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**Title**: Long-term trends in melanoma tumour thickness in Norway

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**Categories:** Melanoma

**Topics:** Epidemiology

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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, node metastasis staging system and the most important prognostic factor for survival after localized melanoma. This ongoing study investigates long-term trends in tumour thickness, and the corresponding T-stages, overall and in important subgroups, in a nationwide case series over a 40-year time period.

# Methods

The population-based Cancer Registry of Norway (CRN) provided all first primary invasive melanoma cases for 1980-2019. Tumour thickness was available from the Norwegian Melanoma Registry (within the CRN) for all cases diagnosed between 2008-2019 and was manually extracted from the paper notifications archived in the CRN for the cases diagnosed between 1980-2007. 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).

# Results

In both men and women, median age at diagnosis increased from 1980-2000 to 2008-2019 (Table 1). Women were diagnosed at a thinner stage than men. In men, median (IQR) tumour thickness decreased from 1.4 (0.75 – 3.0) in 1980-1999 to 1.0 (0.6 – 2.3) in 2008-2019, and in women from 1.0 (0.6 – 2.0) to 0.9 (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 Norwegian Melanoma Registry was established in 2008, the proportions of missing ulceration decreased dramatically.

Table 1: Characteristics1 of Norwegian melanoma cases, 1980-2019.

|  | **Male** | | | **Female** | | |
| --- | --- | --- | --- | --- | --- | --- |
| **Characteristic** | 1980-1999,  N = 7,2931 | 2000-2007,  N = 4,1491 | 2008-2019,  N = 11,4751 | 1980-1999,  N = 8,6271 | 2000-2007,  N = 4,6311 | 2008-2019,  N = 11,2641 |
| **Age at diagnosis** | 59 (46 – 70) | 63 (52 – 75) | 67 (56 – 76) | 56 (42 – 71) | 60 (46 – 75) | 63 (50 – 75) |
| **Age group** | | | | | | |
| ≤20 | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) |
| 21-40 | 1,119 (15) | 355 (8.6) | 665 (5.8) | 1,862 (22) | 721 (16) | 1,209 (11) |
| 41-60 | 2,706 (37) | 1,435 (35) | 3,226 (28) | 2,917 (34) | 1,603 (35) | 3,769 (34) |
| 61-85 | 3,240 (45) | 2,143 (52) | 6,779 (59) | 3,387 (40) | 1,963 (43) | 5,246 (47) |
| >85 | 174 (2.4) | 195 (4.7) | 782 (6.8) | 317 (3.7) | 314 (6.8) | 992 (8.8) |
| Unspecified | 54 | 21 | 23 | 144 | 30 | 48 |
| **Anatomic site** | | | | | | |
| Head and neck | 1,109 (16) | 641 (17) | 1,679 (16) | 1,222 (15) | 620 (14) | 1,300 (12) |
| Upper extremities | 658 (9.7) | 407 (10) | 1,212 (11) | 1,320 (16) | 769 (17) | 1,856 (17) |
| Trunk | 4,062 (60) | 2,277 (59) | 6,469 (60) | 2,360 (29) | 1,427 (32) | 3,797 (35) |
| Lower extremities | 927 (14) | 526 (14) | 1,396 (13) | 3,220 (39) | 1,556 (35) | 3,670 (34) |
| Other | 62 (0.9) | 27 (0.7) | 75 (0.7) | 125 (1.5) | 60 (1.4) | 194 (1.8) |
| Unspecified | 475 | 271 | 644 | 380 | 199 | 447 |
| **Histopathological subtype** | | | | | | |
| Superficial spreading | 3,769 (53) | 1,969 (48) | 6,051 (54) | 4,827 (57) | 2,482 (54) | 6,493 (58) |
| Nodular | 1,509 (21) | 959 (23) | 2,143 (19) | 1,408 (17) | 845 (19) | 1,746 (16) |
| Lentigo maligna | 226 (3.2) | 107 (2.6) | 363 (3.2) | 373 (4.4) | 150 (3.3) | 423 (3.8) |
| Acral | 26 (0.4) | 21 (0.5) | 53 (0.5) | 41 (0.5) | 35 (0.8) | 72 (0.6) |
| Other | 1,643 (23) | 1,028 (25) | 2,696 (24) | 1,824 (22) | 1,052 (23) | 2,407 (22) |
| Unspecified | 120 | 65 | 169 | 154 | 67 | 123 |
| **Clinical stage** | | | | | | |
| Local | 5,853 (80) | 2,230 (54) | 9,302 (81) | 7,363 (85) | 2,677 (58) | 9,629 (85) |
| Regional metastasis | 328 (4.5) | 173 (4.2) | 852 (7.4) | 251 (2.9) | 123 (2.7) | 560 (5.0) |
| Distant metastasis | 440 (6.0) | 264 (6.4) | 425 (3.7) | 286 (3.3) | 158 (3.4) | 246 (2.2) |
| Unknown | 476 (6.5) | 1,376 (33) | 600 (5.2) | 571 (6.6) | 1,609 (35) | 638 (5.7) |
| Unspecified | 196 (2.7) | 106 (2.6) | 296 (2.6) | 156 (1.8) | 64 (1.4) | 191 (1.7) |
| **Ulceration** | | | | | | |
| Absent | 219 (100) | 526 (44) | 8,726 (81) | 243 (100) | 641 (57) | 9,264 (86) |
| Present | 0 (0) | 668 (56) | 1,984 (19) | 0 (0) | 488 (43) | 1,465 (14) |
| Unspecified | 7,074 | 2,955 | 765 | 8,384 | 3,502 | 535 |
| **Tumour thickness** | 1.40  (0.75 – 3.00) | 1.30  (0.70 – 3.00) | 1.00  (0.60 – 2.30) | 1.00  (0.60 – 2.00) | 1.00  (0.60 – 2.00) | 0.90  (0.50 – 1.80) |
| Unspecified | 2,116 | 616 | 1,009 | 2,559 | 602 | 764 |
| **T-stage** | | | | | | |
| T1 | 2,228 (43) | 1,496 (42) | 5,269 (50) | 3,179 (52) | 2,106 (52) | 6,092 (58) |
| T2 | 1,180 (23) | 847 (24) | 2,265 (22) | 1,388 (23) | 955 (24) | 2,221 (21) |
| T3 | 1,029 (20) | 706 (20) | 1,646 (16) | 948 (16) | 563 (14) | 1,222 (12) |
| T4 | 740 (14) | 484 (14) | 1,286 (12) | 553 (9.1) | 405 (10) | 965 (9.2) |
| Unspecified | 2,116 | 616 | 1,009 | 2,559 | 602 | 764 |
| 1Median (IQR); n (%) | | | | | | |

Analysis of incidence rates in relation to tumour thickness is in the process, and will be presented at the conference.

# Conclusions

This unique time series of national melanoma tumour thickness data will identify trends in tumour thickness, overall and in subgroups of the population, as well as identify potential effects of changing exposure patterns and earlier detection.