COLLEGE of AMERICAN PATHOLOGISTS

Protocol for the Examination of Specimens From Patients With Primary Non-Small Cell Carcinoma, Small Cell Carcinoma, or Carcinoid Tumor of the Lung

Based on AJCC/UICC TNM, 7th edition
Protocol web posting date: January 2016

Procedure
• Resection

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CAP Lung Protocol Revision History

Version Code
The definition of version control and an explanation of version codes can be found at www.cap.org (search: cancer protocol terms).

Version: Lung 3.4.0.0

Summary of Changes
The following changes have been made since the October 2013 release.

The following data elements were modified:

- Tumor Focality
- Histologic Type
- Visceral Pleura Invasion
- Lymph-Vascular Invasion
- Extranodal Extension (Lymph Nodes)
- Regional Lymph Nodes
- Distant Metastasis (changed to required only if confirmed pathologically)

The following data element was deleted:

- Specimen Integrity

Surgical Pathology Cancer Case Summary

Protocol web posting date: January 2016

LUNG: Resection

Select a single response unless otherwise indicated.

Specimen
___ Lung
___ Lobe(s) of lung (specify): _____
___ Bronchus (specify): _____
___ Other (specify): _____
___ Not specified

Procedure
___ Major airway resection
___ Wedge resection
___ Segmentectomy
___ Lobectomy
___ Bilobectomy
___ Pneumonectomy
___ Other (specify): _____
___ Not specified

Specimen Laterality
___ Right
___ Left
___ Not specified

Tumor Site (select all that apply)
___ Upper lobe
___ Middle lobe
___ Lower lobe
___ Mainstem bronchus
___ Other(s) (specify): _____
___ Not specified

Tumor Size
Greatest dimension: ___ cm
+ Additional dimensions: ___ x ___ cm
___ Cannot be determined

Tumor Focality (select all that apply) (Note A)
___ Unifocal
___ Separate tumor nodules in same lobe
    + ___ Synchronous primaries
    + ___ Intrapulmonary metastases
___ Separate tumor nodules in different lobe/ lung (specify sites): _____
    + ___ Synchronous primaries
    +___ Intrapulmonary metastases
___ Cannot be determined

Histologic Type (select all that apply) (Note B)
___ Adenocarcinoma
+___ Lepidic predominant
+___ Acinar predominant
+___ Papillary predominant
+___ Solid predominant
+___ Micropapillary predominant
___ Invasive mucinous adenocarcinoma
___ Mixed invasive mucinous and nonmucinous adenocarcinoma
___ Colloid adenocarcinoma
___ Fetal adenocarcinoma
___ Enteric adenocarcinoma
___ Minimally invasive adenocarcinoma
+ ___ Nonmucinous
+ ___ Mixed nonmucinous and mucinous
+ ___ Mucinous
___ Adenocarcinoma in situ
+ ___ Nonmucinous
+ ___ Mixed nonmucinous and mucinous
+ ___ Mucinous
___ Squamous cell carcinoma
___ Keratinizing squamous cell carcinoma
___ Non-keratinizing squamous cell carcinoma
___ Basaloid squamous cell carcinoma
___ Small cell carcinoma
___ Combined small cell carcinoma (small cell carcinoma and non-small cell component)
(specify type of non-small cell carcinoma component): _____
___ Large cell neuroendocrine carcinoma
___ Typical carcinoid tumor
___ Atypical carcinoid tumor
___ Large cell carcinoma
___ Adenosquamous carcinoma
___ Pleomorphic carcinoma
___ Spindle cell carcinoma
___ Giant cell carcinoma
___ Carcinosarcoma
___ Pulmonary blastoma
___ Lymphoepithelioma-like carcinoma
___ NUT carcinoma
___ Mucoepidermoid carcinoma
___ Adenoid cystic carcinoma
___ Epithelial-myoepithelial carcinoma
___ Carcinoma, type cannot be determined
___ Non-small cell carcinoma, subtype cannot be determined
___Other histologic type not listed above (specify): _____

+ Histologic type comments: _____

+ Histologic Grade (Note C)
+ ___ Not applicable
+ ___ GX: Cannot be assessed
+ ___ G1: Well differentiated
+ ___ G2: Moderately differentiated
+ ___ G3: Poorly differentiated
+ ___ G4: Undifferentiated
+ ___ Other (specify): _____

+ Data elements preceded by this symbol are not required. However, these elements may be clinically important but are not yet validated or regularly used in patient management.

Visceral Pleura Invasion (Note D)
___ Not identified
___ Present
___ Cannot be determined

Tumor Extension (select all that apply) (Note E)
___ Not applicable
___ Not identified
___ Superficial spreading tumor with invasive component limited to bronchial wall
___ Tumor involves main bronchus 2 cm or more distal to the carina
___ Parietal pleura
___ Chest wall
+ Specify involved structure(s): _____
___ Diaphragm
___ Mediastinal pleura
___ Phrenic nerve
___ Parietal pericardium
___ Tumor in the main bronchus less than 2 cm distal to the carina but does not involve the carina
___ Mediastinum
+ Specify involved structure(s): _____
___ Heart
___ Great vessels
___ Trachea
___ Esophagus
___ Vertebral body
___ Carina
___ Other (specify): _____

Margins (select all that apply) (Note F)

If all margins uninvolved by invasive carcinoma:
Distance of invasive carcinoma from closest margin: ___ mm
Specify margin: _____

Bronchial Margin
___ Not applicable
___ Cannot be assessed
___ Uninvolved by invasive carcinoma and carcinoma in situ
___ Involved by invasive carcinoma
___ Involved by carcinoma in situ

Vascular Margin
___ Not applicable
___ Cannot be assessed
___ Uninvolved by invasive carcinoma
___ Involved by invasive carcinoma

Parenchymal Margin
___ Not applicable
___ Cannot be assessed
___ Uninvolved by invasive carcinoma
___ Involved by invasive carcinoma

Other Attached Tissue Margin (required only if applicable)
Specify margin: _____
___ Cannot be assessed
___ Uninvolved by invasive carcinoma
___ Involved by invasive carcinoma

Treatment Effect (required only if applicable) (Note G)
___ Cannot be determined
___ Greater than 10% residual viable tumor
___ Less than 10% residual viable tumor

+ Tumor-Associated Atelectasis or Obstructive Pneumonitis (Note H)
+ ___ Extends to the hilar region but does not involve entire lung
+ ___ Involves entire lung

Lymph-Vascular Invasion (select all that apply) (Note I)
___ Not identified
___ Present
    + ___ Lymphatic
    + ___ Arterial
    + ___ Venous
___ Cannot be determined

+ Extranodal Extension (Note J)
+ ___ Not identified
+ ___ Present

Pathologic Staging (pTNM) (Note J)

TNM Descriptors (required only if applicable) (select all that apply)
___ m (multiple primary tumors)
___ r (recurrent)
___ y (posttreatment)

Primary Tumor (pT)
___ pTX: Cannot be assessed, or tumor proven by presence of malignant cells in sputum or bronchial washings but not visualized by imaging or bronchoscopy
___ pT0: No evidence of primary tumor
___ pTis: Carcinoma in situ
___ pT1a: Tumor 2 cm or less in greatest dimension, surrounded by lung or visceral pleura, without bronchoscopic evidence of invasion more proximal than the lobar bronchus (ie, not in the main bronchus); or
Superficial spreading tumor of any size with its invasive component limited to the bronchial wall, which may extend proximally to the main bronchus
___ pT1b: Tumor greater than 2 cm, but 3 cm or less in greatest dimension, surrounded by lung or visceral pleura, without bronchoscopic evidence of invasion more proximal than the lobar bronchus (ie, not in the main bronchus)
___ pT2a: Tumor greater than 3 cm, but 5 cm or less in greatest dimension surrounded by lung or visceral pleura, without bronchoscopic evidence of invasion more proximal than the lobar bronchus (ie, not in the main bronchus); or
Tumor 5 cm or less in greatest dimension with any of the following features of extent: involves main bronchus, 2 cm or more distal to the carina; invades the visceral pleura; associated with atelectasis or obstructive pneumonitis that extends to the hilar region but does not involve the entire lung
___ pT2b: Tumor greater than 5 cm, but 7 cm or less in greatest dimension
___ pT3: Tumor greater than 7 cm in greatest dimension; or

Tumor of any size that directly invades any of the following: parietal plural chest wall (including superior sulcus tumors), diaphragm, phrenic nerve, mediastinal pleura, parietal pericardium; or
Tumor of any size in the main bronchus less than 2 cm distal to the carina but without involvement of the carina; or
Tumor of any size associated with atelectasis or obstructive pneumonitis of the entire lung; or
Tumors of any size with separate tumor nodule(s) in same lobe

___ pT4: Tumor of any size that invades any of the following: mediastinum, heart, great vessels, trachea, recurrent laryngeal nerve, esophagus, vertebral body, carina; or
Tumor of any size with separate tumor nodule(s) in a different lobe of ipsilateral lung (Note A)

Regional Lymph Nodes (pN)

___ pNX: Cannot be assessed
___ pN0: No regional lymph node metastasis
___ pN1: Metastasis in ipsilateral peribronchial and/or ipsilateral hilar lymph nodes, and intrapulmonary nodes, including involvement by direct extension
___ pN2: Metastasis in ipsilateral mediastinal and/or subcarinal lymph node(s)
___ pN3: Metastasis in contralateral mediastinal, contralateral hilar, ipsilateral or contralateral scalene, or supraclavicular lymph node(s)

___ No nodes submitted or found

Number of Lymph Nodes Examined
Specify: ____
___ Number cannot be determined (Note J) (explain): _____

Number of Lymph Nodes Involved
Specify: ____
___ Number cannot be determined (Note J) (explain): _____

+ Specify stations examined: _____
+ Specify stations involved: _____

Distant Metastasis (pM) (required only if confirmed pathologically in this case)

___ pM1: Distant metastasis
___ pM1a: Separate tumor nodule(s) in contralateral lung; tumor with pleural nodules or malignant pleural (or pericardial) effusion (Note A)
___ pM1b: Distant metastases (in extrathoracic organs)
Specify site(s), if known: _____

+ Additional Pathologic Findings (select all that apply)

+ ___ None identified
+ ___ Atypical adenomatous hyperplasia
+ ___ Squamous dysplasia
+ ___ Metaplasia (specify type): _____
+ ___ Diffuse neuroendocrine hyperplasia
+ ___ Inflammation (specify type): _____
+ ___ Emphysema
+ ___ Other (specify): _____

+ Ancillary Studies

Note: For reporting cancer biomarker testing results, the CAP Lung Biomarker Template should be used. Pending biomarker studies should be listed in the Comments section of this report.

+ Comment(s)

Explanatory Notes

A. Tumor Focality

When more than 1 tumor nodule is identified in resection specimens, it is important to attempt distinction of synchronous primary tumors from a tumor with intrapulmonary metastasis. These scenarios have different prognoses and are staged differently. Separate tumour nodules of different histologic types are considered synchronous primaries and should be recorded as such in the pathology report with the highest T category followed by the suffix "m," indicating multiplicity, or the number of tumours in parentheses (eg, T1b(m) or T1b(2)). For multiple tumor nodules with similar histologic type, the criteria of Martini and Melamed have historically been used. According to these criteria, tumors of similar histology are categorized as synchronous primaries if they are in different segments, lobes, or lungs; they originate from carcinoma in situ; and there is neither carcinoma in lymphatics common to both nor extrapulmonary metastases at the time of diagnosis. These criteria were developed prior to the classification of adenocarcinoma in situ. More recently, comprehensive histologic assessment has been proposed for distinction of synchronous primary versus intrapulmonary metastasis.[1] This technique examines not only whether multiple tumours share the same histologic type, but also similarities in the percentages of histologic subtypes and cytologic and stromal features. Tumors that differ in major histologic type (eg, 1 squamous cell carcinoma, 1 adenocarcinoma) are considered multiple primaries. Tumors that differ by major histologic subtype (eg, 1 acinar-predominant adenocarcinoma, 1 papillary-predominant adenocarcinoma) are considered multiple primaries. Tumors with similar histologic subtypes and similar minor histologic patterns (eg, both acinar-predominant adenocarcinoma with similar smaller percentage of micropapillary pattern) are considered metastases. Tumors with similar major subtype but differing minor subtypes should have similar cytologic and stromal appearance to be considered metastases, otherwise they should be considered synchronous primaries. A source of difficulty lies in tumors with predominant lepidic pattern. Those with mucinous appearance (when the diagnosis invasive mucinous adenocarcinoma is applied) often show multiple foci and likely represent metastasis. Lepidic-predominant nonmucinous adenocarcinomas are more difficult to classify. While they meet the above criteria for metastasis (similar histologic type and similar major histologic subtype), they are often clinically felt to represent synchronous primaries due to their slow growth.

Patients with multiple tumour nodules deemed not to represent synchronous primaries in the same lobe have survival outcomes similar to patients with solitary tumors that by size or other criteria fall into the T3 category and for this reason are staged similarly. Analogously, the similarity in survival between patients with multiple tumor nodules deemed not to represent synchronous primaries in different lobes of the same lung and patients with solitary tumours that fulfill T4 criteria has led the American Joint Committee on Cancer (AJCC) to recommend staging such patients similarly.[2]

B. Histologic Type

For consistency in reporting, the histologic classification published by the World Health Organization (WHO) for tumors of the lung, including carcinoids, is recommended.[1] Accurate typing of lung carcinoma is important, as histology impacts on decisions to proceed with molecular testing and determination of the most appropriate chemotherapy regimen for patients in whom adjuvant therapy is indicated. Although acceptable in small biopsies, a designation of non-small cell lung carcinoma, not otherwise specified (NSCLC, NOS), is not acceptable in resection specimens.

Lung carcinomas should be adequately sampled in order to ensure defining features are satisfactorily represented in the sections examined histologically. For cases in which adenocarcinoma in situ (AIS) or minimally invasive adenocarcinoma (MIA) are being considered, the International Association for the Study of Lung Cancer (IASLC), American Thoracic Society (ATS), and European Respiratory Society (ERS) requires that lesions be entirely submitted for histopathologic examination. The diagnoses of adenocarcinoma in situ and minimally invasive adenocarcinoma should only be made on solitary lesions of 3 cm or less in diameter. The diagnosis of minimally invasive adenocarcinoma is made in a lepidic-predominant tumors with an invasive components measuring 0.5 cm or less in size.

Classification of adenocarcinomas by predominant histologic pattern may be performed and can be useful for assessing pathologic grade. In poorly differentiated cases, immunohistochemistry can greatly aid in classification. This is particularly useful in making a diagnosis of solid-type adenocarcinoma or nonkeratinizing squamous cell carcinoma.

C. Histopathologic Grade (G)

To standardize histologic grading, the following grading system is recommended.[1]

Grade X (GX): Cannot be assessed
Grade 1 (G1): Well differentiated
Grade 2 (G2): Moderately differentiated
Grade 3 (G3): Poorly differentiated
Grade 4 (G4): Undifferentiated

Although a tiered grading scheme for lung cancer is specified by the AJCC, its reproducibility and prognostic significance has not been rigorously tested. According to the WHO, sarcomatoid carcinomas (pleomorphic carcinoma, spindle cell carcinoma, giant cell carcinoma, and carcinosarcoma) and pulmonary blastoma are classified as either undifferentiated (more commonly), or poorly differentiated (if there is focal squamous or glandular differentiation). Large cell carcinoma is classified as undifferentiated, and small cell carcinoma is classified as undifferentiated. While a definitive grading system for resected lung adenocarcinomas has yet to be established, the IASLC/ATS/ERS have proposed a grading system based on the predominant histologic subtype. In this classification, lepidic-predominant adenocarcinomas are classified as well differentiated (G1), papillary-predominant and acinar-predominant adenocarcinomas are classified as moderately differentiated (G2), and solid-predominant and micropapillary-predominant adenocarcinomas are classified as poorly differentiated (G3). Cribriform-predominant tumors are currently classified alongside acinar-predominant tumors as G2 but may show worse prognosis. Invasive mucinous adenocarcinoma and colloid adenocarcinoma are classified as G3. No definitive grading system has been established for squamous cell carcinoma; however, it is accepted that tumors with extensive keratinization are well differentiated, while those with little to no keratinization are poorly differentiated. *WHO Classification of Tumours of the Lung, Pleura, Thymus and Heart*[1] should be consulted for the applicability and/or assignment of histologic grade for tumors not discussed here. Undifferentiated (G4) is reserved for carcinomas that show minimal or no specific differentiation following histologic evaluation. According to the definition of grading, a squamous cell carcinoma or an adenocarcinoma arising in the lung can be classified only as grade 1, grade 2, or grade 3, because by definition these tumors show squamous or glandular differentiation, respectively. If there are variations in the differentiation of a tumor, the least favorable variation is recorded as the grade, using grades 1 through 3.

D. Visceral Pleural Invasion

The presence of visceral pleural invasion by tumors smaller than 3 cm changes the T category from pT1 to pT2 and increases the stage from IA to IB in patients with N0, M0 disease or stage IIA to IIB in patients with N1, M0 disease (M0 is defined as no distant metastasis).[3] Studies have shown that tumors smaller than 3 cm that penetrate beyond the elastic layer of the visceral pleura behave similarly to similar-size tumors that extend to the visceral pleural surface.[4,5] Visceral pleural invasion should therefore be considered present not only in tumors that extend to the visceral pleural surface, but also in tumors that penetrate beyond the elastic layer of the visceral pleura (Figure 1).[4-6] Elastic stains may aid in the assessment of visceral pleural invasion.[4,7]

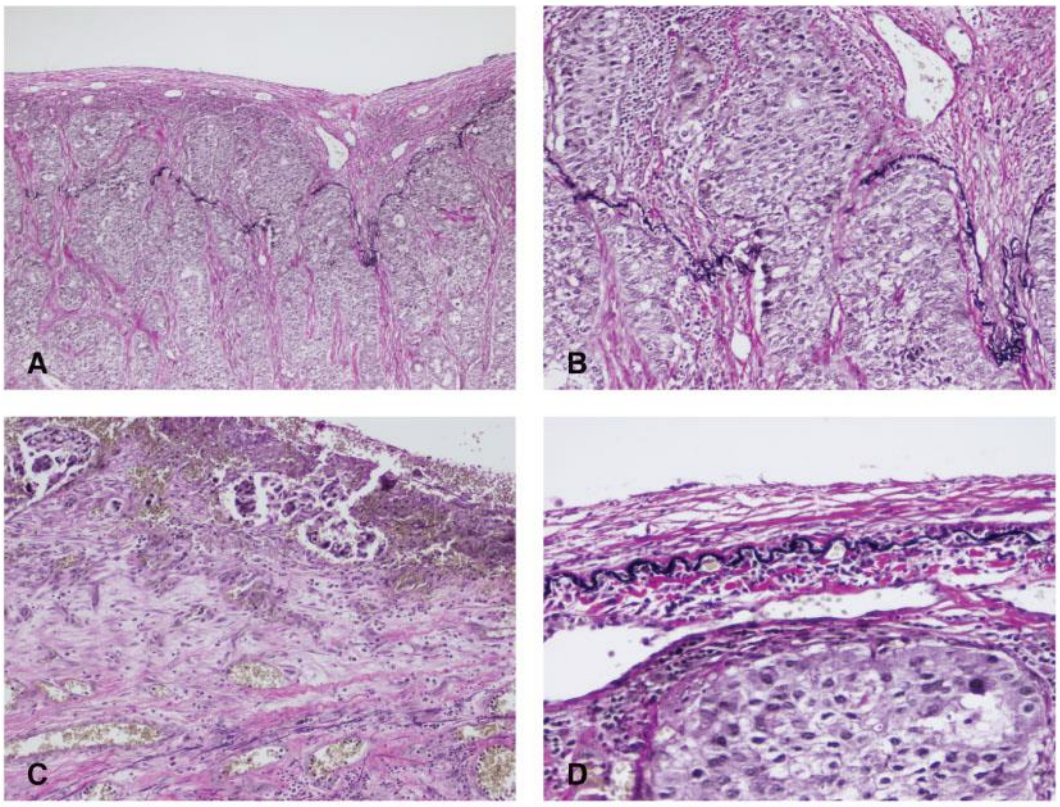

Figure 1. Types of visceral pleural invasion. Staining for elastin (eg, elastic-Van Gieson [EVG] stain) can aid in detection of visceral pleural invasion where it is indeterminate by hematoxylin-eosin (H&E) stain. A and B. Visceral pleural invasion is present when a tumor penetrates beyond the elastic layer of the visceral pleura (type PL1 pleural invasion) C. Tumor extension to the visceral pleural surface is also categorized as visceral pleural invasion (type PL2). Both types of visceral pleural invasion raise the T category of otherwise T1 tumors to T2. D. Visceral pleural invasion is categorized as absent in tumors that do not penetrate the visceral pleural elastic layer (type PL0). (Original magnifications x200 [A], x400 [B and C], x600 [D]).

Based on available data, a tumor with local invasion through an adhesed fissure into another ipsilateral lobe should be classified as T2.[7]

Pleural tumor foci that are separate from direct pleural invasion should be categorized as M1a.[8]

E. Tumor Extension

According to the AJCC, direct invasion of the parietal pleura is categorized as T3, as is direct invasion of the chest wall.[2] Although not required, specifying the chest wall structures directly invaded by tumor (eg, intercostal muscle[s], rib[s], pectoralis muscle, latissimus muscle, serratus muscle) may facilitate patient management.

In addition to containing the heart and great vessels, the mediastinum includes the thymus and other structures between the lungs, direct invasion of any of which is considered T4.

Occasionally, lung cancer specimens consist of en bloc resections that incorporate other structures directly invaded by tumor that are not referred to in AJCC pathologic staging but are discussed under the clinical staging section of the AJCC manual.[2] The T categories that correspond to direct invasion of these structures are summarized in the collaborative staging manual.[9] These should be reported under the “other” designation and include the following:

- Tumors with direct invasion of the phrenic nerve or brachial plexus (inferior branches or not otherwise specified) from the superior sulcus are categorized as T3.

- Superior sulcus tumors with encasement of subclavian vessels or unequivocal involvement of the superior branches of the brachial plexus are categorized as T4.
- Direct invasion of the visceral pericardium or cervical sympathetic, recurrent laryngeal, or vagus nerve(s) is considered T4.

F. Margins
Surgical margins represent sites that have either been cut or bluntly dissected by the surgeon to resect the specimen. The presence of tumor at a surgical margin is an important finding, because there is the potential for residual tumor remaining in the patient in the area surrounding a positive margin. Peripheral wedge resections contain a parenchymal margin, which is represented by the tissue at the staple line(s). Lobectomy and pneumonectomy specimens contain bronchial and vascular margins, and depending on the completeness of the interlobar fissures and other anatomic factors, may also contain parenchymal margins in the form of staple lines. En bloc resections in which extrapulmonary structures are part of the specimen contain additional margins (eg, parietal pleura, chest wall) that should be designated by the surgeon for appropriate handling. This includes cases in which the visceral pleura is adherent to the parietal pleura. Note that the visceral pleura is not a surgical margin.

G. Treatment Effect
For patients who have received neoadjuvant chemotherapy and/or radiation therapy before surgical resection, quantifying the extent of therapy-induced tumor regression provides prognostically relevant information.[10] A “y” prefix is applied to the TNM classification in such cases (see Note J).

H. Tumor Associated Atelectasis or Obstructive Pneumonitis
Although the presence and extent of obstructive pneumonitis associated with tumor can sometimes be determined in pneumonectomy specimens, accurate assessment of tumor-associated atelectasis or obstructive pneumonitis typically requires integration of radiographic information.[11] Atelectasis recognized by pathology only should not be used for TNM staging.

I. Vascular/Lymphatic Invasion
There is data showing that lymphovascular invasion by tumor may represent an unfavorable prognostic finding.[12] Angiolymphatic invasion does not change the pT and pN classifications or the TNM stage grouping.

J. TNM and Stage Grouping
The TNM staging system of the AJCC and the International Union Against Cancer (UICC) is recommended for non-small cell lung cancer.[2,13] Small cell lung cancer has been more commonly classified according to a separate staging system as either “limited” or “extensive” disease, but based on analysis of the IASLC database, TNM staging is also recommended for small cell lung cancer.[14,15] Carcinoid and atypical carcinoid tumors should also be classified according to the TNM staging system.

By AJCC/UICC convention, the designation “T” refers to a primary tumor that has not been previously treated. The symbol “p” refers to the pathologic classification of the TNM, as opposed to the clinical classification, and is based on gross and microscopic examination. pT entails a resection of the primary tumor or biopsy adequate to evaluate the highest pT category, pN entails removal of nodes adequate to validate lymph node metastasis, and pM implies microscopic examination of distant lesions. Clinical classification (cTNM) is usually carried out by the referring physician before treatment during initial evaluation of the patient or when pathologic classification is not possible.

Pathologic staging is usually performed after surgical resection of the primary tumor. Pathologic staging depends on pathologic documentation of the anatomic extent of disease, whether or not the primary tumor has been completely removed. If a biopsied tumor is not resected for any reason (eg, when technically unfeasible) and if the highest T and N categories or the M1 category of the tumor can be confirmed microscopically, the criteria for pathologic classification and staging have been satisfied without total removal of the primary cancer.

T Category Considerations
The uncommon superficial spreading tumor of any size with its invasive component limited to the bronchial wall, which may extend proximal to the main bronchus, is classified as T1.[2]

Although pneumonectomy specimens allow assessment of tumor involvement of a main bronchus, determining the distance to the carina typically requires consultation with the surgeon, bronchoscopist, or radiologist. This allows for accurate assignment of T categorization for centrally located tumors. [16]

A number of other T category considerations are addressed above (see Notes A, D, E, and G).

N Category Considerations
Lymph node metastases are an adverse prognostic factor, the extent of which is dependent on the location of the involved lymph nodes. The involved lymph node levels or stations should be recorded according to the IASLC lymph node map. Given the nature of the procedure, lymph nodes obtained by mediastinoscopy are often received fragmented and it may not be possible to distinguish a single fragmented lymph node from fragments of multiple lymph nodes. For this reason, only if the actual number of nodes is known or provided should it be quantified. Otherwise, it is permissible to report the sites of nodal metastases without specifying the number involved.

Cases with only micrometastasis (greater than 0.2 mm but less than or equal to 0.2 cm) to lymph nodes can be classified as involved by micrometastasis only. Isolated tumour cells (ITCs) in lymph nodes (less than 0.2 mm in greatest dimension) do not impact the pN designation, and cases with only ITCs are classified as pN0.

Although extranodal extension of a positive mediastinal lymph node may represent an unfavorable prognostic finding, it does not change the pN classification or the TNM stage grouping. Extranodal extension refers to the extension of metastatic intranodal tumor beyond the lymph node capsule into the surrounding tissue. Direct extension of a primary tumor into a nearby lymph node does not qualify as extranodal extension.

The anatomic classification of regional lymph nodes proposed by the IASLC is shown below, which reconciles differences between the Naruke and Mountain/Dresler lymph node maps.[2,17,18]

N2 Nodes

Station 1 Lower cervical, supraclavicular, and sternal notch nodes
Upper border: lower margin of cricoid cartilage
Lower border: clavicles bilaterally and, in the midline, the upper border of the manubrium, 1R designates right-sided nodes, 1L, left-sided nodes in this region

Station 2 Upper paratracheal nodes
2R: Upper border: apex of lung and pleural space
Lower border: intersection of caudal margin of innominate vein with the trachea
2L: Upper border: apex of the lung and pleural space
Lower border: superior border of the aortic arch

Station 3 Prevascular and retrotracheal nodes: 3A: prevascular; 3P: retrotracheal

Station 4 Lower paratracheal nodes:

4R: includes right paratracheal nodes, and pretracheal nodes extending to the left lateral border of trachea
Upper border: lower border of origin of innominate artery
Lower border: lower border of azygos vein
4L: includes nodes to the left of the left lateral border of the trachea, medial to the ligamentum arteriosum
Upper border: upper margin of the aortic arch
Lower border: upper rim of the left main pulmonary artery

Station 5 Subaortic nodes (aorto-pulmonary window): Subaortic nodes are lateral to the ligamentum arteriosum
Upper border: the lower border of the aortic arch
Lower border: upper rim of the left main pulmonary artery

Station 6 Paraaortic nodes (ascending aorta or phrenic): Nodes lying anterior and lateral to the ascending aorta and the aortic arch
Upper border: a line tangential to the upper border of the aortic arch
Lower border: the lower border of the aortic arch

Station 7 Subcarinal nodes

Upper border: the carina of the trachea
Lower border: the upper border of the lower lobe bronchus on the left; the lower border of the bronchus intermedius on the right

Station 8 Paraesophageal nodes (below carina): Nodes lying adjacent to the wall of the esophagus and to the right or left of the midline, excluding subcarinal nodes
Upper border: the upper border of the lower lobe bronchus on the left; the lower border of the bronchus intermedius on the right
Lower border: the diaphragm

Station 9 Pulmonary ligament nodes: Nodes lying within the pulmonary ligament
Upper border: the inferior pulmonary vein
Lower border: the diaphragm

N1 Nodes

Station 10 Hilar nodes: Nodes immediately adjacent to the mainstem bronchus and hilar vessels including the proximal portions of the pulmonary veins and main pulmonary artery
Upper border: the lower rim of the azygos vein on the right; upper rim of the pulmonary artery on the left
Lower border: interlobar region bilaterally

Station 11 Interlobar nodes: Nodes lying between the origin of the lobar bronchi
Optional notations for subcategories of Station 11:
11s between the upper lobe bronchus and bronchus intermedius on the right
11i between the middle and lower lobe bronchi on the right

Station 12 Lobar nodes: Nodes adjacent to the lobar bronchi

Station 13 Segmental nodes: Nodes adjacent to the segmental bronchi

Station 14 Subsegmental nodes: Nodes around the subsegmental bronchi

Isolated tumor cells are single tumor cells or small clusters of cells not more than 0.2 mm in greatest dimension detected on routine sections or more commonly by immunohistochemistry or molecular methods. ITCs in lymph nodes or at distant sites should be classified as N0 or M0, respectively.[2]

The following classification of ITCs may be used:

pN0(i-) No regional lymph node metastasis histologically, negative morphological findings for ITC
pN0(i+) No regional lymph node metastasis histologically, positive morphological findings for ITC
pN0(mol-) No regional lymph node metastasis histologically, negative nonmorphological findings for ITC
pN0(mol+) No regional lymph node metastasis histologically, positive nonmorphological findings for ITC

M Category Considerations

Most pleural effusions with lung cancer are due to tumor. However, in some patients, multiple cytopathologic examinations of pleural fluid are negative for tumor, the fluid is nonbloody, and the fluid is not an exudate. Where these elements and clinical judgment dictate that the effusion is not related to the tumor, the effusion should be excluded as a staging element and not used for a criterion for M1a disease.

TNM Stage Groupings

Stage IA	T1a	N0	M0
	T1b	N0	M0
Stage IB	T2a	N0	M0
Stage IIA	T1a	N1	M0
	T1b	N1	M0
	T2a	N1	M0
	T2b	N0	M0
Stage IIB	T2b	N1	M0
	T3	N0	M0
Stage IIIA	T1a	N2	M0
	T1b	N2	M0
	T2a	N2	M0
	T2b	N2	M0

	T3	N1-2	M0
	T4	N0-1	M0
Stage IIIB	T1a	N3	M0
	T1b	N3	M0
	T2a	N3	M0
	T2b	N3	M0
	T3	N3	M0
	T4	N2-3	M0
Stage IV	Any T	Any N	M1a or M1b

TNM Descriptors
For identification of special cases of TNM or pTNM classifications, the “m” suffix and “y,” and “r” prefixes are used. Although they do not affect the stage grouping, they indicate cases needing separate analysis.

The “m” suffix indicates the presence of multiple primary tumors in a single site and is recorded in parentheses: pT(m)NM (see Note A).

The “y” prefix indicates those cases in which classification is performed during or following initial multimodality therapy (ie, neoadjuvant chemotherapy, radiation therapy, or both chemotherapy and radiation therapy). The cTNM or pTNM category is identified by a “y” prefix. The ycTNM or ypTNM categorizes the extent of tumor actually present at the time of that examination. The “y” categorization is not an estimate of tumor prior to multimodality therapy (ie, before initiation of neoadjuvant therapy) (see Note F).

The “r” prefix indicates a recurrent tumor when staged after a documented disease-free interval, and is identified by the “r” prefix: rTNM.

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