The role of osteopaths in the recognition of melanoma: Attitudes, knowledge and practices in melanoma screening within the osteopathic community.

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ABSTRACT

Background: Melanoma has the highest mortality rate of skin cancer in New Zealand, and has the third highest incidence rate of cancer overall. The severity of melanoma can be reduced through early detection, which can be achieved through early recognition of suspicious lesions. Osteopaths are primary health care practitioners, who can often examine a patient with the removal of the outer layers of clothing. As primary practitioners, they have a duty to provide for the general health of their patients, whilst the removal of clothing also allows an opportunity for non-invasive screening. As such, osteopaths may be in a good position to provide screening and risk assessment services for their patients.

Purpose: Both the New Zealand Cancer Control Strategy: Action Plan 2005-2010 and the Report on the Early Detection of Skin Cancer in New Zealand by the Early Detection Advisory Group (2006) recommend action by associated health care providers to help improve the early detection of melanoma. This study aims to provide a baseline view of the current situation of melanoma screening within the New Zealand osteopathic community, and explore the role this community can play in the early detection of melanoma through development and dissemination of a self-completed questionnaire.

Method: A self-completed questionnaire was developed incorporating both quantitative and qualitative aspects, encompassing practitioner demographics, attitudes and beliefs, current practices and knowledge. A short skill quiz was also included to investigate the ability of osteopathic practitioners to recognise melanoma and assess the level of knowledge in the community. This questionnaire underwent limited pilot testing and was assessed for validity and reliability before being distributed to registered members of the Osteopathic Council of New Zealand. Three hundred and fifty questionnaires were distributed through both postal and email services, resulting in 71 valid returns (a return rate of 20.3%).

Results: A majority of osteopaths in New Zealand believed that skin cancer detection was important in New Zealand; with 93% believing it would benefit their patients, and 94% believing it was an issue in their region. Eighty-seven percent of practitioners believed osteopathy could help to reduce the mortality from skin cancer; however only 58% believed it was within their scope of practice to recognise skin cancer in their patients, with 15% answering that they were unsure. Despite this, 79% believed that they had a responsibility to manage their patient’s general health, and 92% believed they
should be able to recognise a wide range of pathologies. Practitioners’ confidence in their knowledge was not high, however, with 79% believing they did not have enough knowledge about skin cancer and melanoma, and 30% believing that skin cancer was very difficult to detect clinically. A number of osteopaths reported they already looked for suspicious lesions on their patients, with 44% noting this often or always occurred. This was weakly correlated with how often practitioners asked their patients to disrobe during examination ($r = .254, p < 0.05$). A significant number of practitioners noted that they only occasionally noted suspicious lesions on their patients (51%), and a similar number (49%) noted that they only occasionally discussed skin cancer with their patients. Patient initiated discussions regarding skin cancer were less common, with 59% of practitioners noting this seldom or never happened. Referrals for suspicious lesions were also rare, again with 59% of practitioners noting this seldom or never occurred. A higher frequency of referrals was also moderately correlated with a belief that skin cancer was difficult to detect clinically ($r = .430, p < 0.01$). The reasons given for referral varied from referring for any lesion that caused patient or practitioner concern, to only referring those lesions for which the clinical signs were indicative of melanoma. Practitioners’ beliefs regarding their knowledge showed that most practitioners believed their knowledge of risk factors for melanoma and knowledge of melanoma detection was reasonable, but were less confident with being able to determine a melanoma from a benign mole or determining which moles would require referral to a skin specialist. These views were supported by the results of the skill quiz, although practitioners tended to over-estimate their knowledge of risk factors. Practitioners showed good sensitivity in image recognition of melanoma (75.2%), however specificity was poor (44.4%). Overall, practitioners believed osteopathy could play a role in the early detection of melanoma due to good opportunity, such examination being both part of the service and falling under the osteopathic philosophy of holism. Practitioners believed osteopathy could play a role in referral and patient education, but practitioner education and knowledge was a limiting factor.

**Conclusions:** Osteopaths consider melanoma and non-melanoma skin cancer is an important topic in New Zealand, and early detection of melanoma would benefit their patients. They feel that osteopathy can be involved in the early detection of melanoma, both in the role of recognition and referral, and in patient education and support. For this to occur, however, educational courses and resources must be made available to increase the skill levels of the community. A significant proportion of osteopaths already check their patients for suspicious lesions as part of their routine examination; however there may be a tendency to over-refer benign lesions, especially for those osteopaths who are less confident in their skills in melanoma recognition.
DECLARATION

Name of candidate: Tim Friedlander

This Thesis/Dissertation/Research Project entitled: *The role of osteopaths in the recognition of melanoma: Attitudes, knowledge and practices in melanoma screening within the osteopathic community* is submitted in partial fulfilment for the requirements for the Unitec degree of: Master of Osteopathy

Candidate’s declaration

I confirm that:

- This Thesis/Dissertation/Research Project represents my own work;
- The contribution of supervisors and others to this work was consistent with the Unitec Regulations and Policies.
- Research for this work has been conducted in accordance with the Unitec Research Ethics Committee Policy and Procedures, and has fulfilled any requirements set for this project by the Unitec Research Ethics Committee.

Research Ethics Committee Approval Number: 2007.760

Candidate: …………………………………………………

Signature: ………………………………………….Date: …………………

Student number: 1128465
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I would also like to thank MoleMap New Zealand for allowing me access to their database and the occasional item of stationary.

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<th>Full Form</th>
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<tbody>
<tr>
<td>ABCDE</td>
<td>Asymmetry, Border, Colour, Diameter, Evolution</td>
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<td>OCNZ</td>
<td>Osteopathic Council of New Zealand</td>
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<td>BCC</td>
<td>Basal Cell Carcinoma</td>
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<td>CAM</td>
<td>Complementary and Alternative Medicine</td>
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<tr>
<td>CBD</td>
<td>Central Business District</td>
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<td>CEO</td>
<td>Chief Executive Officer</td>
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<td>CMM</td>
<td>Cutaneous Malignant Melanoma</td>
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<td>CPD</td>
<td>Continuing Professional Development</td>
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<td>EDAG</td>
<td>Early Detection Advisory Group</td>
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<tr>
<td>GP</td>
<td>General Practitioner</td>
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<tr>
<td>HPCA</td>
<td>Health Practitioners Competency Assurance (in reference to the Act)</td>
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<td>NZ</td>
<td>New Zealand</td>
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<tr>
<td>OCNZ</td>
<td>Osteopathic Council of New Zealand</td>
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<tr>
<td>RMIT</td>
<td>Royal Melbourne Institute of Technology, now known as RMIT University</td>
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<tr>
<td>SCC</td>
<td>Squamous Cell Carcinoma</td>
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<tr>
<td>SEER</td>
<td>Surveillance, Epidemiology and End Results</td>
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<td>UK</td>
<td>United Kingdom</td>
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<td>UREC</td>
<td>Unitec Research Ethics Committee</td>
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<td>USA / US</td>
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INTRODUCTION

Melanoma in New Zealand

New Zealand is recognized as having the second highest melanoma rate in the world, with only Australia having a greater rate (Bevona & Sober, 2002).

In 2002, melanoma of the skin was the third most common cancer registered in New Zealand, with only breast and prostate cancer being more prevalent (New Zealand Health Information Service, 2006b). Furthermore, the rate of new melanoma registrations has increased over the last few years, from 26.7 per 100,000 people in 1995 (Martin & Robinson, 2004) to 33.6 per 100,000 in 2001 (New Zealand Health Information Service, 2006b).

Although, at 92%, the 5-year survival rate of malignant melanoma is relatively high compared to other forms of cancer (New Zealand Health Information Service, 2006a), the survival rates decrease dramatically in relation to the melanoma thickness at diagnosis. With a thickness between 1.5mm and 3.49mm, 5-year survival rates decrease to 76.5%, and at thicknesses of 3.5mm or over, survival rates drop to 51% (MacKie et al., 2002).

Because of this, the New Zealand Ministry of Health reports that “a 10 percent shift in depth distribution from ≥0.75mm to <0.75mm depth would result in about 49 deaths prevented per year” (as cited in Cancer Control Taskforce, 2005).
Strategies for change

One of the goals of the New Zealand Cancer Control Action Plan 2005-2010 is to “ensure effective screening and early detection to reduce cancer incidence and mortality” (Cancer Control Taskforce, 2005).

Early detection of melanoma is associated with a much greater chance of survival than those lesions diagnosed at a more advanced stage (Brenner & Tamir, 2002), and this can be achieved through regular screening for suspicious lesions (McPherson et al., 2006).

Studies have shown that there is a lack of evidence supporting the use of skin cancer screening for the entire population, and that patients should instead be assessed for risk levels with those at a high risk included in a screening programme (Helfand, Mahon, Eden, Frame, & Orleans, 2001). These risk factors are discussed in the Literature Review, below.

Currently, screening for melanoma is performed by the public health care system (family doctors and dermatologists) as well as a number of private companies; however it has been suggested that the demand for melanoma screening outweighs the number of primary care practitioners offering this service (as cited in Maguire-Eisen, 2003). As such, there are a number of studies that investigated the role that non-specialist health care workers can provide within the realm of screening for melanoma (Lorenzten et al., 1999; Oliveria et al., 2001; Piccolo et al., 2002)
The role of the Osteopathic Community

Under the Health Practitioner’s Competency Assurance Act, the osteopathic scope of practice recognizes osteopathy as a primary health care practice. As such, osteopaths have a duty to “focus on appropriate screening, opportunistic education, interventions to help change damaging behaviours, early detection and careful management and support for people with ongoing conditions” (King, 2001).

Additionally, it is common for osteopaths to examine and treat patients in a state of partial undress. This would provide the opportunity for osteopaths to screen for suspicious lesions without interfering with a typical consultation.

As health care providers, there is also the likelihood that osteopaths who take part in such screening can be trained to a good level of skill (Oliveria et al., 2001). In this, the osteopath would not seek to diagnose melanoma or skin cancer, but rather screen for high risk patients, or those with suspicious lesions. These patients could then be referred on to specialist care, or appropriate advice could be given.

Aim

The aim of this research project was to determine the attitudes, beliefs, practices and knowledge of New Zealand osteopaths in their role in the recognition, detection and screening of melanoma and skin cancer. This has been done in order to provide grounding for further research into this area, and to determine if such investigation is warranted.

This information was achieved through the design and distribution of a survey to the members of the 2007 Osteopathic Council of New Zealand (The Osteopathic Council of New Zealand, 2007b).
**Study Objectives**

The objectives of this study are therefore:

(1) to develop a questionnaire to cover the areas of interest and ensure its reliability and validity;

(2) to use this questionnaire to gather data regarding the current position of osteopathy with regards to screening for skin cancer; and

(3) to use this data to develop an understanding of the role that osteopaths play in the recognition and detection of skin cancer and provide recommendations for further research into this area.

**Research Question**

What is the current situation in the osteopathic community with regards to screening for skin cancer?

- What are the current attitudes and beliefs within the community?
- What are the current practices and level of knowledge within the community?
- Is there a need for further investigation and/or action in this area?

**Significance**

The osteopathic scope of practice defines osteopathy as a primary health care provider within New Zealand (The Osteopathic Council of New Zealand, 2007a), and as such, are required to “focus on appropriate screening, opportunistic education, interventions to help change damaging behaviours, early detection and careful management and support for people with ongoing conditions” (King, 2001). Also, the New Zealand Cancer Control strategy: Action plan 2005–2010 Goal 2, Objective 2 is to “establish a process to assess the value of early detection of cancer other than that obtained through organised screening” (Cancer Control Taskforce, 2005). In light of their status as primary health care providers, it would be useful
to ascertain whether the osteopathic community is able and/or willing to play a role in meeting this goal.

The typical osteopathic appointment often engenders the removal of outer layers of clothing. This provides the osteopath with the opportunity to scan the skin for signs of melanoma, and as such suggests that the ability to recognize melanoma could allow the osteopathic profession to play a role in melanoma detection within the community.

Through analysis of the data obtained in this survey, a baseline picture has been developed of the current situation within the community. This data can now be used as a springboard for further research seeking to develop the ability of the profession to perform such recognition tasks, or indicate that such an effort may not be useful.

Additionally, the instrument developed can be modified to apply to other professions in a similar situation.
**Melanoma pathology**

Melanoma is a highly malignant tumour that arises from melanocytes – normal cells which produce the pigment melanin. Although typically occurring in the basement membrane of epithelial surfaces, it can also occur in the uveal tract of the eye, central nervous system and mucosal surfaces (Brenner & Tamir, 2002). Primary melanoma typically retains the differentiation functions of producing and storing melanin, so the presence of pigment within a tumour is one of the methods used to differentiate melanoma from other forms of skin cancer (Houghton & Polsky, 2002).

Melanoma generally follows two distinct growth phases. The first of these - the radial growth phase – involves the horizontal growth of altered melanocytes within the epidermis, with small nests of invasive cells limited to the upper part of the dermis. The second phase – the vertical growth phase – involves the vertical growth of melanoma cells, with invasion into the deeper dermis and subcutaneous tissues. It is very rare for melanomas in the radial growth phase to metastasize, however the vertical growth phase brings a greatly increased chance of this occurring (Houghton & Polsky, 2002).

There are four classifications of melanoma that are currently recognized:

- **Superficial spreading melanoma** – accounting for 70% of all cutaneous malignant melanomas – follows a progression from radial to vertical growth phases and can evolve over a period of one to seven years. This form of melanoma is more likely to arise from existing naevi – benign, pigmented growths on the skin such as moles - than other classifications of melanoma.

- **Nodular melanomas** – which account for 15% to 30% of melanomas – are more aggressive, lacking a significant radial growth phase. These may arise from an existing naevus, but are more likely to arise without precursor. The predominantly vertical growth phase gives a tendency towards a greater depth of invasion and a worse prognosis, with the lesion also tending to meet less of the clinical diagnostic criteria.
- Lentigo maligna melanoma is the least common classification, accounting for less than 5% of melanoma. Lentigo maligna melanoma arises from sun-damaged areas of the skin, and can remain growing slowly within the radial growth phase for 3 to 15 years. Less than 5% of these lesions proceed to a vertical growth phase, and are therefore the least aggressive classification of melanoma.

- Acral lentiginous melanoma also accounts for less than 5% of all melanoma, however it accounts for 35% to 65% of melanoma diagnosed in darkly pigmented individuals. It occurs primarily on the soles of the feet, but also on the palms of the hands, on nailbeds and occasionally on mucous membranes.

These classifications are not all-inclusive, and other forms of melanoma - such as amelanotic melanoma (melanoma that does not produce melanin) - can also be found. (Cummins et al., 2006)

**Current diagnostic methods, staging and therapy**

As melanoma is a primarily visible cancer, it is typically noticed incidentally either by the patient, a friend or a doctor or during a specific skin screening examination. McPherson et al. (2006) found that in Queensland, Australia, approximately one quarter of melanomas were detected by a doctor, with the remaining three quarters being detected by the patient, their partner or other people. Similarly, they noted that only one quarter of melanomas were detected through a specific examination, whether by the doctor or self-examination by the patient.

There are several factors which can indicate an increased risk of melanoma, with four main categories noted by Cummins et al. (2006).

The first of these is the presence of melanocytic naevi. They note that approximately one third of cutaneous malignant melanomas arise from pre-existing naevi, and that a large number of such naevi can therefore increase the risk of developing melanoma. The presence of atypical naevi or large congenital naevi also increases the risk of developing melanoma. Inherited factors can also increase the risk of developing melanoma; therefore a family or personal history of melanoma also indicates an increased risk.
The third factor identified by Cummins et al. (2006) is that of phenotypic characteristics. Like the inherited characteristics, these are also genetic factors, but the increased risk is due to the presence of fair skin, light hair and eyes. These characteristics often indicate a tendency to form freckles and moles, and an inability to tan, increasing the risk of developing melanoma. The fourth factor identified is that of ultra-violet (UV) exposure, which is theorised to cause damage to the cellular deoxyribose nucleic acid (DNA). Any increased UV exposure will therefore increase the risk of developing melanoma; however it has been noted that the highest risk comes from intermittent but intense exposure, such as from that preceding severe sunburn.

In addition to these factors Brenner & Tamir (2002) have noted the presence of immunosuppression and increasing age as also increasing the risk of developing melanoma.

The initial diagnosis of melanoma is through clinical examination. Clinical characteristics of melanoma are often summarized using the ‘ABCD’ mnemonic, standing for lesion Asymmetry, an irregular Border, variability in Colour and a Diameter that is greater than 6mm (Houghton & Polsky, 2002). This mnemonic has also been extended to include Evolution; or the change in a skin lesion over time (Cummins et al., 2006).

Detection of melanoma during a clinical exam may also be aided through the use of various devices, such as dermoscopy/epiluminiscence microscopy or full-body photography. Dermoscopy involves the use of a magnification tool (a ‘dermatoscope’) to better view the structural makeup of a naevus (Lorenzten et al., 1999). This may also incorporate the use of a lightsource of a particular wavelength, which highlights the melanin beneath the skin, allowing a better view of the internal structure of the naevus (Nischal & Khopkar, 2005).

Full body photography allows the health professional to accurately and precisely track any changes to suspicious naevi, enabling earlier recognition of any change in size, shape or colour – the most significant warning signs of melanoma. Traditionally, such recognition has been based on patient history, which can be less helpful if the patient does not regularly self-perform a skin examination (Weinstock, 2006).
Although examination of the skin is the primary method of melanoma detection, a biopsy should be taken of any naevus suspected for melanoma, with a histopathological examination performed to confirm the suspected diagnosis. As a positive result for melanoma generally results in excision of the lesion, an excision biopsy is generally performed on suspected lesions (Reynolds & Strayer, 2003).

Computer algorithms may also be used to assist in the diagnosis of digitally-imaged lesions. It has been shown that such computer assistance is useful in aiding non-specialist medical professionals in diagnosing melanoma, although a high number of false positives suggested by the algorithm could lead to a lower specificity (Piccolo et al., 2002).

There are a number of private companies in New Zealand that offer melanoma screening services, using a combination of dermoscopy, full-body photography and computer aided diagnosis. These include MoleMap (dermoscopy and full-body photography), Molestop and SolarScan (dermoscopy and computer-assisted diagnosis) and Molecheck (dermoscopy only) (Molecheck, 2007; MoleMap NZ Limited, 2007; Molestop Limited, 2006; Polartechnics Limited, 2007).

There are several methods used to describe staging of melanoma. Both Breslow’s method and Clark’s method are based on the depth of invasion of a melanoma, with Breslow’s method reporting the measured depth from the epidermis in millimetres. Clark’s method involves staging the lesion based on anatomical structures compromised - Stage I indicates that all tumour cells are above the basement membrane whereas Stage V indicates tumour invasion of the subcutaneous tissue (Houghton & Polsky, 2002).

If a diagnosis of melanoma is confirmed, a complete examination of the skin and regional lymph nodes is generally performed to determine the presence of any metastases. The initial lesion is completely excised - or if already excised for biopsy purposes a re-excision should be made – with a margin ranging from 1cm to 2.5cm depending on location and tumour diameter. In the case of metastatic melanoma, there is no standard treatment although certain chemotherapy protocols have shown promise (Brenner & Tamir, 2002).
**Incidence and trends**

Globally, melanoma has been on the increase over the last few decades. Lens & Dawes (2004) suggest that there has been an average increase in the incidence of melanoma of 3-7% per year in fair-skinned Caucasian populations, with a doubling of melanoma incidence every 10-20 years.

de Vries & Coebergh (2004) note that the incidence in Northern Europe rapidly increased during the 1980’s before levelling off somewhat since the mid-1990’s; however they also add that rates for Southern and Eastern Europe have continued to increase at a steep rate across all age categories.

Between 1973-1997, data obtained from the U.S. Surveillance, Epidemiology, and End Results (SEER) registry showed that “malignant melanoma was the most rapidly increasing malignancy in both sexes in the U.S.A.”, with rates almost tripling in males and doubling in females (Lens & Dawes, 2004).

In New Zealand, the rate of melanoma incidence has also increased. Reports from 1995 indicate an incidence of 26.7 per 1000 people (Martin & Robinson, 2004), whereas those from 2001 show an incidence of 33.6 per 100,000 people (New Zealand Health Information Service, 2006b).

With these rates, New Zealand has one of the highest rates of melanoma in the world, second only to Australia. Data from the World Health Organization GLOBOCAN 2000 database shows that the age-standardized incidence of melanoma in Australia per 100,000 people was 40.5 for males and 31.8 for females. The corresponding rates in New Zealand were 36.7 (males) and 34.9 (females), with the next highest country – Sweden – having rates of only 12.6 (males) and 13.3 (females) (as cited in Lens & Dawes, 2004).

In general, mortality rates from melanoma are also rising, although this increase is typically less than that of the increased incidence (Lens & Dawes, 2004). Despite this, Lens & Dawes also suggest that melanoma has one of the fastest growing mortality rates of all cancers,
following behind only non-Hodgkin’s lymphoma, lung cancer in women and testicular cancer.

This rise in mortality rates, however, seems to predominate in countries with a lower incidence of melanoma. de Vries & Coebergh (2004) noted that in many countries with high incidence rates (such as Australia, New Zealand, USA and Sweden) the mortality rates have shown signs of levelling off, as opposed to the rising mortality rates in countries such as Italy, Spain and Southern Europe which all have lower incidence rates.

In New Zealand, the mortality rate has remained fairly even from 1995 to 2002, with 2002 mortality rates of 5.5 per 100,000 people for males and 2.8 per 100,000 people for females (New Zealand Health Information Service, 2006b).

There are a number of factors that have been linked to mortality rates; however several studies have shown that the most significant is the thickness of melanoma at discovery (Kolmel, Kulle, Lippold, & Seebacher, 2002; Lens & Dawes, 2004; MacKie et al., 2002).

MacKie et al. (2002) show that although the 5-year survival rate for an initial Breslow depth of less than 1.5mm is 95%, this rate drops to 51% for an initial thickness of over 3.5mm. The 10-year survival shown in this study shows a similar trend, falling from 92.5% (tumour thickness <1.5mm) to 41.5% (tumour thickness >3.5mm). Kolmel et al. (2002) shows similar results, with 5-year survival rates ranging from 96.6% (tumour thickness ≤0.75mm) to 46.5% (tumour thickness >4mm).

**Screening**

In 2005, the New Zealand Ministry of Health published the New Zealand Cancer Control Strategy Action Plan 2005-2010. In this publication, a number of goals were identified, with the aim of reducing “the incidence and impact of cancer in New Zealand” (Cancer Control Taskforce, 2005)

The first three of these goals focus on reducing the incidence and improving detection, diagnosis and treatment of cancer. Of particular relevance to the detection of melanoma - and
to this study - were the objectives within Goal 2 - *To ensure effective screening and early detection to reduce cancer incidence and mortality.*

The use of screening within the general population, however, has been met with controversy.

Helfand, Mahon, Eden, Frame, & Orleans (2001) performed a review of previously published articles on the accuracy and effectiveness melanoma screening in both the general population and high-risk individuals. They found that there was insufficient evidence to support the hypothesis that melanoma screening programs reduced the mortality or morbidity of patients.

On the strength of this article, the U.S. Preventive Services Task Force has withheld recommendation of screening programs for melanoma until further evidence is presented (U.S. Preventive Services Task Force, 2001).

Contrary to this, a more recent study by McPherson et al. (2006) found that both the delay in treatment and the Breslow depth of melanoma was reduced for melanoma detected through a deliberate skin-screening examination. Furthermore, of all the melanoma detected first by a doctor, almost two-thirds were detected during a deliberate examination.

Aitken et al. (2006) also reported positively on the outcomes of melanoma screening programs. Although they were unable to determine the effect of such examinations on mortality and morbidity rates, they found that the specificity of these examinations was comparable to those of other cancer screening approaches such as mammography.

de Vries & Coebergh (2004) determined that the usefulness of general-population screening is of limited use due to the relatively low incidence of melanoma – a view backed up by Holme, Varma, Chowdhury, & Roberts (2001) - however the use of screening programs for those identified as being at a high risk for developing melanoma can lead to earlier detection of melanoma.

This process of risk-assessment followed by screening programs for high risk patients seems to be the most common recommendation, both by various medical groups and expert opinion (Ferrini, Perlman, & Hill, 1998; Fisher, Schaffer, Berwick, & Bologna, 2005; Maguire-Eisen, 2003).
Aptitude of non-trained groups

Although specialist examination is the standard method of detecting melanoma, it has been suggested that the limited number of specialists makes it unfeasible to provide such a service to all who require it (as cited in Maguire-Eisen, 2003), as well as the fact that most of the population does not regularly see a dermatologist (Einstock, 2006). In addition, non-physician medical workers are in a prime position to provide “quality, cost-effective cancer screening” (Reed & Selleck, 1996).

As such, several studies have been performed to assess the ability of naïve medical staff and laypersons to recognize and detect melanoma.

Oliveria et al. (2001) examined the ability of nurse practitioners to recognize melanoma after a training course involving both didactic lectures and clinical experience. They found that for highly or slightly concerning lesions, both sensitivity (the percentage of melanoma cases identified as such) and specificity (the percentage of cases identified as melanoma that were actually melanoma and not benign) were in the range of 99.5% to 100% during a full skin examination.

An earlier study by Katris, Donovan, & Gray (1998) found similar results. This study focused on the concurrence between nurses and plastic surgeons on the need for referral for suspicious lesions. As in Oliveria et al. (2001), this study also involved a training regime including lectures and practical experience. The authors found that nurses recognized 95% of those patients deemed as needing referral for suspicious lesions.

It appears, however, that the type of training used is important. Brooks, Predebon, & van der Zwan (2001) found that the use of an educational pamphlet on melanoma seemed to actually decrease the ability of naïve observers to recognize melanoma; however it must be noted that these observers were laypeople, and not medically trained.

In summary, melanoma can be seen as a serious disease, which is highly prevalent in New Zealand and has shown a trend of increasing incidence. Although some services exist to aid in the detection of melanoma, an increased rate of early detection could serve to reduce the
impact of this disease on the New Zealand population. As evidence tends to support the concept that non-specialists can have some ability in recognizing melanoma, this research intends to investigate the amenability (and current aptitude) of the osteopathic profession in this field. As there seems to be no specific instrument designed to facilitate the collection of this data, one must therefore be developed.
**METHOD**

**Research Design**

As the aim of this study is to provide an overview of the attitudes, beliefs, practices and knowledge with regards to melanoma and skin cancer throughout the osteopathic profession, it was decided that a questionnaire-based approach would be the most appropriate methodology.

Experimental designs tend to focus on hypothesized causal relationships (which do not exist in this case), and the lack of existing literature precludes a meta-analysis approach. A field research approach - incorporating a qualitative methodology - was considered, however this method tends to lend itself to an in-depth understanding of a relatively small number of individuals, rather than the larger perspective this study aims for (Babbie, 2001).

To best investigate the views of a broad section of the osteopathic community, a structured, self-completed questionnaire design was chosen. This method has been described as the principle approach to surveying a designated population or sample (Baker, 2003), making it an excellent tool for measuring attitudes in a large population (Babbie, 2001).

**Participant Selection**

The population studied consists of those osteopaths practicing in New Zealand, which (with the introduction of the HPCA Act (2003)) requires a current registration with the Osteopathic Council of New Zealand, as well as a current practicing certificate. It was also decided to include registered osteopaths who were involved in teaching or research in an osteopathic field, despite any lack of patient contact.

As the New Zealand osteopathic community is of relatively limited size (with approximately 407 osteopaths listed on the register of the Osteopathic Council of New Zealand (2007b)), it was intended for the survey to be offered to the entire population. As such, further sampling of this population was not required (Bouma, 1998).
Unfortunately, contact details were unavailable for 57 (14%) of those registered and, as such, these members were unable to be recruited for the survey. Although this may be due to continued registration for osteopaths who are no longer practicing or those who practice overseas but maintain New Zealand registration, this cannot be determined, and they have therefore been included in the population count.

Despite this, the 350 registered practitioners for whom contact details were available were all approached requesting participation in the survey. This was to help ensure the results would represent the largest proportion of practitioners possible, however at least 69 responses were sought, as this would give a 3% margin of error with an alpha error level = 0.1 (Bartlett, Kotrlik, & Higgins, 2001).

**Recruitment and Data Collection**

Traditionally, such self-completed questionnaires are disseminated through the postal system; however recently other systems such as email and online distribution have been gaining popularity (McCabe, Diez, Boyd, Nelson, & Weitzman, 2006). Furthermore, such systems have been reported as giving increased response rates at a lower cost than post based surveys (Lonsdale, Hodge, & Rose, 2006). Although several studies have shown little difference in response data and demographics (Fleming & Bowden, 2007; Lonsdale et al., 2006; McCabe et al., 2006), it must still be noted that access to the internet is not all-pervasive. As such, it was decided that a mixed-mode survey would be used to allow both the advantages of an internet-based survey and a traditional postal based survey. This ensured that those who did not have readily available access to the internet or preferred to complete the questionnaire manually were able to do so. This also allowed the use of paper and postage resources to be limited to a small amount, significantly reducing the costs involved.

Recruitment for this survey was achieved through two primary methods. Those members of the population with a valid email address were emailed a recruitment letter offering participation in the study. This email also contained details of the various methods available to complete the survey, including a return email to request the questionnaire either by post or email and a direct link to the online questionnaire.
Those practitioners who did not have a valid email address were posted a recruitment letter again giving the option of completing the questionnaire online, by email or by post. Although no return envelope was included with the posted letter, two contact telephone numbers, a return postal address, an email address and a link to the online survey were all included.

The online version of the questionnaire was made accessible through SurveyMonkey, a professional online survey service (SurveyMonkey.com, 2007). Included in the recruitment letter or email was a unique access code which participants were asked to enter on the first page of the questionnaire. To ensure that each participant only filled in the questionnaire once, only the first questionnaire completed with a recognised code was included in analysis. These codes were generated using the random number function available in Microsoft Excel. Each potential participant was assigned a number before recruitment commenced.

Those who opted to complete the questionnaire via post were posted a copy of the questionnaire with a unique code written on the questionnaire itself. A pre-paid, addressed envelope was included to facilitate the questionnaire’s return.

As involvement in the survey required the participant to complete and return the questionnaire, this return was considered indication of consent.

**Questionnaire Design**

To enable a survey of a wide range of the population, a self-completed questionnaire design was implemented, as opposed to an interviewer-administered instrument (such as a face-to-face or telephone interview). Although self-completed questionnaires can result in a decreased response rate and a tendency towards non-response of difficult or boring questions, self-completed questionnaires can eliminate bias from an interviewer (or the interview process) and are much easier to implement. Moreover, many of the difficulties associated with the questionnaire structure can be ameliorated through good questionnaire design (de Vaus, 1995).
The sections of the questionnaire followed those suggested by de Vaus (1995) for use in descriptive research, and were adapted in part from a similar questionnaire developed by Christos, Oliveria, Masse, McCormick, & Halpern (2004).

The questionnaire also utilised a combination of open questions and closed questions to ascertain general feelings and reasons for opinions, as well as to determine strength of opinions and information on specific aspects of the issues (de Vaus, 1995).

Both open and closed questions have their own advantages and disadvantages. Foddy (1993) suggested that open questions allow the expression of opinions in the respondent’s own words, avoiding the suggestion of answers that is implicit within a closed question, whilst aiding the interpretation of answers given in similar closed questions. Closed questions, however, provide an advantage in that any responses are easily compared and coded, providing less variable answers while also aiding in a respondent’s recall of facts, making them easier to answer. As such, he also recommended a mix of both question types.

The first section of the questionnaire sought participants’ demographic data. This was important both to ensure a good representation of the population and to allow later correlation with the results of other sections.

This demographic data included the participants’ age and gender, as well as details about the area in which they practiced. Participants were also asked about their length of experience as an osteopath, as well as the nature of their practice and educational history, as it was theorised that variations in experience and training could also have an effect on their responses.

The second section dealt primarily with participants’ attitudes towards various statements.

As well as measuring the presence or absence of a respondent’s attributes, it can also be useful to measure the strength of these attributes – thus giving an ordinal measurement. Foddy (1993) reported that the most popular method of achieving this is through the use of rating scales, such as the Likert scale used in this questionnaire.
Although these scales provide a useful estimate of the strength of an attribute, there are potential difficulties in the use of this method. A researcher must ensure that each question explores only one dimension, that the ranking system used gives a clear explanation of order, and that adjectives used can be clearly understood and whether such adjectives cover the whole scale or only delineate the extreme ends of the scale (Fowler, 1995). Also, scales must be designed to provide a sufficient number of ranks and allow for a lack of opinion. When assessing attitudes, it is also important to note that although such scales measure the strength of an attitude, they do not directly measure the respondent’s belief of the importance of the subject or how sure they are of their opinion (Foddy, 1993).

To alleviate these problems, (Foddy, 1993) suggested that scales contain at least six non-neutral categories as well as both ‘undecided’ and ‘no opinion’ categories, and that labels are provided for the end and middle categories.

As such, in the first section all questions were answered with a seven-point scale, with an additional ‘undecided’ option. Labels were provided for all categories, however, to aid in understanding.

In designing the questions themselves, many were adapted from the previous questionnaire used by Christos et al. (2004). New questions were also used, and these were piloted (as discussed below) to ensure comprehension. A number of questions were also weighted negatively (i.e. it was expected that the predominant opinion would be disagreement) to avoid the response set that can occur with a group of questions that all tend towards a positive answer.

The third section of the questionnaire looked at the practices of participants within their daily practice. Scales were once again used to allow participants to give an estimate of their prior practices; however these were reduced to five points. It was considered that five points would be sufficient given the unreliable nature of self reported practices. Although it would be more useful to have a more accurate report of practices – as could be achieved through the use of a diary or longitudinal study – it was decided that the self reported data would be sufficient given the broad scope of this study. This section also included the first of the open questions to allow participants to expand on the responses given in the scale questions.
The fourth section looked at participants’ beliefs about their level of knowledge. Again, this section contained a combination of both scale and open questions. In the design of the open ended questions, a number of factors were considered. Fowler (1995) indicated that the most important design goal of a self-completed questionnaire is that it is easy to read and answer. Although he reported that open ended questions are often kept to a minimum or avoided in such questionnaires, the difficulties that are generally experienced through the use of open ended questions (such as adding complexity, increasing completion time and being left unanswered) can be reduced by ensuring that the question is worded as clearly as possible, and it is easy for the respondent to determine how to answer the question.

The final section sought to determine the accuracy of participants’ beliefs about their level of knowledge through the use of an optional skill test.

This self-assessment section of the questionnaire was made optional for a number of reasons. Firstly, the assessment nature of the section may have resulted in a lower completion rate, due to the possibility that it appears confrontational in testing a respondent’s abilities. Secondly, the lack of baseline scores made it difficult to accurately determine a relative rating of skill in comparison to other groups and/or professions. Additionally, since the questionnaire is self-completed, it would be possible for the respondent to consult reference material before answering the questions. Despite this, it is believed that enough useful data was gained from correlation of scores in this section both with data from other sections and other questionnaires to warrant inclusion in the instrument.

The first part of this self assessment used images of lesions to determine skill in melanoma recognition. Although there appears to be a lack of studies correlating skill in recognition in this manner with recognition rates in a clinical setting, the method has been used to assess competency in several prior projects (Brooks et al., 2001; Lorenzten et al., 1999; Oliveria et al., 2001; Piccolo et al., 2002).

The second part of this section used a selection of True/False questions to assess participants’ general knowledge about melanoma, and the third and final part used two long answer questions to examine participants’ knowledge about clinical aspects of melanoma.
Once questions had been developed, the format of the questionnaire was considered, including both the layout and question order. The primary consensus on layout of a questionnaire is that it is easy to read and understand, especially in the case of self-completed questionnaires. Plenty of space was provided for responses and pages were designed to be uncluttered so that the respondent would be more likely to complete the questionnaire fully and correctly (Babbie, 2001; de Vaus, 1995; Foddy, 1993).

Although question order is often considered along with layout, Schuman & Presser (1996) showed that the effects of question order tend to be limited, and may only be slightly higher than that given through sampling error. As such, questions were not limited to any particular order, and only grouped by the general headings mentioned above.

**Questionnaire Testing**

After the questionnaire was designed, it was subjected to a number of checks to ensure it was valid and reliable. Without such testing, it is impossible to determine whether the results gained from the survey are actually representative of the population. An unreliable questionnaire would give varying answers each time it was used, whereas an invalid questionnaire would return results that did not measure the intended variables.

de Vaus (1995) gave two main methods of testing for reliability. The first, most useful in the case of single questions, involved a test-retest modality. In this method, the respondent is asked to complete the questionnaire twice, at an interval of two to four weeks. The data gained from each can then be compared and any significant deviations noted. The difficulty presented by this method is twofold. Firstly, it can be difficult to get a sample to complete the same questionnaire twice; secondly, respondents may remember answers to questions given in the first questionnaire, therefore giving an inflated reliability.

The second method involves the use of Cronbach’s alpha to measure correlation between various items in a single scale (Bland & Altman, 1997). In effect, this measures how reliably different questions measure the same variable. Items which do not show good reliability (and have the effect of decreasing the overall alpha value) can then be dropped from the scale to improve its reliability. This method has the advantage of only requiring respondents to
complete a questionnaire once, but cannot be used for single questions. As such, it was this method that was selected for testing this questionnaire.

Ellis (1994) suggested that a correlation coefficient (i.e. an alpha value) exceeding 0.75 to 0.80 as being of high reliability, although a low correlation does not necessarily mean a low reliability. Changing opinions or unstable variables can mean a low correlation is all that can be achieved.

The survey was initially piloted with nine students enrolled in the Masters of Osteopathy degree at Unitec. As part of their course, all these students participated in regular clinical work, and they were deemed to be the group most similar to the target population.

From this pilot, the value of Cronbach’s alpha for the Attitudes section of the questionnaire was calculated as $\alpha=0.769$. Furthermore, the deletion of the question with the lowest correlation (Question 16: “I try to keep up to date with recent research regarding skin cancer”) only raised the correlation coefficient to $\alpha=0.834$. The initial correlation coefficient was deemed to be satisfactory, so this section was left unchanged.

The correlation coefficient for the following sections – Practice and Knowledge – was lower (being $\alpha=0.608$ and $\alpha=0.340$ respectively), however both these scales were designed to measure more than one dimension in a limited number of questions so these values were expected to be low. Again, the deletion of any one question from either of these sections did not appreciably increase the correlation coefficient, so they were also left unchanged.

On analysis of the final data, the correlation coefficients of each section were found to show high reliability, with the Attitudes section having $\alpha=0.773$, the Practice section having $\alpha=0.714$ and the Knowledge section having $\alpha=0.851$. As such, the questionnaire was deemed to show good reliability.

After testing for reliability, the questionnaire still needed to measure what it is intended to measure – that is, have a high validity.

Both Babbie (2001) and de Vaus (1995) referred to three aspects of validity, namely criterion-related (or predictive) validity, construct validity and content validity.
de Vaus (1995) defined criterion-related validity as a measure of how well the instrument in question correlates with other, well-accepted measures of the same variables. If the correlation is high, then it is likely the new instrument is valid. Problems can arise, however, if the existing instrument is invalid or if no acceptable instrument exists. An alternative method - which was also suggested by Babbie (2001) - involves surveying existing groups which are associated with a particular criterion. If the results of this survey match what would be expected from such a group, it suggests the instrument has validity. Again, however, such discreet groups may not exist for the criterion being examined.

With this questionnaire, the lack of any previous research into the views of the osteopathic community regarding melanoma paired with the exploratory nature of this research greatly limited the ability of this questionnaire to be tested for criterion-related validity. Despite this, some data was available from the pilot testing of the questionnaire. A review of this data suggested a match with the hypothesised results; however the limited sample size precluded a conclusion being drawn from this.

Content validity refers to how well the given instrument covers the area being investigated. A questionnaire which investigates every facet of a particular concept is likely to be more valid than one which focuses on only one facet. If a survey instrument fails to assess all aspects of a concept, it may be perfectly valid for those aspects it did investigate, but it would be difficult to apply any results to the concept as a whole (de Vaus, 1995). A measure of content validity is generally obtained through consultation with an expert in the field being researched (Heffner, 2004; Saw & Ng, 2001).

In developing the questionnaire, several experts were consulted and their views incorporated into the design. These included members of the Unitec Health Science faculty, the Clinical Education Manager and the CEO of MoleMap New Zealand - a company specialising in melanoma screening and diagnosis - and New Zealand dermatologists.

The third aspect of validity described is construct validity. Babbie (2001) defined this as the extent to which a logical relationship exists amongst similar variables. If the data generated from a questionnaire shows that different variables relate to one another in a manner one would expect (either a variable correlating with a related variable or not correlating with an
unrelated variable), then it suggests that the instrument is valid. If, however, variables relate in an unexpected or random manner, it is an indicator of poor construct validity. Construct validity is often estimated using either exploratory or confirmatory factor analysis, depending on whether an existing or hypothesized data model exists (Swisher, Beckstead, & Bebeau, 2004). This allows the underlying structure of data received to be analysed and compared with the structure expected. If the structure given through factor analysis seems logical, a high level of construct validity is implied.

In considering the usage of exploratory factor analysis in the design of this questionnaire, it was noted that very large sample sizes are necessary for limiting the error rates inherent in the procedure. Costello & Osborne (2005) cite a subject to item ration of 10:1 as an early rule-of-thumb, but note that a ratio of 20:1 or greater is ideal. For this questionnaire, this would require a sample size of 170 for a 10:1 ratio.

As such, the data gained from the pilot testing (with a sample size of nine) would be unlikely to allow meaningful analysis. Factor analysis was therefore only performed on the data received from the final sample. Although this still provided less than the recommended number of samples, it was deemed sufficient for assessing the construct validity.

Each section – Attitudes, Practice and Knowledge – was assessed separately. Exploratory factor analysis was performed using Principal Component Analysis and orthogonal (varimax) rotation, as suggested by de Vet, Ader, Terwee, & Pouwer (2005).

Although there were several questions which showed crossloading over more than one component, there was enough logical order to indicate a degree of construct validity, with five components being identified for the Attitudes section, two for the Practice section, and all of the questions in the Knowledge section being accounted for by one component.

Due to the insufficient number of samples and a potentially high error rate, a more in-depth exploration of the factor analysis was not deemed to be beneficial.
Data Analysis

After data collection, all data needed to be collated from the various sources and encoded for ease of analysis. To facilitate this process, the Microsoft Excel computer program was used as the primary database,

Data collected online through SurveyMonkey was available to download in spreadsheet format; however all responses were returned as text values. Due to this, all data from the scale and multiple choice type questions were re-coded into numerical values. For nominal data, a number was assigned to each choice, with ordinal data being coded according to the scale used – for example, the data in the Attitudes section was coded as 0=Unsure, 1=Completely Disagree, up to 7= Completely Agree. Questions that had been negatively weighted had their coding reversed to allow greater ease in future analysis.

Data received from other sources – such as hard-copy questionnaires or email – was then transcribed into the spreadsheet. Data was initially coded on the hard-copy (or printed email) before being entered into the spreadsheet, and then rechecked to ensure correct data entry.

Data from the skill tests – such as the recognition tasks, or True/False questions – were coded as being correct (coded ‘1’), incorrect (coded ‘2’) or unsure (coded ‘0’). Answers to the long-answer questions were initially left uncoded. Those that were part of the skill test were then marked as described in Results, and the marks also recorded.

Once all data had been entered into the spreadsheet, it was duplicated in SPSS Statistics – a statistical analysis program (SPSS Inc., 2008). This allowed both the ease of use of the Excel program and the more in-depth statistical analysis afforded by SPSS Statistics.

The initial set of data analysed was the quantitative data, as this represented the bulk of the questionnaire. As the primary aim of this research was to explore the attitudes, beliefs, knowledge and practices of the osteopathic community, the primary method of examining data was through frequency counts. This was again achieved through the use of Microsoft Excel, facilitating the production of graphs from this data.
Also of interest, however, were correlations both within and between each section. For this, the SPSS computer program was used, as it allowed a much greater range of statistical tests. This program was also used for the reliability tests and factor analysis described previously in this chapter.

Correlations were measured using the Pearson Product Moment Correlation. Cohen (1988) notes that within these ranges, an $r$-value $\approx 0.5$ denotes a large correlation, $r \approx 0.3$ a moderate correlation and $r \approx 0.1$ a small correlation.

Qualitative data was analysed using a thematic analysis approach. As the answers received were typically short, any theme that was apparent within an answer was included, and there was no lower limit on the prevalence of a theme within the data for it to be included. Themes were generated inductively – that is, they were generated during analysis – and were focused on the semantic themes explicit in the responses, without looking at any underlying meaning.

Thematic analysis was performed using the steps outlined by Braun & Clarke (2006), namely:

1. Familiarizing yourself with your data
2. Generating initial codes
3. Searching for themes
4. Reviewing themes
5. Defining and naming themes
6. Producing the report

These themes were then considered in light of the data gained through the quantitative sections of the questionnaire, and are outlined in Results.
**RESULTS**

**Introduction**

This chapter presents the data collected from the surveys completed by registered members of the New Zealand Osteopathic Council (OCNZ).

This is presented in six sections. The first will outline the survey response rates, including comparison of postal and electronic recruitment and which formats were preferred for completion of the questionnaire. The following sections will review each aspect of the survey; these being the Attitudes, Practices, Knowledge and Skill of the participants within the field of skin cancer screening.

**Survey Response**

All returned questionnaires were collected over a six week period during late April and May 2008. In total, 78 questionnaires were returned. Seven online questionnaires were excluded due to technical errors and being significantly incomplete, resulting in a total of 71 valid returns. The register of the OCNZ shows a total of 407 osteopaths practicing within New Zealand and, of these, 350 were contacted requesting participation in the survey. As such, the return rate was 20.3%, and represents 17.4% of the total population. This number of returns also satisfies the 69 returns aimed for (as discussed in Methodology).

There was a large discrepancy noted in the return rate between postal and email recruitment. Those participants who were recruited via email (n=177) showed a return rate of 27.7% (n=49), whereas those recruited via postal (n=166) showed a return rate of only 11.5% (n=19). The remainder were recruited via other methods (n=7), with a higher return rate (42.9%, n=3).

Overall completion of the questionnaire was good, with only 8 participants not fully completing the compulsory sections of the questionnaire. Among these 8 questionnaires, uncompleted questions were primarily those requiring long answers.
Of the questionnaires returned, the vast majority was returned via SurveyMonkey, an online survey application (SurveyMonkey.com, 2007). Seven questionnaires were returned via post, and two returned via email, leaving 62 being completed online (see Table 1).

<table>
<thead>
<tr>
<th>Recruitment Method</th>
<th>Online Return</th>
<th>Postal Return</th>
<th>Email Return</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Email Recruitment</td>
<td>47</td>
<td>2</td>
<td>0</td>
<td>49 (69%)</td>
</tr>
<tr>
<td>Postal Recruitment</td>
<td>13</td>
<td>4</td>
<td>2</td>
<td>19 (27%)</td>
</tr>
<tr>
<td>Other Recruitment</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>3 (4%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>62 (87%)</strong></td>
<td><strong>7 (10%)</strong></td>
<td><strong>2 (3%)</strong></td>
<td><strong>71 (100%)</strong></td>
</tr>
</tbody>
</table>

Table 1: Survey recruitment method versus method of questionnaire return.

**Participant Demographics**

There were two main aims behind the demographic data requested in the survey; these being to identify whether a broad range of participants responded, and to allow correlation with subsequent data.

Participants showed a wide range of ages – from 24 to 63 – and had a mean age of 42 (n=68). Three respondents either declined to give their age or did not answer the question correctly. The age of participants was also well spread across this range, as shown in Figure 1, below.

![Figure 1: Age distribution of participants](image-url)
Gender was equally well balanced, with 53% (n=38) male and 45% (n=32) female respondents (1 respondent did not give their gender).

Participants also gained osteopathic qualifications from a range of institutions (Table 2); the three most frequent being the British School of Osteopathy (21%, n=15), Unitec New Zealand (18%, n=13) and the British School of Naturopathy and Osteopathy (17%, n=12). Thirty six percent (n=26) held a Diploma as their highest qualification in any field, 11.3% (n=8) held a Bachelor’s Degree, 21.1% (n=15) held an Honours Degree, 29.6% (n=21) held a Master’s Degree and 1.4% (n=1) held a PhD or Doctoral Degree (although not necessarily in a medical field). One participant did not give the name of the institution from which they received their osteopathic qualification.

There was a strong relationship between the institution where participants gained their osteopathic qualification, and their highest qualification in any area. All of those participants who received their osteopathic qualification from Unitec New Zealand, the University of Western Sydney or Victoria University (n=18) stated their highest qualification was that of a Master’s Degree. Similarly, all those who gained their osteopathic qualification from RMIT or the Phillip Institute of Technology (n=5) stated that their highest qualification was that of a Bachelor’s Degree, and all but one of those who gained their osteopathic qualification from the South Pacific College of Naturopathy and Osteopathy or the Osteopathic College of New Zealand (n=9) stated that their highest qualification was that of a Diploma (one participant who attended the Osteopathic College of New Zealand held a Master’s Degree as their highest qualification).

There was more variation in those participants who received their osteopathic qualification from institutions in the United Kingdom (the British School of Osteopathy, the British College of Naturopathy and Osteopathy, the European School of Osteopathy, the College of Osteopaths and the London College of Osteopathic Medicine), with the majority holding either a Diploma (59.5%, n=17) or an Honour’s Degree (40.5%, n=15) as their highest qualification, with the remainder holding a Bachelor’s Degree (5.4%, n=2), Master’s Degree (5.4%, n=2), or a PhD or Doctoral Degree (2.7%, n=1).
Years of experience (measured as time since qualifying) also had a large range – from 1 year to 32 years – and had a mean time of 12 years (n=69). This correlated strongly with the age of participants ($r = .766$, $p < 0.01$).

All participants practiced within New Zealand and responses were received from participants practicing in most of the regions within New Zealand. The most common region for participants to practice in was Auckland (36.6%, n=26), followed by the Bay of Plenty and Canterbury (both 11.3%, n=8). Responses were also received from practitioners who practiced in the Northland (n=1), Waikato (n=5), Hawke’s Bay (n=4), Manawatu-Wanganui (n=4), Wellington (n=5), Nelson (n=6), and Otago (n=2) regions.

<table>
<thead>
<tr>
<th>Institution</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>British School of Osteopathy, United Kingdom</td>
<td>15</td>
<td>21.1%</td>
</tr>
<tr>
<td>Unitec New Zealand, New Zealand</td>
<td>13</td>
<td>18.3%</td>
</tr>
<tr>
<td>British College of Naturopathy and Osteopathy, United Kingdom</td>
<td>12</td>
<td>16.9%</td>
</tr>
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<tr>
<td>European School of Osteopathy, United Kingdom</td>
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<td>11.3%</td>
</tr>
<tr>
<td>Royal Melbourne Institute of Technology (RMIT), Australia</td>
<td>4</td>
<td>5.6%</td>
</tr>
<tr>
<td>Victoria University, Australia</td>
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<td>5.6%</td>
</tr>
<tr>
<td>College of Osteopaths, United Kingdom</td>
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<td>1.4%</td>
</tr>
<tr>
<td>London College of Osteopathic Medicine, United Kingdom</td>
<td>1</td>
<td>1.4%</td>
</tr>
<tr>
<td>Phillip Institute of Technology, Australia</td>
<td>1</td>
<td>1.4%</td>
</tr>
<tr>
<td>South Pacific College of Naturopathy and Osteopathy, New Zealand</td>
<td>1</td>
<td>1.4%</td>
</tr>
<tr>
<td>University of Western Sydney, Australia</td>
<td>1</td>
<td>1.4%</td>
</tr>
</tbody>
</table>

Table 2: Institution where participants gained their osteopathic qualification.
Investigation of participants’ working hours showed a mean working week of 37.6 hours, from a range of zero to 65 hours. This was predominantly patient care, with participants reporting a mean rate of 29.1 hours of patient care per week, ranging from zero to 55 hours. The remaining time was taken up by practice management (\( \bar{x} = 4.1 \) hours), teaching (\( \bar{x} = 2.6 \) hours) and research related activity (\( \bar{x} = 2.2 \) hours).

Figure 3: Typical working week of participants
Participants practiced in a range of settings; however the predominant place of practice was in a private, solely osteopathic clinic (60.6%, n=43). The next most common place of practice was in a private, multidisciplinary clinic (38.0%, n=27) followed by practicing from home (15.5%, n=11), in a teaching environment (12.7%, n=9) and home visits (5.6%, n=4). None of the respondents practiced in a public hospital, however 2.8% (n=2) did practice in a private hospital.

Most participants practiced within or close to main town centres, with 32.4% (n=23) of participants practicing within the inner city and an equal number (25.4%, n=18) practicing in either the CBD or the city suburbs. Participants who practiced outside main city areas were less common, with 19.7% (n=14) practicing in provincial towns, 7.0% (n=5) practicing in rural areas and only 1.4% (n=1) practicing in a village area.

**Attitudes**

Participants were generally positive regarding a role for osteopathy in the recognition of skin cancer, and agreed that there was a need for early detection of melanoma. There was, however, some disagreement as to whether this was the role of the patient, their general practitioner or the osteopath. There was also some concern over practitioners’ knowledge regarding melanoma and non-melanoma skin cancer.

Overall, participants seemed to agree that skin cancer was an important issue, with 93.0% (n=66) agreeing with the statement “Skin cancer detection would benefit many of my patients” and the same number disagreeing to some extent with the statement “Skin cancer is not an issue in my region”. Also there seemed to be the same view from the public, with 66.2% (n=47) of participants disagreeing with the statement “My patients do not seem to be concerned about skin cancer”.

There was also clear views on the role of health practitioners in skin cancer screening - with 63.3% (n=45) agreeing with the statement “All health professionals should spend more time screening for skin cancer”, and on the responsibility of patients, with 81.7% (n=58) disagreeing with the statement that “most patients are able to detect suspicious skin lesions by
themselves” and 64.8% (n=46) disagreeing with the statement “Patients should take full responsibility for skin cancer recognition”.

Participants believed there was some opportunity for osteopathy to be involved in skin cancer recognition, with 98.6% (n=70) agreeing with the statement “We should be mindful of our patient’s general health, not just their presenting complaint” and 78.9% (n=56) agreeing with the statement “As primary practitioners, we have a responsibility to manage our patient’s general health”. Also, 74.7% (n=53) disagreed with the statement “There is not enough time to check for skin cancer during a treatment”. More contentious, however, was the response to the statement “It is within the New Zealand osteopathic scope of practice to recognize skin cancer in patients”, with 15.5% (n=11) participants being unsure – although 57.8% (n=41) agreed with the statement.

Along with this, participants also believed there was the ability for osteopaths to assist in the recognition of skin cancer. The majority of participants (87.3%, n=62) disagreed with the statement “Osteopaths cannot help to reduce the mortality from skin cancer” and 91.6% (n=65) agreed with the statement “As primary practitioners, we should be able to recognise a wide range of pathologies”. Many were less sure of their ability to recognise skin cancer, however, with 29.6% (n=21) agreeing with the statement “Skin cancer is difficult to detect clinically”, and 5.6% (n=4) being unsure if this was the case.
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<th>Question</th>
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<th>Comp. Disagree</th>
<th>Disagree</th>
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<td>1. Skin cancer detection would benefit many of my patients</td>
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<td>2. Knowledge and skills in skin cancer recognition would benefit me as a practitioner</td>
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<td>4. All health professionals should spend more time screening for skin cancer</td>
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<td>5. It is within the New Zealand osteopathic scope of practice to recognize skin cancer in patients</td>
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<td>6. My patients do not seem to be concerned about skin cancer</td>
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<td>7. There is not enough time to check for skin cancer during a treatment</td>
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<td>8. Patients should take full responsibility for skin cancer recognition</td>
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<td>9. As primary practitioners, we should be able to recognize a wide range of pathologies</td>
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Table 3: Attitudes of participants towards skin cancer - Questions 1-9
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<td>10. We should be mindful of our patient's general health, not just their presenting complaint</td>
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<td>11. Most patients are able to detect suspicious skin lesions by themselves</td>
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<td>12. As primary practitioners, we have a responsibility to manage our patient's general health</td>
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<td>13. Skin cancer is not an issue in my region</td>
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<td>14. I am not interested in continuing education for skin cancer recognition.</td>
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<td>15. I already have enough knowledge about skin cancer and recognition</td>
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<td>16. I try to keep up to date with recent research regarding skin cancer</td>
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<td>17. Skin cancer is very difficult to detect clinically</td>
<td>5.6%</td>
<td>1.4%</td>
<td>26.8%</td>
<td>21.1%</td>
<td>15.5%</td>
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Table 4: Attitudes of participants towards skin cancer - Questions 10-17
Screening for Skin Lesions

This section explores the current practices of osteopaths in regards to screening for skin cancer in order to determine whether such procedures already form part of their daily practice.

Although it appeared that a number of practitioners were performing checks for suspicious lesions and discussing skin cancer with their patients, there was substantial variation in the frequency of these practices between respondents. In general, however, it would appear that any interaction beyond a skin check for unusual moles only occurs occasionally.

The first question asked was to determine how often patients sought the advice of the osteopath regarding skin cancer. Interestingly, this was not common, with 59.2% (n=42) of participants stating that this happened either seldom or never, and only 12.7% (n=9) advising that this happened often or always.

This contrasts with the rate at which practitioners noticed unusual moles on their patients, with only 26.8% (n=19) stating that this occurred seldom or never. This correlated strongly with how often participants discussed skin cancer with their clients (r = .523, p < 0.01), although this was slightly less common than noticing unusual moles, with 29.58% (n=21) stating this occurred seldom or never.

As an indicator of opportunity to examine the skin, participants were asked how often they asked patients to remove their outer clothing, and this was reported as always or often occurring in 67.6% (n=48) of cases. Interestingly this was only weakly correlated with both consciously checking for (r = .254, p < 0.05) and noticing unusual moles (r = .263, p < 0.05).

A higher number of participants stated that they consciously checked their patients for unusual moles, with 28.2% (n=20) responding that this always occurred, although 31.0% (n=22) stated that they seldom or never performed such checks. Referral of a patient for further investigation occurred less often, with 59.2% (n=42) of participants reporting this seldom or never occurred.
Although there seems to be a reasonable amount of practitioner-patient interaction regarding skin cancer, discussion of skin cancer with colleagues was reported as being quite rare, with 81.7% (n=58) stating this occurred seldom or never, and none stating that it occurred often or always.

Figure 4: Practices of osteopaths regarding skin cancer

Participants were also asked what factors would cause them to refer a patient for further investigation. As shown below, these factors mainly fell under four groups:

- **Patient concern**
  - ‘Patient was concerned about a possible lesion.’
  - ‘If they drew my attention to a skin lesion and asked what they should do about it.’
  - ‘...or just by a patient’s concern for peace of mind.’
  - ‘A question of concern from the patient.’

- **Patient history**
  - ‘No previous knowledge or investigations of suspicious moles ... prior history of skin cancer.’
  - ‘Family history, previous melanoma, suspicious skin lesions.’
  - ‘Age, outdoor lifestyle, history.’
• Suspicion
  o ‘If I was concerned.’
  o ‘If I was unsure of a spot/mole.’
  o ‘Any suspicion [regarding] a lesion on the skin.’

• Appearance of lesion
  o ‘Change in shape, size, colour, irregularity.’
  o ‘Changes in shape, colour or size from previous visits. Anything that has a deteriorated lateral border or outline, excessively raised/itchy/bleeding growths.’
  o ‘Lesions over 5mm wide, lesions that are raised/multicoloured and irregular in shape, lesions that the patient reports has changed shape recently/suddenly...’
  o ‘Irregular, itchy, blotchy or changed skin.’

One participant never on-referred patients stating ‘I've never done this – it's not something we were trained on...’

**Knowledge**

This section explored participants’ beliefs regarding their knowledge about the recognition of melanoma. The first part of this section looked at the responses to four questions regarding the participants’ beliefs about their current knowledge; whereas the second part explored the long answer responses to questions regarding beliefs about factors that limit the ability of osteopaths to perform a role in skin cancer recognition.

Most practitioners believed they had at least a reasonable understanding of the risk factors for melanoma, with 16.2% (n=11) believing their knowledge to be very good and only 8.8% (n=6) believing their knowledge to be less than reasonable. Participants were less sure about their knowledge regarding melanoma detection, with 33.8% (n=23) believing their knowledge is less than reasonable. None believed their knowledge in this field was excellent.
Similarly, few were confident regarding the detection of melanoma, with 55.9% (n=38) believing they could distinguish between a benign mole and melanoma less than half the time. Of these, 16.2% (n=11) believe they could never determine the difference.

A minority of participants (32.4%, n=22) were confident of knowing which moles to refer to a specialist more than half the time. However, a greater percentage stated they would be comfortable less than half the time (38.2%, n=26) and eight participants (11.8%) stated they were never confident in determining which moles required referral for further investigation.

![Figure 5: Participants’ beliefs regarding knowledge of melanoma recognition.](Image)

Participants were also asked five questions regarding their views on the limitations of the role of osteopaths in skin cancer recognition. Their views are summarised below.

The majority of participants explained that they would be comfortable discussing skin cancer with a patient, with 54 of the 67 respondents (80.6%) clearly stating that this was the case. Their reasons (for or against) fell into several recurring themes:
Those that were comfortable discussing skin cancer with patients gave the following reasons:

- Only towards referral
  - ‘Yes, but it would be discussing with them about the need to see someone about it.’
  - ‘Yes but referral for further investigation would be a safe and wise option for both parties.’
  - ‘...anything that I am suspicious of or just don’t like the look of I will discuss with the patient and strongly advise them to see their GP.’
  - ‘Only as far as to refer them to a doctor.’

- Part of the service
  - ‘Yes, as part of the Health Service I am providing.’
  - ‘Yes, as it is part of their health care.’
  - ‘Yes – part of my role as a primary healthcare practitioner.’
  - ‘Yes. It is part of my role.’

- Safety
  - ‘Yes. As it could be potentially fatal.’
  - ‘I would rather be wrong than have missed bringing something to a patient’s attention.’
  - ‘Yes, it is too important and too risky to ignore.’

- Holism
  - ‘Yes – it’s an aspect of their health and I like to be holistic.’
  - ‘Yes as it is an integral part of their wellbeing.’
  - ‘Yes as we look at the whole body.’

- Education
  - ‘Yes, to educate and learn from them.’
  - ‘Yes – about importance of monitoring moles, skin growths. But not as a diagnosis.’
  - ‘Yes because it is something everyone should have an awareness of.’

- Experience/Knowledge
I’ve seen enough of them to feel confident in discussing and referring.’

‘While not terribly competent I would likely know more than a patient.’

‘Yes. Gained reasonable knowledge through training.’

- Opportunity
  
  ‘Simply because in the course of history taking, many general health issues are touched upon.’
  
  ‘With many patients I am the only practitioner that sees them without clothes.’
  
  ‘Yes. Because I see their back more than they do.’

- Patient comfort/care
  
  ‘It is part of our duty of care to the patient.’
  
  ‘There is good awareness and patients are grateful for your vigilance.’
  
  ‘They are grateful that someone has thought about their health.’

A number of participants, however, noted that they would not feel comfortable discussing skin cancer with their patients. There were two main reasons given for this:

- Not the role of osteopathy
  
  ‘We are not dermatologists therefore we are not in a position to discuss skin cancer per se...’
  
  ‘This is the role of a specialist to determine and discuss.’
  
  ‘I have the perception that most patients don’t view ‘skin cancer’ as being within the domain (scope of practice) of their osteopath.’

- Lack of knowledge/skill
  
  ‘No, lack of extended knowledge regarding skin cancer, detection and therapeutics.’
  
  ‘No. I don’t have the skills.’
  
  ‘No, insufficient knowledge.’

In contrast to these results, the majority of participants noted that they would not be comfortable reassuring a patient that a particular mole did not require future investigation. Almost two thirds of respondents (64.2%, n=43) clearly stated they would not be comfortable doing this at any time. Again, there were several themes apparent in the responses:
Those practitioners that advised that they may be comfortable reassuring a patient a mole did not require further investigation would do so only under certain conditions:

- **Opinion only**
  - ‘I would be comfortable giving my opinion but noting that it is not my area of expertise.’
  - ‘Yes, but it is not a medical opinion as it is outside our scope.’

- **Only if no doubts**
  - ‘If the lesion was obviously viral or some other type of lesion that I was familiar with, yes.’
  - ‘Generally. If the mole resembled the other moles and there were none of the above stated changes [size, shape, colour etc.].’
  - ‘Generally yes if [it] has no atypical features and is similar to their other moles.’
  - ‘Yes, but only for the blatantly obvious, anything else I refer.’

- **Yes, with further patient education**
  - ‘Probably, but would warn the patient to look for further changes and report them to their GP.’
  - ‘I have done so in the past but always ask them to watch for any changes and to get their GP to look at it at the next appointment.’
  - ‘If I was sure, yes, but I would tell them to keep an eye on it, and if anything changes to get it checked regardless.’

Whereas those who were not comfortable reassuring a patient a lesion did not require further investigation gave several reasons:

- **Not the role of osteopathy**
  - ‘It is not in my scope of practice – only a specialist can make that call.’
  - ‘I would always want a second opinion, as I am NOT a skin specialist.’
  - ‘No, it’s not within my scope of practice.’

- **Lack of knowledge/skill**
  - ‘No, I don’t have the skills.’
  - ‘No – do not believe I have enough expertise in field.’
• ‘Not enough experience, never seen a skin cancer except in text book.’

• Safety
  o ‘I think it could be dangerous if an osteopath decided that a mole does not require future investigation.’
  o ‘If in doubt I would refer on. I would play safe.’
  o ‘If I get it wrong, the consequences are too great.’

• Difficulty of clinical diagnosis
  o ‘If mole map practitioners can be uncertain when they look at hundreds, how can I be sure?’
  o ‘Clinical exam is far from fool proof.’
  o ‘Only way to really tell is biopsy.’

Despite this, there was overwhelming support for the ability of osteopathy to play a role in the recognition of skin cancer, with 63 of 67 respondents (94.0%) clearly answering “Yes”. Several recurring themes were again found in participants’ reasoning:

Those who believed osteopathy can play a role gave many reasons as to why:

• Part of the service
  o ‘We are primary health care professionals. We have a duty to care for our patients overall health.’
  o ‘Yes, because we are often first point of contact primary carers.’

• Education
  o ‘It’s important to look and advise patients to get checked out.’
  o ‘We can motivate action in cases of patient ignorance or complacency.’

• Holism
  o ‘Yes, we treat the whole person.’

• Experience/Knowledge
  o ‘We’re trained health care providers.’
  o ‘Yes, given we get to see so many examples when they remove patient’s clothing and examine them.’
‘Differential diagnosis is a critical part of what we do and how we manage patients.’

Opportunity

‘Yes, as we are in a situation where we have access to patients’ bodies we often have an opportunity not normally afforded to GP’s of sighting blemishes that may not have been noted or have only just started changing.’

‘Because of our close proximity and contact to so many areas of the body with our hands on contact during examination, diagnosis and therapy.’

‘Yes. We get the opportunity to look at the skin on people’s backs and not many people do that. We’re obvious practitioners for recognising suspicious moles in places that not many people see.’

‘Very much so. We see the same patients over a period of time for a reasonable amount of time in the treatment (1/2 hr or more) without clothing. We have a better chance than a GP to spot skin changes.’

‘Yes, as we sometimes get our patients to disrobe - for those people who live alone this may be the only time their skin is seen.’

Ability to refer

‘Yes - osteopaths can refer for further investigation if anything suspicious is noted.’

‘Yes but only on the basis of detection and referral.’

‘If anything looks suspicious, we should refer the patient on.’

Whereas those who believed osteopathy could not play a role in the recognition of skin cancer gave two main reasons:

Not the role of osteopathy

‘It is not a primary concern for an osteopath.’

Lack of knowledge/skill

‘It could be if practitioners were fully informed, most are not.’

‘Only if the osteopath is trained in its recognition, differential diagnosis AND requires patients to remove all outer layers of clothing for treatment and examination.’
Participants were then asked to identify the factors that most limited their confidence or desire to look for skin cancer in their patients. From this, four main barriers were identified by respondents:

- **Lack of Knowledge/Experience**
  - 'Experience based only on self-driven learning.'
  - '[Lack of] clinical knowledge and education in the field.'
  - 'No current or recent training for skin cancer.'
  - 'Lack of training and practice of detection.'

- **Lack of Opportunity**
  - '[Patients] less likely to undress to their underwear.'
  - 'Time in consult limits desire to actively seek signs of skin cancer.'
  - 'Patients do not always take all of their clothes off, or only some or none.'

- **Outside Osteopathic Scope of Practice**
  - 'Presenting complaint mostly does not warrant this.'
  - 'It is a specialist opinion. Outside scope and ongoing education so it is dangerous to think our opinion is absolute.'
  - 'My desire is limited as skin cancer is not why my patient has come.'

- **Difficulty in Clinical Detection**
  - 'Early changes can be hard to be sure about and timing for referral can be difficult.'
  - 'I do not entirely trust physical examination for the diagnosis of skin cancer.'
  - 'It is very difficult to accurately diagnose without biopsy.'
  - '[Difficulty in] distinguishing types of moles/cancers from each other.'

To try to find potential solutions to some of these barriers, participants were then asked to identify the factors that could most improve their confidence or desire to look for skin cancer in their patients. From this, one theme was overwhelming in its prevalence. Fifty-seven of the 64 respondents (89.1%) answered that either further education or reference material would most help ameliorate these barriers, stating they needed:
‘More knowledge about early changes, when dermatologists want referral and their criteria for referral.’

‘Education - spending time looking at photos of skin cancers.’

‘Opportunity to take part in seminars aimed at improving our knowledge and diagnostic skills regarding melanoma.’

‘An assurance that my knowledge of skin cancer is up to date and that my ability to detect skin cancer in my patience is satisfactory.’

‘Identifying features, things to look for, comparison pictures.’

The few remaining respondents either could not identify any factors that would improve their confidence or desire to look for skin cancer in their patients, or they noted that they would consider looking for skin cancer in their patients if their patients requested or expected such a service from them.

**Skill in detecting abnormal lesions**

Participants were invited to take a “quiz” to test their ability in identification of malignant lesions by photographs. As this section was optional, not every respondent answered it, and those respondents that did may not have answered every question.

Because of the design of the survey, it is impossible to determine how valid the results of the “quiz” are – no control was made with regards to use of reference books or outside sources of knowledge. Despite this, it provides an indication of the level of skill of respondents.

Participants viewed images of various skin lesions, and identified those that they believed to be either melanoma or benign lesions. Participants showed a high degree of uncertainty with many of the images, and the mean number of correct answers was 4.7 out of 8 (58.8%). Incorrect answers were more uncommon, however, with the mean number of questions answered incorrectly being 0.9 out of 8 (11.3%) (see Figure 6).
To determine the accuracy of these results, it is important to note how many lesions were correctly identified as melanoma (that is, the sensitivity), and how many lesions were correctly identified as benign (the specificity) (Altman & Bland, 1994).

It is also important to note that a high sensitivity (that is, identifying all melanomas) can be achieved simply by identifying all lesions (both benign and melanoma) as melanoma; however this would result in zero specificity, as all benign lesions would also have been identified as melanoma. Therefore, it is necessary to compare both sensitivity and specificity to properly judge the effectiveness of the test.

In order to determine the sensitivity and specificity of this recognition, indeterminate results (i.e. those who answered unsure) have been counted as false negatives (for sensitivity) or false positives (for specificity), thereby giving a worst-case scenario for each.

Table 5, below, shows the process by which these values are calculated for the image recognition task. The sensitivity is determined by dividing the number of true positives (that is, melanomas correctly identified as such) by the sum of the true positives and false negatives (that is, the number of melanomas identified as benign in addition to the ‘unsure’ answers to images of melanoma). The specificity is determined in much the same way, except the number of true negatives (that is, the number of correctly identified benign lesions) is divided by the sum of the true negatives and false positives (that is, the number of
benign lesions identified as melanoma, in addition to the ‘unsure’ answers to images of benign lesions).

As such, the sensitivity for recognising melanoma in these images is 75.2%, whereas the specificity equals 44.4%; however the deleterious effect of the high number of indeterminate results must be allowed for when considering these results.

<table>
<thead>
<tr>
<th>Lesion type (as reported by histological exam)</th>
<th>Melanoma</th>
<th>Benign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respondent Answer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Melanoma</td>
<td>194</td>
<td>43</td>
</tr>
<tr>
<td>(True Positive)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benign</td>
<td>15</td>
<td>115</td>
</tr>
<tr>
<td>(False Negative)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unsure</td>
<td>49</td>
<td>101</td>
</tr>
<tr>
<td>(Sensitivity)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5: Sensitivity and Specificity of Visual Identification

The next part of this section gave respondents nine True/False questions regarding melanoma knowledge. Overall, these questions were well answered, with a mean score of 7.5 out of 9 questions (83.3%) being answered correctly.

<table>
<thead>
<tr>
<th>Question (True/False)</th>
<th>Unsure</th>
<th>Incorrect</th>
<th>Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. New Zealand has one of the highest rates of melanoma in the world (True)</td>
<td>4.7% (n=3)</td>
<td>(n=0)</td>
<td>95.3% (n=61)</td>
</tr>
<tr>
<td>2. A small melanoma is not dangerous (False)</td>
<td>1.6% (n=1)</td>
<td>(n=0)</td>
<td>98.4% (n=62)</td>
</tr>
<tr>
<td>3. Other forms of skin cancer have a higher mortality rate than melanoma (False)</td>
<td>20.3% (n=13)</td>
<td>3.1% (n=2)</td>
<td>76.2% (n=48)</td>
</tr>
<tr>
<td>4. Melanoma only occurs in areas exposed to the sun (False)</td>
<td>7.8% (n=5)</td>
<td>(n=0)</td>
<td>92.1% (n=58)</td>
</tr>
<tr>
<td>5. Both moles and freckles can be a potential site of melanoma (True)</td>
<td>15.6% (n=10)</td>
<td>6.3% (n=4)</td>
<td>78.1% (n=50)</td>
</tr>
<tr>
<td>6. Melanomas can arise in existing moles or from melanocytes in normal skin (True)</td>
<td>7.8% (n=5)</td>
<td>(n=0)</td>
<td>92.1% (n=58)</td>
</tr>
<tr>
<td>7. There is no risk involved in delaying the diagnosis of melanoma (False)</td>
<td>1.6% (n=1)</td>
<td>1.6% (n=1)</td>
<td>96.9% (n=62)</td>
</tr>
<tr>
<td>8. The horizontal growth phase of melanoma is worse than the vertical growth phase (False)</td>
<td>53.1% (n=34)</td>
<td>9.4% (n=6)</td>
<td>37.5% (n=24)</td>
</tr>
<tr>
<td>9. Melanoma rarely metastasizes (False)</td>
<td>9.4% (n=6)</td>
<td>1.6% (n=1)</td>
<td>89.1% (n=57)</td>
</tr>
</tbody>
</table>

Table 6: True/False Question Results
The third part of this section involved two long answer questions concerning the clinical recognition and risk factors of melanoma.

In order to recognise melanoma in a clinical setting, it is important to have some knowledge of the clinical signs of melanoma. As mentioned in the Literature Review, these signs can be remembered through the mnemonic ABCDE, standing for Asymmetry, irregular Border or surface, multiple Colours, Diameter over 6mm and Evolution or change within the mole. Additionally, signs and symptoms such as pain and bleeding have also been noted as indicating further investigation, though these are not specific to melanoma (Cummins et al., 2006).

A majority of participants identified multiple colours (75.9%, n=44) and irregular border (70.0%, n=40) as being features of a melanoma, with a lesser number recognising evolution (56.9%, n=33) or asymmetry (50.0%, n=29). Fewer noted the diameter of a lesion as being important (32.8%, n=19). There were also a number who mentioned the presence of pain (8.6%, n=5), itchiness (15.5%, n=9) and bleeding (27.6%, n=16).

Counting the additional signs/symptoms of pain, itchiness and bleeding as one feature, respondents identified, on average, approximately half of the six features (\(\bar{x} = 3.2\)). The distribution of scores is shown in Figure 7.

Figure 7: Number of clinical signs identified by participants
To aid in determining which patients are most in need of examination, some familiarity with the risk factors for melanoma is also required. As discussed in the Literature Review, Cummins et al. (2006) state that the main risk factors for cutaneous malignant melanoma are phenotypic characteristics (such as fair skin, light eye and hair colour and central or northern European ancestry), inherited factors (indicated by a personal or family history of melanoma and/or skin cancer), melanocytic naevi (especially atypical or a large number of naevi) and increased UV exposure (especially when young, or intense, intermittent episodes of UV exposure). It has also been suggested that both increased age and the presence of immunosuppression (through various factors such as disease or medication) are also risk factors for this disease (Brenner & Tamir, 2002).

Of these factors, the most well recognised by the participants was that of increased UV exposure, with 96.0% (n=48) noting this in their answer. The next most recognised was phenotypic characteristics with 58.0% (n=29) noting this as a risk factor, and 38.0% (n=19) identifying a personal or family history of skin cancer as indicating increased risk.

Less well recognised were increased age (14.0%, n=7), an increased number of naevi and/or atypical naevi (10.0%, n=5) and the presence of immunosuppression (10.0%, n=5).

Knowledge of a number of different factors was not high, with the participants identifying, on average, approximately a third of the six possible factors (n = 2.3) and no participants identified all of the factors. The distribution of scores is shown in Figure 8.
Unfortunately, the question “What are the risk factors for melanoma?” seemed to cause some confusion among participants. Nine of the 59 responses to this question (15.3%) were excluded, as they appeared to answer the question “What are the risks of melanoma?” instead, giving answers such as “metastases to organs”, “disfigurement” and “death”.

There was a high degree of correlation between the results of the long answer questions and both the image recognition task ($r = .503, p < 0.01$) and the True/False questions ($r = .669, p < 0.01$), with moderate correlation between scores for the image recognition task and the True/False questions ($r = .397, p < 0.01$). This suggests that participants tended to have skill across all aspects of the “quiz”, rather than in just one area.
DISCUSSION

Response and Representation

When surveying a small population, a high response rate is often required to achieve a representative sample. Although this study was designed to provide only a brief overview of the osteopathic community, it was nevertheless desirable to achieve as large a sample as possible. To this end, several avenues for both participant recruitment and distribution were used to maximize the response rate.

The use of the internet to collect data in surveys is becoming increasingly popular (Lonsdale et al., 2006) as it allows several advantages over traditional survey methods such as low cost and resource usage, speed of returns, accessibility of data and convenience for the participant (Fleming & Bowden, 2007). However, although New Zealand has one of the highest rates of household internet availability in the world, approximately one third of households still do not have access (Statistics New Zealand, 2007).

As such, this survey used both electronic and traditional mediums to recruit participants and distribute the questionnaire. As cost was a major deciding factor, electronic recruitment was selected as the primary method, and a recruitment email was sent to all registered New Zealand osteopaths for whom a valid email address was listed. The number of recruitment emails sent was relatively close to the number of recruitment letters sent (n=177 and n=166 respectively) so it was interesting to note the disparity in response rates, with an email response rate of 27.7% (n=49) versus a postal response rate of only 11.5% (n=19).

There was an even greater disparity in the response method chosen, with 87% of returns occurring through the online questionnaire, and only 10% of responses occurring via post.

Although it may be argued that differing recruitment and distribution methods may target different demographics, several studies have noted little significant difference in the demographic makeup or data gained from either modality (Fleming & Bowden, 2007; Lonsdale et al., 2006). Internet respondents have been noted to show increased education
levels and general science knowledge (Fricker, Galesic, Tourangeau, & Yan, 2005); however no correlation of these factors was found in this study.

These results suggest that, for this population at least, an online questionnaire is an excellent method for gathering survey data. It must be noted, however, that recruitment must still include alternatives to email unless valid email addresses are available for all potential participants. Also, a number of participants were unable or unwilling to complete the survey online – either through preference or technical problems – and such cases must be accounted for if an online questionnaire is the only data collection method used.

Although there is a lack of data on the general demographic make-up of the osteopathic community in New Zealand, it would seem from the data gathered that the participants in this survey covered a good range of the members of the community.

The age ranges of participants were found to be from 24 to 63 years of age, and there was good representation from each age group. Although there were only two participants over the age of 60, this was expected due to retirement ages. Similarly, gender was well balanced, with a male-to-female ratio of 1.2:1.

Participants also responded from throughout New Zealand, with responses being received from most regions within the country. Although the majority of responses were received from the Auckland region, this was again expected due to the population of Auckland compared to other regions in New Zealand.

Data was also gathered regarding the workplace of participants, and this suggested that most osteopaths in New Zealand work in a private practice (either solely osteopathic or multidisciplinary) and within city limits (either in the CBD or suburbs). The place of work, however, is also likely to be affected by the large proportion of respondents working in the Auckland region although excluding those participants practicing in Auckland still shows a majority of participants (62.5%) practicing within the CBD, inner city or suburbs.

The working week of participants showed a high amount of variation, with those participants currently working noting a week ranging from 10 to 65 hours. On average, patient care made up the majority of these hours, with the mean percentage totalling 79.5% of the working
week. Practice management also featured as a component of the week, with the mean number of hours totalling 11.1% of the working week. Teaching/Education and Research also made up a mean 7.2% and 5.9% of the week; however these means were higher due to a small number of participants who reported a significant amount of time in these categories – likely members of staff in the Unitec Master of Osteopathy degree. As such, looking at the median levels of Teaching/Education and Research showed that there was generally no participation in these activities.

This suggests that for the average osteopath, their focus is on treating patients and managing their clinic, and that further education or participation in research is something that is not well supported by the community. The fact that most osteopaths work in a city environment would suggest that resources for such activities would be available (in the form of public libraries, educational institutes or peers for discussion groups) so it would be interesting to further investigate the reasons for the limited participation in these activities. It is also worth noting, however, that under the rules of the OCNZ, registered practitioners must complete a number of courses and activities to show continued professional development. These activities equate to approximately 25-35 hours of education each year and ensure that some education and/or research activity is a required part of the profession.

The Importance of Melanoma Awareness

Before the current practices or future roles of the New Zealand osteopathic community can be investigated, it must first be ascertained if the topic of melanoma awareness is even considered important within the profession.

There is little doubt that melanoma is a serious disease, and that the incidence in New Zealand is particularly high (Martin & Robinson, 2004; New Zealand Health Information Service, 2006b), and there is evidence to support the idea that early detection and treatment of melanoma can reduce the mortality associated with this diagnosis (Pacifico, Grover, & Sanders, 2004).

Although there has been some debate over the effectiveness of specifically screening for melanoma (Helfand et al., 2001; Saraiya et al., 2004; U.S. Preventive Services Task Force,
2001) there have been calls – both overseas and in New Zealand – for primary healthcare providers to play a role in the recognition of skin cancer during regular appointments (Cancer Control Taskforce, 2005; U.S. Preventive Services Task Force, 2001; Weinstock, 2006). Indeed, the New Zealand government, through its New Zealand Cancer Control Strategy, has advised the need for “improved understanding of cancer screening and familial risk assessment at all levels of the health sector” (Cancer Control Taskforce, 2005, p. 41), with the Early Detection Advisory Group (2006) recommending that “clinicians should remain alert for skin lesions with malignant features in the context of physical examinations performed for other reasons” (p. 53).

As a system of medicine that often works alongside (but not as part of) the more widespread ‘allopathic’ system of medicine, does the osteopathic profession see melanoma awareness as important?

There seems to be a strong view that melanoma is an important topic, with the vast majority of osteopaths surveyed believing that their patients would benefit from skin cancer screening, and that skin cancer was an issue in their region. Interestingly, there were two osteopaths who believed that skin cancer was not an issue in their region; however there were no common factors between these two – one worked in Auckland and the other in Otago. Both still indicated that screening would be advantageous for their patients, suggesting they still regard skin cancer awareness as an important topic, if not specific to their region. Although it has been suggested that the incidence of melanoma is highest in the far north and lowest in Southland (Martin & Robinson, 2004), melanoma incidence is high in all regions of New Zealand.

Participants also tended to agree that all health professionals should spend more time screening for skin cancer, although there were a significant number of participants (21.2%) who disagreed with this statement. Again, it would be useful to determine the reasons behind this disagreement although it may be due to the term ‘all health professionals’, as this includes associated health professionals (such as osteopaths) and other professionals who may or may not be in primary care. This is further reinforced by the strong belief that skin examinations needed to be carried out by a trained health professional, with a majority of participants believing that most patients would be unable to detect a suspicious skin lesion on their own. This is an interesting viewpoint, as research suggests that a majority of skin
cancers are first noticed by the patient or their partner or family members (McPherson et al., 2006).

A majority of participants also believed that patients should not be left to take full responsibility for skin cancer recognition, again supporting the need for the medical community to take responsibility for skin cancer detection. Interestingly, a small number of participants disagreed, believing that patients needed to take responsibility for their health in this regard. This stance is supported by current New Zealand recommendations, which suggest that responsibility should primarily lie with the patient, although still in conjunction with a health professional (Early Detection Advisory Group, 2006). Also, the fact that almost all participants believed knowledge and skill in skin cancer recognition would be beneficial indicates that the ability for a practitioner to identify suspicious lesions is important, whether this is used as part of a specific skin screening procedure, or in providing a greater opportunity to notice suspicious lesions during routine treatment.

In New Zealand, initiatives such as SunSmart, run by the Health Sponsorship Council and the Cancer Foundation of New Zealand, have been set up to provide the public with information and promote awareness of skin cancer and melanoma (The Health Sponsorship Council, 2007). The number of participants who report patient concern regarding skin cancer and melanoma would suggest that concern regarding these topics is not limited to those in the medical field, but that there is significant public awareness and concern.

Interestingly, however, this patient concern was not reflected in everyday practice, with most participants reporting that they seldom discussed skin cancer with a patient, if ever. Moreover, there was no significant correlation between the two. Although this may indicate that the participants’ views of their patients concerns are inaccurate, it may instead show some reluctance for patients to discuss such topics with their osteopath. This was touched upon by one participant, who noted:

“I have the perception that most patients don’t view ‘skin cancer’ as being within the domain (scope of practice) of their osteopath.”
It would be interesting to know the reason for this, whether it is due to reticence of the patient or a belief that such topics are outside the osteopathic scope of practice, however this would require further investigation and is outside the scope of this research.

Participants also noted their belief in the importance of melanoma awareness in their answers to the long answer questions in the Knowledge section.

Most of these statements reflected the safety theme. Several participants explained that the threat of melanoma was high enough to engender a need for awareness, saying that “it is too important and too risky to ignore” and “it is something that everyone should have an awareness of”.

In summary, osteopaths in New Zealand seem to agree that melanoma and skin cancer awareness is important, both from their perspective and their patients’ perspective, as melanoma is a serious problem in New Zealand that can have grave repercussions if undetected. Furthermore, they agree that there is a need for skin cancer screening within the health system, and that patients require the assistance of health professionals to manage their health in this regard. The next section will discuss whether the osteopathic profession sees this as an area in which they can help, or whether it is best left to general practitioners and specialists.

**The Relevance to Osteopathy**

Although osteopaths in New Zealand seem to recognize melanoma awareness as an important topic, this does not necessarily equate to a belief that osteopathy can (or should) be involved in ameliorating the problem.

Much of the focus of schemes designed to aid in the detection and treatment of melanoma have focused on members of the conventional medical community, including general practitioners and specialist doctors. Despite this, there has been recognition of a role for practitioners of complementary medicine (Early Detection Advisory Group, 2006).
Osteopaths are recognized in New Zealand as being primary practitioners (Health Practitioners Competence Assurance Act 2003), and as such form part of the first level of contact within the health system. Furthermore, there is a responsibility to care for a patient’s general health or to refer patients to services that can care for ongoing problems (King, 2001).

Despite this, the scope of practice for osteopathy in New Zealand does not specifically denote the role of the osteopath, stating, in part, that osteopaths are “practitioners who facilitate healing through osteopathic assessment, clinical differential diagnosis and treatment of dysfunctions of the whole person” (The Department of Internal Affairs, 2004, p. 2966), making it difficult to determine whether such care is part of osteopathic practice.

As such, participants were asked their views on whether skin cancer and melanoma recognition were relevant to osteopathic practice.

The responses in this survey indicate that New Zealand osteopaths are generally comfortable with the responsibility of being a primary practitioner, with almost every participant agreeing that they must be mindful of their patient’s general health. This result was expected, as it ties in strongly with the osteopathic philosophy of holism – that the body must be treated as a whole. Without consideration of the patient’s general health, this tenet cannot be met.

In further considering the role of an osteopath as a primary practitioner however, most respondents also agreed that they should be able to diagnose a wide range of pathologies, and that they had a responsibility to manage (not just be aware of) their patient’s general health. Although there were a few (17%) who disagreed with this statement, it shows that the community as a whole is accepting of the responsibilities that their position in primary care engenders.

The consideration of the place of skin cancer recognition in the osteopathic scope of practice is less clear, however. Although a majority of participants agreed that skin cancer recognition was within the osteopathic scope of practice, there were a significant number of respondents who were unsure, and several who disagreed. This may indicate the need for a more specific scope of practice or further investigation into exactly how practitioners view the scope of practice currently given for the osteopathic profession.
There was a strong correlation \((r = .637, p < 0.01)\) between believing that skin cancer recognition was within the scope of osteopathic practice and attitudes towards accepting responsibility for management of a patient’s health. This indicates that – as would be expected – a practitioner’s interpretation of their scope of practice drives their beliefs regarding their range of responsibilities to the patient.

Interestingly, however, there was also moderate correlation between those participants who rated their knowledge of skin cancer highly and those who believed that screening for skin cancer falls into the osteopathic scope of practice \((r = .410, p < 0.01)\). Those who believed that patients should not take full responsibility for skin cancer recognition also showed moderate correlation with those who believed that screening for skin cancer falls into the osteopathic scope of practice \((r = .484, p < 0.01)\). This suggests that practitioners who believe patients require assistance in recognising skin cancer and who are also comfortable in providing this assistance are more likely to accept such assistance as part of their role.

Despite the uncertainty of whether melanoma recognition falls within the osteopathic scope of practice, many practitioners seem to already include it as part of their practice. Only 12.9% of those surveyed \((n=9)\) indicated that they never consciously checked their patients for unusual moles, suggesting that 87.1% had checked at least once. Also, with 28.6% of participants \((n=20)\) stating that they always consciously checked their patients for unusual moles, it would appear that over a quarter of the profession already performs a regular – if brief - scan for melanoma.

There was moderate correlation between participants’ belief that screening for skin cancer falls into the osteopathic scope of practice and the number of times they discussed skin cancer with their patients \((r = .398, p < 0.01)\), suggesting that those who believed their role included concerns regarding skin cancer and melanoma followed this up in practice.

The attitudes towards the relevance of skin cancer recognition in osteopathy were also shown in the themes developed from the qualitative questions in the survey, specifically those pertaining to holism, patient care and that it is part of the service.
There were again a small number of participants that believed osteopathy should not play a role in the recognition of skin cancer, stating “it is not a primary concern for an osteopath”, however a majority of respondents believed that this was an area osteopathy could and should be involved in. In contrast to the above statement, several believed such a role was an inherent part of the osteopathic role, especially considering the position of the osteopath as a primary health care practitioner. Again, these dichotomous opinions suggest some different interpretations of the role of the osteopath within the profession, with some practitioners focusing on their role as a manual therapist and others on their role as a primary health care practitioner.

Other responses focused more on the ‘duty of care’ to the patient, arguing that not only is having some knowledge of skin cancer part of the duty of care owed to patients, but also that patients appreciate such care from the practitioner. This would suggest that even if patients do not expect such care from their osteopath, they value such care when it is offered.

Finally, respondents again stated the osteopathic tenet of holism as a reason for a role in the recognition of skin cancer, further emphasizing the fact that an osteopath considers the whole body not just the musculoskeletal system when examining and treating their patient.

Altogether, this suggests that there is a range of opinions as to the exact role of the osteopath in the New Zealand health system. While many osteopaths see themselves as primary health care practitioners, and accept the responsibility of health management that comes with that role, others believe that such care is best left to the ‘allopathic’ medical system, leaving them to concentrate on manual therapy and the specific complaints that patients present with.

These differences are no doubt exacerbated by the place of osteopathy in the New Zealand health system, where it is categorised as ‘complementary and alternative medicine’ (CAM). As such, osteopathy can either be considered either an alternative or an adjunct to the dominant medical system (Ministerial Advisory Committee on Complementary and Alternative Health, 2004).

Patients may therefore seek treatment only from an osteopathic practitioner (whereby it would seem the practitioner would need to perform a primary health care role) or may see an osteopath in conjunction with their doctor (whereby the practitioner would seem more able to
focus on their role as a manual therapist). Further investigation as to where the osteopath sees themselves within this mixed role would no doubt prove useful; however this highlights the need for clear discussion between patient and practitioner to determine expectations of treatment.

Despite this, it seems the majority of the osteopathic community in New Zealand believes that the recognition of melanoma is a relevant part of osteopathic practice, both due to the role of the osteopath and osteopathic philosophy. The next question that must be considered is whether this willingness to be involved is matched by an ability to help.

**Ability to Help**

In the New Zealand medical system, the person most qualified to assess a patient for skin conditions is, of course, a dermatologist. Unfortunately, such care over a long term can be very resource intensive (Weinstock, 2006), and the number of dermatologists in New Zealand is limited, with only 49 dermatologists registered as members of the New Zealand Dermatological Society (New Zealand Dermatological Society, 2008a).

As such, the New Zealand Cancer Control Action Plan (Cancer Control Taskforce, 2005) noted that early detection of melanoma by health care workers before referral to a specialist was an important component of cancer control, and this was reinforced by a recent report on the early detection of skin cancer in New Zealand from the Early Detection Advisory Group (2006), which stated that “other health professionals ... are well placed to notice the early signs of skin cancer” (p. 46).

The osteopathic community seems to believe that they have the potential to help, with only 5 respondents (6.8%) believing that the osteopathic community cannot help to reduce the mortality from skin cancer; however the following sections will look at whether this belief translates into actual possibility.
Opportunity

The first key consideration in whether the osteopathic profession is able to provide assistance in the detection of skin cancer is whether the opportunity exists for this to occur.

One issue that has been identified as a barrier for the performance of skin examinations by physicians is the lack of time (Mikkilineni, Weinstock, Goldstein, Dube, & Rossi, 2002). It is interesting to note, then, that a majority of respondents disagreed with the belief that there was not enough time during an appointment to check for skin cancer. This may be due to differing definitions of what is considered a ‘skin examination’, however combined with the fact that a significant number of respondents also stated that they often or always consciously check for suspicious moles, it would seem that a lack of time is not a significant barrier to such inspection.

This may be aided by the fact that a majority of participants also noted that they often or always ask a patient to remove outer layers of clothing during an examination – something which may not occur during a typical consultation with a general practitioner. This was a major theme noticed in the answers to the qualitative questions, with many practitioners explaining that the exposure to patients in a state of undress gave a great opportunity to notice suspicious lesions.

Again, there were a small number of respondents who disagreed with these statements, advising that time was a limiting factor for them, or that patients were reluctant to remove clothing. Interestingly, there was a moderate correlation ($r = .460, p < 0.01$) between those who did not often ask patients to remove clothing and those who noted that time factors were a barrier to checking for suspicious lesions. This may suggest that some osteopaths who do not ask for patients to remove clothing may not have the same opportunity to check for skin cancer as those who do.

Another avenue of opportunity mentioned in these answers was the fact that patients can be seen multiple times over prolonged periods. When combined with repeated exposure to that patient’s skin, changes in lesions over time are more likely to be noticed, further enhancing the ability of the practitioner to note suspicious lesions.
As such, provided the osteopath sees their patients in a state of undress as part of their practice, it would seem that there is ample opportunity for practitioners to check their patients for melanoma.

**Ability to recognise melanoma**

With the opportunity for melanoma recognition present, do osteopaths have the ability recognise melanoma?

Many respondents noted that they had reasonable levels of knowledge regarding both the risk factors for melanoma and melanoma detection; although as a group they were more comfortable with their knowledge of risk factors, with 16.2% (n=11) believing their knowledge in this area was excellent. Understanding of risk factors and knowledge of melanoma detection correlated highly with each other (r = .519, p < 0.01), suggesting that participants’ knowledge of melanoma was multifaceted, and not limited to one area.

Participants were not as confident in their ability to distinguish a benign mole from a melanoma, however, and although several believed they could distinguish between the two more than half the time, the majority of participants believed they could do this less than half the time. As expected, this was also highly correlated with participants’ beliefs regarding their levels of knowledge regarding melanoma detection (r = .580, p < 0.01).

With these factors taken into consideration, it was interesting to note that only 32.4% (n=22) of participants were confident that they would be able to tell which moles would require referral to a specialist – although this is again highly correlated with participants’ beliefs regarding their knowledge of risk factors (r = .645, p < 0.01), detection (r = .629, p < 0.01) and ability to determine benign moles from melanoma (r = .678, p < 0.01), suggesting that those who believed they had high levels of knowledge were more confident in knowing when to refer.

A lack of confidence in referral also seems to be reflected in practice. A majority of participants (73.2%, n=52) noted that they saw patients with suspicious moles occasionally,
often or always. Just over half this number of practitioners (n=29) referred their patients for further investigation, however, suggesting that a large proportion of patients with suspicious moles were not referred. This discrepancy could be explained either by a lack of confidence in referral, or a decision by the osteopath that these lesions, while suspicious, did not require further investigation.

Interestingly, there was a weak negative correlation between the respondents’ comfort in determining a benign mole from a melanoma and referral rates ($r = -.299, p < 0.05$) and a moderate positive correlation between respondent’s belief that melanoma is difficult to detect clinically and referral rates ($r = 0.430, p < 0.01$). This would suggest that the majority of referrals are those who are not confident in their melanoma recognition skills. As discussed further in the next section, this might lead to over-zealous referral of lesions and - as excision followed by histological exam is the gold standard for diagnosis – possible over treatment of patients with benign lesions.

A tendency for those less confident in recognition to refer more often is also shown in the responses to the question “What would prompt you to refer a patient for further investigation for skin cancer?” Although several answers focused on the clinical signs of melanoma, many noted that they would refer any patient who was concerned, or if there was a concern on the behalf of the practitioner (without necessarily being based on clinical signs). Although it would be far better for an uncertain practitioner to refer a patient that had concerning lesions, being able to apply some triage during the consultation would no doubt help reduce the number of unnecessary referrals.

Within the survey, the participants had the opportunity to complete a skill based section, which tested them on the recognition of melanoma over benign moles, and on general melanoma facts and clinical signs. This provided a relatively objective measure of participants’ knowledge, but also allowed a comparison to be made between the participants’ beliefs regarding their knowledge levels and actual knowledge.

The respondents who participated in this section showed good sensitivity (75.2%) when compared to that of other studies (Piccolo et al. (2002) noted a sensitivity of 69% for inexperienced clinicians, whereas Oliveria et al. (2001) found that nurse practitioners’ sensitivity for detecting significant skin cancer lesions ranged from 50% to 100% after a
training course). Specificity, however, was quite low, with a value of 44.4%, compared to 94% found by Piccolo et al. (2002) and 99% to 100% found by Oliveria et al. (2001). Although the sensitivity and specificity shown in this study was influenced by the large amount of ‘Unsure’ answers, it again reflects the uncertainty that practitioners have in judging a suspicious lesion benign.

The general knowledge of participants with regard to melanoma seemed quite good, with a majority of participants answering the True/False section well; however knowledge of both the risk factors for and clinical signs of melanoma was not as strong.

Although a majority of participants noted both the colour and border of a lesion as being important clinical signs of melanoma, only 56.9% (n=33) noted evolution. Evolution, the changing of an existing mole or the appearance of a new mole, has been noted as one of the most significant indicators for the early detection of melanoma (Weinstock, 2006). Few participants noted lesion diameter or asymmetry as being of importance in the clinical recognition of melanoma. Although many participants could identify three or four of the possible six signs, there were several participants (8.6%, n=5) who could not identify any factors at all, showing a gap in clinical knowledge.

This is similar to the results seen with risk factors for melanoma, with most participants being able to identify two or three of the six major risk factors. Again, this suggests some limited knowledge, but at a superficial level only.

Interestingly, while there was a moderate correlation between participants’ beliefs regarding their knowledge of melanoma detection and the number of clinical factors identified (r = 0.346, p < 0.01), there was no significant correlation between the participants’ beliefs regarding their knowledge of risk factors, and the number of factors correctly identified in the skill quiz. This suggests that practitioners believe they have a better understanding of risk factors than is actually the case.

There was weak correlation between participants’ ability to identify melanoma from benign moles and their perceived knowledge regarding skin cancer detection (r = .249, p < 0.05). Furthermore, there was also weak correlation between participants’ ability to identify melanoma from benign moles and their confidence in determining melanoma from a benign
mole \((r = .266, p < 0.05)\). This suggests that some practitioners who believe they are able to
determine melanoma from benign moles generally can do so.

In considering this, it would seem that there is a fair amount of uncertainty within the
osteopathic community as to their knowledge regarding melanoma and their skills in
melanoma recognition. There is some indication that melanoma knowledge could be lower
than believed by many practitioners; however there is also evidence that skills in recognising
melanoma are reasonably good, especially among those who are confident in their ability.

How this uncertainty could be ameliorated is explored more below, in *Barriers and
Opportunities*; however, first the potential role of osteopathy in the recognition and detection
of melanoma will be explored.

**Potential Roles**

With support from the community (and, indeed, existing practice within the community),
substantial opportunity for involvement and the potential of skill in the area, it would seem
that the osteopathic community can play a role in the recognition and detection of melanoma.

For this to occur, however, the role that the osteopathic community would play must also be
considered.

Many of the participants expressed concern over the possibility of osteopaths diagnosing
melanoma, stating that this is best left to specialist medical care. This is a valid argument –
with a dermatologist in New Zealand having a minimum of thirteen years training, including
at least four years of specialist training (New Zealand Dermatological Society, 2008b), there
would be no benefit – and in fact likely great harm – in trying to supersede this role.

A more likely role is that suggested by the Early Detection Advisory Group (2006),
remaining alert for suspicious lesions while performing routine examination and treatment.
This role seems to have support from the osteopathic community, with several participants stating that they would be comfortable discussing referral with a patient, or that this is the best role for osteopathy to take.

As discussed previously, the opportunity inherent in a typical osteopathic consultation matched with some evidence of skill in recognising suspicious lesions suggests that osteopathy would be well suited to a recognition and referral role. An aspect of this that must be considered, however, is that of over-referral, and subsequent over-treatment of a patient.

Due to a high false-positive rate, the effectiveness of skin cancer screening on the general population has been queried (Helfand et al., 2001). Formalised skin cancer screening (in the manner of total-body skin examinations) may result in “unnecessary treatment, either due to misdiagnosis or to detection of lesions that might not have caused clinical consequences” (Cancer Control Taskforce, 2005). As such, it is important that a sufficient level of knowledge is maintained to help ameliorate this problem.

Another role that was suggested by participants in the survey was that of patient education, with several participants feeling they could play a role both in education and motivation of patients.

Again, this approach is supported by current recommendations on the early detection of melanoma. To help limit the difficulties associated with skin screening programmes, the patient is being given increasing responsibility for caring for themselves, both through general ‘skin cancer awareness’ and prevention strategies (Early Detection Advisory Group, 2006). There have also been encouraging results from patients performing skin self-examinations, with such examinations being performed more often with encouragement from health care providers (Oliveria et al., 2004).

As such, it would seem that osteopathy can play a role in the early detection of melanoma, not in a diagnostic or treatment sense, but in the recognition and referral of suspicious lesions, and the education of patients to better care for themselves.
**Barriers and Opportunities**

With the potential to play a role in the early detection of melanoma, and some existing practice within the community, the factors limiting further involvement must be explored.

Of the four main barriers identified, two related to knowledge and skill (*Lack of Knowledge/Experience* and *Difficulty in Clinical Detection*) and two related to opportunity and relevance (*Outside Osteopathic Scope of Practice* and *Lack of Opportunity*).

The latter two barriers relate strongly to issues previously discussed. The comments regarding lack of opportunity relate to removal of a patient’s clothing during a typical examination, and the limitation of opportunity that occurs when patients are not required to disrobe. Such removal of clothing is a personal preference of the practitioner, factoring in the wishes of the patient and as such, the opportunity for examining the skin is naturally limited by either party requiring that clothes are not removed. As seen previously, however, the majority of practitioners ask patients to disrobe during most examinations, helping to reduce this barrier.

Similarly, the issues surrounding whether examination for suspicious lesions falls within the osteopathic scope of practice has been previously discussed. Again, whether this is a barrier depends on the personal views of the practitioner as to their role as an osteopath, and to what extent they accept their role as a primary practitioner.

The other barriers to osteopathic practitioners playing a role in the early detection of melanoma seem to be related to knowledge and skill levels. Several respondents noted that the difficulty in clinical detection of melanoma was a barrier to their involvement.

Interestingly, there is a moderate negative correlation between clinical experience (measured in years since graduation) and the perceived difficulty in clinical detection of skin cancer ($r=-0.329$, $p<0.01$), suggesting that such difficulty could be linked to inexperience. There was also no significant correlation between a belief that skin cancer was difficult to detect and skill levels – both as measured by image diagnosis and the total score for the skill quiz. This suggests that such belief may be linked more to low confidence than to any actual lack in skill.
Perhaps the most widely identified barrier was the osteopaths lack of knowledge regarding melanoma. Certainly, when asked what factors would most improve their confidence or desire to look for skin cancer in their patients, almost 90% of respondents identified either better knowledge or reference materials.

It is therefore interesting to note that only a small number of participants (18.3%, n=13) noted that they occasionally discussed the topic with their colleagues, and none “often” or “always” discussed skin cancer with colleagues. Furthermore, 38.0% (n= 27) of osteopaths surveyed noted that they did not try to keep up to date with research on skin cancer. The reasons for this are not clear, especially considering that almost all participants (93.0%, n=66) noted that they were interested in continuing education for skin cancer recognition.

One factor that may account for this is difficulty in accessing training courses on the topic, although this will hopefully be remedied in accordance with the recommendations provided by the Early Detection Advisory Group (2006), in that an information course be developed for health professionals regarding skin cancer and melanoma.

It would seem that the availability of such resources would be of great value to many osteopaths who noted a need for better education. There was a strong correlation between those who believed they had sufficient knowledge regarding skin cancer detection, and confidence in recognising which lesions would require referral (r = .554, p < 0.01). There was also a moderate correlation between those who believed they had sufficient knowledge and the total score in the skill quiz (r = .381, p < 0.01), suggesting that those practitioners who had previously sought training regarding skin cancer and melanoma were both more confident and better skilled than their untrained peers.
**Limitations of Study**

There were several issues identified during this research which may limit the generalisability of the results.

The first of these is the sample size attained during the survey process. Although enough responses were obtained to provide some accuracy, low response rates combined with a limited population meant achieving a large sample was challenging. This also made the use of more advanced statistical tests difficult as sample sizes were often not sufficient to provide acceptable significance.

In addition, the lack of previously ascertained demographic data made it difficult to determine how well the sample represented the population. Again, due to the small population of New Zealand osteopaths, any factors due to misrepresentation may be amplified.

The determination of validity and reliability of the questionnaire was also limited, again due to sample sizes, but also due to time limitations. Ideally, a much greater sample would have been canvassed during the piloting phase, and have completed the questionnaire on more than one occasion to allow both test-retest reliability and factor analysis to be performed properly. Although post-hoc analysis of the data suggests that the questionnaire shows both reliability and validity, this is again limited by the sample size.

A larger pilot would also have allowed identification of some issues in the questions used, specifically the confusion over the question “What are the risk factors for melanoma?” as well as rewording some of the questions in the Attitude section to make their meaning more clear (although this did not affect the results).

The skill quiz section also provides limited validity, and may only be useful as a guide and/or indicator of skill levels and knowledge in the osteopathic community. This was necessitated by the self-reported nature of the survey; however further research into these areas would be necessary before concrete conclusions may be drawn.
There has been a sizeable amount of data gained from this survey, and there are no doubt further relationships that could be gained from additional analysis of both the quantitative and qualitative data. Despite this, the results shown have provided some interesting issues for the osteopathic community in New Zealand.
CONCLUSION

With reference to the research question presented in the Introduction, this section summarizes the findings and discussion of the preceding chapters, noting implications for the osteopathic community in New Zealand and avenues of future research.

Current Attitudes and Beliefs

The osteopathic community in New Zealand seems to view melanoma (as well as non-melanoma skin cancer) as an important topic, both generally and to them as a practitioner and as a profession. There is, however, some disagreement as to the exact role of the osteopath in primary health care.

In light of this, osteopaths recognized that there was ample opportunity for recognition of suspicious lesions during a typical examination, although a lack of knowledge or training in the area was identified as a major barrier. Many practitioners expressed a desire for further training; however there was a general lack of self-motivated education, perhaps as a consequence of a lack of awareness regarding courses and resources available to the community.

Practitioners believed they could assist both through recognition and referral of suspicious lesions and patient education. It was widely (and firmly) believed that osteopaths could and should not replace the current system for the diagnosis and treatment of melanoma, but could work in a cooperative manner with the public health system to ensure the best care for their patients.

Current Practices and Levels of Knowledge

A number of osteopaths already check their patients for skin cancer. Practitioners occasionally notice suspicious lesions and discuss this with their patients, although patients were less likely to initiate a conversation about skin cancer.
Referral of patients with suspicious lesions tended to be greater for those practitioners who had noted low confidence in melanoma recognition. Although osteopaths had relatively good sensitivity in recognizing melanoma, a low specificity suggests a potentially high amount of referrals for benign lesions.

This pattern gives the potential for patients to be over-referred for diagnosis, possibly leading to both over-treatment of otherwise benign lesions and increased use of public health resources.

**Implications for the Profession**

By being able to recognize suspicious lesions and refer patients to the appropriate care, and by being able to provide patient education and support, osteopaths can work with the public health system to provide good care for their patients. In this manner, the osteopathic community can meet the latest recommendations of the Early Detection Advisory Group (2006) and assist with the goals of The New Zealand Cancer Control Strategy by providing “early cancer detection by individuals and health care workers, coupled with timely referral for specialist assessment and investigation” as well as helping to “raise awareness, increase knowledge, and improve protective attitudes and behaviours” with regards to skin cancer (Cancer Control Taskforce, 2005, p. 27).

One area that will need addressing before this can take place, however, is the development of training courses or resources for education about melanoma and non-melanoma skin cancer. Given the responses to this survey, there is certainly call for such resources to be made available, and it may be worth considering including such a course in the CPD (Continuing Professional Development) framework.

It would appear that with sufficient training, the osteopathic community will be able to play a significant role in the early detection of melanoma.
**Future research**

As melanoma has such a high incidence in New Zealand, all health practitioners can likely assist in similar ways to the osteopathic community. It may be worthwhile performing similar investigations into other health systems, especially manual therapists (such as massage therapy, chiropractics and physiotherapy) who would enjoy similar opportunity to examine their patient’s skin.

Similarly, as the incidence of melanoma in Australia is, if anything, greater than in New Zealand, this study could be repeated within the osteopathic community there (as well as with other health practitioners). This would have the added advantage of being able to access a greater population base, improving the accuracy of any results.

Following on from this research, several topics have been brought to light. Firstly, the skill test used in this study was of low validity. It may be worthwhile repeating such a test using a more valid instrument, while also investigating the effect training courses have on skill and knowledge levels. Following on from this, the effectiveness of various short courses could be assessed to find the most efficient way of improving practitioner skill and knowledge.

Finally, it has become apparent during this research that there is some disagreement over the exact place of osteopathy within the medical system, the degree to which osteopaths should consider themselves a primary health care practitioner, and the degree of responsibility that should be taken for a patient’s general health. With consideration to the breadth of the New Zealand osteopathic scope of practice, it may be useful to ascertain the osteopathic community’s views regarding this subject.
STATEMENT OF COMPETING INTERESTS

The researcher is currently an employee of MoleMap New Zealand Limited; however this company had no input into this research excepting provision of resources (specifically the images used in the skill quiz) and minor consultation on questionnaire design.
REFERENCES


APPENDIX ONE: SURVEY QUESTIONNAIRE

SCREENING FOR SKIN CANCER – AN OSTEOPATHIC PERSPECTIVE

INTRODUCTION

This questionnaire has been designed to determine the attitudes and beliefs of the osteopathic community towards melanoma, the knowledge held about melanoma and the practices regarding melanoma that occur within osteopathic practice.

All data gathered is anonymous and linked only to the questionnaire number written at the top of the questionnaire.

This questionnaire is in five parts:

1: Demographics – This section includes questions to determine demographic data, including clinical experience, qualifications and location of practice.

2: Attitudes and Beliefs – This section includes questions to determine your attitudes and beliefs about melanoma and skin cancer, as well as the place of melanoma and skin cancer recognition in the osteopathic community.

3: Practice – This section includes questions to determine how melanoma and skin cancer recognition is incorporated into your clinical practice.

4: Knowledge – This section includes questions to determine how you regard your knowledge about melanoma and skin cancer.

5: Self-assessment (optional) – This section includes a range of questions to determine your knowledge about melanoma and skin cancer, as well as your skill at recognition of melanoma. This last section is completely optional and answers are available on request.

If you would like the answers to the self assessment questions, please indicate by typing ‘Yes’ in the box below

Please send me the answers to the self-assessment questions

Please send me a summary of the survey results
**DEMOGRAPHICS**

1. **Age (in years):** [ ]

2. **Gender:** [ ]

3. **Institution where you gained your registrable osteopathic qualification:**

   (Please type ‘X’ in the box corresponding to your answer)

<table>
<thead>
<tr>
<th>Institute</th>
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<tbody>
<tr>
<td>British College of Osteopathic Medicine, United Kingdom</td>
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<td>British College of Naturopathy and Osteopathy, United Kingdom</td>
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<td>Phillip Institute of Technology, Australia (pre 1993)</td>
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<td>Royal Melbourne Institute of Technology (RMIT), Australia (1993-present)</td>
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<tr>
<td>Surrey Institute of Osteopathic Medicine, United Kingdom</td>
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<td>Sydney College of Osteopathy, Australia</td>
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<td>Unitec New Zealand, New Zealand</td>
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<td>University of Western Sydney, Australia</td>
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<td>Victoria University, Australia</td>
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<td>Windsor College, Australia</td>
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<td>Other (please name)</td>
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4. Please indicate the highest educational level in **ANY** area of study (tick only one)

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<td>Bachelor’s Degree</td>
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<td>PhD or Doctoral Degree</td>
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<td>Honours Degree</td>
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5. Number of years since graduation with osteopathy qualification: ____________

6. Average working week (total hours) ____________

7. Please estimate the hours of your usual osteopathic working week spent on each of the following:

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<th>Activity:</th>
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<td>Patient Care</td>
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<td>Practice Management</td>
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<tr>
<td>Teaching / Education</td>
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<td>Research Related Activity</td>
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8. In what setting(s) do you practice? (Select all that apply)

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<tr>
<th>Setting:</th>
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<tr>
<td>Your own home</td>
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<td>Private Hospital</td>
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<td>Private Practice Premises (osteopathy only)</td>
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<td>Public Hospital</td>
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<tr>
<td>Home visits</td>
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<td>Teaching/tutoring</td>
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<tr>
<td>Private Medical or Health Centre (multidisciplinary centre)</td>
<td>Other (please name)</td>
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9. In what kind of area is/are your practice(s) located? (Select all that apply)

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<td>Rural or Country</td>
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<td>Village</td>
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<td>Provincial Town (outside a main centre)</td>
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<td>City (central business district)</td>
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<td>Inner City (suburbs close to central business district)</td>
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<td>City Suburban</td>
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<td>Other (please name)</td>
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10. Please select the region(s) in which you practice:
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<tr>
<th>Region:</th>
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<td>Waikato</td>
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<td>Manawatu-Wanganui</td>
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<td>Southland</td>
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### ATTITUDES/BELIEFS

Please read the statements on the left and indicate by ticking the boxes whether you agree or disagree with each statement. (Please type ‘X’ in the box corresponding to your answer)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Completely disagree</th>
<th>Disagree</th>
<th>Slightly Disagree</th>
<th>Unsure</th>
<th>Slightly Agree</th>
<th>Agree</th>
<th>Completely Agree</th>
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<tbody>
<tr>
<td>1. Skin cancer detection would benefit many of my patients</td>
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<td>2. Knowledge and skills in skin cancer recognition would benefit me as a practitioner</td>
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<td>3. Osteopaths cannot reduce the severity of skin cancer</td>
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<td>4. All health professionals should spend more time screening for skin cancer</td>
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<td>5. It is within the New Zealand scope of practice to recognize skin cancer in patients</td>
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<td>6. My patients do not seem to be concerned about skin cancer</td>
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<td>7. There is not enough time to check for skin cancer during a treatment</td>
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<td>8. Patients should take full responsibility for skin cancer recognition</td>
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<td>9. As primary practitioners, we should be able to recognize a wide range of pathologies</td>
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<td>10. We should be mindful of our patient’s general health, not just their presenting complaint</td>
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<td>11. Most patients are able to detect suspicious lesions by themselves</td>
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<td>12. As primary practitioners, we have a responsibility to manage our patient’s general health</td>
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<td>13. Skin cancer is not an issue in my region</td>
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<tr>
<td>15. I already have enough knowledge about skin cancer and recognition</td>
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<tr>
<td>16. I try to keep up to date with recent research regarding skin cancer</td>
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<tr>
<td>17. Skin cancer is very difficult to detect clinically</td>
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</tr>
</tbody>
</table>
**PRACTICE**

Please respond to the questions according to the circumstances in your own practice over the last year. (Please type ‘X’ in the box corresponding to your answer)

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Seldom (e.g. 1-2 per year)</th>
<th>Occasionally (e.g. 1-2 per month)</th>
<th>Often (e.g. 1-2 per week)</th>
<th>Always (e.g. daily)</th>
</tr>
</thead>
<tbody>
<tr>
<td>How often do your patients ask you about skin cancer?</td>
<td></td>
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<tr>
<td>How often do you notice patients with unusual moles?</td>
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<tr>
<td>How often do you discuss skin cancer with your patients?</td>
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<td></td>
<td></td>
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<tr>
<td>How often do you consciously check patients for unusual moles?</td>
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<tr>
<td>How often do you refer a patient for further investigation for skin cancer?</td>
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<tr>
<td>How often do you discuss skin cancer with your colleagues?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How often do you ask patients to remove outer layers of clothing during your examination?</td>
<td>Never</td>
<td>Seldom</td>
<td>Occasionally</td>
<td>Often</td>
<td>Always</td>
</tr>
</tbody>
</table>

What would prompt you to refer a patient for further investigation for skin cancer?
**KNOWLEDGE**

Please type the number that best represents your feelings regarding the questions below into the box provided after each question:

1. How well do you feel you understand the risk factors for melanoma?

   (Type 1 – 7):

2. How would you rate your level of knowledge of melanoma detection?

   (Type 1 – 7):

3. Would you feel comfortable distinguishing a melanoma from a benign mole?

   (Type 1 – 7):

4. Would you feel comfortable in determining which moles would require referral to a skin specialist?

   (Type 1 – 7):
Would you be comfortable discussing skin cancer with a patient? Why / why not?

Based on your inspection, would you be comfortable reassuring a patient that a particular mole does not require future investigation? Why / why not?

Can osteopathy play a role in the recognition of skin cancer? Why / why not?
What are the current factors that most limit your confidence or desire to look for skin cancer in your patients?

What potential factors could most improve your confidence or desire to look for skin cancer in your patients?
SELF ASSESSMENT

Please note that this section is optional. If you would like the answers to these questions, please tick the relevant box on the introduction page.

Alternatively, type “Yes” here: ____________________________

1. Please indicate for each picture whether you feel the picture is of a benign mole, a melanoma or if you are unsure. (Please type ‘X’ in the box corresponding to your answer)

<table>
<thead>
<tr>
<th></th>
<th>X</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Benign</td>
<td></td>
<td>Benign</td>
</tr>
<tr>
<td>Unsure</td>
<td></td>
<td>Unsure</td>
</tr>
<tr>
<td>Melanoma</td>
<td></td>
<td>Melanoma</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>X</th>
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</tr>
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</tr>
<tr>
<td>Melanoma</td>
<td></td>
<td>Melanoma</td>
</tr>
</tbody>
</table>
Please answer these questions to the best of your knowledge. (Please type ‘X’ in the box corresponding to your answer)

<table>
<thead>
<tr>
<th></th>
<th>True</th>
<th>False</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Zealand has one of the highest rates of melanoma in the world</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A small melanoma is not dangerous</td>
<td></td>
<td></td>
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<tr>
<td>Other forms of skin cancer have a higher mortality rate than melanoma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Melanoma only occurs in areas exposed to the sun</td>
<td></td>
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</tr>
<tr>
<td>Both moles and freckles can be a potential site of melanoma</td>
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<td></td>
</tr>
<tr>
<td>Melanomas can arise in existing moles or from melanocytes in normal skin</td>
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</tr>
<tr>
<td>There is no risk involved in delaying the diagnosis of melanoma</td>
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<tr>
<td>The horizontal growth phase of melanoma is worse than the vertical growth phase</td>
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<td></td>
</tr>
<tr>
<td>Melanoma rarely metastasizes</td>
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<td></td>
</tr>
</tbody>
</table>

What features of a melanoma can aid in clinical recognition?

What are the risk factors for melanoma?
Thank you for taking part in this survey. If you wish to discuss this questionnaire or survey further, please enter this below, or contact me at osteosurvey@gmail.com.

Thanks again,

Tim Friedlander

Are there any general comments you would like to make regarding this questionnaire? (e.g. confusing questions, length of questions, difficulty in completing questionnaire).
APPENDIX TWO: UNITEC RESEARCH ETHICS COMMITTEE

APPROVAL LETTER

Tim Friedlander
180 Carrington Rd
Mt Albert
Auckland

October 23, 2007

Dear Tim,

Your file number for this application: 2007.760
Title: The role of osteopaths in the recognition of melanoma: Attitudes, knowledge and practices in melanoma screening within the osteopathic community

Your application for ethics approval has been reviewed by the Unitec Research Ethics Committee (UREC) and has been approved for the following period:

Start date: 17 October 2007
Finish date: 30 April 2008

Please note that:
1. the above dates must be referred to on the information AND consent forms given to all participants
2. you must inform UREC, in advance, of any ethically-relevant deviation in the project. This may require additional approval.

This letter has been copied to the Principal Supervisor for Unitec student research projects.

You may now commence your research according to the protocols approved by UREC. We wish you every success with your project.

Yours sincerely,

[Signature]

Deborah Rolland
Deputy Chair, UREC

RMOL ref#: 1001

cc: Dr Carol Horgan
Carla Sutton