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   - Guidelines are optional and those which are deemed not applicable may be removed.
   - Numbering of Standards and Guidelines must be retained in the checklist, but can be reduced in size, moved to the end of the checklist item or greyed out or other means to minimise the visual impact.
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The Royal College of Pathologists of Australasia ("College") has developed these protocols as an educational tool to assist pathologists in reporting of relevant information for specific cancers. While each protocol includes “standards” and “guidelines” which are indicators of ‘minimum requirements’ and ‘recommendations’, the protocols are a first edition and have not been through a full cycle of use, review and refinement. Therefore, in this edition, the inclusion of “standards” and “guidelines” in each document are provided as an indication of the opinion of the relevant expert authoring group, but should not be regarded as definitive or as widely accepted peer professional opinion. The use of these standards and guidelines is subject to the clinician’s judgement in each individual case.

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Contents

Scope ................................................................................................................................. 5
Abbreviations ................................................................................................................. 6
Definitions ....................................................................................................................... 7
Introduction ...................................................................................................................... 9
Authority and development .......................................................................................... 11
1 Clinical information and surgical handling ............................................................ 14
2 Specimen handling and macroscopic findings ......................................................... 19
3 Microscopic findings .................................................................................................. 23
4 Ancillary studies findings .......................................................................................... 29
5 Synthesis and overview ............................................................................................. 31
6 Structured checklist .................................................................................................... 33
7 Formatting of pathology reports ................................................................................... 43
Appendix 1 Pathology request form for thyroid cancer ............................................. 44
Appendix 2 Guidelines for formatting of a pathology report .................................... 47
Appendix 3 Example of a pathology report ................................................................. 48
Appendix 4 WHO histological classification of thyroid tumours ............................ 49
Appendix 5 AJCC TNM classification of thyroid carcinomas ................................... 51
Appendix 6 AJCC Staging Grouping .......................................................................... 53
References ..................................................................................................................... 54
Scope

This protocol contains standards and guidelines for the preparation of structured reports for thyroid cancer.

Structured reporting aims to improve the completeness and usability of pathology reports for clinicians, and improve decision support for cancer treatment. The protocol provides the framework for the reporting of any thyroid cancer, whether as a minimum data set or fully comprehensive report.

This protocol is based on information contained within multiple international publications and has been developed in consultations with practising pathologists and colleagues from different clinical disciplines. It is intended for use by pathologists, surgeons, physicians (endocrinologists), radiologists and oncologists.
### Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>AJCC</td>
<td>American Joint Committee on Cancer</td>
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<tr>
<td>CD</td>
<td>Cluster of differentiation</td>
</tr>
<tr>
<td>CEA</td>
<td>Carcinoembryonic antigen</td>
</tr>
<tr>
<td>IHI</td>
<td>Individual Healthcare Identifier</td>
</tr>
<tr>
<td>LIS</td>
<td>The laboratory information system</td>
</tr>
<tr>
<td>MEN</td>
<td>Multiple endocrine neoplasia</td>
</tr>
<tr>
<td>mm</td>
<td>Millimetres</td>
</tr>
<tr>
<td>MRN</td>
<td>Medical Record Number</td>
</tr>
<tr>
<td>NHI</td>
<td>New Zealand National Health Identifier</td>
</tr>
<tr>
<td>PBS</td>
<td>Pharmaceutical Benefits Scheme</td>
</tr>
<tr>
<td>RCPA</td>
<td>Royal College of Pathologists of Australasia</td>
</tr>
<tr>
<td>SI</td>
<td>International System of Units</td>
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<tr>
<td>TNM</td>
<td>tumour-node-metastasis</td>
</tr>
<tr>
<td>TTF</td>
<td>Thyroid transcription factor-1</td>
</tr>
<tr>
<td>UICC</td>
<td>International Union Against Cancer</td>
</tr>
<tr>
<td>UK</td>
<td>United Kingdom</td>
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<tr>
<td>WHO</td>
<td>World Health Organization</td>
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</table>
Definitions

The table below provides definitions for general or technical terms used in this protocol. Readers should take particular note of the definitions for ‘standard’, ‘guideline’ and ‘commentary’, because these form the basis of the protocol.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
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<tbody>
<tr>
<td>Ancillary study</td>
<td>An ancillary study is any pathology investigation that may form part of a cancer pathology report but is not part of routine histological assessment.</td>
</tr>
<tr>
<td>Clinical information</td>
<td>Patient information required to inform pathological assessment, usually provided with the specimen request form. Also referred to as ‘pretest information’.</td>
</tr>
<tr>
<td>Commentary</td>
<td>Commentary is text, diagrams or photographs that clarify the standards (see below) and guidelines (see below), provide examples and help with interpretation, where necessary (not every standard or guideline has commentary). Commentary is used to:</td>
</tr>
<tr>
<td></td>
<td>• define the way an item should be reported, to foster reproducibility</td>
</tr>
<tr>
<td></td>
<td>• explain why an item is included (eg how does the item assist with clinical management or prognosis of the specific cancer).</td>
</tr>
<tr>
<td></td>
<td>• cite published evidence in support of the standard or guideline</td>
</tr>
<tr>
<td></td>
<td>• clearly state any exceptions to a standard or guideline</td>
</tr>
<tr>
<td>General commentary</td>
<td>General commentary is text that is not associated with a specific standard or guideline. It is used:</td>
</tr>
<tr>
<td></td>
<td>• to provide a brief introduction to a chapter, if necessary</td>
</tr>
<tr>
<td></td>
<td>• for items that are not standards or guidelines but are included in the protocol as items of potential importance, for which there is currently insufficient evidence to recommend their inclusion. (Note: in future reviews of protocols, such items may be reclassified as either standards or guidelines, in line with diagnostic and prognostic advances, following evidentiary review).</td>
</tr>
</tbody>
</table>
Guidelines are recommendations; they are not mandatory, as indicated by the use of the word ‘should’. Guidelines cover items that are not essential for clinical management, staging or prognosis of a cancer, but are recommended. Guidelines include key observational and interpretative findings that are fundamental to the diagnosis and conclusion. Such findings are essential from a clinical governance perspective, because they provide a clear, evidentiary decision-making trail. Guidelines are not used for research items. In this document, guidelines are prefixed with ‘G’ and numbered consecutively within each chapter (eg G1.10).

Macroscopic findings Measurements, or assessment of a biopsy specimen made by the unaided eye.

Microscopic findings In this document, the term ‘microscopic findings’ refers to histological or morphological assessment.

Predictive factor A predictive factor is a measurement that is associated with response or lack of response to a particular therapy.

Prognostic factor A prognostic factor is a measurement that is associated with clinical outcome in the absence of therapy or with the application of a standard therapy. It can be thought of as a measure of the natural history of the disease.

Standard Standards are mandatory, as indicated by the use of the term ‘must’. Their use is reserved for core items essential for the clinical management, staging or prognosis of the cancer. The summation of all standards represents the minimum dataset for the cancer. In this document, standards are prefixed with ‘S’ and numbered consecutively within each chapter (eg S1.02).

Structured report A report format which utilizes standard headings, definitions and nomenclature with required information.

Synoptic report A structured report in condensed form (as a synopsis or precis).

Synthesis Synthesis is the process in which two or more pre-existing elements are combined, resulting in the formation of something new. In the context of structured pathology reporting, synthesis represents the integration and interpretation of information from two or more chapters to derive new information.
Introduction

Thyroid cancer

Thyroid cancer is the most common endocrine cancer in Australia and in other parts of the world. This malignancy is more common in women than in men and occurs primarily in young and middle aged adults, with approximately 122,000 new cases per year worldwide1.

Thyroid cancers, like benign thyroid diseases, usually present as a thyroid nodule and/or enlargement of thyroid gland. In many instances, it is very difficult to differentiate them from benign thyroid lesions clinically. Thyroid nodules are common clinically (prevalence of approximately 5%) and even more common on ultrasound examination (prevalence of approximately 25%)2. Approximately 5% of thyroid nodules are malignant.

Importance of histopathological reporting

Pathological reporting of resection specimens for thyroid cancer provides information both for the clinical management of the affected patient and for the evaluation of the health care systems as a whole. In thyroid cancer, there are many different histological types. Papillary carcinoma is the most common type, accounting for approximately three quarters of thyroid malignancies3. Many subtypes of papillary carcinoma have been described and some are known to have prognostic significance. Also, follicular lesions including follicular carcinoma, minimally invasive follicular carcinoma, follicular variant of papillary carcinoma, follicular adenoma and adenomatous nodule often be difficult to differentiate from each others. Some patients with thyroid cancer can progress to a more aggressive metastatic form of thyroid cancer with a high mortality4. Therefore, recognition of pathological parameters in thyroid cancer is very important for the management of these patients.

Benefits of structured reporting

Structured pathology reports with standardised definitions for each component have been shown to significantly enhance the completeness and quality of data provided to clinicians, and have been recommended both in North America and the United Kingdom5-9.

The College of American Pathologists and the Royal College of Pathologists (UK) have recently published useful protocols for the reporting of cancer9-10. A protocol endorsed by the Royal College of Pathologists of Australasia and other Australasian organisations involved in the management of thyroid cancer is timely.

Design of this protocol

This structured reporting protocol provides a complete framework for the assessment and documentation of all the pathological features of thyroid cancer.

Mandatory elements (standards) are differentiated from those that are not mandatory but represent best practice (guidelines). Consistency and speed of reporting is improved by the use of discrete data elements recorded from the checklist. However, the pathologist is encouraged to include free text or narrative to document any other relevant issues, to give reasons for coming to a particular opinion and to explain any points of uncertainty.
The structure provided by the following chapters, headings and subheadings describes the elements of information and their groupings, but does not necessarily represent the format of either a pathology checklist (Chapter 6) or report (Chapter 7). These, and the structured pathology request form (Appendix 1) are templates that represent information from this protocol, organised and formatted differently to suit different purposes.

**Key documentation**

This protocol draws on the following key documents:

- *Guidelines for Authors of Structured Cancer Pathology Reporting Protocols*¹¹
- *The Pathology Request-Test-Report Cycle — Guidelines for Requesters and Pathology Provider*¹²
- *AJCC Cancer Staging Manual, 7th edition*¹³
- *Pathology and Genetics of Tumours of Endocrine Organs. WHO Classification of Tumours, Volume 8, 2004*¹⁴

**Changes since the last edition**

Not applicable
Authority and development

This section provides details of the committee involved in developing this protocol and the process by which it was developed.

Protocol developers

This protocol was developed by an expert committee, with assistance from relevant stakeholders.

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International Liaison

Dr Bruce Wenig, Chair of the Head and Neck Tumors Cancer Committee, College of American Pathologists

Acknowledgements

The Thyroid cancer expert committee wish to thank all the pathologists and clinicians who contributed to the discussion around this document.

Stakeholders

ACT Health
Anatomical Pathology Advisory Committee (APAC)
Australian Association of Pathology Practices Inc (AAPP)
Australian Cancer Network
Australian Commission on Safety and Quality in Health Care
British Association of Head & Neck Oncologists (BAHNO)
British Society of Oral & Maxillo-facial Pathologists (BSOMP)
Cancer Australia
Cancer Council ACT
Cancer Council NSW
Cancer Council Queensland
Cancer Council SA
Cancer Council Tasmania
Cancer Council Victoria
Cancer Council Western Australia
Cancer Institute NSW
Cancer Services Advisory Committee (CanSAC)
Cancer specific expert groups – engaged in the development of the protocols
Cancer Voices
Clinical Oncology Society of Australia (COSA)
Colorectal Cancer Research Consortium
Department of Health and Ageing
Endocrine Society of Australia (ESA)
Grampians Integrated Cancer Services (GICS)
Health Informatics Society of Australia (HISA)
Medical Software Industry Association (MSIA)
National Breast and Ovarian Cancer Centre (NBOCC)
National Coalition of Public Pathology (NCOPP)
National E-Health Transition Authority (NEHTA)
National Pathology Accreditation Advisory Council (NPAAC)
National Round Table Working Party for Structured Pathology Reporting of Cancer.
New Zealand Guidelines Group (NZGG)
NSW Department of Health
Peter MacCallum Cancer Institute
Queensland Cooperative Oncology Group (QCOG)
Representatives from laboratories specialising in anatomical pathology across Australia
Royal Australasian College of Physicians (RACP)
Southern Cancer Network, Christchurch, New Zealand
Southern Melbourne Integrated Cancer Service (SMICS)
Standards Australia
The Medical Oncology Group of Australia
The Royal Australasian College of Surgeons (RACS)
The Royal Australian and New Zealand College of Radiologists (RANZCR)
The Royal Australian College of General Practitioners (RACGP)
The Royal College of Pathologists of Australasia (RCPA)
Victorian Cooperative Oncology Group (VCOG)
Western Australia Clinical Oncology Group (WACOG)
Secretariat

Meagan Judge, Royal College of Pathologists of Australasia.

Development process

This protocol has been developed following the seven-step process set out in *Guidelines for Authors of Structured Cancer Pathology Reporting Protocols*11.

Where no reference is provided, the authority is the consensus of the expert group.
1 Clinical information and surgical handling

This chapter relates to information that should be collected before the pathology test, and procedures that are required before handover of specimens to the laboratory.

The standards and guidelines below specify the particular information and specimens required for thyroid cancer. Some of this information can be collected on generic pathology request forms; any additional information required specifically for the reporting of thyroid cancer may be recorded on a separate data sheet. Appendix 1 provides a standardised data sheet that may be useful in obtaining all relevant information.

S1.01 Adequate demographic and request information must be provided with the specimen by the requesting clinician.

CS1.01a The Royal College of Pathologists of Australasia (RCPA) The Pathology Request-Test-Report Cycle — Guidelines for Requesters and Pathology Providers must be adhered to.\(^{12}\) This document specifies the minimum information to be provided by the requesting clinician for any pathology test. Items relevant to cancer reporting protocols include:

- patient name
- date of birth
- sex
- identification and contact details of requesting doctor
- date of request

Additional information specified in the RCPA The Pathology Request-Test-Report Cycle — Guidelines for Requesters and Pathology Providers such as the specimen type and clinical information relevant to the investigation is catered for in the following standards and guidelines.

CS1.01b The patient’s ethnicity must be recorded, if known.

G1.01 The patient’s health identifiers should be recorded where provided.

CG1.01a The patient’s health identifiers may include the patient’s Medical Record Number as well as a national health number such as a NHI or the Individual Healthcare Identifier (IHI).

S1.02 The pathology accession number of the specimen must be recorded.

S1.03 The principal clinician and/or management unit involved in the patient’s care and responsible for investigating the patient must be identified.

CS1.03a The requesting clinician (identified under S1.01) may be the doctor who performs the surgery or biopsy, and may not be the person with overall responsibility for investigating and managing the patient. The clinician is
likely to be either an endocrinologist or in some settings a nuclear medicine physician. Identification of the principal clinician and/or managing unit is essential, to ensure that clinical information is communicated effectively.

S1.04 The operating surgeon’s identity and contact details must be recorded.

S1.05 The type of operation performed must be recorded.

CS1.05a The requesting clinician should indicate the thyroid specimen type as:
  - total thyroidectomy +/- neck dissection (including side and levels),
  - near-total thyroidectomy +/-, neck dissection (including side and levels),
  - subtotal thyroidectomy +/-, neck dissection (including side and levels),
  - lobectomy with isthmusectomy (hemi-thyroidectomy) +/-, neck dissection (including side and levels),
  - lobectomy +/-, neck dissection (including side and levels),
  - partial lobectomy,
  - completion thyroidectomy.

CS1.05b Additional surgical procedures should be mentioned: eg neck dissection. For neck dissections, clinicians should indicate whether it is central or lateral compartments in addition to side and levels. Clinicians often use only the term “central compartment” for levels 6 and 7 lymph nodes. (See figure CS1.05b)
Figure CS1.05b

S1.06 Any previous operation on the thyroid must be recorded.

CS1.06a Previous surgery of the thyroid alters the shape and hence orientation of the thyroid.

S1.07 The anatomical site of the lesion(s) must be recorded.

CS1.07a Site is an important identifier especially when multiple lesions are present.

CS1.07b Sufficient information is required to localise the lesion(s) for subsequent therapy. A diagram or photograph can facilitate this.

CS1.07c Specimens other than thyroid should be identified (eg parathyroid gland, thymus, lymph nodes, neck dissection).

S1.08 The laterality of the lesion(s) must be recorded.

CS1.08a Laterality information is needed for identification purposes.

CS1.08b Left, right, isthmus should be recorded.

G1.02 Any clinical information relevant to the thyroid disease should be recorded.

CG1.02a Clinical or biochemical evidence of hyperthyroidism or hypothyroidism should be noted.

CG1.02b Previous medical treatments like anti-thyroid drug or radioactive iodine should be noted.

CG1.02c Previous exposure to the neck to radiotherapy (eg for treatment of Hodgkin lymphoma) should be noted.

CG1.02d The indication for performing the surgery should be recorded as many thyroid cancers are found incidentally in thyroid specimens removed for purpose other than cancer.

CG1.02e Family history of thyroid cancers or features of other endocrine tumours or syndromes should be recorded. It is worth noting that gastrointestinal manifestations of an endocrine syndrome may present before identification of an endocrine tumour.

G1.03 If a pre-operative fine needle aspiration has been performed, this should be recorded.

CG1.03a Fine needle aspiration of the thyroid may alter the microscopic appearance of the tumour in the thyroid, including tumour infarction. The results of the procedure may sometimes make the judgement of the invasiveness of the thyroid tumour difficult as it can cause distortion of
the tissue, including the thyroid capsule.

CG1.03b Correlations of histological and cytological findings are important for quality assurance purposes.

G1.04 The results of clinical staging with ultrasound and fine needle aspiration should be recorded.

CG1.04a This is important for pathologic staging of cancer.

G1.05 The involvement of adjacent organs or any distant metastases should be recorded.

CG1.05a This is important for staging of cancer.

G1.06 The clinical diagnosis or differential diagnosis should be recorded.

CG1.06a Providing the provisional clinical diagnosis or differential diagnosis improves clinicopathological correlation and improves diagnostic accuracy.

Surgical handling

S1.09 The specimen must be orientated.

CS1.09a The specimen must be capable of orientation if the status of specific surgical margins is critical in determining the need for, or extent of, further surgery.

CS1.09b Where there are no anatomical landmarks, specimen orientation may be indicated with marking sutures or other techniques. If a specimen is orientated, the orientation should be indicated on the specimen request form (this may be facilitated by the use of a diagram).

S1.10 The specimen must be handled properly.

CS1.10a Specimens are best received fresh and without delay. This can help the process of tissue banking.

CS1.10b If the specimen cannot be handled without delay it should be fixed in an adequate volume of formalin. The usual recommended ratio is 8-10:1 formalin: specimen.

G1.07 Research blocks should be taken by the pathologist in order to avoid compromising the diagnosis.
2 Specimen handling and macroscopic findings

This chapter relates to the procedures when the specimen is received in the laboratory.

Tissue banking

G2.01 Pathologists may be asked to provide tissue samples from fresh specimens for tissue banking or research purposes. The decision to provide tissue should be encouraged. However, the pathologist should make sure that the diagnostic process including the measurement of maximum extent and other important parameters that influence patient prognosis and management will not be compromised. Also, the pathologist should ensure that appropriate ethical approval has been obtained for tissue banking. As a safeguard, research use of the specimen may be put on hold until the diagnostic process is complete so that the specimen can be retrieved.

Intra-operative consultations

G2.02 Requests for intra-operative frozen section of the thyroid should be discouraged as it will not help in providing additional information in most cases and may compromise the chance of making a proper diagnosis in paraffin section.

CG2.02a If being done, try to limit the number of blocks taken from the lesion to a minimum, to ensure that there are tumour tissues that have not been frozen.

CG2.02b Care should be taken to prevent the spread of marking ink and distortions which may compromise subsequent paraffin section.

CG2.02c Intra-operative frozen section will not help in the differential diagnosis of follicular neoplasm or in other instances in which the diagnosis is difficult to make by fine needle aspiration.

CG2.02d Intra-operative frozen section may be beneficial in some instances eg identifying lymph node involvement by thyroid cancer.
Specimen handling

S2.01 The specimen must be orientated.

CS2.01a Orientate the thyroid gland by identifying the inferiorly-placed isthmus, and the concavity of the posterior aspect of the lateral lobes.

CS2.01b Some thyroid glands have an upwardly pointed pyramidal lobe, arising from the isthmus.

CS2.01c Inspect the capsule of the thyroid to see whether it is intact or not.

S2.02 The external surface of the thyroid must be inked as the resection margin.

CS2.02a It is preferable to use dyes of different colours for the different resection surfaces.

S2.03 The specimen must be serially sectioned.

CS2.03a Serially section each thyroid lobe transversely, along the short axis, and maintain the proper orientation of the slices.

CS2.03b The slices preferably should still be attached to one another, such that orientation is still preserved if resampling of the specimen is required.

G2.03 A diagram or photograph can facilitate the specimen orientation and block labelling.

S2.04 If the resection of thyroid is partial, the surgical resection margin should be blocked.

S2.05 In the presence of macroscopically noted thyroid cancer, blocks should be taken from the uninvolved thyroid, from the ipsilateral and contralateral lobe (when present) and perithyroid soft tissue.

S2.06 Submit sections to demonstrate any identifiable lymph nodes and parathyroid glands, if present.

S2.07 All lymph nodes and other tissue (parathyroid, thymus, etc) submitted by the surgeon(s) should be embedded.

CS2.07a The neck dissection specimen should be processed as recommended by the head and neck reporting protocol.

S2.08 Block selection will differ for the different types of thyroid lesions.

CS2.08a The blocks to be taken will vary with the clinical information, macroscopic appearance and cancer type.
CS2.08b When no focal lesion is identified (e.g., Graves’ disease, Hashimoto’s thyroiditis, completion thyroidectomy), all the white/cream or firm foci must be sampled because they may represent cancer.

If there is no suspicious lesion, it is recommended that random blocks from each lobe and the isthmus be taken.

CS2.08c For a multi-nodular goitre, all the white/cream or firm foci must be sampled because they may represent cancer.

If there is no suspicious lesion, it is recommended that random blocks, including nodules and adjacent thyroid tissue, be taken. Random blocks should be taken from each lobe and the isthmus.

CS2.08d In the setting of follicular neoplasm (dominant encapsulated nodule) there is no universal accepted sampling method. In practice, there are certain principles to be followed:

- The specimen should be widely sampled at the interface between the nodule, the capsule and the adjacent thyroid tissue to detect invasion.
- The specimen should be sampled more adequately where the lesion has worrisome features such as a thick capsule, fleshy cut surface, pale or very solid appearance.
- If the lesion is small i.e. \( \leq 30\text{mm} \) in diameter, embed the whole nodule and the adjacent thyroid tissue.
- If the lesion is large, sample widely (at least 1 block per cm of maximum tumour dimension is recommended) and take additional blocks in the suspicious region.

CS2.08e In the setting of invasive thyroid cancer (papillary thyroid carcinoma, medullary thyroid carcinoma, undifferentiated carcinoma, etc):

(a) If the cancer is small (i.e. \( \leq 20\text{mm} \)), block the whole tumour and the adjacent thyroid tissue.

(b) If the cancer is large, it should be sampled widely enough (at least 1 block per cm of maximum tumour dimension is recommended) to permit a diagnosis and assess whether the tumour is of uniform type.

Blocks should be taken where the cancer comes closest to the soft tissue resection margin.

In the case of medullary carcinoma, some may recommend the whole specimen be blocked.
Macroscopic findings

S2.09 All measurements are in SI units, unless explicitly stated.

G2.04 The specimen should be weighed and findings recorded.

S2.10 The specimen dimensions must be recorded.

CS2.10a A measurement must be done for each lobe of the thyroid and isthmus (if present).

G2.05 Whether the capsule of the thyroid is intact or not should be recorded.

S2.11 The macroscopic description of any lesion(s) in the specimen must be recorded.

CS2.11a Where there are multiple lesions, the total number of lesions must be recorded and each lesion should be identified and described.

CS2.11b For each lesion, the location, appearance, the borders (encapsulated or infiltrative), size (greatest dimension), and distance from the nearest excision margin must be recorded.

CS2.11c Thyroid cancer can be an incidental finding in thyroid glands surgically removed for reasons other than thyroid cancer.

G2.06 The appearance of the thyroid other than the lesion(s) detected should be documented.

G2.07 The presence or absence of parathyroid(s) and lymph nodes(s) should be recorded.

G2.08 A descriptive or narrative field should be provided to record any macroscopic information that is not recorded in the above standards and guidelines, and that would normally form part of the macroscopic description.

CG2.08a The traditional macroscopic narrative recorded at the time of specimen dissection is often reported separately from the cancer dataset. Although this remains an option, it is recommended that macroscopic information be recorded within the overall structure of this protocol.

CG2.08b Much of the information recorded in a traditional macroscopic narrative is covered in the standards and guidelines above and in many cases, no further description is required.
3 Microscopic findings

Microscopic findings relates to purely histological (morphological) assessment. Information derived from multiple investigational modalities, or from two or more chapters, is described in Chapter 5.

S3.01 The tumour type must be recorded.

CS3.01a The tumour type must be based on the WHO histological classification of tumours of endocrine organs\textsuperscript{14}.

The commoner types are papillary carcinoma, follicular carcinoma, medullary carcinoma, undifferentiated carcinoma and poorly-differentiated carcinoma. It is important to note that other types of benign and malignant tumours can occur in the thyroid gland.

CS3.01b For follicular carcinoma, it is important to define the carcinoma on the basis of the extent of capsular and/or vascular invasion.

Follicular carcinoma is divided into widely invasive and minimally invasive type.

Widely invasive follicular carcinoma shows infiltration of thyroid parenchyma outside the capsule of the follicular lesion.

Minimally invasive follicular carcinoma shows significant focal invasion of the tumour capsule. It is important to indicate whether there is only capsular invasion or whether the tumour is angioinvasive. The number of foci of capsular or vascular invasion should be noted. (See figures CS3.01b(i), (ii) and (iii)).

Invasion must be differentiated from entrapments of follicles in the capsule and the pseudo-invasive changes following fine needle aspiration.
Figure CS3.01b (i) Capsular invasion (CI)

Schematic drawing for the interpretation of the presence or absence of CI. The diagram depicts a follicular neoplasm (orange) surrounded by a fibrous capsule (green).

a) bosselation on the inner aspect of the capsule does not represent CI;
b) sharp tumour bud invades into but not through the capsule suggesting invasion requiring deeper sections to exclude;
c) tumour totally transgresses the capsule invading beyond the outer contour of the capsule qualifying as CI;
d) tumour clothed by thin (probably new) fibrous capsule but already extending beyond an imaginary (dotted) line drawn through the outer contour of the capsule qualifying as CI;
e) satellite tumour nodule with similar features (architecture, cytomorphology) to the main tumour lying outside the capsule qualifying as CI;
f) Follicles aligned perpendicular to the capsule suggesting invasion requiring deeper sections to exclude

g) follicles aligned parallel to the capsule do not represent CI;
h) mushroom-shaped tumour with total transgression of the capsule qualifies as CI;
i) mushroom-shaped tumour within but not through the capsule suggests invasion requiring deeper sections to exclude;
j) neoplastic follicles in the fibrous capsule with a degenerated appearance accompanied by lymphocytes and siderophages does not represent CI but rather capsular rupture related to prior fine needle aspiration.

Figure CS3.01b (ii)  Vascular invasion (VI): Schematic drawing for the interpretation of the presence or absence of VI.

The diagram depicts a follicular neoplasm (green) surrounded by a fibrous capsule (blue).

a) Bulging of tumour into vessels within the tumour proper does not constitute VI.
b) Tumour thrombus covered by endothelial cells in intracapsular vessel qualifies as VI.
c) Tumour thrombus in intracapsular vessel considered as VI since it is attached to the vessel wall.
d) Although not endothelialized, this tumour thrombus qualifies for VI because it is accompanied by a fibrin thrombus.
e) Endothelialized tumour thrombus in vessel outside the tumour capsule represents VI.
f) Artefactual dislodgement of tumour manifesting as irregular tumour fragments into vascular lumen unaccompanied by endothelial covering or fibrin thrombus.

Encapsulated follicular carcinoma (FC), oncocytic variant with multiple foci of microscopic vascular invasion (VI) and no gross invasion.

In some classification schemes, these tumours are labelled as minimally invasive while others will use terms such as encapsulated angioinvasive FC or encapsulated FC with extensive angioinvasion to stress their potential for aggressive behaviour. This 50 year old patient developed bone metastases 10 years after thyroidectomy.

A. Low power view showing multiple microscopic foci of VI in tumour capsule (arrow) and immediately outside the capsule.

B. High power view of a tumour thrombus (arrow) attached to vessel wall and covered by endothelial cells.

Reproduced with kind permission from Springer Science+Business Media: Ghossein R. Update to the College of American Pathologists Reporting on Thyroid Carcinomas Head and Neck Pathol (2009) 3:86–93. Figure 3, pg 89

CS3.01c There is no doubt that minimally invasive follicular carcinoma with capsular invasion alone behaves like a benign tumour. The presence of vascular invasion should be noted but no definite prognostic implications have been demonstrated.15

CS3.01d For poorly-differentiated carcinoma, the pattern should be dominant for the carcinoma to be placed in this category.

CS3.01e For papillary, follicular or poorly-differentiated thyroid carcinomas, the presence of even a minor undifferentiated component should be noted as having a component of undifferentiated carcinoma confer a poorer prognosis.4

G3.01 Variants of tumour types should be recorded.
For papillary carcinoma, there are 15 histological variants documented by WHO. Some variants have prognostic significance, while others do not. Papillary microcarcinoma (≤ 10mm in diameter) discovered incidentally is not thought to have a significant risk of recurrence or metastasis. On the other hand, tall cell and columnar cell variants may show more aggressive clinical behaviour than conventional papillary thyroid carcinoma. Some variants, in particular encapsulated follicular variant, oncocytic variant, etc may be difficult to differentiate from other tumours. It is recommended that expert opinion be sought if there are uncertainties.

For follicular carcinoma, the carcinoma is considered oncocytic if at least 75% of the carcinoma is composed of oncocytic cells. For poorly-differentiated and undifferentiated carcinomas, minor components of papillary or follicular carcinoma should be mentioned.

In familial medullary carcinoma, the tumour is preceded by expansion of the C cell population, termed familial C cell hyperplasia that is thought to be neoplastic. The C cells are normally found in the upper and middle thirds of the lobes, so immunostaining of sections from these areas may be helpful in suggesting familial disease, although the thresholds for diagnosis are a matter of debate. From a practical point of view, the presence of multiple groups or nodules of C cells in sections that do not contain the main tumour is suggestive of C cell hyperplasia. It should be noted, however, that secondary C cell hyperplasia may occur in a number of other circumstances such as hyperparathyroidism, Hashimoto’s thyroiditis and around tumours of follicular origin. It is now less important for the pathologist to identify C cell hyperplasia, as patients with medullary carcinoma in appropriate clinical settings should have genetic testing for the common mutations in the RET protooncogene.

The presence or absence of multifocal lesions must be recorded. Multifocal lesions are not uncommon in patients with papillary carcinoma and medullary carcinoma.

The diameter of the tumour must be recorded. For multifocal tumours, the diameter of the largest tumour must be recorded.

The extension of the tumour into adjacent tissues or organs must be recorded.
CS3.04a  The pathological staging (T stage) depends on the size of the cancer and the extent of involvement of thyroid gland and adjacent tissues.

The extension into peri-thyroid soft tissue and the sternohyoid muscles is recorded as T3 regardless of size of the cancer.

Cancer extending beyond the thyroid capsule into subcutaneous soft tissue, larynx, trachea, oesophagus or recurrent laryngeal nerve, etc should be recorded as T4.

S3.05  The presence or absence of cancer at the resection margins must be recorded.

CS3.05a  The location of the involved margin(s) must be specified.

S3.06  The presence, location and status of lymph nodes must be recorded.

CS3.06a  If regional lymph nodes were identified the location must be specified.

CS3.06b  The total number of lymph nodes sampled must be stated.

CS3.06c  The number of lymph nodes containing metastatic tumour must be stated.

CS3.06d  The presence and sites of lymph node metastases of thyroid carcinoma affect the pathological staging (N stage) of thyroid cancer.

S3.07  The presence or absence of parathyroid tissue must be recorded.

CS3.07a  The presence of parathyroid tissue may provide correlation with the clinical data on calcium status.

G3.02  The presence or absence of coexistent pathological abnormalities in the thyroid gland should be recorded.

CG3.02a  Hashimoto’s thyroiditis, lymphocytic thyroiditis, diffuse parenchymatous goitre and nodular hyperplasia, etc are often additional findings and may help elucidate the aetiological relationship or the differential diagnosis.

G3.03  Any additional relevant microscopic comments should be recorded.
4 Ancillary studies findings

Ancillary studies may be used to determine lineage, clonality or disease classification or subclassification; as prognostic biomarkers; or to indicate the likelihood of patient response to specific biologic therapies.

S4.01 Immunohistochemistry must be done for some cancers in the thyroid gland. Where performed, the findings must be recorded.

CS4.01a In cases in which the diagnosis is suspected to be medullary carcinoma, immunostaining for calcitonin should be done to confirm the diagnosis. The immunostain is also helpful to identify nodular of C–cell hyperplasia in the settings of multiple endocrine neoplasia (MEN) and familial medullary thyroid carcinoma. Neuroendocrine markers and/or carcinoembryonic antigen (CEA) should be done in less well-differentiated medullary carcinomas in which calcitonin immunoreactivity is lost.

CS4.01b In cases in which the diagnosis is suspected to be lymphoma, the tumours must be investigated in the pathway as adopted for lymphoma.

CS4.01c Follicular neoplasm with vascular invasion has a higher risk of metastasis and increases with the extent of vascular involvement. CD31 or other vascular markers may be helpful in delineating the vascular invasion. However, the findings by such endothelial markers in this setting should be interpreted with care.

CS4.01d Epithelial markers, thyroglobulin and thyroid transcription factor-1 (TTF-1) may define that a tumour is of thyroid origin in the right clinical settings, for instance, for metastatic thyroid carcinoma. TTF-1 is more sensitive than thyroglobulin but TTF-1 can be positive in other cancers such as lung adenocarcinoma and small cell carcinoma of any primary site. Undifferentiated thyroid carcinoma is often negative for both thyroglobulin and TTF-1, but PAX-8 is often positive.

CS4.01e Uncommon tumours (eg angiosarcoma, carcinoma showing thymus-like differentiation, paraganglioma, etc) can occur in the thyroid gland. Immunohistochemistry can help in the diagnosis or in confirming the diagnosis.

CS4.01f It is not possible to differentiate benign and malignant thyroid tumours by using immunohistochemistry. Although cytokeratin 19, other high molecular weight cytokeratins and some other markers have been demonstrated to have stronger positivity in thyroid carcinomas than benign thyroid lesions, there are many exceptions and the interpretation has to be taken in the context of morphology of the lesion.
G4.01 Any molecular investigation performed should have the results incorporated into the pathology report.

CG4.01a Molecular investigation can be useful in the management of patients with medullary thyroid carcinoma in the context of appropriate advice from a genetic counsellor or from a clinician with experience in following through on the implications of positive or negative tests.

Identification of germline \textit{RET} mutation carriers allows prophylactic surgery as well as biochemical follow-up for metastatic and recurrent medullary thyroid carcinoma, and for development of MEN 2-associated phaeochromocytoma and parathyroid disease.

Somatic \textit{RET} mutations can be performed for the prognosis of patients with medullary thyroid carcinoma. Somatic \textit{RET} mutations can be detected in tumour tissue of 23–69\% of sporadic medullary thyroid carcinoma patients. It has been demonstrated that the somatic \textit{RET} mutation (M918T) correlates with stage of the disease, a higher probability of persistence of the disease after total thyroidectomy, increased chance of recurrence and metastatic potential, and a reduced survival.

CG4.01b Ancillary tests performed externally may contain information needed for compliance with NPAAC and RCPA requirements, but they are not relevant to cancer reporting protocols. The specific elements of an ancillary study report needed for cancer reporting include the following:

- laboratory performing the test,
- substrate (eg cytology smears, fluid in special media, paraffin block, fresh tissue, etc),
- method (where relevant),
- results,
- conclusion (usually a text field,) and
- person responsible for reporting the ancillary test.

CG4.01c Documentation of all relevant ancillary study findings is essential for overarching commentary (see Synthesis and Overview, Chapter 5), in which the significance of each finding is interpreted in the overall context of the case.
5  Synthesis and overview

Information that is synthesised from multiple modalities and therefore cannot reside solely in any one of the preceding chapters is described here.

For example, tumour stage is synthesised from multiple classes of information – clinical, macroscopic and microscopic.

By definition, synthetic elements are inferential rather than observational, often representing high-level information that is likely to form part of the report ‘Summary’ or ‘Diagnosis’ section in the final formatted report.

Overarching case comment is synthesis in narrative format. Although it may not necessarily be required in any given report, the provision of the facility for overarching commentary in a cancer report is essential.

S5.01  The tumour stage and stage grouping must be recorded according to the most recent TNM staging system of the AJCC Cancer Staging Manual. (See Appendices 5 and 6)

CS5.01a  In thyroid cancer, the staging depends also on the age of the patients and the type of cancer. At the moment, staging information is only available for papillary carcinoma, follicular carcinoma, medullary carcinoma and undifferentiated carcinoma.

CS5.01b  For papillary and follicular carcinomas of thyroid, young patients (age under 45 years) have a different cancer staging.

CS5.01c  For medullary carcinoma, the age of the patient does not affect the cancer staging.

CS5.01d  Undifferentiated carcinoma is considered to be stage IV but being subdivided to stage IVA, IVB and IVC based on the criteria of TNM.

S5.02  The year of publication and edition of the cancer staging system used in S5.01 must be included in the report.

G5.01  The “Diagnostic summary” section of the final formatted report should include:

a. Operation type (S1.05)

b. Tumour site and laterality (S1.07 and S1.08)

c. Tumour type (S3.01)

d. Tumour stage (S5.01)

e. Completeness of excision (S3.05).

S5.03  The reporting system must provide a field for free text or narrative in which the reporting pathologist can give
**overarching case comment.**

CS5.03a This field may be used, for example, to:
- list any relevant ancillary tests,
- document any noteworthy adverse gross and/or histological features,
- express any diagnostic subtlety or nuance that is beyond synoptic capture, and
- document further consultation or results still pending.

CS5.03b Use of this field is at the discretion of the reporting pathologist.
6 Structured checklist

The following checklist contains all the standards and guidelines for this protocol in the simplest possible form. The summation of all “Standards” is equivalent to the “Minimum Data Set” for thyroid cancer. For emphasis, standards (mandatory elements) are formatted in bold font.

S6.01 The structured checklist provided below may be modified as required but with the following restrictions:

a. All standards and their respective naming conventions, definitions and value lists must be adhered to.

b. Guidelines are not mandatory but are recommendations, and where used, must follow the naming conventions, definitions and value lists given in the protocol.

G6.01 The order of information and design of the checklist may be varied according to the laboratory information system (LIS) capabilities.

CG6.01a Where the LIS allows dissociation between data entry and report format, the structured checklist is usually best formatted to follow the pathologist’s workflow. In this situation, the elements of synthesis or conclusions are necessarily at the end. The report format is then optimised independently by the LIS.

CG6.01b Where the LIS does not allow dissociation between data entry and report format, (for example where only a single text field is provided for the report), pathologists may elect to create a checklist in the format of the final report. In this situation, communication with the clinician takes precedence and the checklist design is according to principles given in Chapter 7.

G6.02 Where the checklist is used as a report template (see G6.01), the principles in Chapter 7 and Appendix 2 apply.

CG6.02a All extraneous information, tick boxes and unused values should be deleted.

G6.03 Additional comment may be added to an individual response where necessary to describe any uncertainty or nuance in the selection of a prescribed response in the checklist. Additional comment is not required where the prescribed response is adequate.
Clinical information and surgical handling

S1.01 Patient name ______________________________
   Date of birth ______________________________
   Sex ______________________________
   Identification and contact
details of requesting doctor ______________________________
   Date of request ______________________________

Ethnicity:
   Aboriginal or Torres Strait Islander ___
   Other ethnicity ___
   Unknown ___

G1.01 Patient identifiers (eg MRN, IHI, NHI) ______________________________
   ______________________________

S1.02 Pathology accession number ______________________________

S1.03 Principal clinician involved in the patient’s care ______________________________

S1.04 Operating surgeon ______________________________
   Contact details ______________________________
   ______________________________

S1.05 Type of operation:
   total thyroidectomy ___
   near-total thyroidectomy ___
   subtotal thyroidectomy ___
   lobectomy with isthmusectomy ___
   (hemi-thyroidectomy) ___
lobectomy ___ 
partial lobectomy ___ 
completion thyroidectomy ___ 

Neck dissection: 
No ___ 
Yes ___ 

If yes, complete the following details: 
Side Right ___ 
Left ___ 
Compartment Central ___ 
Lateral ___ 
Levels ________________________________ 

Additional procedures ________________________________ 
__________________________________ 

S1.06 Details of any previous thyroid operation ________________________________ 
__________________________________ 
Not stated ___ 

S1.07 Anatomical site(s) (insert diagram or photograph if possible) 
a.______________________________ 
b.______________________________ 
c.______________________________ 

Not stated ___ 

Other specimens received: 
No ___ 
Yes ___ 

If yes, specify details ________________________________ 
__________________________________ 

S1.08 Laterality of the lesion 
Left ___ 
Right ___
Isthmus ___
Not stated ___

G1.02 Any relevant clinical information:

Thyroid function status
______________________________
______________________________

Relevant medical treatments (eg anti-thyroid drug, radioactive iodine)
______________________________
______________________________

Previous exposure of neck to radiotherapy
______________________________

Indication for performing surgery
______________________________

Family history (eg thyroid cancer, endocrine tumours or syndromes)
______________________________
______________________________

Other (specify)
______________________________
______________________________

G1.03 Pre-operative fine needle aspiration:

No ___
Yes ___

If yes, specify details
______________________________
______________________________

G1.04 Clinical staging
______________________________

G1.05 Involvement of adjacent organs or distant metastases:

No ___
Yes ___

If yes, specify details
______________________________
______________________________
| G1.06 Clinical or differential diagnosis | ________________________________ | ________________________________ | ________________________________ |
| G2.04 Weight of specimen | ___ g |
| S2.10 Specimen dimensions: | Right lobe ___ x___ x___ mm |
| | Left lobe ___ x___ x___ mm |
| | Isthmus ___ x___ x___ mm |
| G2.05 Thyroid capsule: | Intact ___ |
| | Not intact ___ |
| S2.11 Macroscopic description of lesion(s): | Multiple lesions? |
| | No ___ |
| | Yes ___ |
| | If yes, indicate number and complete the following items for each tumour as appropriate ___ |
| **Lesion 1** | Location ________________________________ |
| | Appearance ________________________________ |
| | Borders: encapsulated ___ |
| | infiltrative ___ |
| | Size in greatest dimension ___ mm |
| | Distance from nearest excision margin ___ mm |
| **Lesion 2** | |
Lesion 3

Location ______________________________

Appearance ______________________________
_____________________________________

Borders:    

encapsulated ___

infiltrative ___

Size in greatest dimension ___ mm

Distance from nearest excision margin ___ mm

Lesion 4

Location ______________________________

Appearance ______________________________
_____________________________________

Borders:    

encapsulated ___

infiltrative ___

Size in greatest dimension ___ mm

Distance from nearest excision margin ___ mm

G2.06 Appearance of other portion of thyroid ______________________________
_____________________________________

G2.07 Parathyroid
<table>
<thead>
<tr>
<th>Lymph nodes</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>absent</td>
<td>___</td>
<td>___</td>
</tr>
<tr>
<td>present</td>
<td>___</td>
<td>___</td>
</tr>
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</table>

If yes, indicate type

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G2.08 Other macroscopic comment

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**Microscopic findings**

**S3.01 Tumour type:**

<p>| | |</p>
<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Papillary carcinoma</td>
<td>___</td>
</tr>
<tr>
<td>Follicular carcinoma</td>
<td>___</td>
</tr>
<tr>
<td>Medullary carcinoma</td>
<td>___</td>
</tr>
<tr>
<td>Others (please state)</td>
<td></td>
</tr>
</tbody>
</table>

**Level of invasion** (for follicular carcinoma)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Minimally invasive</td>
<td>___</td>
</tr>
<tr>
<td>Widely invasive</td>
<td>___</td>
</tr>
</tbody>
</table>

If minimally invasive, record:

**Vascular invasion**

<p>| | |</p>
<table>
<thead>
<tr>
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</tr>
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<tbody>
<tr>
<td>present</td>
<td>___</td>
</tr>
<tr>
<td>absent</td>
<td>___</td>
</tr>
</tbody>
</table>

**Number of foci of capsular and/or vascular invasion** (if known)

<p>| | |</p>
<table>
<thead>
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<tbody>
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</table>

G3.01 Tumour variant

<p>| | |</p>
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<tr>
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<tbody>
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</table>

S3.02 Multifocal lesions

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>absent</td>
</tr>
</tbody>
</table>
S3.03 Diameter of tumour (for multifocal tumours measure largest) ___ mm

S3.04 Extension into adjacent tissues/organs

absent ___
present ___

If present, into which tissue

Sternohyoid muscle ___
Perithyroid soft tissue ___
Subcutaneous soft tissues ___
Larynx ___
Trachea ___
Oesophagus ___
Recurrent laryngeal nerve ___
Other (specify) ________________

S3.05 Cancer at resection margin

absent ___
present ___

If absent, clearance from resection margin ___ mm

If present, which margin(s) ________________

S3.06 Lymph node status

Location 1 ________________

Total number of nodes resected ___
<table>
<thead>
<tr>
<th>Location 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of positive nodes</td>
</tr>
<tr>
<td>Location 2</td>
</tr>
<tr>
<td>Total number of nodes resected</td>
</tr>
<tr>
<td>Number of positive nodes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>S3.07 Parathyroid tissue</th>
</tr>
</thead>
<tbody>
<tr>
<td>absent</td>
</tr>
<tr>
<td>present</td>
</tr>
<tr>
<td>If present, state where</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>G3.02 Co-existing pathology:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hashimoto’s thyroiditis</td>
</tr>
<tr>
<td>Lymphocytic thyroiditis</td>
</tr>
<tr>
<td>Diffuse parenchymatous goitre</td>
</tr>
<tr>
<td>Nodular hyperplasia</td>
</tr>
<tr>
<td>Other (specify)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>G3.03 Other microscopic comment</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Ancillary test findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>S4.01 Immunohistochemical stains:</td>
</tr>
<tr>
<td>Antibodies:</td>
</tr>
<tr>
<td>Positive antibodies</td>
</tr>
<tr>
<td>Negative antibodies</td>
</tr>
<tr>
<td>Equivocal antibodies</td>
</tr>
</tbody>
</table>
Interpretation

Clinical significance

G4.01 Molecular investigation

performing laboratory

result

conclusion

Person responsible for reporting

Synthesis and overview

S5.01 Tumour stage (AJCC)

T ___
N ___
M ___

Stage Grouping ___

S5.02 Year of publication and edition of cancer staging system

G5.01 Diagnostic summary

S5.03 Other relevant information and comments
7 Formatting of pathology reports

Good formatting of the pathology report is essential for optimising communication with the clinician, and will be an important contributor to the success of cancer reporting protocols. The report should be formatted to provide information clearly and unambiguously to the treating doctors, and should be organised with their use of the report in mind. In this sense, the report differs from the structured checklist, which is organised with the pathologists’ workflow as a priority.

Uniformity in the format as well as in the data items of cancer reports between laboratories makes it easier for treating doctors to understand the reports; it is therefore seen as an important element of the systematic reporting of cancer. For guidance on formatting pathology reports, please refer to Appendix 2.
## Appendix 1  Pathology request form for thyroid cancer

<table>
<thead>
<tr>
<th>S1.01 Patient name</th>
<th>______________________________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of birth</td>
<td>______________________________</td>
</tr>
<tr>
<td>Sex</td>
<td>______________________________</td>
</tr>
<tr>
<td>Identification and contact details of requesting doctor</td>
<td>______________________________</td>
</tr>
<tr>
<td>Date of request</td>
<td>______________________________</td>
</tr>
</tbody>
</table>

**Ethnicity:**

- Aboriginal or Torres Strait Islander ___
- Other ethnicity ___
- Unknown ___

<table>
<thead>
<tr>
<th>G1.01 Patient identifiers (eg MRN, IHI, NHI)</th>
<th>______________________________</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>S1.03 Principal clinician involved in the patient’s care</th>
<th>______________________________</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>S1.04 Operating surgeon:</th>
<th>______________________________</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Contact details</th>
<th>______________________________</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Type of operation:</th>
<th>______________________________</th>
</tr>
</thead>
</table>

- total thyroidectomy ___
- near-total thyroidectomy ___
- subtotal thyroidectomy ___
- lobectomy with isthmusectomy (hemi-thyroidectomy) ___
- lobectomy ___
partial lobectomy ___
completion thyroidectomy ___

Neck dissection:
No ___
Yes ___

If yes, complete the following details:
Side Right ___
Left ___
Compartment Central ___
Lateral ___
Levels ____________________________

Additional procedures ____________________________
__________________________________________

S1.06 Details of any previous thyroid operation ____________________________
__________________________________________

S1.07 Anatomical site(s) (insert diagram or photograph if possible)
a.______________________________
b.______________________________
c.______________________________

Other specimens :
No ___
Yes ___
If yes, specify details ____________________________
__________________________________________

S1.08 Laterality of the lesion
Left ___
Right ___
Isthmus ___

G1.02 Any relevant clinical information:
<table>
<thead>
<tr>
<th>Section</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1.03 Pre-operative fine needle aspiration:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No ___</td>
</tr>
<tr>
<td></td>
<td>Yes ___</td>
</tr>
<tr>
<td></td>
<td>If yes, specify details</td>
</tr>
<tr>
<td>G1.04 Clinical staging</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>G1.05 Involvement of adjacent organs or distant metastases:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No ___</td>
</tr>
<tr>
<td></td>
<td>Yes ___</td>
</tr>
<tr>
<td></td>
<td>If yes, specify details</td>
</tr>
<tr>
<td>G1.06 Clinical or differential diagnosis</td>
<td></td>
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<tr>
<td></td>
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</tr>
</tbody>
</table>
Appendix 2  Guidelines for formatting of a pathology report

Layout
Headings and spaces should be used to indicate subsections of the report, and heading hierarchies should be used where the LIS allows it. Heading hierarchies may be defined by a combination of case, font size, style and, if necessary, indentation.

- Grouping like data elements under headings and using ‘white space’ assists in rapid transfer of information.23

Descriptive titles and headings should be consistent across the protocol, checklist and report.

When reporting on different tumour types, similar layout of headings and blocks of data should be used, and this layout should be maintained over time.

- Consistent positioning speeds data transfer and, over time, may reduce the need for field descriptions or headings, thus reducing unnecessary information or ‘clutter’.

Within any given subsection, information density should be optimised to assist in data assimilation and recall.

- Configuring reports in such a way that they ‘chunk’ data elements into a single unit will help to improve recall for the clinician.23
- ‘Clutter’ should be reduced to a minimum.23 Thus, information that is not part of the protocol (eg billing information, Snomed codes, etc) should not appear on the reports or should be minimized.
- Injudicious use of formatting elements (eg too much bold, underlining or use of footnotes) constitutes clutter and may distract the reader from the key information.

Where a structured report checklist is used as a template for the actual report, any values provided in the checklist but not applying to the case in question must be deleted from the formatted report.

Reports should be formatted with an understanding of the potential for the information to mutate or be degraded as the report is transferred from the LIS to other health information systems.

As a report is transferred between systems:

- text characteristics such as font type, size, bold, italics and colour are often lost
- tables are likely to be corrupted as vertical alignment of text is lost when fixed font widths of the LIS are rendered as proportional fonts on screen or in print
- spaces, tabs and blank lines may be stripped from the report, disrupting the formatting
- supplementary reports may merge into the initial report.
Appendix 3  Example of a pathology report

**Citizen**, Georgina W.
C/O Paradise Close
Wreck Bay Resort
Nar Nar Goon East, 3181

Female
DOB 1/7/1951
MRN FMC1096785

**THYROID CANCER STRUCTURED REPORT**

**Diagnostic Summary**

Total thyroidectomy:

Right upper lobe, Papillary carcinoma, Stage pT1a, pNX (AJCC 7th edition, 2010), **Resection margins negative**

**Comment:** Nil

**Supporting Information**

**CLINICAL**

- **Type of operation:** Total thyroidectomy
- **Previous thyroid operation:** Details not provided
- **Anatomical site/Laterality:** Right upper lobe
- **Other specimens received:** No
- **Clinical information:** Suspicious of papillary carcinoma
  - Confined to thyroid
  - No enlarged lymph node
- **Pre-operative fine needle aspiration:** Yes - St Bart’s Hospital, 21st July 2010

**MACROSCOPIC**

- **Weight of specimen:** 40g
- **Specimen dimensions**
  - Right lobe: 40 x 20 x 15mm
  - Left lobe: 45 x 30 x 15mm
  - Isthmus: 10 x 3 x 3mm
- **Thyroid capsule:** intact
- **Tumour Morphology**
  - **Multiple lesions:** No – single lesion
  - **Location:** right upper portion
  - **Appearance:** white, partly cystic
  - **Border:** infiltrative
  - **Size (greatest dimension):** 15 mm
  - **Distance from nearest excision margin:** 5mm
  - **Appearance of other portion of thyroid:** Nodular with colloid nodules

**MICROSCOPIC**

- **Tumour type:** Papillary carcinoma
- **Tumour variant:** Conventional
- **Multifocal:** Absent
- **Largest tumour dimension:** 15 mm
**Extension into adjacent tissue/organ:** Limited to thyroid (T1)

**Cancer at resection margin:** Absent

**Clearance from margin:** 5mm

**Lymph nodes**
- **Location:** Detected near isthmus
- **Total number resected:** 2
- **Number positive:** 0

**Parathyroid:** Present - Parathyroid tissue noted near right lobe

**Co-existing pathology:** Nodular hyperplasia

**ANCILLARY TESTS**

None performed.

*Reported by Dr Bernard Mg*  
*Authorised 4/9/2010*
Appendix 4    WHO histological classification of thyroid tumours

Papillary carcinoma  8260/3
Follicular carcinoma  8330/3
Poorly differentiated carcinoma
Undifferentiated (anaplastic) carcinoma  8020/3
Squamous cell carcinoma  8070/3
Mucoepidermoid carcinoma  8430/3
Sclerosing mucoepidermoid carcinoma with eosinophilia  8480/3
Mucinous carcinoma  8480/3
Medullary carcinoma  8345/3
Mixed medullary and follicular cell carcinoma  8346/3
Spindle cell tumour with thymus-like differentiation  8588/3
Carcinoma showing thymus-like differentiation  8589/3

**Thyroid adenoma and related tumours:**
Follicular adenoma  8330/0
Hyalinizing trabecular tumour  8336/0

**Other thyroid tumours:**
Teratoma  9080/1
Primary lymphoma and plasmacytoma
Ectopic thymoma  8580/1
Angiosarcoma  9120/3
Smooth muscle tumours:
Peripheral nerve sheath tumours
Parangangioma  8693/1
Solitary fibrous tumour  8815/0
Follicular dendritic cell tumour  9758/3
Langerhans cell histiocytosis  9751/1
Secondary tumours

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## Appendix 5  AJCC TNM classification of thyroid carcinomas

### Primary Tumour (T)

*Note: All categories may be subdivided: (s) solitary tumour and (m) multifocal tumour (the largest determines the classification).*

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TX</td>
<td>Primary tumour cannot be assessed</td>
</tr>
<tr>
<td>T0</td>
<td>No evidence of primary tumour</td>
</tr>
<tr>
<td>T1</td>
<td>Tumour 2cm or less in greatest dimension limited to the thyroid.</td>
</tr>
<tr>
<td>T1a</td>
<td>Tumour 1cm or less, limited to the thyroid.</td>
</tr>
<tr>
<td>T1b</td>
<td>Tumour more than 1cm but not more than 2cm in greatest dimension limited to the thyroid.</td>
</tr>
<tr>
<td>T2</td>
<td>Tumour more than 2cm but not more than 4cm in greatest dimension limited to the thyroid.</td>
</tr>
<tr>
<td>T3</td>
<td>Tumour more than 4cm in greatest dimension limited to the thyroid or any tumour with minimal extrathyroid extension (eg extension to sternothyroid muscle or perithyroid soft tissues).</td>
</tr>
<tr>
<td>T4a</td>
<td>Moderately advanced disease. Tumour of any size extending beyond the thyroid capsule to invade subcutaneous soft tissues, larynx, trachea, oesophagus or recurrent laryngeal nerve.</td>
</tr>
<tr>
<td>T4b</td>
<td>Very advanced disease. Tumour invades prevertebral fascia or encases carotid artery or mediastinal vessels.</td>
</tr>
</tbody>
</table>

All anaplastic carcinomas are considered T4 tumours

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>T4a</td>
<td>Intrathyroidal anaplastic carcinoma</td>
</tr>
<tr>
<td>T4b</td>
<td>Anaplastic carcinoma with gross extrathyroid extension</td>
</tr>
</tbody>
</table>

### Regional Lymph Nodes (N)

Regional lymph nodes are the central compartment, lateral cervical, and upper mediastinal lymph nodes.

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NX</td>
<td>Regional lymph nodes cannot be assessed</td>
</tr>
<tr>
<td>N0</td>
<td>No regional lymph node metastasis</td>
</tr>
<tr>
<td>N1</td>
<td>Regional lymph nodes metastasis</td>
</tr>
<tr>
<td>N1a</td>
<td>Metastasis to Level VI (Pretracheal, paratracheal, and prelaryngeal/Delphian lymph nodes)</td>
</tr>
<tr>
<td>N1b</td>
<td>Metastasis to unilateral, bilateral, or contralateral cervical (Levels I, II, III, IV, or V) or retropharyngeal or superior mediastinal lymph nodes (Level VII)</td>
</tr>
<tr>
<td>Distant Metastasis (M)</td>
<td></td>
</tr>
<tr>
<td>----------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>M0</td>
<td>No distant metastasis</td>
</tr>
<tr>
<td>M1</td>
<td>Distant metastasis</td>
</tr>
</tbody>
</table>

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Appendix 6  AJCC Staging Grouping

Separate stage groupings are recommended for papillary or follicular (differentiated), medullary, and anaplastic (undifferentiated) carcinoma.

### Papillary or follicular (differentiated)

<table>
<thead>
<tr>
<th>Stage</th>
<th>T</th>
<th>N</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNDER 45 YEARS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stage I</td>
<td>Any T</td>
<td>Any N</td>
<td>M0</td>
</tr>
<tr>
<td>Stage II</td>
<td>Any T</td>
<td>Any N</td>
<td>M1</td>
</tr>
</tbody>
</table>

| 45 YEARS AND OLDER |       |       |      |
| Stage I | T1    | N0    | M0   |
| Stage II| T2    | N0    | M0   |
| Stage III| T3   | N0    | M0   |
|           | T1    | N1a   | M0   |
|           | T2    | N1a   | M0   |
|           | T3    | N1a   | M0   |
| Stage IVA| T4a  | N0    | M0   |
|           | T4a   | N1a   | M0   |
|           | T1    | N1b   | M0   |
|           | T2    | N1b   | M0   |
|           | T3    | N1b   | M0   |
| Stage IVB| T4b  | Any N | M0   |
| Stage IVC| Any T| Any N | M1   |

### Medullary carcinoma (all age groups)

<table>
<thead>
<tr>
<th>Stage</th>
<th>T</th>
<th>N</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage I</td>
<td>T1</td>
<td>N0</td>
<td>M0</td>
</tr>
<tr>
<td>Stage II</td>
<td>T2</td>
<td>N0</td>
<td>M0</td>
</tr>
<tr>
<td>Stage III</td>
<td>T3</td>
<td>N0</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T1</td>
<td>N1a</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T2</td>
<td>N1a</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T3</td>
<td>N1a</td>
<td>M0</td>
</tr>
<tr>
<td>Stage IVA</td>
<td>T4a</td>
<td>N0</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T4a</td>
<td>N1a</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T1</td>
<td>N1b</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T2</td>
<td>N1b</td>
<td>M0</td>
</tr>
<tr>
<td></td>
<td>T3</td>
<td>N1b</td>
<td>M0</td>
</tr>
<tr>
<td>Stage IVB</td>
<td>T4b</td>
<td>Any N</td>
<td>M0</td>
</tr>
<tr>
<td>Stage IVC</td>
<td>Any T</td>
<td>Any N</td>
<td>M1</td>
</tr>
</tbody>
</table>

### Anaplastic carcinoma

All anaplastic carcinomas are considered Stage IV

<table>
<thead>
<tr>
<th>Stage</th>
<th>T</th>
<th>N</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage IVA</td>
<td>T4a</td>
<td>Any N</td>
<td>M0</td>
</tr>
<tr>
<td>Stage IVB</td>
<td>T4b</td>
<td>Any N</td>
<td>M0</td>
</tr>
<tr>
<td>Stage IVC</td>
<td>Any T</td>
<td>Any N</td>
<td>M1</td>
</tr>
</tbody>
</table>

References


11 RCPA (Royal College of Pathologists of Australasia) (2009). Guidelines for Authors of Structured Cancer Pathology Reporting Protocols. RCPA, Surry Hills, NSW.


