A

| Variables                                                                 | OS       |
|---------------------------------------------------------------------------|----------|
|                                                                           | HR       | 95%CI     | P value |
| Age (21-49 vs 50-59 vs >=60y)                                             | 1.25     | (1.18,1.33)| <0.001  |
| Race (white vs black vs other vs unknow)                                  | 0.85     | (0.80,0.90)| <0.001  |
| Gender (female vs male)                                                   | 1.18     | (1.10,1.27)| <0.001  |
| Marriage (Single vs married vs unknow*)                                    | 0.93     | (0.87,0.99)| 0.030   |
| Grade (I vs II vs III vs IV vs unknow)                                    | 0.99     | (0.96,1.01)| 0.312   |
| Pathology (AD vs SCC vs LCC vs Other*)                                     | 1.14     | (1.09,1.19)| <0.001  |
| Stage T (T1 vs T2 vs T3 vs T4)                                             | 1.08     | (1.05,1.12)| <0.001  |
| Stage N (N1 vs N2 vs N3 vs N4 vs Nx)                                      | 1.07     | (1.04,1.11)| <0.001  |
| Primary site surgery (No vs Yes)                                          | 0.66     | (0.45,0.98)| 0.038   |
| Radiotherapy (No vs Yes)                                                  | 0.93     | (0.75,1.14)| 0.471   |
| Chemotherapy (No vs Yes)                                                  | 0.30     | (0.27,0.32)| <0.001  |
| Number of involved extracranial organs (0 vs 1 vs 2 vs >=3)              | 1.21     | (1.16,1.26)| <0.001  |

Abbreviation:  HR: hazard ratio; 95% CI: 95% confidence interval; AD: adenocarcinoma; SCC: squamous cell carcinoma; LCC: large cell carcinoma; OS: overall survival

B

| Variables                                                                 | CSS      |
|---------------------------------------------------------------------------|----------|
|                                                                           | HR       | 95%CI     | P value |
| Age (21-49 vs 50-59 vs >=60y)                                             | 1.14     | (1.07,1.21)| <0.001  |
| Race (white vs black vs other vs unknow)                                  | 0.94     | (0.88,0.99)| 0.032   |
| Gender (female vs male)                                                   | 1.04     | (0.97,1.12)| 0.290   |
| Marriage (Single vs married vs unknow*)                                    | 0.98     | (0.91,1.05)| 0.482   |
| Grade (I vs II vs III vs IV vs unknow)                                    | 1.02     | (0.99,1.05)| 0.327   |
| Pathology (AD vs SCC vs LCC vs Other*)                                     | 1.09     | (1.04,1.14)| <0.001  |
| Stage T (T1 vs T2 vs T3 vs T4)                                             | 1.07     | (1.03,1.11)| <0.001  |
| Stage N (N1 vs N2 vs N3 vs N4 vs Nx)                                      | 1.04     | (1.00,1.08)| 0.042   |
| Primary site surgery (No vs Yes)                                          | 1.15     | (0.78,1.71)| 0.485   |
| Radiotherapy (No vs Yes)                                                  | 0.91     | (0.73,1.13)| 0.391   |
| Chemotherapy (No vs Yes)                                                  | 0.34     | (0.31,0.37)| <0.001  |
| Number of involved extracranial organs (0 vs 1 vs 2 vs >=3)              | 1.14     | (1.10,1.19)| <0.001  |

Abbreviation:  HR: hazard ratio; 95% CI: 95% confidence interval; AD: adenocarcinoma; SCC: squamous cell carcinoma; LCC: large cell carcinoma; OS: overall survival

Supplementary figure 4