Cancer Mortality in Native Americans in North Carolina

Ronnie D. Horner, PhD

Abstract: This paper describes age-adjusted mortality from malignant neoplasms for Native Americans in North Carolina for 1968–72 and 1978–82. Sex-specific standardized mortality ratios were calculated from death certificate data, using the cancer mortality experience of White North Carolinians to obtain the number of expected deaths. For most categories and specific sites of cancer, mortality was at or below the expected level, but higher than expected mortality was found for genitourinary cancers in males (SMR = 1.62, 95% CI = 1.15, 2.21) for the 1978–82 period; within this category, there was a higher than expected level of mortality from prostate cancer (SMR = 2.00; 95% CI = 1.36, 2.83) and cancer of the penis and other male genital organs (SMR = 9.09; 95% CI = 1.10, 32.84). Female Native Americans had an elevated mortality from cervical cancer (SMR = 2.27, 95% CI = 1.09, 4.17) for the 1968–72 period only. (*Am J Public Health* 1990; 80:940–944.)

Introduction

The epidemiology of cancer in Native American tribes in the eastern United States is not well described. Studies of the Seneca Nation in New York State found lower than expected mortality from cancers of all sites for males and females of this tribe.[1,2] In comparison to White residents of New York State (exclusive of New York City), Seneca women had lower mortality from cancers of the pancreas and breast, but higher mortality from cervical cancer; Seneca men had site-specific cancer mortality at or below the expected level.[1]

Native Americans nationally and in the Southwest show a lower than expected overall cancer mortality and incidence.[3,4] Alaskan Native Americans experience a level of mortality and incidence from all cancers which is similar to White Americans.[5-9] For specific sites, elevated mortality (and incidence) is found for cancer of the gallbladder (particularly for females),[3,7,10-13] esophagus and nasopharynx (for Alaskan Native Americans),[5,6,8,14,15] stomach,[16,17] cervix,[3,5,8,18,19] and multiple myeloma (in males).[20] Significantly lower mortality (and incidence) is found for lung cancer,[3,5,7,16,21] cancer of the female breast,[3,6,7,8,16] melanomas,[3,6] lymphomas and leukemias,[20] pancreatic cancer,[3,16] colon cancer,[3] and cancer of the prostate gland (particularly for Eskimos and Aleuts).[3,5-8] Alaskan Native Americans have an increasing incidence of lung cancer for both sexes; for females, esophageal and cervical cancers are decreasing.[6,7,9]

This report describes cancer mortality in Native Americans in North Carolina for the 1968–72 and 1978–82 periods, to gain insights into possible changes over time.

Methods

Native Americans in North Carolina are from several tribes, including the Cherokee, Coharie, Eno-Occan-Eechee, Haliwa-Saponi, Lumbee, Meherrin, Tuscardra, and Waccamaw-Sioun. The Cherokee in western North Carolina and the Lumbee in the eastern region of the State are the largest tribes. There has been considerable interbreeding between Native Americans, Whites and, to a lesser extent, Blacks in the region.[22-25] As a consequence, there are few "full-blooded" Native Americans in any of the tribes in the State. Moreover, cancer mortality data by tribe are not available.

Population data for this study came from the 1970 and 1980 US census reports for North Carolina.[26,27] Sixteen age categories were used: <5 years old, 5–9, 10–14, . . ., 70–74, and 75+ years of age. The distribution of Native Americans by sex but not age was available for 1970, so the sex-specific age distributions of Native Americans for 1980 were used to estimate the 1970 age distributions.

Cancer mortality data were obtained from the detailed mortality data tapes of the North Carolina State Center for Health Statistics using the underlying cause of death for North Carolina residents. Probably some Native Americans were classified as White. (The magnitude of the racial misclassification bias is currently under investigation: Personal communication from Dr. Tim E. Aldrich, director of the Central Cancer Registry of North Carolina.)

The mortality data were classified according to the broad categories of malignant neoplasms found in the International Classification of Diseases (ICD) and by specific sites within these categories.

The use of broad categories was necessary because the data for specific cancer sites for Native Americans in North Carolina were sparse. The use of broad categories also reduced the effect of changes in the classification of cancers; ICD-8 and ICD-9, though, are essentially identical for malignant neoplasms at the three-digit code level.

Specific sites identified by previous studies as being above or below the expected level were also given attention.

The standardized mortality ratio (SMR) was calculated using the 1980 age- and sex-specific cancer mortality rates of White residents to obtain the expected number of deaths. Although SMRs between different areas (times) usually should not be compared because of different standards, the identical age distribution in the Native American population in 1970 and 1980 (for the reason described) and the use of the same set of rates permit comparisons between time periods.[28] In essence, the only difference between the 1970 and 1980 SMRs are the cancer mortality rates for Native Americans which are reflected in the observed number of deaths. Cancer deaths were assumed to follow a Poisson distribution. The 95% confidence intervals for the sex-specific SMRs were calculated according to the approach described by Kahn and Sempos.[29]

Results

The proportion of observed cancer deaths by category among Native American and White residents of North Carolina in 1968–72 and 1978–82 is shown in Table 1. For

TABLE 1—Percentage Distribution of Deaths from Malignant Neoplasms, Native Americans and White Residents of North Carolina, 1968–72 and 1978–82, by Sex and Category*

Category of Malignancy (ICD Code)	Native Americans		Whites	
	1968–72	1978–82	1968–72	1978–82
Males	(n = 76)	(n = 150)	(n = 13,747)	(n = 20,317)
Lip, Oral Cavity, and Pharynx (140–149)	1.3	2.7	3.3	2.3
Digestive Organs and Peritoneum (150–159)	27.6	19.3	22.5	21.5
Respiratory and Intrathoracic Organs (160–165)	19.7	30.0	32.8	38.2
Bone, Connective Tissue, Skin, and Breast (170–175)	1.3	0.7	3.7	3.2
Genitourinary Organs (179–189)	23.7	26.0	14.8	14.4
Lymphatic and Hematopoietic Tissue (200–208)	14.5	11.3	11.1	9.2
Other and Unspecified Sites (190–199)	11.8	10.0	11.8	11.3
Females	(n = 44)	(n = 89)	(n = 11,268)	(n = 16,285)
Lip, Oral Cavity, and Pharynx (140–149)	2.3	3.4	2.0	1.6
Digestive Organs and Peritoneum (150–159)	18.2	27.0	25.5	25.2
Respiratory and Intrathoracic Organs (160–165)	2.3	3.4	7.3	13.8
Bone, Connective Tissue, Skin, and Breast (170–175)	18.2	19.1	22.7	22.1
Genitourinary Organs (179–189)	36.4	19.1	18.4	14.7
Lymphatic and Hematopoietic Tissue (200–208)	9.1	13.5	10.8	10.2
Other and Unspecified Sites (190–199)	13.6	14.6	13.2	12.4

*Percentages may not sum to 100% due to rounding.

White residents of both sexes, the proportion of cancer deaths within each category is fairly stable between the two periods. Among male Native Americans, deaths from cancer of the digestive organs and peritoneum decreased, but deaths from cancers of the respiratory and intrathoracic organs increased. For female Native Americans, deaths from cancers of the digestive organs and the peritoneum increased, but genitourinary cancer deaths decreased. None of the differences between time periods were statistically significant.

As Table 2 shows, Native Americans experienced a generally lower or equal level of mortality from the various cancers to that expected based on the experience of White North Carolinians. The only clearly elevated SMR is for genitourinary neoplasms in male Native Americans for the 1978–82 period (SMR = 1.62, 95% CI = 1.15, 2.21); the SMR for this category is also elevated for 1968–72.

The SMRs in Table 2 suggest that changes in cancer mortality for Native Americans may have occurred between 1968–72 and 1978–82. There is an increase in the number of cancer deaths for Native American females from significantly below to near the expected levels for digestive organ and peritoneum cancers. A similar change occurs for respiratory and intrathoracic cancer mortality for male Native Americans. Also as noted previously, deaths from genitourinary cancers increased from a level similar to the expected number to a higher number for male Native Americans. Both sexes may also be experiencing an increase in cancers of the lip, oral cavity, and pharynx.

Table 3 shows the SMRs associated with specific cancer sites which have been identified as having significantly above

or below expected mortality for Native Americans. The SMRs for each three-digit site are available on request to the author. Most deaths from cancer at the various anatomic sites are at levels similar to that found among White residents of North Carolina. Deaths from cancer of the breast and colon are lower than expected in both time periods for females. Mortality from cancer of the cervix uteri was more than twice that of Whites in 1968–72 and in 1978–82. A slight increase in mortality from prostatic cancer is indicated; and rates are elevated in both periods. Mortality from cancer of the penis and other male genital organs (ICD 187) is also significantly elevated in both periods.

Discussion

The Native Americans in this report represent several tribes which have bred extensively with other racial groups, and yet their cancer mortality experience generally follows that of Native Americans elsewhere in the nation, with lower than expected mortality from cancers of all sites, respiratory and intrathoracic cancers, and cancers of the female breast, but a higher than expected mortality for cancer of the cervix uteri. The higher mortality from prostate cancer seen in this study was also found for Alaskan Indians.[3,5,6,8] A unique finding of this study is the elevated mortality from cancer of the penis and other male genital organs (ICD 187). Unlike Alaskan Native Americans, no nasopharynx cancers were reported in either study period. Nor was there a higher than expected mortality from cancers of the gallbladder and stomach which are common in tribes of the Southwest.

Clearly elevated mortality in North Carolinian Native Americans was found only for cancers of the prostate, male

TABLE 2—Standardized Mortality Ratios (95% CI) for Malignant Neoplasms, Native American Residents of North Carolina, 1968–72 and 1978–82, by Sex and Category

Category of Malignancy (ICD Code)	Males		Females	
	1968–72 (95% CI)	1978–82 (95% CI)	1968–72 (95% CI)	1978–82 (95% CI)
All Sites (140–208)	0.79 (0.62, 0.99)	0.87 (0.73, 1.02)	0.54 (0.39, 0.73)	0.71 (0.57, 0.87)
Lip, Oral Cavity and Pharynx (140–149)	0.32 (0.01, 1.80)	1.02 (0.28, 2.61)	0.64 (0.02, 3.57)	1.61 (0.33, 4.71)
Digestive Organs and Peritoneum (150–159)	1.02 (0.63, 1.57)	0.80 (0.53, 1.14)	0.41 (0.18, 0.82)	0.85 (0.54, 0.98)
Respiratory and Intrathoracic Organs (160–165)	0.48 (0.27, 0.79)	0.70 (0.51, 0.94)	0.17 (0.004, 0.94)	0.17 (0.03, 0.49)
Bone, Connective Tissue, Skin, and Breast (170–175)	0.25 (0.01, 1.38)	0.16 (0.004, 0.90)	0.42 (0.18, 0.82)	0.57 (0.33, 0.91)
Genitourinary Organs (179–189)	1.39 (0.82, 2.20)	1.62 (1.15, 2.21)	1.06 (0.61, 1.72)	0.93 (0.54, 1.48)
Lymphatic and Hematopoietic Tissue (200–208)	0.92 (0.46, 1.64)	0.85 (0.47, 1.40)	0.42 (0.12, 1.09)	0.91 (0.47, 1.59)
Other and Unspecified Sites (190–199)	0.74 (0.34, 1.41)	0.83 (0.48, 1.33)	0.55 (0.20, 1.20)	0.84 (0.44, 1.43)

TABLE 3—Standardized Mortality Ratios (95% CI) for Selected Malignant Neoplasms, Native American Residents of North Carolina, 1968–72 and 1978–82, by Sex

Site of Malignancy (ICD Code)	Males		Females	
	1968–72 (95% CI)	1978–82 (95% CI)	1968–72 (95% CI)	1978–82 (95% CI)
Nasopharynx (147)	0.00 (0.00, 12.30)	0.00 (0.00, 11.53)	0.00 (0.00, 26.34)	0.00 (0.00, 23.06)
Esophagus (150)	0.00 (0.00, 2.20)	0.97 (0.20, 2.83)	1.16 (0.03, 6.48)	3.57 (0.93, 9.14)
Stomach (151)	1.42 (0.46, 3.31)	1.60 (0.64, 3.29)	0.82 (0.10, 2.96)	1.47 (0.40, 3.77)
Colon (153)	0.64 (0.17, 1.63)	0.38 (0.12, 0.88)	0.24 (0.03, 0.87)	0.31 (0.08, 0.79)
Gallbladder (156)	0.00 (0.00, 5.76)	0.00 (0.00, 3.80)	0.84 (0.02, 6.07)	2.42 (0.50, 7.07)
Pancreas (157)	1.93 (0.93, 3.55)	1.00 (0.46, 1.90)	0.52 (0.06, 1.88)	0.95 (0.35, 2.08)
Trachea, Bronchus or Lung (162)	0.44 (0.23, 0.75)	0.71 (0.52, 0.96)	0.18 (0.005, 1.01)	0.17 (0.04, 0.51)
Breast, Female (174)	—	—	0.37 (0.13, 0.77)	0.59 (0.34, 0.99)
Cervix Uteri (180)	—	—	2.27 (1.09, 4.17)	2.30 (0.99, 4.53)
Prostate (185)	1.70 (0.91, 2.91)	2.00 (1.36, 2.83)	—	—
Penis and other male genital organs (187)	22.22 (2.69, 80.27)	9.09 (1.10, 32.84)	—	—
Lymphomas (200–202)	0.46 (0.06, 1.65)	0.30 (0.04, 1.10)	0.28 (0.01, 1.56)	0.84 (0.23, 2.16)
Multiple Myeloma (203)	0.72 (0.02, 4.04)	1.48 (0.40, 3.24)	0.00 (0.00, 3.32)	1.98 (0.54, 5.07)
Leukemias (204–208)	1.28 (0.55, 2.53)	1.07 (0.49, 2.03)	0.56 (0.12, 1.64)	0.63 (0.17, 1.60)

genitalia, and the cervix. Prostatic and penile cancers are more prevalent in Blacks than either Whites or Native Americans generally.[30,31] However, the racial mixing in Native Americans of North Carolina is unlikely to account for their unexpectedly higher mortality from these cancers because the Black contribution to the genetic pool of most tribes of the Carolinas is indicated to be minimal.[22-25] Diet may be involved in cancer of the prostate. Although controversial, there is epidemiologic evidence of a positive association between prostatic cancer and a diet high in fats and vitamin A, particularly in older males.[32-35] However, an inverse association between the level of consumption of green and yellow vegetables (and hence vitamin A) and prostatic cancer is found for Japanese males.[36] Dietary information on North Carolinian Native Americans is not available. The elevated mortality from cervical cancer may indicate a low level of cervical cancer screening among Native American females in North Carolina. An inverse association between extent of cervical cancer screening in populations and mortality from cancer of the cervix is reported for Native Americans elsewhere.[18,19]

There is indication that the cancer mortality experience of North Carolinian Native Americans may be worsening, which would suggest that the lower than expected cancer mortality for Native Americans is more strongly related to environmental factors than to genetics. Although the number of cases is too few for definitive conclusions, an increase in mortality may be occurring from: cancer of the lip, oral cavity, and pharynx for both sexes; cancers of the respiratory and intrathoracic organs, and genitourinary organs for males; and cancers of the digestive organs and peritoneum for females. For specific sites, an increase in mortality may be occurring for cancer of the prostate and the trachea, bronchus, and lung for males. It has been suggested that lung cancer mortality is increasing in Alaskan Native Americans as well.[6,7] Information on the use of tobacco products such as snuff and chewing tobacco by Native Americans in North Carolina is not available, although several reports indicate high prevalence of tobacco use among younger Native Americans elsewhere.[37-40]

It is recognized that the patterns reported in this study may reflect several biases. There is the possibility of racial misclassification bias in the mortality statistics, although its presence and magnitude have yet to be determined. Moreover, the age-specific population data for Native Americans in 1970 are only estimates. Diagnostic bias may also be present; however, the proportion of "other and unspecified" cancers has remained stable over time. The data also reflect coding under the eighth and ninth ICD; however, the two revisions are essentially identical for neoplasia. Perhaps of more concern, the data were aggregated across tribes which could obscure patterns of cancer mortality within tribes.

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HUD Issues Guidelines on Lead-Based Paint Abatement

The US Department of Housing and Urban Development (HUD) has issued the first federal guidelines for the identification and abatement of lead-based paint in all public and Indian housing developments. The interim guidelines, signed by HUD Secretary Jack Kemp and published in the Federal Register, became effective April 1 and apply to all rehabilitation programs in public housing from that date forward. While the guidelines are recommendations and not mandatory, they represent the first national technical rules and procedures for testing, abatement worker protection, clean-up and disposal of lead-based paint in residential structures. The standards outlined in the 160-page document include several procedures for lead paint testing and removal that have proven effective in cities where lead abatement programs are mandated, such as Baltimore and Boston. Lead-based paint is believed to exist in about 40 million homes, or 40 percent of the country's housing stock where lead paint was used prior to 1970.

The federal guidelines recommend three accepted abatement strategies: complete replacement of all lead-painted surfaces, encapsulation or sealing of lead-painted areas, or paint removal. The guidelines outline the various methods of paint stripping, sanding and chemical processing, and the appropriate precautions to be taken with each, including daily and final clean-up. Proper clean-up procedures involve a thorough vacuuming, using a High Efficiency Particulate Air (HEPA)-filtered vacuum, followed by wet wiping with a high-phosphate solution, followed by a second HEPA vacuuming. The guidelines also recommend that sanding flat surfaces should be done with a sander attached to a HEPA vacuum that can collect the dust particles as they are released. Nilfisk of America, Inc., of Malvern, PA, one of the nation's leading manufactures of HEPA-filtered vacuums used in removal of lead, asbestos, silica, fiberglass and other harmful dusts, was asked by the National Institute of Building Sciences to participate in drafting the rules and recommendations that formed the basis for HUD's interim guidelines. For further information, contact HUD Headquarters, 451 7th Street, SW, Washington, DC 20410. Tel: (202) 755-6422.