Protocol for the Examination of Specimens From Patients With Carcinoma of the Stomach

Protocol applies to all invasive carcinomas of the stomach. Tumors of the esophagogastric junction and well-differentiated neuroendocrine tumors (carcinoid tumors) are not included.

Based on AJCC/UICC TNM, 7th edition
Protocol web posting date: June 2014

Procedures
• Endoscopic Mucosal Resection
• Gastrectomy (Partial or Complete)

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CAP Stomach Protocol Revision History

Version Code
The definition of the version code can be found at www.cap.org/cancerprotocols.

Version: Stomach 3.3.0.0

Summary of Changes
The following changes have been made since the October 2013 release.

Local Resection, Gastrectomy

Ancillary Studies
Reporting on ancillary studies was deleted and the following note was added:
Note: For HER2 reporting, the CAP Gastric HER2 template should be used. Pending biomarker studies should be listed in the Comments section of this report.

Explanatory Notes

L. Ancillary Studies
This note was deleted and the remaining notes relabeled as appropriate.
Surgical Pathology Cancer Case Summary

Protocol web posting date: June 2014

STOMACH: Local Resection, Gastrectomy (Note A)

Select a single response unless otherwise indicated.

Specimen (select all that apply)
___ Stomach
___ Portion of stomach
   ___ Gastric body
   ___ Gastric antrum
___ Distal esophagus
___ Proximal duodenum
___ Not specified

Procedure
___ Endoscopic mucosal resection
___ Partial gastrectomy, proximal
___ Partial gastrectomy, distal
___ Partial gastrectomy, other (specify): ____________________________
___ Total gastrectomy
___ Other (specify): ____________________________
___ Not specified

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

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

+ 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 Type (select all that apply) (Note C)
___ Adenocarcinoma
   Lauren classification of adenocarcinoma:
      ___ Intestinal type
      ___ Diffuse type (signet-ring carcinoma if >50% signet-ring cells)
      ___ Mixed (approximately equal amounts of intestinal and diffuse)
   + Alternative optional classification (based on WHO classification):
      + ___ Tubular (intestinal) adenocarcinoma
      + ___ Poorly cohesive carcinoma (including mixed adenocarcinoma with >50% signet-ring cell features)
      + ___ Diffuse carcinoma (noncohesive carcinoma, >80% diffuse/signet-ring cells)
      + ___ Mucinous adenocarcinoma (>50% mucinous)
      + ___ Papillary adenocarcinoma
___ Hepatoid adenocarcinoma
___ Carcinoma with lymphoid stroma (medullary carcinoma)
___ High-grade neuroendocrine carcinoma
   ___ Large cell neuroendocrine carcinoma
   ___ Small cell neuroendocrine carcinoma
___ Mixed adenoneuroendocrine carcinoma
___ Squamous cell carcinoma
___ Adenosquamous carcinoma
___ Undifferentiated carcinoma
___ Other (specify): ____________________________

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

Microscopic Extent of Tumor
___ Cannot be assessed
___ No evidence of residual primary tumor
___ High-grade dysplasia/carcinoma in situ
___ Tumor invades lamina propria
___ Tumor invades into but not through muscularis mucosae
___ Tumor invades submucosa
___ Tumor invades muscularis propria
___ Tumor invades subserosal connective tissue without involvement of visceral peritoneum
___ Tumor penetrates serosa (visceral peritoneum)
___ Tumor directly invades adjacent structures (specify): ______________________
___ Tumor penetrates to the surface of the visceral peritoneum (serosa) and directly invades adjacent structures (specify: ______________________)

Margins (select all that apply) (Note E)
If all margins uninvolved by carcinoma:
   Distance of carcinoma from closest margin: ___ mm or ___ cm
   Specify margin: ____________________________

+ 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.
Proximal Margin
___ Cannot be assessed
___ Uninvolved by invasive carcinoma, carcinoma in situ, and low-grade glandular dysplasia
___ Involved by invasive carcinoma
___ Involved by carcinoma in situ
___ Involved by low-grade glandular dysplasia

Distal Margin
___ Cannot be assessed
___ Uninvolved by invasive carcinoma, carcinoma in situ, and low-grade glandular dysplasia
___ Involved by invasive carcinoma
___ Involved by carcinoma in situ
___ Involved by low-grade glandular dysplasia

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

Deep Margin (endoscopic mucosal resections) (required only if applicable)
___ Cannot be assessed
___ Uninvolved by invasive carcinoma
___ Involved by invasive carcinoma

Mucosal Margins (endoscopic resections) (required only if applicable)
___ Cannot be assessed
___ Uninvolved by invasive carcinoma, carcinoma in situ, and low-grade glandular dysplasia
___ Involved by invasive carcinoma
___ Involved by carcinoma in situ
___ Involved by low-grade glandular dysplasia

Other Margin(s) (required only if applicable)
Specify margin(s): _________________________
___ Cannot be assessed
___ Involved by invasive carcinoma
___ Uninvolved by invasive carcinoma

Treatment Effect (carcinomas treated with neoadjuvant therapy) (required only if applicable) (Note F)
___ No prior treatment
___ Present
   + ___ No residual tumor (complete response, grade 0)
   + ___ Marked response (grade 1, minimal residual cancer)
   + ___ Moderate response (grade 2)
___ No definite response identified (grade 3, poor or no response)
___ Not known

+ 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.
Lymph-Vascular Invasion (Note G)
___ Not identified
___ Present
___ Indeterminate

+ Perineural Invasion (Note H)
+ ___ Not identified
+ ___ Present
+ ___ Indeterminate

Pathologic Staging (pTNM) (Note I)

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/high-grade glandular dysplasia
pT1: Tumor invades lamina propria, muscularis mucosae, or submucosa
___ pT1a: Tumor invades lamina propria or muscularis mucosae
___ pT1b: Tumor invades submucosa
___ pT2: Tumor invades muscularis propria
___ pT3: Tumor invades subserosal connective tissue, without involvement of visceral peritoneum or adjacent structures
___ pT4: Tumor invades serosa (visceral peritoneum) or adjacent structures
___ pT4a: Tumor invades serosa (visceral peritoneum)
___ pT4b: Tumor invades adjacent structures

Regional Lymph Nodes (pN) (Note J)
___ pNX: Cannot be assessed
___ pN0: No regional lymph node metastasis
___ pN1: Metastasis in 1 to 2 perigastric lymph nodes
___ pN2: Metastasis in 3 to 6 perigastric lymph nodes
___ pN3: Metastasis in 7 or more perigastric lymph nodes
___ pN3a: Metastasis in 7 to 15 perigastric lymph nodes
___ pN3b: Metastasis in 16 or more perigastric lymph nodes
___ No nodes submitted or found

Number of Lymph Nodes Examined
Specify: ___
___ Number cannot be determined (explain): ____________________

Number of Lymph Nodes Involved
Specify: ___
___ Number cannot be determined (explain): ____________________

+ 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.
Distant Metastasis (pM)
___ Not applicable
___ pM1: Distant metastasis
   + Specify site(s), if known: ____________________________

+ Additional Pathologic Findings (select all that apply) (Note K)
+ ___ None identified
+ ___ Intestinal metaplasia
+ ___ Dysplasia
   + ___ Low-grade glandular dysplasia
   + ___ High-grade glandular dysplasia
+ ___ Gastritis
   + ___ Helicobacter pylori-type gastritis
   + ___ Other gastritis (specify): ____________________________
+ ___ Polyp(s) (type[s]): ____________________________
+ ___ Other (specify): ____________________________

+ Ancillary Studies
  Note: For HER2 reporting, the CAP Gastric HER2 template should be used. Pending biomarker studies should be listed in the Comments section of this report.

+ Clinical History (select all that apply) (Note L)
+ ___ Previous gastric surgery (specify): ____________________________
+ ___ Other (specify): ____________________________
+ ___ Not known

+ Comment(s)
A. Application
This protocol applies to all carcinomas that arise in the stomach and do not involve the esophagogastric junction (EGJ). Tumors with midpoint in the proximal stomach within 5 cm of the EGJ and crossing the EGJ are not included; the CAP protocol for carcinoma of the esophagus applies to such tumors. Lymphomas, low-grade neuroendocrine tumors (carcinoid tumors), and sarcomas are also not included (separate TNM staging systems and College of American Pathologists [CAP] protocols apply).

B. Tumor Site
Tumor location should be described in relation to the following landmarks (Figure 1):
• gastric region: cardia (including EGJ), fundus, body, antrum, pylorus
• greater curvature, lesser curvature
• anterior wall, posterior wall

Figure 1. Anatomical subsites of the stomach. Used with permission of the American Joint Committee on Cancer (AJCC), Chicago, IL. The original source for this material is the AJCC Cancer Staging Atlas (2006) edited by Greene et al and published by Springer Science and Business Media, LLC, www.springerlink.com.

Tumors involving the EGJ are classified for purposes of staging as esophageal carcinomas, and the CAP protocol for the esophagus should be used for such tumors. The EGJ is defined as the junction of the tubular esophagus and the stomach irrespective of the type of epithelial lining of the esophagus. Although the nature of these tumors (gastric versus esophageal) has been controversial (reviewed by Carneiro and Chaves), recent data support their classification as esophageal carcinomas. The World Health Organization (WHO) defines esophageal tumors are those located entirely above the EGJ and proximal gastric tumors as those located entirely below the EGJ. Tumors crossing the EGJ are classified as EGJ tumors. An alternative system proposed by Siewart and colleagues divides adenocarcinomas involving the EGJ into 3 categories, based upon location of the midpoint of the tumor:

Type I: adenocarcinoma of the distal esophagus, with or without infiltration of the EGJ from above

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1 The CAP cancer protocols can be found in Reporting on Cancer Specimens: Case Summaries and Background Documentation published by the College of American Pathologists, Northfield, IL; or on the CAP website at cap.org/cancerprotocols.
Type II: true carcinoma of the gastric cardia, arising from the cardiac epithelium or short segments with intestinal metaplasia at the EGJ

Type III: subcardial gastric carcinoma, which infiltrates the EGJ and distal esophagus from below

Application of the Siewart system is complicated by lack of consensus as to the definition and nature of the gastric cardia, with some investigators regarding it as a normal anatomic finding, and others as a metaplastic response to injury from esophagogastric reflux (reviewed by Carneiro and Chaves).

Although some studies have shown no prognostic impact for tumor site, others have shown a poorer outcome for proximal gastric cancers than for distal tumors.

C. Histologic Type

For consistency in reporting, the recently revised histologic classification proposed by the WHO is recommended but not required for clinical use. However, this classification scheme does not distinguish between intestinal and diffuse types of gastric carcinoma but includes signet-ring cell carcinoma in the poorly cohesive carcinoma category. Thus, the Laurén classification may be used in conjunction with 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.

Table 1. WHO Classification of Carcinoma of the Stomach

<table>
<thead>
<tr>
<th>Tumor Type</th>
<th>Histologic Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adenocarcinoma</td>
<td></td>
</tr>
<tr>
<td>Papillary adenocarcinoma</td>
<td>Exophytic with elongated frond-like tumor extensions with fibrovascular cores; usually low grade.</td>
</tr>
<tr>
<td>Tubular adenocarcinoma</td>
<td>Dilated or slit-like branching tubules; usually low grade, although poorly differentiated variants are described.</td>
</tr>
<tr>
<td>Mucinous adenocarcinoma</td>
<td>Contains more than 50% extracellular mucin pools. May contain scattered signet-ring cells.</td>
</tr>
<tr>
<td>Poorly cohesive carcinomas,</td>
<td>Tumor cells infiltrate as isolated single cells or small aggregates. Signet ring cell carcinoma is predominantly composed of signet-ring cells containing a clear droplet of cytoplasmic mucin displacing the nucleus. Other variants of poorly cohesive carcinoma may resemble mononuclear inflammatory cells.</td>
</tr>
<tr>
<td>including diffuse and signet-ring cell carcinoma and other variants</td>
<td></td>
</tr>
<tr>
<td>Mixed carcinoma</td>
<td>Mixture of morphologically identifiable components such as tubular, papillary, and poorly cohesive patterns.</td>
</tr>
<tr>
<td>Adenosquamous carcinoma</td>
<td>Mixture of glandular and squamous neoplastic components; the squamous component should comprise at least 25% of tumor volume.</td>
</tr>
<tr>
<td>Carcinoma with lymphoid stroma (medullary carcinoma)</td>
<td>Poorly developed glandular structures associated with a prominent lymphoid infiltrate in the stroma. Associated with Epstein-Barr virus infection and may have a more favorable prognosis.</td>
</tr>
<tr>
<td>Hepatoid adenocarcinoma</td>
<td>Large polygonal eosinophilic tumor cells resembling hepatocytes; may express alpha-fetoprotein.</td>
</tr>
<tr>
<td>Squamous cell carcinoma</td>
<td>Keratinizing and nonkeratinizing forms are encountered.</td>
</tr>
<tr>
<td>Undifferentiated carcinoma</td>
<td>High-grade carcinoma that cannot be further classified as adenocarcinoma, squamous cell carcinoma, or other recognized variants</td>
</tr>
</tbody>
</table>
**Histologic Features**

<table>
<thead>
<tr>
<th>Tumor Type</th>
<th>Histologic Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neuroendocrine carcinoma</td>
<td>Poorly differentiated high-grade carcinoma with diffuse synaptophysin expression and faint or focal positivity for chromogranin A. These tumors exhibit a high mitotic rate (&gt;20 per 10 high power fields, or Ki-67 index &gt;20%), marked nuclear atypia, and may have focal necrosis</td>
</tr>
<tr>
<td>Large cell neuroendocrine</td>
<td>Tumor cells are large, with moderate amount of cytoplasm, and may contain prominent nucleoli.</td>
</tr>
<tr>
<td>carcinoma</td>
<td></td>
</tr>
<tr>
<td>Small cell neuroendocrine</td>
<td>Tumor cells are small, with finely granular chromatin and indistinct nucleoli.</td>
</tr>
<tr>
<td>carcinoma</td>
<td></td>
</tr>
<tr>
<td>Mixed adenoneuroendocrine</td>
<td>Composed of both gland-forming and neuroendocrine malignant elements, with at least 30% of each component. Identification of scattered neuroendocrine cells in adenocarcinomas by immunohistochemistry does not qualify as mixed carcinoma.</td>
</tr>
<tr>
<td>carcinoma</td>
<td></td>
</tr>
</tbody>
</table>

For well-differentiated neuroendocrine tumors (grade 1 [carcinoid] and grade 2 neuroendocrine tumors), the CAP protocol for neuroendocrine tumors (carcinoid tumors) of the stomach applies.

The Laurén classification, namely intestinal or diffuse type, and/or the Ming classification, namely expanding or infiltrating type, may also be included. In general, significant correlation is seen between the various classification systems.\(^{11}\)

The WHO classifies premalignant lesions of the gastrointestinal tract as intraepithelial neoplasia. For purposes of data reporting, high-grade glandular dysplasia in a gastric resection specimen is reported as “carcinoma in situ.” The term “carcinoma in situ” is not widely applied to glandular neoplastic lesions in the gastrointestinal tract but is retained for tumor registry reporting purposes as specified by law in many states.

### D. Histologic Grade

For adenocarcinomas, a histologic grading system that is based on the extent of glandular differentiation is suggested, as shown below.

<table>
<thead>
<tr>
<th>Grade X</th>
<th>Cannot be assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 1</td>
<td>Well differentiated (greater than 95% of tumor composed of glands)</td>
</tr>
<tr>
<td>Grade 2</td>
<td>Moderately differentiated (50% to 95% of tumor composed of glands)</td>
</tr>
<tr>
<td>Grade 3</td>
<td>Poorly differentiated (49% or less of tumor composed of glands)</td>
</tr>
</tbody>
</table>

Signet-ring cell carcinomas are high grade and are classified as grade 3.

Small cell neuroendocrine carcinomas and undifferentiated carcinomas are classified as grade 4.

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

<table>
<thead>
<tr>
<th>Grade X</th>
<th>Grade cannot be assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 1</td>
<td>Well differentiated</td>
</tr>
<tr>
<td>Grade 2</td>
<td>Moderately differentiated</td>
</tr>
<tr>
<td>Grade 3</td>
<td>Poorly differentiated</td>
</tr>
</tbody>
</table>

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 are assigned grade 4 (see Note C).
Although grade has been shown to have little impact on survival for patients undergoing complete tumor resection, it has a significant impact on margin-negative resectability, with higher grade tumors less likely to be resectable.

E. Margins
For surgical resection specimens, margins include the proximal, distal, and radial margins. The radial margins represent the nonperitonealized soft tissue margins closest to the deepest penetration of tumor. In the stomach, the lesser omental (hepato-duodenal and hepatogastric ligaments) and greater omental resection margins are the only radial margins. For endoscopic resection specimens, margins include peripheral mucosal margins and the deep margin of resection. 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.

F. Treatment Effect
Response of tumor to previous chemotherapy or radiation therapy should be reported. Although grading systems for tumor response have not been established, in general, 3-category systems provide good interobserver reproducibility. The following system is suggested:

<table>
<thead>
<tr>
<th>Description</th>
<th>Tumor Regression Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>No viable cancer cells</td>
<td>0 (Complete response)</td>
</tr>
<tr>
<td>Single cells or small groups of cancer cells</td>
<td>1 (Moderate response)</td>
</tr>
<tr>
<td>Residual cancer outgrown by fibrosis</td>
<td>2 (Minimal response)</td>
</tr>
<tr>
<td>Minimal or no tumor kill; extensive residual cancer</td>
<td>3 (Poor response)</td>
</tr>
</tbody>
</table>

Sizable pools of acellular mucin may be present after chemoradiation but should not be interpreted as representing residual tumor.

This protocol does not preclude the use of other systems for assessment of tumor response, such as the schemes reported by Memorial Sloan-Kettering Cancer Center investigators and others.

G. Venous/Lymphatic Vessel Invasion
Both venous and lymphatic vessel invasion have been shown to be adverse prognostic factors and are predictive of lymph node metastases in early gastric cancers. 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.

H. Perineural Invasion
Perineural invasion has been shown to be an adverse prognostic factor and has been associated with lymph node metastases in early gastric cancer in univariate but not multivariate analyses.

I. TNM and Anatomic Stage/Prognostic 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.

According to 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.

**Primary Tumor (T)** (Figures 2-4)

<table>
<thead>
<tr>
<th>Code</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 (including high-grade dysplasia): intraepithelial tumor without invasion of the lamina propria</td>
</tr>
<tr>
<td>T1</td>
<td>Tumor invades lamina propria, muscularis mucosae, 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##</td>
</tr>
<tr>
<td>T3</td>
<td>Tumor penetrates subserosal connective tissue without invasion of visceral peritoneum or adjacent structures</td>
</tr>
<tr>
<td>T4</td>
<td>Tumor invades serosa (visceral peritoneum) or adjacent structures</td>
</tr>
<tr>
<td>T4a</td>
<td>Tumor invades serosa (visceral peritoneum)</td>
</tr>
<tr>
<td>T4b</td>
<td>Tumor invades adjacent structures###</td>
</tr>
</tbody>
</table>

* The T1 category has been expanded on the basis of the observed difference in frequency of lymph node metastasis. In addition, the substratifications may be important as indicators for treatment by limited procedures.³

** 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 T3. If there is perforation of the visceral peritoneum covering the gastric ligaments or omenta, the tumor is classified as T4.
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.

**Figure 2.** Definitions of T1, T2, and T3. Tumor invading the lamina propria is classified as T1a (left side or T1 illustration), whereas tumor invading the submucosa is classified as T1b (right side). T2 tumor invades the muscularis propria. T3 tumor invades the subserosal adipose tissue. Used with permission of the American Joint Committee on Cancer (AJCC), Chicago, IL. The original source for this material is the *AJCC Cancer Staging Atlas* (2006) edited by Greene et al[^1] and published by Springer Science and Business Media, LLC, [www.springerlink.com](http://www.springerlink.com).
Figure 3. T3 is defined as tumor that invades the subserosa. Distal extension to duodenum does not affect T category. Used with permission of the American Joint Committee on Cancer (AJCC), Chicago, IL. The original source for this material is the AJCC Cancer Staging Atlas (2006) edited by Greene et al and published by Springer Science and Business Media, LLC, www.springerlink.com.
Figure 4. T4a tumor penetrates serosa (visceral peritoneum) without invasion of adjacent structures, whereas T4b tumor invades adjacent structures, such as the pancreas (shown). Used with permission of the American Joint Committee on Cancer (AJCC), Chicago, IL. The original source for this material is the AJCC Cancer Staging Atlas (2006) edited by Greene et al and published by Springer Science and Business Media, LLC, www.springerlink.com.

Regional Lymph Nodes (N) (also see Note K)
NX Regional lymph nodes cannot be assessed
N0 No regional lymph node metastasis
N1 Metastasis in 1 to 2 perigastric lymph nodes
N2 Metastasis in 3 to 6 perigastric lymph nodes
N3 Metastasis in more than 6 lymph nodes

* A designation of N0 should be used if all examined lymph nodes are negative, regardless of the total number removed and examined. Lymph nodes containing isolated tumor cells, defined as single tumor cells or small clusters of cells not more than 0.2 mm in diameter, are classified as pN0.

Discontinuous tumor deposits without evidence of residual lymph node and located in the subserosal tissue adjacent to a gastric carcinoma are considered regional lymph node metastases, according to the AJCC TNM 7th edition. Nodules implanted on the peritoneal surface are considered distant metastases (M1).

Distant Metastasis (M)
M0 No distant metastasis
M1 Distant metastasis

Stage Groupings
Stage 0 Tis N0 M0
Stage IA T1 N0 M0
Stage 1B T2 N0 M0
Stage T1 N1 M0
Stage II A T3 N0 M0
Stage II A T2 N1 M0
Stage II A T1 N2 M0
### Stage IIIB
- T4a
- N0
- M0
- T3
- N1
- M0
- T2
- N2
- M0

### Stage IIIA
- T4a
- N1
- M0
- T3
- N2
- M0
- T2
- N3
- M0

### Stage IIIB
- T4b
- N0 or N1
- M0
- T4a
- N2
- M0
- T3
- N3
- M0

### Stage IIIC
- T4b
- N2 or N3
- M0
- T4a
- N3
- M0

### Stage IV
- Any T
- Any N
- M1

### Additional Descriptors

**Lymph-Vascular Invasion**

Lymph-vascular invasion (LVI) indicates whether microscopic lymph-vascular invasion is identified in the pathology report. LVI includes lymphatic invasion, vascular invasion, or lymph-vascular invasion. By AJCC/UICC convention, LVI does not affect the T category indicating local extent of tumor unless specifically included in the definition of a T category.

**J. Regional Lymph Nodes**

The specific nodal areas of the stomach (Figure 5) are listed below.¹

**Figure 5.** Regional lymph nodes of the stomach. Used with permission of the American Joint Committee on Cancer (AJCC), Chicago, IL. The original source for this material is the AJCC Cancer Staging Atlas (2006) edited by Greene et al.² and published by Springer Science and Business Media, LLC, www.springerlink.com.

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

**Pancreatic and Splenic Area:** Pancreaticocolinal, 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.¹
K. Other Findings
One of the most important risk factors for development of gastric carcinoma is long-standing infection with Helicobacter pylori, which leads to chronic gastritis and mucosal atrophy with intestinal metaplasia; autoimmune gastritis, also a chronic inflammatory condition, is also associated with increased risk. Occasionally, gastric carcinoma arises in a preexisting gastric polyp, most commonly large hyperplastic polyps in the setting of atrophic gastritis.

L. Clinical History
Previous gastric surgery, such as Billroth I or Billroth II procedures, predisposes to the development of carcinoma in the remnant stomach; such tumors typically arise approximately 25 years after surgery for benign diseases.

References

