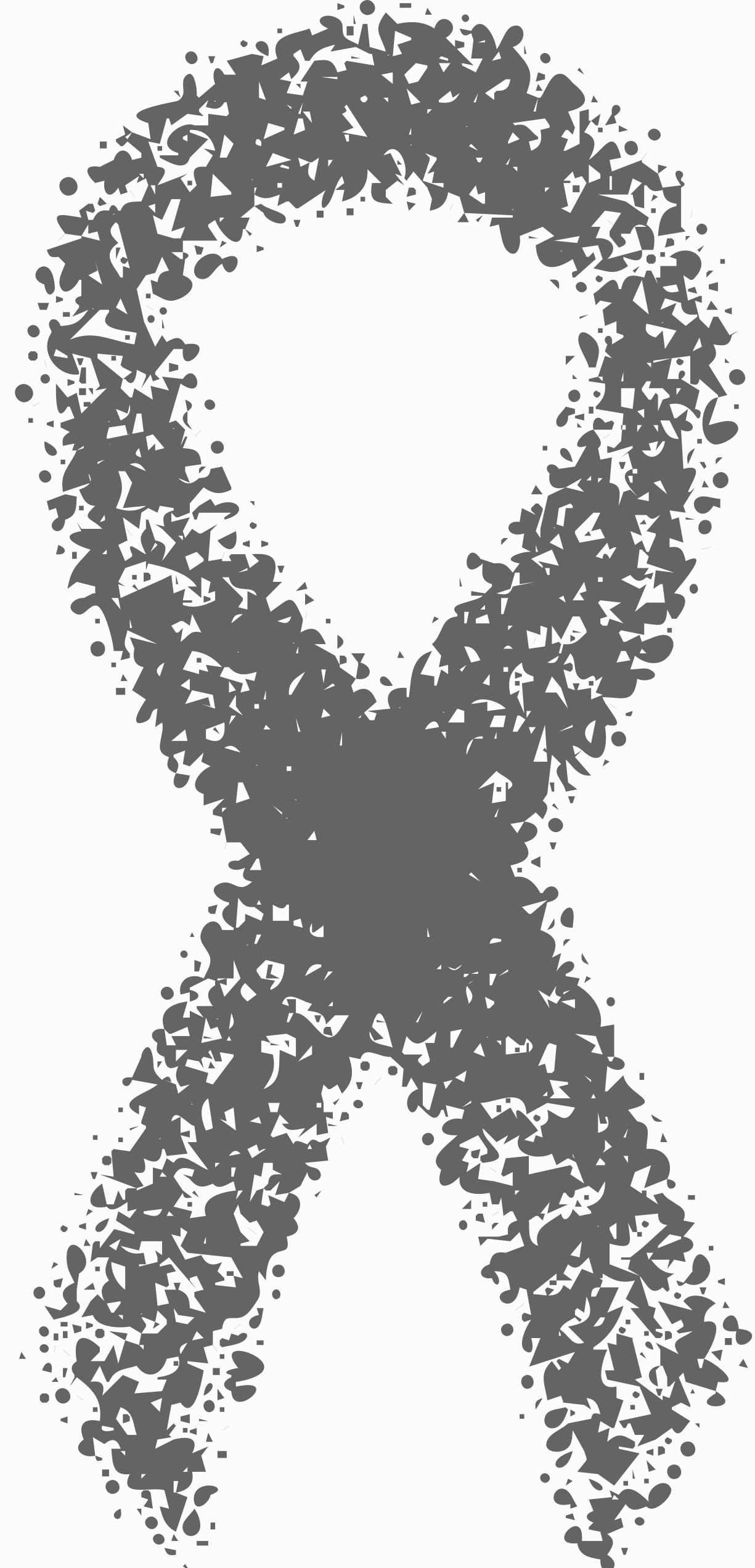


# Melanoma tumour thickness in Norway

An analysis of survival trend,  
1983–2019



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# Outline

- Background
- Case series
- Methods and Results
- Summary



# Research Objective

To examine *melanoma survival* and *trend* by tumour thickness in overall and in important subgroups such as sex and *age* in a unique nationwide case series over a 35-year time period.

# Background

# Data from Cancer Registry of Norway (CRN)

*Histologically verified data*

*Tumour thickness recorded since 1980 are now digitized*

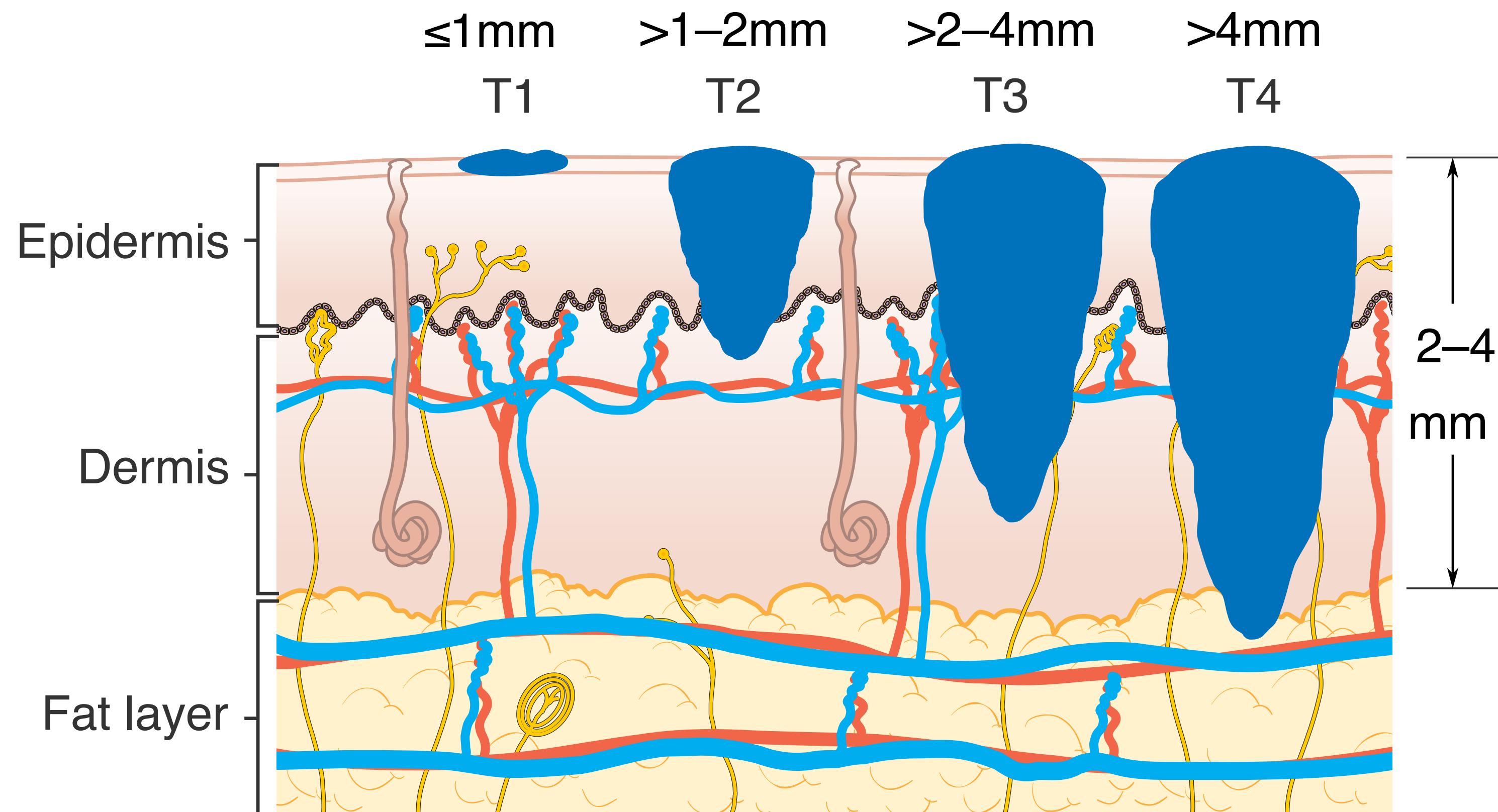
*Melanoma registry established in 2008 under CRN provides the data*

*Here we will use data from 1983 to 2019*



# Melanoma and tumour thickness

## T-categories



Source: <https://www.cancerresearchuk.org/about-cancer/melanoma/stages-types/tnm-staging>

# Case series

# Basic characteristics of data

## Age at diagnosis

Age at diagnosis has increased in the recent period (2008–2019).

Characteristic	Sex	1983–1999	2000–2007	2008–2019	Overall
Number of cases, n (%)	Women	7,720 (54%)	4,632 (53%)	11,267 (50%)	23,619 (52%)
	Men	6,578 (46%)	4,150 (47%)	11,465 (50%)	22,193 (48%)
Age at diagnosis (years), median (IQR)	Women	<b>56</b> (42 – 71)	<b>60</b> (46 – 75)	<b>63</b> (50 – 75)	61 (46 – 73)
	Men	<b>59</b> (46 – 71)	<b>63</b> (52 – 75)	<b>67</b> (56 – 76)	64 (52 – 74)
Tumour thickness (mm), median (IQR)	Women	1.0 (0.6 – 2.0)	1.0 (0.6 – 2.0)	0.9 (0.5 – 1.8)	1.0 (0.6 – 2.0)
	Men	1.3 (0.7 – 2.8)	1.3 (0.7 – 3.0)	1.0 (0.6 – 2.3)	1.1 (0.7 – 2.5)

IQR: interquartile range

# Basic characteristics of data

## Tumour thickness

The thickness of tumour at diagnosis has decreased in the recent period (2008–2019).

Characteristic	Sex	1983–1999	2000–2007	2008–2019	Overall
Number of cases, n (%)	Women	7,720 (54%)	4,632 (53%)	11,267 (50%)	23,619 (52%)
	Men	6,578 (46%)	4,150 (47%)	11,465 (50%)	22,193 (48%)
Age at diagnosis (years), median (IQR)	Women	56 (42 – 71)	60 (46 – 75)	63 (50 – 75)	61 (46 – 73)
	Men	59 (46 – 71)	63 (52 – 75)	67 (56 – 76)	64 (52 – 74)
Tumour thickness (mm), median (IQR)	Women	1.0 (0.6 – 2.0)	1.0 (0.6 – 2.0)	0.9 (0.5 – 1.8)	1.0 (0.6 – 2.0)
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IQR: interquartile range

# Methods and Results

# Relative Survival

*Relative survival<sup>1</sup> compares the survival of people with melanoma with those who don't over a certain period of time.*

1. Relative survival is the *ratio of proportion of observed survival to the proportion of expected survival* in a cohort of cancer patients.

# Relative survival

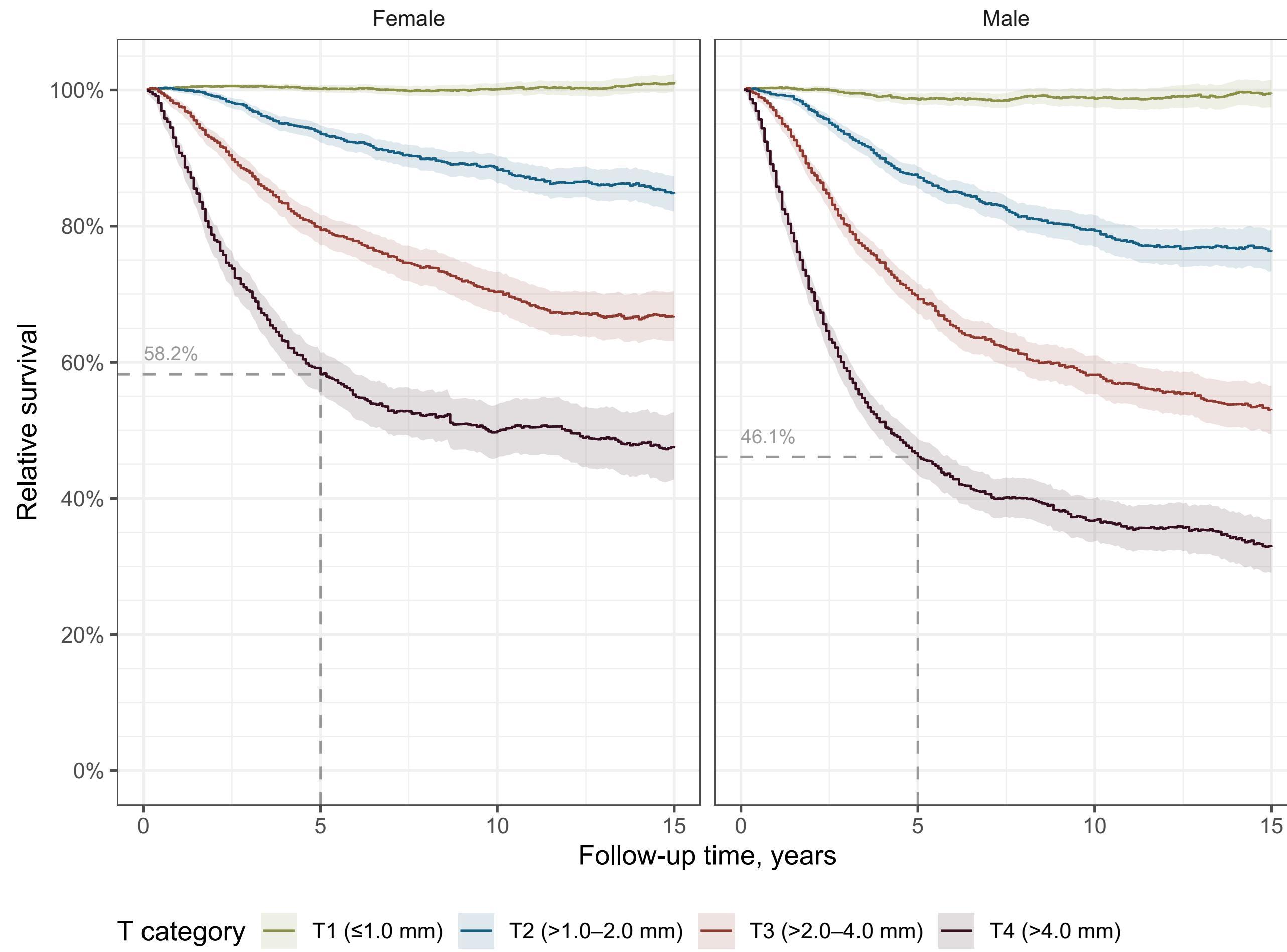
## By sex and T category

Patients with thinner melanoma (T1) have similar survival as general population.

The 5-year survival for patients with T4 melanoma is less than 60% compared to general population.

Men have lower survival compared to women in all T-categories.

Clear difference in survival by T-categories reflects the importance of tumour thickness in prognosis.

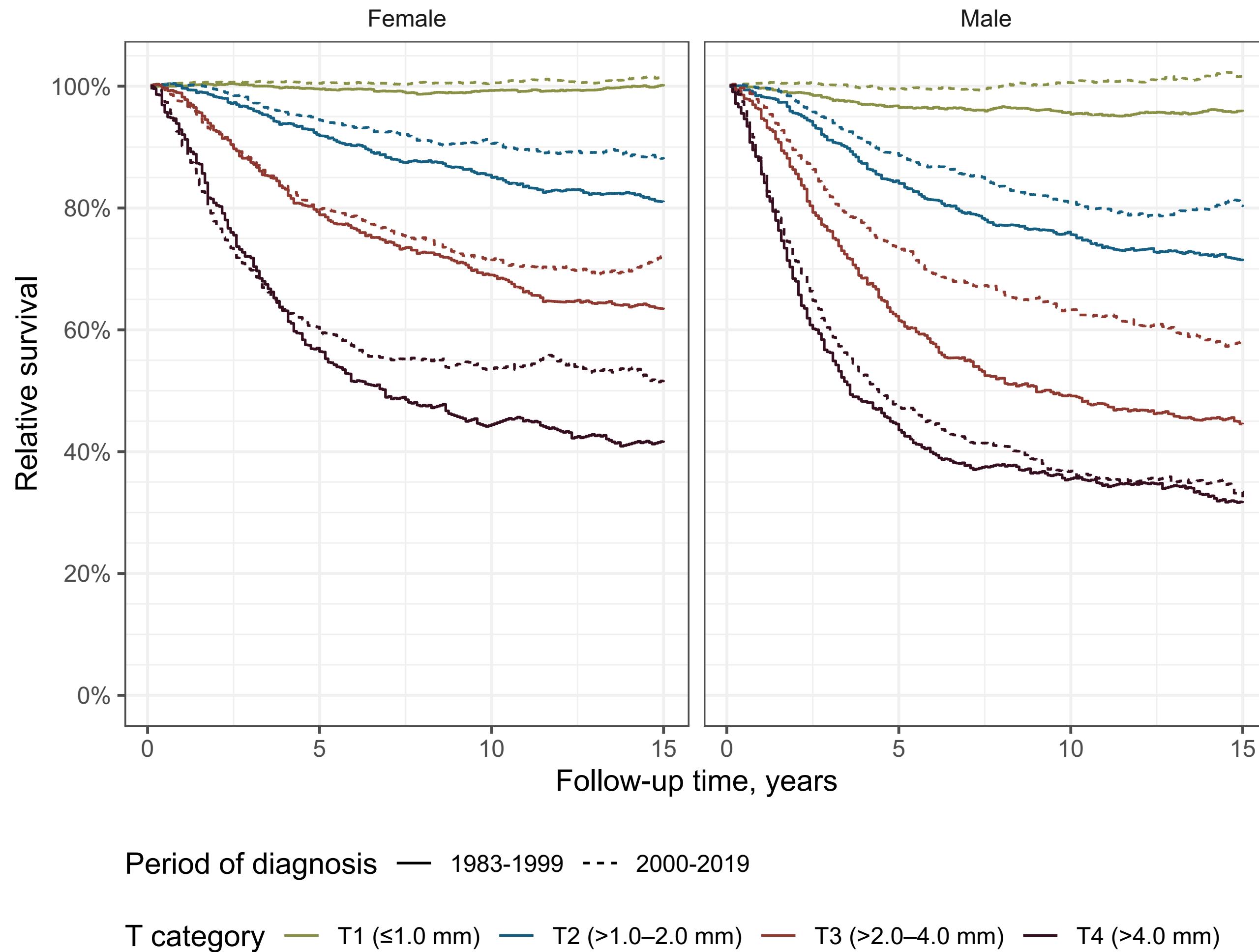


# Relative survival

**By sex and T category  
Before and After 2000**

Changes in long-term survival of T1 and T3 melanoma diagnosed from 2000 is larger in men than in women compared to those diagnosed before 2000.

In T4 melanoma, only small change is observed in men.



# Cumulative mortality

The cumulative mortality<sup>1</sup> up to a given time is the probability of an individual dying by that time<sup>2</sup>.

1. Cumulative mortality (cumulative incidence of death) refers to the event of death due to melanoma.
2. Total cases can be divided into proportion of alive, death due to other causes and death due to melanoma.

# Cumulative Mortality

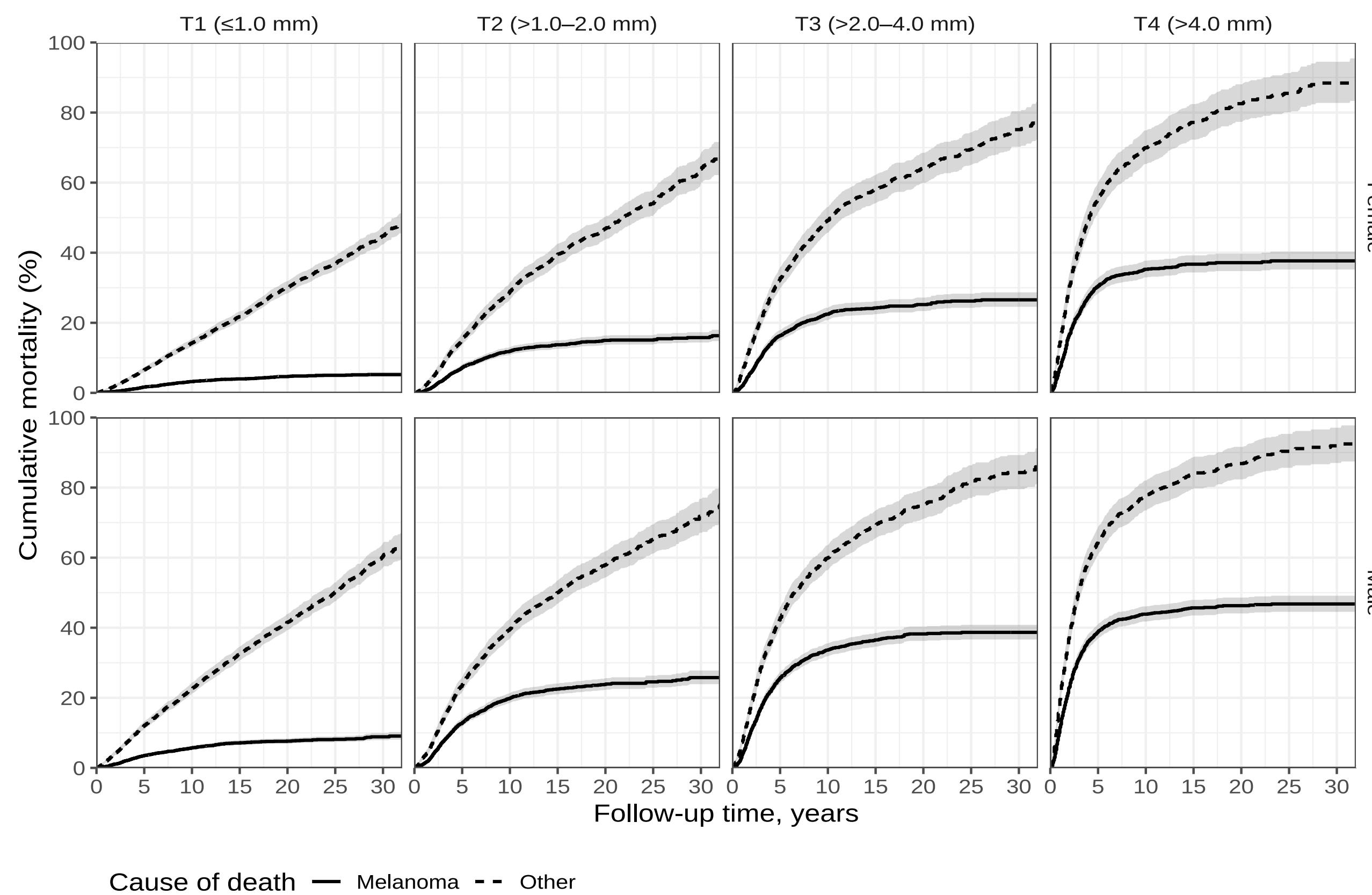
## By sex and T category

The probability of other cause of death does not change drastically as the probability of melanoma death between T categories.

The proportion of melanoma deaths grows as tumour thickness increases.

Men have poor prognosis compared to women (high cumulative mortality).

Younger population has more thinner and older has more thicker cases. In longer follow-up, we see an increasing probability also in death from other causes.

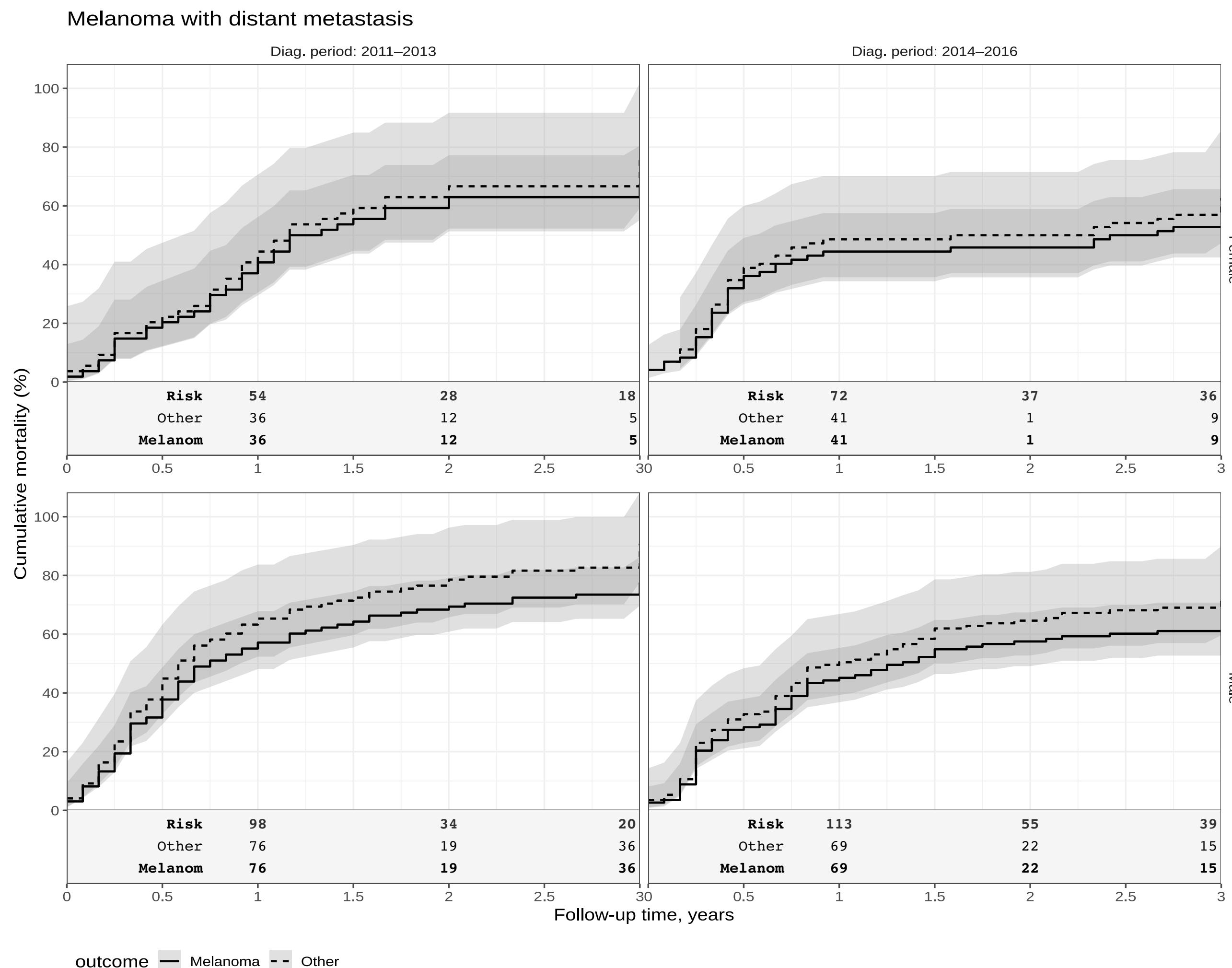


# Is this the effect of treatment?

# Melanoma with distant metastasis

Comparing cumulative incidence within distant metastasis cases diagnosed between 2008–2013 and 2014–2019, we observed a drop in melanoma specific deaths in the later period.

Around year 2014, new treatment immunotherapy was introduced in stage IV melanoma.



# Is this the effect of treatment?

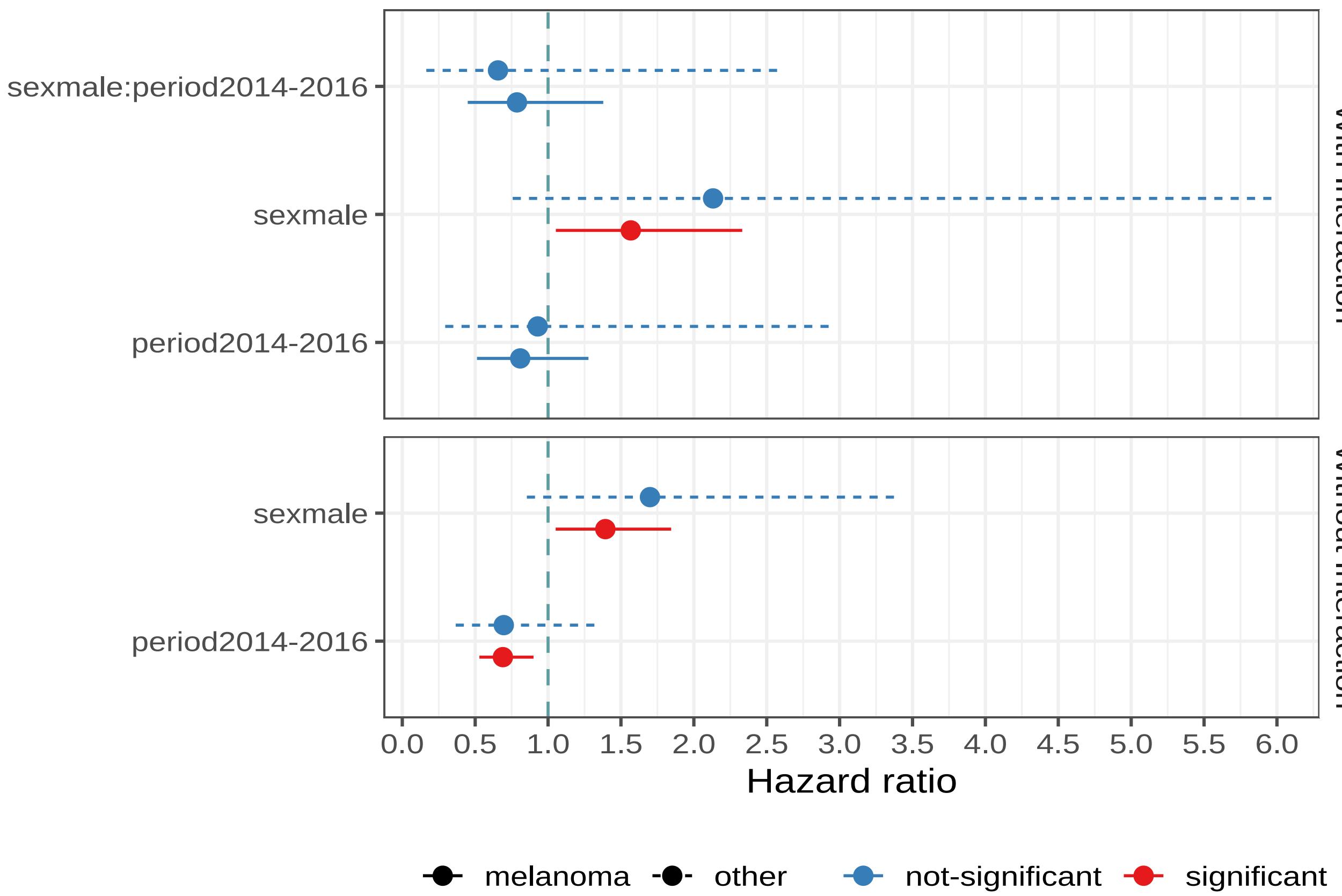
## Melanoma with distant metastasis

No interaction between sex and period of diagnosis

Based on model without interaction:

- Male have higher melanoma mortality than female
- Period 2014-2016 has lower mortality due to melanoma

Around year 2014, new treatment immunotherapy was introduced in stage IV melanoma.



# Conditional Relative Survival

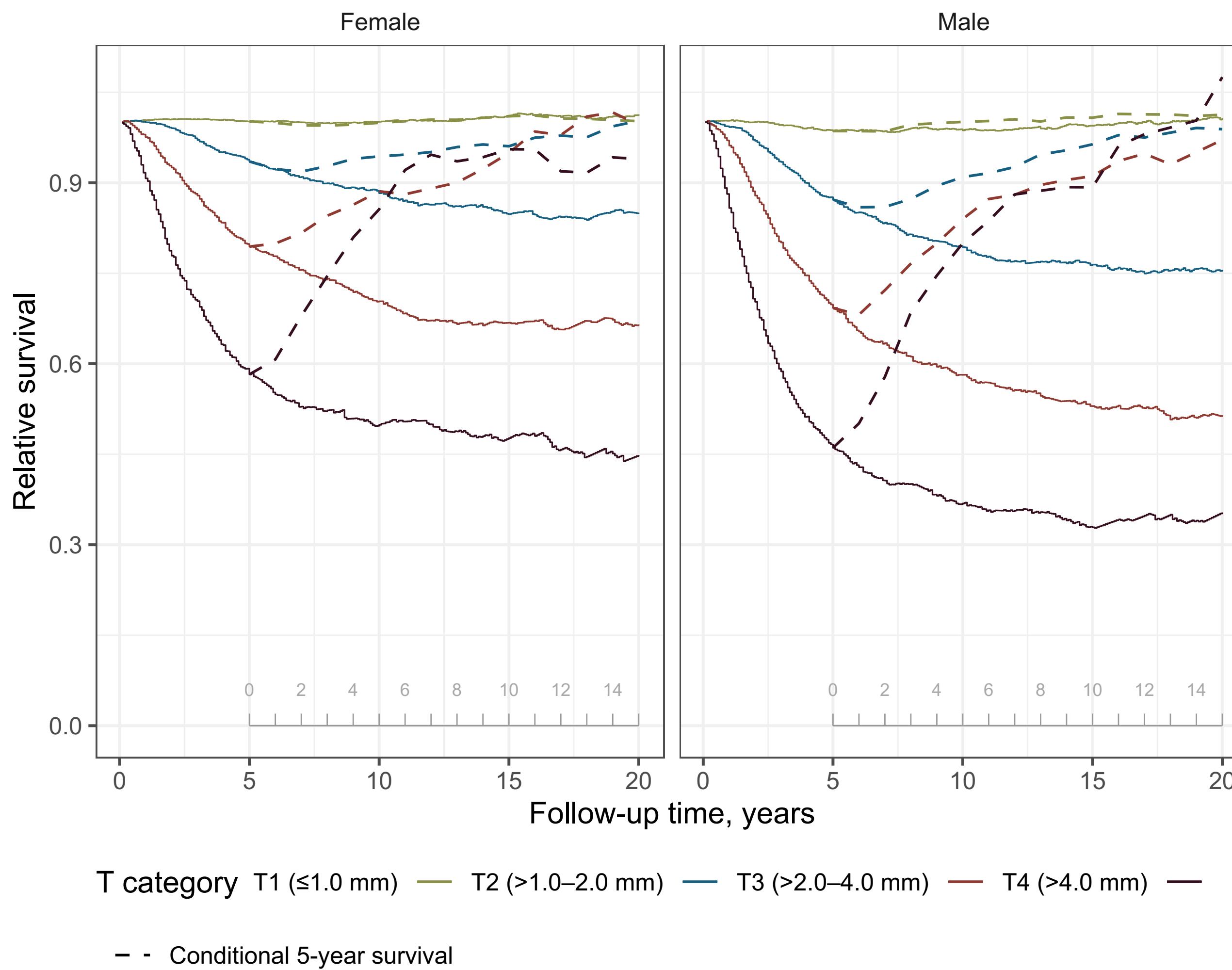
Relative survival of a melanoma patients surviving a certain number of year (y) *given that the patients has already survived* a fixed number of years (x) since diagnosis.

# Conditional 5-year Relative Survival

The dashed line represents the 5-year relative survival after the patients survived for 0 and up-to 15-years (scale in grey color).

We see that in all T-categories, the 5-year relative survival after survived for 0 to 15 years since the year of diagnosis starts to becomes similar.

For example, two patients diagnosed with T1 and T3 melanoma respectively have similar 5-year relative survival after surviving from 15 years.



# Trend in relative survival

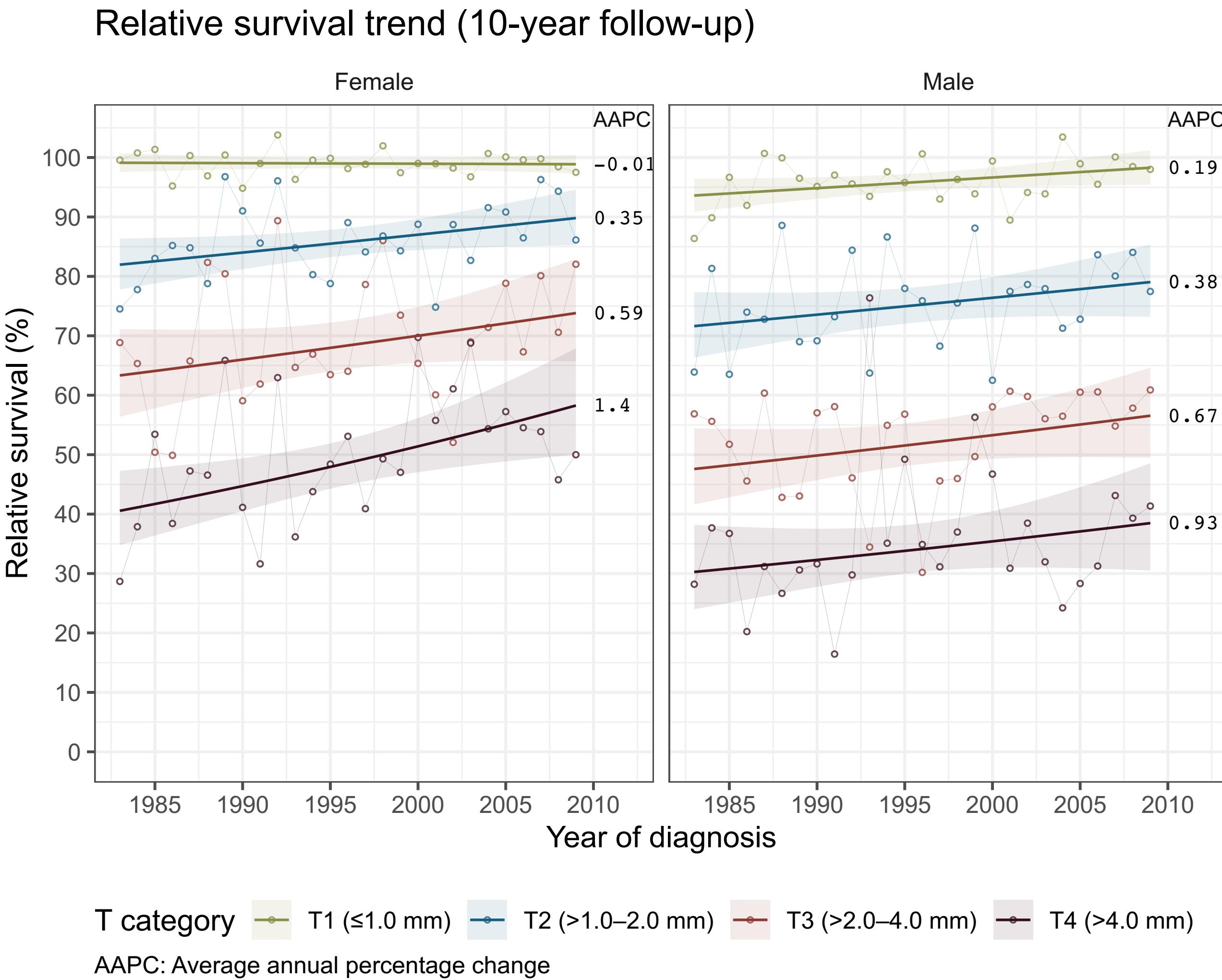
Changes in relative survival over time.

# Relative survival Trend

## Relative survival 10-years follow-up

The 10-year relative survival in all T-categories has stable or slight increasing trend.

In the case of thicker melanoma, women have higher increasing trend in T4 melanoma and men have in T3.



# Summary

# Summary

- Clear difference in survival by T-category
  - Survival has improved in recent years (2000–2019) than before (1983–1999).
- 
- Probability of dying from melanoma than other cause is higher in thicker melanoma and more in men compared to women.
- 
- Melanoma with distant metastasis has lower probability of dying in recent period (2014-2016).
  - May indicate the effect of new treatment introduced around year 2014.
- 
- After surviving for longer time, the survival probability by T-category gets similar.
  - Relative survival trend has stable or slight increase in both sex.



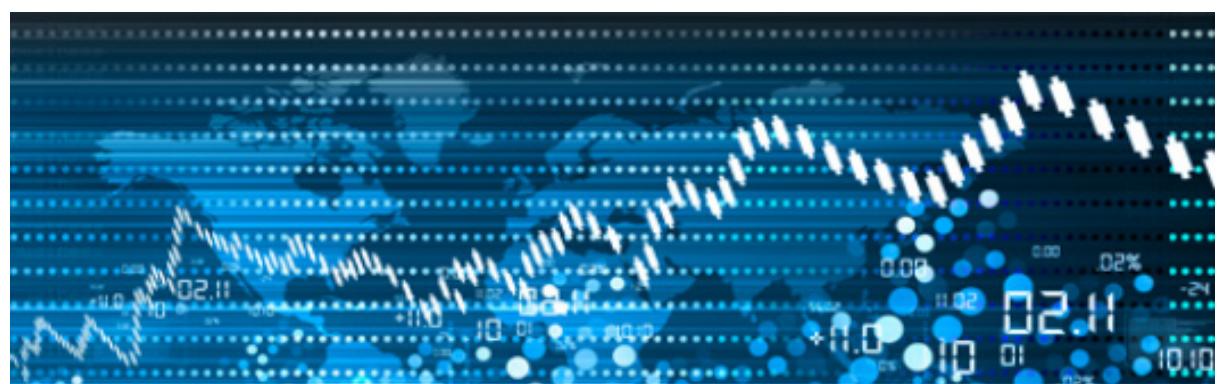
# Collaborators



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**Thank You**

International words for 'thank you' arranged around the central 'Thank You':

- Arabic:** لِي زَجْ ارْكَشْ (Lizj arkash)
- Bulgarian:** Саламат (Salamat)
- Croatian:** HVALA (HVALA)
- Czech:** DAKUJEM (Dakujem)
- French:** MERCI (MERCI)
- Georgian:** �ნახუად (�ন্ধবাদ)
- Hebrew:** שָׁמַעְתִּי (Shema'i)
- Hungarian:** Teşekkür ederim (teşekkür ederim)
- Indonesian:** Terima kasih (terimakasih)
- Italian:** Grazie (Grazie)
- Korean:** 감사합니다 (감사합니다)
- Macedonian:** Саламат (Salamat)
- Mongolian:** Саламат (Salamat)
- Polish:** Dziekuje (Dziekuje)
- Russian:** Спасибо (спасибо)
- Serbian:** HVALA (HVALA)
- Spanish:** Gracias (GRACIAS)
- Turkish:** Teşekkür ederim (teşekkür ederim)
- Ukrainian:** Саламат (Salamat)
- Uzbek:** Shaxshab (шахшаб)
- Vietnamese:** Cảm ơn (cảm ơn)
- Welsh:** Hwyl (Hwyl)
- Yiddish:** זָהָרֶת (Zaharétt)

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