American Joint Committee on Cancer
American College of Surgeons

AJCC Appendix
Version 9 Cancer Staging System

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Version 9 Format

Protocol Format

- **AJCC updated to protocol format**
  - ***Same information*** as previous AJCC chapters, 3 key pieces:

1. Staging report format is key information for managing physician to document
2. Explanatory notes provide guidance
3. Supplemental information available

- **Why change**
  - Easier for users to find what they need … just when they need it
  - Users wanted a synoptic styled report format
  - Synoptic proven to increase accurate and complete documentation

Using Protocol Format

1. **Staging report format**
   - Provides all of the key information
   - Includes new items
     - used for staging
     - Clinical Modalities staging and workup
     - Pathological staging and workup
     - Staging Rules with Common Staging Scenarios

1. **Explanatory notes**
   - Provide the same details found in previous AJCC chapters
   - Includes images for primary site, nodal map, and T N M categories

3. **Supplemental information includes general staging rules**

NEW Features – Clinical Staging and Workup Table

DIAGNOSTIC WORKUP	DESCRIPTION	SPECIFIC CONTRIBUTION TO TNM CATEGORY
Clinical exam		
Medical history and physical examination	Non-contributory before surgery	None
Colonoscopy	In certain cases, can provide histological diagnosis	None
Exploratory laparotomy with diagnostic appendectomy (not definitive treatment)	Intraoperative identification of extent of tumor; assessment of peritoneal spread with microscopic confirmation	T1-T4, N1, M1
Exploratory laparotomy without colectomy	Intraoperative identification of extent of tumor; assessment of peritoneal spread with microscopic confirmation	T1-T4, N1-N2, M1
Imaging		
CT	Chest/abdomen/pelvis – define extent of local disease, nodal involvement, metastases (Note: for localized LAMN or HAMN chest imaging may not be indicated)	T4, N1-N2, M1
MRI	Abdomen/pelvis – define extent of local disease, nodal involvement, metastases (Note: for localized LAMN or HAMN chest imaging may not be indicated)	T4, N1-N2, M1
PET/CT	Base of neck to mid-thigh – define extent of local disease, nodal involvement, metastases (Note: not useful for mucinous neoplasms and limited ability to detect low volume peritoneal disease)	T4, N1-N2, M1
Laboratory studies		
CEA, CA19-9, and CA125	Serum tumor marker tests; not specific for appendiceal cancer Higher levels are generally associated with more advanced disease; may be useful in following treatment response	None

- Contains following elements
  - Common diagnostic workup
  - Description of the evaluation
  - How it contributes to TNM category for staging

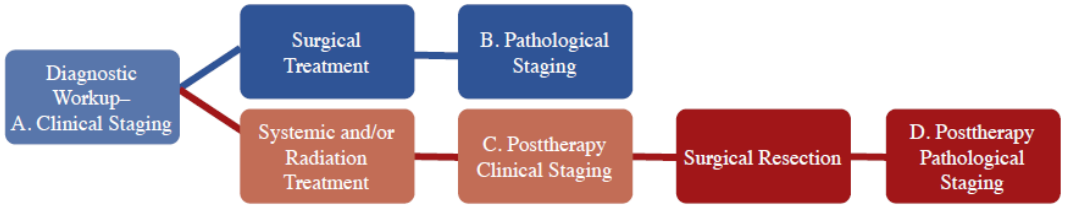
- List of workup options, ***not*** list of required workup

NEW Features – Pathological Staging and Workup

CATEGORY	SPECIMEN	PATHOLOGIST	MANAGING PHYSICIAN (Stage Documented by Cancer Registry)
General Information		• Assignment of pTNM categories is based on surgical resection **specimen(s),** as well as intraoperative findings, biopsy procedures and clinical evaluation up to the point of definitive surgical treatment, if available • All other surgical procedure specimens use cTNM; for example, biopsy of a positive regional lymph node without surgical resection of the primary carcinoma is classified as cN1	• Assignment of pTNM categories for the **patient** requires use of information from all biopsy procedures performed during the clinical evaluation up to and including definitive surgical treatment • Requires information from clinical assessment or imaging studies or intraoperative findings to assign pTNM categories (may not change pTNM, but must be considered)
pTX		Not for use by pathologist; assigned only by managing physician	May assign if unable to determine pT category after surgical resection
pT0		No tumor found in specimen and never identified on diagnostic biopsies	No tumor found in specimen and never identified on diagnostic biopsies
pTis	Appendectomy for locally confined tumors; right hemicolectomy in some cases	Pathological information from surgical specimen only Tissue layer invasion and invasion of adjacent organs T1 and T2 are not applicable to LAMN	Pathology reports +/- appropriate clinical exam, imaging studies, and intraoperative findings
pTis(LAMN)			
pT1			
pT2			
pT3			
pT4			
pT4a			
pT4b	Right hemicolectomy or en-bloc resection		
pNX		Not for use by pathologist; assigned	• May assign if unable to determine pN

- Demonstrates role of pathologist in assessing resection ***specimen***
- Demonstrates role of managing physician in assigning TNM categories and stage to ***patient***

NEW Features – Staging Rules for Appendix



Common staging scenarios (Note CSS):

1) Unsuspected cancer in an appendectomy specimen
The most common way that appendiceal cancer is diagnosed and staged is by pathological examination of an appendectomy specimen, often in a patient presenting with signs and symptoms of acute appendicitis in whom appendiceal cancer is not suspected preoperatively. **Pathological staging** (B in figure above) is assigned by the managing physician for this incidental finding. There is no clinical staging.

2) Detection by imaging or colonoscopy prior to or without appendectomy
Less commonly, appendiceal cancer is identified on imaging or as a lesion at the appendiceal orifice upon colonoscopy. **Clinical staging** (A in figure above) cT, cN, and cM/pM are assigned based on imaging findings. The pathologist assigns pT, pN, and pM (when metastases are sampled) based on the resected specimen, usually a right hemicolectomy specimen. The managing physician then assigns the **pathological staging** (B in figure above) based on the clinical stage information, the operative findings, and the resected specimen pathology report information.

If systemic therapy is administered prior to resection, the 'y' prefix should be applied. **Posttherapy clinical staging** (C in figure above) is assigned to assess the response based on physical exam, imaging, and biopsies assigning ycT for residual tumor, ycN for nodal assessment, and the M category as assigned in the clinical stage. After resection the pathologist will assign posttherapy pathological ypT based on assessment of the primary tumor, and ypN for regional nodes. The managing physician will then use the posttherapy yc stage combined with the operative findings and the pathology report to assign the **posttherapy pathological staging** (D in figure above) ypT, ypN, and the cM/pM.

3) Staging of LAMN
Staging of LAMN may be challenging, and pathological assessment is necessary for diagnosis and determination of both T and M categories. These neoplasms have a pushing rather than infiltrative leading front, and if they penetrate the appendiceal wall, can result in accumulation of abundant mucin in the peritoneal cavity, with few or no tumor cells in the mucin deposits. LAMNs have a special T category, Tis(LAMN), that applies when the tumor cells are confined to the submucosa or muscularis propria of the appendix; this category is used instead of pT1 and pT2. LAMNs that extend into

- Graphic of
  - Appropriate AJCC stage classification
  - Based on treatment choice
- Staging scenarios describe information used to assign AJCC stage classification

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Key Changes in Appendix Staging

Histopathologic Type Changes

- **WHO Classification of Tumors 2021 Corrigendum**
  - LAMN and HAMN behavior was changed from borderline to *in situ*

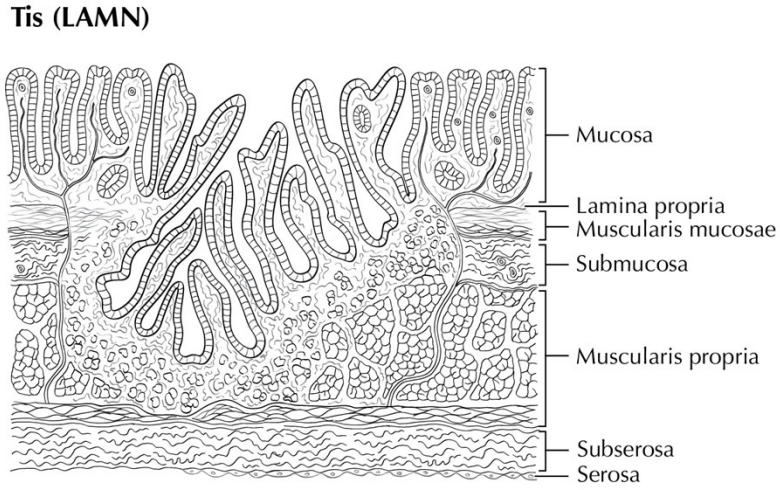
- **LAMN and HAMN are now malignant tumors, either *in situ* or invasive**
  - Registry data collection of LAMN & HAMN started in January 2022
  - Prior to 2022 registry rules considered these non-malignant, not reportable to national databases

- **Mixed adenocarcinoma-neuroendocrine carcinoma**
  - Previously named mixed adenoneuroendocrine carcinoma
  - Form of mixed neuroendocrine nonneuroendocrine neoplasm (MiNEN)

- **Goblet cell adenocarcinoma**
  - Previously goblet cell carcinoid

LAMN

- **LAMN – low grade appendiceal mucinous neoplasm**
  - Show pushing invasion in contrast to infiltrative growth of other mucinous adenoca
  - Risk of progressive disease is low
  - Depth of appendiceal wall involvement is not significant risk factor
  - T categories: Tis(LAMN), T3, T4a, T4b
- **Tis(LAMN)**
  - T1 and T2 are not used for LAMN
  - LAMN that has not penetrated muscularis propria are designated Tis(LAMN)
- **Tis(LAMN) with peritoneal disease**
  - Still assign Tis(LAMN)
  - Peritoneal spread potentially due to perforation that has subsequently “sealed’
- **New illustration demonstrating Tis(LAMN)**



HAMN

- **HAMN – high grade appendiceal mucinous neoplasm**
  - Show pushing invasion in contrast to infiltrative growth of other mucinous adenoca
  - Histologically graded as G2 or moderately differentiated
  - Higher risk of recurrence than LAMN

- **HAMN staging**
  - Uses same staging system as other appendix adenocarcinomas
  - Tis, T1, T2, T3, T4a, T4b

Tumor Deposits

- **Tumor deposits**
  - Discrete tumor nodules within lymph drainage area of primary carcinoma
  - Without identifiable lymph node tissue or identifiable vascular or neural structure

- **Prognostic relevance not well studied**
  - Tumor deposits proven poor prognostic factor for adenocarcinomas
  - Collected as separate data element for future study

- **N1c: tumor deposits but no identified lymph node metastases**
  - Tumor deposits do not change primary tumor T category
  - Changes node status (N) to N1c if all regional lymph nodes are negative
  - Number of tumor deposits **not** added to number of positive regional nodes if nodes involved

- **Not relevant for LAMN or HAMN**

Metastatic Disease

- **M categories reflect distinctive behavior of pseudomyxoma peritonei**
- **M1a: intraperitoneal mucin is acellular, good prognosis**
- **M1b: neoplastic cells in mucin**
  - Cellular peritoneal implants involving serosa of abdominal viscera, regardless of whether implants demonstrate invasion of underlying tissue
  - Pseudomyxoma peritonei clinical picture includes
    - Ovarian involvement
    - Omental infiltration (omental caking)
    - Surface involvement of abdominal organs (such as liver and intestine)
- **M1c: nonperitoneal metastasis**
  - Rare in well differentiated mucinous adenocarcinomas
  - More common in other types of appendiceal neoplasia

Survival Data

- **Survival curves show distinct differences by histologic subtype**
  - Mucinous
  - Non-mucinous
  - Signet ring

- **Rarity of disease hampers ability to amass robust data in some subsets**

- **Issues in data collection**
  - Changes in coding definition of tumor grade over time
    - As a result, grade breakdowns not included in survival curves
  - LAMNs and most HAMNs not included in cancer registry databases
    - Registry rules did not consider these cases malignant
    - Rules changed for cases January 2022 and forward

New Staging & Workup Tables, Scenarios

- **Clinical Staging and Workup**
  - Algorithm of investigation and procedures used to determine T, N, and M categories
- **Pathological Staging and Workup**
  - Demonstrates how resection information is incorporated into staging
- **Staging Rules for Appendix**
  - Staging graphic showing common scenarios
  - Common staging scenarios provided
    - Unsuspected cancer in appendectomy specimen
      - Pathological: assessment on resection
      - No clinical staging since it was not known
    - Clinical detection and treated surgically
      - Clinical staging: diagnostic workup
      - Pathological staging: after resection using diagnostic workup, op findings, and pathology report
    - Staging of LAMN
      - Additional information in Note CSS: Common Staging Scenarios

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Access to Version 9 Protocol

Access to Version 9 Appendix Protocol

- **Kindle on Amazon**
  - Purchase as ebook or paperback
  - Free software to enable reading on PC, MAC, tablet, and phone
  - Individual ownership of ebook content, not to be shared

- **Facility may purchase Kindle ebook for staff**
  - Group purchase allowed for multiple copies in one transaction
  - Purchaser emails links for users to download AJCC ebook

- **Institutional access vendors**
  - Multiple vendors who supply ebooks to hospital libraries
  - EHR companies may include content in their software, staging tables or complete protocol

FAQ

- **AJCC has FAQ document on website**
  - Covers most common questions
  - Provides information and options for institutional purchases

- **Additional questions should be directed to ajcc@facs.org**

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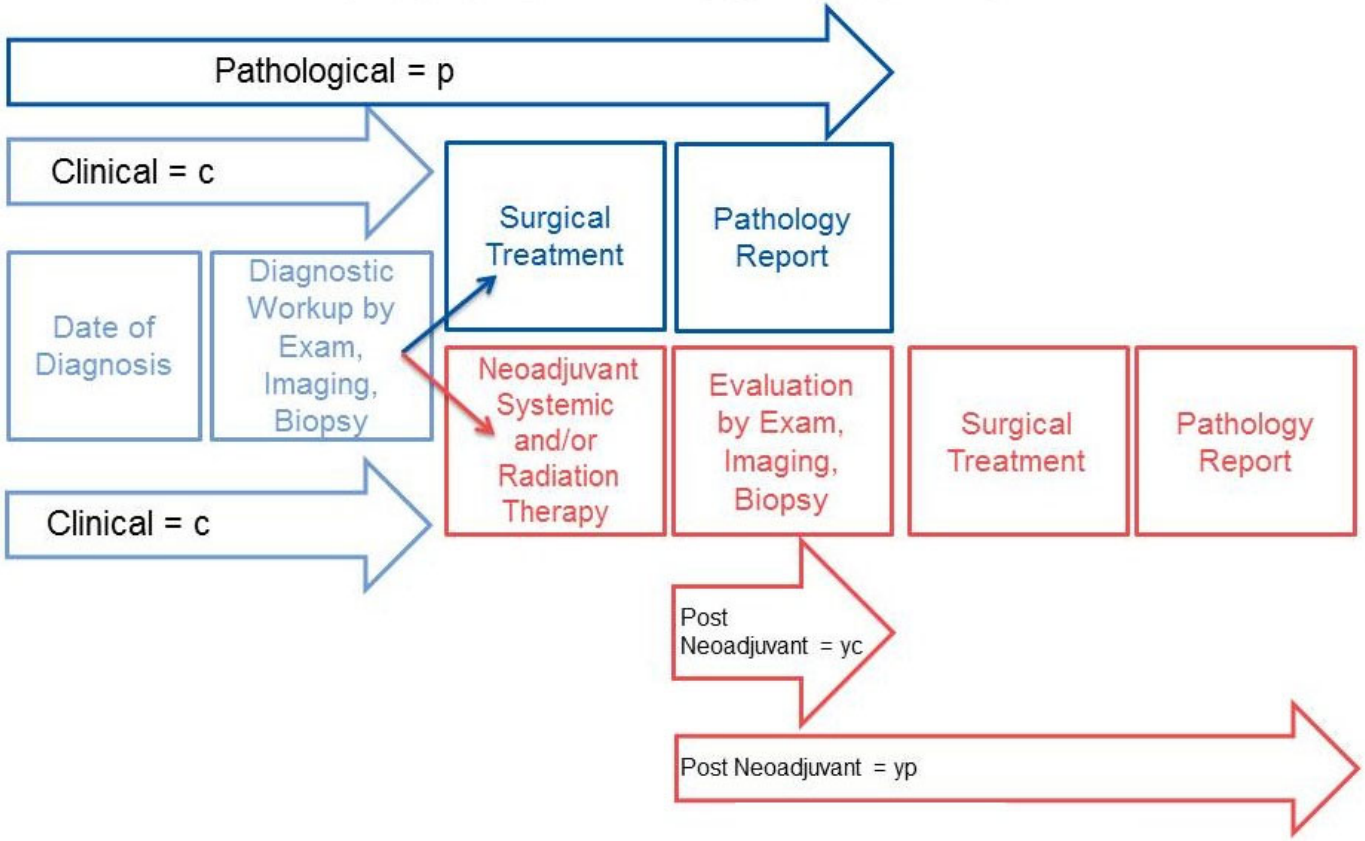
Information and Questions on AJCC Staging

Timing Is Everything

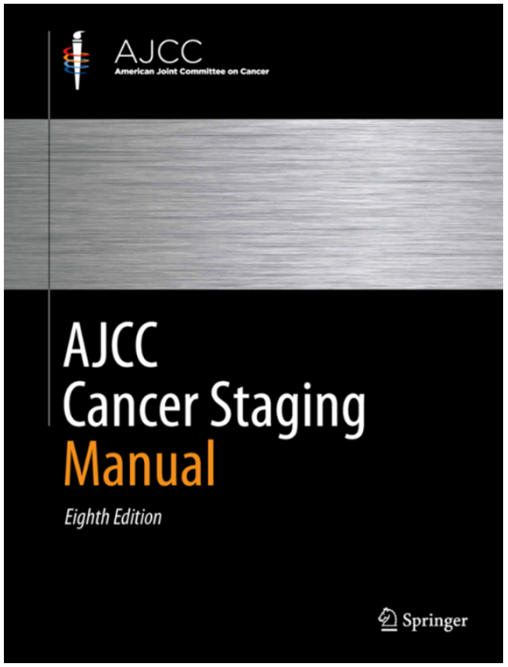
AJCC Stage Classifications

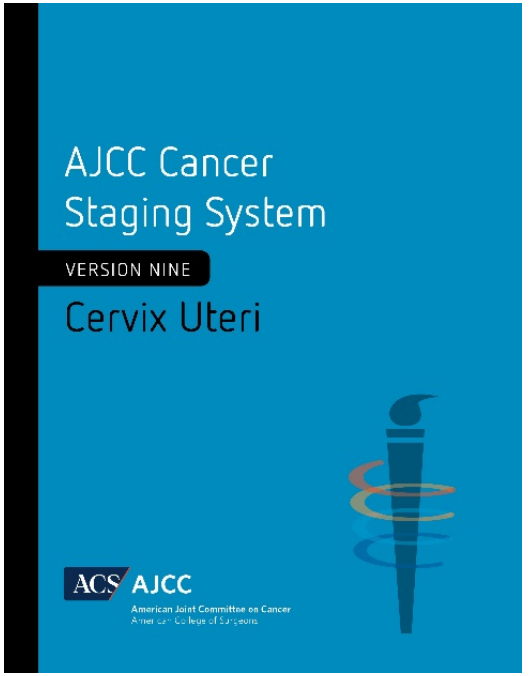
Defining Time Frame and Criteria



AJCC Web site

- https://cancerstaging.org
- https://www.facs.org/quality-programs/cancer-programs/american-joint-committee-on-cancer/
- General information
  - Overview
  - Version 9
  - Cancer Staging Systems
    - AJCC 8th edition Chapter 1: Principles of Cancer Staging
  - Cancer Staging Education
  - FAQ & Resources





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