Munich Cancer Registry

- Survival
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- *Deutsch*

ICD-10 C38, C47-C49: Sarcoma

Incidence and Mortality

Year of diagnosis	1998-2014
Patients	3,283
Diseases	3,296
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/bC3849E-ICD-10-C38-C47-C49-Sarcoma-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
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

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	112	15	13.4	23.2	78.6	100.0	
1999	126	15	11.9	34.9	68.3	98.4	
2000	119	14	11.8	22.7	63.0	98.3	
2001	102	12	11.8	12.7	64.7	97.1	
2002	189	15	7.9	18.5	70.4	97.4	#
2003	204	23	11.3	23.0	71.6	95.1	
2004	196	21	10.7	21.4	60.2	96.9	
2005	206	9	4.4	21.8	62.6	92.2	
2006	187	15	8.0	28.9	63.1	95.2	
2007	251	12	4.8	26.7	55.4	80.1	#
2008	239	8	3.3	25.5	58.2	80.8	
2009	246	9	3.7	28.9	53.7	76.8	
2010	257	10	3.9	28.8	50.6	75.9	
2011	266	8	3.0	32.0	47.7	77.8	
2012	225	12	5.3	22.7	41.8	80.9	
2013	252	11	4.4	31.3	36.1	99.6	
2014	119	9	7.6	31.1	28.6	97.5	##
1998-2014	3296	218	6.6	26.0	56.0	88.7	

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	112	53	59	47.3
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	204	88	116	43.1
2004	196	106	90	54.1
2005	206	98	108	47.6
2006	187	89	98	47.6
2007	251	109	142	43.4
2008	239	104	135	43.5
2009	246	114	132	46.3
2010	257	113	144	44.0
2011	266	117	149	44.0
2012	225	103	122	45.8
2013	252	127	125	50.4
2014	119	42	77	35.3
1998–2014	3296	1529	1767	46.4

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	53	59	4.8	5.0	3.5	2.9	4.5	3.7	5.4	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	4.0	2.7	4.8	3.5	5.6	4.1
2003	88	116	4.7	5.9	3.4	3.3	4.3	4.3	5.0	5.1
2004	106	90	5.6	4.6	4.1	2.9	5.0	3.5	5.6	3.9
2005	98	108	5.2	5.4	4.1	3.4	4.8	4.1	5.0	4.8
2006	89	98	4.6	4.9	3.0	3.1	3.9	3.9	4.8	4.4
2007	109	142	4.9	6.1	3.5	3.4	4.2	4.4	4.8	5.2
2008	104	135	4.7	5.8	3.2	3.3	4.0	4.3	4.5	5.0
2009	114	132	5.1	5.7	3.1	3.2	4.2	4.3	5.0	5.0
2010	113	144	5.0	6.2	3.6	3.3	4.4	4.3	4.9	5.2
2011	117	149	5.1	6.3	3.2	3.3	4.1	4.4	4.9	5.1
2012	103	122	4.5	5.2	2.9	3.0	3.7	3.7	4.3	4.3
2013	127	125	5.6	5.3	3.8	2.8	4.6	3.6	5.5	4.3
2014	42	77	1.8	3.3	1.1	1.6	1.4	2.2	1.8	2.8
1998–2014	1529	1767	4.8	5.3	3.3	3.0	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 patients)
(incl. DCO)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	112	60.4	22.2	0.4	93.2	28.3	50.4	66.1	77.0	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	59.5	21.5	0.0	93.0	30.3	47.1	64.6	75.3	82.0
2003	204	61.6	20.8	0.3	92.5	31.0	52.6	66.1	77.1	84.0
2004	196	58.8	21.1	0.0	96.1	30.8	47.1	64.8	74.0	82.0
2005	206	57.9	21.9	0.2	92.0	28.4	47.7	62.8	73.6	81.3
2006	187	61.1	20.7	0.3	103	33.8	51.8	63.9	76.9	83.1
2007	251	61.7	20.5	0.1	96.4	35.5	54.2	66.9	75.3	81.8
2008	239	62.0	20.0	0.0	101	34.3	51.7	66.6	76.2	83.4
2009	246	63.4	17.8	0.2	94.3	39.7	55.8	66.8	76.2	83.2
2010	257	61.1	20.2	0.1	97.3	32.6	49.9	65.2	75.5	83.0
2011	266	63.8	18.5	0.0	96.8	38.3	52.2	68.5	76.9	84.0
2012	225	63.0	20.4	0.4	98.4	34.8	54.1	66.4	76.4	84.7
2013	252	62.9	20.8	0.0	96.7	31.9	52.7	68.2	76.4	84.9
2014	119	67.1	18.0	2.3	93.6	43.6	59.4	72.0	79.9	85.4
1998-2014	3296	61.6	20.2	0.0	103	33.2	51.6	66.0	76.0	83.2

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	53	57.8	22.1	0.4	90.8	27.1	42.9	63.3	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	56.9	23.4	0.1	92.4	20.1	42.2	63.5	73.6	81.9
2003	88	58.2	22.4	0.3	92.4	21.6	42.3	63.0	75.5	85.7
2004	106	57.0	20.5	0.0	90.7	30.9	45.9	62.5	71.5	78.7
2005	98	53.5	21.8	0.2	90.9	22.3	41.9	58.5	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	109	58.2	22.5	0.1	96.4	26.0	44.6	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	113	57.0	22.0	0.1	93.2	31.5	45.6	59.8	73.4	82.5
2011	117	61.3	20.0	0.0	95.0	32.7	49.6	67.7	75.4	82.5
2012	103	61.2	20.6	0.4	95.5	30.8	51.1	65.8	74.9	83.8
2013	127	60.2	22.5	0.0	95.9	24.3	48.9	66.4	76.4	83.2
2014	42	68.0	18.8	2.3	93.6	53.6	61.2	70.9	80.1	85.4
1998-2014	1529	59.3	21.4	0.0	97.4	29.7	48.0	64.4	74.3	82.5

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	90	61.0	21.6	0.2	96.1	28.2	48.5	66.1	76.6	83.6
2005	108	62.0	21.3	1.1	92.0	28.6	52.6	67.4	78.2	82.6
2006	98	61.2	20.9	1.6	103	33.8	52.1	62.5	78.1	83.9
2007	142	64.4	18.4	0.3	89.4	42.4	58.0	67.5	77.0	82.6
2008	135	63.9	18.8	4.4	101	35.6	54.0	67.4	77.4	84.9
2009	132	63.8	15.0	2.2	94.3	43.8	56.6	64.4	74.7	80.1
2010	144	64.4	18.1	0.9	97.3	36.5	55.9	68.9	76.4	83.0
2011	149	65.8	17.1	11.7	96.8	42.3	56.9	68.9	77.9	86.3
2012	122	64.6	20.1	0.4	98.4	41.4	55.0	68.1	80.0	84.9
2013	125	65.6	18.7	0.0	96.7	43.6	56.3	70.6	76.5	86.7
2014	77	66.7	17.6	20.5	89.8	40.8	57.4	72.0	79.5	85.1
1998-2014	1767	63.5	19.0	0.0	103	37.8	54.0	67.2	77.1	83.6

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	39	2.1	2.1	28	3.4	3.4	11	1.1	1.1
5-9	10	0.5	2.6	6	0.7	4.1	4	0.4	1.5
10-14	12	0.6	3.3	8	1.0	5.1	4	0.4	1.9
15-19	18	1.0	4.3	8	1.0	6.0	10	1.0	2.8
20-24	25	1.3	5.6	12	1.4	7.5	13	1.3	4.1
25-29	32	1.7	7.3	16	1.9	9.4	16	1.6	5.7
30-34	46	2.5	9.8	31	3.7	13.1	15	1.5	7.1
35-39	59	3.2	13.0	38	4.6	17.7	21	2.0	9.2
40-44	74	4.0	17.0	31	3.7	21.5	43	4.2	13.4
45-49	77	4.2	21.1	32	3.9	25.3	45	4.4	17.7
50-54	111	6.0	27.1	53	6.4	31.7	58	5.7	23.4
55-59	149	8.0	35.1	61	7.4	39.1	88	8.6	32.0
60-64	165	8.9	44.0	71	8.6	47.6	94	9.2	41.1
65-69	251	13.5	57.6	111	13.4	61.0	140	13.6	54.8
70-74	262	14.1	71.7	108	13.0	74.1	154	15.0	69.8
75-79	207	11.2	82.9	88	10.6	84.7	119	11.6	81.4
80-84	170	9.2	92.0	66	8.0	92.6	104	10.1	91.5
85+	148	8.0	100.0	61	7.4	100.0	87	8.5	100.0
All ages	1855	100.0		829	100.0		1026	100.0	

Included in the statistics are 35.6% multiple primaries in males and 36.4% 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=34 %	Females DCO rate n=45 %	Males Prop.all cancers n=91183 %	Females Prop.all cancers n=89596 %
0- 4	28	11	3.2	1.3			15.7	8.0
5- 9	6	4	0.7	0.5			6.3	5.1
10-14	8	4	0.9	0.5			8.0	4.5
15-19	8	10	0.8	1.1			3.7	6.1
20-24	12	13	1.1	1.2		7.7	3.2	4.2
25-29	16	16	1.3	1.3			2.9	2.4
30-34	31	15	2.5	1.2			4.0	1.3
35-39	38	21	2.9	1.7		4.8	3.3	1.1
40-44	31	43	1.9	2.8			1.7	1.1
45-49	32	45	2.0	3.0		2.2	1.0	0.8
50-54	53	58	4.1	4.5	3.8		1.1	0.9
55-59	60	88	5.7	7.8	1.7	1.1	0.8	1.2
60-64	70	94	7.1	8.9	2.9	2.1	0.7	1.0
65-69	111	140	11.5	13.4	1.8		0.7	1.2
70-74	108	154	11.9	14.7	5.6	1.9	0.6	1.3
75-79	88	118	16.0	16.5	8.0	4.2	0.7	1.2
80-84	66	104	18.9	18.5	4.5	8.7	0.8	1.2
85+	60	87	25.9	15.1	18.3	25.3	1.0	0.8
All ages	826	1025			4.1	4.4	0.9	1.1
Incidence								
Raw			4.6	5.5				
WS			3.0	3.0				
ES			3.8	3.9				
BRD-S			4.4	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).

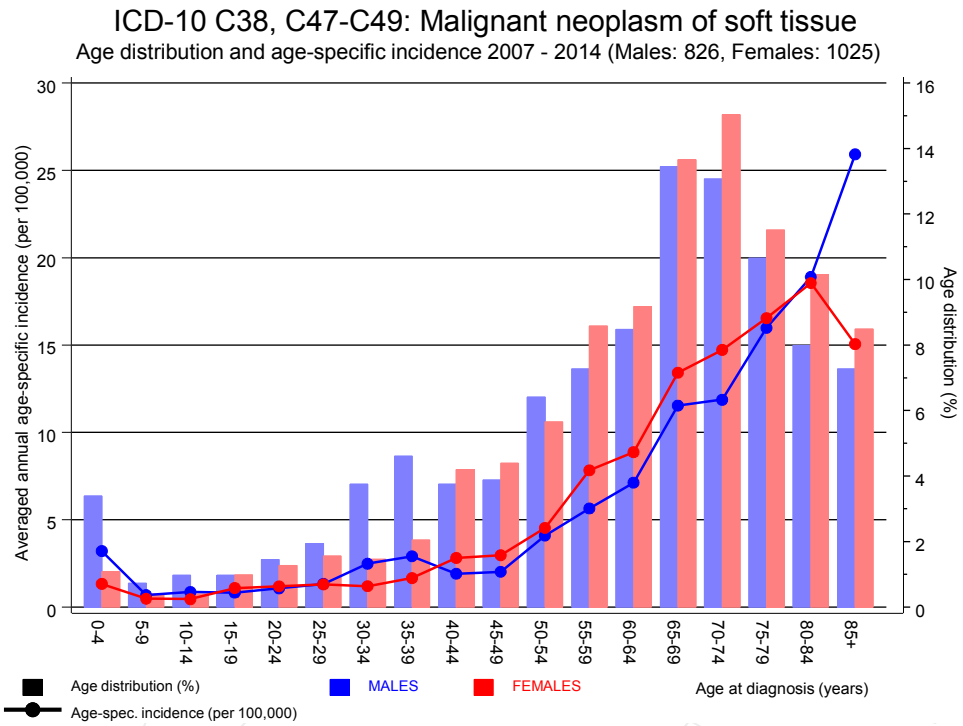


Figure 6. Age distribution and age-specific incidence

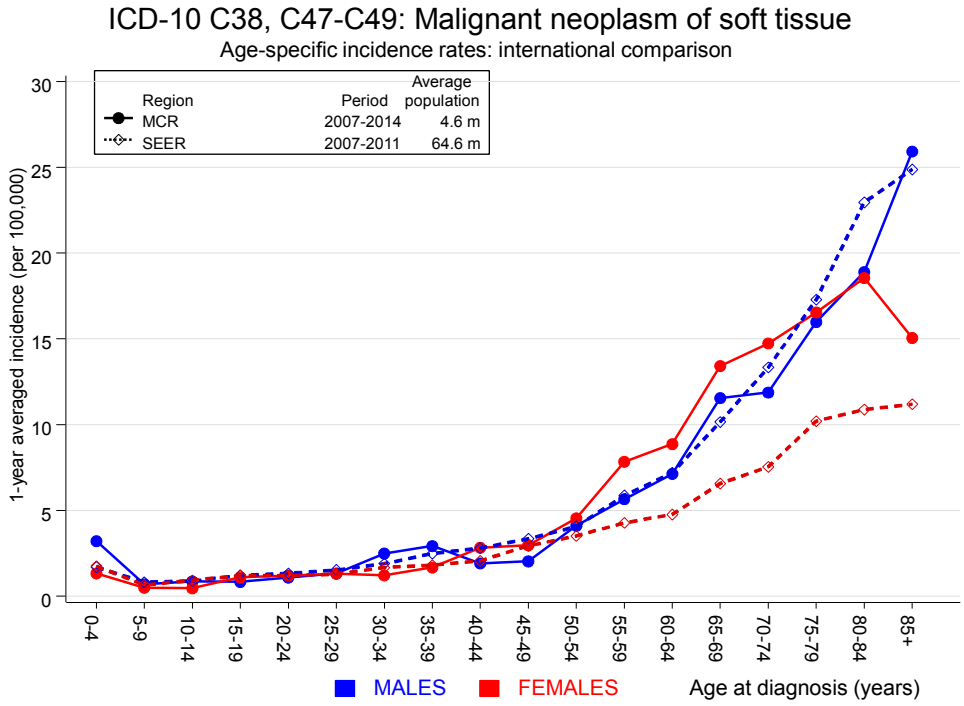


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 18 Regs Research Data, released April 2014, based on the November 2013 submission. http://www.seer.cancer.gov.

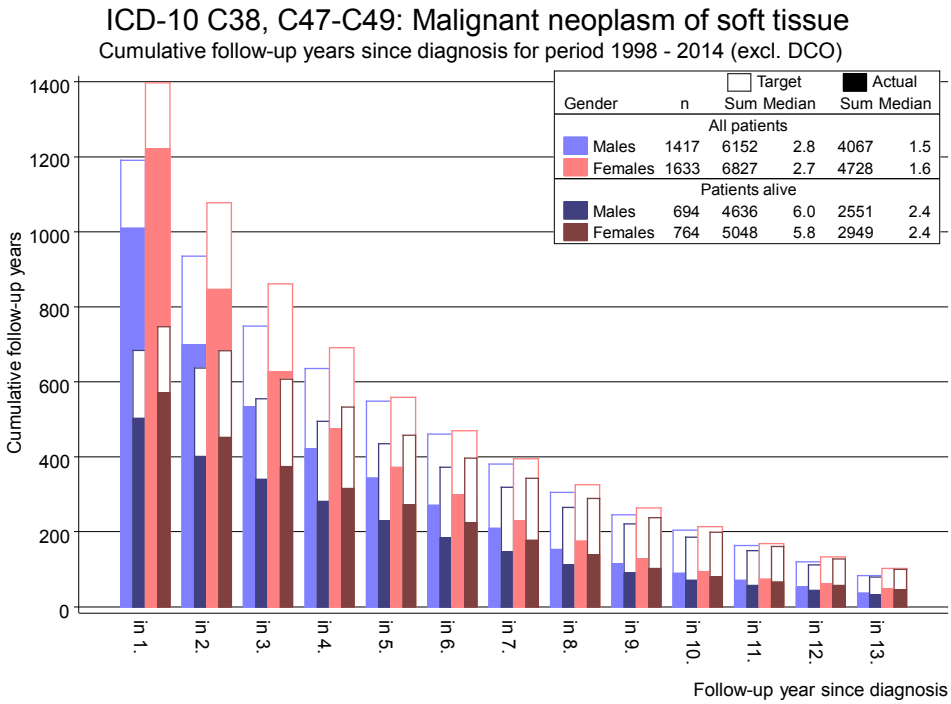


Figure 7. Cumulative follow-up years depending on time since diagnosis

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

Table 8a

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

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C09-C10	Oropharynx	2	0.5	3.8	0.5	13.8		3.6	
C15	Oesophagus	3	0.9	3.3	0.7	9.7		5.2	33.3
C16	Stomach	6	2.2	2.8	1.0	6.0	#	9.5	16.7
C17	Small intestine	2	0.3	7.7	0.9	27.9		4.3	
C18	Colon	9	5.1	1.8	0.8	3.3		9.6	22.2
C19-C20	Rectum	3	2.8	1.1	0.2	3.2		0.5	
C22	Liver	2	1.4	1.4	0.2	5.2		1.5	
C23-C24	Bile	2	0.5	4.0	0.5	14.4		3.7	
C30-C31	Sinuses	2	0.1	22.7	2.7	81.9	#	4.7	
C32	Larynx	2	0.5	3.9	0.5	14.1		3.7	50.0
C33-C34	Lung	12	6.0	2.0	1.0	3.5	#	14.9	8.3
C43	Malign. melanoma	7	2.2	3.2	1.3	6.6	#	11.9	
C46,C49	Soft tissue	5	0.3	16.7	5.4	39.1	#	11.6	
C61	Prostate	31	14.9	2.1	1.4	2.9	#	39.7	
C62	Testis	3	0.3	11.0	2.3	32.1	#	6.7	
C64	Kidney	11	1.8	6.2	3.1	11.1	#	22.8	
C67	Bladder	8	2.4	3.4	1.5	6.7	#	13.9	12.5
C73	Thyroid	2	0.4	5.7	0.7	20.5		4.1	
C82-C85	NHL	11	2.1	5.3	2.6	9.4	#	22.0	9.1
C91-C96	Leukaemia	5	0.9	5.6	1.8	13.0	#	10.1	
Other primaries		9	5.1	1.8	0.8	3.3		9.6	22.2
Not observed		0	1.6	0.0	0.0	2.3		-4.0	
All mult. primaries		137	52.1	2.6	2.2	3.1	#	209.8	7.3

Patients	1425
Median age at second malignancy (years)	71.2
Person-years	4048
Mean observation time (years)	2.8
Median observation time (years)	1.4

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

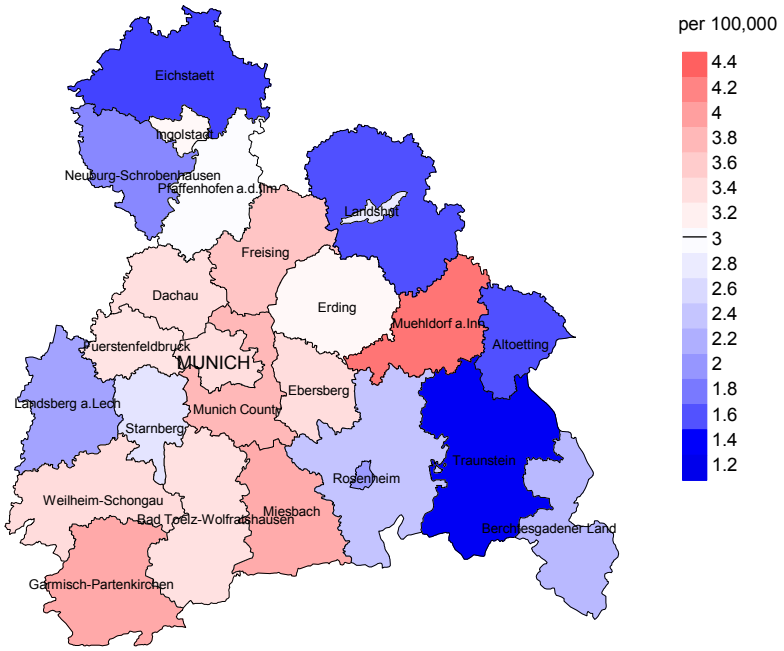
Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C16	Stomach	3	1.5	2.0	0.4	5.7		3.1	
C17	Small intestine	2	0.2	9.3	1.1	33.7	#	3.8	
C18	Colon	7	4.3	1.6	0.7	3.4		5.8	14.3
C19–C20	Rectum	6	1.9	3.2	1.2	7.0	#	8.8	
C25	Pancreas	4	1.9	2.1	0.6	5.3		4.4	50.0
C33–C34	Lung	7	3.2	2.2	0.9	4.5		8.0	
C43	Malign. melanoma	6	1.7	3.5	1.3	7.6	#	9.1	16.7
C46,C49	Soft tissue	5	0.3	19.2	6.2	44.9	#	10.1	20.0
C50	Breast	28	13.8	2.0	1.4	2.9	#	30.4	7.1
C53	Cervix uteri	4	0.7	6.1	1.7	15.6	#	7.1	
C54	Corpus uteri	10	2.5	4.0	1.9	7.4	#	16.0	
C56	Ovary	39	1.8	21.3	15.2	29.2	#	79.3	84.6
C64	Kidney	7	1.1	6.4	2.6	13.2	#	12.6	14.3
C70–C72	CNS cancer	2	0.6	3.2	0.4	11.5		2.9	
C73	Thyroid	4	0.9	4.7	1.3	12.0	#	6.7	
C82–C85	NHL	8	1.7	4.7	2.0	9.3	#	13.4	
C91–C96	Leukaemia	5	0.7	7.0	2.3	16.3	#	9.1	
Other primaries		12	3.7	3.3	1.7	5.7	#	17.7	33.3
Not observed		0	2.4	0.0	0.0	1.5		-5.2	
All mult. primaries		159	44.8	3.5	3.0	4.1	#	243.5	28.3

Patients	1648
Median age at second malignancy (years)	73.8
Person-years	4689
Mean observation time (years)	2.8
Median observation time (years)	1.5

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

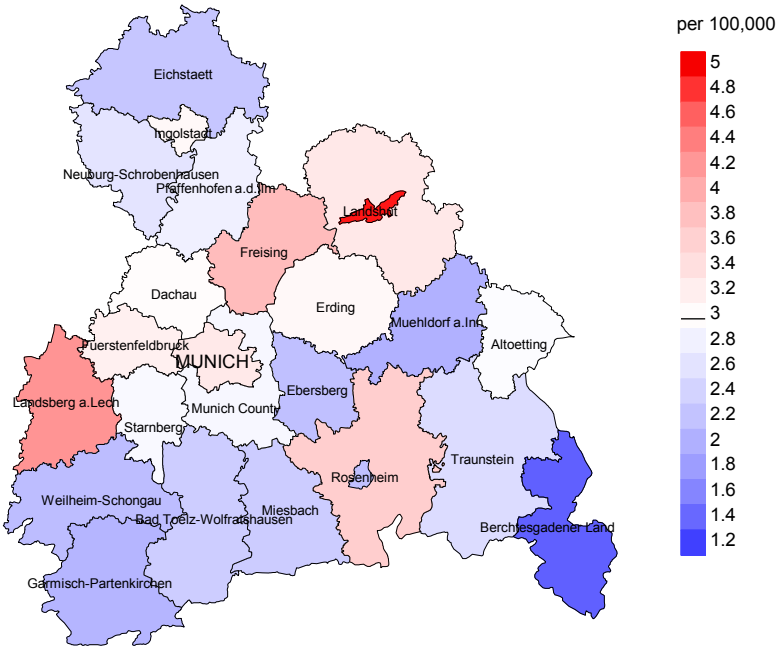
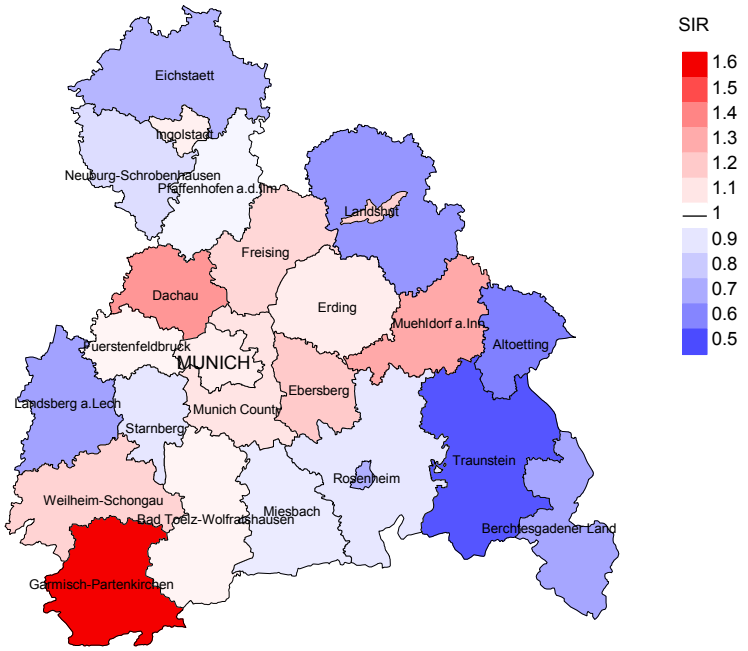


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 3.0/100,000 WS N=826, females 3.0/100,000 WS N=1,025).

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 19 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 4.6/100,000.

Standardized incidence ratio (SIR) 2007 - 2014: Males



Standardized incidence ratio (SIR) 2007 - 2014: Females

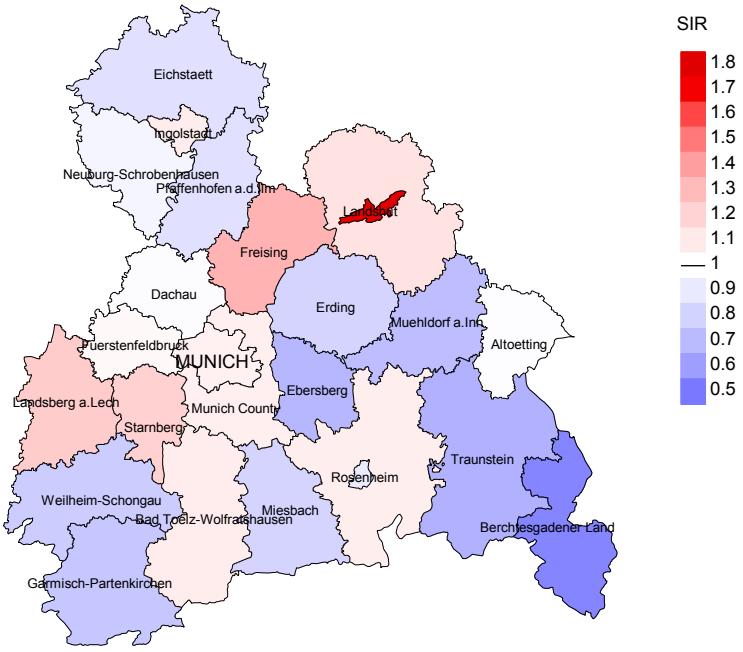


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=826, females N=1,025).

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 19 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 0.69. Though, the value of this parameter may vary with an underlying probability of 99% between 0.35 and 1.21, 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	112	100.0	13.4	88	78.6	95.5
1999	126	98.4	11.9	86	68.3	93.0
2000	119	98.3	11.8	75	63.0	98.7
2001	102	97.1	11.8	66	64.7	95.5
2002	189	97.4	7.9	133	70.4	94.7
2003	204	95.1	11.3	146	71.6	95.9
2004	196	96.9	10.7	118	60.2	99.2
2005	206	92.2	4.4	129	62.6	96.1
2006	187	95.2	8.0	118	63.1	99.2
2007	251	80.1	4.8	139	55.4	99.3
2008	239	80.8	3.3	139	58.2	97.8
2009	246	76.8	3.7	132	53.7	97.0
2010	257	75.9	3.9	130	50.6	99.2
2011	266	77.8	3.0	127	47.7	98.4
2012	225	80.9	5.3	94	41.8	92.6
2013	252	99.6	4.4	91	36.1	97.8
2014	119	97.5	7.6	34	28.6	97.1
1998-2014	3296	88.7	6.6	1845	56.0	97.0

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	112	74	94.6	24	21.4
1999	126	68	91.2	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	204	113	94.7	50	24.5
2004	196	124	96.8	40	20.4
2005	206	134	97.8	41	19.9
2006	187	129	94.6	39	20.9
2007	251	144	99.3	43	17.1
2008	239	120	98.3	35	14.6
2009	246	168	97.6	46	18.7
2010	257	160	99.4	40	15.6
2011	266	165	99.4	54	20.3
2012	225	157	99.4	34	15.1
2013	252	169	97.6	50	19.8
2014	119	149	97.3	29	24.4
1998-2014	3296	2136	97.2	642	19.5

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	68	77.9	22.1	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	113	89.4	10.6	90.7
2004	124	84.7	15.3	90.8
2005	134	87.3	12.7	92.4
2006	129	82.9	17.1	87.7
2007	144	89.6	10.4	93.7
2008	120	87.5	12.5	88.1
2009	168	83.3	16.7	87.2
2010	160	87.5	12.5	89.3
2011	165	84.8	15.2	88.4
2012	157	83.4	16.6	91.0
2013	169	86.4	13.6	91.5
2014	149	79.2	20.8	80.7
1998-2014	2136	84.9	15.1	90.2

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	38	68.7	68.1	75.9	68.7
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	52	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	66	75.5	70.4	81.1	72.6
2013	80	73.6	72.7	81.1	72.9
2014	56	78.9	75.5	86.5	76.5
1998-2014	992	71.6	69.5	81.0	70.5

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	71	73.0	72.4	77.5	72.9
2006	71	75.1	73.3	83.0	75.0
2007	68	75.3	74.6	88.4	74.8
2008	61	78.0	71.7	89.3	73.9
2009	87	72.8	72.2	86.2	72.7
2010	89	72.5	71.5	88.3	71.5
2011	97	76.0	74.8	84.9	75.1
2012	91	76.5	74.0	85.6	75.5
2013	89	75.2	73.0	93.3	73.3
2014	93	75.4	74.4	86.5	74.1
1998-2014	1144	74.7	72.8	84.9	73.5

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	26	2.3	0.49	1.5	0.44	2.1	0.48	2.6	0.49
1999	29	2.6	0.43	1.8	0.42	2.4	0.45	3.1	0.47
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	0.37	2.3	0.41
2003	44	2.3	0.50	1.4	0.41	2.0	0.46	2.6	0.51
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	0.49	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	0.62	1.8	0.51	2.5	0.59	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	0.50	1.2	0.33	1.8	0.41	2.4	0.50
2011	56	2.5	0.48	1.3	0.42	1.9	0.47	2.4	0.50
2012	55	2.4	0.53	1.3	0.43	1.8	0.48	2.4	0.54
2013	66	2.9	0.53	1.6	0.44	2.2	0.49	2.8	0.52
2014	44	1.9	1.05	1.0	0.90	1.3	0.95	1.9	1.08
1998-2014	818	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	0.59	1.2	0.43	1.8	0.51	2.3	0.58
2005	64	3.2	0.59	1.4	0.41	2.0	0.49	2.6	0.53
2006	61	3.0	0.62	1.4	0.44	1.9	0.50	2.5	0.57
2007	61	2.6	0.43	1.1	0.31	1.6	0.36	2.1	0.41
2008	53	2.3	0.40	0.9	0.28	1.3	0.32	1.7	0.35
2009	78	3.4	0.59	1.5	0.47	2.1	0.49	2.7	0.54
2010	83	3.5	0.58	1.7	0.50	2.4	0.54	3.0	0.57
2011	84	3.6	0.56	1.4	0.41	2.0	0.46	2.7	0.53
2012	76	3.2	0.62	1.4	0.47	2.0	0.54	2.6	0.60
2013	80	3.4	0.64	1.4	0.51	2.1	0.56	2.6	0.60
2014	74	3.1	0.96	1.2	0.77	1.8	0.84	2.4	0.85
1998-2014	996	3.0	0.56	1.4	0.45	1.9	0.49	2.4	0.53

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	2	0.2	0.2	2	0.4	0.4			0.0
5-9	4	0.4	0.6	2	0.4	0.9	2	0.3	0.3
10-14	1	0.1	0.7			0.9	1	0.2	0.5
15-19	6	0.6	1.2	3	0.6	1.5	3	0.5	1.0
20-24	11	1.0	2.3	6	1.3	2.8	5	0.8	1.8
25-29	8	0.8	3.0	6	1.3	4.1	2	0.3	2.2
30-34	11	1.0	4.1	8	1.7	5.8	3	0.5	2.7
35-39	12	1.1	5.2	8	1.7	7.5	4	0.7	3.4
40-44	22	2.1	7.3	12	2.6	10.1	10	1.7	5.0
45-49	33	3.1	10.4	17	3.7	13.8	16	2.7	7.7
50-54	39	3.7	14.1	23	5.0	18.8	16	2.7	10.4
55-59	68	6.4	20.5	27	5.8	24.6	41	6.9	17.3
60-64	93	8.8	29.3	40	8.6	33.2	53	8.9	26.2
65-69	134	12.7	41.9	56	12.1	45.3	78	13.1	39.3
70-74	166	15.7	57.6	76	16.4	61.6	90	15.1	54.5
75-79	157	14.8	72.4	54	11.6	73.3	103	17.3	71.8
80-84	149	14.1	86.5	67	14.4	87.7	82	13.8	85.5
85+	143	13.5	100.0	57	12.3	100.0	86	14.5	100.0
All ages	1059	100.0		464	100.0		595	100.0	

Included in the statistics are 35.6% multiple primaries in males and 36.4% 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	2		0.2	0.07	0.0		16.7	
5- 9	2	2	0.2	0.33	0.2	0.50	9.5	11.1
10-14		1	0.0		0.1	0.25		5.0
15-19	3	3	0.3	0.38	0.3	0.30	8.3	13.6
20-24	6	5	0.5	0.50	0.5	0.38	12.5	17.9
25-29	6	2	0.5	0.38	0.2	0.13	9.7	3.1
30-34	8	3	0.6	0.26	0.2	0.20	9.1	2.7
35-39	8	4	0.6	0.21	0.3	0.19	4.5	1.6
40-44	12	10	0.7	0.39	0.7	0.23	2.6	1.6
45-49	17	16	1.1	0.53	1.1	0.36	1.7	1.3
50-54	23	16	1.8	0.43	1.2	0.28	1.2	0.9
55-59	27	41	2.5	0.44	3.6	0.47	0.9	1.6
60-64	40	53	4.1	0.56	5.0	0.56	0.8	1.5
65-69	56	78	5.8	0.50	7.5	0.56	0.8	1.5
70-74	76	90	8.4	0.70	8.6	0.58	0.8	1.4
75-79	54	103	9.8	0.61	14.4	0.87	0.6	1.6
80-84	67	82	19.2	1.02	14.6	0.79	0.9	1.2
85+	57	86	24.6	0.93	14.9	0.99	0.9	1.0
All ages	464	595					0.9	1.4
Mortality								
Raw			2.6	0.56	3.2	0.58		
WS			1.4	0.44	1.3	0.45		
ES			1.9	0.51	1.9	0.50		
BRD-S			2.5	0.56	2.5	0.55		
PYLL-70								
per 100,000			21.3		18.5			
ES			20.5		17.1			
AYLL-70			16.2		12.5			

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 ←%
C09–C10	Oropharynx	5	1.6	1	20.0	1	20.0	3	60.0
C15	Oesophagus	7	2.2	2	28.6			5	71.4
C16	Stomach	7	2.2	4	57.1	1	14.3	2	28.6
C18	Colon	20	6.3	14	70.0	2	10.0	4	20.0
C19–C20	Rectum	10	3.2	6	60.0	1	10.0	3	30.0
C25	Pancreas	5	1.6	2	40.0	2	40.0	1	20.0
C33–C34	Lung	15	4.7			3	20.0	12	80.0
C40–C41	Bone	4	1.3	1	25.0			3	75.0
C43	Malign. melanoma	16	5.0	11	68.8	2	12.5	3	18.8
C44	Skin others	37	11.7	22	59.5			15	40.5
C46,C49	Soft tissue	13	4.1			3	23.1	10	76.9
C61	Prostate	51	16.1	35	68.6	2	3.9	14	27.5
C62	Testis	6	1.9	4	66.7			2	33.3
C64	Kidney	18	5.7	11	61.1	2	11.1	5	27.8
C67	Bladder	25	7.9	13	52.0	1	4.0	11	44.0
C70–C72	CNS cancer	9	2.8			1	11.1	8	88.9
C76–C79	CUP	5	1.6	1	20.0	2	40.0	2	40.0
C82–C85	NHL	22	6.9	11	50.0	1	4.5	10	45.5
C90	Mult. myeloma	5	1.6	2	40.0	1	20.0	2	40.0
C91–C96	Leukaemia	7	2.2	3	42.9			4	57.1
Other primaries		30	9.5	12	40.0	4	13.3	14	46.7
All mult. primaries		317	100.0	155	48.9	29	9.1	133	42.0

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	23	5.7	10	43.5	4	17.4	9	39.1
C19–C20	Rectum	8	2.0	5	62.5	1	12.5	2	25.0
C25	Pancreas	7	1.7			2	28.6	5	71.4
C33–C34	Lung	9	2.2			1	11.1	8	88.9
C43	Malign. melanoma	23	5.7	17	73.9	2	8.7	4	17.4
C44	Skin others	20	5.0	11	55.0	4	20.0	5	25.0
C46,C49	Soft tissue	9	2.2			2	22.2	7	77.8
C50	Breast	115	28.5	91	79.1	4	3.5	20	17.4
C51	Vulva	5	1.2	2	40.0	1	20.0	2	40.0
C53	Cervix uteri	10	2.5	10	100.0				
C54	Corpus uteri	20	5.0	10	50.0	6	30.0	4	20.0
C56	Ovary	68	16.9	17	25.0	10	14.7	41	60.3
C64	Kidney	9	2.2	3	33.3	2	22.2	4	44.4
C67	Bladder	5	1.2	3	60.0			2	40.0
C70–C72	CNS cancer	8	2.0			1	12.5	7	87.5
C82–C85	NHL	13	3.2	8	61.5	4	30.8	1	7.7
C90	Mult. myeloma	6	1.5	3	50.0	1	16.7	2	33.3
C91–C96	Leukaemia	9	2.2	3	33.3			6	66.7
Other primaries		36	8.9	17	47.2	7	19.4	12	33.3
All mult. primaries		403	100.0	210	52.1	52	12.9	141	35.0

Multiple primaries with number of cases 1 to 4 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	2		0.2	0.07	0.0		20.0	
5- 9	2	2	0.2	0.33	0.2	0.50	10.0	11.1
10-14			0.0		0.0			
15-19	3	2	0.3	0.38	0.2	0.22	9.1	10.0
20-24	5	4	0.4	0.45	0.4	0.33	11.6	15.4
25-29	5	2	0.4	0.33	0.2	0.13	9.1	3.4
30-34	7	3	0.6	0.24	0.2	0.21	8.1	3.2
35-39	7	3	0.5	0.19	0.2	0.17	4.2	1.3
40-44	11	8	0.7	0.42	0.5	0.22	2.6	1.4
45-49	15	16	0.9	0.50	1.1	0.44	1.6	1.6
50-54	19	15	1.5	0.40	1.2	0.31	1.2	1.0
55-59	22	28	2.1	0.44	2.5	0.40	0.8	1.3
60-64	31	42	3.2	0.54	4.0	0.59	0.8	1.5
65-69	46	55	4.8	0.55	5.3	0.50	0.8	1.3
70-74	54	68	5.9	0.71	6.5	0.61	0.8	1.3
75-79	37	75	6.7	0.70	10.5	0.96	0.6	1.5
80-84	51	51	14.6	1.09	9.1	0.72	1.0	1.0
85+	42	69	18.1	0.98	11.9	0.97	1.0	1.0
All ages	359	443					0.9	1.3
Mortality								
Raw			2.0	0.55	2.4	0.56		
WS			1.1	0.42	1.0	0.42		
ES			1.5	0.49	1.5	0.48		
BRD-S			1.9	0.55	1.9	0.53		
PYLL-70								
per 100,000			18.4		14.9			
ES			17.9		13.7			
AYLL-70			16.9		13.1			

* 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.	Males MI-index	Females Age-spec. mortal.	Females MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4	2		0.2	0.07	0.0		20.0	
5- 9	2	2	0.2	0.33	0.2	0.67	10.0	11.1
10-14			0.0		0.0			
15-19	3	2	0.3	0.38	0.2	0.22	9.1	11.1
20-24	4	3	0.4	0.36	0.3	0.25	10.3	12.5
25-29	5	2	0.4	0.33	0.2	0.13	9.8	3.6
30-34	7	3	0.6	0.26	0.2	0.21	8.2	3.6
35-39	7	3	0.5	0.19	0.2	0.17	4.4	1.5
40-44	10	8	0.6	0.45	0.5	0.24	2.5	1.6
45-49	14	14	0.9	0.50	0.9	0.40	1.6	1.5
50-54	17	12	1.3	0.38	0.9	0.28	1.2	0.9
55-59	18	25	1.7	0.40	2.2	0.39	0.8	1.3
60-64	30	38	3.1	0.57	3.6	0.59	0.9	1.6
65-69	39	45	4.1	0.51	4.3	0.47	0.8	1.3
70-74	45	53	4.9	0.67	5.1	0.51	0.8	1.3
75-79	30	65	5.4	0.64	9.1	0.93	0.6	1.6
80-84	41	41	11.7	0.91	7.3	0.66	1.0	1.0
85+	34	60	14.7	0.89	10.4	0.87	1.0	1.1
All ages	308	376					1.0	1.3
Mortality								
Raw			1.7	0.51	2.0	0.52		
WS			1.0	0.39	0.9	0.39		
ES			1.3	0.46	1.3	0.44		
BRD-S			1.7	0.51	1.6	0.49		
PYLL-70								
per 100,000			17.1		13.4			
ES			16.7		12.3			
AYLL-70			17.4		13.5			

* See corresponding tables with multiple primaries.

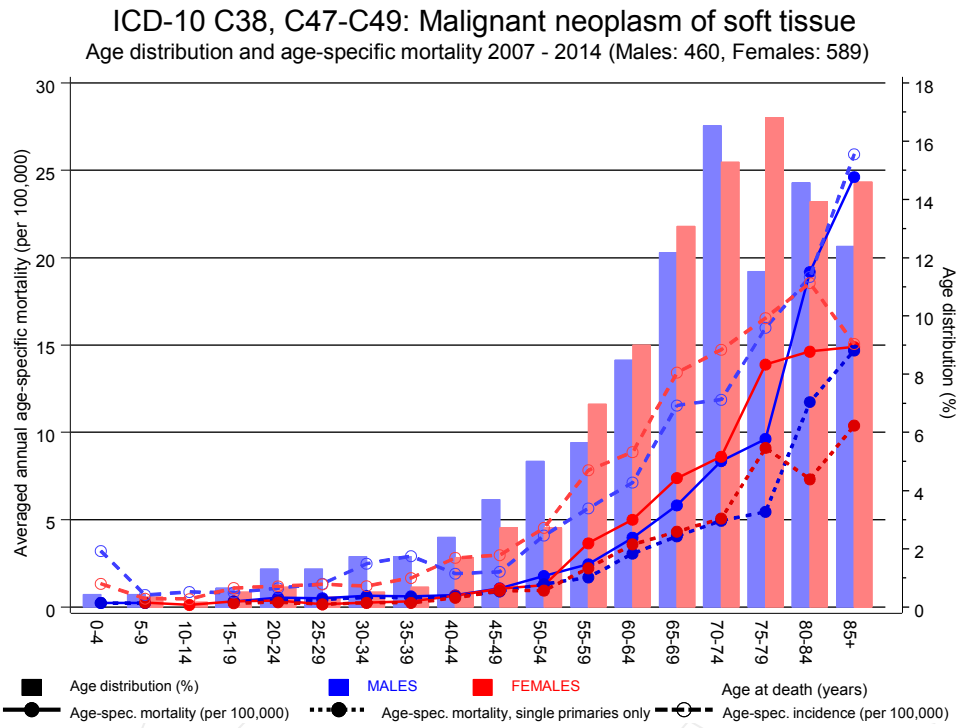


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

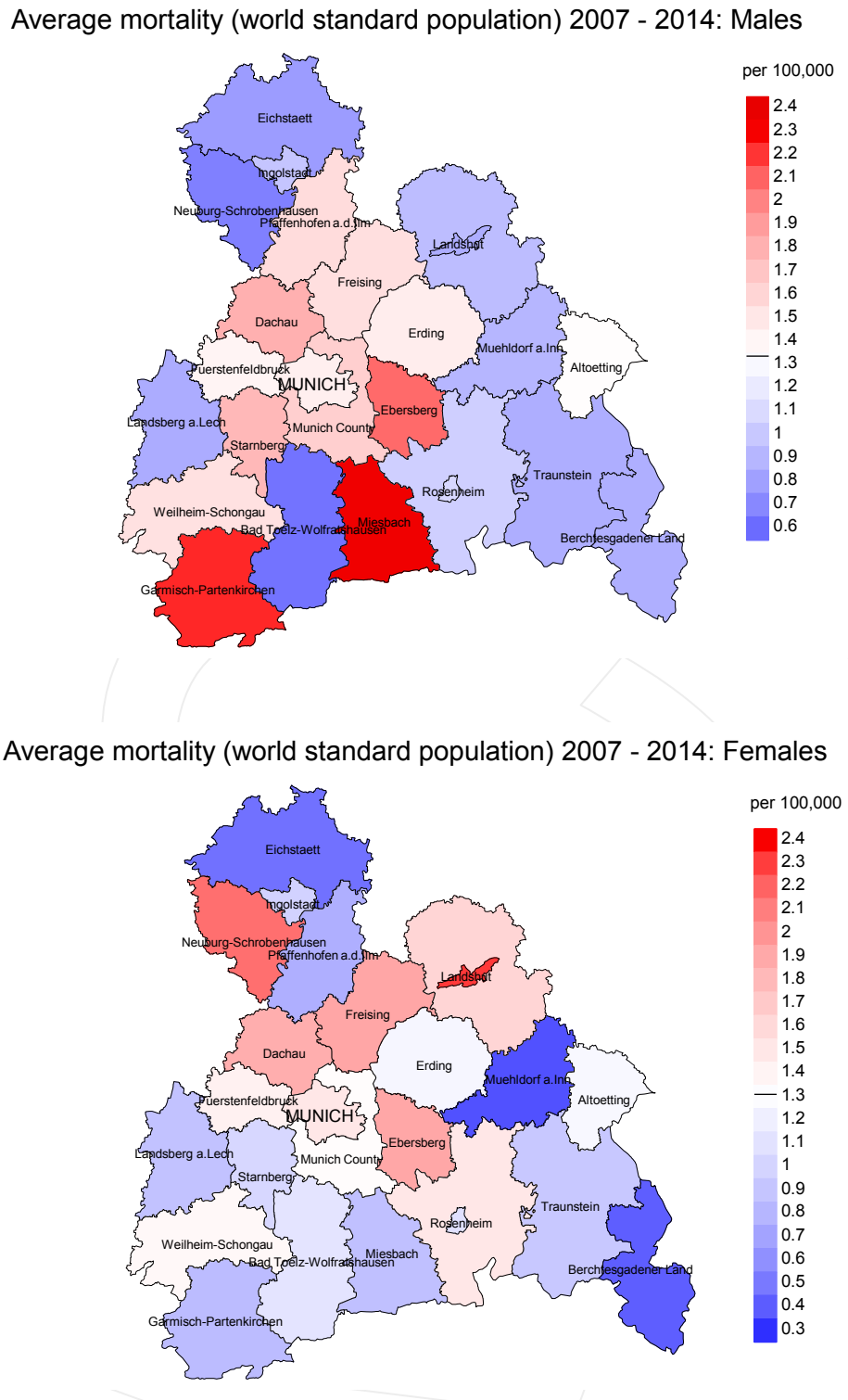
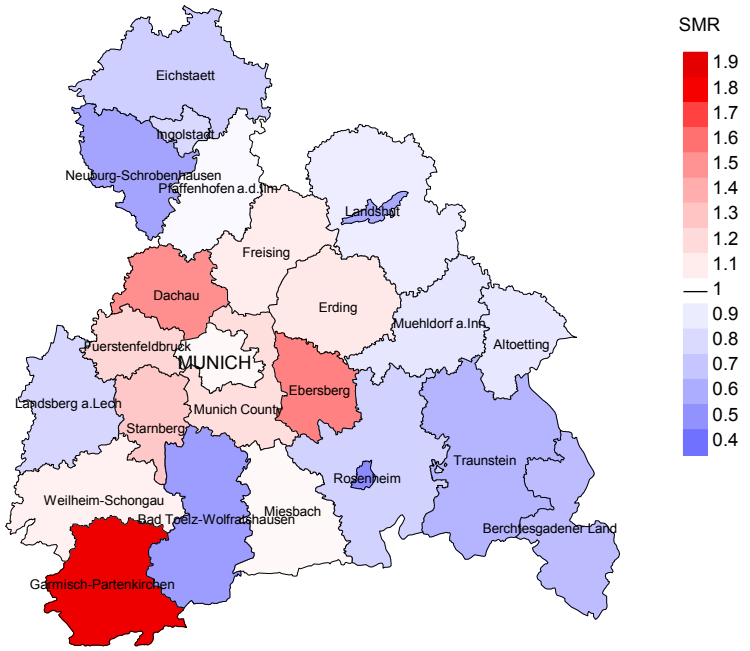


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2014. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 1.3/100,000 WS N=457, females 1.3/100,000 WS N=585).

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 18 women died from sarcoma. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 1.9/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.7 and 4.4/100,000.

Standardized mortality ratio (SMR) 2007 - 2014: Males



Standardized mortality ratio (SMR) 2007 - 2014: Females

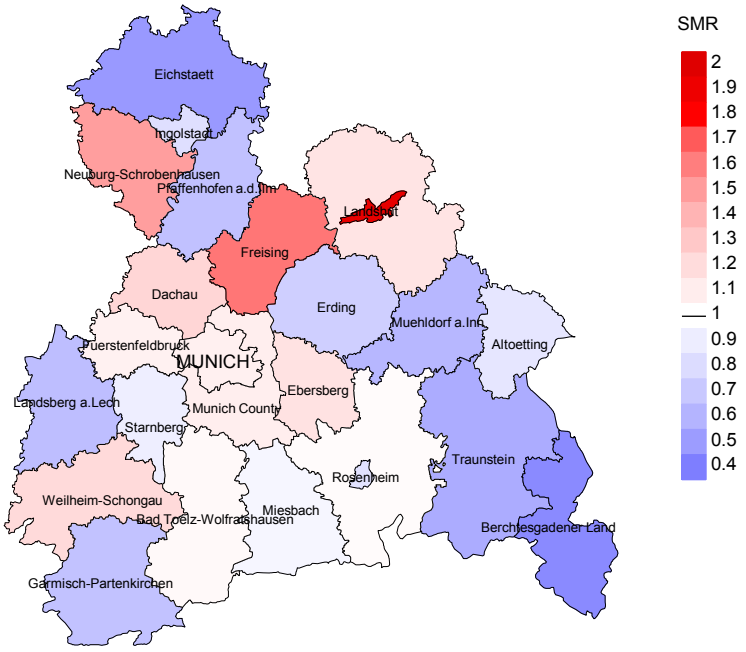


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=457, females N=585).

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 18 women died from sarcoma. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.16. Though, the value of this parameter may vary with an underlying probability of 99% between 0.58 and 2.07, 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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Index of figures and tables