Lung Cancer TNM staging 8th Edition

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TNM Staging

- The official bodies that define, review periodically, and refine the stage classification systems

  The Union Internationale Contre le Cancer (**UICC**)

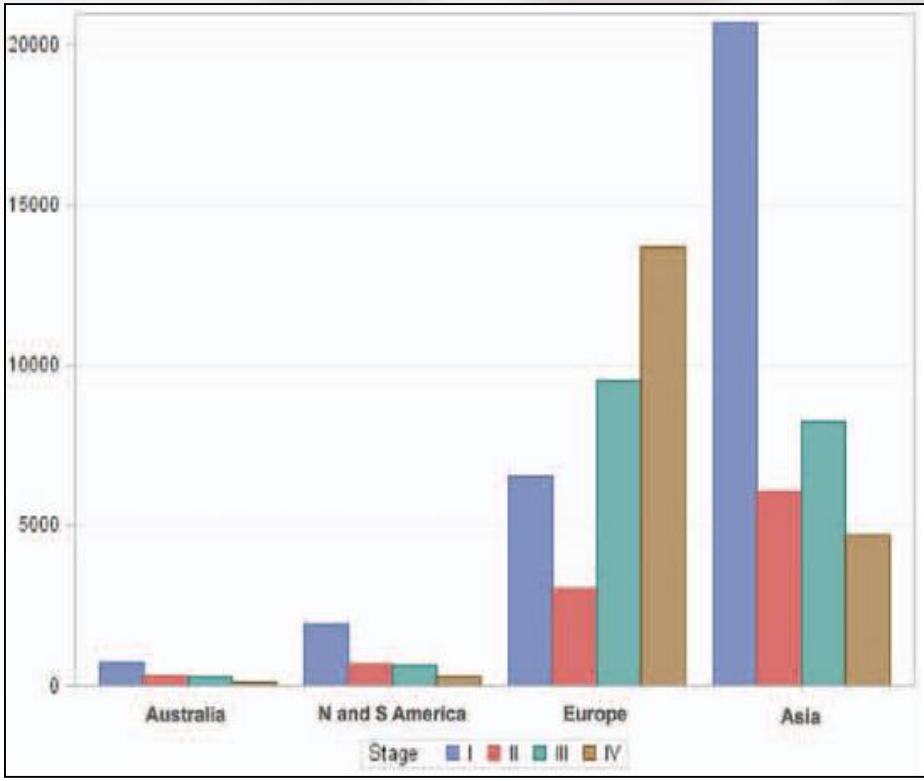
  The American Joint Committee on Cancer (**AJCC**)

- 2010~ 2016, 7th edition
- **8th ed. of the lung cancer staging system**
  - Effect from Jan. 2017
  - based on a major initiative undertaken by *International Association for the Study of Lung Cancer* (**IASLC**), International Staging Committee for non-small cell lung cancer

New DB for 8th Edition

Element	Database for the seventh Edition	Database for the eighth Edition
Period of diagnosis	1990 to 2000	1999 to 2010
Total patients submitted	100,869	94,708
Geographical origin		
Europe	58,701 (58%)	46,560 (49%)
North America	21,130 (21%)	4,660 (5%)
Asia	11,622 (11.5%)	41,705 (44%)
Australia	9,416 (9.3%)	1,593 (1.7%)
South America	0	190 (0.3%)
Patients excluded	19,374 (19%)	17,552 (18%)
Patients included for analyses	81,495	77,154
NSCLC	68,463 (84%)	70,967 (92%)
SCLC	13,032 (16%)	6,189 (8%)
Treatment modalities		
Surgery alone	41%	57.7%
Radiotherapy + surgery	5%	1.5%
Chemotherapy + surgery	4%	21.1%
Chemotherapy alone	23%	9.3%
Radiotherapy alone	11%	1.5%
Chemotherapy + radiotherapy	12%	4.7%
Trimodality	3%	4.4%

Asia	EDC	Guangdong General Hospital, China	739
		Shanghai Lung Tumor Clinical Medical Center, China	51
	Japan 1999		13,344
	Japan 2002		14,695
	Japan 2004		10,889
	South Korea		1,987



J Thorac Oncol. 2014;9:1618-1624

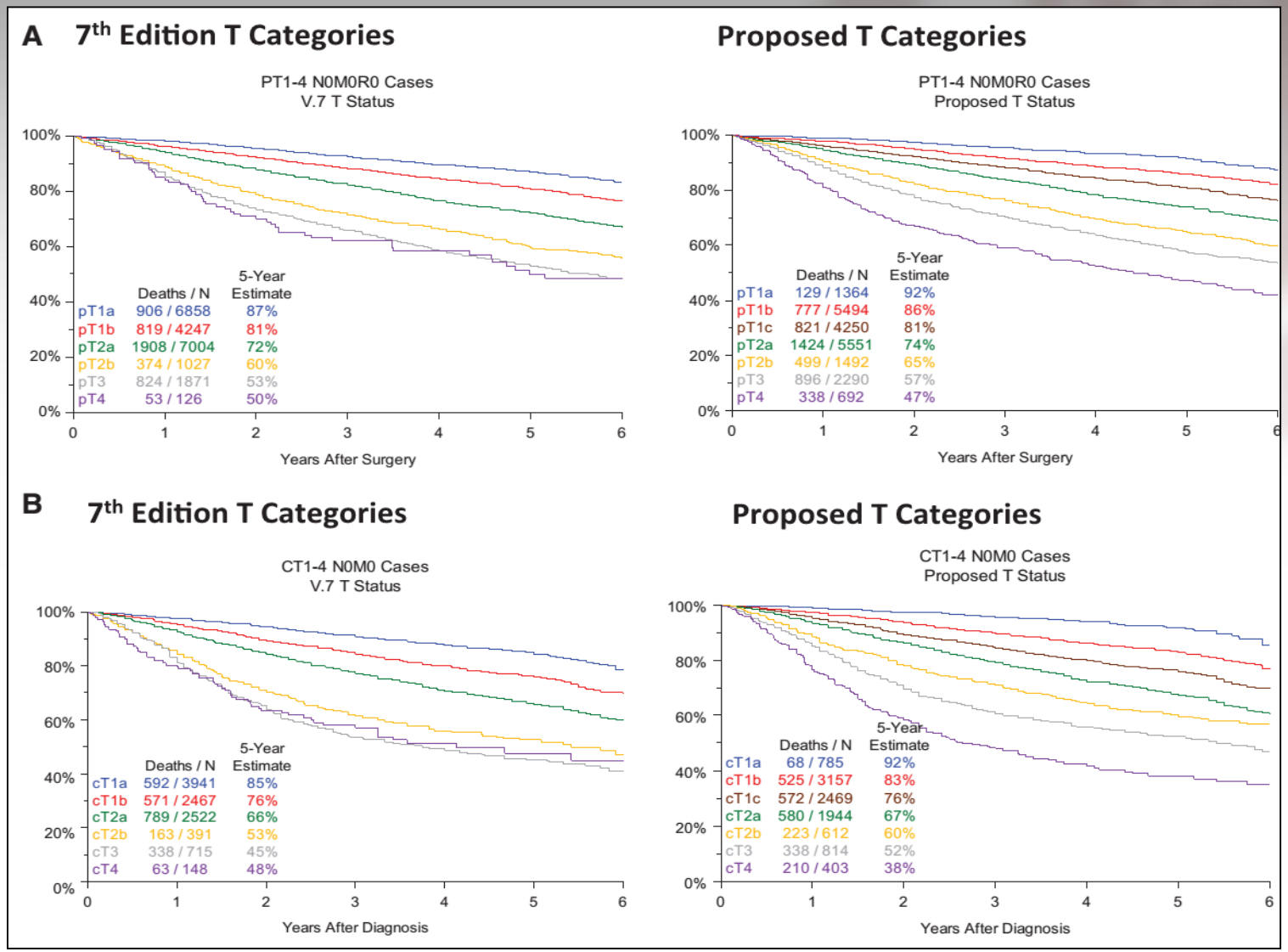
Prefix & Symbol

Prefix	Name	Definition
c	Clinical	Before initiation of any treatment, using any and all information available (eg, including mediastinoscopy)
p	Pathologic	After resection, made on the basis of pathologic assessment
y	Restaging	After part or all of the treatment has been given
r	Recurrence	Stage at time of a recurrence
a	Autopsy	Stage as determined by autopsy

Symbol	Name	Definition
R0	No residual	No identifiable tumor remaining, negative surgical margins
R1	Microscopic residual	Microscopically positive margins but no visible tumor remaining
R2	Gross residual	Gross (visible or palpable) tumor remaining

CHEST 2017; 151(1):193-203

T Descriptors



J Thorac Oncol. 2015;10:1990-1003

T Descriptors

1. The subclassifiation of T1 into
   ① **T1a:** tumor **1** cm or less in greatest dimension
   ② **T1b:** tumor more than **1** cm but not more than **2** cm in greatest dimension
   ③ **T1c:** tumor more than **2** cm but not more than **3** cm in greatest dimension;
2. The subclassifiation of T2 into
   ① **T2a:** tumor more than **3** cm but not more than **4** cm in greatest dimension
   ② **T2b:** tumor more than **4** cm but not more than **5** cm in greatest dimension
3. The reclassifiation of tumors more than **5** cm but not more than **7** cm in greatest dimension as **T3;**
4. The reclassifiation of tumors more than **7** cm in greatest dimension as **T4;**
5. The grouping of the **involvement of the main bronchus as a T2** descriptor, regardless of distance from the carina, but without invasion of the carina;
6. The grouping of partial and total **atelectasis or pneumonitis as a T2** descriptor;
7. The reclassifiation of **diaphragm invasion as T4;**
8. To **delete mediastinal pleura invasion** as a T descriptor.

J Thorac Oncol. 2015;10:1990-1003

T (Primary Tumor)		Label
T0	No primary tumor	
Tis	Carcinoma in situ (Squamous or Adenocarcinoma)	Tis
T1	Tumor ≤3 cm,	
T1a(mi)	Minimally Invasive Adenocarcinoma	T1a*(mi)*
T1a	Superficial spreading tumor in central airways[a]	T1a *SS*
T1a	Tumor ≤1 cm	T1a *≤1*
T1b	Tumor >1 but ≤2 cm	T1b *>1-2*
T1c	Tumor >2 but ≤3 cm	T1c *>2-3*
T2	Tumor >3 but ≤5 cm or tumor involving:	
	visceral pleura[b],	T2 *Visc Pl*
	main bronchus (not carina), atelectasis to hilum[b]	T2 *Centr*
T2a	Tumor >3 but ≤4 cm	T2a *>3-4*
T2b	Tumor >4 but ≤5 cm	T2b *>4-5*
T3	Tumor >5 but ≤7 cm	T3 *>5--7*
	or invading chest wall, pericardium, phrenic nerve	T3 *Inv*
	or separate tumor nodule(s) in the same lobe	T3 *Satell*
T4	Tumor >7 cm	T4 *>7*
	or tumor invading: mediastinum, diaphragm, heart, great vessels, recurrent laryngeal nerve, carina, trachea, esophagus, spine;	T4 *Inv*
	or tumor nodule(s) in a different ipsilateral lobe	T4 *Ipsi Nod*

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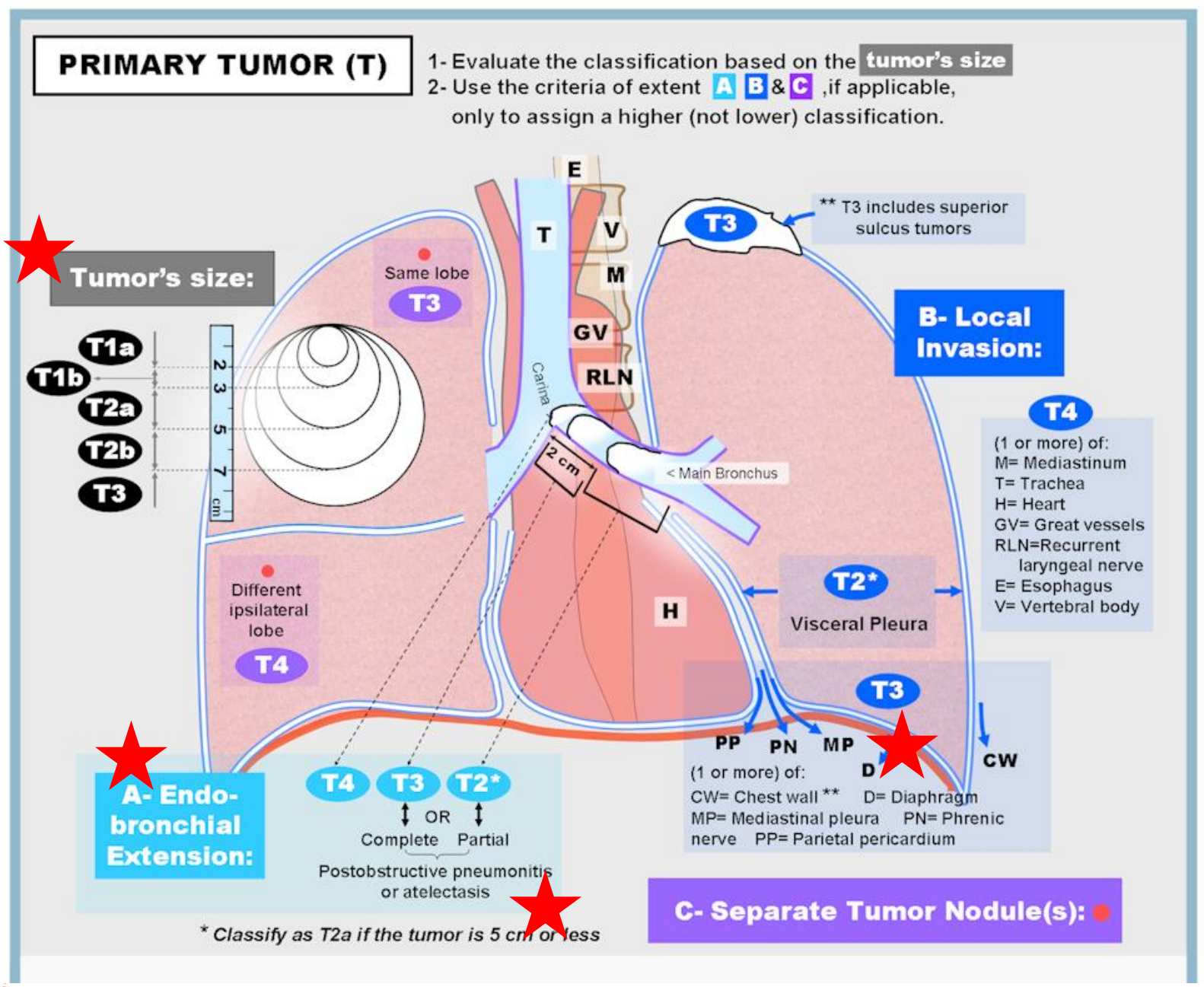
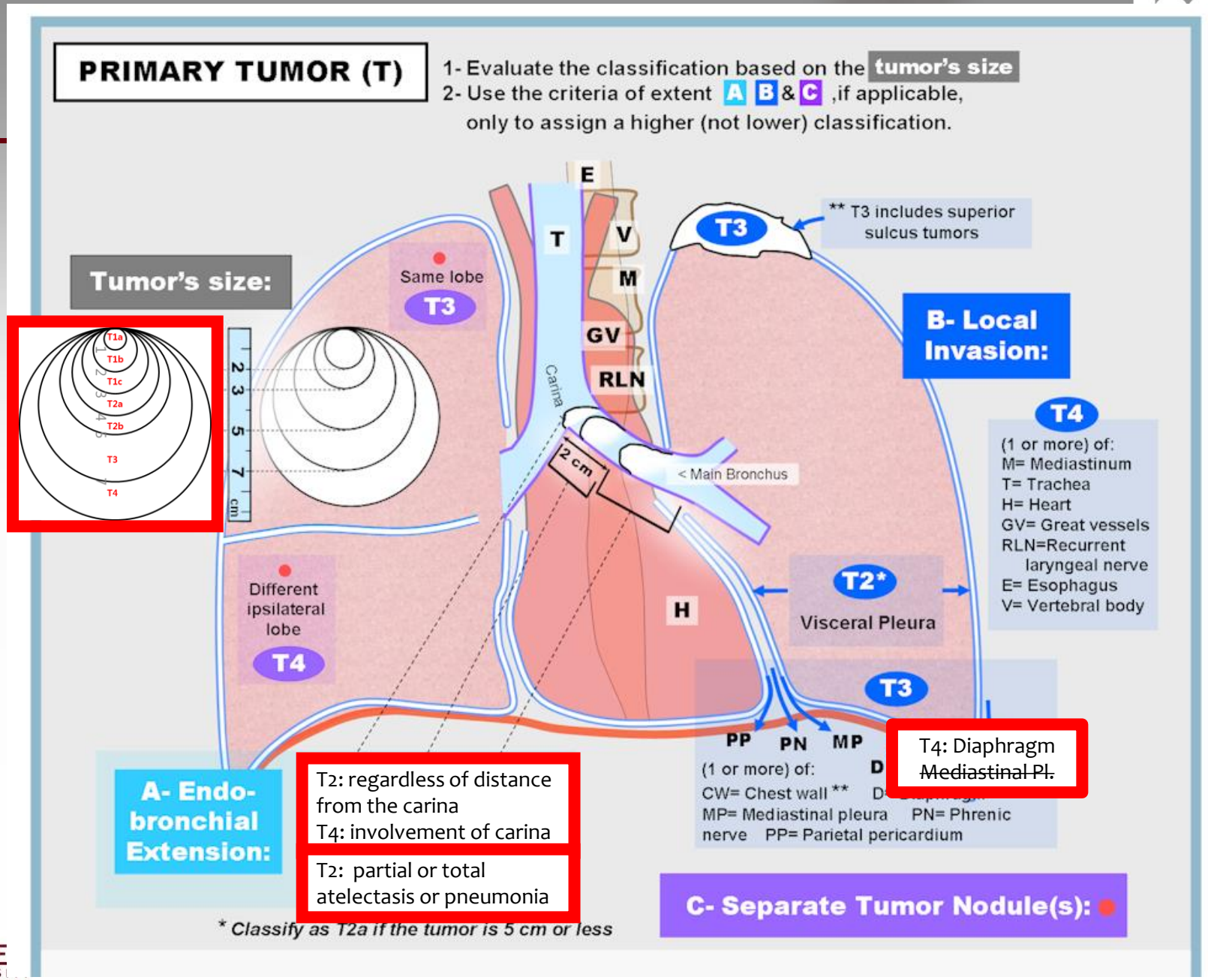


Chest 2011; 139:183-189



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Chest 2011; 139:183-189

N descriptor

- **Current N descriptors adequately predict the prognosis** and therefore should **be maintained in the forthcoming staging system**.

- Furthermore, we recommend that physicians record the number of metastatic lymph nodes (or stations) and to further classify the N category using new descriptors, such as N1a, N1b, N2a, N2b, and N3, for further testing.

Category	Subclass	Description
Nx		Regional lymph nodes cannot be assessed
N0		No regional lymph node involvement
N1	N1a	Single-station N1 involvement
	N1b	Multiple-station N1 involvement
N2	N2a1	Single-station N2 without N1 involvement (skip)
	N2a2	Single-station N2 with N1 involvement
	N2b	Multiple-station N2 involvement
N3		N3 lymph node involvement

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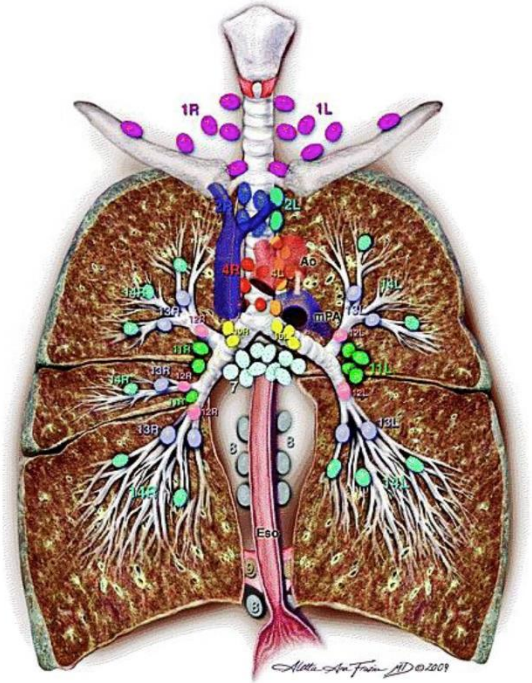
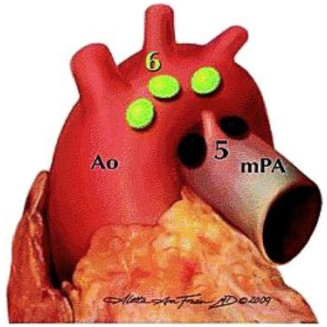
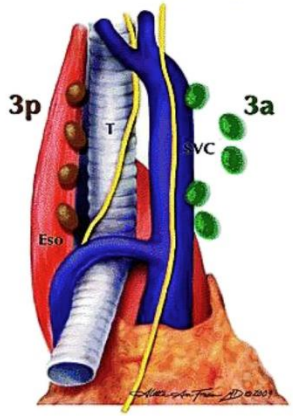
J Thorac Oncol. 2015;10:1675-1684







Supraclavicular zone

1 Low cervical, supraclavicular, and sternal notch nodes

SUPERIOR MEDIASTINAL NODES

Upper zone

- 2R Upper Paratracheal (right)
- 2L Upper Paratracheal (left)
- 3a Prevascular
- 3p Retrotracheal
- 4R Lower Paratracheal (right)
- 4L Lower Paratracheal (left)

AORTIC NODES

AP zone

- 5 Subaortic
- 6 Para-aortic (ascending aorta or phrenic)

INFERIOR MEDIASTINAL NODES

Subcarinal zone

- 7 Subcarinal

Lower zone

- 8 Paraesophageal (below carina)
- 9 Pulmonary ligament

N1 NODES

Hilar/Interlobar zone

- 10 Hilar
- 11 Interlobar

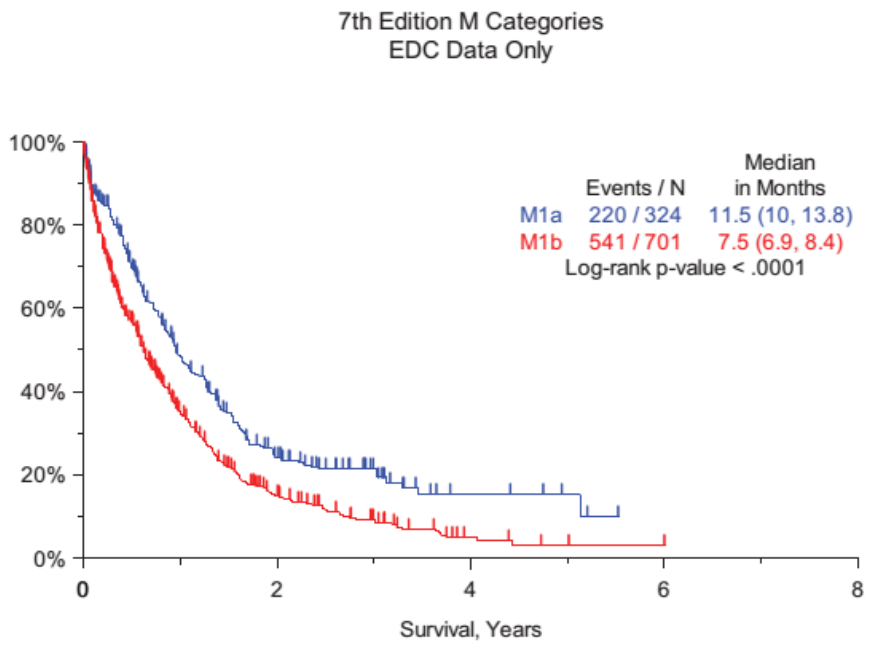
Peripheral zone

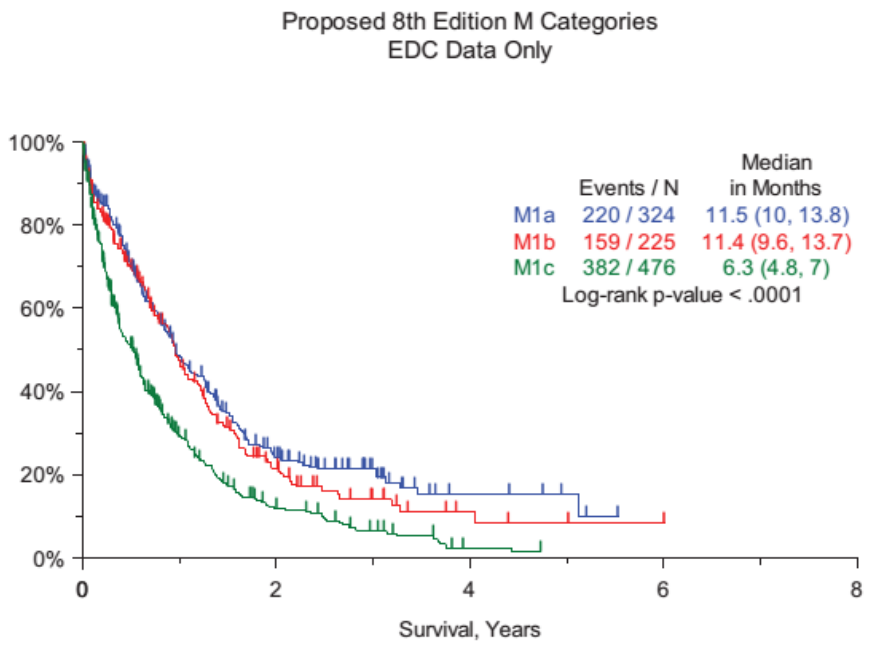
- 12 Lobar
- 13 Segmental
- 14 Subsegmental

M Descriptor

Proposed Category	Variable	Overall Survival n/N (%)	HR (95% CI)	*P* Value
M1a	M1a	324/1025 (32)	Reference level	
M1b	M1b, single organ/lesion	225/1025 (22)	1.11 (0.91, 1.36)	0.308
M1c	M1b, single organ/multiple lesions	229/1025 (22)	1.63 (1.34, 1.99)	<0.001
	M1b, multiple organs	247/1025 (24)	1.85 (1.52, 2.24)	<0.001

P value from score χ^2 test in Cox regression.
HR, hazard ratio; 95% CI, 95% confidence interval.





J Thorac Oncol. 2015;10:1515-1522

N (Regional Lymph Nodes)		
N0	No regional node metastasis	
N1	Metastasis in ipsilateral pulmonary or hilar nodes	
N2	Metastasis in ipsilateral mediastinal/subcarinal nodes	
N3	Metastasis in contralateral mediastinal/hilar, or supraclavicular nodes	
M (Distant Metastasis)		
M0	No distant metastasis	
M1a	Malignant pleural/pericardial effusion[c] or pleural /pericardial nodules	M1a *Pl Dissem*
	or separate tumor nodule(s) in a contralateral lobe;	M1a *Contr Nod*
M1b	Single extrathoracic metastasis	M1b *Single*
M1c	Multiple extrathoracic metastases (1 or >1 organ)	M1c *Multi*

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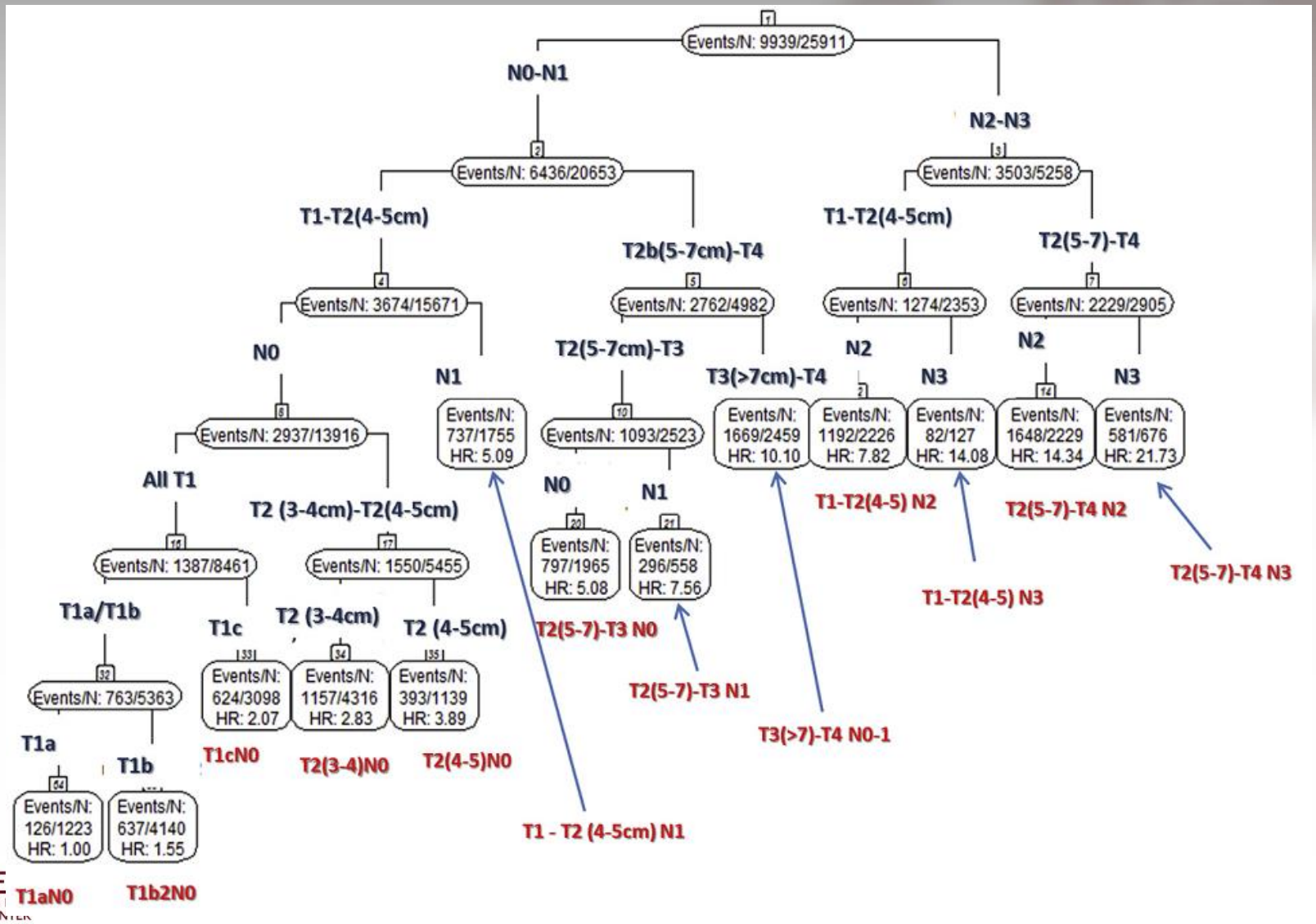
Stage Grouping



J Thorac Oncol. 2015;11:39-51

Stage Grouping

Terminal node	Sample size (training set)	Hazard ratio
T1a N0	1223	1.00
T1b N0	4140	1.55
T1c N0	3098	2.07
T2a N0	4316	2.83
T2b N0	1139	3.89
T3 N0	1965	5.08
T1a-T2b N1	1755	5.09
T3 N1	558	7.56
T1a-T2b N2	2226	7.82
T4 N0-N1	2459	10.10
T1a-T2b N3	127	14.08
T3-T4 N2	2229	14.34
T3-T4 N3	676	21.73

J Thorac Oncol. 2015;11:39-51

5-Year Survival (%)

Type	IA1	IA2	IA3	IB	IIA	IIB	IIIA	IIIB	IIIC	IVA	IVB
Clinical	92	83	77	68	60	53	36	26	13	10	0
Pathologic	90	85	80	73	65	56	41	24	12	-	-

Average overall survival in the International Association for the Study of Lung Cancer global database of patients receiving a diagnosis between 1999 and 2010. Data from Goldstraw et al.

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Stage Grouping

Occult carcinoma	TX	N0	M0
Stage 0	Tis	N0	M0
Stage IA1	**T1a(mi)**	**N0**	**M0**
	T1a	**N0**	**M0**
Stage IA2	**T1b**	**N0**	**M0**
Stage IA3	**T1c**	**N0**	**M0**
Stage IB	T2a	N0	M0
Stage IIA	T2b	N0	M0
Stage IIB	**T1a-c**	**N1**	**M0**
	T2a	**N1**	**M0**
	T2b	N1	M0
	T3	N0	M0
Stage IIIA	**T1a-c**	**N2**	**M0**
	T2a-b	N2	M0
	T3	N1	M0
	T4	N0	M0
	T4	N1	M0
Stage IIIB	**T1a-c**	**N3**	**M0**
	T2a-b	N3	M0
	T3	**N2**	**M0**
	T4	N2	M0
Stage IIIC	**T3**	**N3**	**M0**
	T4	**N3**	**M0**
Stage IVA	**Any T**	**Any N**	**M1a**
	Any T	**Any N**	**M1b**
Stage IVB	**Any T**	**Any N**	**M1c**

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J Thorac Oncol. 2015;11:39-51

T/M	Label	N0	N1	N2	N3
T1	T1a ≤1	IA1	IIB	IIIA	IIIB
	T1b >1-2	IA2	IIB	IIIA	IIIB
	T1c >2-3	IA3	IIB	IIIA	IIIB
T2	T2a *Cent, Yisc Pl*	IB	IIB	IIIA	IIIB
	T2a >3-4	IB	IIB	IIIA	IIIB
	T2b >4-5	IIA	IIB	IIIA	IIIB
T3	T3 >5-7	IIB	IIIA	IIIB	IIIC
	T3 *Inv*	IIB	IIIA	IIIB	IIIC
	T3 *Satell*	IIB	IIIA	IIIB	IIIC
T4	T4 >7	IIIA	IIIA	IIIB	IIIC
	T4 *Inv*	IIIA	IIIA	IIIB	IIIC
	T4 *Ipsi Nod*	IIIA	IIIA	IIIB	IIIC
M1	M1a *Contr Nod*	IVA	IVA	IVA	IVA
	M1a *Pl Dissem*	IVA	IVA	IVA	IVA
	M1b *Single*	IVA	IVA	IVA	IVA
	M1c *Multi*	IVB	IVB	IVB	IVB

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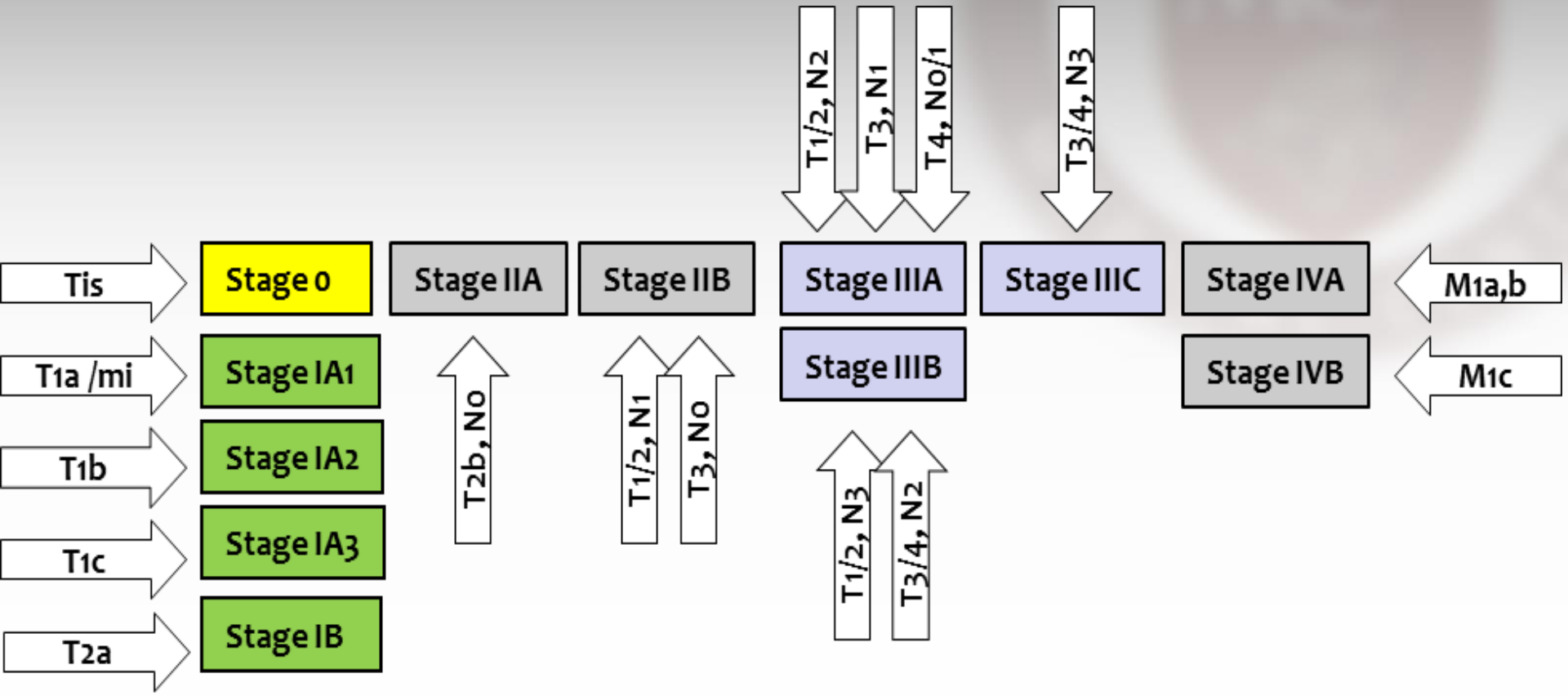

T1/2, N2
T3, N1
T4, N0/1
T3/4, N3
Tis
Stage 0
Stage IIA
Stage IIB
Stage IIIA
Stage IIIC
Stage IVA
M1a,b
T1a /mi
Stage IA1
T2b, N0
T1/2, N1
T3, N0
Stage IIIB
Stage IVB
M1c
T1b
Stage IA2
T1c
Stage IA3
T1/2, N3
T3/4, N2
T2a
Stage IB

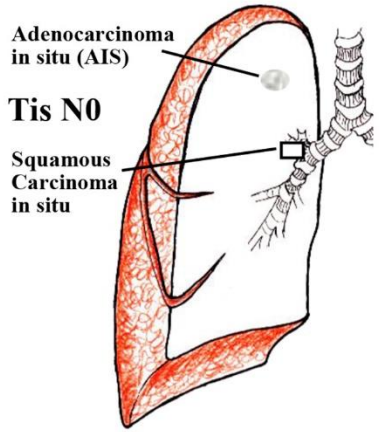
Lung Cancer Stage Classification (8th Edition)

General Note:
All Stage 1-III tumors are M0

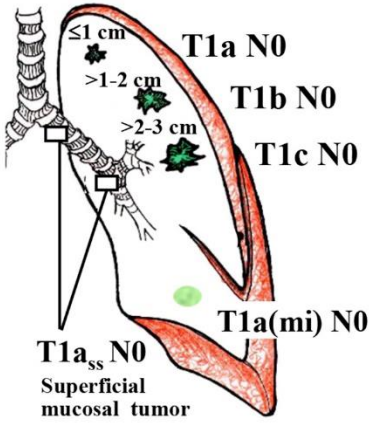
Tx, Nx should be used only if no information at all is available about T or N stage (including no clinical staging information).

Mx is not allowed, because symptoms and physical exam information is always available.

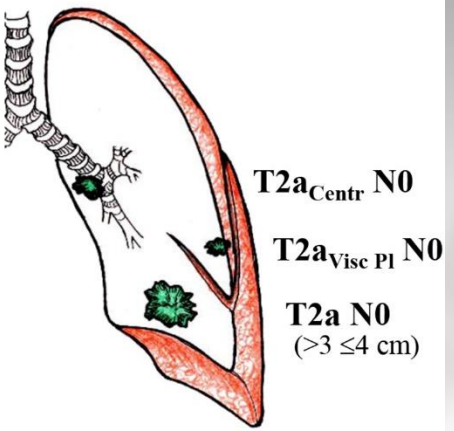
Stage 0



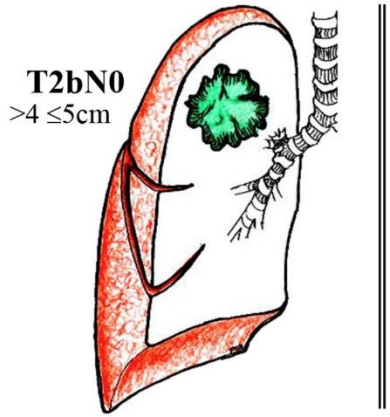
Stage IA

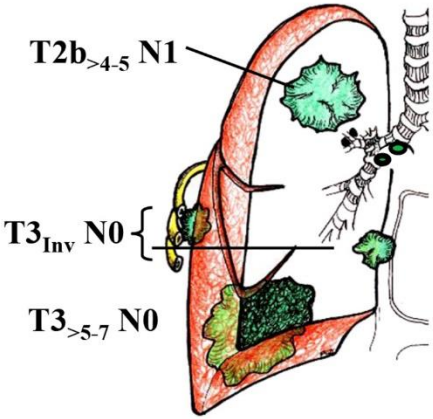


Stage IB

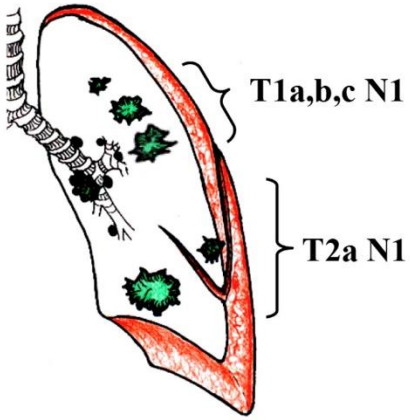


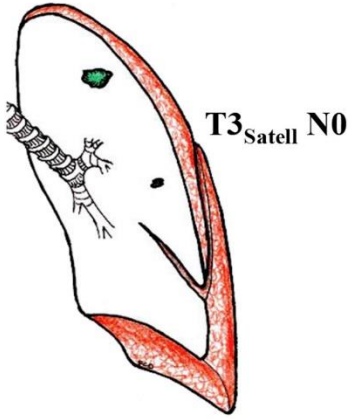
Stage IIA





Stage IIB





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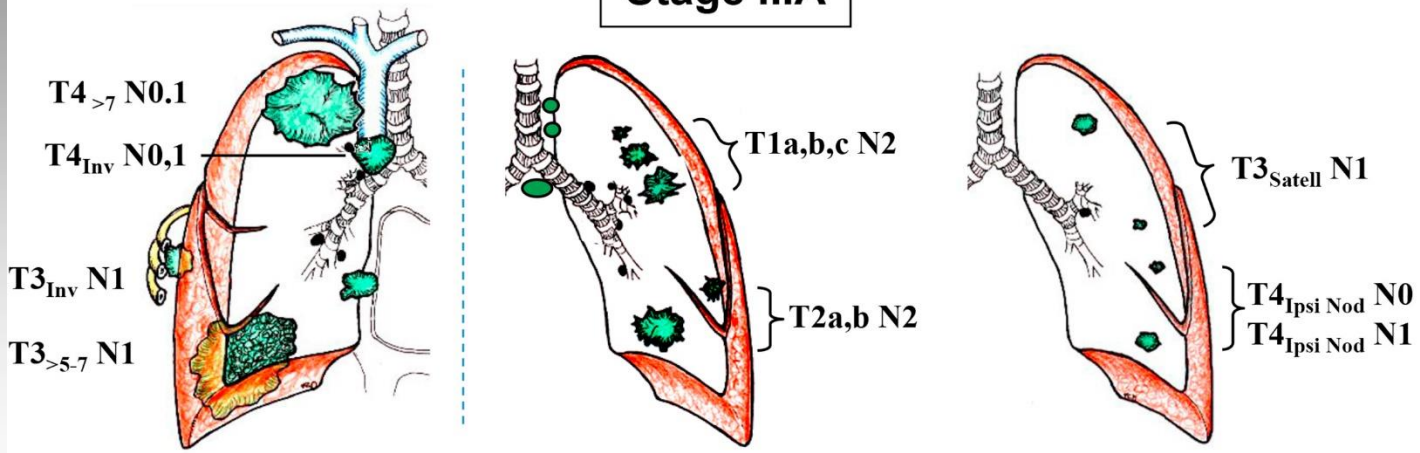
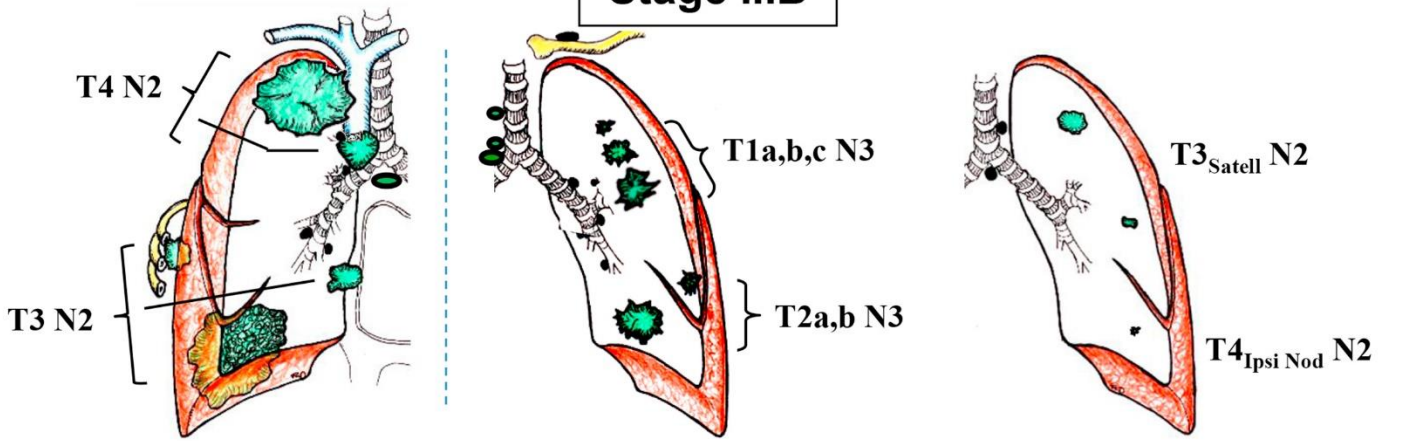
Stage IIIA



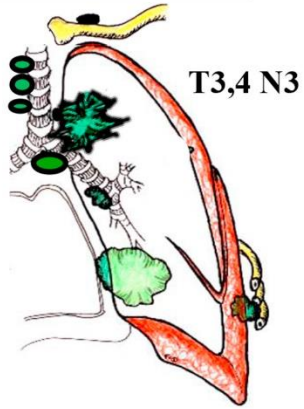
Specific Notes:

- Tumor size defined as largest dimension of the solid (imaging, c-stage) or invasive (p-stage) component
- Direct extension of the primary tumor into an adjacent node counts as nodal involvement
- Extension of a nodal metastasis into a T structure does not count for the T category
- The highest T category is used when there is a discrepancy between T by size or by other factors

Stage IIIB



Stage IIIC



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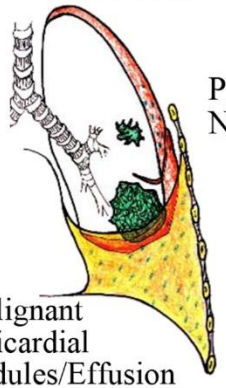
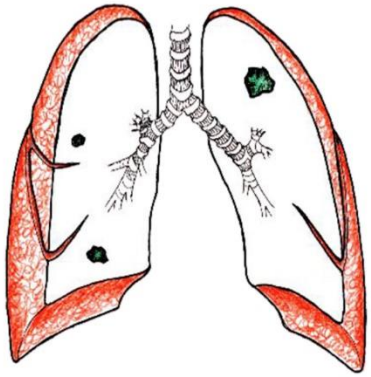
Stage IVA

Stage IVB

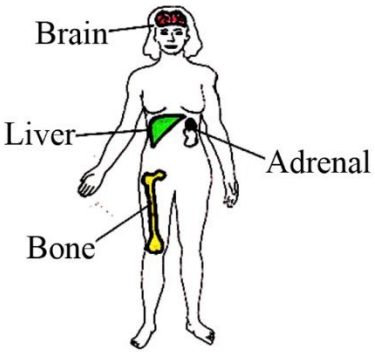
M1a Pl Dissem



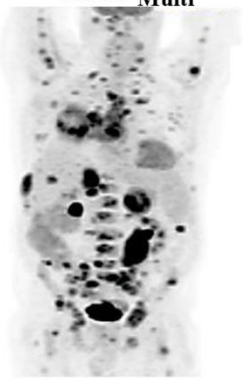
M1a Contra Nod



M1b Single



M1c Multi



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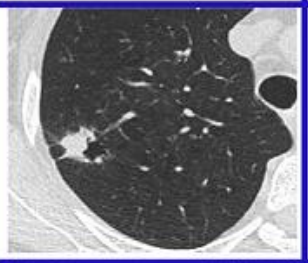
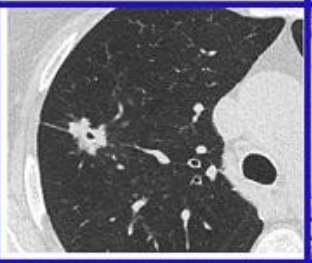
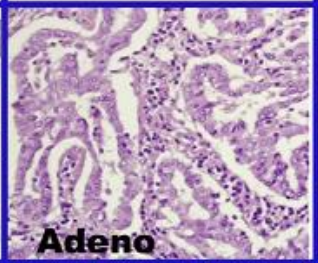
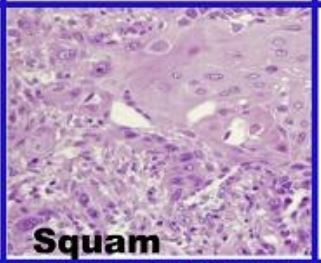
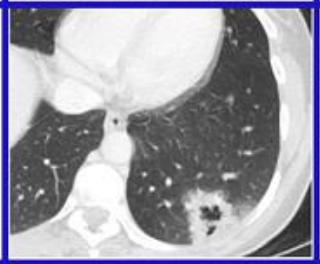
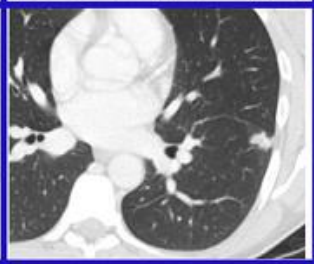
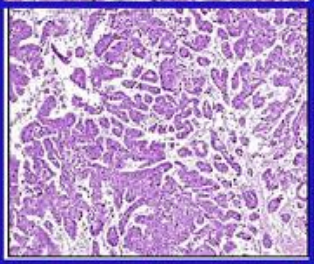
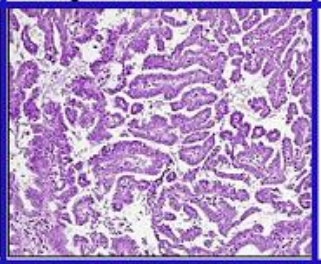
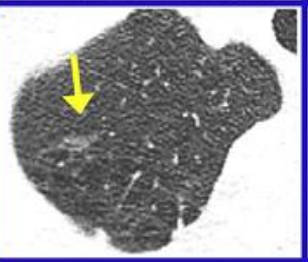
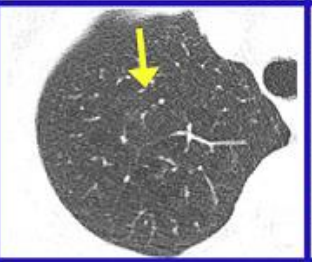
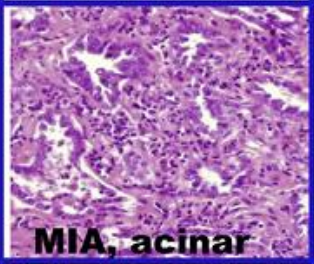
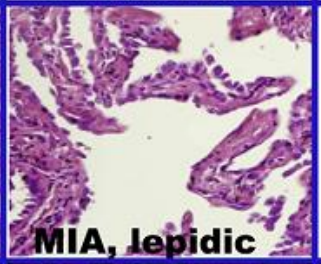
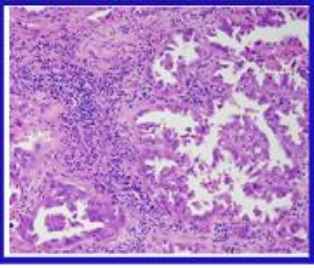
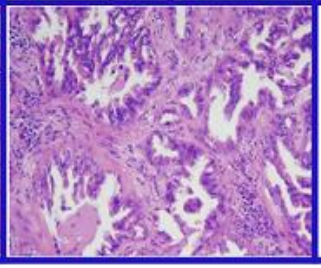
Multiple Sites Involve

	Tumor Site 1	Tumor Site 2	Tumor Site 1	Tumor Site 2	TNM Classification
Second Primary Cancer					Separate T, N and M for each tumor
Separate Tumor Nodules					T3 if in same lobe T4 if same side (other lobe) M1a if different lobe, Single N and M for all
Multifocal GG/L Nodules					T according to highest T lesion, single N and M for all lesions collectively, (#/m) indicates multiplicity
Diffuse Pneumonic-Type					T3 if in same lobe T4 if same side (other lobe) M1a if different lobe, Single N and M for all

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Multiple Sites Involve

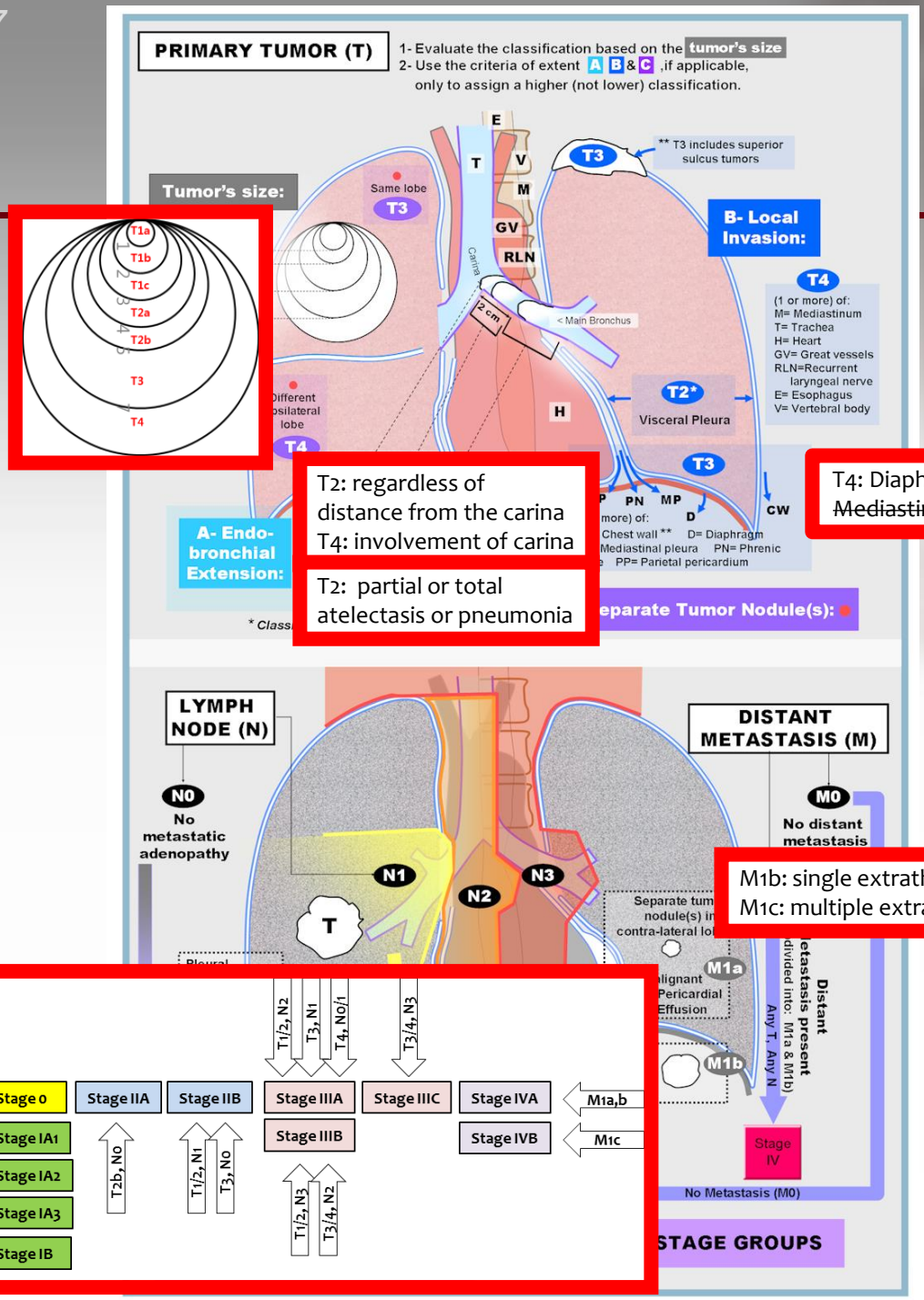
	Second Primary Lung Cancer	Multifocal GG/L Nodules	Pneumonic-Type Adenocarcinoma	Separate Tumor Nodule
Imaging features	Two or more distinct masses with imaging characteristic of lung cancer (e.g., spiculated)	Multiple ground glass or part-solid nodules	Patchy areas of ground glass and consolidation	Typical lung cancer (e.g., solid, spiculated) with separate solid nodule
Pathologic features	Different histotype or different morphologic features by comprehensive histologic assessment	Adenocarcinomas with prominent lepidic component (typically varying degrees of AIS, MIA, LPA)	Same histologic features throughout (most often invasive mucinous adenocarcinoma)	Distinct masses with the same morphologic features by comprehensive histologic assessment
TNM classification	Separate cTNM and pTNM for each cancer	T based on highest T lesion with (#/m) indicating multiplicity; single N and M	T based on size or T3 if in single lobe, T4 or M1a if in different ipsilateral or contralateral lobes; single N and M	Location of separate nodule relative to primary site determines if T3, T4, or M1a; single N and M
Conceptual view	Unrelated tumors	Separate tumors, albeit with similarities	Single tumor, diffuse pulmonary involvement	Single tumor, with intrapulmonary metastasis

J Thorac Oncol. 2016;5:639-650

SCLC

- We confirm the prognostic value of clinical and pathological TNM staging in patients with SCLC, and recommend **continued usage for SCLC in relation to proposed changes to T, N, and M descriptors for NSCLC in the eighth edition**.
- However, for M descriptors, it remains uncertain whether survival differences in patients with single-site metastasis (SSM) in the brain simply reflect better treatment options rather than better survival based on anatomic extent of disease.

J Thorac Oncol. 2015;11:300-311


PRIMARY TUMOR (T)
1- Evaluate the classification based on the tumor's size
2- Use the criteria of extent A B & C ,if applicable, only to assign a higher (not lower) classification.
Tumor's size:
T1a
T1b
T1c
T2a
T2b
T3
T4
Same lobe
T3
** T3 includes superior sulcus tumors
B- Local Invasion:
T4
(1 or more) of:
M= Mediastinum
T= Trachea
H= Heart
GV= Great vessels
RLN=Recurrent laryngeal nerve
E= Esophagus
V= Vertebral body
Carina
2 cm
< Main Bronchus
Different ipsilateral lobe
T4
T2*
Visceral Pleura
T3
PN
MP
D
CW
more) of:
Chest wall **
D= Diaphragm
Mediastinal pleura
PN= Phrenic
PP= Parietal pericardium
A- Endo-bronchial Extension:
eparate Tumor Nodule(s):
T2: regardless of distance from the carina
T4: involvement of carina
T2: partial or total atelectasis or pneumonia
T4: Diaphragm ~~Mediastinal Pl.~~
LYMPH NODE (N)
N0
No metastatic adenopathy
N1
N2
N3
T
DISTANT METASTASIS (M)
M0
No distant metastasis
M1a
M1b
Distant metastasis present
divided into: M1a & M1b)
Any T, Any N
Stage IV
No Metastasis (M0)
M1b: single extrathoracic
M1c: multiple extrathoracic
T1/2, N2
T3, N1
T4, N0/1
T3/4, N3
Tis
T1a /mi
T1b
T1c
T2a
Stage 0
Stage IA1
Stage IA2
Stage IA3
Stage IB
Stage IIA
Stage IIB
Stage IIIA
Stage IIIB
Stage IIIC
Stage IVA
Stage IVB
M1a,b
M1c
T2b, N0
T1/2, N1
T3, N0
T1/2, N3
T3/4, N2
STAGE GROUPS

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Thank You !!!

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