

Air Pollution and Cancer

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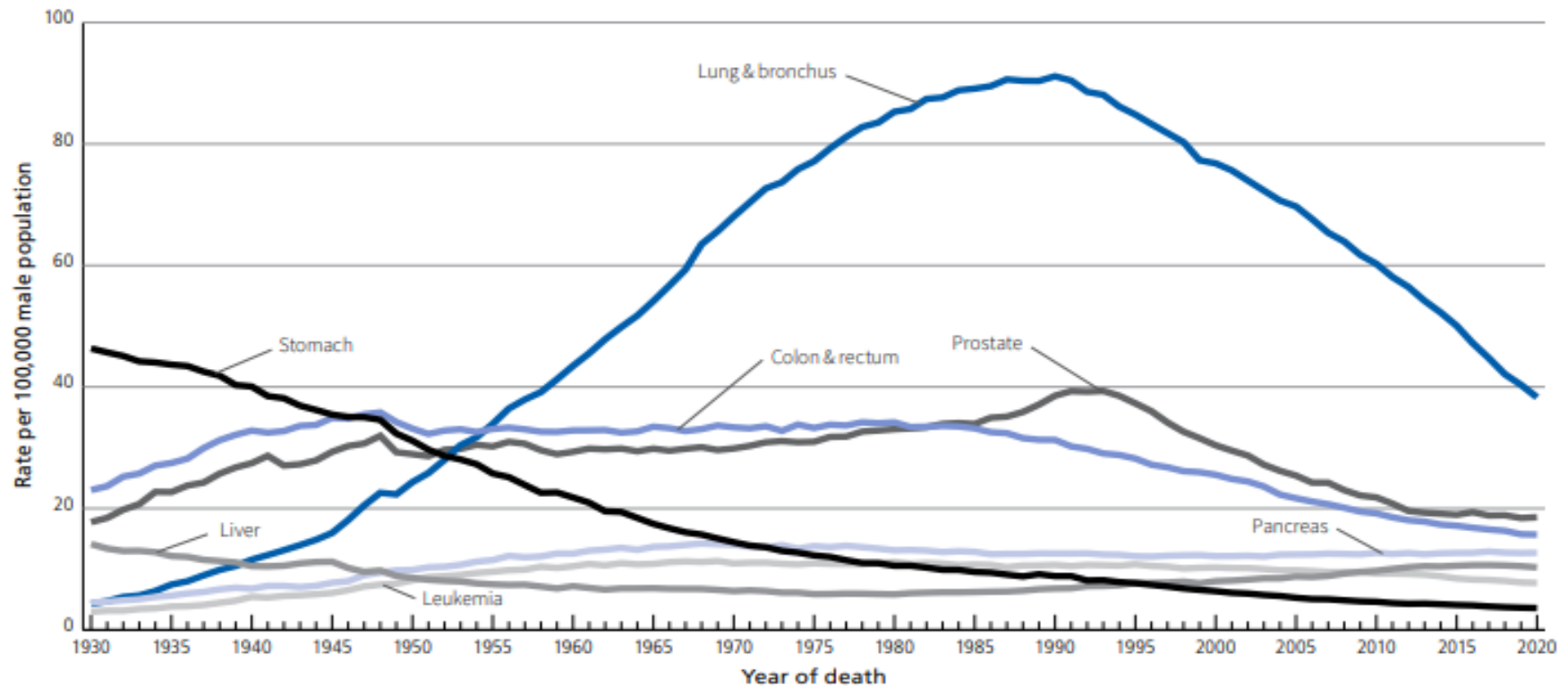
NJ Clean Air Council Public Hearing,
April 19, 2023



Introduction and Purpose

- Provide an overview of lung cancer incidence and mortality data, air toxic data, and an overview of epidemiological studies regarding the association of air pollution and the incidence of lung cancer
- NJDOH's CDC-funded Environmental Public Health Tracking project collaborates across NJDOH and NJDEP to make meaningful health and environmental data & resources publicly available, and to assist local health departments to utilize these to improve the health of their communities

Trends in Age-adjusted Cancer Death Rates by Site, Males, US, 1930-2020

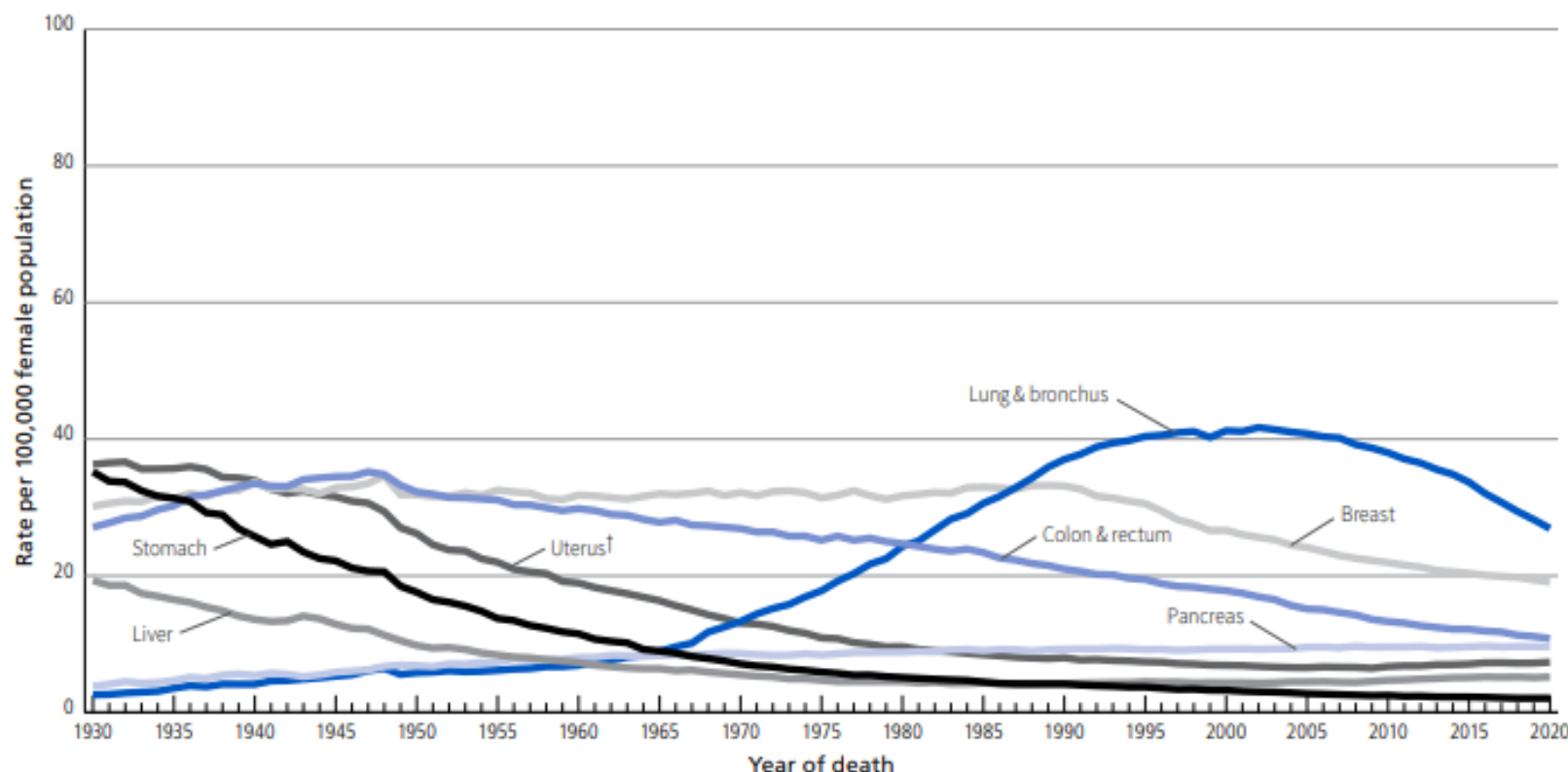


*Age adjusted to the 2000 US standard population. Rates exclude deaths in Puerto Rico and other US territories. Note: Due to changes in ICD coding, numerator information has changed over time for cancers of the liver, lung and bronchus, and colon and rectum.

Source: US Mortality Volumes 1930 to 1959, US Mortality Data 1960 to 2020, National Center for Health Statistics, Centers for Disease Control and Prevention.

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Trends in Age-adjusted Cancer Death Rates by Site, Females, US, 1930-2020



*Age adjusted to the 2000 US standard population. Rates exclude deaths in Puerto Rico and other US territories. †Uterus refers to uterine cervix and uterine corpus combined. Note: Due to changes in ICD coding, numerator information has changed over time for cancers of the liver, lung and bronchus, colon and rectum, and uterus.

Source: US Mortality Volumes 1930 to 1959, US Mortality Data 1960 to 2020, National Center for Health Statistics, Centers for Disease Control and Prevention.

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Air Pollution and Cancer Background

A wide variety of man-made and naturally occurring air pollutants are known to cause cancer, with initial evidence coming from occupational studies of highly exposed workers

Historically diverse exposures, including: tobacco smoke; radon; chemicals (benzene, mustard gas, VOCs); metals and metalloids (chromium, nickel, arsenic); and fibers (asbestos) have been classified as carcinogenic

Air Pollution and Cancer

Epidemiological studies of ambient air pollution and cancer have shown:

- Increased risk of lung cancer in association with higher levels of exposure to PM_{2.5} in air. Increased risk seen in both smokers & non-smokers
- Increased risk of lung and bladder cancers in association with higher levels of occupational exposures to diesel exhaust
- Increased risk of lung cancer in association with indoor exposure to radon and its decay products
- Secondhand smoke is associated with lung cancer in non-smokers

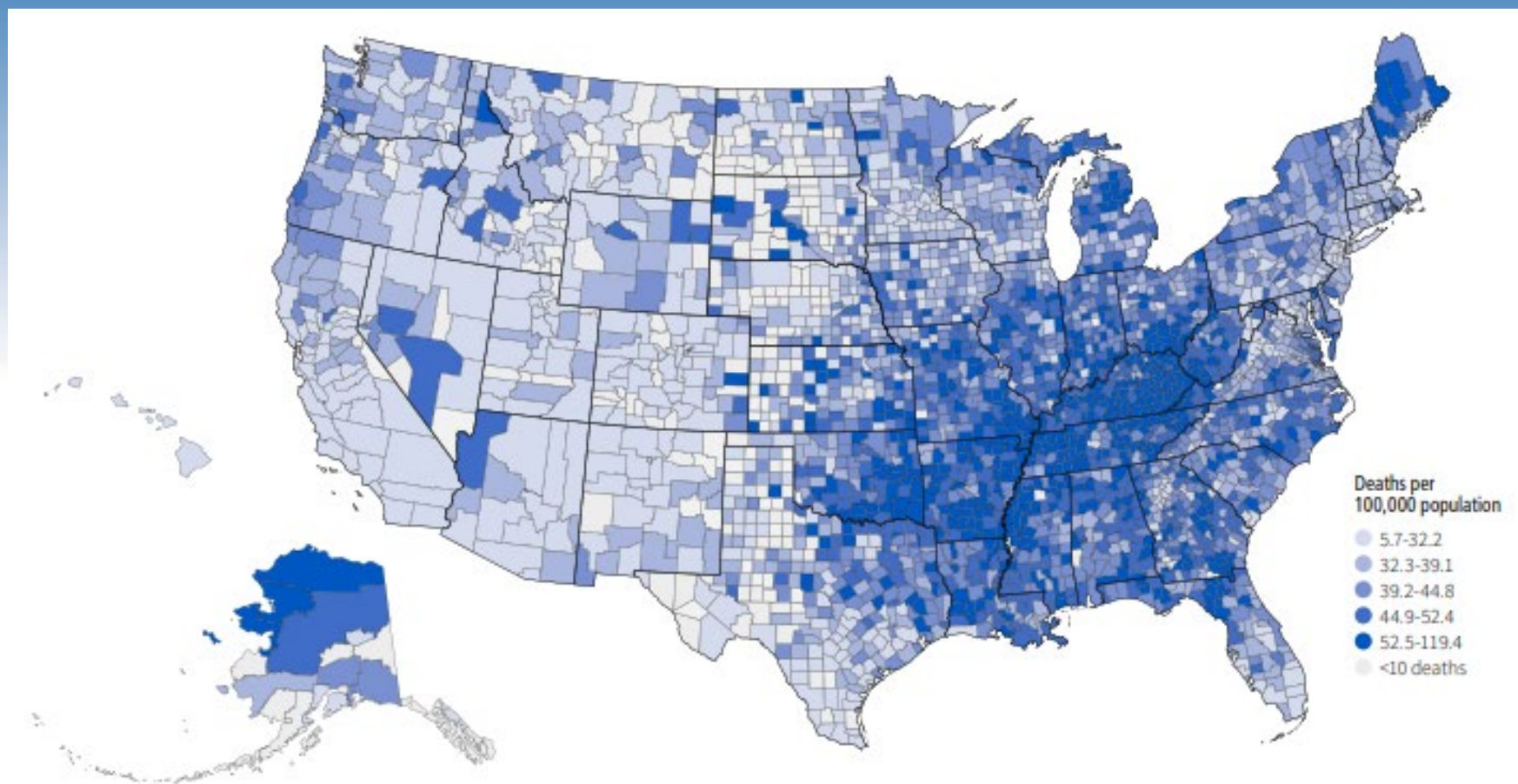
Lung Cancer Background

- According to the World Health Organization, lung cancer was the second most commonly-diagnosed cancer (2.2 million new cases) and the leading cause of cancer deaths (1.8 million deaths) worldwide in 2020
- Lung cancer is the leading cause of cancer deaths in the US, accounting for 1 in 5 of all cancer deaths
- American Cancer Society estimates that in 2023 there will be ~238,000 new US cases of lung and bronchus cancer, and ~127,000 deaths from lung and bronchus cancer
- Lung cancer is highly fatal, with an overall 5-year survival rate of only 18.6%. The 5-year survival is 56% for cases detected when the disease is still localized within the lungs

Lung Cancer Risk Worldwide

- Rates of lung cancer incidence and mortality vary widely within and between countries:
 - Males: highest incidence rates for lung cancer currently in Micronesia/Polynesia, Eastern Asia, and Eastern Europe
 - Females: highest incidence rates for lung cancer in North America, Northern and Western Europe, and Australia/New Zealand
- Cigarette smoking accounts for the majority of lung cancers
- Ambient air pollution and exposure to household burning of solid fuels, residential radon, secondhand tobacco smoke, asbestos, certain metals and organic chemicals, and work in rubber manufacturing, paving, roofing, painting, or chimney sweeping, and other occupational exposures have also been associated with lung cancer risk

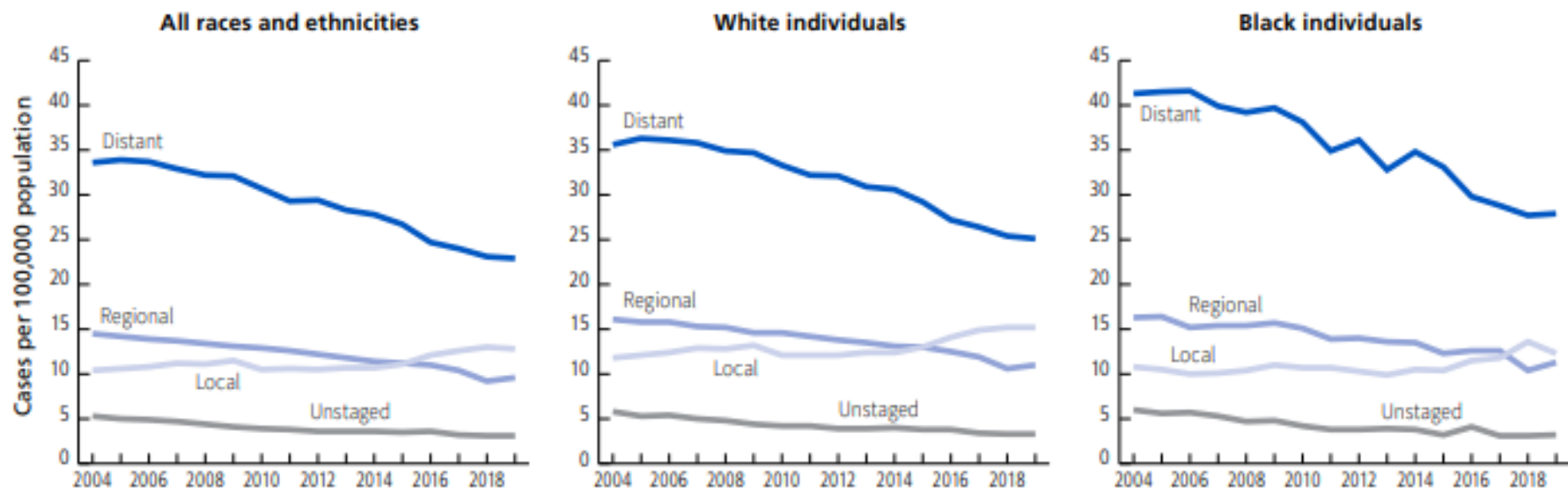
Age-adjusted Lung Cancer Mortality Rates by County, 2016-2020



*Age adjusted to the 2000 US standard population.

Source: National Center for Health Statistics, 2022.

Trends in Lung Cancer Incidence Rates by Race and Stage, US, 2004-2019

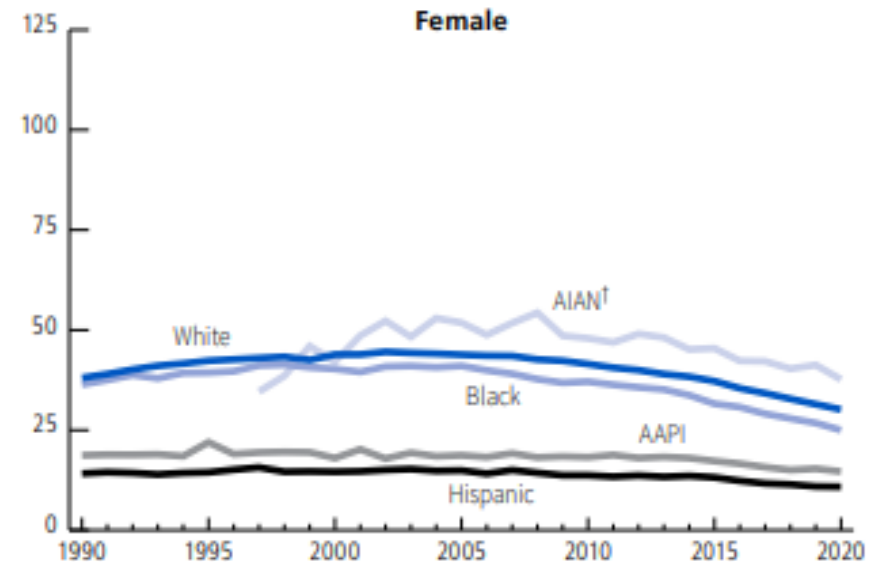
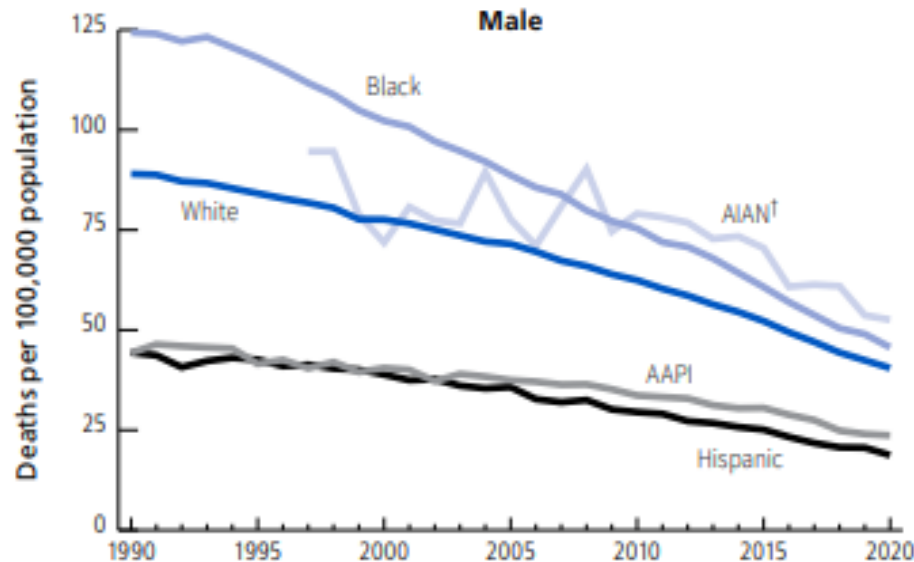


*Age adjusted to the 2000 US Standard Population and adjusted for delays in case reporting. Rates for White and Black individuals are exclusive of individuals identifying as Hispanic.

Source: Surveillance, Epidemiology, and End Results 17 Registries, 2022.

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Trends in Lung Cancer Mortality Rates by Sex, Race, and Ethnicity, US, 1990-2020

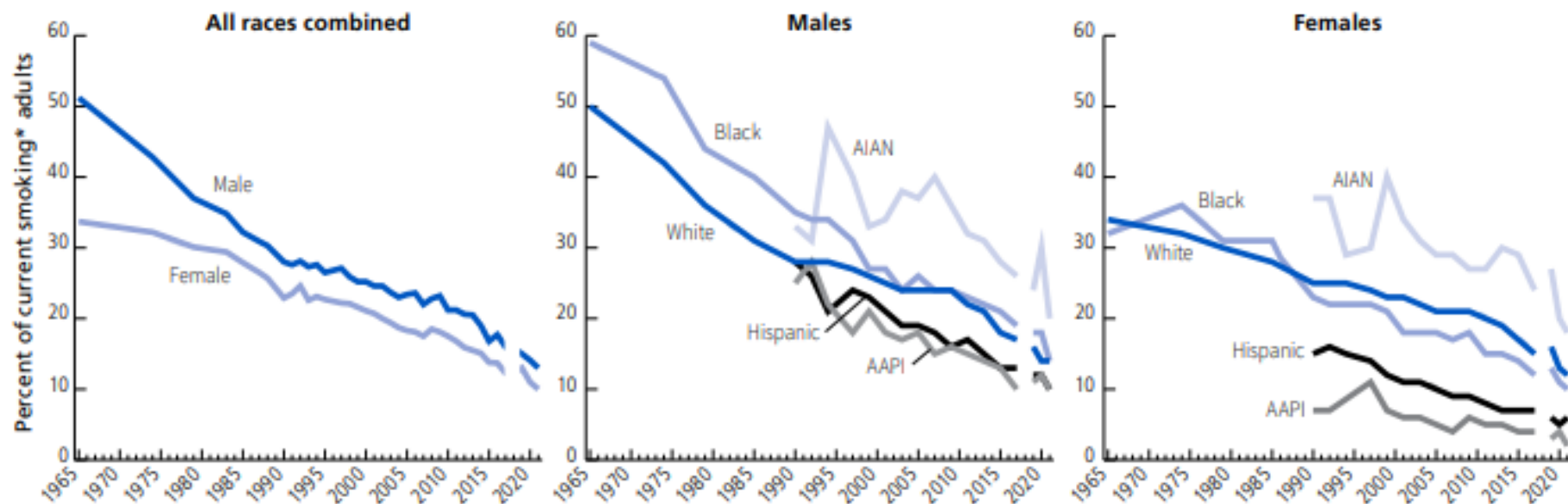


AAPI: Asian American and Pacific Islander individuals; AIAN: American Indian and Alaska Native individuals. *Age adjusted to the 2000 US standard population. †Data for AIAN individuals begin with 1997 to include Oklahoma and are adjusted for racial misclassification on death certificates. All racial groups are exclusive of individuals identifying as Hispanic.

Source: National Center for Health Statistics, 2022.

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Trends in Smoking Prevalence by Sex, Race, and Ethnicity, US, 1965-2021



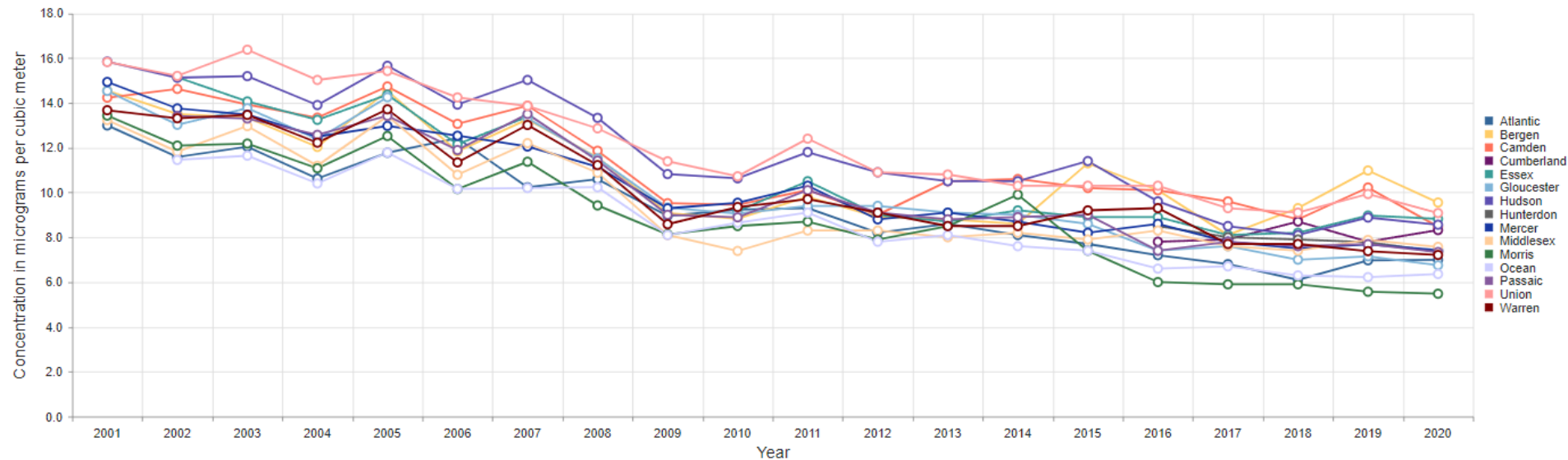
AAPI: Asian American and Pacific Islander individuals; AIAN: American Indian and Alaska Native individuals. *Ever smoked 100 cigarettes in lifetime and now smoke every day or some days. All racial groups are exclusive of individuals identifying as Hispanic beginning in 1990. All estimates are age adjusted. Due to changes in National Health Interview Survey (NHIS) survey design, estimates from 2019 onward are not directly comparable to prior years and are separated from the trend line.

Sources: Adult cigarette smoking prevalence 1965-2018, Health United States: 2019; NHIS 1990-2021.

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Particulate Matter (PM_{2.5}) Trends in Outdoor Air in NJ, by County, 2001-2020

Fine Particulate Matter in Outdoor Air, Trend in Annual Average PM_{2.5} Concentration, by County, 2001-2020



EPHT Indicators on Air Quality and Cancer

**New Jersey State Health Assessment Data**
New Jersey's Public Health Data Resource
Path: [NJSHAD](#) » [Topic](#)

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Air Quality

To see current air quality conditions in New Jersey, visit the [New Jersey's Air Monitoring Web Site](#).

Description

Air pollution refers to any biological, physical, or chemical particle that can cause disease, death or damage to animals and plants. Pollutants come from many human activities, including cleaning, cars, trains, airplanes, and buses, as well as from natural sources. Air quality measures how much pollution is in the air.

Why Important

What is Known

Who is at Risk

How to Reduce Risk

How is it Tracked

Indicator Reports (data tables, maps, charts, more detailed information)

Links below are part of the New Jersey Environmental Public Health Tracking Program.

Outdoor Air Quality

- [Ozone](#)
- [Fine Particulate Matter](#)
- [Air Toxics](#)
 - [Chromium](#)
 - [Benzene](#)
 - [Chloroform](#)
 - [1,3-Butadiene](#)
 - [Acetaldehyde](#)
 - [Formaldehyde](#)
 - [Acrolein](#)
 - [Diesel Particulate Matter](#)
 - [Naphthalene](#)
 - [Perchloroethylene](#)
- [Air Quality](#)

Indoor Air Quality

- [Radon Screening](#)
- [Radon Mitigation](#)

Carbon Monoxide Exposure

- [CO Detectors](#)
- [Emergency Department Visits](#)
- [Hospitalizations](#)
- [Deaths](#)

FAQs and Resources

Air Quality Conditions

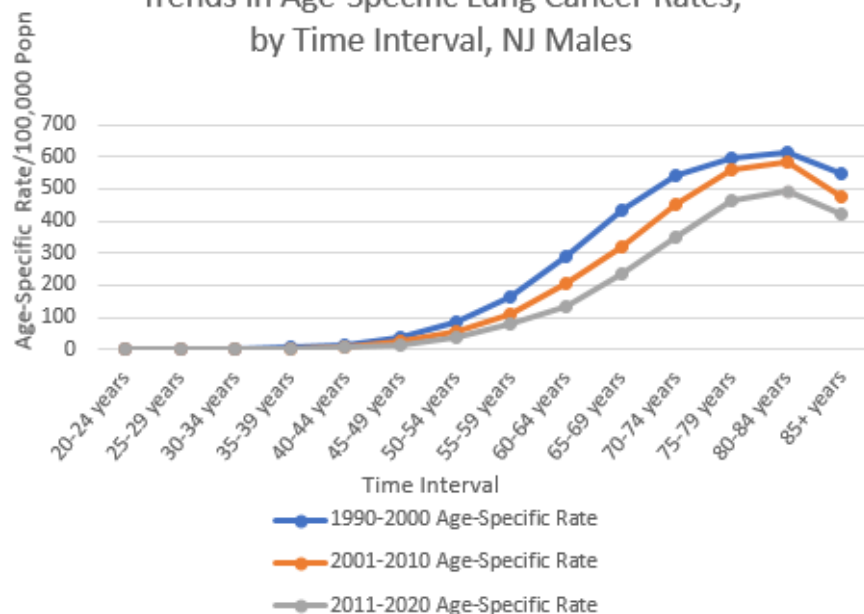
- [Current Air Quality for New Jersey](#)
- [Real-time Air Pollution and Visibility Monitor for Newark, NJ and New York City, NY \(northern NJ\)](#)
- [Real-time Air Pollution and Visibility Monitor for Brigantine, NJ \(southern NJ\)](#)
- [U.S. EPA Air Now Air Quality Index Forecast](#)

Resources

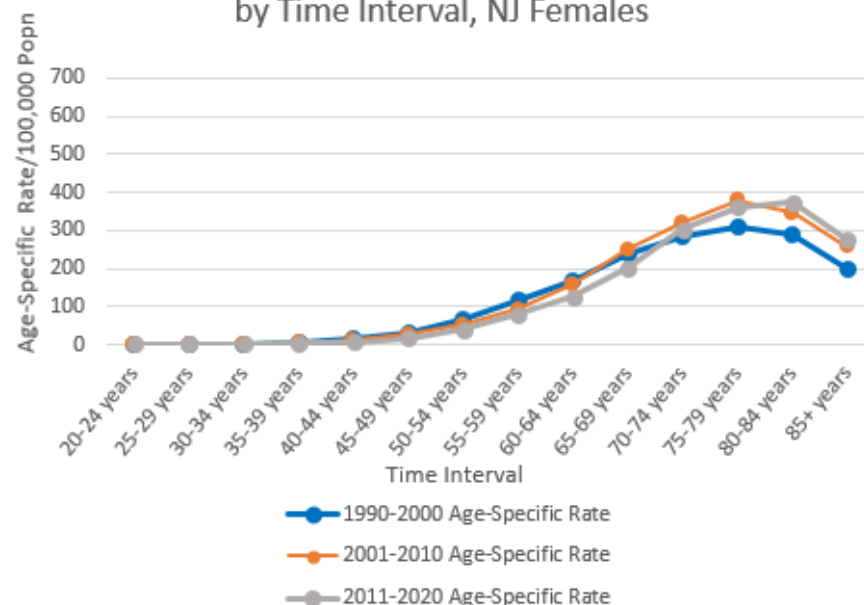
- [Clean Air NJ](#)
- [NJDEP Bureau of Evaluation and Planning](#)
- [NJDEP Bureau of Mobile Sources](#)
- [Learn About Air Pollution](#)
- [The Plain English Guide to the Clean Air Act](#)

NJ Lung & Bronchus Cancer Incidence by Sex, Age Group, and Time Interval

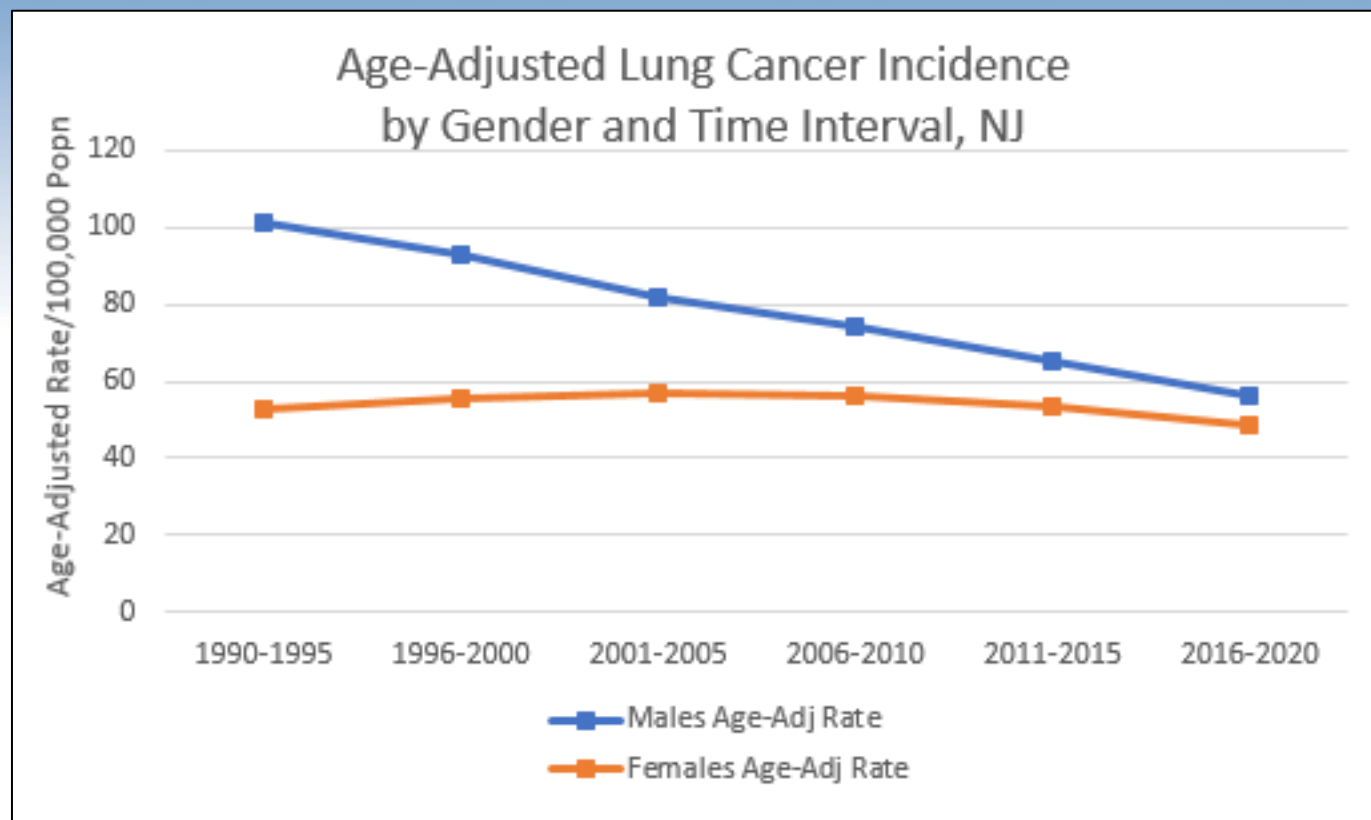
Trends in Age-Specific Lung Cancer Rates, by Time Interval, NJ Males



Trends in Age-Specific Lung Cancer Rates, by Time Interval, NJ Females

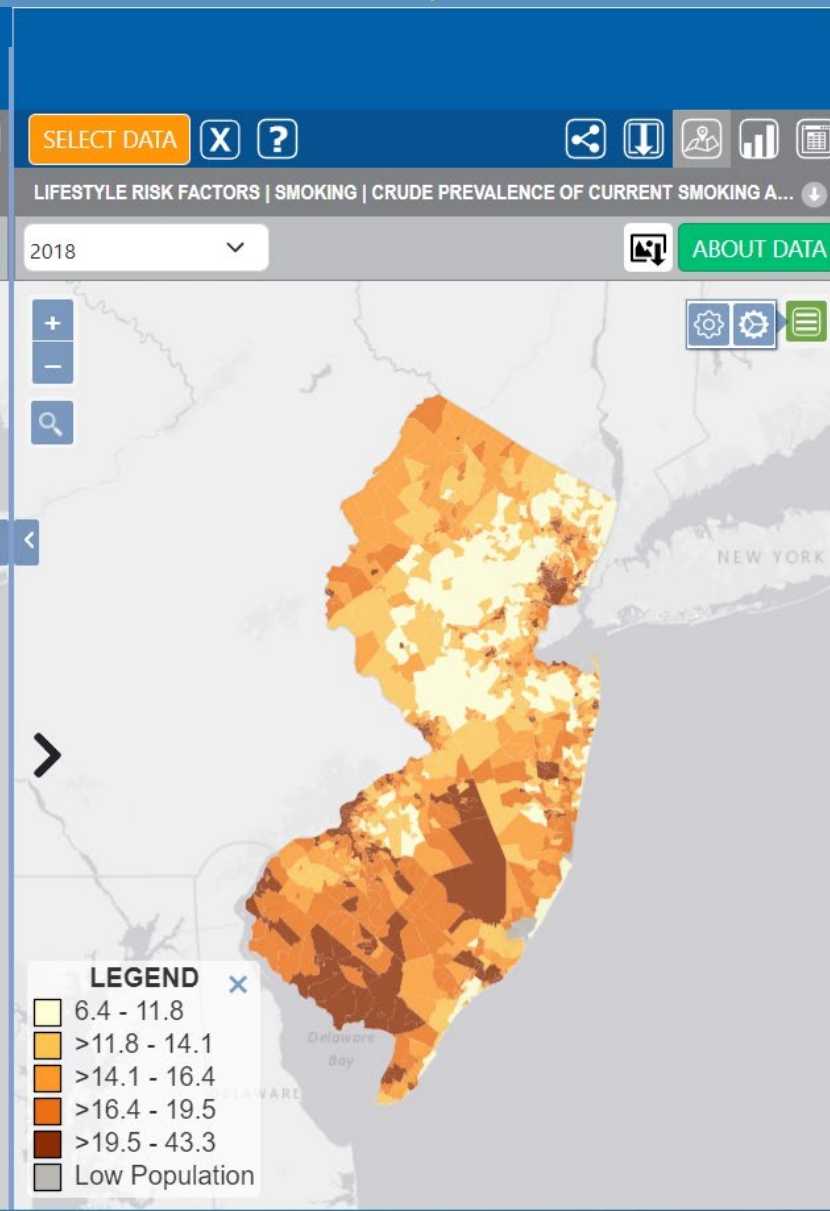
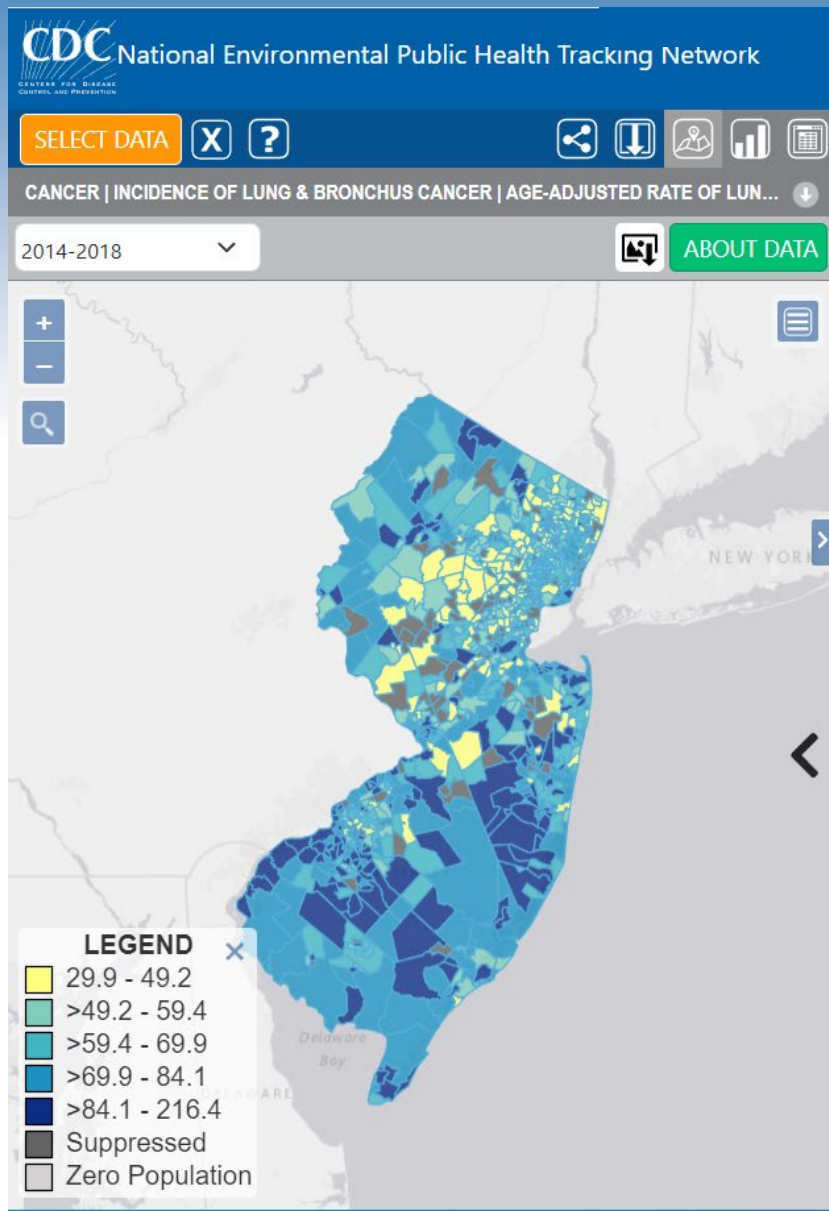


NJ Lung & Bronchus Cancer Incidence by Gender and Time Interval



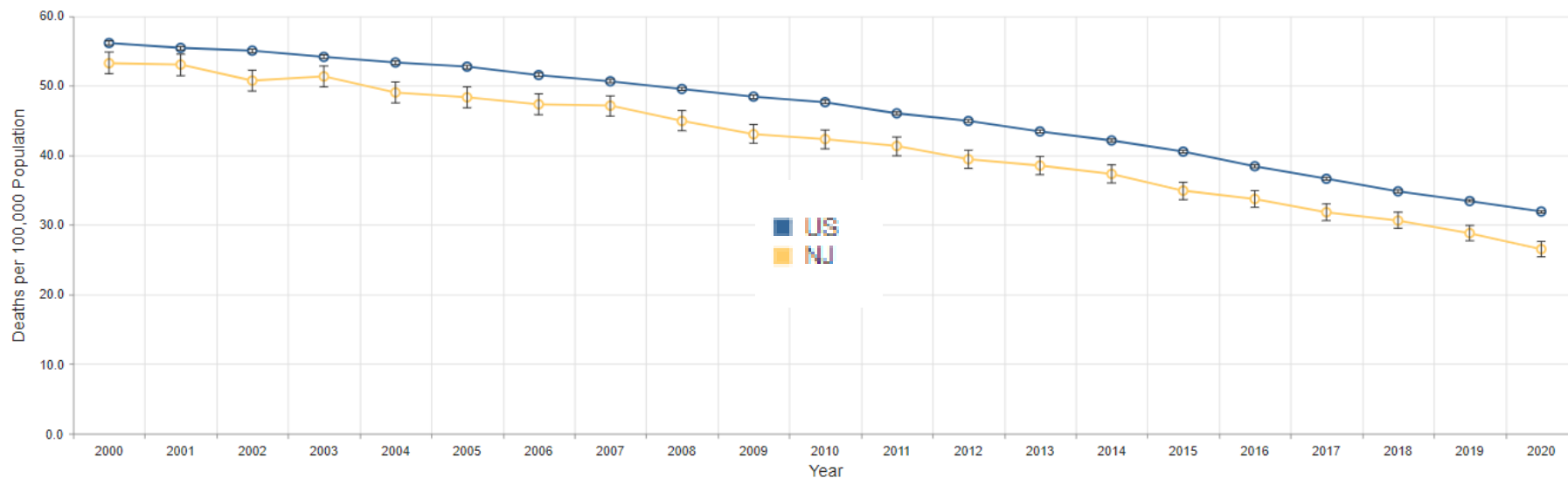
Age-Adj Lung & Bronchus Cancer, 2014-2018

Current Smoking Adults, 2018



NJ & US Lung Cancer Deaths by Year, 2000-2020

Age-Adjusted Death Rate due to Lung Cancer, by Year, New Jersey and the United States, 2000-2020 (HNJ2020)



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NJSHAD website

<https://www.nj.gov/health/shad>

Healthy Community Planning website

<https://www.nj.gov/health/hcpnj/>

