

CANCER AMONG THE NAVAJO 1994-2004



NAVAJO DIVISION OF HEALTH – NAVAJO EPIDEMIOLOGY CENTER,



Photo by George H. Pepper, 1899

Foreword

This report was produced in response to professional and community concerns that cancer may be increasing among the Navajo. Our intent is three-fold: 1) to help broaden our understanding of cancer; 2) inform patients, family members, providers, public health professionals, educators, community members, and policy makers about cancer among the Navajo people; and 3) strategize to improve cancer prevention, education, and treatment.

Acknowledgments

This report is the result of continuing collaboration between the Navajo Epidemiology Center, other Navajo Division of Health programs, New Mexico Tumor Registry, Arizona Cancer Registry, Navajo Area Indian Health Service, and the Centers for Disease Control and Prevention. The following individuals represent these organizations and their contribution to this report is recognized and commended:

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- Navajo Area Indian Health Service
- Navajo Nation Division of Health
- Navajo Nation Human Research Review Board
- New Mexico Tumor Registry

Dedication

We dedicate this report to the late Dr. Taylor McKenzie (1931-2007), the first Navajo to become a medical doctor and surgeon. After 30 years with the Indian Health Service, Dr. McKenzie became Vice President of the Navajo Nation from 1999-2003. As Vice President he addressed the healthcare and public health needs of the Navajo People. In 2006 Dr. McKenzie became the Navajo Nation's first Medical Officer – using his clinical and public health experience to develop



and strengthen public health capacity within the Navajo Nation Division of Health.

Dr. McKenzie was essential to this report because he helped build partnerships between the Navajo Nation Division of Health, Navajo Area Indian Health Service, New Mexico Tumor Registry, and Arizona Cancer Registry for the purpose of sharing, using, and improving Navajo-specific cancer data. It is his vision that led to his important report. We remember him with much gratitude and respect.

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Introduction

Until the advent of population-based cancer surveillance in the 1970s, reports of cancer among the Navajo were mostly based on case-series that were derived from the experiences of individual physicians or facilities that served Native communities and on vital records. Reports of cancer among the Navajo were published in the medical literature as early as the 1930's¹⁻³. A common finding in these reports was the relatively low numbers of cancers observed among the Navajo. For example, C.G. Salsbury, M.D., a physician who worked among the Navajo in Ganado, Arizona, wrote in *Arizona Medicine* that cancer rates were lower among the Navajo compared to whites and wondered if the Navajo were protected from diabetes and cancer by their diet⁴.

During and after World War II, uranium mining swept onto the Navajo reservation and settled within many uranium-rich communities such as Shiprock, Cove, Church Rock, and Kayenta⁵. Decades later, increasing lung cancer rates in this generally non-smoking population was attributed to occupational exposure to uranium during mining activi-

ties.⁵⁻⁷

A report in 1998 revealed that mortality from all cancers among American Indians remained lower compared to whites⁸. Yet mortality rates for cancers of the liver, stomach, kidney, and gallbladder were much higher than whites⁸. American Indian women also had significantly higher mortality rates from cancer of the cervix than white women. In another report for the period 1999-2004, incidence rates for all cancers among Southwest American Indians and Alaska Natives (which include the Navajo) were lower than whites, while cancers of the stomach, liver, kidney, gallbladder, and cervix for females were much higher.⁹

Today cancer has become one of the leading causes of illness and death for the Navajo people. The Indian Health Service estimated that 7.3% of all deaths in the Navajo Service Area was due to cancer for the period 1999 to 2001¹⁰. Clearly, the observations from the 1930s to 1950s are much different than current reports. In this report



Photo by George H. Pepper, 1890

the Navajo Cancer Workgroup used cancer data from the Arizona Cancer Registry and New Mexico Tumor Registry to provide Navajo-specific cancer incidence, stage of cancer diagnosis, and cancer mortality from 1994-2004. These data focus on contiguous Navajo Nation, excluding the three satellite communities of Ramah, Alamo, and Tohajilee, which are served by the Albuquerque IHS office. These satellite communities were excluded because the Navajo Cancer Workgroup did not have access to Albuquerque area IHS Resource Patient Management System database for population estimate data.

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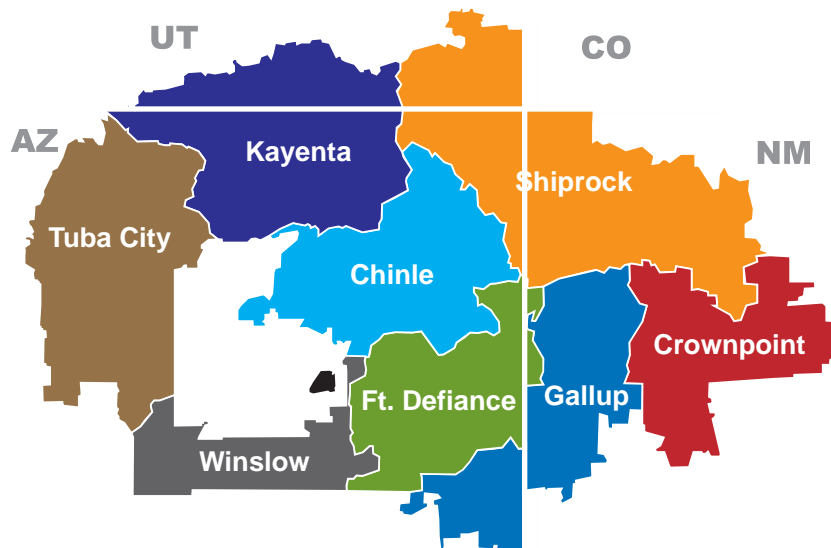
Health Care on the Navajo Nation

Navajo Nation is the largest American Indian reservation in the United States, and the Navajo constitute the largest tribe in the Southwest. The reservation spans over 27,000 square miles, bordering Arizona, Colorado, New Mexico and Utah. According to the U.S. 2000 Census, the Navajo resident population was 180,462, with 49% male and 51% female; the median age was 24 years old (much younger than the U.S. general population which was 35 years old).^{11,12}

The Navajo people believe that the Holy People bestowed special teachings upon them. These teachings tell how to live in balance with nature and all of Mother Earth's inhabitants; this balance is known as K'e. When out of balance, traditional people seek traditional healing from native healers or "medicine people" for mental, spiritual, and physical wellbeing. Many kinds of practitioners exist within traditional healing including diagnosticians such as hand trem-

blers, crystal gazers, and individuals who perform healing ceremonies involving herbs, balms, and purgatives.^{11,13,14}

Parallel to traditional healing is the western medicine system.



The Indian Health Service (IHS) - an agency within the U.S. Department of Health and Human Services - is responsible for providing western healthcare services to American Indians and Alaska Natives. Within the Navajo Area IHS there are five hospitals, seven health centers, fifteen health stations and twenty-two dental clinics, including three contract (or "638") facilities that are run by the tribe. These facilities are geographically divided into eight

IHS service areas called service units (see map). The Navajo Area IHS primarily serves the Navajo Nation and the Southern Band of San Juan Pauites, plus other local tribes such as the Hopi and Zuni.

Their services include inpatient, outpatient, contract health, and community health programs.¹⁵

A key provider of health, education, and prevention services is the Navajo Nation Division of Health (NDOH). In 1977 the NDOH was established within the Navajo government to promote and protect the

overall health of the Navajo people by developing tribal health programs that focus on health promotion and disease prevention. NDOH programs include breast and cervical cancer screening, community health representatives, public health nursing, emergency preparedness, planning/research/evaluation, aging, diabetes, behavioral health, food distribution, women, infants, and children program, office of uranium workers, environmental health, new dawn (agricultural/nutrition) pro-

11. Choudhary, T. "Comprehensive Economic Development Strategy of the Navajo Nation". Division of Economic Development of the Navajo Nation. 2008.

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Navajo Cancer Workgroup

The Navajo Cancer Workgroup was formed in 1999 to support Navajo Nation leaders' efforts to improve cancer care and prevention by utilizing and improving cancer data. The work group aims to: 1) evaluate and improve cancer data quality and data infrastructure, 2) empower and engage communities around cancer prevention, 3) support and improve Navajo area health programs, and 4) produce Navajo-specific cancer reports. The following diagram summarizes these strategies:



Incidence

Cancer incidence is a measurement that inform us of the burden of cancer on a population.

Cancer incidence rate is the number of new cancers occurring in a specified population during a period of time. The cancer incidence rate is usually expressed as the number of cancers per 100,000 people at risk.

***Incidence Rate =
(New Cancers/Population) x
100,000***

The numerator is the number of new cancers and the denominator is the population size.

In the following tables the incidence rates were age-adjusted to the 2000 United States standard population (i.e., using the 2000 census data). It is known that the older we get the more likely we are to develop cancer which means that cancer incidences often increases with age. Therefore, to accurately

compare rates of two populations (which may have different age distributions), the age groups of one population must be compared to the same age groups of the comparison population. This technique is called age standardization (or age adjusting).

Methodology

Cancer incidence data in this report were collected from the population-based New Mexico Tumor Registry and Arizona Cancer Registry, which jointly cover a major geographic area of the Navajo Nation. Utah cancer data were not included because they were not available at the time of this report. The New Mexico Tumor Registry is a member of the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) Program. The Arizona Cancer Registry participates in the Centers for Disease Control and Prevention's National Program of Cancer Registries (NPCR). Data from both state cancer registries are routinely linked with Indian Health Service patient records to identify cases that are Navajo. These data were used as numerators for

our cancer incidence rate calculations. Cancers were coded and classified according to prevailing standards as summarized in the International Classification of Diseases-Oncology (ICD-O).

Given that the Navajo Nation does not have annual population estimates, we used Navajo Area IHS user population data from the IHS RPMS (Resources Patient Management System) clinical database to determine Navajo Nation population estimates. Navajo Area IHS user population data includes patients seen at any of the 8 Navajo Area IHS service areas (Crownpoint, Gallup, Shiprock, Chinle, Fort Defiance, Tuba City, Kayenta, or Winslow) at least once within three years. Rather than collect IHS user population data for each year from 1994-2004, we selected a mid-point

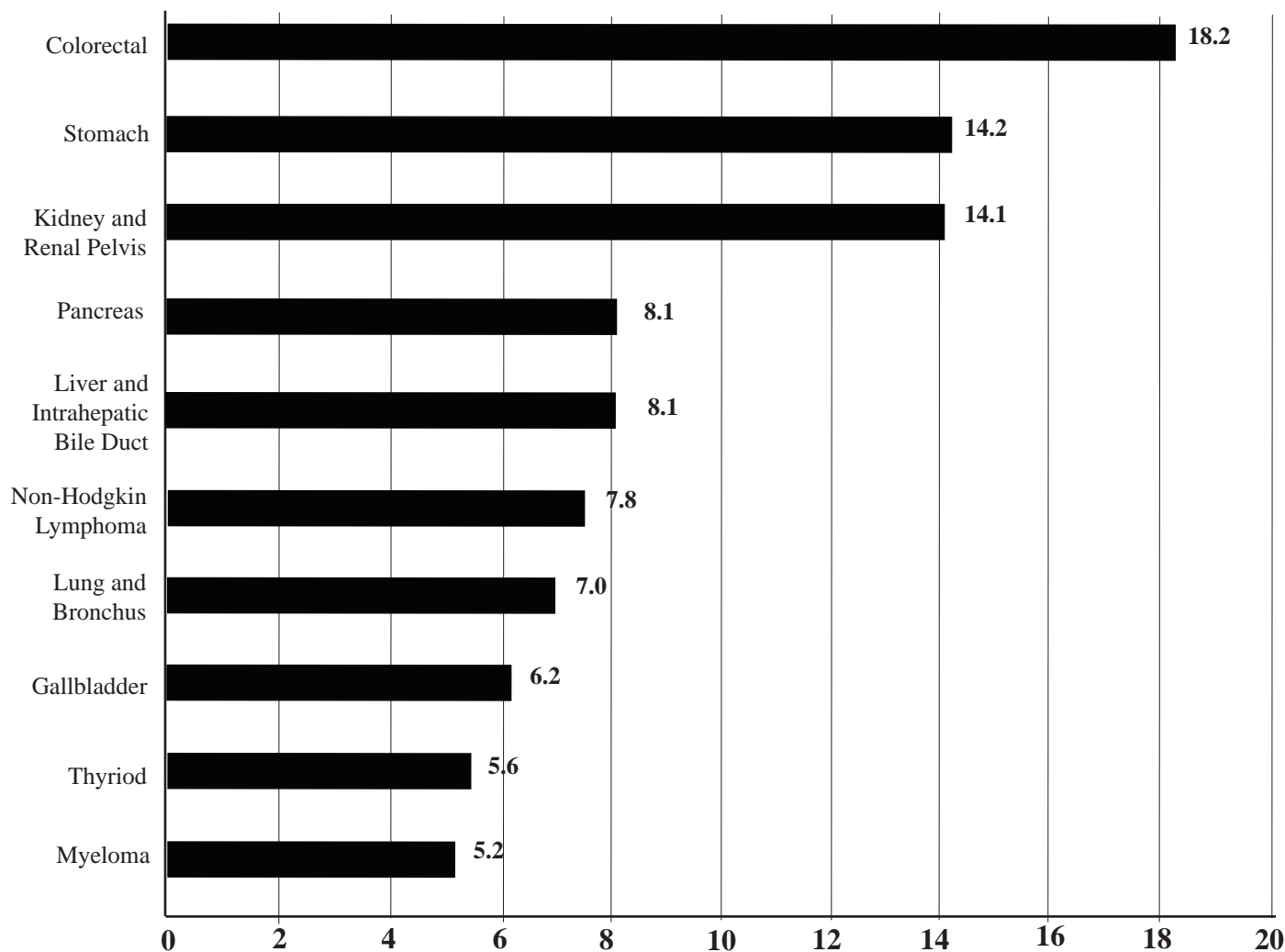
period from 1998-2000. This means that IHS user population counts were collected from 1998 to 2000 and averaged to produce a mid-point population estimate which was used as the denominator for our cancer incidence rate calculations.

The two comparison groups we used in this report were Non-Hispanic Whites in Arizona and New Mexico and in the United States. These comparison groups were selected because we wanted to observe any differences between Navajo and the general Non-Hispanic white population. The incidence and population data (based on 2000 U.S. Census population estimates) for these comparison groups were collected from the National Cancer Institute's SEER program.

Data Summary

- From 1994-2004, the major cancer burden among the Navajo was first from colorectal cancer, followed by stomach cancer, kidney and renal pelvis cancer, pancreas cancer, and liver and intrahepatic bile duct cancer, respectively.
- In comparing the burden of cancer by gender, Navajo men were more likely to be diagnosed with cancer compared with Navajo women. Prostate cancer was the most commonly diagnosed cancer among Navajo men, followed by colorectal cancer and stomach cancer.
- Among Navajo women, breast cancer was the most commonly diagnosed cancer, followed by ovarian cancer and colorectal cancer.

FIGURE 1: Most commonly diagnosed cancers among the Navajo
Average Age-adjusted Incidence Rates^a 1995-2004
Males and Females Combined



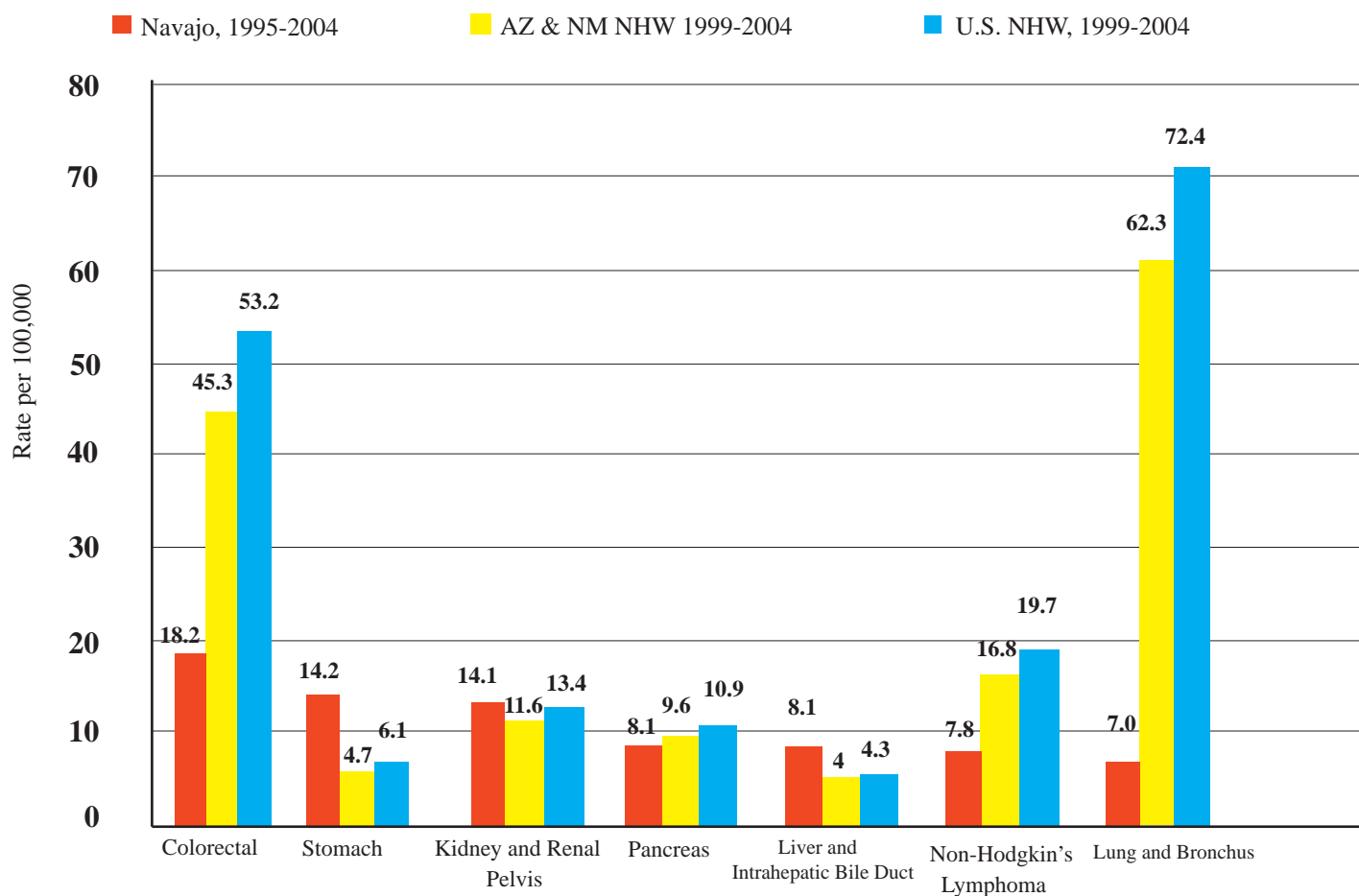
Source: New Mexico Tumor Registry and Arizona Cancer Registry in the National Program of Cancer Registries of the Centers for Disease Control and Prevention and/or the Surveillance Epidemiology and End Results program of the National Cancer Institute; Navajo Area Indian Health Service Resource Patient Management System.

^a Rates are per 100,000 persons and are age-adjusted to the 2000 US standard population.

This figure shows the top ten most commonly diagnosed cancers among the Navajo. Colorectal cancer is the most commonly diagnosed cancer (18.2 cases per 100,000), fol-

lowed by stomach cancer (14.2 per 100,000), kidney cancer (14.1 per 100,000), pancreas cancer and liver cancer (8.1 per 100,000 for both cancers).

FIGURE 2: Average Age-adjusted Cancer Incidence Rates^a among the Navajo, Arizona & New Mexico Non-Hispanic Whites, U.S. Non-Hispanic Whites, by Cancer Site Males and Females Combined



AZ: Arizona; NM: New Mexico; U.S.; United States; NWH: Non-Hispanic Whites.

Source: New Mexico Tumor Registry and Arizona Cancer Registry in the National Program of Cancer Registries of the Centers for Disease Control and Prevention and/or the Surveillance Epidemiology and End Results program of the National Cancer Institute; Navajo Area Indian Health Service Resource Patient Management System.

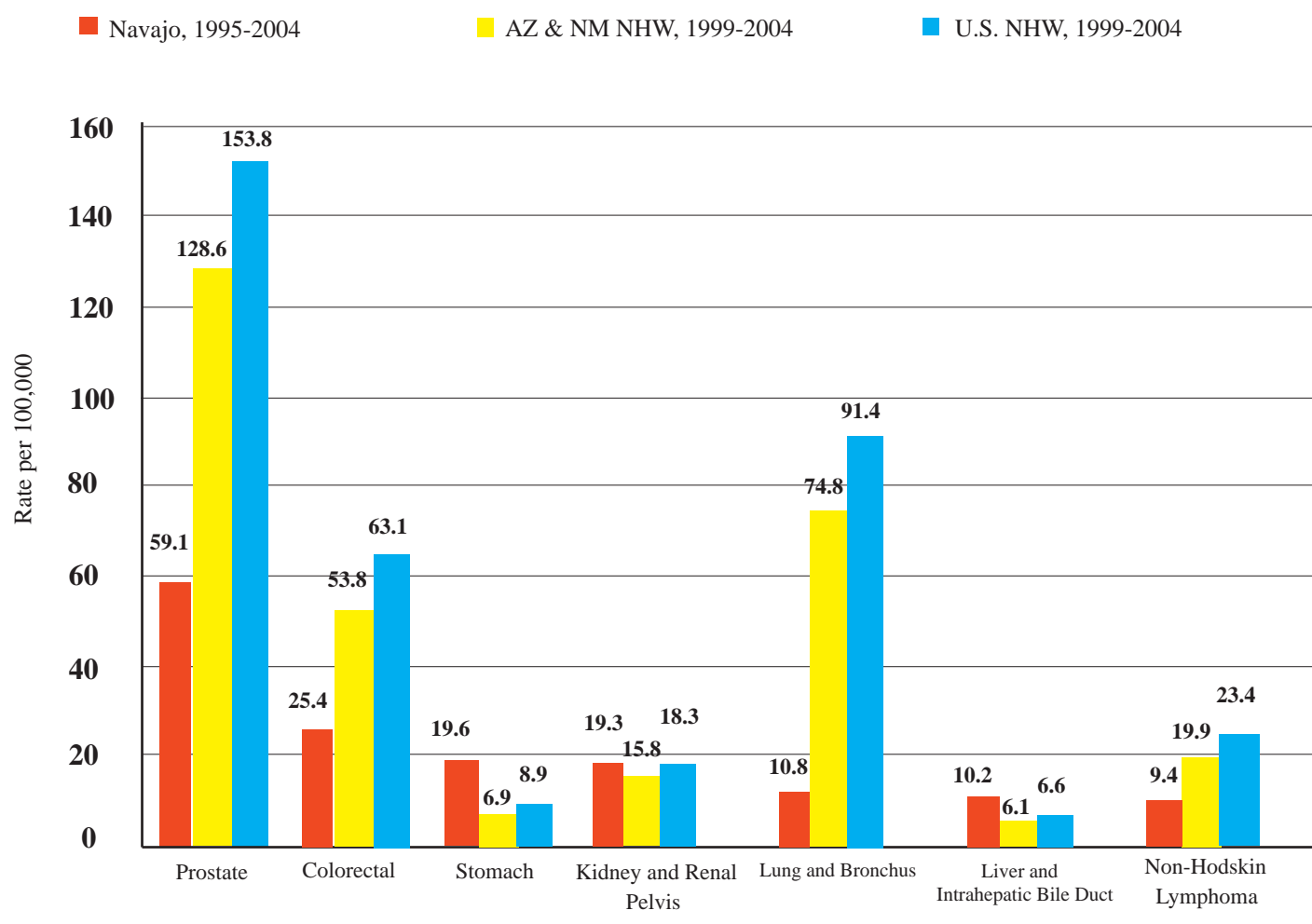
^a Rate per 100,000 persons and are age-adjusted to the 2000 US standard population.

This figure shows incidence rates for the most common Navajo cancers and compares these Navajo rates with incidence rates for Non-Hispanic Whites (NHW) in New Mexico/Ari-

zona and in the United States. Higher Navajo incidence rates were found for stomach and liver cancers, compared with NHWs. Lower Navajo incidence rates were found for colorectal cancer,

Non-Hodgkin's lymphoma, and lung cancer compared to NHWs. Rates for other cancers, such as kidney cancer and pancreas cancer, incidence rates were similar for both Navajo and NHWs.

FIGURE 3: Average Age-adjusted Cancer Incidence Rates^a among the Navajo, Arizona & New Mexico Non-Hispanic Whites, U.S. Non-Hispanic Whites by Cancer Site Males Only



AZ: Arizona; NM: New Mexico; U.S.: United States; NWH: Non-Hispanic Whites.

Source: New Mexico Tumor Registry and Arizona Cancer Registry in the National Program of Cancer Registries of the Centers for Disease Control and Prevention and/or the Surveillance Epidemiology and End Results program of the National Cancer Institute; Navajo Area Indian Health Service Resource Patient Management System.

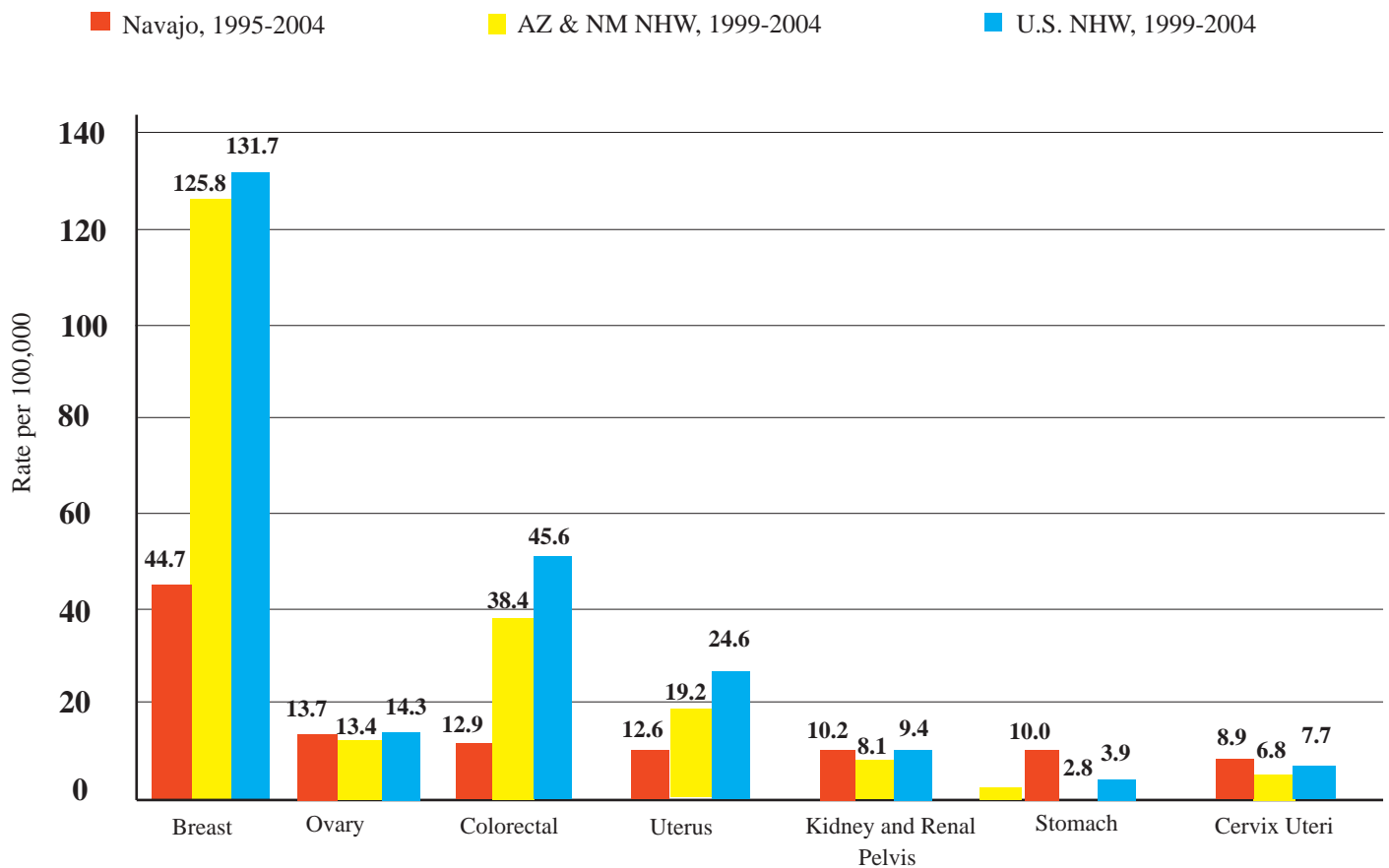
^a Rate per 100,000 persons and are age-adjusted to the 2000 US standard population.

This figure displays the leading incident cancers for Navajo men and how they compare to Non-Hispanic White (NHW) men in Arizona and New Mexico and in the United States. Compared

to NHW men, Navajo men had higher rates for stomach and liver cancers. Yet Navajo men had lower rates for prostate cancer, colorectal cancer, lung cancer, and Non-Hodgkin's Lymphoma

compared with NHW men. Navajo and Non-Hispanic White men had similar incidence rates for kidney cancer.

**FIGURE 4: Average Age-adjusted Cancer Incidence Rates^a among the Navajo, Arizona & New Mexico Non-Hispanic Whites, U.S. Non-Hispanic Whites by Cancer Site
Females Only**



AZ: Arizona; NM: New Mexico; U.S.: United States; NWH: Non-Hispanic Whites.

Source: New Mexico Tumor Registry and Arizona Cancer Registry in the National Program of Cancer Registries of the Centers for Disease Control and Prevention and/or the Surveillance Epidemiology and End Results program of the National Cancer Institute; Navajo Area Indian Health Service Resource Patient Management System.

^a Rate per 100,000 persons and are age-adjusted to the 2000 US standard population.

This figure shows the leading incident cancers for Navajo women compared with Non-Hispanic White (NHW) women in Arizona and New Mexico and in the United States. Among Navajo women the incidence of stomach cancer was much higher

compared with NHW women, while breast cancer and colorectal cancer rates were much lower compared with NHW women's rates. Incidence rates for cancers of the ovary, cervix, and kidney were similar for both Navajo and NHW women.

Stage at Diagnosis

Cancer staging describes the extent to which the patient's cancer has spread. Cancers that have not spread beyond the organ of origin are said to be at a "local" stage; cancers that have spread to organs adjacent to the organ of origin are said to be at a "regional" stage; and "distant" stage cancers have spread to areas of the body that are not adjacent to the organ of origin.

Cancer staging helps healthcare providers design a treatment plan that is best suited to addressing the patient's disease. Staging is often used to estimate a patient's prognosis or likely outcome from cancer.

Staging is based on knowledge of the way cancer develops. Cancer cells divide and grow without control or

order. Such cells can break away from the primary site of growth and enter the bloodstream or lymphatic system to form new tumors in other parts of the body. This spread of cancer is called metastasis.

There are several different cancer staging systems. The elements common in most cancer staging systems are:

- Location of the primary tumor
- Tumor size and number of tumors
- Lymph node involvement (spread of cancer into the lymph nodes)
- Cell type and tumor grade (how closely the cancer cells resemble normal tissue) and
- Presence or absence of metastasis.

Staging systems used by doctors are generally more detailed and complex than those used by cancer registries. In this report we have used a summary staging system that can be expressed in the following categories:

- *Localized* cancer is limited to the organ in which it began, without evidence of spread
- *Regional* cancer has spread beyond the original (primary) growth site to nearby lymph nodes, organs or tissues
- *Distant* cancer has spread from the primary growth site to distant organs or lymph nodes
- *Unknown* or *Unstaged* cancer describes cases for which there is not enough information to indicate a stage.

Methodology

Cancer staging data for this report were obtained from the New Mexico Tumor Registry for cases diagnosed during the period 2001-2004. Utah cancer data were not included because they were not available at the time of this report. Also, the Arizona Cancer Registry data were not included because of the difficulty in merging staging systems for 2001-2004.

Cancer staging systems change over time, due in part to our changing understanding of

the biology of cancer. During the time period that corresponds to this report (i.e., 1994-2004), these cancer registries employed three different staging systems that were not necessarily comparable to each other. For the purposes of this report, we presented only the most recent staging scheme. Therefore, we used the Summary Stage 2000 system that was available for cases diagnosed during the calendar years 2001-2004.

Data for non-Hispanic

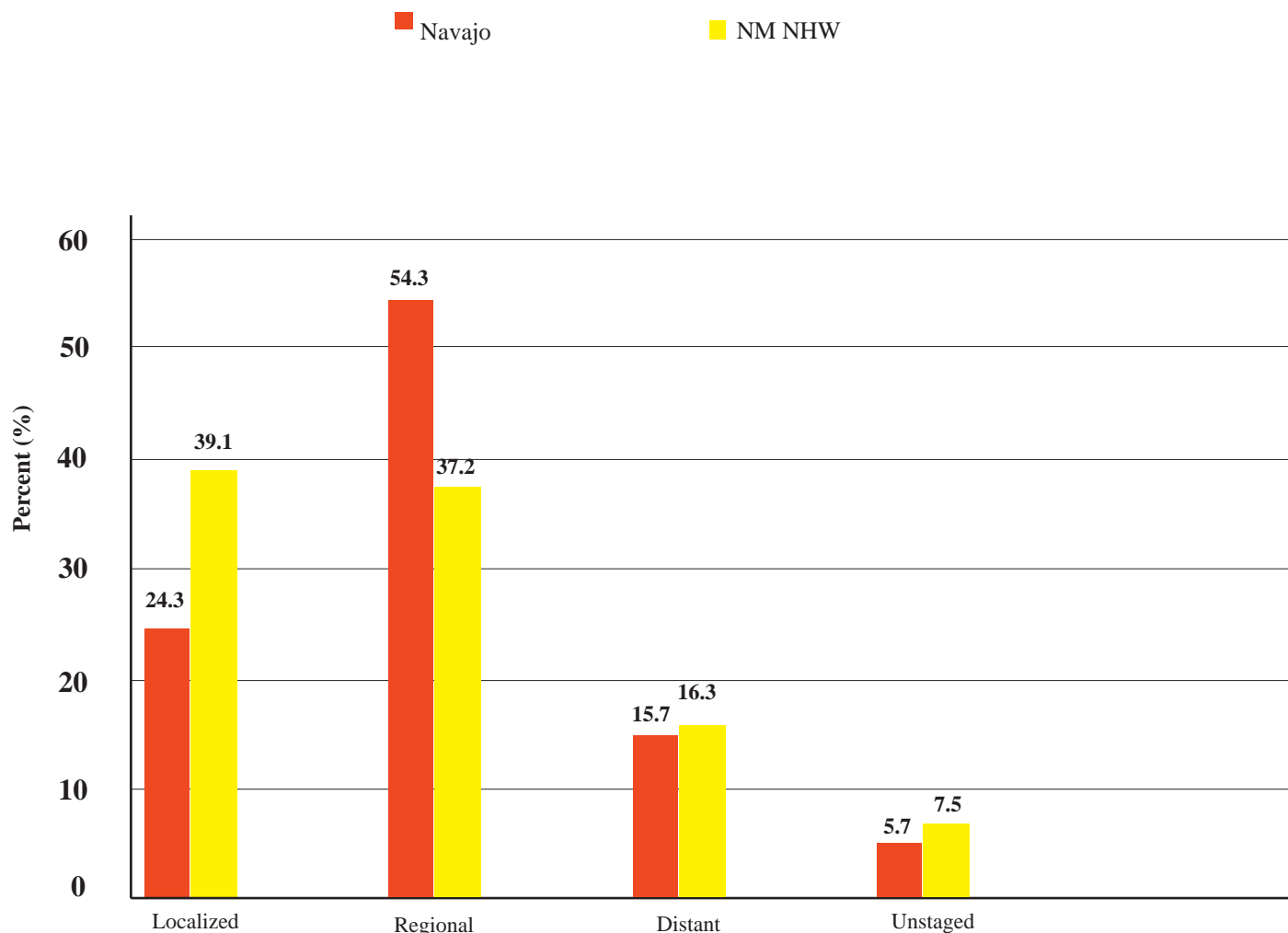
whites in New Mexico are presented in this report for comparison. The comparison group stage of diagnosis data were derived from the New Mexico Tumor Registry.

Cancer staging data are presented in proportions: the number of cases diagnosed in a particular stage category divided by the total cases diagnosed for that particular cancer. The stage categories used were localized, regional, distant, and unstaged/unknown.

Data Summary

- Over half of screenable cancers were diagnosed in the local or regional stage but some notably high percentages of cancers were diagnosed in the unknown stage, particularly for prostate cancer and female breast cancer.
- For both Navajo men and women, colorectal cancer cases were mostly diagnosed in the regional stage compared to NHWs which were commonly diagnosed in the localized stage.
- Among Navajo women over half of breast cancer cases were diagnosed in the local stage but higher percentage of Navajo cases still were being diagnosed in the regional stage compared with Non-Hispanic white women. Invasive cervical cancer cases among Navajo women were primarily diagnosed in the regional stage compared to Non-Hispanic White women which were commonly diagnosed in the localized stage.
- Among Navajo men over half of prostate cancer cases were diagnosed in the localized stage; however, Navajo men still had higher proportions of prostate cancer diagnosed in the regional, distant, and unknown stage compared to Non-Hispanic White men.

FIGURE 5: Stage of Colorectal Cancer (Age 50+) at Diagnosis for Navajos
New Mexico Non-Hispanic Whites, 2001-2004,
Males and Females Combined



NM: New Mexico; NWH: Non-Hispanic Whites.

Source: New Mexico Tumor Registry of the National Cancer Institute's Surveillance Epidemiology and End Results (SEER) program.

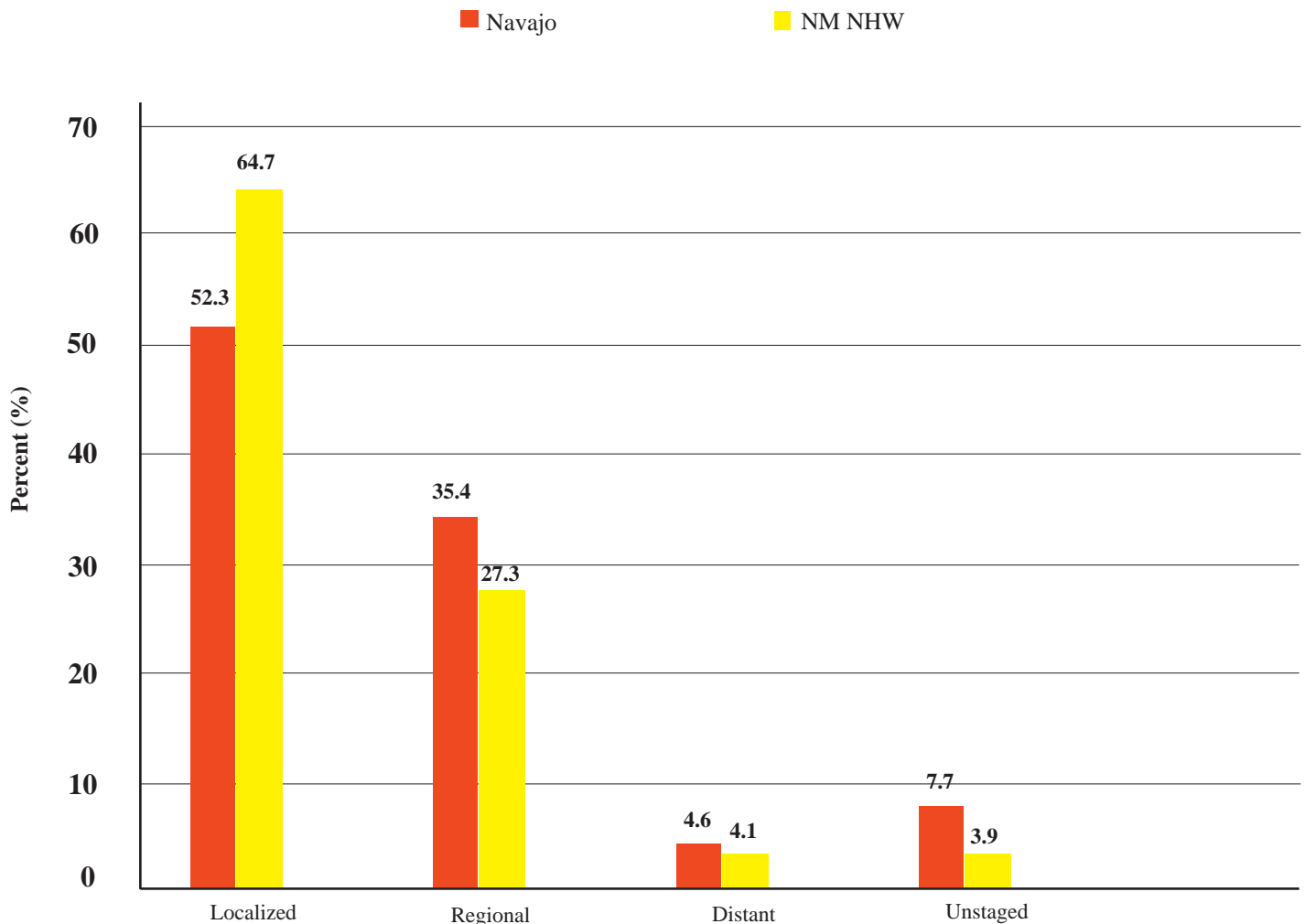
^a Rate per 100,000 persons and are age-adjusted to the 2000 US standard population.

Over half (54.3%) of colorectal cancer cases were diagnosed in the regional stage among Navajo adults (ages 50+) compared with Non-Hispanic Whites (NHW) in New Mexico (37.2%). For

cancer diagnosis it is better to have a cancer diagnosed in the localized stage (when a cure is more likely). However, fewer colorectal cancer cases were diagnosed at the local stage among

Navajo adults (24.3%) compared with NHWs in New Mexico (39.1%). Navajo and Non-Hispanic Whites adults had similar proportions of colorectal cancers diagnosed in the distant stage.

FIGURE 6: Stage of Breast Cancer (Ages 40+) at Diagnosis for Navajos, New Mexico Non-Hispanic Whites, 2001-2004, Females Only



NM: New Mexico; NWH: Non-Hispanic Whites.

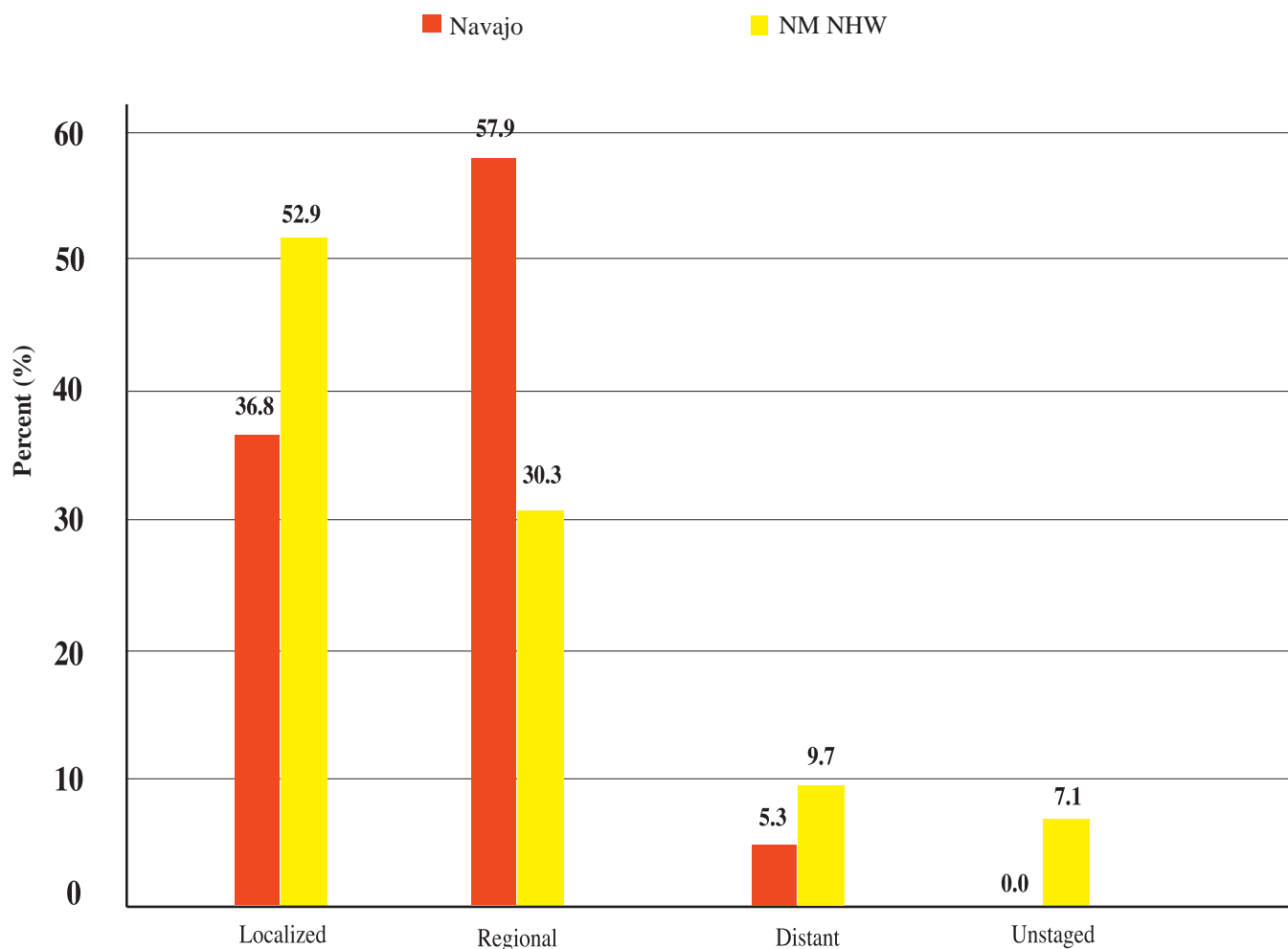
Source: New Mexico Tumor Registry of the National Cancer Institute's Surveillance Epidemiology and End Results (SEER) program.

^a Rate per 100,000 persons and are age-adjusted to the 2000 US standard population.

More than half (52.3%) of breast cancer cases among Navajo women age 40 and over were diagnosed in the localized stage, which was lower than among Non-Hispanic white women in New Mexico (64.7%). A higher percentage of Navajo female

breast cancer cases was found at the regional stage compared with Non-Hispanic women in New Mexico. There was also higher proportion of breast cancer cases determined as unstaged among Navajo women compared with NHW women in New Mexico.

FIGURE 7: Stage of Cervix Cancer (Ages 21+) at Diagnosis Among Navajo, New Mexico Non-Hispanic White, 2001-2004, Females Only



NM: New Mexico; NWH: Non-Hispanic Whites.

Source: New Mexico Tumor Registry of the National Cancer Institute's Surveillance Epidemiology and End Results (SEER) program.

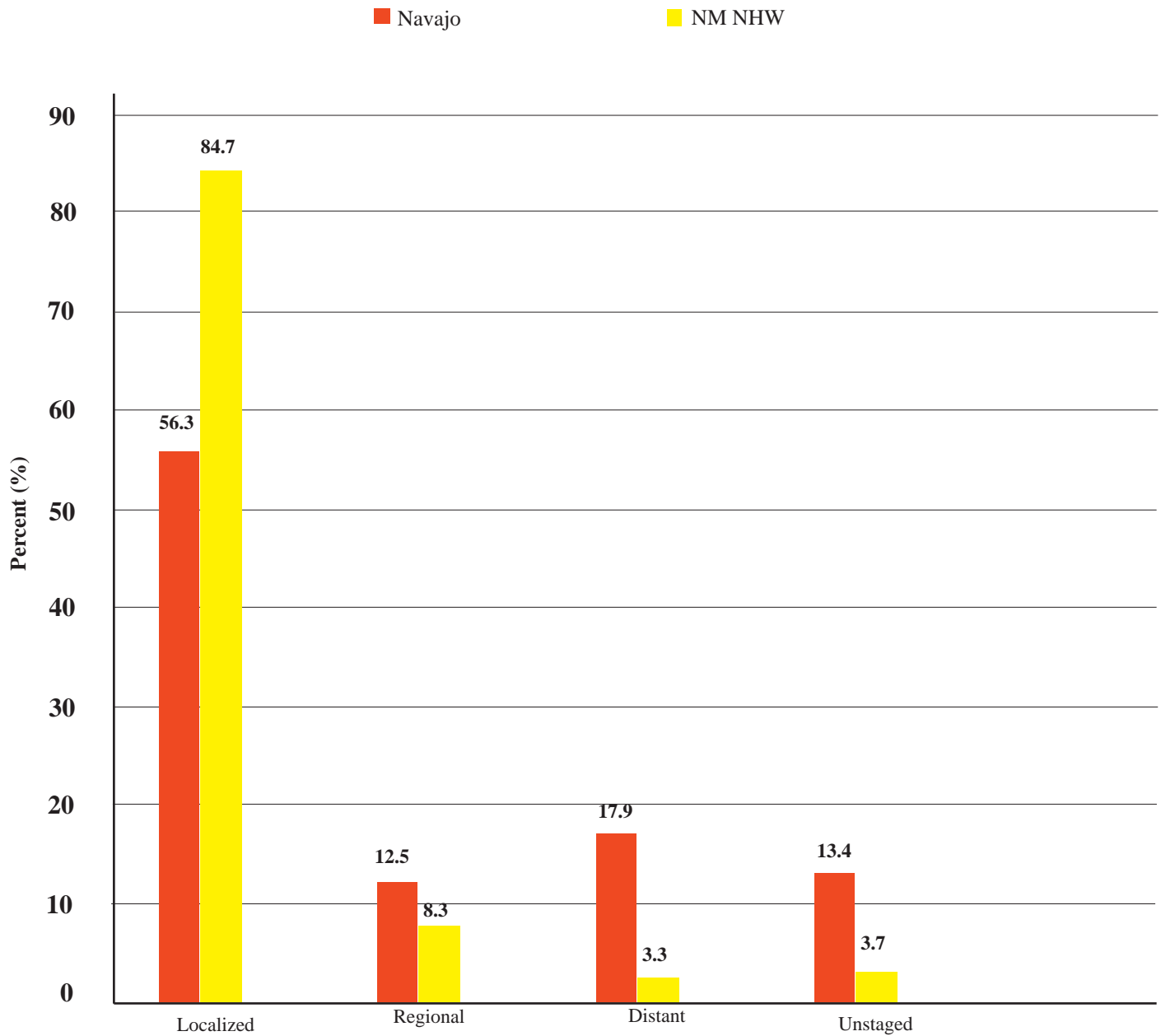
^a Rate per 100,000 persons and are age-adjusted to the 2000 US standard population.

A much higher percentage (57.9%) of Navajo cervical cancer cases (ages 21+) were diagnosed in the regional stage com-

pared with Non-Hispanic White (NHW) women in New Mexico (30.3%). This figure also shows that Navajo women were less

likely (36.8%) to be diagnosed in the more treatable localized stage than Non-Hispanic women in New Mexico.

FIGURE 8: Stage of Prostate Cancer (Age 50+) at Diagnosis for Navajo, New Mexico Non-Hispanic, 2001-2004, Males Only



NM: New Mexico; NWH: Non-Hispanic Whites.

Source: New Mexico Tumor Registry of the National Cancer Institute's Surveillance Epidemiology and End Results (SEER) program.

^a Rate per 100,000 persons and are age-adjusted to the 2000 US standard population.

For Navajo men prostate cancer cases were most commonly diagnosed in the localized stage (56.3%). However, this proportion was considerably lower

compared with Non-Hispanic White (NHW) men in New Mexico. Navajo men also had higher percentage of cases diagnosed at both regional and distant stages

compared with NHW men in New Mexico. In addition there was a higher number of cases that were unstaged.

Cancer Screening Estimates



Cancer screening tests are designed to test both asymptomatic (with no clinical symptoms) and symptomatic individuals for particular cancers. The main purpose of screening is to detect cancers early in their development and

implement treatment to improve survival. This chapter focuses on screening for four common cancers: cervical cancer (the Pap test), breast cancer (mammography), colorectal (CRC) cancer (fobt, sig, colonoscopy), and prostate cancer (PSA test).

While such screening is effective for reducing deaths due to cancers of the breast, cervix and colon/rectum, current evidence is insufficient to conclude that the PSA test is beneficial for men younger than 75 years of age.

Data Source

Cancer screening estimates for Navajos, American Indians/Alaskan Natives (AI/AN) of the Southwest, and Non-Hispanic Whites (NHW) of the Southwest were collected from various data sources. Data sources included the Navajo Education and Research Towards Health (EARTH) study, Navajo Area Indian Health Service Government Performance Result Act (GPRA) measures, and the Behavioral Risk Factor Surveillance System (BRFSS) survey.

Navajo-specific screening estimates were selected from the Navajo EARTH study and the Navajo Area Indian Health Service GPRA measures. The Navajo EARTH study was a 5-year prospective cohort study that collected data from AI/AN adults who were eligible for

healthcare through the Indian Health Service and residents of the Navajo Nation. The study collected data on diet, physical activity, diabetes, cancer, and also included a small panel of medical measurements. The Navajo EARTH study asked participants about cancer screening practices, and the study reported the percentage of people who met recommended screening guidelines.¹⁶

The Navajo GPRA is a federal reporting system that evaluates the performance of the healthcare system of Navajo Area by monitoring key health status measurements. Included in the Navajo GPRA reports are annual cancer screening rates for the Pap smear, mammogram, and colorectal screening tests. Pap smear, mammography, and colorectal screening rates have specific numerator and denominator definitions. In

general, the numerators contain both the number of patients with documented screening tests and patients who refused the tests in the past year; the denominators contain the number of patients seen in the Navajo Service Area during the reporting period.

The Southwest AI/AN and NHW cancer screening estimates were collected from the BRFSS. BRFSS is an on-going telephone-based survey of adults implemented at the state level and supported by the Centers for Disease Control and Prevention. BRFSS tracks health conditions and risk behaviors of the U.S. adult population.

Data Summary

- Overall, results from the Navajo EARTH study and Navajo GPRA measures indicated that Navajo adults were less likely to undergo cancer screening tests for breast cancer, cervical cancer and colorectal cancer compared with Non-Hispanic Whites

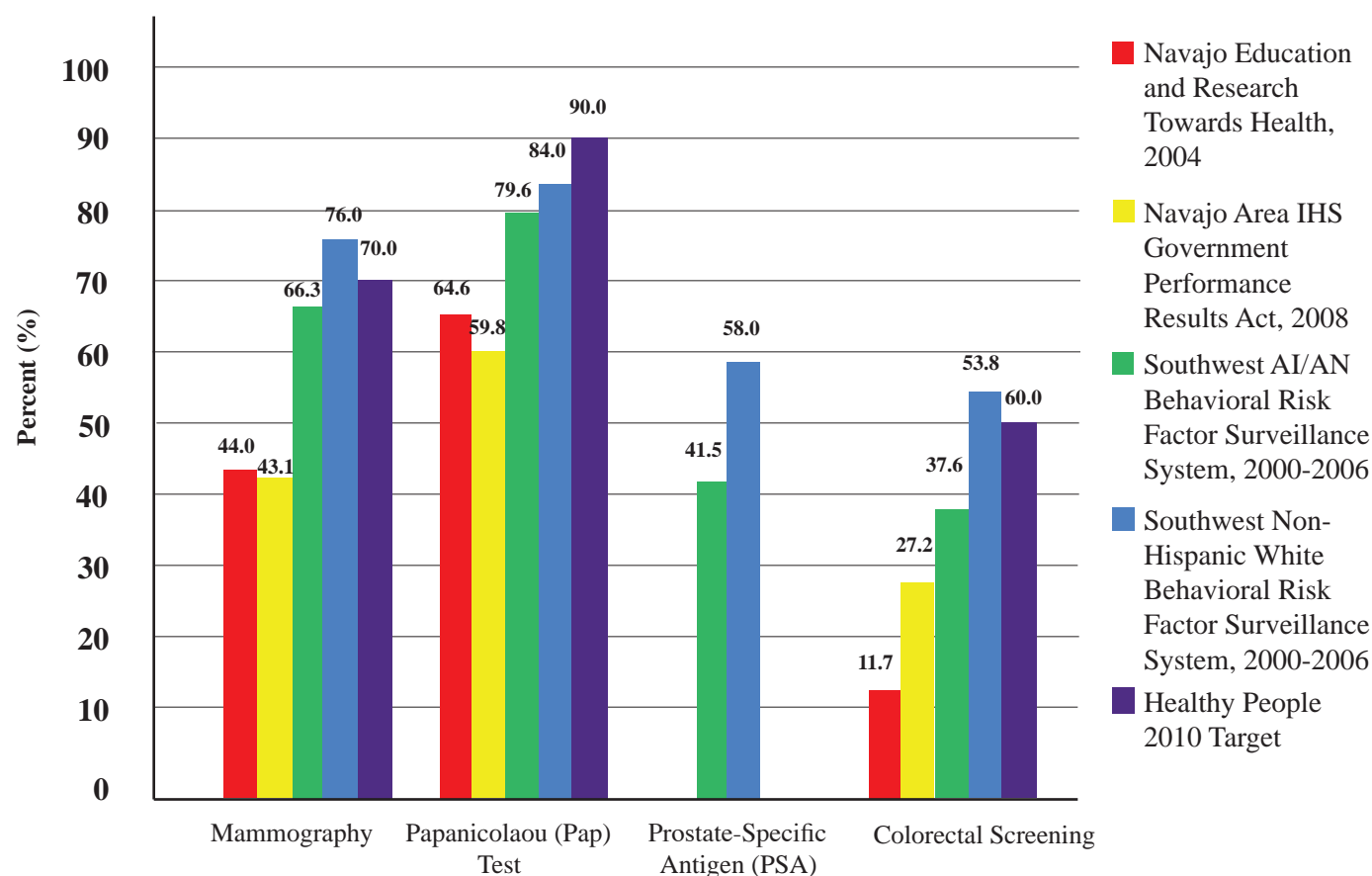
(NHW) of the Southwest. Furthermore, cancer screening estimates for Navajo did not meet Healthy People 2010 screening target goals.

- The prevalence of Prostate-Specific Antigen (PSA) screening among Navajo men was not available for

this report; however, among AI/AN men of the Southwest (which included Navajo), 41.5% reported having a PSA test which was lower than PSA screening rates for NHW men of the Southwest (58.0%).

16. Slattery, M., et al. Navajo EARTH Study Data Summary 2008: A report to the Navajo Nation. August, 2008.

Figure 9: Cancer Screening Prevalence Percentage for Navajos,
Southwest American Indian/ Alaskan Natives
Southwest Non-Hispanic Whites



This figure shows low cancer screening percentages for Navajos compared with American Indian/Alaskan Native and Non-Hispanic Whites of the Southwest for all cancer screening tests. Moreover, these Navajo screening percentages fall far below recommended Healthy People 2010 screening goals.

About 40% of Navajo women reported having a mam-

mogram and about 60% reported having a Pap test, which was much lower compared to NHW women in the 2000-2006 Southwest BRFSS Surveys.

At the time of this report, Prostate-Specific Antigen (PSA) screening estimates were not available for Navajo men. Instead, the Southwest AI/AN estimate was used as a proxy for Navajo; this AI/AN estimate was

much lower than PSA screening among NHW men of the Southwest. Also, there were no comparable Healthy People 2010 target goals for PSA.

A low range (11.7% - 27.2%) of Navajo adults reported colorectal screening compared with AI/AN and NHWs of the Southwest.

TABLE 1: Cancer screening prevalence for Navajo, American Indian/Alaskan Native, and Non-Hispanic White Adults from Various Data Sources

Screening Test	Navajo Education and Research Towards Health (EARTH), 2004 ¹	Navajo Area Government Performance Results Act, 2008 ²	Southwest AI/AN Behavioral Risk Factor Surveillance System, 2000-2006 ³	Southwest Non-Hispanic White Behavioral Risk Factor Surveillance System, 2000-2006 ³	Healthy People 2010 Target %
Mammography	44.0	43.1	66.3	76.0	70.0
Papanicolaou (Pap) Test	64.6	59.8	79.6	84.0	90.0
* Prostate-Specific Antigen	DNA	DNA	41.5	58.0	NA
Colorectal Screening	11.6	27.2	37.6	53.8	50.0

¹Pap Test in the past 3yrs for females 18+ yrs; Mammography in the past 2yrs for females 40+ yrs; Colonoscopy/ Sigmoidoscopy in past 5yrs, aged 50+ yrs.

²Pap Test in the past 3yrs for female patients ages 21-64; Mammography in past 2yrs for female patients ages 50-64; ANY CRC screening in the past year for patients ages 51-80

³Pap Test in past 3yrs, females without hysterectomy; Mammography in past 2yrs for females ≥40yrs; fecal occult blood test or endoscopy in past 5yrs, aged ≥50yrs; includes AI/AN in Arizona, Colorado, Nevada, New Mexico, and Utah; Steele, CB et al., "Surveillance for Health Behaviors of American Indians and Alaskan Natives - Findings from the Behavioral Risk Factor Surveillance System, 2000-2006", Cancer Supplement, *Cancer*

DNA = Data not available

NA = Not Assessed

* At the time of this report no data were available for prostate-specific antigen (PSA) screening estimates for Navajo men. Instead, the Southwest AI/AN estimate was used as a proxy for Navajo men;

Mortality



Cancer mortality rates measure at the population level the risk of dying from specific cancers or from all cancers. These rates are important indicators of the burden of cancer and are the preferred measure for evaluating secondary prevention programs. Reduction in cancer mortality is the standard target for improvements in cancer control.¹⁷

The definition of cancer

mortality rate is the number of persons dying during a specified period divided by the population size. The cancer mortality rate is usually expressed as cancer deaths per 100,000 persons.

Mortality rate = (number of deaths during a specified period / population) x 100,000

Age-adjustment or age standardization is a procedure

that adjusts the mortality rates of one population (in this case, Navajo) to have the same age group distribution of the comparison population or the U.S. Non-Hispanic Whites. Mortality rates presented in this report have been age-adjusted to the 2000 US standard population.

17. Adami, H., D. Hunter, and D. Trichopoulos. Textbook of Cancer Epidemiology. Oxford University Press, New York, NY. 2002.

Methodology

Navajo-specific cancer mortality data were not available to the Navajo Cancer Workgroup at the time of this report. At best, we used the cancer mortality rates among American Indians and Alaska Natives (AI/AN) who resided in a five-county region that comprises most of the Navajo Nation. The five-county region consisted of three counties in Arizona (Apache, Coconino, and Navajo) and two counties in New Mexico (McKinley and San Juan). Navajos residing in these five counties represent about 80% of the total AI/AN population in these counties¹⁸. For this reason cancer mortality among AI/ANs in these five counties served as a proxy for Navajo. The AI/AN data, therefore, are termed Navajo cancer mortality. These data covered the period 1999 – 2004.

Cancer mortality rates

for specific cancer types were compared with the Arizona and New Mexico Non-Hispanic white (NHW) and the U.S. NHW populations.

American Indian and Alaska Native vital events data were collected from data furnished by National Centers for Health Statistics (NCHS) to the IHS. NCHS obtains birth and death data for all U.S. residents from state health departments from information reported on official state birth and death certificates. The records received from NCHS by IHS do not contain names, addresses, tribal identity, or medical record identification numbers. Each vital record includes a single underlying cause of death listed on the death certificate. The records contain county of residence, which allows selection of deaths by county and allowed us to identify deaths in the five-counties of

interest. For this report we examined only those AI/AN deaths for which the underlying cause of death was cancer, as determined by International Classification of Diseases, 10th Revision (ICD-10) codes. These data were used as numerators in cancer mortality rate calculations.

The AI/AN population counts were based on 2000 U.S. Census Bureau county population estimates. During the decennial census, the U.S. Census Bureau counts those persons who identify themselves as AI/AN. The county-level population estimates from the 2000 U.S. Census were used as denominators in cancer mortality rate calculations.

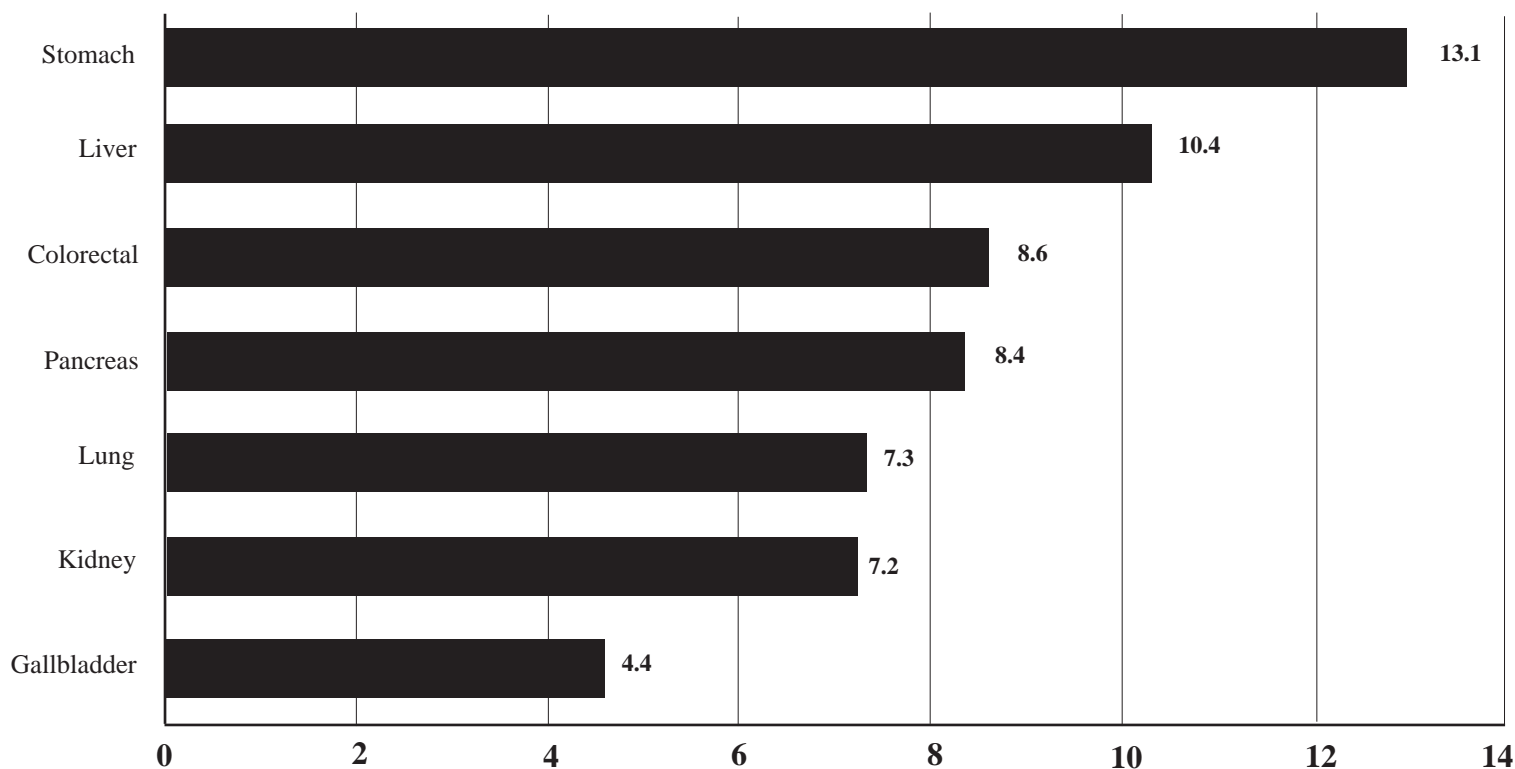
The Arizona and New Mexico NHW and U.S. NHW mortality and population data were derived from the National Cancer Institute SEER database.

Data Summary

- The leading causes of cancer mortality among the Navajo were from stomach cancer, followed by liver cancer and colorectal cancer. For the NHW of Arizona and New Mexico the leading causes of cancer mortality were from lung cancer, colorectal cancer, and pancreas cancer (which were similar to the U.S. NHW population rates).
- The cancer mortality burden among the Navajo varied by sex. Navajo men had higher cancer mortality rates than Navajo women, but both groups had much lower rates compared with Non-Hispanic whites of Arizona/New Mexico, and the U.S.
- Among Navajo men the leading causes of death from cancer were from prostate cancer, followed by stomach cancer and liver cancer.
- Among Navajo women the leading causes of death from cancer were from breast cancer, followed by stomach cancer and liver cancer.

18. Benally, CJ et al. "2005 Navajo Community Health Status Assessment". Navajo Area Indian Health Service, Office of Program Planning and Evaluation. 2005.

FIGURE 10: Leading Causes of Mortality by Cancer Site among the Navajo^a
Age-Adjusted Mortality Rates^a, 1996-2004,
Males and Females Combined



Source: National Centers for Health Statistics (NCHS), National Cancer Institute's Surveillance Epidemiology and End Results (SEER) program.

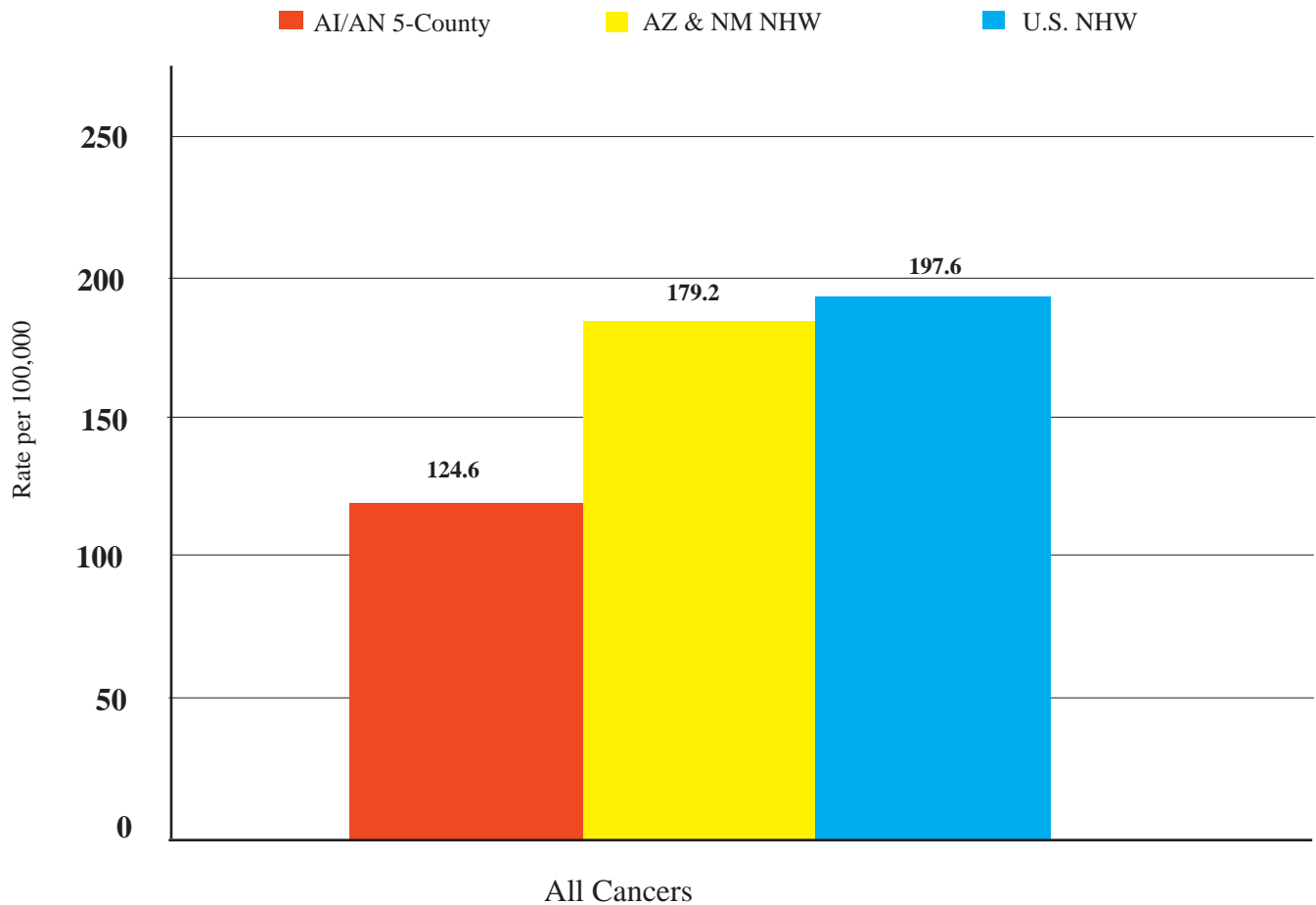
^a American Indian/Alaskan Native Cancer Mortality data in the five counties that comprise Navajo Nation were used as a proxy for Navajo Cancer Mortality rates; the five counties included: Apache County (AZ), Coconino County (AZ), Navajo County (AZ), McKinley County (NM), and San Juan County (NM).

^b Rates are per 100,000 persons and are age-adjusted to the 2000 U.S. standard population.

This figure shows the leading causes of death from cancer among the Navajo. The most common cancer that Navajo adults died from were: stom-

ach cancer (13.1 per 100,000), liver cancer (10.4 per 100,000) and colorectal cancer (8.6 per 100,000).

FIGURE 11: Age-Adjusted Mortality Rates^a from All Cancer Sites among the Navajo^b, Arizona & New Mexico Non-Hispanic Whites and U.S. Non-Hispanic Whites^c, 1996-2004, Males and Females Combined



Source: National Centers for Health Statistics (NCHS), National Cancer Institute's Surveillance Epidemiology and End Results (SEER) program.

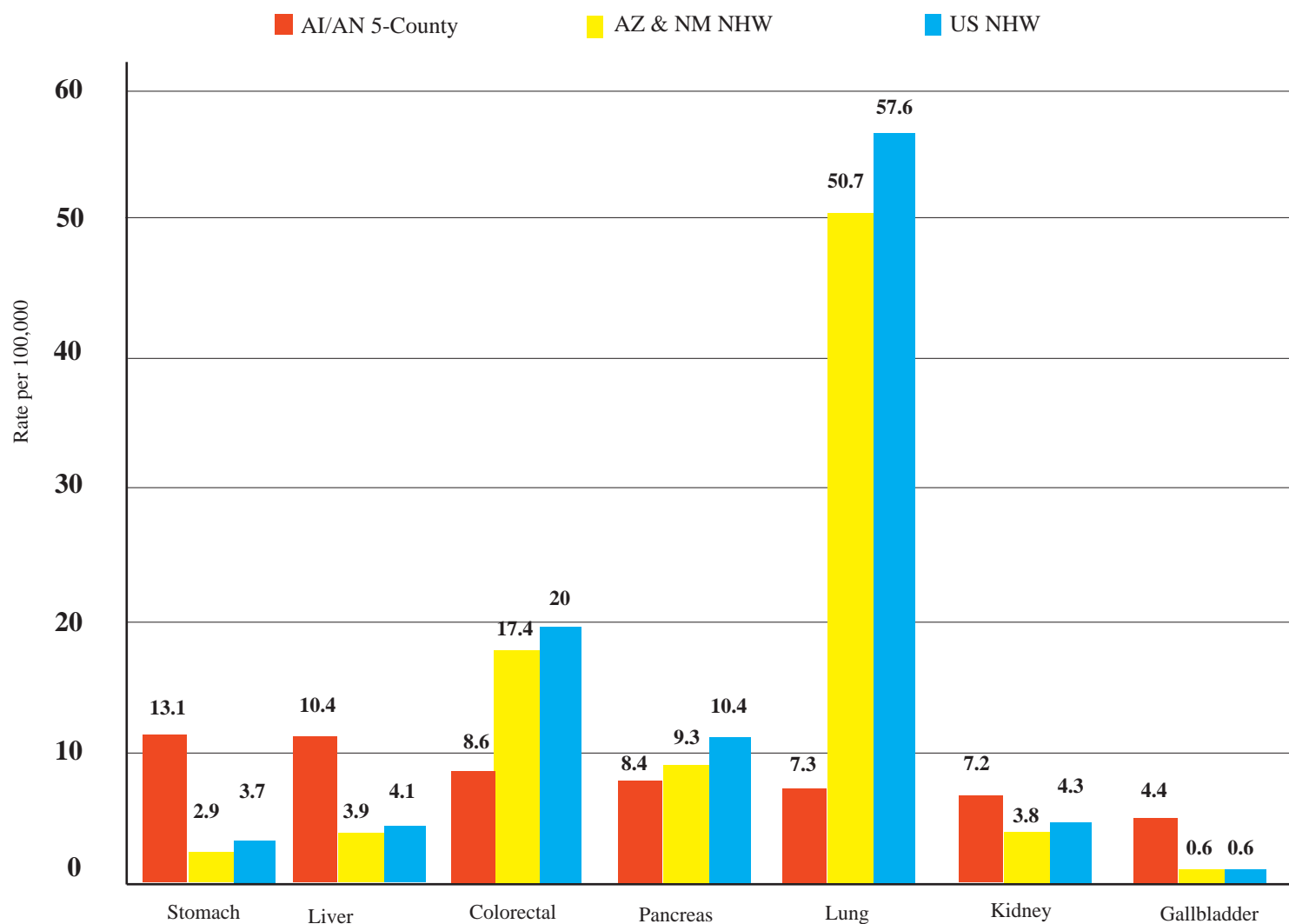
^aRates are per 100,000 persons and are age-adjusted to the 2000 U.S. standard population.

^bAmerican Indian/Alaskan Native Cancer Mortality data in the five counties that comprise Navajo Nation were used as a proxy for Navajo Cancer Mortality rates; the five counties included: Apache County (AZ), Coconino County (AZ), Navajo County (AZ), McKinley County (NM), and San Juan County (NM).

^cData excluded North Dakota because data on Hispanic and Non-Hispanic Mortality may be unreliable for 2000-2004.

Regarding death from all cancers combined, Navajo adults had a much lower mortality rate compared with Non-Hispanic Whites (NHW) in both Arizona/New Mexico and in the U.S.

FIGURE 12: Age-adjusted Cancer Mortality Rates^a among the Navajo^b, Arizona & New Mexico Non-Hispanic Whites, U.S. Non-Hispanic Whites^c, 1996-2004, Males and Females Combined



Source: National Centers for Health Statistics (NCHS), National Cancer Institute's Surveillance Epidemiology and End Results (SEER) program.

^aRates are per 100,000 persons and are age-adjusted to the 2000 U.S. standard population.

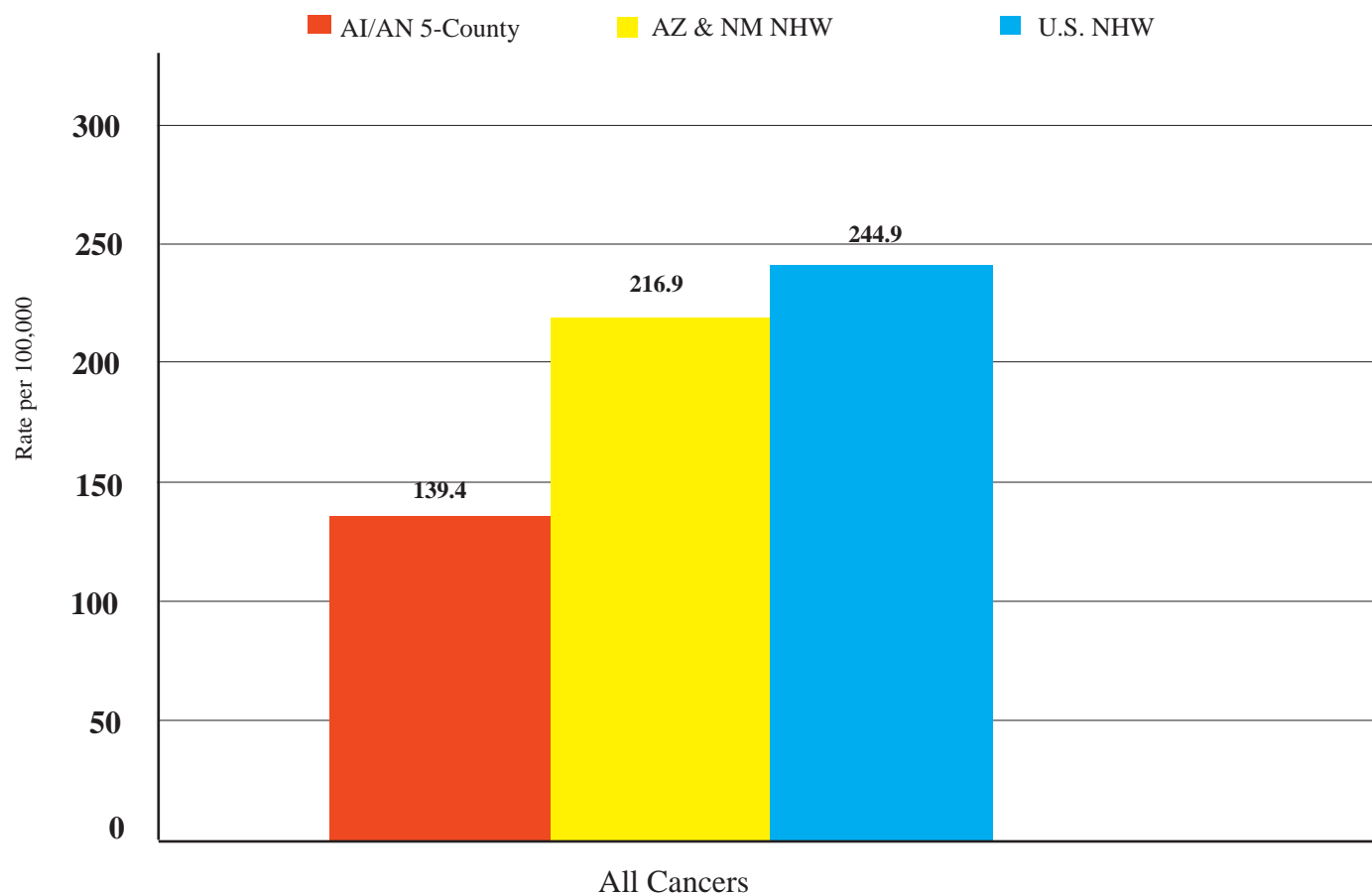
^bAmerican Indian/Alaskan Native Cancer Mortality data in the five counties that comprise Navajo Nation were used as a proxy for Navajo Cancer Mortality rates; the five counties included: Apache County (AZ), Coconino County (AZ), Navajo County (AZ), McKinley County (NM), and San Juan County (NM).

^cData excluded North Dakota because data on Hispanic and Non-Hispanic Mortality may be unreliable for 2000-2004.

In this figure death rates from cancers of the stomach, liver, kidney and gallbladder were much higher among the Navajo compared with Non-Hispanic whites (NHW). Conversely,

death rates for colorectal cancer and lung cancer among the Navajo were much lower compared with NHWs. And, for pancreas cancer, death rates for Navajo and NHWs were similar.

FIGURE 13: Age-Adjusted Mortality Rates^a from All Cancer Sites among the Navajo^b, Arizona & New Mexico Non-Hispanic Whites, U.S. Non-Hispanic Whites^c, 1996-2004, Males Only



Source: National Centers for Health Statistics (NCHS), National Cancer Institute's Surveillance Epidemiology and End Results (SEER) program.

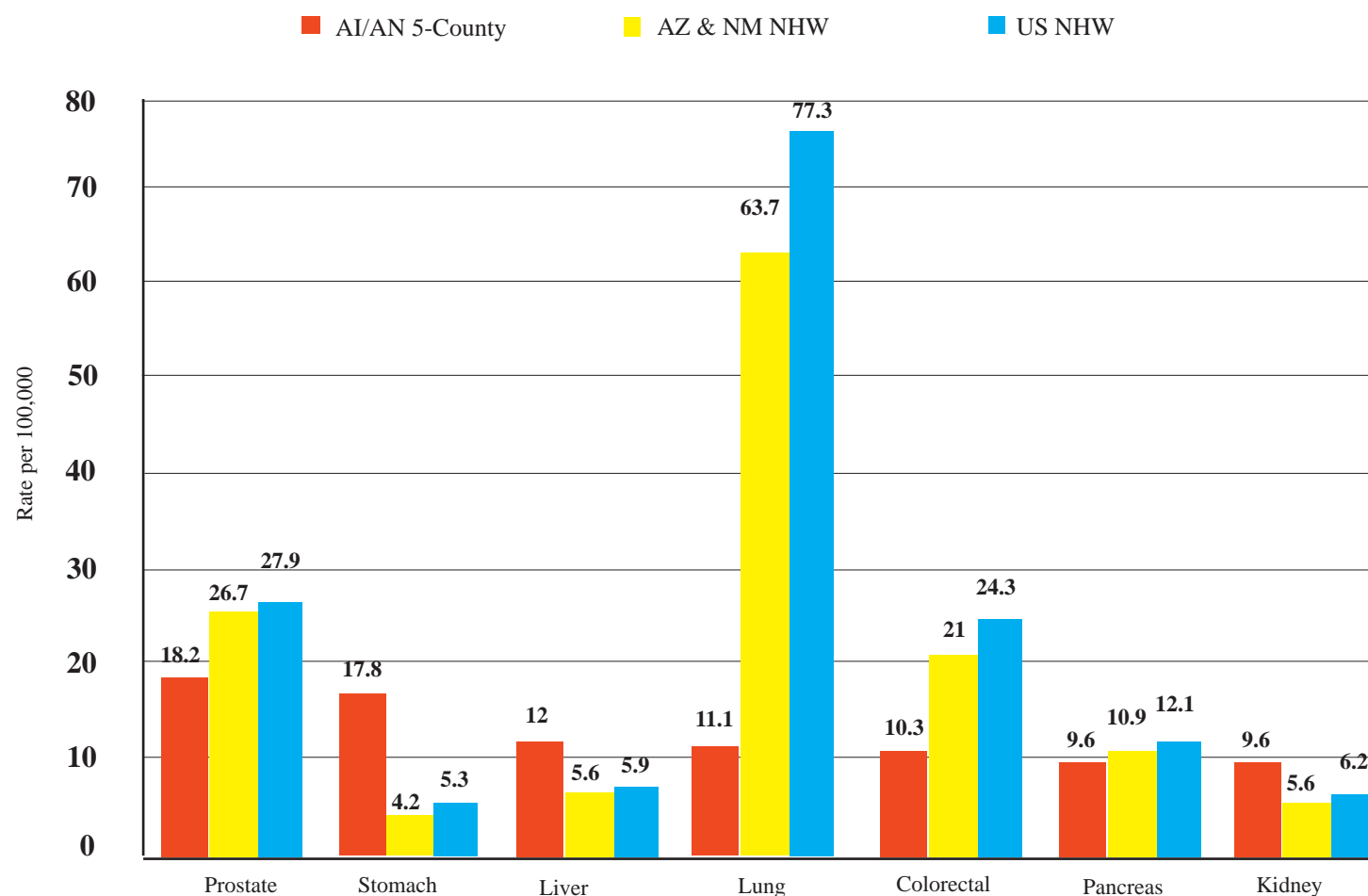
^a Rates are per 100,000 persons and are age-adjusted to the 2000 U.S. standard population.

^b American Indian/Alaskan Native Cancer Mortality data in the five counties that comprise Navajo Nation were used as a proxy for Navajo Cancer Mortality rates; the five counties included: Apache County (AZ), Coconino County (AZ), Navajo County (AZ), McKinley County (NM), and San Juan County (NM).

^c Data excluded North Dakota because data on Hispanic and Non-Hispanic Mortality may be unreliable for 2000-2004.

The death rate from all cancer sites combined for Navajo men was much lower compared with Non-Hispanic white men.

FIGURE 14: Age-Adjusted Cancer Mortality Rates^a among the Navajo^b, Arizona & New Mexico Non-Hispanic Whites, U.S. Non-Hispanic Whites^c, 1996-2004, Males Only



Source: National Centers for Health Statistics (NCHS), National Cancer Institute's Surveillance Epidemiology and End Results (SEER) program.

^aRates are per 100,000 persons and are age-adjusted to the 2000 U.S. standard population.

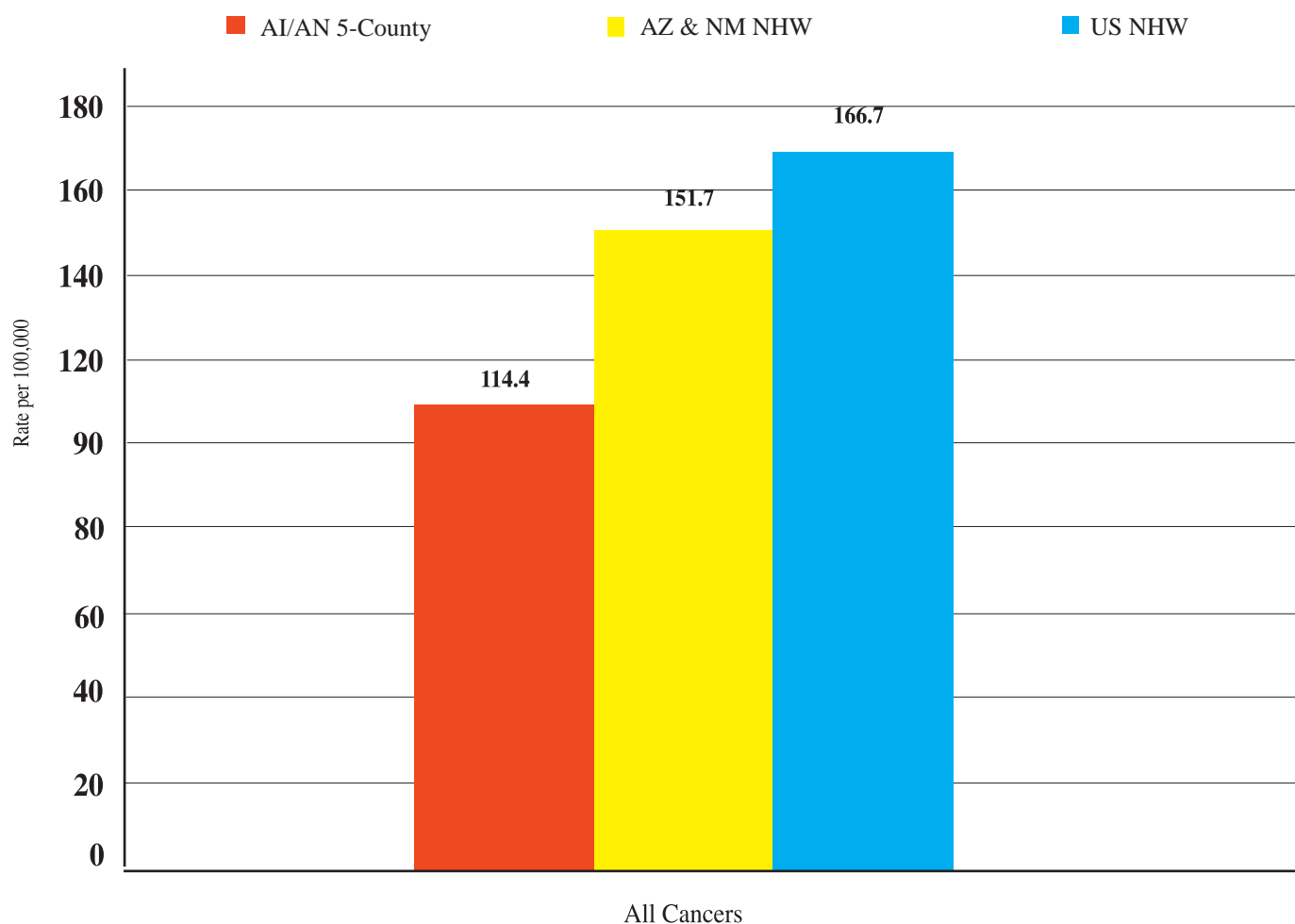
^bAmerican Indian/Alaskan Native Cancer Mortality data in the five counties that comprise Navajo Nation were used as a proxy for Navajo Cancer Mortality rates; the five counties included: Apache County (AZ), Coconino County (AZ), Navajo County (AZ), McKinley County (NM), and San Juan County (NM).

^cData excluded North Dakota because data on Hispanic and Non-Hispanic Mortality may be unreliable for 2000-2004.

For Navajo men mortality rates due to stomach cancer, liver cancer, and kidney cancer were higher compared with NHW men. Lower mortality rates for Navajo men were observed for

cancers of the prostate, lung, and colon and rectum compared to NHW men. Pancreatic cancer mortality was similar across all three groups.

FIGURE 15: Age-Adjusted Mortality Rates from All Cancer Sites among the Navajo, Arizona & New Mexico Non-Hispanic Whites, U.S. Non-Hispanic Whites, 1996-2004, Females Only



Source: National Centers for Health Statistics (NCHS), National Cancer Institute's Surveillance Epidemiology and End Results (SEER) program.

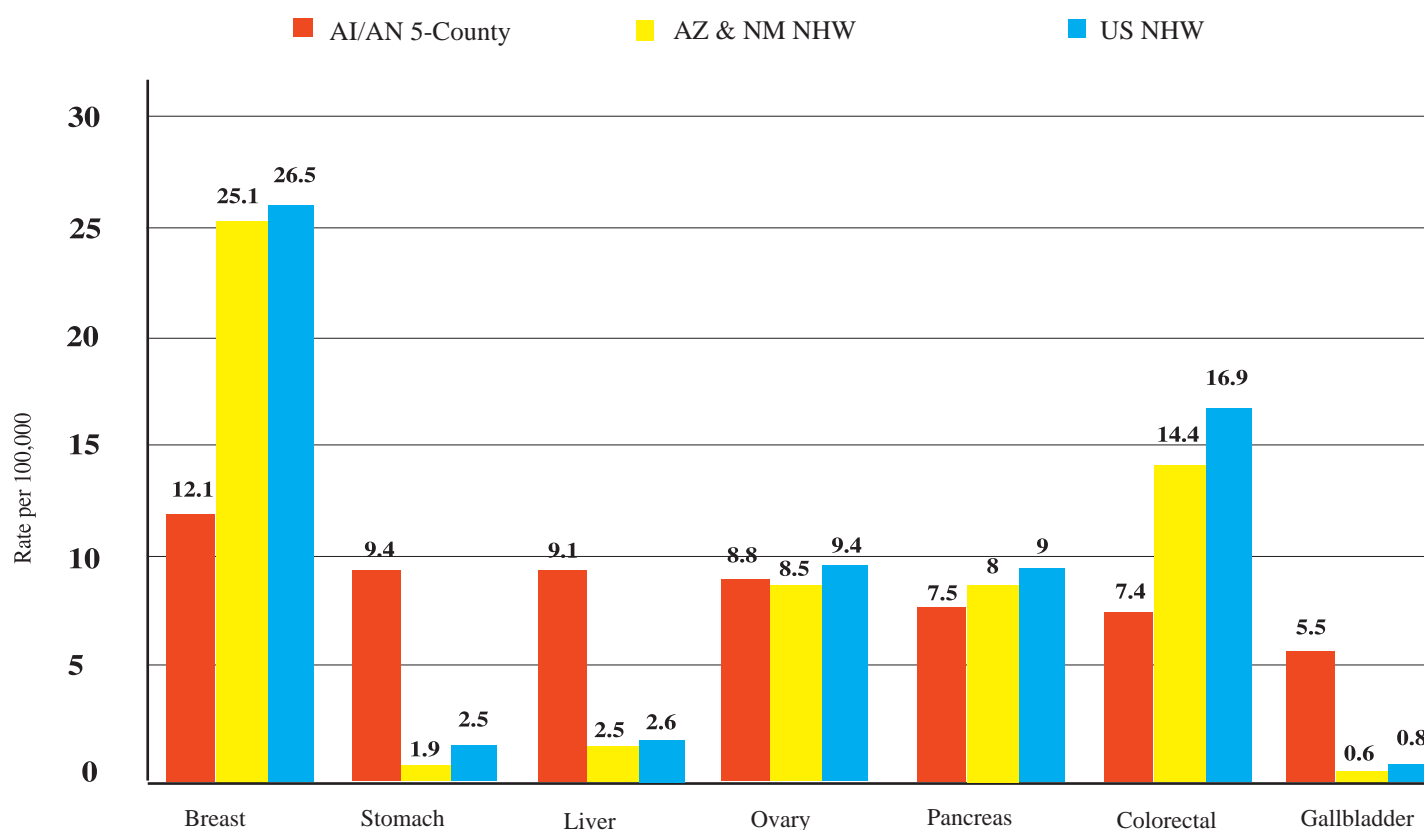
^a Rates are per 100,000 persons and are age-adjusted to the 2000 U.S. standard population.

^b American Indian/Alaskan Native Cancer Mortality data in the five counties that comprise Navajo Nation were used as a proxy for Navajo Cancer Mortality rates; the five counties included: Apache County (AZ), Coconino County (AZ), Navajo County (AZ), McKinley County (NM), and San Juan County (NM).

^c Data excluded North Dakota because data on Hispanic and Non-Hispanic Mortality may be unreliable for 2000-2004.

The death rate for Navajo women from all cancer sites combined was lower compared with Non-Hispanic White women.

FIGURE 16: Average Age-Adjusted Cancer Mortality Rates^a among the Navajo^b, Arizona & New Mexico Non-Hispanic Whites, U.S. Non-Hispanic Whites^c, 1996-2004, Females Only



Source: National Centers for Health Statistics (NCHS), National Cancer Institute's Surveillance Epidemiology and End Results (SEER) program.

^aRates are per 100,000 persons and are age-adjusted to the 2000 U.S. standard population.

^bAmerican Indian/Alaskan Native Cancer Mortality data in the five counties that comprise Navajo Nation were used as a proxy for Navajo Cancer Mortality rates; the five counties included: Apache County (AZ), Coconino County (AZ), Navajo County (AZ), McKinley County (NM), and San Juan County (NM).

^cData excluded North Dakota because data on Hispanic and Non-Hispanic Mortality may be unreliable for 2000-2004.

Compared with Non-Hispanic White (NHW) women, Navajo women had distinctly lower mortality rates from breast cancer

and colorectal cancer. Higher mortality rates among Navajo women, however, were observed for stomach cancer, liver cancer,

and gallbladder cancer. For cancers of the ovary and pancreas, mortality rates were similar across all three groups.

Discussion and Recommendations

Many cancer reports have combined Navajo with other tribes to produce American Indian/Alaskan Native cancer statistics. This report, however, separates and presents Navajo specific cancer data, demonstrating the Navajo Nation's ability to utilize and analyze its own cancer data.

These results are meant to inform and educate the Navajo Nation. By better understanding the occurrence and patterns of cancer among Navajos, Navajo Nation will be better positioned to develop solutions, interventions and relevant research.

Regarding cancer incidence, stage at diagnosis and cancer mortality, it is clear that the Navajo have different cancer rates than the Non-Hispanic White population, as well as different cancer screening practices.

Incidence Rates

These data show that the three most commonly diagnosed cancers among the Navajo were colorectal cancer, stomach cancer, and kidney/renal pelvis cancer. In comparison to NHW, Navajo Nation residents had higher incidence of stomach cancer, liver cancer and gallbladder cancer and lower incidence of colorectal cancer, Non-Hodgkin's Lymphoma and lung cancer.

Navajo men were more likely to be diagnosed with cancer than Navajo women. The three most commonly diagnosed cancer sites for Navajo men were prostate, colon/rectum and stomach. Compared with NHW men, Navajo men had higher incidence of stomach cancer and liver cancer and lower incidence of prostate cancer, colorectal cancer, lung cancer, and Non-Hodgkin's Lymphoma.

For Navajo women, breast cancer was the most commonly diagnosed cancer, followed by ovary cancer and colorectal cancer.

Compared with NHW women, Navajo women had higher incidence of stomach cancer and lower incidence of breast cancer and colorectal cancer.

Stage at Diagnosis

The stage at diagnosis data tell us that among Navajo Nation residents colorectal cancer and cervix cancer were most commonly diagnosed in the regional stage; and breast cancer and prostate cancer were commonly diagnosed in the localized stage. In comparison to NHW women, Navajo women had higher proportions of late stage diagnosis of cervical cancer and breast cancer. And for Navajo men they had much higher proportions of late stage diagnosis of prostate cancer compared to NHW men.

Cancer Screening

The available sources of cancer screening data suggest that cancer screening among the Navajo is low. These low cancer screening estimates indicate the need for improvement. Further comprehensive and culturally appropriate education and awareness around screening and additional research to identify barriers to cancer screening are needed.

Mortality Rates

According to these mortality data, the cancers with the highest mortality rates among the Navajo were stomach cancer, liver cancer, and colorectal cancer. In comparison to NHW, Navajo had much higher rates for cancers of the stomach, liver, kidney, and gallbladder and lower rates for colorectal cancer and lung cancer. Among Navajo men, mortality from prostate cancer, stomach cancer, and liver cancer were highest. And among Navajo women, mortality from breast cancer, stomach cancer, and

liver cancer were most common.

Recommendations

Using cancer data from the Arizona Cancer Registry, New Mexico Tumor Registry, and National Cancer Institute SEER program, the Navajo Cancer Workgroup was able to identify the leading cancers that impact the health of the Navajo people. The data showed differences in cancer burden between the Navajo and the Non-Hispanic whites of Arizona and New Mexico and the United States and also indicated that both Navajo men and women have different cancer experiences.

In view of these results, the following recommendations constitute a framework that public health professionals, healthcare providers, and communities can use to reduce the cancer burden of the Navajo people:

1. Expand collaboration among Navajo tribal health programs, Indian Health Service and tribally operated facilities and local communities in order to translate these data into targeted and culturally appropriate cancer prevention and intervention programs.
2. Continue meaningful partnership with state cancer registries to further utilize and improve population-based cancer surveillance data and maintain an on-going surveillance of cancer in Navajo Area.
3. Promote research that examines: risk factors for many of these cancers; risk factors; late diagnose for screenable cancers; and low cancer screening rates.
4. Increase targeted and culturally appropriate education and awareness about cancer and risk factors, cancer screening, and prevention.
5. Increase education and training for health providers regarding current cancer screening practices and guidelines.

Cancer Resources



Navajo Nation Breast and Cervical Cancer Screening Program
Tel: (928) 871-6254

Indian Health Service
www.ihs.gov/epi/index.cfm?module=epi_cancer_main

San Juan Regional Cancer Center
Tel: (505) 609-6259
www.ourcancercenter.com

Native American Cancer Research
natamcancer.org/index.html

New Mexico Cancer Center
nmcancercenter.org

American Cancer Society
www.cancer.org

Centers for Disease Control and Prevention (CDC)
www.cdc.gov

New Mexico Tumor Registry, University of New Mexico Health Sciences Center, UNM Cancer Center
hsc.unm.edu/som/nmtr/index.shtml

Arizona Cancer Registry
www.azdhs.gov/phs/phstats/acr/index.htm

Appendix A

Cancer Incidence Rates among the Navajo Average Annual Age-Adjusted Incidence Rate^a 1995-2004 BOTH SEXES - COMBINED

<u>TYPE OF CANCER</u>	<u>COUNT</u>	<u>RATE</u>	<u>95% Confidence Interval</u>	
			<u>LOWER</u>	<u>UPPER</u>
ALL SITES	2,514	202.80	194.71	211.12
Colorectal	226	18.22	15.87	20.79
Stomach	162	14.20	12.06	16.59
Kidney and Renal Pelvis	108	14.08	11.99	16.42
Pancreas	93	8.13	6.54	9.96
Liver and Intrahepatic Bile Duct	97	8.11	5.52	9.93
Non-Hodgkin Lymphoma	100	7.82	6.32	9.54
Lung and Bronchus	80	6.99	5.52	8.70
Gallbladder	69	6.17	4.78	7.81
Thyroid	79	5.61	4.40	7.02
Myeloma	60	5.18	3.93	6.66
Leukemia	74	4.50	3.45	5.75
Other Biliary	35	3.21	1.64	4.45
Oral Cavity and Pharynx	34	2.41	1.64	3.40
Brain and Other Nervous System	40	2.06	1.41	2.90
Esophagus	18	1.68	0.99	2.62
Melanoma of the Skin	18	1.47	0.85	2.34
Urinary Bladder	12	1.07	0.54	1.84
Larynx	11	0.99	0.49	1.75
Bones and Joints	13	0.69	0.34	1.25
Hodskin Lymphoma	6	0.45	0.16	0.96
Eye and Orbit	6	0.42	0.14	0.94
Mesothelioma	4	0.32	0.09	0.80

Source: New Mexico Tumor Registry and Arizona Cancer Registry in the National Program of Cancer Registries of the Centers for Disease Control and Prevention and/or the Surveillance Epidemiology and End Results (SEER) program of the National Cancer Institute; Navajo Area Indian Health Service Resource Patient Management System.

^a Rates are per 100,000 persons and are age-adjusted to the 2000 U.S. standard population.

Appendix B

Cancer Incidence Rates^a among the Navajo Average Annual Age-Adjusted Incidence Rate, 1995-2004 MALES

TYPE OF CANCER	COUNT	RATE	95% Confidence Interval	
			LOWER	UPPER
ALL SITES	1,159	222.02	208.95	235.63
Prostate	271	59.06	52.16	66.65
Colorectal	135	25.41	21.21	30.13
Stomach	95	19.01	15.79	23.99
Kidney and Renal Pelvis	101	19.31	15.63	23.53
Lung and Bronchus	52	10.75	7.99	14.08
Liver and Intrahepatic Bile Duct	55	10.17	7.57	13.32
Non-Hodgkin Lymphoma	54	9.35	6.94	12.28
Pancreas	43	8.78	6.33	11.79
Gallbladder	24	5.29	3.37	7.79
Myeloma	26	5.1	3.29	7.47
Leukemia	41	5.04	3.42	7.15
Testis	41	4.15	2.91	5.8
Oral Cavity and Pharynx	23	3.65	2.23	5.59
Thyroid	17	3	1.72	4.82
Esophagus	14	2.99	1.62	4.94
Brain and Other Nervous System	21	2.44	1.39	3.98
Melanoma of the Skin	12	2.42	1.21	4.21
Other Biliary	11	2.37	1.17	4.16
Larynx	10	2.19	1.04	3.93
Urinary Bladder	9	1.89	0.85	3.52
Bones and Joints	8	1.07	0.42	2.22
Eye and Orbit	4	0.6	0.14	1.62
Hodskin Lymphoma	3	0.54	0.11	1.53
Mesothelioma	1	0.19	0	0.97

Source: New Mexico Tumor Registry and Arizona Cancer Registry in the National Program of Cancer Registries of the Centers for Disease Control and Prevention and/or the Surveillance Epidemiology and End Results (SEER) program of the National Cancer Institute; Navajo Area Indian Health Service Resource Patient Management System.

^aRates are per 100,000 persons and are age-adjusted to the 2000 U.S. standard population.

Appendix C

Cancer Incidence Rates^a among the Navajo Average Annual Age-Adjusted Incidence Rate, 1995-2004 FEMALES

<u>TYPE OF CANCER</u>	<u>COUNT</u>	<u>RATE</u>	<u>95% Confidence Interval</u>	
			<u>LOWER</u>	<u>UPPER</u>
ALL SITES	1,355	190.41	180.17	201.05
Breast	326	44.72	39.92	49.9
Ovary	96	13.67	11.02	16.72
Colorectal	91	12.91	10.35	15.88
Uterus	96	12.6	10.17	15.41
Kidney and Renal Pelvis	67	10.22	7.87	13
Stomach	67	10.04	7.74	12.76
Cervix Uteri	66	8.92	6.86	11.38
Thyroid	62	7.77	5.92	10.02
Pancreas	50	7.63	4.82	8.85
Gallbladder	45	6.86	4.98	9.18
Non-Hodgkin Lymphoma	46	6.63	4.82	8.85
Liver and Intrahepatic Bile Duct	42	6.53	4.66	8.84
Myeloma	34	5.26	3.63	7.33
Lung and Bronchus	28	4.29	2.83	6.19
Leukemia	33	3.97	2.69	5.62
Other Biliary	24	3.85	2.45	5.69
Brain and Other Nervous System	19	1.78	1.02	2.89
Oral Cavity and Pharynx	11	1.45	0.72	2.59
Melanoma of the Skin	6	0.78	0.27	1.72
Esophagus	1	0.71	0.19	1.73
Urinary Bladder	3	0.46	0.09	1.31
Mesothelioma	3	0.42	0.09	1.18
Bones and Joints	5	0.41	0.12	1.07
Hodgkin Lymphoma	3	0.39	0.08	1.13
Eye and Orbit	2	0.3	0.03	1.05
Larynx	1	0.14	0	0.74

Source: New Mexico Tumor Registry and Arizona Cancer Registry in the National Program of Cancer Registries of the Centers for Disease Control and Prevention and/or the Surveillance Epidemiology and End Results (SEER) program of the National Cancer Institute; Navajo Area Indian Health Service Resource Patient Management System.

^aRates are per 100,000 persons and are age-adjusted to the 2000 U.S. standard population.

Appendix D

STAGE OF CANCER AT DIAGNOSIS Navajo Nation, 2001-2004 New Mexico Non-Hispanic Whites, 2001-2004

Prostate (Age 50+)				
	Navajo		NM NHW	
Stage	No. Cases	Percent	No. Cases	Percent
Local	63	56.25	2,977	84.65
Regional	14	12.50	292	8.30
Distant	20	17.86	117	3.33
Unknown	15	13.39	131	3.37

Female Breast (Age 40+)				
	Navajo		NM NHW	
Stage	No. Cases	Percent	No. Cases	Percent
Local	68	52.31	1,904	64.70
Regional	46	35.38	804	27.32
Distant	6	4.62	121	4.11
Unknown	10	7.69	114	3.87

Colorectal (Age 50+)				
	Navajo		NM NHW	
Stage	No. Cases	Percent	No. Cases	Percent
Local	17	24.29	720	39.07
Regional	38	54.29	685	37.17
Distant	11	15.71	300	16.28
Unknown	4	5.71	138	7.49

Invasive Cervix (Age 50+)				
	Navajo		NM NHW	
Stage	No. Cases	Percent	No. Cases	Percent
Local	7	36.84	82	52.90
Regional	11	57.89	47	30.32
Distant	1	5.26	15	9.68
Unknown	0	—	11	7.10

NM: New Mexico; NHW: Non-Hispanic Whites

Source: New Mexico Tumor Registry of the National Cancer Institute's Surveillance Epidemiology, and End Results (SEER) program.

Appendix E

Cancer Mortality for American Indian/ Alaskan Native^a (including Navajo) and Non-Hispanic Whites, United States, 1996-2004

Sex	Site	AI/AN			NHW			NHW		
		5 County ^b			US ^c			AZ & NM		
		Count	Rate ^d	95% CI	Count	Rate ^d	95% CI	Count	Rate ^d	95% CI
Both	All Cancers	1,474	124.6	118.1-131.3	4,083,516	197.6	197.4-197.8	87,018	179.2	178.0-180.4
	Colorectal	105	8.6	7.0-10.4	416,875	20.0	19.9-20.1	8,455	17.4	17.0-17.7
	Gallbladder	48	4.4	3.3-5.9	13,574	0.6	0.6-0.7	275	0.6	0.5-0.6
	Kidney	83	7.2	5.7-8.9	88,549	4.3	4.3-4.3	1,834	3.8	3.6-4.0
	Liver	120	10.4	8.6-12.5	83,979	4.1	4.0-4.1	1,885	3.9	3.7-4.1
	Lung	80	7.3	5.7-9.0	1,190,804	57.6	57.5-57.7	25,107	50.7	50.1-51.3
	Pancreas	94	8.4	6.8-10.3	215,806	10.4	10.3-10.4	4,579	9.3	9.1-9.6
	Stomach	151	13.1	11.0-15.4	77,124	3.7	3.7-3.7	1,421	2.9	2.8-3.1
Male	All Cancers	703	139.4	128.8-150.5	2,112,774	244.9	244.6-245.3	46,444	216.9	214.9-218.9
	Colorectal	54	10.3	7.6-13.5	207,293	24.3	24.2-24.4	4,463	21.0	20.4-21.6
	Gallbladder	13	3.1	1.6-5.2	4,013	0.5	0.5-0.5	102	0.5	0.4-0.6
	Kidney	49	9.6	7.0-12.7	54,779	6.2	6.2-6.3	1,193	5.5	5.2-5.8
	Liver	62	12.0	9.1-15.4	52,223	5.9	5.9-6.0	1,193	5.6	5.2-5.9
	Lung	52	11.1	8.2-14.5	684,039	77.3	77.1-77.5	14,115	63.7	62.7-64.8
	Pancreas	47	9.6	7.0-12.8	105,982	12.1	12.0-12.2	2,375	10.9	10.5-11.3
	Prostate	78	18.2	14.3-22.7	220,160	27.9	27.8-28.0	5,357	26.7	26.0-27.5
	Stomach	89	17.8	14.2-22.0	45,648	5.3	5.3-5.4	893	4.2	3.9-4.5
Female	All Cancers	771	114.4	106.2-122.9	1,970,742	166.7	166.4-166.9	40,574	151.7	150.2-153.2
	Breast	88	12.1	9.7-15.0	303,328	26.5	26.4-26.6	6,414	25.1	24.5-25.7
	Cervical	37	5.0	3.5-7.0	24,879	2.4	2.3-2.4	478	2.1	1.9-2.3
	Colorectal	51	7.4	5.5-9.8	209,582	16.9	16.8-16.9	3,992	14.4	14.0-14.9
	Gallbladder	35	5.5	3.8-7.6	9,561	0.8	0.8-0.8	173	0.6	0.5-0.7
	Kidney	34	5.4	3.7-7.5	33,770	2.8	2.8-2.9	641	2.4	2.2-2.6
	Liver	58	9.1	6.9-11.7	31,756	2.6	2.6-2.7	692	2.5	2.3-2.7
	Lung	28	4.4	2.9-6.4	506,765	43.5	43.4-43.6	10,992	40.5	39.8-41.3
	Ovary	61	8.8	6.7-11.3	108,331	9.4	9.3-9.4	2,228	8.5	8.1-8.8
	Pancreas	47	7.5	5.5-9.9	109,824	9.0	8.9-9.1	2,204	8.0	7.6-8.3
	Stomach	62	9.4	7.2-12.1	31,476	2.5	2.5-2.6	528	1.9	1.8-2.1

AI/ AN: American Indian/ Alaskan Natives; NHW: non-Hispanic whites; CI: confidence interval; NCHS: National Center for Health Statistics
Source: National Centers for Health Statistics (NCHS), National Cancer Institute Surveillance Epidemiology, and End Results (SEER) program

^a AI/AN race as reported by National Center for Health Statistics (NCHS).

^b 5 County includes: Apache County(AZ), Coconino County(AZ), Navajo County(AZ), McKinley County(NM), and San Juan County(NM).

^c Data excluded for North Dakota because data on Hispanic and non-Hispanic mortality may be unreliable for 2000-2004

^d Rates are per 100,000 persons and are age-adjusted to the 2000 U.S. standard population

Definitions

Term	Definition
RPMS	The Resource and Patient Management System is a decentralized automated information system of over 50 integrated software applications. RPMS software modules fall into three major categories: clinical, administrative, and infrastructure applications.
GPRA	Government Performance Results Act mandates federal measures to monitor the performance of federal agencies according to specific health and treatment guidelines. Meeting these target measures demonstrates the effectiveness of the federal agency to comply with identified strategic and annual performance goals.
Local Stage	A cancer that is limited to the organ of origin; it has spread no farther than the organ in which it started.
Regional Stage	A cancer that extends beyond the limits of the organ of origin; cancer becomes regional when there is the potential for spread by more than one lymphatic or vascular supply route.
Distant Stage	Cancer cells have broken away from the primary cancer, have traveled to other parts of the body, and have begun to grow at the new location; distant stage is also called remote, diffuse, disseminated, metastatic, or secondary disease.
Unknown Stage	Not enough information to categorize a case; it must be recorded as unstageable.
Incident Rate	The number of new cancer cases of specific site/type occurring in a specified population during a period in time.
Mortality Rate	The number of persons dying during a specified period of time within a population.
Age-standardization	A procedure for adjusting rates (e.g., death rates) designed to minimize the effects of differences in age composition when comparing rates for different populations.

CANCER AMONG THE NAVAJO 1994-2004



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