Cancer Disparities by Race and Ethnicity in Nebraska: 1991-2005

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Executive Summary

This report intends to identify and document cancer disparities by race and ethnicity in Nebraska between 1991 and 2005. The report also examines cancer status and trends at the same period in terms of incidence, staging, and survival with an emphasis on incidence, either by cancer site or by geography for the following mutually exclusive racial/ethnic groups: non-Hispanic whites, non-Hispanic African Americans, non-Hispanic American Indians/Alaska Natives, non-Hispanic Asians and Pacific Islanders, Hispanic whites, and Other Races with Hispanic Origin.

In general, differences in the incidence among major cancer sites, such as breast, colorectal, lung, prostate by race and ethnicity, exhibit patterns and trends similar to those at the national level. In addition, differences in early stage diagnoses and five-year survival rates favoring non-Hispanic whites remain throughout the study period.

In particular, non-Hispanic African Americans and non-Hispanic whites had a heavier and more persistent burden for prostate cancer than other groups, although the trend for non-Hispanic whites declined. There was an increasing trend in lung cancer incidence for non-Hispanic white females. Measures specifically targeting lung cancer risk factors for white females should be considered. The state incidence rate for cervical cancer between 1991 and 2000 among non-Hispanic Asians was two to three times higher than the national rate for Asians. The higher state rate can be attributed, in part, to a relatively high proportion of Vietnamese Americans among the Asian population in Nebraska.

American Indians in Nebraska share similar cancer risk factors as Northern Plains American Indians and had much higher incidence rates for many types of cancer than the corresponding national population. Localized cancer risk identification and intervention are needed to target American Indians in Nebraska.

The rate of late-stage cancer at diagnosis is inversely related to the five-year survival rate. Nebraska's non-Hispanic African Americans and American Indians had the highest rate of late-stage cancer at diagnosis and the lowest five-year survival rate of all racial and ethnic groups. Since minority populations are concentrated in a few counties in Nebraska with evident geographic staging and survival patterns, more localized efforts to increase the opportunity for early cancer diagnosis among minority populations should be implemented.

The Hispanic white population increased rapidly in Nebraska during the study period, and this population tended to have relatively low incidence rates for most cancer sites. It is not clear whether the low incidence was due to the characteristics of in-migrants of Hispanic origin or due to this population's low number of risk factors, or due to the underreporting of Hispanic ethnicity in the census population.

Recommendations:

Review cancer screening efforts. Due to observed disparities among minority groups in cancer staging and survival, a review of cancer screening efforts in Nebraska should be conducted, with a focus on minority populations and other underserved groups.

Increased efforts should be made to reduce the percentage of cases without race and/or ethnicity information. Overall, the cancer registry does well in collecting this information (since 2000, fewer than 2% of cases do not include information on race and less than 3% do not include information on ethnicity), but because the size of Nebraska's minority populations is so small, even a small number of cases with missing information can have a substantial impact on minority race and ethnicity incidence rates. Efforts should include 1) cleaning and linking death certificates and other administrative data, 2) better training of local tumor registrars for race and ethnicity coding, and 2) communicating with health professionals regarding race/ethnicity probing and documentation of cancer patients.

Benchmark cancer disparity indicators for future improvements. The reported descriptive statistics for incidence, staging, and survival rates should be verified and benchmarked for regular cancer disparity surveillance. Comprehensive cancer control should include a better mechanism for data integration and surveillance so that known risk factors can be detected and controlled at an early stage. The findings from this report should be used in the revision of the Nebraska Cancer Plan due in 2010 and provided to the Nebraska Cancer Registry Advising Committee.

Study unique risk factors and their measures in minority population groups. To further assess race- and ethnicity-specific cancer burden, separate studies should be conducted to identify common and unique cancer incidence and risk factors pertinent to Nebraska minority population groups. In addition, further studies are needed that examine additional health disparity measures including socioeconomic disparities.

Link program outcomes with health disparity measures. Outcomes from major programs that are either directly or indirectly related to cancer control and cancer disparities should be linked to and assessed with evidence-based health disparity measures that can be derived from the Nebraska Cancer Registry, existing population-based surveys, and health care quality information. In this way, findings can have a direct impact on existing programs and future planning.

1. Introduction

Cancer health disparities are defined as "differences in the incidence, prevalence, mortality, and burden of cancer and related adverse health conditions that exist among specific population groups in the United States." (NCI, 2009). One of the Healthy People 2010 goals is to eliminate health disparities across the categories of gender, race, ethnicity, and geographic location (USDHHS, 2000). A cancer-related goal is to "reduce the number of new cancer cases as well as the illness, disability, and death caused by cancer" (9, page 3-3). The first goal of the Nebraska Comprehensive Cancer Control Plan for 2004-2010 is to "eliminate cancer disparities for all people in Nebraska." In a method review for assessing cancer disparities, Harper and Lynch (2005) point out the lack of studies that assess long-term trends in cancer disparities. They attribute it to the lack of detailed, comparable racial/ethnic information in cancer-related data that could be linked to a corresponding at-risk population. In this report, we use mutually exclusive racial/ethnic categories to document three major indicators of cancer disparities - incidence, staging, and survival - in Nebraska between 1991 and 2005.

Like most states in the country, Nebraska produces an annual cancer report that contains site-specific incidence for four racial groups (White, African American, American Indian, and Asian), and one ethnic group (Hispanic). Unlike resource-rich states such as New York, New Jersey, California, and Wisconsin, Nebraska does not regularly produce a report that examines site-specific trends by detailed racial/ethnic categories, nor does it examine site-specific trends for a longer period (e.g., 10+ years). The current report fills this gap by assessing medium- and long-term trends in cancer disparities.

Most national and state cancer reports mix race and ethnicity in mutually inclusive groups. However, with Nebraska's increasing Hispanic population, such an approach may not be sufficient to highlight race- and ethnicity-specific cancer disparities. To bridge the current state efforts with future planning, it is necessary to examine each racial and ethnic group separately.

This report also attempts to identify issues and set priorities for the next phase of Nebraska's Comprehensive Cancer Control Plan. The Nebraska Comprehensive Cancer Control Program was formed when the Nebraska Department of Health and Human Services received a planning grant from the Centers for Disease Control and Prevention (CDC) in 2001. During the planning process, a statewide partnership was formed representing more than 150 groups and organizations. The partnership, known as Nebraska Cancer Awareness, Research, Education and Service (C.A.R.E.S.), developed the Nebraska Cancer Plan 2004-2010 (NEHHSS, 2004), and has implemented many of the plan's objectives, such as promoting early cancer screenings, increasing access to screening among minority and low-income individuals, and coordinating cancer prevention with programs that promote a healthy lifestyle, etc. (see Appendix I for a list of activities).

Several state efforts are aimed at reducing cancer disparities for all Nebraskans. In 2005, Nebraska C.A.R.E.S. distributed the report *Eliminating Cancer Disparities in Nebraska* (Sanchez de Jimenez, 2005), which extracted some demographic information and racial differences in cancer burden from census and state cancer annual reports. In 2006, a Cancer Disparities Work Group in Omaha was formed that has collaborated with the North Omaha and South Omaha Care Coalitions, cancer centers, and non-profit organizations. Nebraska C.A.R.E.S. collaborated with the Tobacco Free Nebraska Program to offer symposia on Women, Tobacco and Cancer in several cities with a high concentration of Hispanics to reduce risk factors that contribute to cancer disparities.

2. Method

2.1. Data

Cancer data used in this report are from the Nebraska Cancer Registry (NCR) with a case finding date through September 30, 2008, for the study period 1991 to 2005. We chose the 15-year period for two reasons. First, cancer registrations for military veterans from Veterans Administration hospitals were not included prior to 1990. Second, although the majority of cancer cases are registered shortly after diagnosis, case finding is an ongoing process. It takes about two years to get nearly 100% of cases into the system. By excluding the years 2006 and 2007, we were assured case ascertainments of almost 100%.

Data quality from 1995 onward has been excellent, as evidenced by the NCR being awarded Gold Certification for data quality by the North American Association of Central Cancer Registries (NAACCR) each year. Part of the mandate for the NCR and the Nebraska Department of Health and Human Services' health statistics unit is to safeguard patient information. For this reason, any rates based on frequency counts of 20 or less are not reported by a reportable unit (e.g., county, racial group).

Population data are based on the official US Census Bureau annual population estimates by race and ethnicity from 1991 and 2005. During the first 10 years of the study period, the Census Bureau used the traditional race and ethnicity definition of four races and Hispanic origin. The Census Bureau started to implement multiracial categories in the 2000 census. However, these changes have not directly affected the practice of reporting race and ethnicity in population estimates by the Census Bureau.

All calculations for cancer incidence rates are based on the total of five-year incidents and the sum of five-year corresponding population estimates for four major racial groups—white, African American, American Indian, and Asian, and for Hispanic origin. Due to small sample sizes for races with Hispanic origin, only Hispanic whites are reported separately; Hispanics of all other races are grouped into a single category. We use the abbreviation NH to refer non-Hispanic in the following race and ethnicity groups: NH whites, NH African Americans, NH American Indians/Alaska Natives, and NH Asians. These population subgroups are mutually exclusive, which is different from the annual report of the NCR, in which Hispanic is a category overlapping each race category.

The Nebraska Cancer Incidence and Mortality Reports use the same data set from the NCR that we used, but with a slightly different at-risk population. We use the sum of any five-year period; the state cancer report uses the third year of the five-year period and does not treat Hispanics separately from whites or African Americans. In addition, the state cancer reports use an early cut-off date for case finding in the NCR. As a result, compared to various state cancer reports, especially the 2005 report, the total cases in this report for any particular five-year period are slightly higher for the same period, and incidence rates are also slightly higher.

There are several measures for cancer disparity at the population level. Four most often used are incidence, mortality, staging, and survival rates. Because the NCR does not have a reliable indicator of mortality, while readily available vital statistics are aggregated by the traditional mutually inclusive race and ethnic groups, we opted to use three indicators: site-specific incidence rates, cancer staging rates, and short-to-medium survival rates.

2.2. Incidence

We calculated cancer incidence based on malignant or invasive cancer, which excludes carcinoma in situ and cancer of unknown behaviors. Cancer incidence is the number of new cases of a specific site/type occurring in a given population group (age, sex, race, etc.). According to this definition, laterals for symmetric body organs, such as kidney, breast, arm, leg, etc., could have two incidents if they were not diagnosed at the same time or were determined to have developed differently. Potential laterals have a greater effect on more recent cancer coding than on earlier coding due to recent updates of coding rules.

The standard incidence rate is a weighted average of the age-specific rates, where the numerator is the number of age-specific new cases, the denominator is the size of the age-specific population, and the weights are the proportions of persons in the corresponding age groups of the 2000 US standard population. We used 10 rather than 11 age groups in the calculation of standard incidence because there was no individual with Hispanic origin in the group aged 75 to 84 years in the 1991-1995 period. For this reason, we grouped individuals aged 75 years and older with those aged 85 years and older. Whenever possible, we also attempted to compare state incidence rates with national rates. However, due to inconsistent race and ethnicity definitions, most site-specific rates can only be compared broadly, not with a one-to-one correspondence. This limitation applies to CDC data for recent years (U.S. Cancer Statistics Working Group, 2004) and to Surveillance Epidemiology and End Results (SEER) data for the entire study period. We rely on SEER periodical reports of a nationally representative sample for the comparison. We used SEER Statistics Reviews for 1973-1995, 1975-2000, and 1975-2005 to cover, respectively, 1991-1995, 1996-2000, and 2001-2005 (Ries et al., 2002, Ries et al., 2003, Ries et al., 2008). Since the SEER Review has a limited number of sample states, caution should be used when comparing incidence.

Among the total of 122,494 cases, there were 1,366 cases (1.12%) without race designations and 2,058 (1.68%) without either race or Hispanic origin designation; however, most of those cases were in counties with high minority populations. For example, among the top five counties with the highest African American populations, four had above average (1.37%) missing race values (Douglas, 1.5%; Lancaster, 2.0%; Sarpy, 1.7%; and Madison, 2.6%). Only Buffalo County had less than the average, with about 1% missing values. To reduce the impact of missing values, missing cases for Hispanic origin were imputed according to the computed Hispanic origin variable based on Hispanic surnames, while the remaining 1.12% of cases with missing race designations were deleted for race- or ethnicity-specific incidence calculation. As a result, the incidence rates in this report are likely to be slightly lower than the actual rates.

2.3. Staging

Cancer stages include nine broad categories (in situ, localized, regional with direct extension only, regional with regional lymph nodes only, regional with direct extension and regional lymph nodes, regional with not otherwise specified, distant, unknown, and unstaged). Timely screening and primary care referrals capture many types of cancer at an early stage, while lack of access to screening and primary care leads to more advanced cancer staging in treatment. We grouped in situ and localized as the early stage, regional and distant as the late stage, and the rest as unstaged. In the staging analysis, cases with missing racial designation were retained as a unique category. The staging classification system was

modified in 2000, which may introduce some inconsistencies for the three study periods. Prior to 2000, the SEER 1977 classification system was used; the SEER 2000 staging classification was used thereafter. According to an NAACCR study (Howe et al., 2008), there were some inconsistencies between the two systems. For instance, about 8% of cases of unknown stage for prostate cancer in 1997 were staged as local. For most cancer sites, the broad early, late, and unstaged categories are consistent.

2.4. Survival

There are several measures for cancer survival: crude survival rate, relative survival rate, and period-specific survival rate. Crude survival rate is the proportion of patients alive at the end of a study period after diagnosis, and cumulative probability of death is the remaining proportion. However, in Nebraska's and other states' cancer registries, the calculation of crude survival rate is not accurate due to untimely updating of death certificates in the NCR. Period-specific survival rate can be calculated based on the time between the date of last contact with the patient (including death) and the date of diagnosis. The five-year survival rate, which is the proportion of patients alive after five years, is a measure of successful treatment. When a cancer patient survives longer than five years, he or she is less likely to die from cancer. For the five-year survival analysis, cases diagnosed within the last five-year period (2001-2005) were excluded, because cohorts diagnosed more than five years earlier are the basis for the calculation. In the survival analysis, those with missing race designations were also retained.

Assuming that cancer patients who die of causes other than cancer follow the same profile of the general population, then the population life tables approach can be used to calculate relative survival rate - the ratio of the observed survival rate for the patients to the expected survival rate for those in the general population. Since most cancers occur in persons 65 years of age and older who could die naturally, the relative survival rate is an estimate of the chance of surviving the effects of cancer. However, since we do not currently have life tables for racial/ethnic groups in Nebraska, we will leave this measure to the next report.

3. Findings

3.1 Incidence for selected cancer sites

Overall changes in population and cancer burden: Accurate incidence calculations require accurate race and ethnicity data from both the NCR and the population census. It is, therefore, necessary to set the context by describing population and cancer distributions. Some of the difficulties of relating race/ethnicity to population estimates and cancer incidence include (1) inconsistent race and ethnicity definitions due to different coding rules, and (2) the use of different time frames of implementing coding rules in the population census and in the NCR. These difficulties can be further complicated in the NCR as race and ethnicity data are collected by multiple entities or hospitals that may have different data coding schemes, depending on their database requirements. Table 1 lists population and cancer incidence changes over the 15-year period by four races and by Hispanic origin for whites and all other races.

During the study period, the percentage of the white population in Nebraska declined 5.1% on average, from 91.6% in 1991-1995 to 86.5% in 2001-2005, while the share of cancer incidence for whites declined by 2.7%, from 96% in 1991-1995 to 93.3% in 2001-2005. This finding suggests that the cancer burden for NH whites became relatively heavier over the study period.

Table 1. Population and cancer incidence distributions (%) by race/ethnicity in Nebraska: 1991-2005

	Population			Incidence		
Race/Ethnicity	1991-1995	1996-2000	2001-2005	1991-1995	1996-2000	2001-2005
Non-Hispanic white	91.64	89.22	86.54	96.00	94.62	93.31
Non-Hispanic African Am.	3.72	4.07	4.43	2.51	2.48	2.66
Non-Hispanic Am. Indian	0.74	0.79	0.85	0.28	0.40	0.40
Non-Hispanic Asian	0.92	1.26	1.62	0.20	0.42	0.47
Hispanic white	2.81	4.43	6.20	0.45	0.99	1.34
Other Hispanic	0.17	0.23	0.36	0.01	0.07	0.12
Missing race info				0.55	1.03	1.69
Total*	1625846	1694833	1737703	7614	8228	8657

*The total population and cases were averaged to the annual basis.

Since natural population changes tend to be very slow, differentials in interstate migrations by race and ethnicity may play a role in shifting race/ethnicity composition. Figure 1 displays the average percent of the NH white population for the five-year period between 2001 and 2005 by county, and the percent changes in Hispanic population over three periods from 1991 through 2005. Figure 1 shows that Hispanic whites or others were concentrated in a few counties (e.g., Scotts Bluff, Morrill, Box Butte, Dawson, and Dakota), and that the Hispanic white population were more than tripled in many counties, such as Dawson, Dakota, Colfax, Hall, Saline, and to a lesser extent, Douglas. The figure also shows that NH whites dominated Nebraska's central and southern counties that border Kansas.

In contrast to NH whites, the population of all racial minority groups increased during the study period. Hispanic whites increased to 6.2%, more than double their average share of the total population of 2.8% in 1991-1995. The corresponding share of cancer burden among Hispanic whites, however, was less than 1.3%. In other words, about 4.5% of Hispanic whites shared about 1% of the cancer burden in Nebraska, and this sharp difference is likely to result in lower incidence for all cancer sites for Hispanic whites. Hispanic whites were either much less likely to have cancer as a group, or there are substantial discrepancies in the coding of race and ethnicity between the Census Bureau and the NCR.

The changes in population and cancer incidence suggest that an effective measure of cancer burden among subpopulation groups should be able to account for changes from both sides: the numerators (cancer incidence among racial and ethnic subgroups) and the denominator (corresponding at-risk population). In addition, some adjustment might be needed to account for the 1.12% of cases with missing race designations that were deleted from the numerator. Potential bias introduced by the deletion was more pronounced in recent years than in the early years. If we translate the percentages in Table 1 into numbers, the average missing race value cases were 42 per year in the first period, 85 in the second period, and 146 in the third period. Even though current population estimates for race and ethnicity subgroups correspond with race and ethnicity variables in the NCR, a subtle difference in coding between the two systems could cause some bias and should be further investigated. Increased missing values for the race variable should cause some concern. Because the minority population percentages in Nebraska are small, the state should aim for higher data collection quality than what the North American Association of Central Cancer Registries requires for the Gold Certification.

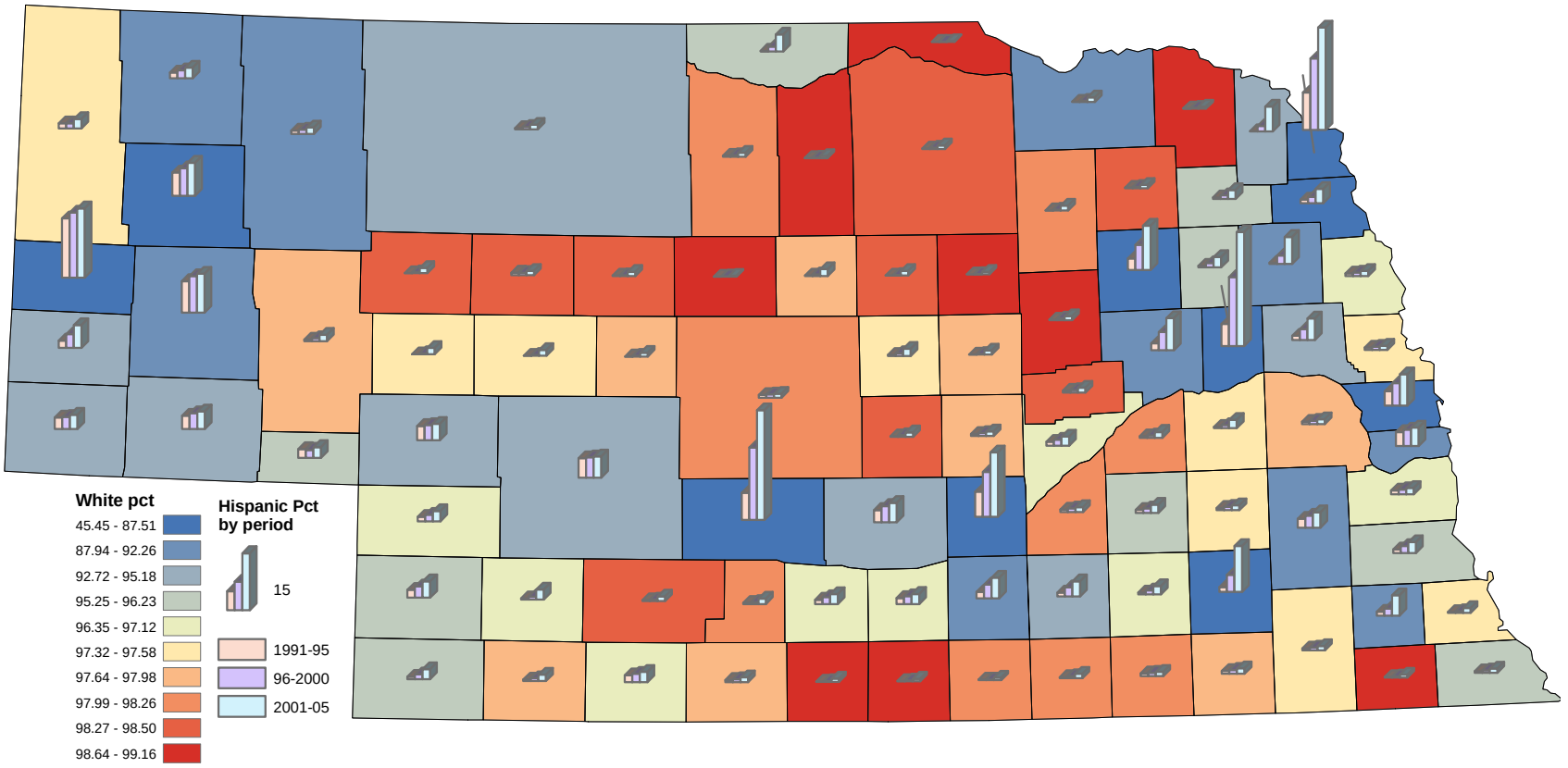


Figure 1. Percent of white population in 2001-2005 and changes in Hispanic population between 1991 and 2005

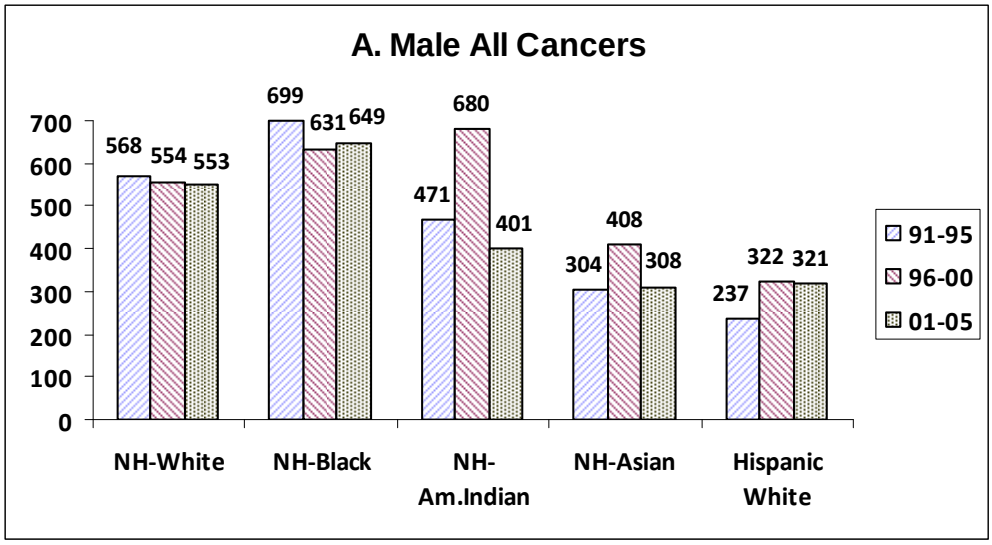
Figure 2 shows changes in invasive cancer incidence by race and ethnicity over time for Nebraska and the United States. As mentioned earlier, all the national rates were from SEER's Statistics Reviews (Ries et al, 2002, Ries et al, 2003, Ries et al, 2008). In order to compare it with national incidence, we include both in Appendix Tables 1. NH white males in Nebraska had a higher incidence rate in the first period (568 per 100,000) than in the latter two periods (552 per 100,000). NH white females, in contrast, had increased incidence rates throughout the study period. Multiple factors, such as the decline in the share of white population of about 3% and differentially aging populations by sex, may contribute to this increase. The trend in cancer incidence over the study period was opposite for NH African American females and NH white females. From 1991 through 1995, NH African American females had higher incidence than their white counterparts, and the reverse was true in the latter period. There were few apparent trends for the rest of the racial and ethnic groups, but the rate increased from 1996 through 2000 and dropped from 2001 through 2005. The increase is more pronounced for Hispanics of all races and NH American Indians.

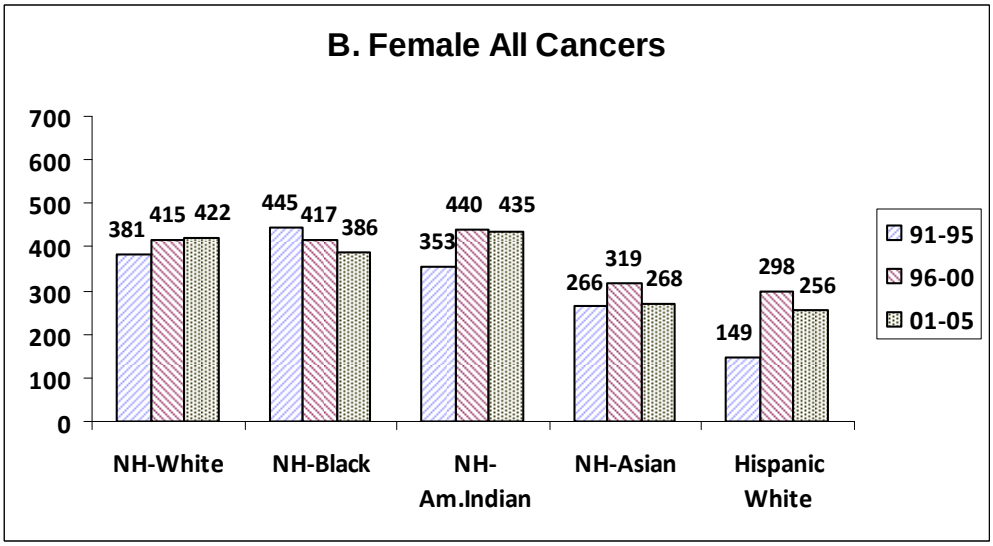
NH American Indians in Nebraska had a higher-than-national-average cancer incidence rate, and the rates in 1996-2000 were double the national average for both males and females. Although these numbers were high, they were comparable to the overall incidence rates for Northern Plains American Indians (Wingo et al., 2008). National statistics, which normally do not separate American Indians from Alaska Natives and do not show regional differences, tend to be much lower than statistics for American Indians in the Northern Plains. Incidence rates for Hispanic whites in Nebraska were lower than the national rates, perhaps due to in-migration of young Hispanics. The ranking of cancer incidence by site for population subgroups varied over the study period, with the exception of NH Asians, who had the highest incidence rate for only one site (cervix) for all three periods. Finally, there are no corresponding national statistics for Hispanics of other races. We list their rates in Appendix II Table 1just to show how the rate may become volatile due to small population size and a small number of cases.

In Appendix II (Table 2), we list incidence rates for the top five cancer sites (colorectal, lung, prostate, breast, urinary bladder) by race and ethnicity for males and females. Corresponding rates are at the national level listed in Appendix II Table 3. Cervical cancer is included due to its importance to the current state cancer control program. Two additional groups are hematological malignancies that include leukemia, lymphoma, and myeloma (LLM) and all other cancers. As noted in Appendix II Table 3, only the NH white and Hispanic white categories are comparable between the two tables. In addition, since very few Asians are Hispanic, this racial category is generally comparable between the state and national levels. Due to small numbers, rates for other races with Hispanic origin were suppressed.

Colorectal cancer: NH white males had a higher incidence of colorectal cancer, and the rate decreased slightly, from around 72 per 100,000 in the first two periods to 69 in the last period (Figure 3). The national rates for NH white males and females from 2001 through 2005 were 60 and 44 per 100,000 respectively, lower by 10 and 5 per 100,000 respectively than the rates in Nebraska. These gaps were fairly persistent over the three periods.

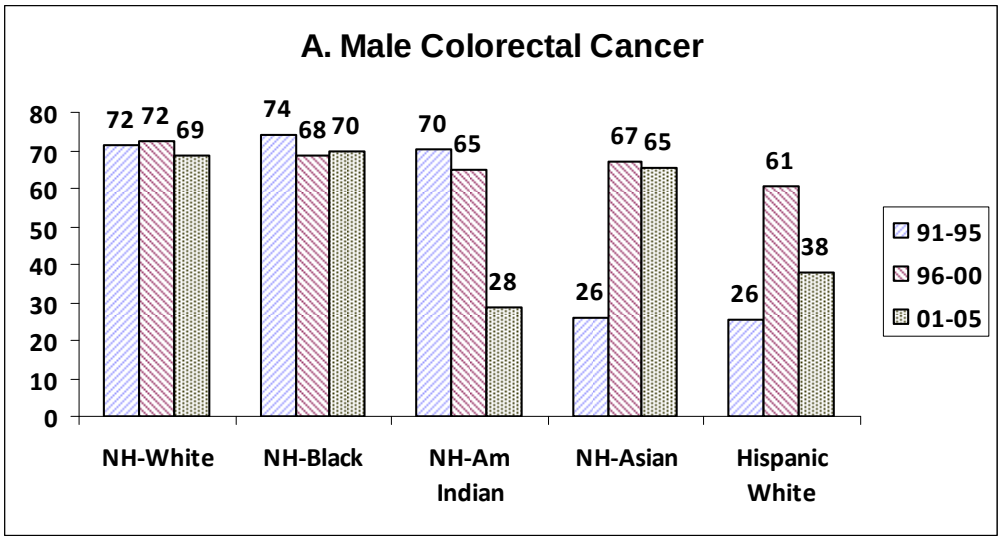
Figure 2. Cancer incidence rates by race/ethnicity: Nebraska, 1991-2005

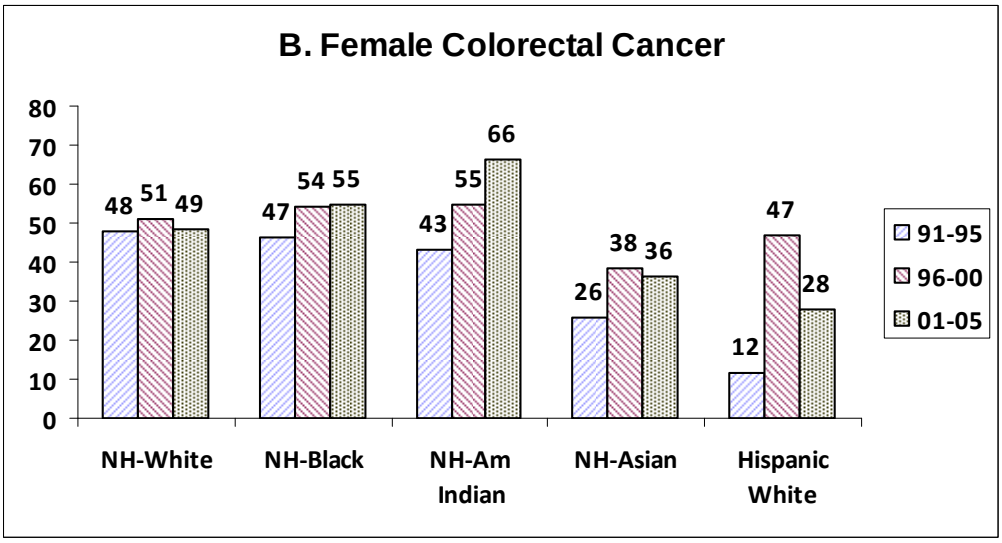




Neither NH African American males nor NH African American females in Nebraska were disadvantaged in terms of colorectal cancer burden, and their incidence rates were either comparable or slightly lower than the rates for NH whites. At the national level, African Americans tend to have higher rates for both males and females than NH whites, especially in the latter two periods. However, if Nebraska follows the national trends from 1996 to 2005, then the incidence rates for NH African Americans could increase in the coming years. In particular, the rates for NH African American females increased steadily, from 46.5 per 100,000 during 1991-1995 to 55 per 100,000 during 2001-2005. Among other racial and ethnic groups, NH Asians and Hispanic whites had lower rates at both the state and the national level.

Figure 3. Colorectal cancer incidence rates by race/ethnicity: Nebraska, 1991-2005

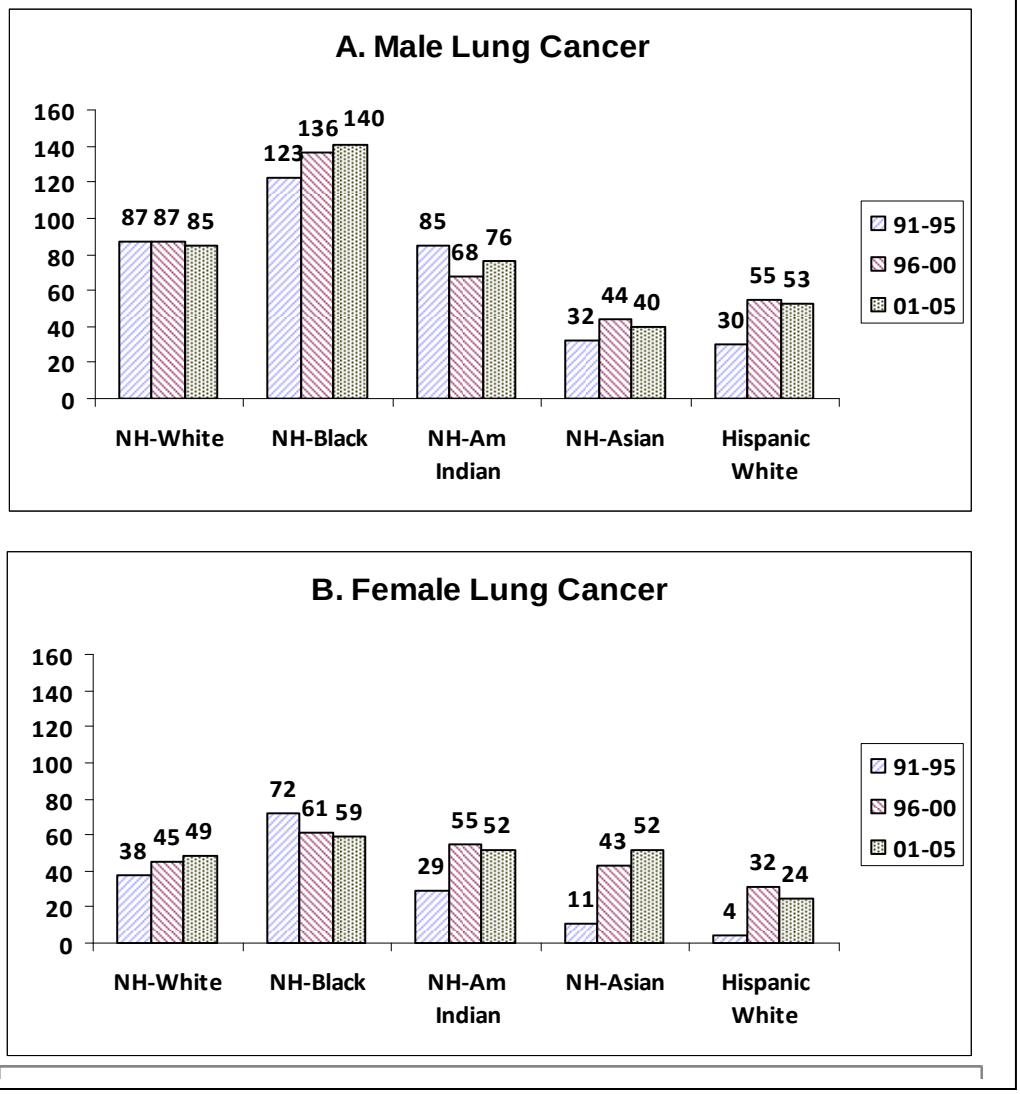




Lung and bronchus cancer: Similar to the national rates, lung cancer incidence in Nebraska is much lower for females and whites than for NH African Americans, but the overall rates in Nebraska by race and sex were higher than the national average (Figure 4). The differences in incidence between NH white and African American males were about 50 to 56 per 100,000 in the last two periods (e.g., 84.8 for NH whites versus 140.2 for NH African Americans in 2001-2005), and the gap was slightly wider than the national range of about 40 per 100,000 (e.g. the rates for NH white and African American males in 2001-2005 were 79.5 and 107.6, respectively). However, the national rates for NH white and African American females were almost identical, which is in sharp contrast to Nebraska: NH African American females had between 10 and 20 per 100,000 higher incidence rates than their white counterparts.

Finally, lung cancer incidence for other racial and ethnic groups tended to be substantially lower than that for whites, with the exception of American Indians from 1996 through 2000. Due to the sample sizes, those rates may not be stable enough to suggest any significant difference or trend. Since African Americans in Nebraska are concentrated in a few major cities, such as Omaha and Lincoln, some area risk factors should also be explored. Identifying area risk factors could also shed light on other cancers with high incidence, as many whites could also live with similar environmental risk factors.

Figure 4. Lung cancer incidence rates by race/ethnicity: Nebraska, 1991-2005

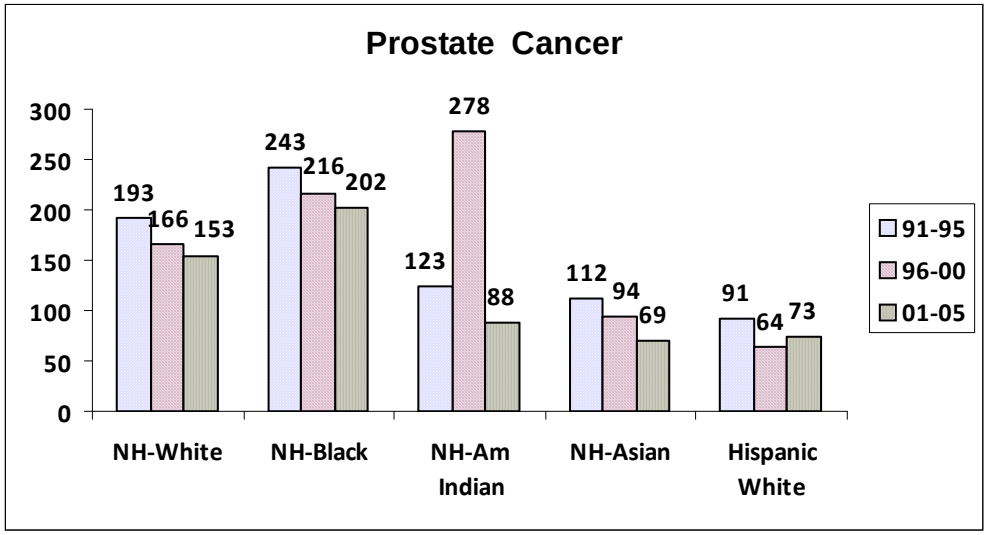


Prostate cancer: Prostate cancer incidence rates are shown in Figure 5, and they were much higher for NH African Americans higher (averaging 220 per 100,000) than those for NH whites (averaging 170 per 100,000) for the study period. The difference between whites and African Americans nationally in prostate cancer reported in the literature and national reports is usually about 100 (Ward et al., 2004). The corresponding gap in Nebraska is much smaller, around 50 per 100,000, and this difference needs to

be further explored. Trends for prostate cancer incidence rates over the 15-year period also follow the national trends. Incidence peaked from 1991 through 1995 and fell thereafter due to wide availability of the prostate-specific antigen (PSA) test. Our analysis of the annual incidence rate and Behavioral Risk Factor Surveillance System data also suggests that NH African Americans in Nebraska were slower to take advantage of the PSA test availability than non-Hispanic whites and all racial and ethnic groups nationally.

In addition, American Indians were expected to have the lowest prostate cancer incidence rate according to the national profile, but they ranked between first and third throughout the study period. National prostate cancer incidence rates for American Indians were around 50 per 100,000 between 1998 and 2002; the lowest corresponding rate in Nebraska was 122 per 100,000. This rate is close to the observed rate for Northern Plains American Indians (Henderson et al., 2008). Again, due to a small number of NH American Indian cases in the NCR, the difference may not be as great as it seems, but such a trend should be watched closely. Because American Indians are concentrated in only a few places in Nebraska, researchers could investigate local risk factors that may be contributing to this group's higher prostate cancer incidence more easily than they could for whites.

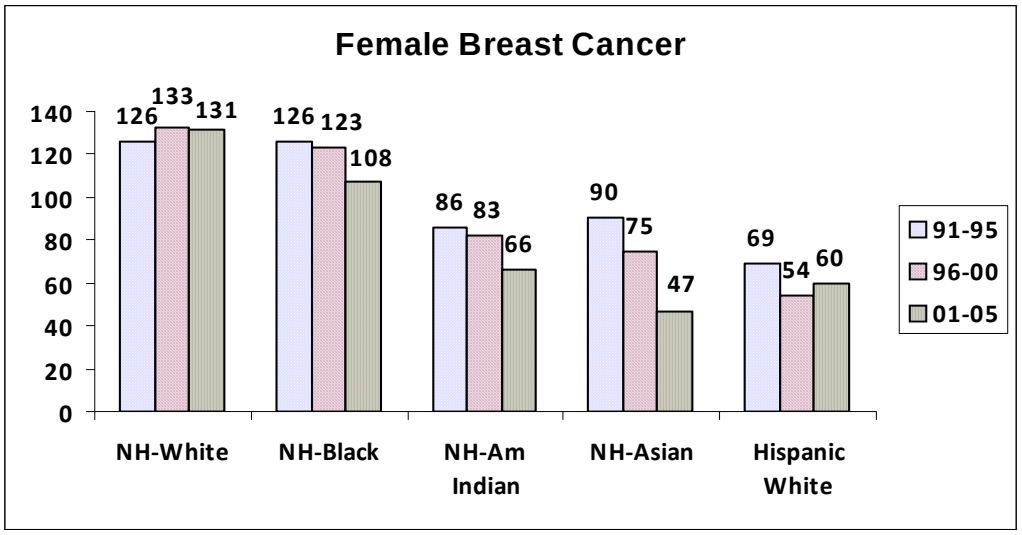
Figure 5. Prostate cancer incidence rates by race/ethnicity: Nebraska, 1991-2005



Female breast cancer: The national rates for female breast cancer were about 140 per 100,000 for most racial groups for most years (Figure 6). Nebraska's rates tended to be lower than the national rates for the three study periods. The wide availability of mammography screening starting in the early 1990s could explain some of the increase in breast cancer incidence for NH whites in Nebraska. However, the trend should be watched as obesity is a breast cancer risk factor and increased obesity in Nebraska in the last few years could also be contributing to increased breast cancer incidence. Both the literature (Ward et al., 2004) and national reports indicate that African Americans have a lower breast cancer incidence rate than whites, and this disparity is also observed in Nebraska (e.g., 108 for African Americans vs. 131 for whites in 2001-2005). In addition, NH Asians had a lower incidence rate than NH whites. Nebraska NH

American Indians had a breast cancer rate of around 80 per 100,000, compared to the national average of 58 for American Indians and Alaska Natives. However, according to a recent study by Wingo et al. (2008), the Nebraska rate for American Indians was about equal to the national average and below the Northern Plains Indian rate in 2000 and later.

Figure 6. Female breast cancer incidence rates by race/ethnicity: Nebraska, 1991-2005

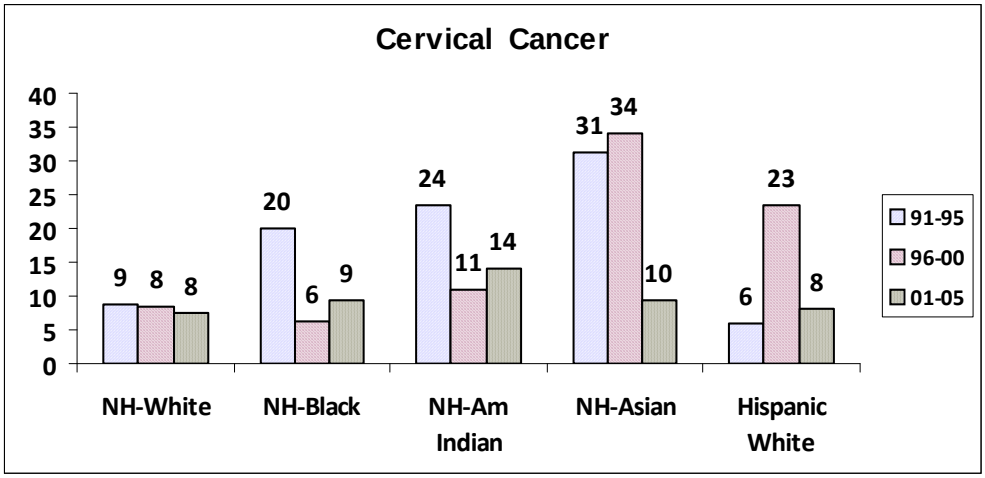


The breast cancer incidence rate in the last two periods for other races with Hispanic origin was fairly high, averaging about 155 per 100,000. Even though this number may not be stable due to the sample size, further scrutiny is warranted, not only because the corresponding population base has a disproportionally lower rate for all cancer sites, but also because geographically concentrated immigrants are more likely to be of Hispanic origin.

Cervix uteri cancer: Cervical cancer incidence rates in most parts of Nebraska were comparable to the national average (See Appendix II Tables 2 and 3). The rates for NH whites were between 8.7 and 7 per 100,000 from 1991 through 2005. The average national rate for NH whites was about 7.1 for the same period. NH African Americans also had a higher incidence rate than whites. However, Asians in Nebraska had a very high incidence rate in the first two periods – 31 to 34 per 100,000, far higher than the national average among Asian Americans (Figure 7). In the United States, Vietnamese women have the highest incidence rate at about 43 per 100,000 from 1988 to 1992 (Miller et al, 1996). The high rates in the first two periods may be due to a greater proportion of Vietnamese Americans among the Asian population in Nebraska (31.2% in Nebraska versus 11.2% in the United States). Indeed, of eight counties (Adams, Dakota, Dawson, Douglas, Hall, Lancaster, Saline, and Sarpy) with 80 or more Vietnamese Americans in 2000, all but Lancaster had an incidence rate higher than the state's average during the 15-year period. Other factors, such as a higher concentration of African Americans, could also contribute to higher rates in counties with a higher Vietnamese American population, but the findings here corroborate the national figures in early years.

With the introduction of the Papanicolaou (Pap) test and a statewide effort promoting early screening as part of the state's comprehensive cancer control plan, the cervical cancer rate for Asians and other racial groups declined substantially. Although national incidence rates for Asian and other racial groups also declined, the magnitude of decline was far less than the 50% reduction witnessed in Nebraska. The rate for Hispanic whites also declined sharply from 1996-2000 to 2001-2005, with the rate in the last period being 8.1 per 100,000 in Nebraska versus 13.7 in the United States, both excluding NH whites.

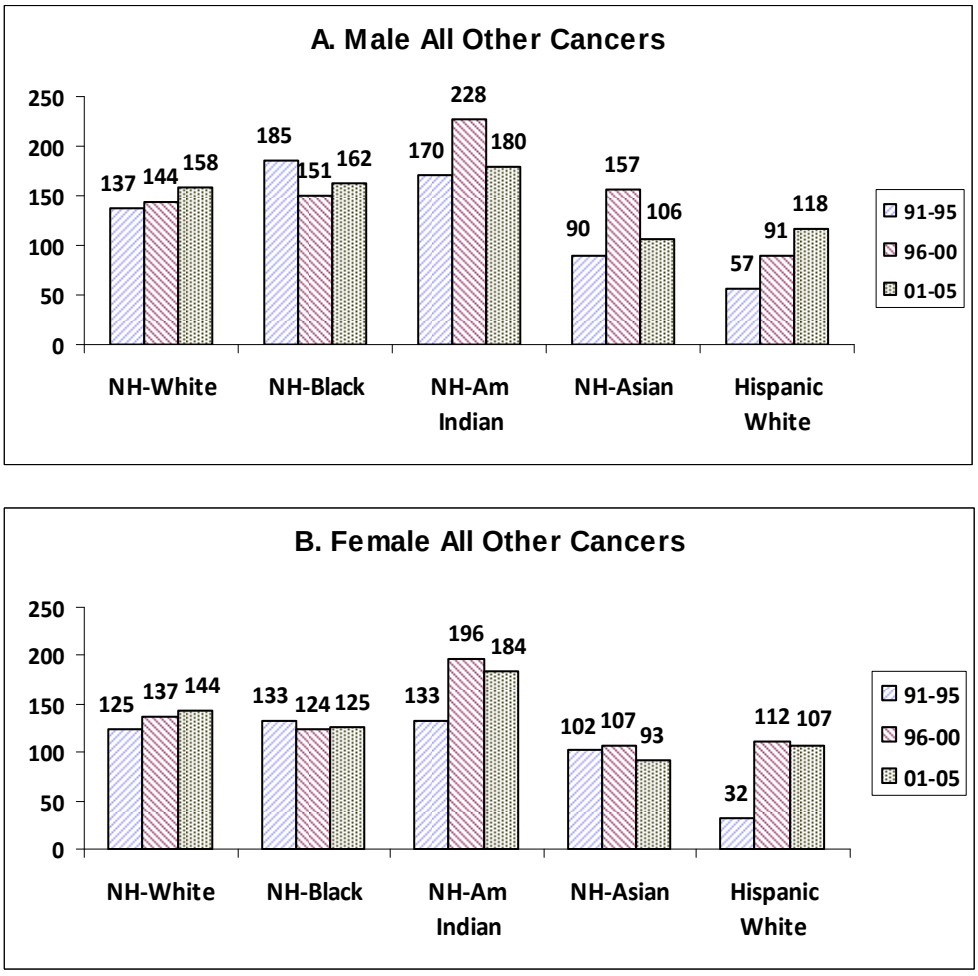
Figure 7. Cervical cancer incidence rates by race/ethnicity: Nebraska, 1991-2005



Other cancers: Figure 8 shows incidence rates for all other cancers. From 1991 to 1995, NH African Americans had the highest incidence of other cancers, but from 2001-2005, NH African American males had the second highest rate and NH African American females had the fourth highest rate. This reversal contributed to an overall decline in all invasive cancer incidences for NH African Americans mentioned earlier. In contrast, incidence rates for other cancers among NH American Indians and NH whites increased from 1991 through 2005.

Although we did not show urinary bladder cancer, it is the fifth leading cancer in Nebraska. Nationally, males are four times more likely than females to develop bladder cancer, and in Nebraska, this rate is true among white males. Over the years, the rates increased, but the incidence ratio between males and females for NH whites remains at 4 to 1. However, this ratio does not apply to NH African Americans, who had much lower incidence. These numbers were all comparable to the national statistics. Leukemia, Lymphoma, and Myeloma (LLM) are hematological malignancies that mainly affect blood, bone marrow, and lymph nodes. LLM together are the fourth most prevalent cancers in Nebraska for both males and females. From 1991-1995 to 1996-2001, NH African Americans had higher LLM incidence rates than NH whites, but these differences could be attributed to a higher incidence of myeloma for African Americans (Flowers et al., 2007). In general, the Nebraska rates for LLM together or separately are similar to those reported nationally.

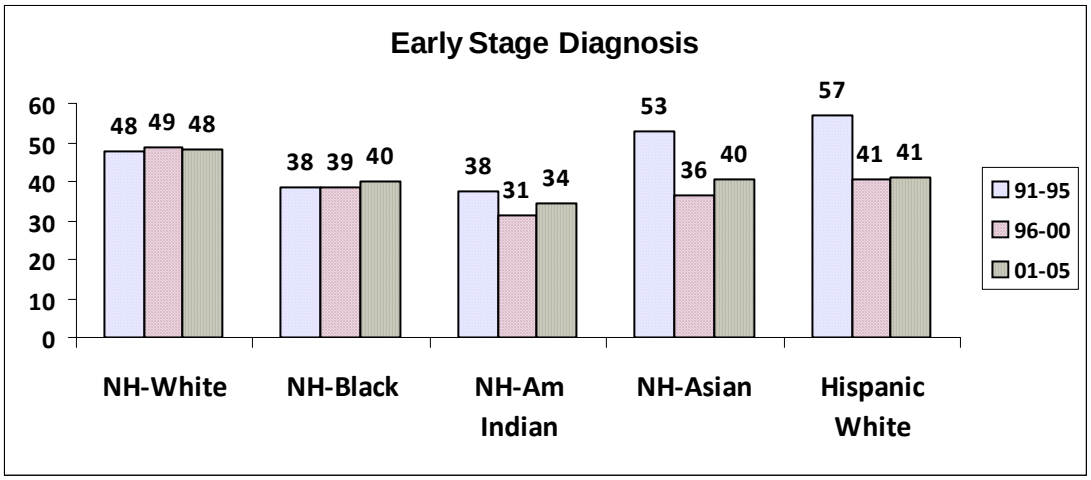
Figure 8. Other cancer incidence rates by race/ethnicity: Nebraska, 1991-2005



3.2 Cancer staging by race/ethnicity

Racial and ethnic differences in cancer stages at diagnosis within the same cancer site can indicate differences in access to cancer screening and other health care services. Consistent with national reports, Nebraska's racial minorities tend to have a greater proportion of late-stage diagnosis, while NH whites tend to have a greater proportion of early stage diagnosis. These patterns were surprisingly persistent over the study period (Figure 9). For instance, the percentage of NH whites diagnosed at an early stage was 48%-49% throughout the three periods, and the 1% to 3% differences (40% to 43%) in late-stage diagnosis were mainly due to an increase in the unstaged proportions (Table 2). The percentage of NH African Americans with a late-stage diagnosis dropped from 52% during 1991-95 to around 47% during 1996-2005. The proportion of early-stage diagnosis for Hispanic whites was relatively low in the later two periods, ranging from 57% during 1991-1995 to 41% during 1996-2005. Finally, those with missing race information tended to have a much higher proportion of early stage diagnosis in the latter two periods.

Figure 9. Proportions of early state cancer diagnosis by race/ethnicity: Nebraska, 1991-2005



Our analysis of Behavioral Risk Factor Surveillance System (BRFSS) surveys in Nebraska suggests that breast cancer screening improved substantially between the early 1990s and 2005. In the first five years, the average screening rate for breast cancer was about 50%, increasing to 56% in 2000 and to 72% in 2004. This could be due to the effect of CDC Breast and Cervical Cancer Early Detection Program implemented in Nebraska. The state does not have early years' screening rates for prostate and colorectal cancers, and evaluation of those cancers will be dealt with in a separate study. Even though increased screening should be positively related to the rate of early-stage diagnosis, an increase in one or two site-specific screening rates may not noticeably affect the early stage diagnosis rate because they will be outweighed by the lack of screening in other cancer sites.

Figure 10 displays a geographic distribution of the early stage at diagnosis rates by county in Nebraska for the 15-year period. Recall that the highest proportions for whites were observed in central and southern border counties, and higher proportions of cancer patients with an early stage at diagnosis were found in central counties with a higher white population. It is certainly expected that different cancers may have different screening and diagnosis methods, which may affect staging distribution, but border counties with a higher proportion of whites may also lack access to cancer screening. Both colorectal and prostate cancers had higher screening rates in central regions, and southern border counties tended to have an average screening rate for both types of cancer.

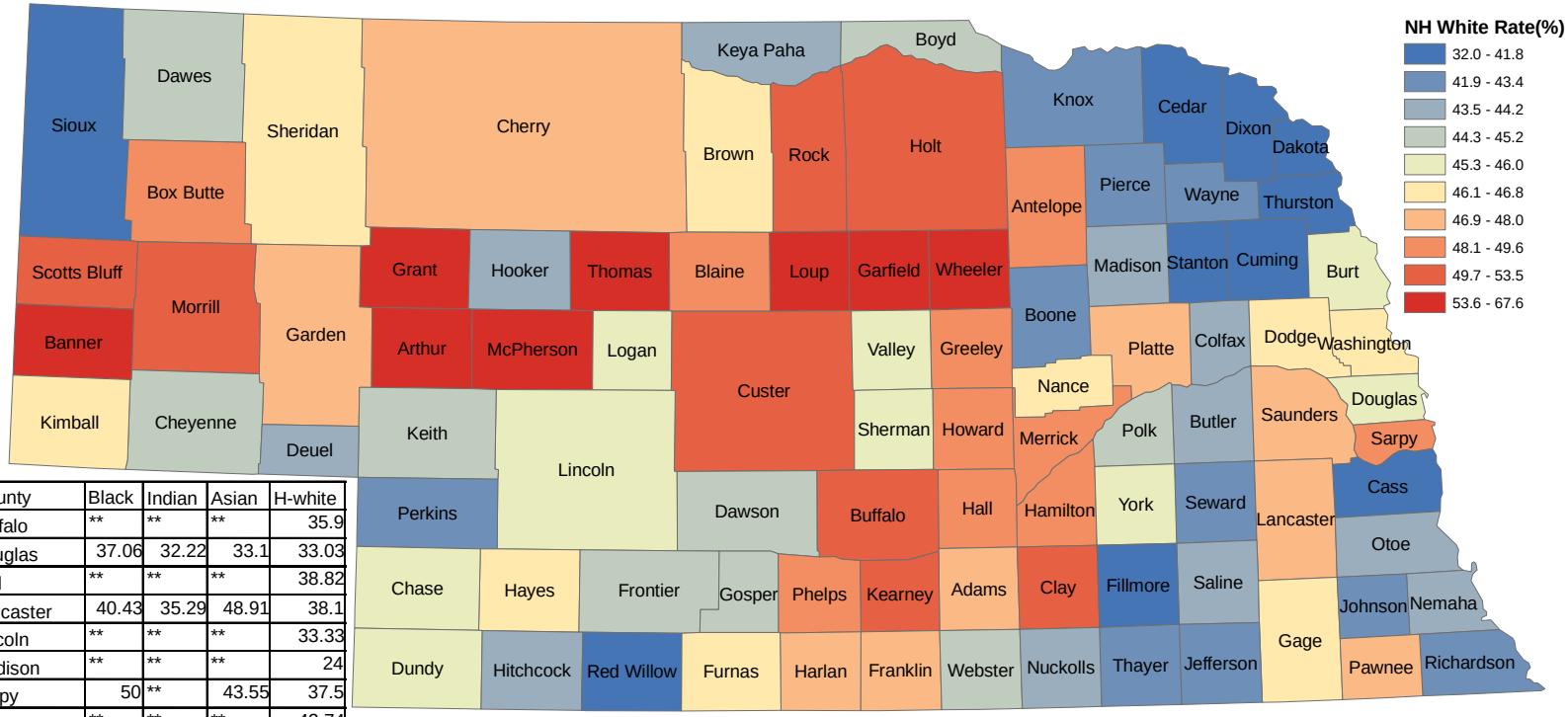
The insert in Figure 10 lists county-specific early-stage incidence rates for other races and Hispanic whites. Due to small numbers (less than 25), most counties did not have stable rates, but for those listed, almost all had a rate far below 46.5%, the median for NH whites. The only exception was for NH African Americans in Sarpy County, who had a 50% early-stage-diagnosis rate.

Table 2. Cancer stage distribution by race and ethnicity in Nebraska: 1991-2005

1991-1995	Early	Late	Unstage	Total
NH-White	47.78	42.84	9.38	38229
All minority groups	41.5	48.83	9.6	1364
NH-Black	38.38	51.62	10	990
NH-Am Indian	37.61	55.05	7.34	109
NH-Asian	53.01	38.55	8.43	83
Hispanic White	56.74	34.27	8.99	178
Other Hispanics	**	**	**	**
Missing-race-info	44.44	13.17	42.39	243
1996-2000				
NH-White	48.57	39.58	11.85	41330
All minority groups	38.33	46.18	15.48	1873
NH-Black	38.67	46.82	14.51	1068
NH-Am Indian	31.03	42.53	26.44	174
NH-Asian	36.31	49.16	14.53	179
Hispanic White	40.57	45.75	13.68	424
Other Hispanics	50	32.14	17.86	28
Missing-race-info	76.29	7.13	16.58	603
2001-2005				
NH-White	48.38	41.22	10.41	43262
All minority groups	39.9	48.68	11.42	2311
NH-Black	39.95	47.78	12.28	1224
NH-Am Indian	34.41	47.96	17.63	182
NH-Asian	40.46	50.41	9.13	220
Hispanic White	40.91	47.08	12.01	630
Other Hispanics	42.53	48.28	9.2	55
Missing-race-info	71.38	9.38	19.24	999

Note: All figures are percentages, and ** indicates too few cases to calculate the rate.

Figure 10. Percent of early-stage cancer diagnosis for non-Hispanic whites and other races/ethnicity (in box): 1991-2005

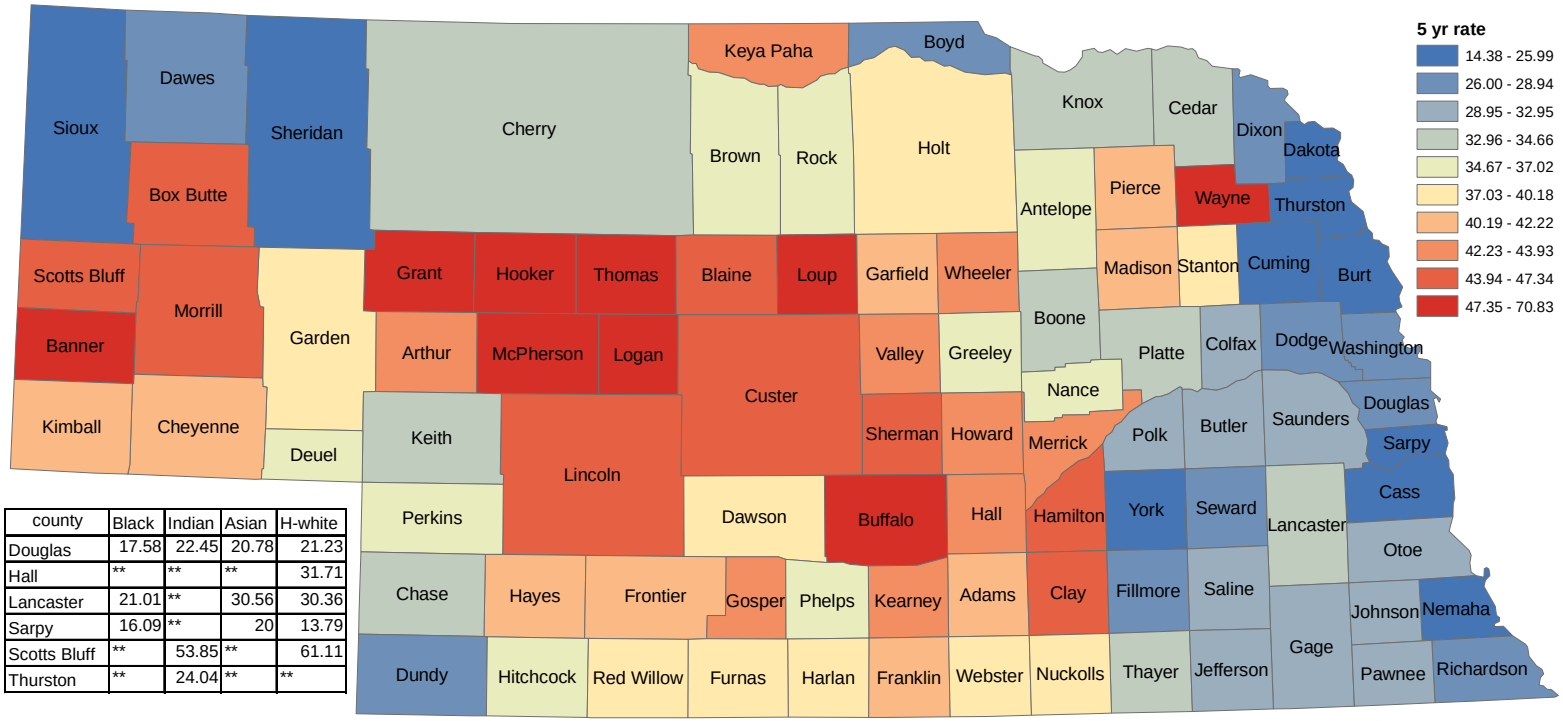


County	Black	Indian	Asian	H-white
Buffalo	**	**	**	35.9
Douglas	37.06	32.22	33.1	33.03
Hall	**	**	**	38.82
Lancaster	40.43	35.29	48.91	38.1
Lincoln	**	**	**	33.33
Madison	**	**	**	24
Sarpy	50	**	43.55	37.5
Scotts Bluff	**	**	**	42.74
Thurston	**	32.93	**	**

**Fewer than 25 cases.

Note: Because racial/ethnic groups other than non-Hispanic white are concentrated in a few counties, rates for those groups and those counties are listed in the box in the lower left corner.

Figure 11. Five-year cancer survival rates (%) for non-Hispanic whites and other races/ethnicity (in box): 1991-2000



county	Black	Indian	Asian	H-white
Douglas	17.58	22.45	20.78	21.23
Hall	**	**	**	31.71
Lancaster	21.01	**	30.56	30.36
Sarpy	16.09	**	20	13.79
Scotts Bluff	**	53.85	**	61.11
Thurston	**	24.04	**	**

Note: Sample is for 1991-2000 because five-year survival cannot be determined for 2001 through 2005.
**Fewer than 25 cases. All rates on the maps are based on 20 or more cases, except for Arthur, Banner and McPherson counties, which are based on fewer than 25 cases. Because racial/ethnic groups other than non-Hispanic white are concentrated in a few counties, rates for those groups and those counties are listed in the box in the lower left corner.

3.3 Cancer survival by race/ethnicity

Cancer survival is inversely related to stage at diagnosis. Table 3 lists two- and five-year survival rates. The data are for the first two periods only, because the five-year survival rate cannot be calculated for the last five-year period. The results show that whites, regardless of Hispanic origin, had the highest two- and five-year survival rates. Those without race information had the lowest survival rates. Except for the category of other races with Hispanic origin, which did not have many cases, NH African Americans had the lowest two- and five-year survival rates among known racial and ethnic categories.

Table 3. Cancer survival rates by race and ethnicity in Nebraska: 1991-2000

Race/Ethnicity	2 years +	5 years +	total cases
NH-White	51.2	33.7	75306
All minority groups	38.6	22.8	3096
NH-Black	35.1	18.1	1975
NH-American Indian	39.3	24.1	270
NH-Asian	40.5	27.9	247
Hispanic White	50.2	36.4	574
Other Hispanics	30.0	16.7	30
Missing-race-info	12.0	7.1	633

Figure 11 shows the geographic distribution of five-year cancer survival rates in Nebraska for the 10-year cohort of 1991 to 2000. The rates were higher in central and southern border counties, where the percentages of whites are often in the top 10 or 20 percentiles. Exceptions are Buffalo, Wayne, and Dawson counties. Buffalo County had a relatively high percentage of African American population; Wayne County had slightly more Hispanics, African Americans, and Asians; and Dawson County had a higher percentage of Hispanic population. Buffalo and Wayne counties both had a 48% or higher five-year survival rate.

4. Conclusion and recommendations

In this report, we used mutually exclusive racial and ethnic categories to document cancer sites that are either among the top in incidence or important in state efforts. Except for NH African Americans, all other racial and ethnic population subgroups by sex tended to have an increased incidence rate for other cancers. For NH whites, population shifts to Hispanic whites and other racial minority groups may be a reason for the increase. Other reasons for increased incidence are (1) better case finding (e.g., dermatologists were included in the reporting system in the early 1990s), (2) changes in case definition (e.g., the brain tumor definition changed in 2002), and (3) improvements in cancer screening. The latter cause of increase is likely to be short-term as we have seen for prostate and breast cancers. However, population aging and changes in other risk factors, such as obesity, may also contribute to a bulk of the increase in incidence.

We identified or reconfirmed racial disparities for several cancers. Heavier burdens were persistent for NH African American males in prostate, lung, and other cancers, while incidence rates for NH white males were highest for bladder cancer. For NH white females, incidence rates for almost all discussed cancers were lower than for NH African American females in the first period, and the gap narrowed in the last period. In addition, the rate of increase in lung and other cancers was much faster for NH white females than for NH white males. Measures specifically targeting white female cancer risk factors should be considered.

Disparities in incidence rates between NH African Americans and whites may also be due to disparities in screening, as we found persistently higher rates of late-stage cancer diagnosis for African Americans and higher rates of early-stage diagnosis for whites. As is often the case, the rate of late-stage cancer diagnosis is inversely related to the five-year survival rate, for which NH African Americans and American Indians were likely to have the lowest rate. Future studies should also examine the dimension of the quality of health care and service for its impact on survival disparity. Future studies should also expand health disparity measures to include mortality, relative survival rate, years of active life lost, etc., by detailed race/ethnicity categories and by socioeconomic status.

Due to smaller population sizes, site-specific trends and cancer disparities among other racial minority groups, such as American Indians and Asians, may not be stable enough to suggest policy implications. However, the overall incidence rates for both NH American Indians and Asians in Nebraska were higher than those reported nationally. For Asians, we identified a higher cervical cancer rate, especially for the early two periods. American Indians have a higher incidence of other cancers. From the Nebraska Cancer Incidence and Mortality Report (NEDHHS, 2005), we know that some cancers common to whites may not necessarily be common among Asians and American Indians. For example, kidney/renal/pelvis and oral cavity/pharynx cancers were among the top six cancers for American Indians in Nebraska, while cervical and liver/bile duct cancers were among the top six for Asian Nebraskans. Separate studies are needed to identify common and unique cancer incidence and risk factors pertinent to Nebraska Indian and Asian populations.

Finally, Hispanic whites had relatively low incidence rates for the selected cancer sites. However, since the Hispanic population increased much faster than other racial/ethnic groups, the extent to which the low incidence was due to low risk factors and the extent to which it was due to enlarged population denominators is yet to be determined. As expected for a small population size, incidence rates for other Hispanics could not be effectively evaluated in the current report. Some statistical methods that deal with small population sizes (e.g., the Bayesian method) should be explored.

Based on the findings, we have the following recommendations:

- Due to observed disadvantages among minority groups in cancer staging and survival, the DHHS should conduct a review of cancer screening in Nebraska with a focus on minority populations and other underserved groups. Since minority populations are concentrated in a few counties in Nebraska with evident geographic staging and survival patterns, more localized efforts to increase the opportunity for early cancer diagnosis among minority populations should be implemented.

- Since many minority racial and ethnic groups shared less than 1% of cancer burden in any particular year in Nebraska, 1% of cases with missing race values could have a considerable effect on race- and

ethnicity-specific incidence. We reported that missing race values increased from an average of 42 per year to 146 per year for invasive cancer. As the proportion of missing racial identifications reached nearly 2% in 2005, some concerted efforts to collect race and ethnicity data, especially on death certificates, should be considered. The Nebraska Cancer Registry should also seek advice to identify and experiment with other methods to reduce missing race values. For instance, linking patient records with other administrative records has been used to identify Indian patients (Henderson et al., 2008). On the other hand, continued support for tumor registration and training for local registrars with specific racially sensitive case finding and coding methods may also improve the data quality.

- It is known that behavioral, genetic, and environmental risk factors contribute to the cancer development process. Comprehensive cancer control should include a better data integration and surveillance mechanism, so that known risk factors can be detected and controlled at an early stage. Some of this effort should include the integration of existing data, such as BRFSS data, for cancer control, and some of this effort may include educating physicians and other health care providers regarding patient data collection and documentation. For instance, the Nebraska Cancer Registry includes items such as smoking status, current occupation, previous residence, etc., but these items are rarely collected by health care providers. If allied health professionals who provide patient consultations assisted with this effort, patient-level information could be linked to other existing data integration efforts to evaluate how individual risk factors interact with environmental and other group-level factors. Pilot studies could be conducted by seeking funding from external sources.

- In the current study, we implicitly used NH whites as the referent. Reducing cancer disparities for all Nebraskans means that the group with the lowest site-specific incidence (in Nebraska, NH whites) should be the referent for achieving long-term reduction in disparities. The reported descriptive statistics in incidence, staging, and survival rates should be verified and benchmarked for regular cancer disparity surveillance. The findings from this report should be used in the revision of the Nebraska Cancer Plan due in 2010 and provided to the Nebraska Cancer Registry Advising Committee.

- There are many state programs that intend to reduce the cancer burden in Nebraska. Some within Nebraska C.A.R.E.S. are documented in Appendix I, but several other programs, such as the Every Woman Matters Program and Tobacco Free Nebraska, are also related to cancer control and prevention. Outcomes from these programs should be included or referenced in future cancer health disparity studies. Some outcome measures should be linked to and assessed with evidence-based health disparity measures that can be derived from the Nebraska Cancer Registry, existing population-based surveys, and health care quality information. In this way, findings can have a direct impact on existing programs and future planning.

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Appendix I Nebraska C.A.R.E.S. activities

Other Examples of Nebraska C.A.R.E.S. activities intended to help reduce cancer disparities

- Partnership agreement developed with the National Cancer Institute Cancer Information Service that supports a full-time position assigned to Nebraska to work exclusively on minority and access issues-2004-present

- Formed, chaired and participated in the Cancer Disparities Work Group in Omaha

- Participation in the Tobacco Disparities Work Group which will soon publish its Report and Action Plan to Reduce Tobacco Disparities

- Participation in the South Omaha Health Fair—October 2005, 2006, and 2007

- Planned and supported monthly "Lunch and Learn" events at Fred LeRoy Health Center 2007-2008

- Participation in and support of African American Families Health Fair—March 2008

- Arranged for and supported the Super Colon Exhibit—Kearney and Omaha in 2008; supported Super Colon Exhibits in Omaha (with Alegent) and Lexington in 2007; and supported Colossal Colon Exhibit in Omaha in 2005

- With the Nebraska Medical Association, Husker Sports Network, NE Colon Cancer Screening Program (NCP), CARES and other partners, developed a year-long Stay in the Game social marketing campaign that directs people to a website and NCP enrollment materials for colon cancer awareness and screening.

- Presented community health profiles re: breast, cervical, and colon cancer
    - Lincoln Lancaster County Health Department
    - Douglas-Sarpy Task Force on Colon Cancer
    - Lincoln Lancaster County Crusade Against Cancer
    - Every Woman Matters, WiseWoman, and NE Colon Cancer Screening Program
    - Title X, Women's Reproductive Health and UNMC, Office of Minority Health and Health Equity

- Collaboration with the Northern Plains Comprehensive Cancer Control Program
    - Participation on the Coalition Steering Committee
    - Participation on the Screening and Early Detection, Prevention, and Data Work Groups
    - Supported the Dialogue for Action grant and subsequent colorectal cancer screening projects
    - Support of and participation in the annual Native American Cancer Conferences since 2004
    - Participation in developing and offering Native American Cultural Competency Training to Nebraska DHHS staff
    - Supported Spirit of Eagles application for project funding for NP and Winnebago, both of which were funded in 2008
    - Supported Winnebago Tribe Community Needs Assessment with UNMC, NP CCCP
    - Participated in strategic planning with the Carl T. Curtis Health Center and the Omaha Tribe of Nebraska for development of a series of women's and men's health nights to emphasize screening

Appendix II Detailed Tables

A II. Table 1. Changes in invasive cancer incidence by race/ethnicity in Nebraska in reference to the United States

	1991-1995*		1996-2000		2001-2005	
Race/Ethnicity	Males	Females	Males	Females	Males	Females
Non-Hispanic white	568.3 (499.0)	381.2 (361.8)	553.7 (561.2)	414.7 (444.4)	552.5 (568.3)	421.9 (439.7)
Non-Hispanic African Am.	698.7 (605.1)	445.3 (336.1)	630.9 (696.8)	417.4 (406.3)	649.0 (651.5)	385.5 (398.9)
Non-Hispanic Am. Indian	470.5 (180.1)	352.9 (135.9)	679.5 (259.0)	440.4 (229.2)	400.8 (336.6)	435.1 (296.4)
Non-Hispanic Asian	303.6 (324.1)	265.9 (243.4)	408.2 (392.0)	318.7 (306.9)	307.7 (354.0)	267.8 (287.8)
Hispanic white	236.6 (348.7)	148.7 (258.7)	321.9 (430.8)	298.1 (322.4)	320.5 (424.8)	256.1 (324.0)
Other Hispanic	47.2	10.7	769.9	612.9	757.8	587.5

*US data are in ( ) and the 1990-1995 US data were used without adjustment for the year of 1990, which is off by one year to 1991-1995.

A II. Table 2. Standard incidence rates for selected cancer sites by race and ethnicity in Nebraska: 1991-2005

	Colorectal		Lung & Bronchus		Urinary Bladder		Leukemia, Lymphoma, Myeloma (LLM)		Prostate	Breast	Cervix	Other cancers	
1991-1995	Male	Female	Male	Female	Male	Female	Male	Female		Female		Male	Female
Non-Hispanic White	71.5	48.1	86.7	38.1	36.8	8.3	42.5	27.8	192.8	125.7	8.7	137.2	124.5
All minority groups	54.9	35.7	82.6	44.3	19.2	10.6	35.2	27.5	175.3	99.4	17.9	134.6	101.3
Non-Hispanic African Am.	74	46.5	122.7	71.9	18.4	13	54.8	34.4	243	126.1	20.1	184.7	133.3
Non-Hispanic Am. Indian	70.4	43.2	84.6	28.8	13	0	9.4	38.8	123.1	85.6	23.5	170	133
Non-Hispanic Asian	25.7	25.8	32.1	11	22.4	4.5	21.1	1.7	111.9	90.2	31.1	90.4	101.6
Hispanic White	25.6	11.7	30.3	3.9	19.6	10.4	13.4	15.4	91.1	69.4	5.8	56.6	32.1
1996-2000													
Non-Hispanic White	72.2	50.9	86.6	45.3	37.1	8.5	46.6	32.2	165.7	133	8.3	144.4	136.5
All minority groups	65.3	50.1	94.9	48.7	11.4	4	41.3	36.9	156.8	93.3	16.9	135.1	126.2
Non-Hispanic African Am.	68.4	54.1	136.4	61	8.8	5.5	48.9	43.3	215.9	123.4	6.4	150.5	123.7
Non-Hispanic Am. Indian	64.9	54.6	67.6	54.6	8.8	0	32.7	41.8	277.5	82.6	10.8	228	196
Non-Hispanic Asian	66.9	38.4	43.6	43.4	22	0	24.7	20.7	94.1	75.1	34.2	156.9	106.9
Hispanic White	60.5	47	55.2	31.5	11.6	4.4	39.7	26.6	64.3	53.7	23.4	90.6	111.5
2001-2005													
Non-Hispanic White	68.8	48.6	84.8	48.5	38.5	10.2	48.3	32.4	153.4	131.2	7.5	157.8	143.5
All minority groups	55	44.6	90.3	45.7	15.2	5.9	36.1	26.1	127.7	80.7	9.4	138.3	120.7
Non-Hispanic African Am.	69.9	54.8	140.2	58.9	21.8	8.9	51.7	20.7	201.9	107.7	9.4	161.6	125.1
Non-Hispanic Am. Indian	28.4	66.4	75.8	51.9	3.8	13.9	24.4	38.7	88.2	66	14	180.2	184.2
Non-Hispanic Asian	65.4	36.4	39.7	52	2.1	0	17	30.2	69.4	46.8	9.5	106.2	92.9
Hispanic White	38.1	27.9	52.8	24.3	11.7	2	26.9	26.7	73.3	59.7	8.1	117.7	107.4

Note: All minority groups are included as a single category for readers' convenience. They also include other Hispanic, which was omitted due to small numbers. The incidence rates should be adjusted upward by about 1.12% due to the deletion of missing race values in the numerators.

A II. Table 3. Standard incidence rates for selected cancer sites by race and ethnicity in the United States: 1991-2005

	Colorectal		Lung & Bronchus		Urinary Bladder		Leukemia, Lymphoma, Myeloma (LLM)		Prostate	Breast	Cervix
1990-1995	Male	Female	Male	Female	Male	Female	Male	Female		Female	
Non-Hispanic White	55.2	38.2	77.6	45.8	33.0	8.4	39.9	24.4	153.8	117.7	7.2
African American	59.4	45.5	114.4	46.4	15.9	6.1	37.5	23	224.3	99.0	12.1
Indian/Alaska Native	21.9	-	25.1	14.1	-	-	-	-	46.4	31.9	-
Asian/Pacific Islander	47.2	31.2	52.4	22.4	12.3	3.4	24.6	16.5	82.2	71.4	10.2
Hispanic White	37.4	25.6	42.1	20.7	15.3	4.2	30.9	20.7	109.1	73.2	17.0
1996-2000											
Non-Hispanic White	64.6	47.5	80.5	53.9	40.9	10.2	48.5	30.2	163.3	148.3	7.6
African American	72.4	56.2	120.4	54.8	20.4	7.6	44.5	29.6	272.1	121.7	12.4
Indian/Alaska Native	37.5	32.6	45.6	23.4	8.8	-	-	-	53.6	58.0	6.9
Asian/Pacific Islander	57.2	38.8	62.1	28.4	16.5	4.5	31.2	20.3	100.0	97.2	10.2
Hispanic White	51.4	33.6	47.4	25.1	18.9	5.1	38.3	25.8	139.6	92.7	17.5
2001-2005											
Non-Hispanic White	59.5	43.8	79.5	57.3	43.4	10.7	49	31.4	161.5	138.2	7
African American	71.2	54.5	107.6	54.6	20.4	7.7	45.8	29.9	248.5	117.5	10.8
Indian/Alaska Native	46	41.2	54.3	39.7	12.4	3.1	25.8	21.3	73.3	75	6.9
Asian/Pacific Islander	48	35.4	53.9	28	16.3	4.1	28.9	19.9	93.8	89.6	8
Hispanic White	48.2	33.1	44.8	26	20.5	5.6	38.6	28	137.4	91.9	13.7

Sources: SEER Statistics Reviews 1973-1995, 1975-2000 and 1975-2005.

Notes: The state rates and the US rates are comparable only for non-Hispanic white and Hispanic white categories. Other Hispanics do not have corresponding national statistics.