# Should the Ministry of Health introduce a melanoma screening programme?

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## Abstract

New Zealand has the highest incidence of melanoma in the world. It poses a significant burden both to patients and to the health system, and therefore, there has been debate regarding whether a national screening programme for melanoma in New Zealand should be implemented. This article discusses some of the criteria required for a screening programme, some of the issues that may arise with melanoma screening, and whether one would be appropriate for New Zealand.

## Background

Melanoma is a cancer of melanocytes, usually in the skin, and has a significant risk of metastasis.[1] Patients with metastatic melanoma have markedly reduced survival.[2] Each year in New Zealand approximately 56.2 per 100,000 people will develop melanoma (age-standardised rate), a staggeringly large number compared with the age-standardised global incidence of about 5 per 100,000 people.[3] This likely relates to an amalgam of risks factors, including much of the New Zealand population having fair skin, a population that spends a significant amount of time exposed to the sun, and high amounts of ultraviolet radiation in New Zealand.[4]

Diagnosis of melanoma is usually made by clinical suspicion, with consideration of the patient's history, inspection of pigmented skin lesions in examination, and confirmed with biopsy. Treatment is variable and depends on the stage of the disease; often surgical excision is sufficient. If there is advanced metastatic spread, treatment may involve immunotherapy or other targeted therapy typically aimed at controlling symptoms and the rate of progression of the disease, rather than the cure.[5] There are many non-modifiable risk factors for the disease such as a patient's genetics and family history. And while melanoma can be fatal, it is also preventable, and some modifiable risk factors include excessive sun exposure, tanning bed use, and severe sunburns in childhood. Primary prevention may be brought about by a societal reduction in these modifiable risk factors in New Zealand, decreasing the incidence and overall burden of melanoma to our society.[6]

Secondary prevention, however, involves treatment of melanoma once it has been diagnosed. In general, treatment is more effective when performed earlier during a disease, which is made easier when it is detected earlier. Therefore, there is a potential place for a melanoma screening programme. Screening is the testing of an asymptomatic population for a disease before symptoms develop and while there are still features that may be detected clinically. This allows earlier diagnosis, meaning an intervention can be initiated earlier. However, not every disease or population is suited for a screening programme. In 1968, Wilson and Junger delineated ten features of a good screening programme for the World Health Organisation, which are widely referred to in screening programme development, globally, and are outlined with reference to a potential melanoma screening programme in New Zealand below:[7]

### 1. The condition should be an important health problem

Melanoma does present a significant public health burden in New Zealand. It has a relatively high incidence in New Zealand and is often fatal for many patients.[8] Moreover, there will be an increasing incidence of melanoma as the population ages. As such, melanoma poses a significant enough threat to warrant a national screening programme.

### 2. There should be treatment for the condition

Melanoma, particularly in its early stages is treatable and curable with excision. Therefore, screening for melanoma does not pose the ethical dilemma of identifying patients with an incurable and untreatable disease who are otherwise asymptomatic, and many patients would be able to receive curative treatment.

### 3. Facilities for diagnosis and treatment should be available

There are facilities to diagnose and treat melanoma in New Zealand, including general practitioners and specialist services, in both the

public and private sectors. Therefore, most people would have the opportunity to receive follow-up diagnostic investigation and treatment where indicated if they receive a positive screening result.

### 4. There should be a latent stage of the disease

This means that for a screening programme to be effective, there should be a period where the disease is clinically detectable before the disease progresses beyond cure. Melanoma has a latent period where there are malignant cells present that may be detected, while there is no deeper invasion nor metastatic spread.[1]

### 5. There should be a test or examination for the condition

One issue with a potential melanoma screening programme arises when deciding what would be the screening test. The diagnosis of melanoma is often made upon clinical suspicion. Suspicious lesions may be examined visually for changes consistent with melanoma, such as asymmetry, irregular margins, variable colour, a large diameter, and evolution. These features are not pathognomonic for melanoma, but an increased number raises clinical suspicion and the likelihood of the disease.[1] However, clinical inspection for the diagnosis of melanoma is not consistently accurate, even among experienced dermatologists; it has been shown that the sensitivity of history and examination of the diagnosis of melanoma is about 70% for dermatologists.[9] If there was to be a national melanoma screening programme and the method of screening was to be clinical inspection, it should be noted that there will be limits to the accuracy, namely the sensitivity and specificity of the screening, which will present problems with high rates of false positive and false negatives.

This also presents the question of who would administer the screening programme. It could be assumed that specialist dermatologists would be able to provide the most accurate screening of melanoma. However, this does not appear to be an efficient allocation of resources, as there may be too few dermatologists in New Zealand to meet the demand that screening would impose.[10] Another alternative is to train people to perform melanoma screening, such as is the case with the national childhood vision and hearing screening programme. Alternatively, general practitioners could administer the screenings, such as is already done with cervical cancer screening.[11] These two options may not be as accurate as dermatologists, but would be more readily available as a national programme.

### 6. The test should be acceptable to the population

Confirmation of melanoma is often by biopsy. While this is the ideal method of diagnosing melanoma, it is not necessarily an appropriate method of screening. The process of screening and detecting a case should be acceptable to the population, and one may assume that excision of every pigmented lesion, regardless of clinical suspicion, is both superfluous and exposes the population to many unnecessary procedures which are not without complications, cosmetic or otherwise.[12] Using inspection of lesions as a screening test would be more acceptable to the population, but is less accurate.[9]

### 7. The natural history of the disease should be adequately understood

The natural history of melanoma is well elucidated and will usually progress unrelentingly to metastatic disease, which is appropriate for a screening programme.[1]

### 8. There should be an agreed policy on whom to treat

Given the natural history of melanoma, a melanoma screening programme will presumably treat anyone diagnosed as a positive case, regardless of severity.

### 9. The total cost of finding a case should be economically balanced in relation to medical expenditure as a whole

The cost of screening needs to be balanced against total medical expenditure, meaning that the process of screening is cost effective. This depends on several factors, such as the cost of the resources involved in screening and the cost of the cases of melanoma that are not diagnosed as early as they would have been during the screening. Therefore, appropriate calculation of the cost-effectiveness of the programme is more suitable once the proposed programme is established, particularly regarding the cost of human resources that would be required, and until the change for the outcomes of melanoma is known. Until then, whether a melanoma screening programme is cost effective remains uncertain.

### 10. Case finding should be a continuous process, not just a 'once and for all' project

The screening will be an ongoing process rather than happening only once. It is easy and appropriate to continue to screen people continually at either different times, or different points in patient's lives.

The proposal of a melanoma screening programme appears to meet all the Wilson Criteria, except for the fifth and sixth, which are arguably the most important. If there is no appropriate screening test for a disease, then a screening programme cannot be suitably administered, regardless of the number of the other criteria met.

### Other Issues with screening

Screening itself is not without significant issue. Screening is a tool to identify those who are likely to have a condition, rather than make definitive diagnoses. Therefore, there will always be limited accuracy in screening programmes. The two significant inaccuracies in screening are false positives (i.e. a patient is told they have the disease when they do not), and false negatives (i.e. a patient is incorrectly reassured they do not have the disease when they do). If screening is to be based upon visual examination, there will almost certainly be significant numbers of false positives and negatives. Since melanoma has a rather low prevalence compared to some diseases, most patients being screened will not have the disease. Therefore, significant numbers of patients being screened will be falsely screened as positive. This has the potential to create unnecessary stress and anxiety while waiting for diagnostic confirmation.[13]

The other risk with screening programmes is over-diagnosis – identifying patients who do have the disease even though it is not likely to have ever affected the patient's life. Over-diagnosis leads to over-treatment, treating the patient with potentially harmful procedures or medication when it would have no impact on survival. However, the issue of over-diagnosis is less in a melanoma screening programme, as it is a rapidly advancing disease with high metastatic potential, and in general, treatment (even in very early disease) will be life prolonging and disease modifying.[1]

There has been a trial in Germany that assessed mortality rates before and after implementing a screening programme between 2003 and 2013.[14] Following implementation, there was a transient decrease in mortality from melanoma within about the first five years of the programme, but the mortality rate did return to the rate prior to screening. This probably represents a lead-time bias where cases are

identified earlier (and thus patient survival seems increased), despite having no impact on mortality. No randomised control trial assessing a melanoma screening programme has ever been performed, and so there exists little high-quality data regarding the benefits and harms of implementing a screening programme.[15]

## Conclusion

Melanoma is a major public health concern in New Zealand and it has been suggested that a screening programme may be a practical solution in reducing the burden and adverse consequences of this disease. While a melanoma screening programme would meet most of the criteria outlined by Wilson and Junger for an acceptable screening programme, the main issue remaining is the screening test itself, both in terms of what the test would involve and who would perform it. Other issues with screening, such as the impact of false positive tests, also present concerns and on balance, the benefits of screening do not seem to outweigh the costs. Therefore, public health efforts should continue to remain focussed on primary prevention rather than a screening programme, at least until a time when more is known about the benefits and harms of a melanoma screening programme.

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## Conflicts of Interest

William Muller is the NZMSJ Web Editor. This article has gone through a double-blinded peer review process applied to all articles submitted to the NZMSJ and has achieved a standard required for publishing. The author has no other conflict of interest.

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