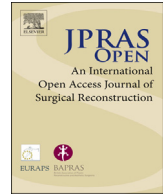




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Original article

# Cutaneous malignant melanoma in situ: A Danish cross-sectional study on patient and tumour characteristics in 144 cases

## Population-based cross-sectional study

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### ABSTRACT

**Introduction:** Cutaneous malignant melanoma in situ (MIS) has not been subject to much attention or investigation. Little is known of the characteristics of patients and tumours. The aim of this study was to elucidate important tumour characteristics in patients treated for MIS.

**Methods:** Based on data from the Danish Melanoma Register, patient and tumour characteristics were evaluated in a cross-sectional study including all patients diagnosed with cutaneous malignant melanoma in Health care Region Zealand between 2012 and 2013.

**Results:** A total of 144 patients were identified with malignant melanoma in situ; more females were affected than males, and the males were older than females. Patients with lentigo maligna were older than patients with superficial spreading MIS, which were predominantly found in the head and neck region. Among patients treated for MIS, 28% were previously treated for other skin malignancies.

**Conclusion:** The anatomical distribution of MIS differed with patient age and tumour subtype. The anatomical distribution was different in comparison to invasive malignant melanomas, and

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MIS cases were generally older. This suggests a non-linear relation between malignant melanoma in situ and invasive malignant melanoma.

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## Introduction

Cutaneous malignant melanoma in situ (MIS) is thought to be a precursor to invasive cutaneous malignant melanoma (CMM).<sup>1</sup> However, all MISs may not progress to CMM.<sup>2</sup> In Denmark, MIS is treated according to guidelines from the Danish Melanoma Group,<sup>3</sup> which implies local radical excision at 5-mm distances to the tumour, and a profound resection of a superficial part of the subcutaneous fat, ensuring complete removal of the dermis in the affected area.

Patients with MIS have an increased risk of developing a subsequent MIS.<sup>4</sup> In addition, they have 4.6 times increased risk of developing subsequent invasive CMM compared with the general population. An annual increase in the MIS incidence rates of up to 15% has been reported<sup>4–8</sup> in Australia, USA and Sweden. The highest incidence rates of CMM in Europe are found in Northern and Western countries (Scandinavian countries, the Netherlands, UK and Ireland) and the lowest incidence rates have been observed in Spain and Portugal.<sup>9</sup> World Health Organisation (WHO) Globocan reports that the Danish female population has the third highest risk of melanoma in the world (First is New Zealand, with Australia in the second place), and the Danish female population aged 15–39 years had the highest incidence of CMM in the world.<sup>10</sup> In 2006, Denmark showed the highest incidence rates across Europe (both genders), and different studies have suggested a continuous annual increase in the incidence rate of more than 3%.<sup>11,12</sup> Whereas CMM only represents approximately 4% of all skin cancers, the disease is responsible for approximately 80% of all skin cancer-related deaths.<sup>13</sup>

Over the years, the people of Denmark have changed from a culture of avoiding the sun to seeking it instead. Furthermore, during the 1960s, artificial sun devices were introduced in Denmark, and a cross-sectional study by Køster et al in 2009 showed that 29% of all Danes aged 15–59 had used sunbeds within the past 12 months. Among female children and adolescents aged 15–19 years, 59% had used sunbeds within the past 12 months.<sup>14</sup> As a consequence of the altered sun exposure pattern, in addition, we hypothesize that the patient and tumour characteristic may have changed during the past decades. In order to improve targeted examination and intervention, the main aim of this study was to describe patient and tumour characteristics in a cohort of Danish MIS.

## Method

### *Study design and setting*

This was a cross-sectional study based on the entire population living in the Health care Region Zealand (approximately 800,000 inhabitants) in Denmark. Data were obtained from the national Danish Melanoma Registry (DMR), which holds prospectively collected information on patients diagnosed with MIS or CMM in Denmark.<sup>3</sup> Reporting to DMR is mandatory for all departments involved in the diagnosis and treatment of malignant melanoma. The recorded data include specific information on disease characteristics, treatment and follow-up. Patients are registered in DMR after a histological confirmation of the MIS.

### *Participants*

This study included patients diagnosed with primary MIS between January 2012 and December 2013, residing in the Health care Region Zealand (a governmental administration unit comprising the

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