CANADIAN PARTNERSHIP AGAINST CANCER | PARTENARIAT CANADIEN CONTRE LE CANCER

Basic Concepts of TNM Staging

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Outline

- Introduction
- Pre-Test
- Background of TNM Staging Systems
- Basics of TNM Staging Systems
- Rules of AJCC TNM
- Additional Data Elements Relevant to Staging
- Post-Test
- Questions

Introduction

This presentation is a general overview on the TNM 8th edition and is simply intended to be an introduction to the basic concepts.

Since Council has approved the collection of AJCC TNM 8 effective for cases diagnosed January 1, 2018 with the initial focus being the top 4 cancer sites, only information for the top 4 sites is used for the examples.

Pre Test Questions

Background of TNM Staging Systems

History of TNM

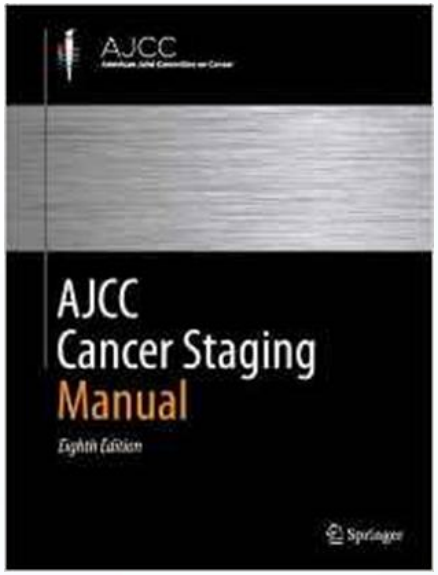
1943-52	TNM system proposed - Pierre Denoix
1950-54	UICC Committee on Clinical Stage Classification and Applied Statistics
1958-59	TNM proposals for breast & larynx
1960-67	TNM Committee - 26 sites
1968	First Edition Livre de Poche
1977	First AJCC Manual of Staging
1987	Unified UICC/AJCC TNM

Later incorporated FIGO and Ann Arbor systems

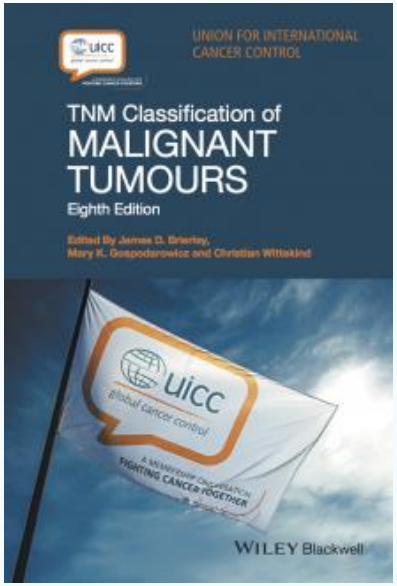
History of AJCC TNM

AJCC TNM Edition	Effective Date for Cancers Diagnosed
1	January 1, 1978
2	January 1, 1984
3	January 1, 1989
4	January 1, 1993
5	January 1, 1998
6	January 1, 2003
7	January 1, 2010
8	January 1, 2018

TNM Manuals, 8th Edition



AJCC
8th edition



UICC
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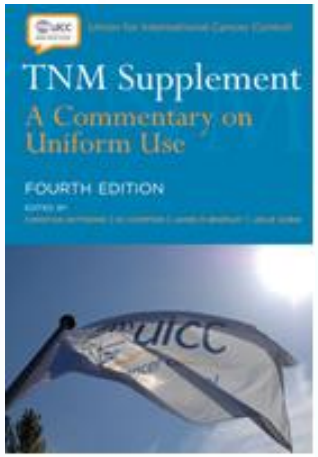
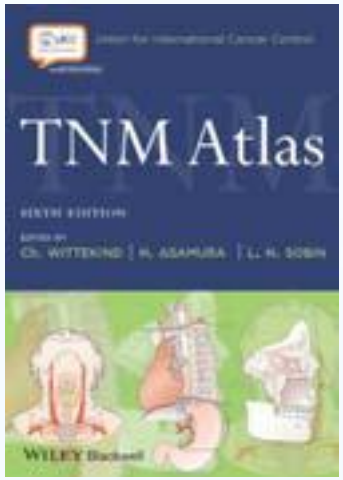
Other TNM Resources





These are current resources; updates will be available for TNM 8

Some of the material from the Atlas has been incorporated within the AJCC Cancer Staging Manual, 8th edition.

Collaborative Stage to TNM

Collaborative Stage was the 'registrars' coding system

- Adopted for use in Canada 2004-2017
- Data Collection system, not a new staging system
- Allowed mixed 'combined' stage

Collaborative Stage to TNM (Cont'd)

Advantages of TNM for the Cancer Registrar

- CS often listed several codes but all mapped to the same T, N, or M category
- CS often listed several lymph node codes but N category based on number of lymph nodes positive
- CS often listed combination codes to accommodate backward compatibility but no combo codes in TNM
- CS required evaluation (EVAL) codes but not required in TNM

Collaborative Stage to TNM (Cont'd)

'Combined' Stage

- Some cases lack enough information to be fully TNM staged
- Some cases are not 'purely' clinical or 'purely' pathological

It has been suggested that a method is needed in order to calculate a ***surveillance/harmonized stage*** as a means to have a ***complete TNM stage group*** for all stageable cases

Ambiguous Terminology

AJCC does not have a 'list' for registrars to follow in determining the T, N, or M categories when the documentation uses ambiguous terms. However, the standard setters have agreed to the following:

- Discuss with physician who diagnosed/staged case
- If physician consultation is not possible, review all documentation, including how the patient is treated, to make an informed decision
  - assign the TNM based on involvement when the patient was treated as though adjacent organs/nodes were involved
- Use the Ambiguous Terminology list **ONLY** as the last resort

Basics of TNM Staging Systems

Basics of TNM

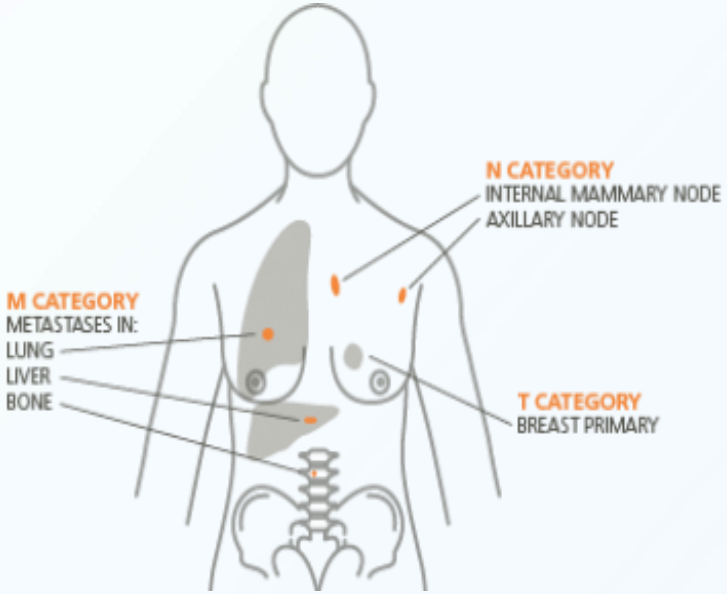
- TNM staging is the common language of cancer
  - 'Shorthand'
  - Worldwide consistency
  - Accurate communications
- Aids the clinician in appropriate diagnostic workup and treatment
- Provides some indications of prognosis for survival
- Standardizes analysis-stratified by stage
  - Aids in evaluation of treatment results
- Supports cancer control activities

TNM Categories

T - Extent of the Primary Tumour

N - Absence or presence & extent of regional lymph node metastasis

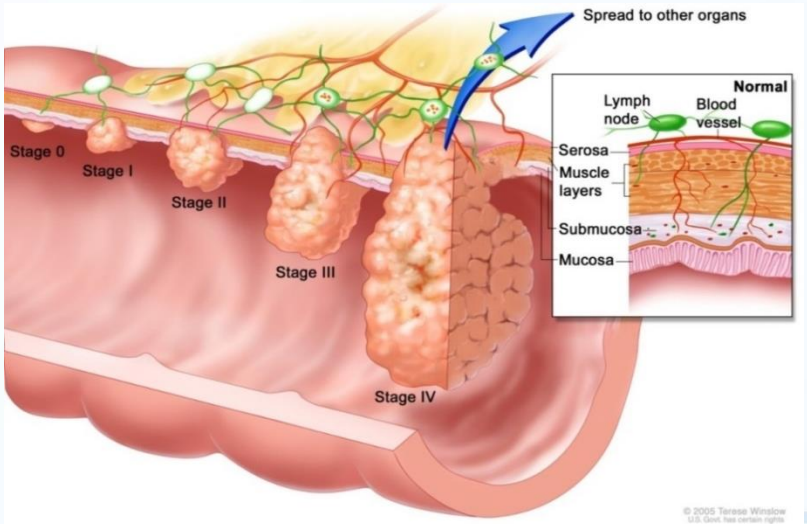
M- Absence or presence of distant metastasis



TNM Stage Group

Stage Group summarizes the ***three*** TNM categories (and additional information for some cancers) into a single clinical, pathological, or post therapy value

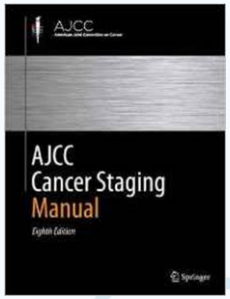
- **Stage 0-IV**



Rules of AJCC TNM

General Staging Rules

- Required for cases diagnosed as of
  - ***January 1, 2018***
- Rules covered in ***Chapter One, AJCC Cancer Staging Manual 8th edition***
  - Used for all cancer sites
  - Exceptions or additions in site-specific chapters take precedence over chapter one rules



General Staging Rules

Microscopic Confirmation

- All cases should be confirmed microscopically
- There are clinical scenarios where biopsy or cytology is not performed. These can still be staged provided the cancer diagnosis is NOT in doubt.
  - *Example: Lung cancer diagnosed by CT scan only*

General Staging Rules

Timing-Clinical Staging

- From date of diagnosis before initiation of primary treatment to one of the following time points, which ever is ***shorter:***
  - Four months after diagnosis
  - Date of cancer progression, if it occurs before four months

Note: Treatment includes watchful waiting, active surveillance, observation or decision not to treat

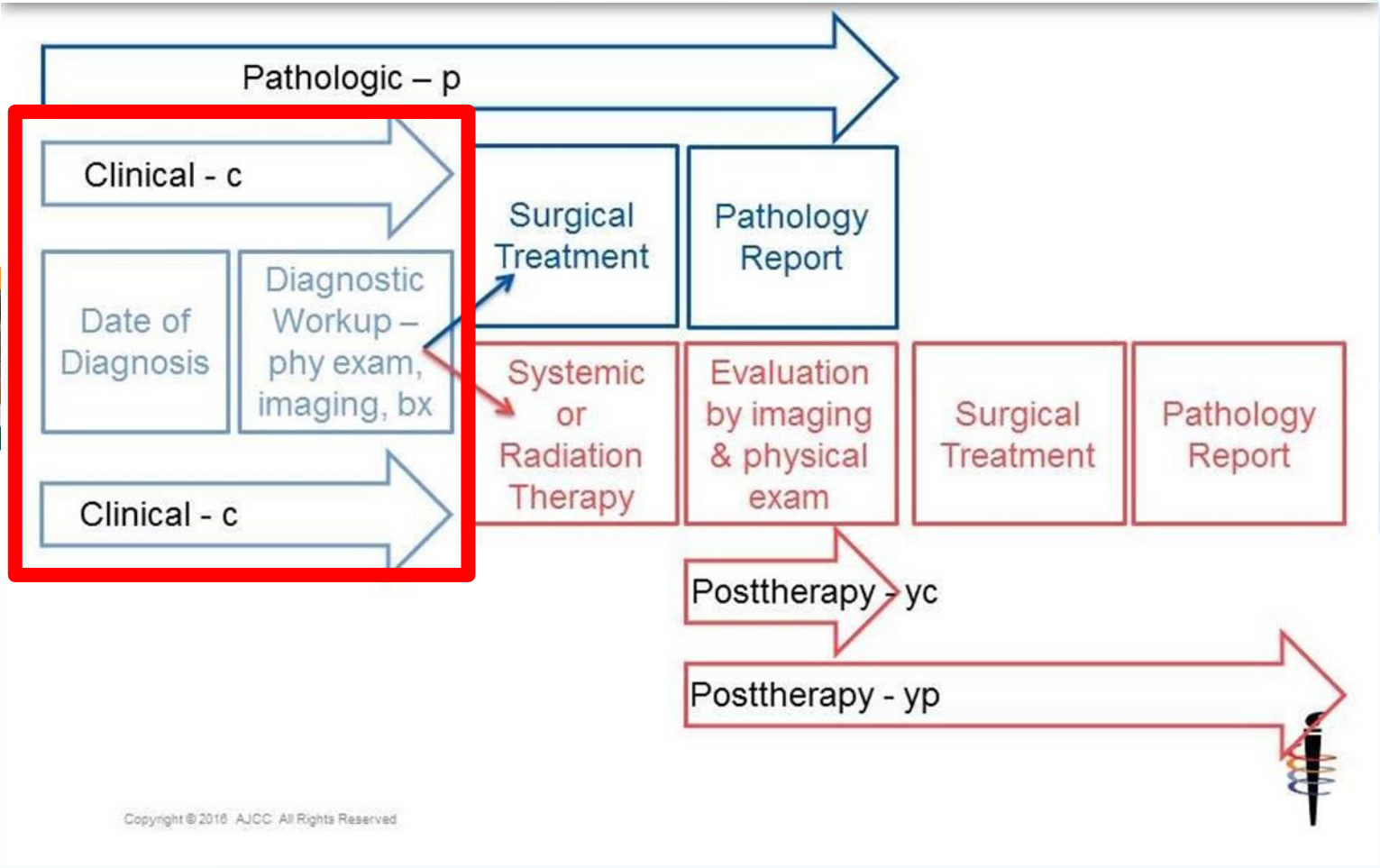
General Staging Rules

Clinical Classification includes:

- Clinical history and symptoms
- Physical exam
- Lab tests
- Imaging
- Endoscopy
- Biopsy
- Surgical exploration without resection
- Other relevant exams and diagnostic procedures

Note: Always review site specific chapter for what is included in the clinical classification

Timing of Stage Classification



General Staging Rules

Timing-Pathological Staging

- From date of diagnosis through surgical resection as first therapy in the absence of cancer progression
  - within 4 months after diagnosis
  - to date of cancer progression if progression occurs before 4 months
  - through completion of definitive first course surgery if that surgery occurs later than 4 months after diagnosis and has not progressed

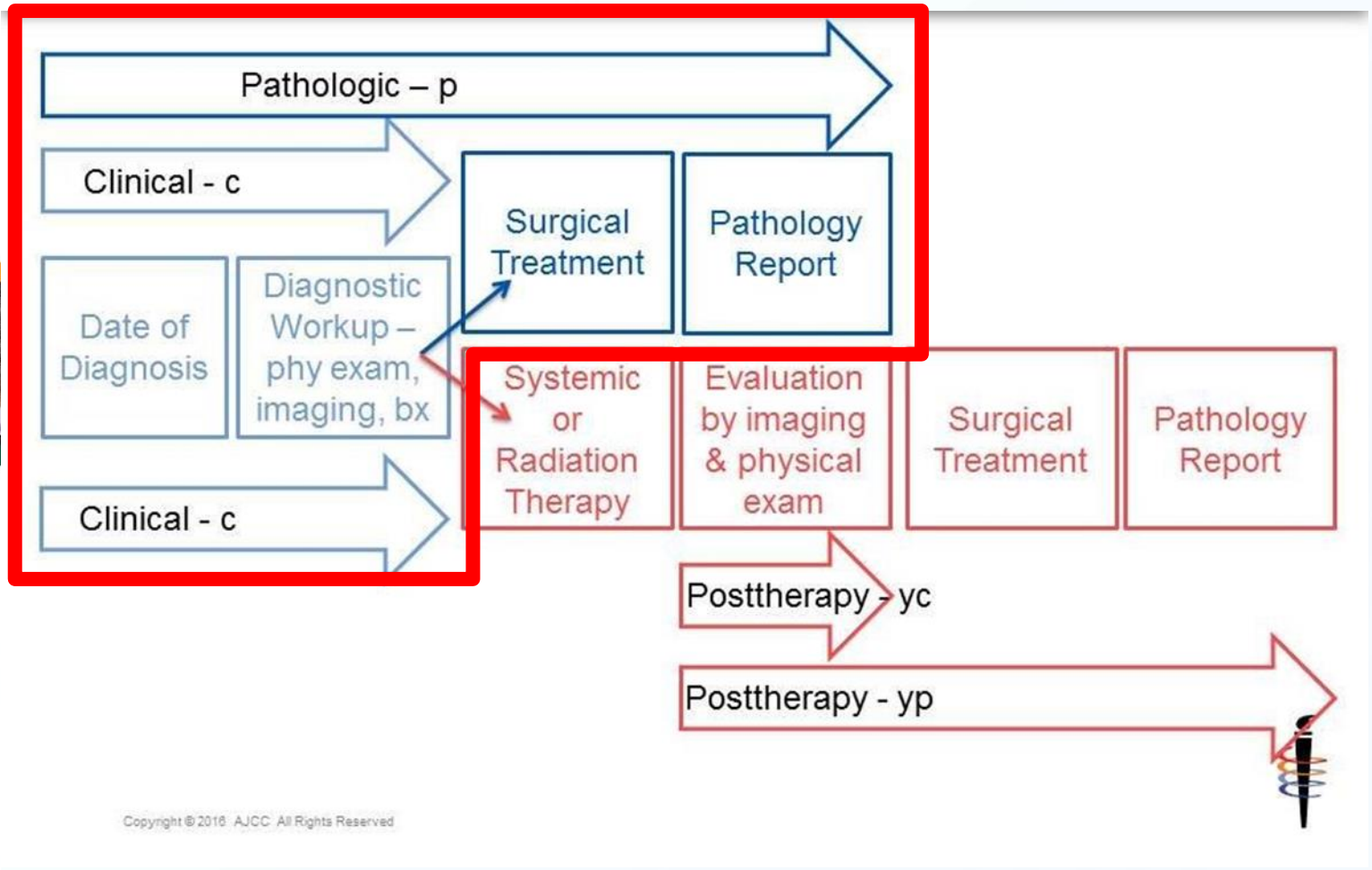
General Staging Rules

Pathological Classification includes:

- All clinical information unless disproven by operative findings and/or pathology report
- Operative findings
- Pathology report of resected specimen(s)
- No surgical resection performed, but microscopic confirmation of highest T ***and*** highest N categories OR microscopic confirmation of M1 category
- Imaging studies performed after surgery if within pathological stage time frame
- Autopsy information if within pathological stage time frame

Note: Always review site specific chapter for what is included in the pathological classification

Timing of Stage Classification

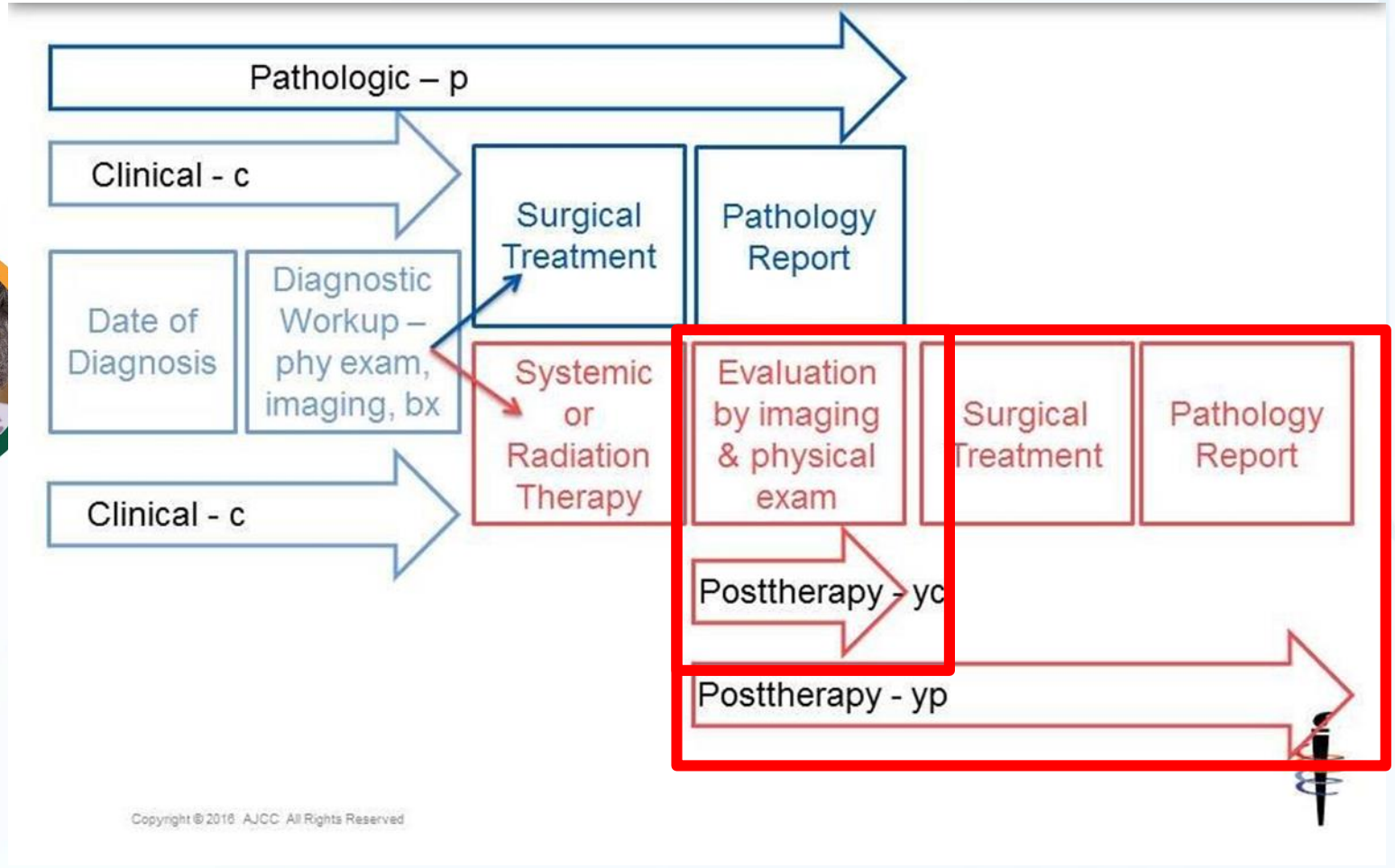


General Staging Rules

Post Therapy Classification

- Cases treated initially with neoadjuvant therapy (pre-operative systemic and/or radiation therapy) may be restaged:
  - ***yc***; information after neoadjuvant therapy without subsequent surgical resection OR after neoadjuvant therapy and before planned surgical resection
  - ***yp;*** information from yc stage, supplemented and modified by operative findings and pathological evaluation of the resected specimen(s)

Timing of Stage Classification



General Staging Rules

Progression of Disease

- Only clinical investigations done prior to documentation of progression of disease are to be used for staging
- Progression does not include the time needed for diagnostic workup but rather a major change in clinical status
- Determination of progression is based on Managing Physician's judgement and may result in a major change in the treatment plan

General Staging Rules

Uncertainty about Categories and/or Stage Group

- Rule for clinical decision making – doesn't apply to cancer registry data
- Physicians may need to make treatment decisions if staging information is uncertain/unclear
  - they may assign the lower of two possible categories, subcategories or groups
  - unknown/missing information for T, N, M, or stage group is never assigned the lower category, subcategory, or group
- Cancer registrars may assign the main (umbrella) category if the subcategory information is not available
  - e.g., for breast cancer assign T1 if only description is < 2 cm and T1a, T1b, or T1c cannot be determined
- Cancer registrars should document stage group as unknown if information is not available, including subcategories or missing prognostic factors

General Staging Rules

Prognostic Factor Category

- If a required prognostic factor is unavailable, the category used to assign stage group is ‘X’
  - If the specific information to assign the stage group is not available (prognostic factor information is missing), the stage group cannot be assigned and should be documented as unknown

General Staging Rules

Grade

- If applicable, the recommended histologic grade is specified in each chapter

Synchronous Primary Tumours

- Simultaneous tumours of same histology in one organ , coded as a single primary, are classified by highest T category (m suffix)
- Simultaneous bilateral tumours are classified separately (exception ovary, thyroid and liver)

Metachronous Primary Tumours

- Second or subsequent cancers (same or different organ) outside the staging window are staged separately

'T' Category

T is defined by the size and/or contiguous extension of the primary tumour as specifically defined for each cancer site

- TX: Primary tumour cannot be assessed
- T0: No evidence of primary tumour
- Tis, Ta: Carcinoma in situ; non-invasive
- T1-T4: Primary invasive tumour, for which a higher category generally means an increasing size and/or an increasing local extension

'N' Category

N is defined by cancer in the regional lymph nodes as specifically defined for each cancer site, including:

- Absence or presence of cancer in regional node(s)
- Number of positive regional nodes
- Involvement of specific regional nodal groups
- Size of nodal mets or extension of nodal capsule
- In-transit and satellite mets

'N' Category

- NX: Regional nodes not assessed
- N0: No regional lymph node involvement
- N1-N3: Evidence of regional nodes containing cancer with an increasing number and/or regional nodal group involvement and/or size or in-transit/satellite mets
- If a primary tumour directly extends into a regional node it is included in the N category as a positive regional node
- Regional node metastasis invading a distant organ = ENE (not distant metastasis)
- If primary tumour involves more than one organ/ structure, the regional nodes include those of all involved organs/structures

'M' Category

M is defined by the absence or presence of distant metastases in sites and/or organs outside the local tumour area and regional nodes as defined for each cancer site

- M0: No evidence of distant mets
- M1: Distant mets

Notes:

- *MX does not exist; the absence of any clinical history or physical findings is sufficient to assign cM0*
- *pM0 does not exist; negative biopsy of a suspected met site is assigned cM0*

Stage Group

The T, N, and M categories are summarized into stage groups defined for each cancer site.

General Concepts

- **Stage 0**: Carcinoma in situ
- **Stage I**: Confined to primary site
- **Stage II**: Limited local extension and/or limited regional lymph node(s) involved
- **Stage III**: More advanced local extension or regional lymph node(s) involved
- **Stage IV**: Involvement of distant sites

Stage Group
Colorectal Stage Group Example

When T is…	And N is …	And M is …	Then the stage group is …
Tis	N0	M0	0
T1, T2	N0	M0	I
T3	N0	M0	IIA
T4a	N0	M0	IIB
T4b	N0	M0	IIC
T1-T2	N1/N1c	M0	IIIA
T1	N2a	M0	IIIA
T3-T4a	N1/N1c	M0	IIIB
T2-T3	N2a	M0	IIIB
T1-T2	N2b	M0	IIIB
T4a	N2a	M0	IIIC
T3-T4a	N2b	M0	IIIC
T4b	N1-N2	M0	IIIC
Any T	Any N	M1a	IVA
Any T	Any N	M1b	IVB
Any T	Any N	M1c	IVC

Use of Blank versus X

AJCC defines the use of **X** versus leaving categories **blank**:

- **X** is assigned when stage classification criteria is met and information is available but a specific T or N category cannot be assessed
- **Blank** is used when no information is available or criteria for clinical or pathological stage has not been met

Prefixes for T, N and M

All T, N, and M categories are preceded by either a '**c**' , a '**p**' or a '**yp**' prefix

Clinical T, N, M categories:

- cT only
- cN only
- cM or pM
  - cM0, cM1 based on clinical history, physical exam, imaging during clinical timeframe
  - pM1 based on microscopic confirmation of distant mets during clinical timeframe

Reminder: MX and pM0 do not exist

Prefixes for T, N and M

Pathological T, N, M categories:

- pT, pN and certain cT and cN
  - cT and cN are acceptable values in pathological stage when there is microscopic confirmation of distant mets and the T and N are only assessed clinically
  - cN0 is acceptable in pathological stage for in situ neoplasms and certain cancer sites where lymph node involvement is rare
- pM or cM
  - cM0, cM1 based on clinical history, physical exam, imaging during clinical timeframe
  - pM1 based on microscopic confirmation of distant mets

Prefixes for T, N and M
Example

Biopsy of rectal mass = adenocarcinoma. MRI indicates the rectal mass extends through the muscularis propria into fat, 3 metastatic perirectal nodes, and a liver lesion. Liver biopsy is positive for metastatic adenocarcinoma. No surgical resection performed.

- ***cT3 cN1b pM1a Stage Group IVA***
- ***cT3 cN1b pM1a Stage Group IVA***

Prefixes for T, N and M

Post Therapy T, N, M categories

- ypT only
- ypN only
- cM or pM only
  - post therapy M category remains the same as that assigned in the clinical stage prior to neoadjuvant therapy
  - cM0, cM1 based on clinical history, physical exam, imaging during clinical timeframe
  - pM1 based on microscopic confirmation of distant mets during clinical timeframe

In Situ Neoplasms

New in AJCC 8th edition:

- In situ neoplasia identified during diagnostic workup (core/incisional biopsy) = **c**Tis
- Rare cases of Tis with nodal involvement = Tis N1-3 (appropriate N category) AND no stage group
  - managing physician may assign the stage based on the N category for patient care

Additional Data Elements Relevant to Staging

Tumour Size

Tumour Size-Clinical

- Records the size of a solid primary tumour before any treatment
- 3 digits recorded to the nearest ***mm***

Tumour Size-Pathologic

- Records the size of a solid primary tumour that has been resected even when there is neoadjuvant therapy
- 3 digits recorded to the nearest ***mm***

Grade

Grade data item (NAACCR #440) discontinued; only used for cases diagnosed **prior** to 1/1/2018

For cases diagnosed 1/1/2018 forward*

- Grade Clinical
  - grade from primary tumour before any treatment
- Grade Pathological
  - grade from primary tumour that has been resected without prior neoadjuvant therapy
- Grade Post-therapy
  - grade from prior tumour that has been resected following neoadjuvant therapy

Grade not applicable for hematopoietic neoplasms

Lymph-vascular Invasion

LVI revised for 2018+

- Code 0 = not present
- Code 1 = present/identified
- Code 2 = lymphatic and small vessel invasion only (L)
- Code 3 = venous (large vessel) invasion only (V)
- Code 4 = BOTH lymphatic and small vessel AND venous (large vessel) invasion
- Code 8 = not applicable
- Code 9 = unknown/indeterminate/not mentioned in path report

Site Specific Data Items (SSDI): Top 4 Sites

Breast

- ER Summary (required for staging)
- PR Summary (required for staging)
- HER2 Overall Summary (required for staging)
- HER2 IHC Summary
- HER2 ISH Summary
- Oncotype Dx Recurrence Score – Invasive (required for staging)

Site Specific Data Items (SSDI): Top 4 Sites

Prostate

- PSA Lab Value (required for staging)
- Gleason Patterns Clinical
- Gleason Score Clinical
- Gleason Patterns Pathological
- Gleason Score Pathological
- Gleason Tertiary Pattern
- Number of Cores Positive
- Number of Cores Examined

Site Specific Data Items (SSDI): Top 4 Sites

Colorectal

- CEA Pretreatment Interpretation
- Circumferential Resection Margin
- Microsatellite Instability (MSI)

Lung

- No required site-specific data items

Post Test - Answers

Additional Resources on Staging

Continue to check the websites of the following Standard Setting Organizations for information on TNM 8th edition:

- **AJCC**
- **NAACCR**
- **NCI/SEER**
- **NCRA**
- **UICC**

This presentation, along with the recording, will be posted through CPAC

In Conclusion…