
























⇒ Consider pts previous antibiotic exposure to maximize efficacy. If fails one triple regimen; repeat therapy with a different antibiotic combo, or treat for 2week rather than one, or use quadruple tx. 

	Selected Regimens	Days	Cost	Comments ¹ (PPIs are best given ~30min before meals)
First-Line Triple Therapy (PPI + amoxicillin + clarithromycin) if not allergic to penicillin, this is the preferred 1 st line regimen less resistance	Hp-PAC  ▼: lansoprazole 30mg po BID   PL amoxicillin 1000mg po BID clarithromycin 500mg po BID 	X7d	\$100	<ul style="list-style-type: none"> • Hp-PAC: all 3 meds in a single 7day blister pack^{only 1 dispensing fee} • lower dose of clarithromycin (250mg) was effective in some studies but is not currently recommended • using 2x 500mg XL od with food is ~ \$13 more than the reg formulation • SE: diarrhea (~28%), taste disturbance (~15%) • CI: avoid if penicillin allergy • esomeprazole NEXIUM 1-2-3-A  ⊗ 20mg po BID ^{\$90 regimen} as  PL effective as omeprazole 20mg BID and an option to listed PPIs² • rabeprazole PARIET on SPDP, ▼ 20mg BID -approved; similar efficacy³;  PL 7day rabeprazole/amoxicillin/clarithromycin = \$61^{generic}
	LOSEC 1-2-3-A : omeprazole 20mg po BID ^{on SPDP, ▼} Agents used  PL amoxicillin 1000mg po BID in peds trial ⁴ clarithromycin 500mg po BID 	X7d	\$65 ^{generic}	
	pantoprazole PANTOLOC 40mg po BID  amoxicillin 1000mg po BID clarithromycin BIAXIN  PL 500mg po BID 	X7d	\$68 ^{generic}	
First-Line Triple Therapy (PPI + metronidazole + clarithromycin)  PL	lansoprazole PREVACID 30mg po BID  metronidazole FLAGYL 500mg po BID clarithromycin BIAXIN 250mg po BID 	X7d	\$44 ^{generic}	<div> Drug-Lab Interaction: PPIs & H2RA should be stopped ≥1week & antibiotics 4 weeks prior to culture & histology for <i>H. pylori</i>. {For the ¹³C-urea breath test stop for: antibiotics 4 weeks, bismuth 2 weeks, PPIs 3 days & H2RAs 1 day to prevent false negative results^{Helikit}. Concurrent antacids will not affect the urea breath test} </div> <ul style="list-style-type: none"> • 250mg dose of clarithromycin preferred as better tolerated, equal or better efficacy (MACH I study⁵), and less costly than using the 500mg dose as in the PPI + amoxicillin regimens • pantoprazole & rabeprazole regimens less potential DI's than omeprazole; • generic forms of omeprazole, pantoprazole & rabeprazole are least costly • avoid alcohol! (DI: metronidazole → disulfiram rx; ↓ clarithromycin by rifampin) • SE: taste disturb. (~14%), diarrhea (~13%), headache (~6%); Also (less common): neuropathy, coated tongue • esomeprazole NEXIUM  ⊗ 20mg BID (\$66) regimen an option to listed PPIs  PL • rabeprazole PARIET on SPDP, ▼ 20mg BID \$37^{generic} regimen an option to listed PPIs
	LOSEC 1-2-3-M : omeprazole 20mg po BID ^{on SPDP, ▼} metronidazole 500mg po BID clarithromycin 250mg po BID 	X7d	\$40 ^{generic}	
	pantoprazole PANTOLOC 40mg po BID  metronidazole FLAGYL 500mg po BID clarithromycin BIAXIN 250mg po BID 	X7d	\$44 ^{generic}	
Alternate First-Line Quadruple Tx Regimens (PPI + bismuth + 2 antibiotics) eg. OBMT	Omeprazole ^{on SPDP, ▼} or rabeprazole ^{on SPDP, ▼} , or other PPI 20mg po BID + bismuth subsalicylate  PL 30mls po QID* PEPTO BISMOL metronidazole 250mg po QID tetracycline  PL 500mg po QID ac	X7d X14d * See comment	\$55 ^{generic} \$85 ^{generic}	<ul style="list-style-type: none"> • *14 day quadruple tx most effective but less well tolerated & more \$\$. 10-14 day option for 1st line⁶ or treatment failure. • PEPTO BISMOL suspension preferred to tablets to avoid drug interaction with tetracycline (PEPTO BISMOL tablets contain calcium carbonate which can interfere with tetracycline) • SE: temporary darkening of stool and tongue, diarrhea • CI: porphyria, renal dysfx (CrCl <25ml/min), pregnancy, children; avoid alcohol

 =EDS Exceptional Drug Status Sask.  =prior approval NIHB coverage ▼ =covered NIHB ⊗ =not covered by NIHB DI=Drug interactions ER=eradication rate CI=major contraindications PPI=Proton pump inhibitors SE=Side Effects

Length of Tx: 7day regimens ↓cost & ↑compliance; but ↑ER's with 14 day regimens^{American ACG→10-14day}; suggest 14d for kids⁷ **Compliance** & resistance determines eradication success; warn pts for SE.

Resistance: Cdn 2004¹⁵: metronidazole ~20% relative, clarithromycin ↑from 2% to 8% absolute & amoxicillin ~1% (may affect ERs)⁸ Bismuth/metronidazole combos appear effective even if ↑ metronidazole resistance.

Follow-up acid suppression (with PPI or H2RA) **not generally** indicated^{esp duodenal ulcers} once *H. pylori* eradicated⁹ except for acute ulcer healing^{esp gastric ulcers}, if symptomatic or if complicated/high risk pts.

Other regimens: 1. Quadruple 14 day therapy (ranitidine 300mg po BID + bismuth 30ml po QID + metronidazole 250mg po QID + tetracycline 500mg po QID; ER >80%^{ITT}).

2. Classic triple therapy (bismuth 30ml po QID + metronidazole 250mg po QID + tetracycline 500mg QID x14days; ER~78%^{ITT}). 3. Maclor 5day regimen:¹⁰ PPI or high dose H2RA + metro + amox + clarithromycin

4. Quadruple 1 day regimen¹¹: PPI double dose + Pepto Bismol 2 tab qid + metronidazole 500mg qid + amoxicillin 2gm qid Needs more validation: 5. Levofloxacin regimens¹⁴ 6. Sequential treatment^{Jafri'08 Gatta'09}

Intention to treat analysis (ITT): Canadian Consensus Conference 1998 classified treatments as "recommended" when controlled trials had at least 80% eradication efficacy by ITT analysis.¹²

Search & treat beneficial if: symptomatic with high risk ethnic background (Aboriginals, Asians, Hispanics), family hx of gastric cancer, ?long-term NSAID/ASA tx.¹³ Overall ~ 30% of Canadians are infected[↑]s with age.

H. pylori causes ~90% of duodenal & ~70% of gastric ulcers. If GERD, *H. pylori* testing **not** required.

Risk of Reinfection: Low at 3.4% per pt year in developed countries; & 8.7% in developing countries.^{Fuccio BMJ'08}

• **Lifestyle changes for DIET** moderation, **EXERCISE**, moderate alcohol use & **stop SMOKING!**

Testing for *H. pylori* infection is indicated in patients with active peptic ulcer disease, a past history of documented peptic ulcer, or gastric MALT lymphoma, after endoscopic resection of gastric cancer, patients with uninvestigated dyspepsia who are <50yr & have no "alarm features" (bleeding, anemia, early satiety, unexplained wt loss, dysphagia, vomiting, family hx GI cancer, previous esophagogastric malignancy) after ruling out NSAID or GERD symptoms.

Serology is recommended as an initial test to detect *H. pylori*. If the patient has had previously positive serology or other testing, then a urea breath test (UBT) is the recommended test. It is not necessary to order both serology and UBT for initial testing.

Confirmation of eradication is not routinely recommended except in 1. complicated duodenal ulcers (perforation or hemorrhage)

2. gastric ulcer or mucosa associated lymphoid tissue (MALT) lymphoma 3. for early gastric cancer 4. persisting symptoms after eradication tx

- ¹ Micromedex 2012
- ² Van Zanten V, Lauritsen K, Delchier JC, Labenz J, De Argila CM, Lind T. One-week triple therapy with esomeprazole provides effective eradication of *Helicobacter pylori* in duodenal ulcer disease. *Aliment Pharmacol Ther.* 2000 Dec;14(12):1605-11.
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- ⁴ Gottrand F, Kalach N, Spyckerelle C, et al. Omeprazole combined with amoxicillin and clarithromycin in the eradication of *Helicobacter pylori* in **children** with gastritis: A prospective randomized double-blind trial. *J Pediatr.* 2001 Nov;139(5):664-8.
- ⁵ Lind T, Veldhuyzen van Zanten S, Unge P. Eradication of *Helicobacter pylori* using one-week triple therapies combining omeprazole with two antimicrobials: the MACH I Study. *Helicobacter* 1996;1(3):138-44.
- ⁶ Hunt R, Fallone C, Veldhuyzen van Zanten S, et al. CHSG 2004 participants. Canadian *Helicobacter* Study Group Consensus Conference: Update on the management of *Helicobacter pylori*--an evidence-based evaluation of six topics relevant to clinical outcomes in patients evaluated for H pylori infection. *Can J Gastroenterol.* 2004 Sep;18(9):547-54.
- ⁷ Jones NL. A review of current guidelines for the management of *Helicobacter pylori* infection in **children** and adolescents. *Paediatr Child Health* 2004;9(10):709-713.
- ⁸ Duck WM, et al. Antimicrobial resistance incidence & risk factors among *Helicobacter pylori*-infected persons, United States. *Emerg Infect Dis.* 2004 Jun;10(6):1088-94.
- ⁹ Liu CC, Lee CL, Chan CC, et al. Maintenance treatment is not necessary after *Helicobacter pylori* eradication and healing of bleeding peptic ulcer: a 5-year prospective, randomized, controlled study. *Arch Intern Med.* 2003 Sep 22;163(17):2020-4.
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- ¹⁴ Iacopini F, et al. One-week once-daily triple therapy with esomeprazole, levofloxacin and azithromycin compared to a standard therapy for *Helicobacter pylori* eradication. *Dig Liver Dis.* 2005 Aug;37(8):571-6.
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