

Figure S1 Diagram of group A selection steps. SEER, Surveillance, Epidemiology, and End Results.

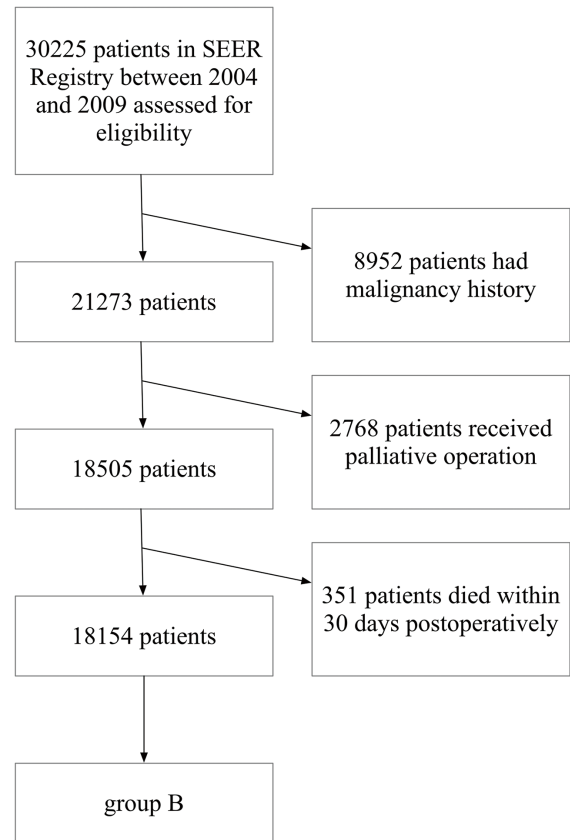


Figure S2 Diagram of group B selection steps. SEER, Surveillance, Epidemiology, and End Results.

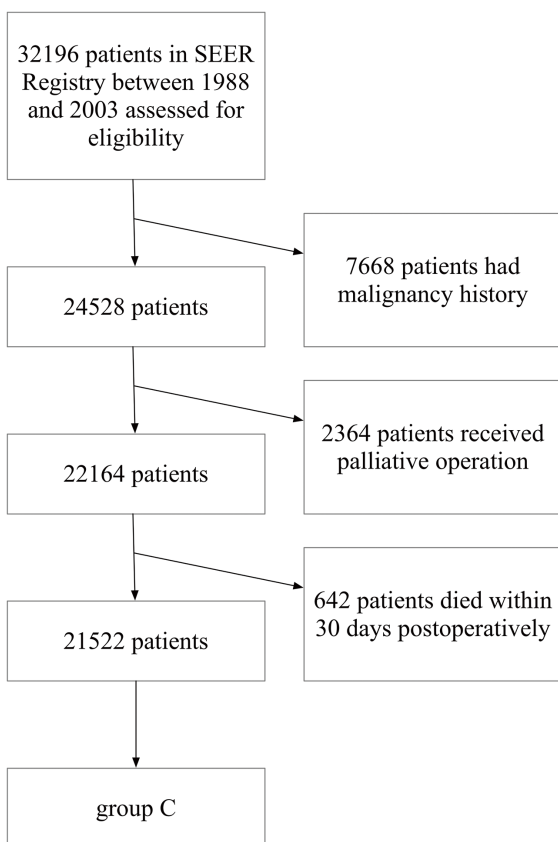


Figure S3 Diagram of group C selection steps. SEER, Surveillance, Epidemiology, and End Results.

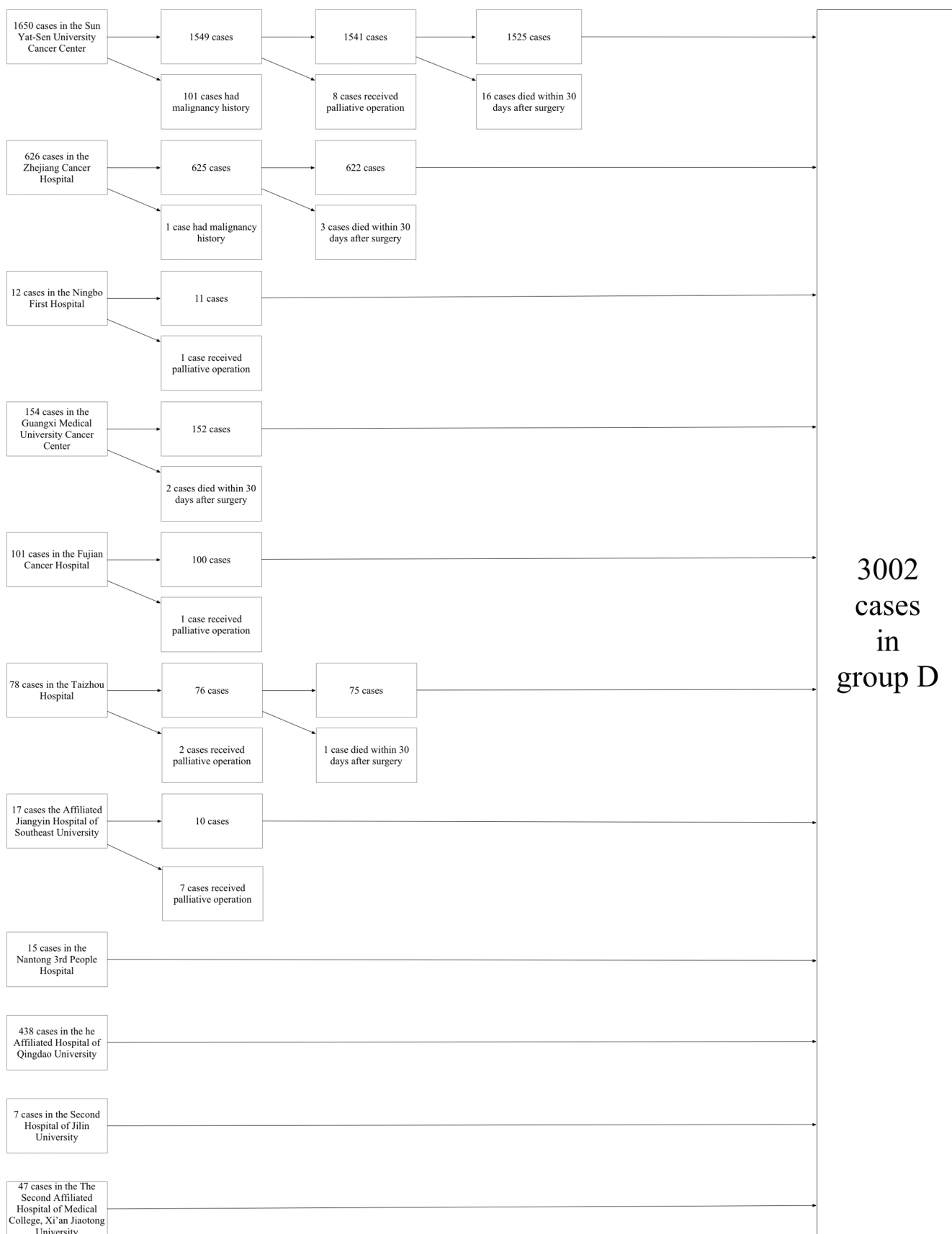


Figure S4 Diagram of group D selection steps.

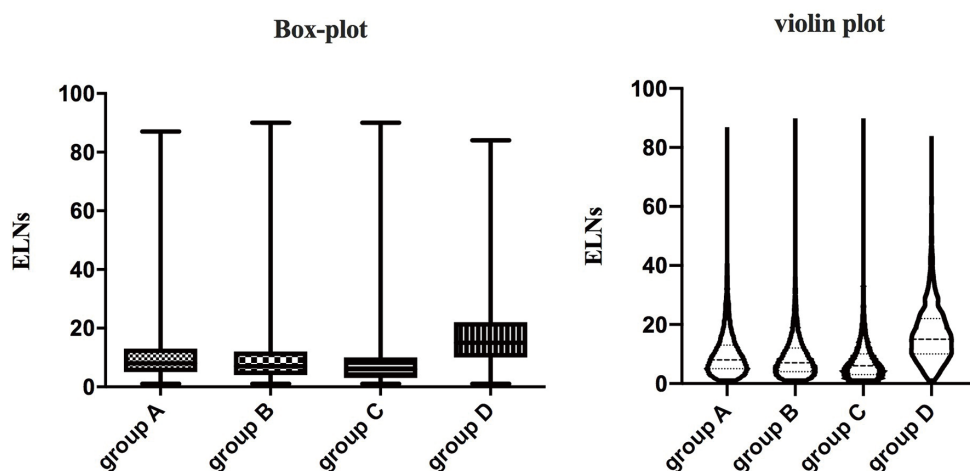


Figure S5 The examined lymph nodes of the entire study. ELNs, examined lymph nodes.

Table S1 Patient characteristics of the entire study

Characteristic	Group A (n=12,423), N (%) ^a	Group B (n=18,154), N (%) ^a	Group C (n=21,522), N (%) ^a	Group D (n=3,002), N (%) ^a
ELNs, median [IQR]	8 [8]	7 [8]	6 [7]	15 [12]
Age				
<65 years	4,603 (37.1)	6,870 (37.8)	8,676 (40.3)	1,988 (66.2)
≥65 years	7,820 (62.9)	11,284 (62.2)	12,846 (59.7)	1,014 (33.8)
Sex				
Male	5,911 (47.6)	8,857 (48.8)	11,632 (54.0)	1,892 (63.0)
Female	6,512 (52.4)	9,297 (51.2)	9,890 (46.0)	1,110 (37.0)
T stage				
T1	5,895 (47.5)	8,847 (48.7)	9,449 (43.9)	1,215 (40.5)
T2	4,885 (39.3)	8,376 (46.1)	10,790 (50.1)	1,455 (48.5)
T3	1,643 (13.2)	931 (5.1)	1,283 (6.0)	332 (11.1)
Histology				
SCC	3,280 (26.4)	5,061 (27.9)	6,318 (29.4)	837 (27.9)
AC	7,587 (61.1)	10,414 (57.4)	11,868 (55.1)	1,983 (66.1)
ASC	311 (2.5)	461 (2.5)	630 (2.9)	88 (2.9)
Other ^b	1,245 (10)	2,218 (12.2)	2,706 (12.6)	94 (3.1)
Race				
White	10,292 (82.8)	15,550 (85.6)	18,318 (85.1)	NA ^d
Black	1,131 (9.1)	1,422 (7.8)	1,822 (8.5)	NA ^d
Other	959 (7.7)	1,156 (6.4)	1,368 (6.4)	NA ^d
Unknown ^c	41 (0.3)	26 (0.1)	14 (0.1)	NA ^d
Marital				
Married	4,852 (39.1)	6,927 (38.2)	7,593 (35.3)	NA ^d
Other ^e	6,998 (56.3)	10,782 (59.4)	13,385 (62.2)	NA ^d
Unknown	573 (4.6)	445 (2.5)	544 (2.5)	NA ^d
Grade				
I and II	7,769 (62.5)	11,900 (56.1)	2,455 (11.4)	NA ^d
III and IV	4,093 (33.0)	6,779 (37.4)	7,730 (35.9)	NA ^d
Unknown	561 (4.5)	1,185 (6.5)	8,097 (37.6)	NA ^d

^a, percentages might not add up to 100% due to approximation; ^b, non-small cell not further defined; ^c, includes American Indian, Chinese, Japanese and other specified types of races; ^d, race, marriage, and grade are not included in Chinese multi-institutional registry; ^e, includes single (never married), separated, divorced, widowed and unmarried or domestic partner. ELNs, examined lymph nodes; IQR, interquartile; SCC, squamous cell carcinoma; AC, adenocarcinoma; ASC, adenosquamous carcinoma; NA, not available.

Table S2 Patient characteristics (before PSM)

Characteristic	Group B, N (%) ^a			Group C, N (%) ^a			Group D, N (%) ^a	
	ELNs <10 (n=11,806)	ELNs ≥10 (n=6,348)	P value	ELNs <10 (n=15,648)	ELNs ≥10 (n=5,874)	P value	ELNs <10 (n=665)	ELNs ≥10 (n=2,337)
Age			0.324			0.034		
<65 years	4,437 (37.6)	2,433 (38.3)		6,240 (39.9)	2,436 (41.5)		414 (62.3)	1,574 (67.4)
≥65 years	7,369 (62.4)	3,915 (61.7)		9,408 (60.1)	3,438 (58.5)		251 (37.6)	763 (32.6)
Sex			0.012			0.000		
Male	5,679 (48.1)	3,178 (50.1)		8,304 (53.1)	3,328 (56.7)		397 (59.7)	1,495 (64.0)
Female	6,127 (51.9)	3,170 (49.9)		7,344 (46.9)	2,546 (43.3)		268 (40.3)	842 (36.0)
T stage			0.000			0.000		
T1	6,017 (51.0)	2,830 (44.6)		7,135 (45.6)	2,314 (39.4)		326 (49.0)	889 (38.0)
T2	5,239 (44.4)	3,137 (49.4)		7,661 (49.0)	3,129 (53.3)		271 (40.8)	1,184 (50.7)
T3	550 (4.7)	381 (6.0)		852 (5.4)	431 (7.3)		68 (10.2)	264 (11.3)
Histology			0.000			0.000		
SCC	3,130 (26.5)	1,931 (30.4)		4,369 (27.9)	1,949 (33.2)		147 (22.1)	690 (29.5)
AC	6,937 (58.8)	3,477 (54.8)		8,832 (56.4)	3,036 (51.7)		470 (70.7)	1,513 (64.7)
SAC	306 (2.6)	155 (2.4)		455 (2.9)	175 (3.0)		24 (3.6)	64 (2.7)
Other ^b	1,433 (12.1)	785 (12.4)		1,992 (12.7)	714 (12.2)		24 (3.6)	70 (3.0)
Race			0.000			0.000		
White	10,014 (84.8)	5,536 (87.2)		13,205 (84.4)	5,113 (87)		NA ^d	NA ^d
Black	987 (8.4)	435 (6.9)		1,375 (8.8)	447 (7.6)		NA ^d	NA ^d
Other	784 (6.6)	372 (5.9)		1,056 (6.7)	312 (5.3)		NA ^d	NA ^d
Unknown ^c	21 (0.2)	5 (0.1)		12 (0.1)	2 (0)		NA ^d	NA ^d
Marital			0.108			0.000		
Married	4,546 (38.5)	2,381 (37.5)		5,640 (36.0)	1,953 (33.2)		NA ^d	NA ^d
Other ^e	6,956 (58.9)	3,826 (60.3)		9,626 (61.5)	3,759 (64.0)		NA ^d	NA ^d
Unknown	304 (2.6)	141 (2.2)		382 (2.4)	162 (2.8)		NA ^d	NA ^d
Grade			0.000			0.000		
I and II	6,745 (57.1)	3,445 (54.3)		7,416 (47.4)	2,769 (47.1)		NA ^d	NA ^d
III and IV	4,281 (36.3)	2,498 (39.4)		6,588 (42.1)	2,617 (44.6)		NA ^d	NA ^d
Unknown	780 (6.6)	405 (6.4)		1,644 (10.5)	488 (8.3)		NA ^d	NA ^d

^a, percentages might not add up to 100% due to approximation; ^b, non-small cell not further defined; ^c, includes American Indian, Chinese, Japanese and other specified types of races; ^d, race, marriage, and grade are not included in Chinese multi-institutional registry; ^e, includes single (never married), separated, divorced, widowed and unmarried or domestic partner. ELNs, examined lymph nodes; SCC, squamous cell carcinoma; AC, adenocarcinoma; ASC, adenosquamous carcinoma; NA, not available.

Table S3 Patient characteristics (after PSM)

Characteristic	Group B, N (%) ^a			Group C, N (%) ^a			Group D, N (%) ^a	
	ELNs <10 (n=6,348)	ELNs ≥10 (n=6,348)	P value	ELNs <10 (n=11,748)	ELNs ≥10 (n=5,874)	P value	ELNs <10 (n=665)	ELNs ≥10 (n=1,330)
Age			0.143			0.149		
<65 years	2,353 (37.1)	2,433 (38.3)		4,739 (40.3)	2,436 (41.5)		414 (62.3)	823 (61.9)
≥65 years	3,995 (62.9)	3,915 (61.7)		7,009 (59.7)	3,438 (58.5)		251 (37.7)	507 (38.1)
Sex			0.915			0.389		
Male	3,172 (50.0)	3,178 (50.1)		6,736 (57.3)	3,328 (56.7)		397 (59.7)	813 (61.1)
Female	3,176 (50.0)	3,170 (49.9)		5,012 (42.7)	2,546 (43.3)		268 (40.3)	517 (38.9)
T stage			0.738			0.265		
T1	2,847 (44.8)	2,830 (44.6)		4,714 (40.1)	2,314 (39.4)		326 (49.0)	649 (48.8)
T2	3,158 (49.7)	3,137 (49.4)		6,244 (53.1)	3,129 (53.3)		271 (40.8)	558 (42.0)
T3	343 (5.4)	381 (6.0)		790 (6.7)	431 (7.3)		68 (10.2)	123 (9.2)
Histology			0.787			0.090		
SCC	1,926 (30.3)	1,931 (30.4)		3,741 (31.8)	1,949 (33.2)		147 (22.1)	297 (22.3)
AC	3,511 (55.3)	3,477 (54.8)		6,302 (53.6)	3,036 (51.7)		470 (70.7)	940 (70.7)
SAC	140 (2.2)	155 (2.4)		317 (2.7)	175 (3.0)		24 (3.6)	40 (3.0)
Other ^b	771 (12.1)	785 (12.4)		1,388 (11.8)	714 (12.2)		24 (3.6)	53 (4.0)
Race			0.838			0.224		
White	5,569 (87.7)	5,536 (87.2)		10,243 (87.2)	5,113 (87)		NA ^d	NA ^d
Black	422 (6.6)	435 (6.9)		905 (7.7)	447 (7.6)		NA ^d	NA ^d
Other ^c	352 (5.5)	372 (5.9)		600 (5.1)	312 (5.3)		NA ^d	NA ^d
Unknown	5 (0.1)	5 (0.1)		0 (0)	2 (0)		NA ^d	NA ^d
Marital			0.765			0.670		
Married	2,370 (37.3)	2,381 (37.5)		3,835 (32.6)	1,953 (33.2)		NA ^d	NA ^d
Other ^e	3,848 (60.6)	3,826 (60.3)		7,598 (64.7)	3,759 (64.0)		NA ^d	NA ^d
Unknown	130 (2.0)	141 (2.2)		315 (2.7)	162 (2.8)		NA ^d	NA ^d
Grade			0.538			0.729		
I and II	3,468 (54.6)	3,445 (54.3)		5,607 (47.7)	2,769 (47.1)		NA ^d	NA ^d
III and IV	2,505 (39.5)	2,498 (39.4)		5,161 (43.9)	2,617 (44.6)		NA ^d	NA ^d
Unknown	375 (5.9)	405 (6.4)		980 (8.3)	488 (8.3)		NA ^d	NA ^d

^a, percentages might not add up to 100% due to approximation; ^b, non-small cell not further defined; ^c, Includes American Indian, Chinese, Japanese and other specified types of races; ^d, race, marriage, and grade are not included in Chinese multi-institutional registry; ^e, includes single (never married), separated, divorced, widowed and unmarried or domestic partner. ELNs, examined lymph nodes; IQR, interquartile; SCC, squamous cell carcinoma; AC, adenocarcinoma; ASC, adenosquamous carcinoma; NA, not available.

Table S4 Cox proportional hazard multivariable analysis results for entire study

Characteristic	Group B, N (%) ^a			Group C, N (%) ^a			Group D, N (%) ^a	
	ELNs <10 (n=11,806)	ELNs ≥10 (n=6,348)	P value	ELNs <10 (n=15,648)	ELNs ≥10 (n=5,874)	P value	ELNs <10 (n=665)	ELNs ≥10 (n=2,337)
Age			0.324			0.034		
<65 years	4,437 (37.6)	2,433 (38.3)		6,240 (39.9)	2,436 (41.5)		414 (62.3)	1,574 (67.4)
≥65 years	7,369 (62.4)	3,915 (61.7)		9,408 (60.1)	3,438 (58.5)		251 (37.6)	763 (32.6)
Sex			0.012			0.000		
Male	5,679 (48.1)	3,178 (50.1)		8,304 (53.1)	3,328 (56.7)		397 (59.7)	1,495 (64.0)
Female	6,127 (51.9)	3,170 (49.9)		7,344 (46.9)	2,546 (43.3)		268 (40.3)	842 (36.0)
T stage			0.000			0.000		
T1	6,017 (51.0)	2,830 (44.6)		7,135 (45.6)	2,314 (39.4)		326 (49.0)	889 (38.0)
T2	5,239 (44.4)	3,137 (49.4)		7,661 (49.0)	3,129 (53.3)		271 (40.8)	1,184 (50.7)
T3	550 (4.7)	381 (6.0)		852 (5.4)	431 (7.3)		68 (10.2)	264 (11.3)
Histology			0.000			0.000		
SCC	3,130 (26.5)	1,931 (30.4)		4,369 (27.9)	1,949 (33.2)		147 (22.1)	690 (29.5)
AC	6,937 (58.8)	3,477 (54.8)		8,832 (56.4)	3,036 (51.7)		470 (70.7)	1,513 (64.7)
SAC	306 (2.6)	155 (2.4)		455 (2.9)	175 (3.0)		24 (3.6)	64 (2.7)
Other ^b	1,433 (12.1)	785 (12.4)		1,992 (12.7)	714 (12.2)		24 (3.6)	70 (3.0)
Race			0.000			0.000		
White	10,014 (84.8)	5,536 (87.2)		13,205 (84.4)	5,113 (87.0)		NA ^d	NA ^d
Black	987 (8.4)	435 (6.9)		1,375 (8.8)	447 (7.6)		NA ^d	NA ^d
Other	784 (6.6)	372 (5.9)		1,056 (6.7)	312 (5.3)		NA ^d	NA ^d
Unknown ^c	21 (0.2)	5 (0.1)		12 (0.1)	2 (0)		NA ^d	NA ^d
Marital			0.108			0.000		
Married	4,546 (38.5)	2,381 (37.5)		5,640 (36.0)	1,953 (33.2)		NA ^d	NA ^d
Other ^e	6,956 (58.9)	3,826 (60.3)		9,626 (61.5)	3,759 (64)		NA ^d	NA ^d
Unknown	304 (2.6)	141 (2.2)		382 (2.4)	162 (2.8)		NA ^d	NA ^d
Grade			0.000			0.000		
I and II	6,745 (57.1)	3,445 (54.3)		7,416 (47.4)	2,769 (47.1)		NA ^d	NA ^d
III and IV	4,281 (36.3)	2,498 (39.4)		6,588 (42.1)	2,617 (44.6)		NA ^d	NA ^d
Unknown	780 (6.6)	405 (6.4)		1,644 (10.5)	488 (8.3)		NA ^d	NA ^d

^a, percentages might not add up to 100% due to approximation; ^b, non-small cell not further defined; ^c, includes American Indian, Chinese, Japanese and other specified types of races; ^d, race, marriage, and grade are not included in Chinese multi-institutional registry; ^e, includes single (never married), separated, divorced, widowed and unmarried or domestic partner. HR, hazard ratio; ELNs, examined lymph nodes; SCC, squamous cell carcinoma; AC, adenocarcinoma; ASC, adenosquamous carcinoma; NA, not available.