Stomach

Protocol applies to all invasive carcinomas of the stomach.

Protocol revision date: January 2005
Based on AJCC/UICC TNM, 6th edition

Procedures
• Cytology (No Accompanying Checklist)
• Incisional Biopsy (Endoscopic or Other)
• Excisional Biopsy (Polypectomy)
• Local Resection
• Gastrectomy (Partial or Complete)

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For the Members of the Cancer Committee, College of American Pathologists

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The College of American Pathologists offers these protocols to assist pathologists in providing clinically useful and relevant information when reporting results of surgical specimen examinations of surgical specimens. The College regards the reporting elements in the “Surgical Pathology Cancer Case Summary (Checklist)” portion of the protocols as essential elements of the pathology report. However, the manner in which these elements are reported is at the discretion of each specific pathologist, taking into account clinician preferences, institutional policies, and individual practice.

The College developed these protocols as an educational tool to assist pathologists in the useful reporting of relevant information. It did not issue the protocols for use in litigation, reimbursement, or other contexts. Nevertheless, the College recognizes that the protocols might be used by hospitals, attorneys, payers, and others. Indeed, effective January 1, 2004, the Commission on Cancer of the American College of Surgeons mandated the use of the checklist elements of the protocols as part of its Cancer Program Standards for Approved Cancer Programs. Therefore, it becomes even more important for pathologists to familiarize themselves with the document. At the same time, the College cautions that use of the protocols other than for their intended educational purpose may involve additional considerations that are beyond the scope of this document.
Summary of Changes to Checklist(s)

Protocol revision date: January 2005

No changes have been made to the data elements of the checklist(s) since the January 2004 protocol revision.
*STOMACH: Biopsy
(Note: Use of checklist for biopsy specimens is optional)

*Patient name:
*Surgical pathology number:

**Note: Check 1 response unless otherwise indicated.**

**MACROSCOPIC**

**Specimen Type**
* Incisional biopsy
* Excisional biopsy (polypectomy)
* Other (specify): ____________________________
* Not specified

**Tumor Site**
* Specify, if known: ____________________________
* Not specified

**MICROSCOPIC**

**Histologic Type**
* Adenocarcinoma, intestinal type
* Adenocarcinoma, diffuse type
* Papillary adenocarcinoma
* Tubular adenocarcinoma
* Mucinous adenocarcinoma (greater than 50% mucinous)
* Signet-ring cell carcinoma (greater than 50% signet-ring cells)
* Other (specify): ____________________________
* Carcinoma, type cannot be determined

* Data elements with asterisks are not required for accreditation purposes for the Commission on Cancer. These elements may be clinically important, but are not yet validated or regularly used in patient management. Alternatively, the necessary data may not be available to the pathologist at the time of pathologic assessment of this specimen.
*Histologic Grade
* ___ Not applicable
* ___ GX: Cannot be assessed
* ___ G1: Well differentiated
* ___ G2: Moderately differentiated
* ___ G3: Poorly differentiated
* ___ G4: Undifferentiated
* ___ Other (specify): ____________________________

*Extent of Invasion (deepest)
* ___ Cannot be determined
* ___ Lamina propria
* ___ Muscularis mucosae
* ___ Submucosa
* ___ Muscularis propria

*Margins (polypectomy only; check all that apply)
* ___ Not applicable

*Mucosal Margin
* ___ Cannot be assessed
* ___ Uninvolved by invasive carcinoma
* ___ Involved by invasive carcinoma
* ___ Involved by adenoma

*Deep Margin
* ___ Cannot be assessed
* ___ Uninvolved by invasive carcinoma
* ___ Involved by invasive carcinoma
  * Distance of invasive carcinoma from margin: ___ mm
* ___ Involved by invasive carcinoma

*Additional Pathologic Findings (check all that apply)
* ___ None identified
* ___ Intestinal metaplasia
* ___ Dysplasia
* ___ Gastritis (type): ____________________________
* ___ Other (specify): ____________________________

*Comment(s)

* Data elements with asterisks are not required for accreditation purposes for the Commission on Cancer. These elements may be clinically important, but are not yet validated or regularly used in patient management. Alternatively, the necessary data may not be available to the pathologist at the time of pathologic assessment of this specimen.
Surgical Pathology Cancer Case Summary (Checklist)

Protocol revision date: January 2005
Applies to invasive carcinomas only
Based on AJCC/UICC TNM, 6th edition

STOMACH: Resection

Patient name:
Surgical pathology number:

*Note: Check 1 response unless otherwise indicated.*

MACROSCOPIC

Specimen Type
___ Partial gastrectomy
___ Partial gastrectomy, proximal
___ Partial gastrectomy, distal
___ Partial gastrectomy, other (specify): ____________________________
___ Total gastrectomy
___ Other (specify): ____________________________
___ Not specified

Tumor Site (check all that apply)
___ Cardia
___ Fundus
   *___ Anterior wall
   *___ Posterior wall
___ Body
   *___ Anterior wall
   *___ Posterior wall
   *___ Lesser curvature
   *___ Greater curvature
___ Antrum
   *___ Anterior wall
   *___ Posterior wall
   *___ Lesser curvature
   *___ Greater curvature
___ Other (specify): ____________________________
___ Not specified

* Data elements with asterisks are not required for accreditation purposes for the Commission on Cancer. These elements may be clinically important, but are not yet validated or regularly used in patient management. Alternatively, the necessary data may not be available to the pathologist at the time of pathologic assessment of this specimen.
### CAP Approved Digestive System • Stomach

* **Tumor Configuration**
  - ___ Exophytic (polypoid)
  - ___ Infiltrative
  - ___ Diffusely infiltrative (linitis plastica)
  - ___ Expansile (noninfiltrative)
  - ___ Ulcerating
  - ___ Annular

* **Tumor Size**
  - Greatest dimension: ___ cm
  - *Additional dimensions: ___ x ___ cm
  - ___ Cannot be determined (see Comment)

### MICROSCOPIC

* **Histologic Type**
  - ___ Adenocarcinoma, intestinal type
  - ___ Adenocarcinoma, diffuse type
  - ___ Papillary adenocarcinoma
  - ___ Tubular adenocarcinoma
  - ___ Mucinous adenocarcinoma (greater than 50% mucinous)
  - ___ Signet-ring cell carcinoma (greater than 50% signet-ring cells)
  - ___ Other (specify): ____________________________
  - ___ Carcinoma, type cannot be determined

* **Histologic Grade**
  - ___ Not applicable
  - ___ GX: Cannot be assessed
  - ___ G1: Well differentiated
  - ___ G2: Moderately differentiated
  - ___ G3: Poorly differentiated
  - ___ G4: Undifferentiated
  - ___ Other (specify): ____________________________

* **Pathologic Staging (pTNM)**

### Primary Tumor (pT)
  - ___ pTX: Cannot be assessed
  - ___ pT0: No evidence of primary tumor
  - ___ pTis: Carcinoma in situ
  - ___ pT1: Tumor invades lamina propria or submucosa
    - ___ pT1a: Tumor invades lamina propria
    - ___ pT1b: Tumor invades submucosa
  - ___ pT2: Tumor invades muscularis propria or subserosa
    - ___ pT2a: Tumor invades muscularis propria
    - ___ pT2b: Tumor invades subserosa
  - ___ pT3: Tumor penetrates serosa (visceral peritoneum) without invasion of adjacent structures
  - ___ pT4: Tumor directly invades adjacent structures

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* Data elements *with asterisks* are *not required* for accreditation purposes for the Commission on Cancer. These elements may be clinically important, but are not yet validated or regularly used in patient management. Alternatively, the necessary data may not be available to the pathologist at the time of pathologic assessment of this specimen.
Regional Lymph Nodes (pN)
— pNX: Cannot be assessed
— pN0: No regional lymph node metastasis
— pN1: Metastasis in 1 to 6 perigastric lymph nodes
— pN2: Metastasis in 7 to 15 perigastric lymph nodes
— pN3: Metastasis in greater than 15 perigastric lymph nodes
Specify: Number examined: ___
Number involved: ___

Distant Metastasis (pM)
— pMX: Cannot be assessed
— pM1: Distant metastasis
   * Specify site(s), if known: __________________________

Margins (check all that apply)

Proximal Margin
— Cannot be assessed
— Uninvolved by invasive carcinoma
— Involved by invasive carcinoma
— Carcinoma in situ/adenoma absent at proximal margin
— Carcinoma in situ/adenoma present at proximal margin

Distal Margin
— Cannot be assessed
— Uninvolved by invasive carcinoma
— Involved by invasive carcinoma
— Carcinoma in situ/adenoma absent at distal margin
— Carcinoma in situ/adenoma present at distal margin

Omental (Radial) Margins
— Cannot be assessed
— Uninvolved by invasive carcinoma
— Lesser omental margin involved by invasive carcinoma
— Greater omental margin involved by invasive carcinoma

If all margins uninvolved by invasive carcinoma:
   Distance of invasive carcinoma from closest margin: ___ mm
   Specify margin: ____________________________

*Lymphatic (Small Vessel) Invasion (L)
*___ Absent
*___ Present
*___ Indeterminate

* Data elements with asterisks are not required for accreditation purposes for the Commission on Cancer. These elements may be clinically important, but are not yet validated or regularly used in patient management. Alternatively, the necessary data may not be available to the pathologist at the time of pathologic assessment of this specimen.
*Venous (Large Vessel) Invasion (V)
* ___ Absent
* ___ Present
* ___ Indeterminate

*Perineural Invasion
* ___ Absent
* ___ Present

*Additional Pathologic Findings (check all that apply)
* ___ None identified
* ___ Intestinal metaplasia
* ___ Dysplasia
* ___ Gastritis (type): ____________________________
* ___ Polyp(s) (type[s]): ____________________________
* ___ Other (specify): ____________________________

*Comment(s)

* Data elements with asterisks are not required for accreditation purposes for the Commission on Cancer. These elements may be clinically important, but are not yet validated or regularly used in patient management. Alternatively, the necessary data may not be available to the pathologist at the time of pathologic assessment of this specimen.
I. Cytologic Material

A. Clinical Information
   1. Patient identification
      a. Name
      b. Identification number
      c. Age (birth date)
      d. Sex
   2. Responsible physician(s)
   3. Date of procedure
   4. Other clinical information
      a. Relevant history
         (1) previous diagnoses and treatment for gastric cancer
         (2) previous Billroth procedure
         (3) *Helicobacter pylori* gastritis
         (4) atrophic gastritis
      b. Relevant findings (eg, endoscopic/imaging studies)
      c. Clinical diagnosis
      d. Procedure (eg, brushing, washing, other)
      e. Anatomic site(s) of specimen(s)

B. Macroscopic Examination
   1. Specimen
      a. Unfixed/fixed (specify fixative)
      b. Number of slides received, if appropriate
      c. Quantity and appearance of fluid specimen, if appropriate
      d. Other (eg, cytologic preparation from tissue)
      e. Results of intraprocedural consultation
   2. Material submitted for microscopic evaluation
   3. Special studies (specify) (eg, cytochemistry, immunocytochemistry, DNA analysis [specify type], cytogenetic analysis)

C. Microscopic Evaluation
   1. Adequacy of specimen (if unsatisfactory for evaluation, specify reason)
   2. Tumor, if present
      a. Histologic type, if possible (Note A)
      b. Histologic grade, if possible (Note B)
      c. Other characteristics (eg, nuclear grade/necrosis)
   3. Additional pathologic findings, if present
   4. Results/status of special studies (specify)
   5. Comments
      a. Correlation with intraprocedural consultation, as appropriate
      b. Correlation with other specimens, as appropriate
      c. Correlation with clinical information, as appropriate
II. Incisional Biopsy  
(Endoscopic or Other)  
A. Clinical Information  
1. Patient identification  
   a. Name  
   b. Identification number  
   c. Age (birth date)  
   d. Sex  
2. Responsible physician(s)  
3. Date of procedure  
4. Other clinical information  
   a. Relevant history  
      (1) previous diagnoses and treatment for gastric cancer  
      (2) previous Billroth procedure  
      (3) Helicobacter pylori gastritis  
      (4) atrophic gastritis  
   b. Relevant findings (eg, endoscopic/imaging studies)  
   c. Clinical diagnosis  
   d. Procedure (eg, endoscopic biopsy)  
   e. Operative findings  
   f. Anatomic site(s) of specimen(s)  
B. Macroscopic Examination  
1. Specimen  
   a. Unfixed/fixed (specify fixative)  
   b. Number of pieces  
   c. Largest dimension of each piece  
   d. Results of intraoperative consultation  
2. Tissues submitted for microscopic evaluation  
   a. Submit entire specimen  
   b. Frozen section tissue fragment(s) (unless saved for special studies)  
3. Special studies (specify) (eg, histochemistry, immunohistochemistry, morphometry, DNA analysis [specify type], cytogenetic analysis)  
C. Microscopic Evaluation  
1. Tumor  
   a. Histologic type (Note A)  
   b. Histologic grade (Note B)  
   c. Extent of invasion  
   d. Venous/lymphatic vessel invasion  
2. Additional pathologic findings, if present  
   a. Dysplasia  
   b. Metaplasia  
   c. Atrophy  
   d. Gastritis  
   e. Helicobacter pylori  
   f. Other(s)  
3. Results of special studies (specify)  
4. Comments  
   a. Correlation with intraoperative consultation, as appropriate  
   b. Correlation with other specimens, as appropriate  
   c. Correlation with clinical information, as appropriate
III. Excisional Biopsy  
(Local Excision or Polypectomy)  

A. Clinical Information  
1. Patient identification  
   a. Name  
   b. Identification number  
   c. Age (birth date)  
   d. Sex  
2. Responsible physician(s)  
3. Date of procedure  
4. Other clinical information  
   a. Relevant history  
      (1) previous diagnoses and treatment for gastric cancer  
      (2) previous Billroth procedure  
      (3) Helicobacter pylori gastritis  
      (4) atrophic gastritis  
   b. Relevant findings (eg, endoscopic/imaging studies)  
   c. Clinical diagnosis  
   d. Procedure (eg, polypectomy)  
   e. Operative findings  
   f. Anatomic site(s) of specimen(s)  

B. Macroscopic Examination  
1. Specimen  
   a. Unfixed/fixed (specify fixative)  
   b. Number of pieces  
   c. Descriptive features (eg, color, consistency)  
   d. Dimensions  
   e. Layers of stomach present, if grossly discernible  
   f. Orientation, if indicated by surgeon  
   g. Results of intraoperative consultation  
2. Tumor  
   a. Configuration, if appropriate (Note C)  
   b. Dimensions (3) (Note D)  
   c. Distance from closest margin  
   d. Estimated depth of invasion (Note E)  
3. Lesions in noncancerous stomach, if appropriate (eg, ulcers, polyps, other)  
4. Tissue(s) submitted for microscopic evaluation  
   a. Carcinoma, including  
      (1) point of deepest penetration  
      (2) interface with adjacent stomach  
      (3) margin closest to tumor edge  
      (4) (if a polyp) apex and stalk in same section, if possible  
   b. Frozen section tissue fragment(s) (unless saved for special studies)  
5. Special studies (specify) (eg, histochemistry, immunohistochemistry,  
   morphometry, DNA analysis [specify type], cytogenetic analysis)  

C. Microscopic Evaluation  
1. Tumor  
   a. Histologic type (Note A)  
   b. Histologic grade (Note B)  
   c. Extent of invasion (Note E)  
   d. Venous/lymphatic vessel invasion (Note F)  
   e. Perineural invasion (Note G)
2. Carcinoma in a polyp
   a. Specify histologic type of polyp
   b. Specify presence/absence of invasion of:
      (1) muscularis mucosae/submucosa of polyp head
      (2) submucosa at base
      (3) venous/lymphatic vessels (Note F)
3. Margins
   a. Distance from closest mucosal margin and deep margin
   b. Presence of metaplasia/dysplasia/adenoma
4. Additional pathologic findings, if present
   a. Dysplasia
   b. Metaplasia
   c. Atrophy
   d. Gastritis
   e. *Helicobacter pylori*
   f. Other(s)
5. Results/status of special studies (specify)
6. Comments
   a. Correlation with intraoperative consultation, as appropriate
   b. Correlation with other specimens, as appropriate
   c. Correlation with clinical information, as appropriate

IV. Gastric Resection
A. Clinical Information
1. Patient identification
   a. Name
   b. Identification number
   c. Age (birth date)
   d. Sex
2. Responsible physician(s)
3. Date of procedure
4. Other clinical information
   a. Relevant history
      (1) previous diagnoses and treatment for gastric cancer
      (2) previous Billroth procedure
      (3) *Helicobacter pylori* gastritis
      (4) atrophic gastritis
   b. Relevant findings (eg, endoscopic/imaging studies)
   c. Clinical diagnosis
   d. Procedure (eg, subtotal gastrectomy, total gastrectomy, other)
   e. Operative findings
   f. Anatomic site(s) of specimen(s)
B. Macroscopic Examination
1. Specimen
   a. Organ(s)/tissue(s) included
   b. Unfixed/fixed (specify fixative)
   c. Open/unopened
   d. Number of pieces
   e. Dimensions (Note H)
   f. Length of attached esophagus/duodenum
   g. Orientation, if indicated by surgeon
   h. Results of intraoperative consultation
2. Tumor
   a. Location (Note I)
   b. Configuration (Note C)
   c. Dimensions (3) (Note D)
   d. Descriptive features (eg, color, consistency)
   e. Ulceration/perforation
   f. Distance from margins (Note J)
      (1) proximal
      (2) distal
      (3) radial (soft tissue and/or mesenteric margin(s) closest to deepest tumor penetration)
   g. Estimated depth of invasion (Note E)
3. Lesions in noncancerous stomach
   a. Ulcers
   b. Polyps
   c. Other(s)
4. Regional lymph nodes (Notes E and K)
5. Metastasis to other organ(s) or structure(s) (Notes E and K)
6. Tissues submitted for microscopic evaluation
   a. Carcinoma, including
      (1) point of deepest penetration
      (2) interface with adjacent stomach
      (3) visceral serosa overlying tumor
   b. Margins (Note G)
      (1) proximal
      (2) distal
      (3) radial (soft tissue and/or mesenteric margin(s) closest to deepest tumor penetration)
   c. All lymph nodes (Notes E and K)
      (1) specify node(s) when labeled by surgeon
   d. Other lesions (eg, polyp/ulcers)
   e. Stomach uninvolved by tumor
   f. Other tissue(s/organ(s)
   g. Frozen section tissue fragments (unless saved for special studies)
7. Special studies (specify) (eg, histochemistry, immunohistochemistry, morphometry, DNA analysis [specify type], cytogenetic analysis)

C. Microscopic Evaluation
1. Tumor
   a. Histologic type (Note A)
   b. Histologic grade (Note B)
   c. Extent of invasion (Note E)
   d. Extension into esophagus or duodenum
   e. Venous/lymphatic vessel invasion (Note F)
   f. Perineural invasion (Note G)
2. Additional pathologic findings, if present
   a. Chronic gastritis (type)
   b. Intestinal metaplasia
   c. Dysplasia
   d. Atrophy
   e. Adenoma
   f. Other types of polyps
   g. *Helicobacter pylori*
   h. Other
3. Margins (Note J)
   a. Proximal
   b. Distal
   c. Radial
4. Regional lymph nodes (Note K)
   a. Number
   b. Number involved by tumor
5. Distant metastasis (specify site[s]) (Note K)
6. Other tissue(s)/organ(s)
7. Results/status of special studies (specify)
8. Comments
   a. Correlation with intraoperative consultation, as appropriate
   b. Correlation with other specimens, as appropriate
   c. Correlation with clinical information, as appropriate

Explanatory Notes

A. Histologic Type

For consistency in reporting, the histologic classification proposed by the World Health Organization (WHO) is recommended. However, this protocol does not preclude the use of other systems of classification or histologic types, such as the Laurén classification, which may be used in addition to the WHO system.

With the exception of the rare small cell carcinoma of the stomach, which has an unfavorable prognosis, most multivariate analyses show no effect of tumor type, independent of stage, on prognosis.

WHO Classification of Carcinoma of the Stomach

Adenocarcinoma
   Intestinal type
   Diffuse type
   Papillary adenocarcinoma#
   Tubular adenocarcinoma#
   Mucinous adenocarcinoma (greater than 50% mucinous)
   Signet-ring cell carcinoma# (greater than 50% signet-ring cells)
   Adenosquamous carcinoma
   Squamous cell carcinoma
   Small cell carcinoma#
   Undifferentiated carcinoma#
   Other (specify)

# Not usually graded (see below).

The Laurén classification, namely intestinal or diffuse type, and/or the Ming classification, namely expanding or infiltrating type, may also be included. The WHO classifies in situ carcinoma as intraepithelial neoplasia. The term "carcinoma, NOS (not otherwise specified)" is not part of the WHO classification.
B. Histologic Grade
For adenocarcinomas, a histologic grade is based on the extent of glandular differentiation is suggested as shown below.

Grade X  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 (49% or less of tumor composed of glands)  

Tubular adenocarcinomas are not typically graded but are low-grade and would correspond to grade 1.

Signet-ring cell carcinomas are not typically graded but are high-grade and would correspond to grade 3.

Small cell carcinomas and undifferentiated carcinomas are not typically graded but are high-grade tumors and would correspond to grade 4.

For squamous cell carcinomas (rare), a suggested histologic grading system is shown below.

Grade X  Grade cannot be assessed  
Grade 1  Well differentiated  
Grade 2  Moderately differentiated  
Grade 3  Poorly differentiated  

Note: Undifferentiated tumors cannot be specifically categorized as adenocarcinoma or squamous cell carcinoma. Instead, they are classified as undifferentiated carcinoma by the WHO classification and may be assigned grade 4 (see Note A).  

For all stage groupings, grading correlates with outcome.\(^4\,5\)

C. Configuration
Macroscopic configuration types as described by Borrmann include polypoid (Borrmann type I), ulcerating (Borrmann type II), ulcerating and infiltrating (Borrmann type III), and diffusely infiltrating (Borrmann type IV or limitis plastica). Tumor configuration has been shown to have prognostic significance in several large studies.\(^3\) Specifically, polypoid and ulcerating cancers (Borrmann types I and II) have a better prognosis than infiltrating cancer (Borrmann types III and IV). However, the prognostic value of tumor configuration is controversial since numerous smaller studies have failed to demonstrate independent prognostic significance for this pathologic feature.  

D. Tumor Size
Although not a factor in the T classification of gastric carcinoma (see Note E), tumor size has been shown to be an independent adverse prognostic factor in many studies.\(^3\) However, the prognostic value of tumor size is controversial since a large number of other studies have failed to demonstrate independent prognostic significance for this pathologic feature.  

E. TNM and Stage Groupings
The TNM staging system for gastric carcinoma of the American Joint Committee on Cancer (AJCC) and the International Union Against Cancer (UICC) is recommended and shown below.\(^6\,7\)
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 unfeasible) 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.

**Primary Tumor (T)**

<table>
<thead>
<tr>
<th>pT</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TX</td>
<td>Primary tumor cannot be assessed</td>
</tr>
<tr>
<td>T0</td>
<td>No evidence of primary tumor</td>
</tr>
<tr>
<td>Tis</td>
<td>Carcinoma in situ: intraepithelial tumor without invasion of the lamina propria</td>
</tr>
<tr>
<td>T1</td>
<td>Tumor invades lamina propria or submucosa</td>
</tr>
<tr>
<td>T1a</td>
<td>Tumor invades lamina propria</td>
</tr>
<tr>
<td>T1b</td>
<td>Tumor invades submucosa</td>
</tr>
<tr>
<td>T2</td>
<td>Tumor invades muscularis propria or subserosa</td>
</tr>
<tr>
<td>T2a</td>
<td>Tumor invades muscularis propria</td>
</tr>
<tr>
<td>T2b</td>
<td>Tumor invades subserosa</td>
</tr>
<tr>
<td>T3</td>
<td>Tumor penetrates serosa (visceral peritoneum) without invasion of adjacent structures</td>
</tr>
</tbody>
</table>
| T4 | Tumor directly invades adjacent structures ^

^ An optional expansion of T1 is proposed by the UICC based on the observed difference in frequency of lymph node metastasis. In addition, the substratifications may be important as indicators for treatment by limited procedures.  

## Separation of T2 into T2a and T2b is justified because postsurgical survival following resection for cure has been shown to be significantly different for T2a and T2b (see below).  

<table>
<thead>
<tr>
<th>pT</th>
<th>2-Year Survival Rate</th>
<th>5-Year Survival Rate</th>
<th>Median Survival Rate (Months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T2a</td>
<td>74%</td>
<td>62%</td>
<td>119</td>
</tr>
<tr>
<td>T2b</td>
<td>57%</td>
<td>40%</td>
<td>36</td>
</tr>
</tbody>
</table>

### A tumor may penetrate the muscularis propria with extension into the gastrocolic or gastrohepatic ligaments or into the greater or lesser omentum without perforation of the visceral peritoneum covering these structures. In this case the tumor would be classified as T2. If there is perforation of the visceral peritoneum covering the gastric ligaments or omenta, the tumor is classified as T3.

^ The adjacent structures of the stomach are the spleen, transverse colon, liver, diaphragm, pancreas, abdominal wall, adrenal gland, kidney, small intestine, and
retroperitoneum. Intramural extension into the duodenum or esophagus is classified by the depth of greatest invasion in any of these sites, including the stomach.

**Regional Lymph Nodes (N)** (also see Note K)

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NX</td>
<td>Regional lymph nodes cannot be assessed</td>
</tr>
<tr>
<td>N0</td>
<td>No regional lymph node metastasis</td>
</tr>
<tr>
<td>N1</td>
<td>Metastasis in 1 to 6 perigastric lymph nodes</td>
</tr>
<tr>
<td>N2</td>
<td>Metastasis in 7 to 15 perigastric lymph nodes</td>
</tr>
<tr>
<td>N3</td>
<td>Metastasis in more than 15 lymph nodes</td>
</tr>
</tbody>
</table>

# A designation of N0 should be used if all examined lymph nodes are negative, regardless of the total number removed and examined.

**Regional Lymph Nodes (pN0): Isolated Tumor Cells**

Isolated tumor cells (ITCs) are single cells or small clusters of cells not more than 0.2 mm in greatest dimension. Lymph nodes or distant sites with ITCs found by either histologic examination, immunohistochemistry, or nonmorphologic techniques (eg, flow cytometry, DNA analysis, polymerase chain reaction [PCR] amplification of a specific tumor marker) should be classified as N0 or M0, respectively. Specific denotation of the assigned N category is suggested as follows for cases in which ITCs are the only evidence of possible metastatic disease.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>pN0</td>
<td>No regional lymph node metastasis histologically, no examination for isolated tumor cells (ITCs)</td>
</tr>
<tr>
<td>pN0(i-)</td>
<td>No regional lymph node metastasis histologically, negative morphologic (any morphologic technique, including hematoxylin-eosin and immunohistochemistry) findings for ITCs</td>
</tr>
<tr>
<td>pN0(i+)</td>
<td>No regional lymph node metastasis histologically, positive morphologic (any morphologic technique, including hematoxylin-eosin and immunohistochemistry) findings for ITCs</td>
</tr>
<tr>
<td>pN0(mol-)</td>
<td>No regional lymph node metastasis histologically, negative nonmorphologic (molecular) findings for ITCs</td>
</tr>
<tr>
<td>pN0(mol+)</td>
<td>No regional lymph node metastasis histologically, positive nonmorphologic (molecular) findings for ITCs</td>
</tr>
</tbody>
</table>

**Distant Metastasis (M)**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MX</td>
<td>Presence of distant metastasis cannot be assessed</td>
</tr>
<tr>
<td>M0</td>
<td>No distant metastasis</td>
</tr>
<tr>
<td>M1</td>
<td>Distant metastasis</td>
</tr>
</tbody>
</table>
**Stage Groupings**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Tis</th>
<th>T1</th>
<th>T2a/b</th>
<th>T2a/b</th>
<th>T3</th>
<th>T4</th>
<th>T2a/b</th>
<th>T3</th>
<th>T4</th>
</tr>
</thead>
<tbody>
<tr>
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<td>N0</td>
<td>N0</td>
<td>N0</td>
<td>N1</td>
<td>N0</td>
<td>N0</td>
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<td>N1</td>
<td>N0</td>
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<td></td>
<td></td>
<td></td>
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<tr>
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<td>N2</td>
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<td></td>
<td>N0</td>
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<td>Any N</td>
<td>M1</td>
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</tr>
</tbody>
</table>

**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 following 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 prior to 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.

**Additional Descriptors**

**Residual Tumor (R)**

Tumor remaining in a patient after therapy with curative intent (eg, surgical resection for cure) is categorized by a system known as R classification, shown below.\(^\text{10}\)

<table>
<thead>
<tr>
<th>R</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RX</td>
<td>Presence of residual tumor cannot be assessed</td>
</tr>
<tr>
<td>R0</td>
<td>No residual tumor</td>
</tr>
<tr>
<td>R1</td>
<td>Microscopic residual tumor</td>
</tr>
<tr>
<td>R2</td>
<td>Macroscopic residual tumor</td>
</tr>
</tbody>
</table>

For the surgeon, the R classification may be useful to indicate the known or assumed status of the completeness of a surgical excision. For the pathologist, the R classification is relevant to the status of the margins of a surgical resection specimen. That is, tumor involving the resection margin on pathologic examination may be assumed to correspond to residual tumor in the patient and may be classified as macroscopic or microscopic according to the findings at the specimen margin(s).
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. In all other cases, lymphatic and venous invasion by tumor are coded separately as follows.

**Lymphatic Vessel Invasion (L)**
- LX: Lymphatic vessel invasion cannot be assessed
- L0: No lymphatic vessel invasion
- L1: Lymphatic vessel invasion

**Venous Invasion (V)**
- VX: Venous invasion cannot be assessed
- V0: No venous invasion
- V1: Microscopic venous invasion
- V2: Macroscopic venous invasion

F. Venous/Lymphatic Vessel Invasion
Both venous and lymphatic vessel invasion have been shown to be adverse prognostic factors. However, the microscopic presence of tumor in lymphatic vessels or veins does not qualify as local extension of tumor as defined by the T classification. It is codified by L1 or V1, respectively.

G. Perineural Invasion
Perineural invasion has been shown to be an adverse prognostic factor.

H. Specimen Dimensions
Open specimen along greater curvature, avoiding tumor if located in this position. Measure length of stomach along lesser curvature and circumference of distal margin. Measure length and width of tubular esophagus.

I. Tumor Location
Tumor location should be described in relation to the following landmarks:
- gastric region: cardia (including gastroesophageal junction), fundus, corpus, antrum, pylorus
- greater curvature, lesser curvature
- anterior wall, posterior wall

For tumors involving the gastroesophageal junction, specific observations should be recorded in an attempt to establish the exact site of origin of the tumor. The gastroesophageal junction is defined as the junction of the tubular esophagus and the stomach irrespective of the type of epithelial lining of the esophagus. The pathologist should record the:
1. proportion of tumor mass located in the esophagus and stomach
2. greatest dimensions of esophageal and gastric portions of the tumor
3. anatomic location of the center of the tumor

If more than 50% of the tumor involves the esophagus, the tumor is classified as esophageal. If more than 50% of the tumor involves the stomach, the tumor is classified as gastric. If the tumor is equally located above and below the gastroesophageal junction and/or is designated as being at the junction (anatomic center of the tumor), carcinomas of the squamous, small cell, and undifferentiated types are classified as
esophageal, whereas adenocarcinomas and signet-ring cell carcinomas are classified as gastric.  

Tumor site has been shown to be an independent prognostic factor in gastric carcinoma. The long-term prognosis for patients with proximal carcinomas (ie, tumors of the upper third of the stomach, including the gastric cardia and gastroesophageal junction) is poorer than for those with distal cancers.  

J. Margins
Margins include the proximal, distal, and radial margins. The radial margins represent the non-peritonealized soft tissue margins closest to the deepest penetration of tumor. In the stomach, the lesser omental (hepatoduodenal and hepatogastric ligaments) and greater omental resection margins are the only radial margins. It may be helpful to mark the margin(s) closest to the tumor with ink. Margins marked by ink should be designated in the macroscopic description.

K. Regional Lymph Nodes
The specific nodal areas of the stomach are listed below.  

Greater Curvature of Stomach
Greater curvature, greater omental, gastroduodenal, gastroepiploic, pyloric, and pancreaticoduodenal

Pancreatic and Splenic Area
Pancreaticocolenal, peripancreatic, splenic

Lesser Curvature of Stomach
Lesser curvature, lesser omental, left gastric, cardioesophageal, common hepatic, celiac, and hepatoduodenal

Involvement of other intra-abdominal lymph nodes, such as hepatoduodenal, retropancreatic, mesenteric, and para-aortic, is classified as distant metastasis.

References
Stomach • Digestive System

For Information Only


Bibliography


