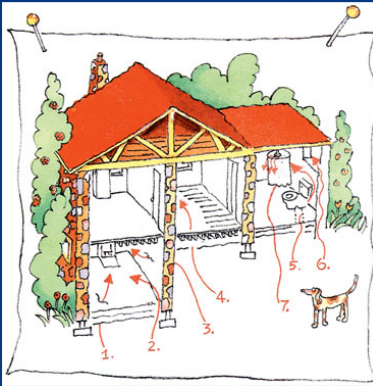


**National Native Network  
Cancer Risk Reduction Webinar Series:**

**Lung Cancer Burden among the American  
Indian and Alaska Native Populations**

**J. Michael Underwood, PhD  
Epidemiologist  
Comprehensive Cancer Control Branch  
July 29, 2014**

# Risk factors for lung cancer



# IARC Classification of Lung Cancer Carcinogens

WORLD HEALTH ORGANIZATION  
INTERNATIONAL AGENCY FOR RESEARCH ON CANCER



## IARC Monographs on the Evaluation of Carcinogenic Risks to Humans

VOLUME 83

### Tobacco Smoke and Involuntary Smoking



LYON, FRANCE  
2004

#### List of Classifications by cancer sites with *sufficient* or *limited* evidence in humans, Volumes 1 to 109\*

Cancer site	Carcinogenic agents with <i>sufficient</i> evidence in humans	Agents with <i>limited</i> evidence in humans
Lung	<p>Aluminum production</p> <p>Arsenic and inorganic arsenic compounds</p> <p>Asbestos (all forms)</p> <p>Beryllium and beryllium compounds</p> <p>Bis(chloromethyl)ether; chloromethyl methyl ether (technical grade)</p> <p>Cadmium and cadmium compounds</p> <p>Chromium(VI) compounds</p> <p>Coal, indoor emissions from household combustion</p> <p>Coal gasification</p> <p>Coal-tar pitch</p> <p>Coke production</p> <p>Engine exhaust, diesel</p> <p>Hematite mining (underground)</p> <p>Iron and steel founding</p> <p>MOPP (vincristine-prednisone-nitrogen mustard-procarbazine mixture)</p> <p>Nickel compounds</p> <p>Outdoor air pollution</p> <p>Painting</p> <p>Particulate matter in outdoor air pollution</p> <p>Plutonium</p> <p>Radon-222 and its decay products</p> <p>Rubber production industry</p> <p>Silica dust, crystalline</p> <p>Soot</p> <p>Sulfur mustard</p> <p>Tobacco smoke, secondhand</p> <p>Tobacco smoking</p> <p>X-radiation, gamma-radiation</p>	<p>Acid mists, strong inorganic</p> <p>Art glass, glass containers and pressed ware (manufacture of)</p> <p>Biomass fuel (primarily wood), indoor emissions from household combustion of</p> <p>Bitumens, occupational exposure to oxidized bitumens and their emissions during roofing</p> <p>Bitumens, occupational exposure to hard bitumens and their emissions during mastic asphalt work</p> <p>Carbon electrode manufacture</p> <p><math>\alpha</math>-Chlorinated toluenes and benzoyl chloride (combined exposures)</p> <p>Cobalt metal with tungsten carbide</p> <p>Creosotes</p> <p>Frying, emissions from high-temperature</p> <p>Insecticides, non-arsenical (occupational exposures in spraying and application)</p> <p>Printing processes</p> <p>2,3,7,8-Tetrachlorodibenzo-para-dioxin</p> <p>Welding fumes</p>

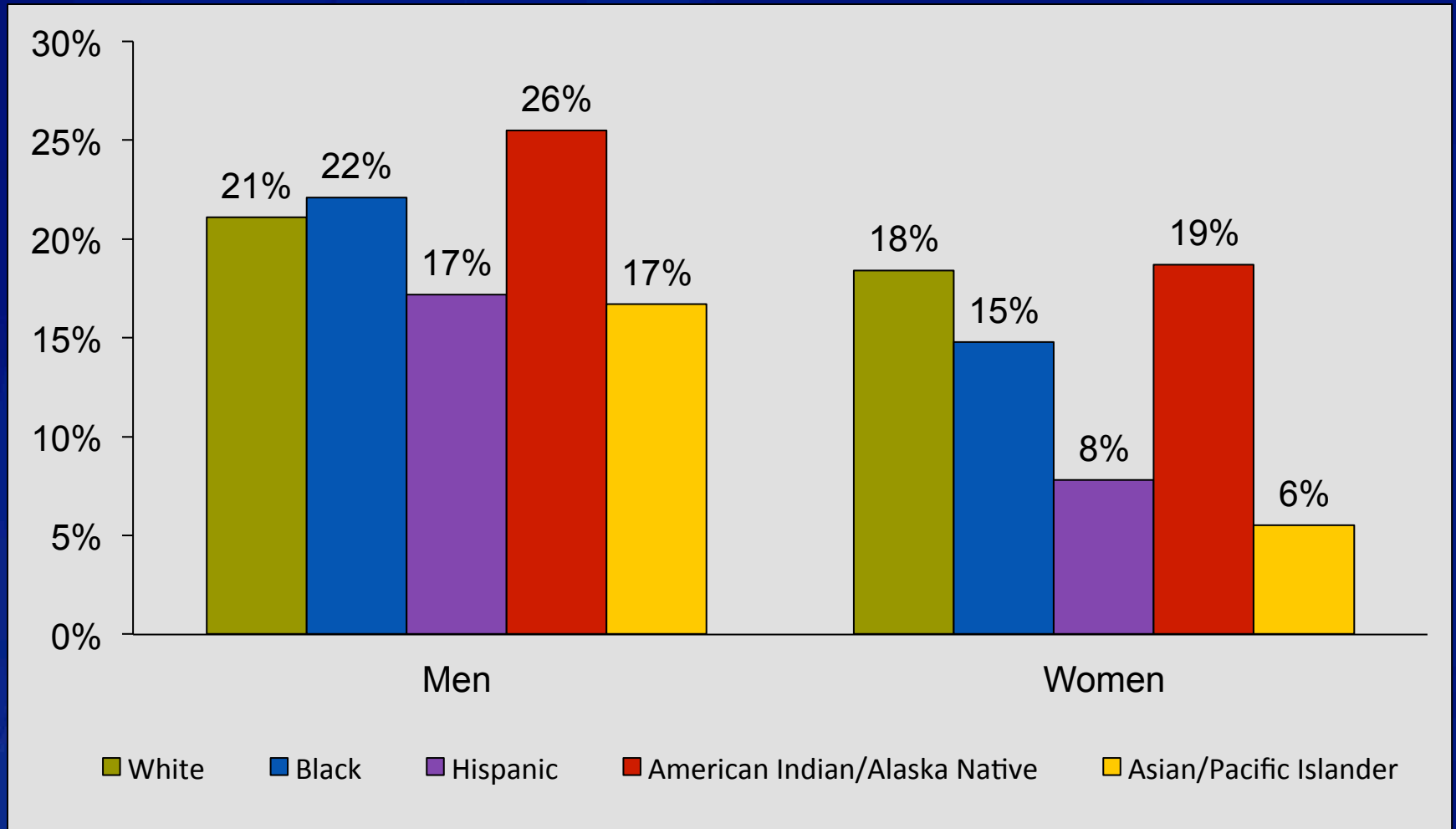




**Cigarette smoking causes most lung cancers**



## Current cigarette smoking



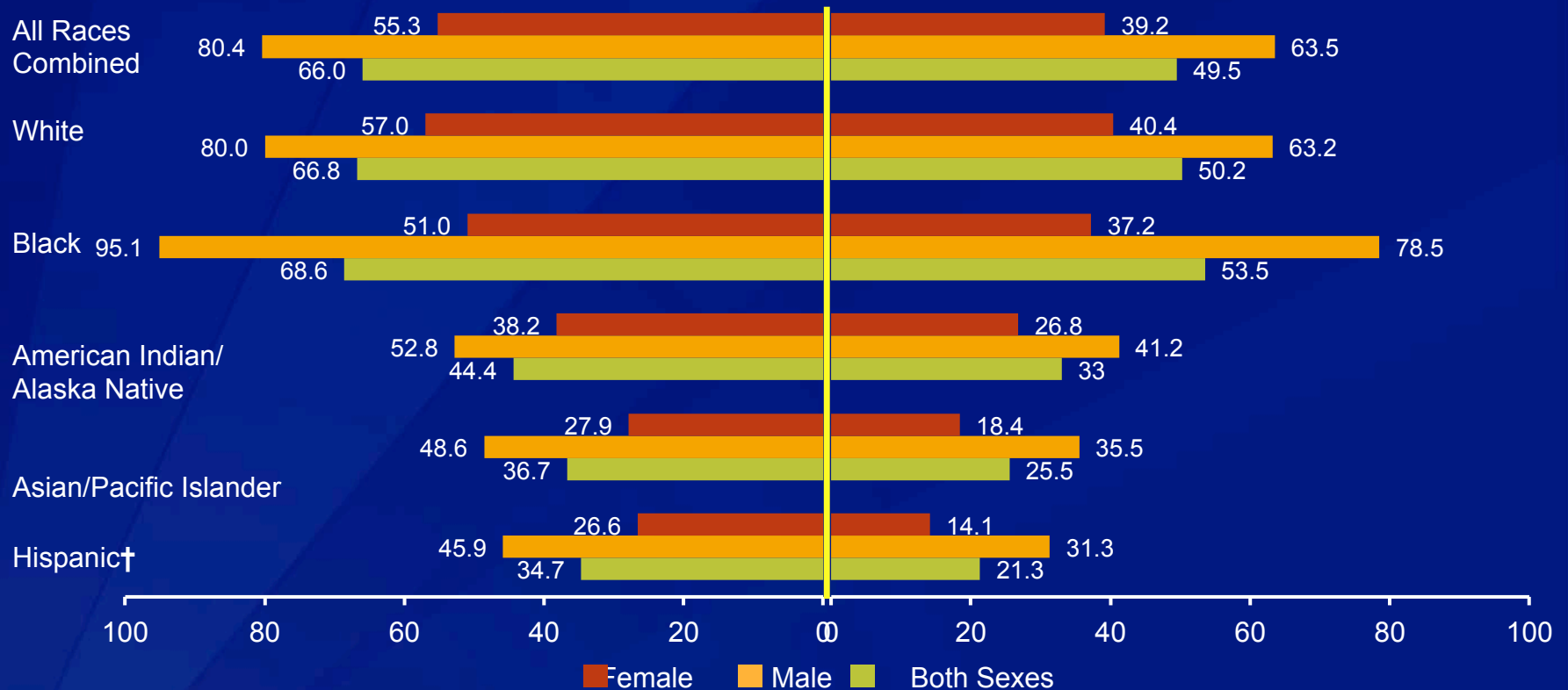
Percentage of persons aged  $\geq 18$  years who were current cigarette smokers, National Health Interview Survey, United States, 2012.

Source: CDC. Current Cigarette Smoking Among Adults— United States, 2005–2012. MMWR. 2014;63:29-34.

# **Lung and Bronchus Incidence and Death Rates\*** By Race, Ethnicity, United States, 2006-2010

## **Incidence Rate**

## **Death Rate**



Rates are per 100,000 and are age-adjusted to the 2000 US standard population (19-age groups -- Census P25-1130).

Incidence rates are for state registries that meet USCS publication criteria for all years, 2006-2010. Incidence rates cover approximately 94.8% of the US population for 2006-2010; death rates cover approximately 100% of the US population.

† Hispanic origin is not mutually exclusive from race categories (white, black, Asian/Pacific Islander, American Indian/Alaska Native).

Source for Incidence Data: Combined data from the National Program of Cancer Registries as submitted to CDC and from the Surveillance, Epidemiology, and End Results program as submitted to NCI on November 2012.

Source for Mortality Data: US Mortality Files, CDC., More data is available at: [www.cdc.gov/cancer](http://www.cdc.gov/cancer).

ICD03 behavior used for 2006-2010 combined.

## Problem

- ❑ **Cancer cases and deaths among American and Alaska Native populations are under-reported**
  - Incidence & mortality data use race reported in medical records
  - Misclassification of American Indians and Alaska Natives in incidence and mortality data

## **Solution**

- ❑ **Use data from Indian Health Services registration records to identify cases and deaths among American Indian / Alaska Native patients**
  - Cancer registries
  - National Death Index



## Indian Health Service (IHS) Data Linkage

- ❑ **CDC cancer registry data is linked with IHS to limit misclassification**
  - Individuals who may not have been classified as American Indian in cancer registry, but were known to be members of federally recognized tribes/ enrolled in the IHS healthcare system
  - Example: An individual not identified as American Indian in the cancer registry, but identified in the IHS database is classified as American Indian for analyses

**Number of all-cause deaths, death rate, and rate ratio compared to whites – American Indians/Alaska Natives residing in CHSDA counties, 1990-2009, before linkage and after linkage with IHS records**

	Pre-link	Post-link
Deaths	105,552	122,644
Rate	994.0	1165.9
Rate Ratio	1.24	1.46

SUPPLEMENT TO

American Journal of  
**PUBLIC  
HEALTH**

A PUBLICATION OF  
AMERICAN PUBLIC HEALTH ASSOCIATION

Geographic Variation in Colorectal Cancer Incidence and Mortality | Perspectives on Mortality Data From the Indian Health Service | Racial Misclassification of American Indians and Alaska Natives | **AMERICAN INDIAN AND ALASKA NATIVE MORTALITY** | Disparities in Cancer Mortality and Incidence Among AI/AN People | American Indian Health Policy | The Alcohol-Attributable Death Rate Disparity Between American Indians and Alaska Natives and Non-Hispanic Whites | What Are the Causes of Suicide Among Young Alaska Native Men?

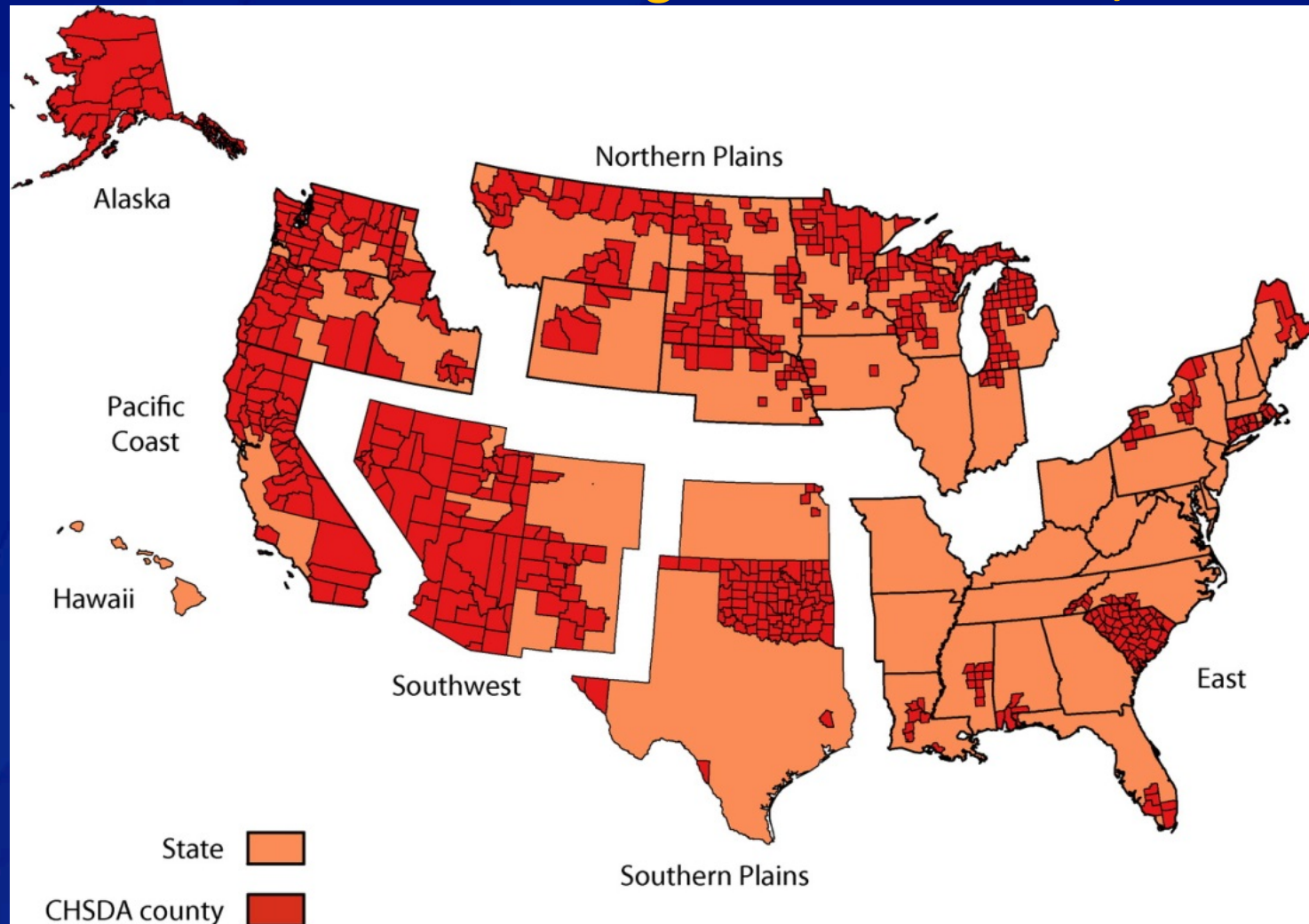


## AJPH Supplement June 2014

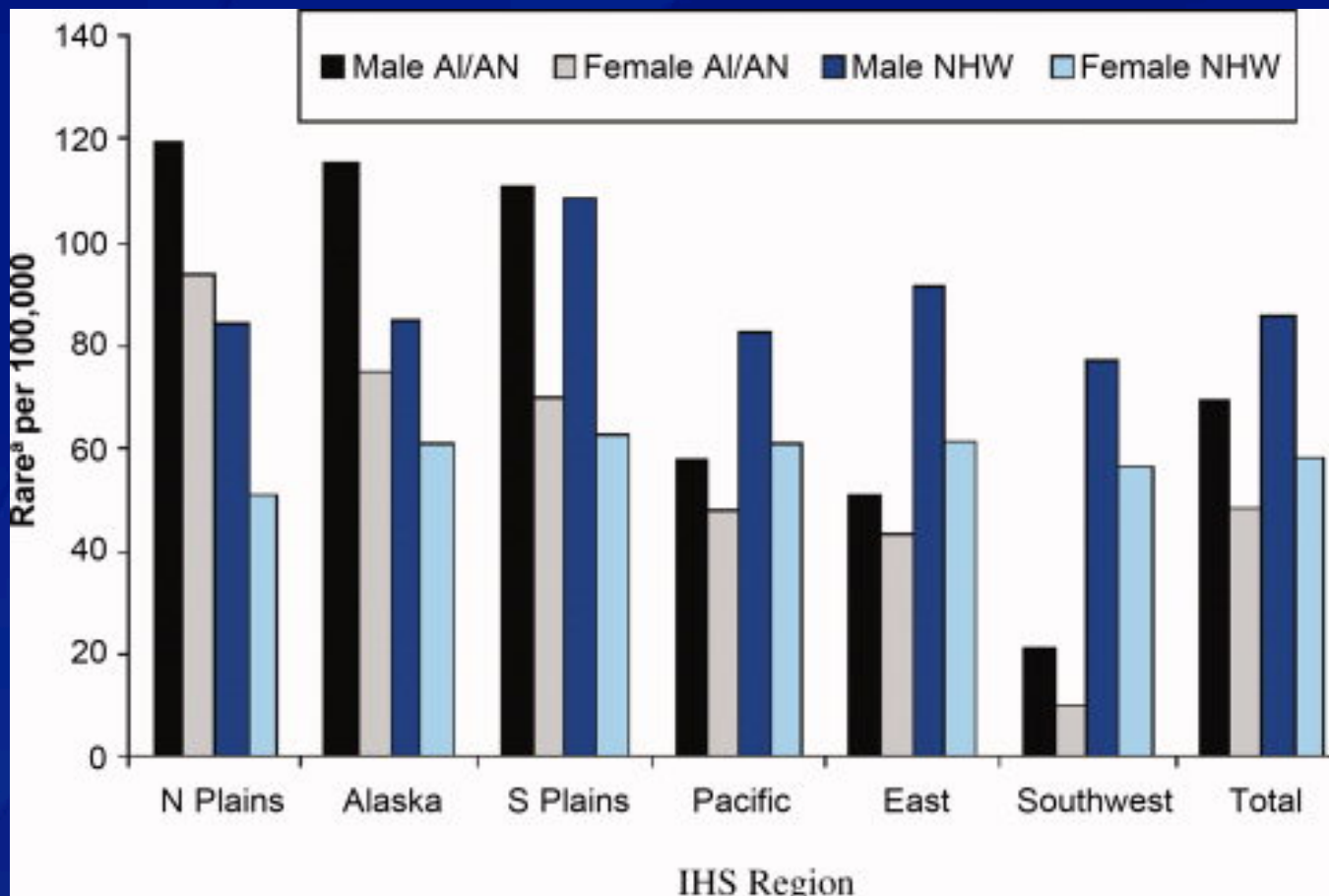
**Reviews current data  
on American Indian  
and Alaska Native  
mortality**

**26 research articles**

## States and Contract Health Service Delivery Area counties by Indian Health Service Region: United States, 2009.



## Regional Differences in Lung Cancer Incidence, American Indian/Alaska Natives by IHS region, 1999-2004

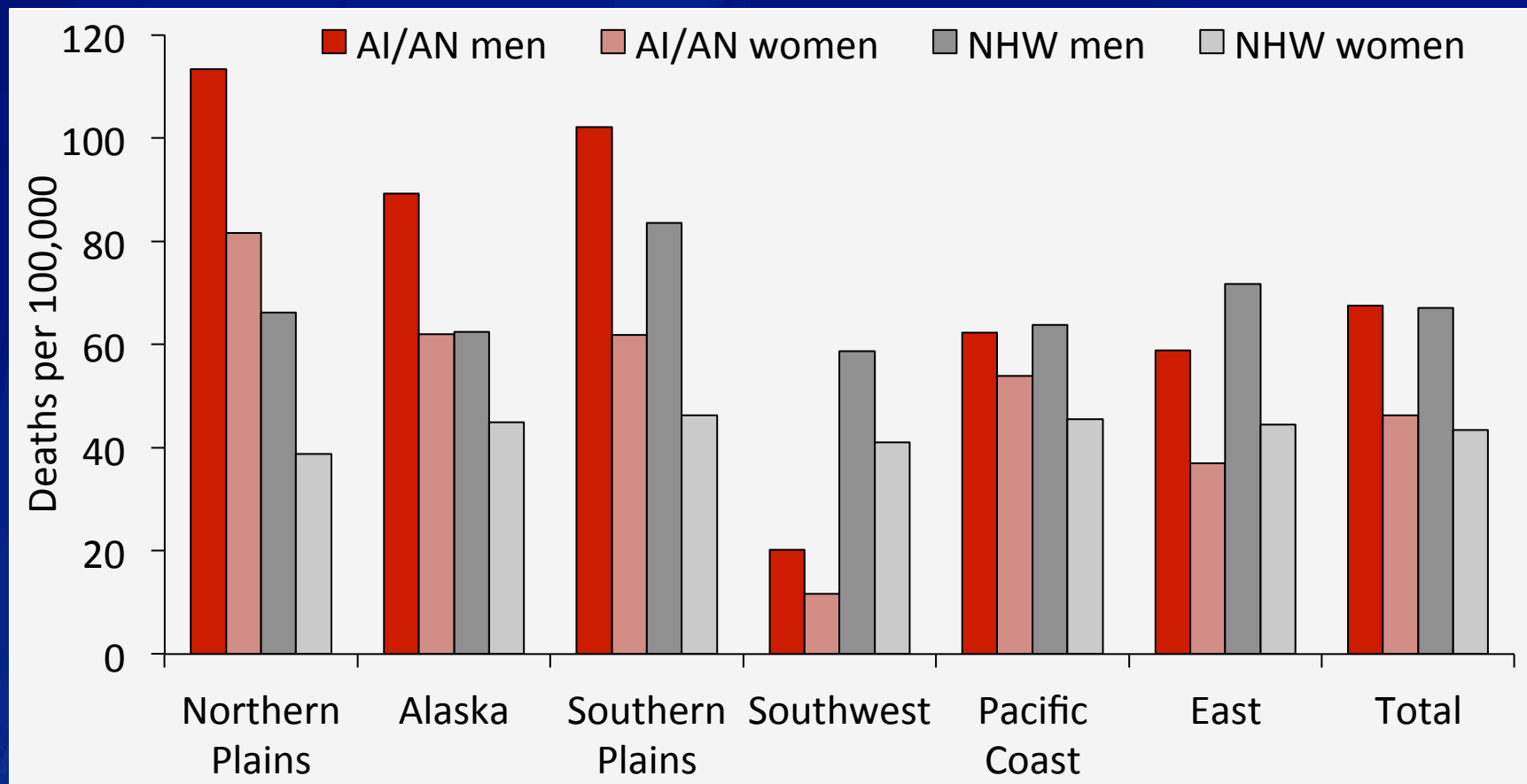


Lung and bronchus cancer incidence rates for American Indians and Alaska Natives (AI/AN) and non-Hispanic whites (NHW) by Indian Health Service (IHS) region and Sex in Contract Health Service Delivery Area (CHSDA) counties in the United States from 1999 to 2004. <sup>a</sup>Rates are age-adjusted to 2000 United States standard population (19 age groups; Census P25-1130; see Day, 1996). N Plains indicates Northern Plains; S Plains, Southern Plains. Source: cancer registries in the Centers for Disease Control and Prevention's National Program of Cancer Registries and/or the National Cancer Institute's Surveillance, Epidemiology, and End Results Program.

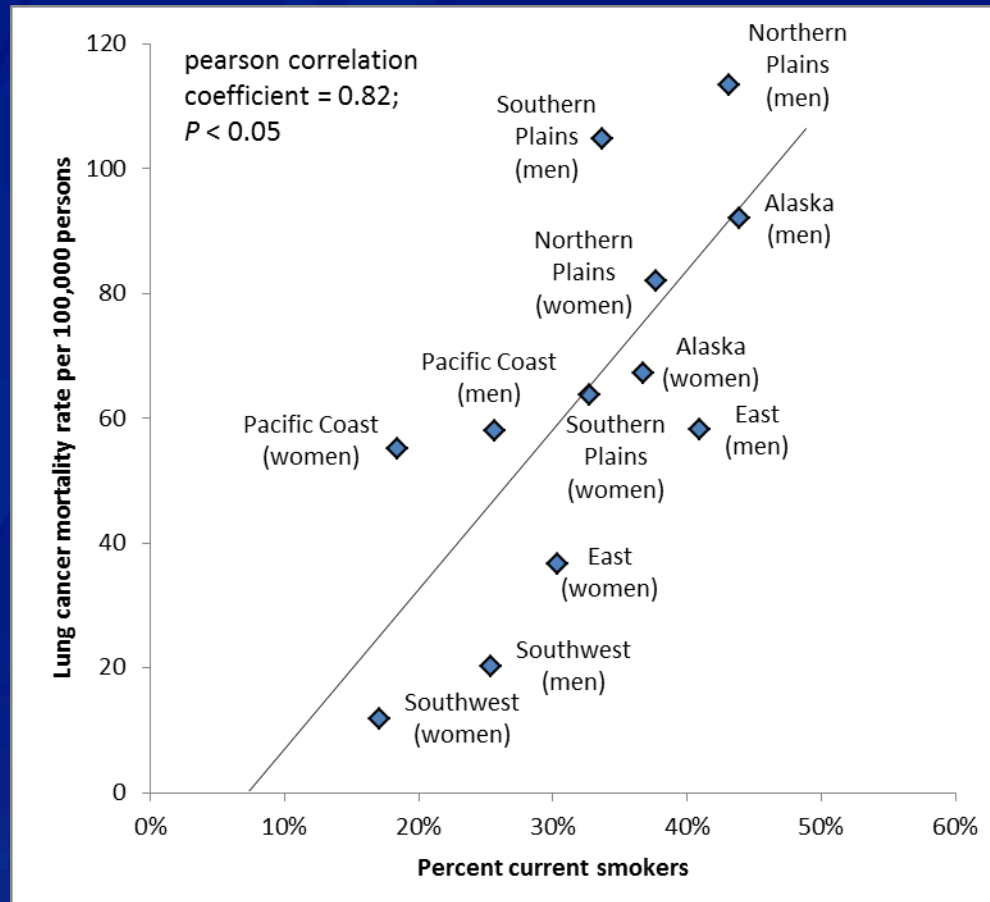
Source: Bliss A et al. Lung cancer incidence among American Indians and Alaska Natives in the United States, 1999-2004. Cancer 2008;113(S5):1168-1178 .



## Regional Differences in Lung Cancer Mortality, American Indian/Alaska Natives by IHS region, 1999-2009



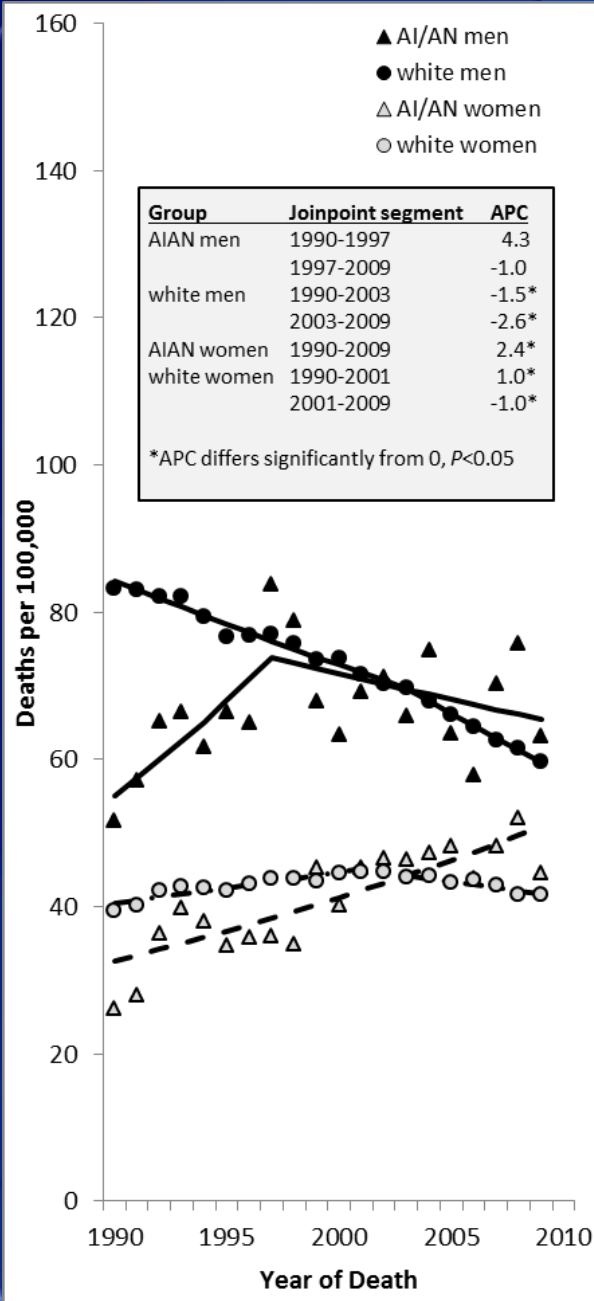
# Correlation between cigarette smoking prevalence and lung cancer death rates by IHS region among American Indians and Alaska Natives



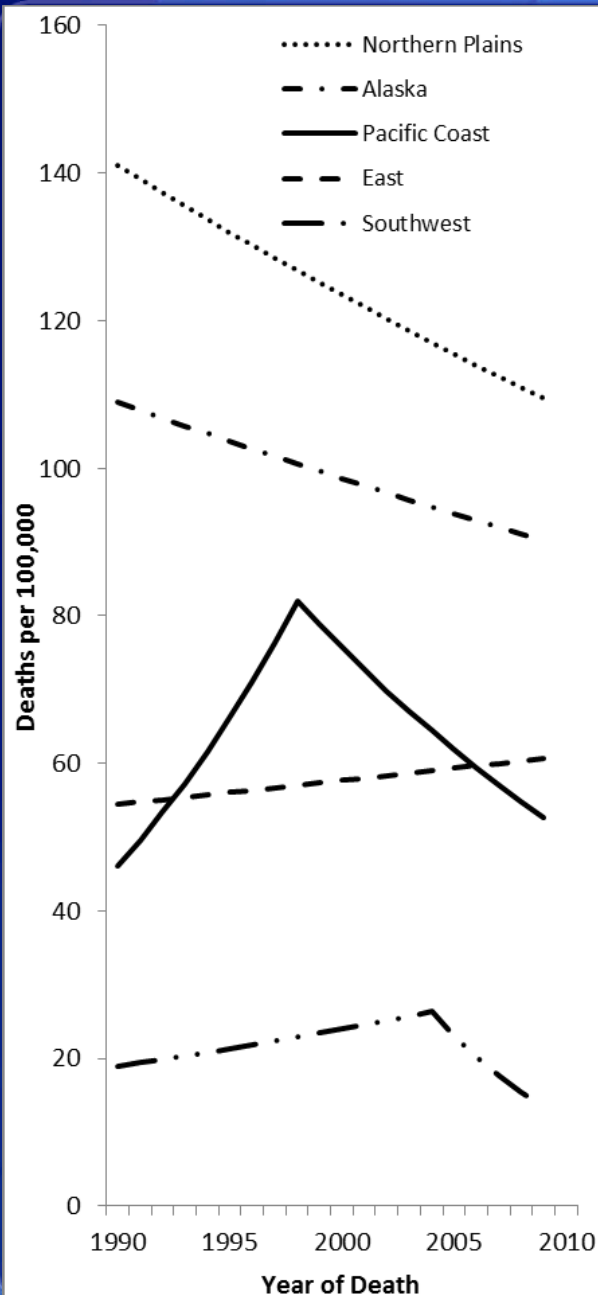
## Trends in lung cancer death rates 1990- 2009

In 1990, lung cancer death rates were higher among whites than among American Indians and Alaska Natives.

However, due to differences in trends, lung cancer death rates among American Indians and Alaska Natives are now higher than among whites.

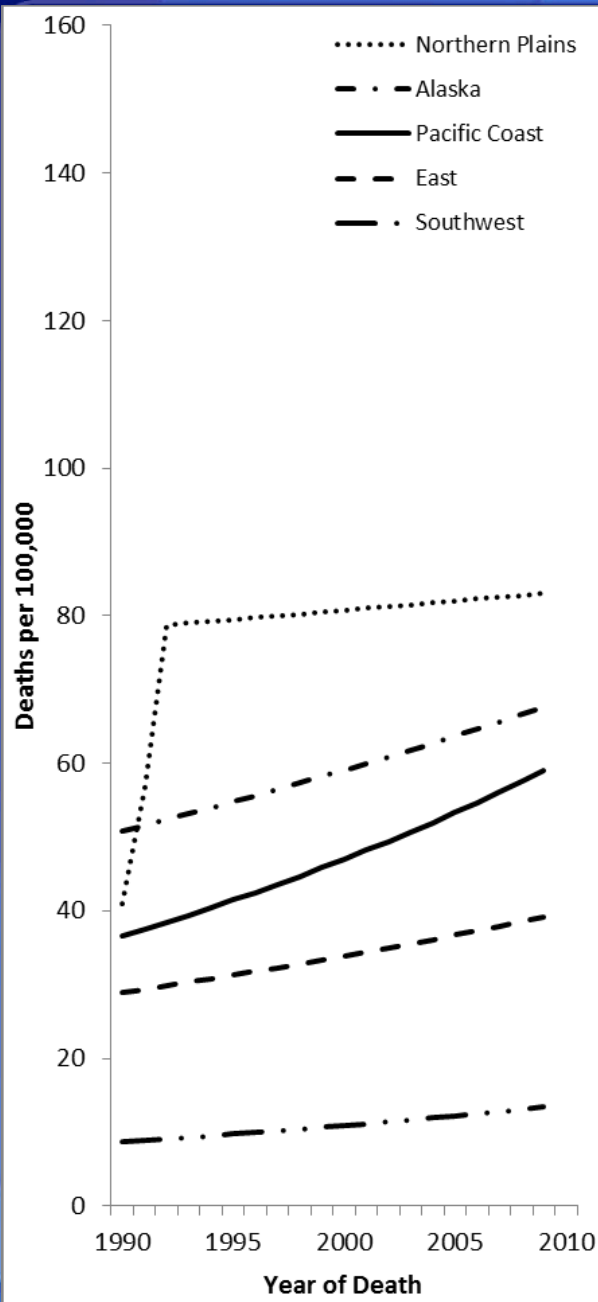


## Trends in lung cancer death rates among American Indian and Alaska Native males by IHS region, 1990- 2009



**Lung cancer death rates decreased in all IHS regions except the East, where rates were stable.**

## Trends in lung cancer death rates among American Indian and Alaska Native females by IHS region, 1990- 2009

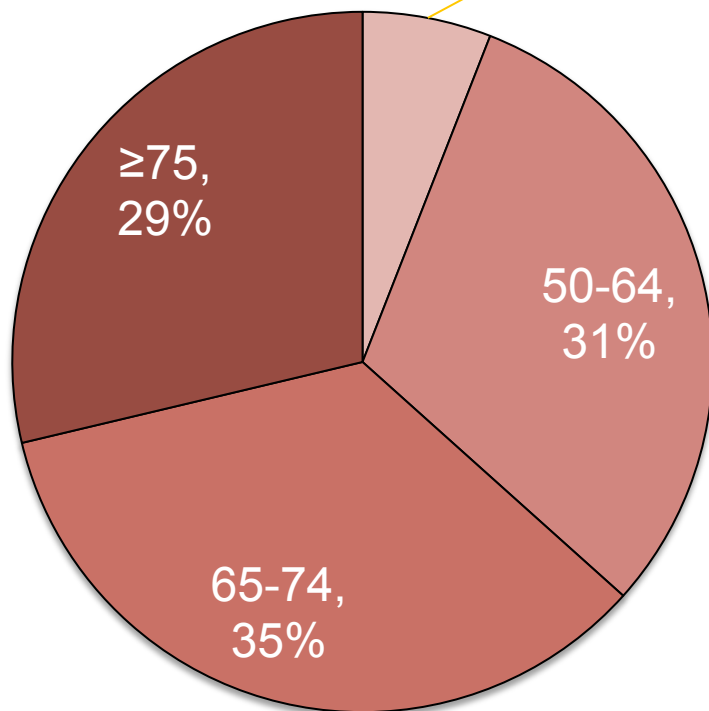


**Lung cancer death rates increased in all IHS regions except the Northern Plains, where rates were stable.**

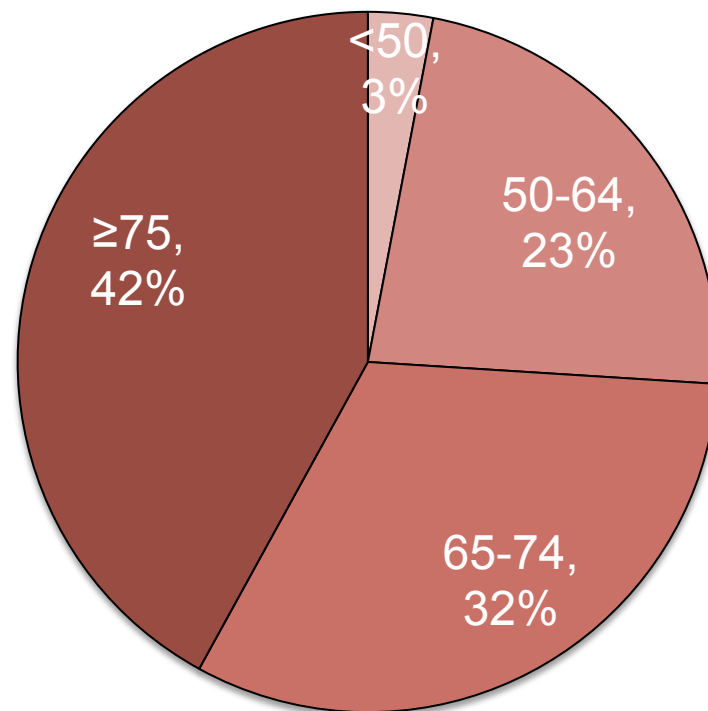


## More lung cancer deaths among American Indians and Alaska Natives occur at younger ages.

Percentage of lung cancer deaths by age group



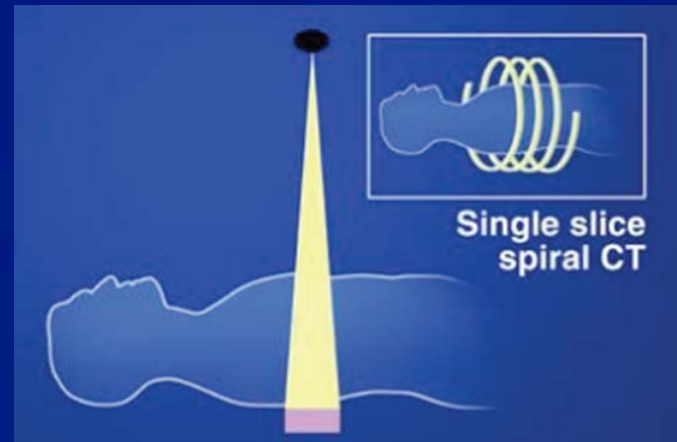
American Indian and Alaska Natives



Whites

# Lung Cancer Screening with Low Dose Computed Tomography (LDCT)

- ❑ Individual is on table moving through donut shaped x-ray machine.
- ❑ X-rays rotate around individual on a path similar to a helix or spiral.
- ❑ Multiple x-ray “slices” are analyzed by computer.
- ❑ Definition of “low dose” can change with improvements in technology over time.



# National Lung Screening Trial

	LDCT	Chest X-ray
Number of participants	26,722	26,732
Adherence to 3 rounds of screening	95%	93%
Person years	144,103	143,368
Lung cancer deaths	356	443
Relative reduction in mortality from lung cancer with LDCT	20%	----
Rate of at least one complication after the most invasive screening related diagnostic procedure	1.4%	1.6%
Deaths within 60 days after the most invasive screening-related diagnostic procedure	16	10

# USPSTF Recommendations for Lung Cancer Screening

- ❑ Based on NLST results, many US medical organizations have recommended lung cancer screening with LDCT.
- ❑ In 2013, US Preventive Services Task Force recommended annual lung cancer screening with LDCT for adults:
  - ❑ age 55 to 80 years
  - ❑ 30 pack-year smoking history
  - ❑ currently smoke or have quit within the past 15 years.
  - ❑ Grade B recommendation (means Patient Protection and Affordable Care Act requires private insurers to cover starting Jan 2015).

## **SUMMARY**

- ❑ **Lung cancer death rates among American Indian and Alaska Native persons varied 6-fold across IHS regions**
  - These rates were closely correlated with cigarette smoking
- ❑ **Reductions in lung cancer mortality among American Indian and Alaska Native males have lagged 10 years behind those for white males.**
- ❑ **Lung cancer mortality is still increasing among American Indian and Alaska Native females**
- ❑ **Lung cancer screening (LDCT ) reduces mortality**



## **PUBLIC HEALTH IMPLICATIONS**

- ❑ **Effective tobacco control prevention and control policies can decrease smoking prevalence and exposure to secondhand smoke, which ultimately leads to decreases in lung cancer.**
- ❑ **Only 2 of the 562 federally recognized tribes have adopted comprehensive commercial tobacco-free ordinances on their reservations**
- ❑ **Exposure to secondhand smoke is a significant concern in tribally owned casinos and gaming venues that are a major source of employment**

## **PUBLIC HEALTH IMPLICATIONS**

- ❑ **Screening may detect lung cancer early & reduce mortality**
  - Health care providers should extend smoking cessation referral and support to current smokers screened for lung cancer
  - Cancer control programs should assess resources available in their communities for LDCT lung cancer screening
- ❑ **Widespread uptake may depend on availability of insurance reimbursement and access to facilities capable of providing quality screening and interpretation of tests.**
- ❑ **American Indian and Alaska Native populations encounter significant barriers to cancer screening because of geographic isolation and socioeconomic conditions**
- ❑ **Efforts should be taken to ensure that American Indian and Alaska Native populations receive equal benefit from screening**

# Thank you

**For more information please contact Centers for Disease Control and Prevention**

1600 Clifton Road NE, Atlanta, GA 30333

Telephone, 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348

E-mail: [cdcinfo@cdc.gov](mailto:cdcinfo@cdc.gov) Web: [www.cdc.gov](http://www.cdc.gov)

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.