Munich Cancer Registry

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ICD-10 C71: Brain cancer

Incidence and Mortality

Year of diagnosis	1998-2014
Patients	5,114
Diseases	5,120
Creation date	04/13/2016
Export date	12/23/2015
Population	4.64 m

Munich Cancer Registry at Munich Cancer Center
Marchioninistr. 15
Munich, 81377
Germany

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

http://www.tumorregister-muenchen.de/en/facts/base/bC71__E-ICD-10-C71-Brain-cancer-incidence-and-mortality.pdf

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 4.64 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, April 2016

[#] 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 2.51 million to 3.96 in 2002, and to 4.52 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

All patients with invasive cancer by year of diagnosis, proportions of DCO, multiple primaries, deaths, and active follow-up (incl. DCO)

Year of diagnosis	Cases n	DCO cases n	Prop. DCO %	Prop. mult. primaries %	Prop. deaths %	Prop. actively followed %
1998	180	43	23.9	10.0	87.8	97.2
1999	173	50	28.9	9.8	89.6	98.3
2000	195	50	25.6	11.3	83.1	98.5
2001	230	55	23.9	9.1	84.8	96.5
2002	331	63	19.0	12.1	84.0	99.1 #
2003	361	70	19.4	11.1	81.2	98.9
2004	330	73	22.1	13.0	81.8	97.3
2005	365	62	17.0	13.4	81.1	96.4
2006	287	40	13.9	12.2	84.0	96.9
2007	328	48	14.6	14.3	76.8	88.1 #
2008	383	53	13.8	14.1	78.1	86.7
2009	420	52	12.4	12.4	81.4	90.7
2010	368	52	14.1	15.5	82.9	91.0
2011	378	45	11.9	15.3	72.5	87.6
2012	371	43	11.6	14.0	67.7	87.6
2013	347	38	11.0	15.9	65.1	99.4
2014	73	31	42.5	35.6	72.6	95.9 ##
1998-2014	5120	868	17.0	13.4	79.1	93.8

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 found in the respective headings.

Table 1a

All patients with invasive cancer
by year of diagnosis and gender
(incl. DCO)

Year of diagnosis	All n	Males n	Females n	Prop. males %
1998	180	95	85	52.8
1999	173	87	86	50.3
2000	195	101	94	51.8
2001	230	113	117	49.1
2002	331	169	162	51.1
2003	361	188	173	52.1
2004	330	163	167	49.4
2005	365	193	172	52.9
2006	287	165	122	57.5
2007	328	174	154	53.0
2008	383	218	165	56.9
2009	420	244	176	58.1
2010	368	205	163	55.7
2011	378	201	177	53.2
2012	371	196	175	52.8
2013	347	202	145	58.2
2014	73	36	37	49.3
1998-2014	5120	2750	2370	53.7

Table 2

Incidence measures by year of diagnosis including DCO cases
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002,
and from 3.96 to 4.64 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	95	85	8.6	7.2	6.0	5.1	7.7	6.1	8.7	6.8
1999	87	86	7.8	7.2	5.4	4.4	7.2	5.6	8.3	6.5
2000	101	94	8.9	7.8	6.4	4.8	8.1	6.1	9.6	7.0
2001	113	117	9.8	9.6	6.7	5.6	8.8	7.3	10.3	8.5
2002	169	162	9.1	8.3	6.4	4.7	8.0	6.2	9.0	7.4
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	172	10.2	8.6	6.9	5.2	8.6	6.5	9.9	7.4
2006	165	122	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	218	165	9.8	7.1	6.4	4.6	8.3	5.5	9.8	6.1
2009	244	176	10.9	7.6	6.8	4.4	9.0	5.7	10.6	6.5
2010	205	163	9.1	7.0	5.8	4.0	7.5	5.0	8.7	5.8
2011	201	177	8.8	7.5	5.4	4.1	7.1	5.3	8.4	6.4
2012	196	175	8.6	7.4	5.7	4.5	7.0	5.6	8.1	6.3
2013	202	145	8.8	6.1	5.6	3.5	7.2	4.5	8.2	5.3
2014	36	37	1.6	1.6	0.8	0.6	1.2	0.9	1.5	1.1
1998-2014	2750	2370	8.6	7.1	5.7	4.2	7.3	5.3	8.4	6.2

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

Table 3

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	180	56.8	18.2	1.8	90.2	32.5	46.7	57.5	70.0	79.1
1999	173	59.9	17.8	1.6	93.4	36.5	50.7	61.9	72.6	79.4
2000	195	59.1	18.7	2.9	93.8	33.7	48.2	62.5	72.3	79.7
2001	230	60.4	17.9	1.0	92.0	36.5	51.1	62.1	73.3	80.1
2002	331	60.1	18.3	0.8	91.2	33.2	51.0	63.0	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	365	59.6	19.6	0.8	94.3	33.1	47.5	64.5	72.7	81.6
2006	287	60.4	18.5	3.0	97.0	34.8	48.0	64.1	73.1	81.6
2007	328	59.6	19.2	1.5	93.5	32.3	47.5	63.5	73.8	81.0
2008	383	59.7	19.9	0.1	94.1	31.1	48.4	64.4	73.7	80.8
2009	420	62.2	17.9	0.2	94.2	37.3	53.2	65.4	75.1	82.7
2010	368	62.1	19.2	0.1	91.6	37.1	52.4	67.4	75.2	82.6
2011	378	61.3	18.0	6.2	94.0	37.2	49.6	64.3	75.7	81.9
2012	371	60.5	20.1	0.0	96.0	34.9	48.6	65.1	74.1	83.0
2013	347	61.7	18.2	0.1	93.9	38.3	52.6	65.9	74.2	80.7
2014	73	70.1	15.1	31.8	93.6	53.0	59.7	72.7	83.2	87.5
1998-2014	5120	60.4	18.8	0.0	97.0	34.7	49.9	64.0	74.0	81.5

Table 3a

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	95	55.4	14.8	14.5	83.3	33.2	46.7	56.4	66.2	74.6
1999	87	58.8	16.3	1.6	85.5	38.9	50.5	60.2	71.0	77.6
2000	101	56.4	18.4	4.1	88.2	30.0	46.6	59.9	68.6	77.6
2001	113	58.5	17.1	1.0	91.2	37.0	50.8	60.1	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	218	58.9	18.2	1.2	94.1	32.0	48.2	63.5	72.6	78.8
2009	244	61.3	17.8	5.0	90.3	35.3	51.5	65.0	74.2	82.0
2010	205	60.4	18.8	0.1	90.8	35.8	51.0	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	196	59.8	20.5	0.3	96.0	33.5	47.6	65.3	74.0	81.1
2013	202	60.6	18.1	0.1	93.9	39.0	52.3	65.6	73.7	77.9
2014	36	67.8	15.2	34.5	93.6	43.5	58.5	66.6	81.8	87.5
1998-2014	2750	59.0	18.1	0.1	96.0	34.4	48.4	62.2	72.0	79.4

Table 3b

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	85	58.5	21.4	1.8	90.2	27.9	46.9	62.3	75.6	82.6
1999	86	61.1	19.3	4.7	93.4	33.4	50.7	64.2	76.4	84.0
2000	94	62.1	18.6	2.9	93.8	35.8	55.5	67.6	74.2	80.6
2001	117	62.3	18.5	2.3	92.0	36.1	53.4	66.5	76.0	81.8
2002	162	63.9	18.0	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	172	60.8	19.5	2.7	91.7	34.5	47.6	65.4	75.3	83.4
2006	122	62.9	20.1	7.3	97.0	35.0	50.7	67.2	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	165	60.7	21.9	0.1	92.9	29.0	48.9	66.5	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	163	64.2	19.5	0.6	91.6	42.3	56.7	69.2	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	175	61.3	19.7	0.0	90.4	34.9	49.9	65.0	74.3	83.7
2013	145	63.1	18.3	0.7	92.8	37.6	53.2	66.8	76.3	84.6
2014	37	72.3	14.8	31.8	92.7	53.0	63.7	73.7	84.2	91.7
1998-2014	2370	62.1	19.3	0.0	97.0	35.0	51.9	66.1	76.4	83.4

Table 4

Age distribution by 5-year age group and gender for period 2007-2014
(incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4	36	1.3	1.3	17	1.2	1.2	19	1.6	1.6
5-9	27	1.0	2.4	17	1.2	2.3	10	0.8	2.4
10-14	18	0.7	3.0	12	0.8	3.1	6	0.5	2.9
15-19	20	0.7	3.8	13	0.9	4.0	7	0.6	3.5
20-24	35	1.3	5.1	20	1.4	5.4	15	1.3	4.8
25-29	49	1.8	6.9	26	1.8	7.1	23	1.9	6.7
30-34	75	2.8	9.7	41	2.8	9.9	34	2.9	9.6
35-39	93	3.5	13.2	53	3.6	13.5	40	3.4	12.9
40-44	134	5.0	18.3	89	6.0	19.5	45	3.8	16.7
45-49	161	6.0	24.3	95	6.4	25.9	66	5.5	22.2
50-54	192	7.2	31.5	113	7.7	33.6	79	6.6	28.9
55-59	226	8.5	40.0	137	9.3	42.9	89	7.5	36.3
60-64	247	9.3	49.2	144	9.8	52.6	103	8.6	45.0
65-69	339	12.7	61.9	193	13.1	65.7	146	12.2	57.2
70-74	358	13.4	75.3	191	12.9	78.7	167	14.0	71.2
75-79	286	10.7	86.1	155	10.5	89.2	131	11.0	82.2
80-84	215	8.1	94.1	101	6.8	96.0	114	9.6	91.8
85+	157	5.9	100.0	59	4.0	100.0	98	8.2	100.0
All ages	2668	100.0		1476	100.0		1192	100.0	

Included in the statistics are 18.1% multiple primaries in males and 16.9% in females.

Table 5

Age-specific incidence, DCO rate and proportion of all cancers for period 2007-2014

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=160 %	Females DCO rate n=202 %	Males Prop.all cancers n=91183 %	Females Prop.all cancers n=89596 %
0- 4	17	19	1.9	2.3			9.6	13.8
5- 9	17	10	1.9	1.2	5.9		17.7	12.8
10-14	12	6	1.3	0.7			12.0	6.7
15-19	13	7	1.3	0.8	7.7		6.0	4.2
20-24	20	15	1.8	1.4	5.0		5.4	4.8
25-29	26	23	2.2	1.9	3.8		4.7	3.5
30-34	41	34	3.3	2.7		5.9	5.3	2.9
35-39	53	40	4.1	3.2	3.8		4.6	2.0
40-44	89	45	5.5	2.9	2.2		4.9	1.2
45-49	95	66	6.0	4.4	2.1	1.5	3.0	1.2
50-54	113	79	8.7	6.2	3.5	8.9	2.3	1.2
55-59	137	89	12.9	7.9	3.6	5.6	1.9	1.2
60-64	144	103	14.7	9.7	5.6	6.8	1.3	1.1
65-69	193	145	20.1	13.9	6.2	6.9	1.2	1.3
70-74	191	166	21.0	15.9	11.0	10.8	1.1	1.4
75-79	155	131	28.1	18.4	21.3	20.6	1.2	1.3
80-84	101	114	28.9	20.3	31.7	45.6	1.2	1.3
85+	59	98	25.5	17.0	59.3	74.5	1.0	1.0
All ages	1476	1190			10.8	17.0	1.6	1.3
Incidence								
Raw			8.2	6.4				
WS			5.2	3.7				
ES			6.7	4.7				
BRD-S			7.8	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).

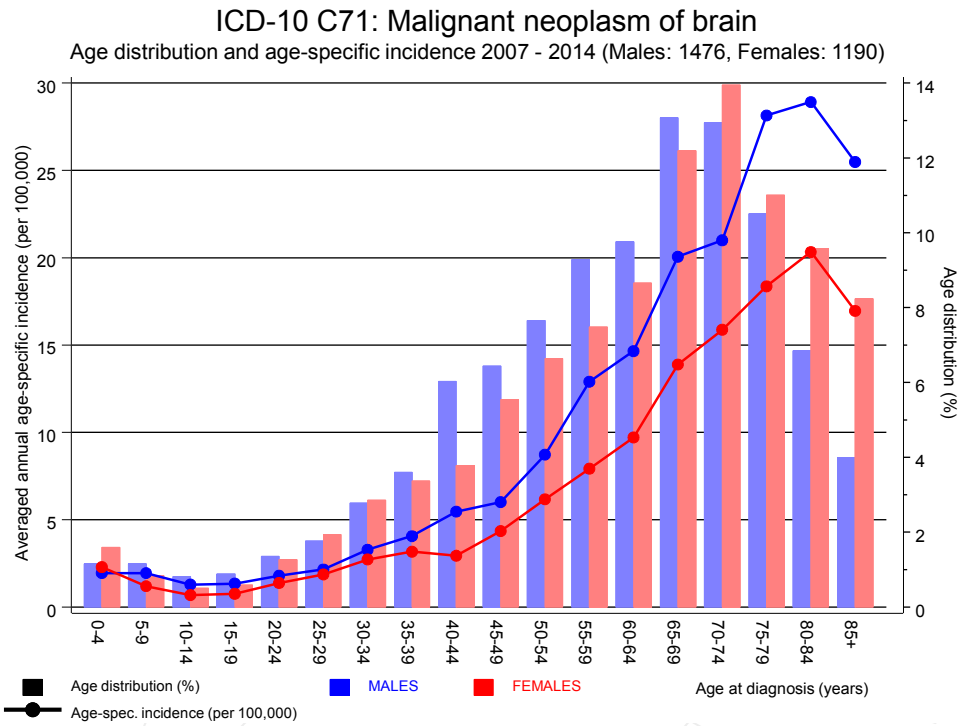


Figure 6. Age distribution and age-specific incidence

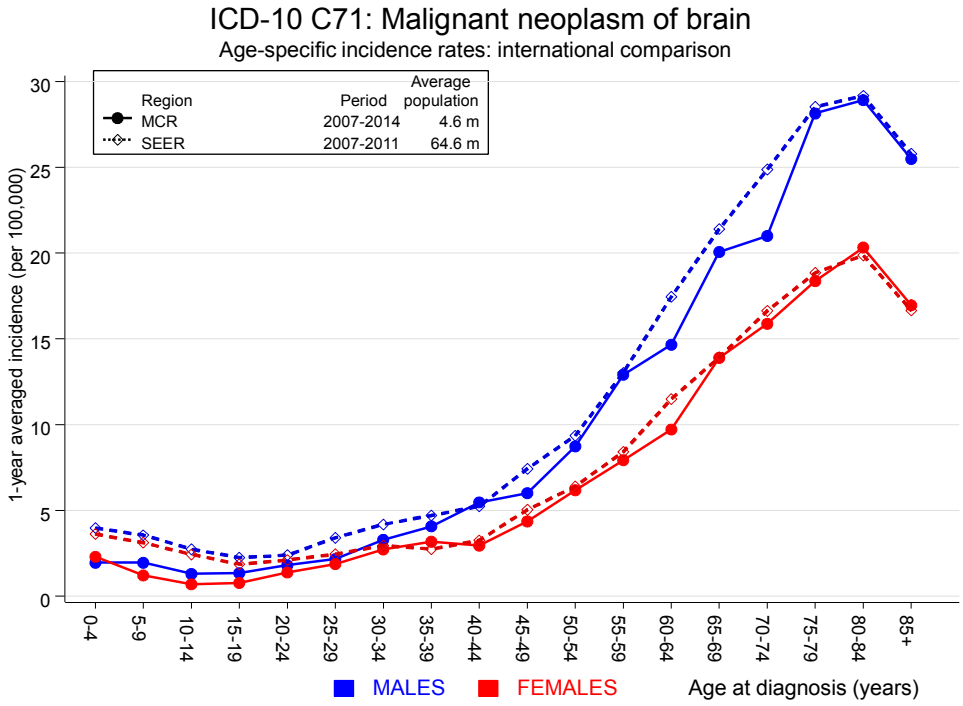


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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.

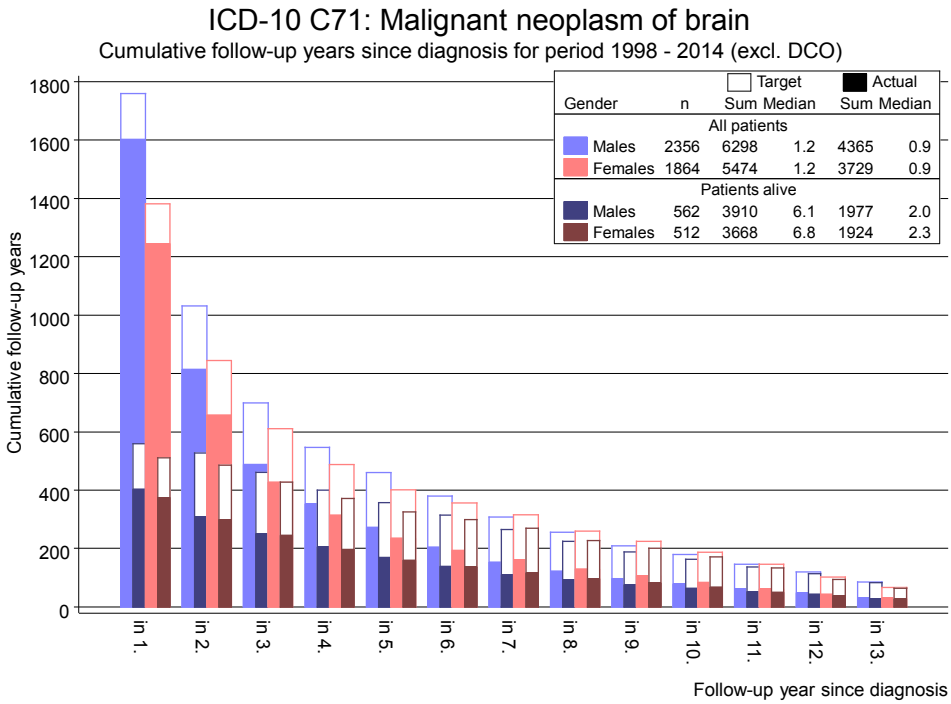


Figure 7. Cumulative follow-up years depending on time since diagnosis

The increase of the lost to follow-up rate can be interpreted as a consequence of a declining number of survivors over time.

Table 8a

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries for period 1998-2014
MALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C18	Colon	5	3.0	1.7	0.5	3.9		4.5	
C19-C20	Rectum	2	2.0	1.0	0.1	3.6		-0.0	
C25	Pancreas	3	1.2	2.6	0.5	7.5		4.2	
C30-C31	Sinuses	2	0.1	28.4	3.4	102.6	#	4.4	
C33-C34	Lung	3	4.1	0.7	0.1	2.1		-2.6	
C43	Malign. melanoma	3	1.7	1.7	0.4	5.0		2.8	
C61	Prostate	11	9.8	1.1	0.6	2.0		2.7	18.2
C62	Testis	2	0.4	4.6	0.6	16.6		3.5	
C64	Kidney	7	1.3	5.2	2.1	10.8	#	12.8	28.6
C67	Bladder	2	1.3	1.6	0.2	5.7		1.7	
C70-C72	CNS cancer	4	0.6	6.9	1.9	17.7	#	7.7	
C76-C79	CUP	2	0.5	3.7	0.4	13.3		3.3	
C82-C85	NHL	3	1.4	2.2	0.5	6.4		3.7	33.3
Other primaries		9	3.9	2.3	1.1	4.4	#	11.6	33.3
Not observed		0	4.0	0.0	0.0	0.9	#	-9.1	
All mult. primaries		58	35.4	1.6	1.2	2.1	#	51.1	13.8

Patients	2486
Median age at second malignancy (years)	65.6
Person-years	4419
Mean observation time (years)	1.8
Median observation time (years)	0.8

The occurrence of second malignancy is statistically significant.

Observed second primaries with count 1 are pooled in category “Other primaries”

Table 8b

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries for period 1998–2014
FEMALES

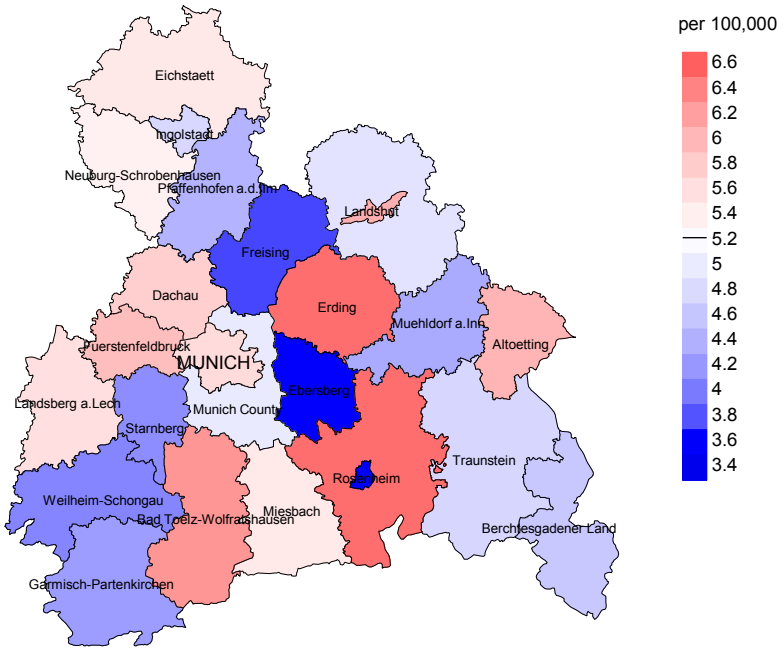
Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C18	Colon	3	2.0	1.5	0.3	4.4		2.6	
C19–C20	Rectum	3	1.0	3.1	0.6	9.1		5.3	33.3
C33–C34	Lung	2	1.8	1.1	0.1	4.0		0.5	
C43	Malign. melanoma	3	1.2	2.6	0.5	7.6		4.9	
C50	Breast	17	8.8	1.9	1.1	3.1	#	21.5	11.8
C54	Corpus uteri	5	1.4	3.5	1.1	8.2	#	9.4	
C56	Ovary	2	1.0	1.9	0.2	7.0		2.5	
C64	Kidney	2	0.6	3.5	0.4	12.7		3.8	
C70–C72	CNS cancer	3	0.4	7.9	1.6	23.1	#	6.9	
C82–C85	NHL	4	0.9	4.5	1.2	11.6	#	8.2	25.0
C91–C96	Leukaemia	3	0.4	8.2	1.7	24.0	#	6.9	
Other primaries		6	2.5	2.4	0.9	5.3		9.2	16.7
Not observed		0	3.6	0.0	0.0	1.0		-9.5	
All mult. primaries		53	25.5	2.1	1.6	2.7	#	72.2	9.4

Patients	2031
Median age at second malignancy (years)	66.4
Person-years	3812
Mean observation time (years)	1.9
Median observation time (years)	0.8

The occurrence of second malignancy is statistically significant.

Observed second primaries with count 1 are pooled in category “Other primaries”

Average incidence (world standard population) 2007 - 2014: Males



Average incidence (world standard population) 2007 - 2014: Females

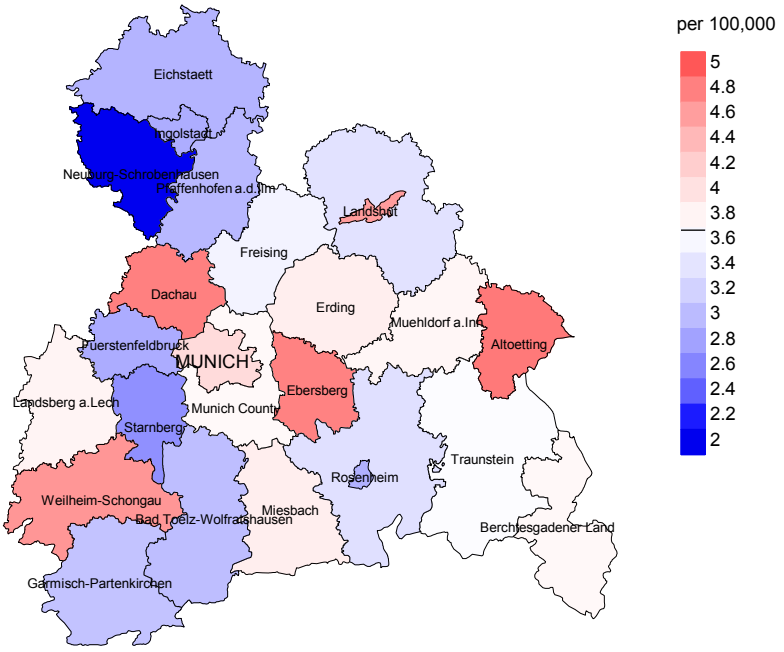
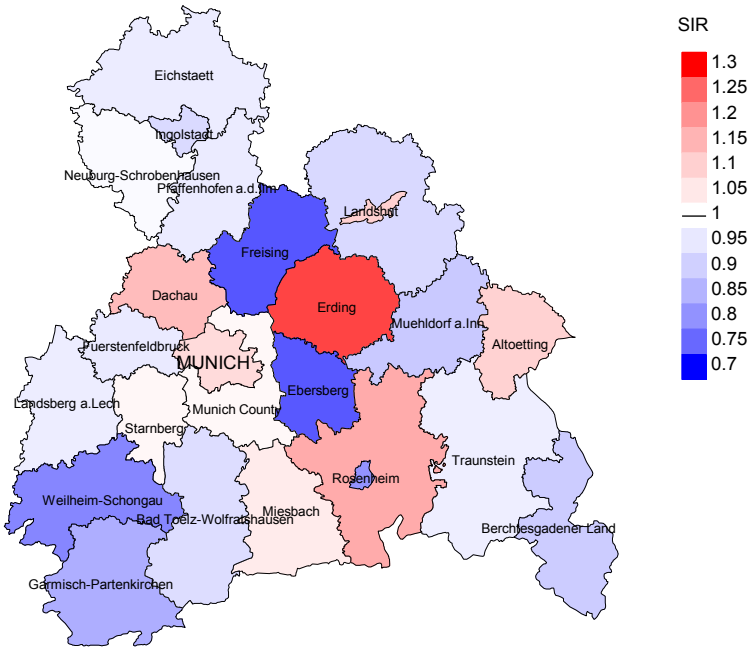


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 5.2/100,000 WS N=1,476, females 3.7/100,000 WS N=1,190).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,347 female residents (averaged) in the period from 2007 to 2014 a total of 40 women were identified with newly diagnosed brain cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 4.8/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 2.7 and 8.4/100,000.

Standardized incidence ratio (SIR) 2007 - 2014: Males



Standardized incidence ratio (SIR) 2007 - 2014: Females

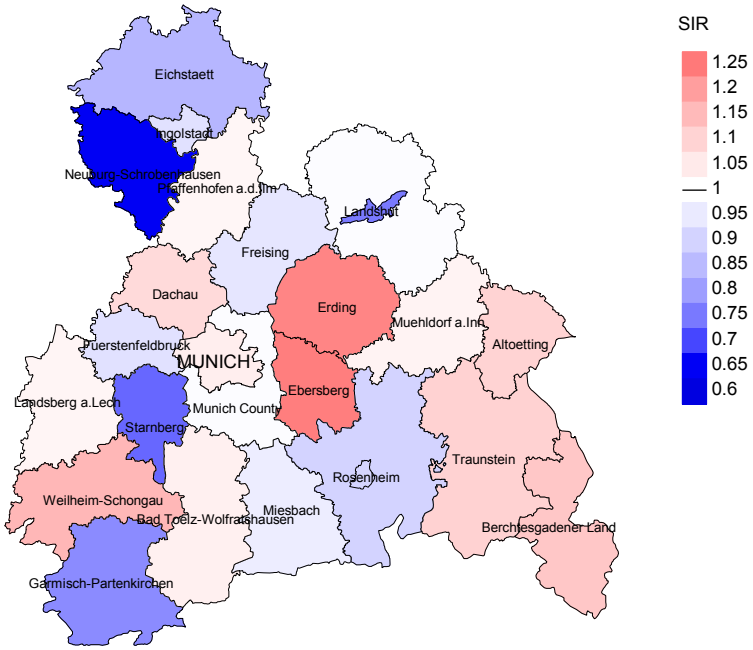


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=1,476, females N=1,190).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,924 female residents (averaged) in the period from 2007 to 2014 a total of 40 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 1.24. Though, the value of this parameter may vary with an underlying probability of 99% between 0.80 and 1.85, and is therefore not statistically striking.

MORTALITY

Table 10a

Patient cohorts of incident cancers by year of diagnosis, follow-up status, proportion of DCO, deaths among the annual cohorts and proportion of available death certificates (with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.64 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	180	97.2	23.9	158	87.8	96.2
1999	173	98.3	28.9	155	89.6	96.1
2000	195	98.5	25.6	162	83.1	93.8
2001	230	96.5	23.9	195	84.8	92.8
2002	331	99.1	19.0	278	84.0	98.6
2003	361	98.9	19.4	293	81.2	95.6
2004	330	97.3	22.1	270	81.8	97.8
2005	365	96.4	17.0	296	81.1	97.3
2006	287	96.9	13.9	241	84.0	97.9
2007	328	88.1	14.6	252	76.8	98.0
2008	383	86.7	13.8	299	78.1	98.0
2009	420	90.7	12.4	342	81.4	98.0
2010	368	91.0	14.1	305	82.9	99.0
2011	378	87.6	11.9	274	72.5	98.2
2012	371	87.6	11.6	251	67.7	96.8
2013	347	99.4	11.0	226	65.1	96.0
2014	73	95.9	42.5	53	72.6	100.0
1998-2014	5120	93.8	17.0	4050	79.1	97.2

Table 10b

Annual cohorts of incident cancers and deaths, proportion of death certificates and cases deceased the same year of cancer diagnosis
(incl. DCO)
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.64 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	180	130	95.4	67	37.2
1999	173	171	97.1	83	48.0
2000	195	156	94.9	75	38.5
2001	230	191	92.1	103	44.8
2002	331	231	97.0	123	37.2
2003	361	249	95.6	125	34.6
2004	330	267	97.4	121	36.7
2005	365	253	97.2	136	37.3
2006	287	263	96.2	108	37.6
2007	328	249	98.0	120	36.6
2008	383	261	97.3	125	32.6
2009	420	304	98.4	141	33.6
2010	368	348	98.6	145	39.4
2011	378	308	98.7	120	31.7
2012	371	292	97.3	124	33.4
2013	347	292	96.6	117	33.7
2014	73	238	97.9	50	68.5
1998-2014	5120	4203	97.0	1883	36.8

Table 10c

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 2.51 to 3.96 m as of 2002, and from 3.96 to 4.64 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	78.9	21.1	97.6
2000	156	78.8	21.2	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	93.6	6.4	99.2
2005	253	90.9	9.1	98.0
2006	263	90.9	9.1	96.8
2007	249	94.4	5.6	98.4
2008	261	94.6	5.4	98.4
2009	304	91.4	8.6	97.0
2010	348	94.0	6.0	98.0
2011	308	93.5	6.5	97.0
2012	292	93.5	6.5	98.6
2013	292	93.2	6.8	98.2
2014	238	96.2	3.8	97.4
1998-2014	4203	90.9	9.1	98.1

Table 11a

Medians of age at death according to the grouping in Table 10
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	63.4	71.2	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	65.4	68.3	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	66.6	71.0	66.4
2010	219	68.6	68.5	68.6	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	139	64.0	64.0	62.1	64.3
1998-2014	2297	65.6	65.6	66.1	65.7

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 11b

Medians of age at death according to the grouping in Table 10
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	78.6	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	115	69.4	68.6	75.1	69.2
2008	118	68.2	68.0	76.8	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	68.3	74.4	69.1
2013	128	67.0	66.9	74.7	66.9
2014	99	67.9	67.8	74.1	67.8
1998-2014	1906	68.8	68.2	74.3	69.0

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 12a

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	0.47	2.9	0.49	3.7	0.49	4.2	0.48
1999	75	6.7	0.86	4.4	0.81	6.0	0.84	7.2	0.87
2000	52	4.6	0.51	3.0	0.47	4.1	0.50	4.7	0.49
2001	85	7.3	0.75	4.4	0.66	6.4	0.73	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	129	6.9	0.79	4.3	0.76	5.8	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	0.58	4.9	0.60	5.8	0.59
2009	159	7.1	0.65	4.1	0.60	5.6	0.63	6.9	0.65
2010	210	9.3	1.02	5.3	0.92	7.2	0.97	8.8	1.01
2011	153	6.7	0.76	3.7	0.68	5.2	0.73	6.4	0.76
2012	153	6.7	0.78	3.9	0.69	5.2	0.74	6.3	0.78
2013	151	6.6	0.75	3.8	0.67	5.1	0.70	6.1	0.75
2014	135	5.9	3.75	3.6	4.37	4.8	3.89	5.4	3.65
1998-2014	2098	6.6	0.76	3.9	0.70	5.4	0.74	6.4	0.76

Table 12b

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	0.58	2.0	0.40	2.9	0.48	3.8	0.56
1999	60	5.1	0.70	3.2	0.73	4.0	0.71	4.5	0.69
2000	71	5.9	0.76	3.5	0.73	4.5	0.75	5.2	0.74
2001	74	6.1	0.63	3.5	0.62	4.5	0.62	5.4	0.63
2002	92	4.7	0.57	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	0.52	3.6	0.55	4.2	0.57
2006	112	5.6	0.92	3.0	0.83	3.9	0.87	4.7	0.90
2007	107	4.6	0.69	2.3	0.59	3.2	0.64	4.0	0.67
2008	113	4.9	0.68	2.8	0.62	3.6	0.66	4.1	0.68
2009	119	5.1	0.68	2.5	0.56	3.4	0.60	4.1	0.63
2010	117	5.0	0.72	2.6	0.66	3.5	0.70	4.2	0.72
2011	135	5.7	0.76	3.0	0.73	3.9	0.74	4.7	0.74
2012	120	5.1	0.69	2.7	0.60	3.6	0.64	4.2	0.68
2013	121	5.1	0.84	2.8	0.80	3.7	0.83	4.3	0.82
2014	94	4.0	2.54	2.2	3.55	2.9	3.10	3.3	2.95
1998-2014	1724	5.2	0.73	2.8	0.67	3.7	0.70	4.4	0.71

Table 13

Age distribution of age at death (cancer-related) for period 2007-2014
(**incl. multiple primaries**)

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4	9	0.4	0.4	4	0.3	0.3	5	0.5	0.5
5-9	18	0.8	1.3	8	0.7	1.0	10	1.1	1.6
10-14	13	0.6	1.9	8	0.7	1.6	5	0.5	2.2
15-19	12	0.6	2.4	7	0.6	2.2	5	0.5	2.7
20-24	9	0.4	2.8	5	0.4	2.6	4	0.4	3.1
25-29	19	0.9	3.7	13	1.1	3.7	6	0.6	3.8
30-34	19	0.9	4.6	12	1.0	4.7	7	0.8	4.5
35-39	41	1.9	6.5	27	2.2	6.9	14	1.5	6.0
40-44	89	4.1	10.6	57	4.7	11.5	32	3.4	9.5
45-49	145	6.7	17.4	88	7.2	18.7	57	6.1	15.6
50-54	138	6.4	23.8	86	7.0	25.7	52	5.6	21.2
55-59	174	8.1	31.9	102	8.3	34.0	72	7.8	29.0
60-64	237	11.0	42.9	142	11.6	45.6	95	10.2	39.2
65-69	321	14.9	57.8	179	14.6	60.2	142	15.3	54.5
70-74	351	16.3	74.1	207	16.9	77.1	144	15.5	70.0
75-79	256	11.9	86.0	136	11.1	88.2	120	12.9	83.0
80-84	175	8.1	94.1	93	7.6	95.8	82	8.8	91.8
85+	127	5.9	100.0	51	4.2	100.0	76	8.2	100.0
All ages	2153	100.0		1225	100.0		928	100.0	

Included in the statistics are 18.1% multiple primaries in males and 16.9% in females.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2014
(**incl. multiple primaries**)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4	4	5	0.5	0.24	0.6	0.26	33.3	33.3
5- 9	8	10	0.9	0.47	1.2	1.00	38.1	55.6
10-14	8	5	0.9	0.67	0.6	0.83	44.4	25.0
15-19	7	5	0.7	0.54	0.5	0.71	19.4	22.7
20-24	5	4	0.4	0.25	0.4	0.27	10.4	14.3
25-29	13	6	1.1	0.50	0.5	0.26	21.0	9.4
30-34	12	7	1.0	0.29	0.6	0.21	13.6	6.4
35-39	27	14	2.1	0.51	1.1	0.35	15.3	5.4
40-44	57	32	3.5	0.64	2.1	0.71	12.4	5.1
45-49	88	57	5.6	0.93	3.8	0.86	8.6	4.7
50-54	86	52	6.6	0.76	4.1	0.66	4.6	2.9
55-59	102	72	9.6	0.74	6.4	0.81	3.3	2.8
60-64	142	95	14.5	0.99	9.0	0.92	3.0	2.7
65-69	179	142	18.6	0.93	13.6	0.97	2.5	2.7
70-74	207	144	22.8	1.08	13.8	0.86	2.3	2.2
75-79	136	120	24.7	0.88	16.8	0.92	1.6	1.9
80-84	93	82	26.6	0.92	14.6	0.72	1.3	1.2
85+	51	76	22.0	0.86	13.2	0.78	0.8	0.9
All ages	1225	928					2.5	2.1
Mortality								
Raw			6.8	0.83	5.0	0.78		
WS			3.9	0.75	2.6	0.71		
ES			5.3	0.79	3.5	0.74		
BRD-S			6.4	0.82	4.1	0.76		
PYLL-70								
per 100,000			72.1		48.7			
ES			67.4		47.2			
AYLL-70			15.7		15.2			

The rates underestimate the prognosis if other synchronous cancers are prognostic unfavorable.

Table 15a

Multiple primaries in deaths in period 1998–2014
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	26	7.1	22	84.6	3	11.5	1	3.8
C19–C20	Rectum	21	5.8	19	90.5	1	4.8	1	4.8
C25	Pancreas	5	1.4	1	20.0	2	40.0	2	40.0
C33–C34	Lung	17	4.7	7	41.2	3	17.6	7	41.2
C43	Malign. melanoma	24	6.6	19	79.2			5	20.8
C44	Skin others	18	4.9	9	50.0	4	22.2	5	27.8
C46,C49	Soft tissue	4	1.1	2	50.0			2	50.0
C61	Prostate	107	29.3	96	89.7	6	5.6	5	4.7
C62	Testis	7	1.9	5	71.4	2	28.6		
C64	Kidney	15	4.1	9	60.0	1	6.7	5	33.3
C65	Renal pelvis	4	1.1	1	25.0			3	75.0
C67	Bladder	27	7.4	24	88.9	1	3.7	2	7.4
C70–C72	CNS cancer	18	4.9			4	22.2	14	77.8
C76–C79	CUP	6	1.6	3	50.0			3	50.0
C82–C85	NHL	16	4.4	14	87.5	2	12.5		
C90	Mult. myeloma	6	1.6	2	33.3	1	16.7	3	50.0
C91–C96	Leukaemia	6	1.6	2	33.3	2	33.3	2	33.3
Other primaries		31	8.5	18	58.1	3	9.7	10	32.3
All mult. primaries		365	100.0	259	71.0	35	9.6	71	19.5

Multiple primaries with number of cases 1 to 3 are pooled in category “Other primaries”

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 multiple malignancy.

Table 15b

Multiple primaries in deaths in period 1998–2014
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C18	Colon	13	5.0	9	69.2	1	7.7	3	23.1
C19–C20	Rectum	6	2.3	2	33.3	2	33.3	2	33.3
C25	Pancreas	3	1.2	1	33.3			2	66.7
C33–C34	Lung	4	1.6	4	100.0				
C43	Malign. melanoma	18	7.0	15	83.3			3	16.7
C44	Skin others	8	3.1	4	50.0	1	12.5	3	37.5
C46,C49	Soft tissue	4	1.6	2	50.0	1	25.0	1	25.0
C50	Breast	83	32.2	64	77.1	8	9.6	11	13.3
C53	Cervix uteri	8	3.1	7	87.5			1	12.5
C54	Corpus uteri	16	6.2	14	87.5			2	12.5
C56	Ovary	9	3.5	7	77.8	1	11.1	1	11.1
C64	Kidney	8	3.1	6	75.0	2	25.0		
C67	Bladder	7	2.7	4	57.1			3	42.9
C69	Eye melanoma	3	1.2	3	100.0				
C70–C72	CNS cancer	25	9.7			8	32.0	17	68.0
C73	Thyroid	7	2.7	7	100.0				
C82–C85	NHL	8	3.1	4	50.0			4	50.0
C91–C96	Leukaemia	9	3.5	5	55.6			4	44.4
Other primaries		19	7.4	12	63.2	1	5.3	6	31.6
All mult. primaries		258	100.0	170	65.9	25	9.7	63	24.4

Multiple primaries with number of cases 1 to 2 are pooled in category “Other primaries”

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 multiple malignancy.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2014
(**First primaries only** *)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4	3	5	0.3	0.19	0.6	0.26	30.0	38.5
5- 9	7	10	0.8	0.41	1.2	1.00	35.0	55.6
10-14	8	5	0.9	0.67	0.6	0.83	44.4	26.3
15-19	6	5	0.6	0.46	0.5	0.71	18.2	25.0
20-24	5	4	0.4	0.25	0.4	0.27	11.6	15.4
25-29	12	6	1.0	0.48	0.5	0.29	21.8	10.2
30-34	12	6	1.0	0.30	0.5	0.18	14.0	6.3
35-39	27	14	2.1	0.52	1.1	0.36	16.4	6.2
40-44	53	29	3.3	0.64	1.9	0.76	12.5	5.2
45-49	86	56	5.4	0.93	3.7	0.90	9.4	5.5
50-54	83	49	6.4	0.76	3.8	0.68	5.2	3.3
55-59	95	62	8.9	0.74	5.5	0.78	3.6	2.9
60-64	130	86	13.2	1.06	8.1	0.92	3.3	3.0
65-69	155	121	16.1	0.95	11.6	0.98	2.7	3.0
70-74	168	118	18.5	1.10	11.3	0.93	2.4	2.3
75-79	99	100	18.0	0.93	14.0	0.92	1.6	2.1
80-84	74	71	21.2	0.94	12.7	0.75	1.4	1.4
85+	31	68	13.4	0.82	11.8	0.78	0.7	1.0
All ages	1054	815					2.7	2.4
Mortality								
Raw			5.8	0.83	4.4	0.79		
WS			3.5	0.74	2.4	0.71		
ES			4.7	0.79	3.1	0.74		
BRD-S			5.5	0.82	3.6	0.76		
PYLL-70								
per 100,000			67.9		45.9			
ES			63.2		44.9			
AYLL-70			16.0		15.9			

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2014
(**Single primaries only** *)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4	3	5	0.3	0.19	0.6	0.28	30.0	38.5
5- 9	7	10	0.8	0.41	1.2	1.00	35.0	55.6
10-14	8	5	0.9	0.67	0.6	0.83	44.4	27.8
15-19	6	4	0.6	0.46	0.4	0.57	18.2	22.2
20-24	5	4	0.4	0.25	0.4	0.27	12.8	16.7
25-29	11	5	0.9	0.44	0.4	0.24	21.6	8.9
30-34	12	6	1.0	0.31	0.5	0.18	14.1	7.2
35-39	25	14	1.9	0.50	1.1	0.39	15.8	6.8
40-44	50	29	3.1	0.61	1.9	0.78	12.6	5.7
45-49	86	54	5.4	0.93	3.6	0.89	10.0	5.9
50-54	81	48	6.3	0.74	3.7	0.71	5.6	3.6
55-59	94	59	8.9	0.75	5.3	0.76	4.0	3.1
60-64	127	83	12.9	1.09	7.8	0.91	3.7	3.4
65-69	150	119	15.6	0.93	11.4	0.98	3.2	3.5
70-74	163	115	17.9	1.08	11.0	0.94	2.9	2.8
75-79	97	96	17.6	0.92	13.5	0.89	2.0	2.4
80-84	73	70	20.9	0.92	12.5	0.74	1.8	1.7
85+	30	67	13.0	0.79	11.6	0.77	0.9	1.2
All ages	1028	793					3.3	2.8
Mortality								
Raw			5.7	0.82	4.2	0.78		
WS			3.4	0.74	2.3	0.70		
ES			4.5	0.78	3.0	0.74		
BRD-S			5.4	0.81	3.5	0.76		
PYLL-70								
per 100,000			66.2		44.5			
ES			61.7		43.6			
AYLL-70			16.0		15.8			

* See corresponding tables with multiple primaries.

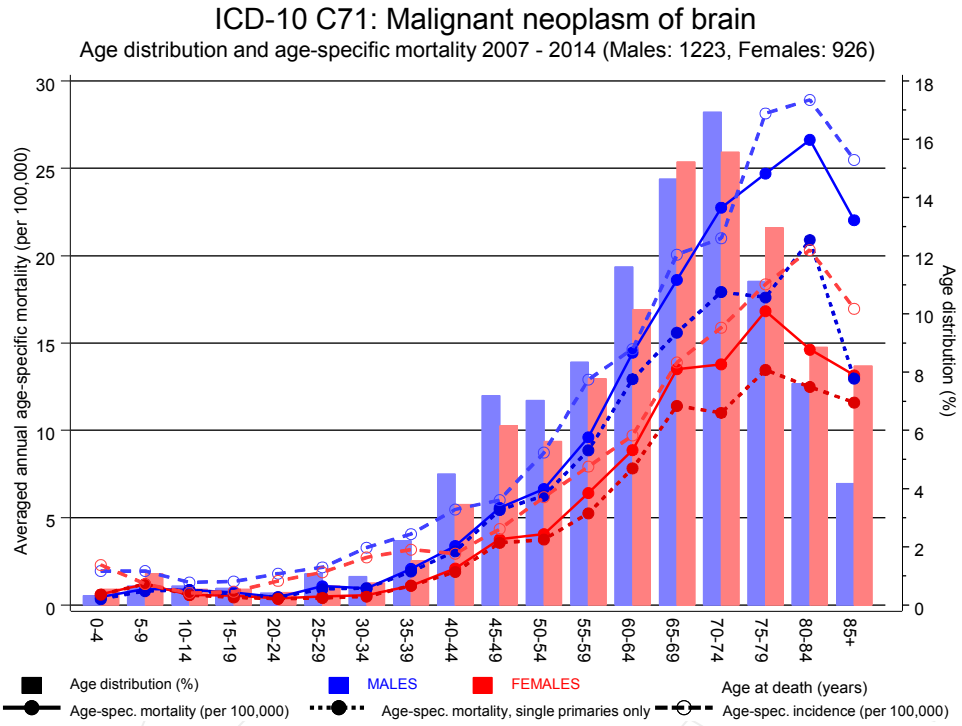
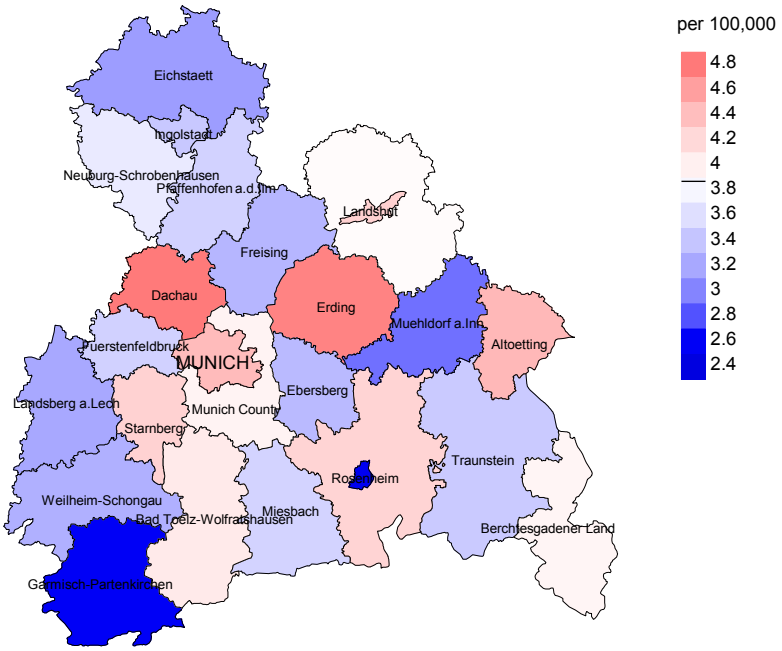


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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 - 2014: Males



Average mortality (world standard population) 2007 - 2014: Females

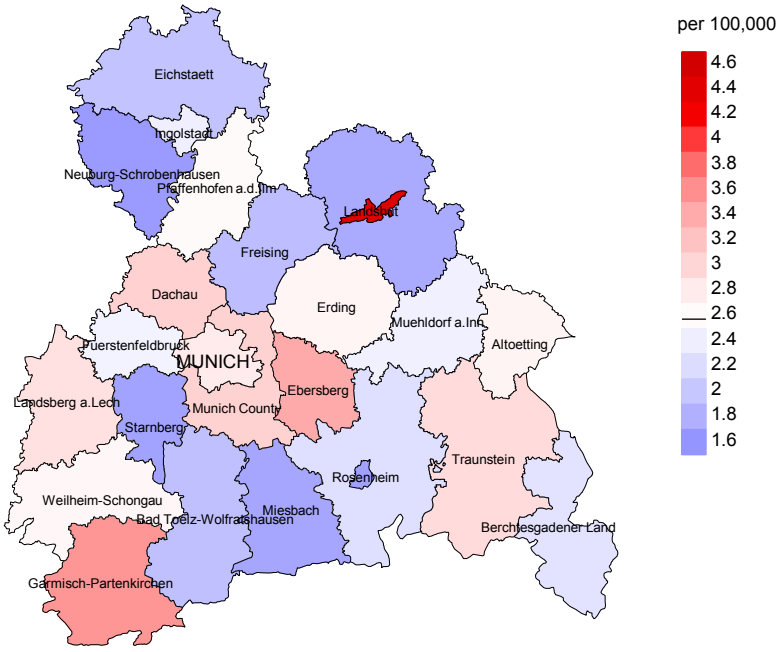
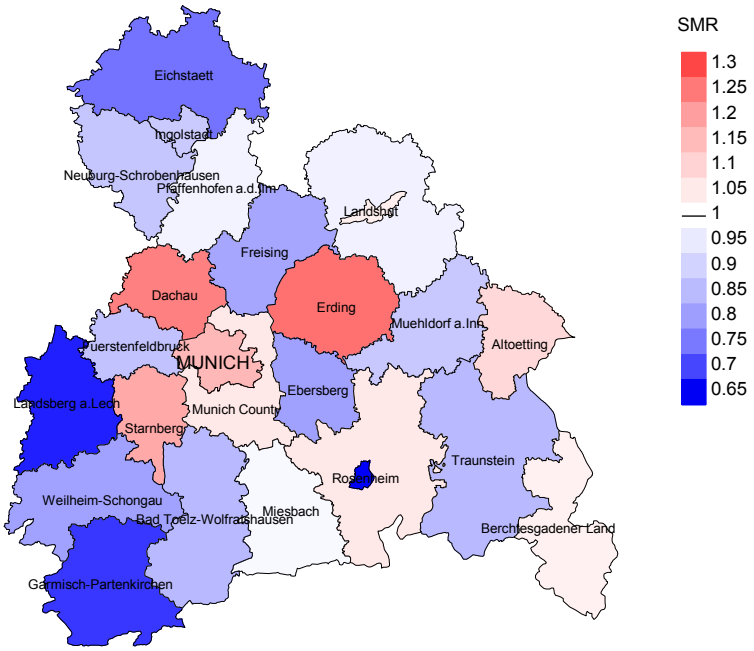


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2014. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 3.9/100,000 WS N=1,214, females 2.6/100,000 WS N=916).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,347 female residents (averaged) in the period from 2007 to 2014 a total of 34 women died from brain cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 3.4/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.9 and 6.1/100,000.

Standardized mortality ratio (SMR) 2007 - 2014: Males



Standardized mortality ratio (SMR) 2007 - 2014: Females

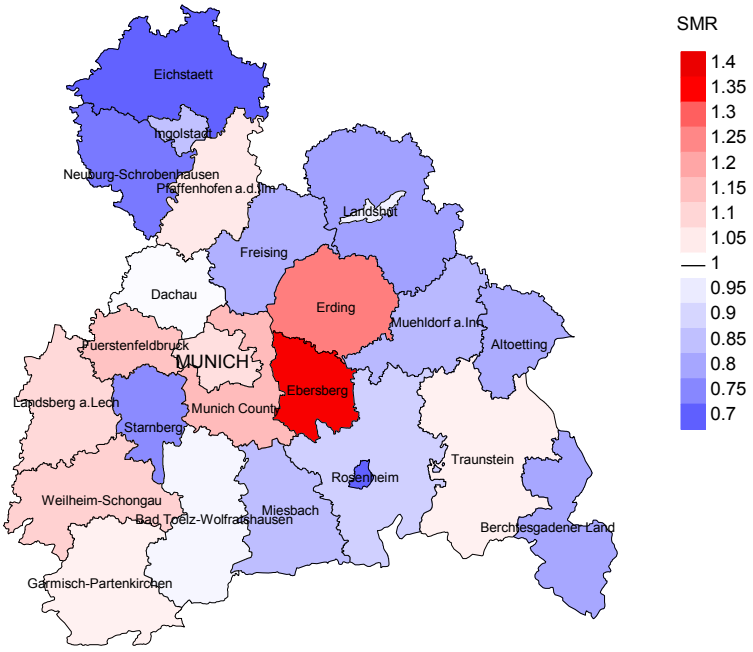


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=1,214, females N=916).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,924 female residents (averaged) in the period from 2007 to 2014 a total of 34 women died from brain cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.37. Though, the value of this parameter may vary with an underlying probability of 99% between 0.84 and 2.09, 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

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

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