Detecting Early Lung Cancer (DELUGE) in the Mississippi Delta

Ray U. Osarogiagbon, MBBS FACP
Chief Scientist, Baptist Memorial Health Care Corporation
Director, Multidisciplinary Thoracic Oncology Program
Baptist Cancer Center, Memphis, TN.
DECLARATIONS

Chair: Board of Directors, Hope Foundation for Cancer Research (SWOG)

Co-chair: IASLC N-Staging Sub-Committee, IASLC Prognostic Factors Subcommittee; SWOG Early Lung Cancer Sub-Committee

Consultant: American Cancer Society, AstraZeneca, Genentech/Roche, National Cancer Institute

Member: Fleischner Society

Patents: Lymph node specimen collection kit, Method for lymph node analysis

PI: S1934 (NASSIST: NeoAdjuvant chemoradiation +/- immunotherapy before Surgery for Superior Sulcus Tumors)

Scientific Advisory Board: Druckenmiller Center for Lung Cancer Research, MSKCC; GO2 Foundation; Lung Cancer Foundation of America; LUNGevity Foundation

Speaker: Biodesix, Genentech/Roche, Medscape, Trypnych Healthcare Partners

Steering Committee: National Lung Cancer Round Table, NCI Cancer Prevention Steering Committee

Stock: Eli Lilly, Gilead Sciences, Pfizer
Objectives

2. Review two approaches to early lung cancer detection.
3. Discuss challenges, opportunities in implementing early detection programs.
4. Describe the Detecting Early Lung Cancer (DELUGE) in the Mississippi Delta project.
The Good News: Evolving US Lung Cancer Statistics

Epidemiology of Lung Cancer in the US: A Tale of Geographic Disparity

If BMHCC was a state....

<table>
<thead>
<tr>
<th>State</th>
<th>Estimated new lung cancer cases, 2020¹</th>
<th>NCI-Designated Cancer Center?</th>
</tr>
</thead>
<tbody>
<tr>
<td>37 Nebraska</td>
<td>1270</td>
<td>1</td>
</tr>
<tr>
<td>38 New Hampshire</td>
<td>1220</td>
<td>1</td>
</tr>
<tr>
<td>BMHCC</td>
<td><strong>1200 - 1300</strong></td>
<td>0</td>
</tr>
<tr>
<td>39 New Mexico</td>
<td>1040</td>
<td>1</td>
</tr>
<tr>
<td>40 Idaho</td>
<td>990</td>
<td>0</td>
</tr>
<tr>
<td>41 Rhode Island</td>
<td>920</td>
<td>0</td>
</tr>
<tr>
<td>42 Delaware</td>
<td>890</td>
<td>0</td>
</tr>
<tr>
<td>43 Hawaii</td>
<td>870</td>
<td>1</td>
</tr>
<tr>
<td>44 Montana</td>
<td>770</td>
<td>0</td>
</tr>
<tr>
<td>45 Utah</td>
<td>730</td>
<td>1</td>
</tr>
<tr>
<td>46 South Dakota</td>
<td>590</td>
<td>0</td>
</tr>
<tr>
<td>47 Vermont</td>
<td>570</td>
<td>0</td>
</tr>
<tr>
<td>48 North Dakota</td>
<td>460</td>
<td>0</td>
</tr>
<tr>
<td>49 Alaska</td>
<td>400</td>
<td>0</td>
</tr>
<tr>
<td>50 Wyoming</td>
<td>320</td>
<td>0</td>
</tr>
<tr>
<td>DC</td>
<td>300</td>
<td>1</td>
</tr>
</tbody>
</table>

Approaches to Early Detection: LDCT Screening

• Pros:
  • Reduces lung cancer-specific and overall mortality
  • High level evidence: 3 large RCT + international meta-analysis

• Cons:
  • Implementation barriers
  • Low adoption rates (US); no adoption (rest of the world)
  • Eligibility criteria limitations
  • Potential to exacerbate care and outcome disparities

Lung Cancer Burden v Screening: State-Level


LDCT Rate (2018) vs. Lung Cancer Mortality Rate Per 100,000 Adults 55-80 years (2013-2017)

Outlier: Kentucky (KY)

LDCT Screening Eligibility v Per-Capita Lung Cancer Incidence
How Selection Criteria (Policy-Level) Drive Sex, Race and Ethnic (Seemingly Person-Level) Disparities in Access to Lung Cancer Screening in the US

Avoid this... save lives!
Use of CT Imaging Keeps Rising...


Guideline-Concordant Management of Incidentally Detected Lung Nodules$^{1,2}$

**Pros:**
- Starts from the point of detection of potentially malignant lung lesion
- LDCT eligibility criteria less relevant
- Bypasses LDCT implementation barriers
- Leverages existing clinical material, infrastructure
- Expands the reach of early detection to hard-to-reach populations
- Alleviates a medico-legal quandry

**Cons:**
- Requires some infrastructure for identifying, tracking, oversight
- Optimally requires transparent, interdisciplinary decision-making

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Lung Cancer Diagnosed Through Screening, Lung Nodule, and Neither Program: A Prospective Observational Study of the Detecting Early Lung Cancer (DELUGE) in the Mississippi Delta Cohort

Raymond U. Osarogiagbon, MBBS; Wei Liao, PhD; Nicholas R. Faris, MDiv; Meghan Meadows-Taylor, PhD; Carrie Fehnel, BBA; Jordan Lane, MA; Sara C. Williams, MFA; Anita A. Patel, MBBS; Olawale A. Akinbobola, MPH; Alicia Pacheco, MHA; Amanda Epperson, RN; Joy Luttrell, RN; Denise McCoy, BS; Laura McHugh, RN; Raymond Signore, RN; Anna M. Bishop, MSN; Keith Tonkin, MD; Robert Optican, MD, MSHA; Jeffrey Wright, MD, PhD; Todd Robbins, MD; Meredith A. Ray, PhD; and Matthew P. Smeltzer, PhD

PMID: 35258994 DOI: 10.1200/JCO.21.02496
DELUGE: Processes

1. Concurrent implementation projects_ 2015: LDCT and Incidental Lung Nodule Program

2. Prospective observational cohorts.

3. LDCT: consenting, apparently health eligible adults; Lung-RADS

4. ILNP: automated report capture; physician (patient) notification; Fleischner Society guidelines

5. High-risk patients triaged into Multidisciplinary decision-making forum
Detecting Early Lung Cancer (DELUGE) in MS Delta

Program Volumes

Persons Enrolled: BMHCC (Cumulative)

New Cancers Diagnosed: BMHCC (Cumulative)

Annual Volumes

<table>
<thead>
<tr>
<th>Year</th>
<th>Nodule Pts (System)</th>
<th>LDCT Pts (System)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>450</td>
<td>27</td>
</tr>
<tr>
<td>2016</td>
<td>2783</td>
<td>254</td>
</tr>
<tr>
<td>2017</td>
<td>2871</td>
<td>699</td>
</tr>
<tr>
<td>2018</td>
<td>3277</td>
<td>1692</td>
</tr>
<tr>
<td>2019</td>
<td>3253</td>
<td>3090</td>
</tr>
<tr>
<td>2020</td>
<td>4025</td>
<td>4834</td>
</tr>
<tr>
<td>2021</td>
<td>7561</td>
<td>6991</td>
</tr>
</tbody>
</table>

Rates of Lung Cancer Detection

Nodule – 6.2%  LDCT – 2.8%

Ratio_3:1

Ratio_8:1

2nd Annual End Lung Cancer Now Gathering, Indiana University Simon Comprehensive Cancer Center, Indianapolis, IN . November 4, 2022

Get Better.
Stage Distribution, Curative-Intent Treatment, Survival

DELUGE in the Mississippi Delta: LDCT v LNP v MDC

Clinical stage distribution across LDCT, LNP, and MDC program

Treatment modalities across LDCT, LNP, and MDC program

Clinical stage distribution transcohort

Treatment modalities distribution transcohort

Kaplan Meier survival curves of cancer patients in three programs

PMID: 35258994 DOI: 10.1200/JCO.21.02496

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# DELUGE in the Mississippi Delta: LDCT v LNP v BMHCC

<table>
<thead>
<tr>
<th>Demographics</th>
<th>LDCT</th>
<th>LNP</th>
<th>BMHCC</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>N = 156</td>
<td>N = 772</td>
<td>N = 1150</td>
</tr>
<tr>
<td>Age, median (Q1 - Q3)†</td>
<td>68 (64 - 72)</td>
<td>69 (63 - 76)</td>
<td>68 (61-75)</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>84</td>
<td>71</td>
<td>69</td>
</tr>
<tr>
<td>Black</td>
<td>16</td>
<td>27</td>
<td>30</td>
</tr>
<tr>
<td>Other/Not Reported</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Smoking Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active</td>
<td>72</td>
<td>46</td>
<td>41</td>
</tr>
<tr>
<td>Former</td>
<td>28</td>
<td>40</td>
<td>45</td>
</tr>
<tr>
<td>Never</td>
<td>0</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Pack years - Former Smoker</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median (Q1-Q3)†</td>
<td>55 (40.75 - 72.5)</td>
<td>41 (24.25 - 60)</td>
<td>20.25 (21.5 - 60)</td>
</tr>
<tr>
<td>Quit Duration - Former Smoker</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median (Q1-Q3)†</td>
<td>8 (2.75 - 11.25)</td>
<td>16 (7 - 28)</td>
<td>11 (4 - 24)</td>
</tr>
</tbody>
</table>
Why is this important?

**Beyond the AJR: To Expand the Population-Level Benefit of Lung Cancer Screening, Expand Access to Racially Diverse Populations**

Caroline Chiles, MD¹, Raymond U. Osarogiagbon, MBBS²

The authors declare that they have no disclosures relevant to the subject matter of the article.


Even if 100% of eligible persons by USPSTF 2021 criteria had been enrolled into LDCT screening, ILNP would have detected 20% of all stage I/II patients in the entire cohort.

PMID: 35258994 DOI: 10.1200/JCO.21.02496
Lung Cancer Diagnosed Through Different Pathways: BMHCC 2015 - 2020

Kaplan Meier survival curves of cancer patients: cross-linked Tumor Registry and prospective LDCT, ILNP and MDC Databases

Survival probability

0.00 0.25 0.50 0.75 1.00

0 1 2 3 4 5

Years

p < 0.0001

Number at risk

Strata

LDCT: 137 92 39 19 9 2

ILNP: 594 365 236 125 62 14

MDC: 740 454 283 161 93 54

Neither: 5274 2248 1266 731 417 203

Penetration of Programs into BMHCC Population: 2015 to 2020

2nd Annual End Lung Cancer Now Gathering, Indiana University Simon Comprehensive Cancer Center, Indianapolis, IN. November 4, 2022
Take-Home Messages

• Incidental Lung Nodule Programs provide an alternative pathway to early detection of lung cancer.
• Epidemiologically powerful: may rescue more people than LDCT
• LDCT + ILNP: concurrent deployment may expand population-level impact, alleviate looming disparities inadvertently induced by LDCT.
• ILNP can be implemented even in places where LDCT is not available.
Avoid This…. Save Lives

02/14/22

10/24/20

Get Better.
**MSM: Acknowledgements**

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- **Administrators**: Parker Harris, MHA
- **Margaret DeBon, PhD
- **Nicholas Faris, M.Div. (Clinical Program)**
- **Alicia Paccheco, MHA (Research Program)**
- **Clinical Program**
- **Parker Harris, MHA
- **Margaret DeBon, PhD
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- **System Support**: Jillian Foster
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- **Dustin Box
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- **Shirley Banks
- **Pam Beasley
- **Data managers**: Jordan Lane, MA
- **Talat Qureshi, BS
- **Rudy Ramos, BA
- **Sara C. Williams MFA
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