Cancer Control in AI/AN Populations

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Presentation to TCAC
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Outline

• Cancer trends
• Risk factors
• NCI response: disease prevention interventions and treatment
• Future directions
Cancer Trends
## Population Coverage by Race/Ethnicity

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>0%</td>
<td>10%</td>
<td>20%</td>
</tr>
<tr>
<td>Black</td>
<td>10%</td>
<td>20%</td>
<td>30%</td>
</tr>
<tr>
<td>AI/AN</td>
<td>20%</td>
<td>30%</td>
<td>40%</td>
</tr>
<tr>
<td>API</td>
<td>30%</td>
<td>40%</td>
<td>50%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>40%</td>
<td>50%</td>
<td>60%</td>
</tr>
</tbody>
</table>

AI/AN: American Indian and Alaska Native
API: Asian and Pacific Islander
All Sites, Incidence Rates 1975-2013

Incidence

Mortality

Source: Incidence data for whites and blacks are from the SEER 9 areas (San Francisco, Connecticut, Detroit, Hawaii, Iowa, New Mexico, Seattle, Utah, Atlanta). Incidence data for Asian/Pacific Islanders, American Indians/Alaska Natives and Hispanics are from the SEER 13 Areas (SEER 9 Areas, San Jose-Monterey, Los Angeles, Alaska Native Registry and Rural Georgia). Mortality data are from US Mortality Files, National Center for Health Statistics, CDC.
Cancer incidence and mortality rates for American Indians and Alaska Natives by geographic region were published in American Journal of Public Health in 2014.

Lung cancer incidence rates for American Indian/Alaska Native females vary by geographic region within the United States.

- Average annual age-adjusted incidence rates (US 2000 standard)
- United States by region (CHSDA only), 1999-2009
- Asterisk (*) denotes statistically significant difference (p<0.05)

Lung cancer incidence rates for American Indian/Alaska Native **males** vary by geographic region within the United States.

- Average annual age-adjusted incidence rates (US 2000 standard)
- United States by region (CHSDA only), 1999-2009
- Asterisk (*) denotes statistically significant difference (p<0.05)

Colon and rectum cancer incidence rates for American Indian/Alaska Native females vary by geographic region within the United States

- Average annual age-adjusted incidence rates (US 2000 standard)
- United States by region (CHSDA only), 1999-2009
- Asterisk (*) denotes statistically significant difference (p<0.05)

Colon and Rectum cancer incidence rates for American Indian/Alaska Native males vary by geographic region within the United States

- Average annual age-adjusted incidence rates (US 2000 standard)
- United States by region (CHSDA only), 1999-2009
- Asterisk (*) denotes statistically significant difference (p<0.05)

Liver cancer incidence rates for American Indian/Alaska Native females vary by geographic region within the United States

- Average annual age-adjusted incidence rates (US 2000 standard)
- United States by region (CHSDA only), 1999-2009
- Asterisk (*) denotes statistically significant difference (p<0.05)

Liver cancer incidence rates for American Indian/Alaska Native males vary by geographic region within the United States

- Average annual age-adjusted incidence rates (US 2000 standard)
- United States by region (CHSDA only), 1999-2009
- Asterisk (*) denotes statistically significant difference (p<0.05)

Kidney cancer incidence rates for American Indian/Alaska Native *females* vary by geographic region within the United States.

- Average annual age-adjusted incidence rates (US 2000 standard)
- United States by region (CHSDA only), 1999-2009
- Asterisk (*) denotes statistically significant difference (p<0.05)

Kidney cancer incidence rates for American Indian/Alaska Native males vary by geographic region within the United States.

- Average annual age-adjusted incidence rates (US 2000 standard)
- United States by region (CHSDA only), 1999-2009
- Asterisk (*) denotes statistically significant difference (p<0.05)

## Cancer Death Rates per 100,000 – Men (2008-2012)

<table>
<thead>
<tr>
<th>Cancer</th>
<th>American Indian</th>
<th>Non-Hispanic White</th>
<th>American Indian/Non-Hispanic White Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Sites</td>
<td>186.7</td>
<td>210.6</td>
<td>0.9</td>
</tr>
<tr>
<td>Kidney &amp; Renal Pelvis</td>
<td>8.7</td>
<td>5.9</td>
<td>1.5</td>
</tr>
<tr>
<td>Liver &amp; IBD*</td>
<td>13.9</td>
<td>7.6</td>
<td>1.8</td>
</tr>
<tr>
<td>Stomach</td>
<td>7.4</td>
<td>3.6</td>
<td>2.1</td>
</tr>
<tr>
<td>Colon &amp; Rectum</td>
<td>18.8</td>
<td>18.2</td>
<td>1.0</td>
</tr>
<tr>
<td>Prostate</td>
<td>20.2</td>
<td>19.9</td>
<td>1.0</td>
</tr>
</tbody>
</table>

## Cancer Death Rates per 100,000 - Women (2008-2012)

<table>
<thead>
<tr>
<th>Cancer</th>
<th>American Indian Women</th>
<th>Non-Hispanic White Women</th>
<th>American Indian/Non-Hispanic White Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Sites</td>
<td>133.9</td>
<td>149.2</td>
<td>0.9</td>
</tr>
<tr>
<td>Cervical</td>
<td>3.5</td>
<td>2.0</td>
<td>1.8</td>
</tr>
<tr>
<td>Kidney &amp; Renal Pelvis</td>
<td>4.7</td>
<td>2.6</td>
<td>1.8</td>
</tr>
<tr>
<td>Liver &amp; IBD*</td>
<td>6.3</td>
<td>3.1</td>
<td>2.0</td>
</tr>
<tr>
<td>Stomach</td>
<td>3.6</td>
<td>1.8</td>
<td>2.0</td>
</tr>
<tr>
<td>Breast</td>
<td>15.0</td>
<td>21.9</td>
<td>0.7</td>
</tr>
<tr>
<td>Colon and Rectum</td>
<td>15.6</td>
<td>12.9</td>
<td>1.2</td>
</tr>
</tbody>
</table>

Risk Factors
## Smoking Prevalence Among Adults - 2015

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Prevalence (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Indian/Alaska Natives</td>
<td>29.2</td>
</tr>
<tr>
<td>Asians</td>
<td>9.5</td>
</tr>
<tr>
<td>Blacks</td>
<td>17.5</td>
</tr>
<tr>
<td>Hispanics</td>
<td>11.2</td>
</tr>
<tr>
<td>Multiple Races</td>
<td>27.9</td>
</tr>
<tr>
<td>White</td>
<td>18.2</td>
</tr>
</tbody>
</table>

Adults aged 50-75 who had any colorectal test or procedure, 2013

<table>
<thead>
<tr>
<th>American Indian Alaska Native</th>
<th>Non-Hispanic White</th>
<th>American Indian Alaska Native/Non-Hispanic White Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>49.3</td>
<td>60.4</td>
<td>0.8</td>
</tr>
</tbody>
</table>

# AI/AN – Obesity Rates – 18 years and older

<table>
<thead>
<tr>
<th></th>
<th>American Indian &amp; Alaska Native</th>
<th>Non-white Hispanic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overweight – Not Obese</td>
<td>31.2</td>
<td>34.1</td>
</tr>
<tr>
<td>Obese</td>
<td>42.3</td>
<td>27.4</td>
</tr>
</tbody>
</table>

Source: National Health Interview Survey 2014
Percent Inactive physical activity among adults: 2014
(Did not meet federal physical activity guidelines)

<table>
<thead>
<tr>
<th>American Indian Alaska Native</th>
<th>Non-Hispanic White</th>
<th>African American/ Non-Hispanic White Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>51.6</td>
<td>43.4</td>
<td>1.2</td>
</tr>
</tbody>
</table>

http://www.cdc.gov/nchs/nhis/shs/tables.htm
NCI Response: disease prevention interventions and treatment
NCI Funding Collaborations

SEER/IHS linkage

Native CIRCLE
- [http://cancercenter.mayo.edu/native_circle.cfm](http://cancercenter.mayo.edu/native_circle.cfm)
Interventions for Health Promotion & Disease Prevention in Native American Populations

Trans-NIH Program Announcement: http://cancercontrol.cancer.gov/nativeamericanintervention/

- National Cancer Institute
- National Institute on Alcohol Abuse and Alcoholism
- National Institute on Drug Abuse
- National Institute of Environmental Health Sciences
- National Institute of Mental Health
- National Institute of Nursing Research
- National Institute of Minority Health and Health Disparities
- Office of Behavioral and Social Sciences Research
Purpose of the Funding Opportunity Announcement

• Develop interventions for health promotion including cancer prevention
• Solicit research to adapt, develop, test and implement interventions in AI/AN populations to improve risk profiles at individual, familial, and community levels
• Researchers to partner with communities to:
  o Incorporate concerns and issues of the community
  o Adopt methodologies that are relevant to AI/AN populations
  o Study designs to address the complex and multi-layered causes of health inequities
Examples of Funded Projects

- Reducing tobacco use-risk of tobacco-related maternal, fetal, and infant adverse health outcomes
  Principal Investigator: Christi A. Patten, Mayo Clinic, Rochester

- Interventions for uptake of colorectal cancer screening in Southwest tribes
  Principal Investigators:
  - Shiraz Mishra, University of New Mexico Cancer Center
  - Kevin English, Albuquerque Area Indian Health Board
### NCI Clinical Trials Accrual – By Cancer Site

<table>
<thead>
<tr>
<th>Disease Area</th>
<th>Breast Number of Accruals (# trials)</th>
<th>Prostate Number of Accruals (# trials)</th>
<th>Colorectal Number of Accruals (# trials)</th>
<th>Myeloma Number of Accruals (# trials)</th>
<th>Lung Number of Accruals (# trials)</th>
<th>Total Number of Accruals (# trials)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast</td>
<td>5,424 (16)</td>
<td>2,709 (7)</td>
<td>1,350 (4)</td>
<td>629 (5)</td>
<td>1,679 (25)</td>
<td>11,791 (57)</td>
</tr>
<tr>
<td>Prostate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colorectal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Myeloma</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lung</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

| % to Ph 2 Trials (# Ph 2 trials) | 1% (2) | 0% (0) | 11% (2) | 22% (1) | 16% (8) | 5% (13) |
| % to Ph 3 Trials (# Ph 3 trials) | 99% (14) | 100% (7) | 64% (1) | 58% (2) | 61% (8) | 87% (32) |

- Other disease areas with 500+ accruals in from March 2014-February 2016 (combining pediatric and adult accruals):
  - Leukemia: 6,785
  - Brain: 1,296
  - Head and neck: 1,058
  - Lymphoma: 1,020
  - Renal: 861
  - Melanoma: 725
  - Ovarian: 542

- 25% of colorectal accruals to Ph2/3
- 20% of myeloma accruals to Ph1/2
- 9% of lung accruals to Ph1/2 and 14% to Ph2/3
## Key Disease Areas - Accruals: Colorectal, Multiple Myeloma, Lung
**March 2014 – February 2016**
*Circles indicate differences >5%*

<table>
<thead>
<tr>
<th>Disease Area</th>
<th>White</th>
<th>Black</th>
<th>AI/AN</th>
<th>Asian/Pl</th>
<th>#</th>
<th>Hispanic</th>
<th>Not Hispanic</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Colorectal Incidence</strong></td>
<td>77.6%</td>
<td>17.0%</td>
<td>0.7%</td>
<td>4.6%</td>
<td></td>
<td>13.9%</td>
<td>86.1%</td>
<td></td>
</tr>
<tr>
<td><strong>Colorectal Accruals</strong></td>
<td>84.0%</td>
<td>10.9%</td>
<td>0.7%</td>
<td>4.4%</td>
<td>1,307</td>
<td>8.4%</td>
<td>91.6%</td>
<td>1,317</td>
</tr>
<tr>
<td><strong>Expected – Observed</strong></td>
<td>+6.4%</td>
<td>-6.1%</td>
<td>0.0%</td>
<td>-0.2%</td>
<td></td>
<td>-5.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Myeloma Incidence</strong></td>
<td>69.6%</td>
<td>26.9%</td>
<td>0.5%</td>
<td>3.0%</td>
<td></td>
<td>15.1%</td>
<td>84.9%</td>
<td></td>
</tr>
<tr>
<td><strong>Myeloma Accruals</strong></td>
<td>83.0%</td>
<td>13.4%</td>
<td>1.0%</td>
<td>2.6%</td>
<td>605</td>
<td>6.7%</td>
<td>93.3%</td>
<td>599</td>
</tr>
<tr>
<td><strong>Expected – Observed</strong></td>
<td>+13.4%</td>
<td>-13.5%</td>
<td>+0.5%</td>
<td>-0.4%</td>
<td></td>
<td>-8.4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lung Incidence</strong></td>
<td>80.6%</td>
<td>15.4%</td>
<td>0.5%</td>
<td>3.4%</td>
<td></td>
<td>8.7%</td>
<td>91.3%</td>
<td></td>
</tr>
<tr>
<td><strong>Lung Accruals</strong></td>
<td>86.0%</td>
<td>10.2%</td>
<td>0.8%</td>
<td>3.0%</td>
<td>1,633</td>
<td>2.6%</td>
<td>97.4%</td>
<td>1,633</td>
</tr>
<tr>
<td><strong>Expected – Observed</strong></td>
<td>+5.4%</td>
<td>-5.2%</td>
<td>+0.3%</td>
<td>-0.4%</td>
<td></td>
<td>-6.1%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Colorectal: 37 NR/UK and 6 Multiple Race; 33 NR/UK Ethnicity
Myeloma: 23 NR/UK and 1 Multiple Race; 30 NR/UK Ethnicity
Lung: 43 NR/UK and 3 Multiple Race; 46 NR/UK Ethnicity
Future Directions
This conference, sponsored by NCI’s Division of Cancer Control and Population Sciences (DCCPS), will address spatial and contextual aspects of cancer across the entire cancer control continuum, including etiology, prevention, detection, diagnosis, treatment, and survivorship.

Conference Goals
Growing technological capacity in mapping and spatial technology along with increasing sophistication in has resulted in the emergence of a growing research community using geospatial approaches on diverse aspects of cancer prevention and control.

The conference aims to bring together a community of researchers across the cancer control continuum using geospatial tools, models and approaches to address cancer prevention and control to:

- Support and build this research community;
- Accelerate the integration of state-of-the-art tools and theories from spatial research into cancer control and population sciences; and
- Identify future directions for data, resource, training and research funding in cancer control.

Presentations include:

Health Service Accessibility and Risk in Cervical Cancer Prevention: Comparing Rural Versus Non-Rural Residence in New Mexico
National Meeting on Precision Medicine and Cancer in American Indian & Alaska Native Communities

Precision medicine is an emerging approach for disease treatment and prevention that takes into account individual variability in genes, tissue and tumor profiles, environment, and lifestyle for each person. To understand how precision medicine can inform cancer diagnosis and treatment in American Indian and Alaska Native communities, the Stephenson Cancer Center at the University of Oklahoma will host a meeting in Oklahoma City on Thursday, Nov. 10.

GUEST SPEAKERS include Congressman Tom Cole (OK-04) and National Cancer Institute Acting Director Dr. Douglas Lowy. The primary group of invitees will be scientists and community partners at NCI-designated cancer centers.

http://www.precisionmedicineandcancernationalmeeting.com/
SEER Program Expansion

Currently covers 30% of the US population (450,000+ incident cases reported annually)

Scientific priorities include:

1. Represent data in more clinically relevant categories with better representation of special U.S. populations
2. Automate and directly capture data via
   - Linkages
   - Auto-processing of data (Natural Language Processing)
3. Expand outcomes data collection
4. Expand the capacity of SEER to support cancer research
New Mexico Registry with CDC and IHS

• Has spearheaded the collection of AI/AN cancer incidence and mortality data
• Works on misclassification of AI/AN

• In partnership with Mayo’s Spirit of Eagles
  o Creating a searchable database of AI/AN cancer incidence & mortality
  o Allows for comparison with local community data
Small Data – Implications for AI/AN communities

• Those for which the size, dispersion, or accessibility of the population may make it difficult to obtain adequate sample sizes for specific research questions
• What statistical tools are needed to analyze this kind of data?
• What are the factors that need to be considered when testing and implementing multilevel interventions?
• Is there sufficient statistical power to assess the effect of each level and tease them apart?