General practice implications

- General practice is undergoing major changes and the profession needs to respond to these changes
- One response could be the widespread involvement of general practitioners in higher professional training
- At present only 1 in 300 general practitioners are enrolled on the seven general practice (or primary health care) master's degree courses in the United Kingdom
- Present master's courses lack flexibility, have little student input to content, and could be less costly to students and have less emphasis on research
- The provision and uptake of innovative and flexible master's courses should improve the quality of care that patients receive in general practice

general practitioners taking such courses at present which could be ameliorated. It is suggested that course content needs to be more flexible to match more closely the needs of the learners. This can be achieved by increasing elective modules within courses. The option of not doing a formal thesis might help, as might the introduction of the requirement of possession of a relevant higher degree before appointment to various academic general practice posts. The personal financial cost to general practitioners could be reduced by including prolonged part time study leave as a claimable expense within the NHS regulations, by ensuring all courses were approved for a postgraduate education allowance, increasing external funding of courses, and increasing the availability of paid research fellowship

posts funded by departments of general practice or the Royal College of General Practitioners.

Increasing the size of the cohort of appropriately trained general practitioners who can teach, research, and lead general practice into the next century should improve patient care throughout the primary care setting.

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Cancer Prevention in Primary Care

This is the fifth in a series of articles looking at how cancer can be prevented in general practice

Melanoma: prevention and early diagnosis

Joan Austoker

Over the past two decades there has been a rapid rise in the numbers of people developing and dying from malignant melanoma. Sunlight is the main aetiological factor linked with melanoma. Exposure to the sun is a risk factor that can be modified provided that people are aware of the dangers. Health promotion campaigns can play a part in producing such change. General practitioners and practice nurses have an important part to play in providing those most at risk with information and advice about sensible sun exposure and sun protection measures. Campaigns to reduce delay in diagnosis by a combination of professional and public education have been reported from several centres around the world. The effects of these campaigns in reducing the depth distribution of cutaneous malignant melanoma have sometimes been encouraging, but in other instances have shown little effect. Until there is clear evidence that early detection reduces mortality from melanoma, the opportunistic promotion of early detection may not be cost effective and will fail to reach all sections of the community at risk. At the present time, therefore, the emphasis should be on the primary prevention of skin cancer.

Skin cancer: current facts

Skin cancers are common in many parts of the world, and the number of cases is increasing. In the United Kingdom there are some 40 000 new cases each year. There are three main types of skin cancer. The most frequently occurring types are basal cell carcinoma (rodent ulcer) and squamous cell carcinoma, both of which tend to occur in older people. Over 95% of these types of skin cancer are curable. They can, however, be disfiguring if not diagnosed and treated early.

The third type is malignant melanoma, which is comparatively rare (11% of all skin cancers). There are four main types of melanoma (table I). There were 4438 new cases of melanoma in the United Kingdom in 1988, but this is probably an underestimation because of incomplete ascertainment (except in Scotland). There are roughly six to seven cases in women for every four cases in men. Malignant melanoma occurs most frequently on the leg in women (particularly between the knee and ankle) and on the trunk (especially the back) in men (figure). In elderly people melanomas develop most commonly on the face. Overall, 1288 people in the United Kingdom died of malignant melanoma in 1991. Both incidence and death rates

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TABLE 1—Summary of features of the four main types of malignant melanoma (adapted from MacKie²)

Type of melanoma	Main features	% Of cases in United Kingdom
Superficial spreading melanoma	Occurs more often in younger adults, most commonly on body sites only intermittently exposed to the sun. Commonest on the lower legs of women and the back in men	50
Nodular melanoma	Occurs more often in younger adults, and in men more than women, most commonly on body sites only intermittently exposed to the sun. The trunk is the commonest site. Grows fairly quickly	20-25
Lentigo maligna melanoma	Occurs mainly in older adults, most commonly on sites continually exposed to the sun, particularly the face. Commoner in those who have spent a lot of time out of doors	15
Acral or acral-lentiginous melanoma	Occurs in adults on the palms, sole of the foot, and the area around the first toenail. Eight times more common on the sole of the foot than on the palm	10

Distribution of malignant melanoma on parts of body by sex²

have risen significantly over recent years. Since 1974 the number of people dying of melanoma has increased by 73% while the incidence has risen by 156%. It is one of the few cancers to affect young adults (but is extremely rare before puberty). Twenty two per cent of all melanomas occur in people under 40. In those aged 15 to 34 it is the third most common cancer in women and the seventh most common cancer in men.

Survival of patients treated when their melanoma is at an early stage before it has formed metastases is very good. Prognosis is also related to the thickness of the tumour, known as the Breslow thickness. Patients with "thin" tumours have a high survival (table II). Unfortunately, diagnosis is often delayed for a number of reasons, and the overall relative survival rate at five years in England and Wales in 1981 was 52% for men and 75% for women. The better prognosis for women may be due to the earlier diagnosis of their disease, although early stage lesions may consist of a proportion of non-progressive tumours. For fast growing tumours, particularly of the nodular type, early diagnosis may be difficult to achieve.

TABLE II—Survival at five years of patients registered in 1979 as having malignant melanoma according to thickness of tumour²

% Of patients	Thickness of melanoma (mm)	Survival at 5 years (%)
39	< 1.5	93
30	1.5-3.49	67
31	≥ 3.5	37

TABLE III—Skin types and effect of exposure to sun¹

Type	Description
1	White skin, never tans, always burns
2	White skin, burns initially, tans with difficulty
3	White skin, tans easily, burns rarely
4	White skin, never burns, always tans, Mediterranean type
5	Brown skin—for example, people from India
6	Black Afro-Caribbean skin

Risk of melanoma and other skin cancers

Several factors affect an individual's risk of melanoma:

- Excessive exposure to the sun
- Skin type
- Changes in an existing mole
- Presence of a large number of naevi
- Previous melanoma.

Naevi—simple or dysplastic—are the strongest indicators of melanoma risk. People with a strong family history of melanoma and a personal history of dysplastic naevi are at greatest risk. Up to 10% of melanomas are thought to be associated with inherited characteristics—that is, the dysplastic naevus syndrome or being a gene carrier.

Exposure to the sun—The aetiology of both non-

melanoma skin cancer and malignant melanoma is not fully established, but, on the basis of case-control studies and geographical correlation studies, there is strong evidence that all types of skin cancer are linked to excessive exposure of fair skins to ultraviolet radiation (for melanoma, see box 1). Whether the intensity, wavelength, duration, or frequency of the ultraviolet radiation or the age at exposure is the most harmful is not known. Both cumulative sunlight exposure over a prolonged period and episodic intensive exposure are probably important, particularly if the exposure is sufficient to cause sunburn. The evidence linking sunburn and melanoma is complex. Several studies suggest an association between sunburn and melanoma, but the increase in risk is modest. It is unclear from the available evidence whether it is a specific and critical age related sensitivity to sunlight in childhood that is most important or whether the risk related to sunburn is constant throughout life. A single episode of severe sunburn, especially in infancy or childhood, may be enough to trigger melanoma later in life. It is not clear whether this is a special effect from sunburn or simply because sunburn is a marker for high intermittent exposure. The association between sunburn and melanoma may also reflect heavy (but unremembered) exposures in general that did not necessarily result in sunburn.

Box 1—Established associations between sunlight and melanoma¹

- The incidence of melanoma varies with latitude. For populations with the same skin colour, the nearer the equator, the higher the incidence
- Studies have reported significantly increased risks associated with sunburn in childhood
- Studies of emigrants to Australia and New Zealand show that those who arrive over the age of 15 have a substantially reduced risk of melanoma than those born in these sunny countries. Thus early childhood sun exposure is important
- The incidence is 10-12 times higher in white skinned races who have little protective melanin pigment by comparison with black skinned races living the same lifestyle
- Among white skinned people those with particularly fair skin that burns easily and tans poorly are at most risk
- Individual habits of sun exposure affect the risk
- Case-control studies have found a clear association between sunburn and melanoma, after adjustment for factors other than skin type

Skin type—Six skin types have been identified according to the ability of the skin to tan (table III). People with skin types 1 and 2 are at greater risk of developing melanoma whereas people with brown or black skin have a low risk as their skin provides natural protection against the sun. If a person's skin has large numbers of naevi, both normal and atypical, and a tendency to freckle, then he or she is at a higher risk of developing melanoma. The number of naevi may be associated with excessive sun exposure. It is not known whether ultraviolet radiation acts solely as an initiator—for example, increasing the number of naevi—or as a promotor—for example, changing the naevi to melanoma.

Sunshine: ultraviolet radiation

Ultraviolet radiation is the part of the sun's electromagnetic spectrum that can damage the skin. The main component is ultraviolet A, which causes a pigment in the skin to darken, does not burn the skin,

but can do damage at a deeper level within the skin. Ultraviolet B rays are very damaging and can cause redness and burning. Prolonged exposure to such rays may cause blistering and even second degree burns. In considering the risks of exposure to sunlight, the ultraviolet B seems to be critically important. Ultraviolet C rays, which are at present removed by the ozone layer, are extremely damaging to the skin. Ultraviolet rays are more intense near the equator, at high altitudes, when the sun is directly overhead, and when little or no cloud is present.

Sun lamps

Older types of sun lamps emit some ultraviolet B and C radiation, can cause severe burning, and are probably associated with skin cancers in humans. Less is known about modern ultraviolet A lamps. Ultraviolet A radiation does, however, increase aging of the skin and can cause severe ocular damage.

Prospects for prevention

Exposure to the sun is a risk factor that can be modified provided that people are aware of the dangers. Even then, advocating a change in lifestyle behaviour is not without its problems. Persuading and helping people to lead healthy lifestyles is the current major challenge for prevention. For example, a recent survey showed that over 90% of people in the United Kingdom were aware of sun protection measures for children, yet a study in the north of England in 1991 found a high incidence of sunburn in children, with 38% of them having been sunburnt in the previous year, nearly always in Britain.

The epidemiological data offer some support for the view that it is important to recommend reduced exposure to sunlight of an intensity sufficient to cause sunburn, particularly in childhood. There is a case for targeting programmes at behaviours that lead to episodic exposure to strong sunlight—for example, package holidays to hot destinations such as the Mediterranean. Safe practice entails rationing exposure around noon, seeking shade, wearing suitable clothing and broad brimmed hats, and using sunscreens (box 2).

SUNSCREENS

Once the use of shade and clothing has been maximised, sunscreens offer a good method of reducing the immediate, damaging burning effects of the sun. They may be effective in long term prevention of skin cancer, but it is important to note that this has not been proved conclusively for human skin.

The sun protection factor applies to the ability of given sunscreens to filter ultraviolet radiation, predominantly in the ultraviolet B range. The sun protection factor gives an idea of how much longer it would take to burn compared with being in the sun without a sunscreen—that is, with factor 8 a person can spend eight times as long as if unprotected in the sun before getting burnt. Table IV shows the reduction in ultraviolet B radiation with given sun protection factors. Once a factor of around 16 is reached further large increases in factor numbers offer relatively little increase in the absolute amount of protection achieved. The benefits of seeking high factor numbers in sunscreens seems to be outweighed at the moment by the greatly increased cost and potential risk of side effects. This is an important consideration as many people find sunscreens expensive and are therefore reluctant to use them. It is important, however, to remember that, whatever sunscreen is used, it should be liberally applied and reapplied every two hours if exposure to the sun continues.

TABLE IV—Percentage reduction in ultraviolet B radiation produced by sunscreens of given sun protection factor numbers¹

Factor No	% Reduction
2	50
4	75
8	87.5
16	93.75
32	96.88
64	98.44

Box 2—Guidelines for reducing risk of malignant melanoma

- Ration exposure to strong sunlight
- Keep out of the strong midday sun (between 11 am and 3 pm)
- Remember clothing is an effective sunscreen (particularly fine woven cotton clothing)
- Use hats in the sun, particularly broad brimmed hats
- Use a sunscreen to shield from ultraviolet B radiation as appropriate for skin type and sun intensity, with additional protection against ultraviolet A radiation
- Sunscreens should be liberally applied and re-applied every two hours if exposure to the sun continues
- Protect children and infants from strong sunlight at all times. Use a sunscreen with a high sun protection factor number (>10) and additional protection against ultraviolet A radiation
- Avoid using sunbeds and sunlamps
- Remember there is no such thing as a safe or healthy suntan
- Recognise the cumulative nature of sun induced skin damage

The choice of sunscreen will depend on the skin type and the associated risk of burning (table II). Particular care needs to be taken with skin types 1 and 2. In general, children and those fair skinned people at greater risk should use at least sun protection factor 10, depending on the intensity of the sun.

There is as yet no standardised method of grading protection against ultraviolet A radiation, but a star system has been developed in which the more stars there are the greater the protection. As we do not know which part of the ultraviolet spectrum is associated with melanoma, protection against ultraviolet A and B should be advocated.

Can health promotion campaigns to change sun related attitudes and behaviours work?

A study in Australia determined trends in sunlight exposure in the context of the three year SunSmart melanoma prevention campaign by monitoring the prevalence of sunburn and sun related attitudes and behaviours. The health promotion campaign was based on the stages of change model. The study suggested that a significant reduction in exposure to risk of melanoma can occur in an urban population over a fairly short period of time. The campaign brought about reduced exposure to a presumed melanoma risk factor—sunburn. Significant reductions in sunburn over the period were found to be due to behaviour changes. Substantial shifts in attitudes occurred over the three years. There was a marked change in perceived susceptibility to skin cancer, with substantially fewer people denying their risk of getting skin cancer. Attitudes to acquiring a suntan changed. There was an increase from 39% to 51% in those who did not desire any degree of suntan. Use of protective measures, such as hat wearing and sunscreens, increased significantly.

Although the study did not establish causality, there was strong evidence that the exposure of populations to sunburn can change fairly rapidly and that health promotion campaigns can play a part in producing such change. Ultimately the value of such interventions will depend on whether the behaviour modifications are sustained. As yet the long term benefits of primary prevention are unproved.

Measures in the United Kingdom to reduce the risk of skin cancers produced by sunlight

Because of the rapid rise in skin cancers, particularly malignant melanoma, the government has included a target and key actions for skin cancer in its *Health of the Nation* strategy (box 3). These focus on the need to increase awareness of risk factors for skin cancer and to persuade those at high risk to adopt appropriate sun avoidance behaviour and sun protection measures. General practitioners and practice nurses have an increasingly important role in providing accurate information and practical advice about exposure to those at risk. This can be done opportunistically, by providing more comprehensive advice within a planned appointment for health promotion (usually with the practice nurse), and by discussing sun exposure with those embarking on travel to sunny destinations.

Early diagnosis

ENCOURAGING SKIN SURVEILLANCE: PUBLIC EDUCATION CAMPAIGNS

As shown in table II, the prognosis for malignant melanoma is related to the thickness of the tumour. Patients with thin tumours at the time of surgery have high survival rates compared with those with thick tumours. This variation in survival after diagnosis depending on the depth of invasion provides good a priori evidence that earlier diagnosis may be effective in reducing mortality. It does not, however, prove a benefit for earlier diagnosis. There is as yet no unequivocal evidence that earlier detection reduces mortality from melanoma.

Delay on the part of the patient in presenting a suspicious lesion to a doctor is the main contribution to delay in diagnosis, most often because of the lack of knowledge about the seriousness of the condition. However, delay also occurs on the part of doctors because of initial failure of diagnosis.

Campaigns to reduce delay in diagnosis by a combination of professional and public education have been reported from several centres around the world. These have set out to encourage the recognition of the early signs of melanoma, to encourage skin self examination, and to encourage a rapid response to suspicious lesions by seeking prompt medical advice. Such initiatives require a multidisciplinary approach to ensure cooperation between general practitioners, dermatologists, pathologists, and health promotion officers. The effects of the campaigns in reducing the depth distribution of cutaneous malignant melanoma have

sometimes been encouraging, but in other instances they have shown little effect.

Two research studies, based on public education campaigns, have been conducted in Britain to determine the value of early detection (one in western Scotland, the other in seven other centres in Britain, supported by the Cancer Research Campaign). In these studies health education about the signs of melanoma was directed at a target population of over five million; education for general practitioners was also provided. People concerned about possible lesions were encouraged to consult their general practitioner, who could refer those with suspicious lesions direct to a pigmented lesion clinic. The effects of these campaigns on reducing the incidence of late stage melanoma and on mortality across all sections of the community are still being evaluated. Preliminary results from western Scotland indicate some possible benefit to women but not yet to men.

The Cancer Research Campaign's study found that the impact of the campaign on general practitioners' workload was acceptable. Although dermatology and pathology services experienced an increased workload, both studies concluded that general practitioners played an important part in maintaining a reasonable ratio of melanoma to non-melanoma referrals.

It is important to note that these campaigns related specifically to public education programmes, backed up by education of general practitioners and a rapid referral service. They do not relate to population screening, and it is wrong to apply their results to screening.

IMPROVING MANAGEMENT OF SUSPICIOUS LESIONS IN PRIMARY CARE

If public education campaigns are to be effective it is important that all general practitioners are aware of the clinical features of early melanoma and of the clinical features of benign lesions that may be confused with melanoma. They should be able to evaluate pigmented lesions and, when required, must have facilities to arrange rapid referral for a specialist opinion. They need also to develop confidence in their ability to recognise lesions that do not require referral. Few studies have looked at the accuracy of decisions about pigmented lesions in primary care, and there have been no trials to assess whether specific improvements in methods in primary care will lead to improvements in diagnosis. The systematic use of checklists should be considered.

The campaign in western Scotland reported that general practitioners screened patients effectively using a checklist of seven points devised by MacKie. Elsewhere in the United Kingdom this was not always the case, and some dermatologists expressed reservations about its usefulness, concluding that the checklist was not specific enough to discriminate benign from malignant lesions and did not reduce referral of obviously benign lesions. MacKie's revision of the seven point list into major and minor signs goes a long way towards resolving some of the earlier problems with its use (box 4). Many general practitioners are now using the features of the checklist to aid a decision on referral. Public awareness has dramatically increased the number of pigmented lesions shown to general practitioners; most of them are subsequently proved to be benign. As the consequences of missing a diagnosis are serious, many general practitioners will still err on the side of caution when considering referral. This does not diminish the value of the seven point checklist, as its primary aim is to have a high sensitivity for melanoma, with specificity being of only secondary importance. A recent study in Leicestershire has confirmed the sensitivity of the revised checklist in the diagnosis of malignant melanoma.

Box 3—*Health of the Nation* skin cancer target and key actions^a

Target

- To halt the year on year increase in the incidence of skin cancer by 2005

Key actions

- To increase the number of people who are aware of their own skin cancer risk factors and in the light of that knowledge
- To persuade people at high risk to avoid excessive exposure to the sun and artificial sources of ultraviolet radiation, for themselves and for their children, through the adoption of appropriate avoidance behaviour and sun protection measures
- To secure an alteration in people's attitude to a tanned appearance

Underlying these actions must be the principle that prevention should form just as important a part of clinical intervention as treatment

Box 4—Seven point checklist for suspected malignant melanoma

- Major signs
 - Change in size
 - Change in shape
 - Change in colour
- Minor signs
 - Inflammation
 - Crusting or bleeding
 - Sensory change
 - Diameter ≥ 7 mm
- One or more major signs—consider rapid referral
- Additional presence of one or more minor signs—increased possibility of melanoma
- Three or four minor signs without major sign—consider referral

Studies in south east Scotland, Manchester, and Glasgow have shown that general practitioners have a useful role in excising pigmented lesions, including malignant melanoma. However, there was evidence of the need for further training to ensure complete excision, the need to ensure that specimens are sent for histological analysis, and the need to ensure that clinical information is provided with the specimen (or in the referral letter if this is the preferred option).

GENERAL POPULATION SCREENING BY HEALTH PROFESSIONALS

The use of a skin examination by a health professional on a general population basis cannot be recommended as a screening test because information on the validity, reproducibility, and ill effects (such as unnecessary biopsies or anxiety) are not known. There is no research assessing what measures such an examination should emphasise or how often they should be carried out. Costs would also need to be assessed. The additional workload in primary care to undertake skin examinations would be substantial. In New Zealand it has been estimated that if general practitioners did a full skin examination annually, even restricted to adults aged 35–64, they would need to commit up to 5% of their clinical time to this procedure alone.

Conclusion

Malignant melanoma is assuming increasing significance in the United Kingdom because of the rapid rise in the numbers of people developing and dying of the disease. There is scope for improving public awareness of melanoma. In 1987 a survey showed that 20% of people were aware that melanoma was skin cancer. By 1992 this proportion had risen to 45%. Least aware were men, people under 25, elderly people, those living alone, and people in poorer socioeconomic groups.

Sunlight is the main aetiological factor linked with melanoma. General practitioners and practice nurses have an important part to play in providing those most at risk with information and advice about sensible exposure to the sun and how to protect themselves against it. General practitioners also have a diagnostic role in distinguishing benign pigmented lesions from melanoma and in ensuring the rapid referral of those with suspicious lesions.

Many crucial questions about the appropriate methods and ultimate value of screening for melanoma remain unanswered. Screening by general practitioners and self screening for melanoma are currently being promoted in many parts of the world, but without good information on their validity and usefulness.

Such promotion is justified only if screening gives rise to appreciably earlier diagnosis of melanoma, which leads to a good outcome in terms of reduction in mortality. Moreover, it should do so without an excessive increase in anxiety, medical interventions, and morbidity. As with any other potential screening procedure, screening for melanoma should therefore be regarded as an experimental procedure with its attendant benefits and risks.

Until there is clear evidence that early detection reduces mortality from melanoma, the opportunistic promotion of early detection may not be cost effective and will fail to reach all sections of the population at risk. Currently, therefore, the emphasis should be on the primary prevention of skin cancer.

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