

Munich Cancer Registry



- ▶ Survival
- ▶ Selection Matrix
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- ▶ *Deutsch*

ICD-10 C71: Brain cancer

Incidence and Mortality

Year of diagnosis	1998-2016
Patients	5,665
Diseases	5,671
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/bC71__E-ICD-10-C71-Brain-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[#], with a total of 4.69 million inhabitants, account for the frequency of cancer diseases^{##} and the achieved long term results. Additionally, the long term survival evaluated by the Munich Cancer Registry (MCR) is compared with the results of the population-based registry in the USA (SEER), which is useful for checking the consistency of the data on an international level.

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

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

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

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

Munich Cancer Registry, August 2018

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

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

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

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

Code	Description
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

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	186	48	25.8	9.1	2.4	88.2	96.8
1999	181	57	31.5	10.4	2.3	90.6	97.2
2000	198	52	26.3	9.9	2.3	84.3	97.5
2001	233	57	24.5	9.5	2.3	86.7	96.6
2002	332	63	19.0	9.2	2.3	85.2	98.5 #
2003	361	70	19.4	9.2	2.2	82.8	98.3
2004	330	73	22.1	9.2	2.2	83.6	97.9
2005	363	62	17.1	9.7	2.1	82.9	96.7
2006	288	40	13.9	9.7	2.1	85.8	97.2
2007	328	48	14.6	9.9	2.1	78.7	89.6 #
2008	387	54	14.0	9.9	1.9	79.6	87.9
2009	421	52	12.4	10.1	1.6	83.1	90.7
2010	371	52	14.0	10.3	1.7	84.6	91.9
2011	378	45	11.9	10.6	1.4	74.9	86.5
2012	377	41	10.9	10.7	1.5	75.6	88.6
2013	367	40	10.9	11.0	1.5	76.6	87.5
2014	333	29	8.7	11.2	1.2	77.5	91.6
2015	152	36	23.7	11.3	0.9	86.8	100.0
2016	85	32	37.6	11.4	2.4	68.2	90.6 ##
1998-2016	5671	951	16.8	11.4	2.4	81.6	93.2

5,671 cases diagnosed 1998-2016 are related to a total of 5,665 patients. Currently, in 789 (13.9 %) of these 5,665 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 666 / 102 / 21 (11.8 % / 1.8 % / 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 333 cases has been diagnosed, of which 11.2 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 1.2 % 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	97	52.2	23	23.7	9.3	2.2	88.7	96.9
1999	91	50.3	27	29.7	10.1	2.2	89.0	96.7
2000	103	52.0	23	22.3	9.6	2.2	80.6	97.1
2001	114	48.9	26	22.8	8.6	2.2	86.0	96.5
2002	169	50.9	24	14.2	8.7	2.2	84.6	98.2 #
2003	188	52.1	31	16.5	8.5	2.1	84.6	98.9
2004	163	49.4	28	17.2	8.9	2.1	89.0	99.4
2005	193	53.2	28	14.5	9.6	1.9	86.0	97.4
2006	165	57.3	17	10.3	9.8	2.0	86.7	97.6
2007	174	53.0	23	13.2	9.8	2.0	77.6	87.9 #
2008	219	56.6	23	10.5	10.1	1.8	84.0	90.4
2009	245	58.2	23	9.4	10.3	1.4	80.8	90.6
2010	206	55.5	24	11.7	10.4	1.5	83.0	89.3
2011	201	53.2	18	9.0	11.0	1.5	79.6	87.6
2012	200	53.1	19	9.5	11.0	1.5	78.0	87.0
2013	211	57.5	18	8.5	11.4	1.8	79.1	89.6
2014	189	56.8	11	5.8	11.6	1.6	76.2	92.1
2015	81	53.3	15	18.5	11.8	1.7	87.7	100.0
2016	37	43.5	10	27.0	11.9	5.4	59.5	86.5 ##
1998-2016	3046	53.7	411	13.5	11.9	2.2	82.5	93.2

3,046 cases diagnosed 1998-2016 are related to a total of 3,043 patients. Currently, in 428 (14.1 %) of these 3,043 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 356 / 57 / 15 (11.7 % / 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 189 cases has been diagnosed, of which 11.6 % 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	89	47.8	25	28.1	9.0	2.5	87.6	96.6
1999	90	49.7	30	33.3	10.6	2.4	92.2	97.8
2000	95	48.0	29	30.5	10.2	2.4	88.4	97.9
2001	119	51.1	31	26.1	10.4	2.4	87.4	96.6
2002	163	49.1	39	23.9	9.7	2.5	85.9	98.8 #
2003	173	47.9	39	22.5	9.9	2.3	80.9	97.7
2004	167	50.6	45	26.9	9.6	2.4	78.4	96.4
2005	170	46.8	34	20.0	9.8	2.3	79.4	95.9
2006	123	42.7	23	18.7	9.7	2.2	84.6	96.7
2007	154	47.0	25	16.2	9.9	2.2	79.9	91.6 #
2008	168	43.4	31	18.5	9.8	2.1	73.8	84.5
2009	176	41.8	29	16.5	9.9	1.8	86.4	90.9
2010	165	44.5	28	17.0	10.1	1.8	86.7	95.2
2011	177	46.8	27	15.3	10.2	1.3	69.5	85.3
2012	177	46.9	22	12.4	10.4	1.4	72.9	90.4
2013	156	42.5	22	14.1	10.5	1.2	73.1	84.6
2014	144	43.2	18	12.5	10.7	0.8	79.2	91.0
2015	71	46.7	21	29.6	10.8	0.0	85.9	100.0
2016	48	56.5	22	45.8	10.9	0.0	75.0	93.8 ##
1998-2016	2625	46.3	540	20.6	10.9	2.5	80.7	93.1

2,625 cases diagnosed 1998-2016 are related to a total of 2,622 patients. Currently, in 361 (13.8 %) of these 2,622 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 310 / 45 / 6 (11.8 % / 1.7 % / 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 144 cases has been diagnosed, of which 10.7 % 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 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	97	89	8.8	7.6	6.0	5.2	7.8	6.3	8.9	7.1
1999	91	90	8.1	7.6	5.6	4.5	7.5	5.8	8.8	6.7
2000	103	95	9.0	7.9	6.5	4.8	8.3	6.1	9.9	7.0
2001	114	119	9.8	9.8	6.7	5.7	8.9	7.4	10.4	8.6
2002	169	163	9.1	8.3	6.4	4.7	8.0	6.2	9.0	7.5
2003	188	173	10.0	8.8	7.0	5.4	8.9	6.9	10.3	7.9
2004	163	167	8.7	8.4	5.6	5.5	7.5	6.6	8.8	7.3
2005	193	170	10.2	8.5	6.9	5.1	8.6	6.4	9.9	7.3
2006	165	123	8.6	6.1	5.6	3.6	7.2	4.5	8.2	5.2
2007	174	154	7.9	6.7	5.3	3.9	6.7	5.0	7.6	6.0
2008	219	168	9.8	7.2	6.5	4.7	8.3	5.6	9.8	6.3
2009	245	176	11.0	7.6	6.8	4.4	9.0	5.7	10.7	6.5
2010	206	165	9.1	7.0	5.8	4.0	7.5	5.1	8.8	5.9
2011	201	177	9.0	7.6	5.6	4.1	7.3	5.4	8.5	6.5
2012	200	177	8.8	7.5	5.9	4.6	7.2	5.6	8.2	6.4
2013	211	156	9.2	6.5	5.8	3.8	7.4	4.8	8.4	5.6
2014	189	144	8.1	6.0	5.0	3.1	6.5	4.2	7.4	4.8
2015	81	71	3.4	2.9	1.6	1.3	2.4	1.8	3.1	2.3
2016	37	48	1.5	2.0	0.7	0.8	1.0	1.1	1.4	1.4
1998-2016	3046	2625	8.3	6.8	5.4	4.0	6.9	5.1	8.0	5.9

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	186	57.3	18.1	1.8	90.2	32.6	46.9	58.4	71.4	78.9
1999	181	60.8	17.9	1.6	93.4	38.7	51.6	63.6	73.8	79.7
2000	198	59.4	18.7	2.9	93.8	33.7	48.4	63.1	72.4	80.1
2001	233	60.7	17.9	1.0	92.0	37.0	51.2	62.3	73.3	80.4
2002	332	60.2	18.3	0.8	91.2	33.2	51.1	63.1	72.9	80.9
2003	361	58.6	18.5	0.6	95.4	31.5	46.3	62.1	72.9	79.7
2004	330	60.1	18.8	0.0	92.8	35.0	51.2	63.1	73.7	81.9
2005	363	59.6	19.6	0.8	94.3	33.7	47.5	64.5	72.9	81.6
2006	288	60.4	18.5	3.0	97.0	34.8	48.1	64.1	72.9	81.6
2007	328	59.6	19.2	1.5	93.5	32.3	47.5	63.5	73.8	81.0
2008	387	59.5	19.9	0.1	94.1	29.6	48.2	64.2	73.7	80.8
2009	421	62.1	18.0	0.2	94.2	37.3	53.1	65.4	75.1	82.6
2010	371	62.0	19.2	0.1	91.6	37.1	52.1	67.2	75.2	82.3
2011	378	61.3	18.0	6.2	94.0	37.2	49.6	64.3	75.7	81.9
2012	377	60.3	20.3	0.0	96.0	33.5	48.6	65.0	74.1	83.0
2013	367	61.8	18.0	0.1	93.9	38.4	52.7	65.9	74.5	80.7
2014	333	62.6	18.0	2.6	93.6	38.3	53.0	66.4	75.1	82.6
2015	152	70.8	12.0	26.9	95.8	56.1	64.4	72.2	78.5	85.2
2016	85	71.9	15.5	4.0	94.5	56.5	63.6	76.0	81.6	87.3
1998-2016	5671	60.9	18.7	0.0	97.0	35.2	50.7	64.6	74.4	81.6

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	97	55.6	14.9	14.5	83.3	33.2	46.8	56.9	66.2	74.8
1999	91	59.7	16.6	1.6	89.2	41.8	51.6	61.2	71.8	77.8
2000	103	56.7	18.4	4.1	88.2	30.0	46.6	59.9	69.7	78.3
2001	114	58.6	17.1	1.0	91.2	37.0	50.8	60.2	71.3	77.3
2002	169	56.5	18.0	0.8	87.7	32.1	46.0	61.9	68.7	76.2
2003	188	56.8	18.8	6.2	89.4	27.7	44.6	61.0	71.6	77.7
2004	163	59.9	16.1	0.1	90.1	38.3	48.8	61.0	70.4	81.9
2005	193	58.5	19.7	0.8	94.3	33.1	47.5	63.5	71.1	80.3
2006	165	58.5	17.1	3.0	90.4	34.8	47.1	62.8	69.7	77.4
2007	174	58.0	18.7	1.5	92.6	32.5	47.5	61.4	70.7	79.9
2008	219	58.9	18.2	1.2	94.1	32.0	48.2	63.5	72.6	78.8
2009	245	61.1	18.0	5.0	90.3	35.2	51.3	65.0	74.2	82.0
2010	206	60.4	18.8	0.1	90.8	35.8	50.2	63.9	74.2	81.0
2011	201	59.3	17.8	6.2	91.9	37.2	46.0	60.6	73.8	80.5
2012	200	59.5	20.8	0.3	96.0	32.5	47.3	65.2	73.8	81.0
2013	211	60.9	17.9	0.1	93.9	39.4	52.5	65.5	73.7	78.2
2014	189	60.9	18.3	2.6	93.6	35.4	51.6	63.4	73.8	81.7
2015	81	71.0	11.0	26.9	95.1	58.3	64.8	72.0	78.0	81.1
2016	37	71.0	15.7	4.0	93.0	57.4	63.6	76.0	79.8	85.7
1998-2016	3046	59.5	18.1	0.1	96.0	34.8	49.1	62.9	72.6	79.7

Table 3b

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.		Max.		Median		
				10%	25%	50%	75%	90%		
1998	89	59.0	21.1	1.8	90.2	27.9	47.5	62.9	75.6	82.6
1999	90	61.9	19.3	4.7	93.4	33.4	51.0	64.6	76.5	84.6
2000	95	62.3	18.7	2.9	93.8	35.8	55.5	67.6	74.6	81.3
2001	119	62.6	18.5	2.3	92.0	36.1	53.4	66.6	76.1	82.0
2002	163	63.9	17.9	2.6	91.2	37.8	54.2	67.2	78.1	83.0
2003	173	60.5	18.1	0.6	95.4	36.2	49.6	63.7	74.1	80.5
2004	167	60.3	21.2	0.0	92.8	30.5	51.8	65.1	76.4	82.4
2005	170	60.9	19.4	2.7	91.7	34.5	47.7	65.4	75.4	83.7
2006	123	63.0	20.0	7.3	97.0	35.0	50.7	67.0	78.2	85.8
2007	154	61.5	19.6	4.0	93.5	32.1	47.2	66.9	77.9	82.6
2008	168	60.4	22.0	0.1	92.9	28.1	48.4	66.2	77.1	85.4
2009	176	63.5	17.9	0.2	94.2	43.8	54.7	65.9	76.6	83.9
2010	165	64.0	19.6	0.6	91.6	42.3	56.7	69.0	76.6	83.5
2011	177	63.5	18.1	11.1	94.0	37.7	50.3	68.6	77.8	82.9
2012	177	61.2	19.6	0.0	90.4	34.9	49.9	65.0	74.3	83.7
2013	156	63.0	18.2	0.7	92.8	37.6	53.2	66.7	76.5	84.4
2014	144	65.0	17.3	3.2	92.7	42.8	54.5	70.0	77.4	83.2
2015	71	70.6	13.1	39.9	95.8	49.7	62.9	72.7	80.7	85.8
2016	48	72.7	15.5	17.2	94.5	54.0	64.8	76.3	82.5	90.9
1998–2016	2625	62.6	19.1	0.0	97.0	35.8	52.6	66.5	76.8	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	42	1.3	1.3	21	1.2	1.2	21	1.5	1.5
5–9	28	0.9	2.2	18	1.0	2.2	10	0.7	2.2
10–14	21	0.7	2.8	15	0.9	3.1	6	0.4	2.6
15–19	26	0.8	3.7	14	0.8	3.9	12	0.8	3.4
20–24	39	1.2	4.9	24	1.4	5.2	15	1.0	4.5
25–29	56	1.8	6.6	31	1.8	7.0	25	1.7	6.2
30–34	82	2.6	9.2	44	2.5	9.5	38	2.6	8.8
35–39	104	3.3	12.4	58	3.3	12.8	46	3.2	12.0
40–44	148	4.6	17.1	95	5.4	18.2	53	3.7	15.7
45–49	190	5.9	23.0	112	6.4	24.5	78	5.4	21.2
50–54	226	7.1	30.1	133	7.5	32.0	93	6.5	27.6
55–59	271	8.5	38.5	166	9.4	41.5	105	7.3	35.0
60–64	297	9.3	47.8	171	9.7	51.2	126	8.8	43.7
65–69	399	12.5	60.3	224	12.7	63.9	175	12.2	55.9
70–74	445	13.9	74.2	241	13.7	77.5	204	14.2	70.1
75–79	374	11.7	85.9	202	11.5	89.0	172	12.0	82.1
80–84	256	8.0	93.9	119	6.7	95.7	137	9.5	91.6
85+	195	6.1	100.0	75	4.3	100.0	120	8.4	100.0
All ages	3199	100.0		1763	100.0		1436	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=184 %	Females DCO rate n=245 %	Males	Females
							Prop.all cancers %	Prop.all cancers %
0– 4	21	21	1.9	2.0			10.7	14.1
5– 9	18	10	1.6	1.0	5.6		17.3	11.9
10–14	15	6	1.3	0.6			13.0	5.9
15–19	14	12	1.1	1.0	7.1		5.5	5.8
20–24	24	15	1.7	1.1	4.2		5.2	4.0
25–29	31	25	2.0	1.6	3.2		4.5	3.0
30–34	44	38	2.8	2.4		7.9	4.6	2.6
35–39	58	46	3.6	2.9	5.2		4.2	1.8
40–44	95	53	5.1	3.0	2.1		4.4	1.2
45–49	112	78	5.7	4.1	1.8	2.6	2.8	1.1
50–54	133	93	7.7	5.4	3.0	9.7	2.2	1.1
55–59	166	105	11.7	7.1	4.2	6.7	1.8	1.1
60–64	171	126	14.0	9.5	5.8	5.6	1.3	1.1
65–69	224	174	18.9	13.4	6.3	6.3	1.2	1.2
70–74	241	203	21.8	16.0	8.7	12.8	1.1	1.4
75–79	202	172	25.4	17.2	18.8	18.0	1.2	1.3
80–84	119	137	25.9	19.4	30.3	42.3	1.1	1.3
85+	75	120	24.5	16.4	57.3	75.8	0.9	0.9
All ages	1763	1434			10.4	17.1	1.5	1.3
Incidence								
Raw			7.7	6.1				
WS			4.8	3.4				
ES			6.3	4.4				
BRD-S			7.3	5.1				

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

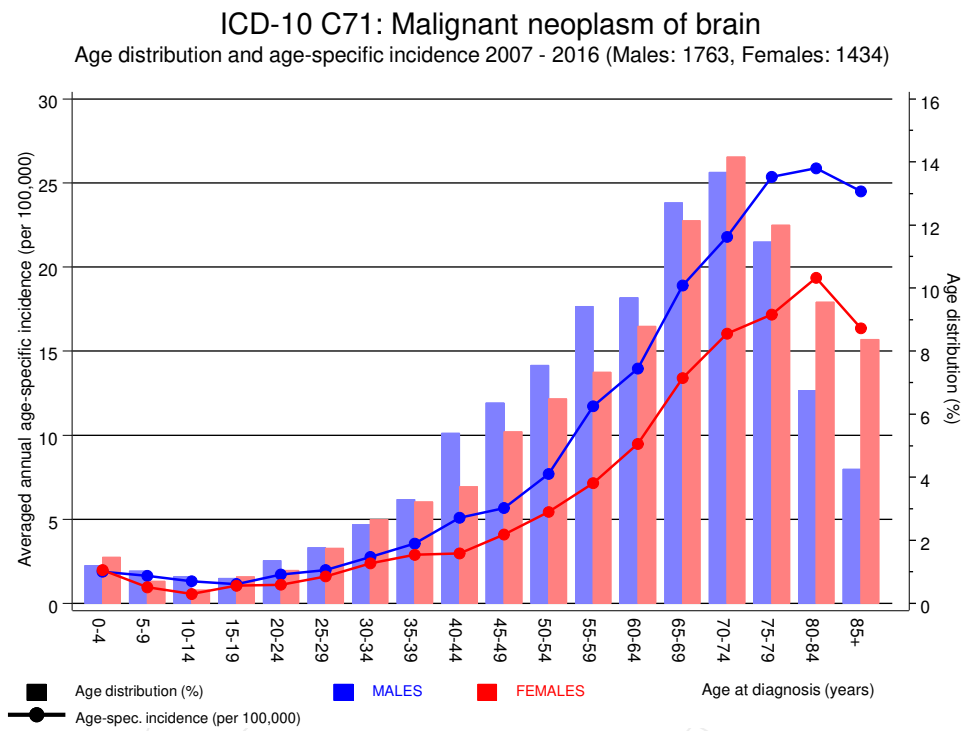


Figure 6. Age distribution (males: mean=60.6 yrs, median=64.4 yrs; females: mean=63.4 yrs, median=67.5 yrs) and age-specific incidence.

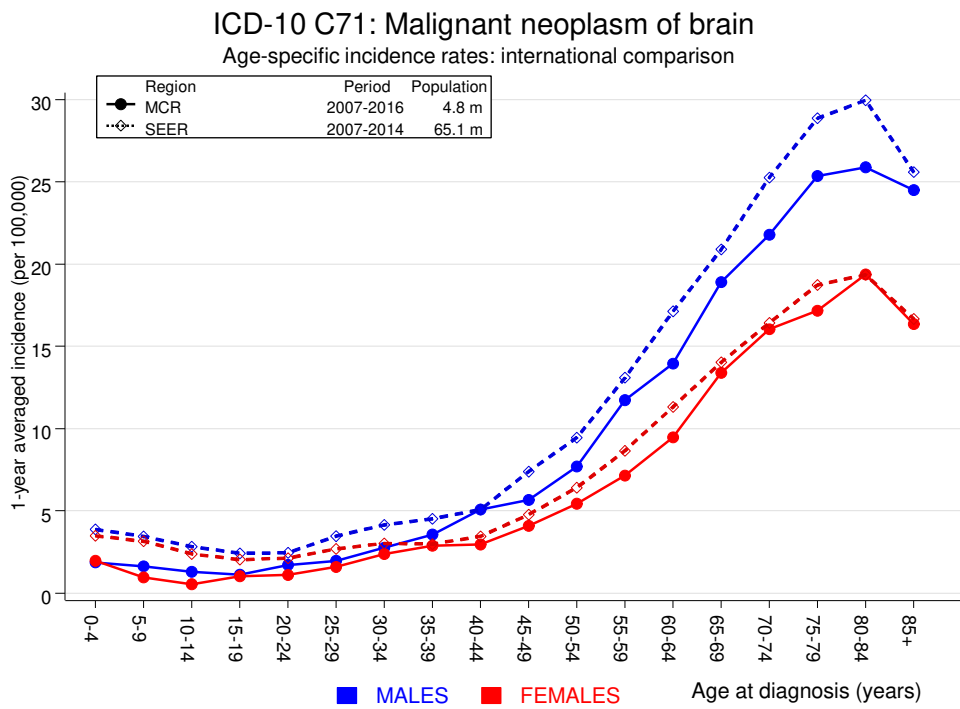


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 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 %
C18 Colon	5	3.5	1.4	0.5	3.3	2.8	
C19–C20 Rectum	4	2.3	1.7	0.5	4.4	3.1	25.0
C25 Pancreas	4	1.4	2.8	0.8	7.2	4.9	
C30–C31 Sinuses	2	0.1	22.4	2.7	80.9 #	3.6	
C33–C34 Lung	5	4.9	1.0	0.3	2.4	0.1	
C43 Malign. melanoma	5	2.1	2.4	0.8	5.5	5.4	20.0
C61 Prostate	12	11.4	1.1	0.5	1.8	1.2	16.7
C62 Testis	2	0.5	3.8	0.5	13.9	2.8	
C64 Kidney	6	1.6	3.8	1.4	8.2 #	8.3	16.7
C67 Bladder	4	1.5	2.7	0.7	6.8	4.7	
C70–C72 CNS cancer	4	0.7	5.9	1.6	15.2 #	6.3	
C76–C79 CUP	2	0.6	3.1	0.4	11.1	2.5	
C82–C85 NHL	3	1.7	1.8	0.4	5.3	2.5	33.3
Others, specified	9	4.8	1.9	0.9	3.5	7.9	33.3
Not observed	0	4.7	0.0	0.0	0.8 #	-8.9	
All further malignancies	67	41.9	1.6	1.2	2.0 #	47.4	13.4
Patients		2743					
Median age at next malignancy (years)		65.9					
Person-years		5303					
Mean observation time (years)		1.9					
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

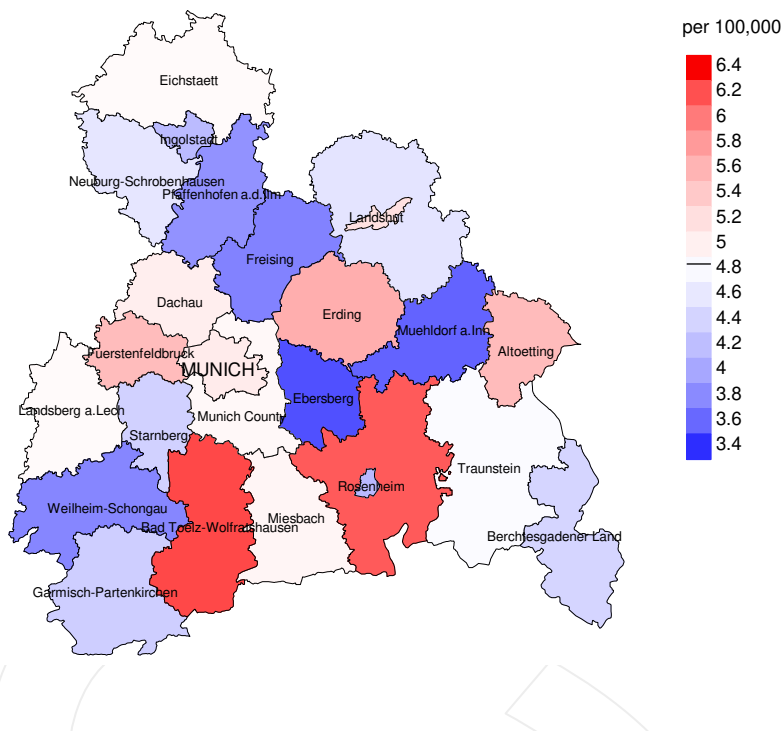
Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C18 Colon	3	2.4	1.3	0.3	3.7	1.4	
C19–C20 Rectum	3	1.1	2.7	0.6	7.9	4.1	33.3
C23–C24 Bile	2	0.3	6.1	0.7	22.0	3.7	50.0
C25 Pancreas	2	1.1	1.9	0.2	6.8	2.1	50.0
C33–C34 Lung	2	2.2	0.9	0.1	3.2	-0.5	
C43 Malign. melanoma	3	1.4	2.2	0.4	6.3	3.5	
C50 Breast	21	10.5	2.0	1.2	3.1 #	23.0	14.3
C54 Corpus uteri	6	1.7	3.6	1.3	7.7 #	9.4	
C56 Ovary	2	1.2	1.6	0.2	5.9	1.7	
C64 Kidney	2	0.7	3.0	0.4	10.8	2.9	
C70–C72 CNS cancer	3	0.4	6.7	1.4	19.7 #	5.6	
C73 Thyroid	2	0.8	2.4	0.3	8.5	2.5	
C82–C85 NHL	5	1.1	4.7	1.5	11.0 #	8.6	20.0
C91–C96 Leukaemia	3	0.4	6.9	1.4	20.0 #	5.6	
Others, specified	4	1.0	3.9	1.1	10.0 #	6.5	
Not observed	0	4.1	0.0	0.0	0.9 #	-9.0	
All further malignancies	63	30.5	2.1	1.6	2.6 #	71.1	11.1

Patients 2238
 Median age at next malignancy (years) 66.4
 Person-years 4572
 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".

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



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

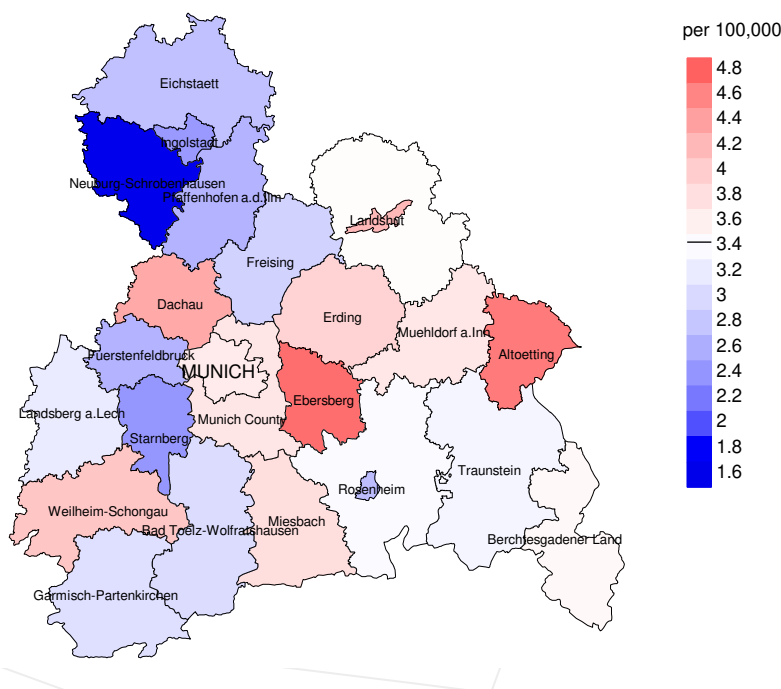
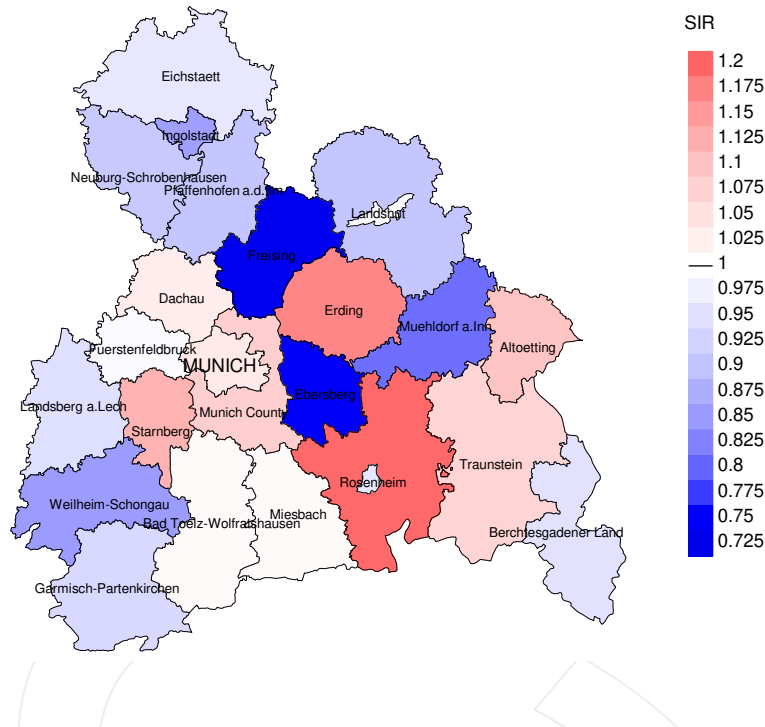


Figure 8a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 4.8/100,000 WS N=1,763, females 3.4/100,000 WS N=1,434).

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 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

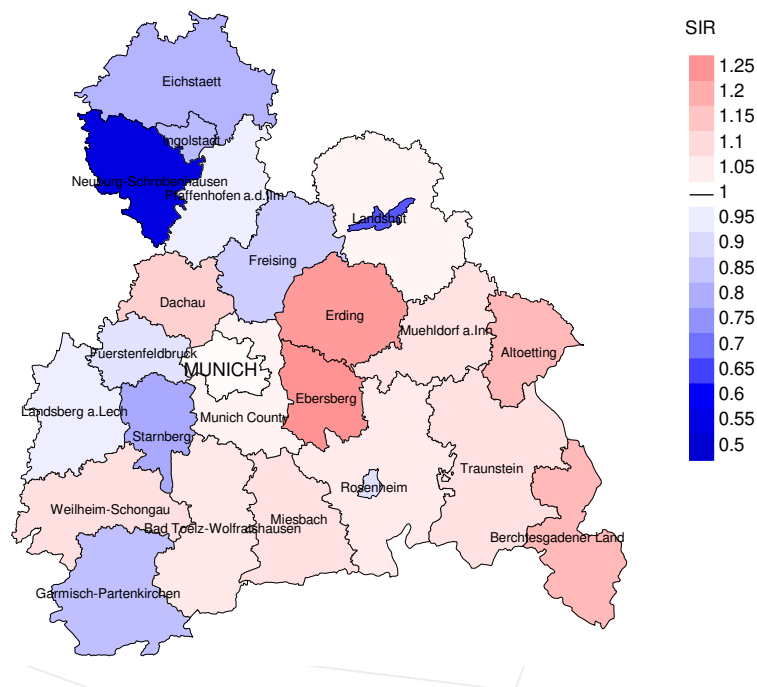


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=1,763, females N=1,434).

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 cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.25. Though, the value of this parameter may vary with an underlying probability of 99% between 0.84 and 1.79, 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	186	96.8	25.8	164	88.2	96.3
1999	181	97.2	31.5	164	90.6	96.3
2000	198	97.5	26.3	167	84.3	94.0
2001	233	96.6	24.5	202	86.7	93.1
2002	332	98.5	19.0	283	85.2	98.6
2003	361	98.3	19.4	299	82.8	95.3
2004	330	97.9	22.1	276	83.6	97.8
2005	363	96.7	17.1	301	82.9	97.3
2006	288	97.2	13.9	247	85.8	97.2
2007	328	89.6	14.6	258	78.7	97.3
2008	387	87.9	14.0	308	79.6	98.1
2009	421	90.7	12.4	350	83.1	97.1
2010	371	91.9	14.0	314	84.6	98.4
2011	378	86.5	11.9	283	74.9	98.2
2012	377	88.6	10.9	285	75.6	97.2
2013	367	87.5	10.9	281	76.6	96.8
2014	333	91.6	8.7	258	77.5	96.5
2015	152	100.0	23.7	132	86.8	100.0
2016	85	90.6	37.6	58	68.2	96.6
1998-2016	5671	93.2	16.8	4630	81.6	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	186	130	95.4	72	38.7
1999	181	171	97.1	91	50.3
2000	198	156	94.9	78	39.4
2001	233	191	92.1	106	45.5
2002	332	231	97.0	123	37.0
2003	361	249	95.6	125	34.6
2004	330	267	97.4	121	36.7
2005	363	253	97.2	136	37.5
2006	288	263	96.2	108	37.5
2007	328	250	97.6	120	36.6
2008	387	262	96.9	125	32.3
2009	421	304	98.4	141	33.5
2010	371	349	98.3	145	39.1
2011	378	308	98.7	120	31.7
2012	377	292	97.3	124	32.9
2013	367	292	96.9	116	31.6
2014	333	320	98.1	115	34.5
2015	152	292	97.9	109	71.7
2016	85	186	98.9	56	65.9
1998-2016	5671	4766	97.1	2131	37.6

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	130	72.3	27.7	100.0
1999	171	78.4	21.6	97.6
2000	156	78.2	21.8	98.0
2001	191	83.2	16.8	98.9
2002	231	91.3	8.7	99.6
2003	249	93.2	6.8	98.7
2004	267	94.0	6.0	99.2
2005	253	90.9	9.1	98.0
2006	263	90.9	9.1	96.8
2007	250	94.4	5.6	98.4
2008	262	94.3	5.7	98.4
2009	304	91.8	8.2	97.0
2010	349	93.7	6.3	98.0
2011	308	93.5	6.5	97.0
2012	292	93.2	6.8	98.6
2013	292	92.8	7.2	98.2
2014	320	95.6	4.4	98.1
2015	292	93.5	6.5	97.9
2016	186	95.2	4.8	98.9
1998-2016	4766	91.2	8.8	98.2

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	65	58.0	57.6	61.6	58.0
1999	91	62.1	61.4	63.5	62.1
2000	69	63.5	63.3	68.8	65.9
2001	103	63.5	63.3	67.8	64.9
2002	129	63.0	63.5	57.9	63.3
2003	120	66.4	66.7	56.0	66.8
2004	138	65.5	65.2	69.0	65.4
2005	145	64.7	63.0	73.3	64.0
2006	136	64.1	64.2	63.7	64.2
2007	134	66.1	66.1	65.0	66.3
2008	143	64.3	64.2	72.1	64.3
2009	180	68.6	66.7	70.6	66.4
2010	220	68.5	68.5	64.2	68.7
2011	161	67.4	67.4	70.3	67.4
2012	161	67.4	67.4	68.6	67.4
2013	164	67.1	67.1	61.8	67.1
2014	185	66.9	66.6	72.8	67.1
2015	174	67.3	67.3	55.3	67.4
2016	95	63.9	62.6	72.1	64.0
1998–2016	2613	65.8	65.8	66.0	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	65	71.4	72.3	70.3	72.2
1999	80	68.7	64.9	79.2	69.2
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	129	67.6	66.6	75.4	67.6
2004	129	66.3	66.0	67.6	66.3
2005	108	67.7	67.7	68.4	67.7
2006	127	68.1	68.0	69.1	68.6
2007	116	69.3	68.5	75.1	69.2
2008	119	68.0	68.0	71.8	68.4
2009	124	69.4	69.2	77.4	69.4
2010	129	68.9	68.6	75.4	69.2
2011	147	70.5	69.8	71.7	70.5
2012	131	68.4	68.4	70.6	69.1
2013	128	67.0	66.9	74.8	66.9
2014	135	70.0	70.0	74.1	70.0
2015	118	70.5	69.8	75.8	70.6
2016	91	68.9	68.9	69.7	69.3
1998–2016	2153	69.0	68.5	74.3	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	45	4.1	0.46	2.9	0.48	3.7	0.48	4.2	0.47
1999	73	6.5	0.80	4.3	0.77	5.9	0.79	7.1	0.80
2000	51	4.5	0.50	2.9	0.45	4.0	0.48	4.6	0.47
2001	85	7.3	0.75	4.4	0.65	6.4	0.72	8.1	0.78
2002	119	6.4	0.70	4.0	0.63	5.5	0.69	6.4	0.71
2003	112	6.0	0.60	3.5	0.50	4.9	0.56	6.2	0.60
2004	130	6.9	0.80	4.3	0.77	5.9	0.78	7.1	0.81
2005	131	6.9	0.68	4.3	0.62	5.8	0.67	6.8	0.69
2006	127	6.6	0.77	4.4	0.78	5.6	0.77	6.4	0.78
2007	128	5.8	0.74	3.3	0.62	4.6	0.68	5.6	0.74
2008	134	6.0	0.61	3.7	0.57	4.9	0.59	5.8	0.59
2009	160	7.2	0.65	4.1	0.60	5.6	0.63	6.9	0.65
2010	210	9.3	1.02	5.3	0.91	7.2	0.96	8.8	1.00
2011	153	6.8	0.76	3.8	0.68	5.3	0.73	6.5	0.76
2012	153	6.7	0.77	3.9	0.67	5.2	0.72	6.2	0.76
2013	151	6.6	0.72	3.7	0.65	5.0	0.68	6.0	0.71
2014	176	7.5	0.93	4.4	0.87	5.9	0.90	6.8	0.92
2015	167	7.0	2.06	3.9	2.45	5.4	2.24	6.4	2.06
2016	88	3.7	2.38	2.0	2.79	2.8	2.71	3.3	2.39
1998-2016	2393	6.5	0.79	3.9	0.72	5.3	0.76	6.3	0.78

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	49	4.2	0.55	2.0	0.39	2.9	0.46	3.8	0.53
1999	61	5.1	0.68	3.3	0.73	4.1	0.70	4.6	0.68
2000	71	5.9	0.75	3.5	0.73	4.5	0.74	5.2	0.74
2001	74	6.1	0.62	3.5	0.61	4.5	0.61	5.4	0.62
2002	92	4.7	0.56	2.4	0.51	3.3	0.53	4.1	0.55
2003	120	6.1	0.69	3.5	0.64	4.7	0.68	5.4	0.69
2004	121	6.1	0.72	3.7	0.67	4.6	0.71	5.4	0.74
2005	99	5.0	0.58	2.7	0.53	3.6	0.55	4.2	0.58
2006	112	5.6	0.91	3.0	0.82	3.9	0.87	4.7	0.89
2007	108	4.7	0.70	2.3	0.59	3.2	0.65	4.0	0.67
2008	113	4.9	0.67	2.8	0.60	3.6	0.64	4.1	0.66
2009	119	5.1	0.68	2.5	0.56	3.4	0.60	4.1	0.63
2010	117	5.0	0.71	2.6	0.64	3.5	0.69	4.2	0.71
2011	135	5.8	0.76	3.0	0.73	4.0	0.74	4.8	0.74
2012	119	5.0	0.68	2.7	0.59	3.5	0.62	4.2	0.66
2013	120	5.0	0.77	2.7	0.73	3.6	0.76	4.2	0.75
2014	130	5.4	0.90	2.7	0.87	3.6	0.87	4.4	0.90
2015	106	4.4	1.49	2.0	1.55	2.8	1.58	3.5	1.53
2016	89	3.6	1.85	1.9	2.39	2.5	2.22	3.0	2.10
1998-2016	1955	5.1	0.75	2.7	0.68	3.6	0.71	4.3	0.73

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	10	0.4	0.4	5	0.3	0.3	5	0.4	0.4
5-9	19	0.7	1.1	9	0.6	0.9	10	0.9	1.3
10-14	14	0.5	1.6	9	0.6	1.5	5	0.4	1.7
15-19	14	0.5	2.1	8	0.5	2.0	6	0.5	2.2
20-24	10	0.4	2.5	5	0.3	2.4	5	0.4	2.7
25-29	23	0.9	3.4	17	1.1	3.5	6	0.5	3.2
30-34	22	0.8	4.2	13	0.9	4.3	9	0.8	4.0
35-39	48	1.8	6.0	35	2.3	6.6	13	1.1	5.1
40-44	103	3.8	9.8	63	4.1	10.8	40	3.5	8.6
45-49	178	6.7	16.5	108	7.1	17.9	70	6.1	14.6
50-54	176	6.6	23.1	107	7.0	24.9	69	6.0	20.6
55-59	228	8.5	31.6	144	9.5	34.4	84	7.3	27.9
60-64	283	10.6	42.2	164	10.8	45.2	119	10.3	38.1
65-69	386	14.4	56.6	213	14.0	59.2	173	15.0	53.1
70-74	442	16.5	73.1	260	17.1	76.3	182	15.7	68.9
75-79	351	13.1	86.2	186	12.2	88.6	165	14.3	83.1
80-84	216	8.1	94.3	109	7.2	95.7	107	9.3	92.4
85+	153	5.7	100.0	65	4.3	100.0	88	7.6	100.0
All ages	2676	100.0		1520	100.0		1156	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		Females		Males		Females	
	n	n	Age- spec. mortal.	MI-index	Age- spec. mortal.	MI-index	Prop.all cancers %	Prop.all cancers %
0– 4	5	5	0.4	0.24	0.5	0.24	33.3	33.3
5– 9	9	10	0.8	0.50	1.0	1.00	37.5	55.6
10–14	9	5	0.8	0.60	0.5	0.83	39.1	20.8
15–19	8	6	0.7	0.57	0.5	0.50	18.2	27.3
20–24	5	5	0.4	0.21	0.4	0.33	8.8	15.2
25–29	17	6	1.1	0.55	0.4	0.24	23.0	8.2
30–34	13	9	0.8	0.30	0.6	0.24	12.5	7.5
35–39	35	13	2.1	0.60	0.8	0.28	17.4	4.6
40–44	63	40	3.4	0.66	2.2	0.75	12.8	6.0
45–49	108	70	5.5	0.96	3.7	0.90	9.4	5.3
50–54	107	69	6.2	0.80	4.0	0.74	5.2	3.5
55–59	144	84	10.2	0.87	5.7	0.80	4.3	2.9
60–64	164	119	13.4	0.96	9.0	0.94	3.3	3.2
65–69	213	173	18.0	0.95	13.3	0.99	2.9	3.2
70–74	260	182	23.5	1.08	14.4	0.90	2.8	2.7
75–79	186	165	23.3	0.92	16.5	0.96	2.1	2.4
80–84	109	107	23.7	0.92	15.1	0.78	1.4	1.6
85+	65	88	21.2	0.87	12.0	0.73	1.0	1.0
All ages	1520	1156					2.9	2.5
Mortality								
Raw			6.7	0.86	4.9	0.81		
WS			3.8	0.79	2.5	0.73		
ES			5.2	0.83	3.4	0.77		
BRD-S			6.2	0.85	4.0	0.79		
PYLL-70								
per 100,000			69.5		45.5			
ES			64.7		43.2			
AYLL-70			15.6		14.8			

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	7	1.9	6	85.7			1	14.3
C18 Colon	29	7.9	23	79.3	4	13.8	2	6.9
C19–C20 Rectum	21	5.8	19	90.5	1	4.8	1	4.8
C25 Pancreas	7	1.9	1	14.3	2	28.6	4	57.1
C33–C34 Lung	17	4.7	7	41.2	3	17.6	7	41.2
C40–C41 Bone	4	1.1	1	25.0	1	25.0	2	50.0
C43 Malign. melanoma	23	6.3	19	82.6			4	17.4
C44 Skin others	18	4.9	8	44.4	5	27.8	5	27.8
C46,C49 Soft tissue	4	1.1	2	50.0			2	50.0
C61 Prostate	118	32.3	104	88.1	8	6.8	6	5.1
C62 Testis	9	2.5	7	77.8	2	22.2		
C64 Kidney	19	5.2	13	68.4	2	10.5	4	21.1
C67 Bladder	15	4.1	10	66.7	2	13.3	3	20.0
C70–C72 CNS cancer	7	1.9			1	14.3	6	85.7
C73 Thyroid	6	1.6	5	83.3			1	16.7
C76–C79 CUP	6	1.6	3	50.0			3	50.0
C82–C85 NHL	17	4.7	15	88.2	2	11.8		
C90 Mult. myeloma	4	1.1	2	50.0	1	25.0	1	25.0
C91–C96 Leukaemia	4	1.1	2	50.0	1	25.0	1	25.0
Others, specified	30	8.2	18	60.0	2	6.7	10	33.3
All further malignancies	365	100.0	265	72.6	37	10.1	63	17.3

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	14	5.2	10	71.4	1	7.1	3	21.4
C19–C20 Rectum	8	3.0	4	50.0	2	25.0	2	25.0
C25 Pancreas	3	1.1	1	33.3			2	66.7
C33–C34 Lung	6	2.2	4	66.7			2	33.3
C43 Malign. melanoma	18	6.7	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	36.8	77	77.8	9	9.1	13	13.1
C53 Cervix uteri	8	3.0	8	100.0				
C54 Corpus uteri	19	7.1	14	73.7			5	26.3
C56 Ovary	11	4.1	8	72.7	2	18.2	1	9.1
C64 Kidney	9	3.3	7	77.8	2	22.2		
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	1.9			1	20.0	4	80.0
C73 Thyroid	9	3.3	9	100.0				
C82–C85 NHL	12	4.5	5	41.7	2	16.7	5	41.7
C91–C96 Leukaemia	8	3.0	4	50.0			4	50.0
Others, specified	20	7.4	13	65.0	1	5.0	6	30.0
All further malignancies	269	100.0	188	69.9	22	8.2	59	21.9

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	5	0.4	0.20	0.5	0.24	28.6	33.3
5- 9	8	10	0.7	0.44	1.0	1.00	34.8	55.6
10-14	9	5	0.8	0.60	0.5	0.83	39.1	23.8
15-19	7	6	0.6	0.50	0.5	0.50	16.7	30.0
20-24	5	5	0.4	0.21	0.4	0.33	9.8	16.1
25-29	16	6	1.0	0.53	0.4	0.26	23.9	9.0
30-34	13	8	0.8	0.30	0.5	0.21	12.7	7.5
35-39	35	13	2.1	0.60	0.8	0.29	18.5	5.1
40-44	59	37	3.2	0.66	2.1	0.82	12.9	6.2
45-49	104	67	5.3	0.97	3.5	0.92	9.9	5.9
50-54	101	64	5.8	0.79	3.7	0.76	5.6	3.8
55-59	137	74	9.7	0.88	5.0	0.79	4.7	3.1
60-64	146	109	11.9	1.02	8.2	0.96	3.5	3.6
65-69	185	149	15.6	0.98	11.5	1.01	3.2	3.5
70-74	216	151	19.5	1.10	11.9	0.96	3.0	2.8
75-79	142	133	17.8	0.99	13.3	0.93	2.1	2.5
80-84	85	94	18.5	0.92	13.3	0.80	1.5	1.8
85+	41	79	13.4	0.80	10.8	0.74	0.9	1.1
All ages	1313	1015					3.2	2.7
Mortality								
Raw			5.7	0.87	4.3	0.81		
WS			3.4	0.78	2.3	0.73		
ES			4.5	0.83	3.0	0.77		
BRD-S			5.3	0.85	3.6	0.79		
PYLL-70								
per 100,000			65.4		42.8			
ES			60.7		41.0			
AYLL-70			15.9		15.3			

* 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	5	0.4	0.20	0.5	0.25	28.6	33.3
5- 9	8	10	0.7	0.44	1.0	1.00	34.8	55.6
10-14	9	5	0.8	0.60	0.5	0.83	39.1	23.8
15-19	7	5	0.6	0.50	0.4	0.42	16.7	26.3
20-24	5	5	0.4	0.21	0.4	0.33	9.8	16.1
25-29	15	5	1.0	0.50	0.3	0.22	22.4	7.7
30-34	13	8	0.8	0.32	0.5	0.22	12.7	7.7
35-39	32	13	2.0	0.56	0.8	0.32	17.0	5.1
40-44	58	37	3.1	0.66	2.1	0.84	12.7	6.3
45-49	104	64	5.3	0.98	3.4	0.90	10.0	5.7
50-54	99	61	5.7	0.78	3.6	0.76	5.6	3.7
55-59	135	70	9.5	0.90	4.8	0.75	4.7	3.0
60-64	142	106	11.6	1.06	8.0	0.95	3.5	3.5
65-69	178	147	15.0	0.95	11.3	1.01	3.1	3.6
70-74	209	146	18.9	1.08	11.5	0.96	3.0	2.8
75-79	138	127	17.3	0.97	12.7	0.89	2.2	2.4
80-84	83	92	18.0	0.90	13.0	0.80	1.6	1.8
85+	40	78	13.1	0.78	10.6	0.73	0.9	1.1
All ages	1279	984					3.2	2.7
Mortality								
Raw			5.6	0.86	4.2	0.80		
WS			3.3	0.77	2.2	0.73		
ES			4.4	0.82	2.9	0.76		
BRD-S			5.2	0.85	3.4	0.78		
PYLL-70								
per 100,000			64.0		41.3			
ES			59.5		39.6			
AYLL-70			16.0		15.2			

* See corresponding tables with multiple malignancies.

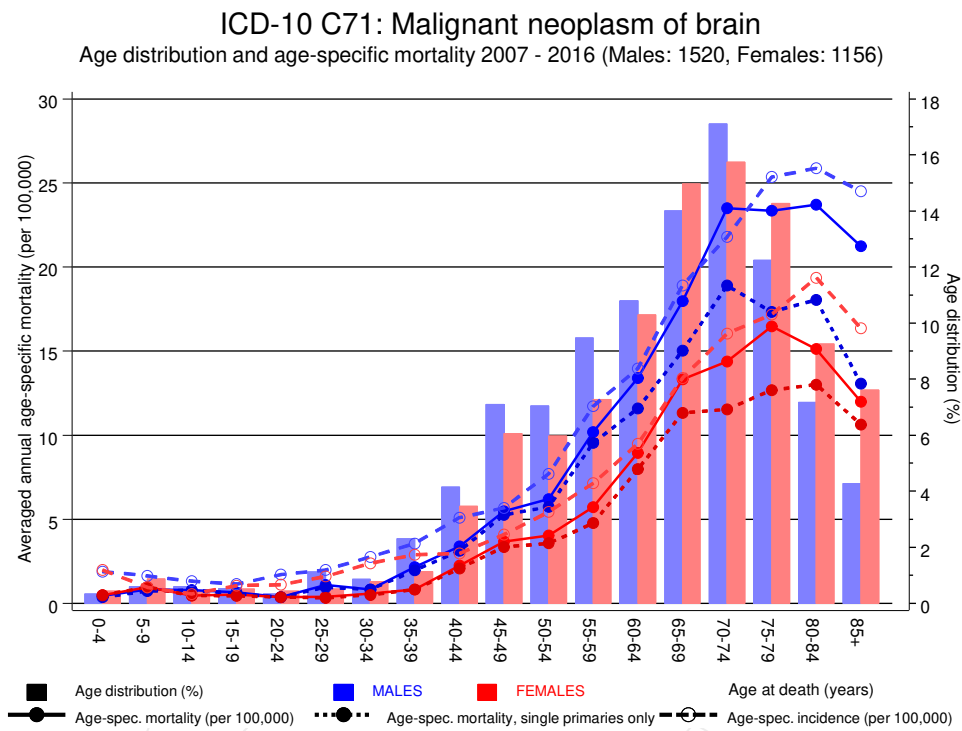
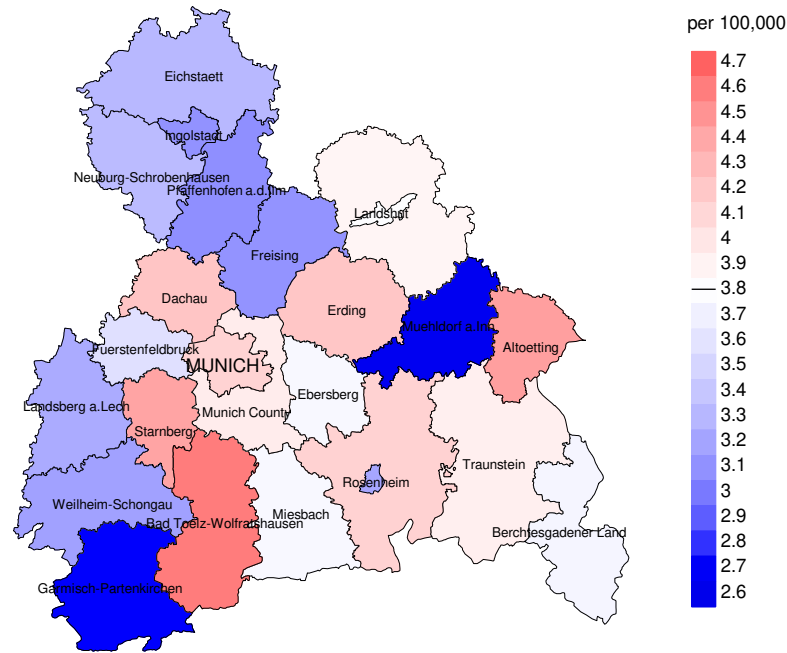


Figure 17. Distribution of age at death (bars; males: mean=61.6 yrs, median=65.0 yrs; females: mean=63.9 yrs, median=67.1 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

The difference between age at diagnosis (Table 3) and age at brain 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

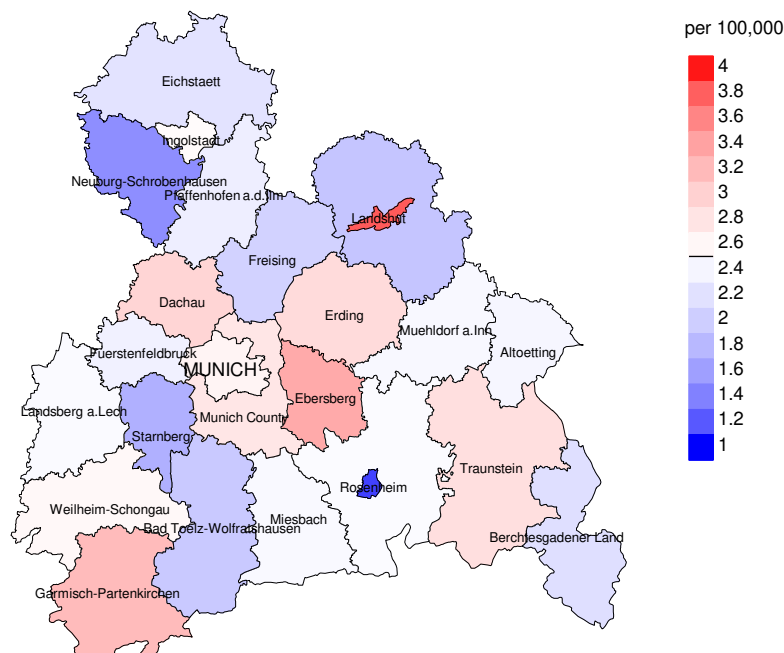
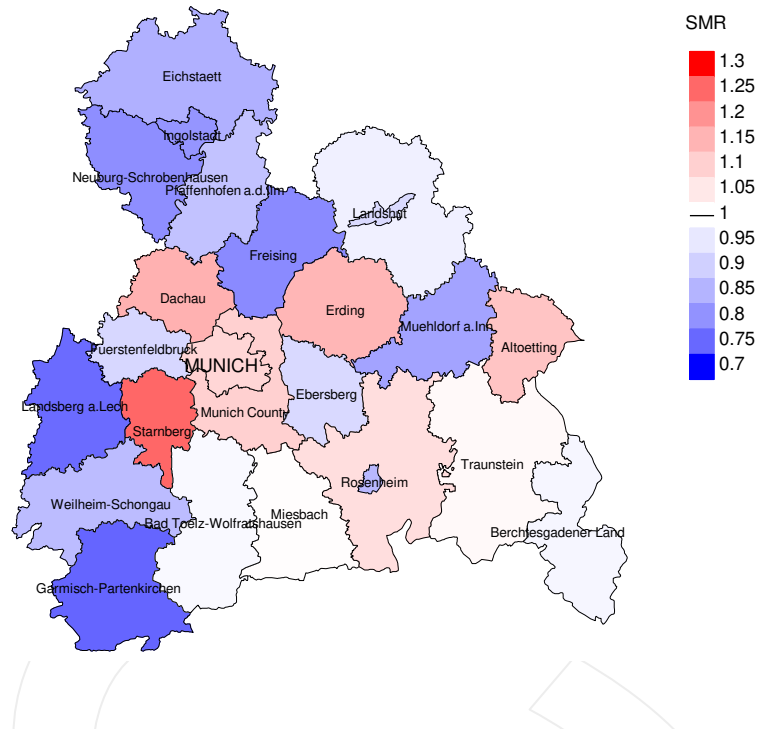


Figure 18a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2016. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 3.8/100,000 WS N=1,520, females 2.5/100,000 WS N=1,156).

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 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

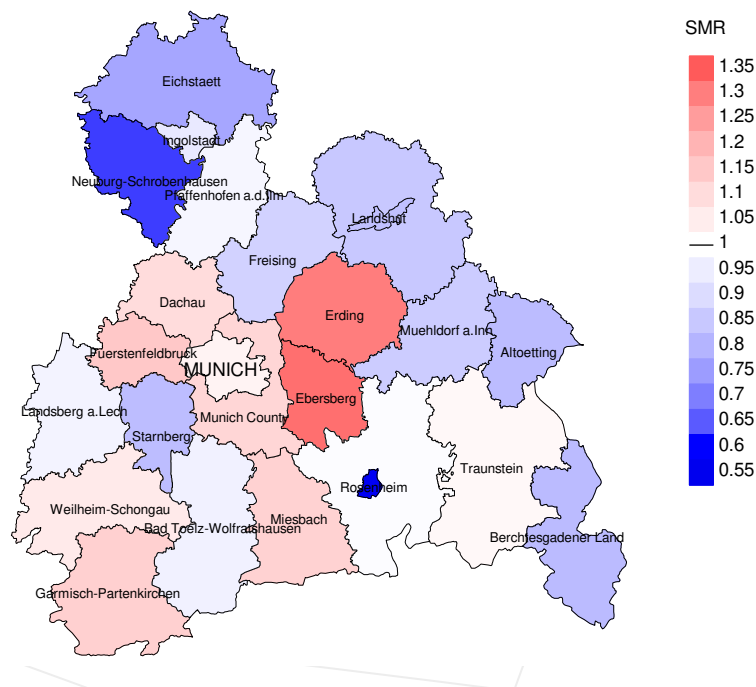


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=1,520, females N=1,156).

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 cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.32. Though, the value of this parameter may vary with an underlying probability of 99% between 0.86 and 1.94, 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

Munich Cancer Registry. ICD-10 C71: Brain cancer - Incidence and Mortality [Internet]. 2018 [updated 2018 Aug 21; cited 2018 Oct 1]. Available from: https://www.tumorregister-muenchen.de/en/facts/base/bC71__E-ICD-10-C71-Brain-cancer-incidence-and-mortality.pdf

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