TABLE 1 (14)

ANATOMIC SITE/DIAGNOSIS/ MODIFYING CIRCUMSTANCES	ETIOLOGIES (usual)	SUGGESTED REGIMENS* PRIMARY	SUGGESTED REGIMENS* ALTERNATIVE§	ADJUNCT DIAGNOSTIC OR THERAPEUTIC MEASURES AND COMMENTS
FOOT				
"Diabetic foot"—Two thirds of patients have triad of neuropathy, deformity and pressure-induced trauma. IDSA Guidelines *CID 54:e132, 2012.*				
Ulcer without inflammation	Colonizing skin flora	No antibacterial therapy.		**General:** 1. Glucose control, eliminate pressure on ulcer 2. **Assess for peripheral vascular disease** 3. Caution in use of TMP-SMX in patients with diabetes, as many have risk factors for hyperkalemia (e.g., advanced age, reduced renal function, concomitant medications). 4. Improved outcomes in healing of diabetic foot ulcer with negative-pressure wound therapy (See *Curr Opin Infect Dis 29:145, 2016* for review). **Principles of empiric antibacterial therapy:** 1. Obtain culture; cover for MRSA in moderate, more severe infections pending culture data, local epidemiology. 2. Severe limb and/or life-threatening infections require initial parenteral therapy with predictable activity vs. Gm-positive cocci including MRSA, coliforms & other aerobic Gm-neg. rods, & anaerobic Gm-neg. bacilli. Other alternatives exist & may be appropriate for individual patients. 3. Risk of associated osteomyelitis is increased if ulcer area >2 cm^2, positive probe to bone *(CID 2016,63:944),* ESR >70 and abnormal plain x-ray. MRI is best imaging modality.
Mild infection	*S. aureus (assume MRSA), S. agalactiae (Gp B), S. pyogenes predominate*	Oral therapy: (**Amox-clav** extended release 2000/125 po bid + **TMP-SMX**-DS 1-2 tabs po bid) or [(**CIP** 750 mg po bid or **Levo** 750 mg po q24h or **Moxi** 400 mg po q24h) + (**Linezolid** 600 mg po bid)]		
Moderate infection. **Osteomyelitis** *See Comment.*	As above, plus coliforms possible	**Oral:** As above Parenteral therapy [based on prevailing susceptibilities]: (**Amp-sulb** 3 gm IV q6h or **Erta** 1 gm IV q24h) + **Vanco** 15-20 mg/kg IV q8-12h to achieve preferred target AUC_{24} 400-600 µg/mL x hr until MRSA is excluded. *Dosages in footnotes* [4]		
Extensive local inflammation plus systemic toxicity.	As above, plus anaerobic bacteria. Role of enterococci unclear.	**Parenteral therapy: Vanco** 15-20 mg/kg IV q8-12h to achieve preferred target AUC_{24} 400-600 µg/mL x hr + **Pip-tazo** 3.375 gm IV q6h (or 4.5 gm IV q8h or 4-hour infusion of 3.375 gm q8h) OR **Vanco** as above + (**IMP** 0.5 gm IV q6h or **MER** 1 gm IV q8h) *Dosages in footnote* [4] **Assess for arterial insufficiency!**		
Onychomycosis: *See Table 11, page 148, fungal infections*				
Puncture wound *See J Am Podiatr Med Assoc. 2020 Nov 2;20-206.*	*P. aeruginosa, S. aureus, Strept*	Cleanse. Tetanus booster. Observe.		*See Osteomyelitis, page 5.* 1-2% evolves to osteo.
GALLBLADDER				
Cholecystitis, cholangitis, biliary sepsis, or common duct obstruction (partial: 2nd to tumor, stones, stricture).	Enterobacteriaceae 68%, enterococci 14%, bacteroides 10%, Clostridium sp. 7%, rarely candida	(**Pip-tazo** or **ERTA**) If life-threatening: **IMP** or **MER** or **DORI**	(**P Ceph 3*** + **Metro**) or (**Aztreonam*** + **Metro**) or (**CIP*** + **Metro**) or **Moxi** *Dosages in footnote* [4] * Add **Vanco** for empiric activity vs. enterococci	• Establish adequate biliary drainage, surgical, percutaneous or ERCP-placed stent, in more severely ill patients. No benefit to continuation of antibiotics after surgery in pts with acute calculous cholecystitis *(JAMA 3312:145, 2014).* • Increasing FQ resistant *E. coli* limits utility of FQ regimens for empiric therapy. Choice should be guided by local susceptibility profiles. • Avoid Amp-sulb due to high levels of resistance among *E. coli* isolates.

[4] **Vanco** 15-20 mg/kg IV q8-12h to achieve preferred target AUC_{24} level of 400-600 µg/mL x hr, **Parenteral β-lactam/β-lactamase inhibitors**; **Amp-sulb** 3 gm IV q6h, **Pip-tazo** 3.375 gm IV q6h or 4.5 gm IV q8h or 4 hr infusion of 3.375 gm q8h; **carbapenems: Doripenem** 500 mg (1-hr infusion) q8h, **ERTA** 1 gm IV q24h, **IMP** 0.5 gm IV q6h, **MER** 1 gm IV q8h, **Dapto** 6 mg per kg IV q24h, **Linezolid** 600 mg IV q12h, **Aztreonam** 2 gm IV q8h. **CIP** 400 mg IV q12h, **Levo** 750 mg IV q24h, **Moxi** 400 mg IV q24h, **Metro** 1 gm IV loading dose & then 0.5 gm IV q6h or 1 gm IV q12h.

Abbreviations on page 2. **NOTE: All dosage recommendations are for adults (unless otherwise indicated) and assume normal renal function. § Alternatives consider allergy, PK, compliance, local resistance, cost.*

TABLE 1 (15)

ANATOMIC SITE/DIAGNOSIS/ MODIFYING CIRCUMSTANCES	ETIOLOGIES (usual)	SUGGESTED REGIMENS* PRIMARY	SUGGESTED REGIMENS* ALTERNATIVE§	ADJUNCT DIAGNOSTIC OR THERAPEUTIC MEASURES AND COMMENTS
GASTROINTESTINAL				
Gastroenteritis—Empiric Therapy (laboratory studies not performed or culture, microscopy, toxin results NOT AVAILABLE) ***NEJM 370:16, 2014*****; IDSA Guideline (Diarrhea):** ***CID 2017,65:1963 & e45.***				
Premature infant with necrotizing enterocolitis	Associated with intestinal flora	Treatment should cover broad range of intestinal bacteria using drugs appropriate to age and local susceptibility patterns, rationale as in diverticulitis/peritonitis, *page 24.*		Pneumatosis intestinalis, if present on x-ray confirms diagnosis. Bacteremia-peritonitis in 30–50%. If Staph. epidermidis isolated, add vanco (IV). For review and general management, *see NEJM 364:255, 2011.*
Mild diarrhea 1-2 unformed stools per day	Bacterial *(see Severe, below)*, viral (norovirus), parasitic. Viral usually causes mild to moderate disease.	Fluids only + lactose-free diet, avoid caffeine		**Rehydration: For po fluid replacement,** *see Cholera, page 21.* **Antimotility** (Do not use if fever, bloody stools, or suspicion of HUS): Loperamide (Imodium) 4 mg po, then 2 mg after each loose stool to max. of 16 mg per day. Bismuth subsalicylate (Pepto-Bismol) 2 tablets (262 mg) po qid. **Hemolytic uremic syndrome (HUS):** Risk in **children** infected with E. coli 0157:H7 is 8–10%. Early treatment with TMP-SMX or FQs ↑ risk of HUS. **Norovirus:** Etiology of over 90% of non-bacterial diarrhea (± nausea/ vomiting). Lasts 12-60 hrs. Hydrate. No effective antiviral. **Other potential etiologies (parasitic):** Cryptosporidia—no treatment in immunocompetent host. Cyclospora—usually chronic diarrhea, responds to TMP-SMX *(see Table 13A).* Klebsiella oxytoca identified as cause of antibiotic-associated hemorrhagic colitis (cytotoxin positive): *NEJM 355:2418, 2006.*
Moderate diarrhea 3-5 unformed stools per day	For traveler's diarrhea, *see page 22*	Antimotility agents *(see Comments)* + fluids		
Severe diarrhea (≥6 unformed stools/day, &/or temp ≥101°F, tenesmus, blood, or fecal leukocytes). **NOTE: Severe afebrile bloody diarrhea should ↑ suspicion of Shiga-toxin E. coli 0157:H7 & others** *(MMWR 58 (RR-12):1, 2009).*	Shigella, salmonella, C. jejuni, Shiga toxin + E. coli, toxin-positive C. difficile, Klebsiella oxytoca, E. histolytica, Vibrio sp. *For typhoid fever, see page 68*	(**CIP** 500 mg po q12h or **Levo** 500 mg q24h) x 3–5 days **Azithro** 1000 mg po once or 500 mg q 24h x 3 days preferred for Campylobacter and disease acquired in Southeast Asia. If C. difficile is suspected (e.g., recent antibiotic use) add **Fidaxomicin** 200 bid x 10 days or **Vanco** 125 mg po qid x 10–14 days. **Metro** 500 mg po tid no longer treatment of choice for C. difficile but may be effective in milder cases.	**TMP-SMX**-DS po bid x 3–5 days. Campylobacter resistance to TMP-SMX is common in the tropics. *C. diff* recommendations changed: See *CID 73:755, 2021 or Med Let 63:137, 2021*	
		If recent antibiotic therapy (C. difficile toxin colitis possible) promptly test stool for C. diff. toxin		
Gastroenteritis—Specific Therapy (results of culture, microscopy, toxin assay AVAILABLE) Ref.: *NEJM 370:1532, 2014*; IDSA infectious diarrhea guideline *(CID 2017,65:1963).*				
If culture negative, probably **Norovirus (Norwalk)** other virus *(EID 17:1381, 2011) — see Norovirus, page 200* **NOTE**: WBC >15,000 suggestive of C. difficile in hospitalized patient.	**Aeromonas/Plesiomonas**	**CIP** 750 mg po bid x 3 days.	**TMP-SMX DS** tab 1 po bid x 3 days	Aeromonas ref: *Eur J Clin Microbiol ID. 36:1393, 2017.*
	Amebiasis (Entamoeba histolytica, Cyclospora, Cryptosporidia and **Giardia)**, *see Table 13A*			
	Campylobacter jejuni History of fever in 53-83%. Self-limited diarrhea in normal host.	**Azithro** 500 mg po q24h x 3 days OR 1000 mg po one dose	**Erythro stearate** 500 mg po qid x 5 days or **CIP** 500 mg po bid (CIP resistance increasing) *(CID 2017;65:1624).*	**Post-Campylobacter Guillain-Barré;** assoc. 15% of cases. **Reactive arthritis** another potential sequelae. *See Traveler's diarrhea, page 22.*
	Campylobacter fetus Diarrhea uncommon. More systemic disease in debilitated hosts. Don't treat immunocompetent.	**IMP** 500 mg IV q 6 or **MER** 1 gm IV q8	**AMP** 100 mg/kg/day IV div q6h or **Gent** 5 mg/kg IV q 24. **Erta** 1 gm q24	Draw blood cultures. In bacteremic pts, FQ resistance common in *C. fetus*. Meropenem inhibits C. fetus at low concentrations in vitro. Clinical review: *CID 58:1579, 2014.*

Abbreviations on page 2. **NOTE: All dosage recommendations are for adults (unless otherwise indicated) and assume normal renal function. § Alternatives consider allergy, PK, compliance, local resistance, cost.*

TABLE 1 (16)

ANATOMIC SITE/DIAGNOSIS/ MODIFYING CIRCUMSTANCES	ETIOLOGIES (usual)	SUGGESTED REGIMENS* PRIMARY	SUGGESTED REGIMENS* ALTERNATIVE§	ADJUNCT DIAGNOSTIC OR THERAPEUTIC MEASURES AND COMMENTS
GASTROINTESTINAL/Gastroenteritis—Specific Therapy (results of culture, microscopy, toxin assay AVAILABLE) *(continued)*				
Differential diagnosis of toxin-producing diarrhea: • *C. difficile* • *Klebsiella oxytoca* • *S. aureus* • Shiga toxin producing *E. coli* (STEC) • Enterotoxigenic *B. fragilis* IDSA Guidelines *(C. diff): CID 2018,66:987* Revised focused guidelines: *CID 73:755, 2021; Med Lett 63:137, 2021*	**C. difficile toxin positive antibiotic-associated colitis. Probiotics:** Cochrane review found moderate quality evidence the probiotics prevents C. diff. associated diarrhea *(Cochrane Database Syst Rev. 2017 Dec 19;12:CD006095).*			
	po meds okay; WBC <15,000; no increase in serum creatinine.	**Fidaxomicin** 200 mg po bid x 10 days or **Vanco** 125 mg po qid x 10-14 days	*See Comment*	**D/C antibiotic if possible; avoid antimotility agents, hydration, enteric isolation.** Recent review suggests antimotility agents can be used cautiously in certain pts with mild disease who are receiving rx *(CID 48: 598, 2009).* **Relapse in 10-20%.** Note: **Metro 500 mg tid no longer recommended as first-line therapy.**
	po meds okay; Sicker; WBC >15,000; ≥50% increase in baseline creatinine	**Fidaxomicin** 200 mg po bid x 10 days or **Vanco** 125 mg po qid x 10 days. For oral use of IV Vanco, *see Table 10A, page 124.*	**Fidaxomicin** 200 mg po bid x 10 days	**Vanco superior to metro in sicker pts.** Relapse in 10-20%. Fidaxomicin had lower rate of recurrence than Vanco for diarrhea with non-NAP1 strains *(N Engl J Med 364:422, 2011).* Bezlotoxumab 1 dose IV + standard rx reduced relapse rate 11-14% *(NEJM 2017, 376:305).*
	Post-treatment relapse. Ideally use a regimen not used previously.	**Fidaxomicin** 200 mg po bid x 10 days or **Vanco** 125 mg po qid x 10-14 days, then immediately start taper *(See Comments)*	**Fidaxomicin** 200 mg po bid x 10 days then 200 mg po qod x 20 days	**Vanco taper** (all doses 125 mg po): week 1 – tid, week 2 – bid week 3 – q24h week 4 – q48h, week 5 – q72h. Ref: *CID 2017;65:1624.* **Fecal transplant** efficacious but safety warnings: transmission of MDR bacteria, COVID-19 *(CID 73:e1621, 2021).* **Bezlotoxumab**, anti C. diff toxin B approved and recommended in 2021 IDSA focused guidelines, decreases recurrence 10% but very expensive *CID 68:699, 2019.* If **Metro** used for initial therapy can use standard 10-day course of **Vanco**.
	Post-op ileus; severe disease with toxic megacolon *(CID 61:934, 2015).*	**Metro** 500 mg IV q8h + **Vanco** 500 mg q6h via nasogastric tube (or naso-small bowel tube) ± vanco 500 mg q6h retention enema. *See comment* for dosage. No data on efficacy of **Fidaxomicin** in severe life-threatening disease.		For vanco instillation into bowel, add 500 mg vanco to 500 mL of saline. **NOTE: IV vanco not effective.** Indications for colectomy, *see ICHE 31:431, 2010.*
	Enterohemorrhagic E. coli (EHEC): O157:H7 & O104:H4 & others. Hemolytic uremic syndrome complicates 6-9% *(see Comment)*	Treatment: 1. If afebrile, bloody diarrhea: a. Hydration b. Avoid antiperistaitic drugs c. No antibiotics 2. If febrile, bloody diarrhea, risk of bacteremia: **Azithro** 500 mg IV/po once daily x 3 d		**Risk of antibiotic therapy is HUS due to Shiga toxin production.** HUS = renal failure, hemolytic anemia, thrombocytopenia. Restrict antibiotics to patients with increased risk of, or documentation of, bacteremia due to EHEC. Ref: *CID 62:1251 & 1259, 2016.*
	Klebsiella oxytoca— antibiotic-associated diarrhea	Responds to stopping antibiotic		Suggested that stopping NSAIDs helps. Ref.: *NEJM 355:2418, 2006.*
	Listeria monocytogenes	Usually self-limited. Value of oral antibiotics (e.g., AMP or TMP-SMX) unknown, but their use might be reasonable in populations at risk for serious listeria infections.		Cause of food-associated febrile gastroenteritis. Not detected in standard stool cultures. Populations at ↑ risk of severe systemic disease: pregnant women, neonates, the elderly, and immunocompromised hosts.
	Salmonella, non-typhi— For typhoid (enteric) fever, *see page 68* Fever in 71–91%, history of bloody stools in 34%	**If asymptomatic or illness mild, antimicrobial therapy not indicated. Treat if:** age <1 yr or >50 yrs, immunocompromised, vascular grafts or prosthetic joints, bacteremic, hemoglobinopathy, or hospitalized with fever and severe diarrhea *(see typhoid fever, page 68).*		
		(**CIP** 500 mg bid) or (**Levo** 500 mg q24h) x 7-10 days (14 days if immunocompromised). If infection acquired in Asia, avoid FQ and treat with **Azithro** or **Ceftriaxone**.	**Azithro** 500 mg po once daily x 7 days (14 days if immunocompromised).	↑ resistance to TMP-SMX and chloro. Ceftriaxone, cefotaxime usually active if IV therapy required *(see footnote† on page 28, for dosage).* CIP: susceptible strains, MIC ≤0.06 µg/mL *(Clin Infect Dis 55:1107, 2012).* Increasing resistance to FQ, particularly in Asia. **Primary treatment of enteritis is fluid and electrolyte replacement.**

(Continued on next page)

Abbreviations on page 2. **NOTE: All dosage recommendations are for adults (unless otherwise indicated) and assume normal renal function. § Alternatives consider allergy, PK, compliance, local resistance, cost.*

TABLE 1 (17)

ANATOMIC SITE/DIAGNOSIS/ MODIFYING CIRCUMSTANCES	ETIOLOGIES (usual)	SUGGESTED REGIMENS* PRIMARY	SUGGESTED REGIMENS* ALTERNATIVE§	ADJUNCT DIAGNOSTIC OR THERAPEUTIC MEASURES AND COMMENTS
GASTROINTESTINAL/Gastroenteritis—Specific Therapy (results of culture, microscopy, toxin assay AVAILABLE) *(continued)*				
(Continued from previous page)	**Shigella** Fever in 58%, history of bloody stools 51%	**CIP** 750 mg po q12-24h or **Levo** 500 mg q24h x 3 days **Pockets of resistance** ***(see Comment)*** **Peds doses: Azithro** 10 mg/kg/day once daily x 3 days. For severe disease, **Ceftriaxone** 50–75 mg/kg per day x 2–5 days. **CIP** suspension 10 mg/kg bid x 5 days.	**Azithro** 500 mg po once daily x 3 days	**Immunocompromised children & adults: Treat for 7–10 days.** CDC recommends avoiding CIP if MIC ≥0.12 µg/mL *(CDC Health Alert Network, Apr 18, 2017)*. Pockets of resistance reported, especially to FQ in Asia. Resistance more common in international travelers and immunocompromised; clusters of resistance to FQ, Azithro, Ceftriaxone in MSM. For most individuals, treatment not necessary. May be associated with traveler's diarrhea, where one dose of treatment may be sufficient.
	Spirochetosis (Brachyspira pilosicoli)	Benefit of treatment unclear. Susceptible to **Metro**, **Ceftriaxone**, and **Moxi**.		Anaerobic intestinal spirochete that colonizes colon of domestic & wild animals plus humans. Called enigmatic disease due to uncertain status *(Digest Dis & Sci 58:202, 2013)*.
	Vibrio cholerae (toxigenic - 01 & 039) Treatment decreases duration of disease, volume losses, & duration of excretion	**Primary therapy is rehydration.** Select antibiotics based on susceptibility of locally prevailing isolates. Options include: **Doxy** 300 mg po single dose, **Azithro** 1 gm po single dose, **Tetra** 500 mg po qid x 3 days, **Erythro** 500 mg po qid x 3 days.	**Pregnancy:** **Azithro** 1 gm po single dose **OR Erythro** 500 mg po qid x 3 days **Peds: Azithro** 20 mg/kg po as single dose; for other age-specific alternatives, *see CDC website http://www.cdc.gov/haitiicholera/hcp_goingtohaiti.htm*	**Antimicrobial therapy shortens duration of illness, but rehydration is paramount.** When IV hydration is needed, use Ringer's lactate. Switch to po repletion with Oral Rehydration Salts (ORS) as soon as able to take oral fluids. ORS are commercially available for reconstitution in potable water. If not available, WHO suggests a substitute can be made by dissolving ½ teaspoon salt and 6 level teaspoons of sugar per liter of potable water *(http://www.who.int/cholera/technical/en/)*.
	Vibrio parahaemolyticus, V. mimicus, V. fluvialis	**Antimicrobial rx does not shorten course. Hydration.**		Shellfish exposure common. Treat severe disease: **FQ, Doxy, 3rd gen Ceph**
	Vibrio vulnificus Usual presentation is skin lesions & bacteremia; life-threatening	Adult: (**Doxy** or **Minocycline** 100 mg IV/po bid) + (**Ceftriaxone** 2 gm IV once daily or **Ceftaz** 1 gm IV q8h). Peds: **Doxy** 4.4 mg/kg/day div bid (max 200 mg/day). Alternatives: **Levo** or **CIP**. Ref: *Epidemiol Infect. 142:878, 2014.*		
	Yersinia enterocolitica Fever in 68%, bloody stools in 26%	**No treatment unless severe.** If severe, **Doxy** 100 mg IV bid + (**Tobra** or **Gent** 5 mg/kg per day once q24h). **TMP-SMX** or **FQs** are alternatives.		Mesenteric adenitis pain can mimic acute appendicitis. Lab diagnosis difficult: requires "cold enrichment" and/or yersinia selective agar. Desferrioxamine therapy increases severity, discontinue if pt on it. Iron overload states predispose to yersinia.
Gastroenteritis—Specific Risk Groups–Empiric Therapy				
Anoreceptive intercourse				
Proctitis (distal 15 cm only)	Herpes viruses, gonococci, chlamydia, syphilis. *See Genital Tract, page 25*			
Colitis	Shigella, salmonella, campylobacter, E. histolytica *(see Table 13A)*			*See specific GI pathogens, Gastroenteritis, above.*
HIV-1 infected (AIDS): >10 days diarrhea	G. lamblia Acid fast: Cryptosporidium parvum or hominis, Cyclospora cayetanensis Other: Cystisospora belli, microsporidia (Enterocytozoon bieneusi, Septata intestinalis)			*See Table 13A*
Neutropenic enterocolitis or "typhlitis" *(CID 56:711, 2013) (World J Gastroenterol 23: 42, 2017)*	Mucosal invasion by **Clostridium septicum** and others. Occasionally caused by C. sordellii or P. aeruginosa	Bowel rest and **Pip-tazo** 4.5 gm IV q6h or **IMP** 500 mg IV q6h or **MER** 2 gm IV q8h	**Cefepime** 2 gm IV q8h + **Metro** 500 mg IV q8h	Need surgical consult. Surgical resection controversial but may be necessary. **NOTE:** Resistance of clostridia to clindamycin reported. Pip-tazo, IMP, MER, DORI should cover most pathogens.

Abbreviations on page 2. **NOTE: All dosage recommendations are for adults (unless otherwise indicated) and assume normal renal function. § Alternatives consider allergy, PK, compliance, local resistance, cost.*

TABLE 1 (18)

ANATOMIC SITE/DIAGNOSIS/ MODIFYING CIRCUMSTANCES	ETIOLOGIES (usual)	SUGGESTED REGIMENS* PRIMARY	SUGGESTED REGIMENS* ALTERNATIVE§	ADJUNCT DIAGNOSTIC OR THERAPEUTIC MEASURES AND COMMENTS
GASTROINTESTINAL/Gastroenteritis—Specific Risk Groups–Empiric Therapy *(continued)*				
Traveler's diarrhea, self-medication. Patient often afebrile	**Acute**: 60% due to diarrheagenic E. coli; shigella, salmonella, or campylobacter. C. difficile, amebiasis *(see Table 13A)*. **If chronic**: cyclospora, cryptosporidia, giardia, isospora	**Adult: Azithro** 1000 mg po once or 500 mg po q24h for 3 days **CIP** 500 mg po bid x 3 days **OR** **Levo** 500 mg po q24h for 1-3 days **OR** **Oflox** 300 mg po bid for 3 days **OR** **Rifaximin** 200 mg po tid for 3 days **OR** **Rifamycin SV** 2 tabs bid x 3 days **Peds: Azithro** 10 mg/kg/day as a single dose for 3 days or **Ceftriaxone** 50 mg/kg/day as single dose for 3 days. Avoid FQs. **Pregnancy:** Use Azithro. Avoid FQs. **For loperamide**, *see Comment*.		**Antimotility agent:** For non-pregnant adults with no fever or blood in stool, add **loperamide** 4 mg po x 1, then 2 mg po after each loose stool to a maximum of 16 mg per day. **Rifaximin** approved only for ages 12 and older. Works only for diarrhea due to non-invasive E. coli; do not use if fever or bloody stool. **Rifamycin SB**: adult only; for E. coli. Do not use if fever or bloody diarrhea. **Ref:** *NEJM 361:1560, 2009; Clin Micro Inf 21:744, 2015.* **NOTE:** Self-treatment with FQs associated with acquisition of resistant Gm-neg bacilli *(CID 60:837, 847, 872, 2015)*. Increasing resistance of Campylobacter to FQ, particularly in Asia. Azithro now first line choice.
Prevention of Traveler's diarrhea	Preventative treatment of traveler's diarrhea is **not routinely indicated**. Preferred approach in the current recommendation is **Azithro** 1000 mg once + Imodium with first loose stool. Consider **CIP** 500 mg po daily for short trips with vital missions that cannot be disrupted and in immunocompromised patients and those with HIV and CD4 <200. As an alternative during the first 3 weeks (if activities are essential): **Rifaximin** 200 mg po bid, *Ann Intern Med 142:805, 2005; Ann Intern Med 142:861, 2005*. Such prophylactic use is not an FDA approved indication.			
Gastrointestinal Infections by Anatomic Site: Esophagus to Rectum				
Esophagitis	Candida albicans, HSV, CMV	*See Table 11A and Table 14A*.		
Duodenal/Gastric ulcer; gastric cancer, MALT lymphomas (not 2°NSAIDs) Comparative effectiveness & tolerance of treatment Review: *NEJM 380:1158, 2018*	**Helicobacter pylori** Prevalence of pre-treatment resistance increasing, especially clarithro *(AAC 2017,61:e02530-16)*. Ask about previous antibiotics and try to avoid prior antibiotic given. Where available treatment should be guided by susceptibility testing or PCR typing of Clarith R; all H. pylori + should be treated. Test & treat without EGD if age <45 yrs.	**Quadruple therapy:** (**Bismuth subsalicylate** 2 tabs qid + **Tetra** 500 mg qid + **Metro** 500 mg tid + **PPI**) x 14 days. For doses, *see footnote[5] & Comments*	(**PPI** + **Amox** 1000 mg bid + metro 500 mg bid + **Clarithro** 500 mg bid) x 14 days. Newer combination treatments: **Talicia** and **Pylera** In Japan: combination of **Vonoprazen** + **Clarithro** *(Inter Med 59:153, 2020)*	**Comment:** Any one of these **proton pump inhibitors (PPI)** may be used: omeprazole 20 mg bid, Lansoprazole 30 mg bid, esomeprazole 20 mg bid, pantoprazole 40 mg bid, rabeprazole 20 mg bid. In many locations, 20% failure rates with previously recommended *triple* regimens **(PPI + Amox + Clarithro)**. Exercise caution regarding potential interactions with other drugs, contraindications in pregnancy and warnings for other special populations. **Dx: Stool antigen**—Monoclonal EIA >90% sens. & 92% specific. Other tests: if endoscoped, rapid urease &/or histology &/or culture; serology less sens & spec; urea breath test, but some office-based tests underperform. Testing ref: *BMJ 344:44, 2012.* **Test of cure:** Repeat stool antigen and/or urea breath test >8 wks post-treatment. **Treatment outcome:** Failure rate of triple therapy 20% due to clarithro resistance.
Small intestine: Whipple's disease *(NEJM 356:55, 2007; LnID 8:179, 2008)* Treatment: *JAC 69:219, 2014.* *See Infective endocarditis, culture-negative, page 32.*	Tropheryma whipplei	(**Doxy** 100 mg po bid + **Hydroxychloroquine** 200 mg po tid) x 1 year, then **Doxy** 100 mg po bid for life (Peds dose, *see Comment*) Immune reconstitution inflammatory response (IRIS) reactions occur: Thalidomide therapy may be better than steroids for IRIS reaction *(J Infect 60:79, 2010)*		In vitro susceptibility testing and collected clinical experience *(JAC 69:219, 2014)*. In vitro resistance to TMP-SMX plus frequent clinical failures & relapses. Frequent in vitro resistance to carbapenems. Ceftriaxone demonstrates high MICs against intracellular organisms in vitro *(AAC 48: 747, 2004)*. **Peds: Doxy** considered safe regardless of age for duration of 21 days or less: 4.4 mg/kg div bid *(AAP Redbook 2018)*.

[5] **Bismuth preparations:** (1) In U.S., **bismuth subsalicylate (Pepto-Bismol)** 262 mg tabs; adult dose for helicobacter is 2 tabs (524 mg) qid. (2) Outside U.S., **colloidal bismuth subcitrate** (De-Nol) 120 mg chewable tablets; dose is 1 tablet qid. In the U.S., bismuth subcitrate is available in combination cap only (Pylera: each cap contains bismuth subcitrate 140 mg + Metro 125 mg + Tetracycline 125 mg), given as 3 caps po 4x daily for 10 days **together with** a twice daily PPI.

Abbreviations on page 2. **NOTE: All dosage recommendations are for adults (unless otherwise indicated) and assume normal renal function. § Alternatives consider allergy, PK, compliance, local resistance, cost.*

TABLE 1 (19)

ANATOMIC SITE/DIAGNOSIS/ MODIFYING CIRCUMSTANCES	ETIOLOGIES (usual)	SUGGESTED REGIMENS*		ADJUNCT DIAGNOSTIC OR THERAPEUTIC MEASURES AND COMMENTS
		PRIMARY	ALTERNATIVE§	
GASTROINTESTINAL/Gastrointestinal Infections by Anatomic Site: Esophagus to Rectum *(continued)*				
Appendicitis, acute	Aerobic & anaerobic gram-negative bacilli	**Uncomplicated, no apparent perforation**		
		If decision is not to perform appendectomy but treat with antibiotics. CT scan shows no evidence of appendicolith, perforation or abscess. Suggested antibacterial therapy: Adult: **Erta** 1 gm IV q24h Pediatric: **Erta** 15 mg/kg IV bid (max daily 1 gm)	**Surgery:** Adult: **Ceftriaxone** 2 gm IV q24h + **Metro** 500 mg IV q8h Pediatric: **Ceftriaxone** 75 mg/kg IV q24h (max daily 2 gm) + **Metro** 10 mg/kg IV q8h (max dose 500 mg; max 1500 mg/day). With this approach, most patients were able to be discharged with no antibiotic therapy within a mean (±SD) of 23.5 (20) hrs *(J Ped Surgery 2015;50:1566).* Can further streamline: **Ceftriaxone** 50 mg/kg/dose every 24hrs (max 2 gm/day) + **Metro** 30 mg/kg/ dose q24h (max 1500 mg/dose if ≥ to 80 kg or max of 1000 mg / dose if < 80 kg). Efficacious and cost-saving *(J Ped Infect Dis 2017;6:57-64).* PK/PD justification of once daily metronidazole; studies in human volunteers: *Antimicrob Agents Chemother 2004;48:4597*	Goal: Activity vs. both aerobic & anaerobic bacteria. Active vs; anaerobes: Metro. Active vs. aerobic gram neg bacilli: AG, P Ceph 2/3/4, Aztreonam, Cip, Levo, Ceftaz-avi. Active vs. both: Pip-tazo, Amox-clav, carbapenems, eravacycline, Moxi, Delaflox. Refs: Non-operative rx of uncomplicated appendicitis *(J Trauma Acute Care Surg 86:722, 2019; JAMA 32:1245 & 1259, 2018).* Note: No firm guidance on dose for Metro: range 500 mg q6-8h to 30 mg/kg IV once daily (max 1500 mg). Note: Amox-clav may reduce FQ harm without impacting efficacy *(Ann Intern Med 174:737, 2021)*
		Perforation, peritonitis, shock *Emergency surgery:* **MER** 1 gm IV q8h or CIP 400 mg IV q8h + Metro 500 mg IV q8h *(See Comments for other options)*		

TABLE 1 (20)

ANATOMIC SITE/DIAGNOSIS/ MODIFYING CIRCUMSTANCES	ETIOLOGIES (usual)	SUGGESTED REGIMENS* PRIMARY	SUGGESTED REGIMENS* ALTERNATIVE§	ADJUNCT DIAGNOSTIC OR THERAPEUTIC MEASURES AND COMMENTS
GASTROINTESTINAL/Gastrointestinal Infections by Anatomic Site: Esophagus to Rectum *(continued)*				
Diverticulitis, perirectal abscess, peritonitis *Also see Peritonitis, page 51* *NEJM 2018;379:1635*	Enterobacteriaceae, occasionally P. aeruginosa, Bacteroides sp., enterococci	**Outpatient rx—mild diverticulitis, drained perirectal abscess:** **Amox-clav** 875/125 mg po bid if beta-lactam allergic or intolerant: [(**TMP-SMX**-DS tab po bid) or (**CIP** 750 mg po bid or **Levo** 750 mg po q24h)] + **Metro** 500 mg q6h. Duration of treatment varies based on clinical response. Usually Treat for 7-10 days. Can customize duration by trending serum procalcitonin serum levels. Treat until PCT level is <0.5 ng/ml	**Moxi** 400 mg po q24h Duration varies with clinical response. Usually 7-10 days	Must "cover" both Gm-neg. aerobic & Gm-neg. anaerobic bacteria. **Drugs active only vs. anaerobic Gm-neg. bacilli:** clinda, metro. **Drugs active only vs. aerobic Gm-neg. bacilli:** APAG[6], P Ceph 2/3/4 *(see Table 10A, page 118)*, aztreonam, CIP, Levo. **Drugs active vs. both aerobic/anaerobic Gm-neg. bacteria:** cefoxitin, cefotetan, TC-CL, Pip-tazo, Amp-sulb, ERTA, DORI, IMP, MER, Moxi, & tigecycline. **Resistance (B. fragilis):** Metro, Pip-tazo rare. Resistance to FQ increased in enteric bacteria, particularly if any FQ used recently. **Concomitant surgical management important**, esp. with moderate-severe disease. **Role of enterococci remains debatable**. Probably pathogenic in infections of biliary tract. Probably need drugs active vs. enterococci in pts with valvular heart disease. **Tigecycline: Black Box Warning:** All cause mortality higher in pts treated with tigecycline (2.5%) than comparators (1.8%) in meta-analysis of clinical trials. Note: Amox-clav may reduce FQ harm without impacting efficacy *(Ann Intern Med 174:737, 2021)*
		Inpatient, mild-moderate disease Surgical consultation advisable **Pip-tazo** 4.5 gm IV over 30 min as a loading dose. Then, 4 hrs later, start 3.375 gm IV infused over 4 hrs. Repeat 4 hr infusion q8h **Erta** 1 gm IV q24h **Moxi** 400 mg IV q24h (resistance of Bacteroides group maybe increasing)	[(**CIP** 400 mg IV q12h) or (**Levo** 750 mg IV q24h)] + (**Metro** 500 mg IV q6h or 1 gm IV q12h) **Moxi** 400 mg IV q24h **Cefepime** 2 gm IV q12h + **Metro** 1 gm IV q12h **Amox-clav** 1000 mg-200 mg IV q8h (non-US)	
		Severe life-threatening disease, ICU patient: **IMP** 500 mg IV q6h **or MER** 1 gm IV q8h **or Dori** 500 mg q8h (1-hr infusion). For **Ceftolo-tazo** & **Ceftaz-avi** dosing, *see Peritonitis, page 51.*	**AMP** + **Metro** + (**CIP** 400 mg IV q12h or **Levo** 750 mg IV q24h) **OR** [**AMP** 2 gm IV q6h + **Metro** 500 mg IV q6h + **Aminoglycoside**[6] *(see Table 10C, page 134)*]	
		Severe penicillin/cephalosporin allergy: (**Aztreonam** 2 gm IV q6h to q8h) + [**Metro** (500 mg IV q6h) or (1 gm IV q12h)] **OR** [(**CIP** 400 mg IV q12h) or (**Levo** 750 mg IV q24h) + **Metro**].		

[6] **Aminoglycoside = antipseudomonal aminoglycosidic aminoglycoside, e.g., Amikacin, Gentamicin, Tobramycin, Plazomicin**

 **NOTE: All dosage recommendations are for adults (unless otherwise indicated) and assume normal renal function. § Alternatives consider allergy, PK, compliance, local resistance, cost.*

TABLE 1 (21)

ANATOMIC SITE/DIAGNOSIS/ MODIFYING CIRCUMSTANCES	ETIOLOGIES (usual)	SUGGESTED REGIMENS* PRIMARY	SUGGESTED REGIMENS* ALTERNATIVE§	ADJUNCT DIAGNOSTIC OR THERAPEUTIC MEASURES AND COMMENTS
GENITAL TRACT: Mixture of empiric & specific treatment. Divided by sex of the patient. For sexual assault (rape), *see Table 15A, page 230.* ***See CDC Guidelines for Sexually Transmitted Diseases:*** *MMWR 70:1, 2021.*				
Both Women & Men:				
Chancroid *(Curr Op Inf Dis 29:52, 2016)* Ulcer is painful.	H. ducreyi	**Ceftriaxone** 250 mg IM single dose OR **Azithro** 1 gm po single dose	**CIP** 500 mg bid po x 3 days OR **Erythro base** 500 mg po tid x 7 days.	In HIV+ pts, failures reported with single dose azithro *(CID 21:409, 1995).* Evaluate after 7 days, ulcer should objectively improve. All patients treated for chancroid should be tested for HIV and syphilis. All sex partners of pts with chancroid should be examined and treated if they have evidence of disease or have had sex with index pt within the last 10 days.
Non-gonococcal or post-gonococcal urethritis, cervicitis NOTE: Assume concomitant N. gonorrhoeae (Chlamydia conjunctivitis, *see page 14)*	Chlamydia 50%, Mycoplasma genitalium (30%). Other known etiologies (10–15%): trichomonas, herpes simplex virus, *see JID 206:357, 2012.* Ref: *CID 61:S774, 2015*	(**Doxy** 100 mg po bid x 7 days) or (**Azithro** 1 gm po as single dose). Evaluate & treat sex partner	(**Erythro base** 500 mg po qid x 7 days) or (**Oflox** 300 mg q12h po x 7 days) or (**Levo** 500 mg q24h x 7 days)	**Diagnosis:** NAAT for C. trachomatis & N. gonorrhoeae on urine or cervix or urethra specimens. Test all urethritis/cervicitis pts for HIV & syphilis. **Evaluate & treat sex partners.** Re-test for cure in pregnancy. Azithromycin 1 gm was superior to doxycycline for M. genitalium male urethritis *(CID 48:1649, 2009),* but may select resistance leading to ↑ failure of multi-dose azithromycin retreatment regimens *(CID 48:1655, 2009).*
		Pregnancy: Azithro 1 gm po single dose OR **Amox** 500 mg po tid x 7 days.	**In pregnancy: Erythro** base 500 mg po qid for 7 days **Doxy & FQs contraindicated**	
Non-gonococcal urethritis: **Mycoplasma genitalium**	Mycoplasma genitalium. Ref: *CID 61:S802, 2015.* If macrolide resistance testing available, treatment guided by testing.	**If *macrolide sensitive*: Doxy** 100 mg po bid x 7 days, followed by **Azithro** 1 gm po x1 then 500 mg x 3 days	**If macrolide resistant or unknown: Doxy** 100 mg po bid x 7 days followed by **Moxi** 400 mg po x 7 days **Pristinamycin** 1 gm qid x 10 days (where available)	Diagnosis by NAAT, but often not available. Beta-lactams ineffective. Cure with single dose Azithro only *67% (CID 61:1389, 2015).* Emerging resistance with no good alternatives *(Em Inf Dis 23:809, 2017).* Pristinamycin may work *(CID 2015;60:1228).*
Recurrent/persistent urethritis	**C. trachomatis** (43%), **M. genitalium** (30%), **T. vaginalis** (13%) *(CID 52:163, 2011).*	**Metro** 2 gm po x 1 dose + or **Tinidazole** 2 gm po x1 then treat for macrolide resistant *M. genitalium* with **Doxy** 100 bid x 7 d followed by **Moxi** 400 po qd x 7 days	No good alternatives	
Rectal, proctitis MSM and increasingly in women	C. trachomatis, M. genitalium, N. gonorrhoeae, syphilis, HSV	If NAAT not available, treat for GC and chlamydia; **Doxy** 100 mg po bid x 7 days	If LGV suspected treat **Doxy** 100 mg po bid x 21 days	**Proctitis:** Doxy x 7 days.
Gonorrhea. FQs no longer recommended for treatment of gonococcal infections *(See CDC Guidelines MMWR 69:1911, 2020; MMWR 70:1, 2021):* **Dual therapy with Ceftriaxone and Azithro no longer recommended Ceftriaxone alone superior to Azithro in 2 RCT** *(CID 73:824, 2021; NEJM 384:2418, 2021).* **If Chlamydia suspected Doxy 100 mg po bid x 7 days.**				
Conjunctivitis (adult)	N. gonorrhoeae	**Ceftriaxone** 1 gm IM or IV single dose		Consider one-time saline lavage of eye.
Disseminated gonococcal infection (DGI, dermatitis-arthritis syndrome)	N. gonorrhoeae	**Ceftriaxone** 1 gm IV q24h	(**Cefotaxime** 1 gm q8h IV or **Ceftizoxime** 1 gm q8h IV)	**Treat for 7 days.** Owing to high-level resistance to oral cephalosporins and fluoroquinolones in the community, "Step-down" therapy should be avoided unless susceptibilities are known and demonstrate full activity of cephalosporin or fluoroquinolone R/O meningitis/endocarditis.
Endocarditis	N. gonorrhoeae	**Ceftriaxone** 1-2 gm IV q12-24 hours x 4 weeks		Severe valve destruction may occur. Ceftriaxone resistance in *N. gonorrhoeae* has been reported; determine susceptibility of any isolate recovered.
Pharyngitis Dx: NAAT	N. gonorrhoeae	**Ceftriaxone** 500 mg IM x 1	Due to resistance concerns, **do not use FQs**.	Pharyngeal GC more difficult to eradicate. **Repeat NAAT 14 days post-rx. Spectinomycin[NUS], cefixime, cefpodoxime & cefuroxime not effective**

Abbreviations on page 2. **NOTE: All dosage recommendations are for adults (unless otherwise indicated) and assume normal renal function. § Alternatives consider allergy, PK, compliance, local resistance, cost.*

TABLE 1 (22)

ANATOMIC SITE/DIAGNOSIS/ MODIFYING CIRCUMSTANCES	ETIOLOGIES (usual)	SUGGESTED REGIMENS* PRIMARY	SUGGESTED REGIMENS* ALTERNATIVE§	ADJUNCT DIAGNOSTIC OR THERAPEUTIC MEASURES AND COMMENTS
GENITAL TRACT/Both Women & Men/Gonorrhea *(continued)*				
Urethritis, cervicitis, proctitis (uncomplicated) 2020 CDC Guidelines: *MMWR 69:1911.* **Diagnosis:** Nucleic acid amplification test (NAAT) on vaginal swab, urine or urethral *swab MMWR 64(RR-3):1, 2015*	N. gonorrhoeae (50% of pts with urethritis, cervicitis have concomitant C. trachomatis — **treat for both unless NAAT indicates single pathogen**).	**Ceftriaxone** 500 mg IM x 1 **Rx failure: Ceftriaxone** 1 gm IM x 1; treat partner; NAAT for test of cure 1 wk post-treatment **Severe Pen/Ceph allergy**: (**Gent** 240 mg IM + **Azithro** 2 gm po x 1 dose) OR (**Gemi** 320 mg + **Azithro** 2 gm po x 1 dose) *(CID 59:1083, 2014)* (nausea in >20%)		Screen for syphilis. **Other alternatives for GC (Test of Cure recommended one week after Rx for ALL of these approaches listed below):** • **Oral cephalosporin use is no longer recommended** as primary therapy owing to emergence of resistance, *MMWR 61:590, 2012.* • Other single-dose cephalosporins: ceftizoxime 500 mg IM, cefotaxime 500 mg IM, cefoxitin 2 gm IM + probenecid 1 gm po.
Pregnancy		**Ceftriaxone** 500 mg IM x1; if Chlamydia not excluded **Azithro** 1 gm po x1		
Granuloma inguinale (Donovanosis)	Klebsiella (formerly Calymmatobacterium) granulomatis	**Azithro** 1 gm po q wk x 3 wks	**TMP-SMX** one DS tablet bid x 3 wks **OR Erythro** 500 mg po qid x 3 wks OR **CIP** 750 mg po bid x 3 wks OR **Doxy** 100 mg po bid x 3 wks	Clinical response usually seen in 1 wk. **Rx until all lesions healed,** may take 4 wks. Treatment failures & recurrence seen with Doxy & TMP-SMX. Relapse can occur 6-18 months after apparently effective Rx. If improvement not evidence in first few days, some experts add Gent 1 mg/kg IV q8h.
Herpes simplex virus	*See Table 14A, page 195*			
Human papilloma virus (HPV)	*See Table 14A, page 200*			
Lymphogranuloma venereum Ref: *CID 61:S865, 2015*	Chlamydia trachomatis, serovars. L1, L2, L3	**Doxy** 100 mg po bid x 21 days	**Erythro** 500 mg po qid x 21 days or **Azithro** 1000 mg po q wk x 3 wks (clinical data lacking)	Dx based on serology; biopsy contraindicated because sinus tracts develop. Nucleic acid ampli tests for *C. trachomatis* will be positive. In MSM, presents as fever, rectal ulcer, anal discharge.
Phthirus pubis **(pubic lice, "crabs")** & scabies	Phthirus pubis & Sarcoptes scabiei	*See Table 13A, page 185*		
Syphilis *CDC 2021 STI guidelines MMWR 70:1, 2021.* Diagnosis: *CID 71 (Suppl 1):S1, 2020*; treatment: *JAMA 312:1905, 2014;* management: *CID 61:S818, 2015.* Overview: *Lancet 389: 1550, 2017.*				
Early: primary, secondary, or latent <1 yr. Screen with treponema-specific antibody or RPR/VDRL, *see JCM 50:2 & 148, 2012; CID 58:1116, 2014.* **Chancre is painless.**	T. pallidum **NOTE:** Test all pts with syphilis for HIV; test all HIV patients for latent syphilis. Screen MSM and/or HIV pts every 3-12 mos Pregnancy: screen all *(JAMA 2018;320:911)*	**Benzathine pen G (Bicillin L-A)** 2.4 million units IM x 1 *(See Comment)*	(**Doxy** 100 mg po bid x 14 days) or (**Tetra** 500 mg po qid x 14 days) or (**Ceftriaxone** 1 gm IM/IV q24h x 10–14 days). Follow-up mandatory. Ceftriaxone efficacy *(CID 2017;65:1683)* Doxy considered safe regardless of age for rx ≤21 days *(AAP Redbook 2018)*	If early or congenital syphilis, **quantitative VDRL at 0**, 3, 6, 12 & 24 mos after rx. If 1° or 2° syphilis, VDRL should ↓ 2 tubes at 6 mos, 3 tubes 12 mos, & 4 tubes 24 mos. Update on congenital syphilis *(MMWR 64(RR-3):1, 2015).* Early latent: 2 tubes ↓ at 12 mos. With 1°, 50% will be RPR seronegative at 12 mos, 24% neg. FTA/ABS at 2–3 yrs *(AnIM 114:1005, 1991).* If titers fail to fall, examine CSF; if CSF (+), treat as neurosyphilis; if CSF is negative, retreat with benzathine Pen G 2.4 mu IM weekly x 3 wks. **If no other options: Azithro** 2 gm po x 1 dose (equivalent to **Benzathine pen** 2.4 M x 1 dose in early syphilis *(J Infect Dis 201:1729, 2010).* **Azithro-resistant syphilis** documented in California, Ireland, & elsewhere. **NOTE:** Use of **benzathine procaine penicillin** is inappropriate!!

Abbreviations on page 2. **NOTE: All dosage recommendations are for adults (unless otherwise indicated) and assume normal renal function. § Alternatives consider allergy, PK, compliance, local resistance, cost.*

TABLE 1 (23)

ANATOMIC SITE/DIAGNOSIS/ MODIFYING CIRCUMSTANCES	ETIOLOGIES (usual)	SUGGESTED REGIMENS* PRIMARY	SUGGESTED REGIMENS* ALTERNATIVE§	ADJUNCT DIAGNOSTIC OR THERAPEUTIC MEASURES AND COMMENTS
GENITAL TRACT/Both Women & Men/Syphilis *(continued)*				
More than 1 yr's duration (latent of indeterminate duration, cardiovascular, late benign gumma)	For penicillin desensitization method, *see Table 7, page 94* and *MMWR 64(RR-3):1, 2015*	**Benzathine Pen G (Bicillin L-A)** 2.4 million units IM q week x 3 = 7.2 million units total	**Doxy** 100 mg po bid x 28 days or **Tetra** 500 mg po qid x 28 days; **Ceftriaxone** 1 gm IV or IM daily for 10-14 days MAY be an alternative; consult an ID specialist	No published data on efficacy of alternatives. **Indications for LP (CDC): neurologic symptoms, treatment failure, any eye or ear involvement, other evidence of active syphilis (aortitis, gumma, iritis).** Neurosyphilis *(NEJM 381:1358, 2019).*
Neurosyphilis—Very difficult to treat. Includes ocular (retro-bulbar neuritis) syphilis **All need CSF exam.**		**Pen G** 18-24 million units per day either as continuous infusion or as 3-4 million units IV q4h x 10-14 days.	(**Procaine Pen G** 2.4 million units IM q24h + **probenecid** 0.5 gm po qid) both x 10-14 days *(CID 71:267, 2020)*	**Ceftriaxone** 2 gm (IV or IM) q24h x 14 days *(Lancet Inf Dis 21:1441, 2021).* For penicillin allergy: either desensitize to penicillin or obtain infectious diseases consultation. **Serologic criteria for response to rx: 4-fold or greater ↓ in VDRL titer over 6-12 mos.**
HIV infection (AIDS) CDC STD guidelines: *MMWR 70:1, 2021*		Treatment same as HIV uninfected with closer follow-up. Treat early neurosyphilis for 10-14 days regardless of CD4 count: *MMWR 56:625, 2007.*		*See Syphilis discussion in CDC Guidelines MMWR 64(RR-3):1, 2015.* Treat for neurosyphilis if CSF VDRL negative but >20 CSF WBCs *(STD 39:291, 2012).*
Pregnancy and syphilis		Same as for non-pregnant, some recommend 2nd dose (2.4 million units) **Benzathine Pen G** 1 wk after initial dose esp. in 3rd trimester or with 2° syphilis	Skin test for penicillin allergy. Desensitize if necessary, as parenteral pen G is only therapy with documented efficacy!	Monthly quantitative VDRL or equivalent. If 4-fold ↑, re-treat. Doxy, tetracycline contraindicated. Erythro not recommended because of high risk of failure to cure fetus.
Congenital syphilis *(Update on Congenital Syphilis: MMWR 64(RR-3):1, 2015)*	T. pallidum	**Aqueous crystalline Pen G** 50,000 units/kg per dose IV q12h x 7 days, then q8h for 10 days total.	**Procaine Pen G** 50,000 units/kg IM q24h for 10 days	Another alternative: **Ceftriaxone** ≤30 days old, 75 mg/kg IV/IM q24h (use with caution in infants with jaundice) or >30 days old 100 mg/kg IV/IM q24h. Treat 10-14 days. If symptomatic, ophthalmologic exam indicated. If more than 1 day of rx missed, restart entire course. **Need serologic follow-up!**
Warts, anogenital	*See Table 14A, page 200*			
Women:				
Amnionitis, septic abortion Data on antibiotic rx poor *(Cochrane Database (12) CD0010976, 2014)*	Bacteroides, esp. Prevotella bivia; Group B, A streptococci; Enterobacteriaceae; C. trachomatis. Rarely U. urealyticum, Mycoplasma sp.	**Pip-tazo** 4.5 gm IV over 30 minutes loading dose, then, starting 4 hrs later, 3.375 gm IV over 4 hrs and repeat q8h If critically ill: **MER** 1-2 gm IV loading dose, then 0.5-1 gm IV q8h	Other potential empiric regimens: **IMP** 0.5 gm IV q6h or **Erta** 1 gm IV q24h **Amp-sulb** 3 gm IV q6h (up to 50% of *E. coli* are now resistant in some locations) Clindamycin 900 mg IV q8h + Ceftriaxone 2 gm IV q24h. NOTE: one-third of Group B streptococci are resistant to Clindamycin	D&C of uterus. **In septic abortion,** Clostridium perfringens may cause fulminant intravascular hemolysis. **In postpartum patients** with enigmatic fever and/or pulmonary emboli, **consider septic pelvic vein thrombophlebitis** *(see Vascular septic pelvic vein thrombophlebitis, page 75).* Add doxy for C. trachomatis, Ureaplasma or Mycoplasma. Review: *Frontiers Pharm 8:97, 2017.*
		NOTE: in US and Europe, 1/3 of Grp B Strep resistant to clindamycin.		

Abbreviations on page 2. *NOTE: All dosage recommendations are for adults (unless otherwise indicated) and assume normal renal function. § Alternatives consider allergy, PK, compliance, local resistance, cost.

TABLE 1 (24)

ANATOMIC SITE/DIAGNOSIS/ MODIFYING CIRCUMSTANCES	ETIOLOGIES (usual)	SUGGESTED REGIMENS* PRIMARY	SUGGESTED REGIMENS* ALTERNATIVE§	ADJUNCT DIAGNOSTIC OR THERAPEUTIC MEASURES AND COMMENTS
GENITAL TRACT/Women *(continued)* Updated CDC Guidelines: *MMWR 70:1, 2021*				
Cervicitis, mucopurulent Treatment based on results of nucleic acid amplification test	N. gonorrhoeae	Treat for Gonorrhea, *page 26*		Criteria for diagnosis: 1) (muco) purulent endocervical exudate and/or 2) sustained endocervical bleeding after passage of cotton swab. >10 WBC/ hpf of vaginal fluid is suggestive. Intracellular gram-neg diplococci are specific but insensitive. If in doubt, send swab or urine for culture, EIA or nucleic acid amplification test and treat for both.
	Chlamydia trachomatis	Treat for non-gonococcal urethritis, *page 25*. If due to *Mycoplasma genitalium*, less likely to respond to doxy and emerging resistance to both azithro and FQ.		
Endomyometritis/septic pelvic phlebitis				
Early postpartum (1st 48 hrs) (usually after C-section)	Bacteroides, esp. Prevotella bivia; Group B, A streptococci; Enterobacteriaceae; C. trachomatis	Severe: **Pip-tazo** or **MER** Strep TSS: **Ceftriaxone** + **Clinda** Mild: **Amox-clav** 875/125 po bid Associated C. trachomatis: add **Doxy** *Dosage: see footnote*[7]		*See Comments under Amnionitis, septic abortion, above*
Late postpartum (48 hrs to 6 wks) (usually after vaginal delivery)	Chlamydia trachomatis, M. hominis	**Doxy** 100 mg IV or po q12h times 14 days		Tetracyclines not recommended in nursing mothers; discontinue nursing. M. hominis sensitive to tetra, clinda, not erythro.
Fitzhugh-Curtis syndrome	C. trachomatis, N. gonorrhoeae	Treat as for pelvic inflammatory disease immediately below.		Perihepatitis (violin-string adhesions). Sudden onset of RUQ pain. Associated with salpingitis. Transaminases elevated in <30% of cases.
Pelvic actinomycosis; usually tubo-ovarian abscess	A. Israelii most common	**AMP** 200 mg/kg/day in 3-4 divided doses x 4-6 wks then Pen VK 2-4 gm/day in 4 divided doses x 6-12 mo	**Doxy** or **Ceftriaxone** or **Clinda**	Complication of intrauterine device (IUD). Remove IUD. Can use **Pen G** 10-20 million units/day IV instead of **AMP** x 4-6 wks.
Pelvic Inflammatory Disease (PID), salpingitis, tubo-ovarian abscess				
Outpatient rx: limit to pts with temp <38°C, WBC <11,000 per mm³, minimal evidence of peritonitis, active bowel sounds & able to tolerate oral nourishment *NEJM 372:2039, 2015; CDC Guidelines MMWR 64(RR-3):1, 2015*	N. gonorrhoeae, chlamydia, bacteroides, Enterobacteriaceae, streptococci, especially S. agalactiae Less commonly: G. vaginalis, Haemophilus influenzae, cytomegalovirus (CMV), M. genitalium, U. urealyticum	**Outpatient rx:** [(**Ceftriaxone** 500 mg IM or IV x 1) (± **Metro** 500 mg po bid x 14 days) + (**Doxy** 100 mg po bid x 14 days)]. **OR** (**Cefoxitin** 2 gm IM with **Probenecid** 1 gm po both as single dose) plus (**Doxy** 100 mg po bid with **Metro** 500 mg bid—both times 14 days)	**Inpatient regimens:** [(**Cefotetan** 2 gm IV q12h or **Cefoxitin** 2 gm IV q6h) + (**Doxy** 100 mg IV/po q12h)] (**Clinda** 900 mg IV q8h) + (**Gent** 2 mg/kg loading dose, then 1.5 mg/kg q8h or 4.5 mg/kg once per day), then **Doxy** 100 mg po bid x 14 days	**Another alternative parenteral regimen:** **Amp-sulb** 3 gm IV q6h + **Doxy** 100 mg IV/po q12h. Recommended treatments don't cover M. genitalium so if no response after 7-10 days consider M. genitalium NAAT and treat with **Moxi** 400 mg/day 14 days. Remember: Evaluate and treat sex partner. FQs not recommended due to increasing resistance *MMWR 64(RR-3):1, 2015 & www.cdc.gov/std/ treatment).* Suggest initial inpatient evaluation/therapy for pts with tubo-ovarian abscess. For inpatient regimens, continue treatment until satisfactory response for ≥ 24-hr before switching to outpatient regimen.

[7] **P Ceph 2** (**Cefoxitin** 2 gm IV q6-8h, **Cefotetan** 2 gm IV q12h, Cefuroxime 750 mg IV q8h); **Amp-sulb** 3 gm IV q6h; **Pip-tazo** 4.5 gm load, then 4-hr infusion of 3.375 gm q8h; **Doxy** 100 mg IV/po q12h; **Clinda** 450-900 mg IV q8h; **Aminoglycoside** (**Gent**, *see Table 10C, page 134*); **P Ceph 3** (**Cefotaxime** 2 gm IV q8h, **Ceftriaxone** 2 gm IV q24h); **Dori** 500 mg IV q8h (1-hr infusion); **Erta** 1 gm IV q24h; **IMP** 0.5 gm IV q6h; **MER** 1-2 gm IV q8h; **Azithro** 500 mg IV q24h; **Linezolid** 600 mg IV/po q12h; **Vanco** 30-60 mg/kg/d in 2-3 div doses, target AUC_{24} 400-600 µg/mL x h.

Abbreviations on page 2. **NOTE: All dosage recommendations are for adults (unless otherwise indicated) and assume normal renal function. § Alternatives consider allergy, PK, compliance, local resistance, cost.*

TABLE 1 (25)

ANATOMIC SITE/DIAGNOSIS/ MODIFYING CIRCUMSTANCES	ETIOLOGIES (usual)	SUGGESTED REGIMENS* PRIMARY	SUGGESTED REGIMENS* ALTERNATIVE§	ADJUNCT DIAGNOSTIC OR THERAPEUTIC MEASURES AND COMMENTS
GENITAL TRACT/Women *(continued)*				
Vaginitis *(MMWR 70:1, 2021)*				
Candidiasis Pruritus, thick cheesy discharge, pH <4.5 *See Table 11A, page 144*	Candida albicans 80–90%. C. glabrata, C. tropicalis may be increasing—they are less susceptible to azoles	**Oral azoles: Fluconazole** 150 mg po x 1; **Itraconazole** 200 mg po bid x 1 day. For milder cases, Topical Therapy with non-prescription agent usually is successful (e.g., clotrimazole, butoconazole, miconazole, or tioconazole) as creams or vaginal suppositories.	**Butoconazole, Clotrimazole, Miconazole, Tioconazole** or **Terconazole** (all intravaginal): variety of strengths - from 1 dose to 7–14 days *(See Table 11A, page 144)*	Nystatin vag. tabs times 14 days less effective. Other rx for azole-resistant strains: gentian violet, boric acid. If recurrent candidiasis (4 or more episodes per yr): 6 mos. suppression with: fluconazole 150 mg po q week or itraconazole 100 mg po q24h or clotrimazole vag. suppositories 500 mg q week.
Trichomoniasis Copious foamy discharge, pH >4.5 Treat sexual partners—*see Comment*	Trichomonas vaginalis **Dx:** NAAT & PCR available & most sensitive; wet mount not sensitive. Ref: *JCM 54:7, 2016.*	**Metro** 500 mg po bid x 7 days for women OR 2 gm single dose for men. 7 days more effective in RCT, If HIV+ always give 7-day course OR **Tinidazole** 2 gm po single dose or **Secnidazole** 2 g packet x1 **Pregnancy:** *See Comment*	**For rx failure:** Re-treat with metro 500 mg po bid x 7 days; if 2nd failure: metro 2 gm po q24h x 3–5 days. If still failure, **Tinidazole** 2 gm po q24h x 5 days	**Treat male sexual partners: Metro** 2 gm x 1 dose or **Secnidazole** Nearly 20% men with NGU are infected with trichomonas *(JID 188:465, 2003).* For alternative option in refractory cases, *see CID 33:1341, 2001.* **Pregnancy:** No data indicating metro teratogenic or mutagenic. For discussion of treating trichomonas, including issues in pregnancy, *see MMWR 70:1, 2021 (CDC Guidelines).*
Bacterial vaginosis (BV) Malodorous vaginal discharge, pH >4.5 No rec to screen during pregnancy *(JAMA 2020,323:1286)*	Etiology unclear: associated with Gardnerella vaginalis, mobiluncus, Mycoplasma hominis, Prevotella sp., & Atopobium vaginae et al.	**Metro** 0.5 gm po bid x 7 days or **Metro vaginal gel**[8] (1 applicator intravaginally) 1x/day x 5 days OR 2% **Clinda vaginal cream** 5 gm intravaginally at bedtime x 7 days	**Clinda** 0.3 gm bid po x 7 days or **Clinda ovules** 100 mg intravaginally at bedtime x 3 days. **Secnidazole** 2 gm packet (granules on applesauce, yogurt, pudding) x 1 dose over 30 min.	**Treatment of male sex partner not indicated unless balanitis present.** **Pregnancy:** Oral **Metro** or oral **Clinda** 7-day regimens *(see CDC STD Guidelines: MMWR 64(RR-3):1, 2015).* If recurrent BV, can try adding **boric acid** to suppressive regimen: Metro 0.5 gm po bid x 7 days, then vaginal boric acid gelatin capsule 600 mg hs x 21 days, followed by Metro vaginal gel 2x/week x 16 weeks *(Sex Trans Dis 36:732, 2009).* **Post gel rx, Lactin-V (probiotic) reduced recurrence rate (p 0.01)** *(NEJM 382:1906, 2020).*
Men:				
Balanitis	Candida 40%, Group B strep, gardnerella	**Metro** 2 gm po x 1 dose OR **Fluconazole** 150 mg po x 1 dose OR **Itra** 200 mg po bid x 1 day.		Exclude circinate balanitis (Reiter's syndrome); (non-infectious) responds to hydrocortisone cream.
Epididymo-orchitis *(MMWR 70:1, 2021)*				
Age <35 years	N. gonorrhoeae, Chlamydia trachomatis	(**Ceftriaxone** 500 mg IM x 1 + **Doxy** 100 mg po bid x 10 days) + bed rest, scrotal elevation, analgesics.		Enterobacteriaceae occasionally encountered. Test all pts age <35 yrs for HIV and syphilis.
Age >35 years or MSM (insertive partners in anal intercourse)	Enterobacteriaceae (coliforms)	**Levo** 500-750 mg IV/po once daily for 10-14 days. If STI unlikely, low local resistance, **TMP-SMX** 1 DS bid x 10-14 days. **Amp-sulb, P Ceph 3, Pip-tazo** *(Dosage: see footnote[7] on page 28)* for MSM can be mixed GC/chlamydia with enterics so treat with FQ AND Ceftriaxone 500 mg IM x1) Also: bed rest, scrotal elevation, analgesics		Midstream pyuria and scrotal pain and edema. **NOTE:** Do urine NAAT (nucleic acid amplification test) to ensure absence of N. gonorrhoeae with concomitant risk of FQ-resistant gonorrhoeae or of chlamydia if using agents without reliable activity. Other causes include: mumps, brucella, TB, intravesicular BCG, B. pseudomallei, coccidioides, Behcet's disease.
Non-gonococcal urethritis	*See page 25 (MMWR 70:1, 2021)*			

[8] 1 applicator contains 5 gm of gel with 37.5 mg metronidazole

TABLE 1 (26)

ANATOMIC SITE/DIAGNOSIS/ MODIFYING CIRCUMSTANCES	ETIOLOGIES (usual)	SUGGESTED REGIMENS* PRIMARY	SUGGESTED REGIMENS* ALTERNATIVE§	ADJUNCT DIAGNOSTIC OR THERAPEUTIC MEASURES AND COMMENTS
GENITAL TRACT/Men *(continued)*				
Prostatitis—Review: *CID 50:1641, 2010. See Guidelines 2015 http://onlinelibrary.wiley.com/doi/10.1111/bju.13101/epdf*				
Acute Uncomplicated (with risk of STD; age <35 yrs)	N. gonorrhoeae, C. trachomatis	**Ceftriaxone** 500 mg IM x 1 dose or **Cefixime** 400 mg po x 1 dose; then **Doxy** 100 mg po bid x 10 days		FQs no longer recommended for gonococcal infections. Test for HIV. In AIDS pts, prostate may be focus of Cryptococcus neoformans.
Uncomplicated with low risk of STD	Enterobacteriaceae (coliforms)	**FQ** *(dosage: see Epididymo-orchitis, >35 yrs, above)* or **TMP-SMX** 1 DS tablet (160 mg TMP) po bid x 10–14 days (minimum). Some recommend 3-6 weeks.		Treat as acute urinary infection, 14 days (not single dose regimen). If uncertain, do NAAT for C. trachomatis and N. gonorrhoeae.
Chronic bacterial	Enterobacteriaceae 80%, enterococci 15%, P. aeruginosa	**CIP** 500 mg po bid x 4 wks OR **Levo** 750 mg po q24h x 4 wks.	**TMP-SMX-DS** 1 tab po bid x 1–3 mos (Fosfomycin: *see Comment*)	**With treatment failures** consider infected prostatic calculi. Fosfomycin penetrates prostate; case report of success with 3 gm po q24h x 12-16 wks *(CID 61:1141, 2015)* or 3 gm q3d x 6 wks *(AAC 60:1854, 2016)*.
Chronic prostatitis/chronic pain syndrome	The most common prostatitis syndrome. Etiology is unknown.	α-adrenergic blocking agents are controversial *(AnIM 133:367, 2000)*.		Pt has sx of prostatitis but negative cultures and no cells in prostatic secretions. Rev.: *JAC 46:157, 2000*. In randomized double-blind study, CIP and an alpha-blocker of no benefit *(AnIM 141:581 & 639, 2004)*.
HAND *(Bites: See Skin)*				
Paronychia				
Nail biting, manicuring	Staph. aureus (maybe MRSA)	Incision & drainage; culture	**TMP-SMX-DS** 1-2 tabs po bid	*See Table 6 for alternatives*. Occasionally--candida, gram-negative rods.
Contact with saliva— dentists, anesthesiologists, wrestlers	Herpes simplex (Whitlow)	**Acyclovir** 400 mg tid po x 10 days	**Famciclovir** or **Valacyclovir**, *see Comment*	Gram stain and routine culture negative. Famciclovir/valacyclovir for primary genital herpes; *see Table 14A, page 195*
Dishwasher (prolonged water immersion)	Candida sp.	**Clotrimazole** (topical)		Avoid immersion of hands in water as much as possible.
HEART				
Infective endocarditis—Native valve—empirical rx awaiting cultures—No IV illicit drugs	**Diagnostic criteria** include evidence of continuous bacteremia (multiple positive blood cultures), new murmur (worsening of old murmur) of valvular insufficiency, definite emboli, and echocardiographic (transthoracic or transesophageal) evidence of valvular vegetations. Refs.: *Circulation 132:1435, 2015.* For antimicrobial prophylaxis, *see Table 15C, page 234.*			
Valvular or congenital heart disease but no modifying circumstances *See Table 15C, page 234 for prophylaxis*	Viridans strep 30–40%, "other" strep 15–25%, enterococci 5–18%, staphylococci 20-35% (including coag-neg staphylococci- *CID 46:232, 2008)*.	**Vanco** 30-60 mg/kg/d in 2-3 div doses, target AUC_{24} 400-600 µg/mL x h + **Ceftriaxone** 2g 24h OR **Vanco** 30-60 mg/kg/d in 2-3 div doses, target AUC_{24} 400-600 µg/mL x h + **Gent** 1 mg/kg q8h IV/IM	Substitute **Dapto** 10 mg/kg IV q24h (or q48h for CrCl <30 mL/min) for **Vanco**	Gent dose is for CrCl of 80 mL/min or greater; even low-dose Gentamicin for only a few days carries risk of nephrotoxicity *(CID 48:713, 2009)*. Peak levels need not exceed 4 µg/mL and troughs should be <1 µg/mL. Modify therapy based on identification of specific pathogen as soon as possible to obtain best coverage and to avoid toxicities.
Infective endocarditis—Native valve—culture positive Ref: *Circulation 132:1435, 2015.*				
Viridans strep, S. bovis *(S. gallolyticus)* with **pen G MIC ≤0.12 mcg/mL**	**Viridans strep, S. bovis (S. gallolyticus subsp. gallolyticus)**	(**Pen G** 12–18 million units/ day IV, divided - q4h x 4 wks) **OR** (**Ceftriaxone** 2 gm IV q24h x 4 wks)	[(**Pen G or Ceftriaxone** 2 gm IV q24h) + **Gent** 3 mg per kg IV q24h] x 2 wks.	4-wks regimen preferred for most patients. Avoid 2-wks regimen for patients age >65 years, those with cardiac or extracardiac abscess, creatinine clearance of <50 mL/min, impaired eighth cranial nerve function, or Abiotrophia, Granulicatella, or Gemella spp infection. Vancomycin 15 mg/kg q12h x 4 weeks, dose adjusted to achieve trough concentrations of 10-15 µg/mL for patients allergic to or intolerant of Pen or Ceftriaxone.

Abbreviations on page 2. **NOTE: All dosage recommendations are for adults (unless otherwise indicated) and assume normal renal function. § Alternatives consider allergy, PK, compliance, local resistance, cost.*

TABLE 1 (27)

ANATOMIC SITE/DIAGNOSIS/ MODIFYING CIRCUMSTANCES	ETIOLOGIES (usual)	SUGGESTED REGIMENS*		ADJUNCT DIAGNOSTIC OR THERAPEUTIC MEASURES AND COMMENTS
		PRIMARY	ALTERNATIVE§	
HEART/Infective endocarditis—Native valve—culture positive *(continued)* Ref: *Circulation 132:1435, 2015.*				
Viridans strep, S. bovis (S. gallolyticus) with **pen G MIC >0.12 to <0.5 mcg/mL**	**Viridans strep, S. bovis (S. gallolyticus subsp. gallolyticus)**	**Pen G** 24 million units/day IV (divided q4h) x 4 wks + **Gent** 3 mg/kg IV q24h x 2 wks	**Vanco** 15-20 mg/kg q12h x 4 wks, target AUC_{24} 400-600 µg/mL x h	If the isolate is Ceftriaxone susceptible (MIC ≤0.5 µg/mL), then Ceftriaxone x 4 wks alone is an option.
For viridans strep or S. bovis with **pen G MIC ≥0.5 mcg/mL** **NOTE:** Inf. Dis. consultation suggested	**Viridans strep, S. bovis, nutritionally variant streptococci** (new names are: Abiotrophia sp. & Granulicatella sp.)	[(**Pen G** 24 million units per 24h IV, divided q4h x 4 wks) + (**Gent** 3 mg/kg/d in 2-3 divided doses x 4 wks)] OR (**AMP** 12 gm/day IV, divided q4h + **Gent** as above x 4 wks)	**Vanco** 15-20 mg/kg q12h x 4 wks, target AUC_{24} 400-600 µg/mL x h	For streptococci with Ceftriaxone MIC ≤0.5 µg/mL, Ceftriaxone 2 gm q24h can be substituted for ampicillin or penicillin. For gentamicin given 1 mg/kg q8h target peak serum concentration of 3-4 µg/mL and trough serum concentration of <1 µg/mL.
Enterococci, penicillin and aminoglycoside susceptible	E. faecalis E. faecium	Pen sensitive and synergy with Gent positive: (**Amp** 12 gm/day IV divided q4h + **Ceftriaxone** 2 gm IV q12h) x 6 weeks **Pen G** 24 million units/day IV divided q4h + **Gent** 1 mg/kg q8h IV x 4-6 weeks (6-week course for patients with > 3 months of symptoms or for prosthetic valve infection) **Amp** 12 gm/day IV, divided q4h + **Gent** 1 mg/kg q8h IV x 4-6 weeks (6-weeks for patients with > 3 months of symptoms or for prosthetic valve infection)	(**AMP** 2 gm IV q4h + **Ceftriaxone** 2 gm IV q12h) x 6 wks Penicillin-intolerant patient only: (**Vanco** 30 mg/kg/d IV in 2 divided doses + **Gent** 1 mg/kg IV q8h) x 6 wks	**Native valve:** 4 wks Pen or AMP + Gent if symptoms <3 mo; 6 wks if symptoms >3 mo; **prosthetic valve:** 6 wks. **Vanco** target AUC_{24} 400-600 µg/mL x h. Adjust dose of **Gent** to achieve peak serum conc. of 3-4 µg/mL and trough of <1 µg/mL. **AMP + Ceftriaxone** preferred for patients with creatinine clearance <50 mL/min or who develop such on gent regimen. Vanco + Gent toxic: consider pen desensitization.
Enterococci, Penicillin susceptible, Gentamicin resistant (MIC >500 µg/mL), streptomycin susceptible (MIC <1500 µg/mL)	E. faecalis E. faecium	(**AMP** 2 gm IV q4h + **Ceftriaxone** 2 gm IV q12h) x 6 wks	[(**AMP** 2 gm IV q4h or **Pen G** 24 million units) + **streptomycin** 15 mg/kg IV q24h] x 4-6 wks	Must confirm streptomycin MIC for synergy if strep combo used. **AMP + Ceftriaxone** regimen preferred, if creatinine clearance <50 mL/min, concern for impaired eighth nerve function.
Enterococci, Penicillin, aminoglycoside, Vancomycin resistant	E. faecalis E. faecium	**Dapto** 8-12 mg/kg IV q24h + **AMP** 2 gm IV q4h	**Linezolid** 600 mg IV/po q12h	**Quinupristin-Dalfopristin** 7.5 mg/kg IV q8h (via central line for E. faecium, not active vs E. faecalis). Duration of therapy ≥8 weeks, expert consultation strongly advised. Valve replacement often required for cure.
Infective endocarditis, Gram-negative bacilli	Enterobacteriaceae or P. aeruginosa	Optimal therapy unknown, infectious diseases consult recommended: an aminoglycoside (**Tobra** if P. aeruginosa) + (**Cefepime** or **MER**) is a reasonable option.		Choice of agents based on in vitro susceptibilities, fluoroquinolone an option instead of aminoglycoside, but few data.
Infective endocarditis, fungal	Candida sp. Aspergillus	Optimal therapy unknown, infectious diseases consultation recommended; an azole or echinocandin is a reasonable empirical choice. High failure rate with medical therapy alone, consider early surgery		

Abbreviations on page 2. **NOTE: All dosage recommendations are for adults (unless otherwise indicated) and assume normal renal function. § Alternatives consider allergy, PK, compliance, local resistance, cost.*

TABLE 1 (28)

ANATOMIC SITE/DIAGNOSIS/ MODIFYING CIRCUMSTANCES	ETIOLOGIES (usual)	SUGGESTED REGIMENS*		ADJUNCT DIAGNOSTIC OR THERAPEUTIC MEASURES AND COMMENTS
		PRIMARY	ALTERNATIVE§	
HEART/Infective endocarditis—Native valve—culture positive *(continued)*				
Staphylococcal endocarditis Aortic &/or mitral valve infection—MSSA Surgery indications: *see Comment page 30.*	**Staph. aureus, methicillin-sensitive**	**Nafcillin/Oxacillin** 2 gm IV q4h x 4-6 wks	[(**Cefazolin** 2 gm IV q8h x 4-6 wks) OR **Vanco** 30-60 mg/kg/d in 2-3 div doses, target AUC_{24} 400-600 µg/mL x h x 4-6 wks	If IgE-mediated penicillin allergy, 10% cross-reactivity to cephalosporins. **Cefazolin** and **Nafcillin** probably similar in efficacy and Cefazolin better tolerated *(CID 65:100, 2017; Clin Micro Infect 24:152, 2018).* Presence of cefazolin inoculum effect may limit efficacy *(Open Forum Infect Dis. 2018 May 23;5(6):ofy123).*
Aortic and/or mitral valve—MRSA	**Staph. aureus, methicillin-resistant**	**Vanco** 30-60 mg/kg/d in 2-3 div doses, target AUC_{24} 400-600 µg/mL x h	**Dapto** 8-12 mg/kg q24h IV (Not FDA approved for this indication or dose)	For other alternatives, *see Table 6, page 93.*
Tricuspid valve infection (usually IVDUs): MSSA, uncomplicated	**Staph. aureus, methicillin-sensitive**	**Nafcillin/Oxacillin** 2 gm IV q4h x 2 wks (uncomplicated)	**If penicillin allergy: Vanco** 30-60 mg/kg/d in 2-3 div doses, target AUC_{24} 400-600 µg/mL x h x 4 wks OR **Dapto** 8-12 mg/kg IV q24h x 4 wks OR **Cefazolin** 2 gm IV q8h x 4 wks	**2-week regimen not long** enough if metastatic infection (e.g., osteo) or left-sided endocarditis. **Dapto** resistance can occur de novo, after or during vanco, or after/during dapto therapy. *See Comments on MSSA above.*
Tricuspid valve--MRSA	**Staph. aureus, methicillin-resistant**	**Vanco** 30-60 mg/kg/d in 2-3 div doses, target AUC_{24} 400-600 µg/mL x h recommended for serious infections x 4-6 wks	**Dapto** 8-12 mg/kg IV q24h x 4-6 wks	
Slow-growing fastidious Gm-neg. bacilli--any valve	**HACEK group** *(see Comments).*	**Ceftriaxone** 2 gm IV q24h x 4 wks OR **CIP** 400 mg IV q12h x 4 wks	**Amp-sulb** 3 gm IV q6h x 4 wks OR **Levo** 750 mg po/IV q24h x 4 wks OR **Moxi** 400 mg po/IV q24h x 4 wks	**HACEK** (acronym for Haemophilus parainfluenza, Aggregatibacter, Actinobacillus, Cardiobacterium, Eikenella, Kingella). **AMP** 2 gm IV q4h an option if growth of isolate in vitro is sufficient for reliable determination of ampicillin susceptibility.
Bartonella species--any valve	B. henselae, B. quintana	**Doxy** 100 mg IV/po bid x 6 weeks + **Gent** 3 mg/kg/day IV divided in 3 equal doses x 2 wks, then continue doxy for an additional 3 months unless valve resected, then 6 wks	If can't use gentamicin: **Doxy** 100 mg IV/po bid x 6 wks + **RIF** 300 mg IV/po bid x 2 wks, then continue doxy for an additional 3 months unless valve resected, then 6 wks	**Dx:** Immunofluorescent antibody titer ≥1:800; blood cultures only occ. positive, or PCR of tissue from surgery *(J Clin Micro 57:e00114, 2019).* B. quintana transmitted by body lice among homeless. **Doxy** considered safe regardless of age for rx ≤21 days *(AAP Redbook 2018).*
Infective endocarditis— "culture negative"				
Fever, valvular disease, and ECHO vegetations ± emboli and neg. cultures.		Etiology in 348 cases studied by serology, culture, histopath, & molecular detection: C. burnetii 48%, Bartonella sp. 28%, and rarely (Abiotrophia elegans (nutritionally variant strep), Mycoplasma hominis, Legionella pneumophila, Tropheryma whipplei—together 1%), & rest without etiology identified (most on antibiotic).		
Infective endocarditis—Prosthetic valve—empiric therapy (cultures pending) S. aureus now most common etiology *(JAMA 297:1354, 2007).*				
Early (<2 mos post-op)	S. epidermidis, S. aureus. Rarely, Enterobacteriaceae, diphtheroids, fungi	**Vanco** 30-60 mg/kg/d in 2-3 div doses, target AUC_{24} 400-600 µg/mL x h + **Gent** 1 mg/kg IV q8h + **RIF** 600 mg po q24h		Early surgical consultation advised especially if etiology is S. aureus, evidence of heart failure, presence of diabetes and/or renal failure, or concern for valve ring abscess. Early valve surgery not associated with improved 1 year survival in patients with S. aureus prosthetic valve infection *(CID 60:741, 2015).*
Late (>2 mos post-op)	S. epidermidis, viridans strep, enterococci, S. aureus			

Abbreviations on page 2. **NOTE: All dosage recommendations are for adults (unless otherwise indicated) and assume normal renal function. § Alternatives consider allergy, PK, compliance, local resistance, cost.*

TABLE 1 (29)

ANATOMIC SITE/DIAGNOSIS/ MODIFYING CIRCUMSTANCES	ETIOLOGIES (usual)	SUGGESTED REGIMENS* PRIMARY	SUGGESTED REGIMENS* ALTERNATIVE§	ADJUNCT DIAGNOSTIC OR THERAPEUTIC MEASURES AND COMMENTS
HEART *(continued)*				
Infective endocarditis— Prosthetic valve—positive blood cultures **Surgical consultation advised:** Indications for surgery: severe heart failure, S. aureus infection, prosthetic dehiscence, resistant organism, emboli due to large vegetation *(See AHA guidelines; Circulation 132:1435, 2015).*	Staph. epidermidis	(**Vanco** 30-60 mg/kg/d in 2-3 div doses, target AUC_{24} 400-600 µg/mL x h + **RIF** 300 mg po q8h) x 6 wks + **Gent** 1 mg/kg IV q8h x 14 days.		If S. epidermidis is susceptible to nafcillin/oxacillin in vitro, then substitute nafcillin (or oxacillin) for vanco. Some clinicians prefer to wait 2-3 days after starting vanco/ gent before starting RIF, to decrease bacterial density and thus minimize risk of selecting rifampin-resistant subpopulations.
	Staph. aureus	Methicillin sensitive: (**Nafcillin/Oxacillin** 2 gm IV q4h + **RIF** 300 mg po q8h) x 6 wks + **Gent** 1 mg per kg IV q8h x 2 wks. Methicillin resistant: (**Vanco** 30-60 mg/kg/d in 2-3 div doses, target AUC_{24} 400-600 µg/mL x h + **RIF** 300 mg po q8h) x 6 wks + **Gent** 1 mg per kg IV q8h x 2 wks.		
	Viridans strep, enterococci	*See infective endocarditis, native valve, culture positive, page 30.* Treat for 6 weeks.		
	Enterobacteriaceae or P. aeruginosa	[(**Cefepime** 2 gm IV q8h or **MER** 1 gm IV q8h) or (**Pip-tazo** 4.5 gm IV q6h) + **Tobra** 1.5-2 mg/kg IV q8h]		In theory, could substitute CIP for aminoglycoside, but no clinical data and resistance is common. Select definitive regimen based on susceptibility results.
	Candida, aspergillus	*Table 11, page 142*		High mortality. Valve replacement plus antifungal therapy standard therapy but some success with antifungal therapy alone.
Infective endocarditis—Q fever *Emerg Infect Dis 21:1183, 2015 JCM 52:1637, 2014*	Coxiella burnetii	**Doxy** 100 mg po bid + **hydroxychloroquine** 600 mg/day for at least 18 mos *(Mayo Clin Proc 83:574, 2008).* *Pregnancy: Need long term* **TMP-SMX** *(see CID 45:548, 2007).*		**Dx:** IFA > 800 phase I IgG plus evidence of endocarditis or vasculopathy or signs of chronic Q fever **OR** positive Coxiella burnetii PCR of blood or tissue. Possible chronic Q fever = IFA > 800 phase I IgG. Treatment duration: 18 mos for native valve, 24 mos for prosthetic valve. Monitor serologically for 5 yrs.
Pacemaker/defibrillator infections	S. aureus (40%), S. epidermidis (40%), Gram-negative bacilli (5%), fungi (5%).	MRSA/MRSE: **Device removal + Vanco** 30-60 mg/kg/d in 2-3 div doses, target AUC_{24} 400-600 µg/mL x h. MSSA/MSSE: **Nafcillin/ Oxacillin** 2 gm IV q4h OR **Cefazolin** 2 gm IV q8h	MRSA/MRSE: **Device removal + Dapto** 8-10 mg per kg IV q24h[NAI]	**Duration of rx after device removal:** For "pocket" or subcutaneous infection, 10-14 days; if lead-assoc. endocarditis, 4-6 wks depending on organism. Device removal and absence of valvular vegetation assoc. with significantly higher survival at 1 yr *(JAMA 307:1727, 2012).* British guidelines: *JAC 70:325, 2015.* Prophylaxis: Antibiotic eluting envelope (Tyrx) reduced infection of implantable devices *(NEJM 380:1895, 2019).*
Pericarditis, bacterial	Staph. aureus, Strep. pneumoniae, Group A strep, Enterobacteriaceae	[**Vanco** 30-60 mg/kg/d in 2-3 div doses, target AUC_{24} 400-600 µg/mL x h + (**Ceftriaxone** 2 gm q24h OR **Cefepime** 2 gm IV q8h)] *(Dosage, see footnote[9])*	**Vanco + CIP** 400 mg q12h *(see footnote[9])*	Drainage required if signs of tamponade. Adjust regimen based on results of organism ID and susceptibility. Use Nafcillin, Oxacillin, or Cefazolin for confirmed MSSA infection.
Rheumatic fever with carditis Ref.: *Ln 366:155, 2005*	Post-infectious sequelae of Group A strep infection (usually pharyngitis)	ASA, and usually prednisone 2 mg/kg po q24h for symptomatic treatment of fever, arthritis, arthralgia. May not influence carditis.		Clinical features: Carditis, polyarthritis, chorea, subcutaneous nodules, erythema marginatum. Prophylaxis: *see page 68.* ASA dose: 80-100 mg/kg/day (pediatric), 4-8 gm/day (adult). Eradication of group A streptococcus also recommended: Child, Penicillin V, 250 mg po tid x 10 days; adult, Penicillin V 500 mg po tid x 10 days.

[9] **Aminoglycosides** *(see Table 10C, page 134)*, **IMP** 0.5 gm IV q6h, **MER** 1 gm IV q8h, **Nafcillin** or **Oxacillin** 2 gm IV q4h, **Pip-Tazo** 3.375 gm IV q6h or 4.5 gm q8h, **Amp-sulb** 3 gm IV q6h, **P Ceph** 1 (**cephalothin** 2 gm IV q4h or **cefazolin** 2 gm IV q8h), **CIP** 750 mg po bid or 400 mg IV bid, **Vanco** 30-60 mg/kg/d in 2-3 div doses, target AUC_{24} 400-600 µg/mL x h, **RIF** 600 mg po q24h, **Aztreonam** 2 gm IV q8h, **Cefepime** 2 gm IV q12h

 **NOTE: All dosage recommendations are for adults (unless otherwise indicated) and assume normal renal function. § Alternatives consider allergy, PK, compliance, local resistance, cost.*

TABLE 1 (30)

ANATOMIC SITE/DIAGNOSIS/ MODIFYING CIRCUMSTANCES	ETIOLOGIES (usual)	SUGGESTED REGIMENS* PRIMARY	SUGGESTED REGIMENS* ALTERNATIVE§	ADJUNCT DIAGNOSTIC OR THERAPEUTIC MEASURES AND COMMENTS
HEART *(continued)*				
Ventricular assist device-related infection Manifest & mgmt: *CID 57:1438, 2013* Prevent & mgmt: *CID 64: 222, 2017*	S. aureus, S. epidermidis, aerobic gm-neg bacilli, Candida sp	After culture of blood, wounds, drive line, device pocket and maybe pump: **Vanco** 30-60 mg/kg/d in 2-3 div doses, target AUC_{24} 400-600 µg/mL x h + (**Cefepime** 2 gm IV q12h) + **Fluconazole** 800 mg IV q24h.		Can substitute **Daptomycin** 10 mg/kg/d[NAI] for **Vanco,** (**CIP** 400 mg IV q12h or **Levo** 750 mg IV q24h) for cefepime, and (**Vori, Caspo, Micafungin or Anidulafungin**) for **Fluconazole**. Modify regimen based on results of culture and susceptibility tests. Higher than FDA-approved Dapto dose because of potential emergence of resistance.
JOINT—*Also see Lyme Disease, page 65*				
Reactive arthritis				
Reiter's syndrome *(See Comment for definition)*	Occurs wks after infection with C. trachomatis, Campylobacter jejuni, Yersinia enterocolitica, Shigella/Salmonella sp.	Only treatment is non-steroidal anti-inflammatory drugs		**Definition:** Urethritis, conjunctivitis, arthritis, and sometimes uveitis and rash. **Arthritis:** asymmetrical oligoarthritis of ankles, knees, feet, sacroiliitis. **Rash:** palms and soles—keratoderma blennorrhagica; circinate balanitis of glans penis. HLA-B27 positive predisposes to Reiter's.
Poststreptococcal reactive arthritis *(See Rheumatic fever, above)*	Immune reaction after strep pharyngitis: (1) arthritis onset in <10 days, (2) lasts months, (3) unresponsive to ASA	Treat strep pharyngitis and then NSAIDs (prednisone needed in some pts)		A reactive arthritis after a β-hemolytic strep infection in absence of sufficient Jones criteria for acute rheumatic fever. Ref.: *Pediatr Emerg Care 28:1185, 2012.*
Septic arthritis: Treatment requires both adequate drainage of purulent joint fluid and appropriate antimicrobial therapy. **There is no need to inject antimicrobials into joints.** Empiric therapy after collection of blood and joint fluid for culture; review Gram stain of joint fluid. 2 wk of oral step-down after surgical drainage and 1-2 days of IV therapy non-inferior to 4 wk for septic arthritis, principally hand or wrist, in adults *(Ann Rheum Dis 2019; 78:1114).*				
Infants <3 mos (neonate)	Staph. aureus, Enterobacteriaceae, Group B strep	**If MRSA not a concern:** (**Nafcillin** OR **Cefazolin**) + **Cefotaxime**	**If MRSA a concern: Vanco + Cefotaxime**	Blood cultures frequently positive. Adjacent bone involved in 2/3 pts. Group B strep and gonococci most common community-acquired etiologies. Kingella kingae suscept. to ceftriaxone *(Ped Infect Dis J 2016, 35:340).*
Children (3 mos–14 yrs) *K. kingella* most common for age 6-48 mos.	S. aureus 27%, S. pyogenes & S. pneumo 14%, H. influ 3%, Gm-neg. bacilli 6%, other (GC, N. mening) 14%, unk 36%	MRSA prevalence high: **Vanco + Cefotaxime** MRSA prevalence low: **Cefazolin**		Marked ↓ in H. influenzae since use of conjugate vaccine. Usual duration is 3 weeks for S. aureus, 2-3 weeks others. 10 days of therapy as effective as a 30-day treatment course if there is a good clinical response and CRP levels normalize quickly *(CID 48:1201, 2009).*
Adults *(review Gram stain): See page 65 for Lyme Disease and page 65 for gonococcal arthritis*				
Acute monoarticular				
At risk for sexually-transmitted disease	**N. gonorrhoeae** *(see page 25)*, S. aureus, streptococci, rarely aerobic Gm-neg. bacilli	**Gram stain negative:** **Ceftriaxone** 1 gm IV q24h or **Cefotaxime** 1 gm IV q8h or **Ceftizoxime** 1 gm IV q8h	If Gram stain shows Gm+ cocci in clusters: **Vanco** 30-60 mg/kg/d in 2-3 div doses, target AUC_{24} 400-600 µg/mL x h	Suspected gonococcal infections (GC): culture urethra, cervix, anal canal, throat, blood, joint fluid. For treatment comments, *see Disseminated GC, page 25.*

 **NOTE: All dosage recommendations are for adults (unless otherwise indicated) and assume normal renal function. § Alternatives consider allergy, PK, compliance, local resistance, cost.*

TABLE 1 (31)

ANATOMIC SITE/DIAGNOSIS/ MODIFYING CIRCUMSTANCES	ETIOLOGIES (usual)	SUGGESTED REGIMENS*		ADJUNCT DIAGNOSTIC OR THERAPEUTIC MEASURES AND COMMENTS
		PRIMARY	ALTERNATIVE§	
JOINT/Septic arthritis/Adults/Acute monoarticular *(continued)*				
Not at risk for sexually-transmitted disease	S. aureus, streptococci, Gm-neg. bacilli	Gram stain shows Gram-pos. cocci: **Vanco** 30-60 mg/kg/d in 2-3 div doses, target AUC_{24} 400-600 µg/mL x h Gram stain shows Gram-neg bacilli: **Cefepime** 2 gm q8h IV OR **Meropenem** 1 gm q8h IV Gram stain neg: **Vanco** 30-60 mg/kg/d in 2-3 div doses, target AUC_{24} 400-600 µg/mL x h + [**Ceftriaxone** 1 gm IV q24h OR **Cefepime** 2 gm q8h IV q8h (preferred for possible healthcare-associated infection)] *For treatment duration, see Table 3, page 79*		Differential includes gout and chondrocalcinosis (pseudogout). **Look for crystals in joint fluid.** Adjust regimen based on culture and susceptibility. **NOTE:** *See Table 6* for MRSA treatment.
Chronic monoarticular	Brucella, nocardia, mycobacteria, fungi	*See specific bacterial organism (Table 2) and/or mycobacteria (Table 12)*		*See Brucellosis, page 67*
Polyarticular, usually acute	**Gonococci,** B. burgdorferi (Lyme), acute rheumatic fever; viruses, e.g., hepatitis B, rubella vaccine, parvo B19, staph and strep may also cause polyarticular infections	Gram stain usually negative for GC. If sexually active, culture urethra, cervix, anal canal, throat, blood, joint fluid, and then: **Ceftriaxone** 1 gm IV q24h. No STD risk, Gram stain negative: **Vanco** + **Ceftriaxone** OR **Cefepime**.		GC may be associated with pustular/hemorrhagic skin lesions and tenosynovitis; treat with **Ceftriaxone** for 7 days and with **Azithromycin** 1 gm po x1 OR **Doxycycline** 100 mg po twice daily for 7 days if GC proven or suspected. Consider Lyme disease if exposure areas known to harbor infected ticks *(see page 65)*; usually large joint. Vanco+ CIP or Levo also an option if low STD risk. Expanded differential includes gout, pseudogout, reactive arthritis (HLA-B27 pos.).
Septic arthritis, post intra-articular injection	MSSE/MRSE 40%, MSSA/ MRSA 20%, P. aeruginosa, Propionibacteria, AFB	**NO empiric therapy.** Arthroscopy for culture/sensitivity, crystals, washout		Treat based on culture results x 14 days (assumes no foreign body present).

TABLE 1 (32)

ANATOMIC SITE/DIAGNOSIS/ MODIFYING CIRCUMSTANCES	ETIOLOGIES (usual)	SUGGESTED REGIMENS* PRIMARY	SUGGESTED REGIMENS* ALTERNATIVE§	ADJUNCT DIAGNOSTIC OR THERAPEUTIC MEASURES AND COMMENTS
JOINT *(continued)*				
Infected prosthetic joint (PJI) • Suspect infection if sinus tract or wound drainage; acutely painful prosthesis; chronically painful prosthesis; or high ESR/CRP assoc. w/painful prosthesis. • **Empiric therapy is NOT recommended.** Treat based on culture and sensitivity results. • **3 surgical options:** 1) debridement and prosthesis retention (if sx <3 wks or implantation <30 days); 2) 1 stage, direct exchange; 3) 2 stage: debridement, removal, reimplantation • **IDSA Guidelines:** *CID 56:e1, 2013.*	MSSA/MSSE	**Debridement/Retention**: (**Nafcillin/Oxacillin** 2 gm IV q4h + **RIF** 300 mg po bid) OR (**Cefazolin** 2 gm IV q8h + **RIF** 300 mg po bid) x 2-6 wks followed by [(**CIP** 750 mg po bid OR **Levo** 750 mg po q24h) + **RIF** 300 mg po bid] for 3-6 months (shorter duration for total hip arthroplasty) **1-stage exchange:** IV/po regimen as above for 3 mos **2-stage exchange:** regimen as above for 4-6 wks	(**Dapto** 8-10 mg/kg IV q24h OR **Linezolid** 600 mg po/IV bid) ± **RIF** 300 mg po bid	• **Confirm isolate susceptibility to fluoroquinolone and rifampin:** for fluoroquinolone-resistant isolate consider using other active highly bioavailable agent, e.g., TMP-SMX, Doxy, Minocycline, Amoxicillin-Clavulanate, Clindamycin, or Linezolid. • Enterococcal infection: addition of aminoglycoside optional. • *P. aeruginosa* infection: consider adding aminoglycoside if isolate is susceptible, (but if this improves outcome unclear). • Prosthesis retention most important risk factor for treatment failure *(Clin Microbiol Infect 16:1789, 2010).* (Linezolid 600 mg + Rifampin 300 mg) may be effective as salvage therapy if device removal not possible *(Antimicrob Agents Chemother 55:4308, 2011)* • If prosthesis is retained, consider long-term, suppressive therapy, particularly for staphylococcal infections: depending on in vitro susceptibility options include TMP-SMX, Doxycycline, Minocycline, Amoxicillin, Ciprofloxacin, Cephalexin. • Culture yield may be increased by sonication of prosthesis (*N Engl J Med 357:654, 2007).* • Other treatment consideration: Rifampin is bactericidal vs. biofilm-producing bacteria. Never use Rifampin alone due to rapid development of resistance. Rifampin 300 mg po/IV bid + Fusidic acid[NUS] 500 mg po/IV tid is another option *(Clin Micro Inf 12(S3):93, 2006).* • Watch for toxicity if Linezolid is used for more than 2 weeks of therapy. • Role of longer durations of therapy or chronic suppressive therapy in Gram-negative or Pseudomonas PJI not established. • Alpha-defensin immunoassay (Synovasure) with a sensitivity ~0.8-0.9 and specificity ~0.9-0.95 may be a useful biomarker for diagnosis of PJI. • Observational study of 156 pts, 35.6% given FQ vs. 3% given non-FQ treatment required cessation of the FQ due to AEs *(CID 73:850 & 857, 2021).*
	MRSA/MRSE	**Debridement/Retention:** (**Vanco** 30-60 mg/kg/d in 2-3 div doses, target AUC_{24} 400-600 µg/mL x h + **RIF** 300 mg po bid) x 2-6 weeks *followed by* [(**CIP** 750 mg po bid OR **Levo** 750 mg po q24h) + **RIF** 300 mg po bid] for 3-6 months (shorter duration for total hip arthroplasty) **1-stage exchange:** IV/po regimen as above for 3 mos **2-stage exchange:** regimen as above for 4-6 wks	(**Dapto** 8-10 mg/kg IV q24h OR **Linezolid** 600 mg po/IV bid) ± **RIF** 300 mg po bid	
	Streptococci (Grps A, B, C, D, viridans, other)	**Debridement/Retention** (Poorer outcomes with retention compared with removal and exchange, *CID 64:1742, 2017*): **Pen G** 20 million units IV continuous infusion q24h or in 6 divided doses OR **Ceftriaxone** 2 gm IV q24h x 4-6 wks **1 or 2 stage exchange:** regimen as above for 4-6 wks	**Vanco** 15 mg/kg IV q12h	
(Continued on next page)				*(Continued on next page)*

TABLE 1 (33)

ANATOMIC SITE/DIAGNOSIS/ MODIFYING CIRCUMSTANCES	ETIOLOGIES (usual)	SUGGESTED REGIMENS*		ADJUNCT DIAGNOSTIC OR THERAPEUTIC MEASURES AND COMMENTS
		PRIMARY	ALTERNATIVE§	
JOINT/Infected prosthetic joint (PJI) *(continued)*				
(Continued from previous page)	Enterococci	**Debridement/Retention:** **Pen-susceptible:** (**AMP** 200 mg/kg/day IV in divided doses q6h or **Pen G** 20 million units/day IV by continuous infusion or in 6 divided doses) x 4-6 wks **Pen-resistant: Vanco** 15 mg/kg IV q12h x 4-6 wks **1 or 2 stage exchange:** regimen as above for 4-6 wks	**Dapto** 8-10 mg/kg IV q24h OR **Linezolid** 600 mg po/IV bid	*(Continued from previous page)*
	Cutibacterium acnes (Hold broth cultures, especially in infections of the shoulder, for 10 days with blind subculture to maximize recovery of C. acnes *(Clin Infect Dis 2018;66:54; J Clin Microbiol 54:3043, 2016)*).	**Debridement/Retention:** **Pen G** 20 million units IV continuous infusion or in 6 divided doses OR **Ceftriaxone** 2 gm IV q24h x 4-6 wks **1 or 2 stage exchange:** regimen as above for 4-6 wks	**Vanco** 15 mg/kg IV q12h OR **Clinda** 300-450 mg po qid	
	Gm-neg enteric bacilli	**Debridement/Retention:** **Erta** 1 gm q24h IV OR other beta-lactam (e.g., **Ceftriaxone** 2 gm IV q24h OR **Cefepime** 2 gm IV q12h, based on susceptibility) x 4-6 wks **1 or 2 stage exchange:** regimen as above for 4-6 wks	**CIP** 750 mg po bid	
	P. aeruginosa	**Debridement/Retention:** **Cefepime** 2 gm IV q12h OR **MER** 1 gm IV q8h + **Tobra** 5.1 mg/kg once daily IV x 4-6 wks **1 or 2 stage exchange:** regimen as above for 4-6 wks	**CIP** 750 mg po bid or 400 mg IV q8h	
Rheumatoid arthritis	**TNF inhibitors** (adalimumab, certolizumab, etanercept, golimumab, infliximab) and other anti-inflammatory biologics (tofacitinib, rituximab, tocilizumab, abatacept) ↑ risk of TBc, fungal infection, legionella, listeria, and malignancy. Hep B flare may be fatal. *See Med Lett 55:1, 2013 for full listing.*			
Septic bursitis: Olecranon bursitis; prepatellar bursitis	Staph. aureus >80%, M. tuberculosis (rare), M. marinum (rare)	(**Nafcillin/Oxacillin** 2 gm IV q4h or **Cefazolin** 2 gm IV q8h if **MSSA**. Oral step-down: **Diclox** 500 mg po qid	(**Vanco** 30-60 mg/kg/d in 2-3 div doses, target AUC_{24} 400-600 µg/mL x h or **Linezolid** 600 mg po bid) if **MRSA**. Another option: **Dapto** 6 mg/kg IV q24h	Empiric MRSA coverage recommended if risk factors are present and in high prevalence areas. Immunosuppression, not duration of therapy, is a risk factor for recurrence; 7 days of therapy may be sufficient for immuno-competent patients undergoing one-stage bursectomy *(JAC 65:1008, 2010)*.

Abbreviations on page 2. **NOTE: All dosage recommendations are for adults (unless otherwise indicated) and assume normal renal function. § Alternatives consider allergy, PK, compliance, local resistance, cost.*

TABLE 1 (34)

ANATOMIC SITE/DIAGNOSIS/ MODIFYING CIRCUMSTANCES	ETIOLOGIES (usual)	SUGGESTED REGIMENS* PRIMARY	SUGGESTED REGIMENS* ALTERNATIVE§	ADJUNCT DIAGNOSTIC OR THERAPEUTIC MEASURES AND COMMENTS
KIDNEY & BLADDER *(Reviewed in Nature Rev 13:269, 2015; IDSA Guidelines CID 52: e103, 2011)*				
Acute Uncomplicated Cystitis & Pyelonephritis in Women				
Cystitis Diagnosis: dysuria, frequency, urgency, suprapubic pain & no vaginal symptoms *See AAC 60:2860, 7535 & 7536, 2016*	E. coli (75-95%) P. mirabilis K. pneumoniae S. saprophyticus Presence of enterococci, Grp B streptococcus, other S. epidermidis suggests contamination Often no need for culture if uncomplicated	**Nitrofurantoin (Macrobid)** 100 mg po bid x 5 d OR **TMP-SMX DS** 1 tab po bid x 3 days (Avoid TMP-SMX if 20% or more local E. coli are resistant) OR **Fosfomycin** 3 gm po x 1 dose (less effective than nitrofurantoin in RCT, *JAMA 2018,319:1771 & 1781*)	• **CIP** 250 mg bid or extended release 500 mg q24h x 3 days • **Levo** 250 mg q24h x 3 days • **Amox-clav** 875/125 mg bid x 5-7 days • **Cephalexin** 500 mg bid x 5-7 days • **Cefdinir** 300 mg bid x 3-7 days • **Pivmecillinam** (NUS) 400 mg bid for 3-7 days	• **Pyridium** (phenazopyridine) may hasten resolution of dysuria. • Beta lactams are less effective. • Nitrofurantoin & Fosfomycin active vs. ESBLs; however, if pyelonephritis avoid these drugs due to low renal concentrations. • Outpatient therapy of UTIs due to MDR bacteria: - Fosfomycin & nitrofurantoin usually active. - Increasing TMP-SMX & FQ resistance *(AAC 2016,60:2680).* - Beta-lactams least efficacious. - Ref: *CID 2016,63:960.*
Pyelonephritis Diagnosis: fever, CVA, pain, nausea/vomiting	Same as for Cystitis, above. Need urine culture & sensitivity testing	*LOW RISK for resistant bacteria:* (**CIP** 500 mg po bid OR **CIP-ER** 1000 mg po once daily OR **Levo** 750 mg po once daily) x 5-7 days OR **Ceftriaxone** 1 gm IV qd x 10 days (can transition to po FQ or TMP-SMX 1 DS bid if suscept) *HIGH RISK for MDR bacteria* consider **Erta** 1 gm IV qd or, if critically ill and/or had recent Pseudomonas infection, **MER** 1 gm IV q8h	*Low risk for resistant bacteria:* **Erta** 1 gm IV q24 or **Gent** 5 mg/kg IV qd. When transitioning to po, if FQ or TMP-SMX not an option, consider oral B-lactams to complete 14 days (may be less effective): **Cefixime** 400 mg po qd *(Emerg Med J 2002; 19:19)* **Amox-clav** 875 mg/125 mg po bid	• When tolerating po fluids, can transition to oral therapy; drug choice based on culture/sens results. • Consider imaging (US / CT) if critical illness, new renal failure, history of nephrolithiasis, ureteral colic, obstructive uropathy, urine pH ≥ 7.0, or failure to respond to appropriate therapy. • **HIGH-RISK for resistant bacteria include prior highly resistant bacteria in urine, recent inpatient health-care facility stay, obstructive uropathy, recent fluoroquinolone or B-lactam exposure, recent travel to Asia, Middle East or Africa in past 3 months).** • Review of pyelonephritis *(N Engl J Med 2018;378:48).*
Pregnancy: Asymptomatic bacteriuria & cystitis Drug choice based on culture / sensitivity results; do follow-up culture one week after last dose of antibiotic	E. coli (70%) Klebsiella sp. Enterobacter sp. Proteus sp. Grp B Streptococcus	**Nitrofurantoin (Macrobid)** (but not in 3rd trimester) 100 mg po q12h x 5-7 days OR **Amox-clav** 500 mg po q8h x 3-7 days OR **Cephalexin** 500 mg po bid x 3-7 days	**TMP-SMX DS** (but not in 1st trimester or at term) 1 tab po q12h x 3 days OR **Cefpodoxime** 100 mg po q12h x 3-7 days	• Treatment recommended to avoid progression to cystitis or pyelonephritis. • Untreated bacteriuria associated with increased risk of low birth wt, preterm birth & increased perinatal mortality. • If post-treatment culture positive, re-treat with different drug of longer course of same drug. • Avoid nitrofurantoin in 3rd trimester due to risk of hemolytic anemia in newborn.
Pregnancy: Acute pyelonephritis Diagnosis: CVA pain, fever, nausea/vomiting in 2nd/3rd trimester. *See Comment*	Same as for Cystitis, above Regimens are empiric therapy *(see Comment)*	**Moderately ill: Ceftriaxone** 1 gm IV q24h OR **Cefepime** 1 gm IV q12h. If Pen-allergic, **Aztreonam** 1 gm IV q8h (no activity vs. Gram-pos cocci)	**Severely ill: Pip-Tazo** 3.375 gm IV q6h OR **MER** 500 mg IV q8h OR **Erta** 1 gm IV q24h	• Differential dx includes: placental abruption & infection of amniotic fluid. • Try to avoid FQs and AGs during pregnancy. • Switch to po therapy after afebrile x 48 hrs. • **Treat for 10-14 days.** • If pyelo recurs, re-treat. Once asymptomatic continue suppressive therapy for duration of pregnancy: Nitrofurantoin 50-100 mg po qhs OR Cephalexin 250-500 mg po qhs.

Abbreviations on page 2. **NOTE: All dosage recommendations are for adults (unless otherwise indicated) and assume normal renal function. § Alternatives consider allergy, PK, compliance, local resistance, cost.*