These guidelines have been withdrawn

MOH clinical practice guidelines are considered withdrawn five years after publication unless otherwise specified in individual guidelines. Users should keep in mind that evidence-based guidelines are only as current as the evidence that supports them and new evidence can supersede recommendations made in the guidelines.

CLINICAL PRACTICE GUIDELINES

Management of Helicobacter pylori Infection

Ministry of Health

Gastroenterological Society of Singapore

Sep 2004

MOH Clinical Practice Guidelines 9/2004

Levels of evidence and grades of recommendation

Levels of evidence

Level	Type of Evidence
Ia	Evidence obtained from meta-analysis of randomised controlled trials.
Ib	Evidence obtained from at least one randomised controlled trial.
IIa	Evidence obtained from at least one well-designed controlled study without randomisation
IIb	Evidence obtained from at least one other type of well-designed quasi-experimental study.
III	Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case studies.
IV	Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities.

Grades of recommendation

Grade	Recommendation
A (evidence levels Ia, Ib)	Requires at least one randomised controlled trial as part of the body of literature of overall good quality and consistency addressing the specific recommendation.
B (evidence levels IIa, IIb, III)	Requires availability of well conducted clinical studies but no randomised clinical trials on the topic of recommendation.
C (evidence level IV)	Requires evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities. Indicates absence of directly applicable clinical studies of good quality.
GPP (good practice points)	Recommended best practice based on the clinical experience of the guideline development group.

CLINICAL PRACTICE GUIDELINES

Management of Helicobacter pylori Infection

MOH Clinical Practice Guidelines 9/2004

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Statement of Intent

These guidelines are not intended to serve as a standard of medical care. Standards of medical care are determined on the basis of all clinical data available for an individual case and are subject to change as scientific knowledge advances and patterns of care evolve.

The contents of this publication are guidelines to clinical practice, based on the best available evidence at the time of development. Adherence to these guidelines may not ensure a successful outcome in every case, nor should they be construed as including all proper methods of care or excluding other acceptable methods of care. Each physician is ultimately responsible for the management of his/her unique patient in the light of the clinical data presented by the patient and the diagnostic and treatment options available.

Foreword

This is the second edition of the MOH clinical practice guidelines on the management of *Helicobacter pylori* infection. The first edition was published in 1998 and based on the recommendations of the 1997 Asia Pacific Consensus Conference on this topic. With time, the evidence-base has advanced and widened and it is appropriate to issue these revised guidelines.

H. pylori infection is common in Singapore and its prevalence increases with age. Most people with *H. pylori* infection do not develop clinical disease or symptoms, but there is a risk of developing ulcer disease and gastric cancer.

These guidelines provide useful recommendations on who should be tested and treated for *H. pylori* infection, and includes discussion on drug regimens for treatment. I hope you find the guidelines useful in your own practice.

PROFESSOR K SATKU
DIRECTOR OF MEDICAL SERVICES

Contents

Executive summary of recommendations

Details of recommendations can be found in the main text at the pages indicated. Where differences exist between this executive summary and the main text, please take reference from the main text.

Testing and treatment of *H. pylori* infection is recommended for the following:

Indication	Grade of recommendation & level of evidence
Duodenal ulcer (pg 6)	grade A, level Ia
Gastric ulcer (pg 6)	grade A, level Ia
Complicated ulcer (page 6)	grade A, level Ia
Before starting NSAID/Aspirin therapy in patients with a past history of peptic ulcer disease, or ulcer complications (pg 6)	grade A, level Ib
Before starting NSAID/Aspirin therapy in patients with a current or recent history of dyspepsia (pg 6)	GPP
Following resection of early gastric cancer (pg 9)	grade C, level IV
Patients who are first degree relatives of patients with gastric cancer (pg 7)	GPP
Low-grade gastric mucosa-associated lymphoid tissue (MALT) lymphoma (pg 10)	grade B, level III
Non-ulcer dyspepsia on a case-by-case basis (pgs 7, 11 and 12)	grade A, level Ia
Patients with gastro-oesophageal reflux disease and who require long-term PPI therapy (pg 8)	grade C, level IV

NSAID = Non-steroidal anti-inflammatory drug
PPI = Proton pump inhibitor

1 Introduction

The first edition of these clinical practice guidelines was based on recommendations made at the 1997 Asia Pacific Consensus Conference on the management of Helicobacter pylori (*H. pylori*).

Since publication of the guidelines in 1998, more information about the bacteria has emerged. The important role of *H. pylori* in the pathogenesis of peptic ulcer disease and complications has been further confirmed. Data from meta-analysis establishes the role of *H. pylori* infection in non-cardia gastric cancer, although recent data show that host factors do modify the risks of carcinoma. The relationship of *H. pylori* and NSAIDs in the development of NSAID-associated ulcer and bleeding have also been clarified and last but not least, there is some data on the usefulness of *H. pylori* eradication in patients with non-ulcer dyspepsia.

The present revision is undertaken by a group of gastroenterologists from the public and private institutions, as well as a family physician.

2 Review of the guidelines

These guidelines were first prepared in 1998 and reviewed in 2003. Evidence-based clinical practice guidelines are only as current as the evidence that supports them. Users should supplement the guidelines with any new evidence that has emerged since publication. The workgroup advises that these guidelines be scheduled for review five years after publication or if new evidence appears that requires substantial changes to the recommendations.

3 Diagnosis of *H. pylori* infection

Tests available for detection of *H. pylori* infection are serological tests, urea breath test, biopsy urease test, histology, culture and stool antigen test.

3.1 **A Serological tests for *H. pylori* infection should be locally validated and have a sensitivity and specificity of at least 90%.**

Grade A, Level Ib

Serological tests for diagnosis of *H. pylori* infection rely on detection of IgG antibodies to *H. pylori*. In children false negative tests can occur from a few weeks to a few months after an infection before an immune response occurs. Enzyme-linked immunoabsorbent assay serology may be used as an alternative for diagnosis prior to treatment, but is inferior to urea breath test (UBT) and stool antigen test and requires local validation for appropriate accuracy. So far, office-based serology tests have not reached acceptable accuracy for the diagnosis of *H. pylori* infection in primary care.[1] In developing countries, the accessibility and cost of the urea breath test and stool antigen test are recognized problems, but such countries usually have a high prevalence of *H. pylori* infection, making laboratory serology a satisfactory alternative.

3.2 **A The urea breath test (UBT) is a reliable test for *H. pylori* before and after treatment.**

Grade A, Level Ib

This is the test of choice for determining cure of infection when clinically indicated and when repeat endoscopy is unnecessary, as the sensitivity and specificity is $\geq 95\%$.[2] When using a UBT to determine cure of *H. pylori* infection, it should be done at least four weeks after stopping treatment. Both C^{13} and C^{14} breath tests are available in Singapore.

3.3 **A Biopsy urease test is the endoscopic investigation of choice for *H. pylori* infection.**

Grade A, Level Ib

The sensitivity of this test is improved if biopsies are taken from the corpus and antrum of the stomach and the number of organisms present

is 10^2 (this is required for a positive test). Histology as a means of diagnosing *H. pylori* infection should be reserved for patients with a negative biopsy urease test. When histology is used, staining of the biopsy specimen with hematoxylin and eosin (H&E) is adequate.[3]

3.4 **B** **Culture is an impractical means of diagnosing *H. pylori* infection.**

Grade B, Level IIa

Culture is an impractical means of diagnosing *H. pylori* when compared to the other simpler and highly sensitive and specific tests. It may be helpful in determining antibiotic sensitivity and resistance of *H. pylori* inpatients who have had more than two failed attempts at eradicating the infection. It is useful to determine the antibiotic susceptibility of *H. pylori* in a given locality.[3]

3.5 **B** **Post-treatment testing is desirable.**

Grade B, Level IIa

After treatment of H. pylori infection, cure of infection should be demonstrated in patients treated either for gastric ulcer (GU) or complicated duodenal ulcer (DU). In patients treated for GU, repeat endoscopy and biopsy should be undertaken to exclude malignancy; additional biopsies may be taken for determination of H. pylori status. In patients treated for complicated DU, either repeat endoscopy with biopsy or a UBT or a stool antigen test, if UBT is not available, is recommended. In patients with DU who have symptoms after treatment, a UBT is indicated. Serology is an inappropriate means of detecting cure of infection.[4,5]

3.6 **A** **Stool antigen test (HpSA).**

A new test, which detects the presence of *H. pylori* antigen in the stool, has been introduced. It is comparable to UBT at 93.8% and 90%[6] sensitivity and specificity respectively, and is extremely useful in children. Like the UBT it is very useful in monitoring the response to eradication therapy.

Grade A, Level Ia

4 Treatment of *H. pylori* infection

4.1 **A** **All gastric and duodenal ulcer patients who are infected with *H. pylori* should be treated with eradication therapy. Patients with a history of ulcer bleeding or perforation should also be treated.**

Grade A, Level Ia

This statement has a Grade A recommendation since there are numerous randomised-controlled trials demonstrating benefit.[7] It is in agreement with the conclusion of the American Digestive Health Foundation (ADHF) International Update Conference,[8] the recommendations of Asia Pacific Consensus on the Management of *H. pylori* infection[3] and the Maastricht Consensus of 2-2000.[9]

4.2 **A** **Routine testing for, and treatment of, *H. pylori* infection is not recommended prior to initiating treatment with NSAIDs. For patients with a past history of peptic ulcer disease, or ulcer complications (perforation, bleeding or obstruction), testing for and treatment of *H. pylori* infection is recommended.**

Grade A, Level Ib

As non-steroidal anti-inflammatory drugs (NSAIDs) are widely used, it would be impractical to recommend routine testing for *H. pylori* infection prior to their initiation. However, a meta-analysis of observational studies has shown that NSAIDs and *H. pylori* infection are independent, possibly additive, risk factors for the development of peptic ulcer disease[10] and NSAIDs increase the risk of complications such as bleeding in the presence of *H. pylori* infection.[11,12] For these reasons, it is recommended that the infection be treated in patients who require NSAIDs with an ulcer history or ulcer complications.[13,14]

4.3 **GPP** **In patients requiring long-term NSAID therapy, who have a current or recent history of dyspepsia, appropriate investigation of the dyspepsia and treatment for *H. pylori* infection, if documented to be present, is recommended.**

GPP

This statement refers to patients with uninvestigated dyspeptic symptoms rather than those with established peptic ulceration who are included in the previous statements. Appropriate investigations for

dyspepsia would include upper gastrointestinal endoscopy in particularly high-risk patients, such as the elderly and those with significant comorbidity. This recommendation does not imply that *H. pylori* infection should be looked for and potentially eradicated in all patients on NSAIDs even when they are asymptomatic.

4.4 **A** **Patients with non-ulcer dyspepsia (i.e. dyspepsia after investigation) can be considered for treatment of *H. pylori* infection on a case-by-case basis.**

Grade A, Level Ia

More than 13 clinical trials have been performed comparing *H. pylori* eradication with placebo with differing outcomes. Two meta-analysis have been performed with one showing no benefits in terms of symptoms attributable to *H. pylori* eradication in patients with non-ulcer dyspepsia.[15] The other showed that *H. pylori* eradication was superior to placebo (14% vs 4%) in terms of symptom improvement.[16] There is probably a clinically relevant improvement in symptom cure rate associated with *H. pylori* eradication in patients with non-ulcer dyspepsia but the effect is likely to be small and it has been estimated that 15 patients with dyspepsia need to be treated for 1 patient to be cured of his symptoms.[16] This response rate is no better than in other therapies, which are not directed at *H. pylori* infection in functional dyspepsia. Treatment should only be offered after a discussion with the patient about the implications of treatment.

4.5 **GPP** **Patients who are first degree relatives of gastric cancer patients should be treated for *H. pylori* infection.**

GPP

There is emerging data that first degree relatives of gastric cancer patients have a higher risk of developing gastric cancer. Familial clustering of stomach cancer has been reported in 12.5% of sibling cases.[17] Theoretically primary prevention with *H. pylori* eradication can reduce the risk of gastric cancer although data to show this has yet to emerge.

4.6 **C** **Patients with gastro-oesophageal reflux disease and who require long-term PPI therapy should be treated for *H. pylori* infection.**

Grade C, Level IV

The group agrees with the Asia Pacific Consensus on Gastro-esophageal reflux disease (GERD) 2003[18] that there is little evidence that *H. pylori* has any direct pathogenic role in GERD. Any influence of *H. pylori* infection on GERD is a consequence of the related gastritis and its effect on gastric acid secretion. The effect of *H. pylori* eradication on reflux symptoms depends on two factors: (1) the anatomical distribution of gastritis and (2) the presence or absence of pre-existing GERD. In patients who have erosive oesophagitis, it is advisable that *H. pylori* status be checked and treated before commencing long-term proton pump inhibitor (PPI) therapy. This is based on the observation that long-term PPI treatment in patients infected with *H. pylori* may be associated with an acceleration of atrophic gastritis.

5 *H. pylori* infection and gastric cancer

5.1 ***H. pylori* infection predisposes to both the intestinal and diffuse types of gastric cancer, but not to cancer of the gastric cardia.**

Meta-analysis[19] has shown that *H. pylori* infection increases the risk of non-cardia gastric cancer. There is no current evidence that eradication of *H. pylori* infection reverses the premalignant lesions of gastric cancer or prevents its developments. Several prospective large studies are being carried out in China and Japan to evaluate the effect of eradication of *H. pylori* on the prevention of gastric cancer.

5.2 **There are no known predictors for the development of gastric cancer in infected individuals.**

Since most strains of *H. pylori* in the Asia Pacific region contain the cytotoxin associated gene A (CagA) protein, knowledge of CagA status is of no practical utility.[20] Other markers of *H. pylori* virulence have been suggested and include age as well as host factors such as interleukin genetic profile.

5.3 **C It is recommended that *H. pylori* infection be treated in patients following resection of early gastric cancer. Screening asymptomatic individuals for *H. pylori* infection as a means of reducing the incidence of gastric cancer is not currently recommended.**

Grade C, Level IV

The workshop participants made this recommendation by consensus and the level of evidence supports a Grade C recommendation. In a non-randomised controlled trial, patients treated for *H. pylori* infection following endoscopic resection of early gastric cancer (EGC) had no recurrence of EGC in the period of follow-up, whereas patients not treated for the infection had a 9% incidence of new lesions.[21]

5.4 **B** **Treatment for *H. pylori* infection is recommended in patients with low-grade gastric mucosa-associated lymphoid tissue lymphoma.**

Grade B, Level III

The available studies on the treatment of the infection in patients with gastric mucosa-associated lymphoid tissue (MALT) lymphoma are uncontrolled case series and these show complete remission of the lymphoma in approximately 75% of patients at up to two years after successful treatment of *H. pylori* infection.[22,23] It is recommended that patients with this condition be managed by gastroenterologists with access to endoscopic ultrasonography (EUS) since additional treatment modalities may be required, and all patients will need expert follow-up.

5.5 As already discussed in section 4.5 on page 7, patients who are first degree relatives of gastric cancer patients should be treated for *H. pylori* infection.

6 *H. pylori* infection and dyspepsia

Dyspepsia is defined as pain or discomfort centered in the upper abdomen that has been persistent for two weeks or longer and is significant enough for an individual to seek medical attention.

Non-Ulcer Dyspepsia - This refers to patients who have symptoms which are thought to be related to the upper gastrointestinal tract but in whom endoscopic examination shows no evidence of macroscopic disease. Studies indicate that the prevalence of *H. pylori* in patients with non-ulcer dyspepsia is the same as or slightly higher than that of asymptomatic controls.[6] Eradication of *H. pylori* infection in dyspeptics have yielded conflicting results (see section on treatment).

6.1 **C** **Screening all dyspeptic patients for H. pylori infection is not recommended.**

Grade C, Level IV

The consensus conference participants adopted this recommendation by unanimous consensus, though the level of evidence supporting screening merits a Grade C recommendation. It was felt to be unnecessary and impractical to recommend widespread screening for *H. pylori* infection in all dyspeptic patients.

6.2 **GPP** **It is possible to identify dyspeptic patients who require early endoscopy based on: the incidence of gastric cancer in a particular country; the presence of alarm features such as weight loss, bleeding and anaemia; the age of presentation of the patient with the cut-off depending on the age-specific incidence of gastric cancer in that country.**

GPP

The incidence of cancer of stomach in Singapore starts to rise between 35 years to 40 years,[24,25] hence the workgroup decided on 35 years of age as a 'cut off' point. Patients with uninvestigated dyspepsia above 35 years of age, or with alarm features such as weight loss, bleeding, taking NSAIDs and cancer phobia, should be investigated by endoscopy. Uninvestigated dyspepsia patients below 35 years without alarm features may be first treated symptomatically and reviewed. If symptoms do not improve after 4 weeks of treatment, the patient should be investigated by *H. pylori* test and endoscopy (see algorithm at Annex on page 19).

6.3 **A Dyspeptics, after full investigation (i.e. non-ulcer dyspepsia) may be offered *H. pylori* eradication therapy.**

Grade A, Level Ia

Treatment should only be offered after a discussion with the patient about the implications of treatment. Patients should be advised that treatment of the infection may or may not alleviate their symptoms in the short term and may even aggravate them and they should be made aware of the possible adverse effects of therapy. Clinical trials have shown that eradication of *H. pylori* infection relieves symptoms of non-ulcer dyspepsia in a small group of infected patients. Treatment should be offered on the basis that 1 in 15 infected person may have symptom improvement.[16,26]

7 Drug regimens for *H. pylori* infection

7.1 **A** **In 1998, drug regimens for *H. pylori* infection could produce an eradication rate of 90% or greater on a per-protocol analysis and 80% or greater on an intent-to-treat analysis in properly designed clinical trials. Based on these criteria, the following combination regimens are recommended:**

PPI in standard dose[(1)] + clarithromycin 500 mg + amoxicillin 1000 mg

PPI in standard dose[(1)] + clarithromycin 500 mg + metronidazole 400 mg

Grade A, Level Ia

[(1)] Proton Pump Inhibitor : lansoprazole 30 mg, omeprazole 20 mg.

Each of the above regimens should be given **for seven days on a twice-daily basis**. Currently the following PPIs are available: omeprazole, lansoprazole, rabeprazole, pantoprazole and esomeprazole. There are more published data in support of these newer PPI. Tinidazole can be used in place of metronidazole. In general, the amoxicillin-containing combinations are recommended over those containing metronidazole, particularly in places such as Singapore where rates of metronidazole resistance exceed 30%.

The Mach 2 trial (PPI + metronidazole + clarithromycin) has shown that with metronidazole-containing regimes there is a reduction in eradication rate by as much as 19% when metronidazole resistant strains are treated.[27] Meta-analysis has shown that results with clarithromycin 500 mg bid are about 10% better than clarithromycin 250 mg bid and this has been accepted.[28]

7.2 **A** **If clarithromycin is not available, either of the following two regimens may be considered:**

PPI in standard dose twice daily + Amoxicillin 1000 mg twice daily + Metronidazole 400 mg twice daily	For 7 days

Colloidial bismuth subcitrate 120 mg four times daily + Metronidazole 400 mg twice daily + Tetracycline 500 mg four times daily	For 14 days

Grade A, Level Ib

In general, eradication rates will be at least 10% lower than with a clarithromycin-containing regimen.

7.3 **A In the event of a treatment failure with a PPI regimen containing clarithromycin, 'salvage therapy' is required.[9]**

Grade A, Level Ib

A regimen for use after initial treatment failure is:

PPI in standard dose twice daily + Colloidal bismuth subcitrate 120 mg four times daily + Metronidazole 400 mg twice daily + Tetracycline 500 mg four times daily	For 7 days

This has been referred to as "quadruple therapy" and could result in an eradication rate of 70%. Newer salvage therapeutic regimens involving a new combination of PPI, rifabutin and clarithromycin have been reported in preliminary trials to produce an eradication rate of 84%.

Ranitidine Bismuth Citrate is not available anymore.

8 Clinical Quality Improvement

The desired clinical outcome is eradication of *H. pylori* in all patients in whom eradication is of proven benefit, i.e. patients with complicated or uncomplicated *H. pylori*-associated peptic ulcer disease.

Audit should look at

- Proportion of patients with Upper GI bleeding that are tested for *H.pylori* infection.[29] (see page 6)

- The proportion of patients with bleeding peptic ulcer due to *H. pylori* infection that are offered eradication therapy. (see page 6)

- Proportion of patients with peptic ulcer disease receiving long-term anti-secretory treatment that are offered eradication therapy. (see page 6)

- Proportion of patients treated for gastric ulcer or complicated duodenal ulcer with *H. pylori* infection, who demonstrate cure of infection. (see page 5)

- Proportion of peptic ulcer disease patients with *H. pylori* infection that relapse after treatment. (see Annex at page 19)

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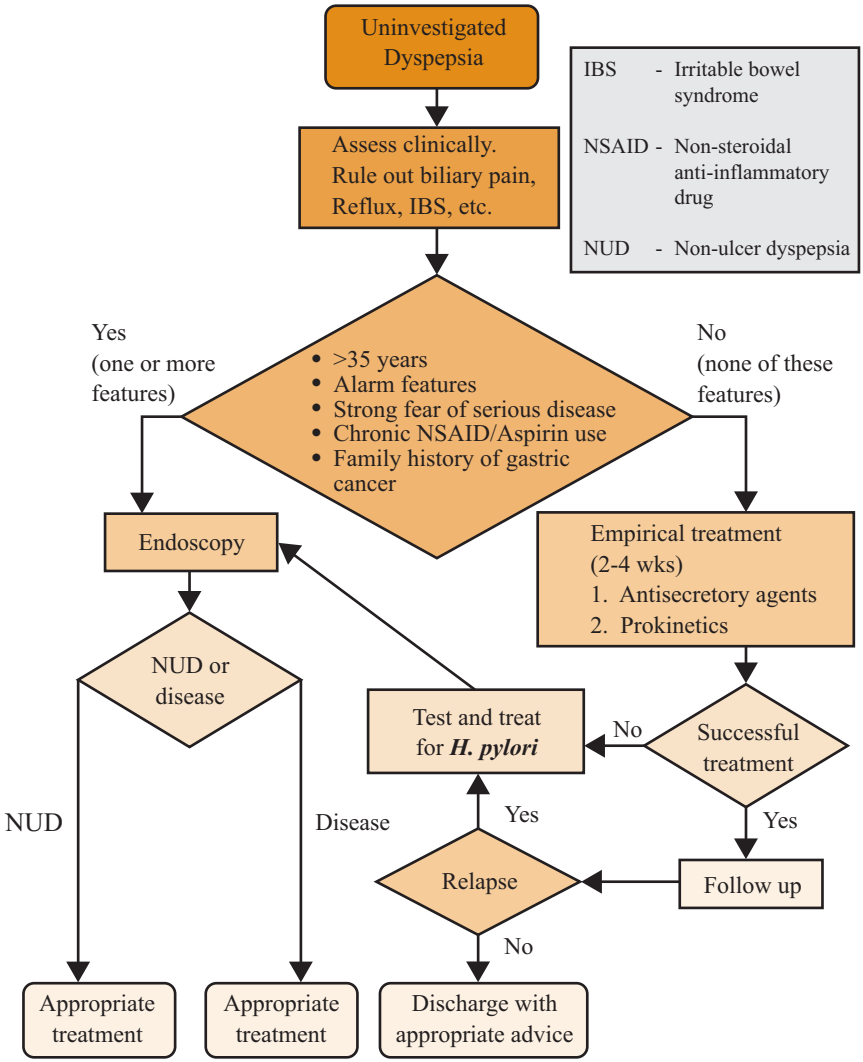
Annex

Algorithm for Management of New Onset Uninvestigated Dyspepsia



Self-assessment (MCQs)

After reading the Clinical Practice Guidelines, you can claim one CME point under Category III (Self-Study) of the SMC Online CME System. Before you login to claim the CME point, we encourage you to evaluate whether you have mastered the key points in the Guidelines by completing this set of MCQs. This is an extension of the learning process and is not intended to "judge" your knowledge and is not compulsory. The answers can be found at the end of the questionnaire.

Instruction: Choose the best answer.

1. The value of treating *H. pylori* in a patient with non-ulcer dyspepsia:
   - A) is unequivocal.
   - B) will usually cure the patient's symptoms in most cases.
   - C) has been insufficiently studied and little data exists to guide this situation.
   - D) results in benefit in about one of 15 such patients.

2. Treatment of *H. pylori* in order to prevent gastric cancer:
   - A) is recommended for the average person if found to be *H. pylori*-positive.
   - B) should be offered in older patients aged above 50 years if *H. pylori*-positive .
   - C) is effective in the presence of intestinal metaplasia or pre-neoplasia.
   - D) is recommended following resection of early gastric cancer.

3. *H. pylori* is a carcinogen and eradication of the infection has been shown convincingly to prevent gastric cancer.
   - A) True
   - B) False

4. *H. pylori* infection causes duodenal ulcer through increased gastric acid production. It is therefore strongly recommended that individuals with gastro-oesophageal reflux disease should be tested and treated for *H. pylori* infection.
   - A) True
   - B) False

5. The best diagnostic test to assess for *H. pylori* before and after treatment is:
   A) The qualitative serological test
   B) The quantitative serological test
   C) The urea breath test
   D) Helicobacter pylori Stool Antigen (HpSA) test

6. Helicobacter Pylori testing and treatment is indicated in the following conditions, except:
   A) Gastric Ulcer
   B) Duodenal Ulcer
   C) All patients on Aspirin/NSAID therapy
   D) Gastric Cancer

7. The ideal treatment regime to eradicate *H. pylori* in our local population is (in twice a day dosing for a duration of 7 days):
   A) PPI (e.g. Omeprazole) and Amoxycillin combination
   B) PPI, Azithromycin and Metronidazole/Tinidazole combination
   C) PPI, Clarythromycin and Amoxycillin combination
   D) PPI, Clarythromycin, Flagyl and Tetracycline combination

8. After treatment of *H. pylori* infection, it is desirable to test for cure or eradication. Which of the below statements is true?
   A) The urea breath test is a reliable means of test of cure.
   B) In patients with ulcers, endoscopy and biopsy is a good alternative to test for cure.
   C) The stool antigen test is also useful to monitor response to treatment.
   D) All of the above are true.

9. Regarding treatment of *H. pylori*:
   A) Data does not clearly support the treatment of *H. pylori* infection among first-degree relatives of gastric cancer patients.
   B) Long-term PPI use may accelerate atrophic gastritis amongst those with *H. pylori* infection.
   C) Both A and B are true.
   D) None of the above is true.

Answers

1. D
2. D
3. B
4. B
5. C
6. C
7. C
8. D
9. B

Workgroup members

The members of the workgroup, who were appointed in their personal professional capacity, are:

Chairman	Professor Fock Kwong Ming Division of Gastroenterology Changi General Hospital
Members	Associate Professor Yeoh Khay Guan Department of Medicine National University Hospital
	Dr Lim Chee Chian Department of General Medicine Tan Tock Seng Hospital
	Dr Widjaja Luman Department of Gastroenterology Singapore General Hospital
	Dr Alexius Chee Eng Nam Mt Elizabeth Medical Centre
	Dr Johnathan Pang Sze Kang Ever Health Family Clinic & Surgery

MOH CLINICAL PRACTICE GUIDELINES 9/2004
Management of Helicobacter Pylori Infection

Ministry of Health

Gastroenterological Society of Singapore

Executive summary of recommendations

Details of recommendations can be found in the main text at the pages indicated. Where differences exist between this executive summary and the main text, please take reference from the main text.

Testing and treatment of *H. pylori* infection is recommended for the following:

Indication	Grade of recommendation & level of evidence
Duodenal ulcer (pg 6)	grade A, level Ia
Gastric ulcer (pg 6)	grade A, level Ia
Complicated ulcer (page 6)	grade A, level Ia
Before starting NSAID/Aspirin therapy in patients with a past history of peptic ulcer disease, or ulcer complications (pg 6)	grade A, level Ib
Before starting NSAID/Aspirin therapy in patients with a current or recent history of dyspepsia (pg 6)	GPP
Following resection of early gastric cancer (pg 9)	grade C, level IV
Patients who are first degree relatives of patients with gastric cancer (pg 7)	GPP
Low-grade gastric mucosa-associated lymphoid tissue (MALT) lymphoma (pg 10)	grade B, level III
Non-ulcer dyspepsia on a case-by-case basis (pgs 7, 11 and 12)	grade A, level Ia
Patients with gastro-oesophageal reflux disease and who require long-term PPI therapy (pg 8)	grade C, level IV

NSAID = Non-steroidal anti-inflammatory drug
PPI = Proton pump inhibitor

Algorithm for Management of New Onset Uninvestigated Dyspepsia