Table S1 Histological code and pathological types

Histological code	Pathological types
9590	Malignant lymphoma, NOS
9591	Non-Hodgkin lymphoma, NOS
9596	B-cell lymphoma, between diffuse large B and HL (composite HL and NHL)
9650	Classical Hodgkin lymphoma
9651	Lymphocyte-rich classical Hodgkin lymphoma
9652	Mixed cellularity classical Hodgkin lymphoma
9653	Lymphocyte-depleted classical Hodgkin lymphoma
9659	Nodular lymphocyte predominant Hodgkin lymphoma
9663	Nodular sclerosis classical Hodgkin lymphoma
9664	Hodgkin lymphoma, nodular sclerosis, cellular phase
9667	Hodgkin lymphoma, nodular sclerosis, grade 2
9670	Malignant lymphoma, small B lymphocytic, NOS
9671	Lymphoplasmacytic lymphoma
9673	Mantle cell lymphoma
9675	Malignant lymphoma, mixed small & large cell, diffuse
9678	Primary effusion lymphoma
9679	Primary mediastinal (thymic) large B-cell lymphoma
9680	Diffuse large B-cell lymphoma (DLBCL), NOS
9684	Malignant lymphoma, large B, diffuse, immunoblastic
9687	Burkitt lymphoma
9690	Follicular lymphoma
9691	Follicular lymphoma, grade 2
9695	Follicular lymphoma, grade 1
9698	Follicular lymphoma, grade 3
9699	Extranodal marginal zone lymphoma of mucosal-assoc. lymphoid tissue-MALT
9702	Peripheral T-cell lymphoma, NOS
9714	Anaplastic large cell lymphoma, ALK-positive
9719	Extranodal NK-/T-cell lymphoma, nasal type
9727	Blastic plasmacytoid dendritic cell neoplasm
9729	Precursor T-cell lymphoblastic lymphoma, NOS
9735	Plasmablastic lymphoma
9823	Chronic lymphocytic leukemia/small lymphocytic lymphoma
9837	9837/3: T lymphoblastic leukemia/lymphoma

NOS, not otherwise specified; NHL, non-Hodgkin's lymphoma; HL, Hodgkin's lymphoma; MALT, mucosa-associated lymphoid tissue; NK, natural killer.
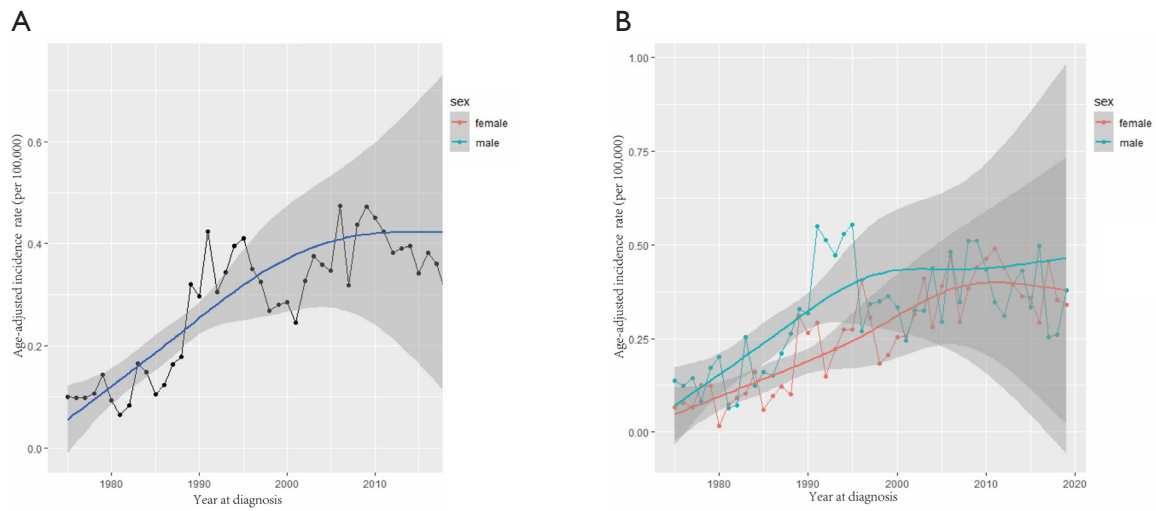
Figure S1 Annual age-adjusted incidence rates of all PPLs from 1975 to 2019. (A) The annual age-adjusted incidence rate. (B) The annual age-adjusted incidence rate by sex. PPLs, primary pulmonary lymphomas.
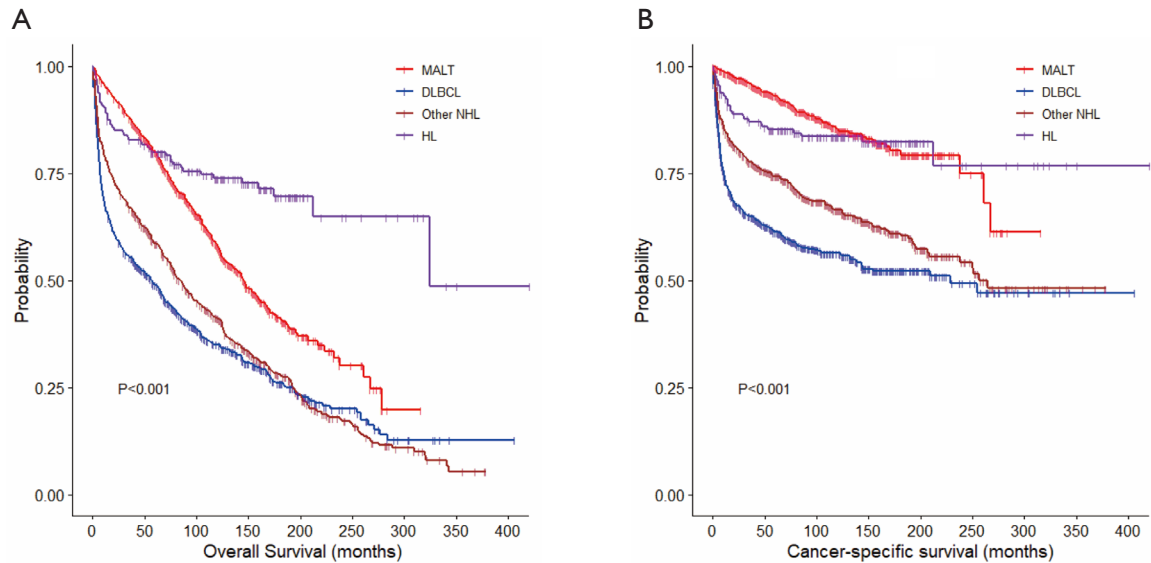

Figure S2 KM survival curves according to different histological subtypes. (A) KM survival curves of OS. (B) KM survival curves of CSS. MALT, mucosa-associated lymphoid tissue; DLBCL, diffuse large B-cell lymphoma; NHL, non-Hodgkin's lymphoma; HL, Hodgkin's lymphoma; KM, Kaplan-Meier; OS, overall survival; CSS, cancer-specific survival.
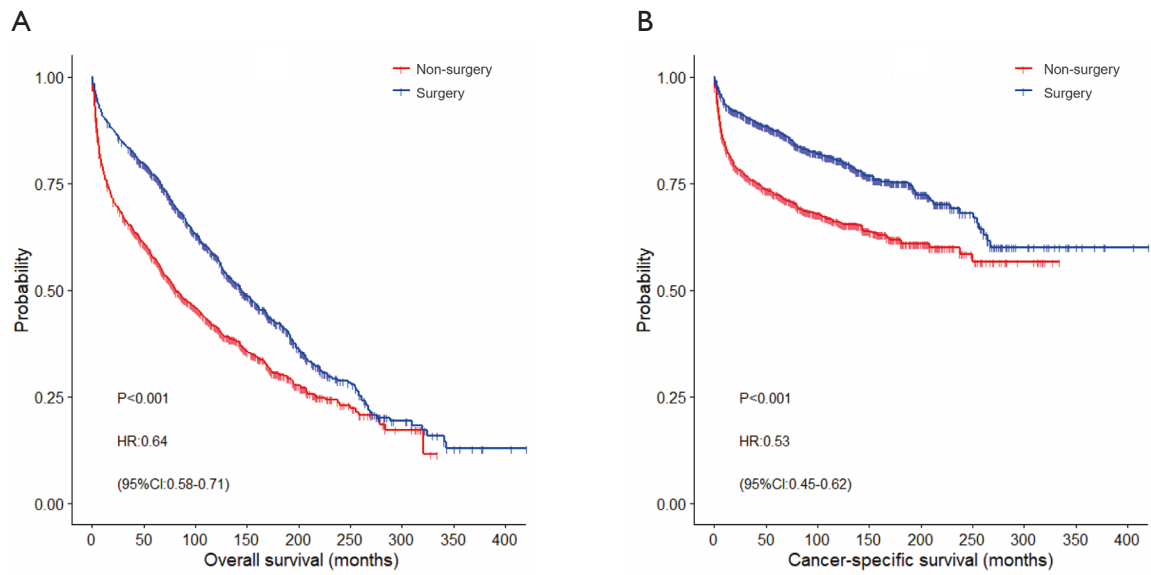
Figure S3 Kaplan-Meier survival curves of All PPLs before PSM. (A) OS for patients receiving surgery *vs.* non-surgery; (B) CSS for patients receiving surgery *vs.* non-surgery. HR, hazard ratio; CI, confidence interval; PPLs, primary pulmonary lymphomas; OS, overall survival; PSM, propensity score matching; CSS, cancer-specific survival.
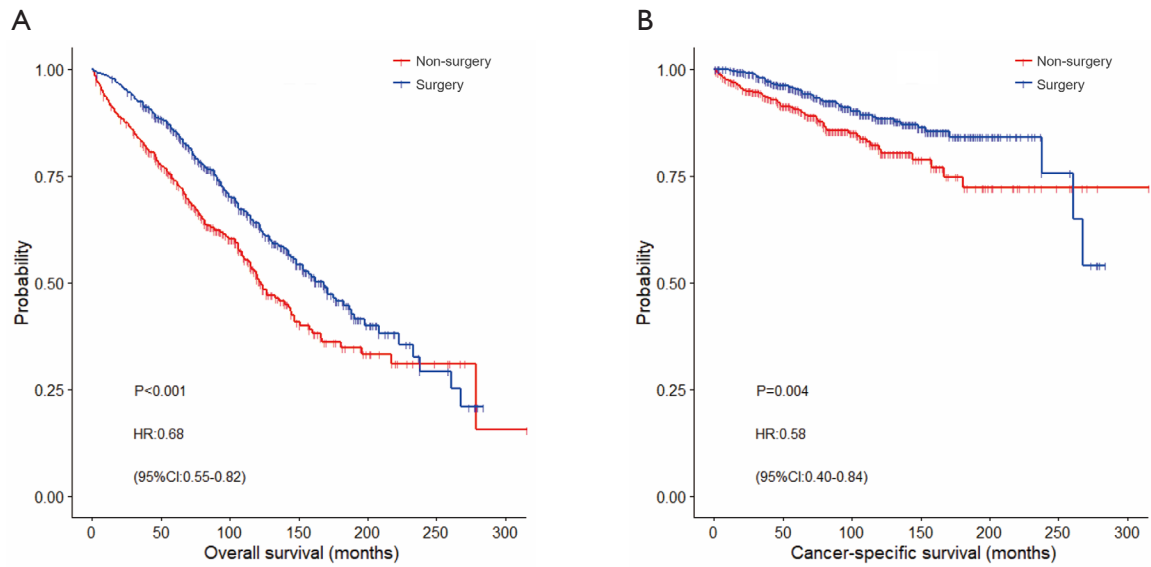

Figure S4 Kaplan-Meier survival curves of MALT lymphoma before PSM. (A) OS for patients receiving surgery *vs.* non-surgery; (B) CSS for patients receiving surgery *vs.* non-surgery. HR, hazard ratio; CI, confidence interval; MALT, mucosa-associated lymphoid tissue; OS, overall survival; PSM, propensity score matching; CSS, cancer-specific survival.

Table S2 Clinicopathological characteristics of mucosa-associated lymphoid tissue lymphoma before and after propensity score-matching

Variables	All patients (n=981)	Before PSM			After PSM		
		Surgery (n=508)	Non-surgery (n=473)	P	Surgery (n=306)	Non-surgery (n=306)	P
Age (years)				<0.001			0.75
<70	529 (53.9)	311 (61.2)	218 (46.1)		173 (56.5)	169 (55.2)	
≥70	452 (46.1)	197 (38.8)	255 (53.9)		133 (43.5)	137 (44.8)	
Sex				0.04			0.41
Female	579 (59.0)	316 (62.2)	263 (55.6)		186 (60.8)	176 (57.5)	
Male	402 (41.0)	192 (37.8)	210 (44.4)		120 (39.2)	130 (42.5)	
Race				0.04			0.78
White	844 (86)	448 (88.2)	396 (83.7)		261 (85.3)	267 (87.3)	
Black	76 (7.7)	38 (7.5)	38 (8.0)		23 (7.5)	20 (6.5)	
Other	61 (6.2)	22 (4.3)	39 (8.2)		22 (7.2)	19 (6.2)	
Marital status				0.27			0.06
Married	596 (60.8)	318 (62.6)	278 (58.8)		163 (53.3)	188 (61.4)	
Single	331 (33.7)	167 (32.9)	164 (34.7)		127 (41.5)	99 (32.4)	
Unknown	54 (5.5)	23 (4.5)	31 (6.6)		16 (5.2)	19 (6.2)	
Laterality				0.002			0.79
Unilateral	895 (91.2)	479 (94.3)	416 (87.9)		278 (90.8)	279 (91.2)	
Bilateral	63 (6.4)	22 (4.3)	41 (8.7)		21 (6.9)	18 (5.9)	
Unknown	23 (2.3)	7 (1.4)	16 (3.4)		7 (2.3)	9 (2.9)	
Stage				<0.001			0.75
Stage IE	810 (82.6)	441 (86.8)	369 (78.0)		252 (82.4)	249 (81.4)	
Stage IIE	171 (17.4)	67 (13.2)	104 (22.0)		54 (17.6)	57 (18.6)	
Radiation				<0.001			>0.99
No	857 (87.4)	482 (94.9)	375 (79.3)		280 (91.5)	280 (91.5)	
Yes	124 (12.6)	26 (5.1)	98 (20.7)		26 (8.5)	26 (8.5)	
Chemotherapy				<0.001			0.64
No	727 (74.1)	429 (84.4)	298 (63.0)		231 (75.5)	226 (73.9)	
Yes	254 (25.9)	79 (15.6)	175 (37.0)		75 (24.5)	80 (26.1)	

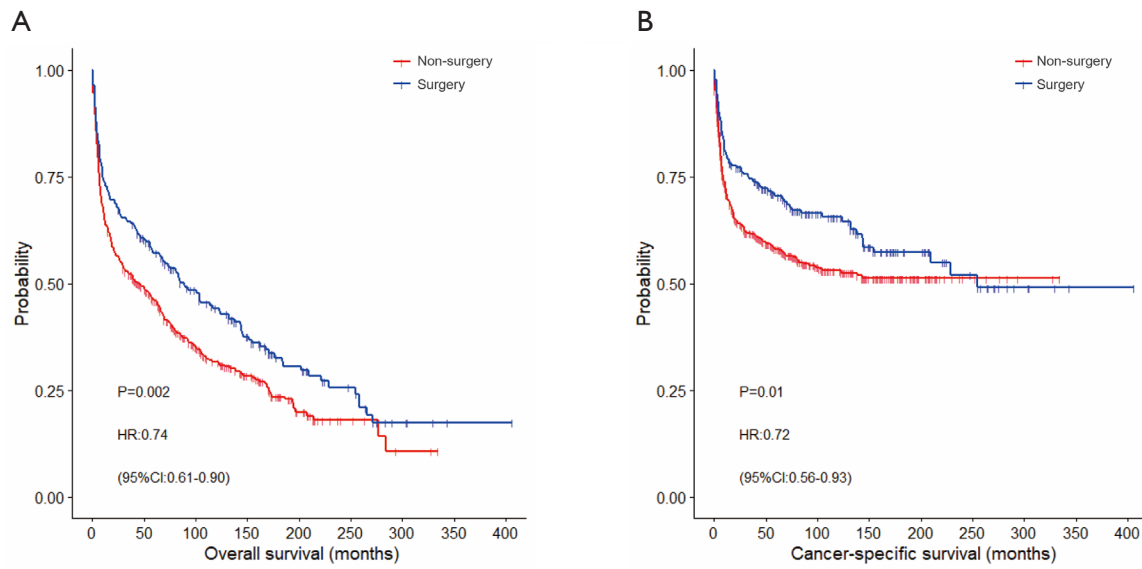Data are presented as n (%). PSM, propensity score matching.

Figure S5 Kaplan-Meier survival curves of DLBCL before PSM. (A) OS for patients receiving surgery *vs.* non-surgery; (B) CSS for patients receiving surgery *vs.* non-surgery. HR, hazard ratio; CI, confidence interval; DLBCL, diffuse large B-cell lymphoma; OS, overall survival; PSM, propensity score matching; CSS, cancer-specific survival.

Table S3 Clinicopathological characteristics of diffuse large B-cell lymphoma before and after propensity score matching

Variables	All patients (n=832)	Before PSM			After PSM		
		Surgery (n=217)	Non-surgery (n=615)	P	Surgery (n=206)	Non-surgery (n=206)	P
Age (years)				0.007			0.92
<70	491 (59.0)	145 (66.8)	346 (56.3)		134 (65.0)	135 (65.5)	
≥70	341 (41.0)	72 (33.2)	269 (43.7)		72 (35.0)	71 (34.5)	
Sex				0.33			0.32
Female	388 (46.6)	95 (43.8)	293 (47.6)		88 (42.7)	98 (47.6)	
Male	444 (53.4)	122 (56.2)	322 (52.4)		118 (57.3)	108 (52.4)	
Race				0.81			0.38
White	734 (88.2)	189 (87.1)	545 (88.6)		180 (87.4)	187 (90.8)	
Black	61 (7.3)	18 (8.3)	43 (7.0)		16 (7.8)	14 (6.8)	
Other	37 (4.4)	10 (4.6)	27 (4.4)		10 (4.9)	5 (2.4)	
Marital status				0.27			0.49
Married	455 (54.7)	112 (51.6)	343 (55.8)		101 (49)	113 (54.9)	
Single	345 (41.5)	99 (45.6)	246 (40.0)		99 (48.1)	87 (42.2)	
Unknown	32 (3.8)	6 (2.8)	26 (4.2)		6 (2.9)	6 (2.9)	
Laterality				0.41			>0.99
Unilateral	769 (92.4)	205 (94.5)	564 (91.7)		194 (94.2)	194 (94.2)	
Bilateral	40 (4.8)	8 (3.7)	32 (5.2)		8 (3.9)	8 (3.9)	
Unknown	23 (2.8)	4 (1.8)	19 (3.1)		4 (1.9)	4 (1.9)	
Stage				<0.001			>0.99
Stage IE	473 (56.9)	155 (71.4)	318 (51.7)		144 (69.9)	144 (69.9)	
Stage IIE	359 (43.1)	62 (28.6)	297 (48.3)		62 (30.1)	62 (30.1)	
Radiation				<0.001			>0.99
No	665 (79.9)	198 (91.2)	467 (75.9)		187 (90.8)	187 (90.8)	
Yes	167 (20.1)	19 (8.8)	148 (24.1)		19 (9.2)	19 (9.2)	
Chemotherapy				<0.001			0.92
No	225 (27.0)	88 (40.6)	137 (22.3)		77 (37.4)	76 (36.9)	
Yes	607 (73.0)	129 (59.4)	478 (77.7)		129 (62.6)	130 (63.1)	

Data are presented as n (%). PSM, propensity score matching.
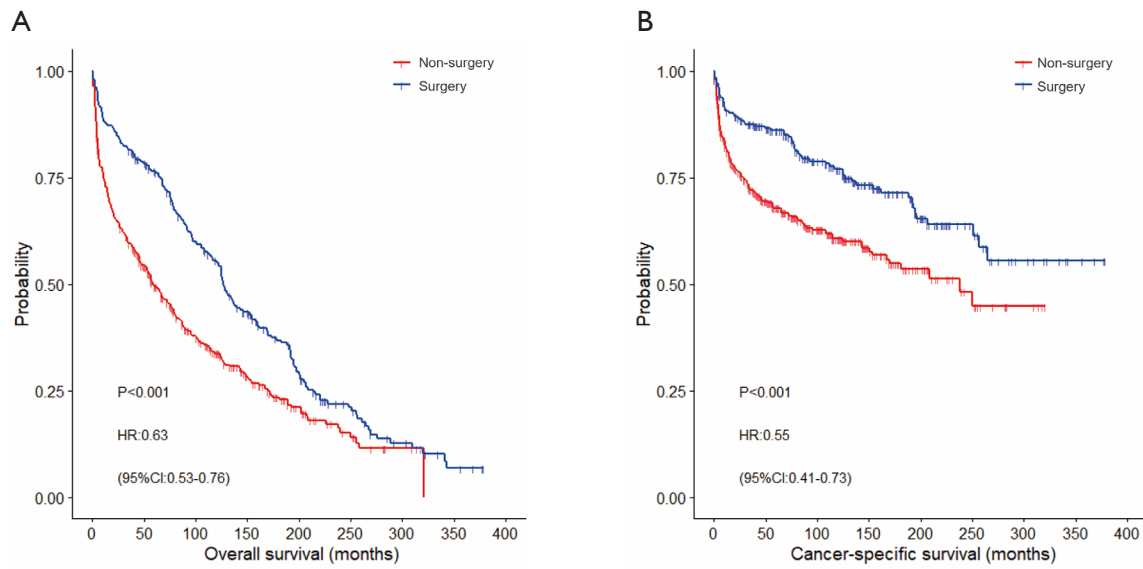
Figure S6 Kaplan-Meier survival curves of other NHL before PSM. (A) OS for patients receiving surgery *vs.* non-surgery; (B) CSS for patients receiving surgery *vs.* non-surgery. HR, hazard ratio; CI, confidence interval; NHL, non-Hodgkin's lymphoma; OS, overall survival; PSM, propensity score matching; CSS, cancer-specific survival.

Table S4 Clinicopathological characteristics of other non-Hodgkin's lymphoma before and after propensity score matching

Variables	All patients (n=705)	Before PSM			After PSM		
		Surgery (n=237)	Non-surgery (n=468)	P	Surgery (n=200)	Non-surgery (n=200)	P
Age (years)				0.02			0.23
<70	350 (49.6)	132 (55.7)	218 (46.6)		106 (53.0)	94 (47.0)	
≥70	355 (50.4)	105 (44.3)	250 (53.4)		94 (47.0)	106 (53.0)	
Sex				0.03			0.27
Female	369 (52.3)	138 (58.2)	231 (49.4)		101 (50.5)	112 (56.0)	
Male	336 (47.7)	99 (41.8)	237 (50.6)		99 (49.5)	88 (44.0)	
Race				0.02			0.71
White	601 (85.2)	213 (89.9)	388 (82.9)		179 (89.5)	183 (91.5)	
Black	66 (9.4)	12 (5.1)	54 (11.5)		12 (6.0)	11 (5.5)	
Other	38 (5.4)	12 (5.1)	26 (5.6)		9 (4.5)	6 (3.0)	
Marital status				0.03			0.90
Married	361 (51.2)	136 (57.4)	225 (48.1)		106 (53.0)	109 (54.5)	
Single	310 (44.0)	94 (39.7)	216 (46.2)		87 (43.5)	83 (41.5)	
Unknown	34 (4.8)	7 (3.0)	27 (5.8)		7 (3.5)	8 (4.0)	
Laterality				0.02			0.90
Unilateral	655 (92.9)	229 (96.6)	426 (91.0)		193 (96.5)	192 (96.0)	
Bilateral	30 (4.3)	6 (2.5)	24 (5.1)		5 (2.5)	5 (2.5)	
Unknown	20 (2.8)	2 (0.8)	18 (3.8)		2 (1.0)	3 (1.5)	
Stage				0.15			0.32
Stage IE	490 (69.5)	173 (73.0)	317 (67.7)		148 (74.0)	139 (69.5)	
Stage IIE	215 (30.5)	64 (27.0)	151 (32.3)		52 (26.0)	61 (30.5)	
Radiation				<0.001			0.85
No	596 (84.5)	221 (93.2)	375 (80.1)		184 (92.0)	185 (92.5)	
Yes	109 (15.5)	16 (6.8)	93 (19.9)		16 (8.0)	15 (7.5)	
Chemotherapy				<0.001			0.83
No	405 (57.4)	169 (71.3)	236 (50.4)		132 (66.0)	130 (65.0)	
Yes	300 (42.6)	68 (28.7)	232 (49.6)		68 (34.0)	70 (35.0)	

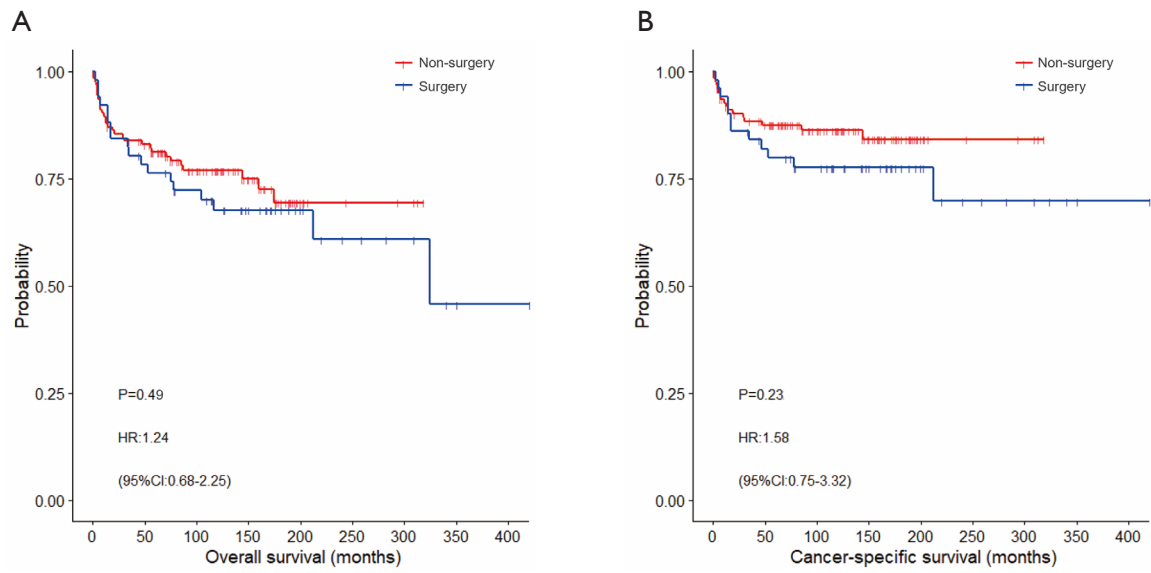Data are presented as n (%). PSM, propensity score matching.

Figure S7 Kaplan-Meier survival curves of HL before PSM. (A) OS for patients receiving surgery *vs.* non-surgery; (B) CSS for patients receiving surgery *vs.* non-surgery. HR, hazard ratio; CI, confidence interval; HL, Hodgkin lymphoma; OS, overall survival; PSM, propensity score matching; CSS, cancer-specific survival.

Table S5 Clinicopathological characteristics of Hodgkin's lymphoma before and after propensity score matching

Variables	All patients (n=175)	Before PSM			After PSM		
		Surgery (n=51)	Non-surgery (n=124)	P	Surgery (n=45)	Non-surgery (n=45)	P
Age (years)				0.10			0.37
<70	155 (88.6)	42 (82.4)	113 (91.1)		37 (82.2)	40 (88.9)	
≥70	20 (11.4)	9 (17.6)	11 (8.9)		8 (17.8)	5 (11.1)	
Sex				0.14			>0.99
Female	91 (52.0)	31 (60.8)	60 (48.4)		28 (62.2)	28 (62.2)	
Male	84 (48.0)	20 (39.2)	64 (51.6)		17 (37.8)	17 (37.8)	
Race				0.12			
White	155 (88.6)	49 (96.1)	106 (85.5)		43 (95.6)	43 (95.6)	>0.99
Black	15 (8.6)	1 (2.0)	14 (11.3)		1 (2.2)	1 (2.2)	
Other	5 (2.9)	1 (2.0)	4 (3.2)		1 (2.2)	1 (2.2)	
Marital status				0.49			>0.99
Married	94 (53.7)	30 (58.8)	64 (51.6)		26 (57.8)	26 (57.8)	
Single	79 (45.1)	21 (41.2)	58 (46.8)		19 (42.2)	19 (42.2)	
Unknown	2 (1.1)	0	2 (1.6)		0	0	
Laterality				0.43			>0.99
Unilateral	171 (97.7)	51 (100.0)	120 (96.8)		45 (100.0)	45 (100.0)	
Bilateral	1 (0.6)	0	1 (0.8)		0	0	
Unknown	3 (1.7)	0	3 (2.4)		0	0	
Stage				0.08			>0.99
Stage IE	55 (31.4)	21 (41.2)	34 (27.4)		16 (35.6)	16 (35.6)	
Stage IIE	120 (68.6)	30 (58.8)	90 (72.6)		29 (64.4)	29 (64.4)	
Radiation				0.67			0.37
No	109 (62.3)	33 (64.7)	76 (61.3)		28 (62.2)	32 (71.1)	
Yes	66 (37.7)	18 (35.3)	48 (38.7)		17 (37.8)	13 (28.9)	
Chemotherapy				0.006			>0.99
No	30 (17.1)	15 (29.4)	15 (12.1)		10 (22.2)	10 (22.2)	
Yes	145 (82.9)	36 (70.6)	109 (87.9)		35 (77.8)	35 (77.8)	

Data are presented as n (%). PSM, propensity score matching.

Figure S8 Kaplan-Meier survival curves of stage IE/IIE MALT lymphoma before PSM. (A) OS for patients receiving surgery *vs.* non-surgery in stage IE MALT lymphoma; (B) CSS for patients receiving surgery *vs.* non-surgery in stage IE MALT lymphoma; (C) OS for patients receiving surgery *vs.* non-surgery in stage IIE MALT lymphoma; (D) CSS for patients receiving surgery *vs.* non-surgery in stage IIE MALT lymphoma. HR, hazard ratio; CI, confidence interval; MALT, mucosa-associated lymphoid tissue; OS, overall survival; PSM, propensity score matching; CSS, cancer-specific survival.

Figure S9 Kaplan-Meier survival curves of stage IE/IIE DLBCL before PSM. (A) OS for patients receiving surgery *vs.* non-surgery in stage IE DLBCL; (B) CSS for patients receiving surgery *vs.* non-surgery in stage IE DLBCL; (C) OS for patients receiving surgery *vs.* non-surgery in stage IIE DLBCL; (D) CSS for patients receiving surgery *vs.* non-surgery in stage IIE DLBCL. HR, hazard ratio; CI, confidence interval; DLBCL, diffuse large B-cell lymphoma; OS, overall survival; PSM, propensity score matching; CSS, cancer-specific survival.
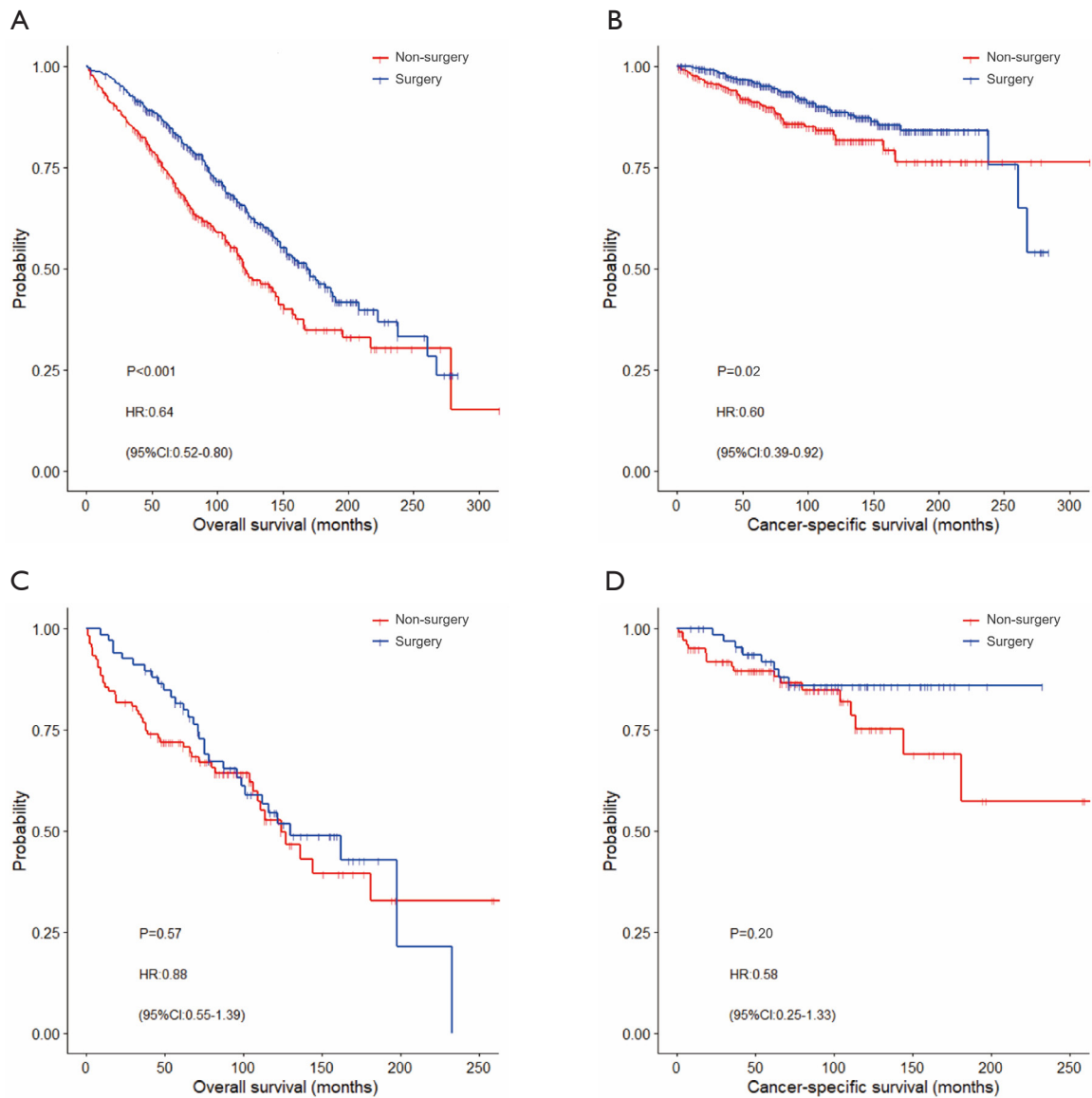
Figure S10 Kaplan-Meier survival curves of stage IE/IIE other NHL before PSM. (A) OS for patients receiving surgery *vs.* non-surgery in stage IE other NHL; (B) CSS for patients receiving surgery *vs.* non-surgery in stage IE other NHL; (C) OS for patients receiving surgery *vs.* non-surgery in stage IIE other NHL; (D) CSS for patients receiving surgery *vs.* non-surgery in stage IIE other NHL. HR, hazard ratio; CI, confidence interval; NHL, non-Hodgkin's lymphoma; OS, overall survival; PSM, propensity score matching; CSS, cancer-specific survival.

Figure S11 Kaplan-Meier survival curves of stage IE/IIE PPLs patients receiving surgery before PSM. (A) OS for patients receiving sublobectomy *vs.* lobectomy/pneumectomy in stage IE PPLs; (B) CSS for patients receiving sublobectomy *vs.* lobectomy/pneumectomy in stage IE PPLs; (C) OS for patients receiving sublobectomy *vs.* lobectomy/pneumectomy in stage IIE PPLs; (D) CSS for patients receiving sublobectomy *vs.* lobectomy/pneumectomy in stage IIE PPLs. HR, hazard ratio; CI, confidence interval; PPLs, primary pulmonary lymphomas; OS, overall survival; PSM, propensity score matching; CSS, cancer-specific survival.
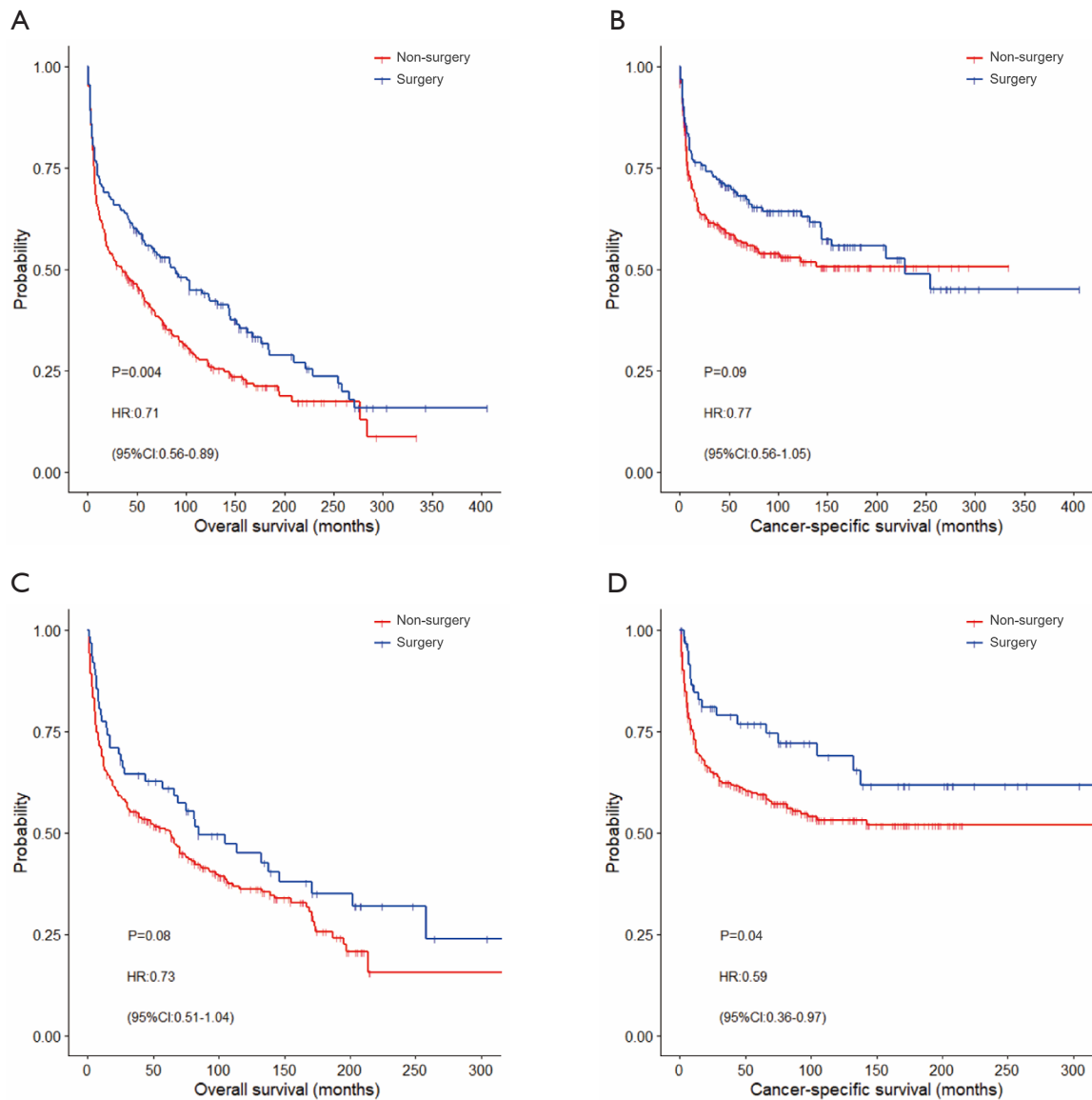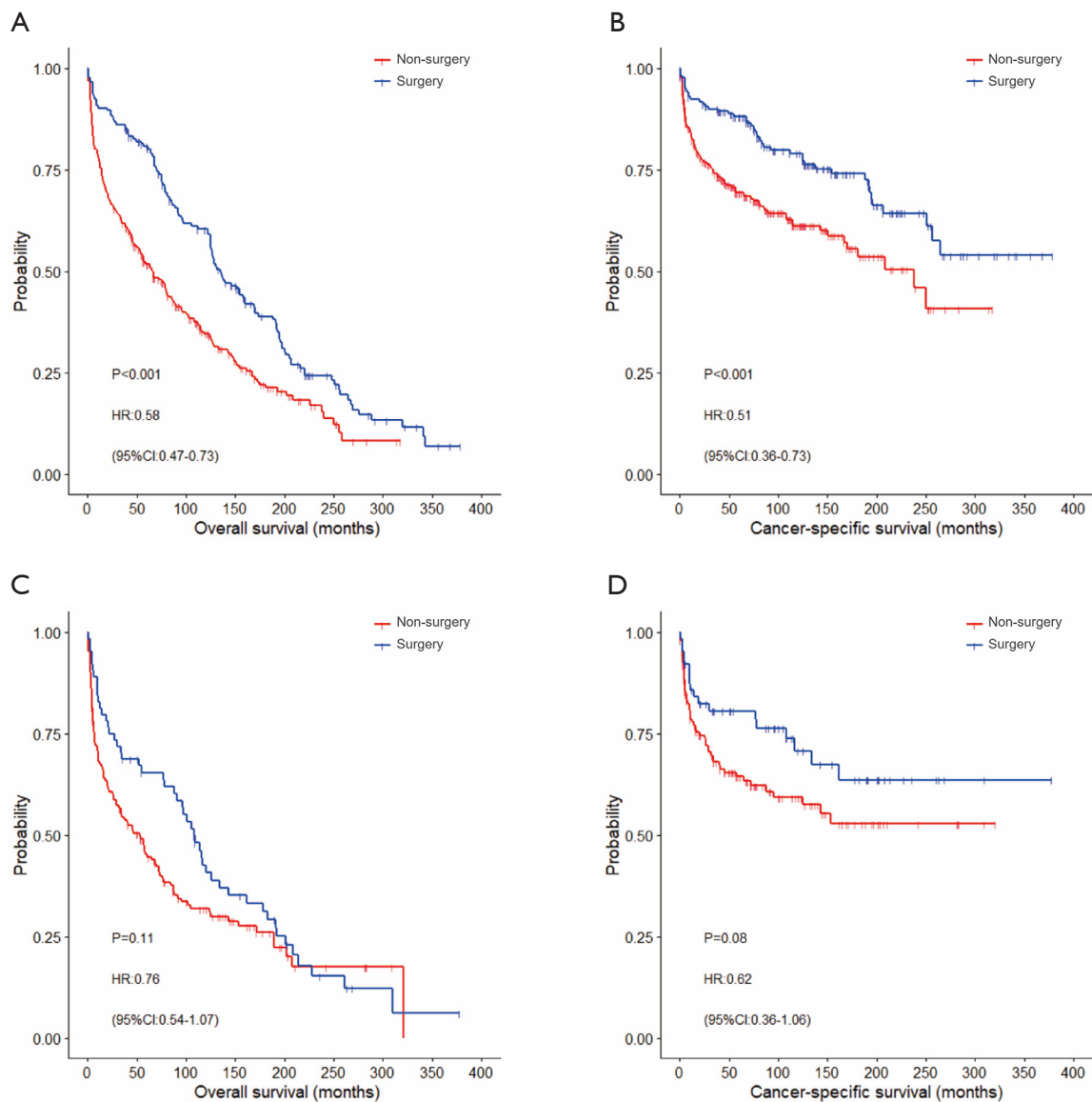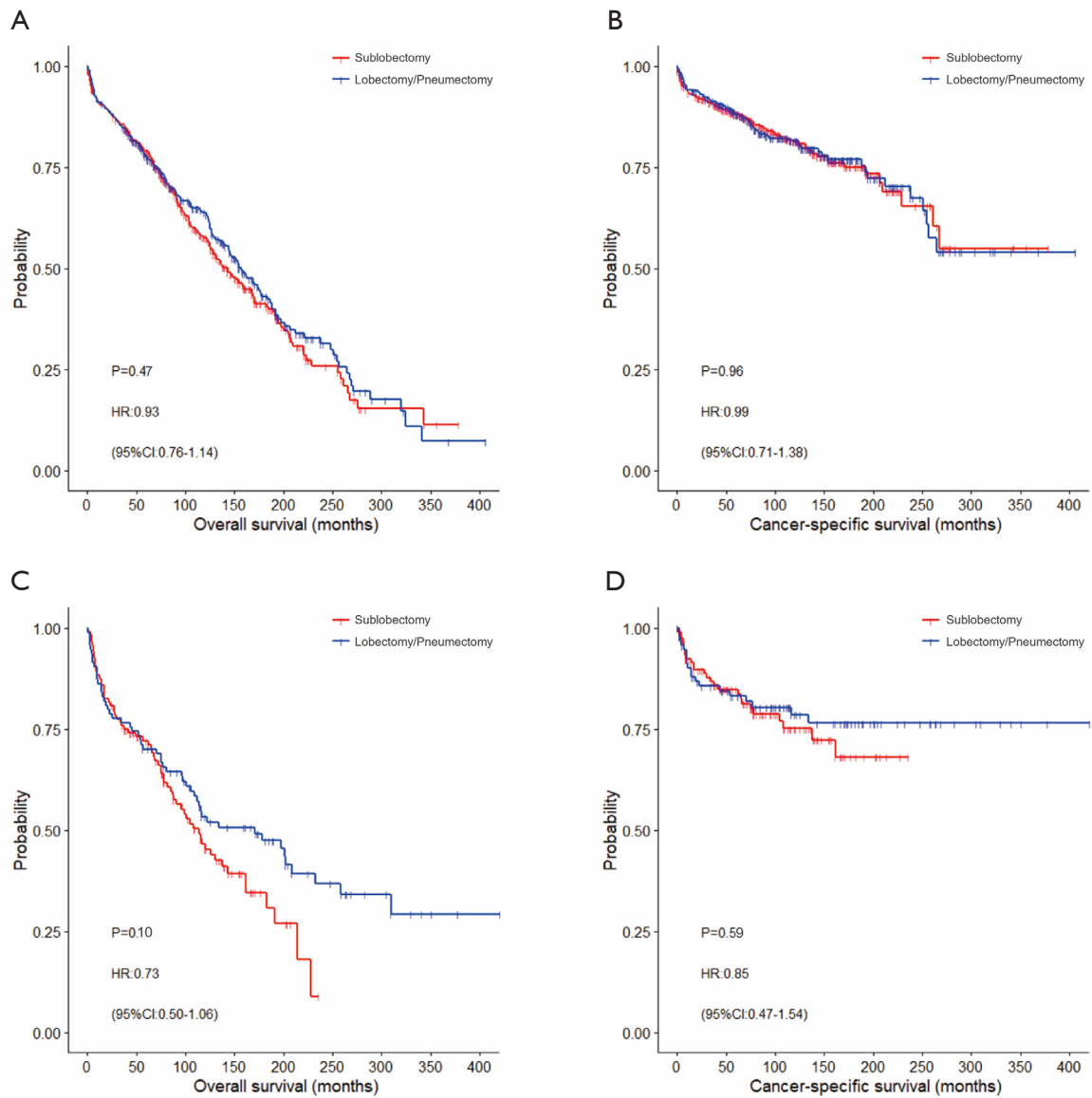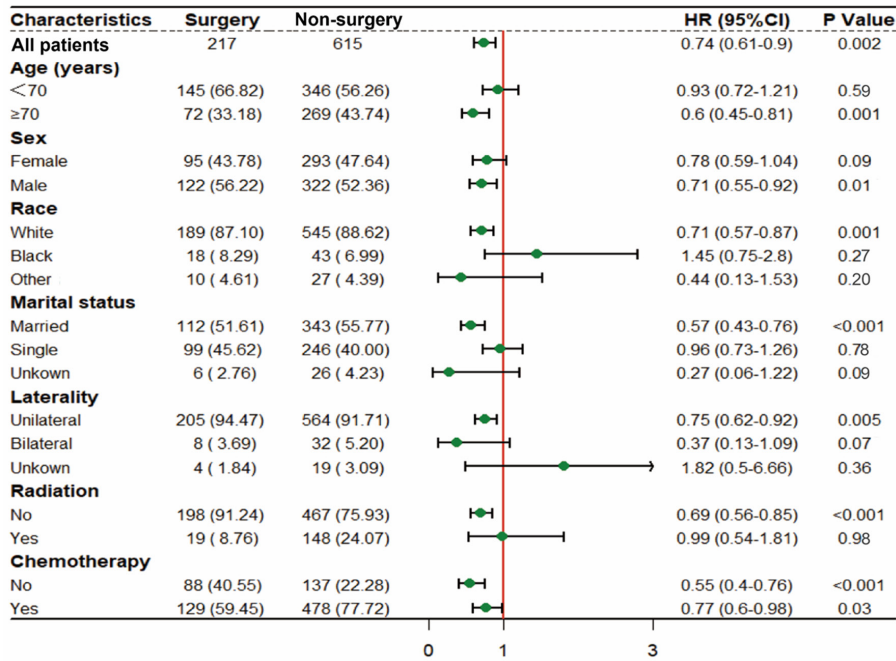
A Subgroup analysis of overall survival in DLBCL

Characteristics	Surgery	Non-surgery		HR (95%CI)	P Value
All patients	217	615		0.74 (0.61-0.9)	0.002
Age (years)					
<70	145 (66.82)	346 (56.26)		0.93 (0.72-1.21)	0.59
≥70	72 (33.18)	269 (43.74)		0.6 (0.45-0.81)	0.001
Sex					
Female	95 (43.78)	293 (47.64)		0.78 (0.59-1.04)	0.09
Male	122 (56.22)	322 (52.36)		0.71 (0.55-0.92)	0.01
Race					
White	189 (87.10)	545 (88.62)		0.71 (0.57-0.87)	0.001
Black	18 (8.29)	43 (6.99)		1.45 (0.75-2.8)	0.27
Other	10 (4.61)	27 (4.39)		0.44 (0.13-1.53)	0.20
Marital status					
Married	112 (51.61)	343 (55.77)		0.57 (0.43-0.76)	<0.001
Single	99 (45.62)	246 (40.00)		0.96 (0.73-1.26)	0.78
Unkown	6 (2.76)	26 (4.23)		0.27 (0.06-1.22)	0.09
Laterality					
Unilateral	205 (94.47)	564 (91.71)		0.75 (0.62-0.92)	0.005
Bilateral	8 (3.69)	32 (5.20)		0.37 (0.13-1.09)	0.07
Unkown	4 (1.84)	19 (3.09)		1.82 (0.5-6.66)	0.36
Radiation					
No	198 (91.24)	467 (75.93)		0.69 (0.56-0.85)	<0.001
Yes	19 (8.76)	148 (24.07)		0.99 (0.54-1.81)	0.98
Chemotherapy					
No	88 (40.55)	137 (22.28)		0.55 (0.4-0.76)	<0.001
Yes	129 (59.45)	478 (77.72)		0.77 (0.6-0.98)	0.03

B Subgroup analysis of cancer-specific survival in DLBCL

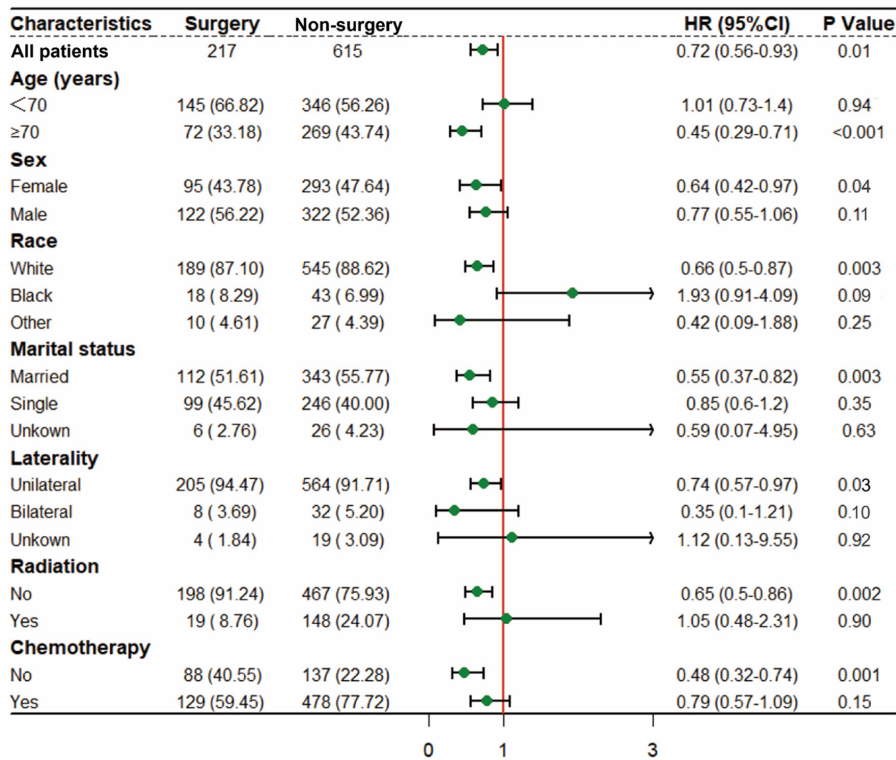| Characteristics	Surgery	Non-surgery		HR (95%CI)	P Value
All patients	217	615		0.72 (0.56-0.93)	0.01
Age (years)					
<70	145 (66.82)	346 (56.26)		1.01 (0.73-1.4)	0.94
≥70	72 (33.18)	269 (43.74)		0.45 (0.29-0.71)	<0.001
Sex					
Female	95 (43.78)	293 (47.64)		0.64 (0.42-0.97)	0.04
Male	122 (56.22)	322 (52.36)		0.77 (0.55-1.06)	0.11
Race					
White	189 (87.10)	545 (88.62)		0.66 (0.5-0.87)	0.003
Black	18 (8.29)	43 (6.99)		1.93 (0.91-4.09)	0.09
Other	10 (4.61)	27 (4.39)		0.42 (0.09-1.88)	0.25
Marital status					
Married	112 (51.61)	343 (55.77)		0.55 (0.37-0.82)	0.003
Single	99 (45.62)	246 (40.00)		0.85 (0.6-1.2)	0.35
Unkown	6 (2.76)	26 (4.23)		0.59 (0.07-4.95)	0.63
Laterality					
Unilateral	205 (94.47)	564 (91.71)		0.74 (0.57-0.97)	0.03
Bilateral	8 (3.69)	32 (5.20)		0.35 (0.1-1.21)	0.10
Unkown	4 (1.84)	19 (3.09)		1.12 (0.13-9.55)	0.92
Radiation					
No	198 (91.24)	467 (75.93)		0.65 (0.5-0.86)	0.002
Yes	19 (8.76)	148 (24.07)		1.05 (0.48-2.31)	0.90
Chemotherapy					
No	88 (40.55)	137 (22.28)		0.48 (0.32-0.74)	0.001
Yes	129 (59.45)	478 (77.72)		0.79 (0.57-1.09)	0.15

Figure S12 Forest plots of subgroup analysis according to different characteristics in DLBCL. (A) OS for patients receiving surgery *vs.* non-surgery; (B) CSS for patients receiving surgery *vs.* non-surgery. HR, hazard ratio; CI, confidence interval; DLBCL, diffuse large B-cell lymphoma; OS, overall survival; CSS, cancer-specific survival.