

# INPLASY PROTOCOL

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None declared.

## Global trend of Helicobacter pylori infection 1980-2022: A systematic review and meta-analysis

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**Review question / Objective:** To explore the temporal trend of global H.pylori infection prevalence over the past four decades. Also, to probe its association with countries' income and universal health coverage levels.

**Condition being studied:** Helicobacter pylori (H.pylori), a gram-negative bacterium discovered by Marshall and Warren in 1983 as the chief 'culprit' for peptic ulcer, has attracted more and more attention to its prevalence worldwide. The discovery of H.pylori was a significant milestone in gastroenterology development. However, due to the non-uniform testing method, screening procedure, or indications, the time trend of its prevalence change is still ambiguous and controversial. Reported infection prevalence varies in diverse countries/regions, from lower than 30% among American populations to over 40% in the WestPacific region. Great difficulties were posed in evaluating the time trend by fluctuation and change of the H.pylori infection in different regions.

**INPLASY registration number:** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 06 October 2022 and was last updated on 28 November 2022 (registration number INPLASY2022100026).

### INTRODUCTION

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screening procedure, or indications, the time trend of its prevalence change is still ambiguous and controversial. Reported infection prevalence varies in diverse countries/regions, from lower than 30% among American populations to over 40% in the WestPacific region. Great difficulties were posed in evaluating the time trend by fluctuation and change of the H.pylori infection in different regions.

## METHODS

**Search strategy:** Pubmed: ((HP[Title/Abstract]) OR (((H\$ Pylori[Title/Abstract]) OR (pylori[Title/Abstract])) OR (((((Helicobacter nemestrinae[Title/Abstract]) OR (Campylobacter pylori[Title/Abstract])) OR (Campylobacter pylori subsp. pylori[Title/Abstract])) OR (Campylobacter pyloridis[Title/Abstract])) OR ("Helicobacter pylori"[Mesh]))) AND (((prevalence[Title/Abstract]) OR (seroprevalence[Title/Abstract])) OR (survery[Title/Abstract])) OR (incidence[Title/Abstract])) AND (1980/1:2022/6[pdat])

Embase: ('helicobacter pylori'/exp OR 'helicobacter nemestrinae':ab,ti OR 'campylobacter pylori':ab,ti OR 'campylobacter pylori subsp. pylori':ab,ti OR 'campylobacter pyloridis':ab,ti OR 'hpylori':ab,ti) AND ('prevalence':ab,ti OR 'incidence':ab,ti OR 'seroprevalence':ab,ti OR 'survey':ab,ti)

Embase: Date of pub From 1980-

1 'helicobacter pylori'/exp

2 'Helicobacter pylori':ab,ti OR 'H. pylori':ab,ti OR 'Campylobacter pylori':ab,ti OR 'helicobacter nemestrinae':ab,ti

3 'prevalence':ab,ti OR 'incidence':ab,ti OR 'seroprevalence':ab,ti OR 'survey':ab,ti

4 #1 OR #2

5 #2 AND #3 AND #4

MEDLINE: Date of pub From 1980

1 exp Helicobacter pylori/

2 (Helicobacter pylori or H pylori or Campylobacter pylori).ab,ti.

3 (prevalence or incidence or epidemiology or seroprevalence or survey).ab,ti.

4 1 or 2

5 3 and 4.

**Participant or population:** Studies reported the prevalence of H.pylori infection.

**Intervention:** Not available.(Report with prevalence).

**Comparator:** Not available.(Report with prevalence).

**Study designs to be included:** Retrospective study, population-based study, territory study.

**Eligibility criteria:** Studies that described the prevalence of H. pylori. Diagnosis of H. pylori infection could be done by urea breath test (UBT), serology (anti-IgG antibody), histological methods, rapid urease test (RUT), and stool antigen test. Meta-analysis, systematic review, conference paper, editorials and other inappropriate form of studies were excluded. Specific sub-group of population (such as immune-deficiency, pregnant or cancer patients) were not included. Studies that failed to demonstrate the prevalence of H. pylori infection and detection methods were also eliminated.

**Information sources:** Data acquisition can be done by contacting with author by mail(yunhaoli@connect.hku.hk).

**Main outcome(s):** 264 records from 71 countries or regions across six WHO regions were included. The changes in prevalence were relatively static before 2000 but declined sharply in the last decade. Overall, individuals who were younger, from high-income countries, and countries with the higher UHC level had a lower prevalence of H. pylori infection. Studies based on serological diagnosis methods reported higher prevalence than other diagnostic methods, and only studies that were based on urea breath tests showed a decline in H. pylori prevalence during this study period.

**Quality assessment / Risk of bias analysis:** Two independent authors did quality assessments using the Critical Appraisal of the Health Research Literature: Prevalence or Incidence of a Health Problem by

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Patricia L Loney et al. Maximum score of the intact quality assessment procedure is eight points, including three aspects of valid study methods, results interpretation, and result applicability. Total score of eight questions was calculated.

**Strategy of data synthesis:** Heterogeneity was assessed by use of the  $I^2$  index and Cochran Q test. Pooled prevalence and the corresponding 95% confidence interval were carried out by the random-effects model. P-value of less than 0.05 was deemed statistically significant in all analyses.

**Subgroup analysis:** The synthesized study results were used for subgroup analysis and meta-regression to account for heterogeneity in the prevalence of H.pylori infection. In the meta-regression analyses, variables displayed a significance in the univariable meta-regression (determined by P-value for test moderator) were included in the multivariable meta regression model.

**Sensitivity analysis:** Publication bias and sensitivity analysis was not performed due to methodological issues for prevalence studies.

**Country(ies) involved:** Hong Kong SAR, China.

**Keywords:** Prevalence, Epidemiology, Helicobacter pylori, Systematic review.

**Contributions of each author:**

Author 1 - Yunhao Li.

Author 2 - Fang Jiang.

Author 3 - Kathy Leung.

Author 4 - Horace Choi.

Author 5 - Joseph Wu.

Author 6 - Wai Keung Leung.