mg) on day 1 then 50mg/m2 (maximum 70mg) once daily; increased to 70 mg/m2 (maximum 70 mg) daily if lower dose tolerated but inadequate response
CEFAZOLIN	ADULT 1 g as a single dose at induction of anaesthesia, or after cord clamping in caeserian section, repeated if necessary if surgery lasts more than 3 hours CHILD: 25mg/kg (maximum 1 g) as a single dose at induction of anaesthesia, repeated if necessary if surgery lasts more than 3 hours Further doses may be given every 6-8 hours post operatively for 24 hours if necessary or up to 5 days in continued risk of infection
CEFTRIAXONE	Adult : 2g IV daily, in meningitis use 2g IV twice daily Paediatric : 20 – 50mg/kg/day IV ; up to 80mg/kg/day in severe infections No change necessary in renal impairment
CEFTAZIDIME	Adult : 1 - 2g IV 8 to 12 hourly Paediatric : 30 – 100mg /kg/day IV in 3 to 4 divided doses Dosing in renal impairment CrCl 30-50 ml/min; Administer every 12 hours CrCl 10 ml/min: Administer every 24 hours CrCl <10ml/min: Administer every 48-72 hours Hemodialysis: Dialyzable (50-100%)

CEFUROXIME	Oral (cefuroxime axetil): Adult: 250-500mg 12 hourly Paediatric : 20 – 30mg/kg/day in two divided doses Intravenous (cefuroxime sodium): Adult : 750mg - 1.5gm 6 to 8 hourly Paediatric : 20-50mg/kg/day in 3 to 4 divided doses Dosing interval in renal impairment CrCl 10-20 ml/min: Administer every 12 hours CrCl< 10ml/min; Administer every 24 hours Hemodialysis: Dialyzable (25%)
CIPROFLOXACIN	500-750mg PO 12 hourly 200mg - 400mg IV 12 hourly CHILD: 1 month-5years 4-8 mg/kg daily 5 years and above 10mg/kg daily Dosing in renal impairment CrCl 30-50ml/min: Oral 250-500mg every 12 hours CrCl 5-29ml/min: Oral 250-500mg every 18 hours, IV 200-400mg every 18-24 hours Dialysis: Only small amounts removed by dialysis: usual dose 25-500mg administered following dialysi

CLINDAMYCIN	IM/IV Infusion ADULT: 600mg- 2700mg per day in 2-4 divided doses increased upto 4.8g daily in life threatening infections; single doses over 600mg by IV infusion only; single doses by IV Infusion not to exceed 1.2 g. Child over 1 month: 15-40mg/kg/day in 3-4 divided doses Neonates: 15-20mg/kg daily Oral ADULT 150-300mg every 6 hours up to 450mg every 6 hours in severe infections Pediatric 3-6 mg/kg every 6 hours
ERYTHROMYCIN	Adult and Paediatric : 250 – 500mg PO 6 hourly
FLUCONAZOLE	Secondary prophylaxis for Cryptococcal Meningitis in AIDS patients after completion of primary therapy: PO/IV infusion Adult 200mg once daily. Systemic candidiasis: IV infusion Adult 800mg stat then 400mg OD Paediatrics: 6-12 mg/kg/day Neonates up to 2 weeks : 6-12 mg/kg every 72 hours Neonates 2-4 weeks : 6-12 mg/kg every 48 hours Cryptococcal Meningitis (following induction with Amphotericin

	B): ADULT Intensive phase (2 weeks) –high dose fluconazole 1200mg OD Continuation phase (8 weeks) – Fluconazole 400mg OD Maintenance phase (until CD4 >200) – Fluconazole 200mg Paediatric Child 6-12 mg/kg/day Neonates up to 2 weeks : 6-12 mg/kg every 72 hours Neonates 2-4 weeks : 6-12 mg/kg every 48 hours Oesophageal and oropharyngeal candidiasis: PO/IV infusion ADULT 50-100 mg daily until symptoms resolve for 7-14 days; up to 400mg daily in very resistant infection for 14-28 days. Paediatric: 3-6mg/kg on the first day, then 3mg/kg/day (every 72 hours in neonates up to 2weeks old, every 48 hours in neonates 2-4 weeks old)
FLUCLOXACILLIN	Adult : 250-500mg PO/IM 6 hourly; Child under 2 years 62.5mg-125mg PO/IM 6 hourly Child 2-10 years 125mg-250mg PO/IM 6 hourly OR as IV or Infusion (Slow) Adult 250mg-2g 6 hourly Child under 2 years 62.5mg-1g 6 hourly Child 2-10 years 125mg-1 g 6 h

GENTAMICIN	3 - 5mg /kg IV day as a single dose Dosing in renal impairment CrCl≥ 60ml/min : Adminster every 8 hours CrCl 40-60 ml/min: Administer every 12 hours CrCl 20-40 ml/min: Administer every 24 hours CrCl<20ml/min: Loading dose then monitor levels Hemodialysis: Dialyzable 30%;administer dose after dialysis and monitor levels
LEVOFLOXACIN	500mg PO/IV once (or twice) daily Dosing in renal impairment Initial dose remains the same, subsequent doses adjusted based on creatinine clearance: CrCl 20-50 ml/min: Half standard dose CrCL 10-19 ml/min : After 500mg initial dose reduce to 250mg given on alternate days CrCl< 10ml/min: (Including patients in dialysis) after initial dose of 500mg reduce to 125 mg every 24 hours
METRONIDAZOLE	Adult : 800mg initially then 400mg PO 8 hourly 500mg IV 8 hourly Paediatric : 7.5mg/kg PO/IV 8 hourly Dosing in renal impairment CrCl < 10ml/min: Administer every 12 hours Hemodialysis : Dialyzable (50-100%), administer dose post dialysis

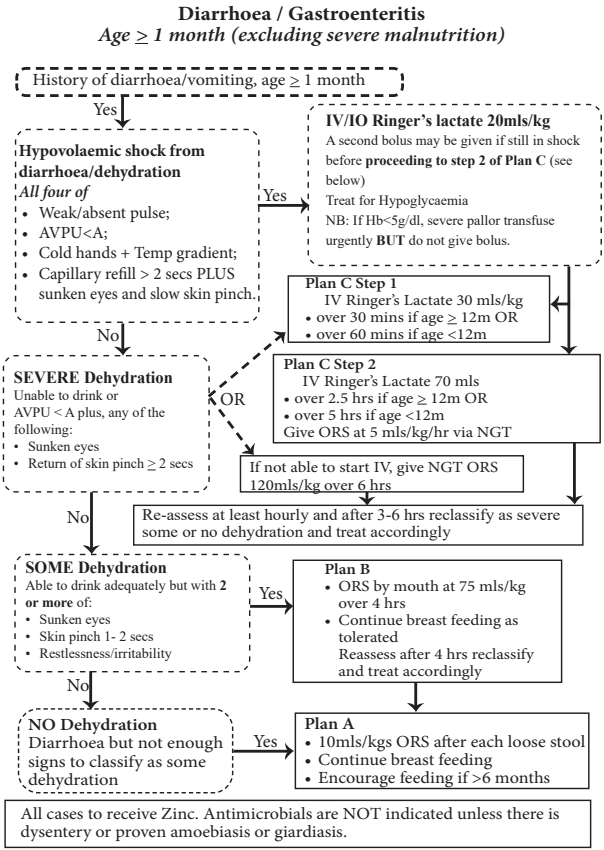
MEROPENEM:	Adult : 0.5-1.0 mg every 8hours (not to exceed 2g IV q8hr) Paediatrics: 10-40mg/kg IV q8hr (not to exceed 2g IV q8hr) Dosing in renal impairment • Crcl>50ml/min:0.5-1g IV q8hr • Crcl 26-50 ml/min:0.5-1g IV q12hr • Crcl 10-25 ml/min:0.25-0.5g IV q12hr • Crcl<10ml/min:0.25-0.5 IV q24hr
NITROFURANTOIN	Adult : 100mg PO 6 hourly with food. Paediatric: 5 – 7mg/ kg/day PO in four divided doses. Dosing in renal impairment CrCl< 50ml/min: Avoid use
PIPERACILLIN / TAZOBACTAM	Adult and Child over 12 years : 2.25g - 4.5gm IV 6 to 8 hourly Dosing in renal impairment CrCl 20-40 ml/min: Administer every 6 hours Crcl <20ml/min; Adminster every 8 hours
VANCOMYCIN	Adult : 1gm IV 12 hourly (elderly over 65 yrs, 500mg IV 12 hourly or 1gm IV once daily) Paediatric : 10mg – 15mg/kg IV 6 to 8 hourly Dosing in renal impairment CrCl > 60ml/min: Start with 1g or 10-15mg/kg every 12 hours CrCl 40-60 ml/min: Start with 1g or 10-15 mg/kg every 24 hours CrCl <40ml/min: Longer intervals required, use serum concentration to determine the interval

VORICONAZOLE	Oral:Adult over 40 kg 400mg every 12 hours for 2 doses the 200mg every 12 hours, increased if necessary to 300mg every 12 hours. Body weight under 40 kg 200mg every 12 hours for 2 doses the 100mg every 12 hours, increased if necessary to 150mg every 12 hours. Paediatric 2-12 years (Oral suspension recommended) 200mg every 12 hours IV Infusion ADULT 6mg/kg every 12 hours for 2 doses then 4mg/kg every 12 hours

Important information

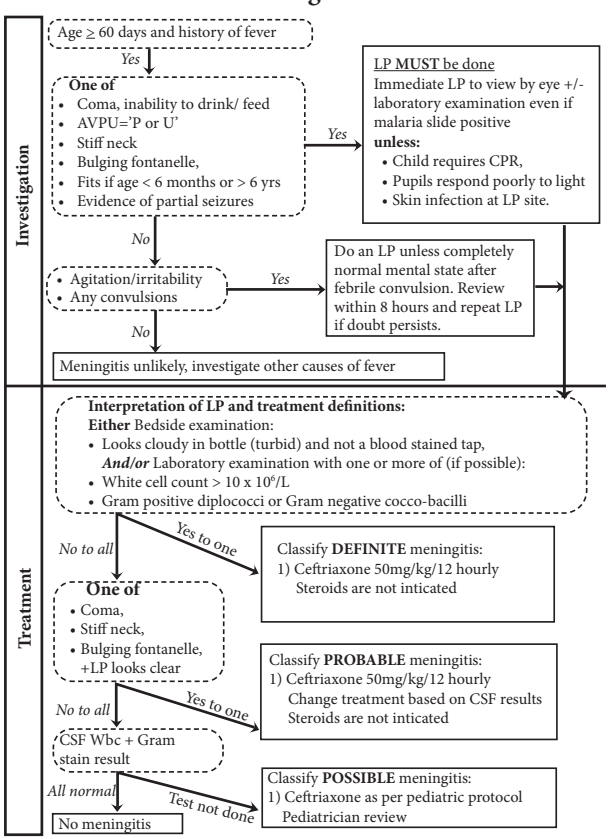
1. Staphylococcus Spp is intrinsically resistant to ceftazidime.
2. Pseudomonas and Acinetobacter are intrinsically resistant to Ampicillin and cephalosporins except Ceftazidime, Chloramphenicol and doxcycline
3. For salmonella and shigella Spp,1st and 2nd generation Cephalosporins may appear active in vitro but are not effective clinically and should not be prescribed for conditions suspected to be caused by these pathogens.
4. In general MRSA is resistant to:
   - ALL penicillins including flucloxacillin,co-amoxyclav,piperacillin/tazobactam
   - All cephalosporins except ceftaroline
   - All carbapenems including meropenem
   - All macrolides

TREATMENT ALGORITHM FOR DIARRHOEA/ GASTROENTERITIS IN CHILDREN



Adapted from Basic Paediatric Protocol 2022

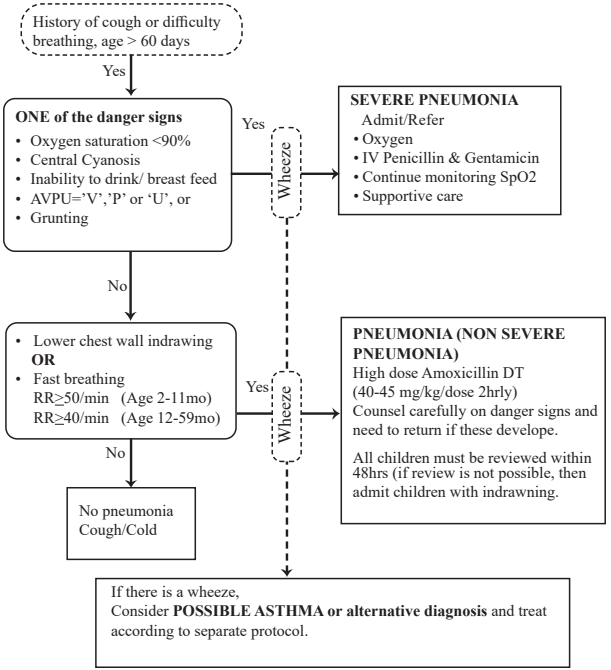
TREATMENT ALGORITHM FOR MENINGITIS IN CHILDREN



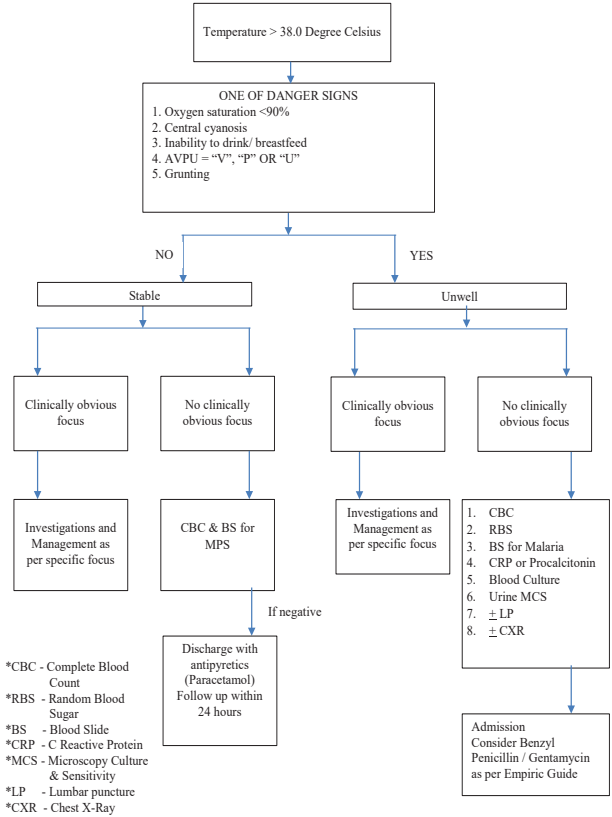
Adapted from Basic Paediatric Protocol 2022

Pneumonia

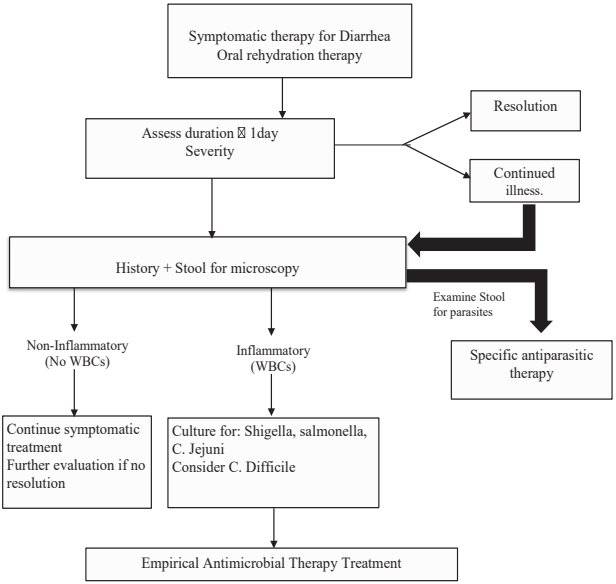
for children aged 2-59months without severe acute malnutrition
For HIV exposed/ infected children see separate protocol



TREATMENT ALGORITHM FOR UNDIFFERENTIATED FEVER IN CHILDREN



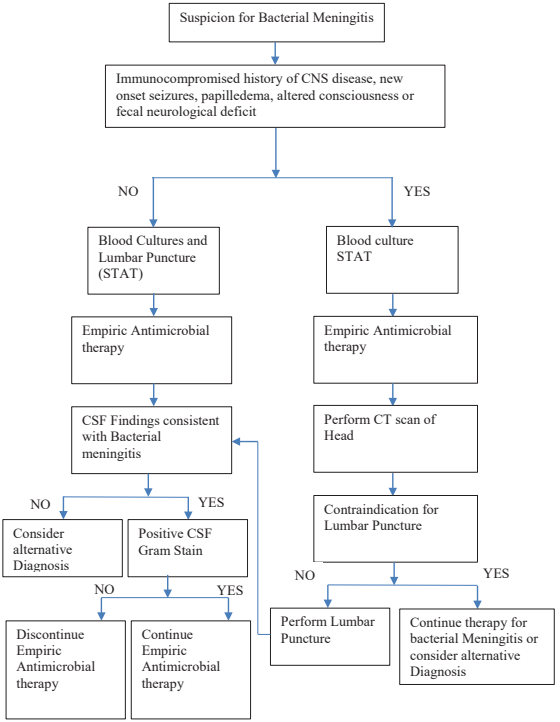
ALGORITHM FOR MANAGEMENT OF DIARRHOEA IN ADULTS.



Vibrio Cholerae: Doxycycline 300mg Stat, Azithromycin 1g single dose
Shigella: Ciprofloxacin 500mg PO BD X 3/7 OR Ceftriaxone 2g IV as a single dose
Amoebiasis: Metronidazole 400mg PO TID X 5/7
Giardiasis: Metronidazole 200mg PO TDS X 5/7
Campylobacter: Azithromycin 500mg PO OD X 3/7
Aeromonas: Ciprofloxacin 500mg PO BD X 3/7

1. Adequate fluid & electrolyte replacement and maintenance is required
2. None-Moderate hypovolemia = ORS solution (75mEq/L & 75mmol/L of glucose)
3. Severe Hypovolemia = IV fluids, RL preferred alternative Normal Saline
4. Loperamide should be avoided in Dysentery

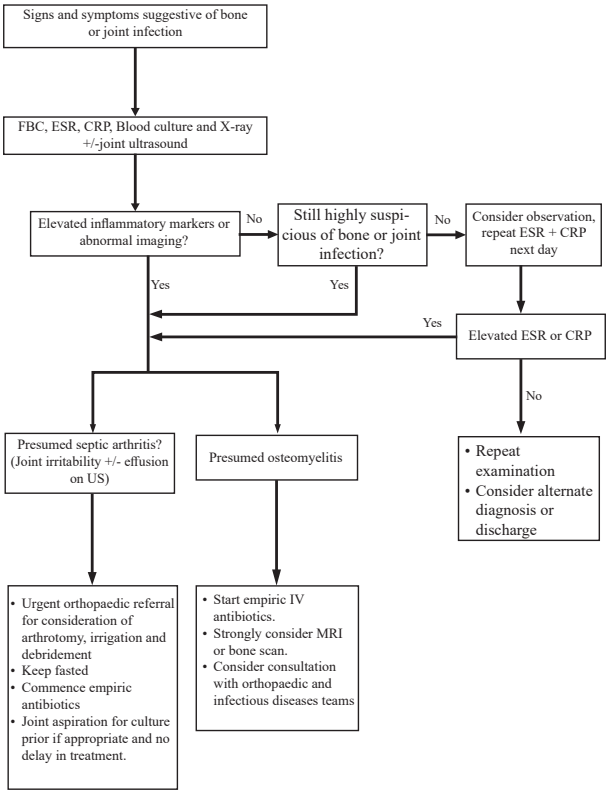
TREATMENT ALGORITHM FOR ADULTS WITH SUSPECTED BACTERIAL MENINGITIS.



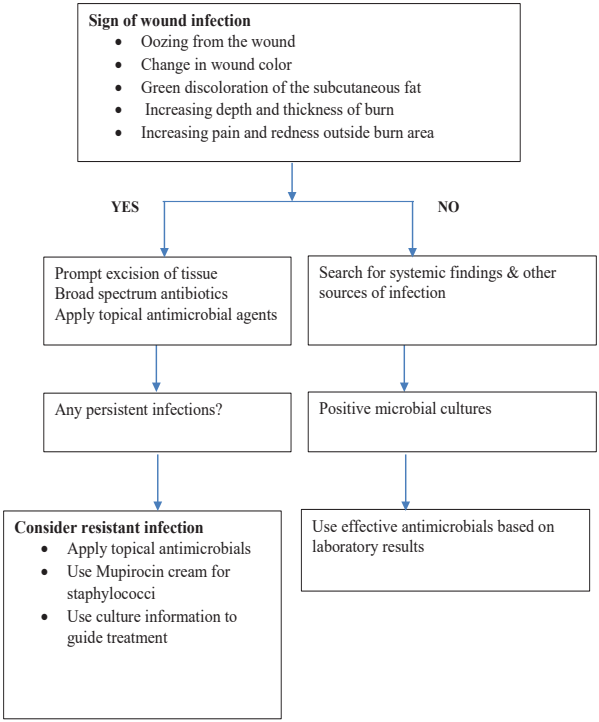
Preferred: Ceftriaxone 2 g IV twice daily
Alternative: Ceftazidime 1-2 g IV 8 to 12 hourly
Note: Age >50 yrs +/- Recurrent Meningitis; Use Ceftriaxone plus Vancomycin

Duration 10-14 days
For Aerobic GNRs, duration 21 days

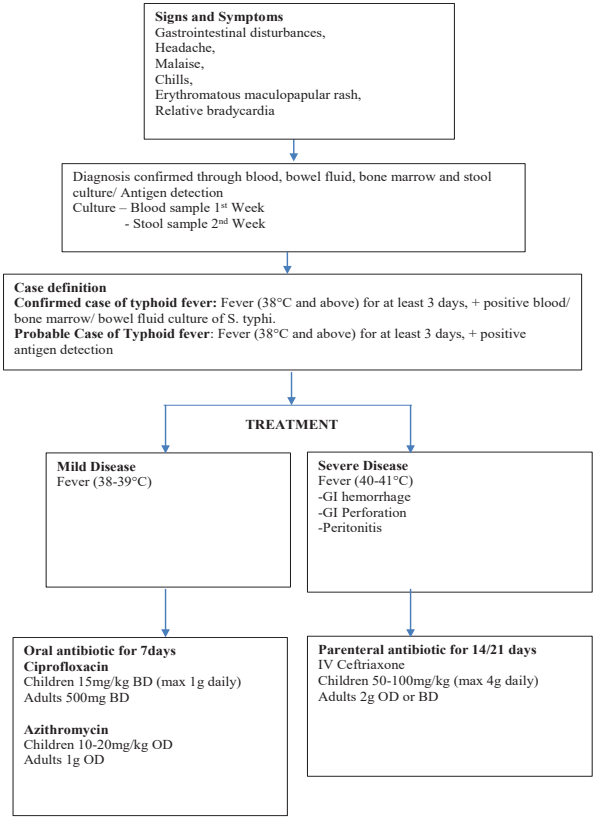
TREATMENT ALGORITHM FOR BONE AND JOINT INFECTIONS.



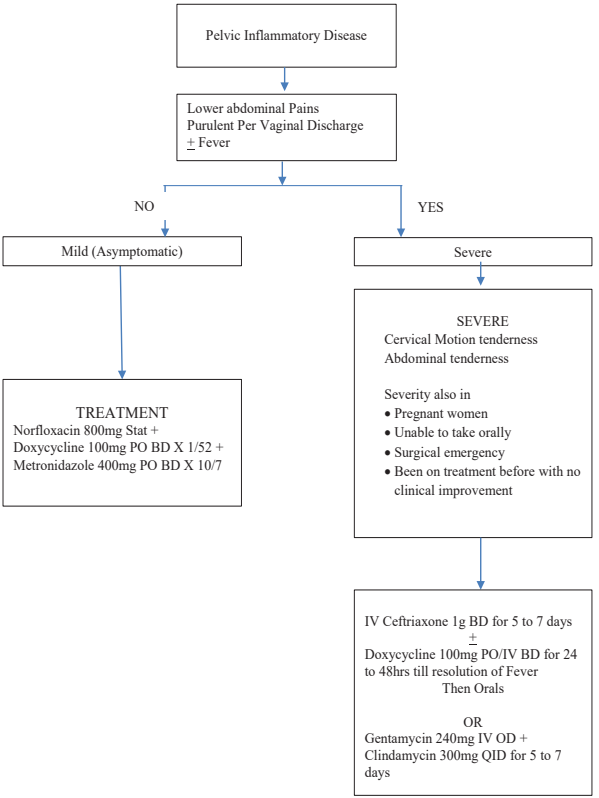
TREATMENT ALGORITHM FOR BURNS WOUND INFECTION.



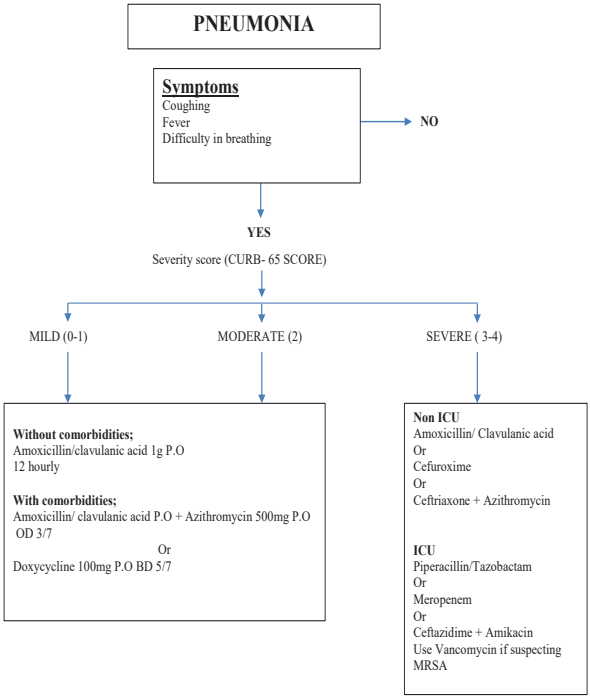
TREATMENT ALGORITHM FOR ENTERIC (TYPHOID / PARATHYPHOID) FEVER



TREATMENT ALGORITHM FOR PELVIC INFLAMMATORY DISEASE.



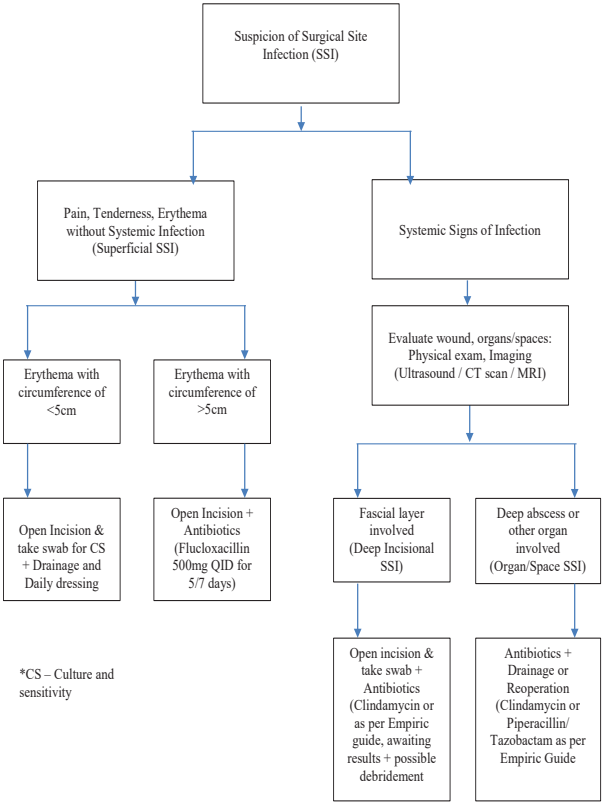
TREATMENT ALGORITHM FOR PNEUMONIA IN ADULTS.



CURB-65 SCORE

CONFUSION		1 point
UREA	> 7 Mmol/l	1 point
RESPIRATORY RATE	> 30 BPM	1 point
BLOOD PRESSURE	< 90/60 mmHg	1 point
AGE	> 65 Years	1 point

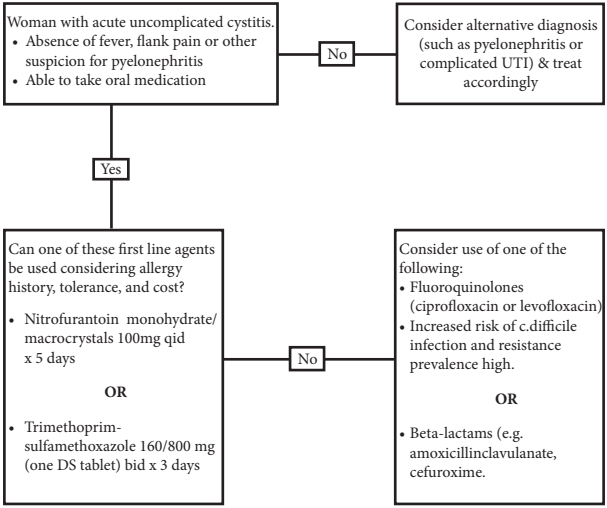
TREATMENT ALGORITHM FOR SURGICAL SITE INFECTIONS.



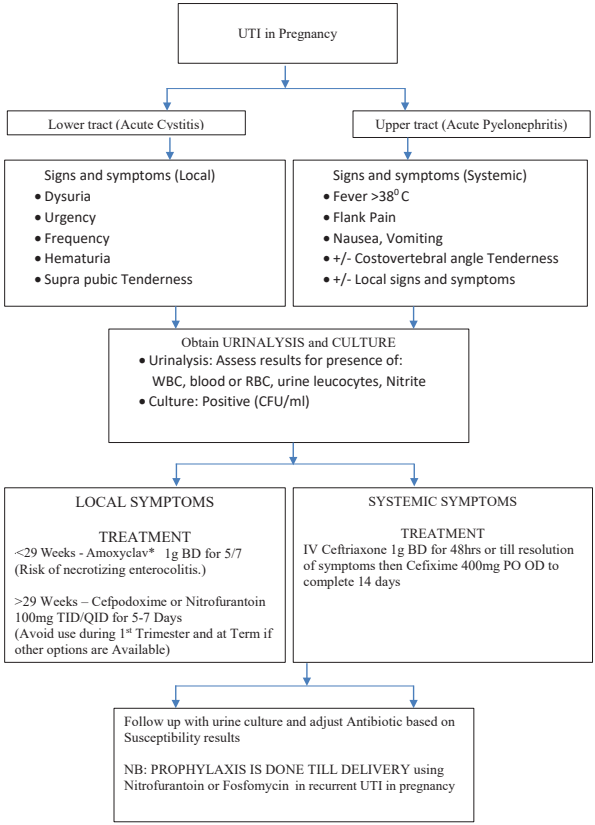
*CS – Culture and sensitivity

TREATMENT ALGORITHM FOR UNCOMPLICATED CYSTITIS IN WOMEN

Uncomplicated cystitis is defined by the presence of typical lower urinary tract symptoms (dysuria, frequency, urgency, hematuria) and lack of upper tract symptoms (see below) in an otherwise healthy pre-menopausal female.

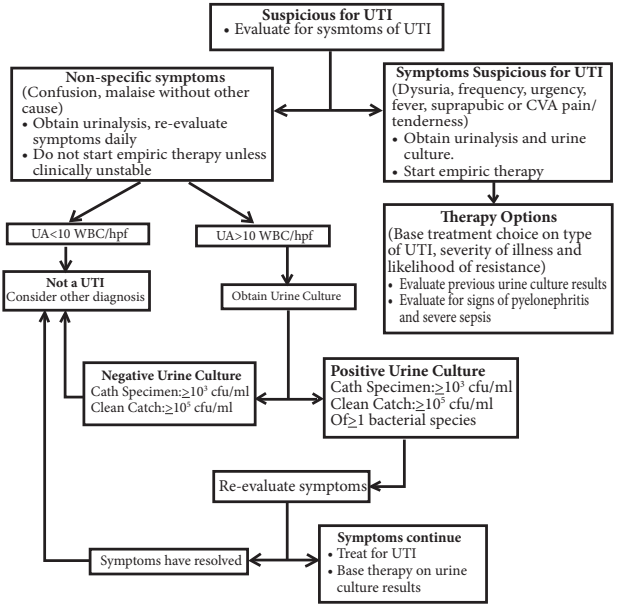


TREATMENT ALGORITHM FOR URINARY TRACT INFECTION IN PREGNANCY.



TREATMENT ALGORITHM FOR URINARY TRACT INFECTION IN ADULTS

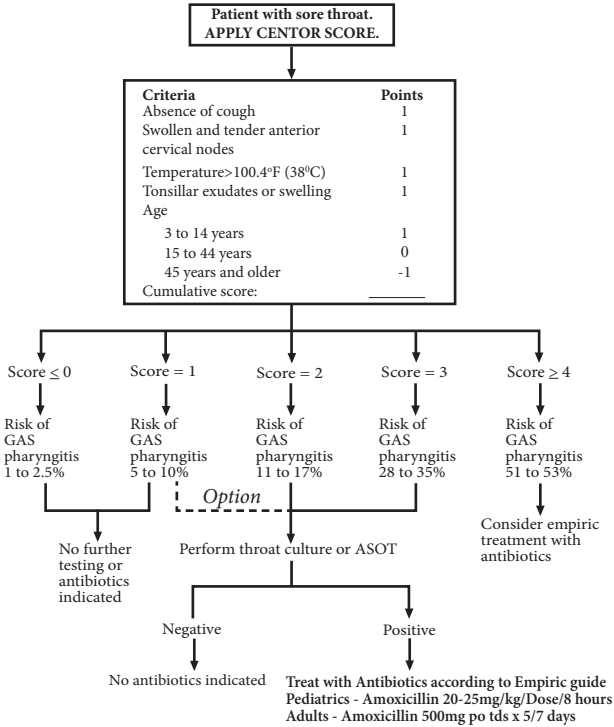
UTI Treatment Algorithm



TREATMENT

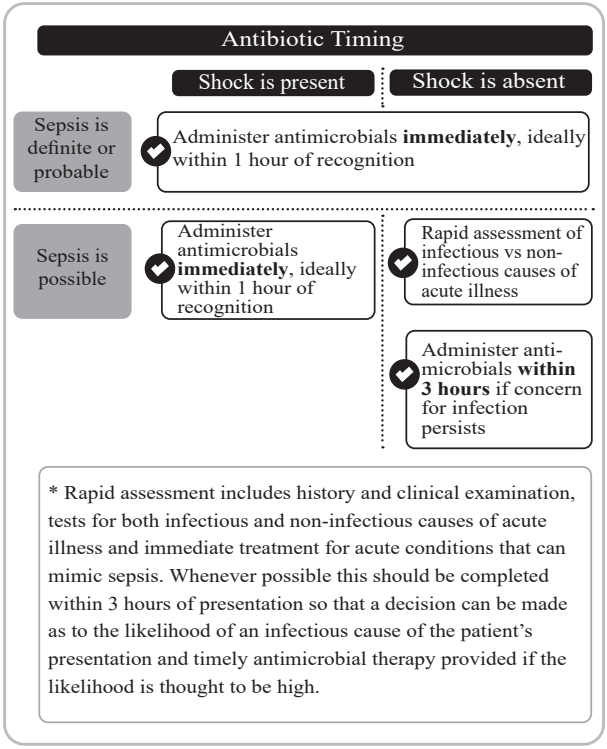
Preferred: Amoxicillin/Clavulanic Acid 1g PO 12 hourly for 5 days
Alternative: Ciprofloxacin 500mg PO 12 hourly for 5 days
For Category three Patients: Piperacillin/Tazobactam/Meropenem+ Amikacin OR IV Ciprofloxacin.

TREATMENT ALGORITHM FOR UPPER RESPIRATORY TRACT INFECTION (SORE THROAT)



*** GAS - Group A Streptococcus**
***ASOT - Antistreptolysin O antibody Titre**

MANAGEMENT OF SEPSIS.



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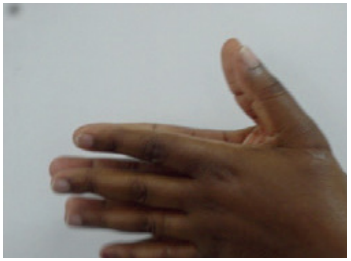
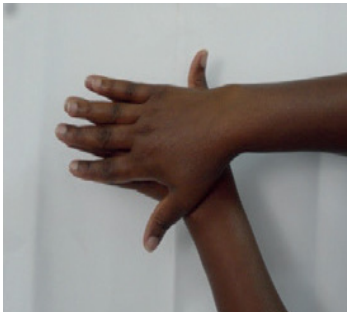
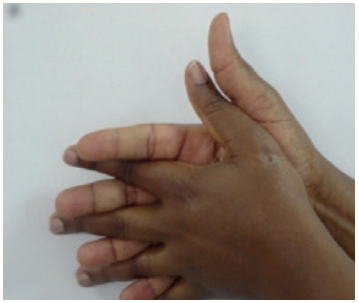
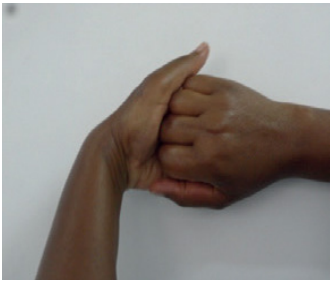
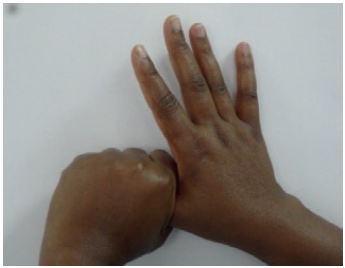
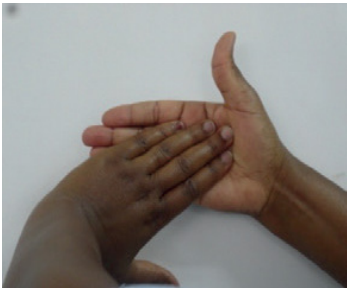
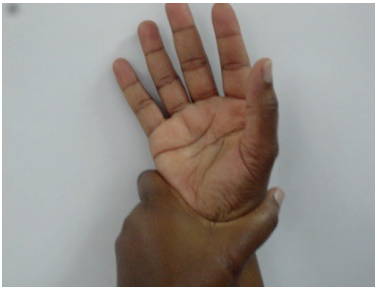
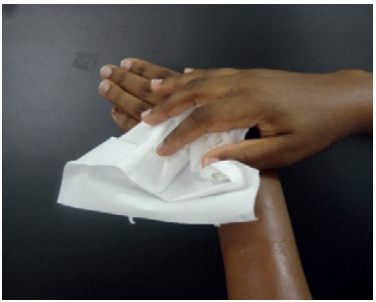
Dr. Michael Mudeheri	Medical Officer
Dr. Kevin Oyula	Pharmacist
Beverlyn Onzee	Nurse
Robert Werunga	Nurse

HAND WASHING TECHNIQUE

	1. Wet hands with water
	2. Apply enough soap to cover all hand surfaces

	3. Rub hands palm to palm,
	4. Right palm over left dorsum and left palm over right dorsum
	5. Palm to palm fingers interlaced

	6. Back to fingers to opposing palms with fingers interlocked
	7. Rotational rubbing of right thumb clasped in left palm and vice versa
	8. Rotational rubbing, backwards and forwards with clasped fingers hand in left palm and vice versa

	9. Rotational rubbing of the wrist palm and vice versa
	10. Rinse hands with water
	11. Dry hands thoroughly with a single use towel

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