NATIONAL ANTIBIOTIC GUIDELINES 2016

DOH
Department of Health

NATIONAL ANTIBIOTIC GUIDELINES

(Gastrointestinal Tract Infections)

GASTROINTESTINAL TRACT INFECTIONS

ACUTE DIARRHEA AND GASTROENTERITIS

Acute Diarrhea In Children

- Acute diarrhea is defined as diarrhea lasting less than 14 days. Mainstay of treatment is to give fluids, zinc supplements, and food.

Classification of dehydration status of children 2 months to 5 years of age (IMCI 2014):

- **Severe dehydration** (when 2 of the following signs are present)
  - Lethargic or unconscious
  - Sunken eyes
  - Not able to drink or drinking poorly
  - Skin pinch goes back very slowly

- **Some dehydration** (when 2 of the following signs are present)
  - Restless, irritable
  - Sunken eyes
  - Drinks eagerly, thirsty
  - Skin pinch goes back slowly

- **No dehydration** (when there are not enough signs to classify patient's status as some or severe)

Etiology	Preferred regimen	Comments
Community and hospital-based based studies in children < 5 years (Saniel et al 1982-84, Lucero et al 1982-83, Carlos et al 1989) • *Salmonella*: 10-15% • ETEC: 9-15% • Rotavirus: 7-17% Etiology of acute diarrheas in developing countries expressed in weighted annual incidence per 100 child years (Nelson's Textbook of Pediatrics, 20th edition, 2015): • **<12 months** – Rotavirus: 2.1-10.1 – Enterotoxigenic *Escherichia coli* (ETEC): 0.7-3.6 – *Cryptosporidium*: 0.7-5.4 • **12-23 months** – Rotavirus: 1.6-12.4 – ETEC: 0.7-2.8 – *Shigella*: 0.5-8.5	**IMCI protocol for neonate up to 2 months:** *For suspected dysentery:* **Ciprofloxacin** tab 30 mg/kg/d div 2 doses x 3d **IMCI protocol for child 2 months to 5 years:** *For suspected cholera:* **Erythromycin** 250 mg tab qid x 3d OR **Tetracycline** 250 mg tab qid x 3d *For suspected dysentery* **Ciprofloxacin** 30 mg/kg/d div 2 doses x 3d **Recommendations of Feigin and Cherry:** *For suspected antibiotic-associated colitis presenting as severe disease or with prolonged symptoms:* **Metronidazole** 30 mg/kg/d IV or PO div 4 doses x 10-14d OR **Vancomycin** 40 mg/kg/d PO div 4 doses especially for patients with severe disease	For children with severe dehydration living in an area with reported cases of cholera, give antibiotic for cholera. For cases of acute diarrhea with dysentery (blood in the stool), give ciprofloxacin for 3 days. For suspected antibiotic-associated colitis, mild disease does not warrant antibiotic treatment since symptoms resolve within 7-10 days after discontinuing precipitating antibiotics. Probiotic treatment of children with *C. difficile* diarrhea has not been well studied.

• **24-59 months** – Rotavirus: 0.3-3.5 – *Shigella*: 0.2-3.1 – *Vibrio cholera* 01: 0.2-1.8	*For suspected nontyphoidal Salmonella in the setting of severe diarrhea in infants less than 6 months of age, malnourished and immunocompromised children:* **Ciprofloxacin** 30 mg/kg/d IV div 2 doses x 10-14d OR **Azithromycin** 6 mg/kg/d PO OD x 5d OR **Ceftriaxone** 75-100 mg/kg/d IV q24h x 14d *For Campylobacter:* **Azithromycin** 10 mg/kg/d PO x 3d OR **Erythromycin** 40 mg/kg/d PO div 4 doses x 5d *For Entamoeba histolytica:* **Metronidazole** 35-50 mg/kg/d PO div 3 doses x 7-10d *For Giardia:* **Metronidazole** 15 mg/kg/d PO div 3 doses x 5-7d *For Cyclospora:* **Trimethoprim-sulfamethoxazole**, with **Trimethoprim** 10 mg/kg/d and **Sulfamethoxazole** 50 mg/kg/d PO div 2 doses x 7-10d	Immunization of infants starting at 6 weeks of age with either of 2 available live attenuated rotavirus vaccines is recommended to afford protection against severe rotavirus disease. The monovalent human rotavirus vaccine is given as a 2-dose series and the pentavalent human bovine rotavirus vaccine is given as a 3-dose series. Oral vancomycin is not available locally.

Gastroenteritis (infectious diarrhea) In Adults		
Clinical Setting	**Preferred regimen**	**Comments**
Mild Diarrhea (≤3 unformed stools per day; minimal associated symptomatology)	Oral Hydration	Try to make specific diagnosis, especially in patients with severe diarrhea or systemic symptoms.
Moderate Diarrhea (3 - 4 unformed stools per day; with or without systemic symptoms)	Oral or Parenteral Hydration	
Severe Diarrhea (≥ 6 unformed stools per day± fever, tenesmus, blood or fecal leukocytes)		
Etiologies: • Bacterial - *Shigella* sp., *Salmonella* sp., *C. jejuni, C. difficile* (Toxin positive) *E. coli* (enterotoxigenic, enteroaggregative, Shiga-toxin producing)	**Empiric therapy:** **Ciprofloxacin** 500 mg PO q12h OR **Levofloxacin** 500 mg PO q24h x 3–5d OR **Azithromycin** 500 mg PO q24h for 3 days (preferred for	

K. oxytoca (Toxin producer) • Parasitic - *Giardia lamblia, E. histolytica*, *Cryptosporidium*	*Campylobacter*) **Cotrimoxazole** DS PO bid x 3–5 days **Specific Therapy:** *Entamoeba histolytica:* **Metronidazole** 500-750mg PO tid x 7-10 days OR **Tinidazole** 2 gm PO daily x 3 days *Vibrio cholera:* **Doxycycline** 300 mg single dose OR **Tetracycline** 500 mg qid X 3 days OR **Cotrimoxazole** DS PO bid X 3 days *Shigella* species: **Cotrimoxazole** DS PO bid X 3days OR **Ciprofloxacin** 500 mg PO bid X 3 days *Clostridium difficile:* **Metronidazole** 500 mg PO tid x 10–14 days. Offending antibiotic should be withdrawn if possible.	

Primary spontaneous bacterial peritonitis (SBP) Characterized by a patient with cirrhosis, ascites, fever, and ≥ 250 neutrophils/µl of ascitic fluid.		
Etiology	**Preferred regimen**	**Comments**
P: *Streptococcus pneumoniae* (30-50%; most common) *E. coli* (25-40%) Staphylococci (2-4%) Group A *Streptococcus* *Enterococci* *Klebsiella pneumoniae*	*Streptococcus pneumoniae:* **Cefotaxime** 200 mg/kg/d IV div 4 or 6 doses OR **Ceftriaxone** 100 mg/kg/d IV div 1-2 doses OR If penicillin sensitive *Streptococcus pneumoniae*, aqueous **Penicillin** G– 200,000-300,000 U/kg/d IV in 6 divided doses X10-14d *For Gram-negative bacilli:* **Cefotaxime** 200 mg/kg/d IV div 4 or 6 doses x 10d to 3 weeks OR **Ceftriaxone** 100 mg/kg/d IV div 1-2 doses x 10d to 3 weeks +/-	Perform analysis (check bleeding parameters first), Gram stain and culture of peritoneal fluid to distinguish primary from secondary peritonitis. Ceftriaxone may cause bile sludge in patients with jaundice or cirrhosis. Maintain fluid and electrolyte balance. Do surgical consult. Start antimicrobials as soon as possible. Generally managed medically. Duration of antibiotic therapy depends on clinical course of the patient.

	Gentamicin 3-7.5 mg/kg/d IV div 3 doses OR Monotherapy with the following antibiotic: **a) Piperacillin tazobactam** 300 mg/kg/d of piperacillin component IV div 3 doses OR **b) Ampicillin-sulbactam** 100-200 mg/kg/d of ampicillin component div 4 doses	Probiotics have no use in the adjunctive treatment.
A: *Enterobacteriaceae* *Strep. pneumoniae* *Enterococcus* sp. Anaerobes Extended spectrum β-lactamase (ESBL) positive *Klebsiella* sp. reported	1st line: **Cefotaxime** 2 gm IV q8h (q4h, if life-threatening infection) OR **Ampicillin-sulbactam** 3g IV q6h OR **Piperacillin-tazobactam** 4.5 gm IV q6h (or 4-hour infusion of 4.5 gm q8h) OR **Ceftriaxone** 2 gm IV q24h OR **Ertapenem** 1 gm IV q24h 2nd line If resistant *E. coli*, *Klebsiella* species (e.g., ESBL) **Meropenem** 1 g IV q8h **Duration of therapy:** Unclear. Treat at 5 days and perhaps longer if documented bacteremia.	
	Antibiotic Prophylaxis: 1. Patients with cirrhosis Norfloxacin 400 mg PO q12h for 7 days OR Ceftriaxone 1 gm IV OD for 7 days	**Indications:** • Variceal or upper GI bleeding

	2. Prophylaxis of SBP **Norfloxacin** 400 mg/day PO OR **Ciprofloxacin** 500 mg/day PO **Duration of prophylaxis for SBP**: Until liver transplantation, death, resolution of ascites or improvement in liver function to a compensated state.	• Low protein ascites (< 15 g/L) • Advanced liver failure (Child-Pugh score ≥ 9 points with serum bilirubin ≥ 3 mg/dl) and/or renal dysfunction (serum creatinine ≥ 1.2 mg/dl, BUN ≥ 25 mg/dl and/or serum sodium ≤ 130 mEq/L) • Prior episode of SBP

Secondary peritonitis		
Etiology	**Preferred regimen**	**Comments**
Usually polymicrobial consisting of anaerobes and facultative gram negative bacilli *Bacteroides fragilis* group *Peptostreptococcus* *E. coli* *Klebsiella* *Pseudomonas aeruginosa* *Enterococcus*	**Metronidazole** 22.5-40 mg/kg/d IV div 3 doses PLUS **Cefotaxime** 200 mg/kg/d IV div 4 or 6 doses OR Monotherapy with the following antibiotics: **Piperacillin tazobactam** 300 mg/kg/d piperacillin component IV div 3 doses OR **Meropenem** 30-60 mg/kg/d IV div 3 doses Antibiotics are generally given for 5-10d but the primary basis for duration of antibiotic treatment is the patient's clinical course.	Patient may require either immediate surgery to control the source of contamination and to remove necrotic tissue, blood and intestinal contents from the peritoneal cavity or a drainage procedure if a limited number of large abscesses can be shown.

CAPD-associated peritonitis

- Infectious complication of chronic ambulatory peritoneal dialysis (CAPD)

Etiology	Preferred regimen	Comments
P: Gram-positive organisms, coagulase negative staphylococci, *S. aureus* (30-45%) *Enterobacteriaceae* (20-30%) *Pseudomonas* (6%) *Acinetobacter* (4%)	**Vancomycin** 45-60 mg/kg/d IV or intraperitoneal in 3-4 doses PLUS **Gentamicin** 3-7.5 mg/kg/d IV div 3 doses Antibiotics are generally given for 10d but the primary basis for duration of antibiotic treatment is the patient's clinical course.	A positive Gram stain will help guide initial therapy. If polymicrobic gram-negative flora is cultured, consider possibility of catheter-induced bowel perforation, and/or concomitant underlying GI pathology (e.g., dead bowel).
Ventriculo-peritoneal shunt peritonitis: Coagulase-positive/negative Staphylococci Gram-negative bacilli	**Vancomycin** 45-60 mg/kg/d IV or intraperitoneal div 3-4 doses PLUS for Gram-negative infections **Cefotaxime** 200 mg/kg/d IV div 4 or 6 doses OR **Ceftriaxone** 100 mg/kg/d IV div 1 or 2 doses OR **Ceftazidime** 200-300 mg/kg/d div 3 doses OR **Meropenem** 30-60 mg/kg/d div 3 doses Antibiotics are generally given for 10d but the primary basis for duration of antibiotic treatment is the patient's clinical course.	Infection almost always limited to abdominal cavity; complicating bacteremia is rare. Hence, usually treat by adding drugs to dialysis fluid; if bacteremia documented or likely, treat via IV route. The following are the recommendations based on the Consensus Guidelines for Prevention and Treatment of Catheter-related infections and peritonitis in pediatric patients receiving peritoneal dialysis (2012 update): • Empiric diagnosis of PD-related peritonitis can be made if the effluent WBC count > 100/mm^3 and at least 50% of the WBCs are polymorphonuclear leukocytes. Effluent should be centrifuged and sediment should be cultured. • Antibiotics for the treatment of bacterial peritonitis should be administered by the intraperitoneal route. Beta lactam antibiotics should be administered continuously. • Center-specific antibiotic susceptibility patterns should guide selection of empiric antibiotic therapy although the ISPD recommends cefepime as empiric treatment. Refer to a specialist for co-management.
A: Gram-positive cocci (45%) Gram-negative bacilli (15%) Mixture (1%) Fungi (2%) *M. tuberculosis* (0.1%)	For Gram-positive cocci: **Vancomycin** added to the dialysis fluid. For Gram-negative bacilli: **Cefepime** 2 gm IV q8–12h OR **Ceftazidime** 3 gm loading dose intraperitoneal (IP), then 1-2 g IP q24h or 2g IP q48h OR **Meropenem** 1 gm IV q8h OR **Aztreaonam** 1–2 gm IV q6–8h OR **Ciprofloxacin** 400 mg IV q12h OR **Amikacin** 15–20 mg/kg IV q24h Add an antifungal only if yeast seen on Gram stain.	Higher cure rate is achieved with VP shunt removal.

Hepatitis A		
Etiology	**Preferred regimen**	**Comments**
Hepatitis A virus	**P:** No antiviral treatment is recommended **A:** No antiviral treatment is recommended. Give supportive measures.	Hepatitis A vaccine is given intramuscularly as a 2 dose series at a minimum age of 12 months. A second dose is given at least 6 months from the first dose. If within 2 weeks of exposure, Hepatitis A vaccination: • **Monovalent Hepatitis A vaccine** a) 720 ELISA units/ml IM - 2 doses 1 month apart b) 1440 ELISA units/ml IM single dose • **Booster dose** between 6 & 12 months after initiation of primary course is recommended to ensure long term antibody titers. (Handbook on Adult Immunization for Filipinos 2012) A single dose of immunoglobulin 0.02 mL/kg IM is protective if administered within 2 weeks of exposure, but is not locally available. Immunoglobulin might be preferred over Hepatitis A vaccination among seronegative individuals with significant underlying liver disease. (Sanford Guide to Antimicrobial Therapy 2016)

Hepatitis B • Patients with Hepatitis B (HBV) are usually asymptomatic. • When symptomatic, common complaints include: fatigue, nausea, anorexia, myalgias, arthralgias, asthenia, weight loss (except where ascites). • There is poor correlation between symptoms and disease stage or transaminase elevation		
Etiology	**Preferred regimen**	**Comments**
Hepatitis B virus	**P:** Refer to a specialist.	Hepatitis B vaccine is given intramuscularly. The first dose is given at birth or within the first 12hours of life. The minimum interval between doses is 4 weeks. The final dose is administered not earlier than age 24 weeks. Another dose is needed if the last dose was given at age < 24 weeks. For preterm infants, if born to HBsAg (-) mothers and medically stable, the first dose of HBV may be given at 30 days of chronological age regardless of weight, and this can be counted as part of the 3 dose primary series.

	A: Refer to a specialist. The following are key indicators for treatment: HBeAg status, HBV viral load (HBV DNA), elevated liver enzymes (ALT level), cirrhosis. For HBeAg+ patients treatment is typically deferred for 3-6 months to observe spontaneous seroconversion from HBeAg+ to negative. [Sanford]	Another dose of HBV is needed for those < 2 kgs whose 1st dose was received at birth. For infants born to HBsAg (+) mothers, administer HBV and HBIG (0.5ml) within 12hours of life. HBIG should be administered not later than 7 days of age, if not immediately available. For infants born to mothers with unknown HBsAg status, if birth weight is ≥2 kg, administer HBV within 12h of birth and determine mother's HBsAg status as soon as possible. If HBsAg (+), administer HBIG not later than 7 days of age. If with birth weight of <2 kg, administer HBIG in addition to HBV within 12h of life. Referral to a specialist is recommended for management of hepatitis cases. Vaccination: **Recombinant Hepatitis B Vaccine** (20 ug/ml) IM 3 doses at 0,1,6months **Combined Hepatitis A** (720 ELISA units) & B (20 ug/ml recombinant) – 3 doses IM at 0,1,6 months (Handbook on Adult Immunization for Filipinos 2012)

Hepatitis C

- Usually asymptomatic (elevated transaminases).
- When symptomatic, common complaints include fatigue, nausea, anorexia, myalgias, arthralgias, asthenia, weight loss (except where ascites).
- If symptomatic, usually abates in days to weeks; rarely associated with hepatic failure.
- 75-85% of persons with acute infection progress to chronic HCV.

Etiology	Preferred regimen	Comments
Hepatitis C virus	**Specialist referral RECOMMENDED.**	No recommended prophylaxis; immune serum globulin not effective.

Liver abscess
- Fever, right upper quadrant tenderness
- Findings consistent with single or multiple abscesses on abdominal ultrasound or CT

Etiology	Preferred regimen	Comments
P: • 50% polymicrobial • *Staphylococcus aureus* • *Streptococcus sp*. • *E. coli* • *Klebsiella pneumoniae, Salmonella* • Anaerobic organisms • In developing countries, may consider *E. histolytica* and *Toxocara canis*	**Ampicillin-sulbactam** 100-200 mg/kg/d ampicillin component IV div 4 doses (max 8 g) OR **Piperacillin-tazobactam** 300 mg/kg/d piperacillin component IV div 3 doses (Daily adult dose 9-16 g) OR **Ceftriaxone** 100 mg/kg/d IV in 1-2 doses (daily adult dose: 2-4 g) PLUS **Metronidazole** 30-50 mg/kg/d IV div 3 doses (daily adult dose 0.75-2.25 g) for 2-3 weeks then shift to oral to complete 4-6 weeks. *For hepatic abscess secondary to* E. histolytica*:* **Metronidazole** 30-50 mg/kg/d IV div 3 doses x 10d FOLLOWED BY Intraluminal amoebicides such as **diloxanide** (2nd line agent) to cure luminal infection	If MRSA is suspected, start on anti-MRSA regimen (refer to section on treatment of MRSA infections) Ceftriaxone may cause bile sludge in patients with jaundice or cirrhosis.
A: Enterobacteriaceae (esp. *Klebsiella* sp.) *Bacteroides* sp. *Enterococcus* sp. *Entamoeba histolytica* *Fusobacterium necrophorum* (Lemierre's)	Pending determination of bacterial versus amoebic liver abscess: **Metronidazole** 30-40 mg/kg/d div 3 doses IV q8h or 500 mg PO q6-8h PLUS **Ceftriaxone** 1-2 gm IV q24h OR **Piperacillin-tazobactam** 4.5g IV q4-6h OR **Ciprofloxacin** 400 mg IV q12h 750 mg PO OR **Levofloxacin** 750 mg PO/IV q24h OR **Ertapenem** 1 gm IV q24h If amoeba serology is positive: **Metronidazole** 750 mg IV to PO tid x 10d	Serological tests for amebiasis should be done on all patients. For anaerobic or mixed infections piperacillin-tazobactam, ertapenem (or other carbapenem) are sufficiently active alone and metronidazole may be discontinued.

Gallbladder infection		
Etiology	**Preferred regimen**	**Comments**
Acute acalculous cholecystitis is uncommon in children and usually caused by an infection secondary to Groups A and B *Streptococci*, Gram-negative bacilli (like *Salmonella*) and *Leptospirosis interrogans*. Antibiotic therapy should cover for gut luminal flora (*E. coli, Klebsiella*, *Enterococcus*).	**P:** 1st line: **Piperacillin tazobactam** 300 mg/kg/d of piperacillin component IV div 3 doses OR **Ampicillin-sulbactam** 100-200 mg/kg/d of ampicillin component div 4 doses OR **Cefotaxime** 200 mg/kg/d IV div 4-6 doses +/- **Gentamicin** 3.75 mg/kg/d IV div 3 doses x 14-21d OR **Amikacin** 15-22.5 mg/kg/d div 3 doses x 14-21d	Laparoscopic cholecystectomy is the most common surgical treatment for acute calculous or acalculous cholecystitis in over 95% of pediatric cases. Other treatment options when laparoscopic or open cholecystectomy is not feasible include cholecystostomy.

COMPLICATED INTRA-ABDOMINAL INFECTIONS

- Complicated intra-abdominal infection extends beyond the hollow viscus of origin into the peritoneal space and is associated with either abscess formation or peritonitis.
- Contamination of peritoneal cavity by bowel flora due to bowel perforation, ruptured appendix, ruptured diverticula, ischemic bowel, leaking surgical anastomosis, intra-abdominal abscess or other like conditions.
- Common pathogens: *Escherichia coli, Klebsiella pneumoniae, Pseudomonas aeruginosa, Enterobacter cloacae, Acinetobacter baumannii*

(Antibiotic management of complicated intra-abdominal infections in adults: The Asian perspective, Annals of Medicine and Surgery 2014)

Biliary complicated intra-abdominal infections		
Clinical Setting	**Preferred regimen**	**Comments**
Community-acquired acute cholecystitis of mild-to-moderate severity	**Cefazolin** 1–2 g IV q8h OR **Cefuroxime** 1.5 g IV q8h OR **Ceftriaxone** 1–2 g IV q12–24h	Obtain surgical consult for possible gallbladder removal. Patients undergoing cholecystectomy for acute cholecystitis should have antimicrobial therapy discontinued within 24hours unless there is evidence of infection outside the wall of the gallbladder. (IDSA Complicated Intra-abdominal Infection Guidelines, CID 2010:50)
Community-acquired acute cholecystitis of severe physiologic disturbance, advanced age, or immunocompromised state	1st line: **Piperacillin-tazobactam** 4.5 g IV q6h 2nd line: **Metronidazole** 500 mg IV q8–12h PLUS any of the following:	

	Ciprofloxacin 400 mg IV q12h OR **Levofloxacin** 750 mg IV q24h OR **Cefepime** 2 g IV q8–12h	
Acute cholangitis following bilio-enteric anastamosis of any severity Health care–associated biliary infection of any severity (IDSA 2010)	1st line: **Meropenem** IV 1g q8h 2nd line: **Metronidazole** 500 mg IV q8–12h PLUS any of the following: **Ciprofloxacin** 400 mg IV q12h OR **Levofloxacin** 750 mg IV q24h OR **Cefepime** 2 g IV q8–12h	

Extra-biliary complicated intra-abdominal infections		
Clinical Setting	**Preferred regimen**	**Comments**
Mild-to-moderate severity: perforated or abscessed appendicitis and other infections of mild-to-moderate severity	Monotherapy: **Cefoxitin** 2 g IV q6h OR **Ertapenem** 1 g IV q24h OR Combination Therapy: **Metronidazole** 500 mg IV q8–12h PLUS **Cefazolin** 1–2 g IV q8h OR **Cefuroxime** 1.5 g IV q8h OR **Ceftriaxone** 1–2 g IV q12–24h OR **Cefotaxime** 1–2 g IV q6–8h OR **Ciprofloxacin** 400 mg IV q12h OR **Levofloxacin** 750 mg IV q24h	An appropriate source control procedure to drain infected foci, control ongoing peritoneal contamination by diversion or resection, and restore anatomic and physiological function to the extent feasible is recommended for nearly all patients with intra-abdominal infection.

High risk or severity: severe physiologic disturbance, advanced age, or immunocompromised state	*High risk or severity:* 1st line: Monotherapy **Piperacillin-tazobactam** 4.5 g IV q6h OR **Meropenem** 1 g IV q8h OR 2nd line: Combination Therapy **Metronidazole** 500 mg IV q8–12h PLUS **Cefepime** 2 g IV q8–12h OR **Ceftazidime** 2 g IV q8h OR **Ciprofloxacin** 400 mg IV q12h OR **Levofloxacin** 750 mg IV q24h Antimicrobial therapy of established infection should be limited to 4–7 days, unless it is difficult to achieve adequate source control. Longer durations of therapy have not been associated with improved outcome. (IDSA Complicated Intra-abdominal Infection Guidelines, CID 2010:50) Duration of therapy is variable and clinical trial data, especially for severe disease is sparse: • Mild or moderate peritonitis: clinical trial found comparable clinical outcomes in patients treated for 4 days vs those treated until vital signs and GI continuity had returned (mean of 8 days). All patients had "source control". Normalization of serum procalcitonin concentration may assist in customizing the duration of therapy. • Severe peritonitis: need source control and resolution of fever, leukocytosis and ileus. Some centers continue antibiotics until the serum procalcitonin serum concentration is <0.25 mg/ml or has decreased by 90% from its peak concentration. (Sanford Guide to Antimicrobial Therapy 2016)	

Acute pancreatitis • Patients with necrotizing pancreatitis who develop gas in the area of necrosis, rising inflammatory markers or persistent fever may be suspected of having infected pancreatic necrosis and would be candidates for antibiotic therapy. • Post-Necrotizing pancreatitis, infected pseudocyst or pancreatic abscess		
Etiology	**Preferred regimen**	**Comments**
Enterobacteriaceae *Enterococcus* sp. *Staphylococcus aureus* *Staphylococcus epidermidis* Anaerobes *Candida* sp.	1st line: Piperacillin-tazobactam 4.5 gm IV q4-6h OR **Meropenem** 1 gm IV q8h 2nd line: **Ciprofloxacin** 400 mg IV q12h OR **Levofloxacin** 750 mg IV q24h PLUS **Metronidazole** 500 mg IV every 8–12h	Current consensus is that use of prophylactic antibiotics is not advisable in pancreatitis, but that they should be employed when clinical factors point to infected pancreatic necrosis. Those with necrosis involving 30% or more of the pancreas are at greatest risk of developing infection. (Sanford Guide to Antimicrobial Therapy 2016)

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