

**Completing the Puzzle**  
**AJCC TNM Staging**  
**Lung**

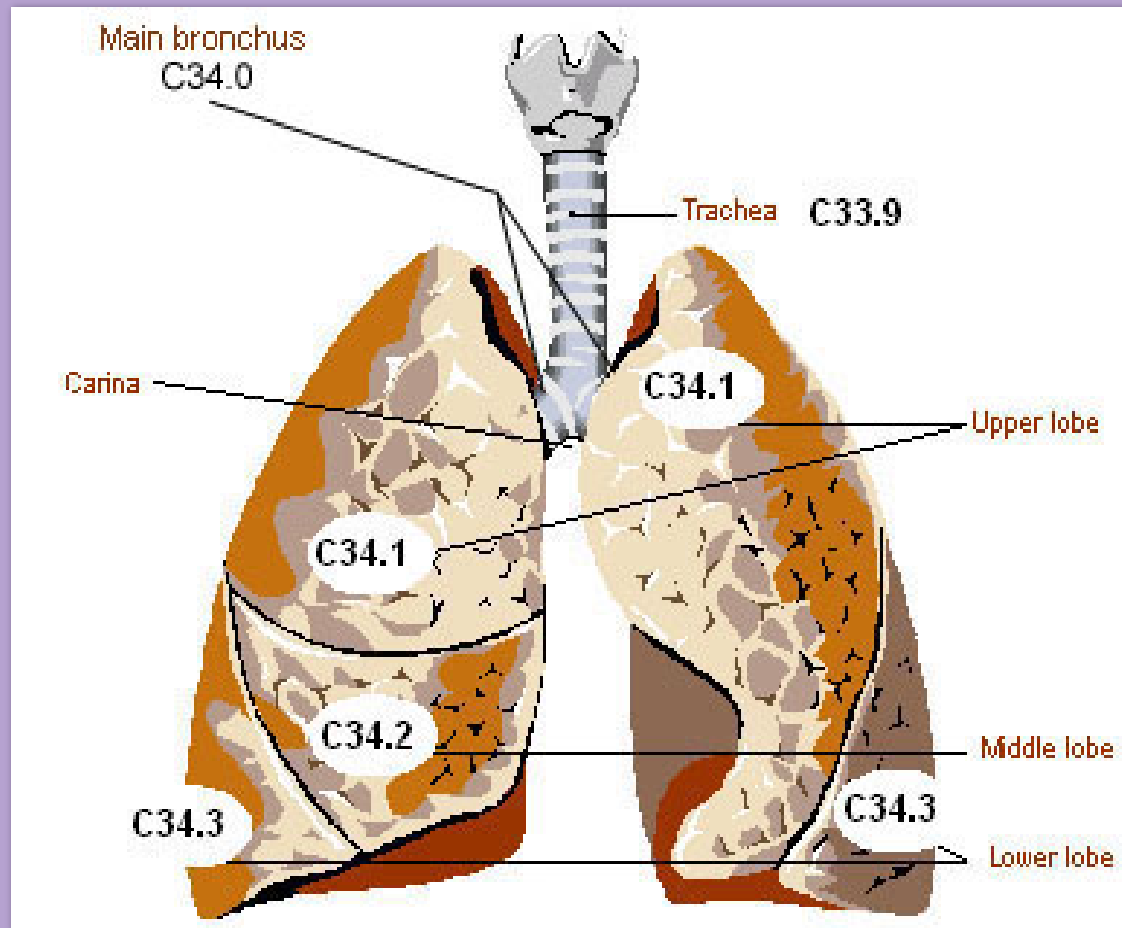
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2017 Kentucky Cancer Registry Fall Conference, September 21 & 22, 2017

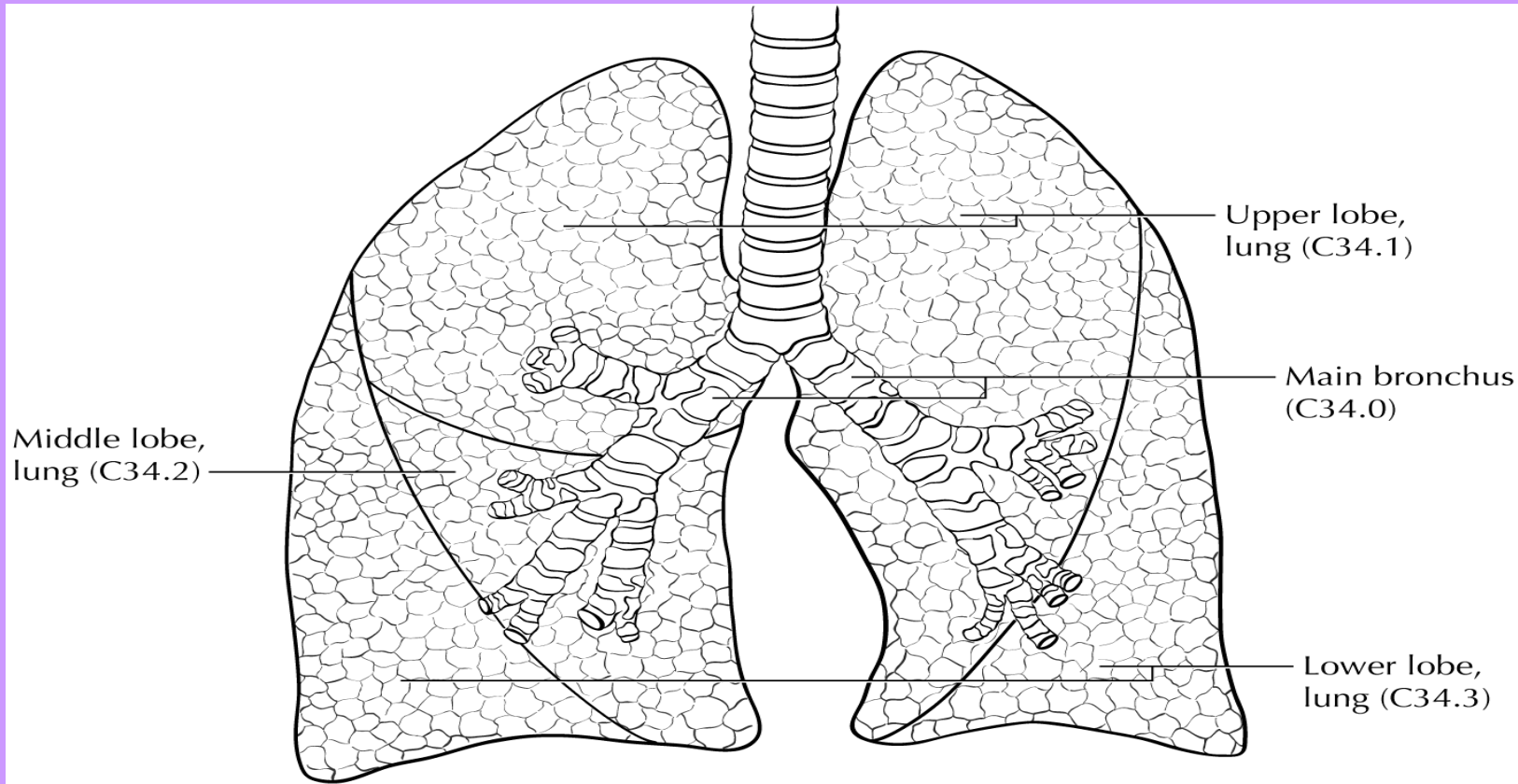
# OBJECTIVES

- Understanding of Lung TNM staging
- Identify clinical versus pathologic information to use in staging cases
- Case eligibility for pathologic staging

# Lung Topography



# Lung



Anatomic subsites of the lung.

# LUNG TOPOGRAPHY CODES

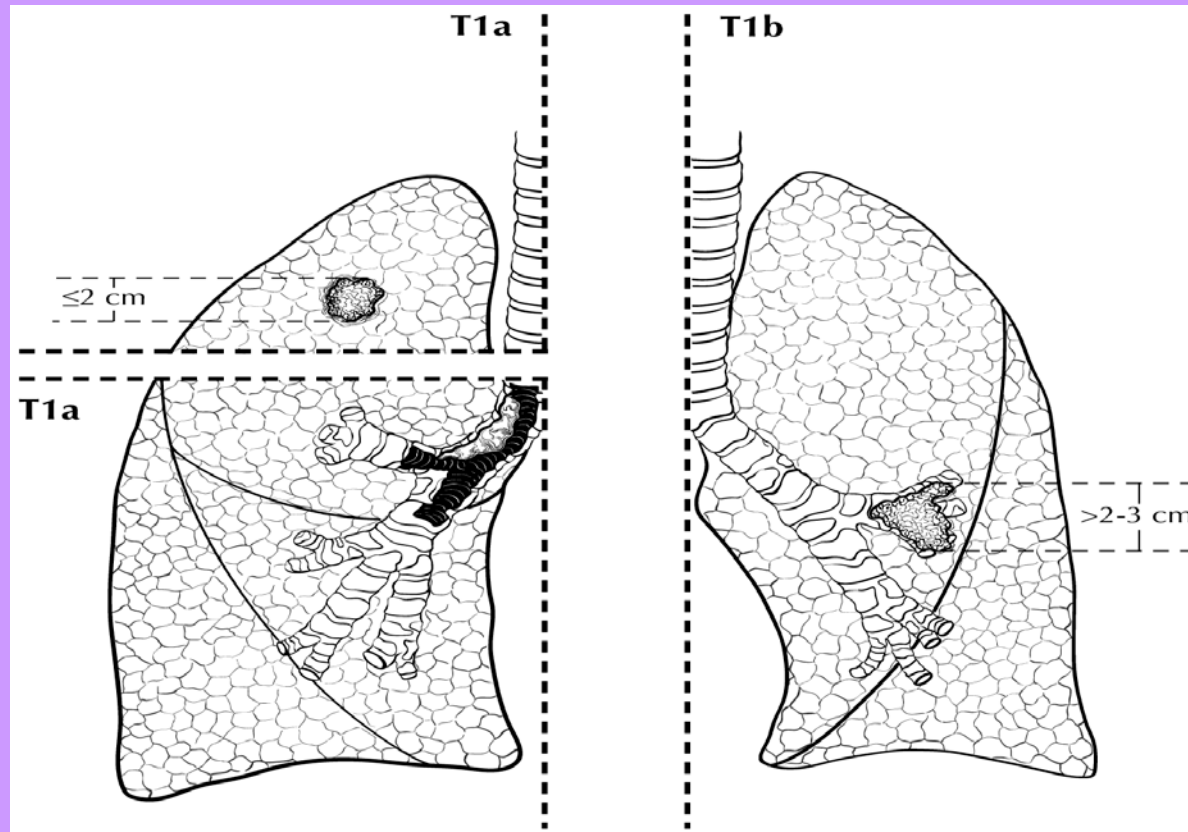
## ICD-0-3

- **c34.0** Main Bronchus (Hilar mass considered the primary)
- **c34.1** Upper Lobe (apex)
- **c34.2** Middle Lobe (right lung only)
- **c34.3** Lower Lobe (base)
- **c34.8** Overlapping lesion of lung (used when one tumor in multiple lobes and it can't be determined which lobe the tumor arose from)
- **c34.9** Lung, NOS

# AJCC T classifications

- **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
- **T1** Tumor 3 cm or less, surrounded by lung or visceral pleura, without bronchoscopic evidence of invasion more proximal than the lobar bronchus (i.e., not in the main bronchus)
  - **T1a** Tumor 2 cm or less
  - **T1b** Tumor more than 2 cm but 3 cm or less

# Lung



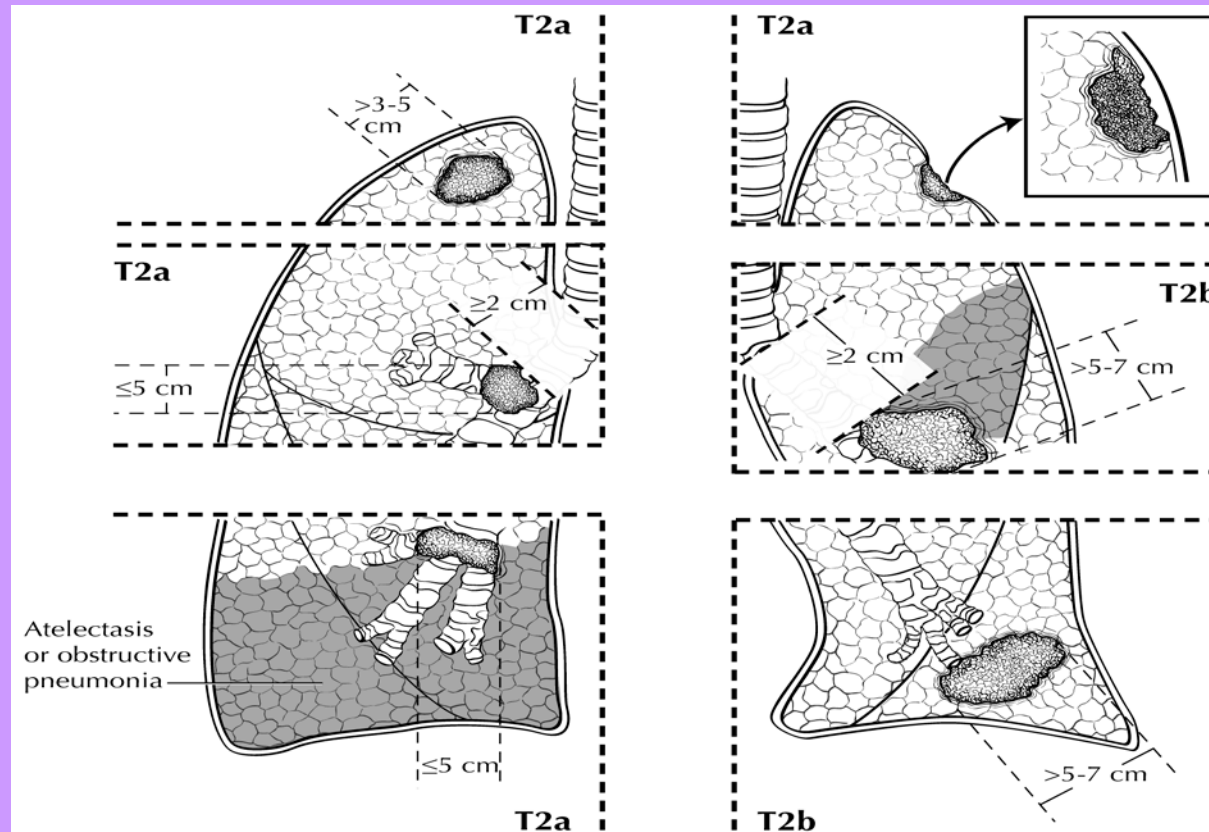
T1 is defined as a tumor 3 cm or less in greatest dimension, surrounded by lung or visceral pleura, without bronchoscopic evidence of invasion more proximal than the lobar bronchus (i.e., not in the main bronchus). T1a is defined as a tumor 2 cm or less in greatest dimension (upper left). T1a is also defined as a superficial spreading tumor of any size with its invasive component limited to the bronchial wall, which may extend proximally to the main bronchus (lower left). T1b is defined as a tumor more than 2 cm but 3 cm or less in greatest dimension (right).

# AJCC T classifications

- **T2** Tumor more than 3 cm but less than or equal to 7 cm **OR** tumor involves main bronchus, 2 cm or more distal to the carina; invades visceral pleura (PL1 or PL2); associated with atelectasis or obstructive pneumonitis that extends to the hilar region but does not involve entire lung
- **T2a** Tumor more than 3 cm but less than or equal to 5 cm
- **T2b** Tumor more than 5 cm but less than or equal to 7 cm

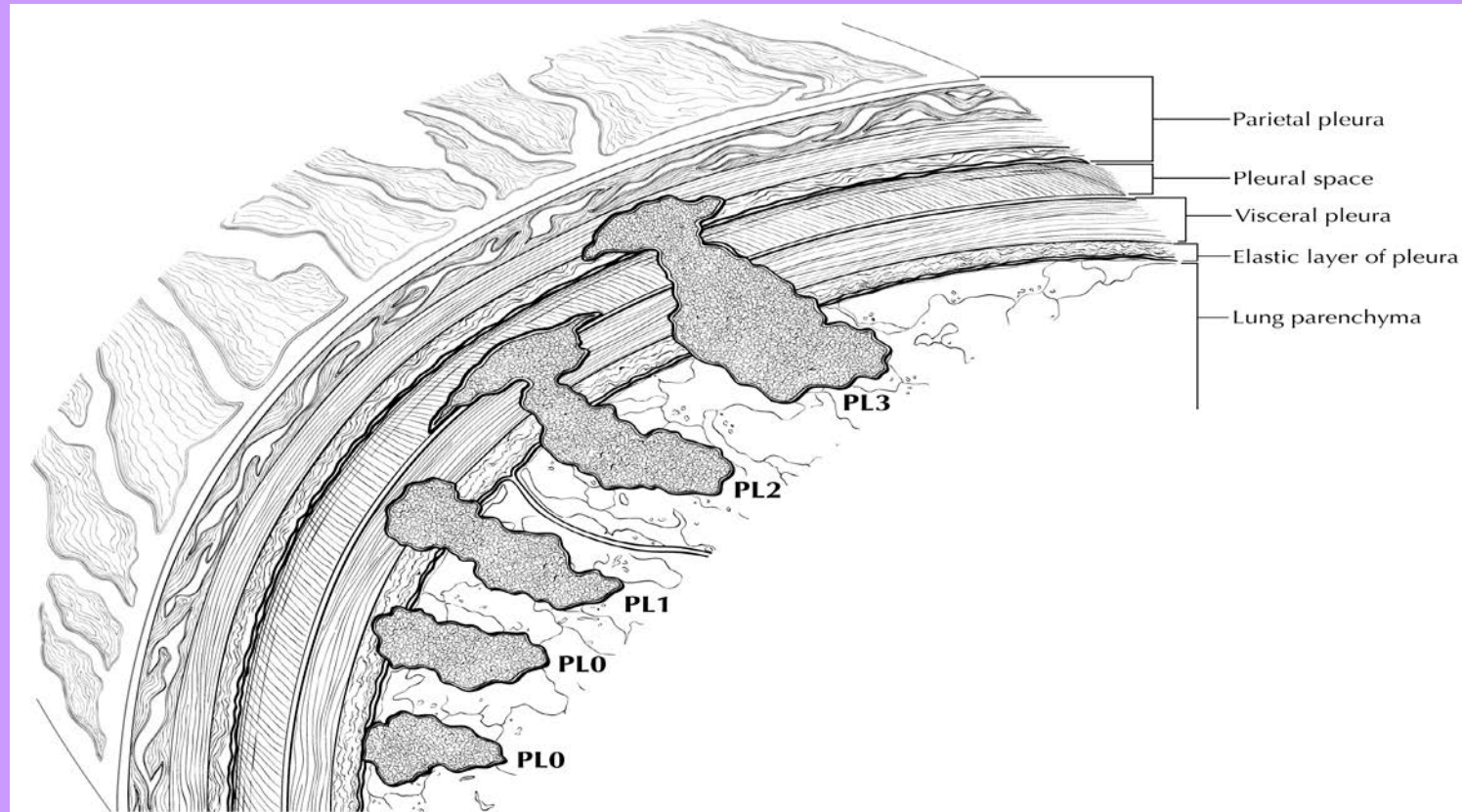


# Lung



T2 is defined as a tumor more than 3 cm but 7 cm or less or tumor with any of the following features (T2 tumors with these features are classified T2a if 5 cm or less); involves main bronchus, 2 cm or more distal to the carina (middle left and middle right); invades visceral pleura (PL1 or PL2) (upper right); associated with atelectasis or obstructive pneumonitis that extends to the hilar region but does not involve the entire lung (bottom left). T2a is defined as tumor more than 3 cm but 5 cm or less in greatest dimension (upper left). T2b is defined as tumor more than 5 cm but 7 cm or less in greatest dimension (bottom right).

# Lung



A tumor that falls short of completely traversing the elastic layer of the visceral pleura is defined as PL0. A tumor that extends through the elastic layer is defined as PL1 and one that extends to the surface of the visceral pleural as PL2. Extension of the tumor to the parietal pleura is defined as PL3.

# COMBINED CODING EXT/SSF2 TABLE FOR SURGICALLY RESECTED LUNG CASES

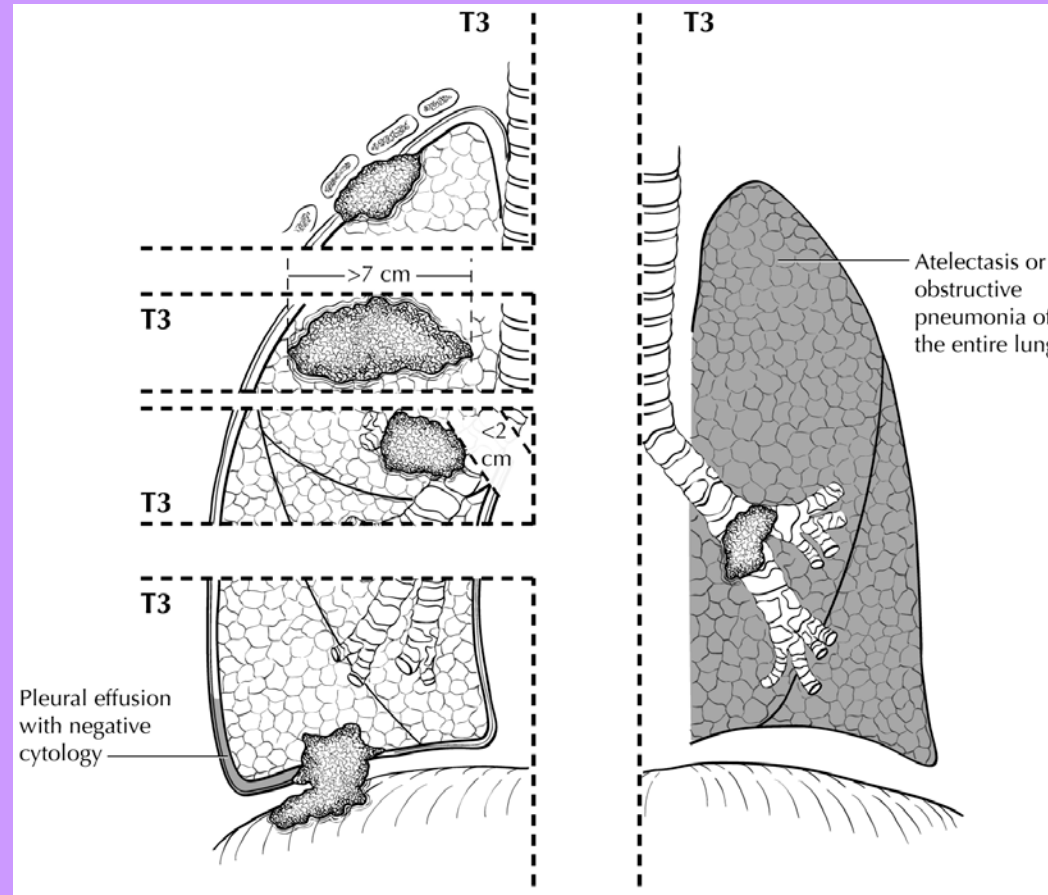
CSEXT 100	SSF2 000	PL0	T1 based on extension
CSEXT 410	SSF2 000	PL0	T1 based on extension
CSEXT 420	SSF2 010 OR 020	PL1 OR PL2	T2 based on extension
CSEXT 430	SSF2 040	PL1	T2 based on extension
CSEXT 600	SSF2 030	PL3	T3 based on extension

# AJCC T classifications

## ○ T3

- Tumor more than 7 cm
- Tumor directly invades parietal pleura (PL3), chest wall (including superior sulcus tumors), diaphragm, phrenic nerve, mediastinal pleura, parietal pericardium
- Tumor in the main bronchus- less than 2 cm distal to the carina but without involvement of the carina
- Associated atelectasis or obstructive pneumonitis of the entire lung
- Separate tumor nodule(s) in the same lobe

# Lung



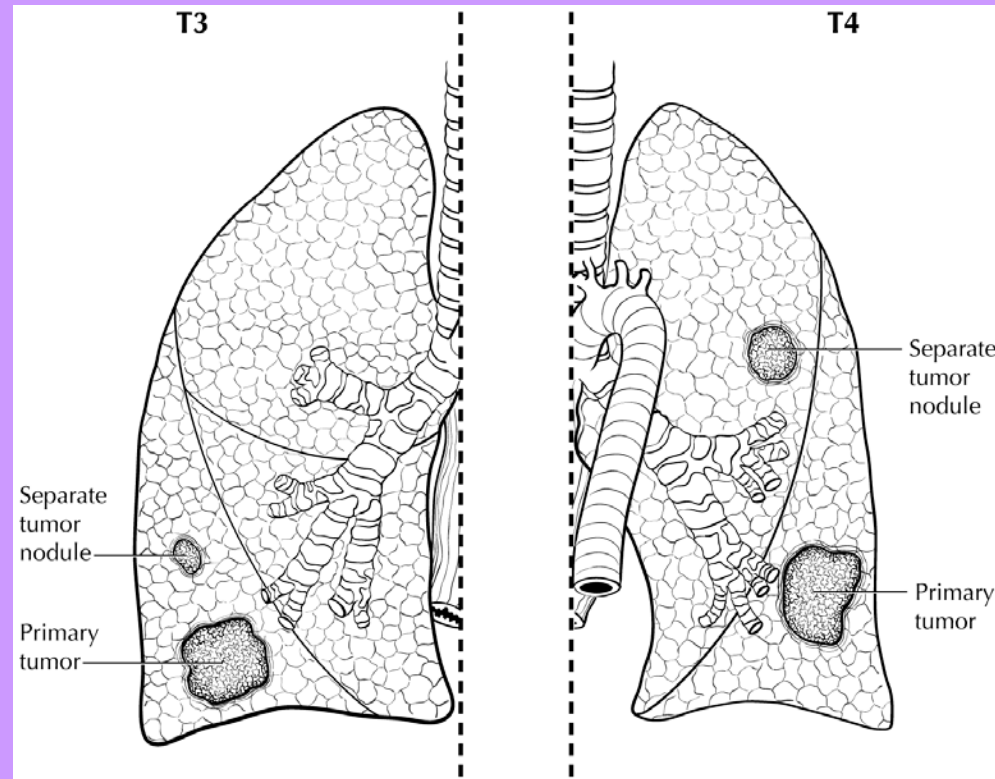
T3 is defined as a tumor more than 7 cm (upper middle left) or one that directly invades any of the following: parietal pleural (PL3), chest wall (including superior sulcus tumors) (upper left), diaphragm (lower left), phrenic nerve, mediastinal pleura, parietal pericardium; or tumor in the main bronchus (less than 2 cm distal to the carina but without involvement of the carina) (lower middle left); or associated atelectasis or obstructive pneumonitis of the entire lung (right) or separate tumor nodule(s) in the same lobe.

# AJCC T classifications

## ○ T4

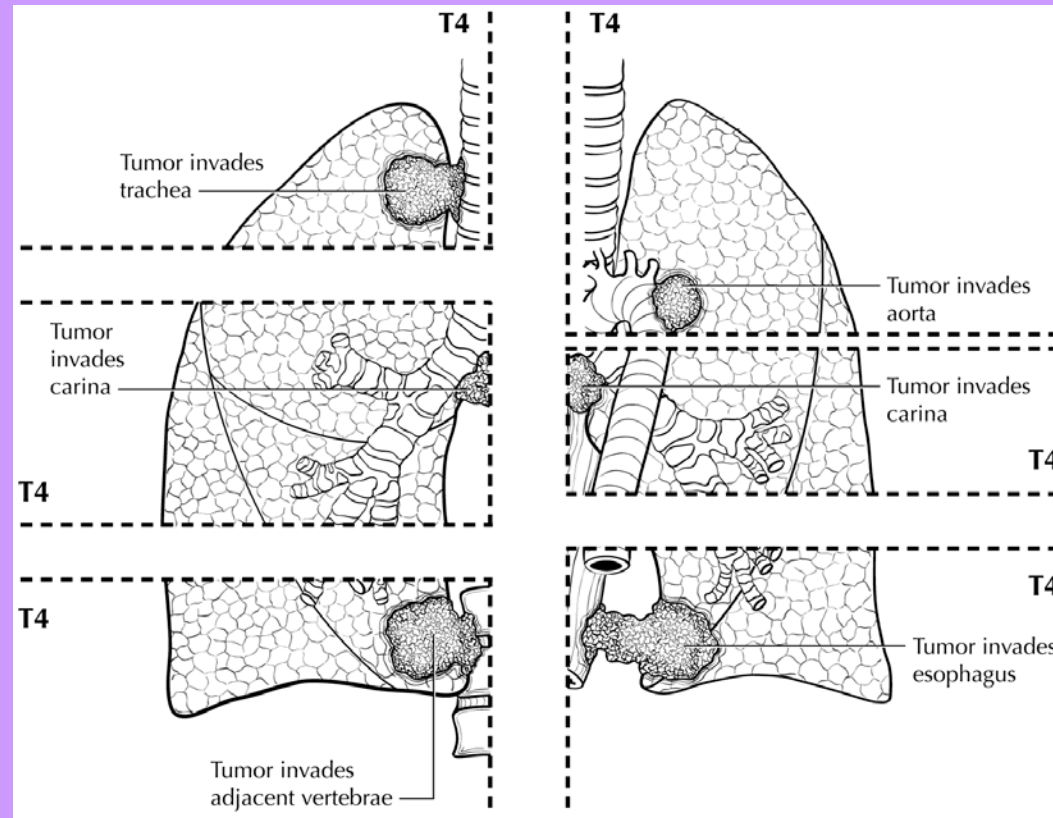
- Tumor of any size that invades the mediastinum, heart, great vessels, trachea, recurrent laryngeal nerve, esophagus, vertebral body or carina
- Separate tumor nodule(s) in a different ipsilateral lobe

# Lung



T3 includes separate tumor nodule(s) in the same lobe. T4 includes separate tumor nodule(s) in a different ipsilateral lobe.

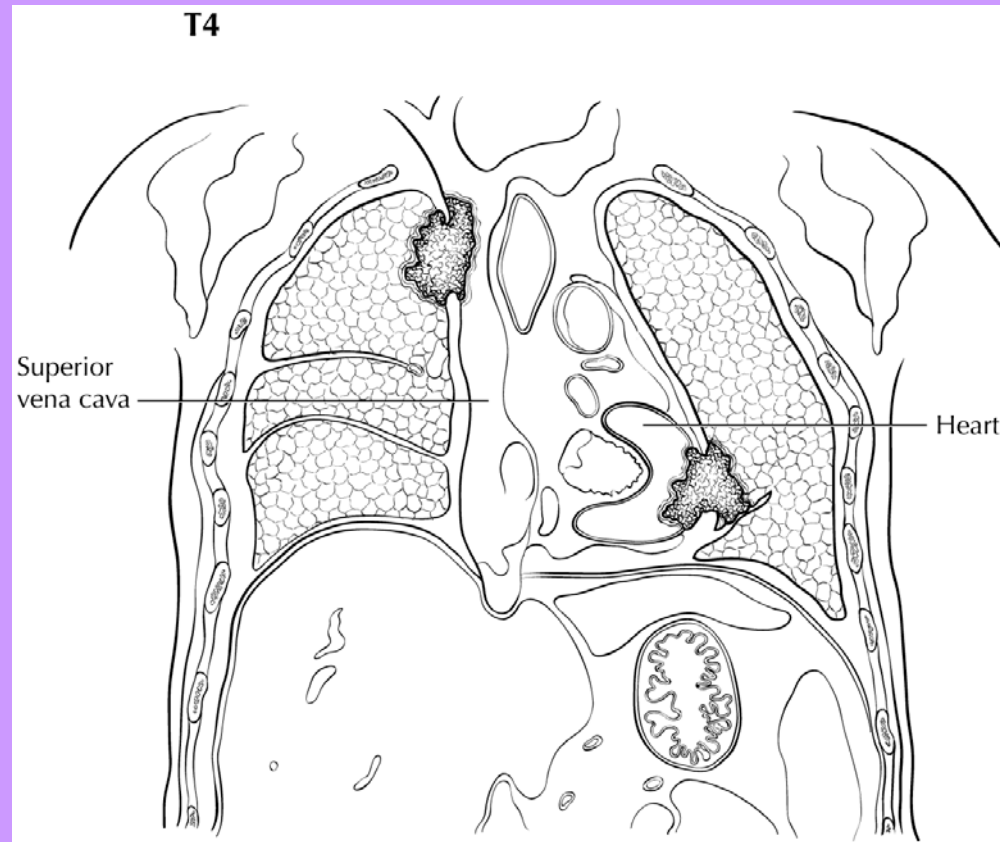
# Lung



T4 is defined as tumor of any size that invades any of the following: mediastinum, heart, great vessels (upper right), trachea (upper left), recurrent laryngeal nerve, esophagus (lower right), vertebral body (lower left), carina (middle left and right), separate tumor nodule(s) in a different ipsilateral lobe.

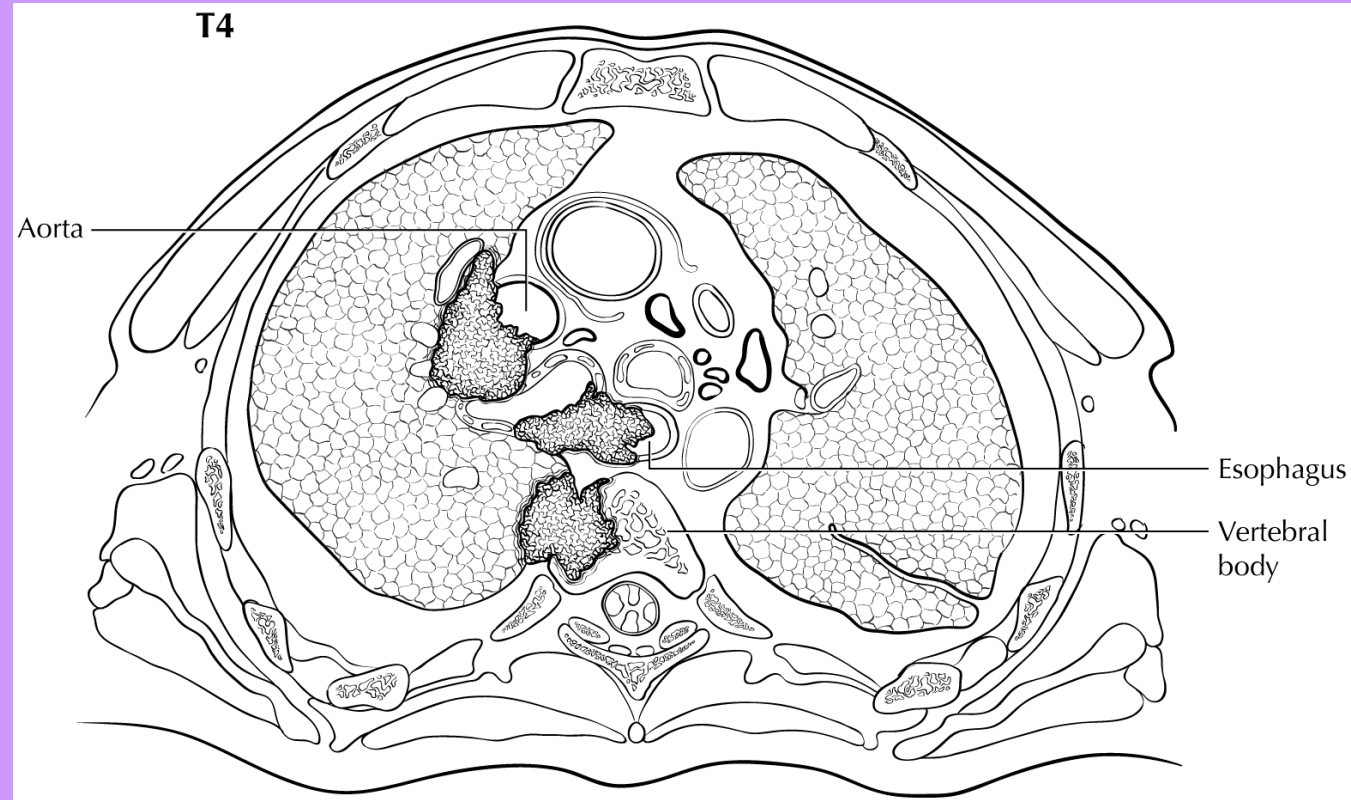


# Lung



T4 includes tumor invasion of the superior vena cava and heart.

# Lung

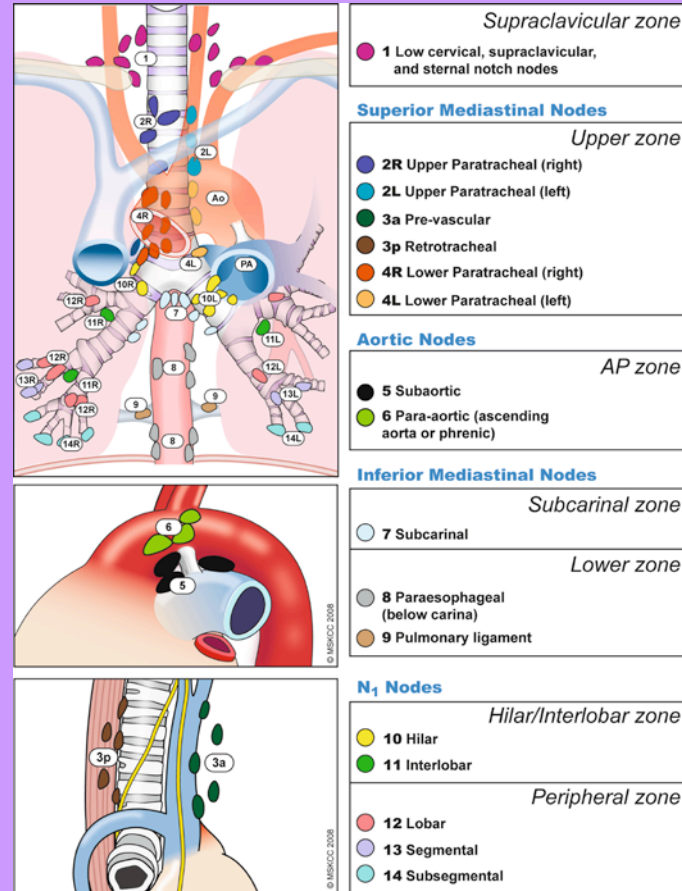


T4 includes tumor invasion of the aorta, esophagus, and vertebral body.

# AJCC N classifications

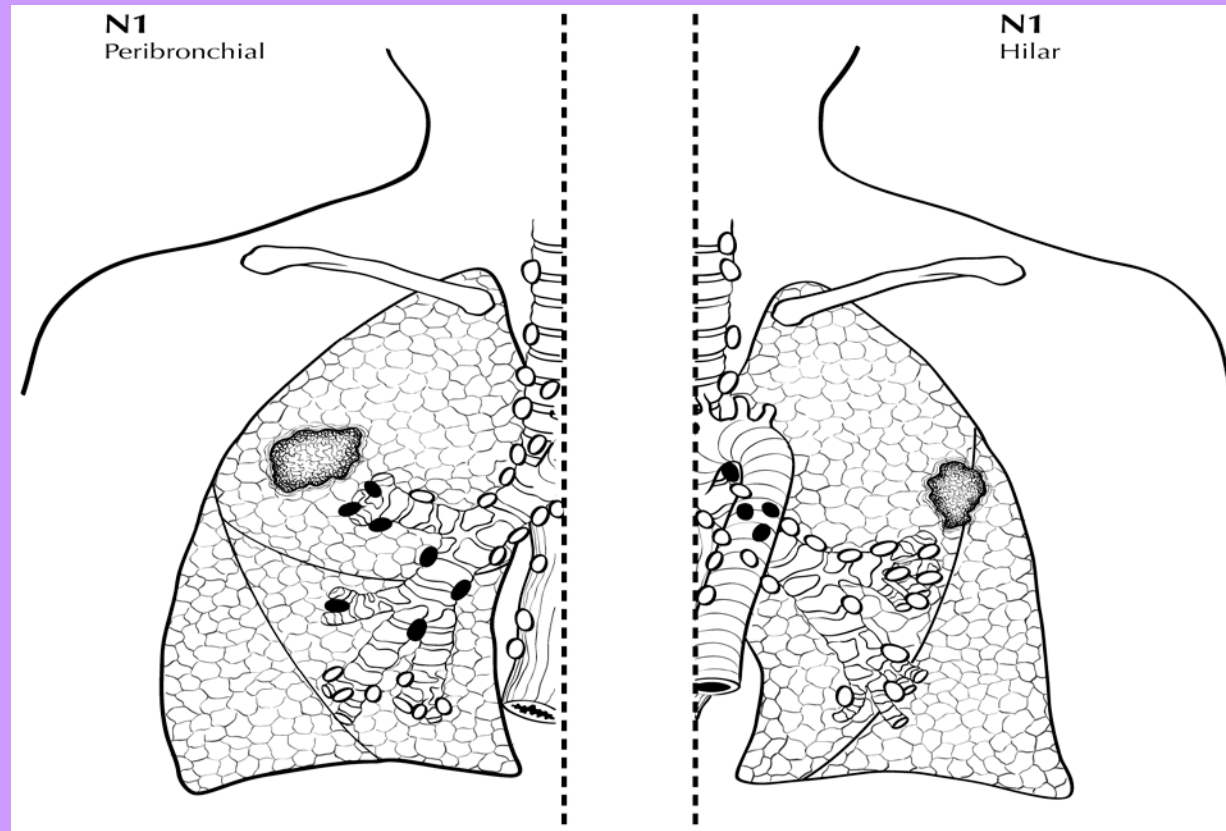
- **NX** Regional Lymph nodes cannot be assessed
- **N0** No regional lymph node metastases
- **N1** Metastasis in ipsilateral peribronchial and or/ipsilateral hilar LNs and intrapulmonary nodes, including involvement by direct extension
- **N2** Metastasis in ipsilateral mediastinal and or subcarinal LN(s)
- **N3** Metastasis in contralateral mediastinal, contralateral hilar, ipsilateral or contralateral scalene or supraclavicular LN(s)

# Lung



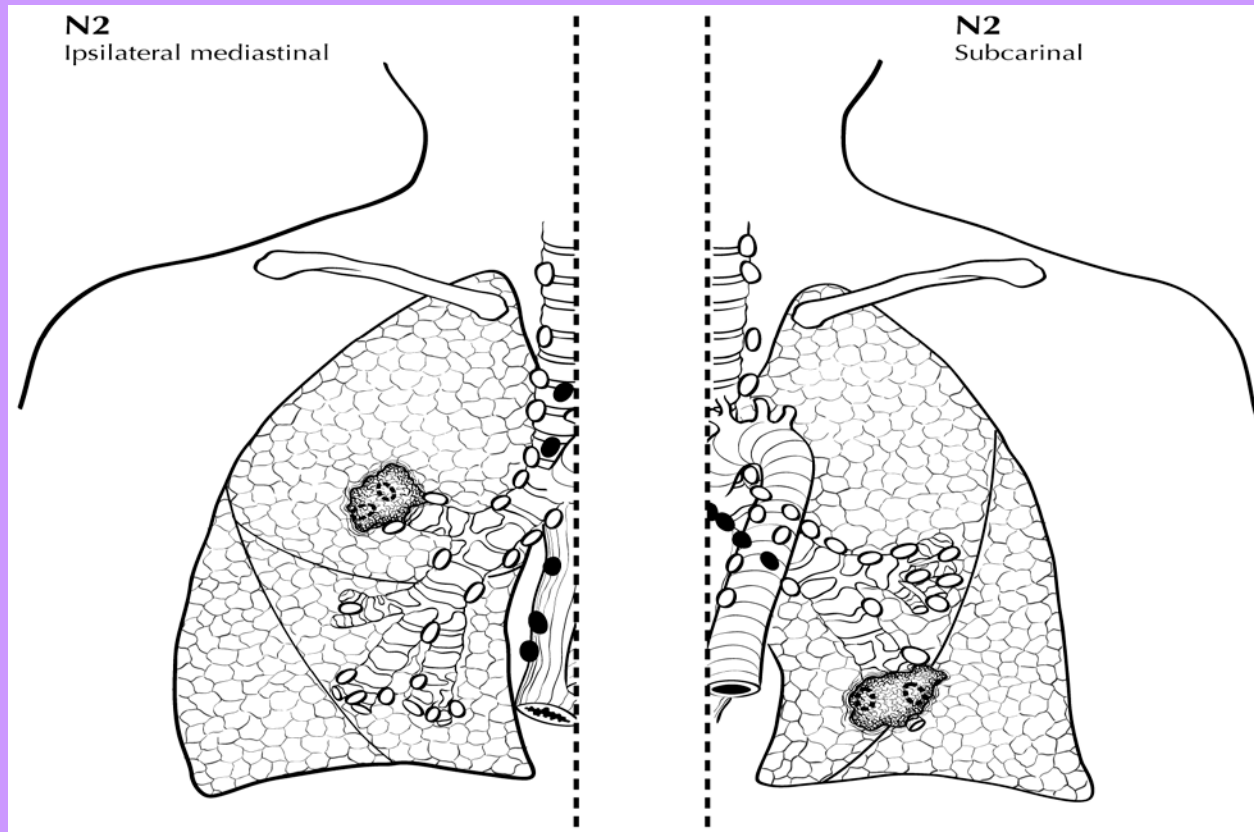
The IASLC lymph node map shown with the proposed amalgamation of lymph node levels into zones. (Reprinted with permission courtesy of the International Association for the Study of Lung Cancer. Copyright © 2009 Memorial Sloan-Kettering Cancer Center).

# Lung



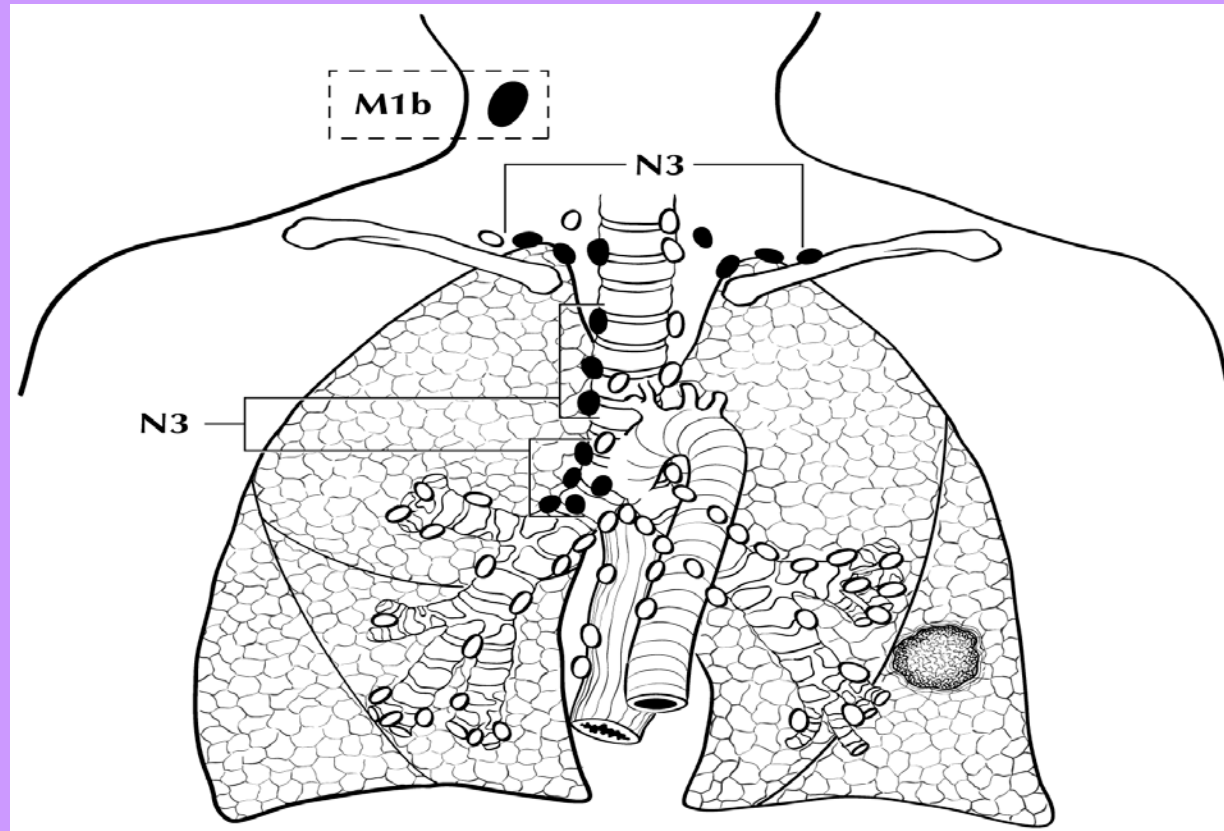
N1 is defined as metastasis in ipsilateral peribronchial (left side of diagram) and/or ipsilateral hilar lymph nodes (right side of diagram) and intrapulmonary nodes, including involvement by direct extension of the primary tumor.

# Lung



N2 is defined as metastasis in ipsilateral mediastinal (left side of diagram) and/or subcarinal lymph node(s) (right side of diagram).

# Lung



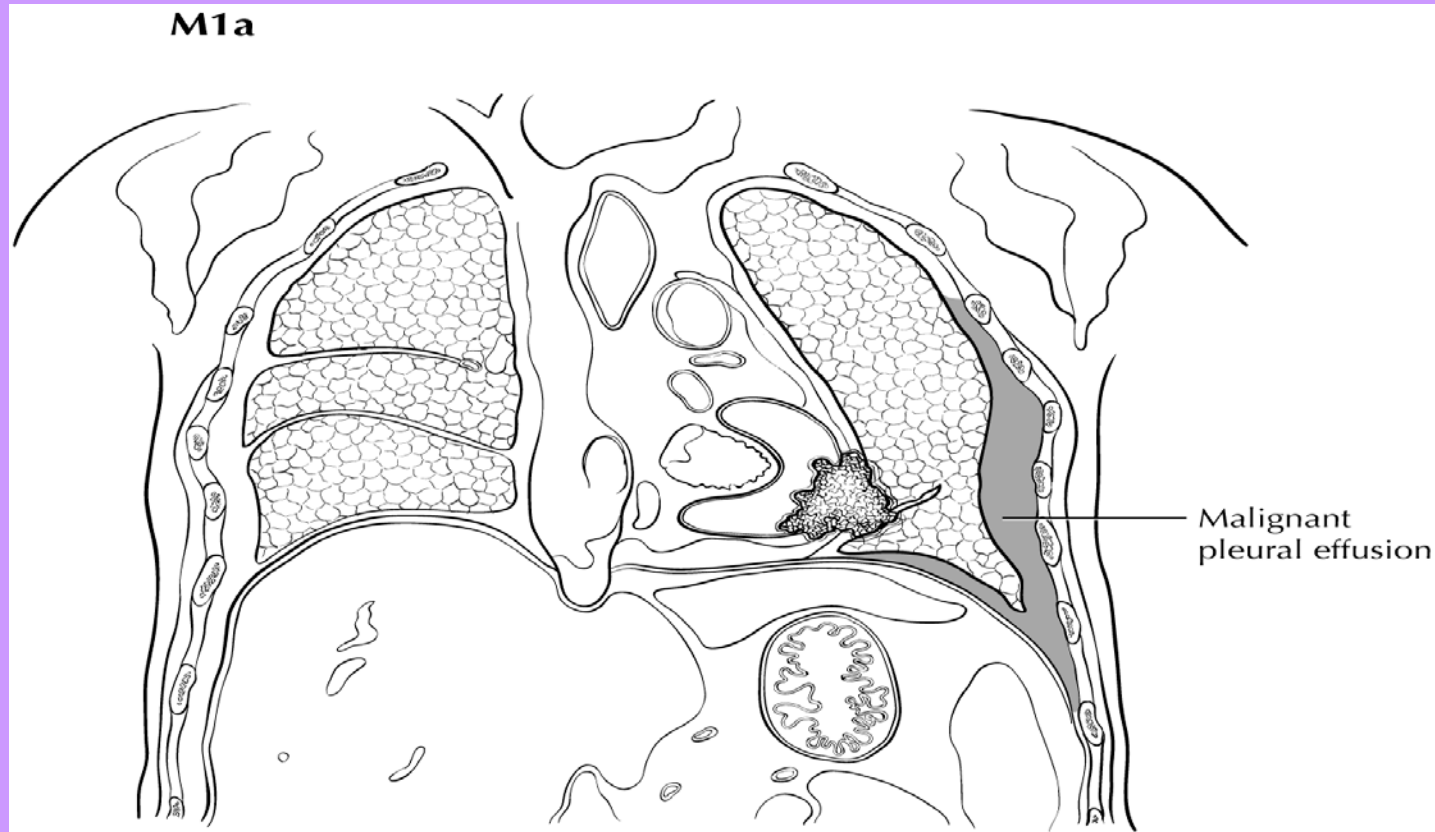
**N3 is defined as metastasis in contralateral mediastinal, contralateral hilar, ipsilateral or contralateral scalene, or supraclavicular lymph node(s)**, whereas M1b is defined as distant metastasis (in extrathoracic organs), and this would include distant lymph nodes.

# AJCC M classifications

- **M0** No distant metastasis
- **M1a** Separate tumor nodule(s) in a contralateral lobe, tumor with pleural nodule(s) or malignant pleural/pericardial effusion
- **M1b** Distant metastasis in extrathoracic organs

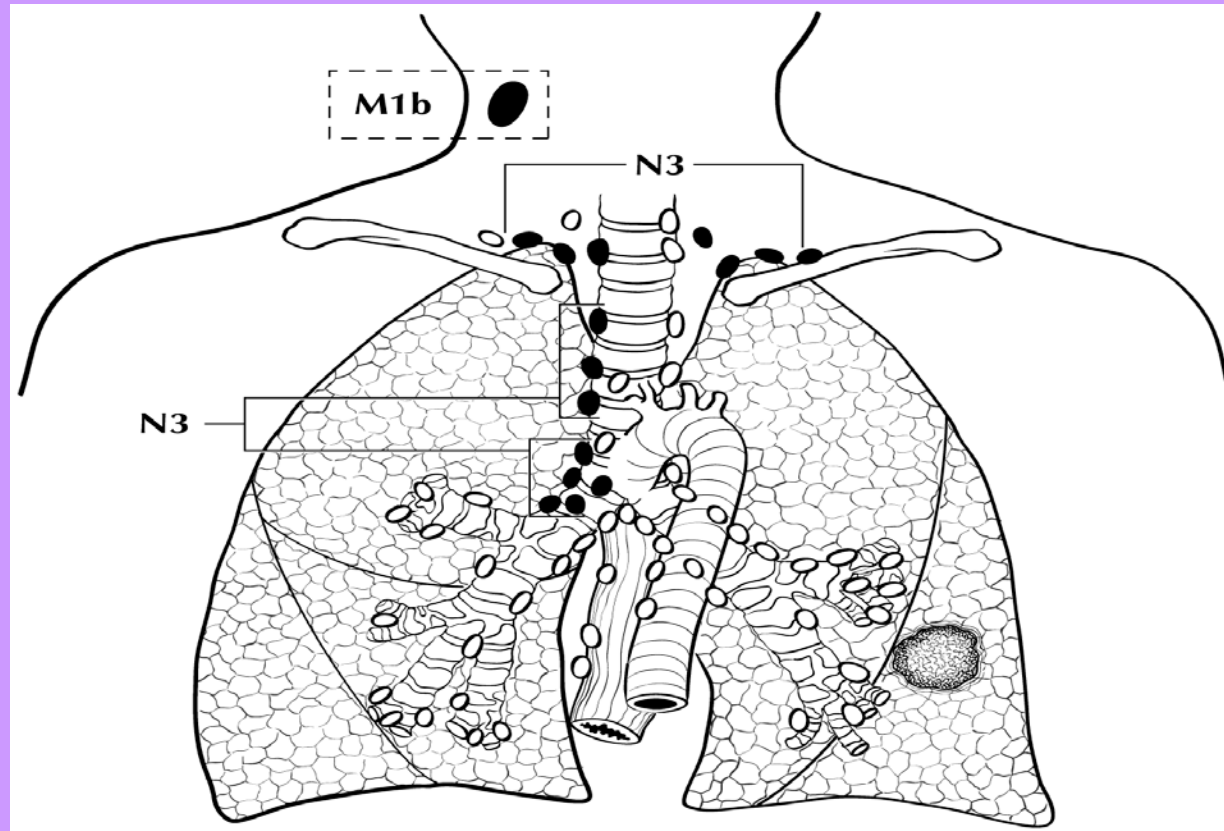


# Lung



M1a is defined as separate tumor nodule(s) in a contralateral lobe; tumor with pleural nodules or malignant pleural (or pericardial) effusion. This is an image of tumor with malignant pleural effusion.lymph nodes.

# Lung



N3 is defined as metastasis in contralateral mediastinal, contralateral hilar, ipsilateral or contralateral scalene, or supraclavicular lymph node(s), whereas **M1b is defined as distant metastasis (in extrathoracic organs), and this would include distant lymph nodes.**

## LUNG ANATOMIC STAGE/PROGNOSTIC GROUPS

Occult carcinoma	TX	N0	M0
Stage 0	Tis	N0	M0
Stage IA	T1a	N0	M0
	T1b	N0	M0
Stage IB	T2a	N0	M0
Stage IIA	T2b	N0	M0
	T1a-b	N1	M0
Stage IIB	T2a	N1	M0
	T2b	N1	M0
	T3	N0	M0
Stage IIIA	T1a-T2b	N2	M0
	T3	N1-2	M0
	T4	N0-1	M0
Stage IIIB	T1-T4	N3	M0
	T4	N2	M0
Stage IV	Any T	Any N	M1a
	Any T	Any N	M1b

# AJCC Staging for Lung Cases

- For clinical staging to apply, there must be a suspicion of cancer.
- For pathologic staging to apply you must meet one of the following criteria:
  1. Surgical resection per AJCC Lung chapter including wedge resection, lobectomy or pneumonectomy.
  2. Biopsy of highest T category PLUS biopsy of highest N category. (T4/N3 proven).
  3. Positive histologic confirmation of a metastatic site. (M1a/M1b proven).

# Clinical Staging for Lung cases

- Physical Exam (for LAD)
- Imaging (CXR, CT chest/Abdomen/Pelvis, MRI, PET)
- Endoscopic Procedures (Bronchoscopy, EBUS/FNA, Mediastinoscopy)
- FNA/CT guided BX (regional LNs without resection of primary tumor)

# LUNG CASE example

- A 55 year old white female presents to PCP with shortness of air. CXR performed showed abnormality in R lung. Chest CT showed **3.9 cm RLL** mass w/ associated **R hilar LAD** suspicious for malignancy. PET scan showed no other areas of malignancy. Bronchoscopy was performed w/ RLL mass biopsy positive for Adenocarcinoma. Patient then taken to surgery for a **RLL lobectomy w/ hilar LAD**. Path showed RLL **3.7 cm** Adenocarcinoma involving the **visceral pleura** w/ negative margins. 5 **benign hilar LNs**. No other TX recommended.

# LUNG CASE example

○ Does our case meet eligibility for clinical staging ?

**YES**

*There is a suspicion of cancer so clinical staging must be completed.*

# LUNG CASE Example

What information can be used for clinical staging ?

- ✓ Imaging (chest x-ray, CT chest, PET)
- ✓ Endoscopic Procedures (bronchoscopy)
- ✓ Physical Exam



# LUNG CASE example

○ What is our clinical T classification?

**cT2a**

What is this based on ?

Imaging showing 3.9 cm tumor confined to lung.

# LUNG CASE example

○ What is our clinical N classification?

**cN1**

What is this based on ?

Imaging showing R hilar LAD.

# LUNG CASE example

○ What is our clinical M classification?

**cM0**

What is this based on ?

Imaging showing no evidence of METS, also based on H&P with no signs or symptoms of METS present.

# LUNG CASE example

○ What is our clinical staging?

**cT2a**

**cN1**

**cM0**

**cStage IIA**

# LUNG CASE example

○ Does our case meet eligibility for pathologic staging ?

**YES**

*There has been surgical resection of the primary tumor.*

# LUNG CASE example

○ What is our pathologic T classification?

**pT2a**

What is this based on ?

Pathology report showing a 3.8 cm tumor invading into the visceral pleura.

# LUNG CASE example

○ What is our pathologic N classification?

**pN0**

What is this based on ?

LN's were removed for evaluation and the Pathology report stated 5 benign hilar LN's.

# LUNG CASE example

○ What is our pathologic M classification?

**cM0**

What is this based on ?

Imaging showed no METS.



# LUNG CASE example

○ What is our pathologic staging?

**pT2a**

**pN1**

**cM0**

**pStage IB**

# Interactive Lung TNM staging

- It's time to put you to work...
- One side is Yellow = which indicates either "No" or "Disagree" = **X**
- One side is Pink = which indicates "YES" or "Agree" =



# Interactive Lung TNM staging

- A patient comes into your ER with complaints of chest pain and difficulty breathing. A CT chest showed an centrally located **LUL suprahilar mass invading into an adjacent L rib.**
- **LNs** suspicious for involvement were noted in the **L hilum, L paratracheal and subcarinal** areas. There was also a suspicious **L supraclavicular LN.**
- **Pleural tumor foci studding** the L lung base was identified and hypermetabolic on PET scan.
- **Pleural effusion** also noted.
- An **FNA performed of the L supraclavicular LN** was **positive for SCC.**
- A left **thoracentesis** was performed where the **pleural fluid was positive** for malignant cells, favoring SCC.
- PT refused any other workup.

# Interactive Lung TNM staging

○ Does our case meet eligibility for clinical staging ?



**YES** Cancer has been diagnosed so  
clinical staging must be completed

# Interactive Lung TNM Staging

Based on the information given what is the clinical T classification ?

Answer ? **cT3** Involves adjacent rib

Do you agree ?



# Interactive Lung TNM Staging

Based on the information given what is the clinical N classification ?

Answer ?

cN2

Do you agree ?



Positive FNA L supraclavicular LN, cN3

# Interactive Lung TNM Staging

Based on the information given what is the clinical M classification ?

Answer ?

cM1a

Do you agree ?



Confirmation of METS, pM1a (pleural fluid)

# Interactive Lung TNM Staging

Based on the information what would the clinical staging be ?

Answer

cT3

cN3

pM1a

cStage IV





# Interactive Lung TNM Staging

Based on the information given does the case meet criteria to be pathologically staged ?

Answer ?



(Positive confirmation  
of METS)

# Interactive Lung TNM Staging

Based on the information what would the pathologic staging be ?

Answer

pT blank  
pN blank  
pM1a  
pStage IV



## LUNG ANATOMIC STAGE/PROGNOSTIC GROUPS

Occult carcinoma	TX	N0	M0
Stage 0	Tis	N0	M0
Stage IA	T1a	N0	M0
	T1b	N0	M0
Stage IB	T2a	N0	M0
Stage IIA	T2b	N0	M0
	T1a-b	N1	M0
Stage IIB	T2a	N1	M0
	T2b	N1	M0
	T3	N0	M0
Stage IIIA	T1a-T2b	N2	M0
	T3	N1-2	M0
	T4	N0-1	M0
Stage IIIB	T1-T4	N3	M0
	T4	N2	M0
Stage IV	Any T	Any N	M1a
	Any T	Any N	M1b

# Interactive Lung TNM Staging

- Let's take a look at the Anatomic Stage/Prognostic Groups for Lung (page 265 in AJCC 7<sup>th</sup> Edition Manual, large book)

Can we assign a stage group for TxN3M0 ?

Answer





Stage IIIB (since all T classifications T1-T4 are included, It is the N3 that is making this a Stage IIIB).

## LUNG ANATOMIC STAGE/PROGNOSTIC GROUPS

Occult carcinoma	TX	N0	M0
Stage 0	Tis	N0	M0
Stage IA	T1a	N0	M0
	T1b	N0	M0
Stage IB	T2a	N0	M0
Stage IIA	T2b	N0	M0
	T1a-b	N1	M0
Stage IIB	T2a	N1	M0
	T2b	N1	M0
	T3	N0	M0
Stage IIIA	T1a-T2b	N2	M0
	T3	N1-2	M0
	T4	N0-1	M0
<b><i>Stage IIIB</i></b>	<b><i>T1-T4</i></b>	<b><i>N3</i></b>	<b><i>M0</i></b>
	T4	N2	M0
Stage IV	Any T	Any N	M1a
	Any T	Any N	M1b

# LUNG PRACTICE CASE #1

- Imaging shows a 5 cm LLL tumor invading the mediastinum with bilateral hilar LAD. No distant METS. A mediastinoscopy was performed. A BX of the mediastinal portion of the LLL tumor was obtained (part A) as well as biopsies of bil hilar LNs (part B). Path showed A. small cell carcinoma. B. Metastatic small cell carcinoma. No further TX.
- Does clinical staging apply ? 
- What info can be used ? All imaging, endoscopic procedures, biopsies
- Does pathologic staging apply ? 
- Why ? There is a BX of highest T category (T4) + BX of highest N category (N3) performed during the mediastinoscopy

# LUNG PRACTICE CASE #1

- cStaging: cT4 (invasion of mediastinum)
  - cN3 (bil hilar)
  - cM0 (per imaging)
  - cStage IIIB
- pStaging: pT4 (confirmation of mediastinal invasion per BX of highest T)
  - pN3 (confirmation of bil hilar LN involvement per BX of highest N)
  - cM0 (per imaging)
  - pStage IIIB

# LUNG PRACTICE CASE #2

○ PT taken to surgery for RUL lobectomy performed for 2 cm RUL mass proven on core BX to be Adenocarcinoma. No associated LAD seen on preop imaging. No METS. Path: 2.1 cm confined to lung with no LNs received with the specimen.

○ Does clinical staging apply? 

○ What is clinical stage?

Answer: cT1a (2 cm in size confined to lung per imaging) 


cN0 (per imaging)

cM0 (per imaging)

cStage IA



# LUNG PRACTICE CASE #2

- PT taken to surgery for RUL lobectomy performed for 2 cm RUL mass proven on core BX to be Adenocarcinoma. No associated LAD seen on preop imaging. No METS. Path: 2.1 cm confined to lung with no LNs received with the specimen.
- Does Pathologic staging apply? 
- What is pathologic stage?

Answer: pT1b (2.1 cm in size confined to lung per path)

pNx (LNs not assessed/none removed)

cM0 (per imaging)

pStage 99 Unknown (w/ pNx). 

# REMINDER:

## When can you bring down cN0 to pN field ?

There are 6 scenarios in which you can bring down cN0 to pN field if case has met eligibility for pathologic staging.

1. In-situ/non-invasive of any site
2. Melanoma Stage IA
3. GIST
4. Bone
5. Soft Tissue Sarcoma
6. Endometrium

# Clinical Staging Lung Example

- CT Chest – 4.1 cm RLL mass. No invasion of chest wall. Enlarged R hilar and subcarinal LAD identified.
- PET – 4.2 cm RLL mass is hypermetabolic with maximum SUV 18. The LNs seen on CT in the R hilar and subcarinal regions do not show any uptake. No distant METS identified. PT is then taken to surgery for RLL lobectomy.
- WHAT WOULD OUR CLINICAL STAGE BE ?
- cT2a (4.2 cm in size – largest size stated)
- cN0 (no LAD per PET)
- cM0 (per imaging)
- cStage IB

# Where do I find MD AJCC TNM Staging in MY EMR ?

- Facility specific AJCC TNM documentation policies
- Staging Forms ?
- Documentation of clinical TNM in H&P, OP report, D/C summary
- Documentation of clinical TNM in MD/Surgeon office notes
- Nurse Navigation Forms
- Cancer Conference/Tumor Board documentation

**DOCUMENT ALL STAGING IN YOUR TEXT!**

# Summary

- You must be familiar with AJCC Staging manual and site specific chapter rules.
- Review your medical record/info available closely to assign **clinical** and **pathologic** staging if case meets eligibility.
- NOTE: If your staging **doesn't match** MD staging and will change the treatment planned, you should discuss with your physicians directly.
- Document in your text what your physician has staged and what you are staging.  
\*EXAMPLE: Dr. Mouse staged cStage IV in office note dated 1/1/17. CTR stages cT4 Involvement of esophagus per imaging & EGD, cN3 bilateral hilar LAD on PET, cM1b distant METS to bone and liver per imaging. cStage IV.

Any Questions ?



# Contact Information

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Thank you!