Update on Lung Cancer Care Disparities

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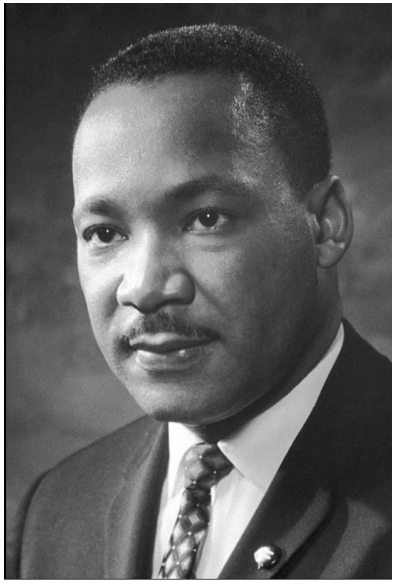


"Of all the forms of inequality, injustice in health is the most shocking and inhumane."

Dr. Martin Luther King, Jr

** Image courtesy of Wikipedia

US Cancer Disparities – 2024

HIGHEST overall

Black people have the **highest overall cancer death rate** among all racial and ethnic groups.

Significantly HIGHER

Incidence and **mortality rates** for stomach and liver cancers are **significantly higher in AI/AN, API, and Hispanic populations**.

21% more likely

NHOPI women are 21 percent **more likely to die from breast cancer** compared to White women.

38% more likely

Residents of rural counties are 38 percent **more likely to be diagnosed with and die from lung cancer**, compared to those living in large metropolitan or urban counties.

60% lower risk

Compared to cisgender men, **transgender women** appear to be at a 60 percent **lower risk of developing prostate cancer**, but they are **nearly double the likelihood of dying** from it.

22% higher mortality

Residents of disadvantaged neighborhoods had a 22 percent **higher mortality rate for all cancers combined** compared to those living in advantaged neighborhoods.

CANCER SCREENING

In 2021, only **64 percent of eligible Asian and AI/AN** individuals were **up to date** with USPSTF-recommended **cervical cancer screening** compared to 78 percent of White individuals.

Women under the age of 65 without any insurance were 50% **less likely to be up to date with breast cancer screening** compared to those who had private insurance.

CANCER TREATMENT

Of the **pivotal clinical trials** that supported FDA approvals of **82 novel therapeutics** during 2015–2021, **90 percent lacked adequate representation of Black patients**, and **73 percent** lacked adequate representation of **Hispanic/Latino patients**.

Compared to non-Hispanic (NH) White women, **NH Black women with breast cancer are less likely to receive curative surgery** and NH Black and Hispanic women are more likely to delay surgical procedures.

CANCER SURVIVORSHIP

Cancer survivors who belong to **medically underserved populations** are at an **elevated risk of worse health-related quality of life**, which has been shown to **increase the likelihood of cancer recurrence** and mortality.

US Population Groups That Experience Cancer Disparities

Individuals belonging to certain ancestry, racial or ethnic minority populations

Individuals of low socioeconomic status (SES), including low educational attainment

Individuals who lack or have inadequate health insurance coverage

Individuals belonging to sexual and gender minority communities

Individuals with disabilities

Adolescents and young adults (AYA)

Individuals who are incarcerated

Immigrants, refugees, or asylum seekers

Older adults

Citizens of Sovereign Native Nations

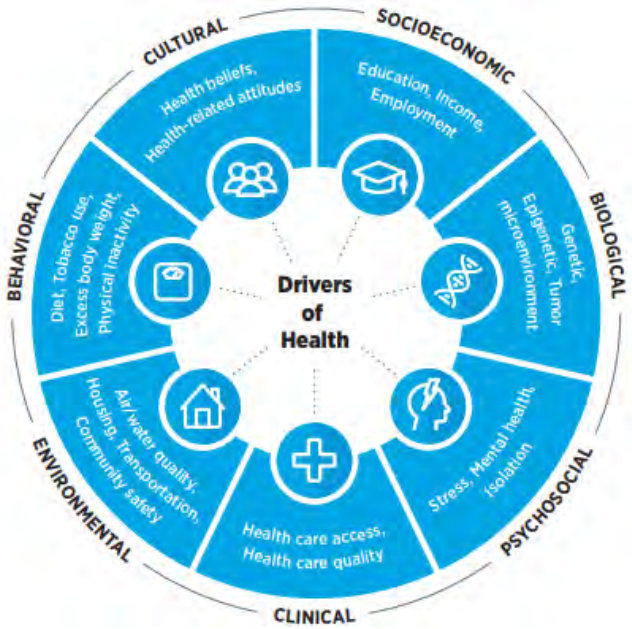
Residents in certain geographic locations, including rural areas, or of certain types of neighborhoods, such as those with low access to resources

Disparities in lung cancer care

- ***Racial and Ethnic disparities***
- Disparities related to socioeconomic status and geographic location
- Disparities related to insurance
- Age related disparities
- Disparities related to sexual identity
- Disparities in individuals with disabilities
- Disparities in individuals who are incarcerated

Racism · Discrimination · Segregation

Structural Inequities · Societal Injustices



Disparities In

CANCER CARE CONTINUUM

DEVELOPMENT · RISK REDUCTION · EARLY DETECTION · TREATMENT · SURVIVORSHIP

CANCER RESEARCH AND CARE TRAINEES AND WORKFORCE

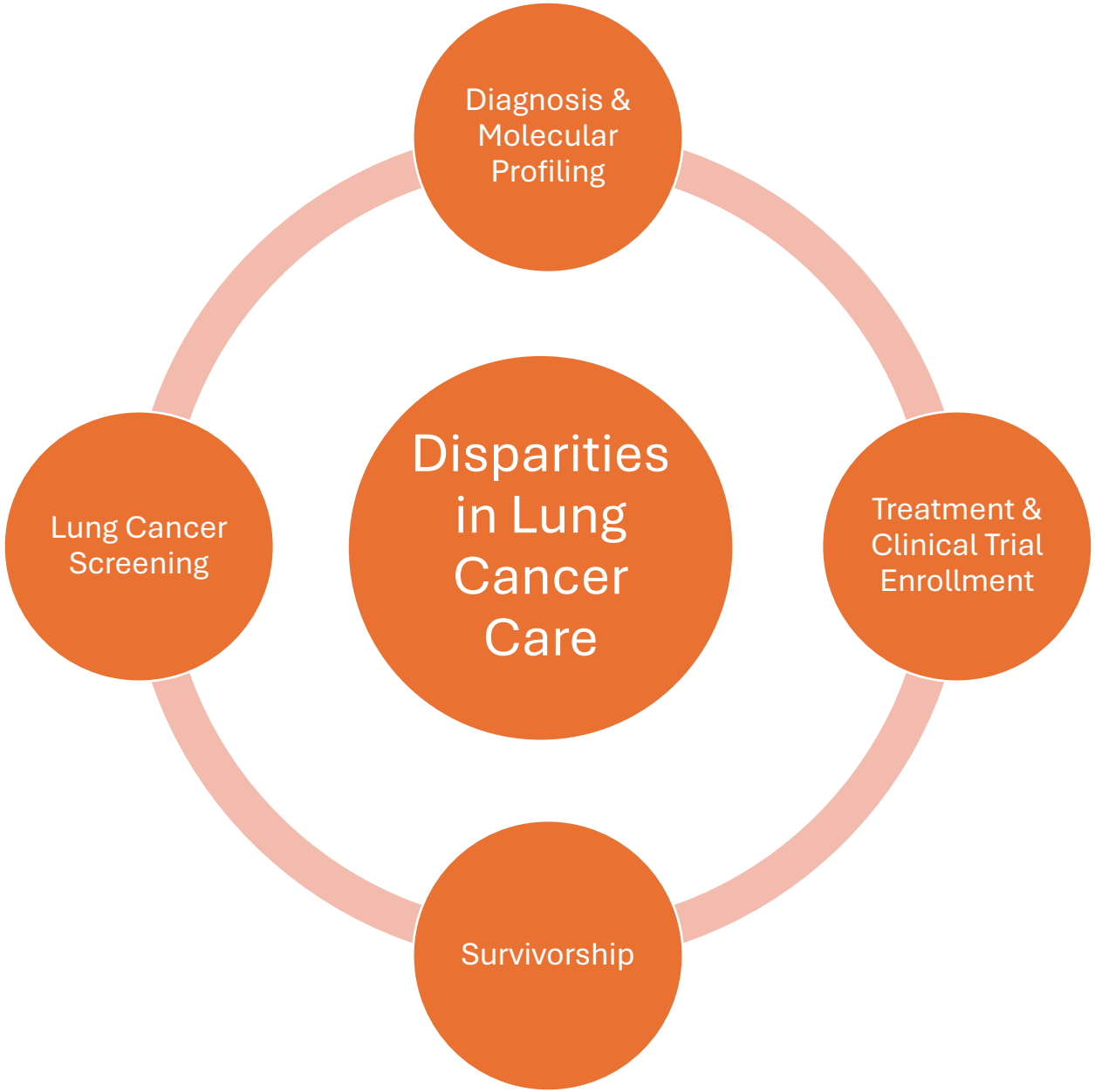
EDUCATORS · CANCER RESEARCHERS · PHYSICIANS · PHYSICIAN-SCIENTISTS · HEALTH CARE PROFESSIONALS

Adverse Health Outcomes

* AACR Cancer Disparities Progress Report [AACR Cancer Disparities Progress Report 2024 | AACR]

Mr. B, 49 years old, construction worker

- Presents for annual check up with PCP
- HTN → on hydrochlorothiazide
- Former tobacco use disorder (14 pack/year) quit 20 years ago
- No respiratory symptoms


Diagnosis & Molecular Profiling
Lung Cancer Screening
Disparities in Lung Cancer Care
Treatment & Clinical Trial Enrollment
Survivorship

Disparities in Lung Cancer Screening

CA: A Cancer Journal for Clinicians
The flagship journal of the American Cancer Society

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Screening for lung cancer: 2023 guideline update from the American Cancer Society

Eligibility	2023	2013 (2018)[a]
Age	50–80 years	55–74 years
Smoking status	Persons who currently smoke or who previously smoked.	Persons who currently smoke or who previously smoked and quit within the past 15 years.
Smoking history[b]	≥20 pack-year history[b]	≥30 pack-year history
Recommendation	Annual screening with LDCT	Annual screening with LDCT
Health status exclusions	Health conditions that may increase harm or hinder further evaluation, surgery, or treatment for lung cancer. Comorbid conditions that limit life expectancy <5 years; not willing to accept treatment for screen-detected cancer.	Life-limiting comorbid conditions. Metallic implants or devices in the chest or back. Requirement for home oxygen supplementation.
Decision making about screening	Undergo a process of SDM with a qualified health professional that includes information about the benefits, limitations, and harms of screening with LDCT; *and* A person who currently smokes should be advised to quit and offered counseling and pharmacotherapy to assist in quitting.	Undergo a process of SDM that includes information about the potential benefits, limitations, and harms of screening with LDCT; *and* Have access to a high-volume, high-quality lung cancer screening and treatment center[c]; *and* A person who currently smokes should receive evidence-based smoking-cessation counseling.

2021 USPSTF updates – expanded screening

- 31.5% aged 50 to 54 years[1]
  - More racial or ethnic minority groups are now eligible
- SEER analysis → 7.2% of Black patients with NSCLC were < 50 yoa (vs 4.3% of White patients)[2]
  - Updated guidelines will still miss more Black vs White high-risk smokers

[1] Ritzwoller DP. et al. Evaluation of Population-Level Changes Associated With the 2021 US Preventive Services Task Force Lung Cancer Screening Recommendations in Community-Based Health Care Systems. JAMA Netw Open. 2021 Oct 1;4(10):e2128176

[2] Annangi S et al. Potential Racial Disparities Using Current Lung Cancer Screening Guidelines. J Racial Ethn Health Disparities. 2019 Feb;6(1):22-26.

LCS disparities despite 2021 updates

- 5900 ever-smoking patients with lung cancer diagnosis[1]
  - 43.3% of lung cancer cases were eligible per 2021 criteria (vs 35.1% per 2013 criteria)
  - Latino (37.3%), African American (38.4%), (vs 49.6% White)
- ~ 105,000 adults with a smoking history[2]
  - Eligibility highest in White; 30.2% (vs. African American; 21.4%, Latino; 15.7%)

[1] Aredo JV et al. Racial and Ethnic Disparities in Lung Cancer Screening by the 2021 USPSTF Guidelines Versus Risk-Based Criteria: The Multiethnic Cohort Study. JNCI Cancer Spectr. 2022 May 2;6(3):pkac033.

[2] Choi E et al. Risk Model-Based Lung Cancer Screening and Racial and Ethnic Disparities in the US. JAMA Oncol. 2023 Dec 1;9(12):1640-1648.

Other disparities in LCS

- Low screening rates throughout the population
  - Only 5.8% of eligible individuals up to date with LDCT in 2021[1]
  - Adherence to the recommended follow-up after a (+) LDCT → 22.3%[2]
- Disparities regarding adherence/follow up[2]
  - Black individuals →
    - 33% less likely to adhere to follow-up after the 1st LDCT
    - 44% less likely to follow up after (+) LDCT finding, vs White

[1] Carter-Harris L (2015) J Am Assoc Nurse Pract, 27: 240.
[2] Silvestri GA, et al. (2023) Chest, 164: 241.

Smoking prevalence and access to smoking cessation interventions

- LDCT has maximum benefit when coupled with smoking cessation[1]
- Underrepresented racial/ethnic groups are less likely to be offered smoking cessation compared to white counterparts[2]
- Lack of insurance and low health literacy → decreased use of smoking cessation programs[3]

[1] Tanner NT et al. The association between smoking abstinence and mortality in the National Lung Screening Trial. Am J Respir Crit Care Med 2016;193:534–541.
[2] Babb S et al. Quitting smoking among adults - United States, 2000-2015. MMWR Morb Mortal Wkly Rep 2017;65:1457–1464.
[3] Berkman ND et al. Low health literacy and health outcomes: an updated systematic review. Ann Intern Med 2011;155:97–107

Mr. B, 51 years old

- Presents for annual check up with PCP
- HTN → on hydrochlorothiazide
- Former tobacco use disorder (14 pack/year) quit 21 years ago
- Reports occasional cough associated with clear phlegm, and wheezing
- Attributed to his working conditions and former smoking history
  - Albuterol PRN

Disparities in diagnostic tests including molecular profiling

Disparities in diagnostic imaging studies

- SEER analysis → PET/CT at the time of lung cancer diagnosis[1]
  - Black & Hispanic patients less likely to undergo PET/CT vs NHW
- FL registration study → ~ 157,000 NSCLC patients, 47.8% were diagnosed at an advanced stage[2]
  - NHB & Hispanic patients; significantly higher odds of advanced-stage diagnosis vs NHW
- The most recent ACS report → Black men were more likely to be diagnosed with stage IV disease vs White men (53% vs 49%)

[1] Morgan RL, Karam SD, Bradley CJ. Ethnic Disparities in Imaging Utilization at Diagnosis of Non-Small Cell Lung Cancer. J Natl Cancer Inst. 2020 Dec 14;112(12):1204-1212.

[2] Liu Q et al. Intra-ethnic and geographic disparities in stage at diagnosis for non-small cell lung cancer. J Natl Cancer Inst. 2024 Dec 1;116(12):2022-2031

Disparities related to molecular testing

- SEER analysis (~ 5500 patients) → the rates of molecular testing within 60 days of diagnosis lowest among Black patients[1]
  - 14.1% among Black, 26.2% among White patients
- Medicare analysis (~ 1,5M individuals - GI, lung, breast; 2015 – 2020)[2]
  - Non-Hispanic Black & Hispanic individuals were less likely to undergo NGS
- Flatiron analysis w similar results[3]
  - NGS testing rates before 1st - line therapy: 29.7% vs 36.6% (Black vs White)
  - NGS testing at any given time: 43.8% vs 54.7% (Black vs White)
- NGS testing before & after March 2018 (*Medicare National Coverage Determination*)[4]
  - Improvement in NGS testing was 14% lower in NHB and 23% lower in Hispanic/Latino individuals, compared to NHW individuals

[1] Kehl KL et al. Race, Poverty, and Initial Implementation of Precision Medicine for Lung Cancer. J Natl Cancer Inst. 2019 Apr 1;111(4):431-434.
[2] Khan, M.M.M. et al. Disparities in Next-Generation Genetic Sequencing Among Individuals with Cancer. Ann Surg Oncol (2024).
[3] Bruno DS et al. Disparities in Biomarker Testing and Clinical Trial Enrollment Among Patients With Lung, Breast, or Colorectal Cancers in the United States. JCO Precis Oncol. 2022 Jun;6:e2100427.
[4] Sheinson DM et al. Trends in Use of Next-Generation Sequencing in Patients With Solid Tumors by Race and Ethnicity After Implementation of the

Disparities in clinical trial participation

- A recent analysis of 311 clinical trials conducted in US (2004 – 2021)[1]
  - Only 136 trials (44%) reported race and ethnicity
  - NHB and Hispanic individuals were significantly underrepresented
  - No improvement in the enrollment of NHB or Hispanic individuals
- In a similar analysis focusing on precision oncology studies in the US (2004 - 2021)[2]
  - Only 93 studies (47.2%) reported race and ethnicity
  - Black & Hispanic patients were underrepresented in lung, breast, prostate & CRC studies
- NCDB analysis (2004 - 2018), ~1.6M patients, 0.12% enrolled to clinical trial[3]
  - Enrollment was significantly less likely in Black and Hispanic patients.
  - More likely if private insurance & treated at an academic program

[1] Kilic, S. et al. Disparities in US Lung Cancer Clinical Trial Enrollment. J. Racial and Ethnic Health Disparities 11, 3201–3209 (2024).
[2] Aldrighetti CM et al. Racial and Ethnic Disparities Among Participants in Precision Oncology Clinical Studies. JAMA Netw Open. 2021 Nov 1;4(11):e2133205.
[3] Kwak M et al. National enrollment of lung cancer clinical trials is disproportionate based on race and health care access. J Thorac Cardiovasc Surg. 2024 Oct

Barriers and Facilitators of Diverse Participation in Cancer Clinical Trials

	Barrier	Solution
Individual level		
	PATIENT	**PATIENT**
	Transportation	Transportation vouchers, decentralized trials
	Cost	Financial navigation, decentralized trials
	Caregiver burden	Support system, decentralized trials
	Time toxicity	Extended clinic hours, decentralized trials
	Language	Use of translators
	Education	Patient education
	Health literacy	Patient education
	Lack of awareness	Patient education
	DOCTOR	**DOCTOR**
	Lack of awareness	Education and training
	Implicit bias	Education and training
	Cultural insensitivity	Cultural competence
Institutional/ Structural level		
	Lack of clinical trial sites	Increase clinical trial site locations
	Complicated informed consent process	Patient navigation
	Eligibility criteria	Expand criteria based on real world data
	Medical distrust	Patient navigation and community outreach and engagement

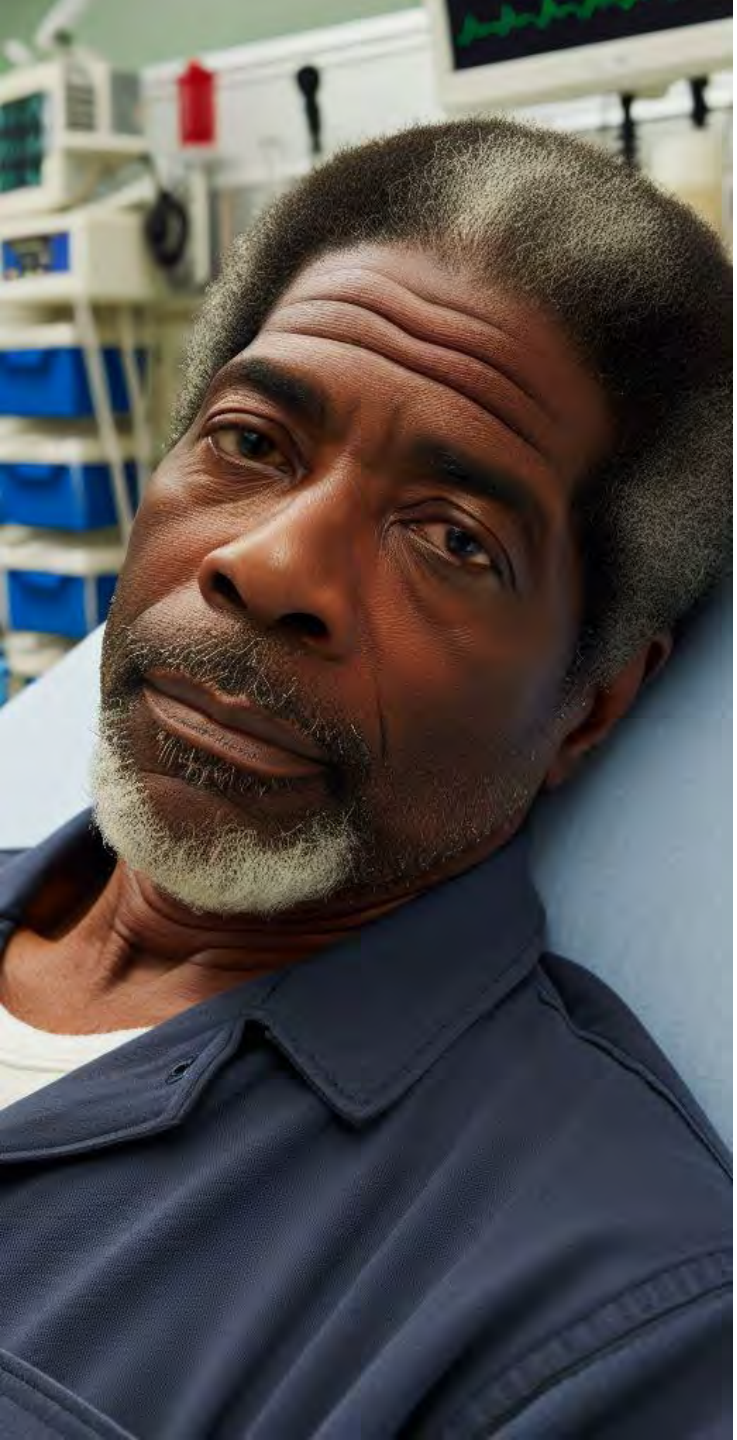
GREATER DIVERSITY IN THE CLINICAL RESEARCH WORKFORCE

* AACR Cancer Disparities Progress Report [AACR Cancer Disparities Progress Report 2024 | AACR]

Disparities in time to treatment

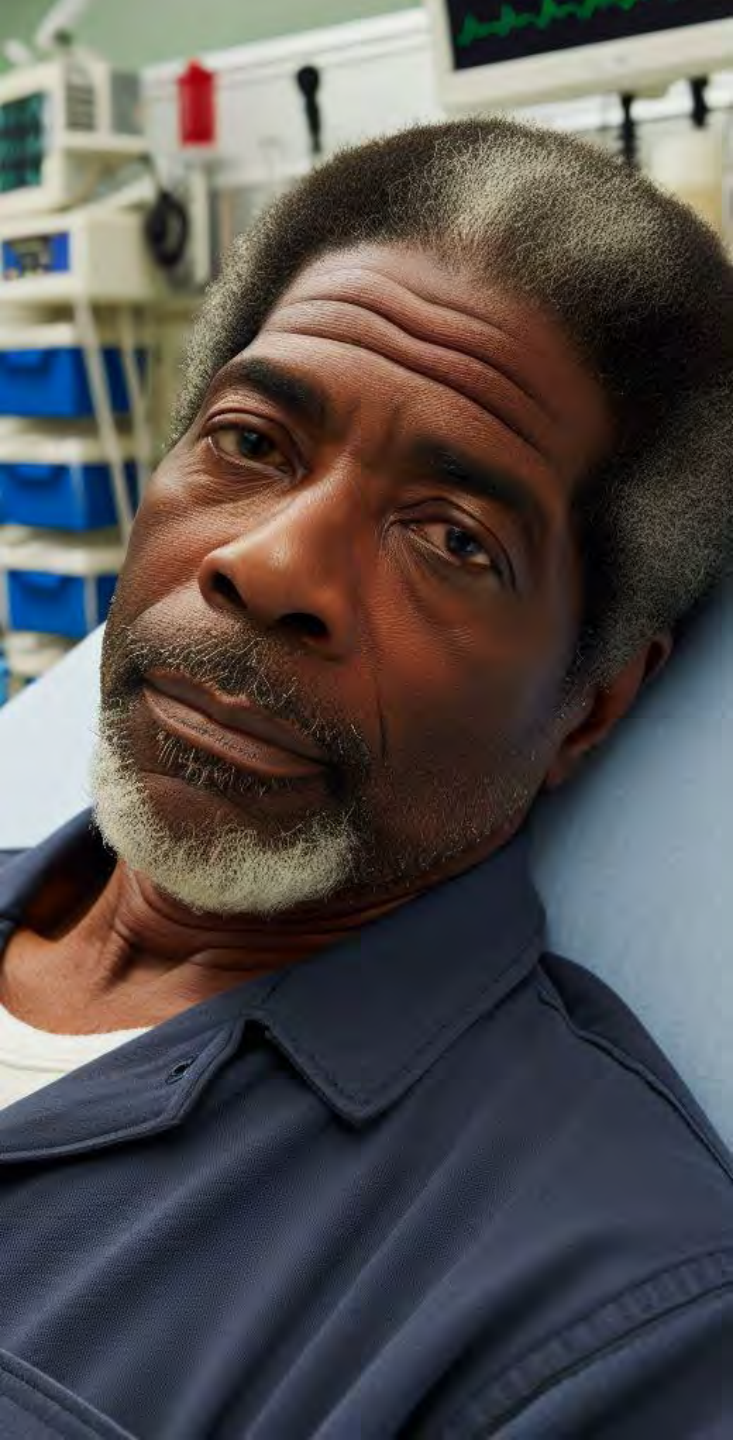
- NCDB analysis of ~ 565K patients (2010 and 2018)[1]
- Increased time to treatment (irrespective of disease stage)
  - Black race
    - Time to treatment → 22% longer for stage I, 16% for stage II, 18% for stage III & 15% for Stage IV
  - Non-private insurance, diagnosis and treatment at different facilities
- NCDB analysis of ~ 119K Stage I patients[2]
  - Black patients were less likely to receive surgery or SBRT, & more likely to receive conventional RT
  - Longer median time to treatment for all three modalities
- A more recent NCDB analysis, ~ 222K patients, stage I – III NSCLC, treated with RT as part of their therapy → time to treatment was longer in Black patients[3]

[1] Muslim Z, et al., Ann Thorac Surg. 2023 Jan;115(1):192-199.
[2] Holmes JA, et al. Racial Disparities in Time From Diagnosis to Treatment for Stage I Non-Small Cell Lung Cancer. JNCI Cancer Spectr. 2018 Apr 25;2(1):pky007.
[3] Rekulapelli A, et al. Racial and Treatment Center Differences on Time to Treatment Initiation for NSCLC Patients Receiving Radiation Therapy As an Initial Treatment. Health Equity. 2022 Aug 18;6(1):603-609.



Mr. B, 53 years old

- ER with weight loss and back pain
- CT Chest; lung mass and vertebral metastases
- Admitted for pain control and further work up
- Lung biopsy confirms NSCLC, PD-L1 is 95%
- NGS testing not done while admitted



Mr. B, 53 years old

- Due to highly symptomatic disease, he is started on carboplatin, pemetrexed while admitted
- Stable disease after 4 cycles
- NGS performed → EGFR exon 20 insertion mutation
- Disease progression noted after 6th cycle and treatment was changed to amivantamab
- Disease progression noted after 8 weeks of therapy with diffuse LM disease and brain metastases
- Patient and family decided not to pursue further therapy and patient passed away shortly after

Lung cancer screening at BMC

Table 1. Comparison of demographics for patients receiving LCS at BMC as compared to the National Lung Screening Trial (NLST). * p<0.01

Characteristic	BMC	NLST
Female	40.2%	41.0%
Age*	62 (9)	60 (8)
Race*		
White	46.1%	91.2%
Black	34.5%	4.4%
Asian	3.5%	2.1%
Other	0.2%	1.9%
Data not available	15.7%	0.4%
Ethnicity*		
Hispanic	12.8%	1.8%
Educational Level*		
Some high school or less	42.7%	6.1%
High school graduate or GED	35.6%	23.5%
Some college or associate's degree	7.9%	37.3%
Bachelor's degree or greater	8.5%	31.1%
Data not available	5.3%	2.0%
Current cigarette use*	64.3%	48.1%
Pack years of smoking*	40 (20)	48 (27)

Shift to earlier lung cancer stages:

Stage I: 29% -> 65% (2015-2024)

Stage IV: 29% -> 12% (2015-2024)

In-house NGS testing

- Faster turnaround time
  - Reflex testing is being adopted which will reduce turnaround further
- Lower rates of QNS, and subsequently lower need for re-biopsy
- Prior authorization not a barrier
- Goal: improving time to treatment, higher clinical trial enrollment rates

Clinical trial program

- Advocate for consents and QoL questionnaires to be immediately translated into the most common languages (Spanish, Haitian-Creole, Portuguese, Vietnamese)
- Advocate for transportation, housing, childcare, and food stipend/reimbursement for the trial participants.
- Advocate for modification of exclusion criteria that would cause inequity
  - "only English or Spanish speakers can be enrolled"
- Advocate for changes to dose reduction/modifications based on ANC for patients with Duffy-null Associated neutropenia

Patient Navigation Services

- Intake navigators and THRIVE screening
  - Screen for SDOH & connect with resources to mitigate barriers
  - Some of the assessed domains;
    - Transportation needs
    - Immigration status → referral to Immigration Refugee Health Center
    - Food, housing, insecurity and utility/rent assistance
  - Tracking appointments, reminder calls
  - Referrals for personal care assistance

Other Support Services – Holistic Cancer Care

- Interpreter services
- Lodging assistance - collaboration with American Cancer Society
- Social work services → Psychosocial support
- Patient support groups
  - Mind-body classes, acupuncture clinic
  - Financial Futures Program for women
  - Support program for patients with young children
- Nutrition services and food bank
- Clothing bank

The Medical Research Community: Working Together to Eliminate Cancer Disparities

* AACR Cancer Disparities Progress Report [AACR Cancer Disparities Progress Report 2024 | AACR]

Thank you

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