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Title: 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 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 categories, 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 in 2008-2019 and was manually extracted from the paper notifications archived in the CRN for the cases diagnosed in 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 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 Norwegian Melanoma Registry was established in 2008, the proportions of missing ulceration decreased dramatically.

Table 1: Characteristics[1] of Norwegian melanoma cases, 1980-2019.

	Male			Female		
Characteristic	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 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 (88)	2,230 (84)	9,302 (88)	7,363 (93)	2,677 (91)	9,629 (92)
Regional metastasis	328 (5.0)	173 (6.5)	852 (8.1)	251 (3.2)	123 (4.2)	560 (5.4)
Distant metastasis	440 (6.6)	264 (9.9)	425 (4.0)	286 (3.6)	158 (5.3)	246 (2.4)
Unspecified	672	1,482	896	727	1,673	829
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 category						
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

[1]Median (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.