Munich Cancer Registry

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ICD-10 C70-C72: Brain/nerves cancer

Incidence and Mortality

Year of diagnosis	1998-2014
Patients	5,338
Diseases	5,346
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/bC7072E-ICD-10-C70-C72-Brain-nerves-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
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

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	188	48	25.5	10.1	86.7	97.3	
1999	176	50	28.4	10.2	89.2	98.3	
2000	199	50	25.1	11.1	81.9	98.0	
2001	235	55	23.4	9.4	84.3	96.6	
2002	340	63	18.5	12.6	82.6	98.8	#
2003	379	72	19.0	11.3	80.2	98.9	
2004	338	73	21.6	13.0	80.8	97.3	
2005	375	62	16.5	13.9	80.0	96.5	
2006	299	40	13.4	12.7	81.6	95.3	
2007	347	48	13.8	14.1	73.8	86.2	#
2008	402	54	13.4	14.2	76.1	85.1	
2009	441	52	11.8	12.5	78.7	88.4	
2010	382	52	13.6	15.7	81.2	90.3	
2011	402	45	11.2	16.4	69.9	86.3	
2012	398	44	11.1	14.6	66.1	86.7	
2013	368	38	10.3	16.0	62.5	99.5	
2014	77	32	41.6	36.4	70.1	96.1	##
1998-2014	5346	878	16.4	13.7	77.3	93.0	

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	188	97	91	51.6
1999	176	88	88	50.0
2000	199	103	96	51.8
2001	235	116	119	49.4
2002	340	175	165	51.5
2003	379	197	182	52.0
2004	338	168	170	49.7
2005	375	199	176	53.1
2006	299	170	129	56.9
2007	347	186	161	53.6
2008	402	228	174	56.7
2009	441	254	187	57.6
2010	382	216	166	56.5
2011	402	212	190	52.7
2012	398	212	186	53.3
2013	368	214	154	58.2
2014	77	37	40	48.1
1998-2014	5346	2872	2474	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	97	91	8.8	7.7	6.2	5.3	7.9	6.4	8.9	7.3
1999	88	88	7.9	7.4	5.4	4.5	7.2	5.8	8.4	6.6
2000	103	96	9.0	8.0	6.5	4.9	8.3	6.2	9.8	7.1
2001	116	119	10.0	9.8	6.8	5.8	9.1	7.5	10.6	8.7
2002	175	165	9.4	8.4	6.7	4.8	8.3	6.3	9.4	7.6
2003	197	182	10.5	9.2	7.3	5.7	9.3	7.3	10.8	8.3
2004	168	170	8.9	8.6	5.7	5.7	7.7	6.7	9.0	7.5
2005	199	176	10.5	8.8	7.1	5.3	8.9	6.7	10.3	7.6
2006	170	129	8.9	6.4	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	228	174	10.2	7.5	6.8	4.8	8.7	5.8	10.2	6.5
2009	254	187	11.4	8.0	7.1	4.9	9.3	6.2	11.0	6.9
2010	216	166	9.6	7.1	6.2	4.1	7.9	5.1	9.2	5.9
2011	212	190	9.3	8.1	5.9	4.4	7.6	5.8	8.8	6.9
2012	212	186	9.3	7.9	6.1	4.8	7.6	5.9	8.8	6.7
2013	214	154	9.4	6.5	6.0	3.9	7.7	4.9	8.7	5.6
2014	37	40	1.6	1.7	0.9	0.7	1.3	1.0	1.5	1.2
1998-2014	2872	2474	9.0	7.4	5.9	4.4	7.6	5.6	8.8	6.4

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	188	57.0	18.7	1.8	90.6	32.4	46.7	57.8	71.5	79.8
1999	176	59.9	17.8	1.6	93.4	36.5	50.6	61.6	72.6	79.4
2000	199	59.1	18.5	2.9	93.8	33.7	48.4	62.2	71.7	79.7
2001	235	60.3	18.0	1.0	92.0	37.0	50.8	62.1	73.3	80.4
2002	340	59.9	18.4	0.8	91.2	32.6	50.7	63.0	72.9	80.9
2003	379	58.4	18.5	0.6	95.4	31.5	45.7	62.0	72.9	79.7
2004	338	59.8	19.0	0.0	92.8	34.1	48.8	63.1	73.7	81.9
2005	375	59.6	19.5	0.8	94.3	32.8	47.5	64.4	73.2	81.3
2006	299	60.5	18.6	3.0	97.0	34.7	48.3	64.2	73.2	81.6
2007	347	58.7	19.6	0.8	93.5	31.1	44.4	62.8	73.3	80.9
2008	402	59.5	19.9	0.1	94.1	31.0	48.2	64.2	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	382	61.6	19.5	0.1	91.6	37.0	51.6	67.0	75.1	82.3
2011	402	60.7	18.3	1.7	94.0	37.2	48.4	63.6	75.6	81.8
2012	398	60.4	20.1	0.0	96.0	32.8	48.6	65.1	74.1	82.9
2013	368	61.1	18.6	0.1	93.9	37.1	52.2	65.7	74.1	80.7
2014	77	69.7	15.4	31.8	95.0	49.7	58.7	72.1	83.2	87.7
1998-2014	5346	60.1	18.9	0.0	97.0	34.3	49.3	63.7	73.9	81.4

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	97	54.7	15.7	3.4	83.3	32.6	46.3	55.8	65.5	74.6
1999	88	59.0	16.3	1.6	85.5	38.9	51.1	60.4	71.2	77.6
2000	103	56.4	18.2	4.1	88.2	30.0	46.6	59.4	68.6	77.6
2001	116	58.6	17.3	1.0	91.2	37.0	50.7	60.2	71.5	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	228	58.6	18.5	1.2	94.1	31.9	47.6	63.4	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	216	60.0	19.1	0.1	90.8	34.4	49.1	63.9	73.8	81.0
2011	212	58.6	18.4	1.7	91.9	36.6	44.9	59.7	73.7	80.5
2012	212	59.6	20.5	0.3	96.0	31.5	47.3	65.2	73.8	80.8
2013	214	60.1	18.5	0.1	93.9	37.3	51.9	64.6	73.6	77.9
2014	37	67.5	15.1	34.5	93.6	43.5	58.4	66.4	80.9	87.5
1998-2014	2872	58.7	18.4	0.1	96.0	33.9	47.8	61.9	72.0	79.3

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	91	59.5	21.3	1.8	90.6	30.9	47.5	62.9	77.2	83.4
1999	88	60.7	19.3	4.7	93.4	33.0	49.6	64.1	75.9	84.0
2000	96	62.0	18.4	2.9	93.8	35.8	55.5	66.7	73.8	80.6
2001	119	62.0	18.5	2.3	92.0	36.1	51.0	64.5	76.0	81.8
2002	165	63.9	17.8	2.6	91.2	37.8	54.3	67.2	78.1	83.0
2003	182	60.2	17.9	0.6	95.4	36.2	48.9	62.9	74.1	80.3
2004	170	60.0	21.5	0.0	92.8	30.1	51.6	65.1	76.4	82.5
2005	176	61.0	19.3	2.7	91.7	34.5	48.1	65.1	75.3	83.4
2006	129	63.6	19.7	7.3	97.0	35.0	54.1	67.4	77.7	86.1
2007	161	60.4	20.3	0.8	93.5	30.7	44.4	65.8	77.7	82.3
2008	174	60.7	21.7	0.1	92.9	29.1	48.9	66.2	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	166	63.7	20.0	0.6	91.6	41.8	56.6	68.9	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	186	61.4	19.7	0.0	90.4	34.9	50.1	65.0	74.5	83.4
2013	154	62.4	18.8	0.7	92.8	37.1	52.8	66.4	76.1	84.4
2014	40	71.7	15.6	31.8	95.0	51.2	59.8	73.6	84.9	91.8
1998-2014	2474	61.9	19.4	0.0	97.0	34.8	51.4	65.9	76.3	83.3

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	43	1.5	1.5	20	1.3	1.3	23	1.8	1.8
5-9	31	1.1	2.6	20	1.3	2.6	11	0.9	2.7
10-14	18	0.6	3.3	12	0.8	3.3	6	0.5	3.2
15-19	22	0.8	4.0	14	0.9	4.2	8	0.6	3.8
20-24	38	1.3	5.4	22	1.4	5.6	16	1.3	5.1
25-29	55	2.0	7.3	30	1.9	7.6	25	2.0	7.1
30-34	82	2.9	10.3	44	2.8	10.4	38	3.0	10.1
35-39	104	3.7	14.0	62	4.0	14.4	42	3.3	13.4
40-44	150	5.3	19.3	100	6.4	20.8	50	4.0	17.4
45-49	171	6.1	25.3	99	6.4	27.1	72	5.7	23.1
50-54	203	7.2	32.6	117	7.5	34.6	86	6.8	30.0
55-59	239	8.5	41.0	145	9.3	43.9	94	7.5	37.4
60-64	258	9.2	50.2	148	9.5	53.4	110	8.7	46.2
65-69	352	12.5	62.7	200	12.8	66.3	152	12.1	58.3
70-74	372	13.2	75.9	202	13.0	79.2	170	13.5	71.8
75-79	298	10.6	86.5	159	10.2	89.4	139	11.0	82.8
80-84	222	7.9	94.4	106	6.8	96.2	116	9.2	92.1
85+	159	5.6	100.0	59	3.8	100.0	100	7.9	100.0
All ages	2817	100.0		1559	100.0		1258	100.0	

Included in the statistics are 18.3% multiple primaries in males and 17.4% 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=161 %	Females DCO rate n=204 %	Males Prop.all cancers n=91183 %	Females Prop.all cancers n=89596 %
0- 4	20	23	2.3	2.8			11.2	16.7
5- 9	20	11	2.3	1.3	5.0		20.8	14.1
10-14	12	6	1.3	0.7			12.0	6.7
15-19	14	8	1.4	0.9	7.1		6.5	4.8
20-24	22	16	2.0	1.5	4.5		5.9	5.1
25-29	30	25	2.5	2.0	3.3		5.4	3.8
30-34	44	38	3.5	3.0		5.3	5.7	3.3
35-39	62	42	4.8	3.3	3.2		5.4	2.1
40-44	100	50	6.1	3.3	2.0		5.5	1.3
45-49	99	72	6.3	4.7	2.0	1.4	3.1	1.3
50-54	117	86	9.0	6.7	3.4	8.1	2.4	1.3
55-59	145	94	13.7	8.4	3.4	5.3	2.0	1.3
60-64	147	110	15.0	10.4	5.4	6.4	1.4	1.2
65-69	200	151	20.8	14.5	6.0	6.6	1.3	1.3
70-74	201	169	22.1	16.2	10.4	10.7	1.2	1.4
75-79	159	139	28.9	19.5	21.4	20.1	1.3	1.4
80-84	106	116	30.3	20.7	30.2	44.8	1.2	1.3
85+	59	100	25.5	17.3	59.3	74.0	1.0	1.0
All ages	1557	1256			10.3	16.2	1.7	1.4
Incidence								
Raw			8.6	6.7				
WS			5.6	4.0				
ES			7.1	5.0				
BRD-S			8.2	5.8				

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).

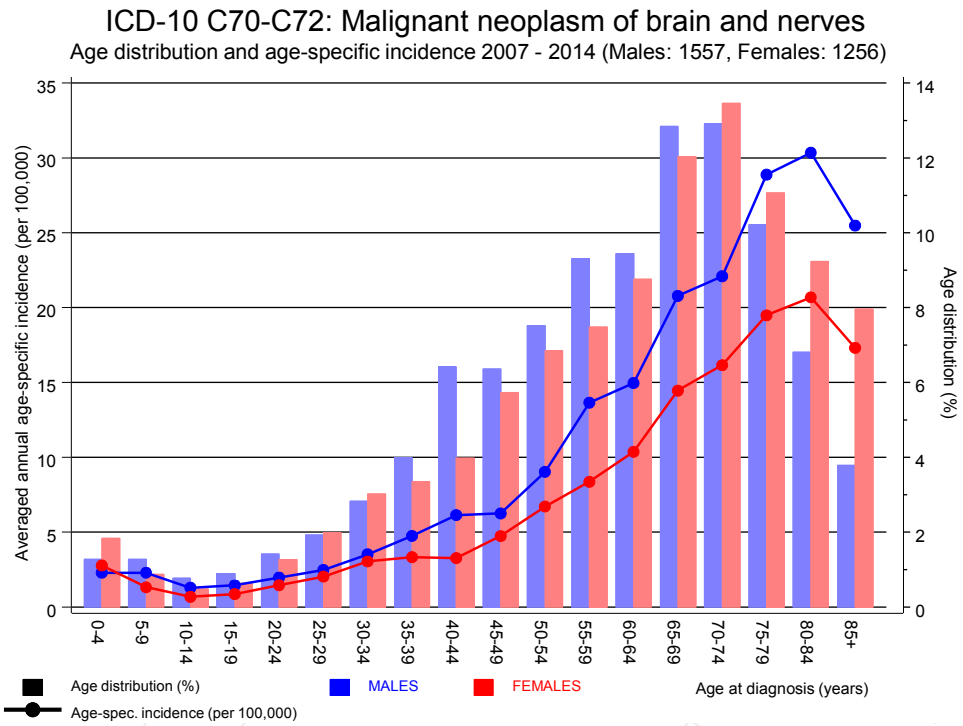


Figure 6. Age distribution and age-specific incidence

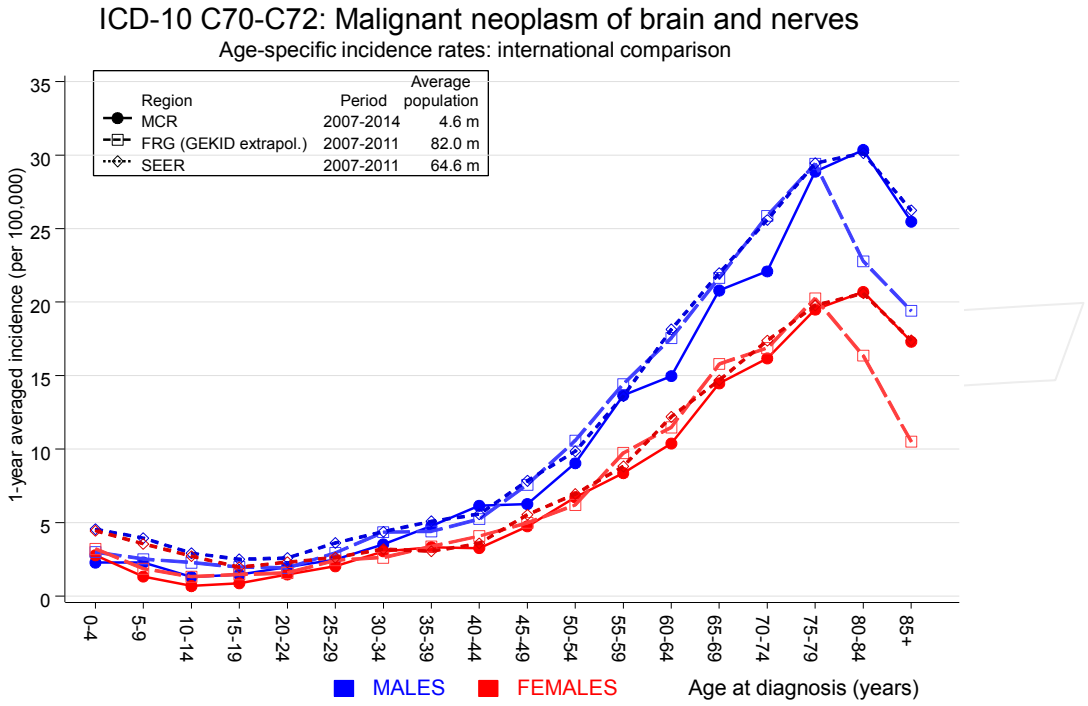


Figure 6a. Age-specific incidence in MCR registry areas compared to Germany (FRG, GEKID extrapolation) and SEER (Surveillance, Epidemiology, and End Results, USA).

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.

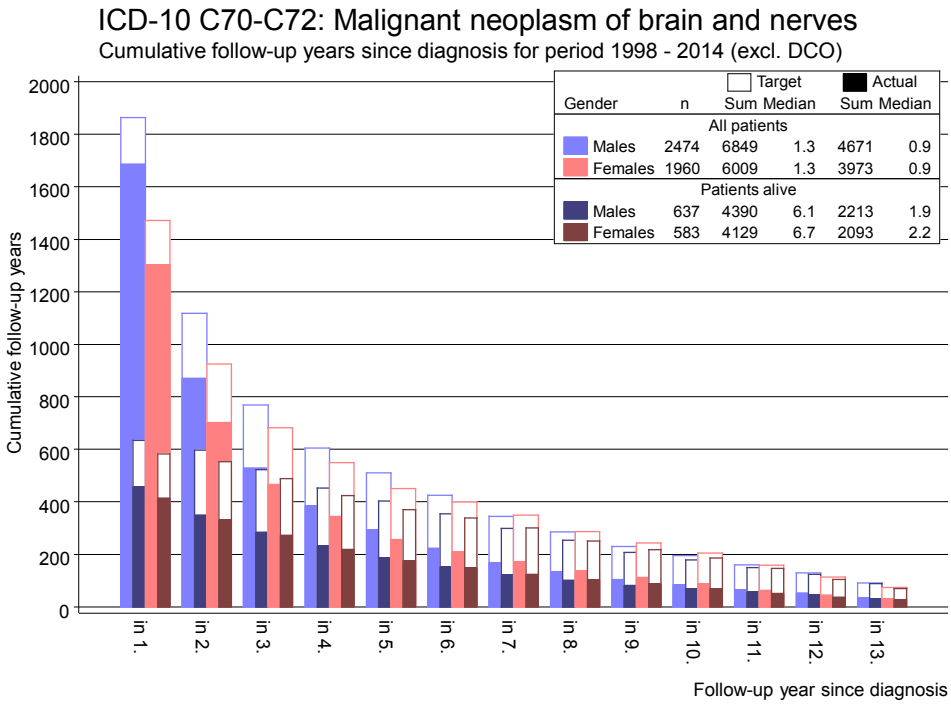


Figure 7. Cumulative follow-up years depending on time since diagnosis

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 %
C16	Stomach	2	1.3	1.5	0.2	5.4		1.4	
C18	Colon	5	3.2	1.5	0.5	3.6		3.7	
C19-C20	Rectum	2	2.1	0.9	0.1	3.4		-0.3	
C25	Pancreas	3	1.2	2.4	0.5	7.1		3.7	
C30-C31	Sinuses	2	0.1	26.8	3.2	96.7	#	4.1	
C33-C34	Lung	3	4.4	0.7	0.1	2.0		-3.0	
C43	Malign. melanoma	5	1.9	2.7	0.9	6.3		6.7	20.0
C61	Prostate	11	10.4	1.1	0.5	1.9		1.2	18.2
C62	Testis	3	0.5	6.4	1.3	18.7	#	5.4	
C64	Kidney	7	1.4	4.9	2.0	10.2	#	11.8	28.6
C67	Bladder	2	1.4	1.5	0.2	5.3		1.4	
C70-C72	CNS cancer	5	0.6	8.1	2.6	18.9	#	9.3	
C76-C79	CUP	2	0.6	3.5	0.4	12.5		3.0	
C82-C85	NHL	3	1.5	2.1	0.4	6.0		3.3	33.3
Other primaries		9	3.1	2.9	1.3	5.5	#	12.4	44.4
Not observed		0	4.0	0.0	0.0	0.9	#	-8.4	
All mult. primaries		64	37.7	1.7	1.3	2.2	#	55.7	15.6

Patients	2603
Median age at second malignancy (years)	66.1
Person-years	4723
Mean observation time (years)	1.8
Median observation time (years)	0.9

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

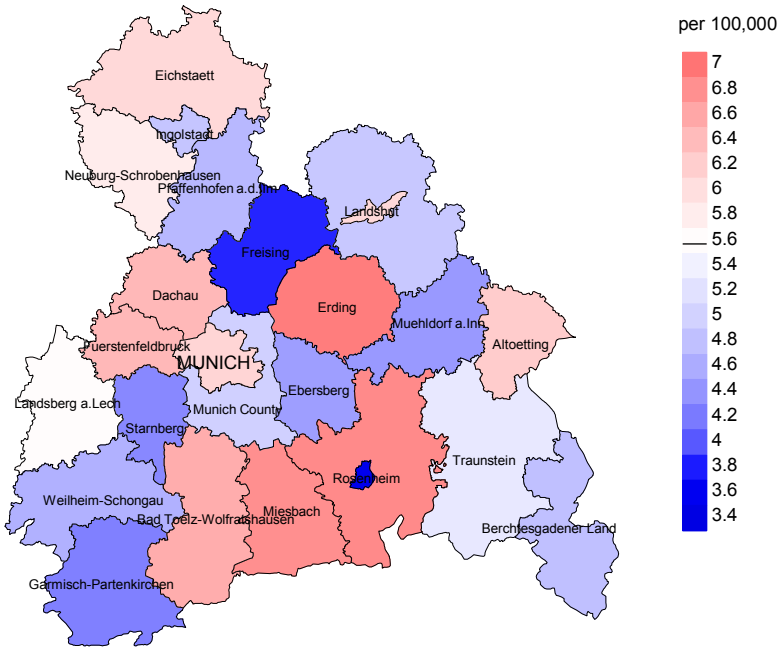
Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C18	Colon	5	2.2	2.3	0.7	5.4		7.0	20.0
C19–C20	Rectum	3	1.0	2.9	0.6	8.4		4.8	33.3
C33–C34	Lung	2	2.0	1.0	0.1	3.7		0.1	
C43	Malign. melanoma	3	1.2	2.4	0.5	7.1		4.4	
C50	Breast	19	9.5	2.0	1.2	3.1	#	23.5	10.5
C54	Corpus uteri	5	1.5	3.3	1.1	7.6	#	8.6	
C56	Ovary	2	1.1	1.8	0.2	6.5		2.2	
C64	Kidney	2	0.6	3.2	0.4	11.7		3.4	
C70–C72	CNS cancer	3	0.4	7.4	1.5	21.5	#	6.4	
C82–C85	NHL	4	1.0	4.2	1.1	10.8	#	7.5	25.0
C90	Mult. myeloma	2	0.3	7.1	0.9	25.7		4.2	
C91–C96	Leukaemia	3	0.4	7.6	1.6	22.2	#	6.4	
Other primaries		5	2.4	2.1	0.7	4.9		6.4	20.0
Not observed		0	3.9	0.0	0.0	0.9	#	-9.7	
All mult. primaries		58	27.5	2.1	1.6	2.7	#	75.2	10.3

Patients	2127
Median age at second malignancy (years)	66.5
Person-years	4055
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

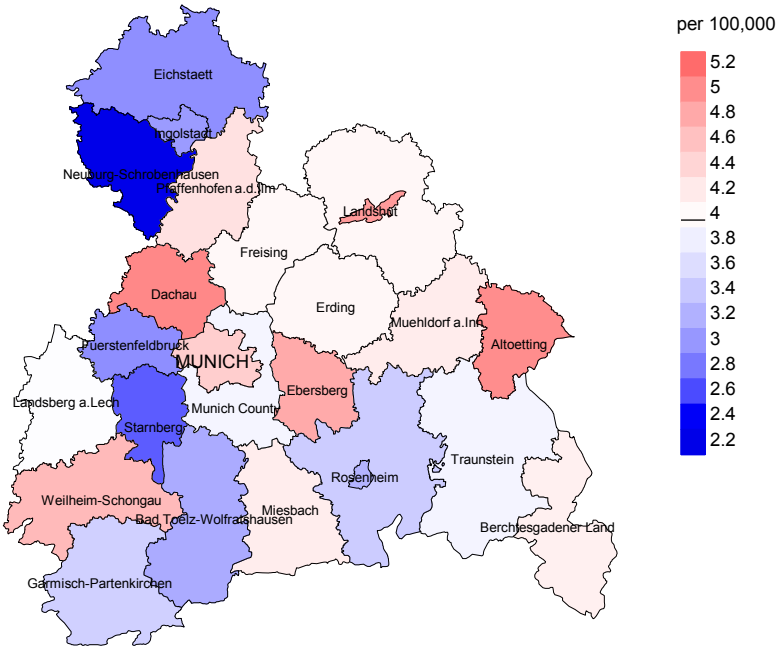
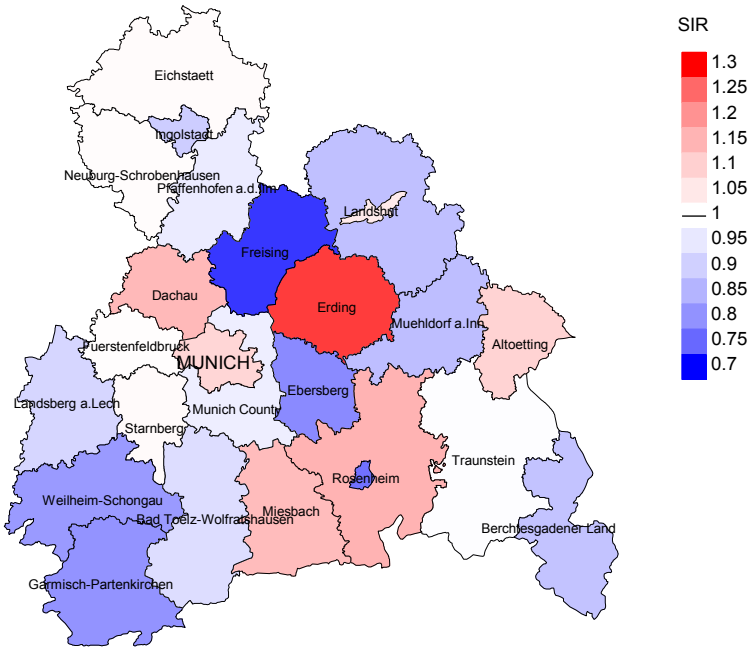


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 5.6/100,000 WS N=1,557, females 4.0/100,000 WS N=1,256).

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/nerves 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

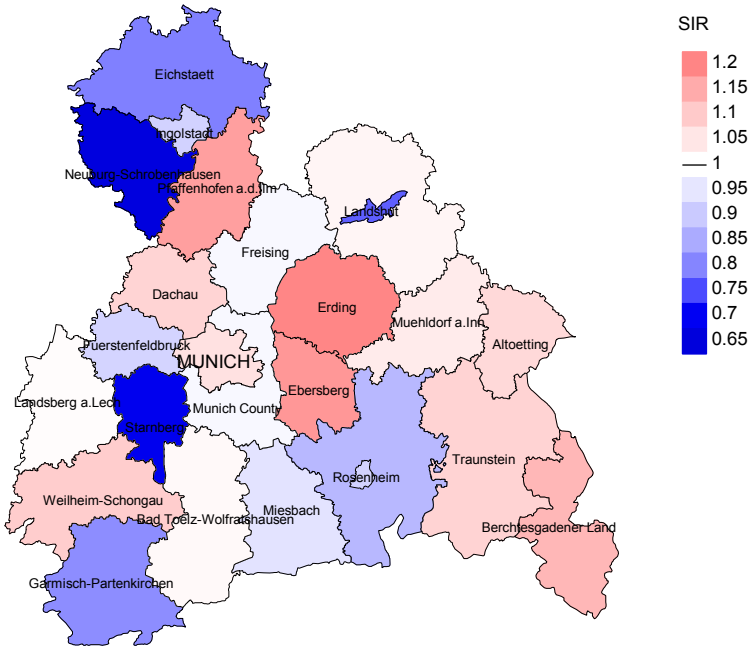


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=1,557, females N=1,256).

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/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 0.75 and 1.75, 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	188	97.3	25.5	163	86.7	96.3
1999	176	98.3	28.4	157	89.2	95.5
2000	199	98.0	25.1	163	81.9	93.9
2001	235	96.6	23.4	198	84.3	92.9
2002	340	98.8	18.5	281	82.6	98.6
2003	379	98.9	19.0	304	80.2	95.7
2004	338	97.3	21.6	273	80.8	97.8
2005	375	96.5	16.5	300	80.0	97.3
2006	299	95.3	13.4	244	81.6	98.0
2007	347	86.2	13.8	256	73.8	98.0
2008	402	85.1	13.4	306	76.1	98.0
2009	441	88.4	11.8	347	78.7	98.0
2010	382	90.3	13.6	310	81.2	99.0
2011	402	86.3	11.2	281	69.9	98.2
2012	398	86.7	11.1	263	66.1	96.6
2013	368	99.5	10.3	230	62.5	96.1
2014	77	96.1	41.6	54	70.1	100.0
1998-2014	5346	93.0	16.4	4130	77.3	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	188	136	95.6	72	38.3
1999	176	172	97.1	83	47.2
2000	199	156	94.9	75	37.7
2001	235	192	92.2	103	43.8
2002	340	233	97.0	124	36.5
2003	379	253	95.7	127	33.5
2004	338	273	97.4	122	36.1
2005	375	256	97.3	138	36.8
2006	299	267	96.3	108	36.1
2007	347	256	98.0	121	34.9
2008	402	265	97.4	127	31.6
2009	441	310	98.4	142	32.2
2010	382	358	98.6	147	38.5
2011	402	320	98.8	123	30.6
2012	398	301	97.0	127	31.9
2013	368	304	96.4	121	32.9
2014	77	242	97.9	51	66.2
1998-2014	5346	4294	97.0	1911	35.7

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	136	71.3	28.7	100.0
1999	172	79.1	20.9	97.6
2000	156	78.8	21.2	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	93.0	7.0	98.9
2005	256	91.0	9.0	98.0
2006	267	91.0	9.0	96.9
2007	256	93.4	6.6	98.0
2008	265	94.7	5.3	98.4
2009	310	91.3	8.7	96.7
2010	358	93.3	6.7	97.5
2011	320	93.1	6.9	96.8
2012	301	92.4	7.6	98.3
2013	304	92.4	7.6	98.0
2014	242	95.9	4.1	97.0
1998-2014	4294	90.6	9.4	98.0

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	66	57.8	57.6	61.6	57.8
1999	91	62.1	61.4	63.5	62.1
2000	69	63.5	63.4	71.2	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	65.5	69.0	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	66.6	71.6	66.4
2010	223	68.6	68.4	69.6	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	67.1
2014	142	64.0	64.0	62.1	64.1
1998-2014	2347	65.7	65.6	68.2	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	70	72.2	72.7	70.7	72.5
1999	81	68.3	64.9	78.6	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	119	69.9	69.0	80.7	69.6
2008	119	68.0	67.9	76.8	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	67.9	78.7	69.1
2013	132	67.0	67.0	72.1	66.9
2014	100	67.9	67.8	77.5	67.8
1998-2014	1947	68.9	68.2	74.9	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	46	4.2	0.47	3.0	0.49	3.8	0.48	4.3	0.48
1999	75	6.7	0.85	4.4	0.80	6.0	0.83	7.2	0.86
2000	52	4.6	0.50	3.0	0.46	4.1	0.50	4.7	0.48
2001	86	7.4	0.74	4.4	0.65	6.5	0.72	8.2	0.78
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	132	7.0	0.79	4.3	0.76	6.0	0.77	7.2	0.80
2005	133	7.0	0.67	4.3	0.61	5.8	0.66	6.9	0.68
2006	127	6.6	0.75	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	0.58
2009	163	7.3	0.64	4.2	0.60	5.8	0.62	7.1	0.64
2010	213	9.5	0.99	5.4	0.88	7.4	0.93	8.9	0.97
2011	160	7.0	0.75	3.9	0.66	5.5	0.72	6.6	0.75
2012	154	6.7	0.73	4.0	0.65	5.2	0.70	6.3	0.73
2013	158	6.9	0.74	4.0	0.66	5.3	0.69	6.4	0.74
2014	138	6.0	3.73	3.7	4.31	4.9	3.84	5.5	3.62
1998-2014	2141	6.7	0.75	4.0	0.68	5.5	0.72	6.6	0.75

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	51	4.3	0.56	2.1	0.39	3.0	0.47	4.0	0.54
1999	61	5.1	0.69	3.3	0.73	4.1	0.71	4.6	0.69
2000	71	5.9	0.74	3.5	0.71	4.5	0.73	5.2	0.72
2001	74	6.1	0.62	3.5	0.60	4.5	0.60	5.4	0.62
2002	92	4.7	0.56	2.4	0.50	3.3	0.52	4.1	0.54
2003	121	6.1	0.66	3.5	0.61	4.7	0.65	5.5	0.66
2004	122	6.2	0.72	3.7	0.65	4.7	0.70	5.4	0.73
2005	100	5.0	0.57	2.7	0.52	3.6	0.54	4.3	0.56
2006	116	5.8	0.90	3.1	0.84	4.1	0.87	4.9	0.89
2007	108	4.7	0.67	2.3	0.54	3.2	0.61	4.0	0.64
2008	114	4.9	0.66	2.9	0.60	3.6	0.63	4.2	0.64
2009	120	5.2	0.64	2.6	0.53	3.5	0.56	4.1	0.59
2010	121	5.2	0.73	2.7	0.65	3.6	0.70	4.4	0.74
2011	138	5.8	0.73	3.0	0.69	4.0	0.70	4.8	0.70
2012	124	5.3	0.67	2.9	0.60	3.7	0.63	4.4	0.66
2013	123	5.2	0.80	2.8	0.74	3.8	0.78	4.4	0.78
2014	94	4.0	2.35	2.2	3.20	2.9	2.82	3.3	2.72
1998-2014	1750	5.2	0.71	2.9	0.64	3.8	0.67	4.5	0.69

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	10	0.5	0.5	4	0.3	0.3	6	0.6	0.6
5-9	19	0.9	1.3	9	0.7	1.0	10	1.1	1.7
10-14	14	0.6	2.0	9	0.7	1.8	5	0.5	2.2
15-19	13	0.6	2.5	7	0.6	2.3	6	0.6	2.9
20-24	10	0.5	3.0	6	0.5	2.8	4	0.4	3.3
25-29	19	0.9	3.9	13	1.0	3.8	6	0.6	3.9
30-34	20	0.9	4.8	13	1.0	4.9	7	0.7	4.7
35-39	43	2.0	6.7	27	2.1	7.0	16	1.7	6.4
40-44	91	4.1	10.9	59	4.7	11.7	32	3.4	9.7
45-49	148	6.7	17.6	90	7.2	18.9	58	6.1	15.9
50-54	138	6.3	23.9	86	6.8	25.7	52	5.5	21.4
55-59	178	8.1	32.0	104	8.3	34.0	74	7.8	29.2
60-64	242	11.0	43.0	145	11.5	45.5	97	10.3	39.5
65-69	327	14.9	57.8	183	14.6	60.1	144	15.3	54.8
70-74	359	16.3	74.1	215	17.1	77.2	144	15.3	70.0
75-79	264	12.0	86.1	140	11.1	88.4	124	13.1	83.2
80-84	178	8.1	94.2	95	7.6	95.9	83	8.8	91.9
85+	127	5.8	100.0	51	4.1	100.0	76	8.1	100.0
All ages	2200	100.0		1256	100.0		944	100.0	

Included in the statistics are 18.3% multiple primaries in males and 17.4% 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	6	0.5	0.20	0.7	0.26	33.3	40.0
5- 9	9	10	1.0	0.45	1.2	0.91	42.9	55.6
10-14	9	5	1.0	0.75	0.6	0.83	50.0	25.0
15-19	7	6	0.7	0.50	0.7	0.75	19.4	27.3
20-24	6	4	0.5	0.27	0.4	0.25	12.5	14.3
25-29	13	6	1.1	0.43	0.5	0.24	21.0	9.4
30-34	13	7	1.0	0.30	0.6	0.18	14.8	6.4
35-39	27	16	2.1	0.44	1.3	0.38	15.3	6.2
40-44	59	32	3.6	0.59	2.1	0.64	12.8	5.1
45-49	90	58	5.7	0.91	3.8	0.81	8.8	4.8
50-54	86	52	6.6	0.74	4.1	0.60	4.6	2.9
55-59	104	74	9.8	0.72	6.6	0.79	3.4	2.8
60-64	145	97	14.8	0.98	9.1	0.88	3.0	2.7
65-69	183	144	19.0	0.92	13.8	0.95	2.6	2.8
70-74	215	144	23.6	1.06	13.8	0.85	2.4	2.2
75-79	140	124	25.4	0.88	17.4	0.89	1.6	2.0
80-84	95	83	27.2	0.90	14.8	0.72	1.3	1.3
85+	51	76	22.0	0.86	13.2	0.76	0.8	0.9
All ages	1256	944					2.5	2.2
Mortality								
Raw			7.0	0.81	5.0	0.75		
WS			4.0	0.72	2.7	0.67		
ES			5.5	0.77	3.6	0.71		
BRD-S			6.6	0.80	4.2	0.73		
PYLL-70								
per 100,000			74.4		50.3			
ES			69.7		49.1			
AYLL-70			15.8		15.4			

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	8	2.1	6	75.0			2	25.0
C18	Colon	27	7.0	23	85.2	3	11.1	1	3.7
C19–C20	Rectum	21	5.4	19	90.5	1	4.8	1	4.8
C25	Pancreas	6	1.6	1	16.7	2	33.3	3	50.0
C33–C34	Lung	18	4.7	7	38.9	4	22.2	7	38.9
C43	Malign. melanoma	28	7.2	20	71.4			8	28.6
C44	Skin others	18	4.7	9	50.0	4	22.2	5	27.8
C46,C49	Soft tissue	4	1.0	2	50.0			2	50.0
C61	Prostate	111	28.7	99	89.2	6	5.4	6	5.4
C62	Testis	8	2.1	5	62.5	2	25.0	1	12.5
C64	Kidney	15	3.9	9	60.0	1	6.7	5	33.3
C65	Renal pelvis	4	1.0	1	25.0			3	75.0
C67	Bladder	27	7.0	24	88.9	1	3.7	2	7.4
C70–C72	CNS cancer	20	5.2			4	20.0	16	80.0
C76–C79	CUP	7	1.8	3	42.9			4	57.1
C82–C85	NHL	18	4.7	15	83.3	2	11.1	1	5.6
C90	Mult. myeloma	7	1.8	3	42.9	1	14.3	3	42.9
C91–C96	Leukaemia	6	1.6	2	33.3	2	33.3	2	33.3
Other primaries		34	8.8	20	58.8	3	8.8	11	32.4
All mult. primaries		387	100.0	268	69.3	36	9.3	83	21.4

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	14	5.3	9	64.3	1	7.1	4	28.6
C19–C20	Rectum	6	2.3	2	33.3	2	33.3	2	33.3
C25	Pancreas	3	1.1	1	33.3			2	66.7
C33–C34	Lung	4	1.5	4	100.0				
C43	Malign. melanoma	18	6.8	15	83.3			3	16.7
C44	Skin others	8	3.0	4	50.0	1	12.5	3	37.5
C46,C49	Soft tissue	4	1.5	2	50.0	1	25.0	1	25.0
C50	Breast	83	31.6	64	77.1	8	9.6	11	13.3
C53	Cervix uteri	8	3.0	7	87.5			1	12.5
C54	Corpus uteri	16	6.1	14	87.5			2	12.5
C56	Ovary	9	3.4	7	77.8	1	11.1	1	11.1
C64	Kidney	9	3.4	7	77.8	2	22.2		
C67	Bladder	7	2.7	4	57.1			3	42.9
C69	Eye melanoma	3	1.1	3	100.0				
C70–C72	CNS cancer	28	10.6			8	28.6	20	71.4
C73	Thyroid	7	2.7	7	100.0				
C82–C85	NHL	8	3.0	4	50.0			4	50.0
C91–C96	Leukaemia	9	3.4	5	55.6			4	44.4
Other primaries		19	7.2	12	63.2	1	5.3	6	31.6
All mult. primaries		263	100.0	171	65.0	25	9.5	67	25.5

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	6	0.3	0.16	0.7	0.26	30.0	46.2
5- 9	8	10	0.9	0.40	1.2	0.91	40.0	55.6
10-14	9	5	1.0	0.75	0.6	0.83	50.0	26.3
15-19	6	6	0.6	0.43	0.7	0.86	18.2	30.0
20-24	6	4	0.5	0.27	0.4	0.25	14.0	15.4
25-29	12	6	1.0	0.41	0.5	0.26	21.8	10.2
30-34	13	6	1.0	0.30	0.5	0.16	15.1	6.3
35-39	27	16	2.1	0.44	1.3	0.39	16.4	7.0
40-44	55	29	3.4	0.59	1.9	0.67	13.0	5.2
45-49	87	57	5.5	0.91	3.8	0.85	9.5	5.6
50-54	83	49	6.4	0.74	3.8	0.63	5.2	3.3
55-59	97	62	9.1	0.71	5.5	0.76	3.7	2.9
60-64	133	88	13.5	1.06	8.3	0.89	3.4	3.1
65-69	158	123	16.4	0.93	11.8	0.95	2.8	3.0
70-74	173	118	19.0	1.09	11.3	0.93	2.5	2.3
75-79	102	103	18.5	0.94	14.4	0.90	1.6	2.1
80-84	76	72	21.8	0.92	12.8	0.74	1.4	1.4
85+	31	68	13.4	0.82	11.8	0.77	0.7	1.0
All ages	1079	828					2.8	2.4
Mortality								
Raw			6.0	0.80	4.4	0.76		
WS			3.6	0.71	2.4	0.68		
ES			4.8	0.76	3.2	0.71		
BRD-S			5.6	0.79	3.7	0.74		
PYLL-70								
per 100,000			70.0		47.4			
ES			65.4		46.6			
AYLL-70			16.1		16.1			

* 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	6	0.3	0.16	0.7	0.27	30.0	46.2
5- 9	8	10	0.9	0.40	1.2	0.91	40.0	55.6
10-14	9	5	1.0	0.75	0.6	0.83	50.0	27.8
15-19	6	5	0.6	0.43	0.5	0.71	18.2	27.8
20-24	6	4	0.5	0.27	0.4	0.25	15.4	16.7
25-29	11	5	0.9	0.38	0.4	0.22	21.6	8.9
30-34	13	6	1.0	0.31	0.5	0.16	15.3	7.2
35-39	25	16	1.9	0.42	1.3	0.42	15.8	7.8
40-44	52	29	3.2	0.57	1.9	0.69	13.1	5.7
45-49	87	55	5.5	0.91	3.6	0.83	10.1	6.0
50-54	81	48	6.3	0.72	3.7	0.65	5.6	3.6
55-59	96	59	9.0	0.73	5.3	0.73	4.1	3.1
60-64	128	85	13.0	1.07	8.0	0.89	3.8	3.5
65-69	152	121	15.8	0.90	11.6	0.96	3.2	3.6
70-74	166	115	18.2	1.07	11.0	0.94	2.9	2.8
75-79	98	99	17.8	0.92	13.9	0.88	2.0	2.5
80-84	75	71	21.5	0.90	12.7	0.74	1.8	1.7
85+	30	67	13.0	0.79	11.6	0.76	0.9	1.2
All ages	1046	806					3.3	2.8
Mortality								
Raw			5.8	0.79	4.3	0.76		
WS			3.5	0.70	2.4	0.67		
ES			4.6	0.75	3.1	0.71		
BRD-S			5.5	0.78	3.6	0.73		
PYLL-70								
per 100,000			68.2		46.0			
ES			63.8		45.3			
AYLL-70			16.1		16.0			

* See corresponding tables with multiple primaries.

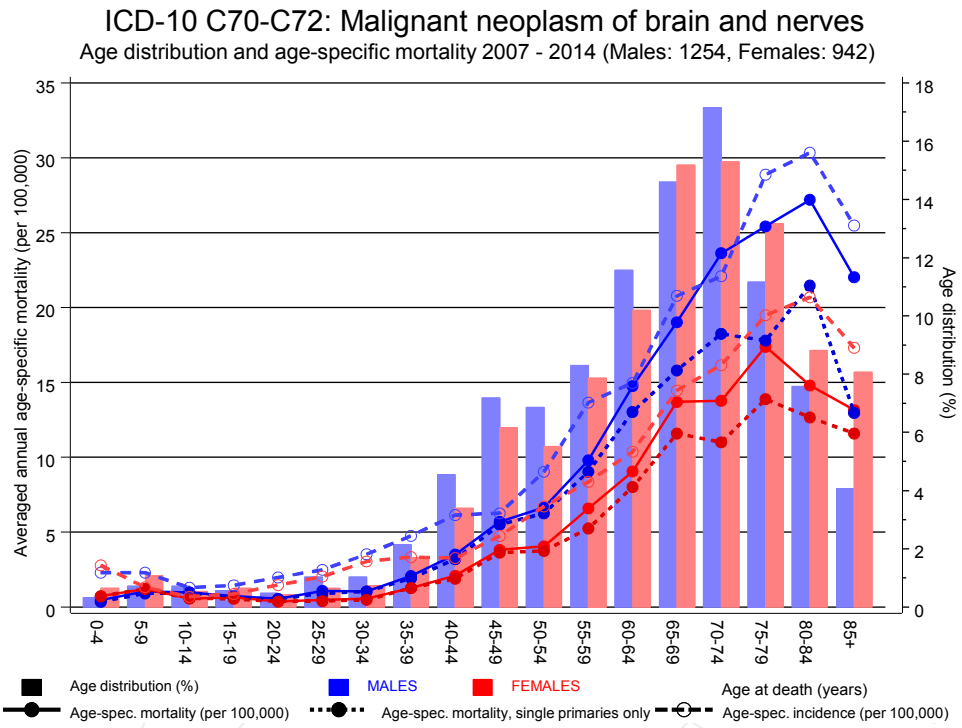
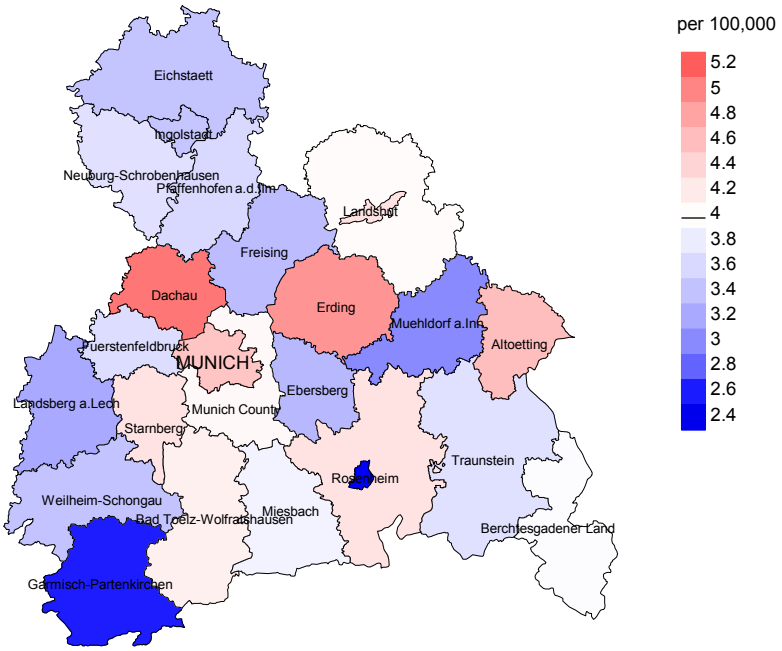


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

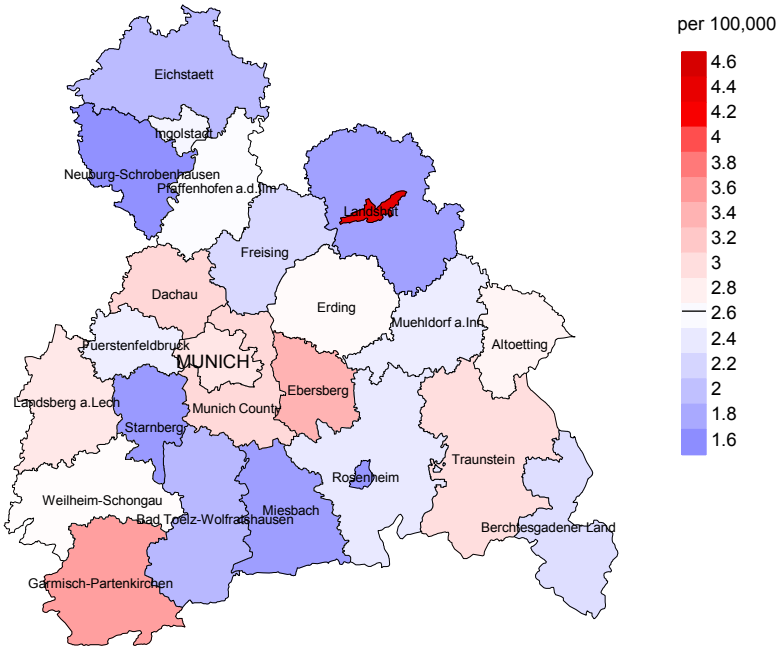
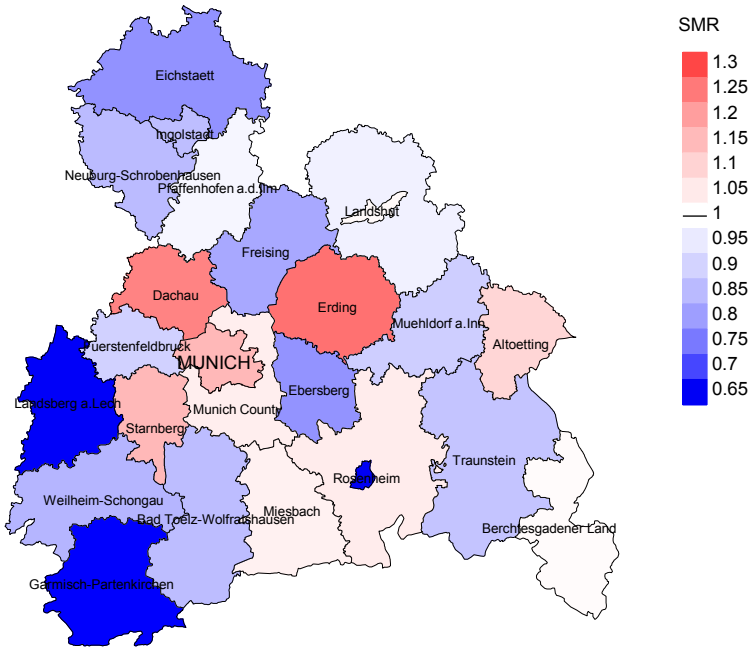


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2014. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 4.0/100,000 WS N=1,245, females 2.6/100,000 WS N=932).

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/nerves 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

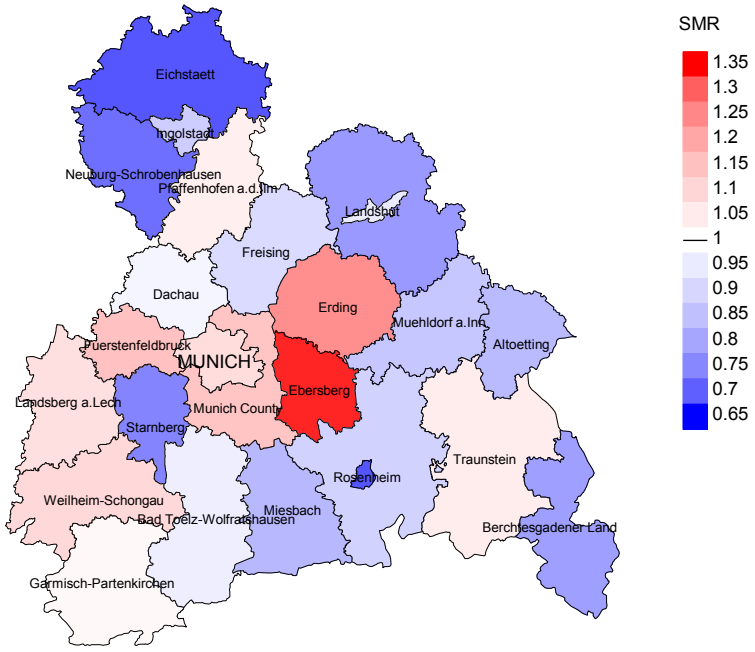


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=1,245, females N=932).

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/nerves cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.34. Though, the value of this parameter may vary with an underlying probability of 99% between 0.82 and 2.06, 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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