

Long-term trends in melanoma tumour thickness in Norway



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Background

Incidence of cutaneous melanoma has increased in fair-skinned populations during the past decades [1]. Tumour (Breslow) thickness at diagnosis is important for assessing early detection. Tumour thickness is the primary determinant of the T category in the Tumor-Node-Metastasis (TNM) staging system, and the most important prognostic factor for survival after localized melanoma [2].

Aim: This newly started study investigates long-term trends in tumour thickness, and the corresponding T categories, overall and in important subgroups such as sex, age and anatomic sites, in a nationwide case series over a 40-year time period.

Methods

The population-based Cancer Registry of Norway (CRN) provided all morphologically verified first primary invasive cutaneous melanoma cases diagnosed in 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 calendar period of diagnosis was categorized as 1980–1999, 2000–2007, and 2008–2019. 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). In the figures, we present proportions of patients diagnosed with T1–T4 melanoma per year. The thickness of the lines reflects the number of cases in each period.

Results

Table 1: Characteristics of Norwegian melanoma cases, 1980–2019 (N = 47,439)

Characteristic ¹	Women			Men		
	1980–1999 N = 8627	2000–2007 N = 4631	2008–2019 N = 11264	1980–1999 N = 7293	2000–2007 N = 4149	2008–2019 N = 11475
Age at diagnosis	56 (42–71)	60 (46–75)	63 (50–75)	59 (46–70)	63 (52–75)	67 (56–76)
Age group						
≤20	144 (1.7)	30 (0.6)	48 (0.4)	54 (0.7)	21 (0.5)	23 (0.2)
21–40	1,862 (22)	721 (16)	1,209 (11)	1,119 (15)	355 (8.6)	665 (5.8)
41–60	2,917 (34)	1,603 (35)	3,769 (33)	2,706 (37)	1,435 (35)	3,226 (28)
61–85	3,387 (39)	1,963 (42)	5,246 (47)	3,240 (44)	2,143 (52)	6,779 (59)
>85	317 (3.7)	314 (6.8)	992 (8.8)	174 (2.4)	195 (4.7)	782 (6.8)
Anatomic site						
Head and neck	1,222 (15)	620 (14)	1,300 (12)	1,109 (16)	641 (17)	1,679 (16)
Upper limbs	1,320 (16)	769 (17)	1,856 (17)	658 (9.7)	407 (10)	1,212 (11)
Trunk	2,360 (29)	1,427 (32)	3,797 (35)	4,062 (60)	2,277 (59)	6,469 (60)
Lower limbs	3,220 (39)	1,556 (35)	3,670 (34)	927 (14)	526 (14)	1,396 (13)
Other	125 (1.5)	60 (1.4)	194 (1.8)	62 (0.9)	27 (0.7)	75 (0.7)
Unspecified	380	199	447	475	271	644
Histopathological subtype						
Superficial spreading	4,827 (57)	2,482 (54)	6,493 (58)	3,769 (53)	1,969 (48)	6,051 (54)
Nodular	1,408 (17)	845 (19)	1,746 (16)	1,509 (21)	959 (23)	2,143 (19)
Lentigo maligna	373 (4.4)	150 (3.3)	423 (3.8)	226 (3.2)	107 (2.6)	363 (3.2)
Acral	41 (0.5)	35 (0.8)	72 (0.6)	26 (0.4)	21 (0.5)	53 (0.5)
Other	1,824 (22)	1,052 (23)	2,407 (22)	1,643 (23)	1,028 (25)	2,696 (24)
Unspecified	154	67	123	120	65	169

¹ Median (IQR); n (%)

In both men and women, the median age at diagnosis increased from 1980–2000 to 2008–2019 (Table 1).

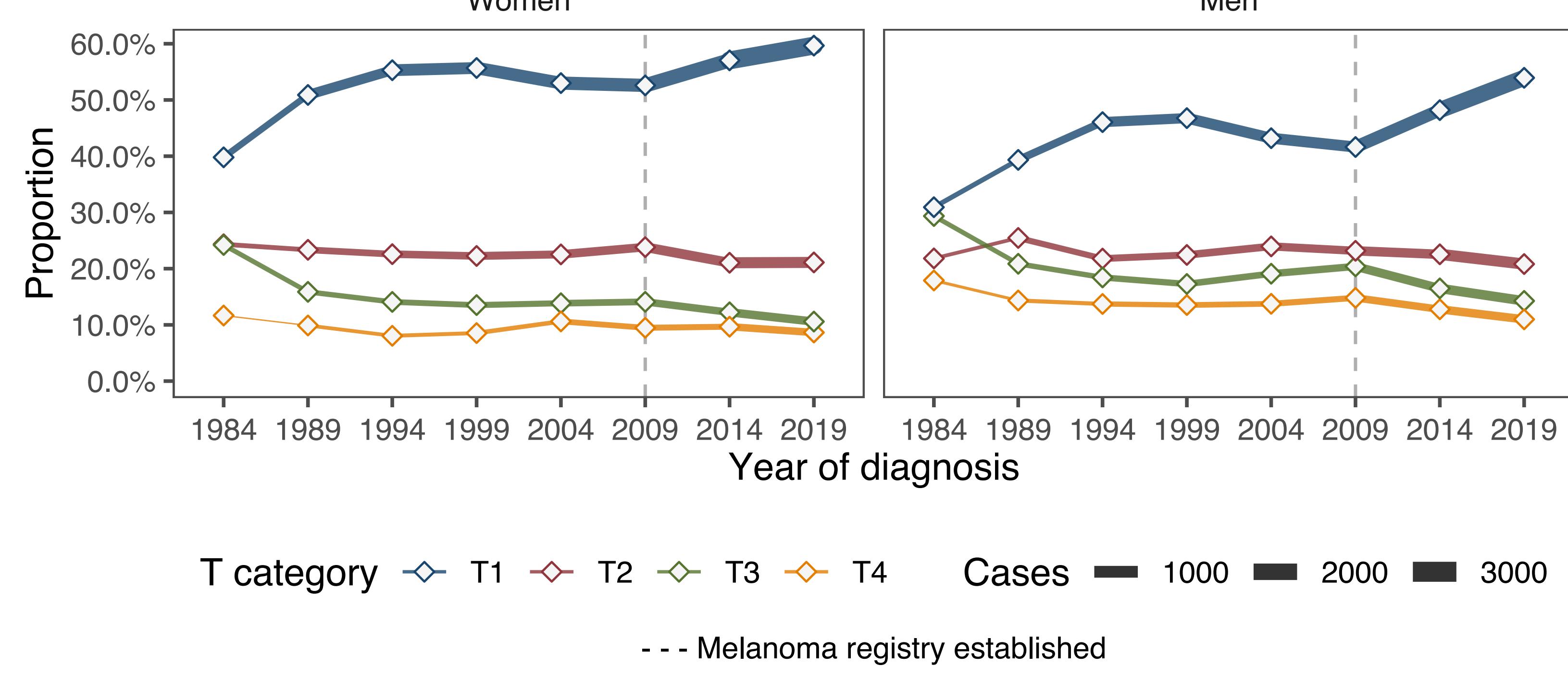
Table 2: Tumour thickness and T category, 1980–2019 (N = 47,439)

Characteristic ¹	Women			Men		
	1980–1999 N = 8627	2000–2007 N = 4631	2008–2019 N = 11264	1980–1999 N = 7293	2000–2007 N = 4149	2008–2019 N = 11475
Tumour thickness	1.00 (0.60–2.00)	1.00 (0.60–2.00)	0.90 (0.50–1.80)	1.40 (0.75–3.00)	1.30 (0.70–3.00)	1.00 (0.60–2.30)
Unspecified (% of N)	2,559 (29.7%)	602 (13.0%)	764 (6.8%)	2,116 (29.0%)	616 (14.8%)	1,009 (8.8%)
T category						
T1 (≥1mm)	3,179 (52)	2,106 (52)	6,092 (58)	2,228 (43)	1,496 (42)	5,269 (50)
T2 (>1–2mm)	1,388 (23)	955 (24)	2,221 (21)	1,180 (23)	847 (24)	2,265 (22)
T3 (>2–4mm)	948 (16)	563 (14)	1,222 (12)	1,029 (20)	706 (20)	1,646 (16)
T4 (>4mm)	553 (9.1)	405 (10)	965 (9.2)	740 (14)	484 (14)	1,286 (12)

¹ Median (IQR); n (%)

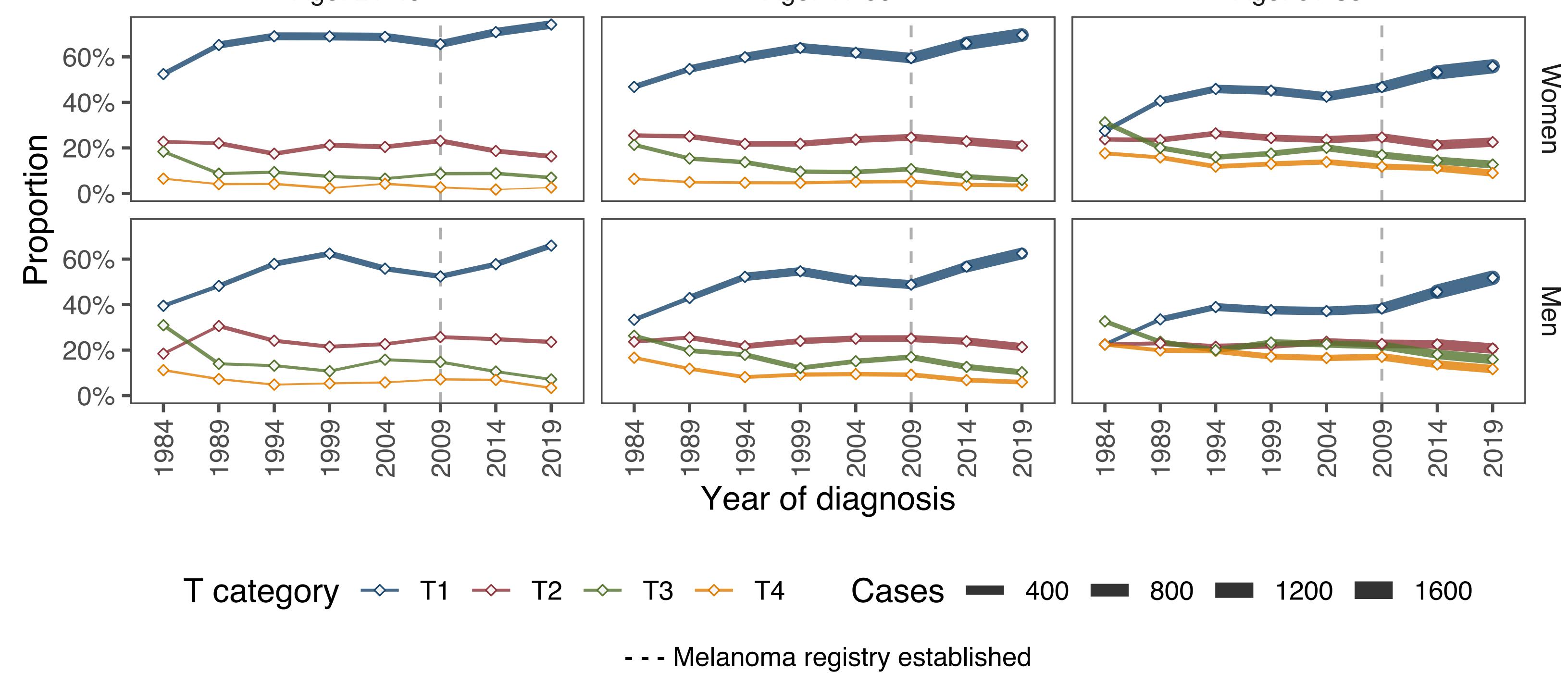
Tumour thickness was missing in the pathology reports for almost 30% of the cases until 1999. After the Norwegian Melanoma Registry was established in 2008, the proportions of missing decreased dramatically (Table 2). In all time periods, women were diagnosed at a thinner stage than men. In men, median (IQR) tumour thickness decreased from 1.4 mm (0.75–3) in 1980–1999 to 1 mm (0.6–2.3) in 2008–2019, and in women from 1 mm (0.6–2) to 0.9 mm (0.5–1.8).

Figure 1: Proportion of cases in each T-category per year, by sex



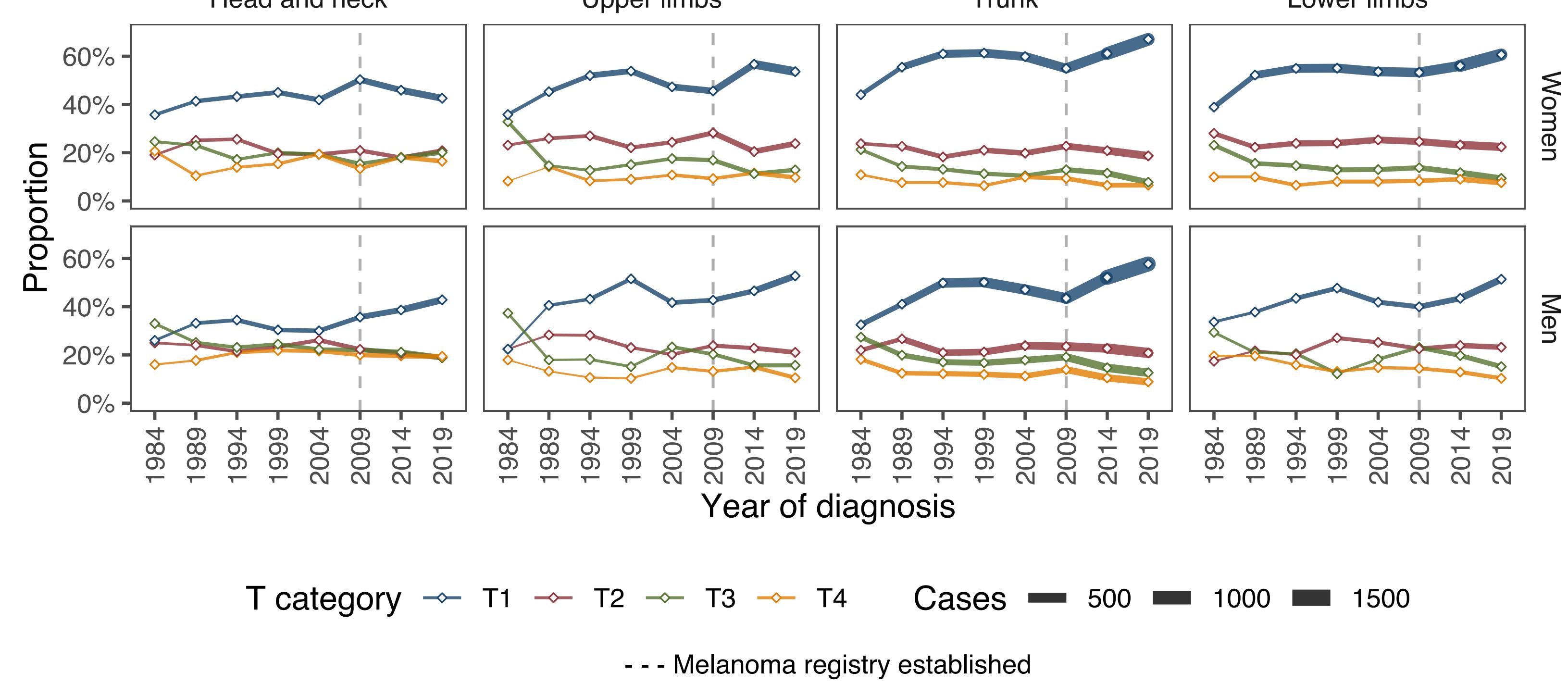
More than 40% of the cases in women and more than 30% in men were diagnosed as T1 ($\leq 1\text{mm}$), and the proportion of T1 increased over time in both men and women. T2 ($>1\text{-}2\text{mm}$) was almost constant over time (20–25%), while T3 ($>2\text{-}4\text{mm}$) declined. T4 ($>4\text{mm}$) declined more in men, especially in the most recent years, and was more constant in women. The dashed line indicates when the melanoma registry was established.

Figure 2: Proportion of cases in each T-category per year, by sex and age group



Similar trends in the T category at diagnosis were observed in all age-groups 21–85 years. The largest proportions of cases were in T1, but the T1 proportion was lower in the oldest age group (61–85 years) where thicker melanomas were more common.

Figure 3: Proportion of cases in each T-category per year, by sex and anatomic site



Conclusions

The proportion of melanomas diagnosed as T1 was highest in women but increased over time in both men and women. T2 was more stable. T3 decreased, while the proportion of T4 also decreased in some of the subgroups. The oldest age group still has the largest proportion of thick melanomas. This unique national case series will form the basis for studies of melanoma incidence and mortality in relation to tumour thickness, overall and in subgroups of the population.

Funding: This project is funded by the Norwegian Research Council (project no. 302048) and UNIFOR-FRIMED (2019).

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