Reducing the burden of melanoma in New Zealand
Part 2: Early detection of melanoma

KEY PRACTICE POINTS:

- If melanoma occurs, making an early diagnosis is essential as survival is inversely correlated with lesion thickness.
- For patients who present with a suspicious lesion, and those who are at higher than average risk of melanoma, a full skin check should be offered to evaluate common benign lesions and identify those that appear different (“ugly ducklings”).
- Dermatoscopic evaluation is strongly recommended in primary care as melanomas can exhibit significant heterogeneity and are often difficult to identify.
- Diagnostic tools such as the ABCDEFG checklist may be useful in the absence of dermatoscopy to evaluate the clinical features of suspicious lesions.
- Excision biopsy with a 2 mm clinical margin or referral (or teledermatology where available) should occur for all people with high concern lesions or suspected melanomas and the resulting pathology report will direct subsequent treatment.

Identifying melanoma

Identification of melanoma at the earliest possible clinical stage is essential. The majority of melanomas develop from uncontrolled melanocyte proliferation within the epidermis (melanoma in situ), which can then spread to the dermis (invasive melanoma) and in some cases to regional lymph nodes and other tissues (metastatic melanoma). Melanoma lesion thickness is the strongest predictor of prognosis; in general, the thinner the lesion, the better the outcome for the patient:

- ≤ 1 mm thick: 92% ten-year survival rate
- > 1–2 mm thick: 80% ten-year survival rate
- > 2–4 mm thick: 63% ten-year survival rate
- > 4 mm thick: 50% ten-year survival rate

Most melanomas are first recognised by patients or family members (see: “Self-checking can aid in early detection”). However, melanomas detected by health professionals are often thinner and in the in situ phase, with a better prognosis. Therefore opportunistic skin checking in primary care is important.
**Look for the “ugly duckling”**

Melanomas exhibit significant heterogeneity — each one is unique in appearance — and can sometimes be exceedingly difficult to identify clinically.1 In many cases, the “ugly duckling” sign will prompt the initial discovery of melanoma, with the rationale being that any lesion which is dissimilar in appearance, e.g. size, colouring, shape, to other moles, freckles or lesions, should undergo further scrutiny (Figure 1). This may be a particularly useful approach in patients who have large numbers of solar lentigines or melanocytic naevi. Although melanomas can present in a variety of colours, (including tan, dark brown, black, blue, red and, occasionally, light grey), one or two in 20 will lack pigmentation (amelanotic), making their diagnosis even more challenging.1,2

* Less commonly, melanomas may arise within the dermis and therefore do not have an in situ phase. In very rare cases, melanomas can originate in internal tissues, such as the brain and the eye.2

**Patients presenting with a lesion of concern and those that are at higher than average risk of melanoma should be offered a full skin check**

Evaluating the suspicious lesion in the context of any other lesions enables an understanding of what is considered “normal” for the patient, i.e. allowing identification of “ugly duckling” lesions. Full skin checks may include dermatoscopy or total body photography, rather than just visual inspection (see: “Dermatoscopy should be considered an essential skill in primary care” and “Other diagnostic tools may be considered as appropriate”). The interval between full skin checks depends on the patient’s age, risk factors, amount of sun damage, and number or type of other lesions, however, 6–12 monthly review is likely appropriate for many with an elevated risk of melanoma.

For a comprehensive toolkit of primary care resources and information relating to the early detection of skin cancer, see: www.sunsmart.org.nz/resources

![Figure 1. Example of an “ugly duckling” lesion (image supplied by DermNet NZ).](ssm-ugly-duckling)

**Subtypes of melanomas**

There are four main subtypes of melanoma, all of which have the potential to metastasise if they invade the dermis (Table 1).1,2 These include superficial spreading melanoma, nodular melanoma, lentigo maligna melanoma and acral lentiginous melanoma. A number of less common subtypes also exist, such as desmoplastic and mucosal lentiginous melanoma.1,3

Prognosis differs based on the melanoma subtype; nodular and acral lentiginous melanomas are usually thicker at diagnosis and are associated with a lower five-year survival rate compared with superficial spreading and lentigo maligna melanomas.6 However, the most important predictor of prognosis is tumour thickness.

**Clinical checklists can support the diagnostic suspicion of melanoma**

Suspicion of melanoma should preferably be based on a lesion’s visual appearance using a dermatoscope, supported by any history of change.2 However, if dermatoscopy is not available, using a diagnostic checklist may help to distinguish benign from potentially malignant lesions.2,8 Completing a checklist may be required for secondary care referral in some DHBs. The ABCDE criteria is a commonly used checklist, however, studies have found that nodular melanomas and thick melanomas are not always recognised early using this method.9 Recently, an expanded and updated ABCDEFG checklist has been developed:

**ABCDEFG checklist**

- Asymmetry – one half of the lesion does not match the other
- Border irregularity – notched, blurred, ragged and especially variable edges
- Colour variegation – different colours such as brown, black, white, red or blue within the same lesion
- Different – the lesion looks different from other spots, freckles, or moles (i.e. an ‘ugly duckling’)
- Evolution or elevation – any change in a lesion over time is suspicious (colour, shape, elevation, structure or symptoms) especially if documented by digital dermatoscopy
- Firm – the lesion is firm to the touch
- Growing – the majority of melanoma are more than 6 mm in diameter (although up to 25% of new lesions may be smaller) and keep growing

**Interpreting the score:** one point is given for any of these characteristics, and a score two or higher may indicate a possible melanoma. However, these characteristics are not
Table 1. The four main clinical subtypes of melanoma (images supplied by DermNet NZ).1, 2

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Example image based on visual inspection</th>
<th>Example image based on dermatoscopic inspection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Superficial spreading melanoma</strong></td>
<td>The most common type of melanoma. Generally found on the trunk and associated with a history of sunburn and the presence of large numbers of melanocytic naevi. Typically begins as a flat patch that is irregularly shaped, irregularly pigmented and with an irregular outline. Superficial spreading melanomas often have a prolonged pre-invasive <em>in situ</em> phase, growing slowly over months to decades.</td>
<td><img src="image1" alt="Superficial spreading melanoma" /></td>
<td><img src="image2" alt="Superficial spreading melanoma" /></td>
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<tr>
<td><strong>Nodular melanoma</strong></td>
<td>The second most common type of melanoma. Presents as a rapidly-growing (over several weeks to months) pink, red, brown or black nodule. The pigmentation within nodular melanomas is often more uniform than in superficial spreading forms. It may arise within an existing mole or in normal appearing skin. Nodular melanomas may be more likely to bleed or ulcerate than superficial spreading forms and do not have an <em>in situ</em> radial growth phase.</td>
<td><img src="image3" alt="Nodular melanoma" /></td>
<td><img src="image4" alt="Nodular melanoma" /></td>
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<tr>
<td><strong>Lentigo maligna melanoma</strong></td>
<td>Found on sun-damaged skin in older people, e.g. on the head and neck. Lesions typically have a long pre-invasive <em>in situ</em> stage (years to decades), termed lentigo maligna. Lentigo maligna presents as an enlarging, irregularly pigmented freckle.</td>
<td><img src="image5" alt="Lentigo maligna melanoma" /></td>
<td><img src="image6" alt="Lentigo maligna melanoma" /></td>
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<tr>
<td><strong>Acral lentiginous melanoma</strong></td>
<td>Found on the palms of the hands, soles of the feet and may involve finger or toe nails. Acral lentiginous melanomas account for less than 5% of all melanomas in New Zealand, and less than 1% of invasive melanomas. Although rare in the overall population, this form is the most common type of melanoma in people with dark skin, including Māori and Pacific peoples. Melanoma on the feet may not always demonstrate the characteristics associated with melanoma at other body sites and there is a higher rate of amelanotic melanoma among acral lesions.</td>
<td><img src="image7" alt="Acral lentiginous melanoma" /></td>
<td><img src="image8" alt="Acral lentiginous melanoma" /></td>
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**Dermatoscopy should be considered an essential skill in primary care**

Dermatoscopy involves the examination of skin using a device that contains a magnifying lens (≥ 10×) and a light source (dermatoscope).2 Attachments are also available to facilitate photography. With training, dermatoscopic inspection of suspicious lesions greatly improves diagnostic accuracy over naked-eye examination, regardless of their size (Table 1).2 Use of this technique also facilitates:5,7

- Fewer unnecessary referrals and excision of benign skin lesions
- A higher proportion of smaller, in situ or thin melanomas being identified due to dermatoscopic asymmetry (often years before a clinical diagnosis is possible)
- More accurate follow-up if serial dermatoscopic photography is used; which can also allow for specialist review of images, i.e. teledermatology (available in many regions of New Zealand through District Health Boards or in the private sector)
- Increased self-learning regarding melanoma features and identification

Melanocytic naevi conform to a symmetrical dermatoscopic pattern whereas melanomas can be diagnosed by lack of pattern and asymmetry of colour, structure and border abruptness (see “Clinical checklists can support the diagnostic suspicion of melanoma”).5 Angiomas, dermatofibromas, benign keratoses (lentigines and seborrhoeic keratoses), and keratinocytic skin cancers have specific dermatoscopic characteristics not shared by melanomas.5

For further information on the dermatoscopic features of non-melanoma skin cancers, see: www.bpac.org.nz/BPJ/2013/December/skincancer.asp

**Primary healthcare professionals should strongly consider seeking training in dermatoscopy.** It is encouraged that larger practices identify practitioners who will undertake skin checks (this can be a practice nurse, nurse practitioner or general practitioner), and that they have a suitable dermatoscope, camera and adapter to facilitate documentation and referral if required.

For more information on dermatoscopy training options, see: www.dermnetnz.org/cme/teledermatology-skin-cancer/dermoscopy-training-options/

unique to melanomas and some early stage melanoma may not initially display any of these characteristics. Clinical judgement is still required to distinguish “high” and “low” concern lesions, which are associated with distinct management strategies (see: “A suspicious lesion has been identified; where to from here?”). Nevertheless, a high score should increase the concern that a lesion is malignant.

**Additional factors to consider.** Bleeding, crusting, inflammation, pruritis and pain are not included in the ABCDEFG checklist, yet are additional features that may be present, particularly with nodular and thick melanomas.

**Other diagnostic tools may be considered as appropriate**

**Ophthalmoscopy.** Observation using an ophthalmoscope can help identify choroidal melanomas, which are most commonly orange pigmented, dome-shaped and may be associated with an exudative retinal detachment.2 10 Given that approximately 5% of primary melanomas occur in the eye, ophthalmoscopy should be considered as part of a full body examination for patients identified as having a high risk of melanoma.2 Ophthalmoscopy should be routinely used during the review of patients with previously diagnosed primary tumours, as the choroid is the second most common malignant site for melanoma in the body.10

**Serial digital photography.** Digital photographs of low-concern lesions can be taken either by patients or by a health professional at regular intervals to monitor change over time (see: “Patient self-checking can aid in detection” and “Keep an eye on low concern lesions”).5

**Total body photography.** This is the use of clinical photography to provide a record of patients’ entire skin surface, rather than individual lesions.5 Total body photography is most useful for assessing changes in pigmented lesions. Dedicated services exist, e.g. MoleMap NZ, that provide serial total body photography with review by accredited dermatologists (generally several hundred NZD depending on the type of service).5 While it is not routinely recommended for all people with melanoma risk factors, surveillance with total body photography may be useful for patients with a large number of moles (≥ 50), atypical moles, a strong family history of melanoma or a previous history of melanomas, although cost may be a barrier.

**Confocal microscopy.** This technique is not yet available in New Zealand but is used in larger centres elsewhere in the world to aid in melanoma diagnosis, especially the lentigo maligna type of melanoma in situ.5
Self-checking can aid in early detection
Approximately two-thirds of melanomas are identified through self-examination. Patients identified as having a high risk of developing melanoma, or any adult aged 50 years or older, should be advised on how to perform self-checks of their entire body and encouraged to do this regularly between check-ups. In particular, it should be stressed that self-checks need to include skin that is not normally exposed to the sun, e.g. between toes, under nails, soles of the feet, perineum and genitalia.


Detecting melanoma using smartphone apps
Smartphone apps may be used to aid early skin cancer detection by allowing people to archive photos of their moles and to send photos of moles, rashes or regions of skin to a skin specialist; some apps may include an automatic algorithm to classify the lesion. This approach may help overcome the reluctance that some people have in seeking medical advice about their moles. However, further studies are required to validate their benefit on early detection of melanoma, and to assess the risk of false reassurance. In addition, currently available apps are associated with a cost for virtual consultations or charge a subscription fee, which may be a barrier for use for some people.

For more information on smartphone skin check apps, see: www.healthnavigator.org.nz/apps/s/skin-check-apps/

A suspicious lesion has been identified; where to from here?
For early stage melanoma, timely intervention is particularly important as the overall survival rate is close to 100% with prompt surgical excision, which will usually eliminate all localised abnormal cells, i.e. it is essentially “curative”. If left undiagnosed and untreated, progression to invasive or metastatic forms is associated with a sharp increase in mortality. For patients with advanced or Stage IV melanoma with regional or more widespread metastases, surgical excision is rarely curative. As a result, more intensive treatment options may be used in these cases, which are associated with widely variable outcomes.

Keep an eye on low concern lesions
The removal of low concern lesions is not recommended. Observation over a period of two to three months may be appropriate for low concern, flat pigmented lesions, and patients should be reminded about the importance of self-monitoring. Serial digital photography with dermatoscopy should be used to assess for any change during this period as neither patient nor physician memory are sensitive enough to determine whether changes have occurred. However, monitoring alone is not an appropriate strategy for patients with thickened melanocytic lesions; if the diagnosis is unclear, excise the lesion or refer the patient to a dermatologist.

Best practice tip: Patients with low concern suspicious lesions can perform serial photography themselves at home. By including a ruler or object, e.g. matchstick head, within the photo for scale, changes in size over time are more apparent. Consumer digital dermatoscopes and smartphone apps are also available to help monitor skin lesions over time.

Biopsy is required for moderate to high concern lesions or suspected melanomas
Depending on the skill level of the general practitioner and the body site, an excisional biopsy should be performed under local anaesthesia on suspicious lesions for subsequent pathological examination. Ensure the incision plane is perpendicular to the skin surface down to subcutaneous fat. Margins of 2 mm should be included around the edges. If direct closure with a 2 mm margin is not possible, or if the excision cannot be performed in general practice for any reason, urgent referral to secondary care is appropriate (see: “Triaging melanoma referrals”).

Partial biopsies (e.g. punch and shave biopsies) should only be performed by melanoma specialists and in certain clinical situations, e.g. if the lesion is unusually large or for some acral lesions. It is recommended to discuss or refer patients with unusually large lesions to a dermatologist.

Pigmented lesions and undiagnosed lesions should not be destroyed by other methods such as cryotherapy, diathermy or laser.

If melanoma is diagnosed, the pathology report will include:
- Tumour thickness (Breslow thickness) to the nearest 0.1 mm from the top of the granular layer to the deepest malignant cell (for invasive melanoma only)
- Clark level of invasion
  - Level 1 – melanoma in situ (confined to the epidermis)
  - Level 2 – melanoma invades the papillary dermis
  - Level 3 – melanoma fills papillary dermis
  - Level 4 – melanoma invades the reticular dermis
  - Level 5 – melanoma invades subcutaneous tissue
- Clearance margins
- Mitotic rate (reflects how fast cells are proliferating)
- Presence or absence of ulceration
This information can then be used to direct subsequent management decisions, which will either involve wide local excision of the melanoma in primary care, or referral to secondary care.

**Best practice tip:** Histological diagnosis of melanoma is often difficult. Provide the pathologist with a careful description of the lesion and explain why it is suspicious. Some pathologists find clinical and dermatoscopic photographs useful, with attention drawn to areas of specific concern, e.g. eccentric pigmentation, as melanoma might be arising within a melanocytic naevus.

**Triaging melanoma referrals**

If a biopsy cannot be performed on a suspicious lesion in primary care referral is required to a public or private dermatologist or surgeon. In some regions, funded referral to a general practitioner with a special interest (GPSI) in skin cancer may be available. Typically, referrals to a DHB are made electronically, and may be for advice only or requesting a face to face appointment selecting urgent, semi-urgent or routine priority.

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N.B. Expert reviewers do not write the articles and are not responsible for the final content

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**References**