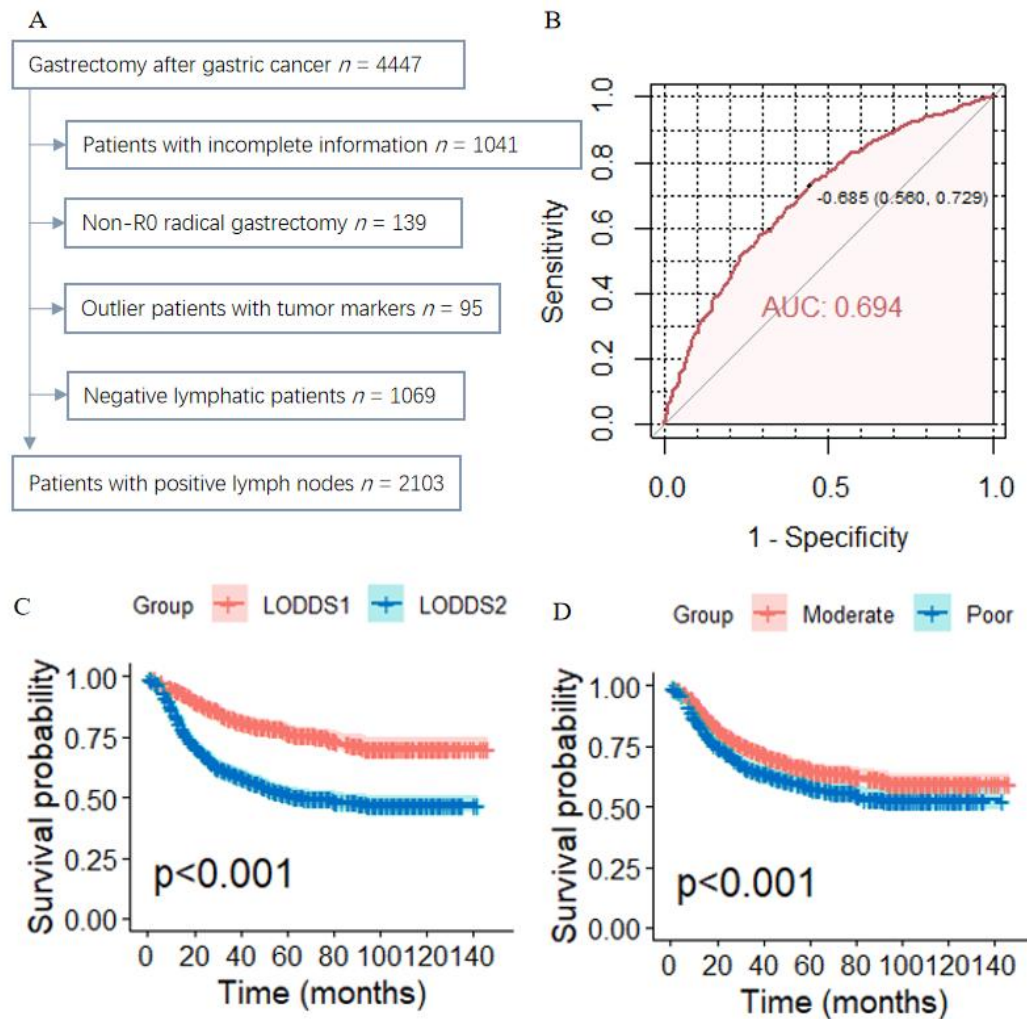
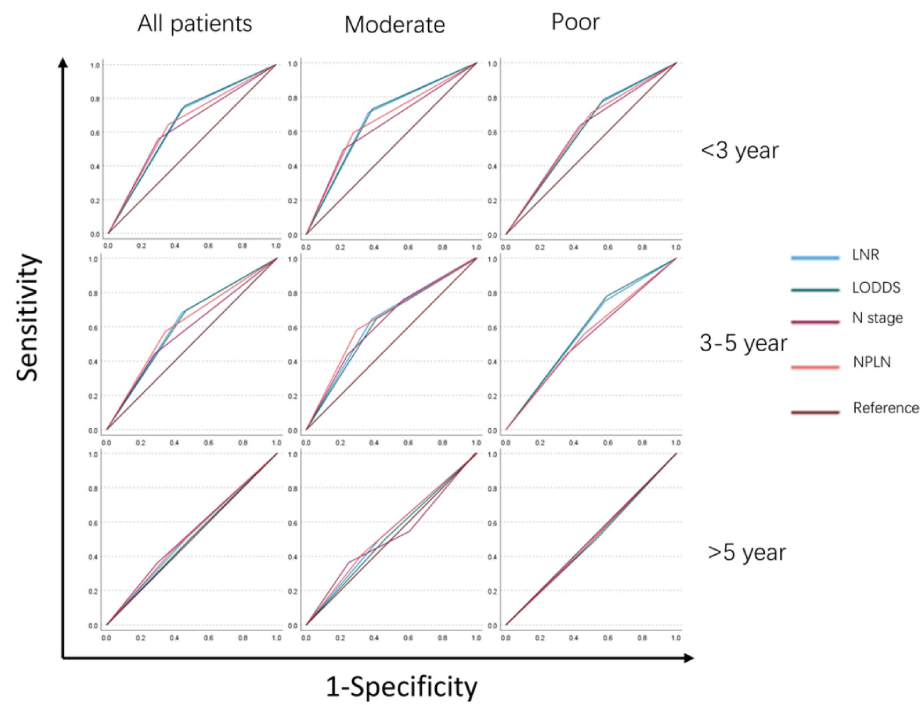


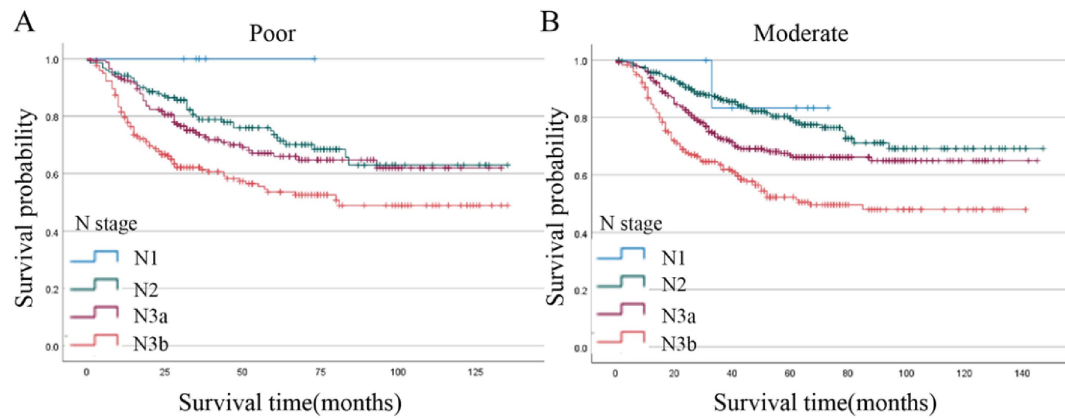
Supplementary Material



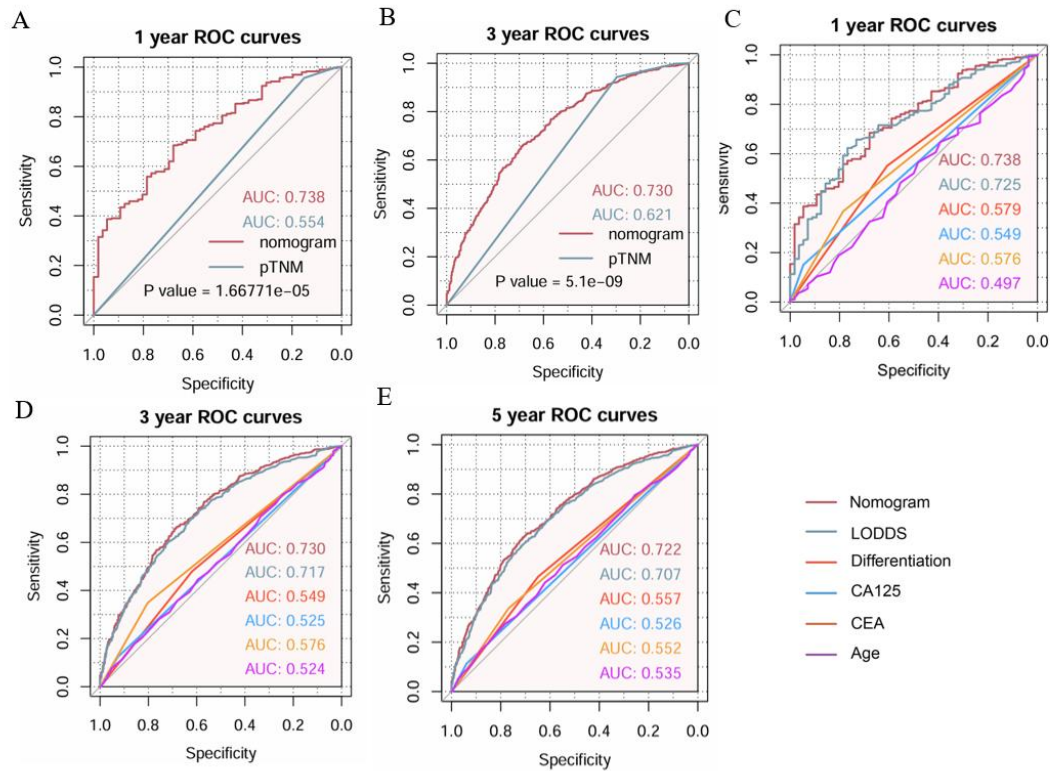
Supplementary Figure 1 Patient selection and pre-analysis. A: Patient selection flowchart; B: Receiver operating characteristic analysis of log odds of positive lymph nodes; C: Survival analysis of patients stratified by log odds of positive lymph nodes; D: Survival analysis of patients stratified by tumor differentiation status. LODDS: Log odds of positive lymph nodes; AUC: Area under the curve.



Supplementary Figure 2 Receiver operating characteristic analysis of different systems.LODDS: Log odds of positive lymph nodes; NPLN: Positive lymph nodes; LNR: Lymph node ratio.



Supplementary Figure 3 Kaplan-Meier survival analysis of patients with different degrees of tumor differentiation stratified by N stage.



Supplementary Figure 4 Receiver operating characteristic curves for different systems and indicators. A: 1 year of nomogram and pathological tumor-node-metastasis; B: 3 years of nomogram and pathological tumor-node-metastasis; C: 1 year of nomogram, log odds of positive lymph nodes (LODDS), differentiation, carbohydrate antigen (CA) 125, carcinoembryonic antigen (CEA) and age; D: 3 year of nomogram, LODDS, differentiation, CA125, CEA and age; E: 5 year of nomogram, LODDS, differentiation, CA125,

CEA and age. LODDS: Log odds of positive lymph nodes; CA: Carbohydrate antigen; CEA: Carcinoembryonic antigen; Pathological tumor-node-metastasis; AUC: Area under the curve; pTNM: Pathological tumor-node-metastasis.

Supplementary Table 1 Multicollinearity test

Characteristics	LODDS	LNR	pN	PNLN	PTLN
VIF	8.359	7.436	3.835	4.874	1.115

VIF: variance inflation factor; NPLN: Number of positive lymph nodes; NTLN: Number of total lymph nodes; LNR: Lymph node ratio; LODDS: Log odds of positive lymph nodes; pN: American Joint Committee on Cancer pathologic N stage.

Supplementary Table 2 Area under the curve of different systems

Characteristics	All patients		Moderate		Poor	
	AUC	<i>P</i> value	AUC	<i>P</i> value	AUC	<i>P</i> value
< 3 year						
NPLN	0.685 (0.652-0.717)	< 0.001	0.658 (0.614-0.702)	< 0.001	0.604 (0.548-0.659)	< 0.001
LNR	0.700 (0.668-0.732)	< 0.001	0.672 (0.629-0.716)	< 0.001	0.605 (0.549-0.661)	< 0.001
LODDS	0.701 (0.669-0.733)	< 0.001	0.672 (0.628-0.715)	< 0.001	0.607 (0.551-0.662)	< 0.001
pN	0.630 (0.596-0.664)	< 0.001	0.638 (0.593-0.682)	< 0.001	0.600 (0.545-0.655)	< 0.001
3-5 year						
NPLN	0.630 (0.562-0.697)	< 0.001	0.643 (0.564-0.722)	< 0.001	0.542 (0.416-0.669)	0.514
LNR	0.650 (0.585-0.715)	< 0.001	0.630 (0.553-0.707)	0.001	0.536 (0.411-0.660)	0.575
LODDS	0.654 (0.590-0.717)	< 0.001	0.618 (0.540-0.695)	0.003	0.519 (0.394-0.643)	0.766
pN	0.615 (0.553-0.677)	< 0.001	0.628 (0.551-0.705)	0.001	0.506 (0.382-0.629)	0.929
> 5 year						

NPLN	0.482 (0.376-0.588)	0.719	0.549 (0.440-0.658)	0.056	0.493 (0.337-0.649)	0.08
LNR	0.477 (0.372-0.582)	0.646	0.585 (0.480-0.690)	0.053	0.492 (0.336-0.648)	0.08
LODDS	0.479 (0.374-0.583)	0.669	0.594 (0.490-0.698)	0.047	0.485 (0.329-0.642)	0.08
pN	0.504 (0.408-0.601)	0.93	0.541 (0.431-0.651)	0.056	0.502 (0.347-0.658)	0.079

AUC: Area under the curve NPLN: Number of positive lymph nodes; NTLN: Number of total lymph nodes; LNR: Lymph node ratio; LODDS: Log odds of positive lymph nodes; pN: American Joint Committee on Cancer pathologic N stage.

Supplementary Table 3 Significance of differences in survival rates among patients with different N stages [log rank (Mantel-Cox)].

Differentiation	N stage	N1	N2	N3a	N3b
Poor	N1	-	0.266	0.202	0.108
	N2	0.266	-	0.322	0.000
	N3a	0.202	0.322	-	0.003
	N3b	0.108	< 0.001	0.003	-
Moderate	N1	-	0.712	0.336	0.125
	N2	0.712	-	0.003	< 0.001
	N3a	0.336	0.003	-	< 0.001
	N3b	0.125	< 0.001	< 0.001	-

Supplementary Table 4 Multivariate Cox regression analysis of prognostic factors in gastric cancer patients with different tumor differentiation levels

Poor

Patient characteristics	LODDS HR (95%CI)	P value	LNR HR (95%CI)	P value	pN HR (95%CI)	P value	NTLN (95%CI)	HR	P value
Age									
< 60	Reference	-	Reference	-	Reference	-	Reference	-	-
≥ 60	1.346 (1.069-1.694)	0.011	1.342 (1.066-1.689)	0.012	1.393 (1.105-1.757)	0.005	1.357 (1.077-1.709)	0.010	0.010
Surgery methods									
Open	Reference	-	Reference	-	Reference	-	Reference	-	-
Laparoscopy	0.555 (0.339-0.909)	0.019	0.551 (0.336-0.902)	0.018	0.837(1.122-3.008)	0.016	0.872(1.143-3.066)	0.013	0.013
Recurrence or metastasis									
No	Reference	-	Reference	-	Reference	-	Reference	-	-
Yes	1.892 (1.391-2.574)	< 0.001	1.892 (1.391-2.574)	< 0.001	1.929(1.418-2.624)	< 0.001	1.926(1.415-2.621)	< 0.001	< 0.001
pTNM									
I	Reference	-	Reference	-	Reference	-	Reference	-	-
II	2.036 (0.267-15.525)	0.493	1.89(0.247-14.454)	0.539	2.145(0.281-16.361)	0.462	2.012(0.264-15.358)	0.500	0.500

III	4.609 (0.641-33.14)	0.129	4.349(0.602-31.433)	0.145	4.747(0.66-34.117)	0.122	4.562(0.633-32.858)	0.132
CEA								
Low	Reference	-	Reference	-	Reference	-	Reference	-
High	1.546 (1.174-2.036)	0.002	1.546(1.174-2.036)	0.002	1.529(1.157-2.019)	0.003	1.504(1.14-1.984)	0.004
CA19-9								
Low	Reference	-	Reference	-	Reference	-	Reference	-
High	1.282 (0.89-1.847)	0.182	1.284(0.892-1.848)	0.178	1.289(0.891-1.865)	0.178	1.228(0.853-1.768)	0.269
CA125								
Low	Reference	-	Reference	-	Reference	-	Reference	-
High	1.315 (0.862-2.006)	0.004	1.31(0.859-1.999)	0.010	1.305(0.856-1.99)	0.016	1.292(0.847-1.97)	0.035
AFP								
Low	Reference	-	Reference	-	Reference	-	Reference	-
High	0.939 (0.615-1.433)	0.770	0.937(0.613-1.43)	0.761	0.967(0.632-1.48)	0.877	1.005(0.657-1.537)	0.982
CA242								
Low	Reference	-	Reference	-	Reference	-	Reference	-
High	0.922 (0.614-1.383)	0.694	0.931(0.621-1.395)	0.729	0.898(0.595-1.354)	0.607	0.936(0.624-1.403)	0.749

< 60	Reference		Reference		Reference		Reference	
≥ 60	1.494 (1.194-1.869)	< 0.001	1.51(1.207-1.889)	< 0.001	1.57(1.254-1.966)	< 0.001	1.565(1.251-1.959)	< 0.001
Surgery methods								
Open	Reference	-	Reference	-	Reference	-	Reference	-
Laparoscopy	0.746 (0.483-1.152)	0.086	0.744(0.482-1.148)	0.081	0.75(0.486-1.159)	0.196	0.718(0.465-1.108)	0.034
Recurrence or metastasis								
No	Reference	-	Reference	-	Reference	-	Reference	-
Yes	1.865 (1.417-2.454)	< 0.001	1.835(1.395-2.416)	< 0.001	1.941(1.476-2.553)	< 0.001	1.882(1.431-2.476)	< 0.001
pTNM	-	-	-	-	-	-	-	< 0.001
I	Reference	-	Reference	-	Reference	-	Reference	-
II	2.319(0.704-7.644)	0.167	2.249(0.682-7.416)	0.183	2.554(0.775-8.408)	0.123	2.487(0.755-8.19)	0.134
III	4.766(1.514-15.002)	0.008	4.577(1.452-14.435)	0.009	5.217(1.661-16.388)	0.005	4.91(1.562-15.437)	0.006
CEA								
Low	Reference		Reference		Reference		Reference	
High	1.213(0.978-1.505)	0.039	1.207(0.973-1.497)	0.087	1.191(0.96-1.479)	0.013	1.172(0.944-1.455)	0.041
CA19-9								

Low	Reference	-	Reference	-	Reference	-	Reference	-
High	1.071(0.804-1.426)	0.641	1.071(0.805-1.426)	0.638	1.033(0.776-1.374)	0.825	1.009(0.758-1.342)	0.953
CA125								
Low	Reference	-	Reference	-	Reference	-	Reference	-
High	1.134(0.787-1.633)	0.039	1.117(0.776-1.609)	0.032	1.094(0.759-1.575)	0.048	1.123(0.78-1.618)	0.043
AFP								
Low	Reference	-	Reference	-	Reference	-	Reference	-
High	1.326(0.9-1.956)	0.154	1.322(0.897-1.948)	0.159	1.309(0.887-1.93)	0.175	1.368(0.928-2.018)	0.114
CA242								
Low	Reference	-	Reference	-	Reference	-	Reference	-
High	1.241(0.916-1.681)	0.163	1.222(0.902-1.655)	0.195	1.343(0.994-1.816)	0.055	1.346(0.995-1.82)	0.054
CA72-4								
Low	Reference	-	Reference	-	Reference	-	Reference	-
High	1.221(0.966-1.543)	0.095	1.211(0.959-1.531)	0.108	1.169(0.925-1.477)	0.192	1.196(0.946-1.511)	0.135
LODDS								
LODDS1	Reference	-	-	-	-	-	-	-
LODDS2	2.391 (1.592-2.49)	< 0.001	-	-	-	-	-	-

LNR								
LNR1	-	-	Reference	-	-	-	-	-
LNR2	-	-	2.019 (1.618-2.519)	< 0.001	-	-	-	-
pN								
N1 + N2	-	-	-	-	Reference	-	-	-
N3a + N3b	-	-	-	-	1.939 (1.577-2.383)	< 0.001	-	-
NPLN	-	-	-	-	-	-	-	-
NPLN1	-	-	-	-	-	-	Reference	-
NPLN2	-	-	-	-	-	-	2.033 (1.649-2.508)	< 0.001

CI: Confidence interval; HR: Hazard ratio; BMI: Body mass index; MGC: Mucinous gastric adenocarcinoma; NMGC: Non-mucinous gastric adenocarcinoma; pTNM: Pathological tumor-node-metastasis; NPLN: Number of positive lymph nodes; NTLN: Number of total lymph nodes; LNR: Lymph node ratio; LODDS: Log odds of positive lymph nodes; pN: American Joint Committee on Cancer pathologic N stage; CA: Carbohydrate antigen; AFP: Alpha-fetoprotein; CEA: Carcinoembryonic antigen.