Acknowledgement
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STANDARDS AND MINIMUM DATASETS
FOR REPORTING CANCERS

Since the publication of the Calman-Hine Report, *A Policy Framework for Commissioning Cancer Services*, several national groups and committees have begun to define the standards which Cancer Centres and Units should attain.

- The *Department of Health Clinical Outcomes Group* is drawing up guidance on clinical services for site-specific cancers. This group employs a very elaborate, open and evidence-based approach and has already published guidelines for breast and colorectal cancers, including their pathological reporting. Guidance on lung cancer will follow shortly.

- The *NHS Advisory Committee on Cancer Registration* and the *UK Association of Cancer Registries* are also making recommendations on the collection and coding of clinical and pathological data of diagnostic and prognostic importance for epidemiological and strategic purposes. The cancer registries are improving their links with histopathology departments which they see as timely, convenient and reliable sources of cancer data.

- The *Royal Colleges’ Intercollegiate Committee on Oncology* has stated its intention to produce interdisciplinary guidance on diagnosing and managing patients with common cancers.

In addition, many working groups and committees throughout the UK are drawing up local guidelines and defining working practices and standards, including those for pathology.

The Royal College of Pathologists (RCPath) seeks an active role in this process. The RCPath Specialty Advisory Committee (SAC) on Histopathology approved the formation of a small Working Group to link with the various national committees and to produce a series of succinct evidence-based publications defining minimum standards of reporting common cancers to ensure that pathological standards are defined by histopathologists and to prevent the proliferation of numerous diverse and possibly conflicting local guidelines. Although the time-scale for producing these publications has been short, there has been extensive consultation with specialist and general histopathologists, with multidisciplinary groups and societies, and with cancer registries in order to achieve the broadest possible consensus.

The standards and datasets are being published separately as individual booklets. This will have the major advantages of speed, by enabling documents to be published individually as soon as they become available, and ease of updating. They are also being included in the College’s website (www.rcpath.org).

All these documents are evidence-based and define the minimum standards for reporting each group of tumours. They conform to a standard format and include a proforma which is intended to function as an aide memoire when reporting specific tumours. Although the data in the proforma may be presented as or supplemented by free text, the use of proformas in histopathological reporting is recommended; published audits have shown that they are very effective in ensuring that all necessary data are provided.

There will be an opportunity to participate in a programme of national audit, organised by the RCPath, based on these documents.

These documents will be reviewed in 2001 and before that if new evidence emerges.

Further copies of this document can be obtained from the publications department of The Royal College of Pathologists, 2 Carlton House Terrace, London SW1Y 5AF. Tel: 020 7451 6732. Alternatively it can be downloaded from the College website (www.rcpath.org).
The RCPath Working Group on Cancer Services recommends that:

- the minimum datasets for reporting tumours are used in the system of standard setting, data collection, audit and feedback for those involved in caring for these patients.
- histopathology laboratories nominate a lead pathologist for each of the main cancers with responsibility for liaising with relevant local committees and clinicians and ensuring that the relevant cancers are examined, sampled and reported appropriately and in a consistent fashion.
- histopathologists should be members of multidisciplinary teams dedicated to the diagnosis and management of patients with specific cancers (and be involved in auditing the service).
- the SNOMED coding system is used to achieve as much uniformity as possible from centre to centre and to facilitate reliable cancer registration. Either the 1979 or 1993 version of SNOMED can be used as currently there is no clear consensus for using one or the other.
- histopathologists reporting cancers should participate in appropriate EQA schemes.
- Cancer Centres and Units should be supported only by laboratories accredited with Clinical Pathology Accreditation (UK) Ltd and staffed in accordance with the recommendations of the Royal College of Pathologists and the Association of Clinical Pathologists.

Anyone wishing to make specific or general comments on any of the documents should contact the Chairman of the Working Group.

Royal College of Pathologists Working Group on Cancer Services
G.T. Williams Chairman
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References

Careful reporting of gastric cancer is important for the following reasons.

1. To confirm that a gastrectomy is ‘potentially curative’, i.e. when the surgeon has removed all macroscopic tumour and microscopic examination of the surgical margins reveals no evidence of carcinoma. This is the strongest predictor of survival.¹

2. To determine the maximum extent of spread through the stomach wall and possible involvement of the peritoneal surface. Carcinoma restricted to the mucosa and submucosa (early gastric cancer) is associated with excellent survival² whereas penetration through the serosa and invasion of adjacent structures has a poor outlook even after ‘potentially curative’ resections.³

3. To identify accurately the extent of lymph node involvement. The number of involved lymph nodes is highly prognostic⁴ therefore the yield of nodes for microscopic examination must be maximised. A target yield of over 15 regional lymph nodes allows a full lymph node status to be assigned⁵ but the number obtainable will be considerably influenced by the type of operation performed.

4. To assign the patient the correct clinico-pathological stage on which to base prognosis and adjuvant therapy. The extent of spread should be reported according to the UICC ‘TNM’ classification. While competing classifications exist in Japan and America, the UICC scheme has been widely adopted in Europe. The TNM approach is highly prognostic.¹

This document has been devised to include the minimum amount of data required for a careful assessment of a gastrectomy for gastric cancer. It is evidence based and has been widely discussed. It has been approved by the British Society of Gastroenterology (Pathology Section), the UK Association of Cancer Registries, and panels of specialist and general histopathologists acting on behalf of the College, whose names are listed on the College website. We strongly recommend its use as a minimum dataset.
GASTRIC CANCER HISTOPATHOLOGY REPORT

Surname ........................................  Forenames ........................................  Date of birth ..........  Sex........

Hospital ........................................  Hospital no ........................................  NHS no .......................

Date of request .........................  Date of reporting...............................  Report no.....................

Pathologist ........................................  Surgeon ............................................

Gross description
Type of specimen:  Gastrectomy – Total □  Subtotal □  Partial □  Oesophago-gastrectomy □
Spleen included □  Pancreas included □
Length of specimen – lesser curve .......... mm  Length of specimen – greater curve .......... mm
Length of duodenum .......... mm  Length of oesophagus .......... mm
Site of tumour:  Pylorus □  Antrum □  Body □  O-G junction □
Lesser curve □  Greater curve □  Anterior wall □  Posterior wall □
Macroscopic type:  Ulcer like □  Diffusely infiltrating □  Fungating □  Polypoid □
Size of tumour:  Length .......... mm  Width .......... mm  Thickness .......... mm
Distance of tumour edge to:  Distal margin .......... mm  Proximal margin .......... mm

Histology
Adenocarcinoma  Yes □  No □  Other □ (specify)
Differentiation:  Poor □  Other □
Character of the invasive margin:  Expansive □  Infiltrative □

Local invasion into:
Lamina propria (Intra-mucosal) (T1) □  Submucosa (T1) □
Muscularis propria (T2) □  Subserosa (T2) □
Tumour penetrates peritoneum without invasion of adjacent structures (T3) □
Tumour invades adjacent structures (T4) □  structure invaded ........................................

Lymph node spread:  regional
Total number of regional lymph nodes examined ........
Number of lymph nodes involved ........

Lymph node spread: distant
Nodes submitted separately from:
Number submitted ........
Number involved ........ [M1]

(0 involved = N0; 1-6 involved = N1; 7-15 involved = N2; >15 involved = N3)

Other sites:
Histologically confirmed liver metastasis:  Yes □  No □
Peritoneal deposits  Yes □  No □

Margins:  Tumour involvement of:  Proximal donut Yes □  No □  Distal donut Yes □  No □
Proximal margin  Main specimen Yes □  No □  Frozen section Yes □  No □
<table>
<thead>
<tr>
<th></th>
<th>Distal margin</th>
<th>Main specimen</th>
<th>Frozen section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic gastritis:</td>
<td>Yes ☐ No □</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intestinal metaplasia:</td>
<td>Yes ☐ No □</td>
<td>Atrophy</td>
<td>Yes ☐ No □</td>
</tr>
<tr>
<td>Other lesions:</td>
<td>Yes ☐ No □</td>
<td>H. pylori</td>
<td>Yes ☐ No □</td>
</tr>
<tr>
<td>Synchronous carcinoma</td>
<td>Yes ☐ No □</td>
<td>Lesion present</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Comments**

**Pathological staging**  Complete resection at all margins?  Yes ☐ No □  pTNM:  pT  pN  pM

Signature:.................................  Date:........................  SNOMed codes:..........................
INTRODUCTION

Surgeons differ in the type of operation they perform for gastric cancer. In the UK the usual operation is a 'wide gastric resection', a so-called D1 resection which includes the local lymph nodes. However, Japanese surgeons routinely perform a more extensive D2 resection in which an extra 'tier' of lymph nodes is taken from around the coeliac axis and its branches together with the spleen and/or part of the pancreas. This approach (with or without splenectomy) is increasingly employed by 'Western' surgeons with beneficial consequences for long-term survival. The importance for pathologists is the impact on lymph node yield; obviously, the number to be found in D2 resections will be considerably higher than in D1 operations.

Note: In the past the extent (radicality) of excision was categorised as R1 and R2. This has been superseded by D1, D2 (D = level of dissection of lymph nodes).

SPECIMEN DISSECTION

Handling and fixation
The specimen is ideally received fresh as soon as possible after resection. If this is not practicable then the specimen should be suitably incised and placed in a large volume of formalin. Overnight storage of the fresh specimen in a theatre refrigerator is acceptable unless special techniques are to be performed. The stomach is generally opened along the anterior margin of the greater curve unless this would cut across the tumour as this makes assessment of serosal invasion more difficult. Under these circumstances the cut can be taken in a wide arc around the tumour or when dealing with large greater curve tumours, the anterior margin of the lesser curve is opened. Where there is a gastro-jejunostomy the anastomosis is avoided and the jejunal loop is opened longitudinally by a separate incision. The opened stomach should be fixed flat. Ideally it should be pinned to a cork board to optimise fixation and display the pathology to maximum advantage. Before immersion the specimen is eased away from the board to allow ready access of formalin to the serosal aspect. The specimen is then floated upside down in a bath of 10% formalin for 24–48 hours in a warm environment.

Where the stomach is received in formalin, handling will depend on the adequacy of fixation. If the surgeon has already opened the stomach and the specimen has been sufficiently long in formalin to produce satisfactory fixation then blocks can be taken immediately. Many specimens will be received unopened and only partially fixed. Under these circumstances, the specimen should be opened by a pathologist, pinned out (or placed flat in a large volume of formalin) and ‘extra’ fixed as above.

Gross description
Examination of the specimen starts with a description of the macroscopic appearances. The type of resection, total or partial (proximal or distal) gastrectomy or oesophago-gastrectomy, is recorded. The length along the greater and lesser curve is always measured so that the extent of resection can be assessed, as is the length of duodenal cuff and any oesophagus that is attached. Look carefully for small mucosal erosions and irregularities and for intramural or subserosal nodules. The location of the tumour is described and may be recorded on a simple outline diagram of the opened stomach. This is particularly helpful when more than one lesion is present.

Dimensions of the tumour, axial (length), transverse (width) and maximum thickness together with distance from the tumour edge to the proximal and distal resection margins are measured, and the macroscopic type of tumour is described, e.g. ulcerative, diffusely infiltrating (linitis plastica), polypoid or fungating. These gross forms do not have special biological significance but the descriptions are useful for correlation with endoscopic and imaging findings.
The serosal aspect in the vicinity of the tumour should be carefully examined, particularly as induration and pallor may indicate involvement by cancer. For tumours at the gastro-oesophageal junction at least part of the circumferential margin will not have a serosal covering. This surgical margin should be painted or inked to facilitate identification.

**Blood taking**

Tissue sampling is aimed at determining whether or not the surgical margins are free from tumour and to reveal the maximal extent of spread through the wall with particular emphasis on serosal penetration. The number of blocks to be taken from the tumour will depend upon its size and location but should be at least three. These should include serosa or the omental attachments to assess the extent of direct spread. At least one block should include adjacent mucosa. Serial transverse slices through the tumour will help in the selection of a block showing the maximum depth of penetration of the stomach wall. In the case of suspected early gastric cancer the whole lesion should be embedded to exclude focal invasion of the muscularis propria. Large ‘peptic’ ulcers may prove to be malignant and should be extensively sampled (> 4 blocks), paying particular regard to the edge of the ulcer.

Blocks are taken from the proximal and distal resection margins, even where these appear to be remote from the tumour as some types of gastric cancer exhibit wide infiltration beyond the macroscopic margins. Where adequate intra-operative frozen sections have been performed with follow-up paraffin sections, it is not necessary to take further samples from the margins of the main specimen. Blocks are best taken along the circumference of the resection margin rather than perpendicular to it. This is essential when taking the inked circumferential margin of the oesophageal segment if present.

A random block of antrum and corpus should be taken from all specimens to assess the nature and distribution of any associated gastritis.

**Lymph node retrieval**

Lymph nodes are sought in all the attached tissue. The node is cut through its greatest diameter and one half taken for microscopy. The approach to lymph node retrieval varies according to the type of specimen.

i) An intact gastrectomy with the greater and lesser omentum attached to the specimen. In this situation fat along both curvatures is carefully sliced at 3–5mm intervals and searched for lymph nodes. The principal lymph node groups are gastro-oesophageal junction, proximal lesser curve (paying particular attention to nodes around the left gastric artery pedicle), distal lesser curve, proximal and mid greater curve and infra-pyloric nodes. If the spleen is attached then nodes should be sought in the splenic hilum. The surgeon may send extra-gastric lymph nodes separate from the main specimen and these are dealt with as separate ‘parts’.

ii) A partially dissected gastrectomy, received as a stomach from which all, or almost all associated lymph nodes have been stripped away by the surgeon (the ‘Japanese approach’). The lymph nodes and surrounding fat are received separately, dissected out by the surgeon and submitted in 10–16 pots according to the perigastric origin or extragastric site in the abdomen from which they were obtained. Each piece is searched for nodes. These are cassetted according to their site of origin as involvement of certain intra-abdominal nodes will constitute distant spread. Many of the tissue samples will be small enough to be cassetted whole.

It must be emphasised, however, that the precise location of perigastric lymph nodes is not required in a minimum dataset. Only the total number retrieved and the number involved by metastatic carcinoma are used in staging.
NOTES ON RECORDING DATA ITEMS

GROSS DESCRIPTION
While the need to record the compartment of the stomach in which the tumour is mainly located or appears to be arising is self-evident, it is worth underlining the current interest in the epidemiology of distal versus proximal gastric cancers. While the former are decreasing in incidence there has been a steep increase in the frequency of cancers at the cardia particularly in white males below the age of 65. There is an overall poorer prognosis for proximal cancer for all TNM stages despite the fact that this group is on average younger. However, these differences are based primarily on poorer short-term survival for proximal cancer related to the increased risks of surgery.

HISTOLOGY
Type
Cancers which are not adenocarcinomas are uncommon. Neuroendocrine tumours should be distinguished from adenocarcinomas showing some degree of neuroendocrine differentiation, and from mixed carcinoid and adenocarcinoma (‘collision’ type). Adeno-squamous carcinoma is another uncommon variant, while pure squamous carcinoma is exceedingly rare. Other rare variants include hepatoid, parietal-cell, embryonal and chorio-carcinomas.

Classification and grading
While there are several approaches to categorising and grading gastric cancers (WHO, Lauren, Goseki and Ming), only Ming’s division into ‘expansive’ and ‘infiltrative’ has proved to be reproducibly prognostic in multivariate analyses after stage has been taken into account. Expansive tumours are associated with longer survival than infiltrative forms. However it should be borne in mind that even this apparently straightforward distinction between two growth patterns has only moderate inter-observer agreement. The nature of the invasive margin is also of importance in early gastric cancers (EGC). However in EGC, in contrast to the claimed effect in advanced cases, expansive tumours have a worse prognosis that infiltrative lesions. Nevertheless this has to be put in the context of the generally favourable outlook in EGC and the rarity of ‘aggressive’ subtypes.

With regard to tumour grade a simple division of differentiation into POOR and OTHER (based on the predominant appearance) should suffice. This dichotomous separation is more in keeping with Japanese practice and ‘poorly differentiated’ will almost always embrace diffuse (as opposed to intestinal) and non-cohesive (as opposed to cohesive) tumours. Poorly differentiated carcinomas have usually spread more extensively than well or moderately differentiated tumours at the time of diagnosis, so that some surgeons use a biopsy diagnosis of ‘poorly differentiated’ or ‘diffuse type’ cancer to indicate more radical surgery. Even amongst potentially curative resections there may be a survival advantage for the better differentiated carcinomas. When tumour stage is taken into account however, any such advantage generally disappears.

Local invasion
The extent of direct spread through the stomach wall and beyond is the major determinant of prognosis. The levels of spread are not entirely logical but have been chosen to reflect the greatest changes in prognosis. Thus tumour limited to the mucosa or mucosa and submucosa regardless of its lateral extent is T1 (early gastric cancer), but it is of value to distinguish between mucosal and submucosal invasion as the latter is associated with an increased risk of lymph node metastasis. Tumour extending into the muscularis propria or subserosa but not penetrating through the peritoneal surface is T2; tumour which penetrates through the peritoneal surface without invading contiguous structures is T3; and tumour which penetrates through the peritoneal aspect and involves adjacent structures is T4. ‘Adjacent structures’ include transverse colon, spleen, liver, pancreas, abdominal wall, adrenal gland, kidney, small intestine and retroperitoneum. A carcinoma which extends into the omentum or gastric ligaments without penetrating through the visceral peritoneum
covering these structures is still classified as T2. If there is penetration of the peritoneal aspect of the ligaments or omenta then the tumour is classified as T3.

In the event of intramural tumour extension into the duodenum or oesophagus the tumour is classified by the greatest depth of invasion in these sites and the stomach. In so far as the lower oesophagus lacks a peritoneal covering particular attention has to be paid to circumferential margin involvement. Involvement of the adventitia of the oesophagus is classified as T3.

**Lymph node spread: regional**
The regional lymph nodes are the perigastric nodes along the lesser and greater curvatures and the nodes along the left gastric, common hepatic, hepatoduodenal, splenic and coeliac arteries. The recently updated UICC TNM classification (1997) is used to assign tumours to N0 = no regional node involvement, N1 = involvement of 1–6 regional nodes, N2 = involvement of 7 to 15 regional lymph nodes, and N3 = involvement of more than 15 regional lymph nodes. Thus at least 15 nodes should be the ‘target’ but as indicated above, the possible yield will depend upon the type of surgical resection performed.

**Lymph node spread: distant**
Involvement of more remote intra-abdominal lymph nodes such as retro-pancreatic, mesenteric and para-aortic groups, is considered to be distant metastasis (M1).

**Other sites**
Involvement of the liver or the presence of peritoneal seedlings is also M1.
STOMACH

TNM Clinical Classification

T  Primary Tumour
TX Primary tumour cannot be assessed
T0 No evidence of primary tumour
Tis Carcinoma in situ: intraepithelial tumour without invasion of lamina propria
T1 Tumour invades lamina propria or submucosa
T2 Tumour invades muscularis propria or subserosa

Diagram reproduced from *TNM Classification of malignant tumours.*
Reprinted by permission of Wiley-Liss, Inc., a division of John Wiley & Sons, Inc.
T3  Tumour penetrates serosa (visceral peritoneum) without invasion of adjacent Structures

T4  Tumour invades adjacent structures

Diagram reproduced from *TNM Classification of malignant tumours.*
REFERENCES


