

# Helicobacter infection of the stomach

You have been diagnosed with an infection in the stomach caused by bacterium (bug) called *Helicobacter pylori* (*H. pylori*).

## Risks associated with *H. pylori* infection

There is now convincing evidence that the presence of this bacterium **increases the possibility that patients will develop ulcers in the stomach (duodenal or gastric ulcers)**. The risk of this occurring is 5-15% over your lifetime.

There is also some evidence that the presence of the organism can cause ongoing symptoms of indigestion. Symptoms that patients frequently report are **pain or discomfort in the upper abdomen** (between the breast bone and the belly button), **heartburn** (a burning sensation rising up from the upper abdomen into the chest), **upper abdominal bloating, nausea, excessive burping and belching**, and **feeling full quickly** when eating a normal sized meal. Doctors often refer to these symptoms with the medical term dyspepsia, which stems from the Greek language and means bad digestion.

*H. pylori* also increases the risk of ever developing **cancer of the stomach (gastric cancer)**. The risk that somebody, who is infected with *H. pylori* will ever develop stomach cancer is very low, less than 1%.

## How does one get the infection?

We do not know when you became infected with the Helicobacter bacterium. It is clear that **most people appear to acquire the infection during their early childhood years**. When small children do grow up, they are exposed to many different kinds of infections. In small children, the Hp infection may disappear spontaneously. But generally speaking, most often, once a person is infected, the Helicobacter bacterium stays present in the stomach for the rest of the lifetime of that person.

In Canada, the overall frequency of the infection is approximately 15-20% but is disappearing in younger individuals. The infection is a lot more common in elderly people. The frequency of infection is also higher in First Nations and people who immigrated to Canada, particularly from Central and South America and South-East Asia. The most likely explanation for this is that people living in the North and elderly individuals had a higher chance of becoming infected during their childhood years compared to children who have been born recently.

## Can you give the infection to someone else?

Based on data from the medical literature, this seems highly unlikely in people who have reached their teenage or adult years. Therefore, it is unlikely that you could give the helicobacter bacterium to your spouse or adult children. In less developed countries, there is some evidence that Helicobacter can spread by parents and possibly among children. We do not routinely recommend that partners or children of patients be tested for the infection.

## Does it cause reflux symptoms?

Patients whose most important symptom is heartburn or acid regurgitation most likely have a problem with reflux. The medical term for this is gastroesophageal reflux disease or GERD. The most common reflux symptoms are heartburn and regurgitation, the feeling of stomach contents refluxing back up into the food pipe (esophagus). Most studies do not suggest that *H. pylori* infection plays a role in patients who have reflux symptoms. This means that most of these **patients will continue to have reflux symptoms after the bacteria is successfully cured from the stomach**.

## Medications

The most successful treatments use a combination of 3 or 4 medications containing a Proton Pump Inhibitor (PPI), sometimes Pepto-Bismol (bismuth subsalicylate), and 2 to 3 antibiotics.

### Proton Pump Inhibitors (PPIs)

PPIs are strong blockers of acid production in the stomach, which makes antibiotics more effective in killing the helicobacter. There are six PPIs available in Canada:

1. Pantoloc (Pantoprazole) 40 mg
2. Pariet (Rabeprazole) 20 mg
3. Losec (Omeprazole) 20 mg
4. Prevacid (Lansoprazole) 30 mg
5. Nexium (Esomeprazole) 40 mg
6. Dexilant (dexlansoprazole) 30 or 60 mg

They have very few side effects. Reported side effects include nausea, headache, dry mouth, and loose stools.

### Pepto-Bismol (bismuth subsalicylate)

This bismuth preparation is commonly used as an over-the-counter drug to treat indigestion. It comes in tablets of 262 grams. Pepto-Bismol can cause a dark coloring in the color of the stool and sometimes a black appearance of the tongue. This disappears after the medication is stopped.

Side effects of the nervous systems (e.g., dizziness, confusion) have been reported but this is rare. Patients who are known to have kidney problems should consult their physician before taking this medication as Pepto-Bismol can cause side effects of the nervous system if the kidney function is poor.

## Antibiotics

NAME	DETAILS	SIDE EFFECTS AND PRECAUTIONS	DOSAGE
<b>Clarithromycin (Biaxin)</b>	Also used to treat pneumonia or ear infections.	<ul style="list-style-type: none"><li>• Taste disturbance (10%)</li><li>• Loose stools (5%)</li><li>• Nausea (2%)</li></ul>	500 mg 2x/day OR 250 mg 2x/day
<b>Amoxicillin</b>	Commonly used to treat infections such as pneumonia and bladder infections. Belongs to the penicillin class.	<ul style="list-style-type: none"><li>• Loose stools (7%)</li><li>• Skin rash (2%)</li></ul> <p><b>* If you are allergic to penicillin you cannot take this medication.</b> <i>Should a skin rash develop while on this medication, please contact your physician and stop taking the drug.</i></p>	1 gram 2x/day
<b>Metronidazole (Flagyl)</b>	Commonly used to treat diarrhea due to infections.	<ul style="list-style-type: none"><li>• Nausea</li><li>• Metallic taste in the mouth</li><li>• Loose stools</li></ul> <p><b>* You are not allowed to drink any alcoholic drinks while taking this medication.</b> Metronidazole can give a disulfiram-like reaction (medication used to treat alcohol use disorder) and side effects.</p>	500 mg 2x/day OR 250 mg 4x/day OR 500 mg 4x/day
<b>Tetracycline</b>	Commonly used to treat several kinds of infections including pneumonia and skin infections.	<ul style="list-style-type: none"><li>• Nausea and vomiting</li><li>• Loose stools</li><li>• Skin rash</li></ul> <p><b>* Avoid exposure to sunlight</b> as you may become more sensitive to the sun while taking this medication. <i>* Side effects occur in less than 5% of patients.</i></p>	500 mg 4x/day
<b>Levofloxacin (Levaquin)</b>	Commonly used to treat pneumonia, urinary tract infections, sinus infections, and skin infections. Belongs to the fluoroquinolone class.	<ul style="list-style-type: none"><li>• Neurological, especially abnormal sensation in feet and legs</li><li>• Damage to the tendons including the rare side effect of rupture of the Achilles tendon</li><li>• Diarrhea</li><li>• Liver damage</li></ul> <p><b>* Caution should be used in patients with liver or kidney problems, patients with cardiac arrhythmias, and patients who are taking blood thinners</b> such as Coumadin (warfarin). Administration together with warfarin may increase the risk of bleeding. <b>* Should not be used by patients who are allergic to antibiotics in the same Quinolone drug class,</b> such as ciprofloxacin. <b>* Should not be used in small children, pregnant women, and breastfeeding mothers.</b></p>	250 mg 2x/day OR 500 mg 2x/day

## Treatments

Several treatment options are available to eradicate the *H. pylori* from the stomach.

### Recommended duration of all treatments is 14 days.

1. The most effective first-line combination treatment is CLAMET concomitant quadruple therapy (PPI and 3 antibiotics).
2. Second-line treatment is usually Bismuth-based quadruple therapy (PPI, 2 antibiotics, and bismuth) and is given if CLAMET concomitant therapy failed. Patients who are allergic to penicillin cannot take CLAMET concomitant therapy and bismuth-based quadruple therapy is usually given as first-line therapy. Bismuth-based quadruple therapy is more complex to take than the CLAMET concomitant therapy as the number of pills per day is higher and it also has more side effects than concomitant therapy.
3. Third-line treatment is usually a combination of a PPI and 2 antibiotics, amoxicillin, and levofloxacin.

TREATMENT OPTIONS	MEDICATIONS AND DOSAGE
<b>CLAMET concomitant quadruple therapy</b>	<ol style="list-style-type: none"><li>1. PPI tablet twice a day</li><li>2. Clarithromycin 500 mg twice a day</li><li>3. Amoxicillin 1 g twice a day</li><li>4. Metronidazole 500 mg twice a day</li></ol>
<b>Bismuth-based quadruple therapy</b>	<ol style="list-style-type: none"><li>1. PPI tablet twice a day</li><li>2. Bismuth subsalicylate (Pepto-Bismol) 2 tablets four times a day</li><li>3. Metronidazole 250 or 500 mg (recommended) four times a day</li><li>4. Tetracycline 500 mg four times a day</li></ol>
<b>PPI-amoxicillin-levofloxacin therapy</b>	<ol style="list-style-type: none"><li>1. PPI tablet twice a day</li><li>2. Amoxicillin 1 g twice a day</li><li>3. Levofloxacin 250 or 500 mg (recommended) twice a day</li></ol>

### Success of therapy

**Overall the chance that the above listed treatments are successful in getting rid of the bacterium is 80–85% when the patient is treated for the first time.** If three rounds of treatment are given the cumulative success rate is 96%. Your doctor will decide which treatment is best for you. There are a few other treatments available but these usually are only prescribed in patients in whom the *Helicobacter pylori* infection has not been cured with one of the above-mentioned combinations.

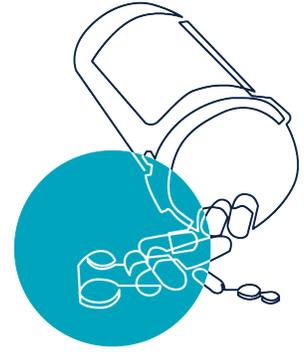
Despite the fact that side effects are listed most people can take these medications without too much difficulty. However, we know that that **success of treatments is lower if not all tablets are taken.** Therefore, **it is important that you try to take all medication as prescribed.**

It was already mentioned that often in patients who have reflux as their main problem, cure of the *Helicobacter* infection might not alleviate the symptoms of reflux.

If you have any further questions about the *H. pylori* infection or treatment please make sure to discuss with your physician.

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# Concomitant Therapy with PPI-CL-A-MET



Take the following 14-day treatment

MEDICATION	DOSE	DETAILS	SIDE EFFECTS AND PRECAUTIONS
<p><b>Proton-pump inhibitor</b></p> <p>Options:                      Losec (Omeprazole) 20mg                      Prevacid (Lansoprazole) 30mg                      Pantoloc (Pantoprazole) 40mg                      Pariet (Rabeprazole) 20mg                      Nexium (Esomeprazole) 40mg                      Dexilant (Dexlansoprazole) 60 or 90mg</p>	1 tablet 2x/day	Strong blocker of acid production in the stomach.	<ul style="list-style-type: none"> <li>• Nausea</li> <li>• Headache</li> <li>• Dry mouth</li> <li>• Loose stools</li> </ul>
<p><b>Clarithromycin (Biaxin)</b></p>	500 mg 2x/day	Antibiotic also used to treat pneumonia or ear infections.	<ul style="list-style-type: none"> <li>• Taste disturbance (10%)</li> <li>• Loose stools (5%)</li> <li>• Nausea (2%)</li> </ul>
<p><b>Amoxicillin</b></p>	1 gram 2x/day	Antibiotic commonly used to treat infections such as pneumonia and bladder infections. Belongs to the penicillin class.	<ul style="list-style-type: none"> <li>• Loose stools (7%)</li> <li>• Skin rash (2%)</li> </ul> <p><b>*If you are allergic to penicillin you cannot take this medication.</b>                      Should a skin rash develop while on this medication, please contact your physician and stop taking the drug.</p>
<p><b>Metronidazole (Flagyl)</b></p>	500 mg 2x/day	Antibiotic commonly used to treat diarrhea due to infections.	<ul style="list-style-type: none"> <li>• Nausea</li> <li>• Metallic taste in the mouth</li> <li>• Loose stools</li> </ul> <p><b>*You are not allowed to drink any alcoholic drinks while taking this medication.</b>                      Metronidazole can give a disulfiram-like reaction (medication used to treat alcohol use disorder) and side effects.</p>

## Importance of adherence for treatment success

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# Bismuth-based Quadruple Therapy with PPI-B-MET-T



Take the following 14-day treatment

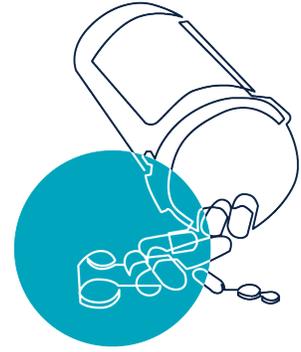
MEDICATION	DOSE	DETAILS	SIDE EFFECTS AND PRECAUTIONS
<b>Proton-pump inhibitors</b>  Options: Losec (Omeprazole) 20mg Prevacid (Lansoprazole) 30mg Pantoloc (Pantoprazole) 40mg Pariet (Rabeprazole) 20mg Nexium (Esomeprazole) 40mg Dexilant (Dexlansoprazole) 60 or 90mg	1 tablet 2x/day	Strong blocker of acid production in the stomach.	<ul style="list-style-type: none"> <li>• Nausea</li> <li>• Headache</li> <li>• Dry mouth</li> <li>• Loose stools</li> </ul>
<b>Bismuth subsalicylate (Pepto-Bismol)</b>	2 tablets 4x/day	Commonly used to treat indigestion.	<ul style="list-style-type: none"> <li>• Dark-colored stool</li> <li>• Black tongue</li> <li>• Dizziness &amp; confusion (rare)</li> </ul> <p><b>* Patients with kidney problems should consult their physician before taking Pepto-Bismol due to potential nervous system side effects.</b></p>
<b>Metronidazole</b>	500 mg 3x/day	Antibiotic commonly used to treat diarrhea due to infections.	<ul style="list-style-type: none"> <li>• Nausea</li> <li>• Metallic taste in the mouth</li> <li>• Loose stools</li> </ul> <p><b>* You are not allowed to drink any alcoholic drinks while taking this medication as it gives an alcohol-like reaction.</b></p>
<b>Tetracycline</b>	500 mg 4x/day	Antibiotic commonly used to treat several kinds of infections including pneumonia and skin infections.	<ul style="list-style-type: none"> <li>• Nausea and vomiting</li> <li>• Loose stools</li> <li>• Skin rash</li> </ul> <p><b>* Exposure to sunlight should be avoided as patients sometimes become more sensitive to sunburn while taking this medication. Side effects occur in less than 5% of patients.</b></p>

## Importance of adherence for treatment success

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# Triple Therapy with PPI-A-Levoflaaxacin



Take the following 14-day treatment

MEDICATION	DOSE	DETAILS	SIDE EFFECTS AND PRECAUTIONS
<p><b>Proton-pump inhibitors</b></p> <p>Options:                      Losec (Omeprazole) 20mg                      Prevacid (Lansoprazole) 30mg                      Pantoloc (Pantoprazole) 40mg                      Pariet (Rabeprazole) 20mg                      Nexium (Esomeprazole) 40mg                      Dexilant (Dexlansoprazole) 60 or 90mg</p>	1 tablet 2x/day	Strong blocker of acid production in the stomach.	<ul style="list-style-type: none"> <li>Nausea</li> <li>Headache</li> <li>Dry mouth</li> <li>Loose stools</li> </ul>
<b>Levofloxacin (Levaquin)</b>	500 mg 2x/day	Antibiotic commonly used to treat pneumonia, urinary tract infections, sinus infections, and skin infections. Belongs to the fluoroquinolone class.	<ul style="list-style-type: none"> <li>Neurological, especially abnormal sensation in feet and legs</li> <li>Damage to the tendons including the rare side effect of rupture of the Achilles tendon</li> <li>Diarrhea</li> <li>Liver damage</li> </ul> <p><b>*Caution should be used in patients with liver or kidney problems, patients with cardiac arrhythmias, patients who are taking blood thinners such as Coumadin (warfarin) (some data indicate that administration of the antibiotic together with warfarin may increase the risk of bleeding).</b></p> <p><b>*Should not be used by patients who are allergic to antibiotics in the same Quinolone drug class, such as ciprofloxacin.</b></p> <p><b>*Should not be used in small children, pregnant women, and breastfeeding mothers.</b></p>
<b>Amoxicillin</b>	1 gram 2x/day	Antibiotic commonly used to treat infections such as pneumonia and bladder infections. This antibiotic is like a penicillin.	<ul style="list-style-type: none"> <li>Loose stools (7%)</li> <li>Skin rash (2%)</li> </ul> <p><b>*If you are allergic to penicillin you cannot take this medication. Should a skin rash develop while on this medication, please contact your physician and stop taking the drug.</b></p>

## Importance of adherence for treatment success

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# Triple Therapy with PPI-A-Rifabutin



## Take the following 10-day treatment

MEDICATION	DOSE	DETAILS	SIDE EFFECTS AND PRECAUTIONS
<b>Proton-pump inhibitors</b>  <b>Options:</b> Losec (Omeprazole) 20mg Prevacid (Lansoprazole) 30mg Pantoloc (Pantoprazole) 40mg Pariet (Rabeprazole) 20mg Nexium (Esomeprazole) 40mg Dexilant (Dexlansoprazole) 60 or 90mg	1 tablet 2x/day	Strong blocker of acid production in the stomach.	<ul style="list-style-type: none"> <li>• Nausea</li> <li>• Headache</li> <li>• Dry mouth</li> <li>• Loose stools</li> </ul>
<b>Rifabutin</b>	150 mg 2x/day	Antibiotic commonly used to treat tuberculosis and Helicobacter infection.	<ul style="list-style-type: none"> <li>• Muscle aches, taste disturbance, urine and skin discoloration</li> <li>• Bone marrow suppression (up to 3% of patients) resulting in fever, infection, increased bleeding risk. In most cases this is not serious and the bone marrow returns to a normal function in a few weeks after the drug is discontinued. There have been a few reports of more serious bone marrow depression where the bone marrow did not completely return to normal but this has not been reported for patients treated for Helicobacter infection.</li> </ul>
<b>Amoxicillin</b>	1 gram 2x/day	Antibiotic commonly used to treat infections such as pneumonia and bladder infections. This antibiotic is like a penicillin.	<ul style="list-style-type: none"> <li>• Loose stools (7%)</li> <li>• Skin rash (2%)</li> </ul> <p><b>*If you are allergic to penicillin you cannot take this medication.</b> Should a skin rash develop while on this medication, please contact your physician and stop taking the drug.</p>

### Importance of adherence for treatment success

Despite the fact that side effects are listed most people can take these medications without too much difficulty. However, we know that that success of treatments is lower if not all tablets are taken. Therefore, it is important that you try to take all medication as prescribed.