Supplementary file 1. Full list of included studies

All included studies [1-99] (n=99):

Development studies [1-26, 28-43, 45-49, 51, 53-61, 63-65, 67-78, 80, 81, 83, 84, 86-99] (n=90)

Validation studies (independently-external validation studies, and development studies including external validation) [4, 8, 17, 25, 27, 28, 44, 47, 48, 50, 52, 56, 62, 63, 66, 73, 75, 79, 82, 83, 85, 87, 90, 94] (n=24)

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Supplementary file 2. Model presentation and included final predictors

Model #	Reference #*	Study ID	Model presentation	Included final predictors
1	1	Liu Hao 2016(1)	Nomogram	T, N, M, CCL2 expression
2	2	Wang Wei 2016	Nomogram	Age, tumor size, TNM, NPTM
3	2	Wang Wei 2016	Nomogram	Tumor size, TNM, NPTM, macroscopic type
4	3	Rades Dirk 2015	Unweighted score	Visceral metastasis, rapidity of developing weakness of legs
5	4	Wang Xuefei 2012	No information	TNM, MGAT5 expression
6	4	Wang Xuefei 2012	No information	Kiel stage, MGAT5 expression
7	5	Bria E 2013	HR-weighted score	Sex, age, TNM, resection margin, tumor site, resected LN, Her2, APC
8	6	Zhu Xiaodong 2015	Unweighted score	liver metastasis, lung metastasis, CA199, ascite*pleural effusion
9	7	Mohri Yasuhiko 2010	Coefficient-weighted score	NLR, tumor size, T
10	8	Woo Yanghee 2016	Equation	Age, T, M, number of retrieved LN, number of positive LN, resection type(total/subtotal), sex, histology(differentiation)
11	9	Victorzon M 1996	Coefficient-weighted score	TNM, STn, DNA ploidy

12	10	Costa Marcelo Leite Viera 2006	Coefficient-weighted score	Sex, weight loss, TNM, lymphocyte count, LNR, lymphedenectomy(D)
13	11	Haga Yoshio 2015	Equation	T, N, circumferential involvement, age, ASA physical status, serum sodium
14	12	Catalano V 2008	Unweighted score	ECOG performance status, Hb, CEA, the number of metastasis, TTP after chemotherapy
15	13	Park Hyung Soon 2011	Unweighted score	ECOG performance status, multiple bone metastasis, CEA
16	14	Wang Qing 2014	Unweighted score	CEA, CA125, mGPS
17	15	Kanagavel D 2010	HR-weighted score	ECOG performance score, Hb, TTP under chemotherapy
18	16	Wang Xuefei 2014	Nomogram	T, N, M, SDF-1expression
19	17	Han Dongseok 2012	Nomogram	Age, sex, tumor site, depth of invasion, number of metastatic LN, number of examined LN(square root)
20	18	Song Bongil 2015	No information	T, N, nodal SUVmax
21	19	Xu Zhenyue 2010	Equation (Weights based on z score from univariate)	ITGB1, PDGFB, THBS1, TWIST1
22	20	Zhang Heng 2015	Nomogram	T, N, M, CD11c, CD206
23	21	Wang Zhenglin 2015	Nomogram	T, N, M, CXCR2 expression

24	22	Mohammadzadeh F 2015	Decision tree (with 16 rules)	Diabetes, surgery, tumor size, age, pathologic stage, ethnicity, exposure to chemical exposure, alcohol, tobacco
25	23	Min Lingqiang 2015	No information	T, TNM, G3BP1 expression
26	24	Koo Dong Hoe 2011	HR-weighted score	M, NLR
27	25	Zhang H 2014	Score	TNM, ICN1 expression
28	26	Liu Kai 2015	Nomogram	Tumor site, tumor size, N, resection type(total/subtotal),TFoxp3+ cells, TCD68+/SCD68+ ratio, TCD66b+/SCD66b+ ratio, TCD8+/TFoxp3+ ratio
29	28	Eom Bang Wool 2015	Nomogram	Age, lymphedenectomy, tumor site, lymphovascular invasion, tumor size, depth of invasion, metastatis LN
30	29	Qian Jing 2016	HR-weighted score	LNR, lymphovascular invasion, TNM, CEA, Hb
31	30	Qu Jinglei 2015	HR-weighted score	Age, tumor size, Lauren type, T, number of positive LN, NLR
32	31	Xu Yeqiong 2016	Nomogram	Age, grade, T, N, chemotherapy, ABO blood type, CA724
33	32	Kim Jong Gwang 2008	Coefficient-weighted score	ECOG performance score, bilirubin, peritoneal metastasis, bone metastasis, number of metastasis sites
34	33	Kologlu Murat 2000	Coefficient-weighted score	T, N, M, LNR,resection margin, tumor site, lymphedenectomy, Lauren type, Borrmann type
35	34	Du Chunyan 2011	Coefficient-weighted score	Tumor size, lymphatic and/or blood vascular invasion, perineural invasion
36	35	Becker Karen 2012	Unweighted score	T, N, tumor regression

37	36	Lee J 2007	Unweighted score	ECOG performance score, bone metastasis, ascite, ALP, albumin, previous gastrectomy
38	37	Wang Jin 2016	HR-weighted score	Liver metastasis, bone metastasis, NLR, number of metatsasis sites, previous gastrectomy
39	38	Lei Ke Feng 2012	Equation	SERPINB5, KLK10, KLK11, TNM
40	39	Kadowaki Shigenori 2014	Unweighted score	ECOG performance score, multiple metastasis sites, ALP
41	40	Hirabayashi S 2014	Nomogram	Age, sex, tumor size, tumor site, macroscopic type, histological type, depth of invasion, number of positive LN, number of examined LN, lymphovascular invasion
42	41	Takahari Daisuke 2014	Unweighted score	ECOG performance score, ALP, number of metastasis sites, previous gastrectomy
43	42	Liu Hao 2015	Nomogram	T, N, M, Jagged1 expression
44	43	Song Kyo Young 2014	Nomogram	Age, sex, tumor size, T, N, Borrmann type, Lauren type
45	45	Wang Zixian 2016	Nomogram	Tumor size, T, N, FOLFOX6*THN
46	46	Liu Hao 2016(2)	Nomogram	T, N, CSF1 expression
47	47	Marubini E 1993	Coefficient-weighted score	Age, T, N, tumor site
48	48	Wang Zhiqiang 2017	Unweighted score	NR1I2, CST2, LAMP5, MMP7, LGALSL, CES1P1, COL8A1, FOXS1,C1ORF198
49	49	Wang Pin 2016	Coefficient-weighted	53 genes

			score	
50	51	Bauer L 2018	Equation	T, site, Lauren type, CCL5, CTNNB1, EXOSC3, LZTR1
51	53	Cao Yifan 2017	Nomogram	TNM, CXCR1
52	54	Cao Yifan 2016	Nomogram	TNM, gp130
53	55	Chen Hao 2017	Nomogram	Lauren type, N, metastasis, tetranectin
54	56	Chen Shangxiang 2017	Nomogram	Age, site, patholgical type, T, TLN,mLNR
55	57	Choi Jongho 2018	Equation, Nomogram	NLR, age:NLR, sex, size, T, N
56	58	De Brian 2018	Nomogram	TNM, treatment, grade, race, comorbidity score, sex
57	59	Deng Xiaorong 2017	Nomogram	Gene risk score, age, sex, size, grade, radiation
58	60	Fuchs Charles S 2017	Equation	Primary tumor, differentiation, time to progression, ECOG, peritoneal metastasis, ALP, lymphcyte, LDH, albumin, AST, neutrophil, sodium
59	61	Goshayeshi Laden 2017	Equation	Sex, birth year, age at diagnosis, family history, other GI cancer, age at diagnosis of family gastric cancer
60	63	Hou Junyi 2016	Unweighted score	TRPC1, SGCE, TNFRSF11A, LRRN1, HLF, CYS1, PPP1R14A, NOV, NBEA, CES1, RGN
61	64	Hung Yushin 2017	Unweighted score	T, LNR, CEA, ECOG performance score, adjuvant chemotherapy
62	65	Jiang Yuming 2018	Nomogram	IS, differentiation, CA199, CEA, T,N
63	65	Jiang Yuming	Nomogram	IS, differentiation, CA199, CEA, T,N

		2018		
64	67	Kim Sunyoung 2018	Nomogram	Age, ECOG performance score, differentiation, liver metastasis, lung metastasis, peritoneal metastasis, bone metastasis, gastrectomy, WBC, platelet, albumin, bilirubin, ALP
65	67	Kim Sunyoung 2018	Nomogram	Age, ECOG performance score, differentiation, liver metastasis, lung metastasis, peritoneal metastasis, bone metastasis, gastrectomy, WBC, platelet, albumin, bilirubin, ALP, response to chemotherapy
66	68	Kangi Azam Korhani 2017	Artificial Neural Network	Time of diagnosis, age, sex, smoking, addiction to opium, residency, family history, morphology, surgery, chemotherapy, radiotherapy, metastasis, histological grade, TNM
67	68	Kangi Azam Korhani 2017	Bayesian Neural Network	Time of diagnosis, age, sex, smoking, addiction to opium, residency, family history, morphology, surgery, chemotherapy, radiotherapy, metastasis, histological grade, TNM
68	69	Lin C 2017	Nomogram	T, N, Tryptase
69	70	Lin Chao 2016	Nomogram	T, N, M, IL-13Ra2
70	71	Liu Hao 2017	Nomogram	T, N, GM-CSF, adjuvant chemotherapy
71	72	Miao Yan 2017	Equation, Score	LINC01018, LOC553137, MIR4435-2HG, TTTY14
72	73	Narita Yukiya 2017	Nomogram	ECOG performance score, previous gastrectomy, HER2, ALP, LDH
73	74	Peng Peike 2016	Nomogram	T,N,M, calpain-4
74	75	Peng Pailan 2017	Coefficient-weighted score	ACOT7, CES1, IPMK, NES, PBX3, TMEM245, MIR6756, RAB11FIP4, RBPMS2, RPS27L, TPMT, TNFRSF11A

75	76	Qu Jinglei 2017	HR-weighted score	Age, T, NLR
76	77	Song Jianning 2017	Coefficient-weighted score	MiR-106, miR-15a, miR-93, miR-664
77	78	Sun Huiling 2017	Nomogram	T, N, M, surgery type, TBIL,albumin,
78	80	Wang Chenghu 2018	No information	TNM, TRIM29
79	81	Wang Pengliang 2017	Nomogram	Sex, age at operation, site, macroscopic type, LV invasion, T, number of metastasis LN, number of examined LN
80	83	Wang Zixian 2017	Nomogram	Age, year of diagnosis, race, site, size, differentiation, T, MLN, NLN
81	83	Wang Zixian 2017	Nomogram	Age, year of diagnosis, race, site, size, differentiation, T, LNR
82	83	Wang Zixian 2017	Nomogram	Age, year of diagnosis, race, site, size, differentiation, T, LODDS
83	84	Wen Ti 2017	HR-weighted score	Lauren type, TNM, TC PD-L1, IC PD-L1, IC PD-1, CD8
84	86	Wu Songyang 2016	Nomogram	T, N, galectin-8
85	87	Yang Junchi 2018	Coefficient-weighted score	10-gene score, N, TNM, mutL homolog mutation, recurrence
86	88	Yuan Shuqian 2017	Nomogram	Age, race, site, differentiation, T, LNR:ART

87	88	Yuan Shuqian 2017	Nomogram	Age, race, site, differentiation, T, LNR:ART
88	89	Zeng D 2018	Nomogram	Immunoscore, TNM, age, Lauren type
89	90	Zhang Heng 2018	No information	TNM, CD66b
90	91	Zhang Jing 2017	Nomogram	Age, TNM, chemotherapy, differentiation, tumor size, CEA
91	91	Zhang Jing 2017	Nomogram	TNM, chemotherapy, differentiation, tumor size, CEA, FPR
92	92	Zhao Linyong 2016	Nomogram	Age, tumor size, LN counts, LV invasion, T
93	93	Zheng Zhifang 2017	Coefficient-weighted score	Sacropenia, T, N,
94	94	Zhong Qing 2018	Nomogram	Sex, race, age, depth of invasion, metastasis LN, tumor size, tumor site, grade
95	95	Zhou Yixin 2018	Nomogram	T, tumor site, number of positive LN, number of negative LN
96	95	Zhou Yixin 2018	Nomogram	T, tumor site, LNR
97	95	Zhou Yixin 2018	Nomogram	T, tumor site, LODDS
98	96	Oh Sung Eun 2018	Artificial Neural Network	Age, sex, extent of resection, site, size, reseaction margin, histologic type, Lauren type, T, N, M, TNM, lymphatic invasion, venous invasion, perineural invasion, postoperative chemotherapy
99	97	Coimbra FJF 2016	Unweighted score	Age, extent of resection, chemotherapy
100	98	Hsieh Mengche 2016	Coefficient-weighted score	Peritoneal metastasis, NLR, mGPS, PG-SGA

101	99	Liu Jianjun	2016	Nomogram	Age, site, pathological type, depth of invasion, mLNR, NLR, CAR

*: The reference # is the same as those in the Online Resource 1.

Supplementary file 3. Quality assessment of model development and validation

Model #*	Reference #*	Study ID	Risk of bias					
			Participant selection	Predictors	Outcome	Sample size and participant flow	Analysis	Overall Judgment
Model development								
1	1	Hao Liu 2016	high	low	low	unclear	high	high
2	2	Wang Wei 2016	high	low	low	unclear	high	high
3	2	Wang Wei 2016	high	low	low	unclear	high	high
4	3	Rades Dirk 2015	high	low	low	high	high	high
5	4	Wang Xuefei 2012	low	low	low	unclear	low	unclear
6	4	Wang Xuefei 2012	low	low	low	unclear	low	unclear
7	5	Bria E 2013	high	low	low	unclear	low	high
8	6	Zhu Xiaodong 2015	high	low	low	high	high	high
9	7	Mohri Yasuhiko 2010	high	low	low	high	high	high
10	8	Woo Yanghee 2016	low	low	low	unclear	low	unclear
11	9	Victorzon M 1996	high	low	low	unclear	high	high
12	10	Costa Marcelo 2006	high	low	low	high	high	high
13	11	Haga Yoshio 2015	low	low	low	unclear	unclear	unclear
14	12	Catalano V 2008	high	low	low	unclear	high	high
15	13	Park Hyung Soon 2011	high	low	low	high	high	high
16	14	Wang Qing 2014	high	low	low	unclear	high	high
17	15	Kanagavel D 2010	high	low	low	unclear	high	high
18	16	Wang Xuefei 2014	high	low	low	unclear	high	high
19	17	Han Dongseok 2012	high	low	low	high	high	high
20	18	Song Bongil 2015	high	low	low	high	high	high
21	19	Xu Zhenyue 2010	high	high	low	high	high	high
22	20	Zhang Heng 2015	high	low	low	high	low	high
23	21	Wang Zhenglin 2015	high	low	low	unclear	high	high
24	22	Mohammadzadeh F 2015	high	low	low	high	high	high
25	23	Min Lingqiang 2015	high	low	low	high	high	high
26	24	Koo Dong Hoe 2011	low	low	low	unclear	high	high
27	25	Zhang H 2014	high	low	low	high	high	high
28	26	Liu Kai 2015	high	low	low	high	high	high
29	28	Eom Bang Wool 2015	high	unclear	low	high	high	high
30	29	Qian Jing 2016	high	low	low	high	low	high
31	30	Qu Jinglei 2015	high	low	low	high	high	high

32	31	Xu Yeqiong 2016	high	low	low	unclear	high	high
33	32	Kim Jong Gwang 2008	high	low	low	high	high	high
34	33	Kologlu Murat 2000	low	unclear	low	high	high	high
35	34	Du Chunyan 2011	high	low	low	high	high	high
36	35	Becker Karen 2012	high	high	low	unclear	high	high
37	36	Lee J 2007	high	low	low	high	high	high
38	37	Wang Jin 2016	high	low	low	high	high	high
39	38	Lei Ke Feng 2012	high	high	low	high	high	high
40	39	Kadowaki Shigenori 2014	high	low	low	unclear	high	high
41	40	Hirabayashi S 2014	high	low	low	high	high	high
42	41	Takahari Daisuke 2014	low	low	low	low	high	high
43	42	Liu Hao 2015	high	low	low	unclear	high	high
44	43	Song Kyo Young 2014	high	low	low	high	high	high
45	45	Wang Zixian 2016	low	low	low	unclear	high	high
46	46	Liu Hao 2016	high	low	low	unclear	high	high
47	47	Marubini E 1993	low	low	low	unclear	high	high
48	48	Wang Zhiqiang 2017	high	high	low	high	high	high
49	49	Wang Pin 2016	high	high	low	high	high	high
50	51	Bauer L 2018	high	low	low	high	high	high
51	53	Cao Yifan 2017	high	low	low	unclear	high	high
52	54	Cao Yi fan 2016	high	low	low	unclear	high	high
53	55	Chen Hao 2017	high	low	low	unclear	high	high
54	56	Chen Shangxiang 2017	high	low	low	unclear	high	high
55	57	Choi Jongho 2018	high	low	low	unclear	low	high
56	58	De Brian 2018	high	low	low	high	high	high
57	59	Deng Xiaorong 2017	high	high	low	unclear	high	high
58	60	Fuchs Charles S 2017	low	low	low	high	high	high
59	61	Goshayeshi Laden 2017	high	high	low	high	high	high
60	63	Hou Junyi 2016	high	high	low	high	high	high
61	64	Hung Yushin 2017	high	low	low	unclear	low	high
62	65	Jiang Yuming 2018	high	low	low	unclear	low	high
63	65	Jiang Yuming 2018	high	low	low	unclear	low	high
64	67	Kim Sunyoung 2018	high	low	low	unclear	high	high
65	67	Kim Sunyoung 2018	high	low	low	unclear	high	high
66	68	Kangi Azam Korhani 2017	high	low	low	unclear	high	high

67	68	Kangi Azam Korhani 2018	high	low	low	unclear	high	high
68	69	Lin C 2017	high	high	low	unclear	high	high
69	70	Lin Chao 2016	high	high	low	unclear	high	high
70	71	Liu Hao 2017	high	high	low	unclear	high	high
71	72	Miao Yan 2017	high	high	low	unclear	high	high
72	73	Narita Yukiya 2017	high	low	low	low	high	high
73	74	Peng Peike 2016	high	high	low	unclear	high	high
74	75	Peng Pailan 2017	high	high	low	high	low	high
75	76	Qu Jinglei 2017	high	low	low	unclear	high	high
76	77	Song Jianning 2017	high	high	low	high	high	high
77	78	Sun Huiling 2017	high	high	low	unclear	high	high
78	80	Wang Chenghu 2018	high	high	low	unclear	high	high
79	81	Wang Pengliang 2017	high	low	low	high	high	high
80	83	Wang Zixian 2017	high	low	low	low	high	high
81	83	Wang Zixian 2017	high	low	low	low	high	high
82	83	Wang Zixian 2017	high	low	low	low	high	high
83	84	Wen Ti 2017	high	high	low	high	high	high
84	86	Wu Songyang 2016	high	high	low	high	high	high
85	87	Yang Junchi 2018	high	high	low	high	high	high
86	88	Yuan Shuqian 2017	high	low	low	low	low	high
87	88	Yuan Shuqian 2017	high	low	low	low	low	high
88	89	Zeng D 2018	high	low	low	high	low	high
89	90	Zhang Heng 2018	high	high	low	unclear	high	high
90	91	Zhang Jing 2017	high	low	low	high	high	high
91	91	Zhang Jing 2017	high	low	low	high	high	high
92	92	Zhao Linyong 2016	high	low	low	unclear	high	high
93	93	Zheng Zhifang 2017	high	low	low	high	high	high
94	94	Zhong Qing 2018	high	low	low	unclear	high	high
95	95	Zhou Yixin 2018	high	low	low	high	low	high
96	95	Zhou Yixin 2018	high	low	low	high	low	high
97	95	Zhou Yixin 2018	high	low	low	high	low	high
98	96	Oh Sung Eun 2018	high	low	low	unclear	high	high
99	97	Coimbra FJF 2016	high	high	low	high	high	high
100	98	Hsieh Mengche 2016	high	low	low	high	high	high
101	99	Liu Jianjun 2016	high	low	low	unclear	high	high
External validation								
5	4	Wang Xuefei 2012	high	low	low	high	unclear	high

6	4	Wang Xuefei 2012	high	low	low	high	unclear	high
10	8	Woo Yanghee 2016	high	low	low	unclear	low	high
10	8	Woo Yanghee 2016	high	low	low	unclear	low	high
10	8	Woo Yanghee 2016	high	low	low	unclear	low	high
10	8	Woo Yanghee 2016	high	low	low	unclear	low	high
10	50	Akgul O 2018	high	low	low	high	low	high
10	85	Woo Yanghee 2017	high	low	low	low	unclear	high
13	62	Haga Yoshio 2018	high	low	low	low	high	high
19	17	Han Dongseok 2012	high	low	low	high	high	high
19	52	Bencivenge M 2017	high	low	low	low	high	high
19	52	Bencivenge M 2017	high	low	low	low	low	high
19	66	Kim Pyeongsu 2017	high	low	low	low	high	high
19	82	Wang ZX 2017	high	low	low	low	unclear	high
27	25	Zhang H 2014	high	low	low	high	high	high
29	27	Reim Daniel 2015	high	low	low	low	low	high
29	28	Eom Bang Wool 2015	high	low	low	low	unclear	high
42	79	Daisuke Takahari 2017	high	low	low	low	high	high
47	44	Mariani Luigi 2005	high	low	low	high	high	high
47	47	Marubini E 1993	low	low	low	unclear	high	high
48	48	Wang Zhiqiang 2017	high	low	low	low	high	high
54	56	Chen Shangxiang 2017	high	low	low	low	low	high
54	56	Chen Shangxiang 2017	high	low	low	low	low	high
60	63	Hou Junyi 2016	high	low	low	unclear	unclear	high
72	73	Narita Yukiya 2017	high	low	low	low	unclear	high
74	75	Peng Pailan 2017	high	low	low	unclear	unclear	high
80	83	Wang Zixian 2017	high	low	low	low	high	high
81	83	Wang Zixian 2017	high	low	low	low	high	high
82	83	Wang Zixian 2017	high	low	low	low	high	high
85	87	Yang Junchi 2018	high	low	low	unclear	unclear	high
89	90	Zhang Heng 2018	high	low	low	unclear	unclear	high
94	94	Zhong Qing 2018	high	low	low	unclear	high	high

*: The model # and reference # are the same as those in the Online Resource 1.