Cancer Surveillance in American Indian and Alaska Natives: What the Data Are Telling Us and Future Directions

Looking back and looking ahead: Collaborating to Advance Cancer Control in American Indian/Alaska Native Communities

April 26-28, 2016

Traverse City, Michigan

David Espey – CDC/NCCDPHP
Key Topics

- Status of cancer surveillance for AI/AN populations
- Regional patterns of cancer: what’s next?
- Liver Cancer: need and opportunities for prevention
- The case for primary prevention
Cancer Incidence
Previous IHS Linkage with Cancer Registry Data

- **Use of improved data to report cancer burden of AI/AN**
(Cancer) Mortality
Ratios for Race Categories

- White: 1.00
- Black: 1.02
- AIAN: 1.41
- API: 1.14

Strengthening Partnerships: Shaping the Future
Portland, OR
Number of individuals identified by IHS linkage with NDI, CHSDA counties, 1990-2008

- **Alaska**: 823
- **East**: 835
- **Northern Plains**: 2,557
- **Southern Plains**: 14,007
- **Pacific Coast**: 5,332
- **Southwest**: 2,747

Legend:
- Red: Pre-link
- Blue: Post-link

<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>AI/AN Rank (White)</th>
<th>AI/AN Rate (White)</th>
<th>AI/AN:White RR</th>
</tr>
</thead>
<tbody>
<tr>
<td>All causes</td>
<td>…</td>
<td>1381.8 (948.8)</td>
<td>1.46*</td>
</tr>
<tr>
<td>Heart disease</td>
<td>1 (1)</td>
<td>320.9 (262.5)</td>
<td>1.22*</td>
</tr>
<tr>
<td>Cancer</td>
<td>2 (2)</td>
<td>248.4 (224.7)</td>
<td>1.11*</td>
</tr>
<tr>
<td>Unintentional injury</td>
<td>3 (4)</td>
<td>141.3 (55.6)</td>
<td>2.54*</td>
</tr>
<tr>
<td>Diabetes</td>
<td>4 (6)</td>
<td>75.5 (23.6)</td>
<td>3.19*</td>
</tr>
<tr>
<td>Chronic liver disease</td>
<td>5 (11)</td>
<td>50.0 (12.9)</td>
<td>3.88*</td>
</tr>
<tr>
<td>Suicide</td>
<td>6 (7)</td>
<td>34.7 (23.2)</td>
<td>1.49*</td>
</tr>
<tr>
<td>CLRD</td>
<td>7 (3)</td>
<td>61.4 (56.4)</td>
<td>1.09*</td>
</tr>
<tr>
<td>Stroke</td>
<td>8 (5)</td>
<td>59.3 (49.6)</td>
<td>1.20*</td>
</tr>
<tr>
<td>Homicide</td>
<td>9 (21)</td>
<td>18.5 (3.8)</td>
<td>4.85*</td>
</tr>
<tr>
<td>Flu and Pneumonia</td>
<td>10 (8)</td>
<td>42.7 (22.4)</td>
<td>1.90*</td>
</tr>
</tbody>
</table>

* Statistically significant


<table>
<thead>
<tr>
<th>Cause of Death</th>
<th>AI/AN Rank (White)</th>
<th>AI/AN Rate (White)</th>
<th>AI/AN:White RR</th>
</tr>
</thead>
<tbody>
<tr>
<td>All causes</td>
<td>…</td>
<td>991.5 (678.6)</td>
<td>1.46*</td>
</tr>
<tr>
<td>Cancer</td>
<td>1 (2)</td>
<td>185.8 (159.1)</td>
<td>1.17*</td>
</tr>
<tr>
<td>Heart disease</td>
<td>2 (1)</td>
<td>204.8 (167.2)</td>
<td>1.22*</td>
</tr>
<tr>
<td>Unintentional injury</td>
<td>3 (6)</td>
<td>65.6 (27.0)</td>
<td>2.43*</td>
</tr>
<tr>
<td>Diabetes</td>
<td>4 (8)</td>
<td>69.2 (17.1)</td>
<td>4.04*</td>
</tr>
<tr>
<td>Stroke</td>
<td>5 (3)</td>
<td>58.9 (49.3)</td>
<td>1.20*</td>
</tr>
<tr>
<td>Chronic liver disease</td>
<td>6 (12)</td>
<td>34.6 (6.4)</td>
<td>5.36*</td>
</tr>
<tr>
<td>CLRD</td>
<td>7 (4)</td>
<td>45.4 (43.9)</td>
<td>1.03</td>
</tr>
<tr>
<td>Flu and pneumonia</td>
<td>8 (7)</td>
<td>31.7 (17.2)</td>
<td>1.84*</td>
</tr>
<tr>
<td>Kidney disease</td>
<td>9 (9)</td>
<td>25.0 (9.2)</td>
<td>2.72*</td>
</tr>
<tr>
<td>Septicemia</td>
<td>10 (10)</td>
<td>18.6 (7.8)</td>
<td>2.38*</td>
</tr>
</tbody>
</table>

* Statistically significant

**Top 10 causes of cancer death for AI/AN men compared with White men: CHSDA, US, 1999-2009**

<table>
<thead>
<tr>
<th>Cause of Cancer Death</th>
<th>AI/AN Rank (White)</th>
<th>AI/AN Rate (White)</th>
<th>AI/AN:White RR</th>
</tr>
</thead>
<tbody>
<tr>
<td>All malignant cancers</td>
<td>...</td>
<td>248.4 (224.7)</td>
<td>1.11*</td>
</tr>
<tr>
<td>Lung</td>
<td>1 (1)</td>
<td>67.5 (67.0)</td>
<td>1.01</td>
</tr>
<tr>
<td>Colorectal</td>
<td>2 (3)</td>
<td>26.0 (20.6)</td>
<td>1.26*</td>
</tr>
<tr>
<td>Prostate</td>
<td>3 (2)</td>
<td>27.6 (25.2)</td>
<td>1.09*</td>
</tr>
<tr>
<td>Liver</td>
<td>4 (8)</td>
<td>13.4 (6.3)</td>
<td>2.12*</td>
</tr>
<tr>
<td>Kidney</td>
<td>5 (10)</td>
<td>11.3 (5.9)</td>
<td>1.92*</td>
</tr>
<tr>
<td>Pancreas</td>
<td>6 (4)</td>
<td>11.8 (12.2)</td>
<td>0.96</td>
</tr>
<tr>
<td>Stomach</td>
<td>7 (14)</td>
<td>10.8 (4.3)</td>
<td>2.49*</td>
</tr>
<tr>
<td>Esophagus</td>
<td>8 (6)</td>
<td>8.6 (8.1)</td>
<td>1.06</td>
</tr>
<tr>
<td>NHL</td>
<td>9 (5)</td>
<td>7.9 (9.4)</td>
<td>0.82*</td>
</tr>
<tr>
<td>Brain</td>
<td>10 (9)</td>
<td>3.9 (6.1)</td>
<td>0.63*</td>
</tr>
</tbody>
</table>

* Statistically significant

Top 10 causes of cancer death for AI/AN women compared with White women: CHSDA, US, 1999-2009

<table>
<thead>
<tr>
<th>Cause of Cancer Death</th>
<th>AI/AN Rank (White)</th>
<th>AI/AN Rate (White)</th>
<th>AI/AN:White RR</th>
</tr>
</thead>
<tbody>
<tr>
<td>All malignant cancers</td>
<td>...</td>
<td>185.8 (159.1)</td>
<td>1.17*</td>
</tr>
<tr>
<td>Lung</td>
<td>1 (1)</td>
<td>46.2 (43.4)</td>
<td>1.06*</td>
</tr>
<tr>
<td>Breast</td>
<td>2 (2)</td>
<td>22.2 (24.1)</td>
<td>0.92*</td>
</tr>
<tr>
<td>Colorectal</td>
<td>3 (3)</td>
<td>19.3 (14.7)</td>
<td>1.31*</td>
</tr>
<tr>
<td>Pancreas</td>
<td>4 (4)</td>
<td>10.1 (9.3)</td>
<td>1.08</td>
</tr>
<tr>
<td>Ovary</td>
<td>5 (5)</td>
<td>9.0 (9.2)</td>
<td>0.98</td>
</tr>
<tr>
<td>Liver</td>
<td>6 (10)</td>
<td>7.7 (2.7)</td>
<td>2.84*</td>
</tr>
<tr>
<td>NHL</td>
<td>7 (6)</td>
<td>6.4 (6.0)</td>
<td>1.07</td>
</tr>
<tr>
<td>Stomach</td>
<td>8 (14)</td>
<td>5.9 (2.1)</td>
<td>2.77*</td>
</tr>
<tr>
<td>Kidney</td>
<td>9 (12)</td>
<td>5.4 (2.7)</td>
<td>2.02*</td>
</tr>
<tr>
<td>Cervix</td>
<td>10 (19)</td>
<td>4.2 (2.0)</td>
<td>2.11*</td>
</tr>
</tbody>
</table>

* Statistically significant

AI/AN and NHW death rates, all malignant cancers combined, by region, males, 1999-2009

Rate per 100,000

Region

N. Plains | Alaska | S. Plains | P. Coast | East | Southwest | US
AI/AN and NHW death rates, all malignant cancers combined, by region, females, 1999-2009

Region

Rate per 100,000

0 50 100 150 200 250 300 350

N. Plains Alaska S. Plains P. Coast East Southwest US

AI/AN NHW
AI/AN and NHW death rates, lung and bronchus cancer by region, males, 1999-2009

Region

N. Plains Alaska S. Plains P. Coast East Southwest US

Rate per 100,000

0 20 40 60 80 100 120

AI/AN NHW
AI/AN and NHW estimated prevalence of current smokers, Behavioral Risk Factor Surveillance System, Contract Health Service Delivery Areas, males, 2000-2010

![Bar chart showing AI/AN and NHW male smokers by region and the US comparison.](chart.png)
Age-adjusted Lung Cancer Death Rates and Joinpoint Trend Lines in CHSDA Counties, 1990-2009, Males
AI/AN and NHW death rates, lung and bronchus cancer by region, females, 1999-2009
AI/AN and NHW estimated prevalence of current smokers, Behavioral Risk Factor Surveillance System, Contract Health Service Delivery Areas, females, 2000-2010

Prevalence (%)

Region

N. Plains | Alaska | S. Plains | P. Coast | East | Southwest | US

US female NHW prevalence (20.2)
Annual age-adjusted lung cancer mortality rates and Joinpoint trend lines in CHSDA counties, 1990-2009, Females
AI/AN and NHW death rates, colorectal cancer, by region, males, 1999-2009

Rate per 100,000

Region

N. Plains | Alaska | S. Plains | P. Coast | East | Southwest | US
Age-adjusted Colorectal Cancer Death Rates and Joinpoint Trend Lines in CHSDA Counties, 1990-2009, Males
AI/AN and NHW death rates, colorectal cancer, by region, females, 1999-2009
Age-adjusted Colorectal Cancer Death Rates and Joinpoint Trend Lines in CHSDA Counties, 1990-2009, Females
AI/AN and NHW death rates, breast cancer, by region, females, 1999-2009

Region
N. Plains Alaska S. Plains P. Coast East Southwest US
Rate per 100,000
Age-adjusted Breast Cancer Death Rates and Joinpoint Trend Lines in CHSDA Counties, 1990-2009, Females

Rate per 100,000

AI/AN Rate

AI/AN Trend

NHW Rate

NHW Trend
AI/AN and NHW death rates, liver and intrahepatic bile duct cancer, by region, males, 1999-2009
Annual age-adjusted liver and intrahepatic bile duct cancer mortality rates and Joinpoint trend lines in CHSDA counties, 1990-2009, Males
AI/AN and NHW death rates, liver and intrahepatic bile duct cancer, by region, females, 1999-2009
Annual age-adjusted liver and intrahepatic bile duct cancer mortality rates and Joinpoint trend lines in CHSDA counties, 1990-2009, Females

Rate per 100,000

- AI/AN Rate
- AI/AN Trend
- NHW Rate
- NHW Trend

Graph showing the annual age-adjusted liver and intrahepatic bile duct cancer mortality rates and Joinpoint trend lines in CHSDA counties for females from 1990 to 2009.
Commentary


A. Blythe Ryerson, PhD, MPH²; Christie R. Eheman, PhD, MSPH³; Sean F. Altekruse, DVM, MPH, PhD⁴; John W. Ward, MD⁵; Ahmedin Jemal, DVM, PhD⁶; Jennifer A.1. Sherman, MPH, PhD⁷; Jane Henley, MSMP⁸; Deborah Holzmann, PhD⁹; Andrew Lakes, BS¹⁰; Anne-Michelle Nonne, MS¹¹; Robert N. Anderson, PhD¹²; Jieming Ma, PhD, MHS¹³; Kathleen N. Lyn, MPH¹⁴; Kathleen A. Cronin, PhD, MPH¹⁵; Lynne Penberth, MD, MPH¹⁶; and Betsy A. Kohler, MPH¹⁷

BACKGROUND: Annual updates on cancer occurrence and trends in the United States are provided through an ongoing collaboration among the American Cancer Society (ACS), the Centers for Disease Control and Prevention (CDC), the National Cancer Institute (NCI), and the North American Association of Central Cancer Registries (NAACCR). This annual report highlights the increasing burden of liver and intrahepatic bile duct (liver) cancers. METHODS: Cancer incidence data were obtained from the CDC’s National Center for Health Statistics (NCHS). Annual percent changes in incidence and death rates (age-adjusted to the 2000 US Standard Population) for all cancers combined and for the leading cancers among men and women were estimated by joinpoint analysis of long-term trends (incidence for 1992-2012 and mortality for 1975-2012) and short-term trends (2008-2012). In-depth analysis of liver cancer incidence included an age-period-cohort analysis and an incidence-based estimation of person-years of life lost because of the disease. By using NCHS multiple causes of death data, hepatitis C virus (HCV) and liver cancer-associated death rates were examined from 1999 through 2013. RESULTS: Among men and women of all major racial and ethnic groups, death rates continued to decline for all cancers combined and for most cancer sites; the overall cancer death rate (for both sexes combined) decreased by 18% per year from 2003 to 2012. Overall, incidence rates decreased among men and remained stable among women from 2005 to 2012. Among both men and women, deaths from liver cancer increased at the highest rate of all cancer sites, and liver cancer incidence rates increased sharply, second only to thyroid cancer. Men had more than twice the incidence rate of liver cancer than women, and rates increased with age for both sexes. Among non-Hispanic (NH) white, NH black, and Hispanic men and women, liver cancer incidence rates were higher for persons born after the 1958 to 1967 birth cohort. In contrast, there was a minimal birth cohort effect for NH Asian and Pacific Islanders (APIs). NH black men and Hispanic men had the lowest median age at death (60 and 62 years, respectively) and the highest average person-years of life lost per death (21 and 20 years, respectively) from liver cancer. NH black and Hispanic men had the lowest median age at death (60 and 62 years, respectively) and the highest average person-years of life lost per death (21 and 20 years, respectively) from liver cancer. NH black and Hispanic men had the lowest median age at death (60 and 62 years, respectively) and the highest average person-years of life lost per death (21 and 20 years, respectively) from liver cancer. CONCLUSIONS: Overall, cancer incidence and mortality declined among men and, although cancer incidence was stable among women, mortality declined. The burden of liver cancer is growing and is not equally distributed throughout the population. Efforts to vaccinate populations that are susceptible to hepatitis B virus (HBV) infection and to identify and treat those living with HCV or HBV infection, metabolic conditions, alcohol-related liver disease, or other causes of cirrhosis can be effective in reducing the incidence and mortality of liver cancer. Cancer 2016;12:23132-37. © 2016 American Cancer Society.

KEYWORDS: cancer, incidence, liver cancer, mortality. National Program of Cancer Registries (NPCR), National Program of Cancer Registries (NPCR), Surveillance, Epidemiology, and End Results (SEER), survival, trends, viral hepatitis.

INTRODUCTION

This marks the 18th year that the American Cancer Society (ACS), the Centers for Disease Control and Prevention (CDC), the National Cancer Institute (NCI), and the North American Association of Central Cancer Registries...
Liver cancer

- AI/AN have high incidence and mortality
- Opportunities for prevention:
  - Viral hepatitis
  - Obesity
  - Diabetes
  - Alcohol
Primary Prevention

Good Health and Wellness in Indian Country is a 5-year program funded at $16 million in 2015. The program enlists tribes and tribal organizations as change agents to improve the health of American Indians and Alaska Natives.
How GHWIC Works:
Component 1 vs. Component 2

C1

• Tribes that use community-chosen, culturally adapted policies, systems and environmental improvements (PSE) to achieve GHWIC’s long-term goals

C2

• Tribal organizations
  • Provide leadership, technical assistance, and resources to sub-awardees and C1s in their IHS Areas
12 Tribes work on culturally adapted activities to address the following outcomes

- Reduce commercial tobacco use and exposure
- Improve nutrition and physical activity
- Increase support for breastfeeding
- Increase health literacy
- Strengthen team based care and community based clinical linkages
National Center for Chronic Disease Prevention and Health Promotion
FY 2015 Investments in Indian Country

**Good Health & Wellness in Indian Country**

- Tribes (Component 1)
  1. Catawba Indian Nation
  2. Fort Peck Community College
  3. Kickapoo Tribe in Kansas
  4. Lower Brule Sioux Tribe
  5. Navajo Nation Department of Health
  6. Nez Perce Tribe
  7. Pueblo of Santa Ana
  8. Red Cliff Band of Lake Superior Chippewa
  9. San Carlos Apache Tribe
  10. Sault Ste. Marie Tribe of Chippewa Indians
  11. Winnebago Tribe of Nebraska
  12. YellowHawk Tribal Health Center
C2 Map

National Center for Chronic Disease Prevention and Health Promotion
FY 2015 Investments in Indian Country

Good Health & Wellness in Indian Country

Tribal Organizations (Component 2)
1. Alaska Native Tribal Health Consortium
2. Albuquerque Area Indian Health Board, Inc.
3. California Rural Indian Health Board, Inc.
4. Great Lakes Inter-Tribal Council, Inc.
5. Great Plains Tribal Chairmen’s Health Board
6. Inter-Tribal Council of Arizona, Inc.
7. Montana and Wyoming Tribal Leaders Council
8. Northwest Portland Area Indian Health Board
9. Oklahoma City Area Inter-Tribal Health Board
10. United Indian Health Services, Inc.
11. United South and Eastern Tribes, Inc.
Future Directions

- Cancer surveillance
- Regional patterns of cancer incidence and mortality
- Liver Cancer
- Good Health and Wellness in Indian Country: “it’s cancer control too!” the case for collaborating around primary prevention
Thank you!

For more information please contact Centers for Disease Control and Prevention

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Telephone: 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348
Visit: www.cdc.gov | Contact CDC at: 1-800-CDC-INFO or www.cdc.gov/info

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.