Clinical diagnosis and management of suspicious pigmented skin lesions

A survey of GPs

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BACKGROUND
The ability of general practitioners to make important clinical decisions about the diagnosis and management of skin lesions is poorly understood.

METHODS
A questionnaire on the diagnosis and management of eight photographed skin lesions was sent to 150 GPs in southeast Queensland.

RESULTS
The questionnaire was completed by 114 GPs (response rate 77%). General practitioners' provisional diagnoses and management of photographed skin lesions were mostly or always correct, and there was general high consistency between diagnosis and intended management. Pigmented seborrhoeic keratoses were the most difficult lesions for GPs to diagnose correctly. Whether a lesion was different to usual moles appears to have the strongest association with clinical diagnosis.

DISCUSSION
The high ability of GPs as measured in this artificial study is encouraging. The strong association between identifying moles that appear different to usual and correct clinical diagnoses suggest that unless GPs can increase the number of skin lesions they see as part of their typical workload, their clinical ability may not increase further.

Skin cancer is the most common type of cancer in Australia[1] and is one of eight priority cancers included in the National Health Priority Areas initiative.[2] Each year over 1 million skin excisions are billed to Medicare;[3] over 8500 are found to be melanomas.[1] Long term patterns suggest an increasing trend for both melanotic and nonmelanotic skin cancers.[4,5]

Preventive programs aim to detect melanoma at an early stage when prognosis is better.[6–9] Although there are no empirical trial data,[10,11] clinical experience and knowledge of melanoma behaviour suggest that early detection may have enormous potential to reduce mortality.[12]

Patients with suspicious skin lesions have an important role in detecting their own melanomas,[13–16] but general practitioners must make important clinical decisions about diagnosis and management. General practitioners' ability to do this is poorly understood, as are the clinical features that inform the decision making process. This study attempts to document GPs' ability to recognise suspicious lesions by asking them to examine a series of photographs of pigmented skin lesions.

Table 1. Lesion photograph selection criteria

- They should represent the range of features of pigmented skin lesions seen by GPs
- Each of the following clinical characteristic features listed in the questionnaire (ie. large diameter, ragged or uneven edges, more than one colour, irregular shape, dark colour, raised or elevated, looked different from usual moles) should be a prominent feature in at least one photograph
- Each lesion photograph should
  - be an enlargement on a common size scale
  - be a skin lesion that is not too obviously benign or malignant
  - have some uncertainty about the true diagnosis
  - have more than one clinical characteristic

Methods

Responses from GPs were obtained via self completed surveys. A sample of 150 GPs was randomly selected by the Commonwealth Department of Health and Human Services from all GPs working in the Brisbane (Queensland) metropolitan area who provided at least 3000 Medicare services per year. Two reminders were sent at 4 week intervals to nonresponders. Of these, two were ineligible (one left address, one dermatologist) and 34 did not reply, resulting in an eligible response rate of 77%.

The questionnaire contained photographs of pigmented skin lesions obtained from local dermatologists. Lesions were chosen that commonly pose diagnostic problems for GPs, and that had been subsequently excised and histologically diagnosed. Selection criteria (*Table 1*) were based on discussions with other researchers and focus groups, and finally a small consensus survey of GPs (n=15, RR: 56%). Eight photographed lesions met these criteria (*Figure 1*). The photographs were ranked in order of suspiciousness, paired, and each pair was placed on the same randomly selected

Table 2. Clinical impressions and intended management of skin lesions, % (95% CI)

	A. Superficial spreading melanoma	B. Seborrheic keratosis	C. Lentigo maligna (Hutchinson melanotic freckle)	D. Dysplastic melanocytic naevi	E. Benign macular naevus	F. Intradermal naevus
Histological group	**Malignant**	**Benign**	**Intermediate**	**Intermediate**	**Benign**	**Benign**
Clinical diagnosis						
Very likely to be benign	2.7 (0.0, 6)	5.5 (1, 10)	3.6 (0, 7)	3.6 (0, 7)	25.2 (17, 33)	72.3 (64, 81)
Likely to be benign	13.6 (7, 20)	25.7 (18, 34)	36.9 (28, 46)	26.8 (19, 35)	66.7 (58, 75)	27.7 (19, 36)
Likely to be malignant	44.6 (35, 54)	49.5 (40, 59)	45.1 (36, 54)	49.1 (40, 58)	8.1 (3, 13)	0.0 (0, 0)
Very likely to be malignant	39.1 (30, 48)	19.3 (12, 27)	14.4 (8, 21)	20.5 (13, 28)	0.0 (0, 0)	0.0 (0, 0)
Correct diagnosis A	83.7 (77, 91)	31.2 (23, 40)			91.9 (87, 97)	100.0 (100,100)
Management strategy						
Do nothing	0 (0, 0)	0 (0, 0)	0 (0, 0)	0 (0, 0)	2.7 (0, 6)	33.3 (25, 42)
Patient to occasionally monitor	2.7 (0, 6)	3.7 (0, 7)	0.9 (0, 3)	0.9 (0, 3)	13.5 (7, 20)	29.6 (21, 38)
Patient to regularly monitor	0.9 (0, 3)	5.5 (1, 10)	3.7 (0, 7)	3.7 (0, 7)	20.7 (13, 28)	17.6 (11, 25)
Monitor the lesion yourself	11.7 (6, 18)	21.1 (14, 29)	26.6 (18, 35)	22.9 (15, 31)	44.1 (35, 53)	17.6 (11, 25)
Treat or refer the lesion	84.7 (78, 91)	69.7 (61, 78)	68.8 (60, 77)	72.5 (64, 81)	18.9 (12, 26)	1.9 (0, 4)
Correct management A	84.7 (78, 91)	30.3 (22, 9)			81.1 (74, 88)	98.1 (96, 100)
Consistency						
Diagnosis vs management	83% (76, 90)	81% (74, 88)	75 (67, 83)	82 (75, 89)	83 (76, 90)	93 (88, 98)

A=Correct diagnosis and management are only reported for lesions clearly malignant or clearly benign

Table 3. Skin features identified in each photograph by GPs, % (95% CI)

	Histological diagnosis of the photographed lesion	Large diameter	Uneven edges	>1 colour	Irregular shape	Dark colour
A	Superficial spreading melanoma	31.8 (23, 40)	79.6 (72, 87)	97.3 (94, 100)	91.8 (87, 97)	100.0 (100, 100)
B	Seborrheic keratosis	52.7 (43, 62)	35.5 (27, 44)	99.1 (97, 100)	64.2 (55, 73)	96.4 (93, 100)
C	Lentigo maligna (Hutchinson melanotic freckle)	92.7 (88, 97)	96.4 (93, 100)	100.0 (100, 100)	98.2 (96, 100)	100.0 (100, 100)
D	Dysplastic melanocytic naevi	62.7 (54, 72)	71.2 (63, 80)	75.7 (68, 84)	75.5 (68, 83)	98.2 (96, 100)
E	Benign macular naevus	0.9 (0, 3)	8.6 (3, 14)	15.7 (9, 22)	10.2 (5, 6)	98.2 (96, 100)
F	Intradermal naevus	34.6 (26, 43)	2.7 (0, 6)	16.5 (10, 23)	1.8 (0, 4)	5.5 (1, 10)
G	Superficial spreading melanoma	82.7 (76, 90)	98.2 (96, 100)	96.4 (93, 100)	100.0 (100, 100)	100.0 (100, 100)
H	Nodular melanoma arising from a superficial spreading component	96.4 (93, 100)	87.0 (81, 93)	100.0 (100, 100)	92.7 (88, 97)	83.6 (77, 90)

page in the questionnaire to avoid providing a setting baseline that might assist diagnosis.

An identical vignette accompanied each of the eight photographs: the GPs were asked to imagine they had just found the lesion on the patient's arm coincidently while measuring blood pressure, and that the patient did not know if the lesion had changed or not. This was an attempt to standardise potential biases such as lesion location and patient expectation.

The GPs were asked the same three questions about each photograph. The first question assessed intended management: 'If you saw this lesion on a patient's upper arm, what would you do?' Response options are shown in *Table 2* with 'occasional monitoring' being less than once a month, and 'regular monitoring' being at least once a month. The second question assessed which of seven features GPs thought were visible in the lesion (*Table 3*). More than one response was possible. Finally, GPs were asked for their clinical diagnosis of the lesion (*Table 2*).

Additional questions asked how often skin checks were conducted, what such a check consisted of, and how often melanomas and other skin cancers were diagnosed during the past 12 months. Respondents were also asked how much patient pressure influenced their management of such skin lesions, and whether they usually manage skin lesions themselves or refer them to a skin specialist. Demographic data were collected including gender, postgraduate qualifications registrable with the Medical Board, and full or part time status.

Frequencies and percentages (with 95% confidence intervals) were calculated for each of the outcome measures for each photograph. We defined consistency between the provisional diagnosis and proposed management as 'no action/monitor' for lesions thought to be benign, and 'treat' or 'refer the lesion' for lesions thought to be malignant. We calculated the percentage of correct diagnoses and management plans for each lesion. We made no definition of correct diagnosis for 'intermediate lesions' because of the considerable uncertainty in the literature about their management.

To assess the contribution of specific skin features to the GP's clinical diagnosis of a skin lesion, we combined all eight photographs. We then modelled the clinical diagnosis (outcome) against the presence or absence of each of the seven skin features (explanatory variables) using logistic regression. The combined dataset was weighted by one-eighth to ensure that the weighted number of records in the combined dataset was equivalent to the original sample.

Ethics approval to conduct the study was obtained from the University of Queensland.

Results

Of the 114 GPs completing the questionnaire, 21% were women and 41% had formal postgraduate qualifications registrable with the Medical Board. The majority (87%) worked full time as a GP, and 27% worked in solo practice.

The majority of GPs (77%) reported being required to examine skin lesions every day. Only 15% undertook whole body skin checks daily, with 24% doing so less than monthly. Most (94%) had diagnosed a melanoma less often than monthly, while 67% diagnosed a nonmelanoma skin cancer at least weekly. Nearly half (45%) reported that patient pressure at least moderately influenced their management of pigmented skin lesions. Most (70%) usually managed suspicious skin lesions themselves, the rest referring to another doctor (usually a dermatologist) outside their practice.

General practitioners' provisional diagnoses and management of the photographed lesions were mostly or always correct (*Table 2*). There was little provisional underdiagnosis of the three malignant lesions, and only the seborrheic keratosis was seriously overdiagnosed as malignant (*Table 2*). Consistency between diagnosis and intended management (*Table 2*) was high, except for the lentigo maligna that was mostly treated or referred for treatment without a period of monitoring.

The clinical characteristics nominated as important in diagnosis and management varied between GPs (*Table 3*). This was especially true for large diameter and raised or elevated for all lesions. Logistic regression analyses suggested that the only clinical skin feature significantly associated with the correct clinical diagnosis after adjusting for the other skin features was different to usual moles ($p<0.05$).

Discussion

Based on their responses to the photographs we found that most GPs are able to appropriately diagnose and manage pigmented skin lesions. The high proportion indicating that the (nonmalignant) excision of the lentigo maligna lesion can be justified on the basis of it being at

G. Superficial spreading melanoma		H. Nodular melanoma arising from a superficial spreading component	
Malignant		**Malignant**	
0.0	(0, 0)	1.8	(0, 4)
3.6	(0, 7)	22.7	(15, 30)
15.5	(9, 22)	36.4	(28, 45)
80.9	(74, 88)	39.1	(30, 48)
96.4	(93, 100)	75.5	(68, 83)
0.0	(0, 0)	0	(0, 0)
0.0	(0, 0)	0.9	(0, 3)
0.9	(0, 3)	5.5	(1, 10)
1.8	(0, 4)	16.5	(10, 23)
97.3	(94, 100)	77.1	(69, 85)
97.3	(94, 100)	77.1	(69, 85)
96	(92, 100)	82	(75, 89)

Raised or elevated		Different to usual moles	
19.6	(12, 27)	96.3	(93, 100)
59.4	(50, 68)	92.6	(88, 97)
18.8	(12, 26)	95.3	(91, 99)
37.4	(28, 46)	88.0	(82, 94)
6.0	(2, 10)	36.5	(28, 45)
75.2	(67, 83)	7.4	(3, 12)
41.0	(32, 50)	98.2	(96, 100)
76.7	(69, 84)	91.7	(87, 97)

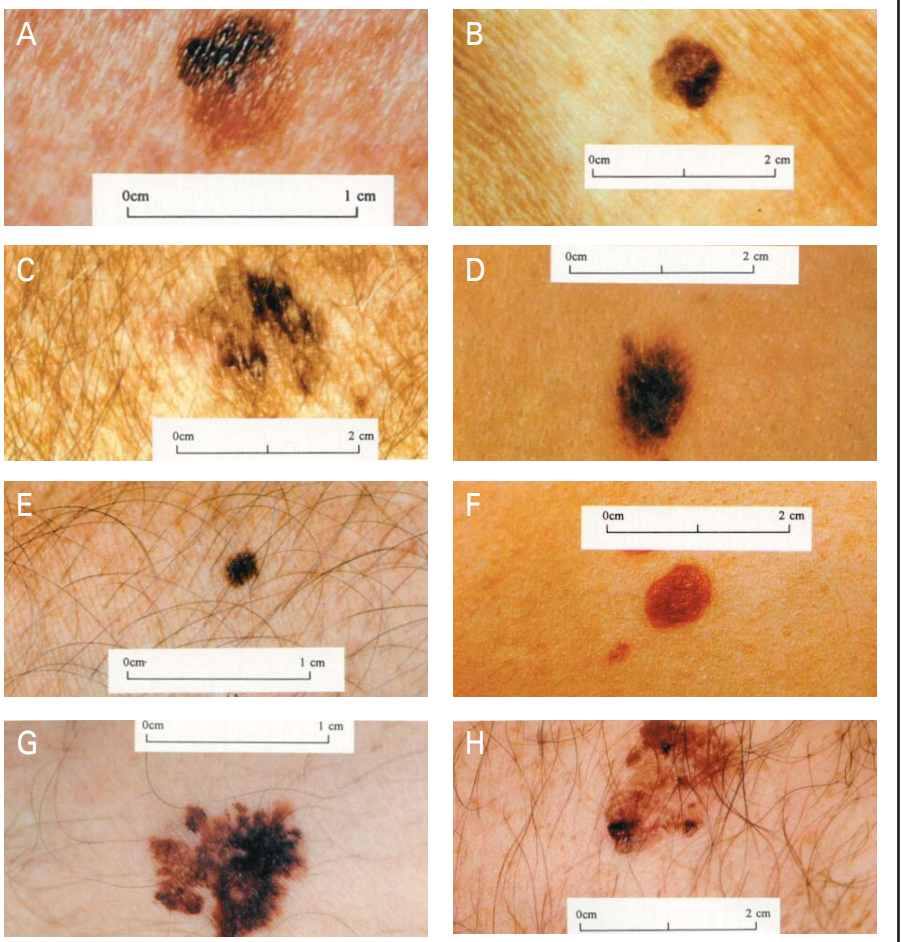

Figure 1. Photographs of skin lesions included in the questionnaire
A. Superficial spreading melanoma
B. Seborrheic keratosis
C. Lentigo maligna (Hutchinson melanotic freckle)
D. Dysplastic melanocytic naevi
E. Benign macular naevus
F. Intradermal naevus
G. Superficial spreading melanoma
H. Nodular melanoma arising from a superficial spreading component

least premalignant. It is interesting that the most important clinical feature of lesions is 'different to usual moles'. This is different from the usual sets of criteria identified in the literature.[17] This may reflect the difficulty of detecting specific skin features in a photograph, or alternatively, it may be that GPs rely more on the overall characteristics of the skin lesion rather than using a checklist to tick off the number of suspicious features they find. Clearly we have much to learn about the clinical diagnostic process.

Previous research has found that the ability of clinicians to diagnose skin cancers increases with the prevalence of new cases they see and the experience they have in diagnosing skin cancers.[18–21] The results of this study suggest that GPs use their perception of whether the lesion is different to 'usual moles' when making their diagnosis rather than using specific guidelines or checklists. Past Australian research suggests GPs conduct 1–3 skin examinations each week.[22–24] Whether GPs could increase their diagnostic accuracy in clinical practice by specialising in skin cancer diagnoses, and thereby increasing the number of skin examinations they conduct, is unclear. More research into this area is required.[25]

This study has several limitations. Using photographs is clearly very artificial compared with real life, when, for example, other lesions on the patient can be studied in comparison. Some clinical skin lesion characteristics such as elevation and the important factor of change of lesions[26] are impossible to determine from photographs. This may reduce content validity, even though the use of photographs to investigate clinical diagnosis of skin lesions has been used previously.[27–29] Nor is it clear whether results from these eight photographs can be extrapolated to the wide range of lesions typically seen in general practice, however we attempted to address this in the method of photo selection. General practitioners' performance may also be influenced by the extra scrutiny of the study conditions.

This study found that, based on a series of photographs, there is encouraging evidence of GPs being able to distinguish between photographs of benign and malignant skin lesions with reasonable accuracy. The major exception being pigmented seborrhoeic keratoses, although elevation is a key characteristic of this condition that the photograph could not demonstrate. More research is needed into the diagnostic processes that GPs use when assessing skin lesions. The results of this study suggest that GPs should compare the lesion being examined with ones they consider 'usual'. Implications of this for training of GPs should be investigated further.

Implications of this study for general practice

- According to this simulated photograph survey, Australian GPs diagnose and manage a range of pigmented skin lesions well.
- Pigmented seborrhoeic keratoses seem to be difficult for GPs to identify correctly.
- The clinical characteristic that guides GPs most is the difference between the lesion in question and others on the skin.
- This characteristic is not the most often quoted diagnostic discriminator in the literature.

Conflict of interest: none declared.

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