



# Protocol for the Examination of Specimens From Patients With Carcinoma of the Anus

Protocol applies to all invasive carcinomas of the anal canal.  
Perianal tumors are not included.

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Based on AJCC/UICC TNM, 7th edition

Protocol web posting date: October 2013

## Procedures

- Excisional Biopsy
- Local Excision (Transanal Disk Incision)
- Abdominoperineal Resection

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## CAP Anus Protocol Revision History

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### Version Code

The definition of the version code can be found at [www.cap.org/cancerprotocols](http://www.cap.org/cancerprotocols).

**Version:** Anus 3.2.0.1

### Summary of Changes

The following changes have been made since the June 2012 release.

#### Excisional Biopsy or Local Excision (Transanal Disk Excision)

##### Margins

“Carcinoma in situ” was changed to “carcinoma in situ (high-grade squamous intraepithelial lesion)” and “at mucosal margin” was deleted, as follows:

##### Margins (select all that apply)

- Cannot be assessed
- Margins uninvolved by invasive carcinoma
  - Distance of invasive carcinoma from closest margin: \_\_\_ mm *or* \_\_\_ cm
  - Specify margin (if possible): \_\_\_\_\_
  - Carcinoma in situ (high-grade squamous intraepithelial lesion) absent
  - Carcinoma in situ (high-grade squamous intraepithelial lesion) present
- Margin(s) involved by invasive carcinoma
  - Specify margin (if possible): \_\_\_\_\_
- Not applicable (specify reason): \_\_\_\_\_

##### Additional Pathologic Findings

The spelling of “acuminatum” was corrected and “Anal fistula” reporting element was added.

#### Abdominoperineal Resection

##### Margins

“Carcinoma in situ” was changed to “carcinoma in situ (high-grade squamous intraepithelial lesion)” and “at mucosal margin” was deleted, as follows:

##### Proximal Margin

- Cannot be assessed
- Uninvolved by invasive carcinoma
  - Carcinoma in situ (high-grade squamous intraepithelial lesion) absent
  - Carcinoma in situ (high-grade squamous intraepithelial lesion) present
- Involved by invasive carcinoma

##### Distal Margin

- Cannot be assessed
- Uninvolved by invasive carcinoma
  - Carcinoma in situ (high-grade squamous intraepithelial lesion) absent
  - Carcinoma in situ (high-grade squamous intraepithelial lesion) present
- Involved by invasive carcinoma

##### Additional Pathologic Findings

The spelling of “acuminatum” was corrected and “Anal fistula” reporting element was added.

## Surgical Pathology Cancer Case Summary

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Protocol web posting date: October 2013

### ANUS: Excisional Biopsy or Local Excision (Transanal Disk Excision)

Select a single response unless otherwise indicated.

#### Specimen (select all that apply)

- Anal canal
- Anorectal junction
- Rectum
- Perianal skin
- Other (specify): \_\_\_\_\_
- Not specified

#### Procedure

- Excisional biopsy (polypectomy)
- Local excision (transanal disk excision)
- Other (specify): \_\_\_\_\_
- Not specified

#### Specimen Integrity (Note A)

- Intact
- Fragmented
  - + Number of pieces in fragmented specimens: \_\_\_\_
- Other (specify): \_\_\_\_\_

#### Tumor Site (Note B)

- Anal canal
- Anorectal junction
- Anus, not otherwise specified
- Unknown
- Other (specify): \_\_\_\_\_

#### Tumor Size

- Greatest dimension: \_\_\_\_ cm
- + Additional dimensions: \_\_\_\_x\_\_\_\_ cm
- Cannot be determined (see Comment)

#### Histologic Type (Note C)

- Squamous cell carcinoma
- Adenocarcinoma
- Mucinous adenocarcinoma
- High-grade neuroendocrine carcinoma
  - Large cell neuroendocrine carcinoma
  - Small cell neuroendocrine carcinoma
- Undifferentiated carcinoma
- Paget disease
- Other (specify): \_\_\_\_\_

+ Data elements preceded by this symbol are not required. However, these elements may be clinically important but are not yet validated or regularly used in patient management.

**Histologic Grade (Note D)**

- Not applicable  
 GX: Cannot be assessed  
 G1: Well differentiated  
 G2: Moderately differentiated  
 G3: Poorly differentiated  
 G4: Undifferentiated  
 Other (specify): \_\_\_\_\_

**Microscopic Tumor Extension**

- Cannot be assessed  
 No evidence of primary tumor  
 Carcinoma in situ  
 Tumor invades lamina propria  
 Tumor invades muscularis mucosae  
 Tumor invades submucosa  
 Tumor invades sphincter muscle  
 Tumor invades perianal skin

**Margins (select all that apply)**

- Cannot be assessed  
 Margins uninvolved by invasive carcinoma  
     Distance of invasive carcinoma from closest margin: \_\_\_ mm *or* \_\_\_ cm  
     Specify margin (if possible): \_\_\_\_\_  
      Carcinoma in situ (high-grade squamous intraepithelial lesion) absent  
      Carcinoma in situ (high-grade squamous intraepithelial lesion) present  
 Margin(s) involved by invasive carcinoma  
     Specify margin (if possible): \_\_\_\_\_  
 Not applicable (specify reason): \_\_\_\_\_

**Treatment Effect (applicable to carcinomas treated with neoadjuvant therapy) (Note E)**

- No prior treatment  
 Present  
     +  Complete response (no viable tumor cells, grade 0)  
     +  Moderate response (single cells or small groups of tumor cells, grade 1)  
     +  Minimal response (residual tumor outgrown by fibrosis, grade 2)  
 No definite response identified (grade 3, poor or no response; extensive residual tumor)  
 Not known

**+ Lymph-Vascular Invasion**

- Not identified  
 Present  
 Indeterminate

**+ Perineural Invasion**

- Not identified  
 Present  
 Indeterminate

+ Data elements preceded by this symbol are not required. However, these elements may be clinically important but are not yet validated or regularly used in patient management.

**Pathologic Staging (pTNM) (Note F)**TNM Descriptors (required only if applicable) (select all that apply)

- m (multiple primary tumors)
- r (recurrent)
- y (posttreatment)

Primary Tumor (pT)

- pTX: Cannot be assessed
- pT0: No evidence of primary tumor
- pTis: Carcinoma in situ
- pT1: Tumor 2 cm or less in greatest dimension
- pT2: Tumor more than 2 cm but not more than 5 cm in greatest dimension
- pT3: Tumor more than 5 cm in greatest dimension
- pT4: Tumor of any size with invasion of adjacent organ(s); eg, vagina, urethra, bladder (involvement of sphincter muscles alone is not classified as T4).

**+ Additional Pathologic Findings (select all that apply) (Note G)**

- +  None identified
- +  Crohn disease
- +  Condyloma acuminatum
- +  Anal fistula
- +  Dysplasia
- +  Associated rectal carcinoma (Paget disease)
- +  Other (specify): \_\_\_\_\_

**+ Ancillary Studies (Note H)**

- + Specify: \_\_\_\_\_
- +  Not performed

**+ Clinical History (select all that apply) (Note I)**

- +  Solid organ transplantation
- +  HIV/AIDS
- +  Human papillomavirus infection
- +  Crohn disease
- +  Neoadjuvant therapy (specify type, if known): \_\_\_\_\_
- +  Other (specify): \_\_\_\_\_
- +  Not known

**+ Comment(s)**

+ Data elements preceded by this symbol are not required. However, these elements may be clinically important but are not yet validated or regularly used in patient management.

## Surgical Pathology Cancer Case Summary

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Protocol web posting date: October 2013

### ANUS: Abdominoperineal Resection

Select a single response unless otherwise indicated.

#### Specimen (select all that apply)

- Anal canal
- Anorectal junction
- Rectum
- Perianal skin
- Other (specify): \_\_\_\_\_
- Not specified

#### Procedure

- Abdominoperineal resection
- Other (specify): \_\_\_\_\_
- Not specified

#### Tumor Site (select all that apply) (Note B)

- Anal canal
- Anorectal junction
- Anus, not otherwise specified
- Unknown
- Other (specify): \_\_\_\_\_

#### Tumor Size

- Greatest dimension: \_\_\_ cm  
 + Additional dimensions: \_\_\_ x \_\_\_ cm  
 Cannot be determined (see Comment)

#### Histologic Type (Note C)

- Squamous cell carcinoma
- Adenocarcinoma
- Mucinous adenocarcinoma
- High-grade neuroendocrine carcinoma
  - Large cell neuroendocrine carcinoma
  - Small cell neuroendocrine carcinoma
- Undifferentiated carcinoma
- Paget disease
- Other (specify): \_\_\_\_\_
- Carcinoma, type cannot be determined

+ Data elements preceded by this symbol are not required. However, these elements may be clinically important but are not yet validated or regularly used in patient management.

**Histologic Grade (Note D)**

- Not applicable
- GX: Cannot be assessed
- G1: Well differentiated
- G2: Moderately differentiated
- G3: Poorly differentiated
- G4: Undifferentiated
- Other (specify): \_\_\_\_\_

**Microscopic Tumor Extension**

- Cannot be assessed
- No evidence of primary tumor
- Carcinoma in situ
- Tumor invades lamina propria
- Tumor invades muscularis mucosae
- Tumor invades submucosa
- Tumor invades into but not through sphincter muscle
- Tumor invades into but not through muscularis propria of rectum
- Tumor invades through sphincter muscle into perianal or perirectal soft tissue without involvement of adjacent structures
- Tumor directly invades adjacent structures (specify): \_\_\_\_\_
- Tumor invades perianal skin

**Margins (select all that apply)**

If all margins uninvolved by invasive carcinoma:

Distance of invasive carcinoma from closest margin: \_\_\_ mm *or* cm

Specify margin: \_\_\_\_\_

Proximal Margin

- Cannot be assessed
- Uninvolved by invasive carcinoma
  - Carcinoma in situ (high-grade squamous intraepithelial lesion) absent
  - Carcinoma in situ (high-grade squamous intraepithelial lesion) present
- Involved by invasive carcinoma

Distal Margin

- Cannot be assessed
- Uninvolved by invasive carcinoma
  - Carcinoma in situ (high-grade squamous intraepithelial lesion) absent
  - Carcinoma in situ (high-grade squamous intraepithelial lesion) present
- Involved by invasive carcinoma

Circumferential (Radial) Margin

- Cannot be assessed
- Uninvolved by invasive carcinoma
- Involved by invasive carcinoma

+ Data elements preceded by this symbol are not required. However, these elements may be clinically important but are not yet validated or regularly used in patient management.

Other Margin(s) (required only if applicable)

Specify margin(s): \_\_\_\_\_

- Cannot be assessed
- Uninvolved by invasive carcinoma
- Involved by invasive carcinoma

**Treatment Effect (applicable to carcinomas treated with neoadjuvant therapy) (select all that apply) (Note E)**

- No prior treatment
- Present
  - +  Complete response (no viable tumor cells, grade 0)
  - +  Moderate response (single cells or small groups of tumor cells, grade 1)
  - +  Minimal response (residual tumor outgrown by fibrosis, grade 2)
- No definite response identified (grade 3, poor or no response; extensive residual tumor)
- Not known

**+ Lymph-Vascular Invasion**

- +  Not identified
- +  Present
- +  Indeterminate

**+ Perineural Invasion**

- +  Not identified
- +  Present
- +  Indeterminate

**Pathologic Staging (pTNM) (Note F)**

TNM Descriptors (required only if applicable) (select all that apply)

- m (multiple primary tumors)
- r (recurrent)
- y (posttreatment)

Primary Tumor (pT)

- pTX: Cannot be assessed
- pT0: No evidence of primary tumor
- pTis: Carcinoma in situ
- pT1: Tumor 2 cm or less in greatest dimension
- pT2: Tumor more than 2 cm but not more than 5 cm in greatest dimension
- pT3: Tumor more than 5 cm in greatest dimension
- pT4: Tumor of any size with invasion of adjacent organ(s); eg, vagina, urethra, bladder (involvement of sphincter muscles alone is not classified as T4).

Regional Lymph Nodes (pN)

- pNX: Cannot be assessed
- pN0: No regional lymph node metastasis
- pN1: Metastasis in perirectal lymph nodes
- pN2: Metastasis in unilateral internal iliac and/or inguinal lymph node(s)
- pN3: Metastasis in perirectal and inguinal lymph nodes and/or bilateral internal iliac and/or inguinal lymph nodes
- No nodes submitted or found

+ Data elements preceded by this symbol are not required. However, these elements may be clinically important but are not yet validated or regularly used in patient management.

*Number of Lymph Nodes Examined*

Specify: \_\_\_\_

\_\_\_ Number cannot be determined (explain): \_\_\_\_\_

*Number of Lymph Nodes Involved*

Specify: \_\_\_\_

\_\_\_ Number cannot be determined (explain): \_\_\_\_\_

Distant Metastasis (pM)

\_\_\_ Not applicable

\_\_\_ pM1: Distant metastasis

+ Specify site(s), if known: \_\_\_\_\_

**+ Additional Pathologic Findings (select all that apply) (Note G)**

+ \_\_\_ None identified

+ \_\_\_ Crohn disease

+ \_\_\_ Condyloma acuminatum

+ \_\_\_ Anal fistula

+ \_\_\_ Dysplasia

+ \_\_\_ Associated rectal carcinoma (Paget disease)

+ \_\_\_ Other (specify): \_\_\_\_\_

**+ Ancillary Studies (Note H)**

+ Specify: \_\_\_\_\_

**+ Clinical History (select all that apply) (Note I)**

+ \_\_\_ Solid organ transplantation

+ \_\_\_ HIV/AIDS

+ \_\_\_ Human papillomavirus infection

+ \_\_\_ Crohn disease

+ \_\_\_ Neoadjuvant therapy (specify type if known): \_\_\_\_\_

+ \_\_\_ Other (specify): \_\_\_\_\_

+ \_\_\_ Not known

**+ Comment(s)**

## Explanatory Notes

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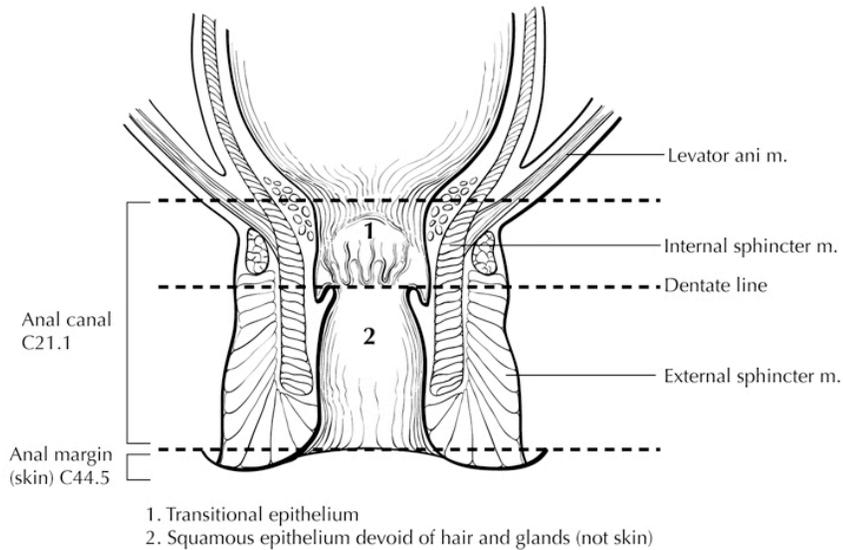
### A. Specimen Integrity and Handling

For specimens from local excision procedures, all relevant margins, including the deep resection margin, should be inked. Evaluation of margins and invasion is facilitated if the specimen is pinned before fixation in formalin.

### B. Location

Documentation of tumor location within the anal canal is important for purposes of stage assignment. Because of possible differences in staging and regional lymph nodes at risk of metastasis among cancers of the anal canal, the rectum, and the perianal skin, it is essential to assure that the anatomic site of the tumor is the anal canal. For the pathologist, however, the documentation of location may be problematic. Currently, most anal canal carcinomas are managed successfully without surgery, using combination chemotherapy and radiation therapy<sup>1</sup>; and resection specimens of anal tumors are seen only infrequently (primarily for small anal margin lesions or after failure of other treatment modalities). Although histological diagnosis is almost always performed on small biopsies, determination of the primary tumor location from biopsy specimens may be difficult or impossible. Therefore, documentation of anatomic site often requires clinical correlation.

A major problem complicating determination of anatomic site clinically or pathologically is the controversy over the anatomic definition of the anal canal itself. The surgical definition of the anal canal is the one most widely accepted for practical reasons and is the preferred definition of the American Joint Committee on Cancer (AJCC).<sup>2</sup> However, it is based on clinically identifiable landmarks that are difficult or impossible for the pathologist to locate. By this definition, the anal canal begins at the point where the rectum enters the puborectalis sling at the apex of the anal sphincter complex, a landmark that is palpable in vivo on digital exam as the anorectal ring. The termination of the anal canal is defined as the squamous mucocutaneous junction (ie, the junction of the distal squamous mucosa of the anal canal with the perianal hair-bearing skin).<sup>2</sup> Thus defined, the anal canal (Figure 1) contains 3 epithelial zones: a proximal narrow zone (approximately 1 to 2 cm) of rectal-type glandular mucosa, an anal transition zone of variable length interposed between colorectal mucosa and squamous epithelium, and a squamous epithelial zone lacking skin appendages. The squamous zone gradually merges into the perianal skin, which contains hair follicles, sweat glands, and sebaceous glands. The anal transition zone may contain a variety of epithelial types, including multilayered transitional mucosa resembling squamous metaplasia or urothelium, which is often present at the dentate line. Anal glands may be found subjacent to the mucosa extending across the internal sphincter in the region of the dentate line.



**Figure 1.** Anatomy of the anal canal. From Greene et al.<sup>17</sup> Used with permission of the American Joint Committee on Cancer (AJCC), Chicago, Illinois. The original source for this material is the *AJCC Cancer Staging Atlas* (2006) published by Springer Science and Business Media LLC, www.springerlink.com.

Tumors involving the anorectal junction should be classified as rectal cancers if the epicenter is more than 2 cm proximal to the dentate line and as anal cancers if the epicenter is 2 cm or less from the dentate line.<sup>2</sup>

Cancers that arise in the perianal skin are termed “perianal cancers” and are biologically similar to other skin tumors. They are staged according to the classification for cancers of the skin<sup>2</sup> (see CAP protocols for skin).

### C. Histologic Type

For consistency in reporting, the histologic classification proposed by the World Health Organization (WHO) is recommended.<sup>3</sup> However, this protocol does not preclude the use of other systems of classification or histologic types.

The great majority of carcinomas of the anus are squamous cell carcinomas.<sup>4</sup> The previous edition of the WHO classification included 3 subtypes of squamous cell carcinoma (SCC): large cell keratinizing, large cell nonkeratinizing, and basaloid. However, because most SCCs of the anal canal show more than one subtype, the diagnostic reproducibility of these subtypes has been low. Furthermore, no significant prognostic differences between subtypes have consistently been established, although the basaloid subtype of squamous cell carcinoma may be associated with a higher risk of distant metastasis.<sup>5</sup> Therefore, the WHO now recommends that the generic diagnostic term “squamous cell carcinoma” be used for all squamous malignancies of the anal canal. However, additional descriptive comment regarding specific histologic features, such as predominant cell size, basaloid features, degree of keratinization, or adjacent intraepithelial neoplasia, is encouraged. Prominent basaloid features and small tumor cell size are related to infection with “high-risk” human papilloma virus.<sup>3</sup> SCC with a predominantly basaloid differentiation pattern was formerly known as cloacogenic carcinoma, but this term is now considered obsolete.

Two variants of SCC of the anal canal deserve note because they differ in prognosis from typical squamous tumors. One is verrucous carcinoma (also known as giant condyloma or Buschke-Lowenstein tumor), which resembles a condyloma macroscopically but is larger and fails to respond to conservative therapy. These lesions are regarded as biologic intermediates between condylomas and SCCs, with a better prognosis than SCC. However, nearly half of these lesions undergo malignant

transformation. Another important variant is SCC with mucinous microcysts (well-formed cystic spaces containing Alcian blue- or PAS-stainable mucin). This entity has an unfavorable prognosis as compared with that of SCC.<sup>3</sup>

Finally, two rare types of anal canal carcinoma, anaplastic carcinoma and small cell carcinoma (high-grade neuroendocrine carcinoma), are tumors with aggressive biologic behavior and an unfavorable prognosis when compared with typical SCC. Tumors of the more distal anal canal and especially anal margin (mucocutaneous junction) are generally purely squamous in type and show fewer basaloid or glandular features.

### WHO Classification of Carcinoma of the Anal Canal<sup>3</sup>

Intraepithelial neoplasia

    Squamous or transitional epithelium

    Glandular

    Paget disease

Carcinoma

    Squamous cell carcinoma

    Adenocarcinoma

    Mucinous adenocarcinoma

    High-grade neuroendocrine carcinoma

        Large cell neuroendocrine carcinoma

        Small cell neuroendocrine carcinoma<sup>#</sup>

    Undifferentiated carcinoma<sup>#</sup>

    Others

<sup>#</sup> By convention, these histologic types are assigned grade 4.

The term “carcinoma, NOS (not otherwise specified)” is not part of the WHO classification.

### D. Histologic Grade

Histologic grades for anal canal squamous carcinoma are as follows:

Grade X   Grade cannot be assessed

Grade 1   Well differentiated

Grade 2   Moderately differentiated

Grade 3   Poorly differentiated

If there are variations in the differentiation within the tumor, the highest (least favorable) grade is recorded as the overall grade.

Histologic grades for adenocarcinoma of the anal canal based on the proportion of gland formation by the tumor are suggested as follows:

Grade X   Grade cannot be assessed

Grade 1   Well differentiated (greater than 95% of tumor composed of glands)

Grade 2   Moderately differentiated (50% to 95% of tumor composed of glands)

Grade 3   Poorly differentiated (less than 50% of tumor composed of glands)

Small cell carcinomas and tumors with no differentiation or minimal differentiation that is discernible only in rare, tiny foci (undifferentiated carcinomas by WHO classification) are categorized as grade 4.

### E. Treatment Effect

Response of tumor to previous chemotherapy or radiation therapy should be reported. Although grading systems for tumor response have not been established, three-category systems generally provide good interobserver reproducibility.<sup>6</sup> The following system is suggested:

#### Tumor Regression Grade

Description	Tumor Regression Grade
No viable cancer cells	0 (Complete response)
Single cells or small groups of cancer cells	1 (Moderate response)
Residual cancer outgrown by fibrosis	2 (Minimal response)
Minimal or no tumor kill; extensive residual cancer	3 (Poor response)

#### F. TNM and Anatomic Stage/Prognostic Groupings

The TNM staging system for anal carcinoma of the American Joint Committee on Cancer (AJCC) and the International Union Against Cancer (UICC) is recommended by the protocol and shown below.<sup>2</sup> The primary tumor is staged according to its size and local extension, as determined by clinical or pathologic examination. For most histologic types of anal canal cancer, the diameter of the tumor correlates with the depth of penetration. The staging system applies to all carcinomas arising in the anal canal, including carcinomas that arise within anorectal fistulas and anal glands, but excluding melanomas, low-grade neuroendocrine tumors (carcinoid tumors), and sarcomas.

By AJCC/UICC convention, the designation “T” refers to a primary tumor that has not been previously treated. The symbol “p” refers to the pathologic classification of the TNM, as opposed to the clinical classification, and is based on gross and microscopic examination. pT entails a resection of the primary tumor or biopsy adequate to evaluate the highest pT category, pN entails removal of nodes adequate to validate lymph node metastasis, and pM implies microscopic examination of distant lesions. Clinical classification (cTNM) is usually carried out by the referring physician before treatment during initial evaluation of the patient or when pathologic classification is not possible.

Pathologic staging is usually performed after surgical resection of the primary tumor. Pathologic staging depends on pathologic documentation of the anatomic extent of disease, whether or not the primary tumor has been completely removed. If a biopsied tumor is not resected for any reason (eg, when technically infeasible) and if the highest T and N categories or the M1 category of the tumor can be confirmed microscopically, the criteria for pathologic classification and staging have been satisfied without total removal of the primary cancer.

#### TNM Descriptors

For identification of special cases of TNM or pTNM classifications, the “m” suffix and “y,” “r,” and “a” prefixes are used. Although they do not affect the stage grouping, they indicate cases needing separate analysis.

The “m” suffix indicates the presence of multiple primary tumors in a single site and is recorded in parentheses: pT(m)NM.

The “y” prefix indicates those cases in which classification is performed during or after initial multimodality therapy (ie, neoadjuvant chemotherapy, radiation therapy, or both chemotherapy and radiation therapy). The cTNM or pTNM category is identified by a “y” prefix. The ycTNM or ypTNM categorizes the extent of tumor actually present at the time of that examination. The “y” categorization is not an estimate of tumor before multimodality therapy (ie, before initiation of neoadjuvant therapy).

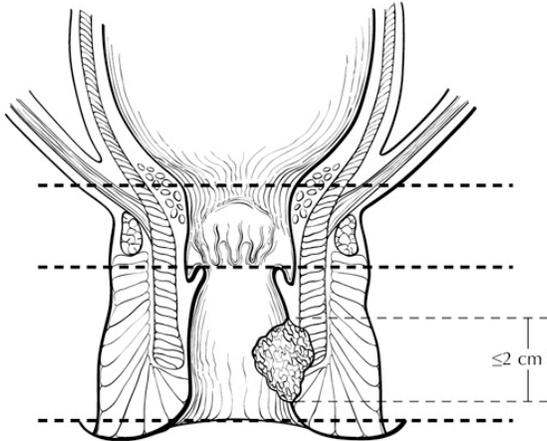
The “r” prefix indicates a recurrent tumor when staged after a documented disease-free interval and is identified by the “r” prefix: rTNM.

The “a” prefix designates the stage determined at autopsy: aTNM.

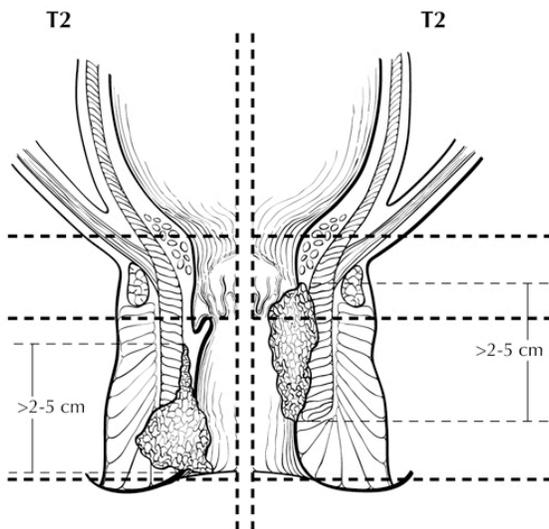
### T Category Considerations

T categories for anal canal cancer are illustrated in Figures 2 through 5.

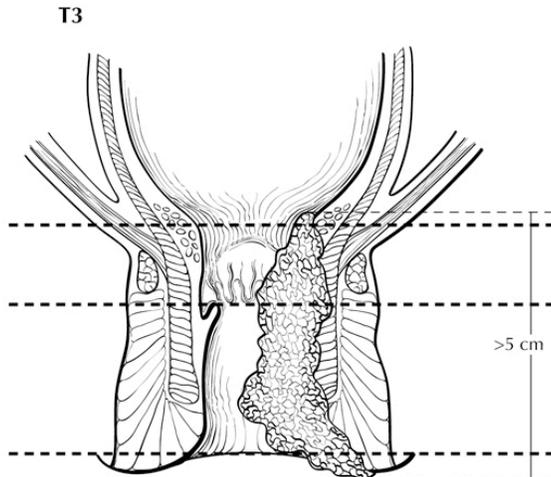
#### T1



**Figure 2.** T1 is defined as tumor 2 cm or less in greatest dimension. From Greene et al.<sup>17</sup> Used with permission of the American Joint Committee on Cancer (AJCC), Chicago, Illinois. The original source for this material is the *AJCC Cancer Staging Atlas* (2006) published by Springer Science and Business Media LLC, [www.springerlink.com](http://www.springerlink.com).

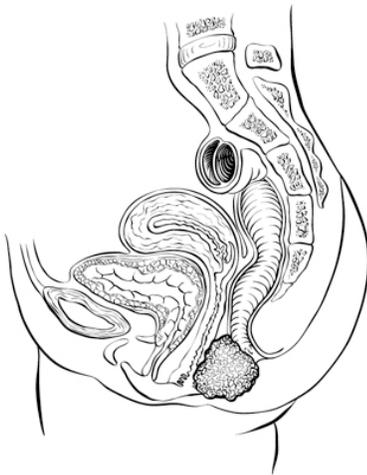


**Figure 3.** T2 is defined as tumor measuring more than 2 cm but 5 cm or less in greatest dimension. From Greene et al.<sup>17</sup> Used with permission of the American Joint Committee on Cancer (AJCC), Chicago, Illinois. The original source for this material is the *AJCC Cancer Staging Atlas* (2006) published by Springer Science and Business Media LLC, [www.springerlink.com](http://www.springerlink.com).



**Figure 4.** T3 is defined as tumor measuring more than 5 cm in greatest dimension. From Greene et al.<sup>17</sup> Used with permission of the American Joint Committee on Cancer (AJCC), Chicago, Illinois. The original source for this material is the *AJCC Cancer Staging Atlas* (2006) published by Springer Science and Business Media LLC, [www.springerlink.com](http://www.springerlink.com).

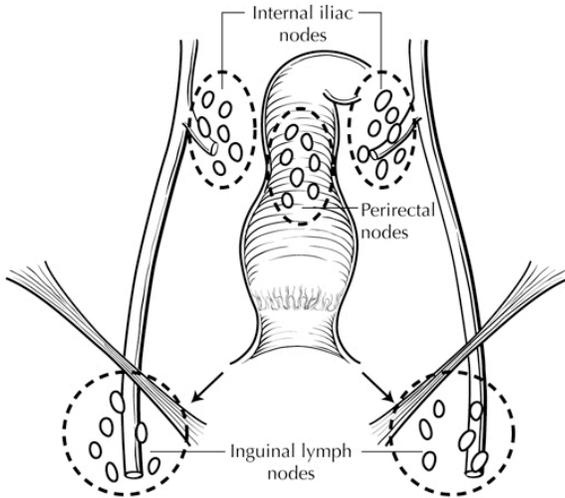
T4



**Figure 5.** T4 is defined as tumor of any size invading adjacent organs such as vagina (illustrated), urethra, or bladder. From Greene et al.<sup>17</sup> Used with permission of the American Joint Committee on Cancer (AJCC), Chicago, Illinois. The original source for this material is the *AJCC Cancer Staging Atlas* (2006) published by Springer Science and Business Media LLC, [www.springerlink.com](http://www.springerlink.com).

### N Category Considerations

Regional lymph nodes (N) (Figure 6) consist of the perirectal (anorectal, perirectal, and lateral sacral), the internal iliac (hypogastric), and the inguinal (superficial and deep femoral).<sup>2</sup> All other nodal groups represent sites of distant metastasis (M). The sites of regional node involvement correspond to the local lymphatic drainage, above to the rectal ampulla and below to the perineum. Tumors that arise in the anal canal usually spread initially to the anorectal and perirectal nodes, and those that arise at the anal margin spread to the superficial inguinal nodes.



**Figure 6.** Regional lymph nodes of the anal canal. From Greene et al.<sup>17</sup> Used with permission of the American Joint Committee on Cancer (AJCC), Chicago, Illinois. The original source for this material is the *AJCC Cancer Staging Atlas* (2006) published by Springer Science and Business Media LLC, www.springerlink.com.

**Primary Tumor (T)**

- TX Primary tumor cannot be assessed
- T0 No evidence of primary tumor
- Tis Carcinoma in situ
- T1 Tumor 2 cm or less in greatest dimension
- T2 Tumor more than 2 cm but not more than 5 cm in greatest dimension
- T3 Tumor more than 5 cm in greatest dimension
- T4 Tumor of any size invades adjacent organ(s), eg, vagina, urethra, bladder<sup>#</sup>

<sup>#</sup>Direct invasion of the rectal wall, perianal skin, subcutaneous tissue, or the sphincter muscle is not classified as T4.

**Regional Lymph Nodes (N)**

- NX Regional lymph nodes cannot be assessed
- N0 No regional lymph node metastasis<sup>#</sup>
- N1 Metastasis in perirectal lymph node(s)
- N2 Metastasis in unilateral internal iliac and/or inguinal lymph node(s)
- N3 Metastasis in perirectal and inguinal lymph nodes and/or bilateral internal iliac and/or inguinal lymph nodes

**Distant Metastasis (M)**

- M0 No distant metastasis
- M1 Distant metastasis

**Stage Groupings**

Stage 0	Tis	N0	M0
Stage I	T1	N0	M0
Stage II	T2	N0	M0
	T3	N0	M0
Stage IIIA	T1	N1	M0
	T2	N1	M0
	T3	N1	M0
	T4	N0	M0

Stage III B	T4	N1	M0
	Any T	N2	M0
	Any T	N3	M0
Stage IV	Any T	Any N	M1

### Vessel Invasion

By AJCC/UICC convention, vessel invasion (lymphatic or venous) does not affect the T category indicating local extent of tumor unless specifically included in the definition of a T category.

### G. Additional Findings

Predisposing conditions to anal canal carcinoma that may be found in the pathologic specimen include condyloma accuminatum associated with human papilloma virus infection.<sup>7</sup> Squamous intraepithelial neoplasia is recognized as a precursor lesion for squamous cell carcinoma of the anal canal,<sup>8</sup> and its presence should be reported. Both adenocarcinomas and squamous cell carcinomas have been reported in the setting of chronic anorectal fistulae arising in long-standing Crohn disease,<sup>9</sup> although the association of benign inflammatory lesions and anal cancer remains controversial.<sup>10,11</sup>

### H. Ancillary Studies

Immunohistochemistry may be helpful in establishing tumor type for poorly differentiated carcinomas; squamous cell carcinomas of the anal canal express cytokeratin (CK) 7, CK5/6, p53,<sup>12</sup> and p63,<sup>13</sup> but are negative for CK20. In contrast, anal gland carcinomas are mucin positive and express CK 20 and CK7, but are negative for CK5/6 and p63.<sup>12,14</sup>

Immunohistochemical studies may also aid in distinguishing primary anal Paget disease from secondary Paget disease of the perianal area, which is associated with colorectal and anal canal carcinoma. CK7 expression is a sensitive method for detection of both primary and secondary Paget cells within involved anal and perianal epithelium. In addition, however, the specific immunophenotype of Paget cells has been shown to correlate with pathogenesis and may be important in patient management. Demonstration of CK20 expression has been shown to identify Paget disease that is likely to be associated with underlying rectal adenocarcinoma (presenting either synchronously or metachronously). In contrast, Paget cells that do not express CK20 but instead are positive for gross cystic disease fluid protein (GCDFP), a marker for apocrine differentiation, are likely to represent primary cutaneous intraepithelial malignancy.<sup>3,8,15</sup>

### I. Clinical History

Predisposing conditions for anal canal carcinomas include immunosuppression, most commonly from solid organ transplantation, or HIV/AIDS infection.<sup>16</sup> The association between human papilloma virus infection and anal cancer has been firmly established.<sup>7</sup>

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