Munich Cancer Registry

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

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

Cancer statistics: Baseline statistics

C18-C21: Colorectal cancer

Year of diagnosis	1998-2013
Patients	43,700
Diseases	44,820
Creation date	05/19/2015
Export date	12/30/2014
Population	4.64 m

http://www.tumorregister-muenchen.de/en/facts/base/base_C1821E.pdf

Global Statements about the statistics on the Internet −
Baseline Statistics (grey button), **Survival** (red button)

In these analyses, the clinics and physicians of Upper Bavaria and the city and county of Landshut[#], with a total of 4.64 million inhabitants, account for the frequency of cancer diseases[##] and the achieved long term results. Additionally, the long term survival evaluated by the Munich Cancer Registry (MCR) is compared with the results of the population-based registry in the USA (SEER), which is useful for checking the consistency of the data on an international level.

In comparing several tables, inconsistent figures may be detected. This is based on the fact that different patient cohorts are included in the base calculation, for example when proportions of multiple tumors or DCO-cases[###] are concerned. In other cases the individual tumor diagnosis is the basis for calculation, for example with incidence.

The foot notes describe the currentness of the data. The baseline statistics and survival data are updated annually. This yearly analysis comprises the Annual Report of the MCR. The time-delayed acquisition of data and the occasionally high DCO-rates indicate optimizing reserves, among others, because of current financial and legal conditions that hinder the analyses.

Clinics and physicians have access to essentially more detailed data, with which they can check, compare and in the best case optimize their own data and results.

We would be pleased to receive corrections, critique and useful suggestions. Just send an e-mail to tumor@ibe.med.uni-muenchen.de.

Munich Cancer Registry, May 2015

[#] Base data has been collected since 1998. An increase in new diseases is apparent, which is an effect of two extensions in the MCR catchment area (from a base population of 2.51 million to 3.96 in 2002, and to 4.52 million in 2007). Death certificates from 2014 are incorporated into these analyses.

[##] Due to the high frequency and good prognosis of non-malignant skin cancer (C44), no systematic ascertainment is performed for this diagnosis. C44 is not designated as a primary, but rather as a secondary tumor.

[###] DCO (death certificate only) identifies a cancer case that first becomes available to the MCR through the death certificate. A high proportion of DCO cases (≥5%) in particular cancer types indicate insufficient participation of specific cancer specializations.

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

Code	Description
C18.-	Malignant neoplasm of colon
C18.0	Caecum
C18.1	Appendix
C18.2	Ascending colon
C18.3	Hepatic flexure
C18.4	Transverse colon
C18.5	Splenic flexure
C18.6	Descending colon
C18.7	Sigmoid colon
C18.8	Overlapping lesion of colon
C18.9	Colon, unspecified
C19	Malignant neoplasm of rectosigmoid junction
C20	Malignant neoplasm of rectum
C21.-	Malignant neoplasm of anus and anal canal
C21.0	Anus, unspecified
C21.1	Anal canal
C21.2	Cloacogenic zone
C21.8	Overlapping lesion of rectum, anus and anal canal

INCIDENCE

Table 1

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

Year of diagnosis	Cases n	DCO cases n	Prop. DCO %	Prop. mult. primaries %	Prop. deaths %	Prop. actively followed %	
1998	1868	97	5.2	24.6	72.3	98.1	
1999	1869	115	6.2	24.2	71.5	97.9	
2000	1728	95	5.5	26.3	70.0	98.3	
2001	1887	121	6.4	26.8	65.2	97.5	
2002	3210	368	11.5	25.2	68.3	97.9	#
2003	3222	299	9.3	25.4	63.1	97.9	
2004	3106	243	7.8	25.3	62.5	97.5	
2005	3035	212	7.0	27.1	61.9	97.0	
2006	3129	159	5.1	27.5	55.9	95.1	
2007	3478	203	5.8	25.2	54.8	85.2	# ##
2008	3421	194	5.7	26.9	51.2	71.1	
2009	3377	173	5.1	26.3	47.2	68.3	
2010	3163	183	5.8	26.0	43.8	66.1	
2011	3061	155	5.1	24.6	38.7	65.7	
2012	2974	163	5.5	24.4	31.3	67.8	
2013	2292	145	6.3	24.2	21.5	98.6	###
1998-2013	44820	2925	6.5	25.7	53.9	86.0	

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

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

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

Table 1a

Patient cohorts by year of diagnosis and gender
including DCO cases

Year of diagnosis	All n	Males n	Females n	Prop. males %
1998	1868	933	935	49.9
1999	1869	950	919	50.8
2000	1728	881	847	51.0
2001	1887	978	909	51.8
2002	3210	1686	1524	52.5
2003	3222	1701	1521	52.8
2004	3106	1639	1467	52.8
2005	3035	1589	1446	52.4
2006	3129	1689	1440	54.0
2007	3478	1902	1576	54.7
2008	3421	1874	1547	54.8
2009	3377	1875	1502	55.5
2010	3163	1755	1408	55.5
2011	3061	1668	1393	54.5
2012	2974	1615	1359	54.3
2013	2292	1305	987	56.9
1998-2013	44820	24040	20780	53.6

Table 2

Incidence measures by year of diagnosis and gender including DCO cases
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002,
and from 3.96 to 4.64 m as of 2007, respectively)

Year of diagnosis	Males n	Females n	Males Inc. raw	Fem. Inc. raw	Males Inc. WS	Fem. Inc. WS	Males Inc. ES	Fem. Inc. ES	Males Inc. BRD-S	Fem. Inc. BRD-S
1998	933	935	84.2	79.5	50.6	34.1	76.0	51.3	99.0	67.1
1999	950	919	84.9	77.4	50.3	33.0	76.0	49.7	99.5	64.6
2000	881	847	77.4	70.5	45.3	29.0	68.5	44.3	88.6	58.0
2001	978	909	84.4	74.7	49.4	32.1	74.0	48.2	94.6	62.6
2002	1686	1524	90.5	77.8	50.5	31.8	76.2	48.1	99.7	62.6
2003	1701	1521	90.7	77.2	49.9	31.8	75.2	47.9	97.7	61.8
2004	1639	1467	87.1	74.2	46.5	31.0	70.3	46.1	91.9	59.4
2005	1589	1446	83.9	72.7	44.6	28.6	66.9	43.2	86.7	56.8
2006	1689	1440	88.2	71.7	46.3	29.5	69.2	44.0	89.6	57.1
2007	1902	1576	85.9	68.2	44.7	27.5	66.7	41.1	86.6	53.2
2008	1874	1547	84.2	66.7	42.3	26.3	63.8	39.6	83.1	51.3
2009	1875	1502	84.0	64.6	41.7	25.5	62.4	38.2	81.5	49.8
2010	1755	1408	77.9	60.2	38.3	23.0	57.4	34.7	74.8	45.7
2011	1668	1393	73.0	59.0	35.5	23.4	53.2	34.8	68.9	44.4
2012	1615	1359	70.7	57.6	34.4	23.5	51.7	34.5	66.9	44.2
2013	1305	987	57.1	41.8	27.4	17.1	41.2	25.2	54.1	32.3
1998-2013	24040	20780	80.9	66.9	42.2	27.1	63.3	40.6	82.1	52.6

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

Table 3

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	1868	69.9	12.5	13.2	102	53.8	60.8	70.9	78.7	86.1
1999	1869	70.3	12.5	24.9	102	54.2	61.6	71.1	79.3	86.4
2000	1728	70.5	12.1	24.7	103	55.0	61.6	71.3	79.2	86.7
2001	1887	69.9	12.5	28.3	103	54.0	61.5	70.2	79.3	86.5
2002	3210	70.9	12.1	17.7	104	55.3	62.6	71.8	80.0	86.7
2003	3222	70.9	12.0	8.4	101	55.6	63.0	71.4	79.9	86.0
2004	3106	70.6	12.3	13.8	101	55.0	62.8	71.0	79.9	85.4
2005	3035	71.3	12.3	15.1	99.9	55.4	63.7	71.8	80.4	86.1
2006	3129	70.4	12.2	17.9	102	54.4	63.2	70.8	79.6	85.2
2007	3478	70.7	12.5	15.8	103	54.1	63.7	71.2	80.2	85.8
2008	3421	71.4	12.3	18.9	105	55.0	64.1	72.0	80.4	86.5
2009	3377	71.0	12.4	12.4	102	54.1	63.6	71.9	80.1	85.9
2010	3163	71.4	12.6	14.9	101	54.1	63.5	72.4	80.9	86.3
2011	3061	71.1	12.8	17.1	101	53.4	63.2	72.2	80.7	86.9
2012	2974	71.0	13.0	9.7	101	54.1	62.9	72.5	80.4	86.4
2013	2292	70.6	13.2	15.7	105	52.0	62.7	72.6	79.8	86.0
1998-2013	44820	70.8	12.5	8.4	105	54.4	62.9	71.7	80.0	86.2

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	933	67.7	11.8	31.4	98.1	53.6	59.4	68.1	75.9	83.9
1999	950	68.3	11.6	24.9	95.5	54.2	60.3	69.0	76.6	83.3
2000	881	68.2	11.0	34.4	95.9	54.2	60.3	68.0	76.5	82.7
2001	978	68.2	11.4	31.3	102	54.1	61.0	67.9	75.8	83.4
2002	1686	69.1	11.0	20.9	98.5	55.5	61.8	69.5	76.6	82.5
2003	1701	69.1	11.1	8.4	99.4	55.4	62.5	69.5	76.5	82.7
2004	1639	69.3	11.1	27.8	101	55.4	62.4	69.3	77.1	83.4
2005	1589	69.2	11.3	19.0	99.6	54.6	62.7	69.4	77.1	83.5
2006	1689	69.0	11.2	17.9	102	54.5	62.5	69.3	77.2	82.8
2007	1902	69.0	11.7	15.8	99.4	54.2	62.7	69.5	77.6	83.0
2008	1874	69.8	11.2	19.3	105	55.0	63.4	70.4	77.8	83.4
2009	1875	69.5	11.5	12.4	102	53.7	62.8	70.9	77.8	83.0
2010	1755	69.8	11.8	21.1	98.9	53.8	62.4	70.9	78.2	84.1
2011	1668	69.9	11.7	26.3	97.3	53.4	63.0	71.1	78.2	84.2
2012	1615	70.3	11.5	9.7	101	55.3	62.9	71.4	78.3	84.1
2013	1305	70.0	12.0	19.4	99.6	53.2	62.7	72.1	78.2	84.1
1998-2013	24040	69.3	11.4	8.4	105	54.4	62.2	70.0	77.4	83.4

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	935	72.0	12.8	13.2	102	54.4	62.9	74.0	81.5	87.4
1999	919	72.3	13.2	26.9	102	54.1	63.5	74.4	82.1	88.0
2000	847	72.8	12.8	24.7	103	56.0	63.0	74.8	81.7	88.3
2001	909	71.7	13.3	28.3	103	53.9	62.2	74.1	81.1	88.4
2002	1524	73.0	13.0	17.7	104	55.2	63.6	74.9	82.1	88.8
2003	1521	72.8	12.6	23.5	101	56.2	63.8	74.2	82.3	88.5
2004	1467	72.0	13.4	13.8	100	54.4	63.7	73.7	82.7	87.7
2005	1446	73.5	12.8	15.1	99.9	56.8	65.2	75.4	83.2	89.2
2006	1440	72.1	13.1	21.2	98.7	54.2	64.1	73.9	82.2	86.7
2007	1576	72.7	13.1	17.8	103	54.0	64.9	74.1	82.8	87.5
2008	1547	73.2	13.3	18.9	102	55.2	65.1	74.2	83.6	88.6
2009	1502	72.9	13.3	15.9	102	54.6	64.9	74.6	83.1	88.4
2010	1408	73.3	13.4	14.9	101	54.6	65.3	75.4	83.4	88.6
2011	1393	72.7	13.8	17.1	101	53.3	63.4	74.1	83.8	88.8
2012	1359	71.9	14.5	13.7	100	52.6	62.9	74.4	82.9	88.8
2013	987	71.5	14.5	15.7	105	50.2	62.5	74.0	82.3	88.5
1998-2013	20780	72.6	13.3	13.2	105	54.4	64.0	74.4	82.7	88.3

Table 4

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

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
5-9	2	0.0	0.0	2	0.0	0.0			0.0
10-14	5	0.0	0.0	1	0.0	0.0	4	0.0	0.0
15-19	26	0.1	0.1	5	0.0	0.0	21	0.1	0.1
20-24	37	0.1	0.2	9	0.0	0.1	28	0.1	0.3
25-29	84	0.2	0.3	37	0.2	0.2	47	0.2	0.5
30-34	167	0.4	0.7	86	0.4	0.6	81	0.4	0.9
35-39	302	0.7	1.4	158	0.7	1.2	144	0.7	1.6
40-44	685	1.5	2.9	363	1.5	2.7	322	1.5	3.1
45-49	1287	2.9	5.8	668	2.8	5.5	619	3.0	6.1
50-54	2193	4.9	10.7	1243	5.2	10.7	950	4.6	10.7
55-59	3579	8.0	18.7	2166	9.0	19.7	1413	6.8	17.5
60-64	5306	11.8	30.5	3292	13.7	33.4	2014	9.7	27.2
65-69	6323	14.1	44.6	4003	16.7	50.1	2320	11.2	38.3
70-74	7024	15.7	60.3	4234	17.6	67.7	2790	13.4	51.7
75-79	6571	14.7	74.9	3498	14.6	82.2	3073	14.8	66.5
80-84	5694	12.7	87.7	2502	10.4	92.6	3192	15.4	81.9
85+	5535	12.3	100.0	1773	7.4	100.0	3762	18.1	100.0
All ages	44820	100.0		24040	100.0		20780	100.0	

Included in the statistics are 32.2% multiple primaries in males and 26.0% in females.

Table 5

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

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=1144 %	Females DCO rate n=1769 %	Males Prop.all cancers n=158258 %	Females Prop.all cancers n=153136 %
0- 4			0.0	0.0				
5- 9	2		0.1	0.0			1.1	
10-14	1	4	0.1	0.3			0.6	2.4
15-19	5	21	0.3	1.4			1.4	7.2
20-24	9	28	0.5	1.6	11.1		1.5	5.3
25-29	34	47	1.7	2.3			3.5	4.2
30-34	86	80	3.8	3.6			5.7	3.9
35-39	155	143	6.2	6.0		1.4	6.9	3.8
40-44	360	322	13.7	12.9	0.6	0.3	11.2	5.2
45-49	661	614	28.0	26.6	0.8	1.1	12.4	7.0
50-54	1222	943	60.5	45.9	1.6	0.8	14.2	8.5
55-59	2138	1397	116.5	72.7	1.7	1.3	14.8	10.2
60-64	3247	1989	183.2	106.0	1.8	1.9	14.9	11.5
65-69	3921	2297	248.4	133.1	2.5	2.4	14.3	12.1
70-74	4138	2748	323.0	181.0	3.6	4.1	15.4	15.0
75-79	3427	3032	414.6	255.3	5.5	6.4	16.6	17.2
80-84	2434	3152	486.5	337.9	9.0	10.1	17.8	20.0
85+	1742	3715	510.8	415.7	21.1	27.3	17.5	21.6
All ages	23582	20532			4.9	8.6	14.9	13.4
Incidence								
Raw			79.3	66.1				
WS			41.4	26.8				
ES			62.1	40.1				
BRD-S			80.5	52.0				

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).

Table 6a

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

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C00	Lip	4	1.4	2.8	0.8	7.1		0.4	
C03-C06	Oral cavity	10	8.7	1.1	0.5	2.1		0.2	
C07-C08	Salivary gland	3	2.6	1.2	0.2	3.4		0.1	
C09-C10	Oropharynx	15	10.4	1.4	0.8	2.4		0.8	
C12-C13	Hypopharynx	7	5.8	1.2	0.5	2.5		0.2	14.3
C15	Oesophagus	38	19.3	2.0	1.4	2.7	#	3.1	13.2
C16	Stomach	120	50.9	2.4	2.0	2.8	#	11.4	6.7
C17	Small intestine	42	5.5	7.7	5.5	10.4	#	6.0	2.4
C18	Colon	323	120.1	2.7	2.4	3.0	#	33.5	1.2
C19-C20	Rectum	155	63.7	2.4	2.1	2.8	#	15.1	1.9
C21	Anus/canal	5	2.2	2.2	0.7	5.2		0.5	
C22	Liver	69	31.5	2.2	1.7	2.8	#	6.2	21.7
C23-C24	Bile	25	11.6	2.2	1.4	3.2	#	2.2	4.0
C25	Pancreas	79	42.0	1.9	1.5	2.3	#	6.1	25.3
C32	Larynx	21	11.2	1.9	1.2	2.9	#	1.6	19.0
C33-C34	Lung	241	135.7	1.8	1.6	2.0	#	17.4	13.7
C38,C45	Mesothelioma	7	7.6	0.9	0.4	1.9		-0.1	
C43	Malign. melanoma	80	43.3	1.8	1.5	2.3	#	6.1	1.3
C46,C49	Soft tissue	14	6.1	2.3	1.3	3.8	#	1.3	
C50	Breast	6	3.0	2.0	0.7	4.4		0.5	16.7
C60	Penis	5	2.6	1.9	0.6	4.4		0.4	
C61	Prostate	542	350.6	1.5	1.4	1.7	#	31.6	5.0
C62	Testis	7	2.1	3.3	1.3	6.8	#	0.8	14.3
C64	Kidney	104	39.5	2.6	2.2	3.2	#	10.6	5.8
C65	Renal pelvis	14	4.9	2.8	1.6	4.8	#	1.5	
C66	Ureter	11	2.7	4.0	2.0	7.2	#	1.4	
C67	Bladder	94	54.8	1.7	1.4	2.1	#	6.5	7.4
C68	Urinary org.	3	0.7	4.3	0.9	12.5		0.4	66.7
C70-C72	CNS cancer	30	14.6	2.1	1.4	2.9	#	2.5	26.7
C73	Thyroid	10	6.6	1.5	0.7	2.8		0.6	20.0
C76-C79	CUP	27	20.3	1.3	0.9	1.9		1.1	3.7
C81	Hodgkin lymphoma	4	2.1	1.9	0.5	4.8		0.3	
C82-C85	NHL	79	47.0	1.7	1.3	2.1	#	5.3	5.1
C90	Mult. myeloma	22	15.2	1.4	0.9	2.2		1.1	22.7
C91-C96	Leukaemia	35	19.5	1.8	1.3	2.5	#	2.6	34.3
Other primaries		8	9.4	0.9	0.4	1.7		-0.2	12.5
Not observed		0	4.2	0.0	0.0	0.9	#	-0.7	
All mult. primaries		2259	1179.5	1.9	1.8	2.0	#	178.3	7.7

Patients	15673
Median age at second malignancy (years)	73.5
Person-years	60561
Mean observation time (years)	3.9
Median observation time (years)	2.8

The occurrence of second malignancy is statistically significant.

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

Table 6b

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

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C03-C06	Oral cavity	5	4.0	1.3	0.4	2.9		0.2	
C09-C10	Oropharynx	7	2.4	2.9	1.2	6.1	#	0.9	
C12-C13	Hypopharynx	3	0.6	4.7	1.0	13.7		0.4	33.3
C15	Oesophagus	8	3.9	2.1	0.9	4.1		0.8	12.5
C16	Stomach	63	30.6	2.1	1.6	2.6	#	6.0	20.6
C17	Small intestine	30	3.1	9.7	6.5	13.8	#	5.0	3.3
C18	Colon	216	81.6	2.6	2.3	3.0	#	24.8	3.2
C19-C20	Rectum	81	33.4	2.4	1.9	3.0	#	8.8	2.5
C21	Anus/canal	8	3.7	2.2	0.9	4.3		0.8	
C22	Liver	23	8.8	2.6	1.7	3.9	#	2.6	47.8
C23-C24	Bile	18	12.0	1.5	0.9	2.4		1.1	22.2
C25	Pancreas	65	34.7	1.9	1.4	2.4	#	5.6	20.0
C33-C34	Lung	123	47.4	2.6	2.2	3.1	#	14.0	14.6
C38,C45	Mesothelioma	3	1.3	2.3	0.5	6.6		0.3	
C43	Malign. melanoma	44	22.9	1.9	1.4	2.6	#	3.9	
C46,C49	Soft tissue	8	4.0	2.0	0.9	3.9		0.7	
C48	Peritoneal	7	2.3	3.0	1.2	6.2	#	0.9	14.3
C50	Breast	322	197.1	1.6	1.5	1.8	#	23.1	4.7
C51	Vulva	18	7.7	2.3	1.4	3.7	#	1.9	5.6
C52	Vagina	5	1.5	3.4	1.1	7.9	#	0.6	20.0
C53	Cervix uteri	17	8.5	2.0	1.2	3.2	#	1.6	17.6
C54	Corpus uteri	80	37.6	2.1	1.7	2.7	#	7.8	3.8
C55,C57	Fem. genitals un	4	2.4	1.7	0.5	4.4		0.3	25.0
C56	Ovary	78	29.3	2.7	2.1	3.3	#	9.0	26.9
C64	Kidney	52	18.2	2.9	2.1	3.8	#	6.3	13.5
C65	Renal pelvis	7	2.3	3.0	1.2	6.3	#	0.9	
C66	Ureter	3	1.1	2.6	0.5	7.7		0.3	
C67	Bladder	34	15.7	2.2	1.5	3.0	#	3.4	17.6
C70-C72	CNS cancer	12	9.6	1.2	0.6	2.2		0.4	58.3
C73	Thyroid	16	9.9	1.6	0.9	2.6		1.1	6.3
C74-C80	Cancer others	3	4.1	0.7	0.2	2.1		-0.2	66.7
C76-C79	CUP	10	14.7	0.7	0.3	1.2		-0.9	
C82-C85	NHL	47	28.8	1.6	1.2	2.2	#	3.4	17.0
C90	Mult. myeloma	16	9.4	1.7	1.0	2.8		1.2	31.3
C91-C96	Leukaemia	29	12.2	2.4	1.6	3.4	#	3.1	41.4
Other primaries		15	8.4	1.8	1.0	2.9		1.2	6.7
Not observed		0	1.9	0.0	0.0	2.0		-0.3	
All mult. primaries		1480	716.9	2.1	2.0	2.2	#	141.0	11.2

Patients	13891
Median age at second malignancy (years)	75.7
Person-years	54130
Mean observation time (years)	3.9
Median observation time (years)	2.8

The occurrence of second malignancy is statistically significant.

Observed second primaries with count 1 to 2 are pooled in category "Other primaries".

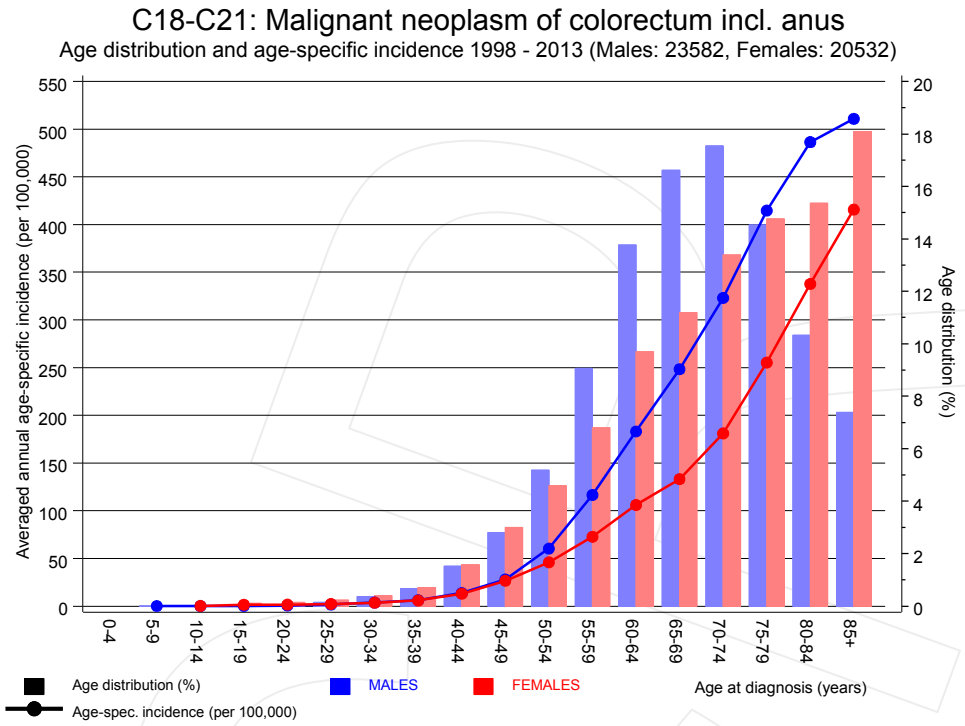


Figure 7. Age distribution and age-specific incidence

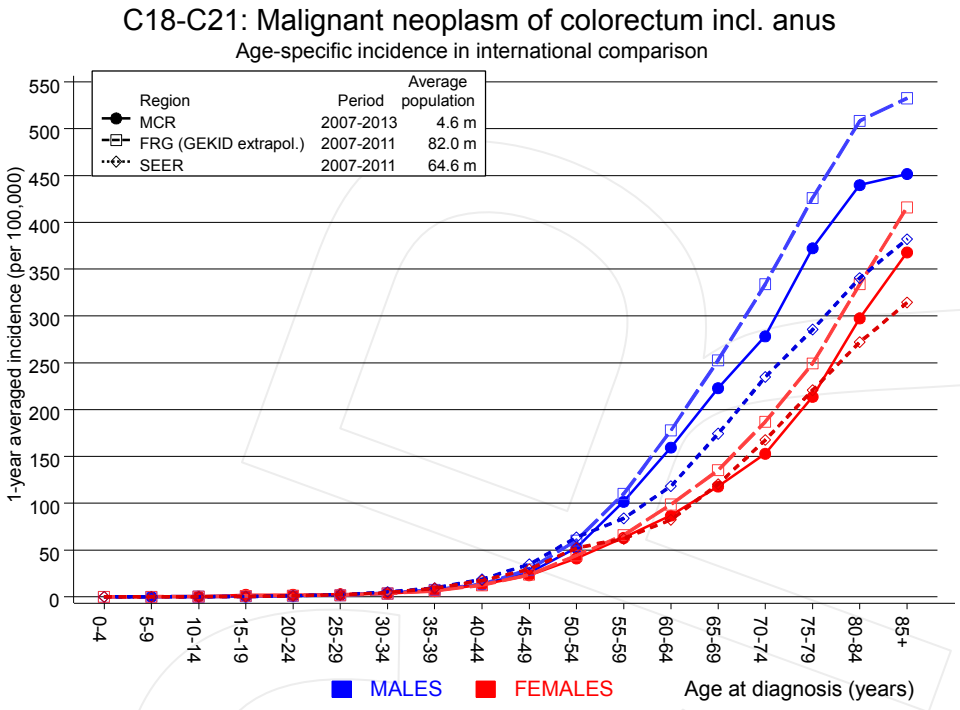


Figure 7a. Age-specific incidence in MCR registry areas compared to Germany (FRG, GEKID extrapolation) and SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

Extrapolated age-specific patient population of Germany, data status middle of 2010. Association of Population-based Cancer Registries in Germany (GEKID e.V.). Berlin, 2014. http://www.gekid.de. Last access: 02/11/2015

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

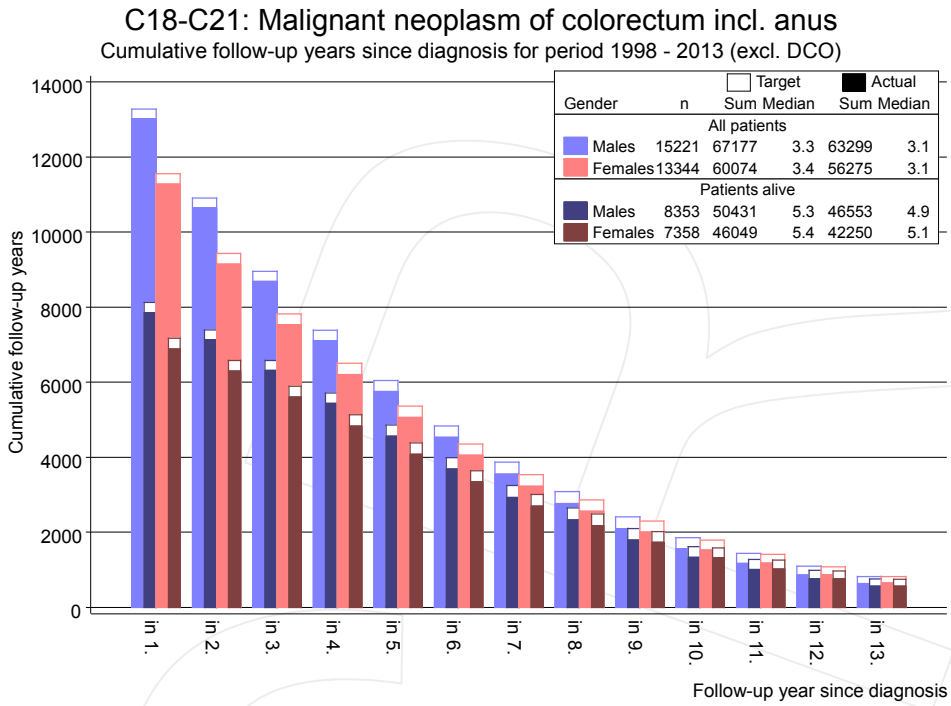
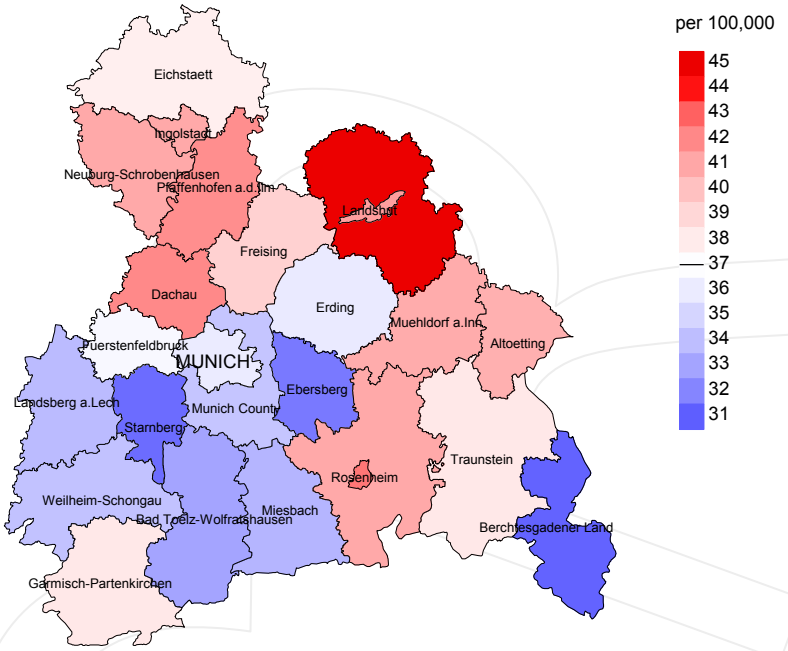


Figure 8. Cumulative follow-up years depending on time since diagnosis

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

Average incidence (world standard population) 2007 - 2013: Males



Average incidence (world standard population) 2007 - 2013: Females

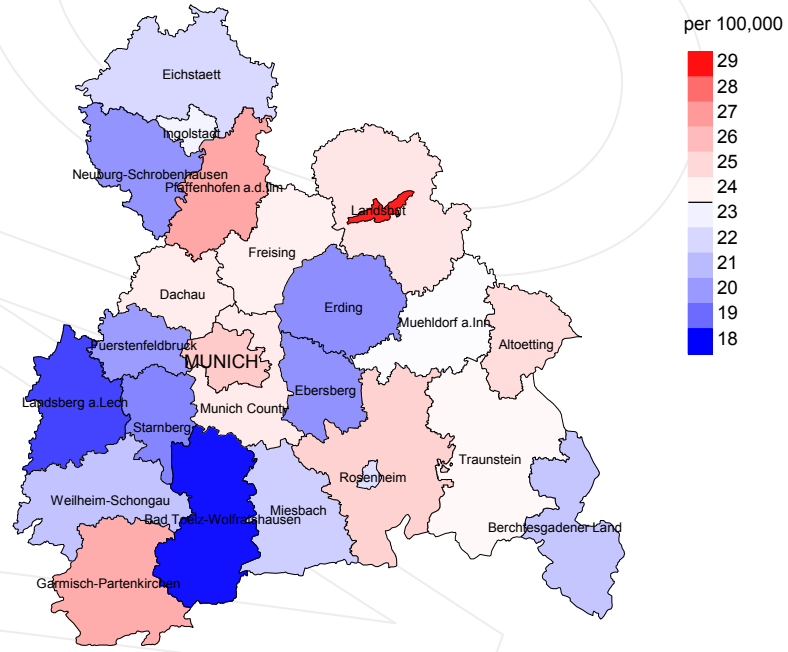
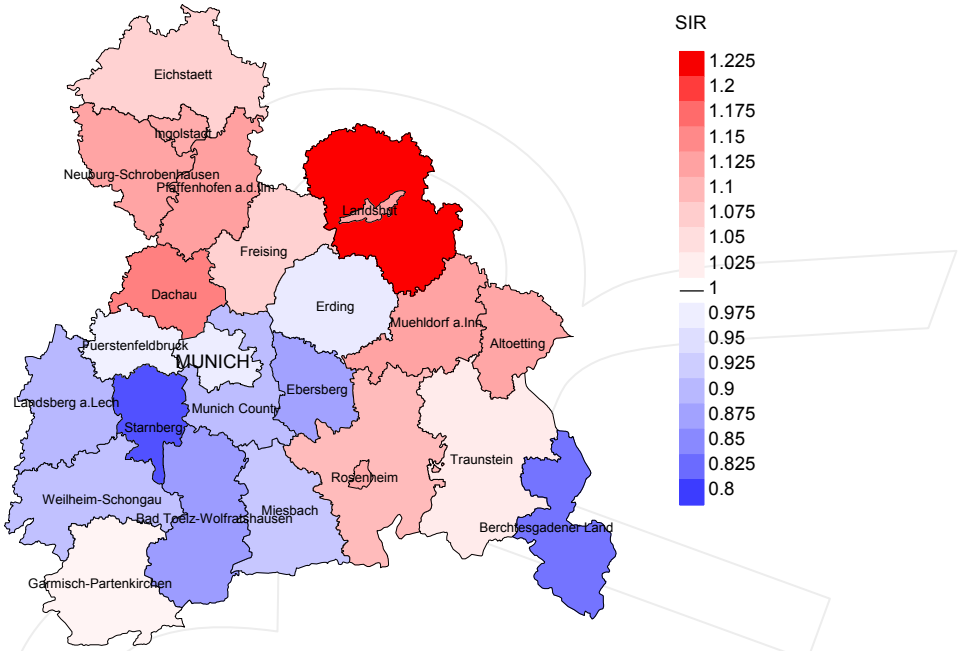


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 37.0/100,000 WS N=11,704, females 23.5/100,000 WS N=9,632).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,928 female residents (averaged) in the period from 2007 to 2013 a total of 195 women were identified with newly diagnosed colorectal cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 19.8/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 16.0 and 24.6/100,000.

Standardized incidence ratio (SIR) 2007 - 2013: Males



Standardized incidence ratio (SIR) 2007 - 2013: Females

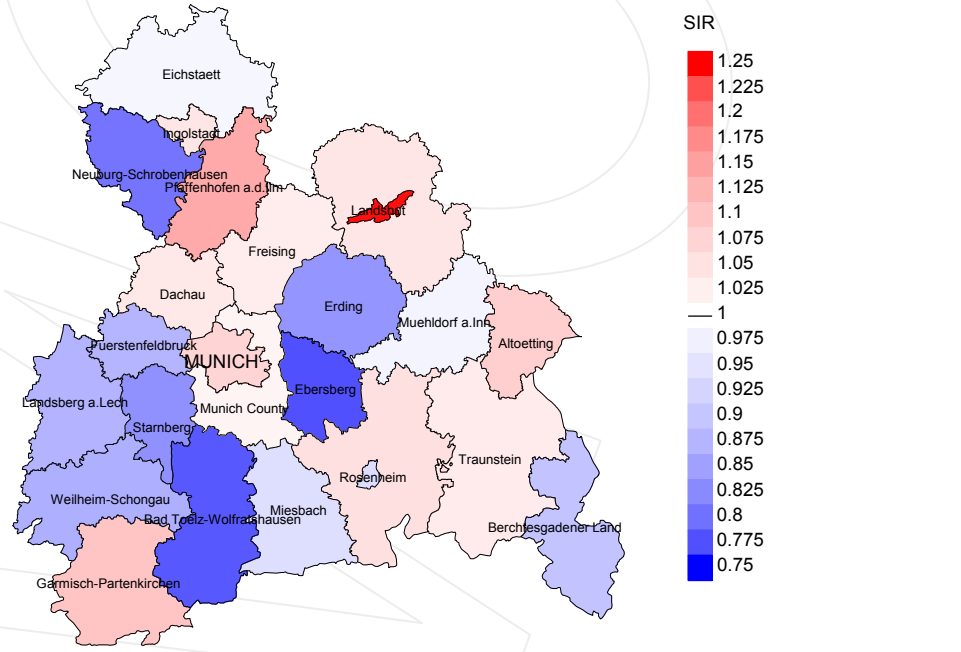


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=11,704, females N=9,632).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,642 female residents (averaged) in the period from 2007 to 2013 a total of 195 women were identified with newly diagnosed colorectal cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.77. Though, the value of this parameter may vary with an underlying probability of 99% between 0.64 and 0.93.

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	1868	98.1	5.2	1351	72.3	93.2
1999	1869	97.9	6.2	1336	71.5	94.3
2000	1728	98.3	5.5	1210	70.0	95.4
2001	1887	97.5	6.4	1230	65.2	96.9
2002	3210	97.9	11.5	2193	68.3	97.4
2003	3222	97.9	9.3	2032	63.1	97.9
2004	3106	97.5	7.8	1940	62.5	97.7
2005	3035	97.0	7.0	1879	61.9	97.5
2006	3129	95.1	5.1	1748	55.9	98.3
2007	3478	85.2	5.8	1907	54.8	97.7
2008	3421	71.1	5.7	1752	51.2	97.9
2009	3377	68.3	5.1	1594	47.2	97.8
2010	3163	66.1	5.8	1384	43.8	97.4
2011	3061	65.7	5.1	1186	38.7	96.9
2012	2974	67.8	5.5	930	31.3	95.6
2013	2292	98.6	6.3	492	21.5	89.8
1998-2013	44820	86.0	6.5	24164	53.9	96.8

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	1868	1054	90.2	301	16.1
1999	1869	1084	90.8	313	16.7
2000	1728	1060	93.6	286	16.6
2001	1887	1138	95.6	294	15.6
2002	3210	1616	98.1	698	21.7
2003	3222	1722	97.9	599	18.6
2004	3106	1741	98.3	557	17.9
2005	3035	1852	96.5	551	18.2
2006	3129	1912	97.5	514	16.4
2007	3478	2027	97.5	581	16.7
2008	3421	2116	98.6	611	17.9
2009	3377	2152	98.7	540	16.0
2010	3163	2249	98.6	543	17.2
2011	3061	2249	98.3	521	17.0
2012	2974	2241	98.6	530	17.8
2013	2292	2086	98.2	376	16.4
1998-2013	44820	28299	97.3	7815	17.4

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	1054	71.7	28.3	87.0
1999	1084	73.2	26.8	86.5
2000	1060	73.8	26.2	86.2
2001	1138	69.2	30.8	84.8
2002	1616	75.6	24.4	87.3
2003	1722	74.0	26.0	86.8
2004	1741	76.2	23.8	86.6
2005	1852	71.9	28.1	82.0
2006	1912	71.5	28.5	82.8
2007	2027	71.6	28.4	83.5
2008	2116	71.8	28.2	82.2
2009	2152	69.5	30.5	80.0
2010	2249	66.8	33.2	79.0
2011	2249	67.2	32.8	78.9
2012	2241	66.3	33.7	78.1
2013	2086	62.1	37.9	73.3
1998-2013	28299	70.3	29.7	82.1

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	513	73.7	71.4	79.4	73.2
1999	534	73.3	71.4	78.4	72.7
2000	550	74.6	72.2	82.3	73.8
2001	548	74.2	71.2	81.1	72.9
2002	828	74.1	72.0	80.3	73.2
2003	883	74.9	72.6	80.7	73.8
2004	892	75.6	74.2	80.9	75.0
2005	960	75.4	73.1	81.3	73.7
2006	1042	76.4	74.3	80.6	75.4
2007	1098	76.0	73.7	80.9	74.6
2008	1178	76.6	74.6	82.1	75.3
2009	1132	76.3	73.6	81.2	74.4
2010	1215	76.5	74.3	81.9	75.4
2011	1230	76.5	73.3	82.5	75.1
2012	1221	77.3	75.4	82.3	76.2
2013	1127	78.9	76.3	83.4	77.1
1998-2013	14951	76.1	73.6	81.6	74.7

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

Table 11b

Medians of age at death according to the grouping in Table 10
FEMALES

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	541	78.6	76.4	84.9	78.4
1999	550	79.9	78.3	86.0	79.7
2000	510	80.5	78.7	86.4	79.6
2001	590	80.9	78.0	86.8	80.1
2002	788	81.0	79.7	86.5	80.7
2003	839	81.3	78.9	86.0	80.3
2004	849	81.3	79.3	85.2	80.2
2005	892	81.8	80.0	85.3	80.7
2006	870	82.0	79.8	86.1	80.6
2007	929	82.0	79.3	86.6	80.4
2008	938	82.6	80.1	86.5	81.0
2009	1020	82.7	79.1	87.4	80.3
2010	1034	83.3	79.9	87.1	81.8
2011	1019	83.4	79.4	88.0	81.2
2012	1020	83.8	79.2	88.4	81.1
2013	959	84.0	79.1	88.4	81.1
1998-2013	13348	82.0	79.2	86.9	80.5

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

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

Table 12a

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

Year of death	Deaths n	Mort. raw	MI-Index raw	Mort. WS	MI-Index WS	Mort. ES	MI-Index ES	Mort. BRD-S	MI-Index BRD-S
1998	367	33.1	0.40	19.3	0.38	30.4	0.40	41.2	0.42
1999	392	35.0	0.42	20.2	0.41	31.7	0.42	44.2	0.45
2000	410	36.0	0.47	20.2	0.45	32.1	0.47	44.1	0.50
2001	392	33.8	0.41	19.1	0.39	29.9	0.41	40.1	0.43
2002	628	33.7	0.38	18.2	0.36	28.5	0.38	38.4	0.39
2003	665	35.5	0.39	18.5	0.37	29.3	0.39	40.5	0.42
2004	687	36.5	0.43	18.1	0.40	29.1	0.42	41.2	0.45
2005	704	37.2	0.45	18.4	0.42	28.8	0.44	40.0	0.47
2006	750	39.2	0.45	19.0	0.42	30.4	0.45	42.3	0.48
2007	809	36.5	0.43	17.1	0.39	27.2	0.42	38.2	0.45
2008	879	39.5	0.48	18.1	0.44	29.0	0.47	40.9	0.51
2009	796	35.7	0.43	16.5	0.40	25.9	0.42	35.4	0.44
2010	835	37.0	0.49	16.3	0.44	25.9	0.46	36.3	0.50
2011	862	37.7	0.53	17.1	0.49	26.6	0.51	36.0	0.53
2012	826	36.2	0.53	15.9	0.48	25.4	0.51	35.1	0.54
2013	729	31.9	0.58	13.6	0.51	22.0	0.55	31.0	0.59
1998-2013	10731	36.1	0.46	17.4	0.42	27.6	0.44	38.2	0.47

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	390	33.2	0.42	12.6	0.37	19.9	0.39	27.6	0.41
1999	403	34.0	0.44	12.1	0.37	19.4	0.39	26.8	0.42
2000	373	31.1	0.44	11.2	0.39	17.8	0.41	23.9	0.42
2001	395	32.5	0.44	11.9	0.37	18.9	0.39	25.9	0.42
2002	594	30.3	0.39	10.2	0.32	16.4	0.34	22.7	0.37
2003	610	31.0	0.40	10.8	0.34	17.2	0.36	23.5	0.38
2004	639	32.3	0.44	10.8	0.35	17.5	0.38	24.4	0.42
2005	627	31.5	0.44	10.4	0.37	16.7	0.39	23.1	0.41
2006	619	30.8	0.44	9.8	0.33	15.9	0.37	22.7	0.40
2007	645	27.9	0.41	9.6	0.35	15.1	0.37	20.8	0.40
2008	642	27.7	0.42	8.9	0.34	14.2	0.37	19.7	0.39
2009	700	30.1	0.47	10.0	0.40	15.8	0.42	21.5	0.44
2010	669	28.6	0.48	9.2	0.41	14.6	0.43	19.7	0.44
2011	652	27.6	0.48	8.7	0.38	13.8	0.40	19.0	0.43
2012	659	27.9	0.49	8.9	0.39	14.2	0.42	19.6	0.45
2013	570	24.2	0.59	7.9	0.47	12.5	0.50	16.9	0.53
1998-2013	9187	29.6	0.45	9.9	0.37	15.7	0.39	21.7	0.42

Table 13

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

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
20-24	4	0.0	0.0	2	0.0	0.0	2	0.0	0.0
25-29	14	0.1	0.1	6	0.1	0.1	8	0.1	0.1
30-34	28	0.1	0.2	17	0.2	0.2	11	0.1	0.2
35-39	66	0.3	0.5	35	0.3	0.5	31	0.3	0.5
40-44	172	0.8	1.4	101	0.9	1.4	71	0.7	1.3
45-49	313	1.5	2.9	158	1.4	2.9	155	1.6	2.9
50-54	627	3.0	5.9	369	3.3	6.2	258	2.7	5.7
55-59	1104	5.3	11.3	695	6.2	12.4	409	4.3	10.0
60-64	1786	8.6	19.9	1177	10.5	22.9	609	6.4	16.4
65-69	2419	11.7	31.6	1602	14.3	37.3	817	8.6	25.0
70-74	3072	14.9	46.5	1896	17.0	54.2	1176	12.4	37.4
75-79	3429	16.6	63.1	1972	17.7	71.9	1457	15.4	52.8
80-84	3479	16.8	80.0	1683	15.1	86.9	1796	19.0	71.8
85+	4136	20.0	100.0	1459	13.1	100.0	2677	28.2	100.0
All ages	20649	100.0		11172	100.0		9477	100.0	

Included in the statistics are 32.2% multiple primaries in males and 26.0% in females.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2013
(**incl. multiple primaries**)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4			0.0		0.0			
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24	2	2	0.1	0.22	0.1	0.07	2.2	3.9
25-29	6	8	0.3	0.16	0.4	0.17	5.6	7.0
30-34	17	11	0.7	0.20	0.5	0.14	9.1	4.8
35-39	35	31	1.4	0.22	1.3	0.22	8.8	6.0
40-44	101	71	3.9	0.28	2.9	0.22	11.8	6.2
45-49	158	155	6.7	0.24	6.7	0.25	8.7	7.7
50-54	369	258	18.3	0.30	12.5	0.27	11.2	8.3
55-59	695	409	37.9	0.32	21.3	0.29	11.8	8.6
60-64	1177	609	66.4	0.36	32.5	0.30	13.2	9.3
65-69	1602	817	101.5	0.40	47.4	0.35	13.4	9.8
70-74	1896	1176	148.0	0.45	77.5	0.42	13.9	11.9
75-79	1972	1457	238.6	0.56	122.7	0.47	15.0	13.6
80-84	1683	1796	336.4	0.67	192.5	0.56	15.5	16.0
85+	1459	2677	427.8	0.82	299.5	0.71	16.4	19.6
All ages	11172	9477					13.9	13.1
Mortality								
Raw			37.6	0.46	30.5	0.46		
WS			18.1	0.43	10.2	0.37		
ES			28.7	0.45	16.2	0.40		
BRD-S			39.8	0.48	22.3	0.42		
PYLL-70								
per 100,000			136.0		88.7			
ES			118.5		75.4			
AYLL-70			8.8		9.9			

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

Table 15a

Multiple primaries in deaths in period 1998-2013
MALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03-C06	Oral cavity	48	1.1	37	77.1	2	4.2	9	18.8
C15	Oesophagus	69	1.6	13	18.8	14	20.3	42	60.9
C16	Stomach	229	5.4	62	27.1	54	23.6	113	49.3
C17	Small intestine	45	1.1	5	11.1	18	40.0	22	48.9
C18	Colon	328	7.7			121	36.9	207	63.1
C19-C20	Rectum	189	4.4			112	59.3	77	40.7
C22	Liver	121	2.8	5	4.1	28	23.1	88	72.7
C25	Pancreas	148	3.5	9	6.1	27	18.2	112	75.7
C32	Larynx	68	1.6	48	70.6	1	1.5	19	27.9
C33-C34	Lung	461	10.8	72	15.6	65	14.1	324	70.3
C43	Malign. melanoma	163	3.8	99	60.7	3	1.8	61	37.4
C44	Skin others	214	5.0	107	50.0	20	9.3	87	40.7
C61	Prostate	939	22.0	530	56.4	78	8.3	331	35.3
C64	Kidney	163	3.8	74	45.4	38	23.3	51	31.3
C67	Bladder	333	7.8	150	45.0	28	8.4	155	46.5
C70-C72	CNS cancer	77	1.8	24	31.2	5	6.5	48	62.3
C76-C79	CUP	48	1.1	9	18.8	9	18.8	30	62.5
C82-C85	NHL	167	3.9	69	41.3	29	17.4	69	41.3
C90	Mult. myeloma	49	1.1	17	34.7	6	12.2	26	53.1
C91-C96	Leukaemia	95	2.2	27	28.4	9	9.5	59	62.1
Other primaries		316	7.4	117	37.0	27	8.5	172	54.4
All mult. primaries		4270	100.0	1474	34.5	694	16.3	2102	49.2

Multiple primaries with number of cases 1 to 38 are pooled in category "Other primaries".

ICD-10 C44 (Other malignant neoplasms of skin) is not systematically recorded by MCR and therefore not considered for evaluation as a particular primary but at least as a multiple malignancy.

Table 15b

Multiple primaries in deaths in period 1998-2013
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C16	Stomach	161	5.1	46	28.6	34	21.1	81	50.3
C18	Colon	218	6.9			68	31.2	150	68.8
C19-C20	Rectum	117	3.7			67	57.3	50	42.7
C22	Liver	35	1.1	2	5.7	9	25.7	24	68.6
C23-C24	Bile	41	1.3	9	22.0	6	14.6	26	63.4
C25	Pancreas	129	4.1	10	7.8	19	14.7	100	77.5
C33-C34	Lung	208	6.6	33	15.9	20	9.6	155	74.5
C43	Malign. melanoma	78	2.5	52	66.7	5	6.4	21	26.9
C44	Skin others	86	2.7	42	48.8	7	8.1	37	43.0
C50	Breast	794	25.0	523	65.9	63	7.9	208	26.2
C51	Vulva	33	1.0	16	48.5	2	6.1	15	45.5
C53	Cervix uteri	124	3.9	94	75.8	10	8.1	20	16.1
C54	Corpus uteri	209	6.6	137	65.6	10	4.8	62	29.7
C56	Ovary	210	6.6	70	33.3	51	24.3	89	42.4
C64	Kidney	69	2.2	34	49.3	13	18.8	22	31.9
C67	Bladder	112	3.5	54	48.2	3	2.7	55	49.1
C70-C72	CNS cancer	60	1.9	24	40.0	9	15.0	27	45.0
C73	Thyroid	32	1.0	17	53.1	3	9.4	12	37.5
C82-C85	NHL	99	3.1	45	45.5	10	10.1	44	44.4
C90	Mult. myeloma	47	1.5	14	29.8	3	6.4	30	63.8
C91-C96	Leukaemia	69	2.2	14	20.3	7	10.1	48	69.6
Other primaries		241	7.6	86	35.7	38	15.8	117	48.5
All mult. primaries		3172	100.0	1322	41.7	457	14.4	1393	43.9

Multiple primaries with number of cases 1 to 28 are pooled in category "Other primaries".

ICD-10 C44 (Other malignant neoplasms of skin) is not systematically recorded by MCR and therefore not considered for evaluation as a particular primary but at least as a multiple malignancy.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2013
(**Singular primaries only** *)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4			0.0		0.0			
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24	2	2	0.1	0.22	0.1	0.07	2.4	4.3
25-29	6	8	0.3	0.19	0.4	0.18	6.1	7.3
30-34	16	11	0.7	0.19	0.5	0.14	8.8	5.5
35-39	31	25	1.2	0.22	1.1	0.19	8.3	5.4
40-44	96	64	3.7	0.28	2.6	0.22	12.2	6.4
45-49	150	140	6.4	0.25	6.1	0.25	9.2	8.1
50-54	324	220	16.0	0.29	10.7	0.26	11.3	8.4
55-59	606	360	33.0	0.31	18.7	0.30	11.9	9.0
60-64	1004	504	56.6	0.35	26.9	0.29	13.4	9.5
65-69	1322	687	83.7	0.41	39.8	0.36	13.7	10.2
70-74	1502	935	117.3	0.46	61.6	0.41	14.0	11.9
75-79	1466	1136	177.4	0.56	95.6	0.46	14.7	13.3
80-84	1245	1397	248.8	0.70	149.8	0.54	15.4	15.7
85+	1077	2138	315.8	0.84	239.2	0.70	16.0	19.4
All ages	8847	7627					13.8	13.0
Mortality								
Raw			29.8	0.46	24.6	0.44		
WS			14.6	0.42	8.3	0.36		
ES			22.9	0.45	13.2	0.39		
BRD-S			31.2	0.48	18.0	0.41		
PYLL-70								
per 100,000			119.7		77.0			
ES			104.4		65.5			
AYLL-70			9.0		10.1			

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2013
(**Single primaries only** *)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4			0.0		0.0			
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24	2	2	0.1	0.22	0.1	0.07	2.5	4.5
25-29	6	8	0.3	0.20	0.4	0.18	6.5	7.8
30-34	16	10	0.7	0.20	0.5	0.14	9.1	5.5
35-39	30	23	1.2	0.22	1.0	0.17	8.4	5.4
40-44	93	62	3.5	0.28	2.5	0.22	12.4	6.8
45-49	144	132	6.1	0.25	5.7	0.25	9.4	8.5
50-54	307	211	15.2	0.29	10.3	0.27	11.8	9.0
55-59	554	332	30.2	0.32	17.3	0.30	12.0	9.3
60-64	893	447	50.4	0.35	23.8	0.29	13.6	9.6
65-69	1147	594	72.7	0.40	34.4	0.34	13.7	10.4
70-74	1224	804	95.6	0.43	53.0	0.39	13.7	12.2
75-79	1175	985	142.2	0.52	82.9	0.44	14.7	13.7
80-84	947	1187	189.3	0.59	127.2	0.49	14.8	16.0
85+	810	1843	237.5	0.68	206.2	0.63	15.0	19.5
All ages	7348	6640					13.6	13.2
Mortality								
Raw			24.7	0.42	21.4	0.42		
WS			12.4	0.40	7.4	0.35		
ES			19.1	0.41	11.6	0.37		
BRD-S			25.7	0.44	15.8	0.39		
PYLL-70								
per 100,000			110.5		71.3			
ES			96.5		60.9			
AYLL-70			9.3		10.4			

* See corresponding tables with multiple primaries.

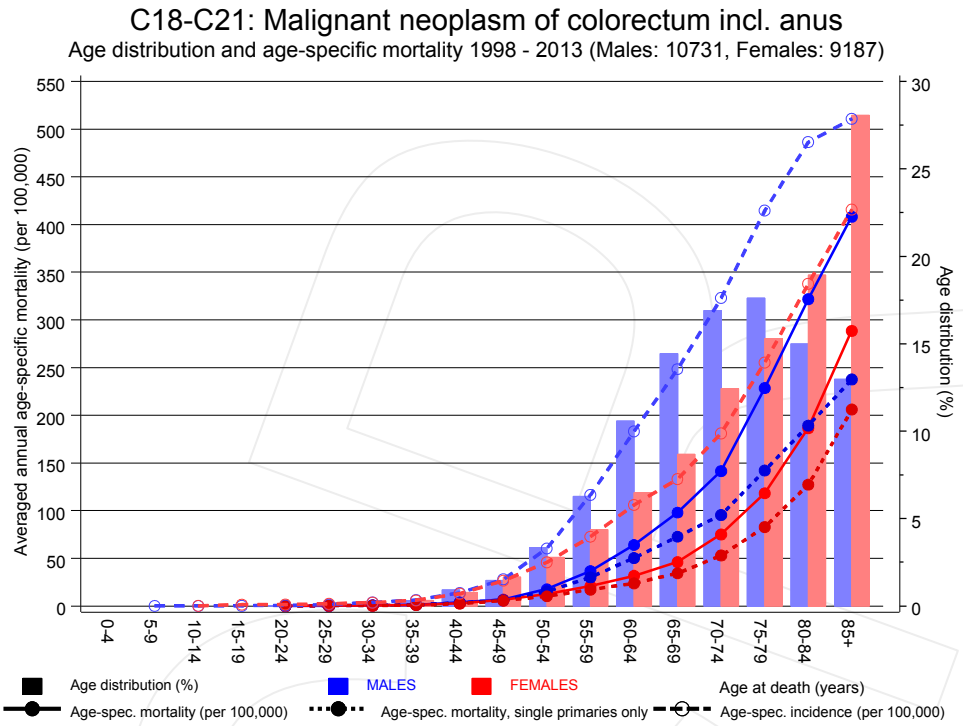
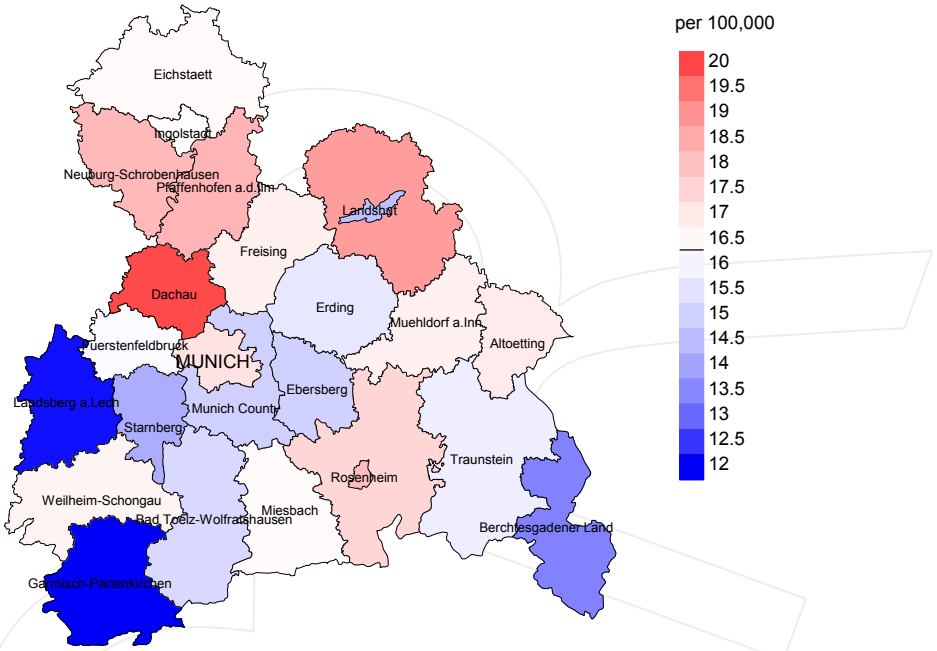


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

Average mortality (world standard population) 2007 - 2013: Males



Average mortality (world standard population) 2007 - 2013: Females

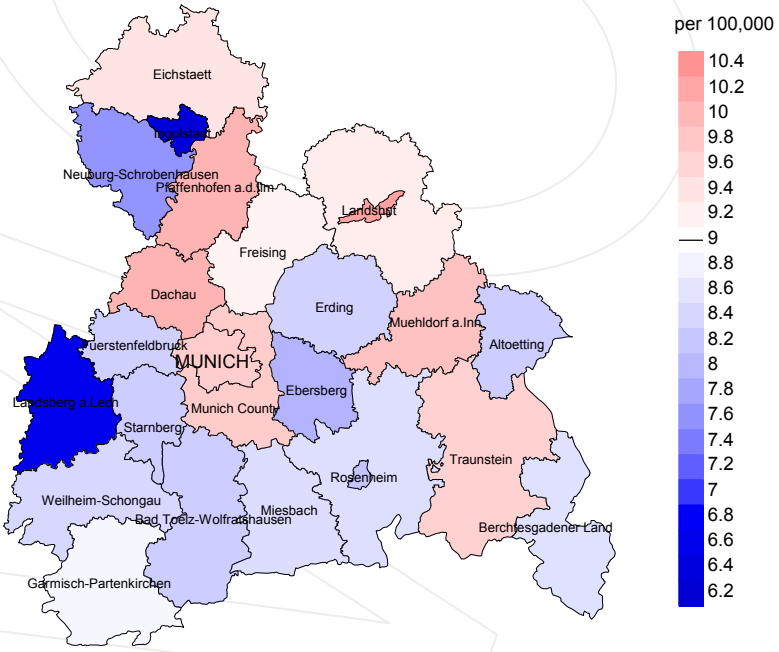
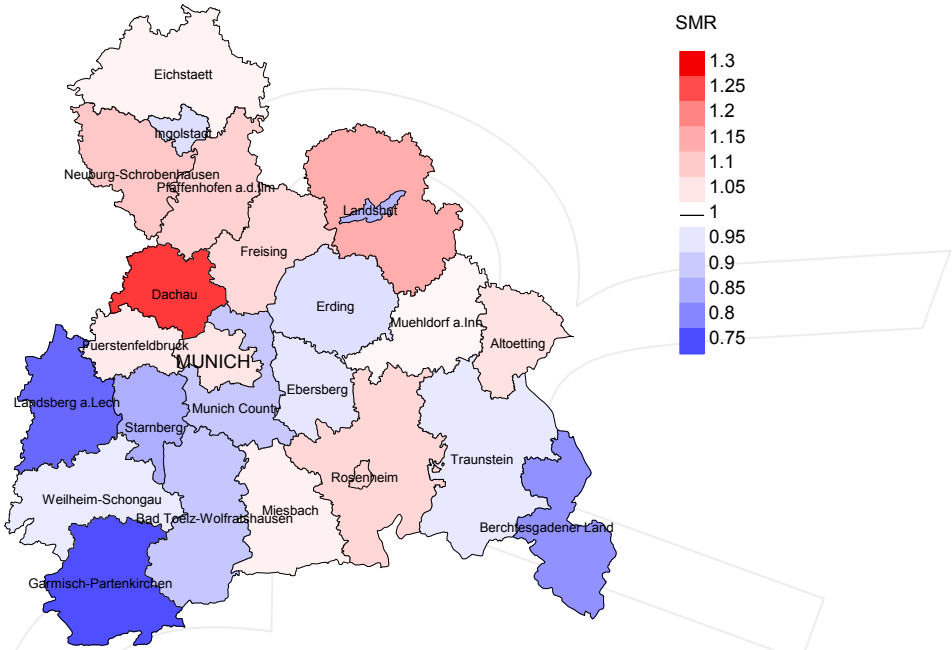


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2013. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 16.3/100,000 WS N=5,687, females 9.0/100,000 WS N=4,494).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,928 female residents (averaged) in the period from 2007 to 2013 a total of 97 women died from colorectal cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 7.9/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 5.7 and 11.1/100,000.

Standardized mortality ratio (SMR) 2007 - 2013: Males



Standardized mortality ratio (SMR) 2007 - 2013: Females

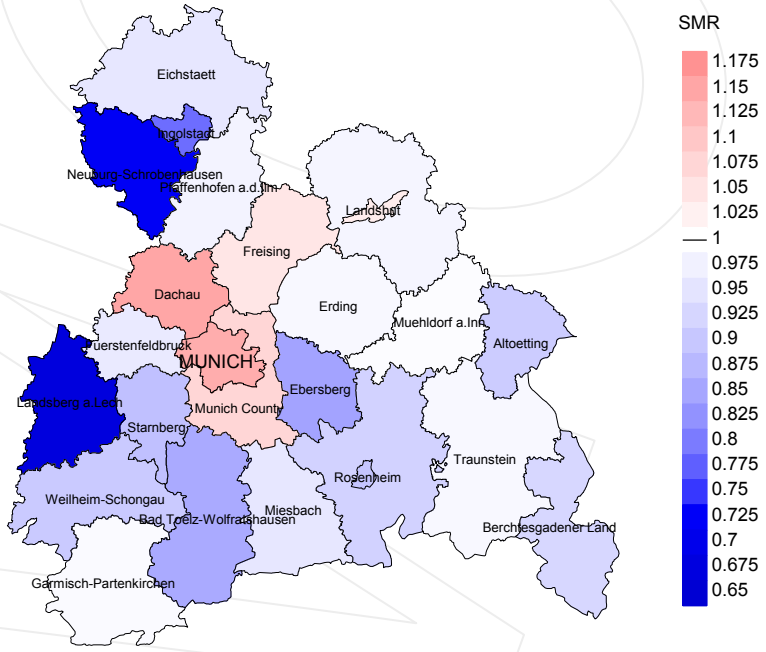


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=5,687, females N=4,494).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,642 female residents (averaged) in the period from 2007 to 2013 a total of 97 women died from colorectal cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.85. Though, the value of this parameter may vary with an underlying probability of 99% between 0.64 and 1.09, and is therefore not statistically striking.

Statistical Notes

In all tables and figures the respective reference values should be carefully considered. The incidence rates include diagnoses (with multiple primary), and death certificate only (DCO) cases. For mortality statistics patients, diagnoses and progressive course of disease are presented. In the calculations, all courses of disease are considered whereby progressions occurred and/or death certificate identified progressive cancers were ascertained. Additionally there are three groups of disease course to consider:

1. **All multiple primaries included**

   The mortality statistic describes the tumor-specific death, independent of any malignancy. The patient perspective, induced secondary malignancies, and the problem of multiple malignancies from the same primary tumor all have reasons for their inclusion.

2. **First singular primary** (no information about other prior or synchronous malignancy)

   The mortality statistic describes the cancer-related death for patients who have no therapeutic restrictions due to a previous or synchronous cancer. These statistics are comparable to studies that have exclusion criteria based on a second malignancy.

3. **Single primary** (no information about other prior, syn- or metachronous malignancy)

   The mortality statistic describes the tumor-specific death that occurs without any impact through secondary primaries, earlier, synchronous, later or induced. Precisely the difference between disease group 1 and 2 highlight the magnitude of the problem of secondary malignancies.

For this reason differences appear concerning official mono-causal mortality statistics. To judge the maximum deviation, 2 further tables are presented. In the first table the distribution of secondary malignancies before, at or after the described cancer are shown, that could be an alternative cause of death. In the second table, the age-specific mortality rates for all courses of disease, without designation of secondary malignancies are shown.

A previously minimally acknowledged statistic is the **age at death**, which allows for a good assessment of the quality of classification of the apparent tumor-specific death. For assumed tumor-independent deaths, the age of death should be estimated from the age of diagnosis and the normal life expectancy, whereas tumor-dependent deaths can be estimated from the age of diagnosis plus the average tumor-specific life expectancy. The comparison of different tumors demonstrates this association, if the causes of cancer and the competing cause of death are independent of each other (e.g. breast and colon versus head/neck and lung).

The index from mortality and incidence (Mortality-Incidence ratio, **MI-index**) is a statistic that allows for the evaluation of the quality of data. For diseases with poor prognoses, comparable values are obtained from all age groups, because to a large extent, the numerator and denominator contain the same cases. For tumors with a good prognosis, increasing and decreasing incidence and age-specific differences in prognosis can more strongly alter the MI- index. Additionally, attention should be paid to the confidence intervals where fewer cases are reported.

The complexity of problems identified here emphasizes the importance of relative survival data for the appropriate analysis of long term results.

As a measurement of the burden of disease, the number of potential life years loss due to premature deaths in a cohort can be calculated (**PYLL**, potential years of life lost, standardized per 100,000 persons or per European standard) as well as the average loss of life years per individual (**AYLL**, average years of life lost). Depending upon the analytic aim (health economy, prevention, health care research) different methods exist for the generation of these measurements. In the results presented here, the age for a premature death is considered to be before 70 years, according to the guidelines of the OECD and the WHO (as seen in the abbreviation PYLL-70 or AYLL-70).

Shortcuts

FRG	Federal Republic of Germany
GEKID	Association of Population-based Cancer Registries in Germany (Gesellschaft der epidemiologischen Krebsregister in Deutschland e.V.)
MCR	Munich Cancer Registry (Tumorregister München)
SEER	Surveillance, Epidemiology, and End Results (USA)
AYLL-70	Average years of life lost prior to age 70 given a person dies before that age
BRD-S	German standard population
DCO	Death certificate only
EAR	Excess absolute risk = excess cancer cases (O - E) per 10,000 person-years
ES	European standard population (old)
LCL	Lower confidence limit
MI-index	Ratio between mortality and incidence
PYLL-70	Potential years of life lost prior to age 70 given a person dies before that age
SIR	Standardized incidence ratio
SMR	Standardized mortality ratio
UCL	Upper confidence limit
WS	World standard population

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