

Figure S1 Flow chart of patient population with available data analyzed in the study. ICD-9, International Classification of Diseases 9th revision; ICD-10, International Classification of Diseases 10th revision; NCCN, National Comprehensive Cancer Network; NSCLC, non-small cell lung cancer; ICI, immune checkpoint inhibitor; LOT, line of therapy; chemo, chemotherapy; TTNT, time-to-next treatment; OS, overall survival.

Table S1 Baseline demographic and clinical characteristics of the patient cohort analyzed in this study

Characteristics	Chemo	ICI	Targeted	Total
Age (years), n [%]				
<65	509 [42]	100 [31]	225 [40]	834 [40]
65+	705 [58]	224 [69]	343 [60]	1,272 [60]
Gender, n [%]				
Female	625 [51]	160 [49]	364 [64]	1,149 [55]
Male	589 [49]	164 [51]	204 [36]	957 [45]
Race/ethnicity, n [%]				
African American	227 [19]	73 [23]	70 [12]	370 [18]
Asian	37 [3]	28 [9]	65 [11]	130 [6]
Hispanic	145 [12]	39 [12]	64 [11]	248 [12]
Other	118 [10]	31 [10]	81 [14]	230 [11]
Unknown	93 [8]	14 [4]	66 [12]	173 [8]
White	594 [49]	139 [43]	222 [39]	955 [45]
Histology, n [%]				
Non squamous	624 [51]	186 [57]	337 [59]	1,147 [54]
NSCLC-NOS	371 [31]	93 [29]	209 [37]	673 [32]
Squamous	219 [18]	45 [14]	22 [4]	286 [14]
Smoking status, n [%]				
Current smoker	118 [10]	33 [10]	13 [2]	164 [8]
Former smoker	458 [38]	123 [38]	121 [21]	702 [33]
Never smoker	147 [12]	41 [13]	150 [26]	338 [16]
Unknown	491 [40]	127 [39]	284 [50]	902 [43]
ECOG score category, n [%]				
0	219 [18]	70 [22]	73 [13]	362 [17]
1	262 [22]	74 [23]	86 [15]	422 [20]
2+	102 [8]	53 [16]	48 [8]	203 [10]
Unknown	631 [52]	127 [39]	361 [64]	1,119 [53]

Chemo, chemotherapy; ICI, immune checkpoint inhibitor; NSCLC, non-small cell lung cancer; NOS, not otherwise specified; ECOG, Eastern Cooperative Oncology Group.

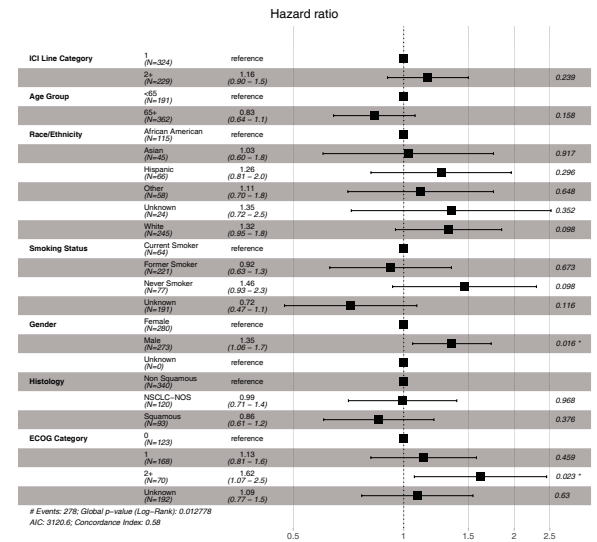
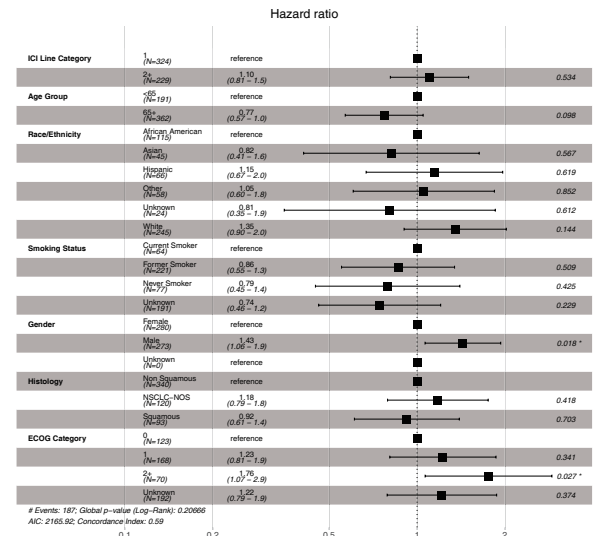
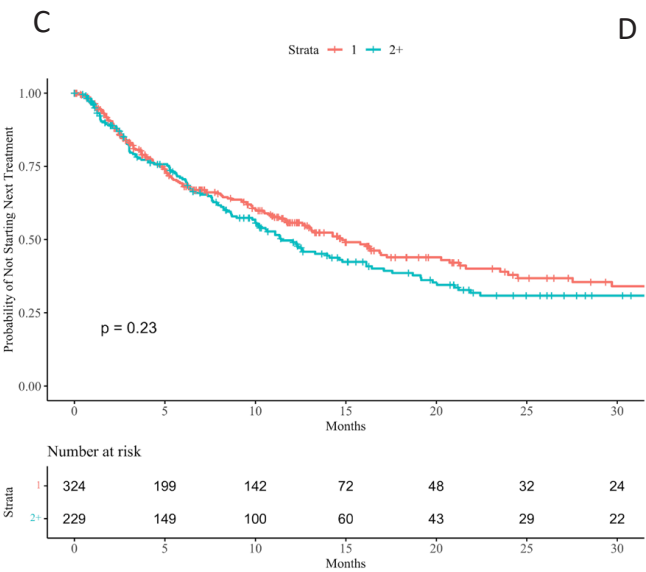
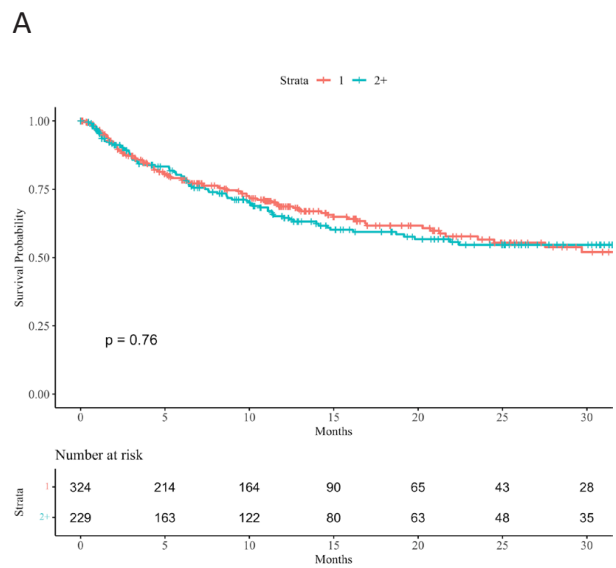


Figure S2 OS (A,B) and TTNT (C,D) in patients treated with ICI in the 1st line vs. 2nd or later lines. (A,C) Kaplan-Meier analysis. (A) Median survival time (95% CI) for the 1st line and 2nd or later line are 35.8 (23.5-NE) and NR (19.8-NE) months respectively. (C) Median survival time (95% CI) for the 1st line and 2nd or later line are 14.8 (12.6-20.7) and 11.4 (10.0-16.1) months respectively. (B,D) Multivariable cox regression. *, 0.01 ≤ P < 0.05. ICI, immune checkpoint inhibitor; NSCLC, non-small cell lung cancer; NOS, not otherwise specified; ECOG, Eastern Cooperative Oncology Group; AIC, Akaike information criterion; OS, overall survival; TTNT, time-to-next treatment; CI, confidence interval; NE, not estimable; NR, not reached.

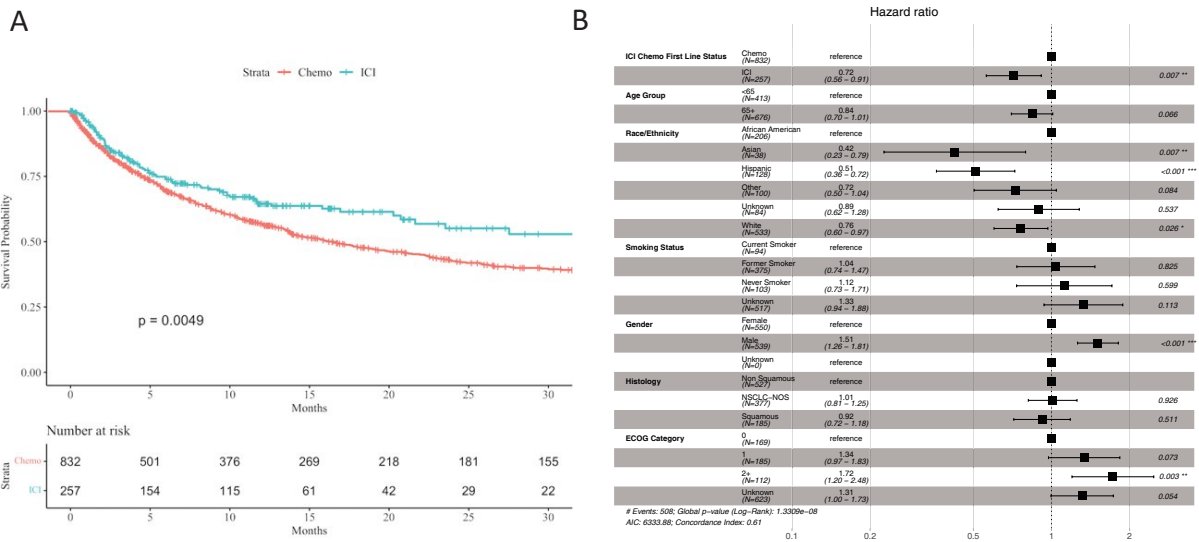


Figure S3 OS of patients who only received chemotherapy or ICI-based therapy as the 1st line treatment but did not receive a 2nd line therapy. (A) Kaplan-Meier analysis. Median survival time (95% CI) for the chemo and ICI group are 16.5 (13.8–20.9) and 35.8 (21.6–NE) months respectively. (B) Multivariable cox regression. *, 0.01 ≤ P < 0.05; **, 0.001 ≤ P < 0.01; ***, P < 0.001. Chemo, chemotherapy; ICI, immune checkpoint inhibitor; NSCLC, non-small cell lung cancer; NOS, not otherwise specified; ECOG, Eastern Cooperative Oncology Group; AIC, Akaike information criterion; OS, overall survival; CI, confidence interval; NE, not estimable.

Table S2 Baseline demographic and clinical characteristics of the patient cohort analyzed in *Figures 4,5*

Characteristics	Chemo-chemo	ICI single-chemo	ICI-chemo-chemo	Total
Age (years), n [%]				
<65	81 [51]	7 [58]	10 [40]	98 [50]
65+	77 [49]	5 [42]	15 [60]	97 [50]
Gender, n [%]				
Female	81 [51]	7 [58]	11 [44]	99 [51]
Male	77 [49]	5 [42]	14 [56]	96 [49]
Race/ethnicity, n [%]				
African American	38 [24]	1 [8]	9 [36]	48 [25]
Asian	7 [4]	2 [17]	3 [12]	12 [6]
Hispanic	12 [8]	2 [17]	5 [20]	19 [10]
Other	17 [11]	1 [8]	1 [4]	19 [10]
Unknown	10 [6]	1 [8]	2 [8]	13 [7]
White	74 [47]	5 [42]	5 [20]	84 [43]
Histology, n [%]				
Non squamous	94 [59]	9 [75]	16 [64]	119 [61]
NSCLC-NOS	40 [25]	2 [17]	3 [12]	45 [23]
Squamous	24 [15]	1 [8]	6 [24]	31 [16]
Smoking status, n [%]				
Current smoker	21 [13]	0 [0]	2 [8]	23 [12]
Former smoker	84 [53]	7 [58]	11 [44]	102 [52]
Never smoker	25 [16]	3 [25]	7 [28]	35 [18]
Unknown	28 [18]	2 [17]	5 [20]	35 [18]
ECOG score category, n [%]				
0	45 [28]	5 [42]	7 [28]	57 [29]
1	44 [28]	6 [50]	10 [40]	60 [31]
2+	12 [8]	1 [8]	5 [20]	18 [9]
Unknown	57 [36]	0 [0]	3 [12]	60 [31]

Chemo, chemotherapy; ICI, immune checkpoint inhibitor; NSCLC, non-small cell lung cancer; NOS, not otherwise specified; ECOG, Eastern Cooperative Oncology Group.