

**Supplementary Table 1.** Baseline characteristics of patients with digestive tract malignancies.

<b>Baseline characteristics</b>	<b>Non-survivors (n=2808)</b>	<b>Survivors (n=4057)</b>	<b><i>p</i>*</b>
Age (years)	57.00 (50.00-65.00)	58.00 (50.00-66.00)	<0.001
Males	2643 (70.52)	1988 (74.32)	<0.001
Smoking	933 (24.89)	763 (28.52)	0.001
Drinking	360 (9.61)	323 (12.07)	0.002
Body mass index (kg/m <sup>2</sup> )	22.41 (20.48-24.46)	22.46 (20.43-24.91)	0.183
Family cancer history	396 (10.58)	284 (10.63)	0.995
Tumor-node-metastasis stage			
I	639 (18.30)	41 (1.65)	<0.001
II	1125 (32.23)	353 (14.19)	
III	1684 (48.24)	1627 (65.42)	
IV	43 (1.23)	466 (18.74)	
Invasion depth			
T1	485 (13.89)	46 (1.85)	<0.001
T2	572 (16.38)	217 (8.73)	
T3	1841 (52.74)	1393 (56.01)	
T4	593 (16.99)	831 (33.41)	
Regional lymph node metastasis			
N0	1713 (49.07)	429 (17.25)	<0.001
N1	996 (28.53)	762 (30.64)	
N2	677 (19.39)	931 (37.43)	
N3	105 (3.01)	365 (14.68)	
Distant metastasis			
Negative	2934 (84.04)	1397 (56.17)	<0.001

	Positive	557 (15.96)	1090 (43.83)	
Tumor embolus	Negative	2773 (79.43)	1526 (61.36)	<0.001
	Positive	718 (20.57)	961 (38.64)	
Tumor size (cm)		4.00 (3.00-6.00)	5.00 (4.00-7.00)	<0.001
Number of regional lymph node metastasis		0 (0-3.00)	4.00 (1.00-8.00)	<0.001

Data are expressed as median (interquartile range) or count (percentage) where appropriate. \*  $p$  was calculated by the Wilcoxon rank-sum test for continuous variables and the Chi-square test for categorical variables.

**Supplementary Table 2.** Estimates of predictive performance of selected optimal cutting points for neutrophil-to-lymphocyte ratio and platelet-to-lymphocyte ratio in predicting cancer-specific mortality.

Cancer type	Neutrophil-to-lymphocyte ratio			Platelet-to-lymphocyte ratio		
	Sensitivity	Specificity	AUC (95% CI)	Sensitivity	Specificity	AUC (95% CI)
Overall	77.68%	75.68%	0.743 (0.728, 0.757)	84.21%	73.89%	0.715 (0.701, 0.730)
Esophageal cancer	73.25%	73.67%	0.677 (0.654, 0.699)	77.75%	67.64%	0.671 (0.648, 0.694)
Gastric cancer	75.15%	78.84%	0.775 (0.754, 0.796)	78.60%	72.00%	0.736 (0.715, 0.758)
Colorectal cancer	86.70%	79.96%	0.793 (0.758, 0.828)	92.99%	77.36%	0.748 (0.712, 0.783)

Abbreviations: AUC, area under the receiver operating characteristic curve; 95% CI, 95% confidence interval. Selected cutting points by survival tree analysis: 2.07 for NLR and 168.50 for PLR in overall patients; 2.36 for NLR and 159.23 for PLR in patients with esophageal cancer; 1.97 for NLR and 188.0 for PLR in patients with gastric cancer; 3.37 for NLR and 264.29 for PLR in patients with colorectal cancer.

**Supplementary Table 3.** Predictive accuracy of basic model with and without INP for postoperative digestive tract cancers overall and by cancer sites.

<b>Predictive measurement</b>	<b>Overall</b>	<b>Esophageal cancer</b>	<b>Gastric cancer</b>	<b>Colorectal cancer</b>
<i>Calibration statistics</i>				
AIC: basic model	41859	14894	16530	5234
AIC: basic model + INP	40793	14390	16078	5178
BIC: basic model	41899	14928	16565	5265
BIC: basic model + INP	40840	14430	16119	5214
LR test: $\chi^2$	112.56	24.39	104.44	29.74
LR test: $p$	<0.001	<0.001	<0.001	<0.001
AUC: basic model	0.647 (0.632, 0.662)	0.677 (0.653, 0.700)	0.653 (0.630, 0.676)	0.651 (0.617, 0.686)
AUC: basic model + INP	0.689 (0.675, 0.704)	0.693 (0.670, 0.717)	0.727 (0.705, 0.749)	0.701 (0.667, 0.736)
AUC comparison: $p$	<0.001	0.022	<0.001	0.002
<i>Discrimination statistics</i>				
NRI: estimate	0.073	0.047	0.118	0.123
NRI: $p$	<0.001	0.012	<0.001	<0.001
IDI: estimate	0.017	0.008	0.039	0.025
IDI: $p$	<0.001	<0.001	<0.001	<0.001
Harrell's C index	0.580	0.583	0.306	0.585

Abbreviations: INP, integrated NLR and PLR; AIC, Akaike information criterion; BIC, Bayesian information criteria; LR test, likelihood ratio test; AUC, area under the receiver operating characteristic curve; NRI, net reclassification improvement; IDI, integrated discrimination improvement. Basic model included age, gender, smoking, drinking, body mass index, family cancer history, tumor-node-metastasis stage and tumor embolus.

**Supplementary Table 4.** Risk prediction of INP for cancer-specific mortality stratified by clinicopathologic characteristics in patients with postoperative digestive tract cancers overall and by cancer sites.

INP	Overall			Esophageal cancer			Gastric cancer			Colorectal cancer		
	n	HR (95% CI)	<i>p</i> *	n	HR (95% CI)	<i>p</i> *	n	HR (95% CI)	<i>p</i> *	n	HR (95% CI)	<i>p</i> *
Tumor-node-metastasis stage												
Stage I/II												
INP 0	1266	Reference		651	Reference		412	Reference		494	Reference	
INP 1	126	0.68 (0.39-1.20)	0.183	71	1.08 (0.63-1.84)	0.787	27	1.04 (0.25-4.37)	0.952	21	0.98 (0.30-3.13)	0.968
INP 2	552	1.25 (0.99-1.59)	0.066	152	1.05 (0.72-1.55)	0.784	192	1.87 (1.13-3.10)	0.015	69	2.49 (1.52-4.10)	<0.001
INP 3	446	1.61 (1.27-2.05)	<0.001	153	1.15 (0.79-1.67)	0.473	114	3.22 (1.91-5.42)	<0.001	34	3.23 (1.72-6.05)	<0.001
Stage III/IV												
INP 0	1709	Reference		745	Reference		773	Reference		492	Reference	
INP 1	258	1.01 (0.83-1.22)	0.951	107	1.26 (0.96-1.67)	0.101	71	1.44 (1.01-2.04)	0.042	16	2.31 (1.28-4.15)	0.005
INP 2	991	1.29 (1.16-1.44)	<0.001	263	1.14 (0.94-1.39)	0.176	633	1.52 (1.31-1.78)	<0.001	68	1.56 (1.10-2.22)	0.013
INP 3	1063	1.51 (1.35-1.67)	<0.001	295	1.47 (1.23-1.76)	<0.001	517	1.65 (1.41-1.93)	<0.001	41	2.48 (1.63-3.78)	<0.001
Invasion depth												
T1/T2												
INP 0	837	Reference		465	Reference		295	Reference		190	Reference	
INP 1	71	0.78 (0.40-1.54)	0.481	54	0.96 (0.54-1.71)	0.879	17	2.04 (0.47-8.79)	0.340	8	1.88 (0.43-8.13)	0.400
INP 2	305	1.17 (0.87-1.58)	0.295	93	0.96 (0.62-1.48)	0.843	124	1.58 (0.78-3.22)	0.202	25	2.54 (1.09-5.93)	0.032
INP 3	203	1.58 (1.15-2.19)	0.005	82	1.17 (0.74-1.85)	0.510	57	4.68 (2.35-9.31)	<0.001	6	1.19 (0.16-9.08)	0.868
T3/T4												
INP 0	2137	Reference		928	Reference		891	Reference		797	Reference	

	INP 1	314	1.00 (0.83-1.22)	0.963	124	1.33 (1.01-1.75)	0.041	82	1.34 (0.95-1.89)	0.098	29	1.42 (0.81-2.49)	0.223
	INP 2	1235	1.27 (1.14-1.42)	<0.001	319	1.21 (1.00-1.46)	0.050	701	1.56 (1.34-1.81)	<0.001	114	1.62 (1.20-2.19)	0.002
	INP 3	1307	1.52 (1.37-1.68)	<0.001	363	1.48 (1.24-1.76)	<0.001	576	1.68 (1.44-1.96)	<0.001	69	2.26 (1.59-3.22)	<0.001
Regional lymph node metastasis													
N0													
	INP 0	1221	Reference		626	Reference		388	Reference		511	Reference	
	INP 1	126	0.94 (0.59-1.51)	0.813	63	1.33 (0.79-2.25)	0.281	28	1.94 (0.69-5.50)	0.210	20	0.93 (0.29-2.97)	0.905
	INP 2	575	1.35 (1.08-1.70)	0.009	169	1.22 (0.86-1.73)	0.276	194	1.89 (1.18-3.05)	0.009	77	2.26 (1.44-3.55)	<0.001
	INP 3	478	1.65 (1.31-2.07)	<0.001	164	1.20 (0.85-1.71)	0.302	123	2.71 (1.65-4.47)	<0.001	37	3.28 (1.87-5.76)	<0.001
N1/N2/N3													
	INP 0	1610	Reference		658	Reference		750	Reference		476	Reference	
	INP 1	237	1.01 (0.82-1.24)	0.946	102	1.12 (0.82-1.51)	0.483	63	1.42 (0.97-2.07)	0.068	17	1.97 (1.10-3.53)	0.024
	INP 2	828	1.29 (1.14-1.46)	<0.001	193	1.11 (0.88-1.40)	0.366	542	1.50 (1.27-1.77)	<0.001	62	1.59 (1.10-2.30)	0.014
	INP 3	896	1.56 (1.39-1.75)	<0.001	240	1.53 (1.24-1.87)	<0.001	430	1.68 (1.42-2.00)	<0.001	38	2.35 (1.50-3.67)	<0.001
Distant metastasis													
Negative													
	INP 0	2243	Reference		713	Reference		1083	Reference		927	Reference	
	INP 1	302	1.18 (0.94-1.49)	0.149	76	1.43 (0.90-2.26)	0.128	87	1.72 (1.18-2.49)	0.004	34	1.47 (0.82-2.64)	0.195
	INP 2	1086	1.40 (1.23-1.61)	<0.001	188	1.27 (0.92-1.74)	0.144	729	1.75 (1.48-2.07)	<0.001	127	1.80 (1.31-2.46)	<0.001
	INP 3	1079	1.73 (1.52-1.97)	<0.001	183	1.33 (0.97-1.82)	0.079	503	1.93 (1.61-2.31)	<0.001	60	2.11 (1.39-3.20)	<0.001
Positive													
	INP 0	730	Reference		680	Reference		103	Reference		59	Reference	

	INP 1	83	0.98 (0.73-1.34)	0.923	102	1.07 (0.80-1.44)	0.635	12	0.60 (0.27-1.31)	0.198	3	1.37 (0.40-4.63)	0.616
	INP 2	454	1.14 (0.97-1.32)	0.105	224	1.10 (0.90-1.36)	0.348	96	1.25 (0.91-1.71)	0.172	10	1.81 (0.86-3.83)	0.120
	INP 3	428	1.65 (1.42-1.92)	<0.001	262	1.51 (1.25-1.82)	<0.001	129	1.24 (0.93-1.65)	0.146	15	1.51 (0.77-2.98)	0.232
Tumor embolus													
Negative													
	INP 0	2108	Reference		1183	Reference		771	Reference		536	Reference	
	INP 1	248	1.18 (0.94-1.50)	0.160	147	1.29 (0.97-1.70)	0.077	59	1.73 (1.08-2.78)	0.023	21	1.44 (0.63-3.30)	0.387
	INP 2	1046	1.31 (1.15-1.49)	<0.001	345	1.19 (0.98-1.45)	0.079	474	1.82 (1.48-2.25)	<0.001	74	2.07 (1.32-3.25)	0.001
	INP 3	990	1.70 (1.50-1.93)	<0.001	383	1.51 (1.26-1.82)	<0.001	362	2.28 (1.84-2.82)	<0.001	37	3.31 (1.96-5.59)	<0.001
Positive													
	INP 0	714	Reference		229	Reference		408	Reference		162	Reference	
	INP 1	113	0.92 (0.67-1.25)	0.580	33	1.21 (0.74-2.00)	0.445	39	1.20 (0.74-1.93)	0.463	5	1.66 (0.51-5.37)	0.398
	INP 2	411	1.27 (1.07-1.51)	0.006	73	1.16 (0.81-1.65)	0.417	347	1.46 (1.19-1.80)	<0.001	20	2.41 (1.29-4.48)	0.006
	INP 3	440	1.65 (1.41-1.94)	<0.001	74	1.60 (1.15-2.22)	0.005	269	1.80 (1.45-2.24)	<0.001	19	2.86 (1.53-5.33)	0.001

Abbreviations: NLR, neutrophil-to-lymphocyte ratio; PLR, platelet-to-lymphocyte ratio; INP, integrated NLR and PLR; HR, hazard ratio; 95% CI, 95% confidence interval. Effect-size estimates were calculated under the COX proportional hazards regression models. \**p* was adjusted for age, gender, smoking, drinking, body mass index and family cancer history. Cutting value: 2.07 for NLR and 168.50 for PLR in overall patients; 2.36 for NLR and 159.23 for PLR in patients with esophageal cancer; 1.97 for NLR and 188.0 for PLR in patients with gastric cancer; 3.37 for NLR and 264.29 for PLR in patients with colorectal cancer. Definitions: INP 0: NLR  $\leq$  cutting point and PLR  $\leq$  cutting point; INP 1: NLR  $\leq$  cutting point and PLR  $>$  cutting point; INP 2: NLR  $>$  cutting point and PLR  $\leq$  cutting point; INP 3: NLR  $>$  cutting point and PLR  $>$  cutting point.

**Supplementary Figure 1.** The three-dimension surface displaying the combined association of NLR and PLR with the risk of digestive tract malignancy-specific mortality in all study patients. Abbreviations: NLR, neutrophil-to-lymphocyte ratio; PLR, platelet-to-lymphocyte ratio.

