Outpatient Empiric Antibiotics Guide for Low Resource Settings in India

Fall 2017,
1st Edition

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Preface

This outpatient empiric antibiotics guide (along with the inpatient 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 common outpatient 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 primary care clinics and 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 minimal use of antibiograms. 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)	Children (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course) In India
Acute Otitis Media **MICROBIOLOGY** *More common*: Viral *Streptococcus pneumoniae* *Haemophilus influenza* *Moraxella catarrhalis* *Less common*: *Staphylococcus aureus*, Group A Streptococci	1st Line: Amoxicllin 500 mg PO q8h X 5-10 days* (depending on severity) 2nd Line: (Consider when concerns for medication adherence with q8h dosing): Cefodroxil 1,000 mg PO q24h or 500 mg PO q12h X 5 days-7 days* (depending on severity) Non-severe Penicillin allergy: Cefixime 400mg PO q24h X 5-7 days (depending on severity) Severe Beta Lactam Allergy with Type 1 Hypersensitivity / Anaphylaxis: Azithromycin 500 mg PO	NOTE: In some settings, immunocompetent children > 2 years old without severe disease are monitored for 48 hours prior to initiation of treatment. Malnutrition is a form of immunocompromise. 1st Line: Amoxicillin 90 mg/kg PO divided q8h (Max 3,000 mg / 24 hours) If < 2 years old: X 10 days If >= 2 years old: X 5-7 days (depending on severity) 2nd Line: Cefadroxil 30 mg/kg q12h X 5-7 days (depending on severity) Non-severe Penicilllin allergy: Cefixime 5 mg/kg/dose PO q12h < 2 years old: X 10 days	Adult 1st and 2nd line are safe and appropriate as is cefixime (pregnancy risk factor category B). Azithromycin can be considered in pregnancy.	All prices calculated for 10 day adult courses: Amoxcillin: 2.12 INR / 500 mg tablet (65 INR / course) Cefodroxil: 3.4 INR / 500 mg tablet (68 INR / course) Cefixime: 5.27 INR / 200 mg tablet (105.4 INR) Azithromycin: 10.41 INR / 500 mg tablet

	QDay X 5-7 days (depending on severity) (However, high rates of *Streptococcus pneumoniae* resistance to Azithromycin)	>= 2 years old: 5-7 days (depending on severity)  Severe Penicillin allergy / Anaphylaxis: Azithromycin 10 mg/kg/day PO (maximum 500 mg/day) on Day #1 → 5 mg/kg/day (maximum 250 mg/day) on Days #2 to #5		(53 INR / course)

NOTE: Resistant pneumococcal disease is not apparently common in India. However, in settings where this is a therapeutic concern, we would recommend the use of a 3rd generation cephalosporin (Cefixime). Azithromcyin is also an option but in some settings 35% of Pneumococcus is fully resistant to azithromycin.

*Neither amoxicillin or cefodroxil will cover beta-lactamase producing strains of Haemophilus influenza or Moraxella catarrhalis. If a patient fails 1st line therapy or if has a severe infection, consider Amoxicillin-clavulanate or a third-generation cephalosporin (cefixime or IV Ceftriaxone).

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Chronic Suppurative Otitis Media (CSOM) Definition: Otorrhea (ear discharge) lasting at least 2 weeks, often > 6 weeks **MICROBIOLOGY** *Staphylococcus aureus* *Pseudomonas aeruginosa* *Proteus mirabilis* Enterococcus (all types) Anaerobes NOTE: Often polymicrobial	Similar to Pediatrics dose	Place cotton ear wisp with soap AND Maintain dry ear 1st Line: Ciprofloxacin 2 drops QID X 14 days If 1st line fails, would recommend culture of ear discharge (NOTE: If anaerobes, may be culture negative) 2nd Line: Gentamicin 2 drops QID X 14 days (should assess baseline hearing status and document in chart and should be avoided in those with tympanic membrane perforation except as last line due to increased risk of hearing loss)	Pediatric 1st and 2nd line are safe and appropriate.	Ciprofloxacin drops: 8.3 INR / 10 mL Gentamicin: 7.15 INR / 10 mL

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Lower Urinary Tract Infection (UTI) **NOTE**: This section is for simple lower UTI, NOT pyelonephritis. **MICROBIOLOGY** *Escherichia coli* In women, treatment course is generally 3 days; in men, treat for 7 days total.	1st Line: If long acting Nitrofurantoin (NFT): NFT 100 mg PO q12h X 3 or 7 days (depending on sex) If short acting NFT: NFT 50 – 100 mg PO q6h X 3 or 7 days (depending on sex) 2nd Line: Cefixime 400 mg PO QDay X 7 days If End-Stage Beta-Lactamase Producing Organism: Fosfomycin 3 gm packet PO X 1	1st Line: NFT 6 mg/kg PO in 3 to 4 divided doses / day X 5 days 2nd Line: Cefixime 10 mg/kg PO BD (in divided doses, 5 mg/kg/dose) X 5 days	For pregnant women, please use 2nd Line Adult treatment. In pregnancy, NFT can be used as a last line therapy but must be avoid after 38 weeks or when labor is imminent due to increased risk of neonatal jaundice.	NFT: 0.35 INR / tablet (3.5 INR / course) Cefixime 5.6 INR / tablet (78.4 INR / course) Fosfomycin: Non-formulary (must be purchased from outside pharmacy)

Due to resistance patterns, we generally avoid the use of Trimethoprim-Cotrimoxazole for treatment of lower UTI. If cultures reveal Trimethoprim-Cotrimoxazole sensitivity, it can be safely used but should not be used in the first trimester of pregnancy due to its anti-folate effects (neural tube defects).

Nitrofurantoin (NFT) comes in different formulations with different pharmacologic properties. NFT should be avoided in patients with an estimated Glomerular Filtration Rate (eGFR) < 30 mL / min / 1.73 m^2. This is not due to higher toxicity, but lower efficacy due to lower concentrations of the drug in the bladder in renal dysfunction.

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Skin / Superficial Abscess **MICROBIOLOGY** *Staphylococcus aureus* Beta hemolytic streptococci (Groups A, B, C) **NOTE**: If abscess is small and without significant surrounding induration, no systemic antibiotic needed after incision and drainage (including MRSA suspicion) in both adult and pediatric patients. These antibiotic recommendations are for when those criteria are not met. Please see below	1st Line: Incision and drainage. 2nd Line: Cefodroxil 1,000 mg PO BD X 5-10 days (depending on severity) or Dicloxacillin 500 mg PO q6h X 5 -10 days (depending on severity) If concerns for MRSA: 1st Line: Doxycycline 100 mg PO BD X 5-10 days (depending on severity) or	1st Line: Incision and drainage 2nd Line: Cefodroxil 30 mg/kg PO BD X 5-10 days (depending on severity) or Dicloxacillin 50 to 100 mg/kg PO q6h X 5-10 days (depending on severity) If concerns for MRSA: 1st Line: Doxycycline 5 mg/kg/day PO in two divided doses X 5-10 days (depending on severity) or Trimethoprim-Cotrimoxazole DS 8 to 12 mg TMP/kg/day in divided	In pregnant women, beta-lactams and clindamycin are options. In pregnant women with concerns for MRSA, we would recommend the use of clindamycin (despite cost) and avoid doxycycline or Trimethoprim-Cotrimoxazole.	Cefodroxil: 3.4 INR / 500 mg tablet (68 INR / course) Cloxacillin: 1.11 INR / 250 mg tablet; 2.0 INR / 500 mg tablet Doxycycline: 0.89 INR / 100 mg tablet (24.92 INR / course) Trimethoprim-Cotrimoxazole DS: 1.32 INR / tablet (36.96 INR / course) Clindamycin: 19.31 INR / 600 mg tablet (1081.36 INR / course)

for more details.	Trimethoprim-Cotrimoxazole DS 1 tablet PO BD X 5-10 days (depending on severity)  2nd Line: Clindamycin 300 to 600 mg PO q6h X 5-10 days (depending on severity)	doses q12h X 5-10 days (depending on severity)  2nd Line: Clindamycin 40 mg/kg/day divided every q8h X 5-10 days (depending on severity)		

We generally only recommend antibiotics in addition to incision and drainage (I + D) in the following scenarios:

- Sepsis (should be admitted for IV antibiotics)
- Border of cellulitis > 5 cm from wound edge
- Immunocompromised
    - Poorly controlled HIV / AIDS
    - Poorly controlled T1 / T2DM
    - Malnourishment
    - Recent hospitalization
    - End Stage Renal Disease

In our institutional experience, Methicillin Resistant *Staphylococcus aureus* (MRSA) is very uncommon. However, increased risk of MRSA is present if patient had prior antibiotics or hospitalization in last month. Consider sending culture in these cases if available / reliable at your institution.

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Stye / Hordeola **MICROBIOLOGY** *Staphylococcus aureus* is most common pathogen; consider *Trachoma* infection where endemic	1st line: 2 weeks of warm compresses - place over affected eye for 15 min QID With associated swelling / redness of eyelid / conjunctiva (blepharoconjunctivitis): Ciprofloxacin eye drops q4h (6X/day) X 14 days OR Azithromycin (1% solution) 1 drop BD X 2 days, then 1 drop QDay X 12 days for 2-4 weeks total Consider: Depilation (hair follicle removal) if visible pus collection Consider: Incision and drainage if the	1st line: 2 weeks of warm compresses - place over affected eye for 15 min QID With associated swelling / redness of eyelid / conjunctiva (blepharoconjunctivitis): Ciprofloxacin eye drops q4h (6X/day) X 14 days OR Azithromycin (1% solution) 1 drop BD X 2 days, then 1 drop QDay X 12 days for 2 weeks total Consider: Depilation (hair follicle removal) if visible pus collection	Do NOT use doxycycline in pregnancy. Otherwise, adult treatment unchanged.	Cipro eye drops: 8 INR / 10 mL Azithromycin eye drops: Must be purchased from outside Cefodroxil: 3.4 INR / 500 mg tablet (34 INR total) Doxycycline: 0.89 INR / 100 mg tablet (17.8 INR for a 10 day course) Azithromycin: 10.41 INR / 500 mg tablet

	stye becomes large, hardens and does not resolve after 2 weeks of conservative treatment With associated pre-septal cellulitis: Cefadroxil 1,000 mg PO q12h X 5-10 days (depends on severity) Or With associated pre-septal cellulitis and concerns for MRSA (or beta-lactam allergy): Doxycycline 100 mg PO BD X 5-10 days (depends on severity) Trachoma Azithromycin 20 mg/kg PO X 1	See *Trachoma* dosing as per adult below if high clinical suspicion.		

NOTE: Post-septal cellulitis is a medical emergency and should be immediately referred to an Ear, Nose and Throat surgical consultant / specialist.

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Acute Lymphadenitis (non *Mycobaterium tuberculosis*) **MICROBIOLOGY** (for cervical, axillary, and inguinal non-STD) *Staphylococcus aureus* Beta hemolytic streptococci (Groups A, B, C)	Cervical: Cefadroxil 1,000 mg PO q12h X 5 to 7 days (30 mg/kg/day) Or Ampiclox 1,000 mg PO QID X 5 to 7 days Or Dicloxacillin 500 mg PO q6h X 5 -7 days Axillary: Same as cervical Inguinal: Non STD: Same as cervical Inguinal: STD: We recommend against empiric coverage. Determine etiology before initiation of treatment. Consider	Cervical: Cefadroxil 30 mg/kg/day PO in divided doses q12h X 5 to 7 days Or Ampiclox 50 to 100 mg/kg/day PO in four divided doses X 5 to 7 days Or Dicloxacillin 50 to 100 mg/kg PO q6h X 5-7 days Axillary: Same as cervical Inguinal: Non STD: Same as cervical	Cefadroxil and Ampiclox can be used safely in pregnancy. For some forms of lymphadenitis (specifically inguinal STD related), fetus' health must also be considered.	Cefodroxil: 3.4 INR / 500 mg tablet Ampiclox: 3.72 INR / 500 mg tablet Cloxacillin: 1.11 INR / 250 mg tablet; 2.0 INR / 500 mg tablet Lindane lotion shampoo: 3 INR / 100 mL Permethrin: 60 INR / tube Ivermectin: 6.5 INR / 6 mg tablet; 19 INR / 12 mg tablet

	Chanchroid, syphilis, LGV, HIV Disseminated: We recommend against empiric coverage. Determine etiology first. FNAC or biopsy generally good first option.	Posterior neck: Same as cervical. However, be aware of presence of head lice. Head Lice: 1st Line: Lindane lotion mixed with shampoo application once 2nd Line: Permethrin lotion mixed with shampoo application once 3rd Line (if severe infestation or not resolving with topical treatment): Ivermectin 400 mcg/kg/dose X 2 doses (Days #1 and #8)		

NOTE: We generally recommend a biopsy of all concerning lymph nodes as history and physical exam is not sufficient to differentiate lymphadenitis for other forms of lymph node pathology. If there is associated abscess with lymphadenitis, incision and drainage should be performed. In both instances, if possible, pus or tissue should be sent for pathology / microbiology testing.

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Acute Tonsillo-pharyngitis **MICROBIOLOGY** Often viral Streptococcus in particular groups A, C, G NOTE: In some settings, as long as non-toxic and no abscess present can treat symptomatically if no group A strep is isolated and Centor Criteria (see below) not met. Due to issues with follow-up, we suggest this only be used with carefully selected Indian patients. For others, consider limiting to a five day total course of oral antibiotics or use benzathine Penicillin.	1st Line: Amoxicillin 500 mg PO TID X 10 days Or Benzathine Penicillin G 1.2 million IU IM X 1 2nd Line: Cefadroxil 1,000 mg PO q12h X 5 days If beta lactam allergy: Azithromycin 500 mg PO X 1 dose followed by 250 mg PO QDay X 4 days (for 5 days total)	1st Line: Amoxicillin 40 mg/kg/day PO in three divided doses X 10 days Or Benzathine Penicillin G If <= 27 kg: 600,000 IU IM X 1 If > 27 kg: 1.2 million IU IM X 1 2nd Line: Cefadroxil 30 mg/kg/day PO in two divided doses X 5 days If severe type 1 hypersensitivity to beta lactams: Azithromycin 12 mg/kg/dose (maximum 500 mg/dose) orally on day 1 followed by 6 mg/kg/dose (maximum 250 mg/dose) orally on days 2 through 5	Both 1st, 2nd and 3rd line options are safe in pregnancy.	Amoxicillin: 2.12 INR / 500 mg tablet (63.6 INR / course) Cefodroxil: 3.4 INR / 500 mg tablet (34 INR / course) Azithromycin: 10.41 INR / 500 mg tablet (31.23 INR / course)

Where available, we recommend use of pharyngeal cultures or rapid tests to confirm group A streptococcal infection in acute tonsillopharyngitis. Where not available, the Centor criteria can be used to guide treatment decisions.

Centor Criteria (not fully validated in Indian setting):

- Fever
- Lack of cough
- Tender anterior cervical lymphadenopathy
- Enlarged, purulent tonsils

If 3 or 4 of these criteria are present, we strongly recommend empiric treatment. If 2 criteria are present, we recommend testing. If testing is not available, a clinical decision must be made as to whether empiric treatment should be offered with close follow up. If only 0 or 1 criteria are met, one can hold on treating group A streptococcal infection.

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Sinusitis **MICROBIOLOGY** Viral When bacterial, > 75% caused by *Streptococcus pneumoniae* or *Haemophilus influenzae*. Less common: *Moraxella catarrhalis, Staphylococcus aureus,* Anaerobes, Other Streptococci species < 14 days we would recommend AGAINST the use of antibiotics. Instead, treat with steam inhalation. Please follow these recommendations for > 14 days of symptoms and consider referral to Ear, Nose and Throat specialist for evaluation of anatomical abnormalities.	1st line Amoxicillin / Clavulanate 625 mg PO BD x 7 days Or (Especially if severe type 1 hypersensitivity Penicillin allergy) Doxycycline 100 mg PO BD X 7 days Or (Especially if severe type 1 hypersensitivity Penicillin allergy but ONLY if no other option and no TB) Levofloxacin 500 mg PO QDay X 7 days NOTE: Cotrimoxazole not recommended due to high rates of *H. influenza* resistance. Azithromycin not recommended due to high rates of *S. pneumoniae* resistance.	1st Line: Amoxicillin 40 mg/kg/day PO in three divided doses X 10 days (If no improvement on amoxicillin consider Amoxicillin / Clavulanate (with 40mg/kg/day of amoxicillin in 3 divided doses) for coverage of beta lactamase producing strains of H. flu, Moraxella and Staph aureus) 2nd Line: Cefixime 10 mg/kg/day in PO BD divided doses X 7 day	Would recommend against the use of doxycycline and levofloxacin during pregnancy. If anaphylaxis to beta-lactam, decision must be made on case-by-case basis. Levofloxacin is pregnancy class C and doxycycline pregnancy class D. If non-severe beta lactam allergy, would recommend: Cefixime 400 mg PO QDay X 7 days	Amoxicillin / Clavulanate 12.27 INR / 625 mg tablet (171.78 INR / course) Doxycycline: 0.89 INR / 100 mg tablet (24.92 INR / course) Levofloxacin 3.95 INR / 500 mg tablet (27.65 INR / course) Amoxicillin: 2.12 INR / 500 mg tablet Cefixime: 5.27 INR / 200 mg tablet (73.78 INR)

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Dysentery - MICROBIOLOGY *Shigella* *Salmonella* *Campylobacter* *Escherichia coli* 0157 Amebiasis **NOTE:** Remember there is an increased risk of HUS/TTP if patient with *E. coli* 0157 if treated with antibiotics. However, this test will be unavailable in many Indian settings. Initial workup must include 1) assessment of vital signs / hydration status and 2) stool microscopy (bacterial vs amoebic). In unclear cases, would	IV fluids as needed based on clinical exam Amoebic (*E. histolytica*): 1st Line: Metronidazole 400 mg PO TID (can give IV if patient cannot take PO) X 3-7 days AND Paromomycin (if available) 25-30 mg/kg/day in 3 divided doses X 5 – 10 days OR Metronidazole 400 mg PO TID X 7 – 10 days (if paromomycin not available) 2nd Line: If treatment fails, retreat with metronidazole given very low rates of *E. histolytica* resistant to this drug. Bacterial: 1st Line:	IV fluids as needed based on clinical exam Amoebic (*E. histolytica*): 1st Line: Metronidazole 7.5 to 10 mg/kg/dose PO TID (can give IV if patient cannot take PO) X 3-7 days Bacterial: 1st Line (for children > 12 years old): Ciprofloxacin 7.5 to 10 mg/kg/dose PO BD X 3 days	In pregnancy, do not use ciprofloxacin.	Metronidazole: 0.69 INR / 400 mg tablet (6.21 INR / 3 day course) Paromomycin: Non-formulary (must be purchased from outside pharmacy) Ciprofloxacin: 1.66 INR / 500 mg tablet (9.96 INR / course) Cefixime: 5.6 INR / 200 mg tablet (56 INR / course) Azithromycin: 5.06 INR / 250 mg tablet; 10.41 INR / 500 mg tablet (20.53 INR / course)

recommend treatment for both amoebic and bacterial causes of dysentery. NOTE: We would recommend against the use of antibiotics in cases of diarrhea without blood with exception of hanging drop positive or known cholera exposure (i.e. a village with a known cholera outbreak).	Ciprofloxacin 500 mg PO BD X 3 days 2nd Line: Cefixime 200 mg PO BD X 5 days Traveler's Diarrhea: Azithromycin 500 mg PO QDay X 3 days Known Shigella: Azithromycin 1,000 – 1,500 mg PO QDay X 1 – 5 days	2nd Line (or 1st Line if children < 12 years old): Cefixime10 mg/kg/day in PO BD divided doses X 5 days Or Azithromycin 10 mg/kg/day PO QDay on Day #1 followed by 5 mg/kg/day PO QDay on Days #2 and #3 Azithromycin can also be used for pediatric traveler's diarrhea.		

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Scabies with Superinfection Perform all mite eradication activities on same day. Treat all family members and close contacts at the same time Please treatment superinfection prior to treatment with topical creams. If need simultaneous PO treatment, would recommend ivermectin (listed as 3rd line)	For scabies: Regardless of which treatment is used, wash all clothing / bedding with hot water 1st Line: Lindane lotion (Gammabenzyl-hexachloride) apply once topically from neck to feet (all family members). 2nd Line: Permethrin cream 5% apply twice from neck to feet (all family members) on 1st day and one week later 3rd Line: Ivermectin 200 mcg/kg PO QDay twice on Day #1 and Day #7 Superinfection: (please refer to “Cellulitis”)	For scabies: Do NOT use Lindane lotion for children < 15 kg or < 12 years old 1st Line: Permethrin cream 5% apply twice from face to feet (all family members) on 1st day and one week later (clean permethrin from face in < 8 hours) 2nd Line: Repeat treatment with permethrin cream Superinfection: (please refer to “Cellulitis”)	Do NOT use Lindane lotion in pregnant or lactating mothers. Permethrin cream (per Adult dosing) is first line in pregnant women.	Lindane Lotion: 5 INR / 60 mL (dose for 1 person) Permethrin cream: 55 INR / 30 gm (dose for 1 person)

Please see instructions concerning application and use of Lindane lotion and Permethrin cream at end of book.

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Concern for Enteric Fever Recommend against use of fluoroquinolones (FQ) in Asia due to resistance and poorer outcomes with use of FQ in patients with nalidixic acid resistance (which is prevalent). **MICROBIOLOGY** *Salmonella enterica* serotype Typhi or Paratyphi	1st Line: Azithromycin 1,000 mg PO first dose then 500 mg PO QDay X 5 to 7 days OR Cefixime 200 mg PO BD X 10 to 14 days  2nd Line / Severe: Ceftriaxone 2,000 mg IV QDay X 7 to 14 days NOTE: While debated, if concern for CNS process or shock, consider Dexamethasone 3 mg/kg first dose followed by 1mg/kg every 6 hours x 48 hours **If ileal perforation suspected, surgical exploration required	1st Line: Cefixime 20 mg/kg/day mg PO BD in two divided doses  2nd Line: Ceftriaxone 50 to 100 mg/kg IV QDay OR Azithromycin 10 mg/kg PO QDay X 7 days	Same as adult treatment	Cefixime: 5.59 INR / 200 mg tablet (336 INR / course) Ceftriaxone: 21.95 INR / 1 gram (614.6 INR / course) Azithromycin: 10.41 INR / 500 mg tablet (72.87 INR / course)

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Cellulitis- non-purulent **MICROBIOLOGY** *Streptococcus pyogenes* (A, B, C, G) *Staphylococcus aureus* – rare when there is NO purulence If abscess is present please I+D. If there is purulence then consider covering for Methicillin-sensitive and Methicillin-resistant *Staphylococcus aureus* (MSSA and MRSA, respectively) NOTE: If simultaneously tinea infection at site of cellulitis, please treat with clotrimazole cream topical BD X 2-4 weeks	1st Line: Cefadroxil 1,000 mg PO BD X 5-10 days based on severity OR Dicloxacillin 500 mg PO q6h X 5-10 days based on severity If non-anaphylaxis Penicillin allergy: Cephalexin 500 mg PO QID x 5-10 days based on severity If concerns for MRSA / Penicillin Anaphylaxis allergy: 1st Line: Doxycycline 100 mg PO BD X 5-10 days based on severity OR Trimethoprim-Cotrimoxazole DS 1 tablet PO BD X 5-10 days based on severity 2nd Line: Clindamycin 300 to 600 mg PO q6h X 5-10 days based on severity	1st Line: Cefodroxil 30 mg/kg PO BD X 5 days 2nd Line: Dicloxacillin 50 to 100 mg/kg PO q6h X 5 days If concerns for MRSA: 1st Line: Doxycycline 5 mg/kg/day PO in two divided doses X 5-10 days or Trimethoprim-Cotrimoxazole DS 8 to 12 mg TMP/kg/day in divided doses q12h X 5-10 days 2nd Line: Clindamycin 40 mg/kg/day divided every q8h X 5-10 days	In pregnant women, please do not use doxycycline. All first line options are safe options. In pregnant women with concerns for MRSA, we would recommend the use of clindamycin (despite cost).	Cefodroxil: 3.4 INR / 500 mg tablet (68 INR / course) Cloxacillin: 1.11 INR / 250 mg tablet; 2.0 INR / 500 mg tablet Doxycycline: 0.89 INR / 100 mg tablet (24.92 INR / course) Trimethoprim-Cotrimoxazole DS: 1.32 INR / tablet (36.96 INR / course) Clindamycin: 19.31 INR / 600 mg tablet (1,081.36 INR / course)

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Community Acquired Pneumonia / Lower Respiratory Tract Infection **MICROBIOLOGY** *Streptococcus pneumoniae* *Haemophilus influenzae* (COAD / COPD, bronchiectasis, alcoholism) *Moraxella cattarhalis* (COAD / COPD) *Chlamydophila* species *Mycoplasma* species Less common: *Legionella* species *Coxiella burneti* If no improvement on these treatments, appropriate to work up tuberculosis.	1st Line: Doxycycline 100 mg PO BD X 7 days 2nd Line: Azithromycin 500 mg PO QDay X 3 days (or 500 mg PO QDay on 1st day followed by 250 mg PO QDay X 2nd to 5th day)	1st Line: Amoxicillin 40-50 mg/kg/day PO in two divided doses X 5 days Unless suspicion for resistant pneumococcal disease then Amoxicillin 90 mg/kg/day PO in two divided doses X 5 days 2nd Line: Azithromycin 10 mg/kg/day PO QDay X 3 days For doxycycline: Only to be used in children >= 8 years old	Would recommend the use of Azithromycin as first line.	Doxycycline: 0.89 INR / 100 mg tablet (7.12 INR / course) Azithromycin: 10.41 INR / 500 mg tablet (31.23 INR / course) Amoxicillin: 2.12 INR / 500 mg tablet

These outpatient recommendations are for individuals appropriate for outpatient therapy. Consider outpatient therapy in those who are NOT: 1) confused, 2) tachypneic (RR <= 30), 3) hypotensive or 4) elderly (<= 65 years old).

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Finger Pulb Abscess ("Felon") If concern that finger pulp abscess has extended into deep structures of the finger, consult with a surgical specialist prior to incision and drainage.	1st Line: Incision and drainage 2nd Line: Cefodroxil 1,000 mg PO BD X 5 -10 days based on severity Or Dicloxacillin 500 mg PO q6h X 5-10 days based on severity If concerns for MRSA: 1st Line: Doxycycline 100 mg PO BD X 5-10 days based on severity Or Trimethoprim-Cotrimoxazole DS 1 tablet PO BD X 5-10 days based on severity 2nd Line: Clindamycin 300 to 600 mg PO q6h X 5-10 days based on severity	1st Line: Incision and drainage 2nd Line: Cefodroxil 30 mg/kg PO BD X 5-10 days based on severity or Dicloxacillin 50 to 100 mg/kg PO q6h X 5-10 days based on severity If concerns for MRSA: 1st Line: Doxycycline 5 mg/kg/day PO in two divided doses X 5-10 days based on severity Or Trimethoprim-Cotrimoxazole DS 8 to 12 mg TMP/kg/day in divided doses q12h X 5-10 days based on severity 2nd Line: Clindamycin 40 mg/kg/day divided every q8h X 5-10 days based on severity	In pregnant women, either of the 2nd line options are possible. In pregnant women with concerns for MRSA, we would recommend the use of clindamycin (despite cost).	Cefodroxil: 3.4 INR / 500 mg tablet (68 INR / course) Cloxacillin: 1.11 INR / 250 mg tablet; 2.0 INR / 500 mg tablet Doxycycline: 0.89 INR / 100 mg tablet (24.92 INR / course) Trimethoprim-Cotrimoxazole DS: 1.32 INR / tablet (36.96 INR / course) Clindamycin: 19.31 INR / 600 mg tablet (1,081.36 INR / course)

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Stomach / Duodenal Ulcer related to *Helicobacter pylori* infection For patients with epigastric burning without clear signs / symptoms of ulcer, would recommend initial empiric antacid treatment (H2 blocker then PPI) as long as NO RED FLAGS (see below). Should these fail, would recommend treatment for *H. pylori* related peptic / duodenal ulcer disease. If pain heavily affected by eating (either better or worse), would recommend empiric treatment for *H. pylori*. If evidence on endoscopy of gastric or duodenal ulcer, would recommend empiric treatment for *H. pylori*. If serologic / breath / stool testing available, would recommend testing and, if	This regimen requires buying clarithromycin: Omeprazole 20 mg PO BD + Amoxicillin 1,000 mg PO BD + Metronidazole 500 mg PO TID + Clarithromycin 500 mg PO BD  X 14 days (all) OR This regimen requires buying bismuth: Bismuth subsalicylate 262 mg 2 tabs PO QID or Colloidal Bismuth subcitrate 120 mg 2 tabs PO BD +	In children, cases often do not present as gastric / duodenal ulcer but instead antral gastritis or iron deficiency. 1st Line: Omeprazole 1 mg/kg until > 20 kg weight; then 20 mg PO OD X 2 weeks Clarithromycin 15 mg/kg PO BD  in divided doses (7.5 mg/kg/dose) Amoxicillin 40 mg/kg/day PO in three divided doses X 14 days Can consider substituting metronidazole for clarithromycin	In pregnancy or children < 8 years old, do not use tetracycline or doxycycline (instead substitute triple therapy (1st line)) Otherwise regimens are the same	Omeprazole: 0.74 INR / 20 mg tablet Clarithromycin: 5.0 INR / 500 mg tablet Amoxicillin: 2.12 INR / 500 mg tablet Metronidazole: 0.69 INR / 500 mg tablet Levofloxacin: 3.04 INR / 250 mg tablet Bismuth: Available OTC Tetracycline: 1.4 INR / 500 mg tablet Doxycycline: 0.89 INR / 100 mg tablet For triple therapy (PPI / amoxicillin / metronidazole): 158.76 INR / course

positive, treatment. Breath and stool testing can be used as confirmation of successful cure, while serologic / antibody tested cannot be used to demonstrate cure. Increasing rates of both clarithromycin and metronidazole resistance are being reported.  RED FLAGS FOR ACID PEPTIC DISEASE PAIN: - Unexplained weight loss - Persistent vomiting - Hematemesis - New onset > 55 years old - Worsening dysphagia / odynophagia If present, concern for gastric cancer – refer for endoscopy.	Omeprazole 20 mg PO BD + Metronidazole 500 mg PO TID + Tetracycline 500 mg PO QID  X 14 days (all) If recurrent issues, can consider trying the other first line regimen a second time and encourage compliance. If not done so already, use the bismuth containing regimen. There is no evidence for triple therapy with PPI / amoxicillin / metronidazole but can be considered as a possibility in low resource settings / when	Metronidazole 30 mg/kg/day in 4 divided doses		For triple therapy (PPI / clarithromycin / amoxicillin): 377.44 INR / course For quadruple therapy without Bismuth (OTC) (PPI / Tetracycline / Metronidazole): 99.1 INR / course (without Bismuth) For quadruple therapy without Bismuth (OTC) (PPI / Doxycycline / Metronidazole): 64.96 INR / course (without Bismuth)

	cost is an issue. Similarly, PPI / amoxicillin + (clarithromycin OR metronidazole) are triple therapy options but less likely to be successful.			

Disease Process	Adult (1st and 2nd Line)	Pediatrics (1st and 2nd Line)	Pregnancy	Price (per tablet / per adult course)
Odontogenic infection / Periapical tooth abscess - MICROBIOLOGY *Streptococci viridans* species Anaerobes (*Peptostreptococci, Fusobacteria, Prevotella, Actinomyces*) *Streptococcus pyogenes* Immunocompromised: *Staphylococcus aureus* Gram negative rods Use warm compresses for pain relief. Beware Ludwig's angina (closed space infection of the submandibular space). This is a surgical emergency.	1st Line: Cefadroxil 1,000 mg PO BD X 7 days AND Metronidazole 400 mg PO TID X 7 days 2nd Line: Amoxicillin / Clavulanic acid 625 mg PO TID X 5 days Recommendation for source control with incision and drainage and removal of culprit tooth / teeth via surgical approach. We recommend treatment with antibiotics prior to any tooth removal.	1st Line: Cefadroxil 30 mg/kg/day PO in two divided doses BD X 7 days 2nd Line: Metronidazole 10 mg/kg/dose PO TID X 7 days 2nd Line: Amoxicillin / clavulanic acid 10 mg/kg/dose (of amoxicillin equivalents) PO TID X 5 days	Safe to use all aspects of 1st and 2nd line during pregnancy but would recommend against metronidazole in the 1st trimester.	Cefadroxil: 3.4 INR / 500 mg tablet (95.2 INR / course) Metronidazole: 0.69 INR / 400 mg tablet (14.49 INR / course) Amoxicillin / clavulanic acid: 13.1 INR / 625 mg tablet (196.5 INR / course)

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

Amoxcillin: Allergies, GI side effects (diarrhea)

Amoxicillin / Clavulanate: Diarrhea / GI upset

Ampiclox: Beware allergies and GI issues (diarrhea)

Azithromycin: Gastritis / diarrhea (especially at high issues), palpitations

Cefadroxil: Allergies, GI side effects

Cefixime: Gastrointestinal issues / allergies

Ceftriaxone: Gastrointestinal issues / allergies

Ciprofloxacin: Gastrointestinal issues, cardiac conduction abnormalities, musculoskeletal issues, ocular lens dislocation

Clarithromycin: Gastrointestinal issues; bad taste

Clindamycin: Diarrhea, including *C. difficile*

Dicloxacillin: Allergies

Doxycycline: Pill Esophagitis; do NOT use if < 12 years old

Fluoroquinolones (as a class): A growing body of evidence cautions against the use of fluoroquinolones due to both musculoskeletal and nervous system side effects. We would also recommend against the use of fluoroquinolones for the treatment of enteric fever (see above).

Gentamicin (ear drops) – minor concern for hearing loss

Ivermectin: Beware serious allergic reactions.

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).**

Lindane lotion: Do NOT use in children < 12 years old or children < 15 kg (increased risk of seizures and death) or pregnant / lactating mothers. Lindane lotion has a sweet smell and is sometimes ingested by small children accidentally. If this occurs, medical attention should be immediately sought. Lindane lotion should not be used more than once. *Instructions*: Use maximum 1 ounce of active medicine. Wash off after 4 minutes. Caregiver should wear gloves and immediately, thoroughly wash hands after application.

Metronidazole: Bad taste; MUST BE DOSE ADJUSTED IN HEPATIC FAILURE

Nitrofurantoin (NFT): Gastritis / Hemolytic anemia in G6PD deficiency

Paromomycin: GI complaints

Permethrin: Do NOT use in children < 2 years old; serious neurologic side effects including seizures usually after repeat use. Can also cause local skin irritation. *Instructions:* Wash hair then towel dry. Apply permethrin to saturate hair/scalp. Leave on for no longer than 10 minutes, then rinse. May repeat after 7 days if lice/nits still present

Penicillins (as a class): While most penicillins should be taken on an empty stomach, this is especially true for dicloxacillin. Further, strict adherence to q6h dosing is necessary due to short half life.

Tetracycline: Diarrhea; Do NOT use in pregnancy or children < 8 years old

Trimethoprim-Cotrimoxazole: Steven Johnson Syndrome

Common Side Effects (Non-Antibiotics)

Bismuth: Horrible taste

Omeprazole: Increased risk of iatrogenic severe diarrhea

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.

Abbreviations (Pharmacy and Otherwise):

BD – twice a day / every 12 hours
CNS – Central Nervous System
COAD – Chronic Obstructive Airway Disease
COPD – Chronic Obstructive Pulmonary Disease
CSOM - Chronic Suppurative Otitis Media
DS – Double Strength
eGFR – Estimated Glomerular Filtration Rate
FNAC – Fine Needled Aspiration Cytology
FQ - Fluoroquinolone
H2 – Histamine 2 (a receptor that some medicines target)
HIV / AIDS – Human Immunodeficiency Virus / Acquired Immune Deficiency Syndrome
HUS / TTP – Hemolytic Uremic Syndrome / Thrombotic thrombocytopenic purpura
I + D – Incision and drainage
IM - Intramuscular
INR – Indian rupees
IU – International Units
IV - Intravenous
Kg – kilogram
LGV – Lymphogranuloma venerum
m2 - meters squared
mg – milligrams
min - minute
mL - milliliters
MRSA- Methicillin resistant Staphylococcus aureus
MSSA - Methicillin sensitive Staphylococcus aureus
NFT - Nitrofurantoin
OTC – Over the counter
PO – by mouth
PPI – Proton Pump Inhibitor
q#h / q(Number)h – every # hours / every (Number) hours – used to describe the frequency with which a medicine should be administered
QDay – every day / every 24 hours
QID – four times per day
RR – Respiratory rate
STD – Sexually Transmitted Infection
T1 / T2DM – Type 1 / Type 2 Diabetes mellitus
TID – three times per day / every 8 hours
TMP – Trimethoprim (used as a dosing equivalent)
UTI – Urinary Tract Infection

> - greater than
< - less than
>= - greater than or equal to
<= - less than or equal to