

Supplemental results

Table S1 Baseline characteristics of participants included in the study and of those excluded because of incomplete biomarker measurements.

Characteristics	Included participants (N=20553)	Excluded participants (N=8483)	<i>P</i> value
Age, years	52.00 [46.00, 59.00]	53.00 [46.00, 60.00]	<0.001
Sex			<0.001
Female	11264 (54.8)	5,315 (62.7)	
Male	9289 (45.2)	3,168 (37.3)	
Smoking			<0.001
No	16456 (80.1)	7,455 (87.9)	
Yes	4097 (19.9)	1,028 (12.1)	
Drinking			<0.001
No	17785 (86.5)	7,814 (92.1)	
Yes	2768 (13.5)	669 (7.9)	
Family history of cancer in first-degree relatives			<0.001
No	16527 (80.4)	7,157 (84.4)	
Yes	4026 (19.6)	1,326 (15.6)	

Continuous data are described as median (IQR), and categorical variables are presented as numbers (percentages).

Table S2. Coding of outcomes based on ICD10.

Cancer site	ICD10
Overall cancer	C00-C97
Head and neck	C00-C14
Oesophageal	C15
Gastric	C16
Colorectal	C18-C20
Liver	C22
Gallbladder	C23-24
Pancreas	C25
Lung	C34
Breast	C50
Cervix uter	C53
Corpus uteri	C54
Ovary	C56
Prostate	C61
Kidney	C64-C65
Bladder	C67
CNS	C70-C72
Thyroid	C73

ICD: International Classification of Diseases.

Table S3. Multivariable-adjusted HRs (95% CI) for outcomes according to serum biomarkers when excluded the participants developed cancer or died within 1 years of follow-up.

Cancer site	No. of Cases	PGI			PGII			PGI/II ratio			G-17			<i>H. pylori</i> infection		
		HR (95%CI)	<i>P</i> value	FDR	HR (95%CI)	<i>P</i> value	FDR	HR (95%CI)	<i>P</i> value	FDR	HR (95%CI)	<i>P</i> value	FDR	HR (95%CI)	<i>P</i> value	FDR
Overall cancer incidence	1768	1.06(0.88-1.28)	0.560	0.560	1.23(1.05-1.42)	0.008	0.020	0.83(0.71-0.97)	0.021	0.035	1.09(1.03-1.16)	0.006	0.020	1.05(0.96-1.16)	0.273	0.341
Head and neck	26	1.38(0.26-7.23)	0.703	0.703	2.33(0.68-7.99)	0.178	0.297	0.50(0.15-1.67)	0.260	0.325	1.65(0.96-2.85)	0.069	0.297	1.85(0.85-4.04)	0.122	0.297
Oesophageal	20	0.68(0.14-3.31)	0.632	0.632	1.82(0.44-7.51)	0.409	0.618	0.41(0.11-1.58)	0.196	0.618	1.28(0.71-2.32)	0.413	0.618	1.36(0.56-3.27)	0.494	0.618
Gastric	255	0.44(0.30-0.65)	0.000	0.000	2.11(1.42-3.15)	0.000	0.000	0.27(0.20-0.38)	0.000	0.000	1.01(0.86-1.19)	0.915	0.915	1.57(1.23-2.01)	0.000	0.000
Colorectal	178	2.25(1.17-4.33)	0.015	0.038	1.87(1.17-3.00)	0.009	0.038	0.85(0.52-1.37)	0.498	0.623	1.18(0.97-1.43)	0.103	0.172	0.94(0.70-1.27)	0.692	0.692
Liver	162	0.84(0.47-1.51)	0.564	0.564	1.19(0.72-1.96)	0.497	0.564	0.74(0.45-1.21)	0.229	0.382	1.16(0.94-1.42)	0.163	0.382	1.33(0.98-1.82)	0.068	0.340
Gallbladder	27	2.00(0.37-10.66)	0.417	0.828	1.25(0.37-4.23)	0.716	0.828	1.21(0.33-4.38)	0.771	0.828	1.17(0.70-1.93)	0.550	0.828	1.09(0.51-2.33)	0.828	0.828
Pancreas	44	1.11(0.33-3.79)	0.864	0.954	1.03(0.40-2.64)	0.954	0.954	1.04(0.38-2.86)	0.936	0.954	0.87(0.59-1.29)	0.489	0.954	0.93(0.51-1.71)	0.826	0.954
Lung	485	1.43(0.98-2.08)	0.067	0.168	0.94(0.71-1.25)	0.683	0.854	1.36(1.00-1.85)	0.048	0.168	0.99(0.88-1.12)	0.920	0.920	0.96(0.80-1.15)	0.667	0.854
Breast	89	1.31(0.52-3.35)	0.566	0.619	0.85(0.44-1.64)	0.619	0.619	1.46(0.70-3.05)	0.315	0.619	1.18(0.89-1.57)	0.255	0.619	0.85(0.55-1.31)	0.456	0.619
Corpus uteri	17	0.63(0.10-3.91)	0.620	0.817	0.64(0.14-2.90)	0.561	0.817	1.22(0.23-6.50)	0.817	0.817	1.14(0.60-2.18)	0.689	0.817	2.14(0.81-5.63)	0.123	0.615
Cervix uteri	39	2.24(0.51-9.85)	0.285	0.497	0.69(0.25-1.87)	0.465	0.497	2.62(0.85-8.11)	0.095	0.475	1.16(0.76-1.77)	0.497	0.497	0.73(0.37-1.42)	0.354	0.497
Ovary	17	0.62(0.10-3.99)	0.619	0.840	1.15(0.25-5.26)	0.854	0.854	0.62(0.13-2.97)	0.549	0.840	1.15(0.60-2.2)	0.672	0.840	1.71(0.66-4.44)	0.271	0.840
Prostate	34	3.01(0.69-13.18)	0.143	0.358	2.63(0.87-7.93)	0.087	0.358	0.76(0.25-2.30)	0.622	0.688	1.28(0.81-2.02)	0.284	0.473	1.15(0.58-2.26)	0.688	0.688
Kidney	34	0.58(0.18-1.93)	0.379	0.630	1.44(0.49-4.25)	0.504	0.630	0.47(0.17-1.32)	0.151	0.610	0.77(0.50-1.20)	0.244	0.610	0.97(0.49-1.93)	0.940	0.940
Bladder	39	0.64(0.21-1.98)	0.439	0.783	1.12(0.40-3.08)	0.832	0.832	0.63(0.22-1.75)	0.371	0.783	1.13(0.74-1.71)	0.577	0.783	0.85(0.45-1.63)	0.626	0.783
CNS	49	2.50(0.67-9.26)	0.171	0.285	2.08(0.85-5.10)	0.110	0.278	0.75(0.29-1.91)	0.545	0.563	1.37(0.93-2.01)	0.111	0.278	1.18(0.67-2.08)	0.563	0.563
Thyroid	90	1.28(0.52-3.16)	0.593	0.855	1.29(0.67-2.47)	0.448	0.855	0.87(0.44-1.75)	0.702	0.855	1.24(0.94-1.64)	0.134	0.670	0.96(0.63-1.47)	0.855	0.855

Cox proportional hazard regression models were adjusted for age, sex, smoking status, drinking status, and family history of cancer in first-degree relatives. Female breast, corpus uteri, cervix uteri and ovary cancers, as well as male prostate cancer, were not adjusted for sex owing to their sex specificity. FDR, false discovery rate–corrected *P* value using the Benjamini–Hochberg method. HR, hazard ratio; CI, confidence interval.

Table S4. Multivariable-adjusted HRs (95% CI) for outcomes according to serum biomarkers when excluded the participants developed cancer or died within 2 years of follow-up.

Cancer site	No. of Cases	PGI			PGII			PGI/II ratio			G-17			<i>H. pylori</i> infection		
		HR (95%CI)	<i>P</i> value	FDR	HR (95%CI)	<i>P</i> value	FDR	HR (95%CI)	<i>P</i> value	FDR	HR (95%CI)	<i>P</i> value	FDR	HR (95%CI)	<i>P</i> value	FDR
Overall cancer incidence	1768	1.11(0.91-1.35)	0.290	0.290	1.24(1.06-1.44)	0.006	0.030	0.85(0.73-1.00)	0.043	0.072	1.08(1.02-1.15)	0.013	0.033	1.07(0.97-1.18)	0.177	0.221
Head and neck	26	1.35(0.25-7.32)	0.726	0.726	2.17(0.62-7.63)	0.226	0.377	0.53(0.15-1.83)	0.314	0.393	1.62(0.93-2.81)	0.088	0.377	1.72(0.78-3.8)	0.179	0.377
Oesophageal	20	0.65(0.13-3.22)	0.598	0.598	1.51(0.35-6.42)	0.580	0.598	0.47(0.12-1.92)	0.296	0.598	1.24(0.68-2.28)	0.483	0.598	1.48(0.6-3.66)	0.392	0.598
Gastric	255	0.47(0.31-0.71)	<0.001	<0.001	2.29(1.52-3.45)	<0.001	<0.001	0.27(0.19-0.38)	<0.001	<0.001	0.98(0.83-1.16)	0.845	0.845	1.65(1.28-2.13)	<0.001	<0.001
Colorectal	178	2.34(1.21-4.54)	0.012	0.030	1.93(1.20-3.11)	0.007	0.030	0.84(0.51-1.36)	0.478	0.594	1.19(0.98-1.45)	0.082	0.137	0.92(0.68-1.25)	0.594	0.594
Liver	162	0.92(0.50-1.69)	0.781	0.781	1.09(0.66-1.82)	0.738	0.781	0.86(0.51-1.44)	0.558	0.781	1.11(0.9-1.36)	0.345	0.781	1.32(0.96-1.82)	0.083	0.415
Gallbladder	27	2.00(0.37-10.66)	0.417	0.828	1.25(0.37-4.23)	0.716	0.828	1.21(0.33-4.38)	0.771	0.828	1.17(0.7-1.93)	0.550	0.828	1.09(0.51-2.33)	0.828	0.828
Pancreas	44	1.18(0.34-4.10)	0.800	0.978	1.09(0.42-2.83)	0.863	0.978	1.01(0.37-2.80)	0.978	0.978	0.87(0.59-1.29)	0.487	0.978	0.97(0.53-1.77)	0.911	0.978
Lung	485	1.42(0.97-2.10)	0.073	0.183	0.91(0.68-1.22)	0.548	0.785	1.41(1.03-1.93)	0.032	0.160	0.98(0.87-1.11)	0.785	0.785	0.96(0.8-1.15)	0.654	0.785
Breast	89	1.44(0.55-3.73)	0.459	0.696	0.90(0.46-1.75)	0.754	0.754	1.43(0.68-3.01)	0.348	0.696	1.2(0.9-1.61)	0.206	0.696	0.88(0.57-1.36)	0.557	0.696
Corpus uteri	17	0.74(0.10-5.30)	0.766	0.880	0.75(0.16-3.58)	0.719	0.880	1.14(0.21-6.35)	0.880	0.880	1.17(0.6-2.28)	0.649	0.880	2.47(0.9-6.81)	0.080	0.400
Cervix uteri	39	2.19(0.49-9.77)	0.304	0.514	0.71(0.26-1.96)	0.514	0.514	2.47(0.79-7.73)	0.121	0.514	1.19(0.77-1.84)	0.423	0.514	0.76(0.39-1.48)	0.419	0.514
Ovary	17	0.55(0.09-3.46)	0.524	0.827	1.24(0.26-5.92)	0.786	0.827	0.52(0.11-2.53)	0.420	0.827	1.08(0.55-2.09)	0.827	0.827	1.95(0.72-5.23)	0.187	0.827
Prostate	34	3.01(0.69-13.18)	0.143	0.358	2.63(0.87-7.93)	0.087	0.358	0.76(0.25-2.30)	0.622	0.688	1.28(0.81-2.02)	0.284	0.473	1.15(0.58-2.26)	0.688	0.688
Kidney	34	0.56(0.17-1.89)	0.352	0.635	1.43(0.47-4.35)	0.527	0.659	0.46(0.16-1.32)	0.149	0.635	0.82(0.52-1.28)	0.381	0.635	1.07(0.53-2.16)	0.849	0.849
Bladder	39	0.65(0.20-2.14)	0.477	0.621	1.45(0.50-4.25)	0.497	0.621	0.49(0.17-1.40)	0.182	0.621	1.25(0.8-1.95)	0.335	0.621	0.89(0.45-1.75)	0.736	0.736
CNS	49	2.50(0.67-9.26)	0.171	0.285	2.08(0.85-5.10)	0.110	0.278	0.75(0.29-1.91)	0.545	0.563	1.37(0.93-2.01)	0.111	0.278	1.18(0.67-2.08)	0.563	0.563
Thyroid	90	1.44(0.55-3.75)	0.453	0.758	1.29(0.66-2.55)	0.455	0.758	0.93(0.45-1.91)	0.846	0.973	1.19(0.89-1.59)	0.240	0.758	0.99(0.64-1.54)	0.973	0.973

Cox proportional hazard regression models were adjusted for age, sex, smoking status, drinking status, and family history of cancer in first-degree relatives. Female breast, corpus uteri, cervix uteri and ovary cancers, as well as male prostate cancer, were not adjusted for sex owing to their sex specificity. FDR, false discovery rate–corrected *P* value using the Benjamini–Hochberg method. HR, hazard ratio; CI, confidence interval.

Table S5. Multivariable-adjusted HRs (95% CI) for the overall cancer incidence according to serum biomarkers when excluded the participants developed gastric cancer.

Biomarkers	Overall cancer incidence		
	HR (95%CI)	<i>P</i> value	FDR
PGI	1.25(1.02-1.54)	0.034	0.085
PGII	1.12(0.96-1.32)	0.154	0.257
PG I/II ratio	1.02(0.86-1.21)	0.798	0.798
G-17	1.10(1.03-1.18)	0.004	0.020
<i>H. pylori</i> infection	0.98(0.89-1.09)	0.758	0.798

Cox proportional hazard regression models were adjusted for age, sex, smoking status, drinking status, and family history of cancer in first-degree relatives. FDR, false discovery rate–corrected *P* value using the Benjamini–Hochberg method. HR, hazard ratio; CI, confidence interval.

Table S6. Multivariable-adjusted HRs (95% CI) for the overall cancer incidence according to serum biomarkers when excluded the participants developed gastric or colorectal cancer.

Biomarkers	Overall cancer incidence		
	HR (95%CI)	<i>P</i> value	FDR
PGI	1.17(0.94-1.45)	0.170	0.425
PGII	1.06(0.90-1.26)	0.478	0.797
PG I/II ratio	1.04(0.87-1.24)	0.697	0.855
G-17	1.09(1.02-1.17)	0.014	0.070
<i>H. pylori</i> infection	0.99(0.89-1.10)	0.855	0.855

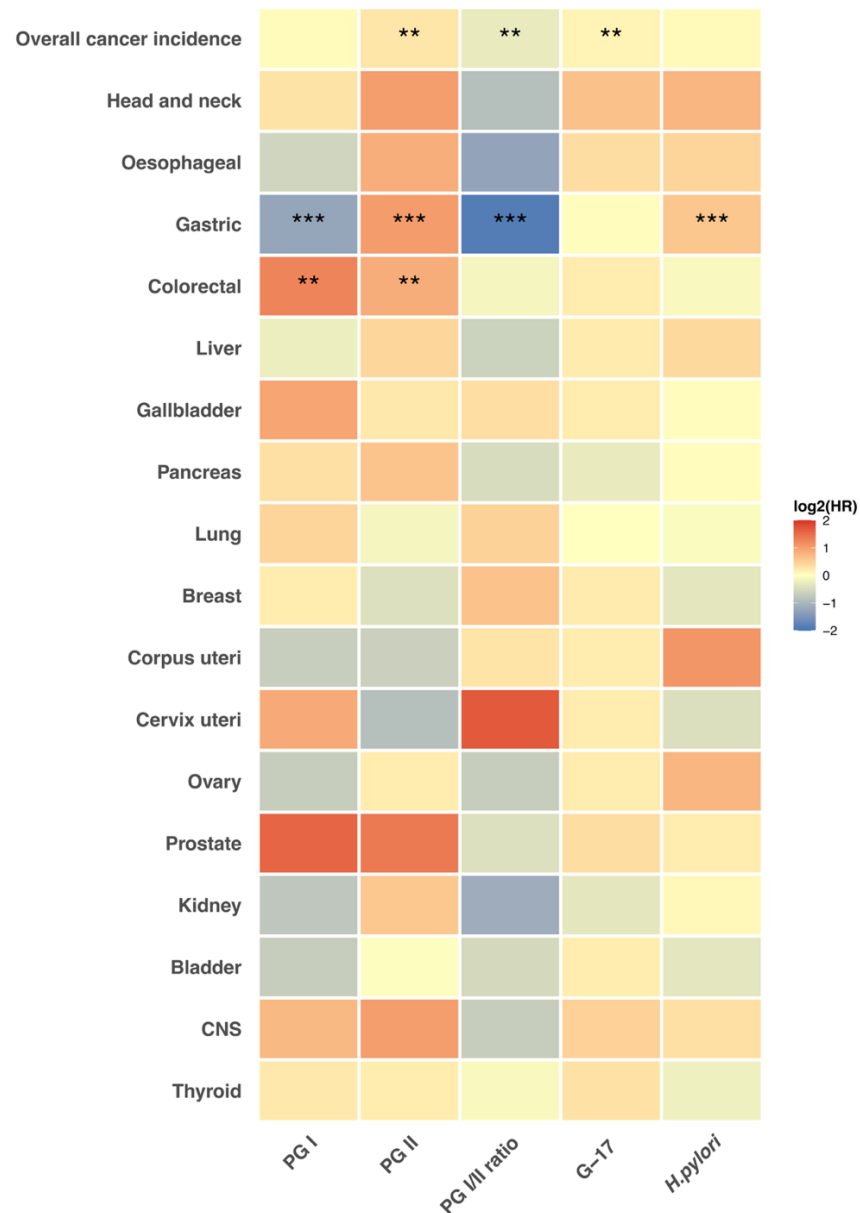
Cox proportional hazard regression models were adjusted for age, sex, smoking status, drinking status, and family history of cancer in first-degree relatives. FDR, false discovery rate–corrected *P* value using the Benjamini–Hochberg method. HR, hazard ratio; CI, confidence interval.

Table S7. The baseline characteristics of participants including analysis for gastric and/or colorectal cancer.

Characteristics	Cancer-free participants (N=18721)	Incident gastric cancer (N=264)	<i>P</i> value	Incident colorectal cancer (N=184)	<i>P</i> value	Incident gastric or colorectal cancer (N=448)	<i>P</i> value
Median follow-up, years	14.46[9.04, 22.64]	9.88[5.28, 15.70]	<0.001	10.44[5.69, 16.25]	<0.001	10.08[5.52, 16.09]	<0.001
Age, years	52.00[45.00, 59.00]	56.50[50.00, 63.00]	<0.001	57.00[49.00, 63.00]	<0.001	57.00[49.00, 63.00]	<0.001
Age, years							
35-44	4027(21.5)	22(8.3)	<0.001	17(9.2)	<0.001	39(8.7)	<0.001
45-54	6968(37.2)	88(33.3)		54(29.3)		142(31.7)	
55-64	6037(32.2)	109(41.3)		75(40.8)		184(41.1)	
65-70	1689(9.0)	45(17.0)		38(20.7)		83(18.5)	
Sex							
Female	10426(55.7)	72(27.3)	<0.001	67(36.4)	<0.001	139(31.0)	<0.001
Male	8295(44.3)	192(72.7)		117(63.6)		309(69.0)	
Smoking							
No	15185(81.1)	161(61.0)	<0.001	109(59.2)	<0.001	270(60.3)	<0.001
Yes	3536(18.9)	103(39.0)		75(40.8)		178(39.7)	
Drinking							
No	16312(87.1)	188(71.2)	<0.001	133(72.3)	<0.001	321(71.7)	<0.001
Yes	2409(12.9)	76(28.8)		51(27.7)		127(28.3)	
Family history of cancer in first-degree relatives							
No	15160(81.0)	190(72.0)	<0.001	129(70.1)	<0.001	319(71.2)	<0.001
Yes	3561(19.0)	74(28.0)		55(29.9)		129(28.8)	
PGI, ng/ml	86.20[63.70, 116.20]	81.25[55.90, 112.10]	0.002	95.31[70.20, 136.16]	0.001	86.40[61.47, 123.82]	0.822
PGI, ng/ml							
<65	4931(26.3)	93(35.2)	0.005	36(19.6)	0.005	129(28.8)	0.208
65-100	6884(36.8)	88(33.3)		59(32.1)		147(32.8)	
≥100	6906(36.9)	83(31.4)		89(48.4)		172(38.4)	
PGII, ng/ml	9.60[6.00, 16.57]	13.10[8.06, 21.43]	<0.001	12.51[6.80, 21.80]	<0.001	12.76[7.57, 21.61]	<0.001
PGII, ng/ml							
<10.5	10061(53.7)	104(39.4)	<0.001	82(44.6)	0.016	186(41.5)	<0.001
≥10.5	8660(46.3)	160(60.6)		102(55.4)		262(58.5)	

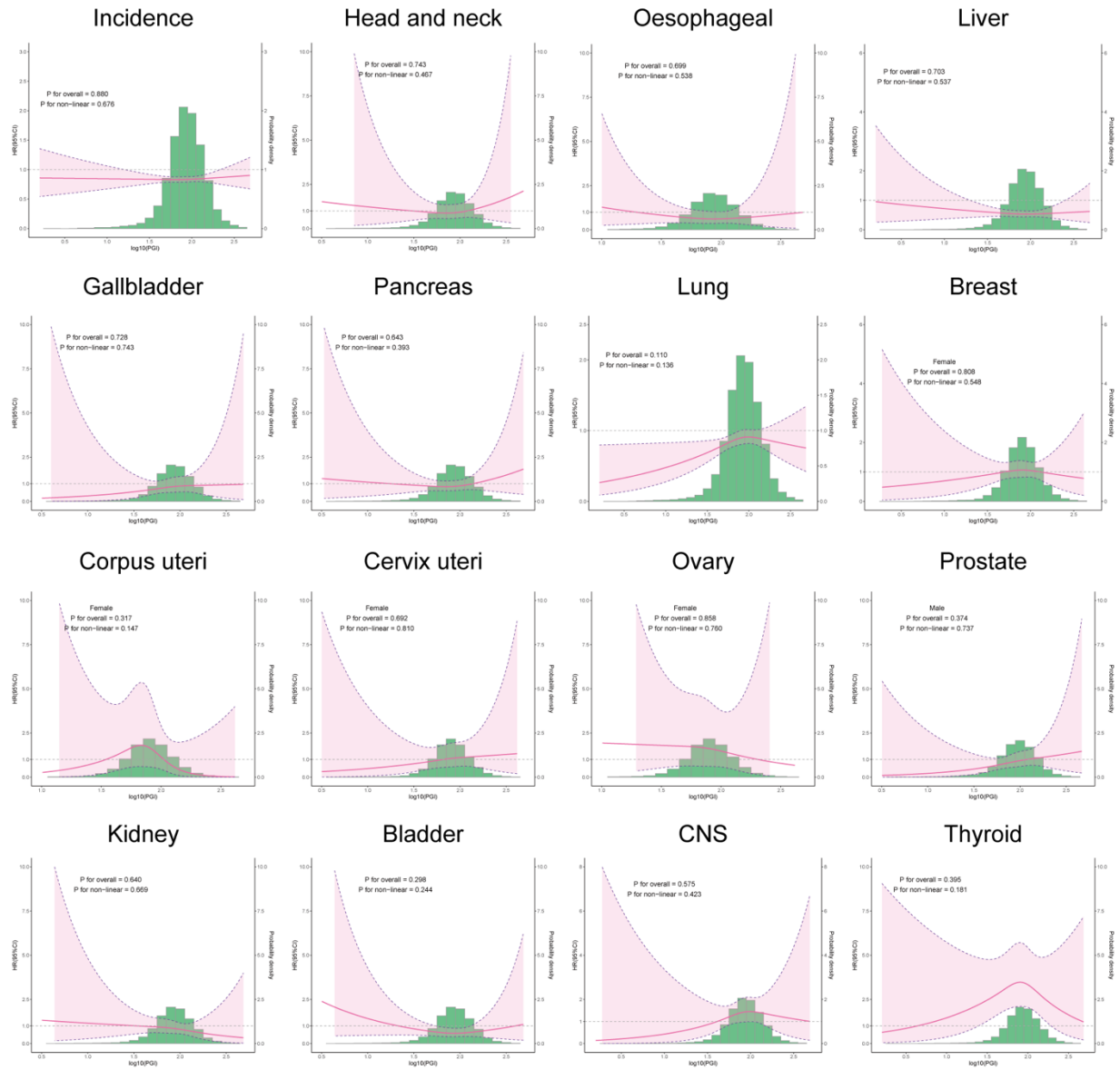
Continuous data are described as median (IQR), and categorical variables are presented as numbers (percentages).

Figure S1. Multivariable-adjusted HRs (95% CI) for the incidence of 17 site-specific cancers, overall cancer incidence, and mortality according to gastric serum biomarkers.



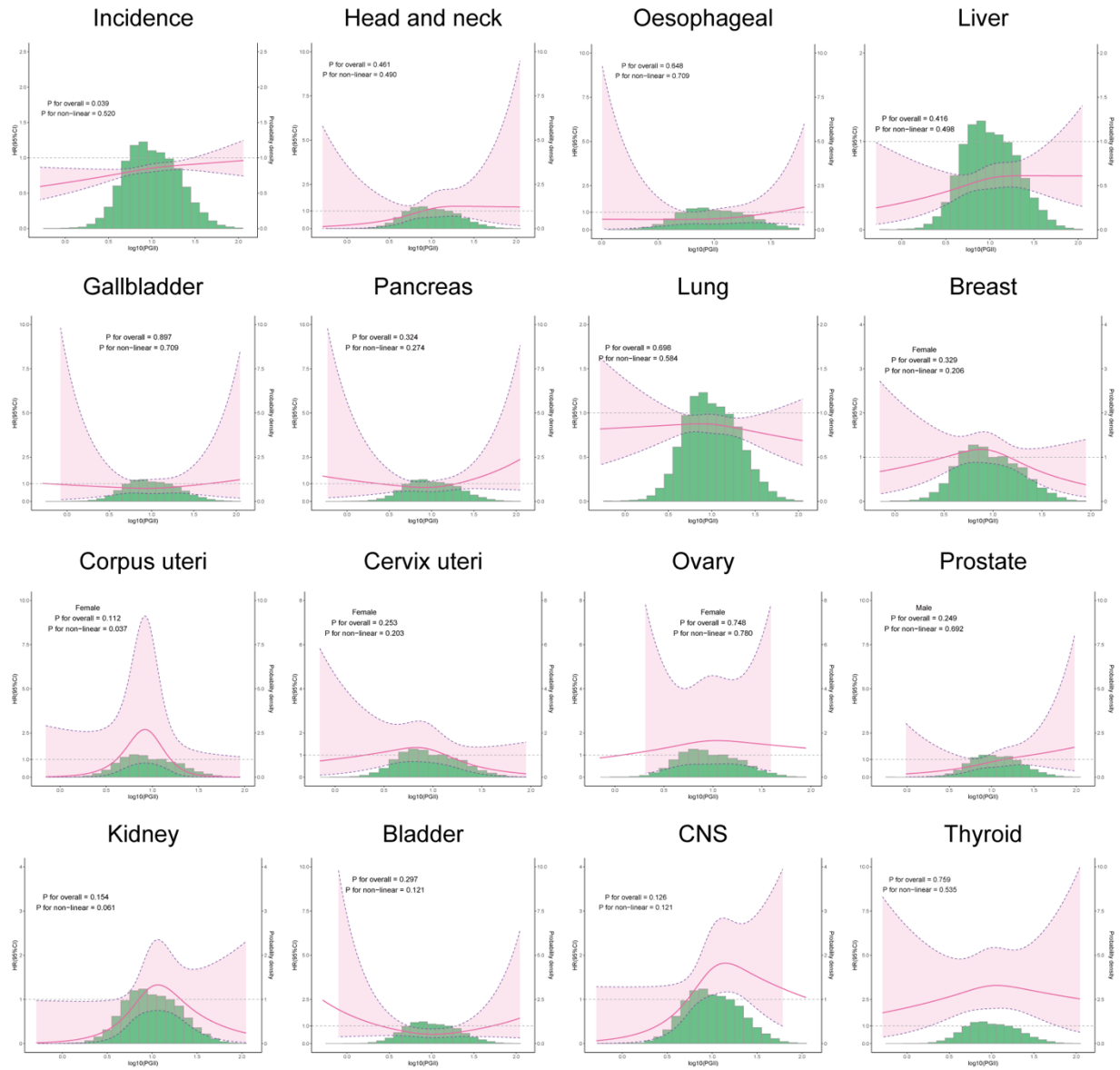
Cox proportional hazard regression models were adjusted for age, sex, smoking status, drinking status, and family history of cancer in first-degree relatives. Female breast, corpus uteri, cervix uteri and ovary cancers, as well as male prostate cancer, were not adjusted for sex owing to their sex specificity. FDR, false discovery rate–corrected *P* value using the Benjamini–Hochberg method. HR, hazard ratio; CI, confidence interval.

Figure S2. RCS analysis of PGI and all outcomes.



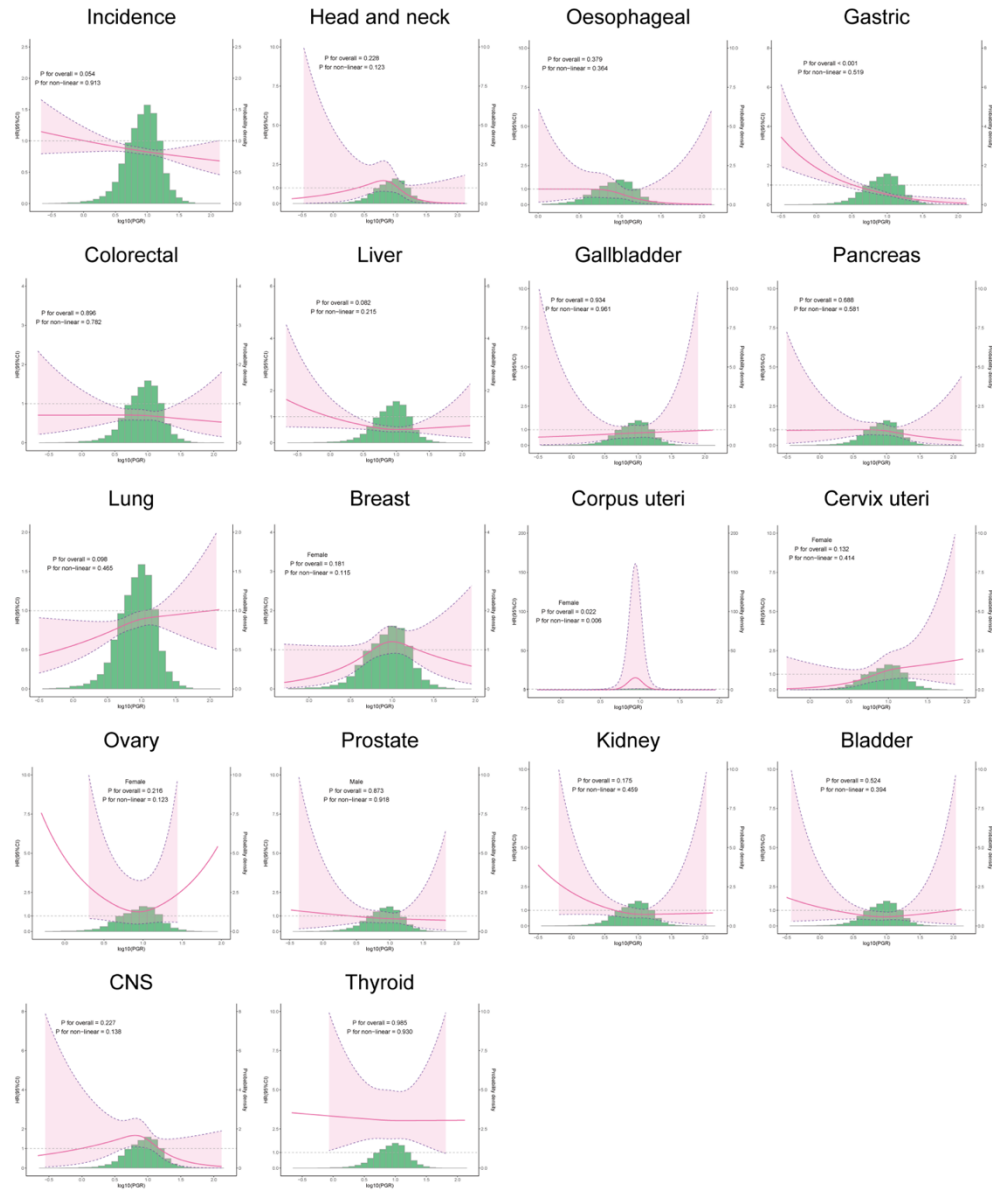
Models were adjusted for age, sex, smoking status, drinking status, and family history of cancer in first-degree relatives. Female breast, corpus uteri, cervix uteri and ovary cancers, as well as male prostate cancer, were not adjusted for sex owing to their sex specificity. Solid pink lines indicate adjusted HRs, and pink shaded areas indicate 95% CIs. Green histograms show the distributions of the log10-transformed biomarker values. P_{overall} and $P_{\text{non-linear}}$ assess the overall and nonlinear associations, respectively. HR, hazard ratio; CI, confidence interval.

Figure S3. RCS analysis of PGII and all outcomes.



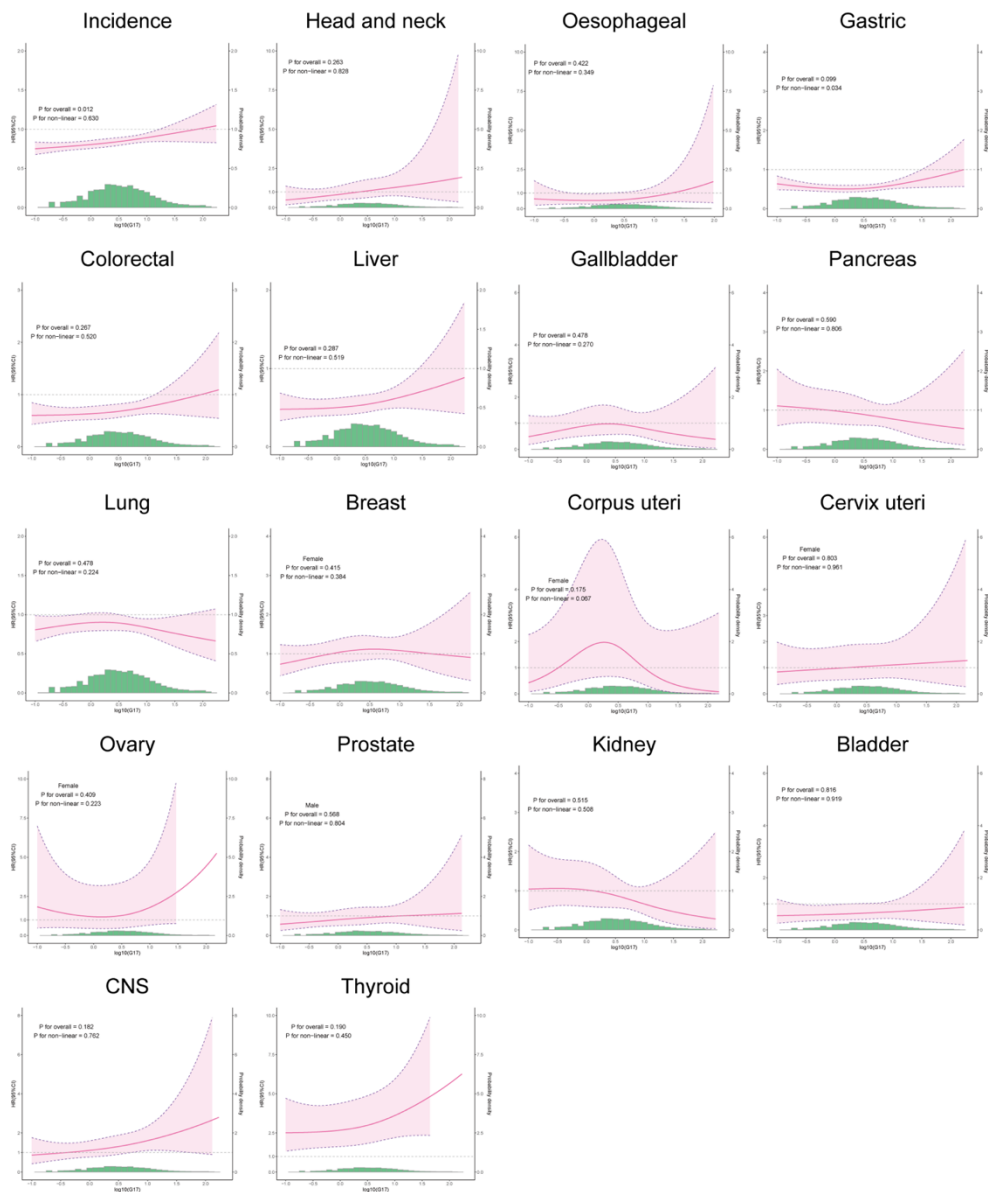
Models were adjusted for age, sex, smoking status, drinking status, and family history of cancer in first-degree relatives. Female breast, corpus uteri, cervix uteri and ovary cancers, as well as male prostate cancer, were not adjusted for sex owing to their sex specificity. Solid pink lines indicate adjusted HRs, and pink shaded areas indicate 95% CIs. Green histograms show the distributions of the log10-transformed biomarker values. P_{overall} and $P_{\text{non-linear}}$ assess the overall and nonlinear associations, respectively. HR, hazard ratio; CI, confidence interval.

Figure S4. RCS analysis of PGI/II ratio and all outcomes.



Models were adjusted for age, sex, smoking status, drinking status, and family history of cancer in first-degree relatives. Female breast, corpus uteri, cervix uteri and ovary cancers, as well as male prostate cancer, were not adjusted for sex owing to their sex specificity. Solid pink lines indicate adjusted HRs, and pink shaded areas indicate 95% CIs. Green histograms show the distributions of the log10-transformed biomarker values. P_{overall} and $P_{\text{non-linear}}$ assess the overall and nonlinear associations, respectively. HR, hazard ratio; CI, confidence interval.

Figure S5. RCS analysis of G-17 and all outcomes.



Models were adjusted for age, sex, smoking status, drinking status, and family history of cancer in first-degree relatives. Female breast, corpus uteri, cervix uteri and ovary cancers, as well as male prostate cancer, were not adjusted for sex owing to their sex specificity. Solid pink lines indicate adjusted HRs, and pink shaded areas indicate 95% CIs. Green histograms show the distributions of the log10-transformed biomarker values. P_{overall} and $P_{\text{non-linear}}$ assess the overall and nonlinear associations, respectively. HR, hazard ratio; CI, confidence interval.