Supplementary Materials

Trends of gastric cancer burdens attributable to risk factors in China from 2000 to 2050

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Supplementary Methods

Quality control of gastric cancer data

The comparability, validity, and completeness of the gastric cancer (GC) data were assessed using indicators including mortality/incidence rate ratios, percentage of cases with morphological verification , percentage of cases with death certificate-only, and the stability of cancer trends over years according to the criteria of "Cancer Incidence in Five Continents Volume IX" by International Agency for Research on Cancer/International Association of Cancer Registries (IARC/IACR) and the "Guideline for Chinese Cancer Registration". All newly diagnosed cancer cases were coded according to the International Classification of Diseases for Oncology, 3rd edition (ICD-O-3) and the International Statistical Classification of Diseases, 10th revision (ICD-10). Cardia gastric cancer (CGC) (C16.0) and non-cardia gastric cancer (NCGC) (C16.1-16.8) were categorized as squamous cell carcinoma (M-8070/3), adenocarcinoma (M-8140/3, M-8144/3, M-8211/3, M-8260/3, M-8480/3), linitis plastica (M-8142/3), carcinoid tumor (M-8240/3), neuroendocrine carcinoma (M-8246/3), signet ring cell carcinoma (M-8490/3), sarcoma (M-8800/3), gastrointestinal mesenchymal sarcoma (M-8936/3), and unspecified type (M-9999/3).

Gastric cancer cases estimation in China

Firstly, the subcategory distribution of GC in 22 cancer registries was adjusted according to the national subcategory distribution ratios by sex (male/female) and 5-year age groups considering the subcategory distribution of GC varies between the 22

registries and the national level. Then, the incidence rates of CGC and NCGC in China from 2000 to 2015 were estimated according to the following formula:

$$R_{i-1} = \frac{r_{i-1}}{r_i} \times R_i$$

Where R_i was the age-specific incidence rate by sex in China of i year, r_i was the age-specific incidence rate by sex in 22 cancer registries of i year.

The prototype equations of the Bayesian age-period-cohort model and prior

Previous studies have used several methods to predict cancer incidence based on population data, including the Bayesian-APC model, Nordpred model, and Poisson regression[1-3]. The Non-identifiability has been a fundamental problem for the traditional Age-Period-Cohort model, which simultaneously incorporates three non-independent variables (age, period, and birth cohort)[4,5]. Comparative studies based on these prediction methods showed that the predictive performance and calibration of BAPC results were better than non-Bayesian APC models, and the BAPC model combined prior knowledge with observational data and was less dependent on parametric assumptions, which had more stable predictions over the long term[6,7]. Therefore, we estimated the projection of GC burden based on integrated nested Laplace approximations (INLA) for full Bayesian inference of the R packages ("BAPC" and "INLA"), and the BAPC model generated age-specific and age-standardized projected incidence, which smoothed the prediction and attenuated the effect of bias from extreme values[8,9].

The frequentist age-period-cohort model was the general linear and could be formulated as:

$$\log(\lambda_{apc}) = \mu + \alpha_a + \beta_p + \gamma_c$$

where α denoted the age effect and a was the age groups (generally 5-year age groups, a=1, 2, 3 …18). β denoted the period effect and p was the specific year (assuming 1-year interval, p=1, 2, 3 ...n). γ denoted the birth cohort effect and c was the number of birth cohorts.

λ_{apc} was the function for the corresponding age, period and birth cohort with the following formula:

$$\lambda_{apc} = f\left(\frac{n_{apc}}{N_{apc}}\right)$$

where n_{apc} and N_{apc} was the corresponding number of cases and population, respectively. The function of λ_{apc} exhibited the Poisson, binomial, or negative binomial distribution depending on the actual data.

On this basis, the Bayesian analysis provided a method of assuming probability, synthesizing the prior knowledge of the unknown parameter with the sample information to derive the posterior knowledge, and inferring the unknown parameter according to the posterior information. The prior knowledge estimated according to the following formula:

$$P(A_i|B) = \frac{P(A_i)P(B|A_i)}{\sum_i^n P(A_i)P(B|A_i)} (i = 1,2, \dots n)$$

where $P(A_i)$ was the prior probability and $P(A_i|B)$ was the posterior probability.

Data on main risk factors and relative risk (RR) for gastric cancer

The definitions of main risk factors were as follows: (1) *H. pylori* infection was defined the positive status of infection by enzyme-linked immunosorbent assay (ELISA),

immunoblotting or urea breath test (UBT); (2) the alcohol consumption was defined the status of regular drinking alcohol at least three times a week; (3) smoking was defined the status of current smoking at accumulating up to 100 cigarettes or still smoking; (4) the intake of pickled vegetable was defined exclude those who did not use or consumed pickled vegetable minimally; (5) diabetes was defined by the American Diabetes Association criteria (self-report diabetes diagnosed by a health professional or with a fasting plasma glucose level of 126mg/dL or higher, a 2-hour plasma glucose level of 200mg/dL or greater after a 75g oral glucose challenge, or HbA_{1c} level of 6.5% or greater); (6) BMI was followed the classification criteria of the largest nested case-control study in Asia (Asia Cohort Consortium), using the BMI range of 22.6 to 25.0 as the reference, with underweight (BMI<18.5) and overweight/obesity (BMI>25.0) combined as the unhealthy BMI. Selection of national surveys covering eastern, central and western regions, with the stable urban-rural ratio, male-female ratio and survey frequencies consistent with study period to obtain the prevalence of risk factors. Data on smoking and alcohol consumption were derived from six volumes of Analysis Reports of the National Health Services Surveys in China, which was initiated in 1993 and conducted every five years using a multistage stratified probability sampling method. Up to 2018, the six volumes have cumulatively covered 31 provinces across China for 270,000 samples, with an urban-rural population rate of 1.10[10]. Data on BMI and pickled vegetable were extracted from the China Health and Nutrition Survey (CHNS), an ongoing open cohort that began in 1989 and has completed nine rounds of surveys with international collaboration between China and the US. CHNS used a

multistage, random cluster sampling method covering about 30,000 samples in 15 provinces and municipal cities from 60 urban communities, 60 suburban communities, 42 towns, and 126 villages across China[11]. For diabetes, we aggregated the prevalence by five nationally sampled studies with uniform definition on diabetes from 1994 to 2017. By using a multistage stratified sampling method, the latest survey was conducted from 2015 to 2017 and covered 31 provinces and 75,880 individuals with an urban-rural population rate of 1.14[12].

We attempted to prioritize the meta-analysis of the associations between these risk factors and CGC/NCGC to obtain RRs. The search strategy of the systematic review on the association between these risk factors and CGC/NCGC risk: We used the following key Medical Subject Heading terms and free words related to “cardia gastric cancer”, “non-cardia gastric cancer”, “Helicobacter pylori/smoking/alcohol consumption/pickled vegetable/diabetes/body weight”, “Cohort Studies” and “China” to conduct a systematic search on articles published in PubMed, Embase, China National Knowledge Infrastructure (CNKI) and Wanfang between January 1, 1990, and June 1, 2022. The final study inclusion criteria: (1) RRs and corresponding 95% CIs were reported or provided data to calculate; (2) Study design was a cohort study or nested case-control study; (3) Only the article with the largest sample size was selected among several studies conducted on the same population. However, due to the limitations of the existing literature, we were not able to obtain separate RRs for CGC and NCGC by using meta-analyses for most of the risk factors. Therefore, we finally decided to select the individual RRs for CGC and NGCG for *H. pylori* infection,

respectively, by using a sensitive detection method in a large Chinese cohort[13], and use the RRs foe GC overall based on the present meta-analysis of the target risk factor and GC for other risk factors[14-18]. Among these, non-sex-specific risk factors were defined as risk factors that were not explicitly identified as sex-specific in the Continuous Update expert Project 2018[19], or risk factors that failed to obtain the sex-specific RR from meta-analyses or representative cohort studies of the association analysis of risk factors with GC in the Chinese population.

The search strategy of the systematic review on the prevalence of *H. pylori* infection in China: We used the following key Medical Subject Heading terms and free words related to "*Helicobacter pylori*", "prevalence" and "China" to conduct a systematic search on articles published in PubMed, Embase, China National Knowledge Infrastructure (CNKI) and Wanfang between January 1, 1990, and June 1, 2022. **Supplementary Figure 1** shows the flowchart of the study inclusion for the *Helicobacter pylori* (*H. pylori*) infection. The original articles reporting the prevalence of *H. pylori* infection in the general Chinese population were included (see **Supplementary Table 2**). We excluded studies based on the flowing criteria: (1) missing useful information about the study population, such as age, sex, and study period; (2) the prevalence reported only for children; (3) missing prevalence, or sample size and the number of positive infections unknown; (4) non-general population-based sampling. Then, we extracted useful information from the final articles including first author, publication year, sex, the prevalence of *H. pylori* infection, sample size, number of positive infections, study period, location, detection method and other relevant

information. The overall prevalence of *H. pylori* infection was calculated by using random effect meta-analysis. Subgroup meta-analyses were further conducted by the study periods. Cochran's Q statistic and I^2 statistics were used to assess possible heterogeneity among included studies. The quality of the included articles was assessed using the Loney Score Criteria[20], which were classified according to eight methodological criteria. **Supplementary Table 3** presents the results of the quality assessment for each study. To determine the effect of publication bias, we performed the following sensitivity analysis: excluding studies with a score of less than 5 points according to the Loney Criteria.

Attributable burden calculation

The PAF of each risk factor was calculated from the following formula:

$$PAF = \frac{\sum_{i=1}^{n} P_i(RR_i - 1)}{\sum_{i=1}^{n} P_i(RR_i - 1) + 1}$$

Where P_i was the prevalence of exposure category i, RR_i was the RR at exposure category i, n was the number of exposure categories.

To account for interaction among multiple risk factors, the overall PAFs for all relevant risk factors by cancer site were calculated from the following formula:

$$PAF_{overall} = 1 - \prod_{r=1}^{R}(1 - PAF_r)$$

Where PAF_r was the PAF of the *r*th risk factor, and R refers to the number of risk factors.

The 95% CIs of PAFs were estimated using the variance of PAF based on the delta method from the following formula:

$$\mathrm{Var(PAF)} = \frac{[\exp(\beta) - 1]^2 \times var(P) + [P \times \exp(\beta)]^2 \times var(\beta)}{(P \times [\exp(\beta) - 1] + 1)^4}$$

$$\beta = \ln RR$$

Where P is the prevalence of exposure risk factor and the variance of β was calculated from the CIs of RR. The variance of prevalence was considered null when the prevalence data represents data of the whole population.

PAFs of modifiable risk factors for CGC and NCGC were estimated by sex, and then multiplied by the corresponding CGC and NCGC cancer cases in selected periods to calculate the attributable cases with 95% CIs in males and females, respectively. The total attributed cases of modifiable risk factors in the Chinese population were the sum of attributed cases in males and females, and then divided by the total CGC and NCGC cases in China to determine the overall PAFs and corresponding 95% CIs.

The current estimates of PAFs and attributable cases of modifiable risk factors for CGC and NCGC in urban and rural areas were calculated by the prevalence of risk factors by urban and rural areas in 2015 and corresponding CGC/NCGC cases and RRs (the prevalence of H. pylori infection was obtained from urban/rural subgroup of above meta-analysis, and the prevalences of other risk factors were obtained from previously mentioned surveys).

Reference:

1. Yu J, Yang X, He W, Ye W. Burden of pancreatic cancer along with attributable risk factors in Europe between 1990 and 2019, and projections until 2039. *Int J Cancer* 2021; **149**(5): 993-1001.
2. Liu Z, Xu K, Jiang Y, et al. Global trend of aetiology-based primary liver cancer incidence from 1990 to 2030: a modelling study. *Int J Epidemiol* 2021; **50**(1): 128-42.
3. Arnold M, Laversanne M, Brown LM, Devesa SS, Bray F. Predicting the Future Burden of Esophageal Cancer by Histological Subtype: International Trends in Incidence up to 2030. *Am J*

Gastroenterol 2017; **112**(8): 1247-55.
4. Mason KO, Mason WM, Winsborough HH, Poole WK. Some Methodological Issues in Cohort Analysis of Archival Data. *American Sociological Review* 1973; **38**(2): 242-58.
5. Lin Y, Zheng Y, Wang HL, Wu J. Global Patterns and Trends in Gastric Cancer Incidence Rates (1988-2012) and Predictions to 2030. *Gastroenterology* 2021; **161**(1): 116-27 e8.
6. Møller B, Weedon-Fekjær H, Hakulinen T, et al. Prediction of cancer incidence in the Nordic countries up to the year 2020. *European journal of cancer prevention : the official journal of the European Cancer Prevention Organisation (ECP)* 2002; **11 Suppl 1**: S1-96.
7. Smith TR, Wakefield J. A Review and Comparison of Age–Period–Cohort Models for Cancer Incidence. *Statistical Science* 2016; **31**(4).
8. Fong Y, Rue H, Wakefield J. Bayesian inference for generalized linear mixed models. *Biostatistics* 2010; **11**(3): 397-412.
9. Rue H, Martino S, Chopin N. Approximate Bayesian inference for latent Gaussian models by using integrated nested Laplace approximations. *Journal of the Royal Statistical Society: Series B (Statistical Methodology)* 2009; **71**(2): 319-92.
10. Center for Health Statistics and Information (NHC). National Health Service Survey. http://www.nhc.gov.cn/mohwsbwstjxxzx/s8211/new_list.shtml/.
11. UNC Carolina Population Center project. China Health and Nutrition Survey. https://www.cpc.unc.edu/projects/china.
12. Wang L, Peng W, Zhao Z, et al. Prevalence and Treatment of Diabetes in China, 2013-2018. *JAMA* 2021; **326**(24): 2498-506.
13. Yang L, Kartsonaki C, Yao P, et al. The relative and attributable risks of cardia and non-cardia gastric cancer associated with Helicobacter pylori infection in China: a case-cohort study. The Lancet Public Health 2021; 6(12): e888-e96.
14. Nishino Y, Inoue M, Tsuji I, et al. Tobacco smoking and gastric cancer risk: an evaluation based on a systematic review of epidemiologic evidence among the Japanese population. *Jpn J Clin Oncol* 2006; **36**(12): 800-7.
15. Deng W, Jin L, Zhuo H, Vasiliou V, Zhang Y. Alcohol consumption and risk of stomach cancer: A meta-analysis. *Chem Biol Interact* 2021; **336**: 109365.
16. Ren JS, Kamangar F, Forman D, Islami F. Pickled food and risk of gastric cancer--a systematic review and meta-analysis of English and Chinese literature. *Cancer Epidemiol Biomarkers Prev* 2012; **21**(6): 905-15.
17. Tian T, Zhang LQ, Ma XH, Zhou JN, Shen J. Diabetes mellitus and incidence and mortality of gastric cancer: a meta-analysis. *Exp Clin Endocrinol Diabetes* 2012; **120**(4): 217-23.
18. Jang J, Wang T, Cai H, et al. The U-shaped association between body mass index and gastric cancer risk in the Helicobacter pylori Biomarker Cohort Consortium: A nested case-control study from eight East Asian cohort studies. *Int J Cancer* 2020; **147**(3): 777-84.
19. WCRF/AICR. Continuous Update Project Expert Report 2018: Diet, nutrition, physical activity and stomach cancer., 2018.
20. Loney PL, Chambers LW, Bennett KJ, Roberts JG, Stratford PW. Critical appraisal of the health research literature: prevalence or incidence of a health problem. *Chronic Dis Can* 1998; **19**(4): 170-6.

Supplementary Table 1. Prevalence of modifiable risk factors and the relative risks associated with GC from 1990 to 2015

	Prevalence of risk factors (%)							Relative Risk (95% CIs)	
Risk factors	1990	1995	2000	2005	2010	2015	*P* for trend	Estimates	Population source
Men									
H. pylori[a]	62.1	59.1	57.0	50.8	45.0	42.1	<0.01	[CGC]: 3.06 (1.54, 6.10) [NCGC]: 5.94 (3.25, 10.86)[1]	China
Alcohol[b]	33.8	29.4	15.3	16.1	18.1	15.6	0.05	1.31 (1.12, 1.54)[2]	China
Smoking[c]	59.3	53.4	48.9	48.0	48.1	48.7	0.03	1.79 (1.51, 2.12)[3]	Japan*
Pickled vegetable[d]	24.2	23.7	19.3	18.3	18.3	15.6	0.04	1.48 (1.30, 1.66)[4]	East Asia[#]
Diabetes[e]	2.2	5.2	10.6	12.1	11.7	13.7	<0.01	1.19 (1.07, 1.32)[5]	Asia^
BMI[f]									
<18.5	9.5	8.0	6.2	6.0	4.4	3.1	<0.01	1.56 (1.03, 2.36)	East Asia[&]
18.5-20.0	20.1	16.6	13.3	10.5	8.2	4.8	<0.01	1.33 (1.01, 1.76)	
20.1-22.5	40.3	36.6	31.4	28.3	24.6	20.4	<0.01	1.39 (1.15, 1.69)	
22.6-25.0	19.7	22.5	26.0	27.1	28.5	31.4	<0.01	1.00 (ref)	
25.1-27.5	7.4	10.6	15.1	17.8	19.9	23.9	<0.01	1.01 (0.80, 1.26)	
≥27.5	3.1	5.7	8.1	10.2	14.5	16.5	<0.01	1.48 (1.14, 1.91)[6]	
Women									
H. pylori[a]	62.1	59.1	57.0	50.8	45.0	42.1	<0.01	[CGC]: 3.06 (1.54, 6.10) [NCGC]: 5.94 (3.25, 10.86)[1]	China
Alcohol[b]	3.1	2.4	1.1	1.2	1.2	1.0	<0.01	1.31 (1.12, 1.54)[2]	China
Smoking[c]	5.0	4.0	3.2	2.6	2.3	2.0	<0.01	1.22 (1.07, 1.38)[3]	Japan*
Pickled vegetable[d]	25.5	24.9	19.9	18.8	18.8	15.8	<0.01	1.48 (1.30, 1.66)[4]	East Asia[#]
Diabetes[e]	2.4	5.8	8.8	11.0	10.2	11.8	<0.01	1.19 (1.07, 1.32)[5]	Asia^
BMI[f]									

<18.5	9.8	8.1	7.1	6.6	5.6	4.4	<0.01	1.56 (1.03, 2.36)	East Asia[&]
18.5-20.0	18.7	15.5	11.7	10.5	9.3	6.0	<0.01	1.33 (1.01, 1.76)	
20.1-22.5	34.3	32.5	29.3	28.1	25.6	23.4	<0.01	1.39 (1.15, 1.69)	
22.6-25.0	22.1	24.0	26.1	26.5	26.6	28.1	<0.01	1.00 (ref)	
25.1-27.5	10.3	12.6	15.6	16.5	17.9	20.2	<0.01	1.01 (0.80, 1.26)	
≥27.5	4.8	7.3	10.2	11.8	15.1	17.4	<0.01	1.48 (1.14, 1.91)[6]	

Abbreviations: *H. pylori*, helicobacter pylori; BMI, body mass index; GC, gastric cancer; CGC, cardia gastric cancer; NCGC: non-cardia gastric cancer; ref, reference.

[a]The positive status of *H. pylori* infection as defined by enzyme-linked immunosorbent assay (ELISA), immunoblotting or urea breath test (UBT).

[b]Currently smoking, accumulated up to 100 cigarettes, and still smoking.

[c]Regular alcohol consumption, drinking alcohol at least three times a week.

[d]Exclude those who did not use or consumed pickled vegetable minimally.

[e]The diabetes as defined by the American Diabetes Association criteria.

[f]BMI followed the classification criteria of the largest nested case-control study in Asia (Asia Cohort Consortium), using the BMI range of 22.6 to 25.0 as the reference, with underweight (BMI<18.5) and overweight/obesity (BMI>25.0) combined as the unhealthy BMI

*The RR between smoking and gastric cancer was obtained from a systematic review of epidemiologic evidence among the Japanese population.

#The RR between pickled vegetable and gastric cancer was obtained from a systematic review and meta-analysis of predominantly Eastern Asian population (50% from China, 21.6% from Japan and 10% from Korea).

^The RR between diabetes and gastric cancer was obtained from the subgroup analysis in Asian population of a meta-analysis.

&The RR between BMI and gastric cancer was obtained from a nested case-control study pooling eight East Asian cohort studies.

Reference

1. Yang L, Kartsonaki C, Yao P, et al. The relative and attributable risks of cardia and non-cardia gastric cancer associated with Helicobacter pylori infection in China: a case-cohort study. The Lancet Public Health 2021;6:e888-e896.

2. Deng W, Jin L, Zhuo H, et al. Alcohol consumption and risk of stomach cancer: A meta-analysis. Chem Biol Interact

2021;336:109365.

3. Nishino Y, Inoue M, Tsuji I, et al. Tobacco smoking and gastric cancer risk: an evaluation based on a systematic review of epidemiologic evidence among the Japanese population. Jpn J Clin Oncol 2006;36:800-7.

4. Ren JS, Kamangar F, Forman D, et al. Pickled food and risk of gastric cancer--a systematic review and meta-analysis of English and Chinese literature. Cancer Epidemiol Biomarkers Prev 2012;21:905-15.

5. Tian T, Zhang LQ, Ma XH, et al. Diabetes mellitus and incidence and mortality of gastric cancer: a meta-analysis. Exp Clin Endocrinol Diabetes 2012;120:217-23.

6. Jang J, Wang T, Cai H, et al. The U-shaped association between body mass index and gastric cancer risk in the Helicobacter pylori Biomarker Cohort Consortium: A nested case-control study from eight East Asian cohort studies. Int J Cancer 2020;147:777-784.

Supplementary Table 2. Characteristics of the included *H. pylori* infection studies

Author, Publication	Region	Study period (midpoint)	Study design	Age range	Sex ratio (F/M)	Sample Size	Detection method	*H. pylori* prevalence (%)
Ma et al, 2005[1]	Shandong	1990	Population-based	35-64	-	2,469	Serology/UBT	64.93
Brown et al, 2001[2]	Shandong	1994	Population-based	18-69	0.97	3,288	Serology	60.64
Groves et al, 2002[3]	Shandong	1994	Population-based	18-69	-	388	Serology	63.92
Wong et al, 1999[4]	Fujian	1994	Population-based	18-76	-	1,828	Serology	80.91
Jiang et al, 1996[5]	Shandong	1994	Population-based	40-69	0.85	218	UBT	71.10
Zhai et al, 1994[6]	Shanghai	1992	Population-based	18-59	0.13	2,336	Serology	51.37
Wang et al, 1996[7]	Henan	1994	Population-based	20-69	1.99	464	Serology	42.03
He et al, 2001[8]	Fujian	2001	Population-based	38.7±8.5	0.15	1,076	Serology/UBT/PCR	67.01
Fan et al, 2004[9]	Hebei	2004	Population-based	6-59	1.21	263	Serology	57.41
Chen et al, 2003[10]	Shanghai	2004	Population-based	37.0±11.0	0.99	1,822	Serology/UBT	66.36
Shi et al, 2008[11]	Jiangsu	2004	Population-based	47.8±14.8	1.34	1,371	Serology/UBT	62.07
Chen et al, 2007[12]	Guangdong	2003	Population-based	3-92	0.94	1,471	Serology	47.04
Cheng et al, 2009[13]	Beijing	2003	Population-based	-	0.88	1,232	UBT	46.75
Nie et al, 2007[14]	Shandong	2002	Population-based	18-69	1.18	242	UBT	53.72
Luo et al, 2010[15]	Guizhou	2004	Population-based	40.3±14.5	0.89	801	Serology	55.18
Suo et al, 2011[16]	Inner Mongolia	2008-2009 (2008.5)	Population-based	42.2±16.4	0.88	1,000	UBT	64.40
Zhu et al, 2011[17]	Zhejiang	2006-2008 (2007)	Population-based	9-72	1.06	1,850	Serology/UBT	72.59
Zhou et al, 2005[18]	Hubei	2006-2007 (2006.5)	Population-based	43.8±10.7	0.86	1,846	UBT	45.18
Zeng et al, 2008[19]	Chongqing	2008	Population-based	20-81	0.52	3,254	Serology	37.12
Zhou et al, 2010[20]	Sichuan	2007-2010 (2008.5)	Population-based	6-82	0.88	4,000	Histology	27.33

Guo et al, 2006[21]	Xinjiang	2006	Population-based	20-60	1.03	5,122	Serology	61.95
Zhang et al, 2009[22]	Gansu	2006	Population-based	19-60	1.16	797	Serology	81.81
Lao et al, 2008[23]	Guangdong	2006	Population-based	20-68	0.58	2,379	Serology	27.24
Zheng et al, 2013[24]	Beijing	2005-2011 (2008.5)	Population-based	46.6±7.9	0.50	51,025	UBT	49.50
Chen et al, 2012[25]	Guangdong	2009	Population-based	40.3±3.5	0.42	1,452	Serology	40.91
Liu et al, 2015[26]	Guangdong	2002-2009 (2005)	Population-based	54.4±9.3	0.77	2,689	UBT	42.99
Yang et al, 2009[27]	Guizhou	2006	Population-based	60.3±12.6	0.85	592	Serology	59.46
Huang et al, 2015[28]	Jiangsu	2007-2009 (2008)	Population-based	46.7±9.8	0.49	3,208	UBT	50.56
Kong et al, 2017[29]	Shandong	2013-2014 (2013.5)	Population-based	48.6±14.3	0.41	22,044	Serology	20.60
Li et al, 2016[30]	Tianjin	2014	Population-based	19-92	1.16	11,096	Serology	30.52
Zhang et al, 2013[31]	Liaoning	2011	Population-based	18-90	0.09	1,237	Serology	48.75
Jiang et al, 2015[32]	Liaoning	2013	Population-based	1-100	0.86	4,127	Serology	29.68
Wang et al, 2011[33]	Liaoning	2010	Population-based	38±10	0.26	3,995	Serology	44.83
Zhang et al, 2016[34]	Jilin	2014	Population-based	21-60	1.23	1,932	Serology	35.61
Huang et al, 2015[28]	Jiangsu	2013	Population-based	47.5±10.4	0.40	2,814	UBT	48.83
Shen et al, 2014[35]	Zhejiang	2012	Population-based	45.8±15.5	0.84	7,911	Serology	50.94
Yang et al, 2015[36]	Zhejiang	2013	Population-based	20-70	0.58	15,187	UBT	56.70
Zhu et al, 2012[37]	Zhejiang	2011	Population-based	20-80	1.16	9,285	Serology	38.27
Cheng et al, 2012[38]	Hubei	2012	Population-based	31-88	0.31	2,975	UBT	41.48
Yang et al, 2011[39]	Hainan	2010	Population-based	19-60	0.00	1,714	Serology	57.47
Deng et al, 2011[40]	Chongqing	2010	Population-based	18-82	0.58	27,177	Serology	34.20
Yang et al, 2015[36]	Sichuan	2013	Population-based	20-80	0.67	1,141	UBT	58.72
Li et al, 2013[41]	Sichuan	2013	Population-based	20-69	0.76	4,517	Serology	35.80
Tang et al, 2014[42]	Sichuan	2014	Population-based	46.3±11.4	0.69	8,365	UBT	53.13

Yang et al, 2011[39]	Sichuan	2010-2011 (2010.5)	Population-based	3-82	0.59	2,400	UBT	44.08
Cao et al, 2013[43]	Xinjiang	2012	Population-based	25-81	0.92	288	Serology	34.38
Dong et al, 2016[44]	Shandong	2014	Population-based	3-83	0.56	1,703	Serology	55.08
Liu et al, 2015[26]	Shandong	2010-2012 (2011)	Population-based	20-90	0.49	11,714	Serology	45.25
Tian et al, 2016[45]	Beijing	2013	Population-based	1-70	1.54	520	UBT	29.62
Cao et al, 2017[46]	Guangxi	2012-2016 (2014)	Population-based	7-69	0.90	3,363	Serology	47.25
Liu et al, 2013[47]	Jiangxi	2010	Population-based	30.3±9.1	0.68	633	Serology	48.66
Liu et al, 2016[48]	Jiangxi	2014	Population-based	46.5±10.3	0.64	4,513	UBT	48.02
Guo et al, 2013[49]	Gansu	2012	Population-based	30-79	1.03	671	Serology/	51.56
Zhang et al, 2013[31]	Shanxi	2014	Population-based	20-69	1.86	406	UBT	47.04
Chen et al, 2013[50]	Shanghai	2011	Population-based	43.7±3.8	0.53	855	Serology	45.26
Jia et al, 2018[51]	Yunnan	2014	Population-based	48.4±10.7	0.42	1,860	UBT	33.55
Xu et al, 2014[52]	Zhejiang	2013	Population-based	46.0±7.0	0.68	8,820	UBT	43.75
Zhu et al, 2014[53]	Jiangsu	2009-2011 (2010)	Population-based	30-69	1.31	5,417	UBT	63.41
Fan et al, 2018[54]	Shanghai	2013	Population-based	48.3±15.0	0.96	28,171	UBT	38.51
Xu et al, 2017[55]	Beijing	2014	Population-based	46.0±18.0	0.49	17,791	Serology	43.86
Gao et al, 2017[56]	Guangdong	2013	Population-based	43.2±15.4	0.68	1,000	UBT	51.00
Wu et al, 2014[57]	Beijing	2012	Population-based	49.8±8.1	0.44	10,331	UBT	44.42
Meng et al, 2015[58]	Jiangsu	2012	Population-based	46.5±11.7	0.92	1,598	UBT	44.43
Mao et al, 2015[59]	Jiangsu	2014	Population-based	18-69	1.15	312	UBT	35.26
Yan et al, 2013[60]	Shanghai	2010-2013 (2012)	Population-based	17-81	0.83	1,507	Serology	48.04
Yang et al, 2013[61]	Guangdong	2011-2013 (2012)	Population-based	18-69	1.07	4,615	UBT	58.50

Chen et al, 2011[62]	Henan	2011	Population-based	10-88	0.60	802	UBT	45.14
Xie et al, 2014[63]	Guangdong	2013	Population-based	21-70	0.57	2,963	Serology	54.98
Zhou et al, 2015[64]	Shandong	2013	Population-based	20-60	1.01	386	UBT	63.47
Li et al, 2012[65]	Anhui	2010-2011 (2010.5)	Population-based	20-79	0.43	2,283	Serology	16.08
Kong et al, 2013[66]	Guizhou	2013	Population-based	20-59	0.40	3,370	UBT	65.40
Zhou et al, 2014[67]	Jiangsu	2009-2013 (2011)	Population-based	20-61	0.60	35,921	Serology	43.12
Gao et al, 2010[68]	Henan	2010	Population-based	25-89	0.49	641	Serology	31.36
Yu et al, 2016[69]	Gansu	2014	Population-based	51.1±13.0	0.42	3,239	UBT	51.84
Qian et al, 2011[70]	Guangdong	2010	Population-based	18-60	0.63	2,840	Serology	46.97
Zhang et al, 2016[34]	Liaoning	2014	Population-based	50.1±0.2	0.46	4,256	UBT	46.01
Wang et al, 2014[71]	Xinjiang	2013	Population-based	0-80	1.26	807	Serology	24.29
Kong et al, 2012[72]	Guizhou	2011	Population-based	15-81	0.88	392	UBT	83.67
Tu et al, 2012[73]	Gansu	2011	Population-based	41.4±3.3	0.83	655	UBT	75.73
Wang et al, 2014[74]	Zhejiang	2013	Population-based	45.7±11.3	0.43	852	Serology	51.41
Li et al, 2012[65]	Tianjin	2010	Population-based	23-87	1.12	292	Serology	35.27
Gong et al, 2017[75]	Shanghai	2014	Population-based	40.1±10.4	0.00	3,022	UBT	34.22
Xia et al, 2016[76]	Tianjin	2007-2012 (2010)	Population-based	43.2±0.5	0.78	10,407	Serology	28.60
Shan et al, 2017[77]	Liaoning	2010-2011 (2010.5)	Population-based	37-87	1.35	395	Serology	46.84
Liu et al, 2012[78]	Shanxi	2011-2012 (2011.5)	Population-based	20-78	0.53	13,632	Serology	40.52
Pan et al, 2016[79]	Shandong	2011-2013 (2012)	Population-based	25-543	1.18	183,970	UBT	57.60
Liu et al, 2017[80]	Chongqing	2014	Population-based	-	0.89	10,912	UBT	34.37
Qu et al, 2017[81]	Sichuan	2014	Population-based	18-69	0.59	25,160	UBT	38.00

Ayinuer A et al, 2017[82]	Xinjiang	2014	Population-based	18-69	0.52	2,188	UBT	43.88
Ji et al, 2016[83]	Liaoning	2013-2015 (2015)	Population-based	18-88	1.10	4,214	Serology	21.76
Shao et al, 2016[84]	Liaoning	2016	Population-based	8-101	0.57	15,739	UBT	33.98
Pan et al, 2017[85]	Jiangsu	2015	Population-based	1-90	0.96	9,076	Serology	50.71
Li et al, 2016[86]	Zhejiang	2015	Population-based	42.3±5.4	0.88	9,856	UBT	40.46
Jia et al, 2016[87]	Hubei	2015	Population-based	18-60	0.92	2,180	UBT	47.02
Zhang et al, 2017[88]	Hubei	2017	Population-based	42.3±10.1	0.82	916	UBT	41.70
Ma et al, 2015[89]	Hainan	2015	Population-based	21-81	0.94	4,122	Histology	25.64
Qin et al, 2017[90]	Shandong	2015	Population-based	7-90	0.62	4,611	UBT	52.66
Wu et al, 2019[91]	Zhejiang	2016	Population-based	35.8±21.5	1.25	2,860	Serology/UBT	47.73
Su et al, 2018[92]	Beijing	2018	Population-based	28-93	0.22	4,950	UBT	34.04
Xu et al, 2015[93]	Guangxi	2015	Population-based	20-65	0.70	2,956	UBT	45.30
Wang et al, 2017[94]	Jiangxi	2016	Population-based	18-79	0.35	6,165	UBT	37.71
Mo et al, 2019[95]	Ningxia	2018	Population-based	17-73	0.67	841	UBT	33.89
Wang et al, 2016[96]	Shanxi	2015	Population-based	18-59	0.77	3,447	UBT	49.46
Wang et al, 2017[94]	Shanxi	2016	Population-based	21-70	0.74	3,214	UBT	54.32
Zhang et al, 2017[88]	Shanghai	2017	Population-based	18-90	0.92	5,164	UBT	36.35
Ma et al, 2015[89]	Shanghai	2015	Population-based	20-93	0.37	58,876	UBT	42.36
Sun et al, 2018[97]	Shanghai	2016	Population-based	40-93	1.28	3,258	Serology	34.13
Qu et al, 2018[98]	Shanghai	2018	Population-based	45.7±13.6	3.13	524	UBT	58.02
Cai et al, 2018[99]	Tibet	2015	Population-based	18-69	1.26	1,000	UBT	56.70
Shu et al, 2019[100]	Zhejiang	2015	Population-based	54.2±9.6	0.86	3,014	UBT	27.50
Wang et al, 2017[94]	Hebei	2016	Population-based	44.5±13.6	1.01	4,796	UBT	52.25
Gu et al, 2019[101]	Tianjin	2015	Population-based	18-69	0.77	5,558	UBT	49.05
Xie et al, 2019[102]	Henan	2015	Population-based	40-69	1.19	2,003	UBT	41.34
Li et al, 2020[103]	Sichuan	2017	Population-based	45.9±12.4	0.65	33,153	UBT	42.07

Shuai et al, 2020[104]	Beijing	2019	Population-based	44.7±12.0	0.88	8,323	UBT	28.93
Guo et al, 2019[105]	Anhui	2017	Population-based	49.2±14.3	1.21	9,684	UBT	31.31
Xie et al, 2017[106]	Yunnan	2016	Population-based	63.5±0.4	0.72	8,790	UBT	32.81
Yang et al, 2019[107]	Tibet	2015-2016 (2015.5)	Population-based	43.5±10.3	1.15	544	UBT	30.51
Guo et al, 2019[108]	Liaoning	2018	Population-based	46.7±12.7	0.59	11,775	UBT	30.99
Wei et al, 2018[109]	Hebei	2016	Population-based	47.6±12.1	0.49	2,877	UBT	58.08
Fu et al, 2018[110]	Hubei	2016	Population-based	45.3±9.1	0.57	1,883	UBT	44.18
Han et al, 2020[111]	Shandong	2017	Population-based	49.0±13.0	0.44	2,557	Serology	57.37
Xu et al, 2019[112]	Sichuan	2017	Population-based	14-87	0.58	18,684	Serology/UBT	31.44
Wang et al, 2017[94]	Shandong	2015	Population-based	43.8±10.2	0.80	2,013	UBT	60.56
Yan et al, 2017[113]	Zhejiang	2015	Population-based	40-69	0.51	1,641	UBT	51.49
Cheng et al, 2017[114]	Jiangxi	2016	Population-based	59.9±1.3	0.97	235	UBT	48.94
Hu et al, 2019[115]	Hubei	2016-2017 (2016.5)	Population-based	43.4±12.3	0.68	10,843	UBT	34.96
Zhang et al, 2020[116]	Zhejiang	2017	Population-based	46.3±12.8	-	39,091	UBT	45.63

Reference

1. Ma JL, Zhang L, Pan KF, et al. Helicobacter pylori and the progression of gastric cancer: a 10-year cohort study. National Medical Journal of China 2005:27-30.

2. Brown LM, Thomas TL, Ma JL, et al. Helicobacter pylori infection in rural China: exposure to domestic animals during childhood and adulthood. Scand J Infect Dis 2001;33:686-91.

3. Groves FD, Perez-Perez G, Zhang L, 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 Epidemiol Biomarkers Prev 2002;11:1091-4.

4. Wong BC, Lam SK, Ching CK, et al. Seroprevalence of cytotoxin-associated gene A positive Helicobacter pylori strains in Changle, an area with very high prevalence of gastric cancer in south China. Aliment Pharmacol Ther 1999;13:1295-302.

5. Jiang Ji;Zhang Lian;Zhao Lei;Chang Yunsheng;Wang Shizhen ea. Preliminary Investigation of Helicobacter Pylori Infection in Linqu County of Shandong Province. ACTA ACADEMIAE MEDICINAE SINICAE 1996:129-132.

6. Zhai Huiping YK, Fang Guifen. Epidemiological investigation of Helicobacter pylori infection rate among car drivers. SHANGHAI MEDICAL JOURNAL 1994:334-335.

7. Wang Kaijuan CJ, Zhang Jianying, Zhang Jianzhong, Gao Sanyou, Jiang Xiugao, Zhang Meixi, Dai Liping. Study on the Epidemiology of HP infection among 464 School Staff in Henan Province. Chinese Journal of Epidemiology 1996:99-101.

8. He Xiangyang JZ, Yang Shunqi, Mei Yanyan, Wen Qin, Jiang Yingzi, Wang Jianmiao. The Endemiology of Helicobacter Pylorus Infection and Gastro-Intestinal Disease in Mine and Related Factory Workers of Tong-Ling City, Anwhei. Journal of Radioimmunology 2006:31-33.

9. Fan Hongmin YJ, Xu Yingjun, Zhang Tianzhe. A seroepidemiology survey on Helicobacter pylori infection in rural families.

World Chinese Journal of Digestology 2006:2948-2953.

10. Chen Shiyao LT, Fan Xiaoming, Dong Ling, Fang Guoting, Tu Chuanxu, Gu Xiuying, Wang Jiyao. Epidemiological study of Helicobacter pylori infection and its risk factors in Shanghai. National Medical Journal of China 2005:802-806.

11. Shi R, Xu S, Zhang H, et al. Prevalence and risk factors for Helicobacter pylori infection in Chinese populations. Helicobacter 2008;13:157-65.

12. Chen J, Bu XL, Wang QY, et al. Decreasing seroprevalence of Helicobacter pylori infection during 1993-2003 in Guangzhou, southern China. Helicobacter 2007;12:164-9.

13. Cheng H, Hu F, Zhang L, et al. Prevalence of Helicobacter pylori infection and identification of risk factors in rural and urban Beijing, China. Helicobacter 2009;14:128-33.

14. Nie XR, Zhou T, Pan KF, et al. The associations of serum gastrin level with Helicobacter pylori infection. Zhonghua Yu Fang Yi Xue Za Zhi 2007;41 Suppl:87-9.

15. Luo Jinbin, Zhou Li, Chen Xiaoqin, et al. Influence of Helicobacter Pylori infection among Buyi and Han nationalities. Medical Journal of West China 2010;22:901-903.

16. Suo Rina ZS. An investigation on the infection status of helicobacter pylori in Chifeng of Inner Mongolia. Journal of Clinical

Medicine in Practice 2011;15:120-122.

17. Zhu Xuxing, Hong Xiaofei, Wu Shenbao, et al. Epidemiological investigation of Helicobacter pylori infection in Yiwu, Zhejiang Province. Modern practical medicine 2011;23:619-621.

18. Zhou hanqiao, Xiangming F. Analysis of Helicobacter pylori infection among permanent residents in Wuhan. Journal of Microcirculation 2009;19:36-37+40+132+136.

19. Zeng Fanling, Lin X. Seroepidemiological investigation of Helicobacter pylori infection among physical examination population in Chongqing City. journal of chongqing medical university 2009;34:224-225.

20. Zhou Ji, Yang Qingqiang, Changzhi L. Clinical analysis of 4000 cases of Helicobacter pylori infection by gastroscopy in Guangyuan City. Sichuan medicine journal 2010;31:1644-1645.

21. Guo Xinwen, Wang Juan, Feng Hui, et al. Epidemiological survey of Helicobacter pylori infection in Uygur and Han nationality natural population in Aksu Area of Xinjiang. Journal of Xinjiang Medical University 2009;32:728-730.

22. Linghua Z. Epidemiological investigation of Helicobacter pylori infection in Wuwei City, Gansu Province: Lanzhou University, 2009.

23. Lao Xianbin, Chen Youming, Chunchang Q. Seroepidemiological investigation of Helicobacter pylori infection among

telecom employees in two different areas of Guangdong Province. Journal of tropical medicine 2008:142-144.

24. Zheng Yansong, Chen Zhilai, Sai Xiaoyong, et al. Cross-sectional analysis of Helicobacter pylori infection in physical examination population. Chinese Journal of Clinician 2013;7:10044-10047.

25. Xiaofang C. Analysis of Helicobacter pylori infection in healthy patients undergoing physical examination in Bao 'an District of Shenzhen City. Journal of Chengdu Medical College 2012;7:460-461.

26. Liu Shuo, Xin Ying, Ma Caixia, et al. Detection and analysis of serum urease antibody of Helicobacter pylori among healthy people in Tai 'an area. Journal of practical medicine 2015;32:83-85.

27. Yang Long, Zhou Li, Zhang Yonghong, et al. Epidemiological investigation and multi-factor analysis of Helicobacter pylori among Buyi, Miao and Han people in Zhenning County, Guizhou Province. Journal of Gastroenterology and Hepatology 2009;18:131-134.

28. Huang Ronggen, Zhu Haixing, Huang Biao, et al. Investigation on Helicobacter pylori infection among people undergoing physical examination in Wuxi area. Jiangsu Medical Journal 2015;41:1412-1414.

29. Kong X, Xu D, Li F, et al. Association of H. pylori infection with chronic kidney disease among Chinese adults. Int Urol Nephrol 2017;49:845-850.

30. Liu Menghui, Zhang Chi, Liang Xiaofeng, et al. Analysis of Helicobacter pylori infection in 11096 patients undergoing physical examination. Tianjin Medical Journal 2016;44:110-113.

31. Zhang Minglei, Guan Huixia, Yuning C. Epidemiological investigation of 1237 cases of Helicobacter pylori. journal of Chinese convalescent medicine 2013;22:680-681.

32. Jiang Fengquan, He Zhenyan, Lu Xiaoyu, et al. Investigation and analysis of Helicobacter pylori infection among healthy people in Dalian City. Journal of Dalian Medical University 2015;37:182-185.

33. Ligang W. Investigation on Helicobacter pylori infection status and related factors among employees of Dalian Port Group: Dalian Medical University, 2011.

34. Zhang Yanbo, Li Xiaoou, Yan L. Analysis of Helicobacter pylori infection among medical staff in a hospital in Jilin. Chinese health industry 2016;13:73-75.

35. Shen Shien, Bi Qihua, Huanqin Z. Investigation and analysis of Helicobacter pylori infection among physical examination population in Hangzhou area. Chinese Journal of Health Inspection 2014;24:1642-1643.

36. Yang Yimai, Endian Z. Investigation on Helicobacter pylori infection among 15817 physical examination subjects in Wenzhou City. Zhejiang Journal of Integrated Chinese and Western Medicine 2015;25:801-803.

37. Zhu Qinfang, Yu Qian, Zhao Xing, et al. Investigation on Helicobacter pylori infection among healthy people in Suzhou area. Laboratory medicine and clinic 2012;9:2269-2270.

38. Cheng Zhiling, Tiantian C. Investigation and analysis of Helicobacter pylori infection and its related factors in Wuhan civil servants. Chinese Journal of nosocomiology 2012;22:3068-3070.

39. Yang Wenrong, Yue L. Investigation on Helicobacter pylori infection among 1714 policemen in Hainan Island. Chinese tropical medicine 2011;11:1257+1264.

40. Deng Xuejie, Qu Xiaoying, Xiang Lin, et al. Epidemiological trend of Helicobacter pylori infection in urban physical examination population in Chongqing for 3 years. Chinese experimental diagnostics 2011;15:2055-2057.

41. Li Lin, Li Duofu, Wei T. Investigation and analysis of urease antibody against Helicobacter pylori among urban residents in Nanchong City. medical information journal 2013:259-259.

42. Tang Huairong, Fan Yunjie, Sha L. Analysis of Helicobacter pylori infection status and related influencing factors in Chengdu area. Journal of Sichuan University (Medical Edition) 2014;45:823-826.

43. Cao Weimin, Han Tao, Hongwei P. Seroepidemiological analysis of Helicobacter pylori infection in physical examination population in Wujiaqu, Xinjiang. Chinese contemporary medicine 2013;20:2.

44. Zhenfang D, Gao Qi, Bingchang Z. Investigation on Helicobacter pylori infection among healthy people in Jinan City. Chinese Journal of Health Inspection 2016;26:3603-3604.

45. Tian Yuan, Cui Xianmin, Qi Sainan, et al. Analysis of Helicobacter pylori infection in physical examination population outside Yongding Gate in Beijing from 2013 to 2014. China Medical Guide 2016;13:189-192.

46. Cao Cong, Zhou Xihan, Hu Gaoyu, et al. Analysis of Helicobacter pylori infection in Dian-Qian-Guangxi border area. Journal of practical medicine 2017;33:1864-1867.

47. Liu Fuchang, Fu Yingyuan, Chen Huoling, et al. Serological analysis of Helicobacter pylori infection among blood donors in Nanchang area. China Medical Guide 2013;10:116-119.

48. Liu Donglin, Hu Jianfang, Zhaohan W. Investigation on Helicobacter pylori infection among healthy people in Nanchang City. Journal of Nanchang University (Medical Science) 2016;56:73-74.

49. Guo Xiaoyan, Wang Ting, Dong Lei, et al. Epidemiological survey of Helicobacter pylori infection in rural population in southern and northern Shaanxi Province. Journal of Hainan Medical College 2013;19:1431-1433+1437.

50. Chen Fei, Tang Haozhou, Miaoxing J. Investigation and analysis of Helicobacter pylori infection rate among healthy persons in Shanghai area. Chinese General Practice 2013;16:3464-3466.

51. Jia Demei, Wang Qiang, Chu Nanjiang, et al. Epidemiological investigation and correlative factors analysis of Helicobacter pylori infection among healthy adults in Yunnan Plateau area. Chongqing Medical Journal 2018;47:950-956.

52. Xu C, Yan M, Sun Y, et al. Prevalence of Helicobacter pylori infection and its relation with body mass index in a Chinese population. Helicobacter 2014;19:437-42.

53. Zhu Y, Zhou X, Wu J, et al. Risk Factors and Prevalence of Helicobacter pylori Infection in Persistent High Incidence Area of Gastric Carcinoma in Yangzhong City. Gastroenterol Res Pract 2014;2014:481365.

54. Fan N, Peng L, Xia Z, et al. Helicobacter pylori Infection Is Not Associated with Non-alcoholic Fatty Liver Disease: A Cross-Sectional Study in China. Front Microbiol 2018;9:73.

55. Xu MY, Cao B, Yuan BS, et al. Association of anaemia with Helicobacter pylori infection: a retrospective study. Sci Rep 2017;7:13434.

56. Gao Yiyun, Chuangui L. Cross-sectional analysis of Helicobacter pylori infection among healthy people in Junan District of Shunde from 2010 to 2016. Chinese medical innovation 2017;14:55-58.

57. Wu Jianjun, Ying Mingzhong, Cao Xiutang, et al. Analysis of Helicobacter pylori infection in physical examination population. Journal of Intractable Diseases 2014;13:1118-1122.

58. Meng Yaping, Ruming H. Analysis of Helicobacter pylori infection in healthy population. Modern Chinese doctor 2015;53:70-72.

59. Yiheng M. Epidemiological analysis of Helicobacter pylori in healthy physical examination subjects. medical information journal 2015:101-101,102.

60. Yan Huafang, Xiaoying S. Analysis of Helicobacter pylori infection in 1507 patients who underwent physical examination from 2009 to 2012. Henan Medical Research 2013;22:940-942.

61. Yang Chenghai, Wu Zhenghua, Zanxiong C. Analysis of Helicobacter pylori detection results in 4615 cases. International Medical and Health Review 2013;19:3415-3417.

62. Chen Xiaohua, Li Yuhua, Ren Ke, et al. Investigation on Helicobacter pylori infection in healthy population. Chinese practical medicine journal 2011;6:254-255.

63. Xie Tao, Li Wenhua, Shanshan C. Investigation and analysis of Helicobacter pylori infection in healthy population. Chinese and foreign medical research 2014;12:75-76.

64. Zhou Kelun, Zheng Y. Epidemiological survey of Helicobacter pylori infection in rural natural population in Penglai City. Clinical Journal of Chinese Medicine 2015;7:126-127.

65. Li Jing, Yuan yuan, Huang Yu, et al. Investigation and analysis of Helicobacter pylori infection rate in healthy population. Journal of Bengbu Medical College 2012;37:1341-1342.

66. Kong Dezhi, Xian P. Investigation and analysis of Hp infection in civil servants and public institutions. Primary medical forum 2013;17:4090-4092.

67. Zhou Ying, Ma Jian, Zhigang H. Epidemiological investigation of serum Helicobacter pylori urease antibody in healthy physical examination personnel. Chinese Journal of nosocomiology 2014;24:5867-5868+5871.

68. Gao Liping, Zhang Yaohua, Hongqi Z. Investigation on Helicobacter pylori infection among healthy adults in Zhoukou area in 2010. Chinese Journal of Medicine 2010;12:2135-2136.

69. Yu Xiaohui, Zhao Hongzhen, Li Xiaoyun, et al. Investigation on Helicobacter pylori infection among healthy people in Lanzhou. Chinese Journal of Gastroenterology 2016;21:687-689.

70. Qian Ming, Yuan Junjun, Yayuan L. Analysis of Helicobacter pylori infection in 2840 patients in Zhuhai City. Laboratory medicine and clinic 2011;8:2709-2710.

71. Wang Tao, Wang Yapeng, Ren Yuying, et al. Investigation and analysis of Helicobacter pylori infection among Kirgiz population in Aheqi County, Xinjiang. Chinese experimental diagnostics 2014;18:603-604.

72. Kong Dezhi, Zhu Dairong, Weiyue L. Epidemiological survey of Helicobacter pylori infection in Gelao nationality. Primary medical forum 2012;16:2043-2045.

73. Tu Jiayin, Chen Zhiping, Cao Weipeng, et al. Epidemiological investigation of Helicobacter pylori in healthy subjects in Lanzhou City. Clinical meta-analysis journal 2012;27:1754-1756.

74. Wang Feng, Yao Panpan, Yao Fangfang, et al. Investigation and analysis of Helicobacter pylori infection and serum pepsinogen I/II levels in physical examination population in Ningbo area. Journal of medical research 2014;43:98-101.

75. Gong Jinfa, Dong Yuanyuan, Zhang Yi, et al. Analysis of 1960 cases of Helicobacter pylori infection in seafarers in Shanghai. Journal of Shanghai Jiao Tong University (Medical Science) 2017;37:102-105.

76. Xia Y, Meng G, Zhang Q, et al. Dietary Patterns are Associated with Helicobacter Pylori Infection in Chinese Adults: A Cross-Sectional Study. Sci Rep 2016;6:32334.

77. Shan JH, Bai XJ, Han LL, et al. Changes with aging in gastric biomarkers levels and in biochemical factors associated with Helicobacter pylori infection in asymptomatic Chinese population. World J Gastroenterol 2017;23:5945-5953.

78. Liu Yang, Wang Jing, Xing Ruiqing, et al. Investigation of Helicobacter pylori infection in healthy adults and analysis of related factors in Xi 'an Journal of modern Laboratory Medicine 2012;27:79-82,85.

79. Pan KF, Zhang L, Gerhard M, et al. A large randomised controlled intervention trial to prevent gastric cancer by eradication of Helicobacter pylori in Linqu County, China: baseline results and factors affecting the eradication. Gut 2016;65:9-18.

80. Liu J, Wang Y, Zhao Q, et al. Prevalence and risk factors for Helicobacter pylori infection in southwest China: a study of health examination participants based on 13C-urea breath test. Turk J Med Sci 2017;47:1456-1462.

81. Qu Zhujun, Bai Xuesong, Chen Lihua, et al. Investigation of Helicobacter pylori infection in healthy population. Chinese Journal of Gerontology 2017;36:214-218.

82. Nuer AHMAY. Helicobacter pylori infection in healthy Uygur and Han populations in Xinjiang. Journal of tropical medicine 2017;17.

83. Ji Na, Yanan G. Analysis of Helicobacter pylori test results in 4214 healthy subjects. Marker immunoassay and clinical analysis 2016;23:303-305.

84. Shao Nan, Lihong Z. Investigation and analysis of Helicobacter pylori infection among healthy people in a physical examination center in Shenyang. Journal of Clinical Military Medicine 2016;44:741-742.

85. Pan Fei, Xu Wen, Bai Wenli, et al. Analysis of Helicobacter pylori infection in healthy subjects in Jiangsu Province. Chinese Electronic Journal of Clinical Laboratory Management 2017;5:183-185.

86. Li Hua, Zhang Zhongfu, Lu Ren, et al. Investigation of Helicobacter pylori infection among physical examination population in Hangzhou area. Chinese Journal of nosocomiology 2016;26:2036-2037+2040.

87. Jia Mingfang, Luo Xiaohong, Wang Junlan, et al. Analysis of Helicobacter pylori infection status and risk factors in 2180 Wuhan residents. Journal of Nursing 2016;23:48-52.

88. Zhang Xiaohui, Chen Honghua, Guang Y. Analysis of Helicobacter pylori infection in healthy population. Chinese Journal of Social Medicine 2017;34:313-315.

89. Ma Zhichao, Ruan Heqiu, Huang Baili, et al. Analysis of Helicobacter pylori detection results in healthy physical examination subjects in Haikou Primary health care in China 2015;29:150-151.

90. Qin Hongwei, Cui Haitao, Yin Ruilan, et al. Investigation on Helicobacter pylori infection in Jiaozhou District of Qingdao. Journal of Chinese Minkang Medicine 2017;29:69-70+80.

91. Wu Xuehong, Wang Liyan, Shengbing L. Investigation on Helicobacter pylori infection and its influencing factors among 2860 physical examiners in Jiaxing area. Journal of Health Studies 2019;39:21-24.

92. Su Chengming, Shao Fuling, Bingxin S. Analysis of Helicobacter pylori infection in health examination of a population. Air force medical journal 2018;34:69-70.

93. Xu Zhen, Bing Y. Analysis of the correlation between helicobacter pylori infection and dyslipidemia in 2956 healthy subjects. Journal of World compound medicine 2018;4:34-36+92.

94. Wang Dan, Luo Hanzi, Wang Na, et al. Analysis of Helicobacter pylori detection results among healthy people in Jiujiang area of Jiangxi. Journal of Southeast defense medicine 2017;19:592-594.

95. Lirong M. Investigation on Helicobacter pylori infection and related factors in Wuzhong area of Ningxia: Ningxia Medical University, 2019.

96. Lu W. Investigation on the correlation between Helicobacter pylori infection and non-alcoholic fatty liver disease among physical examination population in Taiyuan: Shanxi Medical University, 2016.

97. Sun Huixiang, Zou Zhen, Huang Yueping, et al. Epidemiological investigation of Helicobacter pylori infection in a suburban community in Shanghai. Shanghai Preventive Medicine 2018;30:295-298.

98. Qu Zheng, Wu Min, Wang Zhuo, et al. Status and influencing factors of Helicobacter pylori infection in adults in Baoshan District of Shanghai. journal of public health and preventive medicine 2018;29:108-111.

99. Cai Ling, Yi Biranhen, Zhang Mei, et al. Epidemiological investigation of Helicobacter pylori infection in natural population in Lhasa. Chinese Journal of Digestion 2018;38:2-6.

100. Shu L, Zheng PF, Zhang XY, et al. Dietary patterns and Helicobacter pylori infection in a group of Chinese adults ages between 45 and 59 years old: An observational study. Medicine (Baltimore) 2019;98:e14113.

101. Gu Y, Zheng L, Kumari S, et al. The relationship between Helicobacter pylori infection and depressive symptoms in the general population in China: The TCLSIH cohort study. Helicobacter 2019;24:e12632.

102. Xie S, Wang S, Xue L, et al. Helicobacter pylori Is Associated With Precancerous and Cancerous Lesions of the Gastric Cardia Mucosa: Results of a Large Population-Based Study in China. Front Oncol 2020;10:205.

103. Li Yun, Liu Juhua, Tian Weike, et al. Analysis of Helicobacter pylori infection and its correlation with risk factors of arteriosclerosis in 33153 patients in Nanchong. Journal of China Medical Guide 2020;17:53-56.

104. Shuai Xuejun, Li Mu, Chen Gang, et al. Analysis of related factors in physical examination screening for Helicobacter pylori infection. Journal of China-Japan Friendship Hospital 2020;34:195-198.

105. Guo Cheng, Xiang Yang, Chen Min, et al. Investigation on Helicobacter pylori infection in outpatient and physical examination population in Jieshou. Journal of Modern digestive and interventional therapy 2019;24:969-971+976.

106. Piaoxian X. Significance evaluation and clinical analysis of Helicobacter pylori detection in physical examination. Journal of China Foreign Medical Treatment 2017;36:76-78.

107. Yang Lin, Kang Lesiji, Jiang Hua, et al. Epidemiological survey of Helicobacter pylori infection in Tibetan population in Aba Prefecture and analysis of related influencing factors. Journal of Practical Hospital Clinical 2019;16:18-20.

108. Guo Ying, Pei Dongmei, Naisi Z. Investigation and analysis of Helicobacter pylori infection in Shenyang. Journal of Practical Clinical Medicine 2019;23:99-101+105.

109. Wei Wenzhi, Liu Yanru, Wen Xiaohua, et al. Relationship between Helicobacter pylori infection and hyperhomocysteinemia in healthy population. Chinese Journal of Health Medicine 2018;20:7-9.

110. Fu Hongxia, Zhu Qinghong, Kang Min, et al. Two methods were used to detect Helicobacter pylori infection among healthy people in Shiyan. Journal of Marker immunoassay and clinical analysis 2018;25:939-941+976.

111. Han Yugang, Cui Yunpeng, Li Jing, et al. Study on Helicobacter pylori infection and its immune typing in natural population in Jinan. Journal of Laboratory medicine and clinic 2020;17:630-632.

112. Xu Wenjiao, Li Changping, Lei S. Study on Helicobacter pylori infection status and risk factors in physical examination population in Luzhou. Journal of practical medicine 2019;35:649-653.

113. Yan Y, Chen YN, Zhao Q, et al. Helicobacter pylori infection with intestinal metaplasia: An independent risk factor for colorectal adenomas. World J Gastroenterol 2017;23:1443-1449.

114. Ying C. Investigation and analysis of Helicobacter pylori infection in healthy people during physical examination. Chinese contemporary medicine journal 2017;24:162-164.

115. Hu Liu, Wan Zhengce, Lv Yongman, et al. Correlation between Helicobacter pylori infection and serum bilirubin. Chinese Journal of Gastroenterology 2019;24:30-34.

116. Zhang J, Chen Y, Chen W, et al. Persistent infection of Helicobacter pylori affects weight loss in obese population compared with persistent negative: A case-control study based on healthy Chinese. Helicobacter 2020;25:e12697.

Supplementary Table 3. Quality assessment of included *H. pylori* infection studies

Author, Publication	Study design	Sampling frame	Sample size	Outcome measures	Unbiased assessors	Response rate	Result interpretation	Applicability	Total*
Ma et al, 2005[1]	1	1	1	1	1	0	1	1	7
Brown et al, 2001[2]	1	1	1	1	1	0	1	1	7
Groves et al, 2002[3]	1	1	1	1	1	0	1	1	7
Wong et al, 1999[4]	1	1	1	1	1	0	0	1	6
Jiang et al, 1996[5]	1	1	0	1	1	0	0	1	5
Zhai et al, 1994[6]	1	0	1	1	1	0	0	0	4
Wang et al, 1996[7]	1	0	1	1	1	0	0	0	4
He et al, 2001[8]	1	1	1	1	1	0	0	1	6
Fan et al, 2004[9]	1	1	0	1	1	0	0	1	5
Chen et al, 2003[10]	1	1	1	1	1	1	0	1	7
Shi et al, 2008[11]	1	1	1	1	1	1	0	1	7
Chen et al, 2007[12]	1	1	1	1	1	0	0	1	6
Cheng et al, 2009[13]	1	1	1	1	1	0	0	1	6
Nie et al, 2007[14]	1	1	0	1	1	0	0	1	5
Luo et al, 2010[15]	1	1	1	1	1	0	0	1	6
Suo et al, 2011[16]	1	1	1	1	1	0	0	1	6
Zhu et al, 2011[17]	1	1	1	1	1	0	0	1	6
Zhou et al, 2005[18]	1	1	1	1	1	0	0	1	6
Zeng et al, 2008[19]	1	1	1	1	1	0	0	1	6
Zhou et al, 2010[20]	1	0	1	1	1	0	0	0	4
Guo et al, 2006[21]	1	1	1	1	1	0	0	1	6
Zhang et al, 2009[22]	1	1	1	1	1	0	0	1	6
Lao et al, 2008[23]	1	0	1	1	1	0	0	1	5
Zheng et al, 2013[24]	1	1	1	1	1	0	0	1	6

Chen et al, 2012[25]	1	1	1	1	1	0	0	1	6
Liu et al, 2015[26]	1	1	1	1	1	0	0	1	6
Yang et al, 2009[27]	1	0	1	1	1	0	0	1	5
Huang et al, 2015[28]	1	1	1	1	1	0	0	1	6
Kong et al, 2017[29]	1	1	1	1	1	0	1	1	7
Li et al, 2016[30]	1	1	1	1	1	0	0	1	6
Zhang et al, 2013[31]	1	0	1	1	1	0	0	1	5
Jiang et al, 2015[32]	1	1	1	1	1	0	0	1	6
Wang et al, 2011[33]	1	1	1	1	1	0	0	1	6
Zhang et al, 2016[34]	1	0	1	1	1	0	0	1	5
Huang et al, 2015[28]	1	1	1	1	1	0	0	1	6
Shen et al, 2014[35]	1	1	1	1	1	0	0	1	6
Yang et al, 2015[36]	1	1	1	1	1	0	0	1	6
Zhu et al, 2012[37]	1	1	1	1	1	0	0	1	6
Cheng et al, 2012[38]	1	1	1	1	1	0	0	1	6
Yang et al, 2011[39]	1	0	1	1	1	0	0	1	5
Deng et al, 2011[40]	1	1	1	1	1	0	0	1	6
Yang et al, 2015[36]	1	1	1	1	1	0	0	1	6
Li et al, 2013[41]	1	1	1	1	1	0	0	1	6
Tang et al, 2014[42]	1	1	1	1	1	0	0	1	6
Yang et al, 2011[39]	1	0	1	1	1	0	0	1	5
Cao et al, 2013[43]	1	0	0	1	1	0	0	0	3
Dong et al, 2016[44]	1	1	1	1	1	0	0	1	6
Liu et al, 2015[26]	1	1	1	1	1	0	0	1	6
Tian et al, 2016[45]	1	1	1	1	1	0	0	1	6
Cao et al, 2017[46]	1	1	1	1	1	0	0	1	6
Liu et al, 2013[47]	1	1	1	1	1	0	0	1	6
Liu et al, 2016[48]	1	1	1	1	1	0	0	1	6

Guo et al, 2013[49]	1	1	1	1	1	0	0	1	6
Zhang et al, 2013[31]	1	0	1	1	1	0	0	1	5
Chen et al, 2013[50]	1	1	1	1	1	0	0	1	6
Jia et al, 2018[51]	1	1	1	1	1	0	1	1	7
Xu et al, 2014[52]	1	1	1	1	1	0	0	1	6
Zhu et al, 2014[53]	1	1	1	1	1	0	0	1	6
Fan et al, 2018[54]	1	1	1	1	1	0	0	1	6
Xu et al, 2017[55]	1	1	1	1	1	0	0	1	6
Gao et al, 2017[56]	1	1	1	1	1	0	0	1	6
Wu et al, 2014[57]	1	1	1	1	1	0	0	1	6
Meng et al, 2015[58]	1	1	1	1	1	0	0	1	6
Mao et al, 2015[59]	1	1	1	1	1	0	0	1	6
Yan et al, 2013[60]	1	1	1	1	1	0	0	1	6
Yang et al, 2013[61]	1	1	1	1	1	0	0	1	6
Chen et al, 2011[62]	1	1	1	1	1	0	0	1	6
Xie et al, 2014[63]	1	1	1	1	1	0	0	1	6
Zhou et al, 2015[64]	1	1	1	1	1	0	0	1	6
Li et al, 2012[65]	1	1	1	1	1	0	0	1	6
Kong et al, 2013[66]	1	0	1	1	1	0	0	0	4
Zhou et al, 2014[67]	1	1	1	1	1	0	0	1	6
Gao et al, 2010[68]	1	1	1	1	1	0	0	1	6
Yu et al, 2016[69]	1	1	1	1	1	0	0	1	6
Qian et al, 2011[70]	1	1	1	1	1	0	0	1	6
Zhang et al, 2016[34]	1	0	1	1	1	0	0	1	5
Wang et al, 2014[71]	1	1	1	1	1	0	0	1	6
Kong et al, 2012[72]	1	1	1	1	1	0	0	1	6
Tu et al, 2012[73]	1	1	1	1	1	0	0	1	6
Wang et al, 2014[74]	1	1	1	1	1	0	0	1	6

Li et al, 2012[65]	1	1	0	1	1	0	0	1	5
Gong et al, 2017[75]	1	0	1	1	1	0	0	0	4
Xia et al, 2016[76]	1	1	1	1	1	0	1	1	7
Shan et al, 2017[77]	1	1	1	1	1	0	0	1	6
Liu et al, 2012[78]	1	1	1	1	1	0	0	1	6
Pan et al, 2016[79]	1	1	1	1	1	1	1	1	8
Liu et al, 2017[80]	1	1	1	1	1	0	0	1	6
Qu et al, 2017[81]	1	1	1	1	1	0	0	1	6
Ayinuer A et al, 2017[82]	1	1	1	1	1	0	0	1	6
Ji et al, 2016[83]	1	1	1	1	1	0	0	1	6
Shao et al, 2016[84]	1	1	1	1	1	0	0	1	6
Pan et al, 2017[85]	1	1	1	1	1	0	0	1	6
Li et al, 2016[86]	1	1	1	1	1	0	0	1	6
Jia et al, 2016[87]	1	1	1	1	1	0	0	1	6
Zhang et al, 2017[88]	1	1	1	1	1	0	0	1	6
Ma et al, 2015[89]	1	1	1	1	1	0	0	1	6
Qin et al, 2017[90]	1	1	1	1	1	0	0	1	6
Wu et al, 2019[91]	1	1	1	1	1	0	1	1	7
Su et al, 2018[92]	1	1	1	1	1	0	0	1	6
Xu et al, 2015[93]	1	1	1	1	1	0	0	1	6
Wang et al, 2017[94]	1	1	1	1	1	0	0	1	6
Mo et al, 2019[95]	1	0	1	1	1	0	0	0	4
Wang et al, 2016[96]	1	1	1	1	1	0	0	1	6
Wang et al, 2017[94]	1	1	1	1	1	0	0	1	6
Zhang et al, 2017[88]	1	1	1	1	1	0	0	1	6
Ma et al, 2015[89]	1	1	1	1	1	0	0	1	6
Sun et al, 2018[97]	1	1	1	1	1	0	1	1	7

Qu et al, 2018[98]	1	1	1	1	1	0	1	1	7
Cai et al, 2018[99]	1	1	1	1	1	0	1	1	7
Shu et al, 2019[100]	1	1	1	1	1	0	0	1	6
Wang et al, 2017[94]	1	1	1	1	1	0	0	1	6
Gu et al, 2019[101]	1	1	1	1	1	0	0	1	6
Xie et al, 2019[102]	1	1	1	1	1	0	0	1	6
Li et al, 2020[103]	1	1	1	1	1	0	0	1	6
Shuai et al, 2020[104]	1	1	1	1	1	0	0	1	6
Guo et al, 2019[105]	1	1	1	1	1	0	0	1	6
Xie et al, 2017[106]	1	1	1	1	1	0	0	1	6
Yang et al, 2019[107]	1	1	1	1	1	0	0	0	5
Guo et al, 2019[108]	1	1	1	1	1	0	0	1	6
Wei et al, 2018[109]	1	1	1	1	1	0	0	1	6
Fu et al, 2018[110]	1	1	1	1	1	0	0	1	6
Han et al, 2020[111]	1	1	1	1	1	0	0	1	6
Xu et al, 2019[112]	1	1	1	1	1	0	0	1	6
Wang et al, 2017[94]	1	1	1	1	1	0	0	1	6
Yan et al, 2017[113]	1	1	1	1	1	0	1	1	7
Cheng et al, 2017[114]	1	1	0	1	1	0	0	1	5
Hu et al, 2019[115]	1	1	1	1	1	0	0	1	6
Zhang et al, 2020[116]	1	1	1	1	1	0	1	1	7

*Scoring criteria for included studies

Study design: Population-based sample	1 point
Sampling frame: Unbiased sampling frame (i.e. census data)	1 point
Sample size: Adequate sample size (>300 subjects)	1 point
Outcome measures: Using objective, suitable and standard criteria to measure outcome	1 point
Unbiased assessors: Outcomes measured by unbiased assessors	1 point

Response rate: Adequate response rate (≥70%)	1 point
Result interpretation: Results given with confidence intervals and in detail by subgroup	1 point
Applicability: Study subjects described in detail	1 point

Supplementary Table 4. Attributable cases of modifiable risk factors for CGC from 2000 to 2050

Risk factor	Attributable cases (95% CIs)										
	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Male											
H. pylori[a]	59725 (32935,86514)	55601 (29966,81236)	60700 (32157,89242)	55169 (27608,82730)	51517 (24185,78850)	50461 (22833,78090)	48072 (21752,74393)	44791 (20267,69315)	40864 (18490,63237)	37188 (16827,57549)	33794 (15291,52296)
Smoking[b]	33947 (25060,42831)	30047 (21925,38169)	31320 (22636,40001)	29663 (21394,37933)	29488 (21279,37707)	30186 (21805,38569)	29194 (21089,37302)	27509 (19872,35149)	25331 (18298,32366)	23190 (16752,29630)	21081 (15228,26936)
Pickled vegetable[c]	11074 (7332, 14813)	10344 (6876, 13844)	9529 (6238, 12813)	8712 (5696,11727)	8647 (5654, 11641)	7569 (4911, 10224)	6924 (4493, 9353)	6262 (4063, 8458)	5574 (3617, 7529)	4994 (3240, 6746)	4411 (2762, 5959)
Alcohol[d]	10092 (3948, 16238)	8459 (3241, 13672)	5086 (1821, 8351)	5129 (1845, 8415)	5690 (2067, 9317)	5012 (1793, 8224)	4312 (1542, 7076)	3729 (1334, 6120)	3201 (1145, 5253)	2805 (1003, 4603)	2406 (861, 3949)
Unhealthy BMI[e]	6827 (543, 13111)	6909 (1127, 12692)	7852 (1283, 14422)	8392 (1376, 15407)	9401 (1719, 17082)	9783 (1173, 18392)	10451 (1253, 19649)	10616 (1273, 19958)	10410 (1248, 19572)	9932 (1191, 18674)	9558 (1146, 17970)
Diabetes[f]	445 (160, 734)	991 (344, 1641)	2219 (787, 3653)	2425 (863, 3981)	2329 (835, 3823)	2756 (989, 4520)	3798 (1362, 6228)	4712 (1690, 7726)	5496 (1971, 9012)	5927 (2126, 9718)	6805 (2441, 11159)
All above	82384 (56377,98857)	76885 (51577,93251)	82689 (53949,102077)	77723 (49208,96819)	75810 (46842,95023)	75574 (45512,95511)	73697 (43992,93414)	70053 (41533,88910)	65112 (38380,82682)	60068 (35268,76262)	55742 (32561,70706)
Female											
H. pylori	18697 (10311,27084)	18129 (9770,26487)	18763 (9940,27586)	19985 (10001,29968)	19521 (9164,29877)	19915 (9011,30819)	19920 (9013,30826)	19590 (8864,30315)	18730 (8475,28984)	17715 (8016,27413)	16151 (7308,24995)
Smoking	362 (110, 616)	288 (86, 489)	243 (73, 413)	222 (66,379)	204 (61, 349)	188 (56, 322)	163 (48, 279)	144 (43, 247)	127 (38, 217)	114 (34, 195)	97 (29, 166)
Pickled vegetable	3633 (2412, 4854)	3525 (2338, 4712)	3029 (1987, 4072)	3235 (2118, 4354)	3359 (2199, 4520)	3023 (1964, 4082)	2889 (1877, 3901)	2747 (1785, 3710)	2555 (1660, 3450)	2374 (1543, 3207)	2115 (1374, 2857)

Alcohol	317 (107, 530)	244 (83, 406)	115 (35, 195)	145 (47, 242)	150 (49, 252)	133 (43, 223)	111 (36, 186)	96 (31, 161)	82 (27, 138)	73 (24, 123)	61 (20, 103)
Unhealthy BMI	2438 (303, 4572)	2493 (456, 4530)	2877 (591, 5163)	3399 (740, 6057)	3877 (910, 6844)	4256 (915, 7596)	4726 (1017, 8436)	5029 (1082, 8977)	5136 (1105, 9167)	5071 (1091, 9051)	4904 (1055, 8754)
Diabetes	151 (53, 250)	360 (125, 594)	571 (202, 942)	800 (285, 1317)	771 (272, 1270)	940 (334, 1544)	1292 (459, 2121)	1622 (577, 2664)	1912 (680, 3139)	2086 (742, 3425)	2328 (828, 3822)
All above	21543 (12342,28912)	21053 (11903,28403)	21721 (11962,29601)	23562 (12373,32575)	23592 (11804,33035)	24214 (11573,34333)	24689 (11693,35002)	24702 (11623,34999)	24017 (11241,33985)	23001 (10731,32509)	21380 (9932,30152)
Both sex											
H. pylori	78422 (43246,113598)	73730 (39737,107723)	79463 (42098,116829)	75154 (37609,112698)	71038 (33349,108727)	70377 (31844,108909)	67992 (30765,105218)	64381 (29131,99631)	59593 (26965,92222)	54902 (24842,84962)	49945 (22599,77291)
Smoking	34310 (25170,43447)	30335 (22011,38658)	31563 (22709,40415)	29885 (21461,38313)	29693 (21340,38056)	30374 (21861,38891)	29357 (21137,37581)	27653 (19914,35396)	25458 (18336,32583)	23304 (16785,29825)	21178 (15257,27102)
Pickled vegetable	14707 (9744, 19666)	13869 (9184, 18556)	12559 (8225, 16885)	11946 (7815, 16081)	12006 (7854, 16161)	10591 (6875, 14306)	9813 (6369, 13254)	9009 (5847, 12168)	8129 (5276, 10979)	7369 (4783, 9953)	6527 (4237, 8815)
Alcohol	10409 (4054, 16768)	8703 (3323, 14078)	5201 (1856, 8545)	5274 (1892, 8658)	5840 (2116, 9569)	5144 (1836, 8447)	4423 (1578, 7263)	3825 (1365, 6280)	3284 (1172, 5392)	2878 (1027, 4726)	2467 (881, 4052)
Unhealthy BMI	9265 (846, 17683)	9402 (1582, 17222)	10729 (1873, 19585)	11790 (2116, 21464)	13278 (2629, 23926)	14038 (2088, 25988)	15177 (2270, 28085)	15645 (2355, 28935)	15545 (2353, 28738)	15003 (2282, 27725)	14462 (2201, 26724)
Diabetes	596 (213, 984)	1351 (470, 2235)	2790 (988, 4594)	3225 (1148, 5298)	3100 (1107, 5093)	3697 (1323, 6063)	5090 (1822, 8348)	6334 (2267, 10390)	7408 (2651, 12150)	8013 (2868, 13143)	9133 (3269, 14981)
All above	103928 (68719,127769)	97938 (63481,121654)	104410 (65911,131678)	101285 (61581,129393)	99403 (58646,128057)	99788 (57085,129844)	98385 (55684,128416)	94755 (53156,123909)	89129 (49622,116667)	83069 (45999,108771)	77122 (42493,100858)

[a]The positive status of *H. pylori* infection as defined by enzyme-linked immunosorbent assay (ELISA),

immunoblotting or urea breath test (UBT).

[b]Currently smoking, accumulated up to 100 cigarettes, and still smoking.

[b]Exclude those who did not use or consumed pickled vegetable minimally.

[d]Regular alcohol consumption, drinking alcohol at least three times a week.

[e]Unhealthy BMI included underweight (BMI<18.5) and overweight/obesity (BMI > 25.0).

[f]The diabetes as defined by the American Diabetes Association criteria.

Abbreviations: CGC, cardia gastric cancer; CIs, confidence intervals; *H. pylori*, helicobacter pylori; BMI, body mass index.

Supplementary Table 5. Attributable cases of modifiable risk factors for NCGC from 2000 to 2050

Risk factor	Attributable cases (95% CIs)										
	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Male											
H. pylori[a]	105734 (86881,124588)	99867 (81387,118348)	108970 (88256,129683)	99011 (78548,119474)	89955 (69711,110199)	88808 (67892,109724)	85811 (65602,106021)	81228 (62098,100359)	75375 (57623,93127)	69267 (52954,85580)	62319 (47642,76996)
Smoking[b]	44727 (33017,56431)	39779 (29027,50532)	41150 (29741,52556)	38070 (27458,48685)	35912 (25915,45921)	36538 (26394,46686)	35305 (25503,45111)	33420 (24141,42701)	31012 (22402,39624)	28498 (20586,36413)	25430 (18370,32493)
Pickled vegetable[c]	14591 (9660, 19516)	13694 (9063, 18328)	12520 (8196, 16834)	11181 (7311, 15051)	10531 (6886, 14177)	9161 (5944, 12375)	8374 (5433, 11311)	7607 (4936, 10275)	6824 (4428, 9218)	6138 (3982, 8291)	5322 (3453, 7188)
Alcohol[d]	13297 (5201, 21395)	11199 (4290, 18100)	6683 (2392, 10972)	6582 (2368, 10800)	6929 (2517, 11347)	6066 (2170, 9955)	5215 (1865, 8558)	4530 (1620, 7434)	3919 (1402, 6432)	3447 (1233, 5657)	2903 (1038, 4763)
Unhealthy BMI[e]	8995 (716, 17274)	9147 (1492, 16803)	10317 (1685, 18948)	10770 (1766, 19773)	11449 (2094, 20803)	11841 (1420, 22263)	12639 (1515, 23762)	12897 (1546, 24247)	12744 (1528, 23961)	12206 (1463, 22948)	11530 (1382, 21677)
Diabetes[f]	586 (210, 967)	1312 (456, 2172)	2915 (1034, 4799)	3112 (1108, 5109)	2836 (1017, 4656)	3336 (1197, 5471)	4593 (1648, 7532)	5724 (2053, 9386)	6728 (2413, 11032)	7283 (2613, 11943)	8209 (2945, 13461)
All above	122465 (103889,134270)	115813 (97351,127772)	125430 (104387,139651)	115882 (94669,130116)	107649 (86299,121773)	107246 (84705,122146)	104915 (82335,119860)	100361 (78343,114889)	94058 (73081,107821)	87068 (67431,99866)	79222 (61051,90915)
Female											
H. pylori	49179 (40410,57948)	49359 (40225,58493)	50131 (40602,59660)	52785 (41876,63695)	49590 (38430,60750)	49123 (37553,60692)	48099 (36771,59427)	46319 (35410,57228)	43117 (32962,53272)	39454 (30162,48746)	35192 (26904,43481)
Smoking	710 (215, 1206)	578 (172, 981)	475 (143, 808)	420 (125, 716)	362 (108, 618)	319 (95, 546)	266 (79, 456)	229 (68, 391)	194 (57, 332)	167 (50, 286)	138 (41, 237)
Pickled vegetable	7111 (4721, 9501)	7074 (4692, 9456)	5923 (3886, 7962)	6110 (4001, 8224)	5951 (3897, 8009)	5128 (3332, 6925)	4725 (3070, 6382)	4351 (2827, 5876)	3903 (2536, 5271)	3489 (2267, 4712)	3016 (1960, 4074)

Alcohol	621 (209, 1037)	489 (166, 815)	225 (68, 380)	274 (89, 458)	266 (86, 446)	225 (73, 378)	181 (59, 305)	151 (49, 255)	126 (41, 212)	107 (35, 180)	87 (28, 147)
Unhealthy BMI	4772 (593, 8950)	5003 (914, 9091)	5625 (1155, 10095)	6420 (1398, 11442)	6869 (1612, 12126)	7219 (1553, 12886)	7732 (1663, 13801)	7966 (1713, 14219)	7847 (1688, 14006)	7451 (1603, 13300)	6994 (1504, 12484)
Diabetes	296 (104, 489)	722 (252, 1193)	1117 (394, 1841)	1511 (539, 2488)	1367 (482, 2250)	1595 (567, 2619)	2113 (752, 3469)	2570 (914, 4219)	2921 (1039, 4796)	3065 (1090, 5033)	3320 (1181, 5451)
All above	52298 (42602,60078)	52681 (42615,60772)	53424 (42826,61990)	56730 (44484,66593)	53902 (41241,64040)	53545 (40212,64202)	52906 (39497,63539)	51367 (38160,61758)	48201 (35646,57991)	44370 (32709,53401)	39953 (29312,48090)
Both sex											
H. pylori	154913 (127290,182536)	149226 (121611,176841)	159101 (128858,189343)	151797 (120425,183169)	139545 (108141,170949)	137931 (105446,170415)	133910 (102372,165448)	127548 (97508,157587)	118493 (90586,146399)	108721 (83116,134326)	97511 (74546,120476)
Smoking	45436 (33232, 57637)	40357 (29199, 51513)	41625 (29883, 53364)	38490 (27583, 49401)	36274 (26022, 46539)	36857 (26489, 47231)	35572 (25582, 45567)	33648 (24209, 43093)	31205 (22459, 39956)	28666 (20636, 36699)	25569 (18411,32730)
Pickled vegetable	21702 (14381, 29017)	20769 (13755, 27784)	18444 (12081, 24796)	17291 (11312, 23275)	16482 (10783, 22186)	14289 (9276, 19300)	13099 (8503, 17693)	11958 (7763, 16151)	10727 (6964, 14489)	9627 (6249, 13003)	8338 (5413, 11262)
Alcohol	13918 (5410, 22431)	11688 (4456, 18915)	6907 (2460, 11352)	6856 (2456, 11258)	7196 (2603, 11792)	6291 (2243, 10334)	5396 (1924, 8863)	4682 (1669, 7689)	4045 (1443, 6643)	3554 (1268, 5837)	2990 (1067, 4910)
Unhealthy BMI	13767 (1309, 26224)	14150 (2406, 25894)	15942 (2840, 29044)	17190 (3164, 31215)	18318 (3706, 32930)	19060 (2973, 35148)	20370 (3178, 37563)	20863 (3260, 38466)	20591 (3216, 37967)	19657 (3066, 36248)	18524 (2887, 34161)
Diabetes	882 (315, 1456)	2034 (708, 3365)	4033 (1428, 6640)	4623 (1647, 7597)	4203 (1499, 6906)	4931 (1764, 8090)	6706 (2399, 11001)	8294 (2967, 13605)	9649 (3452, 15828)	10349 (3703, 16976)	11529 (4126, 18912)
All above	174763 (146490,194348)	168494 (139966,188544)	178854 (147213,201641)	172612 (139153,196709)	161551 (127540,185813)	160791 (124917,186348)	157821 (121831,183400)	151728 (116503,176647)	142258 (108727,165812)	131438 (100140,153266)	119175 (90363,139005)

[a]The positive status of *H. pylori* infection as defined by enzyme-linked immunosorbent assay (ELISA), immunoblotting or urea breath test (UBT).

[b]Currently smoking, accumulated up to 100 cigarettes, and still smoking.

[b]Exclude those who did not use or consumed pickled vegetable minimally.

[d]Regular alcohol consumption, drinking alcohol at least three times a week.

[e]Unhealthy BMI included underweight (BMI<18.5) and overweight/obesity (BMI > 25.0).

[f]The diabetes as defined by the American Diabetes Association criteria.

Abbreviations: NCGC, non-cardia gastric cancer; *H. pylori*, helicobacter pylori; BMI, body mass index.

Supplementary Table 6. The current PAF and attributable cases of modifiable risk factors for CGC in urban and rural areas

Risk factor	Urban			Rural		
	Prevalence (%)	PAF (95% CIs)	Attributable cases (95% CIs)	Prevalence (%)	PAF (95% CIs)	Attributable cases (95% CIs)
H. pylori	46.2	48.74 (23.20, 74.28)	32202 (15327, 49078)	51.5	51.49 (25.95, 77.02)	42960 (21653, 64267)
Smoking	23.0	12.85 (8.27, 17.43)	8491 (5466, 11517)	26.7	14.30 (9.25, 19.35)	11934 (7721, 16146)
Pickled vegetable	17.8	7.87 (5.14, 10.60)	5200 (3395, 7006)	19.1	8.40 (5.50, 11.30)	7007 (4588, 9426)
Alcohol	27.5	7.86 (2.98, 12.73)	5190 (1972, 8408)	27.6	7.88 (3.00, 12.77)	6576 (2500, 10653)
Unhealthy BMI						
Underweight	4.5	9.07 (1.87, 16.27)	5992 (1235, 10750)	5.4	9.26 (1.99, 16.52)	7723 (1660, 13786)
Overweight/obesity	34.2			33.3		
Diabetes	13.1	2.43 (0.87, 3.99)	1604 (575, 2634)	11.6	2.16 (0.77, 3.54)	1799 (642, 2957)
All above	-	66.36 (36.93, 86.68)	43843 (24399, 57268)	-	68.85 (40.09, 88.45)	57448 (33451, 73802)

Abbreviations: PAF, population attributable fraction; CGC, cardia gastric cancer; CIs, confidence intervals; *H. pylori*, helicobacter pylori; BMI, body mass index.

Supplementary Table 7. The current PAF and attributable cases of modifiable risk factors for NCGC in urban and rural areas

Risk factor	Urban			Rural		
	Prevalence (%)	PAF (95% CIs)	Attributable cases (95% CIs)	Prevalence (%)	PAF (95% CIs)	Attributable cases (95% CIs)
H. pylori	46.2	69.52 (54.14, 84.89)	91411 (71198, 111623)	51.5	71.79 (57.1, 86.48)	62381 (49617, 75144)
Smoking	23.0	11.77 (7.37, 16.17)	15481 (9697, 21265)	26.7	13.46 (8.54, 18.38)	11696 (7423, 15970)
Pickled vegetable	17.8	7.87 (5.14, 10.60)	10351 (6757, 13945)	19.1	8.40 (5.50, 11.30)	7297 (4778, 9816)
Alcohol	27.5	7.86 (2.98, 12.73)	10330 (3925, 16734)	27.6	7.88 (3.00, 12.77)	6848 (2604, 11093)
Unhealthy BMI						
Underweight	4.5	9.07 (1.87, 16.27)	11927 (2458, 21396)	5.4	9.26 (1.99, 16.52)	8043 (1729, 14356)
Overweight/obesity	34.2			33.3		
Diabetes	13.1	2.43 (0.87, 3.99)	3193 (1145, 5242)	11.6	2.16 (0.77, 3.54)	1874 (668, 3079)
All above	-	79.74 (61.98, 92.05)	104856 (81502, 121044)	-	81.71 (65.02, 93.12)	70998 (56496, 80913)

Abbreviations: PAF, population attributable fraction; NCGC, non-cardia gastric cancer; CIs, confidence intervals; *H. pylori*, helicobacter pylori; BMI, body mass index.

Supplementary Table 8. PAF of modifiable risk factors (excluding diabetes and underweight) for GC from 2000 to 2050

Risk factor	PAF (95% CIs)										
	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Male											
H. pylori[a]	67.09 (48.58,85.6)	66.06 (47.31,84.8)	65.24 (46.3,84.18)	62.59 (43.09,82.08)	59.56 (39.53,79.6)	57.99 (37.78,78.2)	56.24 (36.7,75.79)	55.00 (35.95,74.06)	54.02 (35.37,72.66)	53.38 (34.99,71.77)	52.42 (34.32,70.51)
Smoking[b]	31.90 (23.55,40.25)	29.67 (21.65,37.69)	27.87 (20.14,35.59)	27.49 (19.83,35.16)	27.54 (19.87,35.21)	27.78 (20.07,35.5)	27.10 (19.57,34.62)	26.59 (19.21,33.98)	26.18 (18.91,33.45)	25.92 (18.72,33.12)	25.57 (18.47,32.67)
Pickled vegetable[c]	10.41 (6.89,13.92)	10.21 (6.76,13.67)	8.48 (5.55,11.4)	8.07 (5.28,10.87)	8.07 (5.28,10.87)	6.97 (4.52,9.41)	6.43 (4.17,8.68)	6.05 (3.93,8.18)	5.76 (3.74,7.78)	5.58 (3.62,7.54)	5.35 (3.47,7.23)
Alcohol[d]	9.48 (3.71,15.26)	8.35 (3.2,13.5)	4.53 (1.62,7.43)	4.75 (1.71,7.8)	5.31 (1.93,8.7)	4.61 (1.65,7.57)	4.00 (1.43,6.57)	3.6 (1.29,5.92)	3.31 (1.18,5.43)	3.14 (1.12,5.14)	2.92 (1.04,4.79)
High BMI[e]	1.53 (0,3.57)	2.76 (0,5.95)	3.88 (0,8.37)	4.83 (0,10.22)	6.68 (0.04,13.32)	7.54 (0,15.23)	10.18 (0,20.54)	12.84 (0,25.92)	15.68 (0,31.65)	18.00 (0,36.34)	21.93 (0,44.27)
All above	82.10 (64.76,94.49)	80.90 (62.74,93.82)	78.94 (60.15,92.71)	77.39 (57.52,91.82)	76.20 (55.01,90.96)	75.11 (53.3,90.22)	74.26 (51.91,88.96)	73.93 (50.92,88.06)	73.92 (50.15,87.34)	74.11 (49.65,86.9)	74.59 (48.85,86.28)
Female											
H. pylori	68.89 (51.48,86.31)	67.97 (50.36,85.59)	67.10 (49.22,84.97)	64.45 (45.95,82.96)	61.44 (42.31,80.57)	59.71 (40.27,79.15)	57.80 (38.91,76.69)	56.38 (37.87,74.89)	55.17 (36.96,73.38)	54.32 (36.28,72.37)	53.29 (35.51,71.08)
Smoking	1.09 (0.33,1.85)	0.87 (0.26,1.48)	0.70 (0.21,1.19)	0.57 (0.17,0.97)	0.500 (0.15,0.86)	0.44 (0.13,0.75)	0.36 (0.11,0.62)	0.32 (0.09,0.55)	0.29 (0.08,0.49)	0.27 (0.08,0.46)	0.24 (0.07,0.42)
Pickled vegetable	10.91 (7.24,14.57)	10.68 (7.08,14.27)	8.72 (5.72,11.72)	8.28 (5.42,11.14)	8.28 (5.42,11.14)	7.05 (4.58,9.52)	6.47 (4.2,8.74)	6.07 (3.94,8.2)	5.76 (3.74,7.78)	5.57 (3.62,7.52)	5.33 (3.46,7.19)

Alcohol	0.95 (0.32,1.59)	0.74 (0.25,1.23)	0.33 (0.1,0.56)	0.37 (0.12,0.62)	0.37 (0.12,0.62)	0.31 (0.1,0.52)	0.25 (0.08,0.42)	0.21 (0.07,0.36)	0.19 (0.06,0.31)	0.17 (0.06,0.29)	0.15 (0.05,0.26)
High BMI	2.35 (0,5.29)	3.50 (0,7.39)	4.81 (0,9.83)	5.51 (0,11.03)	6.91 (0.44,13.38)	7.88 (0.58,15.18)	9.89 (0.72,19.05)	11.77 (0.86,22.68)	13.67 (1.00,26.33)	15.13 (1.11,29.15)	17.47 (1.28,33.66)
All above	73.49 (55.29,90.25)	72.84 (54.11,89.63)	71.70 (52.28,88.91)	69.49 (49.03,87.41)	67.37 (45.61,85.87)	65.76 (43.14,84.67)	64.65 (41.58,82.93)	64.04 (40.42,81.68)	63.70 (39.41,80.68)	63.55 (38.67,80.02)	63.65 (37.82,79.21)
Both sex											
H. pylori	67.61 (49.41,85.8)	66.63 (48.22,85.04)	65.77 (47.13,84.41)	63.17 (43.99,82.36)	60.17 (40.43,79.91)	58.55 (38.59,78.51)	56.76 (37.43,76.09)	55.47 (36.6,74.34)	54.41 (35.92,72.91)	53.71 (35.44,71.98)	52.72 (34.73,70.71)
Smoking	23.11 (16.92,29.29)	21.13 (15.3,26.95)	20.18 (14.5,25.85)	19.03 (13.65,24.42)	18.85 (13.53,24.17)	18.90 (13.59,24.21)	18.25 (13.13,23.37)	17.72 (12.75,22.68)	17.31 (12.46,22.16)	17.06 (12.28,21.84)	16.85 (12.13,21.56)
Pickled vegetable	10.55 (6.99,14.11)	10.35 (6.85,13.85)	8.55 (5.6,11.49)	8.14 (5.32,10.95)	8.14 (5.32,10.96)	6.99 (4.54,9.45)	6.44 (4.18,8.7)	6.06 (3.93,8.18)	5.76 (3.74,7.78)	5.58 (3.62,7.53)	5.34 (3.47,7.22)
Alcohol	7.05 (2.74,11.36)	6.09 (2.32,9.86)	3.34 (1.19,5.49)	3.38 (1.21,5.54)	3.72 (1.35,6.1)	3.21 (1.15,5.28)	2.76 (0.98,4.53)	2.46 (0.88,4.04)	2.24 (0.8,3.68)	2.11 (0.75,3.47)	1.97 (0.7,3.23)
High BMI	1.76 (0,4.06)	2.98 (0,6.37)	4.14 (0,8.78)	5.04 (0,10.48)	6.76 (0.17,13.34)	7.65 (0.19,15.21)	10.08 (0.24,20.05)	12.48 (0.29,24.83)	14.99 (0.34,29.83)	17.01 (0.38,33.86)	20.39 (0.44,40.61)
All above	79.64 (62.05,93.28)	78.51 (60.18,92.58)	76.89 (57.92,91.64)	74.91 (54.85,90.43)	73.36 (51.99,89.32)	72.07 (50,88.42)	71.08 (48.49,86.96)	70.59 (47.38,85.9)	70.42 (46.47,85.06)	70.46 (45.85,84.52)	70.82 (45.05,83.85)

[a]The positive status of *H. pylori* infection as defined by enzyme-linked immunosorbent assay (ELISA), immunoblotting or urea breath test (UBT).

[b]Currently smoking, accumulated up to 100 cigarettes, and still smoking.

[b]Exclude those who did not use or consumed pickled vegetable minimally.

[d]Regular alcohol consumption, drinking alcohol at least three times a week.

[e]High BMI included overweight and obesity (BMI > 25.0).

Abbreviations: PAF, population attributable fraction; GC, gastric cancer; CIs, confidence intervals; *H. pylori*, helicobacter pylori; BMI, body mass index.

Supplementary Table 9. Attributable cases of modifiable risk factors (excluding diabetes and underweight) for GC from 2000 to 2050

Risk factor	Attributable cases (95% CIs)										
	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Male											
H. pylori[a]	165459 (119816,211102)	155469 (111353,199584)	169670 (120414,218926)	154181 (106157,202204)	141472 (93896,189048)	139269 (90725,187813)	133884 (87353,180414)	126020 (82365,169674)	116239 (76113,156365)	106455 (69780,143129)	96112 (62933,129292)
Smoking[b]	78674 (58077,99262)	69826 (50952,88702)	72470 (52377,92557)	67733 (48852,86618)	65401 (47194,83628)	66724 (48199,85255)	64500 (46592,82413)	60929 (44013,77850)	56343 (40700,71991)	51688 (37338,66043)	46883 (33867,59904)
Pickled vegetable[c]	25665 (16992,34328)	24038 (15909,32172)	22050 (14434,29647)	19892 (13007,26779)	19178 (12541,25818)	16730 (10855,22599)	15298 (9926,20664)	13869 (8998,18734)	12398 (8044,16747)	11132 (7223,15037)	9811 (6366,13252)
Alcohol[d]	23389 (9149,37633)	19658 (7531,31772)	11769 (4213,19323)	11711 (4213,19216)	12619 (4584,20664)	11078 (3963,18180)	9527 (3408,15634)	8259 (2954,13554)	7120 (2547,11685)	6252 (2236,10260)	5351 (1914,8782)
High BMI[e]	3763 (0,8814)	6504 (0,13998)	10096 (0,21768)	11896 (0,25183)	15868 (94,31641)	18116 (0,36570)	24223 (0,48898)	29418 (0,59384)	33740 (0,68110)	35904 (0,72476)	40209 (0,81167)
All above	202478 (159698,233032)	190389 (147663,220797)	205301 (156434,241113)	190661 (141708,226196)	180992 (130663,216033)	180380 (127999,216673)	176774 (123568,211752)	169384 (116673,201753)	159076 (107917,187950)	147779 (99005,173285)	136778 (89571,158212)
Female											
H. pylori	67876 (50720,85032)	67487 (49995,84980)	68894 (50542,87246)	72770 (51877,93663)	69111 (47594,90627)	69038 (46565,91511)	68018 (45784,90252)	65909 (44274,87543)	61847 (41437,82256)	57169 (38178,76160)	51344 (34212,68475)
Smoking	1072 (325,1823)	866 (258,1469)	718 (216,1222)	642 (192,1095)	566 (169,967)	507 (150,867)	429 (127,735)	373 (111,638)	320 (95,549)	281 (83,481)	235 (70,402)
Pickled vegetable	10744 (7133,14355)	10600 (7029,14168)	8953 (5873,12034)	9345 (6119,12577)	9310 (6096,12530)	8151 (5295,11007)	7614 (4947,10283)	7098 (4611,9585)	6458 (4196,8722)	5864 (3810,7919)	5132 (3334,6930)

Alcohol	938 (315,1567)	733 (248,1221)	339 (103,575)	418 (135,700)	417 (135,697)	357 (116,601)	292 (94,491)	247 (80,416)	208 (67,350)	180 (58,303)	149 (48,250)
High BMI	2316 (0,5210)	3478 (0,7334)	4938 (0,10098)	6219 (0,12456)	7776 (498,15055)	9111 (667,17555)	11634 (852,22415)	13763 (1007,26519)	15320 (1121,29518)	15923 (1166,30680)	16830 (1232,32428)
All above	72402 (54470,88917)	72315 (53718,88989)	73624 (53679,91286)	78450 (55352,98682)	75774 (51302,96579)	76030 (49883,97898)	76080 (48934,97589)	74868 (47255,95491)	71405 (44178,90442)	66884 (40694,84220)	61323 (36436,76314)
Both sex											
H. pylori	233335 (170536,296134)	222956 (161348,284564)	238564 (170956,306172)	226951 (158034,295868)	210583 (141490,279676)	208307 (137290,279324)	201902 (133137,270666)	191929 (126640,257218)	178086 (117551,238621)	163623 (107958,219289)	147456 (97145,197767)
Smoking	79746 (58402,101084)	70692 (51210,90171)	73187 (52592,93779)	68375 (49044,87713)	65967 (47362,84595)	67231 (48349,86122)	64929 (46720,83148)	61302 (44123,78489)	56663 (40795,72539)	51969 (37421,66525)	47118 (33936,60306)
Pickled vegetable	36409 (24125,48683)	34638 (22939,46340)	31002 (20307,41681)	29237 (19127,39356)	28488 (18637,38347)	24881 (16150,33606)	22912 (14873,30947)	20967 (13610,28319)	18856 (12240,25468)	16996 (11032,22956)	14943 (9700,20182)
Alcohol	24327 (9465,39200)	20391 (7779,32993)	12108 (4316,19898)	12129 (4348,19916)	13036 (4719,21361)	11435 (4078,18781)	9819 (3502,16125)	8507 (3034,13970)	7329 (2614,12035)	6432 (2295,10563)	5500 (1962,9032)
High BMI	6079 (0,14024)	9981 (0,21332)	15034 (0,31866)	18115 (0,37639)	23644 (592,46695)	27227 (667,54125)	35857 (852,71314)	43181 (1007,85903)	49060 (1121,97627)	51827 (1166,103157)	57039 (1232,113596)
All above	274880 (214167,321949)	262704 (201381,309787)	278925 (210113,332399)	269112 (197060,324878)	256765 (181965,312612)	256410 (177882,314571)	252854 (172501,309341)	244252 (163928,297244)	230482 (152094,278392)	214663 (139699,257505)	198101 (126007,234526)

[a]The positive status of *H. pylori* infection as defined by enzyme-linked immunosorbent assay (ELISA), immunoblotting or urea breath test (UBT).

[b]Currently smoking, accumulated up to 100 cigarettes, and still smoking.

[b]Exclude those who did not use or consumed pickled vegetable minimally.

[d]Regular alcohol consumption, drinking alcohol at least three times a week.

[e]High BMI included overweight and obesity (BMI > 25.0).

Abbreviations: GC, gastric cancer; CIs, confidence intervals; *H. pylori*, helicobacter pylori; BMI, body mass index.