

Practice Patterns for Managing *Helicobacter pylori* Infection and Upper Gastrointestinal Symptoms

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Dyspepsia is a highly prevalent symptom complex defined as pain or discomfort centered in the upper abdomen.¹ New-onset dyspepsia in a previously asymptomatic patient may indicate peptic ulcer disease (PUD), nonulcer dyspepsia (NUD), or (rarely) gastric cancer. It is distinct from gastroesophageal reflux disease (GERD), typically characterized by heartburn or acid regurgitation, although differentiation may be difficult in some patients. Symptoms of dyspepsia and GERD are experienced by about 40% of the population annually¹ and account for 2% to 5% of primary care visits² and \$14 billion in annual prescription drug expense.³ Recognition of *Helicobacter pylori* infection as the single most common cause of PUD revolutionized management of dyspepsia; the significance of that discovery resulted in a Nobel Prize for discoverers Barry J. Marshall and J. Robin Warren.⁴

In 1994, a National Institutes of Health⁵ consensus conference recommended that *H pylori* infection be eradicated in patients with PUD and that this be accomplished using antibiotics and antisecretory medication. Several national and international gastroenterological organizations have since released more detailed guidelines for the diagnosis and treatment of dyspepsia as the understanding of the contribution of *H pylori* infection has developed.^{1,6-11}

One of the key recommendations of various guidelines has been that clinicians use nonendoscopic tests (such as serologic or breath tests) for *H pylori* infection, unless endoscopy is clinically indicated, and that patients testing positive receive eradication therapy. Compared with early endoscopy and treatment based on endoscopic findings, this less costly test-and-treat approach has demonstrated similar outcomes such as number of physician visits and days lost to sick time.^{1,12} Prompt endoscopy is reserved for older patients (≥45-55 years) and for patients with alarm features, such as persistent vomiting, bleeding, weight loss, dysphagia, and anemia.

Clinical practice guidelines for dyspepsia have been in place for more than 10 years and have been widely disseminated to primary care clinicians.¹³⁻¹⁵ However, little is known about the medical community's adher-

Objective: To assess adherence with guidelines for testing and treatment of *Helicobacter pylori* infection and upper gastrointestinal symptoms.

Study Design: Retrospective longitudinal cohort analysis of patient-level medical and pharmacy claims from 75 US managed care plans.

Methods: Persons with new claims for antisecretory medication, *H pylori* tests, or endoscopies were selected from among 2 million plan members continuously enrolled from 2001 to 2004 and were grouped by initial clinical diagnosis (3456 with peptic ulcer disease [PUD], 14 593 with nonulcer dyspepsia [NUD], and 36 233 with gastroesophageal reflux disease [GERD]). Diagnostic procedures, medications received, and sequencing of specific procedures and medications were examined relative to published guidelines by initial diagnosis, age, and physician specialty.

Results: While guidelines recommend testing before treatment, one third of persons receiving antibiotics for *H pylori* infection had not first been tested for the infection. In one third of all posttreatment testing, primary care practitioners incorrectly used serologic tests, despite their inability to distinguish cured from active infection. Eighteen percent of patients with GERD were tested for *H pylori*, although there is no causal link between them. Only two thirds of patients aged 50 to 64 years with presumed PUD underwent endoscopy, which guidelines recommend for older adults; yet one third of patients with PUD aged 18 to 49 years, for whom prompt endoscopy is generally not recommended, had an endoscopy within 30 days of their index date.

Conclusions: Substantial noncompliance with widely disseminated guidelines calls for better understanding of appropriate indications for *H pylori* testing and endoscopy to improve patient care and conserve healthcare resources.

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In this issue

Take-away Points / p43

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Web exclusive

Appendices A and B

For author information and disclosures, see end of text.

ence to these recommendations. Surveys of physician-reported practice have been published,^{16,17} but observational studies^{2,18-20} of treatment patterns at the patient level have been limited to narrow populations or to analyses of drug utilization. The release of updated US guidelines in 2005^{10,11} marked an appropriate time to assess current clinical practice.

This study describes recent patterns for managing patients with dyspepsia or GERD symptoms based on analysis of a national managed care claims database. While lacking the precision of medical record review, analysis of claims data offers insight into actual patterns of community care resulting from the interaction of physician and patient behavior, as well as organizational factors. We characterize current practice and, where possible, assess the consistency of these treatment patterns with published clinical practice guidelines.

METHODS

We performed a retrospective longitudinal cohort study of nonelderly patients treated for dyspepsia or GERD from 2002 to 2004. The study was based on analysis of paid medical and pharmacy claims for more than 15 million persons enrolled in 75 commercial managed care plans across the United States (Pharmetrics, Watertown, Mass). To help ensure documentation of a patient's complete course of care, the study was limited to individuals continuously enrolled for 3 years.

Sample Selection

Individuals were selected if they had paid claims for any of the following: test for *H pylori*, endoscopy with biopsy, claims that included a diagnosis for dyspepsia or GERD, or prescription for antisecretory therapy (proton pump inhibitor [PPI] or H₂ receptor antagonist [H₂RA]) or for eradication therapy (antibiotics plus PPI or H₂RA). The *International Classification of Diseases, Ninth Revision, Clinical Modification* diagnosis codes were 531-534 (PUD), 535-536 (NUD), and 530 (GERD/esophagitis). Codes and drug names for inclusion criteria are given in **Appendix A** (available at www.ajmc.com). Additional clinical events were identified as potential markers for the beginning of treatment. These included endoscopy without biopsy and a general code often applied to patients who present with abdominal signs and symptoms of undetermined cause (*International Classification of Diseases, Ninth Revision, Clinical Modification* code 789), termed SIGN. The first appearance of any of these events or the previously described inclusion events defined the patient's index date.

The study database spanned the 3-year period from October 1, 2001, to September 30, 2004. To limit the analysis to patients

presenting with new-onset symptoms, the sample was restricted to patients in whom no index event appeared during the first 6 months. A minimum of 6 months' follow-up after the index event was also required. Patients were followed up until the end of the study period or until discontinuation of enrollment.

The final analysis was limited to individuals who had at least 1 qualifying prescription or diagnostic procedure; patients with diagnosis only (no intervention) were excluded. Herein, the goal was to eliminate patients whose symptoms may have been recorded only as a rule-out code or secondary diagnosis or those whose symptoms were apparently too mild to warrant follow-up treatment or testing.

Outcome Variables

For each patient, claims were scanned in chronological order to identify the index event and subsequent events potentially related to diagnosis and treatment of dyspepsia or GERD. Outcomes included the percentage of patients receiving specified procedures and treatments and the percentage of patients undergoing noninvasive testing or endoscopy before or after a prescription fill for eradication therapy. The date of a diagnostic test is based on the recorded date of test analysis rather than the date of test administration. Coding ambiguities prevent us from knowing if every endoscopy included an endoscopic test for *H pylori* (such as a biopsy urease test). To err in favor of compliance, we assumed that endoscopy included an *H pylori* test. Similarly, when the data reported a test and prescription fill on the same day, we assumed that the test occurred first. We also checked the effect of moving back the diagnostic test date by 2 days to allow for situations in which the physician receives test results by telephone before the date appearing on the claim.

Each patient was categorized according to the earliest recorded disease-related diagnosis (PUD, NUD, GERD, or SIGN); if none of these appeared, the category assigned was "other." For comparison, patients were also assigned a secondary category based on the last disease-related diagnosis. Consultation with a gastroenterologist was recorded if the patient had a claim with the specialty coded as gastroenterology or if the patient underwent endoscopy. Patients and outcomes were categorized by age, sex, type of health plan, and region of the country.

Statistical Analysis

The study sample was derived by nonrandom selection of health plans of various types and regions across the country. To develop nationally representative findings of the nonelderly privately insured population, results were weighted by region and by whether the health plan was a health mainte-

Practice Patterns for Managing Dyspepsia

nance organization (HMO). The nationwide distribution of individuals by region and by plan type was taken from the Kaiser Family Foundation 2003 Annual Employer Health Benefits Survey,²¹ with corroborating information from the

Agency for Healthcare Research and Quality Medical Expenditure Panel Survey.²²

Differences (with 95% confidence intervals) in proportions of outcomes between categories of patients were ana-

■ **Table 1.** Study Sample Characteristics by First Diagnosis of Patients

Patient Characteristic	First Diagnosis, %					All Diagnoses, No. (%)
	PUD (n = 3456)	NUD (n = 14 593)	GERD (n = 36 233)	SIGN (n = 44 129)	Other (n = 30 768)	
Last diagnosis						
PUD	46	3	2	3	0	3786 (3)
NUD	14	53	6	11	0	14 889 (12)
GERD	18	19	76	20	0	39 703 (31)
SIGN	22	26	17	67	0	40 033 (31)
Other	0	0	0	0	100	30 768 (24)
Age, y						
<18	4	10	5	13	10	12 216 (10)
18-49	47	54	55	54	51	68 847 (53)
50-64	49	36	40	33	40	48 116 (37)
Sex						
Male	47	40	46	34	44	52 348 (41)
Female	53	61	54	66	56	76 831 (60)
Health plan type						
HMO	56	62	70	67	64	85 833 (66)
Indemnity	6	5	6	6	4	6793 (5)
PPO	28	21	10	14	22	20 740 (16)
POS	9	10	12	11	8	13 685 (11)
Other or unknown	1	2	2	2	1	2128 (2)
Census region						
East	39	32	28	27	32	37 514 (29)
Midwest	37	43	50	50	44	61 274 (47)
South	16	17	15	16	18	21 043 (16)
West	8	8	8	8	6	9348 (7)
Preindex period, mo						
6-11	34	35	33	38	29	43 935 (34)
12-17	27	28	28	28	26	35 434 (27)
18-23	21	21	21	19	24	27 209 (21)
24-29	17	17	17	15	22	22 444 (17)
30-35	0	0	0	0	0	157 (0.1)
Follow-up period, mo						
6-11	14	13	14	11	18	17 846 (14)
12-17	20	20	20	18	23	25 501 (20)
18-23	26	27	27	26	26	34 069 (26)
24-29	33	33	31	35	28	41 081 (32)
30-35	7	8	9	10	6	10 682 (8)

PUD indicates peptic ulcer disease; NUD, nonulcer dyspepsia; GERD, gastroesophageal reflux disease; SIGN, abdominal signs and symptoms of undetermined cause; HMO, health maintenance organization; PPO, preferred provider organization; and POS, point of service.

lyzed. Standard errors were computed accounting for the sample weighting using SAS software version 9.1 (SAS Institute Inc, Cary, NC).

RESULTS

Study Cohort

Among more than 1.9 million continuously enrolled health plan members, 129 179 had a qualifying event and met other inclusion criteria. Another 38 334 had no qualifying therapies or tests, although they had at least 1 qualifying diagnosis. The final cohort included 3456 patients with first diagnosis recorded as PUD, 14 593 with NUD, and 36 233 with GERD. Another 44 129 patients were first given a SIGN diagnosis. Almost 31 000 other patients received none of these diagnoses but had dyspepsia or GERD-related treatments or tests. The [Appendix B](#) (available at www.ajmc.com) shows the sample selection process.

Table 1 gives cohort characteristics by initial diagnostic category. For most patients, the last qualifying diagnosis was the same as the first. However, half of those initially diagnosed as having PUD had a different last diagnosis. Two percent to 3% of the other groups were eventually diagnosed as having PUD, so that the total number with PUD as a final diagnosis was 3786, which was 9% larger than the initial diagnosis total.

Ten percent of the sample were younger than 18 years, while 37% were aged 50 to 64 years (Table 1). Patients with PUD tended to be older and were more likely to be male than patients with NUD or SIGN. Two thirds of the study population were enrolled in HMOs; almost half were located in

the Midwest census region (Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, Ohio, North Dakota, South Dakota, and Wisconsin).

Although a minimum follow-up period of 6 months was required for sample inclusion, 86% actually had at least 1 year of follow-up, and 40% had at least 2 years (Table 1). Two thirds of the cohort had no prior claims for at least 12 months before their index date.

Table 2 gives the sample distribution by region and by HMO coverage, along with the distribution from a more representative national sample.^{21,22} Our sample substantially underrepresents non-HMO plans in the West and South. Subsequent results presented herein are tabulations weighted to the regional and HMO composition of the national sample.

Procedures and Treatments Received

The **Figure** shows the number of patients recorded as having received a particular test or treatment during the study period. Among the patients with presumed PUD, 27% were tested noninvasively for *H pylori* infection, while 54% underwent endoscopy; neither occurred for about 25% of patients. About 30% received eradication therapy. Of the patients initially suspected to have NUD, 31% had endoscopy, and 27% were tested for *H pylori* infection by other means. Eighteen percent of the patients with a first diagnosis of GERD were tested for *H pylori* infection, and 6% received eradication therapy.

Thirty-nine percent of patients with GERD had prescription and refill claims for PPIs totaling at least a 4-month supply (Figure). Fewer patients with PUD and NUD had at least a 4-month supply of PPIs (24% and 22%, respectively). Not shown in the Figure is that about 76% of patients with PUD and NUD received at least 1 prescription for a PPI or an H₂RA, as did 85% of patients with GERD.

Complementary to these results is the proportion of patients who filled only a PPI or an H₂RA prescription (ie, they had no endoscopy, test, or eradication therapy). This proportion was 22% for patients with presumed PUD, 44% for patients with NUD, and 53% for patients with GERD.

These data were also analyzed with patients categorized according

■ **Table 2.** Study Sample and National Distribution by Census Region and Health Plan Type*

Census Region	Health Plan Type					
	Study Sample			National Distribution [†]		
	HMO	Non-HMO	Total	HMO	Non-HMO	Total
East	13.1	15.9	29.0	5.0	15.0	20.0
Midwest	30.9	16.5	47.4	4.3	19.7	24.0
South	15.5	0.8	16.3	7.1	26.9	34.0
West	7.0	0.2	7.2	8.1	13.9	22.0
Total	66.5	33.5	100.0	24.5	75.5	100.0

*Data are given as percentage of patients.

[†]Nonelderly privately insured.^{21,22}

HMO indicates health maintenance organization.

to the last observed diagnosis rather than the initial diagnosis. Similar results were obtained.

Type of Test for *H pylori* Infection

The use of specific nonendoscopic tests for *H pylori* infection was tabulated by year (Table 3). While serologic and whole-blood antibody tests still dominated in 2004, the use of tests of active infection (urea breath tests and fecal antigen tests) increased from 7% to 13% (difference, 6% [95% confidence interval, 1%-11%]) of the tests between 2002 and 2004.

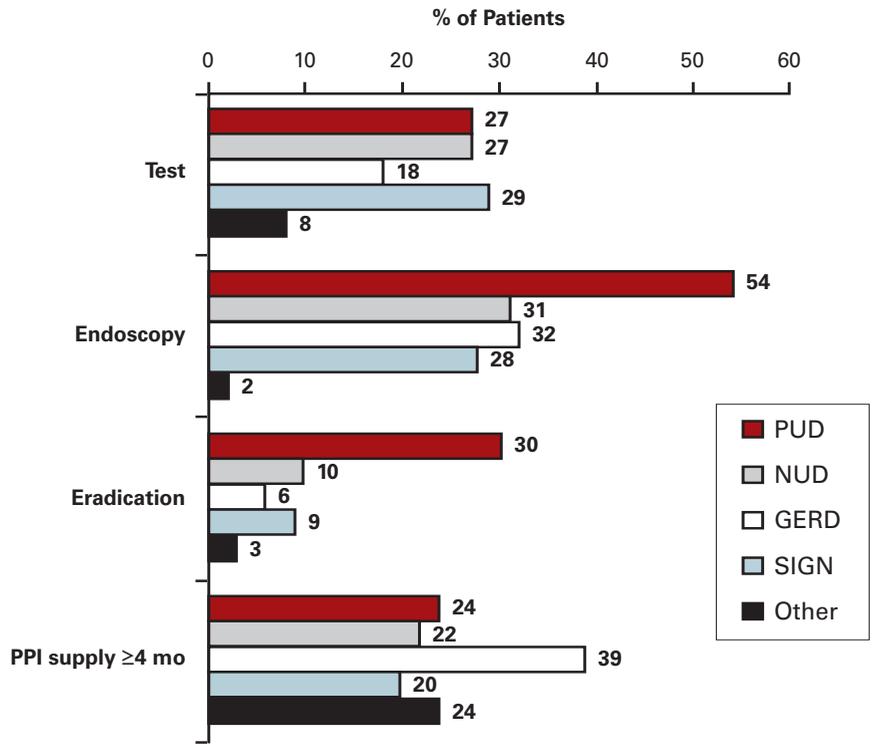
Practices Contrary to Guidelines

Guidelines recommend that patients undergo a diagnostic test or endoscopy for determination of *H pylori* status before eradication therapy.^{6,7} Among the study sample, 7863 patients received eradication therapy, but only 71% (95% confidence interval, 67%-75%) of those were pretested (Table 4). Patients who had been seen by a gastroenterologist were more likely to have been pretested than those who had seen another type of physician (88% vs 59%). The proportion was higher for those with a presumed diagnosis (eg, 87% for PUD). Year-to-year differences in testing rates were not statistically significant. Varying the diagnostic test date or prescription fill date as recorded on the claim form by 2 days did not affect the results.

Guidelines are mixed as to recommendations for routine posttreatment testing to document successful eradication of *H pylori* infection.^{7,9,13}

In our study, only 14% (95% confidence interval, 11%-17%) of patients who received eradication therapy were tested after treatment. Posttreatment testing was performed more fre-

■ **Figure.** Percentage of Patients Receiving Diagnostic Procedure or Therapy by First Diagnosis



Weighted sample results. Margins of error as given by 95% confidence intervals are ±6 percentage points for peptic ulcer disease (PUD), ±3 percentage points for nonulcer dyspepsia (NUD), and ±2 percentage points for gastroesophageal reflux disease (GERD), abdominal signs and symptoms of undetermined cause (SIGN), and Other. PPI indicates proton pump inhibitor.

■ **Table 3.** Type of *Helicobacter pylori* Test by Year*

Year of <i>H pylori</i> Test	Type of <i>H pylori</i> Test			
	2002 (n = 6814)	2003 (n = 9695)	2004 (n = 5026)	All Years (N = 21 535)
Serology	85	86	82	85
Whole blood fingerstick	8	6	5	6
Tests for active infection	7.2	9.2	13.3	9.2
Urea breath test				
13C	1	3	4	2
14C	0.2	0.2	0.3	0.2
Fecal antigen	6	6	9	7

*Data are given as percentage of tests given to the patient cohort and represent weighted sample results. Year-to-year trends by specific test were not statistically significant at $P < .05$.

quently in those patients who had been seen by a gastroenterologist (29% vs 3%). We also found that one third of posttreatment tests performed by primary care physicians (PCPs)

■ **Table 4.** Testing Before and After Eradication Therapy*

Patient Characteristic	No.	Pretreatment Testing [†]	Posttreatment Testing [‡]
		% (95% CI)	% (95% CI)
All patients receiving eradication therapy	7863	71 (67-75)	14 (11-17)
Patient consulted a gastroenterologist within 180 d of eradication therapy fill date			
Yes	3634	88 (83-93)	29 (22-35)
No	4229	59 (53-65)	3 (1.5-4.5)
First diagnosis			
PUD	892	87 (83-91)	11 (8-14)
NUD	1366	69 (58-80)	12 (7-17)
GERD	1586	77 (69-86)	18 (10-25)
SIGN	3206	70 (63-77)	15 (10-20)
Other	813	42 (27-57)	2 (1.5-2.5)

*Weighted sample results.

[†]Percentage of group receiving *Helicobacter pylori* test or endoscopy before eradication.

[‡]Percentage of group receiving *H pylori* test or endoscopy after eradication.

CI indicates confidence interval; PUD, peptic ulcer disease; NUD, nonulcer dyspepsia; GERD, gastroesophageal reflux disease; and SIGN, abdominal signs and symptoms of undetermined cause.

not first tested for the infection. This could have led to unnecessary and potentially harmful antibiotic treatment for patients not infected with *H pylori*. One third of post-treatment tests performed by PCPs were performed using serology. Guidelines emphasize that these tests only detect antibodies and cannot reliably distinguish between ongoing and cured infections.^{7,13}

Only two thirds of patients aged 50 to 64 years with presumed PUD underwent endoscopy, which guidelines recommend for older adults, yet one third of patients with PUD aged 18 to 49 years, for whom prompt endoscopy is generally not recommended, had an endoscopy within 30 days. Half of the older patients with NUD underwent endoscopy; one tenth of the younger patients with NUD had an endoscopy within 30 days, in closer correspondence with guidelines. In

were serologic tests, contrary to guidelines. The rates of pretreatment and posttreatment testing varied little by type of health plan, region, or year.

While guidelines call for endoscopy for patients aged 50 years or older presenting with new-onset dyspepsia,^{6,7,13} only 63% of patients aged 50 to 64 years having an initial presumptive diagnosis of PUD underwent endoscopy, compared with 40% of those initially diagnosed as having NUD and 38% of those having GERD. The proportions of adults aged 18 to 49 years undergoing endoscopy were 46%, 29%, and 27% for PUD, NUD, and GERD diagnoses, respectively; the endoscopies occurred within 30 days of their index date for 34%, 11%, and 12%, respectively, of the patients.

DISCUSSION

Assessment of current practice is a prerequisite for improving outcomes and cost-effectiveness of patient care. As far as we can determine, this is the first study of clinical testing and treatment patterns for dyspepsia and GERD based on a large national sample of claims data.

Some of the treatment patterns described in this study clearly conflict with guidelines. For example, about one third of patients who received treatment for *H pylori* infection were

a study² of managed care patients in the Boston, Mass, area in 1998-1999 who had acid suppression therapy for 1 year or longer, endoscopy was performed in 19% of patients aged 50 years and older and in 16% of younger patients with NUD.

Other areas of practice are more difficult to evaluate using claims data, but some of the findings give cause for concern. For example, it is surprising that only three quarters of patients with PUD were checked for *H pylori* infection via endoscopy or nonendoscopic testing. This finding is corroborated by the Boston study,² which reported that 66% of their patients with PUD had been tested or underwent endoscopy. Furthermore, we found that only 30% of the patients with PUD and 10% of the patients with NUD were actually treated for the infection. With *H pylori* prevalence in the range of 40% to 70% for PUD²³ and 20% to 60% for NUD,¹ a higher proportion of treatment might be expected. However, for patients among whom a physician can legitimately suspect the background prevalence of *H pylori* to be less than 10%, guidelines published after the study period support the option of an initial empirical PPI treatment; testing would then occur only if the patient remained symptomatic.^{1,10} These are examples of findings that measure behavior of the patient and of the physician: the patient may not have pursued a prescribed treatment or test.

Of the patients with presumed GERD, 18% were tested for *H pylori* infection. However, there is no causal link between *H pylori* infection and GERD, and US guidelines do not recommend *H pylori* testing for patients who have only GERD symptoms.^{7,24} In a survey by Chey et al¹⁷ of PCPs attending GERD educational conferences in 2002, 80% reported having tested for *H pylori* in patients with GERD. Physicians may have difficulty distinguishing symptoms of PUD from those of GERD, and patients may have difficulty adequately describing these symptoms. It is possible that some PCPs tested patients with GERD for *H pylori* infection based on a European recommendation that the infection should be excluded or eradicated before long-term PPI therapy.⁹

Previous US guidelines were silent as to the preferred modality for nonendoscopic pretreatment testing, but the new 2005 guidelines recommend testing for active infection.^{1,10} Tests of active infection, such as urea breath tests and fecal antigen tests, have higher sensitivity and specificity than those of serological tests.²⁵ While serum antibody testing is cheap, its positive predictive value is poor when the background prevalence of *H pylori* infection is low, as it is in many parts of the United States.²⁵ Consequently, many of the “positive” serological tests for *H pylori* infection are, in fact, false-positive test results. This concept may be poorly understood by practitioners and payers, which may help to explain why active tests only accounted for 13% of pretreatment tests in 2004. In fact, some payers specifically proscribe payment for fecal or breath tests for pretreatment testing.²⁶

Routine posttreatment testing to verify eradication is recommended in some guidelines⁹ because *H pylori* antibiotic therapy is only about 75% effective in clinical practice.²⁵ However, other guidelines are silent on the issue⁶ or only recommend posttreatment testing for patients with ongoing symptoms and those with a history of an ulcer complication.^{1,7,13} Our results demonstrate that posttreatment testing was performed in only a few patients, especially those in primary care settings. The case for posttreatment testing may not be understood by PCPs who are more accustomed to treating other common bacterial infections of the urinary or respiratory tract, in which symptoms are generally reliable indicators of treatment success and posttreatment testing is usually unnecessary. This is not true for *H pylori* infection, in which the resolution of symptoms after treatment with the combination of antibiotic and acid suppressant does not guarantee successful cure.

This study has several limitations. The data represent insurance claims from working adults and their immediate

■ Take-away Points

- Guidelines recommend that patients undergo a diagnostic test or endoscopy for determination of *Helicobacter pylori* infection before eradication therapy. Serologic tests only detect antibodies and cannot reliably distinguish between ongoing and cured infections. Urea breath tests and fecal antigen tests are recommended as nonendoscopic pretreatment testing for active infection.
- Guidelines call for endoscopy for patients aged 50 years or older with new-onset dyspepsia. Prompt endoscopy is generally not recommended for patients aged 18 to 49 years with peptic ulcer disease. Prompt endoscopy is reserved for older patients (aged ≥45-55 years) and for patients with alarm features.

families and did not include elderly persons, who make up a substantial proportion of those treated for acid-related disorders. Over-the-counter H₂RAs were available during the study period. Our reliance on prescription medication claims may have underestimated drug use to the extent that patients are paying for these products out of pocket. On the other hand, no PPI was available as an over-the-counter product during the study period. We also did not identify patients taking nonsteroidal anti-inflammatory drugs, the use of which is an independent risk factor for PUD.²³ Almost half of the cohort was composed of HMO members in the Midwest region. However, the overall cohort was sufficiently large to permit an overall weighted analysis that accounted for the proportion of patients in other regions and in various types of health plans. Our diagnostic grouping of patients was restricted to the earliest dyspepsia or GERD-related diagnosis recorded on a claim. That initial diagnosis might have changed as a result of further investigation. To test for this possibility, we replicated the analysis using the patients' last recorded diagnoses and did not find any meaningful differences. Finally, the absence of clinical data limits our ability to measure physician conformity to treatment guidelines. For example, we do not know whether a test for *H pylori* yielded a positive or negative result. Nevertheless, our key results were corroborated by findings in other claims and physician studies.

Guidelines for diagnosis and treatment of uninvestigated dyspepsia and GERD based on simple treatment algorithms have been widely circulated. However, our study demonstrates substantial noncompliance with guidelines. That physicians and patients are not complying with guidelines is not surprising; guidelines at best are only partially effective in guiding behavior.²⁷ Physicians need to better understand the indications for noninvasive testing for *H pylori* infection and for endoscopy. Simple changes in practice would greatly improve patient care and make better use of limited resources. Emerging programs that link physician reimbursement to

quality-of-care indicators (pay for performance) should include appropriate management of dyspepsia and GERD.²⁷

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