Endoscopic Resection of the Stomach
Histopathology Reporting Guide

Family/Last name

Given name(s)

Date of birth DD – MM – YYYY

Patient identifiers

Date of request DD – MM – YYYY

Accession/Laboratory number

Elements in **black text** are CORE. Elements in **grey text** are NON-CORE.

☐ indicates multi-select values ◯ indicates single select values

SCOPE OF THIS DATASET

CLINICAL INFORMATION (select all that apply) (Note 1)

- ◯ Information not provided
- ☐ Relevant biopsy results, *specify*
- ☐ Endoscopic location of the tumour, *specify*
- ☐ Clinical staging, *specify level of involvement, distant metastases*
- ☐ Previous history of gastric cancer, *specify*
- ☐ Previous endoscopic resection, *specify*
- ☐ Previous partial gastrectomy procedure, *specify*
- ☐ History of chronic gastritis, *specify*
- ☐ Other, *specify*

ENDOSCOPIC PROCEDURE (Note 2)

- ◯ Not specified
- ◯ Endoscopic mucosal resection (EMR)
- ◯ Endoscopic submucosal dissection (ESD)
- ◯ Other, *specify*

SPECIMEN DIMENSIONS (Note 3)

Mucosal area

mm x mm

Thickness

mm

- ◯ Cannot be assessed, *specify*

TUMOUR FOCALITY[a] (Note 4)

- ◯ Unifocal
- ◯ Multifocal, *specify number of tumours in specimen*
- ◯ Cannot be assessed, *specify*

[a] *If multiple primary tumours are present, separate datasets should be used to record this and all following elements for each primary tumour.*

TUMOUR SITE (select all that apply) (Note 5)

- ◯ Not specified
- ☐ Region
  - ☐ Upper third ☐ Middle third ☐ Distal third
- ☐ Curvature
  - ☐ Greater ☐ Lesser
- ☐ Wall
  - ☐ Anterior ☐ Posterior
- ☐ Other, *specify*

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TUMOUR DIMENSIONS (Note 6)

Maximum tumour dimension

mm

Additional dimensions

mm x mm

◯ Cannot be assessed, *specify*

MACROSCOPIC TUMOUR TYPE (Note 7)

(Applicable to early gastric carcinomas)

◯ Cannot be assessed
◯ Protruding (type 0-I)
◯ Superficial (type 0-II)
◯ Excavated (type 0-III)
◯ Other, *specify*

HISTOLOGICAL TUMOUR TYPE (Note 8)

World Health Organization (WHO) Classification

(Value list based on the WHO Classification of Tumours of the Gastrointestinal Tract (2019))

◯ Cannot be assessed
◯ Tubular adenocarcinoma
◯ Papillary adenocarcinoma
◯ Mucinous adenocarcinoma
◯ Poorly cohesive carcinoma, including signet-ring cell carcinoma and other subtypes
◯ Mixed adenocarcinoma
◯ Other histological type/subtype, *specify*

Laurén Classification

(Applicable to gastric adenocarcinomas)

◯ Intestinal
◯ Diffuse
◯ Mixed
◯ Indeterminate

HISTOLOGICAL TUMOUR GRADE (Note 9)

(Applicable to tubular and papillary adenocarcinomas)

◯ GX: Cannot be assessed
◯ G1: Well differentiated
◯ G2: Moderately differentiated
◯ G3: Poorly differentiated, undifferentiated
◯ Other, *specify*

TISSUE LAYERS PRESENT (select all that apply) (Note 10)

◯ Cannot be determined
☐ Lamina propria
☐ Muscularis mucosae
☐ Submucosa
☐ Muscularis propria

EXTENT OF INVASION (Note 11)

◯ Cannot be assessed
◯ No evidence of primary tumour
◯ Carcinoma in situ (intraepithelial tumour without invasion of the lamina propria, high grade dysplasia)
◯ Invasion into the lamina propria
◯ Invasion into the muscularis mucosae
◯ Invasion into the submucosa, *specify depth of invasion* μm
◯ Invasion into the muscularis propria

LYMPHOVASCULAR INVASION (Note 12)

◯ Not identified
◯ Present

MARGIN STATUS (Note 13)

Invasive carcinoma

◯ Cannot be assessed
◯ Not involved

Distance of tumour from closest margin mm

Specify closest margin, if possible

◯ Involved (select all that apply)

☐ Mucosal ☐ Deep

High grade dysplasia

◯ Cannot be assessed
◯ Not involved

Distance of high grade dysplasia from closest margin mm

◯ Involved

Low grade dysplasia

◯ Cannot be assessed
◯ Not involved
◯ Involved

COEXISTENT PATHOLOGY (select all that apply) (Note 14)

◯ None identified
☐ *Helicobacter* gastritis
☐ Autoimmune gastritis
☐ Reactive gastritis
☐ Intestinal metaplasia
☐ Gastric polyps, *specify*
☐ Dysplasia
  ◯ Low grade
  ◯ High grade
  ◯ Indeterminate
☐ Synchronous carcinoma(s), *specify*
☐ Other, *specify*

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ANCILLARY STUDIES (Note 15)

For neuroendocrine neoplasms only

- ◯ Not applicable
- ◯ Neuroendocrine markers (chromogranin A, synaptophysin, other), *specify test(s) performed and result(s) if available*

AND

Ki-67 proliferation index ____ %

Other gastric carcinomas

- ◯ Not performed
- ◯ Performed, *specify test(s) and result(s)*

PATHOLOGICAL STAGING (UICC TNM 8th edition)[b] (Note 16)
(Applicable to specimens with sufficient tissue layers present)

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

- ☐ m - multiple primary tumours
- ☐ r - recurrent

Primary tumour (pT)

- ◯ TX Primary tumour cannot be assessed
- ◯ Tis Carcinoma in situ: intraepithelial tumour without invasion of the lamina propria, high grade dysplasia
- ◯ T1 Tumour invades lamina propria, muscularis mucosae, or submucosa
  - ◯ T1a Tumour invades lamina propria or muscularis mucosae
  - ◯ T1b Tumour invades submucosa
- ◯ T2 Tumour invades muscularis propria

[b] *Reproduced with permission. Source: UICC TNM Classification of Malignant Tumours, 8th Edition, eds by James D. Brierley, Mary K. Gospodarowicz, Christian Wittekind. 2016, Publisher Wiley.*

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Definitions

CORE elements

CORE elements are those which are essential for the clinical management, staging or prognosis of the cancer. These elements will either have evidentiary support at Level III-2 or above (based on prognostic factors in the National Health and Medical Research Council levels of evidence[1]). In rare circumstances, where level III-2 evidence is not available an element may be made a CORE element where there is unanimous agreement in the expert committee. An appropriate staging system, e.g., Pathological TNM staging, would normally be included as a CORE element.

The summation of all CORE elements is considered to be the minimum reporting standard for a specific cancer.

NON-CORE elements

NON-CORE elements are those which are unanimously agreed should be included in the dataset but are not supported by level III-2 evidence. These elements may be clinically important and recommended as good practice but are not yet validated or regularly used in patient management.

Key information other than that which is essential for clinical management, staging or prognosis of the cancer such as macroscopic observations and interpretation, which are fundamental to the histological diagnosis and conclusion e.g., macroscopic tumour details, may be included as either CORE or NON-CORE elements by consensus of the Dataset Authoring Committee.

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Scope

The dataset has been developed for the pathology reporting of endoscopic resection (ER) specimens of the stomach. Surgically resected specimens are covered in a separate International Collaboration on Cancer Reporting (ICCR) dataset.[2]

Carcinomas involving the oesophagogastric junction (OGJ) with their epicentre >20 millimetres (mm) into the proximal stomach and cardia cancers that do not involve the OGJ are included. These criteria are set by the Union for International Cancer Control (UICC)[3]/American Joint Committee on Cancer (AJCC)[4] 8th edition TNM classifications and have been adopted by the World Health Organization (WHO) and define the diagnosis 'gastric cancer'. An ICCR dataset for carcinoma of the oesophagus is available for tumours not meeting these criteria.[5]

Neuroendocrine carcinomas (NECs) and mixed neuroendocrine-non-neuroendocrine neoplasms (MiNENs) (with the exception of mixed adenoma and neuroendocrine tumours (NETs)) are included in this dataset.

Neuroendocrine tumours (NETs), non-epithelial malignancies, and secondary tumours are excluded from this dataset.

The authors of this dataset can be accessed here.

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Note 1 – Clinical information (Non-core)

Clinical information should ideally be provided by the clinician in the endoscopy report or the pathology request form. Patient medical records may be another source of information if accessible.

Relevant biopsy results include the presence of carcinoma, dysplasia (glandular intraepithelial neoplasia), and intestinal metaplasia.

Endoscopic tumour location or information on the tumour location as reported by the clinicians are important guides to determine the tumour epicentre.

Multiple tumours may occur in the stomach and previous history of cancer or cancer treatment is relevant. In addition, a number of conditions, including previous partial gastrectomy for a benign disease and chronic atrophic gastritis, are risk factors for gastric cancer.

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Note 2 – Endoscopic procedure (Core)

Endoscopic resection (ER), including endoscopic mucosal resection (EMR) and endoscopic submucosal dissection (ESD), is recommended for selected early gastric carcinomas. En bloc resection may be necessary to obtain precise pathological diagnosis. EMR cannot be used to resect lesions larger than 15 millimetres (mm) in one piece, and piecemeal EMR of larger lesions is potentially associated with risk of local recurrence. Therefore, for larger lesions, ESD is the better option.[6] The European Society of Gastrointestinal Endoscopy (ESGE), American Gastroenterological Association (AGA) and Japanese Gastric Cancer Association (JGCA) recommend ESD as the treatment of choice for most gastric superficial neoplastic lesions.[7-10] The standard criteria for ER are 1) T1a; 2) well/moderately differentiated; 3) ≤20 mm; 4) non-ulcerated; and 5) no lymphovascular invasion (also see National Comprehensive Cancer Network (NCCN) guidelines for gastric cancer).[7,8,11] Extended criteria[7,9] for ESD include: 1) moderately and well differentiated intramucosal carcinoma with no ulcer, size >20 mm; 2) moderately and well differentiated intramucosal carcinomas, with ulcer, size ≤30 mm; 3) moderately and well differentiated carcinomas with early submucosal invasion (SM1) ≤500 micrometres (μm), with no ulcer and size ≤30 mm; and 4) poorly differentiated intramucosal carcinoma ≤20 mm, with no ulcer. Reliable long-term results have not been established for the extended criteria.[6] Table 1 shows therapeutic recommendations for endoscopic treatment of gastric cancer from the 2018 JGCA treatment guidelines.[10] Based on pathological examination of the ER specimens, patients are managed with either endoscopic surveillance or surgery.

Table 1: Therapeutic recommendations for endoscopic treatment of gastric cancer based on histopathologic examination of endoscopically resected specimens, from the 2018 Japanese Gastric Cancer Association (JGCA) treatment guidelines.[12]

Endoscopic treatment (EMR/ESD)			
Differentiated[a]		**Undifferentiated[a]**	
Vertical/deep margin (−) Lymphovascular infiltration (−) Any of following: • Intramucosal without ulcer, any size • Intramucosal with ulcer, diameter ≤3 cm (≤30 mm) • Submucosal, diameter ≤3 cm (≤30 mm)		Vertical/deep margin (−) Horizontal/lateral margin (−) Lymphovascular infiltration (−) Intramucosal without ulcer, diameter ≤2 cm (≤20 mm)	
Yes	No	No	Yes
Follow-up[b]	Surgery		Follow-up

EMR, endoscopic mucosal resection; ESD, endoscopic submucosal dissection.
[a] According to the Nakamura Classification;[13] see Table 3 for the corresponding 2017 JGCA and 2019 World Health Organization Classifications.
[b] If the horizontal margin is positive, additional endoscopic treatment or surgery is required.

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Note 3 – Specimen dimensions (Core)

There is no internationally agreed recommendation on how specimens should be measured and whether they should be measured fresh or after formalin fixation. However, the Stomach Endoscopic Resection Dataset Authoring Committee recommended that the reporting of specimen dimensions be a core element as this allows for good clinical correlation.

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Note 4 – Tumour focality (Core)

While multifocal gastric carcinomas are rare, they should be documented. If multiple primary tumours are present, separate datasets should be used to describe this and all following elements for each primary tumour.

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Note 5 – Tumour site (Core)

The stomach is divided into the cardia, fundus, body, antrum and pylorus, but these regions are difficult to define macroscopically, which is especially true for the cardia and fundus. The JGCA guidelines divide the stomach into upper third, middle third and distal third by the lines connecting the trisected points on the lesser and greater curvatures (Figure 1),[14] which is adopted by this dataset. Primary gastric cancer located in the upper third of the stomach, especially at the OGJ/cardia, are reported to be more aggressive and associated with a poor prognosis.[15]

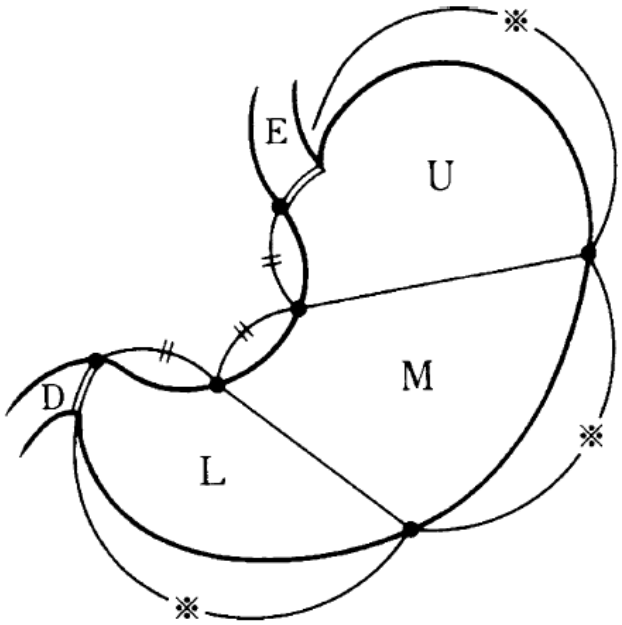


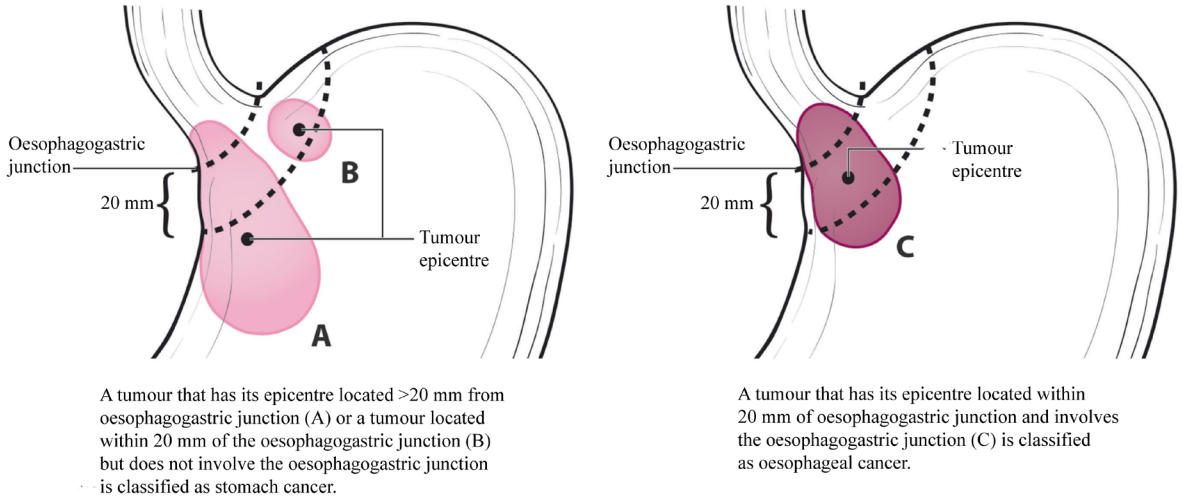
Figure 1: The stomach can be divided into 3 portions: upper third (U), middle third (M) and distal third (L). (E) oesophagus and (D) duodenum. Reproduced with permission from Japanese Gastric Cancer Association, Sano T and Kodera Y (2011). Japanese classification of gastric carcinoma: 3rd English Edition*, Gastric Cancer* 14(2):101-112.[14]

The OGJ is defined as the border between the oesophageal and gastric muscles, irrespective of the type of epithelial lining of the oesophagus. However, it can be challenging to determine the exact location of the OGJ, especially in individuals with conditions affecting OGJ landmarks. Four methods have been proposed to locate the OGJ anatomically as follows:[14-16]

1. The distal end of the longitudinal palisading small vessels in the lower oesophagus. It can be seen endoscopically as well as microscopically and is commonly used by Japanese pathologists. However, it can be obscured by inflammation.
2. The horizontal level of the angle of His (defined as starting from the peritoneal reflection of the stomach onto the diaphragm), as shown by barium meal examination. It can be altered by hiatal hernia or tumour invasion.
3. The proximal end of the gastric longitudinal mucosal folds, which is the most commonly used definition by endoscopists in Western countries. However, it can be obscured by the presence of gastric mucosal atrophy (i.e., post chemoradiation therapy and atrophic gastritis) or a large gastric mass.
4. The level of the macroscopic calibre changes of the resected oesophagus and stomach.

The current recommendation is to use the proximal end of the gastric longitudinal mucosal folds as the landmark for the OGJ. If it cannot be identified, use the distal end of the longitudinal palisading small vessels.

The Siewert Classification categorises OGJ cancer into Siewert type I (tumours with their epicentre located 10-50 mm above the OGJ), type II (tumour epicentre located from 10 mm above to 20 mm below the OGJ) and type III (tumour epicentre located from 20 mm - 50 mm below the OGJ).[17] In the Siewert Classification, the proximal end of the gastric longitudinal mucosa folds is used as pragmatic reference for the endoscopic cardia/OGJ (zero point).[17] The current UICC[3]/AJCC[4] 8th edition Staging System definition of gastric cancer includes those tumours involving the OGJ but with the epicentre >20 mm into the proximal stomach and cardia cancer without involvement of the OGJ (Figure 2).[4] Therefore, all Siewert type III and some Siewert type II tumours are classified as gastric cancer based on the UICC/AJCC 8th edition Staging Systems.[3,4]



A tumour that has its epicentre located >20 mm from oesophagogastric junction (A) or a tumour located within 20 mm of the oesophagogastric junction (B) but does not involve the oesophagogastric junction is classified as stomach cancer.

A tumour that has its epicentre located within 20 mm of oesophagogastric junction and involves the oesophagogastric junction (C) is classified as oesophageal cancer.

Figure 2: (A) Oesophagogastric junction (OGJ) tumours with their epicentre located >20 mm into the proximal stomach are staged as stomach cancers. (B) Cardia cancers not involving the OGJ are staged as stomach cancers. (C) Tumours involving the OGJ with their epicentre <20 mm into the proximal stomach are staged as esophageal cancer. Modified with permission of the American College of Surgeons, Chicago, Illinois. The original source for this information is the American Joint Committee on Cancer Staging Manual, Eighth Edition (2016) published by Springer Science+Business Media.[4]

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Note 6 – Tumour dimensions (Core and Non-core)

For early gastric cancer, the tumour dimension is usually measured microscopically. However, when the tumour size is large, macroscopic mapping of the entire tumour and a thorough pathologic examination may be necessary.

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Note 7 – Macroscopic tumour type (Non-core)

Early gastric carcinoma is defined as an invasive carcinoma involving only the mucosa (T1a) or submucosa (T1b). Growth patterns of early gastric carcinoma are classified into type 0-1 (protruding), type 0-II (superficial), and type 0-III (excavated). Type 0-II tumours are further divided into type 0-IIa (superficial, elevated), type 0-IIb (superficial, flat) and type 0-IIc (superficial depressed) (Table 2, Figure 3).[12,14,18] Tumour ulceration may be a negative determinant in selecting patients for ER, which can be recorded in the dataset. Early gastric carcinomas are usually small, and their macroscopic tumour types may only be accurately assessed by endoscopists.

Table 2: Subclassification of early (type 0) gastric cancer.[12,14,18]

Type 0-I (protruding)	Polyploid lesions, protruding >3 mm
Type 0-IIa (superficial elevated)	Slightly elevated lesions protruding <3 mm
Type 0-IIb (superficial flat)	Tumours without elevation or depression
Type 0-IIc (superficial depressed)	Slightly depressed lesions
Type 0-III (excavated)	Lesions with a deep depression

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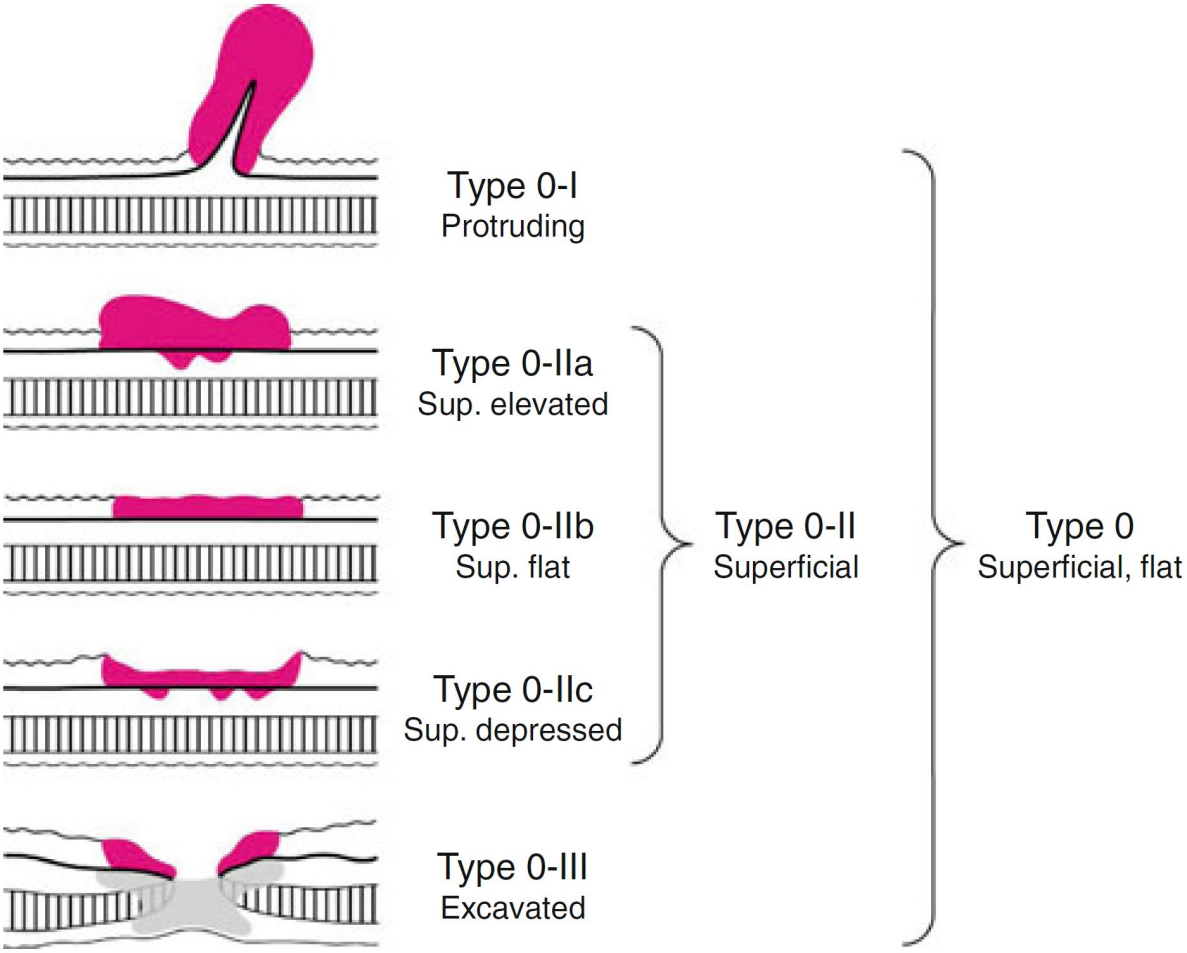

Figure 3: Subclassification of early gastric carcinoma (type 0). Reproduced with permission from Japanese Gastric Cancer Association, Sano T and Kodera Y (2011). Japanese classification of gastric carcinoma: 3rd English Edition*, Gastric Cancer* 14(2):101-112.[14]

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Note 8 – Histological tumour type (Core and Non-core)

Several Classification schemes have been used for subtyping gastric carcinomas histologically, including the Laurén,[19] Nakamura,[13] JGCA,[20] WHO[12] (Table 3) and Ming[21] Classifications. For consistency in reporting, the WHO Classification of Tumours of the Digestive System, 5th edition, is recommended (Tables 3-5).[12] However, if a carcinoma does not fit the WHO Classification for gastric carcinomas, a descriptive diagnosis should be given. The Laurén Classification is also widely used for gastric adenocarcinomas.[19] In the Laurén Classification, gastric adenocarcinomas are simply divided into two histological subtypes - intestinal type and diffuse type.[19] Gastric carcinomas that do not fit into one of these two histological subtypes are placed into the mixed or indeterminate categories. The Laurén Classification provides a simplified categorisation of common types of gastric carcinoma and facilitates a general understanding of pathogenesis of most gastric carcinomas.[12,19,22] However, unlike the WHO Classification, the Laurén Classification is difficult to apply to all histologic gastric cancer subtypes and is therefore a non-core element.

A high incidence of intragastric recurrence is observed in certain histological subtypes including undifferentiated carcinoma and mixed adenocarcinoma with both signet ring cell carcinoma and poorly differentiated adenocarcinoma.[23]

Table 3: Comparison of the Laurén, Nakamura, Japanese Gastric Cancer Association (JGCA) and World Health Organization (WHO) Classification of gastric cancer.[12]

Laurén (1965)	**Nakamura et al (1968)**	**JGCA (2017)**	**WHO (2019)**
Intestinal	Differentiated	Papillary: pap Tubular 1, well differentiated: tub1 Tubular 2, moderately differentiated: tub2	Papillary Tubular, well differentiated Tubular, moderately differentiated
Indeterminate	Undifferentiated	Poorly 1 (solid type): por1	Tubular (solid), poorly differentiated
Diffuse	Undifferentiated	Signet-ring cell: sig Poorly 2 (non-solid type): por2	Poorly cohesive, signet-ring cell phenotype Poorly cohesive, other cell types
Intestinal/diffuse/indeterminate	Differentiated/ undifferentiated	Mucinous	Mucinous
Mixed		Description according to the proportion (e.g., por2>sign>tub2)	Mixed
Not defined	Not defined	**Special type:** Adenosquamous carcinoma Squamous cell carcinoma Undifferentiated carcinoma Carcinoma with lymphoid stroma Hepatoid adenocarcinoma Adenocarcinoma with enteroblastic differentiation Adenocarcinoma of fundic gland type	**Other histological subtypes:** Adenosquamous carcinoma Squamous cell carcinoma Undifferentiated carcinoma Carcinoma with lymphoid stroma Hepatoid adenocarcinoma Adenocarcinoma with enteroblastic differentiation Adenocarcinoma of fundic gland type Micropapillary adenocarcinoma

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Table 4: World Health Organization histological classification of gastric carcinomas.[12]

Tumour type	Histologic features
Adenocarcinoma, main histologic types	
Tubular adenocarcinoma	Most common subtype; composed of dilated or slit-like branching tubules of variable diameter or acinar structures
Papillary adenocarcinoma	Exophytic growth pattern and most commonly well differentiated; composed of elongated finger-like processes lined by columnar or cuboidal cells supported by fibrovascular cores
Poorly cohesive carcinoma, including signet ring cell carcinoma and other subtypes	Accounting for 20-54% of gastric cancers; composed of neoplastic cells that are isolated or arranged in small aggregates without well-formed glands; either signet-ring cell type (composed predominantly or exclusively of signet-ring cells) or non-signet ring cell type with marked desmoplasia
Mucinous adenocarcinoma	Composed of malignant epithelium and extracellular mucin pools (mucin pools >50% of the tumour area)
Mixed adenocarcinoma	Composed of signet ring cell/poorly cohesive component and one or more other distinct histological components such as tubular/papillary carcinoma
Adenocarcinoma, other histological subtypes	
Gastric (adeno)carcinoma with lymphoid stroma	Characterised by irregular sheets, trabeculae, ill-defined tubules or syncytia of polygonal cells embedded within a prominent lymphocytic infiltrate, with intraepithelial lymphocytes; frequently associated with Epstein-Barr virus infection; less commonly associated with microsatellite instability or DNA mismatch repair deficiency
Hepatoid adenocarcinoma and related entities	Composed of large polygonal eosinophilic hepatocyte-like neoplastic cells with alpha fetoprotein (AFP) expression; other AFP-producing carcinomas including well differentiated papillary/tubular-type adenocarcinoma with clear cytoplasm, adenocarcinoma with enteroblastic differentiation and yolk-sac tumour-like carcinoma
Micropapillary adenocarcinoma	Composed of micropapillary component (10-90% of the tumour area) and tubular/papillary adenocarcinoma
Gastric adenocarcinoma of fundic-gland type	Likely develop from oxyntic gland adenoma with oxyntic gland differentiation; include chief-cell predominant (most common), parietal cell-predominant, and mixed phenotype
Rare histological subtypes	Mucoepidermoid carcinoma, paneth cell carcinoma, and parietal cell carcinoma
Gastric squamous cell carcinoma	Only composed of squamous cell carcinoma with no other histological component after thorough sampling
Gastric adenosquamous cell carcinoma	Admixture of adenocarcinoma and squamous cell carcinoma with the squamous cell component ≥25%
Gastric undifferentiated (anaplastic) carcinoma	Composed of diffuse sheets of anaplastic, large to medium size polygonal cells, with frequent pleomorphic tumour giant cells; other morphologies that may be seen include rhabdoid cell, sarcomatoid pleomorphic pattern, undifferentiated carcinoma with osteoclast-like giant cells, carcinoma with lymphoepithelioma-like feature, and a glandular component

Gastroblastoma	Composed of uniform spindle cells and uniform epithelial cells arranged in nests
Gastric neuroendocrine carcinoma (NEC)	
Small cell NEC	Resemble its lung counterpart; frequent necrosis
Large cell NEC	Resemble its lung counterpart; frequent necrosis
Mixed neuroendocrine-non-neuroendocrine neoplasm	
Mixed adenocarcinoma-NEC	Composed of both adenocarcinoma and NEC with each component ≥30%
Mixed adenocarcinoma-neuroendocrine tumour	Composed of both adenocarcinoma and neuroendocrine tumour with each component ≥30%

Table 5: World Health Organization Classification of tumours of the stomach.[12]

Descriptor	**ICD-O codes**[a]
Benign epithelial tumours and precursors	
Glandular intraepithelial neoplasia, low grade	8148/0
Glandular intraepithelial neoplasia, high grade	8148/2
Serrated dysplasia, low grade	8213/0*
Serrated dysplasia, high grade	8213/2*
Intestinal-type dysplasia	
Foveolar-type (gastric-type) dysplasia	
Gastric pit/crypt dysplasia	
Intestinal-type adenoma, low grade	8144/0*
Intestinal-type adenoma, high grade	8144/2*
Sporadic intestinal-type gastric adenoma	
Syndromic intestinal-type gastric adenoma	
Adenomatous polyp, low-grade dysplasia	8210/0*
Adenomatous polyp, high-grade dysplasia	8210/2*
Malignant epithelial tumours	
Adenocarcinoma NOS	8140/3
Tubular adenocarcinoma	8211/3
Parietal cell carcinoma	8214/3
Adenocarcinoma with mixed subtypes	8255/3
Papillary adenocarcinoma NOS	8260/3
Micropapillary carcinoma NOS	8265/3
Mucoepidermoid carcinoma	8430/3
Mucinous adenocarcinoma	8480/3
Signet-ring cell carcinoma	8490/3
Poorly cohesive carcinoma	8490/3
Medullary carcinoma with lymphoid stroma	8512/3
Hepatoid adenocarcinoma	8576/3
Paneth cell carcinoma	
Squamous cell carcinoma NOS	8070/3
Adenosquamous carcinoma	8560/3

Descriptor	ICD-O codes[a]
Carcinoma, undifferentiated, NOS	8020/3
Large cell carcinoma with rhabdoid phenotype	8014/3
Pleomorphic carcinoma	8022/3
Sarcomatoid carcinoma	8033/3
Carcinoma with osteoclast-like giant cells	8035/3
Gastroblastoma	8976/3*
Neuroendocrine tumour NOS	8240/3
Neuroendocrine tumour, grade 1	8240/3
Neuroendocrine tumour, grade 2	8249/3
Neuroendocrine tumour, grade 3	8249/3
Gastrinoma NOS	8153/3
Somatostatinoma NOS	8156/3
Enterochromaffin-cell carcinoid	8241/3
ECL-cell carcinoid, malignant	8242/3
Neuroendocrine carcinoma NOS	8246/3
Large cell neuroendocrine carcinoma	8013/3
Small cell neuroendocrine carcinoma	8041/3
Mixed neuroendocrine–non-neuroendocrine neoplasm (MiNEN)	8154/3

[a] These morphology codes are from the International Classification of Diseases for Oncology, third edition, second revision (ICD-O-3.2).[24] Behaviour is coded /0 for benign tumours; /1 for unspecified, borderline, or uncertain behaviour; /2 for carcinoma in situ and grade III intraepithelial neoplasia; and /3 for malignant tumours, primary site; and /6 for malignant tumours, metastatic site. Subtype labels are indented. Incorporates all relevant changes from the 5th edition Corrigenda, January 2022.
* Codes marked with an asterisk were approved by the International Agency for Research on Cancer/World Health Organization Committee for ICD-O at its meeting in April 2019.

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Note 9 – Histological tumour grade (Core)

The three-tiered grading system, applicable for tubular and papillary adenocarcinomas, is recommended by the UICC[3]/AJCC[4] 8th edition Staging Systems as follows:

- G1: Well differentiated
- G2: Moderately differentiated
- G3: Poorly differentiated, undifferentiated

The AJCC 8th edition also recommends that the highest grade is recorded if there is evidence of more than one grade or level of differentiation of the tumour.[4] The Stomach Endoscopic Resection Dataset Authoring Committee recommended that the UICC[3]/AJCC[4] grading system for endoscopic specimens should be a core element because tumour grade may be more relevant in locally excised tumour specimens.

It is noted that the WHO Classification recommends a two-tiered system: low grade (well and moderately differentiated) and high grade (poorly differentiated).[12]

Histopathological grading does not independently affect patient survival after R0 resection; however, poor histopathological grade is associated with high rate of R1 and R2 resections.[25]

As discussed in 'Endoscopic procedure', the criteria for ER are different between well/moderately differentiated and poorly/undifferentiated tumours. Some (but not all) studies have shown that poorly differentiated/undifferentiated mucosal and submucosal gastric cancer are associated with a high risk for lymphovascular invasion/lymph node metastasis.[9,26,27]

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Note 10 – Tissue layers present (Core)

Sometimes it is not possible to accurately stage the tumour when there are limited tissue layers present in ER specimens. For example, submucosal invasion cannot be determined if an ER specimen consists only of the mucosa with presence of cancer at the deep margin. Therefore, reporting the of tissue layers present in the specimen is very important and is a core element.

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Note 11 – Extent of invasion (Core)

The term 'carcinoma in situ' is not commonly applied to glandular epithelium. However, high grade dysplasia (glandular intraepithelial neoplasia, high grade) in a gastric resection specimen is also reported as 'carcinoma in situ' as recommended by the UICC[3]/AJCC[4] 8th edition Staging Systems mainly for tumour registry reporting purposes.

The depth of invasion is associated with increased risk of lymph node metastasis in early gastric cancer.[9] Tumour invasion into the submucosa >500 µm (0.5 mm) from the muscularis mucosa has been reported as an independent risk factor for lymph node metastasis after noncurative ER.[9] The depth of submucosal invasion is measured from the lower border of the muscularis mucosae to the point of the deepest tumour penetration. While submucosal invasion of <500 µm in depth has been included as one of the extended criteria for ESD, other studies have suggested setting a different cutoff or dividing the submucosa invasion into superficial third (SM1), mid third (SM2) and deep third (SM3).[28,29] However, a measurement is more accurate and less subjective than superficial, mid or deep third.

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Note 12 – Lymphovascular invasion (Core)

Lymphovascular invasion is an independent predictor of lymph node metastasis in endoscopically resected early gastric cancers.[30,31] Therefore, additional gastrectomy is recommended for patients who have ER showing lymphovascular invasion.

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Note 13 – Margin status (Core)

For ER gastric carcinomas, margins include mucosal and deep margins. ER can be en bloc or piecemeal resection. Mucosal margin status is impossible to assess if it is a piecemeal resection with no orientation provided. At this stage no clear consensus on the definition of margin positivity has been reached. Presence or absence of low grade and high grade dysplasia at the mucosal margin should also be recorded.

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Note 14 – Coexistent pathology (Non-core)

Based on the updated Sydney system, chronic gastritis is classified into *Helicobacter pylori* gastritis, ex-*Helicobacter pylori* gastritis, chemically induced/reactive gastritis, autoimmune gastritis and other special forms of gastritis.[32] *Helicobacter pylori* gastritis and autoimmune gastritis are recognised risk factors for gastric carcinoma. Both cause atrophic gastritis with intestinal metaplasia, which may develop into dysplasia/adenoma and further progresses into intestinal-type adenocarcinoma. In addition, pyloric gland adenoma may arise in a background of autoimmune atrophic gastritis,[33] which can also progress into gastric carcinoma.

Gastric polyps include fundic gland polyp, hyperplastic polyp and different types of adenoma. Hyperplastic polyps can be seen in the setting of long-term gastritis, and intestinal metaplasia may be seen in large hyperplastic polyps, which may progress into dysplasia and eventually into invasive carcinoma. Rarely dysplasia is seen in fundic gland polyps, but it almost never progresses to adenocarcinoma. Gastric adenomas include intestinal type, foveolar type, pyloric gland adenoma and oxyntic gland (chief cell) adenoma, all of which can progress to invasive carcinoma.[12]

Other risk factors associated with gastric carcinoma include previous gastric surgery and Epstein-Barr virus (EBV) infection. In addition, approximately 10% of gastric cancers develop in a familial/ hereditary setting, including hereditary diffuse gastric cancer in patients with *CDH1* or *CTBBA1* mutations, patients with Lynch syndrome with microsatellite instability (MSI)-high gastric cancer, familial intestinal gastric cancer, gastric adenocarcinoma, and proximal polyposis of the stomach due to germline mutations in promoter 1B of *APC*. Some patients with familial adenomatous polyposis can have multiple foveolar-type adenomas, which have a potential to become invasive carcinoma but at a consistently low rate.[12] In addition, synchronous gastric carcinoma is rare; however, in one report from Asia, synchronous gastric cancer is seen in approximately 10% of gastric cancer patients.[34]

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Note 15 – Ancillary studies (Core and Non-core)

For gastric carcinomas with neuroendocrine differentiation, including gastric NECs and MiNENs, the reporting of neuroendocrine marker expression and Ki-67 proliferation index are core elements. These elements are non-core for other types of gastric carcinomas.

Gastric neuroendocrine neoplasms are classified into NETs, NECs and MiNENs. NETs are graded 1-3 using the mitotic count and Ki-67 proliferation index,[12] however pure NETs are not considered within the scope of this dataset. Most NECs show marked cytological atypia, brisk mitotic activity, and are subclassified into small cell and large cell subtypes. NECs are considered high grade by definition, typically with a Ki-67 proliferation index >55%.[35] MiNENs are usually composed of a poorly differentiated NEC component and an adenocarcinoma component. If a pure or mixed NEC is suspected on morphology, immunohistochemistry is required to confirm neuroendocrine differentiation, usually applying synaptophysin and chromogranin A as a minimum.[12]

PD-L1 expression and *HER2* amplification/overexpression are only useful for patients with advanced/metastatic gastric cancer. Therefore, these tests are not normally performed on the ER specimens but may be helpful for patients who develop metastases. Mismatch repair may be examined in patients where there is a suspicion for Lynch syndrome-associated gastric cancer, or to predict response to immune checkpoint inhibitor therapy, where appropriate.[36]

Epstein-Barr virus associated gastric cancer (EBVaGC) accounts for approximately 10% of total gastric cancers, most of which occur in men, and are located in the upper part of the stomach.[37] Histologically, EBVaGC is poorly differentiated, with abundant tumour-infiltrating lymphocytes. Morphologic features associated with EBVaGC include abundant tumour-infiltrating lymphocytes and Crohn disease-like reaction. Epstein-Barr encoding region (EBER) in situ hybridisation is widely used to identify EBVaGC, particularly for proximal gastric cancers with the above-mentioned demographic and morphologic features. Although EBVaGC can be poorly differentiated, EBVaGC is a distinct subtype with a low risk of lymph node metastasis.[38] Extension of the criteria for ESD in early EBVaGC is still under discussion.

Lymphovascular invasion is an independent predictor of lymph node metastasis in endoscopically resected early gastric cancers.[30,31] However, immunohistochemical stains for lymphovascular markers are not routinely performed, unless there is a high histological suspicion of lymphovascular invasion.

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Note 16 – Pathological staging (Core)

The UICC[3]/AJCC[4] 8th edition Staging Systems for gastric carcinoma are recommended (Figure 4). However, staging is only applicable to specimens with sufficient tissue layers present.

Endoscopic resections (ERs) are one of the treatment options for early gastric carcinomas, therefore the ‘y’ stage is not applicable.

According to the UICC/AJCC convention, the designation ‘T’ refers to a primary tumour that has not been previously treated. High grade dysplasia in a gastric resection specimen is reported as ‘carcinoma in situ’ (Tis) as recommended by the UICC[3]/AJCC[4] 8th edition Staging Systems mainly for tumour registry reporting purposes.

For ER only T1 and T2 are used, as ER specimens do not contain the subserosa but very rarely may contain superficial muscularis propria.

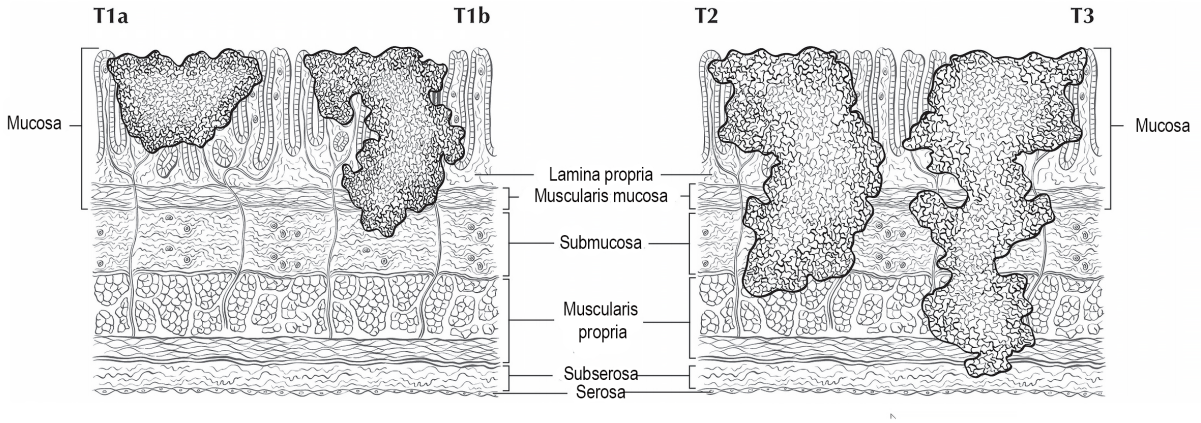

Figure 4: T1a is defined as tumour that invades the lamina propria. T1b is defined as tumour that invades the submucosa. T2 is defined as tumour that invades the muscularis propria, whereas T3 is defined as tumour that extends through the muscularis propria into the subserosal tissue. Used with permission of the American College of Surgeons, Chicago, Illinois. The original source for this information is the American Joint Committee on Cancer Staging Manual, Eighth Edition (2016) published by Springer Science+Business Media.[4]

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