



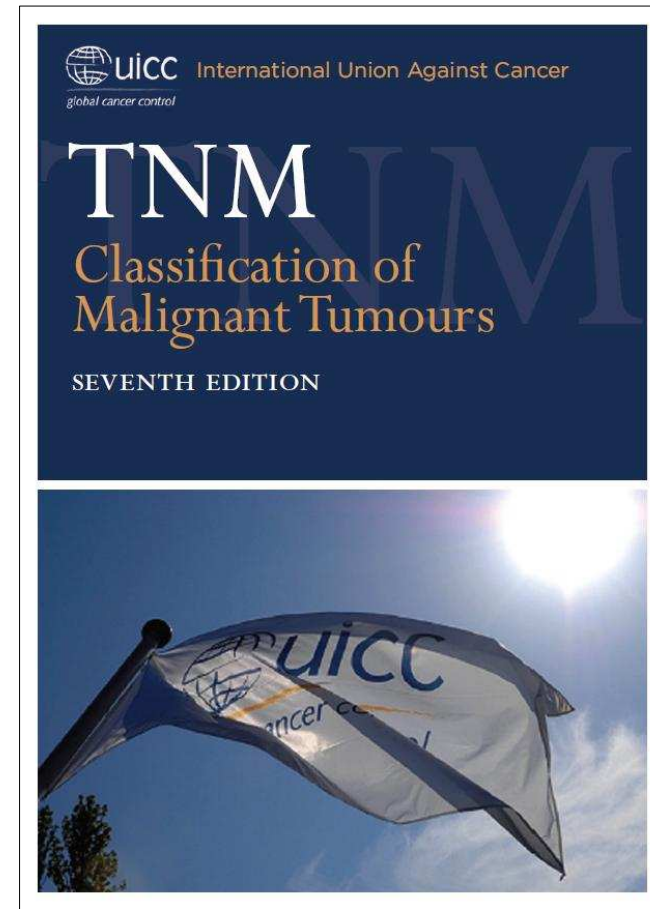
TNM Classification of Malignant Tumours 7th edition

Changes between the 6th and 7th editions

international union
against cancer

TNM 7th edition due December 2009

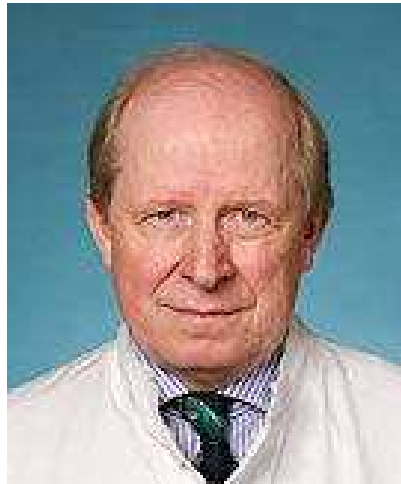
- The aim of this presentation is to:
 - present the changes between the 6th and 7th edition
 - Indicate where no changes have taken place
 - provide links to where questions on the use of TNM may be found



Special thanks to the editors



Dr Mary Gospodarowicz



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Dr Leslie Sobin

Highlights

- Changes to take effect from January 2010
- The rules of classification and staging correspond to those appearing in the seventh edition of the *AJCC Cancer Staging Manual* 2009 and have approval of all national TNM committees
- First time the UICC process for evaluating proposals has been used

Highlights

- 9 new classifications
- 6 major modifications
- Elimination of MX
- Introduction of Anatomical Stage Grouping and Prognostic Grouping

First time the UICC process for evaluating proposals has been used

- A continuous systematic approach composed of two arms has been introduced:
 - procedures to address formal proposals from investigators
 - periodic literature search for articles about improvements to TNM
- Proposals and results of the literature search are evaluated by members of a UICC panel of experts, the TNM Prognostic Factors committee, the AJCC and the other national TNM experts
- The changes to Lung cancer staging proposed by the IALSC and adopted are an example of this process

TNM-7 New classifications

- Melanoma of upper aerodigestive tract
- Gastroesophageal carcinomas
- Gastrointestinal stromal tumours (GISTs)
- Appendix: carcinomas
- Neuroendocrine tumours :
stomach, intestines, appendix; pancreas; lung
- Intrahepatic cholangiocarcinoma
- Merkel cell carcinoma
- Uterine sarcomas
- Adrenal cortex

TNM-7 Major modifications

- Esophagus
- Stomach
- Lung
- Skin
- Vulva
- Prostate

TNM-7 Minor or no modifications

- Head and neck
- Small intestine
- Colon
- Anal canal
- Liver, hepatocellular
- Gallbladder, ampulla, pancreas
- Mesothelioma, pleural
- Skin, melanoma
- Gynecological sites: except vulva
- Urological sites: except prostate

Elimination of MX

- The use of MX may result in exclusion from staging
- cMX is inappropriate as the clinical assessment of metastasis can be based on physical examination alone. If the pathologist does not have knowledge of the clinical M, MX should NOT be recorded. It has been deleted from TNM.
- pMX: does not exist; pM0: does not exist (except at autopsy)

Elimination of MX

What remains:

- cM0 = clinically no distant metastasis
- cM1= distant metastasis clinically, e.g., colon cancer with liver metastasis based on CT
- pM1= distant metastasis proven microscopically, e.g., needle biopsy
If a cM1 (e.g., liver met) is biopsied and is negative, it becomes cM0, not pM0

Stage Grouping and Prognostic Grouping

- Stage grouping:
 - Anatomical extent of disease, composed of T, N, and M categories alone
- Prognostic Grouping:
 - T, N, and M *plus* other prognostic factors

For most tumour sites only the (Anatomical) Stage Grouping is given

Nasopharynx – 7th edition

T1 Nasopharynx, **oropharynx or nasal cavity (was T2a)** without parapharyngeal extension

T2 Parapharyngeal extension (**was T2b**)

T3 Bony structures of skull base and/or paranasal sinuses

T4 Intracranial, cranial nerves, hypopharynx, orbit, infratemporal fossa/masticator space

N1 Unilateral **cervical**, unilateral or bilateral retropharyngeal lymph nodes, above supraclavicular fossa; ≤ 6 cm

N2 Bilateral **cervical** above supraclavicular fossa; ≤ 6 cm

N3a >6 cm; N3b Supraclavicular fossa

Anatomical Stage Groups

Stage I	T1	N0
Stage II	T1	N1
	T2	N0, N1
Stage III	T1, T2	N2
	T3	N0, 1, 2
Stage IVA	T4	N0, 1, 2
Stage IVB	Any T	N3
Stage IVC	Any T	Any N M1

Stage II compressed

←Changes from TNM 6

Mucosal Melanoma (upper aerodigestive)

7th ed - (new site)

T3 Epithelium/ submucosa (mucosal disease)

T4a Deep soft tissue, cartilage, bone, or overlying skin

T4b Brain, dura, skull base, lower cranial nerves, masticator space, carotid artery, prevertebral space, mediastinal structures, cartilage, skeletal muscle, or bone

STAGE GROUPING

Stage III	T3	N0
Stage IVA	T4a	N0
	T3-T4a	N1
Stage IVB	T4b	Any N
Stage IVC	Any T	Any N M1

Mucosal melanomas are aggressive tumours, therefore T1 and T2 and Stages I and II are omitted

TNM-7

Oesophagogastric junction tumours

- A tumour the epicenter of which is within 5 cm of the esophagogastric junction and also extends into the oesophagus is classified and staged according to the **oesophageal** scheme
- All other tumours with an epicenter in the stomach greater than 5 cm from the oesophagogastric junction or those within 5 cm of the EGJ *without* extension into the oesophagus are staged using the **gastric** carcinoma scheme

Oesophagus 7th edition

TNM definitions: AJCC = UICC

Tis	Carcinoma in situ / High-grade dysplasia
T1	lamina propria or submucosa T1a lamina propria or muscularis mucosae T1b submucosa
T2	muscularis propria
T3	adventitia
T4	adjacent structures T4a pleura, pericardium, diaphragm, or adjacent peritoneum T4b other adjacent structures, e.g. aorta, vertebral body, trachea

N0	No regional lymph node metastasis
N1	1 to 2 regional lymph nodes
N2	3 to 6
N3	>6
[N1 was site dependent]	

M - Distant Metastasis

M1	Distant metastasis
[M1a,b were site dependent]	

Changes from 6th edition

Oesophagus 7th edition

Anatomical Stage Groups (adeno & squamous) [UICC]

Stage IA	T1	N0	M0
Stage IB	T2	N0	M0
Stage IIA	T3	N0	M0
Stage IIB	T1, T2	N1	M0
Stage IIIA	T4a	N0	M0
	T3	N1	M0
	T1, T2	N2	M0
Stage IIIB	T3	N2	M0
Stage IIIC	T4a	N1, N2	M0
	T4b	Any N	M0
	Any T	N3	M0
Stage IV	Any T	Any N	M1

Major changes

Oesophageal Squamous Cell Carcinoma

Prognostic Grouping

[AJCC adds type, grade & site]

	T	N	M	Grade	Location
Stage IA	1	0	0	1,X	Any
IB	1	0	0	2,3	Any
	2, 3	0	0	1,X	Lower
Stage IIA	2, 3	0	0	1,X	Upper, middle
	2, 3	0	0	2,3	Lower
Stage IIB	2, 3	0	0	2,3	Upper, middle
	1, 2	1	0	Any	Any
Stage IIIA	1,2		2	0	Any
	3	1	0	Any	Any
	4a	0	0	Any	Any
Low Stages: AJCC not all = UICC.				Stages IIIA,B, C & IV: AJCC=UICC	

Oesophageal Adenocarcinoma Prognostic Grouping

[AJCC adds type & grade]

	T	N	M	Grade
Stage IA	1	0	0	1, 2, X
Stage IB	1	0	0	3
	2	0	0	1, 2, X
Stage IIA	2	0	0	3
Stage IIB	3 (IIA)	0	0	Any
	1, 2	1	0	Any
Stage IIIA	1, 2	2	0	Any
	3	1	0	Any
	4a	0	0	Any
Stage IIIB, IIIC, & IV...				
Low Stages: AJCC not all = UICC.			Stages IIIB, C & IV: AJCC=UICC	

Stomach 7th edition

T1 Lamina propria, submucosa

T1a Lamina propria

T1b Submucosa

T2 Muscularis propria

T3 Subserosa (*was T2b*)

T4a Perforates serosa (*was T3*)

T4b Adjacent structures

N1 1 to 2 nodes

N2 3 to 6 nodes (*was N1*)

N3a 7 - 15 nodes (*was N2*)

N3b 16 or more (*was N3*)

Changes from 6th edition

Stage IA T1 N0

Stage IB T2 N0

T1 N1

Stage IIA T3 N0

T2 N1

T1 N2

Stage IIB T4a N0

T3 N1

T2 N2

T1 N3

Stage IIIA T4a N1

T3 N2

T2 N3

Stages IIIB, IIIC, IV...

Stages: most changed

Gastrointestinal Stromal Tumours (GIST)

7th ed - new chapter

All sites:

T1 ≤ 2 cm	T3 > 5-10 cm
T2 > 2 – 5 cm	T4 > 10 cm

Stage Grouping - Small Intestine

				<u>Mitotic rate</u>
Stage I	T1-2	N0	M0	Low
Stage II	T3			Low
Stage IIIA	T1			High
	T4			Low
Stage IIIB	T2, 3, 4			High
Stage IV	Any T	N1	M0	Any
	Any T	Any N	M1	Any

- Prognostic factors: site, size, mitotic rate

Stage Grouping - Stomach

				<u>Mitotic rate</u>
Stage IA	T1-2	N0	M0	Low
Stage 1B	T3			Low
Stage II	T-2			High
	T4			Low
Stage IIIA	T3			High
	IIIB T4			High
Stage IV	Any T	N1	M0	Any
	Any T	Any N	M1	Any

Carcinoids and Neuroendocrine tumours

Staging

- GI tract:
 - Carcinoid : separate staging by site
 - Small cell/large cell: stage as carcinoma
- Pancreas: stage as carcinoma
- Lung: stage as carcinoma
- Skin: separate classification for Merkel cell carcinoma

Carcinoids (NET) – 7th edition

Gastrointestinal

Appendix

T1 \leq 2 cm

T2 $>$ 2 – 4 cm; cecum

T3 $>$ 4 cm; ileum

T4 Perforates peritoneum; other organs, structures

Small Intestine

T1 Lam propria/ submucosa and \leq 1 cm

T2 Muscularis propria or $>$ 1 cm

T3 Jejunal, ileal: subserosa.

Ampullary, duodenal: pancreas or retroperitoneum`

T4 Perforates serosa; adjacent structures

Stomach

Tis $<$ 0.5 mm confined to mucosa

T1 Lam propria or submucosa & \leq 1cm

T2 Muscularis propria or $>$ 1 cm

T3 Subserosa

T4 Perforates serosa; adjacent structures

Large Intestine

T1 Lam propria or submucosa or \leq 2cm

T1a \leq 1 cm; T1b 1 to 2 cm

T2 Muscularis propria or $>$ 2 cm

T3 Subserosa, or pericorectal tissues

T4 Perforates serosa; adjacent structures

Carcinoids (NET) – 7th edition

Stage Groups

Carcinoid: Appendix

Stage I	T1	N0
Stage II	T2, T3	N0
Stage III	T4	N0
	Any T	N1
Stage IV	Any T Any N	M1

Very

Carcinoid: other GI sites

Stage I	T1	N0
Stage IIA	T2	N0
IIB	T3	N0
Stage IIIA	T4	N0
IIIB	Any T	N1
Stage IV	Any T	Any N M1

similar

Appendix– 7th edition

Carcinoid

Carcinoma

T1 \leq 2 cm
 T2 > 2 – 4 cm; cecum
 T3 > 4 cm; ileum
 T4 Perforates peritoneum; other organs, structures
 N1 Regional

Stage I	T1	N0	
Stage II	T2, T3	N0	
Stage III	T4	N0	
	Any T	N1	
Stage IV	Any T	Any N	M1

Based mainly on size

T1 Submucosa
 T2 Muscularis propria
 T3 Subserosa, non-peritonealize periappendiceal tissues
 T4a Perforates visceral peritoneum/Mucinous peritoneal tumour within right lower quadrant
 T4b Other organs or structures
 N1 \leq 3 regional
 N2 > 3 regional
 M1a Intraperitoneal metastasis beyond right lower quadrant
 M1b Non-peritoneal metastasis
 Like colon, based on depth; includes goblet cell carcinoid

Appendix– 7th edition

Carcinoma (was part of colon classification)

- Colon - Rectum

T4 Tumour directly invades other organs or structures and/or perforates visceral peritoneum

T4a perforates visceral peritoneum

T4b directly invades other organ or structures

M – Distant Metastasis: colon

M1 Distant metastasis

M1a one organ

M1b > one organ or peritoneum

Changes from TNM 6

- Appendix - Carcinoma: Separate **mucinous** from **nonmucinous** carcinomas

T4a Perforates visceral peritoneum/Mucinous peritoneal tumour within right lower quadrant

T4b Other organs or structures

M1a Intraperitoneal metastasis beyond RLQ

M1b Non-peritoneal metastasis

Changes from colon

Colon - Rectum – 7th edition

T4 Tumour directly invades other organs or structures and/or perforates visceral peritoneum

T4a perforates visceral peritoneum

T4b directly invades other organ or structures

M1 Distant metastasis

M1a one organ

M1b > one organ or peritoneum

Basic categories unchanged

Subdivisions expanded

N1 Metastasis in 1 to 3 regional lymph nodes

N1a 1 node

N1b 2 – 3 nodes

N1c satellites in subserosa, *without* regional nodes*

N2 Metastasis in 4 or more regional lymph nodes

N2a 4 – 6 nodes

N2b 7 or more nodes

Basic categories unchanged

Subdivisions expanded

Changes from 6th edition

Colon - Rectum – 7th edition

Stage 0	Tis	N0	
Stage I	T1, T2	N0	
Stage II	T3, T4	N0	
Stage IIA		T3	N0
Stage IIB		T4a	N0
Stage IIC		T4b	N0
Basic categories unchanged			
Subdivisions expanded			
Changes from TNM 6			
Stage III	Any T		N1-2
Stage IIIA	T1, T2		N1
	T1		N2a
Stage IIIB	T3, T4a		N1
	T2-T3		N2a
	T1-T2		N2b
Stage IIIC	T4a		N2a
	T3-T4a		N2b
	T4b		N1-2
Stage IV	Any T	Any N	M1
Stage IVA	Any T	Any N	M1a
Stage IVB	Any T	Any N	M1b

Extrahepatic bile ducts 7th ed

Proximal bile duct (New site)

(right, left and common hepatic ducts)

T1 Ductal wall

T2a Beyond ductal wall

T2b Adjacent hepatic parenchyma

T3 Unilateral portal vein or hepatic artery branches

T4 Main portal vein or branches bilaterally;...

N1 Regional

STAGE GROUPS (Proximal)

Stage I	T1	N0	
Stage II	T2a-b	N0	
Stage IIIA	T3	N0	
Stage IIIB	T1-3	N1	
Stage IVA	T4	Any N	
Stage IVB	Any T	Any N	M1

Distal Extrahepatic Bile Ducts

(from cystic duct insertion into common hepatic duct)

T1 Ductal wall

T2 Beyond ductal wall

T3 adjacent organs

T4 Celiac axis, or superior mesenteric artery

N1 Regional

STAGE GROUPS (Distal)

Stage IA	T1	N0	
Stage IB	T2	N0	
Stage IIA	T3	N0	
Stage IIB	T1 – 3	N1	
Stage III	T4	Any N	
Stage IV	Any T	Any N	M1

No change

Lung – 7th edition

includes non-small cell and small cell carcinoma & carcinoid

T1 ≤3 cm

T1a ≤2 cm

T1b >2 – 3 cm

T2 Main bronchus ≥2 cm from carina,
invades visceral pleura, partial atelectasis

T2a >3- 5 cm

T2b >5 cm -7 cm

T3 >7 cm; chest wall, diaphragm,
pericardium, mediastinal pleura, main
bronchus <2 cm from carina, total
atelectasis, **separate nodule(s) in same lobe**
(was T4)

T4 Mediastinum, heart, great vessels,
carina, trachea, oesophagus, vertebra;
separate tumour nodule(s) in a different
ipsilateral lobe (was M1)

N1 Ipsilateral peribronchial, ipsilateral hilar

N2 Ipsilateral mediastinal, subcarinal

N3 Contralateral mediastinal or hilar,
scalene or supraclavicular

M1a Separate tumour nodule(s) in a
contralateral lobe; pleural nodules or
malignant pleural or pericardial effusion
(was T4)

M1b Distant metastasis

Changes from 6th edition

Lung – 7th edition

includes non-small cell and small cell carcinoma & carcinoid

Occult carcinoma	TX	N0
Stage 0	Tis	N0
Stage IA	T1a, b	N0
Stage IB	T2a	N0
Stage IIA	T2b	N0
	T1a, b	N1
	T2a	N1
Stage IIB	T2b	N1
	T3	N0

Stage IIIA	T1a,b, T2a,b	N2
	T3	N1, N2
	T4	N0, N1
Stage IIIB	T4	N2
	Any T	N3
Stage IV	Any T	Any N
		M1

Changes to the 6th edition are based upon recommendations from the IASLC Lung Cancer Staging Project (retrospective study of 80,000 cases)

One classification for several tumor types; must separate tumors by histology.

Changes from 6th edition

Skin 7th ed - carcinomas

6th ed

T1	≤2 cm
T2	>2 to 5 cm
T3	>5 cm
T4	Deep extradermal structures (bone, muscle...)
N1	Regional

7th ed

T1	≤2 cm
T2	>2 cm
T3	Deep: Muscle, bone, cartilage, jaws, orbit
T4	Skull base, axial skeleton
N1	single <3 cm
N2	single ≥3 to 6 cm, multiple ≤6 cm
N3	>6 cm

Skin 7th ed - carcinomas

6th ed

Stage I	T1	N0
Stage II	T2, T3	N0
Stage III	T4 or	N1
Stage IV	Any T	Any N M1

High Risk Factors (AJCC)

>4 mm thickness, Clark IV
Perineural invasion
Lymphovascular invasion
Ear, non-glabrous lip
Poorly or undifferentiated

*Stage I with > one high risk factor =
Stage II →

Anatomical Stage Groups

Stage I	T1	N0
Stage II	T2	N0
Stage III	T3	N0
	T1, 2, 3	N1
Stage IV	T1, 2, 3	N2
	T4 or	N3 or M1

AJCC Prognostic Groups

Stage I *	T1	N0
Stage II	T2	N0
Stage III and IV: Same as anatomical above		

Skin 7th edition

Skin Carcinoma

7th ed

T1 ≤ 2 cm

T2 > 2 cm

T3 Deep: Muscle, bone, cartilage, jaws,
orbit

T4 Skull base, axial skeleton

N1 single < 3 cm

N2 single ≥ 3 to 6 cm, multiple ≤ 6 cm

N3 > 6 cm

Merkel Cell carcinoma

Merkel cell

T1 ≤ 2 cm

T2 > 2 to 5 cm

T3 > 5 cm

T4 Deep extradermal structures (bone,
muscle...)

N1a microscopic metastasis

N1b macroscopic metastasis

N2 In transit metastasis

M1a skin, subcut, non-regional nodes

M1b lung

M1c other sites

Differs from other skin carcinoma

Skin 7th edition

Skin Carcinoma

Stage I	T1	N0
Stage II	T2	N0
Stage III	T3	N0
	T1, 2, 3	N1
Stage IV	T1, 2, 3	N2
	T4 or	N3 or M1

pN0 = microscopically confirmed

cN0 = nodes neg. clinically; not micro confirmed

Merkel cell carcinoma

Merkel cell carcinoma

Stage I	T1	N0
IA	T1	pN0
IB	T1	cN0
Stage IIA	T2, 3	pN0
IIB	T2, 3	cN0
IIC	T4	N0
Stage IIIA	Any T	N1a
IIIB	Any T	N1b, N2
Stage IV	Any T	Any N M1

Vulva – 7th edition

T1	Confined to vulva/perineum
T1a	≤ 2 cm with stromal invasion ≤ 1.0 mm
T1b	> 2 cm or stromal invasion > 1.0 mm
T2	Lower urethra/vagina/anus
T3	Upper urethra/vagina, bladder rectal/mucosa, bone, fixed to pelvic bone
N1a	One or two nodes < 5 mm
N1b	One node ≥ 5 mm
N2a	3 or more nodes < 5 mm
N2b	2 or more nodes ≥ 5 mm
N2c	Extracapsular spread
N3	Fixed, ulcerated
M1	Distant

Major changes in T & N categories and stage grouping

STAGE GROUPING

Stage 0	Tis	N0	M0
Stage I	T1	N0	M0
Stage IA	T1a	N0	M0
Stage IB	T1b	N0	M0
Stage II	T2	N0	M0
Stage IIIA	T1, T2	N1a, N1b	M0
Stage IIIB	T1, T2	N2a, N2b	M0
Stage IIIC	T1, T2	N2c	M0
Stage IVA	T1, T2	N3	M0
	T3	Any N	M0
Stage IVB	Any T	Any N	M1

Uterine Sarcomas – 7th ed

Leiomyosarcoma/Endometrial stromal sarcoma

I	Tumor limited to uterus
IA	< 5 cm
IB	> 5 cm
II	Beyond uterus, in pelvis
IIA	Adnexal
IIB	Other pelvic tissues
III	Tumor invades abdominal tissues
IIIA	One site
IIIB	> one site
IIIC	Pelvic/para-aortic nodes
IVA	Tumor invades bladder/rectum
IVB	Distant metastasis

Carcinosarcoma staged as endometrial carcinoma

Adenosarcoma

I	Tumor limited to uterus
IA	Endometrium/endocervix
IB	< half myometrium
IC	>half myometrium
II	Beyond uterus, in pelvis
IIA	Adnexal
IIB	Other pelvic tissues
III	Tumor invades abdominal tissues
IIIA	One site
IIIB	> one site
IIIC	Pelvic/para-aortic nodes
IVA	Invades bladder/rectum
IVB	Distant metastasis

Prostate- 7th edition

T1 Not palpable or visible

T1a $\leq 5\%$ or less

T1b $> 5\%$

T1c Detected by needle biopsy

T2 Confined within prostate

T2a \leq half of one lobe

T2b $>$ half of one lobe

T2c Both lobes

T3 Through prostate capsule

T3a Extracapsular

T3b Seminal vesicle(s)

T4 Fixed or invades adjacent structures

No change from 6th

STAGE GROUPING (ANATOMIC)

(UICC)

Stage I **T1, T2a** N0

Stage II **T2b-2c** N0

Stage III T3 N0

Stage IV T4 N0

Any T N1

Any T Any N M1

Change from 6th

Grade was in 6th

Prostate- 7th ed

PROGNOSTIC GROUPING

I	T1a – c	N0	PSA <10	Gle ≤ 6	IIB	T2c	N0	Any PSA	Any Gle	
	T2a	N0	PSA <10	Gle ≤ 6		T 1-2	N0	PSA ≥20	Any Gle	
IIA	T1 a – c	N0	PSA < 20	Gle 7	III	T 1-2	N0	Any PSA	Gle ≥ 8	
	T1 a – c	N0	PSA ≥10 <20	Gle <6		T3a-b	N0	Any PSA	Any Gle	
	T2a,b	N0	PSA < 20	Gle ≤ 7	IV	T4	N0	Any PSA	Any Gle	
						Any T	N1	Any PSA	Any Gle	
						Any T	Any N	M1	Any PSA	Any Gle
If PSA or Gleason is missing, use whatever is available					If both missing, no prognostic grouping is possible					

Adrenal Cortical Carcinoma - 7th edition

(new site)

T1 ≤ 5 cm, no extra-adrenal invasion

T2 > 5 cm, no extra-adrenal invasion

T3 Local invasion

T4 Adjacent organs

N1 Regional

M1 Distant

STAGE GROUPING

Stage I T1 N0

Stage II T2 N0

Stage III T1, T2 N1

 T3 N0

Stage IV T3 N1

 T4 Any N

 Any T Any N M1

What else is new?

- Pn Perineural Invasion

PnX	Perineural invasion cannot be assessed
Pn0	No perineural invasion
Pn1	Perineural invasion

What else is new?

- Tumour deposit or satellite in colorectal cancer
 - N1c
Tumour deposit(s), i.e. satellites, in the subserosa, or in non-peritonealized pericolic or perirectal soft tissue *without* regional lymph node metastasis
 - If a nodule is considered by the pathologist to be a totally replaced lymph node (generally having a smooth contour), it should be recorded as a positive lymph node and counted as such i.e., N1a, N1b, N2a or N2b

Additional Material

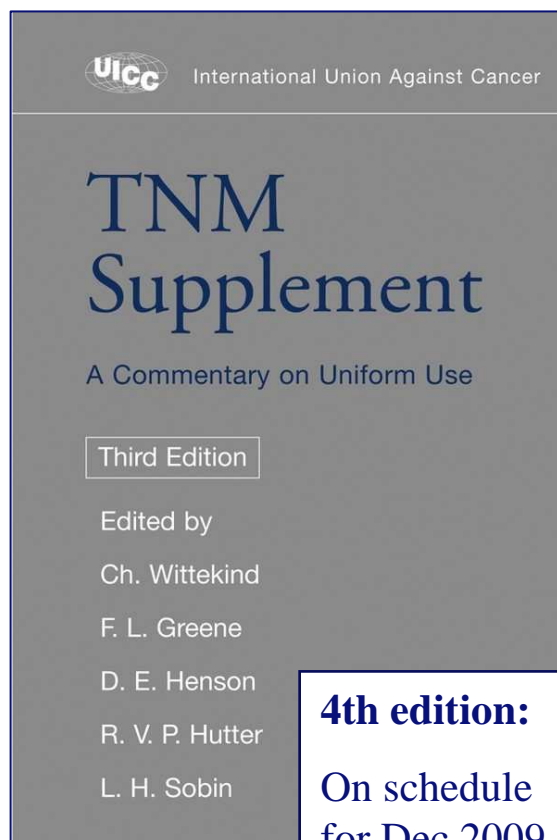
www.uicc.org/tnm

- Web page
- FAQ: Answers to frequently asked questions about TNM
- Helpdesk for questions on TNM not answered by the FAQ
- Guidelines on how to use TNM
- Glossary of terms used
- How to propose changes for the 8th edition

Translations of 7th edition planned

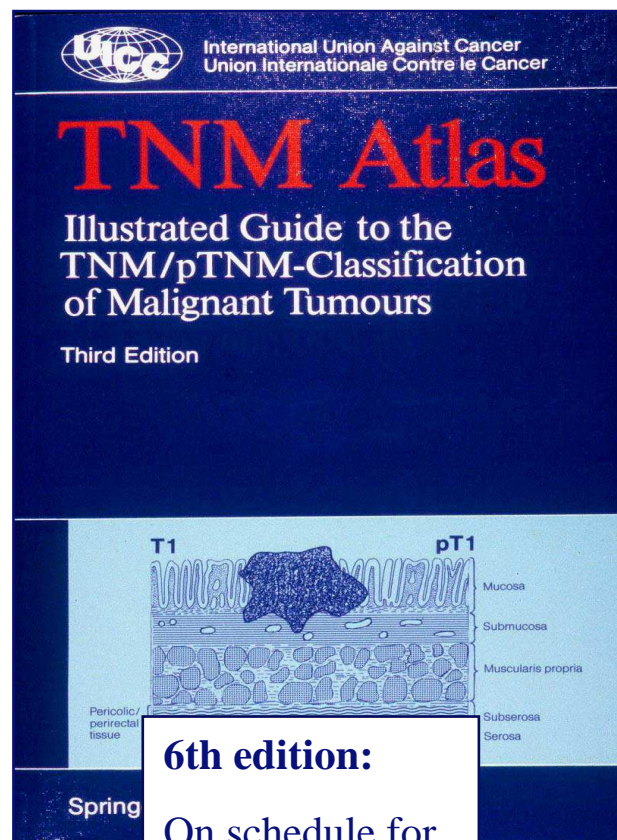


Coming Soon



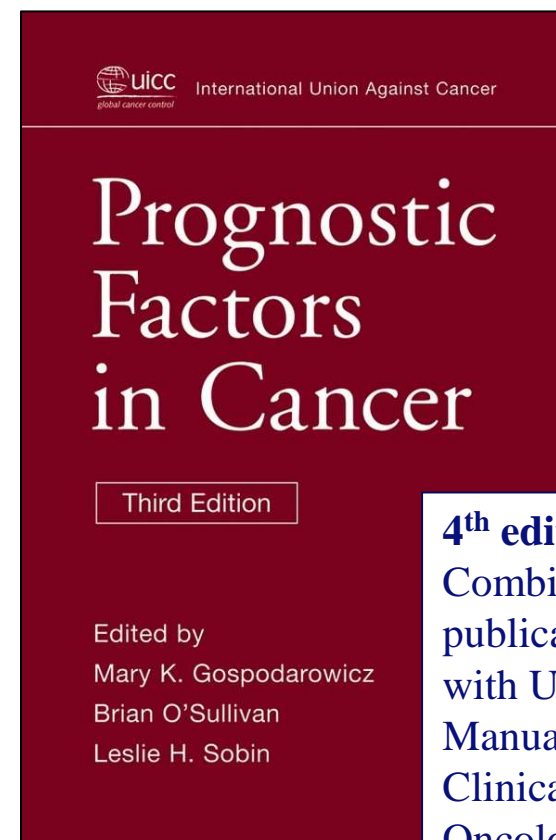
4th edition:

On schedule
for Dec 2009
submission



6th edition:

On schedule for
2010 submission



4th edition:

Combined
publication
with UICC
Manual of
Clinical
Oncology
planned



international union
against cancer