Munich Cancer Registry

- Survival
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- *Deutsch*

ST: Sarcoma (morph.)

Incidence and Mortality

Year of diagnosis	1998-2014
Patients	10,739
Diseases	10,793
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/bhST__E-ST-Sarcoma-morph.-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.

Morphology codes (ICD-O-3 2011) used for specifying cancer site

Code	Description
868–871	Paragangliomas and glomus tumors
880	Soft tissue tumors and sarcomas, NOS
881–883	Fibromatous neoplasms
884	Myxomatous neoplasms
885–888	Lipomatous neoplasms
889–892	Myomatous neoplasms
893–899	Complex mixed and stromal neoplasms
900–903	Fibroepithelial neoplasms
904	Synovial-like neoplasms
905	Mesothelial neoplasms
912–916	Blood vessel tumors
917	Lymphatic vessel tumors
9180/3	Extraskeletal osteosarcoma
9231/3	Myxoid chondrosarcoma
9240/3	Mesenchymal chondrosarcoma
925	Giant cell tumors
9260/3	Extraskeletal Ewing sarcoma
9364/3	Peripheral neuroectodermal tumor
938–948	Gliomas
949–952	Neuroepitheliomatous neoplasms
953	Meningiomas
954–957	Nerve sheath tumors
958	Granular cell tumors and alveolar soft part sarcoma

5th digit behaviour code = /3 (malignant, primary site)

... 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

All patients with invasive cancer by year of diagnosis, proportions of multiple primaries, deaths, and active follow-up

Year of diagnosis	Cases n	Prop. mult. primaries %	Prop. deaths %	Prop. actively followed %
1998	344	14.8	79.7	97.4
1999	313	21.7	76.0	97.1
2000	353	17.3	70.5	96.6
2001	379	12.7	73.4	95.8
2002	601	17.5	75.0	97.5 #
2003	644	16.3	71.4	96.3
2004	657	17.8	68.2	96.2
2005	699	19.6	68.7	94.3
2006	602	19.3	70.1	94.4
2007	736	19.0	61.5	81.0 #
2008	790	18.6	63.8	80.5
2009	860	21.5	64.7	80.6
2010	829	23.9	61.6	80.0
2011	893	24.9	53.8	80.1
2012	912	21.6	50.0	78.5
2013	853	22.6	44.3	99.5
2014	328	32.3	25.6	96.0 ##
1998-2014	10793	20.3	62.3	88.9

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

Year of diagnosis	All n	Males n	Females n	Prop. males %
1998	344	176	168	51.2
1999	313	167	146	53.4
2000	353	185	168	52.4
2001	379	178	201	47.0
2002	601	304	297	50.6
2003	644	324	320	50.3
2004	657	348	309	53.0
2005	699	356	343	50.9
2006	602	323	279	53.7
2007	736	386	350	52.4
2008	790	427	363	54.1
2009	860	464	396	54.0
2010	829	443	386	53.4
2011	893	477	416	53.4
2012	912	473	439	51.9
2013	853	477	376	55.9
2014	328	157	171	47.9
1998-2014	10793	5665	5128	52.5

Table 2

Incidence measures by year of diagnosis
(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	176	168	15.9	14.3	11.8	10.3	14.7	12.0	16.4	13.3
1999	167	146	14.9	12.3	10.9	8.2	13.9	10.1	15.7	11.2
2000	185	168	16.2	14.0	12.0	8.7	14.9	11.1	17.0	12.7
2001	178	201	15.4	16.5	11.4	10.6	14.3	13.5	16.3	14.9
2002	304	297	16.3	15.2	11.9	9.6	14.7	12.2	17.0	13.9
2003	324	320	17.3	16.2	12.5	10.5	15.5	12.9	17.6	14.5
2004	348	309	18.5	15.6	12.9	11.1	16.1	13.1	18.2	14.0
2005	356	343	18.8	17.2	13.7	11.4	16.4	13.7	18.2	15.3
2006	323	279	16.9	13.9	11.3	8.9	14.3	10.8	16.6	12.3
2007	386	350	17.4	15.2	12.4	9.7	15.0	11.9	16.7	13.4
2008	427	363	19.2	15.6	12.5	10.4	15.9	12.5	18.5	13.8
2009	464	396	20.8	17.0	13.2	10.4	17.0	13.2	20.0	14.9
2010	443	386	19.7	16.5	13.2	9.7	16.5	12.3	18.9	14.1
2011	477	416	20.9	17.6	12.9	11.2	16.6	13.5	19.7	15.0
2012	473	439	20.7	18.6	13.0	10.8	16.5	13.7	19.4	15.7
2013	477	376	20.9	15.9	13.5	9.6	17.0	11.9	19.8	13.8
2014	157	171	6.9	7.2	3.7	3.8	5.2	5.1	6.6	6.0
1998-2014	5665	5128	17.7	15.3	12.0	9.7	15.1	12.0	17.4	13.5

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)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	344	56.6	21.0	0.1	93.2	28.1	45.9	59.9	71.3	81.9
1999	313	58.8	18.5	1.1	97.9	33.4	50.2	61.7	71.4	78.9
2000	353	57.8	19.6	0.2	97.1	31.2	47.4	60.0	71.1	80.5
2001	379	58.7	18.3	0.1	97.6	35.1	50.2	61.8	70.6	79.3
2002	601	58.8	19.9	0.0	93.1	30.5	48.6	62.8	72.5	81.1
2003	644	58.3	20.2	0.2	92.5	28.8	46.7	62.9	72.7	80.5
2004	657	58.0	19.9	0.0	96.1	31.2	48.3	63.1	71.2	78.9
2005	699	57.9	21.0	0.2	94.2	29.5	46.8	62.9	72.6	81.2
2006	602	60.0	19.5	0.2	103	34.3	50.5	64.1	73.8	80.7
2007	736	58.9	20.2	0.0	96.9	31.9	48.1	64.1	72.8	79.9
2008	790	60.1	19.6	0.0	101	32.0	50.4	65.3	73.3	79.8
2009	860	61.5	18.5	0.4	97.3	37.3	52.8	65.4	74.4	81.4
2010	829	61.2	19.5	0.0	97.3	35.3	52.0	66.7	74.4	81.1
2011	893	61.2	19.9	0.0	96.8	36.3	50.0	66.4	75.4	82.0
2012	912	62.6	19.3	0.0	98.4	38.1	53.6	67.5	75.2	82.7
2013	853	61.9	19.7	0.0	96.7	36.3	52.7	66.6	75.3	81.9
2014	328	65.7	16.0	2.3	95.0	43.1	57.0	67.9	77.3	84.3
1998-2014	10793	60.1	19.7	0.0	103	33.7	50.5	64.5	73.7	81.1

Table 3a

Age distribution parameters by year of diagnosis (MALES)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	176	55.2	19.5	0.4	91.1	28.6	43.6	58.6	68.5	75.9
1999	167	58.5	18.1	1.6	97.4	36.5	50.8	61.5	70.7	77.4
2000	185	56.2	20.9	0.2	92.9	28.6	46.0	59.4	68.9	82.0
2001	178	57.3	19.1	0.1	97.6	31.6	50.1	60.2	70.1	77.9
2002	304	57.2	20.9	0.1	92.4	29.0	45.8	62.3	72.0	79.2
2003	324	56.7	20.4	0.3	92.1	26.0	44.3	61.8	70.5	78.5
2004	348	58.3	19.0	0.0	93.4	34.7	48.7	63.2	70.5	77.9
2005	356	56.5	21.1	0.2	92.8	29.4	45.3	62.4	70.6	78.4
2006	323	59.2	18.5	0.3	89.2	34.8	50.5	63.4	71.0	78.8
2007	386	58.1	20.7	0.0	96.4	29.3	48.4	64.0	72.0	78.1
2008	427	60.6	18.5	0.0	95.2	33.6	52.2	66.0	73.0	78.7
2009	464	61.0	19.3	0.5	97.3	34.9	51.5	65.8	74.4	81.5
2010	443	59.8	20.3	0.0	92.7	31.9	50.8	65.0	74.2	80.9
2011	477	61.6	19.2	0.0	95.3	37.5	50.9	66.6	75.6	81.9
2012	473	62.1	19.8	0.3	95.5	35.4	52.3	68.1	74.7	81.3
2013	477	61.5	19.9	0.0	95.9	35.1	53.2	66.8	74.5	80.5
2014	157	65.9	16.0	2.3	91.5	41.7	58.3	69.6	77.1	82.5
1998-2014	5665	59.5	19.7	0.0	97.6	32.6	50.3	64.3	73.1	79.9

Table 3b

Age distribution parameters by year of diagnosis (FEMALES)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	168	58.0	22.5	0.1	93.2	24.1	46.5	61.6	75.8	84.0
1999	146	59.2	19.1	1.1	97.9	33.0	48.4	62.4	72.6	81.4
2000	168	59.6	18.0	0.4	97.1	35.6	47.4	61.5	72.7	80.5
2001	201	60.0	17.4	0.6	95.4	38.5	50.8	62.7	70.9	80.4
2002	297	60.5	18.7	0.0	93.1	33.1	51.2	63.6	73.4	81.7
2003	320	60.0	19.8	0.2	92.5	32.0	49.8	63.9	74.6	82.2
2004	309	57.5	20.9	0.2	96.1	28.4	47.7	63.0	71.9	80.2
2005	343	59.4	20.7	0.3	94.2	30.2	47.7	63.3	74.4	82.4
2006	279	61.0	20.7	0.2	103	32.5	50.4	66.5	75.9	83.5
2007	350	59.8	19.8	0.2	96.9	34.7	47.6	64.5	74.2	81.9
2008	363	59.5	20.8	0.1	101	29.4	48.9	64.3	73.8	81.7
2009	396	62.1	17.5	0.4	94.3	41.4	53.5	65.0	74.5	81.2
2010	386	62.7	18.4	0.2	97.3	40.8	55.0	67.6	75.0	81.1
2011	416	60.7	20.6	0.0	96.8	35.0	49.6	65.4	75.0	82.4
2012	439	63.2	18.9	0.0	98.4	40.5	53.9	66.0	76.7	83.7
2013	376	62.4	19.6	0.3	96.7	36.9	52.5	66.0	76.3	83.5
2014	171	65.6	16.0	20.5	95.0	44.1	56.8	67.1	77.5	85.5
1998-2014	5128	60.8	19.6	0.0	103	34.8	50.8	64.7	74.6	82.2

Table 4

Age distribution by 5-year age group and gender for period 2007-2014

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4	166	2.7	2.7	95	2.9	2.9	71	2.5	2.5
5-9	54	0.9	3.5	31	0.9	3.8	23	0.8	3.2
10-14	36	0.6	4.1	23	0.7	4.5	13	0.4	3.7
15-19	47	0.8	4.9	28	0.8	5.4	19	0.7	4.3
20-24	61	1.0	5.9	32	1.0	6.3	29	1.0	5.4
25-29	94	1.5	7.4	49	1.5	7.8	45	1.6	6.9
30-34	133	2.1	9.5	75	2.3	10.1	58	2.0	8.9
35-39	194	3.1	12.7	109	3.3	13.4	85	2.9	11.8
40-44	290	4.7	17.3	152	4.6	18.0	138	4.8	16.6
45-49	331	5.3	22.7	154	4.7	22.6	177	6.1	22.7
50-54	413	6.7	29.3	215	6.5	29.1	198	6.8	29.5
55-59	505	8.1	37.5	266	8.1	37.2	239	8.2	37.8
60-64	603	9.7	47.2	308	9.3	46.5	295	10.2	48.0
65-69	877	14.1	61.3	494	15.0	61.5	383	13.2	61.2
70-74	915	14.8	76.1	529	16.0	77.5	386	13.3	74.5
75-79	696	11.2	87.3	375	11.3	88.8	321	11.1	85.6
80-84	466	7.5	94.8	236	7.1	96.0	230	7.9	93.5
85+	320	5.2	100.0	133	4.0	100.0	187	6.5	100.0
All ages	6201	100.0		3304	100.0		2897	100.0	

Included in the statistics are 27.1% multiple primaries in males and 27.6% in females.

Table 5

Age-specific incidence 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 Prop.all cancers n=91183 %	Females Prop.all cancers n=89596 %
0- 4	92	71	10.5	8.6	51.7	51.4
5- 9	31	23	3.5	2.8	32.3	29.5
10-14	23	13	2.5	1.5	23.0	14.6
15-19	28	19	2.9	2.1	13.0	11.5
20-24	32	29	2.9	2.7	8.6	9.3
25-29	49	45	4.1	3.7	8.8	6.8
30-34	75	58	6.0	4.6	9.7	5.0
35-39	109	85	8.4	6.7	9.4	4.3
40-44	151	136	9.3	8.9	8.3	3.6
45-49	154	177	9.7	11.7	4.8	3.2
50-54	215	197	16.6	15.4	4.4	2.9
55-59	265	238	25.0	21.2	3.6	3.2
60-64	306	294	31.2	27.7	2.8	3.2
65-69	494	382	51.3	36.6	3.2	3.3
70-74	528	386	58.0	36.9	3.1	3.3
75-79	374	319	67.9	44.7	3.0	3.2
80-84	236	230	67.6	41.0	2.8	2.6
85+	132	187	57.0	32.4	2.2	1.8
All ages	3294	2889			3.6	3.2
Incidence						
Raw			18.2	15.4		
WS			11.7	9.4		
ES			14.9	11.7		
BRD-S			17.4	13.3		

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).

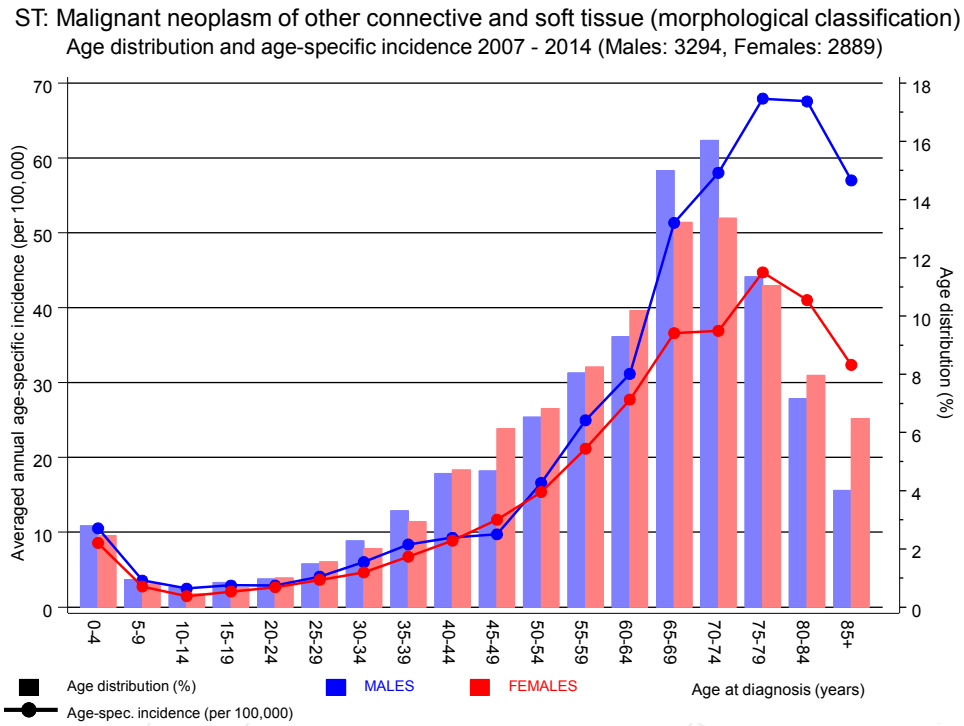


Figure 6. Age distribution and age-specific incidence

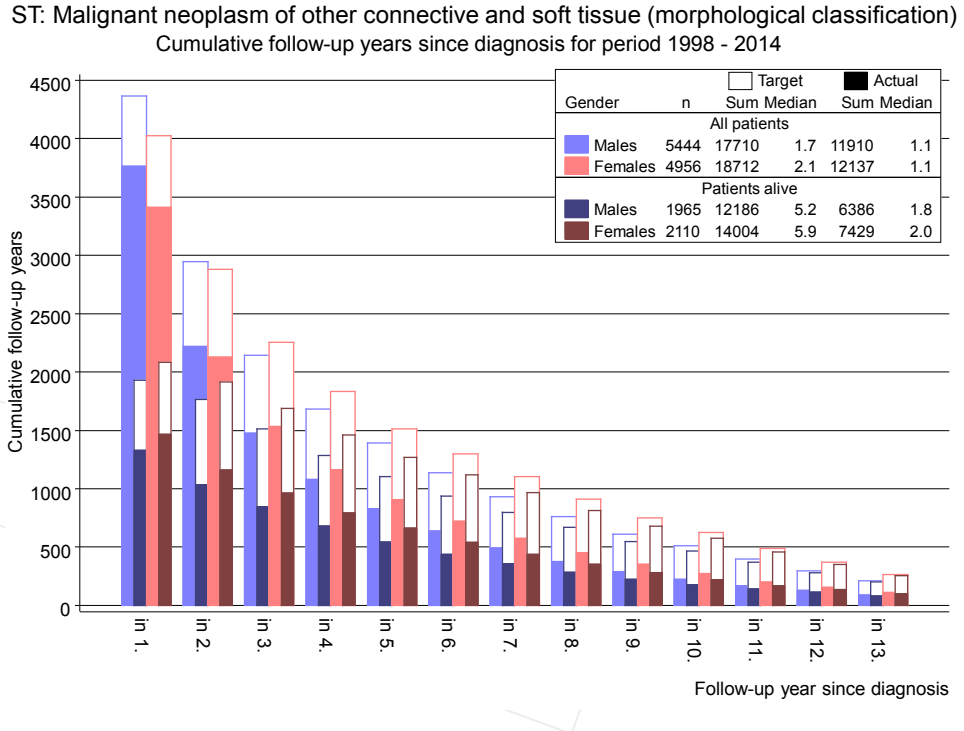


Figure 7. Cumulative follow-up years depending on time since diagnosis

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 %
C03–C06	Oral cavity	3	1.3	2.4	0.5	7.0		1.5	
C09–C10	Oropharynx	4	1.6	2.6	0.7	6.6		2.1	
C12–C13	Hypopharynx	2	0.8	2.4	0.3	8.5		1.0	50.0
C15	Oesophagus	9	2.5	3.6	1.6	6.8	#	5.5	11.1
C16	Stomach	11	5.3	2.1	1.0	3.7	#	4.8	
C17	Small intestine	10	0.7	14.3	6.9	26.4	#	7.8	10.0
C18	Colon	24	12.6	1.9	1.2	2.8	#	9.6	8.3
C19–C20	Rectum	8	7.3	1.1	0.5	2.2		0.6	
C22	Liver	4	3.6	1.1	0.3	2.8		0.3	25.0
C23–C24	Bile	4	1.3	3.2	0.9	8.1		2.3	25.0
C25	Pancreas	6	4.8	1.3	0.5	2.7		1.0	
C30–C31	Sinuses	3	0.2	12.5	2.6	36.6	#	2.3	
C33–C34	Lung	39	15.6	2.5	1.8	3.4	#	19.7	28.2
C40–C41	Bone	2	0.1	15.0	1.8	54.0	#	1.6	
C43	Malign. melanoma	20	6.0	3.3	2.0	5.1	#	11.8	10.0
C46,C49	Soft tissue	8	0.8	10.5	4.5	20.7	#	6.1	
C61	Prostate	59	38.4	1.5	1.2	2.0	#	17.3	8.5
C62	Testis	4	0.9	4.6	1.3	11.8	#	2.6	25.0
C64	Kidney	32	4.8	6.7	4.6	9.5	#	23.0	9.4
C67	Bladder	11	5.7	1.9	1.0	3.5		4.5	9.1
C70–C72	CNS cancer	10	1.9	5.2	2.5	9.6	#	6.8	20.0
C73	Thyroid	5	1.0	4.8	1.6	11.2	#	3.3	20.0
C76–C79	CUP	4	2.2	1.8	0.5	4.6		1.5	
C82–C85	NHL	16	5.3	3.0	1.7	4.9	#	9.0	12.5
C90	Mult. myeloma	4	1.6	2.4	0.7	6.2		2.0	
C91–C96	Leukaemia	9	2.2	4.1	1.9	7.7	#	5.7	11.1
Other primaries		11	4.8	2.3	1.1	4.1	#	5.2	9.1
Not observed		0	1.3	0.0	0.0	2.7		-1.1	
All mult. primaries		322	134.8	2.4	2.1	2.7	#	157.8	11.5

Patients	5444
Median age at second malignancy (years)	70.8
Person-years	11862
Mean observation time (years)	2.2
Median observation time (years)	1.1

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

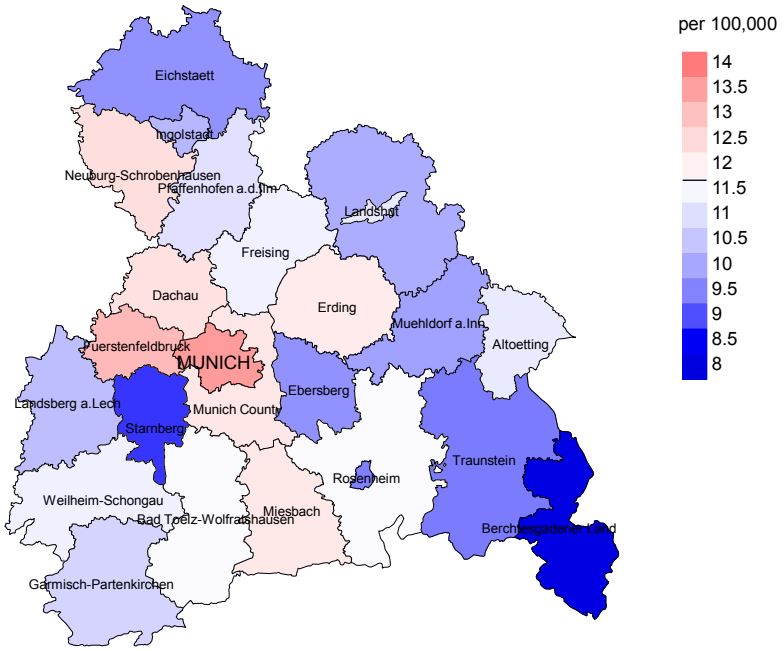
Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C16	Stomach	7	3.3	2.1	0.8	4.3		3.1	14.3
C17	Small intestine	3	0.5	6.0	1.2	17.6	#	2.1	
C18	Colon	24	9.3	2.6	1.6	3.8	#	12.2	8.3
C19–C20	Rectum	11	4.2	2.6	1.3	4.7	#	5.7	
C22	Liver	3	1.1	2.7	0.6	7.9		1.6	
C25	Pancreas	9	4.2	2.2	1.0	4.1		4.0	33.3
C33–C34	Lung	27	7.4	3.6	2.4	5.3	#	16.3	18.5
C40–C41	Bone	2	0.1	21.1	2.6	76.3	#	1.6	50.0
C43	Malign. melanoma	11	4.1	2.7	1.3	4.8	#	5.7	18.2
C46,C49	Soft tissue	8	0.6	13.5	5.8	26.7	#	6.2	37.5
C50	Breast	81	32.7	2.5	2.0	3.1	#	40.1	8.6
C51	Vulva	2	1.0	2.1	0.3	7.5		0.9	
C52	Vagina	2	0.2	10.6	1.3	38.1	#	1.5	
C53	Cervix uteri	4	1.7	2.4	0.7	6.2		1.9	25.0
C54	Corpus uteri	17	5.7	3.0	1.7	4.8	#	9.4	5.9
C56	Ovary	18	4.2	4.3	2.5	6.8	#	11.5	33.3
C64	Kidney	22	2.5	9.0	5.6	13.6	#	16.3	13.6
C67	Bladder	6	1.7	3.5	1.3	7.5	#	3.5	16.7
C70–C72	CNS cancer	8	1.5	5.5	2.4	10.8	#	5.4	12.5
C73	Thyroid	10	2.2	4.6	2.2	8.4	#	6.5	
C82–C85	NHL	14	3.8	3.7	2.0	6.2	#	8.5	7.1
C90	Mult. myeloma	4	1.2	3.4	0.9	8.8		2.4	
C91–C96	Leukaemia	10	1.6	6.2	3.0	11.5	#	7.0	
Other primaries		6	4.5	1.3	0.5	2.9		1.3	16.7
Not observed		0	3.8	0.0	0.0	1.0	#	-3.1	
All mult. primaries		309	103.0	3.0	2.7	3.4	#	171.4	12.6

Patients	4914
Median age at second malignancy (years)	70.9
Person-years	12024
Mean observation time (years)	2.4
Median observation time (years)	1.1

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

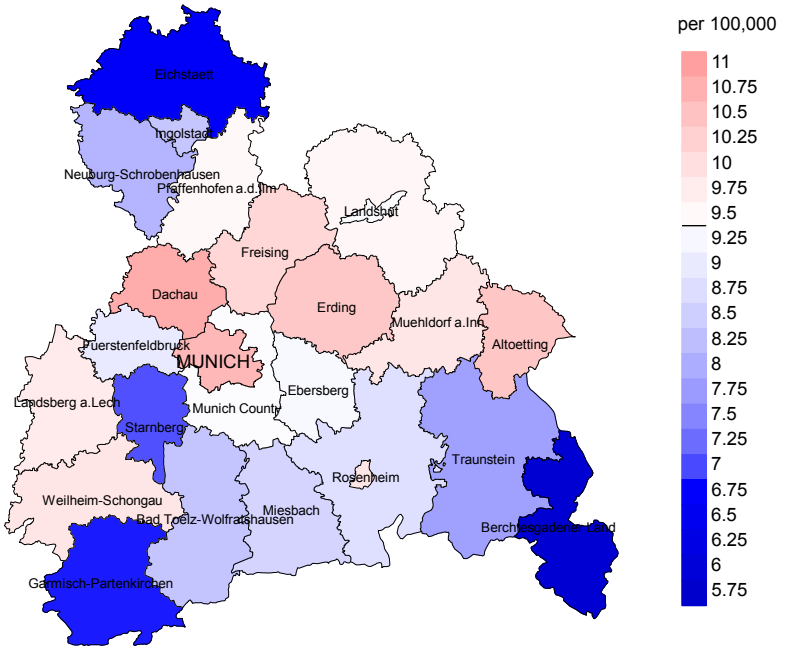
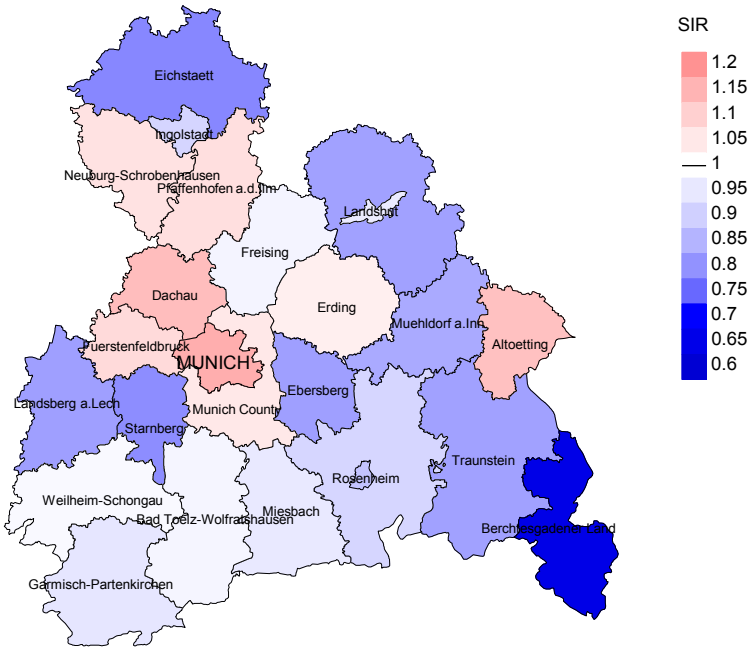


Figure 9a. Map of cancer incidence (world standard population) by county averaged for period 2007 to 2014. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 11.7/100,000 WS N=3,294, females 9.4/100,000 WS N=2,889).

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 83 women were identified with newly diagnosed sarcoma (morph.). Therefore, the mean incidence rate for this cancer type in this area can be calculated at 9.3/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 6.4 and 13.5/100,000.

Standardized incidence ratio (SIR) 2007 - 2014: Males



Standardized incidence ratio (SIR) 2007 - 2014: Females

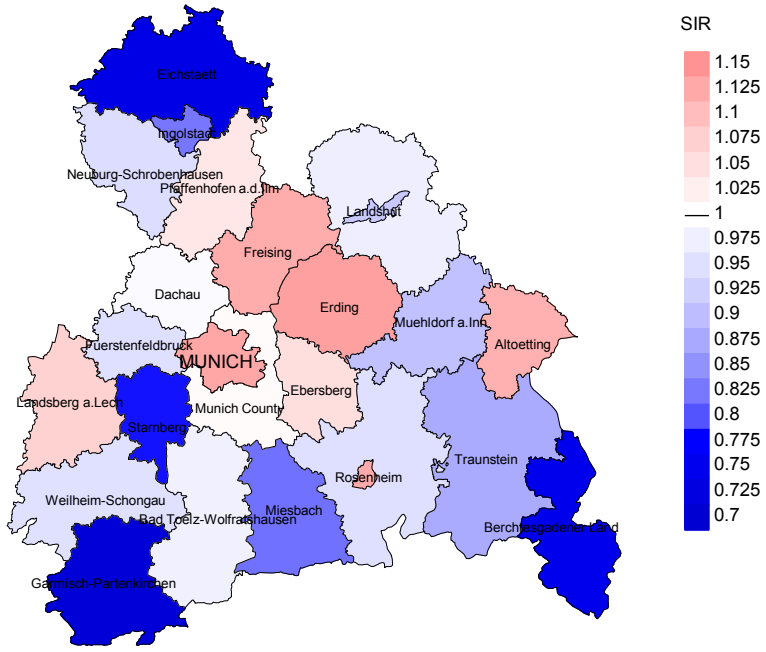


Figure 9b. Map of standardized incidence ratio (SIR) by county averaged for period 2007 to 2014. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=3,294, females N=2,889).

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 83 women were identified with newly diagnosed sarcoma (morph.). Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.05. Though, the value of this parameter may vary with an underlying probability of 99% between 0.78 and 1.39, and is therefore not statistically striking.

MORTALITY

Table 10a

Patient cohorts of incident cancers by year of diagnosis, follow-up status, and deaths among the annual cohorts

(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 %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	344	97.4	274	79.7	93.1
1999	313	97.1	238	76.0	92.0
2000	353	96.6	249	70.5	95.6
2001	379	95.8	278	73.4	91.7
2002	601	97.5	451	75.0	97.6
2003	644	96.3	460	71.4	95.4
2004	657	96.2	448	68.2	97.3
2005	699	94.3	480	68.7	97.5
2006	602	94.4	422	70.1	98.6
2007	736	81.0	453	61.5	98.2
2008	790	80.5	504	63.8	98.2
2009	860	80.6	556	64.7	97.5
2010	829	80.0	511	61.6	98.6
2011	893	80.1	480	53.8	97.7
2012	912	78.5	456	50.0	96.5
2013	853	99.5	378	44.3	96.8
2014	328	96.0	84	25.6	89.3
1998-2014	10793	88.9	6722	62.3	96.7

Table 10b

Annual cohorts of incident cancers and deaths,
and cases deceased the same year of cancer diagnosis

(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	Deaths in same year n	Prop. deaths in same year %
1998	344	224	85	24.7
1999	313	240	83	26.5
2000	353	228	76	21.5
2001	379	243	92	24.3
2002	601	355	140	23.3
2003	644	407	146	22.7
2004	657	447	135	20.5
2005	699	435	149	21.3
2006	602	450	130	21.6
2007	736	495	143	19.4
2008	790	499	154	19.5
2009	860	573	177	20.6
2010	829	609	182	22.0
2011	893	611	177	19.8
2012	912	601	189	20.7
2013	853	602	185	21.7
2014	328	495	64	19.5
1998-2014	10793	7514	2307	21.4

Table 10c

Annual cohorts of deaths, and proportion of cancer-related and non-cancer-related deaths

(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	224	75.4	24.6	95.2
1999	240	83.8	16.3	95.5
2000	228	83.3	16.7	96.2
2001	243	86.4	13.6	95.5
2002	355	86.2	13.8	95.6
2003	407	90.9	9.1	94.9
2004	447	87.9	12.1	94.7
2005	435	88.3	11.7	93.8
2006	450	88.4	11.6	93.3
2007	495	90.7	9.3	94.9
2008	499	91.8	8.2	95.3
2009	573	89.0	11.0	93.6
2010	609	90.0	10.0	93.5
2011	611	89.7	10.3	93.8
2012	601	87.7	12.3	94.2
2013	602	89.9	10.1	94.9
2014	495	85.9	14.1	88.7
1998-2014	7514	88.2	11.8	94.1

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	115	63.7	62.9	66.9	63.6
1999	133	66.0	66.3	65.4	64.8
2000	116	63.4	63.4	61.2	63.4
2001	136	63.5	63.4	66.9	63.5
2002	199	65.3	65.4	63.0	65.3
2003	184	66.7	66.1	72.7	65.6
2004	240	67.1	66.4	76.5	66.9
2005	243	66.2	65.5	70.3	65.7
2006	238	67.0	67.0	67.5	67.1
2007	273	67.4	67.1	72.5	67.1
2008	268	68.3	68.1	76.0	68.2
2009	329	70.1	69.2	75.7	69.3
2010	360	69.6	69.1	74.6	69.3
2011	328	71.1	70.0	80.0	70.2
2012	317	70.2	69.6	78.5	69.8
2013	331	71.6	70.7	78.2	70.9
2014	269	70.2	69.4	81.9	69.8
1998-2014	4079	68.3	67.7	74.7	67.9

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	109	71.4	69.5	79.0	70.6
1999	107	67.7	67.2	74.9	67.7
2000	112	68.4	67.9	73.4	68.2
2001	107	66.6	65.9	71.5	66.0
2002	156	67.9	66.1	80.2	67.8
2003	223	68.7	68.1	82.6	68.4
2004	207	67.1	65.9	80.9	66.0
2005	192	68.8	67.6	80.4	67.6
2006	212	69.3	68.5	79.8	69.1
2007	222	71.0	70.2	81.8	70.1
2008	231	71.2	69.8	83.4	70.8
2009	244	70.5	69.9	86.6	70.4
2010	249	70.8	70.0	79.6	70.5
2011	283	71.8	71.3	83.8	71.6
2012	284	71.4	70.3	83.1	70.6
2013	271	71.7	70.7	87.5	71.0
2014	226	74.2	70.8	83.1	70.9
1998-2014	3435	70.3	69.1	81.5	69.8

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	87	7.9	0.49	5.4	0.46	7.2	0.49	8.3	0.51
1999	111	9.9	0.67	6.5	0.60	9.0	0.65	11.0	0.71
2000	96	8.4	0.52	5.7	0.47	7.6	0.51	8.8	0.51
2001	114	9.8	0.64	6.2	0.55	8.6	0.60	10.4	0.64
2002	170	9.1	0.56	5.6	0.47	7.8	0.53	9.4	0.56
2003	164	8.7	0.51	5.3	0.42	7.3	0.47	9.1	0.52
2004	211	11.2	0.61	7.0	0.54	9.4	0.59	11.6	0.64
2005	215	11.4	0.60	7.0	0.51	9.4	0.57	11.1	0.61
2006	214	11.2	0.66	6.9	0.61	9.2	0.64	11.0	0.66
2007	254	11.5	0.66	6.6	0.54	9.1	0.61	11.1	0.67
2008	249	11.2	0.58	6.3	0.51	8.8	0.56	10.9	0.59
2009	284	12.7	0.61	6.9	0.52	9.7	0.57	12.1	0.60
2010	326	14.5	0.74	8.0	0.61	11.1	0.67	13.7	0.73
2011	296	13.0	0.62	6.9	0.54	9.8	0.59	12.4	0.63
2012	282	12.3	0.60	6.7	0.52	9.3	0.57	11.7	0.61
2013	298	13.0	0.63	7.2	0.53	9.7	0.58	12.2	0.62
2014	240	10.5	1.53	5.9	1.58	8.0	1.53	9.8	1.50
1998-2014	3611	11.3	0.64	6.6	0.55	9.1	0.61	11.2	0.65

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	82	7.0	0.49	3.8	0.37	5.1	0.43	6.4	0.48
1999	90	7.6	0.62	4.7	0.58	5.9	0.59	6.9	0.62
2000	94	7.8	0.56	4.2	0.48	5.7	0.51	6.9	0.54
2001	96	7.9	0.48	4.7	0.44	6.0	0.44	7.0	0.47
2002	136	6.9	0.46	4.1	0.43	5.3	0.43	6.2	0.45
2003	206	10.5	0.65	5.8	0.56	7.8	0.61	9.2	0.63
2004	182	9.2	0.59	5.2	0.47	6.9	0.53	8.1	0.58
2005	169	8.5	0.50	4.6	0.41	6.1	0.45	7.2	0.47
2006	184	9.2	0.66	4.9	0.56	6.5	0.60	7.7	0.63
2007	196	8.5	0.56	4.0	0.41	5.6	0.47	7.1	0.53
2008	209	9.0	0.58	4.6	0.44	6.2	0.50	7.6	0.55
2009	226	9.7	0.57	4.7	0.45	6.4	0.49	7.9	0.53
2010	222	9.5	0.58	4.6	0.47	6.4	0.52	8.0	0.57
2011	252	10.7	0.61	5.1	0.46	7.0	0.52	8.7	0.58
2012	245	10.4	0.56	5.2	0.48	7.0	0.51	8.4	0.54
2013	243	10.3	0.65	5.0	0.53	6.9	0.58	8.3	0.61
2014	185	7.8	1.08	3.8	1.01	5.2	1.02	6.4	1.07
1998-2014	3017	9.0	0.59	4.7	0.48	6.3	0.53	7.6	0.57

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	14	0.3	0.3	9	0.4	0.4	5	0.3	0.3
5-9	27	0.7	1.0	15	0.7	1.1	12	0.7	0.9
10-14	17	0.4	1.4	10	0.4	1.5	7	0.4	1.3
15-19	23	0.6	2.0	13	0.6	2.1	10	0.6	1.9
20-24	24	0.6	2.6	14	0.6	2.7	10	0.6	2.5
25-29	27	0.7	3.3	19	0.8	3.6	8	0.4	2.9
30-34	29	0.7	4.0	19	0.8	4.4	10	0.6	3.5
35-39	61	1.5	5.5	38	1.7	6.1	23	1.3	4.7
40-44	123	3.0	8.6	67	3.0	9.1	56	3.1	7.9
45-49	198	4.9	13.5	116	5.2	14.3	82	4.6	12.4
50-54	216	5.4	18.8	124	5.5	19.8	92	5.1	17.6
55-59	293	7.3	26.1	157	7.0	26.8	136	7.6	25.2
60-64	414	10.3	36.3	237	10.6	37.4	177	9.9	35.0
65-69	614	15.2	51.5	364	16.2	53.6	250	13.9	49.0
70-74	700	17.3	68.9	424	18.9	72.5	276	15.4	64.4
75-79	554	13.7	82.6	286	12.8	85.3	268	14.9	79.3
80-84	413	10.2	92.9	214	9.5	94.8	199	11.1	90.4
85+	288	7.1	100.0	116	5.2	100.0	172	9.6	100.0
All ages	4035	100.0		2242	100.0		1793	100.0	

Included in the statistics are 27.1% multiple primaries in males and 27.6% 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.	Males MI-index	Females Age-spec. mortal.	Females MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4	9	5	1.0	0.09	0.6	0.07	75.0	33.3
5- 9	15	12	1.7	0.48	1.4	0.52	71.4	66.7
10-14	10	7	1.1	0.43	0.8	0.54	55.6	35.0
15-19	13	10	1.3	0.46	1.1	0.53	36.1	45.5
20-24	14	10	1.3	0.44	0.9	0.34	29.2	35.7
25-29	19	8	1.6	0.39	0.6	0.18	30.6	12.5
30-34	19	10	1.5	0.25	0.8	0.17	21.6	9.1
35-39	38	23	2.9	0.35	1.8	0.27	21.5	8.9
40-44	67	56	4.1	0.44	3.7	0.41	14.6	8.9
45-49	116	82	7.3	0.75	5.4	0.46	11.3	6.7
50-54	124	92	9.6	0.58	7.2	0.46	6.6	5.2
55-59	157	136	14.8	0.59	12.1	0.57	5.1	5.2
60-64	237	177	24.1	0.77	16.7	0.60	5.0	5.0
65-69	364	250	37.8	0.74	24.0	0.65	5.1	4.8
70-74	424	276	46.6	0.80	26.4	0.72	4.6	4.2
75-79	286	268	51.9	0.76	37.6	0.83	3.4	4.3
80-84	214	199	61.3	0.91	35.5	0.87	2.9	3.0
85+	116	172	50.1	0.87	29.8	0.92	1.9	2.0
All ages	2242	1793					4.5	4.1
Mortality								
Raw			12.4	0.68	9.6	0.62		
WS			6.9	0.58	4.7	0.49		
ES			9.5	0.64	6.4	0.55		
BRD-S			11.8	0.68	7.9	0.59		
PYLL-70								
per 100,000			109.2		79.6			
ES			104.3		75.4			
AYLL-70			14.6		14.4			

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 ←%
C15	Oesophagus	9	1.0					9	100.0
C16	Stomach	25	2.8			5	20.0	20	80.0
C18	Colon	12	1.3			4	33.3	8	66.7
C19-C20	Rectum	13	1.5			2	15.4	11	84.6
C22	Liver	9	1.0			3	33.3	6	66.7
C33-C34	Lung	48	5.4			6	12.5	42	87.5
C38,C45	Mesothelioma	113	12.7			3	2.7	110	97.3
C43	Malign. melanoma	62	7.0	41	66.1	1	1.6	20	32.3
C44	Skin others	43	4.8			5	11.6	38	88.4
C46,C49	Soft tissue	84	9.4			5	6.0	79	94.0
C48	Peritoneal	12	1.3					12	100.0
C61	Prostate	41	4.6			4	9.8	37	90.2
C64	Kidney	20	2.2			3	15.0	17	85.0
C67	Bladder	27	3.0			4	14.8	23	85.2
C70-C72	CNS cancer	197	22.1			15	7.6	182	92.4
C76-C79	CUP	9	1.0					9	100.0
C82-C85	NHL	52	5.8	31	59.6	6	11.5	15	28.8
C90	Mult. myeloma	14	1.6	6	42.9	2	14.3	6	42.9
C91-C96	Leukaemia	24	2.7	8	33.3	2	8.3	14	58.3
Other primaries		78	8.7	10	12.8	8	10.3	60	76.9
All mult. primaries		892	100.0	96	10.8	78	8.7	718	80.5

Multiple primaries with number of cases 1 to 8 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 ←%
C16	Stomach	17	2.2			1	5.9	16	94.1
C18	Colon	23	2.9			1	4.3	22	95.7
C25	Pancreas	17	2.2			1	5.9	16	94.1
C33-C34	Lung	40	5.1			3	7.5	37	92.5
C38,C45	Mesothelioma	27	3.5			1	3.7	26	96.3
C43	Malign. melanoma	41	5.2	26	63.4	2	4.9	13	31.7
C44	Skin others	21	2.7			2	9.5	19	90.5
C46,C49	Soft tissue	85	10.9			5	5.9	80	94.1
C48	Peritoneal	13	1.7			2	15.4	11	84.6
C50	Breast	93	11.9			16	17.2	77	82.8
C54	Corpus uteri	57	7.3			4	7.0	53	93.0
C56	Ovary	32	4.1			8	25.0	24	75.0
C64	Kidney	20	2.6			5	25.0	15	75.0
C67	Bladder	16	2.0			2	12.5	14	87.5
C70-C72	CNS cancer	133	17.0			12	9.0	121	91.0
C73	Thyroid	12	1.5			3	25.0	9	75.0
C76-C79	CUP	11	1.4			2	18.2	9	81.8
C82-C85	NHL	25	3.2	14	56.0	4	16.0	7	28.0
C91-C96	Leukaemia	23	2.9	8	34.8	2	8.7	13	56.5
Other primaries		75	9.6	15	20.0	4	5.3	56	74.7
All mult. primaries		781	100.0	63	8.1	80	10.2	638	81.7

Multiple primaries with number of cases 1 to 7 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.	Males MI-index	Females Age-spec. mortal.	Females MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4	8	5	0.9	0.09	0.6	0.07	80.0	38.5
5- 9	14	12	1.6	0.45	1.4	0.52	70.0	66.7
10-14	10	6	1.1	0.43	0.7	0.50	55.6	31.6
15-19	12	9	1.2	0.44	1.0	0.53	36.4	45.0
20-24	12	9	1.1	0.39	0.8	0.33	27.9	34.6
25-29	17	8	1.4	0.36	0.6	0.19	30.9	13.6
30-34	19	9	1.5	0.26	0.7	0.16	22.1	9.5
35-39	37	21	2.8	0.36	1.7	0.27	22.4	9.3
40-44	63	47	3.9	0.46	3.1	0.41	14.9	8.5
45-49	109	80	6.9	0.75	5.3	0.49	11.9	7.8
50-54	113	87	8.7	0.57	6.8	0.50	7.1	5.9
55-59	142	110	13.4	0.58	9.8	0.56	5.4	5.1
60-64	207	155	21.1	0.82	14.6	0.65	5.3	5.5
65-69	309	195	32.1	0.78	18.7	0.66	5.5	4.8
70-74	333	213	36.6	0.85	20.4	0.77	4.8	4.2
75-79	214	197	38.9	0.85	27.6	0.86	3.4	4.1
80-84	163	157	46.7	0.95	28.0	0.90	3.1	3.1
85+	80	137	34.6	0.90	23.7	0.93	1.8	2.0
All ages	1862	1457					4.8	4.2
Mortality								
Raw			10.3	0.69	7.8	0.62		
WS			5.9	0.58	3.9	0.49		
ES			8.0	0.64	5.3	0.54		
BRD-S			9.8	0.69	6.5	0.59		
PYLL-70								
per 100,000			100.4		71.6			
ES			95.9		68.3			
AYLL-70			15.0		15.0			

* 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.	Males MI-index	Females Age-spec. mortal.	Females MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4	8	5	0.9	0.09	0.6	0.07	80.0	38.5
5- 9	14	12	1.6	0.45	1.4	0.52	70.0	66.7
10-14	10	6	1.1	0.43	0.7	0.50	55.6	33.3
15-19	12	8	1.2	0.44	0.9	0.47	36.4	44.4
20-24	11	8	1.0	0.37	0.7	0.30	28.2	33.3
25-29	16	7	1.3	0.34	0.6	0.16	31.4	12.5
30-34	19	9	1.5	0.27	0.7	0.16	22.4	10.8
35-39	35	19	2.7	0.35	1.5	0.25	22.2	9.3
40-44	59	45	3.6	0.44	2.9	0.41	14.9	8.8
45-49	105	77	6.6	0.73	5.1	0.48	12.2	8.4
50-54	110	84	8.5	0.57	6.6	0.51	7.7	6.3
55-59	137	102	12.9	0.59	9.1	0.55	5.9	5.4
60-64	198	145	20.2	0.82	13.7	0.64	5.8	6.0
65-69	291	182	30.2	0.77	17.4	0.67	6.1	5.4
70-74	306	192	33.6	0.84	18.4	0.75	5.4	4.6
75-79	195	181	35.4	0.82	25.4	0.83	4.0	4.6
80-84	146	147	41.8	0.89	26.2	0.89	3.6	3.6
85+	68	118	29.4	0.83	20.4	0.84	2.0	2.1
All ages	1740	1347					5.5	4.7
Mortality								
Raw			9.6	0.67	7.2	0.60		
WS			5.6	0.57	3.7	0.48		
ES			7.5	0.62	5.0	0.53		
BRD-S			9.1	0.67	6.0	0.57		
PYLL-70								
per 100,000			96.8		67.8			
ES			92.8		64.9			
AYLL-70			15.1		15.2			

* See corresponding tables with multiple primaries.

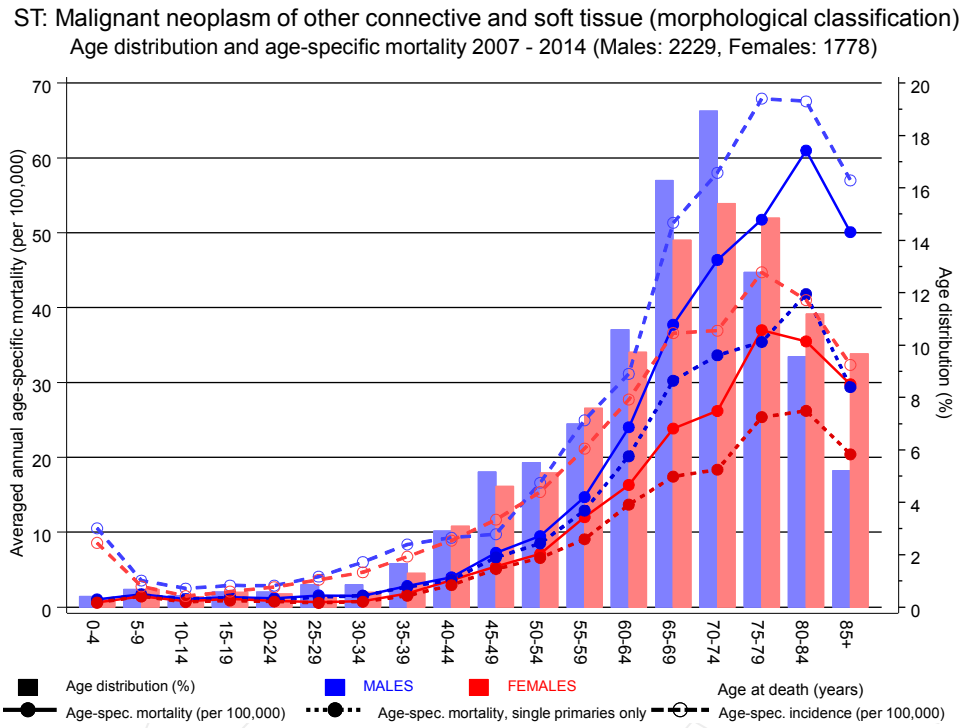


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

The difference between age at diagnosis (Table 3) and age at sarcoma (morph.)-related death (see Table 10) should be considered.

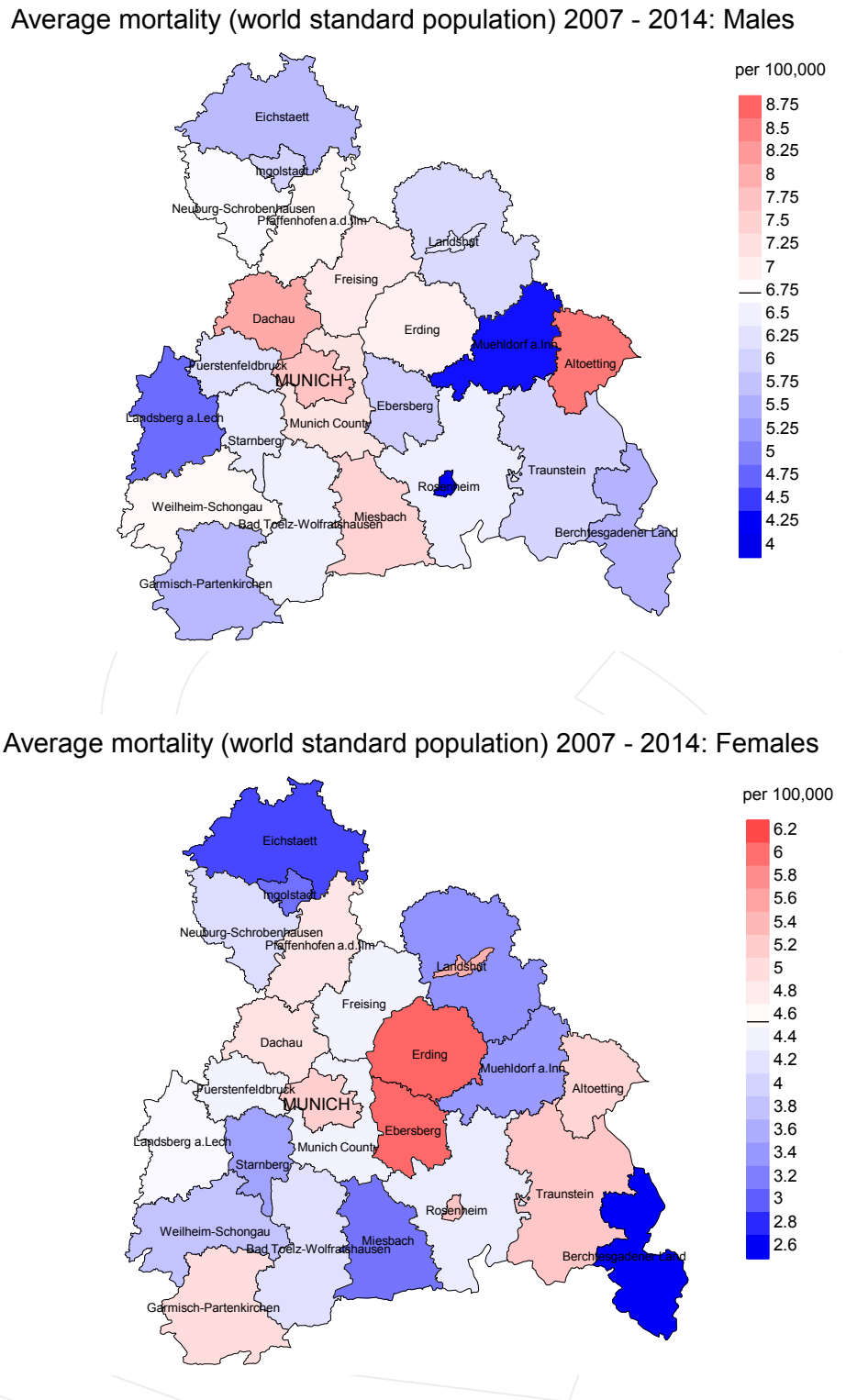
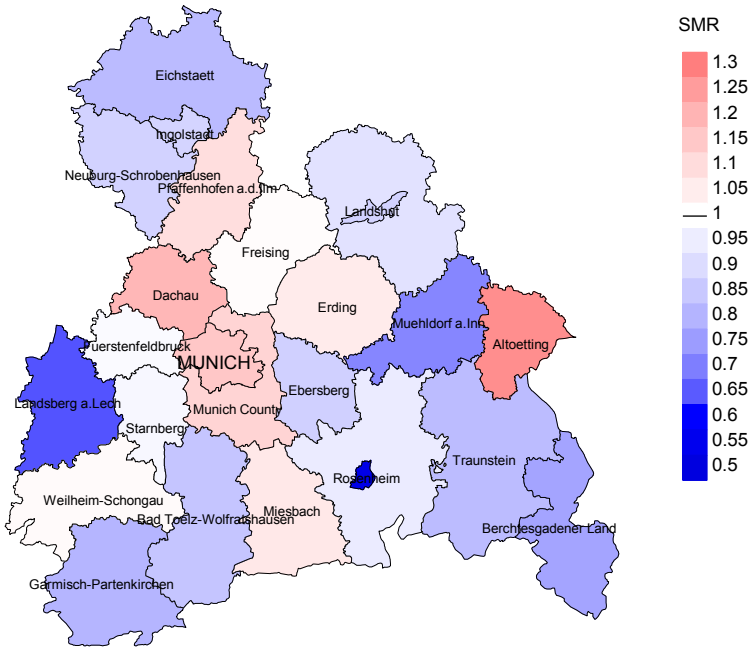


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2014. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 6.7/100,000 WS N=2,214, females 4.6/100,000 WS N=1,752).

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 60 women died from sarcoma (morph.). Therefore, the mean mortality rate for this cancer type in this area can be calculated at 6.0/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 3.8 and 9.5/100,000.

Standardized mortality ratio (SMR) 2007 - 2014: Males



Standardized mortality ratio (SMR) 2007 - 2014: Females

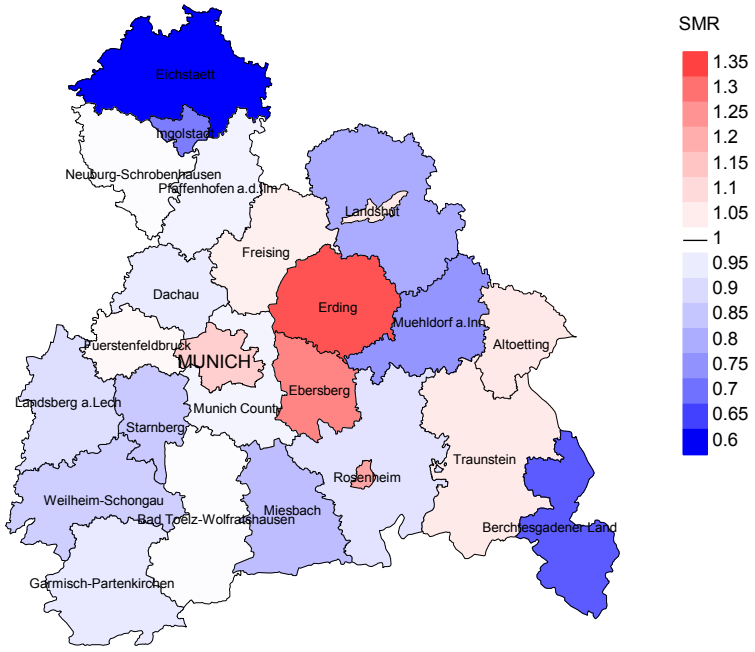


Figure 19b. Map of standardized mortality ratio (SMR) by county averaged for period 2007 to 2014. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=2,214, females N=1,752).

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 60 women died from sarcoma (morph.). Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.27. Though, the value of this parameter may vary with an underlying probability of 99% between 0.89 and 1.76, 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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