

**PRIMARY CUTANEOUS
MELANOMA STRUCTURED
REPORTING PROTOCOL
(1st Edition 2010)**

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Scope

This protocol contains standards and guidelines for the preparation of structured reports for primary cutaneous melanoma.

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

Abbreviations

AJCC	American Joint Committee on Cancer
LDH	lactate dehydrogenase
LIS	laboratory information system
LYVE-1	lymphatic vessel endothelial receptor-1
MITF	microphthalmia-associated transcription factor
NHMRC	National Health and Medical Research Council
RCPA	Royal College of Pathologists of Australasia
TIL	tumour-infiltrating lymphocyte
TNM	tumour–node–metastasis
UICC	International Union Against Cancer
WHO	World Health Organization

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.

Ancillary study	An ancillary study is any pathology investigation that may form part of a cancer pathology report but is not part of routine histological assessment.
Clinical information	Patient information required to inform pathological assessment, usually provided with the specimen request form. Also referred to as 'pretest information'.
Commentary	<p>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).</p> <p>Commentary is used to:</p> <ul style="list-style-type: none">• define the way an item should be reported, to foster reproducibility• explain why an item is included (eg how does the item assist with clinical management or prognosis of the specific cancer).• cite published evidence in support of the standard or guideline• clearly state any exceptions to a standard or guideline. <p>In this document, commentary is prefixed with 'CS' (for commentary on a standard) or 'CG' (for commentary on a guideline), numbered to be consistent with the relevant standard or guideline, and with sequential alphabetic lettering within each set of commentaries (eg CS1.01a, CG2.05b).</p>
General commentary	<p>General commentary is text that is not associated with a specific standard or guideline. It is used:</p> <ul style="list-style-type: none">• to provide a brief introduction to a chapter, if necessary• 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).

Guideline	<p>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.</p> <p>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.</p> <p>Guidelines are not used for research items.</p> <p>In this document, guidelines are prefixed with 'G' and numbered consecutively within each chapter (eg G1.10).</p>
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.
Standard	<p>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.</p> <p>The summation of all standards represents the minimum dataset for the cancer.</p> <p>In this document, standards are prefixed with 'S' and numbered consecutively within each chapter (eg S1.02).</p>
Structured report	A report format which utilises 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

Summary of cancer type

Melanoma is a major public health problem in many countries, particularly those with a predominance of individuals of European origin. Australia and New Zealand have the highest incidences of melanoma in the world. Melanoma is the 3rd most common cancer in both men and women in Australia and both incidence and mortality rates are increasing. Because melanoma is the most common cancer in patients aged in the 15–45 years age group it has a disproportionate effect on the most productive years of life.

Importance of histopathological reporting

Pathological assessment of a tissue biopsy is a critical aspect in the multidisciplinary management of melanoma patients. Such assessment establishes a definite diagnosis in most cases and provides information that, to a major extent, influences patient prognosis and directs the next stages of management.¹

Accurate assessment and documentation of important pathological variables are important in influencing the management of melanoma patients. However, of even greater importance is the need to accurately determine whether a cutaneous melanocytic lesion is benign or malignant (ie a melanoma).² For this reason, pathology reports of melanocytic lesions should both:

- provide the pathological prognostic and other parameters important for patient prognosis and treatment
- document the key diagnostic criteria on which the diagnosis was based.³

Benefits of structured reporting

This structured reporting protocol provides a framework for the assessment and documentation of all the pathological features of any given case. 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 evidence for prognostic markers changes rapidly, and a structured reporting template must be frequently updated to be of maximal value.

Diagnostic certainty

The ability to use descriptive text is especially important for lesions that are difficult to classify.⁴⁻⁷ The approach to such lesions should be to present the evidence for and against the particular diagnoses, and give a preferred diagnosis, but also to express the degree of uncertainty.⁸⁻¹⁰ Where there is genuine doubt about the correct diagnosis, it may be appropriate to seek a further opinion from one or more experienced colleagues.

If a diagnosis of melanoma is favoured but not certain, the structured report may still be completed. The report may be prefaced with comments such as 'if melanoma, the lesion would have the following features: ...'. Individual centres can tailor this structured reporting template to their needs.¹¹

Design of this protocol

This protocol defines the relevant information to be assessed and recorded in a pathology report for melanoma. Mandatory elements (standards) are differentiated from those that are not mandatory but are recommended (guidelines). Also, items suited to tick boxes are distinguished from more complex elements requiring free text or narrative. 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 report (Chapter 7) or checklist (Chapter 6). 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

- *Guidelines for Authors of Structured Cancer Pathology Reporting Protocols*¹²
- *Clinical Practice Guidelines for the Management of Melanoma in Australia and New Zealand*³
- *Pathology And Genetics of Skin Tumours (WHO Classification of Tumours)*¹³
- *The Pathology Request-Test-Report Cycle — Guidelines for Requesters and Pathology Providers*¹⁴
- *AJCC Cancer Staging Manual, 7th edition*¹⁵

Changes since last version

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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Stakeholders

ACT Health

Anatomical Pathology Advisory Committee (APAC)

Australasian College of Dermatologists

Australian Association of Pathology Practices Inc (AAPP)

Australian Cancer Network

Australian Commission on Safety and Quality in Health Care

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
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
Sydney Melanoma Unit (SMU)
The Australia and New Zealand Melanoma Trials Group (ANZMTG)
The Australasian Dermatopathology Society (ADS)
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)
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Development process

This protocol has been developed following the seven-step process set out in *Guidelines for Authors of Structured Cancer Pathology Reporting Protocols*.¹²

Where evidence or consensus is not referenced, the authority is that of the expert group.

1 Clinical information and surgical handling

This chapter relates to information that should be provided to the pathologist when reporting the pathology of the specimen, and procedures that are required before handover of specimens to the laboratory.

The standards below specify the particular information and specimens required for primary cutaneous melanoma. The accuracy of the pathological report may depend on the amount of tissue provided and the availability of relevant clinical details.¹⁶ It is particularly important to record factors that may induce atypical pathological features in melanocytic naevi (eg previous biopsy, trauma, surface irritation, pregnancy, topical treatment and recent strong sunlight exposure) and may lead to a misdiagnosis of melanoma. Other clinical factors relevant to diagnosis include patient age and sex and the site of the lesion.^{2,8-10,17}

This information can be collected on current generic pathology request forms; any additional information required specifically for the reporting of primary cutaneous melanoma may be sought and recorded on a separate data sheet when the diagnosis of melanoma is suspected at the time of excision. Appendix 1 provides a standardised data sheet that may be useful in obtaining all relevant information.

S1.01 The Royal College of Pathologists of Australasia (RCPA) *The Pathology Request-Test-Report Cycle – Guidelines for Requesters and Pathology Providers* must be adhered to.¹⁴

CS1.01a The RCPA guidelines specify 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 and sex
- identification and contact details of requesting doctor
- type of specimen
- date of request
- clinical information relevant to the investigations requested.

CS1.01b Older age at diagnosis is an independent predictor of worse outcome in melanoma.¹⁸⁻²⁰

CS1.01c Women have a better prognosis than men in some, but not all, studies. The statistical significance of sex as a prognostic factor is confounded by anatomical site because a greater proportion of melanomas occur on the extremities (compared with the trunk) in female than in male patients.¹⁸⁻²¹

- 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 UHI.
- G1.02 The pathology accession number of the specimen should be recorded.
- G1.03 The anatomical site of the melanoma should be recorded.
 - CG1.03a Sufficient information is required to localise the lesion for subsequent therapy. A diagram or photograph can facilitate this.^{2,16}
 - CG1.03b When matched for other known prognostic factors, melanomas in the head and neck area, upper back and axial skeleton have a worse prognosis than extremity-based lesions.¹⁸⁻²⁰
 - CG1.03c Naevi occurring on certain sites (including the palms, sole, fingers and toes, flexural sites, genitalia, the breast and ear) often display features that would be considered evidence favouring melanoma in melanocytic tumours occurring on other sites.^{2,16,22-23}
- G1.04 The laterality of the melanoma should be recorded.
 - CG1.04a Laterality information is needed for identification purposes.
- G1.05 The clinical diagnosis or differential diagnosis should be recorded.
 - CG1.05a Providing the provisional clinical diagnosis or differential diagnosis improves clinicopathological correlation and improves diagnostic accuracy.^{2,16}
- G1.06 The description of the type of specimen should be recorded.
 - CG1.06a The following are examples of specimen types: excision, punch, incision, shave, curette and re-excision. For excision and re-excision specimens, it should be stated whether or not the specimen is orientated.
 - CG1.06b Although clinical considerations are important in determining the most appropriate biopsy technique for a melanocytic tumour, the type of biopsy performed may affect the accuracy of pathological evaluation.²⁴

At times partial biopsies are performed of melanocytic lesions. Possible reasons include when the suspicion of melanoma is very low; when the melanocytic lesion is large or in cosmetically sensitive areas, and in some instances there may be no clinical suspicion that the lesion is melanocytic (eg many melanocytic lesions exhibit no clinical pigment).
 - CG1.06c If circumstances permit, an excision biopsy with narrow clearance margins is the most appropriate biopsy of a

melanocytic tumour.¹ This will enable an accurate assessment and will allow definitive treatment to be planned appropriately if a diagnosis of melanoma is confirmed.

- CG1.06d Incomplete biopsies of melanocytic tumours (punch, incision, curette and some superficial shave biopsies) may contribute to pathological misdiagnosis. Incomplete biopsies may lead to unrepresentative sampling of a heterogenous tumour (ie a partial biopsy may sample only the benign part of a lesion and miss a coexisting melanoma) or may not provide sufficient tissue for adequate assessment of the pathological criteria necessary to permit correct diagnosis.^{8,24-25}

Criteria necessary to permit correct diagnosis include features at the peripheral and deep aspects of the tumour, which may not be included in an incomplete biopsy. Another potential pitfall of an incomplete biopsy of a naevus is that it may regrow from residual naevocytes after incomplete removal. Regenerating naevi often display many histological features that commonly occur in melanomas (including pagetoid epidermal invasion, cytological atypia, occasional dermal mitoses and HMB45 positivity). For these reasons, such lesions have been termed 'pseudomelanomas' and are prone to overdiagnosis as melanomas.²⁶⁻²⁸

Incomplete biopsies of melanomas may also provide inaccurate assessment of important pathological features, such as Breslow thickness. Accurate assessment of pathological features of a primary melanoma allows prognosis to be reliably estimated; it also guides selection of appropriate management (width of excision margins, appropriateness of sentinel node biopsy); inaccurate pathological assessment can lead to inappropriate therapy.

- G1.07 If a re-excision specimen is received or sent, a copy of the report for the previous biopsy or excision of the lesion or details of previous pathology laboratory and case numbers or the important findings of the previous biopsy should be provided.
- G1.08 The history and timing of lesional trauma, biopsy, irritation or treatment with topical agent should be recorded.
- CG1.08a Following lesional trauma, biopsy, irritation or topical treatment, melanocytic naevi may display many histological features that commonly occur in melanomas (including pagetoid epidermal invasion, cytological atypia, occasional dermal mitoses and HMB45 positivity). Such regenerating naevi have been termed 'pseudomelanomas' and are prone to overdiagnosis as melanomas. Changes typically occur within six months of a previous injury, and the pathological changes are confined to the affected area.^{8,24,26-29}

- CG1.08b Pathological clues to the presence of surface irritation or trauma include the following epidermal changes: parakeratosis or hyperkeratosis, epidermal thickening and hypergranulosis.¹⁷ Sometimes there is evidence of superficial dermal scarring.
- G1.09 A history of previous primary melanoma, at this or any other site, should be recorded.
 - CG1.09a Previous melanoma is a significant risk factor for melanoma (approximately 10–12% of patients with primary cutaneous melanoma develop a subsequent melanoma).¹
 - CG1.09b Clinical information may be important in determining whether a melanoma is a primary tumour or a metastasis.³⁰
- G1.10 Evidence of metastatic disease should be recorded.
 - CG1.10a Knowledge of the presence and site of metastases is an essential component of American Joint Committee on Cancer/ International Union Against Cancer (AJCC/UICC staging).
- G1.11 In the presence of metastatic disease, serum lactate dehydrogenase (LDH) levels should be provided.
 - CG1.11a Serum LDH is a component of AJCC staging for melanoma.
- G1.12 Other relevant history should be recorded.
 - CG1.12a Relevant history includes the history of the current lesion (duration, history or duration of change, signs of malignancy, size of lesion and ulceration).
 - CG1.12b Relevant melanoma risk factors include number of previous melanomas, presence of dysplastic naevi, total number of naevi, family history of melanoma and nonmelanoma skin cancer history.
 - CG1.12c Pregnancy is relevant because it may influence the interpretation and reporting of melanocytic tumours.^{1,31-34}
- G1.13 The specimen should be orientated if the status of specific surgical margins is critical in determining the need for, or extent of, further surgery.
 - CG1.13a 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 (and this may be facilitated by the use of a diagram).
- G1.14 Any clinically or dermatoscopically identified suspicious areas (often within a pre-existing lesion) should be identified, documented and marked for sectioning (eg with a suture or by superficially scoring the

epidermis and superficial dermis around the area of concern, using a suitably sized punch or other technique).

CG1.14a Clinically suspicious areas may suggest a melanoma developing within a pre-existing naevus (usually long standing and previously unchanged). It is important to examine such areas histopathologically, because they may represent melanoma.

G1.15 Clinical or other diagnostic imaging (eg dermoscopy or confocal microscopy) or a diagram should be included with the clinical request form if this information is useful to direct the pathologist to areas of particular clinical concern in the specimen, or to improve clinicopathological correlation.³⁵

CG1.15a Photography can be helpful when assessing clinically or dermoscopically heterogenous lesions. The clinician can use a clinical or dermoscopic image to direct the pathologist to areas of particular clinical concern, to improve clinicopathological correlation.^{8,16}

CG1.15b Clinical photography is not commonly performed but there are data to support the value of photographic images in aiding histological diagnosis.^{8,10,35-36}

G1.16 A free text field should be included in the clinical notes section of a pathology request form so that the referring doctor can provide any relevant information that was not included in the standards and guidelines above.

2 Specimen handling and macroscopic findings

This chapter relates to the procedures required after the information has been handed over from the requesting clinician and the specimen has been received in the laboratory.

Specimen handling

- G2.01 Pathologists may be asked to provide tissue samples from fresh specimens for tissue banking or other research purposes. The decision to provide tissue should only be made when the pathologist is sure that the diagnostic process and pathological evaluation will not be compromised. As a safeguard, research use of the specimen should be deferred until the diagnostic process is complete so that the specimen can be retrieved.
- G2.02 Biopsy specimens should be placed in a suitable fixative, such as 10% buffered formalin, before dissection.
- CG2.02a Frozen section or cytology examination is not recommended for the assessment of primary cutaneous melanocytic tumours. The significant artefacts caused by freezing the tissue may compromise subsequent analysis of paraffin-embedded sections.
- S2.01 The tissue block(s) must be selected to facilitate microscopic assessment of the thickest or most suspicious portion of the tumour, and determination of the relationship of the tumour to the surgical margins.¹⁶**
- CS2.01a Tissue blocks should be taken of different portions of a heterogeneous lesion and any other separately identified lesion should also be sampled for microscopic examination.
- G2.03 For partial biopsies, the entire specimen should be processed.
- G2.04 In general, excision biopsies should be sequentially sliced transversely in 2–3-mm slices, including the centre, thickest or most suspicious part of the lesion.
- G2.05 For lesions less than 10 mm in diameter, the entire specimen should be embedded, wherever possible.
- G2.06 The skin surface and cut surfaces of wide excision specimens should be examined for macroscopic evidence of residual tumour, and then serially sectioned into 2–3-mm slices.
- CG2.06a If the melanoma was completely excised and had no unusual features (eg desmoplasia or neurotropism) in the original excision, and there is no suspicion of residual tumour on visual inspection, then it is probably sufficient to submit only one or two slices from the centre of the scar for microscopic

examination.³⁷⁻³⁹

- G2.07 Guidelines for the pathological examination of lymphadenectomy specimens from melanoma patients (including sentinel lymph nodes and regional lymph node field dissections specimens) are documented in the National Health and Medical Research Council *Clinical Practice Guidelines for the Management of Melanoma in Australia and New Zealand*, 2008.³

Macroscopic findings

S2.02 The specimen must be described.

S2.03 The specimen dimensions must be measured and recorded.

G2.08 All measurements should be recorded in millimetres.

S2.04 If marking sutures or clips were used to note orientation, this must be noted in the pathology report.

S2.05 The primary lesion must be described.

CS2.05a The description of the lesion includes such features as size, shape, colour, border, contour, evidence of surface crusting or ulceration and its proximity to the resection margins.

S2.06 The presence of other lesions must be noted, and their features recorded.

CS2.06a Other lesions are often naevi or other benign lesions, but it is particularly important to identify the presence of satellite metastases because these portend a worse prognosis.

G2.09 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.

3 Microscopic findings

This chapter relates to purely histological or morphological assessment. Information derived from multiple investigational modalities, or from two or more chapters, is described in Chapter 5.

S3.01 The diagnosis of primary melanoma must be recorded.

CS3.01a If there is uncertainty whether or not a tumour is a melanoma, this should be addressed in the synthesis section of the report (see Chapter 5).

CS3.01b If there is uncertainty whether or not a melanoma is a primary or a metastasis, this should be addressed in the synthesis section of the report (see Chapter 5).

G3.01 The microscopic findings should be described.

CG3.01a A description of the microscopic findings is important for clinical governance, to indicate the process of diagnostic decision making and any areas of uncertainty. The description is particularly important in complex or unusual cases, but may not be necessary in a straightforward case.

CG3.01b Histopathological features of clinically suspicious areas should be documented in the histopathology report.

CG3.01c Documentation of histopathological features in clinically suspicious areas will allow clinicopathological correlation.^{8,16}

S3.02 The Breslow thickness must be recorded.

CS3.02a The Breslow thickness should be measured to nearest 0.1 mm.³

CS3.02b Breslow thickness is the single most important prognostic factor for clinically localised primary melanoma.¹⁸

CS3.02c Breslow thickness is measured from the top of the granular layer of the epidermis (or, if the surface is ulcerated, from the base of the ulcer) to the deepest invasive cell (dermal/subcutaneous).^{16,40}

CS3.02d Determination of Breslow thickness can be problematic.

- In the case of periadnexal extension of melanoma (ie in the tissue immediately adjacent to skin appendageal structures), it is uncertain from current evidence where the measurement of tumour thickness should be made to most accurately predict patient prognosis. (This does not include adnexal involvement by melanoma, which is regarded as in situ disease.) It is generally agreed that thickness measurements should not be based on periadnexal extension, except when it is the only focus of invasion. In that circumstance, depth may be measured from the inner layer of the outer root sheath epithelium or inner luminal surface of sweat glands, to the furthest extent of infiltration into the periadnexal dermis. The depth of extension of such foci beneath the granular layer of the epidermis should also be measured and reported.
- The Breslow thickness cannot be determined if a superficial biopsy transects a melanoma and includes only its superficial portion. In such instances, the pathologist can only report the melanoma to be 'at least' a certain thickness. Correlation with the re-excision specimen is necessary.
- Other problems may arise from differing interpretations of the nature of dermal cells (ie whether they represent melanoma or a pre-existing naevus) and of tumours with verruciform architecture.
- The inclusion of neurotropic spread of melanoma in the measurement of Breslow thickness is controversial. In this instance, it is recommended that the thicknesses of the tumour including and excluding the neurotropic component be recorded in the pathology report.

CS3.02e The standard method for measurement of tumour thickness in ulcerated lesions may lead to an underestimate of thickness, because the recommended measurement from the base of the ulcer to the base of the tumour makes no allowance for the amount of tumour lost through ulceration.

CS3.02f The thickness (measured from the top of the granular layer) of any zone of regression may also be recorded in the pathology report (but does not represent the Breslow thickness).

CS3.02g The Breslow thickness should be measured in the standard way (CS3.02c) when there is dermal regression (ie dermal regression extending to a greater thickness than the melanoma should not be included in the measurement of Breslow thickness).

S3.03 The pathology report must indicate whether or not the invasive or in situ melanoma involves the surgical margins.

CS3.03a For orientated specimens, the pathology report must identify the location of any involved margin; for nonorientated specimens, the report must indicate whether involved

margins are peripheral or deep.

CS3.03b Involvement of the surgical margin may result in regrowth or metastasis from residual melanoma, and may adversely affect patient outcome.⁴¹

G3.02 The pathology report should document the distance of invasive and in situ melanoma from peripheral and deep margins.

CG3.02a Margin measurements to within the nearest 1 mm are sufficient for the purposes of directing further management.

CG3.02b If the melanoma is within 2mm of the resection line, it is recommended that the margin measurement be recorded to within the nearest 0.1mm measurement.

S3.04 The presence or absence of ulceration must be reported.

CS3.04a Ulceration is an integral component of the AJCC/UICC staging system.^{15,42-43}

CS3.04b Assessing the presence of ulceration may be difficult if there is only a focal loss of the epidermis; in this case, it is difficult to determine whether the epidermal deficiency is due to ulceration or sectioning artefact. Absence of fibrin or granulation tissue from putative areas of ulceration would be clues that the apparent ulceration is actually due to sectioning of only part of the epidermis.⁴⁴

CS3.04c Distinguishing between iatrogenic and noniatrogenic ulceration is important because the former is of no prognostic significance.⁴⁵ Differentiation is relatively easy when a clinical history of a previous biopsy is provided or a well demarcated dermal scar is present; however, at other times it can be difficult or impossible to distinguish between the two. Clues that ulceration is iatrogenic in origin include sharp demarcation with 'squared off' edges or the presence of a 'v' or wedge-shaped area of underlying granulation tissue.¹⁶

G3.03 The extent of ulceration should be recorded in millimetres.

CG3.03a The size of the area of ulceration is likely to be prognostically relevant; therefore, the diameter of ulceration should be measured.⁴⁶⁻⁴⁸

CG3.03b The extent of ulceration expressed as a percentage of the maximal width of the dermal component may provide a guide to prognosis, but further research is required to confirm this.⁴⁷

S3.05 The mitotic rate per square millimetre of the invasive melanoma must be recorded.

CS3.05a Recent studies have suggested that mitotic rate is an important prognostic factor for localised primary

melanomas.^{18,44,46,49-55}

- CS3.05b The number of mitotic figures often varies greatly between different parts of a tumour. For consistency and reproducibility, a standardised method must be used to assess mitotic rate. The mitotic rate should be determined by beginning the mitotic count in a zone within the invasive tumour of obvious mitotic activity ('hot spot'), then counting the sum of the number of mitoses in a one square millimetre area (by counting in successive high power microscopic fields).⁴⁴ It is recommended that the field diameter of a microscope be formally calibrated using a stage micrometer to determine the number of high-power fields that equates to a square millimetre.^{18,44,49-56}
- CS3.05c In the 7th edition of the AJCC melanoma staging system, the recommended method to enumerate mitoses is to find the area in the dermis with the most mitoses (the "hot spot"), and begin the count in this area then extending the area counted to immediately adjacent non-overlapping high power fields until 1mm² area of tissue containing the melanoma is assessed. If no hot spot is identified and the mitoses are sparse and randomly scattered, then the count should begin in a field containing a mitosis then extended to immediately adjacent non-overlapping high power fields until a 1mm² area of tissue containing melanoma is assessed. When the invasive component of the tumour involves an area <1mm², a 1mm² area of dermal tissue that includes the tumour should be assessed and recorded as a number per mm². The number of mitoses should be listed as a whole number. If no mitoses are identified then it should be recorded as 0/mm². The AJCC discourages the use of the description of <1mm² for this occurrence. The AJCC staging committee also suggests that as a guide, "no more than 2 slides with multiple sections be examined so that exhaustive evaluation of the lesion is not performed" in an attempt to identify a single mitosis.¹⁵

S3.06 The presence or absence of microsattellites must be recorded.

- CS3.06a A microscopic satellite has been defined as any nest of metastatic tumour cells discontinuous from the primary tumour (but not separated only by fibrosis or inflammation).
- CS3.06b The terms 'microsattellites', 'in-transit metastases' and 'local metastases' probably represent biologically identical processes with identical (worse) prognostic implications.⁵⁷⁻⁶⁰ Microsattellites and in-transit metastases are included in the same prognostic group by the AJCC.^{15,42-43,60}
- CS3.06c In the 7th edition of the AJCC melanoma staging system, microsattellites are defined as "any discontinuous nest of intralymphatic metastatic cells >0.05mm in diameter that are clearly separated by normal dermis (not fibrosis or inflammation) from the main invasive component by a distance of at least 0.3mm".¹⁵

G3.04 The level of invasion (Clark) should be recorded.

CG3.04a Tumour invasion may also be expressed as a Clark level, according to the anatomical compartment of invasion (ie papillary or reticular dermis or subcutis).^{16,61}

Clark's levels are defined as follows:⁶²

- Level I: Melanoma cells confined to the epidermis (melanoma in situ).
- Level II: Melanoma cells invade but do not fill or expand the papillary dermis.
- Level III: Melanoma cells fill and expand the papillary dermis, with extension of tumour to the papillary–reticular dermal interface. The boundary between the papillary and reticular dermis may be hard to identify, particularly if there is severe solar elastosis; it can also be hard to identify in sites such as the scalp, acral skin, mucosal or anogenital regions. The papillary dermal collagen fibres are fine and oriented vertically, whereas the reticular dermal collagen bundles are coarse and have a more horizontal orientation. This distinction can be used in polarisation microscopy because reticular dermal collagen is birefringent. Another useful landmark in separating the papillary and reticular dermis is the presence of a capillary plexus at the interface. Polypoid tumours that expand but do not fill the papillary dermis should be classified as level III.
- Level IV: Melanoma cells infiltrate into the reticular dermis.
- Level V: Melanoma cells infiltrate into the subcutaneous fat. In sites where subcutaneous fat may be absent (eg the lip or subungual regions), extension into other structures deep to the dermis (eg skeletal muscle or bone) should be recorded as Clark level V invasion.

CG3.04b Most evidence suggests that the Breslow thickness of a melanoma is a more accurate prognostic indicator than the Clark level.¹⁸ In the 2010 7th edition of the AJCC melanoma staging system, Clark level is no longer used to define T1b tumours (which are now defined by the presence of a dermal mitotic rate $\geq 1/\text{mm}^2$ or the presence of ulceration).^{15,20,63}

G3.05 The presence or absence of lymphovascular invasion should be recorded.

CG3.05a Vascular invasion is identified by the demonstration of melanoma cells within the lumina of blood vessels or lymphatics, or both. It is an uncommon finding in the excision specimens of primary cutaneous melanoma, but is generally regarded as a marker of poor prognosis.^{34,64}

CG3.05b Pathological misinterpretation may arise in the assessment of vascular invasion if a space around a tumour is regarded as retraction artefact or if a tumour completely occludes a

vessel and the presence of a vessel is not recognised. The application of endothelial markers, such as CD31 and CD34, and new specific lymphatic endothelial markers, such as lymphatic vessel endothelial receptor-1 (LYVE-1) and podoplanin (D2-40), may be of assistance when there is uncertainty.^{16,34,64}

- G3.06 The distribution and density of tumour-infiltrating lymphocytes (TILs) should be recorded.
- CG3.06a To be regarded as TILs, lymphocytes must infiltrate and disrupt tumour nests or directly opposing tumour cells, or both.
- CG3.06b The assessment of TILs by distribution and density remains subjective and prone to interobserver variation, although agreement may be improved by instruction. Reports on the prognostic effect of TIL vary but most suggest the presence of 'brisk' TILs is associated with a more favourable prognosis.^{46,65-66} Absent TILs predicted sentinel lymph node positivity in one recent study.⁶⁷
- G3.07 The presence or absence of intermediate or late regression should be recorded.
- CG3.07a Regression is caused by a host immunological response directed against a melanoma resulting in loss of part or all of the melanoma. It is a temporal phenomenon that may be arbitrarily categorised into three stages: early (TILs — see above), intermediate and late. Complete or late regression is characterised by an area devoid of melanoma in the epidermis and dermis with fibrosis, often flanked on one or both sides by residual melanoma. Often the epidermis is attenuated, with loss of the rete ridges. The underlying dermis shows angiofibroplasia. In intermediate stage regression there are often a few associated lymphocytes, variable numbers of melanophages, some oedema and telangiectasia.
- CG3.07b Regression at a peripheral excision margin is an indication for re-excision because it implies that there may be further melanoma in the skin beyond the visible margins.
- CG3.07c The prognostic significance of regression is controversial.¹⁶ Some studies report that it portends a worse prognosis (particularly in thin melanomas),⁶⁸ whereas others report that it is associated with a more favourable outcome.¹⁶ Difficulties in interpreting such studies include lack of a standardised definition or criteria for its diagnosis, and poor interobserver reproducibility.
- CG3.07d Extent of regression (width and depth in millimetres) and the clearance from margins of excision should be recorded.
- G3.08 The absence or presence and extent of desmoplasia (% of invasive component) should be recorded.

- CG3.08a Desmoplasia in regard to melanoma is defined as spindle melanoma cells associated with and separated by stromal desmoplasia (new collagen). Desmoplastic melanoma of 'pure' type (prominent desmoplasia throughout the invasive tumour) may be associated with a lower rate of regional lymph node metastases and/or longer disease free survival (or both) than desmoplastic melanoma of 'mixed' type (ie partial desmoplasia) and nondesmoplastic melanoma.^{29,69-81} A desmoplastic melanoma may show neurotropism (but not all desmoplastic melanomas are neurotropic).
- CG3.08b In some cases of melanoma, it is impossible to be certain whether the dermal collagen around the melanoma cells is old or new and hence in such cases it is difficult to determine accurately whether a melanoma is truly desmoplastic.
- G3.09 The presence or absence of neurotropism should be recorded.
- CG3.09a Neurotropism is identified by the presence of melanoma cells around nerve sheaths (perineural invasion) or within nerves (intranural invasion).^{76-77,80} Occasionally, the tumour itself may form neuroid structures (termed 'neural transformation'; this is also regarded as neurotropism).⁷⁶
- CG3.09b Infiltration along nerve sheaths (or occasionally within the endoneurium) may be associated with an increased local recurrence rate (local persistence).⁷¹ Neurotropism is common in desmoplastic melanoma (desmoplastic neurotropic melanoma), but may occur in other forms of melanoma.⁸⁰ The presence of neurotropism is associated with an increased risk of local recurrence of melanoma and may require wider excision margins and or adjuvant radiotherapy in some cases.
- CG3.09c The location (in relation to the primary tumour; ie whether it is within, beyond the edge of or apparently separate), extent and proximity of neurotropism to the resection margins should be documented in the pathology report.
- G3.10 Any associated benign melanocytic lesion should be recorded.
- CG3.10a Although of no known prognostic value, the recognition of an associated benign melanocytic lesion is relevant to the pathogenesis of melanoma, and may be important for epidemiological, clinical and genetic studies.⁸²
- CG3.10b Documentation of associated benign melanocytic tumour is also of relevance where there may be residual melanocytic tumour in the re-excision specimen, and where knowledge of this may assist in the interpretation of the residual tumour overlying a scar as pseudomelanoma/recurrent naevus, rather than melanoma.
- CG3.10c In some instances it can be difficult or even impossible to determine whether part of the dermal component of a melanocytic tumour represents melanoma or part of an associated naevus. This is particularly the situation in

melanoma composed of small, minimally atypical 'naevoid' cells, on in cases in which the dermal component of a melanoma 'matures' with depth. Careful assessment of cytological characteristics — including the presence of mitoses and the identification of a second discrete cell population — may assist in some cases.

G3.11 The intra-epidermal growth pattern of the melanoma should be recorded.

CG3.11a The 2008 *Clinical Practice Guidelines for the Management of Melanoma in Australia and New Zealand* recommend that the intraepidermal growth pattern of the melanoma (ie pagetoid, lentiginous or mixed patterns) be recorded.³ The recognition of the intraepidermal growth pattern is important in reaching the diagnosis of melanoma.

G3.12 The subtype of melanoma should be recorded.

CG3.12a The current version of the World Health Organization (WHO) *Classification of Tumours: Pathology and Genetics Skin Tumours*, published in 2006,⁸³ lists the following subtypes:

- superficial spreading melanoma (SSMM)
- nodular melanoma (NM)
- lentigo maligna melanoma (LMM)
- acral-lentiginous melanoma
- desmoplastic melanoma
- melanoma arising from blue naevus
- melanoma arising in a giant congenital naevus
- melanoma of childhood naevoid melanoma
- persistent melanoma.

The common subtypes listed (SSSM, NM and LMM), have little if any prognostic significance independent of tumour thickness; interpretation is subjective and prone to interobserver variation,^{3,16,84-85} and their use is principally for clinicopathological correlation.

The 2008 *Clinical Practice Guidelines for the Management of Melanoma in Australia and New Zealand* recommends the terminology "Melanoma, insitu" (synonyms lentigo maligna/Hutchinson's melanotic freckle, superficial spreading melanoma in situ, acral lentiginous melanoma in situ) and "Melanoma, invasive" (synonyms lentigo maligna melanoma, superficial spreading melanoma, acral lentiginous melanoma, nodular melanoma and unclassified melanoma) for "melanoma of common type".³ The aforementioned guidelines also recommend the terminology desmoplastic melanoma (as an uncommon variant) and for other variants (designated as "controversial and provisional"): malignant blue naevus (melanoma resembling or arising in a blue naevus), melanoma in congenital naevus, minimal deviation (naevoid) melanoma, animal type melanoma (pigmented

epithelioid melanocytoma) and primary dermal melanoma.³

CG3.12b Epidemiological and molecular genetic evidence suggests that there are subgroups of melanoma that are associated with mechanistically critical genetic alterations. There are associations between the presence of some mutations and the anatomical site of a melanoma and the degree of solar elastosis.^{82,86}

Furthermore, certain mutations are associated with morphological features of the primary melanoma which may offer a basis to refine the subclassification of melanoma into more clinically meaningful subgroups in the future.⁸⁷ It is likely that these genetic alterations will be used to define subgroups of melanoma that predict response to targeted therapies.

General commentary

Angiotropism

Angiotropism is the migration of melanoma cells along the external surface of blood vessels. A more detailed proposed definition for angiotropism is as follows:

‘The melanoma cells should be cuffing the external surfaces of either capillary-sized blood vessels or lymphatic channels. The melanoma cells should be present in at least two or more foci. By definition there should be no tumour present within vascular lumina. Angiotropic foci must be located either at the advancing edge of the tumour or some distance (usually within 1–2 mm) from the main tumorous mass. Structures were counted as microvessels if they appeared vascular morphologically (ie they had a lumen surrounded by endothelium)’.⁸⁸

Angiotropism is similar to the known propensity of melanoma to spread along nerves and skin adnexal structures. It has been proposed as a mechanism for melanoma metastasis (termed extravascular migratory metastasis) and may therefore be an important prognostic factor but requires further study.⁸⁸⁻⁹⁰

Cutaneous metastasis

The possibility of metastatic melanoma must be considered in cases where the tumour is located completely within the dermis and/or subcutis without either attachment to the epidermis or an intraepidermal component of atypical melanocytic proliferation. Epidermotropic metastasis may mimic primary melanoma and dermal primary melanoma may mimic a metastasis.^{8,30} Therefore, the importance of clinicopathological correlation for determining whether any cutaneous melanoma is primary or metastatic cannot be overemphasised and is probably more accurate in predicting clinical behaviour of the tumour than histopathological assessment alone.

Epidermal consumption

Consumption of the epidermis is defined as thinning of the epidermis with attenuation of basal and suprabasal layers and loss of rete ridges adjacent to collections of melanocytes and is associated with melanoma.

The value of epidermal consumption as a diagnostic and prognostic marker requires further study.⁹¹⁻⁹²

Immunohistochemistry

In most melanomas, immunohistochemistry is not required to establish a pathological diagnosis of melanoma. In cases in which there is no in situ melanoma or in cases lacking typical morphological features or melanin pigment, immunohistochemistry for melanocytic markers may be useful in identifying the tumour as melanocytic in origin. Immunohistochemistry has only a very limited role in determining whether a primary melanocytic tumour is benign or malignant.¹⁶

S100 protein is expressed by most melanomas; although not specific for melanocytes, its presence is helpful in assessing the extent of inconspicuous infiltration by spindle cell melanomas, especially desmoplastic melanoma. Immunostaining for HMB-45 may be helpful in distinguishing between melanoma and atypical naevi, because HMB-45 positivity is retained in the deep component of melanoma, more than in naevi. Melan-A (Mart 1) is a sensitive marker of melanocytes but it is not usually expressed in desmoplastic melanoma. Microphthalmia transcription factor (MITF) is also a sensitive marker of melanocytic differentiation.

Ki67 is a proliferation marker that is often increased in melanomas (>5%) and low in naevi (<5%) and occasionally may be useful in assessing primary melanocytic tumours to determine whether they are benign or malignant. The Ki67 proliferative index of a tumour may correlate with prognosis but requires further study.

Local melanoma metastasis versus persistent primary melanoma

The pathologist should attempt to distinguish between local melanoma metastasis (when the original primary melanoma was completely excised but has recurred at or near the primary site) and persistent primary melanoma (where the primary melanoma involved a margin on the previous resection specimen and has recurred at the primary melanoma site). This may require review of the previous primary melanoma excision.^{41,93}

Predominant cell type

Melanoma composed predominantly of spindle cells may be associated with a better prognosis than those composed of epithelioid cells, but this has not been a consistent finding.

Solar elastosis

The relationship between patterns of sun exposure and site distribution of melanoma is fundamental to the understanding of the pathogenesis of melanoma.⁹⁴⁻⁹⁵ The reporting of solar elastosis as an index of prolonged sun exposure may be valuable for research purposes.⁸²

4 Ancillary studies findings

There are no ancillary tests currently used on a routine diagnostic basis for primary cutaneous melanoma. Ongoing research is investigating genetic differences between naevi and melanomas, including whether genetic differences could form the basis of ancillary tests. Such tests might include fluorescence in-situ hybridisation (FISH) and comparative genomic hybridisation. The aim would be to determine the malignant potential of 'borderline' primary tumours (where it cannot be determined with certainty whether they are benign or malignant by 'routine' pathological assessment). Other research is attempting to identify new prognostic biomarkers of melanoma and define subcategories of melanoma that may respond to targeted and other therapies.

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.

Overarching case comment is synthesis in narrative form. 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.

By definition, synthetic elements are inferential rather than observational, often representing high-level information that is likely to form part of the 'Diagnostic summary' section in the final formatted report.

S5.01 The AJCC melanoma tumour–node (pTN) subcategories according to the current AJCC staging system¹⁵ must be recorded.

CS5.01a The 2010 (7th edition) of the AJCC melanoma staging system is shown in Tables S5.01a and S5.01b, below.¹⁵

CS5.01b In the 7th edition of the AJCC/UICC melanoma staging system, tumour thickness and ulceration continue to define T2, T3 and T4 categories. However, T1b melanomas are defined by dermal mitotic rate $\geq 1/\text{mm}^2$ or ulceration, rather than Clark level of invasion (as in 6th edition)⁴³.

In the 7th edition AJCC/UICC Staging system, N1 and N2 categories remain for microscopic and macroscopic nodal disease respectively (with sentinel lymph node biopsy recommended for pathological staging). Lymph node positivity is defined by the presence of metastases identified on haematoxylin-eosin stained sections or on sections stained by immunohistochemistry alone. Another criterion for the N category are satellites, intransit metastases and microsatellites. M staging continues to be determined both by site of distant metastases and serum LDH, but patients with regionally isolated metastasis from an unknown primary site should be categorised as Stage III rather than Stage IV, because their prognosis corresponds to that of Stage III disease from a known primary site.

CS5.01c As per the AJCC staging recommendations, where insufficient information is known to determine the N staging subcategory at the time of reporting a primary melanoma, these should be recorded with an "X" (ie NX).

The AJCC staging committee eliminated the MX designation from the 7th edition of the AJCC/UICC TNM system. Pathologic assignment of the presence of metastasis (pM1) requires a biopsy positive for cancer from a metastatic site.

Table S5.01a

7th edition of the AJCC melanoma TNM subcategories. Used with the permission of the American Joint Committee on Cancer (AJCC), Chicago, Illinois. The original source for this material is the AJCC Cancer Staging Manual, Seventh Edition (2010) published by Springer Science and Business Media LLC, www.springerlink.com.

T classification	Definition
TX	Primary Tumour cannot be assessed
T0	No evidence of primary tumour
Tis	Melanoma <i>in situ</i>
T1	Melanomas ≤1.0 mm in thickness
T1a	Without ulceration and mitosis <1/mm ²
T1b	With ulceration or mitoses ≥ 1/mm ²
T2	Melanomas 1.01–2.0 mm
T2a	without ulceration
T2b	with ulceration
T3	Melanomas 2.01–4.0 mm
T3a	without ulceration
T3b	with ulceration
T4	Melanomas >4.0 mm
T4a	without ulceration
T4b	with ulceration
N classification	No. of metastatic nodes
NX	Regional lymph nodes cannot be assessed
N0	No regional lymph node metastasis
N1	1 node
N1a	micrometastasis*
N1b	macrometastasis**
N2	2–3 nodes
N2a	micrometastasis*
N2b	macrometastasis**
N2c	in transit met(s)/satellite(s) <i>without</i> metastatic nodes
N3	Clinical: ≥ 1 node with in transit met(s)/satellite(s); pathologic: 4 or more metastatic nodes, or matted nodes, or in transit met(s)/satellite(s) with metastatic node(s)
M classification	Site
M0	No distant metastasis
M1a	Metastases to skin, subcutaneous tissues, or distant lymph nodes
M1b	Metastases to lung
M1c	Metastases to all other visceral sites or distant metastases to any site combined with an elevated serum LDH

*Micrometastases are diagnosed after sentinel lymph node biopsy and completion lymphadenectomy (if performed).

**Macrometastases are defined as clinically detectable nodal metastases confirmed by therapeutic lymphadenectomy or when nodal metastasis exhibits gross extracapsular extension.

Table S5.01b **7th edition of the AJCC pathological stage grouping for melanoma.** Used with the permission of the American Joint Committee on Cancer (AJCC), Chicago, Illinois. The original source for this material is the AJCC Cancer Staging Manual, Seventh Edition (2010) published by Springer Science and Business Media LLC, www.springerlink.com.

Stage	T	N	M
0	Tis	N0	M0
IA	T1a	N0	M0
IB	T1b	N0	M0
	T2a	N0	M0
IIA	T2b	N0	M0
	T3a	N0	M0
IIB	T3b	N0	M0
	T4a	N0	M0
IIC	T4b	N0	M0
IIIA	T1-4a	N1a	M0
	T1-4a	N2a	M0
IIIB	T1-4b	N1a	M0
	T1-4b	N2a	M0
	T1-4a	N1b	M0
	T1-4a	N2b	M0
	T1-4a	N2c	M0
IIIC	T1-4b	N1b	M0
	T1-4b	N2b	M0
	T1-4b	N2c	M0
	Any T	N3	M0
IV	Any T	Any N	M1

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

- a. specimen type (G1.06)
- b. tumour site and laterality (G1.03, G1.04)
- c. tumour type (S3.01)
- d. tumour pTpN stage (S5.01)
- e. whether or not the specimen margins are involved (S3.03)

S5.02 The pathology report must include a field for free text in which the reporting pathologist can give overarching case comment if required.

CS5.02a This field may be used, for example, to:

- explain the decision-making pathway, any elements of clinicopathological ambiguity, or factors affecting diagnostic certainty
- give recommendations for further action or investigation
- document further consultation or results still pending.

It may be helpful for the clinician and the pathologist to discuss pathology reports that do not accord with the clinical diagnosis. In cases of doubt, it may be appropriate to seek further opinion from one or more pathologists experienced in the diagnosis of melanocytic tumours.⁸

CS5.02b If there is uncertainty whether or not a cutaneous tumour is a melanoma or whether a melanoma is a primary or a metastasis, the evidence for and against the particular diagnoses should be presented and a preferred diagnosis given but this should be accompanied by an expression of the degree of uncertainty.^{2,9-10} Where there is genuine doubt about the correct diagnosis, it may be appropriate to seek a further opinion from one or more experienced colleagues.

If the diagnosis of primary melanoma is favoured, the structured report may be completed, even though the diagnosis is not certain. The report may be prefaced with comments such as *'if primary melanoma, the lesion would have the following features:'*.

6 Structured checklist

The following checklist includes the standards and guidelines for this protocol which must be considered when reporting, in the simplest possible form. The summation of all standards is equivalent to the 'minimum dataset for melanoma'. For emphasis, standards (mandatory elements) are formatted in bold font.

- S6.01 The structured checklist provided 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 pathologist 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.

Clinical information and surgical handling

S1.01	Patient name	_____
	Date of birth	_____
	Sex	_____
	Identification and contact details of requesting doctor	_____
	Type of specimen	_____
	Date of request	_____
	Clinical information relevant to the investigations requested	_____
G1.01	Patient identifiers (eg MRN, UHI, NHI)	_____ _____
G1.02	Pathology accession number	_____
G1.03	Anatomical site of the melanoma	_____
G1.04	Laterality:	
	Left	_____
	Right	_____
G1.05	Clinical or differential diagnosis	_____
G1.06	Specimen type:	
	Excision	_____
	Punch	_____
	Incision	_____
	Shave	_____
	Curette	_____

	Re-excision	_____
	Other	_____
G1.07	For re-excision specimens:	
	Previous laboratory	_____
	Previous laboratory accession number	_____
	Findings in previous biopsy	_____
G1.08	History and timing of lesional trauma, biopsy, irritation or treatment with topical agent	_____
G1.09	A past history of melanoma?	_____
G1.10	Evidence of metastatic disease?	_____
G1.11	Serum LDH	_____
G1.12	Other relevant history	_____
G1.13	Details of specimen orientation	_____
G1.14	Any clinically or dermatoscopically identified suspicious areas?	_____
G1.15	Clinical or other relevant diagnostic imaging results	_____

Diagrams:

G1.16 Comments

Macroscopic findings

S2.02 Specimen description

S2.03 Specimen dimensions
(in mm)

S2.04 Specimen orientation

S2.05 Primary lesion

S2.06 Other lesions

G2.01 Comments

Microscopic findings

S3.01 Diagnosis of primary
melanoma

G3.01 Microscopic description

S3.02 Breslow thickness
(to nearest 0.1mm)

___mm

S3.03 Surgical margins
involved?

Yes _____

No _____

If yes, specify margin,
if known

G3.02	Nearest peripheral margin to in-situ component	___ mm
	Nearest peripheral margin to invasive component	___ mm
	Distance from tumour to deep margin	___ mm
S3.04	Ulceration:	
	Present	___
	Absent	___
G3.03	Extent of ulceration	___ mm
S3.05	Mitotic rate of the dermal invasive melanoma	___ per mm ²
S3.06	Microsatellites:	
	Present	___
	Absent	___
G3.04	Clark level:	
	I	___
	II	___
	III	___
	IV	___
	V	___
G3.05	Lymphovascular invasion:	
	Present	___
	Absent	___
G3.06	Tumour-infiltrating lymphocytes (TILs):	
	Present	___
	Absent	___
G3.07	Intermediate/late regression:	

		Present	—
		Absent	—
G3.08	Desmoplasia:		
		Present	—
		Absent	—
	Extent (% of invasive component)		___%
G3.09	Neurotropism:		
		Not Identified	—
		Present	—
G3.10	Associated benign melanocytic lesion		_____
G3.11	Growth pattern		_____
G3.12	Subtype		_____

Synthesis and overview

S5.01 AJCC melanoma tumour–node (pTpN) subcategory:

		pT	—
		pN	—
G5.01	Diagnostic summary		_____

S5.02 **Overarching comment**

7 Formatting of pathology reports

Good formatting of the pathology report is essential to optimise 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.

Please see Appendix 2 for further guidance.

Appendix 1 Pathology request form for primary cutaneous melanoma

S1.01	Patient name	_____
	Date of birth	_____
	Sex	_____
	Identification and contact details of requesting doctor	_____
	Type of specimen	_____
	Date of request	_____
	Clinical information relevant to the investigations requested	_____
G1.01	Patient identifiers (eg MRN, UHI, NHI)	_____

G1.03	Anatomical site of the melanoma	_____
G1.04	Laterality:	
	Left	___
	Right	___
G1.05	Clinical or differential diagnosis	_____
G1.06	Specimen type:	
	Excision	___
	Punch	___
	Incision	___
	Shave	___
	Curette	___
	Re-excision	___

Other

- G1.07 For re-excision specimens:
- Previous laboratory
 - Previous laboratory accession number
 - Findings in previous biopsy
- G1.08 History and timing of lesional trauma, biopsy, irritation or treatment with topical agent
- G1.09 A past history of melanoma?
- G1.10 Evidence of metastatic disease?
- G1.11 Serum LDH
- G1.12 Other relevant history
- G1.13 Details of specimen orientation
- G1.14 Any clinically or dermatoscopically identified suspicious areas?
- G1.15 Clinical or other relevant diagnostic imaging results

Diagrams:

G1.16 Comments

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.⁹⁶

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. The following strategies will help to achieve this:

- Configuring reports in such a way that they 'chunk' data elements into a single unit. This will help to improve recall for the clinician.⁹⁶
- Reducing 'clutter' to a minimum.⁹⁶ Thus, information that is not part of the protocol (eg billing information, Snomed codes, etc) should not appear on the reports or should be minimised
- Reducing unnecessary formatting. Injudicious use of formatting elements (eg too much bold, underlining or use of footnotes) increases 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

Ng, George W. C/O Paradise Close Wineglass Bay NSW, 2540 Male DOB 1/7/1990 MRN FMC1096785	Lab Ref: 09/P28460 Referred: 30/2/2009
Copy to: Dr G. Mannis Rainforest Cancer Centre, 46 Smith Road, Woop Woop, 3478	Referred by: Mr V. Button Suite 3, AJC Medical Centre, Bunyip Crescent Nar Nar Goon South, 3182
MELANOMA STRUCTURED REPORT	
Page 1 of 2	

Diagnostic Summary

Excision of lesion from skin of right foot:

Melanoma, AJCC (2009) pT3b, pNX, margins clear.

Comment: The patient's age is noted. There is focal superficial dermal scarring, possibly a result of the recent trauma. The appearances nonetheless clearly indicate melanoma.

Supporting Information

CLINICAL

Site and laterality:	Right foot
Clinical diagnosis:	? melanoma
Specimen type:	Excision biopsy
Prev. Rx / Trauma:	Trauma to the site 1 month ago
Previous melanoma:	Nil
Distant metastasis:	Nil known
Other medical history:	None relevant
Comment:	Suspicious area marked by suture

MACROSCOPIC

Size of specimen:	25mm x 12mm
Description:	An ellipse of skin, 25mm x 12mm, bearing an irregularly pigmented nodule 8mm x 5mm. This shows irregular margins with central ulceration. An area of increased pigmentation has been marked by a suture. The lesion is one mm from the nearest superficial margin.
Other lesions:	N/A

MICROSCOPIC

Diagnosis:	Primary melanoma, invasive
Tumour thickness:	2.3mm
Excision margins:	
Invasive -	Clear - 3.7mm
In-situ -	Clear - 1.4
Deep -	Clear - 5.0mm
Ulceration (mm diam):	Present (2.0mm)
Mitotic rate (/mm ²):	6
Microsatellites:	Absent
Level of invasion (Clark):	4
Lymphovascular invasion:	Absent
TILs:	
Distribution -	Focal
Density -	Sparse
Int. / late regression:	Absent
Desmoplasia:	Absent
Neurotropism:	Absent
Assoc. benign naevus:	Compound naevus
Intraepidermal growth:	Mixed lentiginous and Pagetoid
Subtype:	Acral lentiginous

MICROSCOPIC (cont.)

Description:

The sections show acral-type skin and underlying subcutis with an asymmetrical compound melanocytic tumour. The epidermal component shows lentiginous and focally nested growth of large epithelioid melanocytes with variable intracytoplasmic pigment. There is focal single cell and nested Pagetoid epidermal invasion by large atypical cells mainly in the central part of the tumour. The dermal component shows expansile a symmetrical growth, variable, mostly poor maturation and is composed of cells with similar cytological characteristics to those of the epidermal component. Multiple mitoses are present in dermal melanocytes including two mitoses near the deep edge of the tumour. There is focal superficial dermal scarring.

Reported by Dr Samuel Wilks

Authorised 4/3/2009

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