Advancing Health Equity in Lung Cancer Outcomes
Edwin J Jackson Jr. DO
Pulmonary and Critical Care Medicine

Disclosures
Funding:
- American Thoracic Society
Lecture Outline

- Cancer Disparities
- Lung Cancer Overview
- Lung Cancer Disparities
- Smoking
- Early Lung Cancer Detection
- Future Directions

**Health equity**: All people have the opportunity to attain their highest level of health.

**Health disparities**: One way to measure progress towards achieving health equity.
Cancer Disparities

Population groups may be characterized by

- Gender
- Geography
- Income
- Race
- Age
- Disability
- Education
- Ethnicity
## Demographics

### Demographic Information

<table>
<thead>
<tr>
<th></th>
<th>FRANKLIN COUNTY</th>
<th>OHIO</th>
<th>UNITED STATES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Population</td>
<td>1,163,414</td>
<td>11,536,504</td>
<td>308,745,538</td>
</tr>
<tr>
<td>Under 5 Years</td>
<td>7.1%</td>
<td>6.2%</td>
<td>6.5%</td>
</tr>
<tr>
<td>5-17 Years</td>
<td>16.8%</td>
<td>17.4%</td>
<td>17.5%</td>
</tr>
<tr>
<td>18-64 Years</td>
<td>66.1%</td>
<td>62.3%</td>
<td>62.9%</td>
</tr>
<tr>
<td>65 Years and Over</td>
<td>9.9%</td>
<td>14.1%</td>
<td>13.0%</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>71.8%</td>
<td>84.5%</td>
<td>74.8%</td>
</tr>
<tr>
<td>African American</td>
<td>23.1%</td>
<td>13.4%</td>
<td>13.6%</td>
</tr>
<tr>
<td>American Indian/Alaska Native</td>
<td>1.0%</td>
<td>0.8%</td>
<td>1.7%</td>
</tr>
<tr>
<td>Asian</td>
<td>4.6%</td>
<td>2.1%</td>
<td>5.6%</td>
</tr>
<tr>
<td>Native Hawaiian/Other Pacific Islander</td>
<td>0.2%</td>
<td>0.1%</td>
<td>0.4%</td>
</tr>
<tr>
<td>Other</td>
<td>2.7%</td>
<td>1.4%</td>
<td>7.0%</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic or Latino (of any race)</td>
<td>4.8%</td>
<td>3.1%</td>
<td>16.3%</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>48.7%</td>
<td>48.6%</td>
<td>49.2%</td>
</tr>
<tr>
<td>Female</td>
<td>51.3%</td>
<td>51.2%</td>
<td>50.8%</td>
</tr>
</tbody>
</table>

*Race alone or in combination with one or more other races
1) Source: 2010 Census, U.S. Census Bureau

## Importance of Addressing Cancer Disparities

### Minority Groups will compose half of the U.S. population by 2050

- **2000**
  - 65% White, non-Hispanic
  - 13% Black
  - 12% Hispanic
  - 3.8% Asian
  - 2.5% Other

- **2050**
  - 50% White, non-Hispanic
  - 15% Black
  - 24% Hispanic
  - 8% Asian
  - 5.3% Other

NOTE: "Other" includes American Indian/Alaska Native, Native Hawaiian/other Pacific Islander. Numbers add up to more than 100 percent due to rounding.
Cancer Disparities by Race

- Cancer deaths have declined among all races.
  - African Americans (AA) have the highest rate of death and shortest survival of any racial/ethnic group for most cancers in the US.
  - Hispanics and AA are less likely to be diagnosed with localized disease.

Factors Driving Disparities in Cancer

- Early detection strategies
- Genetic and Biologic Differences
- Socioeconomic Status (SES)
- Lack of Healthcare
- Cultural basis and perceptions
- Clinical trial enrolment
Lung Cancer

Lung Cancer in the United States

- Leading cause of cancer mortality in men and women of all racial and ethnic groups
  - 230,000 new diagnosis per year 25% of all cancer diagnosis
  - 160,000 deaths per year

- More deaths than
  - Prostate
  - Breast
  - Colon Cancer

COMBINED
Lung Cancer

- Small Cell (15%)
- Non-Small Cell (85%)
  - Adenocarcinoma
  - Large Cell
  - Squamous Cell
  - Carcinoid

Etiology of Lung Cancer

- Cigarette smoking
  - 80 – 90% are smokers (dose response relationship)
- Individual (genetic susceptibility)
  - 10-15% of active smokers will develop lung CA
- COPD (independent risk factor)
  - Risk increases as FEV-1 decreases
- Age
  - Average age at dx is 70
- Exposures
  - Radon, Arsenic, asbestos, polycyclic hydrocarbons and chromium
Lung Cancer Incidence Rates by Race and Ethnicity

Ohio: 71.1 per 100,000
  - 39th of out 50

Kentucky: 96.8 per 100,000

Utah: 29.1 per 100,000

National Ave: 63.0 per 100,000


www.lung.org
Lung Cancer in Ohio


Stage Determines Outcomes

Stage Determines Outcomes

- **Stage I:** Surgery is 1st line (may be curative)

- **Stage II:** Surgery followed by adjuvant chemotherapy

- **Stage III:** No surgery. Chemo/Radiation is 1st line

- **Stage IV:** Chemo/Radiation (often palliative)

5 year survival rates

- **Lung Cancer** = 17.7%

- **Colon Cancer** = 64.4%

- **Breast Cancer** = 84.7%

- **Prostate Cancer** = 98.9%
Stage Determines Outcomes

- 12% of AA diagnosed at Stage I
- 15% of Hispanics diagnosed at Stage I
- 18% of Caucasians diagnosed at Stage I

Lung Cancer Death Rates by Race and Ethnicity

Smoking

- Smoking is the leading preventable cause of disease and death in the United States.
  - 480,000 deaths annually

- Tobacco smoke contains 7,000 chemicals
  - 250 are harmful & 70 are carcinogens

- Causes Cancers of the:
  - Lung, esophagus, mouth, throat, kidney, bladder, liver, pancreas, stomach, cervix, colon, rectum and leukemia
Smoking by Region

Current Cigarette Use Among Adults (Behavior Risk Factor Surveillance System) 2016

- Midwest (20.7%)
- South (17.2%)
- Northeast (15.3%)
- West (13.1%)

Smoking in Utah

http://www.lung.org/our-initiatives/tobacco/reports-resources/sotc/state-grades/
Smoking in Ohio

Relationship between Adult Smoking and Lung Cancer Incidence Rate by State

http://www.lung.org/our-initiatives/tobacco/reports-resources/sotc/state-grades/

Did YOUR state make the grade?

OHIO

F Tobacco Prevention and Cessation Funding
A Smokefree Air
F Tobacco Taxes
D Access to Cessation Services
F Tobacco 21

http://www.lung.org/our-initiatives/tobacco/reports-resources/sotc/state-grades/
Smoking by Race

- American Indians/Alaska Natives (29.2%)
- Non-Hispanic Whites Americans (18.2%)
- African Americans (17.5%)
- Hispanic Americans (11.2%)
- Non-Hispanic Asians Americans (9.5%)

Menthol

- Menthol tobacco products have been proven to both make it easier to start smoking and harder for adult users to quit

- African-Americans use menthol tobacco products at much higher rates than other racial/ethnic groups

http://www.lung.org/our-initiatives/tobacco/reports-resources/sotc/key-findings/
Smoking by Education

- No High school Diploma (22.9%)
  - High school graduate with out college (21.7%)
  - Associate's degree (17.1%)
  - Completion of an undergraduate college degree (7.9%)
  - Completion of a graduate degree (5.4%)

Smoking by Poverty Status

- 26.3% of adults below the federal poverty guideline smoke.
- 15.2% of adults who live at or above the federal poverty guideline smoke.
Smoking Cessation

- The majority of smokers want to stop smoking however, minority and low SES smokers are less likely to:
  - Offered smoking cessation counseling
  - Enroll in dedicated smoking cessation programs
  - Use recommended treatment to aid cessation

Smoking Cessation

- Quitting smoking improves the prognosis of cancer patients.
  - Quitting smoking helps improve the ability to heal and respond to therapy.
  - Quitting smoking lowers the risk that the cancer will recur, that a second cancer will develop.
Perceptions

335 patients surveyed
- AA, Caucasian & Hispanic
  - AA surgery causes LC to spread
    - Barrier to curative surgery
  - AA Fatalistic views “its meant to happen as part of God’s plan”
    - Barrier to medical treatment

Racial and Ethnic differences in beliefs about lung cancer Chest 2012
Lung Cancer Disparity in Treatment by Race

- AA patients are less likely to undergo surgical treatment for early stage lung cancer
  - Not offered surgery
  - Provider perception AA would refuse
Lung Cancer Disparity in Treatment by Race

- Compared data from the SEER registry of 10,984 pt with resectable NSCLC
- Surgical resection was 12.7% lower in (AA) than Caucasians
- 5 year survival was also lower
  - 26.4% in AA vs 34.1% in Caucasians

Provider Perception Targeted Treatment

- EGFR
- ROS-1
- PD-1 & PDL-1
- KRAS
EGFR Driver (activating) Mutation

- Mutation in the tyrosine kinase domain of EGFR resulting in continued activation
- Observed in 15% of Adenocarcinomas in the US
  - Never smokers
  - Patients of Asian ancestry

Tyrosine Kinase Inhibitors

- Erlotinib, Gefitinib and Afatinib all have shown better progression free survival than standard chemotherapy.
- First line treatment for Stage IV NSCLC
ROS-1

- Tyrosine kinase and driver oncogene
- Found in 1-2 % of NSCLC
- Drug of choice: Crizotinib

Immunotherapy checkpoint inhibition

- PD-1 pathways are immune checkpoint pathways that play critical roles in controlling T-cell immune responses
- T cells become unresponsive PD-1 binds PD-L1 on target cells
- Antagonist antibodies to PD-1 and PD-L1
**KRAS (Kirsten rat sarcoma oncogene)**

- Most common mutation 25% of adenocarcinomas
- Mediates multiple signal transduction and activation pathways
- Exclusive to smokers
- Associated with worse prognosis
- No approved effective targeted therapies

---

**Mutations in Lung Cancers**

245 AA and 264 n-HW with NSCLC had genomic tumor analysis.

- Mutational frequencies and copy number changes were not significantly different

- Activating alterations in members of the receptor tyrosine kinase pathway including EGFR and KRAS were not significantly different

- These results indicate that AA with NSCLC harbor somatic EGFR mutations at a frequency similar to whites with NSCLC
Early Lung Cancer Detection Program

Remember Stage Determines Outcomes

- Stage I: Surgery is 1st line (can be curative)
- Stage II: Surgery followed by adjuvant chemotherapy
- Stage III: No surgery. Chemo/Radiation is 1st line
- Stage IV: Chemo/Radiation (often palliative)
What is Screening and Why is it important for Lung Cancer?

- Screening: Testing of individuals who are asymptomatic, but at risk for a disease.

- The purpose of screening is to prevent, interrupt or delay the development of advanced disease.

National Lung Screening Trial

Multicenter Randomized Trial

54,000 patients

CXR vs LDCT

Screened for 3 years

20% reduction in lung-cancer specific mortality with LDCT

6.7% reduction in overall mortality with LDCT

*50* 20% reduction in lung-cancer specific mortality with LDCT

*50* 6.7% reduction in overall mortality with LDCT

Lung Cancer Screening

Who participated in the NLST?

- Current and former smokers within the last 15 years
  - At least 30 pack years of smoking
  - Age 55-74
  - No signs or symptoms of lung cancer
  - Medically fit for surgery
Disparity in Lung Cancer Screening

- Fee for service prior to 2015
  - 99 dollar fee
  - Martha Morehouse Medical Plaza

CMS.gov
Lung Cancer Screening Racial Differences

- A subgroup analysis of the NLST by Tanner et al showed AAs screened with LDCT had a greater reduction in
  - All cause mortality
  - Lung Cancer specific mortality

Implementing Lung Cancer Screening in the Era of CMS Coverage

- Shared decision making
- Management of Incidental Findings
- Smoking Cessation
- Rapid Diagnostics
- Standardized reporting
- Follow up
Lung Cancer Screening & Smoking Cessation Clinic

Tobacco Dependency Clinic

WHAT DOES OHIO STATE’S TOBACCO DEPENDENCE CLINIC OFFER?

- The Tobacco Dependency Clinic is a service of Ohio State Lung Cancer. The clinic offers comprehensive evaluation and management involving appointments with a dedicated Smoking Cessation Nurse Practitioner. Services include counseling and prescriptions for tobacco cessation medications when indicated.
- Comprehensive nicotine dependence assessment
- Comprehensive counseling
- Personalized medication approach
- Tobacco prevention
- Tobacco-free support

You can schedule an appointment with Jennifer White, MS, MA, CRNP, BC.

Ruthann Kennedy, CNP

THE DIVISION OF PULMONARY MEDICINE
Campus East
583 Tenth Ave, 3rd Floor
Columbus, OH 43210
614-688-8540

DEDICATED TO HELPING YOU QUIT.

The Tobacco Dependence Clinic
Early Lung Cancer Detection Clinic

Lung cancer screenings are offered every week at the following locations:

- Ohio State’s Martha Morehouse Medical Plaza – Tower Building
  2050 Kenny Road • Columbus, OH 43221
  614-293-5066 or 800-293-5066

- CarePoint East
  543 Taylor Avenue • Columbus, OH 43203
  614-293-5066 or 800-293-5066

Visit us online at cancer.osu.edu/lungcancerscreening

The James

Future Directions

- 3rd Early Detection Clinic
- Mobile Lung Cancer Screening
- Total Cancer Care and Bio-banking Protocol
- 23 Lung Cancer Clinical Trials
Summary

- AA and Hispanics are more likely to be diagnosed with advanced stage lung cancer.
- Smoking Cessation must be offered to all patients
- AA are less likely to have surgical resection even when presenting with localized disease
- AA and Caucasians do not differ in rates of cancer mutations
- AA have a greater benefit in Lung Cancer Screening

Lung Cancer Team