

Fig. S1 Flowchart of patient selection process in the SEER cohort

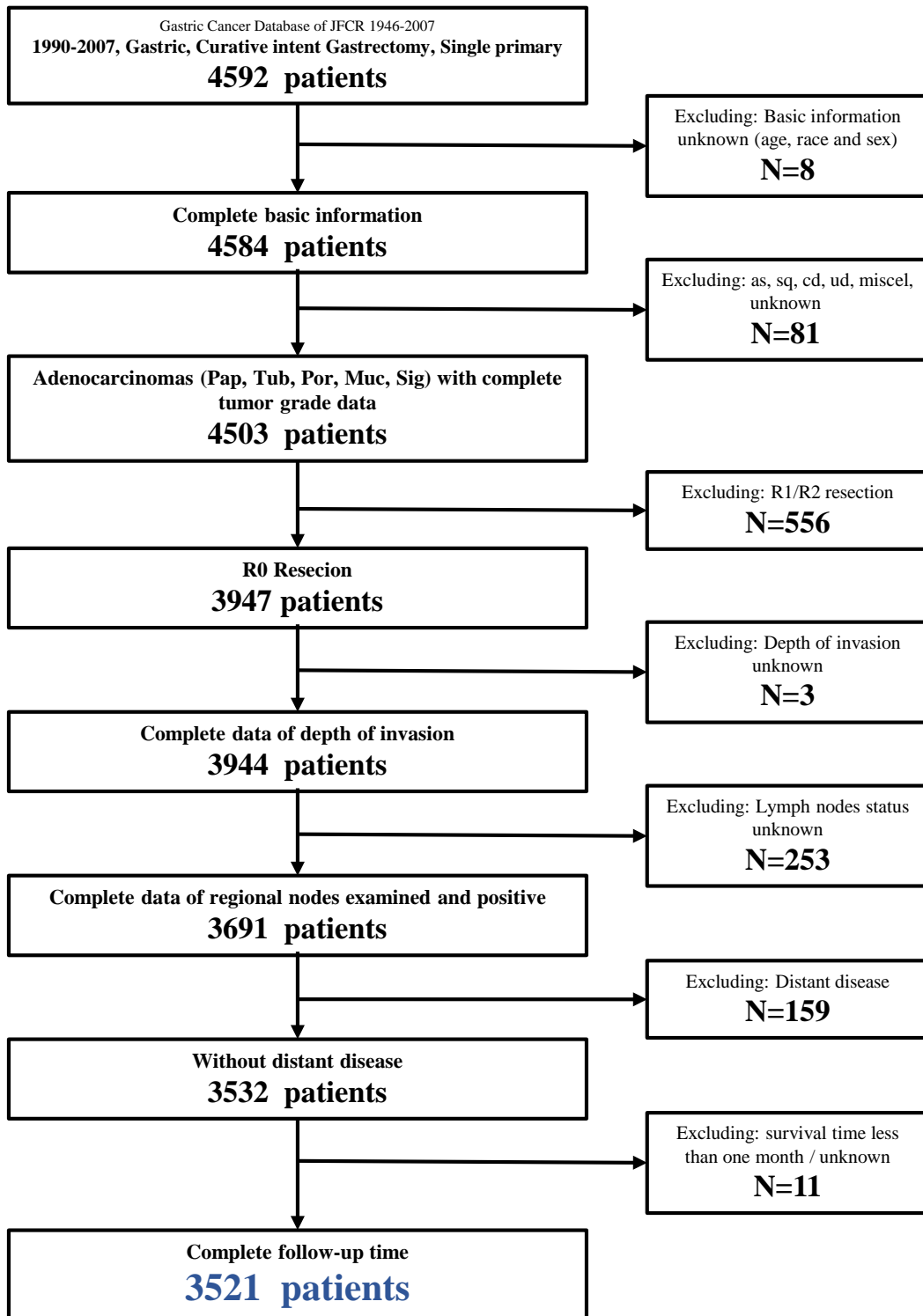


Fig. S2 Flowchart of patient selection process in the CIAH cohort

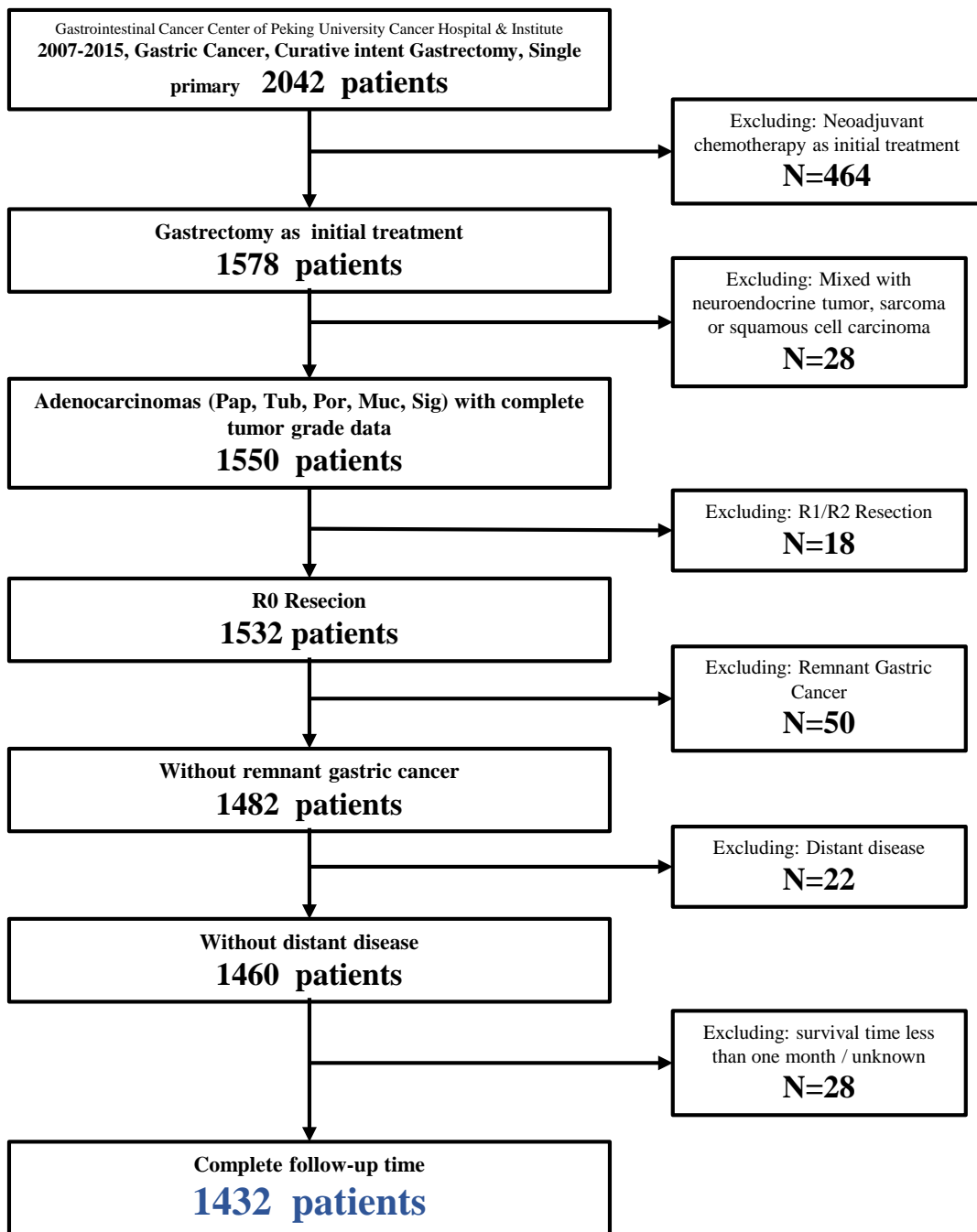


Fig. S3 Flowchart of patient selection process in the PUCHI cohort

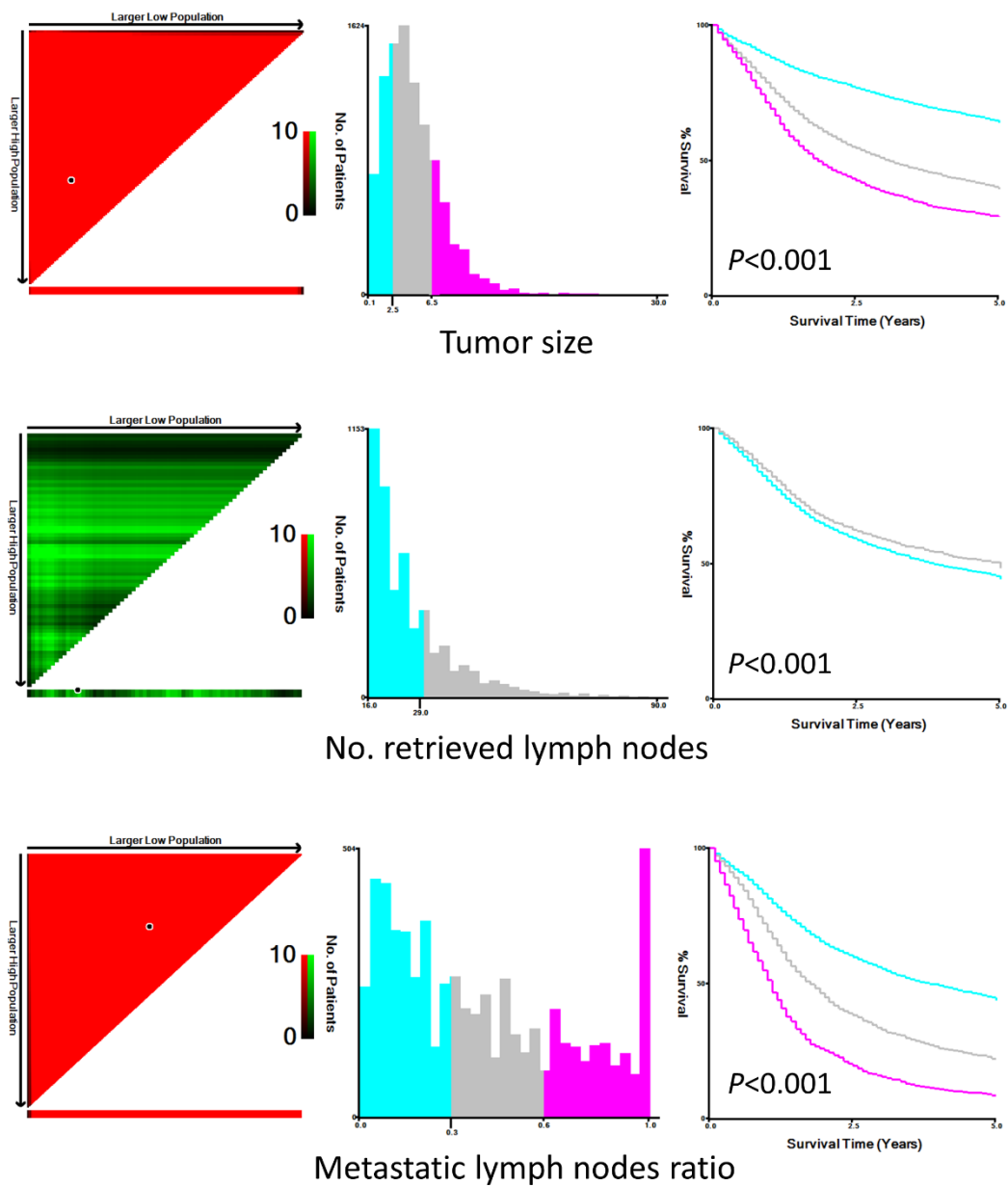


Fig. S4 X-tile analysis of the potential selected variables including tumor size, number of retrieved lymph nodes, and ratio of metastatic lymph nodes. Red coloration represent an inverse correlation with survival, whereas green coloration represents direct associations. The optimal cut-point occurs at the bright pixel (green or red).

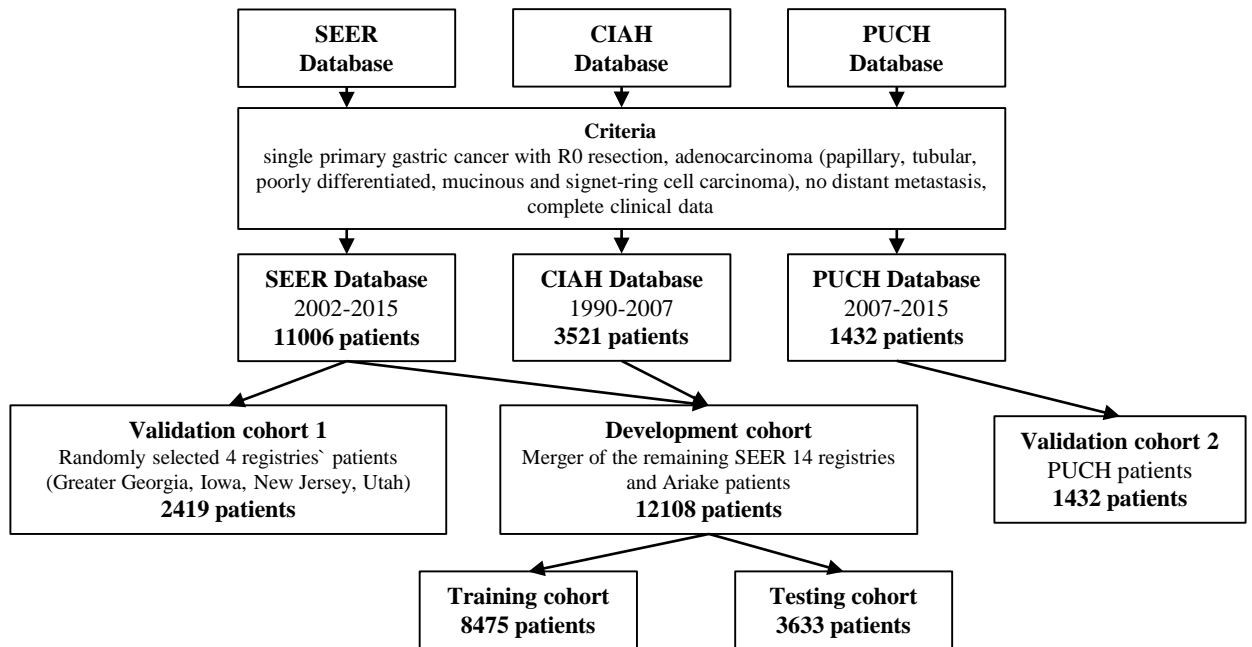


Fig. S5 Detailed grouping process for development cohort and validation cohorts

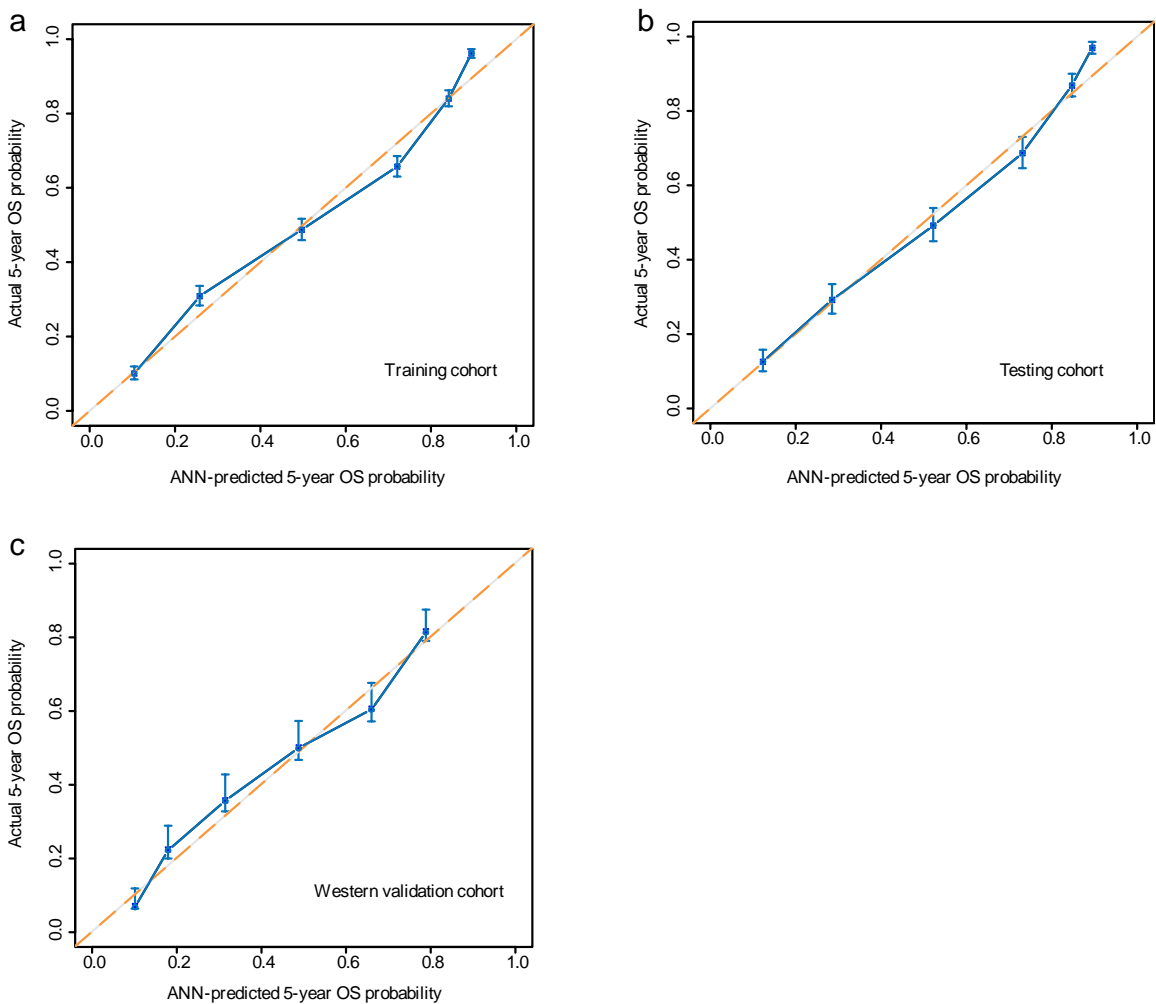
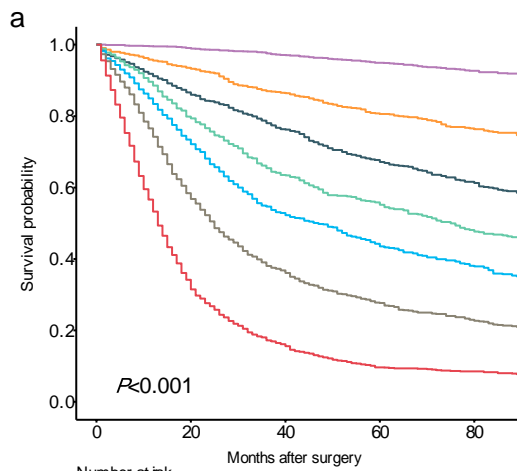
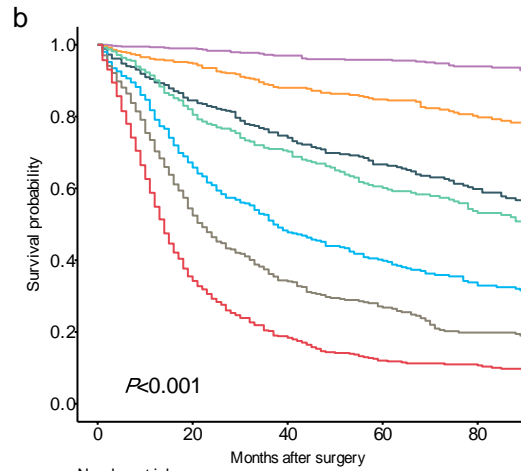


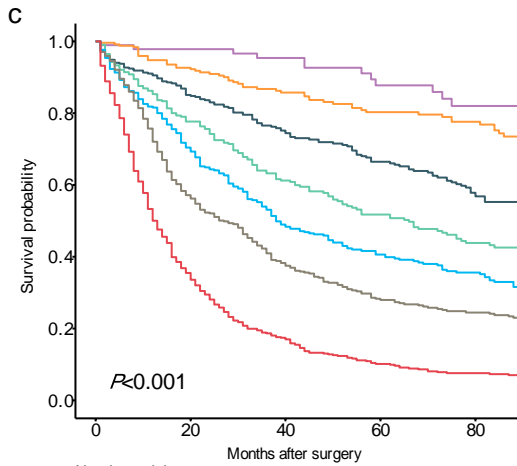
Fig. S6 Calibration of the ANN model. a. training cohort, b. testing cohort, c. Western validation cohort



	Number at risk				
	0	20	40	60	80
Group A	1778	1421	1257	1104	750
Group B	1154	902	727	556	384
Group C	1091	824	623	470	337
Group D	865	617	422	325	224
Group E	1038	687	425	297	220
Group F	1191	644	350	229	156
Group G	1358	438	178	91	69



	Number at risk				
	0	20	40	60	80
Group A	776	573	499	440	306
Group B	508	403	332	269	179
Group C	444	323	242	181	120
Group D	387	263	194	139	97
Group E	463	279	173	117	80
Group F	474	239	133	89	52
Group G	581	195	88	50	36



	Number at risk				
	0	20	40	60	80
Group A	94	85	71	53	39
Group B	252	214	168	135	108
Group C	373	291	215	164	115
Group D	317	230	147	106	73
Group E	392	261	164	114	86
Group F	443	240	142	95	69
Group G	548	184	81	40	27

Fig. S7 Kaplan-Meier survival curves of the ANN risk subgroups. a. training cohort, b. testing cohort, c. Western validation cohort

1-15	3381	39.9	1448	39.9	1397	57.8	
16-29	2631	31	1140	31.4	750	31	
>29	2463	29.1	1045	28.8	272	11.2	
No. of mLN							<0.001
0	4316	50.9	1861	51.2	1045	43.2	
1-2	1388	16.4	615	16.9	445	18.4	
3-6	1276	15.1	541	14.9	469	19.4	
7-15	1077	12.7	454	12.5	344	14.2	
>15	418	4.9	162	4.5	116	4.8	
MLR							<0.001
0	4316	50.9	1861	51.2	1045	43.2	
<0.32	2223	26.2	952	26.2	646	26.7	
0.32-0.64	983	11.6	434	11.9	358	14.8	
>0.64	953	11.2	386	10.6	370	15.3	
Differentiation							0.050
Differentiated	3025	35.7	1304	35.9	802	35.9	
Undifferentiated	5450	64.3	2329	64.1	1617	64.1	
Histology							0.580
Adenocarcinoma	6349	74.9	2709	74.6	1785	73.8	
Mucinous Adenocarcinoma	180	2.1	90	2.5	52	2.1	
Signet-ring cell carcinoma	1946	23	834	23	582	24.1	

SEER Surveillance, Epidemiology, and End Results, *CIAH* Cancer Institute Ariake Hospital, *rLN* retrieved lymph nodes, *mLN* metastatic lymph nodes, *MLR* metastatic lymph nodes ratio

Table S2 ANN variable corresponding codes

Variables	Code	Value
Hospital_volume	0	low
	1	high
Age	1	<41
	2	41-60
	3	61-70
	4	>70
Race	1	Non-Latino-White
	2	Latino-White
	3	Black
	4	Chinese+Japanese+Korea
	5	Others
Gastrectomy_type	0	subtotal
	1	total
Tumor_size	1	<2.6
	2	2.6-6.6
	3	>6.6
	4	diffuse
	5	Unknown
Depth_of_invasion	1	Mucosa and Submucosa
	2	Proper muscle
	3	Subserosa
	4	Serosa
	5	Adjacent organ invasion
No.metastatic_LN	0	0
	1	1-2
	2	3-6
	3	7-15
	4	>15
No.retrieved_LN	1	1-15
	2	16-29
	3	≥ 30
metastatic_LN_ratio	0	0
	1	<0.32
	2	0.32-0.64
	3	≥ 0.64