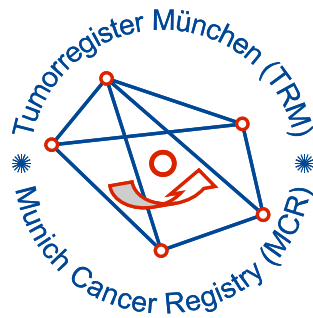


Munich Cancer Registry



- ▶ Incidence and Mortality
- ▶ Selection Matrix
- ▶ Homepage
- ▶ *Deutsch*

ICD-10 C43: Malignant melanoma

Survival

Year of diagnosis	1988-1997	1998-2020
Patients	3,172	21,723
Diseases	3,238	22,851
Cases evaluated	2,937	17,055
Creation date	04/15/2022	
Database export	12/20/2021	
Population	4.92 m	



Munich Cancer Registry
Cancer Registry Bavaria - Upper Bavaria Regional Center
at Klinikum Grosshadern/IBE
Marchioninstr. 15
Munich, 81377
Germany

<https://www.tumorregister-muenchen.de/en>

https://www.tumorregister-muenchen.de/en/facts/surv/sC43__E-ICD-10-C43-Malignant-melanoma-survival.pdf

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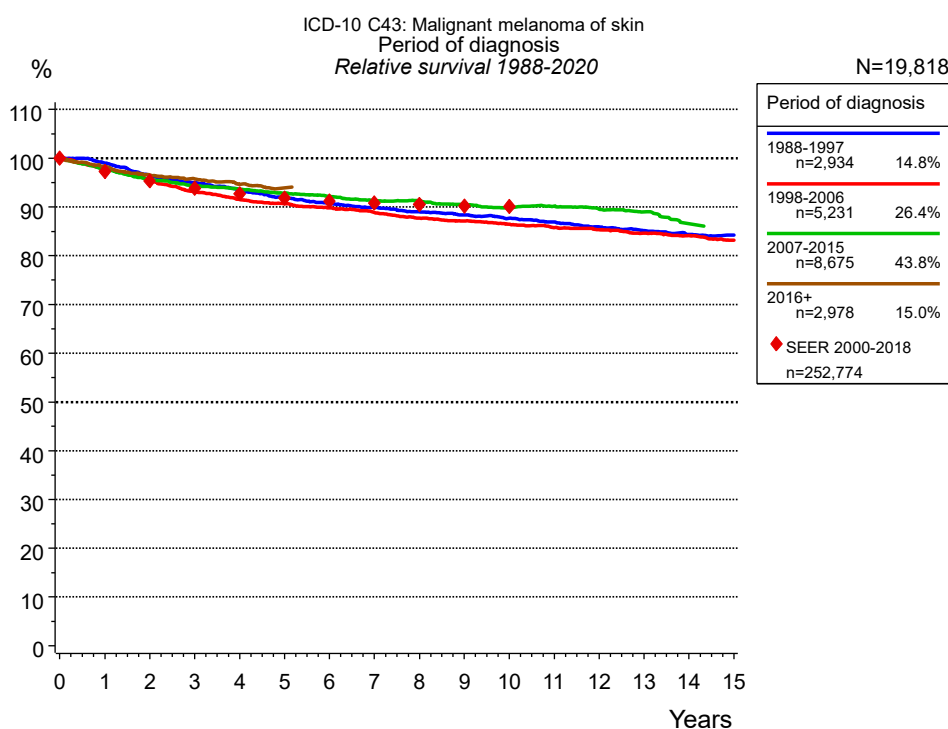


Figure 1a. Relative survival of patients with malignant melanoma by period of diagnosis. Included in the evaluation are 19,818 cases diagnosed between 1988 and 2020.

The survival results of the SEER program (Surveillance, Epidemiology, and End Results) of the American National Cancer Institute (NCI) are summarized as the period of diagnosis from 2000 to 2018, and are represented by colored diamonds in order to facilitate comparisons between MCR and SEER.

The presented survival curves are derived from clinical records with valid follow-up informations, which means that death certificate cases (DCO) cases are omitted from the analysis. With this one restriction, the MCR has provided population-based statistics since 1998, collecting data on all cancer cases in the region of southern Bavaria. Historical data of previous time periods can be heavily selected, therefore, univariate survival comparisons of the presented time periods must be carefully considered. Nonetheless, all calculable survival curves are depicted to facilitate the comparison of long time follow-up analyses of relative survival between particular cancers.

Years	Period of diagnosis							
	1988-1997 n=2,934		1998-2006 n=5,231		2007-2015 n=8,675		2016+ n=2,978	
	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1	97.2	99.0	96.1	97.9	96.0	97.8	96.2	98.4
2	92.9	96.3	92.0	95.4	92.2	95.7	92.4	96.6
3	90.0	94.9	88.2	93.1	89.3	94.3	89.6	95.8
4	86.9	93.4	85.3	91.5	87.0	93.6	86.7	94.6
5	84.2	92.0	83.1	90.7	84.7	92.8	84.5	93.9
6	81.6	90.8	80.9	89.8	82.7	92.2		
7	79.4	89.9	78.7	88.9	80.3	91.2		
8	77.3	89.0	76.4	87.7	78.9	91.2		
9	75.4	88.4	74.6	87.1	76.8	90.5		
10	73.5	87.7	72.8	86.5	74.8	89.9		
11	71.5	86.9	70.9	85.8	73.7	90.2		
12	69.4	85.9	69.3	85.4	71.6	89.5		
13	67.6	85.1	67.4	84.6	69.7	89.0		
14	65.8	84.4	65.8	84.1	66.9	86.6		
15	64.4	84.2	63.8	83.2				
Median	23.2							

Table 1b. Observed (obs.) and relative (rel.) survival of patients with malignant melanoma by period of diagnosis for period 1988-2020 (N=19,818).

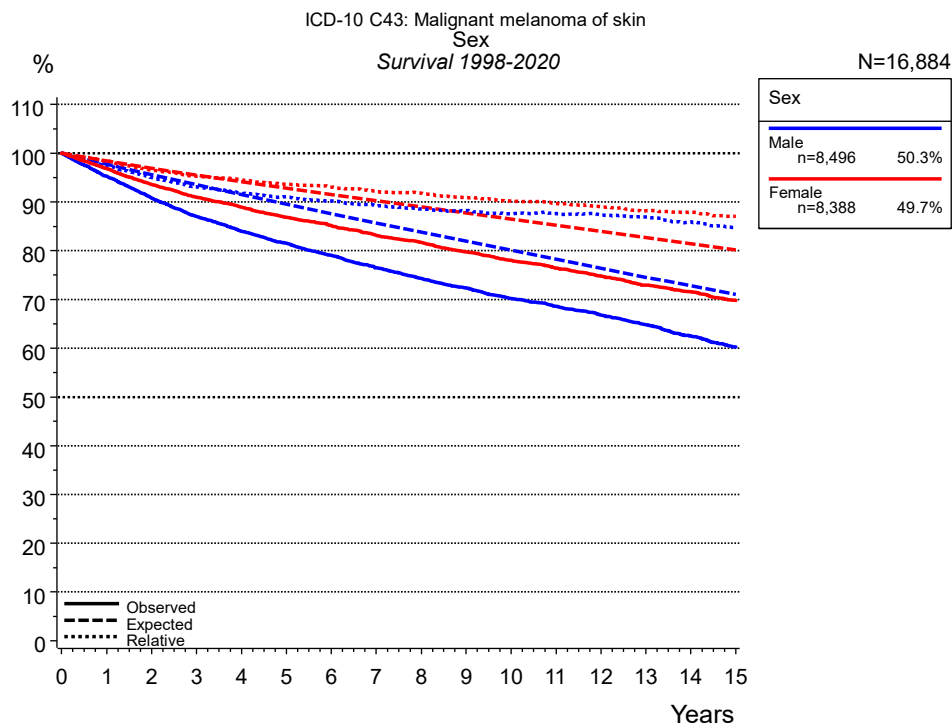


Figure 2a. Survival of patients with malignant melanoma by sex. Included in the evaluation are 16,884 cases diagnosed between 1998 and 2020.

Years	Sex			
	Male n=8,496		Female n=8,388	
	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0
1	95.3	97.4	96.8	98.4
2	90.8	95.0	93.6	96.5
3	87.0	93.1	90.9	95.2
4	83.9	91.7	89.0	94.5
5	81.5	91.0	86.8	93.6
6	79.1	90.2	85.1	93.0
7	76.5	89.2	83.1	92.1
8	74.3	88.6	81.7	91.8
9	72.3	88.2	79.7	90.9
10	70.2	87.6	78.0	90.2
11	68.6	87.6	76.4	89.7
12	66.7	87.3	74.8	89.0
13	64.8	86.9	73.0	88.2
14	62.5	85.8	71.6	87.8
15	60.3	84.8	69.8	87.0
Median	20.8			

Table 2b. Observed (obs.) and relative (rel.) survival of patients with malignant melanoma by sex for period 1998-2020 (N=16,884).

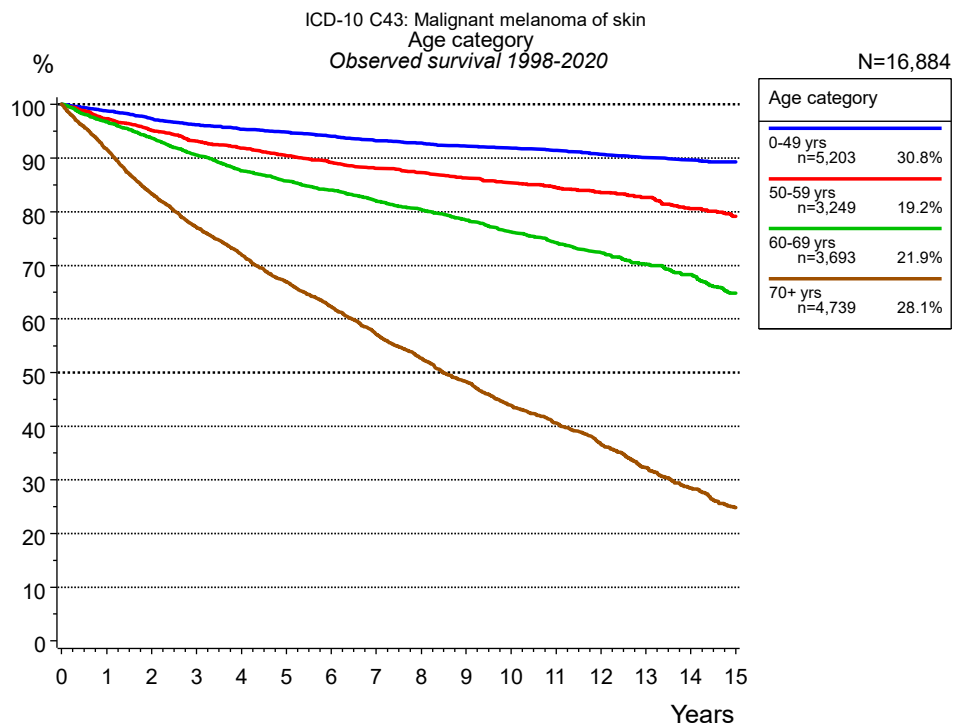


Figure 3a. Observed survival of patients with malignant melanoma by age category. Included in the evaluation are 16,884 cases diagnosed between 1998 and 2020.

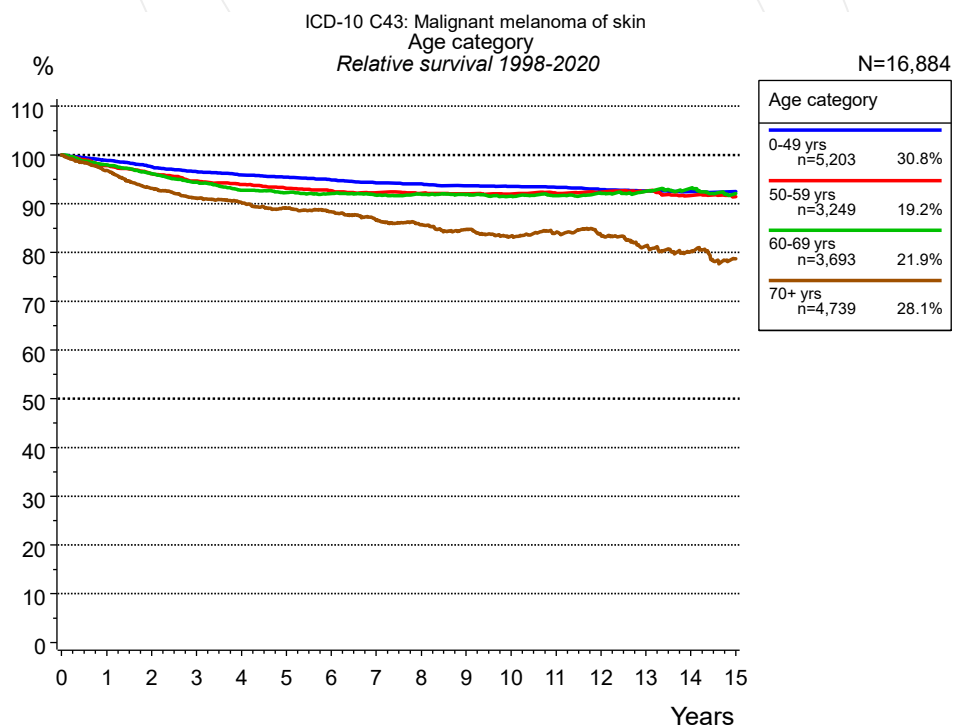


Figure 3b. Relative survival of patients with malignant melanoma by age category. Included in the evaluation are 16,884 cases diagnosed between 1998 and 2020.

Years	Age category							
	0-49 yrs n=5,203		50-59 yrs n=3,249		60-69 yrs n=3,693		70+ yrs n=4,739	
	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1	98.8	98.9	97.3	97.8	96.7	98.0	91.6	96.8
2	97.3	97.6	95.1	96.1	93.7	96.2	83.4	93.1
3	96.2	96.6	93.1	94.7	90.6	94.4	77.0	91.1
4	95.4	95.9	91.8	94.0	87.6	92.8	72.0	90.3
5	94.8	95.5	90.4	93.2	85.7	92.3	66.9	89.1
6	94.1	94.9	89.2	92.6	84.0	92.1	62.3	88.4
7	93.2	94.3	88.1	92.2	82.0	91.7	57.1	86.6
8	92.8	94.0	87.2	92.2	80.4	91.9	52.7	85.7
9	92.2	93.7	86.2	92.0	78.4	91.8	48.3	84.7
10	91.8	93.5	85.3	92.0	76.2	91.5	43.8	83.4
11	91.4	93.3	84.5	92.2	74.2	91.6	40.6	84.1
12	90.6	92.9	83.6	92.4	72.4	92.2	36.7	83.6
13	90.1	92.6	82.7	92.6	70.3	92.5	32.3	81.3
14	89.6	92.5	80.6	91.6	68.3	93.2	28.5	80.2
15	89.3	92.5	79.1	91.4	64.8	92.1	24.8	78.7
Median					19.7		8.5	

Table 3c. Observed (obs.) and relative (rel.) survival of patients with malignant melanoma by age category for period 1998-2020 (N=16,884).

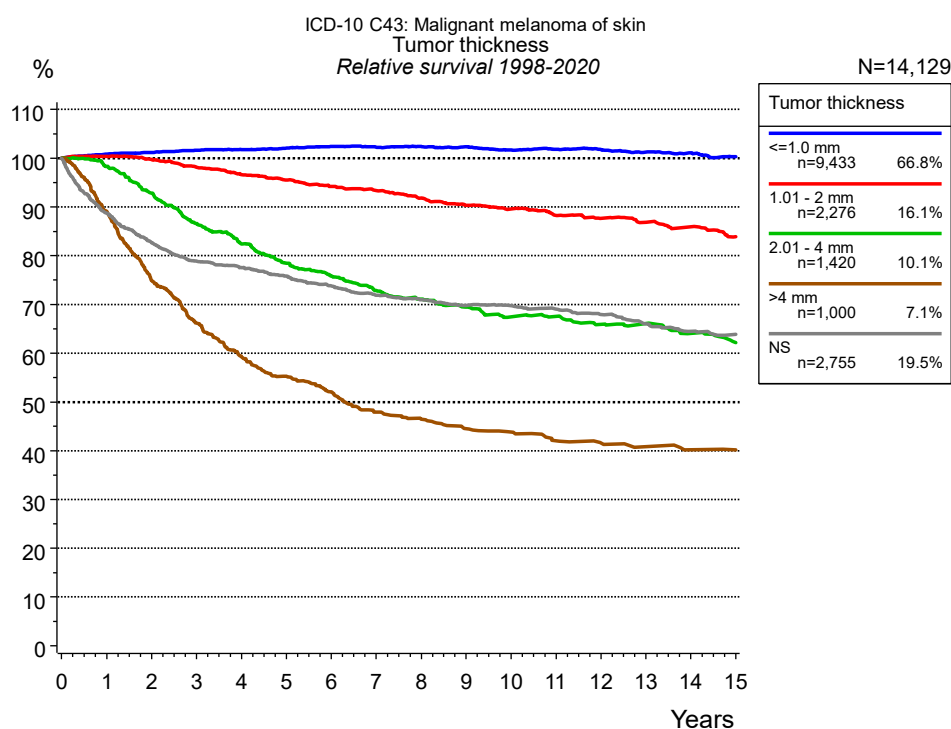


Figure 4a. Relative survival of patients with malignant melanoma by tumor thickness. For 16,025 of 16,884 cases diagnosed between 1998 and 2020 valid data could be obtained for this item. For a total of 14,129 cases an evaluable classification was established. The grey line represents the subgroup of 2,755 patients with missing values regarding tumor thickness (16.3 % of 16,884 patients, the percent values of all other categories are related to n=14,129).

Years	Tumor thickness									
	≤1.0 mm n=9,433		1.01 - 2 mm n=2,276		2.01 - 4 mm n=1,420		>4 mm n=1,000		NS n=2,755	
	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %	obs. %	rel. %
0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1	99.4	100.8	98.6	100.4	95.5	98.3	85.3	89.1	86.7	88.7
2	98.2	101.2	96.2	99.7	87.7	92.8	68.8	74.8	79.0	82.7
3	97.2	101.6	93.0	98.1	79.5	86.5	58.8	66.2	73.8	78.9
4	95.8	101.8	90.0	96.6	73.8	82.4	51.0	59.3	71.1	77.6
5	94.6	102.0	87.5	95.6	68.3	78.5	46.1	55.3	68.0	75.8
6	93.4	102.4	84.7	94.2	64.4	75.8	42.2	52.0	64.9	73.8
7	91.8	102.2	82.4	93.3	60.4	72.8	37.7	47.9	62.0	71.9
8	90.5	102.4	79.6	91.8	57.4	71.1	35.6	46.4	60.0	71.0
9	88.9	102.3	76.9	90.3	54.8	69.5	33.4	44.5	57.9	69.8
10	86.9	101.7	74.8	89.6	51.9	67.5	32.1	43.8	56.7	69.8
11	85.5	101.8	72.4	88.3	50.7	67.6	30.0	42.0	55.0	69.1
12	84.0	101.7	70.4	87.7	48.2	65.9	28.8	41.6	53.0	67.9
13	82.0	101.3	68.6	86.9	47.1	66.1	27.5	40.8	50.5	66.0
14	80.4	101.1	66.5	86.0	44.4	64.0	26.2	40.1	48.3	64.5
15	78.4	100.3	63.5	83.9	42.2	62.2	25.8	40.2	46.8	63.8
Median					11.2		4.1		13.1	

Table 4b. Observed (obs.) and relative (rel.) survival of patients with malignant melanoma by tumor thickness for period 1998-2020 (N=14,129).

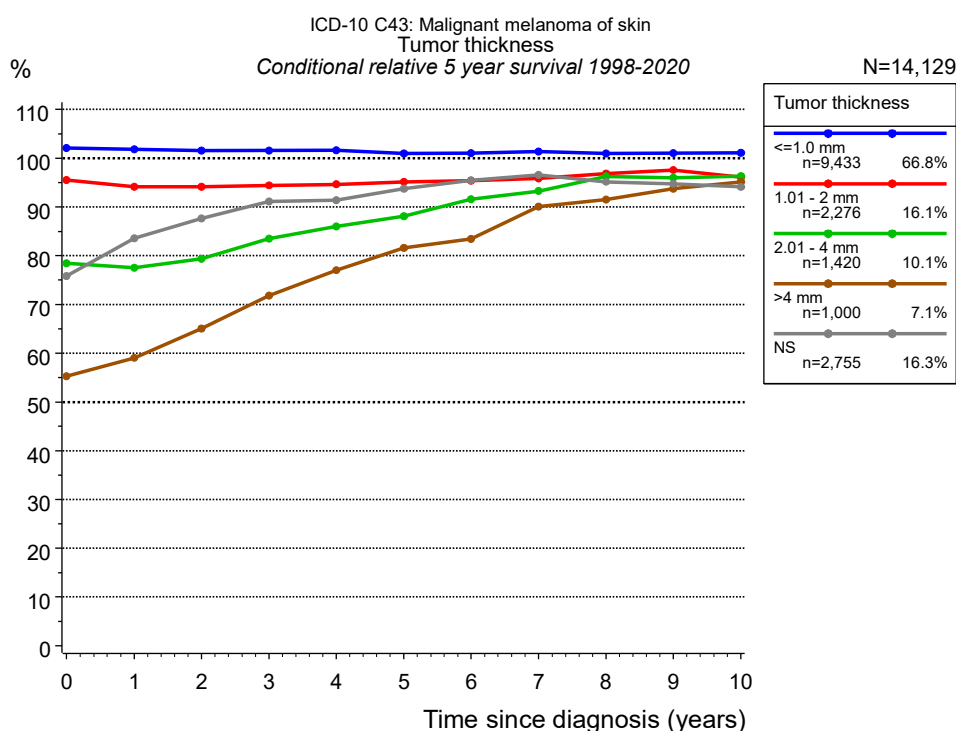


Figure 4c. Conditional relative 5-year survival of patients with malignant melanoma by tumor thickness. For 16,025 of 16,884 cases diagnosed between 1998 and 2020 valid data could be obtained for this item. For a total of 14,129 cases an evaluable classification was established. The grey line represents the subgroup of 2,755 patients with missing values regarding tumor thickness (16.3 % of 16,884 patients, the percent values of all other categories are related to n=14,129).

Years	Tumor thickness									
	≤1.0 mm		1.01 - 2 mm		2.01 - 4 mm		>4 mm		NS	
	n	Cond. surv. % 5 yrs	n	Cond. surv. % 5 yrs	n	Cond. surv. % 5 yrs	n	Cond. surv. % 5 yrs	n	Cond. surv. % 5 yrs
0	9,433	102.0	2,276	95.6	1,420	78.5	1,000	55.3	2,755	75.8
1	8,949	101.8	2,164	94.2	1,312	77.5	829	59.0	2,287	83.5
2	8,512	101.6	2,032	94.2	1,178	79.4	647	65.1	2,047	87.6
3	8,080	101.6	1,902	94.5	1,032	83.5	518	71.8	1,860	91.1
4	7,625	101.6	1,750	94.6	909	86.0	412	77.1	1,709	91.4
5	7,114	100.9	1,612	95.1	789	88.1	337	81.6	1,533	93.7
6	6,536	101.0	1,457	95.4	683	91.6	275	83.4	1,369	95.5
7	5,910	101.3	1,315	95.9	594	93.3	223	90.1	1,238	96.6
8	5,306	100.9	1,171	96.9	520	96.3	197	91.5	1,092	95.2
9	4,666	101.0	1,030	97.6	452	96.0	167	93.7	918	94.8
10	4,013	101.1	888	96.2	388	96.3	136	95.2	790	94.1

Table 4d. Conditional relative 5-year survival of patients with malignant melanoma by tumor thickness for period 1998-2020 (N=14,129).

Conditional relative survival rates refer to the relative survival probability, in this case for 5 years after cancer diagnosis, compared to the age- and sex-matched population (=100 %) under the condition of being alive for a certain time period (x-axis in Figure 4a). The results illustrate to what extent the cancer induced mortality of particular subgroups declines in the subsequent years after detection of the malignancy. For instance, according to the presented survival statistics, patients in the subgroup tumor thickness="≤1.0 mm", who are alive at least 3 years after cancer diagnosis, the conditional relative 5-year survival rate is 101.6% (n=8,080).

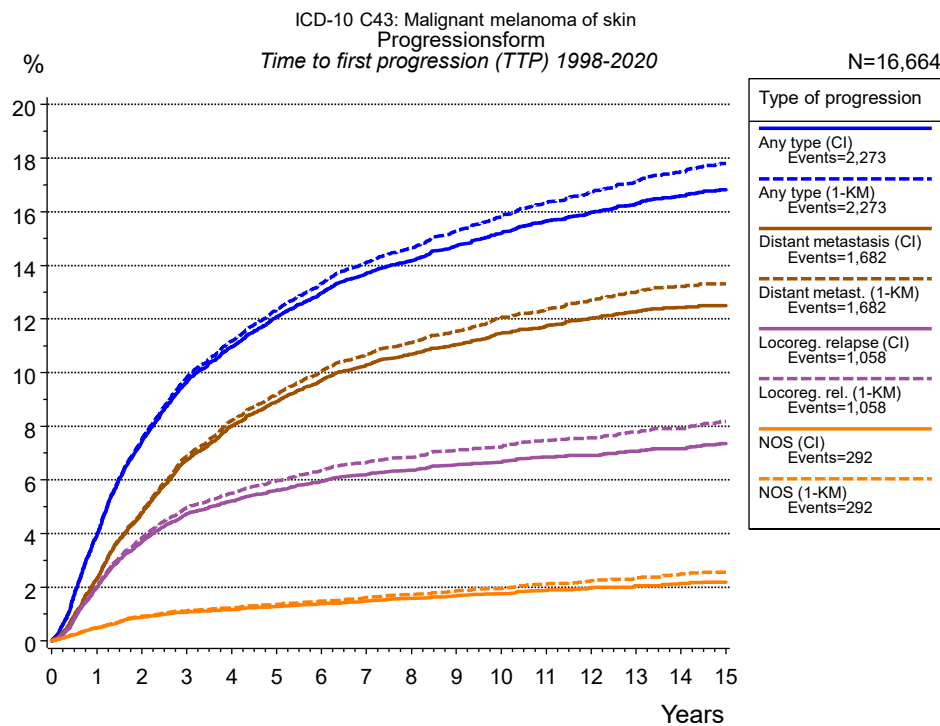


Figure 5a. Time to first progression of 16,664 patients with malignant melanoma diagnosed between 1998 and 2020 (in solid cancers M0 only) estimated by cumulative incidence function (CI, solid line) accounting for death as competing risk and by inverse Kaplan-Meier estimate (1-KM, dashed line). The frequency of events may be underestimated due to underreporting.

	Type of progression						
	Any type (CI)	Any type (1-KM)	Distant metastasis (CI)	Distant metast. (1-KM)	Locoreg. relapse (CI)	Locoreg. rel. (1-KM)	NOS (CI)
N	15,915	15,915	15,924	15,924	16,664	16,664	16,655
Events	2,249	2,249	1,671	1,671	1,049	1,049	282
compet.	1,990		2,224		3,489		3,905
Years	%	%	%	%	%	%	%
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	3.9	3.9	2.3	2.3	2.0	2.0	0.5
2	7.4	7.5	4.8	4.8	3.7	3.8	0.9
3	9.6	9.8	6.7	6.9	4.7	4.9	1.1
4	11.0	11.2	8.0	8.2	5.2	5.5	1.2
5	12.1	12.4	8.9	9.2	5.6	6.0	1.3
6	13.0	13.3	9.7	10.0	6.0	6.4	1.4
7	13.7	14.1	10.3	10.7	6.2	6.6	1.5
8	14.2	14.6	10.7	11.1	6.4	6.8	1.6
9	14.7	15.3	11.0	11.5	6.6	7.1	1.7
10	15.2	15.8	11.5	12.0	6.7	7.2	1.8
11	15.6	16.3	11.7	12.4	6.8	7.5	1.9
12	16.0	16.7	12.0	12.7	6.9	7.6	2.0
13	16.3	17.1	12.3	13.0	7.1	7.8	2.0
14	16.6	17.5	12.4	13.2	7.2	7.9	2.1
15	16.8	17.8	12.5	13.3	7.4	8.2	2.2

Type of progression	
<i>cont'd</i>	NOS (1-KM)
N	16,655
Events	282
compet.	
Years	%
0	0.0
1	0.5
2	0.9
3	1.1
4	1.2
5	1.4
6	1.5
7	1.6
8	1.7
9	1.9
10	2.0
11	2.1
12	2.3
13	2.3
14	2.5
15	2.6

Table 5b. Time to first progression of patients with malignant melanoma for period 1998-2020 (N=16,664), also showing the total of progression events (Events) and of deaths as competing risk (compet.).

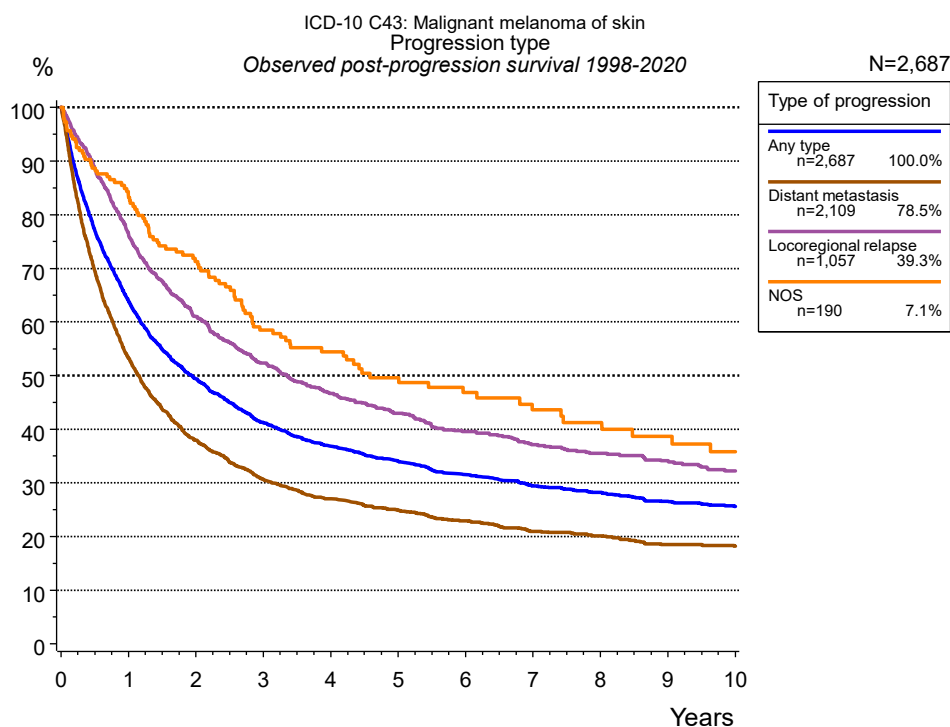


Figure 5c. Observed post-progression survival of 2,687 patients with malignant melanoma diagnosed between 1998 and 2020. These 2,687 patients with documented progression events during their course of disease represent 16.1 % of the totally 16,664 evaluated cases (incl. M1, n=749, 4.5 %). Patients with cancer relapse documented via death certificates only were excluded (n=335, 2.0 %). Multiple progression types on different sites are included in the evaluation even when not occurring synchronously. The NOS (not otherwise specified) class is included under the condition, that it is the one and only progression type during the course of disease.

Medical record documentation often lacks the linguistic severity to distinguish between local relapse, regional lymph node metastasis and distant spread in solid cancers. Frequently, the statement “not specified” is the only information in registries regarding relapse of the disease. The category “Any type” denotes all cases who suffered from at least one relapse during the course of disease (incl. primary M1-status). Although, the real number of relapsed patients is likely to be much higher. The accumulated percentage of patients with local relapse or distant metastasis exceeds the 100 % value because patients are potentially considered in more than one subgroup.

Years	Type of progression			
	Any type n=2,687 %	Distant metastasis n=2,109 %	Locoregional relapse n=1,057 %	NOS n=190 %
0	100.0	100.0	100.0	100.0
1	63.9	53.2	76.3	83.2
2	49.4	38.0	61.0	71.3
3	41.2	30.7	52.3	58.5
4	36.9	27.0	46.7	54.5
5	34.0	24.9	43.0	49.6
6	31.5	22.9	39.6	46.8
7	29.4	21.0	37.2	43.6
8	28.2	20.1	35.5	41.2
9	26.6	18.5	34.1	38.7
10	25.6	18.2	32.2	35.8

Table 5d. Observed post-progression survival of patients with malignant melanoma for period 1998-2020 (N=2,687).

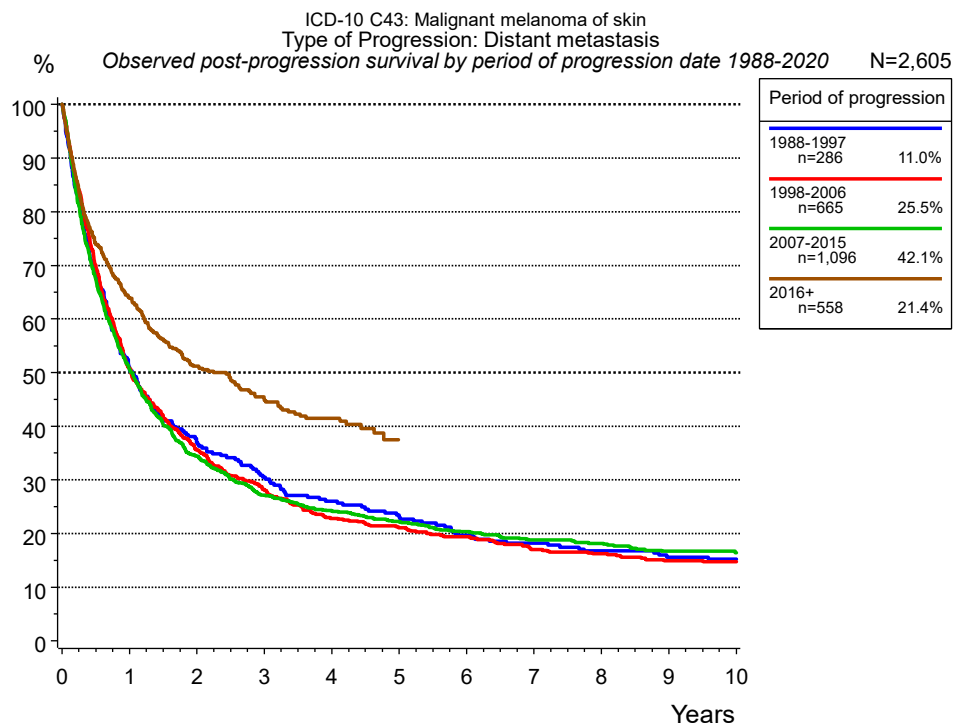


Figure 5e. Observed post-progression (distant metastasis) survival of 2,605 patients with malignant melanoma diagnosed between 1988 and 2020 by period of progression.

Years	Period of progression			
	1988-1997 n=286 %	1998-2006 n=665 %	2007-2015 n=1,096 %	2016+ n=558 %
0	100.0	100.0	100.0	100.0
1	51.0	50.7	50.7	63.8
2	37.0	35.5	34.4	51.3
3	30.5	28.2	27.2	45.2
4	26.0	22.8	24.3	41.4
5	23.1	21.1	22.2	37.5
6	19.7	19.4	20.3	
7	18.2	17.0	18.8	
8	16.7	16.2	18.2	
9	15.6	14.9	16.7	
10	15.2	14.7	16.4	

Table 5f. Observed post-progression (distant metastasis) survival of patients with malignant melanoma for period 1988-2020 by period of progression (N=2,605).

Shortcuts

MCR Munich Cancer Registry, Germany

NCI National Cancer Institute, USA

SEER Surveillance, Epidemiology, and End Results, USA

UICC Union for International Cancer Control, Geneva

DCO Death certificate only Death certificate provides the only notification to the registry.

NA Not available

NOS Not otherwise specified

OS Overall/Observed survival Overall/Observed survival (Kaplan-Meier estimate)

Date of entry: diagnosis
Event: death from any cause

RS Relative survival Survival compared to “general population”, ratio of observed to expected survival (Ederer II method), reflecting cancer specific survival

AS Assembled survival Assembled chart of observed, expected, relative survival

CS Conditional survival Survival probability under the condition of surviving a given period of time

TTP Time to progression Time to first progression / relapse
Date of entry: diagnosis
Event: (progression / relapse): first local-, lymph node recurrence, distant metastasis or unspecified progression

1-KM 1 minus Kaplan-Meier estimator (“inverse” Kaplan-Meier estimator)

CI Cumulative incidence
Death as competing risk (according to Kalbfleisch und Prentice)

PPS Post-progression survival Survival since first progression / relapse (Kaplan-Meier estimate)
Date of entry (progression / relapse): first local-, lymph node recurrence, distant metastasis or unspecified progression
Event: death from any cause

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