Munich Cancer Registry

- Survival
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ICD-10 C45-C49: Mesoth. and soft tissue ca.

Incidence and Mortality

Year of diagnosis	1998-2014
Patients	4,319
Diseases	4,332
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/bC4549E-ICD-10-C45-C49-Mesoth.-and-soft-tissue-ca.-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
C45.-	Mesothelioma
C46.-	Kaposi sarcoma
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

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	154	24	15.6	20.1	83.1	100.0
1999	153	17	11.1	30.1	72.5	98.7
2000	157	32	20.4	22.3	68.8	98.1
2001	141	23	16.3	10.6	73.0	97.2
2002	226	33	14.6	20.4	77.0	98.2 #
2003	248	31	12.5	22.6	75.8	96.0
2004	262	30	11.5	19.8	69.1	97.3
2005	268	16	6.0	22.4	70.1	93.3
2006	243	19	7.8	26.3	68.7	94.7
2007	338	16	4.7	25.7	63.3	83.1 #
2008	332	16	4.8	23.2	68.7	85.8
2009	317	12	3.8	28.4	62.5	81.4
2010	341	17	5.0	29.0	60.1	80.6
2011	352	13	3.7	29.8	55.7	80.4
2012	317	17	5.4	23.3	52.7	84.5
2013	320	18	5.6	29.1	45.0	99.7
2014	163	16	9.8	29.4	31.3	97.5 ##
1998-2014	4332	350	8.1	24.9	63.5	90.5

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	154	86	68	55.8
1999	153	88	65	57.5
2000	157	90	67	57.3
2001	141	71	70	50.4
2002	226	130	96	57.5
2003	248	125	123	50.4
2004	262	166	96	63.4
2005	268	148	120	55.2
2006	243	142	101	58.4
2007	338	183	155	54.1
2008	332	186	146	56.0
2009	317	173	144	54.6
2010	341	181	160	53.1
2011	352	190	162	54.0
2012	317	175	142	55.2
2013	320	183	137	57.2
2014	163	81	82	49.7
1998–2014	4332	2398	1934	55.4

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	86	68	7.8	5.8	5.4	3.4	7.1	4.3	8.5	5.1
1999	88	65	7.9	5.5	5.4	3.3	7.1	4.3	8.5	5.0
2000	90	67	7.9	5.6	5.5	3.5	7.2	4.2	8.5	5.0
2001	71	70	6.1	5.8	4.2	3.4	5.7	4.5	6.9	5.2
2002	130	96	7.0	4.9	4.8	2.9	6.2	3.8	7.4	4.4
2003	125	123	6.7	6.2	4.4	3.5	5.8	4.5	7.0	5.4
2004	166	96	8.8	4.9	5.7	3.1	7.4	3.7	8.7	4.2
2005	148	120	7.8	6.0	5.4	3.7	6.7	4.5	7.7	5.4
2006	142	101	7.4	5.0	4.5	3.1	6.1	3.9	7.6	4.5
2007	183	155	8.3	6.7	5.2	3.7	6.7	4.8	8.0	5.6
2008	186	146	8.4	6.3	5.0	3.4	6.7	4.5	7.9	5.3
2009	173	144	7.8	6.2	4.3	3.3	6.0	4.6	7.6	5.4
2010	181	160	8.0	6.8	4.9	3.5	6.5	4.7	7.7	5.8
2011	190	162	8.3	6.9	4.6	3.4	6.3	4.6	7.9	5.5
2012	175	142	7.7	6.0	4.2	3.2	5.8	4.1	7.2	4.9
2013	183	137	8.0	5.8	4.9	3.0	6.3	3.9	7.7	4.7
2014	81	82	3.5	3.5	1.8	1.6	2.6	2.2	3.4	2.9
1998-2014	2398	1934	7.5	5.8	4.6	3.2	6.1	4.2	7.5	4.9

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	154	61.3	19.9	0.4	93.2	33.1	53.1	64.9	75.4	85.0
1999	153	61.7	16.3	3.5	97.4	39.8	52.9	64.2	73.0	78.9
2000	157	60.3	21.8	0.2	97.1	28.9	51.7	62.5	77.7	85.6
2001	141	61.6	16.3	11.8	95.4	40.7	51.1	62.5	73.1	82.0
2002	226	61.2	20.0	0.0	93.0	32.8	51.1	65.1	75.3	82.9
2003	248	63.0	19.3	2.6	92.5	32.4	55.8	66.7	77.0	83.4
2004	262	61.9	19.2	0.0	96.1	36.0	54.6	66.5	74.0	81.9
2005	268	60.6	20.5	0.2	92.0	31.7	51.5	65.4	74.1	82.3
2006	243	62.8	19.2	0.3	103	36.7	55.1	65.9	77.2	82.5
2007	338	63.6	18.4	0.1	96.4	39.2	58.0	67.8	75.5	81.3
2008	332	64.8	18.2	0.0	101	39.9	57.1	68.9	76.2	84.0
2009	317	66.0	16.5	0.2	97.3	42.7	58.8	68.6	77.6	83.5
2010	341	64.1	18.7	0.1	97.3	36.5	56.0	68.8	76.6	83.0
2011	352	66.4	17.2	0.0	96.8	42.2	58.6	70.4	78.4	84.1
2012	317	66.6	18.3	0.4	98.4	43.0	59.9	70.9	78.4	84.9
2013	320	64.9	19.3	0.0	96.7	37.9	56.7	69.7	77.0	85.1
2014	163	68.9	16.5	2.3	92.1	49.6	63.5	73.2	79.9	85.1
1998-2014	4332	63.8	18.7	0.0	103	37.9	55.9	67.9	76.5	83.4

Table 3a

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	86	60.0	19.1	0.4	90.8	33.0	52.1	63.5	72.4	82.5
1999	88	61.4	16.7	3.5	97.4	39.4	54.5	63.4	72.1	78.4
2000	90	60.0	21.2	0.2	92.9	30.2	53.1	61.7	77.7	85.5
2001	71	62.1	16.9	11.8	95.4	43.0	51.5	63.7	73.7	81.4
2002	130	60.1	20.8	0.1	92.4	30.8	48.6	64.9	74.7	82.4
2003	125	61.3	19.4	7.6	90.3	31.0	55.4	66.2	74.8	82.7
2004	166	62.2	18.0	0.0	90.7	39.0	56.0	66.8	72.7	79.5
2005	148	59.1	20.2	0.2	90.9	34.9	50.7	64.1	71.9	80.8
2006	142	63.5	18.0	0.3	90.3	38.9	56.2	67.3	76.8	81.9
2007	183	63.0	19.0	0.1	96.4	37.3	57.8	68.2	74.6	79.5
2008	186	64.6	17.7	0.0	95.2	41.8	59.9	68.3	74.7	82.3
2009	173	66.8	17.7	0.2	97.3	41.4	61.6	69.6	79.2	83.8
2010	181	62.9	19.3	0.1	92.7	35.1	55.5	67.8	75.6	82.5
2011	190	65.9	17.4	0.0	95.3	38.9	58.4	70.8	76.8	83.7
2012	175	66.8	17.5	0.4	95.5	45.0	62.4	71.2	76.6	84.1
2013	183	63.9	20.0	0.0	95.9	34.5	56.1	69.3	77.2	82.6
2014	81	69.8	15.3	2.3	87.8	55.9	66.2	73.2	78.1	84.5
1998-2014	2398	63.4	18.7	0.0	97.4	36.9	56.1	67.8	75.5	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	68	63.0	20.9	3.4	93.2	33.1	54.6	67.2	77.6	85.2
1999	65	62.2	15.8	17.4	88.4	40.1	50.8	64.6	74.1	81.3
2000	67	60.6	22.7	0.4	97.1	28.1	46.9	64.9	78.0	87.6
2001	70	61.1	15.7	21.1	85.9	40.2	50.1	61.5	73.0	82.5
2002	96	62.7	18.7	0.0	93.0	39.0	53.4	65.8	75.8	83.4
2003	123	64.7	19.1	2.6	92.5	38.2	56.2	67.6	78.7	83.6
2004	96	61.4	21.3	0.2	96.1	30.8	52.1	66.1	76.6	84.4
2005	120	62.4	20.7	1.1	92.0	28.8	52.8	68.0	77.8	82.5
2006	101	61.7	20.8	1.6	103	34.2	54.5	63.9	78.1	83.5
2007	155	64.4	17.6	0.3	89.4	42.4	58.0	67.5	76.8	82.2
2008	146	65.1	18.7	4.4	101	36.3	55.0	69.5	79.3	86.2
2009	144	65.1	15.0	2.2	94.3	45.8	57.8	66.7	75.9	81.9
2010	160	65.3	17.9	0.9	97.3	38.3	56.4	70.0	77.5	83.3
2011	162	67.0	16.9	11.7	96.8	42.6	59.0	70.1	79.4	85.2
2012	142	66.3	19.3	0.4	98.4	42.6	58.8	70.3	81.2	85.7
2013	137	66.3	18.3	0.0	96.7	44.1	56.8	70.9	76.8	87.4
2014	82	68.1	17.7	20.5	92.1	42.5	59.8	72.9	80.8	85.7
1998-2014	1934	64.4	18.6	0.0	103	39.4	55.3	68.0	77.6	84.2

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	1.6	1.6	28	2.1	2.1	11	1.0	1.0
5-9	10	0.4	2.0	6	0.4	2.5	4	0.4	1.3
10-14	12	0.5	2.5	8	0.6	3.1	4	0.4	1.7
15-19	17	0.7	3.1	8	0.6	3.7	9	0.8	2.5
20-24	22	0.9	4.0	10	0.7	4.4	12	1.1	3.5
25-29	29	1.2	5.2	13	1.0	5.4	16	1.4	5.0
30-34	45	1.8	7.0	30	2.2	7.6	15	1.3	6.3
35-39	63	2.5	9.6	41	3.0	10.7	22	2.0	8.2
40-44	83	3.3	12.9	35	2.6	13.2	48	4.3	12.5
45-49	83	3.3	16.3	36	2.7	15.9	47	4.2	16.7
50-54	119	4.8	21.0	61	4.5	20.4	58	5.1	21.8
55-59	173	7.0	28.0	83	6.1	26.6	90	8.0	29.8
60-64	220	8.9	36.9	123	9.1	35.7	97	8.6	38.4
65-69	371	15.0	51.9	216	16.0	51.6	155	13.7	52.1
70-74	421	17.0	68.8	251	18.6	70.2	170	15.1	67.2
75-79	320	12.9	81.7	184	13.6	83.8	136	12.1	79.3
80-84	254	10.2	92.0	128	9.5	93.3	126	11.2	90.4
85+	199	8.0	100.0	91	6.7	100.0	108	9.6	100.0
All ages	2480	100.0		1352	100.0		1128	100.0	

Included in the statistics are 32.6% multiple primaries in males and 35.4% 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=70 %	Females DCO rate n=55 %	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	9	0.8	1.0			3.7	5.5
20-24	10	12	0.9	1.1		8.3	2.7	3.9
25-29	13	16	1.1	1.3			2.3	2.4
30-34	30	15	2.4	1.2			3.9	1.3
35-39	41	22	3.1	1.7	2.4	4.5	3.6	1.1
40-44	35	48	2.2	3.1		2.1	1.9	1.3
45-49	36	47	2.3	3.1	2.8	2.1	1.1	0.9
50-54	61	58	4.7	4.5	4.9		1.3	0.9
55-59	82	90	7.7	8.0	1.2	1.1	1.1	1.2
60-64	122	97	12.4	9.1	4.9	1.0	1.1	1.1
65-69	216	155	22.5	14.8	3.2		1.4	1.4
70-74	251	170	27.6	16.3	5.2	1.8	1.5	1.4
75-79	184	135	33.4	18.9	6.5	3.7	1.5	1.3
80-84	128	126	36.6	22.5	10.2	8.7	1.5	1.4
85+	90	108	38.9	18.7	14.4	27.8	1.5	1.1
All ages	1349	1127			5.2	4.9	1.5	1.3
Incidence								
Raw			7.5	6.0				
WS			4.3	3.2				
ES			5.8	4.2				
BRD-S			7.2	5.0				

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).

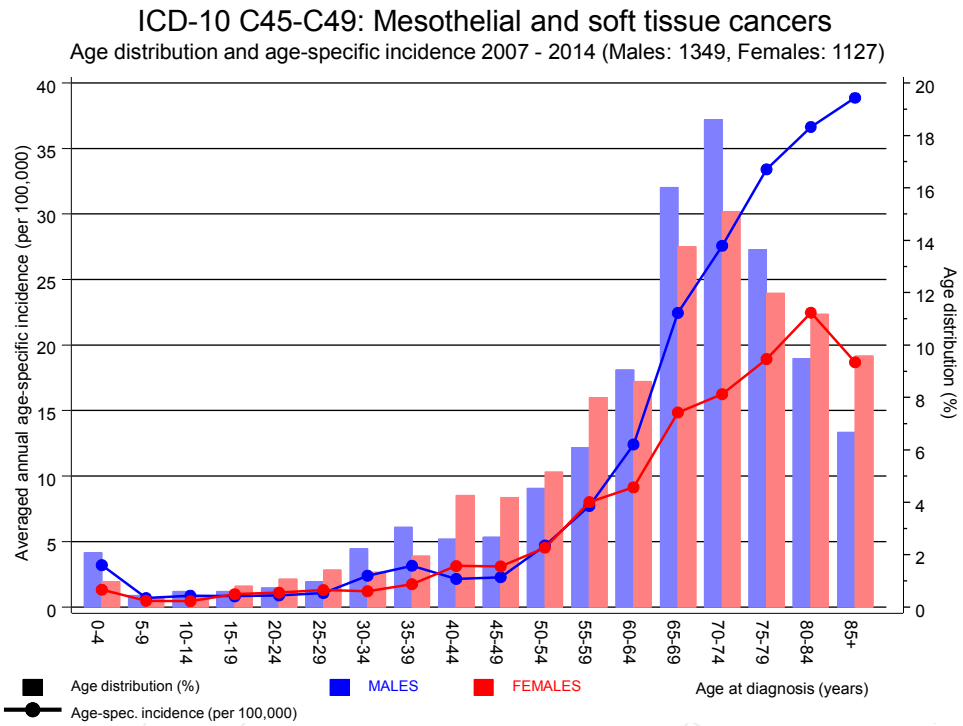


Figure 6. Age distribution and age-specific incidence

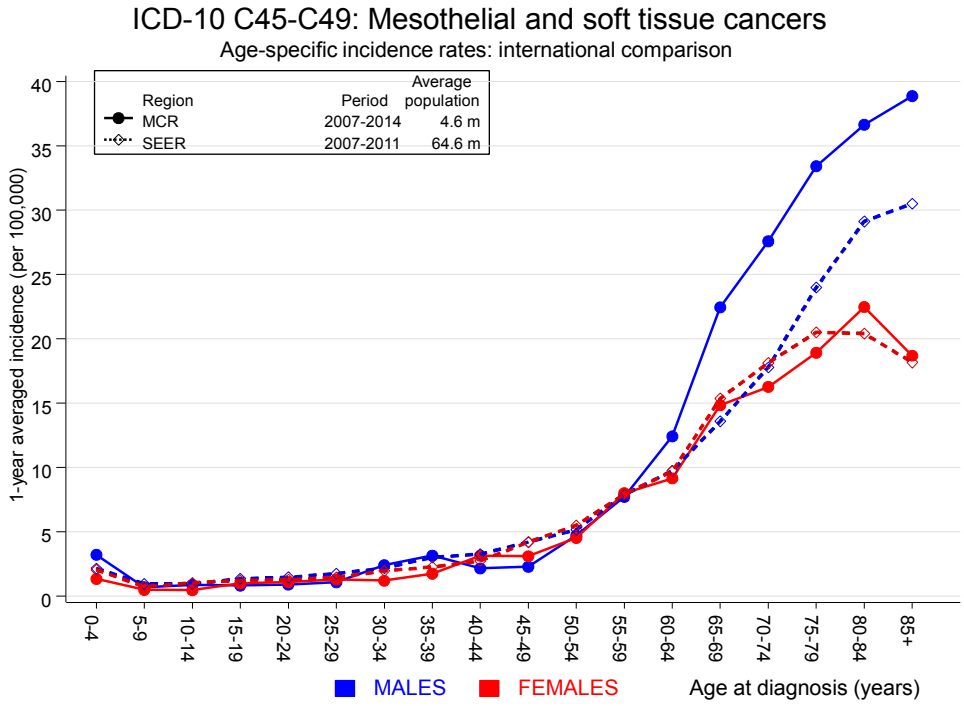


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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.

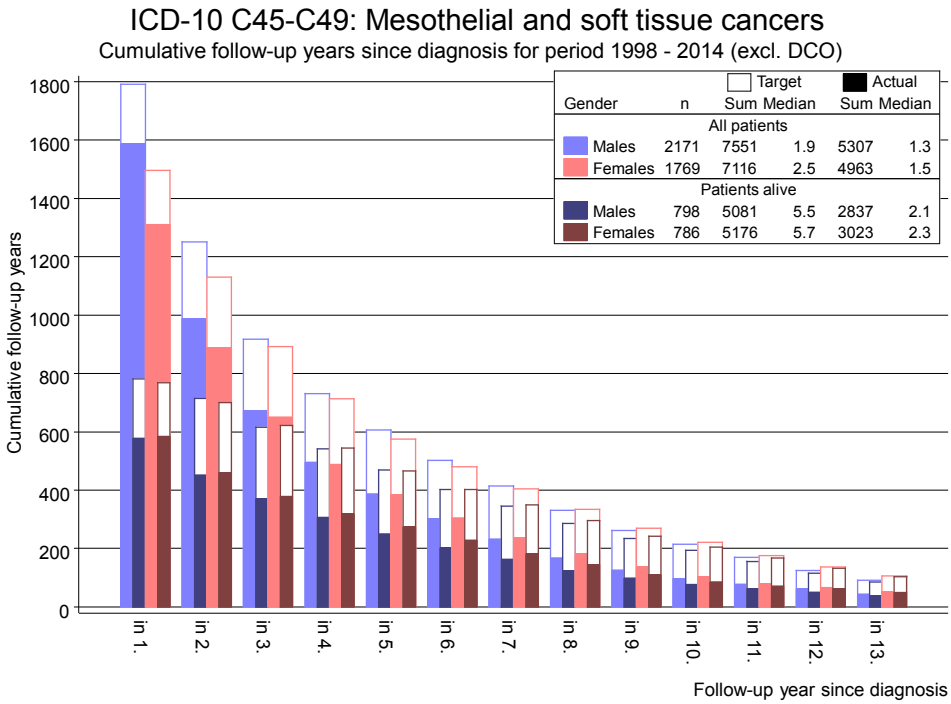


Figure 7. Cumulative follow-up years depending on time since diagnosis

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 %
C03-C06	Oral cavity	3	0.6	5.0	1.0	14.5	#	4.5	
C09-C10	Oropharynx	2	0.7	2.7	0.3	9.7		2.4	
C15	Oesophagus	3	1.3	2.3	0.5	6.7		3.2	33.3
C16	Stomach	8	3.0	2.6	1.1	5.2	#	9.4	12.5
C17	Small intestine	2	0.4	5.4	0.7	19.7		3.1	
C18	Colon	11	7.2	1.5	0.8	2.7		7.1	
C19-C20	Rectum	5	4.0	1.3	0.4	2.9		1.9	
C22	Liver	3	2.0	1.5	0.3	4.4		1.9	33.3
C23-C24	Bile	2	0.7	2.8	0.3	10.1		2.4	
C25	Pancreas	2	2.7	0.7	0.1	2.7		-1.3	50.0
C30-C31	Sinuses	2	0.1	16.0	1.9	57.9	#	3.5	
C33-C34	Lung	25	8.5	2.9	1.9	4.3	#	31.0	44.0
C38,C45	Mesothelioma	2	0.5	4.2	0.5	15.1		2.9	
C43	Malign. melanoma	10	3.1	3.2	1.5	5.9	#	13.0	10.0
C46,C49	Soft tissue	5	0.4	12.1	3.9	28.2	#	8.6	
C61	Prostate	37	21.6	1.7	1.2	2.4	#	29.1	5.4
C62	Testis	3	0.3	9.3	1.9	27.2	#	5.0	
C64	Kidney	14	2.5	5.5	3.0	9.2	#	21.6	7.1
C67	Bladder	8	3.3	2.4	1.0	4.7	#	8.8	12.5
C70-C72	CNS cancer	2	1.0	2.0	0.2	7.3		1.9	50.0
C73	Thyroid	3	0.5	6.1	1.3	17.8	#	4.7	33.3
C82-C85	NHL	13	2.9	4.4	2.4	7.6	#	19.0	7.7
C91-C96	Leukaemia	6	1.2	4.8	1.8	10.5	#	9.0	
Other primaries		9	3.8	2.4	1.1	4.5	#	9.9	
Not observed		0	1.8	0.0	0.0	2.1		-3.4	
All mult. primaries		180	74.3	2.4	2.1	2.8	#	199.3	12.8

Patients	2213
Median age at second malignancy (years)	72.0
Person-years	5305
Mean observation time (years)	2.4
Median observation time (years)	1.2

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

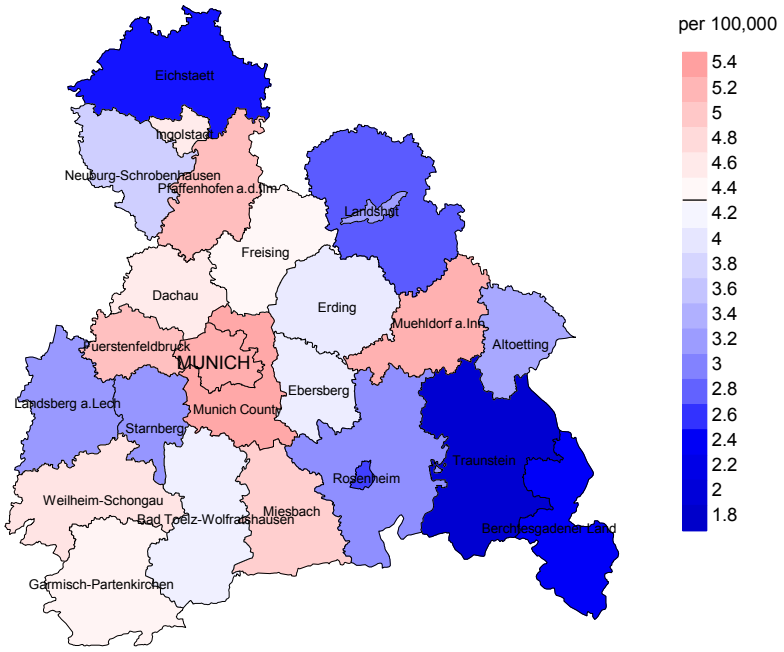
Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C16	Stomach	4	1.6	2.5	0.7	6.3		4.8	25.0
C17	Small intestine	2	0.2	8.8	1.1	31.9	#	3.6	
C18	Colon	7	4.5	1.5	0.6	3.2		5.0	14.3
C19–C20	Rectum	6	2.0	3.1	1.1	6.7	#	8.2	
C25	Pancreas	4	2.0	2.0	0.5	5.0		4.0	50.0
C33–C34	Lung	8	3.4	2.3	1.0	4.6	#	9.3	25.0
C43	Malign. melanoma	5	1.8	2.8	0.9	6.4		6.5	20.0
C46,C49	Soft tissue	5	0.3	18.2	5.9	42.6	#	9.6	20.0
C50	Breast	27	14.5	1.9	1.2	2.7	#	25.3	7.4
C53	Cervix uteri	4	0.7	5.8	1.6	14.9	#	6.7	
C54	Corpus uteri	11	2.6	4.2	2.1	7.5	#	17.0	
C56	Ovary	40	1.9	20.7	14.8	28.3	#	77.3	82.5
C64	Kidney	7	1.2	6.0	2.4	12.5	#	11.9	14.3
C70–C72	CNS cancer	2	0.7	3.0	0.4	10.9		2.7	
C73	Thyroid	4	0.9	4.5	1.2	11.4	#	6.3	
C82–C85	NHL	8	1.8	4.5	1.9	8.8	#	12.6	
C91–C96	Leukaemia	5	0.8	6.6	2.1	15.4	#	8.6	
Other primaries		11	3.8	2.9	1.4	5.2	#	14.6	36.4
Not observed		0	2.7	0.0	0.0	1.4		−5.4	
All mult. primaries		160	47.3	3.4	2.9	3.9	#	228.7	30.0

Patients	1791
Median age at second malignancy (years)	73.4
Person-years	4926
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

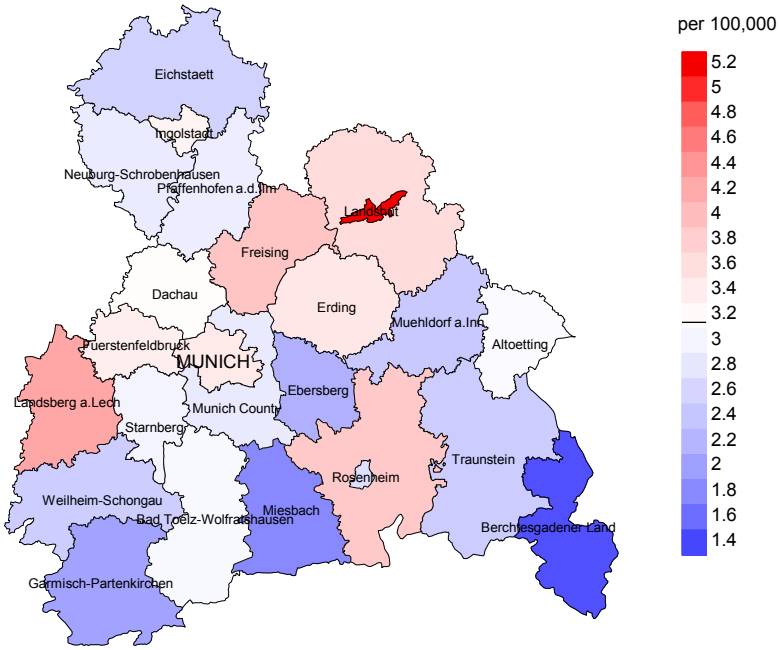
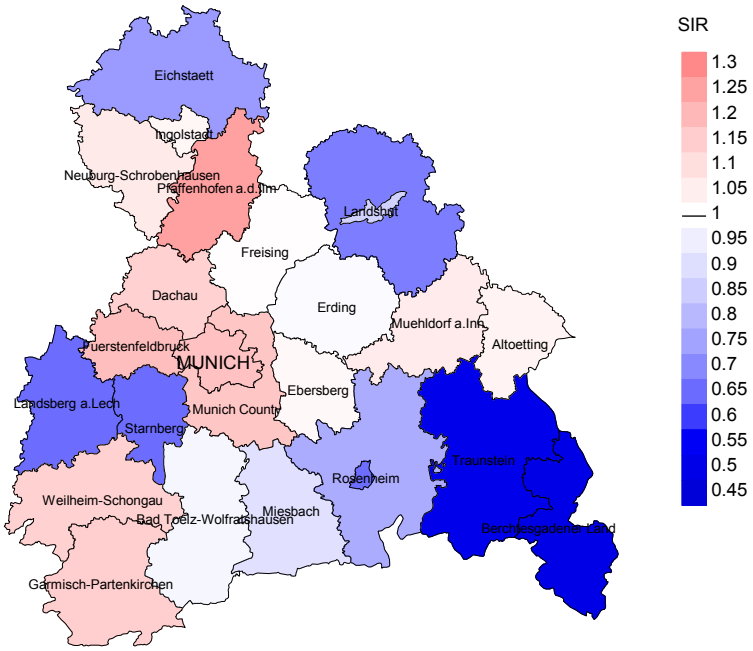


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 4.3/100,000 WS N=1,349, females 3.1/100,000 WS N=1,127).

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 22 women were identified with newly diagnosed mesoth. and soft tissue ca.. 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

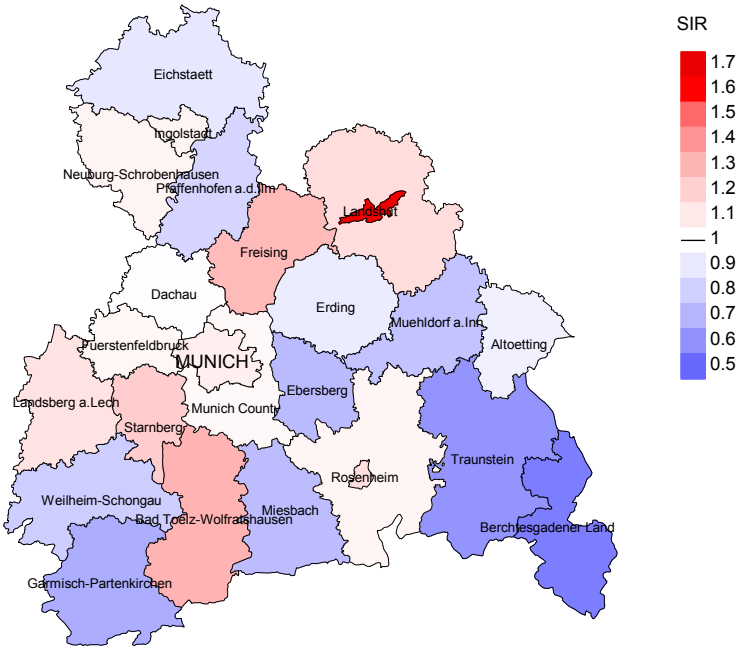


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=1,349, females N=1,127).

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 22 women were identified with newly diagnosed mesoth. and soft tissue ca.. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.73. Though, the value of this parameter may vary with an underlying probability of 99% between 0.39 and 1.23, 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	154	100.0	15.6	128	83.1	94.5
1999	153	98.7	11.1	111	72.5	93.7
2000	157	98.1	20.4	108	68.8	97.2
2001	141	97.2	16.3	103	73.0	94.2
2002	226	98.2	14.6	174	77.0	95.4
2003	248	96.0	12.5	188	75.8	95.2
2004	262	97.3	11.5	181	69.1	98.3
2005	268	93.3	6.0	188	70.1	97.9
2006	243	94.7	7.8	167	68.7	98.8
2007	338	83.1	4.7	214	63.3	98.6
2008	332	85.8	4.8	228	68.7	98.2
2009	317	81.4	3.8	198	62.5	96.0
2010	341	80.6	5.0	205	60.1	98.5
2011	352	80.4	3.7	196	55.7	98.0
2012	317	84.5	5.4	167	52.7	95.8
2013	320	99.7	5.6	144	45.0	97.9
2014	163	97.5	9.8	51	31.3	96.1
1998-2014	4332	90.5	8.1	2751	63.5	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	154	116	94.8	45	29.2
1999	153	94	91.5	31	20.3
2000	157	110	94.5	37	23.6
2001	141	104	94.2	38	27.0
2002	226	147	96.6	63	27.9
2003	248	136	93.4	63	25.4
2004	262	173	96.5	60	22.9
2005	268	180	97.8	56	20.9
2006	243	179	96.6	50	20.6
2007	338	201	98.0	59	17.5
2008	332	199	98.5	67	20.2
2009	317	229	97.8	60	18.9
2010	341	240	98.3	64	18.8
2011	352	244	98.8	77	21.9
2012	317	249	99.2	64	20.2
2013	320	242	97.5	73	22.8
2014	163	214	98.1	45	27.6
1998–2014	4332	3057	97.2	952	22.0

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	116	76.7	23.3	93.6
1999	94	83.0	17.0	95.3
2000	110	86.4	13.6	96.2
2001	104	90.4	9.6	98.0
2002	147	85.0	15.0	93.7
2003	136	88.2	11.8	91.3
2004	173	86.7	13.3	92.8
2005	180	90.0	10.0	92.6
2006	179	88.3	11.7	91.3
2007	201	88.1	11.9	94.9
2008	199	90.5	9.5	92.9
2009	229	87.3	12.7	90.6
2010	240	89.2	10.8	91.5
2011	244	87.3	12.7	91.7
2012	249	85.9	14.1	92.3
2013	242	90.1	9.9	94.1
2014	214	82.2	17.8	85.7
1998-2014	3057	87.1	12.9	92.4

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	69	69.1	69.1	69.2	69.2
1999	61	68.3	66.5	75.9	68.1
2000	63	66.8	66.3	78.8	66.3
2001	56	65.1	64.6	77.7	65.6
2002	89	68.3	67.7	79.0	67.7
2003	74	69.6	66.9	88.3	67.2
2004	101	70.7	69.8	79.4	70.7
2005	108	69.1	69.1	69.6	69.1
2006	102	71.5	72.1	71.1	72.2
2007	131	69.7	69.5	73.7	69.5
2008	121	71.6	71.3	79.7	71.1
2009	133	72.1	71.1	83.1	71.4
2010	137	74.1	73.2	78.0	73.8
2011	140	75.0	74.3	80.7	74.4
2012	140	74.0	73.1	79.8	73.5
2013	135	74.1	73.6	85.0	73.7
2014	111	75.1	74.0	83.7	74.5
1998-2014	1771	71.7	71.0	79.4	71.3

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	47	75.5	71.2	85.4	74.5
1999	33	67.7	67.6	70.2	70.6
2000	47	77.2	78.5	75.2	78.1
2001	48	69.9	70.1	60.9	70.5
2002	58	67.7	64.9	80.3	67.6
2003	62	74.0	69.9	82.6	72.2
2004	72	73.2	71.3	84.3	71.9
2005	72	74.2	73.0	77.5	73.3
2006	77	75.1	74.2	83.0	75.0
2007	70	73.1	72.4	79.0	72.4
2008	78	76.5	71.9	89.3	72.2
2009	96	74.0	72.9	86.2	73.7
2010	103	74.8	73.5	88.9	73.5
2011	104	77.3	75.8	84.9	76.0
2012	109	77.4	75.4	85.0	75.8
2013	107	75.2	73.2	93.3	74.2
2014	103	74.9	74.4	86.6	74.2
1998-2014	1286	74.9	73.1	84.7	74.0

By 2010, life expectancy at birth was 77.5 years for boys and 82.6 years for girls.

Deaths of patients are considered to be cancer-related, in case that fact was recorded on the death certificate, or patients had suffered from metastasis or recurrence.

Table 12a

Mortality measures (cancer-related death) and mortality-incidence-index
by year of death
MALES

Year of death	Deaths n	Mort. raw	MI-Index raw	Mort. WS	MI-Index WS	Mort. ES	MI-Index ES	Mort. BRD-S	MI-Index BRD-S
1998	53	4.8	0.62	3.1	0.57	4.4	0.61	5.3	0.62
1999	52	4.6	0.59	3.1	0.58	4.3	0.60	5.1	0.61
2000	55	4.8	0.61	3.1	0.56	4.3	0.60	5.2	0.62
2001	49	4.2	0.69	2.8	0.66	3.7	0.64	4.4	0.64
2002	74	4.0	0.57	2.3	0.48	3.4	0.54	4.2	0.57
2003	65	3.5	0.52	2.0	0.46	2.9	0.50	3.7	0.53
2004	87	4.6	0.52	2.8	0.49	3.8	0.52	4.9	0.57
2005	97	5.1	0.66	3.0	0.54	4.1	0.61	5.2	0.68
2006	91	4.8	0.64	2.5	0.56	3.7	0.61	4.9	0.64
2007	117	5.3	0.64	2.9	0.56	4.1	0.62	5.3	0.66
2008	110	4.9	0.59	2.5	0.49	3.7	0.56	4.9	0.62
2009	113	5.1	0.65	2.4	0.57	3.6	0.61	4.8	0.63
2010	118	5.2	0.65	2.4	0.48	3.7	0.57	5.1	0.66
2011	122	5.3	0.65	2.5	0.55	3.8	0.61	5.2	0.66
2012	123	5.4	0.70	2.6	0.61	3.8	0.66	5.2	0.72
2013	120	5.3	0.66	2.6	0.54	3.7	0.60	4.9	0.64
2014	93	4.1	1.15	1.9	1.08	2.8	1.10	3.9	1.16
1998-2014	1539	4.8	0.64	2.6	0.56	3.7	0.61	4.9	0.66

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	36	3.1	0.53	1.6	0.48	2.2	0.51	2.8	0.54
1999	26	2.2	0.40	1.4	0.41	1.7	0.39	2.0	0.40
2000	40	3.3	0.60	1.3	0.37	2.0	0.46	2.7	0.54
2001	45	3.7	0.64	2.0	0.58	2.6	0.58	3.2	0.62
2002	51	2.6	0.53	1.5	0.52	1.9	0.52	2.3	0.53
2003	55	2.8	0.45	1.5	0.42	1.9	0.41	2.3	0.42
2004	63	3.2	0.66	1.5	0.49	2.2	0.58	2.8	0.65
2005	65	3.3	0.54	1.4	0.38	2.0	0.45	2.7	0.49
2006	67	3.3	0.66	1.5	0.48	2.1	0.54	2.8	0.62
2007	60	2.6	0.39	1.1	0.29	1.6	0.33	2.1	0.38
2008	70	3.0	0.48	1.2	0.37	1.8	0.40	2.3	0.44
2009	87	3.7	0.60	1.6	0.48	2.3	0.50	3.0	0.55
2010	96	4.1	0.60	1.8	0.50	2.6	0.54	3.3	0.58
2011	91	3.9	0.56	1.4	0.41	2.1	0.47	2.9	0.53
2012	91	3.9	0.64	1.6	0.49	2.3	0.56	3.0	0.63
2013	98	4.2	0.72	1.7	0.56	2.5	0.62	3.1	0.67
2014	83	3.5	1.01	1.4	0.86	2.1	0.92	2.6	0.91
1998-2014	1124	3.4	0.58	1.5	0.46	2.1	0.51	2.7	0.55

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	0.1	0.1	2	0.2	0.2			0.0
5-9	4	0.2	0.4	2	0.2	0.4	2	0.3	0.3
10-14	1	0.1	0.4			0.4	1	0.1	0.4
15-19	6	0.4	0.8	3	0.3	0.8	3	0.4	0.9
20-24	10	0.6	1.4	5	0.5	1.3	5	0.7	1.6
25-29	8	0.5	1.9	6	0.7	2.0	2	0.3	1.9
30-34	11	0.7	2.6	8	0.9	2.8	3	0.4	2.3
35-39	11	0.7	3.3	7	0.8	3.6	4	0.6	2.9
40-44	24	1.5	4.8	11	1.2	4.8	13	1.9	4.8
45-49	35	2.2	7.0	19	2.1	6.8	16	2.3	7.2
50-54	51	3.2	10.2	32	3.5	10.3	19	2.8	10.0
55-59	84	5.2	15.4	43	4.7	15.0	41	6.0	16.0
60-64	131	8.2	23.6	77	8.4	23.3	54	7.9	23.9
65-69	250	15.6	39.2	164	17.8	41.2	86	12.6	36.6
70-74	298	18.6	57.8	184	20.0	61.1	114	16.7	53.3
75-79	266	16.6	74.4	149	16.2	77.3	117	17.2	70.5
80-84	226	14.1	88.5	128	13.9	91.2	98	14.4	84.9
85+	184	11.5	100.0	81	8.8	100.0	103	15.1	100.0
All ages	1602	100.0		921	100.0		681	100.0	

Included in the statistics are 32.6% multiple primaries in males and 35.4% 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	0.33	8.3	13.6
20-24	5	5	0.4	0.50	0.5	0.42	10.4	17.9
25-29	6	2	0.5	0.46	0.2	0.13	9.7	3.1
30-34	8	3	0.6	0.27	0.2	0.20	9.1	2.7
35-39	7	4	0.5	0.17	0.3	0.18	4.0	1.6
40-44	11	13	0.7	0.31	0.8	0.27	2.4	2.1
45-49	19	16	1.2	0.53	1.1	0.34	1.9	1.3
50-54	32	19	2.5	0.52	1.5	0.33	1.7	1.1
55-59	43	41	4.0	0.52	3.6	0.46	1.4	1.6
60-64	77	54	7.8	0.63	5.1	0.56	1.6	1.5
65-69	164	86	17.0	0.76	8.2	0.55	2.3	1.6
70-74	184	114	20.2	0.73	10.9	0.67	2.0	1.7
75-79	149	117	27.1	0.81	16.4	0.86	1.8	1.9
80-84	128	98	36.6	1.00	17.5	0.78	1.7	1.5
85+	81	103	35.0	0.89	17.8	0.95	1.3	1.2
All ages	921	681					1.8	1.6
Mortality								
Raw			5.1	0.68	3.6	0.60		
WS			2.5	0.57	1.5	0.47		
ES			3.7	0.63	2.2	0.52		
BRD-S			4.9	0.69	2.9	0.57		
PYLL-70								
per 100,000			26.5		19.5			
ES			24.9		17.9			
AYLL-70			11.2		12.4			

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 ←%
C09–C10	Oropharynx	8	1.6	4	50.0	1	12.5	3	37.5
C15	Oesophagus	6	1.2	1	16.7			5	83.3
C16	Stomach	15	3.0	10	66.7	1	6.7	4	26.7
C18	Colon	29	5.9	24	82.8	3	10.3	2	6.9
C19–C20	Rectum	23	4.7	17	73.9	1	4.3	5	21.7
C25	Pancreas	5	1.0	1	20.0	3	60.0	1	20.0
C33–C34	Lung	37	7.5	9	24.3	7	18.9	21	56.8
C43	Malign. melanoma	33	6.7	25	75.8	2	6.1	6	18.2
C44	Skin others	54	10.9	34	63.0			20	37.0
C46,C49	Soft tissue	7	1.4			1	14.3	6	85.7
C61	Prostate	94	19.0	71	75.5	4	4.3	19	20.2
C62	Testis	7	1.4	5	71.4			2	28.6
C64	Kidney	25	5.1	15	60.0	3	12.0	7	28.0
C67	Bladder	32	6.5	18	56.3	2	6.3	12	37.5
C70–C72	CNS cancer	11	2.2			2	18.2	9	81.8
C73	Thyroid	5	1.0	3	60.0			2	40.0
C76–C79	CUP	8	1.6	4	50.0	2	25.0	2	25.0
C82–C85	NHL	33	6.7	17	51.5	5	15.2	11	33.3
C90	Mult. myeloma	9	1.8	5	55.6	2	22.2	2	22.2
C91–C96	Leukaemia	13	2.6	6	46.2	2	15.4	5	38.5
Other primaries		40	8.1	17	42.5	4	10.0	19	47.5
All mult. primaries		494	100.0	286	57.9	45	9.1	163	33.0

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 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	5	1.2	4	80.0			1	20.0
C18	Colon	25	5.8	12	48.0	4	16.0	9	36.0
C19-C20	Rectum	7	1.6	4	57.1	1	14.3	2	28.6
C25	Pancreas	7	1.6			2	28.6	5	71.4
C33-C34	Lung	14	3.3	3	21.4	2	14.3	9	64.3
C43	Malign. melanoma	25	5.8	19	76.0	2	8.0	4	16.0
C44	Skin others	22	5.1	12	54.5	4	18.2	6	27.3
C46,C49	Soft tissue	7	1.6			1	14.3	6	85.7
C50	Breast	114	26.6	91	79.8	3	2.6	20	17.5
C51	Vulva	5	1.2	2	40.0	1	20.0	2	40.0
C53	Cervix uteri	11	2.6	11	100.0				
C54	Corpus uteri	25	5.8	14	56.0	6	24.0	5	20.0
C56	Ovary	69	16.1	16	23.2	11	15.9	42	60.9
C64	Kidney	9	2.1	3	33.3	2	22.2	4	44.4
C67	Bladder	7	1.6	5	71.4			2	28.6
C70-C72	CNS cancer	10	2.3			1	10.0	9	90.0
C73	Thyroid	8	1.9	8	100.0				
C82-C85	NHL	17	4.0	10	58.8	5	29.4	2	11.8
C90	Mult. myeloma	7	1.6	4	57.1	1	14.3	2	28.6
C91-C96	Leukaemia	8	1.9	2	25.0			6	75.0
Other primaries		26	6.1	9	34.6	6	23.1	11	42.3
All mult. primaries		428	100.0	229	53.5	52	12.1	147	34.3

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 16

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

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4	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	0.25	9.1	10.0
20-24	4	4	0.4	0.44	0.4	0.36	9.3	15.4
25-29	5	2	0.4	0.42	0.2	0.13	9.1	3.4
30-34	7	3	0.6	0.25	0.2	0.21	8.1	3.2
35-39	6	3	0.5	0.15	0.2	0.17	3.6	1.3
40-44	11	11	0.7	0.35	0.7	0.26	2.6	2.0
45-49	17	16	1.1	0.50	1.1	0.42	1.8	1.6
50-54	27	18	2.1	0.50	1.4	0.38	1.7	1.2
55-59	38	28	3.6	0.51	2.5	0.39	1.5	1.3
60-64	62	42	6.3	0.62	4.0	0.58	1.6	1.5
65-69	138	61	14.3	0.82	5.8	0.51	2.4	1.5
70-74	143	90	15.7	0.76	8.6	0.70	2.1	1.8
75-79	111	86	20.2	0.88	12.1	0.96	1.8	1.8
80-84	94	67	26.9	1.04	11.9	0.75	1.8	1.3
85+	59	82	25.5	0.91	14.2	0.94	1.3	1.2
All ages	729	517					1.9	1.5
Mortality								
Raw			4.0	0.68	2.8	0.59		
WS			2.0	0.56	1.1	0.45		
ES			3.0	0.62	1.7	0.50		
BRD-S			3.9	0.69	2.2	0.56		
PYLL-70								
per 100,000			23.2		15.8			
ES			21.9		14.4			
AYLL-70			11.6		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.	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		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	0.25	9.1	11.1
20-24	3	3	0.3	0.33	0.3	0.27	7.7	12.5
25-29	5	2	0.4	0.42	0.2	0.13	9.8	3.6
30-34	7	3	0.6	0.27	0.2	0.21	8.2	3.6
35-39	6	3	0.5	0.16	0.2	0.17	3.8	1.5
40-44	10	11	0.6	0.38	0.7	0.28	2.5	2.2
45-49	15	14	0.9	0.47	0.9	0.38	1.7	1.5
50-54	25	15	1.9	0.49	1.2	0.35	1.7	1.1
55-59	33	25	3.1	0.47	2.2	0.38	1.4	1.3
60-64	61	38	6.2	0.64	3.6	0.58	1.8	1.6
65-69	127	50	13.2	0.79	4.8	0.48	2.7	1.5
70-74	126	71	13.8	0.73	6.8	0.60	2.2	1.7
75-79	99	76	18.0	0.85	10.7	0.93	2.0	1.9
80-84	82	57	23.5	0.94	10.2	0.72	2.0	1.4
85+	50	73	21.6	0.86	12.6	0.86	1.5	1.3
All ages	656	445					2.1	1.6
Mortality								
Raw			3.6	0.65	2.4	0.55		
WS			1.8	0.53	1.0	0.42		
ES			2.7	0.60	1.4	0.47		
BRD-S			3.5	0.66	1.9	0.52		
PYLL-70								
per 100,000			21.6		14.3			
ES			20.5		13.1			
AYLL-70			11.6		13.5			

* See corresponding tables with multiple primaries.

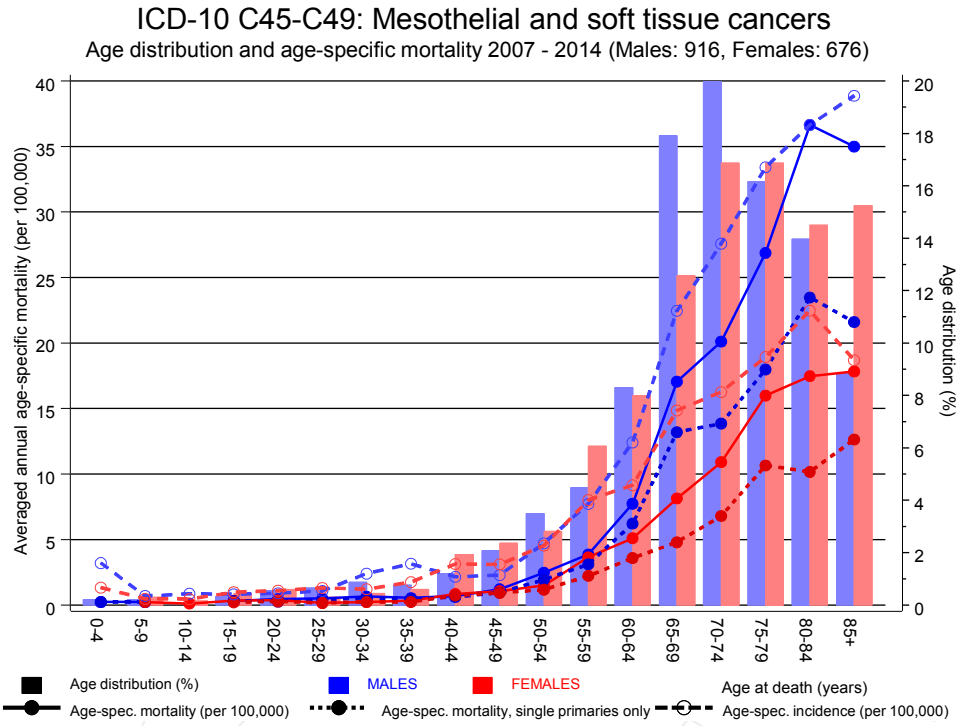
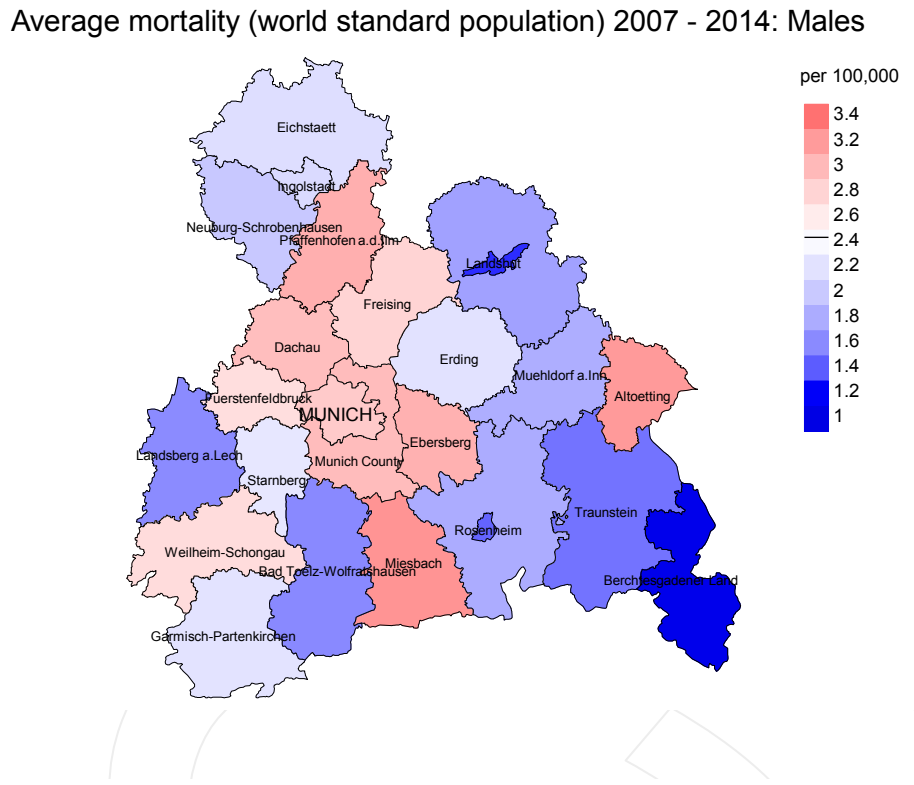


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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



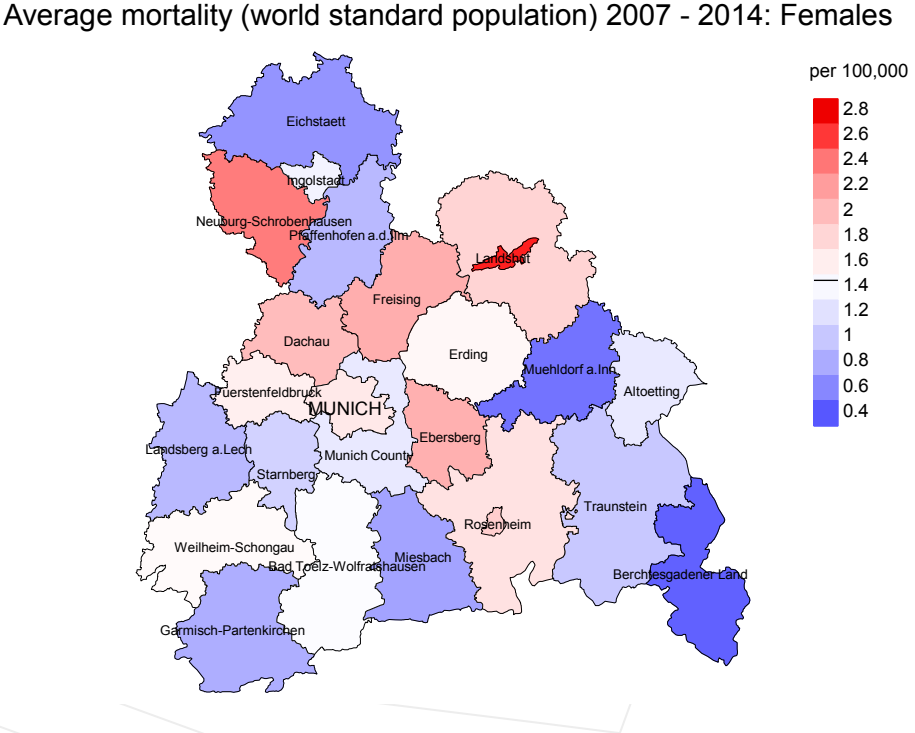
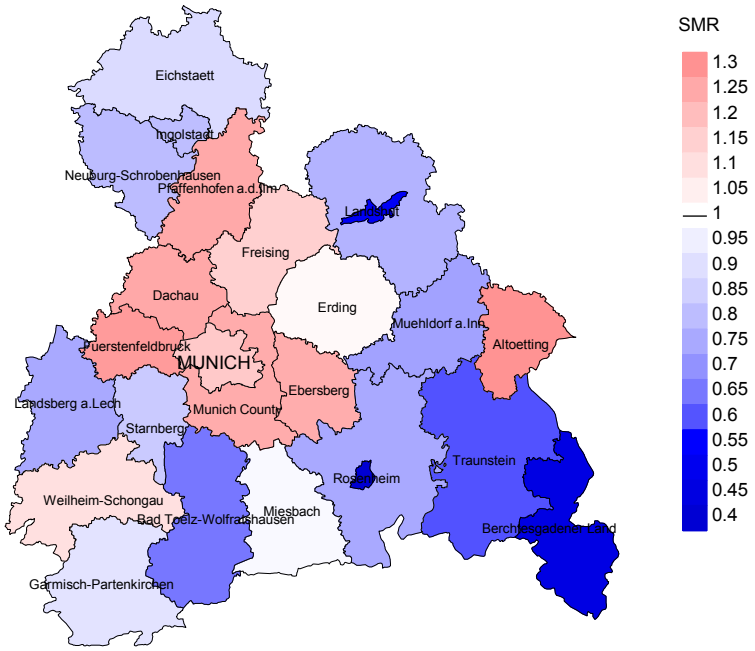


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2014. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 2.4/100,000 WS N=910, females 1.5/100,000 WS N=671).

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 21 women died from mesoth. and soft tissue ca.. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 2.1/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.8 and 4.5/100,000.

Standardized mortality ratio (SMR) 2007 - 2014: Males



Standardized mortality ratio (SMR) 2007 - 2014: Females

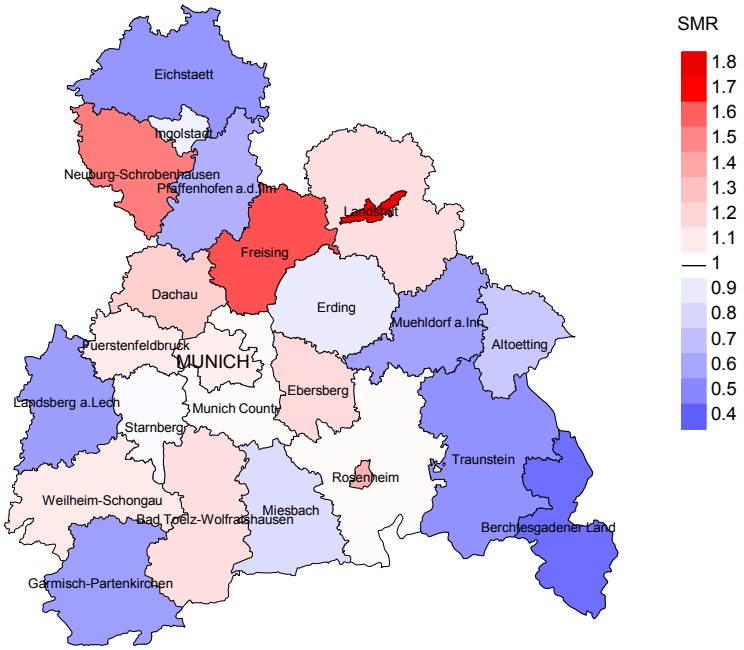


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=910, females N=671).

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 21 women died from mesoth. and soft tissue ca.. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.19. Though, the value of this parameter may vary with an underlying probability of 99% between 0.62 and 2.03, 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

Recommended Citation

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