South Dakota Cancer Coalition Presents

Advancements in Lung Cancer Screening
December 16, 12:00pm CST

https://tinyurl.com/yy9fcr98

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Community Research Representative
Screening for Lung Cancer: Who, when, why, and how?

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Disclosures

• Advisory boards for AstraZeneca and Bayer
Objectives

• Identify an appropriate candidate for lung cancer screening.

• Articulate the risks/benefits of lung cancer screening.

• Increase provider confidence in discussing lung cancer screening with patients.
Lung Cancer: Scope of the Problem

• Most common cause of cancer-related death in U.S.

• Causes more deaths than breast, prostate, and colon cancers combined

• Second most common incident cancer in both men and women
Reduced Lung-Cancer Mortality with Low-Dose Computed Tomographic Screening

The National Lung Screening Trial Research Team
National Lung Screening Trial (NLST)

• Enrolled 53,454 males and females, ages 55-74

• Current or former 30 pack-year smokers who quit within previous 15 years

• No history of lung cancer, hemoptysis, weight loss of >15 lbs, or CT of chest within 18 months
## Results of Screening

<table>
<thead>
<tr>
<th></th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Positive Result Concerning for Lung Cancer</strong>&lt;sup&gt;1&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CT Group</td>
<td>27.3%</td>
<td>27.9%</td>
<td>16.8%</td>
</tr>
<tr>
<td>CXR Group</td>
<td>9.2%</td>
<td>6.2%</td>
<td>5.0%</td>
</tr>
<tr>
<td><strong>Clinically Significant Abnormality Not Concerning for Lung Cancer</strong>&lt;sup&gt;2&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CT Group</td>
<td>10.2%</td>
<td>6.1%</td>
<td>5.8%</td>
</tr>
<tr>
<td>CXR Group</td>
<td>3.0%</td>
<td>1.8%</td>
<td>1.5%</td>
</tr>
</tbody>
</table>

<sup>1</sup>Non-calcified nodule >4 mm  
<sup>2</sup>Emphysema, aortic aneurysm, hiatal hernia, etc.
**False Positives**

<table>
<thead>
<tr>
<th></th>
<th>Total positive tests</th>
<th>Lung Cancer Confirmed</th>
<th>Lung Cancer NOT Confirmed</th>
<th>Lead to Bx or Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT Group</td>
<td>18,146</td>
<td>649</td>
<td>17,497</td>
<td>2033</td>
</tr>
<tr>
<td>CXR Group</td>
<td>5043</td>
<td>279</td>
<td>4764</td>
<td>758</td>
</tr>
</tbody>
</table>

- High false positive rate in both arms
  - CT Group 96.4% and CXR Group 94.5%

Earlier stage at diagnosis

• Low-dose CT
  – 47.5% Stage IA
  – 31.1% Stage III-IV

• Chest X-ray
  – 23.5% Stage IA
  – 59.1% Stage III-IV

Impact on Lung Cancer Deaths and Overall Mortality

- 20% reduction in lung cancer deaths
- 6.7% reduction in overall mortality

How does lung cancer screening compare?

<table>
<thead>
<tr>
<th>Cancer Type</th>
<th>Number needed to screen to prevent one death</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast cancer (Mammogram)</td>
<td>Age 40-49—746</td>
</tr>
<tr>
<td></td>
<td>Age 50-59—351</td>
</tr>
<tr>
<td></td>
<td>Age 60-69—233</td>
</tr>
<tr>
<td>Colon cancer (Colonoscopy)</td>
<td>200</td>
</tr>
<tr>
<td>Cervical cancer (Pap smear)</td>
<td>1140</td>
</tr>
<tr>
<td>Prostate cancer (PSA)</td>
<td>1410</td>
</tr>
<tr>
<td>Lung cancer (Low-dose CT)</td>
<td>320</td>
</tr>
</tbody>
</table>

Loeb et al. JCO February 1, 2011 vol. 29 no. 4 464-467

### Definition of “low-dose”

<table>
<thead>
<tr>
<th>Type of exposure</th>
<th>Radiation Dose in mSv</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest X-ray</td>
<td>0.02</td>
</tr>
<tr>
<td>Standard diagnostic chest CT</td>
<td>8</td>
</tr>
<tr>
<td>Low-dose chest CT</td>
<td>1.5</td>
</tr>
<tr>
<td>A year in Sioux Falls</td>
<td>3.0</td>
</tr>
<tr>
<td>A year in Colorado</td>
<td>4.0</td>
</tr>
<tr>
<td>A year as a commercial pilot</td>
<td>7.0</td>
</tr>
</tbody>
</table>

Overdiagnosis

• A serious complication of cancer screening
• My definition—cancer diagnosis in an individual who would have otherwise died of another cause
• All clinically relevant cancers will eventually result in diagnosis with that cancer
  – Total number of cancers diagnosed in intervention group should equal that in the control group
National Lung Screening Trial (NLST)

Significance of NLST

• First trial to demonstrate a clear benefit of screening for lung cancer

• Results compare favorably with breast and colon screening

• Endorsed by major medical societies
References

References (cont.)

• Website. Accessed 03/27/2014. tech.mit.edu/Bulletins/Radiation/rad5.txt
• Smith et al. CA: A Cancer Journal for Clinicians. 64:30–51
References (cont.)


Questions?
Walking Forward Program Lung Cancer Screening Education Study:

**Increasing Lung Cancer Screening For High Risk Smokers In A Frontier Population**

Kristin Cina
Research Associate
Walking Forward Program
Avera Research Institute
Smoking and Lung Cancer in South Dakota

- High smoking rates: State average 20%, 7 counties over 30% (Todd County highest at 41%)
- High lung cancer mortality rates:
  - American Indian: 95 per 100,000
  - Whites: 55 per 100,000
  - Northern Plains AIs: highest lung cancer mortality rate in the US
Lung Cancer Screening Rationale

- Only 2-4% screened nationally
- Potentially 30,000 screen eligible South Dakota
  - 14,000 West River
- Limited understanding LDCTs primary care providers (PCP)
- High risk individuals: many unaware
- Higher cure rates and good treatment options: surgery or SRS (stereotactic radiosurgery)
Funded by Bristol-Myers Squibb Foundation
3 year project, $1.6 million

Research Question:
will provider and/or individual level interventions increase LDCT lung cancer screening among high risk smokers living in western South Dakota?

Project Goal:
To increase lung cancer screening rates by educating primary care providers and their clinic staff as well as community members in western South Dakota.
Increasing Lung Cancer Screening for High Risk Smokers in a Frontier Population

• Both interventions include education and introduction to an online resource

• Metric will be the **increase** in screening LDCTs
  • Quarterly LDCT #s from collaborating imaging sites

**First WF Project to include all of western SD**
Challenge: Limited access to screening LDCT

Key:
- Clinic(s)
- LDCT screening center
- CT Imaging center not offering LDCT
Provider education sessions

- Pre-survey

- Educational session
  - Dr. Solomon (Avera), Dr. David White (Dakota Radiology), Kristin Cina (WF)

- Post-survey at 6 months

*CMEs provided*
Community education sessions

- Pre-survey
- Educational session
  - LDCT
  - Smoking cessation
  - Screening navigation
- Post-survey at 6 months
Education sessions
Education sessions
Collaborating Imaging Centers

• Quarterly # of LDCTs completed
• Patient Intake Survey
  • Assesses:
    • Why patient sought screening
    • County of residence
    • Referring provider
Collaborating Imaging Sites

- Monument Health sites (5)
- Dakota Radiology (Rapid City)
- Rapid City Medical Center (Rapid City)
- Hans P. Memorial Hospital (Philip)
- Avera St. Mary’s Hospital (Pierre)
- Fall River Health Services (Hot Springs)
- Winner Hospital
Progress

Provider Workshops/CME sessions
Began September 2018
13 clinic sites completed
Provider accrual 95
Target goal: 135

Community Workshops/Education sessions
Began August 2018
460 participants

To date: 100 LDCT referrals have been obtained with 81 completed
## LDCT Results

<table>
<thead>
<tr>
<th>Imaging Center</th>
<th>2017 Baseline LDCT #s</th>
<th>Year 1 total</th>
<th>Chg since baseline</th>
<th>July - Sept 2019</th>
<th>Oct - Dec 2019</th>
<th>Jan - March 2020</th>
<th>Apr - June 2020 COVID shutdown</th>
<th>Year 2 total</th>
<th>Chg since baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead/Deadwood (RH)</td>
<td>49</td>
<td>56</td>
<td>7</td>
<td>20</td>
<td>18</td>
<td>15</td>
<td>5</td>
<td>58</td>
<td>9</td>
</tr>
<tr>
<td>Sturgis (RH)</td>
<td>45</td>
<td>96</td>
<td>51</td>
<td>14</td>
<td>26</td>
<td>25</td>
<td>29</td>
<td>94</td>
<td>49</td>
</tr>
<tr>
<td>Spearfish (RH)</td>
<td>16</td>
<td>81</td>
<td>65</td>
<td>24</td>
<td>28</td>
<td>26</td>
<td>15</td>
<td>93</td>
<td>77</td>
</tr>
<tr>
<td>Monument (RCRH)</td>
<td>112</td>
<td>234</td>
<td>122</td>
<td>65</td>
<td>58</td>
<td>60</td>
<td>27</td>
<td>210</td>
<td>98</td>
</tr>
<tr>
<td>Custer (RH)</td>
<td>33</td>
<td>72</td>
<td>39</td>
<td>21</td>
<td>21</td>
<td>24</td>
<td>21</td>
<td>87</td>
<td>54</td>
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<tr>
<td>Dakota Radiology</td>
<td>86</td>
<td>102</td>
<td>16</td>
<td>39</td>
<td>78</td>
<td>61</td>
<td>29</td>
<td>207</td>
<td>121</td>
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<tr>
<td>RCMC</td>
<td>260</td>
<td>197</td>
<td>-63</td>
<td>63</td>
<td>64</td>
<td>58</td>
<td>38</td>
<td>223</td>
<td>-37</td>
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<tr>
<td>Avera St. Marys</td>
<td>38</td>
<td>34</td>
<td>-2</td>
<td>16</td>
<td>4</td>
<td>10</td>
<td>16</td>
<td>46</td>
<td>8</td>
</tr>
<tr>
<td>Philip Hospital</td>
<td>1</td>
<td>0</td>
<td>-1</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>total</td>
<td>640</td>
<td>872</td>
<td>232</td>
<td>263</td>
<td>299</td>
<td>279</td>
<td>180</td>
<td>1018</td>
<td>378</td>
</tr>
</tbody>
</table>
Year 2 LDCT Results

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Year 1</th>
<th>Year 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>640</td>
<td>872</td>
<td>1209</td>
</tr>
</tbody>
</table>

Legend: Baseline, Year 1, Year 2
Challenges

• Referrals from IHS
  • Sensitive to being able to provide LDCTs to their own communities consistently in the future
    • Working on capabilities in house
      • WF & Dakota Radiology assisting

• COVID travel and screening restrictions
  • Off reservation travel discouraged

• Decline in screening during COVID

• Getting screen eligible community members at workshops
  • Recruitment open to 18 or older
    • Smoking cessation/discourage smoking
    • Share info with older family members
    • Smoking starts at such an early age (hit 30 pk year hx early)
OVERCOMING CHALLENGES

• Indian Health Service/Contract Health is not currently covering the cost nor providing LDCTs
• Grant received from the Irving A. Hansen Memorial Foundation for $105K
  • Will allow us to screen at no cost to the patient
  • Travel assistance for rural patients
Lung Health Forum & Policy Symposium: Impacting Lung Health
May 3-5, 2021
Rushmore Plaza Holiday Inn Convention Center
Rapid City, SD

- Audience: Local and State Government, MDs, medical staff, hospital admin, Tribal Leaders, IHS, Tribal & community members, SD DOH, ACS etc.
- Disseminate study results
- National & local speakers
  - Screening education
  - Policy & emerging strategies (i.e. smoking cessation & mHealth)
OVERCOMING CHALLENGES
Contact info:
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