In this presentation, we are going to review the AJCC Cancer Staging criteria for the lung primary site.

It is important that you follow along and make notes in your manual. In addition to reading the slides and the instructor’s notes, it is important that you stop and read the related sections in your manual as not every point will be discussed in detail.

Don’t forget the general rules, including the timing rules. These still apply.
The right lung has 3 lobes – upper, middle and lower. The left lung has 2 lobes – upper and lower. There is no middle lobe on the left, so a code of C34.2 with a laterality of Left will cause an error.

Sometimes, the location of the tumor may be described as in the apex of the lung, or in the base of the lung. The apex is the narrowest part of the lung, the rounded top of the lung above the hilum. The base is the surface of the lower lung resting on the diaphragm. Use C34.1 to describe the apex and C34.3 to describe the base. You may want to add that to your ICD-O-3 on pages 51 and 165.

C34.0 is used to code tumors that originate in the main bronchus, carina, or hilus. Even though these share the same ICD-O-3 code, these are 3 separate areas within the lung. This is important as you will see when we talk about stage.

The MSB stops where the UL of the lung starts (at the hilum). And, the MSB is shorter on the right than the left.
There are several terms that are used to describe the area of the hilum. For the lung, the hilum is the area surrounding where the bronchus enters the lung and then subdivides into the lobar bronchi. If the tumor originates in the hilum, then assign the site code C34.0.

When the term hilar is used, this is generally referring to lymph nodes in or near the hilum. For example, a mass may be described as perihilar, infrahilar, or just a soft tissue mass. This description is usually describing involvement of the lymph nodes in or near the hilum. This should be considered lymph node involvement and be coded in the CS Lymph Nodes data item. Along with the description of the lymph nodes, there should also be a separate description of a the primary lung tumor (that could be in any part of the lung). The location of that primary tumor should be used to assign the primary site.

Because the term “hilar” is used so loosely, the radiologist may describe the lung tumor as “hilar”. If they do a CT, or CXR and the only description of a mass in the lungs in described as hilar, then code to C34.0.

This diagram is of the left lung (which only has two lobes). It is interesting to note the left upper lobe extends all the way down the length of the lung. The fissure is the natural dividing line between the lobes.

Notice the location of the hilum. It is really in the center of the lung (from top to bottom). Also note the location of lingula. The lingula is a small structure at the very bottom tip of the left upper lobe. According to the medical dictionary, it is the equivalent of the middle lobe. But, in ICD-O-3, this is coded to C34.1 – upper lobe. The reason this is pointed out is that we typically think of the upper lobe as the top half of the lung. But in some instances, it would take a very large tumor to extend from some parts of the upper lobe, such as from the lingula, to the mediastinum, carina, or mainstem bronchus.

In the left lung, the cardiac notch is the indentation in the left lung that allows space for the heart in the thoracic cavity.
The lungs are surrounded by two membranes. The parietal pleura is adherent to the rib cage, diaphragm, and pericardium (space around the heart). The inner pleura is attached to and covers the lungs. Pleura is also called mesothelium. The pleural cavity is the space between the visceral pleura (covering the lungs) and the parietal pleura (pleura is adherent to the rib cage, diaphragm, and pericardium).

The mediastinum is an area behind the breast bone and between the lungs which contains the heart, thymus, great vessels, and other structures.
This is a view of the mediastinum from the side.
As you learned in the MPH discussion, lung cancer can be divided into two main categories: small cell and non-small cell lung cancer. Non-small cell lung cancer can be further divided into adenocarcinoma, squamous cell, and large cell lung cancers. These are treated surgically if possible. Small cell may be either oat cell or small cell. Small cell carcinomas usually respond better to non-surgical treatment.

A tumor that is described as “non-small cell” is not automatically coded to “large cell carcinoma”. What the pathologist is saying is that they cannot determine the exact type of carcinoma, but they do know it is not a “small cell” type of cancer. Therefore, it is given its own code in ICD-O-3 (8046). Large cell carcinoma is a specific cell type.

In situ lung cancers are very rare.

The AJCC manual provides a detailed list of histopathological types that are eligible for staging.
Bronchogenic is a term used as a way of describing that the tumor arose in the bronchus. It is not a cell type.

Bronchioalveolar = arising in the air sac. This is a specific cell type.
Clinical staging is based on the anatomic extent of disease before instituting definitive surgery or other treatment. The clinical staging is based on non-invasive clinical evidence such as the findings from the physical examination and imaging studies. Clinical staging is also based on endoscopic and other staging procedures such as those listed on the slide. Findings from invasive diagnostic procedures such as a diagnostic biopsy, including fine needle aspiration biopsy and surgical observation without biopsy are also included in the clinical stage.
-Oscopy versus -Otomy

- **Oscopy**
  - Procedure using a scope, such as an endoscopy
  - Used to visualize the inside of a hollow organ

- **Bronchoscopy**
  - Used to visualize the trachea and bronchi
  - Tissue biopsy bronchial lesions
  - Bronchial brushings and washings

- **Mediastinoscopy**
  - Used to biopsy lymph nodes in the mediastinum by means of a bronchoscope inserted through an incision in the base of the neck

Endoscopic evaluations play an important role in diagnosis and staging for lung cancer and may identify tumor location, size, extension, and metastasis.

Endoscopy is a medical procedure for viewing the interior of the body through a hollow tube-like instrument called an endoscope. Endoscopes are inserted through a body opening such as the mouth, anus, or urethra. There are many different kinds of endoscopes specially designed for examining different parts of the body. The area of the body being viewed will determine the type of endoscope used. For example, if the area being examined is the colon, then a colonoscope is used.

Some endoscopes not only allow the physician to see inside the body, they can also be used for surgery. Small instruments operated through the hollow endoscope can be used to remove biopsy specimens. A small brush can be operated through an endoscope to sample cells from the surface of growth. In some cases, an entire growth can be removed through the endoscope or a laser beam can be operated through the endoscope to vaporize a growth. There have been many advances in making surgical instruments smaller and smaller so that they can be used through an endoscope.

A bronchoscopy visualizes the trachea and main stem bronchus; a thoroscopy visualizes the thoracic cavity; a mediastinoscopy visualizes and aids in biopsy of lymph nodes in the mediastinum; a laryngoscopy views the larynx to determine the cause of vocal cord paralysis; and a esophagoscopy evaluates the esophagus for invasion by the lung tumor.
What To Look For

- Pleural effusion or pericardial effusion
  - Consider positive unless proven to be negative on multiple cytology
- Atelectasis or obstructive pneumonitis
  - Bronchopneumonia is not the same condition
- Rib invasion (direct extension)
- Laryngeal nerve involvement / vocal cord paralysis
- Superior vena cava obstruction
- Great blood vessels and arteries
- Distance from the carina
  - Assume it is > 2cm away if a resection is done
- Pain in shoulder, inner arm and hand
  - Possible cause: Pancoast Tumor
- Lymph node involvement

Clinical findings are often missed when assigning the stage for lung cancer. As a result, cases are understaged. Reports that describe a pleural effusion or lymph node involvement or vocal cord paralysis may not specifically state that this involvement is consistent with the lung cancer. These terms may not stand out as involvement that will affect the stage that is to be assigned. It is important to understand what clinical findings can affect the stage and what exceptions there are for considering the area as involved or not.

Many of these findings will be described in more detail in the following slides. Careful review of the radiology reports is very important to make sure these clinical findings are not being missed.
PATHOLOGIC STAGING

All data from clinical classification

PLUS

Pathologic examination of resected specimen, including lymph nodes

Pathological staging is based on information from clinical staging plus the pathology report from the resected specimen, including lymph nodes.

The primary tumor does not necessarily have to be completely removed in the resection for the case to be eligible for pathologic staging. If the primary tumor is unresectable, and the highest T and N categories (or the M1 category) can be confirmed microscopically, the case is eligible for pathologic staging.

Review the section on Regional Lymph Nodes on pages 254-255. There is no recommended number of lymph nodes that must be removed. The pathologic criteria states that ideally a sufficient number of nodes should be removed that will allow for evaluation of the highest pN category.
## "T" Classification

<table>
<thead>
<tr>
<th>T</th>
<th>Size</th>
<th>Location / Associated Conditions</th>
<th>Direct Invasion of:</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>&lt;= 3cm</td>
<td>Not in main bronchus</td>
<td></td>
</tr>
</tbody>
</table>
| T2  | > 3cm and <= 7cm | In main bronchus >= 2cm from carina*  
Partial atelectasis  
Partial obstructive pneumonitis | Viseral pleura                                                   |
| T3  | > 7cm      | In main bronchus < 2cm from carina*  
Entire lung atelectasis  
Entire lung obstructive pneumonitis  
Separate tumor nodule(s) in SAME lobe | Parietal pleura, chest wall, diaphragm, phrenic nerve, mediastinal pleura, parietal pericardium |
| T4  | Any        | Separate tumor nodule(s) in DIFFERENT lobe of the SAME lung            | Mediastinum, heart, great vessels, trachea, recurrent laryngeal nerve, esophagus, vertebral body, carina |

*Carina not involved by tumor

The T category is based on a combination of the size of the tumor, the location of the tumor, conditions associated with tumor involvement, and the direct invasion of other structures. Read the criteria for each T category in the manual carefully. This table only provides a summary. The T category that applies could be based on a combination of circumstances and not necessarily require that all be present. For example, for the T3 category, if the tumor size is greater than 7cm and there is no other involvement, it is T3. Or, if a tumor of any size directly invades the chest wall, this is also a T3.
Tumor Size

- Use the largest reported dimension or diameter of the primary tumor
- For the clinical T, use tumor size before surgery, radiation or other systemic treatment
- Do not code size of hilar mass unless the primary tumor is stated to be in the hilum

The manual does not provide a list of which report has the priority if multiple tumor sizes are reported. You should base the T category on the largest reported dimension of the primary tumor. If there is a size reported on pathology from a complete resection of the tumor and there is also a tumor size reported from imaging, the pathology size will have the priority for assigning the pT.

The description of “hilar” can be describing either the primary tumor or lymph node involvement. Only code the size of the hilar mass as the size of the primary tumor if it stated to be the primary tumor and not the lymph node mass. Refer to the discussion on hilar versus hilum for more information.
"T" CLASSIFICATION

**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

For lung, TX applies when the primary tumor cannot be assessed, just as it is with all other sites. However, the TX for the lung includes a little different criterion. TX is also used when the primary cannot be assessed but it was proven to be lung cancer based on the presence of malignant cells in sputum or bronchial washings. These are tumors that could not be visualized by imaging or bronchoscopy so there is no information for a tumor size, location, or direct invasion. For example, there is a diffuse infiltrate on a scan with no evidence of an obstructive endobronchial tumor. Sputum cytology is consistent lung carcinoma.

T0 applies when there is no evidence of a primary tumor. For example, a CT was done and there was no evidence of a lung lesion. However, there was a pleural effusion. This was biopsied and was malignant consistent with lung cancer. This would be a clinical T0 and pM1a.

In situ tumors (Tis) in the lung are very rare.

The next few slides highlight some of the criteria for each T category.
The T1 category is for tumors that are less than or equal to 3cm in greatest dimension. These tumors are completely surrounded by lung tissue or the visceral pleura. These tumors cannot be in the main bronchus. It can extend into a lobar bronchus but no farther.

The difference between T1a and T1b is a more detailed description of the tumor size. These tumors will also have the conditions specified in the T1 category description.

The slide provides 3 examples (A, B and C) of tumor locations in the lung that would qualify as a T1.
T2: Tumor Size is $>3\text{cm}$ and $\leq 7\text{cm}$

- **(D) In main bronchus $\geq 2\text{ cm away from carina}**
- **(E) Invades visceral pleura**

The T2 category is for tumors that are greater than 3cm and less than or equal to 7cm in greatest dimension. T2a and T2b describe the tumor size in more detail.

T2 is also for tumors with the following conditions:

The tumor is in the main bronchus but is 2cm or more away from the carina (Tumor D). Assume the tumor is greater than or equal to 2 cm from carina if lobectomy, segmental resection, or wedge resection is done.

The tumor extends to involve the visceral pleura (Tumor E).

These tumors (D and E) can be of any size as long as they are less than 7cm. T2a and T2b can be used to describe these tumors in more detail. For example, if it is 5cm or less, it will be a T2a. If it is $>5\text{cm}$ and $\leq 7\text{cm}$, it will be a T2b.
T2: Tumor Size is $>3\text{cm}$ and $\leq 7\text{cm}$

(F) Tumor associated with atelectasis or
(G) Obstructive pneumonitis that extends to the hilar region

but does not involve entire lung

T2 also includes tumors that are associated with atelectasis (Tumor F) or obstructive pneumonitis (Tumor G) that extends to the hilar region. This may also be called partial atelectasis or obstructive pneumonitis. Atelectasis or obstructive pneumonitis that involves the entire lung is a T3.
Atelectasis/Obstructive Pneumonitis

- **Atelectasis**
  - Collapse of the lung in which all or part of the lung is airless

- **Obstructive Pneumonitis**
  - A mechanical problem where air gets blocked off and causes inflammation – usually due to tumor
  - Bronchopneumonia is not the same as obstructive pneumonitis

Atelectasis - Collapse of the lung in which all or part of the lung is airless. **Obstructive pneumonitis** - Is a mechanical problem where air gets blocked off and causes inflammation – usually due to tumor. Pneumonia can sometimes occur when lung cancer obstructs one of the bronchial tubes. Longstanding pneumonia is not a synonym for pneumonitis.

For each of these conditions, the T category depends on the amount of the lung affected.

Bronchopneumonia is an inflammation of the lungs caused by an infection and is usually treated with antibiotics. What we are looking for here is a specific condition of atelectasis or obstructive pneumonitis. This usually requires and is seen on radiology.
The T3 category is for tumors that are greater than 7cm in greatest dimension (Tumor H) with or without the additional conditions listed in the description.
T3 also applies if the tumor is in the main bronchus but is less than 2cm away from the carina (Tumor I). These tumors can be of any size but the carina cannot be involved.

If the atelectasis or obstructive pneumonitis involves the ENTIRE lung, then these are classified as T3 (Tumor J).
Pancoast Tumor (T3 or T4)

- Due to Superior Vena Cava (SVC) syndrome
- Tumor in the apex of the lung
- Invades brachial plexus nerves
- Symptoms: Pain in shoulder or arm

Superior sulcus tumor
- less invasive tumor of the apex

The T4 category is for tumors that are of any size that invade any of the structures listed in the T4 description.

Review the paragraph on Pancoast tumors on page 264.

Physical findings may indicate a possible Pancoast tumor due to Superior Vena Cava (SVC) syndrome. Pancoast tumors are located in the pleural apex and the location of the tumor rather than the histology produces the clinical pattern.

Physical findings of this syndrome include facial fullness or flushing, headache, dyspnea, and cough. Less common complaints include edema of the upper extremities, pain, dysphagia, and syncope. Physical findings may include prominent distended and tortuous venous systems in the face, neck, and upper trunk, papilledema, facial cyanosis, and pleural effusion. The most common causes of this syndrome are extrinsic compression of the superior vena cava and intraluminal venous thrombosis. Up to 82% of cases result from obstruction caused by bronchogenic carcinoma.

The T category should be assigned based on the documented involvement of the tumor.
T3 is used to designate tumors with separate nodules in the SAME lobe.

T4 is used to designate tumors with separate nodules in a DIFFERENT lobe of the SAME lung.

Cases that have nodules in the contralateral lung are considered distant (M1a) disease.
Vocal Cord Paralysis (T4 or N2)

Vocal cord paralysis
Superior vena cava obstruction
Compression of trachea or esophagus

These conditions may be related to
direct extension of the primary tumor (T4)
or to
lymph node involvement (N2)

Review the paragraph on vocal cord paralysis on page 264. The conditions listed on this slide and in the paragraph could be a result of direct tumor involvement (T4) or lymph node involvement (N2). Usually, when these symptoms are due to direct tumor extension, they are from tumors that are located more centrally, those that are closer to the larynx, trachea, esophagus, etc. When these tumors are due to lymph node involvement, the primary tumor will be located more peripherally, away from the bronchus and surrounded by normal lung tissue and there will be mediastinal and/or subcarinal lymph node involvement.
Vocal Cord Paralysis (T4)

- If conditions are due from extension of the primary tumor within the lung

- Usually, the primary tumor is centrally located

For the most part, if the tumor is located centrally within the lung itself, and you have any of the conditions listed on the previous slide, you should assign a T4.

The red hashmark area is the SVC obstruction, etc.
Vocal Cord Paralysis (N2)

- If these conditions are clearly not related to direct extension of the primary tumor
- Usually, the primary tumor is located in the periphery of the lung
- Therefore, considered mediastinal lymph node involvement

If the primary tumor is peripheral and clearly unrelated to the conditions listed on the previous slide, code as mediastinal lymph node involvement (N2) unless there is a statement of involvement by direct extension from the primary tumor.

A note about great vessel involvement: It is pretty natural that a tumor, even in the lung tissue will like involve some of the blood vessels with the lung tissue – the lung is very vascular. For great vessel involvement, you are looking for a tumor that has grown beyond the lung tissue into the major blood vessels (such as those listed on page 254).

There are other areas of involvement that were not specifically pointed out in the slides. Be sure to read the description for each category carefully.
## "N" CLASSIFICATION

<table>
<thead>
<tr>
<th>N1</th>
<th>Peribronchial</th>
<th>Hilar</th>
<th>Intrapulmonary (including direct extension)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ipilateral</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>N2</th>
<th>Mediastinal</th>
<th>Subcarcinal</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ipilateral</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>N3</th>
<th>Mediastinal</th>
<th>Hilar</th>
<th>Scalene (includes ipsilateral)</th>
<th>Supraclavicular (includes ipsilateral)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contralateral</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N1 nodes are ipsilateral, or on the same side as the primary. They are located within the visceral pleura of the primary lung.
N2 are also ipsilateral and located higher up than the N1 nodes.
N3 nodes are higher up than N2, contralateral to the primary or involve the scalene or supraclavicular nodes on either side of the primary.

Nodes located higher than the supraclavicular are considered distant (cervical nodes). Nodes at or below than the diaphragm are also distant.
Here is another graphic showing the location of the regional nodes for the lung. There are also excellent diagrams provided in the manual.
Assume the lymph nodes are clinically involved if the words “mass”, “adenopathy”, or “enlargement” are used to describe any of the regional lymph nodes.

“No Evidence of Spread” or “Remaining Examination Negative” is sufficient information to consider regional lymph nodes clinically negative (in the absence of any statement about nodes).

And, don’t forget about the special rules for lymph node involvement for the lung that was introduced in the SS2000 discussion. For example, if the report describes a mediastinal mass, this is to be considered as mediastinal lymph node involvement unless there is a specific statement otherwise.

This is not specifically stated in the AJCC manual but is supported by statements in the Collaborative Stage manual.
## M CLASSIFICATION

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M0</td>
<td>No distant metastasis</td>
</tr>
</tbody>
</table>
| M1a   | Separate nodules in contralateral lung  
       | Malignant pleural or pericardial effusion |
| M1b   | Distant metastasis present |

Use M0 when evaluations do not indicate distant spread or when the chart states, “remaining examination negative”.

Sometimes, we are provided guidelines to help us code situations when there is no comment or statement regarding involvement. They aren’t going to do a chest x-ray or CT on one lung only. And, if there was something there, they wouldn’t exclude it in the summary. So, if the opposite lung isn’t mentioned, assume it was not involved.

For tumors in both lungs, be sure to use the MPH rules to determine the number of primaries first. If it is considered to be the same primary, the nodules in the contralateral lung would be considered M1a.

Use M1b when you have either clinical or pathological information concerning distant spread other than that described in M1a. This would include distant lymph nodes such as the cervical nodes.

Mets known to have developed after the extent of disease was established (referred to as progression) should not be coded in this field.
Pleural Effusion (M1a)

- Most pleural effusions are due to tumor
- Any mention of pleural effusion is coded to M1a

UNLESS

- Cytopathologic examinations of pleural fluid are negative for tumor
- If a resection is done assume it is negative

Review the paragraph on pleural effusions on page 263 (just above the stage group table).

Pleural effusion is fluid between the visceral pleura and the parietal pleura. The fluid starts to take up room in the pleura and causes the lung to be compressed, making it difficult to breathe.

For the lung only, pleural effusions are to be considered as due to the tumor unless there is proof that the pleural effusion is not related to the tumor. When reviewing the radiology report, part of the description may be that there is a pleural effusion present, such as “small pleural effusion on the right.” This is enough to assign the M category as M1a. The report does not have to specifically state that the pleural effusion was malignant. If multiple cytology specimens are taken and these are negative or if clinical judgment determines it is not related to the tumor, then the pleural effusion should be ignored. If a patient has a pleural effusion and a resection is done, the case should be investigated to confirm the clinical judgment of involvement. Usually, it means the effusion was negative.

Pericardial effusion is classified the same as pleural effusion.
The graphics, coding instructions, and other supportive information were provided by the following resources.

Please return to the course content to complete additional case scenarios to reinforce the coding instructions.