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Risk Factors of Atrophic Gastritis and Stomach Cancer in a Population-based Case-control Study in Jiangsu Province, China

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by

Somee Jeong

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ABSTRACT OF THE DISSERTATION

Risk Factors of Atrophic Gastritis and Stomach Cancer
in a Population-based Case-control Study in Jiangsu Province, China

by

Somee Jeong

Doctor of Philosophy in Epidemiology

University of California, Los Angeles, 2017

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Background: Stomach cancer is a major public health burden worldwide, with 5-year survival rates ranging from 20% to 30% in most countries. However, studies have shown early diagnosis and prompt treatment leading to better survival. Atrophic gastritis is a precancerous lesion of stomach cancer, which is thought to be a reversible stage. Few studies have examined environmental risk factors and the role of genetic susceptibility of atrophic gastritis, compared to the stomach cancer endpoint. The overall objective is to evaluate potential risk factors, including *Helicobacter pylori* infection, tobacco smoking, alcohol drinking, dietary habits of excessive salt intake, dietary nitrate and nitrites, and observe their association with atrophic gastritis and stomach cancer individually. In addition, we examine the relationship between candidate single

nucleotide polymorphisms (SNPs) from the microRNA pathway, stem cell pathway, and genomic wide association studies (GWAS) on atrophic gastritis and stomach cancer respectively.

Methods: A population based case-control study was conducted in Jiangsu Province, China. In our study, 1,617 stomach cancer patients and 6,369 cancer-free controls were included for analysis. For specific aim 1, the evaluation of risk factors of atrophic gastritis, only controls (cancer-free participants) are examined. For Specific Aims 2 and 3, case-control study design was employed including both stomach cancer cases and cancer-free controls for the development of stomach cancer. Epidemiologic data were collected by face-to-face interview using a standardized questionnaire, and a 5 ml blood sample was collected at the time of the interview. Atrophic gastritis status was chemically defined using serum pepsinogen (PG) cutoffs of PG I ≤ 70ng/mL and PG I/PG II ≤ 6. Unconditional logistic regression models have been used to estimate adjusted odds ratios (ORs) and 95% confidence intervals (CIs). Potential confounding factors have been adjusted in the analyses, including age, gender, study site, average family income, education level, family history of stomach cancer, pack-years of smoking (except smoking related factors), alcohol consumption (except alcohol drinking related factors), total caloric intake (for dietary intake variables only), and *H. pylori* status. Additive and multiplicative interactions have been evaluated, using relative excess risk due to interaction (RERI) and ratio of odds ratios (ROR) respectively.

Results: In our study, individuals with tonic supplement, having a history of drinking non-boiled water at childhood, and a moderate consumption of red meat were at higher risk of atrophic gastritis respectively, while adjusting for potential confounding factors. However, tobacco smoking, alcohol drinking, tea drinking, and dietary intake of micronutrients (vitamin A, thiamin, riboflavin, niacin, vitamin C, vitamin E, zinc, selenium) and macronutrients (protein, fat, fiber,

carbohydrates) were not significantly associated with atrophic gastritis. A protective effect of frequent consumption of BBQ meat, salted meat or fish, and higher waist-to-hip ratio was observed on the odds of atrophic gastritis. For gastric cancer, tobacco smoking, alcohol drinking, a preference for salty foods, spicy foods, and high temperature foods, high vegetable intake, and high intake of certain vitamins and minerals (vitamin A, thiamin, riboflavin, vitamin C, vitamin E, zinc, selenium) were associated with higher odds of stomach cancer. *H. pylori* IgG seropositivity and atrophic gastritis, expressed by lower serum PG levels, were also positively associated with stomach cancer respectively. Inverse associations of light tea drinking, consumption of raw garlic and ginger, and higher intake of salted or preserved meat/fish (third quartile versus lowest quartile) were found on stomach cancer respectively. When stratifying by atrophic gastritis status, similar associations are observed for the subpopulation without atrophic gastritis, but not in those with atrophic gastritis. For genetic susceptibility markers, significant inverse associations were observed with atrophic gastritis in rs3130932 (Oct4) and rs3729629 (WNT2) from the stem cell pathway, even after semi-bayes adjustment. For the stomach cancer endpoint, rs11077 (XPO5), rs12828 (WWOX), rs4072391 (IL6R), rs11364 (HES2), and rs738722 (CHEK2) are found to be positively associated and rs2075993 (E2F2), rs2273368 (Wnt2B), rs4961280 (Ago2), rs7372209 (miR-26a1), rs1033583 (DLL1), rs1981492 (AXIN1), rs3130932 (Oct4), rs3729629 (WNT2), rs3734637 (HEY2), and rs4835761 (WNT8A) were inversely associated with stomach cancer risk overall, even after semi-bayes shrinkage. When stratifying by atrophic gastritis status, rs12828 (WWOX), rs2273368 (Wnt2B), rs9266 (KRAS) from the miRNA pathway, and rs11364 (HES2), rs2240308 (AXIN2), rs1033583 (DLL1), rs1981492 (AXIN1), rs3130932 (Oct4), rs3729629 (WNT2), rs4835761 (WNT8A), rs915894 (Notch4) from the stem cell pathway were significantly associated with stomach cancer in those

without atrophic gastritis. In those with atrophic gastritis, only the rs2273368 (Wnt2B), rs3734637 (HEY2), and rs738722 (CHEK2) were associated with stomach cancer after semi-bayes adjustment. Additive interactions were observed between atrophic gastritis and rs2273368 (Wnt2B), and multiplicative interactions were observed between atrophic gastritis and rs2273368 (Wnt2B), rs11077 (XPO5), rs3130932 (Oct4), and rs738722 (CHEK2) on stomach cancer. Also interactions were found between *H. pylori* infection and polymorphisms of Ran (rs14035), Gemin4 (rs2740348), HEY1 (rs1046472), Ctbp2 (rs3740535), and between smoking and polymorphisms of Rbl2 (rs3929) and miR-26a1 (rs7372209), and between alcohol drinking and polymorphisms of DOCK4 (rs3801790) on the odds of stomach cancer.

Conclusion: This study confirms the association between established risk factors of stomach cancer such as smoking, *H. pylori* infection, and atrophic gastritis, and adds evidence on the protective effects of tea drinking and raw garlic consumption. To our knowledge, it is the first study to report inverse associations between ginger consumption and stomach cancer. Furthermore, our study is one of the first studies to show association in polymorphisms in the stem cell pathway and atrophic gastritis, and interactions in *H. pylori* infection, smoking, and alcohol drinking with atrophic gastritis on stomach cancer respectively. Further studies on different ethnic groups and atrophic gastritis determined by the use of tissue samples should be conducted for a fuller understanding of atrophic gastritis and stomach carcinogenesis.

The dissertation of Somee Jeong is approved.

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CHAPTER 1: BACKGROUND

1.1 Global burden of Stomach Cancer

Stomach cancer is the fifth most frequently diagnosed cancer worldwide, with an estimated number of 952,000 new cases in 2012, and is the third leading cause of death from cancer worldwide, with an estimated number of 723,000 deaths in 2012.[1] These take account for approximately 6.8% of the total number of new cancer cases and 8.8% of the total number of deaths from cancer worldwide in 2012. Stomach cancer has wide geographic variability, being more common in developing countries than in developed countries in general, and approximately half of the cases are from East Asian countries, with China taking account for almost 42.5% of the incident cases worldwide.[1] It is also common in Central and Eastern Europe and South America. Stomach cancer in the US is rare, where incidence ranks 16th among all cancer cases, and stomach cancer mortality ranks 15th of all cancer deaths in 2017. The American Cancer Society estimates the number of incident cases to be about 28,000 (1.7% of all incident cancer cases) and the number of deaths from stomach cancer to be 10,960 (1.8% of all cancer deaths) in 2017.[2] Most regions in Africa also have low risk of stomach cancer.[1]

A general decrease in stomach cancer incidence and mortality rates are observed worldwide.[3,4] This may be contributed to the increased use of refrigeration, and consequently the increase in availability of fresh fruits and vegetables along with less dependency on salted and pickled foods. Also, the use of antibiotics for the treatment of *Helicobacter pylori* may have led to the decrease in stomach cancer incidence rates. Screening of stomach cancer may have contributed to the

reduction in stomach cancer mortality, but at the same time explains the constantly high incidence overall, especially in Japan.[5]

1.2 Screening and the early diagnose of stomach cancer

"Early stomach cancer" is generally defined as carcinoma confined to the mucosa and/or submucosa, regardless of lymph node metastases.[6] Previous studies found that screening leads to the early diagnosis of stomach cancer, and 5-year survival rates can reach 90% for the early-detected stomach cancers, although these estimates may reflect some degree of lead time bias.[7,8] About 50.6% of the stomach cancers diagnosed in Japan were localized stomach cancers (2003-2005) with 5-year relative survival rates of the localized stomach cancers at 96%.[9] These relative survival rates are the observed survival of stomach cancer patients in comparison with survival to those without stomach cancer. The overall 5-year net survival rate is estimated to be 54% (2005-2009) in Japan.[10] In the US, approximately 26% of the stomach cancers are diagnosed at a localized stage [11], and the overall 5-year relative survival rate of stomach cancer was only 29.1% (2005-2009).[10] Considering that the 5-year survival rates are around 20-30% in most countries,[10,12,13] these rates are a major improvement. Therefore, targeting stomach cancer screening to high-risk populations and detecting stomach cancer in an early stage would contribute greatly on reducing stomach cancer mortality and improving prognosis in an efficient manner. Japan has a national population based screening program, suggesting photofluorography for men and women aged 40 years and older. Other options such as endoscopy, serum pepsinogen tests, and *H. pylori* antibody tests are available for opportunistic screening.[14] In Korea, men and women aged 40 years and older are recommended to undergo endoscopy or upper gastrointestinal series every other year.[15] China is another high-risk country that is home

to almost 40% of incident stomach cancer cases worldwide,[1] but does not have a formal guideline for stomach cancer screening. The 5-year relative survival rate in China is 31.3% (2005-2009).[10]

1.3 The precancerous cascade

Before developing into stomach cancer, stages including atrophic gastritis, intestinal metaplasia, and dysplasia are regarded as premalignant lesions of stomach cancer. Correa first introduced the concept of a precancerous cascade leading to stomach cancer in 1975.[16] This "precancerous cascade" has evolved and been strengthened since, with the discoveries of new epidemiological evidence. Intestinal-type stomach adenocarcinoma is thought to be preceded by a prolonged precancerous process which can go on for several decades, starting from normal gastric mucosa to chronic gastritis, atrophic gastritis, intestinal metaplasia, dysplasia, and finally cancer.[17] In addition to this main framework of the cascade, deleterious factors and protective exposures may modulate this cascade of events. Some risk factors that are thought to assist in the progress of the precancerous cascade are *H. pylori* infection, excessive salt intake, and N-nitroso compounds. Antioxidants such as ascorbic acid and β-carotene are thought to hinder this progress.

1.4 Serum Pepsinogen levels as surrogate of Atrophic Gastritis

Atrophic gastritis is the chronic inflammation of stomach mucosa leading to the loss of stomach glandular cells, which are then replaced with intestinal-like and fibrous tissues. Atrophic gastritis can be detected by gastroendoscopy and endoscopic biopsy, or by the examination of gastric biomarkers from the serum or plasma. Compared to the former method, serum biomarker testing is non-invasive and more convenient. The biological mechanism behind serum pepsinogen (PG)

testing is that in atrophic gastritis, original fundic (oxyntic) glands are lost and are replaced by pyloric glands, resulting in the loss of chief cells and mucous neck cells of the gastric corpus where pepsinogen I (PG I) and pepsinogen II (PG II) are produced. On the other hand, PG II is also produced by the pyloric glands, resulting in a decreased PG I level and relatively unaffected PG II level in atrophic gastritis.[18] This may also be expressed as a lower PG I to PG II ratio (PG I/PG II).

There is considerable debate about the best serological cutoff that should be used to determine atrophic gastritis, and whether to use PG I, PG I/PG II, or a combination of both. Currently a combination of PG I and PG I/PG II ratios with cutoff values of PG I ≤ 70ng/mL and PG I/PG II ≤ 3 is most often used in studies especially from Japan and European countries. A study of Chinese Han people suggested cutoffs of PG I ≤ 70ng/mL and PG I/PG II ≤ 6 for optimal sensitivity (62.1%) and specificity (94.2%) for high risk of stomach cancer.[19]

Although the use of serum PG is convenient and more approachable than the standard biopsies, there are also some limitations to the serum PG tests. PG levels reflect the degree of atrophy in the gastric corpus mucosa, but not for atrophy of the gastric antrum mucosa. Therefore, atrophy limited to the antrum region of the stomach may not be picked up by the sole use of serum PG tests.[20] Furthermore, since serum PG tests are not useful for diffuse type stomach cancers,[21] it should be used only as a screening tool for people at high risk of intestinal type stomach cancer with atrophic gastritis and not for stomach cancer itself.[20] Compared to stomach cancer, precancerous stages of stomach carcinogenesis, and atrophic gastritis in particular, has been rarely studied as an early stage endpoint in epidemiological studies. Since atrophic gastritis is

thought to be a reversible condition, identifying risk and protective factors for this precancerous lesion could help in setting up stomach cancer prevention strategies to reduce stomach cancer incidence and consequently stomach cancer mortality. Because atrophic gastritis is fairly asymptomatic, diagnosis of this condition is not easy without routine screening with endoscopy or blood tests. Endoscopy and subsequent biopsies are invasive to an individual and are vulnerable to measurement errors, with results depending heavily on the location of the biopsy sample, the number of biopsy samples taken, and may have poor inter-observer agreement among pathologists. This is especially true for multifocal atrophic gastritis, which is often found in high risk populations.[22] Therefore, serum pepsinogen testing might be a better measurement to identify high risk individuals for further endoscopic examinations to clinical diagnosis because it is less invasive, readily approachable, and less prone to measurement errors.

1.5 Moderators of the precancerous cascade

Helicobacter pylori infection

Helicobacter pylori infection, defined as a group 1 human carcinogen by IARC in 1994, is frequently found in chronic atrophic gastritis and is thought to affect the early stages of stomach carcinogenesis. It is estimated that *H. pylori* prevalence is 74% in developing countries and 58% in developed countries.[23] The prevalence of *H. pylori* infection is 35.6% and 55.8% in the United States and China respectively.[24] However, only 3% of the people infected with *H. pylori* eventually develop stomach cancer.[25] Approximately 63% of all stomach cancers,[23] and 89% of non-cardia gastric cancers are attributable to *H.pylori* infection.[26] A Chinese cohort study found a 1.8 relative risk (RR=1.8; (1.2-2.6)) of gastric dysplasia or gastric cancer in a *H. pylori* positive group compared to *H. pylori* negative group with a follow-up of 4.5 years,[27] and a meta-analysis

of 19 studies found *H.pylori* infection to be associated with a 3.08 risk of non-cardia stomach cancer (summary odds ratio=3.08; (1.78, 5.31)).[28] As *H. pylori* infection has become an established risk factor for stomach cancer, a growing body of research focus on the effects of *H. pylori* eradiation, including several randomized trials that show a protective effect of eradiation on stomach cancer incidence.[29-31] A meta-analysis studying the long-term impact of *H. pylori* eradication on different stages of the precancerous cascade, shows *H. pylori* eradication to be associated with significant decrease in chronic atrophic gastritis risk (OR=0.55 (0.37-0.83) in antrum; OR=0.21 (0.08, 0.54) in corpus gastric atrophy), but no significant decrease for intestinal metaplasia (OR=0.80 (0.59, 1.08) in antrum; OR=0.89 (0.63, 1.25) in corpus intestinal metaplasia).[32] This suggests *H. pylori*'s role in the early stages of the precancerous cascade and indicates that other genetic or environmental factors would modulate further progress of carcinogenesis. This also suggests the irreversibility of intestinal metaplasia, and that *H. pylori* infection should be treated before proceeding to a point of no return.[33]

Tobacco smoking

Tobacco smoke is a complex mixture of over 5300 compounds, with more than 70 carcinogens identified by IARC Monographs, and likely more that have not been evaluated yet.[34-36] Tobacco smoking has been established as a group 1 carcinogen with sufficient evidence in humans for cancers of multiple sites, including but not limited to the lung, oral cavity, esophagus, liver, colorectum, pancreas, cervix, urinary bladder, and stomach.[36,37] Meta-analysis of 46 studies of smoking status and stomach cancer found the overall relative risk of ever smokers versus never smokers to be RR=1.48 (1.28, 1.71), and the overall relative risk of current smokers versus never smokers to be RR=1.69 (1.35, 2.11) for stomach cancer.[38] However, the relation of tobacco

smoking and atrophic gastritis has not been established yet. A study of first-degree relatives of stomach cancer patients did not find a significant association between ever-smokers and atrophic gastritis (OR=0.43 (0.18, 1.01)),[39] and the ESTHER study, a large population based cohort study in Saarland, Germany, observed no significant risk in former smokers (OR=1.09 (0.55, 2.15)) nor in current smokers (OR=1.32 (0.52, 3.35)) upon a five-year follow-up.[40]

Alcohol drinking

Ethanol in alcoholic beverages are also classified as a group 1 carcinogen with sufficient evidence in human carcinogenesis in the oral cavity, pharynx, esophagus, colorectum, liver, larynx, and breast.[37] The relation between alcoholic beverage consumption and stomach cancer has been hypothesized but with inconsistent results.[36] A meta-analysis of 39 studies show a higher risk of stomach cancer in heavy alcohol intake (RR=1.21 (1.07, 1.36)), but not in light and moderate drinkers (light: RR=0.99 (0.92, 1.06), moderate: 0.97 (0.90, 1.04)).[41] This study also observed the risks by different population groups, and found significantly higher risks of stomach cancer in heavy drinkers of European populations (RR=1.21 (1.04, 1.42)), but not in North American (RR=1.42 (0.86, 2.34)) or Asian (RR=1.08 (0.93, 1.26)) population groups.[41] Studies on the risk of alcohol drinking and atrophic gastritis are limited and often with nonsignificant results.[42,43] After a 5-year follow-up of the ESTHER study, no associations were observed for light (less than 60g/week), moderate (60-140g/week), and heavy (more than 140g/week) alcohol drinking and atrophic gastritis incidence.[40] However, there is a potential that alcohol drinking may affect individuals with atrophic gastritis. In animal models, the gastric mucosa of rats with chronic atrophic gastritis showed decreased thickness of mucin and higher inflammatory cell infiltration compared to normal rats,[44] and a different study found rats treated

with 60% alcohol and 20 mmol/L sodium deoxycholate for 6 months and above to show pathological changes of gastric mucosa typical of chronic atrophic gastritis.[45]

Salt

Excessive salt intake has been found to be associated with an increased risk in stomach cancer in several studies,[46,47] and a synergistic effect is observed in those with *H. pylori* infection,[48,49] including an animal experimental study on Mongolian gerbils.[50] Potential mechanisms include the direct damage of stomach mucosa leading to inflammatory reactions and atrophy induction, and excessive cell replication which increases the possibility of increased endogenous mutations.[17] Based on these mechanisms, salt intake may act on the early stages of the precancerous cascade. A study examining urinary sodium excretion found no significant association between sodium levels and atrophic gastritis without intestinal metaplasia, but found a significant risk in the highest tertile of urinary sodium with atrophic gastritis with intestinal metaplasia (OR=2.87 (1.34, 6.14)).[51] Another study of *H. pylori* positive Portuguese men did not find an association between salt intake and intestinal metaplasia.[52]

N-nitroso compounds

N-nitroso compounds (NNC) are thought to have a role in the transition from gastric atrophy to intestinal metaplasia. Acid secreting parietal cells are lost in the gastric atrophic stage, increasing the pH of the stomach, and consequently allowing anaerobic bacteria to proliferate. These bacteria assist in the formation of mutagenic NNCs by reducing dietary nitrate into nitrite, which in turn react with other nitrogen containing compounds to form NNCs.[17,53] IARC classifies "ingested nitrate or nitrite under conditions that result in endogenous nitrosation" as a Group 2A

carcinogen, and as an agent with limited evidence in humans for stomach cancer.[37,54] Dietary sources of nitrates can be naturally found in certain vegetables (cabbage, cauliflower, carrot, radish, beets, spinach, etc.) or may be manually added in the preservation process such as pickling in the form of sodium nitrite. Preformed NNC and nitrosamines may exist in cured meats, dried milk, and coffee. Also, cooking practices such as broiling, roasting, baking, deep frying, sun drying, salting, curing, and pickling may aid in NNC formation.[55] A positive association was found in studies of processed meat consumption and stomach cancer.[56] In a Colombian population at high risk of stomach cancer, the level of detectable nitrite in gastric juice was significantly higher in those with intestinal metaplasia and dysplasia respectively.[57] High levels of gastric nitrite was found to be associated with higher risk of intestinal metaplasia (OR=4.12 (1.83, 9.27)) when chronic atrophic gastritis was the reference group in a Chinese study.[58]

Antioxidants

Antioxidants are hypothesized to act as free-radical scavengers to play a protective role in stages closer to cancer.[17] These may counteract with the harmful effect of NNCs and high salt intake discussed above. However, there is inconsistent evidence on the action of antioxidants on stomach carcinogenesis. Randomized clinical trials on β-carotene supplementation and stomach cancer risk show weak insignificant associations, or even show an increased risk of stomach cancer in smokers and asbestos workers.[59] No significant differences in the progression and regression of precancerous gastric lesions were found in a randomized clinical trial for dietary supplementation of vitamin C, vitamin E, and β-carotene.[60]

1.6 Genetic Factors

Genetic susceptibility of the host also contributes to stomach carcinogenesis. There have been numerous studies depicting the relationships between genetic polymorphisms and stomach cancer, which leads us to postulate the relation of these polymorphisms and atrophic gastritis, a precursor stage of stomach cancer.

MicroRNA polymorphisms

MicroRNAs (miRNA) are small, non-coding RNAs that inhibits gene expression at the posttranscriptional level, perhaps by gene silencing through cleavage of target messenger RNA (mRNA) or translation repression.[61] miRNAs have desirable features as biomarkers since they may be easily extracted from various biospecimens (serum, plasma, saliva, urine, tissues, feces, etc),[62,63] and are relatively stable against degradation.[64,65] Furthermore, approximately 30% of protein-coding genes in the human genome are thought to be regulated by miRNA.[66]

The dysregulation of miRNAs plays a key role in the pathogenesis of cancers, including stomach cancer, by functioning as upregulated oncogenes (miR-21, miR-106a, and miR-17), or by downregulated tumor suppressors (miR-101, miR181, miR-449, miR-286, let-7a).[67] Sometimes the classification of a specific miRNA as an oncogene or tumor suppressor may be difficult, due to differences in their expression in different tissues and differentiation states,[61] and the ability of a single miRNA to regulate multiple targets.[68] For example, miR-107 was significantly overexpressed in stomach cancer tissues compared to matched normal tissues indicating oncogenic properties in one study,[69] but in another setting, miR-107 expression significantly decreased in stomach cancer cases using real-time PCR suggesting a tumor suppression role.[67,70] Such opposing results were found for studies in miR-126 as well.[67,71,72]

There have been studies on SNPs of miRNA related genes on the effect on stomach cancer with somewhat inconsistent results. In a case-control study of stomach cancer in the Korean population, SNPs of miR-146a (GG and CG+GG) were associated with an increased risk of stomach cancer in nonsmokers, miR-149 (TC and TC+CC) with lower risk of stomach cancer in males, and miR-196a2 CC genotype with higher risk of stomach cancer in females.[73] In a European study, SNPs of miRNAs (miR-27a, miR-146a, miR-196a-2, miR-492, miR-492a and miR-608) were not significantly associated with the stomach cancer.[74]

Even fewer studies have been published on the relationship between miRNA related SNPs and atrophic gastritis. In a case-control study of high risk atrophic gastritis (HRAG) in a European population, no associations were found for SNPs of miR-27a, miR-146a, miR-196a-2, miR-492, miR-492a and miR-608.[74] HRAG was defined as inflammation in antrum and corpus, corpus predominant gastritis with or without gastric atrophy, and intestinal metaplasia in the antrum of corpus of the stomach. A Chinese population based study examining inflammation related miRNA, observed a higher risk of intestinal metaplasia (aOR=1.42; 1.03-1.97) and dysplasia (aOR=1.54; 1.05-2.25) in miR-146a rs2910164 CC carriers versus GG carriers, with participants with superficial gastritis and mild chronic atrophic gastritis as the reference group.[75] No significant association was found for miR-27a rs895819.[75] In a hospital based case-control study from Germany, three miRNAs (miR-21, miR-155, and miR-223) that are usually deregulated in stomach cancers, were examined and compared in normal controls, patients of chronic non-atrophic gastritis, patients of atrophic gastritis, and stomach cancer cases.[76] A gradual increase was observed in miR-155 and miR-223 following the progression of disease, but the study was

relatively small with a total sample size of 80 for four different groups (19 normal controls, 25 chronic non-atrophic gastritis, 20 atrophic gastritis, 16 gastric cancer).

Stem cell pathway

The mutual capability of self-renewal between stem cells and cancer cells suggest similarities between stem cells and carcinogenesis. Cancer cells may result from the transformation of normal stem cells, and similar signaling pathways may aid in the self-renewal regulation of both types of cells.[77] Several signaling pathways, such as Wnt, Notch, and Sonic hedgehog (Shh) have thought to play a role in the process of gastric carcinogenesis as well as regulation of stem cell self-renewal.[78,79]

Acting as an intercellular signaling molecule, the Wnt protein has been found to regulate development in various organs, including the hematopoietic,[80] epidermal,[81] and gut epithelial stem cells and aid in carcinogenesis when dysregulated.[82]

The Notch signaling pathway is a signaling cascade that controls cell fate determination, cell differentiation, tumor angiogenesis, and apoptosis.[79] Expression of Notch components such as Notch 1-4, Dll, Dll3, Dll4, Jagged1, and Jagged2, and activation of the Notch pathway has been observed in gastric cancer tissues,[83,84] and prognosis of stomach cancer has been lower in those with a higher expression of Jagged1.[85] A meta-analysis of components of the Notch signaling pathway and stomach cancer showed higher expression of Notch1, Notch2, Dll4, and Hes1 to be significantly associated with stomach cancer tissues versus normal tissue, and increased Notch3, Jagged1, and Jagged2 expression in intestinal type stomach cancer.[86]

GWAS in stomach cancer

Genome-wide association studies (GWAS) has been used to identify hundreds of SNPs related to cancers.[87] Over-expression of the MUC1 gene was found in H. pylori associated stomach cancer cells,[88] and GWAS studies suggested MUC1 rs4072037 polymorphism to be associated with stomach cancer risk.[89] The single nucleotide polymorphism (SNP) rs2274223 in the PLCE gene was found to be associated with both stomach and esophageal cancer risks,[90] and stomach cancer survival as well.[91] A study found carriers of CHEK2 mutations to have higher risk of stomach cancer, especially in early onset and familial cases.[92] The associations of these SNPs on atrophic gastritis have not been evaluated.

1.7 Gaps in Literature

There have been many studies examining the relationship between *H. pylori* infection and atrophic gastritis and stomach cancer.[93] However, few studies examine other risk factors of stomach cancer in relation to chronic atrophic gastritis, including excessive salt consumption, NNC, and lack of antioxidants. Previous studies on tobacco smoking and alcohol drinking yielded inconsistent results, and the sample sizes are often too small to estimate the magnitude of associations. Furthermore, the relationship between genetic polymorphisms and the risk of atrophic gastritis has seldom been studied. Further studies are needed to examine the risk factors of atrophic gastritis, and examine their role in stomach carcinogenesis.

CHAPTER 2: STUDY OBJECTIVES AND METHODS

2.1 Research Objectives

The overall objective of this study is to examine whether risk factors that are thought to act early in Correa's precancerous cascade such as *H. pylori infection*, excessive salt intake, dietary nitrate, tobacco smoking, alcohol drinking, and other factors, are associated with atrophic gastritis, biochemically defined by lower serum PG I levels and lower PG I/PG II ratios. Additionally, we examine the relationships between select single nucleotide polymorphisms and atrophic gastritis as well as stomach cancer.

2.2 Specific Aims and Hypotheses

Hypothesis for Aim 1: *Helicobacter pylori* infection, excessive salt intake, dietary nitrate, smoking, and other risk factors that are thought to act early in Correa's precancerous cascade would be associated with atrophic gastritis in the Chinese population.

Specific Aim1: Measure the strength of association of *Helicobacter pylori* infection, tobacco smoking, alcohol drinking, and various dietary habits such as excessive salt intake, dietary nitrate, low consumption of fresh fruits and vegetables, etc. on atrophic gastritis, biochemically defined by lower serum PG I levels and lower PG I/PG II ratios in a Chinese population.

Hypothesis for Aim 2: Atrophic gastritis and *Helicobacter pylori* infection would be associated with an elevated risk of stomach cancer. We also hypothesize that smoking, alcohol drinking, excessive salt intake, dietary nitrate, and low consumption of fruits and vegetables are also associated with stomach cancer, especially among those with atrophic gastritis.

Specific Aim 2: Examine the association of atrophic gastritis, biochemically defined by serum pepsinogen levels, with stomach cancer in the Chinese population, when adjusting for potential confounding factors, including age, sex, family history of cancer, and study site. The significance of this aim is to explore the usefulness of serum pepsinogen tests on stomach cancer prediction in the Chinese population. Also, we will evaluate associations of known and potential risk factors on the development of stomach cancer, and assess their relations to atrophic gastritis, as well as their joint associations.

Hypothesis for Aim 3: Polymorphisms of miRNA related genes, stem cell regulation genes, and SNPs identified from GWAS might be associated with atrophic gastritis and stomach cancer respectively. Potential interactions between these SNPs and atrophic gastritis on the risk of stomach cancer might exist. We also hypothesize that potential interactions might be identified between SNPs and potential risk factors of stomach cancer.

Specific Aim 3: Explore the associations between SNPs of miRNA related genes, stem cell pathway, and from GWA studies and atrophic gastritis as well as stomach cancer in the Chinese population. Evaluation of potential gene-environment interactions for atrophic gastritis and stomach cancer respectively in the Jiangsu case-control study.

2.3 Study Design and Methods

2.3.1 Study population

The Jiangsu study is a population based case-control study of the top four cancers (lung, stomach, liver, and esophagus) in Jiangsu province, China. Epidemiologic data were collected from four counties of the Jiangsu province, including Dafeng, Ganyu, Chuzhou, and Tongshan county from

2003 to 2010. Newly diagnosed, primary cancer patients of the four cancers under study were identified from local population based population-based tumor registries managed by Centers for Disease Control and Prevention (CDC) of each county. A rapid case recognition system is implemented so that most patients are identified and interviewed by the field investigators from their local CDC within one month after their cancer diagnosis. Coding follows the 10th version of International Classification of Diseases (ICD-10). Secondary cancers and recurrent cancers were excluded from the study. Controls were randomly selected from the general population using county-specific demographic databases, individually matched by age (±5 years) and gender. Those with a history of any cancer were ineligible as controls. For all cases and controls, residence at the area for at least 5 years was required. However, to increase statistical power, matching was broken and controls for all four cancer sites have been included in the analyses. The participation rates were 40% for stomach cancer cases and 87% for controls.

For the specific purpose of Aim 1, only the participants without cancer (controls) were considered from the Jiangsu study (n=8,019) for measurements of PG I and PG I/PG II ratios. Individuals erroneously assigned with the same identification number (n=86) and individuals without sufficient serum samples (n=1,564) were excluded from the study. In total, the levels of PG I, PG II and *H. pylori* antibody were measured among 6,369 participants for Specific Aim 1.

Stomach cancer cases (n=2,216) and all the controls (n=8,019) from the original Jiangsu study are eligible for inclusion for Specific Aim 2. Excluding participants with duplicate identification numbers (n=140) and insufficient serum samples for *H. pylori* IgG and PG analyses (n=1,564

controls, n=595 stomach cancer cases), a total of 1,617 stomach cancer cases and 6,369 controls from the Jiangsu study were included for analyses.

For Specific Aim 3, only a subgroup of the participants in Jiangsu study had genotyping data available. Excluding individuals without *H. pylori* IgG and serum PG measurements, a total of 3,302 participants (2,264 controls and 1,038 stomach cancer cases) from Dafeng, Ganyu, and Chuzhou county were analyzed for the associations of SNPs with atrophic gastritis and stomach cancer, respectively.

2.3.2 Data collection

Informed consents were given to potential study participants and only those who signed informed consent form were included in the study. Interviews were conducted using a standard questionnaire and 5 ml blood samples were collected. The epidemiologic questionnaire was a pretested standardized questionnaire, administered through face-to-face interviews by trained staff from the local CDC. Questionnaire includes basic demographic information, socioeconomic status, environmental exposures, dietary habits, food frequencies of 90 food items, smoking history, alcohol drinking, tea drinking, occupational history, medical history, family history of any cancers, physical activities, and menstrual history for women, etc. Blood samples were collected at the time of interview.

FFQ

Originally, the frequency and amount of consumption of 90 individual food items were collected by interview using the food frequency questionnaire (FFQ). Each study participant gave

information on the frequency (times per year/month/week/daily) and amount in liang (1 liang=50 grams) of consumption for each food item. Food items were grouped into categories such as vegetables, fruit, pickled food, fried food, and meat, and the amount of consumption was further divided into quartiles based on the distribution of the control group. Total daily caloric intake was calculated using nutritional values from the China Food Composition Table.[94] Extreme values of daily caloric intake, such as less than 500 kcal/day or more than 5000 kcal/day, were considered erroneous and excluded from analyses, and study site and gender specific median values of the control group were imputed for adjustment purposes. Individuals who reported no consumption of any food items or reported consumption of rice only were considered missing. Only the individuals with complete FFQ information were included for nutritional analysis. Study participants from Tongshan county were entirely excluded for the analyses on FFQ related variables because almost 50% of participants had incomplete FFQ data.

Based on the availability of the Chinese Food Composition table, the intakes of micronutrients were estimated for analyses such as vitamin A, carotene, B vitamins (thiamine, riboflavin, niacin), vitamin C, vitamin E, sodium, zinc, selenium, and macronutrients (protein, fat, carbohydrate, and fiber). An individual's nutrient intake was calculated by multiplying the total weight of consumption of each food item (from the FFQ) by its unit nutrient content (from the Chinese Food Composition table) and calculating the total sum for each micronutrient.

Anti-Helicobacter pylori IgG and serum Pepsinogen I, II

Anti-*Helicobacter pylori* immunoglobulin G, serum PG I, and serum PG II were assayed using enzyme-linked immunosorbent assays (ELISA). Anti-*H.pylori* IgG was detected with kits from

Beier Bioengineering (Beijing, China) and serum PG I and PG II were measured with kits from Mokobio Biotechnology (Beijing, China), according to each of the manufacturer's instructions. Since there is no universally set cutoff point for serum pepsinogen levels, those with serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6 were considered to have low serum pepsinogen as suggested by Zhang et al.[19] All ELISA plates were read with BioTek's PowerWave XS microplate spectrophotometer. PGI to PGII ratios (PGI/II) were calculated separately.

SNP selection and Genotyping

28 SNPs from the microRNA pathway, 25 SNPs from the stem cell pathway, and 3 SNPS from GWAS was considered for our study as shown in Table 2.3.1. These SNPS had minor allele frequencies (MAF) of at least 5% in Chinese Han population, with a genotyping call rate greater than 90%, and were not in linkage disequilibrium. SNP genotyping was performed with a Fluidigm Dynamic 96.96 Array™ Assay (Fluidigm, South San Francisco, CA) at the UCLA Genotyping and Sequencing Core. For quality control, DNA purchased from the Coriell Repository and negative control samples composed of a reagent mix with no DNA were included for each 96.96 Array™ Assay chip. Replicate quality control DNA aliquots were distributed throughout the plates to identify inconsistencies.

2.3.3 Statistical Analysis

Chi-square test is used for comparison of categorical variables. The Wilcoxon signed rank test is used for comparisons of continuous variables. Strength of association is presented as adjusted odds ratios (OR) and 95% confidence intervals (CIs) with unconditional logistic regression, adjusting for age, gender, county, education level, income 10 years ago, family history of

stomach cancer, pack-years (except for smoking related factors), ethanol intake 10 years ago (except for alcohol drinking factors), and *H. pylori* infection status, based on prior knowledge and following previous studies on the Jiangsu study, with statistical significance α=0.05 (two tails). For analyses based on food frequency questionnaire (FFQ) related factors, ORs are additionally adjusted for total daily caloric intake. Caloric intake was calculated using the China Food Composition Table.[94]

When adjusting for total caloric intake in the analyses of variables based on food frequency questionnaire (FFQ) data, the residual method is used to compensate for the nutrients' direct correlation with total caloric intake.[95] This method also removes some extraneous variation originating from measurement errors of total caloric intake. Residuals are taken from the regression model where a specific nutrient's intake is the dependent variable and total caloric intake is the independent variable. These residuals are then independent of total energy intake, and used in statistical analyses. As suggested by Willet et al., a term for total energy intake (total daily caloric intake) is included to the residual model in addition to the residuals since we are using a nonlinear logistic model.[95]

Along with adjusted odds ratios (aORs) with 95% confidence intervals, semi-bayes shrinkage was employed to produce sbORs and 95% posterior intervals. Semi-Bayes (partial-Bayes) adjustments are used to attenuate any potential bias arising from sparse-data or multiple comparison issues.[96,97] The data augmentation approach of the semi-Bayes shrinkage method is used to lessen the effects of sparse data bias. Variables are recentered and rescaled for clinically meaningful interpretations, and dummy variables are generated for each categorical variable

included in the analyses. Due to the lack of previous studies on SNPs and atrophic gastritis, we use a conservative null prior of mean=0 and variance=0.5 for a corresponding OR=1 and 95% prior limits of (0.25, 4).

For Specific Aims 2 and 3, study participants are further stratified by atrophic gastritis status, and effect modification by atrophic gastritis and other important risk factors such as *H. pylori* infection is examined. Multiplicative interaction is examined by including the product term in the logistic regression to estimate the ratios of odds ratios (ROR, or ORs for interaction), and additive interaction is assessed by the relative excess risk due to interaction (RERI).[98,99] Preventative factors are recoded inversely, so that the reference category represents the lowest risk to circumvent problems that may arise in the calculation of interaction on the additive scale.[100]

Hardy-Weinberg equilibrium (HWE) tests were performed to check for any serious deviations that could indicate genotyping errors, with a Bonferroni corrected p-value of 0.05/96 as the cutoff. The HWE for each SNP was tested using the chi-square test among the controls. SNPs that violate the HWE were excluded from further analysis. Unconditional logistic regression was used to estimate the associations (ORs and 95% CIs) between the SNPs and the risk of atrophic gastritis and stomach cancer. The association of each SNP with atrophic gastritis and stomach cancer was examined using a co-dominant, additive, dominant, and recessive genetic model respectively.

As a conservative approach, county and sex specific median values of controls are imputed for missing potential confounding variables, including education level, average family income 10 years ago, pack-years of tobacco smoking, ethanol intake in 1990s, and daily total caloric intake. Since the distributions of the covariates are not normally distributed, the median values are used instead of the mean. SAS v9.4 (SAS Institute Inc.) is used for all analyses.

CHAPTER 3. RESULTS

3.1 Risk Factors of Atrophic Gastritis (Specific Aim 1)

Baseline characteristics of the study population are shown in Table 3.1.1. Among a total of 6,369 cancer-free participants with sufficient serum samples for *H. pylori* antibody and pepsinogen testing, 4522 (71%) tested positive for *H.pylori* IgG antibodies and 407 (6.4%) showed lower levels of serum pepsinogen. The number of male participants included in the study was almost three times of that of women, and there were four times of married people compared to those not in a marriage, regardless of atrophic gastritis status. Approximately half of the participants were illiterate and about one third received primary school education. There were a higher percentage of people aged 70 years and older in the group with atrophic gastritis compared to those without atrophic gastritis. Also, the average income 10 years ago per capita was lower in those with atrophic gastritis. There are no significant differences between those with and without atrophic gastritis in the distribution of gender, current marital status, education levels, BMI, family history of stomach cancer, and *H. pylori* status. However, some discrepancies existed in the study site, age (continuous) and average family income.

The association between *H.pylori* status and low serum pepsinogen levels were insignificant in this study (Table 3.1.2). After adjusting for age, gender, county, education level, average family income 10 years ago, family history of stomach cancer, pack-years of smoking, and ethanol intake in the 1990s, the OR was not significant (aOR=1.11, 95% CI=(0.87, 1.40)).

Table 3.1.3 shows the association between smoking related factors with atrophic gastritis. Ever-smokers were defined to have smoked at least a cumulative 100 cigarettes throughout their lifetime. Current smokers include those who quit only in the recent year. Environmental tobacco smoking, or passive smoking, was assessed in never-smokers and in all study participants (including smokers). Study participants were considered to be exposed to ETS if they live with a family member who smokes or if they are exposed to more than 15 minutes of smoking environment in the workplace. None of the smoking related variables had significant association with atrophic gastritis after adjusting for age, gender, county, education level, average income 10 years ago, family history of stomach cancer, ethanol intake in the 1990s, and *H. pylori*, and there are no dose-dependent relationships.

Associations between alcohol drinking related variables and atrophic gastritis are presented in Table 3.1.4. After adjusting for age, gender, county, education level, average income 10 years ago, family history of stomach cancer, pack-years of smoking, and *H. pylori* status, there were no significant associations between alcohol drinking and atrophic gastritis, and no dose-dependent responses. Those who quit only in the recent year were treated as a current alcohol drinker.

Ever tea drinkers were defined to have consumed at least 1 cup of tea per week, for 6 months or more. Current tea drinkers include those who quit drinking tea within the recent year. No tea drinking related behaviors had significant association with atrophic gastritis after adjusting for age, gender, county, education level, average income 10 years ago, family history of stomach cancer, pack-years of smoking, ethanol intake in the 1990s, and *H. pylori* status as shown in Table 3.1.5.

Assuming those who responded to favor green tea had consumed green tea primarily, we found the associations between green tea drinking habits and atrophic gastritis as shown in Table 3.1.6. Although preventive effects of current green tea drinkers were observed, with a dose dependent pattern in duration (years of green tea drinking), amount consumed (cups per day), and preference of a higher concentration of green tea in the crude observations respectively, after adjusting for potential confounders, no obvious associations of these factors were observed with atrophic gastritis.

Table 3.1.7 presents the association of atrophic gastritis, determined by low serum pepsinogen levels, with dietary habits such as usage of a fridge, preference of salty, spicy, or acidic foods, habit of eating food of high temperature, eating speed, use of supplements and vitamins, consumption of raw garlic, ginger, and drinking water, and the frequency of eating differently prepared meat. After adjusting for age, gender, county, education level, average income 10 years ago, family history of stomach cancer, pack-years of smoking, ethanol intake in the 1990s, and *H. pylori* status, those who took supplements and those who drank non-boiled water at childhood, but not now, had elevated odds of atrophic gastritis compared to their counterparts with aOR=1.6 (1.04, 2.45) and aOR=1.35 (1.02, 1.78) respectively. The higher risk for participants who took supplements held even after semi-bayes shrinkage (sbOR=1.54 (1.02, 2.32), but was borderline for those who drank non-boiled water at childhood (sbOR=1.31 (1.00, 1.72)). Also, an inverse association was observed for those who ate barbequed meat once or more weekly, even after adjustment for potential confounding factors (aOR=0.61 (0.38, 0.98)). The other variables do not seem to be associated with atrophic gastritis.

Among the 6,369 cancer free participants for specific aim 1, a total of 258 participants had no data input for any of the FFQ items, and 315 individuals had extreme daily caloric intake of less than 500 kcal/day or more than 5000 kcal/day. Excluding Tongshan county and those with incomplete FFQ data, a total of 4,369 cancer-free individuals are included for FFQ analyses of specific aim 1. After adjusting for potential confounding variables, the intake of vegetables, fruit, pickled food, fried food, and meat were found to have no association with atrophic gastritis, and only the third quartile of red meat consumption (sbOR= 1.57 (1.04, 2.35)) had significantly higher risk of atrophic gastritis after semi-bayes adjustment as shown in Table 3.1.8.

Food groups known to contain high levels of nitrate and nitrite[101,102] were examined in more detail in Table 3.1.9. The weight and frequency of consumption of green and leafy vegetables (cabbage, spinach, bok choi, cauliflower, Chinese lettuce), root vegetables (carrot, radish, potato, taro, ginger), salted or pickled vegetables (pickled cucumber, pickled mustard plant stem, pickled kohlrabi, salty dishes), and preserved and/or salted meat and fish (smoked fish, smoked pork, shredded dried pork, preserved pork, ham sausage, salted fish, salted meat) were examined respectively. After adjusting for potential confounding factors, the third quartile of preserved or salted meat/fish were inversely associated with atrophic gastritis compared to the group of lowest consumption, without an apparent dose-dependent relationship (aOR=0.56 (0.34, 0.92); sbOR=0.63 (0.40, 0.99)). The consumption of green and leafy vegetables, root vegetables, and salted/pickled vegetables had no clear association with atrophic gastritis in our study.

Micronutrients (vitamins and minerals) and macronutrients (protein, fat, carbohydrates, and fiber) are calculated using the Chinese Food Composition Table,[94] and their relation to atrophic

gastritis are shown in Tables 3.1.10 and 3.1.11. After adjusting for age, gender, county, education level, average family income 10 years ago, family history of stomach cancer, pack-years of smoking, ethanol intake in the 1990s, total caloric intake, and *H. pylori* status, there were no obvious association between the nutrients and serum pepsinogen levels. The total caloric intake from food was not associated with atrophic gastritis either, adjusting for age, gender, county, education level, average family income 10 years ago, family history of stomach cancer, pack-years of smoking, ethanol intake in the 1990s, and *Helicobacter pylori* status. There were no dose dependent relationships in this study.

Table 3.1.12 examines the effect of family history of stomach cancer and/or any other type of cancers in first degree relatives and/or any other relatives. Family history of cancers was not obviously associated with atrophic gastritis after adjustment for age, gender, county, education level, average family income 10 years ago, pack-years of smoking, ethanol intake in the 1990s, and *H. pylori* status.

Associations between different measures of obesity and low serum pepsinogen levels are shown in Table 3.1.13. After adjustment for potential confounding factors, a higher degree of obesity was inversely associated with low serum pepsinogen testing in our study in terms of BMI, waist circumference, waist to hip ratio, and waist to height ratio. The protective effect was significant in waist to hip ratio in particular (aOR=0.77 (0.62, 0.96)).

3.2 Risk Factors of Stomach Cancer and the effect of Atrophic Gastritis (Specific Aim 2)

The baseline characteristics of study participants for specific aim 2 are shown in Table 3.2.1 by stomach cancer status. The median age of the overall study population is 64 years, and the

majority of cases and controls were male, currently married, and illiterate. H. pylori infection was present in 76.7% of stomach cancer cases and 71% for controls. Atrophic gastritis, determined by low serum pepsinogen levels, was found in 19% of stomach cancer cases compared to 6.4% in controls. Stomach cancer cases and controls differ in study site (county), education level, average family income 10 years ago, BMI, family history of stomach cancer in first degree relative, family history of stomach cancer in any relative, Helicobacter pylori infection, and low serum pepsinogen levels respectively.

Individuals who tested positive for *H. pylori* IgG were associated with stomach cancer (aOR=1.31;(1.15, 1.50)) compared to those who were H. pylori negative (Table 3.2.2), after adjusting for potential confounding factors. Stratifying the study population by atrophic gastritis status, there still was a positive association with stomach cancer in the *H. pylori* positive individuals without atrophic gastritis (aOR=1.39;(1.20, 1.61)), whereas the association was not obvious among those with atrophic gastritis (aOR=0.93; (0.66, 1.31)). Atrophic gastritis, determined by using our criteria of serum PG levels of PG I≤70ng/mL and PG I/PG II≤6, was also found to have a 3-fold odds (aOR=3.28;(2.78, 3.87)) of stomach cancer (Table 3.2.3).

Smoking related factors, including current and former smoking status, age started smoking, cigarettes smoked per day, duration of smoking (years), and pack-years of smoking, were positively associated with stomach cancer (Table 3.2.4). Never-smokers were defined to have smoked less than a cumulative 100 cigarettes throughout their lifetime. Those who quit only in the recent year were treated as current smokers. A dose-response pattern was observed for age started smoking, intensity of smoking (cigarettes smoked per day), duration of smoking (years of

smoking), and pack-years of smoking, after adjusting for potential confounding factors. In addition to the participant's smoking habits, the effects of environmental tobacco smoke (ETS) in nonsmokers and in all study participants were examined respectively. A study participant was defined to be exposed to ETS if they lived with a smoker or was exposed to a smoking environment for more than 15 minutes every day in their workplace. A positive association was observed between ETS and stomach cancer regardless of their smoking status (aOR=1.58;(1.32, 1.91) for nonsmokers and aOR=1.45;(1.29, 1.62) for all study participants).

When examining the study population by atrophic gastritis status, smoking related factors were still associated with stomach cancer among those without atrophic gastritis, but were not associated with stomach cancer among those with atrophic gastritis, except for former smoking status and ETS in the overall study population.

Table 3.2.5 shows the association of alcohol drinking factors and stomach cancer. Ever alcohol drinkers (aOR=1.22;(1.07, 1.39)), regardless of being a former drinker (aOR=1.38;(1.12, 1.69)) or current drinker (aOR=1.20;(1.05, 1.38)), were associated with stomach cancer, compared to never drinkers, after controlling for potential confounding factors. Current alcohol drinkers include those who quit only in the recent year. Occasional (aOR=1.21;(1.03, 1.42)) and often (aOR=1.42; (1.19, 1.70)) drinkers had a higher odds of stomach cancer, compared to never drinkers, but those who drank almost every day were not positively associated with stomach cancer. A strong association with stomach cancer was observed in those who drank for 30 years or more (aOR=1.27;(1.09, 1.46)) and those who started drinking in earlier in their lives (younger than 35). Weekly ethanol intake was calculated by collecting information on amount (L/week) of

spirits with ABV 38% and up, amount (L/week) of spirits with ABV less than 38%, and amount of beer (bottles/week) consumed 1 year ago and in the 1990's respectively. The amount of ethanol intake was first calculated as total grams of pure ethanol consumed per week and then converted into number of standard drinks per week, where a standard drink was equivalent to 14 grams of pure alcohol. Weekly ethanol intake one year ago was inversely associated with stomach cancer, while a positive association was observed for weekly ethanol intake in the 1990's. A dose-dependent trend was found in age started drinking, years of drinking, and weekly ethanol intake (grams) one year ago and in the 1990's. Similar relationships were found in study participants without atrophic gastritis, except for the inverse relationship in weekly ethanol intake one year ago, and no significant relationships were found in those with atrophic gastritis.

In the case of tea drinking, former tea drinkers had a higher risk of stomach cancer (aOR=2.22;(1.61, 3.07)), whereas current tea drinkers were inversely associated with stomach cancer (aOR=0.74;(0.63, 0.87)) compared to those who never drank tea, after taking into account for potential confounding factors (Table 3.2.6). Those who quit drinking tea within the most recent year due to health problems were included as current tea drinkers. A protective, but non-significant effect, was observed in people that preferred to drink green tea (aOR=0.89;(0.75, 1.05)). A significantly lower odds of stomach cancer was found in participants that drank tea for less than 20 years (aOR=0.71;(0.56, 0.92)), 1 cup per day (aOR=0.80;(0.64, 1.00)), and at medium strength (aOR=0.82;(0.67, 0.99)), compared to never tea drinkers respectively, but without a dose-dependent trend. These associations are also observed in those without atrophic gastritis, but not in people with atrophic gastritis.

Table 3.2.7 presents associations of green tea drinking factors and stomach cancer by atrophic gastritis status, assuming those who answered that their favorite tea was green tea would consume green tea most of the time. Similar to overall tea drinkers, an inverse association with stomach cancer was found in current green tea drinkers, and those who drank green tea for less than 20 years respectively. A higher odds was observed in former green tea drinkers. When examining these relationships by atrophic gastritis status, similar significant observations were found for those without atrophic gastritis, but not in atrophic gastritis cases.

The relationships between dietary habits and stomach cancer are shown in Table 3.2.8. Participants reporting to eat more/very salty foods (aOR=1.45;(1.20, 1.52)), spicy foods (aOR=1.43;(1.27, 1.60)), and foods that are hot (aOR=1.54 (1.38, 1.71)) were found to have a higher odds of stomach cancer compared to their counterparts respectively. A dose-response trend was observed for eating speed, with higher odds of stomach cancer for faster eating. This trend was also observed in raw garlic consumption and ginger consumption respectively, showing a protective effect. Ginger consumption was further adjusted for total daily caloric intake as the measurements were taken from the FFQ, and is usually consumed as an ingredient for a dish. Stomach cancer was found to be associated with fried and boiled meat consumption, without a dose-dependent trend, but no association was found for barbequed meat. Those who consumed raw, unboiled water sometime in their life was found to be at higher odds of stomach cancer (aOR=1.23;(1.10, 1.38)), but when categorized into frequency of raw water intake, the association was found only in “seldom drinkers” (aOR=1.27;(1.11, 1.45)) and those who “drank unboiled water at childhood, but not now” (aOR=1.19;(1.02, 1.39), but not in “frequent drinkers”. When stratifying by atrophic gastritis, a significantly higher odds of stomach cancer was

observed in both strata, for those who ate salty foods, spicy foods, and foods of hot temperature respectively. Also, a protective effect was observed in both strata for those who consumed raw garlic twice or more a week, and ginger once or more times a week. A higher odds was observed in eating speed, ever drinking unboiled water, and consumption of fried meat only in those without atrophic gastritis.

Analyses of FFQ food intake in terms of total weight consumed per week is presented in Table 3.2.9. As described in the methods section, individuals with extreme values of daily caloric intake, such as less than 500 kcal/day (n=162; 133 controls and 29 cases) or more than 5000 kcal/day (n=137; 113 controls and 24 cases), or those who reported no consumption of any food items or reported consumption of rice only (n=1180; 1003 controls and 177 cases) were considered missing. Only those with complete FFQ information were considered for nutritional analysis, and study participants from Tongshan county were entirely excluded for the analyses in this section due to the high proportion of incompleteness of FFQ data (49.2%). In addition to age, gender, county, education, income, family history of stomach cancer, smoking, alcohol drinking, and *H. pylori* IgG, we also adjust for total energy intake using the residual method. Higher intake (in terms of grams/week) of vegetables were found to be associated with a higher odds of stomach cancer (p-trend=0.0397), as well as pickled food (p-trend=0.0354), and meat in general (p-trend=0.0468). The highest quartiles (Q4) of these food categories had significantly higher odds of stomach cancer compared to the lowest quartile (Q1) of intake respectively. Comparable patterns were found in those without atrophic gastritis. No significant associations were observed in individuals with atrophic gastritis.

Table 3.2.10 presents the association of food items that are known to contain high levels of dietary nitrate and nitrite, in terms of total weight of consumption per week. Green and leafy vegetables include cabbage, tatsoi, cauliflower, cabbage, and Chinese lettuce. Root vegetables include carrot, other radish, potato, and taro. Pickled cucumber, pickled mustard plant stem, pickled kohlrabi, and salty dishes are categorized as salted/pickled vegetables. Smoked fish, smoked pork, shredded dried pork, preserved pork, ham/sausage, salted fish, and salted meat are grouped as preserved or salted meat and fish. The highest quartile of consumption (Q4) of green and leafy vegetables (sbOR=1.23;(1.00,1.50)) and salted/pickled vegetables (sbOR=1.24;(1.01, 1.51)) had borderline higher odds of stomach cancer in those without atrophic gastritis with a dose-dependent trend in green and leafy vegetables only. An inverse relationship was observed for intake of preserved or salted meat and fish where higher consumption (Q3) was associated with lower odds of stomach cancer, but without a dose-response pattern, in those without atrophic gastritis.

A higher intake of vitamin A, carotene, riboflavin, niacin, vitamin C, sodium, and zinc was found to be positively associated with stomach cancer after adjusting for potential confounding factors and total daily caloric intake using the residual model (Table 3.2.11). The highest quantiles of intake for vitamin A, carotene, thiamine, vitamin C, sodium from condiments and food, and zinc had higher odds of stomach cancer respectively, with an apparent dose-dependent trend. When observing the data by atrophic gastritis status, higher odds of stomach cancer was found in higher intake levels of carotene (Q4), riboflavin (Q3), vitamin C (Q4), vitamin E (Q2-Q3), zinc (Q3-Q4), and selenium (Q3) in the group of people without atrophic gastritis only. For

those with atrophic gastritis, a higher odds was found in those with higher intake of sodium, and a protective effect for those with higher intake of riboflavin and niacin.

Higher protein intake and higher fat intake was positively associated with stomach cancer after controlling for potential confounding factors including total caloric intake, with a dose-dependent trend for protein consumption (Table 3.2.12). These results hold for those without atrophic gastritis. Individuals with higher caloric intake were also found to be at higher odds of stomach cancer with a dose-dependent trend in atrophic-gastritis-free individuals and in the study population overall, but not in those with atrophic gastritis.

The medical history of family members was also examined for association with stomach cancer (Table 3.2.13). First degree relatives include parents, sibling, and children. Having a first degree relative, or any relative, with a history of stomach cancer was associated with an approximately 2-fold odds of stomach cancer for the individual themselves. Having a first degree relative with any cancer history was shown to have a positive association with stomach cancer in people without atrophic gastritis and overall, but not in those with atrophic gastritis.

Effect measure modification between atrophic gastritis and various risk factors of stomach cancer are shown in Tables 3.2.14 to 3.2.16. Super-additive interaction exists in the relationship between atrophic gastritis with ever-smoking (sbRERI=1.77;(0.37, 3.16)), eating salty foods (sbRERI=1.94;(0.43, 3.45)), eating spicy foods (sbRERI=1.62;(0.13, 3.12)), and eating hot foods (sbRERI=1.59;(0.26, 2.90)), respectively (Table 3.2.14). For green tea drinkers, there is a sub-additive effect on the relationship between atrophic gastritis and stomach cancer (aRERI= -

2.58;(-5.09, -0.07)), but the negative interaction is non-significant with semi-bayes shrinkage (sbRERI= -2.22(-4.47, 0.03)). Sub-multiplicative interaction exists in the relationship between *H.pylori* infection (sbROR=0.66;(0.46, 0.94)), ever drinkers of tea (sbROR=0.62;(0.42, 0.92)), and never drinkers of green tea (sbROR=0.53;(0.34, 0.82)). No additive or multiplicative interactions were observed in consumption of different food groups (Table 3.2.15). However, when examining the intake of specific nutrients from the FFQ, as shown in Table 3.2.16, a positive interaction was observed in the additive joint association of vitamin A (sbRERI=1.70;(0.19, 3.21)), thiamine (sbRERI=2.43;(0.80, 4.07)), vitamin E (sbRERI=1.78;(0.26, 3.30)), sodium (sbRERI=1.66;(0.16, 3.16)), and selenium (sbRERI=2.27;(0.66, 3.89)) with atrophic gastritis on the odds of stomach cancer. A positive multiplicative interaction was also observed for all of these variables, except for vitamin A intake.

The study population can be stratified into four groups by *H. pylori* IgG seropositivity and atrophic gastritis status, determined by low serum pepsinogen levels. The distribution of stomach cancer status, location of the cancer for stomach cancer cases, gender, study site, age, education level, average income 10 years ago, BMI, family history of stomach cancer in any relative, smoking, and tea drinking status differs between the four groups (Table 3.2.17). The odds of stomach cancer is higher in the (HP+ AG-), (HP+ AG+), (HP- AG+) individuals, compared to (HP- AG-) individuals, even after adjusting for potential confounding factors (Table 3.2.18). This is the case for non-cardia stomach cancer, cardia stomach cancers, and stomach cancers overall. Assuming that the natural history of gastric disease would start with a *H. pylori* and atrophic gastritis free stomach, leading to *H. pylori* infection, atrophic gastritis with *H. pylori*

infection, and clearance of *H. pylori* while atrophic gastritis remains, a linear trend exists as well where the odds of stomach cancer gets larger with the progression of gastric disease.

Joint associations between *H. pylori* infection and various risk factors of stomach cancer are shown in Tables 3.2.19 and 3.2.20. Subadditivity is observed between *H. pylori* IgG and ever smokers (aRERI=0.48 (0.16, 0.81)) and those who eat hot food (aRERI=0.35 (0.03, 0.67)) respectively on the risk of stomach cancer. The significance of these RERIs hold even after semi-bayes adjustment. No interactions were observed between H. pylori infection and nutrients on the risk of stomach cancer.

3.3 Genetic Susceptibility of Atrophic Gastritis and Stomach Cancer (Specific Aim 3)

Tables 3.3.1-3.3.3 present the associations between SNPs and the development of atrophic gastritis, defined by low serum pepsinogen levels. In miRNA related SNPs, significant associations with atrophic gastritis were found in the GG genotype of *rs1804429* (aOR for GG vs TT=5.42, 95% CI=(1.11, 26.43)) of *CXCL12*, TT genotype of *rs2273368* (aOR for TT vs CC=2.03, 95% CI=(1.05, 3.92)) of *Wnt2B*, and AG genotype of *rs3801790* (aOR for AG vs AA=0.59, 95% CI=(0.36,0.98)) of *DOCK4* (Table 3.3.1). However, after semi-Bayes adjustment, the significant associations for these SNPs do not hold, except for the log-additive model of *rs2273368*. For stem cell related SNPs (Table 3.3.2), protective associations were found in *rs3130932* (aOR for GT vs TT =0.53, 95% CI=(0.32, 0.87)) of *Oct4*, and *rs3729629* (aOR for CC vs GG=0.19, 95% CI=(0.05, 0.81)) of *WNT2*. These results hold after semi-bayes adjustment, with *rs3130932* of the *Oct4* significant in the log-additive and dominant models and *rs3729629*

of *WNT2* significant in the log-additive and recessive models as well. None of the SNPs from GWAS showed significant associations with atrophic gastritis (Table 3.3.3).

The relationships between selected SNPs and the development of stomach cancer are shown in Tables 3.3.4-3.3.6. Table 3.3.4 presents adjusted odds ratios and semi-bayes adjusted odds ratios of miRNA related SNPs. miRNA related SNPs *rs11077* (CC vs AA), *rs12828* (AA vs GG), and *rs4072391* (TT vs CC) showed positive significant associations with stomach cancer after adjusting for potential confounding factors and remained significant after semi-bayes adjustment. Protective significant associations were found in *rs2075993* (GA vs GG), *rs2273368* (CT vs CC), *rs4961280* (CA vs CC), and *rs7372209* (TT vs CC), even after semi-bayes adjustment.

In addition, when stratifying by atrophic gastritis status, *rs11077* (CC vs AA) and *rs12828* (AA vs GG) was positively significant with stomach cancer, while *rs2273368* (CT vs CC) and *rs9266* (CT vs CC) was negatively significant for people without atrophic gastritis. Only *rs12828, rs2273368,* and *rs9266* remained significant after semi-bayes adjustment. In people with atrophic gastritis, *rs11077* (AC vs AA) had positively significant association, and *rs2273368* (CT vs CC, TT vs CC) and *rs4961280* (CA vs CC) had an inverse association with stomach cancer, but not after semi-bayes adjustment.

Adjusted odds ratios and semi-bayes adjusted odds ratios of stem cell related SNPs are shown in Table 3.3.5. Positive associations were found in *rs11364* (AG vs GG), and negative associations were found in *rs1981492* (AG vs GG), *rs3130932* (GT vs TT), *rs3734637* (CC vs AA), and *rs4835761*(AG vs AA), even after semi-bayes adjustment. When stratified by atrophic gastritis,

SNPs *rs11364* (AG vs GG) and *rs2240308* (AA vs GG) had positive significant association, and *rs1033583* (AC vs AA), *rs3130932* (GT vs TT), *rs3729629* (CC vs GG), *rs4835761* (AG vs AA), *rs915894* (AC vs CC) had negative significant association with stomach cancer in those without atrophic gastritis. These results hold even after semi-bayes adjustment. In individuals with atrophic gastritis, *rs11364* (AA vs GG) and *rs3729629* (CC vs GG) show significantly higher odds, and *rs3734637* (CC vs AA) and *rs4730775* (CT vs CC) show significantly lower odds of stomach cancer, but not after semi-bayes adjustment.

SNP *rs738722* (TT vs CC) from the CHEK2 gene from GWA studies, was found to have a positive association with stomach cancer in the overall study population (aOR=1.47;(1.05, 2.06), sbOR=1.44;(1.04, 2.00)), and in the stratified analysis of atrophic gastritis positive individuals (aOR=11.75;(2.26, 61.04), sbOR=3.25;(1.26, 8.40)), but not in those without atrophic gastritis (Table 3.3.6). No significant associations were found for *rs2274223* from the PLCE1 gene.

Tables 3.3.7-3.3.9 show the joint associations and interaction between selected SNPs and atrophic gastritis in stomach cancer. Among the miRNA related SNPs, positive interactions were observed in the additive and multiplicative scale in *rs2273368* (aRERI=8.76;(0.17, 17.35), sbRERI=6.96;(0.19, 13.72), aROR=2.31;(1.07,4.97), sbROR=1.90;(0.98, 3.69)). A negative multiplicative association was found for *rs11077*, but after semi-bayes adjustment, ceased to be significant (Table 3.3.7). Among stem cell related SNPs, *rs3130932* had negative multiplicative interaction with aROR=0.45;(0.23, 0.87) and sbROR=0.52;(0.29, 0.94) as shown in Table 3.3.8. Finally, *rs738722* from GWAS showed positive interaction in the multiplicative scale (aROR=1.98;(1.01, 3.86)), but not after semi-bayes adjustment (Table 3.3.9).

The joint associations between SNPs and *H. pylori* infection on stomach cancer is presented in Tables 3.3.10-3.3.12. A sub-additive interaction was observed between *H. pylori* infection and *rs14035* (aRERI=-1.52 (-3.04, -0.01)) from the miRNA pathway (Table 3.3.10), and *rs1046472* (aRERI=-1.06 (-2.10, -0.03)) from the stem cell signaling pathway (Table 3.3.11). After semi-bayes adjustment none of these sub-additive interactions remained significant. A negative multiplicative interaction was observed in *rs14035*(sbROR=0.48 (0.29, 0.81)) and *rs2740348* (sbROR=0.55 (0.32, 0.94)) from the miRNA pathway (Table 3.3.10), and *rs1046472* (sbROR=0.53 (0.34, 0.85)) and *rs3740535* (sbROR=0.60 (0.38, 0.95)) from the stem cell signaling pathway (Table 3.3.11) with *H. pylori* infection on stomach cancer. None of the SNPs from GWAS had interactions between *H. pylori* infection status and stomach cancer after adjusting for potential confounding factors (Table 3.3.12).

When examining the joint associations between ever smoking and selected SNPs and stomach cancer, sub-additive interaction was detected in *rs3929* (sbRERI=-0.77 (-1.42, -0.12)) and *rs7372209* (sbRERI=-0.85 (-1.60, -0.11)), as well as sub-multiplicative interactions for *rs3929* (sbROR=0.57 (0.38, 0.86)), *rs7372209* (sbROR=0.54 (0.36, 0.82)) from the miRNA pathway as shown in Table 3.3.13. No significant interactions were observed between smoking status and SNPs from the stem cell signaling pathway and GWAS with stomach cancer (Tables 3.3.14, 3.3.15).

Interaction between selected SNPs and alcohol drinking status (never versus ever alcohol drinker) on the development of stomach cancer is shown in Tables 3.3.16-3.3.18. A negative multiplicative interaction was observed in *rs3801790* from the DOCK4 gene (sbROR=0.67 (0.45,

0.99)) of the miRNA pathway, but no other additive or multiplicative interaction was observed with alcohol drinking on stomach cancer in the other SNPs.

Finally, interactions between SNPS and green tea drinking on the development of stomach cancer is presented in Tables 3.3.19-3.3.21. For *rs12828* of the WWOX gene from the miRNA pathway, a sub-additive interaction (aRERI=-0.68 (-1.34, -0.02)) and sub-multiplicative interaction (aROR=0.55 (0.34, 0.88)) was observed, although only the multiplicative interaction remained significant after additional semi-bayes adjustment (sbROR=0.58 (0.37, 0.92)). Negative multiplicative interactions exist for other SNPs of the miRNA pathway, such as *rs2292305 rs2740348*, and *rs7813* (Table 3.3.19). For the SNPs of the stem cell pathway, negative multiplicative interaction was observed for *rs4835761*, *rs6815391*, and *rs915894* after controlling for potential confounding factors and with semi-bayes adjustment as shown in Table 3.3.20. No significant interactions were observed for the SNPs from GWAS and green tea drinking on stomach cancer (Table 3.3.21).

CHAPTER 4. DISCUSSION

4.1 Risk Factors of Atrophic Gastritis

The goal of Specific Aim 1 was to find the risk factors of atrophic gastritis in a population with a high odds of stomach cancer. *H. pylori* infection, family history of stomach cancer, age, and ethnicity are known risk factors of stomach cancer, while smoking, excessive salt consumption, dietary nitrate and nitrite are also found to be associated with stomach cancer.[16,17,55,103,104] A diet high in fresh fruits and vegetables, and tea drinking habits are suggested to lower the odds of stomach cancer, but with inconsistent results.[105,106] Alcohol drinking and obesity are other possible risk factors of stomach cancer but without convincing evidence in previous studies.[107] In our study, individuals who often took tonic supplements and those who had a history of drinking non-boiled water at childhood were found to have a higher odds of atrophic gastritis respectively, compared to their counterparts. Moderate consumption of red meat also had higher odds of atrophic gastritis compared to the lowest consuming quartile. However, none of the smoking, alcohol drinking, and tea drinking factors were found to be significantly associated with atrophic gastritis after taking account for potential confounding factors. Also, contradicting our expectations, it was found in our study that individuals who frequently ate barbequed meat and salted meat or fish had significantly lower odds of atrophic gastritis respectively. These results may be due to a number of factors including confounding from unknown factors, or excessive "cleaning" of the study population by excluding all stomach cancer cases from our analysis. Since this study excludes all cancer cases from the Jiangsu study, our findings may not simply mean that these factors are associated with a lower odds of atrophic gastritis, but rather that they do not affect the early stages of the precancerous cascade of stomach cancer going from normal

stomach mucosa to chronic atrophic gastritis, but aids or even accelerates the progression of atrophic gastritis going on to stomach cancer and consequently has a higher chance of being excluded from this study. It also may be the case that excluding individuals with any type of cancer (esophageal, stomach, lung, and liver) introduced a type of selection bias where individuals included in the study are less prone to cancer, or the precancerous stages of cancer, regardless of their exposures to potentially carcinogenic factors. Reverse causation may have occurred where symptoms of gastric problems led individuals to change to a healthier diet and instead take supplements or vitamins.

In the case of food items that are known to have a high content of nitate or nitrite that were not associated with atrophic gastritis in our study, it may be that the effect of antioxidants, fiber, or other beneficial factors associated with high vegetable intake overshadow the potential risk of nitrosation from high nitrate/nitrite consumption. Although the antioxidants from fruits and vegetables are thought to act as oxidant scavengers and lower the risk of damage from oxidative stress, the high nitrate/nitrite content may give a counter effect. This may also partially explain the nonexistent relationship between pepsinogen levels and micronutrients and macronutrients in this study. Nitrate and nitrite also exist in soil, water sources, and fertilizers and then may be consumed directly or through food sources, but is not taken into account for in this study. It is assumed that the residents of Jiangsu province have similar sources of drinking water and thus nondifferential nitrate consumption from drinking water for our study. Quantitative analysis of dietary nitrate/nitrite consumption would further improve the measures of association. The content of nitrate and nitrite depends heavily on the geographic region, storage, and other agricultural factors such as soil, water, and the use of fertilizers.[108-111] Since urine samples or

food samples are not available for direct measurement, and no database exists for the amount of nitrate and nitrite in food items in Jiangsu province, accurate quantification of nitrate/nitrite consumption would be difficult.

In our study, a higher waist-to-hip ratio was found to be significantly associated with a lower odds of atrophic gastritis compared to its counterpart. Borderline protective effects, though non-significant, were found for BMI, waist circumference, and waist-to-height ratios. Although all four indices are commonly used for measures of obesity, it may be that waist circumference and waist-to-hip ratios are most representative of central obesity. Our results agree with previous studies in that there is an inverse relationship between obesity and atrophic gastritis. A cross-sectional study on 10,197 asymptomatic Japanese participants found the risk of atrophic gastritis to be higher for individuals with a higher BMI. The authors suggested that atrophic gastritis itself might lead to lower BMI, due to reduced levels of ghrelin and leptin, hormones that play a role in food intake, or digestive dysfunction.[112] Another Japanese study found a J-shaped association against BMI for atrophic gastritis in 819 otherwise healthy men.[113] Our study was the first to examine the relationship between waist circumference, waist-to-height ratios and atrophic gastritis, in addition to BMI. Additional studies using measures for central obesity are suggested.

4.2 Risk Factors of Stomach Cancer by Atrophic Gastritis

For Specific Aim 2, we look at various behavioral factors and their relation to stomach cancer. Smoking duration and intensity, including age started smoking, cigarettes smoked per day, years of smoking, and pack-years of smoking, were found to be positively associated with stomach cancer with a dose-response relationship. Smoking status was also significantly associated with

stomach cancer, where former smokers (aOR=2.53;(2.09, 3.06)) had a higher odds of stomach cancer than current smokers (aOR=1.50;(1.31,1.73)), compared to never smokers respectively. This is unlike previous cohort studies which show smoking cessation to be associated with decreasing risk of stomach cancer.[114] Although we considered those who quit smoking in the recent year as current smokers, reverse causality may have still played a role if symptoms of gastric dysfunction appeared before that in the stomach cancer cases. This is also the case for alcohol drinking in our study, where former drinkers had a higher odds of stomach cancer than current drinkers, versus never drinkers. We also find a positive association of stomach cancer with weekly ethanol intake (grams/week) in the 1990's and an inverse association of weekly ethanol intake one year ago, giving more weight on the suggestion of reverse causality as well.

In terms of environmental tobacco smoke, the odds of stomach cancer was higher in those who were exposed to ETS in their household or workplace for nonsmokers and for all participants (regardless of smoking status) respectively. To our knowledge, this is the first study to find a significant association in ETS and stomach cancer. A recent meta-analysis based on seven studies on stomach cancer and ETS in nonsmokers show no significant relation, with a combined risk estimate of 1.02 (0.91, 1.14).[115] All seven studies included in that meta-analysis also had non-significant risk estimates.

In our study, a protective effect of stomach cancer on light tea drinkers was observed. Those who drank tea for less than 20 years, 1 cup per day, and prefer medium strength tea, were found to be at lower odds of stomach cancer, compared to never tea drinkers respectively. No significant association was found for heavier tea drinkers. Although former tea drinkers had a positive

association with stomach cancer (aOR=2.22; (1.61, 3.07)), this may be an effect of confounding by indication where gastric discomfort may have led to reduced tea drinking or the small sample size of former tea drinkers.

Dietary habits, such as preference for salty foods, spicy foods, hot foods, and fried meat were at higher odds for stomach cancer, as well as faster eating speed. Excessive salt intake may directly damage the stomach mucous to cause inflammation and increase the stomach epithelial cell proliferation, or indirectly act by changing mucosal viscosity and potentiating exposure to carcinogens.[116] Eating speed may correlate to the degree of breakdown of food taking place in the mouth, where faster eating speed can mean less breakdown of food in the oral cavity, giving higher burden on the stomach for digestion. Consumption of raw garlic and ginger was found to have a protective effect on stomach cancer with a dose-response pattern in our study. Ginger has compounds such as gingerols, shogaols, and gingerones that possess antifungal, anti-mycobacterial and anti-inflammatory properties,[117] and have been studied for breast cancer, colorectal cancer, prostate cancer, and lung cancer,[118] but no epidemiological studies have been found on stomach cancer before this study. Garlic has organosulfur compounds, such as diallyl trisulfide, as metabolic byproducts that are known to have anticarcinogenic properties.[119] A few studies on stomach cancer have shown the protective effects of garlic,[119,120] although most do not show significant association and the amount of garlic consumed has not been considered for in these studies.

Previous studies show inconsistent results regarding vegetable and fruit consumption and the incidence of stomach cancer. Some suggest a protective effect from consumption of fresh fruits

and vegetables,[121,122] by means of antioxidants from fruits and vegetables to act as free-radical scavengers.[17] There are also studies that do not show an association between fruit and vegetable intake and stomach cancer,[123,124] a reduced odds for high consumers of fruit but not vegetables,[125] and a reduced risk for vegetable consumption but not for fruit.[126,127] In our study, analyses of the FFQ showed higher odds of stomach cancer for the highest level of intake of vegetables even after adjusting for daily caloric intake along with other potential confounding factors. However, we should note that the way the vegetables and fruit are stored (fridge usage in our study population is low), or the way they are consumed (cooking methods) may impact these effects. Additionally, we did not take into account the effect of pesticides as there are no measurements of pesticide used on the fruits and vegetables consumed by the study participants. The positive association between vegetable intake and stomach cancer in our study may also be due to counter effects of dietary nitrates and nitrosation.[128-130] The majority of dietary nitrates are consumed from vegetables and nitrites mainly come from preserved meat.[131] In table 3.2.10, we examine food groups that are known to have a high content of dietary nitrate and nitrite. Study participants with the highest intake of green and leafy vegetables and salted and pickled vegetables indeed had a higher odds of stomach cancer, especially in those without atrophic gastritis. Quantification of total dietary nitrate/nitrite consumed using the FFQ would have been ideal, but nitrate/nitrite content of food items vary greatly by geographic region, season, and storage methods,[132-135] and due to the lack of data available for accurate quantification for our study conditions, this may lead to biased results. If a valid quantification of dietary nitrate and nitrite consumption were available, this may also help explain the lower odds of stomach cancer found in higher intake levels (Q3) of salted and preserved meat and fish in our study. It may be that dietary nitrite intake does not correlate with the amount of total preserved or salted meat and

fish consumed to the affective level. We also could consider reverse causality where symptoms of digestive discomfort may lead to a person to eat less preserved/salted meat and fish.

Previous studies on micronutrients and stomach cancer show inconsistent results.[136] A meta-analysis on selenium and stomach cancer incidence found to have a protective, yet nonsignificant effect.[137] A cross-sectional study showed no association between vitamins A, C, E, and β-carotene and stomach cancer.[138] The EPIC study found no association between dietary vitamin C and stomach cancer incidence, but an inverse association between plasma vitamin C levels and stomach cancer risk.[139] Unlike previous studies, high consumption of vitamin A, carotene, thiamin, riboflavin, vitamin C, vitamin E, zinc, and selenium, which were derived from the FFQ in our study, were found to be positively associated with stomach cancer after adjusting for total caloric intake. Because of the high correlation between vitamin content and vegetable and fruit intake, the same problems pertaining to vegetable and fruit intake discussed above may also be applied here. The benefits of antioxidants may have been overshadowed by the drawbacks from high nitrate content or other unknown factors. Another plausible explanation may be that the overall level of consumption of each of these micronutrients in our study are still lower than the recommended daily levels. According to the DRI (Dietary Reference Intakes) report from the Institute of Medicine, Food and Nutrition Board of the US, the recommended dietary allowance (RDA) of vitamin A is 700-900ug/day, 1.1-1.2mg/day for thiamin, 1.1-1.3 mg/day for riboflavin, 14-16 mg/day for niacin, 75-90 mg/day for vitamin C, 15 mg/day for vitamin E, 8-11 mg/day for zinc, 55 ug/day for selenium.[140] This value is defined as the average daily level of intake that is sufficient to meet the nutrient requirement of healthy people over the age of 19 years. However, only 21.5%, 14.6%, 7.7%, 30.3%, 19.6%, 42.7%, 59.9%, 10.9% of the study participants in our

study met the RDA guidelines for vitamin A, thiamin, riboflavin, niacin, vitamin C, vitamin E, zinc, and selenium respectively, regardless of their stomach cancer status.

In analysis for macronutrients from our study, there was a positive association between higher consumption of protein and fat respectively for stomach cancer risk. This may be due to the higher burden on the stomach in the digestive process. The risk of higher fat consumption on stomach cancer incidence is consistent with finding from previous studies.[141,142] However, previous studies tend to show inverse relationship between dietary fiber and stomach cancer,[136,141] which we do not find in our study. Also, diets with poor protein quality and high starch were thought to be at higher risk for stomach cancer due to mechanical damage on the stomach mucosa and acid-catalyzed nitrosation in the stomach.[143-145] It should be noted that a high proportion of FFQ data was missing for Tongshan county (49.2%), and although we exclude those without FFQ data and the entire Tongshan county completely from the nutritional analyses, the results may have been biased if the pattern of missing data is not random. Also, if an individual was experiencing symptoms of precancerous stages of stomach cancer, they may have changed their dietary habits and thus the FFQ would not represent their usual dietary behavior.

In our study, we also examined the potential risk factor's effect on stomach cancer by atrophic gastritis status. It is noticeable that most significant relationships found for stomach cancer overall, holds for the subpopulation without atrophic gastritis, but is insignificant in most cases for the atrophic gastritis positive subpopulation. This may be due to the smaller sample size of atrophic gastritis cases, or may be due to reverse causality where individuals with clinical

symptoms of gastric irritation cease to display unhealthy behaviors, or indicate an interaction with atrophic gastritis.

In addition to lifestyle factors, we examined the relationship between serum biomarkers and stomach cancer. *H. pylori* IgG seropositivity (aOR=1.31) and atrophic gastritis (aOR=3.52) were found to have a significantly higher odds of stomach cancer compared to their counterparts, as found in previous studies.[18,146-149] The "ABC" method uses *H. pylori* serology and pepsinogen testing to screen for participants at higher odds of stomach cancer,[150] by classifying individuals into one of the four risk groups (A: (HP- AG-), B: (HP+ AG-), C: (HP+ AG+), D: (HP- AG+)) based on the serologic tests. This is based on the hypothesis that a healthy stomach (A) starts with *H. pylori* infection (B), and proceeds on to atrophic gastritis (C) and finally the clearance of *H. pylori* (D) when atrophic gastritis gets to an extensive state. Sometimes C and D can be grouped into a single category. In our study, there is a trend where the risk of stomach cancer gets greater as we go from stages A to D, for non-cardia stomach cancer, cardia stomach cancer, and stomach cancer overall. These results support the hypothesis that there is a progression from *H. pylori* infection to atrophic gastritis and stomach cancer, and may suggest that populations may be further stratified by serum *H. pylori* IgG and pepsinogen levels to undergo more intense screening for the early detection of stomach cancer. This is especially the case for individuals living in high risk regions with high *H. pylori* infection prevalence.

Sub-additive interactions are observed for *H. pylori* IgG and smoking status and hot food consumption (Table 3.2.19). H. pylori infection, ever smoking, and consumption of hot temperature foods are all positively associated with stomach cancer when examined

independently, but the independent damages to the stomach mucosa may be already to the point that joint effects are not to the additive degree.

4.3 Genetic Polymorphisms in Atrophic Gastritis and Stomach Cancer

Previous studies on genetic susceptibility focuses on the risk of stomach cancer, without taking atrophic gastritis into consideration. In our study, we examine SNPs related to miRNA and stem cell pathways that are frequently found in cancers, including stomach cancer, and see if an association exists for the "precursor state", atrophic gastritis, as well.

Considering atrophic gastritis as the endpoint, we observe significant associations with *rs1804429* (CXCL12), *rs2273368* (Wnt2B), *rs3801790* (DOCK4), *rs3130932* (Oct4), and *rs3729629* (WNT2), with only *rs3130932* (Oct4) and *rs3729629* (WNT2) from the stem cell pathway remaining significantly associated with atrophic gastritis after semi-bayes adjustment. To our knowledge, there are no other studies reporting associations of these SNPs with atrophic gastritis. However, in a study from northern Iran, the TG genotype of rs3130932 from the Oct4 gene was found to be associated with a 66-fold risk of stomach cancer compared to the TT genotype, and for the GG genotype a 140-fold risk of stomach cancer was observed.[151] Oct4, octamer-binding transcription factor 4, plays a key role in the regulation of pluripotency and self-renewal of embryonic stem cells.[152,153] The cell pluripotency characteristic has been shown in mouse gastric epithelial cells and hepatocytes as well.[154] When the embryonic stem cells differentiate, Oct4 is down-regulated and its' expression is lost on normal tissues.[155]

For the stomach cancer endpoint, *rs11077* (XPO5), *rs12828* (WWOX), *rs2075993* (E2F2), *rs2273368* (Wnt2B), rs4072391 (IL6R), *rs4961280* (Ago2), *rs7372209* (miR-26a1), *rs11364* (HES2), *rs1981492* (AXIN1), *rs3734637* (HEY2), *rs4835761* (WNT8A), and *rs738722* (CHEK2) were significantly associated with stomach cancer even after semi-bayes adjustment, with marginal associations observed in *rs1033583* (DLL1) and *rs3130932* (Oct4) in our study.

In the stratified analyses, *rs11077* (XPO5), *rs2273368* (Wnt2B), *rs11364* (HES2), and *rs3729629* (WNT2), were significantly associated with stomach cancer regardless of atrophic gastritis status. However, for *rs3729629* (WNT2), the direction of association is opposite depending on atrophic gastritis status, with the CC genotype being protective in those without atrophic gastritis (vs GG), and the same genotype being of risk in those with atrophic gastritis. We could not find any significant interaction between atrophic gastritis and *rs3729629* (WNT2), although the RERI and ROR were leaning towards negative additive and multiplicative interactions respectively (sbRERI= -1.73 (-5.04, 1.57), sbROR= 0.60 (0.33, 1.10)). Sub-multiplicative interaction was observed in *rs11077* (XPO5), and no interactions were found in *rs11364* (HES2). Super-additive interaction and positive multiplicative interaction was observed between atrophic gastritis status and stomach cancer for *rs2273368* (Wnt2B).

Differences were observed among those with and without atrophic gastritis in the following SNPs. *rs12828* (WWOX), *rs2240308* (AXIN2), *rs3130932* (Oct4), *rs4835761* (WNT8A), and *rs915894* (Notch4) were significantly associated with stomach cancer in those without atrophic gastritis, with marginal associations observed in *rs9266* (KRAS), *rs1033583* (DLL1), and *rs1981492* (AXIN1). All of these SNPs remain significant after semi-bayes adjustment. In those

with atrophic gastritis, *rs4961280* (Ago2), *rs3734637* (HEY2), *rs4730775* (WNT2), and *rs738722* (CHEK2) were significantly associated with stomach cancer, with only *rs3734637* (HEY2) and *rs738722* (CHEK2) significant after semi-bayes. Positive multiplicative interaction was found in *rs2273368* (Wnt2B) and *rs738722* (CHEK2), and a negative multiplicative interaction was found *in rs11077* (XPO5) and *rs3130932* (Oct4). These differences in associations of certain SNPs by atrophic gastritis status may indicate different etiology of stomach cancer. There could be differences genetic polymorphisms in stomach cancers that stem from atrophic gastritis patients, and stomach cancers that are independent from atrophic gastritis.

CHK2 is a stable protein that is mostly inactive while there is no DNA damage. However, in the occasion of double strand DNA breakage, it is activated by ATM, leading to dimerization and autophosphorylation.[156] This protein is encoded by the CHEK2 gene where its mutation has been linked to families with Li-Fraumeni syndrome, with a high prevalence of early-onset breast cancer and cancers of the colon.[157-159] Furthermore, among families with Li-Fraumeni syndrome, those of Asian descent were found to have particularly higher risk of stomach cancer.[160,161] Similarly, in our study, we found TT carriers of *rs738722* in the CHEK2 gene to be of increased odds of stomach cancer overall, and among people with atrophic gastritis respectively. However, polymorphisms in *rs738722* was not associated with atrophic gastritis itself.

There also are some inconsistencies with results from previous studies in our findings. There was one previous study by Xie et al. examining the associations between *rs11077* (XPO5), *rs14035* (RAN), *rs197412* (GEMIN3), and *rs2740348* (GEMIN4) and stomach cancer.[162] Among these SNPs, only the CC genotype of *rs14035* (RAN) was significantly associated with stomach cancer

(aOR=4.9;(1.6, 14.9)). However, *rs14035* was not associated with stomach cancer in our study. Instead, we find *rs11077* (XPO5) to have higher risk of stomach cancer regardless of atrophic gastritis status (overall aOR of CC vs AA=3.28, 95% CI=(1.51, 7.13); in group without atrophic gastritis-aOR of CC vs AA=2.46, 95% CI=(1.01, 5.95); in group with atrophic gastritis-aOR of AC vs AA= 2.99, 95% CI=(1.04, 8.63)). In addition, unlike Xie's study, the CC genotype of *rs197412* (GEMIN3) was marginally associated with stomach cancer (aOR=1.35;(1.00, 1.82)) in our study. The TT genotype of *rs197412* (GEMIN3) has been found to be significantly associated with increased odds of colorectal cancer.[163] In a hospital based case-control study in China, the variant homozygote CC of miR-196a-2 (*rs11614913*) was observed to be significantly associated with increased odds of stomach cancer, compared to TT and CT carriers.[164] However, in our study, no associations with stomach cancer are observed for any variant of *rs11614913,* including co-dominant, log additive, dominant, and recessive genetic models. No associations with atrophic gastritis is observed either.

There has been no other study on *rs1033583* (DLL1), *rs11364* (HES2), *rs12828* (WWOX), *rs1981492* (AXIN1), *rs2240308* (AXIN2), *rs2273368* (Wnt2B), *rs3729629* (WNT2), *rs3734637* (HEY2), *rs4072391* (IL6R), *rs4730775* (WNT2), *rs4835761* (WNT8A), *rs4961280* (Ago2), *rs7372209* (miR-26a1), *rs915894* (Notch4), *rs9266* (KRAS) and stomach cancer. However, a study examining the relation between miRNAs and the risk of oral premalignant lesions (OPL) did find that patients with at least one variant allele for *rs7372209* (miR-26a1), has a two-fold risk of OPL.[165] The rs9266 variant has been found to disrupt regulation of KRAS, which is known to regulate cell proliferation and apoptosis, and has been found to be associated with non-small cell lung cancer and epithelial ovarian cancer.[166]

CHAPTER 5. CONCLUSIONS AND PUBLIC HEALTH IMPLICATIONS

5.1 Limitations and Strengths

Our study has several limitations that pertain to the nature of the case-control study design. Recall bias may exist for known risk factors of stomach cancer, such as tobacco smoking, alcohol drinking, and unhealthy dietary habits. In addition, there is potential for reverse causality since abnormalities of the stomach mucosa may lead to clinical symptoms that the individual may perceive early on the precancerous cascade, leading to a change in behavior, including cessation of tobacco smoking or alcohol drinking, and urge the individual to initiate healthy routines, such as the regular use of vitamin supplements or tonics or an overall healthier lifestyle. In this case, measurements of associations would be underestimated (closer to the null), especially for stratified analysis where atrophic gastritis is positive. Furthermore, advanced stomach cancer cases may have not been included in the study as reflected by low participation rate of cases. During the recruitment period advanced cases with higher clinical stages may have become too sick to participate or have already died before participation. This might lead to potential selection bias so that the associations observed would only reflect risk or protective factors for stomach cancer at earlier stage.

Also, as mentioned in the discussion, Specific Aim 1 examines potential risk factors of atrophic gastritis on cancer-free individuals. This may further result in possible selection bias where the study participants may be healthier and less prone to disease than the regular population.

Small sample size, especially for stratified analyses of atrophic gastritis and SNPs may be problematic. Although the Jiangsu study itself includes a large number of stomach cancer cases and controls, the sample size of atrophic gastritis cases in cancer-free individuals is only 407. Furthermore, for the study of associations of select SNPs and atrophic gastritis in cancer-free individuals, a sample size of only 84 individuals are atrophic gastritis positive. For the risk of stomach cancer in select SNPs, 291 people are atrophic gastritis positive, including 84 that are controls, and 207 that are stomach cancer cases. The proportion of stomach cancer cases are much higher than stomach cancer controls in the atrophic gastritis positive stratum for SNP studies. A larger number of atrophic gastritis cases would improve the power of the study. Semi-bayes shrinkage is applied to our measure of associations to deal with potential bias from sparse data, but there still may be false positives due to multiple comparisons in the analyses of genetic polymorphisms.

Another limitation of our study includes the misclassification of *Helicobacter pylori* infection status. *H. pylori* infection was assessed at only one point of the study, which may be problematic since there is some evidence of clearance of *H. pylori* as gastric atrophy gets more severe.[167] These changes in *H. pylori* infection may not be accurately presented by measurement of anti-HP IgG. Testing positive for *H. pylori* IgG antibodies do not necessarily indicate active infection, and a negative result does not rule out the possibility of a recent infection or false-negatives due to an antibody titer that is too low for detection.[168,169] In our study there is no information of childhood acquirement of *H. pylori* infection or evidence of *H. pylori* eradication and treatment.

There is also a possibility of misclassification of atrophic gastritis status. Since serum PG tests mostly detects atrophy in the gastric corpus mucosa, but not the gastric antrum mucosa, if atrophy is limited to the antrum region we may misclassify that person to be a false negative.[20] In addition, as mentioned earlier, since we are using cutoffs for continuous values of serum pepsinogen levels, there is a potential for misclassification of atrophic gastritis. Further studies using continuous values of serum pepsinogen and tissue samples are warranted for confirmation of observed associations.

There is also room for improvements, including further details in the food frequency questionnaire, such as individual listings of exact food items consumed rather than categorized groups and methods of cooking, for a more accurate measure of total caloric intake. This, in addition to quantifications of nitrate/nitrite content in fruits and vegetables consumed in Jiangsu province and different water sources of Jiangsu province would give the opportunity to examine the dose-dependent relation between nitrate/nitrite consumption and atrophic gastritis more accurately, along with measures of pesticides. A major limitation of the study is that a large proportion of the participants had FFQ information missing, especially in Tongshan county.

Finally, there is always the risk of uncontrolled residual confounding and bias from non-random missing data, especially for the FFQ data.

Strengths of the study includes: 1) this study is one of the largest study with sufficient power to examine hypotheses and explore potential interactions; 2) this is the first large study to evaluate multiple SNPs on the miRNA and stem cell pathway on the development of stomach cancer and

atrophic gastritis, and 3) this is only study to examine gene-environment interactions of smoking, alcohol drinking, and green tea drinking.

5.2 Conclusions and Public Health Implications

With epidemiological studies showing a decrease in mortality rates for early diagnosed stomach cancer which has an otherwise poor prognosis, it would be of great public health value to determine high-risk premalignant population and implement primary prevention and screening to these high risk individuals. Although stomach cancer incidence and mortality is decreasing over time, it is still the third leading cause of deaths from cancer worldwide and remains a public health concern in many regions around the world. According to GLOBOCAN, China had approximately 405,000 incident stomach cancer cases and 325,000 deaths from stomach cancer in 2012.[1] This attributes for over 40% of the worldwide incident cases and deaths from stomach cancer. However, regardless of this huge burden, there are currently no national screening programs available for this high-risk population. Studies regarding the early detection of stomach cancer in the Chinese population may give evidence for the need of screening programs in China.

In addition to the treatment of *H. pylori* infection, smoking cessation, elimination of ETS, less alcohol drinking, reducing salty and spicy food consumption, increasing raw garlic and ginger consumption may help prevention of stomach cancer. Also, identifying high risk individuals by use of serum biomarkers, such as *H. pylori* IgG and PG levels, may reduce the cost and public health burden of screening for stomach cancer.

Identification of genetic polymorphisms provides a possibility for risk assessment, possible early detection of diseases, including stomach cancer and atrophic gastritis. However, more extensive studies on different ethnicities and different tissue types should be conducted for further in-depth understanding of the development of stomach cancer in order to control and prevent the disease.[170]

Table 2.3.1. Single Nucleotide Polymorphisms considered for analysis.

miRNA		Stem Cell		GWAS	
Gene	**SNP**	**Gene**	**SNP**	**Gene**	**SNP**
IL15	rs10519613	*DLL1*	rs1033583	*PLCE1*	rs2274223
Drosha	rs10719	*HEY1*	rs1046472	*MUC1*	rs4072037
XPO5	rs11077	*EpCAM*	rs1126497	*CHEK2*	rs738722
miR-196a2	rs11614913	*HES2*	rs11364		
WWOX	rs12828	*Oct4*	rs13409		
Ran	rs14035	*DLL1*	rs1421		
CXCL12	rs1804429	*AXIN1*	rs1981492		
Gemin3	rs197412	*GLI1*	rs2228224		
E2F2	rs2075993	*DVL2*	rs222851		
RCHY1	rs2126852	*AXIN2*	rs2240308		
Wnt2B	rs2273368	*FZD3*	rs2241802		
THBS1	rs2292305	*Dec1*	rs2269700		
Gemin4	rs2740348	*Oct4*	rs3130932		
pre-miR-146a	rs2910164	*WNT2*	rs3729629		
CTNNB1	rs2953	*HEY2*	rs3734637		
Dicer1	rs3742330	*Ctbp2*	rs3740535		
PPARGC1A	rs3774923	*FZD1*	rs3750145		
DOCK4	rs3801790	*Notch1*	rs3815188		
TAB3	rs3816757	*WNT2*	rs4730775		
Rbl2	rs3929	*WNT8A*	rs4835761		
IL6R	rs4072391	*Notch4*	rs520692		
CDK6	rs42031	*Rex1*	rs6815391		
Ago2	rs4961280	*HES2*	rs8708		
miR-26a1	rs7372209	*Notch4*	rs915894		
TP53INP1	rs7760	*JAG2*	rs9972231		
Gemin4	rs7813				
miR-27	rs895819				
TP53INP1	rs896849				
KRAS	rs9266				

Table 3.1.1. Baseline characteristics of 6369 cancer-free participants with serum samples from the Jiangsu study.

		Atrophic Gastritis[a]		
	Total	**No**	**Yes**	
	N (%)	***N (%)***	***N (%)***	**p-value[b]**
All	***6369 (100)***	***5962 (100)***	***407 (100)***	
Gender				
Male	4533 (71.2)	4243 (71.2)	290 (71.2)	0.9966
Female	1836 (28.8)	1719 (28.8)	117 (28.8)	
Study site (county)				
Dafeng	2036 (32.0)	1952 (32.7)	84 (20.7)	**<.0001**
Ganyu	1489 (23.4)	1440 (24.2)	49 (12.1)	
Chuzhou	844 (13.3)	746 (12.5)	98 (24.1)	
Tongshan	2000 (31.4)	1824 (30.6)	176 (43.1)	
Age				
Mean±SD	*63.95 ± 11.34*	*63.84 ± 11.36*	*65.60 ± 10.92*	**0.0044**
< 50	684 (10.7)	653 (11.0)	31 (7.6)	0.0687
50-59	1433 (22.5)	1344 (22.5)	89 (21.9)	
60-69	2054 (32.3)	1930 (32.4)	124 (30.3)	
70-79	1744 (27.4)	1617 (27.1)	127 (31.3)	
≥ 80	454 (7.1)	418 (7.0)	36 (8.9)	
Current marital status				
Not in marriage	1162 (18.2)	1085 (18.2)	77 (19.0)	0.6639
In marriage	5173 (81.2)	4847 (81.3)	326 (80.1)	
missing	34 (0.5)	30 (0.5)	4 (1.0)	
Education				
Illiteracy	3044 (47.8)	2840 (47.6)	204 (50.3)	0.7756
Primary school	2005 (31.5)	1882 (31.6)	123 (30.3)	
Middle school	1059 (16.6)	994 (16.7)	65 (15.8)	
High school and above	261 (4.1)	246 (4.1)	15 (3.7)	
Average family income 10 years ago				
Mean±SD	*2142.2 ± 2237.9*	*2152.2 ± 2199.2*	*1995.4 ±2742.0*	**0.0071**
< 1000	1343 (21.1)	1237 (20.7)	106 (26.1)	**0.0219**
1000-1500	1270 (19.9)	1188 (19.9)	82 (20.2)	
1500-2500	1748 (27.5)	1634 (27.4)	114 (27.8)	
≥ 2500	2008 (31.5)	1903 (31.9)	105 (25.9)	
BMI groups by Chinese standards				
Mean±SD	*23.12 ± 3.68*	*23.15 ± 3.7*	*22.76 ± 3.32*	0.0757
< 18.5	357 (5.6)	326 (5.5)	31 (7.6)	0.0981
18.5-24	3878 (60.9)	3621 (60.7)	257 (63.1)	
24-28	1776 (27.9)	1674 (28.1)	102 (25.1)	
≥ 28	358 (5.6)	341 (5.7)	17 (4.2)	

Family history of stomach cancer in any relative?					
	No	6073 (95.4)	5682 (95.3)	391 (96.1)	0.4846
	Yes	296 (4.7)	280 (4.7)	16 (3.9)	
Helicobacter pylori					
	Negative	1847 (29.0)	1743 (29.2)	104 (25.6)	0.1204
	Positive	4522 (71.0)	4219 (70.8)	303 (74.4)	

[a]Atrophic gastritis defined as PG I ≤ 70ng/mL and PG I/PG II ≤ 6.
[b]Chi-square for categorical, Wilcoxon signed rank test for continuous.

Table 3.1.2 *Helicobacter pylori* IgG and atrophic gastritis in 6369 cancer-free participants with serum samples from the Jiangsu study.

Effect	Atrophic Gastritis[a]		Crude OR (95% CI)	Adjusted OR (95% CI)[b]	Semi-Bayes OR (95% PI)[b]
	No N=5962 (%)	Yes N=407 (%)			
Helicobacter pylori					
Negative	1743 (29.2)	104 (25.6)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Positive	4219 (70.8)	303 (74.4)	1.20 (0.96, 1.51)	1.11 (0.87, 1.40)	1.10 (0.87, 1.39)

[a] Atrophic gastritis defined as PG I ≤ 70ng/mL and PG I/PG II ≤ 6.
[b] Adjusted for age, gender, county, education level, average family income 10 years ago, family history of stomach cancer, pack-years of smoking, and ethanol intake in the 1990s.

Table 3.1.3. Association of smoking related variables with atrophic gastritis in 6369 cancer-free participants from the Jiangsu study.

	Atrophic Gastritis[a]				
	No	Yes			
Effect	**N=5962 (%)**	**N=407 (%)**	**Crude OR (95% CI)**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**
(never/former/current) smoker					
Never	3204 (53.7)	228 (56.0)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Former	520 (8.7)	29 (7.1)	0.78 (0.53, 1.17)	1.07 (0.70, 1.63)	1.06 (0.70, 1.59)
Current	2238 (37.5)	150 (36.9)	0.94 (0.76, 1.17)	1.23 (0.96, 1.57)	1.22 (0.96, 1.56)
			p-trend=0.5393	p-trend=0.0966	
(ever/never) smoker					
Never	3204 (53.7)	228 (56.0)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Ever	2758 (46.3)	179 (44.1)	0.91 (0.75, 1.12)	1.20 (0.95, 1.52)	1.20 (0.95, 1.51)
Age started smoking					
Never smoker	3204 (53.7)	228 (56.0)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
≥30	515 (8.6)	35 (8.6)	0.96 (0.66, 1.38)	1.21 (0.82, 1.79)	1.20 (0.83, 1.73)
20-29	1370 (23.0)	89 (21.9)	0.91 (0.71, 1.18)	1.21 (0.91, 1.61)	1.21 (0.92, 1.59)
<20	618 (10.4)	39 (9.6)	0.89 (0.63, 1.26)	1.34 (0.91, 1.99)	1.33 (0.91, 1.93)
missing	255 (4.3)	16 (3.9)	p-trend=0.3754	p-trend=0.0906	
Cigarettes smoked per day					
Never smoker	3204 (53.7)	228 (56.0)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
<10	335 (5.6)	23 (5.7)	0.97 (0.62, 1.50)	1.40 (0.88, 2.23)	1.36 (0.85, 2.06)
10-19	670 (11.2)	43 (10.6)	0.90 (0.64, 1.26)	1.17 (0.82, 1.68)	1.14 (0.81, 1.60)
≥20	1180 (19.8)	78 (19.2)	0.93 (0.71, 1.21)	1.31 (0.97, 1.79)	1.26 (0.95, 1.68)
missing	573 (9.6)	35 (8.6)	p-trend=0.4996	p-trend=0.0849	
Years of smoking					
Never smoker	3204 (53.7)	228 (56.0)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
<30	572 (9.6)	33 (8.1)	0.81 (0.56, 1.18)	1.18 (0.79, 1.76)	1.17 (0.80, 1.72)
30-49	1348 (22.6)	90 (22.2)	0.94 (0.73, 1.21)	1.25 (0.94, 1.67)	1.27 (0.97, 1.67)
≥50	551 (9.2)	40 (9.9)	1.02 (0.72, 1.45)	1.32 (0.89, 1.97)	1.35 (0.93, 1.97)
missing	287 (4.8)	16 (3.9)	p-trend=0.7858	p-trend=0.0729	

Pack-years of smoking					
Never smoker	3204 (53.7)	228 (56.0)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
<30	1131 (19.0)	73 (18.0)	0.91 (0.69, 1.19)	1.22 (0.91, 1.64)	1.21 (0.91, 1.61)
≥30	1627 (27.3)	106 (26.1)	0.92 (0.72, 1.16)	1.19 (0.90, 1.56)	1.18 (0.90, 1.54)
			p-trend=0.4957	p-trend=0.1953	
ETS: home/work in never smokers					
no	2328 (72.7)	175 (76.8)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
yes	876 (27.3)	53 (23.2)	0.81 (0.59, 1.11)	1.09 (0.78, 1.54)	1.09 (0.78, 1.52)
ETS: home/work overall					
no	3764 (63.1)	265 (65.1)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
yes	2198 (36.9)	142 (34.9)	0.92 (0.74, 1.13)	1.11 (0.89, 1.39)[c]	1.11 (0.89, 1.38)[c]
				1.09 (0.87, 1.37)[d]	1.09 (0.87, 1.36)[d]

ETS, environmental tobacco smoke.

[a] Lower serum PGI and PGI/II defined as PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b] Odds ratios are adjusted for age, gender, county, education level, average income 10 years ago, family history of stomach cancer, ethanol intake in the 1990s, and *Helicobacter pylori* status.

[c] Adjusted odds ratios, not adjusted for packyears

[d] Adjusted odds ratios, additionally adjusted for packyears

Table 3.1.4. Association of alcohol drinking related variables with atrophic gastritis in 6369 cancer-free participants with serum samples from the Jiangsu study.

	Atrophic Gastritis[a]				
	No	Yes			
Effect	**N=5962 (%)**	**N=407 (%)**	**Crude OR (95% CI)**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**
(never/former/current) alcohol drinker					
Never	3225 (54.1)	239 (58.7)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Former	463 (7.8)	33 (8.1)	0.96 (0.66, 1.40)	1.01 (0.68, 1.50)	1.00 (0.68, 1.46)
Current	2238 (37.5)	130 (32.0)	**0.78 (0.63, 0.98)**	0.99 (0.76, 1.28)	0.98 (0.76, 1.26)
missing	36 (0.6)	5 (1.2)	**p-trend=0.0319**	p-trend=0.9284	
(ever/never) drinker					
Never	3225 (54.1)	239 (58.7)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Ever	2737 (45.9)	168 (41.4)	0.83 (0.68, 1.02)	1.00 (0.79, 1.27)	1.00 (0.80, 1.27)
Drinking frequency					
Never	3225 (54.1)	239 (58.7)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Occasional	1061 (17.8)	73 (18.0)	0.93 (0.71, 1.22)	1.00 (0.75, 1.33)	1.00 (0.75, 1.32)
Often	702 (11.8)	53 (13.1)	1.02 (0.75, 1.39)	1.15 (0.83, 1.61)	1.15 (0.83, 1.60)
Almost everyday	974 (16.3)	42 (10.3)	**0.58 (0.42, 0.81)**	0.85 (0.58, 1.24)	0.86 (0.60, 1.23)
			p-trend=0.0083	p-trend=0.7512	
Frequent drinker?					
Never or occasional	4286 (71.9)	312 (76.6)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Often or everyday	1676 (28.1)	95 (23.4)	**0.78 (0.62, 0.99)**	1.01 (0.77, 1.32)	1.01 (0.78, 1.31)
Age started drinking					
Never drinker	3225 (54.1)	239 (58.7)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
≥30	990 (16.6)	51 (12.6)	**0.70 (0.51, 0.95)**	0.92 (0.66, 1.28)	0.91 (0.66, 1.27)
20-29	1394 (23.4)	92 (22.7)	0.89 (0.70, 1.14)	1.04 (0.79, 1.38)	1.04 (0.79, 1.36)
<20	299 (5.0)	20 (4.9)	0.90 (0.56, 1.45)	1.11 (0.67, 1.82)	1.09 (0.69, 1.74)
missing	54 (0.9)	5 (1.2)	p-trend=0.2508	p-trend=0.6880	
Years of drinking					
Never drinker	3225 (54.1)	239 (58.7)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)

<20	364 (6.1)	18 (4.4)	0.67 (0.41, 1.09)	1.00 (0.60, 1.68)	0.98 (0.60, 1.58)
20-29	575 (9.6)	35 (8.6)	0.82 (0.57, 1.18)	1.16 (0.78, 1.72)	1.13 (0.77. 1.64)
30	1733 (29.1)	105 (25.9)	0.82 (0.65, 1.04)	0.92 (0.70, 1.20)	0.89 (0.68, 1.15)
missing	65 (1.1)	10 (2.5)	p-trend=0.0767	p-trend=0.6412	
Weekly ethanol intake one year ago (g/week)					
Never drinker	3898 (65.4)	290 (71.3)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
<500	1046 (17.5)	62 (15.2)	0.80 (0.60, 1.06)	0.95 (0.70, 1.29)	0.95 (0.71, 1.27)
≥500	946 (15.9)	47 (11.6)	**0.67 (0.49, 0.92)**	0.93 (0.66, 1.33)	0.93 (0.66, 1.31)
missing	72 (1.2)	8 (2.0)	**p-trend=0.0058**	p-trend=0.6700	
Weekly ethanol intake in the 1990's (g/week)					
Never drinker	3225 (54.1)	239 (58.7)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
<500	1394 (23.4)	93 (22.9)	0.90 (0.70, 1.15)	1.03 (0.79, 1.34)	1.03 (0.79, 1.34)
≥500	1343 (22.5)	75 (18.5)	**0.75 (0.58, 0.98)**	0.97 (0.71, 1.32)	0.97 (0.72, 1.31)
			p-trend=0.0368	p-trend=0.8964	

[a] Atrophic gastritis defined as PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b] Adjusted odds ratio is controlled for age, gender, county, education level, average family income 10 years ago, family history of stomach cancer, pack-years of smoking, and *Helicobacter pylori* status.

Table 3.1.5. Association of tea drinking related variables with atrophic gastritis in 6369 cancer-free participants with serum samples from the Jiangsu study.

	Atrophic Gastritis[a]				
	No	Yes			
Effect	**N=5962 (%)**	**N=407 (%)**	**Crude OR (95% CI)**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**
(never/former/current) tea drinker					
Never	4595 (77.1)	338 (83.0)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Former	101 (1.7)	8 (2.0)	1.08 (0.52, 2.23)	1.25 (0.59, 2.64)	1.19 (0.61, 2.32)
Current	1266 (21.2)	61 (15.0)	**0.66 (0.50, 0.87)**	0.86 (0.63, 1.18)	0.87 (0.64, 1.17)
			p-trend=0.0036	p-trend=0.3860	
Ever tea drinker					
Never	4595 (77.1)	338 (83.0)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Ever	1367 (22.9)	69 (17.0)	**0.69 (0.53, 0.90)**	0.90 (0.67, 1.21)	0.90 (0.68, 1.20)
Favors green tea?					
No	4913 (82.4)	357 (87.7)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	1037 (17.4)	50 (12.3)	**0.66 (0.49, 0.90)**	0.89 (0.64, 1.24)	0.89 (0.65, 1.23)
missing	12 (0.2)	0 (0)			
Years of tea drinking					
Never drinks tea	4595 (77.1)	338 (83.0)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
<20	419 (7.0)	18 (4.4)	**0.58 (0.36, 0.95)**	0.84 (0.51, 1.39)	0.86 (0.54, 1.37)
20-34	511 (8.6)	30 (7.4)	0.80 (0.54, 1.17)	1.08 (0.71, 1.62)	1.08 (0.73. 1.60)
≥35	428 (7.2)	21 (5.2)	0.67 (0.43, 1.05)	0.79 (0.49, 1.28)	0.82 (0.52, 1.28)
missing	9 (0.2)	0 (0.0)	**p-trend=0.0184**	p-trend=0.5140	
Amount of tea consumed per day (cups/day)					
Never drinks tea	4595 (77.1)	338 (83.0)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
1 cup/day	486 (8.2)	21 (5.2)	**0.59 (0.37, 0.92)**	0.80 (0.50, 1.29)	0.82 (0.53, 1.28)
2 cups/day	556 (9.3)	30 (7.4)	0.73 (0.50, 1.08)	0.90 (0.60, 1.35)	0.92 (0.62. 1.35)
3 or more cups/day	309 (5.2)	16 (3.9)	0.70 (0.42, 1.18)	0.96 (0.56, 1.65)	0.97 (0.59, 1.60)
missing	16 (0.3)	2 (0.5)	**p-trend=0.0164**	p-trend=0.5866	
Preferred tea concentration					

Never drinks tea	4595 (77.1)	338 (83.0)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Light	273 (4.6)	13 (3.2)	0.65 (0.37, 1.14)	0.97 (0.54, 1.74)	0.98 (0.57, 1.68)
Medium	717 (12.0)	39 (9.6)	0.74 (0.53, 1.04)	0.94 (0.65, 1.36)	0.95 (0.67, 1.35)
Strong	368 (6.2)	16 (3.9)	**0.59 (0.35, 0.99)**	0.73 (0.43, 1.24)	0.76 (0.46, 1.24)
missing	9 (0.2)	1 (0.2)	**p-trend=0.0063**	p-trend=0.3046	
Prefers strong tea					
No	5585 (93.7)	390 (95.8)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	368 (6.2)	16 (3.9)	0.62 (0.37, 1.04)	0.74 (0.44, 1.25)	0.77 (0.47. 1.25)
missing	9 (0.2)	1 (0.2)			

[a] Atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b] Adjusted odds ratio is controlled for age, gender, county, education level, average family income 10 years ago, family history of stomach cancer, pack-years of smoking, ethanol intake in the 1990s, and *Helicobacter pylori* status.

Table 3.1.6. Association of green tea drinking related variables with atrophic gastritis in 6369 cancer-free participants with serum samples from the Jiangsu study.

	Atrophic Gastritis[a]				
	No	Yes			
Effect	**N=5962 (%)**	**N=407 (%)**	**Crude OR (95% CI)**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**
(never/former/current) green tea drinker					
Never	4913 (82.4)	357 (87.7)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Former	70 (1.2)	7 (1.7)	1.38 (0.63, 3.02)	1.67 (0.75, 3.74)	1.47 (0.71, 3.02)
Current	967 (16.2)	43 (10.6)	**0.62 (0.44, 0.85)**	0.82 (0.58, 1.17)	0.83 (0.59, 1.17)
missing	12 (0.2)	0 (0.0)	**p-trend=0.0043**	p-trend=0.3402	
Favors green tea?					
No	4913 (82.4)	357 (87.7)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	1037 (17.4)	50 (12.3)	**0.66 (0.49, 0.90)**	0.89 (0.64, 1.24)	0.89 (0.65, 1.23)
missing	12 (0.2)	0 (0.0)			
Years of green tea drinking					
Never drinks tea	4913 (82.4)	357 (87.7)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
<20	300 (5.0)	12 (2.9)	**0.55 (0.31, 0.99)**	0.79 (0.43, 1.44)	0.82 (0.48, 1.42)
20-34	416 (7.0)	21 (5.2)	0.70 (0.44, 1.09)	0.95 (0.59, 1.53)	0.96 (0.61, 1.51)
≥35	320 (5.4)	17 (4.2)	0.73 (0.44, 1.21)	0.91 (0.53, 1.54)	0.93 (0.56, 1.52)
missing	13 (0.2)	0 (0.0)	**p-trend=0.0276**	p-trend=0.6120	
Amount of green tea consumed per day (cups/day)					
Never drinks tea	4913 (82.4)	357 (87.7)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
1 cup/day	346 (5.8)	14 (3.4)	**0.56 (0.32, 0.96)**	0.77 (0.44, 1.35)	0.80 (0.48, 1.35)
2 cups/day	442 (7.4)	21 (5.2)	0.65 (0.42, 1.03)	0.83 (0.52, 1.34)	0.85 (0.55, 1.33)
3 or more cups/day	243 (4.1)	13 (3.2)	0.74 (0.42, 1.30)	1.02 (0.56, 1.85)	1.02 (0.59, 1.77)
missing	18 (0.3)	2 (0.5)	**p-trend=0.0183**	p-trend=0.5557	
Preferred green tea concentration					
Never drinks tea	4913 (82.4)	357 (87.7)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Light	216 (3.6)	10 (2.5)	0.64 (0.34, 1.21)	0.96 (0.50, 1.85)	0.97 (0.54, 1.76)

Medium	555 (9.3)	29 (7.1)	0.72 (0.49, 1.06)	0.94 (0.62, 1.42)	0.96 (0.64, 1.42)
Strong	262 (4.4)	10 (2.5)	**0.53 (0.28, 1.00)**	0.65 (0.34, 1.27)	0.71 (0.40, 1.27)
missing	16 (0.3)	1 (0.2)	**p-trend=0.0071**	p-trend=0.2839	
Prefers strong green tea					
No	5684 (95.3)	396 (97.3)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	262 (4.4)	10 (2.5)	0.55 (0.29, 1.04)	0.66 (0.34, 1.28)	0.71 (0.40. 1.27)
missing	16 (0.3)	1 (0.2)			

[a] Atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b] Adjusted odds ratio is controlled for age, gender, county, education level, average family income 10 years ago, family history of stomach cancer, pack-years of smoking, ethanol intake in the 1990s, and *Helicobacter pylori* status.

Table 3.1.7 Association of dietary habits with atrophic gastritis in 6369 cancer-free participants with serum samples from the Jiangsu study.

	Atrophic Gastritis[a]				
	No	Yes			
Effect	**N=5962 (%)**	**N=407 (%)**	**Crude OR (95% CI)**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**
Uses fridge?					
No	5305 (89.0)	359 (88.2)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	599 (10.0)	44 (10.8)	1.09 (0.79, 1.50)	1.18 (0.84, 1.66)	1.17 (0.84, 1.63)
missing	58 (1.0)	4 (1.0)			
Do you eat salty food?					
not	747 (12.5)	43 (10.6)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
not very	3356 (56.3)	259 (63.6)	1.34 (0.96, 1.87)	1.24 (0.89, 1.74)	1.26 (0.91, 1.73)
more/very	1849 (31.0)	105 (25.8)	0.99 (0.69, 1.42)	0.94 (0.65, 1.37)	0.96 (0.67, 1.36)
missing	10 (0.2)	0 (0.0)	p-trend=0.3101	p-trend=0.2735	
Do you like spicy food?					
not/not very	4215 (70.7)	301 (73.9)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
more/very	1733 (29.1)	105 (25.9)	0.85 (0.68, 1.07)	0.85 (0.67, 1.08)	0.85 (0.68, 1.08)
missing	14 (0.2)	1 (0.2)			
Do you like acidic food?					
not/not very	5165 (86.6)	363 (89.2)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
more/very	780 (13.1)	44 (10.8)	0.80 (0.58, 1.11)	0.86 (0.62, 1.19)	0.87 (0.63, 1.19)
missing	17 (0.3)	0 (0.0)			
Do you eat hot (high temperature) food?					
not/not very	3404 (57.1)	240 (59.1)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
more/very	2549 (42.8)	167 (40.9)	0.93 (0.76, 1.14)	0.93 (0.765, 1.14)	0.93 (0.76, 1.14)
missing	9 (0.2)	0 (0.0)			
Eating speed					
Slow	982 (16.5)	72 (17.7)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Moderate	3832 (64.2)	261 (64.1)	0.93 (0.71, 1.22)	0.89 (0.68, 1.18)	0.92 (0.70, 1.20)
Fast	1137 (19.1)	74 (18.2)	0.89 (0.64, 1.24)	0.95 (0.67, 1.35)	0.97 (0.70, 1.36)

missing	11 (0.2)	0 (0.0)	p-trend=0.4892	p-trend=0.7929	
Do you often take supplements (tonics)?					
No	5610 (94.1)	371 (91.1)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	250 (4.2)	26 (6.4)	**1.57 (1.04, 2.39)**	**1.60 (1.04, 2.45)**	**1.54 (1.02, 2.32)**
missing	102 (1.7)	10 (2.5)			
Do you often take vitamins?					
No	5753 (96.5)	385 (94.6)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	93 (1.6)	11 (2.7)	1.77 (0.94, 3.33)	1.59 (0.83, 3.01)	1.46 (0.80, 2.65)
missing	116 (1.9)	11 (2.7)			
Do you consume raw garlic?					
No	2780 (46.6)	179 (44.0)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	3157 (53.0)	227 (55.8)	1.12 (0.91, 1.37)	1.08 (0.85, 1.38)	1.08 (0.85, 1.38)
missing	25 (0.4)	1 (0.2)			
Weekly consumption of raw garlic					
Never	2780 (46.6)	179 (44.0)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
less than twice	2296 (38.5)	155 (38.1)	1.05 (0.84, 1.31)	1.05 (0.82, 1.36)	1.05 (0.82, 1.35)
twice or more	861 (14.4)	72 (17.7)	1.30 (0.98, 1.73)	1.20 (0.86, 1.67)	1.19 (0.86, 1.64)
missing	25 (0.4)	1 (0.2)	p-trend=0.1041	p-trend=0.3130	
Weekly consumption of ginger (FFQ)					
Never	1420 (34.3)	83 (35.9)			
once or less	517 (12.5)	19 (8.2)	0.63 (0.38, 1.05)	0.64 (0.38, 1.07)	0.73 (0.47. 1.12)
more than once, less than 4 times	960 (23.2)	52 (22.5)	0.93 (0.65, 1.33)	0.97 (0.67, 1.40)	0.96 (0.68, 1.34)
more than 4 times	1185 (28.6)	77 (33.3)	1.12 (0.81, 1.54)	1.07 (0.77, 1.49)	1.23 (0.89, 1.72)
			p-trend=0.4159	p-trend=0.5689	
Do you drink unboiled water?					
Never	2627 (44.1)	178 (43.8)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Seldom	1557 (26.1)	107 (26.1)	1.01 (0.79, 1.30)	1.07 (0.83, 1.37)	1.05 (0.83. 1.34)
Frequently	687 (11.5)	31 (7.6)	**0.67 (0.45, 0.98)**	0.96 (0.64, 1.45)	0.95 (0.64. 1.41)
At childhood, but not now	943 (15.8)	79 (19.5)	1.24 (0.94, 1.63)	**1.35 (1.02, 1.78)**	1.31 (1.00, 1.72)
missing	148 (2.5)	12 (3.0)			
Have you ever drank unboiled water?					

No	2627 (44.1)	178 (43.8)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	3187 (53.5)	217 (53.2)	1.01 (0.82, 1.23)	1.14 (0.92, 1.41)	1.14 (0.92, 1.40)
missing	148 (2.5)	12 (3.0)			
Frequency of barbecued meat consumption (#/week)					
Never	5532 (92.8)	387 (95.1)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
once or more	408 (6.8)	19 (4.6)	0.67 (0.42, 1.07)	**0.61 (0.38, 0.98)**	**0.64 (0.41, 1.00)**
missing	22 (0.4)	1 (0.2)			
Frequency of fried meat consumption (#/week)					
Never	752 (12.6)	47 (11.6)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
less than twice	3953 (66.3)	251 (61.6)	1.02 (0.74, 1.40)	1.24 (0.89, 1.72)	1.22 (0.90. 1.67)
twice or more	1237 (20.7)	108 (26.6)	1.40 (0.98, 1.99)	1.35 (0.94, 1.94)	1.34 (0.95, 1.88)
missing	20 (0.3)	1 (0.2)	**p-trend=0.0200**	p-trend=0.1196	
Frequency of boiled meat consumption (#/week)					
Never	3136 (52.6)	206 (50.5)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
less than twice	2433 (40.8)	174 (42.9)	1.09 (0.89, 1.34)	1.04 (0.82, 1.31)	1.05 (0.84, 1.33)
twice or more	366 (6.1)	26 (6.4)	1.08 (0.71, 1.65)	0.88 (0.56, 1.40)	0.91 (0.59, 1.40)
missing	27 (0.5)	1 (0.2)	p-trend=0.4554	p-trend=0.8632	

[a] Atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b] Adjusted odds ratio is controlled for age, gender, county, education level, average family income 10 years ago, family history of stomach cancer, pack-years of smoking, ethanol intake in the 1990s, and *Helicobacter pylori* status.

Table 3.1.8 Association of dietary intake based on the food frequency questionnaire with atrophic gastrits in 4369 cancer-free participants with serum samples and complete FFQ information from the Jiangsu study.

	Atrophic Gastritis[a]				
	No	Yes			
Effect	**N=4138 (%)**	**N=231 (%)**	**Crude OR (95% CI)**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**
Monthly intake of vegetables (grams/week)					
continuous (per 1000)			0.97 (0.90, 1.05)	1.01 (0.95, 1.06)	
Q1	1023 (24.7)	63 (27.3)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Q2	1023 (24.7)	56 (24.2)	0.89 (0.61, 1.29)	0.94 (0.63, 1.40)	0.99 (0.68, 1.44)
Q3	1023 (24.7)	50 (21.6)	0.79 (0.54, 1.16)	0.94 (0.61, 1.45)	1.00 (0.67, 1.49)
Q4	1023 (24.7)	62 (26.8)	0.98 (0.69, 1.41)	1.24 (0.82, 1.88)	1.31 (0.89, 1.92)
			p-trend=0.7970	p-trend=0.2890	
Monthly intake of fruit (grams/week)					
continuous (per 1000)			0.88 (0.61, 1.26)	1.07 (0.77, 1.49)	
Q1	1023 (24.7)	63 (27.3)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Q2	1023 (24.7)	57 (24.7)	0.90 (0.63, 1.31)	1.09 (0.74, 1.63)	1.13 (0.78, 1.64)
Q3	1023 (24.7)	55 (23.8)	0.87 (0.60, 1.27)	1.11 (0.74, 1.68)	1.15 (0.79, 1.69)
Q4	1023 (24.7)	56 (24.2)	0.89 (0.61, 1.29)	1.21 (0.81, 1.79)	1.24 (0.86, 1.80)
			p-trend=0.5106	p-trend=0.3631	
Monthly intake of pickled food (grams/week)					
continuous (per 1000)			0.64 (0.36, 1.13)	0.72 (0.41, 1.28)	
Q1	1023 (24.7)	67 (29.0)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Q2	1023 (24.7)	55 (23.8)	0.82 (0.57, 1.18)	1.00 (0.66, 1.49)	1.05 (0.72, 1.54)
Q3	1023 (24.7)	55 (23.8)	0.82 (0.57, 1.18)	1.04 (0.67, 1.60)	1.11 (0.74, 1.65)
Q4	1023 (24.7)	54 (23.4)	0.81 (0.56, 1.17)	0.96 (0.63, 1.45)	1.02 (0.69, 1.49)
			p-trend=0.2650	p-trend=0.8591	
Monthly intake of fried food (grams/week)					
continuous (per 1000)			0.66 (0.23, 1.89)	0.97 (0.35, 2.69)	
Q1	1023 (24.7)	60 (26.0)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Q2	1023 (24.7)	57 (24.7)	0.95 (0.65, 1.38)	1.12 (0.72, 1.73)	1.15 (0.78, 1.70)

Q3	1023 (24.7)	54 (23.4)	0.90 (0.62, 1.31)	1.19 (0.71, 1.99)	1.23 (0.78, 1.93)
Q4	1023 (24.7)	60 (26.0)	1.00 (0.69, 1.45)	1.40 (0.80, 2.44)	1.45 (0.90, 2.35)
			p-trend=0.9316	p-trend=0.2318	
Monthly intake of meat (grams/week)					
continuous (per 1000)			0.99 (0.84, 1.17)	0.94 (0.79, 1.13)	
Q1	1023 (24.7)	53 (22.9)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Q2	1023 (24.7)	61 (26.4)	1.15 (0.79, 1.68)	1.16 (0.78, 1.74)	1.22 (0.84, 1.78)
Q3	1023 (24.7)	55 (23.8)	1.04 (0.70, 1.53)	0.98 (0.63, 1.53)	1.05 (0.70, 1.58)
Q4	1023 (24.7)	62 (26.8)	1.17 (0.80, 1.71)	1.03 (0.67, 1.58)	1.10 (0.74, 1.64)
			p-trend=0.5478	p-trend=0.8956	
Monthly intake of red meat (grams/week)					
continuous (per 1000)			1.18 (0.95, 1.45)	0.98 (0.75, 1.28)	
Q1	1023 (24.7)	46 (19.9)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Q2	1023 (24.7)	48 (20.8)	1.04 (0.69, 1.58)	1.13 (0.73, 1.76)	1.16 (0.78, 1.74)
Q3	1023 (24.7)	70 (30.3)	**1.52 (1.04, 2.23)**	1.52 (0.96, 2.39)	**1.57 (1.04, 2.35)**
Q4	1023 (24.7)	67 (29.0)	1.46 (0.99, 2.14)	1.11 (0.69, 1.79)	1.16 (0.76, 1.78)
			p-trend=0.0152	p-trend=0.6209	
missing	*46 (1.1)*	*0 (0.0)*			

[a] Atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b] Adjusted odds ratio is controlled for age, gender, county, education level, average family income 10 years ago, family history of stomach cancer, pack-years of smoking, ethanol intake in the 1990s, total caloric intake, and *Helicobacter pylori* status.

Table 3.1.9. Association of food items known to contain high concentrations of dietary nitrate and nitrite with atrophic gastrits in 4369 cancer-free participants with serum samples and complete FFQ information from the Jiangsu study.

	Atrophic Gastritis[a]				
	No	Yes			
Effect	**N=4138 (%)**	**N=231 (%)**	**Crude OR (95% CI)**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**
Intake of green, leafy vegetables (grams/week)					
			1.03 (0.90, 1.18)	1.05 (0.91, 1.21)	
Q1	1023 (24.7)	49 (21.2)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Q2	1023 (24.7)	48 (20.8)	0.98 (0.65, 1.47)	1.01 (0.66, 1.53)	1.04 (0.70, 1.54)
Q3	1023 (24.7)	69 (29.9)	1.41 (0.97, 2.05)	1.33 (0.90, 1.96)	1.36 (0.95, 1.96)
Q4	1023 (24.7)	65 (28.1)	1.33 (0.91, 1.94)	1.34 (0.91, 1.98)	1.37 (0.95, 1.97)
			p-trend=0.0486	p-trend=0.0623	
Intake of root vegetables (grams/week)					
			0.95 (0.60, 1.50)	1.26 (0.83, 1.92)	
Q1	1023 (24.7)	69 (29.9)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Q2	1023 (24.7)	52 (22.5)	0.75 (0.52, 1.09)	0.91 (0.60, 1.38)	0.98 (0.67, 1.43)
Q3	1023 (24.7)	60 (26.0)	0.87 (0.61, 1.24)	0.98 (0.63, 1.53)	1.07 (0.71, 1.60)
Q4	1023 (24.7)	50 (21.6)	0.72 (0.50, 1.05)	0.96 (0.59, 1.56)	1.05 (0.68, 1.63)
			p-trend=0.1614	p-trend=0.9625	
Intake of salted/pickled vegetables (grams/week)					
			0.66 (0.36, 1.20)	0.75 (0.42, 1.34)	
Q1	1023 (24.7)	64 (27.7)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Q2	1023 (24.7)	59 (25.5)	0.92 (0.64, 1.33)	1.14 (0.76, 1.71)	1.19 (0.82, 1.73)
Q3	1023 (24.7)	51 (22.1)	0.80 (0.55, 1.16)	1.02 (0.66, 1.59)	1.08 (0.71, 1.62)
Q4	1023 (24.7)	57 (24.7)	0.89 (0.62, 1.29)	1.08 (0.72, 1.64)	1.13 (0.77, 1.66)
			p-trend=0.4071	p-trend=0.8590	
Intake of preserved or salted meat/fish (grams/week)					
			1.45 (0.49, 4.25)	0.67 (0.15, 2.99)	
Q1	1023 (24.7)	55 (23.8)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Q2	1023 (24.7)	64 (27.7)	1.16 (0.80, 1.69)	1.24 (0.83, 1.86)	1.33 (0.91, 1.94)

Q3	1023 (24.7)	32 (13.9)	**0.58 (0.37, 0.91)**	**0.56 (0.34, 0.92)**	**0.63 (0.40, 0.99)**
Q4	1023 (24.7)	80 (34.6)	1.45 (1.02, 2.07)	1.07 (0.71, 1.60)	1.17 (0.80, 1.69)
			p-trend=0.2203	p-trend=0.7108	
missing	*46 (1.1)*	*0 (0.0)*			

[a] Atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.
[b] Adjusted odds ratio is controlled for age, gender, county, education level, average family income 10 years ago, family history of stomach cancer, pack-years of smoking, ethanol intake in the 1990s, total caloric intake, and *Helicobacter pylori* status.

Table 3.1.10. Association of micronutrients and atrophic gastritis in 4369 cancer-free participants with serum samples and complete FFQ information from the Jiangsu study.

	Atrophic Gastritis[a]				
	No	Yes			
Effect	**N=4138 (%)**	**N=231 (%)**	**Crude OR (95% CI)**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**
Vitamin A from food intake					
continuous (per 1000)			0.99 (0.96, 1.02)	1.00 (0.97, 1.02)	
Q1	1023 (24.7)	56 (24.2)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Q2	1023 (24.7)	66 (28.6)	1.18 (0.82, 1.70)	1.34 (0.91, 1.97)	1.36 (0.95, 1.96)
Q3	1023 (24.7)	58 (25.1)	1.04 (0.71, 1.51)	1.31 (0.87, 1.97)	1.33 (0.91, 1.95)
Q4	1023 (24.7)	51 (22.1)	0.91 (0.62, 1.34)	1.07 (0.71, 1.60)	1.09 (0.75, 1.60)
			p-trend=0.51	p-trend=0.83	
Carotene from food intake					
continuous (per 1000)			1.00 (0.99, 1.01)	1.00 (0.99, 1.01)	
Q1	1023 (24.7)	49 (21.2)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Q2	1023 (24.7)	62 (26.8)	1.27 (0.86, 1.86)	1.34 (0.90, 2.01)	1.36 (0.93, 1.97)
Q3	1023 (24.7)	61 (26.4)	1.24 (0.85, 1.83)	1.29 (0.86, 1.95)	1.31 (0.90, 1.92)
Q4	1023 (24.7)	59 (25.5)	1.20 (0.82, 1.78)	1.31 (0.87, 1.96)	1.32 (0.91, 1.92)
			p-trend=0.41	p-trend=0.27	
Thiamin from food intake					
continuous (per 1)			0.93 (0.85, 1.03)	1.03 (0.92, 1.15)	
Q1	1023 (24.7)	64 (27.7)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Q2	1023 (24.7)	66 (28.6)	1.03 (0.72, 1.47)	1.12 (0.77, 1.64)	1.17 (0.82, 1.66)
Q3	1023 (24.7)	48 (20.8)	0.75 (0.51, 1.10)	0.97 (0.63, 1.50)	1.02 (0.68, 1.52)
Q4	1023 (24.7)	53 (22.9)	0.83 (0.57, 1.20)	1.18 (0.75, 1.86)	1.24 (0.81, 1.88)
			p-trend=0.15	p-trend=0.62	
Riboflavin from food intake					

continuous (per 1)			0.98 (0.94, 1.02)	1.00 (0.95, 1.05)	
Q1	1023 (24.7)	60 (26.0)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Q2	1023 (24.7)	53 (22.9)	0.88 (0.60, 1.29)	0.98 (0.65, 1.49)	1.04 (0.71, 1.52)
Q3	1023 (24.7)	68 (29.4)	1.13 (0.79, 1.62)	1.23 (0.80, 1.91)	1.31 (0.88, 1.95)
Q4	1023 (24.7)	50 (21.6)	0.83 (0.57, 1.22)	0.98 (0.60, 1.60)	1.06 (0.68, 1.65)
			p-trend=0.67	p-trend=0.86	
Niacin from food intake					
continuous (per 100)			1.03 (0.64, 1.67)	1.05 (0.64, 1.72)	
Q1	1023 (24.7)	59 (25.5)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Q2	1023 (24.7)	46 (19.9)	0.78 (0.53, 1.16)	0.84 (0.55, 1.28)	0.89 (0.61, 1.32)
Q3	1023 (24.7)	59 (25.5)	1.00 (0.69, 1.45)	1.11 (0.73, 1.71)	1.18 (0.80, 1.75)
Q4	1023 (24.7)	67 (29.0)	1.14 (0.79, 1.63)	1.19 (0.78, 1.82)	1.27 (0.86, 1.87)
			p-trend=0.29	p-trend=0.23	
Vitamin C from food intake					
continuous (per 1000)			0.93 (0.71, 1.22)	1.04 (0.82, 1.33)	
Q1	1023 (24.7)	58 (25.1)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Q2	1023 (24.7)	57 (24.7)	0.98 (0.67, 1.43)	1.07 (0.71, 1.60)	1.11 (0.76, 1.62)
Q3	1023 (24.7)	56 (24.2)	0.97 (0.66, 1.41)	1.11 (0.72, 1.70)	1.16 (0.78, 1.71)
Q4	1023 (24.7)	60 (26.0)	1.03 (0.71, 1.50)	1.30 (0.85, 1.97)	1.34 (0.91, 1.98)
			p-trend=0.89	p-trend=0.21	
Vitamin E from food intake					
continuous (per 1000)			0.35 (0.10, 1.24)	0.82 (0.22, 3.05)	
Q1	1023 (24.7)	65 (28.1)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Q2	1023 (24.7)	55 (23.8)	0.85 (0.58, 1.22)	0.97 (0.65, 1.44)	1.02 (0.70, 1.47)
Q3	1023 (24.7)	66 (28.6)	1.02 (0.71, 1.45)	1.27 (0.85, 1.91)	1.33 (0.92, 1.94)
Q4	1023 (24.7)	45 (19.5)	0.69 (0.47, 1.02)	0.92 (0.60, 1.42)	0.98 (0.65, 1.46)
			p-trend=0.16	p-trend=0.94	

Sodium intake from food and condiments (mg)					
continuous (per 1000)			0.99 (0.99, 1.00)	1.00 (0.99, 1.00)	
Q1	1023 (24.7)	71 (30.7)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Q2	1023 (24.7)	59 (25.5)	0.83 (0.58, 1.19)	0.99 (0.68, 1.45)	1.05 (0.73, 1.50)
Q3	1023 (24.7)	55 (23.8)	0.77 (0.54, 1.11)	1.04 (0.70, 1.54)	1.09 (0.75, 1.59)
Q4	1023 (24.7)	46 (19.9)	**0.65 (0.44, 0.95)**	0.83 (0.55, 1.25)	0.88 (0.60, 1.30)
			p-trend=0.024	p-trend=0.45	
Zinc intake from food (mg)					
continuous (per 10)			0.93 (0.83, 1.04)	0.96 (0.85, 1.08)	
Q1	1023 (24.7)	59 (25.5)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Q2	1023 (24.7)	62 (26.8)	1.05 (0.73, 1.52)	1.13 (0.76, 1.67)	1.18 (0.82, 1.70)
Q3	1023 (24.7)	57 (24.7)	0.97 (0.66, 1.40)	1.08 (0.70, 1.64)	1.13 (0.77, 1.67)
Q4	1023 (24.7)	53 (22.9)	0.90 (0.61, 1.31)	1.05 (0.68, 1.63)	1.11 (0.74, 1.66)
			p-trend=0.51	p-trend=0.91	
Selenium intake from food (ug)					
continuous (per 1000)			0.42 (0.17, 1.01)	0.95 (0.31, 2.88)	
Q1	1023 (24.7)	64 (27.7)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Q2	1023 (24.7)	63 (27.3)	0.98 (0.69, 1.41)	1.08 (0.72, 1.60)	1.12 (0.77, 1.62)
Q3	1023 (24.7)	54 (23.4)	0.84 (0.58, 1.22)	1.00 (0.64, 1.58)	1.06 (0.70, 1.60)
Q4	1023 (24.7)	50 (21.6)	0.78 (0.53, 1.14)	1.32 (0.79, 2.22)	1.38 (0.86, 2.20)
			p-trend=0.15	p-trend=0.41	
missing	*46 (1.1)*	*0 (0.0)*			

[a] Atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b] Adjusted odds ratio is controlled for age, gender, county, education level, average family income 10 years ago, family history of stomach cancer, pack-years of smoking, ethanol intake in the 1990s, total caloric intake, and *Helicobacter pylori* status.

Table 3.1.11. Association of macronutrients and atrophic gastritis in 4369 cancer-free participants with serum samples and complete FFQ information from the Jiangsu study.

	Atrophic Gastritis[a]				
	No	Yes			
Effect	**N=4138 (%)**	**N=231 (%)**	**Crude OR (95% CI)**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**
Protein intake from food (g)					
continuous (per 1000)			0.50 (0.21, 1.23)	0.69 (0.23, 2.04)	
Q1	1023 (24.7)	56 (24.2)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Q2	1023 (24.7)	68 (29.4)	1.21 (0.84, 1.75)	1.30 (0.88, 1.93)	1.34 (0.93, 1.93)
Q3	1023 (24.7)	59 (25.5)	1.05 (0.72, 1.53)	1.25 (0.81, 1.95)	1.30 (0.87, 1.94)
Q4	1023 (24.7)	48 (20.8)	0.86 (0.58, 1.27)	1.04 (0.65, 1.65)	1.08 (0.71, 1.66)
			p-trend=0.34	p-trend=0.98	
Fat intake from food (g)					
continuous (per 1000)			1.30 (0.77, 2.18)	1.00 (0.55, 1.81)	
Q1	1023 (24.7)	51 (22.1)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Q2	1023 (24.7)	48 (20.8)	0.94 (0.63, 1.41)	1.01 (0.66, 1.55)	1.06 (0.71, 1.58)
Q3	1023 (24.7)	70 (30.3)	1.37 (0.95, 1.99)	1.32 (0.85, 2.04)	1.39 (0.93, 2.07)
Q4	1023 (24.7)	62 (26.8)	1.22 (0.83, 1.78)	1.03 (0.65, 1.64)	1.11 (0.73, 1.68)
			p-trend=0.12	p-trend=0.74	
Fiber intake from food (g)					
continuous (per 1000)			0.28 (0.02, 3.31)	0.96 (0.06, 14.91)	
Q1	1023 (24.7)	61 (26.4)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Q2	1023 (24.7)	52 (22.5)	0.85 (0.58, 1.25)	1.06 (0.69, 1.62)	1.09 (0.74, 1.61)
Q3	1023 (24.7)	60 (26.0)	0.98 (0.68, 1.42)	1.31 (0.83, 2.05)	1.35 (0.89, 2.02)
Q4	1023 (24.7)	58 (25.1)	0.95 (0.66, 1.38)	1.29 (0.80, 2.09)	1.33 (0.87, 2.06)
			p-trend=0.98	p-trend=0.22	
Carbohydrate intake from food (g)					

continuous (per 1000)			0.94 (0.77, 1.16)	1.02 (0.81, 1.28)	
Q1	1023 (24.7)	57 (24.7)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Q2	1023 (24.7)	71 (30.7)	1.25 (0.87, 1.78)	1.36 (0.94, 1.96)	1.39 (0.98, 1.96)
Q3	1023 (24.7)	54 (23.4)	0.95 (0.65, 1.39)	1.13 (0.75, 1.71)	1.16 (0.79, 1.70)
Q4	1023 (24.7)	49 (21.2)	0.86 (0.58, 1.27)	0.96 (0.60, 1.54)	0.99 (0.64, 1.53)
			p-trend=0.24	p-trend=0.85	
Total caloric intake from food# (kcal)[c]					
continuous (per 1000)			1.00 (0.98, 1.01)	1.00 (0.99, 1.02)	
Q1	1023 (24.7)	57 (24.7)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Q2	1023 (24.7)	54 (23.4)	0.95 (0.65, 1.39)	0.92 (0.62, 1.36)	0.97 (0.67.1.40)
Q3	1023 (24.7)	48 (20.8)	0.84 (0.57, 1.25)	0.90 (0.60, 1.35)	0.94 (0.64, 1.39)
Q4	1023 (24.7)	72 (31.2)	1.26 (0.88, 1.81)	1.37 (0.94, 2.00)	1.42 (0.99, 2.03)
			p-trend=0.2657	p-trend=0.1136	
missing	*46 (1.1)*	*0 (0.0)*			

[a] Atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.
[b] Adjusted odds ratio is controlled for age, gender, county, education level, average family income 10 years ago, family history of stomach cancer, pack-years of smoking, ethanol intake in the 1990s, total caloric intake, and *Helicobacter pylori* status.
[c]Adjusted odds ratio is controlled for age, gender, county, education level, average family income 10 years ago, family history of stomach cancer, pack-years of smoking, ethanol intake in the 1990s, BMI, and *Helicobacter pylori* status.

Table 3.1.12. Association of family history with serum pepsinogen levels in 6369 cancer-free participants with serum samples from the Jiangsu study.

	Atrophic Gastritis[a]				
	No	Yes			
Effect	**N=5962 (%)**	**N=407 (%)**	**Crude OR (95% CI)**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**
Any cancer history in relatives					
No family history	4766 (79.9)	336 (82.6)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes, in first degree relative(s)	849 (14.2)	55 (13.5)	0.92 (0.69, 1.23)	1.12 (0.81, 1.54)	1.11 (0.80, 1.54)
Yes, in any other relative(s)	330 (5.5)	13 (3.2)	0.56 (0.32, 0.98)	0.65 (0.36, 1.16)	0.67 (0.39, 1.15)
missing	17 (0.3)	3 (0.7)			
Family history of stomach cancer in any relative					
No	5682 (95.3)	391 (96.1)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	280 (4.7)	16 (3.9)	0.83 (0.50, 1.39)	0.95 (0.56, 1.62)	0.91 (0.54, 1.53)
1st degree relative with history of stomach cancer					
No	5769 (96.8)	398 (97.8)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Yes	193 (3.2)	9 (2.2)	0.68 (0.34, 1.33)	0.76 (0.38, 1.51)	0.78 (0.41, 1.47)

[a] Atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b] Adjusted odds ratio is controlled for age, gender, county, education level, average family income 10 years ago, pack-years of smoking, ethanol intake in the 1990s, and *Helicobacter pylori* status.

Table 3.1.13 Association of obesity related measures with serum pepsinogen levels in 6369 cancer-free participants with serum samples from the Jiangsu study.

	Atrophic Gastritis[a]				
	No	Yes			
Effect	**N=5962 (%)**	**N=407 (%)**	**Crude OR (95% CI)**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**
BMI, grouped by Chinese standards					
Less than 18.5	326 (5.5)	31 (7.6)	1.34 (0.91, 1.98)	1.37 (0.92, 2.04)	1.00 (Ref)
18.5-24	3621 (60.7)	257 (63.1)	1.00 (Ref)	1.00 (Ref)	0.80 (0.55, 1.17)
24-28	1674 (28.1)	102 (25.1)	0.86 (0.68, 1.09)	0.81 (0.64, 1.04)	0.66 (0.44, 0.99)
28 and above	341 (5.7)	17 (4.2)	0.70 (0.43, 1.16)	0.70 (0.42, 1.17)	0.60 (0.34, 1.04)
			p-trend=0.0161	**p-trend=0.0078**	
Waist circumference					
Men: less than 85cm, Women: less than 80 cm	3941 (66.1)	283 (69.5)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Men: 85cm and up, Women: 80 cm and up	2021 (33.9)	124 (30.5)	0.85 (0.69, 1.06)	0.87 (0.69, 1.09)	0.87 (0.70, 1.09)
Waist-to-hip ratio					
Men: less than 0.9, Women: less than 0.85	2914 (48.9)	216 (53.1)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Men: 0.9 and up, Women: 0.85 and up	3048 (51.1)	191 (46.9)	**0.85 (0.69, 1.03)**	**0.77 (0.62, 0.96)**	**0.78 (0.63, 0.96)**
Waist-to-height ratio					
Men: less than 0.5 Women: less than 0.48	3582 (60.1)	253 (62.2)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
Men: 0.5 and up Women: 0.48 and up	2380 (39.9)	154 (37.8)	0.92 (0.75, 1.13)	0.94 (0.75, 1.17)	0.94 (0.76, 1.17)

[a] Atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b] Adjusted odds ratio is controlled for age, gender, county, education level, average family income 10 years ago, pack-years of smoking, ethanol intake in the 1990s, and *Helicobacter pylori* status.

Table 3.2.1. Baseline characteristics of stomach cancer cases and controls.

	Total	Stomach cancer		
		Control	Case	
	N=7986 (%)	N=6369 (%)	N=1617 (%)	P-value
Gender				
Male	5715 (71.6)	4533 (71.2)	1182 (73.1)	0.1253
Female	2271 (28.4)	1836 (28.8)	435 (26.9)	
County				
Dafeng	2527 (31.6)	2036 (32.0)	491 (30.4)	**<.0001**
Ganyu	1753 (22.0)	1489 (23.4)	264 (16.3)	
Chuzhou	1269 (15.9)	844 (13.3)	425 (26.3)	
Tongshan	2437 (30.5)	2000 (31.4)	437 (27.0)	
Age (years)				
Mean±SD	*63.87±11.32*	*63.95±11.34*	*63.55±11.26*	0.4603
Less than 50	865 (10.8)	684 (10.7)	181 (11.2)	**0.0328**
50-59	1780 (22.3)	1433 (22.5)	347 (21.5)	
60-69	2599 (32.5)	2054 (32.2)	545 (33.7)	
70-79	2206 (27.6)	1744 (27.4)	462 (28.6)	
80 and above	536 (6.7)	454 (7.1)	82 (5.1)	
Marital status				
not in marriage	1470 (18.4)	1162 (18.2)	308 (19.0)	0.4872
in marriage	6478 (81.1)	5173 (81.2)	1305 (80.7)	
missing	38 (0.5)	34 (0.5)	4 (0.2)	
Education level				
illiteracy	3827 (47.9)	3044 (47.8)	783 (48.4)	**0.0005**
primary school	2570 (32.2)	2005 (31.5)	565 (34.9)	
middle school	1285 (16.1)	1059 (16.6)	226 (14.0)	
high school and above	304 (3.8)	261 (4.1)	43 (2.7)	
Income 10 yrs ago (yuan/year)				
Mean±SD	*2122.26±2214.57*	*2143.10±2239.24*	*2040.21±2113.27*	**0.002**
less than 1000	1732 (21.7)	1342 (21.1)	390 (24.1)	**0.0231**
1000-1499	1605 (20.1)	1273 (20.0)	332 (20.5)	
1500-2499	2180 (27.3)	1747 (27.4)	433 (26.8)	
2500 or higher	2469 (30.9)	2007 (31.5)	462 (28.6)	
BMI (kg/m2)				
Mean±SD	*22.82±3.71*	*23.13±3.68*	*21.62±3.60*	**<.0001**
Less than 18.5	599 (7.5)	357 (5.6)	242 (15.0)	**<.0001**
18.5-24	4979 (62.3)	3875 (60.8)	1104 (68.3)	
24-28	2004 (25.1)	1779 (27.9)	225 (13.9)	
28 and above	404 (5.1)	358 (5.6)	46 (2.8)	
1st degree relative with stomach cancer				
no	7657 (95.9)	6167 (96.8)	1490 (92.1)	**<.0001**
yes	329 (4.1)	202 (3.2)	127 (7.9)	

Family history of SC in any relative				
no	7533 (94.3)	6073 (95.4)	1460 (90.3)	**<.0001**
yes	453 (5.7)	296 (4.6)	157 (9.7)	
***Helicobacter pylori* IgG**				
negative	2224 (27.8)	1847 (29.0)	377 (23.3)	**<.0001**
positive	5762 (72.2)	4522 (71.0)	1240 (76.7)	
Atrophic gastritis[a]				
no	7266 (91.0)	5962 (93.6)	1304 (80.6)	**<.0001**
yes	720 (9.0)	407 (6.4)	313 (19.4)	

[a] Atrophic gastritis is defined by low serum pepsinogen of PG I ≤ 70ng/mL and PG I/PG II ≤ 6.
[b]Chi-square for categorical, Wilcoxon signed rank test for continuous.

Table 3.2.2. Helicobacter pylori infection and stomach cancer

	All			Without Atrophic Gastritis[a]			With Atrophic Gastritis[a]	
Effect	**Ca/Co**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**	**Ca/Co**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**	**Ca/Co**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**
Helicobacter pylori									
Negative	377/1847	1.00 (Ref)	1.00 (Ref)	292/1743	1.00 (Ref)	1.00 (Ref)	85/104	1.00 (Ref)	1.00 (Ref)
Positive	1240/4522	**1.31 (1.15, 1.50)**	**1.31 (1.15, 1.50)**	1012/4219	**1.39 (1.20, 1.61)**	**1.38 (1.19, 1.60)**	228/303	0.93 (0.65, 1.32)	0.93 (0.66, 1.31)

Ca, Cases; Co, Controls

[a] Atrophic gastritis defined as having low serum pepsinogen of PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b]Adjusted odds ratio controlling for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, pack-years of smoking, and alcohol consumption in the 1990's.

Table 3.2.3. Baseline characteristics by Helicobacter pylori IgG seropositivity and serum pepsinogen levels.

	Stomach Cancer				
	Control	**Case**			
Effect	**N=6369 (%)**	**N=1617 (%)**	**Crude OR (95% CI)**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**
Atrophic Gastritis[a]					
no	5962 (93.6)	1304 (80.6)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
yes	407 (6.4)	313 (19.4)	**3.52 (3.00, 4.12)**	**3.28 (2.78, 3.87)**	**3.23 (2.74, 3.80)**
PG I (continuous)	131.10±40.3	83.06±50.7	**0.978 (0.976, 0.979)**	**0.978 (0.977, 0.979)**	**0.978 (0.977, 0.979)**
PG I/PG II (continuous)	8.28±7.2	11.63±14.3	**1.033 (1.027, 1.039)**	**1.038 (1.032, 1.045)**	**1.038 (1.032, 1.045)**

PG, pepsinogen

[a] Atrophic gastritis defined as having low serum pepsinogen of PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b] Adjusted odds ratio controlling for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, packyears smoking, alcohol consumption in the 1990's, and *Helicobacter pylori* IgG.

Table 3.2.4. Association of smoking factors (smoking status, age started smoking, cigarettes smoked per day, smoking duration (yrs), pack-years of smoking, and second hand smoking) and stomach cancer by atrophic gastritis status.

	Stomach Cancer								
	All			Without Atrophic Gastritis[a]			With Atrophic Gastritis[a]		
Effect	**Co/Ca**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**	**Co/Ca**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**	**Co/Ca**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**
(never/former/current) smoker									
Never	3432/692	1.00 (Ref)	1.00 (Ref)	3204/555	1.00 (Ref)	1.00 (Ref)	228/137	1.00 (Ref)	1.00 (Ref)
Former	549/249	**2.53 (2.09, 3.06)**	**2.48 (2.05. 2.99)**	520/202	**2.57 (2.09, 3.17)**	**2.51 (2.05, 3.09)**	29/47	**2.29 (1.30, 4.03)**	**2.03 (1.21, 3.41)**
Current	2388/676	**1.50 (1.31, 1.73)**	**1.49 (1.30, 1.71)**	2238/547	**1.58 (1.36, 1.84)**	**1.56 (1.35, 1.82)**	150/129	1.09 (0.75, 1.58)	1.05 (0.74, 1.50)
(ever/never) smoker									
Never	3432/692	1.00 (Ref)	1.00 (Ref)	3204/555	1.00 (Ref)	1.00 (Ref)	228/137	1.00 (Ref)	1.00 (Ref)
Ever	2937/925	**1.68 (1.47, 1.92)**	**1.67 (1.47, 1.90)**	2758/749	**1.76 (1.52, 2.03)**	**1.75 (1.51, 2.02)**	179/176	1.26 (0.88, 1.80)	1.24 (0.88, 1.75)
Age started smoking									
Never smoker	3432/692	1.00 (Ref)	1.00 (Ref)	3204/555	1.00 (Ref)	1.00 (Ref)	228/137	1.00 (Ref)	1.00 (Ref)
≥30	550/179	**1.65 (1.35, 2.01)**	**1.52 (1.25, 1.84)**	515/142	**1.67 (1.34, 2.08)**	**1.52 (1.23, 1.88)**	35/37	1.28 (0.73, 2.24)	1.20 (0.72, 2.00)
20-29	1459/451	**1.70 (1.46, 1.98)**	**1.55 (1.33, 1.79)**	1370/361	**1.77 (1.49, 2.10)**	**1.59 (1.35, 1.87)**	89/90	1.33 (0.88, 2.01)	1.24 (0.85, 1.82)
<20	657/197	**1.59 (1.30, 1.95)**	**1.45 (1.19, 1.77)**	618/165	**1.70 (1.37, 2.13)**	**1.53 (1.24, 1.90)**	39/32	1.10 (0.61, 1.98)	1.01 (0.60, 1.71)
missing	271/98	**p-trend<0.0001**			**p-trend<0.0001**			p-trend=0.3564	
Cigarettes smoked per day									
Never smoker	3432/692	1.00 (Ref)	1.00 (Ref)	3204/555	1.00 (Ref)	1.00 (Ref)	228/137	1.00 (Ref)	1.00 (Ref)
<20	1071/347	**1.75 (1.49, 2.06)**	**1.61 (1.38, 1.88)**	1005/277	**1.80 (1.50, 2.15)**	**1.62 (1.37, 1.92)**	66/70	1.42 (0.91, 2.23)	1.39 (0.93, 2.09)
20-29	1030/321	**1.66 (1.40, 1.97)**	**1.52 (1.29, 1.79)**	963/259	**1.73 (1.43, 2.09)**	**1.54 (1.29, 1.84)**	67/62	1.24 (0.78, 1.97)	1.22 (0.80, 1.85)
≥30	228/103	**2.35 (1.79, 3.08)**	**2.08 (1.60, 2.70)**	217/84	**2.44 (1.82, 3.28)**	**2.09 (1.58, 2.77)**	11/19	2.23 (0.96, 5.18)	1.82 (0.90, 3.68)
missing	608/154	**p-trend<0.0001**			**p-trend<0.0001**			p-trend=0.0960	
Years of smoking									
Never smoker	3432/692	1.00 (Ref)	1.00 (Ref)	3204/555	1.00 (Ref)	1.00 (Ref)	228/137	1.00 (Ref)	1.00 (Ref)

<30 years	605/179	**1.53 (1.25, 1.87)**	**1.38 (1.14, 1.68)**	572/144	**1.57 (1.26, 1.95)**	**1.41 (1.14, 1.74)**	33/35	1.13 (0.63, 2.03)	1.02 (0.60, 1.72)
30-49	1438/474	**1.74 (1.49, 2.03)**	**1.56 (1.35, 1.81)**	1348/386	**1.83 (1.55, 2.17)**	**1.62 (1.38, 1.90)**	90/88	1.28 (0.85, 1.94)	1.17 (0.80, 1.71)
≥50	591/162	**1.63 (1.31, 2.03)**	**1.46 (1.18, 1.81)**	551/129	**1.70 (1.33, 2.17)**	**1.49 (1.18, 1.89)**	40/33	1.23 (0.68, 2.23)	1.11 (0.65, 1.90)
missing	303/110	**p-trend<0.0001**			**p-trend<0.0001**			p-trend=0.2671	
Pack-years of smoking									
Never smoker	3432/692	1.00 (Ref)	1.00 (Ref)	3204/555	1.00 (Ref)	1.00 (Ref)	228/137	1.00 (Ref)	1.00 (Ref)
<20	689/212	**1.69 (1.40, 2.03)**	**1.66 (1.38, 2.00)**	649/176	**1.79 (1.46, 2.19)**	**1.75 (1.43, 2.14)**	40/36	1.20 (0.70, 2.06)	1.15 (0.70, 1.89)
20-39	1106/335	**1.50 (1.27, 1.76)**	**1.48 (1.26, 1.74)**	1035/271	**1.57 (1.31, 1.88)**	**1.54 (1.29, 1.84)**	71/64	1.18 (0.72, 1.74)	1.09 (0.72, 1.65)
≥40	1142/378	**1.94 (1.64, 2.30)**	**1.91 (1.62, 2.26)**	1074/302	**2.01 (1.67, 2.42)**	**1.97 (1.64, 2.37)**	68/76	1.51 (0.96, 2.39)	1.44 (0.93, 2.20)
		p-trend<0.0001			**p-trend<0.0001**			p-trend=0.1142	
ETS in nonsmokers									
no	2503/430	1.00 (Ref)	1.00 (Ref)	2328/340	1.00 (Ref)	1.00 (Ref)	175/90	1.00 (Ref)	1.00 (Ref)
yes	929/262	**1.58 (1.32, 1.91)**	**1.57 (1.31, 1.89)**	876/215	**1.61 (1.31, 1.97)**	**1.59 (1.30, 1.95)**	53/47	1.54 (0.94, 2.52)	1.47 (0.92, 2.34)
ETS overall[c]									
no	4029/855	1.00 (Ref)	1.00 (Ref)	3764/689	1.00 (Ref)	1.00 (Ref)	265/166	1.00 (Ref)	1.00 (Ref)
yes	2340/762	**1.45 (1.29, 1.62)**	**1.44 (1.28, 1.62)**	2198/615	**1.45 (1.27, 1.65)**	**1.44 (1.27, 1.64)**	142/147	**1.46 (1.06, 2.01)**	**1.43 (1.05, 1.96)**

Ca, Cases; Co, Controls

[a] Atrophic gastritis defined as having low serum pepsinogen of PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b]Adjusted odds ratio controlling for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, alcohol consumption in the 1990's, *Helicobacter pylori* IgG.

[c]Additionally adjusted for pack-years of smoking.

Table 3.2.5. Association of alcohol drinking factors and stomach cancer by atrophic gastritis status.

	Stomach Cancer								
	All			Without Atrophic Gastritis[a]			With Atrophic Gastritis[a]		
Effect	**Co/Ca**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**	**Co/Ca**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**	**Co/Ca**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**
(never/former/current) alcohol drinker									
Never	3464/793	1.00 (Ref)	1.00 (Ref)	3225/640	1.00 (Ref)	1.00 (Ref)	239/153	1.00 (Ref)	1.00 (Ref)
Former	496/164	**1.38 (1.12, 1.69)**	**1.37 (1.12, 1.68)**	463/130	**1.39 (1.11, 1.75)**	**1.38 (1.10, 1.73)**	33/34	1.27 (0.72, 2.22)	1.24 (0.74, 2.08)
Current	2368/653	**1.20 (1.05, 1.38)**	**1.20 (1.05, 1.38)**	2238/528	**1.24 (1.07, 1.44)**	**1.24 (1.06, 1.44)**	130/125	1.10 (0.76, 1.60)	1.10 (0.77, 1.57)
missing	41/7			36/6			5/1		
(ever/never) drinker									
Never	3464/793	1.00 (Ref)	1.00 (Ref)	3225/640	1.00 (Ref)	1.00 (Ref)	239/153	1.00 (Ref)	1.00 (Ref)
Ever	2905/824	**1.22 (1.07, 1.39)**	**1.22 (1.07, 1.39)**	2737/664	**1.25 (1.09, 1.45)**	**1.25 (1.09, 1.44)**	168/160	1.10 (0.78, 1.56)	1.10 (0.78, 1.54)
Drinking frequency									
Never	3464/793	1.00 (Ref)	1.00 (Ref)	3225/640	1.00 (Ref)	1.00 (Ref)	239/153	1.00 (Ref)	1.00 (Ref)
Occasional	1134/314	**1.21 (1.03, 1.42)**	**1.21 (1.03, 1.41)**	1061/257	**1.27 (1.07, 1.51)**	**1.26 (1.06, 1.50)**	73/57	0.98 (0.63, 1.53)	0.98 (0.64, 1.48)
Often	755/263	**1.42 (1.19, 1.70)**	**1.41 (1.18, 1.68)**	702/207	**1.44 (1.18, 1.75)**	**1.43 (1.17, 1.73)**	53/56	1.22 (0.76, 1.96)	1.19 (0.77, 1.85)
Almost everyday	1016/247	1.04 (0.87, 1.26)	1.04 (0.87, 1.25)	974/200	1.06 (0.87, 1.30)	1.06 (0.86, 1.29)	42/47	1.19 (0.70, 2.01)	1.15 (0.71, 1.89)
		p-trend=0.0954			p-trend=0.1001			p-trend=0.3960	
Frequent drinker?									
Never or occasional	4598/1107	1.00 (Ref)	1.00 (Ref)	4286/897	1.00 (Ref)	1.00 (Ref)	312/210	1.00 (Ref)	1.00 (Ref)
Often or everyday	1771/510	1.14 (0.99, 1.30)	1.13 (0.99. 1.30)	1676/407	1.13 (0.97, 1.31)	1.13 (0.97, 1.31)	95/103	1.21 (0.84, 1.76)	1.20 (0.84, 1.72)
Age started drinking									
Never drinker	3464/793	1.00 (Ref)	1.00 (Ref)	3225/640	1.00 (Ref)	1.00 (Ref)	239/153	1.00 (Ref)	1.00 (Ref)
≥35	565/137	1.10 (0.88, 1.36)	1.09 (0.88, 1.35)	534/119	1.19 (0.94, 1.50)	1.19 (0.94, 1.49)	31/18	0.68 (0.35, 1.31)	0.71 (0.39, 1.28)
25-34	1042/291	**1.24 (1.05, 1.47)**	**1.24 (1.05, 1.46)**	989/232	**1.26 (1.04, 1.51)**	**1.26 (1.04, 1.51)**	53/59	1.25 (0.78, 2.00)	1.22 (0.79, 1.90)
<25	1239/387	**1.33 (1.13, 1.55)**	**1.32 (1.13, 1.55)**	1160/307	**1.35 (1.13, 1.61)**	**1.35 (1.13, 1.60)**	79/80	1.23 (0.81, 1.89)	1.21 (0.81, 1.81)

missing	59/9	**p-trend=0.0002**		54/6	**p-trend=0.0005**		5/3	p-trend=0.2421	
Years of drinking									
Never drinker	3464/793	1.00 (Ref)	1.00 (Ref)	3225/640	1.00 (Ref)	1.00 (Ref)	239/153	1.00 (Ref)	1.00 (Ref)
<20	382/94	1.08 (0.84, 1.40)	1.04 (0.81, 1.33)	364/80	1.16 (0.88, 1.52)	1.10 (0.84, 1.44)	18/14	0.76 (0.35, 1.66)	0.82 (0.42, 1.60)
20-29	610/155	1.12 (0.91, 1.38)	1.07 (0.87, 1.32)	575/128	1.18 (0.94, 1.49)	1.12 (0.90, 1.41)	35/27	0.82 (0.45, 1.48)	0.84 (0.49, 1.45)
30	1838/541	**1.27 (1.09, 1.46)**	**1.22 (1.05, 1.40)**	1733/426	**1.26 (1.08, 1.49)**	**1.20 (1.03, 1.41)**	105/115	1.36 (0.92, 2.02)	1.37 (0.95, 1.99)
missing	75/34	**p-trend=0.0017**		65/30	**p-trend=0.0042**		10/4	p-trend=0.1579	
Weekly ethanol intake one year ago (g/week)									
Never drinker	4188/1090	1.00 (Ref)	1.00 (Ref)	3898/876	1.00 (Ref)	1.00 (Ref)	290/214	1.00 (Ref)	1.00 (Ref)
<500	1108/251	**0.79 (0.67, 0.93)**	**0.79 (0.67, 0.93)**	1046/203	0.81 (0.67, 0.97)	0.81 (0.68, 0.97)	62/48	0.77 (0.49, 1.21)	0.80 (0.52, 1.22)
≥500	993/251	**0.84 (0.70, 1.00)**	**0.84 (0.71, 1.00)**	946/205	0.87 (0.72, 1.05)	0.87 (0.72, 1.05)	47/46	0.80 (0.49, 1.31)	0.83 (0.52, 1.32)
missing	80/25	**p-trend=0.0122**		72/20	**p-trend=0.0594**		8/5	p-trend=0.2716	
Weekly ethanol intake in the 1990's (g/week)									
Never drinker	3464/793	1.00 (Ref)	1.00 (Ref)	3225/640	1.00 (Ref)	1.00 (Ref)	239/153	1.00 (Ref)	1.00 (Ref)
<500	1574/427	**1.19 (1.03, 1.38)**	**1.19 (1.03, 1.38)**	1473/341	**1.22 (1.04, 1.43)**	**1.21 (1.03, 1.42)**	101/86	1.09 (0.74, 1.61)	1.08 (0.74, 1.56)
≥500	1331/397	**1.26 (1.07, 1.48)**	**1.26 (1.07, 1.48)**	1264/323	**1.31 (1.10, 1.57)**	**1.31 (1.09, 1.56)**	67/74	1.13 (0.72, 1.77)	1.12 (0.73, 1.71)
		p-trend=0.0032			**p-trend=0.0018**			p-trend=0.5668	

Ca, Cases; Co, Controls

[a] Atrophic gastritis defined as having low serum pepsinogen of PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b]Adjusted odds ratio controlling for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, pack-years smoking, *Helicobacter pylori* IgG.

Table 3.2.6. Association of tea drinking factors and stomach cancer by atrophic gastritis.

	Stomach Cancer								
	All			Without Atrophic Gastritis[a]			With Atrophic Gastritis[a]		
Effect	**Co/Ca**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**	**Co/Ca**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**	**Co/Ca**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**
(never/former/current) tea drinker									
Never	4933/1273	1.00 (Ref)	1.00 (Ref)	4595/1029	1.00 (Ref)	1.00 (Ref)	338/244	1.00 (Ref)	1.00 (Ref)
Former	109/71	**2.22 (1.61, 3.07)**	**2.14 (1.56, 2.93)**	101/58	**2.31 (1.63, 3.28)**	**2.20 (1.56, 3.09)**	8/13	1.64 (0.63, 4.27)	1.41 (0.65, 3.07)
Current	1327/273	**0.74 (0.63, 0.87)**	**0.74 (0.64, 0.87)**	1266/217	**0.73 (0.61, 0.87)**	**0.73 (0.61, 0.87)**	61/56	0.87 (0.56, 1.36)	0.87 (0.57, 1.33)
		p-trend=0.0015			**p-trend=0.0019**			p-trend=0.6152	
Ever tea drinker									
Never	4933/1273	1.00 (Ref)	1.00 (Ref)	4595/1029	1.00 (Ref)	1.00 (Ref)	338/244	1.00 (Ref)	1.00 (Ref)
Ever	1436/344	0.86 (0.74, 1.00)	0.86 (0.74, 1.00)	1367/275	0.85 (0.72, 1.00)	0.85 (0.72, 1.00)	69/69	0.95 (0.63, 1.45)	0.96 (0.64, 1.43)
Favors green tea?									
No	5270/1354	1.00 (Ref)	1.00 (Ref)	4913/1096	1.00 (Ref)	1.00 (Ref)	357/258	1.00 (Ref)	1.00 (Ref)
Yes	1087/259	0.89 (0.75, 1.05)	0.89 (0.76, 1.05)	1037/204	0.86 (0.72, 1.03)	0.86 (0.72, 1.03)	50/55	1.07 (0.66, 1.72)	1.06 (0.68, 1.66)
missing	12/4			12/4					
Years of tea drinking									
Never drinks tea	4933/1273	1.00 (Ref)	1.00 (Ref)	4595/1029	1.00 (Ref)	1.00 (Ref)	338/244	1.00 (Ref)	1.00 (Ref)
<20	437/88	**0.71 (0.56, 0.92)**	**0.72 (0.56, 0.92)**	419/69	**0.68 (0.51, 0.90)**	**0.69 (0.52, 0.90)**	18/19	1.06 (0.52, 2.14)	1.05 (0.56, 1.96)
20-34	541/134	0.91 (0.74, 1.13)	0.91 (0.74, 1.13)	511/102	0.87 (0.68, 1.11)	0.88 (0.69, 1.11)	30/32	0.95 (0.54, 1.69)	0.96 (0.57, 1.63)
≥35	449/120	0.96 (0.76, 1.21)	0.96 (0.77, 1.21)	428/102	1.02 (0.79, 1.31)	1.02 (0.80, 1.30)	21/18	0.85 (0.42, 1.74)	0.88 (0.47, 1.66)
missing	9/2	p-trend=0.3317		9/2	p-trend=0.4520			p-trend=0.7013	
Amount of tea consumed per day (cups/day)									
Never drinks tea	4933/1273	1.00 (Ref)	1.00 (Ref)	4595/1029	1.00 (Ref)	1.00 (Ref)	338/244	1.00 (Ref)	1.00 (Ref)
1 cup/day	507/111	**0.80 (0.64, 1.00)**	0.80 (0.64, 1.01)	486/89	**0.77 (0.60, 0.99)**	**0.78 (0.61, 0.99)**	21/22	1.14 (0.59, 2.19)	1.12 (0.62, 2.02)
2 cups/day	586/152	0.91 (0.74, 1.12)	0.92 (0.75, 1.13)	556/121	0.91 (0.72, 1.14)	0.91 (0.73, 1.14)	30/31	0.94 (0.53, 1.68)	0.95 (0.56, 1.62)
3 or more	325/78	0.88 (0.67, 1.16)	0.89 (0.68, 1.17)	309/62	0.88 (0.65, 1.19)	0.89 (0.66, 1.19)	16/16	0.88 (0.41, 1.88)	0.91 (0.46, 1.76)

cups/day									
missing	18/3	p-trend=0.1586		16/3	p-trend=0.1687		2/0	p-trend=0.7658	
Preferred tea concentration									
Never drinks tea	4933/1273	1.00 (Ref)	1.00 (Ref)	4595/1029	1.00 (Ref)	1.00 (Ref)	338/244	1.00 (Ref)	1.00 (Ref)
Light	286/63	0.81 (0.60, 1.08)	0.82 (0.62, 1.09)	273/47	0.74 (0.53, 1.02)	0.75 (0.55, 1.03)	13/16	1.07 (0.49, 2.34)	1.05 (0.53, 2.08)
Medium	756/165	**0.82 (0.67, 0.99)**	**0.82 (0.68, 1.00)**	717/130	0.81 (0.65, 1.00)	0.81 (0.66, 1.00)	39/35	0.89 (0.52, 1.51)	0.90 (0.55, 1.47)
Strong	384/116	1.01 (0.80, 1.28)	1.01 (0.80, 1.28)	368/98	1.04 (0.81, 1.34)	1.04 (0.81, 1.34)	16/18	1.08 (0.52, 2.26)	1.06 (0.56, 2.04)
missing	10/0	p-trend=0.2311		9/0	p-trend=0.3148		1/0	p-trend=0.9063	
Prefers strong tea									
No	5975/1501	1.00 (Ref)	1.00 (Ref)	5585/1206	1.00 (Ref)	1.00 (Ref)	390/295	1.00 (Ref)	1.00 (Ref)
Yes	384/116	1.07 (0.85, 1.35)	1.07 (0.85, 1.34)	368/98	1.11 (0.87, 1.43)	1.11 (0.87, 1.42)	16/18	1.10 (0.53, 2.27)	1.08 (0.57, 2.05)
missing	10/0			9/0			1/0		

Ca, Cases; Co, Controls

[a] Atrophic gastritis defined as having low serum pepsinogen of PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b]Adjusted odds ratio controlling for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, pack-years smoking, alcohol consumption in the 1990's, *Helicobacter pylori* IgG.

Table 3.2.7. Association of green tea drinking factors and stomach cancer by atrophic gastritis.

	Stomach cancer								
	All			Without Atrophic Gastritis[a]			With Atrophic Gastritis[a]		
Effect	**Co/Ca**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**	**Co/Ca**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**	**Co/Ca**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**
(never/former/current) green tea drinker									
Never	5270/1354	1.00 (Ref)	1.00 (Ref)	4913/1096	1.00 (Ref)	1.00 (Ref)	357/258	1.00 (Ref)	1.00 (Ref)
Former	77/55	**2.49 (1.72, 3.61)**	**2.34 (1.63, 3.36)**	70/43	**2.50 (1.66, 3.75)**	**2.32 (1.57, 3.44)**	7/12	1.76 (0.65, 4.78)	1.46 (0.65, 3.25)
Current	1010/204	**0.76 (0.63, 0.91)**	**0.76 (0.64, 0.91)**	967/161	**0.73 (0.60, 0.89)**	**0.73 (0.60, 0.89)**	43/43	0.96 (0.57, 1.60)	0.95 (0.59, 1.54)
missing	12/4			12/4					
Favors green tea?									
No	5270/1354	1.00 (Ref)	1.00 (Ref)	4913/1096	1.00 (Ref)	1.00 (Ref)	357/258	1.00 (Ref)	1.00 (Ref)
Yes	1087/259	0.89 (0.75, 1.05)	0.89 (0.76, 1.05)	1037/204	0.86 (0.71, 1.03)	0.86 (0.72, 1.03)	50/55	1.07 (0.66, 1.72)	1.06 (0.68, 1.66)
missing	12/4			12/4					
Years of green tea drinking									
Never drinks tea	5270/1354	1.00 (Ref)	1.00 (Ref)	4913/1096	1.00 (Ref)	1.00 (Ref)	357/258	1.00 (Ref)	1.00 (Ref)
<20	312/62	**0.72 (0.54, 0.96)**	**0.73 (0.55, 0.97)**	300/48	**0.68 (0.49, 0.94)**	**0.69 (0.50, 0.94)**	12/14	1.06 (0.46, 2.43)	1.04 (0.51, 2.12)
20-34	437/99	0.87 (0.68, 1.11)	0.87 (0.69, 1.11)	416/73	0.79 (0.60, 1.04)	0.80 (0.61, 1.05)	21/26	1.15 (0.60, 2.21)	1.12 (0.62, 2.02)
≥35	337/98	1.10 (0.85, 1.42)	1.10 (0.85, 1.41)	320/83	1.15 (0.87, 1.52)	1.15 (0.87, 1.50)	17/15	0.96 (0.44, 2.10)	0.97 (0.49, 1.90)
missing	13/4	p-trend=0.7419		13/4	p-trend=0.6794			p-trend=0.8657	
Amount of green tea consumed per day (cups/day)									
Never drinks tea	5270/1354	1.00 (Ref)	1.00 (Ref)	4913/1096	1.00 (Ref)	1.00 (Ref)	357/258	1.00 (Ref)	1.00 (Ref)
1 cup/day	360/84	0.86 (0.67, 1.12)	0.87 (0.68, 1.12)	346/66	0.81 (0.61, 1.08)	0.82 (0.62, 1.08)	14/18	1.39 (0.65, 2.96)	1.30 (0.67, 2.50)
2 cups/day	463/116	0.92 (0.73, 1.16)	0.93 (0.74, 1.16)	442/91	0.89 (0.69, 1.15)	0.90 (0.70, 1.16)	21/25	1.07 (0.55, 2.09)	1.06 (0.58, 1.92)
3 or more cups/day	256/58	0.88 (0.65, 1.20)	0.89 (0.66, 1.20)	243/46	0.87 (0.61, 1.22)	0.88 (0.63, 1.22)	13/12	0.89 (0.37, 2.11)	0.91 (0.44, 1.89)
missing	20/5	p-trend=0.2516		18/5	p-trend=0.1823		2/0	p-trend=0.9443	
Preferred green tea concentration									

Never drinks tea	5270/1354	1.00 (Ref)	1.00 (Ref)	4913/1096	1.00 (Ref)	1.00 (Ref)	357/258	1.00 (Ref)	1.00 (Ref)
Light	226/51	0.86 (0.62, 1.18)	0.86 (0.63, 1.18)	216/39	0.79 (0.55, 1.14)	0.81 (0.57, 1.14)	10/12	1.07 (0.44, 2.62)	1.04 (0.49, 2.20)
Medium	584/124	0.83 (0.66, 1.03)	0.83 (0.67, 1.03)	555/96	0.80 (0.62, 1.01)	0.80 (0.63, 1.02)	29/28	0.93 (0.51, 1.70)	0.93 (0.54, 1.61)
Strong	272/84	1.06 (0.81, 1.39)	1.06 (0.81, 1.39)	262/69	1.04 (0.78, 1.40)	1.04 (0.78, 1.39)	10/15	1.61 (0.67, 3.84)	1.41 (0.68, 2.93)
missing	17/4	p-trend=0.4265		16/4	p-trend=0.3176		1/0	p-trend=0.5530	
Prefers strong green tea									
No	6080/1529	1.00 (Ref)	1.00 (Ref)	5684/1231	1.00 (Ref)	1.00 (Ref)	396/298	1.00 (Ref)	1.00 (Ref)
Yes	272/84	1.11 (0.85, 1.45)	1.11 (0.85, 1.44)	262/69	1.10 (0.82, 1.47)	1.10 (0.83, 1.46)	10/15	1.62 (0.69, 3.82)	1.42 (0.69, 2.93)
missing	17/4			16/4			1/0		

Ca, Cases; Co, Controls

[a] Atrophic gastritis defined as having low serum pepsinogen of PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b]Adjusted odds ratio controlling for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, pack-years smoking, alcohol consumption in the 1990's, *Helicobacter pylori* IgG.

Table 3.2.8. Association of dietary habits and stomach cancer by atrophic gastritis.

	Stomach Cancer								
	All			Without Atrophic Gastritis[a]			With Atrophic Gastritis[a]		
Effect	**Co/Ca**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**	**Co/Ca**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**	**Co/Ca**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**
Uses fridge?									
No	5664/1437	1.00 (Ref)	1.00 (Ref)	5303/1155	1.00 (Ref)	1.00 (Ref)	359/282	1.00 (Ref)	1.00 (Ref)
Yes	643/165	1.01 (0.84, 1.21)	0.95 (0.79, 1.15)	599/136	0.97 (0.79, 1.20)	0.97 (0.79, 1.20)	44/29	0.73 (0.43, 1.24)	0.76 (0.47, 1.25)
missing	62/15			58/13			4/2		
Do you eat salty food?									
not/not very	4405/982	1.00 (Ref)	1.00 (Ref)	4103/789	1.00 (Ref)	1.00 (Ref)	302/193	1.00 (Ref)	1.00 (Ref)
more/very	1954/633	**1.45 (1.30, 1.63)**	**1.35 (1.20, 1.51)**	1849/515	**1.33 (1.17, 1.51)**	**1.33 (1.17, 1.51)**	105/118	**1.61 (1.15, 2.25)**	**1.57 (1.14, 2.17)**
missing	10/2			10/0			0/2		
Monthly consumption of salt per capita (g/month)									
<180	2292/599	1.00 (Ref)	1.00 (Ref)	2114/492	1.00 (Ref)	1.00 (Ref)	178/107	1.00 (Ref)	1.00 (Ref)
180-270	2402/547	**0.87 (0.77, 0.99)**	0.93 (0.81, 1.07)	2261/443	0.89 (0.77, 1.04)	0.90 (0.77, 1.04)	141/104	1.27 (0.88, 1.84)	1.23 (0.87, 1.75)
≥270	1675/471	1.08 (0.94, 1.23)	1.14 (0.98, 1.32)	1587/369	1.05 (0.89, 1.24)	1.05 (0.89, 1.24)	88/102	**1.77 (1.16, 2.70)**	**1.68 (1.13, 2.50)**
		p-trend=0.1286			p-trend=0.6628			**p-trend=0.0080**	
Do you like spicy food?									
not/not very	4516/1016	1.00 (Ref)	1.00 (Ref)	4215/817	1.00 (Ref)	1.00 (Ref)	301/199	1.00 (Ref)	1.00 (Ref)
more/very	1838/590	**1.43 (1.27, 1.60)**	**1.38 (1.23, 1.56)**	1733/479	**1.39 (1.21, 1.58)**	**1.38 (1.21, 1.58)**	105/111	**1.50 (1.07, 2.11)**	**1.47 (1.05, 2.04)**
missing	15/11			14/8			1/3		
Do you like acidic food?									
not/not very	5528/1406	1.00 (Ref)	1.00 (Ref)	5165/1128	1.00 (Ref)	1.00 (Ref)	363/278	1.00 (Ref)	1.00 (Ref)
more/very	824/196	0.94 (0.79, 1.11)	0.88 (0.75, 1.05)	780/164	0.90 (0.75, 1.08)	0.90 (0.75, 1.08)	44/32	0.96 (0.58, 1.59)	0.97 (0.60, 1.55)
missing	17/15			17/12			0/3		

Do you eat hot (high temperature) food?									
not/not very	3644/753	1.00 (Ref)	1.00 (Ref)	3404/608	1.00 (Ref)	1.00 (Ref)	240/145	1.00 (Ref)	1.00 (Ref)
more/very	2716/862	**1.54 (1.38, 1.71)**	**1.51 (1.35, 1.69)**	2549/695	**1.50 (1.32, 1.69)**	**1.49 (1.32, 1.69)**	167/167	**1.70 (1.24, 2.32)**	**1.66 (1.22, 2.24)**
missing	9/2			9/1			0/1		
Eating speed									
Slow	1054/190	1.00 (Ref)	1.00 (Ref)	982/144	1.00 (Ref)	1.00 (Ref)	72/46	1.00 (Ref)	1.00 (Ref)
Moderate	4093/918	**1.24 (1.05, 1.48)**	**1.22 (1.03, 1.45)**	3832/747	**1.33 (1.09, 1.62)**	**1.33 (1.09, 1.61)**	261/171	0.94 (0.61, 1.45)	0.90 (0.60, 1.35)
Fast	1211/508	**2.33 (1.93, 2.80)**	**2.22 (1.83, 2.68)**	1137/413	**2.42 (1.94, 3.00)**	**2.40 (1.94, 2.97)**	74/95	1.53 (0.91, 2.55)	1.44 (0.90, 2.30)
missing	11/1	**p-trend<0.0001**		11/0	**p-trend<0.0001**		0/1	p-trend=0.0631	
Do you often take supplements?									
No	5981/1495	1.00 (Ref)	1.00 (Ref)	5610/1210	1.00 (Ref)	1.00 (Ref)	371/285	1.00 (Ref)	1.00 (Ref)
Yes	276/88	1.28 (1.00, 1.63)	1.23 (0.95, 1.57)	250/66	1.17 (0.87, 1.55)	1.16 (0.87, 1.53)	26/22	1.22 (0.66, 2.27)	1.18 (0.67, 2.08)
missing	112/34			102/28			10/6		
Do you often take vitamins?									
No	6138/1538	1.00 (Ref)	1.00 (Ref)	5753/1241	1.00 (Ref)	1.00 (Ref)	385/297	1.00 (Ref)	1.00 (Ref)
Yes	104/30	1.15 (0.76, 1.74)	1.08 (0.72, 1.61)	93/21	0.94 (0.57, 1.53)	0.94 (0.59, 1.49)	11/9	1.21 (0.48, 3.04)	1.14 (0.53, 2.46)
missing	127/49			116/42			11/7		
Weekly consumption of raw garlic									
Never	2959/874	1.00 (Ref)	1.00 (Ref)	2780/718	1.00 (Ref)	1.00 (Ref)	179/156	1.00 (Ref)	1.00 (Ref)
less than twice	2451/595	0.82 (0.73, 0.92)	0.95 (0.83, 1.09)	2296/464	0.90 (0.77, 1.04)	0.91 (0.78, 1.05)	155/131	1.13 (0.77, 1.64)	1.15 (0.80, 1.64)
twice or more	933/144	0.52 (0.43, 0.63)	**0.60 (0.48, 0.74)**	861/119	**0.61 (0.48, 0.77)**	**0.62 (0.49, 0.77)**	72/25	**0.52 (0.29, 0.93)**	**0.57 (0.34, 0.97)**
missing	26/4	p-trend<0.0001		25/3	**p-trend=0.0001**		1/1	p-trend=0.1189	
Do you consume raw garlic?									
No	2959/874	1.00 (Ref)	1.00 (Ref)	2780/718	1.00 (Ref)	1.00 (Ref)	179/156	1.00 (Ref)	1.00 (Ref)
Yes	3384/739	**0.74 (0.66, 0.83)**	**0.87 (0.76, 0.99)**	3157/583	**0.83 (0.72, 0.97)**	**0.84 (0.72, 0.97)**	227/156	0.98 (0.68, 1.42)	0.99 (0.69, 1.40)
missing	26/4			25/3			1/1		

Ginger consumption (times/week) [c]									
never	1559/510	1.00 (Ref)	1.00 (Ref)	1476/404	1.00 (Ref)	1.00 (Ref)	83/106	1.00 (Ref)	1.00 (Ref)
1-2times	1162/271	**0.74 (0.62, 0.88)**	**0.73 (0.62, 0.87)**	1114/221	**0.77 (0.63, 0.92)**	**0.78 (0.63, 0.91)**	48/50	**0.74 (0.45, 1.23)**	0.82 (0.51, 1.31)
3-4times	576/136	**0.68 (0.55, 0.85)**	**0.68 (0.54, 0.84)**	537/118	**0.76 (0.60, 0.97)**	**0.75 (0.60, 0.95)**	39/18	**0.33 (0.17, 0.65)**	**0.45 (0.25, 0.81)**
5times+	1072/263	**0.70 (0.59, 0.84)**	**0.70 (0.59, 0.83)**	1011/209	**0.71 (0.59, 0.86)**	**0.71 (0.58, 0.85)**	61/54	**0.63 (0.39, 1.02)**	0.72 (0.46, 1.13)
		p-trend<0.0001			**p-trend=0.0005**			**p-trend=0.0168**	
Do you drink unboiled water?									
Never	2805/637	1.00 (Ref)	1.00 (Ref)	2627/494	1.00 (Ref)	1.00 (Ref)	178/143	1.00 (Ref)	1.00 (Ref)
Seldom	1664/480	**1.27 (1.11, 1.45)**	**1.26 (1.10, 1.44)**	1557/398	**1.32 (1.14, 1.54)**	**1.34 (1.15, 1.55)**	107/82	0.91 (0.62, 1.33)	0.95 (0.66, 1.36)
Frequently	718/194	1.19 (0.99, 1.43)	1.15 (0.95, 1.39)	687/160	1.16 (0.94, 1.43)	1.19 (0.97, 1.46)	31/34	1.00 (0.56, 1.79)	1.06 (0.62, 1.79)
At childhood, but not now	1022/276	**1.19 (1.02, 1.39)**	**1.19 (1.02, 1.40)**	943/228	**1.27 (1.06, 1.52)**	**1.28 (1.08, 1.53)**	79/48	0.77 (0.50, 1.20)	0.82 (0.55, 1.24)
missing	160/30			148/24			12/6		
Did you ever drink unboiled water?									
No	2805/637	1.00 (Ref)	1.00 (Ref)	2627/494	1.00 (Ref)	1.00 (Ref)	178/143	1.00 (Ref)	1.00 (Ref)
Yes	3404/950	**1.23 (1.10, 1.38)**	**1.19 (1.06, 1.34)**	3187/786	**1.28 (1.12, 1.45)**	**1.27 (1.12, 1.45)**	217/164	0.88 (0.64, 1.20)	0.88 (0.65, 1.20)
missing	160/30			148/24			12/6		
Frequency of barbecued meat consumption (#/week)									
Never	5919/1513	1.00 (Ref)	1.00 (Ref)	5532/1219	1.00 (Ref)	1.00 (Ref)	387/294	1.00 (Ref)	1.00 (Ref)
once or more	427/98	0.93 (0.74, 1.18)	0.94 (0.74, 1.18)	408/81	0.93 (0.72, 1.19)	0.93 (0.72, 1.19)	19/17	1.48 (0.74, 2.97)	1.37 (0.73, 2.55)
missing	23/6			22/4			1/2		
Frequency of fried meat consumption (#/week)									
Never	799/150	1.00 (Ref)	1.00 (Ref)	752/128	1.00 (Ref)	1.00 (Ref)	47/22	1.00 (Ref)	1.00 (Ref)
less than twice	4204/1105	**1.40 (1.16, 1.69)**	**1.46 (1.21, 1.76)**	3953/893	**1.38 (1.12, 1.70)**	**1.41 (1.15, 1.72)**	251/212	1.59 (0.90, 2.79)	1.44 (0.88, 2.35)
twice or more	1345/359	**1.42 (1.15, 1.75)**	**1.26 (1.02, 1.56)**	1237/281	1.18 (0.93, 1.49)	1.20 (0.96, 1.51)	108/78	1.37 (0.74, 2.52)	1.23 (0.73, 2.09)
missing	21/3	p-trend=0.3023		20/2	p-trend=0.5709		1/1	p-trend=0.6887	

Frequency of boiled meat consumption (#/week)									
Never	3342/733	1.00 (Ref)	1.00 (Ref)	3136/584	1.00 (Ref)	1.00 (Ref)	206/149	1.00 (Ref)	1.00 (Ref)
less than twice	2607/733	**1.28 (1.14, 1.44)**	1.04 (0.91, 1.18)	2433/600	1.05 (0.91, 1.21)	1.07 (0.93, 1.23)	174/133	0.91 (0.63, 1.32)	0.91 (0.64, 1.29)
twice or more	392/145	**1.69 (1.37, 2.07)**	1.11 (0.89, 1.39)	366/115	1.10 (0.86, 1.41)	1.12 (0.88, 1.43)	26/30	1.23 (0.65, 2.34)	1.18 (0.66, 2.11)
missing	28/6	p-trend=0.4953		27/5	p-trend=0.3919		1/1	p-trend=0.8475	

Ca, Cases; Co, Controls

[a] Atrophic gastritis defined as having low serum pepsinogen of PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b]Adjusted odds ratio controlling for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, pack-years smoking, alcohol consumption in the 1990's, *Helicobacter pylori* IgG.

[c]Adjusted odds ratio and semi-bayes adjusted odds ratio adjusted for daily caloric intake in addition to above. Tongshan county excluded.

Table 3.2.9. Association of food consumption (grams) from the FFQ and stomach cancer.

	Stomach Cancer								
	All			Without Atrophic Gastritis[a]			With Atrophic Gastritis[a]		
Effect	**Co/Ca**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**	**Co/Ca**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**	**Co/Ca**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**
Monthly intake of vegetables									
continuous per 1000		1.02 (0.96, 1.08)			1.03 (0.97, 1.10)			0.89 (0.74, 1.08)	
Q1	1042/264	1.00 (Ref)	1.00 (Ref)	992/215	1.00 (Ref)	1.00 (Ref)	50/49	1.00 (Ref)	1.00 (Ref)
Q2	1042/300	**1.23 (1.01, 1.50)**	**1.21 (1.00, 1.46)**	978/236	1.23 (0.99, 1.53)	1.22 (0.99, 1.50)	64/64	1.06 (0.61, 1.86)	0.97 (0.57, 1.64)
Q3	1042/278	1.21 (0.99, 1.48)	1.18 (0.98, 1.43)	993/226	1.23 (0.98, 1.53)	1.21 (0.98, 1.49)	49/52	1.08 (0.59, 1.97)	0.98 (0.55, 1.73)
Q4	1042/291	**1.26 (1.03, 1.55)**	**1.22 (1.01, 1.48)**	983/240	**1.32 (1.06, 1.65)**	**1.29 (1.05, 1.59)**	59/51	0.90 (0.50, 1.60)	0.81 (0.47, 1.41)
		p-trend=0.0397			**p-trend=0.0197**			p-trend=0.7072	
Monthly intake of fruit									
continuous		1.01 (0.95, 1.08)			1.01 (0.94, 1.08)			1.04 (0.87, 1.24)	
Q1	1042/322	1.00 (Ref)	1.00 (Ref)	979/265	1.00 (Ref)	1.00 (Ref)	63/57	1.00 (Ref)	1.00 (Ref)
Q2	1042/273	0.97 (0.80, 1.18)	0.98 (0.81, 1.19)	987/221	0.94 (0.76, 1.17)	0.97 (0.79, 1.19)	55/52	1.09 (0.62, 1.93)	0.98 (0.57, 1.69)
Q3	1042/276	1.06 (0.86, 1.29)	1.06 (0.88, 1.29)	992/220	1.01 (0.81, 1.26)	1.04 (0.84, 1.28)	50/56	1.31 (0.72, 2.36)	1.17 (0.67, 2.04)
Q4	1042/262	1.02 (0.84, 1.24)	1.02 (0.84, 1.23)	988/211	0.99 (0.80, 1.23)	1.01 (0.82, 1.24)	54/51	1.06 (0.61, 1.87)	0.96 (0.56, 1.63)
		p-trend=0.6635			p-trend=0.8916			p-trend=0.7036	
Monthly intake of pickled food									
continuous		**1.07 (1.01, 1.14)**			**1.07 (1.00, 1.15)**			1.13 (0.95, 1.35)	
Q1	1042/290	1.00 (Ref)	1.00 (Ref)	980/231	1.00 (Ref)	1.00 (Ref)	62/59	1.00 (Ref)	1.00 (Ref)
Q2	1042/274	1.03 (0.84, 1.27)	1.04 (0.86, 1.27)	977/221	1.06 (0.85, 1.33)	1.08 (0.87, 1.34)	65/53	0.83 (0.47, 1.46)	0.75 (0.44, 1.29)
Q3	1042/242	0.96 (0.78, 1.18)	0.96 (0.79, 1.17)	1000/193	0.94 (0.75, 1.19)	0.95 (0.77, 1.19)	42/49	1.38 (0.74, 2.58)	1.21 (0.67, 2.20)
Q4	1042/327	**1.25 (1.03, 1.52)**	**1.26 (1.05, 1.51)**	989/272	**1.29 (1.04, 1.59)**	**1.31 (1.07, 1.60)**	54/55	1.29 (0.74, 2.25)	1.16 (0.68, 1.97)
		p-trend=0.0354			**p-trend=0.0373**			p-trend=0.1778	
Monthly intake of fried food									
continuous		1.04 (0.97, 1.12)			1.02 (0.94, 1.10)			1.10 (0.90, 1.34)	
Q1	1042/297	1.00 (Ref)	1.00 (Ref)	986/248	1.00 (Ref)	1.00 (Ref)	56/49	1.00 (Ref)	1.00 (Ref)
Q2	1042/298	1.18 (0.96, 1.46)	1.17 (0.96, 1.42)	992/247	1.16 (0.92, 1.45)	1.17 (0.94, 1.44)	50/51	1.17 (0.62, 2.22)	1.02 (0.57, 1.83)
Q3	1042/271	1.22 (0.96, 1.55)	1.19 (0.96, 1.48)	984/219	1.19 (0.92, 1.54)	1.19 (0.94, 1.51)	58/52	1.19 (0.59, 2.42)	0.99 (0.53, 1.86)

Q4	1042/267	1.16 (0.93, 1.46)	1.13 (0.92, 1.38)	984/203	1.07 (0.84, 1.38)	1.06 (0.84, 1.34)	58/64	1.35 (0.72, 2.53)	1.15 (0.65, 2.02)
		p-trend=0.2598			p-trend=0.6782			p-trend=0.3707	
Monthly intake of meat									
continuous		**1.07 (1.00, 1.14)**			1.06 (0.99, 1.14)			1.13 (0.94, 1.35)	
Q1	1042/263	1.00 (Ref)	1.00 (Ref)	990/208	1.00 (Ref)	1.00 (Ref)	52/55	1.00 (Ref)	1.00 (Ref)
Q2	1042/262	1.03 (0.84, 1.27)	1.04 (0.85, 1.26)	987/222	1.13 (0.91, 1.41)	1.14 (0.92, 1.41)	55/40	0.68 (0.37, 1.25)	0.63 (0.36, 1.13)
Q3	1042/260	0.99 (0.80, 1.22)	0.99 (0.81, 1.21)	984/214	1.06 (0.84, 1.33)	1.06 (0.86, 1.32)	58/46	0.76 (0.42, 1.39)	0.70 (0.40, 1.23)
Q4	1042/348	**1.24 (1.02, 1.52)**	**1.24 (1.03, 1.50)**	985/273	1.24 (0.99, 1.55)	**1.25 (1.01, 1.54)**	57/75	1.34 (0.76, 2.37)	1.23 (0.73, 2.09)
		p-trend=0.0468			p-trend=0.1016			p-trend=0.1959	
Monthly intake of red meat									
continuous		1.01 (0.94, 1.08)			1.00 (0.93, 1.07)			1.07 (0.87, 1.30)	
Q1	1042/248	1.00 (Ref)	1.00 (Ref)	994/209	1.00 (Ref)	1.00 (Ref)	48/39	1.00 (Ref)	1.00 (Ref)
Q2	1042/256	1.11 (0.90, 1.37)	1.12 (0.92, 1.36)	998/203	1.04 (0.83, 1.31)	1.07 (0.86, 1.33)	44/53	1.63 (0.86, 3.09)	1.37 (0.76, 2.45)
Q3	1042/277	1.14 (0.92, 1.41)	1.15 (0.94, 1.40)	984/224	1.11 (0.88, 1.40)	1.14 (0.91, 1.42)	58/53	1.37 (0.72, 2.59)	1.12 (0.63, 2.01)
Q4	1042/352	1.02 (0.83, 1.27)	1.05 (0.86, 1.28)	970/281	0.98 (0.78, 1.23)	1.03 (0.83, 1.27)	72/71	1.38 (0.74, 2.60)	1.13 (0.64, 1.99)
		p-trend=0.8449			p-trend=0.9415			p-trend=0.5280	
missing	201/47			192/35			9/12		

Ca, Cases; Co, Controls

[a]Atrophic gastritis defined as having low serum pepsinogen of PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b]Adjusted odds ratio controlling for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, pack-years smoking, alcohol consumption in the 1990's, *Helicobacter pylori* IgG, and daily caloric intake using the residual method.

Table 3.2.10. Association of nitrate/nitrite high food (grams) from the FFQ and stomach cancer by atrophic gastritis.

	Stomach Cancer								
	All			Without Atrophic Gastritis[a]			With Atrophic Gastritis[a]		
Effect	**Co/Ca**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**	**Co/Ca**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**	**Co/Ca**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**
Intake of green, leafy vegetables (grams/week)									
continuous		1.05 (0.99, 1.12)			**1.07 (1.00, 1.15)**			0.92 (0.77, 1.10)	
Q1	1042/294	1.00 (Ref)	1.00 (Ref)	992/230	1.00 (Ref)	1.00 (Ref)	50/64	1.00 (Ref)	1.00 (Ref)
Q2	1042/239	0.85 (0.70, 1.05)	0.87 (0.72, 1.06)	990/201	0.92 (0.74, 1.15)	0.94 (0.76, 1.16)	52/38	0.63 (0.35, 1.14)	0.60 (0.34, 1.06)
Q3	1042/282	0.98 (0.80, 1.19)	0.99 (0.82, 1.20)	984/223	1.01 (0.81, 1.25)	1.03 (0.83, 1.26)	58/59	0.79 (0.45, 1.38)	0.77 (0.45, 1.30)
Q4	1042/318	1.11 (0.92, 1.35)	1.13 (0.94, 1.35)	980/263	1.21 (0.98, 1.49)	**1.23 (1.00, 1.50)**	62/55	0.71 (0.41, 1.24)	0.69 (0.41, 1.16)
		p-trend=0.1274			**p-trend=0.0433**			p-trend=0.3511	
Intake of root vegetables (grams/week)									
continuous		0.96 (0.90, 1.03)			0.95 (0.89, 1.03)			1.01 (0.84, 1.22)	
Q1	1042/336	1.00 (Ref)	1.00 (Ref)	986/272	1.00 (Ref)	1.00 (Ref)	56/64	1.00 (Ref)	1.00 (Ref)
Q2	1042/282	0.93 (0.77, 1.13)	0.95 (0.79, 1.14)	979/238	0.98 (0.79, 1.20)	1.01 (0.83, 1.23)	63/44	0.63 (0.36, 1.12)	0.59 (0.34, 1.01)
Q3	1042/269	0.92 (0.76, 1.12)	0.94 (0.78, 1.14)	987/210	0.90 (0.72, 1.11)	0.92 (0.75, 1.13)	55/59	1.05 (0.60, 1.85)	0.98 (0.58, 1.67)
Q4	1042/246	0.89 (0.72, 1.09)	0.89 (0.73, 1.09)	994/197	0.88 (0.70, 1.11)	0.89 (0.72, 1.11)	48/49	0.87 (0.47, 1.60)	0.81 (0.46, 1.44)
		p-trend=0.2690			p-trend=0.1989			p-trend=0.9187	
Intake of salted/pickled vegetables (grams/week)									
continuous		1.05 (0.99, 1.12)				1.05 (0.99, 1.13)		1.13 (0.95, 1.35)	
Q1	1042/301	1.00 (Ref)	1.00 (Ref)	976/239	1.00 (Ref)	1.00 (Ref)	66/62	1.00 (Ref)	1.00 (Ref)
Q2	1042/270	0.96 (0.78, 1.18)	0.98 (0.80, 1.19)	982/222	1.00 (0.80, 1.26)	1.03 (0.83, 1.28)	60/48	0.80 (0.45, 1.43)	0.73 (0.42, 1.26)
Q3	1043/239	0.90 (0.73, 1.11)	0.91 (0.75, 1.11)	1000/189	0.89 (0.71, 1.12)	0.90 (0.73, 1.13)	43/50	1.32 (0.71, 2.43)	1.17 (0.65, 2.10)
Q4	1041/323	1.18 (0.97, 1.43)	**1.20 (1.00, 1.44)**	988/267	1.21 (0.98, 1.49)	**1.24 (1.01, 1.51)**	53/56	1.31 (0.75, 2.27)	1.18 (0.70, 2.00)
		p-trend=0.1110			p-trend=0.1255			p-trend=0.1635	
Intake of preserved or salted meat/fish (grams/week)									
continuous		0.98 (0.92, 1.04)				0.95 (0.89, 1.02)		1.12 (0.93, 1.35)	
Q1	1042/289	1.00 (Ref)	1.00 (Ref)	990/238	1.00 (Ref)	1.00 (Ref)	52/51	1.00 (Ref)	1.00 (Ref)
Q2	1042/242	0.86 (0.70, 1.07)	0.91 (0.74, 1.11)	983/201	0.87 (0.69, 1.10)	0.93 (0.75, 1.16)	59/41	0.73 (0.39, 1.34)	0.66 (0.37, 1.17)
Q3	1042/234	**0.78 (0.62, 0.97)**	0.82 (0.67, 1.02)	1005/187	**0.73 (0.57, 0.92)**	**0.78 (0.62, 0.99)**	37/47	1.38 (0.71, 2.68)	1.23 (0.66, 2.30)

Q4	1042/368	0.92 (0.75, 1.13)	0.99 (0.82, 1.20)	968/291	0.87 (0.70, 1.09)	0.95 (0.77, 1.18)	74/77	1.21 (0.68, 2.16)	1.09 (0.64, 1.87)
		p-trend=0.4783			p-trend=0.1734			p-trend=0.2226	
missing	20/47			192/35			9/12		

Ca, Cases; Co, Controls

[a] Atrophic gastritis defined as having low serum pepsinogen of PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b]Adjusted odds ratio controlling for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, pack-years smoking, alcohol consumption in the 1990's, *Helicobacter pylori* IgG, and daily caloric intake using the residual method.

Table 3.2.11. The association of various micronutrients (vitamins and minerals) and stomach cancer by atrophic gastritis.

	Stomach Cancer								
	All			Without Atrophic Gastritis[a]			With Atrophic Gastritis[a]		
Effect	**Co/Ca**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**	**Co/Ca**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**	**Co/Ca**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**
Vitamin A									
continuous		**1.08 (1.02, 1.15)**			1.06 (0.99, 1.14)			1.19 (1.00, 1.42)	
Q1	1042/273	1.00 (Ref)	1.00 (Ref)	989/225	1.00 (Ref)	1.00 (Ref)	53/48	1.00 (Ref)	1.00 (Ref)
Q2	1042/276	1.12 (0.92, 1.37)	1.11 (0.91, 1.34)	977/230	1.16 (0.94, 1.44)	1.16 (0.94, 1.42)	65/46	0.76 (0.42, 1.36)	0.69 (0.40, 1.19)
Q3	1042/280	1.21 (0.99, 1.48)	1.19 (0.98, 1.44)	989/226	1.21 (0.97, 1.50)	1.19 (0.97, 1.47)	53/54	1.09 (0.60, 1.97)	0.98 (0.56, 1.71)
Q4	1042/304	**1.28 (1.05, 1.55)**	**1.25 (1.04, 1.50)**	991/236	1.22 (0.98, 1.51)	1.20 (0.98, 1.48)	51/68	1.53 (0.87, 2.69)	1.38 (0.81, 2.35)
		p-trend=0.0117			p-trend=0.0768			p-trend=0.0553	
Carotene									
continuous		**1.07 (1.01, 1.14)**			**1.09 (1.02, 1.16)**			0.95 (0.79, 1.13)	
Q1	1042/281	1.00 (Ref)	1.00 (Ref)	994/224	1.00 (Ref)	1.00 (Ref)	48/57	1.00 (Ref)	1.00 (Ref)
Q2	1042/251	0.96 (0.79, 1.18)	0.97 (0.80, 1.17)	989/203	0.99 (0.79, 1.24)	1.00 (0.81, 1.24)	53/48	0.84 (0.47, 1.51)	0.79 (0.45, 1.38)
Q3	1042/275	1.01 (0.82, 1.23)	1.01 (0.84, 1.23)	982/222	1.04 (0.84, 1.30)	1.06 (0.86, 1.30)	60/53	0.76 (0.43, 1.33)	0.72 (0.42, 1.23)
Q4	1042/326	**1.22 (1.01, 1.48)**	**1.22 (1.02, 1.46)**	981/268	**1.29 (1.05, 1.59)**	**1.29 (1.06, 1.58)**	61/58	0.86 (0.49, 1.50)	0.81 (0.48, 1.37)
		p-trend=0.0324			**p-trend=0.0130**			p-trend=0.5498	
Thiamin (Vit B1)									
continuous		**1.08 (1.00, 1.16)**			1.06 (0.98, 1.14)			1.16 (0.95, 1.42)	
Q1	1042/302	1.00 (Ref)	1.00 (Ref)	988/250	1.00 (Ref)	1.00 (Ref)	54/52	1.00 (Ref)	1.00 (Ref)
Q2	1042/306	1.14 (0.95, 1.38)	1.13 (0.95, 1.36)	965/253	1.19 (0.97, 1.47)	1.20 (0.98, 1.46)	77/53	0.68 (0.39, 1.20)	0.62 (0.36, 1.05)
Q3	1042/255	1.09 (0.89, 1.34)	1.07 (0.88, 1.29)	1007/204	1.05 (0.84, 1.31)	1.03 (0.84, 1.28)	35/51	1.48 (0.79, 2.76)	1.32 (0.73, 2.38)
Q4	1042/270	**1.31 (1.05, 1.63)**	**1.24 (1.01, 1.53)**	986/210	1.25 (0.98, 1.59)	1.20 (0.96, 1.51)	56/60	1.27 (0.67, 2.39)	1.10 (0.62, 1.97)
		p-trend=0.0381			p-trend=0.1632			p-trend=0.1478	
Riboflavin (Vit B2)									
continuous		**1.07 (1.01, 1.15)**			1.07 (0.99, 1.15)			1.13 (0.93, 1.36)	
Q1	1042/274	1.00 (Ref)	1.00 (Ref)	991/217	1.00 (Ref)	1.00 (Ref)	51/57	1.00 (Ref)	1.00 (Ref)
Q2	1042/264	1.03 (0.84, 1.26)	1.01 (0.84, 1.23)	978/224	1.12 (0.90, 1.40)	1.11 (0.90, 1.37)	64/40	0.60 (0.33, 1.09)	**0.56 (0.32, 0.98)**

Q3	1042/292	1.23 (1.00, 1.51)	1.20 (0.99, 1.46)	990/240	**1.30 (1.03, 1.63)**	**1.28 (1.03, 1.58)**	52/52	0.86 (0.47, 1.58)	0.79 (0.45, 1.39)
Q4	1042/303	1.20 (0.97, 1.49)	1.17 (0.96, 1.43)	987/236	1.20 (0.95, 1.52)	1.17 (0.94, 1.46)	55/67	1.27 (0.70, 2.29)	1.16 (0.67, 2.00)
		p-trend=0.0341			p-trend=0.0772			p-trend=0.2173	
Niacin (Vit B3)									
continuous		1.01 (0.95, 1.07)			1.01 (0.94, 1.08)			1.01 (0.84, 1.20)	
Q1	1042/291	1.00 (Ref)	1.00 (Ref)	994/234	1.00 (Ref)	1.00 (Ref)	48/57	1.00 (Ref)	1.00 (Ref)
Q2	1042/240	0.82 (0.67, 1.00)	0.84 (0.70, 1.03)	988/195	0.84 (0.67, 1.05)	0.88 (0.71, 1.09)	54/45	0.69 (0.38, 1.25)	0.66 (0.37, 1.17)
Q3	1042/287	0.97 (0.79, 1.18)	1.00 (0.83, 1.21)	982/244	1.05 (0.85, 1.31)	1.09 (0.89, 1.34)	60/43	0.59 (0.32, 1.07)	**0.56 (0.32, 0.99)**
Q4	1042/315	0.97 (0.80, 1.17)	1.00 (0.83, 1.20)	982/244	0.96 (0.77, 1.18)	0.99 (0.81, 1.22)	60/71	1.01 (0.57, 1.76)	0.96 (0.57, 1.62)
		p-trend=0.8230			p-trend=0.8208			p-trend=0.9320	
Vitamin C									
continuous		**1.09 (1.02, 1.16)**			**1.10 (1.03, 1.18)**			0.97 (0.80, 1.16)	
Q1	1042/269	1.00 (Ref)	1.00 (Ref)	993/220	1.00 (Ref)	1.00 (Ref)	49/49	1.00 (Ref)	1.00 (Ref)
Q2	1042/275	1.11 (0.91, 1.35)	1.10 (0.91, 1.33)	982/217	1.09 (0.87, 1.35)	1.08 (0.88, 1.34)	60/58	1.03 (0.58, 1.82)	0.94 (0.55, 1.62)
Q3	1042/284	1.17 (0.96, 1.44)	1.16 (0.96, 1.40)	991/229	1.17 (0.94, 1.46)	1.17 (0.95, 1.44)	51/55	1.09 (0.59, 2.00)	0.99 (0.56, 1.75)
Q4	1042/305	**1.29 (1.06, 1.57)**	**1.26 (1.04, 1.52)**	980/251	**1.34 (1.08, 1.66)**	**1.31 (1.07, 1.61)**	62/54	0.89 (0.50, 1.58)	0.81 (0.47, 1.39)
		p-trend=0.0112			**p-trend=0.0067**			p-trend=0.7003	
Vitamin E									
continuous		1.05 (0.99, 1.12)			1.05 (0.98, 1.13)			1.07 (0.89, 1.29)	
Q1	1042/277	1.00 (Ref)	1.00 (Ref)	979/225	1.00 (Ref)	1.00 (Ref)	63/52	1.00 (Ref)	1.00 (Ref)
Q2	1042/293	**1.24 (1.02, 1.51)**	**1.21 (1.00, 1.46)**	987/245	**1.28 (1.03, 1.59)**	**1.26 (1.03, 1.55)**	55/48	1.20 (0.67, 2.15)	1.05 (0.61, 1.81)
Q3	1042/321	**1.49 (1.22, 1.83)**	**1.44 (1.19, 1.74)**	986/248	**1.41 (1.13, 1.76)**	**1.38 (1.12, 1.70)**	56/73	1.66 (0.93, 2.97)	1.42 (0.83, 2.45)
Q4	1042/242	1.12 (0.91, 1.38)	1.08 (0.88, 1.31)	994/199	1.14 (0.91, 1.43)	1.11 (0.89, 1.38)	48/43	1.10 (0.61, 1.97)	0.97 (0.55, 1.69)
		p-trend=0.1164			p-trend=0.1928			p-trend=0.4938	
Sodium (food+condiments)									
continuous		**1.07 (1.01, 1.14)**			1.05 (0.99, 1.12)			**1.28 (1.07, 1.54)**	
Q1	1042/285	1.00 (Ref)	1.00 (Ref)	974/236	1.00 (Ref)	1.00 (Ref)	68/49	1.00 (Ref)	1.00 (Ref)
Q2	1042/272	1.12 (0.92, 1.36)	1.11 (0.92, 1.34)	986/221	1.09 (0.88, 1.35)	1.10 (0.89, 1.35)	56/51	1.42 (0.81, 2.48)	1.24 (0.72, 2.12)
Q3	1042/259	1.07 (0.88, 1.31)	1.07 (0.88, 1.29)	993/208	1.02 (0.82, 1.26)	1.03 (0.84, 1.27)	49/51	1.69 (0.94, 3.03)	1.46 (0.83, 2.56)
Q4	1042/317	**1.27 (1.05, 1.54)**	**1.27 (1.06, 1.53)**	993/252	1.20 (0.97, 1.48)	1.21 (0.99, 1.48)	49/65	**2.17 (1.22, 3.84)**	**1.88 (1.09, 3.26)**

		p-trend=0.0255			p-trend=0.1565			p-trend=0.0075	
Zinc									
continuous		**1.08 (1.01, 1.15)**			**1.08 (1.01, 1.16)**			1,96 (0.89, 1.27)	
Q1	1042/277	1.00 (Ref)	1.00 (Ref)	989/217	1.00 (Ref)	1.00 (Ref)	53/60	1.00 (Ref)	1.00 (Ref)
Q2	1042/270	1.07 (0.87, 1.30)	1.06 (0.87, 1.28)	985/226	1.16 (0.93, 1.45)	1.15 (0.94, 1.42)	57/44	0.66 (0.37, 1.18)	0.63 (0.36, 1.09)
Q3	1042/279	1.15 (0.94, 1.41)	1.13 (0.93, 1.38)	982/237	**1.27 (1.02, 1.59)**	**1.26 (1.02, 1.55)**	60/42	0.54 (0.29, 0.99)	0.51 (0.29, 0.90)
Q4	1042/307	**1.24 (1.02, 1.52)**	**1.22 (1.01, 1.47)**	990/237	**1.25 (1.00, 1.57)**	**1.23 (1.00, 1.52)**	52/70	1.22 (0.69, 2.14)	1.15 (0.68, 1.95)
		p-trend=0.0243			**p-trend=0.0359**			p-trend=0.4933	
Selenium									
continuous		1.07 (0.99, 1.16)			1.04 (0.95, 1.13)			1.15 (0.92, 1.43)	
Q1	1042/289	1.00 (Ref)	1.00 (Ref)	981/239	1.00 (Ref)	1.00 (Ref)	61/50	1.00 (Ref)	1.00 (Ref)
Q2	1042/312	1.18 (0.97, 1.44)	1.17 (0.97, 1.41)	981/261	1.20 (0.97, 1.49)	1.21 (0.99, 1.49)	61/51	1.13 (0.63, 2.03)	0.99 (0.57, 1.70)
Q3	1042/311	**1.34 (1.08, 1.65)**	**1.29 (1.06, 1.57)**	995/249	**1.28 (1.01, 1.61)**	**1.26 (1.02, 1.56)**	47/62	1.74 (0.93, 3.25)	1.46 (0.82, 2.59)
Q4	1042/221	1.14 (0.88, 1.47)	1.05 (0.83, 1.33)	989/168	1.03 (0.78, 1.36)	0.97 (0.75, 1.26)	53/53	1.33 (0.67, 2.65)	1.10 (0.59, 2.04)
		p-trend=0.1024			p-trend=0.4191			p-trend=0.2130	
missing	201/47			192/35			9/12		

Ca, Cases; Co, Controls

[a] Atrophic gastritis defined as having low serum pepsinogen of PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b]Adjusted odds ratio controlling for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, pack-years smoking, alcohol consumption in the 1990's, *Helicobacter pylori* IgG, and daily total caloric intake using the residual method.

Table 3.2.12. Macronutrients and total caloric intake and stomach cancer

	Stomach Cancer								
	All			Without Atrophic Gastritis[a]			With Atrophic Gastritis[a]		
Effect	**Co/Ca**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**	**Co/Ca**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**	**Co/Ca**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**
Protein									
continuous		**1.10 (1.03, 1.18)**			**1.09 (1.02, 1.18)**			1.14 (0.95, 1.37)	
Q1	1042/255	1.00 (Ref)	1.00 (Ref)	987/206	1.00 (Ref)	1.00 (Ref)	55/49	1.00 (Ref)	1.00 (Ref)
Q2	1042/305	**1.26 (1.03, 1.54)**	**1.23 (1.02, 1.48)**	981/253	**1.31 (1.06, 1.63)**	**1.29 (1.05, 1.58)**	61/52	0.93 (0.52, 1.67)	0.83 (0.48, 1.43)
Q3	1042/277	**1.30 (1.06, 1.61)**	**1.25 (1.03, 1.52)**	988/226	**1.34 (1.06, 1.68)**	**1.29 (1.04, 1.60)**	54/51	1.05 (0.57, 1.94)	0.92 (0.52, 1.62)
Q4	1042/296	**1.39 (1.12, 1.71)**	**1.32 (1.08, 1.60)**	990/232	**1.36 (1.08, 1.72)**	**1.30 (1.05, 1.62)**	52/64	1.44 (0.80, 2.60)	1.26 (0.73, 2.18)
		p-trend=0.0044			**p-trend=0.0169**			p-trend=0.1712	
Fat									
continuous		1.04 (0.97, 1.11)			1.04 (0.97, 1.12)			1.05 (0.87, 1.26)	
Q1	1042/239	1.00 (Ref)	1.00 (Ref)	997/193	1.00 (Ref)	1.00 (Ref)	45/46	1.00 (Ref)	1.00 (Ref)
Q2	1042/267	1.21 (0.99, 1.49)	1.19 (0.98, 1.45)	987/216	**1.25 (1.00, 1.57)**	**1.24 (1.00, 1.54)**	55/51	0.91 (0.50, 1.65)	0.83 (0.47, 1.46)
Q3	1042/305	**1.35 (1.09, 1.66)**	**1.32 (1.09, 1.61)**	981/253	**1.44 (1.14, 1.81)**	**1.42 (1.15, 1.76)**	61/52	0.90 (0.49, 1.66)	0.81 (0.46, 1.43)
Q4	1042/322	1.13 (0.91, 1.39)	1.11 (0.91, 1.35)	981/255	1.13 (0.89, 1.42)	1.12 (0.90, 1.40)	61/67	1.13 (0.62, 2.05)	1.02 (0.59, 1.76)
		p-trend=0.2427			p-trend=0.2596			p-trend=0.6465	
Fiber									
continuous		1.06 (0.99, 1.12)			1.06 (0.99. 1.14)			1.05 (0.88, 1.25)	
Q1	1042/297	1.00 (Ref)	1.00 (Ref)	981/240	1.00 (Ref)	1.00 (Ref)	61/57	1.00 (Ref)	1.00 (Ref)
Q2	1042/265	1.05 (0.86, 1.28)	1.04 (0.86, 1.26)	988/213	1.04 (0.84, 1.29)	1.04 (0.85, 1.29)	54/52	1.14 (0.65, 2.02)	1.02 (0.60, 1.75)
Q3	1042/258	1.08 (0.88, 1.32)	1.07 (0.88, 1.29)	993/206	1.06 (0.85, 1.32)	1.06 (0.86, 1.31)	49/52	1.24 (0.69, 2.21)	1.09 (0.63, 1.90)
Q4	1042/313	1.18 (0.98, 1.43)	1.17 (0.98, 1.41)	984/258	1.21 (0.98, 1.49)	1.21 (0.99, 1.48)	58/55	1.15 (0.66, 1.99)	1.03 (0.61, 1.74)
		p-trend=0.0875			p-trend=0.0766			p-trend=0.5913	
Carbohydrate									
continuous		0.95 (0.89, 1.02)			0.94 (0.88, 1.02)			0.98 (0.81, 1.18)	
Q1	1042/320	1.00 (Ref)	1.00 (Ref)	980/257	1.00 (Ref)	1.00 (Ref)	62/63	1.00 (Ref)	1.00 (Ref)
Q2	1042/296	1.10 (0.90, 1.33)	1.10 (0.92, 1.33)	980/239	1.12 (0.90, 1.38)	1.13 (0.93, 1.39)	62/57	0.86 (0.50, 1.47)	0.81 (0.49, 1.36)
Q3	1042/279	1.06 (0.87, 1.30)	1.08 (0.89, 1.30)	991/230	1.09 (0.88, 1.35)	1.11 (0.90, 1.36)	51/49	0.93 (0.52, 1.65)	0.88 (0.51, 1.53)

Q4	1042/238	0.83 (0.67, 1.03)	0.85 (0.69, 1.04)	995/191	0.81 (0.64, 1.02)	0.83 (0.66, 1.05)	47/47	0.92 (0.51, 1.66)	0.87 (0.49, 1.56)
		p-trend=0.1293			p-trend=0.1240			p-trend=0.8224	
Calories[c]									
continuous per 500 kcal/day		**1.07 (1.02, 1.11)**			**1.07 (1.02, 1.13)**			0.98 (0.86, 1.11)	
Q1	1042/248	1.00 (Ref)	1.00 (Ref)	988/203	1.00 (Ref)	1.00 (Ref)	54/45	1.00 (Ref)	1.00 (Ref)
Q2	1042/287	1.13 (0.92, 1.38)	1.13 (0.94, 1.37)	993/229	1.08 (0.87, 1.34)	1.10 (0.90, 1.35)	49/58	1.46 (0.81, 2.61)	1.26 (0.76, 2.06)
Q3	1042/266	1.07 (0.87, 1.31)	1.08 (0.89, 1.31)	994/217	1.03 (0.83, 1.29)	1.06 (0.86, 1.31)	48/49	1.12 (0.62, 2.05)	1.00 (0.60, 1.68)
Q4	1042/332	**1.28 (1.05, 1.57)**	**1.30 (1.08, 1.57)**	971/268	**1.29 (1.04, 1.61)**	**1.34 (1.09, 1.64)**	71/64	1.03 (0.58, 1.81)	0.89 (0.55, 1.44)
		p-trend=0.0286			**p-trend=0.0330**			p-trend=0.7470	
missing	201/47			192/35			9/12		

Ca, Cases; Co, Controls

[a] Atrophic gastritis defined as having low serum pepsinogen of PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b]Adjusted odds ratio controlling for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, pack-years smoking, alcohol consumption in the 1990's, *Helicobacter pylori* IgG, and daily total caloric intake using the residual method.

[c]Adjusted odds ratio controlling for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, pack-years smoking, alcohol consumption in the 1990's, *Helicobacter pylori* IgG.

Table 3.2.13. Family medical history and stomach cancer by atrophic gastritis.

	Stomach Cancer								
	All			Without Atrophic Gastritis[a]			With Atrophic Gastritis[a]		
Effect	**Co/Ca**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**	**Co/Ca**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**	**Co/Ca**	**Adjusted OR (95% CI)[b]**	**Semi-Bayes OR (95% PI)[b]**
Any cancer history in relatives									
No family history	5102/1135	1.00 (Ref)	1.00 (Ref)	4766/900	1.00 (Ref)	1.00 (Ref)	336/235	1.00 (Ref)	1.00 (Ref)
Yes, in first degree relative(s)	904/388	**1.76 (1.52, 2.05)**	**1.76 (1.51, 2.04)**	849/329	**1.91 (1.63, 2.25)**	**1.91 (1.62, 2.24)**	55/59	1.15 (0.74, 1.80)	1.14 (0.75, 1.74)
Yes, in any other relative(s)	343/91	1.13 (0.88, 1.46)	1.13 (0.88, 1.45)	330/73	1.13 (0.85, 1.48)	1.12 (0.86, 1.47)	13/18	1.82 (0.85, 3.88)	1.59 (0.82, 3.09)
missing	20/3			17/2			3/1		
Family history of stomach cancer in any relative									
No	6073/1460	1.00 (Ref)	1.00 (Ref)	5682/1180	1.00 (Ref)	1.00 (Ref)	391/280	1.00 (Ref)	1.00 (Ref)
Yes	296/157	**1.91 (1.55, 2.37)**	**1.88 (1.53, 2.33)**	280/124	**1.89 (1.50, 2.38)**	**1.85 (1.47, 2.33)**	16/33	**2.34 (1.23, 4.47)**	**2.02 (1.13, 3.59)**
First degree relative with history of stomach cancer									
No	6167/1490	1.00 (Ref)	1.00 (Ref)	5769/1200	1.00 (Ref)	1.00 (Ref)	398/290	1.00 (Ref)	1.00 (Ref)
Yes	202/127	**2.21 (1.74, 2.81)**	**2.16 (1.70, 2.74)**	193/104	**2.24 (1.73, 2.90)**	**2.18 (1.69, 2.81)**	9/23	**2.70 (1.19, 6.13)**	**2.11 (1.06, 4.18)**

Ca, Cases; Co, Controls

[a] Atrophic gastritis defined as having low serum pepsinogen of PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b]Adjusted odds ratio controlling for age, gender, county (study site), education level, income ten years ago, pack-years smoking, alcohol consumption in the 1990's, *Helicobacter pylori* IgG.

Table 3.2.14. Joint associations between risk factors and atrophic gastritis on stomach cancer.

Helicobacter pylori	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
no	*no*	292/1743	1.00 (reference)	1.00 (reference)
no	*yes*	85/104	4.58 (3.32, 6.32)	4.48 (3.27, 6.13)
yes	*no*	1012/4219	1.41 (1.21, 1.63)	1.40 (1.21, 1.62)
yes	*yes*	228/303	4.11 (3.30, 5.13)	4.13 (3.31, 5.14)
	Additive	RERI	-0.88 (-2.43, 0.68)	-0.75 (-2.24, 0.73)
	Multiplicative	ROR	**0.64 (0.44, 0.93)**	**0.66 (0.46, 0.94)**
Ever Smoker	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
no	*no*	555/3204	1.00 (reference)	1.00 (reference)
no	*yes*	137/228	3.19 (2.52, 4.05)	3.20 (2.53, 4.04)
yes	*no*	749/2758	1.67 (1.45, 1.92)	1.67 (1.45, 1.92)
yes	*yes*	176/179	5.64 (4.42, 7.18)	5.63 (4.43, 7.17)
	Additive	RERI	**1.78 (0.35, 3.21)**	**1.77 (0.37, 3.16)**
	Multiplicative	ROR	1.06 (0.76, 1.47)	1.06 (0.77, 1.46)
Ever Alcohol Drinking	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
no	*no*	640/3225	1.00 (reference)	1.00 (reference)
no	*yes*	153/239	3.01 (2.40, 3.77)	3.02 (2.41, 3.78)
yes	*no*	664/2737	1.19 (1.04, 1.37)	1.20 (1.04, 1.37)
yes	*yes*	160/168	4.35 (3.40, 5.58)	4.34 (3.39, 5.55)
	Additive	RERI	1.15 (-0.03, 2.33)	1.12 (-0.03, 2.27)
	Multiplicative	ROR	1.21 (0.87, 1.69)	1.20 (0.87, 1.65)
Ever smoker	**Ever drinker**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
no	*no*	515/2557	1.00 (reference)	1.00 (reference)
no	*yes*	177/875	1.16 (0.94, 1.42)	1.14 (0.94, 1.40)
yes	*no*	278/907	1.66 (1.38, 2.00)	1.66 (1.38, 1.98)
yes	*yes*	647/2030	1.91 (1.62, 2.25)	1.90 (1.62, 2.23)
	Additive	RERI	0.09 (-0.27, 0.45)	0.10 (-0.25, 0.45)
	Multiplicative	ROR	0.99 (0.77, 1.29)	1.00 (0.78, 1.29)
Ever Tea Drinking	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
yes	*no*	275/1367	1.00 (reference)	1.00 (reference)
yes	*yes*	69/69	4.99 (3.44, 7.23)	4.82 (3.37, 6.90)
no	*no*	1029/4595	1.23 (1.04, 1.44)	1.22 (1.04, 1.43)
no	*yes*	244/338	3.63 (2.89, 4.56)	3.64 (2.90, 4.57)
	Additive	RERI	-1.58 (-3.45, 0.29)	-1.40 (-3.14, 0.34)
	Multiplicative	ROR	**0.59 (0.39, 0.9)**	**0.62 (0.42, 0.92)**
Green Tea Drinking	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
yes	*no*	204/1037	1.00 (reference)	1.00 (reference)

yes	*yes*	55/50	5.96 (3.89, 9.12)	5.62 (3.74, 8.44)
no	*no*	1096/4913	1.21 (1.01, 1.45)	1.20 (1.01, 1.44)
no	*yes*	258/357	3.59 (2.83, 4.56)	3.60 (2.84, 4.56)
	Additive	RERI	**-2.58 (-5.09,-0.07)**	-2.22 (-4.47, 0.03)
	Multiplicative	ROR	**0.50 (0.31, 0.79)**	**0.53 (0.34, 0.82)**
Fridge use	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
yes	*no*	136/599	1.00 (reference)	1.00 (reference)
yes	*yes*	29/44	2.63 (1.56, 4.44)	2.63 (1.56, 4.44)
no	*no*	1155/5305	1.03 (0.83, 1.26)	1.03 (0.83, 1.26)
no	*yes*	282/359	3.45 (2.67, 4.46)	3.45 (2.67, 4.46)
	Additive	RERI	0.79 (-0.61, 2.2)	0.71 (-0.63, 2.06)
	Multiplicative	ROR	1.28 (0.74, 2.21)	1.24 (0.74, 2.06)
Tonic use	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
no	*no*	1210/5610	1.00 (reference)	1.00 (reference)
no	*yes*	285/371	3.28 (2.76, 3.90)	3.28 (2.77, 3.90)
yes	*no*	66/250	1.17 (0.88, 1.56)	1.17 (0.88, 1.55)
yes	*yes*	22/26	3.90 (2.16, 7.06)	3.90 (2.25, 6.75)
	Additive	RERI	0.45 (-1.93, 2.83)	0.44 (-1.72, 2.60)
	Multiplicative	ROR	1.02 (0.52, 1.99)	1.01 (0.55, 1.85)
Vitamin use	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
no	*no*	1241/5753	1.00 (reference)	1.00 (reference)
no	*yes*	297/385	3.31 (2.80, 3.93)	3.32 (2.81, 3.93)
yes	*no*	21/93	0.96 (0.59, 1.56)	0.98 (0.61, 1.56)
yes	*yes*	9/11	4.09 (1.65, 10.09)	3.81 (1.76, 8.29)
	Additive	RERI	0.82 (-2.93, 4.56)	0.52 (-2.39, 3.43)
	Multiplicative	ROR	1.29 (0.46, 3.64)	1.18 (0.51, 2.70)
Ever drink raw water?	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
no	*no*	494/2627	1.00 (reference)	1.00 (reference)
no	*yes*	143/178	3.99 (3.11, 5.12)	3.95 (3.10, 5.05)
yes	*no*	786/3187	1.26 (1.11, 1.43)	1.26 (1.11, 1.43)
yes	*yes*	164/217	3.62 (2.87, 4.57)	3.65 (2.89, 4.59)
	Additive	RERI	-0.63 (-1.83, 0.57)	-0.57 (-1.73, 0.60)
	Multiplicative	ROR	0.72 (0.51, 1.01)	0.73 (0.53, 1.01)
Ever eat raw garlic?	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
yes	*no*	583/3157	1.00 (reference)	1.00 (reference)
yes	*yes*	156/227	3.60 (2.87, 4.53)	3.59 (2.86, 4.49)
no	*no*	718/2780	1.20 (1.04, 1.39)	1.20 (1.04, 1.39)
no	*yes*	156/179	3.56 (2.77, 4.58)	3.58 (2.79, 4.59)

	Additive	RERI	-0.24 (-1.36, 0.87)	-0.21 (-1.30, 0.88)
	Multiplicative	ROR	0.82 (0.59, 1.14)	0.83 (0.6, 1.14)
Eat salty food	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
no	*no*	789/4103	1.00 (reference)	1.00 (reference)
no	*yes*	193/302	2.99 (2.44, 3.66)	3.01 (2.46, 3.68)
yes	*no*	515/1849	1.33 (1.17, 1.51)	1.33 (1.17, 1.51)
yes	*yes*	118/105	5.33 (4.02, 7.08)	5.28 (4.00, 6.98)
	Additive	RERI	**2.01 (0.45, 3.57)**	**1.94 (0.43, 3.45)**
	Multiplicative	ROR	1.34 (0.94, 1.91)	1.32 (0.94, 1.86)
Eat spicy food	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
no	*no*	817/4215	1.00 (reference)	1.00 (reference)
no	*yes*	199/301	3.11 (2.54, 3.80)	3.12 (2.56, 3.80)
yes	*no*	479/1733	1.38 (1.21, 1.57)	1.38 (1.21, 1.57)
yes	*yes*	111/105	5.16 (3.87, 6.88)	5.13 (3.86, 6.81)
	Additive	RERI	**1.68 (0.13, 3.22)**	**1.62 (0.13, 3.12)**
	Multiplicative	ROR	1.21 (0.85, 1.72)	1.19 (0.84, 1.68)
Eat hot food	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
no	*no*	608/3404	1.00 (reference)	1.00 (reference)
no	*yes*	145/240	3.09 (2.45, 3.90)	3.10 (2.47, 3.90)
yes	*no*	695/2549	1.49 (1.32, 1.69)	1.49 (1.32, 1.69)
yes	*yes*	167/167	5.20 (4.10, 6.60)	5.19 (4.10, 6.58)
	Additive	RERI	**1.62 (0.28, 2.95)**	**1.59 (0.29. 2.90)**
	Multiplicative	ROR	1.13 (0.81, 1.57)	1.12 (0.81, 1.54)
Family history of stomach cancer	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
no	*no*	1180/5682	1.00 (reference)	1.00 (reference)
no	*yes*	280/391	3.26 (2.75, 3.87)	3.27 (2.76, 3.87)
yes	*no*	124/280	1.88 (1.49, 2.36)	1.88 (1.50, 2.36)
yes	*yes*	33/16	6.75 (3.64, 12.54)	6.65 (3.77, 11.73)
	Additive	RERI	2.61 (-1.59, 6.82)	2.50 (-1.25, 6.26)
	Multiplicative	ROR	1.1 (0.56, 2.16)	1.08 (0.59, 1.98)

Ca, case; Co, control; aOR, adjusted odds ratio; sbOR, semi-bayes adjusted odds ratio; RERI, relative excess risk due to interaction; ROR, ratio of odds ratios;

[a] Atrophic gastritis is defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b]Adjusted odds ratio controlling for age, gender, county, education level, income ten years ago, family history of stomach cancer (except variable "family history of stomach cancer"), pack-years of smoking (except "ever smoking"), alcohol consumption in the 1990's (except "ever drinking), and *Helicobacter pylori* IgG (except "*Helicobacter pylori"*).

Table 3.2.15. Joint associations between food groups consumed (FFQ) and atrophic gastritis on stomach cancer.

Vegetables	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*no*	451/1970	1.00 (reference)	1.00 (reference)
low	*yes*	113/114	3.82 (2.85, 5.11)	3.80 (2.86, 5.06)
high	*no*	466/1976	1.12 (0.97, 1.31)	1.12 (0.97, 1.30)
high	*yes*	103/108	3.84 (2.84, 5.20)	3.86 (2.86, 5.20)
	Additive	RERI	-0.10 (-1.61, 1.41)	-0.07 (-1.51, 1.38)
	Multiplicative	ROR	0.90 (0.59, 1.36)	0.90 (0.61, 1.35)
Fruit	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*no*	486/1966	1.00 (reference)	1.00 (reference)
low	*yes*	109/118	3.14 (2.35, 4.20)	3.18 (2.39, 4.22)
high	*no*	431/1980	1.01 (0.87, 1.17)	1.01 (0.87, 1.17)
high	*yes*	107/104	4.25 (3.14, 5.74)	4.21 (3.12, 5.66)
	Additive	RERI	1.10 (-0.38, 2.57)	1.02 (-0.40, 2.43)
	Multiplicative	ROR	1.34 (0.88, 2.04)	1.31 (0.88, 1.95)
Pickled food	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*no*	452/1957	1.00 (reference)	1.00 (reference)
low	*yes*	112/127	3.26 (2.45, 4.34)	3.29 (2.49, 4.36)
high	*no*	465/1989	1.08 (0.93, 1.25)	1.08 (0.93, 1.26)
high	*yes*	104/95	4.44 (3.26, 6.04)	4.40 (3.24, 5.97)
	Additive	RERI	1.09 (-0.46, 2.65)	1.03 (-0.46, 2.52)
	Multiplicative	ROR	1.26 (0.83, 1.92)	1.24 (0.83, 1.85)
Fried food	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*no*	495/1978	1.00 (reference)	1.00 (reference)
low	*yes*	100/106	3.23 (2.39, 4.37)	3.26 (2.43, 4.38)
high	*no*	422/1968	1.00 (0.85, 1.19)	1.01 (0.85, 1.19)
high	*yes*	116/116	4.01 (2.98, 5.41)	3.99 (2.97, 5.36)
	Additive	RERI	0.78 (-0.66, 2.22)	0.72 (-0.66, 2.11)
	Multiplicative	ROR	1.24 (0.82, 1.88)	1.22 (0.82, 1.81)
Meat	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*no*	430/1977	1.00 (reference)	1.00 (reference)
low	*yes*	95/107	3.44 (2.53, 4.67)	3.46 (2.56, 4.66)
high	*no*	487/1969	1.09 (0.93, 1.27)	1.09 (0.93, 1.27)
high	*yes*	121/115	4.11 (3.06, 5.52)	4.10 (3.06, 5.49)
	Additive	RERI	0.59 (-0.90, 2.07)	0.56 (-0.98, 1.99)
	Multiplicative	ROR	1.10 (0.72, 1.67)	1.09 (0.73, 1.63)
Redmeat	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**

low	*no*	412/1992	1.00 (reference)	1.00 (reference)
low	*yes*	92/92	4.22 (3.07, 5.81)	4.17 (3.06, 5.69)
high	*no*	505/1954	1.05 (0.90, 1.24)	1.05 (0.89, 1.23)
high	*yes*	124/130	3.38 (2.53, 4.53)	3.41 (2.55, 4.55)
	Additive	RERI	-0.89 (-2.45, 0.67)	-0.81 (-2.30, 0.67)
	Multiplicative	ROR	0.76 (0.5, 1.16)	0.78 (0.52, 1.16)
Green & leafy vegetables	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*no*	431/1982	1.00 (reference)	1.00 (reference)
low	*yes*	102/102	4.20 (3.09, 5.70)	4.15 (3.08, 5.59)
high	*no*	486/1964	1.15 (0.99, 1.34)	1.15 (0.99, 1.34)
high	*yes*	114/120	3.64 (2.72, 4.87)	3.67 (2.76, 4.90)
	Additive	RERI	-0.71 (-2.27, 0.85)	-0.62 (-2.11, 0.87)
	Multiplicative	ROR	0.75 (0.49, 1.14)	0.77 (0.52, 1.15)
Root vegetables	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*no*	510/1965	1.00 (reference)	1.00 (reference)
low	*yes*	108/119	2.99 (2.24, 3.99)	3.04 (2.29, 4.03)
high	*no*	407/1981	0.89 (0.76, 1.04)	0.89 (0.76, 1.04)
high	*yes*	108/103	3.96 (2.93, 5.36)	3.91 (2.90, 5.27)
	Additive	RERI	1.09 (-0.3, 2.47)	0.98 (-0.35, 2.31)
	Multiplicative	ROR	1.49 (0.98, 2.27)	1.45 (0.97, 2.15)
Salted/pickled vegetables	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*no*	461/1958	1.00 (reference)	1.00 (reference)
low	*yes*	110/126	3.21 (2.40, 4.27)	3.24 (2.44, 4.29)
high	*no*	456/1988	1.04 (0.90, 1.21)	1.05 (0.90, 1.21)
high	*yes*	106/96	4.34 (3.20, 5.90)	4.31 (3.18, 5.83)
	Additive	RERI	1.1 (-0.42, 2.62)	1.02 (-0.44, 2.48)
	Multiplicative	ROR	1.3 (0.85, 1.98)	1.27 (0.85, 1.90)
Preserved, salted meat/fish	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*no*	439/1973	1.00 (reference)	1.00 (reference)
low	*yes*	92/111	3.30 (2.43, 4.49)	3.33 (2.46, 4.49)
high	*no*	478/1973	0.91 (0.78, 1.07)	0.91 (0.78, 1.07)
high	*yes*	124/111	3.56 (2.65, 4.78)	3.54 (2.65, 4.74)
	Additive	RERI	0.35 (-1.01, 1.71)	0.31 (-1.00, 1.61)
	Multiplicative	ROR	1.19 (0.78, 1.80)	1.17 (0.78, 1.75)

Ca, case; Co, control; aOR, adjusted odds ratio; sbOR, semi-bayes adjusted odds ratio; RERI, relative excess risk due to interaction; ROR, ratio of odds ratios;

[a] Atrophic gastritis is defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b]Adjusted odds ratio controlling for age, gender, county, education level, income ten years ago, family history of stomach cancer, pack-years of smoking, alcohol consumption in the 1990's, *Helicobacter pylori* IgG, and total caloric intake.

Table 3.2.16. Joint associations between micronutrients, macronutrients, and total caloric intake with atrophic gastritis on stomach cancer.

Vitamin A	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*no*	455/1966	1.00 (reference)	1.00 (reference)
low	*yes*	94/118	2.93 (2.16, 3.96)	2.98 (2.22, 4.00)
high	*no*	462/1980	1.10 (0.95, 1.28)	1.11 (0.95, 1.29)
high	*yes*	122/104	4.84 (3.61, 6.50)	4.78 (3.57, 6.40)
	Additive	RERI	**1.82 (0.25, 3.38)**	**1.70 (0.19, 3.21)**
	Multiplicative	ROR	1.50 (0.99, 2.29)	1.45 (0.97, 2.17)
Carotene	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*no*	427/1983	1.00 (reference)	1.00 (reference)
low	*yes*	105/101	4.32 (3.19, 5.86)	4.26 (3.16, 5.73)
high	*no*	490/1963	1.17 (1.01, 1.36)	1.17 (1.01, 1.35)
high	*yes*	111/121	3.60 (2.69, 4.81)	3.63 (2.72, 4.85)
	Additive	RERI	-0.9 (-2.48, 0.68)	-0.79 (-2.30, 0.72)
	Multiplicative	ROR	0.71 (0.47, 1.08)	0.73 (0.49, 1.09)
Thiamin (Vit B1)	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*no*	503/1953	1.00 (reference)	1.00 (reference)
low	*yes*	105/131	2.63 (1.98, 3.50)	2.70 (2.04, 3.58)
high	*no*	414/1993	1.00 (0.85, 1.18)	1.01 (0.86, 1.19)
high	*yes*	111/91	5.28 (3.85, 7.23)	5.15 (3.77, 7.03)
	Additive	RERI	**2.64 (0.92, 4.36)**	**2.43 (0.80, 4.07)**
	Multiplicative	ROR	**2.00 (1.31, 3.04)**	**1.88 (1.26, 2.82)**
Riboflavin (Vit B2)	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*no*	441/1969	1.00 (reference)	1.00 (reference)
low	*yes*	97/115	3.19 (2.36, 4.31)	3.23 (2.41, 4.33)
high	*no*	476/1977	1.17 (1.00, 1.37)	1.17 (1.00, 1.38)
high	*yes*	119/107	4.78 (3.54, 6.45)	4.74 (3.52, 6.39)
	Additive	RERI	1.42 (-0.19, 3.02)	1.34 (-0.20, 2.88)
	Multiplicative	ROR	1.28 (0.84, 1.95)	1.25 (0.84, 1.87)
Niacin (Vit B3)	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*no*	429/1982	1.00 (reference)	1.00 (reference)
low	*yes*	102/102	4.20 (3.10, 5.70)	4.20 (3.10, 5.70)
high	*no*	488/1964	1.10 (0.95, 1.28)	1.10 (0.95, 1.28)
high	*yes*	114/120	3.47 (2.59, 4.65)	3.47 (2.59, 4.65)
	Additive	RERI	-0.83 (-2.37, 0.7)	-0.83 (-2.37, 0.70)
	Multiplicative	ROR	0.75 (0.49, 1.14)	0.75 (0.49, 1.14)
Vitamin C	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**

low	*no*	437/1975	1.00 (reference)	1.00 (reference)
low	*yes*	107/109	3.94 (2.93, 5.31)	3.91 (2.93, 5.24)
high	*no*	480/1971	1.19 (1.02, 1.38)	1.18 (1.02, 1.38)
high	*yes*	109/113	3.94 (2.92, 5.30)	3.96 (2.95, 5.31)
	Additive	RERI	-0.19 (-1.74, 1.36)	-0.14 (-1.63, 1.35)
	Multiplicative	ROR	0.84 (0.55, 1.28)	0.85 (0.57, 1.27)

Vitamin E	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*no*	470/1966	1.00 (reference)	1.00 (reference)
low	*yes*	100/118	2.89 (2.15, 3.90)	2.95 (2.20, 3.94)
high	*no*	447/1980	1.09 (0.93, 1.27)	1.10 (0.94, 1.28)
high	*yes*	116/104	4.89 (3.63, 6.58)	4.82 (3.59, 6.47)
	Additive	RERI	**1.91 (0.32, 3.49)**	**1.78 (0.26, 3.30)**
	Multiplicative	ROR	**1.55 (1.02, 2.36)**	**1.49 (1.00, 2.23)**

Sodium (food+condiments)	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*no*	457/1960	1.00 (reference)	1.00 (reference)
low	*yes*	100/124	2.91 (2.16, 3.91)	2.96 (2.22, 3.96)
high	*no*	460/1986	1.05 (0.90, 1.22)	1.05 (0.91, 1.22)
high	*yes*	116/98	4.75 (3.52, 6.41)	4.68 (3.48, 6.29)
	Additive	RERI	**1.79 (0.22, 3.35)**	**1.66 (0.16, 3.16)**
	Multiplicative	ROR	**1.55 (1.02, 2.36)**	**1.50 (1.00, 2.24)**

Selenium	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*no*	500/1962	1.00 (reference)	1.00 (reference)
low	*yes*	101/122	2.70 (2.02, 3.62)	2.77 (2.08, 3.68)
high	*no*	417/1984	1.06 (0.88, 1.26)	1.06 (0.89, 1.27)
high	*yes*	115/100	5.20 (3.80, 7.12)	5.10 (3.74, 6.96)
	Additive	RERI	**2.45 (0.76, 4.14)**	**2.27 (0.66, 3.89)**
	Multiplicative	ROR	**1.82 (1.2, 2.77)**	**1.73 (1.16, 2.59)**

Zinc	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*no*	443/1974	1.00 (reference)	1.00 (reference)
low	*yes*	104/110	3.56 (2.64, 4.80)	3.57 (2.66, 4.78)
high	*no*	474/1972	1.15 (0.99, 1.34)	1.15 (0.99, 1.34)
high	*yes*	112/112	4.23 (3.14, 5.69)	4.22 (3.15, 5.66)
	Additive	RERI	0.51 (-1.02, 2.04)	0.50 (-0.97, 1.98)
	Multiplicative	ROR	1.03 (0.68, 1.56)	1.03 (0.69, 1.53)

Protein	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*no*	459/1968	1.00 (reference)	1.00 (reference)
low	*yes*	101/116	3.15 (2.34, 4.24)	3.19 (2.38, 4.26)

high	*no*	458/1978	1.13 (0.96, 1.33)	1.14 (0.97, 1.33)
high	*yes*	115/106	4.69 (3.47, 6.34)	4.65 (3.45, 6.27)
	Additive	RERI	1.41 (-0.17, 2.99)	1.33 (-0.18, 2.85)
	Multiplicative	ROR	1.32 (0.87, 2)	1.29 (0.86, 1.92)
Fat	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*no*	409/1984	1.00 (reference)	1.00 (reference)
low	*yes*	97/100	4.05 (2.97, 5.52)	4.01 (2.97, 5.43)
high	*no*	508/1962	1.15 (0.98, 1.35)	1.15 (0.98, 1.35)
high	*yes*	119/122	3.80 (2.83, 5.09)	3.82 (2.85, 5.11)
	Additive	RERI	-0.41 (-1.97, 1.15)	-0.35 (-1.84, 1.15)
	Multiplicative	ROR	0.81 (0.54, 1.24)	0.83 (0.55, 1.24)
Fiber	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*no*	453/1969	1.00 (reference)	1.00 (reference)
low	*yes*	109/115	3.56 (2.66, 4.77)	3.57 (2.68, 4.75)
high	*no*	464/1977	1.10 (0.95, 1.28)	1.10 (0.95, 1.28)
high	*yes*	107/107	4.05 (3.00, 5.47)	4.05 (3.01, 5.45)
	Additive	RERI	0.39 (-1.11, 1.89)	0.38 (-1.06, 1.82)
	Multiplicative	ROR	1.03 (0.68, 1.57)	1.03 (0.69, 1.54)
Carbohydrate	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*no*	496/1960	1.00 (reference)	1.00 (reference)
low	*yes*	120/124	3.34 (2.52, 4.43)	3.36 (2.55, 4.44)
high	*no*	421/1986	0.89 (0.76, 1.05)	0.90 (0.76, 1.05)
high	*yes*	96/98	3.56 (2.60, 4.86)	3.54 (2.60, 4.81)
	Additive	RERI	0.32 (-1.05, 1.69)	0.27 (-1.04, 1.59)
	Multiplicative	ROR	1.19 (0.78, 1.81)	1.17 (0.79, 1.75)
Total calories	**Atrophic Gastritis[a]**	**Ca/Co**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*no*	423/1981	1.00 (reference)	1.00 (reference)
low	*yes*	103/103	3.84 (2.83, 5.21)	3.82 (2.84, 5.15)
high	*no*	485/1965	1.10 (0.95, 1.28)	1.10 (0.95, 1.28)
high	*yes*	113/119	3.81 (2.85, 5.08)	3.82 (2.87, 5.09)
	Additive	RERI	-0.14 (-1.64, 1.37)	-0.11 (-1.55, 1.34)
	Multiplicative	ROR	0.90 (0.59, 1.37)	0.91 (0.61, 1.35)

Ca, case; Co, control; aOR, adjusted odds ratio; sbOR, semi-bayes adjusted odds ratio; RERI, relative excess risk due to interaction; ROR, ratio of odds ratios;

[a] Atrophic gastritis is defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b]Adjusted odds ratio controlling for age, gender, county, education level, income ten years ago, family history of stomach cancer, pack-years of smoking, alcohol consumption in the 1990's, *Helicobacter pylori* IgG, and total caloric intake (except "total calories").

Table 3.2.17. Baseline characteristics by *Helicobacter pylori* IgG and atrophic gastritis status.

		Atrophic gastritis and *H. pylori*[a]				
	All	**HP- AG-**	**HP+ AG-**	**HP+ AG+**	**HP- AG+**	**p-value**
Total	7986 (100.0)	2035 (25.5)	5231 (65.5)	531 (6.6)	189 (2.4)	
Stomach cancer						
no	6369 (79.8)	1743 (85.7)	4219 (80.7)	303 (57.1)	104 (55.0)	<.0001
yes	1617 (20.2)	292 (14.3)	1012 (19.3)	228 (42.9)	85 (45.0)	
Location of stomach cancer						
cardia	736 (9.2)	155 (7.6)	452 (8.6)	97 (18.4)	32 (17.2)	0.0238
noncardia	592 (7.4)	89 (4.4)	395 (7.5)	79 (15.0)	29 (15.6)	
unclear	235 (2.9)	40 (2.0)	138 (2.6)	39 (7.4)	18 (9.7)	
missing	54 (0.7)	11 (0.5)	29 (0.6)	11 (2.1)	3 (1.6)	
Gender						
male	5715 (71.6)	1492 (73.3)	3687 (70.5)	393 (74.0)	143 (75.7)	0.0268
female	2271 (28.4)	543 (26.7)	1544 (29.5)	138 (26.0)	46 (24.3)	
County						
Dafeng	2527 (31.6)	464 (22.8)	1898 (36.3)	132 (24.9)	33 (17.5)	<.0001
Ganyu	1753 (22.0)	771 (37.9)	878 (16.8)	61 (11.5)	43 (22.8)	
Chuzhou	1269 (15.9)	317 (15.6)	762 (14.6)	133 (25.0)	57 (30.2)	
Tongshan	2437 (30.5)	483 (23.7)	1693 (32.4)	205 (38.6)	56 (29.6)	
Age (years)						
mean±SD	*63.87±11.32*	*64.36±11.20*	*63.56±11.41*	*64.10±11.19*	*66.67±9.77*	0.0002
age< 50 yrs old	865 (10.8)	200 (9.8)	601 (11.5)	55 (10.4)	9 (4.8)	0.0304
50<= age <60	1780 (22.3)	438 (21.5)	1186 (22.7)	120 (22.6)	36 (19.0)	
60<= age <70	2599 (32.5)	656 (32.2)	1703 (32.6)	176 (33.1)	64 (33.9)	
70<= age <80	2206 (27.6)	601 (29.5)	1397 (26.7)	140 (26.4)	68 (36.0)	
80<= age	536 (6.7)	140 (6.9)	344 (6.6)	40 (7.5)	12 (6.3)	
Current marital status						
not in marriage	1470 (18.4)	385 (18.9)	949 (18.1)	101 (19.0)	35 (18.5)	0.8486
in marriage	6478 (81.1)	1638 (80.5)	4261 (81.5)	427 (80.4)	152 (80.4)	
Education						
illiteracy	3827 (47.9)	1055 (51.8)	2417 (46.2)	266 (50.1)	89 (47.1)	0.0023
primary school	2570 (32.2)	588 (28.9)	1763 (33.7)	154 (29.0)	65 (34.4)	
middle school	1285 (16.1)	321 (15.8)	841 (16.1)	93 (17.5)	30 (15.9)	
high school and above	304 (3.8)	71 (3.5)	210 (4.0)	18 (3.4)	5 (2.6)	

Average family income 10 years ago						
mean±SD	*2122.3±2214.6*	*2085.5±2188.5*	*2159.0±2201.5*	*1969.0±2498.6*	*1932.2±1976.2*	0.1148
less than 1000	1732 (21.7)	494 (24.3)	1056 (20.2)	135 (25.4)	47 (24.9)	0.0002
1000-1499	1604 (20.1)	413 (20.3)	1033 (19.7)	110 (20.7)	49 (25.9)	
1500-2499	2179 (27.3)	518 (25.4)	1474 (28.2)	147 (27.7)	41 (21.7)	
2500 or higher	2471 (30.9)	610 (30.0)	1668 (31.9)	139 (26.2)	52 (27.5)	
BMI groups by Chinese standards						
mean±SD	*22.82±3.71*	*22.79±3.63*	*22.96±3.80*	*21.92±2.88*	*21.98±3.77*	<.0001
Less than18.5	599 (7.5)	144 (7.1)	369 (7.1)	61 (11.5)	25 (13.2)	<.0001
18.5-24	4979 (62.3)	1300 (63.9)	3200 (61.2)	353 (66.5)	126 (66.7)	
24-28	2004 (25.1)	495 (24.3)	1372 (26.2)	103 (19.4)	34 (18.0)	
28 and up	404 (5.1)	96 (4.7)	290 (5.5)	14 (2.6)	4 (2.1)	
Family history of stomach cancer in any relative?						
no	7533 (94.3)	1947 (95.7)	4915 (94.0)	491 (92.5)	180 (95.2)	0.0075
yes	453 (5.7)	88 (4.3)	316 (6.0)	40 (7.5)	9 (4.8)	
Ever smoker?						
no	4124 (51.6)	993 (48.7)	2766 (52.9)	279 (52.5)	86 (46.2)	0.005
yes	3862 (48.4)	1042 (51.3)	2465 (47.1)	252 (47.5)	103 (53.8)	
Pack-years smoking						
mean±SD	*18.06±25.63*	*20.03±26.40*	*17.15±25.17*	*18.65±27.03*	*20.32±24.54*	0.0001
never smoker	4124 (51.6)	993 (48.7)	2766 (52.9)	279 (52.5)	86 (45.5)	<.0001
Less than 40	2342 (29.3)	576 (28.3)	1555 (29.7)	152 (28.6)	59 (31.2)	
40 and above	1520 (19.0)	466 (22.9)	910 (17.4)	100 (18.8)	44 (23.3)	
Ever alcohol drinker?						
no	4257 (53.3)	1039 (51.0)	2826 (54.0)	287 (54.0)	105 (55.6)	0.1259
yes	3729 (46.7)	996 (49.0)	2405 (46.0)	244 (46.0)	84 (44.4)	
Weekly ethanol intake in the 1990s						
mean±SD	*230.0±368.9*	*249.3±391.6*	*223.0±359.7*	*228.0±370.5*	*221.8±359.7*	0.0553
never drinker	4257 (53.3)	1039 (51.1)	2826 (54.0)	287 (54.0)	105 (55.6)	0.0003
0-499	2001 (25.1)	479 (23.5)	1335 (25.5)	145 (27.3)	42 (22.2)	
500+	1728 (21.6)	517 (25.4)	1070 (20.5)	99 (18.6)	42 (22.2)	
Ever tea drinker?						
no	6206 (77.7)	1505 (74.0)	4119 (78.7)	437 (82.3)	145 (76.7)	<.0001
yes	1780 (22.3)	530 (26.0)	1112 (21.3)	94 (17.7)	44 (23.3)	

HP, *Helicobacter pylori*; AG, Atrophic gastritis;

[a]AG+ is defined by PG I ≤ 70ng/mL and PG I/PG II ≤ 6, AG- is PG I > 70ng/mL or PG I/PG II > 6

Table 3.2.18. Helicobacter pylori, atrophic gastritis, and stomach cancer.

HP/AG status[a]	Total	Stomach cancer (overall) Controls n(%)	Cases n(%)	Crude OR (95% CI)	Adjusted OR (95% CI)[b]	Semi-Bayes OR (95% PI)[b]
Total	**7986**	**6369**	**1617**			
HP- AG-	2038	1743 (85.7)	292 (14.4)	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
HP+ AG-	5234	4219 (80.7)	1012 (19.4)	**1.43 (1.24, 1.65)**	**1.41 (1.21, 1.63)**	**1.37 (1.18, 1.58)**
HP+ AG+	528	303 (57.1)	228 (42.9)	**4.49 (3.63, 5.55)**	**4.11 (3.30, 5.13)**	**3.91 (3.15, 4.86)**
HP- AG+	186	104 (55.0)	85 (45.0)	**4.88 (3.57, 6.67)**	**4.58 (3.32, 6.32)**	**4.18 (3.15, 4.86)**
				p-trend<0.0001	**p-trend<0.0001**	

HP/AG status[a]	Total	Non-cardia stomach cancer Controls n(%)	Cases n(%)	Crude OR (95% CI)	Adjusted OR (95% CI)[b]	Semi-Bayes OR (95% PI)[b]
Total	**6961**	**6369**	**592**			
HP- AG-	1832	1743 (95.1)	89 (4.9)	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
HP+ AG-	4615	4219 (91.4)	395 (8.6)	**1.83 (1.45, 2.32)**	**1.69 (1.33, 2.15)**	**1.56 (1.24, 1.96)**
HP+ AG+	381	303 (79.5)	79 (20.5)	**5.11 (3.68, 7.08)**	**4.51 (3.22, 6.31)**	**3.97 (2.88, 5.48)**
HP- AG+	133	104 (78.2)	29 (21.8)	**5.46 (3.44, 8.68)**	**5.36 (3.34, 8.60)**	**4.31 (2.74, 6.80)**
				p-trend<0.0001	**p-trend<0.0001**	

HP/AG status[a]	Total	Cardia stomach cancer Controls n(%)	Cases n(%)	Crude OR (95% CI)	Adjusted OR (95% CI)[b]	Semi-Bayes OR (95% PI)[b]
Total	**7105**	**6369**	**736**			
HP- AG-	1898	1743 (91.8)	152 (8.2)	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
HP+ AG-	4672	4219 (90.3)	451 (9.7)	**1.23 (1.01, 1.49)**	1.18 (0.97, 1.45)	1.14 (0.94, 1.39)
HP+ AG+	399	303 (75.9)	98 (24.1)	**3.71 (2.80, 4.92)**	**3.02 (2.23, 4.08)**	**2.82 (2.10, 3.79)**
HP- AG+	136	104 (76.5)	35 (23.5)	**3.86 (2.54, 5.86)**	**2.93 (1.875, 4.58)**	**2.60 (1.69, 4.00)**
				p-trend<0.0001	**p-trend<0.0001**	

[a]AG+ is defined as PG I ≤ 70ng/mL and PG I/PG II ≤ 6, AG- is PG I > 70ng/mL or PG I/PG II > 6

[b]Adjusted for age, gender, study site (county), education level, average family income10 years ago, family history of stomach cancer, pack-years of smoking, ethanol intake in the 1990's.

Table 3.2.19. Joint associations between risk factors and *H. pylori* infection on stomach cancer.

Ever Smoking	***H. pylori***	**Case/Control**	**aOR (95% CI)[b]**	**sbOR (95% PI)[b]**
no	*negative*	160/919	1.00 (reference)	1.00 (reference)
no	*positive*	532/2513	1.16 (0.95, 1.42)	1.17 (0.96, 1.42)
yes	*negative*	217/928	1.41 (1.11, 1.80)	1.42 (1.12, 1.81)
yes	*positive*	708/2009	2.06 (1.68, 2.53)	2.07 (1.68, 2.54)
	Additive	RERI	**0.48 (0.16, 0.81)**	**0.47 (0.15, 0.79)**
	Multiplicative	ROR	1.25 (0.96, 1.63)	1.24 (0.96, 1.61)
Ever Alcohol Drinking	***H. pylori***	**Case/Control**	**aOR (95% CI)[b]**	**sbOR (95% PI)[b]**
no	*negative*	186/958	1.00 (reference)	1.00 (reference)
no	*positive*	607/2506	1.23 (1.02, 1.48)	1.23 (1.02, 1.48)
yes	*negative*	191/889	1.10 (0.87, 1.40)	1.11 (0.87, 1.40)
yes	*positive*	633/2016	1.55 (1.27, 1.90)	1.56 (1.28, 1.90)
	Additive	RERI	0.22 (-0.06, 0.51)	0.22 (-0.06, 0.50)
	Multiplicative	ROR	1.15 (0.88, 1.5)	1.14 (0.88, 1.48)
Ever Tea Drinking	***H. pylori***	**Case/Control**	**aOR (95% CI)[b]**	**sbOR (95% PI)[b]**
yes	*negative*	100/474	1.00 (reference)	1.00 (reference)
yes	*positive*	244/962	1.18 (0.91, 1.55)	1.19 (0.91, 1.55)
no	*negative*	277/1373	1.04 (0.79, 1.36)	1.04 (0.80, 1.36)
no	*positive*	996/3560	1.41 (1.10, 1.81)	1.412 (1.11, 1.81)
	Additive	RERI	0.19 (-0.12, 0.49)	0.18 (-0.12, 0.48)
	Multiplicative	ROR	1.15 (0.84, 1.56)	1.14 (0.84, 1.54)
Green Tea Drinking	***H. pylori***	**Case/Control**	**aOR (95% CI)[b]**	**sbOR (95% PI)[b]**
yes	*negative*	82/386	1.00 (reference)	1.00 (reference)
yes	*positive*	177/701	1.18 (0.88, 1.60)	1.19 (0.89, 1.60)
no	*negative*	294/1457	1.02 (0.76, 1.35)	1.02 (0.77, 1.35)
no	*positive*	1060/3813	1.37 (1.04, 1.80)	1.37 (1.05, 1.80)
	Additive	RERI	0.17 (-0.16, 0.5)	0.16 (-0.16, 0.49)
	Multiplicative	ROR	1.14 (0.81, 1.59)	1.13 (0.82, 1.56)
Fridge use	***H. pylori***	**Case/Control**	**aOR (95% CI)[b]**	**sbOR (95% PI)[b]**
yes	*negative*	27/155	1.00 (reference)	1.00 (reference)
yes	*positive*	138/488	1.65 (1.04, 2.64)	1.61 (1.04, 2.51)
no	*negative*	348/1677	1.30 (0.83, 2.02)	1.27 (0.83, 1.93)
no	*positive*	1089/3987	1.67 (1.09, 2.58)	1.64 (1.09, 2.48)

	Additive	RERI	-0.28 (-0.94, 0.38)	-0.24 (-0.85, 0.36)
	Multiplicative	ROR	0.78 (0.48, 1.27)	0.8 (0.51, 1.27)

Tonic use	***H. pylori***	**Case/Control**	**aOR (95% CI)[b]**	**sbOR (95% PI)[b]**
no	*negative*	344/1731	1.00 (reference)	1.00 (reference)
no	*positive*	1151/4250	1.34 (1.17, 1.55)	1.34 (1.17, 1.54)
yes	*negative*	21/75	1.38 (0.82, 2.31)	1.34 (0.82, 2.19)
yes	*positive*	67/201	1.50 (1.10, 2.06)	1.51 (1.11, 2.06)
	Additive	RERI	-0.22 (-1.06, 0.61)	-0.18 (-0.93, 0.58)
	Multiplicative	ROR	0.81 (0.45, 1.47)	0.84 (0.48, 1.45)

Vitamin use	***H. pylori***	**Case/Control**	**aOR (95% CI)[b]**	**sbOR (95% PI)[b]**
no	*negative*	360/1780	1.00 (reference)	1.00 (reference)
no	*positive*	1178/4358	1.31 (1.14, 1.50)	1.31 (1.14, 1.51)
yes	*negative*	4/27	0.59 (0.20, 1.76)	0.74 (0.32, 1.71)
yes	*positive*	26/77	1.49 (0.92, 2.40)	1.43 (0.89, 2.28)
	Additive	RERI	0.59 (-0.35, 1.54)	0.38 (-0.43, 1.18)
	Multiplicative	ROR	1.93 (0.59, 6.36)	1.47 (0.61, 3.53)

Ever drink raw water?	***H. pylori***	**Case/Control**	**aOR (95% CI)[b]**	**sbOR (95% PI)[b]**
no	*negative*	144/814	1.00 (reference)	1.00 (reference)
no	*positive*	493/1991	1.41 (1.14, 1.74)	1.40 (1.14, 1.73)
yes	*negative*	225/987	1.32 (1.04, 1.67)	1.32 (1.04, 1.66)
yes	*positive*	725/2417	1.64 (1.34, 2.02)	1.64 (1.34, 2.01)
	Additive	RERI	-0.08 (-0.43, 0.27)	-0.07 (-0.41, 0.26)
	Multiplicative	ROR	0.89 (0.68, 1.16)	0.89 (0.68, 1.16)

Ever eat raw garlic?	***H. pylori***	**Case/Control**	**aOR (95% CI)[b]**	**sbOR (95% PI)[b]**
yes	*negative*	189/1051	1.00 (reference)	1.00 (reference)
yes	*positive*	550/2333	1.22 (1.01, 1.48)	1.23 (1.02, 1.48)
no	*negative*	187/788	1.05 (0.82, 1.34)	1.05 (0.83, 1.34)
no	*positive*	687/2171	1.49 (1.22, 1.82)	1.49 (1.22, 1.82)
	Additive	RERI	0.21 (-0.07, 0.5)	0.21 (-0.07, 0.49)
	Multiplicative	ROR	1.16 (0.89, 1.51)	1.15 (0.89, 1.5)

Eat salty food	***H. pylori***	**Case/Control**	**aOR (95% CI)[b]**	**sbOR (95% PI)[b]**
no	*negative*	220/1261	1.00 (reference)	1.00 (reference)
no	*positive*	762/3144	1.37 (1.15, 1.63)	1.37 (1.15, 1.62)
yes	*negative*	157/583	1.49 (1.18, 1.89)	1.49 (1.18, 1.89)

yes	*positive*	476/1371	1.84 (1.53, 2.22)	1.84 (1.53, 2.21)
	Additive	RERI	-0.02 (-0.41, 0.37)	-0.02 (-0.40, 0.36)
	Multiplicative	ROR	0.9 (0.69, 1.18)	0.9 (0.69, 1.18)
Eat spicy food	***H. pylori***	**Case/Control**	**aOR (95% CI)[b]**	**sbOR (95% PI)[b]**
no	*negative*	225/1300	1.00 (reference)	1.00 (reference)
no	*positive*	791/3216	1.39 (1.17, 1.64)	1.38 (1.17, 1.64)
yes	*negative*	150/542	1.58 (1.24, 2.01)	1.57 (1.24, 1.99)
yes	*positive*	440/1296	1.88 (1.56, 2.27)	1.88 (1.56, 2.27)
	Additive	RERI	-0.09 (-0.5, 0.33)	-0.08 (-0.48, 0.33)
	Multiplicative	ROR	0.86 (0.65, 1.13)	0.86 (0.66, 1.13)
Eat hot food	***H. pylori***	**Case/Control**	**aOR (95% CI)[b]**	**sbOR (95% PI)[b]**
no	*negative*	182/1039	1.00 (reference)	1.00 (reference)
no	*positive*	571/2605	1.22 (1.01, 1.47)	1.22 (1.01, 1.47)
yes	*negative*	195/806	1.35 (1.07, 1.70)	1.35 (1.08, 1.70)
yes	*positive*	667/1910	1.92 (1.59, 2.32)	1.92 (1.59, 2.32)
	Additive	RERI	**0.35 (0.03, 0.67)**	**0.35 (0.03, 0.66)**
	Multiplicative	ROR	1.17 (0.9, 1.52)	1.16 (0.9, 1.51)
Family history of Stomach Cancer	***H. pylori***	**Case/Control**	**aOR (95% CI)[b]**	**sbOR (95% PI)[b]**
no	*negative*	345/1782	1.00 (reference)	1.00 (reference)
no	*positive*	1115/4291	1.32 (1.15, 1.52)	1.32 (1.15, 1.52)
yes	*negative*	32/65	2.05 (1.30, 3.24)	2.03 (1.31, 3.14)
yes	*positive*	125/231	2.46 (1.88, 3.21)	2.46 (1.89, 3.21)
	Additive	RERI	0.08 (-0.99, 1.16)	0.10 (-0.90, 1.11)
	Multiplicative	ROR	0.90 (0.54, 1.51)	0.92 (0.56, 1.48)

Ca, case; Co, control; aOR, adjusted odds ratio; sbOR, semi-bayes adjusted odds ratio; RERI, relative excess risk due to interaction; ROR, ratio of odds ratios;
[b]Adjusted odds ratio controlling for age, gender, county, education level, income ten years ago, family history of stomach cancer (except variable "family history of stomach cancer"), pack-years of smoking (except "ever smoking"), alcohol consumption in the 1990's (except "ever drinking), and atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

Table 3.2.20. Joint associations between micronutrients, macronutrients, and total caloric intake with *Helicobacter pylori* infection on stomach cancer.

Vitamin A	***H. pylori***	**Case/Control**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*negative*	121/598	1.00 (reference)	1.00 (reference)
low	*positive*	428/1486	1.44 (1.14, 1.82)	1.44 (1.14, 1.82)
high	*negative*	146/721	1.13 (0.86, 1.50)	1.13 (0.86, 1.49)
high	*positive*	438/1363	1.68 (1.33, 2.13)	1.68 (1.33, 2.12)
	Additive	RERI	0.11 (-0.26, 0.48)	0.11 (-0.26, 0.47)
	Multiplicative	ROR	1.03 (0.75, 1.42)	1.03 (0.75, 1.40)
Carotene	***H. pylori***	**Case/Control**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*negative*	123/629	1.00 (reference)	1.00 (reference)
low	*positive*	409/1455	1.38 (1.10, 1.75)	1.39 (1.10, 1.75)
high	*negative*	144/690	1.04 (0.79, 1.37)	1.04 (0.80, 1.37)
high	*positive*	457/1394	1.60 (1.27, 2.01)	1.60 (1.27, 2.01)
	Additive	RERI	0.17 (-0.18, 0.52)	0.17 (-0.17, 0.51)
	Multiplicative	ROR	1.11 (0.81, 1.53)	1.10 (0.81, 1.51)
Thiamine (Vit B1)	***H. pylori***	**Case/Control**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*negative*	118/535	1.00 (reference)	1.00 (reference)
low	*positive*	490/1549	1.54 (1.22, 1.95)	1.54 (1.22, 1.94)
high	*negative*	149/784	1.18 (0.88, 1.58)	1.17 (0.88, 1.56)
high	*positive*	376/1300	1.65 (1.29, 2.11)	1.65 (1.29, 2.11)
	Additive	RERI	-0.07 (-0.47, 0.33)	-0.06 (-0.46, 0.33)
	Multiplicative	ROR	0.91 (0.66, 1.25)	0.91 (0.67, 1.25)
Riboflavin (Vit B2)	***H. pylori***	**Case/Control**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*negative*	114/568	1.00 (reference)	1.00 (reference)
low	*positive*	424/1516	1.45 (1.14, 1.84)	1.45 (1.14, 1.84)
high	*negative*	153/751	1.20 (0.90, 1.59)	1.20 (0.91, 1.59)
high	*positive*	442/1333	1.75 (1.38, 2.23)	1.76 (1.38, 2.23)
	Additive	RERI	0.11 (-0.28, 0.49)	0.10 (-0.27, 0.48)
	Multiplicative	ROR	1.01 (0.73, 1.39)	1.01 (0.74, 1.38)
Niacin (Vit B3)	***H. pylori***	**Case/Control**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*negative*	123/656	1.00 (reference)	1.00 (reference)
low	*positive*	408/1428	1.48 (1.17, 1.87)	1.48 (1.17, 1.86)
high	*negative*	144/663	1.08 (0.82, 1.42)	1.08 (0.82, 1.41)
high	*positive*	458/1421	1.56 (1.24, 1.97)	1.56 (1.24, 1.97)
	Additive	RERI	0.01 (-0.37, 0.38)	0.01 (-0.36, 0.37)
	Multiplicative	ROR	0.98 (0.71, 1.35)	0.98 (0.72, 1.34)
Vitamin C	***H. pylori***	**Case/Control**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**

low	*negative*	124/607	1.00 (reference)	1.00 (reference)
low	*positive*	420/1477	1.36 (1.07, 1.71)	1.36 (1.08, 1.71)
high	*negative*	143/712	1.04 (0.79, 1.38)	1.05 (0.80, 1.38)
high	*positive*	446/1372	1.63 (1.30, 2.06)	1.64 (1.30, 2.06)
	Additive	RERI	0.23 (-0.12, 0.58)	0.22 (-0.12, 0.56)
	Multiplicative	ROR	1.15 (0.84, 1.58)	1.14 (0.84, 1.56)
Vitamin E	***H. pylori***	**Case/Control**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*negative*	123/605	1.00 (reference)	1.00 (reference)
low	*positive*	447/1479	1.53 (1.21, 1.93)	1.53 (1.21, 1.92)
high	*negative*	144/714	1.24 (0.93, 1.64)	1.23 (0.93, 1.62)
high	*positive*	419/1370	1.72 (1.36, 2.18)	1.72 (1.36, 2.18)
	Additive	RERI	-0.04 (-0.45, 0.37)	-0.04 (-0.43, 0.36)
	Multiplicative	ROR	0.91 (0.66, 1.25)	0.92 (0.67, 1.25)
Sodium (food+condiments)	***H. pylori***	**Case/Control**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*negative*	140/658	1.00 (reference)	1.00 (reference)
low	*positive*	417/1426	1.43 (1.14, 1.79)	1.43 (1.15, 1.79)
high	*negative*	127/661	1.07 (0.81, 1.41)	1.07 (0.82, 1.40)
high	*positive*	449/1423	1.60 (1.28, 2.01)	1.61 (1.28, 2.01)
	Additive	RERI	0.11 (-0.26, 0.47)	0.10 (-0.25, 0.46)
	Multiplicative	ROR	1.05 (0.76, 1.44)	1.05 (0.77, 1.43)
Selenium	***H. pylori***	**Case/Control**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*negative*	120/510	1.00 (reference)	1.00 (reference)
low	*positive*	481/1574	1.44 (1.14, 1.82)	1.44 (1.14, 1.82)
high	*negative*	147/809	1.12 (0.83, 1.51)	1.12 (0.83, 1.50)
high	*positive*	385/1275	1.66 (1.29, 2.13)	1.66 (1.29, 2.13)
	Additive	RERI	0.10 (-0.27, 0.48)	0.10 (-0.27, 0.47)
	Multiplicative	ROR	1.03 (0.75, 1.43)	1.03 (0.75, 1.41)
Zinc	***H. pylori***	**Case/Control**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*negative*	115/605	1.00 (reference)	1.00 (reference)
low	*positive*	432/1479	1.56 (1.23, 1.99)	1.56 (1.23, 1.97)
high	*negative*	152/714	1.28 (0.96, 1.69)	1.27 (0.96, 1.67)
high	*positive*	434/1370	1.75 (1.38, 2.22)	1.75 (1.38, 2.22)
	Additive	RERI	-0.09 (-0.51, 0.33)	-0.08 (-0.49, 0.33)
	Multiplicative	ROR	0.88 (0.64, 1.21)	0.88 (0.65, 1.21)
Protein	***H. pylori***	**Case/Control**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*negative*	119/569	1.00 (reference)	1.00 (reference)

low	*positive*	441/1515	1.44 (1.14, 1.83)	1.44 (1.14, 1.82)
high	*negative*	148/750	1.15 (0.87, 1.53)	1.15 (0.87, 1.53)
high	*positive*	425/1334	1.70 (1.34, 2.16)	1.70 (1.34, 2.16)
	Additive	RERI	0.10 (-0.27, 0.48)	0.10 (-0.27, 0.47)
	Multiplicative	ROR	1.02 (0.74, 1.41)	1.02 (0.75, 1.40)
Fat	***H. pylori***	**Case/Control**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*negative*	113/617	1.00 (reference)	1.00 (reference)
low	*positive*	393/1467	1.48 (1.17, 1.89)	1.48 (1.17, 1.88)
high	*negative*	154/702	1.15 (0.87, 1.52)	1.15 (0.87, 1.51)
high	*positive*	473/1382	1.65 (1.30, 2.10)	1.65 (1.30, 2.09)
	Additive	RERI	0.02 (-0.37, 0.41)	0.02 (-0.35, 0.40)
	Multiplicative	ROR	0.97 (0.70, 1.34)	0.97 (0.71, 1.33)
Fiber	***H. pylori***	**Case/Control**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*negative*	119/612	1.00 (reference)	1.00 (reference)
low	*positive*	443/1472	1.52 (1.20, 1.93)	1.52 (1.21, 1.92)
high	*negative*	148/707	1.17 (0.89, 1.54)	1.17 (0.89, 1.53)
high	*positive*	423/1377	1.66 (1.31, 2.09)	1.65 (1.31, 2.09)
	Additive	RERI	-0.04 (-0.43, 0.36)	-0.03 (-0.42, 0.35)
	Multiplicative	ROR	0.93 (0.68, 1.28)	0.93 (0.68, 1.27)
Carbohydrate	***H. pylori***	**Case/Control**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*negative*	157/703	1.00 (reference)	1.00 (reference)
low	*positive*	459/1381	1.38 (1.11, 1.71)	1.38 (1.12, 1.71)
high	*negative*	110/616	0.83 (0.63, 1.10)	0.83 (0.63, 1.10)
high	*positive*	407/1468	1.30 (1.03, 1.64)	1.30 (1.03, 1.64)
	Additive	RERI	0.09 (-0.23, 0.42)	0.09 (-0.23, 0.40)
	Multiplicative	ROR	1.14 (0.83, 1.57)	1.13 (0.83, 1.55)
Total calories	***H. pylori***	**Case/Control**	**aOR(95% CI)[b]**	**sbOR (95% PI)[b]**
low	*negative*	134/718	1.00 (reference)	1.00 (reference)
low	*positive*	401/1366	1.52 (1.21, 1.91)	1.52 (1.21, 1.90)
high	*negative*	133/601	1.15 (0.87, 1.51)	1.15 (0.87, 1.50)
high	*positive*	465/1483	1.62 (1.29, 2.04)	1.62 (1.29, 2.04)
	Additive	RERI	-0.05 (-0.44, 0.35)	-0.04 (-0.42, 0.34)
	Multiplicative	ROR	0.93 (0.68, 1.28)	0.93 (0.68, 1.27)

Ca, case; Co, control; aOR, adjusted odds ratio; sbOR, semi-bayes adjusted odds ratio; RERI, relative excess risk due to interaction; ROR, ratio of odds ratios;

[b]Adjusted odds ratio controlling for age, gender, county, education level, income ten years ago, family history of stomach cancer, pack-years of smoking, alcohol consumption in the 1990's, atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6, and total caloric intake (except "total calories").

Table 3.3.1. Associations between SNPs related to the miRNA pathway and atrophic gastritis, defined by low serum pepsinogen levels in the Jiangsu study.

		Atrophic Gastritis[a]			
dbSNP no.	**genotype**	**Ca/Co**	**cOR**	**aOR[b]**	**sbOR[b]**
IL15					
rs10519613	C:C	25/751	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	C:A	35/942	1.12 (0.66, 1.88)	1.18 (0.70, 1.99)	1.12 (0.69, 1.81)
	A:A	19/376	1.52 (0.83, 2.79)	1.61 (0.87, 2.97)	1.47 (0.84, 2.57)
	Log-Additive		1.22 (0.90, 1.67)	1.26 (0.92, 1.72)	1.25 (0.92, 1.69)
	Dominant		1.23 (0.76, 1.99)	1.30 (0.80, 2.11)	1.26 (0.80, 1.99)
	Recessive		1.43 (0.84, 2.42)	1.47 (0.86, 2.50)	1.39 (0.84, 2.31)
XPO5					
rs11077	A:A	74/1798	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	A:C	8/256	0.76 (0.36, 1.59)	0.75 (0.36, 1.59)	0.81 (0.42, 1.54)
	C:C	0/19	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.75 (0.22, 2.55)
	Log-Additive		0.69 (0.34, 1.39)	0.68 (0.33, 1.38)	0.73 (0.40, 1.35)
	Dominant		0.71 (0.34, 1.48)	0.70 (0.33, 1.47)	0.76 (0.40, 1.44)
	Recessive		0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.75 (0.22, 2.57)
miR-196a2					
rs11614913	T:T	28/636	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	C:T	35/964	0.82 (0.50, 1.37)	0.77 (0.46, 1.29)	0.81 (0.50, 1.30)
	C:C	15/427	0.80 (0.42, 1.51)	0.76 (0.40, 1.45)	0.81 (0.45, 1.44)
	Log-Additive		0.88 (0.64, 1.21)	0.86 (0.62, 1.18)	0.86 (0.63, 1.18)
	Dominant		0.82 (0.51, 1.31)	0.77 (0.48, 1.24)	0.79 (0.50, 1.24)
	Recessive		0.89 (0.50, 1.58)	0.88 (0.49, 1.57)	0.90 (0.53, 1.53)
WWOX					
rs12828	G:G	35/840	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	A:G	31/902	0.82 (0.50, 1.35)	0.83 (0.50, 1.36)	0.85 (0.53, 1.35)
	A:A	12/290	0.99 (0.51, 1.94)	1.01 (0.51, 1.98)	1.01 (0.55, 1.86)
	Log-Additive		0.95 (0.69, 1.32)	0.96 (0.69, 1.33)	0.96 (0.70, 1.32)
	Dominant		0.87 (0.55, 1.36)	0.87 (0.55, 1.38)	0.88 (0.57, 1.37)
	Recessive		1.09 (0.58, 2.05)	1.11 (0.59, 2.08)	1.09 (0.61, 1.94)
Ran					
rs14035	C:C	54/1323	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	C:T	22/571	0.94 (0.57, 1.56)	0.95 (0.57, 1.58)	0.96 (0.59, 1.54)
	T:T	3/89	0.83 (0.25, 2.69)	0.94 (0.29, 3.11)	0.97 (0.39, 2.38)
	Log-Additive		0.93 (0.62, 1.39)	0.96 (0.63, 1.45)	0.96 (0.65, 1.43)
	Dominant		0.93 (0.57, 1.50)	0.95 (0.58, 1.54)	0.95 (0.60, 1.51)
	Recessive		0.84 (0.26, 2.72)	0.96 (0.29, 3.13)	0.98 (0.40, 2.39)

CXCL12					
rs1804429	T:T	71/1811	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	G:T	7/258	0.69 (0.31, 1.52)	0.68 (0.31, 1.51)	0.74 (0.38, 1.45)
	G:G	2/9	**5.67 (1.20, 26.73)**	**5.42 (1.11, 26.43)**	1.83 (0.56, 6.00)
	Log-Additive		1.04 (0.56, 1.93)	1.03 (0.55, 1.92)	1.02 (0.58, 1.81)
	Dominant		0.86 (0.42, 1.74)	0.85 (0.42, 1.74)	0.88 (0.47, 1.65)
	Recessive		**5.89 (1.25, 27.74)**	**5.63 (1.15, 27.41)**	1.84 (0.56, 6.06)
Gemin3					
rs197412	T:T	40/910	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	T:C	31/912	0.77 (0.48, 1.25)	0.76 (0.47, 1.23)	0.79 (0.50, 1.24)
	C:C	7/226	0.70 (0.31, 1.59)	0.73 (0.32, 1.67)	0.80 (0.40, 1.60)
	Log-Additive		0.81 (0.57, 1.16)	0.81 (0.57, 1.17)	0.83 (0.58, 1.17)
	Dominant		0.76 (0.48, 1.19)	0.75 (0.48, 1.19)	0.78 (0.50, 1.20)
	Recessive		0.79 (0.36, 1.75)	0.83 (0.38, 1.84)	0.87 (0.44, 1.72)
E2F2					
rs2075993	G:G	27/744	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	G:A	37/940	1.08 (0.65, 1.80)	1.14 (0.68, 1.90)	1.10 (0.68, 1.75)
	A:A	16/327	1.35 (0.72, 2.54)	1.51 (0.80, 2.87)	1.40 (0.78, 2.49)
	Log-Additive		1.15 (0.84, 1.58)	1.22 (0.88, 1.68)	1.20 (0.88, 1.65)
	Dominant		1.15 (0.72, 1.85)	1.23 (0.76, 1.99)	1.20 (0.77, 1.89)
	Recessive		1.29 (0.74, 2.26)	1.40 (0.80, 2.48)	1.34 (0.79, 2.27)
RCHY1					
rs2126852	A:A	47/1117	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	A:G	30/757	0.94 (0.59, 1.50)	0.94 (0.59, 1.50)	0.96 (0.62, 1.50)
	G:G	4/171	0.56 (0.20, 1.56)	0.55 (0.19, 1.54)	0.67 (0.31, 1.48)
	Log-Additive		0.84 (0.59, 1.21)	0.84 (0.58, 1.20)	0.85 (0.60, 1.20)
	Dominant		0.87 (0.56, 1.37)	0.87 (0.55, 1.36)	0.88 (0.57, 1.35)
	Recessive		0.57 (0.21, 1.57)	0.56 (0.20, 1.56)	0.68 (0.31, 1.48)
Wnt2B					
rs2273368	C:C	15/612	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	C:T	40/948	1.72 (0.94, 3.14)	1.66 (0.90, 3.04)	1.44 (0.85, 2.43)
	T:T	25/483	**2.11 (1.10, 4.05)**	**2.03 (1.05, 3.92)**	1.72 (0.97, 3.03)
	Log-Additive		**1.43 (1.05, 1.94)**	**1.40 (1.02, 1.92)**	**1.38 (1.01, 1.87)**
	Dominant		**1.85 (1.05, 3.27)**	**1.78 (1.00, 3.16)**	1.64 (0.97, 2.76)
	Recessive		1.47 (0.91, 2.38)	1.44 (0.88, 2.36)	1.39 (0.87, 2.21)
THBS1					
rs2292305	T:T	34/931	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)

	C:T	31/869	0.98 (0.60, 1.60)	0.99 (0.60, 1.63)	0.97 (0.61, 1.54)
	C:C	14/243	1.58 (0.83, 2.99)	1.46 (0.76, 2.78)	1.36 (0.76, 2.45)
	Log-Additive		1.19 (0.86, 1.64)	1.16 (0.84, 1.60)	1.15 (0.84, 1.57)
	Dominant		1.11 (0.70, 1.74)	1.10 (0.69, 1.73)	1.09 (0.70, 1.68)
	Recessive		1.60 (0.88, 2.89)	1.46 (0.80, 2.67)	1.38 (0.79, 2.41)
Gemin4					
rs2740348	G:G	63/1635	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	G:C	16/346	1.20 (0.68, 2.10)	1.13 (0.64, 2.00)	1.11 (0.66, 1.88)
	C:C	1/28	0.93 (0.12, 6.92)	0.97 (0.13, 7.41)	0.99 (0.32, 3.10)
	Log-Additive		1.13 (0.69, 1.85)	1.10 (0.67, 1.81)	1.08 (0.68, 1.74)
	Dominant		1.18 (0.68, 2.04)	1.12 (0.65, 1.95)	1.11 (0.66, 1.85)
	Recessive		0.90 (0.12, 6.67)	0.95 (0.13, 7.20)	0.98 (0.32, 3.07)
pre-miR-146a					
rs2910164	C:C	28/751	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	G:C	41/961	1.14 (0.70, 1.87)	1.12 (0.68, 1.84)	1.11 (0.70, 1.75)
	G:G	12/363	0.89 (0.45, 1.76)	0.94 (0.47, 1.88)	0.95 (0.51, 1.75)
	Log-Additive		0.98 (0.71, 1.34)	1.00 (0.72, 1.38)	1.00 (0.73, 1.36)
	Dominant		1.07 (0.67, 1.71)	1.07 (0.67, 1.72)	1.07 (0.68, 1.66)
	Recessive		0.82 (0.44, 1.53)	0.88 (0.47, 1.65)	0.90 (0.51, 1.59)
CTNNB1					
rs2953	T:T	49/1152	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	G:T	22/790	0.65 (0.39, 1.09)	0.66 (0.39, 1.11)	0.68 (0.43, 1.10)
	G:G	10/140	1.68 (0.83, 3.39)	1.66 (0.81, 3.38)	1.51 (0.79, 2.88)
	Log-Additive		1.01 (0.71, 1.44)	1.01 (0.71, 1.45)	1.01 (0.72, 1.43)
	Dominant		0.81 (0.51, 1.27)	0.82 (0.52, 1.29)	0.83 (0.54, 1.28)
	Recessive		1.95 (0.99, 3.87)	1.92 (0.96, 3.84)	1.68 (0.88, 3.18)
DOCK4					
rs3801790	A:A	39/771	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	A:G	28/943	**0.59 (0.36, 0.96)**	**0.59 (0.36, 0.98)**	0.63 (0.40, 1.01)
	G:G	14/327	0.85 (0.45, 1.58)	0.88 (0.47, 1.66)	0.92 (0.52, 1.63)
	Log-Additive		0.83 (0.60, 1.14)	0.84 (0.61, 1.17)	0.85 (0.62, 1.17)
	Dominant		0.65 (0.42, 1.02)	0.67 (0.43, 1.05)	0.69 (0.45, 1.07)
	Recessive		1.10 (0.61, 1.97)	1.13 (0.62, 2.06)	1.11 (0.64, 1.93)
Rbl2					
rs3929	G:G	52/1405	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	C:G	23/628	0.99 (0.60, 1.63)	0.99 (0.60, 1.63)	0.98 (0.61, 1.57)
	C:C	4/77	1.40 (0.49, 3.98)	1.30 (0.45, 3.74)	1.18 (0.50, 2.78)
	Log-Additive		1.07 (0.72, 1.59)	1.05 (0.71, 1.57)	1.05 (0.72, 1.54)

	Dominant		1.03 (0.64, 1.66)	1.02 (0.64, 1.65)	1.02 (0.65, 1.60)
	Recessive		1.41 (0.50, 3.95)	1.31 (0.46, 3.71)	1.18 (0.50, 2.78)
IL6R					
rs4072391	C:C	72/1714	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	C:T	10/341	0.70 (0.36, 1.37)	0.69 (0.35, 1.36)	0.75 (0.41, 1.36)
	T:T	0/25	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.69 (0.21, 2.29)
	Log-Additive		0.63 (0.33, 1.20)	0.63 (0.33, 1.19)	0.68 (0.39, 1.20)
	Dominant		0.65 (0.33, 1.27)	0.64 (0.33, 1.26)	0.70 (0.39, 1.26)
	Recessive		0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	0.70 (0.21, 2.33)
Ago2					
rs4961280	C:C	60/1552	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	C:A	18/434	1.07 (0.63, 1.84)	1.01 (0.59, 1.75)	1.01 (0.61, 1.69)
	A:A	1/36	0.72 (0.10, 5.33)	0.69 (0.09, 5.20)	0.88 (0.29, 2.65)
	Log-Additive		1.01 (0.63, 1.63)	0.97 (0.60, 1.56)	0.97 (0.61, 1.53)
	Dominant		1.05 (0.62, 1.77)	0.99 (0.58, 1.69)	0.99 (0.60, 1.63)
	Recessive		0.71 (0.10, 5.23)	0.69 (0.09, 5.16)	0.88 (0.29, 2.64)
miR-26a1					
rs7372209	C:C	44/1029	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	C:T	31/849	0.85 (0.53, 1.36)	0.84 (0.52, 1.34)	0.87 (0.56, 1.36)
	T:T	4/196	0.48 (0.17, 1.34)	0.48 (0.17, 1.36)	0.62 (0.28, 1.35)
	Log-Additive		0.77 (0.54, 1.11)	0.76 (0.53, 1.11)	0.78 (0.55, 1.11)
	Dominant		0.78 (0.50, 1.23)	0.77 (0.49, 1.22)	0.79 (0.51, 1.22)
	Recessive		0.51 (0.18, 1.41)	0.51 (0.18, 1.44)	0.64 (0.30, 1.40)
TP53INP1					
rs7760	T:T	62/1578	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	T:G	17/433	1.00 (0.58, 1.73)	1.02 (0.59, 1.77)	1.01 (0.60, 1.68)
	G:G	3/52	1.47 (0.45, 4.83)	1.73 (0.51, 5.80)	1.35 (0.51, 3.52)
	Log-Additive		1.08 (0.70, 1.67)	1.13 (0.73, 1.76)	1.12 (0.73, 1.70)
	Dominant		1.05 (0.63, 1.76)	1.09 (0.65, 1.82)	1.07 (0.66, 1.75)
	Recessive		1.47 (0.45, 4.80)	1.72 (0.52, 5.74)	1.35 (0.52, 3.51)
Gemin4					
rs7813	T:T	45/1040	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	C:T	29/781	0.86 (0.53, 1.38)	0.81 (0.50, 1.31)	0.83 (0.53, 1.31)
	C:C	7/191	0.85 (0.38, 1.91)	0.79 (0.35, 1.79)	0.84 (0.42, 1.69)
	Log-Additive		0.89 (0.63, 1.26)	0.85 (0.60, 1.21)	0.86 (0.61, 1.21)
	Dominant		0.86 (0.55, 1.34)	0.80 (0.51, 1.27)	0.82 (0.54, 1.26)
	Recessive		0.90 (0.41, 1.99)	0.86 (0.39, 1.91)	0.89 (0.45, 1.77)

KRAS					
rs9266	C:C	51/1313	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	C:T	27/656	1.06 (0.66, 1.71)	1.07 (0.66, 1.73)	1.08 (0.68, 1.69)
	T:T	2/101	0.51 (0.12, 2.12)	0.52 (0.12, 2.21)	0.72 (0.28, 1.82)
	Log-Additive		0.92 (0.62, 1.37)	0.93 (0.63, 1.39)	0.94 (0.64, 1.37)
	Dominant		0.99 (0.62, 1.57)	1.00 (0.63, 1.60)	1.00 (0.64, 1.56)
	Recessive		0.50 (0.12, 2.06)	0.51 (0.12, 2.14)	0.71 (0.28, 1.78)

Ca, case; Co, control; cOR, crude odds ratio; aOR, adjusted odds ratio; sbOR, semi-bayes adjusted odds ratio;

[a] Atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b] Adjusted for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, pack-years of smoking, alcohol consumption in the 1990's, *Helicobacter pylori* IgG.

Table 3.3.2 Associations between SNPs related to the stem cell pathway and atrophic gastritis, defined by low serum pepsinogen levels in the Jiangsu study.

		Atrophic Gastritis[a]			
dbSNP no.	**genotype**	**Ca/Co**	**cOR**	**aOR[b]**	**sbOR[b]**
DLL1					
rs1033583	A:A	36/1037	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	A:C	28/644	1.25 (0.76, 2.07)	1.18 (0.71, 1.97)	1.15 (0.72, 1.86)
	C:C	5/119	1.21 (0.47, 3.14)	1.14 (0.44, 3.00)	1.09 (0.49, 2.42)
	Log-Additive		1.17 (0.80, 1.70)	1.12 (0.76, 1.64)	1.11 (0.77, 1.61)
	Dominant		1.25 (0.77, 2.02)	1.18 (0.72, 1.92)	1.16 (0.73, 1.83)
	Recessive		1.10 (0.44, 2.79)	1.07 (0.42, 2.73)	1.05 (0.48, 2.28)
HEY1					
rs1046472	C:C	47/1302	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	A:C	31/682	1.26 (0.79, 2.00)	1.19 (0.75, 1.90)	1.18 (0.76, 1.84)
	A:A	3/102	0.82 (0.25, 2.66)	0.75 (0.23, 2.47)	0.84 (0.35, 2.02)
	Log-Additive		1.10 (0.76, 1.59)	1.04 (0.72, 1.52)	1.04 (0.72, 1.50)
	Dominant		1.20 (0.77, 1.88)	1.13 (0.72, 1.79)	1.12 (0.73, 1.73)
	Recessive		0.75 (0.23, 2.41)	0.70 (0.22, 2.28)	0.81 (0.34, 1.92)
HES2					
rs11364	G:G	47/1262	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	A:G	19/421	1.21 (0.70, 2.09)	1.24 (0.72, 2.15)	1.22 (0.73, 2.03)
	A:A	1/57	0.47 (0.06, 3.48)	0.50 (0.07, 3.74)	0.77 (0.27, 2.24)
	Log-Additive		1.02 (0.65, 1.62)	1.05 (0.66, 1.67)	1.04 (0.67, 1.63)
	Dominant		1.12 (0.66, 1.92)	1.16 (0.67, 1.98)	1.13 (0.68, 1.88)
	Recessive		0.45 (0.06, 3.28)	0.47 (0.06, 3.51)	0.76 (0.26, 2.17)
Oct4					
rs13409	C:C	28/743	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	C:T	35/954	0.97 (0.59, 1.61)	0.97 (0.58, 1.62)	0.97 (0.60, 1.54)
	T:T	18/379	1.26 (0.69, 2.31)	1.25 (0.68, 2.31)	1.21 (0.69, 2.11)
	Log-Additive		1.11 (0.81, 1.50)	1.10 (0.81, 1.50)	1.10 (0.81, 1.49)
	Dominant		1.06 (0.66, 1.68)	1.05 (0.66, 1.69)	1.05 (0.67, 1.64)
	Recessive		1.28 (0.75, 2.19)	1.27 (0.74, 2.18)	1.23 (0.74, 2.04)
AXIN1					
rs1981492	G:G	37/1060	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	A:G	31/801	1.11 (0.68, 1.80)	1.09 (0.67, 1.79)	1.06 (0.67, 1.67)
	A:A	13/194	**1.92 (1.00, 3.68)**	1.79 (0.93, 3.47)	1.60 (0.88, 2.93)
	Log-Additive		1.31 (0.95, 1.81)	1.28 (0.92, 1.76)	1.26 (0.92, 1.73)
	Dominant		1.27 (0.81, 1.98)	1.24 (0.79, 1.94)	1.21 (0.79, 1.86)
	Recessive		**1.83 (1.00, 3.38)**	1.72 (0.93, 3.21)	1.57 (0.88, 2.80)

GLI1					
rs2228224	G:G	46/1125	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	A:G	22/756	0.71 (0.42, 1.19)	0.74 (0.44, 1.25)	0.76 (0.47, 1.22)
	A:A	11/162	1.66 (0.84, 3.27)	1.72 (0.87, 3.43)	1.56 (0.83, 2.93)
	Log-Additive		1.07 (0.76, 1.51)	1.10 (0.78, 1.55)	1.09 (0.78, 1.53)
	Dominant		0.88 (0.56, 1.39)	0.92 (0.58, 1.45)	0.92 (0.60, 1.43)
	Recessive		1.88 (0.97, 3.62)	1.92 (0.98, 3.73)	1.69 (0.91, 3.14)
DVL2					
rs222851	A:A	28/827	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	A:G	38/918	1.22 (0.74, 2.01)	1.19 (0.72, 1.97)	1.15 (0.72, 1.82)
	G:G	14/294	1.41 (0.73, 2.71)	1.44 (0.74, 2.79)	1.33 (0.73, 2.42)
	Log-Additive		1.19 (0.87, 1.63)	1.20 (0.87, 1.65)	1.19 (0.87, 1.62)
	Dominant		1.27 (0.79, 2.02)	1.25 (0.78, 2.01)	1.22 (0.78, 1.91)
	Recessive		1.26 (0.70, 2.27)	1.31 (0.72, 2.37)	1.25 (0.72, 2.18)
AXIN2					
rs2240308	G:G	33/931	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	A:G	30/775	1.09 (0.66, 1.81)	1.07 (0.64, 1.78)	1.04 (0.65, 1.66)
	A:A	11/193	1.61 (0.80, 3.24)	1.61 (0.79, 3.26)	1.45 (0.77, 2.75)
	Log-Additive		1.22 (0.87, 1.71)	1.21 (0.86, 1.70)	1.20 (0.86, 1.67)
	Dominant		1.19 (0.75, 1.91)	1.17 (0.73, 1.88)	1.16 (0.74, 1.80)
	Recessive		1.54 (0.80, 2.98)	1.56 (0.80, 3.03)	1.43 (0.77, 2.64)
FZD3					
rs2241802	G:G	29/648	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	A:G	33/943	0.78 (0.47, 1.30)	0.79 (0.47, 1.32)	0.82 (0.51, 1.31)
	A:A	16/397	0.90 (0.48, 1.68)	0.91 (0.49, 1.70)	0.94 (0.53, 1.65)
	Log-Additive		0.92 (0.67, 1.27)	0.93 (0.67, 1.28)	0.93 (0.68, 1.27)
	Dominant		0.82 (0.51, 1.31)	0.83 (0.51, 1.32)	0.84 (0.54, 1.32)
	Recessive		1.03 (0.59, 1.81)	1.04 (0.59, 1.83)	1.03 (0.61, 1.74)
Dec1					
rs2269700	T:T	60/1381	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	C:T	17/616	0.64 (0.37, 1.10)	0.63 (0.36, 1.09)	0.66 (0.40, 1.10)
	C:C	4/77	1.20 (0.42, 3.38)	1.33 (0.46, 3.81)	1.21 (0.51, 2.85)
	Log-Additive		0.80 (0.52, 1.24)	0.81 (0.52, 1.25)	0.83 (0.55, 1.25)
	Dominant		0.70 (0.42, 1.16)	0.70 (0.42, 1.16)	0.73 (0.45, 1.17)
	Recessive		1.35 (0.48, 3.78)	1.50 (0.53, 4.28)	1.29 (0.54, 3.07)
Oct4					
rs3130932	T:T	51/956	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)

	G:T	24/887	**0.51 (0.31, 0.83)**	**0.53 (0.32, 0.87)**	**0.58 (0.36, 0.91)**
	G:G	7/235	0.56 (0.25, 1.25)	0.61 (0.27, 1.37)	0.70 (0.36, 1.38)
	Log-Additive		**0.63 (0.44, 0.91)**	**0.66 (0.46, 0.95)**	**0.68 (0.48, 0.96)**
	Dominant		**0.52 (0.33, 0.82)**	**0.54 (0.34, 0.86)**	**0.58 (0.37, 0.89)**
	Recessive		0.73 (0.33, 1.61)	0.79 (0.36, 1.74)	0.83 (0.42, 1.64)
WNT2					
rs3729629	G:G	42/920	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	C:G	35/918	0.84 (0.53, 1.32)	0.87 (0.55, 1.39)	0.92 (0.60, 1.43)
	C:C	2/239	**0.18 (0.04, 0.76)**	**0.19 (0.05, 0.81)**	**0.40 (0.17, 0.92)**
	Log-Additive		**0.65 (0.45, 0.94)**	**0.67 (0.46, 0.97)**	**0.69 (0.48, 0.98)**
	Dominant		0.70 (0.45, 1.10)	0.73 (0.47, 1.16)	0.76 (0.49, 1.17)
	Recessive		**0.20 (0.05, 0.82)**	**0.21 (0.05, 0.85)**	**0.41 (0.18, 0.94)**
HEY2					
rs3734637	A:A	46/1231	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	A:C	26/702	0.99 (0.61, 1.62)	1.02 (0.62, 1.66)	0.99 (0.63, 1.58)
	C:C	10/142	1.88 (0.93, 3.82)	1.83 (0.89, 3.76)	1.61 (0.83, 3.09)
	Log-Additive		1.23 (0.88, 1.72)	1.23 (0.88, 1.72)	1.22 (0.88, 1.69)
	Dominant		1.14 (0.73, 1.78)	1.16 (0.74, 1.81)	1.14 (0.74, 1.75)
	Recessive		1.89 (0.96, 3.74)	1.82 (0.91, 3.66)	1.61 (0.85, 3.06)
Ctbp2					
rs3740535	G:G	45/1129	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	A:G	28/794	0.88 (0.55, 1.43)	0.90 (0.55, 1.46)	0.90 (0.57, 1.42)
	A:A	7/152	1.16 (0.51, 2.61)	1.16 (0.51, 2.66)	1.12 (0.55, 2.29)
	Log-Additive		0.99 (0.69, 1.41)	1.00 (0.70, 1.43)	1.00 (0.70, 1.41)
	Dominant		0.93 (0.59, 1.46)	0.94 (0.59, 1.48)	0.94 (0.61, 1.46)
	Recessive		1.21 (0.55, 2.68)	1.22 (0.54, 2.72)	1.16 (0.57, 2.34)
FZD1					
rs3750145	A:A	48/1206	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	A:G	21/643	0.82 (0.49, 1.38)	0.84 (0.49, 1.42)	0.84 (0.52, 1.37)
	G:G	7/88	2.00 (0.88, 4.55)	1.98 (0.86, 4.57)	1.65 (0.78, 3.48)
	Log-Additive		1.11 (0.76, 1.63)	1.12 (0.76, 1.65)	1.12 (0.77, 1.62)
	Dominant		0.96 (0.60, 1.55)	0.98 (0.60, 1.58)	0.98 (0.62, 1.54)
	Recessive		2.13 (0.95, 4.78)	2.10 (0.93, 4.77)	1.72 (0.82, 3.61)
WNT2					
rs4730775	C:C	44/1167	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	C:T	29/749	1.03 (0.64, 1.66)	1.03 (0.64, 1.67)	1.01 (0.64, 1.59)
	T:T	8/136	1.56 (0.72, 3.38)	1.78 (0.81, 3.91)	1.54 (0.76, 3.12)
	Log-Additive		1.16 (0.82, 1.64)	1.20 (0.85, 1.71)	1.19 (0.85, 1.68)
	Dominant		1.11 (0.71, 1.73)	1.14 (0.73, 1.78)	1.12 (0.73, 1.72)

	Recessive		1.54 (0.73, 3.27)	1.76 (0.82, 3.77)	1.54 (0.77, 3.07)
WNT8A					
rs4835761	A:A	34/689	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	A:G	35/959	0.74 (0.46, 1.20)	0.71 (0.43, 1.15)	0.75 (0.48, 1.19)
	G:G	11/371	0.60 (0.30, 1.20)	0.57 (0.28, 1.14)	0.65 (0.35, 1.19)
	Log-Additive		0.77 (0.55, 1.06)	0.74 (0.53, 1.03)	0.75 (0.55, 1.04)
	Dominant		0.70 (0.45, 1.10)	0.67 (0.42, 1.06)	0.69 (0.45, 1.07)
	Recessive		0.71 (0.37, 1.35)	0.69 (0.36, 1.32)	0.73 (0.41, 1.31)
Notch4					
rs520692	A:A	65/1564	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	A:G	14/480	0.70 (0.39, 1.26)	0.68 (0.38, 1.23)	0.72 (0.42, 1.23)
	G:G	2/36	1.34 (0.32, 5.67)	1.13 (0.26, 5.02)	1.06 (0.38, 2.97)
	Log-Additive		0.82 (0.50, 1.34)	0.78 (0.47, 1.29)	0.80 (0.50, 1.28)
	Dominant		0.75 (0.43, 1.30)	0.72 (0.41, 1.26)	0.75 (0.45, 1.26)
	Recessive		1.44 (0.34, 6.08)	1.23 (0.28, 5.42)	1.10 (0.39, 3.09)
Rex1					
rs6815391	T:T	34/892	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	C:T	31/873	0.93 (0.57, 1.53)	0.93 (0.56, 1.54)	0.95 (0.59, 1.51)
	C:C	8/267	0.79 (0.36, 1.72)	0.85 (0.38, 1.87)	0.88 (0.45, 1.74)
	Log-Additive		0.90 (0.64, 1.27)	0.92 (0.65, 1.31)	0.93 (0.66, 1.30)
	Dominant		0.90 (0.56, 1.43)	0.91 (0.57, 1.46)	0.92 (0.59, 1.44)
	Recessive		0.81 (0.39, 1.71)	0.88 (0.41, 1.86)	0.90 (0.47, 1.74)
HES2					
rs8708	A:A	51/1384	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	A:G	21/593	0.96 (0.57, 1.61)	0.99 (0.59, 1.67)	0.98 (0.60, 1.59)
	G:G	5/83	1.63 (0.64, 4.21)	1.64 (0.63, 4.30)	1.39 (0.61, 3.16)
	Log-Additive		1.11 (0.75, 1.64)	1.13 (0.76, 1.68)	1.12 (0.76, 1.64)
	Dominant		1.04 (0.65, 1.69)	1.07 (0.66, 1.74)	1.06 (0.67, 1.68)
	Recessive		1.65 (0.65, 4.20)	1.65 (0.64, 4.25)	1.40 (0.62, 3.15)
Notch4					
rs915894	C:C	27/595	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	A:C	33/990	0.73 (0.44, 1.23)	0.73 (0.43, 1.22)	0.76 (0.47, 1.23)
	A:A	20/460	0.96 (0.53, 1.73)	0.96 (0.53, 1.74)	0.98 (0.57, 1.69)
	Log-Additive		0.96 (0.70, 1.31)	0.96 (0.70, 1.31)	0.96 (0.70, 1.30)
	Dominant		0.81 (0.50, 1.29)	0.80 (0.49, 1.29)	0.82 (0.52, 1.29)
	Recessive		1.15 (0.69, 1.93)	1.15 (0.68, 1.95)	1.13 (0.69, 1.85)
JAG2					

rs9972231	C:C	52/1333	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	C:T	19/503	0.97 (0.57, 1.65)	0.97 (0.56, 1.66)	0.98 (0.59, 1.62)
	T:T	1/59	0.43 (0.06, 3.20)	0.42 (0.06, 3.11)	0.72 (0.25, 2.04)
	Log-Additive		0.87 (0.55, 1.39)	0.87 (0.54, 1.39)	0.88 (0.57, 1.37)
	Dominant		0.91 (0.54, 1.54)	0.91 (0.53, 1.54)	0.92 (0.56, 1.50)
	Recessive		0.44 (0.06, 3.21)	0.42 (0.06, 3.12)	0.72 (0.25, 2.04)

Ca, case; Co, control; cOR, crude odds ratio; aOR, adjusted odds ratio; sbOR, semi-bayes adjusted odds ratio;

[a] Atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b] Adjusted for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, pack-years of smoking, alcohol consumption in the 1990's, *Helicobacter pylori* IgG.

Table 3.3.3. Associations between SNPs selected by GWAS and atrophic gastritis, defined by low serum pepsinogen levels in the Jiangsu study.

		Atrophic Gastritis[a]			
dbSNP no.	**genotype**	**Ca/Co**	**cOR**	**aOR[b]**	**sbOR[b]**
PLCE1					
rs2274223	A:A	51/1284	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	A:G	24/663	0.91 (0.56, 1.49)	0.92 (0.56, 1.52)	0.93 (0.58, 1.48)
	G:G	3/82	0.92 (0.28, 3.01)	1.07 (0.32, 3.53)	1.04 (0.42, 2.58)
	Log-Additive		0.93 (0.62, 1.40)	0.96 (0.64, 1.45)	0.97 (0.65, 1.43)
	Dominant		0.91 (0.57, 1.47)	0.94 (0.58, 1.51)	0.94 (0.60, 1.48)
	Recessive		0.95 (0.29, 3.08)	1.09 (0.33, 3.58)	1.05 (0.42, 2.61)
CHEK2					
rs738722	C:C	51/1120	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)
	C:T	29/747	0.85 (0.54, 1.36)	0.79 (0.49, 1.27)	0.84 (0.54, 1.31)
	T:T	2/165	0.27 (0.06, 1.10)	0.26 (0.06, 1.08)	0.48 (0.20, 1.13)
	Log-Additive		0.71 (0.49, 1.04)	0.68 (0.46, 1.00)	0.70 (0.48, 1.01)
	Dominant		0.75 (0.47, 1.18)	0.70 (0.44, 1.11)	0.73 (0.47, 1.12)
	Recessive		0.28 (0.07, 1.16)	0.28 (0.07, 1.17)	0.50 (0.21, 1.18)

Ca, case; Co, control; cOR, crude odds ratio; aOR, adjusted odds ratio; sbOR, semi-bayes adjusted odds ratio;

[a] Atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b] Adjusted for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, pack-years of smoking, alcohol consumption in the 1990's, *Helicobacter pylori* IgG.

Table 3.3.4. Associations between SNPs related to the miRNA pathway and stomach cancer, by atrophic gastritis defined by low serum pepsinogen levels in the Jiangsu study.

	Overall			Without Atrophic Gastritis[a]			Atrophic Gastritis[a]		
dbSNP no.	**Ca/Co**	**aOR[b]**	**sbOR[b]**	**Ca/Co**	**aOR[b]**	**sbOR[b]**	**Ca/Co**	**aOR[b]**	**sbOR[b]**
IL15									
rs10519613									
C:C	347/776	1.00 (Ref)	1.00 (Ref)	281/751	1.00 (Ref)	1.00 (Ref)	66/25	1.00 (Ref)	1.00 (Ref)
C:A	412/977	0.89 (0.71, 1.10)	0.89 (0.72, 1.10)	332/942	0.88 (0.70, 1.11)	0.89 (0.71, 1.11)	80/35	0.91 (0.41, 1.99)	0.96 (0.49, 1.87)
A:A	173/395	0.92 (0.70, 1.21)	0.92 (0.71, 1.21)	135/376	0.94 (0.70, 1.27)	0.94 (0.70, 1.26)	38/19	0.71 (0.28, 1.80)	0.79 (0.37, 1.69)
Log-Additive		0.95 (0.83, 1.08)	0.95 (0.83, 1.08)		0.95 (0.82, 1.10)	0.95 (0.83, 1.10)		0.85 (0.54, 1.34)	0.86 (0.56, 1.33)
Dominant		0.90 (0.73, 1.09)	0.90 (0.74, 1.09)		0.90 (0.72, 1.12)	0.90 (0.73, 1.12)		0.83 (0.40, 1.72)	0.87 (0.46, 1.65)
Recessive		0.98 (0.76, 1.26)	0.98 (0.77, 1.26)		1.00 (0.77, 1.32)	1.00 (0.77, 1.31)		0.75 (0.33, 1.70)	0.81 (0.40, 1.63)
XPO5									
rs11077									
A:A	820/1872	1.00 (Ref)	1.00 (Ref)	656/1798	1.00 (Ref)	1.00 (Ref)	164/74	1.00 (Ref)	1.00 (Ref)
A:C	108/264	0.86 (0.63, 1.16)	0.86 (0.64, 1.15)	88/256	0.78 (0.56, 1.09)	0.78 (0.57, 1.09)	20/8	**2.99 (1.04, 8.63)**	1.97 (0.86, 4.50)
C:C	14/19	**3.28 (1.51, 7.13)**	**2.46 (1.23, 4.92)**	10/19	**2.46 (1.01, 5.95)**	1.88 (0.87, 4.07)	4/0	0.00 (0.00, 0.00)	1.69 (0.50, 5.74)
Log-Additive		1.09 (0.85, 1.41)	1.09 (0.85, 1.40)		0.96 (0.72, 1.27)	0.96 (0.73, 1.27)		**3.49 (1.33, 9.14)**	**2.37 (1.12, 5.02)**
Dominant		0.98 (0.74, 1.30)	0.98 (0.74, 1.30)		0.86 (0.63, 1.18)	0.87 (0.64, 1.18)		**3.59 (1.29, 10.02)**	**2.31 (1.04, 5.17)**
Recessive		**3.34 (1.54, 7.25)**	**2.49 (1.24, 4.99)**		**2.53 (1.04, 6.12)**	1.92 (0.88, 4.15)		0.00 (0.00, 0.00)	1.66 (0.49, 5.65)
miR-196a2									
rs11614913									
T:T	296/664	1.00 (Ref)	1.00 (Ref)	233/636	1.00 (Ref)	1.00 (Ref)	63/28	1.00 (Ref)	1.00 (Ref)
C:T	414/999	0.85 (0.67, 1.06)	0.85 (0.68, 1.06)	337/964	0.91 (0.71, 1.16)	0.91 (0.71, 1.15)	77/35	0.70 (0.32, 1.53)	0.78 (0.40, 1.52)
C:C	214/442	1.01 (0.77, 1.31)	1.01 (0.78, 1.31)	173/427	1.07 (0.80, 1.43)	1.07 (0.81, 1.42)	41/15	0.68 (0.26, 1.82)	0.80 (0.36, 1.75)
Log-Additive		0.99 (0.86, 1.13)	0.99 (0.87, 1.13)		1.03 (0.89, 1.19)	1.03 (0.89, 1.19)		0.81 (0.50, 1.30)	0.83 (0.53, 1.30)
Dominant		0.90 (0.73, 1.10)	0.90 (0.73, 1.10)		0.96 (0.76, 1.20)	0.96 (0.77, 1.20)		0.69 (0.33, 1.43)	0.75 (0.39, 1.42)
Recessive		1.11 (0.88, 1.40)	1.11 (0.88, 1.39)		1.14 (0.89, 1.46)	1.13 (0.89, 1.45)		0.83 (0.34, 2.01)	0.87 (0.42, 1.84)
WWOX									
rs12828									
G:G	335/875	1.00 (Ref)	1.00 (Ref)	271/840	1.00 (Ref)	1.00 (Ref)	64/35	1.00 (Ref)	1.00 (Ref)
A:G	413/933	1.09 (0.88, 1.35)	1.08 (0.87, 1.34)	334/902	1.08 (0.86, 1.37)	1.07 (0.85, 1.35)	79/31	1.61 (0.71, 3.65)	1.37 (0.69, 2.71)

A:A	175/302	**1.46 (1.11, 1.93)**	**1.44 (1.10, 1.89)**	144/290	**1.45 (1.08, 1.95)**	**1.43 (1.07, 1.90)**	31/12	1.68 (0.58, 4.87)	1.33 (0.58, 3.05)
Log-Additive		**1.19 (1.04, 1.36)**	**1.19 (1.04, 1.36)**		**1.18 (1.02, 1.37)**	**1.18 (1.02, 1.37)**		1.34 (0.80, 2.26)	1.30 (0.80, 2.11)
Dominant		1.19 (0.97, 1.45)	1.18 (0.97, 1.44)		1.18 (0.95, 1.46)	1.17 (0.95, 1.45)		1.63 (0.76, 3.51)	1.45 (0.75, 2.84)
Recessive		**1.40 (1.09, 1.80)**	**1.38 (1.08, 1.77)**		**1.39 (1.07, 1.82)**	**1.38 (1.06, 1.79)**		1.27 (0.49, 3.31)	1.18 (0.54, 2.58)
Ran									
rs14035									
C:C	630/1377	1.00 (Ref)	1.00 (Ref)	506/1323	1.00 (Ref)	1.00 (Ref)	124/54	1.00 (Ref)	1.00 (Ref)
C:T	281/593	0.94 (0.75, 1.17)	0.94 (0.75, 1.17)	224/571	0.93 (0.73, 1.18)	0.93 (0.73, 1.17)	57/22	1.22 (0.56, 2.66)	1.15 (0.58, 2.24)
T:T	37/92	1.14 (0.71, 1.84)	1.13 (0.72, 1.77)	29/89	1.09 (0.65, 1.82)	1.08 (0.66, 1.75)	8/3	1.62 (0.27, 9.77)	1.19 (0.40, 3.54)
Log-Additive		0.99 (0.83, 1.18)	0.99 (0.84, 1.18)		0.98 (0.81, 1.18)	0.98 (0.81, 1.18)		1.24 (0.66, 2.35)	1.20 (0.67, 2.13)
Dominant		0.96 (0.78, 1.19)	0.96 (0.78, 1.19)		0.95 (0.75, 1.19)	0.95 (0.76, 1.19)		1.26 (0.59, 2.68)	1.20 (0.62, 2.32)
Recessive		1.17 (0.73, 1.87)	1.15 (0.73, 1.80)		1.11 (0.67, 1.86)	1.10 (0.68, 1.78)		1.49 (0.26, 8.64)	1.17 (0.39, 3.44)
CXCL12									
rs1804429									
T:T	835/1882	1.00 (Ref)	1.00 (Ref)	674/1811	1.00 (Ref)	1.00 (Ref)	161/71	1.00 (Ref)	1.00 (Ref)
G:T	103/265	0.80 (0.58, 1.10)	0.81 (0.59, 1.10)	76/258	0.75 (0.53, 1.07)	0.77 (0.55, 1.07)	27/7	1.84 (0.59, 5.77)	1.45 (0.60, 3.49)
G:G	5/11	1.62 (0.47, 5.53)	1.30 (0.51, 3.35)	5/9	2.20 (0.62, 7.78)	1.52 (0.58, 4.00)	0/2	0.00 (0.00, 0.00)	0.72 (0.20, 2.56)
Log-Additive		0.87 (0.65, 1.16)	0.87 (0.66, 1.16)		0.86 (0.62, 1.17)	0.86 (0.63, 1.17)		1.07 (0.43, 2.63)	1.05 (0.49, 2.23)
Dominant		0.83 (0.61, 1.13)	0.84 (0.62, 1.13)		0.80 (0.57, 1.12)	0.81 (0.58, 1.12)		1.38 (0.48, 3.99)	1.22 (0.53, 2.84)
Recessive		1.66 (0.49, 5.67)	1.32 (0.51, 3.40)		2.27 (0.64, 8.03)	1.54 (0.58, 4.07)		0.00 (0.00, 0.00)	0.72 (0.20, 2.55)
Gemin3									
rs197412									
T:T	412/950	1.00 (Ref)	1.00 (Ref)	333/910	1.00 (Ref)	1.00 (Ref)	79/40	1.00 (Ref)	1.00 (Ref)
T:C	405/943	0.84 (0.68, 1.04)	0.84 (0.69, 1.04)	323/912	0.87 (0.70, 1.09)	0.87 (0.70, 1.09)	82/31	0.79 (0.36, 1.71)	0.79 (0.41, 1.55)
C:C	128/233	1.35 (1.00, 1.82)	1.33 (0.99, 1.79)	105/226	1.33 (0.96, 1.84)	1.31 (0.95, 1.80)	23/7	2.11 (0.69, 6.39)	1.61 (0.69, 3.77)
Log-Additive		1.06 (0.92, 1.22)	1.06 (0.92, 1.22)		1.06 (0.91, 1.24)	1.06 (0.91, 1.24)		1.23 (0.75, 2.02)	1.20 (0.75, 1.92)
Dominant		0.94 (0.77, 1.14)	0.94 (0.77, 1.14)		0.96 (0.78, 1.18)	0.96 (0.78, 1.18)		1.03 (0.51, 2.09)	1.02 (0.55, 1.92)
Recessive		**1.46 (1.10, 1.95)**	**1.44 (1.09, 1.91)**		**1.42 (1.04, 1.92)**	**1.39 (1.03, 1.88)**		2.33 (0.80, 6.73)	1.71 (0.75, 3.92)
E2F2									
rs2075993									
G:G	390/771	1.00 (Ref)	1.00 (Ref)	314/744	1.00 (Ref)	1.00 (Ref)	76/27	1.00 (Ref)	1.00 (Ref)
G:A	381/977	**0.76 (0.62, 0.94)**	**0.77 (0.62, 0.95)**	311/940	0.80 (0.64, 1.01)	0.81 (0.64, 1.01)	70/37	0.61 (0.28, 1.32)	0.70 (0.36, 1.36)

A:A	159/343	0.95 (0.72, 1.25)	0.95 (0.72, 1.25)	124/327	0.93 (0.68, 1.26)	0.93 (0.69, 1.26)	35/16	0.70 (0.27, 1.79)	0.81 (0.38, 1.75)
Log-Additive		0.93 (0.81, 1.06)	0.93 (0.81, 1.06)		0.93 (0.80, 1.07)	0.93 (0.80, 1.07)		0.80 (0.51, 1.26)	0.82 (0.53, 1.26)
Dominant		**0.81 (0.67, 0.99)**	**0.81 (0.67, 0.99)**		0.83 (0.67, 1.03)	0.84 (0.68, 1.03)		0.64 (0.32, 1.29)	0.70 (0.37, 1.31)
Recessive		1.09 (0.84, 1.41)	1.09 (0.84, 1.40)		1.04 (0.78, 1.38)	1.04 (0.79, 1.37)		0.89 (0.38, 2.10)	0.92 (0.44, 1.91)
RCHY1									
rs2126852									
A:A	190/1164	1.00 (Ref)	1.00 (Ref)	167/1117	1.00 (Ref)	1.00 (Ref)	23/47	1.00 (Ref)	1.00 (Ref)
A:G	113/787	0.87 (0.68, 1.13)	0.88 (0.68, 1.13)	95/757	0.84 (0.64, 1.10)	0.84 (0.64, 1.10)	18/30	1.19 (0.50, 2.85)	1.05 (0.51, 2.18)
G:G	29/175	1.02 (0.66, 1.58)	1.02 (0.67, 1.54)	21/171	0.82 (0.50, 1.35)	0.84 (0.53, 1.34)	8/4	4.46 (0.94, 21.14)	1.99 (0.73, 5.41)
Log-Additive		0.95 (0.79, 1.15)	0.95 (0.79, 1.15)		0.87 (0.71, 1.07)	0.88 (0.72, 1.07)		1.67 (0.90, 3.12)	1.53 (0.87, 2.70)
Dominant		0.90 (0.71, 1.14)	0.90 (0.71, 1.14)		0.83 (0.64, 1.08)	0.84 (0.65, 1.08)		1.54 (0.68, 3.47)	1.38 (0.68, 2.78)
Recessive		1.08 (0.71, 1.64)	1.07 (0.71, 1.60)		0.88 (0.54, 1.43)	0.89 (0.57, 1.41)		4.18 (0.92, 19.04)	1.97 (0.73, 5.31)
Wnt2B									
rs2273368									
C:C	317/627	1.00 (Ref)	1.00 (Ref)	259/612	1.00 (Ref)	1.00 (Ref)	58/15	1.00 (Ref)	1.00 (Ref)
C:T	369/988	**0.64 (0.51, 0.80)**	**0.65 (0.52, 0.81)**	295/948	**0.67 (0.53, 0.86)**	**0.68 (0.54, 0.87)**	74/40	**0.33 (0.13, 0.82)**	0.51 (0.25, 1.05)
T:T	234/508	0.79 (0.61, 1.02)	0.80 (0.62, 1.03)	185/483	0.81 (0.62, 1.08)	0.83 (0.63, 1.09)	49/25	**0.32 (0.12, 0.87)**	0.53 (0.24, 1.13)
Log-Additive		**0.87 (0.76, 0.99)**	**0.87 (0.76, 0.99)**		0.88 (0.76, 1.02)	0.88 (0.76, 1.02)		**0.57 (0.35, 0.93)**	**0.61 (0.38, 0.96)**
Dominant		**0.69 (0.56, 0.85)**	**0.70 (0.57, 0.85)**		**0.72 (0.58, 0.90)**	**0.73 (0.58, 0.90)**		**0.33 (0.14, 0.75)**	**0.44 (0.22, 0.89)**
Recessive		1.02 (0.81, 1.28)	1.02 (0.81, 1.27)		1.02 (0.80, 1.31)	1.02 (0.80, 1.30)		0.63 (0.28, 1.41)	0.71 (0.35, 1.42)
THBS1									
rs2292305									
T:T	436/965	1.00 (Ref)	1.00 (Ref)	358/931	1.00 (Ref)	1.00 (Ref)	78/34	1.00 (Ref)	1.00 (Ref)
C:T	364/900	0.81 (0.65, 1.00)	0.81 (0.66, 1.00)	297/869	0.81 (0.64, 1.01)	0.81 (0.65, 1.02)	67/31	0.55 (0.24, 1.26)	0.63 (0.31, 1.26)
C:C	95/257	0.95 (0.69, 1.30)	0.95 (0.70, 1.29)	69/243	0.79 (0.56, 1.13)	0.81 (0.57, 1.13)	26/14	1.16 (0.44, 3.06)	1.16 (0.53, 2.54)
Log-Additive		0.92 (0.80, 1.06)	0.92 (0.80, 1.06)		0.86 (0.73, 1.01)	0.86 (0.74, 1.01)		0.98 (0.61, 1.56)	0.98 (0.63, 1.53)
Dominant		0.84 (0.69, 1.02)	0.84 (0.69, 1.02)		0.80 (0.65, 1.00)	0.81 (0.65, 1.00)		0.72 (0.35, 1.50)	0.78 (0.41, 1.48)
Recessive		1.05 (0.78, 1.41)	1.04 (0.78, 1.40)		0.87 (0.62, 1.23)	0.88 (0.63, 1.22)		1.52 (0.62, 3.70)	1.34 (0.63, 2.84)
Gemin4									
rs2740348									
G:G	672/1698	1.00 (Ref)	1.00 (Ref)	541/1635	1.00 (Ref)	1.00 (Ref)	131/63	1.00 (Ref)	1.00 (Ref)

G:C	208/362	1.21 (0.94, 1.54)	1.19 (0.94, 1.52)	165/346	1.23 (0.94, 1.60)	1.22 (0.94, 1.58)	43/16	0.90 (0.36, 2.27)	0.92 (0.43, 1.98)
C:C	16/29	1.96 (0.98, 3.91)	1.71 (0.91, 3.20)	11/28	1.71 (0.78, 3.72)	1.49 (0.75, 2.99)	5/1	2.85 (0.21, 39.41)	1.28 (0.39, 4.26)
Log-Additive		**1.26 (1.03, 1.56)**	**1.26 (1.02, 1.55)**		**1.25 (1.00, 1.57)**	1.24 (0.99, 1.55)		1.12 (0.53, 2.38)	1.09 (0.56, 2.11)
Dominant		1.26 (0.99, 1.59)	1.25 (0.99, 1.58)		1.26 (0.98, 1.63)	1.25 (0.97, 1.61)		1.02 (0.43, 2.45)	1.01 (0.48, 2.13)
Recessive		1.89 (0.95, 3.76)	1.66 (0.89, 3.11)		1.64 (0.75, 3.56)	1.45 (0.73, 2.90)		2.90 (0.21, 39.75)	1.29 (0.39, 4.27)
pre-miR-146a									
rs2910164									
C:C	316/779	1.00 (Ref)	1.00 (Ref)	252/751	1.00 (Ref)	1.00 (Ref)	64/28	1.00 (Ref)	1.00 (Ref)
G:C	471/1002	1.02 (0.82, 1.27)	1.02 (0.82, 1.26)	376/961	0.99 (0.79, 1.25)	0.99 (0.79, 1.25)	95/41	1.22 (0.56, 2.67)	1.17 (0.61, 2.27)
G:G	150/375	0.95 (0.71, 1.26)	0.95 (0.72, 1.26)	125/363	0.95 (0.70, 1.29)	0.95 (0.70, 1.28)	25/12	0.95 (0.32, 2.86)	0.95 (0.41, 2.23)
Log-Additive		0.98 (0.85, 1.13)	0.98 (0.85, 1.13)		0.98 (0.84, 1.13)	0.98 (0.84, 1.13)		1.03 (0.61, 1.73)	1.02 (0.63, 1.67)
Dominant		1.00 (0.81, 1.23)	1.00 (0.82, 1.22)		0.98 (0.79, 1.22)	0.98 (0.79, 1.22)		1.16 (0.55, 2.42)	1.12 (0.58, 2.15)
Recessive		0.94 (0.72, 1.21)	0.94 (0.73, 1.21)		0.95 (0.72, 1.26)	0.96 (0.73, 1.25)		0.85 (0.31, 2.31)	0.90 (0.40, 2.02)
CTNNB1									
rs2953									
T:T	565/1201	1.00 (Ref)	1.00 (Ref)	462/1152	1.00 (Ref)	1.00 (Ref)	103/49	1.00 (Ref)	1.00 (Ref)
G:T	310/812	0.83 (0.68, 1.03)	0.84 (0.68, 1.03)	246/790	0.80 (0.64, 1.00)	0.80 (0.64, 1.00)	64/22	1.58 (0.72, 3.48)	1.42 (0.72, 2.80)
G:G	62/150	1.02 (0.69, 1.50)	1.02 (0.70, 1.48)	47/140	1.04 (0.68, 1.57)	1.03 (0.69, 1.54)	15/10	0.95 (0.27, 3.41)	0.95 (0.37, 2.43)
Log-Additive		0.92 (0.79, 1.08)	0.92 (0.79, 1.08)		0.91 (0.76, 1.08)	0.91 (0.77, 1.08)		1.16 (0.68, 2.00)	1.14 (0.69, 1.89)
Dominant		0.86 (0.71, 1.05)	0.86 (0.71, 1.05)		0.83 (0.67, 1.03)	0.84 (0.68, 1.03)		1.41 (0.68, 2.92)	1.31 (0.69, 2.49)
Recessive		1.09 (0.75, 1.59)	1.08 (0.75, 1.56)		1.13 (0.75, 1.70)	1.12 (0.76, 1.66)		0.81 (0.23, 2.82)	0.89 (0.35, 2.24)
DOCK4									
rs3801790									
A:A	401/810	1.00 (Ref)	1.00 (Ref)	316/771	1.00 (Ref)	1.00 (Ref)	85/39	1.00 (Ref)	1.00 (Ref)
A:G	392/971	0.85 (0.69, 1.05)	0.85 (0.69, 1.05)	318/943	0.83 (0.66, 1.04)	0.83 (0.67, 1.04)	74/28	1.29 (0.59, 2.78)	1.21 (0.62, 2.34)
G:G	143/341	1.04 (0.78, 1.37)	1.04 (0.79, 1.37)	118/327	1.00 (0.73, 1.35)	1.00 (0.74, 1.35)	25/14	1.08 (0.42, 2.79)	1.03 (0.48, 2.25)
Log-Additive		0.98 (0.85, 1.12)	0.98 (0.86, 1.12)		0.96 (0.83, 1.11)	0.96 (0.83, 1.11)		1.08 (0.68, 1.70)	1.07 (0.69, 1.65)
Dominant		0.90 (0.74, 1.09)	0.90 (0.74, 1.09)		0.87 (0.70, 1.08)	0.87 (0.71, 1.08)		1.21 (0.61, 2.42)	1.17 (0.63, 2.17)
Recessive		1.13 (0.87, 1.46)	1.12 (0.87, 1.45)		1.10 (0.83, 1.46)	1.10 (0.83, 1.45)		0.97 (0.40, 2.35)	0.98 (0.46, 2.06)
Rbl2									
rs3929									
G:G	611/1457	1.00 (Ref)	1.00 (Ref)	495/1405	1.00 (Ref)	1.00 (Ref)	116/52	1.00 (Ref)	1.00 (Ref)

C:G	296/651	0.98 (0.80, 1.21)	0.98 (0.80, 1.21)	232/628	0.97 (0.77, 1.21)	0.97 (0.77, 1.21)	64/23	1.16 (0.55, 2.42)	1.11 (0.58, 2.13)
C:C	33/81	1.09 (0.66, 1.79)	1.08 (0.67, 1.72)	26/77	0.98 (0.56, 1.71)	0.98 (0.58, 1.65)	7/4	1.23 (0.28, 5.44)	1.10 (0.40, 3.01)
Log-Additive		1.01 (0.85, 1.19)	1.01 (0.85, 1.19)		0.97 (0.81, 1.18)	0.98 (0.81, 1.17)		1.13 (0.65, 1.99)	1.11 (0.66, 1.87)
Dominant		0.99 (0.81, 1.22)	0.99 (0.82, 1.21)		0.97 (0.78, 1.20)	0.97 (0.78, 1.20)		1.17 (0.58, 2.35)	1.13 (0.61, 2.11)
Recessive		1.09 (0.67, 1.79)	1.08 (0.68, 1.72)		0.99 (0.57, 1.72)	0.99 (0.59, 1.66)		1.18 (0.27, 5.11)	1.08 (0.40, 2.95)
IL6R									
rs4072391									
C:C	715/1786	1.00 (Ref)	1.00 (Ref)	581/1714	1.00 (Ref)	1.00 (Ref)	134/72	1.00 (Ref)	1.00 (Ref)
C:T	187/351	0.85 (0.65, 1.13)	0.85 (0.65, 1.12)	146/341	0.83 (0.62, 1.13)	0.84 (0.63, 1.12)	41/10	1.10 (0.40, 3.08)	1.03 (0.46, 2.35)
T:T	37/25	**2.45 (1.25, 4.79)**	**2.06 (1.11, 3.81)**	26/25	2.02 (0.96, 4.25)	1.73 (0.89, 3.36)	11/0	0.00 (0.00, 0.00)	2.15 (0.67, 6.92)
Log-Additive		1.06 (0.85, 1.33)	1.06 (0.85, 1.32)		1.00 (0.79, 1.28)	1.00 (0.79, 1.28)		2.00 (0.89, 4.49)	1.68 (0.85, 3.33)
Dominant		0.96 (0.74, 1.24)	0.96 (0.74, 1.24)		0.92 (0.69, 1.22)	0.92 (0.70, 1.21)		1.71 (0.65, 4.48)	1.44 (0.66, 3.15)
Recessive		**2.50 (1.28, 4.91)**	**2.10 (1.13, 3.88)**		2.08 (0.99, 4.36)	1.76 (0.90, 3.43)		0.00 (0.00, 0.00)	2.15 (0.67, 6.91)
Ago2									
rs4961280									
C:C	746/1612	1.00 (Ref)	1.00 (Ref)	600/1552	1.00 (Ref)	1.00 (Ref)	146/60	1.00 (Ref)	1.00 (Ref)
C:A	164/452	**0.76 (0.59, 0.98)**	**0.76 (0.60, 0.98)**	130/434	0.81 (0.62, 1.05)	0.81 (0.62, 1.06)	34/18	**0.35 (0.13, 0.92)**	0.48 (0.22, 1.05)
A:A	16/37	1.43 (0.74, 2.76)	1.34 (0.74, 2.44)	11/36	1.18 (0.56, 2.49)	1.14 (0.59, 2.21)	5/1	3.14 (0.23, 43.38)	1.34 (0.41, 4.42)
Log-Additive		0.88 (0.71, 1.09)	0.88 (0.72, 1.09)		0.88 (0.70, 1.11)	0.89 (0.71, 1.11)		0.65 (0.30, 1.38)	0.72 (0.37, 1.39)
Dominant		0.81 (0.64, 1.03)	0.81 (0.64, 1.03)		0.83 (0.65, 1.08)	0.84 (0.65, 1.08)		0.45 (0.18, 1.11)	0.57 (0.27, 1.21)
Recessive		1.51 (0.79, 2.90)	1.40 (0.77, 2.55)		1.24 (0.59, 2.59)	1.18 (0.61, 2.28)		3.96 (0.29, 53.10)	1.40 (0.43, 4.60)
miR-26a1									
rs7372209									
C:C	518/1073	1.00 (Ref)	1.00 (Ref)	401/1029	1.00 (Ref)	1.00 (Ref)	117/44	1.00 (Ref)	1.00 (Ref)
C:T	358/880	0.90 (0.74, 1.10)	0.91 (0.74, 1.11)	296/849	0.95 (0.77, 1.18)	0.96 (0.77, 1.18)	62/31	0.94 (0.45, 1.95)	0.99 (0.52, 1.88)
T:T	74/200	**0.61 (0.41, 0.90)**	**0.63 (0.43, 0.91)**	65/196	0.70 (0.47, 1.05)	0.72 (0.49, 1.06)	9/4	0.27 (0.03, 2.24)	0.66 (0.21, 2.04)
Log-Additive		**0.83 (0.72, 0.97)**	**0.84 (0.72, 0.97)**		0.89 (0.75, 1.04)	0.89 (0.76, 1.04)		0.78 (0.42, 1.46)	0.81 (0.46, 1.44)
Dominant		0.85 (0.70, 1.03)	0.85 (0.70, 1.03)		0.90 (0.74, 1.11)	0.91 (0.74, 1.11)		0.85 (0.42, 1.74)	0.88 (0.47, 1.66)
Recessive		**0.63 (0.43, 0.93)**	**0.65 (0.45, 0.94)**		0.72 (0.49, 1.06)	0.74 (0.51, 1.07)		0.28 (0.03, 2.25)	0.66 (0.21, 2.04)
TP53INP1									
rs7760									
T:T	650/1640	1.00 (Ref)	1.00 (Ref)	513/1578	1.00 (Ref)	1.00 (Ref)	137/62	1.00 (Ref)	1.00 (Ref)

T:G	186/451	1.07 (0.84, 1.37)	1.07 (0.84, 1.36)	155/433	1.14 (0.88, 1.48)	1.13 (0.88, 1.46)	31/17	0.79 (0.32, 1.93)	0.84 (0.40, 1.79)
G:G	21/55	1.18 (0.63, 2.18)	1.14 (0.65, 2.02)	16/52	0.97 (0.46, 2.02)	0.97 (0.51, 1.86)	5/3	1.11 (0.22, 5.60)	1.05 (0.37, 3.00)
Log-Additive		1.07 (0.88, 1.31)	1.07 (0.88, 1.31)		1.08 (0.87, 1.35)	1.08 (0.87, 1.34)		0.93 (0.50, 1.73)	0.94 (0.53, 1.66)
Dominant		1.08 (0.85, 1.37)	1.08 (0.85, 1.36)		1.12 (0.87, 1.44)	1.12 (0.87, 1.43)		0.85 (0.38, 1.91)	0.88 (0.44, 1.78)
Recessive		1.16 (0.62, 2.15)	1.13 (0.64, 1.99)		0.94 (0.45, 1.95)	0.95 (0.50, 1.82)		1.15 (0.23, 5.77)	1.06 (0.37, 3.03)
Gemin4									
rs7813									
T:T	447/1085	1.00 (Ref)	1.00 (Ref)	355/1040	1.00 (Ref)	1.00 (Ref)	92/45	1.00 (Ref)	1.00 (Ref)
C:T	377/810	0.99 (0.80, 1.22)	0.99 (0.81, 1.22)	301/781	1.06 (0.85, 1.34)	1.06 (0.85, 1.33)	76/29	0.84 (0.40, 1.75)	0.88 (0.46, 1.68)
C:C	94/198	1.08 (0.77, 1.51)	1.07 (0.78, 1.49)	80/191	1.18 (0.82, 1.68)	1.16 (0.83, 1.64)	14/7	0.77 (0.21, 2.76)	0.87 (0.34, 2.23)
Log-Additive		1.02 (0.88, 1.18)	1.02 (0.88, 1.18)		1.08 (0.92, 1.26)	1.08 (0.92, 1.26)		0.86 (0.51, 1.46)	0.88 (0.53, 1.44)
Dominant		1.01 (0.83, 1.23)	1.01 (0.83, 1.23)		1.09 (0.88, 1.34)	1.09 (0.88, 1.34)		0.82 (0.41, 1.64)	0.85 (0.46, 1.59)
Recessive		1.08 (0.78, 1.49)	1.08 (0.79, 1.48)		1.14 (0.81, 1.61)	1.14 (0.82, 1.58)		0.81 (0.23, 2.86)	0.89 (0.35, 2.27)
KRAS									
rs9266									
C:C	598/1364	1.00 (Ref)	1.00 (Ref)	490/1313	1.00 (Ref)	1.00 (Ref)	108/51	1.00 (Ref)	1.00 (Ref)
C:T	289/683	0.83 (0.67, 1.02)	0.83 (0.67, 1.02)	224/656	**0.78 (0.62, 0.99)**	**0.79 (0.63, 0.99)**	65/27	0.78 (0.36, 1.70)	0.81 (0.41, 1.60)
T:T	51/103	1.14 (0.75, 1.75)	1.13 (0.75, 1.70)	43/101	1.15 (0.73, 1.80)	1.14 (0.74, 1.75)	8/2	2.14 (0.34, 13.51)	1.34 (0.45, 3.96)
Log-Additive		0.94 (0.79, 1.10)	0.94 (0.80, 1.10)		0.91 (0.76, 1.09)	0.92 (0.77, 1.09)		1.02 (0.55, 1.88)	1.02 (0.58, 1.78)
Dominant		0.87 (0.71, 1.06)	0.87 (0.71, 1.06)		0.83 (0.67, 1.04)	0.84 (0.67, 1.04)		0.89 (0.42, 1.86)	0.91 (0.47, 1.75)
Recessive		1.21 (0.80, 1.85)	1.20 (0.80, 1.79)		1.24 (0.79, 1.93)	1.21 (0.79, 1.86)		2.30 (0.37, 14.31)	1.37 (0.47, 4.04)

Ca, case; Co, control; cOR, crude odds ratio; aOR, adjusted odds ratio; sbOR, semi-bayes adjusted odds ratio;

[a] Atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b] Adjusted for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, pack-years of smoking, alcohol consumption in the 1990's, Helicobacter pylori IgG.

Table 3.3.5. Associations between SNPs related to the stem cell pathway and stomach cancer, by atrophic gastritis defined by low serum pepsinogen levels in the Jiangsu study.

	Overall			Without Atrophic Gastritis[a]			Atrophic Gastritis[a]		
dbSNP no.	**Ca/Co**	**aOR[b]**	**sbOR[b]**	**Ca/Co**	**aOR[b]**	**sbOR[b]**	**Ca/Co**	**aOR[b]**	**sbOR[b]**
DLL1									
rs1033583									
A:A	553/1073	1.00 (Ref)	1.00 (Ref)	449/1037	1.00 (Ref)	1.00 (Ref)	104/36	1.00 (Ref)	1.00 (Ref)
A:C	310/672	0.81 (0.65, 1.00)	0.81 (0.66, 1.00)	247/644	**0.78 (0.62, 0.99)**	**0.79 (0.63, 0.99)**	63/28	0.81 (0.39, 1.71)	0.83 (0.44, 1.59)
C:C	65/124	1.02 (0.69, 1.52)	1.02 (0.70, 1.49)	49/119	0.93 (0.60, 1.44)	0.94 (0.62, 1.42)	16/5	1.58 (0.37, 6.70)	1.26 (0.47, 3.40)
Log-Additive		0.91 (0.77, 1.07)	0.91 (0.78, 1.07)		0.87 (0.73, 1.04)	0.87 (0.73, 1.04)		1.02 (0.58, 1.80)	1.02 (0.61, 1.72)
Dominant		0.84 (0.69, 1.03)	0.84 (0.69, 1.03)		**0.80 (0.65, 1.00)**	**0.81 (0.65, 1.00)**		0.90 (0.45, 1.83)	0.92 (0.49, 1.73)
Recessive		1.11 (0.75, 1.63)	1.10 (0.76, 1.59)		1.02 (0.67, 1.56)	1.02 (0.68, 1.53)		1.72 (0.42, 7.06)	1.31 (0.49, 3.49)
HEY1									
rs1046472									
C:C	574/1349	1.00 (Ref)	1.00 (Ref)	452/1302	1.00 (Ref)	1.00 (Ref)	122/47	1.00 (Ref)	1.00 (Ref)
A:C	303/713	1.02 (0.83, 1.26)	1.02 (0.83, 1.25)	251/682	1.09 (0.87, 1.36)	1.08 (0.87, 1.35)	52/31	0.50 (0.23, 1.05)	0.58 (0.30, 1.11)
A:A	53/105	1.45 (0.97, 2.16)	1.41 (0.96, 2.07)	41/102	1.47 (0.96, 2.27)	1.42 (0.94, 2.15)	12/3	1.08 (0.21, 5.57)	1.06 (0.37, 3.03)
Log-Additive		1.11 (0.95, 1.30)	1.11 (0.95, 1.30)		1.15 (0.97, 1.37)	1.15 (0.97, 1.36)		0.70 (0.39, 1.25)	0.74 (0.43, 1.26)
Dominant		1.08 (0.88, 1.31)	1.07 (0.88, 1.31)		1.14 (0.92, 1.41)	1.14 (0.92, 1.40)		0.55 (0.27, 1.12)	0.62 (0.33, 1.17)
Recessive		1.44 (0.97, 2.13)	1.40 (0.96, 2.04)		1.43 (0.94, 2.19)	1.39 (0.92, 2.08)		1.39 (0.28, 6.92)	1.15 (0.41, 3.27)
HES2									
rs11364									
G:G	632/1309	1.00 (Ref)	1.00 (Ref)	515/1262	1.00 (Ref)	1.00 (Ref)	117/47	1.00 (Ref)	1.00 (Ref)
A:G	275/440	**1.49 (1.19, 1.86)**	**1.47 (1.18, 1.83)**	217/421	**1.49 (1.17, 1.89)**	**1.47 (1.16, 1.86)**	58/19	1.38 (0.61, 3.14)	1.19 (0.60, 2.39)
A:A	29/58	1.57 (0.92, 2.67)	1.48 (0.90, 2.44)	21/57	1.21 (0.66, 2.21)	1.17 (0.67, 2.04)	8/1	**10.88 (1.12, 105.69)**	2.25 (0.77, 6.63)
Log-Additive		**1.39 (1.16, 1.66)**	**1.38 (1.15, 1.65)**		**1.32 (1.09, 1.60)**	**1.31 (1.08, 1.59)**		**1.95 (1.01, 3.76)**	1.73 (0.96, 3.10)
Dominant		**1.50 (1.21, 1.85)**	**1.48 (1.20, 1.83)**		**1.45 (1.15, 1.83)**	**1.44 (1.15, 1.81)**		1.79 (0.82, 3.90)	1.55 (0.79, 3.05)
Recessive		1.40 (0.83, 2.38)	1.34 (0.82, 2.21)		1.08 (0.59, 1.97)	1.06 (0.61, 1.85)		**9.88 (1.03, 94.50)**	2.21 (0.75, 6.48)
Oct4									
rs13409									
C:C	342/771	1.00 (Ref)	1.00 (Ref)	275/743	1.00 (Ref)	1.00 (Ref)	67/28	1.00 (Ref)	1.00 (Ref)
C:T	416/989	0.94 (0.76, 1.17)	0.95 (0.76, 1.17)	330/954	0.98 (0.78, 1.24)	0.98 (0.78, 1.24)	86/35	0.88 (0.41, 1.89)	0.95 (0.49, 1.83)

T:T	182/397	0.98 (0.75, 1.28)	0.98 (0.75, 1.28)	150/379	1.06 (0.79, 1.41)	1.06 (0.79, 1.40)	32/18	0.55 (0.21, 1.48)	0.68 (0.31, 1.49)
Log-Additive		0.98 (0.86, 1.12)	0.98 (0.86, 1.12)		1.02 (0.89, 1.18)	1.02 (0.89, 1.18)		0.76 (0.47, 1.23)	0.79 (0.50, 1.23)
Dominant		0.95 (0.78, 1.17)	0.96 (0.78, 1.17)		1.01 (0.81, 1.25)	1.01 (0.81, 1.25)		0.76 (0.37, 1.56)	0.81 (0.43, 1.52)
Recessive		1.01 (0.79, 1.29)	1.01 (0.80, 1.29)		1.07 (0.82, 1.38)	1.06 (0.82, 1.37)		0.59 (0.24, 1.45)	0.69 (0.33, 1.46)
AXIN1									
rs1981492									
G:G	492/1097	1.00 (Ref)	1.00 (Ref)	396/1060	1.00 (Ref)	1.00 (Ref)	96/37	1.00 (Ref)	1.00 (Ref)
A:G	337/832	**0.80 (0.65, 0.99)**	**0.81 (0.66, 0.99)**	267/801	0.80 (0.64, 1.00)	0.80 (0.64, 1.00)	70/31	0.71 (0.34, 1.50)	0.80 (0.42, 1.53)
A:A	119/207	1.06 (0.77, 1.45)	1.06 (0.78, 1.43)	100/194	1.12 (0.80, 1.56)	1.11 (0.80, 1.54)	19/13	0.51 (0.17, 1.52)	0.67 (0.29, 1.57)
Log-Additive		0.95 (0.82, 1.09)	0.95 (0.82, 1.09)		0.97 (0.83, 1.13)	0.97 (0.83, 1.13)		0.71 (0.43, 1.17)	0.74 (0.46, 1.18)
Dominant		0.86 (0.71, 1.04)	0.86 (0.71, 1.04)		0.87 (0.70, 1.07)	0.87 (0.71, 1.07)		0.65 (0.33, 1.30)	0.71 (0.38, 1.32)
Recessive		1.16 (0.86, 1.57)	1.15 (0.86, 1.55)		1.22 (0.89, 1.69)	1.21 (0.88, 1.66)		0.58 (0.20, 1.67)	0.71 (0.31, 1.63)
GLI1									
rs2228224									
G:G	498/1171	1.00 (Ref)	1.00 (Ref)	395/1125	1.00 (Ref)	1.00 (Ref)	103/46	1.00 (Ref)	1.00 (Ref)
A:G	356/778	1.10 (0.90, 1.36)	1.10 (0.89, 1.35)	292/756	1.14 (0.91, 1.42)	1.13 (0.91, 1.41)	64/22	1.37 (0.62, 3.02)	1.26 (0.64, 2.49)
A:A	78/173	1.24 (0.87, 1.76)	1.22 (0.87, 1.72)	63/162	1.20 (0.81, 1.77)	1.18 (0.81, 1.72)	15/11	1.12 (0.39, 3.27)	1.06 (0.46, 2.45)
Log-Additive		1.11 (0.95, 1.29)	1.11 (0.95, 1.28)		1.11 (0.94, 1.31)	1.11 (0.94, 1.30)		1.13 (0.69, 1.85)	1.12 (0.70, 1.77)
Dominant		1.13 (0.93, 1.37)	1.12 (0.93, 1.36)		1.15 (0.93, 1.42)	1.14 (0.93, 1.41)		1.29 (0.64, 2.61)	1.22 (0.65, 2.29)
Recessive		1.19 (0.84, 1.68)	1.18 (0.84, 1.65)		1.13 (0.77, 1.66)	1.12 (0.78, 1.62)		1.01 (0.36, 2.82)	1.01 (0.44, 2.30)
DVL2									
rs222851									
A:A	308/855	1.00 (Ref)	1.00 (Ref)	247/827	1.00 (Ref)	1.00 (Ref)	61/28	1.00 (Ref)	1.00 (Ref)
A:G	467/956	1.13 (0.92, 1.40)	1.13 (0.92, 1.39)	372/918	1.13 (0.90, 1.42)	1.12 (0.90, 1.41)	95/38	0.83 (0.38, 1.80)	0.92 (0.47, 1.78)
G:G	147/308	1.12 (0.82, 1.51)	1.11 (0.83, 1.49)	125/294	1.19 (0.86, 1.64)	1.17 (0.86, 1.60)	22/14	0.49 (0.16, 1.52)	0.66 (0.28, 1.56)
Log-Additive		1.07 (0.93, 1.24)	1.07 (0.93, 1.24)		1.10 (0.94, 1.28)	1.10 (0.94, 1.28)		0.73 (0.43, 1.24)	0.76 (0.46, 1.25)
Dominant		1.13 (0.92, 1.38)	1.13 (0.92, 1.38)		1.14 (0.92, 1.42)	1.14 (0.92, 1.41)		0.73 (0.35, 1.54)	0.79 (0.41, 1.51)
Recessive		1.04 (0.79, 1.38)	1.04 (0.79, 1.37)		1.11 (0.83, 1.49)	1.11 (0.83, 1.48)		0.54 (0.19, 1.55)	0.68 (0.29, 1.55)
AXIN2									
rs2240308									
G:G	465/964	1.00 (Ref)	1.00 (Ref)	372/931	1.00 (Ref)	1.00 (Ref)	93/33	1.00 (Ref)	1.00 (Ref)
A:G	372/805	0.95 (0.76, 1.18)	0.95 (0.76, 1.17)	298/771	0.95 (0.75, 1.21)	0.95 (0.75, 1.20)	74/30	1.03 (0.46, 2.30)	1.05 (0.53, 2.07)

A:A	100/204	1.36 (0.98, 1.89)	1.34 (0.97, 1.85)	83/193	**1.47 (1.04, 2.09)**	**1.44 (1.02, 2.02)**	17/11	0.71 (0.21, 2.43)	0.82 (0.33, 2.04)
Log-Additive		1.09 (0.94, 1.27)	1.09 (0.94, 1.27)		1.12 (0.96, 1.32)	1.12 (0.96, 1.32)		0.90 (0.51, 1.57)	0.91 (0.54, 1.53)
Dominant		1.03 (0.84, 1.26)	1.02 (0.84, 1.25)		1.05 (0.84, 1.30)	1.05 (0.84, 1.30)		0.95 (0.45, 2.04)	0.96 (0.50, 1.88)
Recessive		**1.40 (1.02, 1.91)**	**1.37 (1.01, 1.87)**		**1.50 (1.08, 2.10)**	**1.47 (1.06, 2.04)**		0.70 (0.22, 2.22)	0.81 (0.33, 1.96)
FZD3									
rs2241802									
G:G	303/677	1.00 (Ref)	1.00 (Ref)	242/648	1.00 (Ref)	1.00 (Ref)	61/29	1.00 (Ref)	1.00 (Ref)
A:G	421/976	0.94 (0.75, 1.19)	0.95 (0.76, 1.18)	341/943	0.96 (0.75, 1.22)	0.96 (0.75, 1.22)	80/33	1.03 (0.46, 2.31)	0.99 (0.50, 1.96)
A:A	180/413	1.00 (0.76, 1.33)	1.00 (0.76, 1.32)	141/397	0.98 (0.72, 1.33)	0.98 (0.73, 1.33)	39/16	1.36 (0.51, 3.64)	1.23 (0.56, 2.70)
Log-Additive		0.99 (0.86, 1.14)	0.99 (0.87, 1.14)		0.99 (0.85, 1.15)	0.99 (0.85, 1.15)		1.15 (0.71, 1.86)	1.13 (0.72, 1.79)
Dominant		0.96 (0.78, 1.19)	0.96 (0.78, 1.19)		0.96 (0.77, 1.21)	0.97 (0.77, 1.21)		1.13 (0.54, 2.38)	1.10 (0.57, 2.12)
Recessive		1.04 (0.81, 1.33)	1.04 (0.81, 1.33)		1.01 (0.77, 1.32)	1.01 (0.77, 1.31)		1.34 (0.56, 3.24)	1.23 (0.59, 2.59)
Dec1									
rs2269700									
T:T	671/1441	1.00 (Ref)	1.00 (Ref)	544/1381	1.00 (Ref)	1.00 (Ref)	127/60	1.00 (Ref)	1.00 (Ref)
C:T	268/633	0.82 (0.66, 1.02)	0.83 (0.67, 1.02)	208/616	0.80 (0.63, 1.01)	0.81 (0.64, 1.01)	60/17	1.17 (0.52, 2.62)	1.13 (0.56, 2.26)
C:C	13/81	0.58 (0.29, 1.14)	0.64 (0.35, 1.16)	11/77	0.54 (0.25, 1.15)	0.62 (0.33, 1.17)	2/4	0.77 (0.12, 5.00)	0.91 (0.30, 2.75)
Log-Additive		**0.81 (0.67, 0.97)**	**0.81 (0.67, 0.97)**		**0.78 (0.64, 0.96)**	**0.78 (0.64, 0.96)**		1.04 (0.56, 1.93)	1.03 (0.58, 1.81)
Dominant		**0.80 (0.65, 0.99)**	**0.80 (0.65, 0.99)**		**0.77 (0.62, 0.97)**	**0.78 (0.62, 0.97)**		1.10 (0.52, 2.34)	1.08 (0.56, 2.09)
Recessive		0.61 (0.31, 1.20)	0.67 (0.37, 1.21)		0.58 (0.27, 1.22)	0.65 (0.34, 1.23)		0.75 (0.12, 4.87)	0.90 (0.30, 2.73)
Oct4									
rs3130932									
T:T	475/1007	1.00 (Ref)	1.00 (Ref)	384/956	1.00 (Ref)	1.00 (Ref)	91/51	1.00 (Ref)	1.00 (Ref)
G:T	367/911	**0.82 (0.66, 1.00)**	**0.82 (0.67, 1.00)**	283/887	**0.77 (0.62, 0.96)**	**0.78 (0.62, 0.97)**	84/24	1.93 (0.91, 4.08)	1.66 (0.87, 3.18)
G:G	106/242	0.96 (0.70, 1.31)	0.96 (0.71, 1.31)	93/235	0.98 (0.70, 1.37)	0.98 (0.71, 1.37)	13/7	1.09 (0.32, 3.72)	1.02 (0.41, 2.54)
Log-Additive		0.92 (0.80, 1.06)	0.92 (0.80, 1.06)		0.91 (0.78, 1.06)	0.91 (0.78, 1.06)		1.33 (0.78, 2.25)	1.28 (0.78, 2.10)
Dominant		0.85 (0.70, 1.02)	0.85 (0.70, 1.03)		0.81 (0.66, 1.00)	0.82 (0.67, 1.00)		1.72 (0.86, 3.45)	1.54 (0.83, 2.86)
Recessive		1.05 (0.77, 1.42)	1.05 (0.78, 1.41)		1.10 (0.79, 1.52)	1.09 (0.80, 1.50)		0.85 (0.26, 2.78)	0.91 (0.37, 2.24)
WNT2									
rs3729629									
G:G	464/962	1.00 (Ref)	1.00 (Ref)	376/920	1.00 (Ref)	1.00 (Ref)	88/42	1.00 (Ref)	1.00 (Ref)
C:G	392/953	0.83 (0.68, 1.02)	0.84 (0.68, 1.02)	315/918	0.81 (0.65, 1.00)	0.82 (0.66, 1.01)	77/35	1.18 (0.56, 2.47)	1.04 (0.55, 1.98)

C:C	97/241	0.74 (0.53, 1.03)	0.75 (0.54, 1.04)	78/239	**0.65 (0.45, 0.95)**	**0.67 (0.47, 0.96)**	19/2	**7.22 (1.31, 39.62)**	2.41 (0.89, 6.52)
Log-Additive		**0.85 (0.73, 0.98)**	**0.85 (0.73, 0.98)**		**0.81 (0.69, 0.95)**	**0.81 (0.69, 0.95)**		1.74 (0.98, 3.10)	1.61 (0.95, 2.72)
Dominant		**0.81 (0.67, 0.98)**	**0.81 (0.67, 0.99)**		**0.78 (0.63, 0.95)**	**0.78 (0.64, 0.96)**		1.50 (0.74, 3.04)	1.38 (0.74, 2.59)
Recessive		0.81 (0.58, 1.11)	0.82 (0.60, 1.12)		0.72 (0.51, 1.03)	0.74 (0.52, 1.04)		**6.72 (1.26, 35.79)**	2.39 (0.89, 6.40)
HEY2									
rs3734637									
A:A	582/1277	1.00 (Ref)	1.00 (Ref)	456/1231	1.00 (Ref)	1.00 (Ref)	126/46	1.00 (Ref)	1.00 (Ref)
A:C	311/728	0.93 (0.75, 1.15)	0.93 (0.76, 1.15)	257/702	0.97 (0.78, 1.22)	0.98 (0.78, 1.22)	54/26	0.73 (0.34, 1.58)	0.85 (0.44, 1.64)
C:C	41/152	**0.62 (0.40, 0.96)**	**0.65 (0.43, 0.98)**	34/142	0.73 (0.46, 1.17)	0.76 (0.49, 1.18)	7/10	**0.12 (0.02, 0.57)**	**0.37 (0.14, 0.99)**
Log-Additive		0.86 (0.73, 1.01)	0.86 (0.73, 1.01)		0.91 (0.77, 1.09)	0.92 (0.77, 1.09)		**0.50 (0.28, 0.88)**	**0.55 (0.33, 0.93)**
Dominant		0.88 (0.72, 1.07)	0.88 (0.72, 1.07)		0.93 (0.75, 1.16)	0.93 (0.76, 1.16)		0.54 (0.26, 1.10)	0.61 (0.33, 1.15)
Recessive		**0.63 (0.41, 0.98)**	**0.66 (0.44, 1.00)**		0.74 (0.47, 1.18)	0.76 (0.49, 1.18)		**0.13 (0.03, 0.61)**	0.38 (0.14, 1.01)
Ctbp2									
rs3740535									
G:G	504/1174	1.00 (Ref)	1.00 (Ref)	408/1129	1.00 (Ref)	1.00 (Ref)	96/45	1.00 (Ref)	1.00 (Ref)
A:G	355/822	0.93 (0.75, 1.14)	0.93 (0.76, 1.14)	283/794	0.95 (0.76, 1.18)	0.94 (0.76, 1.18)	72/28	0.78 (0.35, 1.71)	0.81 (0.41, 1.60)
A:A	82/159	1.31 (0.93, 1.85)	1.29 (0.92, 1.81)	66/152	1.27 (0.87, 1.84)	1.25 (0.87, 1.79)	16/7	1.48 (0.46, 4.72)	1.27 (0.53, 3.08)
Log-Additive		1.05 (0.91, 1.22)	1.05 (0.91, 1.22)		1.05 (0.89, 1.23)	1.05 (0.89, 1.23)		1.06 (0.64, 1.75)	1.05 (0.65, 1.69)
Dominant		0.99 (0.82, 1.20)	0.99 (0.82, 1.20)		1.00 (0.81, 1.23)	1.00 (0.81, 1.23)		0.93 (0.46, 1.88)	0.94 (0.50, 1.77)
Recessive		1.35 (0.97, 1.89)	1.33 (0.96, 1.84)		1.29 (0.90, 1.87)	1.27 (0.89, 1.82)		1.59 (0.51, 4.96)	1.32 (0.55, 3.17)
FZD1									
rs3750145									
A:A	541/1254	1.00 (Ref)	1.00 (Ref)	434/1206	1.00 (Ref)	1.00 (Ref)	107/48	1.00 (Ref)	1.00 (Ref)
A:G	280/662	0.86 (0.68, 1.07)	0.86 (0.69, 1.07)	221/643	0.88 (0.69, 1.12)	0.88 (0.69, 1.12)	59/21	0.68 (0.29, 1.59)	0.78 (0.38, 1.59)
G:G	42/95	0.98 (0.61, 1.58)	0.98 (0.63, 1.54)	36/88	1.05 (0.64, 1.74)	1.05 (0.65, 1.68)	6/7	0.49 (0.10, 2.54)	0.75 (0.26, 2.11)
Log-Additive		0.92 (0.77, 1.09)	0.92 (0.77, 1.09)		0.94 (0.78, 1.14)	0.94 (0.78, 1.14)		0.69 (0.37, 1.30)	0.74 (0.42, 1.31)
Dominant		0.87 (0.70, 1.08)	0.88 (0.71, 1.08)		0.90 (0.71, 1.13)	0.90 (0.72, 1.13)		0.65 (0.29, 1.42)	0.72 (0.36, 1.43)
Recessive		1.03 (0.65, 1.65)	1.03 (0.66, 1.61)		1.10 (0.67, 1.80)	1.09 (0.68, 1.74)		0.55 (0.11, 2.78)	0.77 (0.27, 2.18)
WNT2									
rs4730775									
C:C	553/1211	1.00 (Ref)	1.00 (Ref)	436/1167	1.00 (Ref)	1.00 (Ref)	117/44	1.00 (Ref)	1.00 (Ref)
C:T	325/778	0.88 (0.71, 1.08)	0.88 (0.72, 1.08)	277/749	0.97 (0.78, 1.21)	0.97 (0.78, 1.21)	48/29	**0.43 (0.19, 0.96)**	0.53 (0.27, 1.05)

T:T	52/144	0.87 (0.57, 1.32)	0.88 (0.59, 1.31)	38/136	0.76 (0.47, 1.23)	0.78 (0.49, 1.23)	14/8	0.97 (0.29, 3.19)	1.01 (0.41, 2.49)
Log-Additive		0.90 (0.77, 1.06)	0.90 (0.77, 1.06)		0.92 (0.77, 1.10)	0.92 (0.78, 1.10)		0.75 (0.45, 1.26)	0.78 (0.48, 1.26)
Dominant		0.88 (0.72, 1.07)	0.88 (0.72, 1.07)		0.94 (0.76, 1.16)	0.94 (0.76, 1.16)		0.54 (0.26, 1.10)	0.61 (0.32, 1.15)
Recessive		0.91 (0.60, 1.38)	0.92 (0.62, 1.36)		0.77 (0.48, 1.24)	0.79 (0.50, 1.24)		1.22 (0.38, 3.91)	1.13 (0.46, 2.74)
WNT8A									
rs4835761									
A:A	368/723	1.00 (Ref)	1.00 (Ref)	295/689	1.00 (Ref)	1.00 (Ref)	73/34	1.00 (Ref)	1.00 (Ref)
A:G	389/994	**0.74 (0.59, 0.91)**	**0.74 (0.60, 0.92)**	308/959	**0.73 (0.58, 0.92)**	**0.74 (0.59, 0.93)**	81/35	0.98 (0.45, 2.11)	0.91 (0.47, 1.76)
G:G	185/382	0.93 (0.71, 1.22)	0.93 (0.72, 1.22)	151/371	0.87 (0.65, 1.16)	0.88 (0.66, 1.17)	34/11	2.35 (0.85, 6.50)	1.77 (0.79, 3.93)
Log-Additive		0.92 (0.81, 1.06)	0.92 (0.81, 1.06)		0.90 (0.77, 1.04)	0.90 (0.78, 1.04)		1.41 (0.87, 2.30)	1.36 (0.86, 2.15)
Dominant		**0.79 (0.65, 0.96)**	**0.79 (0.65, 0.97)**		**0.77 (0.62, 0.96)**	**0.77 (0.63, 0.96)**		1.26 (0.62, 2.57)	1.20 (0.64, 2.26)
Recessive		1.09 (0.86, 1.40)	1.09 (0.86, 1.39)		1.03 (0.79, 1.34)	1.03 (0.79, 1.33)		2.38 (0.94, 6.05)	1.83 (0.85, 3.92)
Notch4									
rs520692									
A:A	695/1629	1.00 (Ref)	1.00 (Ref)	559/1564	1.00 (Ref)	1.00 (Ref)	136/65	1.00 (Ref)	1.00 (Ref)
A:G	224/494	0.97 (0.77, 1.22)	0.97 (0.78, 1.21)	181/481	0.98 (0.77, 1.25)	0.98 (0.77, 1.25)	43/14	1.37 (0.58, 3.22)	1.27 (0.61, 2.62)
G:G	9/38	0.78 (0.34, 1.79)	0.83 (0.41, 1.68)	7/36	0.80 (0.33, 1.97)	0.85 (0.41, 1.80)	2/2	0.41 (0.03, 6.44)	0.82 (0.24, 2.79)
Log-Additive		0.95 (0.77, 1.16)	0.95 (0.78, 1.16)		0.96 (0.77, 1.19)	0.96 (0.77, 1.19)		1.10 (0.53, 2.30)	1.08 (0.57, 2.06)
Dominant		0.96 (0.77, 1.19)	0.96 (0.77, 1.19)		0.97 (0.76, 1.23)	0.97 (0.76, 1.22)		1.25 (0.55, 2.84)	1.18 (0.58, 2.39)
Recessive		0.78 (0.34, 1.80)	0.84 (0.41, 1.69)		0.81 (0.33, 1.97)	0.86 (0.41, 1.80)		0.38 (0.02, 5.97)	0.81 (0.24, 2.76)
Rex1									
rs6815391									
T:T	403/926	1.00 (Ref)	1.00 (Ref)	314/892	1.00 (Ref)	1.00 (Ref)	89/34	1.00 (Ref)	1.00 (Ref)
C:T	387/904	0.89 (0.72, 1.10)	0.89 (0.72, 1.09)	316/873	0.98 (0.78, 1.23)	0.97 (0.78, 1.22)	71/31	0.66 (0.29, 1.50)	0.75 (0.37, 1.51)
C:C	138/275	1.12 (0.83, 1.50)	1.11 (0.83, 1.48)	115/267	1.23 (0.90, 1.69)	1.22 (0.89, 1.66)	23/8	0.64 (0.19, 2.18)	0.80 (0.32, 1.99)
Log-Additive		1.01 (0.88, 1.16)	1.01 (0.88, 1.16)		1.08 (0.93, 1.25)	1.08 (0.93, 1.25)		0.75 (0.43, 1.31)	0.78 (0.47, 1.31)
Dominant		0.94 (0.77, 1.15)	0.94 (0.77, 1.14)		1.04 (0.84, 1.28)	1.03 (0.84, 1.28)		0.65 (0.30, 1.41)	0.72 (0.37, 1.41)
Recessive		1.18 (0.90, 1.56)	1.18 (0.90, 1.54)		1.24 (0.93, 1.67)	1.23 (0.92, 1.64)		0.77 (0.24, 2.47)	0.86 (0.35, 2.10)
HES2									
rs8708									
A:A	626/1435	1.00 (Ref)	1.00 (Ref)	499/1384	1.00 (Ref)	1.00 (Ref)	127/51	1.00 (Ref)	1.00 (Ref)
A:G	270/614	0.91 (0.73, 1.14)	0.91 (0.73, 1.14)	219/593	0.95 (0.75, 1.21)	0.96 (0.76, 1.21)	51/21	0.62 (0.26, 1.45)	0.71 (0.34, 1.47)

G:G	29/88	0.88 (0.51, 1.53)	0.90 (0.54, 1.50)	24/83	0.90 (0.49, 1.64)	0.92 (0.53, 1.58)	5/5	0.68 (0.12, 3.67)	0.86 (0.30, 2.50)
Log-Additive		0.92 (0.77, 1.11)	0.92 (0.77, 1.11)		0.95 (0.78, 1.16)	0.95 (0.79, 1.16)		0.71 (0.37, 1.36)	0.76 (0.42, 1.36)
Dominant		0.91 (0.73, 1.12)	0.91 (0.74, 1.12)		0.95 (0.75, 1.19)	0.95 (0.76, 1.19)		0.63 (0.28, 1.39)	0.70 (0.35, 1.40)
Recessive		0.91 (0.53, 1.57)	0.92 (0.55, 1.53)		0.91 (0.50, 1.65)	0.93 (0.54, 1.59)		0.76 (0.14, 4.07)	0.90 (0.31, 2.59)
Notch4									
rs915894									
C:C	308/622	1.00 (Ref)	1.00 (Ref)	253/595	1.00 (Ref)	1.00 (Ref)	55/27	1.00 (Ref)	1.00 (Ref)
A:C	427/1023	0.81 (0.65, 1.01)	0.81 (0.65, 1.01)	341/990	**0.76 (0.60, 0.97)**	**0.77 (0.61, 0.98)**	86/33	1.32 (0.56, 3.09)	1.21 (0.60, 2.45)
A:A	211/480	1.00 (0.77, 1.30)	1.01 (0.78, 1.30)	165/460	0.98 (0.74, 1.29)	0.98 (0.75, 1.29)	46/20	1.10 (0.43, 2.82)	1.04 (0.49, 2.21)
Log-Additive		0.99 (0.87, 1.13)	0.99 (0.87, 1.13)		0.97 (0.84, 1.12)	0.97 (0.84, 1.12)		1.05 (0.66, 1.68)	1.05 (0.67, 1.63)
Dominant		0.87 (0.71, 1.07)	0.87 (0.71, 1.07)		0.83 (0.67, 1.04)	0.84 (0.67, 1.04)		1.23 (0.56, 2.69)	1.17 (0.59, 2.31)
Recessive		1.14 (0.91, 1.43)	1.13 (0.91, 1.42)		1.15 (0.90, 1.46)	1.14 (0.90, 1.45)		0.93 (0.43, 2.05)	0.95 (0.48, 1.88)
JAG2									
rs9972231									
C:C	624/1385	1.00 (Ref)	1.00 (Ref)	498/1333	1.00 (Ref)	1.00 (Ref)	126/52	1.00 (Ref)	1.00 (Ref)
C:T	252/522	0.91 (0.72, 1.14)	0.91 (0.72, 1.14)	205/503	0.96 (0.75, 1.23)	0.96 (0.75, 1.22)	47/19	0.73 (0.30, 1.78)	0.78 (0.37, 1.66)
T:T	33/60	1.21 (0.69, 2.10)	1.17 (0.70, 1.97)	28/59	1.23 (0.68, 2.22)	1.19 (0.69, 2.05)	5/1	3.21 (0.26, 39.88)	1.35 (0.41, 4.42)
Log-Additive		0.98 (0.81, 1.18)	0.98 (0.81, 1.18)		1.01 (0.83, 1.24)	1.01 (0.83, 1.24)		1.00 (0.49, 2.07)	1.00 (0.53, 1.91)
Dominant		0.94 (0.75, 1.17)	0.94 (0.75, 1.17)		0.99 (0.78, 1.25)	0.99 (0.78, 1.25)		0.85 (0.36, 1.99)	0.89 (0.43, 1.84)
Recessive		1.24 (0.71, 2.15)	1.20 (0.72, 2.01)		1.24 (0.69, 2.23)	1.20 (0.69, 2.07)		3.44 (0.28, 42.42)	1.37 (0.42, 4.47)

Ca, case; Co, control; cOR, crude odds ratio; aOR, adjusted odds ratio; sbOR, semi-bayes adjusted odds ratio;

[a] Atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b] Adjusted for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, pack-years of smoking, alcohol consumption in the 1990's, Helicobacter pylori IgG.

Table 3.3.6. Associations between SNPs from GWAS studies and stomach cancer, by atrophic gastritis defined by low serum pepsinogen levels in the Jiangsu study.

	Overall			Without Atrophic Gastritis[a]			Atrophic Gastritis[a]		
dbSNP no.	**Ca/Co**	**aOR[b]**	**sbOR[b]**	**Ca/Co**	**aOR[b]**	**sbOR[b]**	**Ca/Co**	**aOR[b]**	**sbOR[b]**
PLCE1									
rs2274223									
A:A	487/1335	1.00 (Ref)	1.00 (Ref)	394/1284	1.00 (Ref)	1.00 (Ref)	93/51	1.00 (Ref)	1.00 (Ref)
A:G	342/687	1.14 (0.92, 1.42)	1.13 (0.91, 1.41)	276/663	1.10 (0.87, 1.40)	1.10 (0.87, 1.38)	66/24	1.52 (0.66, 3.47)	1.30 (0.64, 2.61)
G:G	39/85	1.54 (0.95, 2.49)	1.46 (0.93, 2.32)	33/82	1.43 (0.85, 2.40)	1.36 (0.84, 2.23)	6/3	3.09 (0.57, 16.71)	1.56 (0.54, 4.51)
Log-Additive		1.18 (0.99, 1.41)	1.18 (0.99, 1.41)		1.14 (0.95, 1.38)	1.14 (0.95, 1.37)		1.63 (0.85, 3.12)	1.49 (0.83, 2.68)
Dominant		1.18 (0.96, 1.46)	1.18 (0.96, 1.45)		1.14 (0.91, 1.43)	1.13 (0.91, 1.42)		1.67 (0.76, 3.70)	1.47 (0.74, 2.93)
Recessive		1.46 (0.91, 2.35)	1.41 (0.89, 2.21)		1.38 (0.82, 2.30)	1.33 (0.82, 2.15)		2.59 (0.50, 13.49)	1.49 (0.52, 4.28)
CHEK2									
rs738722									
C:C	477/1171	1.00 (Ref)	1.00 (Ref)	389/1120	1.00 (Ref)	1.00 (Ref)	88/51	1.00 (Ref)	1.00 (Ref)
C:T	355/776	1.06 (0.86, 1.31)	1.06 (0.86, 1.30)	280/747	1.01 (0.81, 1.27)	1.01 (0.81, 1.26)	75/29	1.29 (0.61, 2.72)	1.10 (0.58, 2.11)
T:T	96/167	**1.47 (1.05, 2.06)**	**1.44 (1.04, 2.00)**	74/165	1.20 (0.83, 1.73)	1.19 (0.83, 1.69)	22/2	**11.75 (2.26, 61.04)**	**3.25 (1.26, 8.40)**
Log-Additive		**1.16 (1.00, 1.34)**	**1.16 (1.00, 1.34)**		1.06 (0.91, 1.25)	1.06 (0.91, 1.25)		**2.13 (1.23, 3.69)**	**1.93 (1.16, 3.19)**
Dominant		1.14 (0.93, 1.38)	1.13 (0.93, 1.37)		1.05 (0.85, 1.29)	1.05 (0.85, 1.29)		1.88 (0.94, 3.76)	1.65 (0.89, 3.07)
Recessive		**1.44 (1.04, 1.98)**	**1.41 (1.03, 1.93)**		1.19 (0.84, 1.70)	1.18 (0.84, 1.67)		**10.66 (2.10, 54.00)**	**3.19 (1.24, 8.17)**

Ca, case; Co, control; cOR, crude odds ratio; aOR, adjusted odds ratio; sbOR, semi-bayes adjusted odds ratio;

[a] Atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b] Adjusted for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, pack-years of smoking, alcohol consumption in the 1990's, Helicobacter pylori IgG.

Table 3.3.7. Joint associations between SNPs related to the miRNA pathway and stomach cancer, by atrophic gastritis defined by low serum pepsinogen levels in the Jiangsu study.

	Without Atrophic Gastritis[a]		Atrophic Gastritis[a]		Interaction			
dbSNP no.	**aOR[b]**	**sbOR[b]**	**aOR[b]**	**sbOR[b]**	**RERI[b]**	**sbRERI[b]**	**ROR[b]**	**sbROR[b]**
IL15								
rs10519613								
CA+AA	1.00 (Ref)	1.00 (Ref)	4.93 (3.27, 7.44)	4.99 (3.36, 7.42)	1.50 (-2.53, 5.52)	1.31 (-2.28, 4.90)	1.19 (0.59, 2.39)	1.15 (0.61, 2.14)
CC	1.12 (0.90, 1.39)	1.12 (0.91, 1.39)	6.55 (3.75, 11.44)	6.42 (3.78, 10.90)				
XPO5								
rs11077								
AC+CC	1.00 (Ref)	1.00 (Ref)	12.51(4.97,31.50)	9.31 (4.36, 19.87)	-7.52(-18.87, 3.84)	-4.23(-11.04, 2.58)	**0.36 (0.13, 0.96)**	0.50 (0.23, 1.10)
AA	1.15 (0.84, 1.58)	1.11 (0.82, 1.51)	5.15 (3.29, 8.05)	5.19 (3.33, 8.10)				
miR-196a2								
rs11614913								
CT+CC	1.00 (Ref)	1.00 (Ref)	4.45 (2.92, 6.79)	4.57 (3.04, 6.86)	2.03 (-1.80, 5.86)	1.67 (-1.72, 5.06)	1.41 (0.70, 2.82)	1.32 (0.71, 2.45)
TT	1.04 (0.83, 1.30)	1.05 (0.83, 1.31)	6.52 (3.82, 11.12)	6.28 (3.78, 10.45)				
WWOX								
rs12828								
GG	1.00 (Ref)	1.00 (Ref)	4.47 (2.64, 7.58)	4.54 (2.76, 7.46)	1.37 (-2.00, 4.73)	1.25 (-1.82, 4.31)	1.14 (0.57, 2.27)	1.11 (0.60, 2.06)
AG+AA	1.18 (0.95, 1.46)	1.18 (0.95, 1.46)	6.01 (3.83, 9.45)	5.97 (3.84, 9.27)				
Ran								
rs14035								
CT+TT	1.00 (Ref)	1.00 (Ref)	5.80 (3.22, 10.43)	5.60 (3.25, 9.65)	-1.03 (-4.77, 2.71)	-0.77 (-4.04, 2.50)	0.78 (0.39, 1.60)	0.83 (0.44, 1.56)
CC	1.06 (0.85, 1.33)	1.06 (0.84, 1.33)	4.83 (3.15, 7.40)	4.88 (3.21, 7.44)				
CXCL12								

rs1804429

GT+GG	1.00 (Ref)	1.00 (Ref)	7.36 (2.77, 19.57)	6.55 (2.93, 14.64)	-1.27 (-8.42, 5.89)	-0.42 (-5.64, 4.80)	0.69 (0.24, 1.95)	0.79 (0.34, 1.81)
TT	1.25 (0.89, 1.75)	1.23 (0.88, 1.72)	6.35 (4.01, 10.06)	6.35 (4.01, 10.06)				

Gemin3

rs197412

TC+CC	1.00 (Ref)	1.00 (Ref)	4.85 (3.04, 7.75)	4.89 (3.13, 7.65)	0.62 (-2.67, 3.91)	0.54 (-2.45, 3.53)	1.09 (0.56, 2.13)	1.07 (0.59, 1.96)
TT	1.04 (0.84, 1.28)	1.04 (0.85, 1.28)	5.51 (3.44, 8.83)	5.48 (3.47, 8.64)				

E2F2

rs2075993

GA+AA	1.00 (Ref)	1.00 (Ref)	4.50 (2.93, 6.91)	4.57 (3.03, 6.91)	2.02 (-1.85, 5.88)	1.80 (-1.67, 5.27)	1.24 (0.63, 2.45)	1.19 (0.64, 2.19)
GG	1.21 (0.98, 1.49)	1.21 (0.98, 1.50)	6.72 (3.98, 11.37)	6.58 (3.99, 10.87)				

RCHY1

rs2126852

AG+GG	1.00 (Ref)	1.00 (Ref)	6.06 (3.38, 10.84)	5.49 (3.19, 9.44)	-2.8 (-6.64, 1.04)	-1.97 (-5.13, 1.19)	0.47 (0.21, 1.05)	0.57 (0.29, 1.13)
AA	1.21 (0.93, 1.56)	1.18 (0.92, 1.53)	3.46 (1.99, 6.02)	3.69 (2.17, 6.28)				

Wnt2B

rs2273368

CT+TT	1.00 (Ref)	1.00 (Ref)	4.14 (2.78, 6.16)	4.36 (2.97, 6.41)	**8.76 (0.17, 17.35)**	**6.96 (0.19, 13.72)**	**2.31 (1.07, 4.97)**	1.90 (0.98, 3.69)
CC	1.39 (1.11, 1.73)	1.41 (1.13, 1.76)	13.29(6.97,25.33)	11.73(6.51,21.14)				

THBS1

rs2292305

CT+CC	1.00 (Ref)	1.00 (Ref)	5.40 (3.43, 8.50)	5.33 (3.45, 8.22)	0.12 (-3.51, 3.74)	0.27 (-3.02, 3.56)	0.86 (0.43, 1.69)	0.88 (0.48, 1.63)
TT	1.24 (1.00, 1.54)	1.24 (1, 1.53)	5.76 (3.47, 9.57)	5.84 (3.58, 9.52)				

Gemin4

rs2740348

GG	1.00 (Ref)	1.00 (Ref)	4.97 (3.40, 7.25)	4.93 (3.42, 7.13)	0.34 (-3.79, 4.46)	0.49 (-3.18, 4.16)	0.89 (0.40, 1.97)	0.92 (0.46, 1.83)
GC+CC	1.26 (0.98, 1.63)	1.26 (0.98, 1.62)	5.57 (2.83, 10.96)	5.68 (3.05, 10.58)				
pre-miR-146a								
rs2910164								
GC+GG	1.00 (Ref)	1.00 (Ref)	5.08 (3.39, 7.62)	5.07 (3.43, 7.49)	-0.15 (-3.48, 3.17)	-0.11 (-3.10, 2.89)	0.95 (0.47, 1.91)	0.96 (0.51, 1.79)
CC	1.03 (0.82, 1.28)	1.02 (0.82, 1.27)	4.96 (2.83, 8.66)	4.98 (2.94, 8.46)				
CTNNB1								
rs2953								
GT+GG	1.00 (Ref)	1.00 (Ref)	5.71 (3.43, 9.51)	5.54 (3.43, 8.95)	-0.75 (-4.26, 2.77)	-0.47 (-3.61, 2.67)	0.75 (0.38, 1.47)	0.79 (0.43, 1.45)
TT	1.21 (0.98, 1.49)	1.20 (0.97, 1.48)	5.17 (3.31, 8.10)	5.27 (3.40, 8.16)				
DOCK4								
rs3801790								
AG+GG	1.00 (Ref)	1.00 (Ref)	6.13 (3.94, 9.54)	5.90 (3.87, 9.00)	-1.92 (-5.23, 1.39)	-1.49 (-4.47, 1.48)	0.62 (0.32, 1.20)	0.68 (0.37, 1.23)
AA	1.15 (0.93, 1.42)	1.14 (0.92, 1.40)	4.36 (2.68, 7.10)	4.54 (2.84, 7.26)				
Rbl2								
rs3929								
CG+CC	1.00 (Ref)	1.00 (Ref)	6.06 (3.51, 10.47)	5.95 (3.57, 9.92)	-0.68 (-4.46, 3.10)	-0.53 (-3.90, 2.85)	0.86 (0.44, 1.70)	0.89 (0.48, 1.63)
GG	1.04 (0.83, 1.29)	1.03 (0.83, 1.28)	5.42 (3.53, 8.31)	5.46 (3.58, 8.31)				
IL6R								
rs4072391								
CT+TT	1.00 (Ref)	1.00 (Ref)	8.33 (3.53, 19.63)	7.09 (3.42, 14.71)	-3.51(-10.61, 3.58)	-2.21 (-7.28, 2.85)	0.54 (0.21, 1.37)	0.65 (0.30, 1.41)
CC	1.08 (0.82, 1.44)	1.06 (0.81, 1.40)	4.89 (3.20, 7.48)	4.95 (3.24, 7.54)				
Ago2								
rs4961280								
CA+AA	1.00 (Ref)	1.00 (Ref)	3.99 (1.93, 8.26)	4.26 (2.23, 8.14)	2.33 (-1.28, 5.93)	2.00 (-1.30, 5.29)	1.37 (0.61, 3.10)	1.26 (0.62, 2.55)

CC	1.19 (0.92, 1.54)	1.2 (0.93, 1.55)	6.51 (4.27, 9.93)	6.45 (4.24, 9.81)				
miR-26a1								
rs7372209								
CT+TT	1.00 (Ref)	1.00 (Ref)	4.72 (2.81, 7.91)	4.80 (2.95, 7.81)	1.23 (-2.16, 4.62)	1.09 (-2.00, 4.19)	1.16 (0.59, 2.28)	1.13 (0.62, 2.07)
CC	1.10 (0.90, 1.35)	1.10 (0.90, 1.36)	6.05 (3.93, 9.33)	6.00 (3.93, 9.15)				
TP53INP1								
rs7760								
TT	1.00 (Ref)	1.00 (Ref)	5.23 (3.57, 7.66)	5.17 (3.57, 7.49)	-0.54 (-4.20, 3.11)	-0.33 (-3.61, 2.95)	0.82 (0.38, 1.81)	0.86 (0.44, 1.71)
TG+GG	1.11 (0.87, 1.43)	1.11 (0.86, 1.42)	4.80 (2.47, 9.33)	4.95 (2.68, 9.15)				
Gemin4								
rs7813								
TT	1.00 (Ref)	1.00 (Ref)	5.88 (3.78, 9.15)	5.71 (3.74, 8.71)	-1.55 (-4.81, 1.72)	-1.22 (-4.17, 1.73)	0.69 (0.35, 1.35)	0.74 (0.41, 1.36)
CT+CC	1.09 (0.88, 1.35)	1.08 (0.88, 1.33)	4.42 (2.66, 7.34)	4.57 (2.80, 7.45)				
KRAS								
rs9266								
CT+TT	1.00 (Ref)	1.00 (Ref)	5.56 (3.25, 9.54)	5.42 (3.27, 8.97)	-0.41 (-3.97, 3.16)	-0.19 (-3.36, 2.99)	0.80 (0.40, 1.58)	0.84 (0.45, 1.54)
CC	1.20 (0.97, 1.50)	1.20 (0.97, 1.49)	5.36 (3.46, 8.32)	5.43 (3.53, 8.35)				

Ca, case; Co, control; cOR, crude odds ratio; aOR, adjusted odds ratio; sbOR, semi-bayes adjusted odds ratio; RERI, relative excess risk due to interaction; ROR, ratio of odds ratios;

[a] Atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b] Adjusted for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, pack-years of smoking, alcohol consumption in the 1990's, *Helicobacter pylori* IgG.

Table 3.3.8. Joint associations between SNPs related to the stem cell pathway and stomach cancer, by atrophic gastritis defined by low serum pepsinogen levels in the Jiangsu study.

	Without Atrophic Gastritis[a]		Atrophic Gastritis[a]		Interaction			
dbSNP no.	**aOR[b]**	**sbOR[b]**	**aOR[b]**	**sbOR[b]**	**RERI[b]**	**sbRERI[b]**	**ROR[b]**	**sbROR[b]**
DLL1								
rs1033583								
AC+CC	1.00 (Ref)	1.00 (Ref)	5.38 (3.23, 8.96)	5.34 (3.3, 8.65)	0.55 (-3.22, 4.32)	0.62 (-2.79, 4.03)	0.93 (0.47, 1.86)	0.94 (0.51, 1.75)
AA	1.23 (0.99, 1.53)	1.23 (0.99, 1.52)	6.16 (3.82, 9.94)	6.19 (3.88, 9.86)				
HEY1								
rs1046472								
CC	1.00 (Ref)	1.00 (Ref)	6.29 (4.14, 9.55)	6.07 (4.06, 9.07)	-2.01 (-5.36, 1.35)	-1.56 (-4.17, 1.73)	0.62 (0.31, 1.21)	0.68 (0.37, 1.24)
AC+AA	1.14 (0.92, 1.41)	1.13 (0.92, 1.39)	4.42 (2.63, 7.43)	4.63 (2.82, 7.62)				
HES2								
rs11364								
GG	1.00 (Ref)	1.00 (Ref)	4.55 (2.97, 6.97)	4.6 (3.05, 6.94)	2.77 (-2.12, 7.67)	2.55 (-1.76, 6.86)	1.18 (0.56, 2.48)	1.14 (0.59, 2.19)
AG+AA	1.45 (1.15, 1.82)	1.45 (1.16, 1.83)	7.77 (4.28, 14.12)	7.61 (4.34, 13.32)				
Oct4								
rs13409								
CC	1.00 (Ref)	1.00 (Ref)	6.31 (3.67, 10.85)	6.05 (3.65, 10.04)	-1.81 (-5.54, 1.92)	-1.46 (-4.73, 1.81)	0.71 (0.36, 1.40)	0.76 (0.41, 1.40)
CT+TT	1.01 (0.81, 1.25)	1.00 (0.81, 1.24)	4.51 (2.92, 6.97)	4.59 (3.00, 7.04)				
AXIN1								
rs1981492								
AG+AA	1.00 (Ref)	1.00 (Ref)	4.43 (2.79, 7.03)	4.52 (2.91, 7.03)	1.88 (-1.57, 5.33)	1.67 (-1.48, 4.82)	1.26 (0.66, 2.42)	1.21 (0.67, 2.18)
GG	1.16 (0.94, 1.42)	1.16 (0.95, 1.43)	6.46 (4.05, 10.32)	6.36 (4.04, 10.01)				
GLI1								
rs2228224								

GG	1.00 (Ref)	1.00 (Ref)	5.11 (3.29, 7.94)	5.11 (3.35, 7.79)	0.57 (-2.94, 4.09)	0.58 (-2.62, 3.77)	1.00 (0.51, 1.94)	1.00 (0.55, 1.82)
AG+AA	1.14 (0.93, 1.41)	1.14 (0.93, 1.41)	5.82 (3.53, 9.62)	5.83 (3.59, 9.44)				
DVL2								
rs222851								
AA	1.00 (Ref)	1.00 (Ref)	5.68 (3.27, 9.87)	5.51 (3.29, 9.22)	-0.75 (-4.36, 2.87)	-0.50 (-4.37, 1.93)	0.78 (0.39, 1.56)	0.82 (0.44, 1.52)
AG+GG	1.14 (0.92, 1.42)	1.14 (0.92, 1.41)	5.08 (3.29, 7.84)	5.15 (3.36, 7.88)				
AXIN2								
rs2240308								
GG	1.00 (Ref)	1.00 (Ref)	6.00 (3.63, 9.94)	5.79 (3.60, 9.33)	-1.55 (-5.11, 2.00)	-1.22 (-3.14, 2.81)	0.71 (0.36, 1.43)	0.76 (0.41, 1.42)
AG+AA	1.05 (0.84, 1.30)	1.04 (0.84, 1.29)	4.50 (2.78, 7.28)	4.62 (2.89, 7.36)				
FZD3								
rs2241802								
AG+AA	1.00 (Ref)	1.00 (Ref)	5.18 (3.39, 7.92)	5.16 (3.43, 7.76)	-0.11 (-3.55, 3.33)	-0.06 (-3.16, 3.03)	0.95 (0.47, 1.93)	0.96 (0.51, 1.81)
GG	1.03 (0.82, 1.30)	1.03 (0.82, 1.29)	5.10 (2.94, 8.85)	5.13 (3.04, 8.66)				
Dec1								
rs2269700								
CT+CC	1.00 (Ref)	1.00 (Ref)	7.18 (3.88, 13.26)	6.68 (3.80, 11.73)	-1.68 (-6.39, 3.03)	-1.06 (-5.03, 2.91)	0.63 (0.30, 1.29)	0.69 (0.37, 1.31)
TT	1.29 (1.03, 1.61)	1.28 (1.02, 1.59)	5.79 (3.83, 8.73)	5.89 (3.92, 8.85)				
Oct4								
rs3130932								
GT+GG	1.00 (Ref)	1.00 (Ref)	7.87 (4.78, 12.96)	7.24 (4.53, 11.57)	-3.74 (-7.95, 0.47)	-2.87 (-6.47, 0.73)	**0.45 (0.23, 0.87)**	**0.52 (0.29, 0.94)**
TT	1.24 (1.01, 1.52)	1.22 (0.99, 1.50)	4.37 (2.82, 6.77)	4.59 (2.99, 7.05)				
WNT2								
rs3729629								
CG+CC	1.00 (Ref)	1.00 (Ref)	6.79 (4.24, 10.88)	6.41 (4.10, 10.02)	-2.36 (-6.09, 1.38)	-1.73 (-5.04, 1.57)	0.54 (0.28, 1.04)	0.60 (0.33, 1.10)

GG	1.30 (1.05, 1.59)	1.28 (1.04, 1.57)	4.73 (2.96, 7.55)	4.95 (3.14, 7.80)				
HEY2								
rs3734637								
AC+CC	1.00 (Ref)	1.00 (Ref)	3.93 (2.30, 6.75)	4.15 (2.50, 6.88)	2.52 (-0.75, 5.79)	2.15 (-0.86, 5.15)	1.55 (0.78, 3.06)	1.42 (0.77, 2.62)
AA	1.07 (0.86, 1.33)	1.08 (0.87, 1.33)	6.52 (4.25, 10.01)	6.38 (4.19, 9.69)				
Ctbp2								
rs3740535								
GG	1.00 (Ref)	1.00 (Ref)	5.29 (3.39, 8.26)	5.28 (3.44, 8.08)	-0.20 (-3.48, 3.08)	-0.17 (-3.14, 2.81)	0.96 (0.50, 1.88)	0.97 (0.53, 1.77)
AG+AA	1.00 (0.81, 1.23)	1.00 (0.81, 1.23)	5.09 (3.11, 8.32)	5.11 (3.18, 8.20)				
FZD1								
rs3750145								
AG+GG	1.00 (Ref)	1.00 (Ref)	4.39 (2.43, 7.94)	4.51 (2.61, 7.81)	1.40 (-2.02, 4.82)	1.22 (-1.89, 4.32)	1.21 (0.58, 2.50)	1.16 (0.61, 2.21)
AA	1.11 (0.88, 1.40)	1.12 (0.89, 1.40)	5.90 (3.79, 9.19)	5.85 (3.78, 9.03)				
WNT2								
rs4730775								
CT+TT	1.00 (Ref)	1.00 (Ref)	3.36 (1.97, 5.72)	3.58 (2.17, 5.89)	2.72 (-0.34, 5.79)	2.30 (-0.49, 5.09)	1.71 (0.86, 3.40)	1.54 (0.83, 2.84)
CC	1.07 (0.87, 1.32)	1.08 (0.88, 1.34)	6.15 (3.95, 9.59)	5.96 (3.87, 9.19)				
WNT8A								
rs4835761								
AG+GG	1.00 (Ref)	1.00 (Ref)	6.21 (4.05, 9.53)	6.01 (3.99, 9.07)	-1.22 (-4.84, 2.40)	-0.80 (-4.10, 2.49)	0.66 (0.34, 1.28)	0.71 (0.39, 1.30)
AA	1.30 (1.04, 1.61)	1.28 (1.04, 1.59)	5.28 (3.19, 8.77)	5.49 (3.38, 8.94)				
Notch4								
rs520692								
AG+GG	1.00 (Ref)	1.00 (Ref)	5.77 (2.85, 11.67)	5.59 (2.97, 10.5)	-0.75 (-5.05, 3.54)	-0.54 (-4.19, 3.11)	0.85 (0.38, 1.88)	0.88 (0.44, 1.76)
AA	1.03 (0.81, 1.31)	1.03 (0.81, 1.30)	5.05 (3.36, 7.59)	5.07 (3.38, 7.61)				

Rex1								
rs6815391								
TT	1.00 (Ref)	1.00 (Ref)	7.27 (4.46, 11.85)	6.85 (4.32, 10.87)	-3.21 (-7.12, 0.69)	-2.58 (-5.99, 0.83)	0.55 (0.27, 1.08)	0.61 (0.33, 1.14)
CT+CC	1.03 (0.83, 1.28)	1.02 (0.82, 1.26)	4.09 (2.50, 6.68)	4.29 (2.67, 6.90)				
HES2								
rs8708								
AG+GG	1.00 (Ref)	1.00 (Ref)	4.25 (2.29, 7.87)	4.45 (2.52, 7.85)	1.79 (-1.63, 5.22)	1.50 (-1.63, 4.63)	1.35 (0.65, 2.83)	1.27 (0.66, 2.43)
AA	1.06 (0.84, 1.33)	1.07 (0.85, 1.34)	6.10 (3.97, 9.38)	6.02 (3.94, 9.19)				
Notch4								
rs915894								
AC+AA	1.00 (Ref)	1.00 (Ref)	5.80 (3.89, 8.62)	5.65 (3.85, 8.29)	-1.31 (-4.73, 2.12)	-0.92 (-4.05, 2.21)	0.67 (0.33, 1.37)	0.73 (0.39, 1.38)
CC	1.20 (0.96, 1.50)	1.19 (0.96, 1.48)	4.69 (2.64, 8.32)	4.92 (2.86, 8.45)				
JAG2								
rs9972231								
CT+TT	1.00 (Ref)	1.00 (Ref)	4.17 (2.11, 8.25)	4.36 (2.35, 8.09)	1.24 (-2.18, 4.66)	0.99 (-2.10, 4.07)	1.28 (0.58, 2.82)	1.20 (0.61, 2.39)
CC	1.02 (0.80, 1.29)	1.02 (0.81, 1.29)	5.43 (3.53, 8.36)	5.37 (3.51, 8.23)				

Ca, case; Co, control; cOR, crude odds ratio; aOR, adjusted odds ratio; sbOR, semi-bayes adjusted odds ratio; RERI, relative excess risk due to interaction; ROR, ratio of odds ratios;

[a] Atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b] Adjusted for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, pack-years of smoking, alcohol consumption in the 1990's, Helicobacter pylori IgG.

Table 3.3.9. Joint associations between SNPs from GWAS studies and stomach cancer, by atrophic gastritis defined by low serum pepsinogen levels in the Jiangsu study.

	Without Atrophic Gastritis[a]		Atrophic Gastritis[a]		Interaction			
dbSNP no.	**aOR[b]**	**sbOR[b]**	**aOR[b]**	**sbOR[b]**	**RERI[b]**	**sbRERI[b]**	**ROR[b]**	**sbROR[b]**
PLCE1								
rs2274223								
AA	1.00 (Ref)	1.00 (Ref)	3.96 (2.50, 6.27)	4.07 (2.62, 6.32)	2.07 (-1.61, 5.75)	1.75 (-1.49. 5.00)	1.38 (0.67, 2.83)	1.29 (0.68, 2.43)
AG+GG	1.13 (0.90, 1.42)	1.14 (0.91, 1.42)	6.17 (3.58, 10.63)	5.96 (3.55, 10.01)				
CHEK2								
rs738722								
CC	1.00 (Ref)	1.00 (Ref)	3.65 (2.32, 5.75)	3.87 (2.51, 5.98)	3.89 (-0.01, 7.79)	3.24 (-0.21, 6.68)	**1.98 (1.01, 3.86)**	1.74 (0.95, 3.17)
CT+TT	1.05 (0.85, 1.30)	1.07 (0.87, 1.31)	7.59 (4.66, 12.39)	7.18 (4.49, 11.48)				

Ca, case; Co, control; cOR, crude odds ratio; aOR, adjusted odds ratio; sbOR, semi-bayes adjusted odds ratio; RERI, relative excess risk due to interaction; ROR, ratio of odds ratios;

[a] Atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

[b] Adjusted for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, pack-years of smoking, alcohol consumption in the 1990's, Helicobacter pylori IgG.

Table 3.3.10. Joint associations between SNPs related to the miRNA pathway and stomach cancer, by *H. pylori* infection status in the Jiangsu study.

	***H.pylori* Negative**		***H. pylori* Positive**		**Interaction**			
dbSNP no.	**aOR[b]**	**sbOR[b]**	**aOR[b]**	**sbOR[b]**	**RERI[b]**	**sbRERI[b]**	**ROR[b]**	**sbROR[b]**
IL15								
rs10519613								
CA+AA	1.00 (Ref)	1.00 (Ref)	2.05 (1.49, 2.83)	2.06 (1.50, 2.82)	0.23 (-0.45, 0.92)	0.22 (-0.43, 0.87)	1.07 (0.64, 1.78)	1.06 (0.66, 1.71)
CC	1.08 (0.69, 1.70)	1.09 (0.71, 1.67)	2.37 (1.68, 3.34)	2.37 (1.68, 3.34)				
XPO5								
rs11077								
AA	1.00 (Ref)	1.00 (Ref)	2.00 (1.53, 2.63)	1.99 (1.52, 2.60)	-0.37 (-1.34, 0.61)	-0.29 (-1.15, 0.56)	0.77 (0.38, 1.55)	0.81 (0.43, 1.52)
AC+CC	1.19 (0.64, 2.22)	1.14 (0.65, 2.03)	1.83 (1.24, 2.71)	1.84 (1.25, 2.72)				
miR-196a2								
rs11614913								
CT+CC	1.00 (Ref)	1.00 (Ref)	2.19 (1.59, 3.01)	2.18 (1.59, 2.97)	-0.14 (-0.92, 0.63)	-0.11 (-0.84, 0.61)	0.85 (0.50, 1.42)	0.86 (0.53, 1.41)
TT	1.23 (0.77, 1.95)	1.21 (0.78, 1.87)	2.28 (1.60, 3.24)	2.27 (1.60, 3.22)				
WWOX								
rs12828								
GG	1.00 (Ref)	1.00 (Ref)	1.91 (1.28, 2.85)	1.91 (1.30, 2.81)	0.20 (-0.44, 0.84)	0.19 (-0.41, 0.80)	1.01 (0.62, 1.67)	1.01 (0.63, 1.62)
AG+AA	1.18 (0.76, 1.84)	1.18 (0.77, 1.80)	2.29 (1.56, 3.35)	2.29 (1.57, 3.33)				
Ran								
rs14035								
CT+TT	1.00 (Ref)	1.00 (Ref)	3.83 (2.34, 6.26)	3.50 (2.21, 5.55)	**-1.52 (-3.04, -0.01)**	-1.22 (-2.48, 0.03)	**0.43 (0.24, 0.75)**	**0.48 (0.29, 0.81)**
CC	2.06 (1.23, 3.42)	1.86 (1.16, 2.99)	3.36 (2.10, 5.38)	3.14 (2.01, 4.92)				
CXCL12								
rs1804429								

TT	1.00 (Ref)	1.00 (Ref)	1.99 (1.53, 2.60)	1.98 (1.52, 2.57)	-0.52 (-1.49, 0.46)	-0.42 (-1.25, 0.41)	0.72 (0.33, 1.58)	0.78 (0.39, 1.56)
GT+GG	1.08 (0.54, 2.18)	1.02 (0.54, 1.92)	1.56 (1.03, 2.35)	1.57 (1.04, 2.36)				
Gemin3								
rs197412								
TT	1.00 (Ref)	1.00 (Ref)	2.24 (1.56, 3.22)	2.22 (1.56, 3.15)	-0.28 (-0.99, 0.43)	-0.25 (-0.91, 0.41)	0.84 (0.52, 1.37)	0.86 (0.54, 1.35)
TC+CC	1.10 (0.71, 1.69)	1.08 (0.71, 1.63)	2.06 (1.44, 2.94)	2.05 (1.44, 2.91)				
E2F2								
rs2075993								
GA+AA	1.00 (Ref)	1.00 (Ref)	2.27 (1.63, 3.17)	2.23 (1.61, 3.09)	-0.37 (-1.25, 0.51)	-0.30 (-1.10, 0.51)	0.68 (0.41, 1.11)	0.71 (0.44, 1.12)
GG	1.68 (1.08, 2.60)	1.62 (1.07, 2.46)	2.58 (1.82, 3.65)	2.55 (1.81, 3.61)				
RCHY1								
rs2126852								
AA	1.00 (Ref)	1.00 (Ref)	2.48 (1.48, 4.17)	2.42 (1.49, 3.93)	-0.45 (-1.55, 0.65)	-0.37 (-1.30, 0.56)	0.77 (0.36, 1.64)	0.82 (0.42, 1.59)
AG+GG	1.13 (0.55, 2.31)	1.07 (0.57, 2.03)	2.16 (1.28, 3.66)	2.12 (1.28, 3.52)				
Wnt2B								
rs2273368								
CT+TT	1.00 (Ref)	1.00 (Ref)	1.98 (1.43, 2.73)	1.98 (1.45, 2.71)	0.51 (-0.33, 1.35)	0.51 (-0.29, 1.31)	1.01 (0.61, 1.69)	1.01 (0.63, 1.63)
CC	1.48 (0.94, 2.32)	1.48 (0.96, 2.27)	2.97 (2.09, 4.21)	2.97 (2.09, 4.21)				
THBS1								
rs2292305								
TT	1.00 (Ref)	1.00 (Ref)	2.53 (1.72, 3.73)	2.48 (1.71, 3.61)	-0.62 (-1.44, 0.20)	-0.57 (-1.32, 0.19)	0.74 (0.44, 1.24)	0.77 (0.47, 1.24)
CT+CC	1.04 (0.66, 1.65)	1.01 (0.65, 1.57)	1.95 (1.33, 2.87)	1.93 (1.32, 2.81)				
Gemin4								
rs2740348								
GG	1.00 (Ref)	1.00 (Ref)	2.37 (1.77, 3.18)	2.31 (1.73, 3.09)	-0.98 (-2.24, 0.28)	-0.77 (-1.87, 0.33)	**0.50 (0.28, 0.88)**	**0.55 (0.32, 0.94)**

GC+CC	2.14 (1.29, 3.52)	1.98 (1.23, 3.17)	2.52 (1.76, 3.63)	2.52 (1.76, 3.62)				
pre-miR-146a								
rs2910164								
GC+GG	1.00 (Ref)	1.00 (Ref)	2.06 (1.51, 2.82)	2.06 (1.52, 2.79)	-0.10 (-0.80, 0.59)	-0.09 (-0.74, 0.56)	0.91 (0.54, 1.51)	0.92 (0.57, 1.48)
CC	1.10 (0.70, 1.74)	1.09 (0.71, 1.69)	2.06 (1.47, 2.89)	2.06 (1.47, 2.88)				
CTNNB1								
rs2953								
GT+GG	1.00 (Ref)	1.00 (Ref)	1.92 (1.32, 2.79)	1.92 (1.34, 2.77)	0.25 (-0.37, 0.87)	0.24 (-0.35, 0.84)	1.07 (0.66, 1.75)	1.06 (0.67, 1.68)
TT	1.11 (0.72, 1.71)	1.12 (0.74, 1.69)	2.28 (1.58, 3.28)	2.28 (1.59, 3.27)				
DOCK4								
rs3801790								
AG+GG	1.00 (Ref)	1.00 (Ref)	1.97 (1.42, 2.74)	1.96 (1.42, 2.70)	-0.08 (-0.76, 0.60)	-0.06 (-0.70, 0.58)	0.88 (0.54, 1.44)	0.90 (0.57, 1.42)
AA	1.20 (0.78, 1.85)	1.19 (0.79, 1.79)	2.10 (1.49, 2.96)	2.09 (1.49, 2.94)				
Rbl2								
rs3929								
CG+CC	1.00 (Ref)	1.00 (Ref)	2.02 (1.34, 3.04)	2.00 (1.35, 2.96)	-0.13 (-0.81, 0.55)	-0.11 (-0.75, 0.52)	0.89 (0.54, 1.46)	0.90 (0.56, 1.44)
GG	1.12 (0.72, 1.74)	1.11 (0.73, 1.68)	2.00 (1.36, 2.96)	1.99 (1.36, 2.93)				
IL6R								
rs4072391								
CC	1.00 (Ref)	1.00 (Ref)	1.97 (1.50, 2.59)	1.95 (1.49, 2.56)	-0.28 (-1.15, 0.59)	-0.23 (-1.01, 0.55)	0.81 (0.43, 1.54)	0.84 (0.47, 1.51)
CT+TT	1.15 (0.66, 2.02)	1.12 (0.66, 1.89)	1.84 (1.27, 2.66)	1.84 (1.27, 2.66)				
Ago2								
rs4961280								
CA+AA	1.00 (Ref)	1.00 (Ref)	2.76 (1.50, 5.07)	2.60 (1.50, 4.53)	-0.28 (-1.39, 0.84)	-0.17 (-1.12, 0.78)	0.68 (0.35, 1.32)	0.73 (0.41, 1.32)
CC	1.68 (0.92, 3.07)	1.59 (0.92, 2.75)	3.17 (1.78, 5.63)	3.03 (1.77, 5.18)				

miR-26a1								
rs7372209								
CT+TT	1.00 (Ref)	1.00 (Ref)	2.26 (1.56, 3.26)	2.22 (1.55, 3.16)	-0.31 (-1.08, 0.46)	-0.26 (-0.98, 0.45)	0.74 (0.46, 1.19)	0.76 (0.48, 1.20)
CC	1.42 (0.93, 2.17)	1.38 (0.92, 2.08)	2.36 (1.64, 3.40)	2.34 (1.63, 3.35)				
TP53INP1								
rs7760								
TT	1.00 (Ref)	1.00 (Ref)	2.06 (1.50, 2.82)	2.06 (1.51, 2.81)	0.19 (-0.61, 0.98)	0.17 (-0.57, 0.92)	1.07 (0.59, 1.96)	1.06 (0.61, 1.84)
TG+GG	1.03 (0.60, 1.77)	1.04 (0.63, 1.73)	2.28 (1.58, 3.29)	2.28 (1.58, 3.29)				
Gemin4								
rs7813								
TT	1.00 (Ref)	1.00 (Ref)	2.20 (1.54, 3.13)	2.19 (1.55, 3.09)	-0.03 (-0.73, 0.66)	-0.02 (-0.68, 0.63)	0.93 (0.57, 1.53)	0.94 (0.59, 1.50)
CT+CC	1.11 (0.71, 1.72)	1.10 (0.72, 1.68)	2.27 (1.59, 3.24)	2.27 (1.59, 3.23)				
KRAS								
rs9266								
CT+TT	1.00 (Ref)	1.00 (Ref)	2.16 (1.40, 3.32)	2.13 (1.41, 3.21)	-0.05 (-0.80, 0.70)	-0.02 (-0.72, 0.67)	0.85 (0.50, 1.42)	0.86 (0.53, 1.40)
CC	1.35 (0.85, 2.13)	1.32 (0.86, 2.05)	2.45 (1.62, 3.71)	2.43 (1.62, 3.64)				

Ca, case; Co, control; cOR, crude odds ratio; aOR, adjusted odds ratio; sbOR, semi-bayes adjusted odds ratio; RERI, relative excess risk due to interaction; ROR, ratio of odds ratios;

[b] Adjusted for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, pack-years of smoking, alcohol consumption in the 1990's, and atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

Table 3.3.11. Joint associations between SNPs related to the stem cell signaling pathway and stomach cancer, by *H. pylori* infection status in the Jiangsu study.

	***H.pylori* Negative**		***H. pylori* Positive**		**Interaction**			
dbSNP no.	**aOR[b]**	**sbOR[b]**	**aOR[b]**	**sbOR[b]**	**RERI[b]**	**sbRERI[b]**	**ROR[b]**	**sbROR[b]**
DLL1								
rs1033583								
AC+CC	1.00 (Ref)	1.00 (Ref)	1.87 (1.24, 2.82)	1.88 (1.27, 2.79)	0.31 (-0.32, 0.94)	0.30 (-0.31, 0.90)	1.08 (0.65, 1.81)	1.07 (0.66, 1.73)
AA	1.15 (0.73, 1.81)	1.15 (0.75, 1.78)	2.32 (1.55, 3.47)	2.33 (1.57, 3.46)				
HEY1								
rs1046472								
CC	1.00 (Ref)	1.00 (Ref)	2.67 (1.92, 3.71)	2.58 (1.87, 3.56)	**-1.06 (-2.10, -0.03)**	-0.91 (-1.83, 0.02)	**0.49 (0.30, 0.81)**	**0.53 (0.34, 0.85)**
AC+AA	1.89 (1.23, 2.92)	1.78 (1.18, 2.69)	2.50 (1.76, 3.53)	2.45 (1.74, 3.46)				
HES2								
rs11364								
GG	1.00 (Ref)	1.00 (Ref)	2.09 (1.52, 2.88)	2.08 (1.52, 2.85)	0.38 (-0.54, 1.31)	0.40 (-0.48, 1.27)	0.93 (0.55, 1.58)	0.94 (0.57, 1.54)
AG+AA	1.55 (0.97, 2.48)	1.54 (0.99, 2.41)	3.03 (2.12, 4.33)	3.02 (2.12, 4.32)				
Oct4								
rs13409								
CT+TT	1.00 (Ref)	1.00 (Ref)	2.33 (1.69, 3.23)	2.31 (1.68, 3.17)	-0.29 (-1.06, 0.48)	-0.25 (-0.97, 0.47)	0.79 (0.48, 1.30)	0.81 (0.51, 1.30)
CC	1.24 (0.79, 1.92)	1.21 (0.79, 1.85)	2.28 (1.61, 3.23)	2.27 (1.60, 3.21)				
AXIN1								
rs1981492								
AG+AA	1.00 (Ref)	1.00 (Ref)	1.94 (1.36, 2.78)	1.94 (1.37, 2.76)	0.16 (-0.48, 0.80)	0.16 (-0.45, 0.77)	0.99 (0.61, 1.60)	0.99 (0.63, 1.56)
GG	1.19 (0.78, 1.83)	1.19 (0.79, 1.79)	2.30 (1.61, 3.29)	2.30 (1.61, 3.28)				
GLI1								
rs2228224								

GG	1.00 (Ref)	1.00 (Ref)	1.82 (1.30, 2.54)	1.83 (1.32, 2.54)	0.34 (-0.25, 0.93)	0.32 (-0.25, 0.88)	1.19 (0.73, 1.93)	1.17 (0.74, 1.85)
AG+AA	1.00 (0.65, 1.54)	1.01 (0.67, 1.53)	2.15 (1.53, 3.03)	2.16 (1.54, 3.04)				
DVL2								
rs222851								
AG+GG	1.00 (Ref)	1.00 (Ref)	2.04 (1.48, 2.82)	2.02 (1.47, 2.78)	-0.31 (-0.97, 0.36)	-0.28 (-0.90, 0.34)	0.84 (0.51, 1.38)	0.86 (0.54, 1.37)
AA	1.03 (0.66, 1.59)	1.01 (0.66, 1.53)	1.76 (1.25, 2.47)	1.75 (1.25, 2.46)				
AXIN2								
rs2240308								
AG+AA	1.00 (Ref)	1.00 (Ref)	2.37 (1.61, 3.50)	2.29 (1.58, 3.34)	-0.74 (-1.67, 0.18)	-0.63 (-1.46, 0.19)	0.60 (0.36, 1.01)	0.64 (0.39, 1.04)
GG	1.48 (0.93, 2.37)	1.41 (0.90, 2.19)	2.11 (1.43, 3.12)	2.07 (1.41, 3.04)				
FZD3								
rs2241802								
AG+AA	1.00 (Ref)	1.00 (Ref)	2.37 (1.70, 3.31)	2.33 (1.68, 3.23)	-0.42 (-1.26, 0.43)	-0.35 (-1.13, 0.42)	0.73 (0.43, 1.23)	0.76 (0.46, 1.24)
GG	1.32 (0.83, 2.10)	1.28 (0.82, 1.99)	2.27 (1.58, 3.27)	2.26 (1.58, 3.24)				
Dec1								
rs2269700								
CT+CC	1.00 (Ref)	1.00 (Ref)	1.68 (1.08, 2.61)	1.70 (1.11, 2.59)	0.34 (-0.24, 0.92)	0.32 (-0.23, 0.88)	1.14 (0.68, 1.92)	1.13 (0.69, 1.83)
TT	1.11 (0.70, 1.75)	1.12 (0.73, 1.73)	2.12 (1.40, 3.22)	2.14 (1.43, 3.21)				
Oct4								
rs3130932								
GT+GG	1.00 (Ref)	1.00 (Ref)	1.95 (1.39, 2.75)	1.94 (1.39, 2.71)	-0.01 (-0.67, 0.65)	0.01 (-0.62, 0.63)	0.90 (0.56, 1.45)	0.91 (0.58, 1.43)
TT	1.24 (0.81, 1.89)	1.23 (0.82, 1.84)	2.18 (1.56, 3.06)	2.18 (1.56, 3.04)				
WNT2								
rs3729629								
CG+CC	1.00 (Ref)	1.00 (Ref)	2.18 (1.55, 3.07)	2.16 (1.54, 3.01)	-0.04 (-0.80, 0.71)	-0.01 (-0.72, 0.69)	0.83 (0.51, 1.34)	0.84 (0.53, 1.33)

GG	1.42 (0.92, 2.18)	1.39 (0.93, 2.10)	2.55 (1.81, 3.61)	2.54 (1.80, 3.58)				
HEY2								
rs3734637								
AC+CC	1.00 (Ref)	1.00 (Ref)	2.06 (1.37, 3.09)	2.06 (1.39, 3.05)	0.15 (-0.50, 0.80)	0.15 (-0.47, 0.77)	1.02 (0.62, 1.68)	1.02 (0.63, 1.63)
AA	1.10 (0.70, 1.73)	1.10 (0.72, 1.69)	2.31 (1.56, 3.42)	2.31 (1.58, 3.40)				
Ctbp2								
rs3740535								
AG+AA	1.00 (Ref)	1.00 (Ref)	2.73 (1.87, 3.98)	2.63 (1.83, 3.79)	-0.89 (-1.85, 0.08)	-0.77 (-1.63, 0.10)	**0.56 (0.34, 0.91)**	**0.60 (0.38, 0.95)**
GG	1.59 (1.03, 2.46)	1.51 (1.00, 2.29)	2.43 (1.67, 3.52)	2.37 (1.65, 3.42)				
FZD1								
rs3750145								
AG+GG	1.00 (Ref)	1.00 (Ref)	2.36 (1.50, 3.73)	2.33 (1.51, 3.59)	-0.10 (-0.94, 0.73)	-0.07 (-0.83, 0.70)	0.83 (0.48, 1.44)	0.85 (0.51, 1.42)
AA	1.32 (0.80, 2.16)	1.29 (0.81, 2.05)	2.58 (1.66, 4.00)	2.55 (1.66, 3.91)				
WNT2								
rs4730775								
CT+TT	1.00 (Ref)	1.00 (Ref)	2.12 (1.44, 3.13)	2.12 (1.45, 3.08)	0.11 (-0.56, 0.79)	0.12 (-0.52, 0.76)	0.98 (0.60, 1.61)	0.98 (0.61, 1.57)
CC	1.15 (0.74, 1.79)	1.15 (0.75, 1.75)	2.38 (1.64, 3.46)	2.38 (1.64, 3.44)				
WNT8A								
rs4835761								
AG+GG	1.00 (Ref)	1.00 (Ref)	1.95 (1.42, 2.68)	1.94 (1.42, 2.66)	0.13 (-0.59, 0.85)	0.14 (-0.54, 0.82)	0.94 (0.57, 1.53)	0.95 (0.60, 1.50)
AA	1.30 (0.85, 2.01)	1.30 (0.86, 1.96)	2.38 (1.70, 3.35)	2.38 (1.70, 3.34)				
Notch4								
rs520692								
AA	1.00 (Ref)	1.00 (Ref)	1.93 (1.44, 2.59)	1.92 (1.44, 2.57)	-0.12 (-0.82, 0.59)	-0.10 (-0.76, 0.55)	0.92 (0.54, 1.59)	0.93 (0.56, 1.54)
AG+GG	1.05 (0.65, 1.69)	1.04 (0.66, 1.63)	1.86 (1.32, 2.64)	1.86 (1.32, 2.63)				

Rex1								
rs6815391								
CT+CC	1.00 (Ref)	1.00 (Ref)	2.43 (1.71, 3.46)	2.38 (1.69, 3.35)	-0.49 (-1.32, 0.34)	-0.43 (-1.19, 0.34)	0.69 (0.42, 1.13)	0.72 (0.45, 1.15)
TT	1.38 (0.89, 2.13)	1.33 (0.88, 2.02)	2.31 (1.61, 3.32)	2.29 (1.59, 3.28)				
HES2								
rs8708								
AG+GG	1.00 (Ref)	1.00 (Ref)	2.47 (1.55, 3.92)	2.42 (1.56, 3.76)	-0.18 (-1.03, 0.67)	-0.14 (-0.92, 0.64)	0.81 (0.47, 1.39)	0.83 (0.50, 1.38)
AA	1.29 (0.80, 2.09)	1.26 (0.80, 1.99)	2.58 (1.67, 3.98)	2.54 (1.67, 3.88)				
Notch4								
rs915894								
AC+AA	1.00 (Ref)	1.00 (Ref)	1.94 (1.43, 2.63)	1.93 (1.44, 2.61)	-0.03 (-0.75, 0.70)	-0.01 (-0.69, 0.68)	0.89 (0.54, 1.46)	0.90 (0.56, 1.44)
CC	1.26 (0.82, 1.96)	1.25 (0.82, 1.90)	2.18 (1.55, 3.06)	2.18 (1.55, 3.06)				
JAG2								
rs9972231								
CC	1.00 (Ref)	1.00 (Ref)	2.14 (1.56, 2.92)	2.13 (1.57, 2.90)	-0.17 (-0.92, 0.58)	-0.15 (-0.85, 0.54)	0.90 (0.52, 1.57)	0.91 (0.55, 1.53)
CT+TT	1.04 (0.64, 1.71)	1.03 (0.65, 1.64)	2.01 (1.41, 2.87)	2.01 (1.41, 2.86)				

Ca, case; Co, control; cOR, crude odds ratio; aOR, adjusted odds ratio; sbOR, semi-bayes adjusted odds ratio; RERI, relative excess risk due to interaction; ROR, ratio of odds ratios;

[b] Adjusted for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, pack-years of smoking, alcohol consumption in the 1990's, and atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

Table 3.3.12. Joint associations between SNPs from GWAS and stomach cancer, by *H. pylori* infection status in the Jiangsu study.

	***H.pylori* Negative**		***H. pylori* Positive**		**Interaction**			
dbSNP no.	**aOR[b]**	**sbOR[b]**	**aOR[b]**	**sbOR[b]**	**RERI[b]**	**sbRERI[b]**	**ROR[b]**	**sbROR[b]**
PLCE1								
rs2274223								
AA	1.00 (Ref)	1.00 (Ref)	2.48 (1.75, 3.51)	2.44 (1.74, 3.42)	-0.31(-1.22, 0.59)	-0.24 (-1.08, 0.59)	0.71 (0.43, 1.19)	0.74 (0.46, 1.20)
AG+GG	1.52 (0.96, 2.40)	1.47 (0.95, 2.27)	2.69 (1.87, 3.87)	2.66 (1.86, 3.82)				
CHEK2								
rs738722								
CC	1.00 (Ref)	1.00 (Ref)	1.83 (1.30, 2.57)	1.84 (1.32, 2.56)	0.25 (-0.35, 0.85)	0.24 (-0.34, 0.81)	1.12 (0.69, 1.82)	1.1 (0.7, 1.75)
CT+TT	1.03 (0.67, 1.59)	1.04 (0.69, 1.58)	2.11 (1.50, 2.97)	2.12 (1.51, 2.97)				

Ca, case; Co, control; cOR, crude odds ratio; aOR, adjusted odds ratio; sbOR, semi-bayes adjusted odds ratio; RERI, relative excess risk due to interaction; ROR, ratio of odds ratios;

[b] Adjusted for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, pack-years of smoking, alcohol consumption in the 1990's, and atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

Table 3.3.13. Joint associations between SNPs from miRNA pathway and stomach cancer, by smoking status in the Jiangsu study.

	Never Smoker		Ever Smoker		Interaction			
dbSNP no.	**aOR[b]**	**sbOR[b]**	**aOR[b]**	**sbOR[b]**	**RERI[b]**	**sbRERI[b]**	**ROR[b]**	**sbROR[b]**
IL15								
rs10519613								
CA+AA	1.00 (Ref)	1.00 (Ref)	1.49 (1.12, 1.98)	1.49 (1.12, 1.97)	0.10 (-0.45, 0.65)	0.09 (-0.43, 0.62)	1.03 (0.66, 1.59)	1.02 (0.67, 1.56)
CC	1.11 (0.77, 1.59)	1.11 (0.78, 1.58)	1.69 (1.24, 2.31)	1.69 (1.24, 2.31)				
XPO5								
rs11077								
AC+CC	1.00 (Ref)	1.00 (Ref)	1.50 (0.82, 2.77)	1.5 (0.85, 2.63)	-0.02 (-0.77, 0.74)	-0.01 (-0.70, 0.68)	0.97 (0.51, 1.84)	0.97 (0.54, 1.74)
AA	1.07 (0.62, 1.83)	1.06 (0.64, 1.76)	1.56 (0.91, 2.67)	1.55 (0.93, 2.60)				
miR-196a2								
rs11614913								
CT+CC	1.00 (Ref)	1.00 (Ref)	1.48 (1.12, 1.96)	1.48 (1.12, 1.96)	0.09 (-0.46, 0.65)	0.09 (-0.44, 0.62)	1.04 (0.67, 1.64)	1.04 (0.68, 1.60)
TT	1.06 (0.73, 1.52)	1.06 (0.74, 1.51)	1.63 (1.17, 2.26)	1.63 (1.17, 2.26)				
WWOX								
rs12828								
GG	1.00 (Ref)	1.00 (Ref)	1.90 (1.31, 2.74)	1.86 (1.30, 2.65)	-0.40 (-1.11, 0.31)	-0.35 (-1.01, 0.32)	0.70 (0.45, 1.09)	0.72 (0.48, 1.10)
AG+AA	1.52 (1.06, 2.19)	1.49 (1.05, 2.11)	2.02 (1.43, 2.86)	2.00 (1.42, 2.82)				
Ran								
rs14035								
CC	1.00 (Ref)	1.00 (Ref)	1.58 (1.20, 2.09)	1.57 (1.19, 2.07)	-0.26 (-0.84, 0.32)	-0.23 (-0.78, 0.31)	0.82 (0.52, 1.29)	0.83 (0.54, 1.29)
CT+TT	1.10 (0.76, 1.60)	1.09 (0.76, 1.56)	1.43 (1.03, 1.97)	1.43 (1.04, 1.97)				
CXCL12								
rs1804429								
GT+GG	1.00 (Ref)	1.00 (Ref)	1.62 (0.84, 3.12)	1.59 (0.88, 2.88)	-0.03 (-0.90, 0.84)	0.00 (-0.78, 0.77)	0.90 (0.45, 1.78)	0.92 (0.50, 1.69)

TT	1.31 (0.74, 2.31)	1.29 (0.76, 2.18)	1.89 (1.08, 3.32)	1.87 (1.10, 3.19)				
Gemin3								
rs197412								
TC+CC	1.00 (Ref)	1.00 (Ref)	1.45 (1.07, 1.96)	1.45 (1.08, 1.95)	0.11 (-0.39, 0.60)	0.10 (-0.37, 0.58)	1.07 (0.70, 1.63)	1.06 (0.71, 1.59)
TT	1.01 (0.71, 1.43)	1.01 (0.72, 1.42)	1.56 (1.15, 2.13)	1.56 (1.15, 2.13)				
E2F2								
rs2075993								
GA+AA	1.00 (Ref)	1.00 (Ref)	1.42 (1.06, 1.91)	1.42 (1.07, 1.90)	0.16 (-0.39, 0.72)	0.16 (-0.38, 0.69)	1.04 (0.68, 1.60)	1.04 (0.69, 1.56)
GG	1.21 (0.85, 1.71)	1.21 (0.86, 1.70)	1.79 (1.31, 2.45)	1.79 (1.31, 2.45)				
RCHY1								
rs2126852								
AG+GG	1.00 (Ref)	1.00 (Ref)	1.52 (1.01, 2.28)	1.53 (1.03, 2.26)	0.13 (-0.50, 0.76)	0.12 (-0.47, 0.72)	1.06 (0.63, 1.79)	1.05 (0.64, 1.72)
AA	1.07 (0.69, 1.65)	1.07 (0.71, 1.63)	1.72 (1.17, 2.54)	1.73 (1.17, 2.54)				
Wnt2B								
rs2273368								
CT+TT	1.00 (Ref)	1.00 (Ref)	1.53 (1.15, 2.04)	1.53 (1.15, 2.03)	0.18 (-0.54, 0.89)	0.19 (-0.50, 0.87)	0.95 (0.61, 1.48)	0.96 (0.63, 1.46)
CC	1.55 (1.08, 2.22)	1.54 (1.09, 2.19)	2.25 (1.64, 3.11)	2.25 (1.64, 3.11)				
THBS1								
rs2292305								
CT+CC	1.00 (Ref)	1.00 (Ref)	1.57 (1.14, 2.17)	1.56 (1.14, 2.15)	-0.04 (-0.63, 0.56)	-0.02 (-0.59, 0.55)	0.89 (0.58, 1.37)	0.90 (0.60, 1.36)
TT	1.32 (0.93, 1.89)	1.32 (0.93, 1.85)	1.86 (1.34, 2.58)	1.86 (1.34, 2.57)				
Gemin4								
rs2740348								
GG	1.00 (Ref)	1.00 (Ref)	1.45 (1.11, 1.89)	1.46 (1.12, 1.89)	0.37 (-0.32, 1.06)	0.34 (-0.31, 0.99)	1.21 (0.72, 2.03)	1.18 (0.73, 1.92)
GC+CC	1.08 (0.71, 1.65)	1.10 (0.73, 1.65)	1.90 (1.35, 2.69)	1.90 (1.34, 2.68)				

pre-miR-146a								
rs2910164								
GC+GG	1.00 (Ref)	1.00 (Ref)	1.51 (1.14, 2.01)	1.51 (1.14, 1.99)	-0.07 (-0.62, 0.47)	-0.07 (-0.58, 0.45)	0.93 (0.60, 1.45)	0.94 (0.62, 1.43)
CC	1.07 (0.75, 1.53)	1.07 (0.75, 1.51)	1.51 (1.10, 2.07)	1.51 (1.10, 2.07)				
CTNNB1								
rs2953								
GT+GG	1.00 (Ref)	1.00 (Ref)	1.69 (1.19, 2.39)	1.67 (1.19, 2.33)	-0.26 (-0.89, 0.37)	-0.23 (-0.82, 0.36)	0.78 (0.51, 1.20)	0.80 (0.53, 1.20)
TT	1.37 (0.96, 1.95)	1.35 (0.96, 1.90)	1.80 (1.28, 2.52)	1.79 (1.28, 2.50)				
DOCK4								
rs3801790								
AG+GG	1.00 (Ref)	1.00 (Ref)	1.47 (1.10, 1.97)	1.47 (1.1, 1.96)	0.02 (-0.52, 0.55)	0.02 (-0.49, 0.53)	0.98 (0.64, 1.50)	0.98 (0.65, 1.47)
AA	1.12 (0.79, 1.59)	1.12 (0.80, 1.57)	1.61 (1.18, 2.20)	1.61 (1.18, 2.20)				
Rbl2								
rs3929								
GG	1.00 (Ref)	1.00 (Ref)	1.85 (1.39, 2.46)	1.81 (1.37, 2.40)	**-0.85 (-1.56, -0.15)**	**-0.77 (-1.42, -0.12)**	**0.54 (0.35, 0.83)**	**0.57 (0.38, 0.86)**
CG+CC	1.46 (1.03, 2.08)	1.41 (1.00, 1.99)	1.46 (1.06, 2.01)	1.46 (1.06, 2.01)				
IL6R								
rs4072391								
CT+TT	1.00 (Ref)	1.00 (Ref)	1.45 (0.86, 2.45)	1.45 (0.88, 2.37)	0.01 (-0.64, 0.67)	0.01 (-0.60, 0.62)	1.00 (0.57, 1.76)	1.00 (0.59, 1.68)
CC	1.03 (0.65, 1.63)	1.03 (0.66, 1.59)	1.49 (0.94, 2.34)	1.49 (0.96, 2.31)				
Ago2								
rs4961280								
CA+AA	1.00 (Ref)	1.00 (Ref)	1.58 (0.97, 2.57)	1.56 (0.98, 2.48)	-0.03 (-0.72, 0.65)	-0.01 (-0.65, 0.62)	0.89 (0.53, 1.52)	0.91 (0.55, 1.49)
CC	1.33 (0.86, 2.07)	1.32 (0.87, 2.01)	1.88 (1.22, 2.89)	1.86 (1.22, 2.84)				

miR-26a1								
rs7372209								
CT+TT	1.00 (Ref)	1.00 (Ref)	2.11 (1.50, 2.96)	2.04 (1.47, 2.84)	**-0.96 (-1.77, -0.15)**	**-0.85 (-1.60, -0.11)**	**0.51 (0.34, 0.79)**	**0.54 (0.36, 0.82)**
CC	1.74 (1.23, 2.46)	1.67 (1.19, 2.34)	1.89 (1.35, 2.64)	1.86 (1.33, 2.60)				
TP53INP1								
rs7760								
TT	1.00 (Ref)	1.00 (Ref)	1.50 (1.14, 1.98)	1.50 (1.14, 1.97)	-0.01 (-0.66, 0.63)	-0.01 (-0.61, 0.60)	0.96 (0.58, 1.59)	0.96 (0.60, 1.55)
TG+GG	1.11 (0.74, 1.68)	1.11 (0.75, 1.65)	1.60 (1.13, 2.27)	1.60 (1.13, 2.27)				
Gemin4								
rs7813								
CT+CC	1.00 (Ref)	1.00 (Ref)	1.56 (1.12, 2.16)	1.55 (1.12, 2.14)	-0.16 (-0.69, 0.38)	-0.15 (-0.65, 0.36)	0.89 (0.58, 1.37)	0.90 (0.60, 1.36)
TT	1.03 (0.73, 1.46)	1.02 (0.73, 1.44)	1.43 (1.03, 1.98)	1.43 (1.03, 1.97)				
KRAS								
rs9266								
CT+TT	1.00 (Ref)	1.00 (Ref)	1.48 (1.02, 2.16)	1.49 (1.03, 2.14)	0.12 (-0.42, 0.66)	0.12 (-0.40, 0.64)	1.02 (0.66, 1.59)	1.02 (0.67, 1.56)
CC	1.17 (0.81, 1.69)	1.17 (0.82, 1.67)	1.78 (1.25, 2.53)	1.78 (1.26, 2.52)				

Ca, case; Co, control; cOR, crude odds ratio; aOR, adjusted odds ratio; sbOR, semi-bayes adjusted odds ratio; RERI, relative excess risk due to interaction; ROR, ratio of odds ratios;

[b] Adjusted for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, alcohol consumption in the 1990's, *Helicobacter pylori* IgG, and atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

Table 3.3.14. Joint associations between SNPs from the stem cell signaling pathway and stomach cancer, by smoking status in the Jiangsu study.

	Never Smoker		Ever Smoker		Interaction			
dbSNP no.	**aOR[b]**	**sbOR[b]**	**aOR[b]**	**sbOR[b]**	**RERI[b]**	**sbRERI[b]**	**ROR[b]**	**sbROR[b]**
DLL1								
rs1033583								
AA	1.00 (Ref)	1.00 (Ref)	1.77 (1.31, 2.40)	1.75 (1.30, 2.36)	-0.53 (-1.13, 0.06)	-0.49 (-1.05, 0.07)	0.69 (0.45, 1.07)	0.72 (0.47, 1.08)
AC+CC	1.06 (0.74, 1.51)	1.03 (0.73, 1.46)	1.30 (0.94, 1.80)	1.30 (0.94, 1.79)				
HEY1								
rs1046472								
AC+AA	1.00 (Ref)	1.00 (Ref)	1.61 (1.14, 2.29)	1.60 (1.14, 2.26)	-0.20 (-0.75, 0.35)	-0.18 (-0.70, 0.34)	0.88 (0.57, 1.34)	0.89 (0.59, 1.33)
CC	1.01 (0.71, 1.43)	1.00 (0.71, 1.41)	1.42 (1.02, 1.99)	1.42 (1.02, 1.97)				
HES2								
rs11364								
GG	1.00 (Ref)	1.00 (Ref)	1.54 (1.16, 2.05)	1.54 (1.16, 2.04)	0.04 (-0.71, 0.79)	0.06 (-0.65, 0.77)	0.89 (0.56, 1.41)	0.90 (0.58, 1.39)
AG+AA	1.57 (1.07, 2.28)	1.55 (1.08, 2.24)	2.15 (1.55, 2.98)	2.15 (1.55, 2.98)				
Oct4								
rs13409								
CT+TT	1.00 (Ref)	1.00 (Ref)	1.50 (1.13, 1.99)	1.50 (1.13, 1.98)	-0.05 (-0.58, 0.49)	-0.04 (-0.55, 0.47)	0.95 (0.61, 1.47)	0.95 (0.63, 1.44)
CC	1.08 (0.76, 1.54)	1.07 (0.76, 1.52)	1.53 (1.11, 2.10)	1.53 (1.11, 2.10)				
AXIN1								
rs1981492								
AG+AA	1.00 (Ref)	1.00 (Ref)	1.57 (1.14, 2.18)	1.56 (1.14, 2.15)	-0.10 (-0.67, 0.48)	-0.08 (-0.63, 0.46)	0.87 (0.57, 1.32)	0.88 (0.59, 1.31)
GG	1.31 (0.93, 1.84)	1.30 (0.93, 1.81)	1.78 (1.30, 2.45)	1.78 (1.29, 2.44)				
GLI1								
rs2228224								
GG	1.00 (Ref)	1.00 (Ref)	1.64 (1.21, 2.24)	1.63 (1.20, 2.21)	-0.22 (-0.82, 0.38)	-0.19 (-0.76, 0.38)	0.81 (0.53, 1.23)	0.82 (0.55, 1.23)
AG+AA	1.31 (0.93, 1.86)	1.30 (0.93, 1.82)	1.74 (1.27, 2.39)	1.74 (1.26, 2.38)				
DVL2								
rs222851								

AA	1.00 (Ref)	1.00 (Ref)	1.45 (1.02, 2.06)	1.45 (1.03, 2.04)	0.00 (-0.53, 0.53)	0.01 (-0.50, 0.51)	0.97 (0.63, 1.49)	0.97 (0.64, 1.46)
AG+GG	1.13 (0.80, 1.61)	1.13 (0.80, 1.59)	1.58 (1.14, 2.19)	1.58 (1.14, 2.19)				
AXIN2								
rs2240308								
GG	1.00 (Ref)	1.00 (Ref)	1.75 (1.25, 2.44)	1.73 (1.25, 2.40)	-0.31 (-0.93, 0.32)	-0.27 (-0.86, 0.31)	0.79 (0.51, 1.22)	0.80 (0.53, 1.22)
AG+AA	1.19 (0.83, 1.70)	1.17 (0.82, 1.66)	1.63 (1.17, 2.28)	1.62 (1.16, 2.27)				
FZD3								
rs2241802								
GG	1.00 (Ref)	1.00 (Ref)	1.65 (1.11, 2.45)	1.63 (1.11, 2.39)	-0.18 (-0.79, 0.43)	-0.16 (-0.73, 0.41)	0.87 (0.55, 1.39)	0.89 (0.57, 1.38)
AG+AA	1.06 (0.72, 1.56)	1.05 (0.73, 1.53)	1.53 (1.05, 2.21)	1.52 (1.05, 2.19)				
Dec1								
rs2269700								
CT+CC	1.00 (Ref)	1.00 (Ref)	1.36 (0.92, 2.01)	1.37 (0.94, 2.00)	0.21 (-0.30, 0.73)	0.20 (-0.29, 0.70)	1.10 (0.7, 1.72)	1.09 (0.71, 1.67)
TT	1.16 (0.81, 1.68)	1.17 (0.82, 1.67)	1.74 (1.22, 2.47)	1.74 (1.23, 2.47)				
Oct4								
rs3130932								
TT	1.00 (Ref)	1.00 (Ref)	1.63 (1.19, 2.24)	1.62 (1.18, 2.21)	-0.32 (-0.86, 0.22)	-0.30 (-0.81, 0.21)	0.80 (0.53, 1.21)	0.81 (0.55, 1.21)
GT+GG	1.02 (0.72, 1.43)	1.00 (0.72, 1.40)	1.32 (0.96, 1.83)	1.32 (0.96, 1.82)				
WNT2								
rs3729629								
CG+CC	1.00 (Ref)	1.00 (Ref)	1.44 (1.06, 1.95)	1.44 (1.07, 1.94)	0.10 (-0.44, 0.63)	0.10 (-0.42, 0.61)	1.00 (0.66, 1.52)	1.00 (0.67, 1.49)
GG	1.21 (0.86, 1.70)	1.21 (0.87, 1.69)	1.74 (1.29, 2.36)	1.74 (1.29, 2.36)				
HEY2								
rs3734637								
AC+CC	1.00 (Ref)	1.00 (Ref)	1.70 (1.19, 2.43)	1.68 (1.18, 2.38)	-0.23 (-0.85, 0.39)	-0.20 (-0.79, 0.38)	0.80 (0.52, 1.24)	0.82 (0.54, 1.24)
AA	1.30 (0.91, 1.86)	1.29 (0.91, 1.82)	1.77 (1.26, 2.48)	1.76 (1.26, 2.46)				
Ctbp2								
rs3740535								
AG+AA	1.00 (Ref)	1.00 (Ref)	1.84 (1.31, 2.60)	1.81 (1.29, 2.53)	-0.50 (-1.16, 0.15)	-0.45 (-1.07, 0.16)	0.68 (0.45, 1.05)	0.71 (0.47, 1.06)

GG	1.30 (0.91, 1.84)	1.27 (0.90, 1.78)	1.64 (1.17, 2.30)	1.62 (1.16, 2.27)				
FZD1								
rs3750145								
AG+GG	1.00 (Ref)	1.00 (Ref)	1.40 (0.95, 2.05)	1.41 (0.97, 2.05)	0.22 (-0.30, 0.75)	0.21 (-0.29, 0.71)	1.14 (0.72, 1.81)	1.13 (0.73, 1.74)
AA	1.04 (0.72, 1.52)	1.05 (0.73, 1.51)	1.67 (1.17, 2.37)	1.67 (1.18, 2.37)				
WNT2								
rs4730775								
CT+TT	1.00 (Ref)	1.00 (Ref)	1.56 (1.10, 2.22)	1.55 (1.10, 2.18)	-0.13 (-0.70, 0.44)	-0.11 (-0.66, 0.43)	0.86 (0.56, 1.32)	0.87 (0.58, 1.32)
CC	1.25 (0.88, 1.77)	1.24 (0.88, 1.74)	1.68 (1.20, 2.35)	1.67 (1.20, 2.34)				
WNT8A								
rs4835761								
AG+GG	1.00 (Ref)	1.00 (Ref)	1.34 (1.00, 1.79)	1.35 (1.01, 1.79)	0.33 (-0.19, 0.86)	0.31 (-0.20, 0.83)	1.21 (0.78, 1.86)	1.19 (0.78, 1.79)
AA	1.10 (0.77, 1.57)	1.11 (0.79, 1.57)	1.77 (1.30, 2.41)	1.77 (1.30, 2.41)				
Notch4								
rs520692								
AG+GG	1.00 (Ref)	1.00 (Ref)	1.74 (1.12, 2.70)	1.70 (1.11, 2.59)	-0.34 (-1.05, 0.37)	-0.30 (-0.95, 0.35)	0.76 (0.47, 1.25)	0.79 (0.50, 1.25)
AA	1.21 (0.81, 1.82)	1.19 (0.81, 1.75)	1.61 (1.08, 2.40)	1.59 (1.07, 2.34)				
Rex1								
rs6815391								
TT	1.00 (Ref)	1.00 (Ref)	1.54 (1.09, 2.17)	1.53 (1.10, 2.14)	-0.13 (-0.66, 0.40)	-0.12 (-0.62, 0.39)	0.91 (0.59, 1.40)	0.92 (0.61, 1.38)
CT+CC	1.03 (0.72, 1.46)	1.02 (0.72, 1.44)	1.44 (1.03, 2.00)	1.43 (1.03, 1.99)				
HES2								
rs8708								
AG+GG	1.00 (Ref)	1.00 (Ref)	1.37 (0.92, 2.04)	1.38 (0.94, 2.03)	0.18 (-0.33, 0.69)	0.16 (-0.33, 0.65)	1.12 (0.71, 1.79)	1.11 (0.72, 1.72)
AA	1.01 (0.69, 1.48)	1.02 (0.71, 1.47)	1.56 (1.09, 2.24)	1.57 (1.09, 2.24)				
Notch4								
rs915894								
AC+AA	1.00 (Ref)	1.00 (Ref)	1.57 (1.19, 2.08)	1.56 (1.19, 2.06)	-0.18 (-0.81, 0.45)	-0.16 (-0.75, 0.44)	0.82 (0.53, 1.29)	0.84 (0.55, 1.28)
CC	1.31 (0.91, 1.88)	1.29 (0.91, 1.84)	1.70 (1.23, 2.34)	1.70 (1.24, 2.34)				

JAG2								
rs9972231								
CT+TT	1.00 (Ref)	1.00 (Ref)	1.64 (1.06, 2.51)	1.62 (1.07, 2.45)	-0.11 (-0.75, 0.53)	-0.10 (-0.69, 0.50)	0.89 (0.55, 1.46)	0.90 (0.57, 1.43)
CC	1.14 (0.76, 1.71)	1.13 (0.76, 1.66)	1.66 (1.12, 2.47)	1.65 (1.12, 2.44)				

Ca, case; Co, control; cOR, crude odds ratio; aOR, adjusted odds ratio; sbOR, semi-bayes adjusted odds ratio; RERI, relative excess risk due to interaction; ROR, ratio of odds ratios;

[b] Adjusted for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, alcohol consumption in the 1990's, *Helicobacter pylori* IgG, and atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

Table 3.3.15. Joint associations between SNPs from GWAS and stomach cancer, by smoking status in the Jiangsu study.

	Never Smoker		Ever Smoker		Interaction			
dbSNP no.	**aOR[b]**	**sbOR[b]**	**aOR[b]**	**sbOR[b]**	**RERI[b]**	**sbRERI[b]**	**ROR[b]**	**sbROR[b]**
PLCE1								
rs2274223								
AA	1.00 (Ref)	1.00 (Ref)	1.39 (1.02, 1.89)	1.39 (1.02, 1.88)	0.09 (-0.47, 0.65)	0.09 (-0.45, 0.62)	1.02 (0.65, 1.61)	1.02 (0.66, 1.57)
AG+GG	1.14 (0.79, 1.66)	1.14 (0.80, 1.64)	1.62 (1.17, 2.25)	1.62 (1.17, 2.25)				
CHEK2								
rs738722								
CC	1.00 (Ref)	1.00 (Ref)	1.83 (1.33, 2.52)	1.80 (1.32, 2.46)	-0.42 (-1.09, 0.25)	-0.37 (-1.00, 0.26)	0.70 (0.46, 1.08)	0.72 (0.48, 1.09)
CT+TT	1.44 (1.01, 2.04)	1.41 (1.00, 1.98)	1.85 (1.33, 2.56)	1.84 (1.33, 2.54)				

Ca, case; Co, control; cOR, crude odds ratio; aOR, adjusted odds ratio; sbOR, semi-bayes adjusted odds ratio; RERI, relative excess risk due to interaction; ROR, ratio of odds ratios;

[b] Adjusted for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, alcohol consumption in the 1990's, *Helicobacter pylori* IgG, and atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

Table 3.3.16. Joint associations between SNPs from the miRNA pathway and stomach cancer, by alcohol drinking status in the Jiangsu study.

	Never Drinker		Ever Drinker		Interaction			
dbSNP no.	**aOR[b]**	**sbOR[b]**	**aOR[b]**	**sbOR[b]**	**RERI[b]**	**sbRERI[b]**	**ROR[b]**	**sbROR[b]**
IL15								
rs10519613								
CA+AA	1.00 (Ref)	1.00 (Ref)	1.03 (0.77, 1.36)	1.03 (0.78, 1.36)	0.05 (-0.40, 0.51)	0.05 (-0.39, 0.48)	1.04 (0.69, 1.59)	1.04 (0.70, 1.55)
CC	1.11 (0.80, 1.54)	1.11 (0.81, 1.53)	1.19 (0.87, 1.61)	1.19 (0.87, 1.61)				
XPO5								
rs11077								
AA	1.00 (Ref)	1.00 (Ref)	1.09 (0.85, 1.39)	1.08 (0.85, 1.38)	-0.20 (-0.81, 0.42)	-0.17 (-0.73, 0.39)	0.83 (0.46, 1.48)	0.85 (0.50, 1.46)
AC+CC	1.08 (0.70, 1.66)	1.06 (0.7, 1.61)	0.97 (0.63, 1.48)	0.98 (0.64, 1.48)				
miR-196a2								
rs11614913								
CT+CC	1.00 (Ref)	1.00 (Ref)	1.18 (0.90, 1.55)	1.17 (0.89, 1.53)	-0.33 (-0.87, 0.20)	-0.30 (-0.81, 0.20)	0.74 (0.48, 1.15)	0.76 (0.51, 1.16)
TT	1.28 (0.92, 1.78)	1.26 (0.91, 1.74)	1.12 (0.81, 1.55)	1.13 (0.82, 1.56)				
WWOX								
rs12828								
GG	1.00 (Ref)	1.00 (Ref)	1.17 (0.82, 1.65)	1.15 (0.82, 1.62)	-0.25 (-0.78, 0.27)	-0.23 (-0.73, 0.27)	0.80 (0.53, 1.22)	0.82 (0.55, 1.22)
AG+AA	1.36 (0.98, 1.88)	1.34 (0.98, 1.84)	1.27 (0.92, 1.76)	1.27 (0.92, 1.75)				
Ran								
rs14035								
CT+TT	1.00 (Ref)	1.00 (Ref)	1.22 (0.84, 1.79)	1.21 (0.83, 1.75)	-0.21 (-0.74, 0.32)	-0.19 (-0.69, 0.31)	0.83 (0.53, 1.28)	0.84 (0.55, 1.28)
CC	1.16 (0.82, 1.64)	1.15 (0.82, 1.61)	1.18 (0.83, 1.66)	1.17 (0.83, 1.65)				
CXCL12								
rs1804429								

GT+GG	1.00 (Ref)	1.00 (Ref)	1.38 (0.73, 2.59)	1.31 (0.74, 2.35)	-0.31 (-1.20, 0.57)	-0.25 (-1.01, 0.52)	0.76 (0.39, 1.47)	0.80 (0.44, 1.44)
TT	1.42 (0.84, 2.40)	1.38 (0.84, 2.25)	1.48 (0.88, 2.52)	1.44 (0.87, 2.39)				
Gemin3								
rs197412								
TC+CC	1.00 (Ref)	1.00 (Ref)	1.05 (0.78, 1.42)	1.06 (0.79, 1.41)	0.06 (-0.35, 0.48)	0.06 (-0.34, 0.46)	1.06 (0.71, 1.59)	1.05 (0.71, 1.55)
TT	1.01 (0.74, 1.39)	1.02 (0.75, 1.38)	1.13 (0.83, 1.54)	1.13 (0.83, 1.54)				
E2F2								
rs2075993								
GA+AA	1.00 (Ref)	1.00 (Ref)	1.14 (0.85, 1.53)	1.13 (0.85, 1.51)	-0.19 (-0.71, 0.33)	-0.17 (-0.67, 0.33)	0.85 (0.56, 1.28)	0.86 (0.58, 1.27)
GG	1.36 (0.99, 1.87)	1.35 (0.99, 1.84)	1.31 (0.96, 1.80)	1.31 (0.96, 1.80)				
RCHY1								
rs2126852								
AA	1.00 (Ref)	1.00 (Ref)	1.10 (0.78, 1.56)	1.09 (0.78, 1.53)	-0.28 (-0.81, 0.26)	-0.24 (-0.74, 0.25)	0.76 (0.46, 1.24)	0.78 (0.49, 1.24)
AG+GG	1.05 (0.73, 1.52)	1.03 (0.72, 1.48)	0.88 (0.60, 1.28)	0.88 (0.61, 1.28)				
Wnt2B								
rs2273368								
CT+TT	1.00 (Ref)	1.00 (Ref)	1.07 (0.81, 1.42)	1.07 (0.82, 1.42)	0.11 (-0.48, 0.69)	0.1 (-0.46, 0.66)	1.05 (0.68, 1.60)	1.04 (0.69, 1.57)
CC	1.45 (1.05, 2.02)	1.46 (1.06, 2.01)	1.63 (1.19, 2.24)	1.63 (1.19, 2.24)				
THBS1								
rs2292305								
CT+CC	1.00 (Ref)	1.00 (Ref)	1.02 (0.75, 1.39)	1.02 (0.75, 1.39)	0.08 (-0.38, 0.53)	0.07 (-0.37, 0.51)	1.06 (0.70, 1.60)	1.06 (0.71, 1.57)
TT	1.18 (0.86, 1.63)	1.19 (0.87, 1.62)	1.28 (0.93, 1.75)	1.28 (0.94, 1.75)				
Gemin4								
rs2740348								
GG	1.00 (Ref)	1.00 (Ref)	1.03 (0.79, 1.33)	1.04 (0.80, 1.34)	0.26 (-0.32, 0.83)	0.23 (-0.31, 0.78)	1.22 (0.74, 2.01)	1.20 (0.75, 1.91)

GC+CC	1.10 (0.75, 1.63)	1.12 (0.77, 1.63)	1.39 (0.99, 1.96)	1.38 (0.98, 1.95)				
pre-miR-146a								
rs2910164								
GC+GG	1.00 (Ref)	1.00 (Ref)	1.17 (0.88, 1.54)	1.16 (0.88, 1.52)	-0.22 (-0.71, 0.27)	-0.20 (-0.66, 0.26)	0.82 (0.54, 1.25)	0.83 (0.55, 1.25)
CC	1.15 (0.83, 1.59)	1.14 (0.83, 1.56)	1.09 (0.80, 1.50)	1.09 (0.80, 1.50)				
CTNNB1								
rs2953								
GT+GG	1.00 (Ref)	1.00 (Ref)	1.01 (0.72, 1.40)	1.01 (0.73, 1.39)	0.09 (-0.34, 0.52)	0.08 (-0.33, 0.50)	1.08 (0.72, 1.63)	1.07 (0.72, 1.59)
TT	1.12 (0.82, 1.54)	1.12 (0.82, 1.53)	1.22 (0.89, 1.66)	1.22 (0.89, 1.66)				
DOCK4								
rs3801790								
AA	1.00 (Ref)	1.00 (Ref)	1.37 (0.97, 1.93)	1.34 (0.96, 1.87)	-0.51 (-1.07, 0.05)	-0.46 (-0.98, 0.06)	**0.64 (0.43, 0.97)**	**0.67 (0.45, 0.99)**
AG+GG	1.19 (0.86, 1.65)	1.17 (0.85, 1.60)	1.05 (0.76, 1.46)	1.04 (0.75, 1.44)				
Rbl2								
rs3929								
GG	1.00 (Ref)	1.00 (Ref)	1.13 (0.87, 1.48)	1.12 (0.86, 1.46)	-0.33 (-0.82, 0.15)	-0.30 (-0.76, 0.16)	0.73 (0.48, 1.11)	0.75 (0.50, 1.12)
CG+CC	1.18 (0.85, 1.63)	1.16 (0.85, 1.59)	0.98 (0.72, 1.34)	0.98 (0.72, 1.34)				
IL6R								
rs4072391								
CT+TT	1.00 (Ref)	1.00 (Ref)	1.04 (0.63, 1.73)	1.04 (0.64, 1.68)	-0.01 (-0.56, 0.55)	-0.01 (-0.52, 0.51)	0.99 (0.58, 1.70)	0.99 (0.60, 1.64)
CC	1.03 (0.68, 1.56)	1.03 (0.69, 1.54)	1.06 (0.69, 1.63)	1.06 (0.70, 1.61)				
Ago2								
rs4961280								
CA+AA	1.00 (Ref)	1.00 (Ref)	0.94 (0.60, 1.49)	0.96 (0.62, 1.48)	0.19 (-0.28, 0.66)	0.17 (-0.28, 0.62)	1.19 (0.72, 1.95)	1.16 (0.73, 1.86)
CC	1.10 (0.75, 1.63)	1.12 (0.77, 1.63)	1.24 (0.84, 1.82)	1.24 (0.85, 1.83)				

miR-26a1								
rs7372209								
CT+TT	1.00 (Ref)	1.00 (Ref)	1.20 (0.87, 1.64)	1.19 (0.87, 1.61)	-0.27 (-0.77, 0.24)	-0.24 (-0.72, 0.23)	0.79 (0.53, 1.18)	0.81 (0.55, 1.18)
CC	1.29 (0.94, 1.76)	1.27 (0.94, 1.73)	1.22 (0.89, 1.66)	1.21 (0.89, 1.66)				
TP53INP1								
rs7760								
TT	1.00 (Ref)	1.00 (Ref)	1.07 (0.82, 1.40)	1.07 (0.82, 1.39)	-0.12 (-0.67, 0.43)	-0.11 (-0.63, 0.41)	0.89 (0.55, 1.45)	0.90 (0.57, 1.43)
TG+GG	1.17 (0.81, 1.69)	1.16 (0.81, 1.66)	1.12 (0.79, 1.59)	1.12 (0.79, 1.60)				
Gemin4								
rs7813								
CT+CC	1.00 (Ref)	1.00 (Ref)	1.19 (0.87, 1.64)	1.19 (0.87, 1.62)	-0.16 (-0.62, 0.30)	-0.14 (-0.58, 0.29)	0.87 (0.57, 1.31)	0.88 (0.59, 1.30)
TT	1.04 (0.75, 1.44)	1.03 (0.75, 1.42)	1.08 (0.78, 1.49)	1.07 (0.78, 1.48)				
KRAS								
rs9266								
CT+TT	1.00 (Ref)	1.00 (Ref)	0.98 (0.69, 1.39)	0.98 (0.70, 1.39)	0.12 (-0.30, 0.55)	0.11 (-0.30, 0.52)	1.11 (0.73, 1.70)	1.10 (0.74, 1.65)
CC	1.10 (0.80, 1.53)	1.11 (0.81, 1.52)	1.20 (0.87, 1.66)	1.21 (0.87, 1.66)				

Ca, case; Co, control; cOR, crude odds ratio; aOR, adjusted odds ratio; sbOR, semi-bayes adjusted odds ratio; RERI, relative excess risk due to interaction; ROR, ratio of odds ratios;

[b] Adjusted for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, pack-years of smoking, *Helicobacter pylori* IgG, and atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

Table 3.3.17. Joint associations between SNPs from the stem cell signaling pathway and stomach cancer, by alcohol drinking status in the Jiangsu study.

	Never Drinker		Ever Drinker		Interaction			
dbSNP no.	**aOR[b]**	**sbOR[b]**	**aOR[b]**	**sbOR[b]**	**RERI[b]**	**sbRERI[b]**	**ROR[b]**	**sbROR[b]**
DLL1								
rs1033583								
AC+CC	1.00 (Ref)	1.00 (Ref)	1.01 (0.72, 1.42)	1.02 (0.73, 1.43)	0.26 (-0.17, 0.68)	0.24 (-0.17, 0.65)	1.23 (0.81, 1.88)	1.21 (0.81, 1.81)
AA	1.08 (0.78, 1.49)	1.09 (0.79, 1.49)	1.34 (0.98, 1.85)	1.35 (0.98, 1.86)				
HEY1								
rs1046472								
CC	1.00 (Ref)	1.00 (Ref)	1.02 (0.77, 1.35)	1.02 (0.78, 1.35)	0.07 (-0.36, 0.50)	0.07 (-0.34, 0.48)	1.07 (0.71, 1.61)	1.06 (0.72, 1.57)
AC+AA	1.05 (0.76, 1.44)	1.05 (0.77, 1.43)	1.14 (0.84, 1.55)	1.14 (0.84, 1.55)				
HES2								
rs11364								
GG	1.00 (Ref)	1.00 (Ref)	1.01 (0.76, 1.33)	1.02 (0.77, 1.34)	0.42 (-0.14, 0.99)	0.39 (-0.15, 0.94)	1.34 (0.86, 2.09)	1.30 (0.85, 1.99)
AG+AA	1.24 (0.88, 1.75)	1.26 (0.90, 1.76)	1.67 (1.21, 2.30)	1.67 (1.21, 2.30)				
Oct4								
rs13409								
CC	1.00 (Ref)	1.00 (Ref)	1.16 (0.82, 1.66)	1.15 (0.82, 1.63)	-0.19 (-0.66, 0.29)	-0.17 (-0.62, 0.28)	0.84 (0.55, 1.28)	0.85 (0.57, 1.28)
CT+TT	1.08 (0.78, 1.49)	1.07 (0.78, 1.47)	1.06 (0.77, 1.47)	1.06 (0.76, 1.46)				
AXIN1								
rs1981492								
AG+AA	1.00 (Ref)	1.00 (Ref)	0.91 (0.67, 1.25)	0.92 (0.68, 1.25)	0.13 (-0.27, 0.53)	0.12 (-0.27, 0.50)	1.13 (0.76, 1.69)	1.12 (0.77, 1.65)
GG	1.10 (0.81, 1.49)	1.11 (0.82, 1.49)	1.14 (0.84, 1.55)	1.14 (0.84, 1.55)				
GLI1								
rs2228224								

GG	1.00 (Ref)	1.00 (Ref)	0.98 (0.73, 1.32)	0.99 (0.74, 1.32)	0.14 (-0.27, 0.56)	0.13 (-0.27, 0.54)	1.14 (0.76, 1.71)	1.13 (0.76, 1.67)
AG+AA	1.06 (0.77, 1.45)	1.06 (0.78, 1.45)	1.18 (0.88, 1.60)	1.19 (0.88, 1.60)				
DVL2								
rs222851								
AA	1.00 (Ref)	1.00 (Ref)	1.12 (0.79, 1.59)	1.12 (0.79, 1.57)	-0.10 (-0.57, 0.38)	-0.09 (-0.54, 0.37)	0.91 (0.60, 1.38)	0.92 (0.61, 1.37)
AG+GG	1.18 (0.85, 1.63)	1.17 (0.86, 1.61)	1.21 (0.87, 1.67)	1.20 (0.87, 1.66)				
AXIN2								
rs2240308								
GG	1.00 (Ref)	1.00 (Ref)	1.09 (0.79, 1.51)	1.09 (0.79, 1.49)	-0.14 (-0.60, 0.33)	-0.12 (-0.56, 0.31)	0.88 (0.58, 1.34)	0.89 (0.59, 1.33)
AG+AA	1.10 (0.79, 1.51)	1.09 (0.79, 1.49)	1.05 (0.76, 1.45)	1.05 (0.76, 1.45)				
FZD3								
rs2241802								
AG+AA	1.00 (Ref)	1.00 (Ref)	1.10 (0.83, 1.47)	1.10 (0.83, 1.46)	-0.05 (-0.53, 0.43)	-0.04 (-0.50, 0.41)	0.95 (0.61, 1.48)	0.96 (0.63, 1.46)
GG	1.06 (0.75, 1.49)	1.06 (0.76, 1.47)	1.12 (0.80, 1.55)	1.12 (0.80, 1.55)				
Dec1								
rs2269700								
CT+CC	1.00 (Ref)	1.00 (Ref)	1.15 (0.78, 1.68)	1.13 (0.78, 1.64)	-0.23 (-0.78, 0.31)	-0.21 (-0.72, 0.30)	0.82 (0.53, 1.27)	0.83 (0.55, 1.26)
TT	1.39 (0.99, 1.95)	1.37 (0.99, 1.91)	1.30 (0.92, 1.84)	1.29 (0.92, 1.82)				
Oct4								
rs3130932								
GT+GG	1.00 (Ref)	1.00 (Ref)	1.02 (0.76, 1.38)	1.02 (0.76, 1.38)	0.05 (-0.37, 0.48)	0.05 (-0.36, 0.46)	1.04 (0.70, 1.56)	1.04 (0.71, 1.53)
TT	1.11 (0.82, 1.52)	1.12 (0.82, 1.51)	1.19 (0.88, 1.61)	1.19 (0.88, 1.61)				
WNT2								
rs3729629								
CG+CC	1.00 (Ref)	1.00 (Ref)	1.09 (0.81, 1.47)	1.09 (0.81, 1.46)	-0.07 (-0.55, 0.41)	-0.06 (-0.52, 0.40)	0.93 (0.62, 1.39)	0.94 (0.64, 1.38)

GG	1.27 (0.93, 1.74)	1.27 (0.94, 1.72)	1.30 (0.96, 1.74)	1.29 (0.96, 1.74)				
HEY2								
rs3734637								
AC+CC	1.00 (Ref)	1.00 (Ref)	1.21 (0.86, 1.71)	1.20 (0.86, 1.67)	-0.31 (-0.84, 0.22)	-0.28 (-0.78, 0.22)	0.77 (0.50, 1.16)	0.78 (0.53, 1.17)
AA	1.31 (0.95, 1.81)	1.29 (0.94, 1.77)	1.22 (0.88, 1.67)	1.21 (0.88, 1.66)				
Ctbp2								
rs3740535								
AG+AA	1.00 (Ref)	1.00 (Ref)	1.15 (0.83, 1.59)	1.15 (0.83, 1.57)	-0.16 (-0.62, 0.30)	-0.15 (-0.58, 0.29)	0.86 (0.57, 1.30)	0.87 (0.59, 1.29)
GG	1.10 (0.80, 1.50)	1.09 (0.80, 1.48)	1.09 (0.80, 1.49)	1.09 (0.80, 1.49)				
FZD1								
rs3750145								
AA	1.00 (Ref)	1.00 (Ref)	1.13 (0.84, 1.52)	1.12 (0.84, 1.50)	-0.24 (-0.71, 0.23)	-0.22 (-0.66, 0.22)	0.79 (0.50, 1.23)	0.80 (0.53, 1.23)
AG+GG	1.02 (0.72, 1.42)	1.00 (0.72, 1.39)	0.90 (0.64, 1.26)	0.90 (0.65, 1.27)				
WNT2								
rs4730775								
CT+TT	1.00 (Ref)	1.00 (Ref)	1.09 (0.78, 1.53)	1.08 (0.78, 1.51)	-0.11 (-0.58, 0.36)	-0.10 (-0.55, 0.35)	0.90 (0.60, 1.37)	0.91 (0.61, 1.35)
CC	1.20 (0.87, 1.65)	1.19 (0.87, 1.63)	1.18 (0.86, 1.62)	1.18 (0.86, 1.61)				
WNT8A								
rs4835761								
AG+GG	1.00 (Ref)	1.00 (Ref)	0.98 (0.74, 1.29)	0.99 (0.75, 1.3)	0.34 (-0.10, 0.78)	0.32 (-0.11, 0.74)	1.34 (0.88, 2.03)	1.31 (0.88, 1.95)
AA	1.04 (0.75, 1.44)	1.05 (0.77, 1.45)	1.36 (1.00, 1.84)	1.36 (1.00, 1.84)				
Notch4								
rs520692								
AA	1.00 (Ref)	1.00 (Ref)	1.04 (0.81, 1.34)	1.04 (0.81, 1.33)	-0.11 (-0.59, 0.36)	-0.10 (-0.55, 0.35)	0.89 (0.57, 1.42)	0.90 (0.59, 1.40)
AG+GG	1.05 (0.74, 1.49)	1.04 (0.74, 1.47)	0.98 (0.70, 1.36)	0.98 (0.70, 1.36)				

Rex1								
rs6815391								
CT+CC	1.00 (Ref)	1.00 (Ref)	1.13 (0.83, 1.52)	1.12 (0.83, 1.51)	-0.11 (-0.57, 0.35)	-0.10 (-0.54, 0.34)	0.90 (0.60, 1.36)	0.91 (0.61, 1.35)
TT	1.09 (0.80, 1.51)	1.09 (0.80, 1.49)	1.11 (0.81, 1.52)	1.11 (0.81, 1.52)				
HES2								
rs8708								
AG+GG	1.00 (Ref)	1.00 (Ref)	0.97 (0.66, 1.42)	0.97 (0.67, 1.42)	0.12 (-0.31, 0.55)	0.11 (-0.30, 0.52)	1.12 (0.72, 1.75)	1.11 (0.73, 1.70)
AA	1.02 (0.72, 1.44)	1.03 (0.73, 1.43)	1.11 (0.78, 1.56)	1.11 (0.79, 1.56)				
Notch4								
rs915894								
AC+AA	1.00 (Ref)	1.00 (Ref)	1.11 (0.85, 1.46)	1.1 (0.85, 1.44)	-0.47 (-1.03, 0.10)	-0.42 (-0.96, 0.11)	0.68 (0.44, 1.04)	0.70 (0.47, 1.06)
CC	1.45 (1.05, 2.01)	1.42 (1.03, 1.96)	1.10 (0.80, 1.51)	1.10 (0.80, 1.51)				
JAG2								
rs9972231								
CT+TT	1.00 (Ref)	1.00 (Ref)	1.35 (0.90, 2.04)	1.32 (0.89, 1.95)	-0.42 (-1.06, 0.21)	-0.38 (-0.96, 0.21)	0.70 (0.44, 1.11)	0.72 (0.47, 1.12)
CC	1.29 (0.90, 1.85)	1.26 (0.89, 1.78)	1.21 (0.85, 1.74)	1.20 (0.84, 1.72)				

Ca, case; Co, control; cOR, crude odds ratio; aOR, adjusted odds ratio; sbOR, semi-bayes adjusted odds ratio; RERI, relative excess risk due to interaction; ROR, ratio of odds ratios;

[b] Adjusted for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, pack-years of smoking, *Helicobacter pylori* IgG, and atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

Table 3.3.18. Joint associations between SNPs from GWAS and stomach cancer, by alcohol drinking status in the Jiangsu study.

	Never Drinker		Ever Drinker		Interaction			
dbSNP no.	**aOR[b]**	**sbOR[b]**	**aOR[b]**	**sbOR[b]**	**RERI[b]**	**sbRERI[b]**	**ROR[b]**	**sbROR[b]**
PLCE1								
rs2274223								
AA	1.00 (Ref)	1.00 (Ref)	1.20 (0.89, 1.62)	1.20 (0.89, 1.61)	-0.02 (-0.55, 0.51)	-0.02 (-0.52, 0.49)	0.96 (0.62, 1.49)	0.96 (0.63, 1.46)
AG+GG	1.19 (0.84, 1.69)	1.19 (0.85, 1.67)	1.37 (0.99, 1.90)	1.37 (0.99, 1.90)				
CHEK2								
rs738722								
CC	1.00 (Ref)	1.00 (Ref)	1.29 (0.95, 1.76)	1.27 (0.94, 1.72)	-0.45 (-1.00, 0.11)	-0.41 (-0.93, 0.12)	0.69 (0.46, 1.04)	0.71 (0.48, 1.05)
CT+TT	1.41 (1.03, 1.93)	1.38 (1.02, 1.88)	1.25 (0.91, 1.73)	1.25 (0.91, 1.72)				

Ca, case; Co, control; cOR, crude odds ratio; aOR, adjusted odds ratio; sbOR, semi-bayes adjusted odds ratio; RERI, relative excess risk due to interaction; ROR, ratio of odds ratios;

[b] Adjusted for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, pack-years of smoking, *Helicobacter pylori* IgG, and atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

Table 3.3.19. Joint associations between SNPs from the miRNA pathway and stomach cancer, by green tea drinking status in the Jiangsu study.

	Green Tea Drinker		Never Drinks Green Tea		Interaction			
dbSNP no.	**aOR[b]**	**sbOR[b]**	**aOR[b]**	**sbOR[b]**	**RERI[b]**	**sbRERI[b]**	**ROR[b]**	**sbROR[b]**
IL15								
rs10519613								
CA+AA	1.00 (Ref)	1.00 (Ref)	1.17 (0.86, 1.60)	1.16 (0.85, 1.57)	-0.36 (-0.99, 0.28)	-0.32 (-0.91, 0.28)	0.74 (0.46, 1.19)	0.77 (0.49, 1.20)
CC	1.43 (0.95, 2.14)	1.39 (0.94, 2.06)	1.24 (0.89, 1.74)	1.24 (0.88, 1.73)				
XPO5								
rs11077								
AC+CC	1.00 (Ref)	1.00 (Ref)	1.33 (0.69, 2.58)	1.28 (0.71, 2.33)	-0.26 (-1.15, 0.63)	-0.20 (-0.96, 0.56)	0.79 (0.40, 1.59)	0.83 (0.45, 1.55)
AA	1.25 (0.68, 2.31)	1.21 (0.69, 2.11)	1.33 (0.73, 2.40)	1.29 (0.74, 2.24)				
miR-196a2								
rs11614913								
TT	1.00 (Ref)	1.00 (Ref)	1.23 (0.80, 1.90)	1.21 (0.80, 1.84)	-0.23 (-0.83, 0.37)	-0.20 (-0.76, 0.35)	0.81 (0.49, 1.35)	0.83 (0.52, 1.34)
CT+CC	1.09 (0.70, 1.69)	1.07 (0.70, 1.62)	1.09 (0.72, 1.63)	1.07 (0.72, 1.60)				
WWOX								
rs12828								
AG+AA	1.00 (Ref)	1.00 (Ref)	1.29 (0.95, 1.75)	1.26 (0.93, 1.70)	**-0.68 (-1.34, -0.02)**	-0.59 (-1.19, 0.01)	**0.55 (0.34, 0.88)**	**0.58 (0.37, 0.92)**
GG	1.32 (0.88, 2.00)	1.26 (0.85, 1.88)	0.94 (0.67, 1.30)	0.93 (0.67, 1.29)				
Ran								
rs14035								
CC	1.00 (Ref)	1.00 (Ref)	1.13 (0.83, 1.52)	1.12 (0.83, 1.51)	-0.10 (-0.63, 0.42)	-0.09 (-0.58, 0.40)	0.91 (0.55, 1.49)	0.92 (0.58, 1.46)
CT+TT	1.03 (0.67, 1.59)	1.02 (0.68, 1.55)	1.06 (0.75, 1.48)	1.05 (0.75, 1.48)				
CXCL12								
rs1804429								

GT+GG	1.00 (Ref)	1.00 (Ref)	0.90 (0.46, 1.76)	0.93 (0.5, 1.71)	0.17 (-0.45, 0.80)	0.14 (-0.43, 0.72)	1.19 (0.58, 2.42)	1.15 (0.61, 2.16)
TT	1.06 (0.58, 1.93)	1.08 (0.62, 1.89)	1.13 (0.63, 2.02)	1.15 (0.67, 2.00)				
Gemin3								
rs197412								
TC+CC	1.00 (Ref)	1.00 (Ref)	1.09 (0.79, 1.51)	1.09 (0.79, 1.50)	-0.05 (-0.55, 0.45)	-0.05 (-0.52, 0.43)	0.95 (0.60, 1.51)	0.96 (0.62, 1.48)
TT	1.08 (0.73, 1.62)	1.08 (0.73, 1.59)	1.13 (0.81, 1.57)	1.13 (0.81, 1.56)				
E2F2								
rs2075993								
GA+AA	1.00 (Ref)	1.00 (Ref)	0.99 (0.73, 1.36)	1.00 (0.74, 1.36)	0.21 (-0.27, 0.70)	0.19 (-0.27, 0.66)	1.20 (0.75, 1.92)	1.18 (0.75, 1.84)
GG	1.08 (0.72, 1.63)	1.10 (0.74, 1.63)	1.29 (0.92, 1.79)	1.29 (0.93, 1.79)				
RCHY1								
rs2126852								
AG+GG	1.00 (Ref)	1.00 (Ref)	1.42 (0.84, 2.40)	1.36 (0.83, 2.23)	-0.42 (-1.40, 0.56)	-0.32 (-1.15, 0.51)	0.71 (0.36, 1.39)	0.75 (0.41, 1.39)
AA	1.49 (0.80, 2.77)	1.40 (0.79, 2.48)	1.49 (0.88, 2.50)	1.44 (0.88, 2.38)				
Wnt2B								
rs2273368								
CT+TT	1.00 (Ref)	1.00 (Ref)	1.20 (0.88, 1.63)	1.18 (0.88, 1.60)	-0.50 (-1.34, 0.35)	-0.43 (-1.21, 0.34)	0.71 (0.43, 1.15)	0.73 (0.46, 1.16)
CC	1.93 (1.26, 2.96)	1.88 (1.25, 2.82)	1.64 (1.17, 2.29)	1.63 (1.17, 2.27)				
THBS1								
rs2292305								
TT	1.00 (Ref)	1.00 (Ref)	1.36 (0.94, 1.95)	1.32 (0.93, 1.87)	-0.60 (-1.26, 0.06)	-0.53 (-1.12, 0.07)	**0.59 (0.37, 0.95)**	**0.62 (0.40, 0.98)**
CT+CC	1.22 (0.81, 1.85)	1.17 (0.79, 1.75)	0.98 (0.68, 1.41)	0.96 (0.67, 1.38)				
Gemin4								
rs2740348								
GG	1.00 (Ref)	1.00 (Ref)	1.25 (0.94, 1.66)	1.22 (0.93, 1.62)	-0.89 (-1.91, 0.13)	-0.74 (-1.63, 0.15)	**0.54 (0.31, 0.95)**	**0.59 (0.35, 0.99)**

GC+CC	1.98 (1.22, 3.21)	1.86 (1.18, 2.94)	1.34 (0.94, 1.91)	1.34 (0.94, 1.91)				
pre-miR-146a								
rs2910164								
CC	1.00 (Ref)	1.00 (Ref)	1.18 (0.79, 1.78)	1.17 (0.79, 1.73)	-0.22 (-0.80, 0.36)	-0.19 (-0.73, 0.34)	0.82 (0.50, 1.33)	0.84 (0.53, 1.32)
GC+GG	1.14 (0.74, 1.74)	1.12 (0.75, 1.68)	1.10 (0.75, 1.62)	1.09 (0.75, 1.59)				
CTNNB1								
rs2953								
GT+GG	1.00 (Ref)	1.00 (Ref)	0.98 (0.69, 1.41)	0.99 (0.70, 1.41)	0.18 (-0.26, 0.63)	0.17 (-0.26, 0.60)	1.18 (0.74, 1.88)	1.16 (0.75, 1.80)
TT	1.03 (0.69, 1.54)	1.04 (0.71, 1.53)	1.20 (0.85, 1.69)	1.20 (0.85, 1.69)				
DOCK4								
rs3801790								
AG+GG	1.00 (Ref)	1.00 (Ref)	1.12 (0.82, 1.53)	1.11 (0.82, 1.51)	-0.29 (-0.88, 0.30)	-0.26 (-0.81, 0.29)	0.77 (0.49, 1.23)	0.80 (0.51, 1.24)
AA	1.32 (0.88, 1.97)	1.29 (0.88, 1.90)	1.15 (0.83, 1.59)	1.14 (0.82, 1.58)				
Rbl2								
rs3929								
GG	1.00 (Ref)	1.00 (Ref)	1.08 (0.80, 1.45)	1.08 (0.80, 1.44)	-0.09 (-0.59, 0.42)	-0.08 (-0.55, 0.40)	0.92 (0.57, 1.48)	0.93 (0.59, 1.45)
CG+CC	1.05 (0.69, 1.58)	1.04 (0.70, 1.54)	1.04 (0.75, 1.43)	1.04 (0.75, 1.43)				
IL6R								
rs4072391								
CC	1.00 (Ref)	1.00 (Ref)	1.15 (0.88, 1.50)	1.14 (0.87, 1.48)	-0.37 (-1.12, 0.37)	-0.31 (-0.97, 0.35)	0.71 (0.39, 1.31)	0.75 (0.43, 1.31)
CT+TT	1.26 (0.75, 2.12)	1.21 (0.74, 1.98)	1.03 (0.71, 1.50)	1.04 (0.72, 1.50)				
Ago2								
rs4961280								
CA+AA	1.00 (Ref)	1.00 (Ref)	1.15 (0.70, 1.90)	1.14 (0.71, 1.84)	-0.06 (-0.70, 0.58)	-0.05 (-0.63, 0.54)	0.93 (0.53, 1.63)	0.94 (0.56, 1.58)
CC	1.29 (0.80, 2.10)	1.28 (0.81, 2.03)	1.39 (0.88, 2.18)	1.38 (0.89, 2.14)				

miR-26a1								
rs7372209								
CT+TT	1.00 (Ref)	1.00 (Ref)	1.17 (0.82, 1.66)	1.16 (0.82, 1.63)	-0.18 (-0.74, 0.38)	-0.16 (-0.69, 0.36)	0.85 (0.54, 1.34)	0.86 (0.56, 1.33)
CC	1.26 (0.85, 1.88)	1.25 (0.85, 1.83)	1.25 (0.88, 1.76)	1.24 (0.88, 1.75)				
TP53INP1								
rs7760								
TT	1.00 (Ref)	1.00 (Ref)	1.00 (0.74, 1.34)	1.00 (0.75, 1.34)	0.08 (-0.49, 0.65)	0.07 (-0.46, 0.60)	1.08 (0.62, 1.88)	1.07 (0.64, 1.79)
TG+GG	1.02 (0.63, 1.66)	1.03 (0.65, 1.63)	1.10 (0.77, 1.57)	1.10 (0.77, 1.57)				
Gemin4								
rs7813								
TT	1.00 (Ref)	1.00 (Ref)	1.42 (1.00, 2.02)	1.38 (0.98, 1.95)	-0.63 (-1.35, 0.10)	-0.55 (-1.21, 0.11)	**0.61 (0.38, 0.98)**	**0.64 (0.41, 1.00)**
CT+CC	1.53 (1.02, 2.31)	1.47 (0.99, 2.18)	1.32 (0.93, 1.89)	1.31 (0.92, 1.86)				
KRAS								
rs9266								
CT+TT	1.00 (Ref)	1.00 (Ref)	1.35 (0.89, 2.06)	1.32 (0.88, 1.97)	-0.40 (-1.11, 0.31)	-0.35 (-0.99, 0.30)	0.72 (0.44, 1.18)	0.74 (0.47, 1.18)
CC	1.52 (0.98, 2.36)	1.48 (0.98, 2.24)	1.47 (0.98, 2.21)	1.45 (0.97, 2.15)				

Ca, case; Co, control; cOR, crude odds ratio; aOR, adjusted odds ratio; sbOR, semi-bayes adjusted odds ratio; RERI, relative excess risk due to interaction; ROR, ratio of odds ratios;

[b] Adjusted for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, pack-years of smoking, alcohol consumption in the 1990's, *Helicobacter pylori* IgG, and atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

Table 3.3.20. Joint associations between SNPs from the stem cell signaling pathway and stomach cancer, by green tea drinking status in the Jiangsu study.

	Green Tea Drinker		Never Drinks Green Tea		Interaction			
dbSNP no.	**aOR[b]**	**sbOR[b]**	**aOR[b]**	**sbOR[b]**	**RERI[b]**	**sbRERI[b]**	**ROR[b]**	**sbROR[b]**
DLL1								
rs1033583								
AA	1.00 (Ref)	1.00 (Ref)	1.21 (0.88, 1.67)	1.19 (0.87, 1.64)	-0.36 (-0.91, 0.20)	-0.32 (-0.83, 0.20)	0.71 (0.44, 1.15)	0.74 (0.47, 1.16)
AC+CC	1.06 (0.70, 1.61)	1.03 (0.69, 1.54)	0.91 (0.65, 1.28)	0.91 (0.65, 1.27)				
HEY1								
rs1046472								
CC	1.00 (Ref)	1.00 (Ref)	1.05 (0.78, 1.43)	1.05 (0.78, 1.42)	-0.12 (-0.65, 0.41)	-0.11 (-0.61, 0.39)	0.89 (0.56, 1.42)	0.90 (0.58, 1.41)
AC+AA	1.18 (0.79, 1.76)	1.17 (0.79, 1.71)	1.11 (0.80, 1.53)	1.11 (0.80, 1.53)				
HES2								
rs11364								
GG	1.00 (Ref)	1.00 (Ref)	1.06 (0.78, 1.43)	1.06 (0.79, 1.43)	0.00 (-0.71, 0.71)	0.00 (-0.67, 0.67)	0.98 (0.59, 1.64)	0.98 (0.61, 1.59)
AG+AA	1.50 (0.95, 2.36)	1.50 (0.97, 2.30)	1.56 (1.11, 2.19)	1.56 (1.11, 2.19)				
Oct4								
rs13409								
CT+TT	1.00 (Ref)	1.00 (Ref)	1.27 (0.93, 1.73)	1.24 (0.92, 1.68)	-0.55 (-1.22, 0.12)	-0.49 (-1.10, 0.13)	0.63 (0.40, 1.02)	0.66 (0.43, 1.04)
CC	1.45 (0.97, 2.17)	1.40 (0.95, 2.06)	1.16 (0.83, 1.63)	1.15 (0.82, 1.61)				
AXIN1								
rs1981492								
GG	1.00 (Ref)	1.00 (Ref)	1.24 (0.88, 1.73)	1.22 (0.88, 1.69)	-0.28 (-0.81, 0.25)	-0.25 (-0.74, 0.24)	0.77 (0.49, 1.22)	0.79 (0.51, 1.23)
AG+AA	1.02 (0.69, 1.52)	1.00 (0.68, 1.47)	0.98 (0.69, 1.38)	0.97 (0.69, 1.37)				
GLI1								
rs2228224								
GG	1.00 (Ref)	1.00 (Ref)	1.11 (0.80, 1.54)	1.11 (0.80, 1.53)	-0.04 (-0.57, 0.48)	-0.04 (-0.54, 0.46)	0.95 (0.60, 1.51)	0.96 (0.62, 1.48)
AG+AA	1.19 (0.80, 1.78)	1.19 (0.81, 1.75)	1.26 (0.90, 1.77)	1.26 (0.90, 1.76)				
DVL2								
rs222851								

AG+GG	1.00 (Ref)	1.00 (Ref)	1.17 (0.86, 1.60)	1.16 (0.85, 1.57)	-0.27 (-0.81, 0.27)	-0.24 (-0.74, 0.26)	0.77 (0.48, 1.24)	0.80 (0.51, 1.25)
AA	1.09 (0.72, 1.64)	1.07 (0.72, 1.58)	0.99 (0.71, 1.37)	0.98 (0.71, 1.37)				
AXIN2								
rs2240308								
GG	1.00 (Ref)	1.00 (Ref)	1.18 (0.81, 1.72)	1.17 (0.81, 1.68)	-0.20 (-0.79, 0.39)	-0.17 (-0.72, 0.37)	0.83 (0.51, 1.37)	0.85 (0.53, 1.36)
AG+AA	1.17 (0.75, 1.81)	1.15 (0.75, 1.75)	1.15 (0.79, 1.67)	1.14 (0.79, 1.65)				
FZD3								
rs2241802								
GG	1.00 (Ref)	1.00 (Ref)	1.46 (0.96, 2.24)	1.42 (0.94, 2.14)	-0.46 (-1.18, 0.26)	-0.40 (-1.04, 0.25)	0.69 (0.41, 1.14)	0.72 (0.44, 1.16)
AG+AA	1.29 (0.82, 2.01)	1.24 (0.81, 1.90)	1.29 (0.86, 1.93)	1.27 (0.85, 1.88)				
Dec1								
rs2269700								
CT+CC	1.00 (Ref)	1.00 (Ref)	0.98 (0.64, 1.49)	0.98 (0.66, 1.48)	0.05 (-0.46, 0.56)	0.04 (-0.44, 0.53)	1.04 (0.64, 1.71)	1.04 (0.65, 1.65)
TT	1.19 (0.77, 1.82)	1.19 (0.79, 1.79)	1.22 (0.82, 1.80)	1.22 (0.83, 1.79)				
Oct4								
rs3130932								
GT+GG	1.00 (Ref)	1.00 (Ref)	1.23 (0.88, 1.73)	1.22 (0.87, 1.69)	-0.34 (-0.96, 0.27)	-0.31 (-0.88, 0.27)	0.75 (0.47, 1.18)	0.77 (0.50, 1.19)
TT	1.42 (0.95, 2.11)	1.39 (0.95, 2.03)	1.31 (0.93, 1.84)	1.30 (0.93, 1.82)				
WNT2								
rs3729629								
CG+CC	1.00 (Ref)	1.00 (Ref)	1.00 (0.72, 1.40)	1.01 (0.73, 1.40)	0.19 (-0.27, 0.65)	0.18 (-0.26, 0.62)	1.18 (0.75, 1.86)	1.16 (0.75, 1.79)
GG	1.08 (0.73, 1.60)	1.09 (0.75, 1.59)	1.27 (0.91, 1.78)	1.28 (0.91, 1.79)				
HEY2								
rs3734637								
AC+CC	1.00 (Ref)	1.00 (Ref)	1.12 (0.77, 1.64)	1.12 (0.77, 1.61)	-0.09 (-0.63, 0.45)	-0.08 (-0.59, 0.43)	0.91 (0.57, 1.47)	0.92 (0.59, 1.44)
AA	1.19 (0.79, 1.80)	1.19 (0.80, 1.76)	1.22 (0.85, 1.77)	1.22 (0.85, 1.75)				
Ctbp2								
rs3740535								
GG	1.00 (Ref)	1.00 (Ref)	1.12 (0.81, 1.55)	1.11 (0.80, 1.53)	-0.18 (-0.70, 0.34)	-0.16 (-0.65, 0.33)	0.84 (0.53, 1.34)	0.86 (0.55, 1.33)

AG+AA	1.12 (0.76, 1.67)	1.11 (0.76, 1.63)	1.06 (0.76, 1.48)	1.05 (0.76, 1.47)				
FZD1								
rs3750145								
AG+GG	1.00 (Ref)	1.00 (Ref)	1.29 (0.83, 2.01)	1.27 (0.83, 1.94)	-0.20 (-0.86, 0.47)	-0.17 (-0.78, 0.44)	0.83 (0.49, 1.40)	0.85 (0.52, 1.39)
AA	1.32 (0.83, 2.11)	1.3 (0.84, 2.02)	1.42 (0.93, 2.16)	1.40 (0.93, 2.12)				
WNT2								
rs4730775								
CC	1.00 (Ref)	1.00 (Ref)	1.09 (0.80, 1.49)	1.08 (0.80, 1.47)	-0.17 (-0.66, 0.33)	-0.15 (-0.62, 0.31)	0.85 (0.53, 1.35)	0.86 (0.55, 1.34)
CT+TT	1.01 (0.67, 1.51)	1.00 (0.67, 1.47)	0.93 (0.67, 1.29)	0.93 (0.67, 1.28)				
WNT8A								
rs4835761								
AG+GG	1.00 (Ref)	1.00 (Ref)	1.33 (0.97, 1.81)	1.30 (0.95, 1.76)	-0.81 (-1.65, 0.03)	-0.71 (-1.47, 0.05)	**0.56 (0.35, 0.90)**	**0.60 (0.38, 0.94)**
AA	1.91 (1.26, 2.88)	1.82 (1.22, 2.71)	1.42 (1.02, 1.99)	1.41 (1.01, 1.97)				
Notch4								
rs520692								
AA	1.00 (Ref)	1.00 (Ref)	1.15 (0.86, 1.53)	1.14 (0.86, 1.51)	-0.24 (-0.85, 0.38)	-0.21 (-0.77, 0.36)	0.80 (0.47, 1.36)	0.83 (0.50, 1.36)
AG+GG	1.16 (0.73, 1.84)	1.14 (0.73, 1.76)	1.07 (0.76, 1.51)	1.07 (0.76, 1.50)				
Rex1								
rs6815391								
TT	1.00 (Ref)	1.00 (Ref)	1.41 (0.97, 2.05)	1.37 (0.95, 1.96)	-0.62 (-1.33, 0.09)	-0.54 (-1.18, 0.10)	**0.61 (0.38, 0.98)**	**0.64 (0.41, 1.00)**
CT+CC	1.42 (0.93, 2.14)	1.36 (0.91, 2.02)	1.21 (0.84, 1.74)	1.19 (0.83, 1.71)				
HES2								
rs8708								
AG+GG	1.00 (Ref)	1.00 (Ref)	1.33 (0.84, 2.11)	1.30 (0.84, 2.02)	-0.30 (-0.99, 0.40)	-0.25 (-0.88, 0.37)	0.77 (0.46, 1.30)	0.80 (0.49, 1.30)
AA	1.33 (0.84, 2.12)	1.30 (0.84, 2.02)	1.37 (0.89, 2.12)	1.35 (0.88, 2.06)				
Notch4								
rs915894								
CC	1.00 (Ref)	1.00 (Ref)	1.66 (1.08, 2.54)	1.57 (1.04, 2.37)	-0.83 (-1.67, 0.01)	-0.71 (-1.45, 0.03)	**0.53 (0.32, 0.87)**	**0.57 (0.36, 0.91)**
AC+AA	1.41 (0.91, 2.18)	1.33 (0.88, 2.02)	1.23 (0.82, 1.85)	1.19 (0.80, 1.77)				

JAG2								
rs9972231								
CT+TT	1.00 (Ref)	1.00 (Ref)	1.53 (0.94, 2.47)	1.46 (0.93, 2.30)	-0.57 (-1.41, 0.27)	-0.48 (-1.21, 0.26)	0.64 (0.37, 1.10)	0.68 (0.41, 1.12)
CC	1.47 (0.91, 2.38)	1.40 (0.89, 2.21)	1.43 (0.91, 2.25)	1.39 (0.90, 2.15)				

Ca, case; Co, control; cOR, crude odds ratio; aOR, adjusted odds ratio; sbOR, semi-bayes adjusted odds ratio; RERI, relative excess risk due to interaction; ROR, ratio of odds ratios;

[b] Adjusted for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, pack-years of smoking, alcohol consumption in the 1990's, *Helicobacter pylori* IgG, and atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

Table 3.3.21. Joint associations between SNPs from GWAS and stomach cancer, by green tea drinking status in the Jiangsu study.

	Green Tea Drinker		Never Drinks Green Tea		Interaction			
dbSNP no.	**aOR[b]**	**sbOR[b]**	**aOR[b]**	**sbOR[b]**	**RERI[b]**	**sbRERI[b]**	**ROR[b]**	**sbROR[b]**
PLCE1								
rs2274223								
AA	1.00 (Ref)	1.00 (Ref)	1.19 (0.86, 1.66)	1.18 (0.86, 1.63)	-0.26 (-0.89, 0.38)	-0.22 (-0.81, 0.37)	0.80 (0.49, 1.30)	0.82 (0.52, 1.30)
AG+GG	1.37 (0.90, 2.08)	1.34 (0.90, 2.01)	1.31 (0.92, 1.85)	1.30 (0.92, 1.84)				
CHEK2								
rs738722								
CT+TT	1.00 (Ref)	1.00 (Ref)	1.19 (0.84, 1.70)	1.18 (0.84, 1.66)	-0.31 (-0.86, 0.25)	-0.27 (-0.79, 0.24)	0.75 (0.47, 1.20)	0.77 (0.50, 1.20)
CC	1.10 (0.74, 1.65)	1.08 (0.73, 1.59)	0.99 (0.70, 1.40)	0.98 (0.70, 1.39)				

Ca, case; Co, control; cOR, crude odds ratio; aOR, adjusted odds ratio; sbOR, semi-bayes adjusted odds ratio; RERI, relative excess risk due to interaction; ROR, ratio of odds ratios;

[b] Adjusted for age, gender, county (study site), education level, income ten years ago, family history of stomach cancer, pack-years of smoking, alcohol consumption in the 1990's, *Helicobacter pylori* IgG, and atrophic gastritis defined as serum PG I ≤ 70ng/mL and PG I/PG II ≤ 6.

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