

# Munich Cancer Registry



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## ICD-10 C70-C72: Brain/nerves cancer

### Incidence and Mortality

Year of diagnosis	1998-2019
Patients	6,651
Diseases	6,658
Creation date	01/25/2021
Database export	01/07/2021
Population	4.92 m





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

<https://www.tumorregister-muenchen.de/en/facts/base/bC7072E-ICD-10-C70-C72-Brain-nerves-cancer-incidence-and-mortality.pdf>

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**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<sup>#</sup>, with a total of 4.69 million inhabitants, account for the frequency of cancer diseases<sup>##</sup> 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<sup>###</sup> 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](mailto:tumor@ibe.med.uni-muenchen.de).

Munich Cancer Registry, January 2021

- <sup>#</sup> 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).
- <sup>##</sup> 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.
- <sup>###</sup> 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
C70.-	Malignant neoplasm of meninges
C70.0	Cerebral meninges
C70.1	Spinal meninges
C70.9	Meninges, unspecified
C71.-	Malignant neoplasm of brain
C71.0	Cerebrum, except lobes and ventricles
C71.1	Frontal lobe
C71.2	Temporal lobe
C71.3	Parietal lobe
C71.4	Occipital lobe
C71.5	Cerebral ventricle
C71.6	Cerebellum
C71.7	Brain stem
C71.8	Overlapping lesion of brain
C71.9	Brain, unspecified
C72.-	Malignant neoplasm of spinal cord, cranial nerves and other parts of central nervous system
C72.0	Spinal cord
C72.1	Cauda equina
C72.2	Olfactory nerve
C72.3	Optic nerve
C72.4	Acoustic nerve
C72.5	Other and unspecified cranial nerves
C72.8	Overlapping lesion of brain and other parts of central nervous system
C72.9	Central nervous system, unspecified

## INCIDENCE

Table 1

Cases with invasive cancer by year of diagnosis, proportions of DCO, further malignancies, deaths, and active follow-up (ALL PATIENTS) (incl. DCO)

Year of diagnosis	All cases n	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	193	54	28.0	9.3	2.6	88.1	97.9
1999	185	58	31.4	10.3	2.5	90.8	97.3
2000	202	54	26.7	9.8	2.5	83.2	97.0
2001	237	59	24.9	9.5	2.5	87.8	96.6
2002	340	64	18.8	9.4	2.6	84.4	98.2 #
2003	379	75	19.8	9.3	2.4	83.1	98.4
2004	338	73	21.6	9.3	2.4	84.3	97.9
2005	373	65	17.4	9.7	2.3	82.8	97.3
2006	303	40	13.2	9.8	2.3	85.1	96.4
2007	349	50	14.3	9.9	2.2	77.7	94.8 #
2008	408	57	14.0	9.9	2.1	79.2	98.8
2009	445	56	12.6	10.1	1.8	82.5	98.4
2010	387	54	14.0	10.3	1.8	85.3	98.2
2011	403	46	11.4	10.7	1.6	75.2	98.8
2012	407	42	10.3	10.9	1.5	77.1	99.0
2013	392	41	10.5	11.1	1.6	80.6	98.5
2014	357	33	9.2	11.4	1.5	81.2	98.0
2015	326	39	12.0	11.4	0.9	79.8	98.8
2016	273	38	13.9	11.4	1.1	76.9	99.3
2017	181	38	21.0	11.6	0.8	71.8	100.0
2018	97	10	10.3	11.8	0.6	54.6	100.0
2019	83	3	3.6	11.9	0.0	44.6	83.1 ##
1998-2019	6658	1049	15.8	11.9	2.6	80.7	97.9

6,658 cases diagnosed 1998-2019 are related to a total of 6,651 patients. Currently, in 971 (14.6 %) of these 6,651 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 811 / 136 / 24 (12.2 % / 2.0 % / 0.4 %) 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 retrieved from the respective headings.

How to interpret:

In 2017, a subgroup of 181 cases has been diagnosed, of which 11.6 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 0.8 % 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 DCO, further malignancies, deaths, and active follow-up (MALES) (incl. DCO)

Year of diagnosis	Males n	Males %	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	98	50.8	24	24.5	9.2	2.5	88.8	98.0
1999	93	50.3	28	30.1	9.9	2.4	90.3	96.8
2000	105	52.0	23	21.9	9.5	2.4	80.0	97.1
2001	117	49.4	26	22.2	8.7	2.4	88.0	96.6
2002	175	51.5	24	13.7	9.0	2.4	82.9	98.3 #
2003	197	52.0	34	17.3	8.8	2.3	84.8	99.5
2004	169	50.0	28	16.6	9.0	2.3	89.3	99.4
2005	199	53.4	30	15.1	9.8	2.1	86.4	97.0
2006	172	56.8	17	9.9	10.0	2.2	85.5	95.9
2007	187	53.6	23	12.3	10.0	2.2	75.9	93.6 #
2008	230	56.4	26	11.3	10.2	2.1	83.5	99.6
2009	258	58.0	26	10.1	10.4	1.7	81.4	98.1
2010	219	56.6	25	11.4	10.6	1.7	84.0	97.7
2011	213	52.9	19	8.9	11.1	1.7	80.3	99.5
2012	218	53.6	19	8.7	11.1	1.4	77.5	99.5
2013	225	57.4	18	8.0	11.6	1.6	84.4	99.6
2014	199	55.7	12	6.0	11.8	1.5	80.9	98.5
2015	178	54.6	18	10.1	11.9	0.7	83.1	98.9
2016	144	52.7	16	11.1	11.8	1.1	75.7	98.6
2017	107	59.1	18	16.8	12.1	0.5	71.0	100.0
2018	61	62.9	7	11.5	12.3	0.0	62.3	100.0
2019	54	65.1	2	3.7	12.4	0.0	42.6	81.5 ##
1998-2019	3618	54.3	463	12.8	12.4	2.5	81.6	98.0

3,618 cases diagnosed 1998-2019 are related to a total of 3,613 patients. Currently, in 537 (14.9 %) of these 3,613 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 443 / 77 / 17 (12.3 % / 2.1 % / 0.5 %) 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 retrieved from the respective headings.

How to interpret:

In 2017, a subgroup of 107 cases has been diagnosed, of which 12.1 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 0.5 % 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 DCO, further malignancies, deaths, and active follow-up (FEMALES) (incl. DCO)

Year of diagnosis	Females n	Females %	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	95	49.2	30	31.6	9.5	2.8	87.4	97.9
1999	92	49.7	30	32.6	10.7	2.7	91.3	97.8
2000	97	48.0	31	32.0	10.2	2.7	86.6	96.9
2001	120	50.6	33	27.5	10.4	2.6	87.5	96.7
2002	165	48.5	40	24.2	9.8	2.7	86.1	98.2 #
2003	182	48.0	41	22.5	9.9	2.5	81.3	97.3
2004	169	50.0	45	26.6	9.6	2.6	79.3	96.4
2005	174	46.6	35	20.1	9.7	2.5	78.7	97.7
2006	131	43.2	23	17.6	9.6	2.4	84.7	96.9
2007	162	46.4	27	16.7	9.7	2.3	79.6	96.3 #
2008	178	43.6	31	17.4	9.6	2.3	73.6	97.8
2009	187	42.0	30	16.0	9.8	1.9	84.0	98.9
2010	168	43.4	29	17.3	10.0	2.0	86.9	98.8
2011	190	47.1	27	14.2	10.2	1.6	69.5	97.9
2012	189	46.4	23	12.2	10.5	1.6	76.7	98.4
2013	167	42.6	23	13.8	10.5	1.6	75.4	97.0
2014	158	44.3	21	13.3	10.8	1.4	81.6	97.5
2015	148	45.4	21	14.2	10.8	1.2	75.7	98.6
2016	129	47.3	22	17.1	10.8	1.1	78.3	100.0
2017	74	40.9	20	27.0	11.1	1.4	73.0	100.0
2018	36	37.1	3	8.3	11.2	1.6	41.7	100.0
2019	29	34.9	1	3.4	11.2	0.0	48.3	86.2 ##
1998-2019	3040	45.7	586	19.3	11.2	2.8	79.6	97.7

3,040 cases diagnosed 1998-2019 are related to a total of 3,038 patients. Currently, in 434 (14.3 %) of these 3,038 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 368 / 59 / 7 (12.1 % / 1.9 % / 0.2 %) 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 retrieved from the respective headings.

How to interpret:

In 2017, a subgroup of 74 cases has been diagnosed, of which 11.1 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 1.4 % 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 2

Incidence measures by year of diagnosis including DCO cases  
(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,  
and from 4.10 to 4.92 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	98	95	8.8	8.1	6.2	5.4	8.0	6.6	9.0	7.6
1999	93	92	8.3	7.8	5.7	4.6	7.6	6.0	9.0	6.9
2000	105	97	9.2	8.1	6.6	4.9	8.4	6.2	10.0	7.1
2001	117	120	10.1	9.9	6.9	5.8	9.1	7.5	10.7	8.7
2002	175	165	9.4	8.4	6.7	4.8	8.3	6.3	9.4	7.6
2003	197	182	10.5	9.2	7.3	5.7	9.3	7.3	10.8	8.3
2004	169	169	9.0	8.5	5.9	5.6	7.8	6.7	9.1	7.4
2005	199	174	10.5	8.7	7.1	5.3	8.9	6.6	10.3	7.5
2006	172	131	9.0	6.5	5.9	3.7	7.6	4.8	8.6	5.6
2007	187	162	8.4	7.0	5.9	4.4	7.3	5.4	8.1	6.3
2008	230	178	10.3	7.7	6.9	5.1	8.8	6.0	10.3	6.7
2009	258	187	11.6	8.0	7.3	4.9	9.5	6.2	11.2	6.9
2010	219	168	9.7	7.2	6.2	4.2	8.0	5.2	9.3	6.0
2011	213	190	9.5	8.1	6.0	4.4	7.8	5.8	9.0	6.9
2012	218	189	9.6	8.0	6.4	4.9	7.9	6.0	9.0	6.8
2013	225	167	9.8	7.0	6.2	4.2	7.9	5.2	9.0	6.0
2014	199	158	8.5	6.6	5.3	3.5	6.9	4.6	7.8	5.4
2015	178	148	7.5	6.1	4.6	3.5	6.0	4.5	7.0	5.2
2016	144	129	6.0	5.3	3.5	2.7	4.6	3.7	5.5	4.3
2017	107	74	4.4	3.0	2.5	1.5	3.3	1.9	4.0	2.4
2018	61	36	2.5	1.5	1.5	0.9	2.0	1.1	2.3	1.2
2019	54	29	2.2	1.2	1.2	0.5	1.7	0.7	2.0	0.9
1998-2019	3618	3040	8.2	6.6	5.3	3.9	6.8	4.9	7.9	5.7

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)  
(incl. DCO)

Year of diagnosis	Cases n	Std.		Median						
		Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	193	57.5	18.6	1.8	90.6	32.6	47.5	59.2	72.2	79.7
1999	185	60.5	18.0	1.6	93.4	36.5	51.0	63.2	73.8	79.7
2000	202	59.3	18.6	2.9	93.8	34.7	48.4	62.5	72.3	79.7
2001	237	60.5	18.0	1.0	92.0	37.0	51.0	62.1	73.3	80.4
2002	340	60.0	18.4	0.8	91.2	32.6	50.7	63.0	72.9	80.9
2003	379	58.4	18.5	0.6	95.4	31.5	45.7	62.0	72.9	79.7
2004	338	59.7	19.3	0.0	92.8	34.0	48.8	63.1	73.7	81.9
2005	373	59.6	19.5	0.8	94.3	33.1	47.7	64.4	73.2	81.3
2006	303	60.5	18.5	3.0	97.0	34.8	48.3	64.2	73.2	81.3
2007	349	58.2	20.1	0.8	93.5	30.6	43.9	62.4	73.2	80.9
2008	408	59.1	20.3	0.0	94.1	29.5	47.8	64.0	73.7	80.8
2009	445	61.2	18.4	0.2	94.2	35.3	51.8	65.0	74.4	82.3
2010	387	61.4	19.3	0.6	91.6	36.2	51.1	66.9	75.0	82.3
2011	403	60.7	18.3	1.7	94.0	37.2	48.4	63.8	75.7	81.8
2012	407	60.1	20.2	0.0	96.0	32.8	48.1	64.9	74.1	82.6
2013	392	61.1	18.6	0.1	93.9	37.1	52.4	65.6	74.2	80.6
2014	357	62.3	17.9	2.6	95.0	38.0	52.6	65.6	75.0	82.6
2015	326	61.7	18.0	0.5	95.8	34.8	52.1	65.0	75.1	80.8
2016	273	63.7	17.7	0.4	94.5	41.1	53.9	67.1	76.8	82.6
2017	181	65.7	17.6	5.0	94.3	38.1	57.4	70.3	77.4	84.5
2018	97	62.6	18.6	1.9	88.2	38.9	53.0	68.0	76.9	82.7
2019	83	64.9	15.5	5.9	94.9	44.0	55.2	68.9	75.7	81.7
1998-2019	6658	60.6	18.8	0.0	97.0	34.6	50.1	64.1	74.4	81.5

Table 3a

Age distribution parameters by year of diagnosis (MALES)  
(incl. DCO)

Year of diagnosis	Cases n	Std.		Median						
		Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	98	55.1	15.7	3.4	83.3	32.6	46.7	56.7	66.2	74.8
1999	93	59.5	16.7	1.6	89.2	38.9	51.6	61.2	71.8	77.8
2000	105	56.8	18.2	4.1	88.2	30.0	47.3	59.9	68.9	78.3
2001	117	58.7	17.2	1.0	91.2	37.0	50.8	60.3	71.3	77.4
2002	175	56.2	18.2	0.8	87.7	30.9	45.4	61.7	68.8	75.9
2003	197	56.8	18.8	6.2	89.4	28.3	44.3	60.8	71.8	78.1
2004	169	59.2	16.8	0.1	90.1	37.1	48.5	61.0	70.4	81.9
2005	199	58.4	19.7	0.8	94.3	31.6	46.4	63.5	72.1	80.3
2006	172	58.3	17.2	3.0	90.4	34.7	46.9	62.6	69.7	76.9
2007	187	56.7	19.4	1.5	92.6	30.9	43.9	60.2	69.8	79.2
2008	230	58.3	18.8	0.0	94.1	31.9	47.4	63.3	72.9	78.7
2009	258	60.4	18.3	5.0	90.3	34.3	50.4	64.3	74.0	81.9
2010	219	60.0	18.6	2.7	90.8	34.4	49.0	63.7	73.7	81.0
2011	213	58.7	18.4	1.7	91.9	36.6	45.3	59.8	73.8	80.5
2012	218	59.1	20.7	0.3	96.0	30.5	47.0	64.8	73.6	80.8
2013	225	60.2	18.5	0.1	93.9	37.3	52.1	64.1	73.7	78.2
2014	199	60.6	18.2	2.6	93.6	35.7	51.2	63.0	73.8	81.7
2015	178	61.8	17.5	0.5	95.1	36.1	55.5	64.7	73.8	79.3
2016	144	62.2	18.3	0.4	93.0	35.2	51.6	65.8	76.5	81.6
2017	107	64.7	16.1	9.4	90.4	45.2	57.0	67.6	76.3	80.0
2018	61	62.4	17.6	1.9	87.5	42.0	52.0	64.3	75.8	82.2
2019	54	63.0	15.8	5.9	86.3	43.6	55.3	66.1	73.4	81.7
1998-2019	3618	59.2	18.3	0.0	96.0	34.2	48.7	62.5	72.7	79.5

Table 3b

Age distribution parameters by year of diagnosis (FEMALES)  
(incl. DCO)

Year of diagnosis	Cases n	Std.		Median						
		Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	95	59.9	21.0	1.8	90.6	30.9	49.6	63.4	77.2	83.4
1999	92	61.5	19.3	4.7	93.4	33.4	50.8	64.4	76.5	84.0
2000	97	62.0	18.7	2.9	93.8	35.7	55.5	67.6	74.2	81.3
2001	120	62.3	18.6	2.3	92.0	36.6	51.2	65.5	76.1	81.9
2002	165	63.9	17.8	2.6	91.2	37.8	54.3	67.2	78.1	83.0
2003	182	60.2	17.9	0.6	95.4	36.2	48.9	62.9	74.1	80.3
2004	169	60.1	21.6	0.0	92.8	29.6	51.8	65.1	76.4	82.6
2005	174	61.1	19.3	2.7	91.7	34.5	48.5	65.1	75.4	83.4
2006	131	63.5	19.6	7.3	97.0	35.1	54.1	67.3	77.7	85.8
2007	162	60.1	20.7	0.8	93.5	30.6	44.1	65.5	77.7	82.3
2008	178	60.1	22.2	0.1	92.9	28.1	48.0	65.8	77.1	85.1
2009	187	62.3	18.7	0.2	94.2	37.3	52.9	65.4	75.8	83.6
2010	168	63.3	20.1	0.6	91.6	39.0	55.2	68.6	76.4	83.5
2011	190	63.1	17.9	11.1	94.0	38.0	50.0	67.0	77.0	82.5
2012	189	61.3	19.7	0.0	90.4	34.9	50.0	65.0	74.6	83.4
2013	167	62.3	18.8	0.7	92.8	34.7	52.8	66.4	76.3	84.3
2014	158	64.4	17.2	3.2	95.0	42.6	53.6	67.5	76.2	83.2
2015	148	61.6	18.6	5.9	95.8	32.9	49.0	65.3	76.5	82.8
2016	129	65.3	16.8	7.1	94.5	42.8	55.6	68.7	77.6	84.0
2017	74	67.3	19.7	5.0	94.3	33.0	59.4	72.7	81.6	86.2
2018	36	63.0	20.4	6.1	88.2	37.3	54.1	70.6	77.0	84.0
2019	29	68.2	14.7	35.3	94.9	44.0	54.7	74.4	77.3	81.8
1998-2019	3040	62.2	19.2	0.0	97.0	35.0	51.8	66.3	76.6	83.3

Table 4

Age distribution by 5-year age group and sex for period 2007–2019  
(incl. DCO)

Age at diagnosis Years	Cases			Males			Females		
	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
0–4	57	1.4	1.4	29	1.3	1.3	28	1.5	1.5
5–9	40	1.0	2.4	25	1.1	2.4	15	0.8	2.4
10–14	28	0.7	3.0	20	0.9	3.2	8	0.4	2.8
15–19	32	0.8	3.8	17	0.7	4.0	15	0.8	3.6
20–24	52	1.3	5.1	32	1.4	5.4	20	1.1	4.7
25–29	83	2.0	7.1	48	2.1	7.5	35	1.9	6.7
30–34	115	2.8	9.9	61	2.7	10.1	54	3.0	9.6
35–39	146	3.6	13.5	81	3.5	13.7	65	3.6	13.2
40–44	197	4.8	18.3	122	5.3	19.0	75	4.1	17.4
45–49	237	5.8	24.0	143	6.2	25.2	94	5.2	22.5
50–54	300	7.3	31.3	174	7.6	32.8	126	6.9	29.5
55–59	372	9.1	40.4	234	10.2	43.0	138	7.6	37.1
60–64	376	9.2	49.5	224	9.8	52.8	152	8.4	45.5
65–69	490	11.9	61.5	276	12.0	64.8	214	11.8	57.2
70–74	547	13.3	74.8	300	13.1	77.9	247	13.6	70.9
75–79	494	12.0	86.8	270	11.8	89.7	224	12.3	83.2
80–84	314	7.6	94.4	148	6.5	96.1	166	9.1	92.3
85+	228	5.6	100.0	89	3.9	100.0	139	7.7	100.0
All ages	4108	100.0		2293	100.0		1815	100.0	

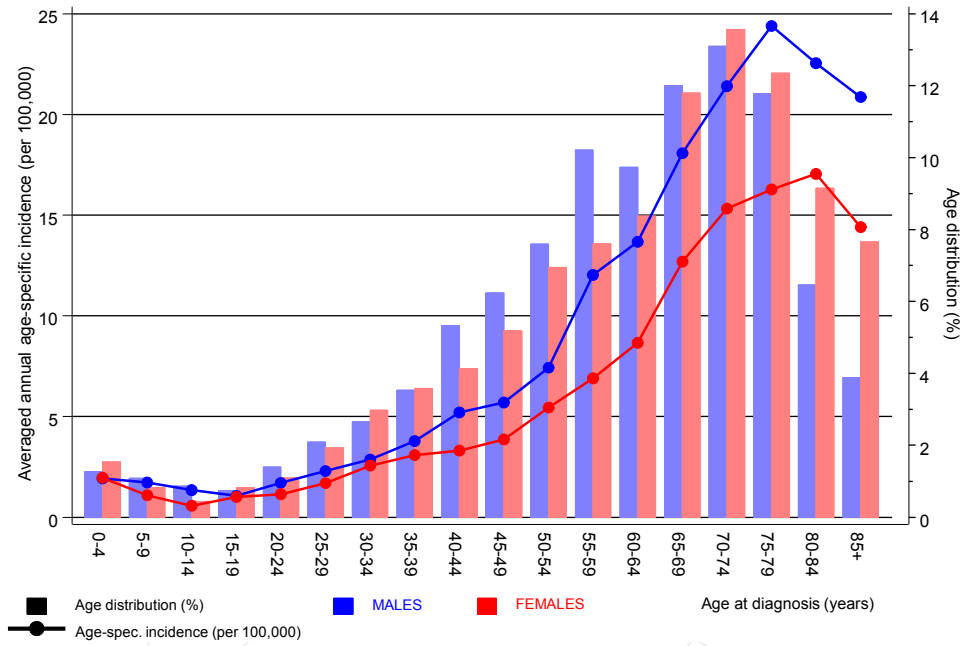
Table 5

Age-specific incidence, DCO rate and proportion of all cancers for period 2007–2019

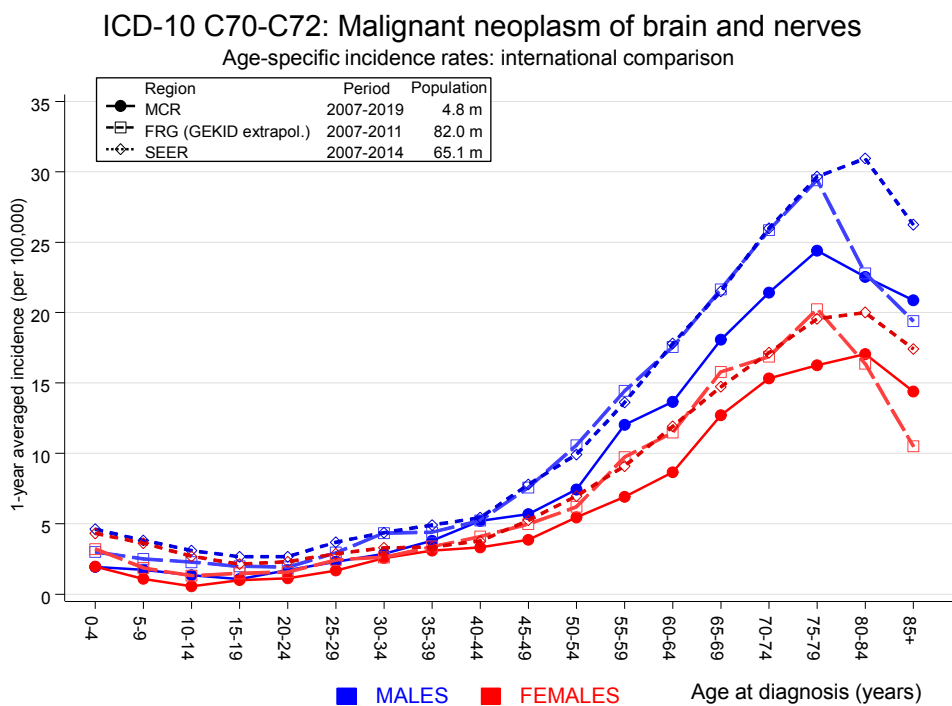
Age at diagnosis Years	Males n	Females n	Males Age- spec. incid.	Females Age- spec. incid.	Males DCO rate n=229 %	Females DCO rate n=278 %	Males	Females
							Prop.all cancers n=143063 %	Prop.all cancers n=144724 %
0- 4	29	28	1.9	2.0			13.7	17.4
5- 9	25	15	1.7	1.1	4.0		21.9	16.1
10-14	20	8	1.3	0.6			15.0	6.8
15-19	17	15	1.1	1.0	5.9		5.7	6.1
20-24	32	20	1.7	1.1	3.1		5.4	4.2
25-29	48	35	2.3	1.7	4.2		5.5	3.2
30-34	61	54	2.9	2.6		7.4	5.1	2.7
35-39	81	65	3.8	3.1	4.9		4.7	2.0
40-44	122	75	5.2	3.3	1.6	1.3	4.7	1.3
45-49	143	94	5.7	3.9	2.8	3.2	3.0	1.1
50-54	174	126	7.4	5.5	2.9	7.1	2.2	1.1
55-59	234	138	12.0	6.9	4.3	5.1	2.0	1.1
60-64	223	152	13.7	8.7	4.9	4.6	1.4	1.0
65-69	275	214	18.1	12.7	5.5	5.6	1.2	1.2
70-74	300	246	21.4	15.3	8.3	11.8	1.2	1.3
75-79	270	224	24.4	16.3	17.8	16.5	1.2	1.2
80-84	148	166	22.5	17.1	29.7	39.2	1.0	1.2
85+	89	139	20.9	14.4	62.9	74.8	0.9	0.9
All ages	2291	1814			10.0	15.3	1.6	1.3
Incidence								
Raw			7.6	5.8				
WS			4.8	3.4				
ES			6.2	4.3				
BRD-S			7.1	4.9				

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).

ICD-10 C70-C72: Malignant neoplasm of brain and nerves  
 Age distribution and age-specific incidence 2007 - 2019 (Males: 2291, Females: 1814)



**Figure 6.** Age distribution (males: mean=60.1 yrs, median=63.5 yrs; females: mean=62.6 yrs, median=66.7 yrs) and age-specific incidence.



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

Reference:

Extrapolated age-specific patient population of Germany, data status middle of 2010. Association of Population-based Cancer Registries in Germany (GEKID e.V.). Berlin, 2014. <http://www.gekid.de>. Last access: 02/11/2015  
 Surveillance, Epidemiology, and End Results (SEER) Program SEER\*Stat Database: Incidence - SEER 18 Regs Research Data, released April 2019, based on the November 2018 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 1998–2019

## MALES

Diagnosis	Observed	Expected	SIR	CI		EAR	DCO %
	n	n		95%	95%		
C07-C08 Salivary gland	1	0.1	8.8	0.2	48.9	1.2	
C12-C13 Hypopharynx	1	0.4	2.3	0.1	12.7	0.8	100.0
C16 Stomach	2	1.9	1.0	0.1	3.8	0.1	
C17 Small intestine	1	0.3	3.0	0.1	16.4	0.9	100.0
C18 Colon	10	4.6	2.2	1.0	4.0 #	7.6	
C19-C20 Rectum	4	3.0	1.3	0.4	3.4	1.4	25.0
C22 Liver	1	1.5	0.7	0.0	3.7	-0.7	
C23-C24 Bile	1	0.5	2.0	0.1	11.3	0.7	100.0
C25 Pancreas	5	1.9	2.6	0.9	6.2	4.4	20.0
C30-C31 Sinuses	2	0.1	17.0	2.1	61.4 #	2.6	
C33-C34 Lung	7	6.3	1.1	0.4	2.3	0.9	
C40-C41 Bone	1	0.1	15.4	0.4	86.0	1.3	
C43 Malign. melanoma	8	2.7	2.9	1.3	5.7 #	7.4	25.0
C46,C49 Soft tissue	3	0.3	9.1	1.9	26.5 #	3.7	
C61 Prostate	19	14.5	1.3	0.8	2.1	6.4	10.5
C62 Testis	3	0.7	4.4	0.9	12.7	3.2	
C64 Kidney	7	2.0	3.4	1.4	7.1 #	7.0	14.3
C67 Bladder	4	2.0	2.0	0.5	5.1	2.8	
C69 Eye melanoma	1	0.1	15.3	0.4	85.1	1.3	
C70-C72 CNS cancer	5	0.9	5.8	1.9	13.5 #	5.8	
C73 Thyroid	1	0.6	1.7	0.0	9.3	0.6	
C76-C79 CUP	2	0.8	2.4	0.3	8.6	1.6	
C81 Hodgkin lymphoma	1	0.2	4.5	0.1	24.9	1.1	
C82-C85 NHL	2	2.2	0.9	0.1	3.2	-0.3	
C91-C96 Leukaemia	1	0.8	1.3	0.0	7.3	0.3	100.0
Not observed	0	5.5	0.0	0.0	0.7 #	-7.7	
All further malignancies	93	54.1	1.7	1.4	2.1 #	54.5	11.8
Patients		3278					
Median age at next malignancy (years)		65.3					
Person-years		7132					
Mean observation time (years)		2.2					
Median observation time (years)		0.9					

# The occurrence of further specified malignancy is statistically significant.



Table 7b

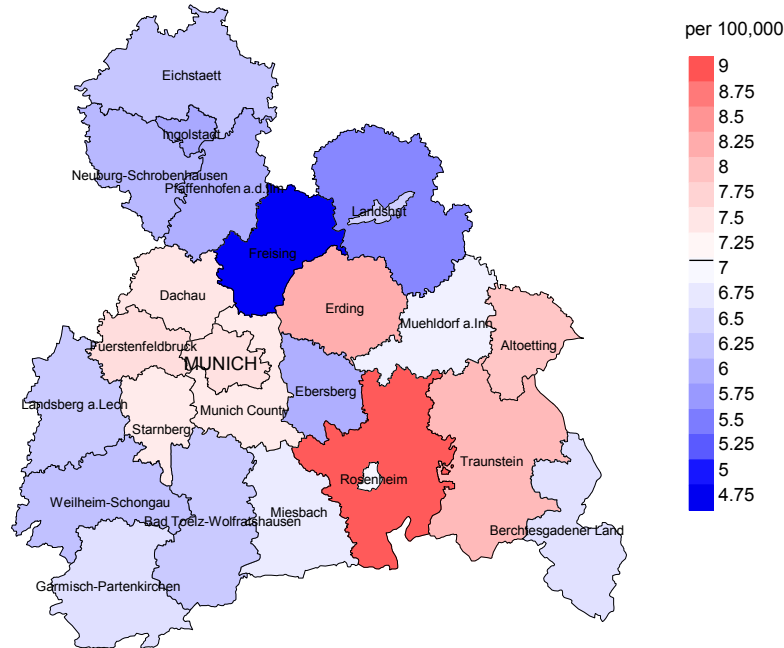
Standardized incidence ratio (SIR, with 95% confidence limits),  
excess absolute risk (EAR) and DCO rate of further malignancies  
for period 1998-2019

## FEMALES

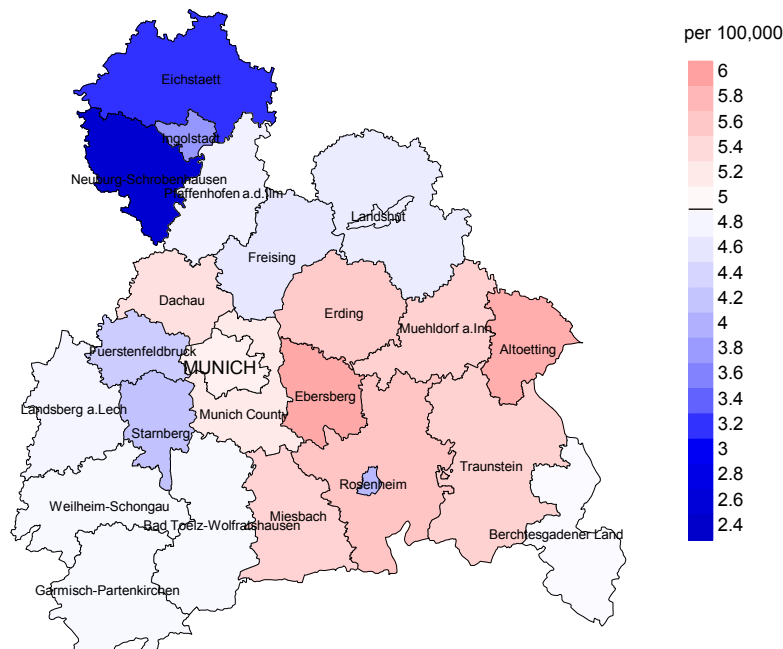
Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C18 Colon	6	3.0	2.0	0.7	4.3	5.0	16.7
C19-C20 Rectum	3	1.4	2.2	0.4	6.3	2.7	33.3
C23-C24 Bile	2	0.4	4.7	0.6	17.1	2.6	50.0
C25 Pancreas	2	1.4	1.4	0.2	5.1	1.0	50.0
C30-C31 Sinuses	1	0.1	18.5	0.5	103.1	1.6	
C33-C34 Lung	3	2.9	1.0	0.2	3.0	0.1	
C40-C41 Bone	1	0.0	23.3	0.6	129.6	1.6	
C43 Malign. melanoma	4	1.8	2.2	0.6	5.7	3.7	
C46,C49 Soft tissue	1	0.2	4.5	0.1	24.9	1.3	
C50 Breast	27	13.7	2.0	1.3	2.9 #	22.4	11.1
C51 Vulva	1	0.3	2.9	0.1	16.2	1.1	
C53 Cervix uteri	1	0.8	1.2	0.0	6.9	0.3	
C54 Corpus uteri	6	2.2	2.7	1.0	6.0 #	6.4	
C56 Ovary	2	1.6	1.3	0.2	4.6	0.7	
C64 Kidney	2	0.8	2.4	0.3	8.6	2.0	
C67 Bladder	1	0.6	1.8	0.0	9.9	0.7	
C70-C72 CNS cancer	2	0.6	3.6	0.4	13.1	2.4	
C73 Thyroid	3	1.1	2.8	0.6	8.2	3.2	
C82-C85 NHL	6	1.4	4.3	1.6	9.5 #	7.8	16.7
C90 Mult. myeloma	2	0.4	4.8	0.6	17.5	2.7	
C91-C96 Leukaemia	3	0.5	5.7	1.2	16.8 #	4.2	
Not observed	0	4.2	0.0	0.0	0.9 #	-7.1	
All further malignancies	79	39.4	2.0	1.6	2.5 #	66.5	10.1
Patients		2638					
Median age at next malignancy (years)		66.7					
Person-years		5953					
Mean observation time (years)		2.3					
Median observation time (years)		0.9					

# The occurrence of further specified malignancy is statistically significant.

Average incidence (Germany 1987 standard population) 2007 - 2019: Males



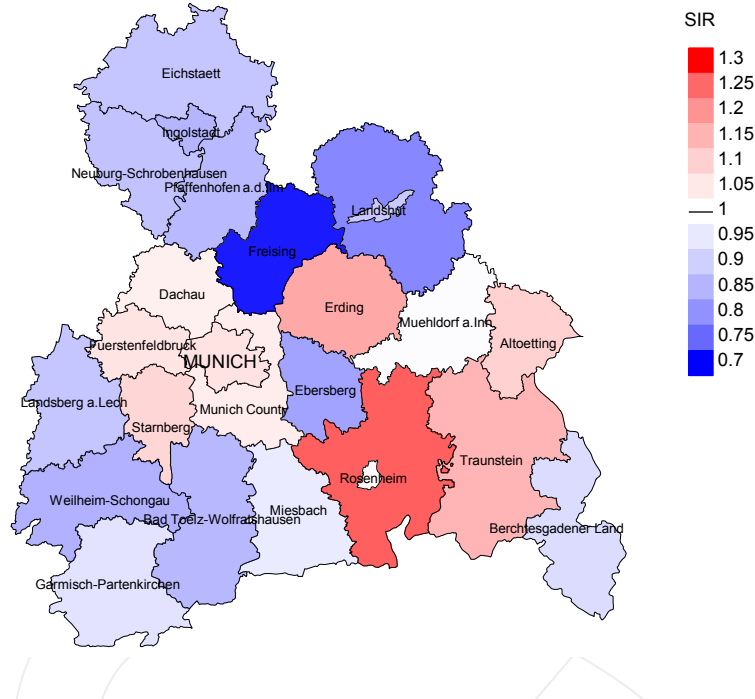
Average incidence (Germany 1987 standard population) 2007 - 2019: Females



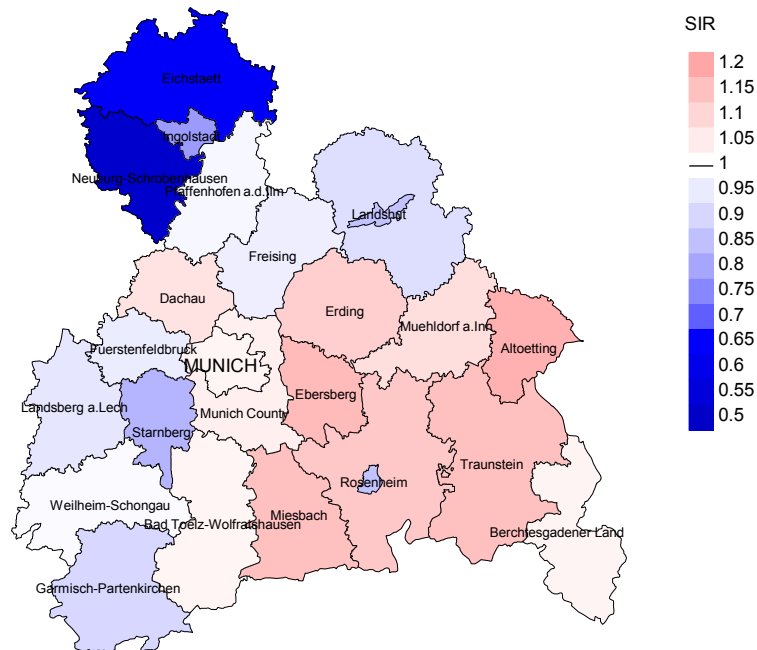
**Figure 8a.** Map of cancer incidence (german standard population, incl. DCO cases) by county averaged for period 2007 to 2019. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 7.1/100,000 WS N=2,291, females 4.9/100,000 WS N=1,814).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,462 female residents (averaged) in the period from 2007 to 2019 a total of 58 women were identified with newly diagnosed brain/nerves cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 5.9/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 4.1 and 8.3/100,000.

Standardized incidence ratio (SIR) 2007 - 2019: Males



Standardized incidence ratio (SIR) 2007 - 2019: Females



**Figure 8b.** Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2019. 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=2,291, females N=1,814).

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 2019 a total of 58 women were identified with newly diagnosed brain/nerves cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.16. Though, the value of this parameter may vary with an underlying probability of 99% between 0.81 and 1.61, and is therefore not statistically striking.

## MORTALITY

Table 9a

Annual cohorts: Incident cancers, follow-up status, proportion of DCO, deaths among the annual cohorts and proportion of available death certificates (with respect to registry area expansion from 2.65 to 4.10 m as of 2002, and from 4.10 to 4.92 m as of 2007, respectively)

Year of diagnosis	Incident cases n	Prop. actively followed %	Prop. DCO %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	193	97.9	28.0	170	88.1	96.5
1999	185	97.3	31.4	168	90.8	95.8
2000	202	97.0	26.7	168	83.2	94.0
2001	237	96.6	24.9	208	87.8	93.3
2002	340	98.2	18.8	287	84.4	98.6
2003	379	98.4	19.8	315	83.1	95.2
2004	338	97.9	21.6	285	84.3	97.2
2005	373	97.3	17.4	309	82.8	97.1
2006	303	96.4	13.2	258	85.1	96.9
2007	349	94.8	14.3	271	77.7	95.9
2008	408	98.8	14.0	323	79.2	96.6
2009	445	98.4	12.6	367	82.5	96.2
2010	387	98.2	14.0	330	85.3	98.8
2011	403	98.8	11.4	303	75.2	97.4
2012	407	99.0	10.3	314	77.1	94.6
2013	392	98.5	10.5	316	80.6	93.7
2014	357	98.0	9.2	290	81.2	95.9
2015	326	98.8	12.0	260	79.8	95.4
2016	273	99.3	13.9	210	76.9	92.4
2017	181	100.0	21.0	130	71.8	80.0
2018	97	100.0	10.3	53	54.6	47.2
2019	83	83.1	3.6	37	44.6	86.5
1998-2019	6658	97.9	15.8	5372	80.7	95.1

Table 9b

Annual cohorts of incident cancers and deaths, proportion of death certificates and cases deceased within the same year of being diagnosed with cancer (incl. DCO)

(with respect to registry area expansion from 2.65 to 4.10 m as of 2002, and from 4.10 to 4.92 m as of 2007, respectively)

Year of diagnosis/ death	Incident cases n	Deaths n	Prop. deaths with death certific. %	Deaths in same year n	Prop. deaths in same year %
1998	193	136	95.6	77	39.9
1999	185	172	97.1	91	49.2
2000	202	156	94.9	78	38.6
2001	237	192	92.2	106	44.7
2002	340	232	97.0	124	36.5
2003	379	253	95.7	127	33.5
2004	338	273	97.4	122	36.1
2005	373	256	97.3	138	37.0
2006	303	266	96.2	108	35.6
2007	349	258	97.3	122	35.0
2008	408	266	97.0	127	31.1
2009	445	311	98.1	142	31.9
2010	387	357	98.3	146	37.7
2011	403	321	98.8	123	30.5
2012	407	304	96.7	127	31.2
2013	392	305	96.7	120	30.6
2014	357	325	98.5	116	32.5
2015	326	302	97.7	113	34.7
2016	273	327	99.1	114	41.8
2017	181	260	95.0	80	44.2
2018	97	127	37.8	23	23.7
2019	83	98	51.0	20	24.1
1998–2019	6658	5497	94.9	2344	35.2

Table 9c

Annual cohorts of deaths, proportion of cancer-related and non-cancer-related deaths, and cancer recorded on death certificates  
(incl. DCO)

(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,  
and from 4.10 to 4.92 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer- related %	Prop. non-cancer- related %	Prop. cancer recorded on death certificate %
1998	136	71.3	28.7	100.0
1999	172	78.5	21.5	97.6
2000	156	78.2	21.8	98.0
2001	192	83.3	16.7	98.9
2002	232	91.4	8.6	99.6
2003	253	93.3	6.7	98.8
2004	273	93.4	6.6	98.9
2005	256	91.0	9.0	98.0
2006	266	91.0	9.0	96.9
2007	258	93.4	6.6	98.0
2008	266	94.4	5.6	98.4
2009	311	91.3	8.7	96.7
2010	357	93.0	7.0	97.4
2011	321	93.1	6.9	96.8
2012	304	91.8	8.2	98.3
2013	305	92.8	7.2	98.0
2014	325	96.0	4.0	97.8
2015	302	94.0	6.0	97.3
2016	327	94.8	5.2	98.5
2017	260	91.9	8.1	96.4
2018	127	44.9	55.1	95.8
2019	98	52.0	48.0	98.0
1998–2019	5497	89.4	10.6	97.9

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	66	57.8	57.6	61.6	57.8
1999	91	62.1	61.4	63.5	62.1
2000	69	63.5	63.3	68.8	65.9
2001	104	64.1	63.4	67.8	64.9
2002	130	63.1	63.5	57.9	63.4
2003	123	66.3	66.6	56.0	66.8
2004	142	65.8	65.4	69.7	65.5
2005	147	65.3	64.0	73.3	64.2
2006	136	64.1	64.2	63.7	64.2
2007	138	66.2	66.2	65.0	66.4
2008	146	64.8	64.3	72.1	64.6
2009	186	68.6	66.7	70.6	66.4
2010	223	68.6	68.5	68.6	68.7
2011	171	67.4	67.1	72.6	67.1
2012	166	67.8	67.4	70.2	67.4
2013	173	67.1	67.1	61.8	67.1
2014	189	66.9	66.1	75.5	67.1
2015	177	67.4	67.4	67.9	68.5
2016	179	65.7	64.9	72.1	65.9
2017	147	64.8	64.6	70.9	64.6
2018	79	68.2	68.7	66.2	66.5
2019	60	67.8	63.9	72.2	65.1
1998-2019	3042	66.0	65.8	68.7	66.0

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	70	72.2	72.7	70.7	72.5
1999	81	68.3	64.6	79.2	69.1
2000	87	69.2	66.4	73.6	69.3
2001	88	70.3	67.8	78.7	70.3
2002	102	70.3	70.4	70.3	70.4
2003	130	67.2	66.6	75.4	67.6
2004	131	66.5	66.2	68.6	66.5
2005	109	67.8	67.7	68.4	67.8
2006	130	68.1	68.0	69.1	68.6
2007	120	69.9	68.6	78.4	69.4
2008	120	67.9	67.9	71.8	68.2
2009	125	69.2	68.9	77.4	69.2
2010	134	69.2	68.8	78.1	69.2
2011	150	70.4	69.6	71.7	70.5
2012	138	68.7	68.2	78.7	69.1
2013	132	67.0	66.9	74.7	66.9
2014	136	70.1	70.0	77.5	70.0
2015	125	70.6	69.8	75.8	71.0
2016	148	68.6	68.6	49.4	68.6
2017	113	70.8	70.2	75.4	71.5
2018	48	70.1	70.1	68.8	70.5
2019	38	71.8	70.4	73.7	73.0
1998-2019	2455	69.1	68.5	74.7	69.2

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	46	4.2	0.47	3.0	0.48	3.8	0.48	4.3	0.47
1999	73	6.5	0.78	4.3	0.75	5.9	0.77	7.1	0.79
2000	51	4.5	0.49	2.9	0.44	4.0	0.48	4.6	0.46
2001	86	7.4	0.74	4.4	0.64	6.5	0.71	8.2	0.77
2002	120	6.4	0.69	4.0	0.61	5.5	0.67	6.5	0.69
2003	115	6.1	0.58	3.6	0.49	5.1	0.55	6.4	0.59
2004	133	7.1	0.79	4.4	0.75	6.0	0.77	7.3	0.80
2005	133	7.0	0.67	4.3	0.61	5.8	0.66	6.9	0.68
2006	127	6.6	0.74	4.4	0.74	5.6	0.74	6.4	0.74
2007	132	6.0	0.71	3.4	0.57	4.7	0.65	5.8	0.71
2008	137	6.2	0.60	3.8	0.54	5.0	0.57	5.9	0.57
2009	164	7.3	0.64	4.3	0.58	5.8	0.61	7.1	0.64
2010	212	9.4	0.97	5.3	0.86	7.3	0.91	8.9	0.96
2011	161	7.2	0.76	4.0	0.66	5.6	0.72	6.8	0.75
2012	156	6.9	0.72	4.0	0.62	5.3	0.67	6.4	0.71
2013	160	7.0	0.71	4.0	0.64	5.3	0.67	6.3	0.71
2014	182	7.8	0.91	4.6	0.86	6.1	0.89	7.1	0.90
2015	170	7.1	0.96	4.1	0.88	5.5	0.91	6.5	0.93
2016	164	6.8	1.14	3.8	1.07	5.2	1.13	6.2	1.12
2017	136	5.6	1.27	3.2	1.32	4.4	1.30	5.1	1.28
2018	33	1.4	0.54	0.8	0.54	1.1	0.54	1.2	0.54
2019	32	1.3	0.60	0.8	0.65	1.0	0.62	1.2	0.63
1998-2019	2723	6.2	0.75	3.6	0.68	4.9	0.72	5.9	0.75

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	51	4.3	0.54	2.1	0.38	3.0	0.45	4.0	0.52
1999	62	5.2	0.67	3.4	0.73	4.2	0.70	4.7	0.68
2000	71	5.9	0.73	3.5	0.71	4.5	0.73	5.2	0.72
2001	74	6.1	0.62	3.5	0.60	4.5	0.60	5.4	0.62
2002	92	4.7	0.56	2.4	0.50	3.3	0.52	4.1	0.54
2003	121	6.1	0.66	3.5	0.61	4.7	0.65	5.5	0.66
2004	122	6.2	0.72	3.7	0.66	4.7	0.70	5.4	0.73
2005	100	5.0	0.57	2.7	0.52	3.6	0.54	4.3	0.57
2006	115	5.7	0.88	3.0	0.81	4.1	0.85	4.8	0.87
2007	109	4.7	0.67	2.3	0.53	3.3	0.60	4.0	0.64
2008	114	4.9	0.64	2.9	0.57	3.6	0.61	4.2	0.63
2009	120	5.2	0.64	2.6	0.53	3.5	0.56	4.1	0.59
2010	120	5.1	0.71	2.7	0.63	3.6	0.69	4.3	0.72
2011	138	5.9	0.73	3.1	0.69	4.1	0.70	4.9	0.70
2012	123	5.2	0.65	2.8	0.58	3.7	0.61	4.4	0.64
2013	123	5.2	0.74	2.8	0.66	3.7	0.71	4.3	0.71
2014	130	5.4	0.82	2.7	0.78	3.6	0.78	4.4	0.82
2015	114	4.7	0.77	2.1	0.61	3.0	0.68	3.8	0.72
2016	146	5.9	1.13	3.0	1.11	4.1	1.12	5.0	1.16
2017	103	4.2	1.39	2.0	1.37	2.7	1.43	3.3	1.40
2018	24	1.0	0.67	0.5	0.57	0.7	0.63	0.8	0.67
2019	19	0.8	0.66	0.4	0.80	0.5	0.71	0.6	0.65
1998-2019	2191	4.8	0.72	2.5	0.65	3.4	0.68	4.0	0.71

Table 12

Age distribution of age at death (cancer-related) for period 2007-2019  
(incl. multiple malignancies)

Age at death Years	Cases			Males			Females		
	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
0-4	13	0.4	0.4	7	0.4	0.4	6	0.4	0.4
5-9	23	0.7	1.1	10	0.5	0.9	13	0.9	1.4
10-14	17	0.5	1.6	12	0.7	1.6	5	0.4	1.7
15-19	17	0.5	2.2	10	0.5	2.1	7	0.5	2.2
20-24	11	0.3	2.5	6	0.3	2.4	5	0.4	2.6
25-29	30	0.9	3.4	21	1.1	3.6	9	0.7	3.3
30-34	28	0.9	4.3	17	0.9	4.5	11	0.8	4.0
35-39	58	1.8	6.1	41	2.2	6.7	17	1.2	5.3
40-44	125	3.9	10.0	80	4.4	11.1	45	3.3	8.5
45-49	207	6.4	16.4	127	6.9	18.0	80	5.8	14.3
50-54	211	6.5	23.0	128	7.0	25.0	83	6.0	20.3
55-59	287	8.9	31.9	176	9.6	34.5	111	8.0	28.3
60-64	349	10.8	42.7	209	11.4	45.9	140	10.1	38.5
65-69	449	13.9	56.6	245	13.3	59.2	204	14.8	53.2
70-74	513	15.9	72.6	303	16.5	75.7	210	15.2	68.4
75-79	438	13.6	86.2	235	12.8	88.5	203	14.7	83.1
80-84	266	8.3	94.4	135	7.3	95.8	131	9.5	92.6
85+	180	5.6	100.0	77	4.2	100.0	103	7.4	100.0
All ages	3222	100.0		1839	100.0		1383	100.0	

Table 13

Age-specific mortality (cancer-related) and proportion of all cancers  
for period 2007–2019  
(incl. multiple malignancies)

Age at death Years	Males		Females		Males		Females	
	n	n	Age- spec. mortal.	MI-index	Age- spec. mortal.	MI-index	Prop.all cancers %	Prop.all cancers %
0– 4	7	6	0.5	0.24	0.4	0.21	36.8	37.5
5– 9	10	13	0.7	0.40	0.9	0.87	40.0	56.5
10–14	12	5	0.8	0.60	0.4	0.63	44.4	21.7
15–19	10	7	0.6	0.59	0.5	0.47	21.3	28.0
20–24	6	5	0.3	0.19	0.3	0.25	9.0	12.8
25–29	21	9	1.0	0.44	0.4	0.26	24.7	9.7
30–34	17	11	0.8	0.28	0.5	0.20	13.3	6.9
35–39	41	17	1.9	0.51	0.8	0.26	16.9	4.7
40–44	80	45	3.4	0.66	2.0	0.60	14.0	5.6
45–49	127	80	5.1	0.89	3.3	0.85	9.5	5.1
50–54	128	83	5.5	0.74	3.6	0.66	5.1	3.4
55–59	176	111	9.1	0.75	5.6	0.80	4.3	3.1
60–64	209	140	12.8	0.94	8.0	0.92	3.5	3.0
65–69	245	204	16.1	0.89	12.1	0.95	2.9	3.1
70–74	303	210	21.6	1.01	13.1	0.85	2.7	2.6
75–79	235	203	21.2	0.87	14.7	0.91	2.1	2.3
80–84	135	131	20.6	0.91	13.5	0.79	1.4	1.5
85+	77	103	18.1	0.87	10.7	0.74	0.9	0.9
All ages	1839	1383					2.9	2.4
Mortality								
Raw			6.1	0.80	4.4	0.76		
WS			3.5	0.73	2.3	0.68		
ES			4.7	0.77	3.1	0.72		
BRD–S			5.6	0.79	3.7	0.74		
PYLL–70								
per 100,000			64.6		41.6			
ES			60.3		39.6			
AYLL–70			15.7		14.8			

Table 14a

Further malignancies in deaths in period 1998-2019

MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	3	0.7	3	100.0				
C07-C08 Salivary gland	3	0.7	2	66.7			1	33.3
C09-C10 Oropharynx	4	0.9	4	100.0				
C11 Nasopharynx	1	0.2	1	100.0				
C12-C13 Hypopharynx	1	0.2					1	100.0
C15 Oesophagus	1	0.2					1	100.0
C16 Stomach	9	2.0	7	77.8			2	22.2
C17 Small intestine	3	0.7	1	33.3	1	33.3	1	33.3
C18 Colon	32	7.0	26	81.3	4	12.5	2	6.3
C19-C20 Rectum	21	4.6	19	90.5	1	4.8	1	4.8
C21 Anus/canal	1	0.2	1	100.0				
C22 Liver	3	0.7	1	33.3			2	66.7
C23-C24 Bile	2	0.4					2	100.0
C25 Pancreas	8	1.8	1	12.5	2	25.0	5	62.5
C30-C31 Sinuses	1	0.2			1	100.0		
C32 Larynx	3	0.7	2	66.7			1	33.3
C33-C34 Lung	20	4.4	7	35.0	4	20.0	9	45.0
C37 Thymus	1	0.2	1	100.0				
C38,C45 Mesothelioma	1	0.2	1	100.0				
C40-C41 Bone	4	0.9	1	25.0	1	25.0	2	50.0
C43 Malign. melanoma	31	6.8	24	77.4			7	22.6
C44 Skin others	23	5.1	12	52.2	5	21.7	6	26.1
C46,C49 Soft tissue	4	0.9	2	50.0			2	50.0
C60 Penis	2	0.4	2	100.0				
C61 Prostate	141	31.1	124	87.9	9	6.4	8	5.7
C62 Testis	11	2.4	7	63.6	2	18.2	2	18.2
C64 Kidney	24	5.3	17	70.8	2	8.3	5	20.8
C65 Renal pelvis	2	0.4					2	100.0
C66 Ureter	1	0.2	1	100.0				
C67 Bladder	16	3.5	11	68.8	2	12.5	3	18.8
C68 Urinary org.	1	0.2	1	100.0				
C69 Eye melanoma	1	0.2					1	100.0
C70-C72 CNS cancer	28	6.2			5	17.9	23	82.1
C73 Thyroid	8	1.8	7	87.5			1	12.5
C76-C79 CUP	6	1.3	3	50.0			3	50.0
C81 Hodgkin lymphoma	2	0.4	2	100.0				
C82-C85 NHL	19	4.2	17	89.5	1	5.3	1	5.3
C90 Mult. myeloma	6	1.3	4	66.7	1	16.7	1	16.7
C91-C96 Leukaemia	5	1.1	2	40.0	1	20.0	2	40.0
C96 Systemic	1	0.2			1	100.0		

Table 14a

Further malignancies in deaths in period 1998-2019  
MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
All further malignancies	454	100.0	314	69.2	43	9.5	97	21.4

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 1998-2019  
FEMALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	1	0.3	1	100.0				
C09-C10 Oropharynx	1	0.3	1	100.0				
C16 Stomach	2	0.6	2	100.0				
C17 Small intestine	1	0.3	1	100.0				
C18 Colon	19	5.8	14	73.7	1	5.3	4	21.1
C19-C20 Rectum	7	2.1	3	42.9	2	28.6	2	28.6
C21 Anus/canal	1	0.3	1	100.0				
C22 Liver	1	0.3	1	100.0				
C23-C24 Bile	1	0.3					1	100.0
C25 Pancreas	3	0.9	1	33.3			2	66.7
C26 GI cancer	1	0.3			1	100.0		
C30-C31 Sinuses	1	0.3	1	100.0				
C32 Larynx	1	0.3	1	100.0				
C33-C34 Lung	8	2.5	5	62.5			3	37.5
C38,C45 Mesothelioma	1	0.3					1	100.0
C40-C41 Bone	1	0.3					1	100.0
C43 Malign. melanoma	20	6.1	16	80.0			4	20.0
C44 Skin others	16	4.9	9	56.3	2	12.5	5	31.3
C46,C49 Soft tissue	5	1.5	2	40.0	1	20.0	2	40.0
C50 Breast	114	35.0	89	78.1	9	7.9	16	14.0
C51 Vulva	1	0.3					1	100.0
C52 Vagina	1	0.3	1	100.0				
C53 Cervix uteri	8	2.5	8	100.0				
C54 Corpus uteri	22	6.7	16	72.7			6	27.3
C55,C57 Fem. genitals un	1	0.3	1	100.0				
C56 Ovary	11	3.4	8	72.7	2	18.2	1	9.1
C64 Kidney	11	3.4	9	81.8	2	18.2		
C65 Renal pelvis	1	0.3	1	100.0				
C67 Bladder	4	1.2	1	25.0			3	75.0
C69 Eye melanoma	3	0.9	3	100.0				
C70-C72 CNS cancer	22	6.7			1	4.5	21	95.5
C73 Thyroid	10	3.1	10	100.0				
C76-C79 CUP	1	0.3	1	100.0				
C81 Hodgkin lymphoma	2	0.6	1	50.0			1	50.0
C82-C85 NHL	12	3.7	5	41.7	2	16.7	5	41.7
C90 Mult. myeloma	3	0.9	1	33.3			2	66.7
C91-C96 Leukaemia	8	2.5	4	50.0			4	50.0
All further malignancies	326	100.0	218	66.9	23	7.1	85	26.1

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 2007-2019  
(First primaries only \*)

Age at death Years	Males		Males		Females		Females	
	n	n	Age- spec. mortal.	MI-index	Age- spec. mortal.	MI-index	Prop.all cancers %	Prop.all cancers %
0- 4	7	6	0.5	0.25	0.4	0.21	36.8	40.0
5- 9	9	13	0.6	0.36	0.9	0.93	37.5	56.5
10-14	12	5	0.8	0.60	0.4	0.63	44.4	26.3
15-19	9	7	0.6	0.53	0.5	0.50	20.0	30.4
20-24	6	5	0.3	0.19	0.3	0.25	10.0	13.5
25-29	20	9	1.0	0.43	0.4	0.27	26.0	10.5
30-34	17	10	0.8	0.28	0.5	0.19	13.7	7.2
35-39	41	17	1.9	0.51	0.8	0.27	18.1	5.2
40-44	76	42	3.2	0.66	1.9	0.64	14.4	6.0
45-49	122	77	4.9	0.90	3.2	0.88	10.0	5.7
50-54	120	76	5.1	0.73	3.3	0.67	5.4	3.7
55-59	167	95	8.6	0.77	4.8	0.77	4.6	3.2
60-64	187	126	11.5	0.98	7.2	0.92	3.7	3.3
65-69	211	179	13.9	0.92	10.6	0.97	3.1	3.5
70-74	243	172	17.3	1.05	10.7	0.92	2.9	2.7
75-79	179	160	16.2	0.94	11.6	0.88	2.1	2.3
80-84	108	116	16.5	0.93	11.9	0.82	1.6	1.8
85+	50	90	11.7	0.79	9.3	0.76	0.8	1.0
All ages	1584	1205					3.2	2.7
Mortality								
Raw			5.3	0.81	3.9	0.77		
WS			3.1	0.72	2.1	0.67		
ES			4.2	0.77	2.7	0.72		
BRD-S			4.9	0.80	3.2	0.74		
PYLL-70								
per 100,000			61.2		39.0			
ES			57.3		37.4			
AYLL-70			16.2		15.3			

\* See corresponding tables with multiple malignancies.



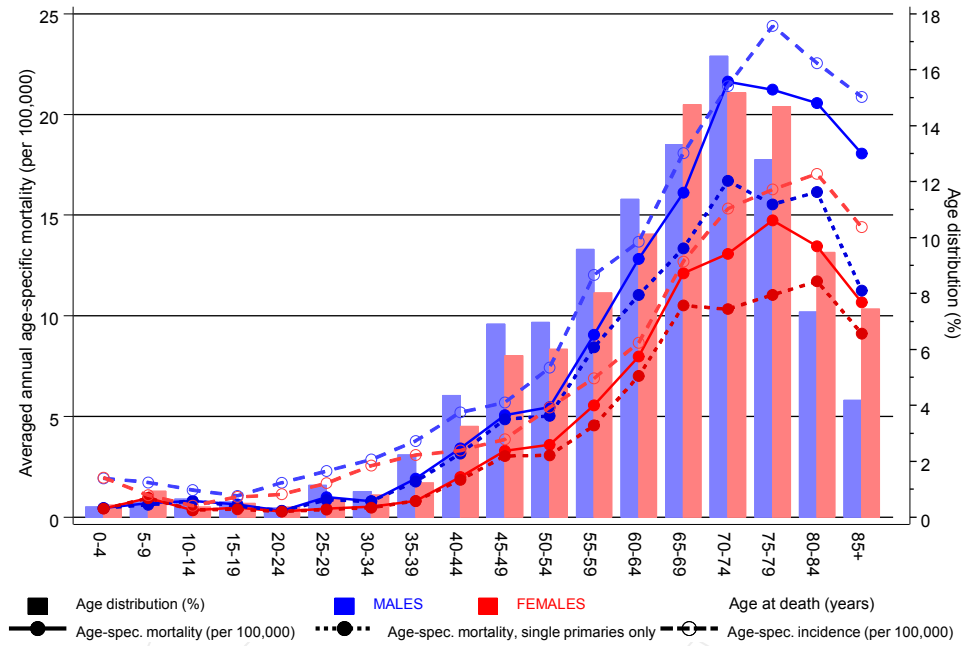
Table 16

Age-specific mortality (cancer-related) and proportion of all cancers  
for period 2007-2019  
(**Single primaries only** \*)

Age at death Years	Males		Males		Females		Females	
	n	n	Age- spec. mortal.	MI-index	Age- spec. mortal.	MI-index	Prop.all cancers %	Prop.all cancers %
0- 4	7	6	0.5	0.25	0.4	0.23	36.8	40.0
5- 9	9	13	0.6	0.36	0.9	0.93	37.5	56.5
10-14	12	5	0.8	0.60	0.4	0.63	44.4	26.3
15-19	9	6	0.6	0.53	0.4	0.43	20.0	27.3
20-24	6	5	0.3	0.19	0.3	0.25	10.0	13.9
25-29	18	8	0.9	0.38	0.4	0.24	23.4	9.5
30-34	17	10	0.8	0.29	0.5	0.19	13.8	7.3
35-39	38	17	1.8	0.49	0.8	0.29	16.9	5.2
40-44	74	42	3.2	0.65	1.9	0.65	14.1	6.0
45-49	122	74	4.9	0.91	3.0	0.86	10.1	5.5
50-54	118	71	5.0	0.72	3.1	0.66	5.4	3.5
55-59	164	91	8.4	0.78	4.6	0.75	4.6	3.1
60-64	180	123	11.0	0.99	7.0	0.92	3.7	3.3
65-69	203	177	13.3	0.90	10.5	0.98	3.0	3.5
70-74	234	166	16.7	1.04	10.3	0.93	2.9	2.7
75-79	172	152	15.5	0.92	11.0	0.84	2.2	2.3
80-84	106	114	16.1	0.91	11.7	0.82	1.7	1.8
85+	48	88	11.3	0.76	9.1	0.74	0.9	1.1
All ages	1537	1168					3.2	2.7
Mortality								
Raw			5.1	0.80	3.8	0.76		
WS			3.0	0.71	2.0	0.67		
ES			4.0	0.76	2.6	0.71		
BRD-S			4.7	0.79	3.1	0.74		
PYLL-70								
per 100,000			59.8		37.8			
ES			56.0		36.3			
AYLL-70			16.2		15.3			

\* See corresponding tables with multiple malignancies.

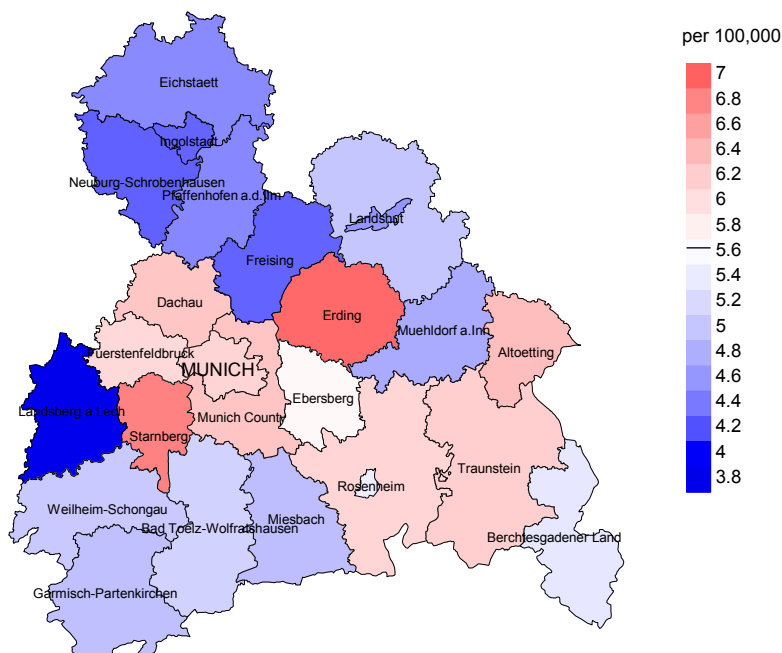
ICD-10 C70-C72: Malignant neoplasm of brain and nerves  
 Age distribution and age-specific mortality 2007 - 2019 (Males: 1839, Females: 1383)



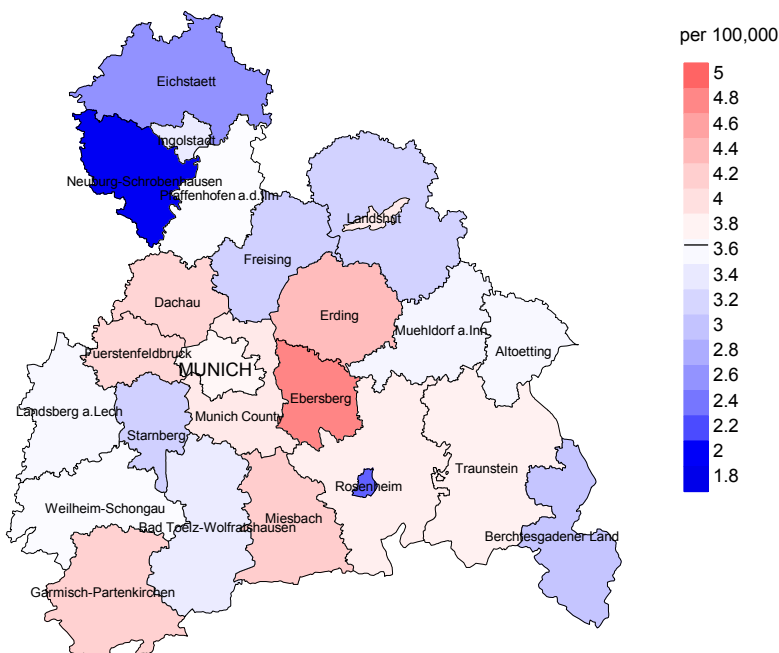
**Figure 17.** Distribution of age at death (bars; males: mean=61.4 yrs, median=64.5 yrs; females: mean=63.7 yrs, median=67.0 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

The difference between age at diagnosis (Table 3) and age at brain/nerves cancer-related death (see Table 10) should be considered.

Average mortality (Germany 1987 standard population) 2007 - 2019: Males



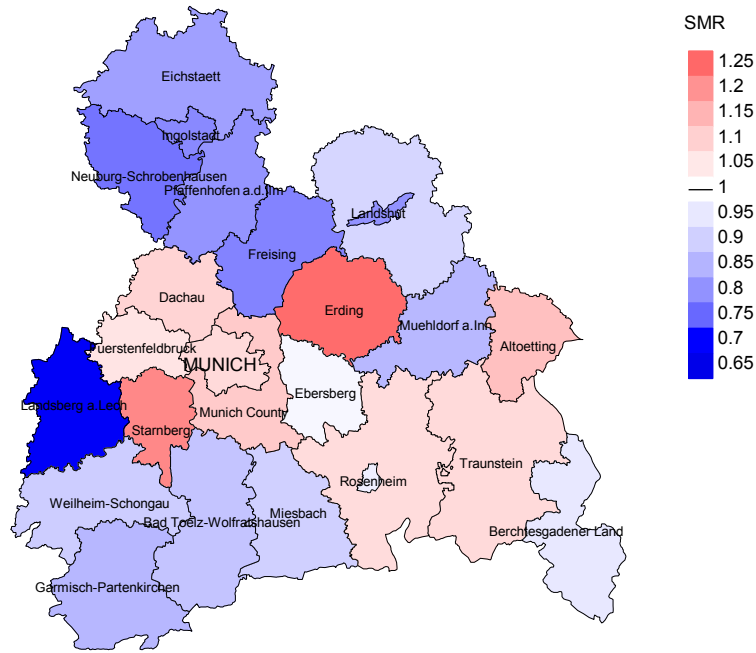
Average mortality (Germany 1987 standard population) 2007 - 2019: Females



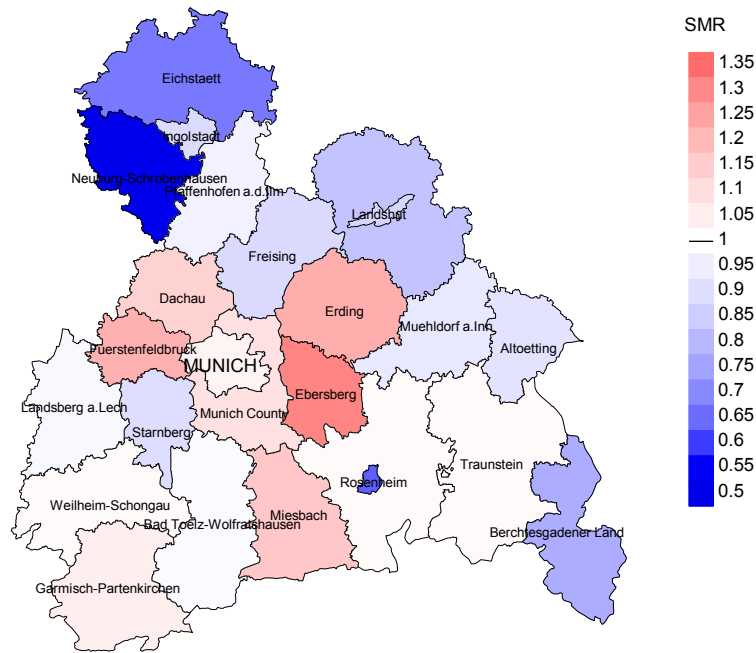
**Figure 18a.** Map of cancer mortality (german standard population) by county averaged for period 2007 to 2019. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 5.6/100,000 WS N=1,839, females 3.7/100,000 WS N=1,383).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,462 female residents (averaged) in the period from 2007 to 2019 a total of 50 women died from brain/nerves cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 4.8/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 3.2 and 6.9/100,000.

Standardized mortality ratio (SMR) 2007 - 2019: Males



Standardized mortality ratio (SMR) 2007 - 2019: Females



**Figure 18b.** Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2019. 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=1,839, females N=1,383).

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 2019 a total of 50 women died from brain/nerves cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.31. Though, the value of this parameter may vary with an underlying probability of 99% between 0.88 and 1.87, 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

**Recommended Citation**

Munich Cancer Registry. ICD-10 C70-C72: Brain/nerves cancer - Incidence and Mortality [Internet]. 2021 [updated 2021 Jan 25; cited 2021 Mar 1]. Available from: <https://www.tumorregister-muenchen.de/en/facts/base/bC7072E-ICD-10-C70-C72-Brain-nerves-cancer-incidence-and-mortality.pdf>

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