Peptic Ulcer Disease and the *H. pylori* Bacterium

By: Catherine I. Whipple, RPh, BCNP[1]; Gregory A. Boyce, MD[2]; Orsolya Lunacsek, MBA[1]; Sandra G. Blake, PhD[1];
1-The University of Louisiana at Monroe School of Pharmacy, 2-Gastroenterology Clinic, Monroe, LA

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Helicobacter pylori infection has been estimated to occur in more than 50% of humans worldwide.[1] In the United States, a developed country, the rate falls to 30-40% of the population.[2] This can be attributed to the strong association between *H. pylori* infection and lower socioeconomic status during childhood (i.e. small crowded housing, sharing a bed with siblings, and unsanitary conditions).[1] A greater risk, and therefore higher rate, is likely to exist in the Louisiana Medicaid population because of the environmental acquisition of *H. pylori* during childhood. According to the most recent census, 18.4% of the Louisiana population is below the poverty line compared to 13.3% nationally.[3] Even more profound is the fact that 26% of Louisiana children live below poverty compared to 19.9% nationally, and this is when most individuals acquire the infection.[1,3]

Infection with *H. pylori* causes histological gastritis in everyone infected, however, not everyone will experience symptoms of gastritis.[4] *H. pylori* has been identified as the most common cause of peptic ulcer disease and an important risk factor for developing gastric adenocarcinoma and lymphoma of mucosa-associated lymphoid tissue (MALT).[2,4,5] Studies have proven the value of treating *H. pylori* infection. Successful eradication of the infection can be associated with a cure for peptic ulcer disease, a reduction in ulcer recurrence, prevention of gastric adenocarcinoma, and regression or resolution of gastric lymphomas (MALT). [6-8] The cost of treating *H. pylori*-related diseases, symptoms, complications, and lost productivity is estimated between $3.0 and $5.6 billion annually.[9,10] Thus, treatment of this infection has many potential health benefits for the patient as well as conservation of health care resources.

The Department of Health and Hospitals, Bureau of Health Services Financing, and the University of Louisiana at Monroe, School of Pharmacy, continue to develop Disease Management programs to address the educational component of the Louisiana Medicaid Pharmacy Benefits Management system.

Selected Medicaid recipients and their health care practitioners receive these educational brochures. We appreciate your taking time to review these and incorporating this information into your practice as you deem appropriate.

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The goal of this study is to determine the number of Louisiana Medicaid recipients with a diagnosis of gastric ulcer, duodenal ulcer, peptic ulcer, gastritis, or dyspepsia that were tested for *H. pylori*. Published guidelines were followed to identify patients who should be tested. Only outpatient test data were accessible through Medicaid and patients over 59 were excluded due to Medicare coverage. The guidelines will be presented and are considered preferable approaches to the management of *H. pylori* but not necessarily the only acceptable approaches.[11] Diagnostic tests for *H. pylori* and the variables that should be considered in choosing the most appropriate test will also be discussed.

Testing Guidelines for *H. pylori* Infection

***Diagnostic testing for* H. pylori *should be performed only if treatment is intended.*[11, 12]**

Most of the infected population report no symptoms and are not at risk of developing complications such as peptic ulcer disease, gastric MALT lymphoma, or gastric cancer.[5,11] The estimated lifetime risk for an infected person to develop peptic ulcer disease is 15%.[13] Benefits of testing and treatment are proven in the above situations but every infected person does not require treatment.[6-8] Suspected causes for those individuals who develop *H. pylori* related complications may be due to different strains of the bacteria or variable host response to the infection.[5]

H. pylori has been classified as a group I or definite carcinogen by the World Health Organization's International Agency for Research on Cancer.[14] Treatment by a physician would therefore be expected for a documented infection even if symptoms are absent and the risk of developing complications is low. Thus, it is recommended that physicians test for *H. pylori* only in specific instances discussed below and only if treatment is intended for positive results.[11]

***Testing for* H. pylori *infection is indicated for patients with active peptic ulcer disease, a past history of documented peptic ulcer, gastric* MALT *lymphoma, a fear or family history of gastric adenocarcinoma.*[11, 12]**

Studies have identified *H. pylori* infection as a major cause of peptic ulcer disease.[5, 6] All newly diagnosed peptic or duodenal ulcer patients should be tested for *H. pylori*. *H. pylori* infection is estimated to cause more than 90% of duodenal ulcers and 70% of gastric ulcers.[13, 15] Patients with a documented history of peptic ulcer disease who are presently being treated with antisecretory medication should also be tested. Ulcer recurrence rates are high in patients with a history of peptic ulcer disease and other complications such as bleeding, obstruction, or perforation could develop.[6] Successful eradication of *H. pylori* has been shown to reduce ulcer recurrence rates to approximately 2%.[16] Therefore, for patients with active peptic ulcer disease or a documented history of peptic ulcer disease caused by *H. pylori*, eradication of the infection results in a true cure and no further medical treatment is necessary.

The presence of *H. pylori* has been found in approximately 90% of patients diagnosed with gastric MALT lymphoma.[17] Growth of this tumor has been shown to be dependent on antigenic stimulation of the lymphoma B cells in culture by the presence of *H. pylori*.[18] In addition, regression of lymphoma after documented eradication of the infection has been reported in a majority of patients.[19-21] Therefore, it is recommended that patients who are diagnosed with gastric MALT lymphoma be tested for *H. pylori* and treatment initiated for any individuals with a positive result.

Testing is also appropriate for patients with a fear or a family history of gastric adenocarcinoma or gastric cancer.[11] *H. pylori* has been identified as a carcinogen and the rate of stomach cancer has been found to be higher in populations with a high incidence of *H. pylori* infection.[22] A recent study has shown that 5% of those infected will develop stomach cancer and no cancer developed in those who were not infected.[7] The study group included 1,526 patients and the average duration of follow-up was 7.8 years.[7] Population-based screening for *H. pylori* in the prevention of gastric cancer is being studied but for now cannot be recommended due to a lack of controlled clinical trials.

***Patients diagnosed with non-ulcer dyspepsia or patients reporting symptoms of new onset dyspepsia may be tested for* H. pylori *on a case-by-case basis, and treatment prescribed for individuals with a positive result.*[11, 12]**

Patients diagnosed with non-ulcer dyspepsia (NUD) should be tested for *H. pylori* if their clinical history indicates the cause may be related to *H. pylori* infection. Dyspepsia can be divided into four classes: "ulcer like", "reflux-like", "dysmotility-like", or nonspecific. No consistent symptom profile has been identified with *H. pylori* infection, however a higher prevalence of infection has been shown in "ulcer-like" dyspepsia and lower incidence in those with "reflux-like" or "dysmotility-like" dyspepsia.[24] A careful clinical history can help identify those patients in whom testing is appropriate. Testing is not indicated in patients with conditions not linked to *H. pylori* infection such as GERD or irritable bowel syndrome.[11]

The guidelines are not as clear for patients presenting to their general practice physician with symptoms of new onset ulcer-like dyspepsia. A general practitioner will first determine if there is a need for a diagnostic work-up by a specialist.[23] The majority of patients with dyspepsia presenting to a general practitioner are given advice on lifestyle changes with or without prescribed medication to control symptoms. Endoscopy referral or *H. pylori* testing may be considered only if there is no relief of symptoms with prescribed medication or lifestyle changes.[23] However, based on the evidence and prevalence of *H. pylori*, recommendations have evolved for patients with new onset dyspepsia. In patients less than fifty years old and otherwise healthy, testing for *H. pylori* by non-endoscopic methods is recommended.[12] In patients over fifty years of age with new onset dyspepsia or in any age patient with alarming symptoms (i.e. bleeding, anemia, weight loss), endoscopy with *H. pylori* testing is indicated.[24]

Detection Methods for *H. pylori* Infection

Helicobacter pylori infection can be detected and diagnosed by invasive (endoscopy and biopsy) and non-invasive (non-endoscopic) techniques. Certain variables should be considered when choosing the appropriate diagnostic test. These variables will be discussed after information regarding the different tests is presented.

Invasive Tests - Endoscopic Biopsy Urease Tests, Histology, and Culture

Invasive testing involves taking several gastric biopsies during the endoscopic procedure. These samples are then assessed for the presence of *H. pylori* by urease activity, histologic examination, or culture.[25]

Biopsy Urease Tests

Biopsy samples are usually first tested for urease activity (rapid urease test - RUT) because these tests are easy to perform and less expensive than histology and culture of biopsy samples. Biopsy urease tests react to the presence of bacterial urease that is produced by *H. pylori*. Currently in the U.S., three rapid urease tests are available. They are CLOtestÒ, Hp-fastÒ, and PyloritekÒ. PyloritekÒ can be read after 1 hour whereas the others are to be read after 24 hours.[26] Biopsy urease tests are highly specific (near 100%) and sensitive (approximately 90%) techniques for detecting *H. pylori* infection.[26] Sensitivity, however, can be reduced resulting in false negatives in patients with active bleeding and in patients receiving proton pump inhibitors (PPI's), H2-receptor antagonists (H2RA), antibiotics, or bismuth-containing products.[27, 28] Discontinuation of medication prior to urease testing is recommended. Patients receiving PPI's or H2RA's should discontinue for two weeks prior to testing, whereas, bismuth and antibiotics should be discontinued for 4 weeks.[28, 29] Alternative tests, not based on urease activity, should be considered if discontinuing therapy is not an option. In practice, many physicians will take biopsies for urease testing, histology and/or culture. The urease test is usually performed first and due to the high specificity, a positive result eliminates the need for histology or culture.[11] Performing this test initially does provide some cost savings but if the physician suspects malignancy or other complications then histology and/or culture become necessary.

Histology

Histology allows the clinician to identify the presence of *H. pylori*, evaluate the extent of gastritis, and examine for malignancy or other disease states. Actual observation of the organism by histologic examination is considered the reference standard for diagnosing *H. pylori* infection. *H. pylori* is usually absent if there are no visual histologic signs of chronic inflammation.[30] Specialized stains such as Warthin-Starry, Giemsa, and Genta can be used to help visualize the organism when inflammation is present and routine stains (hematoxylin and eosin) do not confirm presence of *H. pylori*.[31] Antisecretory drugs and the location of the biopsy samples may negatively effect the sensitivity of histology as with biopsy urease tests. Biopsy samples taken from the corpus of the stomach have higher rates of sensitivity in all patients especially those who are taking antisecretory medication.[32]

Culture

Culturing *H. pylori* is not commonly used as a diagnostic tool for *H. pylori*. It is difficult, expensive, and time consuming, requiring up to 2 weeks for growth.[33] Culture is helpful and may be necessary in patients who have failed two or more eradication attempts. This would allow determination of antibiotic resistance and sensitivity. The use of antisecretory therapy in patients may result in decreased sensitivity of culture as with other tests performed on biopsy samples.[32]

Non-invasive Tests - Blood Antibody Tests, Urea Breath Tests, and Stool Antigen Tests

Blood Antibody Detection Tests

Enzyme-linked immunosorbent assays (ELISA) to detect IgG antibodies to *H. pylori* are commonly used because they are convenient and less expensive than other diagnostic tests. ELISA may be performed on serum as well as whole blood to detect the presence of *H. pylori* antibodies. Testing may be performed in a laboratory, or to improve convenience, may be administered in the physician's office with a simple fingerstick. Antibody tests are useful in evaluating dyspeptic patients when endoscopy is not indicated. Compared to other non-invasive tests, ELISA tests have the lowest cost per diagnosis but the diagnostic accuracy is also the lowest at 80-84%. [34] These tests may be useful for an initial diagnosis in areas with a high prevalence of *H. pylori*.[34] However, due to the low accuracy of the test, confirmation of negative results with an alternative test may be necessary to improve diagnostic accuracy. These tests should not be used to document post-treatment eradication. Antibody titers may remain high in the blood for several months after successful eradication and patients could test positive when *H. pylori* infection is absent.[35]

Urea Breath Tests (UBT)
The urea breath test (UBT) is able to detect active *H. pylori* infection, thus allowing it to be useful in original diagnosis as well as post-eradication documentation. Capsules containing urea in which the stable carbon has been substituted with C-13 or C-14 are administered orally to patients and a breath sample is obtained. The presence of *H. pylori* urease is required to hydrolyze the urea and the C-13 or C-14 is released in the breath as labeled carbon dioxide. C-13 labeled carbon dioxide is detected by mass spectoscopy, whereas, C-14 labeled carbon dioxide is detected by a scintillation detector. C-13 tests are slightly more expensive but they can be performed in a physician's office and may be safely administered to children and women of childbearing age.[35] C-14 tests are radioactive and some states restrict the use to licensed facilities only. C-14 tests should not be performed in children or pregnant women.[35] Urea breath tests and biopsy urease tests are highly accurate because urease is not present in the normal human stomach. Any urease activity is considered a reliable indicator of *H. pylori* infection.[35] Potential for a false negative result does exist, as with the biopsy urease tests, when patients are receiving antisecretory drugs, antimicrobial agents, or bismuth-containing drugs, all of which decrease *H. pylori* density.[36]

Stool Antigen Tests (HpSA)
The stool antigen test (HpSA) is the newest non-endoscopic test approved for the detection of *H. pylori* infection. The test is an enzymatic immunoassay containing a polyclonal anti-*H. pylori* capture antibody adsorbed to microwells. Diluted fecal samples are tested and a color appears in the presence of *H. pylori* antigens.[37] Collection of the stool sample may be unpleasant but can be done at any time. A sample may then be stored at 2-8°C for up to 3 days or indefinitely at -20°C, and later analyzed.[37] Most technicians can perform the assay with equipment commonly available in clinical laboratories and results can be read within 90 minutes. These tests are highly sensitive with rates of true positive at 94% and specific with rates of true negative at 97%.[37] HpSA is a reliable method useful in both initial diagnosis and follow-up testing and is effective in testing adults and children.[38] Stool antigen tests are simple, convenient, and accurate, require no special equipment, and are comparable in price to the urea breath tests that have similar accuracy.

Choosing the Appropriate Diagnostic Test

Based on Clinical Situation

A newly diagnosed ulcer by endoscopy should be evaluated for H. pylori with biopsy samples and a rapid urease test. If the RUT is negative, histology, blood antibody, urea breath test, or stool antigen test should confirm it. If the ulcer is diagnosed by radiograph, any of the non-endoscopic tests (blood antibody test, urea breath test, or stool antigen test) are appropriate and confirmation of a negative result with an alternative non-endoscopic test may be needed.

Patients with a documented or self-reported history of ulcer disease, especially those currently receiving antisecretory medication, should be tested for *H. pylori* by non-endoscopic means. If test results are negative, confirmation of the results should be obtained after cessation of antisecretory therapy. Confirmation of negative *H. pylori* status can be performed by UBT two weeks after cessation of therapy or by HpSA four weeks after cessation of therapy.[12]

Patients with any alarming symptoms such as bleeding, anemia, weight loss, etc. should be evaluated initially by endoscopy and tested for *H. pylori* with a biopsy rapid urease test. Histology samples would also be examined when cancer is suspected and *H. pylori* could be identified with this method.

A diagnosis of non-ulcer dyspepsia obtained by endoscopy may be evaluated for *H. pylori* status with a rapid urease test if biopsy samples are obtained or by histologic examination if the RUT is negative. The physician will determine if testing is necessary based on clinical history and risk of *H. pylori* infection. When endoscopy is not indicated in dyspeptic patients, any of the non-invasive tests could be utilized.

Patients over 55 years of age with new onset dyspepsia should be evaluated by endoscopy. A rapid urease test can then be performed on biopsy samples along with histologic examination if necessary. Physicians will determine the need for testing in dyspeptic patients under the age of 55 and otherwise healthy individuals. Non-endoscopic tests should be used in these patients.

Based on Cost-effectiveness of Test

Endoscopy with biopsy samples for RUT, histology, and/or culture is the most expensive method for testing for *H. pylori*. Rapid urease tests are highly accurate and histology is still considered the gold standard for diagnosis of *H. pylori* infection. Endoscopy is a necessary tool that provides direct visualization of the mucosa and allows a medical diagnosis to be made. Therefore, despite the cost, if endoscopy is indicated then RUT, histology, and/or culture are reasonable choices for *H. pylori* testing.

The cost-effectiveness of the non-invasive tests has been shown to vary based upon the prevalence of *H. pylori* and the importance of diagnostic accuracy.[34] In areas where *H. pylori* prevalence is high, ELISA serology tests are considered the most cost-effective. Serology tests are the least expensive method of *H. pylori* testing but these tests are also the least accurate. Therefore, confirmation of negative results to increase accuracy will also increase costs.[34] Breath tests (UBT) and stool tests (HpSA) are more expensive than ELISA serology tests but they do provide greater accuracy. Therefore, when expected prevalence of *H. pylori* is low or intermediate, UBT or HpSA tests are preferred.[34]

H. pylori Testing Among Louisiana Medicaid Recipients

This retrospective analysis of Louisiana Medicaid claims examines H. pylori testing rates among recipients with an ulcer, gastritis or dyspepsia diagnosis including rural/urban and specialist/generalist differences.

METHODS: Unisys Corporation provided data from 1996-June, 2001 for recipients with a number of gastro-intestinal complications. Recipients were included in this study group if they:

- Had at least one claim with a primary or secondary diagnosis of: gastric ulcer (ICD-9-CM 531-531.9), duodenal ulcer (ICD-9-CM 532-532.9), peptic ulcer (ICD-9-CM 533-533.9), gastritis (ICD-9-CM 535-535.5) or dyspepsia (ICD-9-CM 536.8);
- Were continuously eligible, defined as having at least one claim every calendar semiannum from the date of recipient's first claim with one of the above diagnoses (index claim) through the end of the study period;
- Under 60 years of age as of their first gastric condition (Medicare pays 100% of tests for *H. pylori* for beneficiaries with the appropriate diagnoses).

The test status of each recipient in the study group was ascertained by extracting *H. pylori*-related CPT codes from claims. A recipient was considered tested if they had at least one claim with one of the following CPT codes:

- Antibody 86677
- Antigen 87338, 87339
- Breath 83013, 83014, 78267, 78268
- Rapid urease 87072, 87077
- Histology 88305
- Bacterial culture 87070, 87081

Demographic variables of gender, race, age, parish of residence and rural/urban residence were obtained from the index claim. Age groups "0-35 years of age" and "36-59 years of age" were determined from age. New Orleans, Baton Rouge, Acadiana and North Louisiana regions were determined from parish of residence. Rural/urban residence was determined from parish based on a classification from the U.S. Office of Management and Budget. A recipient was "Specialist-treated" if they had at least one claim containing a provider type of "physician" and a provider specialty of "gastroenterology" or "pediatric gastroenterology." All data analyses were conducted using SAS7 Version 8.2. Graphs were developed using Microsoft Excel7 Version 2002.

RESULTS: For the study period, 12,789 recipients met the inclusion criteria. Demographic characteristics as well as testing rates are presented in Table 1. Table 2 shows utilization of the various *H. pylori* tests performed and the number of recipients who were tested

Table 1. Demographic Characteristics of Study Group

	Number	***Percent***	***Tested***	***Percent Tested***	***Percent Not Tested***
Gender					
Male	4,420	34.56%	1,812	41.00%	59.44%
Female	8,369	65.44%	4,964	59.31%	40.69%
Race					
White	4,257	33.29%	2,314	54.36%	45.64%
Black	7,147	55.88%	3,678	51.46%	48.54%
Asian	1,363	10.66%	778	57.08%	42.92%
Other	22	0.17%	6	27.27%	72.73%
Age Group					
0-35	6,621	51.77%	3,003	45.36%	54.64%
36-59	6,168	48.23%	3,773	61.17%	38.83%
Region					
New Orleans	3,933	30.75%	2,444	62.14%	37.86%
Baton Rouge	3,270	25.57%	1,651	50.49%	49.51%
Acadiana	3,124	24.43%	1,519	48.62%	51.38%
North Louisiana	2,462	19.25%	1,162	47.20%	52.80%
Type of Residence					
Urban	8,326	65.10%	4,570	54.89%	45.11%
Rural	4,463	34.90%	2,206	49.43%	50.57%
Physician Specialty					
GI Specialist	2,632	20.58%	2,017	76.63%	23.37%
Non-GI-Specialist	10,157	79.42%	4,759	46.85%	54.15%

Table 2. Utilization of **H. pylori** *tests*

	Number of Tests	*Number of Recipients**
Antibody		
86677	2,653	1,609
Antigen Detection		
87338	1	1
87339	0	0
Breath Test		
83013	1	1
83014	2	2
78267	0	0
78268	0	0
Rapid Urease		
87072	924	672
87077	77	71
Histology		
88305	8,587	4,151
Bacterial culture		
87070	3,978	2,272
87081	2,295	1,277
Total	18,518	

*Some recipients were tested more than once by more than one type of test.

Conclusion

The discovery of the *H. pylori* bacterium and its association with gastritis, dyspepsia, gastric ulcers, etc., offered great hope to patients suffering from these conditions. And, the introduction of non-invasive tests for the presence of the bacteria or its antigens made screening for *H. pylori* before treatment cost-effective, a win-win situation for patient, physician and health plan alike.

However, the Louisiana Medicaid claims data analysis included in this publication indicated wide-spread use of histology and bacterial culture which require an invasive endoscopy and under-use of the widely available non-invasive tests for primary screening for *H. pylori*. When infection with *H. pylori* is suspected and, if present, the infection will be appropriately treated. Antigen tests are appropriate screening tests with the breath test used as an appropriate post-treatment eradication confirmation. The stool antigen test is becoming more widely used and is another cost-effective screening test in addition to the serology antigen test.

This publication, part of a series of publications addressing issues in gastroenterology, included a brief review of several areas related to *H. pylori* including guidelines for testing and testing in the Louisiana Medicaid population. Future articles will examine further issues related to *H. pylori* including treatment protocols for *H. pylori* positive patients as well as a cost analysis of diagnostic regimens.

References available upon request by contacting:

Sandy Blake
University of Louisiana at Monroe School of Pharmacy
Office of Outcomes Research and Evaluation
1401 Royal Avenue
Monroe, LA 71201
318-410-4359 or blake@ulm.edu

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*** The following is an abbreviated version of the education material sent to selected Medicaid recipients.**

Stomach Ulcer FAQs (Frequently Asked Questions)

Sandra G. Blake[1], PhD; Cathy Whipple[1], RPh, BCNP; and Gregory A. Boyce, MD
1-University of Louisiana at Monroe, School of Pharmacy;
2-Gastroenterology Clinic, Monroe, Louisiana

What is a peptic ulcer?

A peptic ulcer is a sore or hole in the lining of the lower esophagus, the stomach or the duodenum (the first part of the small intestine). The most common symptom is burning pain in the stomach.

What causes peptic ulcers?

For many years, we believed that peptic (stomach) ulcers were caused by stress and spicy foods. We even thought that we inherited ulcers or ulcers were in our genes since they often "run" in families. Scientists now know that 9 out of 10 ulcers are caused by the *Helicobacter pylori* bacterium- *H. pylori* for short. Other causes of ulcers are medicines you take such as arthritis drugs or rare conditions that cause your stomach to make large amounts of acid.

What is a gastritis?

Gastritis means inflammation (swelling) and irritation of the lining of the stomach. Symptoms of gastritis are: stomach pain, nausea, and vomiting.

What causes gastritis?

Gastritis can be caused by:

- Medicines such as aspirin, arthritis drugs, or anticancer drugs
- Alcohol, smoking and unhealthy eating
- Bacterial and viral infections like *H. pylori*.

Chronic gastritis is a strong indicator of *H. pylori* infection.An *H. pylori* infection is treated with several drugs.

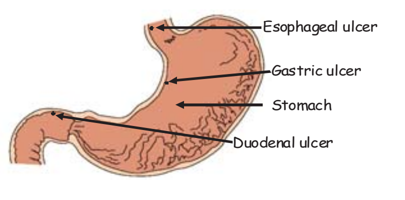
What is dyspepsia?

Dyspepsia, or indigestion, is a term used to describe discomfort in the upper abdomen. You may have heartburn, nausea, a sour taste in your mouth, or pain in your lower chest.

What causes dyspepsia?

Some causes of dyspepsia are:

- Certain foods like beans
- Spicy or fried foods
- Large meals
- Eating too fast
- Being anxious or nervous
- Heavy smoking
- Being overweight
- Stomach ulcers
- *H. pylori* bacterium.



Common Peptic Ulcer Sites

Does everyone infected with the *H. pylori* bacteria get gastritis or a stomach ulcer?

No, you can be infected and not know that you have the *H. pylori* bacteria.

How do people get infected with *H. pylori* bacteria?

About 20% of people under age 40 have *H. pylori* infection and about half of people over age 60 have it. We believe that you get the infection through food or water. *H. pylori* have been found in saliva so you may be able to get the bacteria from mouth-to-mouth contact such as kissing and eating after someone.

How can my doctor tell if my stomach is infected with the *H. pylori* bacteria?

There are 4 kinds of *H. pylori* tests:

1. **Blood tests.** Blood is taken at the doctor's office after a finger stick. This test checks the blood for antibodies that are made by your body in response to an infection. A positive result means that you are infected or have been infected in the past.

2. **Breath tests.** You drink a harmless liquid or take a capsule. If the bacteria are present in your stomach, they break down the liquid or capsule and carbon goes to your lungs. Your breath is then examined to see if it contains the carbon. If so, it means that there is an actual infection in your stomach.

3. **Stool tests.** These tests look for traces of the bacteria in the feces.

4. **Tissue tests.** When you have an endoscopy, a small tube is put down your throat into your stomach. This tube has a camera that can look for ulcers. At the same time, a tissue sample is taken from your stomach. This is then examined in a laboratory to see if the bacteria are present.

How is *H. pylori* treated?

These are:

- One or more antibiotics and
- A drug that helps reduce the acid in your stomach.

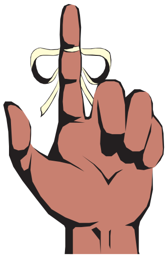
Sometimes several of these drugs are combined into a single pill or capsule. Or there are "combo packs" that help you keep track of when to take each drug. If you are being treated for *H. pylori* infection, it is very important to take all the medicine. This will help make sure the *H. pylori* and the stomach problems do not come back.

Should I be tested for *H. pylori*?

Only you and your doctor can make that decision. But, you should talk to your doctor about *H. pylori* if you:

- Have symptoms of an ulcer such as pain 1-3 hours after eating
- Have an ulcer or have had ulcers in the past
- Have a parent or sibling who has had stomach cancer.

Important Facts to Remember



- The most common ulcer symptom is burning pain in the stomach.
- Most ulcers are caused by an infection not by spicy food, acid or stress.
- Your doctor can test you for *H. pylori*.
- Antibiotics are the cure for ulcers caused by *H. pylori*.
- Eliminating *H. pylori* infection with antibiotics means your ulcer can be cured for good.

References

1. Merck Manual, Home Edition. Pocket Books, New York, 1997.
2. www.gihealth.com/html/education/helicobacter.html.
3. www.niddk.nih.gov/health/digest/pubs/hyploir/hpylori.thm.

Ask your doctor, nurse, and/or pharmacist about the information contained in this brochure

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