Best Practice Management of Lung Cancer: ProvenCare®

Mark R. Katlic, M.D., M.M.M., F.A.C.S.

Chairman, Department of Surgery
Surgeon-in-Chief
Sinai Hospital
Baltimore, Maryland
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Nothing to Disclose
Making the Case for Change

Why Bother Changing What is Working So Well?
Patterns of Surgical Care of Lung Cancer Patients

Alex G. Little, MD, Valerie W. Rusch, MD, James A. Bonner, MD, Laurie E. Gaspar, MD, Mark R. Green, MD, W. Richard Webb, MD, and Andrew K. Stewart, MA

Department of Surgery, Wright State University School of Medicine, Dayton, Ohio; Memorial Sloan-Kettering Center, New York, New York; Radiation Oncology, University of Alabama, Birmingham, Alabama; Anschutz Cancer Pavilion, University of Colorado Health Science Center, Aurora, Colorado; Hollings Cancer Center, Medical University of South Carolina, Charleston, South Carolina; Department of Radiology, University of California, San Francisco, California; and American College of Surgeons and the National Cancer Data Base, Chicago, Illinois

Background. This survey was performed to determine the patterns of surgical care provided patients with non-small cell lung carcinoma (NSCLC).

Methods. In 2001, the American College of Surgeons carried out a patient care survey of 729 hospitals to retrieve information of NSCLC patients’ history, evaluation, pathology, and surgical treatment.

Results. Inclusion criteria were met by 40,090 patients: of whom 11,668 (29.1%) were treated surgically; 74.2% alone and 25.8% as part of multimodality therapy. Of these patients, 59.5% were in stage I, 17.5% in stage II, 17.0% in stage III, and 6.0% in stage IV. Surgery patient demographics were the following: 55% male and 45% female; 46.8% 70 years or older; and 76.3% had significant comorbidities. Tumor characteristics: squamous 28%, adenocarcinoma 37.6%, other 34.4%. Staging: in addition to radiologic examinations, preoperative mediastinoscopy was performed in 27.1% of operated patients with node biopsy in only 46.6% of these procedures. Operations: wedge resection 15.6%, lobectomy 70.8%, pneumonectomy 13.6%. Surgical margins were positive in 7.8%, but only 65.2% had frozen section analysis. Perioperative mortality was 5.2%, but was 4.0% in nontransfused patients and 12.7% in transfused patients and was 3.2% in high-volume (more than 90 operations per year) versus 4.8% in low-volume hospitals (p < 0.001).

Conclusions. (1) Patients being operated for NSCLC are elderly with significant comorbid conditions. (2) More patients than previously are female and have adenocarcinoma. (3) Mediastinoscopy is infrequently performed and lymph nodes are biopsied in less than 50% of them. (4) Lobectomy is the most common operation, and positive surgical margins are too frequent. (5) Operative mortality is reasonable but transfusion is a marker for increased risk and outcomes are superior in high-volume hospitals. (6) Hospitals with higher volume had fewer perioperative deaths.

Making the Case for Change

Patterns of Surgical Care Study

• Mediastinoscopy done in 27%
  Only 47% had LN’s biopsied

• During lung surgery, 58% had mediastinal LN’s sampled

• Only 65% of patients had frozen section on margins
  Positive surgical margin in 7.8%
Making the Case for Change

Patterns of Surgical Care Study

• Medistinoscopy done in 27%
  
  Only 47% had LN’s biopsied

  51.9% in Academic Centers

• During lung surgery, 58% had mediastinal LN’s sampled

• Only 65% of patients had frozen section on margins
  
  Positive surgical margin in 7.8%
Making the Case for Change

Optimal Lung Resection Therapy Varies by Surgeon Specialty

- Nationwide Inpatient Sample 1998-2007
- 222,223 patients, primary lung cancer resections
- Thoracic vs. Cardiac vs. General Surgeon

Fig 1. Lymphadenectomy rates overall and by surgeon type over time.
Making the Case for Change

Optimal Lung Resection Therapy Varies by Surgeon Specialty

Lymphadenectomy

Cardiac and General Surgeons: 55%
Thoracic Surgeons: 73%

Ratio of thoracic lymphadenectomy to total lung resections

Agenda

• Introduction to ProvenCare®

• The Collaborative Model
  Formation
  Chronology
  Participant Strategy
  Evidence Consensus

• ProvenCare® Lung Cancer Pilot Study

• Early Findings / Results
Introduction to ProvenCare®
ProvenCare®

A Geisinger Health System program to deliver to patients, families, referring physicians and payors substantially improved quality and value for a defined set of health care services by:

Redesign of complex systems to embed evidence-based best practices reliably, into everyday patient flow

Activating patients and families to be engaged in the care processes

Aligning the interests of the patient, provider, payor and purchaser
ProvenCare® Components

• Activated patient and family

• Appropriateness documented

• Evidence/consensus-based best practices

• “Hardened,” optimized work flows to assure reliable delivery

• “Episode of Care” packaged pricing

• Performance-based reimbursement (Warranty)
ProvenCare® Components

• Activated patient and family

• Appropriateness documented

• Evidence/consensus-based best practices

• “Hardened,” optimized work flows to assure reliable delivery

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More than just a checklist
Current State at Geisinger

Acute

- CABG
- PCI
- Total Hip Replacement
- Cataract
- Bariatric
- Low Back Care
- Perinatal Care
- Lung Cancer

Chronic

- Adult Preventive
- CAD
- Diabetes
<table>
<thead>
<tr>
<th>Outcome</th>
<th>Before ProvenCare® (n=132)</th>
<th>With ProvenCare® (n=181)</th>
<th>% Improvement/Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-hospital mortality</td>
<td>1.5 %</td>
<td>0 %</td>
<td>21 %</td>
</tr>
<tr>
<td>Patients with any complication (STS)</td>
<td>38 %</td>
<td>30 %</td>
<td>28 %</td>
</tr>
<tr>
<td>Patients with &gt;1 complication</td>
<td>7.6 %</td>
<td>5.5 %</td>
<td>28 %</td>
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<tr>
<td>Atrial fibrillation</td>
<td>23 %</td>
<td>19 %</td>
<td>17 %</td>
</tr>
<tr>
<td>Neurologic complication</td>
<td>1.5 %</td>
<td>0.6 %</td>
<td>60 %</td>
</tr>
<tr>
<td>Any pulmonary complication</td>
<td>7 %</td>
<td>4 %</td>
<td>43 %</td>
</tr>
<tr>
<td>Blood products used</td>
<td>23 %</td>
<td>18 %</td>
<td>22 %</td>
</tr>
<tr>
<td>Re-operation for bleeding</td>
<td>3.8 %</td>
<td>1.7 %</td>
<td>55 %</td>
</tr>
<tr>
<td>Deep sternal wound infection</td>
<td>0.8 %</td>
<td>0.6 %</td>
<td>25 %</td>
</tr>
<tr>
<td>Readmission within 30 days</td>
<td>6.9 %</td>
<td>3.8 %</td>
<td>44 %</td>
</tr>
</tbody>
</table>
ProvenCare® CABG Financial Outcomes

• Average total LOS fell 0.5 days (6.2 vs 5.7)
• Hospital net revenue grew 7.8%
• Contribution margin of index hospitalization grew 16.9%
• Net inpatient margin grew 126%
• Readmission rate fell 45%
CABG ProvenCare
Patient #86
"ProvenCare℠"

A Provider-Driven Pay-for-Performance Program for Acute Episodic Cardiac Surgical Care

Alfred S. Casale, MD, Ronald A. Panius, MD, Mark J. Selna, MD, Michael C. Dool, PA-C, Albert E. Bother, Jr., MD, Karen E. McKinley, RN, Scott A. Berry, MS, Duane E. Davis, MD, Richard J. Gilliland, MD, Bruce H. Hamory, MD, and Glenn D. Steele, Jr., MD

Objective: To test whether an integrated delivery system could successfully implement an evidence-based pay-for-performance program for coronary artery bypass graft (CABG) surgery.

Methods: The program consisted of 3 components: (1) establishing implementable best practices; (2) developing risk-based pricing; (3) establishing a mechanism for patient engagement. Surgeons reviewed all class 1 and IIa “2004 American Heart Association/American College of Cardiology Guidelines for CABG Surgery” and translated them into 40 verifiable behaviors. These were embedded within a new ProvenCare℠ program and “hard-wired” within the electronic health record system, including order sets, templates, and “time outs". Concurrently preoperative, inpatient, and postoperative care within 90 days was packaged into a fixed price. A Patient Compact was developed to highlight the importance of patient activation. All elective CABG patients treated between February 2, 2006 and February 2, 2007 were included (ProvenCare℠ Group) and compared with 127 patients treated in 2005 (Conventional Care Group).

Results: Initially, only 59% of patients received all 40 best practice components. At 3 months, program compliance reached 100%, but fell transiently to 86% over the next 3 months. Reliability subsequently increased to 100% and was sustained for the remainder of the study period. The overall trend in reliability was significant at P = 0.001. Thirty-day clinical outcomes showed improved trends (Table 1) but only the likelihood of discharge to home reached statistical significance. Length of stay decreased by 15% and median hospital charges fell 5.2%.

Healthcare delivery in the United States faces significant quality and cost problems. Medical care is often inappropriate when judged against accepted standards with numerous examples of excess utilization and conversely, appropriately indicated care is frequently not provided.¹ This inconsistency leads to wide, unexplained variation in rates of procedures, expenditures, and outcomes.² Landmark publications by the Institute of Medicine and the Rand Corporation⁴⁻⁵ have focused increased professional and public attention on these issues. Nevertheless, healthcare providers continue to be paid for units of care delivered independent of quality or results achieved. Poor outcomes, such as postoperative complications that require reoperation, often result in more payment.

Care reliability is inconsistent. Best practice guidelines are sometimes based on equivocal evidence, and are often ignored or poorly applied.⁶ Translation of even the best guidelines into actual behavior is difficult and slow-paced. The fragmentation of our delivery systems⁷ and the influence of diverse and often opposing economic factors can overwhelm the influence of science and well-meaning intentions in determining acceptance and dissemination of best practices.⁸

Strategies to improve this system have included mandates from regulators, federal and state agencies, and payers. Public reports of outcome measures are often derived from administrative databases and have typically had only modest
In Bid for Better Hospital Care, Heart Surgery With a Warranty
Current State at Geisinger

Acute
- CABG
- PCI
- Total Hip Replacement
- Cataract
- Bariatric
- Low Back Care
- Perinatal Care
- Lung Cancer

Chronic
- Adult Preventive
- CAD
- Diabetes
Current State at Geisinger

Acute
- CABG
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- Total Hip Replacement
- Cataract
- Bariatric
- Low Back Care
- Perinatal Care
- **Lung Cancer**

Chronic
- Adult Preventive
- CAD
- Diabetes
The Collaborative Model
Formation

• CEO Glenn Steele, Jr. proposed collaboration between Geisinger and American College of Surgeons Commission on Cancer (CoC) for ProvenCare® national cancer pilot

• CoC reps visited Geisinger in March, 2009
  • Group agreed on non-small cell lung cancer
  • The Society of Thoracic Surgeons (STS) suggested as another collaborator
  • 6-8 facilities, academic and community

• Concept approved by CoC Executive Committee

ACS Commission on Cancer National Pilot Study for ProvenCare® Lung Cancer
Why this Collaborative?

- Establish the precedent of working with a national, disease-specific, professional organization
- Determine scalability
- Determine generalizability
- Establish feasibility in organizations without an EHR
- Determine ability to implement in a non-employed physician environment
COLLABORATIVE ENGAGEMENT RULES

Personnel
Appropriate human resources must be appointed and charged with responsibility to do the collaborative work

- Teams are to be co-led by the thoracic surgeon and administrator (e.g. nursing or dept admin)
- Multidisciplinary—MD, mid-levels, nursing, techs, IT
- Consider assigning an improvement specialist/coach or project manager
COLLABORATIVE ENGAGEMENT RULES

Data

• Collaborative members agree to share all HIPPA compliant data in a transparent and timely manner

• CoC will develop a web-based standardized data collection tool

• A single analytic study will be promoted
Participant Strategy

- **Intentionally DIVERSE Institution Types**
- **Goal = Establish RELIABILITY**
  - Across variety of health care delivery platforms
  - Across variety of patient populations
  - With paper OR electronic medical record
Thoracic Surgeon Leaders

- Duke Raleigh Hospital
  - David White, M.D.
- Geisinger Health System
  - Matthew Facktor, M.D.
  - Mark Katlic, M.D.
- Kern Medical Center
  - Jemi Olak, M.D.
- NorthShore University
  - John Howington, M.D.
- Northwestern University
  - Malcolm DeCamp, Jr., M.D.
- University of Washington
  - Douglas Wood, M.D.
Collaborative Participants

6 Diverse Institutions

• 4 Academic Medical Centers
  – 2 Urban (NCI designated Comprehensive Cancer Centers)
  – 1 Suburban
  – 1 Rural (NCI designated Community Cancer Program)

• 2 Community Medical Centers
  – 1 Suburban (University affiliate)
  – 1 County-owned
    – Solo thoracic surgeon
    – Minimal IT support
Collaborative Participants

Phase I
1. Geisinger Health System, PA
2. Duke Raleigh, NC
3. Kern Medical Center, CA
4. NorthShore, Ill
5. Northwestern, Ill
6. University of Washington, WA
Collaborative Participants

Phase II
7. Baystate MC, MA
8. Stony Brook UMC, NY
9. Providence Health, OR
10. Providence Regional, WA
11. Sinai Hospital, MD
12. UMass Regional MC, MA
Thoracic Surgeon Leaders

- Baystate Medical Center, Rose Ganim, M.D.
- Duke Raleigh Hospital, David White, M.D.
- Geisinger Health System, Matthew Facktor, M.D.
- Kern Medical Center, Jemi Olak, M.D.
- NorthShore University, John Howington, M.D.
- Northwestern University, Malcolm DeCamp, Jr., M.D.
- Providence Health, John Handy, M.D.
- Providence Regional, Kimberly Costas, M.D.
- Sinai Hospital, Nikhilesh Korgaonkar, M.D.
- Stony Brook, Thomas Bilfinger, M.D.
- University of Massachusetts, Syed Quadri, M.D.
- University of Washington, Douglas Wood, M.D.
Evidence Consensus

- Existing “best practices” examined thoroughly
  - No pre-existing comprehensive guideline

- Original draft – 3 Geisinger surgeons

- Final draft – 14 surgeons
  - One meeting, one day
  - Consensus in just a few hours
  - 38 total elements
Best Practice Resources

1. CMS Quality Measures (Patient Quality Reporting Initiative, PQRI)
2. ACS National Surgical Improvement Program (NSQIP)
3. ACS Infection & Ventilator Bundles
4. National Quality Forum Voluntary Consensus Standards for Cardiac Surgery
5. National Comprehensive Cancer Network (NCCN)
6. American College of Chest Physicians (ACCP)
7. American College of Cardiology (ACC) & American Heart Association (AHA)
8. Society of Thoracic Surgeons (STS) General Thoracic Surgery Database
ProvenCare® Elective Pulmonary Resection: Process Flow with Examples of Best Practices

Clinic
- PET/CT
- Clinical Stage
- PFTs
- EKG (age≥50)
- Smoking status

Pre-op
- Antibiotics
- DVT prevention
- “Time Out”

OR
- Bronchoscopy
- Mediastinoscopy
- R0 resection
- ≥3 lymph nodes

Post-op
- CXR ≤4 hrs
- Pain protocol
- Pulmonary plan
- DVT prevention
- Follow-up plan

Return Clinic
- Final Stage
- Oncology plan
- Smoking status
ProvenCare® Elements

Pre-Admission Elements

- Treatment options will be discussed and patient preferences determined
- Beta-blockade for all patients on beta-blockers will be maintained through the perioperative period
- Determine & document pre-operative use of ASA / clopidogrel
- Withhold warfarin for 5 days prior to surgery
- Spirometry performed within 180 days prior to surgery and surgeon documents awareness of result
- EKG performed within 180 days prior to surgery (if age ≥ age 50 years) and surgeon documents awareness of result
- Documentation of smoking history
  - Yes / No
  - If yes, then pack-years
  - If yes, then smoking cessation counseling initiated
- Chest CT imaging performed within 60 days prior to surgery and surgeon documents awareness of result
- PET scan imaging performed within 60 days prior to surgery and surgeon documents awareness of result
- Brain MRI obtained for any patients Clinical Stage III-A or greater and surgeon documents awareness of result
- Multidisciplinary evaluation performed for any patients Stage III-A or greater and surgeon documents awareness of result
- If any prior biopsy has been performed, then a copy of the pathology report is available in the medical record and has been reviewed by the surgeon
- Clinical performance status will be measured (Zubrod & ASA systems)
- Clinical disease stage is established, discussed with the patient, and documented in the medical record
- Patient activation (signed contract – based upon previous ProvenCare® projects)
ProvenCare® Elements

In-Patient Operative Elements
- Warfarin will be withheld 5 days pre-op (if applicable)
- Pre-op antibiotics will be given within 60 minutes prior to incision (120 for vanco)
- The appropriate antibiotic will be selected
  - 1st choice = 1st generation cephalosporin
  - 2nd choice (allergy) = Vancomycin or clindamycin
- A cervical mediastinoscopy will be performed in all patients with Clinical Stage I-B or greater unless the mediastinal lymph nodes have been previously pathologic evaluated
- At least 3 mediastinal lymph node stations will be sampled or dissected during resection
- DVT prophylaxis will be accomplished pre-operatively and maintained during the peri-operative period using mechanical, pharmacologic, or both methods
- Documentation of hair removal method, if done (clip, not shave)
- A universal protocol, as defined by the Joint Commission (including surgical time out) will be performed in the operating room prior to the procedure
- Bronchoscopy must have been performed prior to procedure
- For Stage T1b or greater, pulmonary resection will be accomplished in an anatomic fashion
- If a pneumonectomy is performed, surgeon documents consideration of sleeve resection
ProvenCare® Elements

Inpatient Postoperative Elements

- Although an R0 is the goal of every resection, if a pathology report reveals a positive margin then the limitations shall be documented and implications and alternatives for further care will be reviewed.

- Antibiotics will be discontinued 24 hrs after of surgery end time (institution SCIP definition).

- Smoking cessation counseling will be reinforced.

- A structured post-resection pulmonary toilet regimen will be used.

- Pain assessment protocol, including reassessment for recurrent pain above threshold will be followed.

- A CXR will be performed within 4 hours of leaving the operating room and notation of its review made in the chart.

- Justification for indwelling bladder catheters will documented in the chart every 24 hrs.

- Plan for follow-up after discharge will be documented and reviewed with patient.
ProvenCare® Elements

Post-Discharge Elements
- Documentation of smoking status at follow-up and smoking cessation counseling will be reinforced
- Pathologic Stage will documented using synoptic data
- Written oncology care plan (including disease name, type, treatment rendered, and further treatment and/or surveillance recommendations) will be established and reviewed with patient and their referring physician
- Medical oncology referral will be offered to all patients Pathologic Stage II or greater
My Role in NorthShore’s Lung Cancer Program

The NorthShore University HealthSystem (NorthShore) lung cancer surgery team has your health and safety as its chief concern. That is why we established the NorthShore Lung Cancer Program. Our team is committed to providing all of the care steps necessary to ensure the highest quality care before, during and after your lung cancer operation. Your active participation is one of the most important parts of this program. Medical research has shown that the more involved you are in your own care — and the stronger the partnership between you and your caregivers — the better your results will be. We believe that you will get the best result when you, your family and your NorthShore surgery team are all active partners in your care.

I commit to:

COMMUNICATING WITH MY SURGERY TEAM
✓ I will call my surgery team when I don’t understand something, when anything worries me, or if anything unexpected occurs, knowing that my surgery team will work with me until I am satisfied.
✓ I will discuss all of my current medicines, non-prescription products, vitamins or herbs as well as all of my current and past medical problems, recognizing how important this information is in guiding my care and making me safer.

INVOLVING FAMILY AND LOVED ONES
✓ I will have a trusted family member or loved-one present with me during my operation and clinic visits - to help support me during my care.
✓ I will work with my surgery team to develop a sensible plan for my transition from the hospital.

COMPLETING IMPORTANT CARE STEPS
✓ I will alert my surgery team before I stop or start any new medications so that we can discuss how any change might impact my care.
✓ I will use my spirometer and complete my breathing exercises as directed before and after-surgery.
✓ I will follow my after-surgery precautions and instructions because I know that by following these I will be more likely to have a better recovery from my operation.
✓ I will work with my surgery team to develop a sensible schedule for my after-surgery care and follow-up clinic visits.

I realize that my decisions and my behavior have a significant positive impact on my recovery. Because I want to become and stay healthy, I fully accept my role as a partner in the NorthShore Lung Cancer Program.

[PATIENT NAME] ___________________________ Date ___________________________

I commit our team to provide all of the care steps necessary to ensure the highest quality care before, during and after your lung cancer operation.

[PHYSICIAN NAME] ___________________________

Rev07.10
<table>
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<tr>
<th>Pre Admission Elements</th>
<th>YES</th>
<th>NO</th>
<th>NA</th>
<th>Instruction</th>
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<tbody>
<tr>
<td>Treatment options were discussed and patient preferences determined?</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Is the patient taking a Beta-blocker?</td>
<td>YES</td>
<td>NO</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Is the patient taking Plavix(Clopidogrel)?</td>
<td>YES - Discontinue</td>
<td>YES - Continue</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>Is the patient taking Aspirin?</td>
<td>YES - Discontinue</td>
<td>YES - Continue</td>
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<td></td>
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<tr>
<td>Is the patient taking Coumadin(Warfarin)?</td>
<td>YES</td>
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<td>NA</td>
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<td>Spirometry performed within 180 days prior to surgery and surgeon documents awareness of result?</td>
<td>YES</td>
<td>NO</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>EKG performed within 180 days prior to surgery (if age &gt;= 50) and surgeon documents awareness of result?</td>
<td>YES</td>
<td>NO</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Does the patient have a Smoking Hx?</td>
<td>YES</td>
<td>NO</td>
<td>NA</td>
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<tr>
<td>Has Chest CT scan been performed within the last 60 days and surgeon documents awareness of result?</td>
<td>YES</td>
<td>NO</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Has PET scan been performed within the last 60 days and surgeon documents awareness of result?</td>
<td>YES</td>
<td>NO</td>
<td>NA</td>
<td></td>
</tr>
</tbody>
</table>
Cerner Pre-Admission Navigator
# EPIC Postop Orders

| IP Order: Chest Tube Care: -20 cm H₂O suction except when ambulating or transporting | ONGOING, Starting S Until Specified, Routine |
| IP Order: Chest Tube Care: -20 cm water suction, never off suction | Starting S Until Specified, Routine |
| IP Order: Foley Catheter for 24 Hours Then Remove | Order details |
| IP Order: Saline Lok with Peripheral Flush | Order details |
| IP Order: Chest Tube Care: Change chest tube gauze bandage | DAILY, Starting S Until Specified, Routine |
| IP Order: Shower - OK to shower with Chest Tube | PRN, Starting S+2 Until Specified, Routine |
| IP Order: Nursing Communication: Okay for patient to leave floor OFF telemetry and Chest Tube suction for testing unless ordered never off suction | ONGOING, Starting S Until Specified, Routine |

### Isolation
- **IP Order: Isolation**
  - Routine

### Respiratory
- **IP Order: Respiratory Patient Driven Protocol**
  - Routine
- **IP Order: Incentive Spirometry**
  - Q1H, Starting S Until Specified, Routine
- **IP Order: oxygen**
  - 4 L/min(Oxygen), Nasal cannula, OXYGEN PRN, Starting S, Routine, Wean off, keeping sats greater than or equal to 90%
- **IP Order: Flutter Therapy**
  - Routine
EPIC Flowsheet

<table>
<thead>
<tr>
<th>Flowsheet: PROVEN CARE LUNG</th>
<th>Gen RN</th>
<th>Admission Data</th>
<th>Wound Exam</th>
<th>HBOT Session Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planned Date of Surgery?</td>
<td></td>
<td></td>
<td></td>
<td>8/30/10</td>
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<tr>
<td>Treatment options discussed and patient preferences determined</td>
<td></td>
<td></td>
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<td>8/31/2010</td>
</tr>
<tr>
<td>Beta-blockade for all patients on beta-blockers will be maintained through the perioperative period</td>
<td></td>
<td></td>
<td></td>
<td>On BB</td>
</tr>
<tr>
<td>Determine &amp; document pre-operative use of ASA/clopidogrel</td>
<td></td>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Withhold warfarin for 5 days prior to surgery (DATE OF SURGERY)</td>
<td></td>
<td></td>
<td></td>
<td>8/26/2010</td>
</tr>
<tr>
<td>Spirometry performed within 180 days prior to surgery and surgeon documents awareness of result</td>
<td></td>
<td></td>
<td></td>
<td>Normal</td>
</tr>
<tr>
<td>EKG performed within 180 days prior to surgery (if age &gt; 50 years) and surgeon documents</td>
<td></td>
<td></td>
<td></td>
<td>Needs C...</td>
</tr>
<tr>
<td>Chest CT imaging performed within 60 days prior to surgery and surgeon documents awareness of</td>
<td></td>
<td></td>
<td></td>
<td>Docume...</td>
</tr>
<tr>
<td>On Pacs - Chest CT</td>
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<td>No</td>
</tr>
<tr>
<td>PET scan imaging performed within 60 days prior to surgery and surgeon documents awareness of</td>
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<td></td>
<td></td>
<td>Docume...</td>
</tr>
<tr>
<td>On PACS-Pet scan</td>
<td></td>
<td></td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Brain MRI obtained for any patients Clinical Stage III-A or greater and surgeon documents awareness</td>
<td></td>
<td></td>
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<td>Docume...</td>
</tr>
<tr>
<td>On PACS- Brain MRI</td>
<td></td>
<td></td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Multidisciplinary evaluation performed for any patients stage III-A or greater and surgeon documents</td>
<td></td>
<td></td>
<td></td>
<td>Docume...</td>
</tr>
<tr>
<td>If any prior biopsy has been performed, then a copy of the pathology report is available in the</td>
<td></td>
<td></td>
<td></td>
<td>patholog...</td>
</tr>
<tr>
<td>Clinical performance status will be measured ( Zubrod &amp; ASA systems)</td>
<td></td>
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<td>Docume...</td>
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</table>
WRITTEN ONCOLOGY PLAN

- You have been diagnosed with Stage I-A lung cancer.
- More specifically, your cancer is called adenocarcinoma.
- You have undergone surgery to remove the lung cancer and check lymph nodes for any spread of the cancer (called "metastases").
- More specifically, your surgical procedure is called a segmentectomy.
- Based upon all of your results, the evidence-based national guidelines for lung cancer (www.nccn.com) recommend no further surgery, chemotherapy, or radiation.
- All lung cancer patients should have at least 5 years of cancer follow-up, according to the evidence-based national guidelines for lung cancer (www.nccn.com). Imaging of the chest will be done every 6 months for the next two years. Imaging of the chest will be done only once a year after the first two years. This follow-up schedule may change if any abnormalities are found. The doctors will monitor you for any signs of cancer growing back. The doctors will also monitor you for any signs of new lung cancer.
- If you are currently a smoker, then the BEST thing you can do for your own health (and those around you) is to QUIT now and forever.
Evidence Consensus

- **Process Redesign Individualized**
  - Goal = RELIABLY DELIVER all 38 elements
    - EVERY patient, EVERY time
  - Different institutions = Different processes
  - Some elements open to interpretation
    - Pain regimen
    - Respiratory care
    - Ideas shared on common web portal

- **Inter-Team Communication During The Process**
  - 3 in-person meetings
  - Conference calls/webinars ongoing
ProvenCare Lung Cancer: A Multi-Institutional Improvement Collaborative

Mark R. Katlic, MD, MMM1; Matthew A. Facktor, MD2; Scott A. Berry, MS3; Karen E. McKinley, RN, MBA4; Albert Bothe, Jr, MD5; Glenn D. Steele, Jr, MD, PhD6

Abstract

Geisinger’s ProvenCare™ Program (for elective coronary artery bypass surgery, total hip replacement, and others) has shown that the principles of reliability science, facilitated by a robust electronic health record and institutional commitment, allow the re-engineering of complicated clinical processes. This eliminates unwarranted variation and promotes the completion of evidence-based elements of care. It has not been established that ProvenCare can be generalized to other institutions. Now, under the auspices of the American College of Surgeons Commission on Cancer, ProvenCare has been adapted to a multi-institutional collaborative for the care of the patient with resectable lung cancer. CA Cancer J Clin 2011;61:382-396. © 2011 American Cancer Society, Inc.
Q28. Which of these statements about the ProvenCare approach is false:

a. activated patient and family
b. hardened workflows to assure reliable delivery
c. impossible without an electronic health record
d. employs evidence-based and consensus-based best practices.
Preliminary Results
Current State: March 2013

<table>
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<td>Geisinger Medical Center</td>
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Operative Reliability

% Compliance

Operative Reliability

Oper 1  Oper 2  Oper 3  Oper 4  Oper 5  Oper 6  Oper 7  Oper 8  Oper 9  Oper 10  Oper 11

100% 100% 100% 99% 99% 100% 100% 100% 100% 100% 100%
Post Operative Reliability

% Compliance

Post-Operative Reliability

<table>
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<tr>
<th>Post Op</th>
<th>% Compliance</th>
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<tr>
<td>8</td>
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</tbody>
</table>
Post Discharge Reliability

- Post Disch 1: 99%
- Post Disch 2: 100%
- Post Disch 3: 100%
- Post Disch 4: 100%

% Compliance
Overall Reliability
Collaborative Member Comments

“*The process brought our team together*”. First time that the team met together on a *regular* basis to plan and deliver patient care

**Teamwork/Networking** – “*We have really become a cohesive team in Thoracic Surgery. The study has become the responsibility of all its members.*”
Outcomes Study Design

**Overview**

**Proven Care Group**

$n = 6$ sites

**STS Comparator Group**

$n = $ whole STS dataset or comparable institutions

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- **Pre-Proven Care**
- **Proven Care**
- **Pre-Post-Intervention Comparison**

**STS**

- Analyze comparative outcomes during stages 1-4 of Proven Care process design timeline
- Concurrent matched cohort analysis

**Other comparator groups:**

- NIS dataset
- SEER data/National Cancer Database

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**Trend Analysis**
ProvenCare® Lung Cancer

Improved quality and value:

• Redesign of complex systems to embed evidence-based best practices reliably, into everyday patient flow

• Activating patients and families to be engaged in the care processes

• Aligning the interests of the patient, provider, payor and purchaser
The First ProvenCare Lung Cancer Patient

With Special Thanks

Doctor Kathie,

You gave Mr. Hamorsel such love and caring. We will always be greatful to you.

Thanks for being so thoughtful – your kindness is appreciated.

Sincerely,
Mrs. Hamorsel
& Family

God Bless you & all your love

[Signature]

[Note: The handwriting style and the signature suggest the possibility of Parkinson's disease.]
Best Practice Management of Lung Cancer: ProvenCare®

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Chairman, Department of Surgery
Surgeon-in-Chief
Sinai Hospital
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