Long-term trends in melanoma tumour thickness in Norway

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# Background

Norway has the second-highest mortality rate of cutaneous melanoma worldwide and ranks fifth in incidence. Tumour (Breslow) thickness at diagnosis is the primary determinant of the T category in the tumour, nodes, metastasis (TNM) staging system, and the most important prognostic factor for survival after localized melanoma. This study investigates long-term trends in tumour thickness, and the corresponding T categories, in a nationwide case series over a 40-year time period.

# Methods

The population-based Cancer Registry of Norway (CRN) provided information on all first primary invasive melanoma cases diagnosed 1980-2019. Tumour thickness was available from the Norwegian Melanoma Registry (NMR, within the CRN) for cases diagnosed from 2008while for cases diagnosed before 2008 the information was manually extracted from pathology notifications archived in the CRN. The dataset consists of 47,439 morphologically verified first primary invasive melanoma cases. Covariates include sex, age, residential geographical region, anatomic site, histopathological subtype, clinical stage, and ulceration.

Descriptive summaries are presented as frequencies (numbers, %) and medians with interquartile ranges (IQR). Age-adjusted incidence trends were analysed using the segmented regression that identified the significant changes in the trend as join-points. Summary measure of the trend is assessed using annual percentage change (APC) in/for each segments and overall (1980-2019).

# Results

From 1980-2000 to 2008-2019, the median (IQR) age at diagnosis increased from 59 (46-70) to 67 (56-76) in men and 56 (42-71) to 63 (50-75) in women. . More women were diagnosed with thinner tumors than men. In men, median (IQR) tumour thickness decreased from 1.4 mm (0.75–3.0) in 1980-1999 to 1.0 mm (0.6–2.3) in 2008-2019, and in women from 1.0 mm (0.6–2.0) to 0.9 mm (0.5–1.80). Tumour thickness was missing in the pathology reports for more than 25% of the cases until 1990. Reporting of ulceration started in 2000, but with a large proportion of missing values. After the NM R was established in 2008, the proportions of missing ulceration decreased dramatically.

Both men and women have a sharp increase of T1 (up to 1mm) melanoma from 1980-1993 and the trend plateaued during 1993-2006. After 2006, the incidence in T1 again raises drastically in both sexes. The APCfor T1 was 7.23 in men and 6.1 in women for the entire period 1980-2019. The incidence for thicker tumors (>2mm) have also increased, although less pronounced. The APC of T4 tumors were 3.76 in men and 3.01 in women. The increasing trend observed in both thinner and thicker stages indicate the melanoma epidemic is not only due to the over diagnosis.



# Conclusions

This long-term time series data on melanoma cases in national level identifies the trends in melanoma incidence by tumour thickness, overall and in subgroups,

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