Munich Cancer Registry

- Survival
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- *Deutsch*

Sarcoma (morphological classification)

Incidence and Mortality

Year of diagnosis	1998-2020
Patients	4,357
Diseases	4,382
Creation date	12/21/2021
Database export	12/20/2021
Population	4.95 m

Munich Cancer Registry
Cancer Registry Bavaria - Upper Bavaria Regional Center
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Marchioninistr. 15
Munich, 81377
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https://www.tumorregister-muenchen.de/en

https://www.tumorregister-muenchen.de/en/facts/base/bhST__E-Sarcoma-morphological-classification-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.

Morphology codes (WHO classification 2013) applied for specifying cancer site

Code	Description
871	Perivascular tumor
8800/3	Sarcoma NOS
8801/3	Undiff. spindle cell sarcoma
8802/3	Undiff. pleomorphic sarcoma
8803/3	Undiff. round cell sarcoma
8804/3	Undiff. epitheloid sarcoma
8805/3	Undiff. sarcoma NOS
8806/3	Desmoplast. small round cell tumour
881–882, 8832/3, 8833/3, 8840/3	Fibrosarcoma
8842/3	Ossifiz. fibromyx. tumour
885	Liposarcoma
889	Leiomyosarcoma
890–891, 8920/3	Rhabdomyosarcoma
8921/3, 954, 956–957, 9580/3	Nerve sheath tumours
8930/3, 8931/3	Endometr. stromal tumour
8936/3	Gastroint. stromal tumour
8940/3	Mixed tumour NOS
8963/3	Extra-renal rhabdoid tumour
8982/3	Myoepithelial carcinoma
8990/3	Phospaturic mesenchymal tumour
9044/3	Clear cell sarcoma
912–913	Angiosarcoma
918–919	Extraskeletal osteosarcoma
922–924	Extraskeletal chondrosarcoma
925	Fibrohistiocytic tumour
9260/3, 9364/3, 9365/3, 9473/3	Extraskeletal Ewing sarcoma/PNET
9581/3	Alveolar soft-part sarcoma
9040–9043	Synovial sarcoma
9140/3	Kaposi sarcoma (incl. ICD-10 C46)
917	Lymphangiosarcoma

5th digit behaviour code = /3 (malignant, primary site)

Malignancies of the following sites are explicitly excluded:

Topography codes (ICD-O-3 2014)

Code	Description
C40.-	Bones, joints and articular cartilage of limbs
C41.-	Bones, joints and articular cartilage of other and unspecified sites

INCIDENCE

Table 1

Cases with invasive cancer 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	121	9.9	9.6	77.7	95.0
1999	110	12.1	9.6	75.5	93.6
2000	116	11.8	9.3	68.1	93.1
2001	114	11.5	9.3	64.0	93.9
2002	168	12.1	9.3	72.6	97.0 #
2003	185	12.2	9.2	69.7	95.1
2004	209	13.0	9.1	61.7	97.1
2005	207	13.1	8.7	65.2	93.7
2006	183	13.7	8.6	60.1	95.1
2007	223	13.3	8.3	59.6	91.0 #
2008	222	13.2	7.8	56.3	98.6
2009	252	14.1	7.5	61.5	96.8
2010	235	14.4	7.2	52.8	96.2
2011	264	15.4	6.9	55.7	97.7
2012	244	15.7	6.4	56.6	98.8
2013	258	16.5	5.9	54.3	99.6
2014	225	16.9	5.8	54.7	97.8
2015	221	17.2	5.3	52.9	94.6
2016	176	17.5	4.2	56.8	98.9
2017	189	17.6	3.3	43.4	98.9
2018	179	17.7	2.7	38.0	99.4
2019	165	17.8	4.0	24.2	98.2
2020	116	17.9	4.4	24.1	100.0 ##
1998-2020	4382	17.9	9.6	56.5	96.7

4,382 cases diagnosed 1998-2020 are related to a total of 4,357 patients. Currently, in 1,149 (26.4 %) of these 4,357 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 884 / 190 / 75 (20.3 % / 4.4 % / 1.7 %) 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 179 cases has been diagnosed, of which 17.7 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 2.7 % 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 with invasive cancer 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	63	52.1	9.5	11.1	81.0	95.2	
1999	63	57.3	12.7	11.2	82.5	95.2	
2000	58	50.0	10.9	10.8	79.3	93.1	
2001	47	41.2	9.1	10.7	59.6	91.5	
2002	80	47.6	9.6	10.9	75.0	97.5	#
2003	86	46.5	10.1	10.8	68.6	98.8	
2004	99	47.4	10.7	10.5	63.6	99.0	
2005	93	44.9	11.2	10.4	65.6	93.5	
2006	83	45.4	12.1	10.3	67.5	97.6	
2007	98	43.9	11.6	9.8	65.3	93.9	#
2008	104	46.8	11.7	9.3	53.8	99.0	
2009	112	44.4	12.5	8.7	61.6	96.4	
2010	113	48.1	12.5	8.3	47.8	95.6	
2011	122	46.2	13.4	7.8	59.0	97.5	
2012	105	43.0	13.8	7.3	52.4	100.0	
2013	125	48.4	14.5	6.8	52.0	99.2	
2014	104	46.2	15.4	6.5	51.0	98.1	
2015	105	47.5	15.7	6.4	58.1	97.1	
2016	75	42.6	16.3	4.9	53.3	97.3	
2017	89	47.1	16.7	4.1	43.8	97.8	
2018	84	46.9	16.9	3.4	41.7	98.8	
2019	78	47.3	17.1	4.8	20.5	100.0	
2020	50	43.1	17.2	6.0	34.0	100.0	##
1998-2020	2036	46.5	17.2	11.1	57.6	97.2	

2,036 cases diagnosed 1998-2020 are related to a total of 2,027 patients. Currently, in 553 (27.3 %) of these 2,027 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 420 / 93 / 40 (20.7 % / 4.6 % / 2.0 %) 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 84 cases has been diagnosed, of which 16.9 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 3.4 % 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 with invasive cancer 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	58	47.9	10.3	8.3	74.1	94.8
1999	47	42.7	11.4	8.1	66.0	91.5
2000	58	50.0	12.9	8.1	56.9	93.1
2001	67	58.8	13.9	8.1	67.2	95.5
2002	88	52.4	14.5	8.0	70.5	96.6 #
2003	99	53.5	14.1	7.8	70.7	91.9
2004	110	52.6	15.2	7.9	60.0	95.5
2005	114	55.1	14.8	7.3	64.9	93.9
2006	100	54.6	15.2	7.2	54.0	93.0
2007	125	56.1	14.8	7.1	55.2	88.8 #
2008	118	53.2	14.6	6.6	58.5	98.3
2009	140	55.6	15.5	6.4	61.4	97.1
2010	122	51.9	16.1	6.3	57.4	96.7
2011	142	53.8	17.2	6.2	52.8	97.9
2012	139	57.0	17.4	5.6	59.7	97.8
2013	133	51.6	18.1	5.1	56.4	100.0
2014	121	53.8	18.2	5.2	57.9	97.5
2015	116	52.5	18.5	4.3	48.3	92.2
2016	101	57.4	18.5	3.6	59.4	100.0
2017	100	52.9	18.4	2.6	43.0	100.0
2018	95	53.1	18.3	2.0	34.7	100.0
2019	87	52.7	18.4	3.3	27.6	96.6
2020	66	56.9	18.6	3.2	16.7	100.0 ##
1998-2020	2346	53.5	18.6	8.3	55.5	96.2

2,346 cases diagnosed 1998-2020 are related to a total of 2,330 patients. Currently, in 596 (25.6 %) of these 2,330 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 464 / 97 / 35 (19.9 % / 4.2 % / 1.5 %) 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 95 cases has been diagnosed, of which 18.3 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 2.0 % 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	63	58	5.7	4.9	4.2	3.2	5.2	3.9	6.0	4.5
1999	63	47	5.6	4.0	4.3	2.6	5.3	3.3	6.0	3.7
2000	58	58	5.1	4.8	3.5	3.2	4.5	3.8	5.3	4.3
2001	47	67	4.1	5.5	3.4	3.8	4.0	4.7	4.5	5.1
2002	80	88	4.3	4.5	3.4	2.9	4.0	3.5	4.7	4.1
2003	86	99	4.6	5.0	3.2	3.2	4.1	4.0	4.8	4.5
2004	99	110	5.3	5.6	3.8	3.7	4.7	4.5	5.2	5.0
2005	93	114	4.9	5.7	3.7	3.5	4.4	4.5	4.7	5.1
2006	83	100	4.3	5.0	2.8	3.5	3.7	4.2	4.4	4.6
2007	98	125	4.4	5.4	2.9	3.5	3.6	4.4	4.2	4.8
2008	104	118	4.7	5.1	2.9	3.3	3.8	4.1	4.5	4.5
2009	112	140	5.0	6.0	3.0	3.5	4.0	4.7	4.9	5.3
2010	113	122	5.0	5.2	3.5	2.8	4.4	3.7	4.8	4.4
2011	122	142	5.5	6.1	3.3	3.6	4.4	4.5	5.1	5.1
2012	105	139	4.6	5.9	2.8	3.3	3.7	4.3	4.4	4.9
2013	125	133	5.4	5.6	3.6	3.2	4.4	4.1	5.2	4.7
2014	104	121	4.5	5.0	2.5	3.2	3.4	3.9	4.1	4.4
2015	105	116	4.4	4.8	2.6	2.8	3.5	3.6	4.1	4.1
2016	75	101	3.1	4.1	1.7	2.6	2.3	3.2	2.8	3.6
2017	89	100	3.7	4.1	2.1	2.3	2.8	2.9	3.4	3.4
2018	84	95	3.5	3.8	2.1	2.4	2.7	3.0	3.2	3.3
2019	78	87	3.2	3.5	1.9	2.2	2.5	2.7	3.0	3.1
2020	50	66	2.1	2.7	1.1	1.5	1.5	1.9	1.8	2.3
1998-2020	2036	2346	4.4	4.9	2.9	3.0	3.6	3.8	4.2	4.3

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	121	57.5	22.0	0.4	93.2	28.3	43.3	59.7	75.1	85.1
1999	110	57.9	18.7	3.5	97.4	32.8	47.5	61.0	71.5	78.7
2000	116	57.1	20.6	1.7	97.1	31.2	41.6	60.3	71.6	82.3
2001	114	55.4	19.4	11.7	97.6	26.1	43.5	55.6	70.0	79.0
2002	168	56.8	22.4	0.0	93.0	25.4	42.1	61.5	74.1	82.7
2003	185	58.4	20.7	5.3	92.5	26.6	44.2	62.1	75.4	83.1
2004	209	57.5	20.4	0.1	96.1	32.1	44.8	62.4	73.1	80.3
2005	207	56.6	19.5	3.3	94.2	30.7	43.4	58.9	72.4	80.0
2006	183	58.2	19.8	1.0	103	32.5	46.5	59.9	73.6	82.2
2007	223	58.6	19.0	0.3	96.4	35.9	46.0	63.4	71.3	79.9
2008	222	60.7	19.2	0.3	101	35.3	49.6	64.1	73.9	82.2
2009	252	62.4	17.3	2.4	94.3	39.8	51.4	65.1	74.9	82.7
2010	235	59.0	18.4	4.7	95.6	35.0	45.6	60.5	73.3	81.8
2011	264	61.9	18.7	0.7	96.5	37.7	50.0	65.3	75.0	82.9
2012	244	63.0	18.5	0.4	98.4	38.1	52.6	65.7	75.7	84.4
2013	258	61.1	20.4	0.0	96.7	31.1	47.7	66.1	76.3	83.5
2014	225	61.3	18.1	1.7	91.5	35.4	50.9	64.8	74.3	83.6
2015	221	62.4	19.0	0.9	96.2	38.2	50.7	64.5	77.5	84.6
2016	176	62.2	19.0	0.0	91.0	35.6	49.6	66.4	76.9	84.3
2017	189	63.1	18.2	4.1	101	39.4	52.2	67.3	76.5	82.6
2018	179	60.8	20.0	3.6	101	30.9	47.3	62.7	76.1	85.5
2019	165	60.0	18.1	4.4	97.1	32.2	47.0	61.8	74.2	80.7
2020	116	63.5	17.4	16.8	90.5	36.8	53.9	65.6	79.1	82.8
1998-2020	4382	60.1	19.4	0.0	103	33.7	47.7	63.2	74.5	82.6

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	63	55.6	21.5	0.4	91.1	28.3	38.0	59.7	71.0	84.4
1999	63	57.1	19.8	3.5	97.4	32.7	46.6	61.4	71.9	78.6
2000	58	57.0	20.6	1.7	92.9	29.2	44.1	58.9	71.6	85.3
2001	47	53.1	21.8	11.8	97.6	19.5	38.7	51.5	71.5	78.1
2002	80	54.4	23.9	0.1	92.4	19.1	38.5	59.0	72.6	81.2
2003	86	56.7	20.1	8.1	87.9	26.4	42.3	59.6	70.7	79.7
2004	99	56.6	20.8	0.1	93.4	32.1	44.6	62.3	72.1	78.7
2005	93	52.1	19.9	3.3	90.1	29.4	38.6	54.4	66.5	74.1
2006	83	60.0	18.9	1.6	86.9	35.7	47.7	62.5	75.8	82.1
2007	98	58.9	20.0	1.3	96.4	28.8	44.1	66.0	72.7	78.9
2008	104	61.8	18.0	0.3	93.4	37.9	50.3	66.1	73.7	80.2
2009	112	63.1	20.2	2.4	93.0	34.9	50.4	69.0	78.1	84.1
2010	113	54.9	18.4	4.7	91.7	31.9	43.3	57.1	67.7	79.5
2011	122	62.0	18.5	1.5	95.3	37.2	50.7	66.0	74.5	82.3
2012	105	61.6	19.5	1.3	95.5	32.0	50.4	66.1	75.5	83.8
2013	125	59.7	21.2	0.0	87.2	27.9	46.4	66.9	75.6	82.1
2014	104	63.0	17.3	18.1	91.5	36.5	53.1	66.1	76.2	84.5
2015	105	64.3	19.6	0.9	94.3	39.5	53.8	67.6	78.2	86.4
2016	75	66.7	16.3	3.6	91.0	47.8	56.9	68.6	78.8	85.5
2017	89	62.5	18.1	15.4	90.0	35.5	48.4	67.4	76.5	81.3
2018	84	62.0	22.0	3.6	92.8	29.3	47.1	64.4	79.4	88.7
2019	78	60.4	18.3	20.4	85.2	33.4	46.0	66.0	76.4	80.8
2020	50	65.3	17.4	16.8	90.5	39.2	55.5	66.8	79.9	83.9
1998-2020	2036	59.7	19.9	0.0	97.6	31.8	47.3	63.9	74.5	82.2

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	58	59.5	22.4	3.4	93.2	26.8	45.4	60.7	77.2	85.7
1999	47	58.9	17.3	17.4	88.4	34.6	49.1	60.6	70.8	78.7
2000	58	57.2	20.7	5.5	97.1	32.3	38.5	61.5	71.9	81.5
2001	67	57.0	17.6	11.7	88.0	33.2	45.3	59.8	69.7	81.0
2002	88	59.0	20.9	0.0	93.0	28.0	44.2	63.3	76.3	83.4
2003	99	59.8	21.1	5.3	92.5	26.6	49.1	64.2	77.0	83.5
2004	110	58.4	20.2	2.4	96.1	32.1	44.8	63.3	74.2	81.1
2005	114	60.2	18.4	6.3	94.2	36.1	49.4	61.8	74.3	81.3
2006	100	56.8	20.5	1.0	103	31.3	45.9	57.0	72.0	82.9
2007	125	58.3	18.3	0.3	90.1	38.6	46.4	59.4	70.2	82.4
2008	118	59.8	20.3	1.9	101	29.4	48.7	61.6	74.3	83.6
2009	140	61.8	14.6	24.9	94.3	42.3	51.9	62.7	72.9	80.2
2010	122	62.7	17.6	21.8	95.6	37.3	49.2	66.1	76.1	82.3
2011	142	61.8	19.0	0.7	96.5	39.4	49.9	64.9	75.3	83.3
2012	139	64.0	17.8	0.4	98.4	41.1	53.8	65.0	76.8	84.8
2013	133	62.4	19.6	12.1	96.7	36.9	47.8	63.9	76.8	86.9
2014	121	59.8	18.7	1.7	90.5	35.1	49.6	62.6	72.6	83.0
2015	116	60.8	18.3	5.2	96.2	37.5	47.5	61.2	76.4	82.7
2016	101	58.8	20.2	0.0	90.7	34.1	45.2	63.3	75.1	83.2
2017	100	63.6	18.3	4.1	101	43.4	54.7	66.2	76.5	82.8
2018	95	59.7	18.1	10.1	101	32.2	47.4	62.5	74.0	83.0
2019	87	59.6	18.0	4.4	97.1	31.6	47.1	59.6	73.2	80.0
2020	66	62.1	17.5	21.3	86.7	32.8	51.2	64.8	76.8	81.2
1998-2020	2346	60.4	18.9	0.0	103	34.9	48.2	62.7	74.6	82.9

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	25	0.8	0.8	15	1.1	1.1	10	0.6	0.6
5-9	9	0.3	1.1	3	0.2	1.3	6	0.4	1.0
10-14	19	0.6	1.8	11	0.8	2.1	8	0.5	1.5
15-19	33	1.1	2.9	18	1.3	3.4	15	0.9	2.4
20-24	51	1.7	4.6	23	1.7	5.1	28	1.7	4.2
25-29	63	2.1	6.7	31	2.3	7.4	32	2.0	6.2
30-34	86	2.9	9.6	45	3.3	10.7	41	2.6	8.7
35-39	132	4.4	14.1	67	4.9	15.6	65	4.0	12.8
40-44	150	5.1	19.1	60	4.4	20.0	90	5.6	18.4
45-49	197	6.6	25.8	67	4.9	24.9	130	8.1	26.5
50-54	230	7.7	33.5	93	6.8	31.7	137	8.5	35.0
55-59	239	8.0	41.6	98	7.2	38.9	141	8.8	43.8
60-64	280	9.4	51.0	119	8.7	47.7	161	10.0	53.8
65-69	327	11.0	62.0	173	12.7	60.3	154	9.6	63.4
70-74	364	12.3	74.3	175	12.8	73.2	189	11.8	75.2
75-79	309	10.4	84.7	160	11.7	84.9	149	9.3	84.5
80-84	240	8.1	92.8	108	7.9	92.8	132	8.2	92.7
85+	215	7.2	100.0	98	7.2	100.0	117	7.3	100.0
All ages	2969	100.0		1364	100.0		1605	100.0	

Table 5

Age-specific incidence and proportion of all cancers
for period 2007-2020

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males Prop.all cancers n=153686 %	Females Prop.all cancers n=155051 %
0- 4	15	10	0.9	0.6	6.8	5.8
5- 9	3	6	0.2	0.4	2.6	6.0
10-14	11	8	0.7	0.5	8.0	6.3
15-19	18	15	1.0	0.9	5.6	5.7
20-24	23	28	1.1	1.5	3.7	5.4
25-29	31	32	1.4	1.4	3.3	2.7
30-34	45	41	1.9	1.8	3.5	1.9
35-39	67	65	2.9	2.9	3.7	1.9
40-44	60	90	2.4	3.7	2.1	1.5
45-49	67	130	2.5	5.0	1.3	1.4
50-54	93	136	3.6	5.4	1.1	1.1
55-59	98	141	4.6	6.5	0.8	1.1
60-64	119	160	6.7	8.4	0.7	1.0
65-69	173	154	10.6	8.5	0.7	0.8
70-74	175	188	11.7	10.9	0.6	0.9
75-79	160	148	13.2	9.9	0.7	0.8
80-84	108	131	14.9	12.3	0.7	0.9
85+	97	117	20.8	11.2	0.9	0.7
All ages	1363	1600			0.9	1.0
Incidence						
Raw			4.2	4.8		
WS			2.6	2.8		
ES			3.3	3.6		
BRD-S			3.9	4.1		

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).

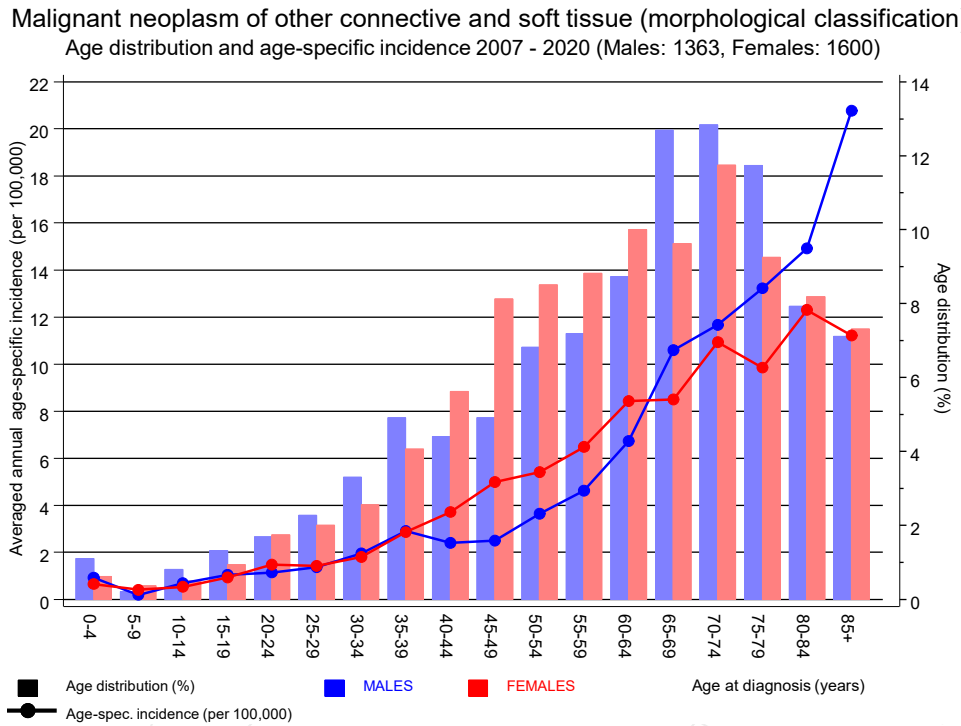


Figure 6. Age distribution (males: mean=61.6 yrs, median=66.1 yrs; females: mean=61.1 yrs, median=63.4 yrs) and age-specific incidence.

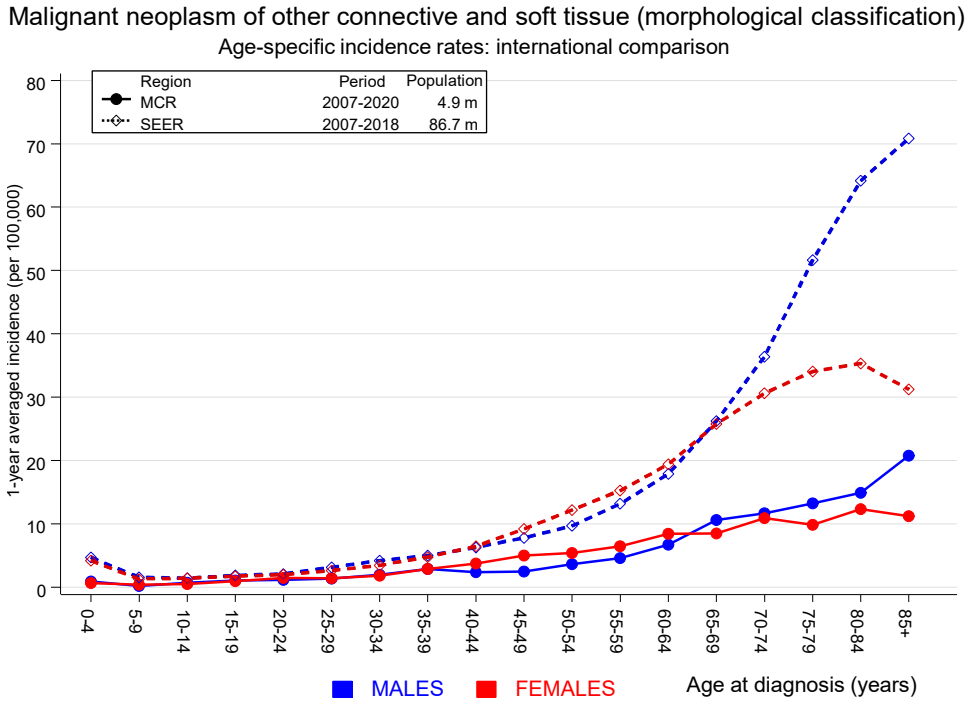


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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 %
C00	Lip	1	0.1	10.5	0.3	58.4		1.3	
C03-C06	Oral cavity	3	0.7	4.1	0.9	12.1		3.2	
C09-C10	Oropharynx	2	0.9	2.3	0.3	8.2		1.6	
C12-C13	Hypopharynx	1	0.5	2.1	0.1	11.9		0.7	
C15	Oesophagus	4	1.7	2.3	0.6	6.0		3.2	25.0
C16	Stomach	7	3.5	2.0	0.8	4.1		4.9	
C17	Small intestine	7	0.5	13.0	5.2	26.7	#	9.1	
C18	Colon	17	8.6	2.0	1.2	3.2	#	11.9	11.8
C19-C20	Rectum	6	4.6	1.3	0.5	2.9		2.0	
C21	Anus/canal	1	0.2	4.6	0.1	25.7		1.1	
C22	Liver	3	2.5	1.2	0.2	3.5		0.7	
C23-C24	Bile	3	0.9	3.2	0.7	9.4		2.9	
C25	Pancreas	2	3.5	0.6	0.1	2.1		-2.1	50.0
C30-C31	Sinuses	2	0.2	12.2	1.5	43.9	#	2.6	
C32	Larynx	2	0.8	2.4	0.3	8.6		1.6	
C33-C34	Lung	30	10.1	3.0	2.0	4.3	#	28.1	6.7
C38,C45	Mesothelioma	1	0.6	1.7	0.0	9.4		0.6	
C43	Malign. melanoma	15	4.1	3.7	2.1	6.0	#	15.4	
C46,C49	Soft tissue	6	0.5	11.0	4.0	23.9	#	7.7	
C48	Peritoneal	1	0.1	13.6	0.3	76.0		1.3	100.0
C50	Breast	1	0.2	4.1	0.1	22.6		1.1	
C60	Penis	1	0.2	4.4	0.1	24.5		1.1	
C61	Prostate	45	23.8	1.9	1.4	2.5	#	29.9	6.7
C62	Testis	3	0.5	6.3	1.3	18.4	#	3.6	33.3
C64	Kidney	11	3.0	3.7	1.8	6.6	#	11.3	
C65	Renal pelvis	1	0.4	2.6	0.1	14.3		0.9	
C66	Ureter	1	0.2	4.2	0.1	23.6		1.1	
C67	Bladder	8	4.2	1.9	0.8	3.7		5.3	12.5
C69	Eye melanoma	1	0.1	10.4	0.3	57.7		1.3	
C73	Thyroid	5	0.6	8.2	2.6	19.0	#	6.2	
C74-C80	Cancer others	1	0.2	4.8	0.1	26.5		1.1	
C76-C79	CUP	3	1.5	2.0	0.4	5.9		2.1	
C81	Hodgkin lymphoma	1	0.2	4.1	0.1	22.6		1.1	
C82-C85	NHL	13	3.8	3.4	1.8	5.9	#	13.0	7.7
C90	Mult. myeloma	2	1.1	1.8	0.2	6.3		1.2	50.0
C91-C96	Leukaemia	10	1.4	7.1	3.4	13.0	#	12.1	
Not observed		0	2.0	0.0	0.0	1.9		-2.8	
All further malignancies		221	88.1	2.5	2.2	2.9	#	187.1	6.3

Patients	1934
Median age at next malignancy (years)	71.2
Person-years	7104
Mean observation time (years)	3.7
Median observation time (years)	1.8

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 %
C15	Oesophagus	1	0.5	2.2	0.1	12.0		0.7	
C16	Stomach	3	2.2	1.4	0.3	4.0		1.0	
C17	Small intestine	2	0.4	5.2	0.6	18.8		2.0	
C18	Colon	8	6.3	1.3	0.5	2.5		2.0	
C19-C20	Rectum	8	2.7	3.0	1.3	5.9	#	6.5	
C21	Anus/canal	1	0.4	2.5	0.1	13.8		0.7	
C22	Liver	2	0.8	2.4	0.3	8.7		1.4	
C23-C24	Bile	2	0.9	2.2	0.3	7.9		1.3	50.0
C25	Pancreas	5	3.1	1.6	0.5	3.8		2.3	
C33-C34	Lung	20	5.3	3.8	2.3	5.8	#	17.9	5.0
C40-C41	Bone	4	0.1	54.7	14.9	140.0	#	4.8	25.0
C43	Malign. melanoma	14	2.9	4.8	2.6	8.0	#	13.5	14.3
C46,C49	Soft tissue	10	0.4	24.4	11.7	44.9	#	11.7	30.0
C50	Breast	51	22.8	2.2	1.7	2.9	#	34.4	5.9
C52	Vagina	1	0.1	7.9	0.2	43.8		1.1	
C53	Cervix uteri	3	1.1	2.7	0.6	7.8		2.3	
C54	Corpus uteri	5	3.9	1.3	0.4	3.0		1.4	
C55,C57	Fem. genitals un	1	0.1	7.3	0.2	40.9		1.1	100.0
C56	Ovary	3	2.8	1.1	0.2	3.1		0.3	66.7
C64	Kidney	11	1.6	7.1	3.5	12.7	#	11.5	18.2
C66	Ureter	1	0.1	9.0	0.2	50.1		1.1	
C67	Bladder	5	1.3	3.9	1.3	9.1	#	4.5	
C69	Eye melanoma	1	0.1	11.6	0.3	64.9		1.1	
C70-C72	CNS cancer	6	0.9	6.6	2.4	14.3	#	6.2	16.7
C73	Thyroid	7	1.4	4.9	2.0	10.2	#	6.8	
C74-C80	Cancer others	2	0.2	9.0	1.1	32.6	#	2.2	
C76-C79	CUP	1	1.2	0.8	0.0	4.7		-0.2	
C82-C85	NHL	8	2.6	3.0	1.3	6.0	#	6.5	
C90	Mult. myeloma	1	0.8	1.2	0.0	6.9		0.2	
C91-C96	Leukaemia	7	1.0	6.9	2.8	14.3	#	7.3	28.6
Not observed		0	3.0	0.0	0.0	1.2		-3.6	
All further malignancies		194	71.0	2.7	2.4	3.1	#	149.7	9.8

Patients	2221
Median age at next malignancy (years)	73.4
Person-years	8214
Mean observation time (years)	3.7
Median observation time (years)	1.9

The occurrence of further specified malignancy is statistically significant.

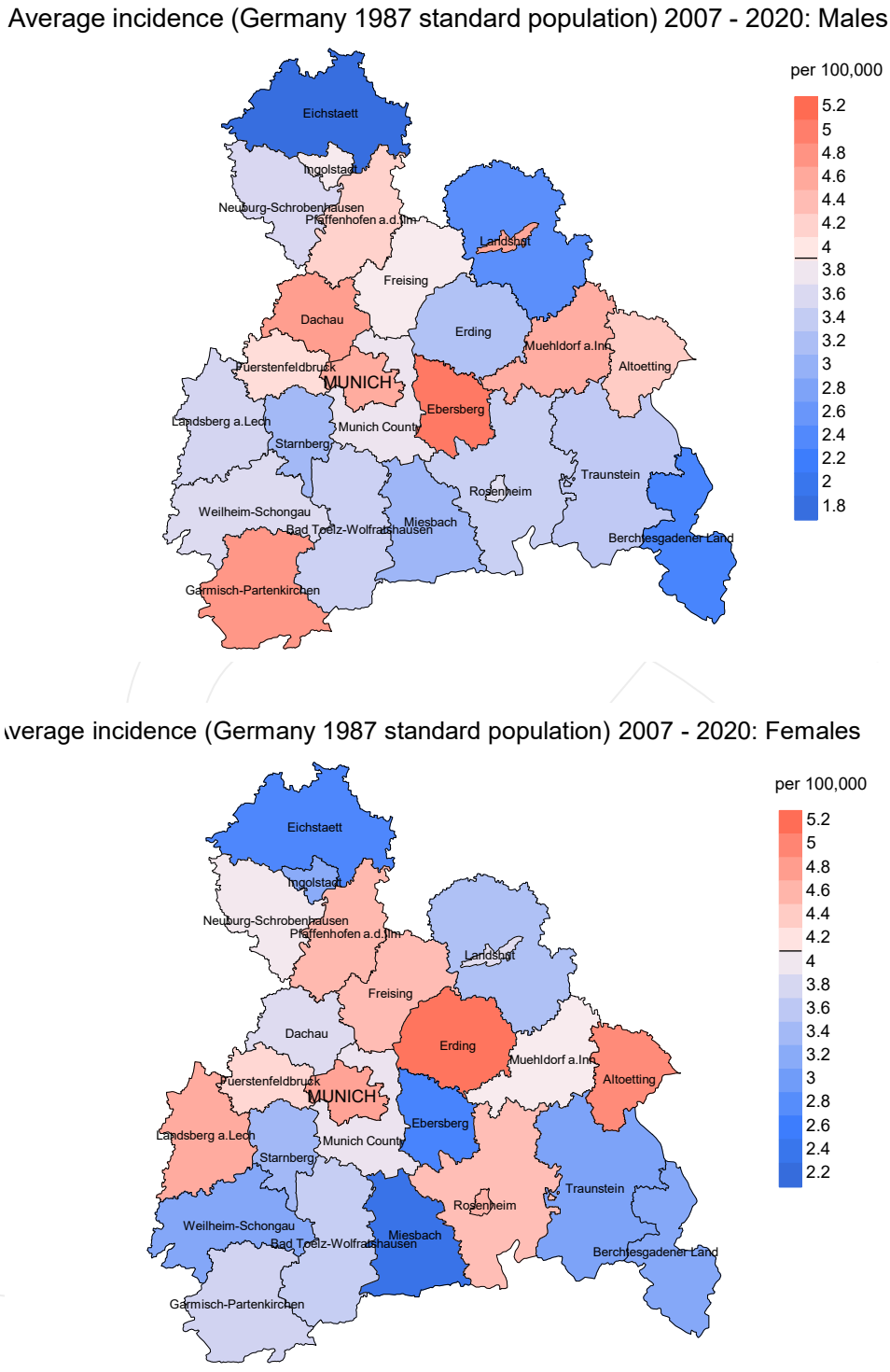
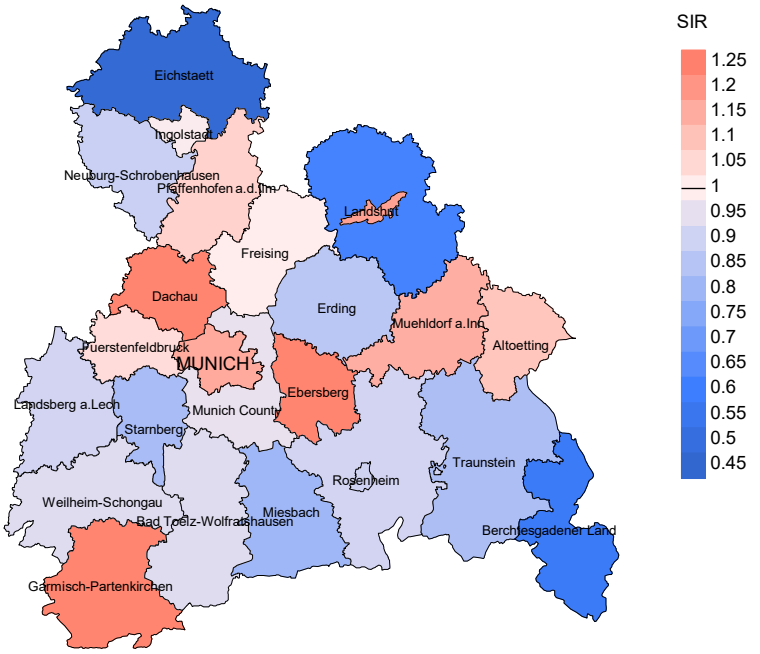


Figure 8a. Map of cancer incidence (german standard population) by county averaged for period 2007 to 2020. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 3.9/100,000 WS N=1,363, females 4.1/100,000 WS N=1,600).

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 28 women were identified with newly diagnosed sarcoma (morphological classification). Therefore, the mean incidence rate for this cancer type in this area can be calculated at 2.7/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.5 and 4.3/100,000.

Standardized incidence ratio (SIR) 2007 - 2020: Males



Standardized incidence ratio (SIR) 2007 - 2020: Females

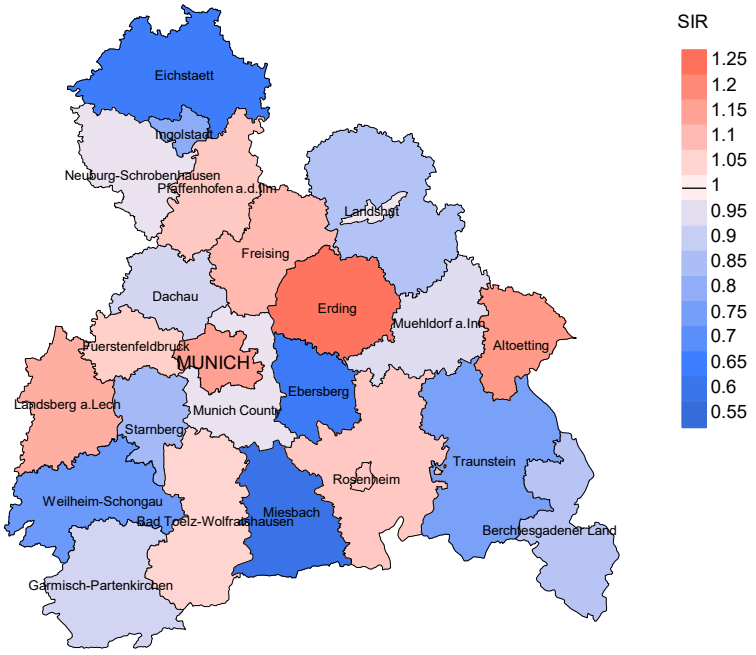


Figure 8b. Map of standardized incidence ratio (SIR) by county averaged for period 2007 to 2020. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=1,363, females N=1,600).

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 28 women were identified with newly diagnosed sarcoma (morphological classification). Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.63. Though, the value of this parameter may vary with an underlying probability of 99% between 0.37 and 1.01, 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	121	95.0	94	77.7	93.6
1999	110	93.6	83	75.5	91.6
2000	116	93.1	79	68.1	97.5
2001	114	93.9	73	64.0	95.9
2002	168	97.0	122	72.6	94.3
2003	185	95.1	129	69.7	96.1
2004	209	97.1	129	61.7	96.9
2005	207	93.7	135	65.2	93.3
2006	183	95.1	110	60.1	96.4
2007	223	91.0	133	59.6	95.5
2008	222	98.6	125	56.3	97.6
2009	252	96.8	155	61.5	97.4
2010	235	96.2	124	52.8	96.0
2011	264	97.7	147	55.7	91.2
2012	244	98.8	138	56.6	91.3
2013	258	99.6	140	54.3	96.4
2014	225	97.8	123	54.7	90.2
2015	221	94.6	117	52.9	90.6
2016	176	98.9	100	56.8	83.0
2017	189	98.9	82	43.4	79.3
2018	179	99.4	68	38.0	67.6
2019	165	98.2	40	24.2	87.5
2020	116	100.0	28	24.1	92.9
1998-2020	4382	96.7	2474	56.5	92.7

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	121	80	25	20.7
1999	110	81	25	22.7
2000	116	68	24	20.7
2001	114	63	22	19.3
2002	168	85	33	19.6
2003	185	109	39	21.1
2004	209	123	37	17.7
2005	207	114	32	15.5
2006	183	103	25	13.7
2007	223	145	37	16.6
2008	222	107	27	12.2
2009	252	157	51	20.2
2010	235	120	29	12.3
2011	264	137	40	15.2
2012	244	137	39	16.0
2013	258	156	47	18.2
2014	225	150	30	13.3
2015	221	175	36	16.3
2016	176	143	29	16.5
2017	189	175	39	20.6
2018	179	121	18	10.1
2019	165	129	9	5.5
2020	116	139	16	13.8
1998–2020	4382	2817	709	16.2

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	80	73.8	26.3	93.3
1999	81	84.0	16.0	95.8
2000	68	83.8	16.2	96.9
2001	63	90.5	9.5	91.7
2002	85	81.2	18.8	92.8
2003	109	85.3	14.7	85.8
2004	123	84.6	15.4	90.1
2005	114	83.3	16.7	90.0
2006	103	81.6	18.4	87.8
2007	145	84.1	15.9	91.6
2008	107	84.1	15.9	87.7
2009	157	85.4	14.6	88.4
2010	120	82.5	17.5	86.7
2011	137	81.8	18.2	88.8
2012	137	79.6	20.4	90.3
2013	156	85.9	14.1	90.8
2014	150	73.3	26.7	76.9
2015	175	78.3	21.7	81.9
2016	143	79.0	21.0	85.7
2017	175	82.3	17.7	84.8
2018	121	65.3	34.7	77.6
2019	129	41.9	58.1	78.3
2020	139	65.5	34.5	79.1
1998-2020	2817	78.6	21.4	87.1

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	44	62.6	62.4	66.2	64.6
1999	48	67.5	68.2	66.0	66.3
2000	34	60.8	62.3	55.0	61.8
2001	37	63.5	61.3	78.6	64.1
2002	46	62.9	63.2	62.4	62.9
2003	43	72.5	68.4	86.6	63.8
2004	56	68.1	66.0	83.1	67.6
2005	51	65.8	63.2	75.4	64.5
2006	38	67.4	65.7	72.2	65.7
2007	79	66.0	64.2	74.0	65.2
2008	52	72.4	71.6	79.4	71.0
2009	77	72.9	71.3	78.3	71.5
2010	53	71.4	70.7	78.0	71.0
2011	61	72.3	67.4	84.8	71.1
2012	66	74.3	69.5	79.1	72.0
2013	67	73.3	68.0	81.6	70.2
2014	69	77.7	76.0	83.7	76.4
2015	75	75.8	72.9	83.3	73.2
2016	76	75.1	73.9	80.7	73.8
2017	68	74.3	71.2	83.3	70.0
2018	59	72.9	70.7	79.2	73.4
2019	55	79.4	74.8	82.0	74.2
2020	66	80.7	72.2	84.6	74.2
1998-2020	1320	71.9	69.1	80.8	69.8

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	36	75.6	70.5	84.1	75.3
1999	33	71.7	71.6	75.8	73.2
2000	34	70.3	68.1	76.9	68.2
2001	26	58.2	58.2		58.2
2002	39	67.6	63.9	81.3	67.6
2003	66	69.5	68.2	84.9	69.5
2004	67	69.9	67.4	85.0	67.3
2005	63	70.2	68.7	84.7	69.1
2006	65	71.8	69.5	82.2	69.8
2007	66	71.3	69.5	88.4	69.8
2008	55	75.6	71.0	85.0	73.8
2009	80	72.4	71.3	86.6	72.1
2010	67	74.8	70.0	88.3	71.0
2011	76	71.9	67.7	86.9	69.8
2012	71	74.3	71.5	85.0	73.0
2013	89	71.0	68.9	90.0	69.4
2014	81	75.0	72.0	83.3	71.9
2015	100	75.5	73.5	88.5	73.9
2016	67	76.4	73.2	81.8	74.0
2017	107	76.0	72.9	91.0	74.2
2018	62	74.4	67.9	78.8	68.9
2019	74	75.6	67.7	80.7	73.7
2020	73	76.5	67.9	81.9	68.8
1998-2020	1497	73.5	69.8	84.4	71.3

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	33	3.0	0.52	2.2	0.53	2.8	0.54	3.5	0.58
1999	39	3.5	0.63	2.6	0.61	3.3	0.64	4.1	0.70
2000	30	2.6	0.52	1.8	0.52	2.3	0.51	2.7	0.51
2001	31	2.7	0.66	1.8	0.53	2.4	0.60	2.8	0.63
2002	35	1.9	0.44	1.3	0.37	1.7	0.42	2.0	0.42
2003	33	1.8	0.39	1.1	0.35	1.5	0.37	2.0	0.42
2004	47	2.5	0.47	1.6	0.42	2.1	0.46	2.7	0.52
2005	40	2.1	0.43	1.5	0.41	1.8	0.42	2.0	0.43
2006	29	1.5	0.35	1.0	0.36	1.3	0.35	1.5	0.33
2007	68	3.1	0.69	2.0	0.67	2.6	0.71	3.1	0.73
2008	45	2.0	0.43	1.0	0.36	1.6	0.42	2.1	0.46
2009	64	2.9	0.57	1.5	0.49	2.1	0.54	2.7	0.55
2010	42	1.9	0.37	0.9	0.27	1.4	0.31	1.7	0.36
2011	48	2.1	0.40	1.2	0.36	1.7	0.38	2.0	0.40
2012	50	2.2	0.48	1.1	0.39	1.6	0.44	2.1	0.49
2013	56	2.4	0.45	1.6	0.45	2.0	0.45	2.4	0.46
2014	53	2.3	0.51	1.0	0.41	1.5	0.45	2.1	0.51
2015	55	2.3	0.52	1.1	0.43	1.7	0.48	2.1	0.51
2016	56	2.3	0.75	1.3	0.77	1.7	0.74	2.1	0.77
2017	59	2.4	0.66	1.3	0.60	1.8	0.63	2.2	0.64
2018	37	1.5	0.44	0.8	0.36	1.1	0.40	1.4	0.43
2019	17	0.7	0.22	0.3	0.16	0.5	0.19	0.6	0.20
2020	40	1.6	0.80	0.8	0.73	1.1	0.77	1.5	0.81
1998-2020	1007	2.2	0.50	1.3	0.44	1.7	0.47	2.1	0.50

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	26	2.2	0.45	1.3	0.39	1.6	0.42	2.0	0.45
1999	29	2.4	0.62	1.3	0.52	1.7	0.53	2.2	0.61
2000	27	2.2	0.47	1.1	0.36	1.6	0.41	1.9	0.45
2001	26	2.1	0.39	1.4	0.37	1.7	0.36	1.9	0.37
2002	34	1.7	0.39	1.1	0.39	1.4	0.39	1.6	0.40
2003	60	3.0	0.61	1.8	0.55	2.2	0.55	2.5	0.57
2004	57	2.9	0.52	1.5	0.41	2.1	0.46	2.5	0.50
2005	55	2.8	0.48	1.4	0.40	1.9	0.42	2.2	0.44
2006	55	2.7	0.55	1.4	0.39	1.9	0.44	2.3	0.50
2007	55	2.4	0.44	1.2	0.33	1.6	0.37	2.0	0.42
2008	45	1.9	0.38	0.9	0.28	1.3	0.32	1.6	0.36
2009	70	3.0	0.50	1.4	0.41	2.0	0.43	2.4	0.44
2010	57	2.4	0.47	1.2	0.43	1.7	0.45	2.1	0.47
2011	64	2.7	0.45	1.4	0.38	1.9	0.41	2.3	0.44
2012	59	2.5	0.43	1.1	0.35	1.6	0.38	2.0	0.40
2013	78	3.3	0.59	1.6	0.52	2.2	0.55	2.6	0.57
2014	57	2.4	0.47	1.0	0.32	1.5	0.37	1.8	0.42
2015	82	3.4	0.71	1.5	0.53	2.1	0.58	2.6	0.63
2016	57	2.3	0.56	1.0	0.39	1.4	0.45	1.7	0.48
2017	85	3.4	0.85	1.5	0.63	2.1	0.71	2.6	0.76
2018	42	1.7	0.44	0.8	0.33	1.1	0.37	1.3	0.40
2019	37	1.5	0.43	0.8	0.39	1.1	0.40	1.3	0.41
2020	51	2.1	0.77	1.0	0.67	1.3	0.68	1.6	0.71
1998-2020	1208	2.5	0.52	1.2	0.42	1.7	0.45	2.0	0.48

Table 12

Age distribution of age at death (cancer-related) for period 2007-2020
(**incl. multiple malignancies**)

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4	5	0.3	0.3	4	0.6	0.6	1	0.1	0.1
5-9	5	0.3	0.7			0.6	5	0.6	0.7
10-14	4	0.3	0.9	2	0.3	0.9	2	0.2	1.0
15-19	8	0.5	1.4	4	0.6	1.4	4	0.5	1.4
20-24	19	1.2	2.7	12	1.7	3.2	7	0.8	2.3
25-29	15	1.0	3.7	9	1.3	4.5	6	0.7	3.0
30-34	20	1.3	5.0	12	1.7	6.2	8	1.0	3.9
35-39	29	1.9	6.9	15	2.2	8.4	14	1.7	5.6
40-44	36	2.4	9.2	16	2.3	10.7	20	2.4	8.0
45-49	59	3.9	13.1	32	4.6	15.4	27	3.2	11.2
50-54	89	5.8	18.9	36	5.2	20.6	53	6.3	17.5
55-59	120	7.8	26.7	45	6.5	27.1	75	8.9	26.5
60-64	144	9.4	36.2	62	9.0	36.1	82	9.8	36.2
65-69	177	11.6	47.7	74	10.7	46.8	103	12.3	48.5
70-74	203	13.3	61.0	113	16.4	63.2	90	10.7	59.2
75-79	211	13.8	74.8	88	12.8	75.9	123	14.7	73.9
80-84	187	12.2	87.1	77	11.2	87.1	110	13.1	87.0
85+	198	12.9	100.0	89	12.9	100.0	109	13.0	100.0
All ages	1529	100.0		690	100.0		839	100.0	

Table 13

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2020
(**incl. multiple malignancies**)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4	4	1	0.2	0.27	0.1	0.10	21.1	6.3
5- 9		5			0.3	0.83		20.0
10-14	2	2	0.1	0.18	0.1	0.25	7.1	8.7
15-19	4	4	0.2	0.22	0.2	0.27	8.3	16.0
20-24	12	7	0.6	0.52	0.4	0.25	16.4	16.3
25-29	9	6	0.4	0.29	0.3	0.19	9.7	6.1
30-34	12	8	0.5	0.27	0.4	0.20	8.4	4.4
35-39	15	14	0.6	0.22	0.6	0.22	5.6	3.4
40-44	16	20	0.6	0.27	0.8	0.22	2.6	2.3
45-49	32	27	1.2	0.48	1.0	0.21	2.3	1.6
50-54	36	53	1.4	0.39	2.1	0.39	1.4	2.0
55-59	45	75	2.1	0.46	3.4	0.53	1.0	2.0
60-64	62	82	3.5	0.52	4.3	0.51	1.0	1.6
65-69	74	103	4.5	0.43	5.7	0.67	0.8	1.5
70-74	113	90	7.5	0.65	5.2	0.48	1.0	1.0
75-79	88	123	7.3	0.55	8.2	0.83	0.7	1.3
80-84	77	110	10.6	0.71	10.3	0.84	0.7	1.2
85+	89	109	19.1	0.92	10.5	0.93	1.0	0.9
All ages	690	839					1.0	1.4
Mortality								
Raw			2.1	0.51	2.5	0.52		
WS			1.1	0.44	1.2	0.41		
ES			1.6	0.47	1.6	0.45		
BRD-S			2.0	0.50	2.0	0.48		
PYLL-70								
per 100,000			19.1		21.0			
ES			18.2		19.6			
AYLL-70			17.0		14.6			

Table 14a

Further malignancies in deaths in period 1998–2020
MALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C00	Lip	1	0.3					1	100.0
C03–C06	Oral cavity	8	2.0	5	62.5			3	37.5
C07–C08	Salivary gland	3	0.8	2	66.7			1	33.3
C09–C10	Oropharynx	4	1.0	1	25.0			3	75.0
C12–C13	Hypopharynx	3	0.8	1	33.3			2	66.7
C15	Oesophagus	6	1.5	1	16.7			5	83.3
C16	Stomach	6	1.5	1	16.7	2	33.3	3	50.0
C17	Small intestine	1	0.3	1	100.0				
C18	Colon	22	5.6	14	63.6	1	4.5	7	31.8
C19–C20	Rectum	17	4.3	11	64.7			6	35.3
C22	Liver	5	1.3			2	40.0	3	60.0
C23–C24	Bile	2	0.5					2	100.0
C25	Pancreas	6	1.5	1	16.7	2	33.3	3	50.0
C30–C31	Sinuses	3	0.8	2	66.7			1	33.3
C32	Larynx	3	0.8	1	33.3			2	66.7
C33–C34	Lung	28	7.1	4	14.3	5	17.9	19	67.9
C37	Thymus	1	0.3	1	100.0				
C38,C45	Mesothelioma	3	0.8	2	66.7			1	33.3
C40–C41	Bone	3	0.8	1	33.3			2	66.7
C43	Malign. melanoma	27	6.9	17	63.0	3	11.1	7	25.9
C44	Skin others	47	12.0	16	34.0	3	6.4	28	59.6
C46,C49	Soft tissue	10	2.5	2	20.0	1	10.0	7	70.0
C48	Peritoneal	1	0.3					1	100.0
C50	Breast	1	0.3	1	100.0				
C61	Prostate	62	15.8	42	67.7	4	6.5	16	25.8
C62	Testis	11	2.8	8	72.7			3	27.3
C64	Kidney	23	5.9	12	52.2	2	8.7	9	39.1
C65	Renal pelvis	2	0.5	1	50.0	1	50.0		
C66	Ureter	2	0.5					2	100.0
C67	Bladder	10	2.5	2	20.0			8	80.0
C69	Eye sarcoma	2	0.5	2	100.0				
C70–C72	CNS cancer	15	3.8	5	33.3			10	66.7
C73	Thyroid	5	1.3	4	80.0	1	20.0		
C74–C80	Cancer others	1	0.3			1	100.0		
C76–C79	CUP	4	1.0			3	75.0	1	25.0
C81	Hodgkin lymphoma	3	0.8	3	100.0				
C82–C85	NHL	26	6.6	11	42.3	3	11.5	12	46.2
C90	Mult. myeloma	2	0.5			1	50.0	1	50.0
C91–C96	Leukaemia	14	3.6	4	28.6	1	7.1	9	64.3
All further malignancies		393	100.0	179	45.5	36	9.2	178	45.3

ICD-10 C44 (Other malignant neoplasms of skin) is not systematically recorded by MCR and therefore not considered for evaluation as a particular primary but at least as a further malignancy.

Table 14b

Further malignancies in deaths in period 1998–2020
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03–C06	Oral cavity	3	0.7	1	33.3			2	66.7
C09–C10	Oropharynx	1	0.2					1	100.0
C15	Oesophagus	1	0.2					1	100.0
C16	Stomach	7	1.6	2	28.6			5	71.4
C17	Small intestine	3	0.7			1	33.3	2	66.7
C18	Colon	12	2.8	4	33.3			8	66.7
C19–C20	Rectum	13	3.0	7	53.8	2	15.4	4	30.8
C21	Anus/canal	1	0.2	1	100.0				
C22	Liver	1	0.2					1	100.0
C23–C24	Bile	2	0.5					2	100.0
C25	Pancreas	6	1.4					6	100.0
C26	GI cancer	1	0.2	1	100.0				
C30–C31	Sinuses	1	0.2					1	100.0
C33–C34	Lung	29	6.7	8	27.6	5	17.2	16	55.2
C38,C45	Mesothelioma	1	0.2	1	100.0				
C40–C41	Bone	2	0.5	1	50.0			1	50.0
C43	Malign. melanoma	26	6.0	16	61.5	2	7.7	8	30.8
C44	Skin others	25	5.7	10	40.0	2	8.0	13	52.0
C46,C49	Soft tissue	6	1.4	2	33.3			4	66.7
C48	Peritoneal	3	0.7	1	33.3	1	33.3	1	33.3
C50	Breast	164	37.7	94	57.3	11	6.7	59	36.0
C51	Vulva	4	0.9	3	75.0	1	25.0		
C52	Vagina	3	0.7	2	66.7			1	33.3
C53	Cervix uteri	13	3.0	11	84.6	1	7.7	1	7.7
C54	Corpus uteri	22	5.1	13	59.1	1	4.5	8	36.4
C55,C57	Fem. genitals un	2	0.5	1	50.0	1	50.0		
C56	Ovary	10	2.3	4	40.0	2	20.0	4	40.0
C64	Kidney	11	2.5	3	27.3	3	27.3	5	45.5
C65	Renal pelvis	1	0.2	1	100.0				
C67	Bladder	4	0.9	1	25.0	1	25.0	2	50.0
C69	Eye melanoma	1	0.2					1	100.0
C70–C72	CNS cancer	14	3.2	4	28.6	2	14.3	8	57.1
C73	Thyroid	9	2.1	6	66.7	1	11.1	2	22.2
C74–C80	Cancer others	1	0.2					1	100.0
C76–C79	CUP	2	0.5			2	100.0		
C81	Hodgkin lymphoma	2	0.5	2	100.0				
C82–C85	NHL	15	3.4	11	73.3	2	13.3	2	13.3
C90	Mult. myeloma	4	0.9	3	75.0			1	25.0
C91–C96	Leukaemia	9	2.1	4	44.4			5	55.6
All further malignancies		435	100.0	218	50.1	41	9.4	176	40.5

ICD-10 C44 (Other malignant neoplasms of skin) is not systematically recorded by MCR and therefore not considered for evaluation as a particular primary but at least as a further malignancy.

Table 15

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2020
(**First primaries only** *)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4	4	1	0.2	0.27	0.1	0.10	21.1	6.7
5- 9		5			0.3	0.83		20.0
10-14	2	1	0.1	0.18	0.1	0.14	7.1	5.3
15-19	4	3	0.2	0.22	0.2	0.21	8.7	13.0
20-24	11	6	0.5	0.50	0.3	0.24	16.7	14.6
25-29	8	6	0.4	0.30	0.3	0.19	9.4	6.6
30-34	10	8	0.4	0.25	0.4	0.20	7.2	5.0
35-39	14	10	0.6	0.22	0.4	0.17	5.6	2.7
40-44	14	17	0.6	0.27	0.7	0.22	2.5	2.3
45-49	29	26	1.1	0.51	1.0	0.22	2.2	1.8
50-54	27	49	1.1	0.36	2.0	0.41	1.2	2.2
55-59	39	60	1.8	0.46	2.8	0.53	1.0	1.9
60-64	46	67	2.6	0.49	3.5	0.54	0.9	1.6
65-69	59	71	3.6	0.45	3.9	0.63	0.8	1.3
70-74	83	66	5.5	0.63	3.8	0.49	0.9	1.0
75-79	67	78	5.5	0.61	5.2	0.87	0.7	1.0
80-84	56	77	7.7	0.72	7.2	0.87	0.8	1.1
85+	62	84	13.3	1.03	8.1	0.92	1.0	0.9
All ages	535	635					1.0	1.3
Mortality								
Raw			1.6	0.50	1.9	0.50		
WS			0.9	0.42	0.9	0.39		
ES			1.2	0.46	1.3	0.43		
BRD-S			1.5	0.50	1.5	0.46		
PYLL-70								
per 100,000			16.7		18.0			
ES			16.0		16.8			
AYLL-70			17.9		15.5			

* See corresponding tables with multiple malignancies.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2020
(**Single primaries only** *)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4	4	1	0.2	0.27	0.1	0.10	21.1	6.7
5- 9		5			0.3	0.83		20.0
10-14	2	1	0.1	0.18	0.1	0.14	7.1	5.3
15-19	4	3	0.2	0.22	0.2	0.21	8.7	13.6
20-24	10	6	0.5	0.45	0.3	0.24	15.2	15.0
25-29	8	6	0.4	0.31	0.3	0.19	9.4	6.8
30-34	10	8	0.4	0.26	0.4	0.22	7.3	5.1
35-39	13	10	0.6	0.21	0.4	0.18	5.2	2.7
40-44	13	15	0.5	0.27	0.6	0.21	2.3	2.0
45-49	26	25	1.0	0.49	1.0	0.22	2.0	1.8
50-54	25	47	1.0	0.35	1.9	0.42	1.1	2.1
55-59	32	54	1.5	0.43	2.5	0.51	0.8	1.7
60-64	41	63	2.3	0.48	3.3	0.55	0.8	1.6
65-69	50	56	3.1	0.44	3.1	0.56	0.7	1.0
70-74	69	57	4.6	0.62	3.3	0.47	0.8	0.9
75-79	53	69	4.4	0.55	4.6	0.83	0.6	0.9
80-84	45	67	6.2	0.61	6.3	0.81	0.6	1.0
85+	41	63	8.8	0.77	6.0	0.72	0.7	0.7
All ages	446	556					0.9	1.2
Mortality								
Raw			1.4	0.46	1.7	0.47		
WS			0.8	0.40	0.8	0.38		
ES			1.1	0.43	1.1	0.41		
BRD-S			1.3	0.45	1.4	0.44		
PYLL-70								
per 100,000			15.4		17.1			
ES			14.9		16.1			
AYLL-70			18.6		16.2			

* See corresponding tables with multiple malignancies.

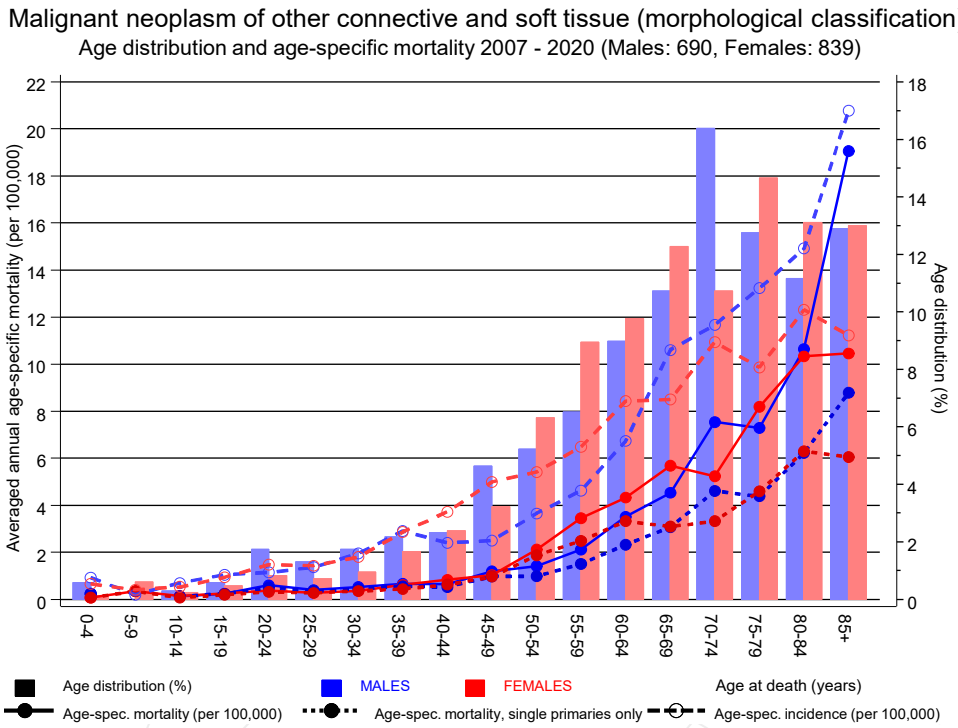


Figure 17. Distribution of age at death (bars; males: mean=63.4 yrs, median=67.5 yrs; females: mean=64.5 yrs, median=66.3 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

The difference between age at diagnosis (Table 3) and age at sarcoma (morphological classification)-related death (see Table 10) should be considered.

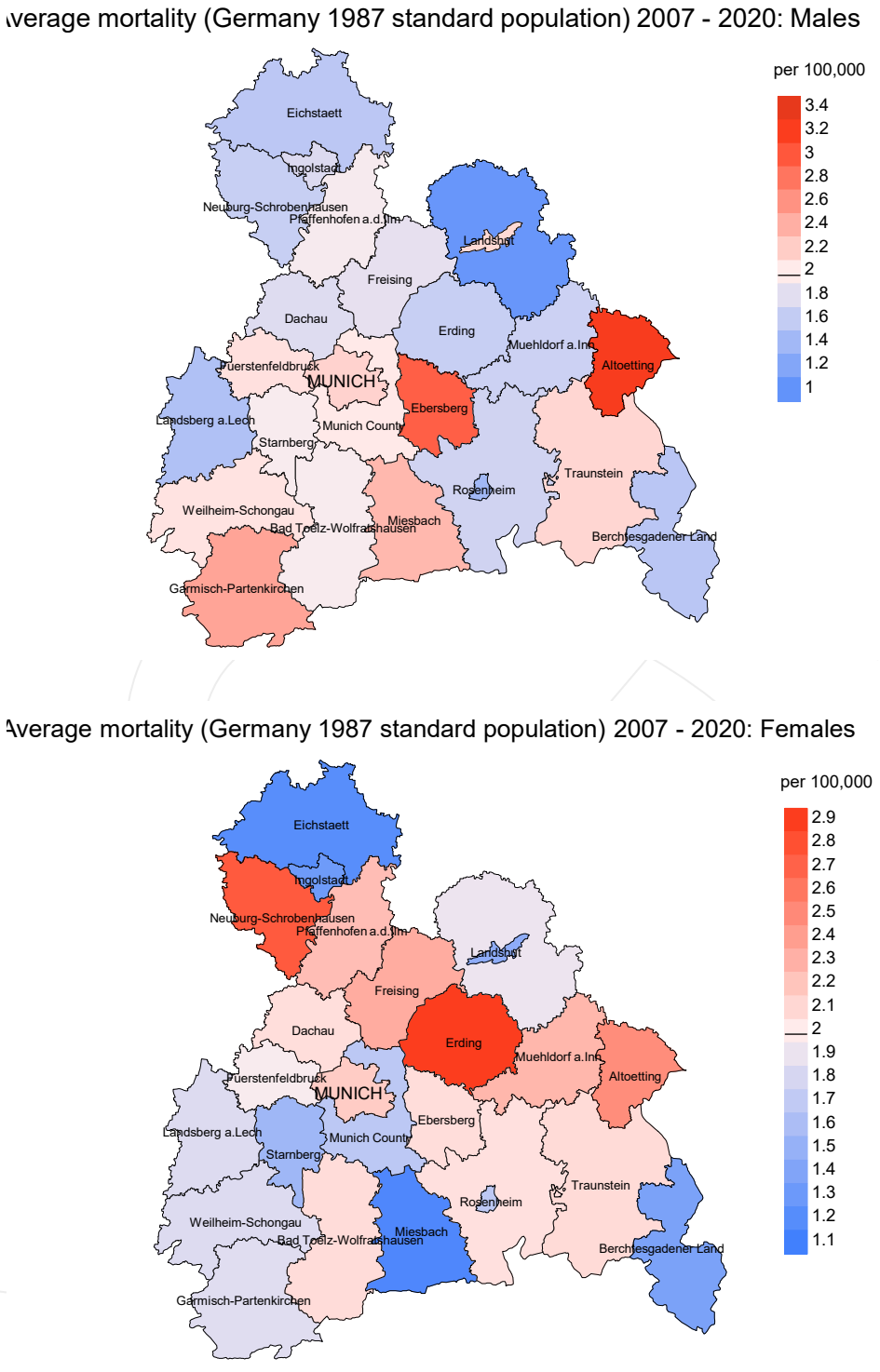
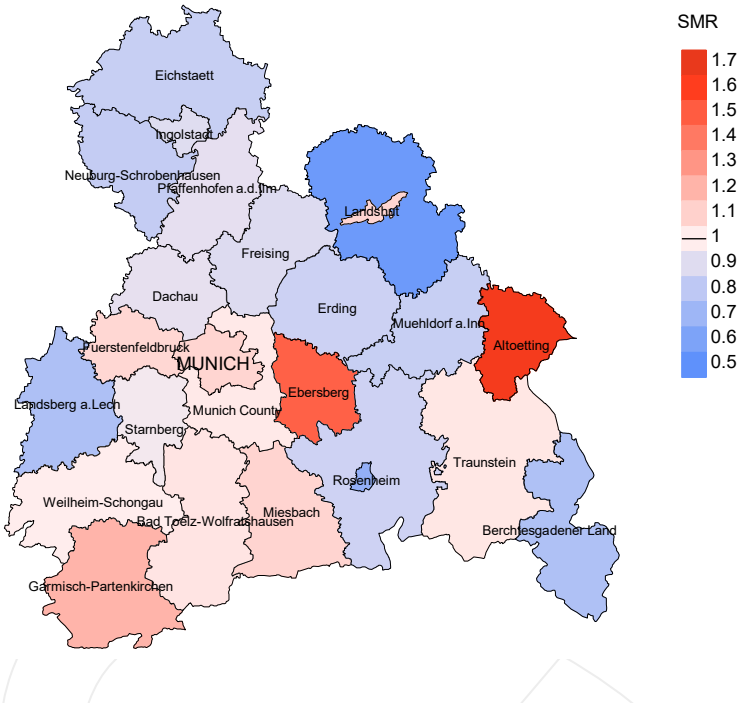


Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2020. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 2.0/100,000 WS N=690, females 2.0/100,000 WS N=839).

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 22 women died from sarcoma (morphological classification). Therefore, the mean mortality rate for this cancer type in this area can be calculated at 2.1/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.1 and 3.6/100,000.

Standardized mortality ratio (SMR) 2007 - 2020: Males



Standardized mortality ratio (SMR) 2007 - 2020: Females

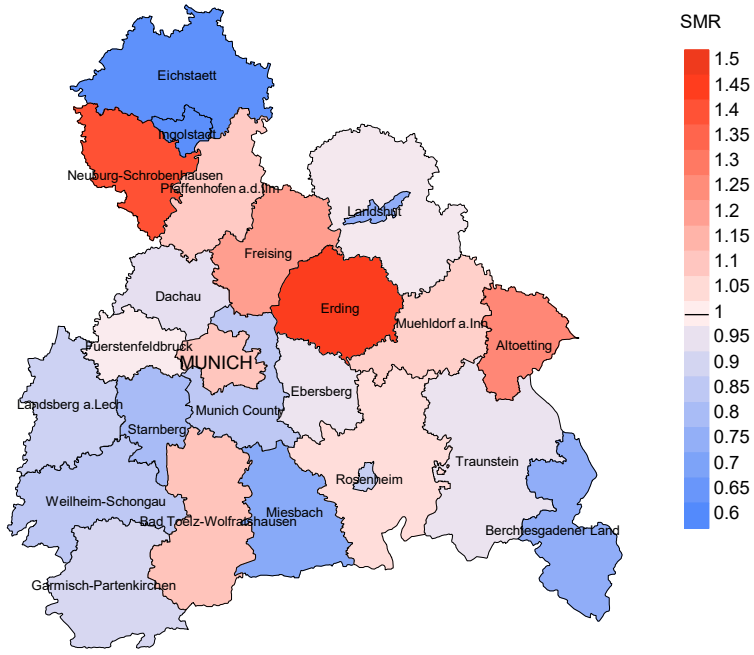


Figure 18b. Map of standardized mortality ratio (SMR) by county averaged for period 2007 to 2020. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=690, females N=839).

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 22 women died from sarcoma (morphological classification). Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.96. Though, the value of this parameter may vary with an underlying probability of 99% between 0.52 and 1.63, and is therefore not statistically striking.

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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