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

**Authors:**

**Categories:** Melanoma

**Topics:** Epidemiology

**Preference**: Poster Presentation

# 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 TNM staging system and the most important prognostic factors for localized melanoma. This on-going study investigates long-term trends in tumour thickness, and the corresponding T-stages, overall and in important subgroups, in a new 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 2007-2019 and was manually extracted from the paper notifications archived in the CRN for 1980-2007. The data constitute 47,439 morphologically verified first invasive melanoma cases. Covariates include sex, age, residential geographical region, histopathological subtype, anatomic site, clinical stage, and ulceration.

Descriptive summaries are presented as frequencies (%) and medians (inter quartile ranges).

# Results

Characteristics of the melanoma cases are presented in Table 1. In both men and women, median age at diagnosis increased from 1980-2000 to 2008-2019 and the median tumour thickness decreased. Melanoma was diagnosed in a thinner stage in women than in men. Within each T stage, median tumour thickness was stable over time however stage T4 has large variation (min- max 4.01-84 mm in men and 4.01-85 mm in women).

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.

| **Characteristic** | **Male** | | | **Females** | | |
| --- | --- | --- | --- | --- | --- | --- |
| 1980-1999,  N = 7,293 | 2000-2007,  N = 4,149 | 2008-2019,  N = 11,475 | 1980-1999,  N = 8,627 | 2000-2007,  N = 4,631 | 2008-2019,  N = 11,264 |
| **Age** | | | | | | |
| ≤20 | 54 (0.7) | 21 (0.5) | 23 (0.2) | 144 (1.7) | 30 (0.6) | 48 (0.4) |
| 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 (33) |
| 61-85 | 3,240 (44) | 2,143 (52) | 6,779 (59) | 3,387 (39) | 1,963 (42) | 5,246 (47) |
| >85 | 174 (2.4) | 195 (4.7) | 782 (6.8) | 317 (3.7) | 314 (6.8) | 992 (8.8) |
| **Age at diagnosis** | 59 (46 – 70) | 63 (52 – 75) | 67 (56 – 76) | 56 (42 – 71) | 60 (46 – 75) | 63 (50 – 75) |
| **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) |
| Unknown | 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) |
| Unknown | 2,116 | 616 | 1,009 | 2,559 | 602 | 764 |
| **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) |
| Unknown | 7,074 | 2,955 | 765 | 8,384 | 3,502 | 535 |
| **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) |
| Unknown | 475 | 271 | 644 | 380 | 199 | 447 |
| **Histopathological subtype** | | | | | | |
| SSM | 3,769 (53) | 1,969 (48) | 6,051 (54) | 4,827 (57) | 2,482 (54) | 6,493 (58) |
| NM | 1,509 (21) | 959 (23) | 2,143 (19) | 1,408 (17) | 845 (19) | 1,746 (16) |
| ALM | 26 (0.4) | 21 (0.5) | 53 (0.5) | 41 (0.5) | 35 (0.8) | 72 (0.6) |
| LMM | 226 (3.2) | 107 (2.6) | 363 (3.2) | 373 (4.4) | 150 (3.3) | 423 (3.8) |
| Other | 1,643 (23) | 1,028 (25) | 2,696 (24) | 1,824 (22) | 1,052 (23) | 2,407 (22) |
| Unknown | 120 | 65 | 169 | 154 | 67 | 123 |
| 1n (%); Median (inter quartile range) | | | | | | |
|  | | | | | | |

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

# Conclusions

The results of this ongoing study of a unique time series of national melanoma tumour thickness data will identify trends overall and in subgroups of the population, and also potential effects of changed exposure patterns and earlier detection. These analyses also serve as an important quality check of these newly digitalized data, forming basis for our planned analyses of mortality by tumour thickness and more into depth studies of mortality in thin melanomas where we now can study long-term survival.