

# Munich Cancer Registry



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

### Incidence and Mortality

Year of diagnosis	1998-2016
Patients	5,904
Diseases	5,912
Creation date	08/21/2018
Export date	08/09/2018
Population	4.81 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, August 2018

- <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	194	53	27.3	9.3	2.6	87.1	96.9
1999	184	57	31.0	10.3	2.5	90.2	97.3
2000	202	52	25.7	9.8	2.5	83.2	97.0
2001	238	57	23.9	9.5	2.5	86.1	96.6
2002	341	63	18.5	9.4	2.5	83.9	98.2 #
2003	379	72	19.0	9.3	2.4	81.8	98.2
2004	338	73	21.6	9.3	2.4	82.5	97.6
2005	373	62	16.6	9.7	2.3	81.8	96.8
2006	300	40	13.3	9.8	2.3	83.7	96.0
2007	347	48	13.8	9.9	2.2	75.5	87.3 #
2008	406	55	13.5	9.9	2.1	77.6	86.2
2009	441	52	11.8	10.1	1.7	80.5	88.7
2010	384	52	13.5	10.3	1.9	83.3	91.1
2011	403	45	11.2	10.7	1.6	72.5	85.1
2012	404	42	10.4	10.9	1.6	73.5	87.1
2013	389	40	10.3	11.1	1.8	73.5	86.4
2014	346	30	8.7	11.4	1.5	75.4	89.9
2015	157	36	22.9	11.6	1.7	85.4	99.4
2016	86	32	37.2	11.6	3.5	67.4	89.5 ##
1998-2016	5912	961	16.3	11.6	2.6	79.8	92.2

5,912 cases diagnosed 1998-2016 are related to a total of 5,904 patients. Currently, in 841 (14.2 %) of these 5,904 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 706 / 113 / 22 (12.0 % / 1.9 % / 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 2014, a subgroup of 346 cases has been diagnosed, of which 11.4 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 1.5 % 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 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	99	51.0	23	23.2	9.1	2.3	86.9	97.0
1999	92	50.0	27	29.3	9.9	2.3	89.1	96.7
2000	105	52.0	23	21.9	9.5	2.3	79.0	97.1
2001	117	49.2	26	22.2	8.7	2.3	86.3	96.6
2002	175	51.3	24	13.7	9.0	2.3	82.9	98.3 #
2003	197	52.0	33	16.8	8.8	2.2	83.8	99.0
2004	168	49.7	28	16.7	9.0	2.2	87.5	99.4
2005	199	53.4	28	14.1	9.8	2.0	84.9	97.5
2006	170	56.7	17	10.0	10.1	2.0	84.1	96.5
2007	186	53.6	23	12.4	10.0	2.1	74.2	85.5 #
2008	229	56.4	24	10.5	10.2	1.9	82.5	90.0
2009	254	57.6	23	9.1	10.4	1.5	79.1	89.4
2010	217	56.5	24	11.1	10.5	1.6	81.6	88.5
2011	213	52.9	18	8.5	11.1	1.6	77.9	86.4
2012	216	53.5	19	8.8	11.1	1.5	75.5	85.2
2013	223	57.3	18	8.1	11.6	1.7	76.7	88.8
2014	194	56.1	11	5.7	11.9	1.6	74.7	90.2
2015	83	52.9	15	18.1	12.0	1.7	85.5	100.0
2016	37	43.0	10	27.0	12.1	5.4	59.5	86.5 ##
1998-2016	3174	53.7	414	13.0	12.1	2.3	80.8	92.4

3,174 cases diagnosed 1998-2016 are related to a total of 3,169 patients. Currently, in 455 (14.4 %) of these 3,169 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 378 / 61 / 16 (11.9 % / 1.9 % / 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 2014, a subgroup of 194 cases has been diagnosed, of which 11.9 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 1.6 % 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	49.0	30	31.6	9.5	2.8	87.4	96.8
1999	92	50.0	30	32.6	10.7	2.7	91.3	97.8
2000	97	48.0	29	29.9	10.2	2.7	87.6	96.9
2001	121	50.8	31	25.6	10.4	2.7	86.0	96.7
2002	166	48.7	39	23.5	9.8	2.8	84.9	98.2 #
2003	182	48.0	39	21.4	9.8	2.6	79.7	97.3
2004	170	50.3	45	26.5	9.5	2.6	77.6	95.9
2005	174	46.6	34	19.5	9.7	2.6	78.2	96.0
2006	130	43.3	23	17.7	9.5	2.5	83.1	95.4
2007	161	46.4	25	15.5	9.7	2.4	77.0	89.4 #
2008	177	43.6	31	17.5	9.6	2.3	71.2	81.4
2009	187	42.4	29	15.5	9.8	2.1	82.4	87.7
2010	167	43.5	28	16.8	10.0	2.2	85.6	94.6
2011	190	47.1	27	14.2	10.2	1.7	66.3	83.7
2012	188	46.5	23	12.2	10.6	1.8	71.3	89.4
2013	166	42.7	22	13.3	10.6	1.8	69.3	83.1
2014	152	43.9	19	12.5	10.9	1.5	76.3	89.5
2015	74	47.1	21	28.4	11.0	1.7	85.1	98.6
2016	49	57.0	22	44.9	11.1	2.0	73.5	91.8 ##
1998-2016	2738	46.3	547	20.0	11.1	2.8	78.7	91.9

2,738 cases diagnosed 1998-2016 are related to a total of 2,735 patients. Currently, in 386 (14.1 %) of these 2,735 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 328 / 52 / 6 (12.0 % / 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 2014, a subgroup of 152 cases has been diagnosed, of which 10.9 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 1.5 % 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 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 4.81 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	99	95	8.9	8.1	6.3	5.4	8.1	6.6	9.1	7.6
1999	92	92	8.2	7.8	5.6	4.6	7.6	6.0	8.9	6.9
2000	105	97	9.2	8.1	6.6	4.9	8.4	6.2	10.0	7.1
2001	117	121	10.1	9.9	6.9	5.8	9.1	7.6	10.7	8.8
2002	175	166	9.4	8.5	6.7	4.8	8.3	6.4	9.4	7.6
2003	197	182	10.5	9.2	7.3	5.7	9.3	7.3	10.8	8.3
2004	168	170	8.9	8.6	5.7	5.7	7.7	6.7	9.0	7.5
2005	199	174	10.5	8.7	7.1	5.3	8.9	6.6	10.3	7.5
2006	170	130	8.9	6.5	5.9	3.7	7.5	4.7	8.5	5.5
2007	186	161	8.4	7.0	5.8	4.2	7.2	5.3	8.0	6.3
2008	229	177	10.3	7.6	6.8	4.9	8.7	5.9	10.3	6.6
2009	254	187	11.4	8.0	7.1	4.9	9.3	6.2	11.0	6.9
2010	217	167	9.6	7.1	6.2	4.2	7.9	5.2	9.2	6.0
2011	213	190	9.5	8.1	6.0	4.4	7.8	5.8	9.0	6.9
2012	216	188	9.5	8.0	6.3	4.9	7.8	6.0	8.9	6.8
2013	223	166	9.7	7.0	6.2	4.1	7.8	5.2	8.9	6.0
2014	194	152	8.3	6.3	5.2	3.4	6.7	4.4	7.6	5.1
2015	83	74	3.5	3.0	1.6	1.3	2.4	1.9	3.2	2.4
2016	37	49	1.5	2.0	0.7	0.8	1.0	1.2	1.4	1.5
1998-2016	3174	2738	8.6	7.1	5.6	4.2	7.2	5.3	8.3	6.2

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				Median		
		Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	194	57.4	18.6	1.8	90.6	32.6	46.9	58.8	72.2	79.7
1999	184	60.7	17.9	1.6	93.4	36.5	51.3	63.4	73.8	79.7
2000	202	59.4	18.5	2.9	93.8	34.7	48.5	62.5	72.3	79.7
2001	238	60.6	18.0	1.0	92.0	37.0	51.0	62.2	73.3	80.4
2002	341	59.9	18.4	0.8	91.2	32.9	51.0	63.0	72.9	80.8
2003	379	58.4	18.5	0.6	95.4	31.5	45.7	62.0	72.9	79.7
2004	338	59.8	19.0	0.0	92.8	34.1	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	300	60.5	18.5	3.0	97.0	34.8	48.3	64.2	73.2	81.5
2007	347	58.7	19.6	0.8	93.5	31.1	44.4	62.8	73.3	80.9
2008	406	59.4	20.0	0.1	94.1	29.6	48.0	64.1	73.8	80.8
2009	441	61.5	18.2	0.2	94.2	36.3	52.1	65.0	74.5	82.3
2010	384	61.5	19.6	0.1	91.6	36.2	51.4	67.0	75.1	82.3
2011	403	60.7	18.3	1.7	94.0	37.2	48.4	63.8	75.7	81.8
2012	404	60.2	20.2	0.0	96.0	32.8	48.6	65.0	74.1	82.6
2013	389	61.3	18.4	0.1	93.9	37.3	52.5	65.7	74.2	80.7
2014	346	62.4	17.9	2.6	95.0	38.0	52.8	65.8	75.0	82.7
2015	157	71.0	11.9	26.9	95.8	56.1	64.5	72.7	78.6	85.2
2016	86	71.7	15.6	4.0	94.5	54.0	62.6	76.0	81.6	87.3
1998-2016	5912	60.7	18.8	0.0	97.0	34.9	50.1	64.2	74.3	81.5

Table 3a

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

Year of diagnosis	Cases n	Std.		Median				Median		
		Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	99	54.9	15.7	3.4	83.3	32.6	46.3	56.4	66.2	74.8
1999	92	59.8	16.5	1.6	89.2	41.8	51.6	61.3	71.9	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	168	59.6	16.2	0.1	90.1	37.4	48.6	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	170	58.1	17.3	3.0	90.4	34.5	46.7	62.4	69.7	77.2
2007	186	57.2	18.9	1.5	92.6	32.5	44.5	60.6	69.9	79.2
2008	229	58.5	18.5	1.2	94.1	31.9	47.8	63.3	72.9	78.7
2009	254	60.8	17.9	5.0	90.3	35.3	50.6	64.6	74.2	81.9
2010	217	59.9	19.1	0.1	90.8	34.4	49.0	63.9	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	216	59.3	20.7	0.3	96.0	31.1	47.1	65.0	73.7	80.8
2013	223	60.3	18.3	0.1	93.9	38.6	52.1	64.1	73.7	78.2
2014	194	60.8	18.2	2.6	93.6	35.7	51.6	63.2	73.8	81.7
2015	83	71.2	11.0	26.9	95.1	58.3	64.8	72.1	78.2	81.1
2016	37	71.0	15.7	4.0	93.0	57.4	63.6	76.0	79.8	85.7
1998-2016	3174	59.2	18.3	0.1	96.0	34.4	48.6	62.7	72.6	79.5

Table 3b

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

Year of diagnosis	Cases n	Std. dev.		Min. Max.		10% 25%		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	62.2	18.5	2.9	93.8	35.8	55.5	67.6	74.2	81.3
2001	121	62.3	18.5	2.3	92.0	37.2	51.3	66.5	76.0	81.8
2002	166	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	170	60.0	21.5	0.0	92.8	30.1	51.6	65.1	76.4	82.5
2005	174	61.1	19.3	2.7	91.7	34.5	48.5	65.1	75.4	83.4
2006	130	63.6	19.7	7.3	97.0	35.0	54.1	67.3	77.7	85.9
2007	161	60.4	20.3	0.8	93.5	30.7	44.4	65.8	77.7	82.3
2008	177	60.4	21.8	0.1	92.9	29.0	48.7	65.9	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	167	63.5	20.1	0.6	91.6	39.0	55.4	68.7	76.6	83.5
2011	190	63.1	17.9	11.1	94.0	38.0	50.0	67.0	77.0	82.5
2012	188	61.3	19.7	0.0	90.4	34.9	50.1	65.0	74.5	83.4
2013	166	62.5	18.6	0.7	92.8	37.1	53.2	66.4	76.3	84.3
2014	152	64.5	17.4	3.2	95.0	42.8	53.6	67.6	77.2	83.2
2015	74	70.8	12.9	39.9	95.8	49.7	63.9	73.9	80.7	85.8
2016	49	72.2	15.6	17.2	94.5	50.4	61.2	76.0	82.4	90.9
1998-2016	2738	62.4	19.2	0.0	97.0	35.4	52.2	66.4	76.7	83.4

Table 4

Age distribution by 5-year age group and sex for period 2007-2016  
(incl. DCO)

Age at diagnosis Years	Cases n	Males			Females				
		%	Cum.%	n	%	Cum.%	n	%	Cum.%
0-4	49	1.5	1.5	24	1.3	1.3	25	1.7	1.7
5-9	32	1.0	2.4	21	1.1	2.4	11	0.7	2.4
10-14	21	0.6	3.0	15	0.8	3.2	6	0.4	2.8
15-19	28	0.8	3.9	15	0.8	4.0	13	0.9	3.6
20-24	41	1.2	5.1	25	1.3	5.4	16	1.1	4.7
25-29	62	1.8	6.9	35	1.9	7.3	27	1.8	6.5
30-34	89	2.6	9.6	47	2.5	9.8	42	2.8	9.3
35-39	117	3.5	13.1	68	3.7	13.5	49	3.2	12.5
40-44	164	4.9	17.9	106	5.7	19.2	58	3.8	16.3
45-49	201	6.0	23.9	116	6.3	25.5	85	5.6	22.0
50-54	239	7.1	31.0	137	7.4	32.9	102	6.8	28.7
55-59	286	8.5	39.5	176	9.5	42.4	110	7.3	36.0
60-64	309	9.2	48.7	175	9.4	51.8	134	8.9	44.9
65-69	412	12.3	61.0	231	12.5	64.3	181	12.0	56.8
70-74	461	13.7	74.7	252	13.6	77.9	209	13.8	70.7
75-79	390	11.6	86.3	209	11.3	89.2	181	12.0	82.7
80-84	265	7.9	94.1	125	6.7	96.0	140	9.3	91.9
85+	197	5.9	100.0	75	4.0	100.0	122	8.1	100.0
All ages	3363	100.0		1852	100.0		1511	100.0	

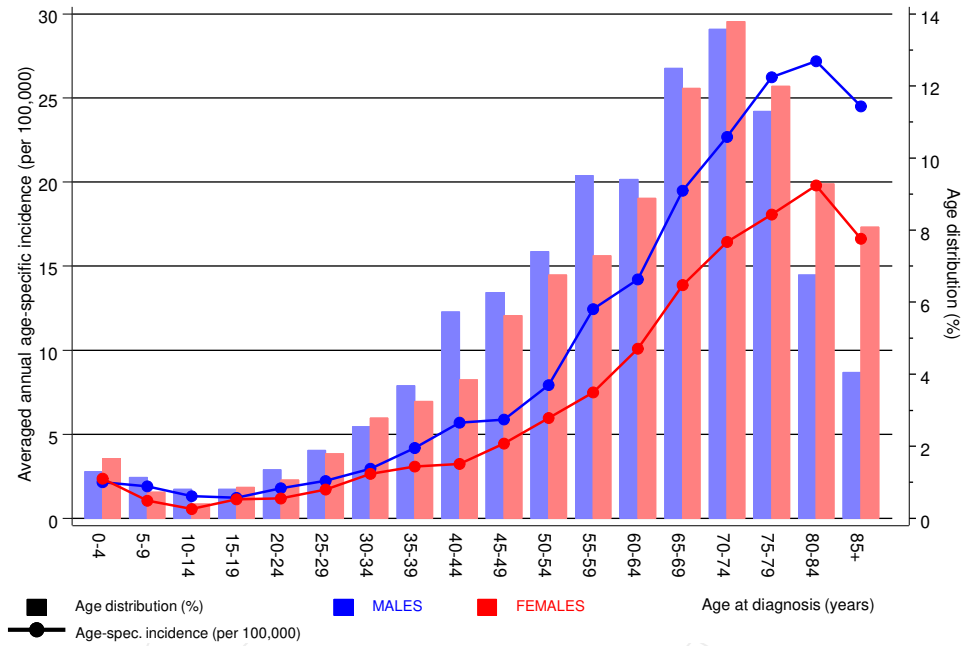
Table 5

Age-specific incidence, DCO rate and proportion of all cancers  
for period 2007-2016

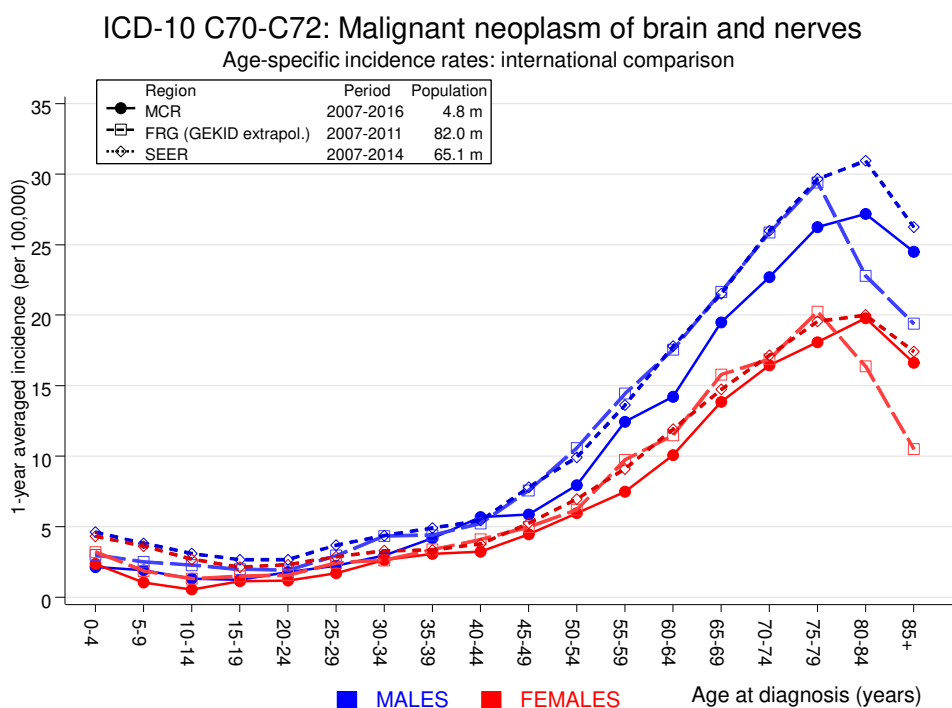
Age at diagnosis Years	Males n	Females n	Males Age- spec. incid.	Females Age- spec. incid.	Males DCO rate n=185 %	Females DCO rate n=247 %	Males	Females
							Prop.all cancers n=113978 %	Prop.all cancers n=112253 %
0- 4	24	25	2.1	2.4			12.2	16.8
5- 9	21	11	1.9	1.1	4.8		20.2	13.1
10-14	15	6	1.3	0.6			13.0	5.9
15-19	15	13	1.2	1.1	6.7		5.9	6.3
20-24	25	16	1.8	1.2	4.0		5.4	4.2
25-29	35	27	2.2	1.7	2.9		5.1	3.2
30-34	47	42	2.9	2.6		7.1	4.9	2.8
35-39	68	49	4.2	3.1	4.4		4.9	2.0
40-44	106	58	5.7	3.2	1.9		4.9	1.3
45-49	116	85	5.9	4.5	1.7	2.4	2.9	1.2
50-54	137	102	7.9	6.0	2.9	8.8	2.2	1.2
55-59	176	110	12.4	7.5	4.0	6.4	1.9	1.2
60-64	174	134	14.2	10.1	5.7	5.2	1.3	1.2
65-69	231	180	19.5	13.9	6.1	6.1	1.2	1.3
70-74	251	208	22.7	16.4	8.4	12.5	1.2	1.4
75-79	209	181	26.2	18.1	18.7	17.7	1.3	1.4
80-84	125	140	27.2	19.8	28.8	41.4	1.1	1.3
85+	75	122	24.5	16.6	57.3	75.4	0.9	1.0
All ages	1850	1509			10.0	16.4	1.6	1.3
Incidence								
Raw			8.1	6.4				
WS			5.1	3.7				
ES			6.6	4.7				
BRD-S			7.6	5.4				

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 - 2016 (Males: 1850, Females: 1509)



**Figure 6.** Age distribution (males: mean=60.2 yrs, median=64.1 yrs; females: mean=63.0 yrs, median=67.0 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 2014, based on the November 2013 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 1998–2016

## MALES

Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C16 Stomach	2	1.6	1.3	0.2	4.5	0.7	
C18 Colon	5	3.8	1.3	0.4	3.1	2.1	
C19–C20 Rectum	4	2.5	1.6	0.4	4.1	2.7	25.0
C25 Pancreas	4	1.5	2.6	0.7	6.8	4.4	
C30–C31 Sinuses	2	0.1	21.0	2.5	76.0 #	3.4	
C33–C34 Lung	5	5.2	1.0	0.3	2.2	-0.4	
C43 Malign. melanoma	7	2.3	3.1	1.2	6.4 #	8.4	28.6
C61 Prostate	12	12.1	1.0	0.5	1.7	-0.2	16.7
C62 Testis	3	0.6	5.3	1.1	15.6 #	4.3	
C64 Kidney	6	1.7	3.6	1.3	7.7 #	7.6	16.7
C67 Bladder	4	1.6	2.5	0.7	6.3	4.2	
C70–C72 CNS cancer	5	0.7	6.9	2.3	16.2 #	7.5	
C76–C79 CUP	2	0.7	2.9	0.3	10.4	2.3	
C82–C85 NHL	3	1.8	1.7	0.3	4.9	2.2	33.3
Others, specified	9	3.9	2.3	1.0	4.3 #	8.9	44.4
Not observed	0	4.6	0.0	0.0	0.8 #	-8.1	
All further malignancies	73	44.7	1.6	1.3	2.1 #	49.9	15.1

Patients 2866  
Median age at next malignancy (years) 66.3  
Person-years 5676  
Mean observation time (years) 2.0  
Median observation time (years) 0.9

# The occurrence of further malignancy listed is statistically significant.

Observed further malignancies with count 1 are pooled in category "Others, specified".

Table 7b

Standardized incidence ratio (SIR, with 95% confidence limits),  
excess absolute risk (EAR) and DCO rate of further malignancies  
for period 1998–2016

## FEMALES

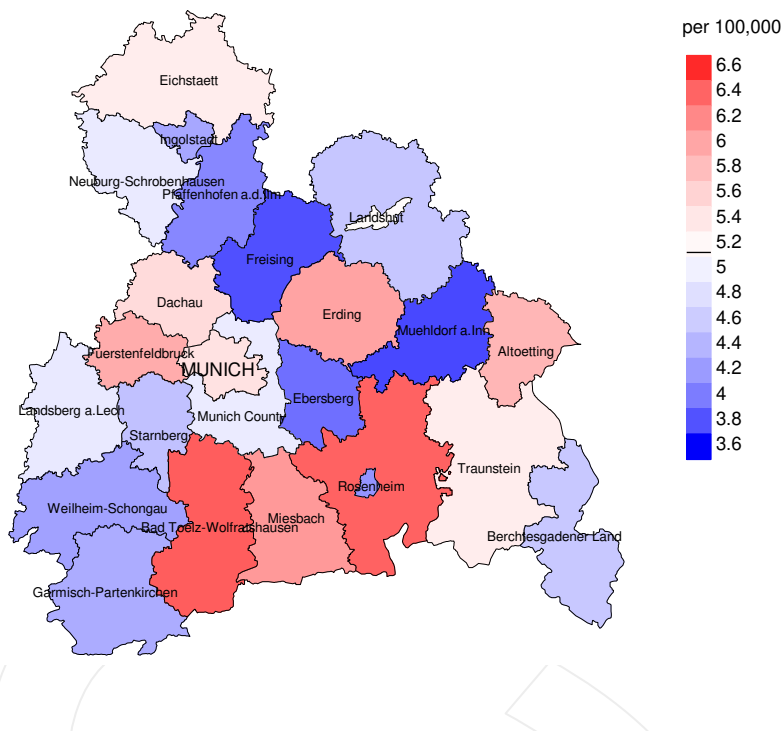
Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C18 Colon	5	2.6	2.0	0.6	4.6	5.0	20.0
C19-C20 Rectum	3	1.2	2.5	0.5	7.3	3.7	33.3
C23-C24 Bile	2	0.4	5.6	0.7	20.2	3.4	50.0
C25 Pancreas	2	1.2	1.7	0.2	6.2	1.7	50.0
C33-C34 Lung	2	2.4	0.8	0.1	3.0	-0.9	
C43 Malign. melanoma	3	1.5	2.0	0.4	5.9	3.1	
C50 Breast	24	11.3	2.1	1.4	3.2 #	26.1	12.5
C54 Corpus uteri	6	1.8	3.3	1.2	7.2 #	8.6	
C56 Ovary	2	1.3	1.5	0.2	5.4	1.4	
C64 Kidney	2	0.7	2.7	0.3	9.9	2.6	
C70-C72 CNS cancer	3	0.5	6.3	1.3	18.3 #	5.2	
C73 Thyroid	2	0.9	2.2	0.3	8.0	2.3	
C82-C85 NHL	5	1.2	4.3	1.4	10.1 #	7.9	20.0
C90 Mult. myeloma	2	0.3	5.8	0.7	20.9	3.4	
C91-C96 Leukaemia	3	0.5	6.3	1.3	18.4 #	5.2	
Others, specified	3	0.8	3.9	0.8	11.3	4.6	
Not observed	0	4.4	0.0	0.0	0.8 #	-9.1	
All further malignancies	69	32.9	2.1	1.6	2.7 #	74.1	11.6

Patients	2341
Median age at next malignancy (years)	66.7
Person-years	4864
Mean observation time (years)	2.1
Median observation time (years)	0.9

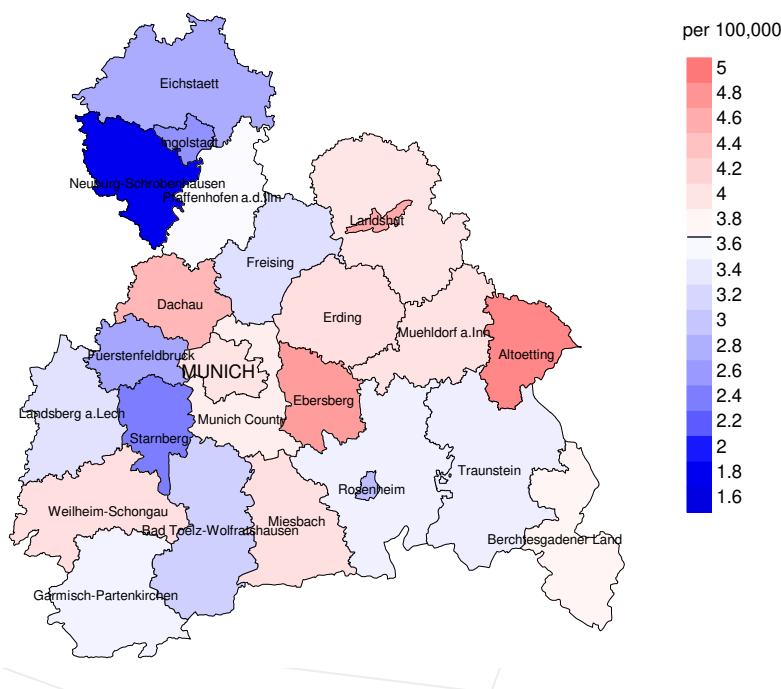
# The occurrence of further malignancy listed is statistically significant.

Observed further malignancies with count 1 are pooled in category "Others, specified".

Average incidence (world standard population) 2007 - 2016: Males



Average incidence (world standard population) 2007 - 2016: Females

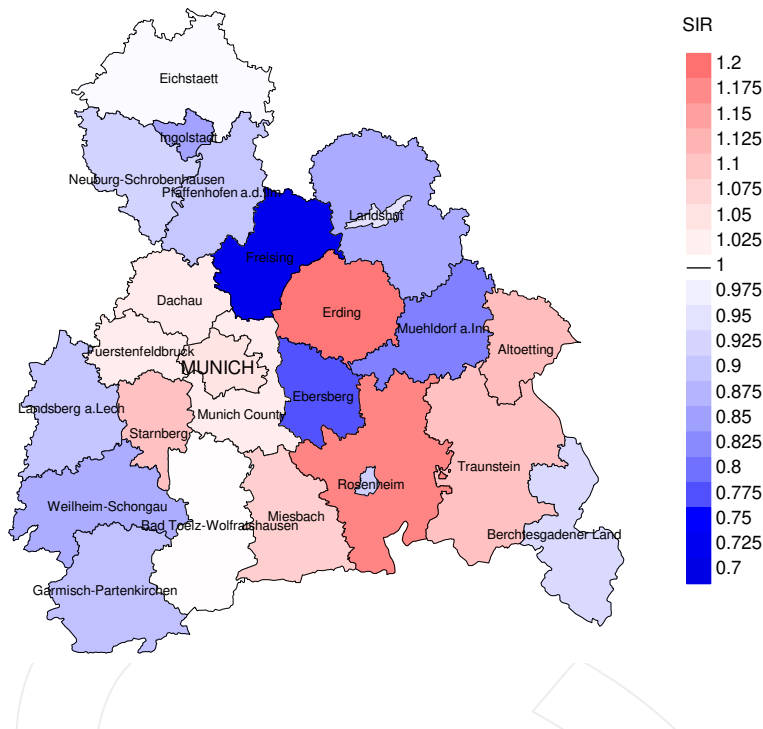


**Figure 8a.** Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 5.1/100,000 WS N=1,850, females 3.7/100,000 WS N=1,509).

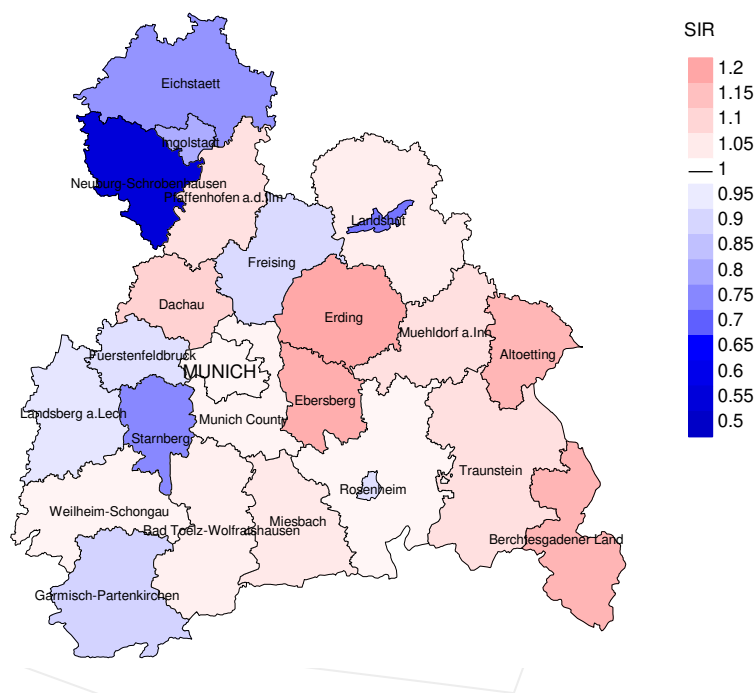
The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 49 women were identified with newly diagnosed brain/nerves cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 4.7/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 2.9 and 7.4/100,000.



Standardized incidence ratio (SIR) 2007 - 2016: Males



Standardized incidence ratio (SIR) 2007 - 2016: Females



**Figure 8b.** Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2016. 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=1,850, females N=1,509).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 49 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 1.18. Though, the value of this parameter may vary with an underlying probability of 99% between 0.79 and 1.69, 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 4.81 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	194	96.9	27.3	169	87.1	96.4
1999	184	97.3	31.0	166	90.2	95.8
2000	202	97.0	25.7	168	83.2	94.0
2001	238	96.6	23.9	205	86.1	93.2
2002	341	98.2	18.5	286	83.9	98.6
2003	379	98.2	19.0	310	81.8	95.5
2004	338	97.6	21.6	279	82.5	97.8
2005	373	96.8	16.6	305	81.8	97.4
2006	300	96.0	13.3	251	83.7	97.2
2007	347	87.3	13.8	262	75.5	97.3
2008	406	86.2	13.5	315	77.6	98.1
2009	441	88.7	11.8	355	80.5	97.2
2010	384	91.1	13.5	320	83.3	98.4
2011	403	85.1	11.2	292	72.5	98.3
2012	404	87.1	10.4	297	73.5	97.0
2013	389	86.4	10.3	286	73.5	96.9
2014	346	89.9	8.7	261	75.4	96.6
2015	157	99.4	22.9	134	85.4	100.0
2016	86	89.5	37.2	58	67.4	96.6
1998-2016	5912	92.2	16.3	4719	79.8	97.1

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 4.81 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	194	136	95.6	77	39.7
1999	184	172	97.1	91	49.5
2000	202	156	94.9	78	38.6
2001	238	192	92.2	106	44.5
2002	341	233	97.0	124	36.4
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	300	267	96.3	108	36.0
2007	347	257	97.7	121	34.9
2008	406	266	97.0	127	31.3
2009	441	310	98.4	142	32.2
2010	384	359	98.3	147	38.3
2011	403	320	98.8	123	30.5
2012	404	301	97.0	127	31.4
2013	389	304	96.7	120	30.8
2014	346	324	98.1	116	33.5
2015	157	298	98.0	111	70.7
2016	86	192	99.0	56	65.1
1998-2016	5912	4869	97.2	2161	36.6

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 4.81 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	233	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	267	91.0	9.0	96.9
2007	257	93.4	6.6	98.0
2008	266	94.4	5.6	98.4
2009	310	91.6	8.4	96.7
2010	359	93.0	7.0	97.5
2011	320	93.1	6.9	96.8
2012	301	92.0	8.0	98.3
2013	304	92.1	7.9	98.0
2014	324	95.4	4.6	97.8
2015	298	93.3	6.7	97.6
2016	192	94.8	5.2	97.9
1998-2016	4869	90.9	9.1	98.0

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	131	63.0	63.5	57.9	63.3
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	137	66.3	66.3	65.0	66.4
2008	146	64.8	64.3	72.1	64.6
2009	185	68.7	66.7	71.0	66.4
2010	224	68.5	68.4	68.6	68.5
2011	170	67.4	67.3	72.6	67.1
2012	163	67.4	67.4	68.7	67.4
2013	172	67.1	67.1	67.6	67.2
2014	188	66.6	66.3	72.8	67.1
2015	177	67.4	67.4	61.6	68.5
2016	100	64.0	62.6	75.7	63.9
1998-2016	2671	66.0	65.9	67.9	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	131	68.0	67.9	69.1	68.5
2007	120	69.9	68.6	80.7	69.6
2008	120	67.9	67.9	71.8	68.2
2009	125	69.2	68.9	77.4	69.2
2010	135	69.2	68.6	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	67.0	73.4	66.9
2014	136	70.1	70.0	77.5	70.0
2015	121	70.8	70.6	75.8	71.0
2016	92	68.9	68.8	69.7	68.9
1998-2016	2198	69.1	68.5	74.9	69.2

By 2010, life expectancy at birth was 77.5 years for boys and 82.6 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	0.46	3.0	0.48	3.8	0.47	4.3	0.47
1999	73	6.5	0.79	4.3	0.76	5.9	0.78	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	121	6.5	0.69	4.1	0.61	5.6	0.67	6.6	0.70
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	0.76	6.0	0.78	7.3	0.81
2005	133	7.0	0.67	4.3	0.61	5.8	0.66	6.9	0.68
2006	127	6.6	0.75	4.4	0.75	5.6	0.75	6.4	0.75
2007	131	5.9	0.70	3.4	0.58	4.7	0.65	5.7	0.71
2008	137	6.2	0.60	3.8	0.55	5.0	0.58	5.9	0.57
2009	164	7.3	0.65	4.3	0.60	5.8	0.62	7.1	0.65
2010	213	9.5	0.98	5.4	0.87	7.4	0.93	8.9	0.97
2011	160	7.2	0.75	4.0	0.66	5.6	0.71	6.7	0.74
2012	154	6.8	0.72	3.9	0.63	5.2	0.68	6.3	0.71
2013	158	6.9	0.71	4.0	0.64	5.2	0.67	6.3	0.71
2014	179	7.7	0.92	4.4	0.86	6.0	0.90	6.9	0.91
2015	169	7.1	2.04	4.0	2.43	5.4	2.22	6.4	2.04
2016	92	3.8	2.49	2.1	2.92	3.0	2.84	3.5	2.50
1998-2016	2442	6.6	0.77	3.9	0.70	5.4	0.74	6.4	0.77

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	0.61	3.5	0.60	4.5	0.60	5.4	0.61
2002	92	4.7	0.55	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	0.65	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	116	5.8	0.89	3.1	0.83	4.1	0.87	4.9	0.88
2007	109	4.7	0.68	2.3	0.54	3.3	0.61	4.0	0.64
2008	114	4.9	0.64	2.9	0.58	3.6	0.62	4.2	0.63
2009	120	5.2	0.64	2.6	0.53	3.5	0.56	4.1	0.59
2010	121	5.2	0.72	2.7	0.64	3.6	0.70	4.4	0.73
2011	138	5.9	0.73	3.1	0.69	4.1	0.70	4.9	0.70
2012	123	5.2	0.66	2.8	0.59	3.7	0.62	4.4	0.65
2013	122	5.1	0.74	2.8	0.67	3.7	0.71	4.2	0.71
2014	130	5.4	0.86	2.7	0.81	3.6	0.82	4.4	0.85
2015	109	4.5	1.47	2.0	1.53	2.9	1.55	3.6	1.50
2016	90	3.7	1.84	1.9	2.34	2.5	2.18	3.1	2.07
1998-2016	1985	5.2	0.73	2.8	0.66	3.7	0.69	4.4	0.71

Table 12

Age distribution of age at death (cancer-related) for period 2007-2016  
(incl. multiple malignancies)

Age at death Years	Cases			Males			Females		
	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
0-4	11	0.4	0.4	5	0.3	0.3	6	0.5	0.5
5-9	20	0.7	1.1	10	0.6	1.0	10	0.9	1.4
10-14	15	0.5	1.7	10	0.6	1.6	5	0.4	1.8
15-19	15	0.5	2.2	8	0.5	2.1	7	0.6	2.4
20-24	11	0.4	2.6	6	0.4	2.5	5	0.4	2.8
25-29	23	0.8	3.5	17	1.1	3.6	6	0.5	3.3
30-34	23	0.8	4.3	14	0.9	4.5	9	0.8	4.1
35-39	50	1.8	6.1	35	2.2	6.7	15	1.3	5.4
40-44	105	3.8	10.0	65	4.2	10.9	40	3.4	8.8
45-49	182	6.7	16.6	111	7.1	18.0	71	6.0	14.8
50-54	177	6.5	23.1	108	6.9	25.0	69	5.9	20.7
55-59	233	8.5	31.7	146	9.4	34.4	87	7.4	28.1
60-64	288	10.5	42.2	167	10.7	45.1	121	10.3	38.4
65-69	393	14.4	56.6	218	14.0	59.1	175	14.9	53.2
70-74	452	16.5	73.1	269	17.3	76.4	183	15.6	68.8
75-79	359	13.1	86.2	190	12.2	88.6	169	14.4	83.2
80-84	221	8.1	94.3	112	7.2	95.8	109	9.3	92.4
85+	155	5.7	100.0	66	4.2	100.0	89	7.6	100.0
All ages	2733	100.0		1557	100.0		1176	100.0	



Table 13

Age-specific mortality (cancer-related) and proportion of all cancers  
for period 2007-2016  
(incl. multiple malignancies)

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	5	6	0.4	0.21	0.6	0.24	33.3	40.0
5- 9	10	10	0.9	0.48	1.0	0.91	41.7	55.6
10-14	10	5	0.9	0.67	0.5	0.83	43.5	20.8
15-19	8	7	0.7	0.53	0.6	0.54	18.2	31.8
20-24	6	5	0.4	0.24	0.4	0.31	10.5	15.2
25-29	17	6	1.1	0.49	0.4	0.22	23.0	8.2
30-34	14	9	0.9	0.30	0.6	0.21	13.5	7.5
35-39	35	15	2.1	0.51	0.9	0.31	17.4	5.3
40-44	65	40	3.5	0.61	2.2	0.69	13.2	6.0
45-49	111	71	5.6	0.96	3.7	0.84	9.7	5.4
50-54	108	69	6.3	0.79	4.0	0.68	5.3	3.5
55-59	146	87	10.3	0.83	5.9	0.79	4.3	3.1
60-64	167	121	13.6	0.96	9.1	0.90	3.4	3.2
65-69	218	175	18.4	0.94	13.5	0.97	3.0	3.3
70-74	269	183	24.3	1.07	14.5	0.88	2.9	2.7
75-79	190	169	23.8	0.91	16.9	0.93	2.1	2.4
80-84	112	109	24.4	0.90	15.4	0.78	1.5	1.6
85+	66	89	21.6	0.88	12.1	0.73	1.0	1.0
All ages	1557	1176					3.0	2.5
Mortality								
Raw			6.8	0.84	5.0	0.78		
WS			3.9	0.76	2.6	0.70		
ES			5.3	0.81	3.4	0.74		
BRD-S			6.3	0.83	4.1	0.76		
PYLL-70								
per 100,000			71.5		46.8			
ES			66.7		44.7			
AYLL-70			15.7		14.9			

Table 14a

Further malignancies in deaths in period 1998–2016  
MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C16 Stomach	8	2.1	6	75.0			2	25.0
C18 Colon	31	8.0	25	80.6	4	12.9	2	6.5
C19–C20 Rectum	21	5.4	19	90.5	1	4.8	1	4.8
C25 Pancreas	8	2.1	1	12.5	2	25.0	5	62.5
C33–C34 Lung	18	4.6	7	38.9	4	22.2	7	38.9
C40–C41 Bone	4	1.0	1	25.0	1	25.0	2	50.0
C43 Malign. melanoma	27	7.0	21	77.8			6	22.2
C44 Skin others	18	4.6	8	44.4	5	27.8	5	27.8
C46,C49 Soft tissue	4	1.0	2	50.0			2	50.0
C61 Prostate	123	31.7	109	88.6	8	6.5	6	4.9
C62 Testis	10	2.6	7	70.0	2	20.0	1	10.0
C64 Kidney	19	4.9	13	68.4	2	10.5	4	21.1
C67 Bladder	16	4.1	11	68.8	2	12.5	3	18.8
C70–C72 CNS cancer	7	1.8			1	14.3	6	85.7
C73 Thyroid	6	1.5	5	83.3			1	16.7
C76–C79 CUP	7	1.8	3	42.9			4	57.1
C82–C85 NHL	19	4.9	16	84.2	2	10.5	1	5.3
C90 Mult. myeloma	5	1.3	3	60.0	1	20.0	1	20.0
C91–C96 Leukaemia	4	1.0	2	50.0	1	25.0	1	25.0
Others, specified	33	8.5	20	60.6	2	6.1	11	33.3
All further malignancies	388	100.0	279	71.9	38	9.8	71	18.3

Further malignancies with number of cases 1 to 3 are pooled in category "Others, specified".

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 1998-2016  
FEMALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C18 Colon	15	5.5	10	66.7	1	6.7	4	26.7
C19-C20 Rectum	8	2.9	4	50.0	2	25.0	2	25.0
C25 Pancreas	3	1.1	1	33.3			2	66.7
C33-C34 Lung	7	2.6	5	71.4			2	28.6
C43 Malign. melanoma	18	6.6	14	77.8			4	22.2
C44 Skin others	9	3.3	4	44.4	1	11.1	4	44.4
C46,C49 Soft tissue	4	1.5	2	50.0	1	25.0	1	25.0
C50 Breast	99	36.3	77	77.8	9	9.1	13	13.1
C53 Cervix uteri	8	2.9	8	100.0				
C54 Corpus uteri	19	7.0	14	73.7			5	26.3
C56 Ovary	11	4.0	8	72.7	2	18.2	1	9.1
C64 Kidney	10	3.7	8	80.0	2	20.0		
C67 Bladder	4	1.5	1	25.0			3	75.0
C69 Eye melanoma	3	1.1	3	100.0				
C70-C72 CNS cancer	5	1.8			1	20.0	4	80.0
C73 Thyroid	9	3.3	9	100.0				
C82-C85 NHL	12	4.4	5	41.7	2	16.7	5	41.7
C90 Mult. myeloma	3	1.1	1	33.3			2	66.7
C91-C96 Leukaemia	8	2.9	4	50.0			4	50.0
Others, specified	18	6.6	12	66.7	1	5.6	5	27.8
All further malignancies	273	100.0	190	69.6	22	8.1	61	22.3

Further malignancies with number of cases 1 to 2 are pooled in category "Others, specified".

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 2007-2016  
(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	4	6	0.4	0.17	0.6	0.24	28.6	40.0
5- 9	9	10	0.8	0.43	1.0	0.91	39.1	55.6
10-14	10	5	0.9	0.67	0.5	0.83	43.5	23.8
15-19	7	7	0.6	0.47	0.6	0.58	16.7	35.0
20-24	6	5	0.4	0.24	0.4	0.31	11.8	16.1
25-29	16	6	1.0	0.47	0.4	0.24	23.9	9.0
30-34	14	8	0.9	0.30	0.5	0.19	13.7	7.5
35-39	35	15	2.1	0.51	0.9	0.31	18.5	5.8
40-44	61	37	3.3	0.62	2.1	0.74	13.3	6.2
45-49	106	68	5.4	0.95	3.6	0.86	10.1	6.0
50-54	102	64	5.9	0.78	3.7	0.70	5.6	3.8
55-59	139	74	9.8	0.85	5.0	0.76	4.7	3.1
60-64	149	111	12.2	1.02	8.3	0.93	3.6	3.6
65-69	189	151	15.9	0.97	11.6	0.99	3.2	3.6
70-74	222	151	20.1	1.09	11.9	0.96	3.1	2.8
75-79	145	136	18.2	0.99	13.6	0.92	2.2	2.5
80-84	87	96	18.9	0.91	13.6	0.80	1.6	1.8
85+	41	80	13.4	0.80	10.9	0.74	0.9	1.1
All ages	1342	1030					3.3	2.8
Mortality								
Raw			5.9	0.84	4.4	0.79		
WS			3.5	0.75	2.3	0.70		
ES			4.6	0.80	3.1	0.74		
BRD-S			5.5	0.83	3.6	0.76		
PYLL-70								
per 100,000			67.3		43.9			
ES			62.7		42.4			
AYLL-70			16.0		15.5			

\* See corresponding tables with multiple malignancies.

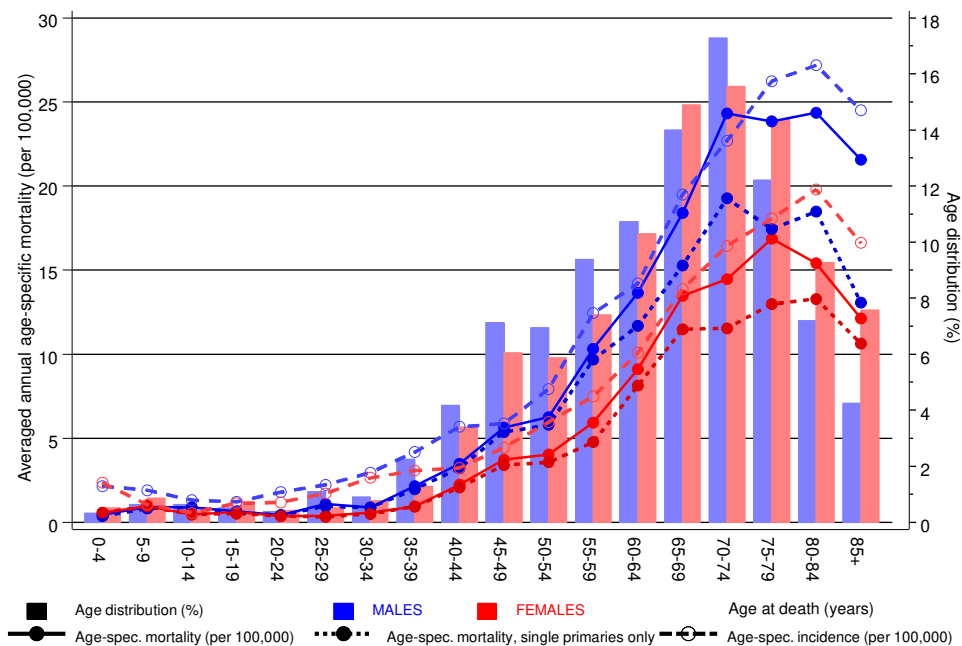
Table 16

Age-specific mortality (cancer-related) and proportion of all cancers  
for period 2007-2016  
(**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	4	6	0.4	0.17	0.6	0.25	28.6	40.0
5- 9	9	10	0.8	0.43	1.0	0.91	39.1	55.6
10-14	10	5	0.9	0.67	0.5	0.83	43.5	23.8
15-19	7	6	0.6	0.47	0.5	0.50	16.7	31.6
20-24	6	5	0.4	0.24	0.4	0.31	11.8	16.1
25-29	15	5	1.0	0.44	0.3	0.20	22.4	7.7
30-34	14	8	0.9	0.32	0.5	0.20	13.7	7.7
35-39	32	15	2.0	0.48	0.9	0.34	17.0	5.9
40-44	60	37	3.2	0.61	2.1	0.76	13.2	6.3
45-49	106	65	5.4	0.96	3.4	0.84	10.2	5.8
50-54	100	61	5.8	0.77	3.6	0.71	5.6	3.7
55-59	137	70	9.7	0.87	4.8	0.72	4.7	3.0
60-64	143	108	11.7	1.04	8.1	0.92	3.5	3.6
65-69	181	149	15.3	0.94	11.5	0.99	3.2	3.6
70-74	213	146	19.3	1.08	11.5	0.96	3.1	2.8
75-79	139	130	17.4	0.95	13.0	0.88	2.2	2.5
80-84	85	94	18.5	0.89	13.3	0.80	1.6	1.8
85+	40	78	13.1	0.78	10.6	0.72	0.9	1.1
All ages	1301	998					3.3	2.8
Mortality								
Raw			5.7	0.83	4.2	0.78		
WS			3.4	0.74	2.2	0.69		
ES			4.5	0.79	3.0	0.74		
BRD-S			5.3	0.82	3.5	0.76		
PYLL-70								
per 100,000			65.8		42.4			
ES			61.4		41.0			
AYLL-70			16.1		15.4			

\* See corresponding tables with multiple malignancies.

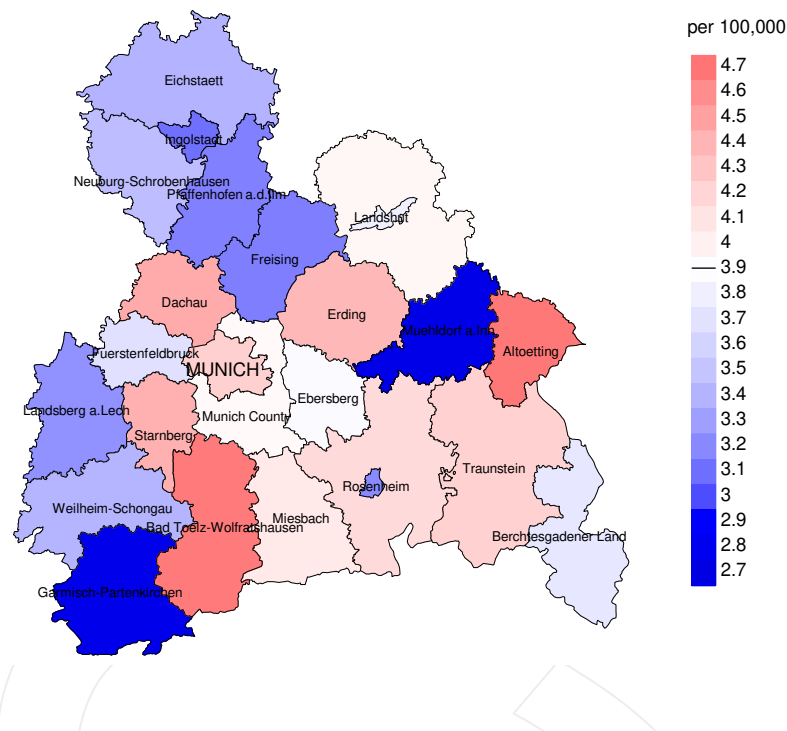
ICD-10 C70-C72: Malignant neoplasm of brain and nerves  
 Age distribution and age-specific mortality 2007 - 2016 (Males: 1557, Females: 1176)



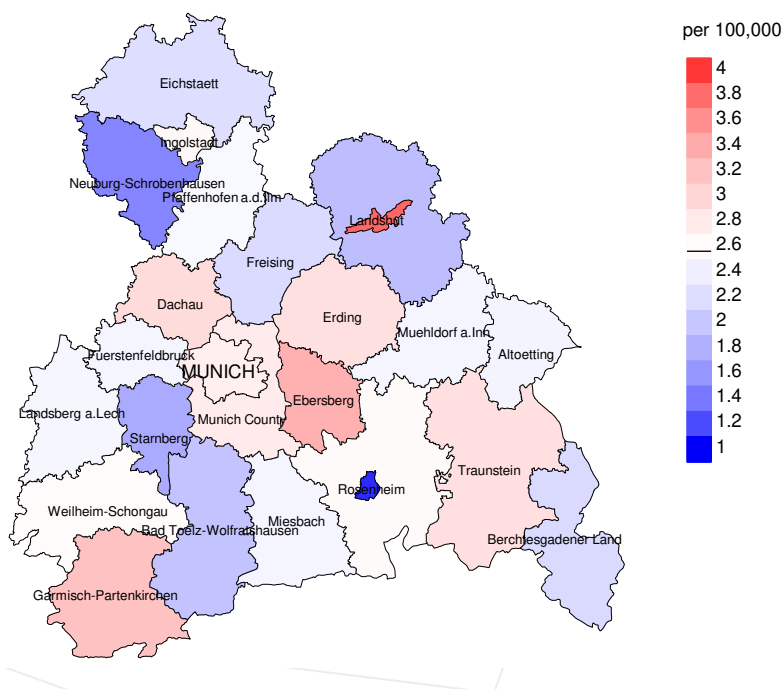
**Figure 17.** Distribution of age at death (bars; males: mean=61.5 yrs, median=65.0 yrs; females: mean=63.7 yrs, median=67.1 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed 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 (world standard population) 2007 - 2016: Males



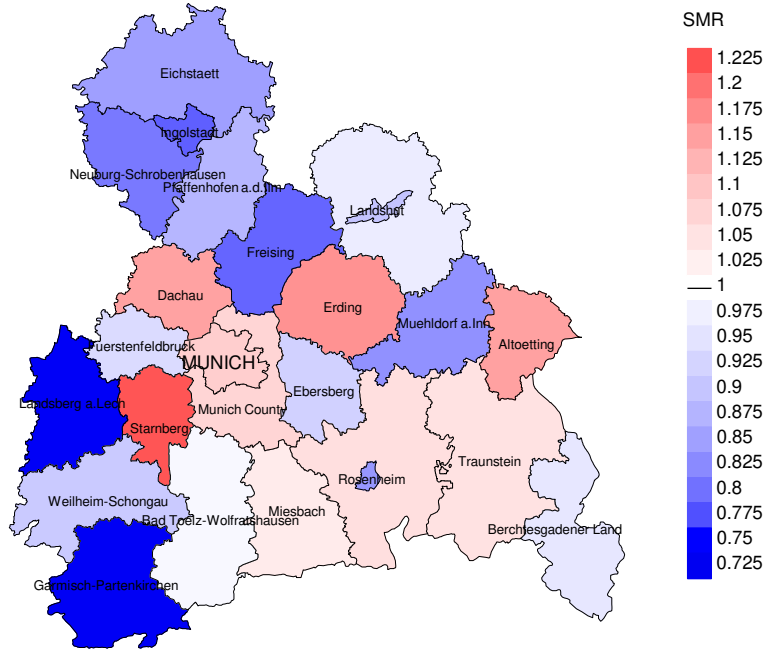
Average mortality (world standard population) 2007 - 2016: Females



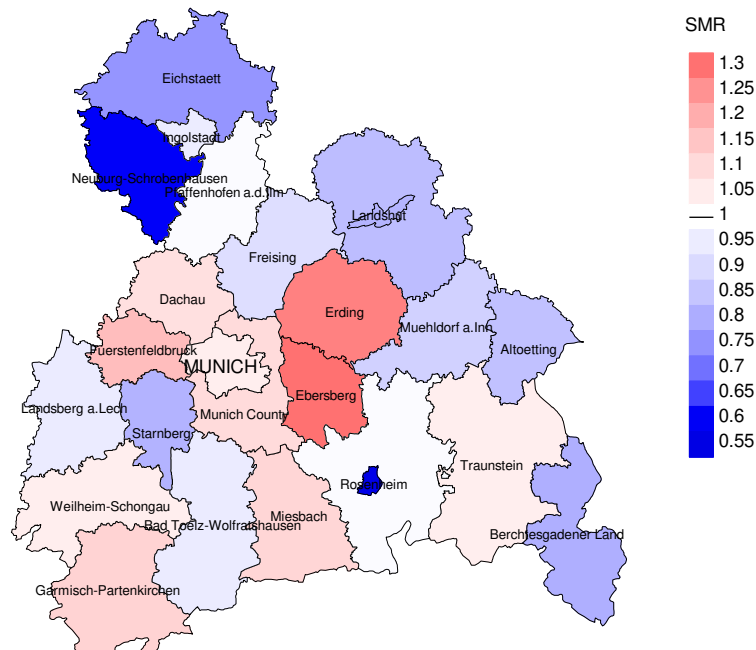
**Figure 18a.** Map of cancer mortality (world standard population) by county averaged for period 2007 to 2016. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 3.9/100,000 WS N=1,557, females 2.6/100,000 WS N=1,176).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 42 women died from brain/nerves cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 3.3/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 2.0 and 5.4/100,000.

Standardized mortality ratio (SMR) 2007 - 2016: Males



Standardized mortality ratio (SMR) 2007 - 2016: Females



**Figure 18b.** Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2016. 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=1,557, females N=1,176).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 42 women died from brain/nerves cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.30. Though, the value of this parameter may vary with an underlying probability of 99% between 0.84 and 1.91, 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 index from mortality and incidence (Mortality-Incidence ratio, **MI-index**) is a statistic 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 MI- index. 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 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 between mortality and incidence
FRG	Federal Republic of Germany

**Recommended Citation**

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