

# Skin Cancer Diagnosis through Images

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Dermatoscope attached to a digital camera.

Melanoma (malignant melanoma) is a serious cancer, and the incidence has increased again after the number of new cases seemed to be stabilising in the 1990s [1]. With an early diagnosis, all melanoma patients will survive, whereas less than 50% will survive with a late diagnosis. It is not easy to distinguish a benign nevus from a melanoma, and numerous nevi are removed as a result of uncertainty. A Swedish study showed that the costs associated with “unnecessary” removal of suspicious nevi, which later turned out to be benign, amount to millions of kroner [2].

Dermatologists routinely use a dermatoscope to detect melanoma early. It is an instrument with a magnifying glass and embedded special lighting, which makes it easier to see the early signs of cancer. Dermatoscopy increases the diagnostic accuracy, but is difficult to learn even for dermatologists [3, 4]. In Norway, general practitioners have so far not been recommended to acquire this skill. [4] There is therefore a need to provide easier access to dermatoscopic examination for patients in primary health services. In principle, this may be achieved in different ways:

- **Better access to dermatologists.** To achieve a real increase in the number of dermatologists, the education

*With early enough diagnosis, all melanoma patients will survive.*

*There will in the foreseeable future be a shortage of dermatologists in Norway.*

*Transmitting dermatoscopic skin images through telemedicine can provide increased access to the dermatologist's expertise in primary health services.*

*Most electronic health record systems in Norway currently do not transmit still images.*

capacity at university hospitals will have to be increased considerably. Based on estimates by the Norwegian Medical Association, this goal seems unrealistic, since it is already difficult to replace the dermatologists who retire [5].

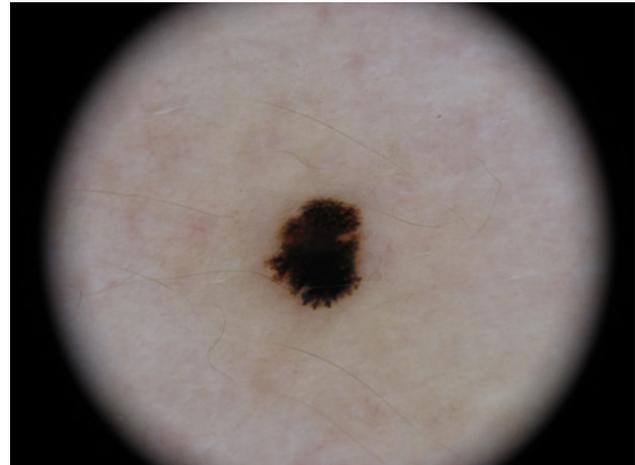
- **Use of computer programs to analyse nevi.** There are different digital computer programs on the market that can analyse digital images taken through a dermatoscope. There is no good documentation of the effects of such programs, and this cannot currently be recommended for routine diagnostics. At the Norwegian Centre for E-health Research, a randomized clinical study is currently underway in order to examine the effect of such a computer program in primary health services.

- **Use of telemedicine.** Diagnostics using still images taken through a dermatoscope (teledermatoscopy) are well-documented [6]. Internationally, still images are used almost exclusively in telemedical diagnosis of skin diseases, since this concept is easier to integrate into the workflow compared with videoconferencing. Teledermatoscopy has been introduced as a routine service in Australia, New Zealand and the United States, etc., where specially trained health professionals take pictures of suspicious skin changes as well as overview pictures of the entire body [7]. The images are sent to skin cancer experts, who determine whether the changes are suspicious. Use of skin images has now been recommended in several acknowledged international guidelines [8, 9].

In the short term, the introduction of teledermatoscopy will provide the greatest benefit for patients in Norway. Before this can happen, it is necessary to remove obstacles, such as electronic health record systems incapable of transmitting still images and too low reimbursement rates for telemedicine [10].

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*Dermoscopic image of a melanoma.*

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