

# COLON

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# ANATOMY

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# Colon Anatomy

- **Cecum (proximal right colon)**  
6 x 9 cm pouch covered with peritoneum
- **Appendix**  
A vermiform (wormlike) diverticulum located in the lower cecum
- **Ascending colon**  
20-25 cm long, located behind the peritoneum
- **Hepatic flexure**  
Lies under right lobe of liver



- **Transverse colon**  
Lies anterior in abdomen, attached to gastrocolic ligament
- **Splenic flexure**  
Near tail of pancreas and spleen
- **Descending colon**  
10-15 cm long, located behind the peritoneum
- **Sigmoid colon**  
Loop extending distally from border of left posterior major psoas muscle



# Rectosigmoid, Rectum & Anus

- **Rectosigmoid segment**  
Between 10 and 15 cm from anal verge
- **Rectum**  
12 cm long; upper third covered by peritoneum; no peritoneum on lower third which is also called the rectal ampulla. About 10 cm of the rectum lies below the lower edge of the peritoneum (below) the peritoneal reflection), outside the peritoneal cavity
- **Anal canal**  
Most distal 4-5 cm to anal verge



# Layers of Colon Wall

## Layers from inside

- Lumen (interior surface of colon "tube")
- Mucosa
- Surface epithelium
- Lamina propria or basement membrane—dividing line between in situ and invasive lesions
- Muscularis mucosae
- Submucosa—lymphatics; potential for metastases increases
- Muscularis propria

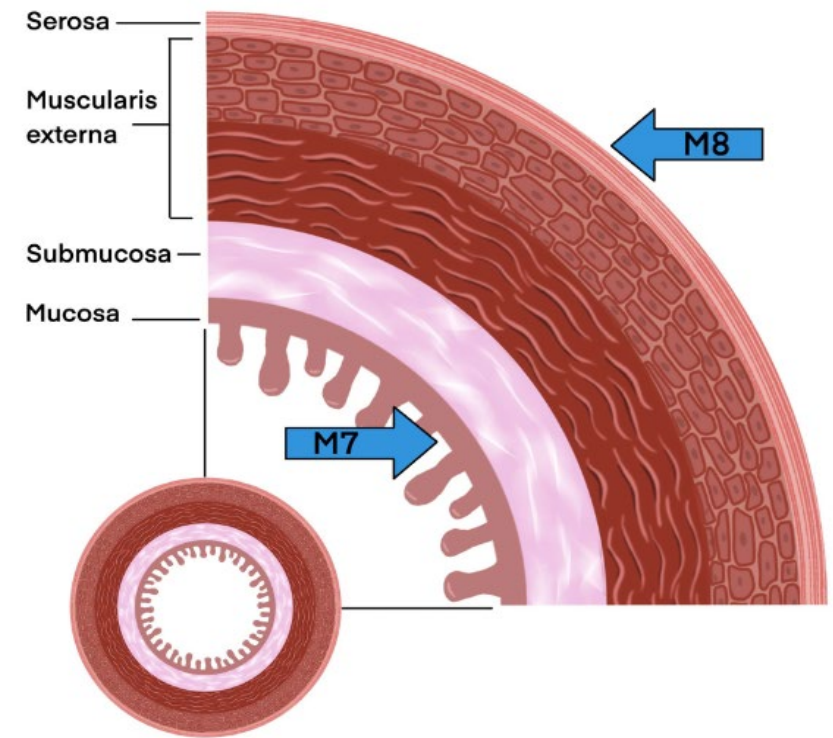
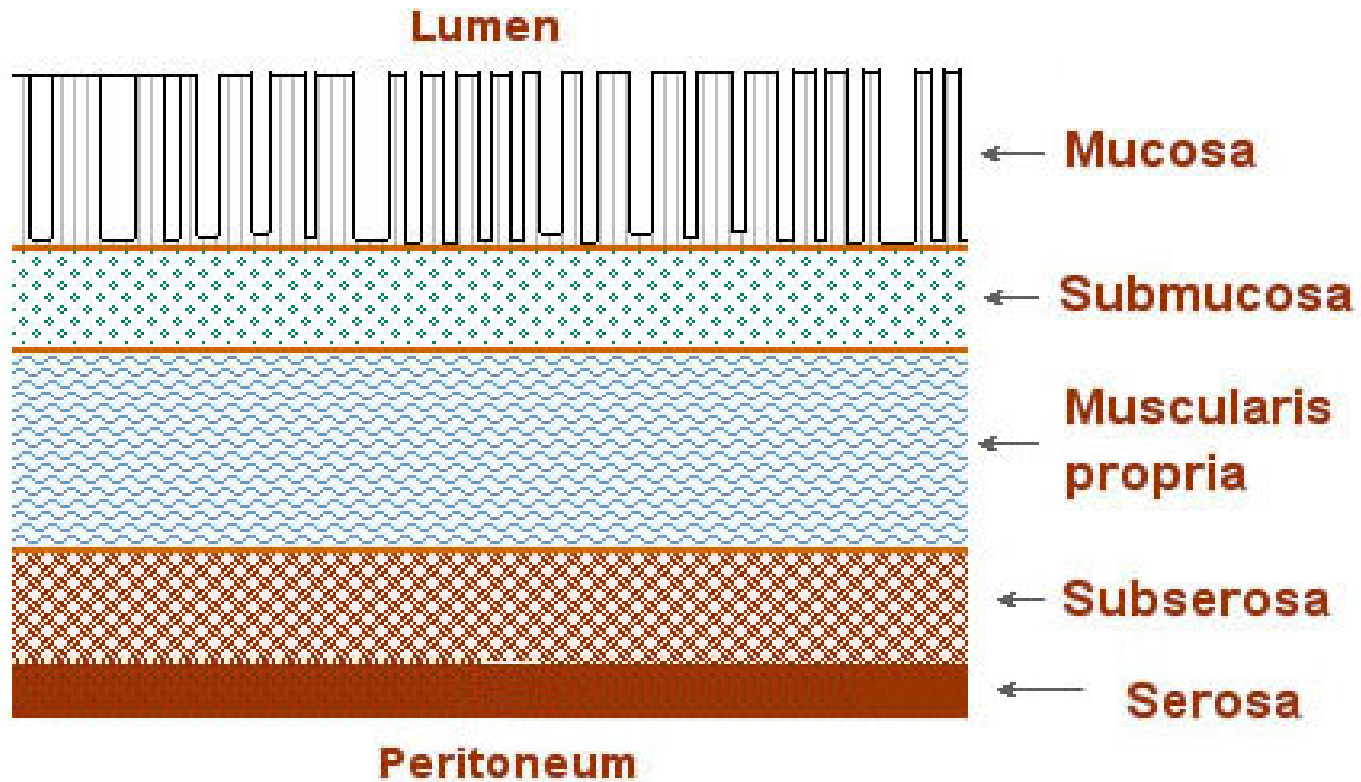


- Circular layer
- Longitudinal layer—in three bands called taenia coli
- Subserosa—sometimes called pericolic fat or subserosal fat
- Serosa—present on ascending, transverse, sigmoid only (also called the visceral peritoneum)
- Retroperitoneal fat (also called pericolic fat)
- Mesenteric fat (also called pericolic fat)

*SEER Training Modules, Colon Module*, U. S. National Institutes of Health, National Cancer Institute, 1/13/12.  
<<http://training.seer.cancer.gov/>>.



# Diagram of the Colon Wall



SEER Training Modules, Colon Module, U S National Institutes of Health, National Cancer Institute. 1/13/12 <<http://training.seer.cancer.gov/>>.





# Signs and Symptoms

## Presenting Symptoms

- Anemia
- Rectal bleeding
- Change n bowl habits
- Weight loss
- Inability to pass stool



# Diagnosing Colon Cancer

- **Physical Exam**
  - Abdominal mass
  - Lymph node metastases
- **Scans**
  - Mass
  - Suspicious lymph nodes
  - Liver Involvement
- **Labs**
  - Elevated CEA
- **Scopes**
  - Confirmed malignancy
- **Biopsies**
  - Microscopic confirmation



# Diagnosis Date

- Review the patient's chart for the report contains the earliest documentation of cancer
- Look for record on:
  - Colonoscopy reports
  - Pathology reports with biopsy results
  - Scans showing obstructions
  - H&P
  - Discharge summaries
  - Consultation notes by a specialist/surgeon
- Date of first contact CANNOT precede Date of Diagnosis!

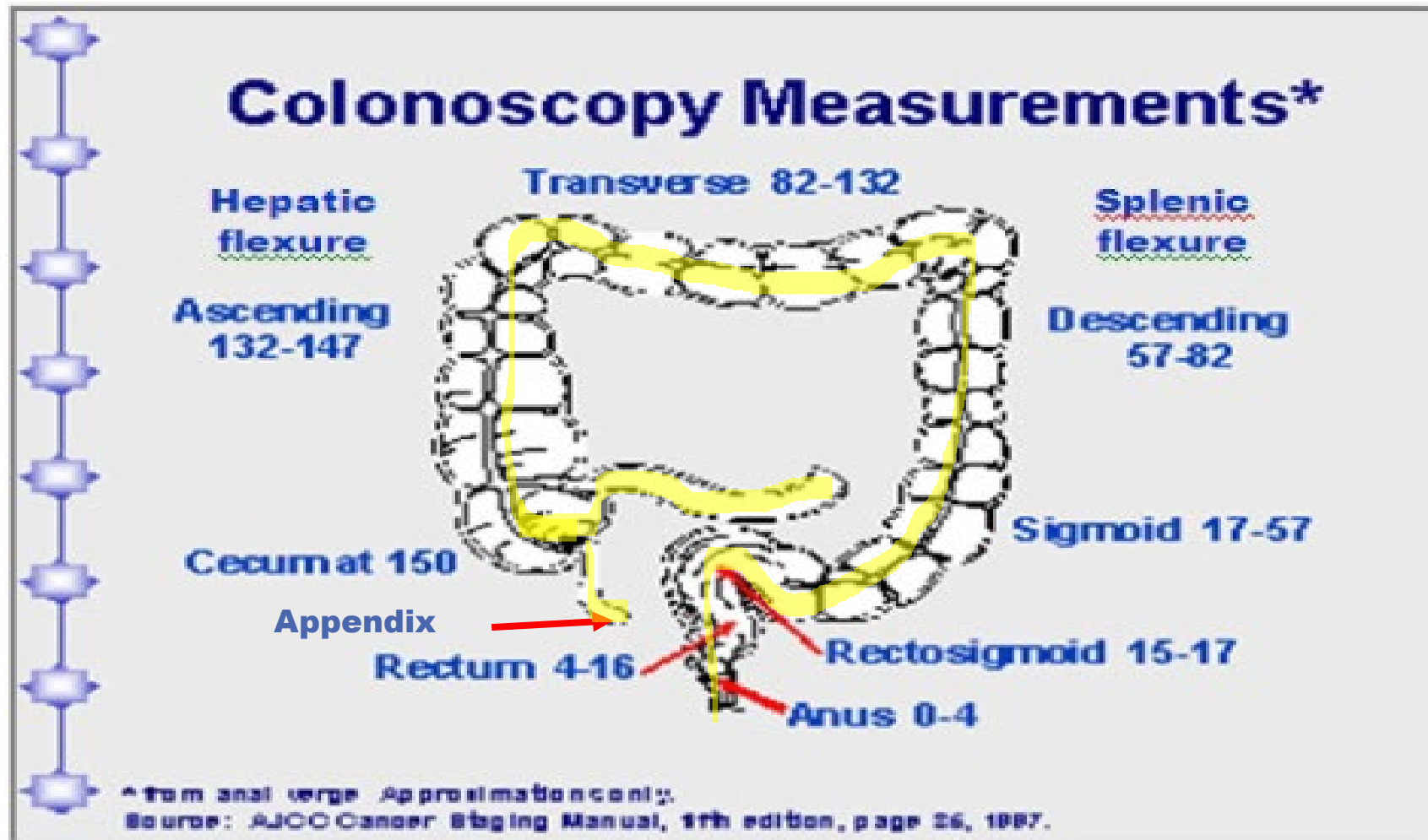


# PRIMARY SITE

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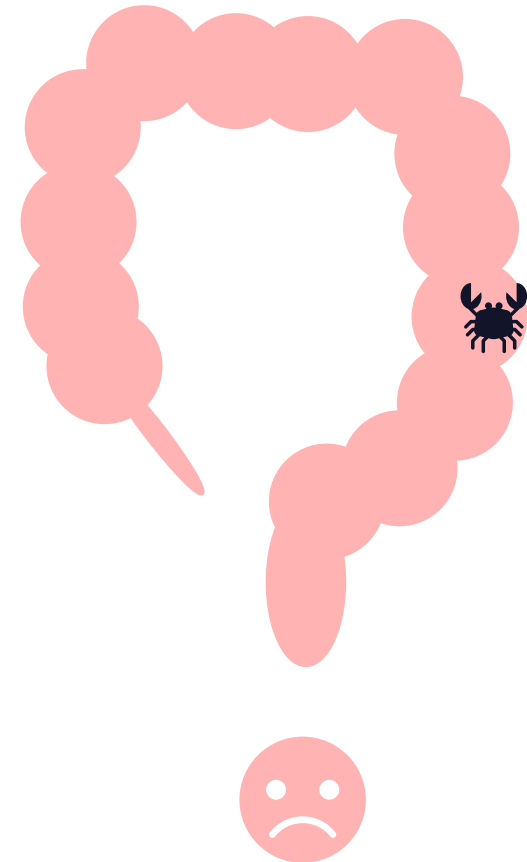


# Colorectal Segments



# Primary Site

- Determining colon cancer primary site can sometimes be challenging
- Different physicians may document different sites
- Colonoscopy is not the most reliable source since the endoscopist is viewing the colon from the inside out, it is difficult to determining the precise segment and location
- Operative Report takes top priority for colon primaries



# Documentation Priority

Use the information from reports in the following priority order to code

The primary site when there is conflicting information:

- Resected cases
- Operative report with surgeon's description
- Pathology report
- Imaging
- Polypectomy or excision without resection
- Endoscopy report
- Pathology report



# HISTOLOGY

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# Determining Topography

## Solid Tumor Rules

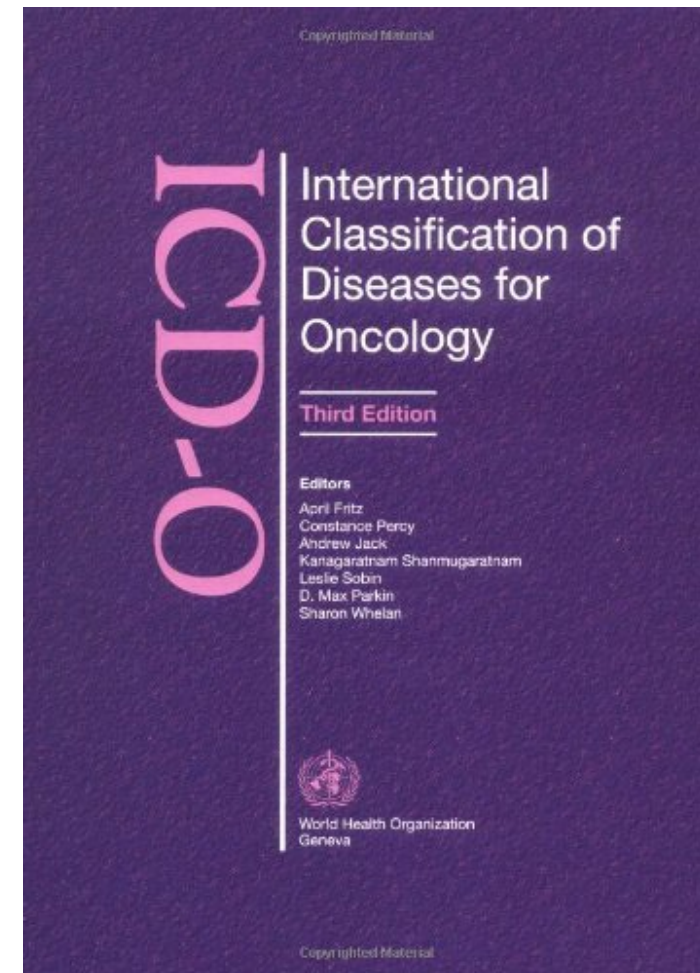
Effective with Cases Diagnosed 1/1/2018 and Forward

Updated September 2021

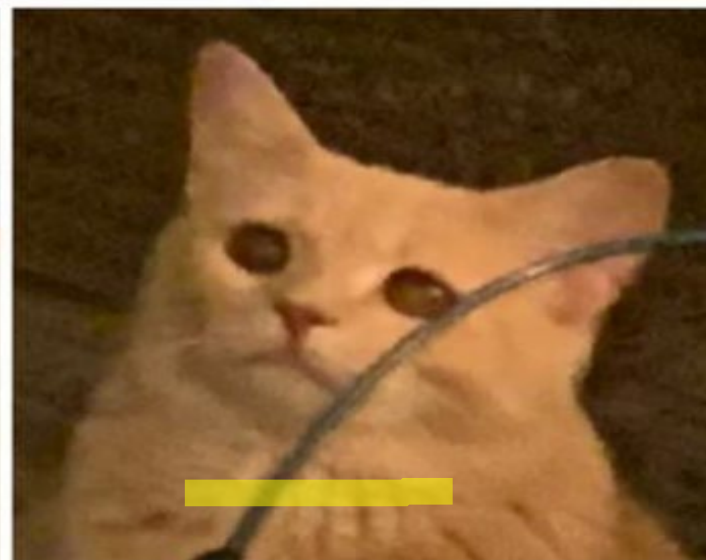
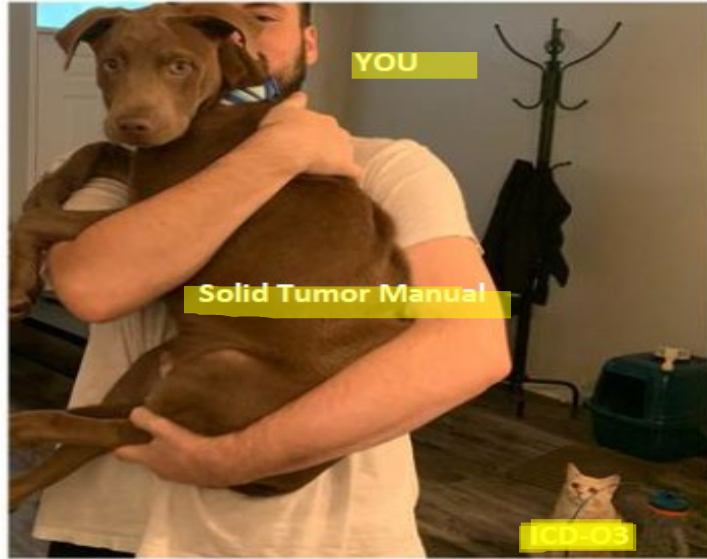


**Editors:** Lois Dickie, CTR, NCI SEER  
Carol Hahn Johnson, BS, CTR (Retired), Consultant  
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**Suggested citation:** Dickie, L., Johnson, CH., Adams, S., Negoita, S. (September 2021). Solid Tumor Rules. National Cancer Institute, Rockville, MD 20850.



# Use the Solid Tumor Manual!



# Not Equivalent or Equal Terms

**These terms are not equivalent. There are no casefinding implications**

- Carcinoma, NOS 8010 is not equivalent to adenocarcinoma, NOS 8140
- Component is not equivalent to subtype/type/variant  
Note: Component is only coded when the pathologist specifies the component as a second carcinoma.
- Exophytic and polypoid are not equivalent to either an adenoma or an adenomatous polyp. The terms “exophytic” and “polypoid” refer to anything projecting from the bowel mucosa into the lumen. The lesion may be benign, malignant, or inflammatory.
- Phenotype is not equivalent to subtype/type/variant
- Polypoid adenocarcinoma is not equivalent to adenocarcinoma in a polyp



- Code the most specific histology or subtype/type/variant, regardless of whether it is described as:
  - The majority or predominant part of tumor
  - The minority of tumor
  - A component
- Do not code histology when described as:
  - Architecture
  - Foci; focus; focal
  - Pattern



# Mucinous and Signet Ring Cell

## H4

- Mucinous and signet ring cell carcinoma must meet a percentage requirement in order to be coded
- Mucinous carcinoma documented as greater than 50% – code mucinous carcinoma 8480
- Signet ring cell carcinoma documented as greater than 50% – code signet ring cell carcinoma 8490



## H6

**Code invasive mucinous adenocarcinoma 8480 when the diagnosis is any of the following:**

- Exactly “mucinous adenocarcinoma” (no modifiers)
- High grade appendiceal mucinous neoplasm (HAMN) stated to be invasive (DX 1/1/2022 forward)
- High-grade pseudomyxoma peritonei
- Invasive pseudomyxoma peritonei
- Low grade appendiceal mucinous neoplasm (LAMN) stated to be invasive (DX 1/1/2022 forward)
- Malignant pseudomyxoma peritonei

# LAMN and HAMN

H5

Code low grade appendiceal mucinous neoplasm (LAMN) and high grade appendiceal mucinous neoplasm (HAMN) 8480/2 when:

- Diagnosis date is 1/1/2022 forward AND
- Behavior is stated to be in situ/non-invasive OR
- Behavior is not indicated

# Documentation Priority

- For each site, priorities include tissue/histology, cytology, imaging/scans, and physician diagnoses, and biomarkers. You must use the priority order that precedes the histology rules for each site.
- Priority order will differ by site. Tissue pathology (and/or biomarkers, if applicable) always takes precedence.
- The specific types of imaging/scans also differ by site.
- Which document to use when there is conflicting information between the final diagnosis, synoptic report, or CAP protocol:
- When there are discrepancies between the final diagnosis and synoptic report, use the document that provides the more specific histology. This will likely be found in the synoptic report. The CAP Protocol should be used only when a final diagnosis or synoptic report are not available. Definitions for CAP Protocol, final diagnosis, and synoptic report can be found in the Definitions section





# Solid Tumor Manual

## Page 49

**Tissue or pathology report from primary site** (in priority order)

- A. Addendum(s) and/or comment(s)
- B. Final diagnosis / synoptic report as required by CAP
- C. CAP protocol

*Note 1:* Addendums and comments on the pathology report are given a high priority because they often contain information about molecular testing, genetic testing, and/or special stains which give a more specific diagnosis.

*Note 2:* The pathologist's diagnosis from the pathology report is always reliable, so the final diagnosis is the second priority. The final diagnosis is often the synoptic CAP report.

*Note 3:* The CAP protocol is a checklist which:

- Provides guidelines for collecting the essential data elements for complete reporting of malignant tumors and optimal patient care.
- Allows physicians to check multiple histologies

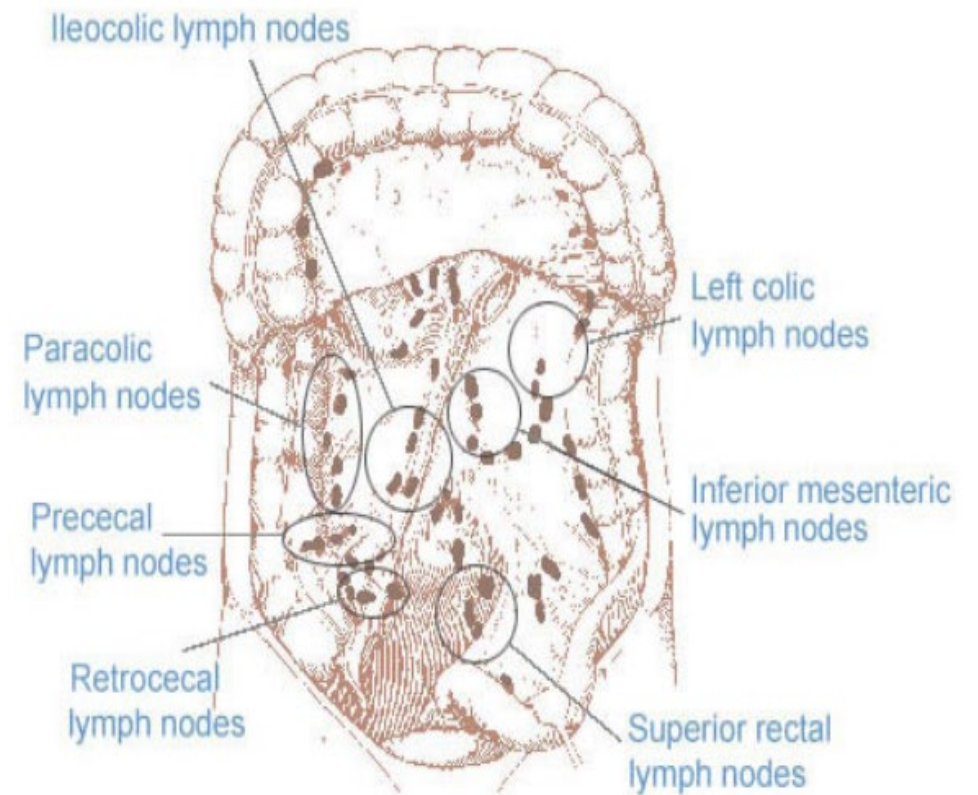


# LYMPH NODES

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# Regional Lymph Nodes

Segment	Regional Lymph Nodes
Cecum	Pericolic, anterior cecal, posterior cecal, ileocolic, right colic
Ascending colon	Pericolic, ileocolic, right colic, middle colic
Hepatic flexure	Pericolic, middle colic, right colic
Transverse colon	Pericolic, middle colic
Splenic flexure	Pericolic, middle colic, left colic, inferior mesenteric



# Regional Lymph Nodes

Segment	Regional Lymph Nodes
Descending colon	Pericolic, left colic, inferior mesenteric, sigmoid
Sigmoid colon	Pericolic, inferior mesenteric, superior rectal, superior hemorrhoidal, sigmoidal, sigmoid mesenteric
Rectosigmoid	Perirectal, left colic, sigmoid mesenteric, sigmoidal, inferior mesenteric, superior rectal, superior hemorrhoidal, middle hemorrhoidal
Rectum	Perirectal, sigmoid mesenteric, inferior mesenteric, lateral sacral, presacral, internal iliac, sacral promontory (Gerota's) superior hemorrhoidal, inferior hemorrhoidal
Anus	Perirectal, anorectal, superficial inguinal, internal iliac, hypogastric, femoral, lateral sacral

# Common Metastatic Sites

- Discontinuous lesions in soft tissue adjacent to primary site
- Regional or distant lymph nodes for the primary site being abstracted as identified in Summary Staging Manual
- Brain
- Liver
- Lung
- Peritoneum
- Spinal cord (not frequent)

# AJCC STAGE

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- For clinical staging to apply, there must be a suspicion of cancer
- For pathologic staging to apply you must meet one of the following criteria:
  - Surgical resection per AJCC Colon chapter including polypectomy, segmental resection (ex: sigmoidectomy), partial colectomy, hemicolectomy, total colectomy)
  - Biopsy of highest T category PLUS biopsy of highest N category. (T<sub>4</sub>/N<sub>2</sub> proven)
  - Positive histologic confirmation of a metastatic site. (M<sub>1</sub> proven).
- For post therapy staging to apply you must have systemic and/or radiation therapy followed by surgery

# Clinical Stage

Incorporates info from physical exam, endoscopy, imaging, biopsies, and surgical exploration ***without*** resection

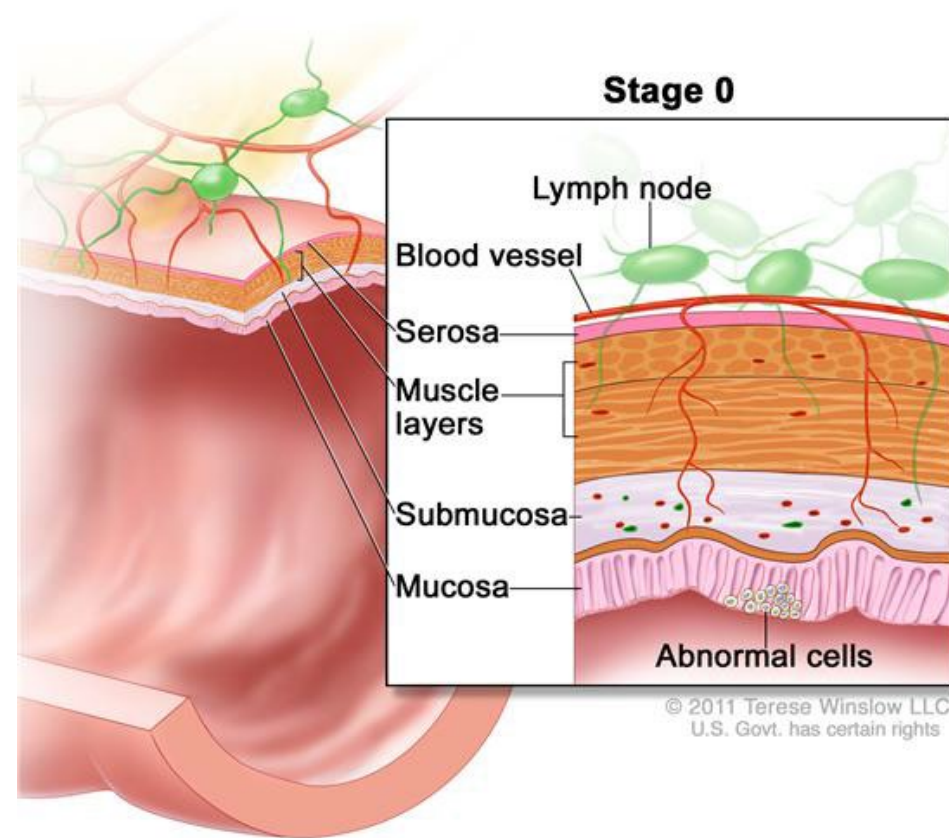
Clinical classification composed of:

- cT
- cN
- cM or pM



# Definitions of Primary Tumor

- TX - Primary tumor cannot be assessed
- To - No evidence of primary tumor
- Tis - carcinoma in situ; intraepithelial or invasion of lamina propria
- \*Note: Tis includes cancer cells confined within the glandular basement membrane (intraepithelial) or mucosal lamina propria (intramucosal) with no extension through the muscularis mucosae into the submucosa.



# Clinical M

## **cMo**

- No symptoms or signs of mets
- There is no MX category, so it must be Mo or M1 or left blank
- Only H&P needed to assign cMo

## **cM1**

- Seen on physical exam or imaging
- Seen during scopes or operations, but not bx

## **pM1**

- Diagnosed by biopsy

# Pathological Clarification

Pathological classification composed of:

- pT
- pN
- cM or pM

# pT

In general, resection of primary tumor is required

- Based on tumor size of extent of contiguous spread
- Record size to the nearest whole millimeter
- Biopsy which allows evaluation of highest T category is adequate to stage,
  - pT can be assigned without resection

# pN

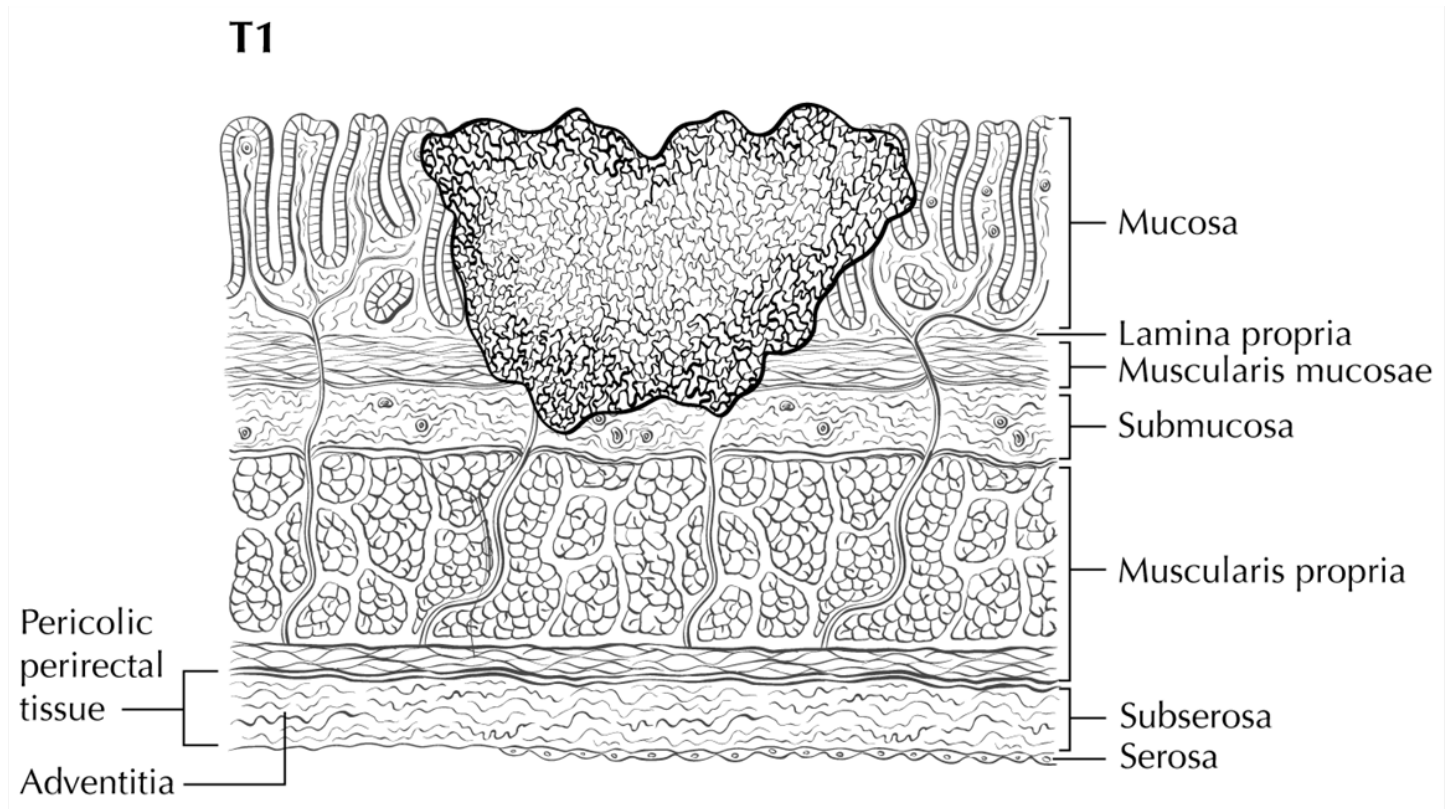
- Regional node assessment for pathological classification:
- Number of nodes resected
  - Requires pathologic assessment of at least ONE node
  - Minimum number for sufficient sampling is explained in each chapter; however, if fewer than minimum number sampled, you can still assign pN
- Usually need pT to code pN
  - Microscopic evaluation of highest N category can be used to assign pN, even if T is cT

# pM

- pM can only be M1 (or 1a, 1b, 1c) or blank

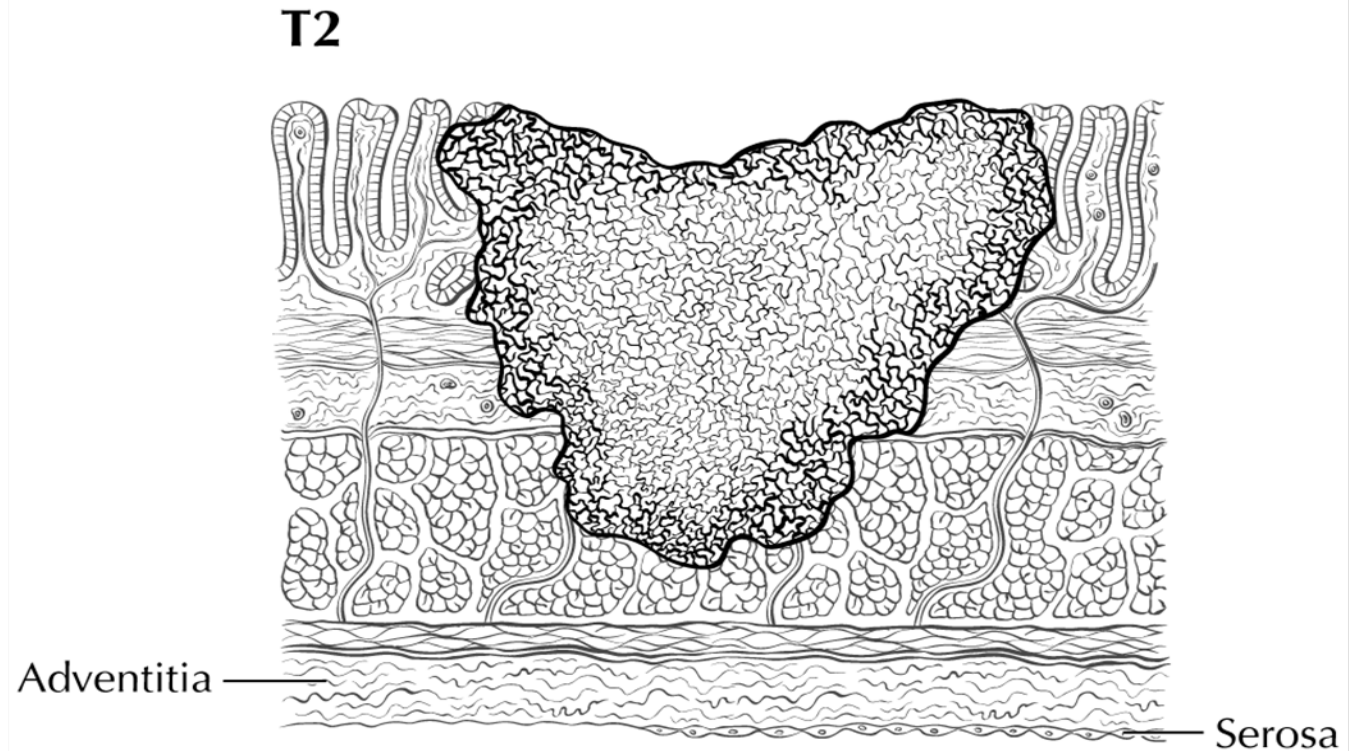
# Definitions of Primary Tumor

- T<sub>1</sub> – tumor invades submucosa
- Through the muscularis mucosa but not into the muscularis propria



# Definitions of Primary Tumor

- T<sub>2</sub> – tumor invades muscularis propria

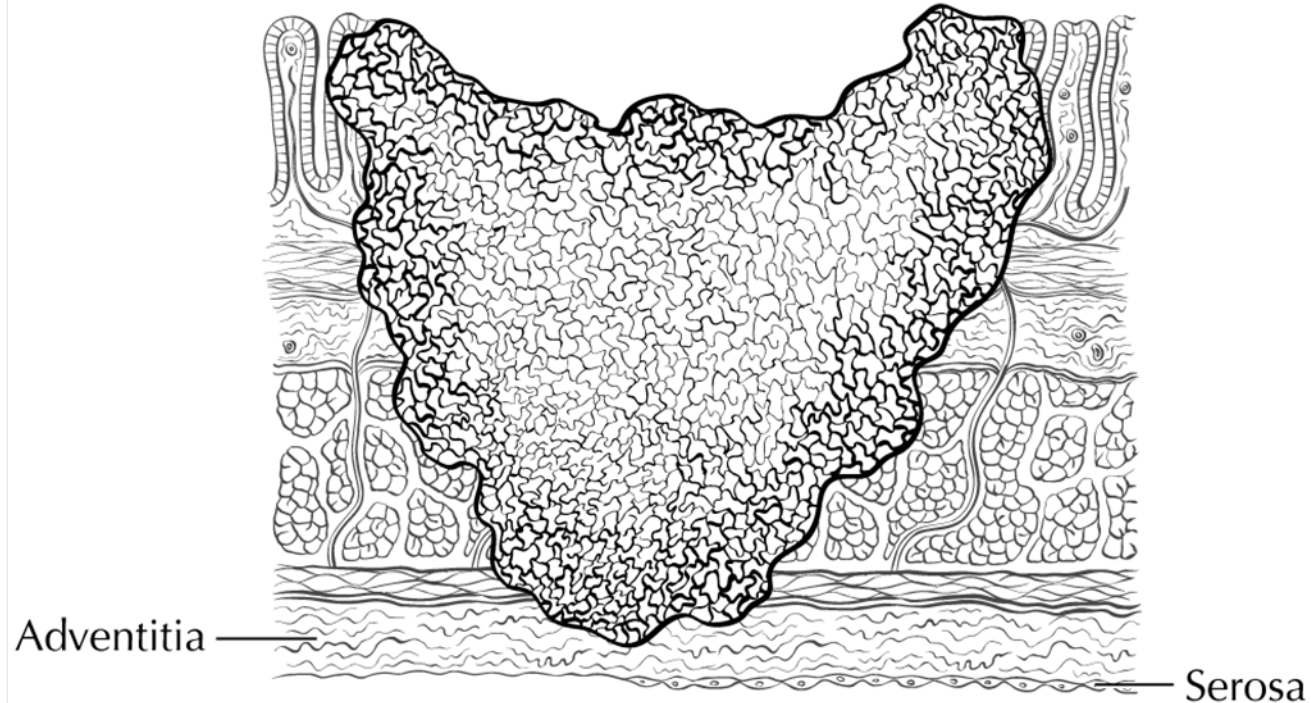




# Definitions of Primary Tumor

- T<sub>3</sub> – tumor invades through the muscularis propria into pericorectal tissues

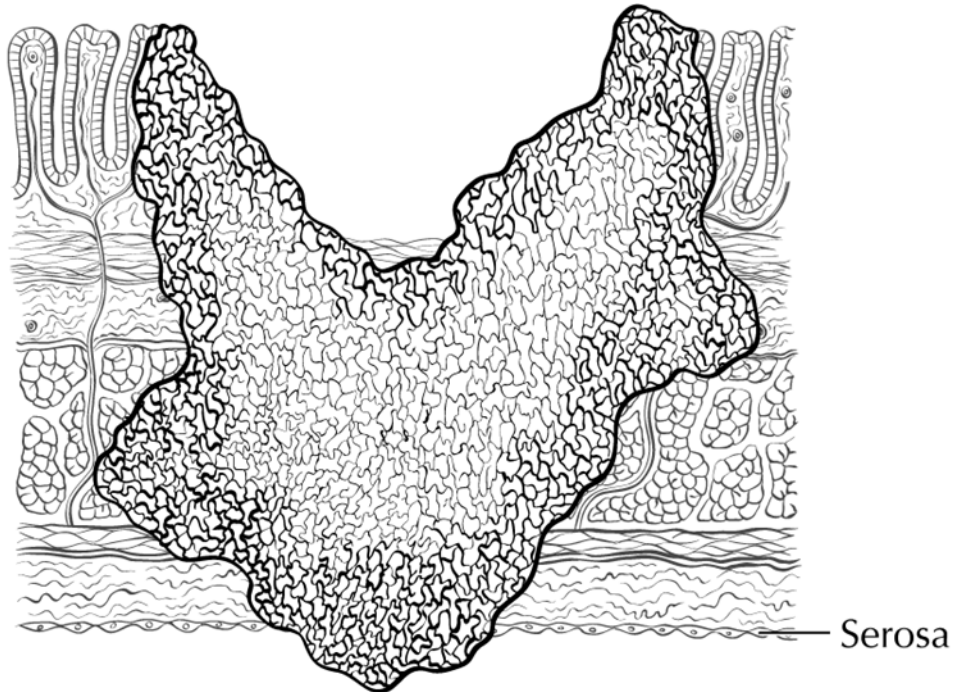
**T3**



# Definitions of Primary Tumor

- T<sub>4a</sub> – tumor invades through the visceral peritoneum

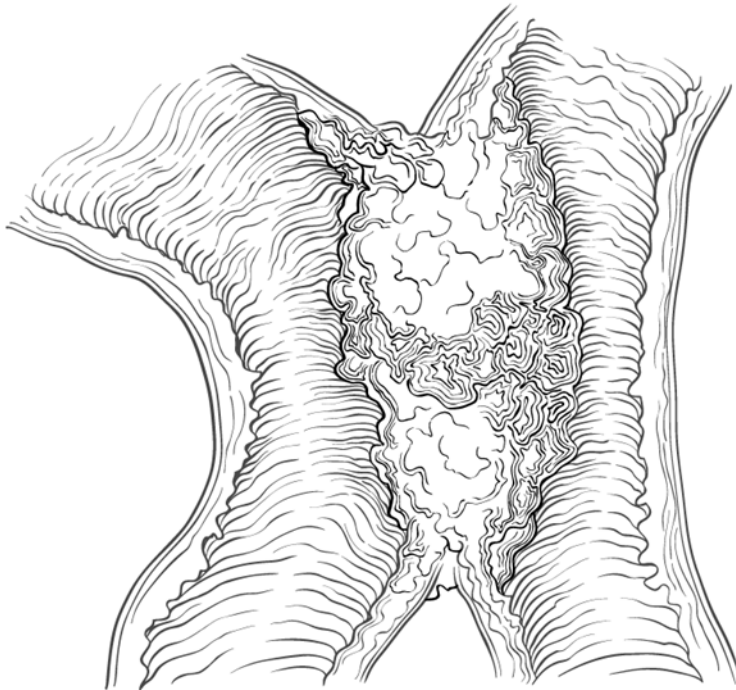
**T<sub>4a</sub>**



# Definitions of Primary Tumor

- T<sub>4</sub>b – tumor directly invades or is adherent to other organs or structures

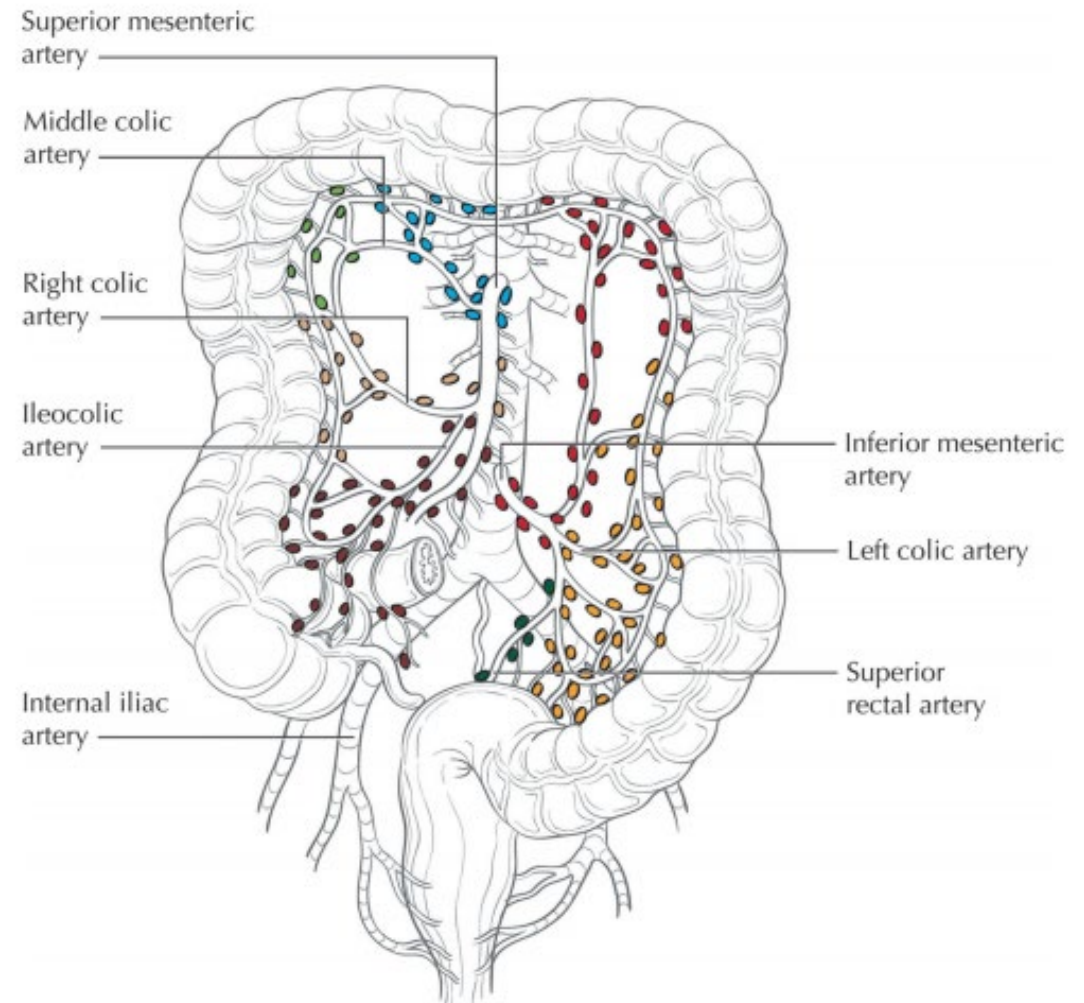
**T4b**



# Regional nodes

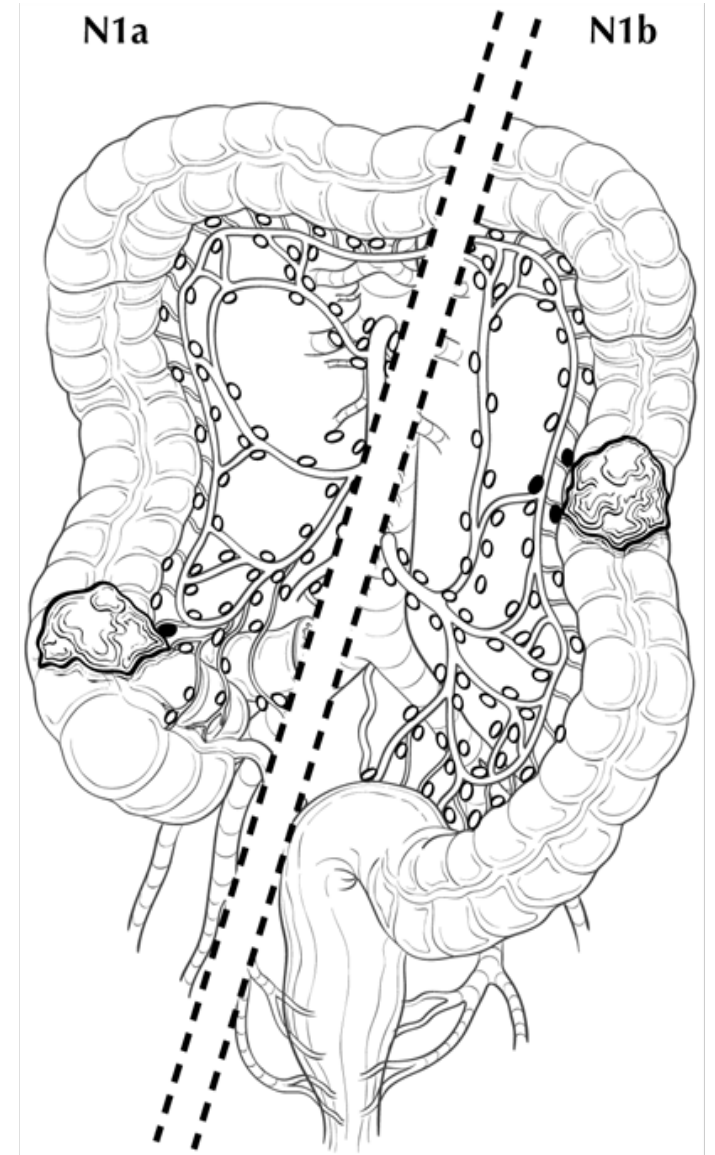
The 'N' category designates the presence or absence of tumor in the regional LNs; increasing numerical involvement based on size, fixation, or invasion of the capsule that surrounds the LN, OR on number/location of involved LNs

Segment	Regional lymph nodes
Cecum	Pericolic, ileocolic, right colic
Ascending colon	Pericolic, ileocolic, right colic, right branch of the middle colic
Hepatic flexure	Pericolic, ileocolic, right colic, middle colic
Transverse colon	Pericolic, middle colic
Splenic flexure	Pericolic, middle colic, left colic
Descending colon	Pericolic, left colic, sigmoid, inferior mesenteric
Sigmoid colon	Pericolic, sigmoid, superior rectal (hemorrhoidal), inferior mesenteric
Rectosigmoid	Pericolic, sigmoid, superior rectal (hemorrhoidal), inferior mesenteric
Rectum	Mesorectal, superior rectal (hemorrhoidal), inferior mesenteric, internal iliac, inferior rectal (hemorrhoidal)



# Definitions of regional nodes

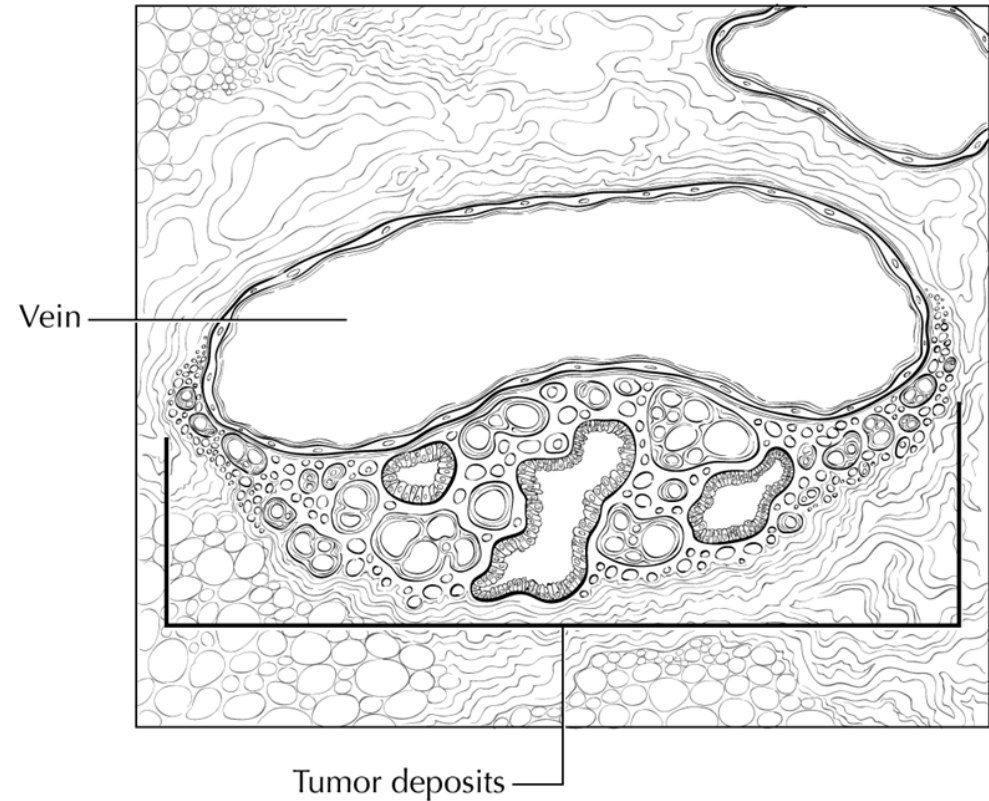
- NX – regional LNs cannot be assessed
- No – no regional LN metastasis
- N1 – mets in 1-3 regional LNs
- N1a – mets in one regional LN
- N1b – mets in 2-3 regional LNs





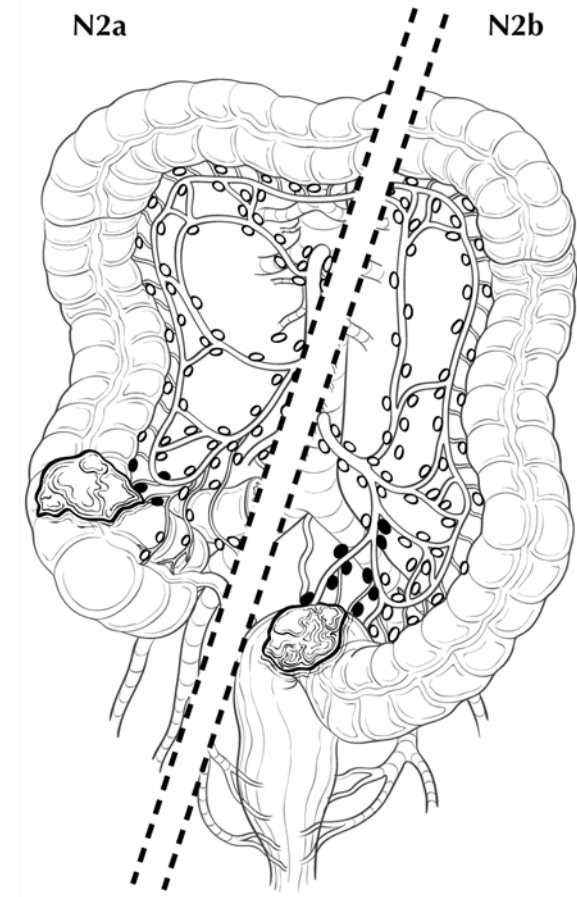
# Definitions of N

- N<sub>1c</sub> – tumor deposits in the subserosa, mesentery, or nonperitonealized pericolic tissues *without* regional nodal metastasis



# Definitions of N

- N2 – mets in four or more regional LNs
- N2a – mets in 4-6 regional LNs
- N2b – mets in seven or more regional LNs



# Metastases

- M component identifies the presence or absence of distant mets
- M<sub>0</sub> – no distant metastasis
- M<sub>1</sub> – distant metastasis NOS
- M<sub>1a</sub> – mets confined to one organ or site
- M<sub>1b</sub> – mets to more than one organ/site or the peritoneum
- M<sub>1c</sub> – mets to the peritoneal surface is identified alone or with other site or organ mets



# Stage Grouping

- Allows grouping of patients with similar prognosis into fewer categories
- Useful for data analysis and treatment guideline development
- Stage groups summarize the stage information in a manner that is easily communicated and reproducible

- Clinical Stage Group

- cT
- cN
- cM or pM

- Pathologic Stage Group

- pT
- pN
- cM or pM

- Post Tx Stage Group

- PostTxT
- PostTxN
- PostTXcM or pM

# Rules for stage groupings with AJCC

## Subcategory info not available to registrar

- Assign main category (available in all AJCC tables)
- Do **NOT** assign lower subcategory

## Stage group info not available to registrar

- e.g., missing subcategory or prognostic factor category
- Do **NOT** assign stage group
- Document stage group as unknown

# TNM Stage Group

## AJCC PROGNOSTIC STAGE GROUPS

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

# When to use blanks and x's

- "X" indicates something was done for T or N Category Code but result was not clear in the test report to assess the primary tumor size/extent or nodal status. "X" does not equal "Unknown"
- <blank> indicates no test was performed, patient not eligible to stage, no info available in medical record on staging to determine T or N Category Code
- M Category always has to be coded when the patient meets eligibility criteria for staging. There can never be a mX or a blank M category when T and N are coded.
- cMo can be used for clinical no evidence of mets AND for pathological when mets not proven histologically
- pM1 is histologically proven mets (bx or resection) and can be used for clinical and pathological

# Blanks and x continued

Blank		X	
Blank = info not available OR doesn't meet staging criteria		X = cannot be assessed	
<ul style="list-style-type: none"><li>• Valid only for TNM categories</li><li>• Use when you know staging was done, but info is not in chart</li><li>• don't default to X</li></ul>		<ul style="list-style-type: none"><li>• Valid only with T and N categories</li><li>• Not a default</li><li>• Not equivalent to unknown</li></ul>	
Clinical		Pathologic	
<ul style="list-style-type: none"><li>• cTX – patient not examined, no imaging or workup</li><li>• cT blank – no access to information when abstracting case</li><li>• cT blank – incidental finding at surgery</li></ul>		<ul style="list-style-type: none"><li>• pTX – resection performed, but the specimen was lost or destroyed</li><li>• pT blank – no surgical resection</li><li>• pT blank – no access to information when abstracting case</li></ul>	

## Have the rules for classification for T been met?



Data Item	Value
Clinical T	cT2
Clinical N	cN0
Clinical M	cM0
Clinical Stage	2
Pathologic T	pT2
Pathologic N	<u>pNX</u>
Pathologic M	cM0
Pathologic Stage	99

Data Item	Value
Clinical T	
Clinical N	
Clinical M	
Clinical Stage	99
Pathologic T	
Pathologic N	
Pathologic M	
Pathologic Stage	99

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# SURGERIES

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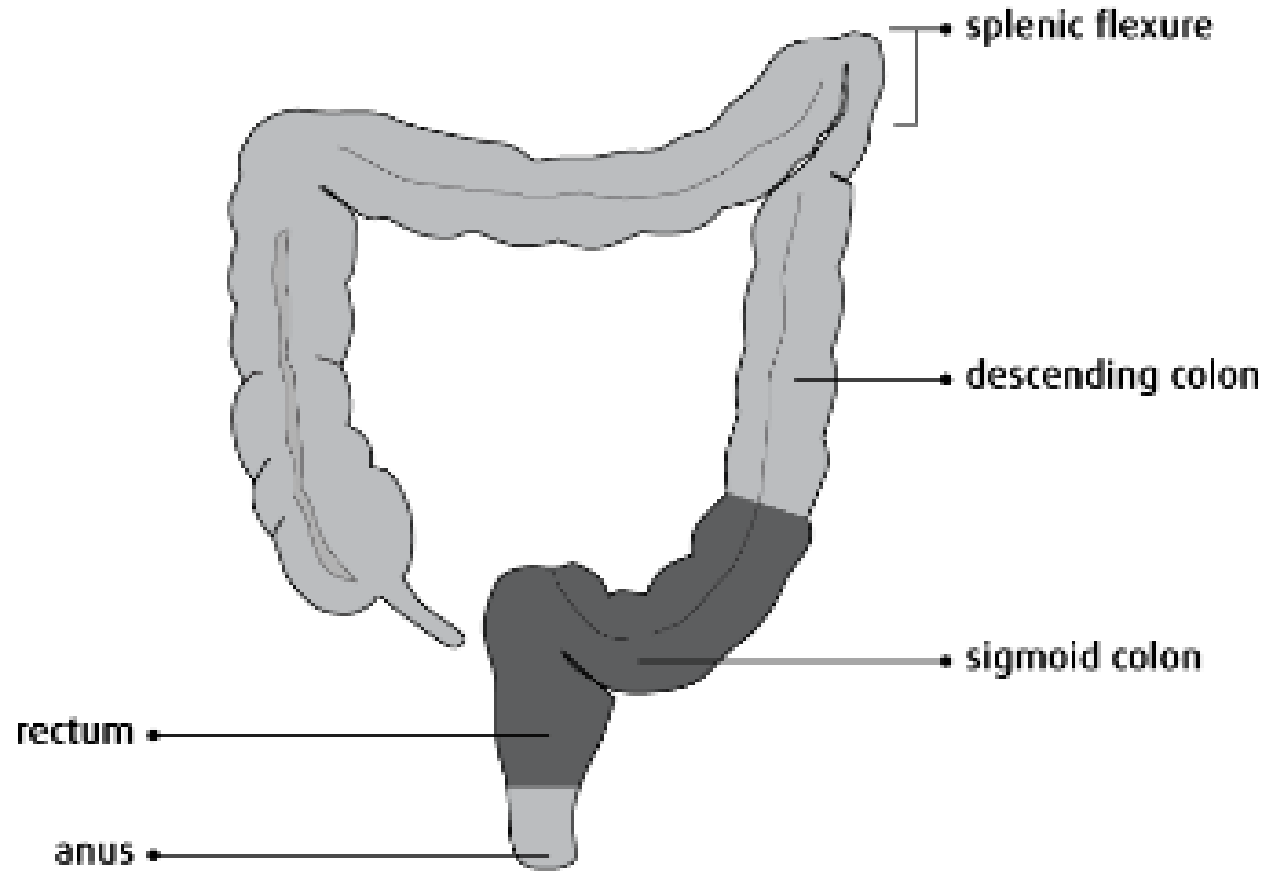


The primary treatment for colon cancer is surgery

Part of the large bowel and the surrounding lymph nodes are removed

The remaining bowel is then joined together (anastomosis)

# Low Anterior Resection (LAR)

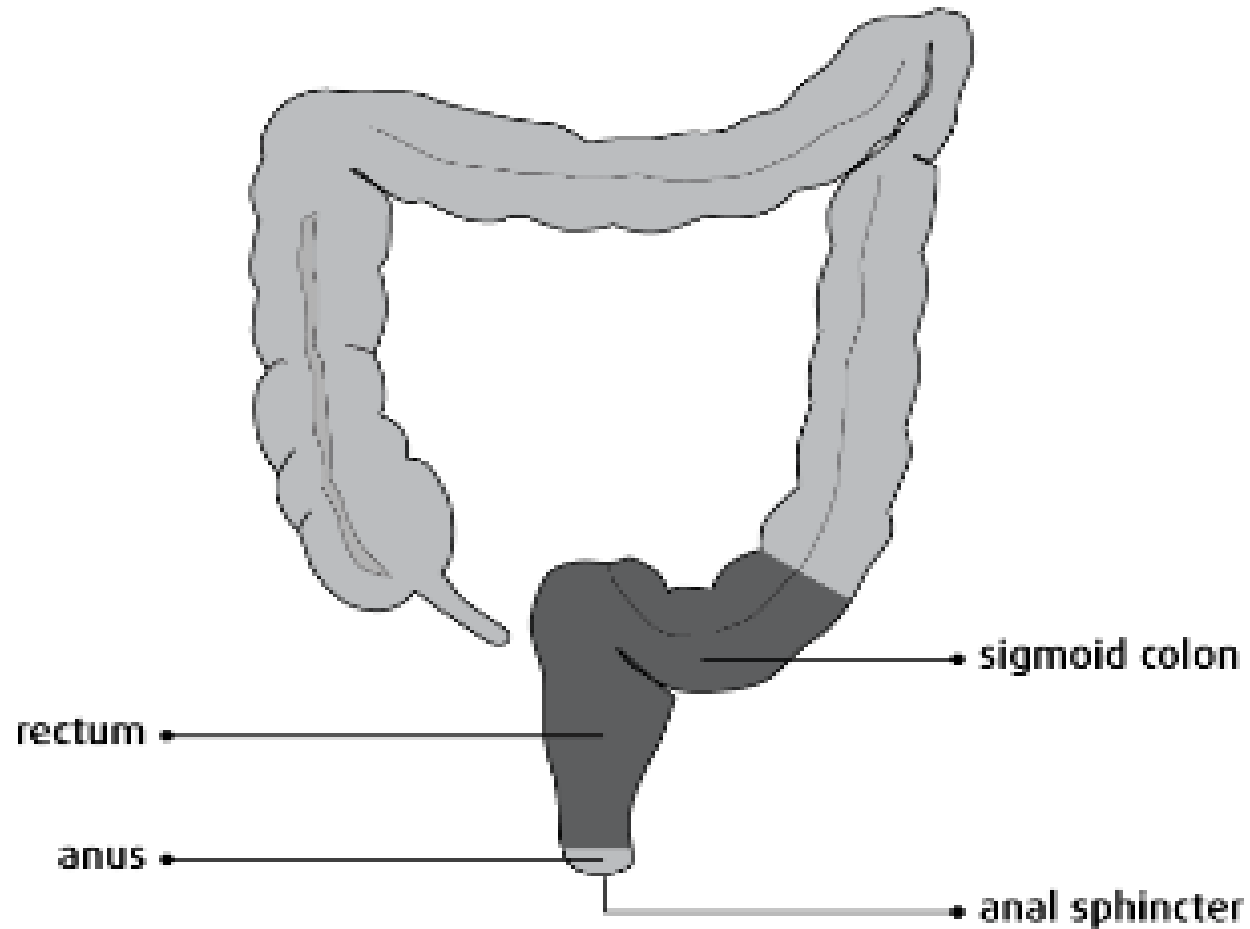


**Type:**  
Segmental Resection

**Description:**

- A low anterior resection removes the sigmoid colon and part of the rectum
- It is used to remove tumors in the middle or upper part of the rectum

# Proctocolectomy with Coloanal Anastomosis



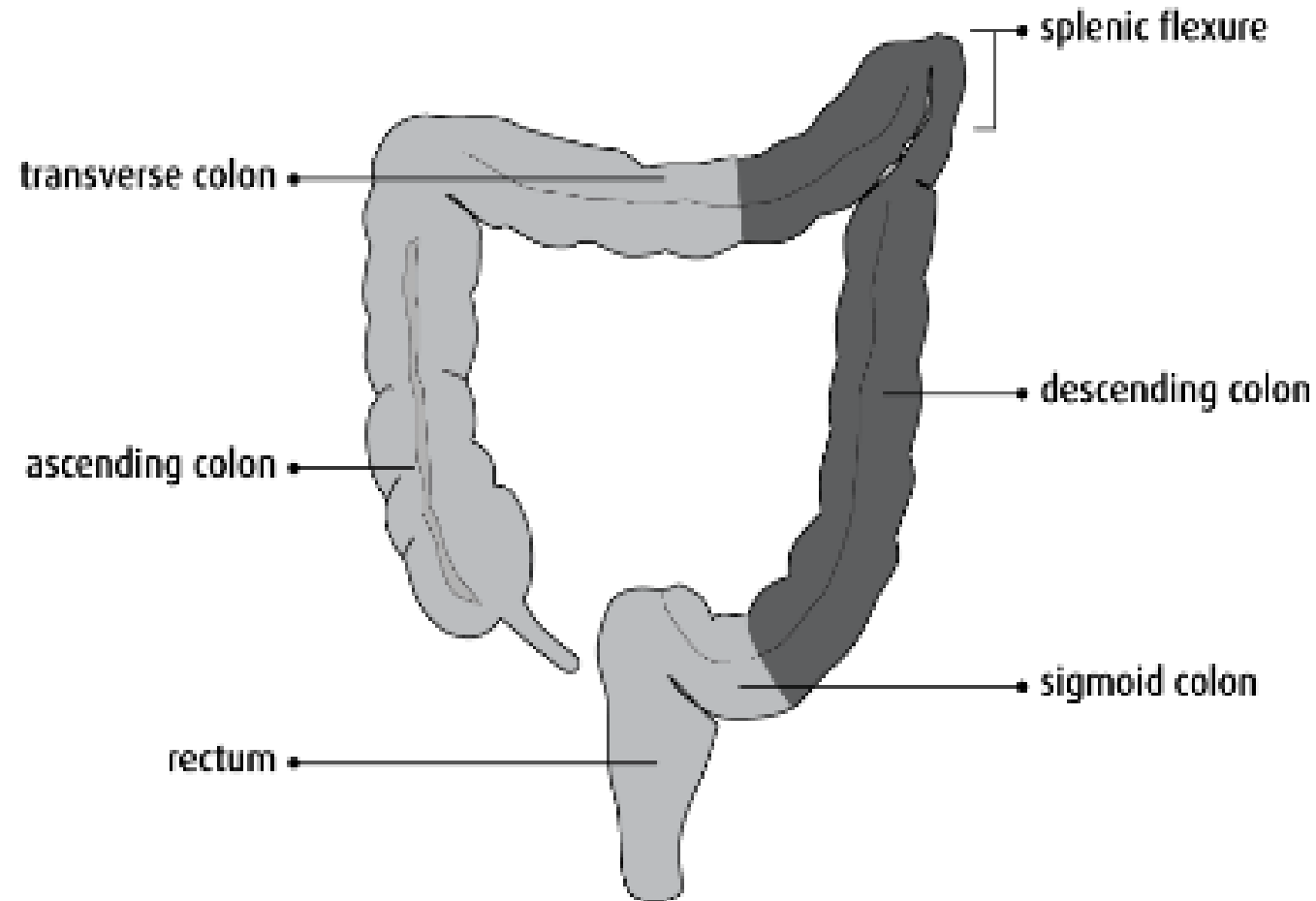
## Type:

Segmental Resection

## Description:

- A proctocolectomy (also called a proctectomy) removes all of the rectum and part of the sigmoid colon
- Coloanal anastomosis joins the remaining colon to the anus

# Left Hemicolectomy



## Purpose:

A left hemicolectomy is used to remove tumours in the transverse colon, splenic flexure (the bend in the colon near the spleen) and the descending colon.

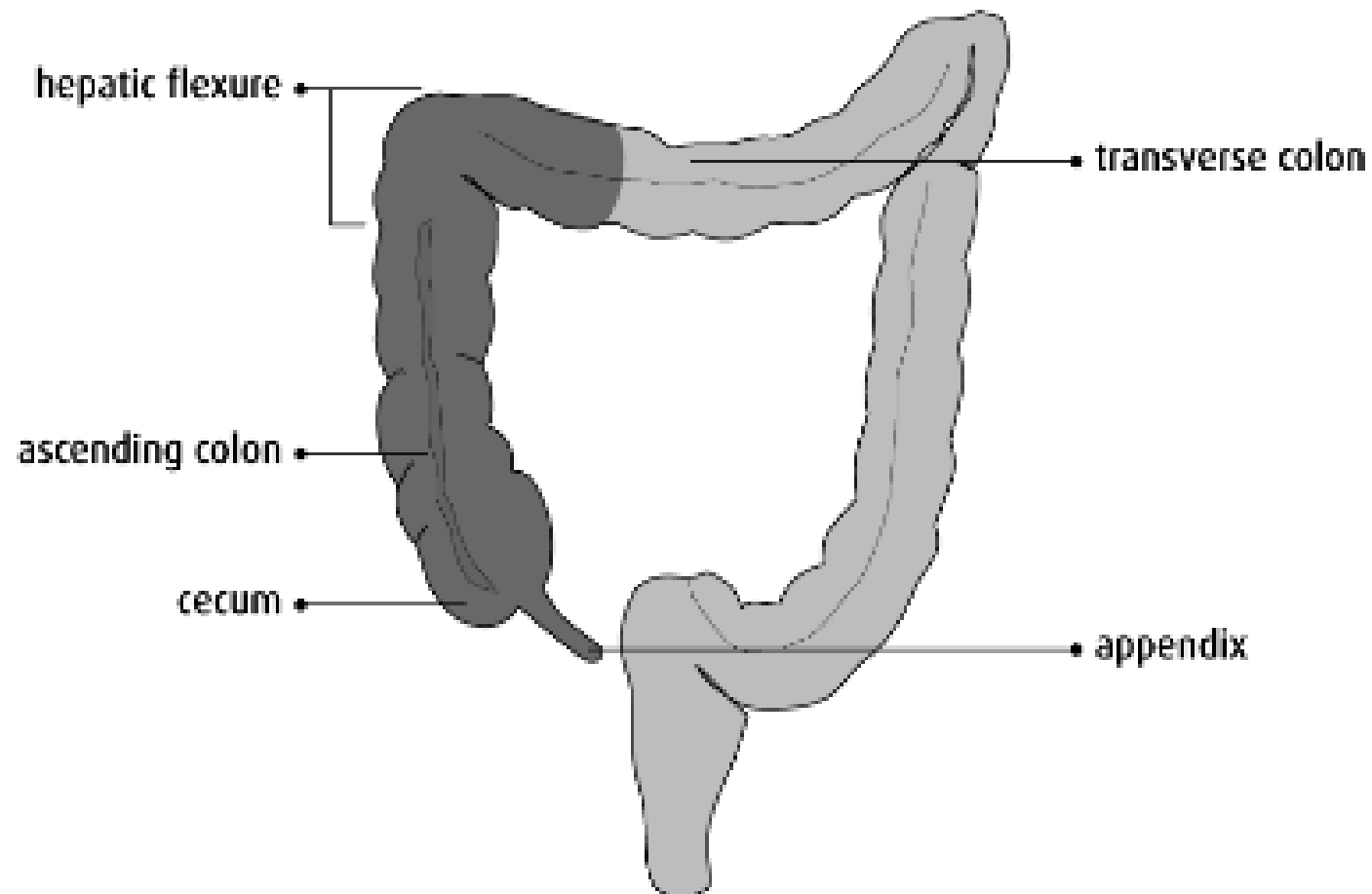
## Description:

The surgeon removes a portion of the transverse colon, the descending colon, and the sigmoid colon and then connects the transverse colon to the rectum.

## Store 2018 Code:

**40:** Left subtotal colectomy or Left hemicolectomy (total left colon and a portion of transverse colon).

# Right Hemicolectomy



## Purpose:

A right hemicolectomy is used to remove tumours in the right colon, including the cecum and ascending colon. It may be done for tumours in the appendix.

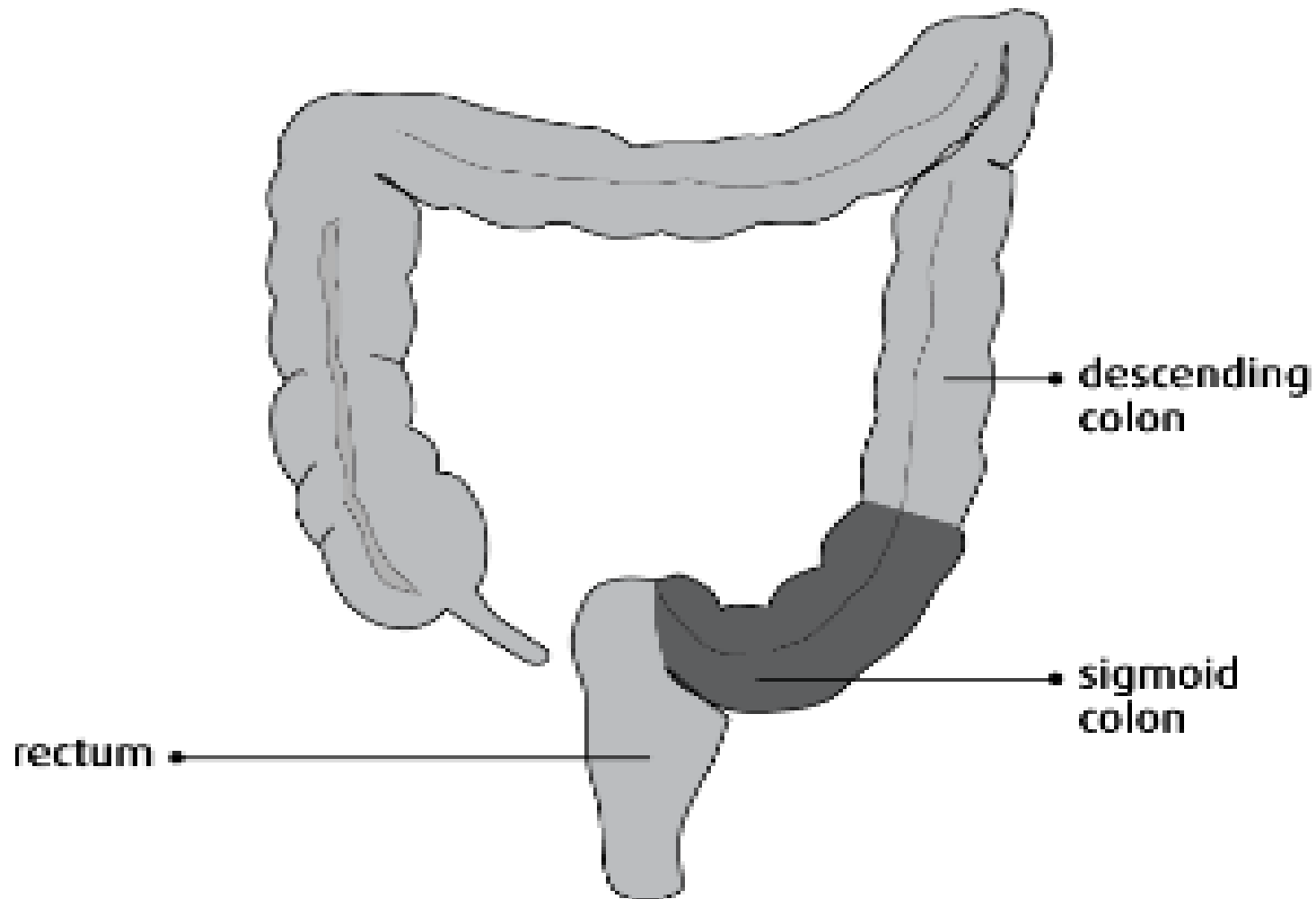
## Description:

The surgeon removes the ascending colon and a portion of the transverse colon and then connects the transverse colon to the end of the small intestine.

## Store 2018 Code:

40: Right subtotal colectomy or Right hemicolectomy (total right colon, cecum, appendix and a portion of transverse colon).

# Sigmoid Colectomy



## Purpose:

A sigmoid colectomy is used to remove tumors in the sigmoid colon

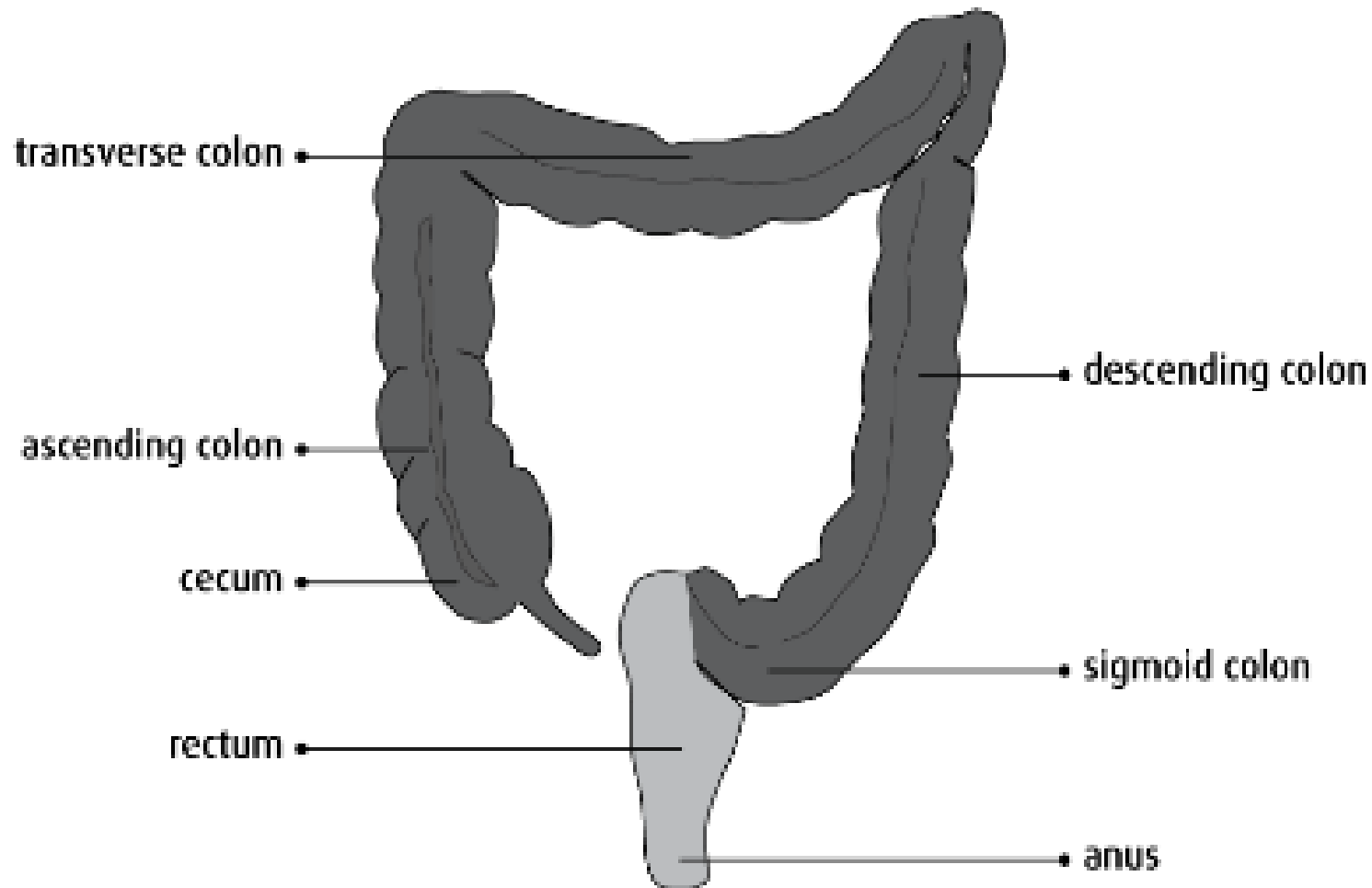
## Description:

The surgeon removes the diseased portion of the sigmoid colon and then connects the descending colon to the rectum

## Store 2018 Code:

**30:** Partial colectomy, segmental resection

# Total Colectomy



## Purpose:

Total colectomy is done when there is cancer on both the right and left sides of the colon and as a way to prevent colorectal cancer for some people with familial adenomatous polyposis (FAP) or Lynch syndrome

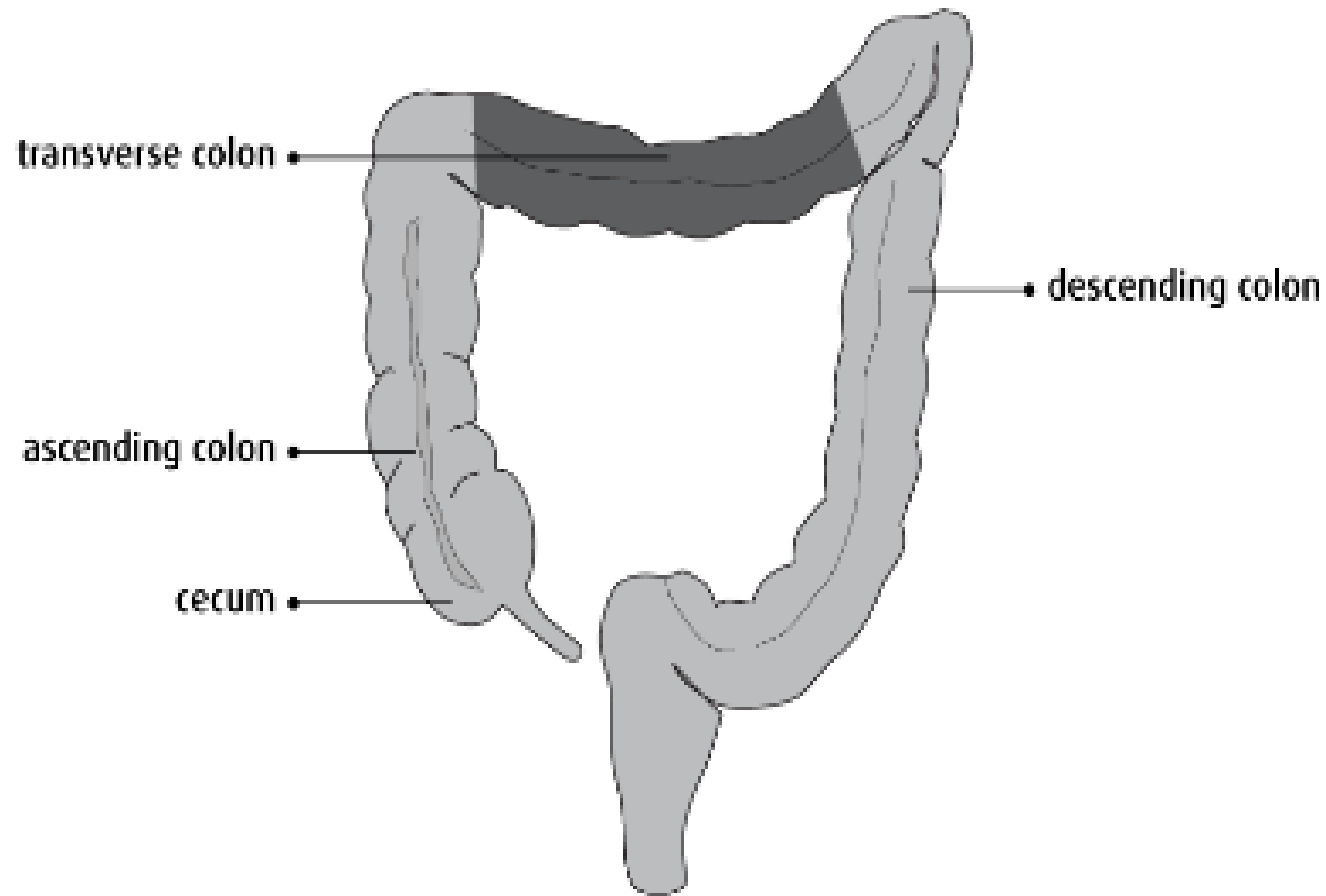
## Description:

If all of the colon is removed, including the cecum and the appendix, it is called a total colectomy.

## Store 2018 Code:

**50:** Total colectomy (removal of colon from cecum to the rectosigmoid junction; may include a portion of the rectum).

# Transverse Colectomy



## Purpose:

A transverse colectomy may be done to remove a tumor in the middle of the transverse colon when the cancer hasn't spread to any other parts of the colon.

## Description:

A transverse colectomy removes the transverse colon

## Store 2018 Code:

**30:** Partial colectomy, segmental resection.

## Common Terms:

Transverse colectomy

Transverse colon resection



# SSDI

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- CEA (Carcinoembryonic Antigen) [3820]
- Circumferential Resection Margin [3823]
- KRAS [3866]
- Microsatellite Instability (MSI) [3890]
- Perineural Invasion [3909]
- Tumor Deposits [3934]
- BRAF Mutational Analysis [3940]
- NRAS Mutational Analysis [3941]

# CEA

- CEA (Carcinoembryonic Antigen) Pretreatment Lab Value records the CEA value prior to treatment or polypectomy
- CEA is a nonspecific tumor marker that has prognostic significance for colon and rectum cancer
- The lab value may be recorded in a lab report, history and physical, or clinical statement in the pathology report

# Circumferential Resection Margin

# KRAS

# Microsatellite Instability (MSI)

# Perineural Invasion

# Tumor Deposits



# **BRAF Mutational Analysis**

# NRAS Mutational Analysis

# Let's work this together!

Patient undergoes colonoscopy with biopsy of a large polyp in the sigmoid colon. Resection reveals tubulovillous adenocarcinoma of the sigmoid colon

What is the histology code?

# What we covered today

- Ambiguous Terminology
- Class of Case
- Anatomy
- Topography / Morphology
- Histology