Model of Lung Cancer Screening Implementation: Is it Interoperable?

JOELLE FATHI, DNP, MN, BSN, ANP-BC, CTTS
Program Director
Swedish Tobacco Related Diseases and Lung Cancer Screening Program
Division of Thoracic Surgery and Interventional Pulmonology
Swedish Cancer Institute, Seattle
Objectives

Describe the delivery of lung cancer screening in a centralized face-to-face, Nurse Practitioner led, program.

Discuss the benefit of detection of tobacco related diseases and prevention of disease through smoking cessation, in the setting of lung cancer screening.

Consider the value of a centralized program in the reduction of potential psychological and physical harms of lung cancer screening.

Review methods of billing, coding, the reimbursement platform, operational and financial feasibility of a centralized screening program.
Disclosures

No financial or vested interests in the information provided within this presentation
The Spirit of our Work: Meeting Quality Standards in Clinical Programs

Six Dimensions of Quality Healthcare
Institute of Medicine, Don Berwick
Swedish Cancer Institute
Division of Thoracic Surgery & Interventional Pulmonology

- 4 Hospital Medical Center
- 4 Thoracic Surgeons
- 2 Interventional Pulmonologists
- 2 ARNPs for surgical services
- 2 ARNP for Lung Cancer Screening Program
- 2 On-site Lung Cancer Screening Service Locations
History of Lung Cancer Screening at Swedish

- Participants in the International Early Lung Cancer Action Program (IELCAP) since 2000

- Designed and operationalized lung cancer screening program, November 2012 (pilot)

- Formal Tobacco Related Diseases and Lung Cancer Screening Program launched March 2013
When it Comes to Tobacco Related Diseases, We Can All Agree on This!

• Tobacco related diseases, including lung cancer, are too often disabling and deadly

• Best way to impact tobacco related diseases
  • Early detection
  • Better treatments for advanced disease
  • Primary prevention from ever smoking
  • Effective smoking cessation
1 out of 5 Americans Smoke

8 Million Meet Eligibility Criteria for Lung Cancer Screening

42 Million Current Smokers in US

http://www.cdc.gov/tobacco/data_statistics/fact_sheets/adult_data/cig_smoking/
Tobacco Related Diseases are Costly

- $7.00/ pack of cigarettes smoked are spent on health care for tobacco related diseases = $150 Billion in healthcare expenditure

- $150 Billion loss in productivity

- 1 in 5 smokers will die of a tobacco related disease, 10 years before their never smoking peers

Jha, P et al. NEJM 368: 341, 2013
MMWR Morb Mortal Wkly Rep 2001; 51 (14): 300-303
Tobacco Related Diseases Leading the Top Four Causes of Death in U.S.

- Heart Disease
- Cancer
- COPD
- CVA

Data on Quitting

**Interest in Quitting**

- 70% want to quit
- 52% make a quit attempt every year
- 3-5% successfully quit on their own

**Benefit of Multi-Modal Therapy**

- 3% quit on advice alone
- 10% with counseling
- 70-100% with counseling, medication treatment, and clinical follow-up

Where is the common place in which we can apply this data and impact health outcomes?

Lung Cancer Screening!
Challenges in Lung Cancer Screening

1. Determination of eligibility and the need for Shared Decision Making
2. Volumes of patients and nodules
3. Potential variation in delivery, interpretation, and reporting of low dose CT scan
4. Potential for variation in nodule management and harm
5. Ensuring safe and quality outcomes
6. High risk for losing nodules to follow-up
7. Managing incidental findings on Low Dose CT scan
8. Accommodating CMS registry data requirements
9. Smoking as a cancer risk and modifiable behavior
10. High potential for psychological distress when nodules are detected
Psychological Impact of Screening: It Is Real

- Did not understand the language
- Did not understand the implications of the findings
- Found the term “nodule” baffling
- Most over estimated the risk of cancer at 50/50 when their real risk was 3%.
- Felt that a dangerous situation was being ignored
- Most people sought outside opinion and care
- Most patients did not have adequate knowledge
- The info they obtained was misleading and inaccurate
- Patients were fearful of what they might learn and used active avoidance to cope

Decentralized Lung Cancer Screening: The Traditional Model

Order written

LDCT scan performed

Results are called or mailed to patient

Patient advised to quit smoking, given resources

Patient recalled for f/u CT by radiology or referring provider

Patient referred out for critical findings
Centralized Lung Cancer Screening Model at Swedish Cancer Institute

Patient referred for screening

Eligibility Determined (Call)

Not Eligible

Eligible

Shared Decision Making visit scheduled + conducted

Low dose CT scan is performed w/ same day in-person visit

Screening Center responsible for recall + followup

Screening Center responsible for critical CT findings

Options for screening discussed with patient + referring provider notified
Swedish Tobacco Related Diseases and Lung Cancer Screening Program

Assess & Counsel for Tobacco Related Diseases

Smoking Cessation Counseling and Treatment

Lung Cancer Screening by Low Dose CT Scan

Patient Education and Primary Care Engagement
Shared Decision Making Visit

- Face-to-face meeting with ARNP
- Review eligibility criteria
- Discuss risks: false-positive findings, overdiagnosis, radiation exposure
- Discuss that early detection is contingent on adherence to annual screening or sooner as needed
- Discuss best way to prevent lung cancer and other tobacco-related diseases is to quit smoking
- Smoking cessation information is provided in preparation for next visit
- Decision Aids and Risk Tools utilized as necessary
- If patient declines screening, relationship terminated and referring provider notified
- If patient agrees, schedules CT scan and follow-up visit
Clinical Pillar 1

Assessment and Counseling for Tobacco Related Diseases

- Medical history
- Review of Systems with emphasis on Tobacco Related Diseases
- Physical Exam
- Review other CT findings and discuss significance of findings
- Discuss follow-up needed and engage Primary Care Provider
Prevalence of Tobacco Related Diseases and Other Imaging Findings

<table>
<thead>
<tr>
<th>Type</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiac</td>
<td>63%</td>
</tr>
<tr>
<td>Emphysema</td>
<td>39%</td>
</tr>
<tr>
<td>Nodules ≥ 6mm</td>
<td>31%</td>
</tr>
<tr>
<td>Other CT Findings</td>
<td>20%</td>
</tr>
<tr>
<td>Aorta</td>
<td>8%</td>
</tr>
<tr>
<td>Liver</td>
<td>5%</td>
</tr>
</tbody>
</table>
Improving Information Exchange and the Patient Experience in Delivery of Results

- Use less medical jargon
- Desire in person appointments to discuss results
- Want to see the nodules/images themselves
- Desire more information about what a lung nodule is
- Want to know the actual statistical risk of lung cancer
- Don’t want their nodules and concerns minimized
- Want to know more about the long range plan
- Prefer notification in person versus mail or phone

Clinical Pillar 2
CT Results Review
Improving Information Exchange and the Patient Experience

Face-to-Face encounter → Discuss nodules → Use plain and simple language and pictures

Review CT films and results together → Discuss follow-up and rationale → Provide date of follow-up imaging study in writing
Clinical Pillar 3
Smoking Cessation Counseling and Treatment

- Certified Tobacco Treatment Specialist Available
- Readiness to quit assessed
- Counseling
- Clinical follow-up as indicated until quit or determine otherwise
- Personalized treatment plan
- Follow-up on tobacco use at each screening visit
Smoking Cessation Success in Our Program

55% Smoking on Entrance into Lung Screening Program

96% Agree to Counseling

71% Agree to Treatment

53% Are Quit on Follow-up CT Scan

66% have Progressed in their Readiness to Quit Stages
Nicotine Dependence is a Chronic Disease and Should be Treated Like One

- Treatment methods are well established and evidence based
- Treatment should be offered to all who are eligible
- Treatment delivers the greatest chances of long-term quit success
- All clinicians should be well versed and comfortable with prescribing available treatments
- Tobacco treatment should be delivered as compassionately and aggressively as cancer care (ASCO, 2015)

Treatment saves lives!
Capitalize on Teachable Moments

• Health related events spur behavior change and are teachable moments
• Teachable moments occur in a patient-clinician interaction
• Most patients want to quit but just don’t know how
Emphasis on Education

Interactive: Smoking and Tobacco Related Diseases

Tobacco has existed for hundreds of years, all around the world. Most people have heard that tobacco and tobacco smoke are not good for us, but it can be difficult to understand how tobacco hurts our bodies from head to toe. The effects of tobacco and tobacco smoke are complex and include many different diseases and conditions ranging from cancer to diabetes. You can click on the circles below to learn more. Click here for references.
Multidisciplinary Work Flow for Critical Findings

Critical Findings Pathway

- Same day CT scan and visit
- Multidisciplinary Review for all Critical Findings
- Referred for Diagnostic Imaging and Procedure as Indicated
- Referred to Thoracic Surgery as Indicated
- Smoking Cessation Follow-Up as Indicated
- Correspondence with PCP and all Care Providers
Nodule Management: Engaging the Multidisciplinary Team

- Bimonthly meeting
- Review all critical findings
- Ensures adherence to clinical guidelines
- Establishes consensus in management of nodules
### Work Flow for Routine Findings

#### Routine Findings Pathway

- **Same day CT scan and visit**
- **Multidisciplinary Review for all Critical Findings**
- **Interval Follow-Up CT Scan as Indicated**

#### Critical Findings Pathway

- **Referred for Diagnostic Imaging and Procedure as Indicated**
- **Referred to Thoracic Surgery as Indicated**
- **Smoking Cessation Follow-Up as Indicated**
- **Correspondence with PCP and all Care Providers**

---

**SWEDISH CANCER INSTITUTE**

Extraordinary care. Extraordinary caring™
Trajectory of Program Growth

Total Patients
January 2014 to Current

Total Patients

Months

Jan-14
Mar-14
May-14
Jul-14
Sep-14
Nov-14
Jan-15
Mar-15
May-15
Jul-15
Sep-15
Nov-15
Jan-16
Mar-16
May-16

Trajectory of Program Growth
Internal Lung Cancer Screening Registry

- Procedures and quality outcomes
- Nodule tracking/Recall
- Research
- CMS Registry
## Cancers Detected in Screening Program

<table>
<thead>
<tr>
<th>Cancers</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early Stage Lung</td>
<td>13</td>
</tr>
<tr>
<td>Late Stage Lung</td>
<td>3</td>
</tr>
<tr>
<td>Metastatic Disease to Lung</td>
<td>2</td>
</tr>
</tbody>
</table>
Case Study

72 y/o male with 68 pack year history. Currently smoking 10 cigarettes per day. ROS reveals worsening exercise tolerance with productive cough over the past year that now interferes with his ability to work as a carpenter in his shop. No formal pulmonary function tests, no history of diagnosis of emphysema or COPD.

Physical exam: Expiratory and inspiratory wheezes throughout.

Low dose CT scan: demonstrates moderate to severe emphysema, extensive CAD, and multiple lung nodules ≤ 5mm.
Sample Clinical Note
New Patient, High Level Complexity
Care and Time.
(99205)

Assessment and Plan:

1. **Lung Cancer Screening & Multiple Lung Nodules**: Screening low dose CT scan was performed today, the CT scan and results were reviewed with the patient. We discussed the prevalence of lung modules in the screening population which reaches 24%, the overall malignancy rate of 3% and high rate of benign findings. …

2. **Coronary Artery Disease**: Patient has evidence of extensive coronary artery disease on imaging today. He has the following risk factors for CAD: HTN, hyperlipidemia and active smoker, and asymptomatic. We discussed the value of quitting smoking ….

3. **Emphysema and DOE**: Patient has evidence of severe emphysema on imaging today. He reports having shortness of breath, dyspnea on exertion, chronic productive cough and declining exercise tolerance symptoms that are getting worse over the past year. The difference between emphysema findings and a clinical diagnosis of Chronic Obstructive Pulmonary Disease (COPD) …. 

4. **Nicotine dependence**: Patient opted for smoking cessation counseling Yes. Significant time was spent discussing nicotine use and the neurohormonal influence of nicotine on the nicotinic acetylcholine receptors in the brain. Discussed what withdrawal looks like and how to avoid withdrawal …

60 minutes was spent in this visit, > 50% of the time was spent counseling and coordinating care regarding the aforementioned assessment and plans.
Sample Clinical Note
Established Patient, Lower Complexity of Care and Time. Follow-up Visit (99214)

Assessment and Plan:

1. **Lung Cancer Screening & Multiple Lung Nodules:** Screening low dose CT scan was performed today, the CT scan and results were reviewed with the patient. We discussed the prevalence of lung modules in the screening population which reaches 24%, the overall malignancy rate of 3% and high rate of benign findings. ...

2. **Nicotine dependence:** Patient opted for smoking cessation counseling Yes. Significant time was spent discussing nicotine use and the neurohormonal influence of nicotine on the nicotinic acetylcholine receptors in the brain. Discussed what withdrawal looks like and how to avoid withdrawal ...

25 minutes was spent in this visit, > 50% of the time was spent counseling and coordinating care regarding the aforementioned assessment and plan.
Sample Clinical Note
Established Patient, Lowest Complexity of Care and Time. Follow-up Visit (99213)

Assessment and Plan:

1. **Lung Cancer Screening & Multiple Lung Nodules:** Screening low dose CT scan was performed today, the CT scan and results were reviewed with the patient. We discussed the prevalence of lung modules in the screening population which reaches 24%, the overall malignancy rate of 3% and high rate of benign findings. …

15 minutes was spent in this visit, > 50% of the time was spent counseling and coordinating care regarding the aforementioned assessment and plan.
### Average Professional Revenue per Visit

<table>
<thead>
<tr>
<th>CPT Codes</th>
<th>Commercial</th>
<th>Medicaid/Medicare</th>
<th>Self Pay</th>
</tr>
</thead>
<tbody>
<tr>
<td>99203</td>
<td>$110</td>
<td>$70</td>
<td>$174</td>
</tr>
<tr>
<td>99204</td>
<td>$200</td>
<td>$120</td>
<td>$250</td>
</tr>
<tr>
<td>99205</td>
<td>$250</td>
<td>$130</td>
<td>$300</td>
</tr>
<tr>
<td>99213</td>
<td>$99</td>
<td>$50</td>
<td>$99</td>
</tr>
<tr>
<td>99214</td>
<td>$120</td>
<td>$65</td>
<td>$155</td>
</tr>
</tbody>
</table>

### Payer Mix

<table>
<thead>
<tr>
<th>Payer Mix</th>
<th>Commercial</th>
<th>Medicaid/Medicare</th>
<th>Self Pay</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>47%</td>
<td>50%</td>
<td>3%</td>
</tr>
</tbody>
</table>
## Estimated Program Financials

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient Volumes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New</td>
<td>480</td>
<td>480</td>
<td>480</td>
<td>480</td>
</tr>
<tr>
<td>Established</td>
<td>0</td>
<td>460</td>
<td>910</td>
<td>1,370</td>
</tr>
<tr>
<td><strong>Total Patient Enrollment</strong></td>
<td>480</td>
<td>940</td>
<td>1,390</td>
<td>1,850</td>
</tr>
<tr>
<td>(accounts for 4% attrition)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Revenue</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Patient Visits</td>
<td>$87,003</td>
<td>$87,003</td>
<td>$87,003</td>
<td>$87,003</td>
</tr>
<tr>
<td>Follow Ups</td>
<td>$46,000</td>
<td>$91,000</td>
<td>$137,000</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$87,003</td>
<td>$133,003</td>
<td>$178,003</td>
<td>$224,003</td>
</tr>
<tr>
<td><strong>Costs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARNP Salary and Benefits</td>
<td>$130,000</td>
<td>$130,000</td>
<td>$130,000</td>
<td>$130,000</td>
</tr>
<tr>
<td>CME, Dues, Licenses</td>
<td>$2,500</td>
<td>$2,500</td>
<td>$2,500</td>
<td>$2,500</td>
</tr>
<tr>
<td>Taxes</td>
<td>$1,000</td>
<td>$1,000</td>
<td>$1,000</td>
<td>$1,000</td>
</tr>
<tr>
<td>Supplies</td>
<td>$3,000</td>
<td>$3,000</td>
<td>$3,000</td>
<td>$3,000</td>
</tr>
<tr>
<td>Occupancy</td>
<td>$40,000</td>
<td>$40,000</td>
<td>$40,000</td>
<td>$40,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>$176,500</td>
<td>$176,500</td>
<td>$176,500</td>
<td>$176,500</td>
</tr>
<tr>
<td><strong>Net Operating Income</strong></td>
<td>$(89,497)</td>
<td>$(43,497)</td>
<td>$1,503</td>
<td>$47,503</td>
</tr>
</tbody>
</table>
# Generation of Downstream Activity from a Lung Cancer Screening Program

<table>
<thead>
<tr>
<th>Imaging and Cancers Detected</th>
<th>Incidental Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Imaging 100%</td>
<td>• Benign Esophageal</td>
</tr>
<tr>
<td>• CT scans</td>
<td>• Cardiac</td>
</tr>
<tr>
<td>• PET scans</td>
<td>• Pulmonary</td>
</tr>
<tr>
<td>• TTNB</td>
<td>• Vascular</td>
</tr>
<tr>
<td>• Lung Cancer Cases 3.5%</td>
<td></td>
</tr>
<tr>
<td>• EBUS/Nav Bronch</td>
<td></td>
</tr>
<tr>
<td>• Surgery</td>
<td></td>
</tr>
<tr>
<td>• Chemo/Rads</td>
<td></td>
</tr>
</tbody>
</table>
2015 Nurse Practitioner State Practice Environment

Green: Full
Yellow: Collaborative
Red: Restrictive

Benefits of a Centralized Screening Program

- Meets CMS screening requirements
- A patient-centered care delivery model
- Capitalizes on a teachable moment
- Delivers a safe and responsible approach to screening and reduces potential harms
- Earlier detection of cancers and reduced downstream health care costs in cancer and tobacco related diseases care
- Aligns with basic public and community health principles while contributing to a healthier population through disease prevention by smoking cessation
Taking Clinical Care One Step Further

- Center for Nicotine Dependence
- Incidental Pulmonary Nodule Clinic
- Tobacco Related Diseases and Lung Cancer Screening Program
- TeleLung
- TeleTobacco
Thank you!

Joelle.Fathi@swedish.org