Munich Cancer Registry

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ICD-10 D03: Melanoma in situ

Incidence and Mortality

Year of diagnosis	1998-2020
Patients	7,187
Diseases	7,508
Creation date	12/21/2021
Database export	12/20/2021
Population	4.95 m

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

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

https://www.tumorregister-muenchen.de/en/facts/base/bD03__E-ICD-10-D03-Melanoma-in-situ-incidence-and-mortality.pdf

Index of figures and tables

Global Statements about the statistics on the Internet −
Baseline Statistics (grey button), **Survival** (red button)

In these analyses, the clinics and physicians of Upper Bavaria and the city and county of Landshut[#], with a total of 4.69 million inhabitants, account for the frequency of cancer diseases[##] and the achieved long term results. Additionally, the long term survival evaluated by the Munich Cancer Registry (MCR) is compared with the results of the population-based registry in the USA (SEER), which is useful for checking the consistency of the data on an international level.

In comparing several tables, inconsistent figures may be detected. This is based on the fact that different patient cohorts are included in the base calculation, for example when proportions of multiple tumors or DCO-cases[###] are concerned. In other cases the individual tumor diagnosis is the basis for calculation, for example with incidence.

The foot notes describe the currentness of the data. The baseline statistics and survival data are updated annually. This yearly analysis comprises the Annual Report of the MCR.

Clinics and physicians have access to essentially more detailed data, with which they can check, compare and in the best case optimize their own data and results.

We would be pleased to receive corrections, critique and useful suggestions. Just send an e-mail to tumor@ibe.med.uni-muenchen.de.

Munich Cancer Registry, December 2021

[#] Base data has been collected since 1998. An increase in new diseases is apparent, which is an effect of two extensions in the MCR catchment area (from a base population of 2.65 million to 4.10 in 2002, and to 4.69 million in 2007).

[##] Due to the high frequency and good prognosis of non-malignant skin cancer (C44), no systematic ascertainment is performed for this diagnosis. C44 is not designated as a primary, but rather as a secondary tumor.

[###] DCO (death certificate only) identifies a cancer case that first becomes available to the MCR through the death certificate.

ICD-10 codes (ICD-10 2015) used for specifying cancer site

Code	Description
D03.-	Melanoma in situ
D03.0	Lip
D03.1	Eyelid, including canthus
D03.2	Ear and external auricular canal
D03.3	Other and unspecified parts of face
D03.4	Scalp and neck
D03.5	Trunk
D03.6	Upper limb, including shoulder
D03.7	Lower limb, including hip
D03.8	Other sites
D03.9	Melanoma in situ, unspecified

INCIDENCE

Table 1

Cases by year of diagnosis, proportions of further malignancies, deaths, and active follow-up (ALL PATIENTS)

Year of diagnosis	All cases n	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	77	20.8	18.4	33.8	96.1
1999	113	20.0	18.2	31.0	93.8
2000	108	21.5	18.0	31.5	95.4
2001	94	23.2	17.9	20.2	93.6
2002	145	22.2	17.7	31.7	93.1 #
2003	170	21.9	17.4	28.2	95.9
2004	237	21.5	17.1	31.2	94.5
2005	257	21.5	16.5	35.0	93.4
2006	292	21.9	15.9	26.7	90.1
2007	252	22.6	15.4	31.0	84.1 #
2008	382	23.1	14.8	25.4	96.3
2009	376	23.1	13.9	25.3	97.6
2010	485	23.4	13.2	20.8	96.3
2011	564	23.2	12.4	16.8	98.0
2012	615	22.8	11.3	18.4	97.7
2013	542	22.7	10.3	12.2	96.7
2014	408	23.0	8.9	12.5	95.8
2015	390	23.3	8.1	10.3	92.1
2016	412	23.5	7.5	9.7	99.0
2017	312	23.6	6.0	7.4	99.4
2018	379	24.0	5.1	5.0	99.2
2019	495	24.3	4.2	4.0	99.4
2020	403	24.3	3.3	1.0	99.3 ##
1998-2020	7508	24.3	18.4	17.2	96.2

7,508 cases diagnosed 1998-2020 are related to a total of 7,187 patients. Currently, in 2,733 (38.0 %) of these 7,187 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 1,756 / 558 / 419 (24.4 % / 7.8 % / 5.8 %) patients exist having 2 / 3 / 4+ malignancies.

The increases of incident cases in 2002 and 2007 reflect the expansion to additional registry areas.

Please be aware that data of recent annual patient cohorts may not yet be fully processed. The years under evaluation can be retreived from the respective headings.

How to interpret:
In 2018, a subgroup of 379 cases has been diagnosed, of which 24.0 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 5.1 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 1a

Cases by year of diagnosis, proportions of further malignancies, deaths, and active follow-up (MALES)

Year of diagnosis	Males n	Males %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %	
1998	34	44.2	29.4	20.9	52.9	94.1	
1999	64	56.6	25.5	20.7	37.5	93.8	
2000	61	56.5	28.3	20.5	41.0	96.7	
2001	43	45.7	28.7	20.4	23.3	93.0	
2002	66	45.5	26.5	20.4	39.4	93.9	#
2003	87	51.2	25.6	19.9	34.5	95.4	
2004	115	48.5	24.7	19.6	34.8	92.2	
2005	119	46.3	25.3	18.8	41.2	93.3	
2006	132	45.2	25.5	18.0	31.8	93.9	
2007	113	44.8	26.0	17.4	34.5	87.6	#
2008	188	49.2	26.9	16.9	28.2	96.3	
2009	203	54.0	27.6	15.8	28.1	97.0	
2010	230	47.4	27.9	15.0	24.8	96.5	
2011	250	44.3	27.0	13.8	20.4	96.8	
2012	298	48.5	26.6	12.9	23.2	97.7	
2013	258	47.6	26.4	11.3	14.3	97.3	
2014	198	48.5	26.7	9.9	16.2	97.5	
2015	201	51.5	27.1	9.2	11.9	93.0	
2016	210	51.0	27.3	9.0	12.9	99.5	
2017	168	53.8	27.4	7.0	8.3	99.4	
2018	201	53.0	28.0	6.1	7.5	100.0	
2019	275	55.6	28.3	4.7	5.5	99.6	
2020	201	49.9	28.2	2.8	1.0	99.0	##
1998-2020	3715	49.5	28.2	20.9	20.3	96.6	

3,715 cases diagnosed 1998-2020 are related to a total of 3,530 patients. Currently, in 1,536 (43.5 %) of these 3,530 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 929 / 327 / 280 (26.3 % / 9.3 % / 7.9 %) patients exist having 2 / 3 / 4+ malignancies.

The increases of incident cases in 2002 and 2007 reflect the expansion to additional registry areas.

Please be aware that data of recent annual patient cohorts may not yet be fully processed. The years under evaluation can be retreived from the respective headings.

How to interpret:
In 2018, a subgroup of 201 cases has been diagnosed, of which 28.0 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 6.1 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 1b

Cases by year of diagnosis, proportions of further malignancies, deaths, and active follow-up (FEMALES)

Year of diagnosis	Females n	Females %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	43	55.8	14.0	16.0	18.6	97.7
1999	49	43.4	14.1	15.9	22.4	93.9
2000	47	43.5	13.7	15.7	19.1	93.6
2001	51	54.3	17.4	15.5	17.6	94.1
2002	79	54.5	17.8	15.3	25.3	92.4 #
2003	83	48.8	18.2	15.1	21.7	96.4
2004	122	51.5	18.4	14.8	27.9	96.7
2005	138	53.7	17.8	14.2	29.7	93.5
2006	160	54.8	18.5	13.9	22.5	86.9
2007	139	55.2	19.5	13.6	28.1	81.3 #
2008	194	50.8	19.5	12.8	22.7	96.4
2009	173	46.0	18.9	12.1	22.0	98.3
2010	255	52.6	19.1	11.5	17.3	96.1
2011	314	55.7	19.7	11.0	14.0	99.0
2012	317	51.5	19.3	9.7	13.9	97.8
2013	284	52.4	19.3	9.3	10.2	96.1
2014	210	51.5	19.6	7.9	9.0	94.3
2015	189	48.5	19.7	6.9	8.5	91.0
2016	202	49.0	19.9	6.0	6.4	98.5
2017	144	46.2	19.9	4.9	6.3	99.3
2018	178	47.0	20.1	3.9	2.2	98.3
2019	220	44.4	20.3	3.6	2.3	99.1
2020	202	50.1	20.4	3.8	1.0	99.5 ##
1998-2020	3793	50.5	20.4	16.0	14.1	95.8

3,793 cases diagnosed 1998-2020 are related to a total of 3,657 patients. Currently, in 1,197 (32.7 %) of these 3,657 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 827 / 231 / 139 (22.6 % / 6.3 % / 3.8 %) patients exist having 2 / 3 / 4+ malignancies.

The increases of incident cases in 2002 and 2007 reflect the expansion to additional registry areas.

Please be aware that data of recent annual patient cohorts may not yet be fully processed. The years under evaluation can be retreived from the respective headings.

How to interpret:
In 2018, a subgroup of 178 cases has been diagnosed, of which 20.1 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 3.9 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 2

Incidence measures by year of diagnosis
(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,
and from 4.10 to 4.94 m as of 2007, respectively)

Year of diagnosis	Males n	Females n	Males Inc. raw	Fem. Inc. raw	Males Inc. WS	Fem. Inc. WS	Males Inc. ES	Fem. Inc. ES	Males Inc. BRD-S	Fem. Inc. BRD-S
1998	34	43	3.1	3.7	1.9	2.7	2.8	3.2	3.4	3.4
1999	64	49	5.7	4.1	3.7	2.9	4.9	3.6	5.5	3.7
2000	61	47	5.4	3.9	3.3	2.7	4.6	3.3	5.5	3.7
2001	43	51	3.7	4.2	2.4	2.9	3.2	3.6	3.6	3.9
2002	66	79	3.5	4.0	2.2	2.9	3.1	3.4	3.4	3.9
2003	87	83	4.6	4.2	2.9	2.6	3.9	3.4	4.6	3.7
2004	115	122	6.1	6.2	3.7	3.7	5.1	4.7	6.0	5.4
2005	119	138	6.3	6.9	3.7	3.9	5.1	5.3	6.2	6.1
2006	132	160	6.9	8.0	4.1	4.7	5.5	6.2	6.5	7.0
2007	113	139	5.1	6.0	2.9	3.3	4.0	4.3	4.8	5.0
2008	188	194	8.4	8.4	4.7	4.7	6.6	6.2	7.8	7.1
2009	203	173	9.1	7.4	4.8	4.1	6.9	5.4	8.7	6.4
2010	230	255	10.2	10.9	5.5	5.9	7.7	7.9	9.5	9.2
2011	250	314	11.2	13.4	6.0	8.0	8.4	10.3	10.3	11.8
2012	298	317	13.1	13.4	6.8	7.4	9.7	9.9	11.9	11.4
2013	258	284	11.2	11.9	6.4	6.8	8.6	8.8	10.2	10.3
2014	198	210	8.5	8.7	4.5	5.0	6.3	6.5	7.6	7.5
2015	201	189	8.4	7.8	4.3	4.4	6.1	5.7	7.7	6.7
2016	210	202	8.7	8.2	4.2	4.8	6.2	6.3	7.9	7.2
2017	168	144	7.0	5.8	3.5	3.0	5.0	4.1	6.2	4.8
2018	201	178	8.3	7.2	3.9	3.6	5.8	5.0	7.3	5.9
2019	275	220	11.3	8.9	5.2	4.2	7.7	5.8	10.0	7.1
2020	201	202	8.3	8.1	3.9	3.8	5.7	5.4	7.3	6.5
1998–2020	3715	3793	8.0	7.9	4.4	4.5	6.2	5.9	7.6	6.8

The computation of the incidence measures includes all cancers, irrespective of first or subsequent malignancy.

Table 3

Age distribution parameters by year of diagnosis (ALL PATIENTS)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	77	55.8	16.7	19.5	92.2	31.4	41.5	59.6	67.3	76.2
1999	113	53.0	16.8	11.8	95.1	31.2	38.8	56.7	63.6	72.6
2000	108	58.3	15.3	22.8	87.1	34.3	46.0	62.1	70.2	75.1
2001	94	54.3	15.0	24.2	86.2	33.5	42.4	55.2	65.7	72.5
2002	145	56.3	16.3	19.9	84.1	32.0	42.2	59.6	67.7	77.5
2003	170	59.1	15.1	18.1	90.3	37.0	50.7	62.0	68.4	78.0
2004	237	60.1	16.2	20.3	94.7	36.4	48.0	63.7	71.3	80.7
2005	257	62.1	16.1	22.9	99.1	38.5	49.2	65.1	73.9	81.2
2006	292	61.4	15.4	16.2	94.5	39.4	50.9	64.4	71.2	80.0
2007	252	63.8	15.2	13.7	91.6	41.3	53.9	67.3	73.9	82.2
2008	382	63.0	14.6	16.0	93.7	42.5	52.3	66.6	72.8	81.2
2009	376	64.0	15.5	15.4	96.5	40.2	53.9	67.7	75.3	81.7
2010	485	64.1	15.2	18.1	97.7	42.2	53.1	67.7	74.5	81.6
2011	564	62.1	15.6	19.6	96.9	40.6	50.3	64.7	73.6	80.8
2012	615	64.1	15.1	12.1	95.7	41.9	53.4	67.9	74.9	80.8
2013	542	61.7	16.7	16.0	96.7	37.0	49.1	65.1	74.1	81.3
2014	408	63.4	15.1	18.4	94.9	41.7	52.3	66.6	74.7	81.0
2015	390	64.2	15.3	23.4	93.9	41.3	52.8	67.3	76.0	80.8
2016	412	64.2	14.9	13.2	91.3	44.1	52.9	67.2	76.6	81.2
2017	312	65.8	14.1	16.1	92.0	45.8	55.4	68.1	77.1	82.1
2018	379	67.0	14.2	24.6	92.8	47.7	57.7	70.7	77.6	82.7
2019	495	68.5	13.7	28.3	101	49.6	59.2	71.7	78.8	82.9
2020	403	68.0	14.0	21.7	95.8	46.9	59.3	70.7	79.1	83.3
1998-2020	7508	63.4	15.5	11.8	101	40.5	52.8	66.2	75.0	81.3

Table 3a

Age distribution parameters by year of diagnosis (MALES)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	34	62.1	14.7	36.1	92.2	41.5	52.5	61.3	72.9	82.6
1999	64	55.6	16.0	23.7	89.7	32.9	39.5	59.0	65.9	72.9
2000	61	62.6	13.1	33.5	87.1	40.4	57.4	64.9	71.0	78.1
2001	43	56.5	15.3	25.9	86.2	34.8	43.4	59.7	67.5	73.5
2002	66	60.3	11.4	32.0	78.8	40.1	56.4	61.6	67.4	73.4
2003	87	58.9	14.8	18.1	83.4	36.8	49.9	62.9	69.6	76.2
2004	115	60.6	14.6	24.5	89.3	38.4	49.7	64.0	70.8	76.6
2005	119	62.5	16.3	25.2	99.1	37.9	50.9	66.3	73.9	82.6
2006	132	62.0	14.7	18.3	94.5	40.1	52.1	66.1	71.2	77.6
2007	113	64.3	13.7	13.7	89.5	43.4	55.0	67.4	73.4	79.2
2008	188	64.5	12.8	16.0	93.2	44.1	57.5	67.2	72.2	78.2
2009	203	65.3	14.3	22.8	96.5	41.2	57.6	68.8	75.7	80.3
2010	230	65.0	14.1	20.9	95.7	44.3	55.6	68.7	74.4	81.3
2011	250	65.1	13.8	24.8	96.9	46.2	55.4	68.0	74.6	81.2
2012	298	66.2	13.0	29.5	95.7	47.0	58.6	69.0	74.8	79.8
2013	258	62.7	15.8	16.0	96.7	41.2	51.5	66.1	73.9	80.7
2014	198	65.4	13.9	22.0	94.9	45.4	55.9	69.4	75.1	81.0
2015	201	66.8	14.4	23.7	90.1	47.2	57.9	70.5	77.6	82.6
2016	210	68.2	13.2	13.2	91.3	50.0	59.9	71.8	78.1	82.1
2017	168	67.1	13.8	16.1	92.0	47.0	57.7	69.6	77.7	82.5
2018	201	68.8	12.9	34.3	92.8	50.9	60.6	72.6	78.7	82.9
2019	275	69.8	12.4	30.4	101	52.3	61.5	73.2	78.6	82.2
2020	201	69.2	12.7	21.7	94.5	52.5	60.5	71.1	79.3	82.9
1998–2020	3715	65.2	14.2	13.2	101	44.3	56.4	68.0	75.6	81.2

Table 3b

Age distribution parameters by year of diagnosis (FEMALES)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	43	50.8	16.6	19.5	82.3	29.5	35.8	53.6	63.9	71.2
1999	49	49.6	17.4	11.8	95.1	26.5	33.8	54.8	59.5	68.5
2000	47	52.6	16.2	22.8	81.3	29.2	36.4	55.6	66.4	72.0
2001	51	52.4	14.7	24.2	82.2	33.5	39.6	53.7	62.7	71.6
2002	79	52.9	18.9	19.9	84.1	27.5	35.7	52.2	68.9	79.1
2003	83	59.3	15.5	22.1	90.3	37.2	50.7	61.7	68.0	79.1
2004	122	59.6	17.6	20.3	94.7	35.5	45.6	62.2	72.0	82.0
2005	138	61.6	15.9	22.9	95.2	38.8	47.7	63.9	75.0	81.2
2006	160	60.9	15.9	16.2	89.2	39.4	49.8	63.2	71.2	82.3
2007	139	63.3	16.4	20.0	91.6	39.3	50.7	67.3	74.1	84.4
2008	194	61.6	16.1	25.5	93.7	39.7	46.9	65.0	73.4	81.7
2009	173	62.6	16.7	15.4	94.6	37.3	50.5	67.1	74.0	82.0
2010	255	63.2	16.1	18.1	97.7	41.2	50.8	66.4	74.7	81.7
2011	314	59.8	16.4	19.6	96.8	36.0	46.5	62.1	72.9	80.4
2012	317	62.0	16.6	12.1	93.4	38.4	48.9	65.2	74.9	81.4
2013	284	60.9	17.4	17.4	95.6	33.9	48.1	64.3	74.3	81.5
2014	210	61.5	15.9	18.4	93.4	38.8	47.6	64.1	74.3	80.8
2015	189	61.5	15.8	23.4	93.9	36.6	50.1	64.8	74.6	79.3
2016	202	60.0	15.4	22.4	89.7	39.8	49.0	59.3	74.1	78.8
2017	144	64.3	14.3	27.3	90.7	44.0	53.8	67.1	76.0	81.4
2018	178	64.9	15.3	24.6	92.0	43.0	55.0	68.0	76.9	82.0
2019	220	67.0	15.1	28.3	96.0	44.5	54.9	69.8	79.1	83.0
2020	202	66.7	15.2	29.2	95.8	43.4	56.5	70.1	78.7	83.7
1998-2020	3793	61.6	16.4	11.8	97.7	38.0	49.3	64.2	74.5	81.4

Table 4

Age distribution by 5-year age group and sex for period 2007-2020

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4									
5-9									
10-14	3	0.0	0.0	2	0.1	0.1	1	0.0	0.0
15-19	10	0.2	0.2	4	0.1	0.2	6	0.2	0.2
20-24	24	0.4	0.6	7	0.2	0.4	17	0.6	0.8
25-29	89	1.5	2.1	23	0.8	1.2	66	2.2	3.0
30-34	133	2.2	4.3	33	1.1	2.3	100	3.3	6.3
35-39	206	3.4	7.7	71	2.4	4.7	135	4.5	10.8
40-44	291	4.8	12.6	123	4.1	8.8	168	5.6	16.3
45-49	401	6.7	19.2	157	5.2	14.0	244	8.1	24.4
50-54	446	7.4	26.7	208	6.9	21.0	238	7.9	32.3
55-59	462	7.7	34.3	230	7.7	28.7	232	7.7	40.0
60-64	583	9.7	44.0	314	10.5	39.1	269	8.9	48.9
65-69	752	12.5	56.5	392	13.1	52.2	360	11.9	60.8
70-74	954	15.9	72.4	536	17.9	70.1	418	13.8	74.6
75-79	834	13.9	86.3	486	16.2	86.4	348	11.5	86.1
80-84	522	8.7	94.9	260	8.7	95.1	262	8.7	94.8
85+	305	5.1	100.0	148	4.9	100.0	157	5.2	100.0
All ages	6015	100.0		2994	100.0		3021	100.0	

Table 5

Age-specific incidence
for period 2007-2020

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.
0- 4				
5- 9				
10-14	2	1	0.1	0.1
15-19	4	6	0.2	0.4
20-24	7	17	0.3	0.9
25-29	22	66	1.0	2.9
30-34	32	98	1.4	4.3
35-39	70	135	3.0	5.9
40-44	123	167	4.9	6.9
45-49	155	240	5.8	9.2
50-54	203	237	8.0	9.4
55-59	228	229	10.7	10.5
60-64	309	265	17.5	14.0
65-69	384	354	23.5	19.5
70-74	531	407	35.4	23.7
75-79	471	341	38.9	22.7
80-84	255	259	35.2	24.3
85+	143	154	30.6	14.8
All ages	2939	2976		
Incidence				
Raw			9.0	8.9
WS			4.7	4.9
ES			6.7	6.5
BRD-S			8.3	7.5

The age-specific incidence characterizes the disease risk in a particular age group. The age distribution depends on the patient population frequency in each age group and reflects the tangible clinical picture of everyday patients care (see following chart).

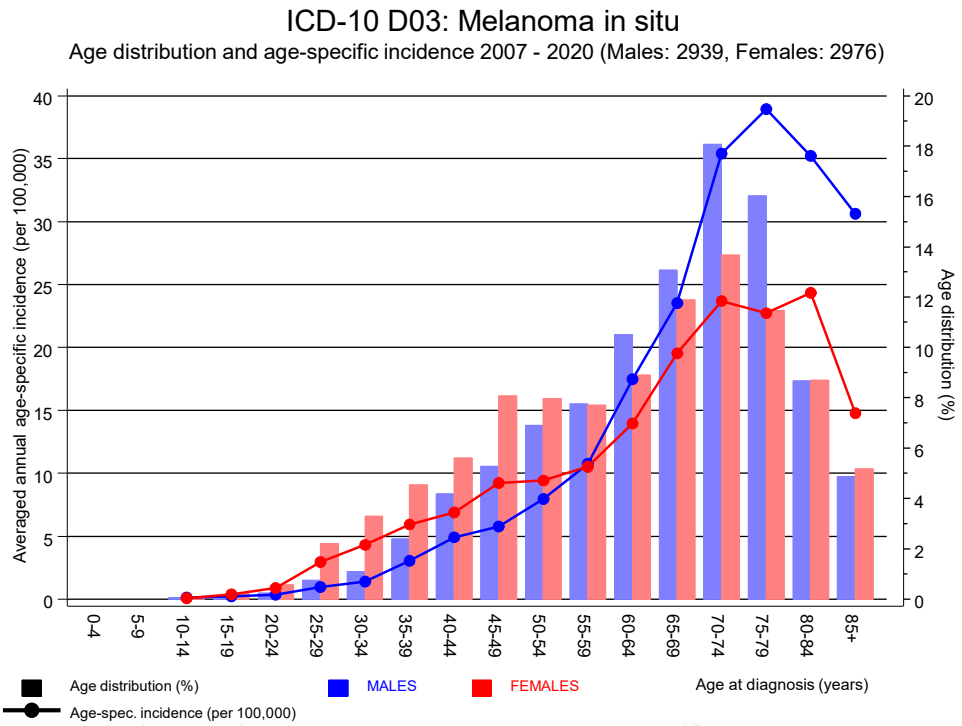


Figure 6. Age distribution (males: mean=66.3 yrs, median=69.2 yrs; females: mean=62.5 yrs, median=65.4 yrs) and age-specific incidence.

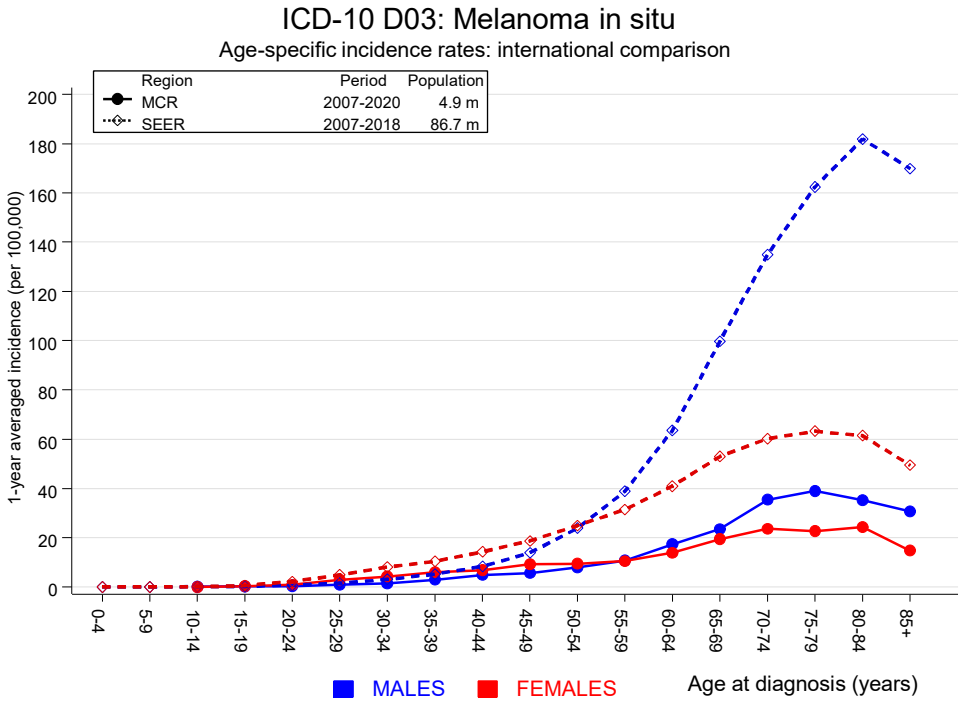


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:
Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 21 Regs Research Data, released April 2021, based on the November 2020 submission. http://www.seer.cancer.gov.

Table 7a

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of further malignancies for period 1998–2020

MALES

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C03–C06	Oral cavity	2	1.5	1.3	0.2	4.8		0.4	
C07–C08	Salivary gland	1	0.5	2.0	0.1	11.0		0.4	
C15	Oesophagus	9	3.8	2.4	1.1	4.5	#	4.1	
C16	Stomach	17	7.9	2.2	1.3	3.5	#	7.3	
C17	Small intestine	5	1.2	4.0	1.3	9.4	#	3.0	
C18	Colon	30	19.5	1.5	1.0	2.2	#	8.4	10.0
C19–C20	Rectum	16	10.2	1.6	0.9	2.6		4.6	
C21	Anus/canal	1	0.5	2.1	0.1	11.6		0.4	
C22	Liver	8	5.7	1.4	0.6	2.7		1.8	12.5
C23–C24	Bile	6	2.2	2.7	1.0	6.0	#	3.0	
C25	Pancreas	19	8.1	2.3	1.4	3.6	#	8.7	10.5
C32	Larynx	2	1.8	1.1	0.1	3.9		0.1	50.0
C33–C34	Lung	35	22.7	1.5	1.1	2.1	#	9.8	8.6
C37	Thymus	2	0.1	17.4	2.1	62.9	#	1.5	50.0
C38,C45	Mesothelioma	1	1.5	0.7	0.0	3.8		−0.4	
C43	Malign. melanoma	320	9.4	34.2	30.5	38.1	#	248.2	0.3
C46,C49	Soft tissue	5	1.2	4.2	1.4	9.7	#	3.0	
C61	Prostate	157	54.2	2.9	2.5	3.4	#	82.2	7.6
C62	Testis	1	0.6	1.6	0.0	9.0		0.3	
C64	Kidney	17	6.6	2.6	1.5	4.1	#	8.3	
C65	Renal pelvis	1	0.9	1.1	0.0	6.0		0.1	
C66	Ureter	2	0.6	3.6	0.4	12.9		1.2	
C67	Bladder	28	9.9	2.8	1.9	4.1	#	14.4	7.1
C68	Urethra	2	0.2	9.5	1.2	34.3	#	1.4	
C69	Eye melanoma	2	0.2	9.1	1.1	32.9	#	1.4	
C70–C72	CNS cancer	8	2.4	3.3	1.4	6.4	#	4.4	
C73	Thyroid	5	1.2	4.2	1.4	9.7	#	3.0	
C74–C80	Cancer others	1	0.4	2.2	0.1	12.5		0.4	
C76–C79	CUP	4	3.4	1.2	0.3	3.0		0.5	
C82–C85	NHL	18	8.7	2.1	1.2	3.3	#	7.5	
C90	Mult. myeloma	7	2.7	2.6	1.1	5.4	#	3.5	14.3
C91–C96	Leukaemia	4	3.2	1.2	0.3	3.2		0.6	25.0
C96	Systemic	1	0.1	11.8	0.3	65.9		0.7	100.0
Not observed		0	6.0	0.0	0.0	0.6	#	−4.8	
All further malignancies		737	199.3	3.7	3.4	4.0	#	429.7	3.9

Patients	3468
Median age at next malignancy (years)	74.1
Person-years	12513
Mean observation time (years)	3.6
Median observation time (years)	1.4

The occurrence of further specified malignancy is statistically significant.

Table 7b

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of further malignancies for period 1998–2020
FEMALES

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C03–C06	Oral cavity	4	0.7	5.6	1.5	14.3	#	2.5	
C09–C10	Oropharynx	1	0.5	2.0	0.1	11.1		0.4	
C12–C13	Hypopharynx	1	0.1	7.7	0.2	43.1		0.7	
C15	Oesophagus	3	0.9	3.5	0.7	10.3		1.7	
C16	Stomach	9	4.2	2.2	1.0	4.1		3.7	
C17	Small intestine	3	0.7	4.3	0.9	12.7		1.8	
C18	Colon	33	12.2	2.7	1.9	3.8	#	16.2	6.1
C19–C20	Rectum	5	4.8	1.0	0.3	2.4		0.1	
C21	Anus/canal	2	0.7	2.8	0.3	10.2		1.0	
C22	Liver	2	1.6	1.2	0.2	4.5		0.3	
C23–C24	Bile	6	1.8	3.4	1.2	7.4	#	3.3	
C25	Pancreas	10	6.1	1.6	0.8	3.0		3.0	30.0
C30–C31	Sinuses	1	0.2	5.6	0.1	31.0		0.6	
C33–C34	Lung	23	9.4	2.4	1.5	3.7	#	10.5	4.3
C43	Malign. melanoma	209	5.2	40.2	34.9	46.0	#	158.2	
C46,C49	Soft tissue	3	0.7	4.0	0.8	11.7		1.7	
C48	Peritoneal	1	0.5	1.9	0.0	10.6		0.4	
C50	Breast	118	39.1	3.0	2.5	3.6	#	61.3	2.5
C51	Vulva	3	1.4	2.1	0.4	6.2		1.2	
C52	Vagina	1	0.2	4.1	0.1	22.7		0.6	
C53	Cervix uteri	3	1.8	1.7	0.3	4.9		0.9	
C54	Corpus uteri	15	6.8	2.2	1.2	3.6	#	6.4	
C56	Ovary	13	4.9	2.6	1.4	4.5	#	6.3	
C57.9	Fem. urogen.	1	0.0	107.2	2.7	597.3	#	0.8	
C64	Kidney	9	2.9	3.1	1.4	6.0	#	4.8	11.1
C67	Bladder	4	2.6	1.5	0.4	4.0		1.1	
C70–C72	CNS cancer	3	1.6	1.9	0.4	5.4		1.1	
C73	Thyroid	4	2.2	1.9	0.5	4.7		1.4	
C76–C79	CUP	3	2.4	1.3	0.3	3.7		0.5	
C81	Hodgkin lymphoma	1	0.3	3.8	0.1	21.4		0.6	
C82–C85	NHL	19	5.0	3.8	2.3	6.0	#	10.9	
C90	Mult. myeloma	5	1.5	3.3	1.1	7.6	#	2.7	20.0
C91–C96	Leukaemia	7	1.9	3.6	1.5	7.4	#	3.9	28.6
Not observed		0	2.9	0.0	0.0	1.3		-2.3	
All further malignancies		525	127.9	4.1	3.8	4.5	#	308.2	2.5

Patients	3601
Median age at next malignancy (years)	72.7
Person-years	12883
Mean observation time (years)	3.6
Median observation time (years)	1.2

The occurrence of further specified malignancy is statistically significant.

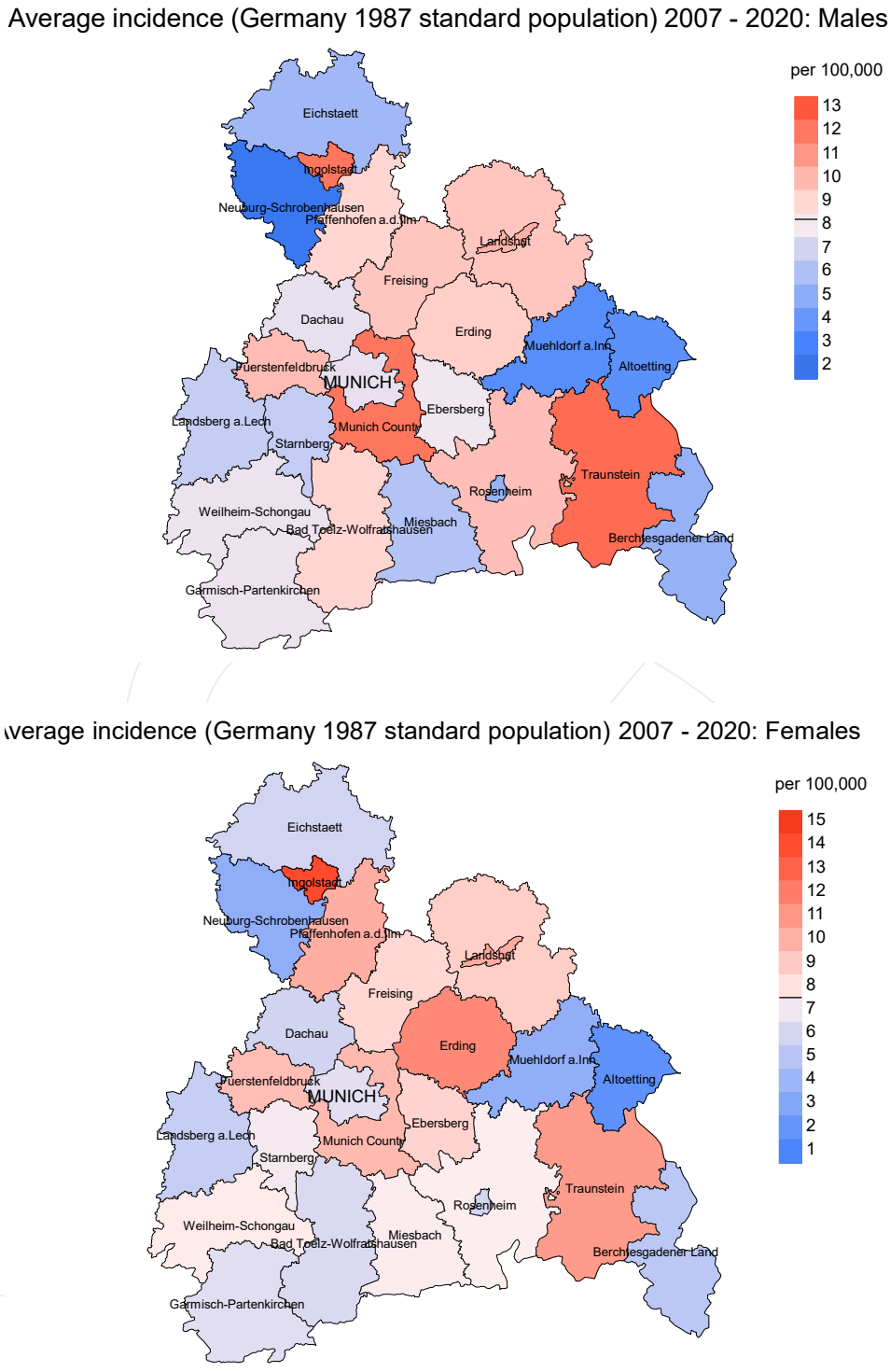
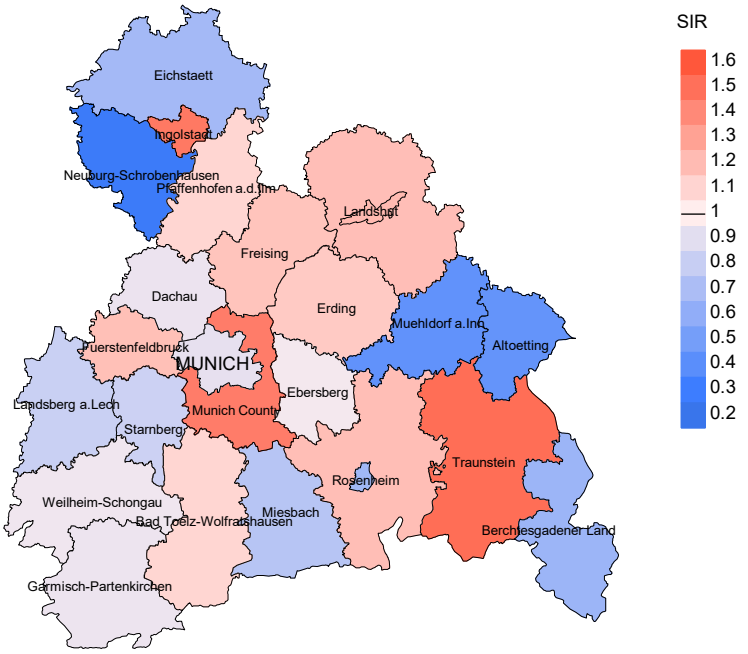


Figure 8a. Map of cancer incidence (german standard population) by county averaged for period 2007 to 2020. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 8.3/100,000 WS N=2,939, females 7.5/100,000 WS N=2,976).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,727 female residents (averaged) in the period from 2007 to 2020 a total of 95 women were identified with newly diagnosed melanoma in situ. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 8.6/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 6.5 and 11.2/100,000.

Standardized incidence ratio (SIR) 2007 - 2020: Males



Standardized incidence ratio (SIR) 2007 - 2020: Females

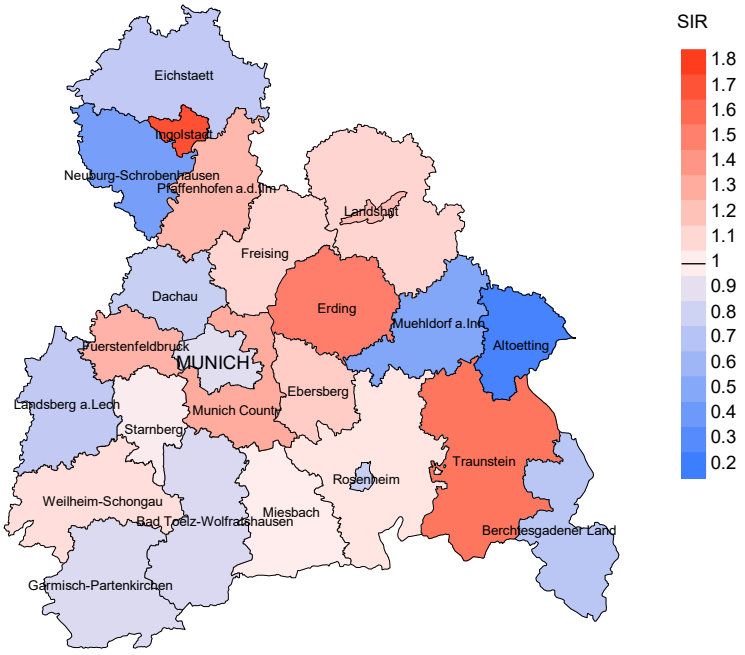


Figure 8b. Map of standardized incidence ratio (SIR) by county averaged for period 2007 to 2020. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=2,939, females N=2,976).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,153 female residents (averaged) in the period from 2007 to 2020 a total of 95 women were identified with newly diagnosed melanoma in situ. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.15. Though, the value of this parameter may vary with an underlying probability of 99% between 0.87 and 1.49, and is therefore not statistically striking.

MORTALITY

Table 9a

Annual cohorts: Incident cancers, follow-up status,
and deaths among the annual cohorts

(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,
and from 4.10 to 4.94 m as of 2007, respectively)

Year of diagnosis	Incident cases n	Prop. actively followed %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	77	96.1	26	33.8	92.3
1999	113	93.8	35	31.0	88.6
2000	108	95.4	34	31.5	82.4
2001	94	93.6	19	20.2	94.7
2002	145	93.1	46	31.7	93.5
2003	170	95.9	48	28.2	89.6
2004	237	94.5	74	31.2	94.6
2005	257	93.4	90	35.0	92.2
2006	292	90.1	78	26.7	83.3
2007	252	84.1	78	31.0	88.5
2008	382	96.3	97	25.4	88.7
2009	376	97.6	95	25.3	90.5
2010	485	96.3	101	20.8	92.1
2011	564	98.0	95	16.8	91.6
2012	615	97.7	113	18.4	85.0
2013	542	96.7	66	12.2	89.4
2014	408	95.8	51	12.5	86.3
2015	390	92.1	40	10.3	85.0
2016	412	99.0	40	9.7	80.0
2017	312	99.4	23	7.4	65.2
2018	379	99.2	19	5.0	52.6
2019	495	99.4	20	4.0	80.0
2020	403	99.3	4	1.0	100.0
1998–2020	7508	96.2	1292	17.2	87.9

Table 9b

Annual cohorts of incident cancers and deaths,
and cases deceased within the same year of being diagnosed with cancer

(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,
and from 4.10 to 4.94 m as of 2007, respectively)

Year of diagnosis/ death	Incident cases n	Deaths n	Deaths in same year n	Prop. deaths in same year %
1998	77	5		
1999	113	12		
2000	108	7		
2001	94	10	1	1.1
2002	145	16		
2003	170	15		
2004	237	14	1	0.4
2005	257	24		
2006	292	26	1	0.3
2007	252	37		
2008	382	38	4	1.0
2009	376	31	1	0.3
2010	485	65	4	0.8
2011	564	60	1	0.2
2012	615	74	5	0.8
2013	542	84	3	0.6
2014	408	91	2	0.5
2015	390	89		
2016	412	116	2	0.5
2017	312	115		
2018	379	111	3	0.8
2019	495	137	4	0.8
2020	403	155	3	0.7
1998–2020	7508	1332	35	0.5

Table 9c

Annual cohorts of deaths, and proportion of cancer-related and non-cancer-related deaths

(with respect to registry area expansion from 2.65 to 4.10 m as of 2002, and from 4.10 to 4.94 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer-related %	Prop. non-cancer-related %	Prop. cancer recorded on death certificate %
1998	5	20.0	80.0	25.0
1999	12	33.3	66.7	33.3
2000	7	28.6	71.4	33.3
2001	10	40.0	60.0	62.5
2002	16	56.3	43.8	71.4
2003	15	46.7	53.3	57.1
2004	14	35.7	64.3	53.8
2005	24	50.0	50.0	52.2
2006	26	34.6	65.4	53.8
2007	37	37.8	62.2	51.4
2008	38	36.8	63.2	47.2
2009	31	38.7	61.3	58.6
2010	65	36.9	63.1	48.4
2011	60	38.3	61.7	39.0
2012	74	36.5	63.5	42.5
2013	84	46.4	53.6	50.6
2014	91	49.5	50.5	55.7
2015	89	39.3	60.7	43.2
2016	116	33.6	66.4	41.6
2017	115	25.2	74.8	32.7
2018	111	27.0	73.0	48.1
2019	137	8.8	91.2	37.5
2020	155	12.3	87.7	39.0
1998-2020	1332	31.2	68.8	44.7

Table 10a

Medians of age at death according to the grouping in Table 9
MALES

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	4	74.4	73.8	74.9	74.9
1999	9	79.3	69.9	83.1	69.9
2000	4	83.2	73.4	88.1	73.4
2001	7	73.7	81.0	72.2	75.9
2002	8	70.8	70.8	79.1	69.6
2003	9	81.7	74.5	82.5	67.2
2004	5	65.4	64.7	87.8	65.0
2005	17	77.3	78.3	76.4	78.3
2006	13	77.5	73.0	80.4	73.0
2007	23	78.3	77.1	78.3	79.1
2008	18	79.9	78.9	85.3	78.9
2009	19	81.7	78.3	84.7	79.4
2010	34	77.9	74.4	81.7	77.6
2011	31	82.3	81.4	83.3	81.4
2012	47	83.0	76.9	83.7	77.1
2013	47	80.2	79.8	80.7	80.0
2014	55	84.1	75.6	87.8	78.7
2015	48	83.1	80.1	85.1	80.2
2016	70	81.9	82.1	81.7	81.5
2017	60	83.7	81.3	83.9	84.1
2018	66	82.4	81.4	83.6	81.8
2019	75	82.6	84.4	82.6	81.3
2020	88	85.1	81.1	86.1	82.0
1998–2020	757	82.0	79.2	83.3	79.9

Deaths of patients are considered to be cancer-related, in case that fact was recorded on the death certificate, or patients had suffered from metastasis or recurrence.

Table 10b

Medians of age at death according to the grouping in Table 9
FEMALES

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	1	76.8		76.8	
1999	3	89.3	91.8	83.9	78.5
2000	3	86.8		86.8	
2001	3	81.0	75.5	88.8	75.5
2002	8	78.1	63.9	79.1	73.5
2003	6	77.7	64.5	85.2	64.5
2004	9	81.5	65.2	85.5	79.3
2005	7	83.4	74.0	90.7	74.0
2006	13	82.1	78.4	82.7	78.9
2007	14	80.3	77.4	83.4	77.9
2008	20	85.2	73.3	86.6	85.0
2009	12	82.1	81.9	82.4	80.4
2010	31	85.3	76.6	86.5	77.3
2011	29	88.4	85.1	90.4	85.1
2012	27	85.7	85.5	85.8	87.4
2013	37	85.0	76.9	90.6	78.4
2014	36	81.7	73.1	90.3	73.1
2015	41	88.0	75.6	89.9	75.6
2016	46	83.4	74.9	85.5	78.7
2017	55	87.5	76.9	89.6	78.9
2018	45	84.6	79.4	87.9	80.0
2019	62	87.5	81.4	88.4	80.4
2020	67	85.9	83.0	86.6	81.9
1998–2020	575	85.2	77.5	87.7	78.7

By 2018, Bavarians' life expectancy at birth is estimated at 79.3 years for boys and 83.8 years for girls.

Deaths of patients are considered to be cancer-related, in case that fact was recorded on the death certificate, or patients had suffered from metastasis or recurrence.

Table 11a

Mortality measures (cancer-related death) and mortality-incidence-index
by year of death
MALES

Year of death	Deaths n	Mort. raw	MI-Index raw	Mort. WS	MI-Index WS	Mort. ES	MI-Index ES	Mort. BRD-S	MI-Index BRD-S
1998	1	0.1	0.03	0.1	0.03	0.1	0.03	0.1	0.03
1999	3	0.3	0.05	0.2	0.04	0.2	0.05	0.3	0.06
2000	2	0.2	0.03	0.1	0.03	0.2	0.04	0.2	0.04
2001	3	0.3	0.07	0.1	0.05	0.2	0.07	0.3	0.09
2002	6	0.3	0.09	0.2	0.09	0.3	0.10	0.4	0.11
2003	4	0.2	0.05	0.1	0.04	0.2	0.05	0.2	0.06
2004	3	0.2	0.03	0.1	0.02	0.1	0.02	0.1	0.02
2005	8	0.4	0.07	0.2	0.05	0.3	0.07	0.5	0.08
2006	6	0.3	0.05	0.1	0.04	0.2	0.04	0.3	0.06
2007	8	0.4	0.07	0.1	0.05	0.2	0.06	0.4	0.08
2008	10	0.4	0.05	0.2	0.04	0.3	0.05	0.5	0.07
2009	8	0.4	0.04	0.2	0.03	0.3	0.04	0.4	0.04
2010	16	0.7	0.07	0.3	0.05	0.5	0.06	0.7	0.07
2011	14	0.6	0.06	0.2	0.04	0.4	0.05	0.6	0.06
2012	18	0.8	0.06	0.3	0.05	0.6	0.06	0.8	0.07
2013	23	1.0	0.09	0.3	0.05	0.6	0.07	1.0	0.10
2014	28	1.2	0.14	0.5	0.10	0.8	0.12	1.0	0.14
2015	24	1.0	0.12	0.3	0.07	0.6	0.09	0.9	0.12
2016	25	1.0	0.12	0.4	0.09	0.7	0.11	0.9	0.12
2017	16	0.7	0.10	0.2	0.06	0.4	0.08	0.6	0.09
2018	17	0.7	0.09	0.2	0.05	0.4	0.06	0.6	0.08
2019	9	0.4	0.03	0.1	0.02	0.2	0.03	0.3	0.03
2020	10	0.4	0.05	0.1	0.03	0.2	0.04	0.3	0.05
1998-2020	262	0.6	0.07	0.2	0.05	0.4	0.06	0.6	0.08

Table 11b

Mortality measures (cancer-related death) and mortality-incidence-index
by year of death
FEMALES

Year of death	Deaths n	Mort. raw	MI-Index raw	Mort. WS	MI-Index WS	Mort. ES	MI-Index ES	Mort. BRD-S	MI-Index BRD-S
1998									
1999	1	0.1	0.02	0.0	0.01	0.0	0.01	0.0	0.01
2000									
2001	1	0.1	0.02	0.0	0.01	0.0	0.01	0.1	0.02
2002	3	0.2	0.04	0.1	0.03	0.1	0.03	0.1	0.03
2003	3	0.2	0.04	0.1	0.04	0.1	0.04	0.1	0.04
2004	2	0.1	0.02	0.1	0.01	0.1	0.01	0.1	0.02
2005	4	0.2	0.03	0.1	0.02	0.1	0.02	0.1	0.02
2006	3	0.1	0.02	0.0	0.01	0.1	0.01	0.1	0.02
2007	6	0.3	0.04	0.1	0.03	0.2	0.04	0.2	0.05
2008	4	0.2	0.02	0.1	0.01	0.1	0.02	0.1	0.02
2009	4	0.2	0.02	0.0	0.01	0.1	0.01	0.1	0.02
2010	8	0.3	0.03	0.1	0.02	0.2	0.02	0.3	0.03
2011	9	0.4	0.03	0.1	0.01	0.2	0.02	0.2	0.02
2012	9	0.4	0.03	0.1	0.01	0.2	0.02	0.2	0.02
2013	16	0.7	0.06	0.2	0.03	0.3	0.04	0.5	0.05
2014	17	0.7	0.08	0.3	0.05	0.4	0.06	0.6	0.07
2015	11	0.5	0.06	0.1	0.03	0.2	0.04	0.3	0.04
2016	14	0.6	0.07	0.2	0.05	0.3	0.06	0.4	0.06
2017	13	0.5	0.09	0.2	0.06	0.3	0.07	0.4	0.08
2018	13	0.5	0.07	0.2	0.05	0.3	0.05	0.4	0.06
2019	3	0.1	0.01	0.0	0.00	0.0	0.01	0.1	0.01
2020	9	0.4	0.05	0.1	0.03	0.2	0.03	0.2	0.03
1998-2020	153	0.3	0.04	0.1	0.02	0.2	0.03	0.2	0.03

Statistical Notes

In all tables and figures the respective reference values should be carefully considered. The incidence rates include diagnoses (with multiple primary), and death certificate only (DCO) cases, where applicable. For mortality statistics patients, diagnoses and progressive course of disease are presented. In the calculations, all courses of disease are considered whereby progressions occurred and/or death certificate identified progressive cancers were ascertained. Additionally there are three groups of disease course to consider:

1. **All multiple primaries included**

   The mortality statistic describes the tumor-specific death, independent of any malignancy. The patient perspective, induced secondary malignancies, and the problem of multiple malignancies from the same primary tumor all have reasons for their inclusion.

2. **First singular primary** (no information about other prior or synchronous malignancy)

   The mortality statistic describes the cancer-related death for patients who have no therapeutic restrictions due to a previous or synchronous cancer. These statistics are comparable to studies that have exclusion criteria based on a second malignancy.

3. **Single primary** (no information about other prior, syn- or metachronous malignancy)

   The mortality statistic describes the tumor-specific death that occurs without any impact through secondary primaries, earlier, synchronous, later or induced. Precisely the difference between disease group 1 and 2 highlight the magnitude of the problem of secondary malignancies.

For this reason differences appear concerning official mono-causal mortality statistics. To judge the maximum deviation, 2 further tables are presented. In the first table the distribution of secondary malignancies before, at or after the described cancer are shown, that could be an alternative cause of death. In the second table, the age-specific mortality rates for all courses of disease, without designation of secondary malignancies are shown.

A previously minimally acknowledged statistic is the **age at death**, which allows for a good assessment of the quality of classification of the apparent tumor-specific death. For assumed tumor-independent deaths, the age of death should be estimated from the age of diagnosis and the normal life expectancy, whereas tumor-dependent deaths can be estimated from the age of diagnosis plus the average tumor-specific life expectancy. The comparison of different tumors demonstrates this association, if the causes of cancer and the competing cause of death are independent of each other (e.g. breast and colon versus head&neck and lung).

The ratio of mortality and incidence (mortality-to-incidence ratio, **MIR**, **MI-Index**) is a statistical index that allows for the evaluation of the quality of data. For diseases with poor prognoses, comparable values are obtained from all age groups, because to a large extent, the numerator and denominator contain the same cases. For tumors with a good prognosis, increasing and decreasing incidence and age-specific differences in prognosis can more strongly alter the MIR. Additionally, attention should be paid to the confidence intervals where fewer cases are reported.

The complexity of problems identified here emphasizes the importance of relative survival data for the appropriate analysis of long term results.

As a measurement of the burden of disease, the number of potential life years loss due to premature deaths in a cohort can be calculated (**PYLL**, potential years of life lost, standardized per 100,000 persons or per European standard) as well as the average loss of life years per individual (**AYLL**, average years of life lost). Depending upon the analytic aim (health economy, prevention, health care research) different methods exist for the generation of these measurements. In the results presented here, the age for a premature death is considered to be before 70 years, according to the guidelines of the OECD and the WHO (as seen in the abbreviation PYLL-70 or AYLL-70).

Shortcuts

MCR	Munich Cancer Registry (Tumorregister München)
GEKID	Association of Population-based Cancer Registries in Germany (Gesellschaft der epidemiologischen Krebsregister in Deutschland e.V.)
SEER	Surveillance, Epidemiology, and End Results (USA)
DCO	Death certificate only
BRD-S	German (FRG) standard population
ES	European standard population (old)
WS	World standard population
SIR	Standardized incidence ratio
CI	Confidence interval
EAR	Excess absolute risk = excess cancer cases (O - E) per 10,000 person-years
PYLL-70	Potential years of life lost prior to age 70 given a person dies before that age
AYLL-70	Average years of life lost prior to age 70 given a person dies before that age
SMR	Standardized mortality ratio
MI-index	Ratio of mortality to incidence, MIR
FRG	Federal Republic of Germany

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