

Title

Racial and Ethnic Disparities in Nasopharyngeal Cancer with an Emphasis among Asian Americans

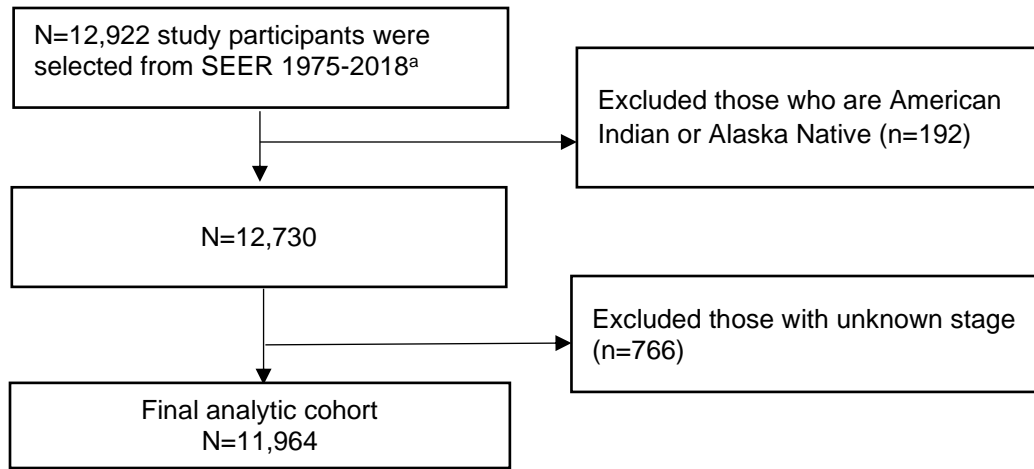
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Supplementary Figure 1. Participants' selection flowchart



^a SEER*stat selection criteria included: 1) aged 15 years old or above; 2) diagnosed between 1975-2018; 3) with available race/ethnicity information; 4) microscopically confirmed malignant nasopharyngeal cancer; 5) cancer as one primary only or 1st of 2 or more primaries; and 6) with active follow-up.

Supplementary Table 1. Definition of other Asian and Pacific Islanders (1975-2018).^a

| Asian and Pacific Islander subgroups | N (%) |
|--------------------------------------|------------|
| Other Asian (1991+) | 298 (57.3) |
| Samoaan (1991+) | 48 (9.2) |
| Hmong (1988+) | 46 (8.6) |
| Thai (1994+) | 35 (6.7) |
| Micronesian, NOS (1991+) | 22 (4.2) |
| Pacific Islander, NOS (1991+) | 18 (3.5) |
| Guamanian, NOS (1991+) | 15 (2.9) |
| Other | 15 (2.9) |
| Polynesian, NOS (1991+) | <11 (<2%) |
| Tongan (1991+) | <11 (<2%) |
| Fiji Islander (1991+) | <11 (<2%) |
| Pakistani (2010+) | <11 (<2%) |
| Melanesian, NOS (1991+) | <11 (<2%) |

^a Data from fewer than 11 patients were masked to maintain patient confidentiality.

Supplementary Table 2. Age-adjusted incidence rate of nasopharyngeal cancer for Guamanian and Samoan, per 100,000 (SEER 9, 1990-2014).^{a,b}

| | Guamanian | Samoan |
|--------------------|-------------------|--------------------|
| IRR ^c | 6.77 (4.09-10.76) | 10.45 (7.37-14.42) |
| AAIR | 3.46 (2.09-5.49) | 5.34 (3.77-7.35) |
| Age | | |
| ≤ 39 | 0.62 (0.13-1.83) | 0.51 (0.14-1.32) |
| 40-49 | 4.51 (1.65-9.79) | 7.44 (4.25-12.09) |
| 50-59 | 7.86 (3.15-16.21) | 12.02 (6.87-19.55) |
| 60-69 | 9.72 (2.59-24.64) | 7.08 (2.28-16.66) |
| ≥ 70 | 2.36 (0.06-18.26) | 10.94 (3.49-26.67) |
| Sex | | |
| Male | 4.77 (2.51-8.58) | 9.36 (6.19-13.63) |
| Female | 2.28 (0.88-5.03) | 1.79 (0.84-3.52) |
| Histology | | |
| KSCC | 0.96 (0.30-2.40) | 2.03 (1.08-3.49) |
| DNKC | 1.17 (0.46-2.60) | 1.29 (0.61-2.46) |
| UNKC | 0.78 (0.23-2.11) | 0.59 (0.22-1.45) |
| Other ^d | 0.55 (0.14-1.72) | 1.42 (0.69-2.63) |

^a Rates are per 100,000 and age-adjusted to the 2000 US Std Population (18 age groups - Census P25-1130) standard; Confidence intervals (Tiwari modification) are 95% for rates.

^b Due to missing of numbers in certain years, the APC was not able to be calculated for Guamanian and Samoan.

^c IRR indicates the AAIR of Guamanian and Samoan comparing to it of non-Hispanic White. Results are statistically significant when the IRR does not cross 1.

^d Other histology included carcinoma, not other specified, malignant tumors of bone, lymphomas, and other non-epithelial tissues.

Abbreviations: AAIR= age-adjusted incidence rate; DNKC= differentiated non-keratinizing carcinoma; IRR=incidence rate ratio; KSCC= keratinizing squamous cell carcinoma; UNKC= undifferentiated non-keratinizing carcinoma.

Supplementary Table 3. Incidence rate ratio (IRR) comparing racial/ethnic groups by age groups (SEER 9, 1990-2014).

| | | Incidence Rate Ratio ^a |
|--------------------|--|-----------------------------------|
| <i>Age</i> | | |
| 15-39 | | |
| NHW | | REF |
| NHB | | 2.56 (2.01-3.25) |
| Hispanic | | 1.29 (1.02-1.64) |
| Chinese | | 22.22 (19.15-25.78) |
| Filipino | | 8.02 (6.51-9.83) |
| Vietnamese | | 14.79 (11.84-18.36) |
| Hawaiian | | 6.34 (3.89-9.79) |
| Japanese | | 1.64 (0.77-3.05) |
| Laotian | | 20.62 (12.18-32.57) |
| Korean | | 3.43 (2.17-5.18) |
| Cambodian | | 15.21 (8.39-25.13) |
| Indian/Pakistani | | 1.41 (0.74-2.43) |
| Guamanian/Chamorro | | 5.34 (1.08-15.82) |
| Samoan | | 4.40 (1.16-11.37) |
| 40-49 | | |
| NHW | | REF |
| NHB | | 2.46 (1.98-3.04) |
| Hispanic | | 0.96 (0.74-1.23) |
| Chinese | | 23.44 (20.82-26.38) |
| Filipino | | 10.89 (9.34-12.66) |
| Vietnamese | | 17.64 (14.74-21.02) |
| Hawaiian | | 6.62 (4.29-9.80) |
| Japanese | | 0.95 (0.45-1.76) |
| Laotian | | 29.51 (19.86-42.35) |
| Korean | | 2.59 (1.65-3.89) |
| Cambodian | | 14.05 (8.26-22.40) |
| Indian/Pakistani | | 0.61 (0.25-1.28) |
| Guamanian/Chamorro | | 11.24 (4.11-24.55) |
| Samoan | | 18.54 (10.52-30.38) |
| 50-59 | | |
| NHW | | REF |
| NHB | | 1.42 (1.16-1.74) |
| Hispanic | | 0.94 (0.76-1.16) |
| Chinese | | 13.72 (12.33-15.25) |
| Filipino | | 6.06 (5.24-7.00) |
| Vietnamese | | 10.59 (8.86-12.57) |
| Hawaiian | | 4.44 (2.91-6.50) |
| Japanese | | 0.87 (0.51-1.41) |

| | |
|--------------------|---------------------|
| Laotian | 23.70 (16.42-33.18) |
| Korean | 1.43 (0.88-2.20) |
| Cambodian | 7.72 (4.31-12.79) |
| Indian/Pakistani | 1.48 (0.94-2.24) |
| Guamanian/Chamorro | 9.21 (3.69-19.08) |
| Samoan | 14.10 (8.02-23.03) |
| 60-69 | |
| NHW | REF |
| NHB | 1.34 (1.06-1.66) |
| Hispanic | 0.94 (0.74-1.18) |
| Chinese | 9.23 (8.15-10.43) |
| Filipino | 4.39 (3.71-5.18) |
| Vietnamese | 6.36 (5.02-7.97) |
| Hawaiian | 4.95 (3.24-7.24) |
| Japanese | 1.28 (0.86-1.84) |
| Laotian | 10.01 (5.14-17.62) |
| Korean | 1.39 (0.83-2.18) |
| Cambodian | 6.96 (3.45-12.55) |
| Indian/Pakistani | 0.91 (0.48-1.56) |
| Guamanian/Chamorro | 7.45 (1.98-18.93) |
| Samoan | 5.43 (1.74-12.81) |
| 70+ | |
| NHW | REF |
| NHB | 1.37 (1.07-1.73) |
| Hispanic | 1.12 (0.88-1.43) |
| Chinese | 6.47 (5.57-7.49) |
| Filipino | 4.76 (3.96-5.68) |
| Vietnamese | 6.80 (5.08-8.95) |
| Hawaiian | 3.58 (2.07-5.73) |
| Japanese | 1.19 (0.81-1.69) |
| Laotian | 12.59 (5.98-23.48) |
| Korean | 0.89 (0.40-1.73) |
| Cambodian | 9.04 (4.06-17.52) |
| Indian/Pakistani | 0.80 (0.29-1.82) |
| Guamanian/Chamorro | 2.02 (0.05-15.64) |
| Samoan | 9.36 (2.98-22.86) |

^a Results are statistically significant when the incidence rate ratio does not cross 1.

Abbreviations: NHB=non-Hispanic Black; NHW=non-Hispanic White; NPC= nasopharyngeal cancer; REF= Reference.

Supplementary Table 4. Incidence rate ratio (IRR) comparing racial/ethnic groups by sex and histology type (SEER 9, 1990-2014).

| | | Incidence Rate Ratio ^a |
|------------------|--------------------|-----------------------------------|
| <i>Sex</i> | | |
| Male | | |
| | NHW | |
| | NHB | 1.80 (1.60-2.02) |
| | Hispanic | 1.01 (0.88-1.16) |
| | Chinese | 13.38 (12.54-14.28) |
| | Filipino | 6.76 (6.19-7.39) |
| | Vietnamese | 10.25 (9.17-11.43) |
| | Hawaiian | 5.81 (4.66-7.17) |
| | Japanese | 1.26 (0.97-1.60) |
| | Laotian | 18.06 (13.79-23.27) |
| | Korean | 1.62 (1.22-2.11) |
| | Cambodian | 10.13 (7.32-13.73) |
| | Indian/Pakistani | 1.04 (0.72-1.44) |
| | Guamanian/Chamorro | 6.38 (3.35-11.48) |
| | Samoan | 12.50 (8.25-18.25) |
| Female | | |
| | NHW | REF |
| | NHB | 1.56 (1.30-1.86) |
| | Hispanic | 1.13 (0.94-1.36) |
| | Chinese | 12.84 (11.64-14.14) |
| | Filipino | 6.08 (5.33-6.92) |
| | Vietnamese | 9.38 (7.83-11.16) |
| | Hawaiian | 2.87 (1.78-4.38) |
| | Japanese | 1.11 (0.73-1.61) |
| | Laotian | 17.32 (11.49-25.17) |
| | Korean | 1.95 (1.36-2.72) |
| | Cambodian | 8.81 (5.09-14.16) |
| | Indian/Pakistani | 0.86 (0.49-1.45) |
| | Guamanian/Chamorro | 7.68 (2.94-16.99) |
| | Samoan | 6.01 (2.83-11.87) |
| <i>Histology</i> | | |
| KSCC | | |
| | NHW | REF |
| | NHB | 1.49 (1.28-1.74) |
| | Hispanic | 0.72 (0.59-0.86) |
| | Chinese | 5.82 (5.23-6.46) |
| | Filipino | 3.44 (2.99-3.95) |
| | Vietnamese | 5.14 (4.26-6.17) |
| | Hawaiian | 3.44 (2.44-4.72) |

| | | |
|------|--------------------|---------------------|
| | Japanese | 0.92 (0.65-1.27) |
| | Laotian | 10.98 (7.30-15.93) |
| | Korean | 0.95 (0.62-1.41) |
| | Cambodian | 5.87 (3.38-9.49) |
| | Indian/Pakistani | 0.69 (0.38-1.17) |
| | Guamanian/Chamorro | 3.93 (1.22-9.82) |
| | Samoan | 8.31 (4.40-14.31) |
| DNKC | | |
| | NHW | REF |
| | NHB | 2.05 (1.59-2.61) |
| | Hispanic | 1.10 (0.82-1.44) |
| | Chinese | 18.49 (16.16-21.14) |
| | Filipino | 9.79 (8.23-11.60) |
| | Vietnamese | 16.66 (13.48-20.45) |
| | Hawaiian | 6.73 (4.10-10.42) |
| | Japanese | 1.50 (0.86-2.46) |
| | Laotian | 30.41 (18.10-48.01) |
| | Korean | 2.43 (1.37-4.00) |
| | Cambodian | 10.81 (5.32-20.12) |
| | Indian/Pakistani | 1.15 (0.54-2.25) |
| | Guamanian/Chamorro | 17.39 (6.80-38.94) |
| | Samoan | 19.21 (8.96-36.86) |
| UNKC | | |
| | NHW | REF |
| | NHB | 1.77 (1.37-2.27) |
| | Hispanic | 1.31 (1.00-1.68) |
| | Chinese | 25.45 (22.52-28.76) |
| | Filipino | 12.00 (10.26-14.01) |
| | Vietnamese | 16.88 (13.70-20.67) |
| | Hawaiian | 10.54 (7.23-14.90) |
| | Japanese | 1.71 (1.01-2.73) |
| | Laotian | 25.65 (15.67-40.24) |
| | Korean | 2.75 (1.70-4.26) |
| | Cambodian | 13.38 (7.12-23.41) |
| | Indian/Pakistani | 1.97 (1.06-3.42) |
| | Guamanian/Chamorro | 11.43 (3.28-30.96) |
| | Samoan | 8.69 (3.14-21.27) |

^a Results are statistically significant when the incidence rate ratio does not cross 1.

Abbreviations: NHB=non-Hispanic Black; NHW= non-Hispanic White; DNKC= differentiated non-keratinizing carcinoma; KSCC= keratinizing squamous cell carcinoma; NPC= nasopharyngeal cancer; REF= Reference; UNKC= undifferentiated non-keratinizing carcinoma.

Supplementary Table 5. Treatment modality that documented by SEER database.^{a,b,c}

| Treatment, # (%) | Total | NHW | NHB | Hispanics | Chinese | Filipino | Vietnamese | Hawaiian | Japanese | Laotian | Korean | Cambodian | Indian /Pakistani | Other API | P- value ^d |
|---------------------------------|-----------------|-----------------|---------------|------------|-----------------|---------------|------------|-----------|-----------|--------------|-----------|-----------|----------------------|------------|--------------------------|
| RT only | 2,915 (24.4) | 1,371 (27.6) | 260 (19.8) | 146 (16.8) | 650 (29.5) | 197 (21.3) | 81 (13.7) | 43 (30.5) | 51 (44.7) | 11 (11.7) | 15 (16.7) | <11 | <11 | 77 (14.8) | <0.000 1 |
| CT only | 577 (4.8) | 228 (4.6) | 99 (7.6) | 46 (5.3) | 74 (3.4) | 42 (4.6) | 34 (5.7) | <11 | <11 | <11 | <11 | <11 | <11 | 28 (5.4) | |
| Both RT and CT | 7,332 (61.3) | 2,784 (56.0) | 814 (62.0) | 588 (67.6) | 1,378 (62.5) | 618 (66.9) | 427 (72.1) | 79 (56.0) | 50 (43.9) | 66 (70.2) | 65 (72.2) | 49 (71.0) | 52 (83.9) | 362 (69.6) | |
| No/unknow for both CT and RT | 1,140 (9.5) | 587 (11.8) | 139 (10.6) | 90 (10.3) | 104 (4.7) | 67 (7.3) | 50 (8.5) | >10 (>5) | <11 | <11 | <11 | <11 | <11 | 53 (10.2) | |

^a According to the SEER, "RT data are classified by the type of RT received or "no/unknown – no evidence of radiation was found in the medical records examined". CT data are categorized as either "yes – patient had chemotherapy" or "no/unknown – no evidence of chemotherapy was found in the medical records examined." In addition, SEER treatment data only collect information as the first course of treatment. Hence, limitation of SEER treatment data exists.

^b Data from fewer than 11 patients were masked to maintain patient confidentiality.

^c Vietnamese, Cambodian, Korean, Laotian cases were separate and captured by SEER only after year of 1988.

^d Chi-square test was used to compute the p-value.

Abbreviations: API=Asian/Pacific Islanders; NHB= non-Hispanic Black; NHW=non-Hispanic White; CT=chemotherapy; RT=radiation therapy.

Supplementary Table 6. Overall mortality and cause-specific mortality by ethnic groups in AA NPC patients, stratified by sex (SEER 18, 1975-2018).^{a,b}

| | Overall ^c | | | Female ^d | | | Male ^d | | |
|---------------------------|----------------------|--------------------|------------------------------------|---------------------|--------------------|------------------------------------|-------------------|--------------------|------------------------------------|
| | HR (95% CI) | Unadjusted P-value | Holm-adjusted P-value ^e | HR (95% CI) | Unadjusted P-value | Holm-adjusted P-value ^e | HR (95% CI) | Unadjusted P-value | Holm-adjusted P-value ^e |
| Overall mortality | | | | | | | | | |
| Chinese | REF | | | REF | | | REF | | |
| Filipino | 1.01 (0.88-1.15) | 0.89 | 1.00 | 0.80 (0.62-1.05) | 0.11 | 1.00 | 1.05 (0.90-1.22) | 0.52 | 1.00 |
| Vietnamese | 1.23 (1.04-1.44) | 0.01 | 0.49 | 0.88 (0.62-1.25) | 0.48 | 1.00 | 1.25 (1.05-1.50) | 0.01 | 0.49 |
| Hawaiian | 1.38 (1.05-1.83) | 0.02 | 0.82 | 1.23 (0.73-2.07) | 0.45 | 1.00 | 1.14 (0.85-1.53) | 0.40 | 1.00 |
| Japanese | 1.44 (1.10-1.88) | 0.01 | 0.32 | 1.34 (0.79-2.28) | 0.28 | 1.00 | 1.33 (0.98-1.81) | 0.07 | 1.00 |
| Laotian | 2.19 (1.59-3.02) | <0.0001 | <0.0001 | 1.41 (0.76-2.64) | 0.28 | 1.00 | 2.19 (1.53-3.13) | <0.0001 | <0.001 |
| Korean | 0.94 (0.63-1.38) | 0.74 | 1.00 | 0.58 (0.27-1.25) | 0.16 | 1.00 | 0.98 (0.62-1.53) | 0.91 | 1.00 |
| Cambodian | 1.43 (0.95-2.16) | 0.09 | 1.00 | 1.66 (0.78-3.56) | 0.19 | 1.00 | 1.10 (0.70-1.72) | 0.68 | 1.00 |
| Indian /Pakistani | 0.83 (0.47-1.49) | 0.54 | 1.00 | 0.26 (0.04-1.84) | 0.18 | 1.00 | 0.93 (0.51-1.70) | 0.82 | 1.00 |
| Other APIs | 1.29 (1.03-1.61) | 0.02 | 0.82 | 1.10 (0.77-1.57) | 0.61 | 1.00 | 1.09 (0.88-1.35) | 0.42 | 1.00 |
| NPC-specific mortality | | | | | | | | | |
| Chinese | REF | | | REF | | | REF | | |
| Filipino | 0.86 (0.72-1.03) | 0.09 | 1.00 | 0.72 (0.50-1.03) | 0.07 | 1.00 | 0.91 (0.75-1.12) | 0.38 | 1.00 |
| Vietnamese | 1.00 (0.81-1.23) | 0.96 | 1.00 | 0.82 (0.52-1.30) | 0.41 | 1.00 | 1.06 (0.84-1.34) | 0.64 | 1.00 |
| Hawaiian | 0.86 (0.61-1.22) | 0.39 | 1.00 | 0.98 (0.47-2.04) | 0.95 | 1.00 | 0.80 (0.54-1.19) | 0.27 | 1.00 |
| Japanese | 0.80 (0.52-1.25) | 0.33 | 1.00 | 1.03 (0.45-2.35) | 0.94 | 1.00 | 0.74 (0.44-1.24) | 0.25 | 1.00 |
| Laotian | 1.10 (0.70-1.73) | 0.68 | 1.00 | 1.31 (0.56-3.04) | 0.53 | 1.00 | 1.02 (0.59-1.77) | 0.94 | 1.00 |
| Korean | 1.06 (0.71-1.56) | 0.79 | 1.00 | 0.92 (0.45-1.91) | 0.83 | 1.00 | 1.10 (0.69-1.77) | 0.69 | 1.00 |
| Cambodian | 1.40 (0.87-2.24) | 0.16 | 1.00 | 1.65 (0.66-4.12) | 0.28 | 1.00 | 1.35 (0.77-2.35) | 0.29 | 1.00 |
| Indian/Pakistani | 0.89 (0.48-1.64) | 0.71 | 1.00 | 0.38 (0.07-2.04) | 0.26 | 1.00 | 1.05 (0.54-2.07) | 0.88 | 1.00 |
| Other APIs | 0.97 (0.76-1.23) | 0.78 | 1.00 | 1.14 (0.71-1.82) | 0.60 | 1.00 | 0.91 (0.69-1.21) | 0.51 | 1.00 |
| CVD-specific mortality | | | | | | | | | |
| Chinese | REF | | | REF | | | REF | | |
| Filipino | 1.09 (0.70-1.70) | 0.70 | 1.00 | 0.98 (0.36-2.65) | 0.97 | 1.00 | 1.07 (0.64-1.80) | 0.80 | 1.00 |
| Vietnamese | 1.04 (0.57-1.91) | 0.89 | 1.00 | NA | <.0001 | NA | 1.39 (0.74-2.60) | 0.30 | 1.00 |
| Hawaiian | 1.21 (0.52-2.82) | 0.66 | 1.00 | 0.79 (0.07-8.65) | 0.85 | 1.00 | 1.23 (0.49-3.05) | 0.66 | 1.00 |
| Japanese | 0.46 (0.15-1.46) | 0.19 | 1.00 | NA | <.0001 | NA | 0.58 (0.18-1.90) | 0.37 | 1.00 |
| Laotian | 1.21 (0.29-5.11) | 0.79 | 1.00 | 1.54 (0.11-22.45) | 0.75 | 1.00 | 0.80 (0.11-5.90) | 0.82 | 1.00 |
| Korean | 1.28 (0.31-5.36) | 0.74 | 1.00 | 2.34 (0.27-20.36) | 0.44 | 1.00 | 0.87 (0.11-6.67) | 0.90 | 1.00 |
| Cambodian | 1.35 (0.40-4.57) | 0.63 | 1.00 | NA | <.0001 | NA | 1.72 (0.53-5.63) | 0.37 | 1.00 |
| Indian /Pakistani | 1.47 (0.20-10.79) | 0.70 | 1.00 | NA | <.0001 | NA | 2.01 (0.27-14.97) | 0.50 | 1.00 |
| Other APIs | 0.99 (0.49-1.98) | 0.97 | 1.00 | 0.29 (0.04-2.11) | 0.22 | 1.00 | 1.18 (0.55-2.53) | 0.68 | 1.00 |
| Cancer-specific mortality | | | | | | | | | |
| Chinese | REF | | | REF | | | REF | | |
| Filipino | 1.14 (0.81-1.60) | 0.45 | 1.00 | 0.83 (0.39-1.79) | 0.63 | 1.00 | 1.22 (0.83-1.78) | 0.32 | 1.00 |
| Vietnamese | 1.44 (0.98-2.11) | 0.06 | 1.00 | 0.56 (0.17-1.88) | 0.35 | 1.00 | 1.67 (1.10-2.54) | 0.02 | 0.63 |
| Hawaiian | 2.14 (1.25-3.68) | 0.01 | 0.25 | 1.27 (0.34-4.68) | 0.72 | 1.00 | 2.26 (1.24-4.13) | 0.01 | 0.35 |
| Japanese | 2.85 (1.71-4.73) | <0.0001 | <0.01 | 3.78 (1.28-11.16) | 0.02 | 0.37 | 2.72 (1.52-4.87) | <0.001 | 0.03 |
| Laotian | 2.27 (1.10-4.67) | 0.03 | 1.00 | NA | <.0001 | NA | 3.10 (1.46-6.58) | <0.01 | 0.14 |
| Korean | 1.01 (0.38-2.66) | 0.99 | 1.00 | NA | <.0001 | NA | 1.45 (0.55-3.77) | 0.45 | 1.00 |
| Cambodian | 1.19 (0.43-3.31) | 0.74 | 1.00 | 1.75 (0.23-13.53) | 0.59 | 1.00 | 1.10 (0.34-3.61) | 0.87 | 1.00 |

| | | | | | | | | | |
|-------------------|------------------|------|------|------------------|--------|------|------------------|------|------|
| Indian/Paki stani | 0.48 (0.07-3.48) | 0.47 | 1.00 | NA | <.0001 | NA | 0.62 (0.09-4.52) | 0.64 | 1.00 |
| Other APIs | 1.45 (0.93-2.23) | 0.10 | 1.00 | 1.44 (0.57-3.67) | 0.44 | 1.00 | 1.46 (0.89-2.41) | 0.14 | 1.00 |

^a Vietnamese, Cambodian, Korean, Laotian cases were separate and captured by SEER only after year of 1988.

^b NA indicates that no death due corresponding cause was captured by SEER. Therefore, cause-specific mortality could not be calculated.

^c Model d + Sex.

^d Model adjusted for age, marital status, stage, grade, histology, radiation, chemotherapy, and surgery.

^e Holm-adjusted p-value is calculated to account for multiple comparisons.

Abbreviations: APIs= Asian/Pacific Islanders; CI= confidence interval; CVD= cardiovascular disease; HR= hazard ratio; NPC= nasopharyngeal cancer; REF= Reference.

Supplementary Table 7. Overall mortality and NPC-specific mortality in AA NPC patients, stratified by histology (SEER 18, 1975-2018).^{a,b}

| | KSCC | | | DNKC | | | UNKC | | |
|-------------------------------|------------------|--------------------|------------------------------------|------------------|--------------------|------------------------------------|------------------|--------------------|------------------------------------|
| | HR (95% CI) | Unadjusted P-value | Holm-adjusted P-value ^c | HR (95% CI) | Unadjusted P-value | Holm-adjusted P-value ^c | HR (95% CI) | Unadjusted P-value | Holm-adjusted P-value ^c |
| Overall mortality | | | | | | | | | |
| Chinese | REF | | | REF | | | REF | | |
| Filipino | 0.94 (0.75-1.18) | 0.58 | 1.00 | 0.89 (0.65-1.22) | 0.46 | 1.00 | 1.07 (0.84-1.37) | 0.60 | 1.00 |
| Vietnamese | 1.29 (0.96-1.74) | 0.09 | 1.00 | 1.08 (0.75-1.55) | 0.69 | 1.00 | 1.10 (0.80-1.50) | 0.56 | 1.00 |
| Hawaiian | 1.36 (0.87-2.12) | 0.17 | 1.00 | 1.24 (0.62-2.47) | 0.55 | 1.00 | 1.19 (0.78-1.80) | 0.42 | 1.00 |
| Japanese | 1.32 (0.90-1.93) | 0.16 | 1.00 | 1.27 (0.54-2.99) | 0.58 | 1.00 | 1.42 (0.79-2.57) | 0.24 | 1.00 |
| Laotian | 2.64 (1.59-4.39) | <0.001 | 0.01 | 1.53 (0.76-3.07) | 0.24 | 1.00 | 1.50 (0.77-2.95) | 0.23 | 1.00 |
| Korean | 0.85 (0.45-1.62) | 0.63 | 1.00 | 1.11 (0.47-2.60) | 0.81 | 1.00 | 0.75 (0.35-1.60) | 0.45 | 1.00 |
| Cambodian | 1.01 (0.53-1.92) | 0.98 | 1.00 | 1.43 (0.57-3.55) | 0.44 | 1.00 | 1.14 (0.47-2.80) | 0.77 | 1.00 |
| Indian/Pakistani | 1.40 (0.65-3.01) | 0.39 | 1.00 | 0.27 (0.04-1.96) | 0.20 | 1.00 | 0.48 (0.15-1.52) | 0.21 | 1.00 |
| Other APIs | 1.01 (0.71-1.45) | 0.94 | 1.00 | 1.21 (0.80-1.84) | 0.37 | 1.00 | 1.12 (0.80-1.57) | 0.51 | 1.00 |
| NPC-specific mortality | | | | | | | | | |
| Chinese | REF | | | REF | | | REF | | |
| Filipino | 0.78 (0.58-1.06) | 0.11 | 1.00 | 0.82 (0.56-1.22) | 0.34 | 1.00 | 1.04 (0.75-1.45) | 0.81 | 1.00 |
| Vietnamese | 0.93 (0.63-1.38) | 0.72 | 1.00 | 1.02 (0.65-1.62) | 0.92 | 1.00 | 1.05 (0.69-1.61) | 0.81 | 1.00 |
| Hawaiian | 0.64 (0.34-1.21) | 0.17 | 1.00 | 1.33 (0.62-2.82) | 0.47 | 1.00 | 0.81 (0.42-1.55) | 0.52 | 1.00 |
| Japanese | 0.64 (0.33-1.23) | 0.18 | 1.00 | 0.88 (0.28-2.78) | 0.82 | 1.00 | 0.98 (0.41-2.35) | 0.96 | 1.00 |
| Laotian | 1.60 (0.87-2.95) | 0.13 | 1.00 | 1.87 (0.81-4.29) | 0.14 | 1.00 | 0.39 (0.10-1.54) | 0.18 | 1.00 |
| Korean | 0.81 (0.41-1.60) | 0.54 | 1.00 | 1.79 (0.79-4.05) | 0.16 | 1.00 | 1.00 (0.44-2.27) | 1.00 | 1.00 |
| Cambodian | 1.20 (0.54-2.67) | 0.66 | 1.00 | 0.74 (0.20-2.70) | 0.65 | 1.00 | 1.92 (0.83-4.42) | 0.13 | 1.00 |
| Indian/Pakistani | 1.31 (0.59-2.93) | 0.51 | 1.00 | 0.43 (0.06-2.94) | 0.39 | 1.00 | 0.64 (0.18-2.24) | 0.49 | 1.00 |
| Other APIs | 0.90 (0.55-1.46) | 0.66 | 1.00 | 0.99 (0.59-1.67) | 0.98 | 1.00 | 0.97 (0.60-1.57) | 0.91 | 1.00 |

^a Model adjusted for age, sex, marital status, stage, grade, surgery, chemotherapy, and radiation.

^b Vietnamese, Cambodian, Korean, Laotian cases were separate and captured by SEER only after year of 1988.

^c Holm-adjusted p-value is calculated to account for multiple comparisons.

Abbreviations: APIs= Asian/Pacific Islanders; CI= confidence interval; HR= hazard ratio; DNKC= differentiated non-keratinizing carcinoma; KSCC= keratinizing squamous cell carcinoma; NPC= nasopharyngeal cancer; REF= Reference; UNKC= undifferentiated non-keratinizing carcinoma.