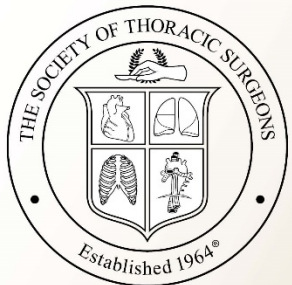




ADVANCES IN QUALITY & OUTCOMES:
A Data Managers Meeting

Lung Cancer Interactive Session

Melanie Edwards, MD, FACS
No Disclosures



Clear as Mud

Disclaimer:



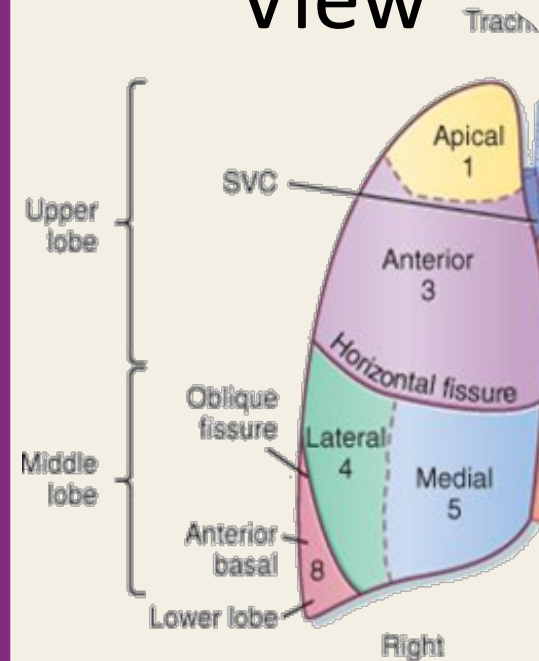


Lung Anatomy

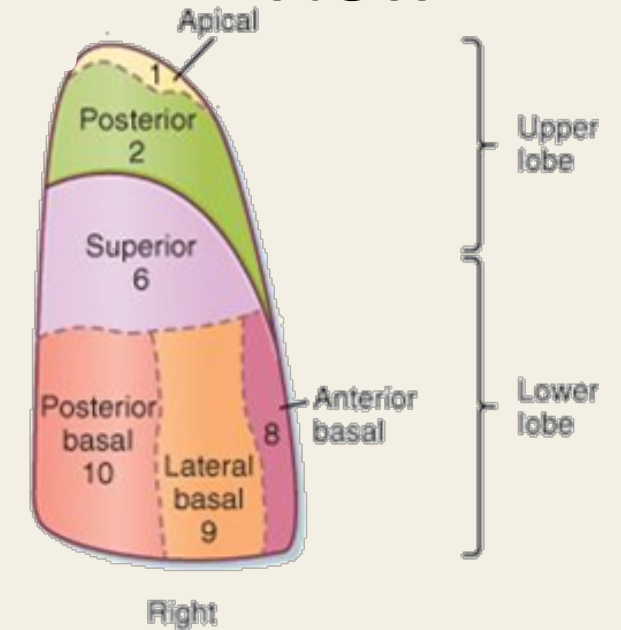
Right Lung

- **3 Lobes**
 - Upper Lobe: 3 Segments
 - Middle Lobe: 2 Segments
 - Lower Lobe: 5 Segments
- 10 Total Segments**

Anterior View



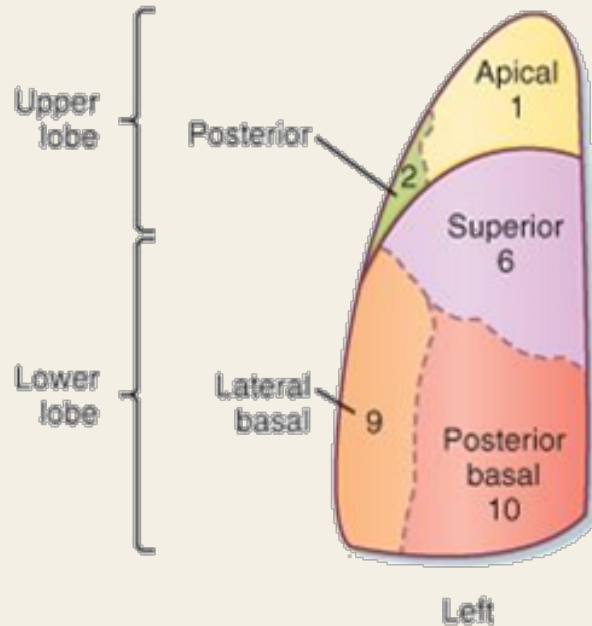
Posterior View



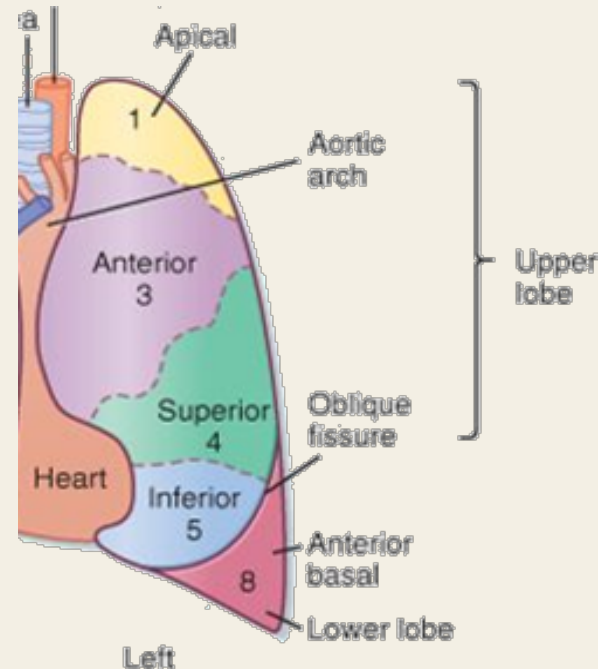


Lung Anatomy

Posterior View



Anterior View

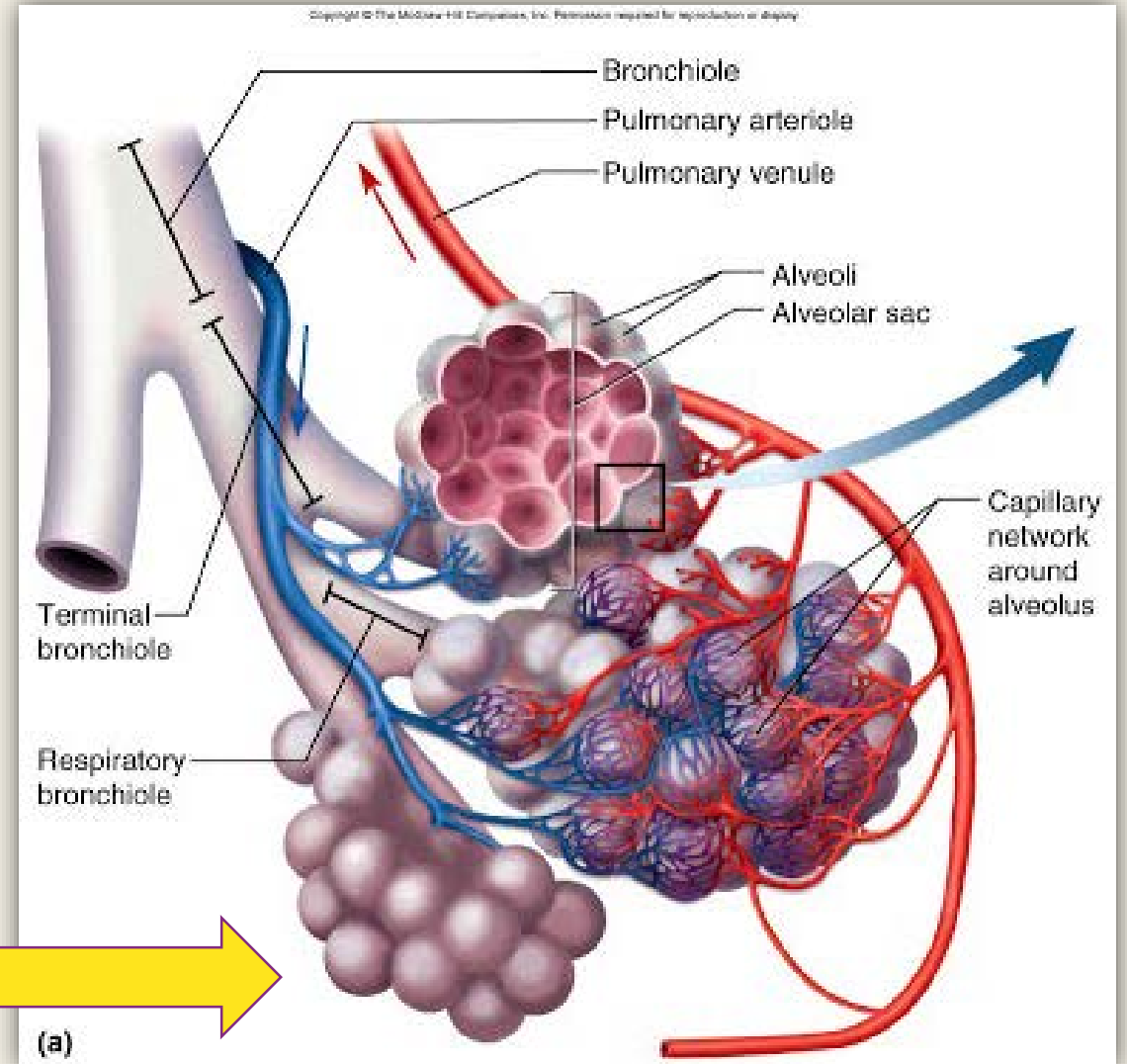
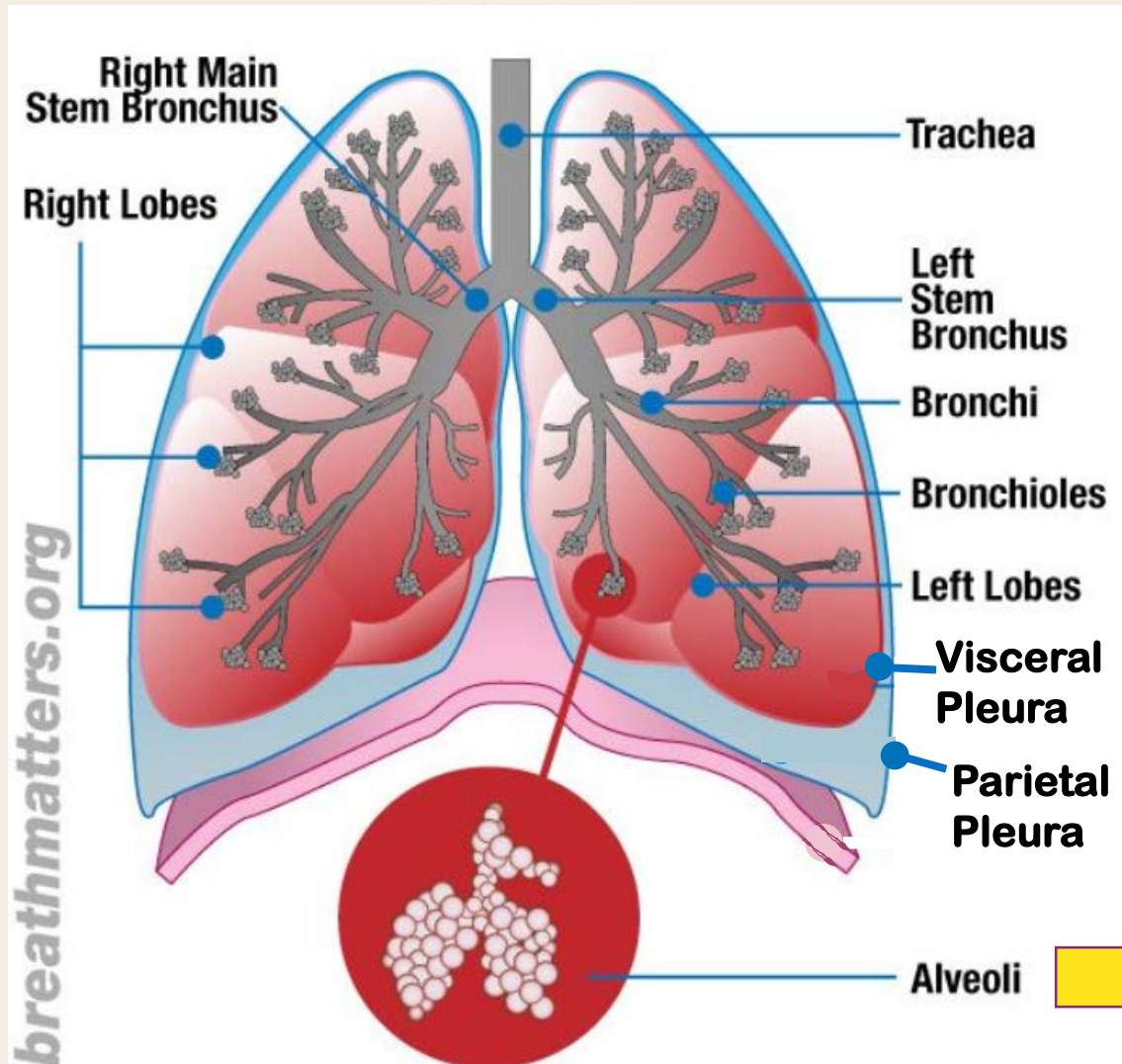


Left Lung

- **2 Lobes**
 - Upper Lobe: 4 Segments
 - Lower Lobe: 4 Segments
- 8 Total Segments**



Lung Anatomy



*Please refer to the
lung cancer
case scenario provided*



PEARL
OF
WISDOM

Go to the end before you begin

SeqNo: 1580

Long Name: Lung Cancer

Short Name: LungCancer

Definition: Indicate whether a major lung resection was performed for ~~known or presumed~~ lung cancer (e.g. wedge, segment, lobectomy, bilobectomy or pneumonectomy), open or VATS. If yes, complete clinical and pathological staging.

Only primary lung cancer resections are required and will be analyzed.

Unless your hospital chooses to enter all lung resections regardless of pathology, always look at the final pathology report first to confirm primary lung cancer before beginning data abstraction.



C. Preoperative Evaluation

C. Pre-Operative Evaluation

Height: **152** (cm) HeightCm (410)

Weight: **49** (kg) WeightKg (420)

Unintentional Wt loss over past 3 months? (Enter "0" if none) - _____(kg) WtLoss3Kg (430)

SeqNo: 430

Long Name: Unintentional Weight Loss in Past Three Months

Short Name: WtLoss3Kg

Definition: Indicate by the number of kilograms lost in the last three months. Enter "0" if there was no weight loss.

Intent/Clarification:

Unintentional weight loss is a significant indicator of the patient's overall health within the last few months. Unintentional weight loss may be an indicator of underlying pathology. If the amount of weight loss is not documented or it is unclear how much has occurred in the 3 month window leave this field blank.

Examples:

- What do I code for the patient who lost 3 kg in the last 6 months? *Leave blank as you do not know what happened in the last three months.*
- Should we enter 0 or leave blank in case of intentional weight loss over past 3 months? *Blank since it was intentional.*

November 2018: Pt has surgery on 9/17/2018, has chemo prior and on 8/9/2018 it is documented "had an 8 lb wt loss in the last 2 weeks." It was unintentional. He stops chemo and by the surgery date has gained it back. My question for sequence #430, do I record the 8 lbs lost, since it was within the last 3 months, or is the intent for overall wt loss within the 3 months prior to surgery? **No, since the patient gained the weight back following the stopping of chemo.**

Leave blank if:

- Intentional
- Not documented
- Unclear



C. Preoperative Evaluation

C. Pre-Operative Evaluation

Height: **152** (cm) HeightCm (410)

Weight: **49** (kg) WeightKg (420)

Unintentional Wt loss over past 3 months? (Enter "0" if none) - _____ (kg) WtLoss3Kg (430)

CardioPulmonary History

Hypertension Hypertn (440)	☒ Yes ☐ No	Congestive Heart Failure(CHF) CHF (450)	☐ Yes ☒ No	If Yes→ EF _____ % EF (460)
Coronary Artery Disease (CAD) CAD (470)	☐ Yes ☒ No	Myocardial Infarction	☐ Yes ☒ No	PreMI (480)
Afib per EKG within the last year; with or without treatment AFIB (490)	☐ Yes ☒ No	Valvular Heart Disease VHD (500)	☐ Yes ☒ No If Yes→	Location – check all that apply: AV ☐ Yes ☐ No VHDLocAV (510) MV ☐ Yes ☐ No VHDLocMV (520) PV ☐ Yes ☐ No VHDLocPV (530) TV ☐ Yes ☐ No VHDLocTV (540)
Pulmonary Hypertension: PulmHypertn (550)	☐ Yes ☐ No ☒ Unknown			
Interstitial Fibrosis/ Interstitial Lung Disease InterstitialFib (560)	☐ Yes ☒ No			



C. Preoperative Evaluation

More about seq #500 – Valvular Heart Disease...

- Refers to **both** valvular stenosis and insufficiency/regurgitation.
- Capture insufficiency that is documented as 2+ (moderate) or greater.
- Capture stenosis that is documented as moderate or greater.
- Mild to moderate (1-2+) is less than 2+ and would not qualify as VHD



Blood flow through the valve is restricted with stenosis.

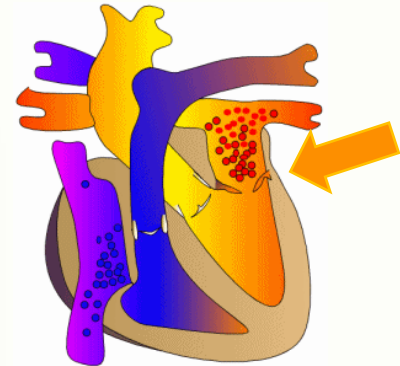
SeqNo: 500

Long Name: Valvular Heart Disease

Short Name: VHD

Definition: Indicate if the patient has had or has the presence of dysfunction of at least one heart valve graded as 2+ or greater on an echocardiogram. Excludes surgically corrected disease.

Intent/Clarification: Valvular heart disease is characterized by damage to or a defect in one of the four heart valves: the mitral, aortic, tricuspid or pulmonary. ~~If a range is provided (i.e., 1 – 2+) use the highest number given, in this example, 2.~~





C. Preoperative Evaluation

Vascular History			
Major Vascular Disease MVD (580)	☐ Yes ☒ No		
DVT/PE DVTPE (590)	☐ Yes ☒ No		
Cerebral Vascular Disease History			
Cerebrovascular History: CerebroHx (610)	☒ No CVD history	☐ Known disease, no events	☐ Transient Ischemic Attack (TIA)
☐ Cerebrovascular Accident (CVA)	If CVA→	Permanent Neurologic impairment PNI (620)	☐ Yes ☐ No
Neuromuscular Disease			
Neurologic symptoms present NeuroSymptPres (630)	☐ Yes ☒ No		
Myasthenia Gravis MyasGravis (640)	☐ Yes ☒ No		
Endocrine / GI / Renal History			
Diabetes Diabetes (650)	☐ Yes ☒ No	If Yes→ Type of therapy: DiabCtrl (660)	☐ None ☐ Diet Only ☐ Oral ☐ Insulin ☐ Other Subcutaneous Medication ☐ Other ☐ Unknown
Liver Dysfunction LiverDys (670)	☐ Yes ☒ No		
On Dialysis Dialysis (680)	☐ Yes ☒ No		



C. Preoperative Evaluation

Cancer History			
Coexisting Cancer CoexisCancer (690)	☐ Yes ☒ No		
Preoperative Chemotherapy / Immunotherapy PreopChemoCur (700)	☐ Yes ☒ No	If Yes →	☐ Same disease, ≤ 6 months PreopChemoCurWhen (710) ☐ Same disease, > 6 months ☐ Unrelated disease, ≤ 6 months ☐ Unrelated disease, >6 months
Preop Thoracic Radiation Therapy PreopXRT (720)	☐ Yes ☒ No	If Yes →	☐ Same disease, ≤ 6 months PreopXRTDisWhen (730) ☐ Same disease, > 6 months ☐ Unrelated disease, ≤ 6 months ☐ Unrelated disease, >6 months If Same disease, ≤ 6 months → Completion Date _____ PreopXRTCompDt (740)

#700 –Preoperative Chemotherapy/Immunotherapy includes:

Systemic Chemo
Targeted Therapy
Immunotherapy



C. Preoperative Evaluation

Prior Surgical History (check all that apply)

Prior Cardiothoracic Surgery
PriorCTS (750)



Yes

☐ No

If Yes →

Sternotomy ☐ Yes



No

PriorStern (760)

VATS/Robotic



Yes

☐ No

PriorVATS (770) If Yes →

☐ Right



Left

☐ Bilateral

PriorVATSLoc (780)

Pulmonary resection



Yes

☐ No

PriorPulmRes (790) If Yes →

☐ Right



Left

☐ Bilateral

PriorPulmResLoc (800)

Thoracotomy



No

PriorThora (810) If Yes →

☐ Right

☐ Left

☐ Bilateral

PriorThoraLoc (820)

(check all that apply)



C. Preoperative Evaluation

More about seq #750 – Prior Cardiothoracic Surgery...

- Capture any prior cardiac or thoracic surgery where an incision was made and the chest was entered.
- Does not include mastectomy, hernia repair, tube thoracostomy, cervical mediastinoscopy.
- Does not need to be in the same surgical field as the current operation.



C. Preoperative Evaluation

PreOp Medication History				
Chronic Immunosuppressive Therapy PreOpImmunoThx (830)		☐ Yes X No		
Chronic anticoagulation PreOpAnticoagThx (840)		☐ Yes X No (defined as any anticoagulation medication other than ASA)		
Home O2 PreOpHomeO2 (850)		☐ Yes X No		
Pre-Operative Testing				
Creatinine level measured CreatMeasured (870)		X Yes ☐ No		If Yes → Last creatinine level <u>1.81</u> CreatLst (880)
Hemoglobin level measured HemoglobinMeasured (890)		X Yes ☐ No		If Yes → Last hemoglobin level <u>11.4</u> HemoglobinLst (900)
<u>Pulmonary Function Tests performed?</u> PFT (910)		X Yes ☐ No		
If No →	PFT Not Performed Reason PFTNotPerReas(920)	☐ Not a Major Lung Resection ☐ Tracheostomy or Ventilator	☐ Never smoked, no lung disease ☐ Urgent or Emergent Status	☐ Pt. Unable to perform
If Yes →	<u>FEV1 test performed?</u> FEV (930)	X Yes ☐ No ☐ Not Applicable		If Yes→ <u>FEV1 % predicted:</u> <u>75</u> FEVPred (940)
	DLCO test performed? DLCO (950)	X Yes ☐ No ☐ Not Applicable		If Yes→ DLCO % predicted: <u>50</u> DLCOPred (960)



C. Preoperative Evaluation

Psychosocial History				
Cigarette smoking: CigSmoking (970)	☐ Never smoked	☒ Past smoker (stopped >1 month prior to operation)	☐ Current smoker	☐ Unknown
If 'Past smoker' or 'Current Smoker' →	Pack Year Known or can be estimated PackYearKnown (980)	☐ Yes ☒ No	If Yes → Pack-Years _____ PackYear (990)	
Narcotic dependency NarcoticDepend (1000)	☐ Yes ☒ No	Alcohol Abuse AlcoholAbuse (1010)	☐ Yes ☒ No	
Dementia/neurocognitive dysfunction DemNeroDys (1020)	☐ Yes ☒ No		Do not include marijuana in #1000 – Narcotic Dependency 	
Major Psychiatric Disorder PsychDisorder (1030)	☒ Yes ☐ No			
Living Status: LiveStat (1040)	☐ Lives alone	☒ Lives with family or friend	☐ Assisted Living	☐ Nursing Home
Functional Status: FuncStat (1050)	☒ Independent	☐ Partially Dependent	☐ Totally Dependent	☐ Unknown
ECOG Score: ECOGScore (1070)	☒ 0 - Fully active, able to carry on all pre-disease performance without restriction ☐ 3 - Capable of only limited self-care, confined to bed or chair more than 50% of waking hours	☐ 1 - Restricted in physically strenuous activity but ambulatory and able to carry out work of a light or sedentary nature, e.g., light house work, office work ☐ 4 - Completely disabled. Cannot carry on any self-care. Totally confined to bed or chair	☐ 2 - Ambulatory and capable of all self-care but unable to carry out any work activities. Up and about more than 50% of waking hours ☐ 5 - Dead	



D. Diagnosis (Category of Disease)

D. Diagnosis (Category of Disease)

Category of Disease: Check both **Primary** and **Secondary** Diagnosis (Category of Disease) (ICD-9, ICD-10). Indicate (circle) the Primary Diagnosis. **CategoryPrim (1250)** **CategorySecond (1280)**

Note: Diagnosis is based on final pathology report.

☐ No Secondary Diagnosis (for Category of Disease - Secondary field only)

Lung Cancer

☐ Lung cancer, main bronchus, carina (162.2, C34.00)

☐ Lung cancer, lower lobe (162.5, C34.30)

☐ Lung cancer, upper lobe (162.3, C34.10)

☐ Lung cancer, location unspecified (162.9, C34.90)

☒ Lung cancer, middle lobe (162.4, C34.2)

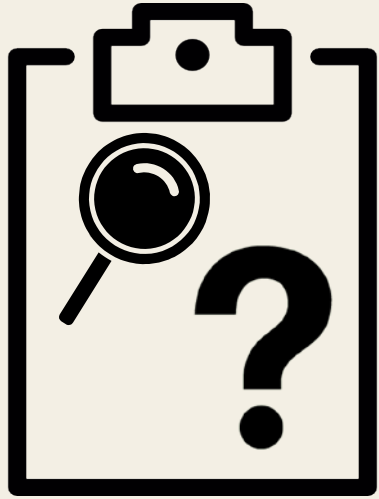
☐ Lung tumor, metastatic (197.0, C78.00)

☐ Malignant neoplasm other parts of bronchus or lung (162.8, C34.8)

☐ Personal history of malignant neoplasm of bronchus and lung (V10.11, Z85.118)

☐ Neoplasm of uncertain behavior of trachea, bronchus and lung (235.7, DM38.1)

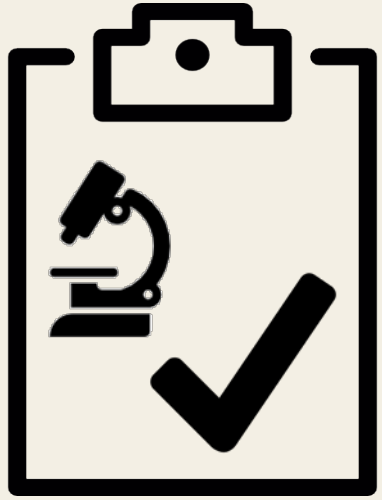
Clinical Staging vs Pathologic Staging



Clinical Staging

- An estimate of cancer extent
- Information obtained before surgery:
 - Physical exam, imaging tests, biopsies.
- Key part of deciding the best treatment to use.
- Baseline used for comparison when looking at how the cancer responds to treatment.
- Assigned by care team.

Clinical Staging vs Pathologic Staging



Pathologic Staging

- Direct microscopic analysis of surgical specimens
 - Tumor, surrounding tissue, and lymph nodes.
- More precise information:
 - Predict treatment response and prognosis.
- **Path T and N assigned by a pathologist.**
- **Path M can be assigned by care team.**



F. Lung Cancer – Clinical Staging

[Surgical Procedure for Lung Cancer?](#) [LungCancer \(15\)](#)

F. Lung Cancer
<u>Diagnosis:</u>
Was there a pathological diagnosis diagnosed preoperatively; no: lung
How was lung cancer diagnosed
Bronchoscopy
ClinStagLungBronc (1640)



on F
☒ Yes ☐ No
☒ Yes ☐ No

In November 01 of 2018, she underwent a **pulmonary nodule** biopsy of the right middle lobe. Her case was discussed and scheduled for robotic right middle lobectomy on November 10, 2018. However, this was cancelled as she was found to have a chronic abdominal abscess and was placed on a course of antibiotics. An abdominal drain was placed.

On December 10, 2018, she underwent a **repeat CT-guided needle biopsy** of the right middle lobe pulmonary nodule. **Pathology confirmed squamous cell carcinoma**. She returns today to rediscuss surgery.

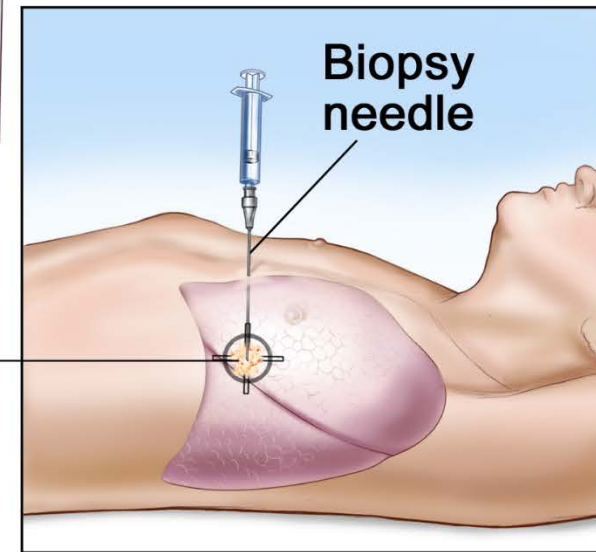
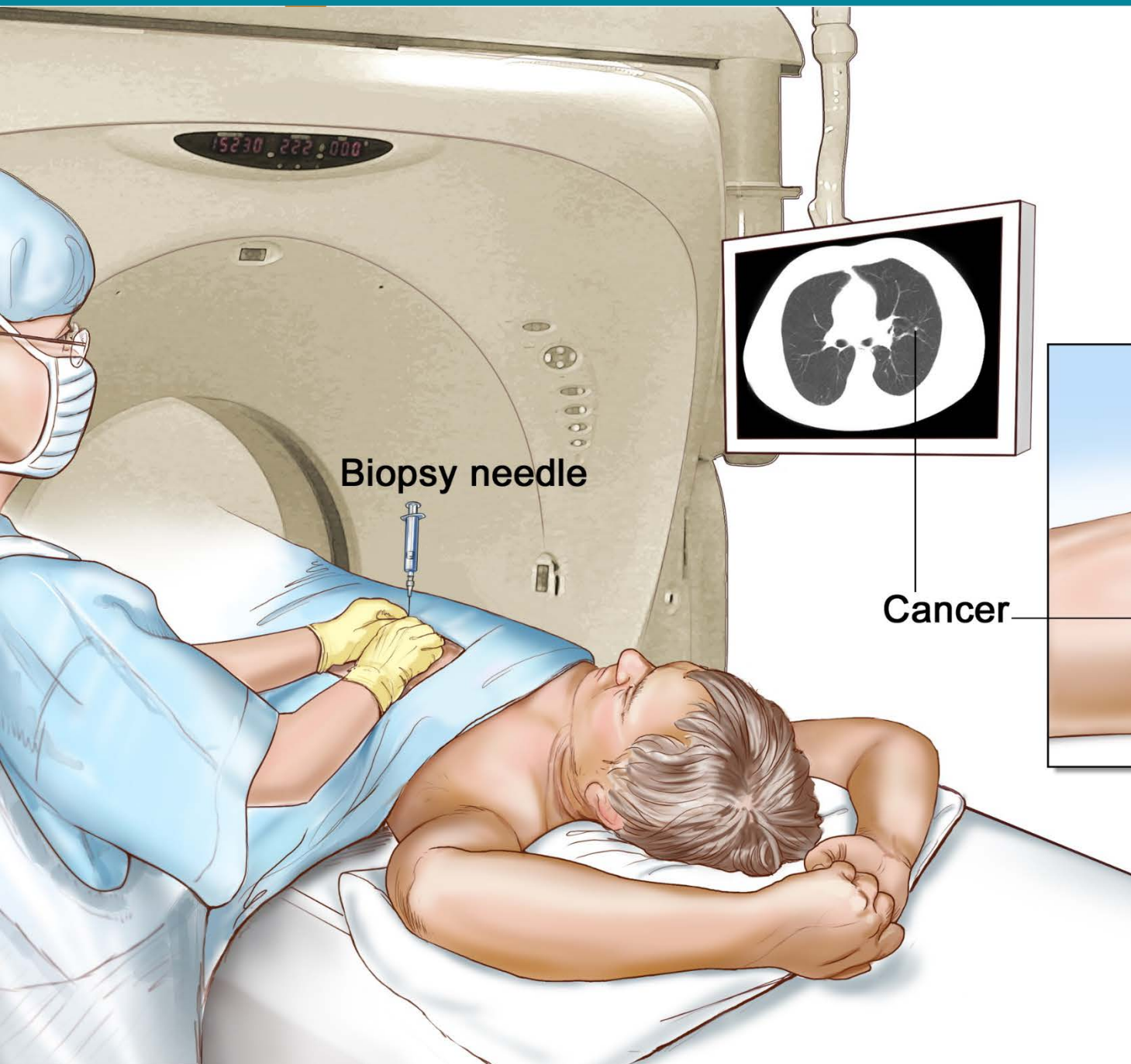
F. Lung Cancer – Clinical Staging Tools

Bronchoscopy

- Visually examine the mucosal surface of the larynx, trachea, bronchi
- **Collect diagnostic specimens.**
 - Bronchial Tissue & Tumors
 - Cell/Bronchial Washing
 - BAL: Bronchioalveolar lavage



Sequence #1650 refers only to CT Guided Needle Biopsy of the tumor.



Only capture completed needle biopsies.



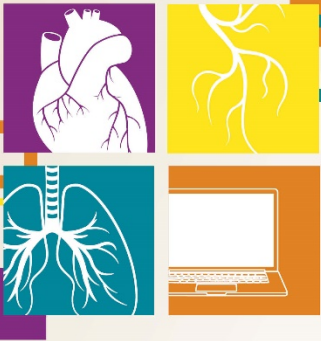
Audience Response Question

As part of her patient's clinical staging for suspected lung cancer, Dr. Spectacular ordered a bronchoscopy with biopsy. The bronchoscope was placed and evaluation of the airways revealed no abnormalities. While attempting to obtain a tissue sample, the patient became hypotensive and the procedure was aborted.

**How would you code
seq #1640 (Bronchoscopy)**

A. Yes

B. No

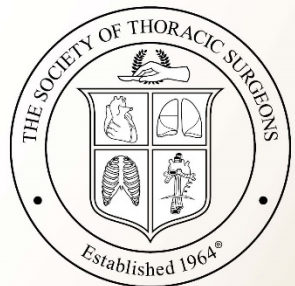


ADVANCES IN QUALITY & OUTCOMES:
A Data Managers Meeting

Live Content Slide

When playing as a slideshow, this slide will display live content

**Poll: How would you code seq #1640
(Bronchoscopy)?**





Audience Response Question

As part of her patient's clinical staging for suspected lung cancer, Dr. Spectacular ordered a bronchoscopy with biopsy. The bronchoscope was placed and evaluation of the airways revealed no abnormalities. While attempting to obtain a tissue sample, the patient became hypotensive and the procedure was aborted.

**How would you code
seq #1640 (Bronchoscopy)**

A. Yes



B. No



Audience Response Question

SeqNo: 1640

Long Name: Clinical Staging Method - Lung – Bronchoscopy

Short Name: ClinStagLungBronc

Definition: Indicate whether a bronchoscopy was performed to diagnose lung cancer.

Looking around and not seeing anything does not count as staging. Unless there is a biopsy performed with the bronch it should not be counted. Or the course of the case is changed by the bronch.

Code Yes to Bronch if a tissue sample was obtained even if the results of the biopsy are non-diagnostic.

Code No to Bronch if a there was an attempt to obtain a tissue sample but the attempt was unsuccessful.



F. Lung Cancer – Radiographic Clinical Staging

Clinical Staging: Pre-treatment Lung cancer staging- to be completed if lung cancer suspected or documented AND lung resection performed. Clinical staging determines the treatment plan.

Clinical Staging Done ClinStagDoneLung (1660)

☒ Yes ☐ No

If Yes→

Pre-Op Positive Tissue diagnosis
Obtained PreopPosTisOb (1670)

☒ Yes ☐ No

Clinical Staging Methods : Choose all that apply

Radiographic Staging Procedures

PET or PET/CT

ClinStagLungPET (1680)

☒ Yes ☐ No

Brain CT Scan

ClinStagLungBrainCT (1700)

☐ Yes ☒ No

CT

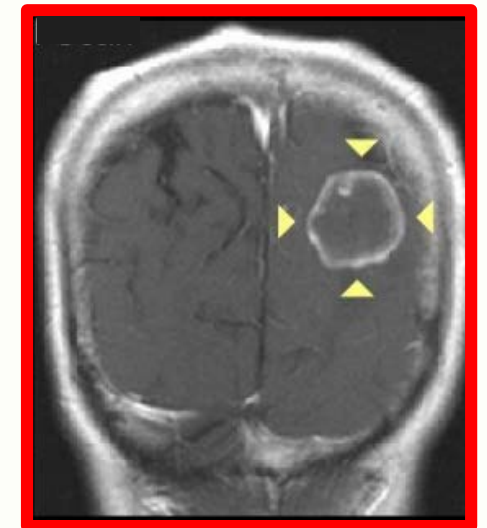
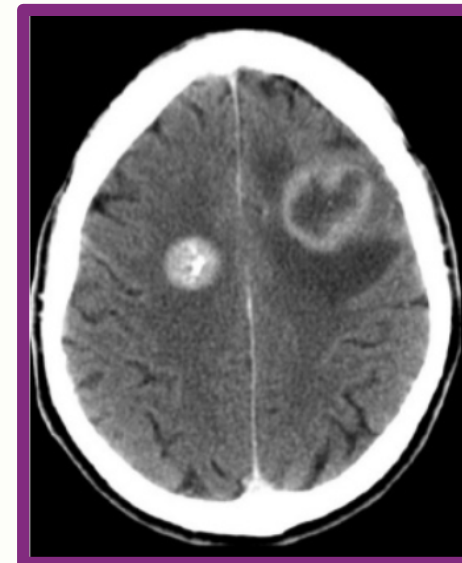
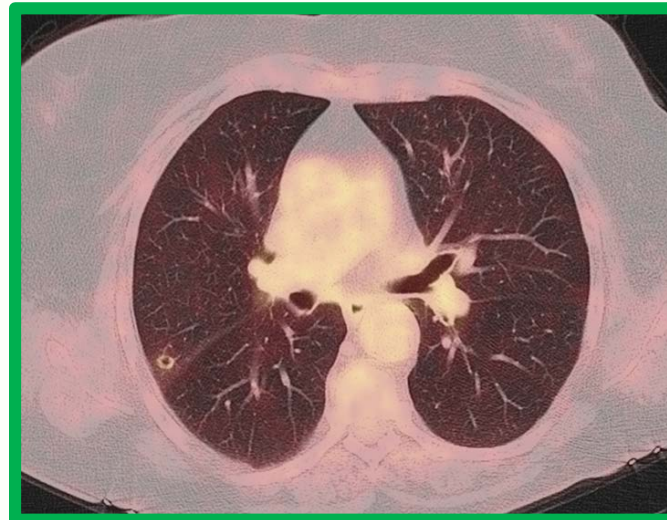
ClinStagLungCT (1690)

☒ Yes ☐ No

Brain MRI

ClinStagLungBMRI (1710)

☐ Yes ☒ No





F. Lung Cancer – Mediastinal Clinical Staging

Was invasive mediastinal staging performed? **ClinStagInvasive (1720)**

☐ Yes, reason documented

☐ Yes, reason not documented

☒ No

*If Documented → Operative/Clinic Note indicates Invasive Mediastinal Staging performed for the following reasons:
(check all that apply)*

Lesion size > 3cm **ClinStagInvasiveSize (1730)**

☐ Yes ☐ No

Mediastinal Lymphadenopathy on CT > 1cm

ClinStagInvasiveLymphCT (1740)

☐ Yes ☐ No

Ipsilateral hilar mediastinal node FDG uptake on PET

ClinStagInvasiveHilar (1750)

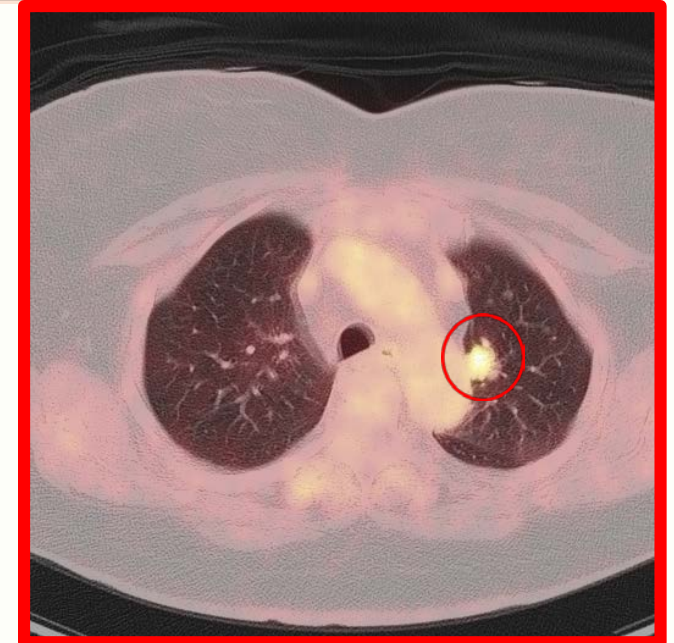
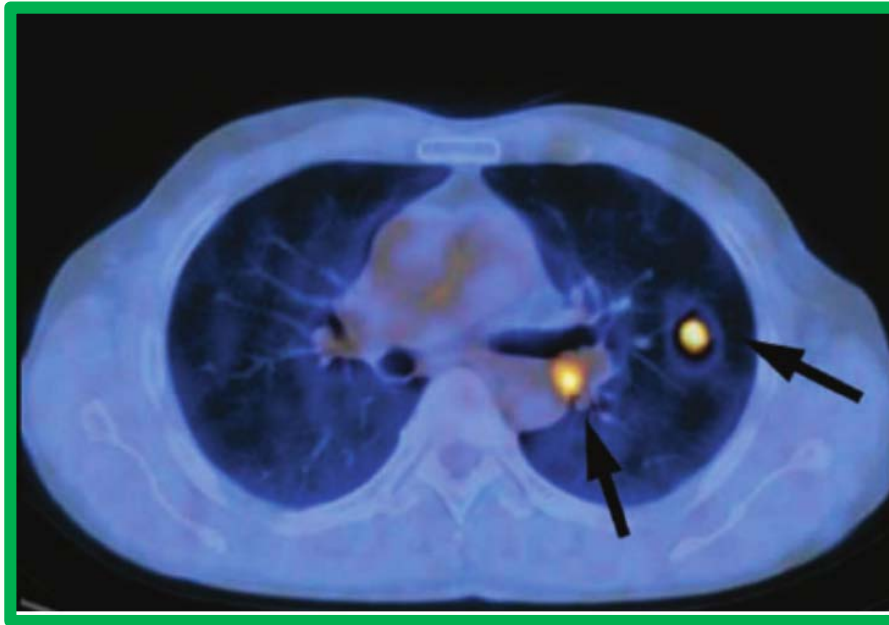
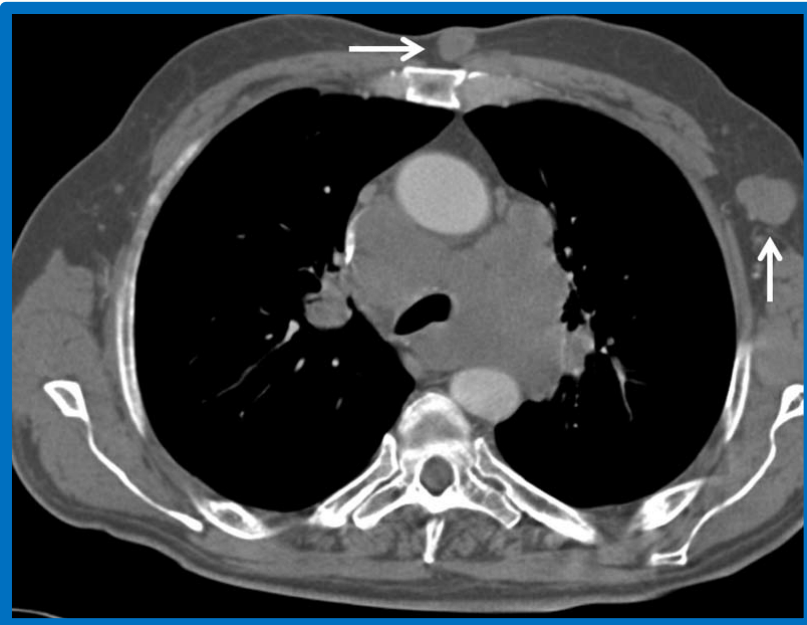
☐ Yes ☐ No

Central Tumor **ClinStagInvasiveTumor (1760)**

☐ Yes ☐ No

Other **ClinStagInvasiveOther (1770)**

☐ Yes ☐ No





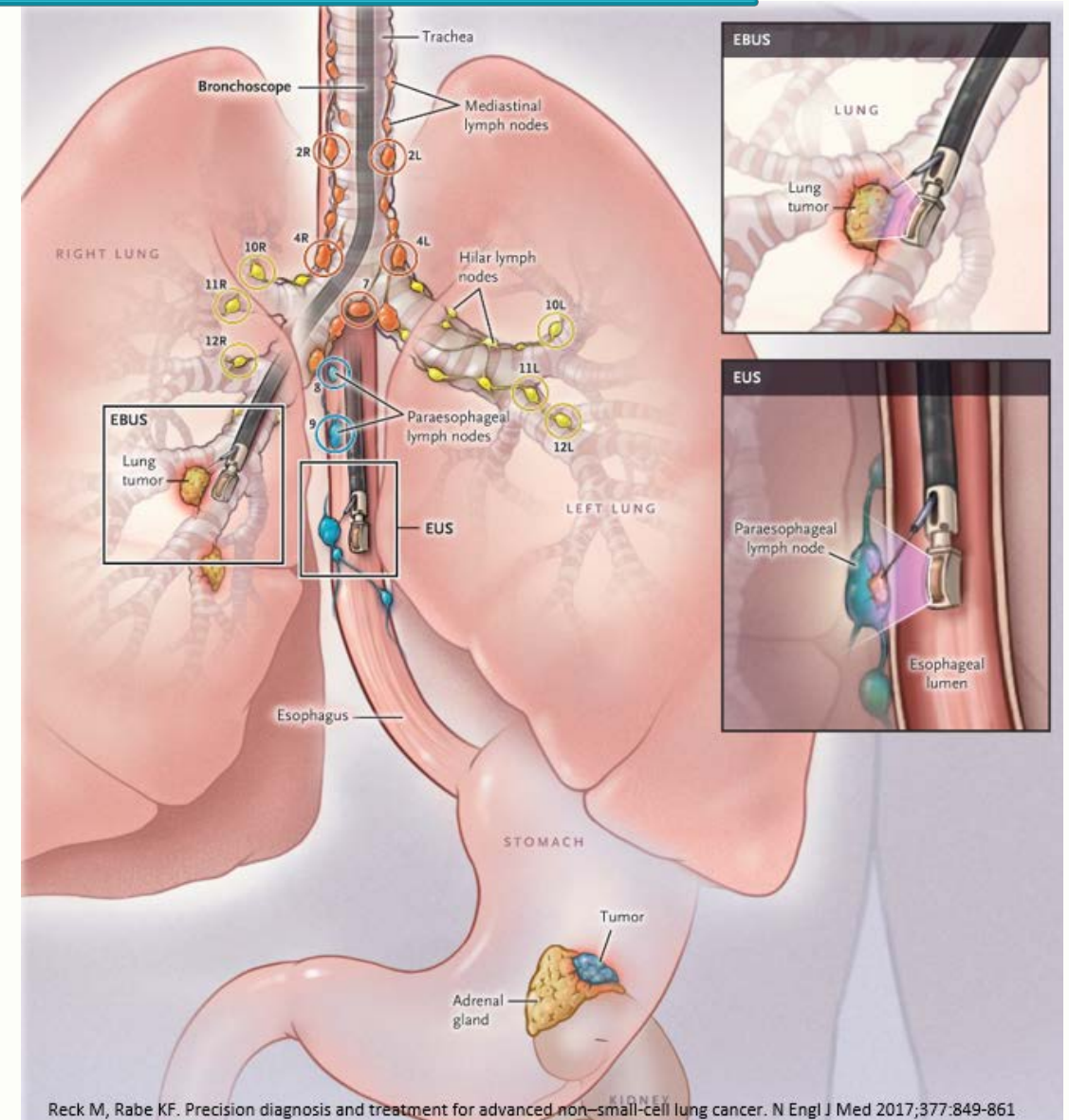
F. Lung Cancer – Mediastinal Clinical Staging

Mediastinal Tissue Sampling/Staging					
EBUS ClinStagLungEBUS (1780)	☐ Yes	☒ No	VATS ClinStagLungVATS (1790)	☐ Yes	☒ No
EUS ClinStagLungEUS (1800)	☐ Yes	☒ No	Other ClinStagLungOth (1810)	☐ Yes	☒ No
Mediastinoscopy/Chamberlain ClinStagLungMedia (1830)	☐ Yes	☒ No			



F. Lung Cancer – Mediastinal Clinical Staging Tools

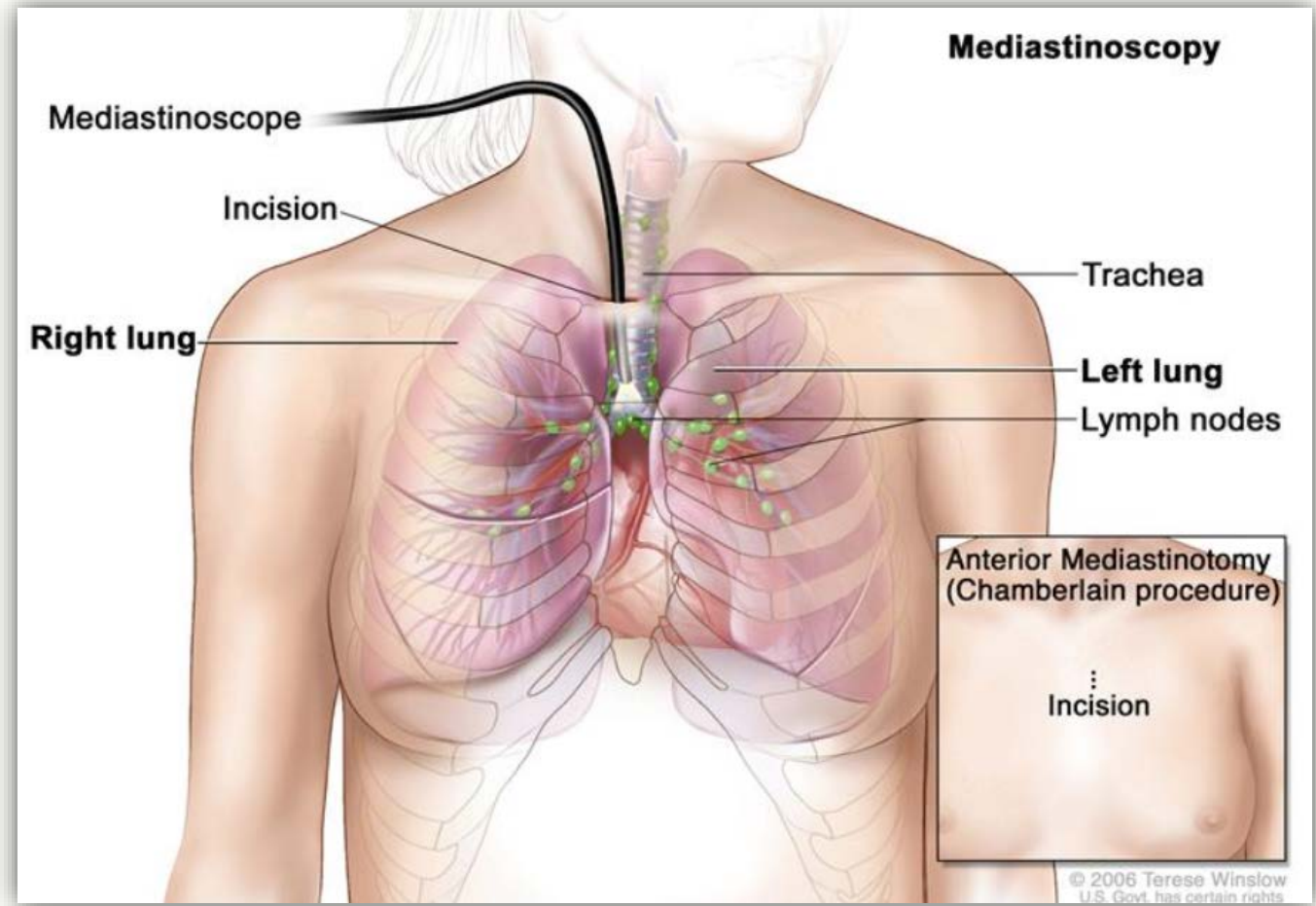
- **EBUS (Endobronchial Ultrasound)**
 - Ultrasound via bronchoscope
 - Commonly used to biopsy lymph nodes outside the airway wall.
 - Levels 2, 4, 7, 10, 11.
- **EUS (Endoscopic Ultrasound)**
 - Endoscope placed into the esophagus
 - Images and tissue samples of the digestive tract & surrounding tissue/organs.
 - Levels 2R, 3, 4L, 7, 8, 9.





F. Lung Cancer – Mediastinal Clinical Staging Tools

- **Mediastinoscopy**
 - Incision made above sternum.
 - Lymph node sampling along the airway (Levels 2, 4, 7).
- **Mediastinotomy (Chamberlain)**
 - Incision made next to sternum.
 - Lymph node sampling from left side of chest (Levels 5,6).





F. Lung Cancer – Mediastinal Clinical Staging Tools

- **VATS**

Examples of what counts as clinical staging when biopsies are obtained during the VATS procedure:

- Pleural biopsy sent for frozen prior to lung resection
- Diaphragm Biopsy sent for frozen prior to lung resection
- AP window or hilar lymph node is removed and frozen and results determine whether to proceed with lung resection.
- VATS wedge resection of a lesion other than the primary lesion for which the surgery is being done.



F. Lung Cancer – Mediastinal Clinical Staging Tools

- **VATS**

Examples of what does not count as clinical staging:

- Wedge of a primary lesion followed by a lobectomy due to that positive wedge.
- Lymph node resection performed as part of the planned procedure.
- Visual inspection of the pleura.



F. Lung Cancer – Mediastinal Clinical Staging Tools



- **VATS for Clinical Staging**

Look for instances where tissue is obtained and frozen results determine whether to proceed with lung resection



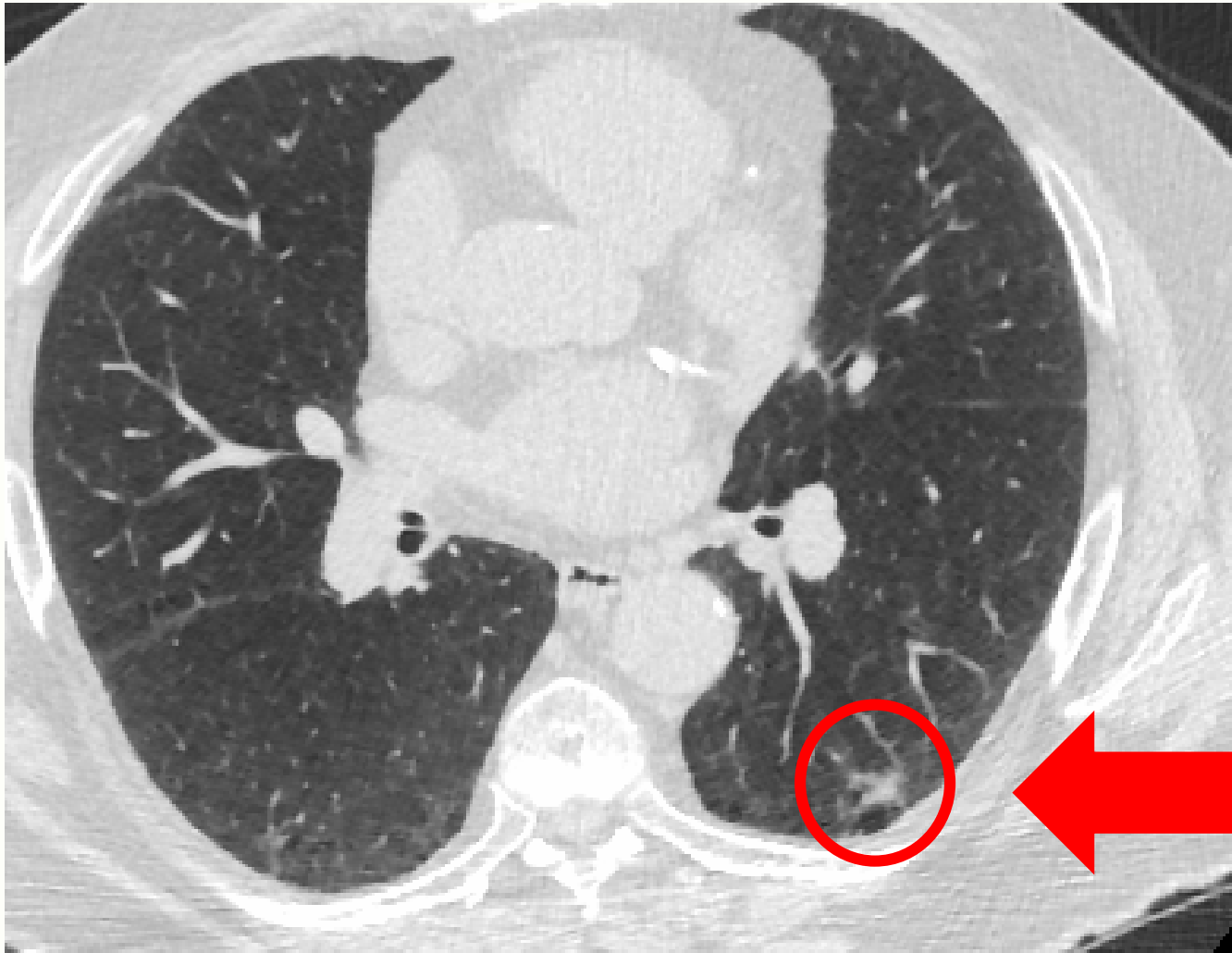
F. Lung Cancer – Clinical Staging

Tumor size known? ☒ Yes ☐ No <i>If Yes ↓</i> LungCaTumSzKnown (1850) Lung CA tumor size in cm (the dominantat/most concerning lesion per CT Scan) LungCaTumSz (1860) <u>2.6</u> cm (ex. 2.3cm)				
Invasion of Adjacent Structures LCInvAdjStr (1870)		☐ Yes ☒ No		
Lung CA T Stage (tumor stage) ClinStageLungTumor (1880)		☐ Tis ☒ T1	☐ T2	☐ T3 ☐ T4
Lung CA Nodes: ClinStageLungN (1890)		☒ N0 <i>No regional lymph node metastasis</i> ☐ N1 <i>Metastasis in ipsilateral peribronchial or hilar and intrapulmonary nodes. Includes direct extension.</i> ☐ N2 <i>Metastasis in ipsilateral mediastinal and/or subcarinal lymph nodes</i> ☐ N3 <i>Metastasis in contralateral mediastinal or contralateral hilar nodes, ipsilateral or contralateral scalene or supraclavicular nodes</i>		
Lung CA Metastases: ClinStageLungM (1900)		☒ M0 <i>No distant metastasis</i> ☐ M1 <i>Distant Metastasis</i>		



F. Lung Cancer – Clinical Staging

More about seq #1860 – Tumor Size in cm...



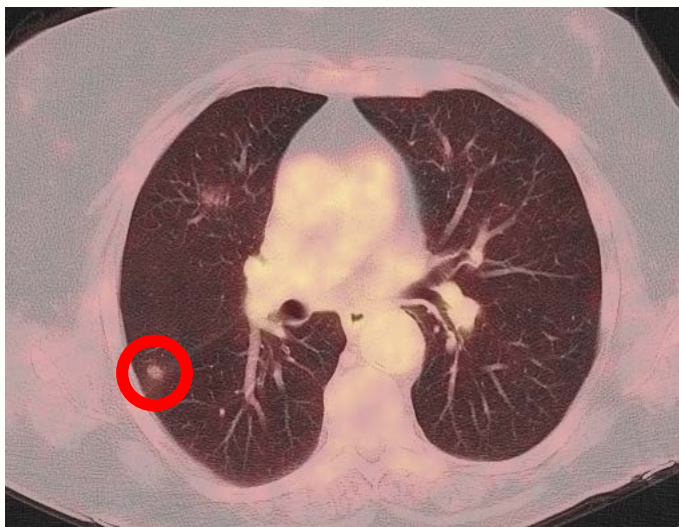
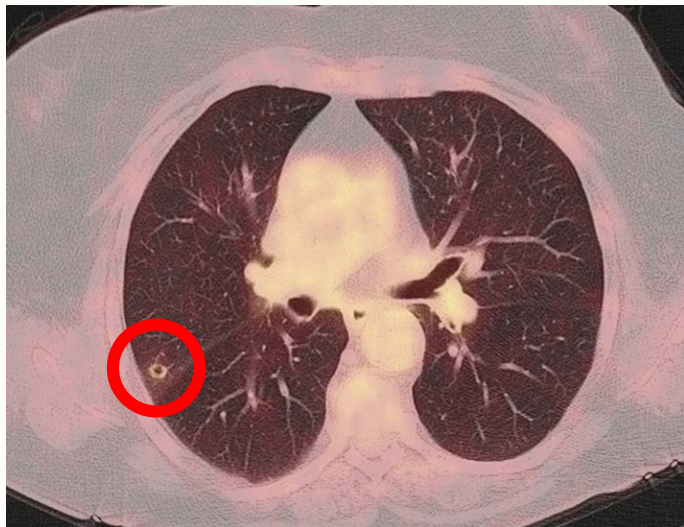
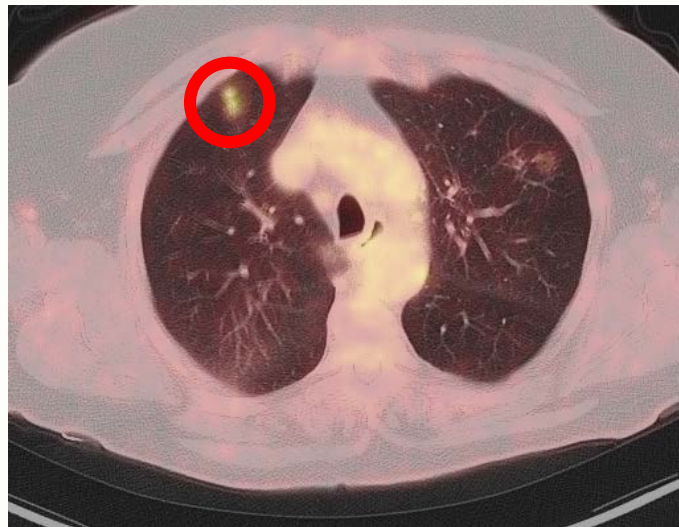
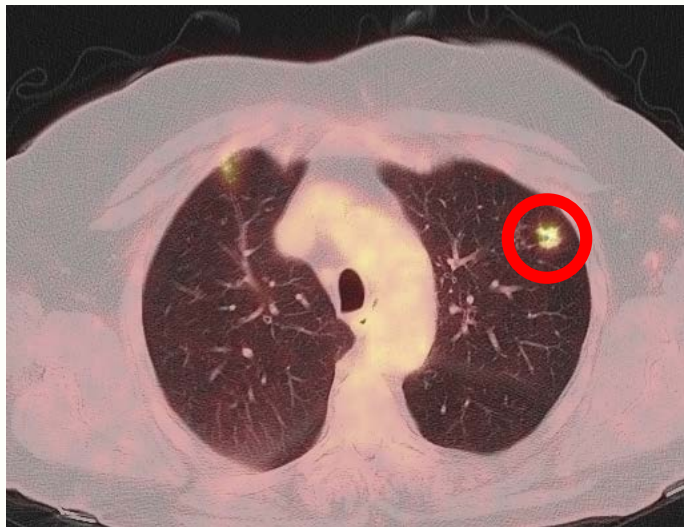
Code the size of the solid component. If pure ground glass, code No to #1850 (tumor size known).

Mixed tumor with solid and ground glass component.



F. Lung Cancer – Clinical Staging

More about seq #1860 – Tumor Size in cm...



If multiple tumors are present, code the size of the largest tumor.

Multiple primary tumors - bilateral adenocarcinoma



F. Lung Cancer – Clinical Staging

TNM 8 th - Primary tumor characteristics	
T_x	Tumor in sputum/bronchial washings but not be assessed in imaging or bronchoscopy
T₀	No evidence of tumor
T_{is}	Carcinoma in situ
T₁	≤ 3 cm surrounded by lung/visceral pleura, not involving main bronchus
T_{1a(mi)}	Minimally invasive carcinoma
T_{1a}	≤ 1 cm
T_{1b}	> 1 to ≤ 2 cm
T_{1c}	> 2 to ≤ 3 cm
T₂	> 3 to ≤ 5 cm or involvement of main bronchus without carina, regardless of distance from carina or invasion visceral pleural or atelectasis or post obstructive pneumonitis extending to hilum
T_{2a}	>3 to ≤4cm
T_{2b}	>4 to ≤5cm
T₃	>5 to ≤7cm in greatest dimension or tumor of any size that involves chest wall, pericardium, phrenic nerve or satellite nodules in the same lobe
T₄	> 7cm in greatest dimension or any tumor with invasion of mediastinum, diaphragm , heart, great vessels, recurrent laryngeal nerve, carina, trachea, oesophagus, spine or separate tumor in different lobe of ipsilateral lung

#1880
Tumor Stage



F. Lung Cancer – Clinical Staging

Tumor size known? ☒ Yes ☐ No <i>If Yes ↓</i> LungCaTumSzKnown (1850) Lung CA tumor size in cm (the dominantat/most concerning lesion per CT Scan) LungCaTumSz (1860) <u>2.6</u> cm (ex. 2.3cm)				
Invasion of Adjacent Structures LCInvAdjStr (1870)		☐ Yes ☒ No		
Lung CA T Stage (tumor stage) ClinStageLungTumor (1880)		☐ Tis ☒ T1	☐ T2	☐ T3 ☐ T4
Lung CA Nodes: ClinStageLungN (1890)		☒ N0 <i>No regional lymph node metastasis</i> ☐ N1 <i>Metastasis in ipsilateral peribronchial or hilar and intrapulmonary nodes. Includes direct extension.</i> ☐ N2 <i>Metastasis in ipsilateral mediastinal and/or subcarinal lymph nodes</i> ☐ N3 <i>Metastasis in contralateral mediastinal or contralateral hilar nodes, ipsilateral or contralateral scalene or supraclavicular nodes</i>		
Lung CA Metastases: ClinStageLungM (1900)		☒ M0 <i>No distant metastasis</i> ☐ M1 <i>Distant Metastasis</i>		



Lung Cancer Treatment Options

Stage Based

- Stage I – Anatomic Lung Resection or
Stereotactic Body Radiation Therapy (SBRT)
- Stage II – Anatomic Resection + Adjuvant Chemotherapy
- Stage III – Induction Therapy + Surgery + Adjuvant or
Definitive Chemotherapy/Radiation
- Stage IV – Chemotherapy/Radiation



Should we Operate?

Resectability

- Complete resection is the goal
- Involvement of major structures may prohibit resection

Distant Disease

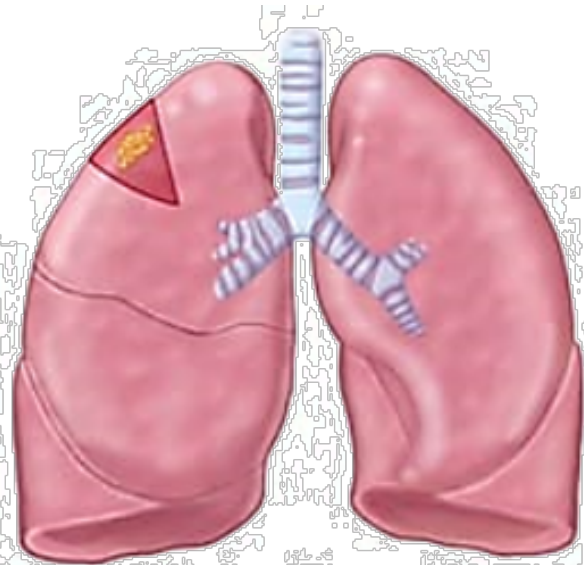
- Inoperable except for solitary brain or adrenal metastases

Physiologic Tolerance

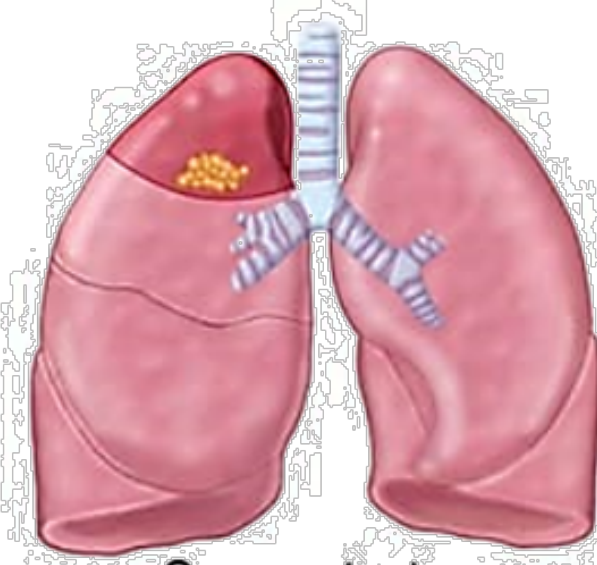
- Cardiac, pulmonary function, neurologic, psychiatric, etc.



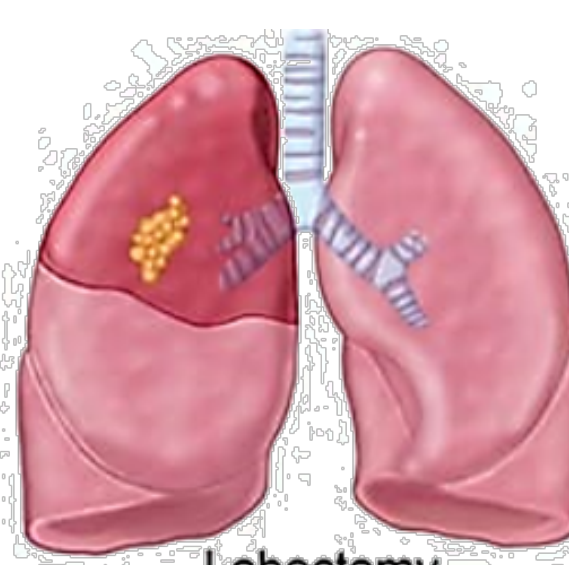
Lung Cancer Resection Procedures



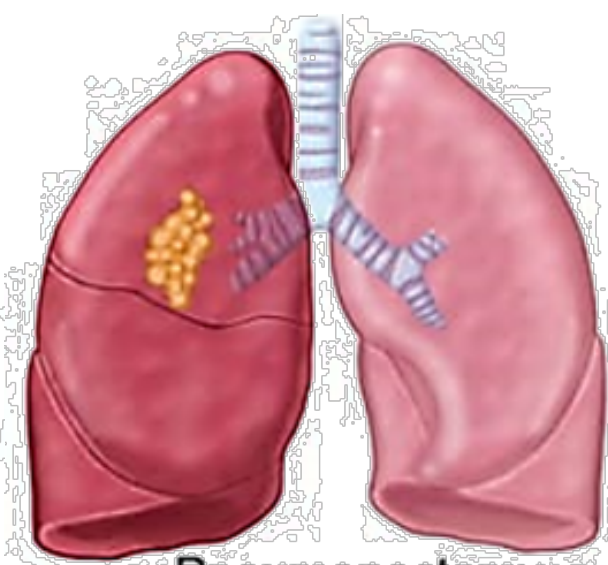
Wedge Resection



Segmentectomy



Lobectomy



Pneumonectomy



Lung Cancer Resection Procedures

Surgical Approach



VATS



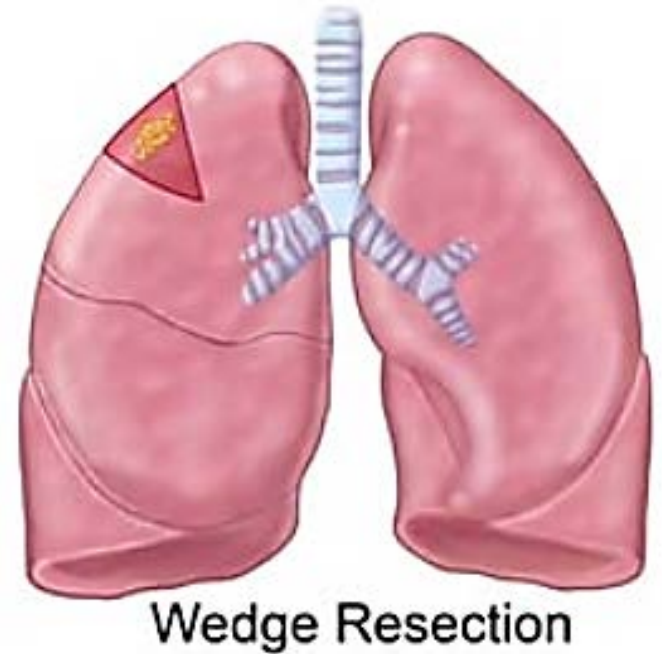
Open thoracotomy



Lung Cancer Resection Procedures

Wedge Resection

- Non-anatomic
- No division of vessels
- Diagnostic vs Therapeutic
 - Diagnostic = Biopsy
 - Therapeutic = Treatment of Disease





Lung Cancer Resection Procedures

Diagnostic or Therapeutic? How to Decide?

General Rule of Thumb...

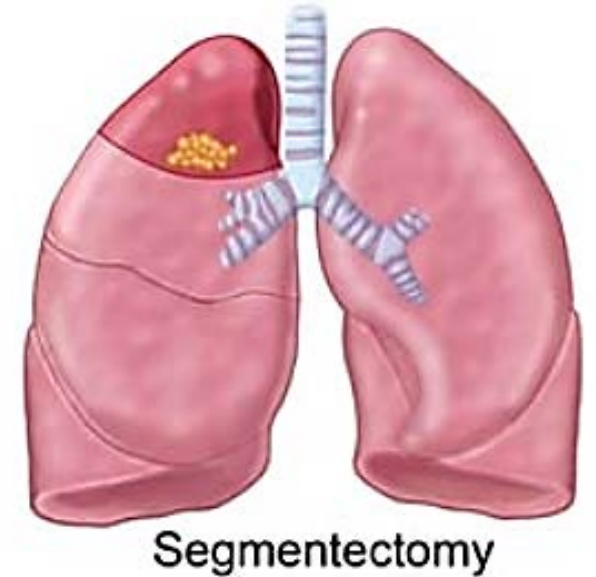
- Diagnostic wedge resections are usually followed by another resection either during the same or a subsequent procedure.
- Therapeutic wedge resections are not usually followed by another resection.



Lung Cancer Resection Procedures

Segmentectomy

- Removal of one or multiple segments from a lobe of the lung.
 - Superior segmentectomy
 - Lingular Segmentectomy
 - Lingular Sparing
- Anatomic Dissection
 - Nodes removed, vessels and airway divided separately from lung parenchyma

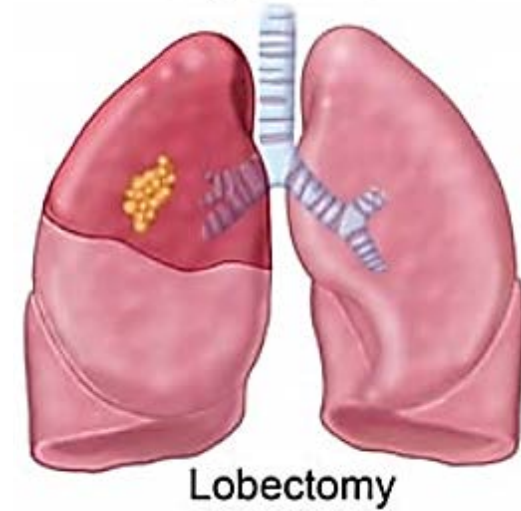




Lung Cancer Resection Procedures

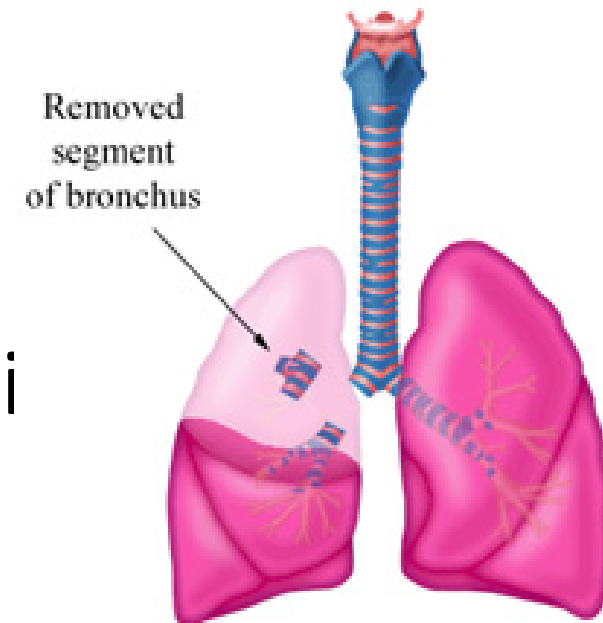
Lobectomy

- Removal of an entire lobe of the lung



Sleeve Lobectomy

- Indicated for bronchogenic carcinomas involving central bronchi





Lung Cancer Resection Procedures

Pneumonectomy

- Removal of an entire lung



Pneumonectomy

Completion Pneumonectomy

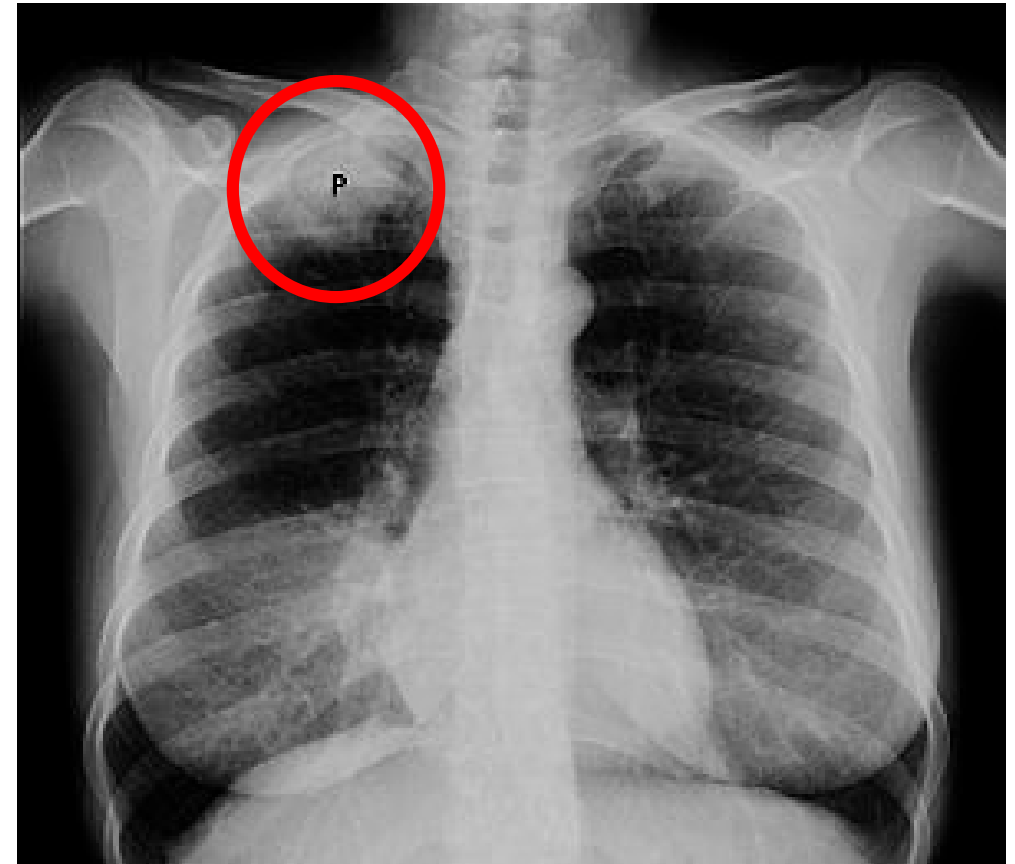
- Resection of remaining lung following prior lobectomy.
- Do not code if prior wedge or segmentectomy.



Lung Cancer Resection Procedures

Resection of Apical Lung Tumor (Pancoast)

- A tumor located at the top (apex) of the lung.
- Typically spreads to the chest wall and ribs.
- Most are non-small cell cancer.





E. Operative - Procedure(s) Performed

Check ALL of the procedures performed. Indicate (circle) the Primary Procedure.

Proc (1490)

Primary (1500)

Analyzed Procedures

Lung Cancer Resection

Primary (1500)



☒ Thoracoscopy, surgical; with lobectomy (32663)

☐ Removal of lung, single lobe (lobectomy) (32480)

☐ Thoracoscopy with therapeutic wedge resection (eg mass or nodule, initial, unilateral) (32666)

☐ Removal of lung, two lobes (bilobectomy) (32482)

☐ Thoracoscopy with therapeutic wedge resection(eg mass or nodule) each additional resection, ipsilateral (32667) List separately in addition to primary procedure code

☐ Removal of lung, single segment (segmentectomy) (32484)

☐ Thoracoscopy with diagnostic wedge resection followed by anatomic lung resection (32668), List separately in addition to primary procedure code

☐ Removal of lung, sleeve lobectomy (32486)

☐ Thoracoscopy with removal of a single lung segment (segmentectomy) (32669)

☐ Removal of lung, completion pneumonectomy (32488)

☐ Thoracoscopy with removal of two lobes (bilobectomy) (32670)

☐ Resection and repair of portion of bronchus (bronchoplasty) when performed at time of lobectomy or segmentectomy (32501)

☐ Thoracoscopy with removal of lung, pneumonectomy (32671)

☐ Resection of apical lung tumor (e.g., Pancoast tumor), including chest wall resection, without chest wall reconstruction(s) (32503)

☐ Thoracotomy with therapeutic wedge resection (eg mass nodule) initial (32505)

☐ Resection of apical lung tumor (e.g., Pancoast tumor), including chest wall resection, with chest wall reconstruction (32504)

☐ Removal of lung, total pneumonectomy; (32440)

☐ Thoracotomy with therapeutic wedge resection (eg mass nodule) each additional resection, ipsilateral (+32506)List separately in addition to primary procedure code

☐ Removal of lung, sleeve (carinal) pneumonectomy (32442)

☐ Thoracotomy with diagnostic wedge resection followed by anatomic lung resection (+32507), List separately in addition to primary proc code

Proc (1490)



☒ Thoracoscopy with mediastinal and regional lymphadenectomy (+32674) List separately in addition to primary procedure code

☐ Thoracic lymphadenectomy, regional, including mediastinal and peritracheal nodes (38746)



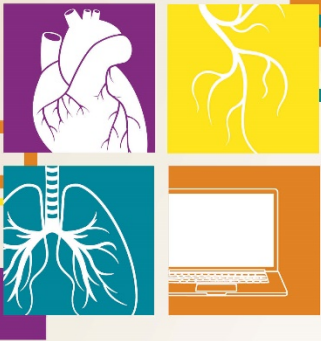
Audience Response Question

Mrs. Mardi Gras is scheduled for a robotic right upper lobe lobectomy. Once the robot was docked, dense adhesions were noted and the surgical approach was converted to thoracotomy.

**How would you code
seq #1500 (Primary Procedure)**

**A. Thoracoscopy, surgical;
with lobectomy (32663)**

**B. Removal of lung, single
lobe (lobectomy) (32480)**

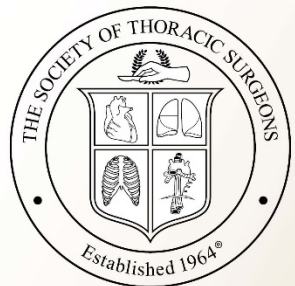


ADVANCES IN QUALITY & OUTCOMES:
A Data Managers Meeting

Live Content Slide

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**Poll: How would you code seq #1500
(Primary Procedure)?**





Audience Response Question

Mrs. Mardi Gras is scheduled for a robotic right upper lobe lobectomy. Once the robot was docked, dense adhesions were noted and the surgical approach was converted to thoracotomy.



**How would you code
seq #1500 (Primary Procedure)**

**A. Thoracoscopy, surgical;
with lobectomy (32663)**

**B. Removal of lung, single
lobe (lobectomy) (32480)**



E. Operative

E. Operative						
<u>Date of Surgery:</u> ____/____/____ SurgDt (1310)						
<u>OR Entry Time:</u> ____:____ OREntryT (1320)		Anesthesia Start Time: ____:____ AnesthStartT (1340)		<u>Procedure Start Time:</u> ____:____ ProcStartT (1360)		
<u>OR Exit Time:</u> ____:____ ORExitT (1330)		Anesthesia End Time: ____:____ AnesthEndT (1350)		<u>Procedure End Time:</u> ____:____ ProcEndT (1370)		
Multi-Day Operation (operation continued through midnight) MultiDay (1380) ☐ Yes ☒ No						
Planned, staged procedure? PlanStageProc (1390) ☐ Yes ☒ No						
Status of Operation ☐ Emergent ☐ Urgent ☒ Elective ☐ Palliative Status (1400)						
Reoperation (any prior cardiothoracic surgery that affects operative field) Reop (1410) ☐ Yes ☒ No				Assisted by Robotic Technology ☒ Yes ☐ No Robotic (1420)		
Surgical Approach Conversion: ☐ VATS → Open ☐ Robotic → VATS ☐ Robotic → Open ☒ No UnanticConv (1430) Conversion Type: ☐ Elective ☐ Emergent UnanticConvTy (1440) If Yes → Conversion Reason: ☐ Vascular ☐ Anatomy ☐ Lymph Nodes ☐ Technical UnanticConvRsn (1450)						
Blood transfusion intraoperatively (packed red blood cells) IntraopPRBC (1460) ☐ Yes ☒ No				If Yes → #Red Blood Cell Units: _____ IntraopPRBCNum (1470)		
<u>ASA Classification:</u> ASA (1480)	☐ I Normal, healthy	☐ II Mild systemic disease	☒ III Severe systemic disease	☐ IV Life threatening severe systemic disease	☐ V Moribund, not expected to survive without operation	☐ VI Declared brain dead, organ donor



E. Operative

More about seq #1390 – Planned, Staged Procedure...

SeqNo: 1390

Long Name: Planned, staged procedure

Short Name: PlanStageProc

Definition: Indicate if the patient's surgery is a planned, staged procedure. A procedure that is planned to occur in two stages which require the patient leave the operating room and return at a preplanned time on a subsequent day in order to complete the case.

There must be a plan to complete the procedure in more than one trip to the operating room prior to the first procedure.



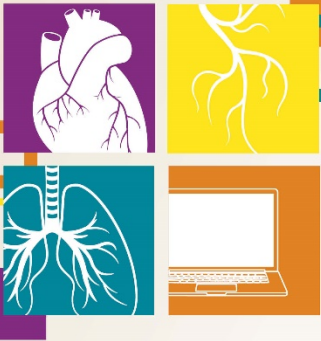
Audience Response Question

Mr. B. Easy undergoes a right upper lobe wedge resection. Final pathology reports positive margins and he returns three weeks later for a RUL lobectomy.

**How would you code
seq #1390
(Planned, Staged Procedure)?**

A. Yes

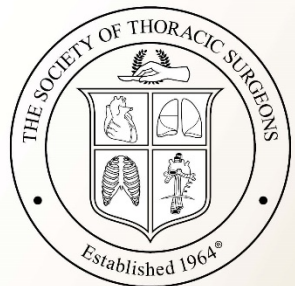
B. No



Live Content Slide

When playing as a slideshow, this slide will display live content

**Poll: How would you code seq #1390
(Planned, Staged Procedure)?**





Audience Response Question

Mr. B. Easy undergoes a right upper lobe wedge resection. Final pathology reports positive margins and he returns three weeks later for a RUL lobectomy.

**How would you code
seq #1390
(Planned, Staged Procedure)?**

A. Yes



B. No



F. Lung Cancer - Pathologic Staging

Lung - FINAL Pathological Staging

To be completed if lung cancer suspected or documented AND lung resection performed. (8th Edition)

Lung Cancer Results

ClinStageLungResult (1910)

☐ No cancer found, benign tumor



Lung Cancer Tumor present:

Only lung resections for confirmed lung cancer are required.

Unless your hospital chooses to enter all lung resections regardless of pathology, you will always code 'Lung Cancer Tumor Present' in sequence #1910.



F. Lung Cancer - Pathologic Staging

If Cancer Tumor Present →
PathStageLungT (1920)

☐ TX

Primary Tumor cannot be assessed, or tumor proven by the presence of malignant cells in sputum or bronchial washings but not visualized by imaging or bronchoscopy

☐ T0

No evidence of primary tumor

☐ Tis

Carcinoma in situ; squamous cell carcinoma in situ (SCIS); Adenocarcinoma in situ (AIS): adenocarcinoma with pure lepidic pattern, ≤ 3 cm in greatest dimension

☐ T1mi

Minimally invasive adenocarcinoma: adenocarcinoma (≤ 3 cm in greatest dimension) with a predominantly lepidic pattern and ≤ 5 mm invasion in greatest dimension.

☐ T1a

Tumor ≤ 1 cm in greatest dimension. A superficial, spreading tumor of any size whose invasive component is limited to the bronchial wall and may extend proximal to the main bronchus also is classified as T1a, but these tumors are uncommon.



☐ T1b

Tumor > 1 cm but ≤ 2 cm in greatest dimension

☐ T1c

Tumor > 2 cm but ≤ 3 cm in greatest dimension

☐ T2a

Tumor > 3 cm but ≤ 4 cm at greatest dimension, or having any of the following features: 1. involves the main bronchus regardless of distance to the carina, 2. but without involvement of the carina; invades visceral pleura (PL1 or PL2); 3. associated with atelectasis or obstructive pneumonitis that extends to the hilar region, involving part or all of the lung.

☐ T2b

Tumor > 4 cm but ≤ 5 cm at greatest dimension

☐ T3

Tumor > 5 cm but ≤ 7 cm in greatest dimension or directly invading any of the following: parietal pleura (PL3), chest wall (including superior sulcus tumors), phrenic nerve, parietal pericardium; or separate tumor nodule(s) in the same lobe as the primary

☐ T4

Tumor > 7 cm or tumor of any size invading one or more of the following: diaphragm, mediastinum, heart, great vessels, trachea, recurrent laryngeal nerve, esophagus, vertebral body, or carina; separate tumor nodule(s) in an ipsilateral lobe different from that of the primary

If tumor is T2a or T2b → Visceral Pleura Invasion ☐ Yes ☐ No **VisPleuralInv (1930)**

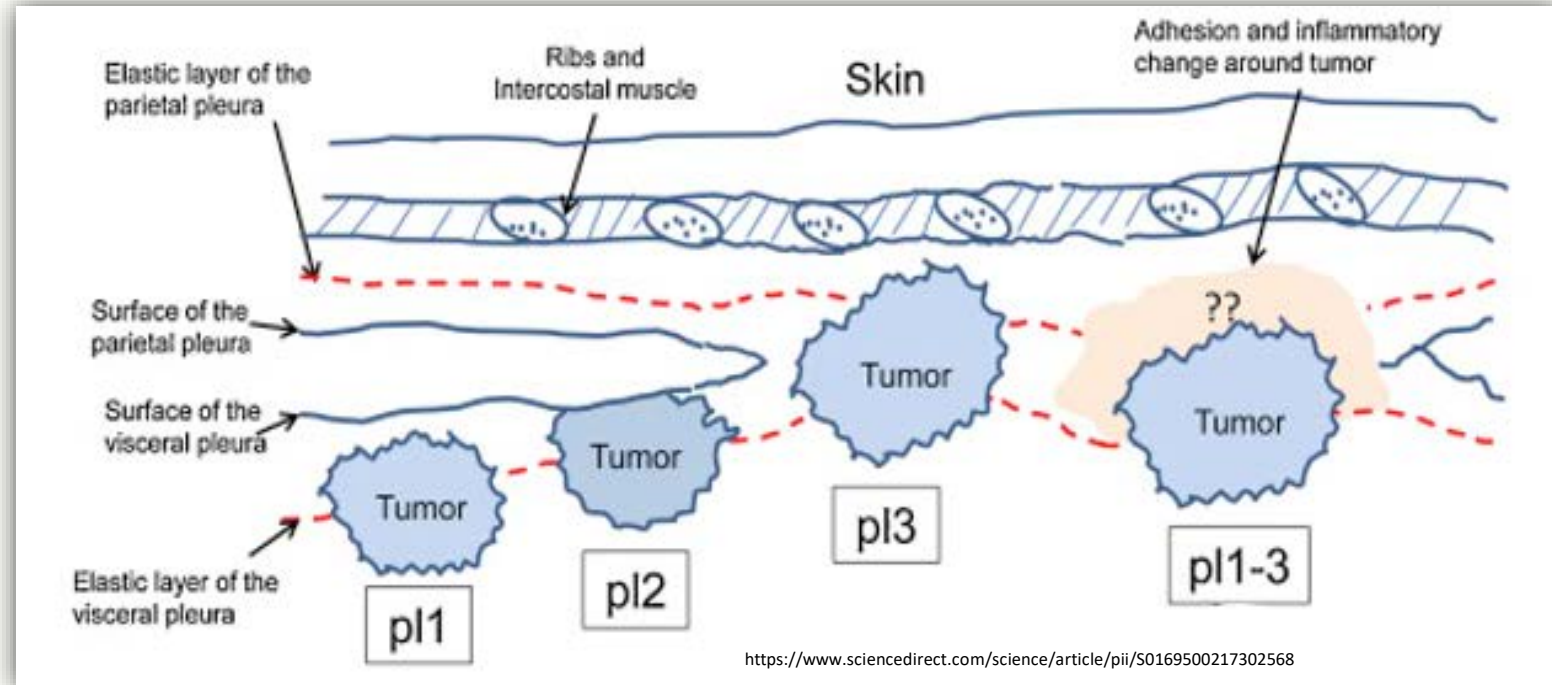
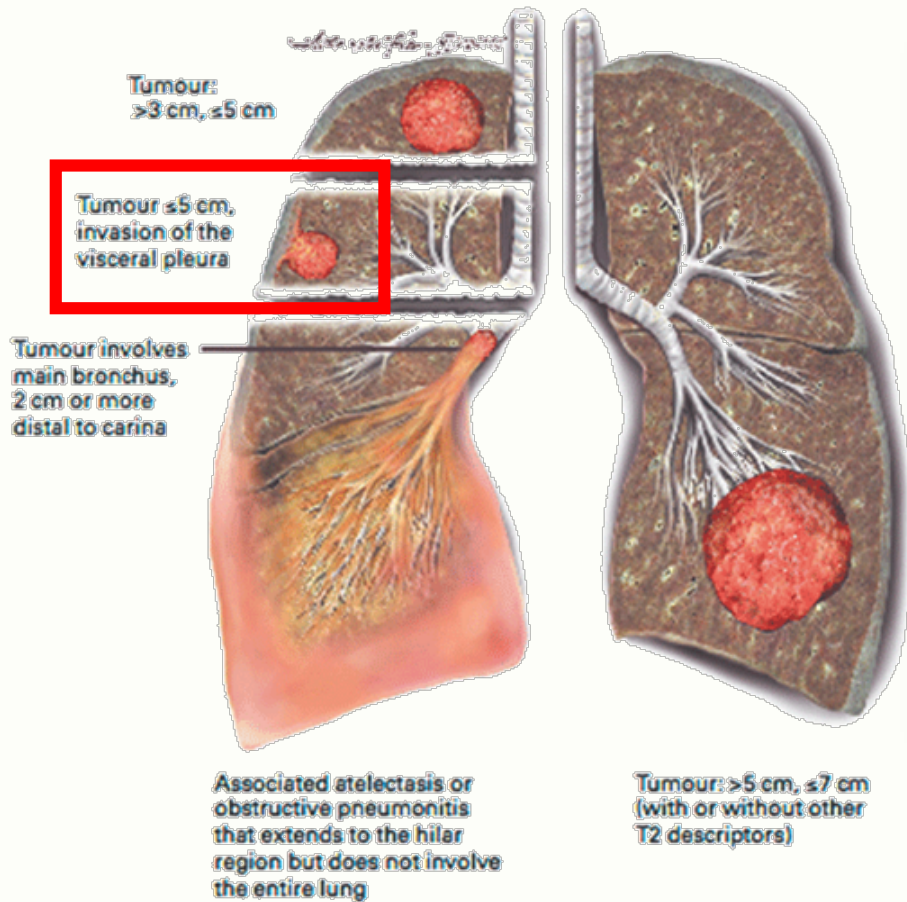


F. Lung Cancer - Pathologic Staging

#1930 – Visceral Pleura Invasion

T2a

T2b



<https://www.sciencedirect.com/science/article/pii/S0169500217302568>



F. Lung Cancer - Pathologic Staging

If Cancer Tumor Present→ PathStageLungT (1920)	Lung CA Nodes: PathStageLungN (1940)	☐ NX Regional lymph nodes cannot be assessed	☒ NO No regional lymph node metastasis	☐ N1 Metastasis in ipsilateral peribronchial and/or ipsilateral hilar lymph nodes and intrapulmonary nodes, includes involvement by direct extension
		☐ N2 Metastasis in ipsilateral mediastinal and/or subcarinal lymph node(s)	☐ N3 Metastasis in contralateral mediastinal, contralateral hilar, ipsilateral or contralateral scalene or supraclavicular lymph node(s)	
	If N2 → Multi-station N2 ☐ Yes ☐ No PathStageLungMultiN2 (1950)			
	Lung CA Metastases: PathStageLungM (1960)	☒ M0 No distant metastasis	☐ M1 Distant metastasis	

#1950 – Multi-Station N2

More than one N2 stations are positive.



F. Lung Cancer - Pathologic Staging

For a tumor in the right lung the N-stages are:

N1

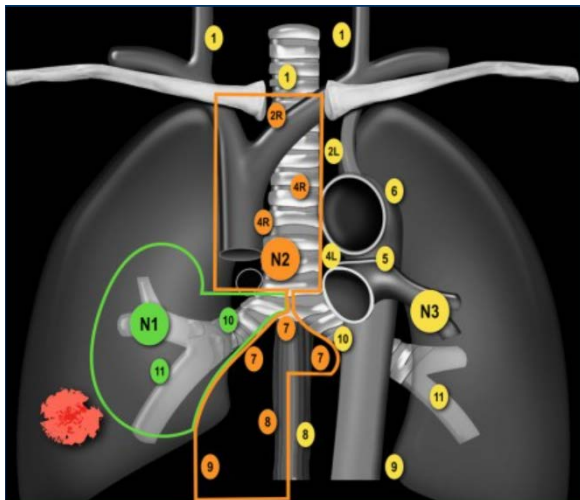
- Ipsilateral peribronchial and/or hilar lymph nodes
- 10R-14R

N2

- Ipsilateral mediastinal and/or subcarinal lymph nodes
- 2R, 3aR, 3p, 4R, 7, 8R, 9R

N3

- Contralateral mediastinal and/or hilar, as well as any supraclavicular lymph nodes
- 1, 2L, 3aL, 4L, 5, 6, 8L, 9L, 10L-14L



For a tumor in the left lung the N-stages are:

N1

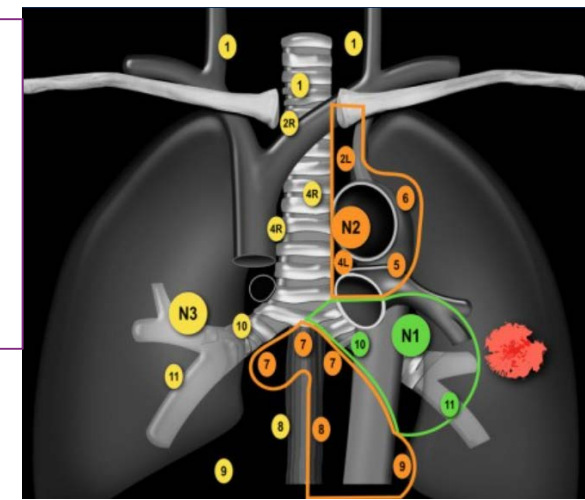
- Ipsilateral peribronchial and/or hilar lymph nodes
- 10L-14L

N2

- Ipsilateral mediastinal and/or subcarinal lymph nodes
- 2L, 3aL, 4L, 5, 6, 7, 8L, 9L

N3

- Contralateral mediastinal and/or hilar, as well as any supraclavicular lymph nodes
- 1, 2R, 3aR, 3pR, 4R, 8R, 9R, 10-14R



#1950 = Yes
If more than one N2
stations are positive

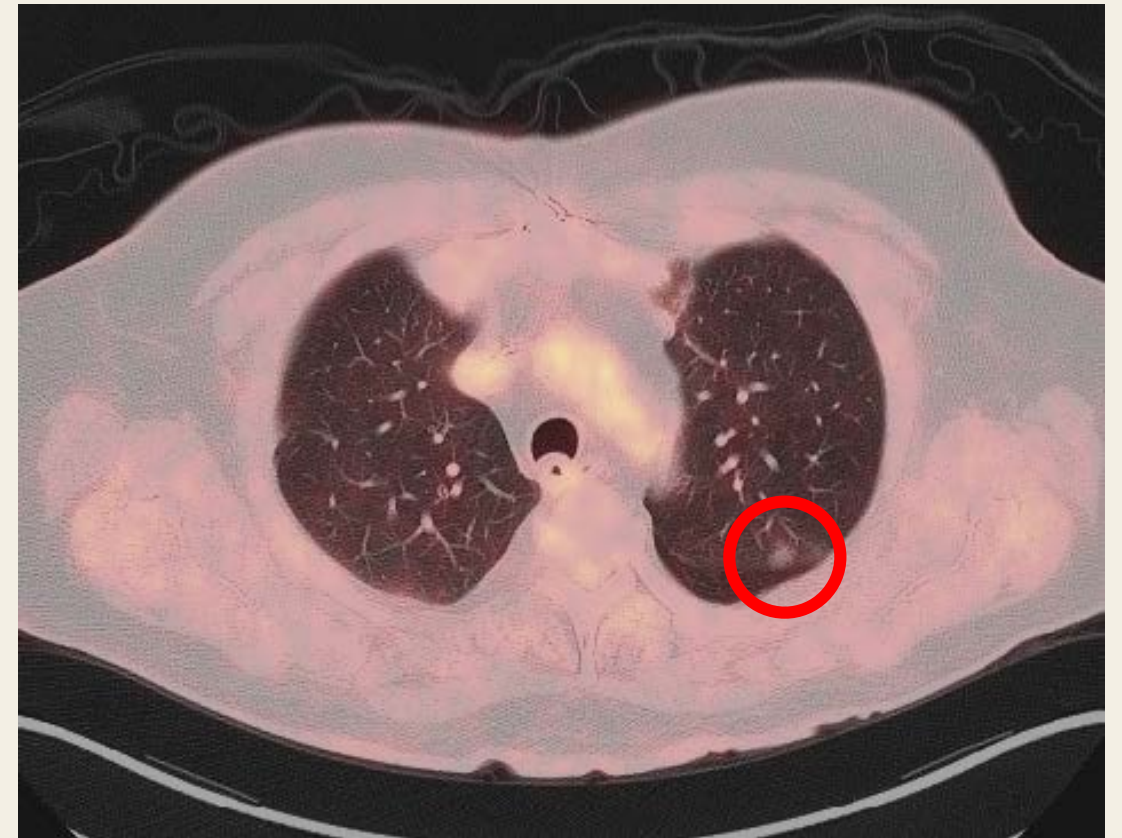


F. Lung Cancer - Pathologic Staging

Synchronous Primaries



LLL adenocarcinoma - T1



LUL adenocarcinoma - Tis



F. Lung Cancer - Pathologic Staging

Lung CA Histology: LungCAHist (1970)	☐ Carcinoma in situ-	☐ Adenocarcinoma	☐ Squamous cell	☐ Large cell
	☐ Small cell	☐ Low Grade Neuroendocrine (typical carcinoid)	☐ Intermediate grade neuroendocrine, atypical carcinoid	☒ Mixed
	☐ Other			

SeqNo: 1970

Long Name: Lung Cancer Histology

Short Name: LungCAHist

Definition: Indicate the appropriate descriptor for the lung cancer histology based on final pathology report.

October 2018: If the pathology is given for two lung nodules. One nodule is Large cell neuroendocrine carcinoma pT1cN1MX and the second is invasive adenocarcinoma, acinar predominant pT2N0MX. Would I use the pathology for the T1 tumor or the T2? **Large cell is more advanced per staging. Always choose the more advanced.**

When pathology is provided for more than one nodule, enter the information from the nodule with the most advanced disease as it will be the biggest prognostic indicator.



F. Lung Cancer - Pathologic Staging

Lung CA Histology: LungCAHist (1970)	☐ Carcinoma in situ-	☐ Adenocarcinoma	☐ Squamous cell	☐ Large cell
	☐ Small cell	☐ Low Grade Neuroendocrine (typical carcinoid)	☐ Intermediate grade neuroendocrine, atypical carcinoid	☒ Mixed
	☐ Other			

- **Small Cell**

Rarely resected

- **Mixed**

- **Other**

- **Non-Small Cell**

- Adenocarcinoma
 - Carcinoma in situ
- Squamous cell
- Large cell
- Carcinoid
 - Low Grade Neuroendocrine – slow growing, more common
 - Intermediate Grade Neuroendocrine – faster growing, less common



F. Lung Cancer - Histology

Small Cell Lung Cancer

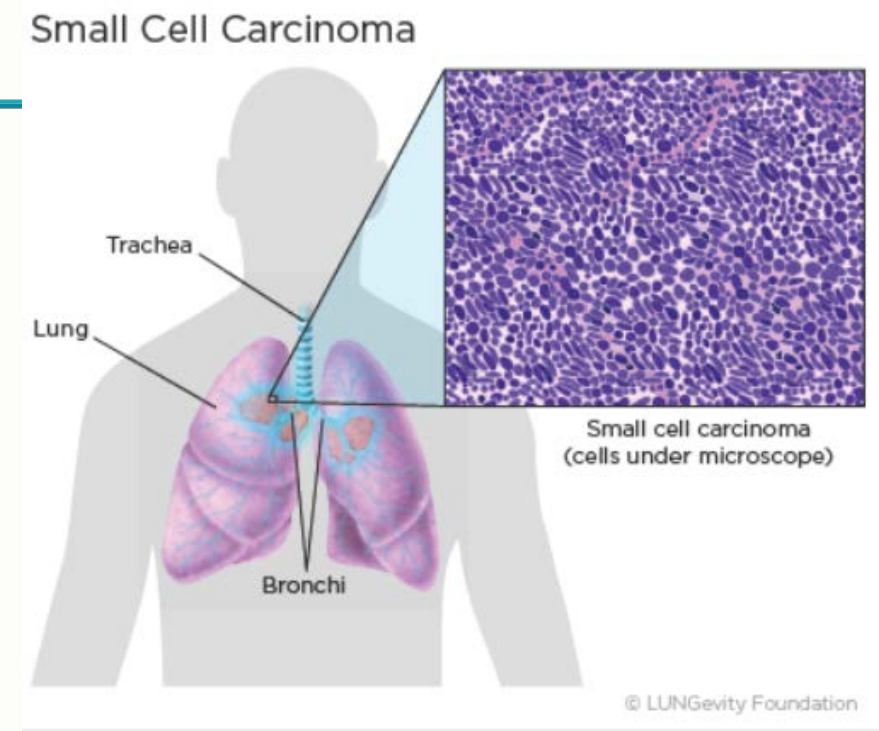
- 10-15% of all lung cancers
- Smoking is most common risk factor
- Usually starts in the bronchi
- Tends to grow and spread faster than NSCLC

■ Limited Stage

- 30-40%
- Generally refers to SCLC that is confined to the chest cavity, mediastinum and supraclavicular nodes

■ Extensive Stage

- 60-70%
- Spread beyond the supraclavicular areas of any distant metastases, including pleural effusion





F. Lung Cancer - Histology

Non-Small Cell Lung Cancer

- 80-85% of lung cancers
- Includes **adenocarcinoma**, **squamous cell**, and large cell carcinoma
- The subtypes start from different types of lung cells but are grouped together as NSCLC because their treatment and prognosis are often similar



F. Lung Cancer - Histology

Adenocarcinoma

- Starts in the glandular cells that would normally secrete mucus
- Tends to develop in smaller airways such as alveoli and is usually located along the outer edges of the lungs
- More likely to be found before it has spread
 - **Carcinoma in situ**
 - Previously called bronchiolalveolar carcinoma (BAC)
 - Exhibits **PURE** alveolar distribution (lepidic growth) and lacks invasion of surrounding normal lung



F. Lung Cancer - Histology

Adenocarcinoma

Histologic type: adenocarcinoma

Percentage of lepidic pattern: approximately 55 %

Percentage of total invasive pattern (sum of invasive pattern percentages below): 45 %

---Acinar: 45 %

---Papillary: 0 %

---Micropapillary: 0 %

---Solid: 0 %

Must be PURE lepidic to code Carcinoma in situ

Histologic Type: Adenocarcinoma, solid predominant

Histologic type: Invasive adenocarcinoma, acinar predominant

Histologic type: Invasive adenocarcinoma, papillary predominant

Histologic Type: Adeoncarcinoma, acinar (85%) predominant; lepidic (15%)

Histologic type: Invasive adenocarcinoma, with mucinous features



F. Lung Cancer - Histology

Squamous Cell Carcinoma

- Begins in the squamous cells that line the inside of the airways.
- Usually occur in the central part of the lung or in one of the main airways (left or right bronchus)
- Central location can cause symptoms such as cough, difficulty breathing, chest pain, and blood in the sputum
- More strongly associated with smoking than any other type of NSCLC



F. Lung Cancer - Histology

Squamous Cell Carcinoma

Histologic type: Invasive squamous cell carcinoma, keratinizing

HISTOLOGIC TYPE: INVASIVE SQUAMOUS CELL CARCINOMA, NONKERATINIZING.



F. Lung Cancer - Histology

Carcinoid Tumors

Originate in neuroendocrine cells of the lung.

- **Low Grade Neuroendocrine (typical carcinoid)**
 - Slow growing, rarely spread beyond the lung
 - More common
- **Intermediate Grade Neuroendocrine (atypical carcinoid)**
 - Faster growing, more likely to spread to other organs
 - Less common

Histologic type: Carcinoid tumor, atypical
(moderately-differentiated neuroendocrine carcinoma)



F. Lung Cancer - Histology

Large Cell Carcinoma

- Originates from epithelial cells.
- Can be found anywhere in the lung, but is more often found in the periphery



F. Lung Cancer - Histology

Mixed

Histologic Type: Adenosquamous carcinoma

Histologic type: Adenocarcinoma and squamous cell carcinoma
Histologic grade: Poorly differentiated (adenocarcinoma), moderately differentiated (squamous cell carcinoma)

Histologic type: Small cell carcinoma and adenosquamous carcinoma
Histologic grade: Adenosquamous carcinoma is moderately differentiated



F. Lung Cancer - Histology

Other

- **Rare, generally bad**

Histologic type: Other histologic type not listed (specify): Poorly differentiated malignant neoplasm (based on prior FNA: CF-19-2196); no residual tumor in current specimen



F. Lung Cancer - Pathologic Staging

Grade:

☐ Low grade (well differentiated)
LungCAHistGrade (1980)

☐ Intermediate grade

☒ High grade (poorly differentiated)

☐ Unknown / Not reported

Histologic Grade

- The rating of how fast the cancer is likely to grow and spread based on the appearance of the cancer cells in comparison to normal cells.
- The more abnormal the cells appear, the faster the cancer is expected to spread.

Well Differentiated

look a lot like normal cells

Moderately Differentiated

retain only some of the features of normal cells

Poorly Differentiated

look very different from normal cells



Audience Response Question

Surgical Pathology Cancer Case Summary: LUNG

Specimen laterality: right upper lobectomy

Tumor site: right upper lobe

Tumor size: 2.8 x 2 x 1.9 cm.

Tumor focality: unifocal

Tumor extension: confined to lung

Visceral pleura invasion: absent

Direct invasion of adjacent structures: not applicable

Margins: all margins are negative.

Histologic type: adenocarcinoma

Histologic grade: 2/3

Lymphovascular invasion: not identified

Non-neoplastic lung: unremarkable

Treatment effect: not applicable

Lymph nodes with metastases/total number of lymph nodes: 0/24 lymph nodes involved.

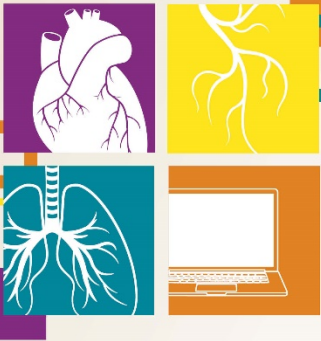
Pathologic TNM classification: pT1c N0 M not applicable.

**How would you code
seq #1980 (Histologic Grade)?**

A. Low Grade

B. Intermediate Grade

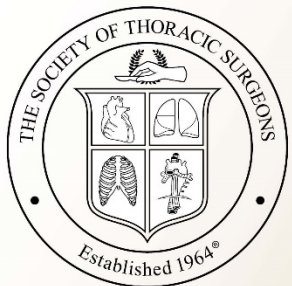
C. High Grade



Live Content Slide

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**Poll: How would you code seq #1980
(Histologic Grade)?**





Audience Response Question

Surgical Pathology Cancer Case Summary: LUNG

Specimen laterality: right upper lobectomy

Tumor site: right upper lobe

Tumor size: 2.8 x 2 x 1.9 cm.

Tumor focality: unifocal

Tumor extension: confined to lung

Visceral pleura invasion: absent

Direct invasion of adjacent structures: not applicable

Margins: all margins are negative.

Histologic type: adenocarcinoma

Histologic grade: 2/3

Lymphovascular invasion: not identified

Non-neoplastic lung: unremarkable

Treatment effect: not applicable

Lymph nodes with metastases/total number of lymph nodes: 0/24 lymph nodes involved.

Pathologic TNM classification: pT1c N0 M not applicable.

How would you code
seq #1980 (Histologic Grade)?

A. Low Grade

B. Intermediate Grade



C. High Grade



F. Lung Cancer - Pathologic Staging

Total # of Lymph Nodes
sampled/harvested: **9**
LungCANodes (1990)

Total # of Nodal Stations sampled/harvested: **7**
LungCANodStat (2000)

Lymph nodes

Stations 2 and 4 (specimen D): Not involved (2 nodes)
Station 7 (specimen B): Not involved (2 nodes)
Station 8R (specimen A): Not involved (1 node)
Station 10R (specimen C): Not involved (2 nodes)
Station 11R (specimen E): Not involved (1 node)
Lobar (main specimen, F): Not involved (1 node)



ADVANCES IN QUALITY & OUTCOMES:
A Data Managers Meeting

