

# Healthcare Disparities in Lung Cancer



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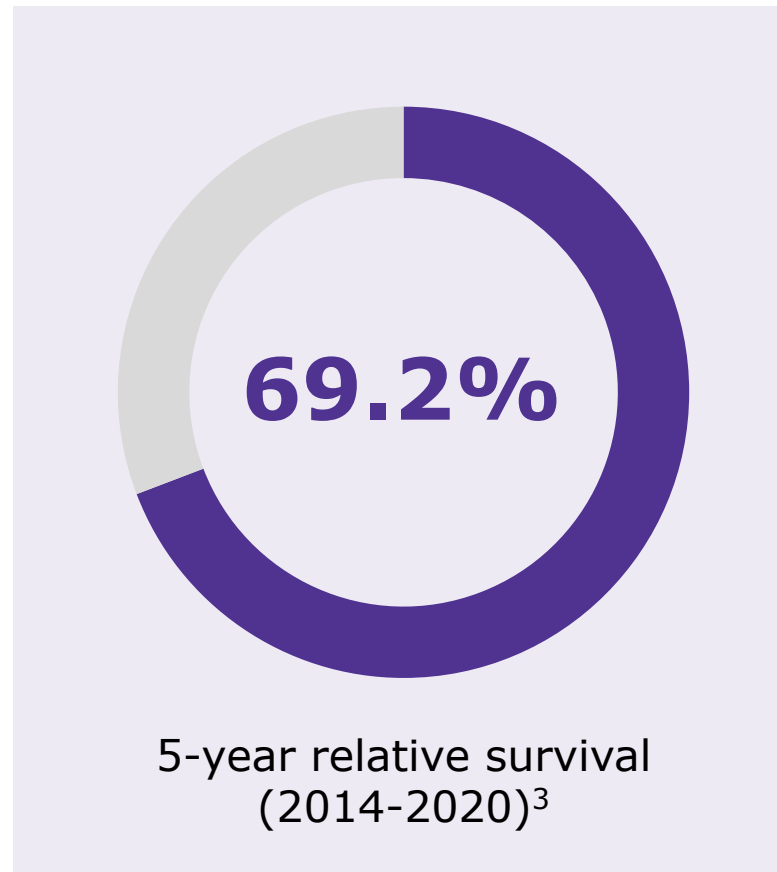
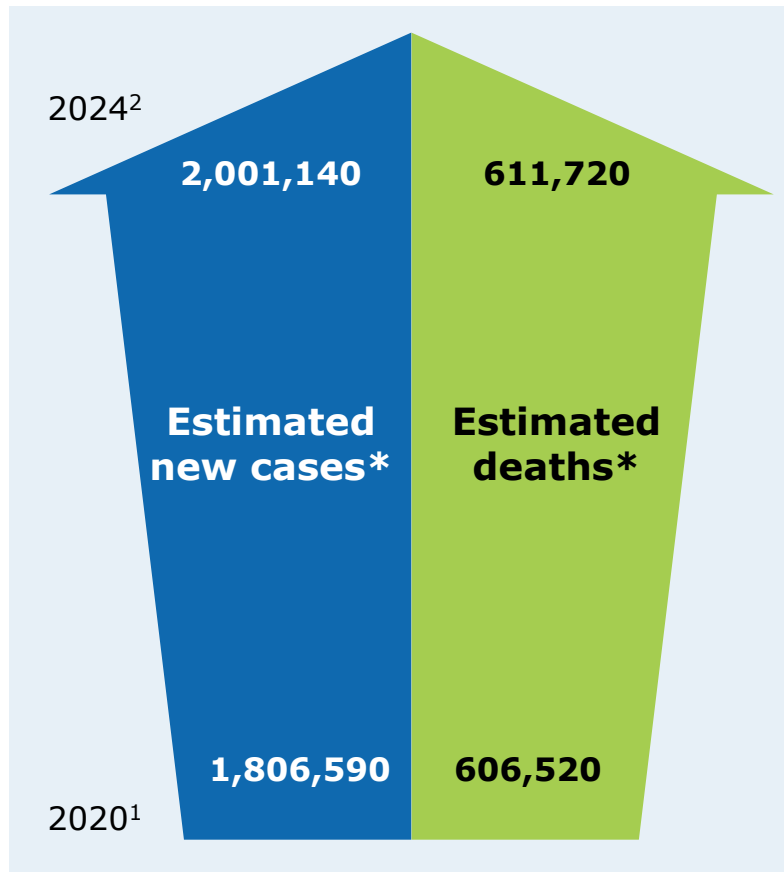
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# Healthcare Disparities in Cancer (US data)



# Cancer in the United States

## An Overview

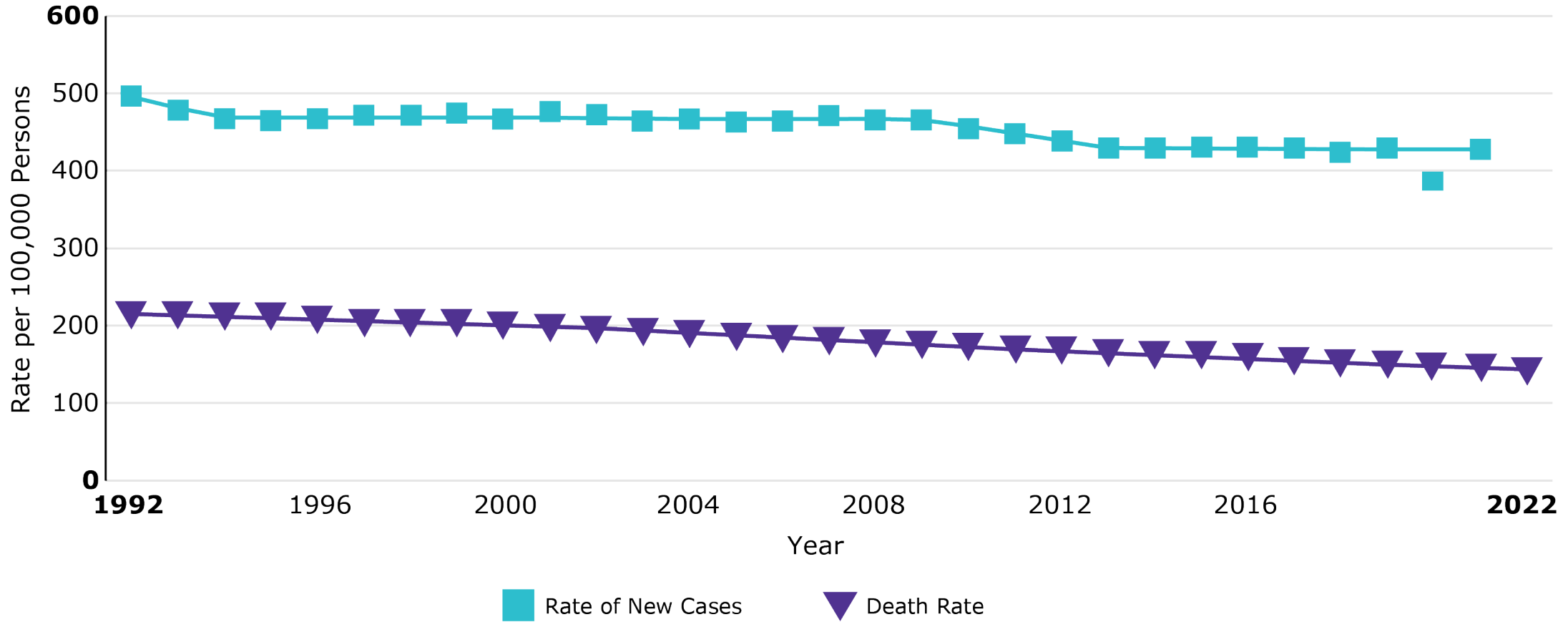


\*Not age adjusted. Age-adjusted rates of new cases was 427.8 and for deaths was 144.2 per 100,000 persons for 2021.<sup>3</sup>  
1. Siegel RL, et al. *CA Cancer J Clin.* 2020;70(1):7-30. 2. Siegel RL, et al. *CA Cancer J Clin.* 2024;74(1):12-49. 3. SEER Cancer Stat Facts: Cancer of Any Site. National Cancer Institute. Accessed October 10, 2024. <https://seer.cancer.gov/statfacts/html/all.html>

# Cancer in the United States

## An Overview (contd.)

### New Cases and Deaths Trends



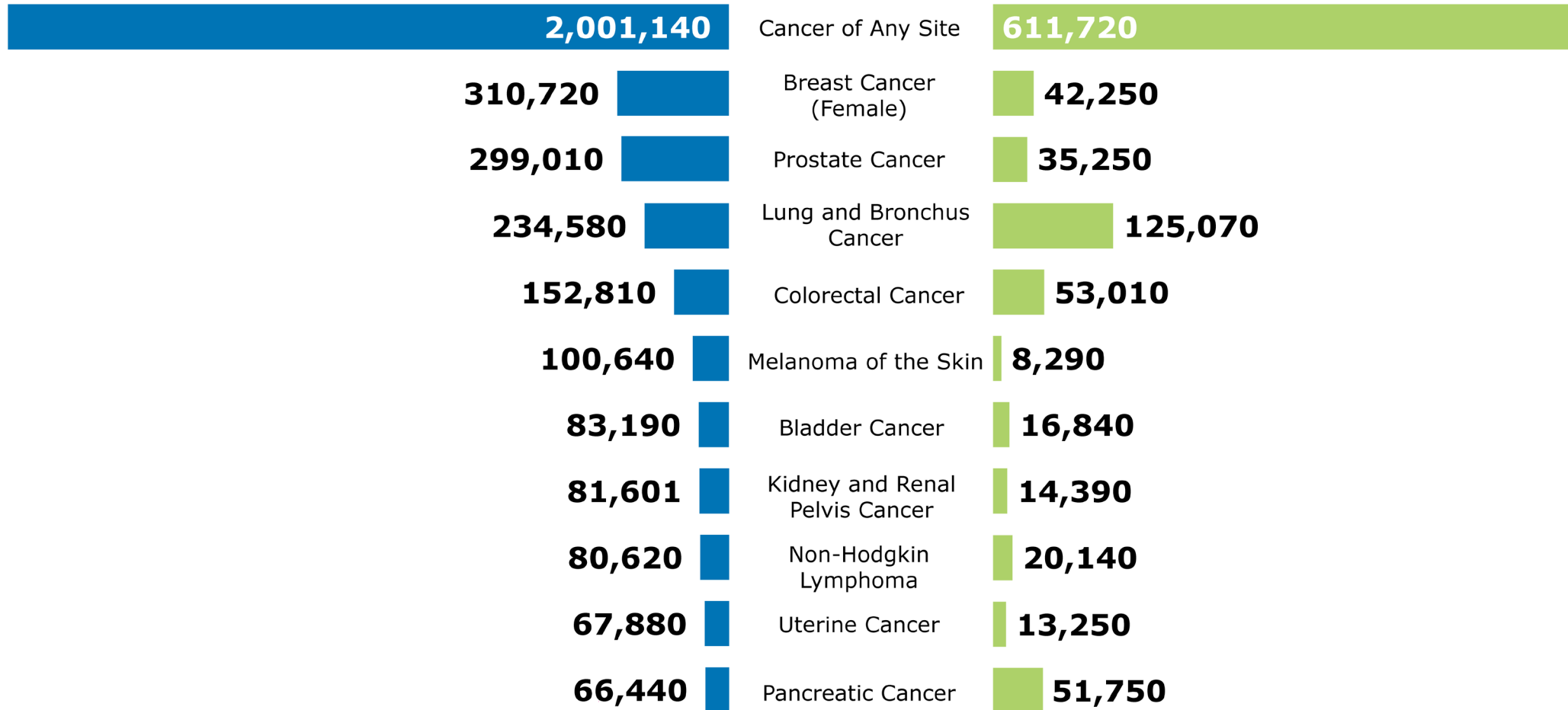
New cases come from SEER 8. Deaths come from US mortality. All races, both sexes. Rates are age-adjusted. Modeled trend lines were calculated from the underlying rates using the Joinpoint Trend Analysis Software. The 2020 incidence rate is displayed but not used in the fit of the trend line(s). Impact of COVID on SEER Cancer Incidence 2020 data. SEER Cancer Stat Facts: Cancer of Any Site. National Cancer Institute. Accessed October 10, 2024. <https://seer.cancer.gov/statfacts/html/all.html>

# Cancer in the United States

## An Overview (contd.)

Estimated New Cases 2024\*

Estimated Deaths 2024\*

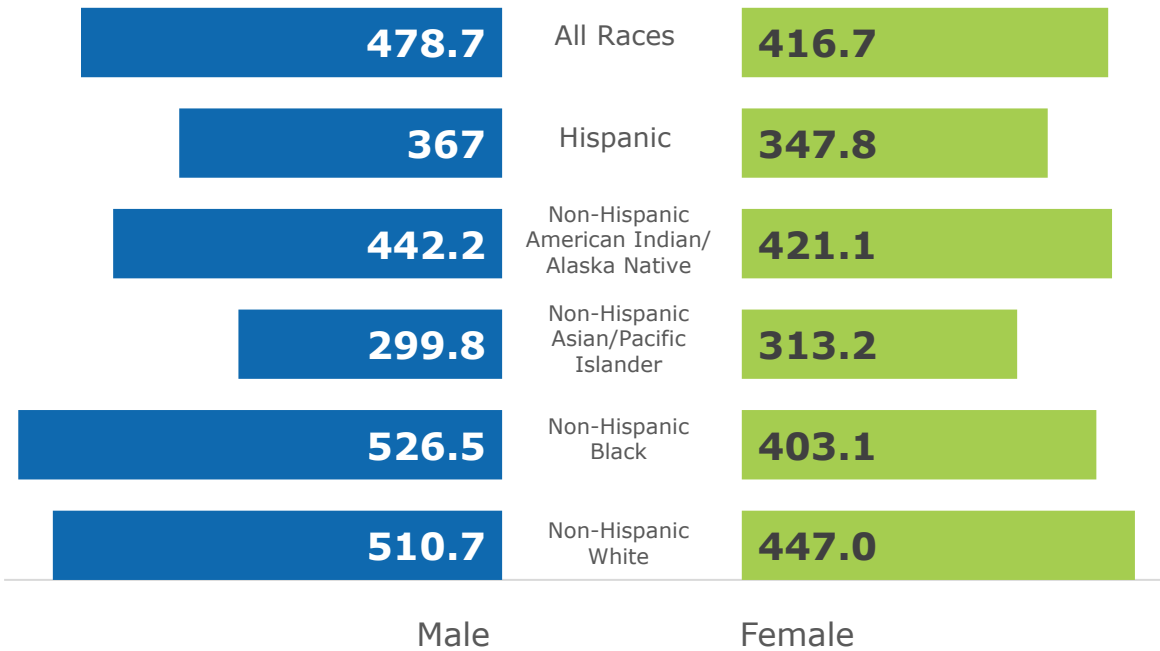


\*Individual bars represent numbers compared to the reference number of "cancer of any site" for estimated new cases and estimated deaths respectively. SEER Cancer Stat Facts: Cancer of Any Site. National Cancer Institute. Accessed October 10, 2024. <https://seer.cancer.gov/statfacts/html/all.html>

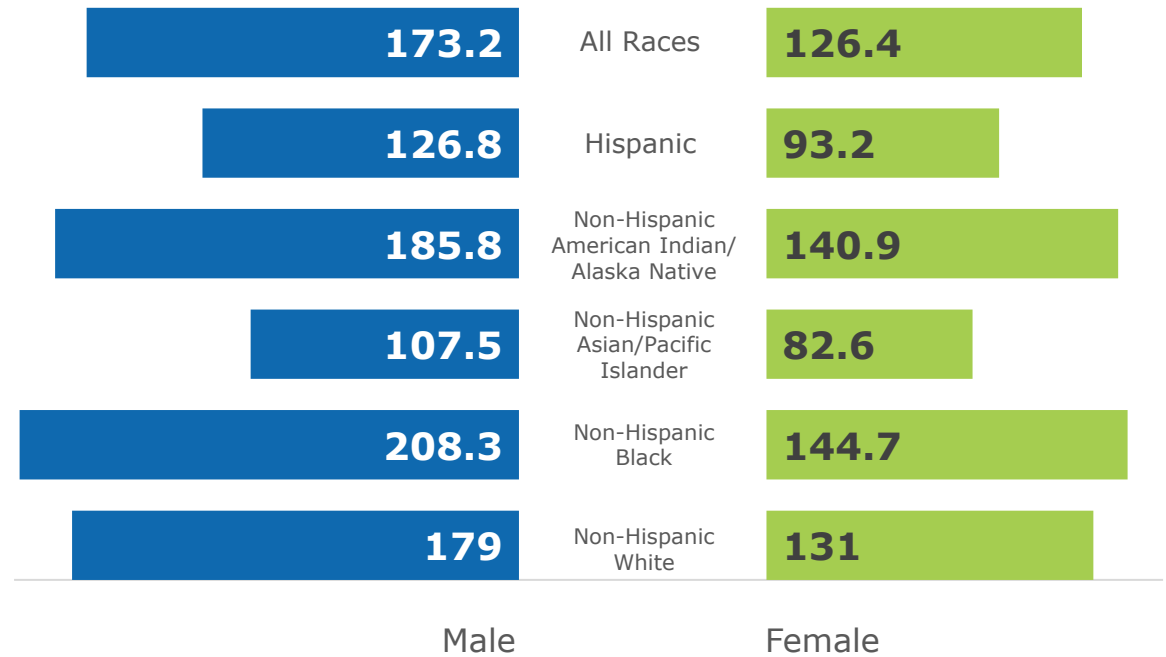
# Cancer in the United States

## An Overview (contd.)

### Rate of New Cases by Race/Ethnicity & Sex\*: Cancer of Any Site



### Death Rate by Race/Ethnicity & Sex†: Cancer of Any Site



# Healthcare Disparities in Cancer (US data)

**Despite overall declines in cancer incidence and mortality rates, healthcare disparities persist, creating substantial social and economic burdens<sup>1</sup>**

Four key factors contributing to disparities include:



**Access to Care**



**Race/Ethnicity**



**Socioeconomic Status**



**Geographical Location**



## Access to Care



**Limited access can result from various barriers, including lack of health insurance, transportation issues, and a shortage of healthcare providers in certain areas.**

Barriers that may lead to delays in diagnoses and treatment, which are crucial in cancer care, include:

- **Access to high-quality oncology** care can vary based on :
  - Location
  - Socioeconomic factors
- Patients in underserved areas may not have access to the latest treatments and technologies.<sup>1,2</sup>
- **Consistent and continuous care** is crucial for effective cancer treatment.<sup>2</sup>
- Negative impact on patient outcomes can be observed due to disruptions in care by factors like:
  - Financial barriers
  - Transportation issues or other factors

## Socioeconomic Status



**Patients with lower socioeconomic status often face barriers such as lack of insurance, inability to afford treatment, and limited access to high-quality healthcare facilities.<sup>1</sup>**

Areas where socioeconomic factors can affect health disparities in clinical practice include:

### Insurance and Financial Barriers:

- Patients with lower socioeconomic status often lack adequate health insurance, which limits their access to necessary treatments and medications.<sup>1</sup>
- High out-of-pocket costs can deter patients from seeking timely care.<sup>2</sup>

### Education and Awareness:

- Lower levels of education can result in a lack of awareness about cancer symptoms, screening programs, and treatment options.
- This leads to delayed diagnoses and poorer outcomes.<sup>3</sup>

### Transportation and Support Services:

- Financial constraints can also affect patients' ability to travel to treatment centers, especially if they are located far from their homes.<sup>1</sup>

## Race and Ethnicity



**Systemic inequities contribute to higher cancer rates, delayed diagnosis and poorer outcomes among minority groups.**

These include:

### Language Barriers:

- Non-English speakers may struggle to understand medical information and communicate effectively with healthcare providers, leading to misunderstandings and suboptimal care.<sup>1</sup>

### Cultural Beliefs:

- Cultural differences can influence health behaviors, attitudes towards medical treatment, and trust in the healthcare system.<sup>2</sup>
- Historical injustices have led to mistrust of the medical system among some minority groups, resulting in delayed or avoided care.<sup>3</sup>

### Insurance access:

- Variations of insurance coverage across ethnic groups is linked to disparities in cancer stage at diagnosis. Minority groups have higher percentages of stage III-IV cancer at diagnosis that may be attributable to lack of health insurance.<sup>4</sup>

## Geographic Location



**Geographic disparities in cancer incidence and outcomes in the United States are influenced by several factors.**

### Availability of Services:

- Residents of rural areas with low socioeconomic status experience considerable disadvantages related to limited access to quality healthcare (such as shortage of primary care physicians, oncologists, and other cancer care specialists).

### Health Behaviors:

- Rural residents tend to be older, engage in risky health behaviors like tobacco use and poor diet, and have lower adherence to preventive care than their urban and suburban counterparts. This places them at higher risk of cancer and other chronic diseases.

### Financial Barriers:

- Health disparities are further exacerbated by the lack of health insurance. Also, the overall cancer mortality is significantly higher in persistent poverty counties versus nonpersistent poverty counties.

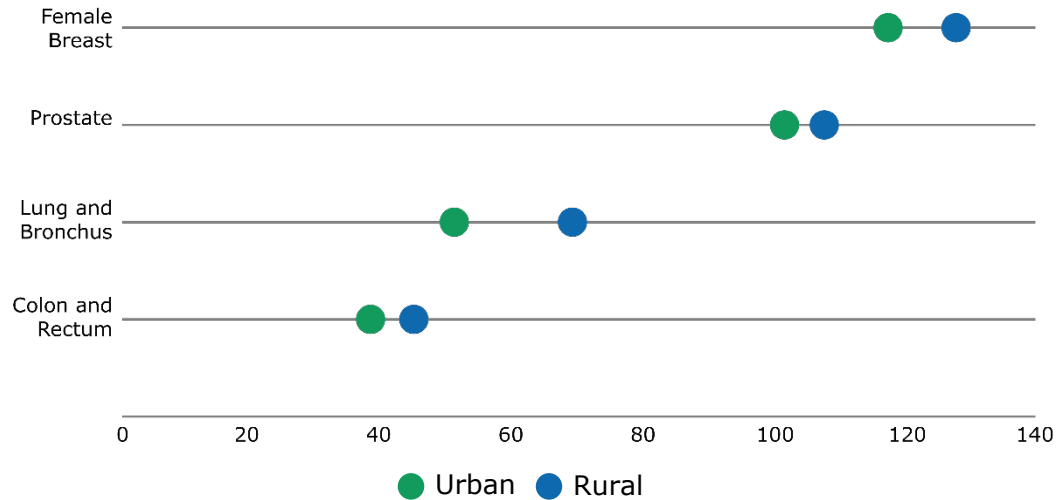
# Healthcare Disparities in Cancer

## Geographic Location (contd.)

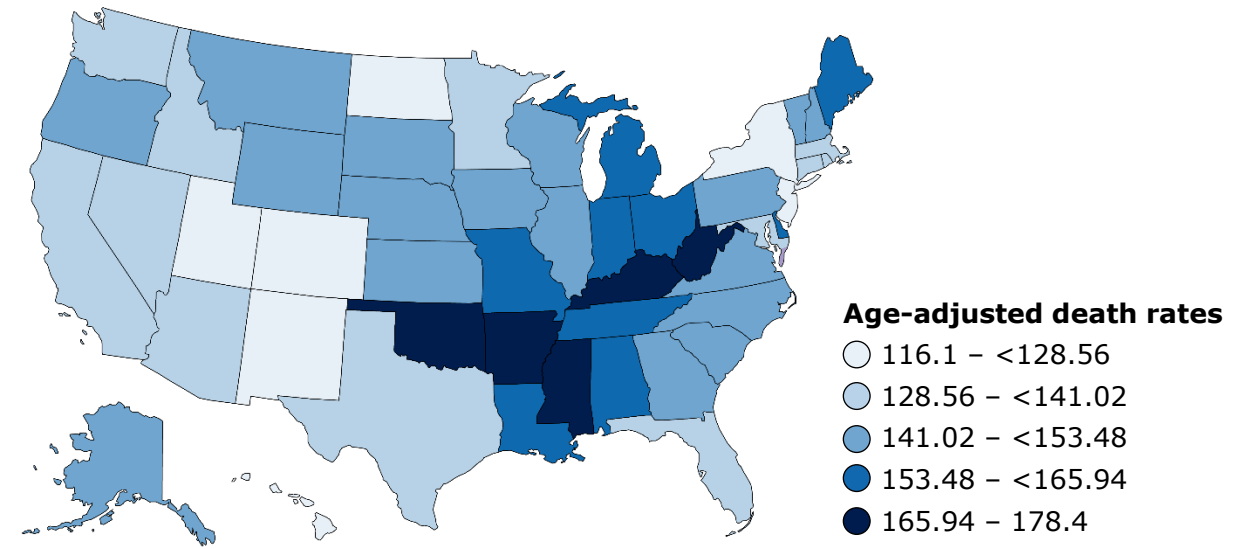


**Geographic disparities in cancer incidence and outcomes in the United States are influenced by several factors.**

### Incidence rates for most common cancers<sup>1,\*</sup>



### Cancer mortality in United States<sup>2,\*</sup>

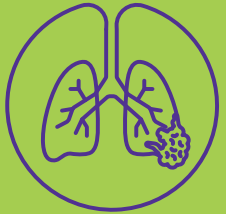


\*Age-adjusted rates per 100,000 people.

1. NIH. Cancer Map Stories. Rural-Urban Disparities in Cancer. Updated November 8, 2024. Accessed November 11, 2024. <https://gis.cancer.gov/mapstory/rural-urban/index.html> 2. CDC. National Center for Health Statistics. Cancer Mortality by State. Accessed October 6, 2024. [https://www.cdc.gov/nchs/pressroom/sosmap/cancer\\_mortality/cancer.htm#print](https://www.cdc.gov/nchs/pressroom/sosmap/cancer_mortality/cancer.htm#print)



# Lung Cancer (NSCLC) Disparities



# NSCLC: Overview

## Prevalence

**NSCLC makes up about 80% to 85% of lung cancers<sup>1</sup>**

### Global Prevalence of Lung Cancer



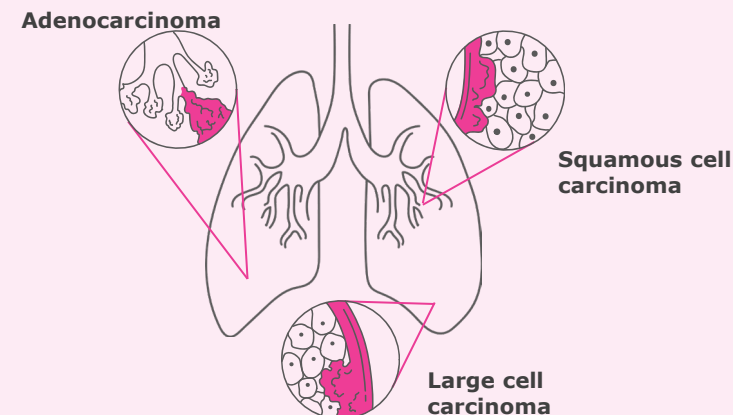
- Ranks **1<sup>st</sup>** in the number of cases and mortality<sup>2</sup>
- New cases in 2022<sup>2</sup>: **2,480,301**
- Deaths in 2022<sup>2</sup>: **1,817,172**

### Lung Cancer in United States



- Ranks **3<sup>rd</sup>** in the number of cases and **1<sup>st</sup>** in mortality<sup>3</sup>
- Estimated new cases in 2024<sup>4</sup>: **234,580**
- Estimated deaths in 2024<sup>4</sup>: **125,070**

### 3 Main Histological Subtypes of NSCLC<sup>4</sup>



- Adenocarcinoma: **40%**
- Squamous cell carcinoma: **25%**
- Large cell carcinoma: **10%**

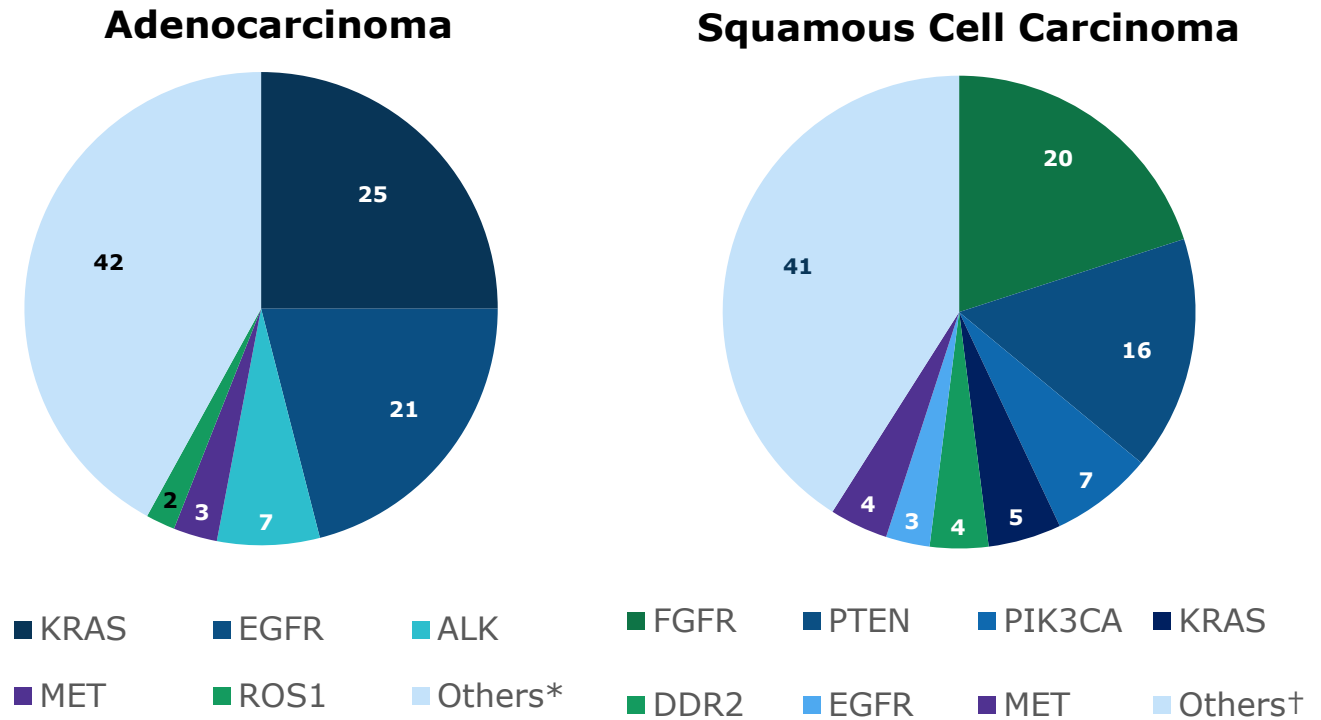
NSCLC: non-small cell lung cancer

1. American Cancer Society. What Is Lung Cancer? Revised January 29, 2024. Accessed September 6, 2024. <https://www.cancer.org/cancer/types/lung-cancer/about/what-is.html> 2. Bray F, et al. *CA Cancer J Clin.* 2024;74(3):229-263. 3. Siegel RL, et al. *CA Cancer J Clin.* 2024;74(1):12-49. 4. National Cancer Institute. Non-Small Cell Lung Cancer Treatment (PDQ®)—Health Professional Version. Updated August 30, 2024. Accessed September 9, 2024. <https://www.cancer.gov/types/lung/hp/non-small-cell-lung-treatment-pdq>

# Biomarker Testing

- Biomarker testing has improved cancer treatment decisions and patient outcomes in NSCLC
- About **69%** of patients with advanced NSCLC may have potential actionable biomarkers and therefore be eligible for targeted treatments
- NSCLC histological subtypes are associated with unique biomarkers, with varying frequencies depending on the type
- *EGFR* and *KRAS* mutations appear to be more prevalent in adenocarcinoma, Asian patients, women, and nonsmokers

## Frequency of current actionable molecular biomarkers in NSCLC



NSCLC: non-small cell lung cancer

\*Others include *FGFR*, *DDR2*, *PTEN*, *NTRK1/2/3*, *MEK1*, *PIK3C*, *BRAF*, *RET*, *HER2*, >1 mutation and unknown oncogenic driver. †Others include *ROS1*, *NTRK 1/2/3*, *MEK1*, *BRAF*, *RET*, *HER2*, >1 mutation, *ALK*, *EGFR* and unknown oncogenic driver.

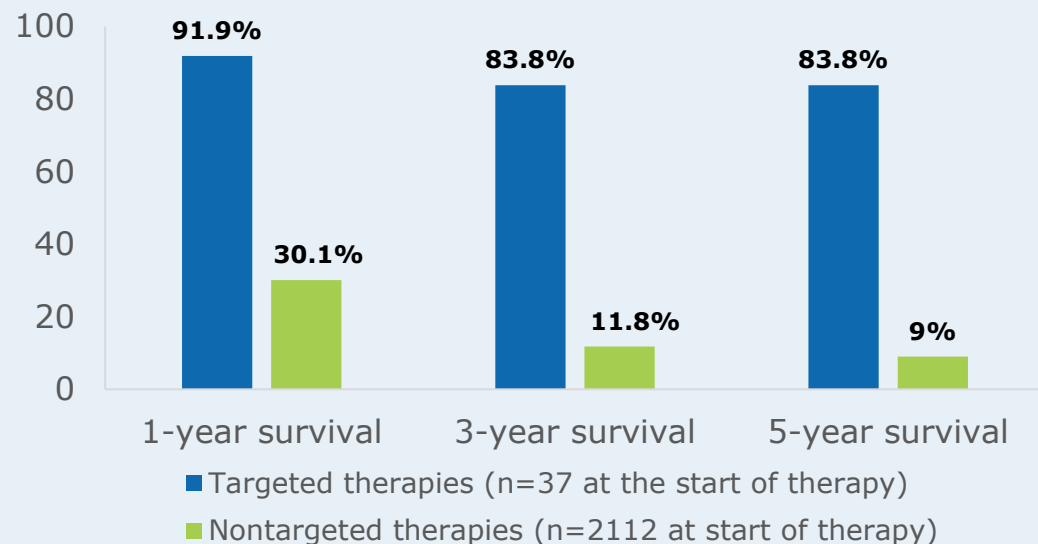
Kurzrock R, et al. *Cancer Metastasis Rev.* Published online May 16, 2024. doi:10.1007/s10555-024-10187-6



# Biomarker Testing

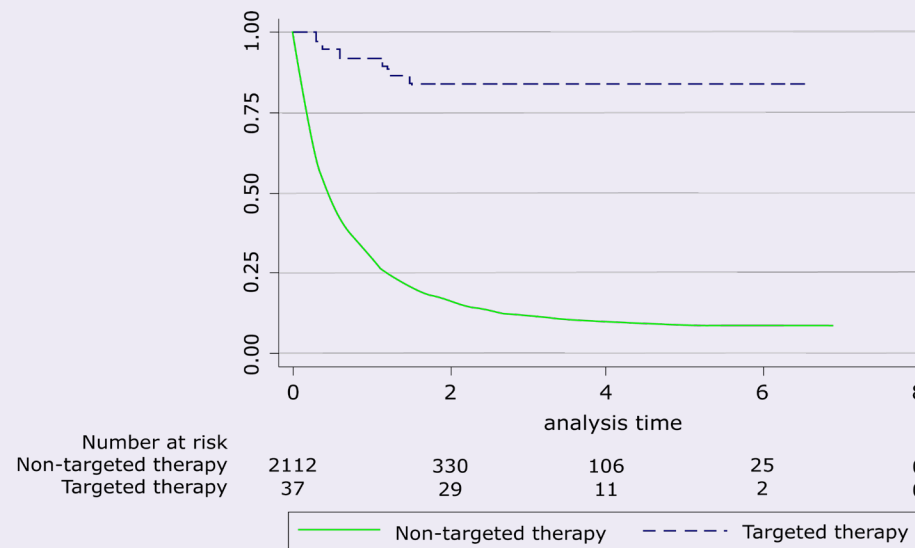
- Patients with lung cancer who received targeted therapy based on biomarker testing results were shown to have a higher 5-year survival rate compared with those who received nontargeted therapy

**Survival of lung cancer by targeted therapy**



- Compared with patients receiving targeted therapy, patients that do not receive targeted therapy have a poor prognosis.

**Kaplan-Meier survival estimates**



# Disparities in NSCLC



**Biomarker Testing**



**Race/Ethnicity**



**Gender**



**Treatment**



**Smoking Status**

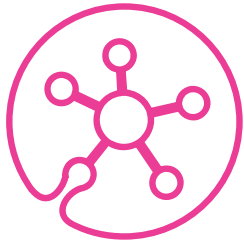


**Geographical Location**



**Access to Care**

## Biomarker Testing

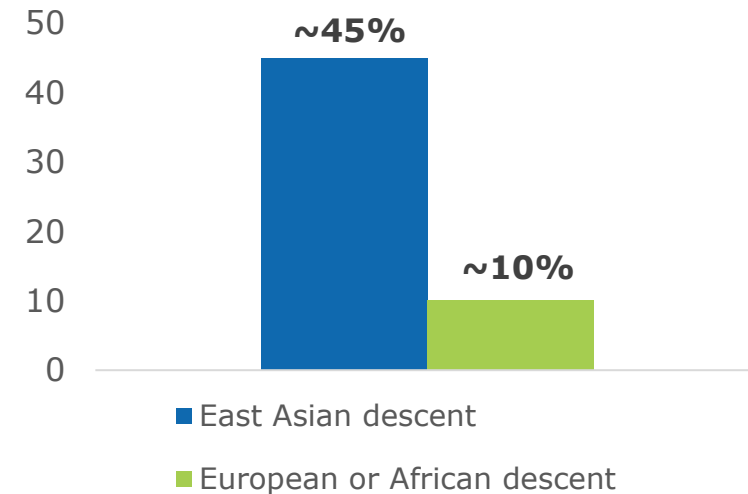


**Although biomarker testing rates have increased in the last few years, challenges to biomarker testing in NSCLC remain<sup>1-3</sup>**

### Different ancestry-based biomarker prevalence affects biomarker testing positivity:

- Prevalence of actionable biomarkers varies with ethnic ancestry, contributing to lung cancer disparities<sup>4</sup>
- Specific driver mutations in *EGFR*, *KRAS*, and *STK11* have been associated with Native American ancestry<sup>4</sup>
- The elevated occurrence of *EGFR* mutations in AAPI individuals might explain their higher survival rates compared to other racial and ethnic groups<sup>4</sup>

### Frequency of somatic EGFR mutations<sup>4</sup>



## Biomarker Testing (contd.)

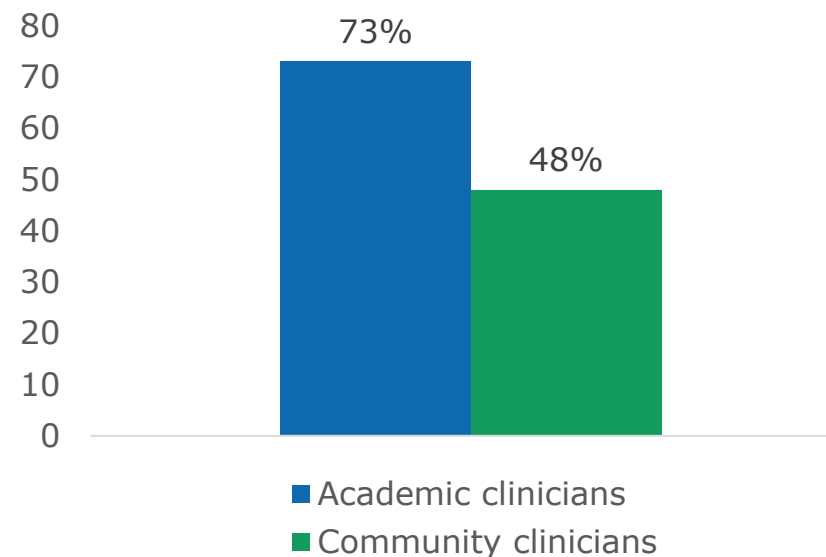


**Although biomarker testing rates have increased in the last few years, challenges to biomarker testing in NSCLC remain<sup>1-3</sup>**

### **Biomarker testing still not ubiquitous in US clinical practice:**

- Biomarker testing is not uniformly performed, often due to cost, lack of patient awareness, or limited HCP experience<sup>4</sup>
- Patients of low socioeconomic status and/or African American patients were less likely to undergo biomarker testing<sup>1,4</sup>

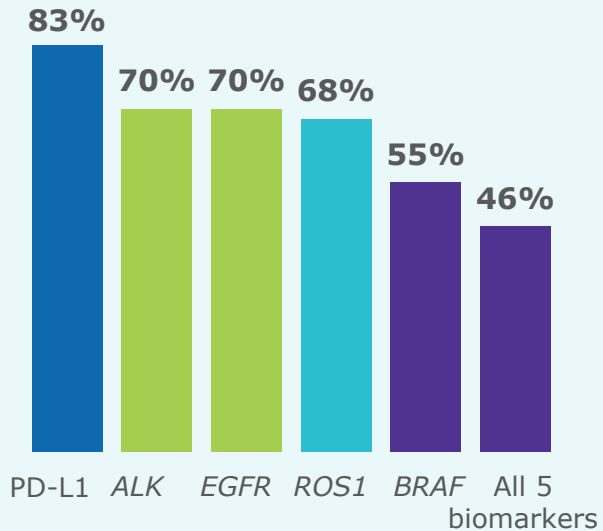
### **Biomarker testing for treatment decisions<sup>4</sup>**



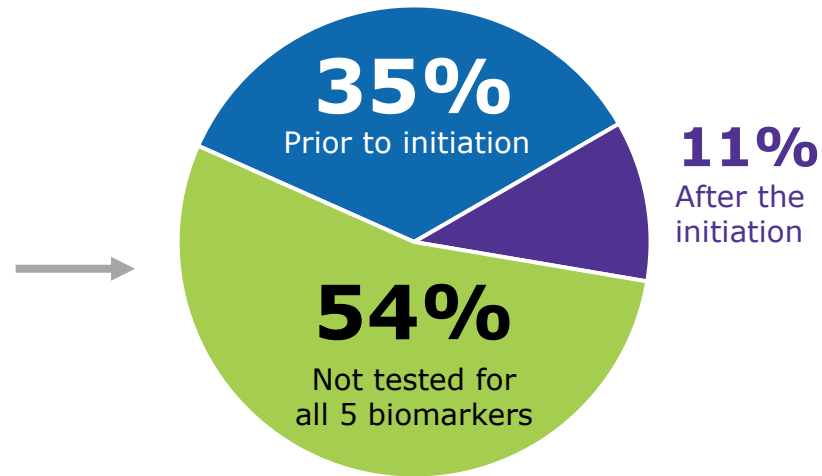
# Biomarker Testing (contd.)

**Despite the identification of actionable biomarkers and known patient benefit, biomarker testing may be limited**

**Biomarker testing rates<sup>1,\*</sup>  
(% of patients tested;  
N=3474)**



**Biomarker testing of all 5 biomarkers prior to and after 1L initiation<sup>1\*</sup>**



About **79%** of patients had  $\geq 1$  biomarker test result available before initiation of 1L therapy; **~10%** had tested after initiation of 1L therapy; **~10%** had no biomarker testing at all.<sup>1</sup>

**Current challenges to biomarker testing include<sup>2,3</sup>:**

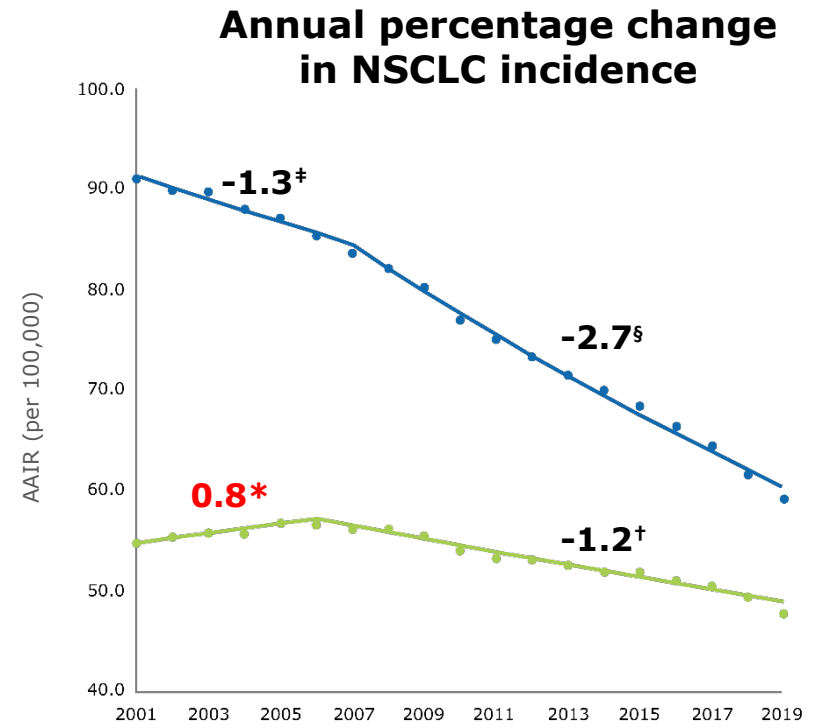
- Tissue sample adequacy
- Selecting the appropriate biomarker test
- Interpretation of biomarker test results
- Financial considerations
- Turnaround time for some results

# Disparities in NSCLC Gender



**Incidence: The gap is narrowing as men’s incidence rates are decreasing faster than women’s**

- Historically, men have had higher incidence rates of NSCLC compared to women. The proportion of newly diagnosed cancer in females increased from 43.9% in 2001 to 49.3% in 2019.
- As shown on the graph, males had a continuous and faster decline in lung cancer incidences from 2001 through 2019, while females displayed an increase in incidence during 2001–2006 and then a slower decline after that.



\*From 2001 to 2006. †From 2006 to 2017. ‡From 2001-2007. §From 2007 to 2019  
AAIR: age-adjusted incidence rates; NSCLC: non-small cell lung cancer  
Fu Y, et al. *Sci Rep.* 2023;13(1):12581

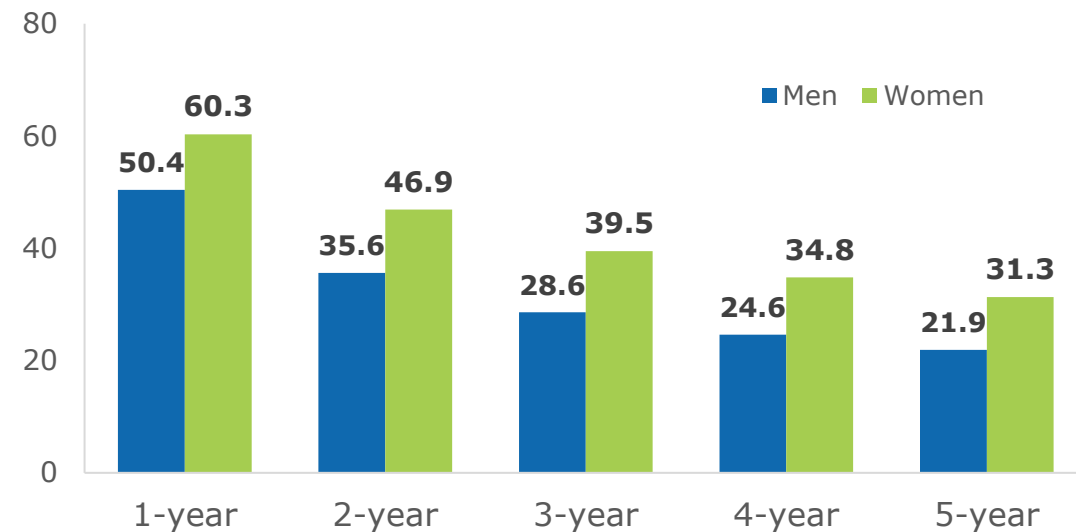
## Gender (contd.)



**Survival: Women tend to have better survival outcomes compared to men**

- Survival estimates were lower for men vs women.<sup>1</sup>
- This survival benefit persists in women, due to factors such as stage at diagnosis, smoking history, and superior surgical outcomes.<sup>2</sup>

**Period survival (2010-2016)<sup>1</sup>**



Disparities in NSCLC

# Smoking Status



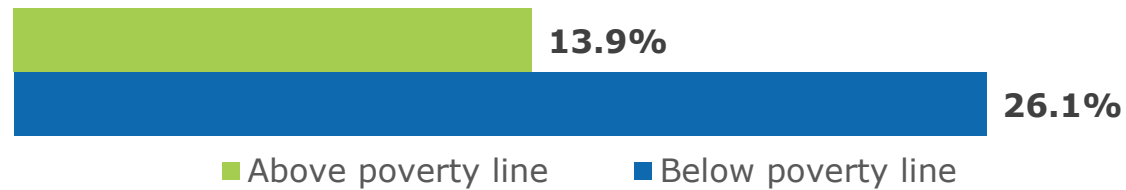
**Smoking is the leading cause of lung cancer, contributing to 82% of cases and 81% of deaths in the United States.**

- Individuals who smoke cigarettes are about **25 times more** likely to develop lung cancer than people who never smoked. Risk increases with both quantity and duration of smoking.<sup>1</sup>
- Differences in smoking behavior impact inhalation patterns, nicotine dependence, and smoking cessation, contributing to disparities in NSCLC incidence and mortality<sup>2</sup>

## Socioeconomic disparities

*People with low income and education tend to have more tobacco consumption<sup>3</sup>*

### Smoking in adults<sup>4</sup>



**77% higher mortality** from lung cancer is estimated in adults without a high school diploma<sup>4</sup>

NSCLC: non-small cell lung cancer

1. American Cancer Society. Cancer Facts and Figures 2024. Accessed October 17, 2024. <https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/annual-cancer-facts-and-figures/2024/2024-cancer-facts-and-figures-acf.pdf> 2. Kurzrock R, et al. *Cancer Metastasis Rev.* Published online May 16, 2024. doi:10.1007/s10555-024-10187-6 3. American Cancer Society. Cancer and tobacco use disparities and health equity. Accessed October 17, 2024. <https://www.cancer.org/research/surveillance-and-health-equity-science/tobacco-control-research/cancer-and-tobacco-use-disparities-and-health-equity.html> 4. U.S. National Cancer Institute. Socioeconomic status and tobacco-related health disparities. In: *A Socioecological Approach to Addressing Tobacco-Related Health Disparities*. U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute; 2017. [https://cancercontrol.cancer.gov/sites/default/files/2020-06/m22\\_9.pdf](https://cancercontrol.cancer.gov/sites/default/files/2020-06/m22_9.pdf)



Disparities in NSCLC

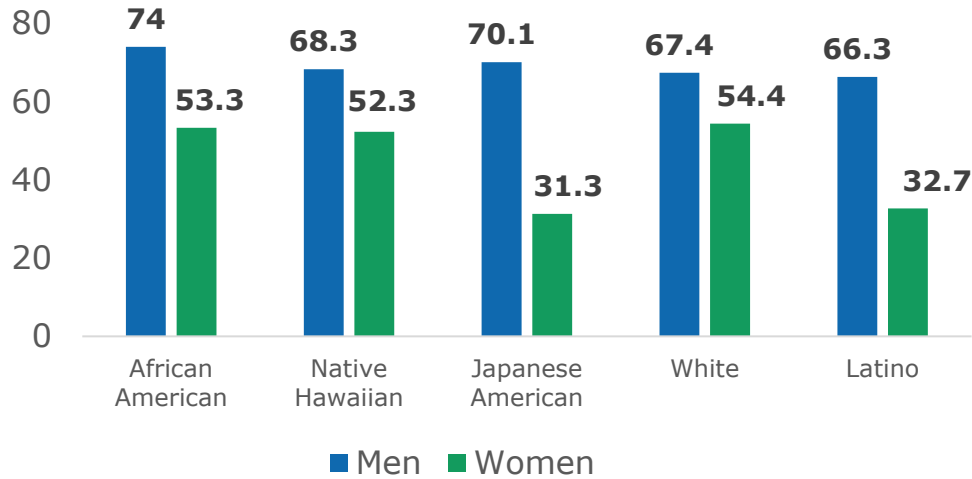
# Smoking Status (contd.)



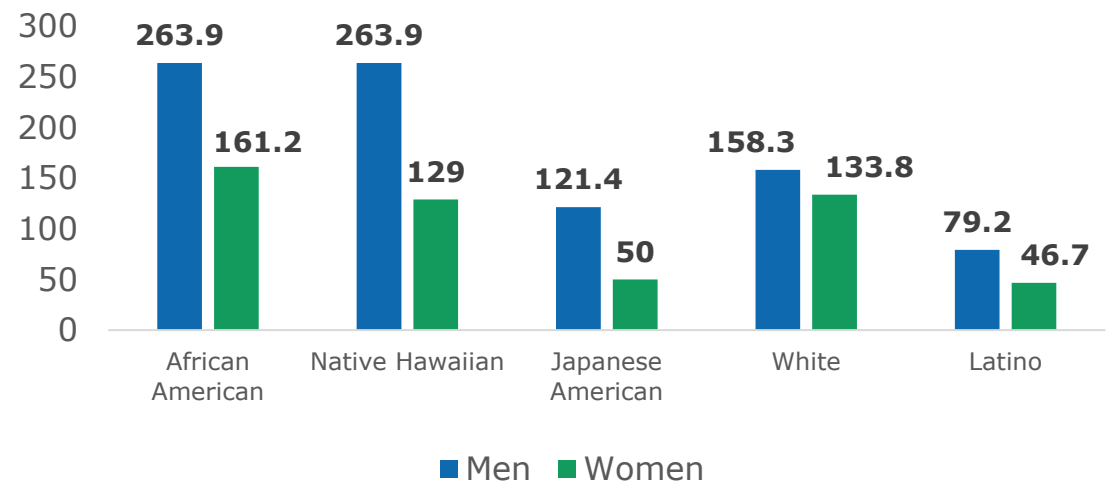
## Racial and ethnic disparities

- For the same amount of smoking, African Americans and Native Hawaiians had significantly greater risks of lung cancer than the other groups<sup>1</sup>

### Smoking Prevalence<sup>1</sup>



### Incidence Rates\*



NSCLC: non-small cell lung cancer; TNE: total nicotine equivalents  
 \*Per 100,000. Rates were adjusted to the 1970 U.S. standard population. The incidence rates for the other groups were computed by multiplying this figure by the relative risks.  
 1. Haiman CA, et al. *N Engl J Med.* 2006;354(4):333-342.

# Disparities in NSCLC Access to Care

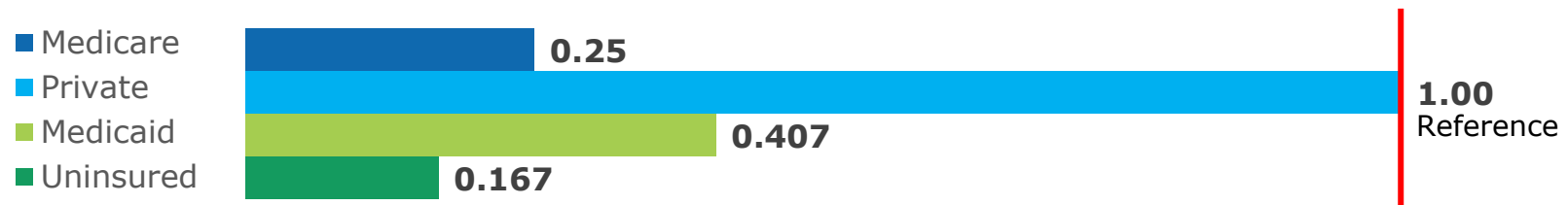


## Incompleteness in Medicaid coverage can contribute to inequities in screening

- Lack of uniform coverage for Medicaid recipients leaves a vulnerable segment of the population without equitable access to lung cancer screening opportunities<sup>1</sup>

## Intention to cure is higher in patients with private insurance

Probability of receiving Curative intent surgery compared to private insurance\*<sup>2</sup>



- Those with only Medicaid or Medicare had significantly lower odds of receiving curative intent surgery than those with private insurance<sup>2</sup>

## Radiation treatment more likely in uninsured patients

- Uninsured patients had greater odds of receiving radiation, an alternative treatment for early-stage NSCLC, compared to those who were privately insured<sup>2</sup>

## Race and Ethnicity



***African Americans have higher lung cancer incidence at more advanced stages and earlier ages.***

- African American men experience higher lung cancer incidence and mortality rates than White counterparts<sup>1,2</sup>
- African Americans have been found to develop cancer at earlier ages than White individuals and, alongside Hispanics, are more likely to present with advanced-stage disease at diagnosis that may be attributable to lack of private health insurance <sup>1,3</sup>
- Eligible non-African American individuals are 2.8 times more likely to have had lung cancer screening than eligible African American individuals<sup>4</sup>
- African American individuals had significantly lower odds of receiving curative intent surgery for early-stage NSCLC compared to White individuals<sup>2</sup>

**Language-based lack of awareness around screening/testing:** Language barriers behind the lack of awareness of lung cancer screening services have been reported in both Hispanic/Latin and Asian populations<sup>3</sup>

Disparities in NSCLC

## Race and Ethnicity (contd.)

### Incidence rate (2015–2019) cases per 100,000

	Men	Women
African American	<b>74.8</b>	46.9
White	67.3	<b>55.5</b>
AIAN	66.9	<b>57.9</b>
AAPI	42.1	28.3
Hispanic	35.6	24.4
All	64.1	50.3

- African American men, AIAN and White women have the highest incidence rates

### Mortality rate (2016–2020), deaths per 100,000

	Men	Women
African American	<b>51.0</b>	27.8
White	44.7	32.8
AIAN	<b>51.1</b>	<b>36.0</b>
AAPI	25.6	15.4
Hispanic	20.9	11.4
All	42.2	29.3

- AIAN, African American men and AIAN women have the highest mortality rates

## Treatment



**Since 2015, immunotherapy has become a standard modality of treatment for stage IV NSCLC in addition to consolidation therapy after chemoradiation of unresectable stage III disease.**

*Impact of education and location in receiving this treatment:*

- Those who lived in more educated zip codes were more likely to receive immunotherapy among all patients overall, non-Hispanic White patients, and Non-Hispanic African American patients
- Patients living in neighborhoods with the lowest education levels were 29% less likely to receive immunotherapy relative to their counterparts living in the most educated areas
- Patients within the lowest income areas were 29% less likely to receive immunotherapy
- Among those treated at non-academic facilities, living in the least educated areas compared to the most educated areas was associated with 30% decreased odds of receiving immunotherapy

## Geographical Location

### Urban location and higher density of physicians equates to more screening access

- **36%** of counties with high mortality rates are at least a 60-minute drive from a screening facility
- Geographic differences in screening access may also be attributed to the higher density of physicians per capita in urban areas, insurance rates, and socioeconomic status

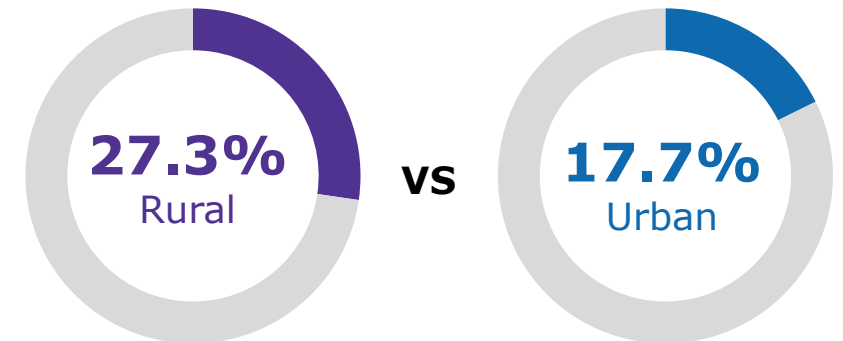
### More smokers in rural areas contributes to mortality discrepancy

- High mortality rates in the rural population are mainly due to higher smoking rates (**27.3% vs 17.7% in urban**) and lower screening rates because of lack of access

Screening facility more than an hour's drive



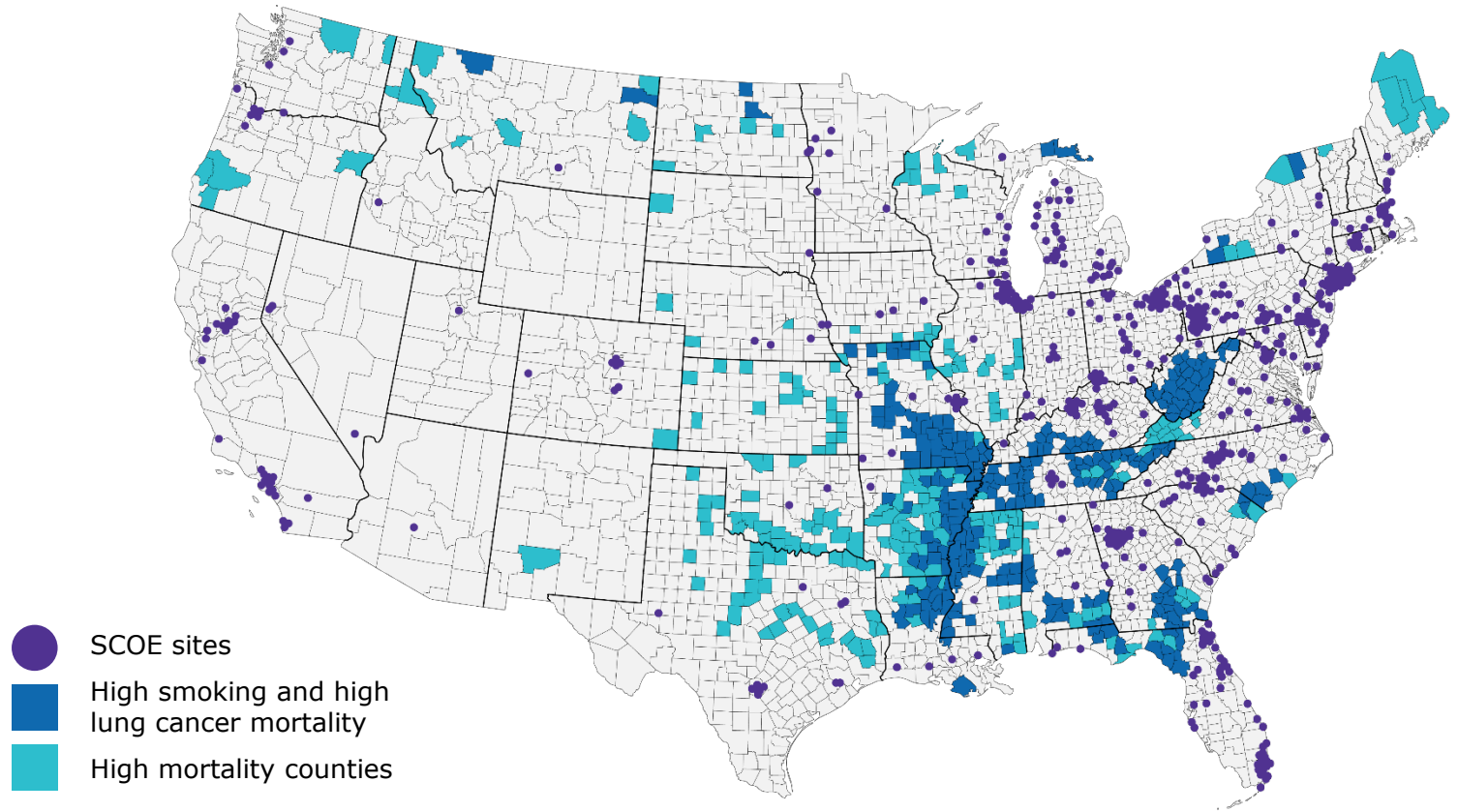
Smoking rates



## Disparities in NSCLC

# Geographical Location (contd.)

Distribution of SCOEs (Screening Center of Excellence) and counties with high smoking and lung cancer mortality rates beyond a 60-minute drive from an SCOE



Although low density CT screening uptake is similar between rural and urban populations (16.3% vs 17.7%), recognized screening centers of excellence are largely **clustered in the more urban, Northeast, and Midwest regions** of the country.

# Efforts to Address Disparities





## Clinical Trials

### Efforts to address these disparities by stakeholders<sup>1-3</sup>



- **Project Equity** aims to ensure that data submitted for approval of oncology medicinal products is generated in a study population that is representative of the demographics of patients for whom medicinal products are intended.<sup>1</sup>
- **Food and Drug Omnibus Reform Act (FDORA)** requires sponsors to submit diversity action plans in the early development. These will ensure that sponsors are thinking critically about the characteristics of the patient population they aim to treat when designing their clinical study.<sup>2</sup>



ASCO and ACCC jointly released resources<sup>3</sup>

- ASCO-ACCC Equity, Diversity and Inclusion Research Site Self-Assessment
- Just ASK™ Training Program

ACCC: Association of Community Cancer Centers; ASCO: American Society of Clinical Oncology; FDA: Food and Drug Administration

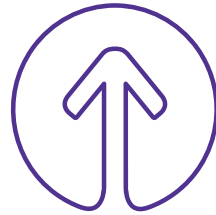
1. FDA. Clinical Trial Diversity- Oncology Perspective and New FDA Policies. Accessed October 16, 2024. [www.fda.gov/media/174159/download?attachment](http://www.fda.gov/media/174159/download?attachment) 2. FDA. FDA Guidance Provides New Details on Diversity Action Plans Required for Certain Clinical Studies. Press release. Published June 26, 2024. Accessed October 16, 2024. <https://www.fda.gov/news-events/press-announcements/fda-guidance-provides-new-details-diversity-action-plans-required-certain-clinical-studies> 3. ASCO. ASCO Initiatives to Improve Access & Inclusion in Clinical Research. Accessed October 16, 2024. <https://society.asco.org/news-initiatives/current-initiatives/cancer-care-initiatives/diversity-cancer-clinical-trials>

## Healthcare Disparities in Cancer

# Efforts to Address Disparities in Cancer Care



Improving access to and coverage of health insurance<sup>1</sup>



Grow patient navigator program<sup>1</sup>



Building community trust and partnerships in health care systems<sup>1</sup>



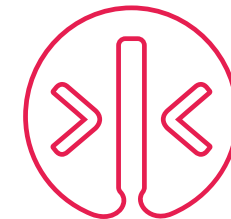
Access to tobacco cessation programs<sup>1</sup>



Enhancing communication between providers and patients<sup>1</sup>



Provide culturally and linguistically tailored programs focused on cancer awareness<sup>1</sup>



Implementation of system changes that promote health equities<sup>2</sup>

1. AACR. Overcoming cancer health disparities through science-based public policy. <https://cancerprogressreport.aacr.org/disparities/chd20-contents/chd20-overcoming-cancer-health-disparities-through-science-based-public-policy/> 2. FDA. FDA Takes Important Steps to Increase Racial and Ethnic Diversity in Clinical Trials. Published June 26, 2024. Accessed November 11, 2024. <https://www.fda.gov/news-events/press-announcements/fda-guidance-provides-new-details-diversity-action-plans-required-certain-clinical-studies>

Efforts to Address Disparities

## Diversity, Equity, and Inclusion in Clinical Trials at EMD Serono

**Our objective:** To better reflect in our clinical trials and provide benefit to the diverse patient populations that are in need and would most likely use our drug(s) for treating their disease

**An inclusive approach:** Our focus includes, but is not limited to, age, sex, gender, gender identity, race, ethnicity, religion, and their intersections

**Our commitment:** To address key barriers and limitations negatively impacting the diversity, equity, and inclusion of minority populations in clinical trials with an end-to-end strategic mindset

### Our 4 key pillars



Partner with healthcare providers who are diverse or provide care to diverse communities



Awareness and community outreach



Facilitate patient participation in clinical research



Protocol design and the use of real-world data

# Thank you