Munich Cancer Registry

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

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

Cancer statistics: Baseline statistics

C38, C47-C49: Sarcoma

Year of diagnosis	1998-2013
Patients	3,059
Diseases	3,070
Creation date	05/19/2015
Export date	12/30/2014
Population	4.64 m

BERLIN

GERMANY

BAVARIA

MUNICH

http://www.tumorregister-muenchen.de/en/facts/base/base_C3849E.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. The time-delayed acquisition of data and the occasionally high DCO-rates indicate optimizing reserves, among others, because of current financial and legal conditions that hinder the analyses.

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, May 2015

[#] 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). Death certificates from 2014 are incorporated into these analyses.

[##] 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. A high proportion of DCO cases (≥5%) in particular cancer types indicate insufficient participation of specific cancer specializations.

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

Code	Description
C38.-	Malignant neoplasm of heart, mediastinum and pleura
C47.-	Malignant neoplasm of peripheral nerves and autonomic nervous system
C48.-	Malignant neoplasm of retroperitoneum and peritoneum
C49.-	Malignant neoplasm of other connective and soft tissue

`... if not existing any of ...`

Topography codes (ICD-O-3 2000) used for specifying cancer site

Code	Description
C40.-	Bones, joints and articular cartilage of limbs
C41.-	Bones, joints and articular cartilage of other and unspecified sites

INCIDENCE

Table 1

Patient cohorts by year of diagnosis including DCO cases
and multiple primaries, and with proportion of deaths and active follow-up

Year of diagnosis	Cases n	DCO cases n	Prop. DCO %	Prop. mult. primaries %	Prop. deaths %	Prop. actively followed %
1998	113	15	13.3	23.0	78.8	100.0
1999	126	15	11.9	34.1	66.7	98.4
2000	119	14	11.8	22.7	63.0	98.3
2001	102	12	11.8	12.7	62.7	99.0
2002	189	16	8.5	18.5	69.8	97.4 #
2003	205	23	11.2	22.9	70.7	96.6
2004	192	21	10.9	21.9	57.8	97.9
2005	207	9	4.3	21.3	61.8	94.7
2006	185	15	8.1	28.6	60.5	96.8
2007	246	12	4.9	24.8	54.1	84.1 # ##
2008	237	8	3.4	25.3	57.8	79.3
2009	246	9	3.7	27.2	51.6	74.8
2010	254	10	3.9	28.7	49.6	73.2
2011	262	8	3.1	31.3	46.2	74.8
2012	215	12	5.6	22.8	35.3	74.9
2013	172	10	5.8	27.9	27.3	99.4 ###
1998–2013	3070	209	6.8	25.1	55.6	87.7

\#   The increases of incident cases in 2002 and 2007 reflect the expansion to additional registry areas.

\##   Since 2007 the percentage of actively followed patients sharply declined compared to the previous years. This is a consequence of ambiguous data protection rules that currently forbid cancer registries in Bavaria to obtain the essential life status informations from competent registration offices.

\###   Please be aware that data of recent annual patient cohorts may not yet be fully processed. Therefore, the presented figures and tables are potentially related to different time periods as pointed out in the respective headlines or legends.

Table 1a

Patient cohorts by year of diagnosis and gender
including DCO cases

Year of diagnosis	All n	Males n	Females n	Prop. males %
1998	113	54	59	47.8
1999	126	67	59	53.2
2000	119	57	62	47.9
2001	102	44	58	43.1
2002	189	98	91	51.9
2003	205	89	116	43.4
2004	192	106	86	55.2
2005	207	99	108	47.8
2006	185	89	96	48.1
2007	246	108	138	43.9
2008	237	104	133	43.9
2009	246	114	132	46.3
2010	254	112	142	44.1
2011	262	112	150	42.7
2012	215	99	116	46.0
2013	172	74	98	43.0
1998-2013	3070	1426	1644	46.4

Table 2

Incidence measures by year of diagnosis and gender 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	54	59	4.9	5.0	3.6	2.9	4.6	3.7	5.5	4.4
1999	67	59	6.0	5.0	4.2	3.0	5.5	4.0	6.5	4.5
2000	57	62	5.0	5.2	3.7	3.2	4.6	3.9	5.4	4.6
2001	44	58	3.8	4.8	2.7	3.0	3.6	3.9	4.5	4.4
2002	98	91	5.3	4.6	4.1	2.7	4.8	3.5	5.6	4.1
2003	89	116	4.7	5.9	3.4	3.3	4.3	4.3	5.1	5.1
2004	106	86	5.6	4.4	4.1	2.8	5.0	3.4	5.6	3.8
2005	99	108	5.2	5.4	4.1	3.4	4.8	4.1	5.0	4.8
2006	89	96	4.6	4.8	3.0	3.0	3.9	3.8	4.8	4.3
2007	108	138	4.9	6.0	3.5	3.4	4.2	4.3	4.7	5.0
2008	104	133	4.7	5.7	3.2	3.2	4.0	4.2	4.5	4.9
2009	114	132	5.1	5.7	3.1	3.2	4.2	4.3	5.0	5.0
2010	112	142	5.0	6.1	3.6	3.3	4.4	4.3	4.9	5.1
2011	112	150	4.9	6.4	3.1	3.3	3.9	4.4	4.7	5.1
2012	99	116	4.3	4.9	2.8	2.9	3.6	3.6	4.2	4.1
2013	74	98	3.2	4.2	2.1	2.1	2.6	2.8	3.2	3.4
1998-2013	1426	1644	4.8	5.3	3.3	3.1	4.1	3.9	4.8	4.6

The computation of the incidence measures includes all primaries, irrespective of first or subsequent malignancy.
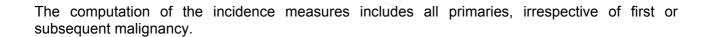
Table 3

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	113	60.2	22.1	0.4	93.2	28.3	50.0	65.6	76.9	85.0
1999	126	60.4	17.2	3.5	97.4	38.5	50.8	62.3	72.9	78.9
2000	119	59.4	22.7	0.2	97.1	28.5	47.4	63.0	77.2	84.3
2001	102	59.9	17.7	11.8	95.4	38.0	47.8	61.5	73.1	81.9
2002	189	59.1	21.9	0.0	93.0	28.0	46.2	64.5	74.7	82.0
2003	205	61.7	20.8	0.3	92.5	31.0	52.7	66.1	77.2	84.0
2004	192	58.6	21.2	0.0	96.1	30.8	46.2	64.4	74.0	81.9
2005	207	57.8	21.9	0.2	92.0	28.4	47.1	62.7	73.6	81.3
2006	185	61.2	20.8	0.3	103	33.8	51.8	64.1	76.9	83.1
2007	246	61.6	20.6	0.1	96.4	34.9	54.2	66.8	75.3	81.8
2008	237	62.2	19.9	0.0	101	35.3	51.9	66.6	76.2	83.4
2009	246	63.5	17.8	0.2	94.3	39.7	55.8	67.0	76.7	83.2
2010	254	61.1	20.2	0.1	97.3	33.3	49.9	65.5	75.4	82.5
2011	262	63.6	18.7	0.0	96.8	38.3	52.0	68.5	76.6	83.5
2012	215	62.9	20.5	0.4	98.4	34.8	54.1	66.4	76.1	84.5
2013	172	64.3	19.6	0.0	96.7	35.0	53.4	68.8	76.9	86.2
1998-2013	3070	61.3	20.3	0.0	103	33.2	51.1	65.8	75.8	83.1

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	54	57.4	22.0	0.4	90.8	27.1	40.9	62.5	73.8	82.5
1999	67	59.5	18.2	3.5	97.4	33.0	51.6	62.0	72.1	78.6
2000	57	58.2	22.8	0.2	93.7	28.6	50.1	62.5	72.4	84.3
2001	44	61.7	19.9	11.8	95.4	38.0	48.3	65.2	77.7	81.9
2002	98	56.1	24.0	0.1	92.4	17.7	40.2	62.9	72.7	81.9
2003	89	58.5	22.4	0.3	92.4	21.6	42.3	63.2	75.6	85.7
2004	106	57.0	20.5	0.0	90.7	30.9	45.9	62.5	71.5	78.7
2005	99	53.3	21.7	0.2	90.9	22.3	41.2	58.2	68.2	77.6
2006	89	61.1	20.5	0.3	90.3	29.9	51.5	65.9	76.4	82.3
2007	108	58.1	22.6	0.1	96.4	26.0	44.1	65.6	73.6	79.2
2008	104	59.6	21.3	0.0	95.2	33.6	46.8	64.7	73.8	82.0
2009	114	63.0	20.7	0.2	93.0	31.0	50.4	68.2	78.3	85.2
2010	112	56.9	22.1	0.1	93.2	31.5	45.6	59.7	73.7	82.5
2011	112	60.7	20.0	0.0	95.0	32.7	48.3	66.9	74.7	81.0
2012	99	61.6	20.9	0.4	95.5	28.0	51.1	66.4	75.2	84.4
2013	74	61.9	21.1	0.0	88.9	27.4	52.1	67.5	76.4	83.1
1998-2013	1426	59.0	21.4	0.0	97.4	29.2	47.1	64.1	74.1	82.3

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	59	62.8	22.2	3.4	93.2	33.0	54.3	67.7	78.0	85.7
1999	59	61.5	16.1	17.4	88.4	38.6	49.5	63.2	74.1	83.0
2000	62	60.5	22.8	0.4	97.1	28.5	46.9	64.3	78.0	83.4
2001	58	58.5	16.0	21.1	85.9	37.6	47.3	59.8	70.1	82.0
2002	91	62.4	19.0	0.0	93.0	39.1	51.6	66.0	75.9	82.9
2003	116	64.2	19.3	2.6	92.5	36.6	55.0	67.3	78.3	83.6
2004	86	60.6	21.9	0.2	96.1	25.6	46.4	65.9	76.6	83.5
2005	108	62.0	21.3	1.1	92.0	28.6	52.6	67.4	78.2	82.6
2006	96	61.2	21.1	1.6	103	33.8	51.9	63.2	78.1	83.9
2007	138	64.3	18.5	0.3	89.4	41.5	58.0	67.5	77.0	82.6
2008	133	64.2	18.5	4.4	101	36.3	54.8	67.4	77.4	84.9
2009	132	64.0	15.0	2.2	94.3	43.8	56.9	64.7	74.9	80.1
2010	142	64.4	17.9	0.9	97.3	40.1	56.4	68.9	75.7	82.1
2011	150	65.7	17.4	0.0	96.8	42.4	56.9	69.0	77.9	85.4
2012	116	64.1	20.2	0.4	98.4	40.1	56.0	67.1	77.8	84.7
2013	98	66.1	18.2	15.1	96.7	43.6	54.3	70.4	77.3	87.5
1998-2013	1644	63.4	19.0	0.0	103	37.6	53.9	66.9	77.0	83.5

Table 4

Age distribution by 5-year age group and gender for period 1998-2013
(incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4	78	2.5	2.5	53	3.7	3.7	25	1.5	1.5
5-9	20	0.7	3.2	12	0.8	4.6	8	0.5	2.0
10-14	25	0.8	4.0	13	0.9	5.5	12	0.7	2.7
15-19	33	1.1	5.1	16	1.1	6.6	17	1.0	3.8
20-24	40	1.3	6.4	23	1.6	8.2	17	1.0	4.8
25-29	60	2.0	8.3	31	2.2	10.4	29	1.8	6.6
30-34	93	3.0	11.4	53	3.7	14.1	40	2.4	9.0
35-39	110	3.6	15.0	69	4.8	18.9	41	2.5	11.5
40-44	134	4.4	19.3	62	4.3	23.3	72	4.4	15.9
45-49	135	4.4	23.7	58	4.1	27.3	77	4.7	20.6
50-54	194	6.3	30.0	97	6.8	34.2	97	5.9	26.5
55-59	255	8.3	38.3	115	8.1	42.2	140	8.5	35.0
60-64	301	9.8	48.1	133	9.3	51.5	168	10.2	45.2
65-69	390	12.7	60.8	188	13.2	64.7	202	12.3	57.5
70-74	384	12.5	73.4	173	12.1	76.9	211	12.8	70.3
75-79	339	11.0	84.4	145	10.2	87.0	194	11.8	82.1
80-84	257	8.4	92.8	92	6.5	93.5	165	10.0	92.2
85+	222	7.2	100.0	93	6.5	100.0	129	7.8	100.0
All ages	3070	100.0		1426	100.0		1644	100.0	

Included in the statistics are 31.1% multiple primaries in males and 32.3% in females.

Table 5

Age-specific incidence, DCO rate and proportion of all cancers
for period 1998-2013

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=99 %	Females DCO rate n=110 %	Males Prop.all cancers n=158258 %	Females Prop.all cancers n=153136 %
0- 4	53	25	3.6	1.8	3.8		16.4	10.2
5- 9	12	8	0.8	0.6			6.8	6.4
10-14	13	12	0.8	0.8			7.8	7.1
15-19	16	17	1.0	1.2	6.3	5.9	4.5	5.8
20-24	23	17	1.3	1.0	4.3		3.7	3.2
25-29	31	29	1.5	1.4			3.2	2.6
30-34	53	40	2.3	1.8	1.9	2.5	3.5	1.9
35-39	69	41	2.8	1.7	4.3	4.9	3.1	1.1
40-44	62	72	2.4	2.9		1.4	1.9	1.2
45-49	58	77	2.5	3.3	6.9	1.3	1.1	0.9
50-54	97	97	4.8	4.7	7.2	2.1	1.1	0.9
55-59	115	140	6.3	7.3	4.3	5.0	0.8	1.0
60-64	132	168	7.4	9.0	2.3	1.8	0.6	1.0
65-69	188	202	11.9	11.7	2.7	1.5	0.7	1.1
70-74	173	211	13.5	13.9	11.0	4.7	0.6	1.1
75-79	145	193	17.5	16.2	11.7	8.8	0.7	1.1
80-84	92	165	18.4	17.7	18.5	17.6	0.7	1.0
85+	92	129	27.0	14.4	15.2	25.6	0.9	0.8
All ages	1424	1643			7.0	6.7	0.9	1.1
Incidence								
Raw			4.8	5.3				
WS			3.3	3.1				
ES			4.1	3.9				
BRD-S			4.8	4.6				

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).

Table 6a

Standardized incidence ratio (SIR, with 95% confidence limits),
excess absolute risk (EAR) and DCO rate of second primaries
for period 1998-2013
MALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C09-C10	Oropharynx	2	0.4	4.6	0.6	16.6		4.7	
C15	Oesophagus	3	0.7	4.1	0.8	12.0		6.8	33.3
C16	Stomach	5	1.8	2.7	0.9	6.4		9.5	
C17	Small intestine	2	0.2	9.7	1.2	35.0	#	5.4	
C18	Colon	6	4.3	1.4	0.5	3.1		5.2	16.7
C19-C20	Rectum	3	2.3	1.3	0.3	3.7		2.0	
C22	Liver	2	1.1	1.7	0.2	6.3		2.5	
C23-C24	Bile	2	0.4	4.8	0.6	17.3		4.7	
C30-C31	Sinuses	2	0.1	27.8	3.4	100.5	#	5.8	
C33-C34	Lung	9	4.9	1.8	0.8	3.5		12.2	11.1
C43	Malign. melanoma	6	1.7	3.5	1.3	7.7	#	12.9	
C46,C49	Soft tissue	3	0.2	12.3	2.5	35.8	#	8.3	
C61	Prostate	20	12.6	1.6	1.0	2.5		22.3	
C64	Kidney	7	1.5	4.7	1.9	9.8	#	16.6	
C67	Bladder	5	1.9	2.6	0.8	6.0		9.2	20.0
C82-C85	NHL	6	1.7	3.5	1.3	7.6	#	12.8	
C91-C96	Leukaemia	3	0.7	4.1	0.8	12.0		6.8	
Other primaries		10	4.8	2.1	1.0	3.8		15.5	20.0
Not observed		0	1.6	0.0	0.0	2.2		-4.9	
All mult. primaries		96	43.2	2.2	1.8	2.7	#	158.1	6.3

Patients	942
Median age at second malignancy (years)	72.5
Person-years	3336
Mean observation time (years)	3.5
Median observation time (years)	2.2

The occurrence of second malignancy is statistically significant.

Observed second primaries with count 1 are pooled in category "Other primaries".

Table 6b

Standardized incidence ratio (SIR, with 95% confidence limits),
excess absolute risk (EAR) and DCO rate of second primaries
for period 1998-2013
FEMALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C16	Stomach	2	1.2	1.6	0.2	6.0		2.2	
C18	Colon	4	3.3	1.2	0.3	3.1		1.9	
C19-C20	Rectum	6	1.5	4.1	1.5	8.9	#	12.5	
C25	Pancreas	2	1.4	1.4	0.2	5.1		1.6	50.0
C33-C34	Lung	5	2.4	2.1	0.7	4.9		7.2	
C43	Malign. melanoma	4	1.3	3.2	0.9	8.1		7.5	
C46,C49	Soft tissue	4	0.2	20.2	5.5	51.6	#	10.4	25.0
C50	Breast	21	10.5	2.0	1.2	3.1	#	28.8	9.5
C53	Cervix uteri	3	0.5	5.8	1.2	17.0	#	6.8	
C54	Corpus uteri	5	1.9	2.6	0.9	6.2		8.6	
C56	Ovary	20	1.4	14.1	8.6	21.8	#	51.1	80.0
C64	Kidney	5	0.8	5.9	1.9	13.8	#	11.4	
C70-C72	CNS cancer	2	0.5	4.1	0.5	14.9		4.2	
C73	Thyroid	2	0.7	2.9	0.4	10.6		3.6	
C82-C85	NHL	4	1.3	3.1	0.8	8.0		7.5	
C91-C96	Leukaemia	3	0.5	5.6	1.2	16.4	#	6.8	
Other primaries		7	1.2	5.9	2.4	12.3	#	16.0	14.3
Not observed		0	3.6	0.0	0.0	1.0		-9.9	
All mult. primaries		99	34.2	2.9	2.4	3.5	#	178.0	21.2

Patients   1045
Median age at second malignancy (years)   72.4
Person-years   3639
Mean observation time (years)   3.5
Median observation time (years)   2.2

The occurrence of second malignancy is statistically significant.

Observed second primaries with count 1 are pooled in category "Other primaries".

C38, C47-C49: Malignant neoplasm of soft tissue

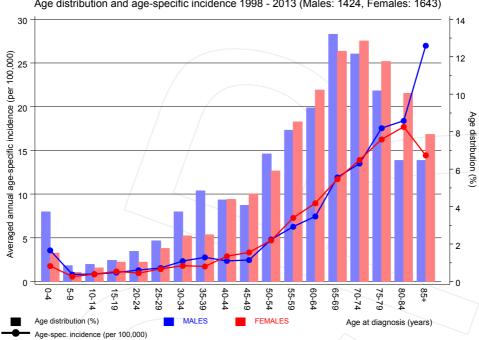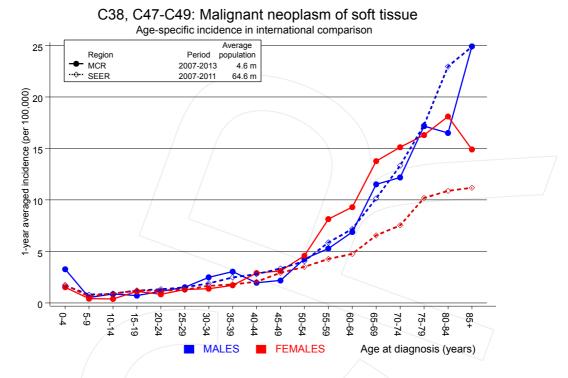Age distribution and age-specific incidence 1998 - 2013 (Males: 1424, Females: 1643)

Figure 7. Age distribution and age-specific incidence

C38, C47-C49: Malignant neoplasm of soft tissue
Age-specific incidence in international comparison

Figure 7a. 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.

C38, C47-C49: Malignant neoplasm of soft tissue

Cumulative follow-up years since diagnosis for period 1998 - 2013 (excl. DCO)

Gender	n	Target Sum Median	Actual Sum Median
All patients			
Males	879	3669 2.9	3438 2.6
Females	961	4055 2.8	3732 2.6
Patients alive			
Males	466	2970 5.7	2739 5.4
Females	486	3188 5.8	2865 5.4
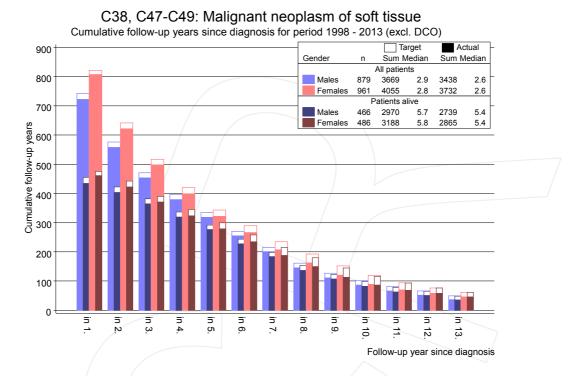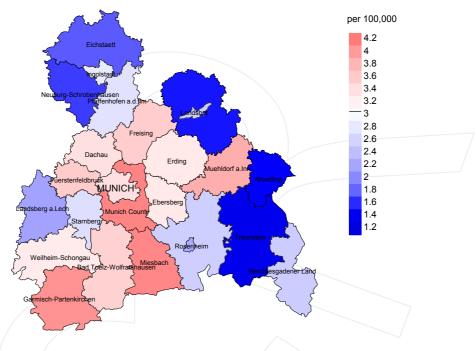
Figure 8. Cumulative follow-up years depending on time since diagnosis
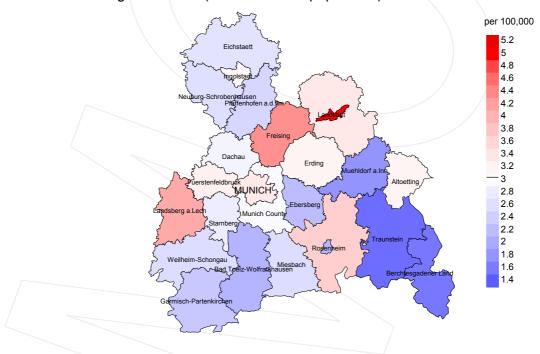
The increase of the lost to follow-up rate can be interpreted as a consequence of a declining number of survivors over time.

Average incidence (world standard population) 2007 - 2013: Males
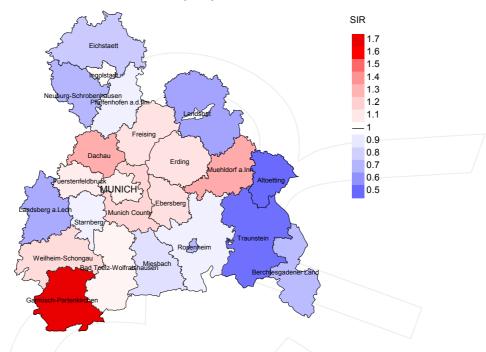
Average incidence (world standard population) 2007 - 2013: Females
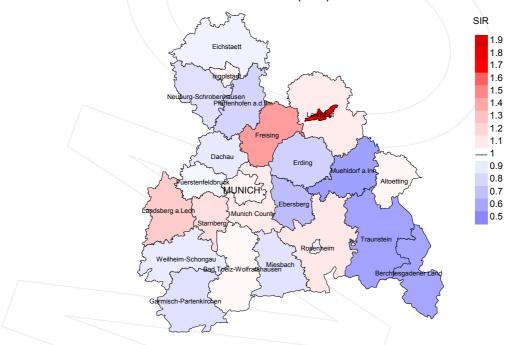
Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 3.1/100,000 WS N=721, females 3.0/100,000 WS N=908).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,928 female residents (averaged) in the period from 2007 to 2013 a total of 17 women were identified with newly diagnosed sarcoma. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 2.2/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.9 and 4.9/100,000.

Standardized incidence ratio (SIR) 2007 - 2013: Males

Standardized incidence ratio (SIR) 2007 - 2013: Females

Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2013. 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=721, females N=908).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,642 female residents (averaged) in the period from 2007 to 2013 a total of 17 women were identified with newly diagnosed sarcoma. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.70. Though, the value of this parameter may vary with an underlying probability of 99% between 0.34 and 1.26, 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	113	100.0	13.3	89	78.8	95.5
1999	126	98.4	11.9	84	66.7	92.9
2000	119	98.3	11.8	75	63.0	98.7
2001	102	99.0	11.8	64	62.7	96.9
2002	189	97.4	8.5	132	69.8	94.7
2003	205	96.6	11.2	145	70.7	95.9
2004	192	97.9	10.9	111	57.8	99.1
2005	207	94.7	4.3	128	61.8	96.1
2006	185	96.8	8.1	112	60.5	99.1
2007	246	84.1	4.9	133	54.1	99.2
2008	237	79.3	3.4	137	57.8	97.8
2009	246	74.8	3.7	127	51.6	96.9
2010	254	73.2	3.9	126	49.6	97.6
2011	262	74.8	3.1	121	46.2	96.7
2012	215	74.9	5.6	76	35.3	90.8
2013	172	99.4	5.8	47	27.3	97.9
1998-2013	3070	87.7	6.8	1707	55.6	96.7

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	113	74	94.6	24	21.2
1999	126	69	91.3	23	18.3
2000	119	79	93.7	26	21.8
2001	102	76	94.7	24	23.5
2002	189	107	97.2	44	23.3
2003	205	115	94.8	51	24.9
2004	192	124	96.8	40	20.8
2005	207	133	97.7	41	19.8
2006	185	128	94.5	39	21.1
2007	246	142	99.3	43	17.5
2008	237	119	98.3	35	14.8
2009	246	168	97.6	46	18.7
2010	254	161	99.4	40	15.7
2011	262	166	98.8	55	21.0
2012	215	156	99.4	36	16.7
2013	172	145	97.2	35	20.3
1998-2013	3070	1962	97.1	602	19.6

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	74	75.7	24.3	92.9
1999	69	78.3	21.7	95.2
2000	79	84.8	15.2	95.9
2001	76	90.8	9.2	97.2
2002	107	84.1	15.9	91.3
2003	115	89.6	10.4	90.8
2004	124	84.7	15.3	90.8
2005	133	87.2	12.8	92.3
2006	128	82.8	17.2	87.6
2007	142	89.4	10.6	93.6
2008	119	87.4	12.6	88.0
2009	168	83.3	16.7	87.2
2010	161	87.6	12.4	89.4
2011	166	84.3	15.7	88.4
2012	156	83.3	16.7	91.0
2013	145	86.2	13.8	91.5
1998-2013	1962	85.3	14.7	90.9

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	35	70.9	68.7	82.1	71.2
1999	39	68.4	64.4	75.9	68.4
2000	42	66.9	66.2	79.9	66.2
2001	36	65.9	64.1	80.4	65.9
2002	50	72.8	69.1	82.7	72.0
2003	54	69.1	67.3	90.9	67.3
2004	61	70.3	69.0	82.9	70.1
2005	63	67.4	66.1	74.3	67.2
2006	58	69.3	68.6	71.3	69.2
2007	76	70.7	68.9	81.8	69.5
2008	59	73.9	71.8	89.9	71.3
2009	81	74.2	71.1	86.4	72.4
2010	71	73.4	73.2	76.6	73.2
2011	68	72.9	69.8	82.6	69.9
2012	64	75.5	70.4	81.1	72.6
2013	65	75.2	72.9	83.3	73.5
1998-2013	922	71.3	69.3	80.4	70.1

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	39	74.5	70.8	85.4	74.3
1999	30	71.9	71.9	72.5	73.2
2000	37	75.5	76.8	72.2	76.3
2001	40	65.4	62.9	81.7	68.8
2002	57	70.5	67.6	78.6	70.5
2003	61	69.9	69.6	87.0	69.9
2004	63	75.7	72.9	84.1	73.3
2005	70	73.3	72.9	77.5	73.0
2006	70	75.3	74.1	83.0	75.1
2007	66	75.7	75.2	88.4	75.2
2008	60	78.5	73.9	89.3	76.2
2009	87	72.8	72.2	86.2	72.7
2010	90	72.2	71.5	88.3	71.5
2011	98	76.0	74.8	84.8	75.1
2012	92	76.2	74.5	85.6	75.4
2013	80	75.0	73.0	93.6	73.3
1998-2013	1040	74.6	72.7	84.7	73.5

By 2010, life expectancy for a newborn male in Germany is 77.5 years compared with 82.6 years for his female counterpart.

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	26	2.3	0.48	1.5	0.43	2.1	0.47	2.6	0.48
1999	30	2.7	0.45	1.9	0.44	2.5	0.46	3.1	0.48
2000	37	3.2	0.65	2.2	0.59	2.9	0.64	3.4	0.63
2001	32	2.8	0.73	1.9	0.71	2.5	0.70	3.0	0.67
2002	39	2.1	0.40	1.2	0.30	1.8	0.36	2.3	0.41
2003	46	2.5	0.52	1.5	0.45	2.1	0.49	2.7	0.53
2004	52	2.8	0.49	1.9	0.46	2.4	0.48	3.0	0.54
2005	53	2.8	0.54	1.8	0.44	2.3	0.48	2.8	0.55
2006	46	2.4	0.52	1.5	0.50	2.0	0.52	2.4	0.49
2007	68	3.1	0.63	1.8	0.51	2.5	0.60	3.1	0.65
2008	52	2.3	0.50	1.2	0.38	1.8	0.46	2.4	0.53
2009	62	2.8	0.54	1.4	0.45	2.1	0.50	2.7	0.53
2010	57	2.5	0.51	1.2	0.33	1.8	0.42	2.4	0.50
2011	56	2.5	0.50	1.3	0.44	1.9	0.49	2.4	0.52
2012	53	2.3	0.54	1.2	0.44	1.7	0.49	2.3	0.54
2013	53	2.3	0.73	1.3	0.63	1.8	0.67	2.2	0.72
1998-2013	762	2.6	0.54	1.5	0.45	2.1	0.50	2.6	0.55

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	30	2.6	0.51	1.4	0.48	1.9	0.50	2.3	0.53
1999	24	2.0	0.41	1.2	0.39	1.5	0.37	1.8	0.40
2000	30	2.5	0.48	1.0	0.32	1.6	0.40	2.1	0.45
2001	37	3.0	0.64	1.7	0.56	2.2	0.56	2.6	0.59
2002	51	2.6	0.56	1.5	0.55	1.9	0.55	2.3	0.56
2003	57	2.9	0.49	1.5	0.46	1.9	0.45	2.3	0.46
2004	53	2.7	0.62	1.2	0.44	1.8	0.53	2.3	0.60
2005	63	3.2	0.58	1.4	0.41	2.0	0.48	2.5	0.52
2006	60	3.0	0.63	1.3	0.44	1.9	0.50	2.5	0.58
2007	59	2.6	0.43	1.0	0.30	1.5	0.35	2.1	0.41
2008	52	2.2	0.39	0.9	0.29	1.3	0.31	1.7	0.35
2009	78	3.4	0.59	1.5	0.47	2.1	0.50	2.7	0.54
2010	84	3.6	0.59	1.7	0.52	2.4	0.56	3.0	0.59
2011	84	3.6	0.56	1.4	0.41	2.0	0.46	2.7	0.53
2012	77	3.3	0.66	1.4	0.48	2.0	0.57	2.6	0.64
2013	72	3.1	0.73	1.3	0.61	1.8	0.66	2.3	0.69
1998-2013	911	2.9	0.55	1.3	0.44	1.9	0.48	2.4	0.53

Table 13

Age distribution of age at death (cancer-related) for period 1998-2013
(**incl. multiple primaries**)

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4	11	0.7	0.7	9	1.2	1.2	2	0.2	0.2
5-9	10	0.6	1.2	4	0.5	1.7	6	0.7	0.9
10-14	5	0.3	1.5	3	0.4	2.1	2	0.2	1.1
15-19	10	0.6	2.1	4	0.5	2.6	6	0.7	1.7
20-24	17	1.0	3.1	9	1.2	3.8	8	0.9	2.6
25-29	19	1.1	4.3	11	1.4	5.2	8	0.9	3.5
30-34	23	1.4	5.6	13	1.7	6.9	10	1.1	4.6
35-39	30	1.8	7.4	20	2.6	9.5	10	1.1	5.7
40-44	51	3.0	10.5	27	3.5	13.1	24	2.6	8.3
45-49	54	3.2	13.7	29	3.8	16.8	25	2.7	11.0
50-54	67	4.0	17.6	39	5.1	21.9	28	3.1	14.1
55-59	119	7.1	24.7	56	7.3	29.2	63	6.9	20.9
60-64	166	9.9	34.6	74	9.7	38.9	92	10.0	31.0
65-69	219	13.0	47.6	105	13.7	52.6	114	12.4	43.4
70-74	229	13.6	61.2	116	15.1	67.8	113	12.3	55.7
75-79	231	13.7	74.9	82	10.7	78.5	149	16.2	72.0
80-84	225	13.4	88.3	86	11.2	89.7	139	15.2	87.1
85+	197	11.7	100.0	79	10.3	100.0	118	12.9	100.0
All ages	1683	100.0		766	100.0		917	100.0	

Included in the statistics are 31.1% multiple primaries in males and 32.3% in females.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2013
(**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	9	2	0.6	0.17	0.1	0.08	27.3	7.7
5- 9	4	6	0.3	0.33	0.4	0.75	10.5	15.0
10-14	3	2	0.2	0.23	0.1	0.17	8.6	6.5
15-19	4	6	0.3	0.25	0.4	0.35	8.9	16.2
20-24	9	8	0.5	0.39	0.4	0.47	10.0	15.7
25-29	11	8	0.5	0.35	0.4	0.28	10.2	7.0
30-34	13	10	0.6	0.25	0.5	0.25	7.0	4.4
35-39	20	10	0.8	0.29	0.4	0.24	5.0	1.9
40-44	27	24	1.0	0.44	1.0	0.33	3.2	2.1
45-49	29	25	1.2	0.50	1.1	0.32	1.6	1.2
50-54	39	28	1.9	0.40	1.4	0.29	1.2	0.9
55-59	56	63	3.1	0.49	3.3	0.45	0.9	1.3
60-64	74	92	4.2	0.56	4.9	0.55	0.8	1.4
65-69	105	114	6.7	0.56	6.6	0.56	0.9	1.4
70-74	116	113	9.1	0.67	7.4	0.54	0.9	1.1
75-79	82	149	9.9	0.57	12.5	0.77	0.6	1.4
80-84	86	139	17.2	0.93	14.9	0.84	0.8	1.2
85+	79	118	23.2	0.85	13.2	0.91	0.9	0.9
All ages	766	917					1.0	1.3
Mortality								
Raw			2.6	0.54	3.0	0.56		
WS			1.5	0.45	1.4	0.44		
ES			2.1	0.51	1.9	0.48		
BRD-S			2.6	0.55	2.4	0.53		
PYLL-70								
per 100,000			25.6		22.0			
ES			25.4		21.1			
AYLL-70			17.0		14.7			

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

Table 15a

Multiple primaries in deaths in period 1998-2013
MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C09-C10 Oropharynx	5	1.8	1	20.0	1	20.0	3	60.0
C15 Oesophagus	7	2.6	2	28.6			5	71.4
C16 Stomach	6	2.2	3	50.0	1	16.7	2	33.3
C18 Colon	20	7.3	15	75.0	2	10.0	3	15.0
C19-C20 Rectum	10	3.6	6	60.0	1	10.0	3	30.0
C25 Pancreas	5	1.8	2	40.0	2	40.0	1	20.0
C30-C31 Sinuses	3	1.1	2	66.7			1	33.3
C33-C34 Lung	15	5.5			3	20.0	12	80.0
C40-C41 Bone	3	1.1	1	33.3			2	66.7
C43 Malign. melanoma	11	4.0	7	63.6	1	9.1	3	27.3
C44 Skin others	28	10.2	14	50.0			14	50.0
C46,C49 Soft tissue	12	4.4			3	25.0	9	75.0
C61 Prostate	41	15.0	27	65.9	2	4.9	12	29.3
C62 Testis	6	2.2	4	66.7			2	33.3
C64 Kidney	16	5.8	9	56.3	2	12.5	5	31.3
C67 Bladder	22	8.0	12	54.5	1	4.5	9	40.9
C70-C72 CNS cancer	7	2.6			1	14.3	6	85.7
C76-C79 CUP	3	1.1	1	33.3	1	33.3	1	33.3
C82-C85 NHL	20	7.3	11	55.0			9	45.0
C90 Mult. myeloma	5	1.8	2	40.0	1	20.0	2	40.0
C91-C96 Leukaemia	6	2.2	3	50.0			3	50.0
Other primaries	23	8.4	9	39.1	4	17.4	10	43.5
All mult. primaries	274	100.0	131	47.8	26	9.5	117	42.7

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 15b

Multiple primaries in deaths in period 1998-2013
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C16	Stomach	4	1.1	3	75.0			1	25.0
C18	Colon	21	5.7	10	47.6	3	14.3	8	38.1
C19-C20	Rectum	7	1.9	4	57.1	1	14.3	2	28.6
C25	Pancreas	6	1.6			2	33.3	4	66.7
C33-C34	Lung	8	2.2			1	12.5	7	87.5
C43	Malign. melanoma	18	4.9	13	72.2	2	11.1	3	16.7
C44	Skin others	17	4.6	8	47.1	4	23.5	5	29.4
C46,C49	Soft tissue	8	2.2			2	25.0	6	75.0
C48	Peritoneal	4	1.1			1	25.0	3	75.0
C50	Breast	107	29.2	83	77.6	4	3.7	20	18.7
C51	Vulva	5	1.4	2	40.0	1	20.0	2	40.0
C53	Cervix uteri	10	2.7	10	100.0				
C54	Corpus uteri	19	5.2	9	47.4	6	31.6	4	21.1
C56	Ovary	58	15.8	16	27.6	10	17.2	32	55.2
C64	Kidney	9	2.5	3	33.3	2	22.2	4	44.4
C67	Bladder	5	1.4	3	60.0			2	40.0
C70-C72	CNS cancer	8	2.2			1	12.5	7	87.5
C73	Thyroid	4	1.1	4	100.0				
C82-C85	NHL	13	3.6	8	61.5	4	30.8	1	7.7
C90	Mult. myeloma	6	1.6	3	50.0	1	16.7	2	33.3
C91-C96	Leukaemia	9	2.5	3	33.3			6	66.7
Other primaries		20	5.5	10	50.0	5	25.0	5	25.0
All mult. primaries		366	100.0	192	52.5	50	13.7	124	33.9

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 1998-2013
(**Singular 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	9	2	0.6	0.17	0.1	0.08	32.1	8.3
5- 9	4	6	0.3	0.33	0.4	0.75	11.1	16.2
10-14	3	1	0.2	0.25	0.1	0.09	8.6	3.4
15-19	4	5	0.3	0.25	0.3	0.31	9.5	15.2
20-24	8	7	0.5	0.36	0.4	0.44	9.5	14.9
25-29	11	8	0.5	0.37	0.4	0.28	11.1	7.3
30-34	12	9	0.5	0.24	0.4	0.24	6.6	4.5
35-39	19	8	0.8	0.29	0.3	0.22	5.1	1.7
40-44	24	21	0.9	0.43	0.8	0.33	3.0	2.1
45-49	27	23	1.1	0.49	1.0	0.35	1.6	1.3
50-54	32	24	1.6	0.38	1.2	0.30	1.1	0.9
55-59	48	49	2.6	0.48	2.5	0.44	0.9	1.2
60-64	60	76	3.4	0.55	4.1	0.55	0.8	1.4
65-69	81	87	5.1	0.56	5.0	0.55	0.8	1.3
70-74	86	82	6.7	0.66	5.4	0.52	0.8	1.0
75-79	63	106	7.6	0.63	8.9	0.80	0.6	1.2
80-84	68	103	13.6	0.99	11.0	0.81	0.8	1.2
85+	59	93	17.3	0.84	10.4	0.89	0.9	0.8
All ages	618	710					1.0	1.2
Mortality								
Raw			2.1	0.52	2.3	0.54		
WS			1.3	0.44	1.1	0.42		
ES			1.7	0.49	1.5	0.47		
BRD-S			2.1	0.54	1.9	0.51		
PYLL-70								
per 100,000			23.3		18.9			
ES			23.3		18.3			
AYLL-70			18.2		15.4			

* See corresponding tables with multiple primaries.
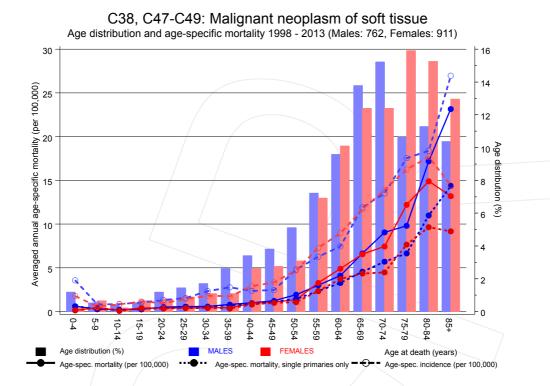
Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2013
(**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	9	2	0.6	0.17	0.1	0.08	33.3	8.3
5- 9	4	6	0.3	0.33	0.4	0.75	11.4	16.7
10-14	3	1	0.2	0.25	0.1	0.09	8.6	3.7
15-19	4	5	0.3	0.25	0.3	0.31	9.5	17.9
20-24	8	6	0.5	0.36	0.3	0.40	10.1	13.6
25-29	11	8	0.5	0.38	0.4	0.28	12.0	7.8
30-34	12	9	0.5	0.24	0.4	0.25	6.9	4.9
35-39	18	8	0.7	0.28	0.3	0.24	5.0	1.9
40-44	22	20	0.8	0.43	0.8	0.33	2.9	2.2
45-49	26	23	1.1	0.51	1.0	0.35	1.7	1.5
50-54	29	22	1.4	0.37	1.1	0.29	1.1	0.9
55-59	43	45	2.3	0.46	2.3	0.45	0.9	1.3
60-64	58	70	3.3	0.60	3.7	0.55	0.9	1.5
65-69	72	75	4.6	0.56	4.3	0.52	0.9	1.3
70-74	73	68	5.7	0.66	4.5	0.48	0.8	1.0
75-79	55	91	6.7	0.63	7.7	0.78	0.7	1.3
80-84	55	90	11.0	0.87	9.6	0.78	0.9	1.2
85+	49	82	14.4	0.77	9.2	0.82	0.9	0.9
All ages	551	631					1.0	1.3
Mortality								
Raw			1.9	0.51	2.0	0.52		
WS			1.2	0.43	1.0	0.41		
ES			1.5	0.48	1.4	0.45		
BRD-S			1.9	0.52	1.7	0.49		
PYLL-70								
per 100,000			22.3		18.0			
ES			22.5		17.5			
AYLL-70			18.7		15.9			

* See corresponding tables with multiple primaries.

C38, C47-C49: Malignant neoplasm of soft tissue
Age distribution and age-specific mortality 1998 - 2013 (Males: 762, Females: 911)
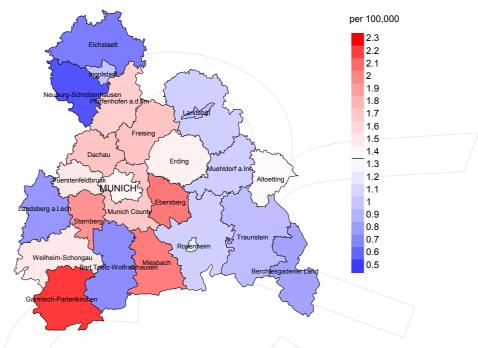
Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).
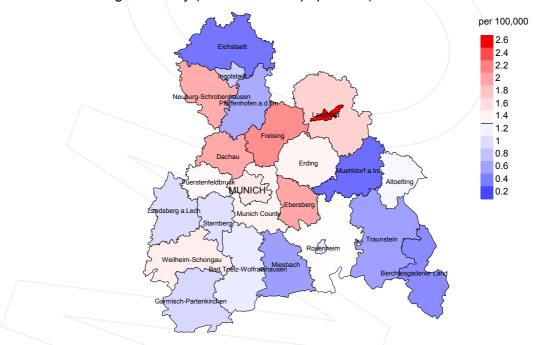
The difference between age at diagnosis (Table 3) and age at sarcoma-related death (see Table 10) should be considered.

Average mortality (world standard population) 2007 - 2013: Males
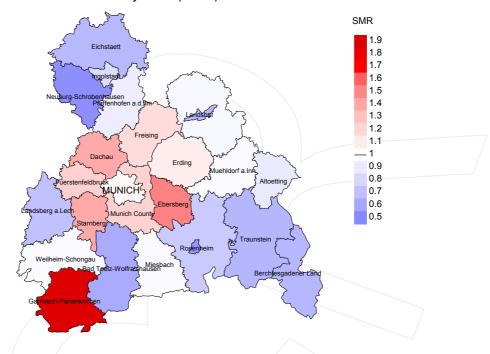
Average mortality (world standard population) 2007 - 2013: Females
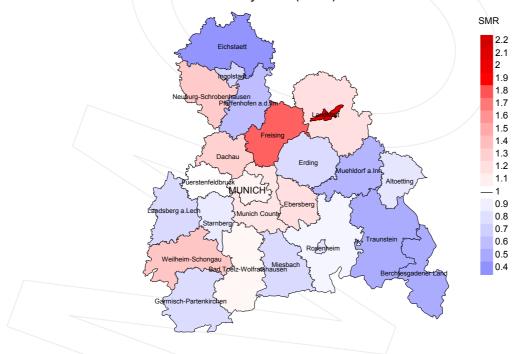
Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2013. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 1.4/100,000 WS N=399, females 1.3/100,000 WS N=502).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,928 female residents (averaged) in the period from 2007 to 2013 a total of 16 women died from sarcoma. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 2.0/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.7 and 4.8/100,000.

Standardized mortality ratio (SMR) 2007 - 2013: Males

Standardized mortality ratio (SMR) 2007 - 2013: Females

Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2013. 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=399, females N=502).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,642 female residents (averaged) in the period from 2007 to 2013 a total of 16 women died from sarcoma. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.21. Though, the value of this parameter may vary with an underlying probability of 99% between 0.57 and 2.23, 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. 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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