Bharati Hospital & Research Center
Antibiotic Policy
Version - 5.0: 2019

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CONTENTS

- Introduction
- Clinical pathway
- Common antimicrobial resistant organisms
- Commonest isolates from various samples and their antibiogram for 1 year: 2015
- Antibiotic therapy in hospitalized patients
- Antibiotic choice in various clinical conditions according to patient category
- Antibiotic prophylaxis
- Appendix 1
- Commonly used antibiotics
- Appendix 2
- Antibiotic audit form

Introduction -

Over the last 60 years antibiotics have been widely used to treat infectious diseases. Their indiscriminate use has led to resistance developing to almost all known antibiotics. Antimicrobial resistance has become widespread not only in hospitals but also in the community.

A rational antibiotic policy and antimicrobial stewardship is a must for all hospitals and is mandated by the Ministry of Health and Family Welfare through it's document "National Policy for Containment of Antimicrobial Resistance, India". The purpose of this document is to provide a guide for rational antibiotic use at Bharati Hospital based on local patterns of antimicrobial sensitivity.

Clinical Pathway

1. Resident of respective department will assess patient for symptoms and signs of infection, including laboratory evidence of infection.
2. He/she will document appropriately on the culture requisition form.
   - suspected cause/site of infection,
   - possibly community (CA)/hospital acquired (HA)
   - patient type (types 1-3 described below)
3. Appropriate site cultures and blood cultures will be sent according to HICC protocol.
4. Antibiotic will be chosen according to antibiotic guide after informing lecturer on call and checking for allergy risks.
5. Any deviation from the policy will be documented along with the reason for deviation.
6. Some antibiotics will be part of the restricted formulary and use of these "ALERT" antibiotics will requires infectious disease/ critical care (ICU/PICU/NICU) consult. These include

   Carbapenems, Colistin, Linezolid, Teicoplanin, Vancomycin, Echinocandins, Voriconazole, Amphotericin B
7. Clinical response will be followed.
8. Once culture reports are available (Day 2 – Day 4) antibiotic is to be de-escalated (if possible) and duration of therapy is to be specified if not already done so.
9. Antibiotic prescription should have a record of the day and expected duration of antibiotics in the left-hand margin of the drug chart, eg D4/7
10. Infection control team will fill antibiotic audit form and conduct regular department wise audits.
11. Findings of the audit will drive improvement in antibiotic use.

Common antimicrobial resistant organisms :

Extended spectrum beta-lactamase producers (ESBL)

These are Gram negative organisms (GNB) like E coli & Klebsiella, which are resistant to the penicillins; first-, second and third-generation cephalosporins; In addition, the plasmids bearing genes-encoding ESBLs frequently also carry genes encoding resistance to other antimicrobial agents, such as aminoglycosides, trimethoprim, sulphonamides, tetracyclines and chloramphenicol. They remain susceptible to beta lctam- beta lactamase inhibitor combinations and carbapenems.

Amp C beta lactamases

These are inducible beta lactamases produced by certain organisms after exposure to cephalosporins. The organisms are resistant to the penicillins; first-, second- and third-generation cephalosporins and beta-lacatm-beta lactamase inhibitor combinations. They may remain susceptible to cefepime and carbapenems. Seen in *Serratia, Psedomonaa, Proteus, Citrobacter and enterobacter* spp.

Metallo beta lactamase producers (MBL):

These are Gram negative organisms resistant to the Carbapenems and almost all beta-lactam antibiotics except monobactams. Colistin and polymyxins are currently used for thsese organisms.

Methicillin Resistant Staphylococcus aureus (MRSA)

These are resistant to all beta lactam antibiotics (Penicillins, BL-BLI, Cephalosporins, monobactams and Carbapenems.)

Vancomycin Resistant Enterococcus (VRE) :

These isolates are resistant to Vancomycin, Teicoplanin but susceptible to linezolid.

MDR (Multi-drug resistance):

Isolates resistant to representatives of three or more classes of antimicrobial agents,

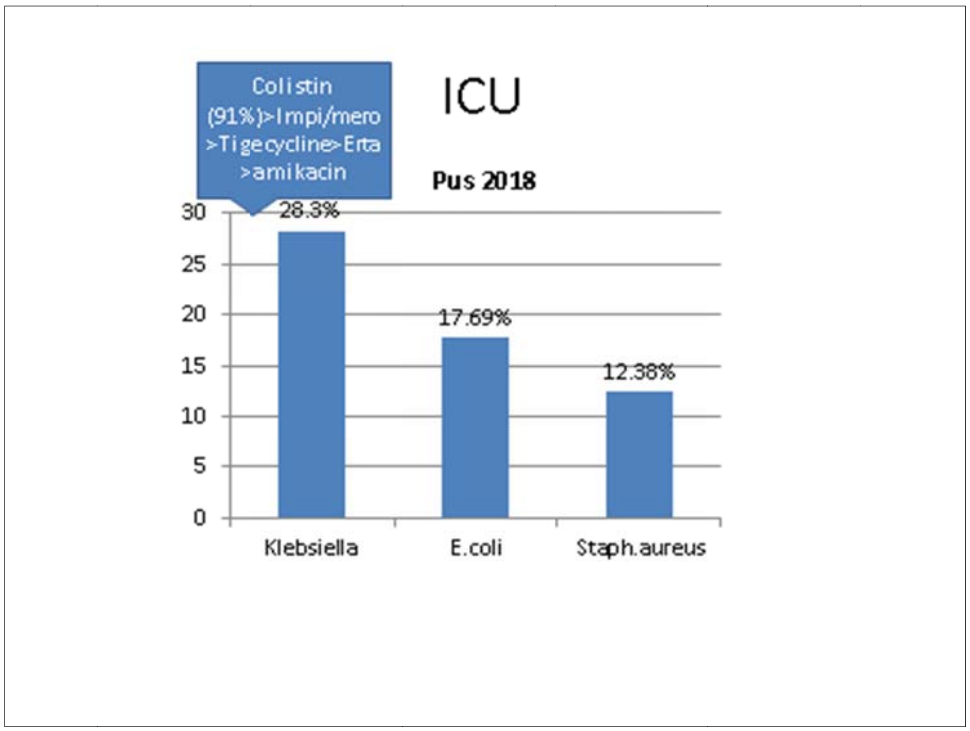
XDR (Extensive drug resistance):

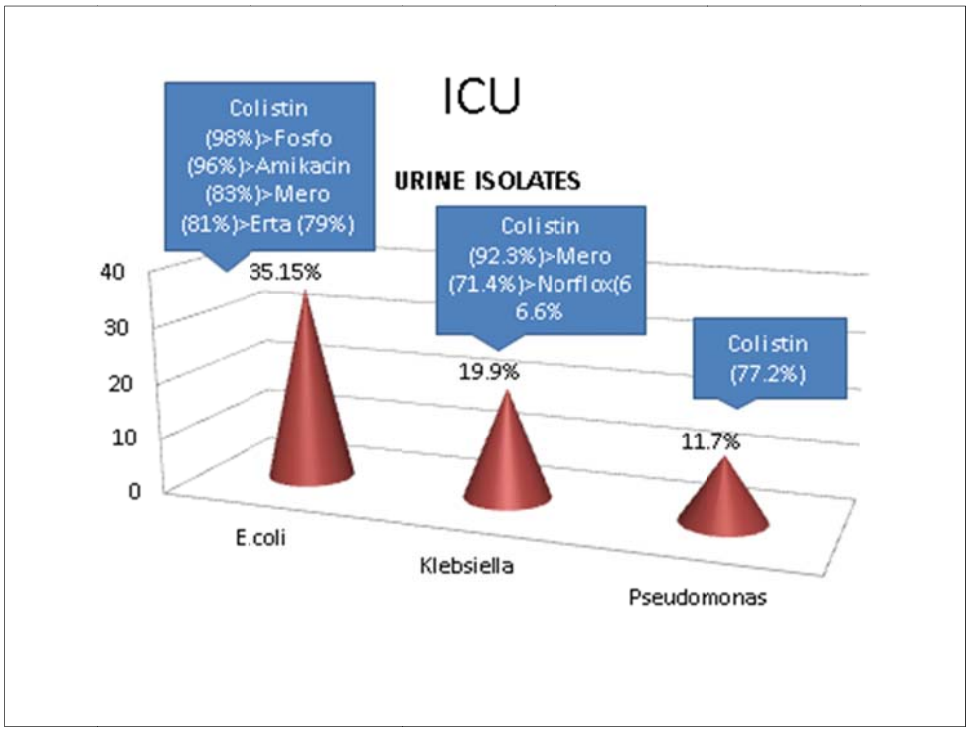
Isolates resistant to all but one or two classes

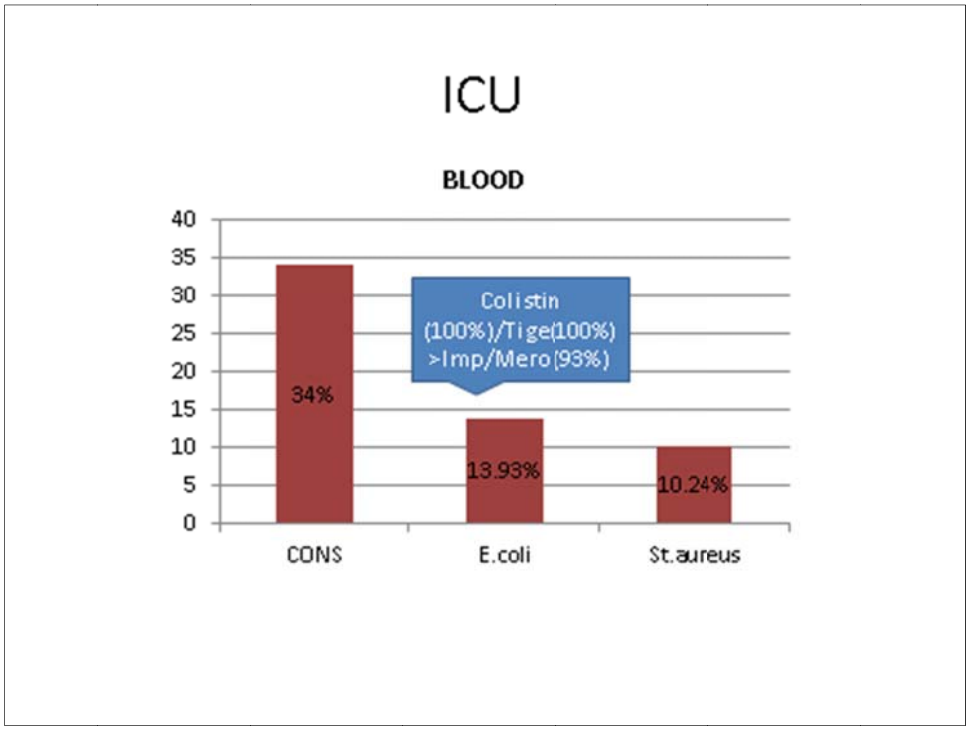
PDR (Pan drug resistance):

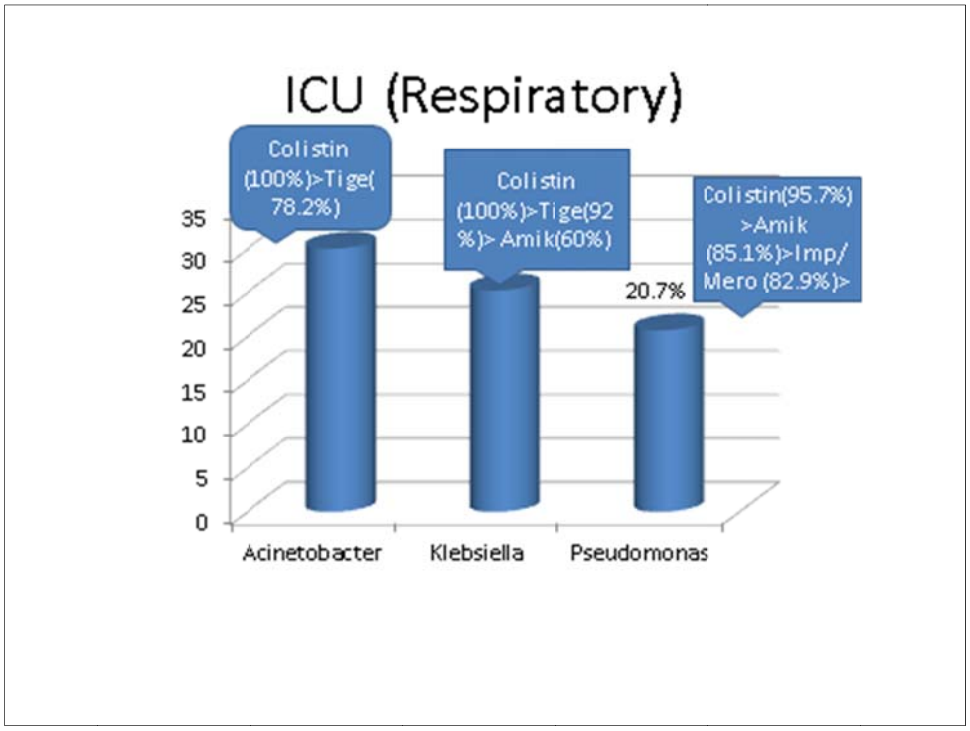
Isolates resistant to all classes of antimicrobial agents available

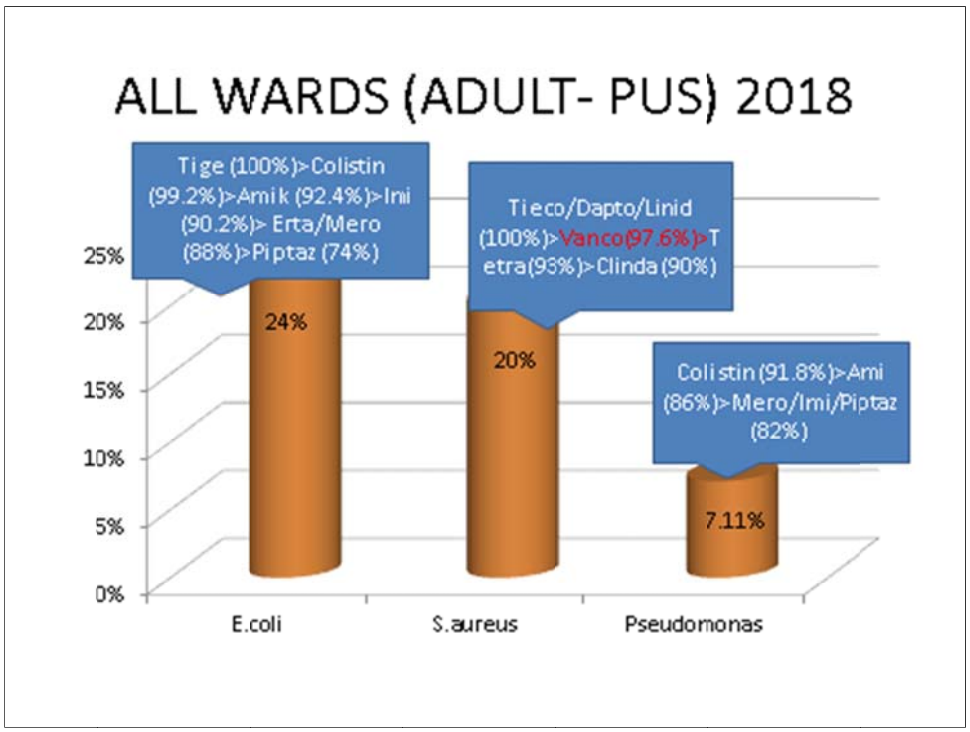
ANTIBIOGRAM of 2018

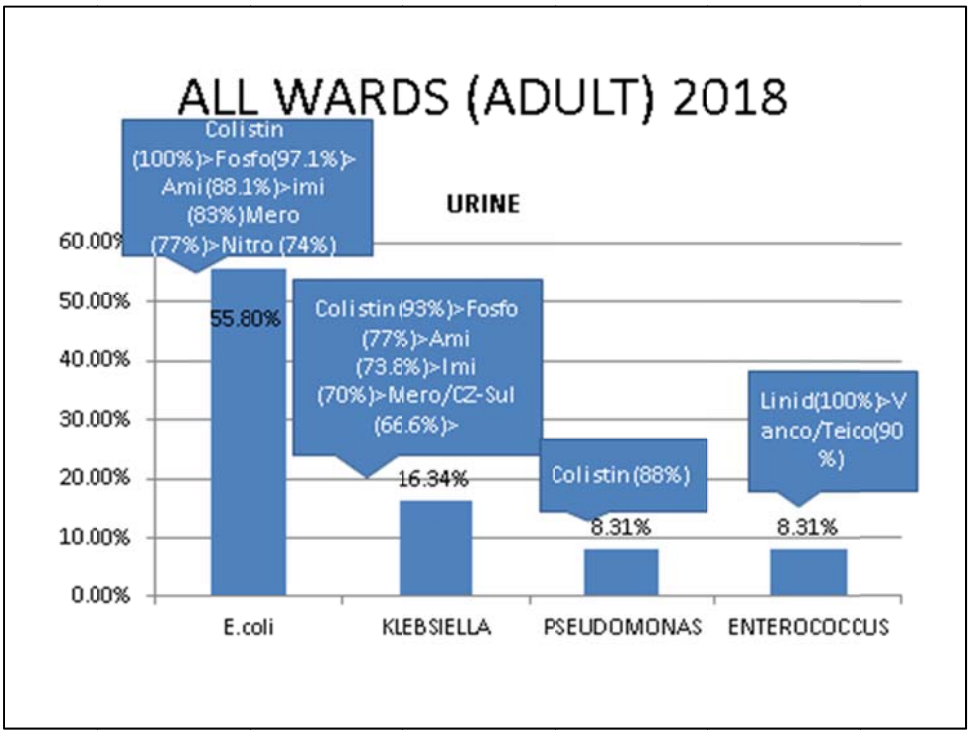


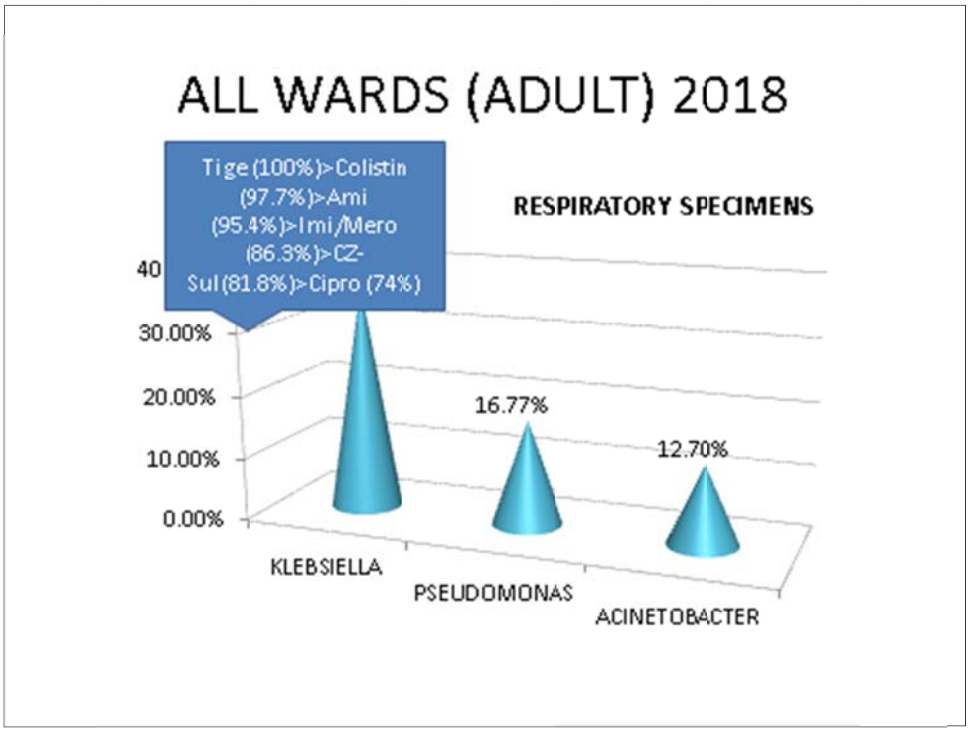



ICU
BLOOD
40
35
30
25
20
15
10
5
0
34%
Colistin (100%)/Tige(100%) >Imp/Mero(93%)
13.93%
10.24%
CONS
E.coli
St.aureus


ICU (Respiratory)
Colistin (100%)>Tige(78.2%)
Colistin (100%)>Tige(92 %)> Amik(60%)
Colistin(95.7%) >Amik (85.1%)>Imp/ Mero (82.9%)>
20.7%
35
30
25
20
15
10
5
0
Acinetobacter
Klebsiella
Pseudomonas


ALL WARDS (ADULT- PUS) 2018
Tige (100%)>Colistin (99.2%)>Amik (92.4%)>Imi (90.2%)> Erta/Mero (88%)>Piptaz (74%)
Tieco/Dapto/Linid (100%)>Vanco(97.6%)>Tetra(93%)>Clinda (90%)
Colistin (91.8%)>Ami (86%)>Mero/Imi/Piptaz (82%)
25%
20%
15%
10%
5%
0%
24%
20%
7.11%
E.coli
S.aureus
Pseudomonas


ALL WARDS (ADULT) 2018
URINE
Colistin (100%)>Fosfo(97.1%)>Ami(88.1%)>imi (83%)Mero (77%)>Nitro (74%)
Colistin(93%)>Fosfo (77%)>Ami (73.6%)>Imi (70%)>Mero/CZ-Sul (66.6%)>
Colistin(88%)
Linid(100%)>Vanco/Teico(90%)
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
55.80%
16.34%
8.31%
8.31%
E.coli
KLEBSIELLA
PSEUDOMONAS
ENTEROCOCCUS

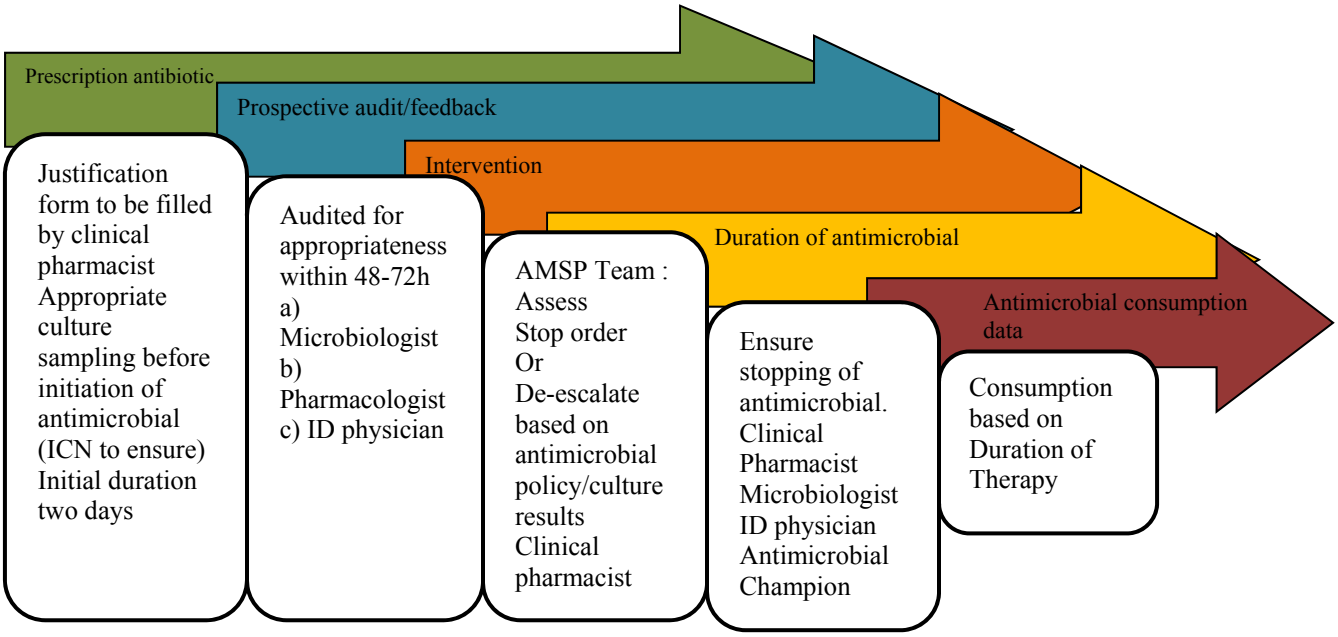

ALL WARDS (ADULT) 2018
Tige (100%)>Colistin (97.7%)>Ami (95.4%)>Imi/Mero (86.3%)>CZ-Sul (81.8%)>Cipro (74%)
RESPIRATORY SPECIMENS
40
30.00%
20.00%
10.00%
0.00%
16.77%
12.70%
KLEBSIELLA
PSEUDOMONAS
ACINETOBACTER

Antibiotic Stewardship

A set of coordinated strategies to improve the use of antimicrobials

Goal

- Enhancing patient health outcomes
- Reducing resistance to antibiotics
- Decreasing unnecessary costs



METRICS USED IN AMSP

- Days of therapy
- Acceptance of intervention
- Cost metrics
- Length of stay of patients on antimicrobials
- Mortality rate
- Resistance pattern
- Comparison of HAI with Abx consumption rate

Antibiotic therapy in hospitalized patients

Antibiotic therapy is used in hospitalized patients in three situations

1. **Empiric therapy** before the causative organism has been identified
2. **Definitive therapy** once the causative organism is identified
3. **Prophylactic therapy** to prevent infection, eg. surgical prophylaxis

Empiric therapy

Patient requiring empiric antibiotic therapy should be classified into three types (Table 1) depending on the past history, prior exposure to health care, previous antibiotics and associated co-morbidities. Antibiotic should then be chosen according to the site of infection and suspected micro-organism based on local hospital microbiologic data (antibiogram). Appropriate cultures must be sent prior to antibiotic therapy. Identification of the micro-organism will then dictate definitive therapy and also contribute to the hospital antibiogram for choosing empiric therapy.

TABLE 1- Patient Types for selecting empiric antibiotic therapy

Patient Type 1 (Community acquired)	**Patient Type 2 (Healthcare associated)**	**Patient Type 3 (Nosocomial Infections)**
No contact with health care system	Contact with health care system (e.g. recent hospital admission, nursing home, dialysis) without invasive procedure within last90 days. Current hospitalization less than 7 days	Current hospitalization> 7 days. Invasive procedures within last 90 days
No prior antibiotic treatment	Recent antibiotic therapy (within last 90 days)	Recent & multiple antibiotic therapies within last 90 days
No procedures done	Minimum procedures done	Major invasive procedures done
Patient young with only a few co-morbid conditions.	Patient old with Multiple co-morbidities.	Cystic fibrosis, structural lung disease, advanced AIDS, neutropenia, other Severe Immunodeficiency.

ANTIBIOTIC GUIDE

Recommended antibiotics for common conditions are listed below. This guide is broad outline; not all-inclusive and not meant to replace treating physician's judgment.

Table 1**: Acute gastroenteriris**

Name of condition	Patient Type 1 (Community acquired)	Patient Type 2 (Healthcare associated)	Patient Type 3 (Nosocomial Infections)
Acute gastroenteritis	Most Cases are self limited.Require only supportive treatment & hydration.Selected very sick patients can be treated as per following guidelines. • Co-trimoxazole 1DS tab for 3 days OR • Cap. Doxycycline 100 mg BD-3-5 days OR • Tab Nitazoxanide 500mg BD 3days If stool examination shows invasive diarrhoea (> 5 leucocytes /HPF or blood in the stool). Then consider stool culture followed by • Inj. Piperacillin – Tazobactam 4.5 gm TDS 3-5 days • Inj Cefpearzone/Sulbactum 1.5 gm BD 3-5 days		

Table 2: Pneumonia

Name of condition	Patient Type 1 (Community acquired)	Patient Type 2 (Healthcare associated)	Patient Type 3 (Nosocomial Infections)
Pneumonia	**1] For non-ICU**	**Late Onset**	**Late onset HAP/VAP**

	patients with community acquired pneumonia (CAP) Ceftriaxone (2g IV q24h X 5-7 days)/ Amoxycillin/Clavulanic acid (1.2g q8h IV) + Macrolide (Azithromycin- 500mg IV/PO once a day), x 5-7 days). **2] ICU patients with CAP** Ceftriaxone (2g IV q24hr X 5-7 days)/ Amoxycillin/Clavulanic acid (1.2g q8hr IV) + MacrolideAzithromycin-500mg IV/PO q24h)/ Doxycycline 100mg PO q12h x 5-7 days). If aspiration is suspected clindamycin 600mg q8h **Early onset HAP/VAP (less than 48 hours**	**HAP/VAP** (For more than 48 hours of hospitalization but less than 7 days) If septic shock or multisystem organ failure, Imipenem0.5-1gm q6h or Meropenem1-2 gm q8h	**suspected MDR Gram negative –** Imipenem (0.5-1 gm q6h /Meropenem (1-2 g IV q8h) **Suspected XDR Gram negative** Colistin **4.5 MU/BD** **Suspected MRSA-** Vancomycin (1g IV q12h OR Teicoplanin (400mg IV q12h for 3 doses, then q24h) **For suspected VRE-** Linezolid (600mg IV/PO q12hr)**x 7-14 days **For suspected Fungal infections-** Consider Antifungals in immunocompromisedhost. AddLiposomal Amphotericin B. Substitute Voriconazole, if Aspergillus suspected on radiological evidence or galactomannanpositive **If PCP suspected-** add TMP-SMX or Clindamycin

	admission) Antibiotic choice as above unless		
H1N1 **Flu-like illness**	Pseudomonas or Gram negative bacilli are suspected. Then use Cefoperazone-Sulbactam* (1.5g-3gm q6h) or piperacillin–tazobactam (PIP-TZ) 4.5gm q6h Look for typical viral symptoms such as sneezing and running nose. If fever,sore throat ,dry cough and viral symptoms present,initiate Oseltamivir 75 mg BD x 5 d without waiting for confirmation by PCR		

1. Fluoroquinolones should not be used for empiric treatment.
2. Fluoroquinolones should not be used routinely for treating Acute exacerbation of COPD
3. In the uncommon scenario of hypersensitivity to β-lactams, respiratory Fluoroquinolones (e.g. levofloxacin 750 mg daily) may be used if tuberculosis is not a diagnostic consideration at admission. Patients should also undergo sputum testing for acid-fast bacilli simultaneously if fluoroquinolones are being used in place of β-lactams.
4. **Patients with suspected MRSA infection, we recommend the use of empiric Vancomycin or Teicoplanin. The use of linezolid in India should be reserved because of its potential use in extensively drug-resistant tuberculosis.
5. Suspected viral pneumonia [influenza] Oseltamivir and/or Zanamavir should be given.
6. In late HAP/VAP with suspected Acinetobacter infection combination of Colistin + carbepenem / sulbactam.
7. Duration of treatment for community acquired pneumonia should be minimum 5-7 days and patient should be afebrile 48-72 hours prior to stopping treatment.

8. For ESBL / MRSA health care associated pneumonia minimum duration of treatment should be 10-14 days.
9. For proven pseudomonal / Acinetobacter health care associated pneumonia treatment should be for minimum 2 weeks and preferably combination of antibiotic therapy should be used.
10. Colonization should be suspected if respiratory secretions culture show growth but following features are absent like Fever, leukocytosis, increased bronchorrhea, increasing oxygen requirement, new lung infiltrates.
11. In presence of Fever, leukocytosis, increased bronchorrhea, increasing oxygen requirement but absence of lung infiltrates with positive cultures [MDR GNB / MRSA] to be treated as health care associated tracheobronchitis with appropriate broad spectrum antibiotics.
12. Aerosolised Tobramycin/ Colistin can be added to IV antibiotics as an adjunctive therapy for MDR gram negative infection with specialized nebulisers.

Table 3: Meningitis

Name of condition	Patient Type 1 (Community acquired)	Patient Type 2 (Healthcare associated)	Patient Type 3 (Nosocomial Infections)
Meningitis	1] **Age 2yrs-50yrs** Vancomycin 1gm q12h + Ceftriaxone 2gm q12h 2] **Age > 50yrs** Above Antibiotics + Ampicillin 2gm q4h	Vancomycin 1gm q12h + cefepime 2gm q12h /Ceftazidime 2gm q8h	**Empirical Therapy** Vancomycin 1gm q12h + Colistin 4.5 MU BD+/- Meropenem 2gm q8h. Consider IntrathecalGentamicin/ Colistin 4.5 MU BD **Organism specific** A] **Suspected MRSA** Meningitis – Vancomycin 1gm q12h +/- Rifampicin 600mg q12hor Linezolid 600mg q12h

			B] ESBL Gram negative/Pseudomonas or Acinetobacter (MDR / XDR) Meropenem 2gm q8h + Colistin 4.5 MU BD .
Intrathecal/ Intraventricular route dosage- Vancomycin 10-20mgq24h; Gentamicin 4-8 mgq24h; Amikacin 30-50mg q24h; Colistin 5-20mg q24h[1mg = 12,500 units]			
IV Dexamethasone should be given in suspected pneumococcal meningitis before antibiotic therapy and should be continued only if GM stain / Culture confirms pneumococcal etiology.			

Table 4: Urinary tract infection

Name of condition	Patient Type 1 (Community acquired)	Patient Type 2 (Healthcare associated)	Patient Type 3 (Nosocomial Infections)
UTI	**Asymptomatic bacteriuria** No empirical therapy. Send C/S. **Non complicated UTI** (Cystitis, Urethritis, No evidence of obstructive uropathy) PO TMP SMX 160/800 q12h / PO Nitrofurantoin 100 mg q12h 5-7 days **Acute Uncomplicated Pyelonephritis** FluroquinolonesOfoxacin 400 mg q12h OR Gentamicin 3 – 5 mg q24h 5-7 days If hospitalized Ceftriaxone 1gm q12h 5-7 days	**Complicated UTI** (Obstruction, reflux, azotemia, CAUTI) IVMeropenem 1gm q8h/ IV Imipenem-cilastatin0.5 gm q6h Antibiotics Up to 2 weeks in presence of obstruction. **Complicated Pyelonephritis** (Obstruction, reflux, azotemia, CAUTI, Shock, perinephric abscess) Meropenem 1gm q8h/Imipenem-cilastatin 0.5 gm q6hUp to 2 weeks in presence of obstruction.	**Complicated UTI and Pyelonephritis** (Suspected MDRO's/ Post renal transplant/ Recurrent UTI's) IV Meropenem 1gm q8h/IV Imipenem-cilastatin 500mg q6h +/- IV Colistin 4.5 MUBD **If MRSA or enterococcus,** ConsiderVancomycin 1 gm q12h/ Teicoplanin 400 mg q24h 2-3 weeks of treatment required. Urgent USG or CT to look for obstruction. Surgical management is

			mandatory to relieve obstruction.
Lower Urinary tract infection(UTI) in antenatal patients up to 20 weeks gestation	**OPD-** Cap.Amoxycillin500 mg q8h PO **In-patient** IV Ceftriaxone 1gm q12h		Meropenem1gm q8h Or Colistin 4.5MUBD
Lower Urinary tract infection(UTI) in antenatal patients after 20 weeks gestation	**OPD** Tab. Nitrofurantoin SR100 mg BD oral for 5 days **In patient**- IV Ceftriaxone 1gm q12h	IV PIP-TZ 4.5 gm q6h	Meropenem 1gm q8h

Table 5- Skin & soft tissue infections

Name of condition	Patient Type 1 (Community acquired)	Patient Type 2 (Healthcare associated)	Patient Type 3 (Nosocomial Infections)
Erysipelas / uncomplicated cellulitis	IVCeftriaxone 2 gm q24h **If beta lactam allergy** IVClindamycin 600 – 900 mg q8h		
Necrotizing infection of skin/fascia and muscle	IV Ceftriaxone 2gm q12h + IV Clindamycin 600-900mg q8h / IV Metronidazole 500mg q6h **If Suspected MRSA** IV Vancomycin1 gm q12h/ IV Teicoplanin 400 mg q24h		

Fournier gangrene	**Mixed aerobic and anaerobic cover including S.aureus, pseudomonas suspected** IV PIP-TZ 4.5gm q6h + MRSA cover IV Vancomycin1gm q12h		
Diabetic foot	IV Co-amoxiclav 1.2 gm q8h/ IV Ceftriaxone 1gm q12h **if beta lactam allergy-** IV Clindamycin 600 q8h	**IV PIP-TZ4.5 gmq6h** **If Suspected MRSA infection** IV Vancomycin1 gm q12h	IV Meropenem 1gm q8h IV Imipenem + Cilastatin 1gm q6h IV/IV**.** If MRSA infectionVancomycin1 gm IV q12h

Table 6- Bone and joint infections

Name of condition	Patient Type 1 (Community acquired)	Patient Type 2 (Healthcare associated)	Patient Type 3 (Nosocomial Infections)
Acute Osteomyelitis / Septic Arthitis	Ceftriaxone IV q12h OR Co-amoxiclav 1.2 gm q8h with/without Gentamicin 3 – 5 mg q24h Total duration- Minimum 21 days; upto 4-6 weeks	-	-

	If MRSA suspected- Vancomycin1gm IVq12h minimum 21days; upto 4-6 weeks		
Early implant associated infection (< 3 months)	-	**Usual Suspected organism- Staph aureus/ MRSA** IV Vancomycin 1 gm q12h/ Teicoplanin(400mg IV q12h for 3 doses, then q24h) + If Suspected MDR Gram negative organism IV Meropenem 1gm q8h IV Imipenem + Cilastatin 1gm q6h IV/IV Colistin	**-**
Late implant associated infection (after 3 months)	-	**-**	**Usually low grade infection** **If Coagulase negative staphylococcus suspected -** IV Vancomycin 1 gm q12h / Teicoplanin (400mg IV q12h for 3 doses, then q24h) **If Anaerobe (Proprionibacterium Acne) suspected** **IV Clindamycin 600-900 mg q8h.**

Table 7 Intra-abdominal infections -

Name of condition	Patient Type 1 (Community acquired)	Patient Type 2 (Healthcare associated)	Patient Type 3 (Nosocomial Infections)
Intra Abdominal **A) Extra – biliary**	IV Ceftriaxone1-2 gm q12h+IV Metronidazole500mg q8h or IV PIP-TZ 4.5gm q6h	IV Meropenem 1gm q8h/ IV Imipenem-cilastatin 500mg q6h	IV Meropenem 1gm q8h / IV Imipenem -cilastatin 500mg q6h **In case of suspected Acinetobacter or XDR Gram negative organisms** Colistin.5 MU BD **If MRSA or Enterococcus suspected** IV Vancomycin 1 gm q12h / Teicoplanin (400mg IV q12h for 3 doses, then q24h) **If VRE suspected** Linezolid 600 mg IV

			q12h **If Fungal Infection suspected,** Add Fluconazole 400 mg IV q24h **If non albicansCandida-** IV Caspofungin 70 mg stat and 50 mg q24h OrAmpho B
Intra Abdominal **B) Biliary**	IV Ceftriaxone1-2 gm q12h + IV Metronidazole500mg q8h or IV PIP-TZ 4.5gm q6h	IV Meropenem 1gm q8h / IV Imipenem -cilastatin 500mg q6h	**Eg- Acute cholangitis following bilioentericanastomosis** IV Meropenem 1gm q8h / IV Imipenem -cilastatin 500mg q6h **If MRSA or Enterococcus suspected** IV Vancomycin 1 gm q12h / Teicoplanin (400mg IV q12h for 3 doses, then q24h) **If VRE suspected** Linezolid 600 mg IV q12h **If Fungal Infection suspected,** Add Fluconazole 400 mg IV q24h **If non Albicanscandida-** IV Caspofungin 70 mg stat and 50 mg q24h Or Ampho B
Metronidazole dosing based on pharmacokinetic studies is 1.5 gm q24h. **PIP-TAZ covers all anaerobic infections except Bacteroidesfragilis.** **For lower GI surgeries add Metronidazole.**			

Table 8: Infective Endocarditis

Native Valve	IV Ceftriaxone 2gmq24h for 4weeks	Alternative 1. Penicillin G2-3mu IV q4h for 4 weeks or 2. Vancomycin500 mg q12h for 4weeks 3. Ceftriaxone 2 gmq24h for 2 weeks plus Gentamicin 3mg per kg divided into equal doses q8h for 2 weeks
Prosthetic Valve	Cloxacillin 2gm IV q4h for 4-6 weeks or IV Vancomycin500 mg q12h for 4-6 weeks + Rifampin 300mg q8hPO 6-8 weeks	IV Cefazolin 2g q8h for 4-6 weeks
Note:- If Penicillin resistant Streptococi - Ceftriaxone 2 gram per day IV q24h for 6 weeks plus Gentamicin 3mg per kg divided into equal doses q8h for 6 weeks Enterococci – Ampicillin 2gm IV q4h + Gentamicin3mg per kg divided into equal doses q8hboth 4-6 weeks or Vancomycin 500 mg q12h + Gentamycin for 4weeks. Staphylococi –Nafcillin or Oxacillin 2gm IV 4 hourly for 4-6 weeks or Vancomycin 15 mg /kg IV 12 hourly for 4-6 weeks If Methicillin Resistant Staphylococcus aureus -Vancomycin 15mg/kg Iv 12hourly for 6-8 weeks + Gentamycin 3mg per kg divided into equal doses q8hfor 2 weeks + Rifampin 300mg 8 hourly oral 6-8 weeks		

Table 9: Malaria, Leptospirosis, Scrub Typhus, Enteric fever

Plasmodium Vivax Malaria	Chloroquine Sensitive Chloroquine (10mg base/kg stat followed by 5 mg/kg at 12,24,36 hours) plus	Chloroquine resistant – any of the ACT therapy excluding SP 1. Artesunate +Amodiaquine
	Primaquine (7.5 mg (base) q12h PO x14days) (Primaquine should not be given in severe G6PD deficiency)	2. Artesunate +Mefloquine 3. Dihydroartemisin plus piperaquine
Plasmodium Falciparum Malaria 5 days	**OPD** Artesunate(2.4 mg/kg at 12 & 24 hours) plus Sulfadoxine (25 mg/ kg) &Pyrimethamine (1.25 mg/kg) as a single dose or Artesunate (same dose as above) plus Amodiaquine (10mg) base per kg OD for 3 days (Fixed dose combinations are available) orArtemether plus Lumefantrine (1.5/9mg/kg BD for 3 days) Drug combination of A+L(mg)available 40+240:60+360:80+480 or Artesunate +Mefloquine (25mg base/kg –total) (8mg/kg once a day for 3 days) **Hospitalized patient** Artesunate IV 2.4 mg/kg at 12 & 24 hours and 2.4 mg/kg q24h X 5 days + Doxycycline 100mg q12h x 7 days	Drug resistant Falciparum Malaria Artesunate 2.4 mg/kg for 7 days or Quinine (10mg/kg TDS for 7 days plus one of the following three 1. Tetracycline 4mg/kg Odx7 days 2. Doxycycline 3mg/kg OD x 7days 3. Clindamycin 10mg/kg BD x 7days
Leptospirosis (Mild)	Doxycycline 100mg q12h x 7 days	Alternative Amoxicillin (500 mg)PO TDS x 7 days Ampicillin (500mg)PO TDS x 7 days
Leptospirosis (Moderate or Severe)	Ceftriaxone (1gm 12 hourly x7 days or Cefotaxime (1gm 6 hourly IV x 7 days	Alternative Penicillin (1.5 million units /IV /IM 6 hourly x7 days
Scrub Typhus	Doxycycline (100mg) BD x 7 to 15 days or Azithromycin (500mg) OD x 3days	Alternative Chloramphenicol (500mg)QID x7-15 days
Enteric Fever (OPD)	T. Cefixime 400 mg TDS for 14 days	Alternative T. Azithromycin (1gm)OD for 5 days
Enteric Fever(IPD)	Ceftriaxone (4gm/day)IV for 7-14 days	

Table 10: Paediatric Infections

Name of condition	Patient Type 1 (Community acquired)	Patient Type 2	Patient Type 3
Pneumonia **AGE: 3 weeks to 3 months**	Community acquired Pneumonia Ceftriaxone100mg/kg/d od or Cefotaxime 150mg/kg/d tds x 10-14 days and *Azithromycin 10mg/kg/day x 5 days	Either Type II or Early HAP/VAP Piperacillin-tazobactam 300 mg/kg/d qid	Either Type III or late HAP/VAP, IV Meropenem (60-120 mg /kg/day divided 8 hrly) plusVancomycin (40-60 mg/ kg/ day divided 6-8 hrly IV Meropenem (60-120 mg /kg/day divided 8 hrly) plusVancomycin (40-60 mg/ kg/ day divided 6-8 hrly. Add Fluconazole 6-12 mg/kg/day or caspofungin or liposomal amphotericin B (if renal dysfunction) x 2-6 weeks
AGE: 4 months to 5 years	Lobar pneumonia/effusion Ceftriaxone 100mg/kg/d od with Cloxacillin 100-200mg/kg/d for 10-14 days Bronchopneumonia without effusion Ampicillin 200mg/kg/d qid x 10- 14 days *consider adding macrolide (azithromycin,) to cover Pertussis in partially unimmunized with DPT	Piperacillin-tazobactam 300 mg/kg/d qidplusVancomycin (40-60 mg/ kg/ day divided 6-8 hrly Ceftriaxone 100mg/kg/d od Or Piperacillin-tazobactam 300 mg/kg/d qid	Same as above
Meningitis	Community acquired	Either type II/post neurosurgical meningitis	Either type II/III or post shunt infection

Age > 3 months	Cefotaxime 200 mg/kg/d qid/or Ceftriaxone 100mg/kg/d od/bd plus Vancomycin* 60mg/kg/d qid *Discontinue Vancomycin if rapid latex agglutination negative for S. pneumonia, or positive for N. meningitides, or H. influenza	IV Meropenem (120 mg /kg/day divided 8 hrly) plusVancomycin (60 mg/ kg/ day divided 6 hrly +/- rifampin 10 mg/kg (PO) q12h	IV Meropenem (120 mg /kg/day divided 8 hrly)/ plusVancomycin 60mg/kg/d qid with or without rifampin 10 mg/kg (PO) q12h x 7-10 days after shunt removal ConsideradditionalIntraventricularth erapy Vancomycin 10mg or Genta 1-2 mgor Polymixin B 2mg or Colistin 10mg [1mg = 12,500 units
Urinary Tract Infection Cystitis **Pyelonephritis**	Co-trimoxazole 8-10 mg/kg/d of trimethoprimbd OR Amoxy-clav 30-40 mg/kg/d bdORCefixime 8-10 mg/kg/d od Uncomplicated : Amoxy-clav 30-40 mg/kg/d bd OR Ceftriaxone 100mg/kg/dod ORCefotaxime 150mg/kg/d tds X 7-10 days Complicated Ceftriaxone 100mg/kg/d od OR Cefotaxime 150mg/kg/d tds OR	Piperacillin-tazobactam300 mg/kg/d tds/qid Or Meropenem 120mg/kg/d x 10-14 days	Same as for type II

	Piperacillin-tazobactam 300 mg/kg/d tds/qid +/- Amikacin 15-20mg/kg/d od X10-14 days		
HEENT Infections Orbital cellulitis	Cloxacillin 200mg/kg/d plus either Cefotaxime 150mg/kg/d tds or Ceftriaxone 100mg/kg/d od/bd x 10-14 days	Piperacillin-tazobactam 300 mg/kg/d tds/qid plus Vancomycin 60mg/kg/d qid	IV Meropenem (120 mg /kg/day divided 8 hrly)/ plusVancomycin 60mg/kg/d qid
Bone and Joint Infections **Acute Osteomyelitis/septic arthritis**	Cloxacillin 200mg/kg/d plus either Cefotaxime 150mg/kg/d tds or Ceftriaxone 100mg/kg/d od/bd x 10-14 days	Vancomycin 60mg/kg/d qid or Clindamycin 20-40 mg/kg/d tds/qid Plus either Cefotaxime 150mg/kg/d tds or Ceftriaxone 100mg/kg/d od/bd	IV Meropenem (120 mg /kg/day divided 8 hrly)/ plusVancomycin 60mg/kg/d qid or Clindamycin 20-40 mg/kg/d tds/qid
Osteochondritis	Piperacillin-tazobactam300 mg/kg/d tds/qid or combination therapy with cloxacillin 200mg/kg/d plus Ceftazidime 100mg/kg/d tds 7-10 days after surgery		
Skin and soft tissue infections	Cloxacillin 200mg/kg/d or Cefazolin 60-100mg/kg/dor Clindamycin 20-40 mg/kg/d tds/qid x 7-10 days	Vancomycin 60mg/kg/d qid	Piperacillin- tazobactam 300 mg/kg/d tds/qidorIVMeropenem (120 mg /kg/day divided 8 hrly plus Vancomycin 60mg/kg/d qid

Animal bite wounds (dog / cat)	Amoxicillin/clavulanate 50mg/kg/d tdsi.v or p.o	Alternatives Piperacillin300mg/kg/d qid 7-10 days <u>Penicillin allergy</u> Clindamycin20-40mg/kg tds/qid plus TMP /SMX 80mg/kg/ bd X 7-10 days (dog bites); or cefuroxime 20-30mg/kg/d x 7-10 days (cat bites)	NA
Vascular catheter associated Infections		Piperacillin-tazobactam300 mg/kg/d tds/qid + Vancomycin60mg/kg/d qid	Meropenem 120mg/kg/d tds plus Vancomycin 60mg/kg/d qid
Severe Sepsis/septic shock	Cefotaxime 150 mg/kg/ day divided 6-8 hrly OR Ceftriaxone 100 mg/kg/ day divided 12 hrly +/- amikacin 15-20 mg/kg/d od	IV Piperacillin – Tazobactam 300-400 mg/kg/day divided 8 hrly + IV Vancomycin 45-60 mg/kg/day divided 6-8 hrly	IV Meropenem 80-120 mg/ kg/8 hrly + IV Vancomycin 45-60 mg/kg/day divided 6-8 hrly

Table 11: Empiric Therapy of Neonatal Intensive Care Unit Sepsis and Meningitis (Above)

Diagnosis	Organisms isolated	Early onset	Late onset	Nosocomial	Community acquired	Duration
Sepsis	Klebsiella,Acinetobacter, E.coli, Enterococcus, Others :Serratia, Burkholderia,Pseudomonas, Proteus	Gentamycin (forhaemodynamically stable) Piperacillin-Tazobactum (for haemodynamically unstable)	1st line :Piperacillin-Tazobactum 2nd line:Meropenem 3rd line:Colistin	1st line Piperacillin-Tazobactum 2nd line: Meropenem 3rd line: Colistin	1st line :Cefotaxime and Amikacin 2nd line:Piperacillin-Tazobactum 3rd line: Meropenem 4th line: Colistin	10days
Pneumonia	E coli, Klebsiella,Acinetobacter, Enterococcus,Staphylococcus(CONS) Others :Serratia, Burkholderia,Pseudomonas, Proteus	Gentamycin (haemodynamically stable) Piperacillin-Tazobactum (haemodynamically unstable)	1st line :Piperacillin-Tazobact 2nd line: Meropenem 3rd line: Colistin	1st line Piperacillin-Tazobact 2nd line Meropenem 3rd line Colistin	Ceftriaxone plus Azithromycin	7days
NEC			1st line Piperacillin-Tazobact and Amikacin 2nd line Meropenem 3rd line Colistin	1st line Piperacillin-Tazobact 2nd line Meropenem 3rd line Colistin	1st line Piperacillin-Tazobactum 2nd line Meropenem 3rd line Colistin	7-10days

Meningitis	For early onset: E coli, GBS, enteric bacilli, listeria, streptococcus, H influenza, Neisseriameningitides. For late onset: Klebsiella,Acinetobacter,E.coli, Enterococcus,Staphylococcus (CONS) Others :Serratia, Burkholderia,Pseudomonas, Proteus	1st line: Cefotaxime plus Gentamycin 2nd line: Meropenem	Meropenum	Meropenem	Ceftriaxone /cefotaxime	Gram Positive: 14-days Gram negative: 21 days# #Ventriculitis/ Brain abscess: 6-8 weeks
UTI	Enterococcus, E coli, Enterobacter		1st line: Piperacillin-Tazobactum 2nd line: Meropenem 3rd line: Colistin	1st line Piperacillin-Tazobactum 2nd line: Meropenem 3rd line: Colistin	Amikacin	10days
Skin and soft tissue infection	Staphylococcus		1stline:Cloxacillin 2ndline:Vancomycin	Vancomycin	Cloxacillin	7days
Arthritis	Staphylococcus ,Klebsiella		1st line Piperacillin-Tazobactum] 2nd line Meropenem 3rd line Colistin	1st line: Piperacillin-Tazobactum 2nd line: Meropenem 3rd line Colistin	Ceftriaxone plus Vancomycin	Culture Negative: 2weeks Culture positive: 3 weeks

Osteomyelitis	Staphylococcus, Gram Negative Bacilli		1st line Piperacillin-Tazobact 2nd line Meropenem 3rd line Colistin	1st line Piperacillin-Tazobact 2nd line Meropenem 3rd line Colistin	Ceftriaxone plus Vancomycin	4 weeks
Catheter related Infection	Staphylococcus(CONS), S.aureus, Gram negative bacteria		1st line: Vancomycin and Amikacin 2nd line:Piperacillin-Tazobact 3rd line: Meropenem 4th line Colistin			10days
Fungal infection	Candida albicans and Candida Non albicans		Amphotericin B or Fluconazole(depending on Culture and sensitivity report)			Depending on location

Table 12: Empiric therapy of Ophthalmic infections

Sr. No	Category	Organisms	First Line	Alternative
1	Bacterial conjunctivitis	S aureus and albus H Aegyptius H Influenzae,	Topical Moxifloxacin 0.5% eyedrops 3-6 times per day Tobramycin eye ointment at bed time	
		C diiphtheriae	Penicillin eye drops 10,000 units/ml	
2	Bacterial Keratitis	Psseudomonas, S .aureus Pneumococcus N gonorrhea	Moxifloxacin eye drops 0.5% 1 hourly Fortified Tobramycin eye drops	Fortified Vancomycin eye drops Amikacin eye drops
3	Fungal Keratitis	Aspergillus, Fusarium, Candida albicans	Natamycineye drops 6 times a day Itraconazole eye drops /ointment at bed time Tablet Fluconazole 150mg twice a day & eye drops 4-6 times per day Nystatin eye ointment	Amphotericin B eye drops Voriconozole eye drops Intracameral Amphotericin B
4	Viral Keratitis	H Simplex H Zoster	Acyclovir Tablet 800mg 5 times a day and ointment 5 times a day Gancyclovir ointment	Tablet Valacyclovir 1000mg 3 times a day
5	Endophthalmitis	S aureus ,Sepidermidis Streptococcus, Pseudomonas , H Influenzae Candida /fusarium	IntravitrealVancomycin 1 mg /0.1 ml andAmikacin 400micrograms /.ml IntravitrealAmphotericin B	IntravitrealVancomycin 1mg /0.1ml and Ceftriaxone 2.25mg/0.1ml
6	Orbital cellulitis	Staphylococci Mucormycosis/Aspergillus	Intravenous Piperacillin and Tazobactum 4.5g twice a day Intravenous Metronidazole 100ml 3 times a day Intravenous Amphotericin B	Intravenous Ceftriaxone
7	Acute Dacryocystitis	Staphylococcus, Streptococcus, Pneumococcus	Tablet Amoxicillin and Clavulanic acid 625 mg twice a day Moxifloxacin eye drops 0.5% 3-6 times a day	

Table 13: ENT Infection

Name of condition	Patient Type 1 (Community acquired)	Patient Type 2	Patient Type 3
Acute infection like acute membranous tonsillitis,ASOM, Acuteepiglottitis without complication	InjAmpicillin 1 gm q6h Amoxicillin +clavulanic acid 1.2 gm q8h	-	-
Acute infection with complications like acute mastoiditis, Quinsy	Addition ofaminoglycoside for gram negative coverage and metronidazole for anaerobic coverage	-	-
Chronic infection without complication like CSOM,chronic sinusitis	Amoxicillin +clavulanic acid 1.2 gm q8h IV Ceftriaxone 1 gm q12h IV	ID/ Medicine consult	ID/Medicine consult
Chronic infection with complications like meningitis,orbital cellulitis,brain abscess	InjCeftriaxone+injamikacin+injmetronidazole	ID/ Medicine consult	ID/ Medicine consult

Table 14: Surgical site infection

Name	Type 1	Type 2	Type 3
Head & Neck	Ceftriaxone 1gm q12h IV + Metronidazole Or PIP-TZ 4.5 gm q6h IV If MRSA suspected Add Vancomycin 1gm IV q12h If CNS infection Ceftazidime 2 gm q8h IV instead of Ceftriaxone/PIP-TZ	Meropenem 2gm q8h IV + Vancomycin 1 gm q12h IV	If fungal infection suspected Ampho B If VRE suspected Linezolid If XDR or PDR Gram negative infection suspected Colistin 4.5MUBD If CNS infection Add intrathecal antibiotics as above
Other infections **Sternal infections** **Chest** **Abdominal** **Perineal**	Ceftriaxone 1gm q12h IV + Metronidazole Or PIP-TZ 4.5 gm q6h IV If MRSA suspected Add Vancomycin 1gm IV q12h	Meropenem 2gm q8h IV + Vancomycin 1 gm q12h IV	If fungal infection suspected Ampho B If VRE suspected Linezolid If XDR or PDR Gram negative infection suspected Colistin 4.5MUBD If clostridium difficile colitis or sepsis suspected Oral Vancomycin 250 mg q6h + Metronidazole 500 mg q8h IV

Note:

Surgical debridement is almost always necessary.

Any graft, device or foreign body must be removed.

Table 15: Catheter related blood stream infections (CRBSI)

Name	Type 1	Type 2	Type 3
Peripheral catheter	Cloxacillin 1 gm q6h IV	Ceftriaxone 1gm q12h IV	-
Central venous catheter (short term) **Dialysis catheter (short term)**	-	+ Meropenem 2gm q8h IV Vancomycin 1 gm q12h IV	Meropenem 2gm q8h IV + Vancomycin 1 gm q12h IV
Dialysis catheter (long term) **Hickman or other implanted catheter (long term)**			If fungal infection (Non-AlbicansCandida suspected) Ampho B iv Or Caspopfungin 70 mg IV q24h flowed by 50 mg If VRE suspected Linezolid If XDR or PDR Gram negative infection suspected Colistin 4.5MUBD

Note:

Catheter cultures and blood cultures to be sent as per HICC protocol.

Catheter maybe kept in situ pending culture reports especially if CRBSI not strongly suspected and no other IV access is available

Remove catheter immediately if local signs of suppuration present or if central venous catheter and blood cultures are positive

Definitive therapy once the causative organism is identified

It is vital to send cultures before empiric antibiotics are prescribed. Once cultures results are available the next steps are

1. Decide whether the organism grown is a colonizer or an actual pathogen. Ask for colony counts. Evaluate carefully if the site from which culture has been sent has active infection either from clinical signs or from elevated WBC counts or radiological evidence.
2. Don't treat colonizing organisms
3. Choose the simplest antibiotic class to which the organism shows sensitivity
4. If the cultures show intermediate sensitivity ask for MIC levels and consult infectious disease specialist for choice of appropriate antibiotic.

5.Linezolid should be given only in culture confirmed MRSA infections after consultation with ID experts

Antibiotic Prophylaxis for Surgery

Procedure	**Antibiotic**
Clean surgeries (example: elective hernia repair, breast surgeries)	Cefazolin / Cefuroxime
Orthopedic surgery	Cefazolin / Cefuroxime
Cardiovascular / vascular surgery	Cefazolin / Cefuroxime
Neurosurgery	Cefazolin / Cefuroxime
Ophthalmic surgery	Topical quinolone. Systemic- Cefazolin / Cefuroxime
Head, neck and ENT surgery	Cefazolin / Cefuroxime
Gastroduodenal	Cefuroxime / Cefazolin
Appendicular / Colorectal surgery	Cefuroxime / Cefazolin and Metronidazole
Biliary	Cefuroxime / Cefazolin/ cefoperazone-sulbactam
Abdominal / Vaginal hysterectomy /	Cefazolin / Cefuroxime

Caesarian section	+Metronidazole
Urologic surgery	Cefuroxime (or as guided by urine culture)
Preoperative (cataract surgery)	Moxifloxacin eye drops 0.5% 4 times a day 2days prior to surgery
Post operative (cataract surgery)	Moxifloxacin eye drops 0.5% 4 times a day for 15 days

Note:

Preoperative dose of antibiotic is to be given within 60 minutes before incision

Dose of Cefazolin 2 gm IV

Dose of Cefuroxime 1.5 gm IV

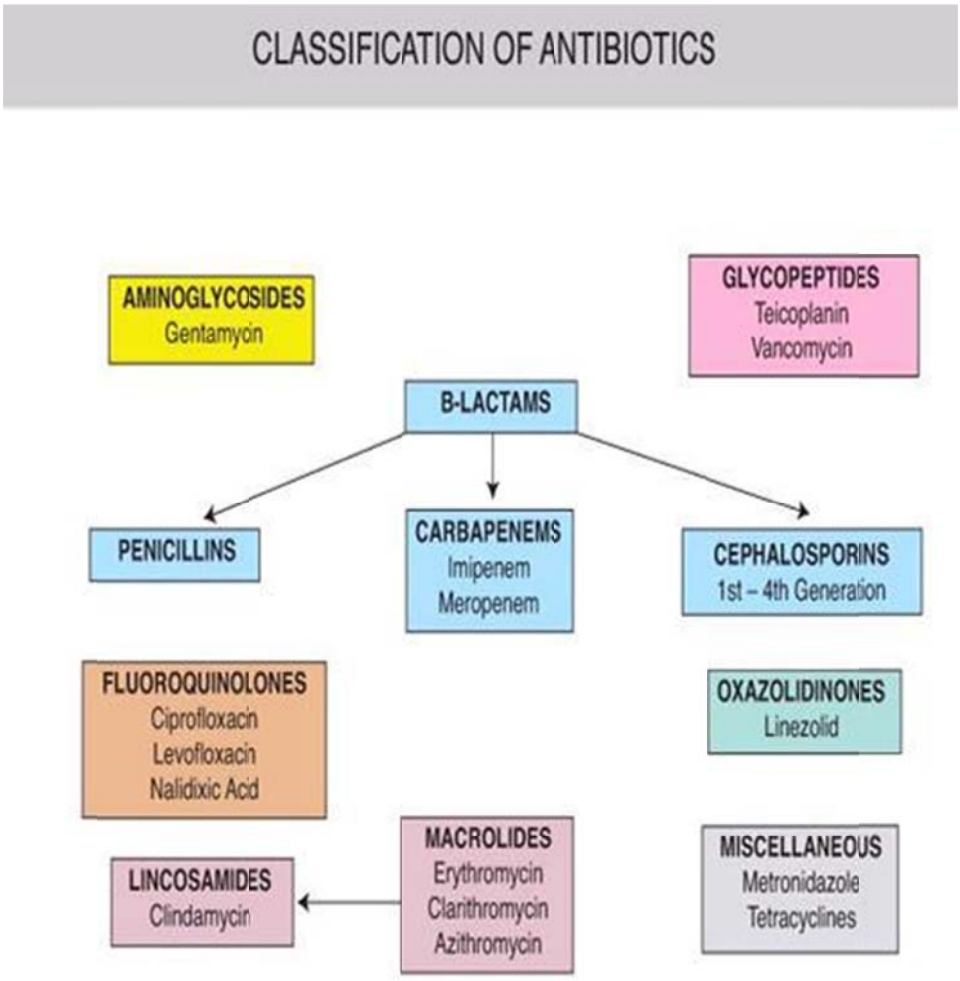
Dose is to be repeated if surgery> 4 hours

Consider either clindamycin or Vancomycin, if penicillin allergy.

Antibiotic prophylaxis must not be continued for more than 24 hours after surgery.

Appendix 1

Commonly used antibiotics



Spectrum of commonly used antimicrobials:

Antibiotic Class	Name	Organisms	Indication & Dose	Side effects
Penicillins				Allergy
β-lactamase susceptible	Penicillin G Penicillin V Ampicillin. Amoxycillin (PO)	Gram +ve Gram +ve Gram +ve& Gram –ve Gram +ve	Not easily available 1-2 gms q6h 500 mg q8h	
β – lactamase resistant	Cloxacillin	Gram +ve	0.5-1gm q6h	
β-lactam/ β-lactam inhibitor combination	Piperacillin-tazobactam. Ampicillin-sulbactam. Amoxycillin-clavulanate (IV)	ESBL Gram –ve organisms ESBL Gram –ve organisms Gram +ve&Haemophilus. influenzae	4.5 gm q6h as infusion 1 gm q6h 1.2 gm q8h	
Cephalosporins				
1st Generation	Cefazolin (IV) Cephalexin (PO)	Gram +ve	1gm q8h 500 mg q8h	
2nd Generation	Cefadroxil (PO) Cefuroxime (PO & IV)	Gram +ve Gram +ve	500 mg q12h 750 mg q8h	
3rd Generation	Cefotaxime Ceftriaxone Ceftizoxime Ceftazidime Cefixime (PO) Cefpodoxime (PO) Cefdinir (PO)	Gram +ve& Gram -ve Gram +ve& Gram –ve Gram +ve& Gram –ve Gram +ve& Gram –ve Anti-pseudomonal	1 gram q6h 1-2gm q12h 1 gm q12h 1-2 gm q8h 200 mg q12h	

4th Generation Cephalosporin Plus beta lactamase inhibitor	Cefepime Cefoperazone /sulbactam	Anti-pseudomonal Anti-pseudomonal	1-2 gm q12h 1.5 gm – 3gm q12h	
Aminoglycosides	Streptomycin Kanamycin Gentamicin Amikacin Tobramycin Netilmicin	Gram –ve Gram –ve Gram –ve Gram –ve Gram –ve Gram -ve	0.75 – 1gm q24h 3mg/kg q24h 13mg/kg q24h 3mg/kg q24h 5mg/kg q24h	Deafness Vertigo Muscle weakness
Quinolones **Extended spectrum**	Nalidixic acid Norfloxacin Ciprofloxacin Ofloxacin Levofloxacin Moxifloxacin		1 gm q6h 400 mg q12h 500 mg q12h 200 mg q12h 750 mg q24h 400 mg q24h	Seizures
Carbapenems Imipenem-cilastatin Meropenem Doripenem Ertapenem		Gram +ve except MRSA, ESBL Gram –ve except Stenotrophomonas, Burkholderia, Corynebacterium, Enterococcusfaecium not covered Does not cover Pseudomonas, Acinetobacter&Enterococcus	0.5gm -1gm q6h 1 – 2 gm q8h 1gm q24h	Seizures
Polymyxins Polymyxin B Colistin		ESBL, Metalloproteinase producing Gram –ve	Colistin 4.5MUBD	Muscle weakness Renal toxicity
Lincosamide Clindamycin		Gram +ve and anerobes	600mg q8h	C. difficile Colitis
Glycopeptides				Renal

Vancomycin Teicoplanin		MRSA	1gm q12h 400 mg q24h	toxicity
Oxazolidinedione Linezolid		VRE	600 mg q12h	Thrombocytopenia
Lipopeptides Daptomycin		MRSA	4-6mg/kg q24h	
Antifungals Fluconazole Voriconazole Caspofungin Anidulafungin AmphoB aqueous AmphoB colloidal AmphoB liposomal		Candida albicans Aspergillus Non albicans candida Non albicans candida Broad spectrum covers all above + Mucor etc	400 mg q12h 6mg/kg q12h first day then 4mg/kg 70mg IV then 50 mg q24h Refer product insert	

Appendix 3 - Specimen Collection for Cultures:

Blood–

Vein selection. [Preferably cubital vein, avoid femoral vein]
Skin preparation using the centre to periphery method with 70% alcohol(spirit), 10 % Povidone-Iodine. Wait for 1 min before collection of sample after disinfection.. Do not palpate the vein once the area is disinfected.
In suspected blood stream infection **10cc** of peripheral blood is collected from different arms in 2separate culture bottles .In paediatric patients 2-5 ml blood should be collected in paediatric blood culture bottles.
For suspected **CRBSI** [catheter related blood stream infection] **10cc** blood from central line port and **10cc** blood from peripheral site, in two different aerobic culture media to be collected simultaneously.
Never refrigerate the Blood culture bottle after collection.

Urine-

Non-catheterised patient

Mid stream sample is collected.Patient is instructed to clean the peri-urethral area before collection.
Patient is instructed to retract the labial folds or glans penis before beginning to void and then collect the midstream urine without stopping the flow of urine
Container: Sterile wide mouthed screw capped container.

Catheterised patient

Urine is never collected from the Urine bag.

Clamp the tubing. Disinfect the site on the catheter with 70% alcohol and then aseptically collect 10 ml of urine using a sterile syringe and needle.Seal the site with adhesive.Maintain the integrity of the closed drainage system to prevent entry of microorganisms in the bladder.
Transport early within 2 hours at Room Temperature. In case of further delay- Sample should be refrigerated.
For suspected urinary tuberculosis fully voided three early morning urine sample should be collected.
24 hour urine sample is not appropriate

Stool sample

Stool sample is collected in a Sterile container. It should be delivered immediately to the laboratory in case trophozoites and ova are to be seen.
If stool sample is not available then rectal swab is used.

Respiratory Secretions/ETT secretions –

Sputum

Patient is advised to rinse or gargle with lukewarm water before sputum collection.In case of inadequate sample patient is advised to exert a deep cough after pummeling of the chest .Saliva is not acceptable.
Container – Sterile wide mouthed screw capped container
Transport within 2 hours at RT. If delay, refrigerate.

Throat Swab

Depress the tongue with a tongue depressor.Rub the sterile cotton swab on the posterior pharyngeal wall, tonsils and inflamed area.Transport immediately at room temperature.

Endotracheal aspirate

Endotracheal secretions shall be aspirated using sterile mucous extractor ensuring that the suction catheter is extended beyond the tip of the endotracheal tube. Aspirate from upper parts of the ETT will result in growth of colonisers

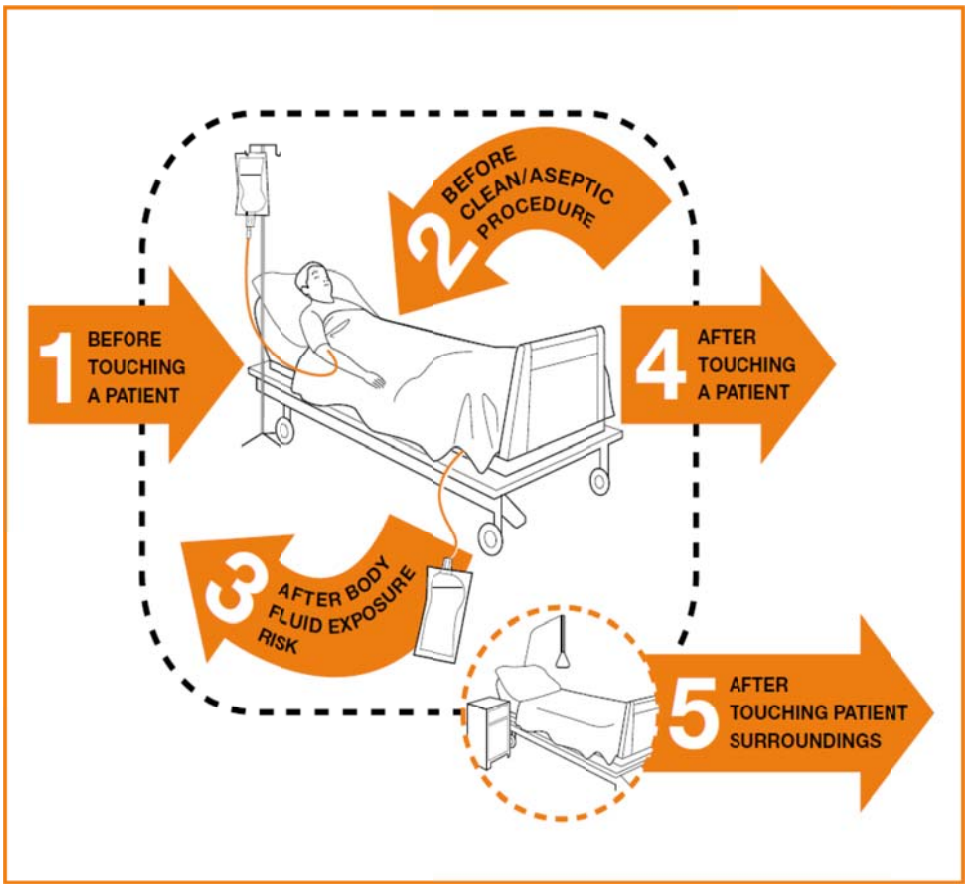
CSF

In suspected **bacterial meningitis** minimum **2-5 cc of CSF** should be collected in a sterile container (for staining) and paediatric blood culture bottle for bacterial culture
CSF should be delivered immediately to the laboratory. **NEVER REFRIGERATE** the sample. In case of delay, incubate at 37°C or room temperature.

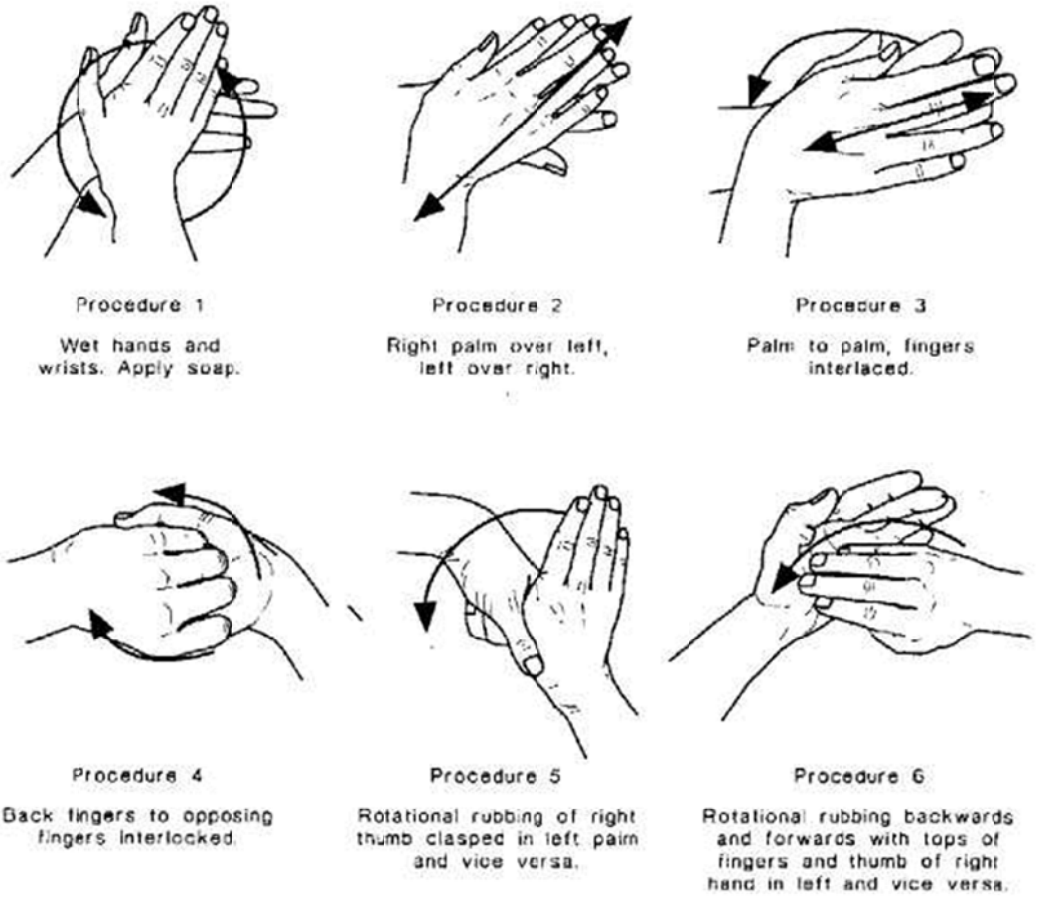
Pus

The pus should be aspirated using sterile disposable syringe and needle and sent to the laboratory . If amount of pus is very less, it is aseptically collected using a sterile cotton swab which is inserted into a transport medium and & sent to the laboratory. Bedside inoculation into RCM is preferable.

Appendix 4 - WHO "5 moments of Hand Hygiene"



Appendix 5 - Hand wash Technique



Procedure 1

Wet hands and wrists. Apply soap.

Procedure 2

Right palm over left, left over right.

Procedure 3

Palm to palm, fingers interlaced.

Procedure 4

Back fingers to opposing fingers interlocked.

Procedure 5

Rotational rubbing of right thumb clasped in left palm and vice versa.

Procedure 6

Rotational rubbing backwards and forwards with tops of fingers and thumb of right hand in left and vice versa.

NOTE: Repeat procedures 1-6 until the hands are clean. Rinse hands and pat dry.

Appendix 6 - Bundles to be followed to prevent Healthcare Associated Infections:

Table 1 - Ventilator associated pneumonia

1	Hand hygiene-Staff shall clean and disinfect hands every time before handling ventilated patient.
2	Elevation of head end by 30-45 degree only after consultation with the Intensivist to rule out contraindications
3	Non invasive ventilation should be used in selected patients
4	Orotracheal intubations and orogastric tubes preferred over nasotracheal and naso gastric tube.
5	Continuous aspiration of subglottic secretions to be used if available.
6	Endotracheal cuff pressure maintained > 20 cm of H2O to prevent leakage of bacterial pathogens around the cuff.
7	Contaminated condensate should be emptied from circuits and should be prevented from entering either the ETT or in line medication nebulizers.
8	Suction should be done as per sterile technique [close suction preferred]
9	HMEF (Heat Moisture Exchange bacterial Filter) to be used. Replace at 48-72 hours or visibly soiled
10	Daily evaluation of need to continue on Ventilator
11	Reintubation should be avoided.
12	Oral hygiene with 2% Chlorhexidine every shift
13	Enteral nutrition is preferred over parental nutrition to prevent risk of bacterial translocation
14	Maintain tight Glycemic control

Table 2 - Catheter associated urinary tract infection

1.	Hand hygiene
2.	Aseptic technique
3.	Selection of size of catheter (preferably small)
4.	Sterile closed drainage system with drainage bag below the level of bladder
5.	Empty the urinary drainage system frequently
6.	Catheter to be fixed to the thigh
7.	Clean the area with soap and water regularly
8.	Daily evaluation for the need to continue
9.	Antibiotic prophylaxis is not indicated
10.	No Bladder washes.

Table 3 - Catheter related blood stream infection

1.	Hand hygiene
2.	Maximum barrier precautions (Sterile cap, mask, gown, gloves) during insertion
3.	Selection of site insertion – Subclavian> Jugular > Femoral vein
4.	Selection of appropriate disinfectant for the skin - 2% Chlorhexidine
5.	Use of semi permeable transparent dressing
6.	Daily evaluation for need to continue. Prompt removal when not required
7.	Clean Injection ports with 2% Chlorhexidine+ alcohol swabs before access.
8.	Minimal injection side ports to be used
9.	Antibiotic prophylaxis is not indicated
10.	Cover the line with sterile dressing

Appendix 7 - Guideline for Segregation and Disposal of Hospital Waste

Yellow bag 	**<u>Infectious waste</u>** Human tissues, organ & body parts, cotton, gauze pieces, plasters, microbiological waste, discarded/expired drugs
Red bag 	**<u>Disposable plastic waste</u>** Gloves,tubing,IV sets,catheters,plastic syringes
Puncture proof container 	**<u>Sharps</u>** Broken glasses, ampoules, glass slides,non infected glass bottle
Sharps container 	**<u>Sharps</u>** Used needles, blades, scalpels
Black bag 	**<u>Kitchen waste</u>** Wet and dry waste should be collected in separate labelled containers
White transparent bag 	**Office waste** Office papers, paper cups, tissue papers, etc.

Note: Disposable items should be disinfected in 1% hypochlorite

Appendix 8- Post Exposure Prophylaxis

HIV:

Needle stick injury or splash of blood on mucous membrane from Unknown or HIV infected patient

- Wash affected part under running water.Do not squeeze.
- Irrigate eyes with water or saline
- Report to ICU-1 consultant
- Take 1st dose of ARV (antiretroviral regimen) within 1-hour
- Tab Viropil : 1 tab OD for 28 days
- Immediately check HIV and HbsAg status of source patient
- If HIV Negative- discontinue ARV
- If HIV Positive- Continue ARV and Consult Infectious Disease Consultant
- ARV duration- 28 days
- Fill up PEP form

Follow-Up of Exposed Health care worker

- HIV antibody testing at baseline, 6 weeks, 12 weeks, and 6 months after exposure
- Do not donate blood, semen or plan pregnancy
- Use condom for prevention of HIV transmission to partner

HBsAg:

- If immunized with 3-dose Hepatitis B vaccine- No need of prophylaxis
- Check anti-HBs antibody titer of exposed Health care worker (protective titer : >10mIU/ml)
- If unimmunized or incompletely immunized
    - Give hepatitis B immunoglobulin
    - Start 1st dose of vaccine/ continue with due does depending on the immunization status