INPATIENT EMPIRIC ANTIBIOTICS GUIDE FOR LOW RESOURCE SETTINGS IN INDIA

Fall 2017,
1st Edition

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Preface

This inpatient empiric antibiotics guide (along with the outpatient empiric antibiotics guide) was devised with the intent of allowing newer and novice medical professionals access to a consultant's wisdom even when a consultant is not available. This guide offers guidance concerning both common and severe conditions seen in India and provides medications and dosages for adult (including pregnant women) and pediatric conditions with notes concerning common side effects.

This guide is largely culled from our clinical experience at one community-based health care system in rural India and its secondary care hospital. As such, it represents expert opinion and will be (we hope) a draft that undergoes future revisions. At this time, it makes use of antibiograms only in disease states involving infections of the urinary tract. Antibiotic selection and pricing reflect those of attempting to combine our rural Indian reality with the expertise of infectious disease consultants working in many different settings worldwide, in places with different antibiotic availability and different antibiotic resistance patterns.

Pricing is included in each disease entity due to the recognition that even basic medical care can be bankruptingly expensive in India and other low resource settings worldwide. All other considerations being equal, we would encourage each practitioner who uses this guide to strike a balance between one of infectious diseases' core teachings – the picking of as narrow a spectrum an antibiotic as possible – with the desire to tax the patient's pocket book as little as possible.

A Word Concerning Pricing

As noted above, this empiric antibiotics guide includes the prices of medications. These prices are 2016-17 prices paid by our patients at our pharmacy in northern Chhattisgarh, India. As a matter of principle, our pharmacy buys only generics (with the use of pooled procurement to optimize prices) and sells all medications with no profit margin (i.e. "at cost"). As such, prices at other pharmacies may vary greatly throughout India.

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Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Sepsis: Neonatal Early Onset: <1 week of age Common bacteria: Escherichia coli Klebsiella, Enterobacter Group B Streptococci Late Onset: ≥ 1 – 4 weeks of age Common Bacteria: Same as above plus Haemophilus influenza Streptococcus pneumoniae Reassess need for antibiotics at 72 hours and determine duration based on clinical findings.	Not applicable	<u>Early Onset:</u> 0-7 days: Ampicillin 100 mg/kg/dose IV q8h AND Cefotaxime 50 mg/kg/dose IV q8h OR Ampicillin 25 mg/kg IV q8h AND Gentamicin 5 mg/kg/dose IV q24h <u>Late Onset:</u> >7 – 28 days: Ampicillin 100 mg/kg/dose IV q8h AND Cefotaxime 50 mg/kg/dose IV q6h OR Ampicillin 100 mg/kg IV q8h AND Ceftriaxone 50 mg/kg/dose IV q12h	Not applicable	Price will vary based on infant weight and duration of therapy. Prices below are for a 5 kg infant treated for 3 days / 72 hours. Ampicillin: 7.31 INR / 500 mg (65.79 INR / 3 day course for 5 kg infant) Cefotaxime: 12.36 INR / 250 mg IV (111.24 INR / 3 day course for 5 kg infant) Gentamicin: 11.4 INR / 400 mg (21.375 INR / 3 day course for 5 kg infant) Ceftriaxone: 16.44 INR / 500 mg IV (98.64 INR / 3 day course for 5 kg infant)

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Febrile Neutropenia Definition: ≥ 38.3 C (101 F) once or > 38.0 C (100.4 F) for > 1 hour with ANC nadir < 500 cells / uL If any suspicion for febrile neutropenia, start antibiotics early. If there are focal / localizing symptoms, treat based on findings. However, the level of immunosuppression often means these patients cannot mount much of an immune response (i.e. no pus cells in urine or no infiltrate on CXR). All appropriate body fluids should be cultured to attempt to determine the culprit organism. These cultures should include fungal cultures if possible.	Initial: Ciprofloxacin 500 mg PO / IV BID AND Ceftriaxone 2,000 mg IV BID AND (+/-) Amikacin 15mg/kg/day divided q12h If no improvement at 48 hours, broaden to either: Piperacillin-Tazobactam 4.5 gm IV q6h (or 4.5 IV q8h with 4 hour infusion) OR Meropenem 1,000 mg IV q8h If clinical suspicion for fungal infection OR no improvement 5 days after initiating treatment, start empiric	Piperacillin-Tazobactam: Neonates: 100 mg/kg/dose IV at following intervals: **<1 kg:** ≤14 days old: q12h 15-28 days old: q8h **≥1 kg:** ≤7 days old: q12h 8- 28 days old: q8h For the following age groups dose q6h for severe infections: <2 mo: 300-400 mg/kg/24 hr divided q6h 2-9 mo: 240 mg/kg/24 hr divided q8h >9 mo: 300 mg/kg/24 hr divided q8h (max: 16 gm /24 hr) **OR** Meropenem 20 mg/kg/dose IV q8h max: 3 g/24 hr If Toxic, Pneumonia, OR Cellulitis:	Febrile neutropenia unlikely in pregnant patient population as sometimes too gravely ill to conceive. Febrile neutropenia is a life-threatening illness so in pregnant women would immediate start with Piperacillin-Tazobactam or meropenem at adult doses. Multiple fluconazole doses are not considered	All total prices will vary on length of necessary clinical course (i.e. until patient's ANC recovers). As such, prices only include base price. Ciprofloxacin: 20 INR / 500 mg IV Ceftriaxone: 22.82 INR / 1,000 mg IV Piperacillin-Tazobactam: 148.51 INR / 4.5 gm IV Meropenem: 610 INR / 1,000 mg IV Fluconazole: 3.73 INR / 150 mg tablet Caspofungin: Must be purchased from outside vendor. Vancomycin: Must be purchased from outside

Gram positive pathogens (including Staphylococcus. aureus, CoNS, Streptococcus) Enteric gram negative bacilli (including Pseudomonas aeruginosa)	anti-fungal coverage based on availability at one's institution. In many low resource settings, this will likely be fluconazole 150 mg PO QDay. (thou not anti-fungal of choice in most published guidelines).	Add Vancomycin 40 mg/kg/day IV divided q8 – 12h (maximum dose: 2 g per 24 hours) OR (If vancomycin not available): Clindamycin 13 mg/kg/dose IVq8h <u>If abdominal symptoms:</u> Add Metronidazole 7.5 mg/kg/dose IV q6h (max: 500 mg/dose)	safe in pregnancy. Would recommend purchase of caspofungin with following dosing: Caspofungin 50 mg IV q24h	vendor Clindamycin: Clindamycin: 151.34 INR / 600 mg IV Metronidazole: 18 INR / 500 mg IV

A newer scoring system for febrile neutropenia in cancer patient has been developed which is called the Multinational Association for Supportive Care in Cancer Risk-Index Score (MASCC). Patients with a score ≥ 21 are considered low risk, while those with a score < 21 are high risk. Such a system has yet to be validated in lower resource settings. It is scored as follows and may be used to guide treatment decisions:

- Burden of febrile neutropenia with no or mild symptoms – 5 points
- No hypotension (systolic blood pressure < 90 mmHg) – 5 points
- No chronic obstructive pulmonary disease – 4 points
- Solid tumor or hematologic malignancy with no previous fungal infection – 4 points
- No dehydration requiring parenteral fluids – 3 points
- Burden of febrile neutropenia with moderate symptoms – 3 points
- Outpatient status – 3 points
- Age > 60 years – 2 points

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Upper Urinary Tract Infection / Pyelonephritis If possible, urine culture should be collected prior to administration of antibiotics. Culture results can be used to narrow to an appropriate oral antibiotic once patient is hemodynamically stable. One must select antibiotics with good renal and urinary tract penetration i.e. NO nitrofurantoin or fosfomycin. With appropriate antibiotics, should improve within 1 – 2 days. Failure to improve warrants examination of 1) culture data and 2) possible further imaging to check for infected stone, urinary stasis due to multiple issues (BPH, stricture) or localized	Mild – moderate infection / No evidence of sepsis: Chloramphenicol 500 mg PO QID AND Amikacin 15 mg/kg/day divided q12h (or q24h in an hour long infusion)  Severe infection / sepsis: Meropenem 1,000 mg IV q8h  AND Amikacin 15 mg/kg/day divided q12h (or q24h in an hour long infusion)  Entire treatment course should be 7 – 14 days duration. In immunosuppressed patients, a clean urinanalysis does not rule	Empiric: Meropenem 20-30 mg/kg/dose IV q8h  AND Amikacin 15 mg/kg/day in divided doses of either q8h or q12h  **Only if culture data demonstrates susceptibility**, we would narrow to: <u>PREFERRED</u> Cefotaxime 50 mg/kg/dose IV q8h (max 2 g/dose)  OR Ceftriaxone 50 mg/kg/dose IV q24h (max 2 g/dose) <u>SECOND LINE</u> TMP/SMX 5 mg/kg/dose trimethoprim component	Chloramphenicol and aminoglycosides recommended against in pregnancy but, in severe cases, health of mother means decisions for their use may need to be made on a case-by-case basis. Meropenem safe to use (at same dose as “Adult”) as beta-lactams with good safety profile during pregnancy.	Chloramphenicol: 6.07 INR / 500 mg capsule (169.96 INR / 7 day course, 242.8 INR / 10 day course) Amikacin: 8.14 INR / 100 mg; 15.05 INR / 500 mg (126.4 INR for 40 kg adult / 7 day course, 180.6 INR for 40 kg adult / 10 day course) Meropenem: 610 INR / 1,000 mg IV (12,810 INR / 7 day course, 18,300 INR / 10 day course) FOR USE ONLY BASED ON CULTURE RESULTS (base price only as treatment duration will vary): Cefotaxime: 12.36 INR / 250 mg IV Ceftriaxone: 16.44 INR / 500 mg

abscess formation (pyonephrosis or prostatitis). Urine sample must be a clean catch, mid-stream sample. While imperfect, obtain a urine specimen from a catheterized patient as follows: clamp the foley tubing, clean a spot on the tubing with antiseptic (if a port is available, clean the port) and then use a sterile needle to withdraw urine from the sterilized location.	out infection of the urinary tract. In patients with recurrent urinary tract infections, previous culture data should be used to guide empiric therapy. In recurrent, culture negative UTI's, send urine AFB and consider CBNAAT testing for genitourinary TB infection.	PO q12h (max: 800/160 mg/dose) OR Ciprofloxacin 6-10 mg/kg/dose IV q8 (max: 400 mg/dose IV) or 6-10 mg/kg/dose PO q12h (max: 500 mg/dose PO) RED FLAG: Consider voiding cystourethrogram (VCUG) in children with: • Multiple (>= 2) febrile UTI events • Congenital renal or genitourinary tract abnormalities • Children with elevated blood pressure or poor growth		TMP/SMX: 2.68 INR / 2 DS tablets Ciprofloxacin: 20 INR / 500 mg IV

Please see Appendix for most recent urinary antibiogram at JSS. Empiric guidelines above are based on these antibiograms. Based on these antibiograms, we believe that there is a limited role (only after definitive culture data and NOT empirically) for ceftriaxone, cefotaxime and ciprofloxacin in our setting and other similar Indian settings.

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Pelvic Inflammatory Disease Triad: 1) Fever, 2) pelvic discomfort, 3) cervical motion tenderness. Outpatient if Temp < 38.0 C (100.4 F), WBC < 11, minimal evidence of peritonitis, active bowel sounds and tolerating oral. Inpatient if high fever, abscess, pregnant or not tolerating oral. Evaluate for tubo-ovarian abscess with additional imaging (ultrasound first, only consider CT scan after pregnancy test negative). Test for pregnancy	<u>Outpatient</u>: Ceftriaxone 250 mg IM x 1 (If not available, Cefixime 400 mg PO once) AND Metronidazole 500 mg PO BID x 14 days AND Doxycycline 100 mg PO BID x 14 days <u>Inpatient</u>: Ceftriaxone 2 g IV QDay AND Metronidazole 500mg PO BID x 14 days AND Doxycycline 100mg PO BID x 14 days OR Clindamycin 900 IV q8h AND Ceftriaxone 2 gm IV QDay OR	For adolescents, treatment same as adults. HEEEEADDSSS Assessment (Home/ Environment/ Education/ Employment/ Eating/ Activity/ Diet/ Drugs/ Sexuality/ Suicide/ Safety or Exposure to violence)	Uncommon in pregnant patients and when occurs generally before 12 weeks gestation. Should be admitted as high risk of complications. Avoid doxycycline. Erythromycin 50mg/kg infusion (with ceftriaxone or metronidazole), or azithromycin 1 gm PO weekly are alternatives.	Ceftriaxone: 14 INR / 250 mg IM 22 INR / 1 gm IV (616 INR / 2 week course) Cefixime 10 INR / 400 mg tablet Metronidazole 0.75 INR / 500 mg tablet (21 INR / 2 week course) Doxycycline: 1.2 INR / 100 mg tablet (33.6 INR / 2 week course) Clindamycin: 226 INR / 900 mg IV (9,492 INR / 2 week course) Gentamicin: 11.4 INR / 400 mg (5mg/kg IV – dose will vary based on weight but 79.8 INR for 40 kg woman / 2 week course) <u>Combination regimens</u> (assume 2 week course): Ceftriaxone 250 mg IM x1 (or cefixime 400 mg tablet x 1) AND Metronidazole 500mg BID x 14

(ectopic pregnancy must be ruled out) and other STDs including HIV.	Clindamycin 600 -900 mg IV Q8H AND Gentamicin 5 mg / kg / day IV divided q8h  <u>De-escalating after inpatient IV antibiotics</u>: Doxycycline 100 mg PO BID AND+/- Metronidazole 500 mg PO BID			days AND Doxycycline 100 mg PO BID: 69 INR (65 INR if cefixime) Doxycycline 100 mg PO BID AND Metronidazole 500 mg BID: 54.6 INR Clindamycin 600-900mg IV Q8H AND Gentamicin: ~9,500 INR (depending on patent weight) Clindamycin 900 IV q8h AND Ceftriaxone 2g QDay: 5,086 INR

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Chorioamionitis / Intra-amniotic infection NOTE: Generally polymicrobial usually involving migration of cervico-vaginal flora through the cervical os in women with ruptured membranes (less likely related to bacteremia). If possible, confirm the diagnosis with analysis of the amniotic fluid – either gram stain, glucose concentration or WBC count. It is important to expedite childbirth. May need to perform D + C of uterus. If complicated by DIC, consider Clostridium perfringens infection. If ongoing fever, consider pelvic thrombo-phlebitis.	Initial: Ampicillin 2 gm IV q6h X 7 days  AND Gentamicin 5 mg / kg IV Once QDay X 7 days  <u>In case of C-section or evidence of disseminated intravascular coagulation (DIC)</u>: Clindamycin 600 mg IV q6h X 7 days	This regimen is for both mother and child.	These antibiotics are for pregnant or recently pregnant women. No changes necessary.	Ampicillin: 7.31 INR / 500 mg IV (818.72 INR / 7 day course) Gentamicin: 11.4 INR / 400 mg (5mg/kg IV – dose will vary based on weight but 39.9 INR for 40 kg woman / 7 day course) Clindamycin: 151.34 INR / 600 mg IV (4,237.52 INR / 7 day course)

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Intra-Abdominal Infection For "Spontaneous Bacterial Peritonitis" and "Cholangitis / Cholecystitis" see separate entries below. Common bacteria: Enterobacteriaceae (E.coli, Klebsiella sp.), Bacteroides (colonic perforation), Anaerobes Identifying and treating the cause of all intra-abdominal / GI infections leading to sepsis is mandatory. Source control (surgery) may be necessary. Additional imaging may be required. Treatment duration will vary with adequacy of source control. Treatment duration: 7 – 14 days with adequate	Mild-Moderate Infection / No evidence of Sepsis: Ceftriaxone 2,000 mg IV q24h AND Metronidazole 500 mg IV q8h OR Ciprofloxacin 500 mg PO / IV q12h AND Metronidazole 500 mg IV q8h Severe Infection / Septic: Piperacillin-Tazobactam 4.5 gm IV q6h or 4.5 gm given over 4 hours / dose IV q8h Severe Infection / Septic / Concern for ESBL organisms: Meropenem 1,000 - 2,000 mg IV q8h Rarely, consider empiric anti-fungal therapy: • Esophageal perforation • Immunosuppression • Prolonged antibiotic /	Ceftriaxone 50 mg/kg/dose IV q24h (max: 2 g/dose) AND Metronidazole 7.5 mg/kg/dose IV q6h (max: 500 mg/dose) OR Ciprofloxacin 10 mg/kg/dose PO / IV q12h (max: 400 mg/dose) AND Metronidazole 7.5 mg/kg/dose IV q6h (max: 500 mg/dose) OR Piperacillin-Tazobactam: 2-9 mo: 80 mg/kg/dose IV Q8h	Beta-lactams are generally considered safe in pregnancy. Metronidazole can be safely used in the 2nd and 3rd trimesters of pregnancy. If possible, Ciprofloxacin should be avoided during pregnancy. While risk factors for need for empiric anti-fungal therapy make pregnancy unlikely, would avoid fluconazole in pregnancy and instead purchase caspofungin from outside: Caspofungin 50 mg IV q24h	All calculations below for 1 week treatment course: Ceftriaxone 22.82 INR / 1,000 mg IV (319.48 INR) Metronidazole 18 INR / 500 mg IV (378 INR) Ciprofloxacin 20 INR / 500 mg IV (280 INR) Piperacillin-Tazobactam 148.51 INR / 4.5 gm IV (4,158.28 INR for q6h dosing regimen) Meropenem 610 INR / 1,000 mg IV (12,810 INR) Fluconazole: 3.73 INR / 150 mg tablet (85.79 INR) Caspofungin: Purchased from outside

source control If possible, culture results can be used to switch to a suitable, narrow spectrum antibiotic(s).	antacid therapy • Persistent GI leak Fluconazole 800 mg PO once (loading dose) followed by 400 mg PO QDay	>9 mo-40 kg: 100 mg/kg/dose IV Q8h >40 kg: 3g IV Q6h (max: 4g/dose)  <u>If concern for ESBL organisms</u>: Meropenem 20 mg/kg/dose IV q8h 		

NOTE: If septic, due to high prevalence of drug resistance in gram negative bacteria in India, would recommend empiric treatment with either Piperacillin-Tazobactam or meropenem.

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Bacterial Colitis NOTE: Confirm absence of trophozoites in stool microscopy for all cases. The presence of trophozoites does not confirm Entamoeba histolytica infection as Entamoeba dispar trophozoites are identifical. Stool samples should be as fresh as possible when taken to lab. While recurrent bloody diarrhea in our setting may be recurrent infection with the above organisms, one should also consider 1) Clostridium difficile infection if previous antibiotic or health care exposures or 2) non-infectious inflammatory bowel disease (IBD).	1st Line: Ciprofloxacin 500 mg PO BID X 3-5 days AND Metronidazole 500 mg PO TID X 3-5 days 2nd Line: Azithromycin 500 mg PO QDay X 3 days NOTE: The oral bioavailability of fluoroquinolones is equal to their IV bioavailability. Unless a patient is unable to take PO, there is no indication for the use of IV fluoroquinolones.	1st Line: Ciprofloxacin 10 mg /kg/dose PO BID X 3 days (max dose: 500 mg/dose) 2nd Line: Azithromycin 10 mg / kg PO Once (max dose: 1000 mg)	We recommend the use of Azithromycin during pregnancy.	All calculations below for 5 day treatment course. Ciprofloxacin: 2.15 INR / 500 mg tablet (21.5 INR) Metronidazole**:** 0.75 INR / 500 mg tablet (11.25 INR) Azithromycin: 9.27 INR / 500 mg tablet (27.81 INR)

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Pyogenic Liver Abscess Common etiologies include gallstones, biliary tree strictures or malignancy. Most common organisms are GI bacteria. Pyogenic abscesses should be drained if large, imminent danger of rupture or not responding to medical therapy. If < 5 cm, prefer needle aspiration and percutaneous drainage. If > 5c m or loculated, may require surgical drainage. Aspirate for Gram Stain, culture, AFB and consider cytology for malignancy. May need repeat aspiration. Percutaneous drains should be flushed at least QDay while in place.	1st Line: Ceftriaxone 2 gm IV QDay AND Metronidazole 500 mg IV TID OR Piperacillin-Tazobactam 4.5 gm IV q6h (or 4.5 IV q8h with 4 hour infusion) When safe to switch to oral: Amoxicillin-clavulanate 625 mg PO TID OR Ciprofloxacin 500 mg PO BID AND Metronidazole 500 mg PO TID However, if possible, culture should be sent	1st line: Piperacillin-tazobactam 75 mg/kg/dose IV q6h (max: 3 gm pipercillin component/dose) OR Ceftriaxone 50 mg/kg/dose IV q24h (max 2 gm/dose) AND Metronidazole 7.5 mg/kg/dose IV q6h (max: 500 mg/dose) After 2 weeks of good response and drainage (if indicated), safe to switch to oral. Goal is 4-6 weeks therapy. Use culture data to narrow antibiotics as able. 2nd Line (in children >6 months): Ciprofloxacin 10 mg/kg/dose PO / IV q12h	Unusual but important to recognize. Ultrasound can be used safely in pregnancy. Adult 1st line can be safely used in pregnancy.	Ceftriaxone: 22 INR / 1 gm IV Amoxicillin-clavulanate: 12.3 INR / 625 mg tablet Piperacillin-Tazobactam: 148.51 Rs / 4.5 gm IV **Regimens:** **2 weeks of IV:** - Ceftriaxone 2 gm IV QDay AND Metronidazole 500 mg IV TID: 1,394 INR / 2 week course - Piperacillin-Tazobactam 4.5 gm IV q6H: 8,316.56 INR / 2 week course **2 weeks of oral:**- Amoxicillin-clavulanate 875 mg PO BID 516.6 INR / 2 week course

If Klebsiella Pneumoniae isolated, strong association with occult colorectal neoplasia. If Streptococcus anguinosis isolated, must look for other sites of metastatic infections. Percutaneous catheter removed once output decreased and clinical improvement. Duration therapy is 4-6 weeks. If good response to therapy, 2 weeks IV and transition to oral. Otherwise, will need 4-6 weeks IV. Trending CRP/ESR periodically may help – if downtrending, reassuring. If rising, concerning and warrants further workup.	and culture data used to narrow antibiotics.	(max: 400 mg/dose)  AND Metronidazole 7.5 mg/kg/dose IV q6h (max: 500 mg/dose)		Ciprofloxacin 500 mg BID AND Metronidazole 500 mg TID: 91.7 INR / 2 week course

NOTE: These empiric guidelines are for pyogenic liver abscesses only and NOT amebic liver abscesses NOR hydatid liver disease.

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Cholecystitis / Choledocholithiasis / Cholangitis Enterobacteriaceae (Escherichia coli, Klebsiella sp.). Consider these diagnoses when: Charcot triad (fever, RUQ, jaundice), Reynolds pentad (shock and altered sensorium PLUS Charcot Triad) Often but not always due to gallstones (consider superimposed gallstone pancreatitis). Ultrasound is image modality of choice. If no evidence of gallstones, beware possibility of malignant stricture. Antibiotic duration will vary. Discuss with consultant.	1) Community-acquired infections in patients without previous biliary procedures AND who are not severely ill / septic: (IV initially, total course of 7-10 days): Ceftriaxone 2gm IV QDay AND Metronidazole 1g loading dose, then 500 mg IV q6h OR Ciprofloxacin 400mg PO / IV q12H AND Metronidazole 1gm loading dose, then 500 mg IV q6h 2) Hospital-acquired infections OR patients with multiple therapeutic biliary manipulations OR	Gallstone disease is uncommon in children. Hemolytic diseases (sickle cell disease especially) most common cause of gallstones. Treat as per intra-abdominal infection above.	These diagnoses are 2nd most common non-obstetrical indication for surgery in pregnant women (behind appendicitis). Wide differential diagnosis including precclampsia / HELLP, acute fatty liver, cholestasis, abruption, intrauterine rupture, intraamniotic infections / chorioamionitis, viral hepatitis. Typical biliary symptoms and gallstones on ultrasound examination. Biliary colic- supportive therapy with hydration. Recurrent biliary colic then surgery, if near term defer surgery until after delivery. Most will require prompt intervention based on consultant input.	Ciprofloxacin: 20 INR / 500 mg IV Ceftriaxone: 22 INR / 1 gm IV Piperacillin-Tazobactam: 148.51 INR / 4.5 gm IV Metronidazole: 18 INR / 500 mg IV Meropenem: 610 INR / 1 gm IV **Regimens (7 day course IV)** Ciprofloxacin 500 BID PLUS Metronidazole 500 mg TID : 802 INR / 7 day course Ceftriaxone 2gm IV QDay PLUS Metronidazole 1gm loading dose, then 500 mg IV q6h: 841 INR / 7 day course

High prevalence of ESBLs. De-escalate therapy once antibiotic susceptibility known. Principles of management: 1. Manage sepsis (supportive care), IV fluids, correct electrolytes, pain control (NSAIDs; avoid opiates if possible) 2. Empiric antibiotics 3. Biliary drainage 4. Definitive surgery Biliary drainage can be managed many different ways, from less invasive procedures (like ERCP or percutaneous drains) to surgical interventions. Timing of these interventions will vary from one consultant to next but consultant should be involved with treatment decisions from admission onwards.	severely ill / septic (IV For 7-10 days): Piperacillin-Tazobactam 4.5 gm IV q6h (or 4.5 IV q8h with 4 hour infusion)  OR Meropenem 1 gm IV q8h 		In pregnancy, same medications as adult empiric therapy except ciprofloxacin should be avoided. It is also important to try to avoid NSAIDs especially in those who are near term.	Piperacillin-Tazobactam 4.5gm IV q6h: 4,158 INR / 7 day course Meropenem 1gm IV q8h: 12,810 INR / 7 day course

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Spontaneous Bacterial Peritonitis (SBP) DEFINITION: Spontaneous infection of the peritoneal cavity, associated with ascites most often in context of liver disease (especially decompensated cirrhosis) and nephrotic syndrome (in children)). <u>Common bacteria</u>: Enterobacteriaceae (E.coli, Klebsiella sp.) MUST obtain ascitic fluid for analysis and culture (high INR in cirrhotic patients is NOT a contraindication to ascetic tap). SBP is diagnosed	<u>1st Line</u>: Cefotaxime 2 gm IV TID X 5 days AND EITHER Albumin 25% 1.5 gm / kg on Day #1 and then 1.0 gm / kg on Day #3 of treatment OR (In resource limited settings): Plasma 1,500 mL on Day #1 and 1,000 mL on Day #3 of treatment <u>2nd Line</u>: Ceftriaxone 2g IV QDay X 5 days <u>If concern for drug resistance</u>: Piperacillin-Tazobactam 4.5 gm IV q6h (or 4.5 IV q8h with 4 hour infusion) OR Meropenem 1 gm IV q8h If patient improving / repeat ascetic tap shows > 25% in neutrophils / culture	<u>In cirrhotic children</u>: Ceftriaxone 50 mg/kg/dose IV q24h (max: 2 gm/dose) OR Cefotaxime: 150–200 mg/kg/day divided IV q 6–8h <u>In children with nephrotic syndrome as underlying pathology</u>: As above OR Ampicillin 200 mg/kg/day IV q6h AND Gentamicin 3–7.5 mg/kg/day IV divided q8h	Pregnancy unlike in patients with co-morbidities increasing risk for SBP. However, 1st line adult therapies are safe in pregnancy. Differential diagnosis should include secondary causes of peritonitis and obstetric and non-obstetric causes of intra-abdominal infections. Ciprofloxacin, ofloxacin and TMP-SMX are contraindicated in pregnancy.	Cefotaxime IV: 18.95 INR /500 gm IV Albumin / Plasma: Must be purchased / acquired from outside Ceftriaxone IV: 22 INR / 1gm IV Ampicillin IV: 7.31 INR / 500 mg IV Gentamicin: 11.4 INR / 400 mg Piperacillin-Tazobactam: 148.51 INR / 4.5gm IV Meropenem: 610 INR/ 1gm IV Ciprofloxacin: 2.15 INR / 500 mg tablet Ofloxacin PO: 1.26 INR / 200 mg tablet Co-trimoxazole (trimethorprim-sulfamethoxazole, TMP-SMX) PO: 1.34 INR / DS tablet (800/160)

when ascites neutrophils count > 250 neutrophils / mm^3. SBP PREVENTION: Pillars to PREVENT SBP: 1) Diuretics to minimize ascites, 2) Prophylatic antibiotics in the following people a) cirrhotics with GI hemorrhage, b) non-bleeding cirrhotic patients with ascites protein <1 gm/dl OR previous SBP. In sicket patients, NNT = 2 for SBP and NNT = 3 for death. Once SBP develops, discontinue nonselective beta-blocker (increases hepatorenal syndrome and death).	identified pathogen, can switch to oral to complete 5 days: Ofloxacin 400 mg PO BID OR Ciprofloxacin 500 mg PO BID **PROPHYLAXIS against SBP:** <u>Cirrhotics with GI HEMORRHAGE</u>: Ofloxacin 400 mg PO BID OR Ciprofloxacin 500 mg PO BID <u>Nonbleeding cirrhotic</u> (long term until ascites resolves): TMP-SMX 1 DS tablet PO QDay OR Ciprofloxacin 500 mg PO QDay			**<u>Treatment Regimens:</u>** 5 days of IV Cefotaxime 2 gm IV TID : 1,137 INR / 5 day course Ceftriaxone 2g IV QDay (or 1g IV BID): 228.2 INR / 5 day course **Prophylaxis Regimens:** 1 month supply of oral: Co-trimoxazole (TMP-SMX): 1 tab DS QDay 40.2 INR / 30 day supply Ciprofloxacin 500 mg PO QDay: 64.5 INR / 30 day supply Ofloxacin 75.6 INR / 30 day supply

NOTE: The above table only addresses SBP. It does NOT address secondary peritonitis, TB peritonitis / abdominal infection or peritonitis in peritoneal dialysis patients.

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Community Acquired Pneumonia CXR for all TB must be fully worked up and ruled out in all cases of concerning pulmonary infiltrates. This should involve 3 AFB's (at least two of which are early morning specimens) and a CBNAAT test if all AFBs are negative, if HIV positive, or if any concern for rifampin resistance or MDRTB. If issues with sputum collection, concerned induced sputum collection. In children, consider gastric lavage. Recent treatment (especially in a hospital / health care setting) and known or suspected immunosuppression are reasonable indications to begin treatment with	No recent health care exposures / not immunosuppressed: Ceftriaxone 2,000 mg IV q24h initially AND EITHER Doxycycline 100 mg PO BID (X 5 days) OR Azithromycin 500 mg PO first dose → 250 mg PO QDay (X 5 days total) Known recent health care exposures / Immuno-suppression: Piperacillin-Tazobactam 4.5 gm IV q6h (or 4.5 gm IV q8h with 4 hour infusion) AND EITHER Doxycycline (as above) OR Azithromycin (as above) Once stable for ≥ 48 hours, consider narrow to	<u>Uncomplicated:</u> Neonate: Refer to dosing in "Neonatal Sepsis" section above Infants/peds: Oral: Amoxicillin PO 45 mg/kg/dose Q12h OR Ceftriaxone 50 mg/kg/dose IV q24h (max: 2 g/dose) OR Cefotaxime 50 mg/kg/dose IV q6h (max: 2 g/dose) <u>Complicated:</u> Ceftriaxone 75 mg/kg/dose IV q24h AND Clindamycin	Beta-lactams (Ceftriaxone, Piperacillin-Tazobactam, Meropenem) are generally considered safe during pregnancy. See adult dosing. For atypical / Scrub typhus / leptospirosis coverage: Ceftriaxone provides excellent coverage against leptospirosis. Azithromycin is the drug of choice against scrub typhus (which is linked to abortions / stillbirths). While doxycycline has some efficacy against both, it is contraindicated during pregnancy. See adult dosing.	Ceftriaxone 22.82 INR / 1,000 mg 1 week course: 319.48 INR Doxycyline: 1.2 INR / 100 mg tablet 5 day course: 16.8 INR Azithromycin: 5.22 INR / 250 mg tablet 5 day course: 30.15 INR Piperacillin-Tazobactam 148.51 INR / 4.5 gm IV 7 day course: 4,158.28 INR (for q6h dosing regimen) Meropenem 610 INR / 1,000 mg IV 7 day course: 12,810 INR Pediatric medications (price will vary based on patient's weight):

broad spectrum therapy. Empiric coverage should include an antibiotic with known activity against atypical bacteria, scrub typhus and / or leptospirosis. Where appropriate, sputum cultures can be sent to lab though their results must be interpreted in setting of possible contamination from oral flora. Similar cultures can be sent on from the tips of endotracheal tubes.	by mouth antibiotics with total duration of 7-10 days. If no improvement within 48 hours of empiric regimen, reasonable to expand to: Meropenem 1,000 mg IV q8h	13 mg/kg/dose IV q8h (max: 600 mg/dose) If atypical pneumonia is suspected: Azithromycin 10 mg/kg PO on day 1 (max: 500 mg/dose), followed by 5 mg/kg PO QDay on days 2-5 (max: 250 mg/dose) Complicated defined by parapneumonic effusion, empyema, or necrotizing pneumonia. All others considered uncomplicated.		Amoxicillin: 0.27 INR (Bottle of 60 mL); 0.87 INR (125 mg tablet) Cefotaxime: 12.36 INR / 250 mg IV Clindamycin: 151.34 INR / 600 mg IV

Who should be admitted? Consider using the following modified CURB 65 Score (though not fully validated in lower resource settings) in patients who are NOT severely malnourished:

- Confusion
- Acute Kidney Injury
- RR > 30 bpm
- BP < 90/60 mmHg

One point is given for each category. Those with 0 to 1 points can be treated as outpatients, 2-3 points treated as inpatients in the wards and 4 points should be admitted to HDU / ICU.

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Lung Abscess (NON Mycobacterium tuberculosis – must be carefully ruled out) Common bacteria: Anaerobes Staphylococcus aureus Enteric Gram negative rods (Klebseilla pneumoniae) Monitor response both clinically and radiographically. Take culture initially Etiology often poor dentition or aspiration/vomiting Oral exam and referral for dental care as needed If these regimens fail, need culture data to guide further therapy. While uncommon, a minority may require surgical drainage.	1st Line: Clindamycin 600 mg IV QID for 2 weeks then 300 mg PO q8h for 4 – 6 additional weeks AND Ceftriaxone 2 g IV QDay for 2 weeks 2nd Line: Amoxicillin-clavulanate 1.2 g IV for 1 - 2 weeks then 625 mg PO TID for 3 - 7 weeks Duration of therapy generally 6 to 8 weeks total.	1st Line: Clindamycin 13 mg/kg/dose q8h, initially IV 1-2 weeks, then PO 2-6 weeks AND Ceftriaxone 75 mg/kg/day IV Q 24h X 1-2 weeks 2nd Line: Amoxicillin-clavulanate 45 mg/kg/dose amoxicillin component PO Q12 h (max dose: see adult dose)	All adult regimens are safe without modification in pregnancy.	Clindamycin: 19.45 INR/300 mg tablet 125 INR/600 mg IV (5250 INR / 2 week IV course; 1,633 INR / 2 week oral course) Ceftriaxone: 22 INR/ 1,000 mg (616 INR / 2 week course) Total for clindamycin and ceftriaxone course: 7,466 INR Amoxicillin-clavulanate: 13.3 INR/625 mg tablet 61 INR 1.2g IV Total cost of amoxicillin-clavulanate 1 month course (1 week IV, 3 weeks oral): 2,570 INR

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Hospital Acquired Pneumonia (HAP) / Ventilator Associated Pneumonia (VAP) DEFINITIONS: HAP – Pneumonia developing > 48 hours after hospital admission and not present at admission VAP – Pneumonia developing after 48 to 72 hours of intubation In HAP and VAP, greater risk of polymicrobial, gram negative, or MRSA infection. Therefore, get sputum / tracheal cultures to narrow therapy. In HAP and VAP, duration is often short (5-7 days) except for MRSA (14 days).	Moderate/Severe HAP, risk of MDR; late onset VAP: Ciprofloxacin 500 mg PO / IV q8H AND Gentamicin 3 – 5 mg / kg / day IV q8h OR Piperacillin-Tazobactam 4.5 gm IV q6h (or 4.5 IV q8h with 4 hour infusion) OR Meropenem 1 gm IV q8h Step down therapy: Amoxicillin clavulanate 625 mg PO TID	NOTE: Do not confuse the treatment of neonatal pneumonia with HAP / VAP. Piperacillin-tazobactam 75 mg/kg/dose IV q6h (max: 3 gm Piperacillin component/dose) OR Meropenem 20 mg/kg/dose IV q8h (max: 3 g/24 hr) <u>In sick patients:</u> ± Gentamicin 2.5 mg/kg/dose Q8h (NOTE: Gentamicin provides double gram negative coverage in either of the above regimens. Double gram negative coverage has not been shown to improve outcomes and	Favor beta lactams / cephalosporins and recommend avoiding fluoroquinolones and / or aminoglycosides.	Ciprofloxacin: 2.15 INR / 500 IV (45.15 INR / 7 day course) Gentamicin: 11.4 INR / 400 mg (5mg/kg IV – dose will vary based on weight but 39.9 INR for 40 kg person / 7 day course) Pipercillin tazobactam: 149 INR / 4.5 gm (4,172 INR / 7 day course) Meropenem: 610 INR / 1,000 mg (12,810 INR / 7 day course) Amoxicillin-clavulanate: 13.3 INR/625 mg tablet (Price will vary based on duration of therapy) Vancomycin: 109 INR / 500 mg (3,052 INR / 33 kg person for 2 week course)

	MRSA Coverage: Vancomycin 15 mg / kg IV q12h  AND Clindamycin 600 mg IV q8h If immune-compromised or Legionella concerns: Azithromycin 500 mg PO once QDay	is generally reserved for the sickest patients empirically.)		Clindamycin: 151 INR / 600 mg IV (6,342 INR / 2 week course)

In VAP, the modified Clinical Pulmonary Infection Score (CPIS) can be used to aid in diagnosis and monitor response to treatment. Score calculations are available online. We caution against the use of levofloxacin as step down therapy due to concerns related to development of tuberculosis drug resistance.

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Bacterial Endocarditis Empiric therapy is guided by valve status – native or prosthetic. <u>Bacteria</u>: Staphylococcus (including MRSA) Enterococcus Streptoccus viridans Beware Culture Negative: Bartonella Coxiella Legionella HACEK Rare: Gram negatives Candida Diagnosis: 3 blood culture samples spaced in time (6 hours apart) drawn from 2 different sites. Blood culture are critical and should be sent to the nearest reputable lab.	FOR NATIVE VALVE(S): Regimen #1: Ceftriaxone 2 gm IV q24h AND Ampicillin 2 gm IV q4h  AND Low-dose Gentamicin 40 mg IV q12h  (misses MRSA, excellent with all others) Regimen #2: Cefazolin 2,000 mg IV q8h  AND Ampicillin 2 gm IV q4h  AND Low-Dose Gentamicin 40 mg IV q12h  (misses MRSA and HACEK) Regimen #3: Ampiclox 4,000 mg IV q4h  AND Low-dose Gent 40 mg IV q12h  (misses HACEK) Regimen #4: Vancomycin 15 mg / kg IV q12h 	If available: Aqueous penicillin G 200,000 – 300,000 units / kg/ day divided q4h  (Max dose: 24 million units / 24 hours) OR (If Penicillin G not available): Ampicillin 200 to 300 mg/kg/day IV divided q4-6h  (maximum dose: 12 g per 24 hours) AND Ceftriaxone 100 mg/kg/day IV divided q12h (maximum dose: 4 g per 24 hours; if dose is >2 g per 24 hours, use divided dosing every 12 hours) OR	In pregnancy → recommendations against (MUST CONFIRM) use of aminoglycosides is generally contraindicated (ototoxicity) → would recommend Regimen #1 with recognition that Staphylococcus coverage is not as good. However, in prosthetic valve endocarditis, aminoglycosides (gentamicin) cannot be avoided.	Vancomycin: 109 INR / 500 mg (total cost will depend on patient's weight and renal function) Ceftriaxone: 16.44 INR / 500 mg 1,382 INR (6 week course) Ampicillin: 7.3 INR / 500 mg 7,358 INR (6 week course) Gentamicin: 11.4 INR / 400 mg 206 INR (6 week course) Cefazolin: 19.5 INR / 1,000 mg 1,638 INR (6 week course) Ampiclox: 6.74 INR / 500 mg 13,588 INR (6 week course)

NOTE: Surgical valve replacement is mandatory when: 1) Embolic phenomenon after starting appropriate antibiotics 2) Heart failure 3) Failure to clear blood cultures 4) Peri-valvular abscesses Prophylaxis 1 hour prior to procedure: Ampicillin 2,000 mg PO or IV (or 50 mg/kg in children) OR (if Penicillin allergy) Clindamycin 600 mg PO or IV (or 20 mg /kg in children): 1) History of endocarditis 2) Cardiac prosthesis 3) Congenital heart disease	AND Low-Dose Gentamicin 40 mg IV q12h (hits everything but HACEK) FOR PROSTHETIC VALVE(S): Vancomycin 15 mg / kg IV q12h AND Low-Dose Gentamicin 40 mg IV q12h (hits everything but HACEK) AND Rifampin 300 mg PO q8h (for biofilm penetrance) – but generally added once evidence of source control due to concerns about up-regulating resistance if used early in clinical course Low dose gentamicin is mandatory in all prosthetic valves (even in pregnancy) Treatment duration will vary but generally 4 – 8 weeks.	Gentamicin 3-6 mg/kg/day IV divided q8-12h If Beta-lactam-intolerant patients/ MRSA: Vancomycin 40 mg/kg/ 24 h IV ÷ Q 8-12h (maximum dose: 2 g per 24 hours) For S. aureus (except MRSA): Cefazolin 100 mg/kg per 24 hours IV (maximum dose: 12 g per 24 hours) ÷ Q8h for 4 to 6 weeks		Rifampin: 7.8 INR / 600 mg tablet 490.5 INR (6 week course) Regimen #1: 8,946 INR for 6 week course Regimen #2: 9,202 INR for 6 week course Regimen #3: 13,794 INR for a 6 week course Regimen #4: 18,312 INR for a 6 week course

NOTE: Methicillin resistant Staphylococcus aureus (MRSA) is uncommon in our setting.

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Septic Arthritis (joint): Diagnostic or therapeutic arthrocentesis is a MUST—ideally prior to antibiotics but do not delay antibiotics. Synovial fluid should also be sent for gram stain / differential / AFB and / or CBNAAT and, if possible, culture and crystal exam. Surgical drainage required for larger joints. Multiple surgical joint washouts may be necessary in some cases. In adults, empiric treatments depends on 1) acute mono/oligoarthritis (consider TB in mono-arthritis) 2) risk for disseminated	Empiric/Acute monoarticular (Use Gram Stain if possible but do not delay antibiotics for results) <u>Empiric / 1st Line</u>: If no concern for MRSA: Ceftriaxone 1,000 mg IV BID If concern for MRSA, add: Vancomycin 15 mg / kg IV q12h If gram stain with gram positive cocci and any possibility of MRSA, would continue both ceftriaxone and vancomycin pending culture results. At risk for disseminated gonococcal disease (ESPECIALLY if gram stain with gram negative diplococci): Ceftriaxone 1,000 mg IV BID AND EITHER Azithromycin 1 gm PO once OR Doxycycline 100 mg BID x 7 days <u>Pathogen specific</u> MSSA: Ceftriaxone 1,000 mgg IV BID OR Cefazolin 2 gm IV q8h	<u>Empiric / 1st line</u>: Cefazolin: 33 mg/kg/dose IV q8h (max: 2 gm/dose) <u>If gram negatives seen on gram stain:</u> ADD Ceftriaxone 50 mg/kg/dose IV q24h (max: 2 gm/dose) <u>If concern for gonorrhea:</u> Ceftriaxone 50 mg/kg/dose IV q24h (max: 2 gm/dose) AND Azithromycin 1 gm PO x1 dose (for patients ≥ 45 kg) <u>If concern for MRSA</u>:	Beta-lactams generally safe. Vancomycin can be used pending culture and gram stain results. Doxycycline, TMP/SMX and aminoglycosides are generally contraindicated.	All total prices will vary on length of necessary clinical course. As such, prices only include base price. Ceftriaxone: 22.82 INR / 1,000 mg IV Vancomycin 109.2 INR / 500 mg IV Azithromycin: 9.27 INR / 500 mg tablet Doxycycline: 1.2 INR / 500 mg tablet Cefazolin: 39 INR / 2,000 mg IV Cephalexin: 7.7 INR / 1,000 mg tablet TMP/SMX: 2.68 INR / 2 DS (800 / 160 mg) tablets Clindamycin 41.5

gonococcal disease (social history key) 3) gram stain 4) risk of MRSA (see risk factors below table). Once culture returns, narrow to cheapest effective regimen. Generally, 2 week IV followed by 2 week oral. Consider 4 weeks PO in complicated cases.	OR Cephalexin 1g PO q6h MRSA: Vancomycin 15 mg/kg IV q12h x 4 weeks OR Cotrimoxazole (TMP-SMX) 2 tabs PO BID OR Clindamycin 600 mg PO TID Pseudomonas: Ciprofloxacin 400 mg PO / IV q8h AND Gentamicin 5 mg/kg/day IV divided q8h OR Piperacillin-Tazobactam 4.5 gm IV q6h (or 4.5 IV q8h with 4 hour infusion) OR Meropenem 1gm IV q8h	ADD Clindamycin 13mg/kg/dose IV q8h (max: 600 mg/dose) Once gram stain or culture results returned, please discuss with Consultant.		INR / 600 mg tablet Ciprofloxacin: 20 INR / 500 mg IV Gentamicin: 11.4 INR / 400 mg Piperacillin-tazobactam: 148.51 INR / 4.5 gm IV Meropenem: 610 INR / 1,000 mg IV

MRSA risk factors:

- Recurrent antibiotic exposure
- Necrotizing infection
- Culture result

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Osteomyelitis: Generally spreads in either hematogenous (spread via blood) or contiguous (spread directly via contact) manner. Surgical source control is critical. Deep wound cultures should be sent from surgical specimen. Treatment must be culture based – blood or bone. Do NOT swab the superficial wound as this will be misleading. Treatment should generally be 6 weeks in length, with at least 2 weeks of IV therapy. Empiric coverage should be narrowed based on culture data once available. Plain film X-rays will only diagnose chronic osteomyelitis. Be suspicious of osteomyelitis in settings with appropriate physical exam findings and elevated ESR / CRP.	No concern for MRSA: Cefazolin 2,000 mg IV q8h OR Ceftriaxone 2,000 mg IV q24h If concern for MRSA infection: Clindamycin 600 mg IV q8h OR (If available): Vancomycin 15 mg / kg q12h These should be combined based on clinical suspicion. Ceftriaxone is drug of choice in adults with sickle cell disease.	For S. aureus, K. kingae: Cefazolin: 33 mg/kg/dose IV q8h (max: 2 gm/dose) For sickle cell patients or H. influenzae Type B: Ceftriaxone: 50 mg/kg/dose IV q24h OR Cefotaxime 50 mg/kg/dose IV q8h (max: 2 gm/dose) For S. aureus (MSSA & MRSA) Clindamycin 13mg/kg/dose IV q8h (max: 600 mg/dose) Sickle cell disease must be ruled out in all patents with osteomyelitis, especially children.	Follow as per the adult guidelines. Clindamycin, vancomycin and beta-lactams are generally considered safe.	All total prices will vary on length of necessary clinical course. As such, prices only include base price. Cefazolin: 19.5 INR / 1,000 mg IV Ceftriaxone: 22.82 INR / 1,000 mg IV Clindamycin: 151.34 INR / 600 mg IV Vancomycin: 109 INR / 500 mg IV Cefotaxime: 12.36 INR / 250 mg IV

MRSA risk factors:
- Recurrent antibiotic exposure - Necrotizing infection - Culture results

In cases with poor response to appropriate treatment or previous TB treatment or significant exposure, consider tubercular osteomyelitis.

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Diabetic Foot / Necrotizing Fasciitis Treat based on severity: Mild: ulcer with superficial inflammation consistent with cellulitis Moderate/Limb threatening: extension into fascia Severe/Life threatening: extensive local inflammation PLUS systemic toxicity If necrotizing fasciitis: Use life threatening regimen and add clindamycin to inhibit toxin production (especially for Streptococci) until leg has been adequately debrided (Immediate surgical debridement mandatory!) and viable tissue exposed. Think about osteomyelitis (changes duration of therapy and need for deeper surgical debridement) if: - Probe to bone - ESR >70 - Ulcer area >	Mild infections (PO options): Treat X 3 - 7 days based on severity Cephalexin 500 mg PO QID (no MRSA coverage) OR Amoxicillin-clavulanate 625 mg PO TID AND Cotrimoxazole (TMP-SMX) DS 1-2 tabs PO BID (covers MRSA) OR Clindamycin 300 -450 PO QID (covers MRSA) Moderate infections (PO and IV options): Ciprofloxacin 500 mg	Generally a disease of adults given latency period for development of diabetic neuropathy. For necrotizing fasciitis, adjust adult regimens as needed based on clinical severity.	In pregnancy, preferred regiments are those consisting of a beta-lactam or cephalosporin without an aminoglycoside. As a general rule, cotrimaxazole (TMP-SMX), fluoroquinolones (ciprofloxacin) and doxycycline are contraindicated during pregnancy.	Cephalexin: 3.86 INR / 500mg (216 INR / 2 week course) Amoxicillin-clavulanate: 18 INR / 625 mg tablet; 0.9 INR / 1.2 gm IV TMP SMX: 2.68 INR / 2 DS tablets Clindamycin: 3.68 INR / 450 mg tablet (1,307 INR / 2 week course); 151 INR / 600 mg IV Ciprofloxacin: 2.15 INR / 500 mg tablet Gentamicin: 11.4 INR / 400 mg (5mg/kg IV – dose will vary based on weight but 79.8 INR for 40 kg person / 2 week course) Piperacillin-

2cm^2 - Abnormal X-ray For moderate/severe infections, cultures should be obtained during surgical debridement to guide narrowing antibiotic regimen. Assess vasculature (pulses and cap refill), sensation, and beware possibility of Deep Venous Thrombosis. Poor vasculature makes wound healing unlikely (will probably need revascularization or, if not possible, amputation). Blood sugar control is paramount for proper healing in diabetics. Target RBS < 180 mg/dL. Diabetes require education and good footwear prior to discharge. Limited data support 2 week course of Vitamin A 10,000 units QDay, vitamin C 500 mg BID and Zinc 220 mg QDay to help with wound healing particularly in those	PO BID AND Clindamycin 450 mg PO TID OR Amoxicillin clavulante 1,200 mg IV q6h AND Gentamicin 3 – 5 mg / kg / day IV divided q8h OR Amoxicillin clavulanate 1,200 mg IV q6h AND Ciprofloxacin 400 mg PO / IV q8h Life threatening (IV only): Piperacillin-Tazobactam 4.5 gm IV q6h (or 4.5 IV q8h with 4 hour infusion)			Tazobactam 148.51 INR / 4.5 gm IV 8,316.56 INR for q6h dosing regimen / 2 week course) Meropenem: 610 INR / 1,000 mg IV (25,620 INR / 2 week course) Vancomycin: 220 INR / 1,000 mg IV (6,160 INR / 2 week course of 1,000 mg IV BID)

malnourished. Protein supplementation also necessary in our and similar settings.	 AND Gentamicin 3-5 mg / kg / day IV divided q8h  OR Meropenem 1,000 mg IV q8h  Shock --- Add clindamycin 600 mg IV QID for toxic shock or necrotizing fasciitis MRSA: Add Vancomycin 15 mg / kg IV q12h  until culture susceptibilities show an alternative			

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Brain Abscess (not HIV positive, not Mycobacterium tuberculosis) Potential sources including adjacent structures (ears, oral cavity, sinuses) or distant embolic phenomenon (endocarditis). It is important to search for other potential niduses of infection. May require Neurosurgery for diagnostic aspiration (microbiology) or, in some cases, surgical management.	Metronidazole (15 mg/kg [usually 1 g] IV as a loading dose, followed by 7.5 mg/kg [usually 500 mg] IV q8h AND Ceftriaxone 2 gm IV q12h OR Cefotaxime 2 gm IV q4-6h Therapy duration of 4 to 8 weeks total.	Metronidazole 7.5 mg/kg/dose IV q6h (max: 500 mg/dose) AND Ceftriaxone 50 mg/kg/dose IV Q12h (max: 500 mg/dose) OR Cefotaxime 50 mg/kg/dose Q 8h (max: 2 g/dose)	No changes to adult regimens.	Metronidazole: 18 INR / 500 mg IV (1,548 INR / 4 weeks IV) Ceftriaxone: 22.82 INR / 1 gm IV (2,555.84 INR / 4 weeks IV) Cefotaxime: 18.95 INR / 500 mg IV (8,489.6 INR / 4 weeks IV if q6h IV)

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Meningitis When suspected, first perform a quality fundoscopic exam to check for evidence of papillaedema and increased intracranial pressure. If no evidence of increased intra-cranial pressure, a lumbar puncture (LP) should be performed as soon as possible. If LP will be delayed, it is appropriate to given antibiotics / antivirals prior to LP. If a causative agent is identified, antibiotic therapy can be narrowed. TB is an important cause of meningitis in rural India and must also be considered (see below). If high suspicion, CBNAAT can be performed with large volume of CSF.	1st Line: Ceftriaxone 2 gm IV q12h OR Cefotaxime 2 gm IV q6h **Consider these additional medicines**: If alcoholic, elderly (> 50 years old) or immuno-compromised: Ampicillin 2 gm IV q4h (for Listeria) If high suspicion / confirmation of Streptococcus pneumoniae, NO evidence of MTb and GCS score of 8-11: Dexamethasone 10 mg IV q6h X 4 days If altered mental status / personal changes with concern for viral meningoencephalitis / high RBC in CSF despite apparently clean LP: Acyclovir 10 mg/kg IV q8h	If preterm to <1 month of age: See neonatal sepsis guidelines (above) If > 1 month of age: Ceftriaxone 50 mg /kg /dose IV q12h (Max: 2 gm/dose) OR Cefotaxime 50 mg / kg /dose IV q6h If concern for Haemophilus influenza b: Dexamethasone 0.15 mg/kg/dose IV q6h X 2 days (should be started before or at the time of start of antibiotics)	Same as Adult Medications – all medicines listed can be used in pregnancy. Beta lactams and steroids are safe in pregnancy; acyclovir is a pregnancy Category B drug.	Ceftriaxone: 22.82 INR / 1 gm IV (639 INR / 7 day course) Cefotaxime: 18.95 INR / 500 mg IV (2,122 INR / 7 day course) Ampicillin: 7.31 INR / 500 mg IV (1,228 INR / 7 day course) Dexamethasone: 5.44 INR / 8 mg IV Acyclovir: 373.56 INR for 500 mg IV (price will vary based on patient size but 7,845 INR for 7 day course for 50 kg person)

If concern for Tuberculosis meningitis:
Start HRZE at age (for pediatric patients) and body weight appropriate doses. Consider addition of high dose levofloxacin 750 mg IV PO QDay. Start prednisolone or dexamethasone (likely the latter as IV formulation) at a high dose X 2 weeks with gradual taper over ~2 months.

Multi Drug Resistant (MDR) / Carbapenem Resistant Gram Negative Rods

While it is difficult to provide truly “empiric” therapy for these pathogens, their prevalence in India dictate that some basic guidelines should be outlined.

Which are organisms of interest?

Carbapenem resistant gram negative rods include (but are not limited to) species of the following: Klebsiella, Acinetobacter, Escherichia coli, Enterobacter, Pseudomonas, Serratia, Morganella, Providencia, and Proteus.

Which organisms most frequently have the New Delhi Metalloproteinase?

The New Delhi Metalloproteinase is found most frequently in Klebsiella species but has also been found in Acinetobacter, Escherichia coli, and Enterobacter cloacea.

Which general approach is advised for carbapenem resistant gram negative rods?

In general, start with meropenem (despite in vitro resistance) and colistin or a polymyxin (if one has access to the latter). ALWAYS use colistin/polymyxin AND another antibiotic. NEVER USE MONOTHERAPY! Remember, the detergent effect of the colistin will allow the second antibiotic to get inside to its target, so it may work in synergy in vivo even though resistant in vitro based on susceptibilities.

DOSING

Meropenem 
CrCl > 50: 2 gm IV q 8, infuse over 3 hours
CrCl 25-50: 1 gm IV q 8, infuse over 3 hours
CrCl 10-25: 1 gm IV q 12, infuse over 3 hours
CrCl < 10 or dialysis, 1 gm IV QDay (dose after dialysis on dialysis days, infuse over 3 hours

Colistin  – MUST MONITOR RENAL FUNCTION WHILE RECEIVING COLISTIN
CrCl > 50: Loading dose: 270 mg followed by 135 mg IV q12h

CrCl 20-50: Loading dose of 270 mg followed by 135 mg IV QDay
CrCl < 20: Loading dose of 270 mg followed by 135 mg IV q48h

Remember, species of all of the following gram negative rod are intrinsically reistant to colistin / polymyxin B: Serratia, Morganella, Providencia, and Proteus.

Is there any difference to approach for gran negative rods with the New Delhi metalloproteinase?

These organisms will be susceptible to colistin/polymyxin most of the time but cultures should still be sent. These organisms may also be susceptible to tigecycline. However, tigecycline does NOT achieve good urine levels and is only bacteriostatic and NOT bacteriocidal against gram negatives. When needed (and if one has access), we would recommend a tigecycline dose of 100 mg IV q12h.

New Delhi metalloproteinase secreting gram negative rods may be susceptible to aminoglycosides or aztreonam but often are not.

What are the differences between colistin (also known as polymyxin E) and polymyxin B (if your facility has access to both)?

Polymyxin B does NOT get into urine, is NOT renally dosed, does NOT need a loading dose, and is LESS renal toxic. If one has access to polymyxin B, chose this over colistin for all cases except urine/renal.

Common Side Effects / Administration Notes (Antibiotics and Antibiotic Classes)

Acyclovir: Acute kidney injury (crystallization in renal tubules)

Amikacin: Renal toxicity, oto- and vestibular toxicity

Amoxcillin: Allergies, GI side effects (diarrhea)

Amoxicillin / Clavulanate: Diarrhea / GI upset; allergic reactions including anaphylaxis

Ampicillin: Diarrhea, Allergic reaction including anaphylaxis

Ampiclox: Rash, Diarrhea, Anaphylaxis

Azithromycin: Gastritis / diarrhea (especially at high issues), palpitations, rarely linked to spontaneous abortions / stillbirths

Carbapenems: As a class, lower seizure threshold, especially in those with pre-existing seizure disorders.

Chloramphenicol: Agranulocytosis / Bone Marrow Suppression, Grey Baby Syndrome (both rare)

Cefotaxime: Rash or other allergic reaction

Cefazolin: Rash, Anaphylaxis

Ceftriaxone: Nausea and vomiting if IV bolus given too rapidly (should be administered very slowly); Gastrointestinal issues; allergic reactions including anaphylaxis

Cephalexin: Rash, Anaphylaxis

Ciprofloxacin: Gastrointestinal issues, cardiac conduction abnormalities, musculoskeletal issues (tendon rupture – rare), ocular lens dislocation

Clindamycin: Diarrhea, including Clostridium difficile

Doxycycline: Gastritis / Pill Esophagitis, photosensitivity; do NOT use if < 12 years old

Fluconazole: Headache, Nausea

Fluoroquinolones (as a class): A growing body of evidence cautions against the use of fluoroquinolones due to both musculoskeletal and nervous system side effects though safety profile in children is perhaps better than originally believed. We would also recommend against the use of fluoroquinolones for the treatment of enteric fever (see above).
NOTE: The oral bioavailability of fluoroquinolones is equal to their IV bioavailability. Unless a patient is unable to take PO, there is no indication for the use of IV fluoroquinolones.

Gentamicin: Long term oto- and vestibular toxicity (would recommend monitor hearing loss), renal toxicity

Levofloxacin: To be avoided in young children / cardiac conduction abnormalities. Headache. **IN HIGH PREVALENCE TUBERCULOSIS REGIONS, THIS MEDICINE MAY ONLY BE USED WHEN 1) THERE IS NO CONCERN FOR TUBERCULOSIS INFECTION AND 2) NO OTHER MEDICATION IS AN OPTION FOR TREATMENT (PREFERRABLY BASED ON CULTURE DATA).**

Meropenem: Nausea, lowers seizure threshold, allergic rash with potential for anaphylaxis

Metronidazole: Severe encephalopathy / seizures, neuropathy, stomatitis or leukopenia possible if given for prolonged treatment courses; if / when transitioned to PO, very bitter, metallic taste. Patients should be advised to not consume alcohol while taking this medicine. MUST BE DOSE ADJUSTED IN HEPATIC FAILURE

Ofloxacin: Gastrointestinal issues, cardiac conduction abnormalities, musculoskeletal issues (tendon rupture – rare), ocular lens dislocation

Piperacillin-Tazobactam: Allergic reactions including anaphylaxis, rarely cholestasis and thrombocytopenia

Rifampin: Red-orange body fluids, hepatitis, MULTIPLE DRUG INTERACTIONS

Trimethoprim-Sulfamethoxazole (TMP-SMX) / Cotrimoxazole: Allergies to sulfa medications, hyperkalemia especially if underlying renal disease, falsely elevated creatinine (TMP-SMX affects renal secretion of creatinine), Steven Johnson Syndrome (rare but a medical emergency), folate metabolism inhibitor

Vancomcyin: Red Man's Syndrome (if occurs, give more slowly) and renal toxicity (in non-monitored settings)

Common Side Effects (Non-Antibiotics)

Albumin: Anaphylaxis, transfer of blood borne diseases

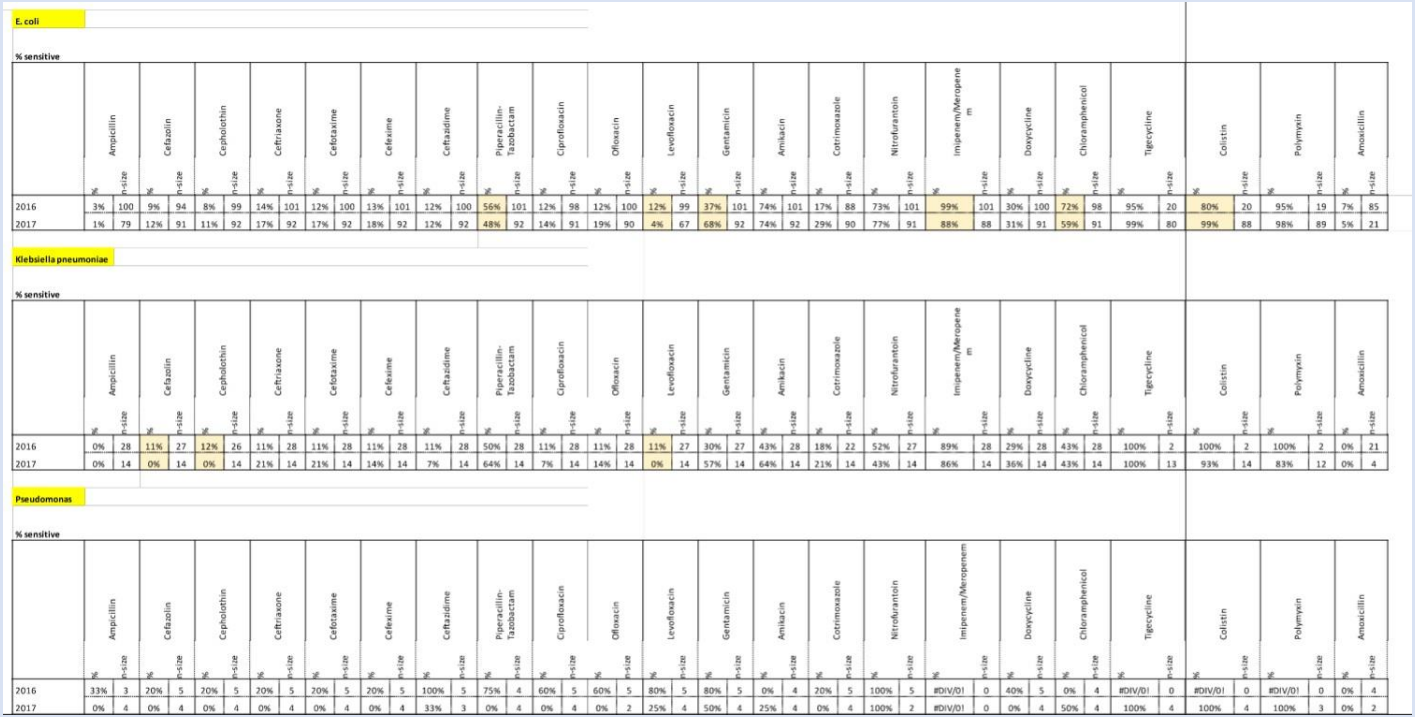
Dexamethasone: Altered glucose metabolism / hyperglycemia, insomnia, altered mental status / psychosis

Renal Dose Adjustment

 All medicines marked with this kidney cartoon require renal dose adjustment. While renal function may not be known in low resource settings while giving empiric treatment, we believe this information should be considered. If there is concern for renal dysfunction, please consult an appropriate medical resource to guide correct dosing for these medications. All doses given in this guide are for normal renal function.

Antibiograms (Urine Sensitivity Patterns) – 2016 and 2017

Escherichia coli, Klebsiella pneumoniae, Pseudomonas aeruginosa



E. coli

% sensitive

	Ampicillin		Cefazolin		Cepholothin		Ceftriaxone		Cefotaxime		Cefexime		Ceftazidime		Piperacillin-Tazobactam		Ciprofloxacin		Ofloxacin		Levofloxacin		Gentamicin		Amikacin		Cotrimoxazole		Nitrofurantoin		Imipenem/Meropenem		Doxycycline		Chloramphenicol		Tigecycline		Colistin		Polymyxin		Amoxicillin	
	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size
2016	3%	100	9%	94	8%	99	14%	101	12%	100	13%	101	12%	100	56%	101	12%	98	12%	100	12%	99	37%	101	74%	101	17%	88	73%	101	99%	101	30%	100	72%	98	95%	20	80%	20	95%	19	7%	85
2017	1%	79	12%	91	11%	92	17%	92	17%	92	18%	92	12%	92	48%	92	14%	91	19%	90	4%	67	68%	92	74%	92	29%	90	77%	91	88%	88	31%	91	59%	91	99%	80	99%	88	98%	89	5%	21

Klebsiella pneumoniae

% sensitive

	Ampicillin		Cefazolin		Cepholothin		Ceftriaxone		Cefotaxime		Cefexime		Ceftazidime		Piperacillin-Tazobactam		Ciprofloxacin		Ofloxacin		Levofloxacin		Gentamicin		Amikacin		Cotrimoxazole		Nitrofurantoin		Imipenem/Meropenem		Doxycycline		Chloramphenicol		Tigecycline		Colistin		Polymyxin		Amoxicillin	
	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size
2016	0%	28	11%	27	12%	26	11%	28	11%	28	11%	28	11%	28	50%	28	11%	28	11%	28	11%	27	30%	27	43%	28	18%	22	52%	27	89%	28	29%	28	43%	28	100%	2	100%	2	100%	2	0%	21
2017	0%	14	0%	14	0%	14	21%	14	21%	14	14%	14	7%	14	64%	14	7%	14	14%	14	0%	14	57%	14	64%	14	21%	14	43%	14	86%	14	36%	14	43%	14	100%	13	93%	14	83%	12	0%	4

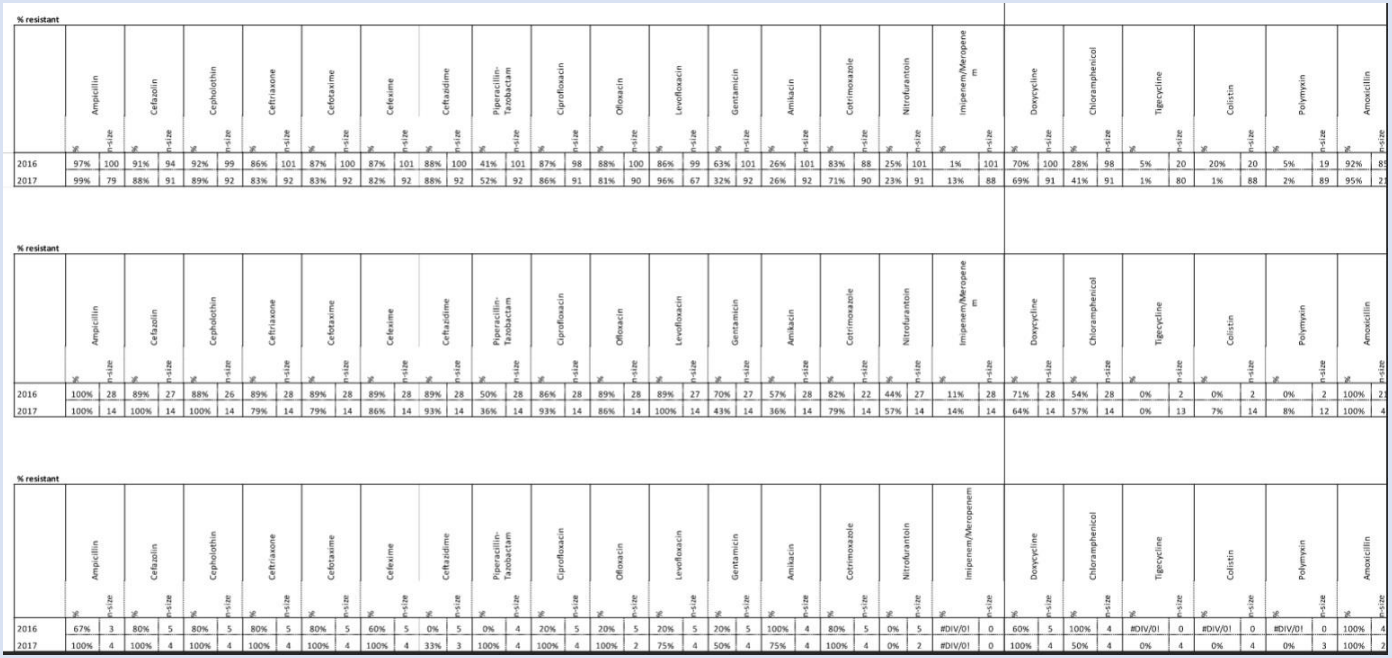
Pseudomonas

% sensitive

	Ampicillin		Cefazolin		Cepholothin		Ceftriaxone		Cefotaxime		Cefexime		Ceftazidime		Piperacillin-Tazobactam		Ciprofloxacin		Ofloxacin		Levofloxacin		Gentamicin		Amikacin		Cotrimoxazole		Nitrofurantoin		Imipenem/Meropenem		Doxycycline		Chloramphenicol		Tigecycline		Colistin		Polymyxin		Amoxicillin	
	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size
2016	33%	3	20%	5	20%	5	20%	5	20%	5	20%	5	100%	5	75%	4	60%	5	60%	5	80%	5	80%	5	0%	4	20%	5	100%	5	#DIV/0!	0	40%	5	0%	4	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	0%	4
2017	0%	4	0%	4	0%	4	0%	4	0%	4	0%	4	33%	3	0%	4	0%	4	0%	2	25%	4	50%	4	25%	4	0%	4	100%	2	#DIV/0!	0	0%	4	50%	4	100%	4	100%	4	100%	3	0%	2

Antibiograms (Urine Resistance Patterns) – 2016 and 2017

Escherichia coli, Klebsiella pneumoniae, Pseudomonas aeruginosa



% resistant

	Ampicillin		Cefazolin		Cephalothin		Ceftriaxone		Cefotaxime		Cefexime		Ceftazidime		Piperacillin-Tazobactam		Ciprofloxacin		Ofloxacin		Levofloxacin		Gentamicin		Amikacin		Cotrimoxazole		Nitrofurantoin		Imipenem/Meropenem		Doxycycline		Chloramphenicol		Tigercycline		Colistin		Polymyxin		Amoxicillin	
	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size
2016	97%	100	91%	94	92%	99	86%	101	87%	100	87%	101	88%	100	41%	101	87%	98	88%	100	86%	99	63%	101	26%	101	83%	88	25%	101	1%	101	70%	100	28%	98	5%	20	20%	20	5%	19	92%	8
2017	99%	79	88%	91	89%	92	83%	92	83%	92	82%	92	88%	92	52%	92	86%	91	81%	90	96%	67	32%	92	26%	92	71%	90	23%	91	13%	88	69%	91	41%	91	1%	80	1%	88	2%	89	95%	2

% resistant

	Ampicillin		Cefazolin		Cephalothin		Ceftriaxone		Cefotaxime		Cefexime		Ceftazidime		Piperacillin-Tazobactam		Ciprofloxacin		Ofloxacin		Levofloxacin		Gentamicin		Amikacin		Cotrimoxazole		Nitrofurantoin		Imipenem/Meropenem		Doxycycline		Chloramphenicol		Tigercycline		Colistin		Polymyxin		Amoxicillin	
	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size
2016	100%	28	89%	27	88%	26	89%	28	89%	28	89%	28	89%	28	50%	28	86%	28	89%	28	89%	27	70%	27	57%	28	82%	22	44%	27	11%	28	71%	28	54%	28	0%	2	0%	2	0%	2	100%	2
2017	100%	14	100%	14	100%	14	79%	14	79%	14	86%	14	93%	14	36%	14	93%	14	86%	14	100%	14	43%	14	36%	14	79%	14	57%	14	14%	14	64%	14	57%	14	0%	13	7%	14	8%	12	100%	4

% resistant

	Ampicillin		Cefazolin		Cephalothin		Ceftriaxone		Cefotaxime		Cefexime		Ceftazidime		Piperacillin-Tazobactam		Ciprofloxacin		Ofloxacin		Levofloxacin		Gentamicin		Amikacin		Cotrimoxazole		Nitrofurantoin		Imipenem/Meropenem		Doxycycline		Chloramphenicol		Tigercycline		Colistin		Polymyxin		Amoxicillin	
	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size	%	n-size
2016	67%	3	80%	5	80%	5	80%	5	80%	5	60%	5	0%	5	0%	4	20%	5	20%	5	20%	5	20%	5	100%	4	80%	5	0%	5	#DIV/0!	0	60%	5	100%	4	#DIV/0!	0	#DIV/0!	0	#DIV/0!	0	100%	4
2017	100%	4	100%	4	100%	4	100%	4	100%	4	100%	4	33%	3	100%	4	100%	4	100%	2	75%	4	50%	4	75%	4	100%	4	0%	2	#DIV/0!	0	100%	4	50%	4	0%	4	0%	4	0%	3	100%	2

Abbreviations (Pharmacy and Otherwise):

AFB – Acid Fast Bacilli
ANC – Absolute Neutrophil Count
BID – twice a day / every 12 hours
BP – blood pressure
BPH – Benign Prostatic Hypertrophy
bpm – breaths per minute
C – Celsius
CBNAAT – Cartridge Based Nucleic Acid Amplification Test
cm – centimeters
cm^2 – centimeters squared
CoNS – Coagulase negative Staphylococci
CPIS – Clinical Pulmonary Infection Score
CrCl – Creatinine clearance
CRP – C-reactive protein
CSF – Cerebrospinal fluid
CT – CAT Scan
CURB-65 – Confusion, Urea, Respiratory Rate, Blood Pressure, Age ≥ 65 years
CXR – Chest X-ray
D + C – Dilatation and curettage
DIC – Disseminated intravascular coagulation
dL – deciliters
DS – Double Strength
ERCP – Endoscopic retrograde cholangiopancreatography
ESBL – End-stage beta-lactamase
ESR – Erythrocyte sedimentation rate
F – Fahrenheit
g / gm – gram
GCS – Glasgow Coma Score
GI – Gastrointestinal

HACEK – (Acronym for bacteria linked to culture negative endocarditis: Haemophilus, Aggregatibacter, Cardiobacterium, Eikenella, Kingella
HAP – Hospital Associated Pneumonia
HDU – High Dependency Unit
HELLP – Hemolysis, Elevated liver enzymes, low platelets (an acronym that describes a worrying manifestation of pre-eclampsia in pregnancy)
HIV – Human Immunodeficiency Virus
hr – hour
HRZE – Isoniazid, Rifampin, Pyrazinamide, Ethambutol (standard 1st line combination therapy for tuberculosis)
IBD – Inflammatory Bowel Disease
i.e. – "that is"
ICU – Intensive Care Unit
INR – International Normalized Ratio
IV - intravenous
JSS - Jan Swasthya Sahyog
kg – kilograms
LP – lumbar puncture
MASCC – Multinational Association for Supportive Care in Cancer Risk-Index Score
MDR – Multi-drug resistance / resistant
MDRTB – Multi-drug resistant tuberculosis
mg – milligram
mm^3 – millimeters squared
mmHg – millimeters of mercury
mo – month
MRSA – Methcillin resistant Staphylococcus aureus
MSSA - Methcillin sensitive Staphylococcus aureus
NNT – Number needed to treat
NSAIDs – Non-steroid anti-inflammatory drug(s)
PO – by mouth
q#h – every # of hours (Ex. Q8h = "every 8 hours")
QDay – daily
QID – four times per day / every 6 hours

RBS – random blood sugar
RR – respiratory rate
RUQ – right upper quadrant
SBP – Spontaneous Bacterial Peritonitis
sp. - species
STD – Sexually Transmitted Disease
TB - Tuberculosis
TID – three times per day / every 8 hours
TMP-SMX – Trimethoprim-Sulfamethoxazole (Cotrimoxazole)
uL – microliters
UTI – Urinary Tract Infection
VAP – Ventilator Associated Pneumonia
VCUG – Voiding cystourethrogram
WBC – White Blood Cell

> - greater than
< - less than
≥ - greater than or equal to
≤ - less than or equal to
~ - approximately