Purpose

At an international and national level, staging is a cohesive approach to the classification of cancer and provides a method of clearly conveying clinical experience to others without ambiguity.
Principles of Cancer Staging

- The extent or stage of cancer at the time of diagnosis is the key factor that defines prognosis and is a critical element in determining appropriate treatment based on the experience and outcomes of groups of previous patients with similar stage.

- Accurate staging is necessary to:
  - evaluate the results of treatments and clinical trials,
  - facilitate the exchange and comparison of information across treatment centers and within and between cancer specific registries
  - serve as a basis for clinical and translational cancer research

Common Language

- AJCC TNM staging is the common language of cancer
- Allows for worldwide consistency
- Essential for accurate communication
American Joint Committee on Cancer

- AJCC established in 1959
- Formulate and publish systems of classification of cancer, including staging and end-results reporting
- Goal: Create acceptable tools to be used by the medical profession for selecting-
  - the most effective treatment
  - determining prognosis
  - continuing evaluation of cancer control measures.

Manual for Staging of Cancer (1977), American Joint Committee for Cancer Staging & End Result Reporting, 1st Edition

“Philosophy of staging by the TNM system”:

“It is intended to provide a way by which designation the state of a cancer at various points in time can be readily communicated to others to assist in decisions regarding treatment and to be a factor in judgment as to prognosis. Ultimately, it provides a mechanism for comparing like or unlike groups of cases, particularly in regard to the results of different therapeutic procedures”
Reasons for Assigning Stage

- Discuss case with multidisciplinary cancer care team
  Primary care physician – Surgeon – Radiologist – Pathologist – Medical Oncologist – Radiation Oncologist - Endocrinologist

- Choose appropriate diagnostic workup and treatment
  – Guidelines include T, N, M, and stage group criteria

- Analyze treatment results for recurrence and survival

- Data analysis of various factors stratified by stage

Classifications

- Stage may be defined at several time points in the care of the cancer patient.

- Time points are termed classifications and are based on the continuum of evaluation

  - Clinical (cTNM)
  - Pathological (pTNM)
  - Post therapy (ycTNM or ypTNM)
  - Recurrence (rTNM)
  - Autopsy (aTNM)

- The staging classifications have a different purpose and therefore can be different. Do not go back and change the clinical staging based on pathologic staging information.
Stage Group Tables

- Patients with similar prognosis TNM are grouped into prognostic stage groups, commonly referred to as stage groups. Stage groups are defined for each classification (clinical and pathological).
- Subcategories: T1a, T1b
- Specific notations: TX (no information, unknown or can't be assessed) This term should be minimized
- No MX. There is no pM0. Should be labelled cM0.
- Stage 0 is used to denote carcinoma in situ

Structure

- AJCC and Union of International Cancer Control (UICC) periodically modify the system in response to newly acquired clinical and pathological data and improved understanding of cancer biology and other factors affecting prognosis.
- Revision cycles are historically every 5-7 years
- Content Harmonization Core was developed for the 8th edition. Goal was to standardize terms and concepts and overall rules
AJCC 8th Edition

• Evidence-based medicine approach
  – 18 expert panels
  – 420 contributors
  – 181 institutions, 22 countries, 6 continents
  – Expanded editorial board supported by 7 AJCC core committees
    • Content harmonization, precision medicine, statistics, imaging, data collection, professional organization and corporate relationships

• Collaborative authorship

AJCC 8th Edition

• Published October 6, 2016

• Effective for all cases diagnosed on or after January 1, 2018
AJCC 8th Edition

• Bridge from a Population Based to a More Personalized Approach
  - require integration of a wide variety of information based on patient history and physical examination findings supplemented by imaging, intraoperative findings, and pathologic data

• What’s New?
  • Data Element Review Form and Levels of Evidence
  • Precision Medicine Core with relevant genomic markers
  • Chapter Templates
  • New Chapter Headings
  • Tabular format for TNM Definitions and Stage Groups

AJCC Vision

...and Where It Fits in the 8th Edition:

- Cancer Stage
- Definitions of TNM
- Prognostic Factors
- Clinical Trial Stratification
- Prognostic and Risk Assessment Models

- Comprehensive Cancer Profile
- Population
- Personalized

8th Edition Chapter Headings
Assigning Stage: The Role of the Managing Physician

- Staging requires the collaborative effort of many professionals, including the managing physician, pathologist, radiologist, cancer registrar and others.

- While the pathologist and the radiologist provide important staging information, and may provide important T-, N-, and/or M-related information, stage is defined ultimately from the synthesis of an array of patient history and physical examination findings supplemented by imaging and pathology data.

- Only the managing physician can assign the patient’s stage, since only (s) he routinely has access to all of the pertinent information from the physical exam, imaging studies, biopsies, diagnostic procedures, surgical findings, and pathology reports.

New Feature: Evidence Based Approach

- Levels of evidence defined by EBM & Statistics core for key information ensure transparency.

- Changes to stage definitions based on data - no changes to stage definition based on level 4 evidence.

- Data sources for stage definition changes and 8E content:
  - NCDB
  - SEER
  - Multi-institutional databases
  - International databases (Lung, Melanoma, Esophagus...)
  - Publications
New Features: Precision Medicine Vision

- **Prognostic factors**
  - Required for prognostic stage grouping
  - Recommended for clinical care
  - Emerging factors (online only)

- **Risk Assessment Models for select cancer sites**

- **Recommendations for Clinical Trial Stratification**

---

Stage Classifications

- **Pathologic – p**
  - Clinical - c

- **Diagnostic Workup – phy exam, imaging, bx**

- **Surgical Treatment**
  - Systemic or Radiation Therapy

- **Pathology Report**
  - Evaluation by imaging & physical exam

- **Posttherapy – yc**

- **Posttherapy – yp**

---

Copyright © 2018 AJCC. All Rights Reserved.
KEY TERMINOLOGY

- **Classifications**
  - Describes points in time of care of cancer patient
  - Criteria: timeframe & specific medical assessments/practices

- **Categories**
  - T, N, M
  - Any non-anatomic factors needed to assign stage group

- **Stage group**
  - Easily communicated summary of categories
  - Groups patients with similar prognosis

- **Assigning stage**
  - AJCC stage assigned by managing physician
  - Based on data from all relevant sources
CLINICAL STAGING CLASSIFICATION RULES

- **General: clinical classification**
  - From date of diagnosis until definitive treatment, or within 4 months

- **T category**
  - Hx, symptoms, physical exam, labs, imaging, endoscopy, Bx, surg exp

- **N category**
  - Physical exam, imaging, FNA/core needle bx, excisional bx, sentinel node bx

- **M category**
  - Clinical history, physical exam, imaging, FNA/biopsy

- **Rationale**
  - Diagnostic bx of primary/nodes/distant mets = clinical classification
  - Pathology exam of resected tissue is not clinical staging
  - cN even if based on lymph node bx
  - Clinical M category is
    - cM if based on history, physical exam and imaging
    - pM1 if based on biopsy proven involvement

PATHOLOGICAL STAGING CLASSIFICATION RULES

- **General: pathological classification**
  - Clinical stage, op findings, path report resected specimen

- **T category**
  - Must meet definitive surgical treatment

- **N category**
  - Microscopic assessment of 1 node required, include imaging & dx bx

- **M category**
  - History, physical exam, imaging, FNA/biopsy, resection

- **Rationale**
  - Include all findings even if not microscopically proven
  - Pathological staging based on synthesis of all info
    - Not solely on resected specimen pathology report
    - Pathologist cannot assign final stage
  - Pathological M category is
    - cM if based on physical exam and imaging
    - pM1 if based on bx proven involvement, “pM0” NOT a valid category
### POST NEOADJUVANT THERAPY STAGING CLASSIFICATION RULES

- **yc Clinical**
  - Includes physical exam and imaging assessment
  - *After* neoadjuvant systemic/radiation therapy

- **yp Pathological**
  - Includes all information from yc staging,
  - Surgeon’s operative findings and
  - Pathology report from resected specimen

---

### 8th Edition Chapter 20

#### 20. Colon and Rectum

**Authors**


**Chapter Summary**

*Cancers Staged Using This Staging System*

Adenocarcinomas, high-grade neuroendocrine carcinomas, and squamous carcinomas of the colon and rectum are covered by this staging system.
Cancers Not Staged Using This Staging System

<table>
<thead>
<tr>
<th>These histopathologic types of cancer</th>
<th>Are staged according to the classification for</th>
<th>And can be found in chapter...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendiceal carcinomas</td>
<td>Appendix—carcinoma</td>
<td>19</td>
</tr>
<tr>
<td>Anal carcinomas</td>
<td>Anus</td>
<td>21</td>
</tr>
<tr>
<td>Well-differentiated neuroendocrine tumors (carcinoids)</td>
<td>Well-differentiated neuroendocrine tumors of the colon and rectum</td>
<td>33</td>
</tr>
</tbody>
</table>

Anatomic Subsites Colon and Rectum
Definition of Primary Tumor (T)

High-grade dysplasia should not be assigned to the Tis category. Tis is assigned to lesions confined to the mucosa in which cancer cells invade into the lamina propria and may involve but not penetrate through the muscularis mucosa. (These lesions are more correctly termed intramucosal carcinoma.)

...not peritonealized (e.g., posterior aspects of the ascending and descending colon, lower portion of the rectum), the T4a category is not applicable.
### N Classification

<table>
<thead>
<tr>
<th>N1</th>
<th>N1a</th>
<th>N1b</th>
<th>N1c</th>
</tr>
</thead>
<tbody>
<tr>
<td>1+ve</td>
<td>2-3+ve</td>
<td>≥7+ve</td>
<td>discrete tumor nodules within the lymph drainage area of the primary carcinoma without identifiable lymph node tissue or identifiable vascular or neural structure (LVI)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>N2</th>
<th>N2a</th>
<th>N2b</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-6+ve</td>
<td>≥7+ve</td>
<td>discrete tumor nodules within the lymph drainage area of the primary carcinoma without identifiable lymph node tissue or identifiable vascular or neural structure (LVI)</td>
</tr>
</tbody>
</table>

### Prognostic Impact of Number Lymph Nodes

#### Colon

<table>
<thead>
<tr>
<th>Stage</th>
<th>Number of Lymph Nodes</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>1-3</td>
</tr>
<tr>
<td>T2</td>
<td>4-6</td>
</tr>
<tr>
<td>T3</td>
<td>≥7</td>
</tr>
</tbody>
</table>

#### Rectum

<table>
<thead>
<tr>
<th>Stage</th>
<th>Number of Lymph Nodes</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>1-3</td>
</tr>
<tr>
<td>T2</td>
<td>4-6</td>
</tr>
<tr>
<td>T3</td>
<td>≥7</td>
</tr>
<tr>
<td>T4</td>
<td>≥7</td>
</tr>
</tbody>
</table>

(Copied with permission from AJCC 8th Edition Staging Manual)
Definition of Distant Metastasis

**M Category**

**M Criteria**

- **M0** No distant metastasis by imaging, etc.; no evidence of tumor in distant sites or organs (This category is not assigned by pathologists.)
- **M1** Metastasis to one or more distant sites or organs or peritoneal metastasis is identified
- **M1a** Metastasis to one site or organ is identified without peritoneal metastasis
- **M1b** Metastasis to two or more sites or organs is identified without peritoneal metastasis
- **M1c** *Metastasis to the peritoneal surface is identified alone or with other site or organ metastases*

AJCC Prognostic Stage Groups

<table>
<thead>
<tr>
<th>When T is...</th>
<th>And N is...</th>
<th>And M is...</th>
<th>Then the stage group is...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tis</td>
<td>N0</td>
<td>M0</td>
<td>0</td>
</tr>
<tr>
<td>T1, T2</td>
<td>N0</td>
<td>M0</td>
<td>I</td>
</tr>
<tr>
<td>T3</td>
<td>N0</td>
<td>M0</td>
<td>II A</td>
</tr>
<tr>
<td>T4a</td>
<td>N0</td>
<td>M0</td>
<td>II B</td>
</tr>
<tr>
<td>T4b</td>
<td>N0</td>
<td>M0</td>
<td>II C</td>
</tr>
<tr>
<td>T1–T2</td>
<td>N1/N1c</td>
<td>M0</td>
<td>II A</td>
</tr>
<tr>
<td>T1</td>
<td>N2a</td>
<td>M0</td>
<td>II A</td>
</tr>
<tr>
<td>T3–T4a</td>
<td>N1/N1c</td>
<td>M0</td>
<td>II B</td>
</tr>
<tr>
<td>T2–T3</td>
<td>N2a</td>
<td>M0</td>
<td>II B</td>
</tr>
<tr>
<td>T1–T2</td>
<td>N2b</td>
<td>M0</td>
<td>II B</td>
</tr>
<tr>
<td>T4a</td>
<td>N2a</td>
<td>M0</td>
<td>II C</td>
</tr>
<tr>
<td>T3–T4a</td>
<td>N2b</td>
<td>M0</td>
<td>II C</td>
</tr>
<tr>
<td>T4b</td>
<td>N1–N2</td>
<td>M0</td>
<td>II C</td>
</tr>
<tr>
<td>Any T</td>
<td>Any N</td>
<td>M1a</td>
<td>IVA</td>
</tr>
<tr>
<td>Any T</td>
<td>Any N</td>
<td>M1b</td>
<td>IVB</td>
</tr>
<tr>
<td>Any T</td>
<td>Any N</td>
<td>M1c</td>
<td>IVC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>T Category</th>
<th>N Category</th>
<th>Tis</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4a</th>
<th>T4b</th>
</tr>
</thead>
<tbody>
<tr>
<td>N0</td>
<td>0</td>
<td>IIA</td>
<td>IIB</td>
<td>IIB</td>
<td>IIC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N1a</td>
<td>N/A</td>
<td>II A</td>
<td>II A</td>
<td>II B</td>
<td>II B</td>
<td>II B</td>
<td>II C</td>
</tr>
<tr>
<td>N1b</td>
<td>N/A</td>
<td>II A</td>
<td>II A</td>
<td>II B</td>
<td>II B</td>
<td>II B</td>
<td>II C</td>
</tr>
<tr>
<td>N1c</td>
<td>N/A</td>
<td>II A</td>
<td>II A</td>
<td>II B</td>
<td>II B</td>
<td>II B</td>
<td>II C</td>
</tr>
<tr>
<td>N2a</td>
<td>N/A</td>
<td>II A</td>
<td>II B</td>
<td>II B</td>
<td>II B</td>
<td>II C</td>
<td>II C</td>
</tr>
<tr>
<td>N2b</td>
<td>N/A</td>
<td>II B</td>
<td>II B</td>
<td>II B</td>
<td>II B</td>
<td>II B</td>
<td>II C</td>
</tr>
<tr>
<td>M1a</td>
<td>N/A</td>
<td>IVA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M1b</td>
<td>N/A</td>
<td>IVB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M1c</td>
<td>N/A</td>
<td>IVC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Special Cases

- Recurrent Colorectal Cancer
  - r prefix
  - assign rTNM
  - Anatomically assigned to proximal segment of anastomosis unless it is small bowel

- Incidental Colorectal Cancer found at death
  - a prefix

Prognostic Factors Recommended for Clinical Care—Registry Data Collection Variables

1. CEA
2. TRG
3. CRM (mm)
4. LVI
5. PNI
6. MSI
7. KRAS/NRAS
8. BRAF
LVI

Lymphovascular Invasion (LVI)
Invasion of either small or large vessels by the primary tumor is an important poor prognostic factor. Small vessel invasion is involvement by tumor of thin-walled structures lined by endothelium, without an identifiable smooth muscle layer or elastic lamina. These thin-walled structures include lymphatics, capillaries, and postcapillary venules. Large vessel invasion is defined by tumor involving endothelium-lined spaces that have an elastic lamina and/or smooth muscle layer. Circumscribed tumor nodules surrounded by an elastic lamina on H&E or elastic stain also are considered venous invasion and may be extramural (beyond the muscularis propria) or intramural (submucosa or muscularis propria).

Additional Factors for Further Evaluation?

• Colorectal Cancer
  – Tumor deposits and impact on stage when N1a-b or N2a-b
  – Total number of lymph nodes examined/Lymph node ratio
  – Detection of isolated tumor cells
    • Clusters of 10-20 tumor cells
  – Detection of micrometastasis
    • ≥ 0.2 mm
  – Extramural vascular invasion
  – Molecular subtypes, novel mutations

• Rectal cancer
  – Definition of regional lymph nodes
    • Internal iliac (N)
    • Obturator lymph nodes (M)
Summary of Key Changes to 8th Edition Colon and Rectum

<table>
<thead>
<tr>
<th>Change</th>
<th>Details of Change</th>
<th>Level of Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition of Distant Metastasis (M)</td>
<td>Introduced M1c, which details peritoneal carcinomatosis as a poor prognostic factor</td>
<td>I</td>
</tr>
<tr>
<td>Definition of Regional Lymph Node (N)</td>
<td>Clarified the definition of tumor deposits</td>
<td>II</td>
</tr>
<tr>
<td>Additional Factors Recommended for Clinical Care</td>
<td>Lymphovascular invasion: reintroduced the L and V elements to better identify lymphatic and vessel invasion</td>
<td>I</td>
</tr>
<tr>
<td>Additional Factors Recommended for Clinical Care</td>
<td>Microsatellite instability (MSI): clarified the importance of MSI as a prognostic and predictive factor</td>
<td>I</td>
</tr>
<tr>
<td>Additional Factors Recommended for Clinical Care</td>
<td>Identified KRAS, NRAS, and BRAF mutations as critical prognostic factors that are also predictive</td>
<td>I and II</td>
</tr>
</tbody>
</table>

AJCC Web site

- https://cancerstaging.org
- Ordering information
  - Cancerstaging.net
- General information
  - Education
  - Articles
  - Updates
CAanswer Forum

- Submit questions to AJCC Forum
  - NEW 8th Edition Forum COMING SOON
  - 7th Edition Forum will remain
  - Located within CAanswer Forum
  - Provides information for all
  - Allows tracking for educational purposes

- http://cancerbulletin.facs.org/forums/

Thank you

AJCC
American Joint Committee on Cancer
Validating science. Improving patient care.

633 N. Saint Clair, Chicago, IL 60611-3211
cancerstaging.org
http://cancerbulletin.facs.org/forums/

No materials in this presentation may be repurposed in print or online without the express written permission of the American Joint Committee on Cancer. Permission requests may be submitted at cancerstaging.org.