

**Supplemental online Figure 1.** Analysis of survival advanced Upper tract urothelial carcinoma patients at 18 Surveillance, Epidemiology, and End Results Program sites according to sex from 2004 to 2015. (A): 12-, 24-, and 36-month relative survival rates (RSRs) according to sex. (B): Kaplan-Meier survival curves for overall survival according to sex and study periods. (C): Kaplan-Meier survival curves for cancer specific survival according to sex and study periods.



**Supplemental online Figure 2.** Analysis of survival advanced Upper tract urothelial carcinoma patients at 18 Surveillance, Epidemiology, and End Results Program sites according to race from 2004 to 2015. (A): 12-, 24-, and 36-month relative survival rates (RSRs) according to race. (B): Kaplan-Meier survival curves for overall survival according to race and study periods. (C): Kaplan-Meier survival curves for cancer specific survival according to race and study periods.



**Supplemental online Figure 3.** Analysis of survival advanced Upper tract urothelial carcinoma patients at 18 Surveillance, Epidemiology, and End Results Program sites according to sex from 2004 to 2015. (A): Kaplan-Meier survival curves for overall survival according to sex and age. (B): Kaplan-Meier survival curves for cancer specific survival according to sex and age.



**Supplemental online Figure 4.** Analysis of survival advanced Upper tract urothelial carcinoma patients at 18 Surveillance, Epidemiology, and End Results Program sites according to race from 2004 to 2015. (A): Kaplan-Meier survival curves for overall survival according to race and age. (B): Kaplan-Meier survival curves for cancer specific survival according to race and age.

**Supplemental Table 1.** Incidence of I-II UTUC and III-IV UTUC based mortality rate per 100000 patients diagnosed with UTUC with time

|  |  |
| --- | --- |
| **Variables** | **Incidence rate % (n\*)** |
| **2004-2007** | **2008-2011** | **2012-2015** |
| Stage | 　 | 　 | 　 |
| I-II | 0.64 (2116) | 0.63 (2160) | 0.58 (2058) |
| III-IV | 0.69 (2287) | 0.74 (2524) | 0.77 (2712) |
| Age(years)\*\* | 　 | 　 | 　 |
| ≤73 | 0.37 (1162) | 0.40 (1303) | 0.43 (1434) |
| 74-82 | 6.40 (849) | 6.61 (883) | 6.69 (928) |
| ≥83 | 5,63 (276) | 5.93 (338) | 5.50 (350) |
| Sex\*\* | 　 | 　 | 　 |
| Male | 0.82 (1329) | 0.88 (1493) | 0.92 (1607) |
| Female | 0.57 (958) | 0.59 (1031) | 0.62 (1105) |
| Race\*\* | 　 | 　 | 　 |
| White | 0.80 (2014) | 0.85 (2199) | 0.88 (2334) |
| Black | 0.25 (103) | 0.29 (125) | 0.30 (135) |
| Other\*\*\* | 0.47 (168) | 0.48 (196) | 0.53 (235) |
| SES\* | 　 | 　 | 　 |
| Poor | 0.67 (1457) | 0.71 (1613) | 0.72 (1696) |
| Rich | 0.75 (830) | 0.79 (910) | 0.85 (1016) |

\*. referring to the possible occurrence of the disease within the 18 SEER Sites at the same time.

\*\*. the incidence rate of stage III-IV UTUC.

\*\*\*. American Indian, Aleutian, Alaskan Native, Eskimo (includes all indigenous populations of the western hemisphere), Chinese and Japanese.

**Supplemental Table 2.** Thirty six-month relative survival rates in stage III-IV UTUC at 18 Surveillance, Epidemiology, and End Results Program sites according to sex, age group, and study periods from 2004 to 2015

|  |  |
| --- | --- |
| Age group, years | Mean±SEM (n) |
| Male | Female |
| 2004-2007 | 　 | 　 |
| All | 37.4±1.9 (656) | 32.1±2.1 (505) |
| ≤73 | 49.4±2.5 (396) | 48.4±3.4 (221) |
| 74-82 | 23.5±3.1 (184) | 25.9±3.3 (179) |
| ≥83 | 9.2±3.3 (76) | 8.6±2.7 (105) |
| 2008-2011 |  |  |
| All | 46.8±1.8 (789) | 40.1±2.1 (570)\* |
| ≤73 | 54.2±2.3 (462) | 52.6±3.2 (251) |
| 74-82 | 41.8±3.2 (234) | 39.4±3.6 (186) |
| ≥83 | 22.6±4.3 (93) | 17.5±3.3 (133) |
| 2012-2015 | 　 | 　 |
| All | 56.6±2.0 (1142) | 57.9±2.2 (811) |
| ≤73 | 63.2±2.7 (623) | 67.4±3.1 (370) |
| 74-82 | 53.9±3.5 (355) | 56.6±4.1 (259) |
| ≥83 | 36.1±5.8 (164) | 42.6±4.6 (182) |

\* p<0.01 compared with the previous period.

Abbreviation: SEM, standard error of the mean.

**Supplemental Table 3.** Thirty six-month relative survival rates in stage III-IV UTUC at 18 Surveillance, Epidemiology, and End Results Program sites according to race, age group, and study periods from 2004 to 2015

|  |  |
| --- | --- |
| Age group, years | Mean±SEM (n) |
| White | Black | Other |
| 2004-2007 | 　 | 　 | 　 |
| All | 34.6±1.5 (1009) | 35.7±6.4 (56) | 40.5±5.1 (96) |
| ≤73 | 49.0±2.2 (522) | 42.1±8.0 (38) | 53.6±6.7 (57) |
| 74-82 | 24.2±2.4 (328) | 16.7±10.8 (12) | 36.8±10.3 (23) |
| ≥83 | 8.8±2.2 (159) | 33.3±10.2 (6) | 6.3±6.1 (16) |
| 2008-2011 |  |  |  |
| All | 44.2±1.4 (1183) | 38.8±6.4 (59) | 46.4±4.8 (117) |
| ≤73 | 55.3±2.0 (611) | 43.5±7.8 (41) | 43.5±6.5 (61)\* |
| 74-82 | 39.6±2.6 (369) | 22.2±13.9 (9) | 55.8±7.9 (43) |
| ≥83 | 19.2±2.8 (204) | 11.1±10.5 (9) | 30.8±12.8 (13) |
| 2012-2015 | 　 | 　 | 　 |
| All | 58.2±1.6 (1676) | 45.8±7.9 (95) | 53.0±5.2 (182) |
| ≤73 | 66.4±2.1 (837) | 49.5±10.6 (62) | 60.0±7.0 (94) |
| 74-82 | 56.5±2.8 (535) | 38.4±13.2 (21) | 43.9±10.2 (58) |
| ≥83 | 39.3±3.9 (304) | 40.0±14.6 (12) | 48.7±10.7 (30) |

\* p<0.01 compared with the previous period.

Abbreviation: SEM, standard error of the mean.

**Supplemental Table 4.** Thirty six-month relative survival rates in stage III-IV UTUC at 18 Surveillance, Epidemiology, and End Results Program sites according to SES, age group, and study periods from 2004 to 2015

|  |  |
| --- | --- |
| Age group, years | Mean±SEM (n) |
| Poor | Rich |
| 2004-2007 | 　 | 　 |
| All | 34.1±1.7 (743) | 36.4±2.9 (418) |
| ≤73 | 49.3±2.6 (383) | 48.5±3.3 (234) |
| 74-82 | 22.2±2.6 (255) | 30.6±4.4 (108) |
| ≥83 | 7.6±2.6 (105) | 10.5±3.5 (76） |
| 2008-2011 |  |  |
| All | 41.1±1.7 (882) | 49.3±2.3 (477)\*\* |
| ≤73 | 50.6±2.3 (465) | 59.4±3.1 (248)\*\* |
| 74-82 | 35.5±2.9 (280) | 51.5±4.3 (140)\* |
| ≥83 | 20.6±3.5 (137) | 18.0±4.1 (89) |
| 2012-2015 | 　 | 　 |
| All | 56.7±1.9 (1213) | 57.7±2.5 (740) |
| ≤73 | 64.5±2.6 (621) | 65.5±3.3 (372) |
| 74-82 | 55.3±3.3 (377) | 54.0±4.6 (237) |
| ≥83 | 38.1±4.5 (255) | 42.8±6.1 (131) |

\* p<0.01 compared with the previous period.

\*\* p<0.05 compared with the previous period.

Abbreviation: SEM, standard error of the mean; SES, socioeconomic status.