Non-invasive diagnostic tests for *Helicobacter pylori* infection

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TABLE OF CONTENTS

HEADER	1
ABSTRACT	1
PLAIN LANGUAGE SUMMARY	2
BACKGROUND	3
Figure 1.	5
OBJECTIVES	6
METHODS	6
RESULTS	9
Figure 2.	10
Figure 3.	12
Figure 4.	14
Figure 5.	15
Figure 6.	16
Figure 7.	17
Figure 8.	18
Figure 9.	19
Figure 10.	21
Figure 11.	23
DISCUSSION	27
AUTHORS' CONCLUSIONS	28
ACKNOWLEDGEMENTS	28
REFERENCES	28
CHARACTERISTICS OF STUDIES	120

Non-invasive diagnostic tests for *Helicobacter pylori* infection

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ABSTRACT

Background

Helicobacter pylori (*H. pylori*) infection has been implicated in a number of malignancies and non-malignant conditions including peptic ulcers, non-ulcer dyspepsia, recurrent peptic ulcer bleeding, unexplained iron deficiency anaemia, idiopathic thrombocytopenia purpura, and colorectal adenomas. The confirmatory diagnosis of *H. pylori* is by endoscopic biopsy, followed by histopathological examination using haematoxylin and eosin (H & E) stain or special stains such as Giemsa stain and Warthin-Starry stain. Special stains are more accurate than H & E stain. There is significant uncertainty about the diagnostic accuracy of non-invasive tests for diagnosis of *H. pylori*.

Objectives

To compare the diagnostic accuracy of urea breath test, serology, and stool antigen test, used alone or in combination, for diagnosis of *H. pylori* infection in symptomatic and asymptomatic people, so that eradication therapy for *H. pylori* can be started.

Search methods

We searched MEDLINE, Embase, the Science Citation Index and the National Institute for Health Research Health Technology Assessment Database on 4 March 2016. We screened references in the included studies to identify additional studies. We also conducted citation searches of relevant studies, most recently on 4 December 2016. We did not restrict studies by language or publication status, or whether data were collected prospectively or retrospectively.

Selection criteria

We included diagnostic accuracy studies that evaluated at least one of the index tests (urea breath test using isotopes such as ¹³C or ¹⁴C, serology and stool antigen test) against the reference standard (histopathological examination using H & E stain, special stains or immunohistochemical stain) in people suspected of having *H. pylori* infection.

Data collection and analysis

Two review authors independently screened the references to identify relevant studies and independently extracted data. We assessed the methodological quality of studies using the QUADAS-2 tool. We performed meta-analysis by using the hierarchical summary receiver operating characteristic (HSROC) model to estimate and compare SROC curves. Where appropriate, we used bivariate or univariate logistic regression models to estimate summary sensitivities and specificities.

Main results

We included 101 studies involving 11,003 participants, of which 5839 participants (53.1%) had *H pylori* infection. The prevalence of *H pylori* infection in the studies ranged from 15.2% to 94.7%, with a median prevalence of 53.7% (interquartile range 42.0% to 66.5%). Most of the studies (57%) included participants with dyspepsia and 53 studies excluded participants who recently had proton pump inhibitors or antibiotics. There was at least an unclear risk of bias or unclear applicability concern for each study.

Of the 101 studies, 15 compared the accuracy of two index tests and two studies compared the accuracy of three index tests. Thirty-four studies (4242 participants) evaluated serology; 29 studies (2988 participants) evaluated stool antigen test; 34 studies (3139 participants) evaluated urea breath test-¹³C; 21 studies (1810 participants) evaluated urea breath test-¹⁴C; and two studies (127 participants) evaluated urea breath test but did not report the isotope used. The thresholds used to define test positivity and the staining techniques used for histopathological examination (reference standard) varied between studies. Due to sparse data for each threshold reported, it was not possible to identify the best threshold for each test.

Using data from 99 studies in an indirect test comparison, there was statistical evidence of a difference in diagnostic accuracy between urea breath test-¹³C, urea breath test-¹⁴C, serology and stool antigen test ($P = 0.024$). The diagnostic odds ratios for urea breath test-¹³C, urea breath test-¹⁴C, serology, and stool antigen test were 153 (95% confidence interval (CI) 73.7 to 316), 105 (95% CI 74.0 to 150), 47.4 (95% CI 25.5 to 88.1) and 45.1 (95% CI 24.2 to 84.1). The sensitivity (95% CI) estimated at a fixed specificity of 0.90 (median from studies across the four tests), was 0.94 (95% CI 0.89 to 0.97) for urea breath test-¹³C, 0.92 (95% CI 0.89 to 0.94) for urea breath test-¹⁴C, 0.84 (95% CI 0.74 to 0.91) for serology, and 0.83 (95% CI 0.73 to 0.90) for stool antigen test. This implies that on average, given a specificity of 0.90 and prevalence of 53.7% (median specificity and prevalence in the studies), out of 1000 people tested for *H pylori* infection, there will be 46 false positives (people without *H pylori* infection who will be diagnosed as having *H pylori* infection). In this hypothetical cohort, urea breath test-¹³C, urea breath test-¹⁴C, serology, and stool antigen test will give 30 (95% CI 15 to 58), 42 (95% CI 30 to 58), 86 (95% CI 50 to 140), and 89 (95% CI 52 to 146) false negatives respectively (people with *H pylori* infection for whom the diagnosis of *H pylori* will be missed).

Direct comparisons were based on few head-to-head studies. The ratios of diagnostic odds ratios (DORs) were 0.68 (95% CI 0.12 to 3.70; $P = 0.56$) for urea breath test-¹³C versus serology (seven studies), and 0.88 (95% CI 0.14 to 5.56; $P = 0.84$) for urea breath test-¹³C versus stool antigen test (seven studies). The 95% CIs of these estimates overlap with those of the ratios of DORs from the indirect comparison. Data were limited or unavailable for meta-analysis of other direct comparisons.

Authors' conclusions

In people without a history of gastrectomy and those who have not recently had antibiotics or proton pump inhibitors, urea breath tests had high diagnostic accuracy while serology and stool antigen tests were less accurate for diagnosis of *Helicobacter pylori* infection. This is based on an indirect test comparison (with potential for bias due to confounding), as evidence from direct comparisons was limited or unavailable. The thresholds used for these tests were highly variable and we were unable to identify specific thresholds that might be useful in clinical practice.

We need further comparative studies of high methodological quality to obtain more reliable evidence of relative accuracy between the tests. Such studies should be conducted prospectively in a representative spectrum of participants and clearly reported to ensure low risk of bias. Most importantly, studies should prespecify and clearly report thresholds used, and should avoid inappropriate exclusions.

PLAIN LANGUAGE SUMMARY

Accuracy of different non-invasive methods for identifying *Helicobacter pylori*

Why is it important to know whether someone has *Helicobacter pylori*?

Helicobacter pylori (*H pylori*) is a type of bacteria which may be present in the stomach of some people. *H pylori* is believed to cause a number of cancers, including stomach cancer, pancreatic cancer, and throat cancer. *H pylori* is also linked with other diseases including stomach ulcers, heart burn, and a bloated feeling. If *H pylori* is found in an individual, appropriate treatment can be started.

What is the aim of this review?

To compare the accuracy of three different types of test for *H pylori*. These are: urea breath tests, blood tests (the specific blood test is called serology), and stool tests (in faeces).

What was studied in this review?

There are two types of urea breath test which use two different forms of carbon known as ^{13}C and ^{14}C , as well as multiple versions of serology and stool tests.

What are the main results of the review?

We found 101 studies which included 11,003 people who were tested for *H pylori*. Of these 11,003 participants, 5839 (53.1%) had *H pylori* infection. All the studies used one of the three tests listed above and compared these test results with the diagnosis given by endoscopic biopsy. Endoscopic biopsy involves obtaining tissue from the stomach using a thin flexible tube introduced through the mouth and testing for the presence of *H pylori* under the microscope. It is currently the most accurate available test, however it causes physical discomfort to the patient, with associated risks for harm. This is in contrast to the alternative non-invasive tests in this review which are significantly less uncomfortable and have minimal or no risk of harm, making them desirable alternatives if they can be shown to be as accurate at diagnosing *H pylori* as endoscopic biopsy. Most of the studies included participants with heart burn or similar problems in the stomach and excluded participants who had previously undergone partial removal of the stomach and those having treatment for *H pylori*.

Thirty-four studies (4242 participants) used serology; 29 studies (2988 participants) used stool antigen test; 34 studies (3139 participants) used urea breath test- ^{13}C ; 21 studies (1810 participants) used urea breath test- ^{14}C ; and two studies (127 participants) used urea breath test but did not report the type of carbon used. Studies varied in the limit they used before saying a test was positive for *H pylori* infection and the type of stains used to examine the biopsy material. When we looked at all the data we found that urea breath tests were more accurate than blood and stool tests. The results mean that, on average, if 1000 people are tested, there will be 46 people without *H pylori* who will be misdiagnosed as having *H pylori*. Also, there will be 30, 42, 86, and 89 people with *H pylori* infection for whom the diagnosis of *H pylori* infection will be missed by urea breath test- ^{13}C , urea breath test- ^{14}C , serology, and stool antigen test, respectively. When we looked at the seven studies which compared urea breath test- ^{13}C and serology, or urea breath test- ^{13}C and stool antigen tests in the same participants, the results were uncertain and we cannot tell which test is more accurate.

How reliable are the results of the studies?

Except for one study, all the studies were of poor methodological quality, which makes their results unreliable.

Who do the results of this review apply to?

These results apply to children and adults with suspected *H pylori* infection, but only in those who have not previously undergone stomach operations and those who have not recently had antibiotics or treatment for *H pylori* infection.

What are the implications of this review?

Urea breath tests, blood tests, and stool tests may be suitable for identifying whether someone has *H pylori* infection. However, the level of the result of urea breath test, blood test, or stool test which should be used to make a diagnosis of *H pylori* infection remains unclear.

How up-to-date is the review?

We performed a thorough literature search for studies reporting the accuracy of these different tests until 4 March 2016.

BACKGROUND

Helicobacter pylori (*H pylori*) is a gram negative spiral bacterium (NCBI 2014). Approximately 13% to 81% of people have *H pylori* infection (Peleteiro 2014). Prevalence of the bacterium varies according to age (generally increasing with age, although infection rates tend to fall among older age groups in some Latin Ameri-

can and Northeast Asian countries); region (lower infection rates are seen in Australia and the UK, while higher rates are reported in Chile, China, Japan, Korea, and Latvia); race (more prevalent amongst Afrocarribeans compared to white people); and socioeconomic class (more common in poorer settings) (Graham 1991; Laszewicz 2014; Muhsen 2012; Peleteiro 2014).

Based on observational studies, *H pylori* infection has been implicated in a number of malignancies, including gastric cancer, premalignant lesions of the stomach (atrophic gastritis and intestinal metaplasia), gastric lymphoma, pancreatic cancer, colorectal cancer, and laryngeal cancer (Huang 1998; Huang 2003; Wu 2013; Xiao 2013; Xue 2001; Zhuo 2008). However, *H pylori* is associated with a lower incidence of oesophageal adenocarcinomas (Islami 2008). *H pylori* is also associated with a number of non-malignant conditions, including peptic ulcers, non-ulcer dyspepsia, recurrent peptic ulcer bleeding, unexplained iron deficiency anaemia, idiopathic thrombocytopenia purpura, and colorectal adenomas (DuBois 2005; Franchini 2007; Gisbert 2004b; Huang 2002; Jaakkimainen 1999; Wu 2013).

Although a number of pathogenic factors such as cytotoxin-associated gene A (CagA), vacuolating cytotoxin A (VacA), and blood group antigen binding adhesin (BabA) are associated with increased virulence of *H pylori* (Huang 2003; Malfertheiner 2012), detection of these pathogenic factors currently has no role in the management of *H pylori* infection (Malfertheiner 2012). The recommended initial treatment for *H pylori* infection is with a combination of a proton pump inhibitor, clarithromycin, and amoxicillin or metronidazole (triple therapy) in regions with low resistance to clarithromycin (< 20% resistance rate in the area), and the triple therapy along with bismuth (quadruple therapy) in regions with high resistance to clarithromycin (> 20% resistance rate in the area) (Malfertheiner 2012). If this results in failure of eradication, bismuth-quadruple therapy or levofloxacin-triple therapy (replacement of clarithromycin with levofloxacin in the classical triple therapy) when triple therapy was used as the initial treatment and levofloxacin-triple therapy when bismuth quadruple therapy was used as the initial treatment is recommended (Malfertheiner 2012). If even this treatment fails to eradicate *H pylori*, then further treatment should be based on antibiotic susceptibility (Malfertheiner 2012). Eradication of *H pylori* might lead to a decrease in malignant and non-malignant conditions associated with *H pylori* infection. Adverse events related to *H pylori* treatment include taste disturbance, diarrhoea, nausea, headache, skin rash, abdominal pain, dizziness, bloating, myalgias (muscle pain), and constipation (Ye 2014).

A glossary of terms is included in Appendix 1.

Target condition being diagnosed

Helicobacter pylori infection.

Index test(s)

Urea breath test

The urea breath test is based on the presence of urease enzyme in live *H pylori* which breaks down urea into ammonia and carbon dioxide (McNulty 2005; Ricci 2007). After ingestion of urea labelled with either ¹³C or ¹⁴C, breath samples are collected for up to 30 minutes by exhaling into a carbon dioxide-trapping agent (Ricci 2007). The urea breath test is performed by the clinician or the clinician's assistant. The thresholds used include the percentage of carbon recovered during the collection time or counts per minute (Ferwana 2015). Threshold levels above 4% or 5% are commonly used to diagnose *H pylori* infection (Ferwana 2015). A wide range of threshold counts per minute, ranging from more than 25 counts per minute to 1000 counts per minute, have been used for diagnosis of *H pylori* infection (Ferwana 2015).

Serology

These tests are based on circulating antibodies to *H pylori*. There are three main methods for these tests: the enzyme-linked immunosorbent assay (ELISA) test, latex agglutination tests, and Western blotting (Ricci 2007). Of these, ELISA is the most commonly used method. Total immunoglobulin, immunoglobulin subtypes, and antibody response to specific antigens can all be tested. Since they do not require any special equipment, they can be easily performed (Ricci 2007). However, serology may be positive because of the presence of active infection at the time of the test, previous infection, or because of non-specific cross-reacting antibodies (McNulty 2005). Tests that use whole blood (rather than serum) and other bedside tests (using a bedside centrifuge) are also available, although these whole-blood tests and bedside serum tests are generally considered unreliable (Ricci 2007). Routine serum tests are performed by the laboratory technician and interpreted by the clinician. The bedside serum tests and whole-blood tests are performed by the clinician or the clinician's assistant. Different researchers evaluating the prevalence of *H pylori* have used different thresholds to define the positivity of serology, for example Lindsetmo 2008 used a titre ≥ 300 while Granberg 1993 used a titre ≥ 500 .

Stool antigen tests

These tests use monoclonal and polyclonal antibodies to detect the presence of *H pylori* antigen in stools and active *H pylori* infection can be diagnosed (McNulty 2005; Ricci 2007). Serum tests are performed by the laboratory technician and interpreted by the clinician. Several thresholds have been used for other tests, for example, an optical density of ≥ 0.15 , ≥ 0.16 , and ≥ 0.19 have all been used as thresholds for diagnosis of *H pylori* using monoclonal antibodies for stool antigen tests.

Clinical pathway

Evidence from randomised controlled trials (RCTs) showed that screening and eradication programmes for *H pylori* in populations at high risk of gastric cancer (e.g. East Asians) lowered the incidence of gastric cancer (Ford 2014). The Asia-Pacific Gastric Cancer Consensus conference recommended that screening and eradication of *H pylori* was advisable in populations in countries at high risk of gastric cancer (i.e. Japan and Korea) (Talley 2008). The updated European Helicobacter Study Group (EHSG) Fourth Maastricht/Florence Consensus Conference guidelines suggest that people should be tested for *H pylori*, and eradication of *H pylori* (when present) has been recommended for the following conditions (Malfertheiner 2012):

1. People at high risk of gastric cancer.

2. Adults with dyspepsia with a locally-determined age cut-off point (depending on local incidence of gastric cancer in different age groups), and without 'alarm' symptoms or signs associated with an increased risk of gastric cancer such as weight loss, dysphagia, upper gastrointestinal bleeding, abdominal mass, or iron deficient anaemia.

3. Unexplained iron deficiency anaemia.

4. Idiopathic thrombocytopenic purpura.

5. Uninvestigated young patients with dyspepsia should also be considered for testing for *H pylori* when the prevalence of *H pylori* is high ($\geq 20\%$).

The clinical pathway is shown in Figure 1.

Figure 1. Clinical pathway

Prior test(s)

The index tests can be performed without any prior test.

Role of index test(s)

The index tests are used for screening and diagnosis of *H pylori*.

Alternative test(s)

Other tests used in the screening and diagnosis of *H pylori* infection include non-invasive saliva and urine antigen-based tests (Ricci 2007), and invasive gastric biopsy followed by Campylobacter-like organism (CLO) test, culture, histology, and polymerase chain reaction (PCR) (Van Doorn 2000). We do not include non-invasive saliva and urine antigen-based tests in this review because these tests are not commonly used (Ricci 2007).

Rationale

Testing for *H pylori* and eradication of *H pylori* have been recommended for a number of population groups (Clinical pathway). These tests have to be non-invasive so that a large number of people can be tested. People with undetected *H pylori* continue to be at high risk of gastric cancer or continue to have dyspepsia, anaemia, or purpura. Overdiagnosis (false positive test results) of *H pylori* means that patients are subject to unnecessary adverse events related to eradication therapy (approximately 27% of patients receiving eradication therapy develop mild adverse events such as bitter taste, nausea, diarrhoea, etc.). Comparing the diagnostic accuracy of different index tests will highlight the best test for the diagnosis of *H pylori* infection.

OBJECTIVES

To compare the diagnostic accuracy of urea breath test, serology, and stool antigen test, alone or in combination, for diagnosis of *H pylori* infection in symptomatic and asymptomatic people, so that eradication therapy for *H pylori* can be started.

Secondary objectives

To investigate the following potential sources of heterogeneity: type of reference standard, risk of bias, publication status, prospective versus retrospective studies, symptomatic versus asymptomatic participants, recent or current use of proton pump inhibitors or antibiotics, different subtypes of tests, and the interval between the index test and reference standard.

METHODS

Criteria for considering studies for this review

Types of studies

We include studies that evaluate the accuracy of the index tests in the appropriate patient population (see Participants), regardless of language or publication status, or whether data were collected prospectively or retrospectively. However, we exclude reports that describe how the diagnosis of *H pylori* was made in an individual patient or group of patients, and which do not provide sufficient diagnostic test accuracy data (i.e. the number of true positives, false positives, false negatives, and true negatives). We also exclude case-control studies because these are prone to bias (Whiting 2011).

Participants

Symptomatic and asymptomatic people in whom *H pylori* infection status is sought so that eradication therapy for *H pylori* can be started. We exclude studies that included only people with acute upper gastrointestinal bleeding because such patients are likely to undergo endoscopy and invasive testing can be performed, if required.

Index tests

Urea breath test-¹⁴C, urea breath test-¹³C, serology, and stool antigen test, alone or in combination. We included only initial testing and excluded repeat testing (monitoring success of treatment), since diagnostic accuracy may vary depending on the purpose of testing (Ricci 2007).

Target conditions

H pylori infection.

Reference standards

There is no gold standard for diagnosis of *H pylori* infection and the diagnosis is made by a combination of tests following endoscopic biopsy; endoscopic biopsy followed by histology, endoscopic biopsy followed by polymerase chain reaction (PCR), and endoscopic biopsy followed by rapid urease testing all have excellent sensitivity and specificity (Chey 2007). However, PCR methodology is not standardised across laboratories (Chey 2007); it is an unreliable reference standard. Endoscopic biopsy followed by rapid urease testing has poor sensitivity following treatment with proton pump inhibitors (Chey 2007). Endoscopic biopsy with culture has high specificity but poor sensitivity (Chey 2007). We therefore considered only endoscopic biopsy followed by histology (using haematoxylin and eosin (H & E) stain, special histological stains such as Giemsa stain and Warthin-Starry stain, or immunohistochemical stain) as the reference standard in this review.

Immunohistochemical stains are more accurate than special stains, while special stains and immunohistochemical stains are thought to have better specificity than H & E stains for diagnosis of *H pylori* infection (Laine 1997; Lee 2015b). For this reason, we considered endoscopic biopsy with histology using immunohistochemical stain as the best reference standard, and endoscopic biopsy with histology using H & E stain as the worst reference standard.

Search methods for identification of studies

We included all studies, irrespective of the language of publication and publication status. If we found articles in languages other than English, we obtained translations.

Electronic searches

We searched the following databases.

1. MEDLINE via OvidSP (January 1946 to 4 March 2016) (Appendix 2).
2. Embase via OvidSP (January 1947 to 4 March 2016) (Appendix 3).
3. Science Citation Index Expanded via Thomson Reuters Web of Science (January 1980 to 4 March 2016) (Appendix 4).
4. National Institute for Health Research (NIHR HTA) via Centre for Reviews and Dissemination, University of York. (www.crd.york.ac.uk/CRDWeb/) (4 March 2016) (Appendix 5).

Searching other resources

To identify additional studies, we examined references in the included studies to see if any might be relevant. We also searched for articles related to the included studies by using the 'related search' function in MEDLINE (OvidSP) and Embase (OvidSP). We conducted a 'citing reference' search (by searching articles which cited the included articles) (Sampson 2008) in MEDLINE (OvidSP) and Embase (OvidSP) on 4 December 2016.

Data collection and analysis

Selection of studies

Two review authors (KG and LB, SS, or AS) independently searched the references to identify relevant studies. We obtained the full text for references considered relevant by at least one of the two review authors. Two review authors independently screened the full-text papers against the inclusion criteria, resolving any differences in study selection by discussion. We attempted to contact study authors if there were doubts about the eligibility of a study.

Data extraction and management

Two review authors (KG and LB, SS, or AS) independently extracted the following data from each included study, using a pre-piloted data extraction form, and resolving differences by discussion.

1. First author.
2. Year of publication.
3. Study design (prospective or retrospective cohort studies; cross-sectional studies or randomised controlled trials).
4. Inclusion and exclusion criteria for individual studies.
5. Total number of participants.
6. Number of female participants.
7. Average age of the participants.
8. Initial testing versus testing after eradication.
9. Number of people with bleeding ulcers, gastric atrophy, lymphoma, and recent or current use of proton pump inhibitors or antibiotics.
10. Number of symptomatic participants.
11. Tests carried out prior to the index test.
12. Description of the index test.
13. Threshold used for the index test.
14. Reference standard.
15. Number of true positives, false positives, false negatives, and true negatives (i.e. 2 x 2 data) at each threshold reported.

If a study reported multiple index tests, we extracted the 2 x 2 data for each index test at each threshold. For studies that reported test accuracy for different reference standards, we extracted 2 x 2 data for only one of the reference standards. For this purpose, due to the accuracy of the stains, we preferred the immunohistochemical stain over special stains, which in turn we preferred over the H & E stain.

Although the number of uninterpretable index test results may provide information on the applicability of the tests in clinical practice and may affect the cost effectiveness of a test, we had planned to exclude patients with uninterpretable index test results from the meta-analyses. We made this decision because in clinical practice uninterpretable index test results would result in additional testing. Nevertheless, we would have extracted and reported such data if available from the studies.

If we suspected an overlap of participants between multiple reports due to common study authors and centres, we planned to contact the study authors for clarification; however, this was not required, since we could identify multiple reports of the same study using the information provided in the reports. We sought further information from study authors, if necessary.

Assessment of methodological quality

Two review authors independently assessed study quality using the QUADAS-2 tool (Whiting 2006; Whiting 2011), resolving differences by discussion. The criteria used for the assessment are shown in Appendix 6. We considered studies classified as 'low risk

of bias' and 'low concern' in all the domains of the QUADAS-2 tool as studies with high methodological quality. It must be noted here that 'risk of bias' refers to internal validity (i.e. whether there were systematic errors in performing the study with respect to the particular domain), while 'applicability concern' refers to external validity (i.e. whether there were concerns that the population, index test or reference standard used in the studies matched the review question).

Statistical analysis and data synthesis

We plotted study estimates of sensitivity and specificity on forest plots and in receiver operating characteristic (ROC) space to explore between-study variation in the accuracy of each test. We examined the thresholds reported for each test and the reference standards used. Due to between-study variation in thresholds, we performed meta-analyses by using the hierarchical summary receiver operating characteristics (HSROC) model to estimate SROC curves (Rutter 2001). For these analyses, if a study reported test accuracy at multiple thresholds, we selected the threshold used by the study authors for their primary analysis.

Prior to comparative meta-analyses of the tests, we performed meta-analysis of each test separately for preliminary investigation of the shape of the SROC curve of each test and to assess heterogeneity in test performance. We used this approach to understand the data and to guide modelling assumptions we may need to make in the comparative meta-analysis. These preliminary analyses were done noting the availability of comparative studies. To compare the accuracy of the index tests, we added test type as a covariate to the HSROC model (Macaskill 2013). For the indirect comparison where we used all available data (i.e. not restricted to comparative studies), we assessed the effect of test type on the accuracy, threshold, and shape parameters of the HSROC model. We also explored the effect of test type on the variance of the random effects for accuracy and threshold. To determine the final meta-analytic model, we used likelihood ratio tests to assess model fit. Likelihood ratio tests were also used to determine the statistical significance of differences in test accuracy. When SROC curves are symmetric (i.e. HSROC model without the shape parameter), each curve can be described using the diagnostic odds ratio (DOR) to quantify the accuracy of the test. We used the ratio of DORs as a summary of the relative accuracy of two tests.

Summary sensitivities and specificities can be obtained from a HSROC model but they are not clinically interpretable here because we included studies with different thresholds. We therefore estimated sensitivities at points on the SROC curves that correspond to the lower quartile, median and upper quartile of the specificities from the studies included in the meta-analysis. When comparative studies that had evaluated two tests head-to-head were available, we performed direct comparisons of the tests (Takwoingi 2013). For these analyses, we fitted HSROC models with symmetric SROC curves, as the available data were insufficient for

reliable estimation of the shape of the SROC curves (Takwoingi 2017).

If there were at least two studies that reported the accuracy of a test at the same threshold, we considered meta-analysis to obtain summary estimates of sensitivity and specificity. Due to the small number of studies in these analyses, we performed meta-analyses using univariate fixed-effect or random-effects logistic regression models, depending on the extent of heterogeneity observed in forest plots and in ROC space (Takwoingi 2017). When there were only two or three studies at the same threshold, and little or no heterogeneity observed in ROC space, we used univariate fixed-effect logistic regression models to pool sensitivities and specificities separately. When there were two or three studies and we observed heterogeneity, we did not perform meta-analysis, as random-effects models would be more appropriate in such situations. However, random effects cannot be reliably estimated with very few studies.

We performed meta-analyses using the NLMIXED procedure in SAS.

Investigations of heterogeneity

We used forest plots and scatter plots of sensitivity against specificity for preliminary investigation of potential sources of heterogeneity such as:

1. Type of reference standard (different histological stains).
2. Studies at low risk of bias in all the QUADAS-2 domains versus those at unclear or high risk of bias.
3. Full-text publications versus abstracts (may provide insight into publication bias if there is an association between the results of a study and full publication of the study) (Eloubeidi 2001).
4. Prospective versus retrospective studies.
5. Symptomatic versus asymptomatic participants.
6. Recent or current use of proton pump inhibitors or antibiotics, as these patients are at higher risk of false negative results for the urea breath test and stool antigen test, with serology being the only non-invasive test unaffected by the use of proton pump inhibitors or antibiotics (Malfertheiner 2012; Ricci 2007).
7. Different subtypes of tests (ELISA, latex agglutination test, and Western blot methods of serological tests; formal serological tests versus bedside serological tests; and monoclonal versus polyclonal antibodies for stool antigen tests).
8. Interval between index test and reference standard. Resolution of *H pylori* infection in people with *H pylori* infection (usually with treatment) and infection in those without *H pylori* infection may occur if there was a long interval between the index test and reference standard.

We formally investigated heterogeneity for each test by adding a covariate to a HSROC model (meta-regression). We used likelihood ratio tests to assess the statistical significance of differences in test accuracy by comparing models with and without the covariate.

Sensitivity analyses

We planned to examine the impact of data inconsistencies on the meta-analytic findings. For example, if test accuracy data reported in the text of a paper differed from those in the figures, we planned to assess the impact of using different data in sensitivity analyses; however, we did not find such inconsistencies.

Assessment of reporting bias

Due to limited data, we were unable to formally investigate whether test accuracy differed between studies that were published as full texts and those available only as abstracts.

RESULTS

Results of the search

We identified 23,896 references through electronic searches of MEDLINE, Embase, Science Citation Index, and NIHR HTA. We did not identify additional references through other searches. The flow of studies through the screening process is shown in [Figure 2](#). After removing 10,313 duplicates, there were 13,583 references. Of these, we dropped 11,737 irrelevant references through reading the titles and abstracts. We could not obtain the full text of 11 references. The quality of copies of two references was too poor to allow translation and we were unable to obtain better copies. We assessed the full text of the remaining 1833 references. We excluded 1728 references (1727 studies) for reasons stated in [Appendix 7](#) (also see Characteristics of excluded studies below). The remaining 107 references (101 studies) met our inclusion criteria. Two references reported diagnostic accuracy data separately for people who underwent gastrectomy and those who did not undergo gastrectomy, and so we considered these subgroups as separate studies ([Adamopoulos 2009a](#); [Adamopoulos 2009b](#); [Sheu 1998a](#); [Sheu 1998b](#)).

Figure 2. Study flow diagram.

Characteristics of included studies

We summarise the characteristics of the 101 included studies in the [Characteristics of included studies](#) table. The studies included 11,003 participants, of which 5839 participants (53.1%) had *H pylori* infection. The prevalence of *H pylori* infection ranged from 15.2% to 94.7% with a median of 53.7% (interquartile range: 42.0% to 66.5%).

Of the 101 studies, 34 evaluated urea breath test-¹³C; 21 evaluated urea breath test-¹⁴C; two evaluated urea breath test but did not report the isotope used; 34 evaluated serology; and 29 evaluated stool antigen test. Seventeen studies evaluated more than one test. Of these, 15 evaluated two tests (Dede 2015; El-Din 2013; Eltumi 1999; Hafeez 2007; Inelmen 2004; Korstanje 2006; Kuloglu 2008; Lahner 2004; Lottspeich 2007; Mansour-Ghanaei 2011; Ogata 2001; Soomro 2012; Vandenplas 1992; Yoshimura 2001; Yu 2001), and two evaluated three tests (Monteiro 2001a; Salles-Montaudo 2002). Studies used different thresholds, with 15 studies reporting test accuracy at more than one threshold (Chey 1998; Dede 2015; Delvin 1999; Formichella 2013; Ladas 2002a; Mana 2001a; Misawa 1998; Monteiro 2001a; Morales 1995; Noguera 1998; Novis 1991; Ozturk 2003; Trevisani 2005; Weiss 1994; Yu 2001).

Eleven studies were prospective (Adamopoulos 2009a; Adamopoulos 2009b; Al-Fadda 2000; Arian 2004; Dede 2015; Eltumi 1999; Fallone 1995; Kalach 1998a; Kuloglu 2008; Ogata 2001; Qadeer 2009); six studies were retrospective (Bosso 2000; Czerwionka-Szaflarska 2007; Graham 1996a; Iqbal 2013; Mion 1994; Wardi 2012), while the remaining 84 studies did not state whether they were prospective or retrospective studies. Six studies were published as abstracts only (Han 2012; Mohammadian 2007; Rathbone 1986; Sheu 1998a; Sheu 1998b; Thobani 1995), and the remaining 95 were full-text publications.

Fourteen studies included only children (Argentieri 2007; Behrens 1999; Czerwionka-Szaflarska 2007; Delvin 1999; Dinler 1999; Eltumi 1999; Hafeez 2007; Kalach 1998a; Kuloglu 2008; Lottspeich 2007; Ogata 2001; Rafeey 2007; Vandenplas 1992; Yoshimura 2001). Five studies clearly included only adults (Atli 2012; Chen 1991; Kamel 2011; Safe 1993; Salles-Montaudo 2002). Although not clearly specified in the remaining 82 studies, it appeared that most or all of the participants were adults. The mean or median age of the participants included in these studies ranged between 31 years and 85 years in the 45 studies that reported this information. One study included only participants without symptoms (Wang 2008). Fifty-eight studies included only participants with symptoms, usually abdominal pain or dyspepsia (Adamopoulos 2009a; Adamopoulos 2009b; Aguilar 2007; Al-Fadda 2000; Allardyce 1997; Behrens 1999; Bosso 2000; Ceken 2011; Chen 1991; Czerwionka-Szaflarska 2007; D'Elios 2000; Delvin 1999; Dinler 1999; Ekesbo 2006; El-Din 2013; El-Mekki

2011; El-Nasr 2003; Eltumi 1999; Fantì 1999; Faruqi 2007; Ferrara 1998; Germana 2001; Guo 2011; Gurbuz 2005; Hafeez 2007; Jordaan 2008; Kamel 2011; Kuloglu 2008; Ladas 2002a; Lahner 2004; Lee 1998; Lottspeich 2007; Mansour-Ghanaei 2011; Mion 1994; Misawa 1998; Mohammadian 2007; Morales 1995; Novis 1991; Ogata 2001; Ozturk 2003; Peitz 2001; Qadeer 2009; Rafeey 2007; Rasool 2007; Rathbone 1986; Safe 1993; Scuderi 2000; Segamwenge 2014; Selcukcan 2011; Sharbatdaran 2013; Sheu 1998a; Soomro 2012; Surveyor 1989; Thobani 1995; Vandenplas 1992; Villalobos 1992; Weiss 1994; Yoshimura 2001).

The remaining 42 studies did not report the type of participants included. Five studies included only participants who had previously undergone gastrectomy (Adamopoulos 2009b; Lombardo 2003; Schilling 2001; Sheu 1998b; Wardi 2012). Two studies included only participants with atrophic gastritis (Korstanje 2006; Ogata 2001). It was clear that participants who received recent proton pump inhibitors or antibiotics were excluded from 53 studies (Ceken 2011; Chey 1998; Debongnie 1991; D'Elios 2000; Delvin 1999; Duan 1999; El-Mekki 2011; El-Nasr 2003; Eltumi 1999; Fallone 1996; Fantì 1999; Ferrara 1998; Formichella 2013; Germana 2001; Guo 2011; Gurbuz 2005; Jekarl 2013; Jensen 1998; Jordaan 2008; Kalach 1998a; Kim 2016; Kuloglu 2008; Ladas 2002a; Lahner 2004; Lee 1998; Lombardo 2003; Lottspeich 2007; Mana 2001a; Mansour-Ghanaei 2011; Monteiro 2001a; Ogata 2001; Ozturk 2003; Peitz 2001; Peura 1996; Puspok 1999; Qadeer 2009; Rafeey 2007; Rasool 2007; Schilling 2001; Segamwenge 2014; Selcukcan 2011; Sharbatdaran 2013; Shin 2009; Tiwari 2014; Trevisani 2005; Vandenplas 1992; Villalobos 1992; Wang 2008; Weiss 1994; Yan 2003; Yoshimura 2001; Yu 1999; Yu 2001). It was not clear whether such participants were included or excluded in the remaining 48 studies.

Thirty-two studies used H & E stain as a reference standard (Aguilar 2007; Al-Fadda 2000; Arian 2004; Atli 2012; Behrens 1999; Ceken 2011; Chen 1991; Chey 1998; Czerwionka-Szaflarska 2007; D'Elios 2000; Dinler 1999; Eggers 1990; El-Nasr 2003; Fallone 1996; Faruqi 2007; Graham 1996a; Gramley 1999; Gurbuz 2005; Iqbal 2013; Jordaan 2008; Kalach 1998a; Kamel 2011; Lee 1998; Logan 1991a; Noguera 1998; Puspok 1999; Segamwenge 2014; Selcukcan 2011; Sheu 1998a; Sheu 1998b; Tiwari 2014; Yu 2001); 24 studies used special stains such as Warthin-Starry stain, Giemsa stain, or silver stain (Argentieri 2007; Bosso 2000; El-Din 2013; Fallone 1995; Guo 2011; Hafeez 2007; Han 2012; Ivanova 2010; Kim 2016; Ladas 2002a; Lahner 2004; Mion 1994; Mohammadian 2007; Morales 1995; Novis 1991; Ozturk 2003; Peura 1996; Qadeer 2009; Schilling 2001; Scuderi 2000; Shin 2009; Soomro 2012; Villalobos 1992; Yan 2003); two studies used immunohistochemical staining (Ekesbo 2006; Misawa 1998); and the remaining 43 studies used a combination of different stains.

The interval between the index test and reference standard was reported only in 21 studies. The interval was less than two weeks in 19 of the 21 studies (Adamopoulos 2009a; Adamopoulos 2009b; Bosso 2000; Debongnie 1991; Duan 1999; Fallone 1995; Fallone 1996; Formichella 2013; Gurbuz 2005; Hafeez 2007; Lahner 2004; Lee 1998; Logan 1991a; Lottspeich 2007; Mansour-Ghanaei 2011; Mion 1994; Ozturk 2003; Peura 1996; Safe 1993), and was between 15 days and 23 days in one study (Dede 2015); it was within 30 days in the remaining study (Lombardo 2003).

Characteristics of excluded studies

We excluded 1726 references (1725 studies). The reason for exclusion is stated for each study in Appendix 7 and summarised below.

- Case-control study: 17
- Not a primary research study: 147
- Erratum: 3
- Inappropriate population: 79
 - In monitoring: 33
 - Not in humans: 1
 - Only in *H pylori* negative people: 2
 - Only in *H pylori* positive people: 39

- Only in people with gastrointestinal bleeding: 2
- Selection of participants was based on the results of other *H pylori* tests: 1
- Includes people who were being monitored for *H pylori* status: 1

- Inappropriate index test: 38
- Inappropriate target condition: 4
- Inappropriate reference standards: 1182
- Lack of data: 256
 - Insufficient diagnostic test accuracy data: 25
 - No diagnostic accuracy data: 42
 - Not a diagnostic test accuracy study of non-invasive *H pylori* diagnosis: 188
 - Incorrect data (correct information could not be obtained): 1

Methodological quality of included studies

The methodological quality of the included studies is summarised across all studies in Figure 3. None of the included studies was of high methodological quality (i.e. low risk of bias in all the domains). Appendix 8 shows the results for individual studies for urea breath test-¹³C, urea breath test-¹⁴C, serology and the stool antigen test, respectively.

Figure 3. Risk of bias and applicability concerns graph: review authors' judgements about each domain presented as percentages across included studies. For each domain, the numbers shown on the bar represent the number of studies that were scored as high, unclear or low in terms of risk of bias or applicability concern.

Patient selection domain

In the patient selection domain, 23, 15 and 63 studies were at low, high and unclear risk of bias, respectively. All 15 studies were at high risk of bias because they did not include a consecutive or

random series of participants.

Twenty-five, seven and 69 studies were of low, high and unclear applicability concern. In the 69 studies of unclear applicability concern it was not clear whether participants similar to those seen

in the clinical setting where the test is used were excluded, while the seven studies of high concern clearly excluded such participants. In these seven studies, only people who had undergone gastrectomy or those with atrophic gastritis were included.

Index test domain

In the index test domain, studies generally had an unclear risk of bias because it was unclear whether the index test results were interpreted without the knowledge of the results of the reference standard, and/or it was unclear whether a threshold was prespecified.

Urea breath test

None of the studies that evaluated the urea breath test (^{13}C , ^{14}C , or unknown isotope) were at low risk of bias. The risk of bias was unclear in the two studies that did not report the type of isotope (Han 2012; Lombardo 2003). Of the 34 studies that evaluated urea breath test- ^{13}C , seven (21%) had a high risk of bias while 27 (79%) had unclear risk of bias. There were 21 studies of urea breath test- ^{14}C , 16 (76%) of which had unclear risk of bias while five (24%) had high risk of bias.

For the two studies with unknown isotope, applicability concern was high in one study and low in the other. Of the 34 urea breath test- ^{13}C studies, applicability concerns were unclear for two (6%) studies, high for six (18%) studies and low for 26 (76%) studies. For urea breath test- ^{14}C , applicability concerns were generally low (18/21; 86%) with only three studies having high applicability concerns (Selcukcan 2011; Surveyor 1989; Yu 1999).

Serology

One study (Ladas 2002a), had a low risk of bias, and another study (Rathbone 1986), had a high risk of bias. The risk of bias for the remaining 32 (94%) studies was unclear. Applicability concerns were low in 19 (56%) studies and high in 15 (44%) studies.

Stool antigen test

None of the 29 studies had a high risk of bias. Most of the studies (26/29; 90%) had an unclear risk of bias; three studies (Islam 2005; Kuloglu 2008; Sharbatdaran 2013), had a low risk of bias. All the studies were of low applicability concern.

Reference standard domain

Two studies were at low risk of bias in the reference standard domain (Fallone 1995; Ladas 2002a). For 27 studies, the risk of bias was unclear because it was not clear whether reference standard results were interpreted without knowledge of the results of the index tests. The remaining 72 studies were at high risk of bias because the reference standard was endoscopic biopsy with H & E stain in some or all participants.

All the studies were of low applicability concern.

Flow and timing domain

Seven studies were at low risk of bias in the flow and timing domain. The risk of bias was unclear for 74 studies because the interval between the index test and reference standard was unclear or it was unclear whether all participants were included in the analysis. The remaining 20 studies were at high risk of bias because some participants were clearly excluded from the analysis. These studies did not report the reference standard results for the excluded participants. None of the studies reported indeterminate results (i.e. there were no indeterminate index test results in studies which provided a clear participant flow and none of the exclusions were due to indeterminate index test results).

Findings

Urea breath test- ^{13}C

The 34 studies of urea breath test- ^{13}C included 3139 participants, of whom 1526 had *H. pylori* infection (Figure 4). The threshold used in six studies was either unknown (Eggers 1990; Monteiro 2001a), or unclear (Sheu 1998a; Sheu 1998b; Vandenplas 1992; Wardi 2012). At the most commonly reported threshold of delta over baseline > 4% (30 minutes after administration of urea), the summary sensitivity (95% confidence interval (CI)) and specificity (95% CI) from 10 studies (958 participants) were 0.95 (95% CI 0.79 to 0.99) and 0.95 (95% CI 0.87 to 0.98). Other thresholds were used by a limited number of studies (Figure 5; Appendix 9). When possible we performed meta-analysis to estimate summary sensitivities and specificities at these common thresholds. The results are presented in Table 1.

Figure 4. Forest plot of urea breath test-I3C.FN = false negative; FP = false positive; TN = true negative; TP = true positive. The forest plot shows an estimate of sensitivity and specificity from each study and the threshold used. Studies are sorted by threshold, sensitivity and specificity. For threshold, the number of minutes in brackets is the time after administration of urea.

Figure 5. Forest plot of urea breath test-¹³C at commonly reported thresholds. FN = false negative; FP = false positive; TN = true negative; TP = true positive. Thresholds are shown in brackets and the number of minutes in brackets is the time after administration of urea.

Urea breath test-¹³C (delta over baseline > 3% (20 minutes))

Study	TP	FP	FN	TN	Reference standard	Sensitivity (95% CI)	Specificity (95% CI)
Yoshimura 2001	42	3	2	25	Combination	0.95 [0.85, 0.99]	0.89 [0.72, 0.98]
Mana 2001a	84	7	0	91	Combination	1.00 [0.96, 1.00]	0.93 [0.86, 0.97]

Urea breath test-¹³C (delta over baseline > 3% (30 minutes))

Study	TP	FP	FN	TN	Reference standard	Sensitivity (95% CI)	Specificity (95% CI)
Yoshimura 2001	42	3	2	25	Combination	0.95 [0.85, 0.99]	0.89 [0.72, 0.98]
Mana 2001a	84	6	0	92	Combination	1.00 [0.96, 1.00]	0.94 [0.87, 0.98]
Delvin 1999	12	0	0	67	Combination	1.00 [0.74, 1.00]	1.00 [0.95, 1.00]

Urea breath test-¹³C (delta over baseline > 3.5% (30 minutes))

Study	TP	FP	FN	TN	Reference standard	Sensitivity (95% CI)	Specificity (95% CI)
Salles-Montaudon 2002	18	19	6	64	Combination	0.75 [0.53, 0.90]	0.77 [0.67, 0.86]
Mana 2001a	84	5	0	93	Combination	1.00 [0.96, 1.00]	0.95 [0.88, 0.98]
Delvin 1999	12	0	0	67	Combination	1.00 [0.74, 1.00]	1.00 [0.95, 1.00]

Urea breath test-¹³C (delta over baseline > 4% (10 minutes))

Study	TP	FP	FN	TN	Reference standard	Sensitivity (95% CI)	Specificity (95% CI)
Mana 2001a	84	5	0	93	Combination	1.00 [0.96, 1.00]	0.95 [0.88, 0.98]
Hafeez 2007	31	8	3	12	Special stain	0.91 [0.76, 0.98]	0.60 [0.36, 0.81]

Urea breath test-¹³C (delta over baseline > 4% (20 minutes))

Study	TP	FP	FN	TN	Reference standard	Sensitivity (95% CI)	Specificity (95% CI)
Mana 2001a	84	4	0	94	Combination	1.00 [0.96, 1.00]	0.96 [0.90, 0.99]
Hafeez 2007	31	8	3	12	Special stain	0.91 [0.76, 0.98]	0.60 [0.36, 0.81]

Urea breath test-¹³C (delta over baseline > 4% (30 minutes))

Study	TP	FP	FN	TN	Reference standard	Sensitivity (95% CI)	Specificity (95% CI)
Adamopoulos 2009b	6	0	9	16	Combination	0.40 [0.16, 0.68]	1.00 [0.79, 1.00]
Korstanje 2006	5	3	1	11	Combination	0.83 [0.36, 1.00]	0.79 [0.49, 0.95]
Germana 2001	54	1	1	44	Combination	0.98 [0.90, 1.00]	0.98 [0.88, 1.00]
Mana 2001a	83	4	1	94	Combination	0.99 [0.94, 1.00]	0.96 [0.90, 0.99]
Adamopoulos 2009a	43	1	0	29	Combination	1.00 [0.92, 1.00]	0.97 [0.83, 1.00]
Delvin 1999	12	0	0	67	Combination	1.00 [0.74, 1.00]	1.00 [0.95, 1.00]
D'Ellos 2000	113	2	3	138	H&E stain	0.97 [0.93, 0.99]	0.99 [0.95, 1.00]
Schilling 2001	13	3	12	40	Special stain	0.52 [0.31, 0.72]	0.93 [0.81, 0.99]
Hafeez 2007	31	8	3	12	Special stain	0.91 [0.76, 0.98]	0.60 [0.36, 0.81]
Bosso 2000	32	6	1	56	Special stain	0.97 [0.84, 1.00]	0.90 [0.80, 0.96]

Urea breath test-¹³C (delta over baseline > 4.5% (30 minutes))

Study	TP	FP	FN	TN	Reference standard	Sensitivity (95% CI)	Specificity (95% CI)
Mana 2001a	81	4	3	94	Combination	0.96 [0.90, 0.99]	0.96 [0.90, 0.99]
Delvin 1999	12	0	0	67	Combination	1.00 [0.74, 1.00]	1.00 [0.95, 1.00]
Lahner 2004	5	3	5	14	Special stain	0.50 [0.19, 0.81]	0.82 [0.57, 0.96]

Urea breath test-¹³C (delta over baseline > 5% (30 minutes))

Study	TP	FP	FN	TN	Reference standard	Sensitivity (95% CI)	Specificity (95% CI)
Inelmen 2004	41	7	13	61	Combination	0.76 [0.62, 0.87]	0.90 [0.80, 0.96]
Mana 2001a	81	4	3	94	Combination	0.96 [0.90, 0.99]	0.96 [0.90, 0.99]
Lottspeich 2007	41	0	0	15	Combination	1.00 [0.91, 1.00]	1.00 [0.78, 1.00]
Behrens 1999	129	7	7	98	H&E stain	0.95 [0.90, 0.98]	0.93 [0.87, 0.97]

Urea breath test-¹⁴C

Figure 6 shows the 21 studies of urea breath test-¹⁴C. The studies included 1810 participants (involving 1018 *H. pylori* cases). Three studies did not state the thresholds used (Selcukcan 2011; Surveyor 1989; Yu 1999). The two most commonly used thresholds were counts per minute > 50 (10 minutes after administration of urea) in six studies (471 participants) and disintegrations per minute

> 200 (10 minutes) in four studies (296 participants) (Table 1). Test accuracy results for other thresholds are shown in Appendix 9. The summary sensitivity (95% CI) and specificity (95% CI) at the counts per minute > 50 threshold were 0.89 (95% CI 0.55 to 0.98) and 0.91 (95% CI 0.79 to 0.96). For the disintegrations per minute > 200 threshold, the summary sensitivity (95% CI) and specificity (95% CI) were 0.95 (95% CI 0.33 to 1.00) and 0.95 (95% CI 0.80 to 0.99).

Figure 6. Forest plot of urea breath test-¹⁴C. FN = false negative; FP = false positive; TN = true negative; TP = true positive. The forest plot shows an estimate of sensitivity and specificity from each study and the threshold used. Studies are sorted by threshold, sensitivity and specificity. For threshold, the number of minutes in brackets is the time after administration of urea.

Serology

Serology was evaluated in 34 studies with a total of 4242 participants, of whom 2477 had *H. pylori* infection (Figure 7). There was considerable variation in the thresholds used but 14 (41%) studies did not state the thresholds used. A threshold of > 7 units/ml was used in two studies (Iqbal 2013; Ogata 2001), involving 97 participants, and two studies involving 234 participants (Ladas 2002a; Monteiro 2001a) used a threshold of ≥ 300 units (Table 1). The summary sensitivity (95% CI) and specificity (95% CI) at the > 7 units/mL threshold were 0.98 (95% CI 0.74 to 1.00) and 0.71 (95% CI 0.51 to 0.86), and 0.91 (95% CI 0.82 to 0.96) and 0.86 (95% CI 0.72 to 0.93) for the ≥ 300 units threshold.

Figure 7. Forest plot of serology. FN = false negative; FP = false positive; SD = standard deviation; TN = true negative; TP = true positive. The forest plot shows an estimate of sensitivity and specificity from each study and the threshold used. Studies are sorted by threshold, sensitivity and specificity. Other threshold is staining of a 120kDa protein (CagA) gel band and/or at least two of five proteins between 28-33 kDa.

Stool antigen test

Twenty-nine studies assessed the stool antigen test in 2988 participants (including 1311 *H pylori* cases) (Figure 8). The threshold used was unknown in almost half of the studies (14/29, 48%). None of the thresholds reported were used by more than one study. Summary estimates of sensitivity and specificity were therefore not obtained at a common threshold.

Figure 8. Forest plot of stool antigen test. FN = false negative; FP = false positive; TN = true negative; TP = true positive; WL = wavelength. The forest plot shows an estimate of sensitivity and specificity from each study and the threshold used. Studies are sorted by threshold, sensitivity and specificity.

Comparative accuracy of non-invasive tests for *H pylori* infection

Comparison based on all studies (Indirect test comparison)

Across the four tests (urea breath test-¹³C, urea breath test-¹⁴C, serology and stool antigen test) 99 studies (5694 cases; 10799 participants) were included in this comparative meta-analysis (Figure 9). Preliminary assessment of each test separately indicated there was no significant association between test accuracy and threshold, and so a symmetric SROC curve is plausible for each test. Based on these preliminary assessments, and likelihood ratio tests comparing different HSROC meta-regression models with covariate

terms for test type and examination of the variance parameters in these models, the final model we fitted allowed for differences in accuracy and threshold as random effects (i.e. unequal variances for the random effects) with symmetric SROC curves for the tests. Overall, there was statistical evidence of a difference in accuracy ($P = 0.024$). The DORs (95% CI) for urea breath test-¹³C, urea breath test-¹⁴C, serology and stool antigen test were 153 (95% CI 73.7 to 316), 105 (95% CI 74.0 to 150), 47.4 (95% CI 25.5 to 88.1) and 45.1 (95% CI 24.2 to 84.1) respectively (Table 2). The accuracy of urea breath tests (¹³C and ¹⁴C) was significantly higher than that of serology and stool antigen test. For example, the ratio of DORs (95%) for urea breath test-¹³C compared to serology was 3.22 (95% CI 1.24 to 8.37), $P = 0.017$.

Figure 9. Summary ROC plot of non-invasive tests for *H pylori* infection. The SROC curves for the four tests are parallel. The curve for each test is drawn within the range of estimates of specificity from the studies included for the test.

Table 3 shows the clinical implications of using each of the four tests in a hypothetical cohort of 1000 people with different levels of prevalence of *H pylori* infection. For example, given a prevalence of 53.7% and a specificity of 0.90, 46 people who do not have *H pylori* infection will be treated and urea breath test-¹³C, urea breath test-¹⁴C, serology and stool antigen test will miss 30, 42, 86 and 89 people respectively who have *H pylori* infection.

Direct comparisons (restricted to comparative studies)

Direct comparisons were based on few studies. Table 4 shows the

number of studies (*N*) for each pairwise comparison and, where meta-analysis was possible, the ratio of DORs with 95% CIs and P value. There were no comparative studies of urea breath test-¹³C and urea breath test-¹⁴C. All other comparisons were based on seven or fewer studies. Each pair of tests were evaluated as follows:

- Urea breath test-¹³C versus serology (Figure 10): seven studies (Eltumi 1999; Korstanje 2006; Monteiro 2001a; Ogata 2001; Salles-Montaudon 2002; Vandenplas 1992; Yoshimura 2001).

Figure 10. Summary ROC plot of direct comparisons of urea breath test- ^{13}C and serology. Each summary curve was drawn restricted to the range of specificities for each test. The size of each symbol was scaled according to the precision of sensitivity and specificity in the study. A dotted line joins the pair of points for the two tests from each study.

- Urea breath test-¹³C versus stool antigen test (Figure 11): seven studies ([Hafeez 2007](#); [Inelmen 2004](#); [Lahner 2004](#); [Lottspeich 2007](#); [Monteiro 2001a](#); [Salles-Montaudon 2002](#); [Yu 2001](#)).

Figure 11. Summary ROC plot of direct comparisons of urea breath test- ^{13}C and stool antigen test. Each summary curve was drawn restricted to the range of specificities for each test. The size of each symbol was scaled according to the precision of sensitivity and specificity in the study. A dotted line joins the pair of points for the two tests from each study.

- Urea breath test-¹⁴C versus serology: two studies (Dede 2015; Kuloglu 2008).
- Urea breath test-¹⁴C versus serology: one study (Mansour-Ghanaei 2011).
- Serology versus stool antigen test: four studies (El-Din 2013; Monteiro 2001a; Salles-Montaudon 2002; Soomro 2012).

The ratios of DORs (95% CI; P value) were 0.68 (95% CI 0.12 to 3.70; P = 0.56) for urea breath test-¹³C versus serology, and 0.88 (95% CI 0.14 to 5.56; P = 0.84) for urea breath test-¹³C versus stool antigen test. Due to paucity of data and substantial heterogeneity observed in ROC space which precluded the use of simpler meta-analytic models, meta-analyses were not possible for the other two test comparisons that had more than one study. For the single study of urea breath test-¹⁴C versus serology (Mansour-Ghanaei 2011), both tests had similar sensitivity, but specificity was higher for urea breath test-¹⁴C than for serology.

Investigation of heterogeneity

We were unable to investigate subtype of tests because most of the serological tests were ELISA (17/20 (85%) studies that provided the type of serology test) and most studies (24/29 (83%) studies)

did not report whether monoclonal or polyclonal antibodies were used for stool antigen tests. Studies did not report the precise interval between index test and reference standard (unless they were performed on the same day), i.e. many studies did not report the interval at all, while some reported that the tests were performed within a few days of each other without stating the exact time interval. Of those that reported the interval, only two studies had an interval of more than two weeks (Dede 2015; Lombardo 2003). For each of the four tests, Appendix 10 shows the number of studies in each subgroup of other factors we had planned to investigate. Given the availability of data, we were only able to perform meta-regression to investigate the effect of reference standard on the accuracy of each test. Of the 99 studies, 42 (42%) used a combination of stains and there were few data for Immunohistochemical stains (2/99; 2%). The analyses were therefore limited to comparisons of H & E stain versus special stain for each test (Appendix 11). Although the effect of reference standard was not consistent across tests, there was no statistical evidence of a difference in test accuracy for any of the tests. For urea breath test-¹⁴C, the DOR for special stain was higher than for H & E stain, while for the other tests the DOR of both types of stain were similar or higher for H & E (Appendix 11).

Summary of findings

What is the best non-invasive test for diagnosis of <i>H pylori</i> infection?				
Population	Children and adults with gastrointestinal symptoms			
Setting	Primary care setting			
Index tests	Urea breath test- ¹³ C, Urea breath test- ¹⁴ C, serology, and stool antigen test			
Threshold	Various thresholds were used for each test			
Role and purpose of test	Screening and diagnosis of <i>H pylori</i>			
Reference standard	Endoscopic biopsy with Haematoxylin & Eosin stain, special stains, or combination of Haematoxylin & Eosin and special stains			
Quality of evidence	Risk of bias was generally high or unclear with respect to the selection of participants, and the conduct and interpretation of the index tests and reference standard. Applicability concerns were also generally high or unclear with respect to selection of participants			
Limitations	There was heterogeneity in thresholds and reference standards. Studies did not often prespecify or clearly report thresholds used			
Pre-test probability (prevalence of <i>Helicobacter pylori</i>)	Median (interquartile range) = 53.7% (42.0% to 66.5%)			
Index test	Number of participants (studies)	Diagnostic odds ratio (95% CI)	Sensitivity (95% CI) at fixed specificity of 0.90¹	Missed <i>H pylori</i> cases per 1000 people tested (95% CI)²
Urea breath test- ¹³ C	3139 participants (34 studies)	153 (95% CI 73.7 to 316)	0.94 (0.89 to 0.97)	30 (15 to 58)
Urea breath test- ¹⁴ C	1810 participants (21 studies)	105 (95% CI 74.0 to 150)	0.92 (0.89 to 0.94)	42 (30 to 58)
Serology	4242 participants (34 studies)	47.4 (95% CI 25.5 to 88.1)	0.84 (0.74 to 0.91)	86 (50 to 140)

Stool antigen test	2988 participants (29 studies)	45.1 (95% CI 24.2 to 84.1)	0.83 (0.73 to 0.90)	89 (52 to 146)
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Comparison of non-invasive tests for *H. pylori* infection

Based on an indirect comparison of the four tests using all the studies, there was statistical evidence of a difference in diagnostic accuracy ($P = 0.024$). Direct comparisons were based on few head-to-head studies. The ratios of diagnostic odds ratios (95% CI; P value) were 0.68 (95% CI 0.12 to 3.70; $P = 0.56$) for urea breath test- ^{13}C versus serology (seven studies), and 0.88 (95% CI 0.14 to 5.56; $P = 0.84$) for urea breath test- ^{13}C versus stool antigen test (seven studies). The 95% confidence intervals of these estimates overlap with those of the ratios of diagnostic odds ratios from the indirect comparison. Data were limited or unavailable for meta-analysis of other direct comparisons

Conclusions

In people with no history of gastrectomy and those who have not recently had antibiotics or proton pump inhibitors, urea breath tests had high diagnostic accuracy while serology and stool antigen tests had lower accuracy to detect *H. pylori* infection. Although susceptible to bias due to confounding, this conclusion is based on evidence from indirect test comparisons as evidence from direct comparisons was based on few studies or was unavailable. It should be noted that studies were generally of poor methodological quality. The thresholds used for the tests were highly variable and there is currently insufficient evidence to recommend specific thresholds for use in clinical practice

¹The sensitivities were estimated along the SROC curves at the median specificity across the studies included for the four tests.

²Based on the sensitivity estimated at the median specificity of 0.90, and the median prevalence of 53.7% from the included studies, the numbers of missed *H. pylori* cases were calculated using a hypothetical cohort of 1000 people suspected of having *H. pylori* infection. The 95% CI for the number of missed cases is from the 95% CI for sensitivity. For a specificity of 0.90 and prevalence of 53.7%, there will be 46 false positives. See [Table 3](#) for results for other values of specificity and prevalence.

DISCUSSION

Summary of main results

We included 101 studies (11,003 participants) that evaluated the diagnostic accuracy of different non-invasive methods for the diagnosis of *H pylori*. Of these 11,003 participants, 5839 participants (53.1%) had *H pylori* infection. The prevalence of *H pylori* infection ranged from 15.2% to 94.7%. The median prevalence was 53.7% (lower quartile: 42.0% and upper quartile: 66.5%). The summary of results for urea breath test-¹³C, urea breath test-¹⁴C, serology and stool antigen test is given in [Summary of findings](#). The studies used different thresholds and reference standards. As a result, there were few data for pooling sensitivities and specificities at specific thresholds, and we mainly estimated and compared SROC curves. The test comparison based on all available data (99 studies) for the four tests showed a statistically significant difference in diagnostic accuracy between the test ($P = 0.024$). There was no statistical evidence of a difference in diagnostic accuracy between urea breath test-¹³C and urea breath test-¹⁴C, while serology and stool antigen test were inferior to both urea breath tests. Direct comparisons are more reliable than indirect comparisons, due to the potential for confounding in indirect comparisons ([Takwoingi 2013](#)). However, we found few head-to-head studies and meta-analysis was possible for only two pairwise comparisons (urea breath test-¹³C versus serology, seven studies; and urea breath test-¹³C versus stool antigen test, seven studies). Most of the tests that used visual assessment (for example, appearance of a pink-red line) were stool antigen tests, although some serology tests also used visual assessment. Some serology and stool antigen tests are therefore easy to use (stool antigen test is easier to use as described below), but low diagnostic accuracy is a disadvantage when compared to urea breath tests. Urea breath test is a cumbersome test and involves the use of radioisotopes; however, urea breath test-¹³C may be the most accurate test among the non-invasive tests. This has implications in the screening of individuals for *H pylori* as a decision has to be made regarding the use of a cumbersome and relatively costly test but with good diagnostic accuracy versus cheap tests that can be performed easily but with lower diagnostic accuracy. A further decision to make if one opts for easy-to-use tests is the threshold at which the test should be used. For example, one can use a threshold that provides higher sensitivity (at the cost of lower specificity, necessitating endoscopic biopsy confirmation or treatment) or a threshold that provides higher specificity (at the cost of lower sensitivity, resulting in people with *H pylori* not being treated). Although at first sight it appears that the treatment for *H pylori* is relatively harmless and one would prefer a threshold at which the test has higher sensitivity rather than higher specificity, the decision to give antibiotics is not a straightforward one, because of the association

between unnecessary antibiotic use and development of antimicrobial resistance ([Llor 2014](#)). Serology and stool antigen test have similar diagnostic test accuracy and the choice between the two may be made based on ease of carrying out the tests. Only one study included in this review used whole blood for performing serology ([Chey 1998](#)). Even this test required a laboratory technician to interpret the test result ([Chey 1998](#)). So, there are no bedside tests available for serology testing. On the other hand, bedside kits with easy interpretation by colour changes are available for stool antigen tests, making them easy to administer ([Inelmen 2004](#); [Jekarl 2013](#); [Kuloglu 2008](#); [Qadeer 2009](#); [Trevisani 2005](#)). A cost-effectiveness study may clarify the most cost-effective non-invasive test in people with suspected *H pylori*, but it is difficult to factor in the price of antimicrobial resistance to an individual as the price of antimicrobial resistance is paid by future generations (through increased mortality and decreased productivity), rather than the individual for whom the treatment decision has to be made ([Taylor 2014](#)).

Strengths and weaknesses of the review

We conducted a thorough literature search and included full-text publications and abstracts without any language restrictions. There are currently no reliable search strategies to identify diagnostic test accuracy studies ([Beynon 2013](#)). We did not use any diagnostic filter in our search strategy, thereby ensuring that studies on the topic were identified. Two review authors independently identified and extracted data from the studies, potentially decreasing errors related to single data extraction. PCR methodology is not standardised across laboratories and it is an unreliable reference standard ([Chey 2007](#)). Endoscopic biopsy followed by rapid urease testing has poor sensitivity following treatment with proton pump inhibitors, and endoscopic biopsy with culture has high specificity but poor sensitivity ([Chey 2007](#)). We used a strict reference standard (histology) which is likely to diagnose the target condition with a high degree of accuracy. These are the major strengths of the review.

A major limitation was the diversity of thresholds used in the studies. As a result, data were sparse for each threshold, which limited estimation of summary sensitivities and specificities. Therefore there is insufficient evidence to recommend specific thresholds for each of the tests. Nonetheless, we were able to estimate and compare SROC curves by including studies with different thresholds. There was a high proportion of studies at high risk of bias and with high concern regarding applicability in all the four domains of the QUADAS-2 tool. This makes the validity and applicability of the results questionable. The major concerns were lack of reporting of the threshold used or when the thresholds were reported, there was no information to judge whether the thresholds were prespecified. Despite the lack of statistical evidence of an effect of type of reference standard on test accuracy, as there were few studies for each subgroup and other differences between studies, we cannot

conclude that diagnostic accuracy does not depend on type of reference standard.

Comparison with other systematic reviews

We identified several relevant systematic reviews (Ferwana 2015; Gisbert 2001; Gisbert 2004a; Loy 1996; Zhou 2014; Zhou 2017). The findings from this review support those of Zhou 2017, and Ferwana 2015, that urea breath test has high diagnostic accuracy and that there was significant heterogeneity in the diagnostic accuracy of the urea breath test (Zhou 2017). Our findings agree with those of Zhou 2014 that stool antigen test has only modest diagnostic test accuracy. The review findings are contrary to those of Gisbert 2001, and Gisbert 2004a, which suggested that stool antigen tests are highly accurate. This difference may be due to the strict reference standards that we used in this review and how we handled the issue of heterogeneity in thresholds. In agreement with the findings of Loy 1996, the role of serology in clinical practice is uncertain, as stool antigen tests provide equivalent diagnostic accuracy to serology and are easier to interpret.

Applicability of findings to the review question

This review included adults and children who underwent non-invasive tests for the diagnosis of *H pylori*. Most of the studies included only symptomatic people and so the findings of this review are applicable only to people with symptoms. Most studies excluded people who had previous gastrectomy and those who had recent antibiotics or proton pump inhibitors. Hence, the findings of this review are not applicable in these populations.

AUTHORS' CONCLUSIONS

Implications for practice

In people with no history of gastrectomy and those who have not recently had antibiotics or proton pump inhibitors, urea breath tests had high diagnostic accuracy while serology and stool antigen tests had lower accuracy to detect *H pylori* infection. Although susceptible to bias due to confounding, this conclusion is based on evidence from indirect test comparisons, as evidence from direct comparisons was based on few studies or was unavailable. There was high or unclear risk of bias for many studies with respect to the selection of participants, and the conduct and interpretation of the index tests and reference standard. The thresholds used for these tests were highly variable, thus there is insufficient evidence to identify specific thresholds that might be useful in clinical practice.

Implications for research

Further comparative studies of high methodological quality are necessary to obtain more reliable evidence of accuracy between the tests (urea breath tests, serology, and stool antigen tests) in people with upper gastrointestinal symptoms and people without any symptoms suggestive of *H pylori*. Such studies should be conducted prospectively in a representative spectrum of participants, and be clearly reported to ensure low risk of bias. Most importantly, studies should pre-specify and clearly report the thresholds used, should apply appropriate reference standards such as endoscopic biopsy with special stains, and should avoid inappropriate exclusions.

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REFERENCES

References to studies included in this review

Adamopoulos 2009a {published data only}

Adamopoulos AB, Stergiou GS, Saklzlis GN, Tiniakos DG, Nasothimiou EG, Sioutis DK, et al. Diagnostic value of rapid urease test and urea breath test for *Helicobacter pylori* detection in patients with Billroth ii gastrectomy: A prospective controlled trial. *Digestive and Liver Disease* 2009;**41**(1):4–8.

Adamopoulos 2009b {published data only}

Adamopoulos AB, Stergiou GS, Saklzlis GN, Tiniakos DG, Nasothimiou EG, Sioutis DK, et al. Diagnostic value of rapid urease test and urea breath test for *Helicobacter pylori* detection in patients with Billroth ii gastrectomy:

A prospective controlled trial. *Digestive and Liver Disease* 2009;**41**(1):4–8.

Aguilar 2007 {published data only}

Aguilar RC, Saavedra SP, Mendoza PG, Bussalleu RA, Cok GJ, Martinez MF, et al. Study of urease test or breath test (BT) and correlation with gastric biopsy to detect *Helicobacter pylori* (hp) in dyspeptic patients at “Hospital Nacional Cayetano Heredia hospital” (HNCH)–Lima. *Revista de Gastroenterologia del Peru* 2007;**27**(2):172–6.

Al-Fadda 2000 {published data only}

Al-Fadda M, Powe J, Rezeig M, Al Nazer M, Alrajhi AA, Baynton R. Comparison of carbon-14-urea breath test and rapid urease test with gastric biopsy for identification of

- Helicobacter pylori. *Annals of Saudi Medicine* 2000;**20**(2): 170–2.
- Allardye 1997** {published data only}
Allardye RA, Chapman BA, Tie ABM, Burt MJ, Yeo KJ, Keenan JI, et al. 37 KBQ C-14-urea breath test and gastric biopsy analyses of H-pylori infection. *Australian and New Zealand Journal of Surgery* 1997;**67**(1):31–4.
- Argentieri 2007** {published data only}
Argentieri M, Sabbi T, Pansani L, Torroni F, Francalanci P, De Angelis P, et al. Helicobacter pylori infection in children: Utility of culture in diagnosis and study of resistance to metronidazole, clarithromycin and amoxicillin. *Journal of Pediatric Infectious Diseases* 2007;**2**(3):135–9.
- Arikan 2004** {published data only}
Arikan S, Kocakusak A, Barut G, Sengoz G, Yucel AF, Gokturk K. Helicobacter pylori stool antigen test: Results of a prospective study. *Surgery Today* 2004;**34**(4):318–22.
- Atli 2012** {published data only}
Atli T, Sahin S, Arslan BU, Varli M, Yalcin AE, Aras S. Comparison of the C14 urea breath test and histopathology in the diagnosis of Helicobacter pylori in the elderly. *Journal of the Pakistan Medical Association* 2012;**62**(10):1061–5.
- Behrens 1999** {published data only}
* Behrens R, Lang T, Keller KM, Bindl L, Becker M, Rodeck B, et al. Dual versus triple therapy of Helicobacter pylori infection: Results of a multicentre trial. *Archives of Disease in Childhood* 1999;**81**(1):68–70.
Behrens R, Lang T, Keller KM, Bindl L, Becker M, Rodeck B, et al. Helicobacter pylori infection in children and adolescents. Diagnosis and treatment. [German]. *Tagliche Praxis* 2001;**42**(3):473–83.
- Bosso 2000** {published data only}
Bosso S, Balbo L, Lerro P, Kuvidi M, Musso A, Ansaldi N. Antigen detection in stools as a first choice for laboratory diagnosis of Helicobacter pylori disease. *Minerva Gastroenterologica e Dietologica* 2000;**46**(1):15–8.
- Ceken 2011** {published data only}
Ceken N, Yurtsever SG, Baran N, Alper E, Buyrac Z, Unsal B. Comparison of Helicobacter pylori antibody detection in stool with other diagnostic tests for infection. *Asian Pacific Journal of Cancer Prevention* 2011;**12**(4):1077–81.
- Chen 1991** {published data only}
Chen CF, Lee MH, Ng JL, Lin CY, Yeh HW, Huang TW. A rapid latex test for the serological diagnosis of Helicobacter pylori. *Chinese Journal of Gastroenterology* 1991;**8**(4): 266–70.
- Chey 1998** {published data only}
Chey WD, Murthy UK, Linscheer W, Barish C, Riff D, Rubin H, et al. The ChemTrak Hp Chek fingerstick whole blood serology test for the detection of Helicobacter pylori infection. *American Journal of Gastroenterology* 1998;**93**(1): 16–9.
- Czerwionka-Szaflarska 2007** {published data only}
Czerwionka-Szaflarska M, Brazowski J, Kupczyk W. Value of urease breath test in Helicobacter pylori infection diagnostics among children and youth. *Medycyna Wieku Rozwojowego* 2007;**11**(2 Pt 1):97–101.
- D'Elios 2000** {published data only}
D'Elios MM, Amedei A, Benagiano M, Azzurri A, Del Prete G. Usefulness of 13C-urea breath test in the diagnosis of gastric Helicobacter pylori infection. *International Journal of Immunopathology and Pharmacology* 2000;**13**(1):27–30.
- Debongnie 1991** {published data only}
Debongnie JC, Pauwels S, Raat A, De Meeus Y, Haot J, Mainguet P. Quantification of Helicobacter pylori infection in gastritis and ulcer disease using a simple and rapid carbon-14-urea breath test. *Journal of Nuclear Medicine* 1991;**32**(6):1192–8.
- Dede 2015** {published data only}
Dede F, Civen H, Dane F, Aliustaoglu M, Turhal S, Turoglu HT, et al. Carbon-14 urea breath test: Does it work in patients with partial gastric resection?. *Annals of Nuclear Medicine* 2015;**29**(9):786–91.
- Delvin 1999** {published data only}
Delvin EE, Brazier JL, Deslandes C, Alvarez F, Russo P, Seidman E. Accuracy of the [13C]-urea breath test in diagnosing Helicobacter pylori gastritis in pediatric patients. *Journal of Pediatric Gastroenterology and Nutrition* 1999;**28**(1):59–62.
- Dinler 1999** {published data only}
Dinler G, Ozen H, Kocak N, Yuce A, Gurakan F. Detection of Helicobacter pylori infection. *American Journal of Gastroenterology* 1999;**94**(4):1118.
- Duan 1999** {published data only}
Duan L, Duan X, Ye S, Wang J, Jin Z, Wang Z. The diagnostic value of 13C-urea breath test in Helicobacter pylori colonization density and the severity of gastritis. *Zhonghua Nei Ke za Zhi [Chinese Journal of Internal Medicine]* 1999;**38**(12):824–6.
- Eggers 1990** {published data only}
Eggers RH, Kulp A, Tegeler R, Ludtke FE, Lepsien G, Meyer B, et al. A methodological analysis of the c-13-urea breath test for detection of Helicobacter-pylori infections - high-sensitivity and specificity within 30-min using 75-mg of c-13-urea. *European Journal of Gastroenterology & Hepatology* 1990;**2**(6):437–44.
- Ekesbo 2006** {published data only}
Ekesbo R, Toth E, Fork FT, Held M, Nilsson I, Wadstrom T, et al. Chronic Helicobacter pylori infection in a population in southern Sweden analysed by histopathology, immunoblot and ELISA serology. *European Journal of Gastroenterology & Hepatology* 2006;**18**(6):589–93.
- El-Din 2013** {published data only}
El-Din HMA, Hashem AGM, Ragab YM, Hussein IL, Mohamed DB, Mohamed EB. Evaluation of noninvasive versus invasive techniques for the diagnosis of Helicobacter pylori infection. *Applied Immunohistochemistry & Molecular Morphology* 2013;**21**(4):326–33.

El-Mekki 2011 {published data only}

El-Mekki A, Kumar A, Alkaway B, Al-Ammari O, Moosa R, Quli S, et al. Comparison of enzyme immunoassays detecting *Helicobacter pylori* specific IgG in serum and saliva with endoscopic and biopsy findings in patients with dyspepsia. *Indian Journal of Medical Microbiology* 2011;**29**(2):136–40.

El-Nasr 2003 {published data only}

El-Nasr MS, Eliabary SA, Bastawi MB, Hassan A, Shahin Y, Hassan L, et al. Evaluation of a new enzyme immunoassay for the detection of *Helicobacter pylori* in stool specimens. *Journal of the Egyptian Society of Parasitology* 2003;**33**(3): 905–15.

Eltumi 1999 {published data only}

Eltumi M, Brueton MJ, Francis N. Diagnosis of *Helicobacter pylori* gastritis in children using the 13C urea breath test. *Journal of Clinical Gastroenterology* 1999;**28**(3): 238–40.

Eppl 1997 {published data only}

Eppl HJ, Kirstein FW, Bojarski C, Frege J, Fromm M, Riecken EO, et al. 13C-urea breath test in *Helicobacter pylori* diagnosis and eradication. Correlation to histology, origin of 'false' results, and influence of food intake. *Scandinavian Journal of Gastroenterology* 1997;**32**(4): 308–14.

Fallone 1995 {published data only}

Fallone CA, Mitchell A, Paterson WG. Determination of the test performance of less costly methods of *Helicobacter pylori* detection. *Clinical and Investigative Medicine. Medecine Clinique et Experimentale* 1995;**18**(3):177–85.

Fallone 1996 {published data only}

Fallone CA, Elizov M, Cleland P, Thompson JA, Wild GE, Lough J, et al. Detection of *Helicobacter pylori* infection by saliva IgG testing. *American Journal of Gastroenterology* 1996;**91**(6):1145–9.

Fanti 1999 {published data only}

Fanti L, Mezzi G, Cavallero A, Gesu G, Bonato C, Masci E. A new simple immunoassay for detecting *Helicobacter pylori* infection: Antigen in stool specimens. *Digestion* 1999;**60**(5):456–60.

Faruqui 2007 {published data only}

Faruqui AN, Majid U, Ahmed L, Khalil M, ul Hassan M. *Helicobacter pylori* stool antigen test (HpSA) for the diagnosis of gastric infection. *Journal of the College of Physicians and Surgeons Pakistan* 2007;**17**(6):316–9.

Ferrara 1998 {published data only}

Ferrara M, Apuzzo M, Bazuro ME, Tammara GF, Pippa G. Serology screening for *Helicobacter pylori* in dyspeptic patients. *Giornale Italiano di Endoscopia Digestiva* 1998;**21**(1):15–22.

Formichella 2013 {published data only}

* Formichella L, Romberg L, Bolz C, Vieth M, Geppert M, Gottner G, et al. A novel line immunoassay based on recombinant virulence factors enables highly specific and sensitive serologic diagnosis of *Helicobacter pylori*

infection. *Clinical & Vaccine Immunology: CVI* 2013;**20**(11):1703–10.

Gholi MK, Kalali B, Formichella L, Gottner G, Shamsipour F, Zarnani AH, et al. *Helicobacter pylori* FliD protein is a highly sensitive and specific marker for serologic diagnosis of *H. pylori* infection. *International Journal of Medical Microbiology* 2013;**303**(8):618–23.

Germana 2001 {published data only}

* Germana B, Galliani E, Lecis P, Costan F. Diagnosis of *Helicobacter pylori* infections using isotope-selective non dispersive infrared spectrometry with 13C-urea breath test. *Recenti Progressi in Medicina* 2001;**92**(2):113–6.

Germana B, Galliani EA, Lecis PE, Doglioni C, Costan F. Isotope-selective non dispersive infrared spectrometry for detection of *Helicobacter-pylori* infection with c-13-urea breath test. *Gut* 1999;**45**(Suppl 3):A130.

Graham 1996a {published data only}

Graham DY, Evans DJ Jr, Peacock J, Baker JT, Schrier WH. Comparison of rapid serological tests (Flexsure Hp and Quickvue) with conventional ELISA for detection of *Helicobacter pylori* infection. *American Journal of Gastroenterology* 1996;**91**(5):942–8.

Gramley 1999 {published data only}

Gramley WA, Asghar A, Frierson HF Jr, Powell SM. Detection of *Helicobacter pylori* DNA in fecal samples from infected individuals. *Journal of Clinical Microbiology* 1999;**37**(7):2236–40.

Guo 2011 {published data only}

Guo JX, Han J, Chen L, Xu J, Liu J, Zhao J, et al. Evaluation of the *Helicobacter pylori* stool antigen test. *Zhonghua Shi Yan He Lin Chuang Bing du Xue za Zhi [Chinese Journal of Experimental and Clinical Virology]* 2011;**25**(6):495–6.

Gurbuz 2005 {published data only}

Gurbuz AK, Ozel AM, Narin Y, Yazgan Y, Baloglu H, Demirturk L. Is the remarkable contradiction between histology and c-14 urea breath test in the detection of *Helicobacter pylori* due to false-negative histology or false-positive c-14 urea breath test?. *Journal of International Medical Research* 2005;**33**(6):632–40.

Hafeez 2007 {published data only}

Hafeez A, Bilal R, Haseeb HA, Khan UF, Latif Z, Hassan M. Comparison of diagnostic accuracy of non-invasive tests for *Helicobacter pylori* infection in children. *Journal of the College of Physicians and Surgeons–Pakistan : JCPSP* 2007;**17**(5):261–4.

Han 2012 {published data only}

Han H, Lee S, Hwang T. The significance of positive giemsa stain cases in negative UBT (urea breath test) patients. *Helicobacter* 2012;**17**:117.

Inelmen 2004 {published data only}

Inelmen EM, Gasparini G, Sergi G, Enzi G. Evaluation of *Helicobacter pylori* with a stool antigen assay in frail, elderly patients. *Scandinavian Journal of Gastroenterology* 2005;**40**(7):794–9.

* Inelmen EM, Maccari T, Enzi G, Gasparini G, Fuson F, Davanzo B, et al. *Helicobacter pylori* infection diagnosis

- in hospitalised elderly patients: The stool antigen test (HpSA) in comparison with other methods. *Aging-Clinical & Experimental Research* 2004;**16**(5):349–55.
- Iqbal 2013** {published data only}
Iqbal S, Fatima S, Raheem A, Khan AH. Agreement between serology and histology for detection of *Helicobacter pylori* infection. *Journal of the College of Physicians and Surgeons--Pakistan : JCPSP* 2013;**23**(10):784–6.
- Islam 2005** {published data only}
Islam S, Weilert F, Babington R, Dickson G, Smith AC. Stool antigen testing for the diagnosis and confirmation of eradication of *Helicobacter pylori* infection: A prospective blinded trial. *Internal Medicine Journal* 2005;**35**(9):526–9.
- Ivanova 2010** {published data only}
Ivanova K, Marina M, Vladimirov B, Churchev J, Tersiev I. Comparison of different methods for detection of *Helicobacter pylori* infection. *Problems of Infectious and Parasitic Diseases* 2010;**38**(1):25–7.
- Jekarl 2013** {published data only}
Jekarl DW, An YJ, Lee S, Lee J, Kim Y, Park YJ, et al. Evaluation of a newly developed rapid stool antigen test using an immunochromatographic assay to detect *Helicobacter pylori*. *Japanese Journal of Infectious Diseases* 2013;**66**(1):60–4.
- Jensen 1998** {published data only}
Jensen G, Friedenberg F, Levine G, Zaeri N, Braitman LE, Tran HD, et al. Accuracy and clinical utility of the mini-dose c-14-urea breath test in the evaluation of *Helicobacter pylori* infection. *Nuclear Medicine Communications* 1998;**19**(8):771–5.
- Jordaan 2008** {published data only}
Jordaan M, Laurens JB. Diagnosis of *Helicobacter pylori* infection with the c-13-urea breath test by means of GC-MS analysis. *Journal of Separation Science* 2008;**31**(2):329–35.
- Kalach 1998a** {published data only}
Kalach N, Briet F, Raymond J, Benhamou PH, Barbet P, Bergeret M, et al. The 13Carbon urea breath test for the noninvasive detection of *Helicobacter pylori* in children: Comparison with culture and determination of minimum analysis requirements. *Journal of Pediatric Gastroenterology & Nutrition* 1998;**26**(3):291–6.
- Kamel 2011** {published data only}
Kamel HY, Abd-Al-Atty MF, El-Banoby MH, El-Baz AA, Sakr MA, Ahmed NS, et al. Stool antigen test in diagnosis of *Helicobacter pylori* in older adults with dyspepsia. *Journal of the American Geriatrics Society* 2011;**59**(9):1769–70.
- Kim 2016** {published data only}
Kim DH, Kim HD, Park H, Choi S, Beom JW, Kim WJ, et al. New monoclonal antibody-based test for *Helicobacter pylori* urease in gastric tissue. *Korean Journal of Internal Medicine* 2016;**31**(1):40–5.
- Korstanje 2006** {published data only}
Korstanje A, Van Eeden S, Offerhaus GJ, Sabbe LJ, Den Hartog G, Biemond I, et al. The 13Carbon urea breath test for the diagnosis of *Helicobacter pylori* infection in subjects with atrophic gastritis: Evaluation in a primary care setting. *Alimentary Pharmacology & Therapeutics* 2006;**24**(4):643–50.
- Kuloglu 2008** {published data only}
Kuloglu Z, Kansu A, Kirsacloglu CT, Ustundag G, Aysev D, Ensari A, et al. A rapid lateral flow stool antigen immunoassay and (14)C-urea breath test for the diagnosis and eradication of *Helicobacter pylori* infection in children. *Diagnostic Microbiology & Infectious Disease* 2008;**62**(4):351–6.
- Ladas 2002a** {published data only}
Ladas SD, Malamou H, Triantafyllou K, Varzakakos I, Georgopoulos S, Giota G, et al. Performance of two immunosorbent assay kits for the detection of serum immunoglobulin G to *Helicobacter pylori* in untreated Greek patients. *Scandinavian Journal of Gastroenterology* 2002;**37**(5):512–6.
- Lahner 2004** {published data only}
Lahner E, Vaira D, Figura N, Pilozi E, Pasquali A, Severi C, et al. Role of noninvasive tests (c-13-urea breath test and stool antigen test) as additional tools in diagnosis of *Helicobacter pylori* infection in patients with atrophic body gastritis. *Helicobacter* 2004;**9**(5):436–42.
- Lee 1998** {published data only}
Lee HS, Gwee KA, Teng LY, Kang JY, Yeoh KG, Wee A, et al. Validation of [13C]urea breath test for *Helicobacter pylori* using a simple gas chromatograph-mass selective detector. *European Journal of Gastroenterology & Hepatology* 1998;**10**(7):569–72.
- Logan 1991a** {published data only}
Logan RP, Polson RJ, Misiewicz JJ, Rao G, Karim NQ, Newell D, et al. Simplified single sample 13Carbon urea breath test for *Helicobacter pylori*: Comparison with histology, culture, and ELISA serology. *Gut* 1991;**32**(12):1461–4.
- Lombardo 2003** {published data only}
Lombardo L, Masoero G, Della Monica P, Crocella L, Ruggia O, Ravarino N, et al. Multiple sampling 13C-urea breath test: Improvement of diagnosis in postgastrectomy patients. *Minerva Gastroenterologica e Dietologica* 2003;**49**(3):181–6.
- Lottspeich 2007** {published data only}
Lottspeich C, Schwarzer A, Panthel M, Koletzko S, Russmann H. Evaluation of the novel *Helicobacter pylori* ClariRes real-time PCR assay for detection and clarithromycin susceptibility testing of *h.pylori* in stool specimens from symptomatic children. *Journal of Clinical Microbiology* 2007;**45**(6):1718–22.
- Luthra 1998** {published data only}
Luthra GK, DiNuzzo AR, Gourley WK, Crowe SE. Comparison of biopsy and serological methods of diagnosis of *Helicobacter pylori* infection and the potential role of antibiotics. *American Journal of Gastroenterology* 1998;**93**(8):1291–6.

Mana 2001a {published data only}

* Mana F, Franken PR, Ham HR, Urbain D. Cut-off point, timing and pitfalls of the c-13-urea breath test as measured by infrared spectrometry. *Digestive and Liver Disease* 2001; **33**(1):30–5.

Mana F, Fried M, Ham HR, Lacor P, Vandenplas Y, Urbain D. Evaluation of a 10 minute c-13-urea breath test for the diagnosis of *Helicobacter pylori* infection, as measured by infrared spectrometry. *Gastroenterology* 2000;**118**(4 Part 1): A508.

Mansour-Ghanaei 2011 {published data only}

Mansour-Ghanaei F, Sanaei O, Joukar F. Clinical validation of an office-based C-14-UBT (Heliprobe) for *H. Pylori* diagnosis in Iranian dyspeptic patients. *Gastroenterology Research and Practice* 2011 Jun 22 [Epub ahead of print]. [DOI: 10.1155/2011/930941]

Mion 1994 {published data only}

Mion F, Delecluse HJ, Rousseau M, Berger F, Brazier JL, Minaire Y. 13C-urea breath test for the diagnosis of *Helicobacter* infection. Comparison with histology. *Gastroenterologie Clinique et Biologique* 1994;**18**(12): 1106–11.

Misawa 1998 {published data only}

Misawa K, Kumagai T, Shimizu T, Furihata K, Ota H, Akamatsu T, et al. A new histological procedure for re-evaluation of the serological test for *Helicobacter pylori*. *European Journal of Clinical Microbiology & Infectious Diseases* 1998;**17**(1):14–9.

Mohammadian 2007 {published data only}

Mohammadian T, Hagh-Zare M, Aria H, Doosti M, Paknejad M, Siavoshi F, et al. Comparison of serologic ELISA and histopathologic findings in diagnosis of *Helicobacter pylori* infection in Iran. *Helicobacter* 2007;**12**(4):446.

Monteiro 2001a {published data only}

Monteiro L, De Mascarel A, Sarrasqueta AM, Bergey B, Barberis C, Talby P, et al. Diagnosis of *Helicobacter pylori* infection: Noninvasive methods compared to invasive methods and evaluation of two new tests. *American Journal of Gastroenterology* 2001;**96**(2):353–8.

Morales 1995 {published data only}

Morales EOS, Vorackova FV, Perez JDV, Alonso SS, Angeles AA, Rivera JE, et al. Optimization of the c-14 urea breath test for the detection of *Helicobacter-pylori* in dyspeptic patients. *Revista De Investigacion Clinica* 1995;**47**(2): 109–16.

Noguera 1998 {published data only}

Noguera ECA, Hames W, Bertola S, Mothe G. *Helicobacter pylori*: C-14 urea breath test in clinical practice in a general hospital. *Medicina-Buenos Aires* 1998;**58**(1):45–50.

Novis 1991 {published data only}

Novis BH, Gabay G, Leichtmann G, Peri M, Bernheim J, Pomeranz IS. Two point analysis 15-minute 14c-urea breath test for diagnosing *Helicobacter pylori* infection. *Digestion* 1991;**50**(1):16–21.

Ogata 2001 {published data only}

Ogata SK, Kawakami E, Patricio FR, Pedroso MZ, Santos AM. Evaluation of invasive and non-invasive methods for the diagnosis of *Helicobacter pylori* infection in symptomatic children and adolescents. *Sao Paulo Medical Journal* 2001;**119**(2):67–71.

Ozturk 2003 {published data only}

Ozturk E, Yesilova Z, Ilgan S, Arslan N, Erdil A, Celasun B, et al. A new, practical, low-dose 14c-urea breath test for the diagnosis of *Helicobacter pylori* infection: Clinical validation and comparison with the standard method. *European Journal of Nuclear Medicine & Molecular Imaging* 2003;**30**(11):1457–62.

Peitz 2001 {published data only}

Peitz U, Baumann M, Tillenburger B, Borsch G, Stolte M, Malfertheiner P, et al. Insufficient validity of a rapid blood test for diagnosis of *Helicobacter pylori* infection. *Medizinische Klinik* 2001;**96**(12):703–7.

Peura 1996 {published data only}

Peura DA, Pambianco DJ, Dye KR, Lind C, Frierson HF, Hoffman SR, et al. Microdose c-14-urea breath test offers diagnosis of *Helicobacter pylori* in 10 minutes. *American Journal of Gastroenterology* 1996;**91**(2):233–8.

Puspok 1999 {published data only}

Puspok A, Bakos S, Oberhuber G. A new, non-invasive method for detection of *Helicobacter pylori*: Validity in the routine clinical setting. *European Journal of Gastroenterology & Hepatology* 1999;**11**(10):1139–42.

Qadeer 2009 {published data only}

Qadeer AS, Kharal SA, Baig MF, Badvi JA, Durrani MA. Detection of *Helicobacter pylori* antigen in stool. *Journal of the Liaquat University of Medical and Health Sciences* 2009;**8**(2):126–30.

Rafeey 2007 {published data only}

Rafeey M, Nikvash S. Detection of *Helicobacter pylori* antigen in stool samples for diagnosis of infection in children. *Eastern Mediterranean Health Journal* 2007;**13**(5): 1067–72.

Rasool 2007 {published data only}

* Rasool S, Abid S, Jafri W. Validity and cost comparison of 14carbon urea breath test for diagnosis of *H pylori* in dyspeptic patients. *World Journal of Gastroenterology* 2007; **13**(6):925–9.

Rasool S, Abid S, Mumtaz K, Shah HA, Hamid S, Islam M, et al. C-14-urea breath test: A reliable and practical test in office-based diagnosis of *Helicobacter pylori* infection. *Helicobacter* 2005;**10**(5):525.

Rathbone 1986 {published data only}

Rathbone BJ, Wyatt J, Tompkins D, Heatley RV, Losowsky MS. Diagnostic IgG ELISA for gastric *campylobacter-pyloridis* infection using serum samples. *Gut* 1986;**27**(5): A607.

Safe 1993 {published data only}

Safe AF, Warren B, Corfield A, McNulty CA, Watson B, Mountford RA, et al. *Helicobacter-pylori* infection in

- elderly people - correlation between histology and serology. *Age and Ageing* 1993;**22**(3):215–20.
- Salles-Montaudon 2002** *{published data only}*
Salles-Montaudon N, Dertheil S, Broutet N, Gras N, Monteiro L, De Mascarel A, et al. Detecting *Helicobacter pylori* infection in hospitalized frail older patients: The challenge. *Journal of the American Geriatrics Society* 2002;**50**(10):1674–80.
- Schilling 2001** *{published data only}*
Schilling D, Jakobs R, Peitz U, Sugilla M, Stolte M, Riemann JF, et al. The diagnostic accuracy of (13)C-urea breath test in diagnosis of *Helicobacter pylori* (hp) infection in patients with partial gastric resection due to peptic ulcer disease. *Gastroenterology* 1999;**116**(4 suppl):A304.
* Schilling D, Jakobs R, Peitz U, Sulliga M, Stolte M, Riemann JF, et al. Diagnostic accuracy of c-13-urea breath test in the diagnosis of *Helicobacter pylori* infection in patients with partial gastric resection due to peptic ulcer disease - a prospective multicenter study. *Digestion* 2001;**63**(1):8–13.
- Scuderi 2000** *{published data only}*
Scuderi G, Celi D, Romagnolo M, Lupi A, Alecci L, Dramissino I, et al. *Helicobacter pylori*: Use of a stool antigen detection test and a six-day triple therapy [2]. *Digestive and Liver Disease* 2000;**32**(1):71–3.
- Segamwenge 2014** *{published data only}*
Segamwenge IL, Kagimu M, Ocama P, Opio K. The utility of the *Helicobacter pylori* stool antigen test in managing dyspepsia: An experience from a low resource setting. *African Health Sciences* 2014;**14**(4):829–34.
- Selcukcan 2011** *{published data only}*
Selcukcan Aydin F, Demirkiran Urganci N, Uzun Yenici FU. Comparison of methods in diagnosis of gastritis originated from *Helicobacter pylori* in pediatric age, and use of urea breath test as a noninvasive technique in post-treatment follow-up of the patient. *Duzce Medical Journal* 2011;**13**(1):6–14.
- Sharbatdaran 2013** *{published data only}*
Sharbatdaran M, Kashifard M, Shefaee S, Siadati S, Jahed B, Asgari S. Comparison of stool antigen test with gastric biopsy for the detection of *Helicobacter pylori* infection. *Pakistan Journal of Medical Sciences* 2013;**29**(1):68–71.
- Sheu 1998a** *{published data only}*
Sheu BS, Lee SC, Lin PW, Chang YC, Yang SB, Lin XZ. Diagnostic efficacy of carbon 13 urea breath test to detect *H. pylori* in patients after gastrectomy. *Gut* 1998;**43**(Suppl 2):A57.
- Sheu 1998b** *{published data only}*
Sheu BS, Lee SC, Lin PW, Chang YC, Yang SB, Lin XZ. Diagnostic efficacy of carbon 13 urea breath test to detect *H. pylori* in patients after gastrectomy. *Gut* 1998;**43**(Suppl 2):A57.
- Shin 2009** *{published data only}*
Shin CM, Kim N, Lee HS, Lee HE, Lee SH, Park YS, et al. Validation of diagnostic tests for *Helicobacter pylori* with regard to grade of atrophic gastritis and/or intestinal metaplasia. *Helicobacter* 2009;**14**(6):512–9.
- Soomro 2012** *{published data only}*
* Soomro RA, Abro AK, Ujjan ID, Ibraheem Z, Farooq M. Comparison of two diagnostic methods for detection of *H. pylori* i.e., gastric biopsy by H&E & Giemsa and serum anti *H. pylori* antibodies. *Pakistan Journal of Medical and Health Sciences* 2012;**6**(3):552–4.
Soomro RA, Sheikh TA, Memon AI, Pathan NA, Qazi N. Two easy and early methods for the diagnosis of *H. pylori* i.e.: serum anti *H. pylori* antibodies and stool antigen. *Journal of the Liaquat University of Medical and Health Sciences* 2013;**12**(2):87–90.
- Surveyor 1989** *{published data only}*
Surveyor I, Goodwin CS, Mullan BP, Geelhoed E, Warren JR, Murray RN, et al. The c-14-urea breath-test for the detection of gastric campylobacter-pylori infection. *Medical Journal of Australia* 1989;**151**(8):435–9.
- Thobani 1995** *{published data only}*
Thobani S, Jafri SMW, Ferrell L, Perezperez GI, Hasan SH, Blaser MJ, et al. Detection of *Helicobacter-pylori* gastritis in Pakistan - efficacy of an IgG ELISA based on a United-States population. *Gastroenterology* 1995;**108**(4 suppl):A241.
- Tiwari 2014** *{published data only}*
Tiwari BP, Nistala S, Patil SP, Kalgutkar DP, Jaychandran N, Chander H, et al. Evaluation of the c-14-urea breath test using indigenously produced c-14-urea capsules and a modified technique for trapping exhaled breath: A pilot study. *Nuclear Medicine Communications* 2014;**35**(3):325–30.
- Trevisani 2005** *{published data only}*
Trevisani L, Sartori S, Rossi MR, Ruina M, Matarese V, Gullini S, et al. Evaluation of a new rapid immunoassay for the detection of *Helicobacter pylori* in faeces: A prospective pilot study. *Alimentary Pharmacology & Therapeutics* 2005;**21**(4):485–9.
- Vandenplas 1992** *{published data only}*
Vandenplas Y, Blecker U, Devreker T, Keppens E, Nijs J, Cadranet S, et al. Contribution of the 13C-urea breath test to the detection of *Helicobacter pylori* gastritis in children. *Pediatrics* 1992;**90**(4):608–11.
- Villalobos 1992** *{published data only}*
Villalobos Perez JJ, Sanchez Morales EO, Vargas Vorackova F, Sixtos Alonso S, Angeles Angeles A, Elizondo Rivera J, et al. Usefulness of the 14c-urea marked test in the detection of *Helicobacter pylori* in patients with dyspepsia. *Revista de Gastroenterología de Mexico* 1992;**57**(3):167–71.
- Wang 2008** *{published data only}*
Wang XY, Yang Y, Shi RH, Ho B, Wang HD, Zhang GX. An evaluation of a serologic test with a current infection marker of *Helicobacter pylori* before and after eradication therapy in Chinese. *Helicobacter* 2008;**13**(1):49–55.
- Wardi 2012** *{published data only}*
Wardi J, Shalev T, Shevah O, Boaz M, Avni Y, Shirin H. A rapid continuous-real-time c-13-urea breath test for the

- detection of *Helicobacter pylori* in patients after partial gastrectomy. *Journal of Clinical Gastroenterology* 2012;**46**(4):293–6.
- Weiss 1994** {published data only}
Weiss J, Mecca J, Da Silva E, Gassner D. Comparison of PCR and other diagnostic techniques for detection of *Helicobacter pylori* infection in dyspeptic patients. *Journal of Clinical Microbiology* 1994;**32**(7):1663–8.
- Yan 2003** {published data only}
Yan S, Lin Q, Song Y, Wang S. Detection of *Helicobacter pylori* stool antigen by non-invasive enzyme immunoassay. *Chinese Medical Sciences Journal* 2003;**18**(4):218–21.
- Yoshimura 2001** {published data only}
Yoshimura N, Tajiri H, Sawada A, Kozaiwa K, Ida S, Fujisawa T, et al. A c-13-urea breath test in children with *Helicobacter pylori* infection: Assessment of eradication therapy and follow-up after treatment. *Journal of Gastroenterology* 2001;**36**(9):606–11.
- Yu 1999** {published data only}
Yu WK, Chow PKH, Tan SY, Ng EH, Goh ASW, Soo KC, et al. Five micro-curie urea breath test for the diagnosis of *Helicobacter pylori* infection: Evaluation in a south-east Asian population. *Australian and New Zealand Journal of Surgery* 1999;**69**(1):37–40.
- Yu 2001** {published data only}
Yu FJ, Wu DC, Kuo CH, Lu CY, Su YC, Lee YC, et al. Diagnosis of *Helicobacter pylori* infection by stool antigen test in southern Taiwan. *Kaohsiung Journal of Medical Sciences* 2001;**17**(7):344–50.
- References to studies awaiting assessment**
- Buhigas-Garcia 2008** {published data only}
Buhigas-Garcia I, Herrero-Alonso MC, Barrio-Merino A. From laboratory to clinic: 13-c urea breath test [Test de urea marcada con carbono 13]. *Anales de Pediatría Continuada* 2008;**6**(3):155–8. apswl.elsevier.es/watermark/ctl?servlet?_f=10&pident=articulo=80000328&pident=usuario=0&pcontactid=&pident=revista=51&ty=30&accion=L&origen=apcontinuada&web=www.apcontinuada.com&lan=es&fichero=v6n3a328pdf001.pdf&anuncioPdf=ERROR'publi'pdf
- Fazeli 2004** {published data only}
Fazeli A, Safaei HG, Tamizifar H, Rashidi N, Medimond. Diagnosis of *Helicobacter pylori* infection by salivary immunoglobulin g. *Immunology* 2004: Immunodeficiency, Infectious Diseases, Immunomodulation, and Vaccines. 12th Annual International Congress of Immunology/ 4th Annual Conference of the Federation-of-Clinical-Immunology-Societies (FOCIS); 2004 Jul 18-23; Montreal. 2004:79–82.
- Fuke 2009** {published data only}
Fuke A, Kunita S, Goto K, Sugiyama F, Yagami K. Diagnosis method based on sandwich ELISA using *Helicobacter hepaticus*-specific monoclonal antibody. *Journal of the American Association for Laboratory Animal Science* 2009;**48**(5):634–5.
- Glupczynski 1991** {published data only}
Glupczynski Y, Bourdeaux L, Vantricht L, Depre M, Balegamire B, Devos D, et al. C-14-urea breath test (ubt), an efficacious tool for studying *Helicobacter-pylori* (hp) epidemiology in developing-countries - a study in Zaire. *Nuclear Medicine* 1991;**27**:253–5.
- Karczewska 1997** {published data only}
Karczewska E, Kacka K, Bielanski W, Plonka M, Zarzycki D, Konturek SJ, et al. The seroprevalence of IgG antibodies to h-pylori caga protein in asymptomatic children assessed by helico blot 2.0 and ELISA methods. *Gut* 1997;**41**:A70.
- Kushch 2014** {published data only}
Kushch I, Korenev N, Kamarchuk L, Pospelov A, Alexandrov Y, Kamarchuk G, et al. New possibilities in diagnosing *Helicobacter pylori* infection by the non-urease products of its activity. 8th World Congress of the World Society for Pediatric Infectious Diseases (WSPID); 2013 Nov 20-23; Cape Town. Bologna: MEDIMOND International, 2014:89–92.
- Lappas 1997** {published data only}
Lappas A, Bogdanos D, Konstantinou G, Bokolas G, Ioannidis K, Boura P, et al. The value of the salivary dental plaque urease test in the diagnosis and treatment of *Helicobacter pylori* infection associated with peptic ulcer disease. *Archives of Hellenic Medicine* 1997;**14**(3):330–4.
- Lee 1999a** {published data only}
Lee G, Chun HJ, Lee SJ, Kim KH, Jeon YT, Song CW, et al. Significance of c-13-urea breath test results: Delta(co2)-c-13 as a predictor of *Helicobacter pylori* density and activity of gastritis in gastric body. *Gastrointestinal Endoscopy* 1999;**49**(4):AB191–AB.
- Martin-de-Argila 1997** {published data only}
Martin-de-Argila C, Boixeda D, Canton R, Valdezate S, Mir N, De Rafael L, et al. Usefulness of the combined igg and iga antibody determinations for serodiagnosis of *Helicobacter pylori* infection. *European Journal of Gastroenterology & Hepatology* 1997;**9**(12):1191–6.
- Mason 1997** {published data only}
Mason CL, Wong WW. The urea breath test for *Helicobacter pylori*: A direct application of stable isotope mass spectrometry. *Abstracts of Papers of the American Chemical Society* 1997;**213**:274–CHED.
- Thong-Ngam 2011** {published data only}
Thong-Ngam D, Chayanupatkul M, Vongchampa P, Hanvivatvong O. An evaluation of a new in-house serum and urine ELISA test for detection of *Helicobacter pylori* infection in Thai population. *Journal of the Medical Association of Thailand* 2011;**94**(8):985–90.
- Tokunaga 2005a** {published data only}
Tokunaga K, Tanaka A, Takahashi S. Evaluation of diagnostic method for *Helicobacter pylori* infection. *Nippon Rinsho [Japanese Journal of Clinical Medicine]* 2005;**63 Suppl 11**:403–8.
- Xu 1995** {published data only}
Xu C, Xu H, Cheng S. 14c-urea breath test in the diagnosis of *Helicobacter pylori* infection in the stomach. *Zhonghua*

Nei Ke Za Zhi [Chinese Journal of Internal Medicine] 1995;
34(4):239–42.

Additional references

Abadi 2011

Abadi ATB, Taghvaei T, Wolfram L. Inefficiency of rapid urease test for confirmation of *Helicobacter pylori*. *Saudi Journal of Gastroenterology* 2011;**17**(1):84–5.

Abdullah 1997a

Abdullah AM, Gad el Rab MO, al Ayed I, Kambal AM, al Sohaibani M, al Mazyad AL. *Helicobacter pylori* infection in children in Saudi Arabia. *Tropical Gastroenterology* 1997;**18**(2):63–5.

Abdullah 1997b

Abdullah AM, Gad el Rab MO, al Ayed I, al Mazyad AS, al Sanie A. Comparison of *Helicobacter pylori* antibody levels in children in Riyadh. *Tropical Gastroenterology* 1997;**18**(2): 65–6.

Abdulqawi 2012

Abdulqawi K, El-Mahalaway AM, Abdelhameed A, Abdelwahab AA. Correlation of serum antibody titres with invasive methods for rapid detection of *Helicobacter pylori* infections in symptomatic children. *International Journal of Experimental Pathology* 2012;**93**(4):295–304.

Abu 2015

Abu Shady MM, Fathy HA, Ali A, Galal EM, Fathy GA, Sibaii H. Comparison of serum IgG antibody test with gastric biopsy for the detection of *Helicobacter pylori* infection among Egyptian children. *Macedonian Journal of Medical Sciences* 2015;**3**(2):303–6.

Abu-Sbeih 2014

Abu-Sbeih RS, Hawari AD, Hassawi DS, Al-Daghistani HI. Isolation and detection of *Helicobacter pylori* from patients suffering from peptic ulcer using biochemical tests and molecular techniques. *American Journal of Biochemistry and Biotechnology* 2014;**10**(1):58–68.

Abukhadir 1998

Abukhadir BA, Heneghan MA, Kearns M, Little CL, McCarthy CF. Evaluation of a 20 minute C-14 urea breath test for the diagnosis of *Helicobacter pylori* infection. *Irish Medical Journal* 1998;**91**(1):23–5.

Abut 2006

Abut E, Guveli H, Kurdas OO. Diagnostic tests used for the detection of *Helicobacter pylori*. *Sendrom* 2006;**18**(3):53–9.

Aceti 1989

Aceti A, Pennica A, Leri O, Caferro M, Grilli A, Celestino D, et al. Time-resolved fluoroimmunoassay for campylobacter pylori antibodies. *Lancet* 1989;**2**(8661):505.

Adachi 2002

Adachi K, Kawamura A, Ono M, Masuzaki K, Takashima T, Yuki M, et al. Comparative evaluation of urine-based and other minimally invasive methods for the diagnosis of *Helicobacter pylori* infection. *Journal of Gastroenterology* 2002;**37**(9):703–8.

Adamczyk 2013

Adamczyk M, Peczek Ł, Rudnicki C, Nawrot B, Stec-Michalska K. The clinical significance of GastroPanel in diagnostics of *Helicobacter pylori* eradication efficiency in patients with dyspepsia with correlation of family history of gastric cancer. *Polski Merkuriusz Lekarski* 2013;**35**(207): 141–7.

Adamek 1994

Adamek RJ, Freitag M, Labenz J, Opferkuch W, Ruhl GH, Aygen S, et al. Modified 13C-urea breath test in the detection of *Helicobacter pylori* in the gastric mucosa. *Deutsche Medizinische Wochenschrift* 1994;**119** (46):1569–72.

Adamek 1995

Adamek RJ, Wegener M, Labenz J. C-12 urea breath test in *Helicobacter pylori* infection of the gastric-mucosa - reply. *Deutsche Medizinische Wochenschrift* 1995;**120**(25-26):941–2.

Adamsson 2000

Adamsson I, Edlund C, Nord CE. Microbial ecology and treatment of *Helicobacter pylori* infections: Review. *Journal of Chemotherapy* 2000;**12**(1):5–16.

Adiloglu 2003

Adiloglu AK, Nazli C, Cicioglu-Aridogan B, Kinay O, Can R, Ergene O. Gastroduodenal *Helicobacter pylori* infection diagnosed by *Helicobacter pylori* stool antigen is related to atherosclerosis. *Acta Cardiologica* 2003;**58**(4):335–9.

Adiloglu 2007

Adiloglu AK, Isler M, Goren I, Candir O, Senol A, Onal S, et al. Quantitative correlation of *Helicobacter pylori* stool antigen (HpSA) test with the severity of H. pylori-related gastritis. *Tohoku Journal of Experimental Medicine* 2007;**212** (2):159–67.

Agha-Amiri 1999a

Agha-Amiri K, Mainz D, Peitz U, Kahl S, Leodolter A, Malfertheiner P. Evaluation of an enzyme immunoassay for detecting *Helicobacter pylori* antigens in human stool samples. *Zeitschrift Fur Gastroenterologie* 1999;**37**(12): 1145–9.

Agha-Amiri 1999b

Agha-Amiri K, Leodolter A, Peitz U, Malfertheiner P. How does the *Helicobacter pylori* antigen concentration in stool correlate with the urease activity in c-13-urea breath test?. *Gut* 1999;**45**(Suppl 3):A132.

Agha-Amiri 2001

Agha-Amiri K, Peitz U, Mainz D, Kahl S, Leodolter A, Malfertheiner P. A novel immunoassay based on monoclonal antibodies for the detection of *Helicobacter pylori* antigens in human stool. *Zeitschrift Fur Gastroenterologie* 2001;**39** (8):555–60.

Agudo 2009a

Agudo S, Alarcón T, Urruzuno P, Lopez-Brea M. Evaluation of two monoclonal-based antigen in stool enzyme immunoassay for diagnosis of *H. pylori* infection in Spanish children. *Helicobacter* 2009;**14**(4):341–2.

Agudo 2009b

Agudo S, Alarcón T, Urruzuno P, Somodevilla A, Lopez-Brea M. Evaluation of a monoclonal-based antigen in stool enzyme immunoassay for diagnosis of *Helicobacter pylori* infection in Spanish children. *Clinical Microbiology and Infection* 2009;**15**:S315.

Aguemon 2004

Aguemon B, Struelens M, Deviere J, Denis O, Golstein P, Nagy N, et al. Evaluation of stool antigen detection for diagnosis of *Helicobacter pylori* infection in adults. *Acta Clinica Belgica* 2004;**59**(5):246–50.

Aguemon 2005

Aguemon B, Struelens M, Deviere J, Denis O, Golstein P, Salmon I, et al. Primary antibiotic resistance and effectiveness of *Helicobacter pylori* triple therapy in ulceroinflammatory pathologies of the upper digestive tract. *Acta Gastroenterologica Belgica* 2005;**68**(3):287–93.

Aguilar-Soto 2004

Aguilar-Soto O, Majalca-Martí ez C, León-Espinosa F, Avila-Vargas G, Sánchez-Medina R, Figueroa SA, et al. Comparative study between rapid urease test, imprint and histopathological study for *Helicobacter pylori* diagnosis. *Revista de Gastroenterología de México* 2004;**69**(3):136–42.

Ahmed 2005

Ahmed F, Murthy UK, Chey WD, Toskes PP, Wagner DA. Evaluation of the Ez-HBT *Helicobacter* blood test to establish *Helicobacter pylori* eradication. *Alimentary Pharmacology & Therapeutics* 2005;**22**(9):875–80.

Ahuja 1998

Ahuja V, Bal CS, Sharma MP. Can the c-14 urea breath test replace follow-up endoscopic biopsies in patients treated for *Helicobacter pylori* infection?. *Clinical Nuclear Medicine* 1998;**23**(12):815–9.

Aje 2010

Aje AO, Otegbayo JA, Odaibo GN, Bojuwoye BJ. Comparative study of stool antigen test and serology for *Helicobacter pylori* among Nigerian dyspeptic patients: a pilot study. *Nigerian Journal of Clinical Practice* 2010;**13**(2):120–4.

Aksoy 2003

Aksoy DY, Aybar M, Ozaslan E, Kav T, Engin D, Ercis S, et al. Evaluation of the *Helicobacter pylori* stool antigen test (HpSA) for the detection of *Helicobacter pylori* infection and comparison with other methods. *Hepato-Gastroenterology* 2003;**50**(52):1047–9.

Aktepe 2011

Aktepe OC, Ciftci IH, Safak B, Usan I, Dilek FH. Five methods for detection of *Helicobacter pylori* in the Turkish population. *World Journal of Gastroenterology* 2011;**17**(47):5172–6.

Al-Assi 1999

Al-Assi MT, Miki K, Walsh JH, Graham DP, Asaka M, Graham DY. Noninvasive evaluation of *Helicobacter pylori* therapy: role of fasting or postprandial gastrin, pepsinogen

i, pepsinogen ii, or serum IgG antibodies. *American Journal of Gastroenterology* 1999;**94**(9):2367–72.

Al-Humayed 2008

Al-Humayed SM, Ahmed MEK, Bello CS, Tayyar MA. Comparison of 4 laboratory methods for detection of *Helicobacter pylori*. *Saudi Medical Journal* 2008;**29**(4):530–2.

Alam 2013

Alam El-Din HM, Hashem AGM, Ragab YM, Hussein IL, Mohamed DB, Mohamed ECB. Evaluation of noninvasive versus invasive techniques for the diagnosis of *Helicobacter pylori* infection. *Applied Immunohistochemistry and Molecular Morphology* 2013;**21**(4):326–33.

Alan 2014

Alan Selcuk N, Toklu T, Karaaslan I. Evaluation of sensitivity of post-therapeutic i-131 whole body scan on detecting *Helicobacter pylori*. *European Journal of Nuclear Medicine and Molecular Imaging* 2014;**41**:S594.

Alarcón-Rivera 2011

Alarcón-Rivera G, Vázquez-Jiménez G, De la Cruz-Patiño E, Abarca M, Leyva E, Delgado F, et al. Comparative analysis between breath test, serological immunoassay and rapid-urease test for detection of *Helicobacter pylori* infection in Mexican patients with non-investigated dyspepsia. *Revista de Gastroenterología de México* 2011;**76**(4):322–9.

Alavi 1996a

Alavi A, Kroser JA, Faigel DO, Childs M, Furth EE, Alavi A, et al. Can quantitative urea breath test for *Helicobacter pylori* (hp) replace endoscopic biopsy?. *Journal of Nuclear Medicine* 1996;**37**(5 Suppl):246 (abstract 1104).

Alavi 1996b

Alavi A, Faigel DO, Childs M, Furth EE, Goin J, Metz DC. Comparison of 14-urea breath test for the diagnosis of *Helicobacter pylori* gastritis with standard techniques. *Journal of Nuclear Medicine* 1996;**37**(5 Suppl):114 (abstract 448).

Albrecht 2012

Albrecht P, Kotowska M, Misko E, Iazowska-Przeorek I, Karolewska-Bochenek K, Banaszkiewicz A, et al. Agreement of monoclonal fecal test (amplified IDEA™ hp star™) with the urease breath test, before and after the eradication treatment of *H. pylori* in children. *Pediatrica Współczesna* 2012;**14**(2):79–82.

Alcalde 1994

Alcalde M, Perez Garcia JI, Sanchez P, Lancha A, Carpintero P, Pajares JM. Usefulness of the breath test with urea-13C in the diagnosis of *Helicobacter pylori* infection. *Medicina Clinica* 1994;**103**(10):371–3.

Alem 2002

Alem M, Alem N, Cohen H, England T, Hamed N, Moussazadeh M, et al. Diagnostic value of detection of IgM antibodies to *Helicobacter pylori*. *Experimental & Molecular Pathology* 2002;**72**(1):77–83.

Alemohammad 1993

Alemohammad MM, Foley TJ, Cohen H. Detection of immunoglobulin g antibodies to *Helicobacter pylori* in urine by an enzyme immunoassay method. *Journal of Clinical Microbiology* 1993;**31**(8):2174–7.

Ali 1997

Ali A, Vaira D, Stanghellini V, Menegatti M, Salardi S, Landi F, et al. C-13 urea-breath test (UBT) with and without a citric acid test meal for *Helicobacter pylori* (hp) detection in adults and children. *Gastroenterology* 1997;**112** (4 suppl):A56.

Ali 1998

Ali A, Vaira D, Stanghellini V, Menegatti M, Landi F, Ricci C, et al. C-13 vs c-14 urea breath test (UBT) for *Helicobacter pylori* (hp) detection. *Gut* 1998;**43**(Suppl 2): A55–A6.

Allerberger 1996

Allerberger F, Oberhuber G, Wrba F, Puspok A, Dejaco C, Dierich MP. Detection of *Helicobacter pylori* infection using single serum specimens: Comparison of five commercial serological tests. *Hepato-Gastroenterology* 1996; **43**(12):1656–9.

Alpert 1989

Alpert LC, Graham DY, Evans DJ, Yoshimura HH, Hazell SL, Evans DG, et al. Diagnostic possibilities for campylobacter pylori infection. *European Journal of Gastroenterology & Hepatology* 1989;**1**(1):17–26.

Altindis 2002a

Altindis M, Dilek ON. Usefulness of the *Helicobacter pylori* stool antigen test for detection *Helicobacter pylori* infection. *Acta Gastro-Enterologica Belgica* 2002;**65**(2): 74–6.

Altindis 2002b

Altindis M, Dilek ON. Erratum: Usefulness of the *Helicobacter pylori* stool antigen test for detection *Helicobacter pylori* infection (Acta Gastro-Enterologica Belgica 2002;**65**:2:74-6). *Acta Gastro-Enterologica Belgica* 2002;**65**(4):246.

Altindis 2003

Altindis M, Dilek ON. Erratum: Usefulness of the *Helicobacter pylori* stool antigen test for detection *Helicobacter pylori* infection (Acta Gastro-Enterologica Belgica 2002;**65**(2):74-6). *Acta Gastro-Enterologica Belgica* 2003;**66**(2):195.

Amendola 2002

Amendola R, Doweck J, Katz J, Racca J, Menendez G, Schenone L, et al. A new method for detection and eradication of *Helicobacter pylori* infection by stool antigens test. *Acta Gastroenterologica Latinoamericana* 2002;**32**(2): 83–5.

Anania 2007

Anania C, Labalestra V, Neaga M, Ferrara E, Borrelli O, Cirulli M, et al. Evaluation of a polyclonal *Helicobacter pylori* stool antigen test (HpSA) for the detection of *Helicobacter pylori* infection in children. *Digestive and Liver Disease* 2007;**39**(10):A62.

Anania 2008

Anania C, Pacifico L, Olivero G, Osborn JF, Bonaiuto E, Chiesa C. Breath tests in pediatrics. *Clinica Chimica Acta* 2008;**397**(1-2):1–12.

Andersen 1989

Andersen LP. Campylobacter pylori antibodies measured by indirect ELISA using O-antigen. Gastrointestinal pathology and Campylobacter pylori: European Campylobacter Pylori Study Group ICS847. 1989:201–3.

Andersen 1998

Andersen LP, Kiilerick S, Pedersen G, Thoreson AC, Jorgensen F, Rath J, et al. An analysis of seven different methods to diagnose *Helicobacter pylori* infections. *Scandinavian Journal of Gastroenterology* 1998;**33**(1):24–30.

Anderson 1993

Anderson G, Alemohammad MM, Foley TJ, Colletti A, Patel A, Dooley CP. Rapid test for detection of antibodies to *Helicobacter pylori*. *Clinical Infectious Diseases* 1993;**16** (SUPPL. 4):S416–S7.

Andrews 2003

Andrews J, Marsden B, Brown D, Wong VS, Wood E, Kelsey M. Comparison of three stool antigen tests for *Helicobacter pylori* detection. *Journal of Clinical Pathology* 2003;**56**(10):769–71.

Ang 2007a

Ang CW, Krogfelt K, Herbrink P, Keijser J, Van Pelt W, Dalby T, et al. Validation of an enzyme-linked immunosorbent assay for the diagnosis of recent campylobacter infections in guillain-barre and reactive arthritis patients. *Zoonoses and Public Health* 2007;**54**:50.

Ang 2007b

Ang CW, Krogfelt K, Herbrink P, Keijser J, Van Pelt W, Dalby T, et al. Validation of an ELISA for the diagnosis of recent campylobacter infections in guillain-barre and reactive arthritis patients. *Clinical Microbiology & Infection* 2007;**13**(9):915–22.

Anonymous 1989

Anonymous. 14c-urea breath test for *C. pylori*. *Gut* 1989;**30** (11):1656–7.

Anonymous 1996

Anonymous. Breath test for *Helicobacter pylori*. *WHO Drug Information* 1996;**10**(4):187.

Anonymous 1997

Anonymous. Technical annex: Tests used to assess *Helicobacter pylori* infection. Working party of the European *Helicobacter pylori* study group. *Gut* 1997;**41** Suppl 2:S10–8.

Anonymous 2000

Anonymous. A stool test for *H. pylori*. *Hospital Practice* 2000;**35**(4):140.

Anonymous 2002a

Anonymous. The stool antigen test for detection of *Helicobacter pylori* after eradication therapy - commentary. *Annals of Internal Medicine* 2002;**136**(4):286–7.

Anonymous 2002b

Anonymous. H. pylori breath test effective. *Pharmaceutical Journal* 2002;**268**(7196):601.

Anonymous 2004

Anonymous. Which test for *Helicobacter pylori* in primary care?. *Drug and Therapeutics Bulletin* 2004;**42**(9):71–2.

Antico 2010

Antico A, Tozzoli R, Villalta D, Tonutti E, Tampoia M, Bizzaro N. Diagnostic efficacy of a specific serological profile for the diagnosis of chronic autoimmune gastritis. *Rivista Italiana della Medicina di Laboratorio* 2010;**6**(3):198–204.

Antoine 1995

Antoine C, Lozniewski A, De Korwin JD, Conroy MC, Feldmann L, Duprez A, et al. Comparative study of four commercial serological tests for the diagnosis of *Helicobacter pylori* infection. *Gastroenterologie Clinique et Biologique* 1995;**19**(2):182–8.

Antos 2005

Antos D, Crone J, Konstantopoulos N, Koletzko S. Evaluation of a novel rapid one-step immunochromatographic assay for detection of monoclonal *Helicobacter pylori* antigen in stool samples from children. *Journal of Clinical Microbiology* 2005;**43**(6):2598–601.

Anwar 2012

Anwar MM, Youssef AI, Sheta MI, Zaki A, Bernaba NR, el-Toukhi MA. Evaluation of specific biochemical indicators of *Helicobacter pylori*-associated gastric cancer in Egypt. *Eastern Mediterranean Health Journal* 2012;**18**(5):501–7.

Arboleda 2013

Arboleda RN, Schneider BG, Bravo LE, Romero-Gallo J, Peek RM Jr, Mera RM, et al. Use of the noninvasive entero-test in the detection of *Helicobacter pylori* in children in an endemic area in Colombia. *Journal of Pediatric Gastroenterology & Nutrition* 2013;**57**(2):192–6.

Archimandritis 2001

Archimandritis A, Giontzis A, Kourtasas D, Tzivras M, Smilakou S, Davaris P. Diagnosis of *Helicobacter pylori* infection with a stool assay: Is it useful after eradication treatment?. *American Journal of Gastroenterology* 2001;**96**(4):1298–9.

Arents 2001

Arents NL, Van Zwet AA, Thijs JC, De Jong A, Pool MO, Kleibeuker JH. The accuracy of the *Helicobacter pylori* stool antigen test in diagnosing *H. pylori* in treated and untreated patients. *European Journal of Gastroenterology & Hepatology* 2001;**13**(4):383–6.

Arents 2002

Arents NL, Van Zwet AA, Thijs JC, De Jong A, Pool MO, Kleibeuker JH. The accuracy of the *Helicobacter pylori* stool antigen test in diagnosing *H. pylori* in treated patients - reply. *European Journal of Gastroenterology & Hepatology* 2002;**14**(1):89–90.

Arinton 2011

Arinton IG. Adjustment of cut-off values in ELISA for detection of *Helicobacter pylori* infection. *Acta Medica Indonesiana* 2011;**43**(2):88–91.

Arita 1982

Arita K, Yamauchi E, Mizuno S, Maki S. Serological response to campylobacter jejuni infection: Enzyme-linked immunosorbent assay (ELISA) for detection of antibodies to campylobacter jejuni. *Kansenshogaku Zasshi [The Journal of the Japanese Association for Infectious Diseases]* 1982;**56**(7):566–73.

Arj 2012

Arj A, Ehteram H, Razavizadeh M. Efficacy of stool ag test for the non-invasive diagnosis of *Helicobacter pylori* infection in dyspeptic patients. *Journal of Gastroenterology and Hepatology* 2012;**27**:420.

Arora 2003

Arora U, Aggarwal A, Singh K. Comparative evaluation of conventional methods and ELISA based IgG antibodies detection for diagnosis of *Helicobacter pylori* infection in cases of dyspepsia. *Indian Journal of Medical Microbiology* 2003;**21**(1):46–8.

Artiko 2004

Artiko V, Obradovic V, Petrovic N, Davidovic B, Vljakovic M, Petrovic M, et al. Breath test (c-14-urea) in the detection of *Helicobacter pylori* infection. *European Journal of Nuclear Medicine and Molecular Imaging* 2004;**31**:S216–S7.

Asaka 1988

Asaka M, Mitani S, Yoshida J, Saito M, Meguro T. Clinical significance of ELISA for campylobacter pylori. *Nihon Shokakibyo Gakkai Zasshi [Japanese Journal of Gastroenterology]* 1988;**85**(4):950.

Asaki 1996

Asaki S, Yamagami H, Noda A, Tachikawa T, Osumi T, Hirao Y, et al. Phase i clinical trial of 13C-urea breath test (c-13ubt). *Japanese Journal of Clinical Pharmacology and Therapeutics* 1996;**27**(3):607–16.

Asante 1998

Asante MA, Mendall MA, Finlayson C, Ballam L, Northfield T. Screening dyspeptic patients for *Helicobacter pylori* prior to endoscopy: Laboratory or near-patient testing?. *European Journal of Gastroenterology & Hepatology* 1998;**10**(10):843–6.

Asfeldt 2004

Asfeldt AM, Lochen ML, Straume B, Steigen SE, Florholmen J, Goll R, et al. Accuracy of a monoclonal antibody-based stool antigen test in the diagnosis of *Helicobacter pylori* infection. *Scandinavian Journal of Gastroenterology* 2004;**39**(11):1073–7.

Ashraf 1999

Ashraf P, Ul Haq M, Amjad R. Assessment of 13C urea breath test's usefulness in the diagnosis of *Helicobacter pylori* infection. *Journal of the College of Physicians and Surgeons Pakistan* 1999;**9**(2):75–7.

Atherton 1992

Atherton JC, Hymantaylor P, Hawkey CJ, Spiller RC. Direct comparison of c-13 and low-dose c-14 as isotopic markers in the urea breath test for *Helicobacter pylori*. *Gut* 1992;**33**(2):S5–S.

Atherton 1994

Atherton JC, Spiller RC. The urea breath test for *Helicobacter pylori*. *Gut* 1994;**35**(6):723–5.

Attallah 2004

Attallah AM, Ismail H, Ibrahim GG, Abdel-Raouf M, El-Waseef AM, Abdel-Wahab M. Use of a novel enzyme immunoassay based on detection of circulating antigen in serum for diagnosis of *Helicobacter pylori* infection. *Clinical & Diagnostic Laboratory Immunology* 2004;**11**(4):775–9.

Attumi 2011

Attumi TA, Graham DY. Follow-up testing after treatment of *Helicobacter pylori* infections: Cautions, caveats, and recommendations. *Clinical Gastroenterology and Hepatology* 2011;**9**(5):373–5.

Aucher 1998

Aucher P, Petit ML, Mannant PR, Pezennec L, Babin P, Fauchere JL. Use of immunoblot assay to define serum antibody patterns associated with *Helicobacter pylori* infection and with h. Pylori-related ulcers. *Journal of Clinical Microbiology* 1998;**36**(4):931–6.

Aulia 2009

Aulia D, Manz GO, Simadibrata M. Pepsinogen i concentration in organic dyspepsia patients at Gastroenterology Division, Department of Internal Medicine, Cipto Mangunkusumo Hospital. *Acta Medica Indonesiana* 2009;**41**(3):107–14.

Auroux 1998

Auroux J, Lamarque D, Tankovic J, Benamouzig R, Mahe S, Chaumette MT, et al. Comparison of *Helicobacter pylori* gastric density by culture, histology and c-13 urea breath test. *Gastroenterologie Clinique et Biologique* 1998;**22**(4):407–12.

Aziz 2014

Aziz F, Sherwani SK, Akhtar SS, Kazmi SU. Development of an in-house enzyme-linked immunosorbent assay based on surface whole cell antigen for diagnosis of *Helicobacter pylori* infection in patients with gastroduodenal ulcer disease. *World Journal of Microbiology & Biotechnology* 2014;**30**(1):305–15.

Bakka 2002

Bakka AS, El-Gariani AB, AbouGhrara FM, Salih BA. Frequency of *Helicobacter pylori* infection in dyspeptic patients in Libya. *Saudi Medical Journal* 2002;**23**(10):1261–5.

Balcilar 2012

Balcilar E, Karsidag T, Tuzun S. Reliability of *Helicobacter* antigen in stool for screening. *Medical Bulletin of Haseki* 2012;**50**(3):89–92.

Ballam 1998

Ballam L, Mendall MA, Morris J, Strachan D, Whincup P, Cook D. Western blotting (wb) is useful in the salivary diagnosis of h-pylori infection. *Gastroenterology* 1998;**114** (4 suppl):A64.

Ballam 2000a

Ballam LD, Mendall MA, Asante M, Morris J, Strachan DP, Whincup PH, et al. Western blotting is useful in the salivary diagnosis of *Helicobacter pylori* infection.[Erratum appears in J Clin Pathol 2000;53(9):725]. *Journal of Clinical Pathology* 2000;**53**(4):314–7.

Ballam 2000b

Ballam LD, Mendall MA, Asante. Erratum: Western blotting is useful in the salivary diagnosis of *Helicobacter pylori* infection (Journal of clinical pathology 2000;53:314–7). *Journal of Clinical Pathology* 2000;**53**(9):725.

Balon 1997

Balon HR, Roff E, Dworkin HJ. Capsule-based c-14 urea breath test for *Helicobacter pylori*: Early experience and comparison with liquid-based test. *Journal of Nuclear Medicine* 1997;**38**(5 Suppl):Abstract 1092.

Baqai 2003

Baqai R, Qureshi H, Arian G, Mehdi I. Diagnostic efficacy of stool antigen test (HPSA), clo test and serology for the detection of *Helicobacter pylori* infection. *Journal of Ayub Medical College, Abbottabad: JAMC* 2003;**15**(4):34–6.

Baranskaia 2006

Baranskaia EK, Ivashkin VT, Lapshin AV, Stepanov EV, Zyrianov PV. The diagnostic significance of laser 13C-urea breath test in various *Helicobacter pylori*-associated diseases. *Klinicheskaya Meditsina* 2006;**84**(8):47–50.

Barbosa 2003

Barbosa J, Dinis-Ribeiro M, Guilherme M, Filipe T, Lomba-Viana R, Guimaraes MA, et al. Use of *Helicobacter pylori*-specific antibodies in the evaluation of intestinal metaplasia and gastric dysplasia. *British Journal of Biomedical Science* 2003;**60**(4):175–9.

Barthel 1990

Barthel JS, Everett ED. Diagnosis of campylobacter pylori infections: The “gold standard” and the alternatives. *Reviews of Infectious Diseases* 1990;**12** Suppl 1:S107–14.

Baryshnikova 2009

Baryshnikova NV. Actual problems of *Helicobacteriosis* diagnostics. *Ekspperimental'naia i Klinicheskaya Gastroenterologiya [Experimental & Clinical Gastroenterology]* 2009;**2**:50–6.

Baryshnikova 2012

Baryshnikova NV, Uspenskiy YP, Smirnova AS, Dmitrienko MA, Bykov SE. *Helicobacter pylori* in oral cavity in patients with chronic gastritis. *Helicobacter* 2012;**17**:90.

Baryshnikova 2013

Baryshnikova NV, Belousova LN, Smirnova AS, Tsopanova EE, Loeva IA, Orlov OY, et al. Breath ammonium test in diagnostic of *Helicobacter pylori* infection. *Helicobacter* 2013;**18**:124.

Baryshnikova 2014

Baryshnikova NV, Belousova LN, Loeva IA, Kudryavtseva AS, Shehman AV, Yakovleva JS. Comparative analysis of efficacy of noninvasive ammonium “helic-test” and

- histological method in diagnostic of *Helicobacter pylori* infection. *Helicobacter* 2014;**19**:122.
- Basinska 2005**
Basinska T, Wisniewska M, Chmiela M. Principle of a new immunoassay based on electrophoretic mobility of poly (styrene/alpha-tert-butoxy-omega-vinylbenzyl-polyglycidol) microspheres: Application for the determination of *Helicobacter pylori* igg in blood serum. *Macromolecular Bioscience* 2005;**5**(1):70–7.
- Bassler 1992**
Bassler HMS, Dreher RM, Wolf K. Isolation of h. Pylori proteins and their availability in serological tests. *Immunitat und Infektion* 1992;**20**(3):103–6.
- Basso 1999**
Basso D, Stefani A, Brigato L, Navaglia F, Greco E, Zambon CF, et al. Serum antibodies anti-h. Pylori and anti-caga: A comparison between four different assays. *Journal of Clinical Laboratory Analysis* 1999;**13**(4):194–8.
- Bateson 1991**
Bateson MC, Ching CK, Loffeld RJLF, Arends JW, Stobberingh E. Screening for *Helicobacter pylori* in dyspepsia [comment]. *Lancet* 1991;**338**(8763):393–4.
- Bateson 2001**
Bateson MC. Quadruple therapy for symptomatic spontaneous duodenal ulcer disease. *Postgraduate Medical Journal* 2001;**77**(909):447–50.
- Bathe 1996**
Bathe OF, Rae AJ, Zetler P, Cleator IGM. Validation of a new saliva test for *Helicobacter pylori* infection. *Canadian Journal of Gastroenterology* 1996;**10**(2):93–6.
- Bauernfeind 1989**
Bauernfeind A, Przyklenk B, Horl G, Otto U. Representative campylobacter pylori antigen for IgG-ELISA and diagnostic significance of antibody titres. Gastroduodenal pathology and Campylobacter pylori. The first meeting of the European Campylobacter Pylori Study Group ICS847; 1989. 1989:185–8.
- Bazaz 2005**
Bazaz RD, Khalaj A, Beiki D, Eftekhari M, Hosein MHAS, Khoshayand MR. Microdose 14c urea breath test for the diagnosis of *Helicobacter pylori*: A survey in Iranian population. *Daru* 2005;**13**(1):6–10.
- Bazzoli 1994**
Bazzoli F, Zagari RM, Pozzato P, Fossi S, Alampi G, Sottili S, et al. C-13-urea breath test to quantify *Helicobacter-pylori* colonization of gastric-mucosa and association with severity of inflammation. *Gastroenterology* 1994;**106**(4 suppl):A48.
- Bazzoli 1995**
Bazzoli F, Zagari RM, Pozzato P, Fossi S, Simoni P, Roda A, et al. The c-13-urea breath test to evaluate the effect of antisecretory drugs on *Helicobacter-pylori*. *Gastroenterology* 1995;**108**(4 suppl):A57.
- Bazzoli 1996**
Bazzoli F, Cecchini L, Corvaglia L, Antonia MD, Libera MD, DeGiacomo C, et al. The c-13-urea breath test for the diagnosis of *Helicobacter pylori* infection in children. *Gastroenterology* 1996;**110**(4 Suppl):A60.
- Bazzoli 1997a**
Bazzoli F, Zagari RM, Festi D, Palli D, Pozzato P, Sottili S, et al. A population based study of *Helicobacter pylori* infection .2. Uprevalence by c-13-urea breath test and association with family history of peptic ulcer and gastric cancer. *Gut* 1997;**41**(Suppl):A106.
- Bazzoli 1997b**
Bazzoli F, Zagari M, Fossi S, Pozzato P, Ricciardiello L, Mwangemi C, et al. Urea breath tests for the detection of *Helicobacter pylori* infection. *Helicobacter* 1997;**2** Suppl 1: S34–7.
- Bazzoli 1998**
Bazzoli F, Zagari M, Pozzato P, Fossi S, Ricciardiello GL, Nicolini G, et al. Diagnosis of *Helicobacter pylori* infection: Non-invasive diagnostic tests. *Italian Journal of Gastroenterology & Hepatology* 1998;**30**(suppl 3):S313–4.
- Bazzoli 1999**
Bazzoli F, Zagari RM, Pozzato P, Fossi S, Ricciardiello L, De Luca L, et al. *Helicobacter pylori*: Optimum diagnosis and test of cure. *Journal of Chemotherapy* 1999;**11**(6):601–5.
- Bazzoli 2000**
Bazzoli F, Cecchini L, Corvaglia L, Dall'Antonia M, De Giacomo C, Fossi S, et al. Validation of the 13C-urea breath test for the diagnosis of *Helicobacter pylori* infection in children: A multicenter study. *American Journal of Gastroenterology* 2000;**95**(3):646–50.
- Befrits 1993**
Befrits R, Granstrom M, Rylander M, Rubio C. *Helicobacter pylori* in 205 consecutive endoscopy patients. *Scandinavian Journal of Infectious Diseases* 1993;**25**(2): 185–91.
- Beiki 2005**
Beiki D, Khalaj A, Dowlatabadi R, Eftekhari M, Hossein MHAS, Fard A, et al. Validation of 13C-urea breath test with non dispersive isotope selective infrared spectroscopy for the diagnosis of *Helicobacter pylori* infection: A survey in Iranian population. *Daru* 2005;**13**(2):52–5.
- Bekmen 2008**
Bekmen N, Demiray E, Gonen C, Dolek D, Soyuturk M, Sagol O, et al. Determination of *H. pylori* antigenic frequency by western blot technique in adult patients with dyspepsia. *Helicobacter* 2008;**13**(5):452.
- Bell 1987**
Bell GD, Weil J, Harrison G, Morden A, Jones PH, Gant PW, et al. 14c-urea breath analysis, a non-invasive test for campylobacter pylori in the stomach. *Lancet* 1987;**1**(8546): 1367–8.
- Bell 1991**
Bell GD, Powell K, Weil J, Harrison G, Brookes S, Prosser S. 13C-urea breath test for *Helicobacter pylori* infection. *Gut* 1991;**32**(5):551–2.

Bellon 2004

Bellon M. The urea breath test. *ANZ Nuclear Medicine* 2004;**35**(2):104–7.

Bener 2002

Bener A, Uduman SA, Ameen A, Alwash R, Pasha MA, Usmani MA, et al. Prevalence of *Helicobacter pylori* infection among low socio-economic workers. *Journal of Communicable Diseases* 2002;**34**(3):179–84.

Benito 1999

Benito LM, Sara S, Gisbert JP, Vasquez MA, Jimenez I, Pajares JM. C-13-urea breath test for the diagnosis of *H. pylori* infection: Are basal samples necessary?. *Gut* 1999;**45** (Suppl 3):A125–A6.

Benjamin 2012

Benjamin YC, Feng Z, Ho KY, Christopher K, Lim LG, So JB, et al. Risk stratification for gastric cancer using serum pepsinogen and *Helicobacter pylori* serology in a Chinese population. *Gastroenterology* 2012;**142**(5 (Suppl)):S631.

Bennedsen 1998

Bennedsen M, Lehn N, Morgner A, Bayerdorffer E, Andersen LP. Development of a *Helicobacter heilmanii* specific ELISA. *Gut* 1998;**43**(Suppl 2):A115–A6.

Bennett 2006

Bennett K, Feely J, Thornton O, Dobson M, O'Morain CA, O'Connor HJ. Impact of *Helicobacter pylori* on the management of dyspepsia in primary care. *Alimentary Pharmacology & Therapeutics* 2006;**24**(4):637–41.

Berger 2002

Berger A. *Helicobacter pylori* breath tests. *BMJ* 2002;**324** (7348):1263.

Bergey 2003

Bergey B, Marchildon P, Peacock J, Megraud F. What is the role of serology in assessing *Helicobacter pylori* eradication?. *Alimentary Pharmacology & Therapeutics* 2003;**18**(6):635–9.

Bergmann 1997

Bergmann WL. Diagnosis and therapy of *Helicobacter pylori* infections in adults. *Deutsche Medizinische Wochenschrift* 1997;**122**(11):348–9.

Berker 2003

Berker B, Soylemez F, Cengiz SD, Kose SK. Serologic assay of *Helicobacter pylori* infection - is it useful in hyperemesis gravidarum?. *Journal of Reproductive Medicine* 2003;**48**(10): 809–12.

Bermejo 2000a

Bermejo San Jose F, Boixeda de Miguel D, Gisbert JP, Martin de Argila de Prados C, Sanz Sacristan JM, Defarges Pons V, et al. Efficacy of four widely used techniques of the diagnosis of *Helicobacter pylori* infection in gastric ulcer disease. *Revista Clinica Española* 2000;**200**(9):475–9.

Bermejo 2000b

Bermejo F, Boixeda D, Gisbert JP, Sanz JM, Canton R, Defarges V, et al. Concordance between noninvasive tests in detecting *Helicobacter pylori* and potential use of serology for monitoring eradication in gastric ulcer. *Journal of Clinical Gastroenterology* 2000;**31**(2):137–41.

Bermejo 2002

Bermejo F, Boixeda D, Gisbert JP, Defarges V, Sanz JM, Redondo C, et al. Rapid urease test utility for *Helicobacter pylori* infection diagnosis in gastric ulcer disease. *Hepato-Gastroenterology* 2002;**49**(44):572–5.

Berning 2009

Berning M, Krasz S, Schneider-Brachert W, Madisch A, Laass MW, Knoth H, et al. Randomized multicenter study of esomeprazole, moxifloxacin and amoxicillin for second-line or rescue treatment of *Helicobacter pylori* infection - impact of treatment duration. *Gastroenterology* 2009;**136**(5 (suppl)):A150.

Bertschinger 1992

Bertschinger P, Brunner J, Flury R, Lammer F, Jost R, Hacki WH. Comparison of effectiveness of omeprazole/bismuth subcitrate and triple therapy in *Helicobacter pylori* gastritis. *Schweizerische Medizinische Wochenschrift* 1992;**122**(39): 1446–51.

Besherdas 2000

Besherdas K, Oben JA, Beck ER, Vicary FR, Wong VS. What proportion of dyspeptic patients having *H. pylori* breath test subsequently undergo endoscopy?. *Gut* 2000;**46** (Suppl 2):A52.

Bessede 2011

Bessede E, Delcamp A, Sifre E, Buissonniere A, Megraud F. New methods for detection of campylobacters in stool samples in comparison to culture. *Journal of Clinical Microbiology* 2011;**49**(3):941–4.

Best 1992

Best LM, Van Zanten SJOV, Bezanson GS, Haldane DJM, Malatjalian DA. Serological detection of *Helicobacter pylori* by a flow microsphere immunofluorescence assay. *Journal of Clinical Microbiology* 1992;**30**(9):2311–7.

Best 1994

Best LM, Van Zanten SJOV, Sherman PM, Bezanson GS. Serological detection of *Helicobacter pylori* antibodies in children and their parents. *Journal of Clinical Microbiology* 1994;**32**(5):1193–6.

Beynon 2013

Beynon R, Leeflang MM, McDonald S, Eisinga A, Mitchell RL, Whiting P, et al. Search strategies to identify diagnostic accuracy studies in MEDLINE and EMBASE. *Cochrane Database of Systematic Reviews* 2013, Issue 9. [DOI: 10.1002/14651858.MR000022.pub3]

Bhewa 2007

Bhewa Y, Hilmi I, Cheah PL, Navaratnam P, Goh KL. Evaluation of the monoclonal stool antigen test for *Helicobacter pylori* in an asian population with dyspepsia. *Journal of Digestive Diseases* 2007;**8**(4):207–10.

Bielanski 1996a

Bielanski W, Konturek SJ, Dobrzanska MJ, Pytko-Polonczyk J, Sito E, Marshall BJ. Microdose 14c-urea breath test in detection of *Helicobacter pylori*. *Journal of Physiology & Pharmacology* 1996;**47**(1):91–100.

Bielanski 1996b

Bielanski W, Pytko J, Konturek SJ, Sito E, Marshall J. Usefulness of c-14-urea breath test in detection of *Helicobacter pylori* associated gastric diseases. *Gastroenterology* 1996;**110**(4 (suppl)):A65.

Bielanski 1996c

Bielanski W, Konturek SJ. New approach to 13C-urea breath test: Capsule-based modification with low-dose of 13C-urea in the diagnosis of *Helicobacter pylori* infection. *Journal of Physiology & Pharmacology* 1996;**47**(3):545–53.

Bielanski 1997a

Bielanski W, Plonka M, Dobrzanska M, Kaminska A, Konturek SJ. Screening of *H-pylori* (HP) infection in adult population of Krakow, Poland using modified capsulated urea breath test. *Gut* 1997;**41**(Suppl):A37–A8.

Bielanski 1997b

Bielanski W, Dobrzanska J, Kaminska A, Plonka M, Sito E, Konturek SJ. Validation of new low dose and low cost c-13-urea breath test in the diagnosis for *Helicobacter pylori*. *Gastroenterology* 1997;**112**(4 (suppl)):A72.

Bielanski 1998

Bielanski W, Bobrzynski A, Kostarczyk W, Karczewska E, Gedliczka O, Konturek SJ. Usefulness of capsulated low dose c-13-urea breath test in diagnosing h-pylori infection in patients with upper gastrointestinal bleeding. *Gut* 1998;**43**(Suppl 2):A54–A5.

Bielanski 1999

Bielanski W, Dobrzanska M, Jakuszevska B, Kaminska A, Plonka M, Konturek SJ. Ethanol as confounding factor in detection of *Helicobacter pylori* (HP) by c-13-urea breath test. *Gastroenterology* 1999;**116**(4 (suppl)):A123.

Bielanski 2000

Bielanski W, Loster BW, Plonka M, Dobrzanska M, Kaminska A, Majewski S, et al. Incidence of *H-pylori* (HP) infection in Polish endoscopists and dentists: Results of field survey with capsulated c-13-urea breath test (ubt). *Gut* 2000;**47**(Suppl 1):A50.

Biemond 1997

Biemond I, Veenendaal RA, Lamers C. Rapid diagnostic test for antibodies to *Helicobacter pylori* in comparison with the ELISA technique. *Gut* 1997;**41**(suppl):A159.

Bilal 2007

Bilal R, Khaar B, Qureshi TZ, Mirza SA, Ahmad T, Latif Z, et al. Accuracy of non-invasive 13C-urea breath test compared to invasive tests for *Helicobacter pylori* detection. *Journal of the College of Physicians & Surgeons - Pakistan* 2007;**17**(2):84–8.

Bilardi 2002

Bilardi C, Biagini R, Dulbecco P, Iiritano E, Gambaro C, Mele MR, et al. Stool antigen assay (HPSA) is less reliable than urea breath test for post-treatment diagnosis of *Helicobacter pylori* infection. *Alimentary Pharmacology & Therapeutics* 2002;**16**(10):1733–8.

Billaud 1996

Billaud N, Morali A, Conroy MJ, Floquet J. *Helicobacter pylori* infection in pediatric patients. A review of twenty-three cases. *Annales De Pediatrie* 1996;**43**(4):281–7.

Bindayna 2006

Bindayna K, Al Baker W, Botta G. Detection of *Helicobacter pylori* caga gene in gastric biopsies, clinical isolates and faeces. *Indian Journal of Medical Microbiology* 2006;**24**(3):195–200.

Birkenfeld 2004

Birkenfeld S, Keter D, Dikman R, Shevah O, Shirin H, Niv Y. Prevalence of *Helicobacter pylori* infection in health-care personnel of primary care and gastroenterology clinics. *Journal of Clinical Gastroenterology* 2004;**38**(1):19–23.

Bjornekleit 1989

Bjornekleit A, Fausa O, Nedenskovsorensen P, Bukholm G, Aase S. The c-14 urea breath test in the diagnosis of *Campylobacter-pylori* infection. *Gastrointestinal Pathology and Campylobacter pylori* 1989;**8**:65–8.

Blairon 2009

Blairon L, Souayah H, Moens C, Dediste A, Vandenberg O. Comparison of 6 rapid assays for detection of *Helicobacter pylori* antigen in stool in children with recurrent abdominal pain - preliminary data. *Clinical Microbiology and Infection* 2009;**15**:S315.

Blancas 2004

Blancas Valencia JM. Importance of *Helicobacter pylori* diagnosis. *Revista de Gastroenterologia de Mexico* 2004;**69**(3):186–7.

Blanco 2008

Blanco S, Forne M, Lacoma A, Prat C, Cuesta MA, Latorre I, et al. Comparison of stool antigen immunoassay methods for detecting *Helicobacter pylori* infection before and after eradication treatment. *Diagnostic Microbiology & Infectious Disease* 2008;**61**(2):150–5.

Blanco 2009

Blanco S, Forne M, Lacoma A, Prat C, Cuesta MA, Fuenzalida L, et al. Evaluation of a latex agglutination test (pylogen) for the detection of *Helicobacter pylori* in stool specimens. *Diagnostic Microbiology & Infectious Disease* 2009;**63**(4):349–53.

Blashenkov 2013

Blashenkov NM, Sheshenya ES, Solov'ev SM, Sachenko VD, Gall LN, Zarutskii IV, et al. A specialized isotope mass spectrometer for noninvasive diagnostics of *Helicobacter pylori* infection in human beings. *Technical Physics Letters* 2013;**39**(5):431–4.

Bleau 1998

Bleau BL, Van Zanten SV, Best L, Hutchison D, Blevins J, Thee D. Determination of eradication of *Helicobacter pylori* (HP) by the HP stool antigen test (HPSAT). *Gut* 1998;**43**(Suppl 2):A50.

Blecker 1992a

Blecker U, Vandenplas Y. *Helicobacter pylori* seropositivity in symptom-free children. *Lancet* 1992;**339**(8808):1537.

Blecker 1992b

Blecker U, Lanciers S, Peeters S, Vandenplas Y. *Helicobacter pylori* infections in children. *Tijdschrift voor Kindergeneeskunde* 1992;**60**(2):35–9.

Blecker 1993a

Blecker U, Keymolen K, Levy J, Vandenplas Y. Low prevalence of *Helicobacter pylori* in the acquired immunodeficiency syndrome. *American Journal of Gastroenterology* 1993;**88**(8):1294.

Blecker 1993b

Blecker U, Lanciers S, Hauser B. Validation of a new serologic test for the detection of *Helicobacter pylori*. *Acta Gastroenterologica Belgica* 1993;**56**(5-6):309–14.

Blecker 1993c

Blecker U, Lanciers S, Hauser B, Vandenplas Y. Diagnosis of *Helicobacter pylori* infection in adults and children by using the malakit *Helicobacter pylori*, a commercially available enzyme-linked immunosorbent assay. *Journal of Clinical Microbiology* 1993;**31**(7):1770–3.

Blecker 1993d

Blecker U, Lanciers S, Hauser B, Vandenplas Y. Positive and negative titres of a new serologic test for the detection of *Helicobacter pylori*. *European Journal of Gastroenterology & Hepatology* 1993;**5**(8):631–4.

Blecker 1993e

Blecker U, Vandenplas Y. *Helicobacter pylori* serology. *Journal of Clinical Microbiology* 1993;**31**(1):173.

Blecker 1993f

Blecker U, Vandenplas Y, Taha AS, Russell RI. Serological diagnosis of *Helicobacter pylori*. *Gut* 1993;**34**(10):1467.

Blecker 1993g

Blecker U, Hauser B, Lanciers S, Peeters S, Suys B, Vandenplas Y. The prevalence of *Helicobacter pylori*-positive serology in asymptomatic children. *Journal of Pediatric Gastroenterology and Nutrition* 1993;**16**(3):252–6.

Blecker 1994a

Blecker U, Lanciers S, Mehta DI, Vandenplas Y. The sensitivity and specificity of a recent generation serum ELISA test for the detection of *Helicobacter-pylori* specific IgG antibodies compared to the c-13-urea breath test. *Gastroenterology* 1994;**106**(4 (suppl)):A54.

Blecker 1994b

Blecker U, Vandenplas Y. Usefulness of specific IgM in the diagnosis of *Helicobacter pylori* infection. *Pediatrics* 1994;**93**(2):342–3.

Blecker 1994c

Blecker U, Vandenplas Y, Blecker U, Lanciers S, Mehta DI. Concordance between serology and 13C-urea breath test in the diagnosis of *Helicobacter pylori* infection. *American Journal of Gastroenterology* 1994;**89**(3):459.

Blecker 1994d

Blecker U, Keymolen K, Lanciers S, Bahwere P, Souayah H, Levy J, et al. The prevalence of *Helicobacter pylori* positivity in human immunodeficiency virus-infected children.

Journal of Pediatric Gastroenterology & Nutrition 1994;**19**(4):417–20.

Blecker 1995a

Blecker U, Lanciers S, Hauser B, Mehta DI, Vandenplas Y. Serology as a valid screening test for *Helicobacter pylori* infection in asymptomatic subjects. *Archives of Pathology & Laboratory Medicine* 1995;**119**(1):30–2.

Blecker 1995b

Blecker U, Lanciers S, Hauser B, De Pont SM, Vandenplas Y. The contribution of specific immunoglobulin m antibodies to the diagnosis of *Helicobacter pylori* infection in children. *European Journal of Gastroenterology & Hepatology* 1995;**7**(10):979–83.

Blum 1997

Blum AL, Bayerdorffer E, Borsch G, Classen M, Creutzfeldt W, Hotz J, et al. The *Helicobacter* revolution .2. Diagnosis and therapy. *Leber Magen Darm* 1997;**27**(4):241–6.

Bode 1998

Bode G, Rothenbacher D, Brenner H, Adler G. Variation in the 13C-urea breath test value by nationality in *Helicobacter pylori*-infected children. *Scandinavian Journal of Gastroenterology* 1998;**33**(5):468–72.

Bode 2000

Bode G, Hoffmeister A, Koenig W, Brenner H, Rothenbacher D. Extent and determinants of differences in *Helicobacter pylori* serology and c-13-urea breath test in an asymptomatic sample of blood donors. *Gut* 2000;**47**(Suppl 1):A121.

Bode 2001

Bode G, Hoffmeister A, Koenig W, Brenner H, Rothenbacher D. Characteristics of differences in *Helicobacter pylori* serology and c-13-urea breath-testing in an asymptomatic sample of blood donors. *Scandinavian Journal of Clinical & Laboratory Investigation* 2001;**61**(8): 603–8.

Bode 2002

Bode G, Marchildon P, Peacock J, Brenner H, Rothenbacher D. Diagnosis of *Helicobacter pylori* infection in children: Comparison of a salivary immunoglobulin g antibody test with the c-13 urea breath test. *Clinical and Diagnostic Laboratory Immunology* 2002;**9**(2):493–5.

Bodger 1999

Bodger K, Wyatt JI, Heatley RV. Serologic screening before endoscopy: The value of *Helicobacter pylori* serology, serum recognition of the caga and vaca proteins, and serum pepsinogen i. *Scandinavian Journal of Gastroenterology* 1999;**34**(9):856–63.

Bodhidatta 1993

Bodhidatta L, Hoge CW, Churnratanakul S, Nirdnoy W, Sampathanukul P, Tungtaem C, et al. Diagnosis of *Helicobacter pylori* infection in a developing country: Comparison of two ELISAs and a seroprevalence study. *Journal of Infectious Diseases* 1993;**168**(6):1549–53.

Bohn 1994

Bohn I, Teufel M, Niessen KH. *Helicobacter pylori* causing chronic stomach-ache in childhood. *Monatsschrift für Kinderheilkunde* 1994;**142**(4):269–71.

Bojko 1997

Bojko JB, Braden B, Lembcke B, Stolte M, Burlage M, Folsch UR, et al. C-13-urea breath test correlates with the hp corpus colonization score in *Helicobacter pylori* - infected patients. *Gastroenterology* 1997;**112**(4 (suppl)):A75.

Bolton 1989a

Bolton FJ, Hutchinson DN, Hinchliffe PM, Holt AV. Distribution in various clinical groups of antibody to *C. pylori* detected by enzyme-linked immunosorbent assay, complement fixation and microagglutination tests. *Serodiagnosis and Immunotherapy in Infectious Disease* 1989; **3**(1):41–50.

Bolton 1989b

Bolton FJ, Hutchinson DN. Evaluation of three *Campylobacter pylori* antigen preparations for screening sera from patients undergoing endoscopy. *Journal of Clinical Pathology* 1989;**42**(7):723–6.

Bolton 1997

Bolton FJ, Wareing DRA, Sails AD. Comparison of a novel microaerobic system with three other gas-generating systems for the recovery of *Campylobacter* species from human faecal samples. *European Journal of Clinical Microbiology and Infectious Diseases* 1997;**16**(11):839–42.

Bommelaer 2001

Bommelaer G, Des Varannes SB, Flejou JF, Matysiak T, Poynard T, Richard A, et al. Caga status and virulence of *Helicobacter pylori* strains. Results of a French multicentric prospective study. *Gastroenterologie Clinique et Biologique* 2001;**25**(12):1084–9.

Bonamico 2004

Bonamico M, Strappini PM, Bonci E, Ferri M, Crisogianni M, Guido M, et al. Evaluation of stool antigen test, PCR on oral samples and serology for the noninvasive detection of *Helicobacter pylori* infection in children. *Helicobacter* 2004; **9**(1):69–76.

Bongermio 2010

Bongermio MP, Ruggero V, Cristallo V, Bonfrate L, Santantonio M, Mola A, et al. Evaluation of non-invasive methods for the diagnosis of *Helicobacter pylori* infection. *European Journal of Clinical Investigation* 2010;**40**:67.

Booka 2005

Booka M, Okuda M, Shin K, Miyashiro E, Hayashi H, Yamauchi K, et al. Polymerase chain reaction-restriction fragment length polymorphism analysis of clarithromycin-resistant *Helicobacter pylori* infection in children using stool sample. *Helicobacter* 2005;**10**(3):205–13.

Bordin 2013

Bordin DS, Berezina OI, Kim VA, Orobey YA, Patrushev NB. Diagnosis of *H. pylori* infection in routine clinical practice in Russia. *Helicobacter* 2013;**18**:122.

Bornschein 2011

Bornschein J, Selgrad M, Malfertheiner P. *Helicobacter pylori* - diagnosis and treatment. *MMW-Fortschritte der Medizin* 2011;**153**(38):58–61.

Borody 2012

Borody T, Wettstein A, Finlayson S, Torres M, Campbell J, Nowak A. Diagnostic value of fundic red spots in *Helicobacter pylori* (HP) infection. *American Journal of Gastroenterology* 2012;**107**:S59.

Borody 2013

Borody TJ, Wettstein AR, Benstock S, Nowak A, Finlayson SJ, Campbell J. Superior diagnosis of *H. pylori* infection with 14c-urea heliCAPTM capsules versus standard ptytest capsules. *Gastroenterology* 2013;**144**(5 (suppl 1)):S214–S5.

Boudjella 2009

Boudjella MEA, Matougui N, Tebaibia A, Oumnia N, Lahcene M, Mouffok F, et al. Evaluation of C-13-urea breath test in determining *H. pylori* status after treatment: About 197 cases. *Helicobacter* 2009;**14**(4):343.

Boukthir 2005

Boukthir S, Mazigh S, Fendri C, Kalach N, Barsaoui S. Evaluation of a non-invasive test for detection of *Helicobacter pylori* antigen in stool from children. *Archives de Pédiatrie* 2005;**12**(1):85–7.

Boyanova 2003

Boyanova L, Koumanova R, Lazarova E, Jelev C. *Helicobacter pylori* and *Helicobacter heilmannii* in children. A Bulgarian study. *Diagnostic Microbiology & Infectious Disease* 2003;**46**(4):249–52.

Boyanova 2013

Boyanova L, Ilieva Y, Vladimirov B, Gergova G, Nikolov R, Spasova Z, et al. The rate of *Helicobacter pylori* in adult patients with the 13C urea breath test. *General Medicine* 2013;**15**(4):22–5.

Braden 1991

Braden B, Lembcke B, Caspary WF. Stable isotopes in diagnosis and research. *Deutsche Medizinische Wochenschrift* 1991;**116**(45):1721–7.

Braden 1992

Braden B, Lembcke B, Caspary WF. Diagnosis of *Helicobacter-pylori*. *Innere Medizin* 1992;**19**(3):103–7.

Braden 1993

Braden B, Klutz M, Lembcke B, Caspary WF. C-13 urea breath test for *Helicobacter-pylori* - optimal timing of breath sample collection. *Gastroenterology* 1993;**104**(4 (suppl)):A45.

Braden 1994a

Braden B, Haisch M, Duan LP, Lembcke B, Caspary WF, Hering P. Clinically feasible stable isotope technique at a reasonable price: Analysis of 13Co2/12co2-abundance in breath samples with a new isotope selective-nondispersive infrared spectrometer. *Zeitschrift für Gastroenterologie* 1994; **32**(12):675–8.

Braden 1994b

Braden B, Duan LP, Caspary WF, Lembcke B. More convenient 13C-urea breath test modifications still meet the

- criteria for valid diagnosis of *Helicobacter pylori* infection. *Zeitschrift für Gastroenterologie* 1994;**32**(4):198–202.
- Braden 1996**
Braden B, Schafer F, Caspary WF, Lembcke B. Nondispersive isotope-selective infrared spectroscopy: A new analytical method for ¹³C-urea breath tests. *Scandinavian Journal of Gastroenterology* 1996;**31**(5):442–5.
- Braden 1997**
Braden B, Duan LP, Caspary WF, Lembcke B. Endoscopy is not a risk factor for *Helicobacter pylori* infection - but medical practice is. *Gastrointestinal Endoscopy* 1997;**46**(4):305–10.
- Braden 1999**
Braden B, Caspary WF, Lembcke B. Nondispersive infrared spectrometry for (co2)-c-13/(co2)-c-12-measurements: A clinically feasible analyzer for stable isotope breath tests in gastroenterology. *Zeitschrift für Gastroenterologie* 1999;**37**(6):477–81.
- Braden 2000a**
Braden B. New faecal antigen test noninvasively detects *Helicobacter pylori* infection. *Biomedicine and Pharmacotherapy* 2000;**54**(7):416–7.
- Braden 2000b**
Braden B, Posselt HG, Ahrens P, Kitz R, Dietrich CF, Caspary WF. New immunoassay in stool provides an accurate noninvasive diagnostic method for *Helicobacter pylori* screening in children. *Pediatrics* 2000;**106**(1 Pt 1):115–7.
- Braden 2000c**
Braden B, Teuber G, Dietrich CF, Caspary WF, Lembcke B. Comparison of new faecal antigen test with c-13-urea breath test for detecting *Helicobacter pylori* infection and monitoring eradication treatment: Prospective clinical evaluation. *BMJ* 2000;**320**(7228):148.
- Braden 2001a**
Braden B, Gelbmann C, Dietrich CF, Caspary WF, Scholmerich J, Lock G. Qualitative and quantitative clinical evaluation of the laser-assisted ratio analyser for detection of *Helicobacter pylori* infection by c-13-urea breath tests. *European Journal of Gastroenterology & Hepatology* 2001;**13**(7):807–10.
- Braden 2001b**
Braden B, Caspary WF. Detection of *Helicobacter pylori* infection: When to perform which test?. *Annals of Medicine* 2001;**33**(2):91–7.
- Braden 2007**
Braden B, Lembcke B, Kuker W, Caspary WF. ¹³C-breath tests: Current state of the art and future directions. *Digestive & Liver Disease* 2007;**39**(9):795–805.
- Braden 2012**
Braden B. Diagnosis of *Helicobacter pylori* infection. *BMJ* 2012;**344**:e828.
- Brandi 2006**
Brandi G, Biavati B, Calabrese C, Granata M, Nannetti A, Mattarelli P, et al. Urease-positive bacteria other than *Helicobacter pylori* in human gastric juice and mucosa. *American Journal of Gastroenterology* 2006;**101**(8):1756–61.
- Bravo 1999**
Bravo LE, Realpe JL, Campo C, Mera R, Correa P. Effects of acid suppression and bismuth medications on the performance of diagnostic tests for *Helicobacter pylori* infection. *American Journal of Gastroenterology* 1999;**94**(9):2380–3.
- Bravos 2000**
Bravos ED, Gilman RH. Accurate diagnosis of *Helicobacter pylori* other tests. *Gastroenterology Clinics of North America* 2000;**29**(4):925–9.
- Brennan 1991**
Brennan DP, Kennedy NP, Keeling PWN. Serum IgG response to *Campylobacter-pylori* antigens as measured by western blotting. *Irish Journal of Medical Science* 1991;**160**(2):64–5.
- Brennan 2015a**
Brennan D, Smith SM, Omorogbe JA, Holleran G, Hall B, Hussey M, et al. Detection of *Helicobacter pylori* and antibiotic resistance using a molecular genetics-based approach in human faecal samples. *Gastroenterology* 2015;**148**(4 (suppl)):S420.
- Brennan 2015b**
Brennan D, Omorogbe J, Holleran G, Hussey M, O'Morain C, Smith S, et al. A comparison of the prevalence of *Helicobacter pylori* infection and rates of antibiotic resistance in patients undergoing gastroscopy versus the urea breath test. *Helicobacter* 2015;**20**:100–1.
- Breslin 1997**
Breslin NP, Omorain CA. Noninvasive diagnosis of *Helicobacter pylori* infection: A review. *Helicobacter* 1997;**2**(3):111–7.
- Breslin 1998**
Breslin NP, Lee J, Buckley M, O'Morain C. Screening for *Helicobacter pylori* in young dyspeptic patients referred for investigation - endoscopy for those who test negative. *Alimentary Pharmacology and Therapeutics* 1998;**12**(6):577–82.
- Breslin 2000**
Breslin NP, Lee JM, Buckley MJ, Balbirnie E, Rice D, O'Morain CA. Validation of serological tests for *Helicobacter pylori* infection in an Irish population. *Irish Journal of Medical Science* 2000;**169**(3):190–4.
- Bretagne 1998**
Bretagne JF, Caekaert A, Barthelemy P, Hepysode. Long-term follow-up of *Helicobacter pylori* (HP) serology after successful eradication: A cohort of 203 patients tested by ELISA and heliSAL (TM) rapid blood tests. *Gastroenterology* 1998;**114**(4 (suppl)):A80.
- Briedigkeit 1992**
Briedigkeit H, Montag T, Spiridonow PS, Sielaff F, Wack R, Held C, et al. Detection of *Helicobacter pylori* infections by antibody determination. *Zeitschrift für Ärztliche Fortbildung (Jena)* 1992;**86**(17):869–72.

Britto 2002

Britto Gomes AT, Coelho LK, Secaf M, Pimenta Modena JL, De Almeida Troncon LE, De Oliveira RB. Accuracy of the 14C-urea breath test for the diagnosis of *Helicobacter pylori*. *Sao Paulo Medical Journal* 2002;**120**(3):68–71.

Brmolic 1997

Brmolic B, Zerjav S, Bogdanov M, Dordevic M, Radivojevic M, Stojic Z, et al. The value of serum IgG and IgA antibodies in the diagnosis of *Helicobacter pylori* infection in dyspeptic patients. *Archives of Gastroenterohepatology* 1997;**16**(1):12–5.

Brown 1993

Brown KE, Peura DA. Diagnosis of *Helicobacter pylori* infection. *Gastroenterology Clinics of North America* 1993;**22**(1):105–15.

Bruce 2005

Bruce M, Parkinson A, Gessner B. Does delayed testing of urea breath test samples effect results?. *Digestion* 2005;**71**(4):261.

Bruden 2011

Bruden DL, Bruce MG, Miernyk KM, Morris J, Hurlburt D, Hennessy TW, et al. Diagnostic accuracy of tests for *Helicobacter pylori* in an Alaska native population. *World Journal of Gastroenterology* 2011;**17**(42):4682–8.

Bruning 2002

Bruning A, Reimann FM, Homann N, Hussein ZE, Konecny E, Ludwig D. A novel continuous 13C-urea breath test for detection of *H. pylori* infection. *Gastrointestinal Endoscopy* 2002;**55**(5):AB190–AB.

Brunner 1989

Brunner H, Markt B, Mittermayer H, Binder L. C-14 urea breath test (UBT) for the detection and follow-up of *Campylobacter-pylori* infection. *Gastrointestinal Pathology and Campylobacter pylori* 1989;**84**:69–71.

Buchan 2013

Buchan BW, Olson WJ, Pezewski M, Marcon MJ, Novicki T, Uphoff TS, et al. Clinical evaluation of a real-time PCR assay for identification of *Salmonella*, *Shigella*, *Campylobacter* (*Campylobacter jejuni* and *C. coli*), and shiga toxin-producing *Escherichia coli* isolates in stool specimens. *Journal of Clinical Microbiology* 2013;**51**(12):4001–7.

Buchvald 1993

Buchvald D, Buchvaldova D. Antigens for the ELISA test for serodiagnosis of *Helicobacter pylori* infection. *Ceskoslovenska Epidemiologie, Mikrobiologie, Imunologie* 1993;**42**(1):16–21.

Buhling 2004

Buhling F, Koch G, Wex T, Heimburg A, Vieth M, Leodolter A, et al. Simultaneous detection and differentiation of anti-*Helicobacter pylori* antibodies by flow microparticle immunofluorescence assay. *Clinical & Diagnostic Laboratory Immunology* 2004;**11**(1):131–6.

Bures 2000

Bures J, Palicka V, Kopacova M, Vorisek V, Rejchrt S, Zivny P. Diagnosis of *Helicobacter pylori* with the 13C-labeled urea

breath test: Study methodology. *Casopis Lekaru Ceskych* 2000;**139**(24):776–8.

Burucoa 2013

Burucoa C, Delchier JC, Courillon-Mallet A, De Korwin JD, Megraud F, Zerbib F, et al. Comparative evaluation of 29 commercial *Helicobacter pylori* serological kits. *Helicobacter* 2013;**18**(3):169–79.

Busro 2013

Busro VO, Bakry F, Farida A, Yuwono. Sensitivity and specificity value of saliva *Helicobacter pylori* examination in chronic gastritis patients. *Hepatology International* 2013;**7**: S753–S4.

Butler 2000

Butler AK, Brennan SA, Neal K, Logan RPH. A multi-centre study of the prevalence of *H-pylori* in urban Nottinghamshire children using the HpSA(r) stool antigen test. *Gut* 2000;**47**(Suppl 1):A45–A6.

Buyukbaba-Boral 2005

Buyukbaba-Boral O, Kucuker-Ang M, Aktas G, Issever H, Ang O. HpSA fecoprevalence in patients suspected to have *Helicobacter pylori* infection in Istanbul, Turkey. *International Journal of Infectious Diseases* 2005;**9**(1):21–6.

Buzas 2001

Buzas GM, Illyes G, Szekely E, Szeles I. Six regimens for the eradication of *Helicobacter pylori* (HP) in duodenal ulcer patients: Three consecutive trials (1995-1999). *Journal of Physiology, Paris* 2001;**95**(1-6):437–41.

Buzas 2008

Buzas GM, Szeles I. Interpretation of the 13C-urea breath test in the choice of second- and third-line eradication of *Helicobacter pylori* infection. *Journal of Gastroenterology* 2008;**43**(2):108–14.

Cacoullis 1991

Cacoullis F, Batten JJ, Logan R, Karim QN, Walker M, Baron JH. Quantifying the extent of *Helicobacter-pylori* infection with the C-13 urea breath test. *Gut* 1991;**32**(5): A565.

Cadranel 1998

Cadranel S, Corvaglia L, Bontems P, Deprez C, Glupczynski Y, Van Riet A, et al. Detection of *Helicobacter pylori* infection in children with a standardized and simplified C-13-urea breath test. *Journal of Pediatric Gastroenterology and Nutrition* 1998;**27**(3):275–80.

Cagdas 2012

Cagdas U, Otag F, Tezcan S, Sezgin O, Aslan G, Emekdas G. Detection of *Helicobacter pylori* and antimicrobial resistance in gastric biopsy specimens. *Mikrobiyoloji Bulteni* 2012;**46**(3):398–409.

Caglar 1999

Caglar M, Belzberg AS, Spruston B, Sexsmith G. Time-optimized carbon-14 breath test for *Helicobacter pylori* contamination of the stomach. *Clinical Nuclear Medicine* 1999;**24**(9):674–7.

Cai 2010

Cai J, Olafsson S. *Helicobacter pylori* breath test in an open access system has a high rate of potentially false negative

- results. Negative result should be considered false negative until proven otherwise. *Gastroenterology* 2010;**138**(5 (suppl 1)):S336.
- Calam 1994**
Calam J. *Helicobacter-pylori*. *European Journal of Clinical Investigation* 1994;**24**(8):501–10.
- Calvet 1999**
Calvet X, Feu F, Forne M, Montserrat A, Elizalde JI, Viver JM, et al. The evaluation of a new immunoenzyme analysis for the detection of *Helicobacter pylori* infection in stool samples. [Spanish]. *Gastroenterologia Y Hepatologia* 1999; **22**(6):270–2.
- Calvet 2002a**
Calvet X, Salceda F, Sanfeliu I, Montserrat A, Bruller E, Real J, et al. Testing a new in-office test for determination of faecal *Helicobacter pylori* antigen. *Medicina Clinica* 2002; **118**(4):126–9.
- Calvet 2002b**
Calvet X, Sanfeliu I, Musulen E, Mas P, Dalmau B, Gil M, et al. Evaluation of *Helicobacter pylori* diagnostic methods in patients with liver cirrhosis. *Alimentary Pharmacology & Therapeutics* 2002;**16**(7):1283–9.
- Calvet 2002c**
Calvet X, Rosello M, Quesada M, Sanfeliu I, Salcerda F, Montserrat A, et al. Diagnosis of *Helicobacter pylori* infection in dyspeptic patients by stool antigen detection. Usefulness of a new monoclonal ELISA test. *Gastroenterology* 2002; **122**(4 (suppl)):A205–A6.
- Calvet 2003**
Calvet X, Quesada M, Rosello M, Salceda F, Sanfeliu I, Dalmau B, et al. Stool antigen for the diagnosis of *Helicobacter pylori* infection in cirrhosis: Comparative usefulness of three different methods. *Alimentary Pharmacology & Therapeutics* 2003;**17**(5):727–31.
- Calvet 2005**
Calvet X, Quesada M, Calvet V, Choat T, Sanfeliu I, Segura F. Usefulness of RAPID HP StAR (TM), a new immunochromatographic, monoclonal antigen-based fecal test for diagnosing *Helicobacter pylori* infection in dyspeptic patients. *Helicobacter* 2005;**10**(5):524.
- Calvet 2009**
Calvet X, SaDelgado J, Montserrat A, Lario S, Ramirez-Lazaro MJ, Quesada M, et al. Accuracy of diagnostic tests for *Helicobacter pylori*: A reappraisal. *Clinical Infectious Diseases* 2009;**48**(10):1385–91.
- Calvet 2010a**
Calvet X, Lario S, Ramirez-Lazaro MJ, Montserrat A, Quesada M, Reeves L, et al. Comparative accuracy of 3 monoclonal stool tests for diagnosis of *Helicobacter pylori* infection among patients with dyspepsia. *Clinical Infectious Diseases* 2010;**50**(3):323–8.
- Calvet 2010b**
Calvet X, Lario S, Ramirez-Lazaro MJ, Montserrat A, Quesada M, Reeves L, et al. Accuracy of monoclonal stool tests for determining cure of *Helicobacter pylori* infection after treatment. *Helicobacter* 2010;**15**(3):201–5.
- Calvet 2015**
Calvet X. Diagnosis of *Helicobacter pylori* infection in the proton pump inhibitor era. *Gastroenterology Clinics of North America* 2015;**44**(3):507–18.
- Calvo 2013**
Calvo XC, Ramirez-Lazaro M, Lario S, Sanchez-Delgado J, Montserrat A, Casalots A, et al. C13-urea breath test skipping citric acid has low specificity for diagnosing *H. pylori* infection. *Helicobacter* 2013;**18**:119–20.
- Camargos 2003**
Camargos Rocha AM, Aguiar Rocha G, Santos A, De Oliveira CA, Magalhaes Queiroz DM. Accuracy of a commercial enzyme-linked immunosorbent assay for CagA in patients from Brazil with and without gastric carcinoma. *Journal of Clinical Microbiology* 2003;**41**(1):447–8.
- Camorlinga-Ponce 1998**
Camorlinga-Ponce M, Torres J, Perez-Perez G, Leal-Herrera Y, Gonzalez-Ortiz B, Madrazo de la Garza A, et al. Validation of a serologic test for the diagnosis of *Helicobacter pylori* infection and the immune response to urease and CagA in children. *American Journal of Gastroenterology* 1998;**93**(8):1264–70.
- Campuzano-Maya 2007**
Campuzano-Maya G. An optimized C-13-urea breath test for the diagnosis of *H. pylori* infection. *World Journal of Gastroenterology* 2007;**13**(41):5454–64.
- Canard 2003**
Canard JM, Ponchon T, Napoleon B, Boyer J, Dalbies P, Escourrou J, et al. Specific roles of endoscopy and respiratory test in the diagnosis and eradication control of *Helicobacter pylori*. *Acta Endoscopica* 2003;**33**(5):810–2.
- Canete 2002**
Canete A, Abunaji Y, Alvarez-Calatayud G, De-Vicente M, Gonzalez-Holguera J, Leralta M, et al. 13C-urea breath test with 50 mg of urea: An accurate method for the diagnosis of *H. pylori* infection in children. *Gastroenterology* 2002; **122**(4 (Suppl)):A207.
- Canete 2003**
Canete A, Abunaji Y, Alvarez-Calatayud G, DeVicente M, Gonzalez-Holguera JA, Leralta M, et al. Breath test using a single 50-mg dose of C-13-urea to detect *Helicobacter pylori* infection in children. *Journal of Pediatric Gastroenterology and Nutrition* 2003;**36**(1):105–11.
- Cao 2012**
Cao X, Jiang J, Jia ZF, Jin MS. Serum levels of pepsinogen ii are a useful biomarker of *Helicobacter pylori*-infected gastric cancer than pepsinogen i. *Journal of Gastroenterology and Hepatology* 2012;**27**:24.
- Caporali 2003**
Caporali R, Epis O, Negrini R, Scire CA, Solcia E, Montecucco C. Salivary gland lymphocytic infiltrates and *Helicobacter pylori* serology in anti-SSA/Ro positive patients

- in Italy. *Clinical and Experimental Rheumatology* 2003;**21**(2):266–7.
- Capurso 2006**
Capurso G, Carnuccio A, Lahner E, Panzuto F, Baccini F, Fave GD, et al. Corpus-predominant gastritis as a risk factor for false-negative C-13-urea breath test results. *Alimentary Pharmacology & Therapeutics* 2006;**24**(10):1453–60.
- Cardenas 2006**
Cardenas VM, Dominguez DC, Puentes F, Aragaki CC, Goodman KJ, Graham DY, et al. Rapid stool antigen test for diagnosis of *H-pylori* infection in asymptomatic children. *Gastroenterology* 2006;**130**(4 (suppl)):A570.
- Cardenas 2008**
Cardenas VM, Dominguez DC, Puentes FA, Aragaki CC, Goodman KJ, Graham DY, et al. Evaluation of a novel stool native catalase antigen test for *Helicobacter pylori* infection in asymptomatic North American children. *Journal of Pediatric Gastroenterology & Nutrition* 2008;**46**(4):399–402.
- Cardinali 2003**
Cardinali LDC, Rocha GA, Rocha AMC, De Moura SB, Soares TD, Esteves AMB, et al. Evaluation of C-13 urea breath test and *Helicobacter pylori* stool antigen test for diagnosis of *H-pylori* infection in children from a developing country. *Journal of Clinical Microbiology* 2003;**41**(7):3334–5.
- Carrasco 1998**
Carrasco MAV, Alonso IJ, Canto JLG, Baruque LL, Molini PS, Gisbert JP, et al. Is fasting required to perform C-13-urea breath test in the diagnosis of *H-pylori* infection?. *Gut* 1998;**43**(Suppl 2):A54.
- Casellas 1999**
Casellas F, Lopez J, Borrueal N, Saperas E, Vergara M, De Torres I, et al. The impact of delaying gastric emptying by either meal substrate or drug on the C-13 -urea breath test. *American Journal of Gastroenterology* 1999;**94**(2):369–73.
- Caselli 1999**
Caselli M, Zaffoni E, Trevisani L, Sartori S, Alvisi V, Plebani M, et al. Diagnosis of *Helicobacter pylori* infection by HPSA test. *Lancet* 1999;**354**(9185):1209–11.
- Caspary 1995**
Caspary WF. 13C-urea breath test. Patient-friendly gold standard in the diagnosis of *Helicobacter pylori* infection with long term cost control potential. *Deutsche Medizinische Wochenschrift* 1995;**120**(27):976–8.
- Casswall 1999**
Casswall TH, Nilsson HO, Bergstrom M, Aleljung P, Wadstrom T, Dahlstrom AK, et al. Evaluation of serology, 13C-urea breath test, and polymerase chain reaction of stool samples to detect *Helicobacter pylori* in Bangladeshi children. *Journal of Pediatric Gastroenterology & Nutrition* 1999;**28**(1):31–6.
- Castro 2004**
Castro Fernández M, Sánchez Muñoz D, García Díaz E, Galán Jurado MV, Rodríguez Alonso C. Diagnosis of *Helicobacter pylori* infection using urease rapid test in patients with bleeding duodenal ulcer: Influence of endoscopic signs and simultaneous corporal and antral biopsies. *Revista Espanola De Enfermedades Digestivas* 2004;**96**(9):599–602; 605.
- Castro-Fernandez 2004**
Castro-Fernández M, Sanchez-Muñoz D, García-Díaz E, Miralles-Sanchiz J, Vargas-Romero J. Diagnosis of *Helicobacter pylori* infection in patients with bleeding ulcer disease: Rapid urease test and histology. *Revista Espanola De Enfermedades Digestivas* 2004;**96**(6):395–8; 398–401.
- Cave 1999**
Cave DR, Zanten SV, Carter E, Halpern EF, Klein S, Prather C, et al. A multicentre evaluation of the laser assisted ratio analyser (LARA): A novel device for measurement of 13CO₂ in the 13C-urea breath test for the detection of *Helicobacter pylori* infection. *Alimentary Pharmacology & Therapeutics* 1999;**13**(6):747–52.
- Cevrioglu 2004**
Cevrioglu AS, Altindis M, Yilmazer M, Fenkci IV, Ellidokuz E, Kose S. Efficient and non-invasive method for investigating *Helicobacter pylori* in gravida with hyperemesis gravidarum: *Helicobacter pylori* stool antigen test. *Journal of Obstetrics & Gynaecology Research* 2004;**30**(2):136–41.
- Chacon 1995**
Chacon EP, Correnti M, Salma N, Serrano N, Pinero R, Cavazza ME, et al. Immunoenzymatic assay for serodiagnosis of *Helicobacter pylori* infections. *GEN* 1995;**49**(3):208–11.
- Chalkias 2011**
Chalkias A, Nikotian G, Koutsovasilis A, Bramis J, Manouras A, Mystrioti D, et al. Patients with colorectal cancer are characterized by increased concentration of fecal Hb-Hp complex, myeloperoxidase, and secretory IgA. *American Journal of Clinical Oncology: Cancer Clinical Trials* 2011;**34**(6):561–6.
- Chang 1999**
Chang MC, Wu MS, Wang HH, Wang HP, Lin JT. *Helicobacter pylori* stool antigen (HPSA) test - a simple, accurate and non-invasive test for detection of *Helicobacter pylori* infection. *Hepato-Gastroenterology* 1999;**46**(25):299–302.
- Chang 2000**
Chang YW, Kim KJ, Min SK, Dong SH, Kim HJ, Kim BH, et al. Quantitative result of C-13-urea breath test does not correlate with *Helicobacter pylori* density in the stomach by assessing histopathology and grade of phenol red staining. *Gastroenterology* 2000;**118**(4):A1221.
- Chang 2002**
Chang MC, Chang YT, Sun CT, Wu MS, Wang HP, Lin JT. Quantitative correlation of *Helicobacter pylori* stool antigen (HPSA) test with C-13-urea breath test (C-13-UBT) by the updated Sydney Grading System of gastritis. *Hepato-Gastroenterology* 2002;**49**(44):576–9.
- Chang 2003**
Chang YW, Min SK, Kim KJ, Han YS, Lee JH, Dong SH, et al. Delta (13)C-urea breath test value is a useful indicator

- for *Helicobacter pylori* eradication in patients with functional dyspepsia. *Journal of Gastroenterology & Hepatology* 2003; **18**(6):726–31.
- Chang 2012**
Chang WT, Lin CC, Lin YH, Wang CC, Wang SH, Liu YW, et al. The potential role of using C-13 urea breath test as a routine perioperative evaluation of *Helicobacter pylori* infection in living-related liver donors. *Liver Transplantation* 2012; **18**:S205–S.
- Chang 2013**
Chang C, Xie H, Ni Y, Ting Q, Bo Z. The clinical studies to the diagnostic value of serum pepsinogen levels in gastric cancer. *Journal of Gastroenterology and Hepatology* 2013; **28**: 742.
- Chattopadhyay 2002**
Chattopadhyay UK. Coagglutination test for rapid noncultural diagnosis of human campylobacteriosis. *European Review for Medical and Pharmacological Sciences* 2002; **6**(1):9–11.
- Chattopadhyay 2004**
Chattopadhyay S, Patra R, Ramamurthy T, Chowdhury A, Santra A, Dhali GK, et al. Multiplex PCR assay for rapid detection and genotyping of *Helicobacter pylori* directly from biopsy specimens. *Journal of Clinical Microbiology* 2004; **42** (6):2821–4.
- Checchi 2000**
Checchi L, Felice P, Acciardi C, Ricci C, Gatta L, Polacci R, et al. Absence of *Helicobacter pylori* in dental plaque assessed by stool test. *American Journal of Gastroenterology* 2000; **95** (10):3005–6.
- Chehter 2013**
Chehter EZ, Bacci MR, Fonseca FLA, Goncalves JAC, Buchalla G, Shiraichi SAR, et al. Diagnosis of the infection by the *Helicobacter pylori* through stool examination: Method standardization in adults. *Clinical Biochemistry* 2013; **46**(15):1622–4.
- Chen 1994**
Chen JJ, Changchien CS, Tai DI, Chiou SS, Lee CM, Kuo CH. Role of *Helicobacter pylori* in cirrhotic patients with peptic ulcer. A serological study. *Digestive Diseases & Sciences* 1994; **39**(7):1565–8.
- Chen 1996**
Chen JJ, Yang ZX, Jiang XG. A comparison of purified urease antigen and whole cell antigen of *Helicobacter pylori* by ELISA test—study on the application and serum diagnoses of *Helicobacter pylori* urease diagnostic reagent. *Zhonghua Liu Xing Bing Xue Za Zhi = Zhonghua Liuxingbingxue Zazhi* 1996; **17**(1):44–6.
- Chen 1997**
Chen TS, Chang FY, Lee SD. Serodiagnosis of *Helicobacter pylori* infection: Comparison and correlation between enzyme-linked immunosorbent assay and rapid serological test results. *Journal of Clinical Microbiology* 1997; **35**(1): 184–6.
- Chen 2000**
Chen X, Haruma K, Kamada T, Mihara M, Komoto K, Yoshihara M, et al. Factors that affect results of the C-13 urea breath test in Japanese patients. *Helicobacter* 2000; **5** (2):98–103.
- Chen 2001a**
Chen X, Haruma K, Kamada T, Hartori N, Yoshihara M, Kitadai Y, et al. A low 13C-urea breath test value is associated with increased risk of gastric cancer. *Journal of Gastroenterology* 2001; **36**(9):601–5.
- Chen 2001b**
Chen TS, Chang FY, Lee SD. Extending the reading time increases the accuracy of rapid whole blood test for diagnosis of *Helicobacter pylori* infection. *Journal of Gastroenterology & Hepatology* 2001; **16**(12):1341–5.
- Chen 2002a**
Chen TS, Li FY, Chang FY, Lee SD. Immunoglobulin G antibody against *Helicobacter pylori*: Clinical implications of levels found in serum. *Clinical & Diagnostic Laboratory Immunology* 2002; **9**(5):1044–8.
- Chen 2002b**
Chen TS, Chang FY, Lee SD. No difference of accuracy between capillary and venous blood in rapid whole blood test for diagnosis of *Helicobacter pylori* infection. *Digestive Diseases & Sciences* 2002; **47**(11):2519–22.
- Chen 2003**
Chen TS, Chang FY, Chen PC, Huang TW, Ou JT, Tsai MH, et al. Simplified C-13-urea breath test with a new infrared spectrometer for diagnosis of *Helicobacter pylori* infection. *Journal of Gastroenterology and Hepatology* 2003; **18**(11):1237–43.
- Chen 2009a**
Chen CC, Liou JM, Hsu YC, Fang JY, Wang HP, Wu MS. Rabeprazole therapeutic trial in patients with uninvestigated dyspepsia. *Journal of Gastroenterology and Hepatology* 2009; **24**:A45.
- Chen 2009b**
Chen LW, Chang JJ, Chiu CJ, Fang KM, Chien RN, Chang LC, et al. 14C urea breath test in patients with peptic ulcer: The correlations with clinical factors, histology, rapid urease test and endoscopic findings. *Journal of Gastroenterology and Hepatology* 2009; **24**:A86.
- Cheng 2004**
Cheng H, Hu FL. The value of *Helicobacter pylori* stool antigen immunocard stat in diagnosis of HP infection and assessing of eradication of HP. *Zhonghua Yi Xue Za Zhi* 2004; **84**(14):1166–70.
- Cherian 2008**
Cherian S, Burgner DP, Carson CF, Sanfilippo FM, Cook AG, Forbes DA. Diagnosis of *Helicobacter pylori* infection in a high-prevalence pediatric population: A comparison of 2 fecal antigen testing methods and serology. *Journal of Pediatric Gastroenterology and Nutrition* 2008; **47**(2):130–5.
- Chey 1997a**
Chey WD, Woods M, Scheiman JM, Nostrant TT, DelValle J. Lansoprazole and ranitidine affect the accuracy of the

- C-14-urea breath test by a pH-dependent mechanism. *American Journal of Gastroenterology* 1997;**92**(3):446–50.
- Chey 1997b**
Chey WD. Proton pump inhibitors and the urea breath test: How long is long enough?. *American Journal of Gastroenterology* 1997;**92**(4):720–1.
- Chey 1999a**
Chey WD, Shaw S, Montague J, Jones M, Murthy U. Appropriate timing of the C-14-urea breath test to establish eradication of *H-pylori* infection: An interim analysis. *Gastroenterology* 1999;**116**(4 (suppl)):A136.
- Chey 1999b**
Chey WD, Murthy U, Toskes P, Carpenter S, Laine L. The 13C-urea blood test accurately detects active *Helicobacter pylori* infection: A United States, multicenter trial. *American Journal of Gastroenterology* 1999;**94**(6):1522–4.
- Chey 2000a**
Chey WD, Metz DC, Shaw S, Kearney D, Montague J, Murthy U. Appropriate timing of the C-14-urea breath test to establish eradication of *Helicobacter pylori* infection. *American Journal of Gastroenterology* 2000;**95**(5):1171–4.
- Chey 2000b**
Chey WD. Accurate diagnosis of *Helicobacter pylori* - C-14-urea breath test. *Gastroenterology Clinics of North America* 2000;**29**(4):895.
- Chey 2007**
Chey WD, Wong BC. American College of Gastroenterology guideline on the management of *Helicobacter pylori* infection. *American Journal of Gastroenterology* 2007;**102**(8):1808–25.
- Chiang 2010**
Chiang TH, Tu CH, Lee YC, Wu MS. Clinical predictors of significant esophagoduodenoscopy findings for asymptomatic subjects with positive immunochemical fecal occult blood test and negative colonoscopy. *Gastrointestinal Endoscopy* 2010;**71** (5):AB357.
- Chiba 1999**
Chiba N, Veldhuyzen Van Zanten SJ. 13C-urea breath tests are the noninvasive method of choice for *Helicobacter pylori* detection. *Canadian Journal of Gastroenterology* 1999;**13**(8):681–3.
- Ching 1991a**
Ching CK, Thompson S, Buxton C, Holgate C, Hill P, Freeman JG, et al. Evaluation of the new Helico-G ELISA for serological diagnosis of *Helicobacter-pylori* infection. *Gut* 1991;**32**(5):A570.
- Ching 1991b**
Ching CK. A simplified diagnostic approach to *Helicobacter pylori* infection--is it adequate?. *American Journal of Gastroenterology* 1991;**86**(9):1276–8.
- Ching 1993**
Ching CK, Thompson S, Buxton C, Holgate C, Holmes GKT. Evaluation of a commercial enzyme-linked immunosorbent assay (ELISA) kit for serological diagnosis of *Helicobacter pylori* infection in a group of non-ulcer dyspepsia sufferers. *Postgraduate Medical Journal* 1993;**69**(812):456–60.
- Chisholm 2004**
Chisholm SA, Watson CL, Teare ELS, Saverymuttu S, Owen RJ. Non-invasive diagnosis of *Helicobacter pylori* infection in adult dyspeptic patients by stool antigen detection: Does the rapid immunochromatography test provide a reliable alternative to conventional ELISA kits?. *Journal of Medical Microbiology* 2004;**53**(7):623–7.
- Chmiela 2003**
Chmiela M, Wisniewska M, Bak-Romaniszyn L, Rechcinski T, Planeta-Malecka I, Bielanski W, et al. Serological differentiation of *Helicobacter pylori* CagA(+) and CagA (-) infections. *Archivum Immunologiae et Therapiae Experimentalis* 2003;**51**(2):131–6.
- Cho 2000**
Cho HS, Kang DH, Kim EA, Park DK, Park HC, Choi DJ, et al. The usefulness of C-13-urea breath test for the diagnosis of *Helicobacter pylori* infection in operative stomach. *Gastroenterology* 2000;**118**(4):A505.
- Cho 2003**
Cho YS, Kim SS, Chae HS, Han SW, Lee CD, Chung IS. The correlation between the DOB30 value of 13C-urea breath test and the staining pattern of endoscopic phenol red test in the diagnosis of *Helicobacter pylori* infection. *Gastroenterology* 2003;**124**(4 (Suppl)):A176.
- Cho 2008**
Cho YS, Chae HS, Jang SN, Kim JS, Son HS, Kim HK, et al. Comparison of the 13C-urea breath test and the endoscopic phenol red mucosal pH test in the quantification of *Helicobacter pylori* infection loading. *Korean Journal of Internal Medicine* 2008;**23**(3):134–9.
- Choi 2010**
Choi J, Kim D, Park M. A prospective evaluation of new stool antigen test for detection of *H-pylori*, in comparison with histology, rapid urease test, C-13-urea breath test, and serology. *Helicobacter* 2010;**15**(4):359.
- Choi 2011**
Choi J, Kim CH, Kim D, Chung SJ, Song JH, Kang JM, et al. Prospective evaluation of a new stool antigen test for the detection of *Helicobacter pylori*, in comparison with histology, rapid urease test, 13C-urea breath test, and serology. *Journal of Gastroenterology and Hepatology (Australia)* 2011;**26**(6):1053–9.
- Chong 1994**
Chong J, Marshall BJ, Barkin JS, McCallum RW, Reiner DK, Hoffman SR, et al. Occupational exposure to *Helicobacter pylori* for the endoscopy professional: A sera epidemiological study. *American Journal of Gastroenterology* 1994;**89**(11):1987–92.
- Chong 1995**
Chong SK, Lou Q, Asnicar MA, Zimmerman SE, Croffie JM, Lee CH, et al. *Helicobacter pylori* infection in recurrent abdominal pain in childhood: Comparison of diagnostic tests and therapy. *Pediatrics* 1995;**96**(2 Pt 1):211–5.

Chou 1997

Chou CH, Sheu BS, Yang HB, Cheng PN, Shin JS, Chen CY, et al. Clinical assessment of the bacterial load of *Helicobacter pylori* on gastric mucosa by a new multi-scaled rapid urease test. *Journal of Gastroenterology and Hepatology* 1997;**12**(1):1–6.

Christensen 1992

Christensen AH, Gjorup T, Hilden J, Fenger C, Henriksen B, Vyberg M, et al. Observer homogeneity in the histologic diagnosis of *Helicobacter pylori* - latent class analysis, kappa-coefficient, and repeat frequency. *Scandinavian Journal of Gastroenterology* 1992;**27**(11):933–9.

Christie 1996

Christie JM, McNulty CA, Shepherd NA, Valori RM. Is saliva serology useful for the diagnosis of *Helicobacter pylori*? *Gut* 1996;**39**(1):27–30.

Chua 2002

Chua TS, Fock KM, Teo EK, Ng TM. Validation of 13C-urea breath test for the diagnosis of *Helicobacter pylori* infection in the Singapore population. *Singapore Medical Journal* 2002;**43**(8):408–11.

Chung 2001a

Chung IK, Hong SJ, Kim EJ, Cho JY, Kim HS, Park SH, et al. What is the best method to diagnose *Helicobacter* infection in bleeding peptic ulcers?: A prospective trial. *Korean Journal of Internal Medicine* 2001;**16**(3):147–52.

Chung 2001b

Chung AYE, Chow PKH, Yu WK, Ho JMS, Chan HS, Wong WK, et al. Prevalence of *Helicobacter pylori* in gastric cancer in a South-East Asian population by C-14-urea breath test. *ANZ Journal of Surgery* 2001;**71**(10):574–6.

Churchill 1998

Churchill RD, Hill PG, Holmes GK. Management of dyspepsia in primary care. Breath test is better than near patient blood tests. *BMJ* 1998;**316**(7141):1389.

Chvalova 1990

Chvalova M, Sedlackova M, Souckova A, Soucek A, Jirasek A. Assessment of antibodies against *Campylobacter pylori* in children and adolescents with gastroduodenal complaints. *Sbornik Lekarsky* 1990;**92**(11-12):343–8.

Cinar 2004

Cinar K, Soykan I, Ozden A. The effect of *Helicobacter pylori* eradication in patients with functional dyspepsia: Assessment of different diagnostic tests. *Turkish Journal of Gastroenterology* 2004;**15**(3):159–63.

Ciok 2003

Ciok J, Tacikowski T, Bujko J, Dzieniszewski J. Urea breath test (UBT) in the diagnosis of *Helicobacter pylori* infection. *Gastroenterologia Polska* 2003;**10**(3):241–6.

Cirak 2007

Cirak MY, Akyon Y, Megraud F. Diagnosis of *Helicobacter pylori*. *Helicobacter* 2007;**12** Suppl 1:4–9.

Clancy 1994

Clancy RL, Cripps AW, Taylor DC, McShane LA, Webster VJ. Detection of antibody against *Helicobacter pylori* in

the saliva of patients with dyspepsia. *Canadian Journal of Gastroenterology* 1994;**8**(7):408–12.

Clayton 1992

Clayton CL, Kleanthous H, Coates PJ, Morgan DD, Tabaqchali S. Sensitive detection of *Helicobacter pylori* by using polymerase chain-reaction. *Journal of Clinical Microbiology* 1992;**30**(1):192–200.

Cockburn 2001

Cockburn M, Collett J, Cox B. Validation of the saliva-based *H. pylori* test, helisal, and its use in prevalence surveys. *Epidemiology & Infection* 2001;**126**(2):191–6.

Coelho 1990

Coelho LGV, Chausson Y, Passos MCF, Sadala RU, Costa EL, Sabino CVS, et al. C-14 urea breath test as a noninvasive method to detect gastric *Helicobacter pylori* colonization. *Gastroenterologie Clinique et Biologique* 1990;**14**(11):801–5.

Coelho 1997

Coelho LGV, Passos MCF, Chausson Y, Simal CJR, Aguiar ROA, Gallo MA, et al. Standard-dose (5-mu Ci) vs mini-dose (1-mu Ci) 14c-urea breath test for *H-pylori* detection. *Gastroenterology* 1997;**112**(4 (suppl)):A92.

Coelho 1999

Coelho LG, Reber M, Passos MC, Aguiar RO, Casaes PE, Bueno ML, et al. Application of isotope-selective non-dispersive infrared spectrometry for the evaluation of the 13C-urea breath test: Comparison with three concordant methods. *Brazilian Journal of Medical & Biological Research* 1999;**32**(12):1493–7.

Coelho 2003

Coelho LGV, Rocha Z, Boechat LC, Aguiar ROA, Aragao ALA, Dias EES, et al. 13C-urea breath test for *H-pylori* detection in children: Determination of the cutoff value by graphic method, independent of gold standard comparison. *Gastroenterology* 2003;**124**(4 (suppl)):A177.

Coelho 2009a

Coelho LGV, Coelho MCF, Oliveira SM, Santa-Cecilia EV, Moreira MR, Bomfim IM, et al. Does low dosage of 13C-urea keep good accuracy for diagnosis of *H. pylori* infection? *Helicobacter* 2009;**14** (4):340.

Coelho 2009b

Coelho LG, Silva-Junior AE, Coelho MC, Santa-Cecilia EV, Ferreira RO, Bomfim IM, et al. Does low dosage of 13C-urea keep good accuracy for diagnosis of *Helicobacter pylori* infection. *Gastroenterology* 2009;**136**(5 (Suppl)):A345.

Coelho 2011

Coelho LG, Silva AE Jr, Coelho MC, Penna FG, Ferreira RO, Santa-Cecilia EV. Does low dose (13)C-urea breath test maintain a satisfactory accuracy in diagnosing *Helicobacter pylori* infection?. *Arquivos de Gastroenterologia* 2011;**48**(2): 104–8.

Cohen 1999

Cohen H, Rose S, Lewin DN, Retama B, Naritoku W, Johnson C, et al. Accuracy of four commercially available serologic tests, including two office-based tests and a

- commercially available C-13 urea breath test, for diagnosis of *Helicobacter pylori*. *Helicobacter* 1999;4(1):49–53.
- Colaiocco 1999**
Colaiocco Ferrante L, Papponetti M, Marcuccitti J, Neri M, Festi D. 13C-urea breath test for *Helicobacter pylori* infection: Stability of samples over time. *Scandinavian Journal of Gastroenterology* 1999;34(9):942–3.
- Collins 1992**
Collins JSA, Bamford KB, Sloan JM, Collins BJ, Moorehead RJ, Love AHG. Screening for *Helicobacter pylori* antibody could reduce endoscopy workload in young dyspeptic patients. *European Journal of Gastroenterology and Hepatology* 1992;4(12):991–3.
- Con 2007**
Con SA, Con-Wong R, Con-Chin GR, Con-Chin VG, Takeuchi H, Valerin AL, et al. Serum pepsinogen levels, *Helicobacter pylori* CagA status, and cytokine gene polymorphisms associated with gastric premalignant lesions in Costa Rica. *Cancer Epidemiology, Biomarkers & Prevention* 2007;16(12):2631–6.
- Connor 1999**
Connor SJ, Seow F, Ngu MC, Katelaris PH. The effect of dosing with omeprazole on the accuracy of the C-13-urea breath test in *Helicobacter pylori*-infected subjects. *Alimentary Pharmacology & Therapeutics* 1999;13(10):1287–93.
- Conti-Nibali 1990**
Conti-Nibali S, Baldari S, Vitulo F, Sferlazzas C, Russo E, Tedeschi A, et al. The 14CO₂ urea breath test for *Helicobacter pylori* infection. *Journal of Pediatric Gastroenterology & Nutrition* 1990;11(2):284–5.
- Continibali 1991**
Continibali S, Sferlazzas C, Fera MT, Saitta G, Tedeschi A, Magazzu G. A simplified diagnostic-approach to *Helicobacter-pylori* infection - is it adequate - reply. *American Journal of Gastroenterology* 1991;86(9):1277–8.
- Contreras 2006**
Contreras M, Amado MAG, Rodriguez MJ, Landaez PB, Zambrano Y, Alvarez M, et al. Validation of a fast immunochromatographic test for *H. pylori* detection in stool. *Interciencia* 2006;31(2):136–9.
- Coombs 2001**
Coombs GW, Foster NM, Pearman JW, Forbes GM. Detection of *Helicobacter pylori* antigen in faeces by enzyme immunoassay. *Pathology* 2001;33(4):496–7.
- Cooreman 1990**
Cooreman M, Hengels KJ, Krausgrill P, Strohmeyer G. 13C-urea breath test as a noninvasive means of diagnosing the presence of *Helicobacter (Campylobacter) pylori*. *Deutsche Medizinische Wochenschrift* 1990;115(10):367–71.
- Corti 2007**
Corti RE. The accuracy of the breath test with C-urea to diagnose *Helicobacter pylori* infection. *Salud I Ciencia* 2007;15(5):914.
- Corvaglia 1997**
Corvaglia L, Bontems P, Keppens E, Vandenborre C, DePrez C. HP infection in children: Comparison of results with serology and C-13-urea breath test. *Gut* 1997;41(suppl):A68.
- Corvaglia 1999**
Corvaglia L, Bontems P, Devaster JM, Heimann P, Glupczynski Y, Keppens E, et al. Accuracy of serology and C-13-urea breath test for detection of *Helicobacter pylori* in children. *Pediatric Infectious Disease Journal* 1999;18(11):976–9.
- Costa 2001**
Costa F, Mumolo MG, Bellini M, Romano MR, Manghetti M, Paci A, et al. Post-treatment diagnostic accuracy of a new enzyme immunoassay to detect *Helicobacter pylori* in stools. *Alimentary Pharmacology & Therapeutics* 2001;15(3):395–401.
- Couturier 2014**
Couturier MR, Marshall BJ, Goodman KJ, Megraud F. *Helicobacter pylori* diagnostics and treatment: Could a lack of universal consensus be the best consensus?. *Clinical Chemistry* 2014;60(4):589–94.
- Crabtree 1990**
Crabtree JE, Shallcross TM, Wyatt JI, Heatley RV. Validation of a commercial ELISA for serodiagnosis of *Helicobacter-pylori* infection. *Gut* 1990;31(10):A1176.
- Crabtree 1991a**
Crabtree JE, Taylor JD, Shallcross TM, Wyatt JI, Rathbone BJ, Heatley RV. Western blotting analysis of mucosal and systemic immune-responses to *Helicobacter-pylori*. *Gut* 1991;32(5):A564.
- Crabtree 1991b**
Crabtree JE, Shallcross TM, Heatley RV, Wyatt JI. Evaluation of a commercial ELISA for serodiagnosis of *Helicobacter pylori* infection. *Journal of Clinical Pathology* 1991;44(4):326–8.
- Cremonini 2000**
Cremonini F, Zocco MA, Armuzzi A, Bartolozzi F, Santarelli L, Ojetti V, et al. C-13 urea breath test for predicting resistance to therapy in *Helicobacter pylori* infection. *Gut* 2000;47(Suppl 1):A117.
- Cremonini 2005**
Cremonini F, Bartolozzi F, Armuzzi A, Zocco MA, Santarelli L, Gabrielli M, et al. Can 13C urea breath test predict resistance to therapy in *Helicobacter pylori* infection?. *Hepato-Gastroenterology* 2005;52(64):1119–21.
- Crespo 2009**
Crespo Medina M, Sanchez Sanchez C, Morales JL, Huber LB, Mendiola I. Valuation of non-invasive tests to detect *Helicobacter pylori* infection in children. *Acta Pediatrica Espanola* 2009;67(7):319–24.
- Crispino 2013**
Crispino P, Colarusso D, Minervini G, Schiava A, Tripodi B, Cimmino G, et al. Diagnosis of *Helicobacter pylori*

- infection: Comparison between invasive and non invasive tests. *Italian Journal of Medicine* 2013;**7**(2S):33.
- Cullen 1992**
Cullen DJ, Cullen KJ, Collins BJ, Christiansen KJ, Epis J. Serological assessment of *Helicobacter pylori* eradication. *Lancet* 1992;**340**(8828):1161–2.
- Cullen 2002**
Cullen KP, Broderick BM, Jayaram J, Flynn B, O'Connor HJ. Evaluation of the *Helicobacter pylori* stool antigen (HPSA) test in routine clinical practice--is it patient-friendly?. *Irish Medical Journal* 2002;**95**(10):305–6.
- Cunningham 2010**
Cunningham SA, Sloan LM, Nyre LM, Vetter EA, Mandrekar J, Patel R. Three-hour molecular detection of *Campylobacter*, *Salmonella*, *Yersinia*, and *Shigella* species in feces with accuracy as high as that of culture. *Journal of Clinical Microbiology* 2010;**48**(8):2929–33.
- Cutler 1993**
Cutler A, Schubert A, Schubert T. Role of *Helicobacter pylori* serology in evaluating treatment success. *Digestive Diseases & Sciences* 1993;**38**(12):2262–6.
- Cutler 1995a**
Cutler AF, Havstad S, Ma CK, Blaser MJ, Perez-Perez GI, Schubert TT. Accuracy of invasive and noninvasive tests to diagnose *Helicobacter pylori* infection. *Gastroenterology* 1995;**109**(1):136–41.
- Cutler 1995b**
Cutler AF. Re - C-13 urea breath test - response. *American Journal of Gastroenterology* 1995;**90**(11):2070.
- Cutler 1996**
Cutler AF, Prasad VM. Long-term follow-up of *Helicobacter pylori* serology after successful eradication. *American Journal of Gastroenterology* 1996;**91**(1):85–8.
- Cutler 1997**
Cutler AF. Diagnostic tests for *H. pylori*: A prospective evaluation of their accuracy, without selecting a single test as the gold standard. *American Journal of Gastroenterology* 1997;**92**(3):538–9.
- Cutler 1998**
Cutler AF, Miller S. Comparison of C-13 urea blood test to C-13 urea breath test for diagnosis of *H-pylori*. *Gastroenterology* 1998;**114**(4 (suppl)):A97.
- Cutler 1999**
Cutler AF, Toskes P. Comparison of 13C-urea blood test to 13C-urea breath test for the diagnosis of *Helicobacter pylori*. *American Journal of Gastroenterology* 1999;**94**(4):959–61.
- Czinn 1991**
Czinn SJ, Carr HS, Speck WT. Diagnosis of gastritis caused by *Helicobacter pylori* in children by means of an ELISA. *Reviews of Infectious Diseases* 1991;**13 Suppl 8**:S700–3.
- Czkwianianc 1997**
Czkwianianc E, Chmiela M, Lawnik M, Planeta-Malecka I, Rudnicka W. Serodiagnosis of *Helicobacter pylori* in children with gastroduodenitis. *Central-European Journal of Immunology* 1997;**22**(4):240–7.
- Da Silva 2010**
Da Silva JMK, Villares CA, Monteiro MS, Colaço C, Dos Santos AF, Mattar R. Validation of a rapid stool antigen test for diagnosis of *Helicobacter pylori* infection. *Revista Do Instituto De Medicina Tropical De Sao Paulo* 2010;**52**(3):125–8.
- Dahlberg 1998**
Dahlberg M, Schjonsby H. 13C-urea breath test as diagnostic method in *Helicobacter pylori* infection. *Tidsskrift for Den Norske Lægeforening* 1998;**118**(24):3762–5.
- Daino 2015**
Daino DF, Soifer L, Pedesta J, Rome J. Pilot test for *Helicobacter pylori* detection with ammonia breath test. *Acta Gastroenterologica Latinoamericana* 2015;**45**(1):12–7.
- Dan 2013**
Dan W, Jing W, Libo W, Hong X. Detection and analysis of *Helicobacter pylori* antibodies by protein chip technology. *Journal of Gastroenterology and Hepatology* 2013;**28**:541.
- Danielli 1993**
Danielli E. A fluorometric enzyme-linked-immunosorbent-assay for serological diagnosis of *Helicobacter-pylori* infection. *European Journal of Gastroenterology & Hepatology* 1993;**5**:S57–S59.
- Datta 2003**
Datta D, Gazzard B, Stebbing J. The diagnostic yield of stool analysis in 525 HIV-1-infected individuals. *Aids* 2003;**17**(11):1711–3.
- Datta 2005**
Datta S, Chattopadhyay S, Chowdhury A, Santra A, Saha DR, Ramamurthy T, et al. Diagnosis and genotyping of *Helicobacter pylori* by polymerase chain reaction of bacterial DNA from gastric juice. *Journal of Gastroenterology and Hepatology* 2005;**20**(8):1253–9.
- Day 2002**
Day AS, Sherman PM. Accuracy of office-based immunoassays for the diagnosis of *Helicobacter pylori* infection in children. *Helicobacter* 2002;**7**(3):205–9.
- Day 2003**
Day AS, Veldhuyzen van Zanten S, Otley AR, Best L, Griffiths A, Sherman PM. Use of LARA-urea breath test in the diagnosis of *Helicobacter pylori* infection in children and adolescents: A preliminary study. *Canadian Journal of Gastroenterology* 2003;**17**(12):701–6.
- De Angelis 2007**
De Angelis GL, Cavallaro LG, Maffini V, Moussa AM, Fornaroli F, Liatopoulou S, et al. Usefulness of a serological panel test in the assessment of gastritis in symptomatic children. *Digestive Diseases* 2007;**25**(3):206–13.
- De Argila 2001**
de Argila CM, Boixeda D. Practical considerations for the diagnosis of *Helicobacter pylori* infection. *Medicina Clinica* 2001;**117**(10):386–91.
- De Arruda 2001**
De Arruda SMB, Passaro DJ, Yang S, Parsonnet J. Variability of serologic testing for *H. pylori* using U.S. and Peruvian antigens. *Gastroenterology* 2001;**120**(1):325–6.

De Boer 1995

De Boer WA. Re: 13C urea breath test. *American Journal of Gastroenterology* 1995;**90**(11):2069–70.

De Bustillo 1998

De Bustillo EM, Tomero JAS, Sanz JC, Moreno JA, Jimenez I, Lopez-Brea M, et al. Eradication and follow-up of *Helicobacter pylori* infection in hemodialysis patients. *Nephron* 1998;**79**(1):55–60.

De Carvalho 2003

De Carvalho Costa Cardinali L, Rocha GA, Rocha AM, De Moura SB, De Figueiredo Soares T, Esteves AM, et al. Evaluation of 13C urea breath test and *Helicobacter pylori* stool antigen test for diagnosis of *H. pylori* infection in children from a developing country. *Journal of Clinical Microbiology* 2003;**41**(7):3334–5.

De Giacomo 1991

De Giacomo C, Lisato L, Negrini R, Licardi G, Maggiore G. Serum immune response to *Helicobacter pylori* in children: Epidemiologic and clinical applications. *Journal of Pediatrics* 1991;**119**(2):205–10.

De Laat 2001

De Laat LE, De Boer WA, Megraud F. The CLO test as a reference method for *Helicobacter pylori* infection. *European Journal of Gastroenterology & Hepatology* 2001;**13**(10):1269–70.

De Oliveira 1999

De Oliveira AMR, Rocha GA, De Magalhaes Queiroz DM, Mendes EN, De Carvalho AST, Ferrari TCA, et al. Evaluation of enzyme-linked immunosorbent assay for the diagnosis of *Helicobacter pylori* infection in children from different age groups with and without duodenal ulcer. *Journal of Pediatric Gastroenterology and Nutrition* 1999;**28**(2):157–61.

De Pascalis 1999

De Pascalis R, Del Pezzo M, Nardone G, Budillon G, Lavitola A. Performance characteristics of an enzyme-linked immunosorbent assay for determining salivary immunoglobulin G response to *Helicobacter pylori*. *Journal of Clinical Microbiology* 1999;**37**(2):430–2.

Deankanob 2006

Deankanob W, Chomvarin C, Hahnvanawong C, Intapan PM, Wongwajana S, Mairiang P, et al. Enzyme-linked immunosorbent assay for serodiagnosis of *Helicobacter pylori* in dyspeptic patients and volunteer blood donors. *Southeast Asian Journal of Tropical Medicine & Public Health* 2006;**37**(5):958–65.

Debongnie 1993

Debongnie JC, Durez P, Luyasu V. Validation of a commercial serologic test in the diagnosis of *Helicobacter-pylori* infection - clinical and epidemiologic use. *Gastroenterologie Clinique et Biologique* 1993;**17**(2):98–102.

Dediste 2003

Dediste A, Vandenberg O, Vlaes L, Ebraert A, Douat N, Bahwere P, et al. Evaluation of the prospect microplate assay for detection of *Campylobacter*: A routine laboratory

perspective. *Clinical Microbiology & Infection* 2003;**9**(11):1085–90.

Deguchi 2009

Deguchi R, Matsushima M, Suzuki T, Mine T, Fukuda R, Nishina M, et al. Comparison of a monoclonal with a polyclonal antibody-based enzyme immunoassay stool test in diagnosing *Helicobacter pylori* infection after eradication therapy. *Journal of Gastroenterology* 2009;**44**(7):713–6.

Del Pozo Garcia 2006

Del Pozo Garcia AJ, Gisbert JP. Is the string test a useful alternative to gastroscopy with biopsy for *H. pylori* identification?. *Revista Espanola De Enfermedades Digestivas* 2006;**98**(7):542–9.

Del Zompo 2014

Del Zompo F, Feliciani D, Mangiola F, D'Angelo G, Di Rienzo T, Vanella G, et al. Gas production during lactulose breath test is associated with *Helicobacter pylori* infection. *Helicobacter* 2014;**19**:82.

Delaney 2003

Delaney BC, Holder RL, Allan TF, Kenkre JE, Hobbs FDR. A comparison of Bayesian and maximum likelihood methods to determine the performance of a point of care test for *Helicobacter pylori* in the office setting. *Medical Decision Making* 2003;**23**(1):21–30.

Demir 2001

Demir H, Ercis S, Kocak N, Hascelik G, Ozen H, Yuce A, et al. Detection of *Helicobacter pylori* with stool antigen test in children with gastroesophageal reflux disease. *American Journal of Gastroenterology* 2001;**96**(6):1944.

Demiray 2006

Demiray E, Yilmaz O, Sarkis C, Soyuturk M, Simsek I. Comparison of invasive methods and two different stool antigen tests for diagnosis of *H-pylori* infection in patients with gastric bleeding. *World Journal of Gastroenterology* 2006;**12**(26):4206–10.

Demiray 2012

Demiray Gurbuz E, Gonen C, Bekmen N, Dolek D, Soyuturk M, Sagol O, et al. The diagnostic accuracy of urine IgG antibody tests for the detection of *Helicobacter pylori* infection in Turkish dyspeptic patients. *Turkish Journal of Gastroenterology* 2012;**23**(6):753–8.

Demiray-Gurbuz 2012

Demiray-Gurbuz E, Bekmen N, Erci T, Dotan Y, Yilmaz O. Evaluation of *Helicobacter pylori* stool antigen test results required from different outpatient clinics at university hospital. *Helicobacter* 2012;**17**:87–8.

Demirturk 2003

Demirturk L, Yazgan Y, Tarcin O, Ozel M, Diler M, Oncul O, et al. Does N-acetyl cysteine affect the sensitivity and specificity of *Helicobacter pylori* stool antigen test?. *Helicobacter* 2003;**8**(2):120–3.

Desroches 1997

Desroches JJ, Lahaie RG, Picard M, Morais J, Dumont A, Gaudreau C, et al. Methodological validation and clinical usefulness of carbon-14-urea breath test for documentation

- of presence and eradication of *Helicobacter pylori* infection. *Journal of Nuclear Medicine* 1997;**38**(7):1141–5.
- Devenish 2005**
Devenish J, Brooks B, Perry K, Milnes D, Burke T, McCabe D, et al. Validation of a monoclonal antibody-based capture enzyme-linked immunosorbent assay for detection of *Campylobacter fetus*. *Clinical and Diagnostic Laboratory Immunology* 2005;**12**(11):1261–8.
- Dewan 2000**
Dewan R, Sachdev GK. Diagnosis of *Helicobacter pylori* infection in primary and tertiary care centers. *Indian Journal of Gastroenterology* 2000;**19 Suppl 1**:S11–4; discussion S5.
- Dhar 1998**
Dhar R, Mustafa AS, Dhar PM, Khan MS, Al-Rashidi FJS, Al-Shamali AAA, et al. Evaluation and comparison of two immunodiagnostic assays for *Helicobacter pylori* antibodies with culture results. *Diagnostic Microbiology and Infectious Disease* 1998;**30**(1):1–6.
- Dhesi 2015**
Dhesi E, White B, Chitembwe A, Alisa A, Musa S, Besherdas K. Is there any value in performing a CLO test at endoscopy in patients previously having a stool antigen test? . *Gut* 2015;**64**:A78.
- Di Fulvio 2003**
Di Fulvio A, Ierfone N, Standoli M, Trancassini M, Giordano A, Magni A, et al. Study of fecal antigens against *Helicobacter pylori* as non-invasive test compared with the 13C-urea breath-test. Personal experience. *Il Giornale di Chirurgia* 2003;**24**(8-9):312–4.
- Di Mario 2009**
Di Mario F, Gatta L, Franze A, Rugge M, Scarpignato C, Dal Bo N, et al. Effects of *H. pylori* eradication on serum pepsinogen i, ii, ratio and gastrin-17 in Italian and immigrant patients. *Helicobacter* 2009;**14** (4):408.
- Di Mario 2010**
Di Mario F. Diagnostic accuracy of serum pepsinogens and gastrin to follow-up *H. pylori* infection. *Helicobacter* 2010;**15**(4):350.
- Di Rienzo 2013**
Di Rienzo TA, D'Angelo G, Ojetti V, Campanale MC, Tortora A, Cesario V, et al. 13C-urea breath test for the diagnosis of *Helicobacter pylori* infection. *European Review for Medical & Pharmacological Sciences* 2013;**17 Suppl 2**: 51–8.
- Di Silvio 1998**
Di Silvio M, Larisch J, Dibildox M, Almaguer I, Gitler R, Dehesa M, et al. Breath tests as a noninvasive diagnostic method in *Helicobacter pylori* infection. *Revista de Gastroenterologia de Mexico* 1998;**63**(3):135–42.
- Dietz 2001**
Dietz J, Sekine S, Segal F, Kulczynski JMU, Chaves ALH, Costa JD, et al. “*Helicobacter pylori*” diagnosis: Comparison between invasive methods. *Gastroenterologia Endoscopia Digestiva* 2001;**20**(2):36–40.
- Dill 1989**
Dill S, Payne-James JJ, McSwiggan D, Scrimgeour CM, Rennie MJ, Misiewicz JJ. Sensitivity and specificity of the C-13 urea breath test in detecting *Campylobacter-pylori*. *Gut* 1989;**30**(5):A752.
- Dill 1990**
Dill S, Payne-James JJ, Misiewicz JJ, Grimble GK, McSwiggan D, Pathak K, et al. Evaluation of 13C-urea breath test in the detection of *Helicobacter pylori* and in monitoring the effect of tripotassium dicitratobismuthate in non-ulcer dyspepsia. *Gut* 1990;**31**(11):1237–41.
- Ding 1993**
Ding SZ, Jia BQ, Liu XG. An urease enzyme linked immunosorbent assay for detection of *Helicobacter pylori* infection. *Zhonghua Nei Ke Za Zhi [Chinese Journal of Internal Medicine]* 1993;**32**(5):298–301.
- Ding 2000**
Ding SL, Ring JA, Hebbard GS, Morcom JM, Young GP. Lansoprazole but not ranitidine interferes with C-13 urea breath test detection of *Helicobacter pylori* infection. *Gastroenterology* 2000;**118**(4):A1228.
- Djurasinovic 2014**
Djurasinovic MZ, Sokic-Milutinovic A, Filipovic B, Basara S, Krstic M, Milosavljevic T. The role of non-invasive assessment of the secretory function of the gastric mucosa in dyspepsia. *Helicobacter* 2014;**19**:112.
- Dmitrienko 2009**
Dmitrienko M, Bykov S. Method of breath sampling for noninvasive *H. pylori* analysis. *Helicobacter* 2009;**14** (4): 341.
- Dmitrienko 2011**
Dmitrienko M, Bykov S, Parolova N, Karaseva G. Ammonia breath test - transportation way of ammonia. *Helicobacter* 2011;**16**:115.
- Dolek 2007**
Dolek D, Soyuturk M, Bekmen N, Yilmaz O, Demiray E, Sarioglu S, et al. Urine-based ELISA testing for the diagnosis and confirmation of eradication of *Helicobacter pylori* infection. *Helicobacter* 2007;**12**(4):444.
- Dominguez 2006**
Dominguez J, Forne M, Blanco S, Prat C, Gali N, Latorre I, et al. Comparison of a monoclonal with a polyclonal antibody-based enzyme immunoassay stool test in diagnosing *Helicobacter pylori* infection before and after eradication therapy. *Alimentary Pharmacology & Therapeutics* 2006;**23**(12):1735–40.
- Dominguezmunoz 1995**
Dominguezmunoz JE, Linke A, Sauerbruch T, Malfertheiner P. How to improve the C-13-urea breath test (UBT) for the diagnosis of *Helicobacter-pylori* infection. *Gastroenterology* 1995;**108**(4 (suppl)):A84.
- Domínguez-Muñoz 1997**
Domínguez-Muñoz JE, Leodolter A, Sauerbruch T, Malfertheiner P. A citric acid solution is an optimal test

- drink in the 13C-urea breath test for the diagnosis of *Helicobacter pylori* infection. *Gut* 1997;**40**(4):459–62.
- Donati 1997**
Donati M, Moreno S, Storni E, Tuccia A, Poli L, Sambri V, et al. Study of anti-*Helicobacter pylori* antibodies with use of latex agglutination test. *Microbiologia Medica* 1997;**12**(3): 130–1.
- Donati 2000**
Donati M, Sambri V, Ranucci L, De Orsi D, Tucci A, Poli L, et al. Recombinant CagA enzyme-linked immunosorbent assay and western immunoblot for the detection of serum antibodies to *Helicobacter pylori*. *Clinical Microbiology & Infection* 2000;**6**(3):164–6.
- Dondi 2006**
Dondi E, Rapa A, Boldorini R, Fonio P, Zanetta S, Oderda G. High accuracy of noninvasive tests to diagnose *Helicobacter pylori* infection in very young children. *Journal of Pediatrics* 2006;**149**(6):817–21.
- Dong 2015**
Dong FY, Ji DN, Huang RX, Zhang F, Huang YQ, Xiang P, et al. Multiple genetic analysis system-based antibiotic susceptibility testing in *Helicobacter pylori* and high eradication rate with phenotypic resistance-guided quadruple therapy. *Medicine* 2015 [Epub ahead of print]; Vol. 94, issue 47. [DOI: 10.1097/MD.0000000000002056]
- Dore 1997**
Dore SP, Krupadas S, Borgonha S, Kurpad AV. The 13C urea breath test to assess *Helicobacter pylori* infection in school children. *National Medical Journal of India* 1997;**10**(2):57–60.
- Dore 2003**
Dore MP, Realdi G, Sepulveda AR, Graham DY. Detection of genomic *Helicobacter pylori* DNA in the blood of patients positive for the infection. *Digestive and Liver Disease* 2003;**35**(11):839–40.
- Dore 2004**
Dore MP, Negrini R, Tadeu V, Marras L, Maragkoudakis E, Nieddu S, et al. Novel monoclonal antibody-based *Helicobacter pylori* stool antigen test. *Helicobacter* 2004;**9**(3):228–32.
- Dorta 2005**
Dorta G. *Helicobacter pylori* detection revisited. *Endoscopy* 2005;**37**(6):579–80; author reply 581–2.
- Dou 2008**
Dou YC, Wang JB. Detection of *H. pylori* infection in patients with pancreatic cancer and clinical significance. *Journal of Jilin University Medicine Edition* 2008;**34**(2): 317–9.
- Douraghi 2013**
Douraghi M, Rostami MN, Goudarzi H, Ghalavand Z. Comparison of stool antigen immunoassay and serology for screening for *Helicobacter pylori* infection in intellectually disabled children. *Microbiology and Immunology* 2013;**57**(11):772–7.
- Doweck 1997**
Doweck J, Quintana C, Barrios A, Monastera L, Lopetegui G, Zerbo O, et al. Evaluation of sensitivity, specificity and predictive value of six qualitative serological methods for the detection of *Helicobacter pylori* antibodies. *Acta Gastroenterologica Latinoamericana* 1997;**27**(4):259–61.
- Dowlatsahi 2002**
Dowlatsahi S. Effect of gastrointestinal bleeding on the sensitivity of diagnostic tests for *Helicobacter pylori* infection. *Archives of Iranian Medicine* 2002;**5**(3):201–2.
- Drew 1988**
Drew H, Lafrance ND, Mertz H, Hernandez J, Ravich W, Milligan F, et al. C-14 urea breath test in *Campylobacter pyloridis* gastric disorders - comparison with biopsy with comparison and sensitivity of 20, 40, 60 and 120 minute sampling. *Clinical Nuclear Medicine* 1988;**13**(5):394.
- Drumm 1999**
Drumm B, Rowland M, Imrie C. Sensitivity of urease-based test on diagnosis of *Helicobacter pylori* in children and the elderly. *Gastroenterology* 1999;**116**(6):1506.
- Drzymala-Czy 2014**
Drzymala-Czy S, Stawinska-Witoszynska B, Madry E, Krzywinska-Wiewiorowska M, Szczepanik M, Walkowiak J, et al. Non-invasive detection of *Helicobacter pylori* in cystic fibrosis - the fecal test vs. the urea breath test. *European Review for Medical and Pharmacological Sciences* 2014;**18**(16):2343–8.
- Du 2004**
Du JX, Watkins T, Bravo LE, Fonham ET, Camargo MC, Correa P, et al. 13C-urea breath test for *Helicobacter pylori* in young children: Cut-off point determination by finite mixture model. *Statistics in Medicine* 2004;**23**(13): 2049–60.
- Duan 1994**
Duan LP, Braden B, Lembcke B, Caspary WF. C-13-urea breath test after breakfast still meets the criteria for valid diagnosis of *Helicobacter-pylori*. *Gastroenterology* 1994;**106**(4 (suppl)):A71.
- DuBois 2005**
DuBois S, Kearney DJ. Iron-deficiency anemia and *Helicobacter pylori* infection: a review of the evidence. *American Journal of Gastroenterology* 2005;**100**(2):453–9.
- Duggan 1998**
Duggan AE, Hardy E, Hawkey CJ. Evaluation of a new near patient test for the detection of *Helicobacter pylori*. *European Journal of Gastroenterology & Hepatology* 1998;**10**(2):133–6.
- Duggan 1999**
Duggan AE, Elliott C, Logan RFA. Testing for *Helicobacter pylori* infection: Validation and diagnostic yield of a near patient test in primary care. *BMJ* 1999;**319**(7219):1236–9.
- Dulbecco 2001**
Dulbecco P, Gambaro C, Zentilin P, Bilardi C, Biagini R, Savarino V. The impact of long-term ranitidine and pantoprazole on the precision of C-13-urea breath test

- (UBT) in subjects infected with *Helicobacter pylori*. *Gastroenterology* 2001;**120**(5 (suppl)):A578.
- Dulbecco 2003**
Dulbecco P, Gambaro C, Bilardi C, Zentilin P, Mele MR, Mansi C, et al. Impact of long-term ranitidine and pantoprazole on accuracy of 13C urea breath test. *Digestive Diseases & Sciences* 2003;**48**(2):315–21.
- Dumont 1989**
Dumont A, Abramovici J, Muller C, Trolin C, Barbier P. Diagnostic efficiency of the 14C-urea breath test in the detection of antral *Campylobacter pylori* infection. Gastrointestinal pathology and Campylobacter pylori: European Campylobacter Pylori Study Group ICS847. 1989;73–5.
- Dun 2001**
Dun CDR, Blac M, Cowell DC, Penaul C, Ratcliffe NM, Spence R, et al. Ammonia vapour in the mouth as a diagnostic marker for *Helicobacter pylori* infection: Preliminary 'proof of principle' pharmacological investigations. *British Journal of Biomedical Science* 2001;**58**(2):66–75.
- Durdal 2002**
Durdal US, Engin D, Hascelik G. Evaluation of western blot method for the serological diagnosis of *Helicobacter pylori* infections. *Mikrobiyoloji Bulteni* 2002;**36**(2):153–60.
- Dy-Limquiao 2006**
Dy-Limquiao LA, Florendo WO, Labio ME, Banez V, Daez ML. Validation of the new 14-carbon urea breath test (14-C UBT) in the diagnosis of *Helicobacter pylori* infection. *Journal of Gastroenterology and Hepatology* 2006;**21**:A505.
- Dyrła 2015**
Dyrła P, Gil J, Wojtun S, Korszun K, Kasinska E, Mackiewicz A. *Helicobacter pylori* infection. Diagnosis and treatment. *Pediatrica i Medycyna Rodzinna* 2015;**11**(1): 68–74.
- Ebara 2000**
Ebara S, Aoyama N, Sakai T, Ikemura T, Shirasaka D, Sakashita M, et al. A study of gastric emptying in *H-pylori* negative healthy volunteers using the C-13-octanoic acid breath test. *Gastroenterology* 2000;**118**(4):A1169.
- Ebell 1998**
Ebell MH. Breath test and serologic testing for *Helicobacter pylori*. *Journal of the American Board of Family Practice* 1998; **11**(2):170–1.
- Edwards 1997**
Edwards CN, Douglin CP, Prussia PR, Garriques SA, Levett PN. Epidemiology of *Helicobacter pylori* infection in Barbados. *West Indian Medical Journal* 1997;**46**(1):3–7.
- El-Nujumi 1996**
El-Nujumi A, Hilditch TE, McColl KEL. Effect of omeprazole therapy on determination of *Helicobacter pylori* status by C-14 urea breath test. *Gastroenterology* 1996;**110** (4 (suppl)):A102.
- El-Nujumi 1998**
El-Nujumi A, Hilditch TE, Williams C, McColl KE. Current or recent proton pump inhibitor therapy markedly impairs the accuracy of the 14C urea breath test. *European Journal of Gastroenterology & Hepatology* 1998;**10**(9): 759–64.
- El-Zaatari 1995**
El-Zaatari FA, Nguyen AM, Genta RM, Klein PD, Graham DY. Determination of *Helicobacter pylori* status by reverse transcription-polymerase chain reaction. Comparison with urea breath test. *Digestive Diseases & Sciences* 1995;**40**(1): 109–13.
- El-Zimaity 1998**
El-Zimaity HMT, Segura AM, Genta RM, Graham DY. Histologic assessment of *Helicobacter pylori* status after therapy: Comparison of Giemsa, Diff-Quik, and Genta stains. *Modern Pathology* 1998;**11**(3):288–91.
- Elbast 1999**
Elbast W, Brazier JL. Nondispersive infrared spectroscopy, an alternative to isotope ratio mass spectrometry: Case of the C-13 urea breath test. *Analisis* 1999;**27**(3):228–31.
- Elitsur 1997**
Elitsur Y, Neace C, Triest WE. Comparison between a rapid office-based and ELISA serologic test in screening for *Helicobacter pylori* in children. *Helicobacter* 1997;**2**(4): 180–4.
- Elitsur 1999a**
Elitsur Y, Neace C, Werthammer MC, Triest WE. Prevalence of CagA, VacA antibodies in symptomatic and asymptomatic children with *Helicobacter pylori* infection. *Helicobacter* 1999;**4**(2):100–5.
- Elitsur 1999b**
Elitsur Y, Neace C. Detection of *Helicobacter pylori* organisms by HP-Fast in children. *Digestive Diseases and Sciences* 1999;**44**(6):1169–72.
- Elitsur 2000**
Elitsur Y, Aflak R, Neace C, Triest WE. *Helicobacter pylori* serology and the diagnosis of *H. pylori* infection in children. *West Virginia Medical Journal* 2000;**96**(5):564–6.
- Elitsur 2004**
Elitsur Y, Lawrence Z, Hill I. Stool antigen test for diagnosis of *Helicobacter pylori* infection in children with symptomatic disease: A prospective study. *Journal of Pediatric Gastroenterology & Nutrition* 2004;**39**(1):64–7.
- Elitsur 2005**
Elitsur Y. *Helicobacter pylori* diagnostic tools: Is it in the stool?. *Journal of Pediatrics* 2005;**146**(2):164–7.
- Elitsur 2009**
Elitsur Y, Tolia V, Gilger MA, Reeves-Garcia J, Schmidt-Sommerfeld E, Opekun AR, et al. Urea breath test in children: The United States prospective, multicenter study. *Helicobacter* 2009;**14**(2):134–40.
- Ellenrieder 1997**
Ellenrieder V, Glasbrenner B, Stoffels C, Weiler S, Bode G, Moller P, et al. Qualitative and semi-quantitative value of a modified 13C-urea breath test for identification of *Helicobacter pylori* infection. *European Journal of Gastroenterology & Hepatology* 1997;**9**(11):1085–9.

Elnujumi 1991

Elnujumi AM, Rowe P, Dorrian CA, McColl KEL. Value of C-14 urea breath test and urease slide test (CLO test) to diagnose *Helicobacter-pylori* in uremic patients. *Gut* 1991; **32**(10):A1220.

Eloubeidi 2001

Eloubeidi MA, Wade SB, Provenzale D. Factors associated with acceptance and full publication of GI endoscopic research originally published in abstract form. *Gastrointestinal Endoscopy* 2001;**53**(3):275–82.

Endtz 2000

Endtz HP, Ang CW, Van den Braak N, Luijendijk A, Jacobs BC, De Man P, et al. Evaluation of a new commercial immunoassay for rapid detection of *Campylobacter jejuni* in stool samples. *European Journal of Clinical Microbiology and Infectious Diseases* 2000;**19**(10):794–7.

Engberg 2003

Engberg JH, Strid MA, Molbak K, Krogfelt KA. Antibody response following infection with *Campylobacter* determined by enzyme-linked immunosorbent assay (ELISA). *Ugeskrift for Laeger* 2003;**165**(24):2485–6.

Engstrand 1992

Engstrand L, Nguyen AM, Graham DY, el-Zaatari FA. Reverse transcription and polymerase chain reaction amplification of rRNA for detection of *Helicobacter* species. *Journal of Clinical Microbiology* 1992;**30**(9):2295–301.

Enroth 1997a

Enroth H, Rigo R, Hulten K, Engstrand L. Diagnostic accuracy of a rapid whole-blood test for detection of *Helicobacter pylori*. *Journal of Clinical Microbiology* 1997;**35**(10):2695–7.

Enroth 1997b

Enroth H, Engstrand L. Rapid detection of *Helicobacter pylori* infection in serum and whole-blood samples. *APMIS* 1997;**105**(12):951–5.

Enroth 2002

Enroth H, Kraaz W, Rohan T, Nyren O, Engstrand L. Does the method of *Helicobacter pylori* detection influence the association with gastric cancer risk?. *Scandinavian Journal of Gastroenterology* 2002;**37**(8):884–90.

Erzin 2004

Erzin Y, Altun S, Dobrucali A, Aslan M, Erdamar S, Dirican A, et al. Comparison of two different stool antigen tests for the primary diagnosis of *Helicobacter pylori* infection in Turkish patients with dyspepsia. *Helicobacter* 2004;**9**(6): 657–62.

Erzin 2005

Erzin Y, Altun S, Dobrucali A, Aslan M, Erdamar S, Dirican A, et al. Evaluation of two enzyme immunoassays for detecting *Helicobacter pylori* in stool specimens of dyspeptic patients after eradication therapy. *Journal of Medical Microbiology* 2005;**54**(Pt 9):863–6.

Evans 1989

Evans DJ Jr, Evans DG, Graham DY, Klein PD. A sensitive and specific serologic test for detection of *Campylobacter pylori* infection. *Gastroenterology* 1989;**96**(4):1004–8.

Everts 1996

Everts B, Hamlet A, Pettersson A. A 10 minutes solid dosage C-13-urea breath test for diagnosis of *Helicobacter pylori* infection. *Gastroenterology* 1996;**110**(4 suppl):A105.

Faigel 1996a

Faigel DO, Furth EE, Childs M, Goin J, Metz DC. Histological predictors of active *Helicobacter pylori* infection. *Digestive Diseases & Sciences* 1996;**41**(5):937–43.

Faigel 1996b

Faigel DO, Childs M, Furth EE, Alavi A, Metz DC. New noninvasive tests for *Helicobacter pylori* gastritis - comparison with tissue-based gold standard. *Digestive Diseases and Sciences* 1996;**41**(4):740–8.

Faigel 2000

Faigel DO, Magaret N, Corless C, Lieberman DA, Fennerty MB. Evaluation of rapid antibody tests for the diagnosis of *Helicobacter pylori* infection. *American Journal of Gastroenterology* 2000;**95**(1):72–7.

Faigel 2001

Faigel DO, Hahn M. Urea breath test for the diagnosis of *Helicobacter pylori* - response. *Gastrointestinal Endoscopy* 2001;**53**(6):700–1.

Fakhrjou 2011

Fakhrjou A, Somi MH, Fattahi E, Koohbanani SS, Shadravan S. Rapid urease test, touch cytology and histopathologic assessment in determining infection by *Helicobacter pylori* in outpatient setting. *Pakistan Journal of Biological Sciences* 2011;**14**(12):698–702.

Falaknazi 2010

Falaknazi K, Jalalzadeh M, Vafaeimaneh J. Noninvasive stool antigen assay for screening of *Helicobacter pylori* infection and assessing success of eradication therapy in patients on hemodialysis. *Iranian Journal of Kidney Diseases* 2010;**4**(4):317–21.

Falk 1997

Falk GW. Best tests for detecting *Helicobacter pylori*. *Consultant* 1997;**37**(7):1765.

Fallone 1998

Fallone CA, Loo VG, Barkun AN. Utility of serology in determining *Helicobacter pylori* eradication after therapy. *Canadian Journal of Gastroenterology* 1998;**12**(2):117–24.

Fallone 2000

Fallone CA, Veldhuyzen van Zanten SJ, Chiba N. The urea breath test for *Helicobacter pylori* infection: Taking the wind out of the sails of endoscopy. *CMAJ Canadian Medical Association Journal* 2000;**162**(3):371–2.

Falsafi 2005

Falsafi T, Valizadeh N, Sepehr S, Najafi M. Application of a stool antigen test to evaluate the incidence of *Helicobacter pylori* infection in children and adolescents from Tehran, Iran. *Clinical & Diagnostic Laboratory Immunology* 2005;**12**(9):1094–7.

Falsafi 2009

Falsafi T, Favaedi R, Mahjoub F, Najafi M. Application of stool-PCR test for diagnosis of *Helicobacter pylori* infection

- in children. *World Journal of Gastroenterology* 2009;**15**(4): 484–8.
- Falsafi 2014**
Falsafi T, Lavasani P, Basardeg I, Massarrat S, Landarani Z. Evaluation of an Iranian home *Helicobacter pylori* stool antigen ELISA kit. *Jundishapur Journal of Microbiology* 2014; Vol. 7, issue 6:e10629. [DOI: 10.5812/jjm.10629]
- Fanti 2001**
Fanti L, Ieri R, Mezzi G, Testoni PA, Passaretti S, Guslandi M. Long-term follow-up and serologic assessment after triple therapy with omeprazole or lansoprazole of *Helicobacter*-associated duodenal ulcer. *Journal of Clinical Gastroenterology* 2001;**32**(1):45–8.
- Farkkila 1996**
Farkkila M. Active *Campylobacter pylori* infection diagnosed by the urea breath test. *Duodecim; Laaketieteellinen Aikakauskirja* 1996;**112**(5):349–50.
- Faulde 1991**
Faulde M, Putzker M, Mertes T, Sobe D. Evaluation of an immunofluorescence assay for specific detection of immunoglobulin-G antibodies directed against *Helicobacter-pylori*, and antigenic cross-reactivity between *Helicobacter-pylori* and *Campylobacter-jejuni*. *Journal of Clinical Microbiology* 1991;**29**(2):323–7.
- Fayaz 2014**
Fayaz F, Gachkar L, Roodsari SR, Pourkaveh B. Prevalence of *Helicobacter pylori* infection in patients with down syndrome and mental retardation. *Archives of Clinical Infectious Diseases* 2014 Sep 25 [Epub ahead of print]; Vol. 9, issue 4. [10.5812/archcid.22064]
- Fayed 2008**
Fayed SB, Aref MI, Fathy HM, El Dayem SMA, Emara NA, Maklof A, et al. Prevalence of celiac disease, *Helicobacter pylori* and gastroesophageal reflux in patients with refractory iron deficiency anemia. *Journal of Tropical Pediatrics* 2008; **54**(1):43–53.
- Fazulzyanova 2012**
Fazulzyanova A, Isaeva G, Ivanovskaya K. Evaluation of effectiveness of different methods of *Helicobacter pylori* detection in patients with chronic HCV-infection. *Helicobacter* 2012;**17**:95.
- Fazzio 1995**
Fazzio S, Vazquez G, Ardao G, Blanco J, Vivero E, Gualco G, et al. *Helicobacter pylori*: Comparative study of different diagnostic techniques. *Acta Gastroenterologica Latinoamericana* 1995;**25**(5):269–76.
- Feldman 1995**
Feldman RA, Deeks JJ, Evans SJW. Multilaboratory comparison of 8 commercially available *Helicobacter-pylori* serology kits. *European Journal of Clinical Microbiology & Infectious Diseases* 1995;**14**(5):428–33.
- Felz 1997**
Felz MW, Burke GJ, Schuman BM. Breath test diagnosis of *Helicobacter pylori* in peptic ulcer disease: A noninvasive primary care option. *Journal of the American Board of Family Practice* 1997;**10**(6):385–9.
- Ferrante 1999**
Ferrante LC, Papponetti M, Marcuccitti J, Neri M, Festi D. C-13-urea breath test for *Helicobacter pylori* infection: Stability of samples over time. *Scandinavian Journal of Gastroenterology* 1999;**34**(9):942–3.
- Ferwana 2015**
Ferwana M, Abdulmajeed I, Alhajiahmed A, Madani W, Firwana B, Hasan R, et al. Accuracy of urea breath test in *Helicobacter pylori* infection: Meta-analysis. *World Journal of Gastroenterology* 2015;**21**(4):1305–14.
- Festi 1999**
Festi D, Marcuccitti J, Papponetti M, Colaiocco-Ferrante L, Bonitatibua A, Di Ilio C, et al. C-13-urea breath test for *Helicobacter pylori* infection: A repeatability study. *Gastroenterology* 1999;**116**(4 (suppl)):A162.
- Feteih 2009**
Feteih R, Abdel-Salam M, Jamjoom H, Akbar H. Salivary anti-*Helicobacter pylori* positivity among endoscopy patients with chronic liver disease. *Eastern Mediterranean Health Journal* 2009;**15**(6):1371–8.
- Feydt-Schmidt 2002**
Feydt-Schmidt A, Russmann H, Lehn N, Fischer A, Antoni I, Stork D, et al. Fluorescence in situ hybridization vs. Epsilometer test for detection of clarithromycin-susceptible and clarithromycin-resistant *Helicobacter pylori* strains in gastric biopsies from children. *Alimentary Pharmacology & Therapeutics* 2002;**16**(12):2073–9.
- Figura 1994**
Figura N, Oderda G, Verdiani S. Evaluation of a commercial ELISA kit for the serological diagnosis of *Helicobacter pylori* infection. *New Microbiologica* 1994;**17**(4):319–25.
- Figura 2005**
Figura N, Santucci A, Lahner E, Mini R, Bernardini G, Vaira D, et al. Western blotting for the diagnosis of *Helicobacter pylori* infection in patients with atrophic body gastritis. *Helicobacter* 2005;**10**(5):521.
- Figura 2014**
Figura N, Marini L, Macchiarelli R, Moretti E. Latex agglutination test for detection of *H. pylori* in gastric biopsies. *Helicobacter* 2014;**19**:125.
- Finderle 2013**
Finderle P, Suhadolc K, Osredkar J. Determination of *Helicobacter pylori* antigen in stool in comparison to breath test. *Biochimica Clinica* 2013;**37**:S665.
- Floch 2012**
Floch P, Goret J, Bessede E, Lehours P, Megraud F. Evaluation of the positive predictive value of a rapid immunochromatographic test to detect *Campylobacter* in stools. *Gut Pathogens* 2012 Dec 4; Vol. 4, issue 1:17. [10.1186/1757-4749-4-17]
- Foertsch 2010**
Foertsch S, Neumann H, Vieth M, Guldi DM, Neurath MF, Kuth R. Development of a new electrochemical device for rapid *Helicobacter pylori* detection. *Gastroenterology* 2010;**138**(5 (suppl 1)):S512.

Folwaczny 1999

Folwaczny C, Reichardt B, Klauser A, Klose J, Blendinger C, Wiebecke B, et al. Accuracy of C-13-urea breath test for diagnosis of *Helicobacter pylori* infection in clinical routine. *Gastroenterology* 1999;**116**(4 (suppl)):A164.

Fontana 2000

Fontana C, Pietroiusti A, Mastino A, Pistoia ES, Marino D, Magrini A, et al. Comparison of an enzyme immunoassay versus a rapid latex test for serodiagnosis of *Helicobacter pylori* infection. *European Journal of Clinical Microbiology & Infectious Diseases* 2000;**19**(3):239–40.

Ford 2014

Ford AC, Forman D, Hunt RH, Yuan Y, Moayyedi P. Helicobacter pylori eradication therapy to prevent gastric cancer in healthy asymptomatic infected individuals: systematic review and meta-analysis of randomised controlled trials. *BMJ* 2014;**348**:g3174.

Formichella 2012

Formichella L, Romberg L, Bolz C, Vieth M, Geppert M, Gottner G, et al. A novel line blot system to detect an infection with pathogenic *H. pylori*. *International Journal of Medical Microbiology* 2012;**302**:6.

Forne 2000

Forne M, Dominguez J, Fernandez-Banares F, Lite J, Esteve M, Gali N, et al. Accuracy of an enzyme immunoassay for the detection of *Helicobacter pylori* in stool specimens in the diagnosis of infection and posttreatment check-up. *American Journal of Gastroenterology* 2000;**95**(9):2200–5.

Fowora 2012

Fowora MA, Breithaupt U, Otegbayo JA, Akere A, Onyekwere CA, Ndububa D, et al. Molecular characterization of *Helicobacter pylori* infections in Nigeria. *Helicobacter* 2012;**17**:88.

Fox 1989

Fox JG, Correa P, Taylor NS, Zavala D, Fonstam E, Janney F, et al. *Campylobacter pylori*-associated gastritis and immune response in a population at increased risk of gastric carcinoma. *American Journal of Gastroenterology* 1989;**84**(7):775–81.

Fradkin 1997

Fradkin A, Yahav Y, DiverHaber A, Weisselberg B, Jonas A. The value of anti-*Helicobacter pylori* IgG antibodies in establishing eradication of infection in children. *Israel Journal of Medical Sciences* 1997;**33**(2):87–92.

Franceschi 1999

Franceschi F, Armuzzi A, Maniccia E, Ojetto V, Torre ES, Candelli M, et al. Delta(CO₂)-C-13 excretion and prevalence of gastrointestinal symptoms in subjects evaluated for *H-pylori* infection through C-13-urea breath test. *Gastroenterology* 1999;**116**(4 (suppl)):A164.

Franchini 2007

Franchini M, Cruciani M, Mengoli C, Pizzolo G, Veneri D. Effect of *Helicobacter pylori* eradication on platelet count in idiopathic thrombocytopenic purpura: a systematic review and meta-analysis. *Journal of Antimicrobial Chemotherapy* 2007;**60**(2):237–46.

Fraser 1996a

Fraser AG, Moore L, Rafiq Ali M, Chua LE, Hollis B, Little SV. An audit of low dose triple therapy for eradication of *Helicobacter pylori*. *New Zealand Medical Journal* 1996;**109**(1027):290–2.

Fraser 1996b

Fraser AG, Ali MR, McCullough S, Yeates NJ, Haystead A. Diagnostic tests for *Helicobacter pylori* - can they help select patients for endoscopy. *New Zealand Medical Journal* 1996;**109**(1018):95–8.

Fraser 1997

Fraser AG, McIntosh C, Berry S, Moore L. The urea breath test (UBT) for *H-pylori* (HP) in the initial assessment of dyspepsia in primary care. *Gut* 1997;**41**(suppl):A77–A8.

Fraser 1998

Fraser AG, McIntosh C, Berry S, Moore L. Can the urea breath test for *H. pylori* replace endoscopy for the assessment of dyspepsia in primary care?. *New Zealand Medical Journal* 1998;**111**(1058):11–4.

Fraser 2003

Fraser A, Williamson S, Lane M, Hollis B. Nurse-led dyspepsia clinic using the urea breath test for *Helicobacter pylori*. *New Zealand Medical Journal* 2003;**116**(1176):U479.

Frenck 2006

Frenck RW Jr, Fathy HM, Sherif M, Mohran Z, El Mohammedy H, Francis W, et al. Sensitivity and specificity of various tests for the diagnosis of *Helicobacter pylori* in Egyptian children. *Pediatrics* 2006;**118**(4):e1195–e202.

Fruehauf 2003

Fruehauf H, Lindenmann N, Volkart K, Bauerfeind P, Ben-Oren I, Fried M. The gastroscopic C-13-urea breath test: A new rapid online test for *Helicobacter pylori* (HP) detection during routine upper endoscopy. *Gastroenterology* 2003;**124**(4 (suppl)):A176.

Fry 2005

Fry LC, Curioso WH, Rickes S, Horton G, Hirschowitz BI, Monkemuller K. Comparison of 13C- urea blood test to 13C-breath test and rapid urease test for the diagnosis of *Helicobacter pylori* infection. *Acta Gastroenterologica Latinoamericana* 2005;**35**(4):225–9.

Fujisawa 2001

Fujisawa T, Kaneko T, Kumagai T, Akamatsu T, Katsuyama T, Kiyosawa K, et al. Evaluation of urinary rapid test for *Helicobacter pylori* in general practice. *Journal of Clinical Laboratory Analysis* 2001;**15**(3):154–9.

Fukuda 1996

Fukuda Y, Fukuda S, Munakata A, Yoshida Y, Shimoyama T. Validity of various diagnostic tests to evaluate cure of *Helicobacter pylori* infection. *Journal of Gastroenterology* 1996;**31**(2):171–4.

Fukuda 2002

Fukuda Y, Yoshida K, Ezaki H, Tomita T, Kosaka T, Hori K, et al. Diagnosis of *Helicobacter pylori* infection. *Nihon Rinsho [Japanese Journal of Clinical Medicine]* 2002;**60**(8):1543–8.

Fukuda 2003a

Fukuda Y, Tamura K, Tomita T, Hori K, Tanida N, Shimoyama T. Validation of the accuracy of the *H. pylori* stool antigen test (HPSA) in the Japanese population. *Digestive and Liver Disease* 2003;**35**(1):62–3.

Fukuda 2003b

Fukuda Y, Hori K, Sakagami T, Shimoyama T. Suitable diagnostic methods for *H. pylori* infection after eradication therapy. *Nihon Rinsho [Japanese Journal of Clinical Medicine]* 2003;**61**(1):102–8.

Fukuda 2005

Fukuda S, Tanaka M, Shimoyama T, Sato M, Takahashi R, Munakata A. Applicability of a *Helicobacter pylori* stool antigen test to determine the results of eradication therapy. *Helicobacter* 2005;**10**(5):524.

Fukuda 2006

Fukuda S, Shimoyama T, Nishiya D, Munakata A. Applicability of a *Helicobacter pylori* stool antigen test to determine the results of eradication therapy. *Gastroenterology* 2006;**130**(4 (suppl)):A571.

Fukuda 2007

Fukuda Y, Shimoyama T, Takahashi R, Nakabayashi N, Koizuka H, Abe D, et al. Evaluation of a new monoclonal antibody (HR11-51)-antigen capture ELISA with high specificity for *Helicobacter hepaticus* using sera from mice inoculated with *Helicobacter* species. *Helicobacter* 2007;**12**(4):388–9.

Fukuda 2009

Fukuda Y, Shimoyama T, Ohmura T, Sano Y, Nakabayashi N, Takahashi R, et al. Characterization and application of a new monoclonal antibody with high specificity for *Helicobacter hepaticus*. *Helicobacter* 2009;**14**(1):66–71.

Fusconi 1997

Fusconi M, Farinelli S, Menegatti M, Figura N, Landi F, Quan S, et al. Western immunoblotting (WB) and a recombinant immunoblotting assay (RIBA(TM)) for detection of *H-pylori* (HP) anti Cag-A reactivity (anti-HP Cag-A). *Gut* 1997;**41**(suppl):A73–A4.

Fusconi 1999

Fusconi M, Vaira D, Menegatti M, Farinelli S, Figura N, Holton J, et al. Anti-caga reactivity in *Helicobacter pylori*-negative subjects - a comparison of three different methods. *Digestive Diseases and Sciences* 1999;**44**(8):1691–5.

Galleguillos 1998

Galleguillos C, Gonzalez P, Massardo T, Morales A, Pimentel C, Gil C, et al. Low specificity of carbon-14-urea breath test is the gold standard adequate for *Helicobacter pylori* infection C. *Journal of Nuclear Medicine* 1998;**39**(5 Suppl):57P–8P.

Gallo 2001

Gallo N, Basso D, Zambon CF, Navaglia F, Di Mario F, Rugge M, et al. Diagnosis of *Helicobacter pylori* infection: Comparison of techniques. *Recenti Progressi in Medicina* 2001;**92**(5):332–5.

Ganga-Zandzou 2001

Ganga-Zandzou PS, Vincent P, Michaud L, Guimber D, Turck D, Gottrand F. C-13-urea breath test in children with *Helicobacter pylori* infection: Validity of the use of a mask to collect exhaled breath samples. *Acta Paediatrica* 2001;**90**(2):232–3.

Gangaidzo 1995

Gangaidzo I, Mason PR, Kiire CF, Bak-Jensen E, Willen R, Lelwala-Guruge J, et al. *Helicobacter pylori* in endoscopy patients in Zimbabwe: Value of enzyme-linked immunosorbent assay and a rapid urease test. *Transactions of the Royal Society of Tropical Medicine & Hygiene* 1995;**89**(5):502–5.

Gao 2015

Gao F, Li W. Investigation on causes of false-negative 14-C-urea breath test. *Chinese Journal of Gastroenterology* 2015;**20**(3):151–4.

Garces 2012

Garces HRH, Gonzalez VVC, Fabian LG, Velazquez MI, Pena K, Sierra YA. Chromoendoscopy with red phenol in the diagnosis of *Helicobacter pylori* infection. *Revista Espanola De Enfermedades Digestivas* 2012;**104**(1):4–9.

Garcia 1996

Garcia JIP, Garcia JMP, Alonso IJ. C13 urea breath test for *Helicobacter pylori*. Validation of the method. *Revista Espanola De Enfermedades Digestivas* 1996;**88**(3):202–8.

Garcia 2000

Garcia Valriberas R, Gisbert JP, Hermida C, Cabrera MM, Diaz Blasco J, Pajares JM. Antibodies against *Helicobacter pylori* in saliva. Study of their validity versus breath test and its agreement with serology. *Atencion Primaria / Sociedad Espanola de Medicina de Familia y Comunitaria* 2000;**25**(6):390–4.

Garcia 2006

Garcia AJD, Gisbert JP. Is the string test a useful alternative to gastroscopy with biopsy for h-pylori identification?. *Revista Espanola De Enfermedades Digestivas* 2006;**98**(7):542–6.

Garcia-Diaz 2002

Garcia-Diaz E, Castro-Fernandez M, Romero-Gomez M, Vargas-Romero J. The effectiveness of (IgG-ELISA) serology as an alternative diagnostic method for detecting *Helicobacter pylori* infection in patients with gastro-intestinal bleeding due to gastro-duodenal ulcer. *Revista Espanola De Enfermedades Digestivas* 2002;**94**(12):725–36.

Garza-Gonzalez 2002

Garza-Gonzalez E, Perez-Perez GI, Tijerina-Menchaca R, Maldonado-Garza HJ, Bosques-Padilla FJ. *Helicobacter pylori* genotypes and their association with host's immune response. *Revista de Gastroenterologia de Mexico* 2002;**67**(3):155–60.

Garza-Gonzalez 2003

Garza-Gonzalez E, Bosques-Padilla FJ, Tijerina-Menchaca R, Flores-Gutierrez JP, Maldonado-Garza HJ, Perez-Perez GI. Comparison of endoscopy-based and serum-based

- methods for the diagnosis of *Helicobacter pylori*. *Canadian Journal of Gastroenterology* 2003;**17**(2):101–6.
- Gatta 2003a**
Gatta L, Ricci C, Tampieri A. Noninvasive tests to diagnose *Helicobacter pylori* infection. *Current Gastroenterology Reports* 2003;**5**(5):351–2.
- Gatta 2003b**
Gatta L, Vakil N, Ricci C, Osborn JF, Tampieri A, Perna F, et al. A rapid, low-dose, c-13-urea tablet for the detection of *Helicobacter pylori* infection before and after treatment. *Alimentary Pharmacology & Therapeutics* 2003;**17**(6):793–8.
- Gatta 2003c**
Gatta L, Vakil N, Tampieri A, Ricci C, Perna F, Miglioli M, et al. Effects of proton pump inhibitor therapy (ppi) on 13C breath test (ubt) & stool antigen test (st) in h pylori (hp): Effects of citric acid & orange juice. *Gastroenterology* 2003;**124**(4 (suppl)):A58.
- Gatta 2003d**
Gatta L, Ricci C, Stanghellini V, Ali A, Menegatti M, Labate AMM, et al. Best cut-off values for c-14 -urea breath tests for *Helicobacter pylori* detection. *Scandinavian Journal of Gastroenterology* 2003;**38**(11):1144–8.
- Gatta 2004a**
Gatta L, Vakil N, Ricci C, Osborn JF, Tampieri A, Perna F, et al. Effect of proton pump inhibitors and antacid therapy on 13C urea breath tests and stool test for *Helicobacter pylori* infection. *American Journal of Gastroenterology* 2004;**99**(5):823–9.
- Gatta 2004b**
Gatta L, Perna F, Ricci C, Osborn JF, Tampieri A, Bernabucci V, et al. A rapid immunochromatographic assay for *Helicobacter pylori* in stool before and after treatment. *Alimentary Pharmacology & Therapeutics* 2004;**20**(4):469–74.
- Gatta 2006**
Gatta L, Ricci C, Tampieri A, Osborn J, Perna F, Bernabucci V, et al. Accuracy of breath tests using low doses of 13C-urea to diagnose *Helicobacter pylori* infection: A randomised controlled trial. *Gut* 2006;**55**(4):457–62.
- Gatta 2010a**
Gatta L, Vaira D, Scarpignato C, Mario P, Cavestro G, Cavallaro L, et al. Diagnostic accuracy of serum pepsinogens and gastrin in the follow-up of *Helicobacter pylori* infection: A pilot study. *Digestive and Liver Disease* 2010;**42**:S112.
- Gatta 2010b**
Gatta L, Di Mario F, Vaira D, Rugge M, Scarpignato C, Malfertheiner P, et al. Diagnostic accuracy of serum pepsinogens and gastrin to follow-up *Helicobacter pylori* infection: A pilot study. *Gastroenterology* 2010;**138**(5 (suppl 1)):S340.
- Gatta 2011**
Gatta L, Di Mario F, Vaira D, Rugge M, Franze A, Plebani M, et al. Quantification of serum levels of pepsinogens and gastrin to assess eradication of *Helicobacter pylori*. *Clinical Gastroenterology & Hepatology* 2011;**9**(5):440–2.
- Geletneky 1996**
Geletneky JV, Meineke I, Ludtke FE, Schauer A, Bauer FE. Long-term investigation using the 13C-urea breath test (13C-UBT) for the noninvasive semiquantitative assessment of the extent of the mucosal lesion. *Verdaunungskrankheiten* 1996;**14**(4):125–32.
- Gemignani 2013**
Gemignani L, Savarino E, Corbo M, Dulbecco P, Giacchino M, Giambruno E, et al. The diagnostic value of narrow-band imaging with magnifying endoscopy in the detection of gastric intestinal metaplasia: A prospective study in an unselected population. *Digestive and Liver Disease* 2013;**45**:S206.
- Gene 2000**
Gene E, Calvet X, Azagra R. Diagnosis of *Helicobacter pylori* after triple therapy in uncomplicated duodenal ulcers—a cost-effectiveness analysis. *Alimentary Pharmacology & Therapeutics* 2000;**14**(4):433–42.
- Gerards 1999**
Gerards C, Leodolter A, Nilius M, Peitz U, Malfertheiner P. Should we rely on serology or c-13-urea breath test (c-13-ubt) for therapy decision in h. Pylori infection?. *Gut* 1999;**45**(Suppl 3):A129.
- Gerstenecker 1992**
Gerstenecker B, Eschweiler B, Vogele H, Koch HK, Hellerich U, Kist M. Serodiagnosis of *Helicobacter pylori* infections with an enzyme immunoassay using the chromatographically purified 120 kilodalton protein. *European Journal of Clinical Microbiology & Infectious Diseases* 1992;**11**(7):595–601.
- Ghasemian 2005**
Ghasemian Safaei H, Fazeli A, Tamizifar H, Rashidi N. Comparison of salivary anti *Helicobacter pylori* IgG with serum IgG and bacteriological tests in detecting *Helicobacter pylori* infections. *Journal of Research in Medical Sciences* 2005;**10**(1):1–5.
- Ghosh 2014**
Ghosh R, Uppal B, Aggarwal P, Chakravarti A, Jha AK, Dubey AP. A comparative study of conventional and molecular techniques in diagnosis of campylobacter gastroenteritis in children. *Annals of Clinical and Laboratory Science* 2014;**44**(1):42–8.
- Ghoshal 2010**
Ghoshal UC, Kumar S, Krishnani N, Chourasia D, Tripathi S. Evaluation of utility of pepsinogen (pg)-i, pg-ii and gastrin-17 serum levels in diagnosis of cancer-associated gastric mucosal lesions like intestinal metaplasia in patients with h. Pylori infection in india. *Indian Journal of Gastroenterology* 2010;**29**(1 Suppl):A25–A6.
- Gilger 2002**
Gilger MA, Tolia V, Johnson A, Rabinowitz S, Jibaly R, Elitsur Y, et al. The use of an oral fluid immunoglobulin g ELISA for the detection of *Helicobacter pylori* infection in children. *Helicobacter* 2002;**7**(2):105–10.

Gill 2007

Gill P, Amini M, Ghaemi A, Shokouhizadeh L, Abdul-Tehrani H, Karami A, et al. Detection of *Helicobacter pylori* by enzyme-linked immunosorbent assay of thermophilic helicase-dependent isothermal DNA amplification. *Diagnostic Microbiology & Infectious Disease* 2007;**59**(3): 243–9.

Girdalidze 2013

Girdalidze AM, Elisabedashvili GV, Sharvadze LG, Dzhorbenadze TA. Comparative diagnostic value of *Helicobacter pylori* infection testing methods. *Georgian Medical News* 2013;**225**:53–60.

Gisbert 1996

Gisbert JP, Boixeda D, Redondo C, Alvarez Baleriola I, Jimenez I, Perez Garcia JJ, et al. Breath test in the diagnosis of *Helicobacter pylori* infection: concordance with histological methods and correlation with anatomopathological lesions of the gastric mucosa. *Revista Espanola de Enfermedades Digestivas* 1996;**88**(4):259–64.

Gisbert 1997

Gisbert JP, Boixeda D, deArgila CM, Barba M, Bermejo F, Plaza AG, et al. Long-term follow-up after h-pylori eradication: Reinfection incidence and evolution of urea breath test. *Gut* 1997;**41**(suppl):A78.

Gisbert 1999a

Gisbert JP, Vazquez MA, Jimenez I, Carpio D, Cruzado AI, Del Castillo E, et al. C-13-urea breath test for the diagnosis of h-pylori infection: Is citric acid necessary?. *Gut* 1999;**45** (Suppl 3):A129.

Gisbert 1999b

Gisbert JP, Vazquez MA, Jimenez I, Del Castillo E, Martin MJ, Morales A, et al. C-13-urea breath test for the diagnosis of h-pylori infection: Is citric acid necessary?. *Gastroenterology* 1999;**116**(4 (suppl)):A171.

Gisbert 1999c

Gisbert JP, Boixeda D, Al-Mostafa A, Vila T, De Rafael L, Baleriola IA, et al. Basal and stimulated gastrin and pepsinogen levels after eradication of *Helicobacter pylori*: A 1-year follow-up study. *European Journal of Gastroenterology & Hepatology* 1999;**11**(2):189–200.

Gisbert 2000a

Gisbert J, Gonzalez L, De Pedro A, Vaibueno M, Prieto B, Llorca I, et al. C-13-urea breath test for the diagnosis of h-pylori infection: Are basal samples necessary?. *Gastroenterology* 2000;**118**(4):A1238.

Gisbert 2000b

Gisbert JP. Diagnosis of *Helicobacter pylori* infection. *Revista Clinica Espanola* 2000;**200**(7):370–2.

Gisbert 2000c

Gisbert JP, Benito LM, Lara S, Vazquez A, Jimenez I, Pajares JM. C-13-urea breath test for the diagnosis of *Helicobacter pylori* infection: Are basal samples necessary?. *European Journal of Gastroenterology & Hepatology* 2000;**12**(11): 1201–5.

Gisbert 2000d

Gisbert JP, Blanco M, Benito LM, Pajares JM. Value of quantitative serology for confirmation of *Helicobacter pylori* eradication: An 18-month follow-up study. *Clinical Infectious Diseases* 2000;**30**(6):976–80.

Gisbert 2000e

Gisbert JP, Cruzado AI, Cabrera MM, Carpio D, Benito LM, Perez Poveda JJ, et al. “Rapid” serology for the diagnosis of *Helicobacter pylori* infection. Evaluation of its accuracy compared with a gold-standard and its concordance with “classic” serology. *Gastroenterologia Y Hepatologia* 2000;**23**(4):159–64.

Gisbert 2000f

Gisbert JP, Vazquez MA, Jimenez I, Cruzado AI, Carpio D, Del Castillo E, et al. 13C-urea breath test for the diagnosis of *Helicobacter pylori* infection before treatment: Is citric acid necessary?. *Digestive & Liver Disease* 2000;**32**(1):20–4.

Gisbert 2000g

Gisbert J, Cruzado A, Cabrera M, Carpio D, Benito L, Perez-Poveda J, et al. Rapid whole blood test for diagnosing *H. pylori* infection. Validation against a gold standard and study of its concordance with ELISA serology. *Gastroenterology* 2000;**118**(4):A1238.

Gisbert 2001

Gisbert JP, Pajares JM. Diagnosis of *Helicobacter pylori* infection by stool antigen determination: A systematic review. *American Journal of Gastroenterology* 2001;**96**(10): 2829–38.

Gisbert 2002a

Gisbert JP, Ducons J, Gomollon F, Dominguez-Muñoz E, Borda F, Mino G, et al. Validation of c-13-urea breath test for the initial diagnosis of *Helicobacter pylori* infection and for the confirmation of its eradication after treatment. *Gut* 2002;**51**(Suppl):A109.

Gisbert 2002b

Gisbert JP, Gomollon F, Dominguez-Muñoz E, Borda F, Jimenez I, Vazquez MA, et al. Isotope ratio mass spectrometry (irms) versus nondispersive infrared spectrometry (ndirs) c-13-urea breath test for the diagnosis of *Helicobacter pylori* infection. *Gut* 2002;**51**(Suppl): A111.

Gisbert 2002c

Gisbert JP, Vazquez MA, Cantero J, Pajares JM. Study of the validity of «rapid» serology in diagnosing *Helicobacter pylori* infection. *Atencion Primaria* 2002;**30**(8):501–6.

Gisbert 2002d

Gisbert JP, Cabrera Md Mdel M, Pajares JM. Stool antigen test for initial *Helicobacter pylori* diagnosis and for confirmation of eradication after therapy. *Medicina Clinica* 2002;**118**(11):401–4.

Gisbert 2003a

Gisbert JP, Gomollon F, Dominguez-Muñoz JE, Borda F, Jimenez I, Vazquez MA, et al. Comparison between two 13C-urea breath tests for the diagnosis of *Helicobacter pylori* infection: Isotope ratio mass spectrometer versus

- infrared spectrometer. *Gastroenterologia Y Hepatologia* 2003;**26**(3):141–6.
- Gisbert 2003b**
Gisbert JP, Ducons J, Gomollon F, Dominguez-Muñoz JE, Borda F, Mino G, et al. Validation of the c-13-urea breath test for the initial diagnosis of *Helicobacter pylori* infection and to confirm eradication after treatment. *Revista Espanola De Enfermedades Digestivas* 2003;**95**(2):121–6.
- Gisbert 2004a**
Gisbert JP, Pajares JM. Stool antigen test for the diagnosis of *Helicobacter pylori* infection: A systematic review. *Helicobacter* 2004;**9**(4):347–68.
- Gisbert 2004b**
Gisbert JP, Khorrami S, Carballo F, Calvet X, Gene E, Dominguez-Muñoz E. Meta-analysis: *Helicobacter pylori* eradication therapy vs. antisecretory non-eradication therapy for the prevention of recurrent bleeding from peptic ulcer. *Alimentary Pharmacology and Therapeutics* 2004;**19**(6):617–29.
- Gisbert 2005**
Gisbert JP, Trapero M, Pajares JM. Evaluation of 3 different tests for the detection of stool antigens to confirm *Helicobacter pylori* eradication after treatment. A pilot study. *Gastroenterologia Y Hepatologia* 2005;**28**(10):615–8.
- Gisbert 2006a**
Gisbert JP, Abaira V. Accuracy of *Helicobacter pylori* diagnostic tests in patients with bleeding peptic ulcer: A systematic review and meta-analysis. *American Journal of Gastroenterology* 2006;**101**(4):848–63.
- Gisbert 2006b**
Gisbert JP, De la Morena F, Abaira V. Accuracy of monoclonal stool antigen test for the diagnosis of *Helicobacter pylori* infection: A systematic review and meta-analysis. *Helicobacter* 2006;**11**(4):380.
- Gisbert 2006c**
Gisbert JP, Esteban C, Jimenez I, Moreno-Otero R, Pajares JM. C-13-urea breath test during hospitalization for the diagnosis of *Helicobacter pylori* infection in peptic ulcer bleeding. *Helicobacter* 2006;**11**(4):382.
- Gisbert 2006d**
Gisbert JP, Olivares D, Jimenez I, Pajares JM. Is there any correlation between 13C-urea breath test values and response to first-line and rescue *Helicobacter pylori* eradication therapies?. *Digestive & Liver Disease* 2006;**38**(4):254–9.
- Gisbert 2006e**
Gisbert JP, Olivares D, Jimenez I, Pajares JM. Is there any correlation between c-13-urea breath test values and response to first-line and rescue *Helicobacter pylori* eradication therapies?. *Helicobacter* 2006;**11**(4):380–1.
- Gisbert 2006f**
Gisbert JP, Olivares D, Jimenez I, Pajares JM. Long-term follow-up of 13C-urea breath test results after *Helicobacter pylori* eradication: Frequency and significance of borderline delta13Co2 values. *Alimentary Pharmacology & Therapeutics* 2006;**23**(2):275–80.
- Gisbert 2006g**
Gisbert JR, De la Morena F, Abaira V. Accuracy of monoclonal stool antigen test for the diagnosis of h-pylori infection: A systematic review and meta-analysis. *American Journal of Gastroenterology* 2006;**101**(8):1921–30.
- Gisbert 2006h**
Gisbert JP. Breath test with c-13-urea for h. Pylori infection diagnosis by means of mass spectrometry and infrared spectrophotometry. *Salud I Ciencia* 2006;**15**(1):461–3.
- Gisbert 2007**
Gisbert JP, Esteban C, Jimenez I, Moreno-Otero R. 13C-urea breath test during hospitalization for the diagnosis of *Helicobacter pylori* infection in peptic ulcer bleeding. *Helicobacter* 2007;**12**(3):231–7.
- Glassman 1990**
Glassman MS, Dallal S, Berezin SH, Bostwick HE, Newman LJ, Perez-Perez GI, et al. *Helicobacter pylori*-related gastroduodenal disease in children. Diagnostic utility of enzyme-linked immunosorbent assay. *Digestive Diseases & Sciences* 1990;**35**(8):993–7.
- Glupczynski 1992**
Glupczynski Y, Bourdeaux L, Verhas M, DePrez C, DeVos D, Devreker T. Use of a urea breath test versus invasive methods to determine the prevalence of *Helicobacter pylori* in Zaire. *European Journal of Clinical Microbiology & Infectious Diseases* 1992;**11**(4):322–7.
- Gobert 1988**
Gobert B, Bene MC, Faure G, Dekorwin JD, Conroy MC, Mole C, et al. Detection of antibodies to campylobacter pyloridis by immunoprint and by quantitative ELISA test. *Annales De Biologie Clinique* 1988;**46**(7):523.
- Gobert 1989**
Gobert B, Bene MC, Faure G, Denis JJ, De Korwin JD, Conroy MC, et al. IgG, IgA and IgM antibodies to campylobacter pylori detected by dot-ELISA and ELISA. Gastrointestinal pathology and Campylobacter pylori: European Campylobacter Pylori Study Group ICS847. 1989:219–22.
- Goel 2003**
Goel N, Sherwal BL, Patwari AK, Bajaj P, Choudhury M. Evaluation of invasive and non-invasive diagnostic modalities for *Helicobacter pylori* infection in children. *Indian Pediatrics* 2003;**40**(2):141–6.
- Goettner 2012**
Goettner G, Formicella L, Romberg L, Bolz C, Nolting C, Soutschek E, et al. Novel immuno-line system to detect infections with pathogenic h. Pylori. *Helicobacter* 2012;**17**:70.
- Goh 1995**
Goh KL, Parasakthi N, Peh SC, Ong KK. 14c-urea breath test: A useful non-invasive test in the diagnosis of *Helicobacter pylori* infection. *Medical Journal of Malaysia* 1995;**50**(3):208–11.

Goji 2015

Goji S, Tamura Y, Sasaki M, Nakamura M, Matsui H, Yamagata Murayama S, et al. Helicobacter suis-infected nodular gastritis and a review of diagnostic sensitivity for Helicobacter heilmannii-like organisms. *Case Reports in Gastroenterology* 2015;**9**:179–87.

Gold 2000

Gold BD, Colletti RB, Abbott M, Czinn SJ, Elitsur Y, Hassall E, et al. Helicobacter pylori infection in children: Recommendations for diagnosis and treatment. *Journal of Pediatric Gastroenterology and Nutrition* 2000;**31**(5):490–7.

Gold 2014

Gold BD, Elfant AB. Helicobacter pylori detection and eradication in pediatric and adult patients. *Gastroenterology and Hepatology* 2014;**10**(7):447–50.

Gomes 2002

Gomes AT, Coelho LK, Secaf M, Modena JL, Troncon LE, Oliveira RB. Accuracy of the 14c-urea breath test for the diagnosis of Helicobacter pylori. *Sao Paulo Medical Journal [Revista Paulista de Medicina]* 2002;**120**(3):68–71.

Gomes 2005

Gomes CAR Jr, Catapani WR, Mader AMAA, Locatelli A, Silva CBP, Waisberg J. Antral exfoliative cytology for the detection of Helicobacter pylori in the stomach. *World Journal of Gastroenterology* 2005;**11**(18):2784–8.

Gomez 2000

Gomez MR, Vargas J, Grande L, Otero MA, Bernal S, Fernandez MC. Usefulness of Helicobacter pylori antigens detection in stools for infection diagnosis and confirming eradication. *Medicina Clinica* 2000;**114**(15):571–3.

Gomez 2011

Gomez PP, Rodriguez CG, Meleiro JI, Rodriguez MM, Sanchez FM. Helicobacter pylori infection in children diagnosed via the urea breath test. *Helicobacter* 2011;**16**: 111.

Gomez-Camarasa 2014

Gomez-Camarasa C, Gutierrez-Fernandez J, Rodriguez-Granger JM, Sampedro-Martinez A, Sorlozano-Puerto A, Navarro-Mari JM. Evaluation of the rapid ridaquick campylobacter test in a general hospital. *Diagnostic Microbiology and Infectious Disease* 2014;**78**(2):101–4.

Gomollon 2003

Gomollon F, Ducons JA, Santolaria S, Omiste IL, Guirao R, Ferrero A, et al. Breath test is very reliable for diagnosis of Helicobacter pylori infection in real clinical practice. *Digestive and Liver Disease* 2003;**35**(9):612–8.

Gong 2010

Gong YH, Sun LP, Jin SG, Yuan Y. Comparative study of serology and histology based detection of Helicobacter pylori infections: A large population-based study of 7, 241 subjects from China. *European Journal of Clinical Microbiology & Infectious Diseases* 2010;**29**(7):907–11.

Gong 2014

Gong YH, Wei W, Yuan Y. Association between abnormal gastric function risk and Helicobacter pylori infection

assessed by ELISA and C-14-urea breath test. *Diagnostic Microbiology and Infectious Disease* 2014;**80**(4):316–20.

Gonzalez 2003

Gonzalez P, Galleguillos C, Massardo T, Rivera M, Morales A, Smok G, et al. Could the [14c]urea breath test be proposed as a 'gold standard' for detection of Helicobacter pylori infection ?. *Medical Science Monitor* 2003;**9**(8): CR363–8.

Gonzalez 2004

Gonzalez P. 14c-urea breath test as a 'gold standard' for detection of Helicobacter pylori infection - in reply. *Medical Science Monitor* 2004;**10**(9):LE17–LE8.

Gonzalez 2007

Gonzalez FCG, Serrano C, Harris PR. Diagnosis of Helicobacter pylori infection in children based on stool antigen test. *Revista Medica De Chile* 2007;**135**(2):182–8.

Gonzalez 2012

Gonzalez CA, Megraud F, Buissonniere A, Lujan Barroso L, Agudo A, Duell EJ, et al. Helicobacter pylori infection assessed by ELISA and by immunoblot and noncardia gastric cancer risk in a prospective study: The eurgast-epic project. *Annals of Oncology* 2012;**23**(5):1320–4.

Gonzalez 2013

Gonzalez L, Marrero K, Reyes O, Rodriguez E, Martinez L, Rodriguez BL. Cloning and expression of a recombinant caga -gene fragment of Helicobacter pylori and its preliminary evaluation in serodiagnosis. *Biomedica* 2013;**33** (4):546–53.

Gonzalez-Cuevas 2001

Gonzalez-Cuevas A, Juncosa T, Jene M, Varea V, Gene A, Muñoz C, et al. Helicobacter pylori infections: Antigen detection in stool samples. *Enfermedades Infecciosas Y Microbiologia Clinica* 2001;**19**(2):49–52.

Good 1991

Good DJ, Dill S, Mossi S, Frey R, Beglinger C, Stalder GA, et al. Sensitivity and specificity of a simplified, standardized 13C-urea breath test for the demonstration of Helicobacter pylori. *Schweizerische Medizinische Wochenschrift Journal Suisse de Medecine* 1991;**121**(20):764–6.

Goodwin 1987

Goodwin CS, Blincow E, Peterson G. Enzyme-linked immunosorbent assay for campylobacter pyloridis: Correlation with presence of c. Pyloridis in the gastric mucosa. *Journal of Infectious Diseases* 1987;**155**(3):488–94.

Gosciniak 1993

Gosciniak G, Matysiak-Budnik T, Przondo-Mordarska A. Evaluation of three serological tests for the detection of Helicobacter pylori associated infection. *Archivum Immunologiae et Therapiae Experimentalis* 1993;**41**(5-6): 315–9.

Gosciniak 1996

Gosciniak G, Poniewierka E, Iwanczak B, Grzeszek T. Iga antibodies against Helicobacter pylori in serum and saliva of patients with upper gastrointestinal tract diseases. *Gastroenterologia Polska* 1996;**3**(2):119–24.

Gosciniak 2000

Gosciniak G, Przondo-Mordarska A, Iwanczak B, Poniewierka E. Neutralisation of vacuolating activity of cytotoxin by serum antibodies of *Helicobacter pylori* infected patients. *Acta Microbiologica Polonica* 2000;**49**(2): 113–20.

Gosciniak 2002

Gosciniak G, Przondo-Mordarska A, Iwanczak B, Blitek A. Detection of *Helicobacter pylori* antigen in stool specimens taken from children with chronic gastritis. *Polski Merkuriusz Lekarski* 2002;**12**(68):104–7.

Gosciniak 2003

Gosciniak G, Przondo-Mordarska A, Iwanczak B, Blitek A. *Helicobacter pylori* antigens in stool specimens of gastritis children before and after treatment. *Journal of Pediatric Gastroenterology & Nutrition* 2003;**36**(3):376–80.

Goto 1995

Goto Y, Ogihara Y, Taniguchi Y, Satoh K, Kimura K, Takatori K, et al. Simple rapid and inexpensive diagnosis of *Helicobacter-pylori* infection in c-13-urea breath test - ir spectrometric analysis. *Gastroenterology* 1995;**108**(4 (suppl)):A103.

Goto 1998

Goto A, Fujimori K, Kaneko T, Akamatsu T. Diagnosis of *Helicobacter* infections by serodiagnosis, analysis of serum pepsinogen, and urea breath tests. *Nihon Naika Gakkai Zasshi [Journal of the Japanese Society of Internal Medicine]* 1998;**87**(5):863–7.

Gotoh 1997

Gotoh T, Nishizono A, Mifune K, Fujioka T, Nasu M, Azumi J. Validity of the new ELISA system of serodiagnosis for eradication of *Helicobacter pylori* infection. *Gastroenterology* 1997;**112**(4 (suppl)):A131.

Gottrand 2001

Gottrand F. Diagnostic tests and treatment of helicopter pylori gastritis in children. *Archives De Pediatrie* 2001;**8**: 396S–8S.

Graham 1986

Graham DY, Klein PD, Evans DG, Opekun AR, Evans DG, Alpert LC, et al. Rapid noninvasive diagnosis of gastric campylobacter by a c-13 urea breath test. *Gastroenterology* 1986;**90**(5):1435.

Graham 1987

Graham DY, Evans DJ, Alpert LC, Klein PD, Evans DG, Opekun AR, et al. *Campylobacter-pylori* detected noninvasively by the c-13 urea breath test. *Lancet* 1987;**1** (8543):1174–7.

Graham 1991

Graham DY, Malaty HM, Evans DG, Evans DJ Jr, Klein PD, Adam E. Epidemiology of *Helicobacter pylori* in an asymptomatic population in the United States. Effect of age, race, and socioeconomic status. *Gastroenterology* 1991;**100**(6):1495–501.

Graham 1996b

Graham DY, Malaty HM, ElZimaity HM, Genta RM, Yousfi MM, Klein PD. 20 minute fasting version of the

c-13-urea breath test for the diagnosis of h-pylori infection. *Gastroenterology* 1996;**110**(4 (suppl)):A122.

Graham 2000

Graham DY, Klein PD. Accurate diagnosis of *Helicobacter pylori* - c-13-urea breath test. *Gastroenterology Clinics of North America* 2000;**29**(4):885.

Graham 2001a

Graham DY, Malaty HM, Cole RA, Martin RF, Klein PD. Simplified 13C-urea breath test for detection of *Helicobacter pylori* infection. *American Journal of Gastroenterology* 2001;**96**(6):1741–5.

Graham 2001b

Graham DY, Reddy S. Rapid detection of anti-*Helicobacter pylori* igg in urine using immunochromatography. *Alimentary Pharmacology & Therapeutics* 2001;**15**(5): 699–702.

Graham 2001c

Graham DY. An alternate explanation of the effect of citric acid on proton pump inhibitor-associated false negative urea breath tests. *American Journal of Gastroenterology* 2001;**96**(10):3037–9.

Graham 2010

Graham DY. Monoclonal stool antigen testing for diagnosing *Helicobacter pylori* in young children: Revisited. *Journal of Pediatric Gastroenterology and Nutrition* 2010;**51** (3):373.

Granberg 1993

Granberg C, Mansikka A, Lehtonen OP, Kujari H, Gronfors R, Nurmi H, et al. Diagnosis of *Helicobacter pylori* infection by using Pyloriset EIA-G and EIA-A for detection of serum immunoglobulin G (IgG) and IgA antibodies. *Journal of Clinical Microbiology* 1993;**31**(6):1450–3.

Grino 2001

Grino P, Pascual S, Such J, Casellas JA, Niveiro M, Andreu M, et al. Comparison of diagnostic methods for *Helicobacter pylori* infection in patients with upper gastrointestinal bleeding. *Scandinavian Journal of Gastroenterology* 2001;**36**(12):1254–8.

Grino 2003

Grino P, Pascual S, Such J, Casellas JA, Niveiro M, Andreu M, et al. Comparison of stool immunoassay with standard methods for detection of *Helicobacter pylori* infection in patients with upper-gastrointestinal bleeding of peptic origin. *European Journal of Gastroenterology & Hepatology* 2003;**15**(5):525–9.

Grossi 2000

Grossi C, Mombelli B, Capurso G, Martino G, Gismondo M, Lahner E, et al. Low sensitivity of c-13-urea breath test (ubt) in the diagnosis of h-pylori infection in atrophic body gastritis patients (abg). *Gut* 2000;**47**(Suppl 1):A117.

Grossi 2012

Grossi L, Di Tullio AM, Pagliaro M, Tavani R, Coccilillo S, Ciccaglione AF, et al. Relationship between *Helicobacter pylori* infection and gerd symptoms. *Digestive and Liver Disease* 2012;**44**:S152.

Grotowski 1998

Grotowski M, Winnicki L, Trawinski J, Gancarz A, Domaniecki J. Prevalence of *Helicobacter pylori* infection after surgery of gastric or duodenal peptic ulcer. *Gastroenterologia Polska* 1998;**5**(6):525–30.

Groves 1997

Groves FD, Zhang L, Li JY, You WC, Chang YS, Zhao L, et al. Comparison of two enzyme-linked immunosorbent assay tests for diagnosis of *Helicobacter pylori* infection in China. *Cancer Epidemiology, Biomarkers & Prevention* 1997;**6**(7):551–2.

Groves 2002

Groves FD, Perez-Perez G, Zhang L, You WC, Lipsitz SR, Gail MH, et al. Serum antibodies to *Helicobacter pylori* and the caga antigen do not explain differences in the prevalence of precancerous gastric lesions in two Chinese populations with contrasting gastric cancer rates. *Cancer Epidemiology Biomarkers and Prevention* 2002;**11**(10 I): 1091–4.

Guducuoglu 2010

Guducuoglu H, Berktaş M, Bozkurt H, Toka Ozer T, Bulut G, Ozturk O, et al. Evaluation of western blot method for the detection of antibodies to *Helicobacter pylori* antigens in patients with gastric carcinoma and cases with epigastric complaints. *Mikrobiyoloji Bulteni* 2010;**44**(1):21–8.

Guell 2006

Guell M, Artigau E, Esteve V, Sanchez-Delgado J, Junquera F, Calvet X. Usefulness of a delayed test for the diagnosis of *Helicobacter pylori* infection in bleeding peptic ulcer. *Alimentary Pharmacology & Therapeutics* 2006;**23**(1):53–9.

Guja 1999

Guja M, Lombardo L, Andrini L, Della Monica P, Vicari S, Sallio F, et al. Is *Helicobacter pylori* stool antigen assay comparable to urea breath test in the diagnosis of h-pylori infection?. *Gastroenterology* 1999;**116**(4 (suppl)):A178.

Gulcan 2005

Gulcan EM, Varol A, Kutlu T, Cullu F, Erkan T, Adal E, et al. *Helicobacter pylori* stool antigen test. *Indian Journal of Pediatrics* 2005;**72**(8):675–8.

Gunay 2009

Gunay EC, Yengel E, Uckle E, Altintas E, Sezgin O. C-14 urea breath test values do not correlate with the degree of colonization by *Helicobacter pylori* in adults. *European Journal of Nuclear Medicine and Molecular Imaging* 2009;**36**:S442.

Guo 2005

Guo YY, Zhang ST, Peng XX, Zhan SY. A systematic review of diagnosis of *Helicobacter pylori* infection by *Helicobacter pylori* stool antigen test.. *National Medical Journal of China* 2005;**85**(22):1564–7.

Gupta 2003

Gupta P, Pandey LB, Behra RN, Rai MK, Chandra R. Role of ELISA in *H. pylori* detection and its correlation with urease test. *Indian Journal of Pathology & Microbiology* 2003;**46**(3):511–4.

Gurbuz 2009

Gurbuz ED, Soyuturk M, Yilmaz O, Bekmen N, Guvenir M, Ellidokuz H, et al. The importance of stool antigen test for the diagnosis of *Helicobacter pylori* infection and eradication follow-up. *Clinical Microbiology and Infection* 2009;**15**:S316.

Guslandi 2000

Guslandi M. Stool immunoassay for *Helicobacter pylori* is not specific enough. *BMJ* 2000;**320**(7248):1541.

Gutierrez 1999

Gutierrez A, Celtran MT, Bonilla F, Vazquez N, Royo G, Sillero C. Use of *Helicobacter pylori* (hp) antigen test in stool samples to detect hp infection. *Gastroenterologia y Hepatologia* 1999;**22**(10):533.

Gutierrez 2005

Gutierrez S, Chacon-Petrola M, Flores M, Pinto A, Pacheco M. Evaluation of infection by *Helicobacter pylori* in hiv positive patients trough enzyme immunoassay and specific amplification of DNA. *Investigacion Clinica* 2005;**46**(1): 43–52.

Guven 2011

Guven MA, Ertas IE, Coskun A, Ciragil P. Serologic and stool antigen assay of *Helicobacter pylori* infection in hyperemesis gravidarum: Which test is useful during early pregnancy?. *Taiwanese Journal of Obstetrics & Gynecology* 2011;**50**(1):37–41.

Hackelsberger 1998

Hackelsberger A, Schultze V, Peitz U, Gunther T, Nilius M, Diete U, et al. Performance of a rapid whole blood test for *Helicobacter pylori* in primary care: A German multicenter study. *Helicobacter* 1998;**3**(3):179–83.

Haggerty 2005

Haggerty TD, Perry S, Sanchez L, Perez-Perez G, Parsonnet J. Significance of transiently positive enzyme-linked immunosorbent assay results in detection of *Helicobacter pylori* in stool samples from children. *Journal of Clinical Microbiology* 2005;**43**(5):2220–3.

Hahn 2000

Hahn M, Fennerty MB, Corless CL, Magaret N, Lieberman DA, Faigel DO. Noninvasive tests as a substitute for histology in the diagnosis of *Helicobacter pylori* infection. *Gastrointestinal Endoscopy* 2000;**52**(1):20–6.

Hamlet 1995

Hamlet AK, Erlandsson KIM, Olbe L, Svennerholm AM, Backman VEM, Pettersson AB. A simple, rapid, and highly reliable capsule-based ¹⁴C urea breath test for diagnosis of *Helicobacter pylori* infection. *Scandinavian Journal of Gastroenterology* 1995;**30**(11):1058–63.

Hamlet 1999

Hamlet A, Stage L, Lonroth H, Cahlin C, Nystrom C, Pettersson A. A novel tablet-based c-13 urea breath test for *Helicobacter pylori* with enhanced performance during acid suppression therapy. *Scandinavian Journal of Gastroenterology* 1999;**34**(4):367–74.

Han 2006

Han FC, Li XJ, Jiang H, Qin LP, Li D, Guo YH, et al. Detection of h. Pylori antibody profile in serum by protein array. *World Journal of Gastroenterology* 2006;**12**(25): 4044–8.

Hanvivatvong 2004

Hanvivatvong O, Pongpanich A, Thong-Ngam D, Thammacharoenrach N, Kullavanijaya P. Evaluation of commercial immunoassays for detection of antibody against *Helicobacter pylori* in Thai dyspeptic patients. *Clinical and Diagnostic Laboratory Immunology* 2004;**11**(3):618–20.

Hanvivatvong 2006

Hanvivatvong O, Thong-Ngam D, Kuakarn S, Mahachai V. Evaluation of *Helicobacter pylori* stool antigen test in Thai patients with upper gastrointestinal bleeding. *Journal of the Medical Association of Thailand* 2006;**89** Suppl 3:S98–103.

Harde 2008

Harde H, Dressler M, Helmrich G, Wolff M, Groninga H. New optical analyzer for c-13-breath test. *Biophotonics: photonic solutions for better health care. Progress in biomedical optics and imaging*; 2008 April 8-10; Strasbourg. Bellingham (DC): SPIE, 2008; Vol. 6691: 69910T. [DOI: 10.1117/12.781271; 69910T]

Harde 2010

Harde H, Helmrich G, Wolff M. Optoacoustic c-13-breath test analyzer. Photons plus ultrasound: imaging and sensing 2010. International Society for Optical Engineering; 2010 Jan 24-26; San Francisco (CA). Bellingham (WA): SPIE, 2010; Vol. 7564:75641E. [DOI: 10.1117/12.841660]

Harries 1992

Harries AD, Stewart M, Deegan KM, Mughogho GK, Wirima JJ, Hommel M, et al. *Helicobacter pylori* in Malawi, central africa. *Journal of Infection* 1992;**24**(3): 269–76.

Harris 1995

Harris AW. *Helicobacter pylori* testing at home. *European Journal of Gastroenterology & Hepatology* 1995;**7**(7):595–6.

Harris 1998

Harris AW. *Helicobacter pylori* and urea breath testing. Can the breath test result predict the outcome of treatment? . *Italian Journal of Gastroenterology & Hepatology* 1998;**30** (2):151–2.

Harrison 1998

Harrison JR, Bevan J, Furth EE, Metz DC. Accustat whole blood fingerstick test for *Helicobacter pylori* infection - a reliable screening method. *Journal of Clinical Gastroenterology* 1998;**27**(1):50–3.

Hart 1999

Hart GC, Avison MP. 13C-urea versus 14c-urea breath test: Is there still a need for 14c-urea?. *Nuclear Medicine Communications* 1999;**20**(5):495–6.

Hartman 1992

Hartman NG, Jay M, Hill DB, Bera RK, Nickl NJ, Ryo UY. Noninvasive detection of *Helicobacter pylori* colonization in stomach using ¹¹C-urea. *Digestive Diseases and Sciences* 1992;**37**(4):618–21.

Hartmann 2003

Hartmann D, Schilling D, Riemann JF. New nondispersive infrared spectrometry in c-13-urea breath tests. *Deutsche Medizinische Wochenschrift* 2003;**128**(31-32):1645–8.

Hashemi 2008

Hashemi MR, Rahnavardi M, Bikdeli B, Zahedani MD, Iranmanesh F. Touch cytology in diagnosing *Helicobacter pylori*: Comparison of four staining methods. *Cytopathology* 2008;**19**(3):179–84.

Hassan 2013

Hassan K, Haq M. To study the frequency of h pylori in patients presenting with functional dyspepsia using stool antigen test and its comparison with serology. *Journal of Gastroenterology and Hepatology* 2013;**28**:547.

Hauser 2006

Hauser B, Wybo I, Tshibuabua G, Pierard D, Vandenplas Y. Multiple-step polyclonal versus one-step monoclonal enzyme immunoassay in the detection of *Helicobacter pylori* antigen in the stools of children. *Acta Paediatrica* 2006;**95**(3):297–301.

Havlasova 1998

Havlasova J, Bures J, Rejchrt S, Voxova B, Krejssek J. *Helicobacter pylori* caga antigen antibodies. *Casopis Lekarů Ceskych* 1998;**137**(13):404–9.

Hawthorne 1999

Hawthorne Barney A, Morgan S, Westmoreland D, Stenson R, Thomas GAO, Newcombe RG. A comparison of two rapid whole-blood tests and laboratory serology, in the diagnosis of *Helicobacter pylori* infection. *European Journal of Gastroenterology & Hepatology* 1999;**11**(8):863–5.

Hawtin 1999

Hawtin PR. Serology and urea breath test in the diagnosis of h-pylori infection. *Molecular Biotechnology* 1999;**11**(1): 85–92.

Hayashi 2003

Hayashi T, Karasawa T, Nagase H, Kinami S, Fujimura T, Miwa K, et al. Timing of sampling in endoscopic ¹³C-urea breath test for *H. pylori* infection. *Japanese Pharmacology and Therapeutics* 2003;**31**(8):667–70.

He 1997

He YN, Chen HY, Zheng JJ, Zhang GY, Chen ZL. Differential pulse voltammetric enzyme-linked immunoassay for the determination of *Helicobacter pylori* specific immunoglobulin g (igg) antibody. *Talanta* 1997;**44** (5):823–30.

Heaney 1998

Heaney A, Collins JS, Watson RG, McFarland RJ, Bamford KB. Rapid serological diagnosis of *Helicobacter pylori*: A need for caution and re-evaluation. *Irish Journal of Medical Science* 1998;**167**(3):152–4.

Heanhean 2013

Heanhean Ng T, Rosaida R. Evaluation of serology and urea breath test as reliable diagnostic test for h.Pylori infection. *Journal of Gastroenterology and Hepatology* 2013;**28**:97.

Heenan 1989

Heenan A. Breath tester. *Nursing Times* 1989;**85**(36):23.

Hegedus 2001a

Hegedus O, Rehnberg AS, Bengtsson C, Befrits R, Granstrom M, Hellstrom PM. Refinement and development of a "dry" novel 14c-urea breath test (heliprobe (tm)) for detection of *Helicobacter pylori*. *Gastroenterology* 2001;**120** (5 (suppl)):A653.

Hegedus 2001b

Hegedus O, Mjornell U, Prior C, Ryden J, Hellstrom PM. Rapid urea breath test (heliprobe) for detection of *Helicobacter pylori* by use of encapsulated acidified solid c-14-urea: Validation of test accuracy. *Gut* 2001;**49**(Suppl):A101.

Hegedus 2002

Hegedus O, Ryden J, Rehnberg AS, Nilsson S, Hellstrom PM. Validated accuracy of a novel urea breath test for rapid *Helicobacter pylori* detection and in-office analysis. *European Journal of Gastroenterology & Hepatology* 2002;**14** (5):513–20.

Helvacı 1993

Helvacı S, Akdis C, Gulten M, Yerci O. Evaluation of the ELISA method for the diagnosis of *Helicobacter pylori*. *Mikrobiyoloji Bulteni* 1993;**27**(4):294–8.

Henze 1988

Henze E, Malfertheiner P, Burkhardt H, Clausen M, Adam WE. The c-14 urea breath test for detecting colonization of campylobacter pylori invivo. *European Journal of Nuclear Medicine* 1988;**14**(5-6):245.

Henze 1989

Henze E, Malfertheiner P, Clausen M, Lietzenmaier R, Burkhardt H, Adam WE. Diagnostic accuracy of a ¹⁴C-urea breath test for detecting campylobacter pylori infection. Gastrointestinal pathology and Campylobacter pylori: European Campylobacter Pylori Study Group ICS847. 1989:85–8.

Henze 1990

Henze E, Malfertheiner P, Clausen M, Burkhardt H, Adam WE. Validation of a simplified carbon-14-urea breath test for routine use for detecting *Helicobacter* [correction of *heliobacter*] pylori noninvasively. *Journal of Nuclear Medicine* 1990;**31**(12):1940–4.

Herbrink 1988

Herbrink P, Vandenmunckhof HAM, Bumkens M, Lindeman J, Vandijk WC. Human-serum antibody-response in campylobacter-jejuni enteritis as measured by enzyme-linked immunosorbent-assay. *European Journal of Clinical Microbiology & Infectious Diseases* 1988;**7**(3):388–93.

Herold 2002

Herold R, Becker M. 13C-urea breath test threshold calculation and evaluation for the detection of *Helicobacter pylori* infection in children. *BMC Gastroenterology* 2002;**2**:12.

Hidaka 2010

Hidaka N, Nakayama Y, Horiuchi A, Kato S, Sano K. Endoscopic identification of *Helicobacter pylori* gastritis in children. *Digestive Endoscopy* 2010;**22**(2):90–4.

Higazy 2000

Higazy E, Al-Saeedi F, Loutfi I, Heiba S, Kalaoui M, Al-Nakib B, et al. The impact of brushing teeth on carbon-14 urea breath test results. *Journal of Nuclear Medicine Technology* 2000;**28**(3):162–4.

Hildebrand 1997

Hildebrand P, Beglinger C. Nondispersive infrared spectrometry: A new method for the detection of *Helicobacter pylori* infection with the c-13-urea breath test. *Clinical Infectious Diseases* 1997;**25**(5):1003–5.

Hilker 1994

Hilker E, Stoll R, Domschke W. Quantitative assessment of *Helicobacter-pylori* (hp) colonization of the gastric-mucosa by c-13-urea breath test. *Gastroenterology* 1994;**106**(4 (suppl)):A93.

Hilker 1996

Hilker E, Domschke W, Stoll R. C-13-urea breath test for detection of *Helicobacter pylori* and its correlation with endoscopic and histologic findings. *Journal of Physiology and Pharmacology* 1996;**47**(1):79–90.

Hino 2004

Hino B, Eliakim T, Levine A, Sprecher H, Berkowitz D, Hartman C, et al. Comparison of invasive and non-invasive tests diagnosis and monitoring of *Helicobacter pylori* infection in children. *Journal of Pediatric Gastroenterology and Nutrition* 2004;**39**(5):519–23.

Hirschl 1990

Hirschl AM, Rathbone BJ, Wyatt JI, Berger J, Rotter ML. Comparison of ELISA antigen preparations alone or in combination for serodiagnosing *Helicobacter pylori* infections. *Journal of Clinical Pathology* 1990;**43**(6):511–3.

Hirschl 1991

Hirschl AM, Hirschl MM, Berger J, Rotter ML. Evaluation of a commercial latex test for serological diagnosis of *Helicobacter pylori* infection in treated and untreated patients. *European Journal of Clinical Microbiology & Infectious Diseases* 1991;**10**(11):971–4.

Hirschl 1993

Hirschl AM, Brandstatter G, Dragosics B, Hentschel E, Kundi M, Rotter ML, et al. Kinetics of specific igg antibodies for monitoring the effect of anti-*Helicobacter pylori* chemotherapy. *Journal of Infectious Diseases* 1993;**168** (3):763–6.

Hirschl 1996

Hirschl AM, Rotter ML. Serological tests for monitoring *Helicobacter pylori* eradication treatment. *Journal of Gastroenterology* 1996;**31** Suppl 9:33–6.

Hirschl 2005

Hirschl AM, Makristathis A. Non-invasive *Helicobacter pylori* diagnosis: Stool or breath tests?. *Digestive & Liver Disease* 2005;**37**(10):732–4.

Ho 1996

Ho AS, Young TH, Shyu RY, Yeh C, Tseng HH, Lee SC, et al. The accuracy of the rapid urease test and 13C-urea breath test in the diagnosis of Helicobacter pylori infection. *Chung Hua i Hsueh Tsa Chih [Chinese Medical Journal]* 1996;**58**(6):400–6.

Ho 2000

Ho B, Marshall BJ. Accurate diagnosis of Helicobacter pylori - serologic testing. *Gastroenterology Clinics of North America* 2000;**29**(4):853.

Ho 2004

Ho CY, Chen TS, Chang FY, Lee SD. Rapid urease test from non-ulcer part of stomach is superior to histology from ulcer in detection of Helicobacter pylori infection in patients with gastric ulcer. *Hepato-Gastroenterology* 2004;**51**(60):1877–80.

Hoang 2006

Hoang TT, Rehnberg AS, Wheeldon TU, Bengtsson C, Phung DC, Befrits R, et al. Comparison of the performance of serological kits for Helicobacter pylori infection with european and asian study populations. *Clinical Microbiology & Infection* 2006;**12**(11):1112–7.

Hoek 1992

Hoek FJ, Noach LA, Rauws EAJ, Tytgat GNJ. Evaluation of the performance of commercial test kits for detection of Helicobacter pylori antibodies in serum. *Journal of Clinical Microbiology* 1992;**30**(6):1525–8.

Hollenz 1999

Hollenz M, Stolte M, Labenz J. Helicobacter pylori screening in a general practice. *Deutsche Medizinische Wochenschrift* 1999;**124**(7):171–5.

Hong 2008

Hong WD, Zhu QH, Chen XR. Study on the value of helicobacter pylori (h. Pylori) stool antigen immunocard stat in the diagnosis of h. Pylori infection: A meta-analysis.. *Zhonghua Liu Xing Bing Xue Za Zhi* 2008;**29**(1):71–4.

Hooton 2006

Hooton C, Keohane J, Clair J, Azam M, O'Mahony S, Crosbie O, et al. Comparison of three stool antigen assays with the c-13-urea breath test for the primary diagnosis of Helicobacter pylori infection and monitoring treatment outcome. *European Journal of Gastroenterology & Hepatology* 2006;**18**(6):595–9.

Hoshiya 2001

Hoshiya S, Tokunaga K, Tanaka A, Takahashi S. Serological diagnosis of Helicobacter pylori infection. *Nihon Rinsho [Japanese Journal of Clinical Medicine]* 2001;**59**(2):259–64.

Houben 1998

Houben M, Hensen EF, Stam P, Van't Hoff BWM, Van der Hulst RWM, Van der Ende A, et al. Post-eradication evaluation of h-pylori (hp) status: The c-13 urea laser assisted ratio analyzer (lara) breath test. *Gastroenterology* 1998;**114**(4 (suppl)):A153.

Houben 1999

Houben M, Vaira D, Lam K, Hensen EF, Stam P, Van 't Hoff BWM, et al. Usefulness of the c-13 lara (tm) urea

breath test in confirming eradication of Helicobacter pylori (hp). *Gastroenterology* 1999;**116**(4 (suppl)):A190.

Hsu 2010

Hsu PI. Application of serology in the diagnosis of Helicobacter pylori infection in patients with atrophic gastritis. *Journal of the Chinese Medical Association* 2010;**73**(11):561–2.

Hu 1995

Hu P, Cui Y, Chen M. Application of serology and 14c-urea breath test to monitoring of the effect of anti-Helicobacter pylori chemotherapy.. *Zhonghua Nei Ke Za Zhi [Chinese journal of internal medicine]* 1995;**34**(12):819–22.

Hu 2000

Hu F, Cheng H, Li J. Evaluation and comparison of the Helicobacter pylori stool antigen test and the gastric mucosal antigen test.. *Zhonghua Yi Xue Za Zhi* 2000;**80**(11):820–2.

Hu 2007

Hu HM, Kuo CH, Lo YC, Wu MT, Wu IC, Lu CY, et al. Evaluation of the two immunochromatographic methods for detecting urine and serum igg antibodies to Helicobacter pylori and comparison of accuracy and clinical utility. *Hepato-Gastroenterology* 2007;**54**(73):119–23.

Hu 2011

Hu FL. Performance of current infection marker test for the diagnosis of Helicobacter pylori current infection: A multicenter clinical trial. *National Medical Journal of China* 2011;**91**(27):1891–4.

Huang 1993

Huang CK, Chen GH, Kao CH, Wang SJ, Leu JF, Shir JM, et al. A 10-minute carbon-14 urea breath test for the detection of Helicobacter pylori. *Chinese Journal of Gastroenterology* 1993;**10**(3):212–20.

Huang 1996

Huang MS, Wang WM, Wu DC, Chen LT, Jan CM, Chen CY, et al. Utility of brushing cytology in the diagnosis of Helicobacter pylori infection. *Acta Cytologica* 1996;**40**(4):714–8.

Huang 1998

Huang JQ, Sridhar S, Chen Y, Hunt RH. Meta-analysis of the relationship between Helicobacter pylori seropositivity and gastric cancer. *Gastroenterology* 1998;**114**(6):1169–79.

Huang 2000

Huang JJ, Huang CJ, Ruaan MK, Chen KW, Yen TS, Sheu BS. Diagnostic efficacy of (13)c-urea breath test for Helicobacter pylori infection in hemodialysis patients. *American Journal of Kidney Diseases* 2000;**36**(1):124–9.

Huang 2002

Huang JQ, Sridhar S, Hunt RH. Role of Helicobacter pylori infection and non-steroidal anti-inflammatory drugs in peptic-ulcer disease: a meta-analysis. *Lancet* 2002;**359**(9300):14–22.

Huang 2003

Huang JQ, Zheng GF, Sumanac K, Irvine EJ, Hunt RH. Meta-analysis of the relationship between cagA

- seropositivity and gastric cancer. *Gastroenterology* 2003;**125**(6):1636–44.
- Huelin 1996**
Huelin J, Sanchez-Galdon S, Cardenas A, Ibanez J, Espana P, De la Cruz J, et al. Comparative study of Helisal™ rapid blood and ELISA, Jatrox and pathologic anatomy in the diagnosis of *Helicobacter pylori* infection [Spanish]. *Revista Espanola de Enfermedades Digestivas* 1996;**88**(12):825–7.
- Huijsdens 2004**
Huijsdens XW, Linskens RK, Koppes J, Tang YL, Meuwissen SGM, Vandenbroucke-Grauls CMJE, et al. Detection of *Helicobacter* species DNA by quantitative PCR in the gastrointestinal tract of healthy individuals and of patients with inflammatory bowel disease. *FEMS Immunology and Medical Microbiology* 2004;**41**(1):79–84.
- Hung 2002**
Hung CT, Leung WK, Chan FKL, Sung JYY. Comparison of two new rapid serology tests for diagnosis of *Helicobacter pylori* infection in Chinese patients. *Digestive and Liver Disease* 2002;**34**(2):111–5.
- Hung 2010**
Hung HH, Chen TS, Lin HC. Immunoglobulin g antibody against *Helicobacter pylori* is an accurate test for atrophic gastritis. *Journal of the Chinese Medical Association* 2010;**73**(7):355–9.
- Husson 2000**
Husson MO, Rolland C, Gottrand F, Guimber D, Kalach N, Spyckerelle C, et al. Evaluation of a *Helicobacter pylori* stool antigen test for the diagnosis and follow-up of infections in children. *European Journal of Clinical Microbiology & Infectious Diseases* 2000;**19**(10):787–9.
- Hynes 1998**
Hynes SO, Moran AP. Comparison of enzyme-linked immunosorbent assay, immunodot and western blot techniques for detecting lewis antigen expression on *Helicobacter pylori* clinical isolates. *Gut* 1998;**43**(Suppl 2):A20.
- Hynes 2000**
Hynes SO, Moran AP. Comparison of three serological methods for detection of lewis antigens on the surface of *Helicobacter pylori*. *FEMS Microbiology Letters* 2000;**190**(1):67–72.
- Ibrahim 2012**
Ibrahim NH, Gomaa AA, Abu-Sief MA, Hifnawy TM, Tohamy MAE. The use of different laboratory methods in diagnosis of *Helicobacter pylori* infection; a comparative study. *Life Science Journal-Acta Zhengzhou University Overseas Edition* 2012;**9**(4):249–59.
- Ichinose 1998**
Ichinose Y, Kanai E, Yamasawa F, Nishi I, Toyama K. Simultaneous continuous 13C, 12C analysis of expired gas in the 13C breath test. *Respirology* 1998;**3**(1):21–4.
- Ierardi 2002**
Ierardi E, Margiotta M, Monno R, De Francesco V, Minenna MF, Burattini O, et al. A new semiquantitative method of quantifying *Helicobacter pylori* in antigen stools. *Journal of Clinical Gastroenterology* 2002;**35**(5):375–8.
- Ierfone 2003**
Ierfone N, Di Fulvio A, Standoli M, Pontone S, Tonda M, Pontone P. Breath test as non-invasive assessment for the initial screening of non-ulcerous dyspepsia. *Giornale di Chirurgia* 2003;**24**(10):357–63.
- Ignys 2006**
Ignys I, Klineciewicz B, Malewski W, Cichy W. The non-invasive diagnostic test for detection of *Helicobacter pylori* infection in children - the value of *Helicobacter pylori* stool antigen test. *Pediatrica Wspolczesna* 2006;**8**(4):234–6.
- Iijima 1998**
Iijima K, Ohara S, Sekine H, Moriyama S, Kato K, Koike T, et al. Correlation between 13C-urea breath test and gastric histological findings in *Helicobacter pylori* positive patients. *Nippon Shokakibyo Gakkai Zasshi [Japanese Journal of Gastroenterology]* 1998;**95**(1):18–25.
- Ilan 1998**
Ilan Y, Israelit YY, Bar Meir S, Yudchack S, Goldin E. A novel method & device for *Helicobacter pylori* detection: Continuous, fast c-13-urea breath test. *Gastroenterology* 1998;**114**(4):A157.
- Ilga 2008**
Ilga U, Ozyurt M, Yildirim S, Ergunay K, Ardic N, Demirturk L, et al. *Helicobacter pylori* isolation, serology and caga, cagA and virB11 detection in patients with non-ulcer dyspepsia from Turkey: Correlation with histopathologic findings. *Central European Journal of Medicine* 2008;**3**(1):41–6.
- Imperiale 1996**
Imperiale TF, McCullough AJ. C-13 urea breath test for *Helicobacter pylori* infection. *American Journal of Gastroenterology* 1996;**91**(1):175–6.
- Imrie 2001**
Imrie C, Rowland M, Bourke B, Drumm B. Limitations to carbon 13-labeled urea breath testing for *Helicobacter pylori* in infants. *Journal of Pediatrics* 2001;**139**(5):734–7.
- Inaba 2002**
Inaba T, Mizuno M, Kawai K, Takaguchi K, Yoshida Y, Kita K, et al. Effect of antiulcer agents on the urea breath test - comparison between rebamipide and ecabate sodium. *Japanese Journal of Gastroenterology* 2002;**99**(1):27–33.
- Iranikhah 2013**
Iranikhah A, Ghadir MR, Sarkeshikian S, Saneian H, Heidari A, Mahvari M. Stool antigen tests for the detection of *Helicobacter pylori* in children. *Iranian Journal of Pediatrics* 2013;**23**(2):138–42.
- Ishihara 2000**
Ishihara S, Kaji T, Kawamura A, Rumi MAK, Sato H, Okuyama T, et al. Diagnostic accuracy of a new non-invasive enzyme immunoassay for detecting *Helicobacter pylori* in stools after eradication therapy. *Alimentary Pharmacology and Therapeutics* 2000;**14**(5):611–4.

Ishizuka 1999

Ishizuka J. Clinical evaluation of *Helicobacter pylori* stool antigen (HPSA) assay for assessment of diagnosis and eradication. *Japanese Journal of Gastroenterology* 1999;**96**(10):1196.

Islami 2008

Islami F, Kamangar F. *Helicobacter pylori* and esophageal cancer risk: a meta-analysis. *Cancer Prevention Research* 2008;**1**(5):329–38.

Ismail 2016

Ismail H, Morgan C, Griffiths P, Williams J, Jenkins G. A newly developed nested PCR assay for the detection of *Helicobacter pylori* in the oral cavity. *Journal of Clinical Gastroenterology* 2016;**50**(1):17–22.

Isomoto 2002

Isomoto H, Inoue K, Shikuwa S, Furusu H, Nishiyama T, Omagari K, et al. Five minute endoscopic urea breath test with 25 mg of c-13-urea in the management of *Helicobacter pylori* infection. *European Journal of Gastroenterology & Hepatology* 2002;**14**(10):1093–100.

Isomoto 2003

Isomoto H, Inoue KI, Mizuta Y, Nakazato M, Kanazawa Y, Nishiyama H, et al. Validation of endoscopic ¹³C-urea breath test with nondispersive infrared spectrometric analysis in the management of *Helicobacter pylori* infection. *Hepato-Gastroenterology* 2003;**50**(50):422–5.

Isomoto 2006

Isomoto H, Kawazoe K, Inoue K, Kohno S. Usefulness of the immunological rapid urease test for detection of *Helicobacter pylori* in patients who are reluctant to undergo endoscopic biopsies. *Digestive Diseases & Sciences* 2006;**51**(12):2302–5.

Israeli 2003

Israeli E, Ilan Y, Meir SB, Buenavida C, Goldin E. A novel ¹³C-urea breath test device for the diagnosis of *Helicobacter pylori* infection: Continuous online measurements allow for faster test results with high accuracy. *Journal of Clinical Gastroenterology* 2003;**37**(2):139–41.

Ito 2002

Ito M, Haruma K, Kaya S, Kamada T, Kim S, Sasaki A, et al. Role of anti-parietal cell antibody in *Helicobacter pylori*-associated atrophic gastritis: Evaluation in a country of high prevalence of atrophic gastritis. *Scandinavian Journal of Gastroenterology* 2002;**37**(3):287–93.

Ito 2005

Ito M, Tanaka S, Kim SJ, Tahara K, Kawamura Y, Sumii M, et al. A combination of the *Helicobacter pylori* stool antigen test and urea breath test is useful for clinical evaluation of eradication therapy: A multicenter study. *Journal of Gastroenterology and Hepatology* 2005;**20**(8):1241–5.

Iwanczak 2005

Iwanczak F, Pytrus T, Iwanczak B, Gosciniak G, Witkowska-Vogt E, Dzierzanowska D, et al. Assessment of selected tests in diagnostics of *Helicobacter pylori* infections. *Polski Merkuriusz Lekarski* 2005;**19**(109):52–6.

Jaakkimainen 1999

Jaakkimainen RL, Boyle E, Tudiver F. Is *Helicobacter pylori* associated with non-ulcer dyspepsia and will eradication improve symptoms? A meta-analysis. *BMJ* 1999;**319**(7216):1040–4.

Jabbari 2009

Jabbari Moghaddam Y, Rafeey M, Radfar R. Comparative assessment of *Helicobacter pylori* colonization in children tonsillar tissues. *International Journal of Pediatric Otorhinolaryngology* 2009;**73**(9):1199–201.

Jadresin 2000

Jadresin O, Kolacek S, Percl M, Tambic A, Dasovic I, Grguric J. Detection of *Helicobacter pylori* antigen in stools - an alternative method of verifying hp infection in children. *Paediatrica Croatica* 2000;**44**(4):141–4.

Jaff 2011

Jaff MS. Relation between ABO blood groups and *Helicobacter pylori* infection in symptomatic patients. *Clinical and Experimental Gastroenterology* 2011;**4**(1):221–6.

Jafri 2010

Jafri W, Yakoob J, Abid S, Siddiqui S, Awan S, Nizami SQ. *Helicobacter pylori* infection in children: Population-based age-specific prevalence and risk factors in a developing country. *Acta Paediatrica* 2010;**99**(2):279–82.

Jaime 2013

Jaime F, Villagran A, Serrano C, Cerda J, Harris PR. Frequency of *Helicobacter pylori* infection in 144 school age Chilean children. *Revista Medica de Chile* 2013;**141**(10):1249–54.

Jain 1999

Jain A, Buddhiraja S, Khurana B, Singhal R, Nair D, Arora P, et al. Risk factors for duodenal ulcer in north India. *Tropical Gastroenterology* 1999;**20**(1):36–9.

Jalali 1988

Jalali S, Hollingsworth J, Vanzanten SV, Tytgat K, Goldie J, Bowen B, et al. C-14 urea breath test for the detection of *C. pylori* (cp) infections. *Gastroenterology* 1988;**94**(5):A205.

Jane 1999

Jane Santamaria M, Varea Calderon V, Camacho E. Concordance between breath test and histologic damage in *Helicobacter pylori* associated infections in infancy. *Revista Espanola De Enfermedades Digestivas* 1999;**91**(10):703–10.

Janjetic 2010

Janjetic MA, Goldman CG, Balcarce NE, Rua EC, Gonzalez AB, Fuda JA, et al. Iron, zinc, and copper nutritional status in children infected with *Helicobacter pylori*. *Journal of Pediatric Gastroenterology & Nutrition* 2010;**51**(1):85–9.

Janjetic 2011

Janjetic MA, Goldman CG, Barrado DA, Rua EC, Balcarce N, Mantero P, et al. Decreasing trend of *Helicobacter pylori* infection in children with gastrointestinal symptoms from Buenos Aires, Argentina. *Helicobacter* 2011;**16**(4):316–9.

Janjetic 2015

Janjetic MA, Mantero P, Rua EC, Balcarce N, De Palma GZ, Catalano M, et al. Dietary and anthropometric indicators of nutritional status in relation to *Helicobacter pylori* infection in a paediatric population. *British Journal of Nutrition* 2015;**113**(7):1113–9.

Janssen 2001

Janssen K. Diagnostic series. *Helicobacter pylori* infections rapidly recognized. *MMW Fortschritte der Medizin* 2001;**143**(13):41–2.

Janulaityte 1998

Janulaityte D, Kupcinskas L, Pavilonis A, Wadstrom T, Andersen L. Western blot analysis of *Helicobacter pylori* infection in patients with and without gastric cancer. *Gut* 1998;**43**(Suppl 2):A69.

Janus 1991

Janus G, Hammermeister I, Prignet JM, Saccharin C, Kist M, Koch HK. *Helicobacter pylori*: A serological study of young soldiers with endoscopic. Microbiologic and histologic study of ten cases with positive serology. *Medecine et Maladies Infectieuses* 1991;**21**(5):308–12.

Jarbol 2006

Jarbol DE, Kragstrup J, Stovring H, Havelund T, Schaffalitzky de Muckadell OB. Proton pump inhibitor or testing for *Helicobacter pylori* as the first step for patients presenting with dyspepsia? A cluster-randomized trial. *American Journal of Gastroenterology* 2006;**101**(6):1200–8.

Jensen 1993

Jensen AKV, Andersen LP, Wachmann CH. Evaluation of eight commercial kits for *Helicobacter pylori* IgG antibody detection. *APMIS* 1993;**101**(10):795–801.

Ji 1993

Ji J, Li XM, Jiang GH. Diagnosis of *Helicobacter pylori* infection by 13C-urea breath test. *Zhonghua Nei Ke za Zhi [Chinese Journal of Internal Medicine]* 1993;**32**(3):170–2.

Jiang 2004

Jiang Z, Huang AL, Tao XH, Wang PL. Diagnosis of *Helicobacter pylori* infection and diseases associated with *Helicobacter pylori* by *Helicobacter pylori* outer membrane proteins. *World Journal of Gastroenterology* 2004;**10**(23):3464–9.

Jo 2008

Jo Y, Chung M, Lim C, Son B, Jun D, Kim S, et al. Urea breath test is the most reliable h. Pylori diagnostic test in patients with upper gastrointestinal bleeding in high h. Pylori prevalent population. *Helicobacter* 2008;**13**(5):451.

Jo 2014

Jo Y, Lee J, Kim J, Kim T. Urea breath test and serological test have equivalent accuracy to detect *Helicobacter pylori* in patients with gastroduodenal ulcer bleeding. *Helicobacter* 2014;**19**:124.

Johansen 2004

Johansen JK, Sehested A, Myrthoj T, Ladefoged K, Krogfelt KA. *Helicobacter pylori* infection in Greenlandic patients with dyspepsia. *International Journal of Circumpolar Health* 2004;**63** Suppl 2:219–20.

Johnston 1998

Johnston BJ, Gruer N, Johnson P. Effect of patient position on the performance of the c-13-urea breath test for the detection of *Helicobacter pylori*. *Gut* 1998;**43**(Suppl 2):A57.

Jolley 2007

Jolley CD, Wagner DA. Comparison of the c-13-urea blood test to histology and rapid urease testing in the diagnosis of *Helicobacter pylori* infection in children. *Journal of Pediatric Gastroenterology and Nutrition* 2007;**44**(1):68–70.

Jonaitis 2007

Jonaitis LV, Kiudelis G, Kupcinskas L. Evaluation of a novel c-14-urea breath test “heliprobe” in diagnosis of *Helicobacter pylori* infection. *Medicina-Lithuania* 2007;**43**(1):32–5.

Jones 1997a

Jones R, Phillips I, Felix G, Tait C. An evaluation of near-patient testing for *Helicobacter pylori* in general practice. *Alimentary Pharmacology & Therapeutics* 1997;**11**(1):101–5.

Jones 1997b

Jones NL, Bourke B, Sherman PM. Breath testing for *Helicobacter pylori* infection in children: A breath of fresh air?. *Journal of Pediatrics* 1997;**131**(6):791–3.

Jones 2007

Jones RT, Darboe MK, Doherty CP, MacKay WG, Weaver LT, Campbell DI, et al. Evaluation of c-13-urea breath test and fecal antigen immunoassay to detect *Helicobacter pylori* infection in Gambian infants. *Journal of Pediatric Gastroenterology and Nutrition* 2007;**44**(5):650–2.

Juhasz 2000

Juhasz M, Pronai L, Zagoni T, Nemeth A, Herszenyi L, Schandl L, et al. Comparison of various methods in the detection of *Helicobacter pylori* infection. *Orvosi Hetilap* 2000;**141**(17):911–4.

Juncal 1998

Juncal AR, Garea MT, Cid A, Penalver MD, Vazquez R, Montero E, et al. Evaluation of four commercial enzyme immunoassays for the serologic diagnosis of infection by *Helicobacter pylori*. *Enfermedades Infecciosas y Microbiología Clínica* 1998;**16**(4):185–9.

Jung 2002

Jung A, Wasilewska-Radwanska M, Kopanski Z. Semiempirical model for diagnostication *Helicobacter pylori* infection by use of c-14 labelled urea. *Nukleonika* 2002;**47**(3):95–9.

Jung 2013

Jung H, Moon J, Park K, Kwon M, Jeong S, Park Y, et al. Detection rates of clarithromycin resistance and eradication rates of *Helicobacter pylori* infection: efficacy of Panplex™ Clar-H. *pylori* detection. *Helicobacter* 2013;**18**:132.

Kabir 2001

Kabir S. Detection of *Helicobacter pylori* in faeces by culture, PCR and enzyme immunoassay. *Journal of Medical Microbiology* 2001;**50**(12):1021–9.

Kajiwar 1997

Kajiwar M, Iida K, Takatori K, Taniguchi Y, Kimura K. Validity of the c-13-urea breath test for the diagnosis of Helicobacter pylori infection. *Chemical & Pharmaceutical Bulletin* 1997;**45**(4):741–3.

Kajiwar 1998

Kajiwar M, Iida K, Takatori K, Taniguchi Y, Kimura K. Validity of the c-13-urea breath test for the diagnosis of Helicobacter pylori infection. In: Heys JR, Melillo DG editor(s). *Synthesis and Applications of Isotopically Labelled Compounds* 1997. 1st Edition. Chichester: John Wiley & Sons, 1998:627–31.

Kakinoki 2001

Kakinoki K, Takemori Y, Noda Y. Efficacy of the urine antibody test for detection of Helicobacter pylori: Comparison with serum antibody tests. *Japanese Journal of Gastroenterology* 2001;**98**(8):935–41.

Kaklikkaya 2006

Kaklikkaya N, Akdogan RA, Ozgur O, Uzun DY, Cobanoglu U, Dinc U, et al. Evaluation of a new rapid lateral flow chromatography test for the diagnosis of Helicobacter pylori. *Saudi Medical Journal* 2006;**27**(6):799–803.

Kalach 1996

Kalach N, Briet F, Raymond J, Benhamou P, Senouci L, Bergert M, et al. Time course analysis and simplification of the c-13-urea breath test (c-13-ubt) in the detection of Helicobacter pylori infection (h-pylori) in children. *Gastroenterology* 1996;**110**(4 (suppl)):A148.

Kalach 1998b

Kalach N, Benhamou PH, Briet F, Raymond J, Dupont C. The urea-c-13 breath test in the course of Helicobacter pylori gastric infection in children. *Archives De Pediatrie* 1998;**5**(12):1359–65.

Kalach 2005

Kalach N, Nguyen V, Bergeret M, Boutros N, Dupont C, Raymond J. Usefulness and influence of age of a novel rapid monoclonal enzyme immunoassay stool antigen for the diagnosis of Helicobacter pylori infection in children. *Diagnostic Microbiology and Infectious Disease* 2005;**52**(2):157–60.

Kalach 2009

Kalach N, Dehecq E, Gosset P, Decoster A, Bergeret M, Dupont C, et al. Usefulness and influence of age of a novel rapid Hpstar™ stool antigen for the diagnosis of Helicobacter pylori infection in children. *Diagnostic Microbiology and Infectious Disease* 2009;**65**(4):450–3.

Kalem 2010

Kalem F, Ozdemir M, Baysal B. Investigation of the presence of Helicobacter pylori by different methods in patients with dyspeptic complaints. *Mikrobiyoloji Bulteni* 2010;**44**(1):29–34.

Kang 1999

Kang G, Rajan DP, Patra S, Chacko A, Mathan MM. Use of serology, the urease test & histology in diagnosis of Helicobacter pylori infection in symptomatic &

asymptomatic Indians. *Indian Journal of Medical Research* 1999;**110**:86–90.

Kannath 2007

Kannath A, Rutt HN. Development of low cost instrumentation for non-invasive detection of Helicobacter pylori - art. No. 643001. *Advanced Biomedical and Clinical Diagnostic Systems* 2007;**6430**:L4300.

Kao 1993

Kao CH, Huang CK, Wang SJ, Hsu CY, Lin WY, Chen GH. Accuracy of a rapid 10-minute carbon-14 urea breath test for the diagnosis of Helicobacter pylori-associated peptic ulcer disease. *European Journal of Nuclear Medicine* 1993;**20**(8):708–11.

Kaore 2012

Kaore NM, Nagdeo NV, Thombare VR. Comparative evaluation of the diagnostic tests for Helicobacter pylori and dietary influence for its acquisition in dyspeptic patients: a rural hospital based study in central India. *Journal of Clinical and Diagnostic Research* 2012;**6**(4 SUPPL 2):636–41.

Kaptan 2009

Kaptan ZK, Emir H, Uzunkulaoglu H, Yucel M, Karakoc E, Koca G, et al. Determination of Helicobacter pylori in patients with chronic nonspecific pharyngitis. *Laryngoscope* 2009;**119**(8):1479–83.

Karakus 2013

Karakus C, Salih BA. Comparison of the lateral flow immunoassays (LFIA) for the diagnosis of Helicobacter pylori infection. *Journal of Immunological Methods* 2013;**396**(1-2):8–14.

Karsligil 2010

Karsligil T, Mehli M, Koruk M, Eksi F. Urea breath test and specific IgA in Helicobacter pylori infection. *Nobel Medicus* 2010;**6**(3):46–50.

Kasho 1996

Kasho VN, Cheng S, Jensen DM, Ajie H, Lee WNP, Faller LD. Feasibility of analysing c-13 urea breath tests for Helicobacter pylori by gas chromatography-mass spectrometry in the selected ion monitoring mode. *Alimentary Pharmacology & Therapeutics* 1996;**10**(6):985–95.

Kassa 1996

Kassa E, Tsega E, Gebre W. Comparison of diagnostic methods for detection of Helicobacter pylori. *East African Medical Journal* 1996;**73**(4):239–41.

Katellaris 1997

Katellaris PH, Jones DB. Testing for Helicobacter pylori infection after antibiotic treatment. *American Journal of Gastroenterology* 1997;**92**(8):1245–7.

Katellaris 1998

Katellaris PH, Connor SJ, Seow F, Huntley S, Ngu MC. The effect of short term omeprazole use on the accuracy of the c-13-urea breath test in Helicobacter pylori infected subjects. *Gut* 1998;**43**(Suppl 2):A53.

Kato 1997

Kato M, Ohara S, Asaka M, Toyota T. New, on-the-spot infrared analyzer for c-13-urea breath test: A simple, easy-to-use method for detecting *Helicobacter pylori* in the physician's office. *Gastroenterology* 1997;**112**(4 (suppl)):A169.

Kato 1998

Kato M, Kobayashi T, Ishizuka J, Kudo T, Katagiri M, Komatsu Y, et al. Detection of h-pylori infections by urine-based enzyme-linked immunosorbent assay. *Gastroenterology* 1998;**114**(4):A169.

Kato 1999

Kato M, Asaka M, Saito M, Ohara S, Toyota T, Akamatsu T, et al. Clinical usefulness of a urine-based ELISA for detection of anti-*Helicobacter pylori* antibody. *Gastroenterology* 1999;**116**(4 (suppl)):A206–A7.

Kato 2000a

Kato M, Hokari K, Ishizuka J, Mizushima T, Sukegawa M, Komatsu Y, et al. Assessment of *Helicobacter pylori* eradication using a urine-based ELISA of anti-*Helicobacter pylori* antibody. *Gastroenterology* 2000;**118**(4 Part 1):A505.

Kato 2000b

Kato S, Tachikawa T, Ozawa K, Konno M, Oyake Y, Nakazato Y, et al. Usefulness of urine-based ELISA for detection of IgG antibodies to *Helicobacter pylori* in children. *Gastroenterology* 2000;**118**(4):A506.

Kato 2000c

Kato M, Asaka M, Saito M, Sekine H, Ohara S, Toyota T, et al. Clinical usefulness of urine-based enzyme-linked immunosorbent assay for detection of antibody to *Helicobacter pylori*: A collaborative study in nine medical institutions in Japan. *Helicobacter* 2000;**5**(2):109–19.

Kato 2001a

Kato M. Evaluation of a new ¹³CO₂ infrared analyzer (ubit-ir300) for ¹³C-urea breath test. *Japanese Journal of Gastroenterology* 2001;**98**(7):853.

Kato 2001b

Kato S, Tachikawa T, Ozawa K, Konno M, Okuda M, Fujisawa T, et al. Urine-based enzyme-linked immunosorbent assay for the detection of *Helicobacter pylori* infection in children. *Pediatrics* 2001;**107**(6):E87.

Kato 2001c

Kato C, Yamaguchi T, Yusa K, Sasaki H, Suzuki K, Sato K, et al. 13C-urea breath test. *Nippon Rinsho [Japanese Journal of Clinical Medicine]* 2001;**59**(2):267–71.

Kato 2002a

Kato M, Iwasaki T, Miyazaki H, Ohira K, Oizumi S, Kawarazaki M, et al. Urea breath test for diagnosis of *Helicobacter pylori* infection. *Nippon Rinsho [Japanese Journal of Clinical Medicine]* 2002;**60**(Suppl 2):332–8.

Kato 2002b

Kato S, Ozawa K, Konno M, Kagimoto S, Okuda M, Fujisawa T, et al. Usefulness of the stool antigen test (HPSA) for diagnosis of *Helicobacter pylori* infection in

Japanese children: A multicenter study. *Gastroenterology* 2002;**122**(4 (suppl)):A202–A3.

Kato 2002c

Kato S, Ozawa K, Konno M, Tajiri H, Yoshimura N, Shimizu T, et al. Diagnostic accuracy of the c-13-urea breath test for childhood *Helicobacter pylori* infection: A multicenter Japanese study. *American Journal of Gastroenterology* 2002;**97**(7):1668–73.

Kato 2002d

Kato S, Ozawa K, Minoura T, Iinuma K. A simplified c-13-urea breath test for diagnosis of *Helicobacter pylori* infection in children. *Gastroenterology* 2002;**122**(4 (Suppl)):A206.

Kato 2002e

Kato C, Kasugai S, Fukuda Y, Yusa K, Kudara N, Iwasaki M, et al. Diagnosis of *Helicobacter pylori* infection by the antigen analysis of stools. *Nippon Rinsho [Japanese Journal of Clinical Medicine]* 2002;**60**(Suppl 2):347–9.

Kato 2003a

Kato C, Sugiyama T, Sato K, Saito S, Kudara N, Abiko Y, et al. Appropriate cut-off value of 13C-urea breath test after eradication of *Helicobacter pylori* infection in Japan. *Journal of Gastroenterology & Hepatology* 2003;**18**(12):1379–83.

Kato 2003b

Kato S, Ozawa K, Okuda M, Fujisawa T, Kagimoto S, Konno M, et al. Accuracy of the stool antigen test for the diagnosis of childhood *Helicobacter pylori* infection: A multicenter Japanese study. *American Journal of Gastroenterology* 2003;**98**(2):296–300.

Kato 2004a

Kato S, Nakayama K, Minoura T, Konno M, Tajiri H, Matsuhisa T, et al. Comparison between the 13C-urea breath test and stool antigen test for the diagnosis of childhood *Helicobacter pylori* infection. *Journal of Gastroenterology* 2004;**39**(11):1045–50.

Kato 2004b

Kato S, Ozawa K, Okuda M, Nakayama Y, Yoshimura N, Konno M, et al. Multicenter comparison of rapid lateral flow stool antigen immunoassay and stool antigen enzyme immunoassay for the diagnosis of *Helicobacter pylori* infection in children. *Helicobacter* 2004;**9**(6):669–73.

Kato 2004c

Kato M, Saito M, Fukuda S, Kato C, Ohara S, Hamada S, et al. C-13-urea breath test, using a new compact nondispersive isotope-selective infrared spectrophotometer: Comparison with mass spectrometry. *Journal of Gastroenterology* 2004;**39**(7):629–34.

Kato 2005a

Kato M, Shimizu Y, Nakagawa S, Nakagawa M, Ono Y, Ono S, et al. Prevention of false-positive result of 13C-urea breath test after eradication of h. Pylori using film-coated 13C-urea tablet. *Gastroenterology* 2005;**128**(4 (suppl)):A561.

Kato 2005b

Kato M, Shimizu Y, Shouji E, Takeda H, Asaka M. Problem of 13C-urea breath test in the diagnosis of h. Pylori after eradication. *Nippon Rinsho [Japanese Journal of Clinical Medicine]* 2005;**63**(Suppl 11):221–5.

Kato 2005c

Kato M, Asaka M. Helicobacter pylori igg antibody, urea breath test, Helicobacter pylori antigen in the stool. *Nippon Rinsho [Japanese Journal of Clinical Medicine]* 2005;**63**(Suppl 7):175–9.

Kato 2007

Kato C, Sugiyama T, Horie A, Igarashi M, Takayanagi N, Tsuchida Y. Diagnostic accuracy of a novel Helicobacter pylori stool antigen test using monoclonal antibody after eradication therapy in Japanese population. *Helicobacter* 2007;**12**(4):442–3.

Kato 2010

Kato M, Asaka M. Helicobacter pylori (igg antibody test, urea breath test, stool antigen test). *Nippon Rinsho [Japanese Journal of Clinical Medicine]* 2010;**68**(Suppl 6):183–8.

Katsuragi 1998

Katsuragi K, Noda A, Tachikawa T, Azuma A, Mukai F, Murakami K, et al. Highly sensitive urine-based enzyme-linked immunosorbent assay for detection of antibody to Helicobacter pylori. *Helicobacter* 1998;**3**(4):289–95.

Kaul 1998

Kaul A, Bhasin DK, Pathak CM, Ray P, Vaiphei K, Sharma BC, et al. Normal limits of 14c-urea breath test. *Tropical Gastroenterology* 1998;**19**(3):110–3.

Kawai 2008

Kawai T, Kawakami K, Kataoka M, Itoi T, Takei K, Moriyasu F, et al. A study of the relationship between Helicobacter pylori microbial susceptibility, 13C-urea breath test values. *Hepato-Gastroenterology* 2008;**55**(82-83):786–90.

Kawakami 2002

Kawakami E, Machado RS, Reber M, Patricio FR. 13 c-urea breath test with infrared spectroscopy for diagnosing Helicobacter pylori infection in children and adolescents. *Journal of Pediatric Gastroenterology & Nutrition* 2002;**35**(1):39–43.

Kazemi 2011

Kazemi S, Tavakkoli H, Habizadeh MR, Emami MH. Diagnostic values of Helicobacter pylori diagnostic tests: Stool antigen test, urea breath test, rapid urease test, serology and histology. *Journal of Research in Medical Sciences* 2011;**16**(9):1097–104.

Kearney 1999

Kearney DJ, Boes L, Peacock JS. Use of a dried plasma collection card for simplified diagnosis of Helicobacter pylori infection. *Alimentary Pharmacology & Therapeutics* 1999;**13**(11):1531–4.

Kearney 2002

Kearney DJ, Hubbard T, Putnam D. Breath ammonia measurement in Helicobacter pylori infection. *Digestive Diseases & Sciences* 2002;**47**(11):2523–30.

Ken 2013

Ken Dror S, Barak M. Evaluation of the diasorin liaison automatic stool antigen test for the diagnosis of Helicobacter pylori infection. *Biochimica Clinica* 2013;**37**:S659.

Kesli 2010

Kesli R, Gokturk HS, Erbayrak M, Karabagli P, Terzi Y. Comparison of the diagnostic values of the 3 different stool antigen tests for the noninvasive diagnosis of Helicobacter pylori infection. *Journal of Investigative Medicine* 2010;**58**(8):982–6.

Kessenich 2012

Kessenich CR, Erigo-Backsman RC. Gastritis and noninvasive testing for Helicobacter pylori. *Nurse Practitioner* 2012;**37**(4):7–9.

Khafri 2005

Khafri A, Van yousefi J, Madani R, Pourdian M, Khaki P. Designing an ELISA technique for h.Pylori antibody detection using water extracted antigens. *Iranian Journal of Public Health* 2005;**34**(2):14–9.

Khalifehgholi 2013

Khalifehgholi M, Shamsipour F, Ajhdarkosh H, Daryani NE, Reza Pourmand M, Hosseini M, et al. Comparison of five diagnostic methods for Helicobacter pylori. *Iranian Journal of Microbiology* 2013;**5**(4):396–401.

Kharchenko 2012

Kharchenko N, Lopukh I, Janelidze D. Helicobacter pylori immediate detection with helic breath test: Diagnostic value comparison with c-13 breath test and PCR DNA in feces. *Journal of Gastroenterology and Hepatology* 2012;**27**:297–8.

Khorovskaya 2003

Khorovskaya LA, Kornienko EA, Dmitrienko MA, Nazhiganov ON. Experience of a modified non-isotopic, non-invasive breath test for Helicobacter pylori in pediatric practice. *Clinical Chemistry* 2003;**49**(6 (suppl)):A52.

Kias 2011

Kias F, Taleb F, Mouffok F, Matougui N, Boudjella M, Lamri A, et al. *Helicobacter pylori*: diagnosis of infection in adults in Algeria. *Helicobacter* 2011;**16**:116.

Kikuchi 1999

Kikuchi H, Ichinose Y, Ishii H, Mori M, Yamaguchi K, Igari K. Influence on diagnosis of Helicobacter pylori infection in 13C urea breath test of existence of dead space gas. *Journal of Occupational Health* 1999;**41**(6):183–9.

Kim 1996

Kim J, Bank S, Bailey B. Comparison of C14 breath test with clo test in detecting Helicobacter pylori. *Gastroenterology* 1996;**110**(4 (suppl)):A155.

Kim 1997

Kim MJ, Michener R, Triadafilopoulos G. Serum c-13-bicarbonate assay for the diagnosis of gastric Helicobacter pylori infection and response to treatment. *Gastroenterology* 1997;**113**(1):31–7.

Kim 1999

Kim PS, Lee JW, Pai SH, Choe YH, Shin YW, Kim YS. Detection of *H. pylori* antigen in stool by ELISA. *Gut* 1999; **45**(Suppl 3):A133.

Kim 2001

Kim I, Kim P, Kwon K, Lee D, Kim H, Shin Y, et al. Comparison of urine-based enzyme-linked immunosorbent assay and c-14 ubt test for detection of *Helicobacter pylori*. *Gut* 2001; **49**(suppl):A102–A3.

Kim 2002

Kim PS, Lee J, Pai SH, Kim YB, Cho JK, Lee JW, et al. Detection of *Helicobacter pylori* antigen in stool by enzyme immunoassay. *Yonsei Medical Journal* 2002; **43**(1):7–13.

Kim 2009

Kim D. The detection of *Helicobacter pylori* in the terminal ileum and rectum from urea breath test positive healthy adults with culture and PCR during colonoscopy. *American Journal of Gastroenterology* 2009; **104**:S514.

Kim 2012

Kim WJ, Kim HD. The efficacy of monoclonal antibody-based test as additive tool to detect h. Pylori. *Journal of Gastroenterology and Hepatology* 2012; **27**:65.

Kim 2013

Kim HD, Kim DH, Park H, Kim WJ, Ahn YS, Lee YJ, et al. Detection of *Helicobacter pylori* in gastric aspirates using a monoclonal antibody-based test. *Gut and Liver* 2013; **7**(1):30–4.

Kim 2014

Kim H, Choi S, Beom J. New monoclonal antibody-based test for *Helicobacter pylori* urease in gastric tissue. *Journal of Gastroenterology and Hepatology (Australia)* 2014; **29**:228–9.

Kindermann 2000

Kindermann A, Demmelmair H, Koletzko B, Krauss-Etschmann S, Wiebecke B, Koletzko S. Influence of age on c-13-urea breath test results in children. *Journal of Pediatric Gastroenterology and Nutrition* 2000; **30**(1):85–91.

Kindermann 2001a

Kindermann A, Konstantopoulos N, Lehn N, Demmelmair H, Koletzko S. Evaluation of two commercial enzyme immunoassays, testing immunoglobulin g (igg) and iga responses, for diagnosis of *Helicobacter pylori* infection in children. *Journal of Clinical Microbiology* 2001; **39**(10):3591–6.

Kindermann 2001b

Kindermann A, Faus-Kessler T, Ballauff A, Findeisen A, Laske G, Demmelmair H, et al. Evaluation of a rapid whole blood test to detect *Helicobacter pylori* infection in children. *Scandinavian Journal of Gastroenterology* 2001; **36**(6):572–6.

Kishkun 2002

Kishkun AA, Sadokov VM, Arsenin SL, Budzinskii AA, Klimkova MA, Kuchin GA, et al. Significance of the operational test parameters in selection of a diagnostic test for *Helicobacter* infection. *Ekspierimental'naia i*

Klinicheskaia Gastroenterologija [Experimental & Clinical Gastroenterology] 2002; **4**:103–8, 34–35.

Kist 1999

Kist M, Strobel S, Kirchner T, Dammann HG. Impact of ELISA and immunoblot as diagnostic tools one year after eradication of *Helicobacter pylori* in a multicentre treatment study. *FEMS Immunology & Medical Microbiology* 1999; **24**(2):239–42.

Klein 1996

Klein PD, Malaty HM, Martin RF, Graham KS, Genta RM, Graham DY. Noninvasive detection of *Helicobacter pylori* infection in clinical practice: The c-13 urea breath test. *American Journal of Gastroenterology* 1996; **91**(4):690–4.

Klein 1999

Klein PD, Malaty HM, Czinn SJ, Emmons SC, Martin RF, Graham DY. Normalizing results of 13C-urea breath testing for co2 production rates in children. *Journal of Pediatric Gastroenterology & Nutrition* 1999; **29**(3):297–301.

Klyucharova 2013

Klyucharova A, Garipova E, Skorohodkina O. Comparison of the urea breath test with bacteriological investigation in detecting of *Helicobacter pylori* in patients with chronic urticaria. *Allergy: European Journal of Allergy and Clinical Immunology* 2013; **68**:604–5.

Kobayashi 2002

Kobayashi D, Eishi Y, Ohkusa T, Ishige I, Suzuki T, Minami J, et al. Gastric mucosal density of *Helicobacter pylori* estimated by real-time PCR compared with results of urea breath test and histological grading. *Journal of Medical Microbiology* 2002; **51**(4):305–11.

Koca 2005

Koca G, Ozdemir E, Cakal E, Culha C, Turkolmez S, Korkmaz M, et al. Comparison of c-14 urea-breath test, *Helicobacter pylori* igg and cytotoxin associated gene a findings in diabetic patients with dyspeptic complaints. *European Journal of Nuclear Medicine and Molecular Imaging* 2005; **32**:S218.

Kodama 2004

Kodama M, Fujioka T, Okimoto T, Kagawa J, Murakami K, Sato R, et al. Evaluation of the *Helicobacter pylori* stool antigen (HPSA) assay for diagnosing infection and confirming eradication after treatment. *Journal of Gastroenterology* 2004; **39**(12):1219–20.

Kodama 2012

Kodama M, Murakami K, Okimoto T, Fukuda Y, Shimoyama T, Okuda M, et al. Influence of proton pump inhibitor treatment on *Helicobacter pylori* stool antigen test. *World Journal of Gastroenterology* 2012; **18**(1):44–8.

Koizumi 2003

Koizumi W, Tanabe S, Imaizumi H, Hibi KI, Kida M, Ohida M, et al. Effect of anti-*Helicobacter pylori* igg antibody titer following eradication of *Helicobacter pylori* infection. *Hepato-Gastroenterology* 2003; **50**(49):293–6.

Kokkola 1998

Kokkola A, Puolakkainen P, Rautelin H, Sipponen P, Farkkila M, Haapiainen R, et al. Positive serology indicates an active h-pylori infection in patients with atrophic gastritis in spite of negative histology and c-13-urea breath test. *Gastroenterology* 1998;**114**(4):A183.

Kokkola 2000

Kokkola A, Rautelin H, Puolakkainen P, Sipponen P, Farkkila M, Haapiainen R, et al. Diagnosis of Helicobacter pylori infection in patients with atrophic gastritis: Comparison of histology, c-13-urea breath test, and serology. *Scandinavian Journal of Gastroenterology* 2000;**35**(2):138–41.

Koletzko 1995

Koletzko S, Haisch M, Seeboth I, Braden B, Hengels K, Koletzko B, et al. Isotope-selective non-dispersive infrared spectrometry for detection of Helicobacter pylori infection with ¹³C-urea breath test. *Lancet* 1995;**345**(8955):961–2.

Koletzko 2003

Koletzko S, Konstantopoulos N, Bosman D, Feydt-Schmidt A, Van der Ende A, Kalach N, et al. Evaluation of a novel monoclonal enzyme immunoassay for detection of Helicobacter pylori antigen in stool from children. *Gut* 2003;**52**(6):804–6.

Kolho 2002

Kolho KL, Korhonen J, Verkasalo M, Lindahl H, Savilahti E, Rautelin H. Helicobacter pylori serology at diagnosis and follow-up of biopsy-verified infection in children. *Scandinavian Journal of Infectious Diseases* 2002;**34**(3):177–82.

Kolho 2006

Kolho KL, Klemola T, Koivusalo A, Rautelin H. Stool antigen tests for the detection of Helicobacter pylori in children. *Diagnostic Microbiology and Infectious Disease* 2006;**55**(4):269–73.

Kolt 1997

Kolt SD, Dow C, Elliott SL, Yeomans ND. Effect of omeprazole on the accuracy of the i mu ci c-14-urea breath test for h-pylori. *Gastroenterology* 1997;**112**(4 (suppl)):A180.

Kolts 1993

Kolts BE, Joseph B, Achem SR, Bianchi T, Monteiro C. Helicobacter-pylori detection - a quality and cost-analysis. *American Journal of Gastroenterology* 1993;**88**(5):650–5.

Kondo 2000

Kondo T, Mitsui T, Kitagawa M, Nakae Y. Association of fasting breath nitrous oxide concentration with gastric juice nitrate and nitrite concentrations and Helicobacter pylori infection. *Digestive Diseases & Sciences* 2000;**45**(10):2054–7.

Konorev 2013

Konorev MR, Matveenko ME, Komleva EN. Comparative evaluation of efficiency of helic ammonia breath test for diagnostics of h. Pylori infection in gastric mucous. *Helicobacter* 2013;**18**:122.

Konorev 2014

Konorev MR, Komleva EN, Matveenko ME. Evaluation of efficiency of helic ammonia breath test for diagnostics of h. Pylori infection in stomach in rheumatoid arthritis patients taking nsais. *Helicobacter* 2014;**19**:123.

Konstantopoulos 2001

Konstantopoulos N, Russmann H, Tasch C, Sauerwald T, Demmelair H, Autenrieth I, et al. Evaluation of the Helicobacter pylori stool antigen test (HPSA) for detection of Helicobacter pylori infection in children. *American Journal of Gastroenterology* 2001;**96**(3):677–83.

Konturek 1999

Konturek SJ, Bielanski W, Bobrzynski A, Rembierz K, Winiarski M, Karczewska E, et al. Upper gastrointestinal bleeding does not interfere with the effectiveness of urea breath test in detecting of Helicobacter pylori in humans. *Gastroenterology* 1999;**116**(4 (suppl)):A220.

Kopacova 1999

Kopacova M, Bures J, Vorisek V, Konstacky M, Rejchrt S, Zivny P, et al. Detection of Helicobacter pylori by means of ¹³C-urea breath test: Clinical reproducibility of the test. *Klinicka Biochemie a Metabolismus* 1999;**7**(4):213–6.

Kopacova 2005

Kopacova M, Bures J, Vorisek V, Konstacky M, Rejchrt S, Zivny P, et al. Comparison of different protocols for c-13-urea breath test for the diagnosis of Helicobacter pylori infection in healthy volunteers. *Scandinavian Journal of Clinical & Laboratory Investigation* 2005;**65**(6):491–8.

Kopanski 1993a

Kopanski Z, Cienciata A. Serologic detection of Helicobacter pylori antibodies after surgery for stomach and duodenal ulcer. *Wiener Klinische Wochenschrift* 1993;**105**(14):408–11.

Kopanski 1993b

Kopanski Z, Cienciala A, Slowakiewicz E, Witkowska B, Ulatowski Z. Serological diagnosis of infection by Helicobacter pylori in chronic ulcer disease. *Materia Medica Polona* 1993;**25**(2):81–2.

Kopanski 1996

Kopanski Z, Schlegel-Zawadzka M, Witkowska B, Cienciala A, Szczurba J. Role of the enterotest in the diagnosis of the Helicobacter pylori infections. *European Journal of Medical Research* 1996;**1**(11):520–2.

Kopanski 1997

Kopanski Z, Nizioł J, Micherdzinski J, Wasilewska-Radwanska H, Schlegel-Zawadzka M, Lasa J, et al. Significance of the 14c-urea breath test in the determination of the location infected by Helicobacter pylori in the alimentary canal. *European Journal of Medical Research* 1997;**2**(3):136–8.

Kopanski 2002

Kopanski Z, Jung A, Wasilewska-Radwanska M, Kuc T, Schlegel-Zawadzka M, Witkowska B. Comparative diagnostic value of the breath test and the urine test with ¹⁴C-urea in the detection of the Helicobacter pylori infection. *Nuclear Medicine Review* 2002;**5**(1):21–4.

Korkmaz 2013

Korkmaz H, Kesli R, Karabagli P, Terzi Y. Comparison of the diagnostic accuracy of five different stool antigen tests for the diagnosis of *Helicobacter pylori* infection. *Helicobacter* 2013;**18**(5):384–91.

Korkmaz 2015

Korkmaz H, Findik D, Ugurluoglu C, Terzi Y. Reliability of stool antigen tests: Investigation of the diagnostic value of a new immunochromatographic *Helicobacter pylori* approach in dyspeptic patients. *Asian Pacific Journal of Cancer Prevention: Apjcp* 2015;**16**(2):657–60.

Korzonek 1997

Korzonek M. Diagnostic value of different methods applied for detecting *Helicobacter pylori* infection in gastric mucosa. *Annales Academiae Medicae Stetinensis* 1997;**43**:143–59.

Koumi 2011

Koumi A, Filippidis T, Leontara V, Makri L, Panos MZ. Detection of *Helicobacter pylori*: A faster urease test can save resources. *World Journal of Gastroenterology* 2011;**17**(3):349–53.

Kountouras 1996

Kountouras J, Boura P, Iliadis M, Giannouli P, Tsapas G. Saliva urease test and serological surveillance of *Helicobacter pylori* infection during treatment of peptic ulcer disease. *Hellenic Journal of Gastroenterology* 1996;**9**(1):67–71.

Kowalski 1990

Kowalski AJ, Cuan J, Chiang CS, Grove T, Perezperez G, Blaser M. Detection of antibodies to *Helicobacter-pylori* by ELISA. *Clinical Chemistry* 1990;**36**(6):1092.

Kozaiwa 1997

Kozaiwa K, Tajiri H, Sawada A, Miyoshi Y, Tada K, Etani Y, et al. Usefulness of c-13 urea breath test in diagnosis and monitoring of *Helicobacter pylori* infection in children with recurrent abdominal pain. *Gastroenterology* 1997;**112**(4 (suppl)):A184.

Kozlov 2006

Kozlov AV, Evstratova Iu S, Novikova VP, Tkachenko EI, Khochinskaia O. Gas analyzer “helicosense” as a new device for diagnosis of the *Helicobacter* infection. *Meditssinskaia Tekhnika* 2006;**3**:44–6.

Krausse 2008

Krausse R, Muller G, Doniec M. Evaluation of a rapid new stool antigen test for diagnosis of *Helicobacter pylori* infection in adult patients. *Journal of Clinical Microbiology* 2008;**46**(6):2062–5.

Kroser 1998

Kroser JA, Faigel DO, Furth EE, Metz DC. Comparison of rapid office-based serology with formal laboratory-based ELISA testing for diagnosis of *Helicobacter pylori* gastritis. *Digestive Diseases & Sciences* 1998;**43**(1):103–8.

Krumbiegel 2000a

Krumbiegel P, Muller DM. *Helicobacter pylori* in vivo diagnosis after food intake: Results of simultaneous n-15 urea urine and c-13 acetate breath tests. *Isotopes in Environmental and Health Studies* 2000;**36**(2):99–110.

Krumbiegel 2000b

Krumbiegel P, Herbarth O, Kiess W, Muller DM, Richter T. Diagnosis of *Helicobacter pylori* infection in children: Is the n-15 urine test more reliable than the c-13 breath test?. *Scandinavian Journal of Gastroenterology* 2000;**35**(4):353–8.

Kryvy 2012

Kryvy V, Klyaryts'ka I. Modified 13C-urea breath test in the diagnosis of infection h. *Pylori* in crimean population patients with gastritis. *Helicobacter* 2012;**17**:94.

Kuang 1998

Kuang A, Liang Z, Tan T, Chen D, Ma H, Si K, et al. Rapid microdose 14c-urea breath test for detection of *Helicobacter pylori* infection.. *Hua Xi Yi Ke Da Xue Xue Bao [Journal of West China University of Medical Sciences]* 1998;**29**(4): 435–8.

Kubo 2001

Kubo Y, Matsui H, Ninomiya T, Mizukami Y, Onji M. Non-invasive approach for diagnosing atrophic gastritis using the c-13-bicarbonate breath test. *International Journal of Molecular Medicine* 2001;**7**(4):381–4.

Kubota 2002

Kubota K, Shimoyama S, Shimizu N, Noguchi C, Mafune K, Kaminishi M, et al. Studies of c-13-urea breath test for diagnosis of *Helicobacter pylori* infection in patients after partial gastrectomy. *Digestion* 2002;**65**(2):82–6.

Kubota 2003

Kubota K, Hiki N, Shimizu N, Shimoyama S, Noguchi C, Tange T, et al. Utility of [13C] urea breath test for *Helicobacter pylori* detection in partial gastrectomy patients. *Digestive Diseases & Sciences* 2003;**48**(11):2135–8.

Kumbhari 2012

Kumbhari V, Rahme N, Meredith CG. Evaluation of a novel office-based c-14 urea breath test ‘heliprobe (r)’ for the rapid detection of *Helicobacter pylori*. *Journal of Gastroenterology and Hepatology* 2012;**27**:58.

Kumbhari 2013

Kumbhari V, Rahme N, Meredith C. Evaluation of a novel office based 14c urea breath test, heliprobe, in patients undergoing endoscopy. *Gastroenterology* 2013;**1**:S334.

Kuo 2002

Kuo CH, Wu DC, Lu CY, Su YC, Yu FJ, Lee YC, et al. The media of rapid urease test influence the diagnosis of *Helicobacter pylori*. *Hepato-Gastroenterology* 2002;**49**(47): 1191–4.

Kuo 2005

Kuo FC, Wang SW, Wu IC, Yu FJ, Yang YC, Wu JY, et al. Evaluation of urine ELISA test for detecting *Helicobacter pylori* infection in Taiwan: a prospective study. *World Journal of Gastroenterology* 2005;**11**(35):5545–8.

Kushch 2009

Kushch I, Korenev N, Kamarchuk L, Pospelov A, Alexandrov J, Kamarchuk G. Non-urease recognition of *Helicobacter pylori* infection using novel sensor technique for breath gas analysis. *Scandinavian Journal of Gastroenterology* 2009;**44**:25.

Kwon 2004

Kwon KT, Lee DS, Chung IK, Park MJ, Park CK, Cho CM, et al. The diagnostic validity of *Helicobacter pylori* stool antigen test in the pre- and post-eradication. *Taeahan Sohwagi Hakhoe C [Korean Journal of Gastroenterology]* 2004;**44**(4):199–205.

Kwon 2015

Kwon YH, Kim N, Lee JY, Choi YJ, Yoon K, Hwang JJ, et al. The diagnostic validity of citric acid-free, high dose c-13-urea breath test after *Helicobacter pylori* eradication in Korea. *Helicobacter* 2015;**20**(3):159–68.

Kyrlagkitsis 2007

Kyrlagkitsis I, Ladas SD, Mallas EG, Raptis S, Mentis A, Delliou E, et al. Evaluation of a conventional ELISA (Novitec) and a near patient immunochromatographic test (Stick H. pyl) for *Helicobacter pylori* antigen detection in stool. *Hepato-Gastroenterology* 2007;**54**(75):799–802.

Labenz 1996

Labenz J, Barsch G, Peitz U, Aygen S, Hennemann O, Tillenburg B, et al. Validity of a novel biopsy urease test (hut) and a simplified 13C-urea breath test for diagnosis of *Helicobacter pylori* infection and estimation of the severity of gastritis. *Digestion* 1996;**57**(6):391–7.

Labenz 1997

Labenz J, Peitz U, Aygen S, Hennemann O, Stolte M. Accuracy of rapid urease test and urea breath test for diagnosis of *Helicobacter pylori* infection after treatment - an investigator blind multicenter study. *Gastroenterology* 1997;**112**(4 (suppl)):A188.

Ladas 2000

Ladas SD, Malamou H, Giota G, Varzakakos I, Kitsanta P, Georgopoulos S, et al. Prospective evaluation of a whole-blood antibody test (flexpack hp) for in-office diagnosis of *Helicobacter pylori* infection in untreated patients. *European Journal of Gastroenterology & Hepatology* 2000;**12**(7):727–31.

Ladas 2002b

Ladas SD, Varzakakos I, Malamou H, Georgopoulos S, Giota G, Triantafyllou K, et al. Evaluation of a single-step serological assay for laboratory diagnosis of *Helicobacter pylori* infection. *European Journal of Clinical Microbiology & Infectious Diseases* 2002;**21**(1):56–9.

Lahaie 1995

Lahaie RG, Desroches J, Picard M, Lemoyne M, Poitras P, Gagnon M, et al. Value of one-step, 20 min c-14 urea breath test in diagnosis and proof of eradication of *Helicobacter pylori* infection. *Gastroenterology* 1995;**108**(4):A141.

Laheij 2006

Laheij RJ. Assessment of a new rapid urease test (gut test) to diagnose *Helicobacter pylori* infection. *Netherlands Journal of Medicine* 2006;**64**(9):317–8.

Lai 1997

Lai KC, Chu KM, Hui WM, Wong BCY, Lam SK. Non-invasive tests before endoscopy in area with high prevalence of gastric carcinoma - *Helicobacter pylori* serology or urea breath test?. *Gastroenterology* 1997;**112**(4 (Suppl)):A599.

Laine 1997

Laine L, Lewin DN, Naritoku W, Cohen H. Prospective comparison of H&E, Giemsa, and Genta stains for the diagnosis of *Helicobacter pylori*. *Gastrointestinal Endoscopy* 1997;**45**(6):463–7.

Laine 1999

Laine L, Knigge K, Faigel D, Margaret N, Marquis SP, Vartan G, et al. Fingerstick *Helicobacter pylori* antibody test: Better than laboratory serological testing?. *American Journal of Gastroenterology* 1999;**94**(12):3464–7.

Lamarque 1996

Lamarque D, Tankovic J, Benamouzig R, Mahe S, Chaumette MT, Auroux J, et al. Quantification of *Helicobacter pylori* (hp) infection in antrum: Comparison of culture, histological examination and c-13-urea breath test. *Gastroenterology* 1996;**110**(4 (suppl)):A169.

Langhorst 2002

Langhorst J, Heuer S, Drouven FU, Schwobel HD, Reichenberger S, Neuhaus H. Evaluation of a new immunochromatographic based whole blood near patient test for the diagnosis of *Helicobacter pylori* infection. *Zeitschrift Fur Gastroenterologie* 2002;**40**(6):389–93.

Larras 2009

Larras R, Moubri M, Berrah H, Mouffok F, Bouhade F, Bouzid K, et al. Evaluation of a monoclonal stool antigen test for the diagnosis of *H. pylori* infection in preschool Algerian children. *Helicobacter* 2009;**14**(4):347.

Lassnig 1988

Lassnig C, Umlauf F, Schaber E, Stoffler G, Aigner F. The value of indirect immunofluorescence, ELISA and western blots for diagnosis and epidemiology of *campylobacter pylori* infections. *Biological Chemistry Hoppe-Seyler* 1988;**369**(9):862.

Laszewicz 2014

Laszewicz W, Iwanczak B, Task Force of the Polish Society of Gastroenterology. Seroprevalence of *Helicobacter pylori* infection in Polish children and adults depending on socioeconomic status and living conditions. *Advances in Medical Sciences* 2014;**59**(1):147–50.

Lee 1999

Lee CL, Lee SC, Wu CH, Chen TK. Diagnosis of h. Pylori infection by urea breath test: Comparison of 50 mg vs 100 mg of c-13 urea. *Gut* 1999;**45**(Suppl 3):A131.

Lee 2000a

Lee SC, Sheu BS, Huang JJ, Yang HB, Lin XZ. Diagnostic efficacy of c-13-urea breath test for *Helicobacter pylori* infection in hemodialysis patients. *Gut* 2000;**47**(Suppl 1):A120.

Lee 2000b

Lee JM, Breslin NP, Fallon C, O'Morain CA. Rapid urease tests lack sensitivity in *Helicobacter pylori* diagnosis when peptic ulcer disease presents with bleeding. *American Journal of Gastroenterology* 2000;**95**(5):1166–70.

Lee 2003

Lee YH, Lee SY, Kim YT, Park CK, Jo CM, Tak WY, et al. Diagnosis of *Helicobacter pylori* infection with urine

- and stool. *Taehan Sohwagi Hakhoe Chi [Korean Journal of Gastroenterology]* 2003;**42**(2):115–20.
- Lee 2013**
Lee YC, Chiu HM, Chiang TH, Yen AMF, Chiu SYH, Chen SLS, et al. Accuracy of faecal occult blood test and *Helicobacter pylori* stool antigen test for detection of upper gastrointestinal lesions. *BMJ Open* 2013; Vol. 3, issue 10: e003989. [DOI: 10.1136/bmjopen-2013-003989]
- Lee 2014**
Lee YC, Tseng PH, Liou JM, Chen MJ, Chen CC, Tu CH, et al. Performance of a one-step fecal sample-based test for diagnosis of *Helicobacter pylori* infection in primary care and mass screening settings. *Journal of the Formosan Medical Association* 2014;**113**(12):899–907.
- Lee 2015a**
Lee SY, Moon HW, Hur M, Yun YM. Validation of western *Helicobacter pylori* igg antibody assays in Korean adults. *Journal of Medical Microbiology* 2015;**64**(Pt 5):513–8.
- Lee 2015b**
Lee JY, Kim N. Diagnosis of *Helicobacter pylori* by invasive test: histology. *Annals of Translational Medicine* 2015;**3**(1): 10.
- Leja 2009**
Leja M, Kupcinskas L, Funka K, Sudraba A, Jonaitis L, Ivanauskas A, et al. The validity of a biomarker method for indirect detection of gastric mucosal atrophy versus standard histopathology. *Digestive Diseases & Sciences* 2009;**54**(11):2377–84.
- Lelwala 1990**
Lelwala Guruge J, Schalen C, Nilsson I, Ljungh A, Tyskiewicz T, Wikander M, et al. Detection of antibodies to *Helicobacter pylori* cell surface antigens. *Scandinavian Journal of Infectious Diseases* 1990;**22**(4):457–65.
- Lemus 2004**
Lemus SMV, Acar MR, Ponce MC, Torres J, Rodriguez OO. Detection of antibodies against *Helicobacter pylori* and positivity to the 13 carbon urea breath test in patients with rosacea. *Dermatologia Revista Mexicana* 2004;**48**(4): 189–96.
- Leodolter 1997**
Leodolter A, DominguezMunoz JE, Nilius M, VonArnim U, Malfertheiner P. Non-invasive primary diagnosis of h-pylori infection: 13C-urea breath test or serology?. *Gastroenterology* 1997;**112**(4 (suppl)):A197.
- Leodolter 1998a**
Leodolter A, Dominguez-Muñoz JE, Von Arnim U, Manes G, Malfertheiner P. 13C-urea breath test for the diagnosis of *Helicobacter pylori* infection. A further simplification for clinical practice. *Scandinavian Journal of Gastroenterology* 1998;**33**(3):267–70.
- Leodolter 1998b**
Leodolter A, Dominguez-Muñoz JE, Gerards C, Von Arnim U, Malfertheiner P. Validity of a modified c-13-urea breath test (c-13-ubt) for pre- and post-treatment diagnosis of *Helicobacter pylori* infection in clinical routine. *Gut* 1998;**43**(Suppl 2):A52.
- Leodolter 1999a**
Leodolter A, Dominguez-Muñoz JE, Von Arnim U, Malfertheiner P. Citric acid or orange juice for the c-13-urea breath test: The impact of ph and gastric emptying. *Alimentary Pharmacology & Therapeutics* 1999;**13**(8): 1057–62.
- Leodolter 1999b**
Leodolter A, Dominguez-Muñoz JE, Von Arnim U, Kahl S, Peitz U, Malfertheiner P. Validity of a modified c-13-urea breath test for pre- and posttreatment diagnosis of *Helicobacter pylori* infection in the routine clinical setting. *American Journal of Gastroenterology* 1999;**94**(8):2100–4.
- Leodolter 2000**
Leodolter A, Von Arnim U, Gerards C, Kahl S, Malfertheiner P. Pre- and post-treatment diagnosis of h-pylori infection by the c-13-urea breath test (13C-ubt): Validation of a new isotope-selective infrared spectrometer (isis). *Gastroenterology* 2000;**118**(4 Part 1):A506.
- Leodolter 2001a**
Leodolter A, Vaira D, Bazzoli F, Hirschl A, Megraud F, Malfertheiner P. European multicentre validation trial of two new non-invasive tests for detection of antibody to *H. pylori*: urine-based ELISA and rapid urine test. *Gastroenterology* 2001;**120**(5):A491.
- Leodolter 2001b**
Leodolter A, Ziegler K, Lehn N, Malfertheiner P. The h-pylori antigen stool test for determination of h-pylori status in general practice: Is unfrozen delivery of stool specimens sufficient using a regular postal service?. *Gut* 2001;**49** (suppl):A97.
- Leodolter 2001c**
Leodolter A, Agha-Amiri K, Peitz U, Gerards C, Ebert MP, Malfertheiner P. Validity of a *Helicobacter pylori* stool antigen assay for the assessment of h-pylori status following eradication therapy. *European Journal of Gastroenterology & Hepatology* 2001;**13**(6):673–6.
- Leodolter 2002**
Leodolter A, Peitz U, Ebert MP, Agha-Amiri K, Malfertheiner P. Comparison of two enzyme immunoassays for the assessment of *Helicobacter pylori* status in stool specimens after eradication therapy. *American Journal of Gastroenterology* 2002;**97**(7):1682–6.
- Leodolter 2003a**
Leodolter A, Wolle K, Wex T, Peitz U, Malfertheiner P. Evaluation of a novel rapid *H. pylori* stool antigen test: Is a reliable diagnosis now possible in the doctor's office?. *Gastroenterology* 2003;**124**(4):A58.
- Leodolter 2003b**
Leodolter A, Vaira D, Bazzoli F, Schutze K, Hirschl A, Megraud F, et al. European multicentre validation trial of two new non-invasive tests for the detection of *Helicobacter pylori* antibodies: urine-based ELISA and rapid urine test. *Alimentary Pharmacology & Therapeutics* 2003;**18**(9): 927–31.

Leodolter 2004

Leodolter A, Wolle K, Peitz U, Schaffranke A, Wex T, Malfertheiner P. Evaluation of a near-patient fecal antigen test for the assessment of *Helicobacter pylori* status. *Diagnostic Microbiology & Infectious Disease* 2004;**48**(2): 145–7.

Leodolter 2005

Leodolter A, Wolle K, Von Arnim U, Kahl S, Treiber G, Ebert MP, et al. Breath and string test: A diagnostic package for the identification of treatment failure and antibiotic resistance of *Helicobacter pylori* without the necessity of upper gastrointestinal endoscopy. *World Journal of Gastroenterology* 2005;**11**(4):584–6.

Lepper 2004

Lepper PM, Moricke A, Vogt K, Bode G, Trautmann M. Comparison of different criteria for interpretation of immunoglobulin g immunoblotting results for diagnosis of *Helicobacter pylori* infection. *Clinical & Diagnostic Laboratory Immunology* 2004;**11**(3):569–76.

Lerang 1998a

Lerang F, Moum B, Mowinckel P, Haug JB, Ragnhildstveit E, Berge T, et al. Accuracy of seven different tests for the diagnosis of *Helicobacter pylori* infection and the impact of H2 receptor antagonists on test results. *Scandinavian Journal of Gastroenterology* 1998;**33**(4):364–9.

Lerang 1998b

Lerang F, Haug JB, Moum B, Mowinckel P, Berge T, Ragnhildstveit E, et al. Accuracy of IgG serology and other tests in confirming *Helicobacter pylori* eradication. *Scandinavian Journal of Gastroenterology* 1998;**33**(7):710–5.

Leszczynska 2009

Leszczynska K, Namiot DB, Namiot Z, Leszczynska JK, Jakoniuk P, Kemona A. Application of immunoassay for detection of *Helicobacter pylori* antigens in the dental plaque. *Advances in Medical Sciences* 2009;**54**(2):194–8.

Leung 1998a

Leung WK, Ng EKW, Sung JY. Performance of commercially available serological ELISA test for *H. pylori* infection: discrepancy between east and west. *Gastroenterology* 1998;**114**(4 (suppl)):A201.

Leung 1998b

Leung WK, Chan FKL, Falk MS, Suen R, Sung JY. Comparison of two rapid whole-blood tests for *Helicobacter pylori* infection in Chinese patients. *Journal of Clinical Microbiology* 1998;**36**(11):3441–2.

Leung 1999

Leung WK, Ng EKW, Chan FKL, Chung SCS, Sung JY. Evaluation of three commercial enzyme-linked immunosorbent assay kits for diagnosis of *Helicobacter pylori* in Chinese patients. *Diagnostic Microbiology and Infectious Disease* 1999;**34**(1):13–7.

Leung 2001

Leung WK, Chow TP, Ng EKW, Chan FKL, Chung SCS, Sung JY. Validation of a new immunoblot assay for the diagnosis of *Helicobacter pylori* in the asian population.

Alimentary Pharmacology and Therapeutics 2001;**15**(3): 423–8.

Leunk 1990

Leunk RD, Ferguson MA, Morgan DR, Low DE, Simor AE. Antibody to cytotoxin in infection by *Helicobacter pylori*. *Journal of Clinical Microbiology* 1990;**28**(6):1181–4.

Levine 2004a

Levine A, Shevah O, Shabat-Sehayek V, Aced H, Boaz M, Moss SF, et al. Masking of c-13 urea breath test by proton pump inhibitors is dependent on type of medication: Comparison between omeprazole, pantoprazole, lansoprazole and esomeprazole. *Alimentary Pharmacology & Therapeutics* 2004;**20**(1):117–22.

Levine 2004b

Levine A, Shevah O, Miloh T, Wine F, Niv Y, Bujanover Y, et al. Validation of a novel real time c-13 urea breath test for rapid evaluation of *Helicobacter pylori* in children and adolescents. *Journal of Pediatrics* 2004;**145**(1):112–4.

Lew 1999

Lew EA, Pisegna JR, Ohning GV, Faller LD, David S, Walsh JH, et al. Intragastric ph titration affects the accuracy of uc urea breath test in the diagnosis of *Helicobacter pylori*. *Gastroenterology* 1999;**116**(4 (suppl)):A235.

Lewin-van 1999

Lewin-van den Broek NT, Numans ME, Buskens E, De Wit NJ, Smout AJPM, Verheij TJM. Validation and value of an enzyme-linked immunosorbent assay for *Helicobacter pylori* in primary care. *Scandinavian Journal of Gastroenterology* 1999;**34**(4):391–5.

Lewis 1997

Lewis JD, Kroser J, Bevan J, Furth EE, Metz DC. Urease-based tests for *Helicobacter pylori* gastritis - accurate for diagnosis but poor correlation with disease severity. *Journal of Clinical Gastroenterology* 1997;**25**(2):415–20.

Li 1995

Li C, Ha T, Ferguson DA, Zhao RG, Chi DS, Patel NR, et al. Comparison of PCR detection of *Helicobacter-pylori* infection using gastric biopsy, saliva and stool specimens with other established techniques (ELISA, culture and histology). *Gastroenterology* 1995;**108**(4):A147.

Li 1996

Li C, Ha T, Ferguson DA, Jr, Chi DS, Zhao R, et al. A newly developed PCR assay of h. Pylori in gastric biopsy, saliva, and feces. Evidence of high prevalence of h. Pylori in saliva supports oral transmission. *Digestive Diseases & Sciences* 1996;**41**(11):2142–9.

Li 2004

Li YH, Guo H, Zhang PB, Zhao XY, Da SP. Clinical value of *Helicobacter pylori* stool antigen test, immunocard stat HPSA, for detecting h pylori infection. *World Journal of Gastroenterology* 2004;**10**(6):913–4.

Liao 2002

Liao CC, Lee CL, Chiang TC, Lee SC, Huang SH, Tu TC, et al. The c-13-urea breath test to detect *Helicobacter pylori* injection: A validated simple methodology with 50 mg c-

- 13-urea. *Alimentary Pharmacology & Therapeutics* 2002;**16**(4):787–92.
- Liao 2003**
Liao CC, Lee CL, Lai YC, Huang SH, Lee SC, Wu CH, et al. Accuracy of three diagnostic tests used alone and in combination for detecting *Helicobacter pylori* infection in patients with bleeding gastric ulcers. *Chinese Medical Journal* 2003;**116**(12):1821–6.
- Lie 2012**
Lie MR, Ganesh S, Haringsma J, Francke J, Kuipers EJ. Analytical equivalence study of ndirs versus irms in breath test analysis. *Gastroenterology* 2012;**142**(5 (Suppl 1)):S487.
- Lim 2005**
Lim LG, Yeoh KG, Ho B, Lim SG. Validation of four *Helicobacter pylori* rapid blood tests in a multi-ethnic asian population. *World Journal of Gastroenterology* 2005;**11**(42):6681–3.
- Lin 1992**
Lin SK, Lambert JR, Schembri M, Nicholson L, Finlay M, Wong C, et al. A comparison of diagnostic tests to determine *Helicobacter pylori* infection. *Journal of Gastroenterology & Hepatology* 1992;**7**(2):203–9.
- Lin 2004a**
Lin HJ, Lo WC, Perng CL, Li AF, Tseng GY, Sun IC, et al. *Helicobacter pylori* stool antigen test in patients with bleeding peptic ulcers. *Helicobacter* 2004;**9**(6):663–8.
- Lin 2004b**
Lin HJ, Sun IC, Lo WC. *Helicobacter pylori* stool antigen test is not reliable in patients with bleeding peptic ulcers. *Gastroenterology* 2004;**126**(4 (Suppl)):A184.
- Lin 2004c**
Lin FY, Sabri M, Erickson D, Alirezaie J, Li D, Sherman PM. Development of a novel microfluidic immunoassay for the detection of *Helicobacter pylori* infection. *Analyst* 2004;**129**(9):823–8.
- Lin 2015**
Lin Z, Cheng SL, Yan Q, Liu XF, Zheng W, Hu XM, et al. Development of an immunochromatographic lateral flow device for rapid detection of *Helicobacter pylori* stool antigen. *Clinical Biochemistry* 2015;**48**(18):1298–303.
- Lindsetmo 2008**
Lindsetmo RO, Johnsen R, Eide TJ, Gutteberg T, Husum HH, Revhaug A. Accuracy of *Helicobacter pylori* serology in two peptic ulcer populations and in healthy controls. *World Journal of Gastroenterology* 2008;**14**(32):5039–45.
- Ling 2013**
Ling D. Carbon-13 urea breath test for *Helicobacter pylori* infection in patients with uninvestigated ulcer-like dyspepsia: An evidence-based analysis. *Ontario Health Technology Assessment Series* 2013;**13**(19):1–30.
- Liquornik 1998**
Liquornik KN, Liacouras CA, Ruchelli ED, Metz DC. The c13-urea breath test: An excellent noninvasive method for detection of h-pylori infection in pediatric patients. *Gastroenterology* 1998;**114**(4 (suppl)):A205.
- Liston 1996**
Liston R, Pitt MA, Banerjee AK. IgG ELISA antibodies and detection of *Helicobacter pylori* in elderly patients. *Lancet* 1996;**347**(8996):269.
- Liu 2002**
Liu W, Xiao S, Wang J, Zhao Z, Qian J, Hu F, et al. Evaluation of *Helicobacter pylori* stool antigen test for detection of *Helicobacter pylori*: A multicenter study. *Chinese Journal of Gastroenterology* 2002;**7**(3):136–9.
- Llor 2014**
Llor C, Bjerrum L. Antimicrobial resistance: risk associated with antibiotic overuse and initiatives to reduce the problem. *Therapeutic Advances in Drug Safety* 2014;**5**(6):229–41.
- Lo 2005**
Lo CC, Lai KH, Peng NJ, Lo GH, Tseng HH, Lin CK, et al. Polymerase chain reaction: A sensitive method for detecting *Helicobacter pylori* infection in bleeding peptic ulcers. *World Journal of Gastroenterology* 2005;**11**(25):3909–14.
- Locatelli 2004**
Locatelli A, Catapani WR, Gomes CR Jr, Silva CBP, Waisberg J. Detection of anti-*Helicobacter pylori* antibodies in serum and duodenal fluid in peptic gastroduodenal disease. *World Journal of Gastroenterology* 2004;**10**(20):2997–3000.
- Loeb 1997**
Loeb MB, Riddell RH, James C, Hunt R, Smaill FM. Evaluation of salivary antibodies to detect infection with *Helicobacter pylori*. *Canadian Journal of Gastroenterology* 1997;**11**(5):437–40.
- Loffeld 1989**
Loffeld RJ, Stobberingh E, Flendrig JA, Van Spreuwel JP, Arends JW. Diagnostic value of an immunoassay to detect anti campylobacter pylori antibodies in non-ulcer dyspepsia. *Lancet* 1989;**1**(8648):1182–5.
- Loffeld 1993**
Loffeld RJLF, Vriese WTJ, Stobberingh EE. Usefulness of several commercial enzyme-linked; immunoassays for detection of *Helicobacter pylori* infection in clinical medicine. *European Journal of Gastroenterology & Hepatology* 1993;**5**(5):333–7.
- Logan 1990**
Logan RPH, Dill S, Walker MM, Bauer FE, Rathbone BP, Johnson P, et al. Evaluation of European standard c-13 urea breath test for the detection of *Helicobacter-pylori*. *Gut* 1990;**31**(10):A1177.
- Logan 1991b**
Logan RPH, Dill S, Bauer FE, Walker MM, Hirschl AM, Gummert PA, et al. The European c-13-urea breath test for the detection of *Helicobacter-pylori*. *European Journal of Gastroenterology & Hepatology* 1991;**3**(12):915–21.
- Lombardo 1999**
Lombardo L, Masoero G, Della Monica P, Taraglio S, Motta M, Ravarino N, et al. Six-time points c-13-urea breath test is a suitable method for *Helicobacter pylori* diagnosis in postgastrectomy patients. *Gut* 1999;**45**(Suppl 3):A131.

Lopez 2001

Lopez Penas D, Naranjo Rodriguez A, Munoz Molinero J, Rodriguez Lopez F, Galvez Calderon C, Chicano Gallardo M, et al. Efficacy of fecal detection of *Helicobacter pylori* with the HPSA technique in patients with upper digestive hemorrhage. *Gastroenterologia y Hepatologia* 2001;**24**(1): 5–8.

Lopez 2004

Lopez T, Quesada M, Almirall J, Sanfeliu I, Segura F, Calvet X. Usefulness of non-invasive tests for diagnosing *Helicobacter pylori* infection in patients undergoing dialysis for chronic renal failure. *Helicobacter* 2004;**9**(6):674–80.

Lopez-Brea 1998

Lopez-Brea M, Alarcon T, Domingo D, Sanchez I, Martinez MJ, Sanz JC. Evaluation of a western-blot technique (helicoblot 2.0) for the detection of antibodies versus specific antigens of *Helicobacter* in children. *Enfermedades Infecciosas Y Microbiologia Clinica* 1998;**16**(6):275–9.

Lotterer 1991

Lotterer E, Ramaker J, Ludtke FE, Tegeler R, Geletneky JV, Bauer FE. The simplified 13C-urea breath test—one point analysis for detection of *Helicobacter pylori* infection. *Zeitschrift Fur Gastroenterologie* 1991;**29**(11):590–4.

Lotterer 1993a

Lotterer E, Ludtke FE, Tegeler R, Lepsien G, Bauer FE. The 13C-urea breath test—detection of *Helicobacter pylori* infection in patients with partial gastrectomy. *Zeitschrift Fur Gastroenterologie* 1993;**31**(2):115–9.

Lotterer 1993b

Lotterer E, Ludtke FE, Tegeler R, Bauer FE. The c-13-urea breath test, *Helicobacter-pylori* infection, and the operated stomach. *Journal of Clinical Gastroenterology* 1993;**16**(1): 82–3.

Loy 1996

Loy CT, Irwig LM, Katelaris PH, Talley NJ. Do commercial serological kits for *Helicobacter pylori* infection differ in accuracy? A meta-analysis. *American Journal of Gastroenterology* 1996;**91**(6):1138–44.

Lozniewski 1996

Lozniewski A, DeKorwin JD, Conroy MC, Plenat F, Weber M. Evaluation of Pyloriset dry, a new rapid agglutination test for *Helicobacter pylori* antibody detection. *Journal of Clinical Microbiology* 1996;**34**(7):1773–5.

Lu 2005

Lu CY, Kuo CH, Lo YC, Chuang HY, Yang YC, Wu IC, et al. The best method of detecting prior *Helicobacter pylori* infection. *World Journal of Gastroenterology* 2005;**11**(36): 5672–6.

Lu 2006

Lu CY, Kuo FC, Wang SW, Lo YC, Wu IC, Chang LL, et al. The clinical applications and accuracy of 2 rapid near-patient tests in detecting *Helicobacter pylori* infection. *Diagnostic Microbiology & Infectious Disease* 2006;**56**(3): 241–6.

Lucio 1999

Lucio L, Masoero G, Della Monica P, Taraglio S, Motta M, Ravarino N, et al. Six-time points c-13-urea breath test is a suitable method for *Helicobacter pylori* diagnosis in post-gastrectomy patients. *Gastroenterology* 1999;**116**(4 (suppl)): A240.

Luzza 1995

Luzza F, Maletta M, Imeneo M, Doldo P, Marasco R, Biancone L, et al. Salivary specific igg is a sensitive indicator of the humoral immune response to *Helicobacter pylori*. *FEMS Immunology & Medical Microbiology* 1995;**10**(3–4): 281–3.

Luzza 1997

Luzza F, Oderda G, Maletta M, Imeneo M, Mesuraca L, Chioboli E, et al. Salivary immunoglobulin g assay to diagnose *Helicobacter pylori* infection in children. *Journal of Clinical Microbiology* 1997;**35**(12):3358–60.

Luzza 2000

Luzza F, Imeneo M, Marasco A, Crotta S, Ierardi E, Usai P, et al. Evaluation of a commercial serological kit for detection of salivary immunoglobulin g to *Helicobacter pylori*: A multicentre study. *European Journal of Gastroenterology & Hepatology* 2000;**12**(10):1117–20.

Ma 2006

Ma YJ, Liu GQ, Zhang HD, Fang QB, Zhao HG. Feasibility of ammonia breath test in diagnosis of *Helicobacter pylori* infection.. *World Chinese Journal of Digestology* 2006;**14** (36):3504–8.

Maaroos 2004

Maaroos HI, Andreson H, Loivukene K, Hutt P, Kolk H, Kull I, et al. The diagnostic value of endoscopy and *Helicobacter pylori* tests for peptic ulcer patients in late post-treatment setting. *BMC Gastroenterology* 2004;**4**:27.

Macaskill 2013

Macaskill P, Gatsonis C, Deeks JJ, Harbord RM, Takwoingi Y, editor(s). Chapter 10: Analysing and Presenting Results. In: Deeks JJ, Bossuyt PM, Gatsonis C, editor(s). *Cochrane Handbook for Systematic Reviews of Diagnostic Test Accuracy* Version 1.0.0. The Cochrane Collaboration, 2013. Available from srdta.cochrane.org.

Machado 2004

Machado RS, Patricio FRD, Kawakami E. C-13-urea breath test to diagnose *Helicobacter pylori* infection in children aged up to 6 years. *Helicobacter* 2004;**9**(1):39–45.

Machado 2006

Machado RS, Kawakami E, Patricio FRD, Reber M. Urease activity does not reflect the degree of colonization by *Helicobacter pylori* in children. *Pediatrics International* 2006;**48**(4):398–402.

MacKay 2003

MacKay WG, Williams CL, McMillan M, Ndip RN, Shepherd AJ, Weaver LT. Evaluation of protocol using gene capture and PCR for detection of *Helicobacter pylori* DNA in feces. *Journal of Clinical Microbiology* 2003;**41**(10): 4589–93.

Madico 1995

Madico G, Verastegui M. Serodiagnosis of *Helicobacter pylori* infection by enzyme-linked immunoelectrotransfer blot. Gastrointestinal physiology working group of Cayetano Heredia University. *Journal of Diarrhoeal Diseases Research* 1995;**13**(2):122–6.

Mahmood 2010

Mahmood S, Hamid A. Comparison between invasive and noninvasive tests in diagnosis of *Helicobacter pylori* infection. *Pakistan Journal of Biological Sciences* 2010;**13**(10):509–12.

Mahony 1988

Mahony MJ, Littlewood JM. Diagnosis of campylobacter pylori gastritis by IgG ELISA. *Pediatric Research* 1988;**24**(3):416.

Maity 2014

Maity A, Banik GD, Ghosh C, Som S, Chaudhuri S, Daschakraborty SB, et al. Residual gas analyzer mass spectrometry for human breath analysis: A new tool for the non-invasive diagnosis of *Helicobacter pylori* infection. *Journal of Breath Research* 2014;**8**(1):016005.

Makristathis 1998

Makristathis A, Pasching E, Schutze K, Wimmer M, Rotter ML, Hirschl AM. Detection of *Helicobacter pylori* in stool specimens by PCR and antigen enzyme immunoassay. *Journal of Clinical Microbiology* 1998;**36**(9):2772–4.

Makristathis 2000

Makristathis A, Barousch W, Pasching E, Binder C, Kuderna C, Apfalter P, et al. Two enzyme immunoassays and PCR for detection of *Helicobacter pylori* in stool specimens from pediatric patients before and after eradication therapy. *Journal of Clinical Microbiology* 2000;**38**(10):3710–4.

Malaty 1996

Malaty HM, El-Zimaity HM, Genta RM, Klein PD, Graham DY. Twenty-minute fasting version of the *us* 13C-urea breath test for the diagnosis of *h. Pylori* infection. *Helicobacter* 1996;**1**(3):165–7.

Malaty 2000

Malaty HM, Logan ND, Graham DY, Ramchatesingh JE, Reddy SG. *Helicobacter pylori* infection in asymptomatic children: Comparison of diagnostic tests. *Helicobacter* 2000;**5**(3):155–9.

Malaty 2002

Malaty HM, Haveman T, Graham DY, Fraley JK. *Helicobacter pylori* infection in asymptomatic children: Impact of epidemiologic factors on accuracy of diagnostic tests. *Journal of Pediatric Gastroenterology & Nutrition* 2002;**35**(1):59–63.

Malfertheiner 1988

Malfertheiner P, Henze E, Stanescu A, Glasbrenner B, Schoetensack C, Ditschuneit H. C-14-breath-test to identify campylobacter-pylori colonization of the mucous-membrane of the stomach. *Zeitschrift für Gastroenterologie* 1988;**26**(9):528.

Malfertheiner 2002

Malfertheiner P, Axon A, O'Morain C, Pajares-Garcia JM, Ekstrom P, Schutze K, et al. Evaluation of a new *Helicobacter pylori* catalase based stool antigen test (femtolab h. Pylori cnx): A European multicenter study. *Gastroenterology* 2002;**122**(4 (Suppl)):A205.

Malfertheiner 2005

Malfertheiner P. 13C-urea breath test: Further modification towards an unrestricted use. *Digestion* 2005;**71**(4):206–7.

Malfertheiner 2012

Malfertheiner P, Megraud F, O'Morain CA, Atherton J, Axon AT, Bazzoli F, et al. Management of *Helicobacter pylori* infection - the Maastricht IV/ Florence Consensus Report. *Gut* 2012;**61**(5):646–64.

Mana 2000a

Mana F, Lacor P, Urbain D. ¹³C urea breath test for the diagnosis of *Helicobacter pylori* infection: Contribution of an infrared spectrometer. *Tijdschrift voor Geneeskunde* 2000;**56**(17):1240–6.

Mana 2000b

Mana F, Franken PR, Ham HR, Reynaert H, Urbain D. C-13 urea breath test with nondispersive isotope-selective infrared spectrometry: Reproducibility and importance of the fasting status. *Helicobacter* 2000;**5**(2):104–8.

Mana 2001b

Mana F, Ham HR, Reynaert H, Franken P, Urbain D. Urea breath test for the diagnosis of *Helicobacter pylori*. *Gastrointestinal Endoscopy* 2001;**53**(6):700–1.

Mana 2005

Mana F, Van Laer W, Bossuyt A, Urbain D. The early effect of proton pump inhibitor therapy on the accuracy of the 13C-urea breath test [erratum appears in Digestive & Liver Disease 2009;41(8):613 note: Van laere, w [corrected to van laer, w]]. *Digestive & Liver Disease* 2005;**37**(1):28–32.

Manes 2000

Manes G, Balzano A, Iaquinto G, Ricci C, Giardullo N, Lioniello M, et al. Accuracy of the h-pylori stool antigen test in the pre- and post-eradication assessment and in patients on omeprazole treatment. *Gut* 2000;**47**(Suppl 1):A113.

Manes 2001

Manes G, Balzano A, Iaquinto G, Ricci C, Piccirillo MM, Giardullo N, et al. Accuracy of the stool antigen test in the diagnosis of *Helicobacter pylori* infection before treatment and in patients on omeprazole therapy. *Alimentary Pharmacology & Therapeutics* 2001;**15**(1):73–9.

Manes 2005

Manes G, Zanetti MV, Piccirillo MM, Lombardi G, Balzano A, Pieramico O. Accuracy of a new monoclonal stool antigen test in post-eradication assessment of *Helicobacter pylori* infection: Comparison with the polyclonal stool antigen test and urea breath test. *Digestive & Liver Disease* 2005;**37**(10):751–5.

Mansour-Ghanaei 2013

Mansour-Ghanaei F, Joukar F, Sheykhan MR, Soati F, Rafatizand AM. Effect of gastric acidification on the c-14-

- ubt heliprobe (r) accuracy during pantoprazole treatment in *Helicobacter pylori* positive patients. *International Journal of Clinical and Experimental Medicine* 2013;**6**(3):185–91.
- Marchildon 1996**
Marchildon PA, Ciota LM, Zamaniyan FZ, Peacock JS, Graham DY. Evaluation of three commercial enzyme immunoassays compared with the c-13 urea breath test for detection of *Helicobacter pylori* infection. *Journal of Clinical Microbiology* 1996;**34**(5):1147–52.
- Marchildon 1999**
Marchildon P, Balaban DH, Sue M, Charles C, Doobay R, Passaretti N, et al. Usefulness of serological igg antibody determinations for confirming eradication of *Helicobacter pylori* infection. *American Journal of Gastroenterology* 1999;**94**(8):2105–8.
- Marchildon 2003**
Marchildon PA, Sugiyama T, Fukuda Y, Peacock JS, Asaka M, Shimoyama T, et al. Evaluation of the effects of strain-specific antigen variation on the accuracy of serologic diagnosis of *Helicobacter pylori* infection [erratum appears in *Journal of Clinical Microbiology* 2003;**41**(7):3462 note: Fukada, y [corrected to fukuda, y]]. *Journal of Clinical Microbiology* 2003;**41**(4):1480–5.
- Marshall 1988a**
Marshall BJ, Surveyor I. Carbon-14 urea breath test for the diagnosis of campylobacter pylori associated gastritis. *Journal of Nuclear Medicine* 1988;**29**(1):11–6.
- Marshall 1988b**
Marshall BJ, Guerrant RL, Plankey MW, Dye KR, Barrett L, Frierson HF, et al. Comparison of c-14-urea breath test, microbiology and histology for the diagnosis of campylobacter pylori. *Gastroenterology* 1988;**94**(5):A284.
- Marshall 1988c**
Marshall BJ, Plankey MW, Dye KR, Frierson H, Hoffman SR, Barrett L, et al. A rapid c-14 urea breath test for the diagnosis of c-pylori associated gastritis. *Clinical Research* 1988;**36**(1):A14.
- Marshall 1991**
Marshall BJ, Plankey MW, Hoffman SR, Boyd CL, Dye KR, Frierson HF Jr, et al. A 20-minute breath test for *Helicobacter pylori*. *American Journal of Gastroenterology* 1991;**86**(4):438–45.
- Marshall 1999**
Marshall JK, O'Brien BJ, Armstrong D. C-13-urea breath test or h-pylori serology for the initial evaluation of young patients with ulcer-like dyspepsia: A decision analysis. *Gastroenterology* 1999;**116**(4 (suppl)):A78.
- Marusic 2006**
Marusic M, Presecki V, Katicic M, Dominis M, Kalenic S. The place and role of serologic methods in detecting *Helicobacter pylori* infection. *Collegium Antropologicum* 2006;**30**(3):529–33.
- Masoero 2000**
Masoero G, Lombardo L, Della Monica P, Vicari S, Crocilla C, Duglio A, et al. Discrepancy between *Helicobacter pylori* stool antigen assay and urea breath test in the detection of *Helicobacter pylori* infection. *Digestive & Liver Disease* 2000;**32**(4):285–90.
- Massarrat 2012**
Massarrat S, Sheykholeslami A. Serum pepsinogen ii as a good marker for mass screening and eradication of h. Pylori infection in populations at risk for gastric cancer. *Archives of Iranian Medicine* 2012;**15**(4):265–6.
- Matougui 2007**
Matougui N, Boudjella MA, Oumnia N, Lahcene M, Tebaibia A, Mouffok F, et al. Evaluation of pronto-dry test versus c-13 urea breath test in determining *Helicobacter pylori* status after treatment. *Helicobacter* 2007;**12**(4):445.
- Matsuda 2003a**
Matsuda M, Noda Y, Takemori Y. Utility and limitations of a method for detecting *Helicobacter pylori*-specific antigens in the stool. *Journal of Gastroenterology* 2003;**38**(3):222–8.
- Matsuda 2003b**
Matsuda M, Noda Y, Takemori Y. Novel diagnostic method of testing for *Helicobacter pylori* infection using the rapid leukocyte strip test, leukostix. *Journal of Gastroenterology and Hepatology* 2003;**18**(10):1196–201.
- Matsukura 1995**
Matsukura N, Onda M, Tokunaga A, Kato S, Yamashita K, Ohbayashi M. Detection of *Helicobacter pylori* DNA in gastric juice by the polymerase chain reaction: Comparison with findings in bacterial culture and the detection of tissue iga and serum igg antibodies against *Helicobacter pylori*. *Journal of Gastroenterology* 1995;**30**(6):689–95.
- Matsukura 2004**
Matsukura N, Tajiri T, Kato S, Togashi A, Masuda G, Tokunaga A, et al. Diagnostic value of culture, histology and PCR for *Helicobacter pylori* in the remnant stomach after surgery. *Alimentary Pharmacology & Therapeutics* 2004;**20 Suppl 1**:33–8.
- Matsuo 2000**
Matsuo K, Hamajima N, Tominaga S, Suzuki T, Nakamura T, Matsuura A, et al. *Helicobacter pylori* igg antibody test established in the United States showed a substantially lower sensitivity for Japanese population. *American Journal of Gastroenterology* 2000;**95**(6):1597–8.
- Mattar 1999**
Mattar R, Silva FM, Alexandrino AM, Laudanna AA. Validation of 14c-urea breath test for diagnosis of *Helicobacter pylori*. *Revista do Instituto de Medicina Tropical de Sao Paulo* 1999;**41**(1):3–8.
- Mattar 2014**
Mattar R, Villares CA, Marostegam PF, Chaves CE, Pinto VB, Carrilho FJ. Low dose capsule based 13C-urea breath test compared with the conventional 13C-urea breath test and invasive tests. *Arquivos de Gastroenterologia* 2014;**51**(2):133–8.
- Matthews 2000**
Matthews GM, Butler RN, Cummins AG, Lawrence A, Johnson B, Campbell F. The c-13-urea breath test

- reflects the severity of *Helicobacter pylori* associated antral inflammation. *Gastroenterology* 2000;**118**(4 (Part 2)): A1272.
- Matthews 2005**
Matthews GM, Cummins AG, Lawrence A, Johnson B, Campbell F, Butler RN. ¹³C-urea breath test: Reproducibility and association with the severity of *Helicobacter pylori*-associated antral gastritis. *Journal of Gastroenterology and Hepatology* 2005;**20**(2):270–4.
- Mauro 2006a**
Mauro M, Radovic V, Zhou P, Wolfe M, Kamath M, Bercik P, et al. ¹³C urea breath test for *Helicobacter pylori*: determination of the optimal cut-off point in a Canadian community population. *Canadian Journal of Gastroenterology* 2006;**20**(12):770–4.
- Mauro 2006b**
Mauro M, Radovic V, Wolfe M, Kamath M, Bercik P, Armstrong D. C-13 urea breath test for *Helicobacter pylori*: Evaluation of 10-minute breath collection. *Canadian Journal of Gastroenterology* 2006;**20**(12):775–8.
- McColl 1997**
McColl KE, El-Nujumi A, Murray L, El-Omar E, Gillen D, Dickson A, et al. The *Helicobacter pylori* breath test: A surrogate marker for peptic ulcer disease in dyspeptic patients. *Gut* 1997;**40**(3):302–6.
- McColl 2003**
McColl KE, Murray LS, Gillen D, Delaney B. Noninvasive *Helicobacter pylori* testing was as effective as endoscopy for managing dyspepsia. *Evidence-Based Medicine* 2003;**8**(1): 20–1.
- McNamara 1999**
McNamara D, Whelan H, Hamilton H, Beattie S, O'Morain C. Hpsa: Assessment of a new non-invasive diagnostic assay for *Helicobacter pylori* infection in an Irish population. *Irish Journal of Medical Science* 1999;**168**(2): 111–3.
- McNulty 1999**
McNulty CA, Nair P, Watson BE, Uff JS, Valori RM. A comparison of six commercial kits for *Helicobacter pylori* detection. *Communicable Disease & Public Health* 1999;**2**(1):59–63.
- McNulty 2005**
McNulty C, Teare L, Owen R, Tompkins D, Hawtin P, McColl K. Test and treat for dyspepsia - but which test?. *BMJ* 2005;**330**(7483):105–6.
- Mediero 2007**
Mediero GG, Ramos JM, Garcia JL, Varela IO, Del Blanco T, Conde JAS. Evaluation of *Helicobacter pylori* stool antigen test for the detection of h-pylori infection in paediatric patients. *International Journal of Antimicrobial Agents* 2007;**29**:S641.
- Megraud 1988**
Megraud F. Comparison of different tests for campylobacter pylori. *Scandinavian Journal of Gastroenterology - Supplement* 1988;**142**:64–8.
- Megraud 2000**
Megraud F, Burette A, Glupczynski Y, Fiocca R, Logan R, Quina M, et al. Comparison of tests for assessment of *Helicobacter pylori* eradication: Results of a multi-centre study using centralized facility testing. *European Journal of Gastroenterology & Hepatology* 2000;**12**(6):629–33.
- Megraud 2005**
Megraud F, European PT FonHp. Comparison of non-invasive tests to detect *Helicobacter pylori* infection in children and adolescents: Results of a multicenter European study. *Journal of Pediatrics* 2005;**146**(2):198–203.
- Mehrazma 2014**
Mehrazma M, Nakhaii S, Talachian E, Harahdashti AL. Diagnostic accuracy of *Helicobacter pylori* stool antigen test in Iranian children. *Infectious Diseases in Clinical Practice* 2014;**22**(3):154–6.
- Meijer 1997**
Meijer BC, Thijs JC, Kleibeuker JH, Van Zwet AA, Berrelkamp RJP. Evaluation of eight enzyme immunoassays for detection of immunoglobulin g against *Helicobacter pylori*. *Journal of Clinical Microbiology* 1997;**35**(1):292–4.
- Meltzer 2013**
Meltzer AC, Pierce R, Cummings DAT, Pines JM, May L, Smith MA, et al. Rapid ¹³C urea breath test to identify *Helicobacter pylori* infection in emergency department patients with upper abdominal pain. *Western Journal of Emergency Medicine* 2013;**14**(3):278–82.
- Mendall 1992**
Mendall MA, Goggin PM, Marrero JM, Molineaux N, Levy J, Badve S, et al. Role of *Helicobacter pylori* serology in screening prior to endoscopy. *European Journal of Gastroenterology & Hepatology* 1992;**4**(9):713–7.
- Mendoza 2006**
Mendoza RB, Sio-Aguilar JO. The validity of *Helicobacter pylori* immunochromatographic stool antigen test and campylobacter urease test in the diagnosis of *Helicobacter pylori* infection among pediatric patients. *Journal of Gastroenterology and Hepatology* 2006;**21**:A392.
- Menegatti 1997a**
Menegatti M, Vaira D, Stanghellini V, Ali A, Landi F, Ricci C, et al. Comparison of c-13- vs c-14-urea breath test (ubt) for *Helicobacter pylori* (hp). *Gastroenterology* 1997;**112**(4 (suppl)):A218.
- Menegatti 1997b**
Menegatti M, Stanghellini V, Landi F, Farinelli S, Mucci F, Ali A, et al. C-13 with and without test meal vs c-14 urea breath test (ubt) to detect h-pylori before and after treatment. *Gut* 1997;**41**(Suppl):A162–A3.
- Metz 1998**
Metz DC, Furth EE, Faigel DO, Kroser JA, Alavi A, Barrett DM, et al. Realities of diagnosing *Helicobacter pylori* infection in clinical practice: A case for non-invasive indirect methodologies. *Yale Journal of Biology & Medicine* 1998;**71**(2):81–90.

Metz 2000

Metz DC. Stool testing for *Helicobacter pylori* infection: Yet another noninvasive alternative. *American Journal of Gastroenterology* 2000;**95**(2):546–8.

Midolo 1995

Midolo PD, Lambert JR, Russell EG, Lin SK. A practical single sample dry latex agglutination test for *Helicobacter pylori* antibody detection. *Journal of Clinical Pathology* 1995;**48**(10):969–71.

Miehlke 1996

Miehlke S, Figura N, Kim JG, Small SM, Graham DY, Do MF. Western blotting for detection of *Helicobacter pylori* anti-caga antibodies strongly correlates with presence of the caga gene. *Gastroenterology* 1996;**110**(4 (suppl)):A197.

Miftahussurur 2016

Miftahussurur M, Yamaoka Y. Diagnostic methods of *Helicobacter pylori* infection for epidemiological studies: Critical importance of indirect test validation. *BioMed Research International* 2016; Vol. 2016:4819423. [DOI: 10.1155/2016/4819423]

Minoli 1998

Minoli G, Prada A, Schuman R, Murnick D, Rigas B. A simplified urea breath test for the diagnosis of *Helicobacter pylori* infection using the lara system. *Journal of Clinical Gastroenterology* 1998;**26**(4):264–6.

Mion 1996

Mion F, Rousseau M. Diagnostic tests to document *Helicobacter pylori* eradication. *Gastroenterology* 1996;**110** (1 (suppl)):324–5.

Mion 1997a

Mion F, Rosner G, Rousseau M, Minaire Y. 13C-urea breath test for *Helicobacter pylori*: Cut-off point determination by cluster analysis. *Clinical Science* 1997;**93**(1):3–6.

Mion 1997b

Mion F, Rosner G, Rousseau M, Brazier JL. C-13-urea breath test for *Helicobacter pylori*: Optimal cutoff point determination by roc curve and cluster analysis. *Clinical Chemistry* 1997;**43**(6 (Suppl 2)):17.

Mion 2001

Mion F, Ecochard R, Guitton J, Ponchon T. (co2)-c-13 breath tests: Comparison of isotope ratio mass spectrometry and non-dispersive infrared spectrometry results. *Gastroenterologie Clinique Et Biologique* 2001;**25**(4): 375–9.

Mirbagheri 2005

Mirbagheri SA, Sohrabpour AA, Hasibi M, Moghimi B, Mohamadnejad M. 14c-urea breath test in patients undergoing anti-tuberculosis therapy. *World Journal of Gastroenterology* 2005;**11**(11):1712–4.

Mitchell 1988

Mitchell HM, Lee A, Berkowicz J, Borody T. The use of serology to diagnose active campylobacter pylori infection. *Medical Journal of Australia* 1988;**149**(11-12):604–9.

Miwa 1997

Miwa H, Murai T, Ohkura R, Kawabe M, Tanaka H, Ogihara T, et al. Effect of fasting subjects' posture on c-13-urea breath test for detection of *Helicobacter pylori* infection. *Helicobacter* 1997;**2**(2):82–5.

Miwa 1998a

Miwa H, Ohkura R, Nagahara A, Murai T, Ogihara T, Watanabe S, et al. C-13 -urea breath test for assessment of cure of *Helicobacter pylori* infection at 1 month after treatment. *Journal of Clinical Gastroenterology* 1998;**27**: S150–S3.

Miwa 1998b

Miwa H, Murai T, Ohkura R, Nagahara A, Watanabe H, Terai T, et al. Usefulness of the c-13 -urea breath test for detection of *Helicobacter pylori* infection in fasting patients. *Journal of Gastroenterology and Hepatology* 1998;**13**(10):1039–43.

Miwa 1999

Miwa H, Hirose M, Kikuchi S, Terai T, Iwazaki R, Kobayashi O, et al. How useful is the detection kit for antibody to *Helicobacter pylori* in urine (urinelisa) in clinical practice?. *American Journal of Gastroenterology* 1999;**94**(12):3460–3.

Miwa 2000

Miwa H, Kikuchi S, Ohtaka K, Kobayashi O, Ogihara A, Hojo M, et al. Insufficient diagnostic accuracy of imported serological kits for *Helicobacter pylori* infection in Japanese population. *Diagnostic Microbiology & Infectious Disease* 2000;**36**(2):95–9.

Miwa 2001

Miwa H, Akamatsu S, Tachikawa T, Sogabe T, Ohtaka K, Nagahara A, et al. On-site diagnosis of h-pylori infection by urine. *Diagnostic Microbiology and Infectious Disease* 2001;**39**(2):95–7.

Mizukami 1994

Mizukami T, Osawa T, Niwa M, Oya A, Masubuchi N, Takahashi S. An enzyme-linked immunosorbent assay for the detection of igg antibodies against urease of *Helicobacter pylori*. *Rinsho Byori [Japanese Journal of Clinical Pathology]* 1994;**42**(11):1188–93.

Moayyedi 1997

Moayyedi P, Braunholtz D, Heminbrough E, Clough M, Tompkins DS, Mapstone NP, et al. Do patients need to fast for a c-13-urea breath test?. *European Journal of Gastroenterology & Hepatology* 1997;**9**(3):275–7.

Mock 1999

Mock T, Yatscoff R, Foster R, Hyun JH, Chung IS, Shim CS, et al. Clinical validation of the helikit™: A c-13 urea breath test used for the diagnosis of *Helicobacter pylori* infection. *Clinical Biochemistry* 1999;**32**(1):59–63.

Mohammadi 2008

Mohammadi M, Talebkhan Y, Khalili G, Mahboudi F, Massarrat S, Zamaninia L, et al. Advantage of using a home-made ELISA kit for detection of *Helicobacter pylori* infection over commercially imported kits. *Indian Journal of Medical Microbiology* 2008;**26**(2):127–31.

Moncayo 2006

Moncayo JJ, Santacruz JJ, Alvarez AL, Franco B, Lopez MA, Angel A, et al. Comparison of methods in the diagnosis of *Helicobacter pylori* infection in Quindio, Colombia. *Colombia Medica* 2006;**37**(3):203–12.

Monteiro 2001b

Monteiro L, Gras N, Megraud F. Magnetic immuno-PCR assay with inhibitor removal for direct detection of *Helicobacter pylori* in human feces. *Journal of Clinical Microbiology* 2001;**39**(10):3778–80.

Morales 2002

Morales A, Hurtado C, Madrid AM, Pimentel C, Espinosa MN. An ELISA stool test to detect *Helicobacter pylori* infection. *Revista Medica de Chile* 2002;**130**(1):61–5.

Moshkowitz 1993

Moshkowitz M, Peled Y, Baratz M, Halpern Z, Tiomny E, Gilat T. 14c-urea breath test—a simple, noninvasive method for the detection of *Helicobacter pylori* infection. *Israel Journal of Medical Sciences* 1993;**29**(2-3):94–7.

Motta 2009

Motta O, De Caro F, Quarto F, Proto A. New FTIR methodology for the evaluation of (13)C/(12)C isotope ratio in *Helicobacter pylori* infection diagnosis. *Journal of Infection* 2009;**59**(2):90–4.

Moulton-Barrett 1993

Moulton-Barrett R, Triadafilopoulos G, Michener R, Gologorsky D. Serum 13C-bicarbonate in the assessment of gastric *Helicobacter pylori* urease activity. *American Journal of Gastroenterology* 1993;**88**(3):369–74.

Mowat 1997

Mowat C, Murray L, Hilditch TE, Kelman A, Oien K, McColl KEI. Comparison of helisal test kit and c-14-urea breath test in determining h-pylori status and predicting ulcer disease in dyspeptic patients. *Gastroenterology* 1997;**112**(4 (suppl)):A226.

Mowat 1998

Mowat C, Murray L, Hilditch TE, Kelman A, Oien K, McColl KE. Comparison of helisal rapid blood test and 14c-urea breath test in determining *Helicobacter pylori* status and predicting ulcer disease in dyspeptic patients. *American Journal of Gastroenterology* 1998;**93**(1):20–5.

Mrevlje 2012

Mrevlje Z, Plut S, Jeverica S, Osredkar J, Stabuc B. Comparison of success rates of noninvasive and invasive methods in diagnosis of *Helicobacter pylori* infection. *Helicobacter* 2012;**17**:94.

Muhsen 2006

Muhsen K, Athamna A, Athamna M, Spungin-Bialik A, Cohen D. Evaluation of a urine-based enzyme-linked immunosorbent assay test for the detection of *Helicobacter pylori* infection among 3- to 5-year-old Israeli Arab healthy children. *Journal of Pediatric Gastroenterology & Nutrition* 2006;**43**(3):398–401.

Muhsen 2012

Muhsen K, Jurban M, Goren S, Cohen D. Incidence, age of acquisition and risk factors of *Helicobacter pylori* infection

among Israeli Arab infants. *Journal of Tropical Pediatrics* 2012;**58**(3):208–13.

Munster 1993

Munster DJ, Chapman BA, Burt MJ, Dobbs BR, Allardyce RA, Bagshaw PF, et al. The fate of ingested 14c-urea in the urea breath test for *Helicobacter pylori* infection. *Scandinavian Journal of Gastroenterology* 1993;**28**(8):661–6.

Murakami 2003

Murakami K, Sato R, Okimoto T, Watanabe K, Nasu M, Fujioka T, et al. Influence of anti-ulcer drugs used in Japan on the result of c-13-urea breath test for the diagnosis of *Helicobacter pylori* infection. *Journal of Gastroenterology* 2003;**38**(10):937–41.

Murakami 2011

Murakami K, Kamada T, Ishikawa H, Imamura H, Matsumoto H, Fujita M, et al. An evaluation of the performance of a novel stick-type kit for rapid detection of *Helicobacter pylori* antibodies in urine. *Clinical Laboratory* 2011;**57**(7-8):481–7.

Murata 2002

Murata Y, Kojyo A, Ikeda A, Yamanaka K. Study on the detection methods of *Helicobacter pylori* from clinical specimens. *Rinsho Biseibutsu Jinsoku Shindan Kenkyukai Shi [JARMAM : Journal of the Association for Rapid Method and Automation in Microbiology]* 2002;**12**(2):105–19.

Murphy 2015

Murphy C, Yamaguchi D, Rainey PM. *Helicobacter pylori* c-13-urea breath test: The unique challenges of validating a clia-waived test. *American Journal of Clinical Pathology* 2015;**143**:A11.

Murugesan 2011

Murugesan SV, Steele I, Tiszlavicz L, Farragher T, Moore AR, Varro A, et al. Factors that determine the sensitivity of rapid urease tests for the detection of *Helicobacter pylori* infection. *Gastroenterology* 2011;**140**(5 (suppl)):S879.

Muñoz 1998

Muñoz E, Corcuera M, Roldán M, Gómez F, Picazo A, Baquero M, et al. Comparative study of microbiological and histopathological techniques used for the detection of *Helicobacter pylori*. *European Journal of Histochemistry* 1998;**42**(4):297–302.

Muñoz 1999

Muñoz C, Jane M, Gonzalez-Cuevas A, Juncosa T, Gene A, Varea V, et al. Evaluation of a simple, rapid polymerase chain reaction (PCR) technique for the diagnosis of *Helicobacter pylori* infection in infancy. *Enfermedades Infecciosas Y Microbiologia Clinica* 1999;**17**(3):119–25.

Myllyniemi 2007

Myllyniemi M, Linnala A, Paloheimo LI, Hendolin P, Engstrand L, Perez GP, et al. Improved specificity of *Helicobacter pylori* IgA/IgG ELISA over other *H. pylori* tests. *Helicobacter* 2007;**12**(4):447.

Myllyniemi 2008

Myllyniemi M, Hendolin P, Telaranta-Keerie A, Nikulin M, Paloheimo LI, Engstrand L, et al. New specific *H. pylori* IgG ELISA test. *Helicobacter* 2008;**13**(5):472–3.

Nagahara 2003

Nagahara Y, Mizuno M, Maga T, Ishiki K, Okuno T, Yoshida T, et al. Outcome of patients with inconsistent results from c-13-urea breath test and bacterial culture at the time of assessment of helicobacter pylori eradication therapy in Japan. *Hepato-Gastroenterology* 2003;**50**(53): 1700–3.

Nair 1995

Nair P, Stephens JC, Mackay EH, West K, Mayberry JF, Wicks ACB, et al. A simple 3-minute latex agglutination-test for rapid *Helicobacter-pylori* serodiagnosis. *Gastroenterology* 1995;**108**(4):A174.

Nakagawa 1995

Nakagawa T, Ohara H, Yamamoto M, Yoneshima M, Suzuki T, Murai S, et al. 13C-urea breath test for the detection of *Helicobacter pylori* infection and the assessment of therapeutic effect. *Nippon Shokakibyo Gakkai Zasshi [Japanese Journal of Gastroenterology]* 1995;**92**(3):264.

Nakata 1995

Nakata H, Itoh H, Yokoya Y, Kawai J, Nishioka S, Miyamoto K, et al. Serum antibody against *Helicobacter pylori* assayed by a new capture ELISA. *Journal of Gastroenterology* 1995;**30**(3):295–300.

Nakata 2004

Nakata H, Itoh H, Ishiguchi T, Iwata T, Sato H, Higashimoto Y, et al. Immunological rapid urease test using monoclonal antibody for *Helicobacter pylori*. *Journal of Gastroenterology and Hepatology* 2004;**19**(9):970–4.

Nakayama 2004

Nakayama K, Konno M, Tajiri H, Matsuhisa T, Kato S, Minoura T, et al. Comparison between the ¹³C-urea breath test and stool antigen test for the diagnosis of childhood *Helicobacter pylori* infection. *Journal of Gastroenterology* 2004;**39**(11):1045–50.

Naruki 1996

Naruki Y, Koyama H, Kurita T, Nishino M, Higashi Y, Otsuka S, et al. Evaluation of c-13 urea breath test in a diagnosis of *Helicobacter pylori*. *Journal of Nuclear Medicine* 1996;**37**(5 (suppl)):246 (abstract 1103).

Navarro 1992

Navarro F, Coll P, Sainz S, Mirelis B, Cardenosa N, Alonso C, et al. Evaluation of two different commercial kits for *Helicobacter pylori* specific antibodies detection in patients undergoing gastrointestinal endoscopic procedures. A seroprevalence study in asymptomatic population. *Enfermedades Infecciosas Y Microbiología Clínica* 1992;**10**(4): 190–4.

NCBI 2014

NCBI. MeSH. NLM Controlled Vocabulary. *Helicobacter pylori*. www.ncbi.nlm.nih.gov/mesh/68016480 (accessed 3 August 2014).

Negayama 1992

Negayama K, Terada S, Kawanishi K. Clinical significance of anti-*Helicobacter pylori* antibody in the diagnosis of *Helicobacter pylori* infection in chronic gastritis.

Kansenshogaku Zasshi [Journal of the Japanese Association for Infectious Diseases] 1992;**66**(11):1597–8.

Negrini 1992

Negrini R, Zanella I, Savio A, Poiesi C, Verardi R, Ghielmi S, et al. Serodiagnosis of *Helicobacter pylori*-associated gastritis with a monoclonal antibody competitive enzyme-linked immunosorbent assay. *Scandinavian Journal of Gastroenterology* 1992;**27**(7):599–605.

Neri 1999

Neri M, Angelucci D, Laterza F, Ricciuti M, Del Duca L, Di Matteo S, et al. False negativity of c-13 urea breath test in the presence of coccoid forms of h.pylori: Effects on the sensitivity of the test. *Gastroenterology* 1999;**116**(4 (suppl)): A265.

Neumann 2010

Neumann H, Foertsch S, Vieth M, Mudter J, Kuth R, Neurath MF. Immediate detection of *Helicobacter* infection with a novel electrochemical system: Feasibility and comparison of diagnostic yield with immunohistochemistry, 13C urea breath test and *Helicobacter* urease test. *Gastroenterology* 2010;**138**(5 (suppl 1)):S114.

Neumann 2011

Neumann H, Foertsch S, Vieth M, Kuth R, Roll S, Neurath MF. A newly developed electrochemical device enables accurate and immediate detection of h. pylori infection within 10 seconds. *Gastroenterology* 2011;**140**(5 (suppl)): S58.

Neumann 2012

Neumann H, Foertsch S, Ritter B, Vieth M, Kuth R, Neurath MF. Final data of a new electrochemical device that enables rapid and accurate detection of *Helicobacter pylori* infection. *Gastroenterology* 2012;**142**(5 (Suppl 1)):S484.

Newell 1988

Newell DG, Johnston BJ, Ali MH, Reed PI. An enzyme-linked immunosorbent assay for the serodiagnosis of campylobacter pylori-associated gastritis. *Scandinavian Journal of Gastroenterology - Supplement* 1988;**142**:53–7.

Newell 1989a

Newell DG, Rathbone BJ. The serodiagnosis of campylobacter pylori infection. *Serodiagnosis and Immunotherapy in Infectious Disease* 1989;**3**(1):1–6.

Newell 1989b

Newell DG, Stacey A. Antigens for the serodiagnosis of campylobacter pylori infections. *Gastroenterologie Clinique et Biologique* 1989;**13**(1 Pt 1):37B–41B.

Newell 1991

Newell DG, Hawtin PR, Stacey AR, MacDougall MH, Ruddle AC. Estimation of prevalence of *Helicobacter pylori* infection in an asymptomatic elderly population comparing [14c] urea breath test and serology. *Journal of Clinical Pathology* 1991;**44**(5):385–7.

Ng 2002

Ng FH, Lai KC, Wong BC, Wong WM, Wong SY, Chow KC, et al. [13C]-urea breath test without prior fasting and without test meal is accurate for the detection

- of *Helicobacter pylori* infection in Chinese. *Journal of Gastroenterology and Hepatology* 2002;**17**(8):834–8.
- Ng 2013**
Ng TH, Rosaida R. Evaluation of serology and urea breath test as reliable diagnostic test for *h.pylori* infection. *Journal of Gastroenterology and Hepatology* 2013;**28**:97.
- Nguyen 2008a**
Nguyen TV, Bengtsson C, Nguyen GK, Granstrom M. Evaluation of a novel monoclonal-based antigen-in-stool enzyme immunoassay (premier platinum HPSA plus) for diagnosis of *Helicobacter pylori* infection in Vietnamese children. *Helicobacter* 2008;**13**(4):269–73.
- Nguyen 2008b**
Nguyen TVH, Bengtsson C, Nguyen GK, Granstrom M. Evaluation of a novel monoclonal-based antigen-in-stool enzyme immunoassay (premier platinum HPSA plus) for diagnosis of *Helicobacter pylori* infection in Vietnamese children. *Helicobacter* 2008;**13**(4):269–73.
- Nguyen 2010**
Nguyen LT, Uchida T, Tsukamoto Y, Trinh TD, Ta L, Ho DQD, et al. Evaluation of rapid urine test for the detection of *Helicobacter pylori* infection in the Vietnamese population. *Digestive Diseases and Sciences* 2010;**55**(1): 89–93.
- Nguyen 2012**
Nguyen VB, Nguyen GK, Ha Nguyen TV, Ha Hoang TT, Anh Le TL, Xuan Nguyen TA, et al. *Helicobacter pylori* (hp) infection in Vietnam: Epidemiology, symptomatology, diagnosis and treatment in children. *Journal of Gastroenterology and Hepatology* 2012;**27**:46.
- Nguyen 2013**
Nguyen B, Anhthi Nguyen V, Nguyen K, Anhthi Le L, Hathi Nguyen V, Hathi Hoang T, et al. *Helicobacter pylori* (hp) infection in Vietnam: Epidemiology, symptomatology, diagnosis and treatment in children. *Journal of Gastroenterology and Hepatology* 2013;**28**:550–1.
- Ni 2000**
Ni YH, Lin JT, Huang SF, Yang JC, Chang MH. Accurate diagnosis of *Helicobacter pylori* infection by stool antigen test and six other currently available tests in children. *Gastroenterology* 2000;**118**(4):A1283.
- Nightingale 1996**
Nightingale SL. Breath test for *Helicobacter pylori* collection kit approved. *Journal of the American Medical Association* 1996;**276**(21):1710.
- Nijevitch 2001**
Nijevitch AA, Sataev VU. The reliability of urease tests for *Helicobacter pylori* in childhood. *Journal of Clinical Gastroenterology* 2001;**32**(3):277–9.
- Nilius 2001**
Nilius M, Wex T, Muller-Dietz G, Leodolter A, Schilling D, Malfertheiner P. Comparative evaluation of two hemagglutination tests for the detection of anti-*Helicobacter pylori* antibodies. *Diagnostic Microbiology & Infectious Disease* 2001;**41**(4):221–3.
- Nishi 1998**
Nishi I, Irie H, Watanabe N, Futami J, Suzuki H, Ichinose Y, et al. Urea breath test “breath by breath measurement” of (v)over-dot(13)co(2) and (v)over-dot(12)co(2): An approach to the quantitative evaluation for the therapeutic elimination of *h-pylori*. *Gastroenterology* 1998;**114**(4 (suppl)):A243.
- Nishikawa 1996**
Nishikawa K, Katagiri M, Kagaya H, Kudo M, Kato M, Takeda H, et al. Evaluation of rapid urease tests for *Helicobacter pylori* in biopsy specimens, compared with culture and c-13-urea breath test. *Gastroenterology* 1996;**110**(4 (suppl)):A212.
- Nishikawa 1999**
Nishikawa K, Kato M, Sugiyama T, Asaka M. *Helicobacter pylori*, serum igg antibody, urea breath test. *Nippon Rinsho* 1999;**57**(Suppl):154–6.
- Nishikawa 2000**
Nishikawa K, Sugiyama T, Kato M, Ishizuka J, Kagaya H, Hokari K, et al. A prospective evaluation of new rapid urease tests before and after eradication treatment of *Helicobacter pylori*, in comparison with histology, culture and c-13-urea breath test. *Gastrointestinal Endoscopy* 2000;**51**(2):164–8.
- Nishizono 1998**
Nishizono A, Gotoh T, Fujioka T, Murakami K, Kubota T, Nasu M, et al. Serological assessment of the early response to eradication therapy using an immunodominant outer membrane protein of *Helicobacter pylori*. *Clinical & Diagnostic Laboratory Immunology* 1998;**5**(6):856–61.
- Niv 1998**
Niv Y, Sperber AD, Scapa E, Maoz E, Fraser G, Druzd T, et al. A comparison of new rapid urease tests for detection of *Helicobacter pylori*: Test characteristics and factors affecting positivity and time to positivity. *Journal of Clinical Gastroenterology* 1998;**27**(4):327–30.
- Niv 2000**
Niv Y, Abuksis G, Ben-Gur S, Koren K. 13C-urea breath test (13C-ubt) for validation of successful *Helicobacter pylori* eradication. Evaluation of 1371 patients. *Gastroenterology* 2000;**118**(4 (part 2)):A1284.
- Niv 2003**
Niv Y, Abuksis G, Koren R. 13C urea breath test (13C ubt) for *Helicobacter pylori* (hp) diagnosis in geriatrics. *Gastroenterology* 2003;**124**(4 (suppl)):A625.
- Noguchi 2007**
Noguchi N, Rimbara E, Kato A, Tanaka A, Tokunaga K, Kawai T, et al. Detection of mixed clarithromycin-resistant and -susceptible *Helicobacter pylori* using nested PCR and direct sequencing of DNA extracted from faeces. *Journal of Medical Microbiology* 2007;**56**(9):1174–80.
- Notarnicola 1996**
Notarnicola M, Russo F, Cavallini A, Bianco M, Jirillo E, Pece S, et al. PCR identification of *Helicobacter pylori* DNA in faeces from patients with gastroduodenal pathology. *Medical Science Research* 1996;**24**(11):785–7.

Nugalieva 2006

Nugalieva ZZ, Opekun AR, Graham DY. Problem of distinguishing false-positive tests from acute or transient *Helicobacter pylori* infections. *Helicobacter* 2006;**11**(2): 69–74.

Nurgalieva 2003

Nurgalieva Z, Goodman KJ, Wang C, Day RS, Campos A, de la Rosa J. Detection of *Helicobacter pylori* infection in children followed from birth: Correspondence of serology and the urea breath test. *American Journal of Epidemiology* 2003;**157**(11):S85–S.

Nurgalieva 2008

Nurgalieva Z, Goodman KJ, Phillips CV, Fischbach L, de la Rosa JM, Gold BD. Correspondence between *Helicobacter pylori* antibodies and urea breath test results in a US-Mexico birth cohort. *Paediatric and Perinatal Epidemiology* 2008;**22**(3):302–12.

Nysaeter 1992

Nysaeter G, Berstad K, Weberg R, Berstad A, Hardardottir H. Diagnosis of *Helicobacter pylori* infection. Rapid urease test, microscopy of smears and culture from ventricular biopsy compared with the 14c-urea breath test. *Tidsskrift for Den Norske Lægeforening* 1992;**112**(18):2356–8.

O'Connor 2010

O'Connor A, O'Morain NR, Dobson M, Qasim A, Ryan BM, Breslin N, et al. *Helicobacter pylori* eradication treatment is more successful when diagnosis is made after urea breath test than after rapid urease testing at endoscopy in patients with dyspepsia. *Gastroenterology* 2010;**138**(5 (suppl 1)):S340.

Oak 2011

Oak JH, Chung WC, Jung SH, Choi KH, Kim EJ, Kang BK, et al. Effect of acid pump antagonist (revaprazan, revanex(r)) on result of 13C urea breath test in patients with *Helicobacter pylori* associated peptic ulcer disease. *Taehan Sohwagi Hakhoe Chi Korean Journal of Gastroenterology* 2011;**57**(1):8–13.

Obata 2003

Obata Y, Kikuchi S, Miwa H, Yagyu K, Lin YS, Ogihara A. Diagnostic accuracy of serological kits for *Helicobacter pylori* infection with the same assay system but different antigens in a Japanese patient population. *Journal of Medical Microbiology* 2003;**52**(10):889–92.

Obradovic 2001

Obradovic V, Artiko V, Petrovic M, Petrovic N, Davidovic B, Bosnjakovic V, et al. Detection of *Helicobacter pylori* infection using 14-c urea breath test. *European Journal of Nuclear Medicine* 2001;**28**(8):1188.

Odaka 2002

Odaka T, Yamaguchi T, Koyama H, Saisho H, Nomura F. Evaluation of the *Helicobacter pylori* stool antigen test for monitoring eradication therapy. *American Journal of Gastroenterology* 2002;**97**(3):594–9.

Oderda 1989

Oderda G, Vaira D, Holton J, Dowsett JF, Ansaldi N. Serum pepsinogen i and igg antibody to campylobacter

pylori in non-specific abdominal pain in childhood. *Gut* 1989;**30**(7):912–6.

Oderda 1998a

Oderda G, Garisio P, Harding M, Thomas JE. Use of the c-13 urea breath test for the diagnosis of *Helicobacter pylori* infection in childhood. *Gut* 1998;**43**:S11–S2.

Oderda 1998b

Oderda G, Harding M, Thomas JE, Coward WA, Bazzoli F, Zagari M, et al. The c-13 urea breath test to assess *Helicobacter pylori* eradication in childhood h pylori gastritis. *Gut* 1998;**43**(Suppl 3):S9–S10.

Oderda 1999

Oderda G, Rapa A, Ronchi B, Lerro P, Pastore M, Staiano A, et al. Evaluation of the *Helicobacter pylori* stool antigen test (HPSA) for detection of h-pylori infection in children. A multicentre Italian study. *Gut* 1999;**45**(Suppl 3):A93–A4.

Oderda 2000

Oderda G, Rapa A, Ronchi B, Lerro P, Pastore M, Staiano A, et al. Detection of *Helicobacter pylori* in stool specimens by non-invasive antigen enzyme immunoassay in children: Multicentre Italian study. *BMJ* 2000;**320**(7231):347–8.

Oderda 2004

Oderda G, Rapa A, Bona G. Diagnostic tests for childhood *Helicobacter pylori* infection: Invasive, noninvasive or both?. *Journal of Pediatric Gastroenterology and Nutrition* 2004;**39**(5):482–4.

Ogunc 2003

Ogunc D, Artan R, Ongut G, Gelen T, Colak D, Donmez L, et al. Evaluation of a western blot technique (helicoblot 2.1) for the diagnosis of *Helicobacter pylori* infection in children. *Pathology* 2003;**35**(2):157–60.

Ohara 1995

Ohara H, Suzuki T, Nakagawa T, Yoneshima M, Yamamoto M, Tsujino D, et al. 13C-ubt using an infrared spectrometer for detection of *Helicobacter pylori* and for monitoring the effects of lansoprazole. *Journal of Clinical Gastroenterology* 1995;**20** Suppl 2:S115–7.

Ohara 1996

Ohara S, Sekine H, Moriyama S, Sugiyama K, Arikawa T, Iijima K, et al. Methodological study of 13C urea breath test for detection of *Helicobacter pylori* infection. *Japanese Journal of Gastroenterology* 1996;**93**(8):530–6.

Ohara 1997

Ohara S, Kato M, Asaka M, Toyota T. Cut-off vague and clinical utility of c-13-urea breath test for diagnosis of *Helicobacter pylori* infection. *Gastroenterology* 1997;**112**(4 (suppl)):A241.

Ohara 1998a

Ohara S, Kato M, Asaka M, Toyota T. Studies of 13C-urea breath test for diagnosis of *Helicobacter pylori* infection in Japan. *Journal of Gastroenterology* 1998;**33**(1):6–13.

Ohara 1998b

Ohara S, Kato M, Asaka M, Toyota T. The ubit-100 13Co2 infrared analyzer: Comparison between infrared

- spectrometric analysis and mass spectrometric analysis. *Helicobacter* 1998;**3**(1):49–53.
- Ohara 2004**
Ohara S, Kato M, Saito M, Fukuda S, Kato C, Hamada S, et al. Comparison between a new c-13-urea breath test, using a film-coated tablet, and the conventional c-13-urea breath test for the detection of *Helicobacter pylori* infection. *Journal of Gastroenterology* 2004;**39**(7):621–8.
- Ohkura 1998**
Ohkura R. Usefulness of *Helicobacter pylori* stool antigen (HPSA) assay for detection of *Helicobacter pylori* infection. *Japanese Journal of Gastroenterology* 1998;**95**(12):1397.
- Ohkura 2000**
Ohkura R, Miwa H, Murai T, Nagahara A, Ohta K, Sato K, et al. Usefulness of a novel enzyme immunoassay for the detection of *Helicobacter pylori* in feces. *Scandinavian Journal of Gastroenterology* 2000;**35**(1):49–53.
- Oksanen 1997**
Oksanen A, Bergstrom M, Sjostedt S, Gad A, Hammarlund B, Seensalu R. Accurate detection of *Helicobacter pylori* infection with a simplified c-13 urea breath test. *Scandinavian Journal of Clinical & Laboratory Investigation* 1997;**57**(8):689–94.
- Oksanen 1998**
Oksanen A, Veijola L, Sipponen P, Schauman KO, Rautelin H. Evaluation of Pyloriset screen, a rapid whole-blood diagnostic test for *Helicobacter pylori* infection. *Journal of Clinical Microbiology* 1998;**36**(4):955–7.
- Oksanen 2001**
Oksanen A, Sipponen P, Sarna S, Rautelin H. Serologic diagnosis of *Helicobacter pylori* infection in outpatients aged 45 years or less. *European Journal of Clinical Microbiology & Infectious Diseases* 2001;**20**(8):554–7.
- Okuda 2002**
Okuda M, Miyashiro E, Koike M, Tanaka T, Bouoka M, Okuda S, et al. Serodiagnosis of *Helicobacter pylori* infection is not accurate for children aged below 10. *Pediatrics International* 2002;**44**(4):387–90.
- Okuda 2004**
Okuda M, Nakazawa T, Booka M, Miyashiro E, Yosikawa N. Evaluation of a urine antibody test for *Helicobacter pylori* in Japanese children. *Journal of Pediatrics* 2004;**144**(2):196–9.
- Okuda 2005**
Okuda M, Sugiyama T, Fukunaga K, Kondou M, Miyashiro E, Nakazawa T. A strain-specific antigen in Japanese *Helicobacter pylori* recognized in sera of Japanese children. *Clinical & Diagnostic Laboratory Immunology* 2005;**12**(11):1280–4.
- Okuda 2010**
Okuda M, Oomatsu H, Kotake J, Fukuda N, Yamamoto N, Sakaedani N, et al. Evaluation of urine antibody test for *h. pylori* in Japanese children. *Helicobacter* 2010;**15**(4):361.
- Okuda 2013**
Okuda M, Kamiya S, Booka M, Kikuchi S, Osaki T, Hiwatani T, et al. Diagnostic accuracy of urine-based kits for detection of *Helicobacter pylori* antibody in children. *Pediatrics International* 2013;**55**(3):337–41.
- Okuda 2014**
Okuda M, Osaki T, Kikuchi S, Ueda J, Lin YS, Yonezawa H, et al. Evaluation of a stool antigen test using a mab for native catalase for diagnosis of *Helicobacter pylori* infection in children and adults. *Journal of Medical Microbiology* 2014;**63**:1621–5.
- Olafsson 2012**
Olafsson S, Patel B, Jackson C, Cai J. *Helicobacter pylori* breath testing in an open access system has a high rate of potentially false negative results due to protocol violations. *Helicobacter* 2012;**17**(5):391–5.
- Oleastro 2000**
Oleastro M, Monteiro L, Matos R, Lopes AI, Cabral J, Cabrita J. Evaluation of a western blot test, helico blot 2.1, in the diagnosis of *Helicobacter pylori* infection in a Portuguese paediatric population. *Gut* 2000;**47**(Suppl 1):A98.
- Oleastro 2002**
Oleastro M, Matos R, Cabral J, Barros R, Lopes AI, Ramalho P, et al. Evaluation of a western blot test, helico blot 2.1, in the diagnosis of *Helicobacter pylori* infection in a pediatric population. *Helicobacter* 2002;**7**(3):210–5.
- Oliaro 2000**
Oliaro J, Johnson RD, Chen WX, Chadwick VS, Murray A. Identification of an immunogenic 18-kda protein of *Helicobacter pylori* by alkaline phosphatase gene fusions. *Journal of Medical Microbiology* 2000;**49**(7):643–50.
- Olsson 1993**
Olsson K, Wadstrom T, Tyskiewicz T. PCR identification of *Helicobacter pylori* in gastritis patients. *Lancet* 1993;**341**(8853):1155.
- Omorogbe 2015**
Omorogbe JA, Brennan D, Alsaffar M, Smith S, McNamara D, Trinity Acad Gastroenterology G. Comparison of non-invasive tests; stool HpSA ELISA and c13urea breath test in the diagnosis of *Helicobacter pylori* infection in a low prevalence cohort. *Helicobacter* 2015;**20**:89.
- Ong 1993**
Ong KK, Goh KL, Parasakthi N. C-14 urea breath test - a useful noninvasive test in the diagnosis of *Helicobacter-pylori* infection. *Gastroenterology* 1993;**104**(4 suppl):A165.
- Opekun 2002**
Opekun AR, Abdalla N, Sutton FM, Hammoud F, Kuo GM, Torres E, et al. Urea breath testing and analysis in the primary care office. *Journal of Family Practice* 2002;**51**(12):1030–2.
- Opekun 2006**
Opekun AR, Luu P, Gotschall AB, Abdalla N, Torres E, Rudd SB, et al. Point-of-care *Helicobacter pylori* urine antibody detection in a multi-ethnic adult population in

- the United States. *Translational Research: The Journal Of Laboratory & Clinical Medicine* 2006;**148**(1):13–8.
- Ormand 1990**
Ormand JE, Talley NJ, Carpenter HA, Shorter RG, Conley CR, Wilson WR, et al. [14c]urea breath test for diagnosis of *Helicobacter pylori*. *Digestive Diseases & Sciences* 1990;**35**(7):879–84.
- Ortiz-Olvera 2007**
Ortiz-Olvera Nayeli NX, Moran Villota S, Gallardo Wong I, Blancas Valencia JM, Cabrera Muñoz L. Validation of a simplified method of the ¹³C urea breath test for diagnosis of *Helicobacter pylori*. *Revista Espanola de Enfermedades Digestivas* 2007;**99**(7):392–7.
- Osaki 2008**
Osaki T, Mabe K, Hanawa T, Kamiya S. Urease-positive bacteria in the stomach induce a false-positive reaction in a urea breath test for diagnosis of *Helicobacter pylori* infection. *Journal of Medical Microbiology* 2008;**57**(Pt 7): 814–9.
- Osman 2014**
Osman HA, Hasan H, Suppian R, Bahar N, Hussin NSC, Rahim AA, et al. Evaluation of the atlas *Helicobacter pylori* stool antigen test for diagnosis of infection in adult patients. *Asian Pacific Journal of Cancer Prevention* 2014;**15**(13): 5245–7.
- Osoba 2004**
Osoba AO, Ibrahim MB, Al-Shareef BA, Yassen AA, Hussein BA. Comparison of *Helicobacter pylori* stool antigen test with clo test in the diagnosis of *Helicobacter pylori* associated dyspepsia in a Saudi population. *Saudi Medical Journal* 2004;**25**(12):1906–8.
- Ou 2013**
Ou ZY, Xiong LY, Li DY, Geng LL, Li LX, Chen PY, et al. Evaluation of a new fluorescence quantitative PCR test for diagnosing *Helicobacter pylori* infection in children. *BMC Gastroenterology* 2013 Jan 14; Vol. 13:7. [DOI: 10.1186/1471-230X-13-7]
- Ozdemir 2008**
Ozdemir E, Karabacak NI, Degertekin B, Cirak M, Dursun A, Engin D, et al. Could the simplified ¹⁴C urea breath test be a new standard in noninvasive diagnosis of *Helicobacter pylori* infection?. *Annals of Nuclear Medicine* 2008;**22**(7): 611–6.
- Ozturk 2009**
Ozturk E, Yesilova Z, Ilgan S, Ozguven M, Dagalp K. Performance of acidified c-14-urea capsule breath test during pantoprazole and ranitidine treatment. *Journal of Gastroenterology and Hepatology* 2009;**24**(7):1248–51.
- Pacheco 2001**
Pacheco N, Mago V, Gomez I, Gueneau P, Guelrud M, Reyes N, et al. Comparison of PCR and common clinical tests for the diagnosis of h-pylori in dyspeptic patients. *Diagnostic Microbiology and Infectious Disease* 2001;**39**(4): 207–10.
- Pacheco 2013**
Pacheco SLM, Ogata SK, Machado RS, Patricio FRDS, Pardo MLE, Kawakami E. Diagnosis of *Helicobacter pylori* infection by means of reduced-dose 13C-urea breath test and early sampling of exhaled breath. *Journal of Pediatric Gastroenterology and Nutrition* 2013;**57**(5):607–11.
- Paimela 2006**
Paimela HM, Oksala NK, Kaariainen IP, Carlson PJ, Kostiala AA, Sipponen PI. Faecal antigen tests in the confirmation of the effect of *Helicobacter* eradication therapy. *Annals of Medicine* 2006;**38**(5):352–6.
- Palka 2010**
Palka M, Tomasik T, Windak A, Margas G, Mach T, Bohonos A. The reliability of ELISA in predicting *H. pylori* infection in dyspeptic populations under age 45. *Medical Science Monitor* 2010;**16**(1):PH24–8.
- Pandya 2014**
Pandya HB, Patel JS, Agravat HH, Singh NKR. Non-invasive diagnosis of *Helicobacter pylori*: Evaluation of two enzyme immunoassays, testing serum igg and iga response in the Anand district of central Gujarat, india. *Journal of Clinical and Diagnostic Research* 2014;**8**(6):D12–D5.
- Pantoflickova 1999**
Pantoflickova D, Blum AL, Blackmon K, Dorta G. Optimization of c-13 urea breath test (ubt) for diagnosis of h-pylori (hp) infection. *Gastroenterology* 1999;**116**(4 (suppl)):A276.
- Pantoflickova 2000**
Pantoflickova D, Lew EA, Dorta G, Pisegna JR, Ohning GV, Faller LV, et al. Intragastric ph affects the results of the c-13-urea breath test (ubt) in the diagnosis of h-pylori (hp). *Gastroenterology* 2000;**118**(4 (part 1)):A507.
- Pantoflickova 2003**
Pantoflickova D, Scott DR, Sachs G, Dorta G, Blum AL. 13C urea breath test (ubt) in the diagnosis of *Helicobacter pylori*: Why does it work better with acid test meals?. *Gut* 2003;**52**(7):933–7.
- Paoluzi 2001**
Paoluzi OA, Rossi P, Montesano C, Bernardi S, Carnieri E, Marchione OP, et al. Discrepancy between polymerase chain reaction assay and western blot analysis in the assessment of caga status in dyspeptic patients. *Helicobacter* 2001;**6**(2):130–5.
- Parejo 1998**
Parejo Carranza R, Olivares Miguel F, Escobar Castro H, Jimenez Alonso I, De Rafael Nerpell L, Camarero Salces C. Comparative analysis of diagnostic methods for *Helicobacter pylori* infection in children. *Anales Espanoles de Pediatria* 1998;**49**(3):257–63.
- Parente 2000a**
Parente F, Maconi G, Sainaghi M, Imbesi V, Vago L, Porro GB. Pretreatment c-13-urea breath test values but not h-pylori antigen levels in stool correlate well with bacterial density and gastritis activity in the gastric body. *Gut* 2000;**47**(Suppl 1):A114.

Parente 2000b

Parente F, Sainaghi M, Maconi G, Imbesi V, Cucino C, Porro GB. Not all short-term proton pump inhibitors (ppi) impair the accuracy of c-13-urea breath test and h.pylori stool antigen assay. *Gut* 2000;**46**(Suppl 2):A86.

Parente 2001

Parente F, Bianchi Porro G. The (13)c-urea breath test for non-invasive diagnosis of *Helicobacter pylori* infection: Which procedure and which measuring equipment?. *European Journal of Gastroenterology & Hepatology* 2001;**13**(7):803–6.

Parente 2002a

Parente F, Maconi G, Porro GB, Caselli M. Stool test with polyclonal antibodies for monitoring *Helicobacter pylori* eradication in adults: A critical reappraisal. *Scandinavian Journal of Gastroenterology* 2002;**37**(7):747–9.

Parente 2002b

Parente F, Sainaghi M, Sangaletti O, Imbesi V, Maconi G, Anderloni A, et al. Different effects of short-term omeprazole, lansoprazole or pantoprazole on the accuracy of the c-13-urea breath test. *Alimentary Pharmacology & Therapeutics* 2002;**16**(3):553–7.

Park 2001

Park D, Kang D, Jung M, Park H, Kim J. Patients factors, dob value of c-13-urea breath test and clinical diagnosis do not affect eradication of *Helicobacter pylori* with omeprazole based triple therapy. *Gut* 2001;**49**(suppl):A95.

Park 2006

Park YB. Diagnostic value of rapid urine test (Rapirun) compared with biopsy, C-13-UBT, and serum IgG-ELISA in *Helicobacter pylori*. *Helicobacter* 2006;**11**:40.

Park 2009

Park S, Park J, Kim Y, Seol S, Moon J, Jee S, et al. The clinical usefulness of the noninvasive rapid urine test to h. Pylori: Rapirun. *Helicobacter* 2009;**14** (4):342–3.

Park 2015

Park YH, Kim N, Shim YK, Lee CM, Kyuahn B, Jaepark S, et al. The effect of pre-intake of citric acid on the delta value of the 13C-urea breath test. *Journal of Gastroenterology and Hepatology* 2015;**30**:120.

Parolova 2012

Parolova N, Dmitrienko M. The effectiveness of non-invasive tests in diagnosis of *Helicobacter pylori* infection in children. *Helicobacter* 2012;**17**:94.

Patel 1994

Patel P, Mendall MA, Khulusi S, Molineaux N, Levy J, Maxwell JD, et al. Salivary antibodies to *Helicobacter pylori*: Screening dyspeptic patients before endoscopy. *Lancet* 1994;**344**(8921):511–2.

Pathak 1992

Pathak CM, Panigrahi D, Bhasin DK, Rana SV, Malik AK, Mehta SK. Advantage of use of dpm for 14^C-urea breath test for the detection of *Helicobacter pylori*. *American Journal of Gastroenterology* 1992;**87**(12):1887–8.

Pathak 1994

Pathak CM, Bhasin DK, Panigrahi D, Goel RC. Evaluation of 14c-urinary excretion and its comparison with 14co2 in breath after 14c-urea administration in *Helicobacter pylori* infection. *American Journal of Gastroenterology* 1994;**89**(5):734–8.

Pathak 2008

Pathak CM, Avti PK, Bungler D, Khanduja KL. Kinetics of 14carbon dioxide excretion from 14c-urea by oral commensal flora. *Journal of Gastroenterology and Hepatology* 2008;**23**(10):1603–7.

Pathak 2011

Pathak CM, Kaur B, Bhasin DK, Mittal BR, Sharma S, Khanduja KL. Comparative performance of capsulated vs noncapsulated 14c-urea breath test for the detection of *Helicobacter pylori* infection. *Indian Journal of Nuclear Medicine* 2011;**26**(Suppl 1):S20.

Pathak 2012

Pathak CM, Kaur B, Bhasin DK, Mittal BR, Sharma S, Khanduja KL, et al. Superiority of non-capsulated 14c-urea breath test over capsule based method for detection of *Helicobacter pylori* infection - a preliminary report. *Tropical Gastroenterology* 2012;**33**(2):123–8.

Pathak 2013

Pathak CM, Kaur B, Bhasin DK, Mittal BR, Sharma S, Khanduja KL, et al. Comparison of capsulated versus non-capsulated 14c-urea breath test for the detection of *Helicobacter pylori* infection: A scintigraphy study. *Indian Journal of Gastroenterology* 2013;**32**(1 SUPPL):A18–A9.

Pathak 2014

Pathak CM, Kaur B, Bhasin DK, Mittal BR, Sharma S, Khanduja KL, et al. Comparison of encapsulated versus nonencapsulated (14) c-urea breath test for the detection of *Helicobacter pylori* infection: A scintigraphy study. *Helicobacter* 2014;**19**(2):116–23.

Pattison 1996

Pattison CP, Marshall L. C-13-urea breath test for *Helicobacter pylori*: A second look analysis. *American Journal of Gastroenterology* 1996;**91**(11):2447.

Pattison 1997

Pattison CP, Kaczmarek DR, Bruggen JT, Oconnor MC. Comparison of c-14-urea breath test (c-14-ubt) and serology for detection of *Helicobacter pylori* in hiv positive patients. *Gastroenterology* 1997;**112**(4 (suppl)):A1060.

Pavlitou 1998

Pavlitou K, Pastore F, Moldovanidou K, Gioula G, Routsinas C, Polidorou F, et al. Rapid immunochromatographic assay for detection of *Helicobacter pylori* antibodies. *Acta Microbiologica Hellenica* 1998;**43**(3):267–70.

Pavlitou 2000

Pavlitou K, Pastore F, Konias A, Chrisohoidou S, Tsintarakis E, Polydorou F, et al. Evaluation of a rapid serological test for the detection of igg antibodies to *Helicobacter pylori*. [greek]. *Acta Microbiologica Hellenica* 2000;**45**(3):293–7.

Pawar 2014

Pawar S, Reddy SR, Chelluri LK, Prasad CE. Detection of *Helicobacter pylori* infection in patients with obstructive airway diseases with sero techniques using highly specific igg antibodies for *Helicobacter pylori* antigen. *Asian Pacific Journal of Tropical Disease* 2014;**4**:S366–S72.

Payne 2006

Payne I, Mold JW. What is the most sensitive non-invasive test for initial diagnosis of h. Pylori infection in adults? . *Journal Oklahoma State Medical Association* 2006;**99**(6): 368–9.

Peitz 2000

Peitz U, Agha-Amiri K, Glasbrenner B, Leodolter A, Kahl S, Maertens D, et al. High specificity, but reduced sensitivity of h-pylori stool test in upper gastrointestinal bleeding. *Gut* 2000;**47**(Suppl 1):A121–A2.

Peitz 2003

Peitz U, Leodolter A, Kahl S, Agha-Amiri K, Wex T, Wolle K, et al. Antigen stool test for assessment of *Helicobacter pylori* infection in patients with upper gastrointestinal bleeding. *Alimentary Pharmacology & Therapeutics* 2003;**17**(8):1075–84.

Peitz 2004

Peitz U, Leodolter A, Wex T, Schutze D, Wolle K, Welte T, et al. Diagnostics of *Helicobacter pylori* infection in patients with peptic ulcer bleeding. *Zeitschrift für Gastroenterologie* 2004;**42**(2):141–6.

Peleteiro 2014

Peleteiro B, Bastos A, Ferro A, Lunet N. Prevalence of *Helicobacter pylori* Infection worldwide: a systematic review of studies with national coverage. *Digestive Diseases and Sciences* 2014;**59**(8):1698–709.

Pena 1989

Pena AS, Endtz HP, Offerhaus GJ, Hoogenboom-Verdegaal A, Van Duijn W, De Vargas N, et al. Value of serology (ELISA and immunoblotting) for the diagnosis of *campylobacter pylori* infection. *Digestion* 1989;**44**(3): 131–41.

Peng 2000a

Peng NJ, Hsu PI, Lee SC, Tseng HH, Huang WK, Tsay DG, et al. A 15-minute c-13 -urea breath test for the diagnosis of *Helicobacter pylori* infection in patients with non-ulcer dyspepsia. *Journal of Gastroenterology and Hepatology* 2000;**15**(3):284–9.

Peng 2000b

Peng NJ, Hsu PI, Lee SC, Tsay DW, Lai KH, Lin LC, et al. Ultrarapid endoscopic c-13-urea breath test for the diagnosis of *Helicobacter pylori* infection. *Journal of Nuclear Medicine* 2000;**41**(5):317P.

Peng 2001a

Peng NJ, Lai KH, Liu RS, Lee SC, Tsay DG, Lo CC, et al. Clinical significance of oral urease in diagnosis of *Helicobacter pylori* infection by c-13 urea breath test. *Digestive Diseases and Sciences* 2001;**46**(8):1772–8.

Peng 2001b

Peng NJ, Hsu PI, Lee SC, Tsay DG, Lai KH, Liu RS. Ultrarapid capsule-based c-13-urea breath test for the diagnosis of *Helicobacter pylori* infection. *Journal of Nuclear Medicine* 2001;**42**(5):329P.

Peng 2002

Peng NJ, Hsu PI, Lee SC, Tsay DG, Lai KH, Liu RS. Comparison of 100 mg and 50 mg endoscopic c-13-urea breath test for the diagnosis of *Helicobacter pylori* infection. *Journal of Nuclear Medicine* 2002;**43**(5):333P.

Peng 2003

Peng NJ, Lai KH, Liu RS, Lee SC, Tsay DG, Lo CC, et al. Endoscopic c-13-urea breath test for the diagnosis of *Helicobacter pylori* infection. *Digestive and Liver Disease* 2003;**35**(2):73–7.

Peng 2005

Peng NJ, Lai KH, Liu RS, Lee SC, Tsay DG, Lo CC, et al. Capsule 13C-urea breath test for the diagnosis of *Helicobacter pylori* infection. *World Journal of Gastroenterology* 2005;**11**(9):1361–4.

Peng 2009

Peng NJ, Lai KH, Lo GH, Hsu PI. Comparison of noninvasive diagnostic tests for *Helicobacter pylori* infection. *Medical Principles & Practice* 2009;**18**(1):57–61.

Perets 2014

Perets TT, Shporn E, Hamouda D, Niv Y, Dickman R. Can we achieve the same results from repetitive testing of 13Co2 breath samples for the diagnosis of *Helicobacter pylori*?. *Gastroenterology* 2014;**146**(5 (suppl)):S397–S8.

Perets 2015

Perets TT, Shporn E, Dickman R, Niv Y. Stability of 13Co2 breath tests samples over time in the diagnosis of *Helicobacter pylori*. *Clinical Chemistry and Laboratory Medicine* 2015;**53**:S1268.

Perez 1996

Perez Paramo M, Albillos Martinez A, Calleja Panero JL, Marin Rojas MC, Marcos Moreno ML, Freile Garcia I, et al. Effectiveness of the breath test with ¹⁴C-urea in the diagnosis of *Helicobacter pylori* infection. *Revista Espanola de Medicina Nuclear* 1996;**15**(1):15–20.

Perez 1998

Perez Paramo M, Albillos Martinez A, Ortiz Berrocal J. The breath test with labeled urea for the diagnosis of *Helicobacter pylori* infection. *Revista Espanola de Medicina Nuclear* 1998;**17**(6):455–67.

Perez-Perez 1997

Perez-Perez GI, Cutler AF, Blaser MJ. Value of serology as a noninvasive method for evaluating the efficacy of treatment of *Helicobacter pylori* infection. *Clinical Infectious Diseases* 1997;**25**(5):1038–43.

Perezperez 1994

Perezperez GI, Brown WR, Cover TL, Dunn BE, Cao P, Blaser MJ. Correlation between serological and mucosal inflammatory responses to *Helicobacter-pylori*. *Clinical and Diagnostic Laboratory Immunology* 1994;**1**(3):325–9.

Perna 2002

Perna F, Tampieri A, Ricci C, Gatta L, Miglioli M, Vaira D. Evaluation of a new rapid one step stool antigen test for *Helicobacter pylori* (hp) infection diagnosis. *Gut* 2002;**51** (Suppl):A106.

Perna 2005

Perna F, Ricci C, Gatta L, Bernabucci V, Cavina M, Miglioli M, et al. Diagnostic accuracy of a new rapid urease test (pronto dry) before and after treatment of *Helicobacter pylori* infection. *Minerva Gastroenterologica e Dietologica* 2005;**51**(3):247–54.

Perri 1994

Perri F, Ghoois Y, Maes B, Annese V, Geypens B, Hiele M, et al. Urea breath test in *Helicobacter-pylori* infected subjects is influenced by gastric-emptying rate. *Gastroenterology* 1994;**106**(4 (suppl)):A160.

Perri 1995

Perri F, Ghoois Y, Hiele M, Andriulli A, Rutgeerts P. The urea breath test: A non-invasive clinical tool for detecting *Helicobacter pylori* infection. *Italian Journal of Gastroenterology* 1995;**27**(2):55–63.

Perri 1997a

Perri F, Clemente R, Bisceglia M, Annese V, Niro G, Ghoois Y, et al. The c-13-urea breath test (ubt) predicts intragastric bacterial load and correlates with the depth of inflammation in h-pylori related gastritis. *Gastroenterology* 1997;**112**(4 (suppl)):A256.

Perri 1997b

Perri F, Clemente R, Bisceglia M, Quitadamo M, Festa V, Niro G, et al. The c-13-urea breath test (ubt) correlates with the bacterial load and the severity of inflammation in h-pylori (hp) gastritis. *Gut* 1997;**41**(Suppl):A80–A1.

Perri 1998a

Perri F, Clemente R, Pastore M, Quitadamo M, Festa V, Bisceglia M, et al. The c-13-urea breath test as a predictor of intragastric bacterial load and severity of *Helicobacter pylori* gastritis. *Scandinavian Journal of Clinical & Laboratory Investigation* 1998;**58**(1):19–27.

Perri 1998b

Perri F, Clemente R, Festa V, Quitadamo M, Conoscitore P, Niro G, et al. Relationship between the results of pre-treatment urea breath test and efficacy of eradication of *Helicobacter pylori* infection. *Italian Journal of Gastroenterology & Hepatology* 1998;**30**(2):146–50.

Perri 1998c

Perri F, Clemente R, Quitadamo M, Annese V, Andriulli A. C-13 urea breath test is a very accurate clinical tool in the diagnosis of intragastric *Helicobacter pylori* infection. *Gut* 1998;**43**(Suppl 3):S8–9.

Perri 2000

Perri F. Diagnosis of *Helicobacter pylori* infection: Which is the best test? The urea breath test. *Digestive & Liver Disease* 2000;**32** Suppl 3:S196–8.

Perri 2002a

Perri F, Manes G, Neri M, Vaira D, Nardone G. *Helicobacter pylori* antigen stool test and 13C-urea breath test in patients after eradication treatments. *American Journal of Gastroenterology* 2002;**97**(11):2756–62.

Perri 2002b

Perri F, Manes G, Nardone G, Neri M, Vaira D. *Helicobacter pylori* antigen stool test (HPSA) and 13C-urea breath test (ubt) in patients after eradicating treatments. *Gastroenterology* 2002;**122**(4 (suppl)):A206.

Perri 2002c

Perri F, Ricciardi R, Merla A, Piepoli A, Gasperi V, Quitadamo M, et al. Appropriateness of urea breath test: A prospective observational study based on maastricht 2000 guidelines. *Alimentary Pharmacology & Therapeutics* 2002;**16**(8):1443–7.

Perri 2005

Perri F, Quitadamo M, Ricciardi R, Piepoli A, Cotugno R, Gentile A, et al. Comparison of a monoclonal antigen stool test (hp star) with the c-13-urea breath test (ubt) in monitoring *Helicobacter pylori* eradication therapy. *World Journal of Gastroenterology* 2005;**11**(37):5878–81.

Perrone 2005

Perrone M, Muñoz L, Camorlinga M, Correnti M, Cavazza ME, Lecuna V, et al. Importance of IgG anti-caga antibodies of *Helicobacter pylori* in Venezuelan patients with gastric diseases. *Investigacion Clinica* 2005;**46**(4):357–67.

Petrovic 2011

Petrovic M, Artiko V, Novosel S, Ille T, Sobic-Saranovic D, Pavlovic S, et al. Relationship between *Helicobacter pylori* infection estimated by c-14-urea breath test and gender, blood groups and rhesus factor. *Hellenic Journal of Nuclear Medicine* 2011;**14**(1):21–4.

Pettersson 2001

Pettersson A, Rasmusson M, Kyronpalo S, Sipponen P, Rautilin H, Farkkila M, et al. A 10 minutes tablet based 13C-urea breath test for the diagnosis of *Helicobacter pylori*. *Gastroenterology* 2001;**120**(5 (suppl)):A579.

Pianko 1999

Pianko S, Petterson A, Lundqvist T, Stringer C, Sievert W, Korman M. Evaluation of a novel tablet based carbon 13 urea breath test for the rapid diagnosis of *Helicobacter pylori* infection. *Gastroenterology* 1999;**116**(4 (Suppl)):A282.

Pilotto 1999

Pilotto A, Franceschi M, Leandro G, Rassu M, Zagari RM, Bazzoli F, et al. The non-invasive diagnosis of h-pylori infection in older subjects: Comparison of c-13-urea breath test with serology. *Gastroenterology* 1999;**116**(4 (suppl)):A283.

Pilotto 2000a

Pilotto A, Franceschi M, Leandro G, Rassu M, Zagari RM, Bozzola L, et al. Noninvasive diagnosis of *Helicobacter pylori* infection in older subjects: Comparison of the c-13-urea breath test with serology. *Journals of Gerontology*

- Series A-Biological Sciences and Medical Sciences* 2000;**55**(3): M163–M7.
- Pilotto 2000b**
Pilotto A, Franceschi M, Rassa M, Novello R, Brusarosco G, Bozzola L, et al. Stool antigen test (HPSA) for detection of h-pylori infection in elderly subjects: Comparison with serology and influence of concomitant treatments on diagnostic accuracy. *Gut* 2000;**47**(Suppl 1):A117–A8.
- Pilotto 2002**
Pilotto A, Franceschi M, Furlan F, Bozzola L, Fucito L, Rassa M, et al. The noninvasive diagnosis of h-pylori infection in geriatric subjects by the c-13-urea breath test (c-13-ubt) and the stool antigen test (HPSA): The role of disability and cognitive status. *Gut* 2002;**51**(Suppl):A108.
- Plebani 1999**
Plebani M, Basso D. Diagnosis of *Helicobacter pylori* infection by HPSA test. *Lancet* 1999;**354**(9185):1210.
- Ploier 1995**
Ploier R, Rezanka E, Emhofer J, Dorninger L, Feichtinger J, Haidinger R, et al. Predictive value of latex agglutination on *Helicobacter pylori* in children with recurrent abdominal pain. *Klinische Padiatrie* 1995;**207**(1):8–11.
- Ploier 1996**
Ploier R, Dorninger L, Emhofer J, Franz V, Feichtinger J. Predictive value of an ELISA for *Helicobacter pylori* infection in children. *Monatsschrift für Kinderheilkunde* 1996;**144**(12):1326–9.
- Ploier 1997**
Ploier R, Dorninger I, Emhofer J, Franz V, Feichtinger J. Predictive value of an ELISA for the detection of *Helicobacter pylori* infection in children - reply. *Monatsschrift für Kinderheilkunde* 1997;**145**(10):1094.
- Polat 2010**
Polat TB, Urganci N, Selcukcan F, Yenici FN. Efficacy of non-invasive tests in the diagnosis and post-treatment follow-up of *Helicobacter pylori* infection in pediatric patients. *Gazi Medical Journal* 2010;**21**(1):17–22.
- Pons 2014**
Pons C, Maisterra S, Salord S, Pla A, Asensio D, Fernandez FJ, et al. Almagate interference in breath test results for the diagnosis of *Helicobacter pylori* infection. *Revista Espanola De Enfermedades Digestivas* 2014;**106**(7):448–51.
- Porter 2009a**
Porter V, Macdonald JC, Zahid MA, Mackie B, McNamara D. Validation of a low dose tablet formulation 13C urea and citric acid breath test employing an automated non dispersive isotope selective infrared spectroscopy analyser (helifan/fan as) for the diagnosis of *Helicobacter pylori* infection in a Scottish population. *Gastroenterology* 2009;**136**(5 (suppl)):A346.
- Porter 2009b**
Porter V, Zahid A, Mackie B, McNamara DA. Results of a prospective comparison pilot validation study of a low-dose tablet formulation c-13 urea and citric acid breath test employing a novel automated nondispersive isotope selective infrared spectroscopy analyser for the diagnosis of *Helicobacter pylori* infection. *European Journal of Gastroenterology & Hepatology* 2009;**21**(11):1321–2.
- Portorreal 2002**
Portorreal A, Kawakami E. Evaluation of enzyme-linked immunosorbent assay for the diagnosis of *Helicobacter pylori* infection in children and adolescents. *Arquivos de Gastroenterologia* 2002;**39**(3):198–203.
- Posteraro 2006**
Posteraro P, Branca G, Sanguinetti M, Ranno S, Cammarota G, Rahimi S, et al. Rapid detection of clarithromycin resistance in *Helicobacter pylori* using a PCR-based denaturing hplc assay. *Journal of Antimicrobial Chemotherapy* 2006;**57**(1):71–8.
- Potashov 1996**
Potashov LV, Morozov VP, Kudrevatykh IP, Savranskii VM, Aurtiunian AA, Did-Zurabova ES, et al. The diagnosis of *Helicobacter* infections in patients with gastric and duodenal peptic ulcers. *Zhurnal Mikrobiologii, Epidemiologii, i Immunobiologii* 1996;**6**:11–3.
- Pourakbari 2011a**
Pourakbari B, Mirsalehian A, Maleknejad P, Mamishi S, Azhdarkosh H, Daryani NE, et al. Evaluation of a new antigen for diagnosis of *Helicobacter pylori* infection in stool of adult and children. *Helicobacter* 2011;**16**(1):42–6.
- Pourakbari 2011b**
Pourakbari B, Mirsalehian A, Mamishi S, Najafi M, Kazemi B, Paknejad M, et al. Diagnosis of *Helicobacter pylori* infection by invasive and noninvasive methods. *Tropical Medicine and International Health* 2011;**16**:264–5.
- Pourakbari 2013**
Pourakbari B, Ghazi M, Mahmoudi S, Mamishi S, Azhdarkosh H, Najafi M, et al. Diagnosis of *Helicobacter pylori* infection by invasive and noninvasive tests. *Brazilian Journal of Microbiology* 2013;**44**(3):795–8.
- Prabakaran 1997**
Prabakaran K, Fernandes V, McDonald J, Jones RC. Single sample c-14 urea breath test for the diagnosis of *Helicobacter pylori* infection. *Journal of Nuclear Medicine* 1997;**38**(5 Suppl):Abstract 261.
- Prell 2009**
Prell C, Osterrieder S, Schwarzer A, Lottspeich C, Rusmann H, Osslander G, et al. Improved performance of a novel rapid one-step monoclonal chromatographic immunoassay for detection of *Helicobacter pylori* antigen in stool in children. *Journal of Pediatric Gastroenterology and Nutrition* 2009;**48**(Suppl 3):E47–E8.
- Presecki 1997**
Presecki V, Katicic M, Kalenic S, Marusic M, Ticak M, Prskalo M, et al. Evaluation of commercial cf and ELISA tests for diagnosis of *H-pylori* infection in gastric carcinoma and non Hodgkin lymphoma patients. *Gut* 1997;**41**:A164.

Prieto 1994

Prieto Bozano G. Clinical diagnosis of *Helicobacter pylori* infection in the child. *Enfermedades Infecciosas Y Microbiología Clínica* 1994;**12** (Suppl 1):18–22.

Pronovost 1994

Pronovost AD, Rose SL, Pawlak JW, Robin H, Schneider R. Evaluation of a new immunodiagnostic assay for *Helicobacter pylori* antibody detection: Correlation with histopathological and microbiological results. *Journal of Clinical Microbiology* 1994;**32**(1):46–50.

Przyklenk 1990

Przyklenk B, Bauernfeind A, Bornschein W, Gabor M. Evaluation of an IgG-ELISA-kit for diagnosing *Helicobacter pylori* associated gastroduodenal disease. *Serodiagnosis and Immunotherapy in Infectious Disease* 1990;**4**(4):263–9.

Pu 2005

Pu XH, Guo XQ, Shi YL, An T, Qiu M, Qiu XX. Values of *Helicobacter pylori* stool antigen test in the etiological diagnosis of recurrent abdominal pain in children. *Chinese Journal of Contemporary Pediatrics* 2005;**7**(5):426–8.

Puolakkainen 1997

Puolakkainen P, Rautelin H, Sipponen P, Farkkila M, Kosunen T, Haapiainen R, et al. Comparison of histology, c-13 urea breath test (ubt) and serology for detecting h-pylori infection in patients with atrophic gastritis. *Gastroenterology* 1997;**112**(4 (suppl)):A262.

Puz 2006

Puz S, Kovach Z, Hirschl AM, Hafner M, Innerhofer A, Rotter M, et al. Evaluation of the novel *Helicobacter pylori* clarires real-time PCR assay for detection and clarithromycin susceptibility testing of h-pylori in stool specimens and gastric biopsies; comparison with the stool antigen test drug resistance. *Helicobacter* 2006;**11**(4):396.

Puz 2008

Puz S, Innerhofer A, Ramharter M, Haefner M, Hirschl AM, Kovach Z, et al. A novel noninvasive genotyping method of *Helicobacter pylori* using stool specimens. *Gastroenterology* 2008;**135**(5):1543–51.

Qibi 2008

Qibi EM, Abdulla ZA. Detection of *Helicobacter pylori* infection in dyspeptic patients by different sero-bacteriological methods. *Qatar Medical Journal* 2008;**17**(2): 17–21.

Quach 2014

Quach DT, Hiyama T, Shimamoto F, Le QD, Ho LX, Vu NH, et al. Value of a new stick-type rapid urine test for the diagnosis of *Helicobacter pylori* infection in the Vietnamese population. *World Journal of Gastroenterology* 2014;**20**(17): 5087–91.

Queiroz 1999

Queiroz DMM, Mendes EN, Rocha GA, Oliveira AMR, Oliveira CA, Cabral MMDA, et al. Serological and direct diagnosis of *Helicobacter pylori* in gastric carcinoma: A case-control study. *Journal of Medical Microbiology* 1999;**48** (5):501–6.

Queiroz 2000

Queiroz DMM, Rocha AMC, Rocha GA, Mendes EN, Carvalho AST, Nogueira AMF, et al. Validation of a commercial ELIS to detect anti-caga antibodies in children with *H. pylori* (hp) infection. *Gut* 2000;**47**(Suppl 1):A96.

Queiroz 2013

Queiroz DM, Saito M, Rocha GA, Rocha AM, Melo FF, Checkley W, et al. *Helicobacter pylori* infection in infants and toddlers in South America: concordance between [13C]urea breath test and monoclonal *H. pylori* stool antigen test. *Journal of Clinical Microbiology* 2013;**51**(11): 3735–40.

Queralt 2005

Queralt N, Bartolome R, Araujo R. Detection of *Helicobacter pylori* DNA in human faeces and water with different levels of faecal pollution in the north-east of Spain. *Journal of Applied Microbiology* 2005;**98**(4):889–95.

Quesada 2006a

Quesada M, Calvet X, Dosal A, Calvet V, Sanfeliu I, Ribera L, et al. Evaluation of four different fecal tests for determination of cure after *Helicobacter pylori* treatment. *Journal of Clinical Gastroenterology* 2006;**40**(9):790–4.

Quesada 2006b

Quesada M, Calvet X, Calvet V, Choat T, Fallowfield B, Sanfeliu I, et al. Usefulness of rapid hp star, a new immuno-chromatographic, monoclonal antigen-based faecal test, for diagnosing *Helicobacter pylori* infection in dyspeptic patients. *Gastroenterology* 2006;**130**(4 (suppl)): A458.

Rabbe 1988

Rabbe MP, Megraud F. Anti-campylobacter-pylori antibody titer by ELISA. *Gastroenterologie Clinique et Biologique* 1988;**12**(6-7):587–8.

Radke 1997

Radke M. Predictive value of an ELISA for the detection of *Helicobacter pylori* infection in children. *Monatsschrift für Kinderheilkunde* 1997;**145**(10):1093.

Rae 1995

Rae AJ, Belzberg A, Cleator IGM, Caglar M. Use of the c-14 breath test in the treatment of *Helicobacter-pylori*. *Canadian Journal of Gastroenterology* 1995;**9**(4):191–4.

Raedsch 1992

Raedsch R. Serological screening for *Helicobacter pylori*. *Deutsche Medizinische Wochenschrift* 1992;**117**(21):844–5.

Raguza 2005

Raguza D, Granato CFH, Kawakami E. Evaluation of the stool antigen test for *Helicobacter pylori* in children and adolescents. *Digestive Diseases and Sciences* 2005;**50**(3): 453–7.

Raguza 2010

Raguza D, MacHado RS, Ogata SK, Granato CFH, Patricio FRS, Kawakami E. Validation of a monoclonal stool antigen test for diagnosing *Helicobacter pylori* infection in young children. *Journal of Pediatric Gastroenterology and Nutrition* 2010;**50**(4):400–3.

Rahman 2008

Rahman SHZ, Azam MG, Rahman MA, Arfin MS, Alam MM, Bhuiyan TM, et al. Non-invasive diagnosis of h pylori infection: Evaluation of serological tests with and without current infection marker cim. *World Journal of Gastroenterology* 2008;**14**(8):1231–6.

Raju 1994

Raju GS, Smith MJ, Morton D, Bardhan KD. Mini-dose (1-microci) ¹⁴c-urea breath test for the detection of Helicobacter pylori. *American Journal of Gastroenterology* 1994;**89**(7):1027–31.

Ramírez-Lázaro 2011

Ramírez-Lázaro MJ, Lario S, Casalots A, Sanfeliu E, Boix L, García-Iglesias P, et al. Real-time PCR improves Helicobacter pylori detection in patients with peptic ulcer bleeding. *PLoS ONE* 2011; Vol. 6, issue 5:e20009. [DOI: 10.1371/journal.pone.0020000]

Ramírez-Lázaro 2015

Ramírez-Lázaro MJ, Lario S, Calvet X, Sánchez-Delgado J, Montserrat A, Quilez EM, et al. Occult h-pylori infection partially explains “false-positive” results of c-13-urea breath test. *United European Gastroenterology Journal* 2015;**3**(5): 437–42.

Rao 2001

Rao P, Sarkar A, Shivananda PG, Pai G. Comparison of ELISA for antibody detection and biopsy urease test against h. Pylori in cases of gastroduodenal disorders. *Indian Journal of Medical Sciences* 2001;**55**(7):366–70.

Rapoport 2014

Rapoport SI, Shubina NA. 13-year period of application of the ¹³C-urease breath test for determining Helicobacter pylori in Russian clinical practice. *Klinicheskaia Meditsina* 2014;**92**(11):59–64.

Rasheed 2014

Rasheed F, Khalid A, Saadia A, Habib S, Khan SM, Saeed F, et al. Correlation of c-13 urea breath test values with Helicobacter pylori load among positive patients. *Hepato-Gastroenterology* 2014;**61**(129):125–8.

Ratnaraj 2015

Ratnaraj F, Hamdeh S, Salih M, Ayan M, Mansour G, Reddymasu S. Urea breath test (ubt) versus stool antigen test in post-treatment eradication of Helicobacter pylori infection: A meta-analysis. *American Journal of Gastroenterology* 2015;**110**:S1038.

Rauws 1987

Rauws EAJ, Langenberg W, Houthoff HJ, Tytgat GN. Histology, culture, breath test and therapeutic attempts in campylobacter pylori gastritis. *Zeitschrift für Gastroenterologie* 1987;**25**(SUPPL. 4):24–8.

Rauws 1989a

Rauws EAJ. Detecting campylobacter-pylori with the c-13 urea and c-14-urea breath test. *Scandinavian Journal of Gastroenterology* 1989;**24**:25–6.

Rauws 1989b

Rauws EA, Van Royen EA, Tytgat GN. ¹⁴c-urea breath test as a method to detect campylobacter pylori colonization.

Gastroenterologie Clinique et Biologique 1989;**13**(1 Pt 1): 42B–3B.

Rauws 1989c

Rauws EAJ, Royen EAV, Langenberg W, Woensel JV, Vrij AA, Tytgat GN. ¹⁴C-urea breath test in *C. pylori* gastritis. *Gut* 1989;**30**(6):798–803.

Raymond 1999

Raymond J, Sauvestre C, Kalach N, De Korwin JD, Valverde V. Evaluation of a new serologic test for diagnosis of Helicobacter pylori infection in children. *European Journal of Clinical Microbiology & Infectious Diseases* 1999; **18**(3):192–8.

Raymond 2000

Raymond J, Sauvestre C, Kalach N, Bergeret M, Dupont C. Immunoblotting and serology for diagnosis of Helicobacter pylori infection in children. *Pediatric Infectious Disease Journal* 2000;**19**(2):118–21.

Razaghi 2010

Razaghi M, Boutorabi SM, Mirjalili A, Norolahi S, Hashemi M, Jalalian M. Diagnosis of Helicobacter pylori infection by ELISA stool antigen and comparison with the other diagnostic methods. *Healthmed* 2010;**4**(3):545–51.

Rechcinski 1997

Rechcinski T, Chmiela M, Malecka-Panas E, Planeta-Malecka I, Rudnicka W. Serological indicators of Helicobacter pylori infection in adult dyspeptic patients and healthy blood donors. *Microbiology & Immunology* 1997;**41** (5):387–93.

Redéen 2011

Redéen S, Petersson F, Törnkrantz E, Levander H, Mårdh E, Borch K. Reliability of diagnostic tests for Helicobacter pylori infection. *Gastroenterology Research and Practice* 2011; Vol. 2011:940650. [DOI: 10.1155/2011/940650]

Rehnberg 2001

Rehnberg AS, Bengtsson C, Befrits R, Granstrom M, Hellstrom PM. Refinement of the c-14-urea breath test for detection of Helicobacter pylori. *Scandinavian Journal of Gastroenterology* 2001;**36**(8):822–6.

Reilly 1997

Reilly TG, Poxon V, Sanders DSA, Elliott TSJ, Walt RP. Comparison of serum, salivary, and rapid whole blood diagnostic tests for Helicobacter pylori and their validation against endoscopy based tests. *Gut* 1997;**40**(4):454–8.

Rejchrt 2004

Rejchrt S, Havlasova J, Bures J, Siroky M, Kopacova M, Voxova B, et al. Evaluation of serum anti-Helicobacter pylori IgG antibodies against p120 antigen (caga) and investigation of specific antibody response against Helicobacter pylori by means of western blotting. *Klinicka Biochemie a Metabolismus* 2004;**12**(1):19–23.

Ren 2005

Ren Z, Borody T, Pang G, Dunkley M, Clancy R, Xia HHX, et al. Evaluation of anti-Helicobacter pylori igg2 antibody for the diagnosis of Helicobacter pylori infection in western and Chinese populations. *Alimentary Pharmacology and Therapeutics* 2005;**21**(1):83–9.

Ren 2010

Ren HT, Xu XW, Li AH. Diagnostic value of gene chip test for detection of h.pylori infection and relationship between H.pylori virulence factors and the severity of gastroduodenal lesions. *World Chinese Journal of Digestology* 2010;**18**(26): 2826–30.

Reshetnikov 2007

Reshetnikov OV, Kurilovich SA, Krotov SA, Krotova VA. Comparison of two ELISA kits for *Helicobacter pylori* detection in Siberian populations. *Helicobacter* 2007;**12**(4): 441.

Reynders 2012

Reynders MBML, Deyi VYM, Dahma H, Scheper T, Hanke M, Decolvenaer M, et al. Performance of individual *Helicobacter pylori* antigens in the immunoblot-based detection of h. Pylori infection. *FEMS Immunology and Medical Microbiology* 2012;**64**(3):352–63.

Riaz 2011

Riaz S, Munir I, Nawaz MK, Bashir H, Muzahir S, Saadullah M, et al. C-14 - urea breath test in the diagnosis of *Helicobacter pylori* infection in Pakistani population. *European Journal of Nuclear Medicine and Molecular Imaging* 2011;**38**:S403.

Ricci 2007

Ricci C, Holton J, Vaira D. Diagnosis of *Helicobacter pylori*: invasive and non-invasive tests. *Best Practice & Research: Clinical Gastroenterology* 2007;**21**(2):299–313.

Richter 2002

Richter J, Stiborova I, Kral V, Jilek D. Direct evidence of the *Helicobacter pylori* antigen in faeces. *Prakticky Lekar* 2002;**82**(4):205–7.

Riepl 2000

Riepl RL, Folwaczny C, Otto B, Klauser A, Blendinger C, Wiebecke B, et al. Accuracy of c-13-urea breath test in clinical use for diagnosis of *Helicobacter pylori* infection. *Zeitschrift für Gastroenterologie* 2000;**38**(1):13–9.

Ritchie 2009

Ritchie B, Brewster D, Tran CD, McNeil Y, Zacharakis B, Davidson GP, et al. Lack of diagnostic accuracy of the monoclonal stool antigen test for detection of *Helicobacter pylori* infection in young Australian aboriginal children. *Pediatric Infectious Disease Journal* 2009;**28**(4):287–9.

Rocha 1998

Rocha GA, Oliveira AM, Queiroz DM, Mendes EN, Moura SB, Oliveira CA, et al. Serodiagnosis of *Helicobacter pylori* infection by cobas core ELISA in adults from Minas Gerais, Brazil. *Brazilian Journal of Medical & Biological Research* 1998;**31**(10):1263–8.

Rocha 2002

Rocha GA, Cardinali LCC, Queiroz DMM, Rocha AMC, Moura SB, Soares TF, et al. The performance of the c-13-urea breath test for the diagnosis of *Helicobacter pylori* infection in children from a developing country. *Gut* 2002;**51**(Suppl):A82.

Rocha 2004

Rocha AM, Rocha GA, Leite JL, Lisboa RL, Silva PV, Queiroz DM. Immunoblotting for the serodiagnosis of *Helicobacter pylori* infection in Brazilian patients with and without gastric carcinoma. *Memorias do Instituto Oswaldo Cruz* 2004;**99**(2):189–93.

Rogge 1995

Rogge JD, Wagner DR, Carrico RJ, Glowinski EA, Mahoney SJ, Boguslaski RC, et al. Evaluation of a new urease reagent strip for detection of *Helicobacter pylori* in gastric biopsy specimens. *American Journal of Gastroenterology* 1995;**90**(11):1965–8.

Roggero 2002

Roggero P, Bonfiglio A, Luzzani S, Valade A, Cataliotti E, Corno G, et al. *Helicobacter pylori* stool antigen test: A method to confirm eradication in children. *Journal of Pediatrics* 2002;**140**(6):775–7.

Rollan 1997

Rollan A, Giancaspero R, Arrese M, Figueroa C, Vollrath V, Schultz M, et al. Accuracy of invasive and noninvasive tests to diagnose *Helicobacter pylori* infection after antibiotic treatment. *American Journal of Gastroenterology* 1997;**92**(8): 1268–74.

Roma-Giannikou 2010

Roma-Giannikou E, Roubani A, Sgouras DN, Panayiotou J, Van-Vliet C, Polyzos A, et al. Endoscopic tests for the diagnosis of *Helicobacter pylori* infection in children: Validation of rapid urease test. *Helicobacter* 2010;**15**(3): 227–32.

Romaozinho 2011

Romaozinho JGM, Donato MRSR, Ferreira J, Sofia C. Detection of *Helicobacter pylori* infection: clinical validation of ¹⁴C (37 kbq) urea breath test. *Helicobacter* 2011;**16**:115.

Roth 2001

Roth DE, Taylor DN, Gilman RH, Meza R, Katz U, Bautista C, et al. Posttreatment follow-up of *Helicobacter pylori* infection using a stool antigen immunoassay. *Clinical & Diagnostic Laboratory Immunology* 2001;**8**(4):718–23.

Rothenbacher 2000a

Rothenbacher D, Marchildon P, Peacock J, Bode G, Brenner H. Diagnosis of h-pylori infection in children: Comparison of a salivary igg antibody test with c-13-urea breath test. *Gut* 2000;**47**(Suppl 1):A116.

Rothenbacher 2000b

Rothenbacher D, Bode G, Brenner H. Diagnosis of *Helicobacter pylori* infection with a novel stool antigen-based assay in children. *Pediatric Infectious Disease Journal* 2000;**19**(4):364–6.

Rowland 1997a

Rowland M, Lambert I, Gormally S, Thomas JE, Daly LE, Durnin M, et al. C-13-urea breath test for the diagnosis of *Helicobacter pylori* in children. *Gastroenterology* 1997;**112** (4 (suppl)):A272.

Rowland 1997b

Rowland M, Lambert I, Gormally S, Daly LE, Thomas JE, Hetherington C, et al. Carbon 13-labeled urea breath test for the diagnosis *Helicobacter pylori* infection in children. *Journal of Pediatrics* 1997;**131**(6):815–20.

Rutter 2001

Rutter CM, Gatsonis CA. A hierarchical regression approach to meta-analysis of diagnostic test accuracy evaluations. *Statistics in Medicine* 2001;**20**(19):2865–84.

Sabbi 2005

Sabbi T, De Angelis P, Colistro F, Dall'Oglio L, Di Abriola GF, Castro M. Efficacy of noninvasive tests in the diagnosis of *Helicobacter pylori* infection in pediatric patients. *Archives of Pediatrics & Adolescent Medicine* 2005;**159**(3):238–41.

Sadowski 1998

Sadowski D, Cohen H, Laine L, Greenberg P, Goldstein J, Mihalov M, et al. Evaluation of the flexsure hp whole blood antibody test for diagnosis of *Helicobacter pylori* infection. *American Journal of Gastroenterology* 1998;**93**(11):2119–23.

Saez 2012

Saez J, Belda S, Santibanez M, Rodriguez JC, Sola-Vera J, Galiana A, et al. Real-time PCR for diagnosing *Helicobacter pylori* infection in patients with upper gastrointestinal bleeding: Comparison with other classical diagnostic methods. *Journal of Clinical Microbiology* 2012;**50**(10):3233–7.

Saffari 2003

Saffari M, Motavali MA, Fazeli A. Immunoblot assay in determination of serum antibody profile of *Helicobacter pylori* infection. *Iranian Journal of Medical Sciences* 2003;**28**(2):90–2.

Salama 1993

Salama SM, Wefuan JN, Shiro-Koulla S, Mbakop A, Tagni-Sartre M, Ndam EC, et al. Value of whole-cell antigen extracts for serologic detection of *Helicobacter pylori*. *Journal of Clinical Microbiology* 1993;**31**(12):3331–2.

Salih 2013

Salih BA, Karakus C, Ulupinar Z, Akbas F. A novel lateral flow test strip (lfts) for the detection of *Helicobacter pylori* infection. *Helicobacter* 2013;**18**:124.

Salles-Montaudon 2001

Salles-Montaudon N, Dertheil S, Broutet N, Monteiro L, Gras N, Pereira E, et al. How should *Helicobacter pylori* infection be diagnosed in the elderly?. *Revue de Medecine Interne* 2001;**22**(4):339–47.

Salomaa-Rasanen 2004

Salomaa-Rasanen A, Kosunen TU, Mattila J, Sarna S, Rautelin H. Age-dependent accuracy of *Helicobacter pylori* antibody assays for adults, with special emphasis on atrophic gastritis. *Clinical and Diagnostic Laboratory Immunology* 2004;**11**(6):1185–8.

Saltik 2001

Saltik IN, Ercis S, Kocak N, Hascelik G, Ozen H, Yuce A, et al. *Helicobacter pylori* stool antigen (HpSA) test in

children with recurrent abdominal pain. *American Journal of Gastroenterology* 2001;**96**(8):2514–5.

Saltik 2003

Saltik IN, Demir H, Kocak N, Ozen H, Gurakan F, Yuce A. Diagnostic accuracy of c-13-urea breath test for Turkish children with *Helicobacter pylori* infection. *American Journal of Gastroenterology* 2003;**98**(1):222–3.

Sampson 2008

Sampson M, Shojania KG, McGowan J, Daniel R, Rader T, Iansavichene AE, et al. Surveillance search techniques identified the need to update systematic reviews. *Journal of Clinical Epidemiology* 2008;**61**(8):755–62.

Sanches 2013

Sanches BSF, Martins GM, Pinto HAF, Meira ACD, Alves EJ, Trindade OR, et al. Evaluation of stool antigen test on initial diagnosis and control test of *Helicobacter pylori* eradication. *Helicobacter* 2013;**18**:122.

Saneian 2013

Saneian H, Rahimi H, Mahmoodi NS. Comparison of the sensitivity and specificity of available methods in *Helicobacter pylori* infection detection in children. *Journal of Isfahan Medical School* 2013; Vol. 30, issue 212.

Sano 2004

Sano N, Ohara S, Koike T, Sekine H, Imatani A, Kitagawa Y, et al. Influence of urease activity of the oral cavity and oropharynx on 13C-urea breath test. *Japanese Journal of Gastroenterology* 2004;**101**(12):1302–8.

Santogade 1990

Santogade PJ, Bokkenheuser VD, Faisal MA, Kotler DP, Scholes JV, Holt PR. Evaluation of methods for identification of campylobacter pyloris infection. *New York State Journal of Medicine* 1990;**90**(1):4–7.

Sarker 2003

Sarker SA, Bardhan PK, Rahaman M, Beglinger C, Gyr N. Usefulness of the *Helicobacter pylori* stool antigen test for detection of *Helicobacter pylori* infection in young Bangladeshi children. *Gastroenterology* 2003;**124**(4 suppl):A178.

SAS [Computer program]

SAS Institute Inc. SAS. Version 9.4. Cary, NC, USA: SAS Institute Inc, 2013.

Sastry 1997

Sastry A, Flynn K, Mehra M. Development of an ELISA method for the measurement of *H. pylori* in human serum using a single reagent tmb system. *Clinical Chemistry* 1997;**43**(6 (Suppl 2)):628.

Sato 2012

Sato M, Shimoyama T, Takahashi R, Kajiyama H, Sano Y, Sakaedani N, et al. Characterization and usefulness of stool antigen tests using a monoclonal antibody to *Helicobacter pylori* catalase. *Journal of Gastroenterology and Hepatology (Australia)* 2012;**27**(SUPPL.3):23–8.

Satoh 1993

Satoh K, Yoshida Y, Taniguchi Y, Kimura K. Elisa tests for detection of *Helicobacter pylori* antibodies. *Nihon Rinsho [Japanese Journal of Clinical Medicine]* 1993;**51**(12):3201–4.

Savarino 1999

Savarino V, Mela GS, Zentilin P, Bisso G, Pivari M, Mansi C, et al. Comparison of isotope ratio mass spectrometry and nondispersive isotope-selective infrared spectroscopy for c-13-urea breath test. *American Journal of Gastroenterology* 1999;**94**(5):1203–8.

Savarino 2000a

Savarino V, Bisso G, Pivari M, Zentilin P, Bilardi C, Dulbecco P, et al. Effect of gastric acid suppression on c-13-urea breath test: Comparison of ranitidine with omeprazole. *Alimentary Pharmacology & Therapeutics* 2000;**14**(3):291–7.

Savarino 2000b

Savarino V, Landi F, Dulbecco P, Ricci C, Tessieri L, Biagini R, et al. Isotope ratio mass spectrometry (irms) versus laser-assisted ratio analyzer (lara) - a comparative study using two doses of c-13 urea and two test meals for pre- and posttreatment diagnosis of *Helicobacter pylori* infection. *Digestive Diseases and Sciences* 2000;**45**(11):2168–74.

Savarino 2001

Savarino V, Tracci D, Dulbecco P, Mele MR, Zentilin P, Mansi C, et al. Negative effect of ranitidine on the results of urea breath test for the diagnosis of *Helicobacter pylori*. *American Journal of Gastroenterology* 2001;**96**(2):348–52.

Savio 1999

Savio A, Buffoli F, Landi F, Ricci C, Acciardi C, Gatta L, et al. The value of a new capture ELISA system for the diagnosis and the follow-up of *Helicobacter pylori* (hp) infection. *Gut* 1999;**45**(Suppl 3):A128.

Sawada 2001

Sawada A, Tajiri H, Yoshimura N, Kozaiwa K, Ida S, Fujisawa T, et al. A simplified C-13-urea breath test in children with *Helicobacter pylori* infection: Assessment of eradication therapy and follow-up after treatment. *Gastroenterology* 2001;**120**(5 suppl):A579.

Sayed 2011

Sayed MM, Ibrahim WA, Abdel-Bary SA, Abdelhakam SM, El-Masry SA, Ghoraba D. Salivary PCR detection of *Helicobacter pylori* DNA in Egyptian patients with dyspepsia. *Egyptian Journal of Medical Human Genetics* 2011;**12**(2):211–6.

Schaefer 1999

Schaefer R, Bugno M, Auer P, Ramp U, Gabbert HE, Erckenbrecht JF. Does quantitative c-13-urea breath test reflect intensity of gastric *Helicobacter pylori* colonization or mucosal inflammation?. *Gastroenterology* 1999;**116**(4 (suppl)):A304.

Scherbakov 2001

Scherbakov PL, Belousov B, Govorun VM, Filin VA, Isakov VA, Kaganov BS, et al. Diagnosis of *Helicobacter pylori* infection in children by PCR in stool: comparative study with antigen stool test. *Gut* 2001;**49**(suppl):A81.

Schilling 2003

Schilling D, Demel A, Adamek HE, Nusse T, Weidmann E, Riemann JF. A negative rapid urease test is unreliable for exclusion of *Helicobacter pylori* infection during acute

phase of ulcer bleeding - a prospective case control study. *Digestive and Liver Disease* 2003;**35**(4):217–21.

Schmitt 1996

Schmitt B, Bartel J. Comparison of a new rapid blood assay for detection of antibodies to *Helicobacter pylori* (bm-test *Helicobacter pylori* rapid assay, boehringer mannheim) with an enzyme-linked immunosorbent assay (enzynost, behringwerke marburg). *Klinisches Labor* 1996;**42**(7-8):601–6.

Schuman 1995

Schuman R, Rigas B, Prada A, Minoli G. Diagnosis of *Helicobacter-pylori* infection by the Lara™ system - towards a simplified breath test. *Gastroenterology* 1995;**108** (4 suppl):A215.

Schumann 2006

Schumann C, Triantafyllou K, Rasche FM, Moricke A, Vogt K, Triantafyllou M, et al. Serum antibody positivity for distinct *Helicobacter pylori* antigens in benign and malignant gastroduodenal disease. *Ijmm International Journal of Medical Microbiology* 2006;**296**(4-5):223–8.

Schwarzer 2007

Schwarzer A, Lottspeich C, Russmann H, Ossianer G, Koletzko S. Evaluation of a novel rapid one-step monoclonal chromatographic immunoassay for detection of *Helicobacter pylori* in stool from children. *European Journal of Clinical Microbiology & Infectious Diseases* 2007;**26**(7):475–80.

Sedlackova 1992

Sedlackova M, Soucek A, Mucksova J. Serologic detection of antibodies to *Helicobacter pylori* in children and adolescents using ELISA. *Ceskoslovenska Pediatrie* 1992;**47**(10):577–80.

Sen 2005

Sen N, Yilmaz O, Simsek I, Kupelioglu AA, Ellidokuz H. Detection of *Helicobacter pylori* DNA by a simple stool PCR method in adult dyspeptic patients. *Helicobacter* 2005;**10**(4):353–9.

Sen 2011

Sen N, Demiray-Gurbuz E, Yilmaz O, Kupeliolu A, Simsek I. Comparing the accuracy of stool antigen tests for the detection of *Helicobacter pylori* infection in Turkish dyspeptic patients. *Helicobacter* 2011;**16**:114–5.

Seo 2004

Seo JK. Diagnostic validity of the *Helicobacter pylori* stool antigen test before and after eradication treatment. *Taehan Sohwagi Hakhoe Chi [Korean Journal of Gastroenterology]* 2004;**44**(4):229–35.

Seo 2013

Seo JH, Jun JS, Youn HS, Yeom JS, Park JS, Park CH, et al. Development of an ELISA for quantitative detection of immunoglobulin g (IgG) and IgA antibodies to *Helicobacter pylori* for use in Korean patients with *H. pylori*-associated diseases. *Gut and Liver* 2013;**7**(4):437–42.

Serrano 2008

Serrano CA, Gonzalez CG, Rollan AR, Duarte I, Torres J, Pena AJ, et al. Lack of diagnostic utility of specific

- immunoglobulin m in *Helicobacter pylori* infection in children. *Journal of Pediatric Gastroenterology and Nutrition* 2008;**47**(5):612–7.
- Sfarti 2009**
Sfarti C, Stanciu C, Cojocariu C, Trifan A. 13C-urea breath test for the diagnosis of *Helicobacter pylori* infection in bleeding duodenal ulcer. *Revista Medico-Chirurgicala a Societatii de Medici si Naturalisti Din Lasi* 2009;**113**(3): 704–9.
- Shaikh 2005**
Shaikh S, Khaled MA, Islam A, Kurpad AV, Mahalanabis D. Evaluation of stool antigen test for *Helicobacter pylori* infection in asymptomatic children from a developing country using 13C-urea breath test as a standard. *Journal of Pediatric Gastroenterology & Nutrition* 2005;**40**(5):552–4.
- Sharma 1995**
Sharma TK, Cutler AF. Relationship between the magnitude of c-13 urea breath test-results and endoscopic diagnoses in *Helicobacter-pylori* infected individuals. *Gastroenterology* 1995;**108**(4 (suppl)):A217.
- Sharma 1997**
Sharma TK, Young EL, Miller S, Cutler AF. Evaluation of a rapid, new method for detecting serum igg antibodies to *Helicobacter pylori*. *Clinical Chemistry* 1997;**43**(5):832–6.
- Sharma 1999**
Sharma BC, Bhasin DK, Pathak CM, Sinha SK, Ray P, Vaiphei K, et al. C-14 -urea breath test to confirm eradication of *Helicobacter pylori*. *Journal of Gastroenterology and Hepatology* 1999;**14**(4):309–12.
- Sharma 2015**
Sharma U, Rehmani B, Shirazi N, Mittal G. A study of *Helicobacter pylori* infection in perforated peptic ulcer disease. *International Journal of Surgery* 2015;**23**:S119–S20.
- She 2009**
She RC, Wilson AR, Litwin CM. Evaluation of *Helicobacter pylori* immunoglobulin g (igg), iga, and igm serologic testing compared to stool antigen testing. *Clinical and Vaccine Immunology* 2009;**16**(8):1253–5.
- Sheikhian 2007**
Sheikhian A, Hassan Zuhair M, Mostafaie A. Detection of *Helicobacter pylori* diagnostic antigens in the stool of infected patients. *Iranian Journal of Medical Sciences* 2007;**32**(4):198–204.
- Shepherd 2000**
Shepherd AJ, Williams CL, Doherty CP, Hossack M, Preston T, McColl KEL, et al. Comparison of an enzyme immunoassay for the detection of *Helicobacter pylori* antigens in the faeces with the urea breath test. *Archives of Disease in Childhood* 2000;**83**(3):268–70.
- Sheu 1997**
Sheu BS, Lee SC, Lin XZ. Quantitative result of c-13 urea breath test can predict the bacterial density of h-pylori. *Gut* 1997;**41**:A84.
- Sheu 1999a**
Sheu BS, Lee SC, Yang HB, Lin XZ. Quantitative result of c-13 urea breath test at 15 minutes may correlate with the bacterial density of h-pylori in the stomach. *Hepato-Gastroenterology* 1999;**46**(27):2057–62.
- Sheu 1999b**
Sheu BS, Lee SC, Wang YL, Shiesh SC, Yang HB, Lin XZ. A lower cut-off point of c-13 urea breath test is more suitable to monitor the success of h-pylori eradication. *Gut* 1999;**45**(Suppl 3):A125.
- Sheu 2000a**
Sheu BS, Lee SC, Yang HB, Kuo AW, Wang YL, Shiesh SC, et al. Selection of lower cutoff point of c-13 urea breath test is helpful to monitor h-pylori eradication after proton pump inhibitor-based triple therapy. *Digestive Diseases and Sciences* 2000;**45**(7):1330–6.
- Sheu 2000b**
Sheu BS, Lee SC, Yang HB, Wu HW, Wu CS, Lin XZ, et al. Lower-dose c-13-urea breath test to detect *Helicobacter pylori* infection - comparison between infrared spectrometer and mass spectrometry analysis. *Alimentary Pharmacology & Therapeutics* 2000;**14**(10):1359–63.
- Sheu 2000c**
Sheu BS, Lee SC, Lin PW, Wang ST, Chang YC, Yang HB, et al. (13)carbon urea breath test is not as accurate as endoscopy to detect *Helicobacter pylori* after gastrectomy. *Gastrointestinal Endoscopy* 2000;**51**(6):670–5.
- Sheu 2002**
Sheu BS, Yang HB, Wang YL, Kao AW, Chuang CH, Lin PW, et al. Stool antigen assay to screen h-pylori infection and to assess the success of 3-day and 7-day eradication therapy in the patients with partial gastrectomy. *Helicobacter* 2002;**7**(3):199–204.
- Shiba 1998**
Shiba K. The rapid method in microbiology using chemical method and immunochemical method. *Rinsho Biseibutsu Jinsoku Shindan Kenkyukai Shi [Journal of the Association for Rapid Method and Automation in Microbiology]* 1998;**9**(2): 73–81.
- Shimada 1994**
Shimada T, Ogura K, Ota S, Terano A, Takahashi M, Hamada E, et al. Identification of *Helicobacter pylori* in gastric specimens, gastric juice, saliva, and faeces of Japanese patients. *Lancet* 1994;**343**(8913):1636–7.
- Shimizu 2003a**
Shimizu T, Yaritha Y, Haruna H, Kaneko K, Yamashiro Y, Gupta R, et al. Urine-based enzyme-linked immunosorbent assay for the detection of *Helicobacter pylori* antibodies in children. *Journal of Paediatrics & Child Health* 2003;**39**(8): 606–10.
- Shimizu 2003b**
Shimizu T, Fujii T, Haruna H, Shoji H, Kudo T, Yamashiro Y. Effects of stool dilution on the faecal *Helicobacter pylori* antigen test. *Journal of Paediatrics and Child Health* 2003;**39**(4):286–8.

Shimoyama 1996

Shimoyama T, Fukuda Y, Fukuda S, Munakata A, Yoshida Y, Shimoyama T. Validity of various diagnostic tests to evaluate cure of *Helicobacter pylori* infection. *Journal of Gastroenterology* 1996;**31**(2):171–4.

Shimoyama 2009a

Shimoyama T, Oyama T, Matsuzaka M, Danjo K, Nakaji S, Fukuda S. Comparison of a stool antigen test and serology for the diagnosis of *Helicobacter pylori* infection in mass survey. *Helicobacter* 2009;**14**(2):87–90.

Shimoyama 2009b

Shimoyama T, Kato C, Kodama M, Kobayashi I, Fukuda Y. Applicability of a monoclonal antibody-based stool antigen test to evaluate the results of *Helicobacter pylori* eradication therapy. *Japanese Journal of Infectious Diseases* 2009;**62**(3): 225–7.

Shimoyama 2010

Shimoyama T, Kobayashi I, Kato C, Kodama M, Fukuda Y. Comparison of monoclonal antibody-based stool antigen tests to determine the results of *Helicobacter pylori* eradication therapy. *Scandinavian Journal of Gastroenterology* 2010;**45**(12):1431–4.

Shimoyama 2011

Shimoyama T, Sawaya M, Ishiguro A, Hanabata N, Yoshimura T, Fukuda S. Applicability of a rapid stool antigen test, using monoclonal antibody to catalase, for the management of *Helicobacter pylori* infection. *Journal of Gastroenterology* 2011;**46**(4):487–91.

Shimoyama 2014

Shimoyama T, Chinda D, Ebina T, Iwamura H, Fukuda S. Screening of *Helicobacter pylori* infection using stool antigen test for young adults in a Japanese population with high incidence of gastric cancer. *Helicobacter* 2014;**19**:121.

Shimoyama 2015

Shimoyama T, Sawada Y, Fukuda S. Accuracy of a stick-type kit and enzyme-linked immunosorbent assay for the detection of *Helicobacter pylori* antibodies in urine. *American Journal of Gastroenterology* 2015;**110**:S1020.

Shirin 2001

Shirin H, Kenet G, Shevah O, Wardi Y, Birkenfeld S, Shahmurov M, et al. Evaluation of a novel continuous real time c-13 urea breath analyser for *Helicobacter pylori*. *Alimentary Pharmacology & Therapeutics* 2001;**15**(3): 389–94.

Shirin 2003

Shirin H, Frenkel D, Shevah O, Levine A, Bruck R, Moss SF, et al. Effect of proton pump inhibitors on the continuous real time c-13-urea breath test. *American Journal of Gastroenterology* 2003;**98**(1):46–50.

Shirin 2005

Shirin H, Levine A, Shevah O, Shabat-Sehayek V, Aeed H, Wardi J, et al. Eradication of *Helicobacter pylori* can be accurately confirmed 14 days after termination of triple therapy using a high-dose citric acid-based c-13 urea breath test. *Digestion* 2005;**71**(4):208–12.

Shmueli 2007

Shmueli H, Yahav J, Samra Z, Chodick G, Ofek I. Elevated c-13 urea breath test values females infected with *Helicobacter pylori*. *Digestive Diseases and Sciences* 2007;**52**(2):402–4.

Shuber 2002

Shuber AP, Ascaño JJ, Boynton KA, Mitchell A, Frierson HF Jr, El-Rifai W, et al. Accurate, noninvasive detection of *Helicobacter pylori* DNA from stool samples: Potential usefulness for monitoring treatment. *Journal of Clinical Microbiology* 2002;**40**(1):262–4.

Shukla 2012

Shukla S, Pujani M, Agarwal A, Pujani M, Rohtagi A. Correlation of serology with morphological changes in gastric biopsy in *Helicobacter pylori* infection and evaluation of immunohistochemistry for h. Pylori identification. *Saudi Journal of Gastroenterology* 2012;**18**(6): 369–74.

Sicinschi 2003a

Sicinschi LA, Correa P, Schneider BG. Comparison of genotyping of *Helicobacter pylori* caga and vaca virulence genes from gastric biopsies and stool specimens. *Helicobacter* 2003;**8**(6):601–7.

Sicinschi 2003b

Sicinschi LA, Correa P, Bravo LE, Schneider BG. Detection and typing of *Helicobacter pylori* caga/vaca genes by radioactive, one-step polymerase chain reaction in stool samples from children. *Journal of Microbiological Methods* 2003;**52**(2):197–207.

Siddiqui 2010

Siddiqui AA, Ansari MA, Rahman RU, Jabeen R, Qureshi NR, Kashoob MB. Comparison between *Helicobacter pylori* fecal antigen detection and endoscopic gastric biopsy in diagnosis of h. Pylori infection in 50 adult cases. *Journal of the Liaquat University of Medical and Health Sciences* 2010;**9**(1):23–6.

Silva 2009

Silva DG, Stevens RH, Macedo JMB, Hirata R, Pinto AC, Alves LM, et al. Higher levels of salivary muc5b and muc7 in individuals with gastric diseases who harbor *Helicobacter pylori*. *Archives of Oral Biology* 2009;**54**(1):86–90.

Sito 1994

Sito E, Karczewska E, Szczeba J, Kaminski K, Oleksy J, Nowak-Sadzikowska J, et al. Comparative evaluation of culture techniques and ELISA test in detection of *Helicobacter pylori* infection. *Medycyna Doswiadczalna i Mikrobiologia* 1994;**46**(4):301–4.

Slade 1999

Slade PE, Davidson AR, Steel A, Cox RA, Blackburn PA. Reducing the endoscopic workload: Does serological testing for *Helicobacter pylori* help?. *European Journal of Gastroenterology & Hepatology* 1999;**11**(8):857–62.

Slater 2004

Slater C, Preston T, Weaver LT. Is there an advantage in normalising the results of the *Helicobacter pylori* c-13 urea

- breath test for co2 production rate in children?. *Isotopes in Environmental and Health Studies* 2004;**40**(1):89–98.
- Slomianski 1994**
Slomianski A, Schubert T, Cutler AF. C-13 urea breath test to confirm eradication of *Helicobacter-pylori*. *Gastroenterology* 1994;**106**(4 (suppl)):A183.
- Slomianski 1995**
Slomianski A, Schubert T, Cutler AF. [13C]urea breath test to confirm eradication of *Helicobacter pylori*. *American Journal of Gastroenterology* 1995;**90**(2):224–6.
- Smith 2006**
Smith SI, Oyediji KS, Odeniyi OAM, Arigbabu AO, Coker AO. Diagnosis of *Helicobacter pylori* infection among patients with dental caries by stool antigen test. *British Journal of Biomedical Science* 2006;**63**(3):144–5.
- Smith 2009**
Smith SI, Omonigbehin EA, Goodluck HA, Abdulkareem FB, Onyekwere CA, Agomo C, et al. The use of histology as a gold standard for diagnosis of h. Pylori in Nigeria. *Helicobacter* 2009;**14**(4):342.
- Smith 2010**
Smith SI, Fowora MA, Lesi OA, Agbebaku E, Abdulkareem FB, Contreras M, et al. Application of stool-PCR test for the diagnosis of h. Pylori in Nigeria. *Helicobacter* 2010;**15**(4):363.
- Smith 2011**
Smith SI, Oyediji KS, Goodluck HA, Fowora MA, Anomneze E, Lesi OA. The use of *Helicobacter pylori* stool antigen test for the diagnosis of *Helicobacter pylori* in Lagos, Nigeria. *West Indian Medical Journal* 2011;**60**(1): 33–5.
- Smith 2012**
Smith SI, Fowora MA, Lesi OA, Agbebaku E, Odeigah P, Abdulkareem FB, et al. Application of stool-PCR for the diagnosis of *Helicobacter pylori* from stool in Nigeria- a pilot study. *Springerplus* 2012;**1**(1):78. [DOI: 10.1186/2193-1801-1-78]
- Snyder 1999**
Snyder JD, Veldhuyzen Van Zanten S. Novel diagnostic tests to detect *Helicobacter pylori* infection: A pediatric perspective. *Canadian Journal of Gastroenterology* 1999;**13**(7):585–9.
- Sobala 1991**
Sobala GM, Crabtree JE, Pentith JA, Rathbone BJ, Shallcross TM, Wyatt JI, et al. Screening dyspepsia by serology to *Helicobacter pylori*. *Lancet* 1991;**338**(8759): 94–6.
- Sokucu 2002**
Sokucu S, Suoglu OD, Turkkan E, Elkabes B, Ozden T, Saner G. *Helicobacter pylori* infection in turkish children with gastrointestinal symptoms and evaluation of serology. *Turkish Journal of Pediatrics* 2002;**44**(2):102–8.
- Song 2000**
Song Q, Lange T, Spahr A, Adler G, Bode G. Characteristic distribution pattern of *Helicobacter pylori* in dental plaque and saliva detected with nested PCR. *Journal of Medical Microbiology* 2000;**49**(4):349–53.
- Song 2014**
Song Y, Jiang K, Jin H, Wang BM. The application of methane and hydrogen breath test in the diagnosis and treatment of *Helicobacter pylori*. *Journal of Digestive Diseases* 2014;**15**:116.
- Sonmezoglu 2005**
Sonmezoglu M, Baysal B, Ergen A, Barut SG. Detection and evaluation of salivary antibodies to *Helicobacter pylori* in dyspeptic patients. *International Journal of Clinical Practice* 2005;**59**(4):433–6.
- Sorberg 1997**
Sorberg M, Engstrand L, Strom M, Jonsson KA, Jorbeck H, Granstrom M. The diagnostic value of enzyme immunoassay and immunoblot in monitoring eradication of *Helicobacter pylori*. *Scandinavian Journal of Infectious Diseases* 1997;**29**(2):147–51.
- Steen 1995**
Steen T, Berstad K, Meling T, Berstad A. Reproducibility of the 14c urea breath test repeated after 1 week. *American Journal of Gastroenterology* 1995;**90**(12):2103–5.
- Stege 2010**
Stege PW, Raba J, Messina GA. Online immunoaffinity assay-ce using magnetic nanobeads for the determination of anti-*Helicobacter pylori* IgG in human serum. *Electrophoresis* 2010;**31**(20):3475–81.
- Stermer 1997**
Stermer E, Levy N, Tabak M, Neeman I. Lanzoprazole and ranitidine affect the accuracy of the 14c-urea breath test by a ph-dependent mechanism. *American Journal of Gastroenterology* 1997;**92**(9):1575–6.
- Sternberg 1997**
Sternberg A, Coscas D, Wagner Y, Auslander L, Kaufshtein M, Fireman Z. Comparison of various *Helicobacter pylori* detection methods: Serology, histology and bacteriology. *Israel Journal of Medical Sciences* 1997;**33**(3):160–3.
- Stirling 1995**
Stirling N, McCallion W. *Helicobacter pylori* gastritis: Non-invasive diagnosis. *Paediatric Nursing* 1995;**7**(2):17–9.
- Stojkovic 2011**
Stojkovic M, Durutovic DR, Petrovic MN, Stojkovic MV, Petrovic NS, Antic AA, et al. *Helicobacter pylori* infection in various groups of patients studied, estimated by 14c-urea breath test. *Acta Chirurgica Iugoslavica* 2011;**58**(1):95–8.
- Stone 1997**
Stone MA, Mayberry JF, Wicks ACB, Livsey SA, Stevens M, Swann RA, et al. Near patient testing for *Helicobacter pylori*: A detailed evaluation of the cortecs helisal rapid blood test. *European Journal of Gastroenterology & Hepatology* 1997;**9**(3):257–60.
- Storskrubb 2005**
Storskrubb T, Aro P, Ronkainen J, Vieth M, Stolte M, Weiber K, et al. A negative *Helicobacter pylori* serology test is more reliable for exclusion of premalignant gastric

- conditions than a negative test for current h. Pylori infection: A report on histology and h. Pylori detection in the general adult population. *Scandinavian Journal of Gastroenterology* 2005;**40**(3):302–11.
- Stray-Pedersen 2007**
Stray-Pedersen A, Gaustad P, Stray-Pedersen B, Rognum TO. Detection rate of *Helicobacter pylori* stool antigen in newborn infants and small children. *Journal of Perinatal Medicine* 2007;**35**(2):155–8.
- Stuppy 2010**
Stuppy W, Everitt M. Correlation of salivary antibody (HPSAigg) and stool antigen (hpstag) in *Helicobacter pylori* infection. *American Journal of Gastroenterology* 2010;**105**: S46.
- Stuppy 2011**
Stuppy W, El Khoury M. Pre- and post-treatment correlation of salivary antibody with stool antigen in *Helicobacter pylori* infection. *American Journal of Gastroenterology* 2011;**106**:S49.
- Sudraba 2010**
Sudraba A, Funka K, Tolmanis I, Vanags A, Daugule I, Janciauskas D, et al. Gastric biomarkers in h. Pylori positive and negative patients. *Helicobacter* 2010;**15**(4):353.
- Sudraba 2011**
Sudraba A, Daugule I, Rudzite D, Funka K, Tolmanis I, Engstrand L, et al. Performance of routine *Helicobacter pylori* tests in patients with atrophic gastritis. *Journal of Gastrointestinal & Liver Diseases* 2011;**20**(4):349–54.
- Sue 1996**
Sue M, Peura D, Charles C, Doobay R, Reid H, Morris E, et al. Comparison of two treatment strategies for the eradication of h-pylori utilizing a screening antibody serum blot test and confirmatory c 14 breath test. *Gastroenterology* 1996;**110**(4 (suppl)):A266.
- Sugiyama 1991**
Sugiyama T, Imai K, Yoshida H, Takayama Y, Yabana T, Yokota K, et al. A novel enzyme immunoassay for serodiagnosis of *Helicobacter pylori* infection. *Gastroenterology* 1991;**101**(1):77–83.
- Sujatha 2013**
Sujatha R, Arunagiri D, Singh DN, Hariomsharan. Diagnosis of *Helicobacter pylori* associated acid peptic disease by serology and rapid urease test. *Journal of Pure and Applied Microbiology* 2013;**7**(1):691–5.
- Sukhanov 2011**
Sukhanov AV, Pikerskii IE, Saifutdinov RG, Makarov AA, Frolov SV. Comparison of various diagnostic methods of *Helicobacter* infection. *Eksperimental'naia i Klinicheskaia Gastroenterologiya [Experimental & Clinical Gastroenterology]* 2011;**5**:8–15.
- Sumona 2009**
Sumona AA, Hossain MA, Musa AK, Shamsuzzaman AK, Mahmud MC, Khan MS, et al. Anti h.Pylori igm in symptomatic and asymptomatic population. *Mymensingh Medical Journal: MMJ* 2009;**18**(1):18–20.
- Sunnerstam 1999**
Sunnerstam B, Kjerstadius T, Jansson L, Giesecke J, Bergstrom M, Ejderhamn J. Detection of *Helicobacter pylori* antibodies in a pediatric population: Comparison of three commercially available serological tests and one in-house enzyme immunoassay. *Journal of Clinical Microbiology* 1999;**37**(10):3328–31.
- Surveyor 1988**
Surveyor I, Goodwin CS, Warren JR, Geelhoed E, Murray RN, Waters TE. Further experience of the c-14 urea breath test for the detection of c-pylori infection. *Australian and New Zealand Journal of Medicine* 1988;**18**(3):505.
- Suto 1997a**
Suto H, Azuma T, Ito S, Ito Y, Miyaji H, Yamazaki Y, et al. Evaluation of the endoscopic c-13-urea breath test: A new accurate diagnostic test of *Helicobacter pylori* infection. *Gastroenterology* 1997;**112**(4 (suppl)):A301.
- Suto 1997b**
Suto H, Azuma T, Ito S, Ito Y, Miyaji H, Yamazaki Y, et al. A trial of ¹³C-urea breath test combined with endoscopic phenol red test for detection of *Helicobacter pylori* infection. *Digestive Endoscopy* 1997;**9**(4):283–9.
- Suto 1999**
Suto H, Azuma T, Ito S, Ito Y, Miyaji H, Yamazaki Y, et al. Evaluation of endoscopic c-13-urea breath test for assessment of *Helicobacter pylori* eradication. *Journal of Gastroenterology* 1999;**34**(Suppl 11):67–71.
- Suto 2000a**
Suto H, Azuma T, Ito S, Ito Y, Miyaji H, Yamazaki Y, et al. Endoscopic¹³C-urea breath test for quantification of *Helicobacter pylori* infection. *Journal of Gastroenterology and Hepatology (Australia)* 2000;**15**(2):161–7.
- Suto 2000b**
Suto G, Vincze A, Pakodi F, Hunyady B, Karadi O, Garamszegi M, et al. C-13-urea breath test is superior in sensitivity to detect *Helicobacter pylori* infection than either antral histology or rapid urease test. *Journal of Physiology-Paris* 2000;**94**(2):153–6.
- Suzuki 2010**
Suzuki K, Shimoyama T, Kobayashi I, Kato C, Kodama M, Fukuda Y. Comparison of monoclonal antibody-based stool antigen tests to determine the results of h. Pylori eradication therapy. *Helicobacter* 2010;**15** (4):358.
- Syam 2005**
Syam AF, Rani AA, Abdullah M, Manan C, Makmun D, Simadibrata M, et al. Accuracy of *Helicobacter pylori* stool antigen for the detection of *Helicobacter pylori* infection in dyspeptic patients. *World Journal of Gastroenterology* 2005;**11**(3):386–8.
- Sykora 2002**
Sykora J, Valeckova K, Hejda V, Varvarovska J, Stozicky F. Accurate noninvasive diagnosis of *Helicobacter pylori* infection using antigen determination in the feces in the pediatric population. *Casopis Lekaru Ceskych* 2002;**141**(13): 425–7.

Sykora 2003

Sykora J, Valeckova K, Stozicky F, Schwarz J, Varvarovska J. Revealing of the *Helicobacter pylori* infection in children by detection of stool antigen by a novel enzyme immunoassay using monoclonal antibodies (hpstar). *Casopis Lekaru Ceskych* 2003;**142**(11):687–90.

Taha 1992

Taha AS, Boothman P, Nakshabendi I, Reid J, Morran C, Gemmell CG, et al. Diagnostic tests for *Helicobacter pylori*: Comparison and influence of non-steroidal anti-inflammatory drugs. *Journal of Clinical Pathology* 1992;**45**(8):709–12.

Taha 1993

Taha AS, Reid J, Boothmann P, Gemmell CG, Lee FD, Sturrock RD, et al. Serological diagnosis of *Helicobacter pylori*—evaluation of four tests in the presence or absence of non-steroidal anti-inflammatory drugs. *Gut* 1993;**34**(4):461–5.

Takagi 1993

Takagi A, Suyama T, Kida M, Matsuda M, Matsumoto H, Kojima K, et al. Comparison between ELISA and culture method for detection of *Helicobacter pylori*. *Rinsho Byori [Japanese Journal of Clinical Pathology]* 1993;**41**(12):1333–7.

Takagi 2002

Takagi A, Mine T. Serodiagnosis of *Helicobacter pylori* infection. *Nihon Rinsho [Japanese Journal of Clinical Medicine]* 2002;**60**(Suppl 2):324–7.

Takagi 2003

Takagi A. Detection of h. Pylori by serum and urine-based ELISA. *Nihon Rinsho [Japanese Journal of Clinical Medicine]* 2003;**61**(1):88–91.

Takahashi 2010

Takahashi R, Shimoyama T, Abe D, Nakabayashi N, Okuda M, Fukuda Y. Determining cut-off values for serodiagnosis of *Helicobacter hepaticus* infection by hrii-51-hh-15 capture enzyme-linked immunosorbent assay. *Helicobacter* 2010;**15**(4):362.

Takwoingi 2013

Takwoingi Y, Leeflang MM, Deeks JJ. Empirical evidence of the importance of comparative studies of diagnostic test accuracy. *Annals of internal medicine* 2013;**158**(7):544–54. [PUBMED: 23546566]

Takwoingi 2017

Takwoingi Y, Guo B, Riley RD, Deeks JJ. Performance of methods for meta-analysis of diagnostic test accuracy with few studies or sparse data. *Statistical Methods in Medical Research* 2017; Vol. 26, issue 4:1896–911.

Talebkhan 2009

Talebkhan Y, Ebrahimzadeh F, Esmacili M, Oghalaie A, Sadeghi M, Mohammadi M. H. Pylori immunoreactive antigens and their screening applications. *Helicobacter* 2009;**14** (4):338.

Talebkhan 2010

Talebkhan Y, Esmaili M, Hassanpour P, Morakabati A, Rakhshani N, Mohagheghi M, et al. Comparison of

routinely used invasive and non invasive approaches in diagnosis of h. Pylori infection. *Helicobacter* 2010;**15**(4):358–9.

Talley 1991

Talley NJ, Newell DG, Ormand JE, Carpenter HA, Wilson WR, Zinsmeister AR, et al. Serodiagnosis of *Helicobacter pylori*: Comparison of enzyme-linked immunosorbent assays. *Journal of Clinical Microbiology* 1991;**29**(8):1635–9.

Talley 1992

Talley NJ, Kost L, Haddad A, Zinsmeister AR. Comparison of commercial serological tests for detection of *Helicobacter pylori* antibodies. *Journal of Clinical Microbiology* 1992;**30**(12):3146–50.

Talley 1998

Talley NJ, Lambert JR, Howell S, Xia HH, Lin SK, Agreus L. An evaluation of whole blood testing for *Helicobacter pylori* in general practice. *Alimentary Pharmacology & Therapeutics* 1998;**12**(7):641–5.

Talley 2008

Talley NJ, Fock KM, Moayyedi P. Gastric Cancer Consensus conference recommends *Helicobacter pylori* screening and treatment in asymptomatic persons from high-risk populations to prevent gastric cancer. *American Journal of Gastroenterology* 2008;**103**(3):510–4.

Tamura 2001

Tamura S, Yokoyama Y, Morita T, Tadokoro T, Higashidani Y, Onishi S. Stool test for *Helicobacter pylori*. *American Journal of Gastroenterology* 2001;**96**(6):1936–8.

Tanahashi 1998

Tanahashi T, Kodama T, Yamaoka Y, Sawai N, Tatsumi Y, Kashima K, et al. Analysis of the c-13-urea breath test for detection of *Helicobacter pylori* infection based on the kinetics of delta-(co2)-c-13 using laser spectroscopy. *Journal of Gastroenterology and Hepatology* 1998;**13**(7):732–7.

Tanaka 2001

Tanaka A, Watanabe K, Tokunaga K, Hoshiya S, Imase K, Sugano H, et al. Evaluation of *Helicobacter pylori* stool antigen test before and after eradication therapy. *Gut* 2001;**49**(suppl):A101.

Tanaka 2003

Tanaka A, Watanabe K, Tokunaga K, Hoshiya S, Imase K, Sugano H, et al. Evaluation of *Helicobacter pylori* stool antigen test before and after eradication therapy. *Journal of Gastroenterology & Hepatology* 2003;**18**(6):732–8.

Tanaka 2004

Tanaka A, Takahashi S. *Helicobacter pylori* stool antigen test. *Nihon Rinsho [Japanese Journal of Clinical Medicine]* 2004;**62**(3):464–9.

Tanaka 2005

Tanaka A, Tokunaga K, Imase K, Sugano H, Ishida H, Takahashi S. Evaluation of rapid h-pylori stool antigen test before and after eradication therapy. *American Journal of Gastroenterology* 2005;**100**(9):S69–70.

Tanigawa 1996

Tanigawa T, Mizo-oku Y, Moriguchi K, Suzuki T, Osumi T, Odomi M. Simple and rapid quantitative assay of ¹³C-labelled urea in human serum using liquid chromatography-atmospheric pressure chemical ionization mass spectrometry. *Journal of Chromatography B: Biomedical Applications* 1996; **683**(2):135–42.

Taniguchi 1995

Taniguchi Y, Kimura K, Satoh K, Kawada H, Sohara H, Yamamoto H, et al. Substitute, inexpensive diagnosis of *Helicobacter-pylori* infection by infrared (ir) spectrophotometer in c-13-urea breath test. *Gastroenterology* 1995; **108**(4 (Suppl)):A235.

Taylor 1987

Taylor DE, Chang N. Immunoblot and enzyme-linked immunosorbent assays of campylobacter major outer-membrane protein and application to the differentiation of campylobacter species. *Molecular & Cellular Probes* 1987; **1**(3):261–74.

Taylor 2014

Taylor J, Hafner M, Yerushalmi E, Smith R, Bellasio J, Vardavas R, et al. Estimating the economic costs of antimicrobial resistance. Model and Results. www.rand.org/pubs/research_reports/RR911.html 2014 (accessed 15 December 2016).

Teich 1997

Teich M, Bohn I, Niessen KH. Validation of a children's c-13-urea breath test for diagnosis of *Helicobacter pylori*. *Monatsschrift Kinderheilkunde* 1997; **145**(3):242–8.

Temelli 2011

Temelli B, Velipasaoglu Z, Akdemir E, Bozkurt MF. Efficacy of carbon-14 urea breath test in the diagnosis of *Helicobacter pylori* infection in children: Comparison among different tests to find out the best. *European Journal of Nuclear Medicine and Molecular Imaging* 2011; **38**: S190–S1.

Teo 1997

Teo EK, Fock KM, Ng TM, Khor CJL, Lee YM, Sim CS. 13 carbon-urea breath test for detection of h-pylori infection. *Gastroenterology* 1997; **112**(4 suppl):A311.

Tepes 2015

Tepes B, Malfertheiner P, Labenz J, Aygen S. The accuracy of a new c-13 urea breath test meal (refex (r)) for *Helicobacter pylori* in patients taking proton pump inhibitors. *Helicobacter* 2015; **20**:81.

Tereshchenko 2014

Tereshchenko S, Gorbacheva N, Anisimova E, Babushkin V. The diagnostic accuracy of *Helicobacter pylori* antigen detection in duodenal juice. *Helicobacter* 2014; **19**:125–6.

Tewari 2001

Tewari V, Nath G, Gupta H, Dixit VK, Jain AK. 14c-urea breath test for assessment of gastric *Helicobacter pylori* colonization and eradication. *Indian Journal of Gastroenterology* 2001; **20**(4):140–3.

Tham 1993

Tham TCK, McLaughlin N, Hughes DF, Ferguson M, Crosbie JJ, Madden M, et al. Evaluation of a commercial ELISA for the serodiagnosis of *Helicobacter-pylori* infection. *Gastroenterology* 1993; **104**(4 suppl):A210.

Tham 1994

Tham TCK, McLaughlin M, Hughes DF, Ferguson M, Crosbie JJ, Madden M, et al. Possible role of *Helicobacter pylori* serology in reducing endoscopy workload. *Postgraduate Medical Journal* 1994; **70**(829):809–12.

Thijs 1994

Thijs JC, Van Zwet AA, Meyer BC, Berrelkamp RJP. Serology to monitor the efficacy of anti-*Helicobacter pylori* treatment. *European Journal of Gastroenterology & Hepatology* 1994; **6**(7):579–83.

Thijs 1995a

Thijs WJ, Thijs JC, Kleibeuker JH, Elzinga H, Stellaard F. Evaluation of clinical and home performance of the ¹³C-urea breath test for the detection of *Helicobacter pylori*. *European Journal of Gastroenterology & Hepatology* 1995; **7**(7):603–7.

Thijs 1995b

Thijs WJ, Thijs JC, Kleibeuker JH, Elzinga H, Stellaard F. The c-13-urea breath test for the detection of *Helicobacter-pylori* - an analysis of the test performed clinically and at home. *Gastroenterology* 1995; **108**(4 (suppl)):A241.

Thijs 1996

Thijs JC, Van Zwi AA, Thijs WJ, Oey HB, Karrenbeld A, Stellaard F, et al. Diagnostic tests for *Helicobacter pylori*: A prospective evaluation of their accuracy, without selecting a single test as the gold standard. *American Journal of Gastroenterology* 1996; **91**(10):2125–9.

Thillainayagam 1991

Thillainayagam AV, Arvind AS, Cook RS, Harrison IG, Tabaqchali S, Farthing MJG. Diagnostic efficiency of an ultrarapid endoscopy room test for *Helicobacter-pylori*. *Gut* 1991; **32**(5):467–9.

Thomas 1990

Thomas JE, Whatmore AM, Barer MR, Eastham EJ, Kehoe MA. Serodiagnosis of *Helicobacter pylori* infection in childhood. *Journal of Clinical Microbiology* 1990; **28**(12): 2641–6.

Thomas 1999

Thomas JE, Dale A, Harding M, Coward WA, Cole TJ, Sullivan PB, et al. Interpreting the c-13-urea breath test among a large population of young children from a developing country. *Pediatric Research* 1999; **46**(2):147–51.

Thongbai 2007

Thongbai T, Thong-Ngam D, Mahachai V, Kullavanijaya P. Effect of antiulcer drugs used on the detection of *Helicobacter pylori* using urea breath test. *Helicobacter* 2007; **12**(4):443.

Tindberg 2001

Tindberg Y, Bengtsson C, Bergstrom M, Granstrom M. Phe accuracy of serologic diagnosis of *Helicobacter pylori*

- infection in school-aged children of mixed ethnicity. *Helicobacter* 2001;**6**(1):24–30.
- Tinnert 1998**
Tinnert A, Hamlet A, Svennerholm AM. Antibodies against *Helicobacter pylori* in feces and saliva before and after eradication therapy. *Clinical Microbiology and Infection* 1998;**4**(11):634–43.
- Tiryaki 2010**
Tiryaki Z, Yilmaz-Ciftcioglu D, Kasirga E. Diagnostic value of stool antigen and antibody tests for *Helicobacter pylori* infection in Turkish children with upper gastrointestinal complaints before and after eradication. *Turkish Journal of Pediatrics* 2010;**52**(5):505–11.
- Togashi 2006**
Togashi A, Matsukura N, Kato S, Masuda G, Ohkawa K, Tokunaga A, et al. Simple and accurate c-13-urea breath test for detection of *Helicobacter pylori* in the remnant stomach after surgery. *Journal of Gastroenterology* 2006;**41**(2):127–32.
- Tokunaga 1998**
Tokunaga Y, Shirahase H, Yamamoto E, Gouda Y, Kanaji K, Ohsumi K. Semiquantitative evaluation for diagnosis of *Helicobacter pylori* infection in relation to histological changes. *American Journal of Gastroenterology* 1998;**93**(1):26–9.
- Tokunaga 2000**
Tokunaga Y, Shirahase H, Yamamoto E, Inao R, Hamaguchi S, Kanaji K, et al. Modified rapid urease test for *Helicobacter pylori* detection in relation to an immunohistochemical stain. *Journal of Gastroenterology and Hepatology* 2000;**15**(6):617–21.
- Tokunaga 2005**
Tokunaga K, Watanabe K, Tanaka A, Sugano H, Imase K, Ishida H, et al. Evaluation of ¹³C-urea breath test to confirm eradication of *Helicobacter pylori*. *Japanese Journal of Gastroenterology* 2005;**102**(2):176–82.
- Toporowska-Kowalska 2005**
Toporowska-Kowalska E, Wasowska-Krolukowska K, Kurnatowski M, Gebora-Kowalska B. Clinical applicability of non-invasive testing of *Helicobacter pylori* infection in children - stool antigen (HPSA) and urea breath test. *Pediatrica Wspolczesna* 2005;**7**(3):177–9.
- Tormo 2013**
Tormo R. Urea c-13 test is not enough to diagnose a *Helicobacter pylori* infection. *Journal of Pediatric Gastroenterology and Nutrition* 2013;**56**(6):e53.
- Torres 2001**
Torres J, Camorlinga M, Perez-Perez G, Gonzalez G, Muñoz O. Validation of the string test for the recovery of *Helicobacter pylori* from gastric secretions and correlation of its results with urea breath test results, serology, and gastric pH levels. *Journal of Clinical Microbiology* 2001;**39**(4):1650–1.
- Toyama 1999**
Toyama J, Kato C, Sato K, Sato S. The ¹³C-urea breath test efficacy in determining *Helicobacter pylori* eradication. *Nihon Rinsho [Japanese Journal of Clinical Medicine]* 1999;**57**(1):93–6.
- Trautmann 1994**
Trautmann M, Moldrzyk M, Vogt K, Korber J, Held T, Marre R. Use of a receiver operating characteristic in the evaluation of two commercial enzyme immunoassays for detection of *Helicobacter pylori* infection. *European Journal of Clinical Microbiology & Infectious Diseases* 1994;**13**(10):812–9.
- Treiber 2000**
Treiber G, Malfertheiner P. Usefulness of serology for diagnosis and follow-up of h.pylori infection - comparison of third vs. second generation ELISA. *Gastroenterology* 2000;**118**(4 Part 2):A1316.
- Trevisani 1998**
Trevisani L, Sartori S, Galvani F, Rossi MR, Ruina M, Caselli M. Detection of *Helicobacter pylori* in faeces with a new enzyme immunoassay method: Preliminary results. *Scandinavian Journal of Gastroenterology* 1998;**33**(8):893–4.
- Trevisani 1999a**
Trevisani L, Sartori S, Ruina M, Caselli M, Rossi MR, Costa F, et al. *Helicobacter pylori* stool antigen test - clinical evaluation and cost analysis of a new enzyme immunoassay. *Digestive Diseases and Sciences* 1999;**44**(11):2303–6.
- Trevisani 1999b**
Trevisani L, Sartori S, Galvani F, Rossi MR, Ruina M, Chiamenti C, et al. Evaluation of a new enzyme immunoassay for detecting *Helicobacter pylori* in feces: A prospective pilot study. *American Journal of Gastroenterology* 1999;**94**(7):1830–3.
- Trevisani 2002**
Trevisani L, Sartori S. The accuracy of the *Helicobacter pylori* stool antigen test in diagnosing h-pylori in treated patients. *European Journal of Gastroenterology & Hepatology* 2002;**14**(1):89.
- Tseng 2005**
Tseng CA, Wang WM, Wu DC. Comparison of the clinical feasibility of three rapid urease tests in the diagnosis of *Helicobacter pylori* infection. *Digestive Diseases and Sciences* 2005;**50**(3):449–52.
- Tu 1999**
Tu TC, Lee CL, Wu CH, Chen TK, Chan CC, Huang SH, et al. Comparison of invasive and noninvasive tests for detecting *Helicobacter pylori* infection in bleeding peptic ulcers. *Gastrointestinal Endoscopy* 1999;**49**(3 1):302–6.
- Tucci 1996**
Tucci A, Poli L, Donati M, Mazzoni C, Cevenini R, Sambri V, et al. Value of serology (ELISA) for the diagnosis of *Helicobacter pylori* infection: evaluation in patients attending endoscopy and in those with fundic atrophic gastritis. *Italian Journal of Gastroenterology* 1996;**28**(7):371–6.
- Tummala 2007**
Tummala S, Sheth SG, Goldsmith JD, Goldar-Najafi A, Murphy CK, Osburne MS, et al. Quantifying gastric

- Helicobacter pylori infection: A comparison of quantitative culture, urease breath testing, and histology. *Digestive Diseases & Sciences* 2007;**52**(2):396–401.
- Uchida 2011**
Uchida T, Vilaichone R, Ratanachu-Ek T, Mahachai V, Tshering L, Fujioka T, et al. Evaluation of diagnostic tests for h. Pylori infection in the Bhutanese population. *Helicobacter* 2011;**16**:114.
- Ueda 2014**
Ueda J, Okuda M, Nishiyama T, Lin YS, Fukuda Y, Kikuchi S. Diagnostic accuracy of the e-plate serum antibody test kit in detecting Helicobacter pylori infection among Japanese children. *Journal of Epidemiology* 2014;**24**(1):47–51.
- Uematsu 2002**
Uematsu T, Matsuno H, Tanba M, Kozawa O, Ikei N, Kawasaki J, et al. Clinical pharmacology study of c-13 ubt tablet for the in vivo diagnosis of Helicobacter pylori infection. *Japanese Journal of Clinical Pharmacology and Therapeutics* 2002;**33**(3):81–4.
- Urita 2000**
Urita Y, Miki K. Endoscopic ¹³C-urea breath test. *Digestive Endoscopy* 2000;**12**(1):29–32.
- Urita 2002**
Urita Y, Torii N, Hike K, Kikuchi Y, Kanda E, Sasajima M, et al. Proteinuria reduces the diagnostic accuracy of urine-based enzyme-linked immunosorbent assay for detection of antibody to Helicobacter pylori. *American Journal of Gastroenterology* 2002;**97**(9):S49.
- Urita 2004a**
Urita Y, Hike K, Torii N, Kikuchi Y, Kurakata H, Kanda E, et al. Comparison of serum iga and igg antibodies for detecting Helicobacter pylori infection. *Internal Medicine* 2004;**43**(7):548–52.
- Urita 2004b**
Urita Y, Kikuchi Y, Hike K, Torii N, Kanda E, Kurakata H, et al. Endoscopic ¹³C-urea breath test for detection of Helicobacter pylori infection after partial gastrectomy. *Gastrointestinal Endoscopy* 2004;**59**(5):AB153.
- Urita 2004c**
Urita Y, Hike K, Torii N, Kikuchi Y, Kanda E, Kurakata H, et al. Breath sample collection through the nostril reduces false-positive results of c-13-urea breath test for the diagnosis of Helicobacter pylori infection. *Digestive and Liver Disease* 2004;**36**(10):661–5.
- Urita 2006**
Urita Y, Hike K, Torii N, Kikuchi Y, Kanda E, Kurakata H, et al. Influence of urease activity in the intestinal tract on the results of c-13-urea breath test. *Journal of Gastroenterology and Hepatology* 2006;**21**(4):744–7.
- Urita 2007a**
Urita Y, Maeda T, Ishihara S, Sugimoto M, Watanabe T, Domon K, et al. Endoscopic c-13-urea breath test for detection of Helicobacter pylori infection after partial gastrectomy. *Hepato-Gastroenterology* 2007;**54**(78):1891–4.
- Urita 2007b**
Urita Y, Hike K, Torii N, Kikuchi Y, Watanabe T, Kurakata H, et al. Ten-second endoscopic breath test using a 20-mg dose of c-13-urea to detect Helicobacter pylori infection. *Hepato-Gastroenterology* 2007;**54**(75):951–4.
- Us 2002**
Us D, Engin D, Hascelik G. Evaluation of western blot methods for serologic diagnosis of Helicobacter pylori infections. *Mikrobiyoloji Bulteni* 2002;**36**(2):153–60.
- Uyub 1994**
Uyub AM, Anuar AK, Aiyar S. Reliability of two commercial serological kits for serodiagnosing Helicobacter pylori infection. *Southeast Asian Journal of Tropical Medicine & Public Health* 1994;**25**(2):316–20.
- Vafaeimanesh 2014**
Vafaeimanesh J, Bagherzadeh M. Noninvasive stool antigen assay for screening of Helicobacter pylori infection and assessing success of eradication therapy in patients on hemodialysis. *Journal of Gastroenterology and Hepatology (Australia)* 2014;**29**:236.
- Vaira 1989**
Vaira D, Holton J. Serum immunoglobulin g antibody levels for campylobacter pylori diagnosis. *Gastroenterology* 1989;**97**(4):1069–70.
- Vaira 1996**
Vaira D, Stanghellini V, Miglioli M, Corinaldesi R. IgG ELISA antibodies and detection of Helicobacter pylori in elderly patients. Italian Helicobacter pylori Study Group. *Lancet* 1996;**347**(8996):269–70.
- Vaira 1999a**
Vaira D, Malferteiner P, Megraud F, Axon AT. Diagnosis of Helicobacter pylori infection by HPSA test. European Helicobacter pylori HPSA study group. *Lancet* 1999;**354**(9191):1732.
- Vaira 1999b**
Vaira D, Malferteiner P, Megraud F, Axon AT, Deltenre M, Hirschl AM, et al. Diagnosis of Helicobacter pylori infection with a new non-invasive antigen-based assay. Hpsa European Study Group. *Lancet* 1999;**354**(9172):30–3.
- Vaira 1999c**
Vaira D, Malferteiner P, Megraud F, Moayyedi P, Axon AT, Deltenre M, et al. Accuracy of a new antigen based stool test for Helicobacter pylori (hp) in 117 endoscoped patients before and after treatment. European Multicentre Study. *Gut* 1999;**44**(Suppl 3):A96.
- Vaira 2000a**
Vaira D, Menegatti M, Ricci C, Gatta L, Berardi S, Miglioli M. Accurate diagnosis of Helicobacter pylori stool tests. *Gastroenterology Clinics of North America* 2000;**29**(4): 917–23.
- Vaira 2000b**
Vaira D, Ricci C, Menegatti M, Gatta L, Geminiani A, Miglioli M. Clinical role of fecal antigen determination in the diagnosis of Helicobacter pylori infection. *Clinical Laboratory* 2000;**46**(9-10):487–91.

Vaira 2000c

Vaira D, Malfertheiner P, Megraud F, Axon AT, Deltenre M, Gasbarrini G, et al. Noninvasive antigen-based assay for assessing *Helicobacter pylori* eradication: A European multicenter study. The European *Helicobacter pylori* HPSA Study Group. *American Journal of Gastroenterology* 2000;**95**(4):925–9.

Vaira 2002

Vaira D, Vakil N, Menegatti M, Van't Hoff B, Ricci C, Gatta L, et al. The stool antigen test for detection of *Helicobacter pylori* after eradication therapy [summary for patients in *Annals of Internal Medicine*. feb 19 2002;136(4):I36; pmid: 11848739]. *Annals of Internal Medicine* 2002;**136**(4):280–7.

Vaira 2009

Vaira D, Gatta L, Ricci C, Di Mario F, Lanzini A. Accuracy of urea breath tests tablets after 10 minutes compared with standard 30 minutes to diagnose and monitoring *Helicobacter pylori* infection: A randomized controlled trial. *Journal of Clinical Gastroenterology* 2009;**43**(7):693–4.

Vaira 2010a

Vaira D, Vakil N, Gatta L, Ricci C, Perna F, Saracino I, et al. Accuracy of a new ultrafast rapid urease test to diagnose *Helicobacter pylori* infection in 1000 consecutive dyspeptic patients. *Alimentary Pharmacology & Therapeutics* 2010;**31**(2):331–8.

Vaira 2010b

Vaira D, Gatta L, Ricci C, Perna F, Saracino I, Fiorini G, et al. A comparison amongst three rapid urease tests to diagnose *Helicobacter pylori* infection in 375 consecutive dyspeptic. *Internal & Emergency Medicine* 2010;**5**(1):41–7.

Vakil 1999

Vakil N, Affi A, Sundaram M, Robinson J, Dunn B, Phadnis S. Prospective, blinded evaluation of the accuracy of a stool test for the detection of h-pylori. *Gastroenterology* 1999;**116**(4 (suppl)):A342.

Vakil 2000a

Vakil N, Affi A, Robinson J, Sundaram M, Phadnis S. Prospective blinded trial of a fecal antigen test for the detection of *Helicobacter pylori* infection. *American Journal of Gastroenterology* 2000;**95**(7):1699–701.

Vakil 2000b

Vakil N. Is the stool test out of breath?. *Digestive & Liver Disease* 2000;**32**(4):291–3.

Valdeperez 2003

Valdeperez J, Vicente R, Novella MP, Valle L, Sicilia B, Yus C, et al. Is the breath test reliable in primary care diagnosis of *Helicobacter pylori* infection?. *Atencion Primaria* 2003;**31**(2):93–7.

Valentine 1991

Valentine JL, Arthur RR, Mobley HLT, Dick JD. Detection of *Helicobacter-pylori* by using the polymerase chain-reaction. *Journal of Clinical Microbiology* 1991;**29**(4):689–95.

Valle 1997

Valle J, Vazquez MA, Zomeno M, FernandezSalazar L, JimenezAlonso I, Lara S, et al. Direct correlation between the c-13-urea breath test values and the density of *Helicobacter pylori* in antrum biopsies. *Gut* 1997;**41**:A87.

Valle 2013

Valle PC, Breckan RK, Mortensen L, Amin A, Kildahl-Andersen O, Paulssen EJ. Managing dyspepsia in the young adult patient: Effects of different tests for *Helicobacter pylori* in a "test-and-scope" approach. *Scandinavian Journal of Gastroenterology* 2013;**48**(8):913–20.

Van Bohemen 1988

Van Bohemen CG, Langenberg ML, Rauws EAJ, Weterings E, Zanen HC. Assay-igg to campylobacter pylori in histological chronic and biopsy campylobacter positive gastritis. *FEMS Microbiology Letters* 1988;**55**(3):321–6.

Van Bohemen 1989

Van Bohemen CG, Langenberg ML, Rauws EAJ, Oudbier J, Weterings E, Zanen HC. Rapidly decreased serum igg to campylobacter pylori following elimination of campylobacter in histological chronic biopsy campylobacter-positive gastritis. *Immunology Letters* 1989;**20**(1):59–61.

Van de Wouw 1995

Van de Wouw BA, De Boer WA, Jansz AR, Staals AP, Roymans RT. Serodiagnosis of *Helicobacter pylori* infection: an evaluation of a commercially available ELISA-IgG. *Netherlands Journal of Medicine* 1995;**47**(6):272–7.

Van de Wouw 1996

Van de Wouw BA, De Boer WA, Jansz AR, Roymans RT, Staals AP. Comparison of three commercially available enzyme-linked immunosorbent assays and biopsy-dependent diagnosis for detecting *Helicobacter pylori* infection. *Journal of Clinical Microbiology* 1996;**34**(1):94–7.

Van de Wouw 1997

Van de Wouw BA, De Boer WA, Hermesen HW, Valkenburg JG, Geuskens LM, Tytgat GN. Usefulness of the 14c urea breath test as a semi-quantitative monitoring instrument after therapy for *Helicobacter pylori* infection. *Scandinavian Journal of Gastroenterology* 1997;**32**(2):112–7.

Van Den 1991

Van Den Oever HLA, Loffeld RJLF, Stobberingh EE. Usefulness of a new serological test (bio-rad) to diagnose *Helicobacter pylori*-associated gastritis. *Journal of Clinical Microbiology* 1991;**29**(2):283–6.

Van Der Ende 1999

Van Der Ende A, Van Der Hulst RWM, Roorda P, Tytgat GNJ, Dankert J. Evaluation of three commercial serological tests with different methodologies to assess *Helicobacter pylori* infection. *Journal of Clinical Microbiology* 1999;**37**(12):4150–2.

Van der Est 1990

Van der Est MMC, Veenendaal RA, Pena AS, Van Duijn W, Kuiper I, Lamers CBHW. ELISA analysis of IgA subclass antibodies to *Helicobacter pylori*. Elevated serum IgA1 antibodies in *Helicobacter pylori* infected patients.

- Journal of Clinical Nutrition and Gastroenterology* 1990;**5**(1): 185–90.
- Van Der Hulst 1999**
Van Der Hulst RWM, Lamouliatte H, Megraud F, Pounder RE, Stolte M, Vaira D, et al. Laser assisted ratio analyser ¹³C-urea breath testing, for the detection of H. pylori: A prospective diagnostic European multicentre study. *Alimentary Pharmacology & Therapeutics* 1999;**13**(9): 1171–7.
- Van der Hulst 1999**
Van der Hulst RW, Hensen EF, Van der Ende A, Kruizinga SP, Homan A, Tytgat GN. Laser-assisted ¹³C-urea breath test; a new noninvasive detection method for Helicobacter pylori infection. *Nederlands Tijdschrift voor Geneeskunde* 1999;**143**(8):400–4.
- Van der Voort 1998**
Van der Voort PHJ, Van der Hulst RWM, Zandstra DF, Geraedts AAM, Tytgat GNJ. Detection of h-pylori in mechanically ventilated intensive care patients using the lara-c-¹³C-urea breath test. *Gastroenterology* 1998;**114**(4 (suppl)):A319.
- Van der Voort 1999**
Van der Voort PHJ, Van der Hulst RWM, Zandstra DF, Van der Ende A, Geraedts AAM, Tytgat GNJ. Detection of Helicobacter pylori in mechanically ventilated patients: The lara-¹³C-urea breath test and serology. *Clinical Intensive Care* 1999;**10**(3):91–5.
- Van der Wouden 1999**
Van der Wouden ET, Thijs JC, Van Zwet AA, Oey HB, Kleibeuker JH. Reliability of biopsy-based diagnostic tests for Helicobacter pylori after treatment aimed at its eradication. *European Journal of Gastroenterology & Hepatology* 1999;**11**(11):1255–8.
- Van Doorn 2000**
Van Doorn LJ, Henskens Y, Nouhan N, Verschuuren A, Vreede R, Herbink P, et al. The efficacy of laboratory diagnosis of Helicobacter pylori infections in gastric biopsy specimens is related to bacterial density and vacA, cagA, and iceA genotypes. *Journal of Clinical Microbiology* 2000;**38**(1):13–7.
- Van Doorn 2001**
Van Doorn OJ, Bosman DK, Van THBW, Taminiau JA, Ten Kate FJ, Van der Ende A. Helicobacter pylori stool antigen test: A reliable non-invasive test for the diagnosis of Helicobacter pylori infection in children. *European Journal of Gastroenterology & Hepatology* 2001;**13**(9):1061–5.
- Van Leerdam 2002**
Van Leerdam ME, Van der Ende A, Ten Kate F, Rauws EAJ, Tytgat GNJ. Lack of accuracy of the non-invasive Helicobacter pylori stool antigen test in patients with gastroduodenal ulcer bleeding. *Gastroenterology* 2002;**122**(4 (suppl)):A46.
- Van Leerdam 2003**
Van Leerdam ME, Van der Ende A, Ten Kate FJW, Rauws EAJ, Tytgat GNJ. Lack of accuracy of the noninvasive Helicobacter pylori stool antigen test in patients with gastroduodenal ulcer bleeding. *American Journal of Gastroenterology* 2003;**98**(4):798–801.
- Van Zanten 1998**
Van Zanten SV, Bleau BL, Best L, Hutchison D, Blevins J, Thee D. Use of the Helicobacter pylori stool antigen test (HPSAt) for detection of h-pylori (hp) infection. *Gut* 1998;**43**(Suppl 2):A49.
- Van Zanten 1999**
Van Zanten S, Bleau BL, Best LM, Hutchison DM, Blevins J, Thee D. Helicobacter pylori stool antigen test (HPSA): Use for detection of infection and eradication. *Gastroenterology* 1999;**116**(4 (suppl)):A837.
- Van Zwet 1992**
Van Zwet AA, Meyer BC, Berrelkamp RJ, Thijs JC. Serological tests to monitor treatment of Helicobacter pylori. *Lancet* 1992;**340**(8810):51.
- Van Zwet 1994**
Van Zwet AA, Thijs JC, Kooistra-Smid AMD, Schirm J, Snijder JAM. Use of PCR with feces for detection of Helicobacter pylori infections in patients. *Journal of Clinical Microbiology* 1994;**32**(5):1346–8.
- Van't Hoff 2000**
Van't Hoff BW, Vaira D, Vakil NB, Gasbarrini G, Quina M, Garcia JMP, et al. Early diagnosis of failed Helicobacter pylori (hp) eradication using a stool antigen test. *Gastroenterology* 2000;**118**(4):A697.
- Vannella 2009**
Vannella L, Gianni D, Lahner E, Amato A, Grossi E, Delle Fave G, et al. Pre-endoscopic screening for Helicobacter pylori and celiac disease in young anemic women. *World Journal of Gastroenterology* 2009;**15**(22):2748–53.
- Vargas 2013**
Vargas J, Lopez-Sanchez M, Pabon M, Lamas E, Parra M, CastroFernandez M. Evaluation of a novel chemiluminiscent immunoassay for the detection of Helicobacter pylori antigen and their correlation with immunochromatographic rapid test in stools samples from adults patients. *Helicobacter* 2013;**18**:121.
- Vaz Coelho 2005**
Vaz Coelho LG, De Castro Boechat L, Rocha Z, Almeida Aguiar RO, Andrade Aragao AL, Silva Dias EE, et al. ¹³C-urea breath test for the detection of h. pylori infection in children: determination of the cut-off point by a graphic method not depending on the gold standard. *Gastroenterologia Endoscopia Digestiva* 2005;**24**(1):15–20.
- Vecsei 2010**
Vecsei A, Innerhofer A, Binder C, Gizci H, Hammer K, Bruckdorfer A, et al. Stool polymerase chain reaction for Helicobacter pylori detection and clarithromycin susceptibility testing in children. *Clinical Gastroenterology & Hepatology* 2010;**8**(3):309–12.
- Veenendaal 1995**
Veenendaal RA, Gotz JM, Schroyen V, Kurban F, Bernards AT, Veselic M, et al. Diagnosis of Helicobacter pylori infection by specific gastric mucosal iga and igg pylori

- antibodies. *Journal of Clinical Pathology* 1995;**48**(11): 990–3.
- Veijola 2005a**
Veijola L, Myllyluoma E, Korpela R, Rautelin H. Stool antigen tests in the diagnosis of *Helicobacter pylori* infection before and after eradication therapy. *World Journal of Gastroenterology* 2005;**11**(46):7340–4.
- Veijola 2005b**
Veijola L, Oksanen A, Lofgren T, Sipponen P, Karvonen AL, Rautelin H. Comparison of three stool antigen tests in confirming *Helicobacter pylori* eradication in adults. *Scandinavian Journal of Gastroenterology* 2005;**40**(4): 395–401.
- Veijola 2008**
Veijola L, Oksanen A, Sipponen P, Rautelin H. Evaluation of a commercial immunoblot, helicoblot 2.1, for diagnosis of *Helicobacter pylori* infection. *Clinical & Vaccine Immunology: CVI* 2008;**15**(11):1705–10.
- Velayos 2012**
Velayos B, Fernandez-Salazar L, Pons-Renedo F, Muñoz MF, Almaraz A, Aller R, et al. Accuracy of urea breath test performed immediately after emergency endoscopy in peptic ulcer bleeding. *Digestive Diseases & Sciences* 2012;**57**(7):1880–6.
- Veldhuyzen 1990**
Veldhuyzen van Zanten SJO, Tytgat KMAJ, Hollingsworth J, Jalali S, Rashid FA, Bowen BM, et al. ¹⁴C-urea breath test for the detection of *Helicobacter pylori*. *American Journal of Gastroenterology* 1990;**85**(4):399–403.
- Veldhuyzen 1991**
Veldhuyzen van Zanten SJO, Tytgat DeGara KMAJCJ, Goldie J, Rashid FA, Bowen BM, Cook RJ, et al. A prospective comparison of symptoms and five diagnostic tests in patients with *Helicobacter pylori* positive and negative dyspepsia. *European Journal of Gastroenterology & Hepatology* 1991;**3**(6):463–8.
- Vesna 2005**
Vesna Vukadinovic M, Prohaska Potocnik C. Specific igg decline after successful treatment of *Helicobacter pylori* infection according to treatment protocol with azithromycin. *Infektoloski Glasnik* 2005;**25**(4):137–42.
- Vincent 1999**
Vincent P, Michaud L, Martin de Lasalle E, Benon B, Turck D, Gottrand F. ¹³C-urea breath test and gastric mucosal colonization by *Helicobacter pylori* in children: Quantitative relation and usefulness for diagnosis of infection. *Helicobacter* 1999;**4**(4):233–7.
- Vinette 2004**
Vinette KMB, Gibney KM, Proujansky R, Fawcett PT. Comparison of PCR and clinical laboratory tests for diagnosing h-pylori infection in pediatric patients. *BMC Microbiology* 2004;**4**:5.
- Vivas 1993**
Vivas J, Contreras M, Mathew C, Peraza S, Maury de Tami I, Oliver W, et al. The use of urea carbon 14 in breath tests as diagnostic method for *Helicobacter pylori* infections. *GEN* 1993;**47**(3):150–6.
- Von Wulffen 1988a**
Von Wulffen H, Grote HJ, Laufs R. Serodiagnosis of campylobacter pylori-related antrum gastritis by ELISA and immunoblot methods. *Zentralblatt für Bakteriologie, Mikrobiologie, und Hygiene. Series A, Medical Microbiology, Infectious Diseases, Virology, Parasitology* 1988;**268**(4):499.
- Von Wulffen 1988b**
Von Wulffen H, Grote HJ. Enzyme-linked immunosorbent assay for detection of immunoglobulin a and g antibodies to campylobacter pylori. *European Journal of Clinical Microbiology & Infectious Diseases* 1988;**7**(4):559–65.
- Von Wulffen 1989**
Von Wulffen H, Grote HJ. Serodiagnosis of campylobacter pylori infection using an enzyme-linked immunosorbent assay. Gastrointestinal pathology and Campylobacter pylori: European Campylobacter Pylori Study Group ICS847. 1989:231–6.
- Von Wulffen 1993**
Von Wulffen H, Gatermann S, Windler E, Gabbe E, Heinrich HC. Performance of *Helicobacter pylori* acid extract and urease enzyme-linked immunosorbent assays in relation to ¹⁴C-urea breath test. *Zentralblatt für Bakteriologie* 1993;**280**(1-2):203–13.
- Vorobjova 1991**
Vorobjova T, Maaroos HI, Uibo R, Wadstrom T, Wood WG, Sipponen P. *Helicobacter pylori*: Histological and serological study on gastric and duodenal ulcer patients in Estonia. *Scandinavian Journal of Gastroenterology - Supplement* 1991;**186**:84–9.
- Vyas 1994**
Vyas SK, Sharpstone D, Treasure J, Fine D, Hawtin PR. Pre-endoscopy screening using serodiagnosis of *Helicobacter pylori* infection. *European Journal of Gastroenterology & Hepatology* 1994;**6**(9):783–5.
- Wadstrom 1994**
Wadstrom T, Bolin I, Fandriks L, Gad A, Carling L. Diagnosis of *Helicobacter pylori* infection. *Lakartidningen* 1994;**91**(19):1926–7.
- Wallace 2006**
Wallace RA, Schluter P, Webb P. Stool antigen testing for the diagnosis and confirmation of eradication of *Helicobacter pylori* infection. *Internal Medicine Journal* 2006;**36**(2): 139–41.
- Wang 1998**
Wang WM, Lee SC, Ding HJ, Jan CM, Chen LT, Wu DC, et al. Quantification of *Helicobacter pylori* infection: Simple and rapid c-13-urea breath test in Taiwan. *Journal of Gastroenterology* 1998;**33**(3):330–5.
- Wang 2000**
Wang WM, Lee SC, Wu DC, Chen LT, Liu CS, Peng CF, et al. Simplified ¹³C-urea breath test for the diagnosis of *Helicobacter pylori* infection—the availability of without fasting and without test meal. *Kaohsiung Journal of Medical Sciences* 2000;**16**(12):607–13.

Wang 2001

Wang YL, Sheu BS, Huang JJ, Yang HB. Noninvasive stool antigen assay can effectively screen *Helicobacter pylori* infection and assess success of eradication therapy in hemodialysis patients. *American Journal of Kidney Diseases* 2001;**38**(1):98–103.

Wang 2002

Wang L, Zhou L, Tian R. *Helicobacter pylori* antigen and its iga, iga-type specific immunocomplexes in sera from patients with *Helicobacter pylori* infection. *Chinese Medical Journal* 2002;**115**(3):381–3.

Wang 2003

Wang SW, Yu FJ, Lo YC, Yang YC, Wu MT, Wu IC, et al. The clinical utility of string-PCR test in diagnosing *Helicobacter pylori* infection. *Hepato-Gastroenterology* 2003;**50**(53):1208–13.

Wang 2015a

Wang H, Zou WJ. Comparison of different methods for detecting *Helicobacter pylori*. *World Chinese Journal of Digestology* 2015;**23**(3):525–9.

Wang 2015b

Wang Z, Xie L, Liu C, Zhao H. Reliability of stool antigen test for clinical diagnosis of *Helicobacter pylori* infection. *Chinese Journal of Gastroenterology* 2015;**20**(2):78–80.

Watanabe 2001

Watanabe K, Joh T, Seno K, Sasaki M, Todoroki I, Miyashita M, et al. Development and clinical application of an immunoassay using intact *Helicobacter pylori* attached to a solid phase as an antigen. *Clinical Biochemistry* 2001;**34**(4):291–5.

Watanabe 2013

Watanabe K, Nagata N, Shimbo T, Nakashima R, Furuhashi E, Sakurai T, et al. Accuracy of endoscopic diagnosis of *Helicobacter pylori* infection according to level of endoscopic experience and the effect of training. *BMC Gastroenterology* 2013;**13**:128.

Weijnen 2001a

Weijnen CF, De Wit NJ, Numans ME, Kuipers EJ, Hoes AW, Verheij TJM. *Helicobacter pylori* testing in the primary care setting: Which diagnostic test should be used? *Alimentary Pharmacology and Therapeutics* 2001;**15**(8):1205–10.

Weijnen 2001b

Weijnen CF, Hendriks HA, Hoes AW, Verweij WM, Verheij TJM, De Wit NJ. New immunoassay for the detection of *Helicobacter pylori* infection compared with urease test, c-13 breath test and histology: Validation in the primary care setting. *Journal of Microbiological Methods* 2001;**46**(3):235–40.

Weingart 2003

Weingart V, Ruessmann H, Koletzko S, Weingart J, Hoechter W, Sackmann M. A novel monoclonal stool antigen test for the detection of h. Pylori before and after eradication therapy: A prospective study in outpatients. *Gastroenterology* 2003;**124**(4 (suppl)):A177.

Weingart 2004

Weingart V, Russmann H, Koletzko S, Weingart J, Hoechter W, Sackmann M. Sensitivity of a novel stool antigen test for detection of *Helicobacter pylori* in adult outpatients before and after eradication therapy. *Journal of Clinical Microbiology* 2004;**42**(3):1319–21.

Werdmuller 1998

Werdmuller BFM, Van der Putten A, Veenendaal RA, Lamers C, Loffeld R. Can screening for iga antibodies against *Helicobacter pylori* be used in clinical practice? Omit endoscopy in seropositive or seronegative patients? *Digestive Diseases and Sciences* 1998;**43**(10):2296–300.

Westblom 1992

Westblom TU, Madan E, Gudipati S, Midkiff BR, Czinn SJ. Diagnosis of *Helicobacter pylori* infection in adult and pediatric patients by using Pyloriset, a rapid latex agglutination test. *Journal of Clinical Microbiology* 1992;**30**(1):96–8.

Westblom 1999

Westblom TU, Bhatt BD. Diagnosis of *Helicobacter pylori* infection. *Current Topics in Microbiology & Immunology* 1999;**241**:215–35.

Whiting 2006

Whiting PF, Weswood ME, Rutjes AW, Reitsma JB, Bossuyt PN, Kleijnen J. Evaluation of QUADAS, a tool for the quality assessment of diagnostic accuracy studies. *BMC Medical Research Methodology* 2006;**6**:9.

Whiting 2011

Whiting PF, Rutjes AW, Westwood ME, Mallett S, Deeks JJ, Reitsma JB, et al. QUADAS-2: a revised tool for the quality assessment of diagnostic accuracy studies. *Annals of Internal Medicine* 2011;**155**(8):529–36.

Wilcox 1996

Wilcox MH, Dent THS, Hunter JO, Gray JJ, Brown DFJ, Wight DGD, et al. Accuracy of serology for the diagnosis of *Helicobacter pylori* infection - a comparison of eight kits. *Journal of Clinical Pathology* 1996;**49**(5):373–6.

Wildgrube 1995

Wildgrube HJ. C-12 urea breath test in *Helicobacter-pylori* infection of the gastric-mucosa. *Deutsche Medizinische Wochenschrift* 1995;**120**(25-26):940–1.

Wildner-Christensen 2002

Wildner-Christensen M, Lassen AT, Lindebjerg J, Schaffalitzky De Muckadell OB. Diagnosis of *Helicobacter pylori* in bleeding peptic ulcer patients, evaluation of urea-based tests. *Digestion* 2002;**66**(1):9–13.

Wilson 2008

Wilson RB, Lam VWT, Trinh LK. Clo test in *Helicobacter gastritis*. *ANZ Journal of Surgery* 2008;**78**(8):722.

Winiarski 2003a

Winiarski M, Bielanski W, Plonka M, Dobrzanska M, Kaminska A, Bobrzynski A, et al. The usefulness of capsulated ¹³C-urea breath test in diagnosis of *Helicobacter pylori* infection in patients with upper gastrointestinal bleeding.[erratum appears in Journal of

- Clinical Gastroenterology 2003;37(2):198]. *Journal of Clinical Gastroenterology* 2003;37(1):34–8.
- Winiarski 2003b**
Winiarski M, Bielanski W, Plonka M, Dobrzanska M, Kaminska A, Bobrzynski A, et al. Erratum: The usefulness of capsulated ¹³C-urea breath test in diagnosis of Helicobacter pylori infection in patients with upper gastrointestinal bleeding (Journal of Clinical Gastroenterology (2003) 37 (34-38)). *Journal of Clinical Gastroenterology* 2003;37(2):198.
- Wirthheim 2001**
Wirthheim E, Yahav J, Maoz E, Dickman R, Braun M, Fraser GM, et al. Evaluation of novel enzyme immunoassay for detection of Helicobacter pylori antigen in stool. *European Journal of Clinical Microbiology and Infectious Diseases* 2001; 20(4):293–4.
- Wisniewska 2002a**
Wisniewska M, Bak-Romaniszyn L, Planeta-Malecka I, Rechcinski T, Plonka M, Bielanski W, et al. The detection of Helicobacter pylori antigens in stool with premier platinum HPSA test. *Pediatrica Wspolczesna* 2002;4(3): 373–6.
- Wisniewska 2002b**
Wisniewska M, Nilsson HO, Bak-Romaniszyn L, Rechcinski T, Bielanski W, Planeta-Malecka I, et al. Detection of specific Helicobacter pylori DNA and antigens in stool samples in dyspeptic patients and healthy subjects. *Microbiology & Immunology* 2002;46(10):657–65.
- Wisniewska 2006**
Wisniewska M, Grebowska A, Rechcinski T, Bak-Romaniszyn L, Czkwanianc E, Planeta-Malecka I, et al. Usefulness of selected noninvasive tests in detection of Helicobacter pylori infections. *Gastroenterologia Polska* 2006;13(4):265–8.
- Witt 1990**
Witt CS, Anderson J, McShane LA, Montgomery JM, Stiel D, Clancy RL, et al. False positive with campylobacter-pylori antibody ELISA. Advances in mucosal immunology. Fifth international congress of mucosal immunology; July 1989; London. Dordrecht: Kluwer Academic, 1990:793–4. [250]
- Wong 1999**
Wong CY, Wong KW, Lam SK, Lai KC, Hu WHC, Lau GKK, et al. A simplified c13-urea breath test for detection of Helicobacter pylori (hp) infection. *Gastroenterology* 1999; 116(4 (suppl)):A356–A7.
- Wong 2000a**
Wong WM, Wong BC, Wong KW, Fung FM, Lai KC, Hu WH, et al. (13)c-urea breath test without a test meal is highly accurate for the detection of Helicobacter pylori infection in Chinese. *Alimentary Pharmacology & Therapeutics* 2000;14(10):1353–8.
- Wong 2000b**
Wong BC, Wong W, Tang VS, Lai K, Yuen S, Hu WH, et al. An evaluation of whole blood testing for Helicobacter pylori infection in the Chinese population. *Alimentary Pharmacology & Therapeutics* 2000;14(3):331–5.
- Wong 2000c**
Wong WM, Wong BCY, Wong KW, Fung FMY, Lai KC, Hu WHC, et al. C-13-urea breath test without a test meal is highly accurate for the detection of Helicobacter pylori infection in Chinese. *Alimentary Pharmacology & Therapeutics* 2000;14(10):1353–8.
- Wong 2001a**
Wong BC, Wong WM, Wang WH, Tang VS, Young J, Lai KC, et al. An evaluation of invasive and non-invasive tests for the diagnosis of Helicobacter pylori infection in Chinese. *Alimentary Pharmacology & Therapeutics* 2001;15 (4):505–11.
- Wong 2001b**
Wong WM, Wong BCY, Li TM, Wong KW, Cheung KL, Fung FMY, et al. Twenty-minute 50 mg c-13-urea breath test without test meal for the diagnosis of Helicobacter pylori infection in Chinese. *Alimentary Pharmacology & Therapeutics* 2001;15(9):1499–504.
- Wong 2003a**
Wong WM, Lam SK, Lai KC, Chu KM, Xia HHX, Wong KW, et al. A rapid-release 50-mg tablet-based c-13-urea breath test for the diagnosis of Helicobacter pylori infection. *Alimentary Pharmacology & Therapeutics* 2003;17(2):253–7.
- Wong 2003b**
Wong BCY, Xia HHX, Cheung HKL, Ng FH, Wong SY, Chow KC, et al. Evaluation of two stool antigen tests for the detection of Helicobacter pylori infection in the Chinese population. *Journal of Gastroenterology and Hepatology (Australia)* 2003;18(1):26–31.
- Wong 2003c**
Wong WM, Lam SK, Tong TSM, Cheung KL, Tang VSY, Xia HHX, et al. Evaluation of a rapid stool antigen test for the diagnosis of Helicobacter pylori infection in Chinese patients. *Chinese Journal of Digestive Diseases* 2003;4(3): 132–5.
- Wu 1992**
Wu JC, Liu GL, Zhang ZH, Mou YL, Chen Q, Wu JC, et al. (nh4+)-n-15 excretion test - a new method for detection of Helicobacter-pylori infection. *Journal of Clinical Microbiology* 1992;30(1):181–4.
- Wu 2001a**
Wu DC, Kuo CH, Lu CY, Su YC, Yu FJ, Lee YC, et al. Evaluation of an office-based urine test for detecting Helicobacter pylori: A prospective pilot study. *Hepato-Gastroenterology* 2001;48(39):614–7.
- Wu 2001b**
Wu S, Gao Q, Zhang D, Xiao S. 13C-urea breath test with infrared heterodyne ratiometry in the diagnosis of Helicobacter pylori infection. *Chinese Journal of Gastroenterology* 2001;6(4):206–8.
- Wu 2003**
Wu IC, Ke HL, Lo YC, Yang YC, Chuang CH, Yu FJ, et al. Evaluation of a newly developed office-based stool test

- for detecting *Helicobacter pylori*: An extensive pilot study. *Hepato-Gastroenterology* 2003;**50**(54):1761–5.
- Wu 2004**
Wu IC, Wu DC, Lu CY, Kuo CH, Su YC, Yu FJ, et al. Comparison of serum and urine ELISA methods for the diagnosis of *Helicobacter pylori* - a prospective pilot study. *Hepato-Gastroenterology* 2004;**51**(60):1736–41.
- Wu 2006a**
Wu DC, Wu IC, Wang SW, Lu CY, Ke HL, Yuan SSF, et al. Comparison of stool enzyme immunoassay and immunochromatographic method for detecting *Helicobacter pylori* antigens before and after eradication. *Diagnostic Microbiology and Infectious Disease* 2006;**56**(4): 373–8.
- Wu 2006b**
Wu IC, Wang SW, Yang YC, Yu FJ, Kuo CH, Chuang CH, et al. Comparison of a new office-based stool immunoassay and c-13-ubt in the diagnosis of current *Helicobacter pylori* infection. *Journal of Laboratory and Clinical Medicine* 2006; **147**(3):145–9.
- Wu 2013**
Wu Q, Yang ZP, Xu P, Gao LC, Fan DM. Association between *Helicobacter pylori* infection and the risk of colorectal neoplasia: a systematic review and meta-analysis. *Colorectal Disease* 2013;**15**(7):e352–64.
- Xia 2000a**
Xia HH, Kalantar JS, Wyatt JM, Adams S, Cheung K, Eslick GD, et al. High sensitivity and specificity of a laboratory-based serological test, pylori dtect ELISA, for detection of *Helicobacter pylori* infection. *Diagnostic Microbiology & Infectious Disease* 2000;**36**(2):69–74.
- Xia 2000b**
Xia HHX, Kalantar JS, Mitchell HM, Talley NJ. Can *Helicobacter pylori* serology still be applied as a surrogate marker to identify peptic ulcer disease in dyspepsia?. *Alimentary Pharmacology and Therapeutics* 2000;**14**(5): 615–24.
- Xia 2002**
Xia HHX, Wong BCY, Wong WM, Tang VSY, Cheung HKL, Sham FNF, et al. Optimal serological tests for the detection of *Helicobacter pylori* infection in the Chinese population. *Alimentary Pharmacology and Therapeutics* 2002;**16**(3):521–6.
- Xiao 1991**
Xiao SD, Pan ZJ, Zhang ZH, Jiang SJ. Enzyme-linked immunosorbent assay for detection of immunoglobulin g antibody against *Helicobacter pylori*. *Chinese Medical Journal* 1991;**104**(11):904–8.
- Xiao 2013**
Xiao M, Wang Y, Gao Y. Association between *Helicobacter pylori* infection and pancreatic cancer development: a meta-analysis. *PloS One* 2013;**8**(9):e75559.
- Xie 2008a**
Xie F, Luo N, Blackhouse G, Goeree R, Lee HP. Cost-effectiveness analysis of *Helicobacter pylori* screening in prevention of gastric cancer in Chinese. *International Journal of Technology Assessment in Health Care* 2008;**24**(1): 87–95.
- Xie 2008b**
Xie F, Luo N, Lee HP. Cost effectiveness analysis of population-based serology screening and 13C-urea breath test of *Helicobacter pylori* to prevent gastric cancer: A Markov model. *World Journal of Gastroenterology* 2008;**14** (19):3021–7.
- Xue 2001**
Xue FB, Xu YY, Wan Y, Pan BR, Ren J, Fan DM. Association of *H. pylori* infection with gastric carcinoma: a meta analysis. *World Journal of Gastroenterology* 2001;**7**(6): 801–4.
- Yachi 1991**
Yachi A, Yabana T, Imai K, Sugiyama T, Takayama Y, Yoshida H, et al. Novel ELISA for serodiagnosis of *Helicobacter-pylori* (campylobacter-pylori) infection-associated gastritis. *Frontiers of Mucosal Immunology* 1991; **939**:697–700.
- Yakoob 2008**
Yakoob J, Jafri W, Abbas Z, Abid S, Islam M, Ahmed Z. The diagnostic yield of various tests for *Helicobacter pylori* infection in patients on acid-reducing drugs. *Digestive Diseases and Sciences* 2008;**53**(1):95–100.
- Yakoob 2014**
Yakoob J, Abbas Z. Agreement between serology and histology for detection of *Helicobacter pylori* infection. *Journal of the College of Physicians & Surgeons - Pakistan* 2014;**24**(10):779–80.
- Yamakawa 1993**
Yamakawa O, Takemori Y, Noda Y, Ohta G. Availability of determination of serum anti-*Helicobacter pylori* igg antibody in diagnosis of *Helicobacter pylori* infection. *Japanese Journal of Gastroenterology* 1993;**90**(9):2090–6.
- Yamamoto 1995**
Yamamoto Y, Kouda M, Abe K, Sakurabayashi S, Sezai S, Hirano M, et al. Detection of *Helicobacter pylori* by culture and the 13C-urea breath test using an automated breath 13C analyzer. *Japanese Journal of Gastroenterology* 1995;**92**(11):1839–45.
- Yamamoto 1996**
Yamamoto Y, Koda M, Abe K, Sakurabayashi M, Sezai H, Hirano M, et al. The detection of *Helicobacter pylori* by the 13C-urea breath test (13C-ubt) using automated breath 13C analyser. *Nippon Shokakibyo Gakkai Zasshi [Japanese Journal of Gastroenterology]* 1996;**93**(1):68.
- Yamamoto 2000**
Yamamoto S, Uemura N, Okamoto S, Yamaguchi S, Mashiba H, Tachikawa T. A new rapid test for detecting anti-*Helicobacter pylori* antibody excreted into urine. *Helicobacter* 2000;**5**(3):160–4.
- Yamamoto 2003**
Yamamoto T, Tamura M, Ishii T, Anjiki H, Hattori K, Saitoh M, et al. Urinary antibody titers to *Helicobacter*

- pylori and an impact of clinical characteristics. *Journal of Clinical Gastroenterology* 2003;**36**(4):329–31.
- Yamamoto 2005**
Yamamoto T, Ishii T, Kawakami T, Sase Y, Horikawa C, Aoki N, et al. Reliability of urinary tests for antibody to *Helicobacter pylori* in patients with pulmonary tuberculosis. *World Journal of Gastroenterology* 2005;**11**(3):412–4.
- Yamamoto 2008**
Yamamoto T, Ishii T, Sanaka M, Kuyama Y. Diagnosis of *Helicobacter pylori* infection using rapirun h. Pylori antibody detection kit. *Expert Review of Molecular Diagnostics* 2008;**8**(5):565–9.
- Yamaoka 1998**
Yamaoka Y, Kodama T, Graham DY, Kashima K. Comparison of four serological tests to determine the caga or vaca status of *Helicobacter pylori* strains. *Journal of Clinical Microbiology* 1998;**36**(11):3433–4.
- Yamasaki 2004**
Yamasaki T, Kume K, Yamasaki M, Yoshikawa I, Otsuki M. Light meal decreased false-positive in the 13C-urea breath test for the diagnosis of *Helicobacter pylori* infection. *Gastroenterology* 2004;**126**(4 (suppl)):A187.
- Yamashiro 1995**
Yamashiro Y, Oguchi S, Otsuka Y, Nagata S, Shioya T, Shimizu T. *Helicobacter pylori* colonization in children with peptic ulcer disease iii. Diagnostic value of the 13C-urea breath test to detect gastric h. Pylori colonization. *Acta Paediatrica Japonica (Overseas Edition)* 1995;**37**(1):12–6.
- Yan 2010**
Yan J, Yamaguchi T, Odaka T, Suzuki T, Ohyama N, Hara T, et al. Stool antigen test is a reliable method to detect *Helicobacter pylori* in the gastric remnant after distal gastrectomy for gastric cancer. *Journal of Clinical Gastroenterology* 2010;**44**(1):73–4.
- Yanez 2000**
Yanez P, Madrazo-de la Graz A, Perez-Perez G, Cabrera L, Muñoz O, Torres J. Comparison of invasive and noninvasive methods for the diagnosis and evaluation of eradication of *Helicobacter pylori* infection in children. *Archives of Medical Research* 2000;**31**(4):415–21.
- Yang 2005**
Yang HR, Seo JK. Diagnostic accuracy of the c-13-urea breath test in children: Adjustment of the cut-off value according to age. *Journal of Gastroenterology and Hepatology* 2005;**20**(2):264–9.
- Yang 2007**
Yang YJ, Sheu BS, Lee SC, Wu JJ. More economic 25 mg c-13-urea breath test can be effective in detecting primary *Helicobacter pylori* infection in children. *Journal of Gastroenterology and Hepatology* 2007;**22**(3):335–9.
- Yang 2008a**
Yang HR, Seo JK. *Helicobacter pylori* stool antigen (HpSA) tests in children before and after eradication therapy: comparison of rapid immunochromatographic assay and HpSA ELISA. *Digestive Diseases & Sciences* 2008;**53**(8):2053–8.
- Yang 2008b**
Yang HR, Ko JS, Seo JK. Does the diagnostic accuracy of the 13C-urea breath test vary with age even after the application of urea hydrolysis rate?. *Helicobacter* 2008;**13**(4):239–44.
- Yang 2015**
Yang BL, Yeh C, Kwong WG, Lee SD. A novel one-step *Helicobacter pylori* saliva antigen test. *Journal of the Chinese Medical Association* 2015;**78**(2):96–100.
- Yasuda 2009**
Yasuda A, Uchida T, Nguyen LT, Kawazato H, Tanigawa M, Murakami K, et al. A novel diagnostic monoclonal antibody specific for *Helicobacter pylori* caga of east Asian type. *APMIS; Acta Pathologica, Microbiologica, et Immunologica Scandinavica* 2009;**117**(12):893–9.
- Ye 2005**
Ye WM, Held M, Enroth H, Kraaz W, Engstrand L, Nyren O. Histology and culture results among subjects with antibodies to caga but no evidence of *Helicobacter pylori* infection with IgG ELISA. *Scandinavian Journal of Gastroenterology* 2005;**40**(3):312–8.
- Ye 2014**
Ye CL, Liao GP, He S, Pan YN, Kang YB, Zhang ZY. Levofloxacin and proton pump inhibitor-based triple therapy versus standard triple first-line therapy for *Helicobacter pylori* eradication. *Pharmacoepidemiology and Drug Safety* 2014;**23**(5):443–55.
- Yee 2002**
Yee YK, Yip KT, Que TL, Chang KK, Li KF, Lee CK, et al. Efficacy of enzyme immunoassay for the detection of *Helicobacter pylori* antigens in frozen stool specimens: Local validation. *Alimentary Pharmacology and Therapeutics* 2002;**16**(10):1739–42.
- Yilmaz 2006**
Yilmaz O, Sen N, Kupelioglu AA, Simsel I. Detection of *h pylori* infection by ELISA and western blot techniques and evaluation of anti caga seropositivity in adult Turkish dyspeptic patients. *World Journal of Gastroenterology* 2006;**12**(33):5375–8.
- Yin 2015**
Yin SM, Zhang F, Shi DM, Xiang P, Xiao L, Huang YQ, et al. Effect of posture on c-13-urea breath test in partial gastrectomy patients. *World Journal of Gastroenterology* 2015;**21**(45):12888–95.
- Yokota 1990**
Yokota K, Oguma K, Yoshida H, Takayama Y, Sugiyama T, Yabana T, et al. Comparison of three methods for detecting campylobacter pylori and measurement of human antibody titers against the whole organisms. *Kansenshogaku Zasshi [Journal of the Japanese Association for Infectious Diseases]* 1990;**64**(5):597–603.
- Yong 2006**
Yong CS, Kim YI, Park SM, Kwon R, Han HH, Park JG, et al. Trials of novel c-13-urea-containing capsule for more

- economic and sensitive diagnosis of *Helicobacter pylori* infection in human subjects. *Archives of Pharmacal Research* 2006;**29**(10):879–83.
- Yoo 2007**
Yoo JY, Kim N, Park YS, Hwang JH, Kim JW, Jeong SH, et al. Detection rate of *Helicobacter pylori* against a background of atrophic gastritis and/or intestinal metaplasia. *Journal of Clinical Gastroenterology* 2007;**41**(8): 751–5.
- Yoshida 1993**
Yoshida J, Asaka M. 13C-urea breath test. *Nippon Rinsho [Japanese Journal of Clinical Medicine]* 1993;**51**(12): 3196–200.
- Yoshida 2000**
Yoshida H, Hirota K, Ogura K, Maeda S, Shiratori Y, Sasaki Y, et al. Determination of the optimal cut-off value for the c-13 -urea breath test based on a *Helicobacter pylori*-specific polymerase chain reaction assay. *Journal of Gastroenterology and Hepatology* 2000;**15**(2):155–60.
- Young 1995**
Young EL, Cutler AF. Use of the c-13 urea breath test to evaluate a new rapid urease test for *Helicobacter-pylori*. *Gastroenterology* 1995;**108**(4 (suppl)):A265.
- Young 1996**
Young EL, Sharma TK, Cutler AF. Prospective evaluation of a new urea-membrane test for the detection of *Helicobacter pylori* in gastric antral tissue. *Gastrointestinal Endoscopy* 1996;**44**(5):527–31.
- Zagari 1998**
Zagari RM, Pozzato P, Bazzoli F, Fossi S, Ricciardiello L, Nicolini G, et al. A comparative trial to optimize the protocol of the c-13 urea breath test for the diagnosis of *Helicobacter pylori* infection. *Gastroenterology* 1998;**114**(4):A344.
- Zagari 2003**
Zagari RM, Bazzoli F. *Helicobacter pylori* testing in patients with peptic ulcer bleeding. *Digestive & Liver Disease* 2003;**35**(4):215–6.
- Zagari 2005**
Zagari RM, Pozzato P, Martuzzi C, Fuccio L, Martinelli G, Roda E, et al. C-13-urea breath test to assess *Helicobacter pylori* bacterial load. *Helicobacter* 2005;**10**(6):615–9.
- Zagari 2012**
Zagari RM, Eusebi LH, Rabitti S, Bazzoli F. 13C-urea breath-id system for the real-time diagnosis of *Helicobacter pylori* infection. *Digestive and Liver Disease* 2012;**44**:S208.
- Zalabska 2010**
Zalabska E. The evidence of *Helicobacter pylori* in gastric biopsy and stool samples. *Klinicka Mikrobiologia i Infekcni Lekarstvi* 2010;**16**(6):203–5.
- Zambon 2004**
Zambon CF, Basso D, Navaglia F, Mazza S, Razetti M, Fogar P, et al. Non-invasive diagnosis of *Helicobacter pylori* infection: Simplified c-13-urea breath test, stool antigen testing, or DNA PCR in human feces in a clinical laboratory setting?. *Clinical Biochemistry* 2004;**37**(4):261–7.
- Zanetti 2002**
Zanetti M, Vendramin R, Pieramico O. Stool antigen test for non-invasive post-treatment assessment of *Helicobacter pylori* infection: A comparative study between immunoenzymatic and immunochromatographic tests. *Gut* 2002;**51**(Suppl):A111.
- Zaremba 1995**
Zaremba M, Rozkiewicz M, Pydzinska J, Stasiewicz J, Szalaj W, Musiatowicz B, et al. Diagnostic value of the latex test (Pyloriset) for detection of *Helicobacter pylori* antibodies in adult patients with upper digestive tract diseases. *Medycyna Doswiadczalna i Mikrobiologia* 1995;**47**(1-2):11–6.
- Zawadzka-Gralec 2009**
Zawadzka-Gralec A, Wroblewska M, Szaflarska PA, Mierzwa G, Parzecka M, Bala G, et al. The analysis of usefulness different diagnostic methods in children and adolescents with *Helicobacter pylori* infection. *Polski Merkuriusz Lekarski* 2009;**26**(151):24–8.
- Zhang 1990**
Zhang QB, Zhang SJ, Jia BQ. Enzyme-linked immunosorbent assay for the serodiagnosis of campylobacter pylori infection. *Zhonghua Nei Ke Za Zhi [Chinese Journal of Internal Medicine]* 1990;**29**(8):457-60, 509.
- Zhang 2002**
Zhang WD, Xu ZM. Immunophenotyping of *Helicobacter pylori*. *World Chinese Journal of Digestology* 2002;**10**(5): 509–12.
- Zhang 2006**
Zhang C, Guan Y, Yuan Z, Wu Y, Yamada N, Wen M, et al. Analysis of histological detection of *Helicobacter pylori* before and after eradication therapy: Compared with the results of 13C-urea breath test. *Chinese Journal of Gastroenterology* 2006;**11**(4):215–8.
- Zhang 2007**
Zhang L, Zhang JZ. Analysis of different diagnostic methods of *Helicobacter pylori* infection in China. *World Chinese Journal of Digestology* 2007;**15**(6):649–54.
- Zhelezova 2006**
Zhelezova GZ, Boyanova L. Stool antigen test for diagnosis of *Helicobacter pylori* infection. *Problems of Infectious and Parasitic Diseases* 2006;**34**(2):16–8.
- Zheng 2004**
Zheng Q, Chen X, Pan Y, Shi Y. Comparison of reliability of 13C-urea breath tests using two different reagents for clinical diagnosis of *Helicobacter pylori* infection. *Chinese Journal of Gastroenterology* 2004;**9**(4):210–2.
- Zhou 1996**
Zhou DY, Xu KQ, Yang HT, Hoffman S, Marshall B. Microdose c-14-urea breath test for the detection of h-pylori in Chinese patients. *Gastroenterology* 1996;**110**(4 (suppl)):A307.

Zhou 2000

Zhou H, Chan KL, Chu KM, Tam PKH. Intrafamilial spread of *Helicobacter pylori*: A prospective study using urea breath test. *Journal of Pediatric Surgery* 2000;**35**(11): 1672–5.

Zhou 2014

Zhou XY, Su J, Xu GX, Zhang GX. Accuracy of stool antigen test for the diagnosis of *Helicobacter pylori* infection in children: A meta-analysis. *Clinics and Research in Hepatology and Gastroenterology* 2014;**38**(5):629–38.

Zhou 2017

Zhou Q, Li L, Ai Y, Pan Z, Guo M, Han J. Diagnostic accuracy of the 14c-urea breath test in *Helicobacter pylori* infections: A meta-analysis. *Wiener Klinische Wochenschrift* 2017; Vol. 129, issue 1–2:38–45. [DOI: 10.1007/s00508-016-1117-3]

Zhu 2002a

Zhu Y, Lin J, Li D, Du Q, Qian K, Wu Q, et al. *Helicobacter pylori* antigen and its igg, iga -type specific immunocomplexes in sera from patients with *Helicobacter pylori* infection. *Chinese Medical Journal* 2002;**115**(3): 381–3.

Zhu 2002b

Zhu YY, Wu JC, Zhang ZH. Emissive spectral analysis applied in n-15 excretion test of *Helicobacter pylori*. *Society of Photo-optical Instrumentation Engineers (SPIE): Optics in health care and biomedical optics: Diagnostics and treatment* 2002;**4916**:194–6.

Zhukhovitskii 2005

Zhukhovitskii VG, Gorbacheva AP, Golovkin BA, Gidaiatova LA. Serological diagnosis of *Helicobacter* infection: Comparison of the analytical capacities of

three test systems for enzyme immunoassay. *Klinicheskaia Laboratornaia Diagnostika* 2005;**11**:12–4.

Zhuo 2008

Zhuo XL, Wang Y, Zhuo WL, Zhang XY. Possible association of *Helicobacter pylori* infection with laryngeal cancer risk: an evidence-based meta-analysis. *Archives of Medical Research* 2008;**39**(6):625–8.

Zipser 2000

Zipser RD, Parikh MV. Is repeat testing needed for *Helicobacter pylori*?. *Journal of the American Board of Family Practice* 2000;**13**(6):449–50.

Zubillaga 1997

Zubillaga M, Oliveri P, Calcagno ML, Goldman C, Caro R, Mita A, et al. Min 14c ubt: A combination of gastric basal transit and 14c-urea breath test for the detection of *Helicobacter pylori* infection in human beings. *Nuclear Medicine & Biology* 1997;**24**(6):565–9.

Zubillaga 1999

Zubillaga M, Oliveri P, Panarello H, Buzurro M, Adami J, Goldman C, et al. Stable isotope techniques for the detection of *Helicobacter pylori* infection in clinical practice. 13C-urea breath test in different experimental conditions. *Acta Physiologica, Pharmacologica et Therapeutica Latinoamericana* 1999;**49**(2):101–7.

References to other published versions of this review**Gurusamy 2016**

Gurusamy KS, Yaghoobi M, Davidson BR. Non-invasive diagnostic tests for *Helicobacter pylori* infection. *Cochrane Database of Systematic Reviews* 2016, Issue 2. [DOI: 10.1002/14651858.CD012080]

* Indicates the major publication for the study

CHARACTERISTICS OF STUDIES

Characteristics of included studies [ordered by study ID]

Adamopoulos 2009a

Study characteristics			
Patient sampling	Type of study: prospective study Consecutive or random sample: consecutive patients		
Patient characteristics and setting	Sample size: 73 Female: 24 (33%) Age: 63 years Presentation: 1. People who had undergone endoscopy (for various indications) Setting: secondary care, Greece		
Index tests	Index test: urea breath test - ¹³ C Further details: Technical specifications: manufacturer - Infai Institut für Biomedizinische; Analytik & NMR-Imaging GmbH, Bochum Performed by: not stated Criteria for positive diagnosis: delta over baseline > 4.0% (30 minutes)		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and histopathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 0 (0%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Yes		

Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Yes		
		Low	Low
DOMAIN 2: Index Test Urea breath test-¹³C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Unclear
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	Yes		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		Unclear	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Yes		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Yes		
		Low	

Adamopoulos 2009b

Study characteristics			
Patient sampling	Type of study: prospective study Consecutive or random sample: consecutive patients		
Patient characteristics and setting	Sample size: 31 Female: 8 (25.8%) Age: 71 years Presentation: 1. People who had undergone Billroth II gastrectomy and endoscopy (for various indications) Setting: secondary, Greece		
Index tests	Index test: urea breath test- ¹³ C Further details: Technical specifications: manufacturer - Infai Institut für Biomedizinische; Analytik & NMR-Imaging GmbH, Bochum Performed by: not stated Criteria for positive diagnosis: delta over baseline > 4.0% (30 minutes)		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and histopathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 0 (0%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Yes		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Yes		
		Low	High

DOMAIN 2: Index Test Urea breath test- ¹³ C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Unclear
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	Yes		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		Unclear	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Yes		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Yes		
		Low	

Aguilar 2007

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 31 Female: 5 (16.1%)

	Age: not stated Presentation: 1. Dyspepsia Setting: secondary care, Peru		
Index tests	Index test: urea breath test- ¹⁴ C Further details: Technical specifications: Not stated Performed by: Not stated Criteria for positive diagnosis: disintegrations per minute > 200 (10 minutes)		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain Further details: Technical specifications: Not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Low
DOMAIN 2: Index Test Urea breath test- ¹⁴ C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		

Aguilar 2007 (Continued)

If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Al-Fadda 2000

Study characteristics	
Patient sampling	Type of study: prospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 64 Female: not stated Age: not stated Presentation: 1. Patients with upper gastrointestinal symptoms Setting: secondary care, Peru

Index tests	Index test: urea breath test- ¹⁴ C Further details: Technical specifications: Not stated Performed by: Not stated Criteria for positive diagnosis: CO ² recovery > 0.55 (20 minutes)		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain Further details: Technical specifications: Not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Low
DOMAIN 2: Index Test Urea breath test- ¹⁴ C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Yes		
		Unclear	Low

DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Allardyce 1997

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 63 Female: 26 (41.3%) Age: not stated Presentation: 1. Dyspepsia Setting: secondary care, New Zealand
Index tests	Index test: urea breath test- ¹⁴ C Further details: Technical specifications: Not stated Performed by: Not stated Criteria for positive diagnosis: disintegrations per minute > 49 (time not stated)

Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Giemsa stain Further details: Technical specifications: Not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Low
DOMAIN 2: Index Test Urea breath test- ¹⁴ C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		

Allardyce 1997 (Continued)

Were the reference standard results interpreted without knowledge of the results of the index tests?	No		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Argentieri 2007

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 215 Female: not stated Age: not stated Presentation: 1. Children undergoing upper gastrointestinal endoscopy Exclusion: 1. Recent <i>H pylori</i> treatment Setting: secondary care, Italy
Index tests	Index test: stool antigen test Further details: Technical specifications: Premier Platinum HpSA Performed by: Not stated Criteria for positive diagnosis: Not stated
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with Giemsa stain Further details: Technical specifications: Not stated Performed by: endoscopist and pathologist

	Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Stool Antigen Test			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	Yes		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		

		Unclear	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Arikan 2004

Study characteristics	
Patient sampling	Type of study: prospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 100 Female: not stated Age: not stated Presentation: 1. Patients undergoing endoscopy Exclusion: 1. Malignancy 2. Taken antibiotics or proton pump inhibitors in last 2 weeks Setting: secondary care, Turkey
Index tests	Index test: stool antigen test Further details: Technical specifications: Premier Platinum HpSA Performed by: Not stated Criteria for positive diagnosis: Not stated
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain Further details: Technical specifications: Not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated

Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Stool Antigen Test			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			

Arikan 2004 (Continued)

Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Atli 2012

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 100 Female: 57 (57%) Age: 71 years Presentation: 1. Patients with dyspepsia and symptoms or signs related to peptic ulcer > 65 years of age Exclusion: 1. Patients who had taken antibiotics or anti-ulcer treatment in the past 2 weeks 2. Advanced dementia 3. Cerebrovascular disease 4. Advanced respiratory problems 5. Alarm symptoms for malignancy Setting: secondary setting, Turkey
Index tests	Index test: urea breath test- ¹⁴ C Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: counts per minute > 50 (10 minutes)
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy (staining not reported, probably H & E) Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated

Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Urea breath test-¹⁴C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			

Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Behrens 1999

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 252 Female: not stated Age: not stated Presentation: 1. Children (3 years to 18 years) with abdominal pain, nausea, or vomiting Exclusion criteria: 1. Previous treatment with antibiotics or proton pump inhibitors 2. WBC < 3500/microlitre or platelets < 100,000/microlitre Setting: secondary setting, Germany
Index tests	Index test: urea breath test - ¹³ C Further details: Technical specifications: Promochem, Wesel Performed by: not stated Criteria for positive diagnosis: delta over baseline > 5.0% (30 minutes and 60 minutes)
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated
Comparative	
Notes	

Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Urea breath test-¹³C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		

Behrens 1999 (Continued)

Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Bosso 2000

Study characteristics			
Patient sampling	Type of study: retrospective study Consecutive or random sample: unclear sampling process		
Patient characteristics and setting	Sample size: 95 Female: not stated Age: not stated Presentation: 1. Patients with upper abdominal symptoms Exclusion: 1. Patients with previous gastric surgery Setting: secondary care, France		
Index tests	Index test: urea breath test - ¹³ C Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: delta over baseline > 4.0% (30 minutes)		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with Warthin-Starry stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns

DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Urea breath test- ¹³ C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	No		
		High	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	Yes		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		Unclear	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Yes		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		

		Unclear	
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Ceken 2011

Study characteristics			
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process		
Patient characteristics and setting	Sample size: 100 Female: 67 (67%) Age: 48 years Presentation: 1. Patients with dyspepsia Exclusion: 1. Antibiotics or anti-ulcer treatment within last 4 weeks 2. Gastric surgery Setting: secondary care, France		
Index tests	Index test: stool antigen test Further details: Technical specifications: Helicobacter Antigen Quick Castte Performed by: not stated Criteria for positive diagnosis: not stated		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy (staining not reported, probably H & E) Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		

Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Stool Antigen Test			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Chen 1991

Study characteristics			
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: consecutive patients		
Patient characteristics and setting	Sample size: 96 Female: not stated Age: not stated Presentation: 1. Adult patients with dyspepsia Setting: secondary care, China		
Index tests	Index test: serology Further details: Technical specifications: Pyloriset Performed by: not stated Criteria for positive diagnosis: presence of agglutination (within 3 minutes)		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 0 (0%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Yes		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Yes		
		Low	Low

DOMAIN 2: Index Test Serology			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Yes		
		Unclear	

Chey 1998

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process

Patient characteristics and setting	Sample size: 287 Female: 140 (48.8%) Age: 53 years Presentation: 1. People undergoing endoscopy Exclusion: 1. Recent treatment for <i>H pylori</i> or anti-ulcer treatment Setting: Variable settings, USA		
Index tests	Index test 1a: serology Further details: Technical specifications: HM-CAP (Enteric Products Inc.) Performed by: not stated Criteria for positive diagnosis: not stated Index test 1b: serology (serum) Further details: Technical specifications: Hp Chek (Chem Trak) Performed by: not stated Criteria for positive diagnosis: 2 red lines Index test 1c: serology (whole blood) Further details: same as for index test 2		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy (staining not reported, probably H & E) Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		

Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Serology			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Yes		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Yes		
		Unclear	

Study characteristics			
Patient sampling	Type of study: retrospective study Consecutive or random sample: unclear sampling process		
Patient characteristics and setting	Sample size: 100 Female: 66 (66%) Age: 13 years Presentation: 1. Children with gastrointestinal disorders Setting: secondary care, Poland		
Index tests	Index test: urea breath test- ¹³ C Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: delta over baseline > 4.0 % (time not stated)		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear

DOMAIN 2: Index Test Urea breath test- ¹³ C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

D'Elia 2000

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: consecutive patients
Patient characteristics and setting	Sample size: 256 Female: not stated

	Age: not stated Presentation: 1. Patients with dyspepsia Exclusion: 1. Gastric surgery 2. Recent treatment for ulcer or <i>H pylori</i> 3. Pulmonary failure Setting: secondary care, Italy		
Index tests	Index test: urea breath test- ¹³ C Further details: Technical specifications: AB Analitica Performed by: not stated Criteria for positive diagnosis: delta over baseline > 4.0% (30 minutes)		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy (staining not reported, probably H & E) Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 0 (0%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Yes		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Yes		
		Low	Low
DOMAIN 2: Index Test Urea breath test- ¹³ C			

Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Yes		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Yes		
		Unclear	

Debonnie 1991

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: neither - patients with previous gastric surgery excluded
Patient characteristics and setting	Sample size: 230 Female: not stated Age: not stated Presentation:

	1. Patients referred for upper gastrointestinal surgery Excluded: 1. Gastric surgery 2. Haematologic disease 3. Immunodeficiency 4. Gastric cancer 5. Recent treatment for ulcer or <i>H pylori</i> 6. Atrophic gastritis Setting: secondary care, Belgium		
Index tests	Index test: urea breath test- ¹⁴ C Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: specific activity > 0.3% (10 minutes)		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Cresyl Violet stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 27 (11.7%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	No		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		High	Unclear
DOMAIN 2: Index Test Urea breath test- ¹⁴ C			

Debongnie 1991 (Continued)

Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	No		
		High	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Yes		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	No		
		High	

Dede 2015

Study characteristics	
Patient sampling	Type of study: prospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 30 Female: 8 (26.7%) Age: 55 years Presentation:

	1. Patients who had undergone partial gastrectomy Setting: secondary care, Turkey		
Index tests	Index test 1: stool antigen test Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: not stated Index test 2: urea breath test- ¹⁴ C Further details: Technical specifications: Heliprobe System, Kibion AB Performed by: not stated Different criteria for positive diagnosis: <ul style="list-style-type: none">● Counts per minute > 23 (10 minutes)● Counts per minute > 29 (30 minutes)● Counts per minute > 35 (20 minutes)● Counts per minute > 50 (10 minutes)● Counts per minute > 50 (20 minutes)● Counts per minute > 50 (30 minutes)		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and modified Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		

		Unclear	Unclear
DOMAIN 2: Index Test Urea breath test-¹⁴C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	No		
		High	Low
DOMAIN 2: Index Test Stool Antigen Test			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Yes		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	No		
Did all patients receive the same reference standard?	Yes		

Were all patients included in the analysis?	Unclear		
		High	

Delvin 1999

Study characteristics	
Patient sampling	Type of study: prospective study Consecutive or random sample: consecutive patients
Patient characteristics and setting	Sample size: 79 Female: not stated Age: not stated Presentation: 1. Children with gastrointestinal symptoms Exclusion: 1. Children with functional abdominal pain 2. Anti-ulcer or <i>H pylori</i> treatment in last 6 weeks Setting: secondary care, Canada
Index tests	Index test 1: urea breath test- ¹³ C Further details: Technical specifications: Dia 13-Helico; Dianatec iso Performed by: not stated Different criteria for positive diagnosis: <ul style="list-style-type: none"> • Delta over baseline > 2.0% (30 minutes) • Delta over baseline > 2.5% (30 minutes) • Delta over baseline > 3.0% (30 minutes) • Delta over baseline > 3.5% (30 minutes) • Delta over baseline > 4.0% (30 minutes) • Delta over baseline > 4.5% (30 minutes)
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Warthin-Starry stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 0 (0%)
Comparative	
Notes	

Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Yes		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Yes		
		Low	Low
DOMAIN 2: Index Test Urea breath test-¹³C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Yes		
If a threshold was used, was it pre-specified?	No		
		High	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		

Delvin 1999 (Continued)

Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Yes		
		Unclear	

Dinler 1999

Study characteristics			
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process		
Patient characteristics and setting	Sample size: 77 Female: 48 (62.3%) Age: 13 years Presentation: 1. Children with recurrent abdominal pain Setting: secondary care, Turkey		
Index tests	Index test: serology Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: not stated		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy (staining not reported, probably H & E) Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			

Dinler 1999 (Continued)

Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Serology			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		

		Unclear	
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Duan 1999

Study characteristics			
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process		
Patient characteristics and setting	Sample size: 149 Female: 35 (23.5%) Age: 44 years Presentation: 1. Patients with gastritis or gastric ulcer Exclusion: 1. Treatment with antibiotics or bismuth in the previous 2 months 2. Previous gastric surgery or gastric cancer Setting: secondary care, China		
Index tests	Index test: urea breath test- ¹³ C Further details: Technical specifications: Finniga, MAT-252, USA Performed by: not stated Criteria for positive diagnosis: delta over baseline > 5 per thousand (30 minutes)		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Warthin-Starry stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		

Duan 1999 (Continued)

Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Urea breath test-¹³C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Yes		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Eggers 1990

Study characteristics			
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process		
Patient characteristics and setting	Sample size: 100 Female: not stated Age: not stated Presentation: 1. Patients undergoing endoscopy Setting: secondary care, Germany		
Index tests	Index test: urea breath test- ¹³ C Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: not stated		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy (staining not reported, probably H & E) Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 8 (7.4%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear

DOMAIN 2: Index Test Urea breath test- ¹³ C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Yes		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Yes		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	No		
		High	

Ekesbo 2006

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: neither - patients with previous gastric surgery excluded

Patient characteristics and setting	Sample size: 126 Female: not stated Age: not stated Presentation: 1. Patients undergoing gastroscopy for dyspepsia or gastrointestinal bleeding Setting: primary care, Sweden		
Index tests	Index test: serology Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: staining of a 120 kilodalton protein gel band and/or at least 2 of 5 proteins between 28 - 33 kilodaltons		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with immunostaining Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 40 (24.1%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	No		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		High	Unclear
DOMAIN 2: Index Test Serology			

Ekesbo 2006 (Continued)

Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	Yes		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		Unclear	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	No		
		High	

El-Din 2013

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: neither - patients without pathologic data excluded
Patient characteristics and setting	Sample size: 19 Female: 6 (31.6%) Age: 47 years Presentation:

	1. Patients with upper gastrointestinal disorders Setting: secondary care, Egypt		
Index tests	Index test 1: serology Further details: Technical specifications: Ridascreen Performed by: not stated Criteria for positive diagnosis: not stated Index test 2: stool antigen test Further details: Technical specifications: Immunodiagnostik AG Performed by: not stated Criteria for positive diagnosis: not stated		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 33 (63.5%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	No		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		High	Unclear
DOMAIN 2: Index Test Stool Antigen Test			

Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 2: Index Test Serology			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	Yes		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		Unclear	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	No		
		High	

El-Mekki 2011

Study characteristics			
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: consecutive patients		
Patient characteristics and setting	Sample size: 55 Female: 35 (63.6%) Age: 37 years Presentation: 1. Patients with dyspepsia Setting: secondary care, Saudi Arabia		
Index tests	Index test: serology Further details: Technical specifications: HeliSAL TM serum Performed by: not stated Criteria for positive diagnosis: > 1 units/ml		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 0 (0%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Yes		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Yes		
		Low	Low

DOMAIN 2: Index Test Serology			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Yes		
		Unclear	

El-Nasr 2003

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 50 Female: 16 (32%)

	Age: 36 years Presentation: 1. Patients with dyspepsia Setting: secondary care, Egypt		
Index tests	Index test: stool antigen test Further details: Technical specifications: Premier Platinum HpSA, Meridien Diagnostics Performed by: not stated Criteria for positive diagnosis: not stated		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy (staining not reported, probably H & E) Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Stool Antigen Test			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		

If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Eltumi 1999

Study characteristics	
Patient sampling	Type of study: prospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 50 Female: 17 (34%) Age: 11 years Presentation: 1. Children referred for endoscopy Exclusion: 1. Recent treatment for <i>H pylori</i> Setting: Tertiary care, UK

Index tests	Index test 1: urea breath test- ¹³ C Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: delta over baseline > 5 units/ml (40 minutes) Index test 2: serology Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: not stated		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Warthin-Starry stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Urea breath test- ¹³ C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		

If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 2: Index Test Serology			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Epple 1997

Study characteristics			
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: consecutive patients		
Patient characteristics and setting	Sample size: 126 Female: 70 (55.6%) Age: 48 years Presentation: 1. Patients undergoing routine endoscopy Exclusion: 1. Gastric cancer 2. Previous gastric surgery Setting: secondary care, Germany		
Index tests	Index test: urea breath test- ¹³ C Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: > Mean + 2 standard deviations above normal level (30 minutes)		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Warthin-Starry stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 0 (0%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Yes		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Yes		

		Low	Low
DOMAIN 2: Index Test Urea breath test-¹³C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	No		
		High	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Yes		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Yes		
		Low	

Fallone 1995

Study characteristics	
Patient sampling	Type of study: prospective study Consecutive or random sample: consecutive patients

Patient characteristics and setting	Sample size: 50 Female: not stated Age: not stated Presentation: 1. Patients undergoing endoscopy Exclusion 1. Conditions that would make gastric biopsy dangerous 2. Lactating 3. Pregnant or women of child-bearing potential who were not using adequate control Setting: secondary care, Canada		
Index tests	Index test: urea breath test- ¹³ C Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: > 1.5% excretion (15 minutes)		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with Silver stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 4 (7.4%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Yes		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Urea breath test- ¹³ C			

Fallone 1995 (Continued)

Were the index test results interpreted without knowledge of the results of the reference standard?	Yes		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	Yes		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Yes		
		Low	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Yes		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	No		
		High	

Fallone 1996

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: consecutive patients
Patient characteristics and setting	Sample size: 106 Female: 51 (48.1%) Age: 54 years Presentation:

	1. Patients undergoing endoscopy Exclusion: 1. Recent treatment for <i>H pylori</i> Setting: secondary care, Canada		
Index tests	Index test: serology Further details: Technical specifications: HeliSAL TM serum Performed by: not stated Criteria for positive diagnosis: not stated		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 0 (0%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Yes		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Yes		
		Low	Low
DOMAIN 2: Index Test Serology			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		

Fallone 1996 (Continued)

If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Yes		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Yes		
		Low	

Fanti 1999

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 84 Female: 45 (53.6%) Age: 50 years Presentation: 1. Patients with dyspepsia 2. Not on current treatment for <i>H pylori</i> or ulcers Setting: secondary care, Italy

Index tests	Index test: stool antigen test Further details: Technical specifications: Premier Platinum HpSA (Meridian Diagnostics) Performed by: not stated Criteria for positive diagnosis: Absorbance 450/630 nm > 0.150		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Stool Antigen Test			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low

DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Faruqui 2007

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 50 Female: 26 (52%) Age: 36 years Presentation: 1. Patients with dyspepsia despite anti-ulcer treatment Exclusion: 1. Myocardial infarction in the last 6 months 2. Cardiac failure 3. Bleeding diathesis Setting: secondary care, Pakistan
Index tests	Index test: stool antigen test Further details: Technical specifications: not stated

	Performed by: not stated Criteria for positive diagnosis: not stated		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy (staining not reported, probably H & E) Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Stool Antigen Test			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 3: Reference Standard			

Faruqui 2007 (Continued)

Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Ferrara 1998

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 100 Female: 56 (56%) Age: not stated Presentation: 1. Patients with dyspepsia 2. Not on current treatment for <i>H pylori</i> Setting: secondary care, Italy
Index tests	Index test: serology Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: not stated

Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Serology			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		

Ferrara 1998 (Continued)

Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Formichella 2013

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 500 Female: 263 (52.6%) Age: 50 years Presentation: 1. Patients undergoing routine endoscopy Exclusion: 1. Undergone <i>H pylori</i> eradication therapy 2. Active immunosuppressive therapy 3. Suffering from malignant diseases Setting: secondary care, Germany
Index tests	Index test 1a: serology Further details: Technical specifications: recomWell ELISA (Mikrogen) Performed by: not stated Criteria for positive diagnosis: not stated Index test 1b: serology Further details: Technical specifications: not stated Performed by: not stated

	Criteria for positive diagnosis: 2 or more antigens Index test 1c: serology Further details: Technical specifications: Immunoblot Helicobacter (Mikrogen) Performed by: not stated Criteria for positive diagnosis: not stated		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain, Warthin-Starry stain, and Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Serology			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High

DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Yes		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Germana 2001

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 100 Female: 52 (52%) Age: 51 years Presentation: 1. Patients with dyspepsia 2. Not on current treatment for <i>H pylori</i> Setting: secondary care, Italy
Index tests	Index test: urea breath test- ¹³ C Further details: Technical specifications: Wagner Analysen - Tecturik Performed by: not stated Criteria for positive diagnosis: delta over baseline > 4.0% (30 minutes)

Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and immunohistochemical stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Urea breath test- ¹³ C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		

Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Graham 1996a

Study characteristics	
Patient sampling	Type of study: retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 75 Female: not stated Age: not stated Presentation: 1. Patients undergoing screening for <i>H pylori</i> and who underwent endoscopy Setting: secondary care, USA
Index tests	Index test: serology Further details: Technical specifications: FlexSure HP Performed by: not stated Criteria for positive diagnosis: pink line
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy (staining not reported, probably H & E) Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy

Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 476 (86.4%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Serology			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Yes		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low

DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	No		
		High	

Gramley 1999

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: consecutive patients
Patient characteristics and setting	Sample size: 22 Female: not stated Age: not stated Presentation: 1. Patients undergoing endoscopy Setting: secondary care, USA
Index tests	Index test: serology Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: not stated
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy (staining not reported, probably H & E) Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 0 (0%)
Comparative	
Notes	

Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Yes		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Yes		
		Low	Low
DOMAIN 2: Index Test Serology			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		

Gramley 1999 (Continued)

Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Yes		
		Unclear	

Guo 2011

Study characteristics			
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process		
Patient characteristics and setting	Sample size: 328 Female: 90 (27.4%) Age: 47 years Presentation: 1. Patients with gastrointestinal symptoms 2. No previous treatment or stopped treatment for <i>H pylori</i> Setting: secondary care, China		
Index tests	Index test: stool antigen test Further details: Technical specifications: Kyowa pharmaceutical Performed by: not stated Criteria for positive diagnosis: not stated		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with silver stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			

Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Stool Antigen Test			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	Yes		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		Unclear	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Study characteristics			
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: neither - patients with previous gastric surgery excluded		
Patient characteristics and setting	Sample size: 65 Female: 45 (69.2%) Age: not stated Presentation: 1. Patients undergoing routine endoscopy Exclusion: 1. Undergone <i>H pylori</i> eradication therapy 2. Pregnancy or lactation 3. Prior gastric surgery Setting: secondary care, Turkey		
Index tests	Index test: urea breath test- ¹⁴ C Further details: Technical specifications: Heliprobe system Performed by: not stated Criteria for positive diagnosis: Counts per minute > 50 (10 minutes)		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 3 (4.4%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	No		
Was a case-control design avoided?	Yes		

Did the study avoid inappropriate exclusions?	Unclear		
		High	Unclear
DOMAIN 2: Index Test Urea breath test-¹⁴C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Yes		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	No		
		High	

Study characteristics			
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: neither - patients with inadequate breath samples excluded		
Patient characteristics and setting	Sample size: 60 Female: not stated Age: not stated Presentation: 1. Children with gastrointestinal symptoms Setting: secondary care, Pakistan		
Index tests	Index test 1: urea breath test- ¹³ C Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: delta over baseline > 4.0% (10 minutes, 20 minutes, and 30 minutes) Index test 2: stool antigen test Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: not stated		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 6 (10%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	No		
Was a case-control design avoided?	Yes		

Did the study avoid inappropriate exclusions?	Unclear		
		High	Unclear
DOMAIN 2: Index Test Urea breath test-¹³C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 2: Index Test Stool Antigen Test			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	Yes		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		Unclear	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Yes		

Hafeez 2007 (Continued)

Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	No		
		High	

Han 2012

Study characteristics			
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process		
Patient characteristics and setting	Sample size: 99 Female: not stated Age: not stated Presentation: 1. Patients who had undergone urea breath tests and endoscopy Setting: secondary care, South Korea		
Index tests	Index test: urea breath test - unknown isotope Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: not stated		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			

Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Urea breath test - unknown isotope			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	Yes		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		Unclear	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Inelmen 2004

Study characteristics			
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: consecutive patients		
Patient characteristics and setting	Sample size: 122 Female: 81 (66.4%) Age: 80 years Presentation: 1. Patients undergoing upper gastrointestinal endoscopy Setting: secondary care, Italy		
Index tests	Index test 1: urea breath test- ¹³ C Further details: Technical specifications: BreathQuality-UBT 13C-Urea Kit, Zeta Farmaceutici SpA Performed by: not stated Criteria for positive diagnosis: delta over baseline > 5.0% (30 minutes) Index test 2: stool antigen test Further details: Technical specifications: Premier Platinum HpSA (Meridian Diagnostics) Performed by: not stated Criteria for positive diagnosis: definite yellow colour		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 0 (0%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Yes		
Was a case-control design avoided?	Yes		

Did the study avoid inappropriate exclusions?	Yes		
		Low	Low
DOMAIN 2: Index Test Urea breath test-¹³C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 2: Index Test Stool Antigen Test			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		

Inelmen 2004 (Continued)

Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Yes		
		Unclear	

Iqbal 2013

Study characteristics			
Patient sampling	Type of study: retrospective study Consecutive or random sample: unclear sampling process		
Patient characteristics and setting	Sample size: 50 Female: 19 (38%) Age: 41 years Presentation: 1. Patients who underwent upper gastrointestinal endoscopy Setting: secondary care, Pakistan		
Index tests	Index test: serology Further details: Technical specifications: HpG screen ELISA kit Performed by: not stated Criteria for positive diagnosis: > 7 units/ml		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy (staining not reported, probably H & E) Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			

Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Serology			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Yes		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Study characteristics			
Patient sampling	Type of study: prospective study Consecutive or random sample: neither - patients without stool samples excluded		
Patient characteristics and setting	Sample size: 112 Female: not stated Age: not stated Presentation: 1. Patients undergoing upper gastrointestinal endoscopy Setting: secondary care, New Zealand		
Index tests	Index test: stool antigen test Further details: Technical specifications: Premier Platinum HpSA (Meridian Diagnostics) Performed by: pathologists Criteria for positive diagnosis: Absorbance 450/630 nm > 0.120		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Immunoperoxidase stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 15 (11.8%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	No		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		High	Unclear

DOMAIN 2: Index Test Stool Antigen Test			
Were the index test results interpreted without knowledge of the results of the reference standard?	Yes		
If a threshold was used, was it pre-specified?	Yes		
		Low	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Yes		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	No		
		High	

Ivanova 2010

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process

Patient characteristics and setting	Sample size: 33 Female: 16 (48.5%) Age: 42 years Presentation: 1. Patients undergoing upper gastrointestinal endoscopy Setting: secondary care, Bulgaria		
Index tests	Index test: serology Further details: Technical specifications: Rapid HP, US Meds Performed by: not stated Criteria for positive diagnosis: not stated		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Serology			
Were the index test results interpreted without knowledge of the results of the reference stan-	Unclear		

dard?			
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	Yes		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		Unclear	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Jekarl 2013

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: neither - patients with a recent antibiotic treatment were excluded
Patient characteristics and setting	Sample size: 209 Female: 85 (40.7%) Age: not stated Presentation: 1. Patients undergoing routine health check-up and upper gastrointestinal endoscopy Exclusion: 1. Recent ulcer or <i>H pylori</i> treatment 2. Previous gastric surgery

	3. Previous gastric cancer Setting: secondary care, Korea		
Index tests	Index test: stool antigen test Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: Absence of yellow		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Warthin-Starry stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 57 (21.4%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	No		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		High	Unclear
DOMAIN 2: Index Test Stool Antigen Test			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Yes		

		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	No		
		High	

Jensen 1998

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear
Patient characteristics and setting	Sample size: 35 Female: not stated Age: not stated Presentation: 1. Patients referred for endoscopy Exclusion: Recent <i>H pylori</i> treatment Setting: secondary care, USA
Index tests	Index test: urea breath test- ¹⁴ C Further details: Technical specifications: not stated

	Performed by: not stated Criteria for positive diagnosis: disintegrations per minute > 200 (10 minutes)		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 7 (16.7%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Urea breath test- ¹⁴ C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			

Jensen 1998 (Continued)

Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Yes		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	No		
		High	

Jordaan 2008

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: neither - patients with previous gastrointestinal surgery excluded
Patient characteristics and setting	Sample size: 103 Female: not stated Age: not stated Presentation: 1. Patients with dyspepsia Exclusion criteria: 1. Recent <i>H pylori</i> therapy 2. Major gastrointestinal surgery Setting: secondary care, South Africa
Index tests	Index test: urea breath test- ¹³ C Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: delta over baseline > 4.5% (time not stated)

Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy (staining not reported, probably H & E) Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 8 (7.2%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	No		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		High	Unclear
DOMAIN 2: Index Test Urea breath test- ¹³ C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		

Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	No		
		High	

Kalach 1998a

Study characteristics	
Patient sampling	Type of study: prospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 100 Female: 35 (35%) Age: 11 years Presentation: 1. Children undergoing upper gastrointestinal endoscopy for recurrent epigastric pain or upper GI tract disorders Exclusion: 1. Recent <i>H pylori</i> treatment Setting: secondary care, France
Index tests	Index test: serology Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: > 6 IU /ml
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain Further details: Technical specifications: not stated

	Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Serology			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Yes		

		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Kamel 2011

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 55 Female: not stated Age: 67 years Presentation: 1. Older adults with dyspepsia and no gastrointestinal bleeding Setting: secondary care, Egypt
Index tests	Index test: stool antigen test Further details: Technical specifications: CerTest <i>H pylori</i> Card Performed by: not stated Criteria for positive diagnosis: not stated
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated
Comparative	

Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Stool Antigen Test			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Yes		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		

Kamel 2011 (Continued)

Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Kim 2016

Study characteristics			
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process		
Patient characteristics and setting	Sample size: 107 Female: 56 (52.3%) Age: 41 years Presentation: 1. Patients undergoing upper gastrointestinal endoscopy Exclusion: 1. Recent <i>H pylori</i> treatment Setting: secondary care, South Korea		
Index tests	Index test: urea breath test- ¹³ C Further details: Technical specifications: UbiT-IR300 apparatus Performed by: not stated Criteria for positive diagnosis: delta over baseline > 2.5% (20 minutes)		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns

DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Urea breath test- ¹³ C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	Yes		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		Unclear	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		

		Unclear	
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Korstanje 2006

Study characteristics			
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process		
Patient characteristics and setting	Sample size: 20 Female: 9 (45%) Age: 68 years Presentation: 1. Patients with atrophic gastritis Setting: primary care, Netherlands		
Index tests	Index test 1: urea breath test- ¹³ C Further details: Technical specifications: INFAI, Bochum, Germany Performed by: not stated Criteria for positive diagnosis: delta over baseline > 4.0% (30 minutes) Index test 2: serology Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: Absorbance (wavelength not stated) > 0.320		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			

Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	High
DOMAIN 2: Index Test Urea breath test-¹³C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 2: Index Test Serology			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			

Korstanje 2006 (Continued)

Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Kuloglu 2008

Study characteristics	
Patient sampling	Type of study: prospective study Consecutive or random sample: neither - patients without either a stool sample or a breath sample excluded
Patient characteristics and setting	Sample size: 109 Female: 58 (53.2%) Age: 12 years Presentation: 1. Children with symptoms suggestive of <i>H pylori</i> infection Exclusion criteria: 1. Recent <i>H pylori</i> treatment Setting: secondary care, Turkey
Index tests	Index test 1: urea breath test- ¹⁴ C Further details: Technical specifications: Heliprobe BreathCard Performed by: not stated Criteria for positive diagnosis: Counts per minute > 50 (10 minutes) Index test 2: stool antigen test Further details: Technical specifications: Rapid HpSA test (Li NEAR Chemical) Performed by: not stated Criteria for positive diagnosis: pinkish red band (within 10 minutes)
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy

Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 16 (12.8%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	No		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		High	Unclear
DOMAIN 2: Index Test Urea breath test- ¹⁴ C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 2: Index Test Stool Antigen Test			
Were the index test results interpreted without knowledge of the results of the reference standard?	Yes		
If a threshold was used, was it pre-specified?	Yes		
		Low	Low
DOMAIN 3: Reference Standard			

Kuloglu 2008 (Continued)

Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Yes		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	No		
		High	

Ladas 2002a

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: consecutive patients
Patient characteristics and setting	Sample size: 130 Female: 48 (36.9%) Age: 50 years Presentation: 1. Patients with dyspepsia Exclusion: 1. Recent <i>H pylori</i> therapy 2. Malignancy 3. Pregnancy 4. Gastric surgery Setting: secondary care, Greece
Index tests	Index test 1a: serology Further details: Technical specifications: Pyloriset EIA-G Performed by: not stated

	Criteria for positive diagnosis: ≥ 300 Index test 1b: serology Further details: Technical specifications: Milenia H Pylori IgG Performed by: not stated Criteria for positive diagnosis: ≥ 44		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with Giemsa and Warthin-Starry stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 0 (0%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Yes		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Yes		
		Low	Low
DOMAIN 2: Index Test Serology			
Were the index test results interpreted without knowledge of the results of the reference standard?	Yes		
If a threshold was used, was it pre-specified?	Yes		
		Low	Low

DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	Yes		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Yes		
		Low	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Yes		
		Unclear	

Lahner 2004

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: consecutive patients
Patient characteristics and setting	Sample size: 27 Female: 19 (70.4%) Age: 52 years Presentation: 1. Patients with atrophic gastritis Exclusion criteria: 1. Gastric surgery 2. Gastric malignancy 3. Recent <i>H pylori</i> treatment 4. Diarrhoea 5. Constipation Setting: not stated

Index tests	Index test 1: urea breath test- ¹³ C Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: delta over baseline > 4.5% (15 minutes and 30 minutes) Index test 2: stool antigen test Further details: Technical specifications: HpSA, Meridian Performed by: not stated Criteria for positive diagnosis: Absorbance 450 nm ≥ 0.160		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 0 (0%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Yes		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Yes		
		Low	Low
DOMAIN 2: Index Test Urea breath test- ¹³ C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		

If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 2: Index Test Stool Antigen Test			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	Yes		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		Unclear	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Yes		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Yes		
		Low	

Study characteristics			
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: consecutive patients		
Patient characteristics and setting	Sample size: 71 Female: not stated Age: not stated Presentation: 1. Patients undergoing endoscopy for duodenitis, gastritis, duodenal ulcer, gastric ulcer Exclusion criteria: 1. Recent <i>H pylori</i> treatment Setting: secondary care, Singapore		
Index tests	Index test: urea breath test- ¹³ C Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: delta over baseline > 6% (30 minutes)		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 0 (0%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Yes		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Yes		

		Low	Low
DOMAIN 2: Index Test Urea breath test-¹³C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Yes		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Yes		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Yes		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Yes		
		Low	

Logan 1991a

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process

Logan 1991a (Continued)

Patient characteristics and setting	Sample size: 50 Female: 24 (48%) Age: 51 years Presentation: 1. Patients undergoing upper gastrointestinal endoscopy Exclusion criteria: 1. Recent <i>H pylori</i> infection 2. Previous gastric surgery Setting: secondary care, UK		
Index tests	Index test: urea breath test- ¹³ C Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: > Mean + 3 standard deviations above normal level (60 minutes)		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Urea breath test- ¹³ C			

Logan 1991a (Continued)

Were the index test results interpreted without knowledge of the results of the reference standard?	No		
If a threshold was used, was it pre-specified?	No		
		High	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Yes		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Lombardo 2003

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: neither - histology performed in a subset of patients
Patient characteristics and setting	Sample size: 28 Female: not stated Age: not stated Presentation:

	1. Patients who had undergone gastrectomy Setting: secondary care, Italy
Index tests	Index test: urea breath test - unknown isotope Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: delta over baseline > 4 per ml (at 5-minute intervals up to 30 minutes)
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 72 (72%)
Comparative	
Notes	

Methodological quality

Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	No		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		High	High
DOMAIN 2: Index Test Urea breath test - unknown isotope			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		

Lombardo 2003 (Continued)

		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	No		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	No		
		High	

Lottspeich 2007

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample; neither - patients with recent antibiotic treatment were excluded
Patient characteristics and setting	Sample size: 56 for urea breath test, 100 for stool antigen test Female: not stated Age: 10 years Presentation: 1. Children with abdominal symptoms undergoing endoscopy Exclusion criteria: 1. Recent <i>H pylori</i> treatment Setting: secondary care, Germany
Index tests	Index test 1: urea breath test- ¹³ C Further details: Technical specifications: not stated

	Performed by: not stated Criteria for positive diagnosis: delta over baseline > 5.0% (30 minutes) Index test 2: stool antigen test Further details: Technical specifications: IDEIA HpStAR assay (DakoCytomation) Performed by: not stated Criteria for positive diagnosis: Absorbance 450/620 nm to 650 nm ≥ 0.150		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain or Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 44 (44%) for urea breath test; 0 (0%) for stool antigen test		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	No		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		High	Unclear
DOMAIN 2: Index Test Urea breath test- ¹³ C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		

		Unclear	Low
DOMAIN 2: Index Test Stool Antigen Test			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Yes		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Yes		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Luthra 1998

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process

Patient characteristics and setting	Sample size: 240 Female: not stated Age: not stated Presentation: 1. Patients undergoing upper gastrointestinal endoscopy Excluded: 1. People with upper GI bleeding 2. People with coagulation abnormalities Setting: not stated		
Index tests	Index test: serology Further details: Technical specifications: Pyloristat (BioWhittaker) Performed by: not stated Criteria for positive diagnosis: not stated		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain, immunostain, or Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Serology			

Luthra 1998 (Continued)

Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Mana 2001a

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: consecutive patients
Patient characteristics and setting	Sample size: 182 Female: not stated Age: not stated Presentation:

	1. Patients undergoing upper gastrointestinal endoscopy 2. People not taking <i>H pylori</i> medication Setting: secondary care, Belgium		
Index tests	Index test 1: urea breath test- ¹³ C Further details: Technical specifications: not stated Performed by: not stated Multiple criteria for positive diagnosis: <ul style="list-style-type: none">● Delta over baseline > 3.0% (10 minutes)● Delta over baseline > 3.0% (20 minutes)● Delta over baseline > 3.0% (30 minutes)● Delta over baseline > 3.5% (10 minutes)● Delta over baseline > 3.5% (20 minutes)● Delta over baseline > 3.5% (30 minutes)● Delta over baseline > 4.0% (10 minutes)● Delta over baseline > 4.0% (20 minutes)● Delta over baseline > 4.0% (30 minutes)● Delta over baseline > 4.5% (10 minutes)● Delta over baseline > 4.5% (20 minutes)● Delta over baseline > 4.5% (30 minutes)● Delta over baseline > 5.0% (10 minutes)● Delta over baseline > 5.0% (20 minutes)● Delta over baseline > 5.0% (30 minutes)		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with immunohistochemistry and Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 0 (0%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Yes		

Mana 2001a (Continued)

Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Yes		
		Low	Low
DOMAIN 2: Index Test Urea breath test-¹³C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	No		
		High	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	Yes		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		Unclear	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Yes		
		Unclear	

Study characteristics			
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: consecutive patients		
Patient characteristics and setting	Sample size: 125 Female: 65 (52%) Age: 36 years Presentation: 1. Patients with dyspepsia Exclusion: 1. Recent or past <i>H pylori</i> eradication 2. Pregnancy 3. Severe cardiopulmonary disorders or other life-threatening illnesses Setting: secondary care, Iran		
Index tests	Index test 1: urea breath test- ¹⁴ C Further details: Technical specifications: Heliprobe BreathCard Performed by: not stated Criteria for positive diagnosis: Counts per minute > 50 (15 minutes) Index test 2: serology Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: > 11 IU		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 0 (0%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Yes		

Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Yes		
		Low	Low
DOMAIN 2: Index Test Urea breath test-¹⁴C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	No		
		High	Low
DOMAIN 2: Index Test Serology			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			

Was there an appropriate interval between index test and reference standard?	Yes		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Yes		
		Low	

Mion 1994

Study characteristics	
Patient sampling	Type of study: retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 95 Female: not stated Age: not stated Presentation: 1. Patients with upper abdominal symptoms Exclusion: 1. Patients with previous gastric surgery Setting: secondary care, France
Index tests	Index test: urea breath test- ¹³ C Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: > + 3 delta 0/00 (30 minutes)
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with Warthin-Starry stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated
Comparative	
Notes	

Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Urea breath test-¹³C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	No		
		High	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	Yes		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		Unclear	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Yes		

Mion 1994 (Continued)

Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Misawa 1998

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 114 Female: 46 (40.4%) Age: not stated Presentation: 1. Patients with gastritis, gastric, or duodenal ulcers Setting: secondary care, Japan
Index tests	Index test 1a: serology (IgA) Further details: Technical specifications: GAP-IgA (BioMerica) Performed by: not stated Criteria for positive diagnosis: not stated Index test 1b: serology (IgG) Further details: Technical specifications: GAP-IgG (BioMerica) Performed by: not stated Criteria for positive diagnosis: not stated
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with immunostaining (Carnoy's solution) Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated
Comparative	
Notes	
Methodological quality	

Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Serology			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	Yes		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		Unclear	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		

Misawa 1998 (Continued)

Were all patients included in the analysis?	Unclear		
		Unclear	

Mohammadian 2007

Study characteristics			
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process		
Patient characteristics and setting	Sample size: 179 Female: 108 (60.3%) Age: 54 years Presentation: 1. Patients undergoing endoscopy for gastrointestinal problems Setting: secondary care, Iran		
Index tests	Index test: serology Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: not stated		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		

Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Serology			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	Yes		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		Unclear	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Monteiro 2001a

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: consecutive patients
Patient characteristics and setting	Sample size: 104 Female: not stated Age: not stated Presentation: 1. Patients undergoing endoscopy Exclusion criteria: 1. Recent <i>H pylori</i> therapy 2. Bleeding disorders or other conditions with contraindication for endoscopy or biopsy Setting: secondary care, France
Index tests	Index test 1: urea breath test- ¹³ C Further details: Technical specifications: ABCA, Europa Scientific Performed by: not stated Criteria for positive diagnosis: not stated Index test 2a: serology Further details: Technical specifications: Pyloriset EIA Kit (Orion Diagnostica) Performed by: not stated Criteria for positive diagnosis: > = 300 Index test 2b: serology Further details: Technical specifications: Helicoblot Immunoblot kit Performed by: not stated Criteria for positive diagnosis: not stated Index test 3: stool antigen test Further details: Technical specifications: Premier Platinum HpSA, Meridian Performed by: not stated Criteria for positive diagnosis: Absorbance (wavelength not reported) > = 0.160
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 0 (0%)
Comparative	
Notes	

Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Yes		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Yes		
		Low	Low
DOMAIN 2: Index Test Urea breath test-¹³C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 2: Index Test Stool Antigen Test			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 2: Index Test Serology			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		

Monteiro 2001a (Continued)

If a threshold was used, was it pre-specified?	Yes		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Morales 1995

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 104 Female: 52 (50%) Age: 50 years Presentation: 1. Patients with upper abdominal symptoms Setting: Outpatients, Mexico

Index tests	Index test 1: urea breath test- ¹⁴ C Further details: Technical specifications: not stated Performed by: not stated Multiple criteria for positive diagnosis: First criterion: ≥ 1.6% excretion (time not stated) Second criterion: not stated		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with Warthin-Starry stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Urea breath test- ¹⁴ C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	No		

		High	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	Yes		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		Unclear	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Noguera 1998

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear
Patient characteristics and setting	Sample size: 38 Female: not stated Age: not stated Presentation: 1. Patients undergoing urea breath tests and endoscopic biopsy Setting: secondary care, Argentina
Index tests	Index test 1: urea breath test- ¹³ C Further details: Technical specifications: not stated Performed by: not stated Multiple criteria for positive diagnosis:

	<ul style="list-style-type: none">• > 1% excretion (10 minutes)• > 1% excretion (20 minutes)• > 1% excretion (30 minutes)		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 87 (69.6%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Urea breath test- ¹⁴ C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			

Noguera 1998 (Continued)

Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	No		
		High	

Novis 1991

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 76 Female: not stated Age: not stated Presentation: 1. Patients undergoing endoscopy for gastrointestinal symptoms Setting: secondary care, Israel
Index tests	Index test 1: urea breath test- ¹⁴ C Further details: Technical specifications: not stated Performed by: not stated Multiple criteria for positive diagnosis: <ul style="list-style-type: none"> • > 4.7% excretion (5 minutes) • > 4.7% excretion (10 minutes) • > 4.7% excretion (15 minutes) • > 4.7% excretion (20 minutes)

	● > 4.7% excretion (25 minutes)		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Urea breath test- ¹⁴ C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	No		
		High	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target	Yes		

condition?			
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		Unclear	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Yes		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Ogata 2001

Study characteristics	
Patient sampling	Type of study: prospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 47 Female: 27 (57.4%) Age: 12 years Presentation: 1. Children with dyspepsia undergoing endoscopy Exclusion: 1. Recent <i>H pylori</i> treatment 2. Immunosuppressive treatment or chemotherapy 3. Extradigestive disease Setting: secondary care, Brazil
Index tests	Index test 1: urea breath test- ¹³ C Further details: Technical specifications: Isomed Performed by: not stated Criteria for positive diagnosis: > 3% excretion (time not stated) Index test 2: serology Further details: Technical specifications: Cobas Core II (Roche)

	Performed by: not stated Criteria for positive diagnosis: > 7 U/ml		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	High
DOMAIN 2: Index Test Urea breath test- ¹³ C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 2: Index Test Serology			

Ogata 2001 (Continued)

Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Yes		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Ozturk 2003

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 73 Female: 56 (74.6%) Age: 41 years Presentation:

	1. Patients with dyspepsia Setting: secondary care, Turkey		
Index tests	Index test 1a: urea breath test- ¹⁴ C Further details: Technical specifications: Heliprobe BreathCard Performed by: not stated Criteria for positive diagnosis: Counts per minute > 50 (10 minutes) Index test 1b: urea breath test- ¹⁴ C Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: disintegrations per minute > 100 (10 minutes)		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Urea breath test- ¹⁴ C			

Ozturk 2003 (Continued)

Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	Yes		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		Unclear	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Yes		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Peitz 2001

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: consecutive patients
Patient characteristics and setting	Sample size: 145 Female: 87 (60%) Age: 59 years Presentation: 1. Patients with dyspepsia

	Exclusion criteria: 1. Recent <i>H pylori</i> treatment 2. Recent NSAID treatment 3. Previous gastric surgery 4. Clotting disorders Setting: secondary care, Germany		
Index tests	Index test: serology Further details: Technical specifications: Helisa Rapid Whole Blood Test (Cortecs Diagnostics Ltd) Performed by: not stated Criteria for positive diagnosis: not stated		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 0 (0%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Yes		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Yes		
		Low	Low
DOMAIN 2: Index Test Serology			
Were the index test results interpreted without knowledge of the results of the reference stan-	Unclear		

Peitz 2001 (Continued)

dard?			
If a threshold was used, was it pre-specified?	Yes		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Yes		
		Unclear	

Peura 1996

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 200 Female: 118 (59%) Age: not stated Presentation: 1. Patients undergoing endoscopy Exclusion criteria: 1. Recent <i>H pylori</i> treatment 2. Gastric surgery

	Setting: secondary care, USA		
Index tests	Index test: urea breath test- ¹⁴ C Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: disintegrations per minute > 200 (10 minutes)		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Urea breath test- ¹⁴ C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		

		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	Yes		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		Unclear	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Yes		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Puspok 1999

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: consecutive patients
Patient characteristics and setting	Sample size: 72 Female: 42 (58.3%) Age: 55 years Presentation: 1. Patients undergoing endoscopy Exclusion criteria: 1. Recent <i>H pylori</i> treatment Setting: secondary care, Austria
Index tests	Index test: stool antigen test Further details: Technical specifications: Premier Platinum HpSA (Meridian Diagnostics)

Puspok 1999 (Continued)

	Performed by: not stated Criteria for positive diagnosis: Absorbance 450/620 nm ≥ 0.100		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy (staining not reported, probably H & E) Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 0 (0%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Yes		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Yes		
		Low	Low
DOMAIN 2: Index Test Stool Antigen Test			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			

Puspok 1999 (Continued)

Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Yes		
		Unclear	

Qadeer 2009

Study characteristics	
Patient sampling	Type of study: prospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 100 Female: 50 (50%) Age: 39 years Presentation: 1. Patients with dyspepsia Exclusion criteria: 1. Recent <i>H pylori</i> therapy 2. Not on anti-coagulant therapy 3. Oral anticoagulants or NSAID treatment Setting: secondary care, Pakistan
Index tests	Index test: stool antigen test Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: pink-red band

Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Stool Antigen Test			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	Yes		

Qadeer 2009 (Continued)

Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		Unclear	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Rafeey 2007

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 96 Female: 31 (32.3%) Age: 8 years Presentation: 1. Children with dyspepsia or abdominal pain Exclusion criteria: 1. Recent <i>H pylori</i> treatment 2. Diarrhoea Setting: secondary care, Iran
Index tests	Index test: stool antigen test Further details: Technical specifications: Equipar HPSA test Performed by: not stated Criteria for positive diagnosis: not stated
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Giemsa stain Further details: Technical specifications: not stated

	Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Stool Antigen Test			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		

		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Rasool 2007

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: consecutive patients
Patient characteristics and setting	Sample size: 94 Female: 34 (36.2%) Age: 41 years Presentation: 1. Patients with dyspepsia Exclusion criteria: 1. Recent <i>H pylori</i> treatment 2. Pregnancy 3. Gastric surgery Setting: secondary care, Pakistan
Index tests	Index test: urea breath test Further details: Technical specifications: Heliprobe BreathCard Performed by: not stated Criteria for positive diagnosis: Counts per minute > 50 (10 minutes)
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy

Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 0 (0%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Yes		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Yes		
		Low	Low
DOMAIN 2: Index Test Urea breath test- ¹⁴ C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low

DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Yes		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Rathbone 1986

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 73 Female: not stated Age: not stated Presentation: 1. Patients with dyspepsia Setting: secondary care, UK
Index tests	Index test: serology Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: > Mean + 2 standard deviations above normal level
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated
Comparative	
Notes	

Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Serology			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	No		
		High	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		

Rathbone 1986 (Continued)

Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Safe 1993

Study characteristics			
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process		
Patient characteristics and setting	Sample size: 100 Female: 59 (59%) Age: 72 years Presentation: 1. Elderly dyspeptic patients Setting: secondary care, UK		
Index tests	Index test: serology Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: > 10 units/ml		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			

Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Serology			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Yes		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Yes		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Study characteristics			
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process		
Patient characteristics and setting	Sample size: 107 Female: 71 (66.4%) Age: 85 years Presentation: 1. Adults > 75 years Exclusion criteria: 1. Contraindication to biopsy Setting: secondary care, Switzerland		
Index tests	Index test 1: urea breath test- ¹³ C Further details: Technical specifications: ABCA, Europa Scientific Performed by: not stated Criteria for positive diagnosis: delta over baseline > 3.5% (30 minutes) Index test 2: serology Further details: Technical specifications: Pyloriset EIA Kit (Orion Diagnostica) Performed by: not stated Criteria for positive diagnosis: > 300 Units Index test 3: stool antigen test Further details: Technical specifications: Premier Platinum HpSA, Meridian Performed by: not stated Criteria for positive diagnosis: Absorbance (wavelength not reported) > 0.160		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			

Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Urea breath test-¹³C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 2: Index Test Stool Antigen Test			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 2: Index Test Serology			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Yes		
		Unclear	Low
DOMAIN 3: Reference Standard			

Salles-Montaudon 2002 (Continued)

Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Schilling 2001

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 68 Female: 20 (29.4%) Age: 62 years Presentation: 1. Patients with partial gastric resection Exclusion criteria: Recent <i>H pylori</i> treatment Setting: secondary care, Germany
Index tests	Index test: urea breath test- ¹³ C Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: delta over baseline > 4.0% (30 minutes)

Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with Warthin-Starry stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	High
DOMAIN 2: Index Test Urea breath test- ¹³ C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	Yes		

Schilling 2001 (Continued)

Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		Unclear	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Scuderi 2000

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 250 Female: 127 (50.8%) Age: 58 years Presentation: 1. Patients with dyspeptic symptoms Setting: secondary care, Italy
Index tests	Index test: stool antigen test Further details: Technical specifications: Premier Platinum HpSA (Meridian Diagnostics) Performed by: not stated Criteria for positive diagnosis: not stated
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy

Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Stool Antigen Test			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	Yes		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		Unclear	Low

DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Segamwenge 2014

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: neither - patients with recent antibiotic treatment were excluded
Patient characteristics and setting	Sample size: 160 Female: not stated Age: not stated Presentation: 1. Patients with dyspepsia Exclusion criteria 1. Could not tolerate endoscopy 2. Recent <i>H pylori</i> treatment 3. Pain attributable to pancreas or liver 4. NSAID-related dyspepsia Setting: secondary care, Italy
Index tests	Index test: stool antigen test Further details: Technical specifications: Rapid strip HPSA (Meridian Bioscience) Performed by: not stated Criteria for positive diagnosis: not stated
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy (staining not reported, probably H & E) Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated

Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	No		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		High	Unclear
DOMAIN 2: Index Test Stool Antigen Test			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			

Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	No		
		High	

Selcukcan 2011

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 100 Female: 47 (47%) Age: not stated Presentation: 1. Infants undergoing endoscopy Exclusion criteria: 1. No recent <i>H pylori</i> treatment Setting: secondary care, Turkey
Index tests	Index test: urea breath test- ¹⁴ C Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: not stated
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy (staining not reported, probably H & E) Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated
Comparative	
Notes	

Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Urea breath test-¹⁴C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		

Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Sharbatdaran 2013

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: consecutive patients
Patient characteristics and setting	Sample size: 61 Female: 36 (59%) Age: 31 years Presentation: 1. Patients with dyspepsia Exclusion criteria: 1. Recent <i>H pylori</i> infection 2. Gastric cancer 3. Bleeding during endoscopy Setting: secondary care, Iran
Index tests	Index test: stool antigen test Further details: Technical specifications: GA Generic Assay Performed by: not stated Criteria for positive diagnosis: Absorbance 450 nm > + 0.1 of negative control
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 0 (0%)
Comparative	
Notes	
Methodological quality	

Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Yes		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Yes		
		Low	Low
DOMAIN 2: Index Test Stool Antigen Test			
Were the index test results interpreted without knowledge of the results of the reference standard?	Yes		
If a threshold was used, was it pre-specified?	Yes		
		Low	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Yes		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		

Were all patients included in the analysis?	Yes		
		Unclear	

Sheu 1998a

Study characteristics			
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process		
Patient characteristics and setting	Sample size: 135 Female: not stated Age: not stated Presentation: 1. Patients with dyspepsia Setting: secondary care, Mexico		
Index tests	Index test: urea breath test- ¹³ C Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: not clearly stated		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy (staining not reported, probably H & E) Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		

Sheu 1998a (Continued)

Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Urea breath test-¹³C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Sheu 1998b

Study characteristics			
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process		
Patient characteristics and setting	Sample size: 66 Female: not stated Age: not stated Presentation: 1. Patients with gastrectomy Setting: secondary care, Mexico		
Index tests	Index test: urea breath test- ¹³ C Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: not clearly stated		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy (staining not reported, probably H & E) Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	High

DOMAIN 2: Index Test Urea breath test- ¹³ C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Shin 2009

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 651 Female: 254 (39%)

	Age: 58 years Presentation: 1. Patients undergoing endoscopy Exclusion criteria: 1. Recent <i>H pylori</i> treatment 2. Chronic medication 3. Gastric surgery Setting: secondary care, South Korea		
Index tests	Index test: serology Further details: Technical specifications: Genedia <i>H pylori</i> Performed by: not stated Criteria for positive diagnosis: Absorbance 450 nm > 0.406		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Serology			

Shin 2009 (Continued)

Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Yes		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	Yes		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		Unclear	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Soomro 2012

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 100 Female: 44 (44%) Age: not stated Presentation: 1. Patients undergoing endoscopic biopsy for dyspepsia or gastritis

	Setting: secondary care, Pakistan		
Index tests	Index test: serology Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: not stated Index test: stool antigen test Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: not stated		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Stool Antigen Test			
Were the index test results interpreted without knowledge of the results of the reference stan-	Unclear		

dard?			
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 2: Index Test Serology			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	Yes		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		Unclear	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Surveyor 1989

Study characteristics			
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: consecutive patients		
Patient characteristics and setting	Sample size: 63 Female: 30 (47.8%) Age: 59 years Presentation: 1. Patients with symptoms related to upper gastrointestinal tract undergoing endoscopy Setting: secondary care, Australia		
Index tests	Index test: urea breath test- ¹⁴ C Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: not stated		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain, Warthin-Starry stain, and Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 0 (0%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Yes		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Yes		
		Low	Low

DOMAIN 2: Index Test Urea breath test- ¹⁴ C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Yes		
		Unclear	

Thobani 1995

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 26 Female: not stated

	Age: not stated Presentation: 1. Patients with upper gastrointestinal symptoms Setting: secondary care, Pakistan		
Index tests	Index test: serology Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: > 2		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Serology			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		

Thobani 1995 (Continued)

If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Tiwari 2014

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 30 Female: 25 (83.3%) Age: not stated Presentation: 1. Patients undergoing endoscopy Exclusion criteria: 1. Recent <i>H pylori</i> treatment Setting: secondary care, India

Index tests	Index test: urea breath test- ¹⁴ C Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: disintegrations per minute > 200 (10 minutes)		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy (staining not reported, probably H & E) Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Urea breath test- ¹⁴ C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low

DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Trevisani 2005

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 105 Female: 50 (47.6%) Age: 58 years Presentation: 1. Patients referred to endoscopy centre Exclusion criteria: 1. Recent <i>H pylori</i> treatment 2. Pregnancy or lactation 3. Steroids or NSAID treatment 4. Prior gastric surgery 5. Bleeding peptic ulcer 6. Severe concomitant diseases Setting: secondary care, Italy

Index tests	Index test 1a: stool antigen test Further details: Technical specifications: Amplified IDEA Hp StAR Performed by: doctor Criteria for positive diagnosis: Absorbance 450 nm ≥ 0.190 Index test 1b: stool antigen test Further details: Technical specifications: Immunocard Stat Performed by: doctor Criteria for positive diagnosis: pink red band (5 minutes)		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Stool Antigen Test			
Were the index test results interpreted without knowledge of the results of the reference standard?	Yes		

Trevisani 2005 (Continued)

If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Vandenplas 1992

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: consecutive patients
Patient characteristics and setting	Sample size: 95 Female: 50 (52.6%) Age: 9 years Presentation: 1. Children with chronic abdominal pain Exclusion criteria: 1. Recent <i>H pylori</i> treatment Setting: secondary care, Belgium

Index tests	Index test 1: urea breath test- ¹³ C Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: not clearly stated Index test 2: serology Further details: Technical specifications: Malakit Helicobacter pylori (Biolab) Performed by: not stated Criteria for positive diagnosis: > Mean + 3 standard deviations above normal level		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 0 (0%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Yes		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Yes		
		Low	Low
DOMAIN 2: Index Test Urea breath test- ¹³ C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		

If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 2: Index Test Serology			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Yes		
		Unclear	

Villalobos 1992

Study characteristics			
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process		
Patient characteristics and setting	Sample size: 105 Female: 69 (65.7%) Age: not stated Presentation: 1. Patients with dyspepsia Excluded: 1. Recent <i>H pylori</i> treatment 2. Patients taking steroids 3. Patients with coagulopathy 4. Patients allergic to penicillin 5. Pregnancy or lactation Setting: secondary care, Mexico		
Index tests	Index test: urea breath test- ¹⁴ C Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: disintegrations per minute > 1.6% (60 minutes)		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		

Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Urea breath test-¹⁴C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	Yes		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		Unclear	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Study characteristics			
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: neither - patients with recent antibiotic treatment were excluded		
Patient characteristics and setting	Sample size: 123 Female: 69 (56.1%) Age: 48 years Presentation: 1. Asymptomatic individuals Exclusion criteria: 1. Recent <i>H pylori</i> therapy 2. Gastric surgery Setting: secondary care, Italy		
Index tests	Index test: serology Further details: Technical specifications: Assure <i>H pylori</i> Rapid Test (CIM-test, Genelabs Diagnostics Ltd) Performed by: not stated Criteria for positive diagnosis: not stated		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain, Warthin-Starry stain, and Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 214 (63.5%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	No		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		

		High	Unclear
DOMAIN 2: Index Test Serology			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Yes		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	No		
		High	

Wardi 2012

Study characteristics			
Patient sampling	Type of study: retrospective study Consecutive or random sample: unclear sampling process		
Patient characteristics and setting	Sample size: 76 Female: 15 (19.7%) Age: 70 years Presentation: 1. Patients with partial gastrectomy Setting: secondary care, Israel		
Index tests	Index test: urea breath test - C13 Further details: Technical specifications: BreathID Performed by: not stated Criteria for positive diagnosis: not clearly stated		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	High

DOMAIN 2: Index Test Urea breath test- ¹³ C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	No		
		High	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Weiss 1994

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 95 Female: not stated

	Age: not stated Presentation: 1. Patients with abdominal pain Exclusion criteria: 1. Recent <i>H pylori</i> treatment Setting: secondary care, USA		
Index tests	Index test 1a: serology Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: not stated Index test 1b: serology Further details: Technical specifications: Cobas Core anti- <i>H pylori</i> (Roche) Performed by: not stated Criteria for positive diagnosis: not stated		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear

DOMAIN 2: Index Test Serology			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Yan 2003

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: neither - patients with recent antibiotic treatment were excluded

Patient characteristics and setting	Sample size: 31 Female: not stated Age: not stated Presentation: 1. Patients undergoing endoscopy Exclusion criteria: 1. Recent <i>H pylori</i> treatment Setting: secondary care, China		
Index tests	Index test: stool antigen test Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: Absorbance 450/630 nm ≥ 0.120		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with Warthin-Starry stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 32 (50.8%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	No		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		High	Unclear
DOMAIN 2: Index Test Stool Antigen Test			

Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	Yes		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		Unclear	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	No		
		High	

Yoshimura 2001

Study characteristics	
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: unclear sampling process
Patient characteristics and setting	Sample size: 72 Female: 34 (47.2%) Age: 13 years Presentation:

	1. Children undergoing endoscopy for symptoms such as anaemia and abdominal pain Exclusion criteria: 1. Recent <i>H pylori</i> treatment Setting: secondary care, Japan		
Index tests	Index test 1: urea breath test- ¹³ C Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: delta over baseline > 3.0% (20 minutes and 30 minutes) Index test 2: serology Further details: Technical specifications: HM-CAP Anti- <i>H pylori</i> -EIA; Kyowa Medics Performed by: not stated Criteria for positive diagnosis: ≥ 1.8		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Giemsa stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: not stated		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Unclear		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		
		Unclear	Unclear
DOMAIN 2: Index Test Urea breath test- ¹³ C			

Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Yes		
		Unclear	Low
DOMAIN 2: Index Test Serology			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Unclear		
		Unclear	

Study characteristics			
Patient sampling	Type of study: unclear whether prospective or retrospective study Consecutive or random sample: neither - patients with recent antibiotic treatment were excluded		
Patient characteristics and setting	Sample size: 88 Female: not stated Age: not stated Presentation: 1. Patients undergoing endoscopy Exclusion criteria: 1. Recent <i>H pylori</i> treatment Setting: secondary care, Singapore		
Index tests	Index test: urea breath test- ¹⁴ C Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: not stated		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain and Warthin-Starry stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 16 (16.5%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	No		
Was a case-control design avoided?	Yes		
Did the study avoid inappropriate exclusions?	Unclear		

		High	Unclear
DOMAIN 2: Index Test Urea breath test-¹⁴C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Yes		
		Unclear	High
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		
Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	No		
		High	

Yu 2001

Study characteristics	
Patient sampling	Type of study: retrospective study Consecutive or random sample: consecutive patients

Patient characteristics and setting	Sample size: 32 Female: 14 (43.8%) Age: 51 years Presentation: 1. Patients undergoing endoscopy Exclusion criteria: 1. Recent <i>H pylori</i> treatment 2. Gastric surgery Setting: secondary care, Taiwan, China		
Index tests	Index test 1: urea breath test- ¹³ C Further details: Technical specifications: not stated Performed by: not stated Criteria for positive diagnosis: delta over baseline > 2.8% (15 minutes) Index test 2: stool antigen test Further details: Technical specifications: Premier Platinum HpSA, Meridian Performed by: not stated Multiple criteria for positive diagnosis: <ul style="list-style-type: none">● Absorbance 450 nm > 0.140● Visual assessment by gastroenterologists		
Target condition and reference standard(s)	Target condition: <i>H pylori</i> infection Reference standard: endoscopic biopsy with H & E stain Further details: Technical specifications: not stated Performed by: endoscopist and pathologist Criteria for positive diagnosis: presence of <i>H pylori</i> in biopsy		
Flow and timing	Number of indeterminates for whom the results of reference standard was available: not stated Number of patients who were excluded from the analysis: 0 (0%)		
Comparative			
Notes			
Methodological quality			
Item	Authors' judgement	Risk of bias	Applicability concerns
DOMAIN 1: Patient Selection			
Was a consecutive or random sample of patients enrolled?	Yes		
Was a case-control design avoided?	Yes		

Did the study avoid inappropriate exclusions?	Yes		
		Low	Low
DOMAIN 2: Index Test Urea breath test-¹³C			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Yes		
		Unclear	Low
DOMAIN 2: Index Test Stool Antigen Test			
Were the index test results interpreted without knowledge of the results of the reference standard?	Unclear		
If a threshold was used, was it pre-specified?	Unclear		
		Unclear	Low
DOMAIN 3: Reference Standard			
Is the reference standards likely to correctly classify the target condition?	No		
Were the reference standard results interpreted without knowledge of the results of the index tests?	Unclear		
		High	Low
DOMAIN 4: Flow and Timing			
Was there an appropriate interval between index test and reference standard?	Unclear		

Yu 2001 (Continued)

Did all patients receive the same reference standard?	Yes		
Were all patients included in the analysis?	Yes		
		Unclear	

CO₂ - carbon dioxide;

H & E stain - haematoxylin and eosin stain;

HpSA - *H. pylori* stool antigen;

IgA - immunoglobulin A;

IgG - immunoglobulin G;

NMR - nuclear magnetic resonance;

NSAID - non-steroidal anti-inflammatory

WBC - white blood cell

All other acronyms and abbreviations are the full title of either products or companies producing products included in the study.

Characteristics of studies awaiting classification [ordered by study ID]

Buhigas-Garcia 2008

Study characteristics	
Patient sampling	
Patient characteristics and setting	
Index tests	urea breath test- ¹³ C
Target condition and reference standard(s)	
Flow and timing	
Comparative	
Notes	

Fazeli 2004

Study characteristics	
Patient sampling	
Patient characteristics and setting	
Index tests	salivary test, potential index tests of interest
Target condition and reference standard(s)	
Flow and timing	
Comparative	
Notes	

Fuke 2009

Study characteristics	
Patient sampling	
Patient characteristics and setting	
Index tests	serology
Target condition and reference standard(s)	
Flow and timing	
Comparative	
Notes	

Glupczynski 1991

Study characteristics	
Patient sampling	
Patient characteristics and setting	

Glupczynski 1991 (Continued)

Index tests	urea breath test- ¹³ C
Target condition and reference standard(s)	
Flow and timing	
Comparative	
Notes	

Karczewska 1997

Study characteristics	
Patient sampling	
Patient characteristics and setting	
Index tests	serology
Target condition and reference standard(s)	
Flow and timing	
Comparative	
Notes	

Kushch 2014

Study characteristics	
Patient sampling	
Patient characteristics and setting	
Index tests	unclear
Target condition and reference standard(s)	
Flow and timing	

Kushch 2014 (Continued)

Comparative	
Notes	

Lappas 1997

Study characteristics	
Patient sampling	
Patient characteristics and setting	
Index tests	salivary test, potential index tests of interest
Target condition and reference standard(s)	
Flow and timing	
Comparative	
Notes	

Lee 1999a

Study characteristics	
Patient sampling	
Patient characteristics and setting	
Index tests	urea breath test- ¹³ C
Target condition and reference standard(s)	
Flow and timing	
Comparative	
Notes	

Martin-de-Argila 1997

Study characteristics	
Patient sampling	
Patient characteristics and setting	
Index tests	serology
Target condition and reference standard(s)	
Flow and timing	
Comparative	
Notes	

Mason 1997

Study characteristics	
Patient sampling	
Patient characteristics and setting	
Index tests	urea breath test
Target condition and reference standard(s)	
Flow and timing	
Comparative	
Notes	

Thong-Ngam 2011

Study characteristics	
Patient sampling	
Patient characteristics and setting	

Thong-Ngam 2011 (Continued)

Index tests	serology
Target condition and reference standard(s)	
Flow and timing	
Comparative	
Notes	

Tokunaga 2005a

Study characteristics	
Patient sampling	
Patient characteristics and setting	
Index tests	urea breath test
Target condition and reference standard(s)	
Flow and timing	
Comparative	
Notes	

Xu 1995

Study characteristics	
Patient sampling	
Patient characteristics and setting	
Index tests	urea breath test- ¹³ C
Target condition and reference standard(s)	
Flow and timing	

Xu 1995 (Continued)

Comparative	
Notes	