Munich Cancer Registry

- Survival
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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	1998-2011
Patients	37654
Diseases	38535
Creation date	04/02/2013
Export date	01/03/2013
Population	4.5 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 4.5 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, April 2013

[#] 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 2011 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 used for specifying cancer site

ICD-10	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	1857	98	5.3	23.5	69.9	98.0
1999	1867	115	6.2	23.1	68.6	97.9
2000	1729	96	5.6	25.2	66.8	98.1
2001	1885	121	6.4	25.5	62.1	97.4
2002	3207	367	11.4	24.0	64.8	97.8
2003	3209	298	9.3	24.0	59.5	97.7
2004	3100	243	7.8	24.1	59.6	97.4
2005	3008	212	7.0	26.4	58.2	96.9
2006	3071	158	5.1	25.9	51.7	94.8
2007	3426	203	5.9	23.3	49.4	83.0 ##
2008	3362	196	5.8	24.5	45.3	68.8
2009	3283	175	5.3	24.5	39.9	69.2
2010	3002	181	6.0	23.6	33.8	91.4
2011	2529	146	5.8	21.6	22.2	73.2 ###
1998-2011	38535	2609	6.8	24.2	52.4	89.1

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	1857	929	928	50.0
1999	1867	951	916	50.9
2000	1729	880	849	50.9
2001	1885	976	909	51.8
2002	3207	1685	1522	52.5
2003	3209	1698	1511	52.9
2004	3100	1637	1463	52.8
2005	3008	1577	1431	52.4
2006	3071	1671	1400	54.4
2007	3426	1866	1560	54.5
2008	3362	1849	1513	55.0
2009	3283	1830	1453	55.7
2010	3002	1660	1342	55.3
2011	2529	1383	1146	54.7
1998-2011	38535	20592	17943	53.4

Table 2

Incidence measures by year of diagnosis and gender including DCO cases
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002,
and from 3.96 to 4.52 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	929	928	83.8	78.9	50.4	33.8	75.7	50.9	98.6	66.5
1999	951	916	85.0	77.2	50.3	32.8	76.1	49.4	99.6	64.4
2000	880	849	77.3	70.7	45.2	29.2	68.5	44.4	88.6	58.1
2001	976	909	84.2	74.7	49.3	32.1	73.8	48.2	94.4	62.6
2002	1685	1522	90.4	77.7	50.5	31.7	76.2	48.0	99.7	62.5
2003	1698	1511	90.6	76.7	49.8	31.6	75.1	47.5	97.5	61.4
2004	1637	1463	87.0	74.0	46.5	30.9	70.2	46.0	91.7	59.2
2005	1577	1431	83.3	71.9	44.3	28.2	66.4	42.7	86.2	56.1
2006	1671	1400	87.3	69.7	45.8	28.6	68.5	42.7	88.7	55.4
2007	1866	1560	84.2	67.6	43.8	27.1	65.4	40.6	85.0	52.6
2008	1849	1513	83.1	65.2	41.7	25.6	62.9	38.6	82.0	50.1
2009	1830	1453	82.0	62.5	40.6	24.6	60.9	36.9	79.5	48.2
2010	1660	1342	73.7	57.3	36.3	22.0	54.3	33.2	70.7	43.6
2011	1383	1146	61.4	49.0	30.2	19.7	45.2	29.3	58.5	37.3
1998-2011	20592	17943	81.9	68.2	43.3	27.6	65.1	41.5	84.5	53.9

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)
(incl. DCO)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	1857	69.9	12.5	13.2	102	53.8	60.8	71.0	78.7	86.1
1999	1867	70.3	12.6	24.9	102	54.2	61.7	71.1	79.4	86.4
2000	1729	70.4	12.1	24.7	103	54.6	61.5	71.3	79.2	86.7
2001	1885	69.9	12.5	28.3	103	54.0	61.5	70.2	79.3	86.5
2002	3207	70.9	12.1	17.7	104	55.2	62.6	71.8	80.0	86.7
2003	3209	70.9	12.0	23.5	101	55.6	63.0	71.4	79.9	86.1
2004	3100	70.6	12.3	13.8	101	55.0	62.8	71.0	79.9	85.4
2005	3008	71.3	12.3	15.1	99.9	55.3	63.7	71.8	80.4	86.1
2006	3071	70.5	12.2	17.9	102	54.5	63.2	70.9	79.7	85.3
2007	3426	70.7	12.5	15.8	103	54.2	63.8	71.3	80.2	85.9
2008	3362	71.4	12.3	18.9	105	55.2	64.1	72.0	80.4	86.5
2009	3283	71.1	12.3	15.9	102	54.4	63.7	71.9	80.1	85.9
2010	3002	71.3	12.6	14.9	101	54.1	63.5	72.3	80.8	86.2
2011	2529	70.8	12.8	17.1	101	53.4	62.9	71.8	80.4	86.6
1998-2011	38535	70.8	12.4	13.2	105	54.5	62.9	71.5	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	929	67.7	11.8	31.4	98.1	53.5	59.4	68.1	75.9	83.9
1999	951	68.2	11.6	24.9	95.5	54.2	60.2	69.0	76.6	83.3
2000	880	68.2	11.0	34.4	95.9	54.1	60.3	68.0	76.6	83.1
2001	976	68.2	11.4	31.3	102	54.1	61.0	67.9	75.9	83.4
2002	1685	69.1	11.0	20.9	98.5	55.2	61.8	69.5	76.6	82.5
2003	1698	69.2	11.1	25.7	99.4	55.3	62.5	69.5	76.5	82.7
2004	1637	69.3	11.1	27.8	101	55.4	62.4	69.2	77.1	83.4
2005	1577	69.2	11.3	19.0	99.6	54.5	62.6	69.5	77.1	83.6
2006	1671	69.1	11.2	17.9	102	54.6	62.6	69.3	77.3	82.9
2007	1866	69.1	11.7	15.8	99.4	54.2	62.8	69.6	77.6	83.0
2008	1849	69.9	11.2	19.3	105	55.0	63.4	70.4	77.8	83.4
2009	1830	69.6	11.4	20.7	102	53.9	63.1	70.9	77.8	83.0
2010	1660	69.7	11.7	21.1	98.9	53.7	62.3	70.8	78.1	83.9
2011	1383	69.6	11.7	26.3	97.3	53.7	62.8	70.8	77.7	84.1
1998-2011	20592	69.1	11.4	15.8	105	54.4	62.1	69.7	77.2	83.3

Table 3b

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	928	72.0	12.8	13.2	102	54.4	63.1	74.0	81.5	87.4
1999	916	72.4	13.2	26.9	102	54.2	63.5	74.5	82.1	88.0
2000	849	72.7	12.8	24.7	103	55.7	62.9	74.7	81.7	88.3
2001	909	71.7	13.3	28.3	103	53.9	62.2	74.2	81.2	88.4
2002	1522	73.0	13.0	17.7	104	55.2	63.6	74.9	82.1	88.8
2003	1511	72.8	12.6	23.5	101	56.0	63.8	74.3	82.3	88.5
2004	1463	72.0	13.4	13.8	100	54.4	63.7	73.7	82.7	87.8
2005	1431	73.6	12.8	15.1	99.9	56.9	65.3	75.4	83.2	89.3
2006	1400	72.2	13.1	21.2	98.7	54.2	64.0	74.1	82.3	86.8
2007	1560	72.7	13.1	17.8	103	54.1	64.9	74.3	82.8	87.5
2008	1513	73.3	13.2	18.9	102	55.4	65.2	74.3	83.6	88.5
2009	1453	73.0	13.2	15.9	102	54.7	64.9	74.7	83.1	88.2
2010	1342	73.3	13.3	14.9	101	54.7	65.3	75.1	83.2	88.6
2011	1146	72.4	13.8	17.1	101	53.2	63.1	73.6	83.6	88.5
1998-2011	17943	72.7	13.1	13.2	104	54.7	64.1	74.5	82.7	88.2

Table 4

Age distribution by 5-year age group and gender for period 1998-2011 (incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
10-14	3	0.0	0.0			0.0	3	0.0	0.0
15-19	15	0.0	0.0	4	0.0	0.0	11	0.1	0.1
20-24	24	0.1	0.1	8	0.0	0.1	16	0.1	0.2
25-29	64	0.2	0.3	28	0.1	0.2	36	0.2	0.4
30-34	139	0.4	0.6	75	0.4	0.6	64	0.4	0.7
35-39	262	0.7	1.3	146	0.7	1.3	116	0.6	1.4
40-44	582	1.5	2.8	309	1.5	2.8	273	1.5	2.9
45-49	1079	2.8	5.6	572	2.8	5.5	507	2.8	5.7
50-54	1881	4.9	10.5	1069	5.2	10.7	812	4.5	10.2
55-59	3076	8.0	18.5	1867	9.1	19.8	1209	6.7	17.0
60-64	4713	12.2	30.7	2916	14.2	34.0	1797	10.0	27.0
65-69	5563	14.4	45.2	3513	17.1	51.0	2050	11.4	38.4
70-74	5931	15.4	60.5	3577	17.4	68.4	2354	13.1	51.5
75-79	5595	14.5	75.1	2947	14.3	82.7	2648	14.8	66.3
80-84	4898	12.7	87.8	2081	10.1	92.8	2817	15.7	82.0
85+	4710	12.2	100.0	1480	7.2	100.0	3230	18.0	100.0
All ages	38535	100.0		20592	100.0		17943	100.0	

Included in the statistics are 29.7% multiple primaries in males and 24.5% in females.

Table 5

Age-specific incidence, DCO rate and proportion of all cancers
for period 1998-2011

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=1019 %	Females DCO rate n=1580 %	Males Prop.all cancers n=132509 %	Females Prop.all cancers n=129521 %
0- 4			0.0	0.0				
5- 9			0.0	0.0				
10-14		3	0.0	0.2				2.0
15-19	4	11	0.3	0.9			1.4	4.6
20-24	8	16	0.5	1.1	12.5		1.6	3.7
25-29	26	36	1.5	2.1			3.2	3.9
30-34	75	63	3.9	3.3			5.8	3.6
35-39	143	115	6.6	5.6		0.9	7.2	3.5
40-44	307	273	13.8	12.9	0.7	0.4	11.1	5.2
45-49	567	504	29.2	26.3	0.9	1.4	12.6	7.0
50-54	1055	806	63.2	47.0	1.9	0.9	14.5	8.7
55-59	1843	1198	118.1	73.1	1.6	1.4	14.8	10.2
60-64	2882	1775	189.4	110.7	1.9	1.9	15.3	11.9
65-69	3445	2031	252.8	136.4	2.6	2.5	14.7	12.5
70-74	3499	2323	339.3	188.2	3.8	4.5	16.1	15.4
75-79	2891	2614	427.8	262.9	6.0	6.9	17.2	17.8
80-84	2031	2781	500.0	349.8	9.0	10.6	18.4	20.6
85+	1456	3195	524.9	430.2	22.5	27.6	17.6	22.0
All ages	20232	17744			5.0	8.9	15.3	13.7
Incidence								
Raw			80.5	67.4				
WS			42.6	27.3				
ES			64.0	41.0				
BRD-S			83.0	53.3				

The age-specific incidence characterizes the disease risk in a particular age group. The age distribution depends on the patient population frequency in each age group and reflects the tangible clinical picture of everyday patients care (see following chart).

Table 6a

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries for period 1998-2011
MALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C00	Lip	3	1.1	2.8	0.6	8.1		0.4	
C03-C06	Oral cavity	7	7.3	1.0	0.4	2.0		-0.1	
C07-C08	Salivary gland	3	2.1	1.4	0.3	4.1		0.2	
C09-C10	Oropharynx	12	9.0	1.3	0.7	2.3		0.6	
C12-C13	Hypopharynx	7	5.0	1.4	0.6	2.9		0.4	14.3
C15	Oesophagus	33	16.0	2.1	1.4	2.9	#	3.3	15.2
C16	Stomach	94	43.4	2.2	1.8	2.7	#	9.9	7.4
C17	Small intestine	33	4.2	7.9	5.4	11.1	#	5.6	3.0
C18	Colon	279	101.2	2.8	2.4	3.1	#	34.7	1.4
C19-C20	Rectum	133	54.4	2.4	2.0	2.9	#	15.3	2.3
C21	Anus/canal	3	1.7	1.7	0.4	5.1		0.2	
C22	Liver	57	26.1	2.2	1.7	2.8	#	6.0	22.8
C23-C24	Bile	20	9.4	2.1	1.3	3.3	#	2.1	
C25	Pancreas	67	34.3	2.0	1.5	2.5	#	6.4	26.9
C32	Larynx	14	9.6	1.5	0.8	2.5		0.9	7.1
C33-C34	Lung	201	115.1	1.7	1.5	2.0	#	16.8	12.4
C38,C45	Mesothelioma	7	6.2	1.1	0.5	2.3		0.2	
C43	Malign. melanoma	63	34.4	1.8	1.4	2.3	#	5.6	1.6
C46,C49	Soft tissue	10	5.0	2.0	1.0	3.7		1.0	
C50	Breast	4	2.4	1.7	0.5	4.3		0.3	
C60	Penis	4	2.1	1.9	0.5	4.8		0.4	
C61	Prostate	438	288.3	1.5	1.4	1.7	#	29.2	5.7
C62	Testis	7	1.9	3.7	1.5	7.7	#	1.0	14.3
C64	Kidney	87	32.9	2.6	2.1	3.3	#	10.6	6.9
C65	Renal pelvis	10	3.9	2.6	1.2	4.7	#	1.2	
C66	Ureter	10	2.1	4.7	2.2	8.6	#	1.5	
C67	Bladder	74	44.0	1.7	1.3	2.1	#	5.8	8.1
C68	Urinary org.	3	0.5	6.1	1.3	18.0	#	0.5	66.7
C70-C72	CNS cancer	28	12.4	2.3	1.5	3.3	#	3.0	25.0
C73	Thyroid	9	5.6	1.6	0.7	3.1		0.7	22.2
C76-C79	CUP	21	16.9	1.2	0.8	1.9		0.8	4.8
C81	Hodgkin lymphoma	2	1.6	1.2	0.1	4.4		0.1	
C82-C85	NHL	69	38.0	1.8	1.4	2.3	#	6.0	4.3
C90	Mult. myeloma	19	12.4	1.5	0.9	2.4		1.3	21.1
C91-C96	Leukaemia	29	15.4	1.9	1.3	2.7	#	2.6	37.9
Other primaries		4	5.1	0.8	0.2	2.0		-0.2	
Not observed		0	6.0	0.0	0.0	0.6	#	-1.2	
All mult. primaries		1864	977.2	1.9	1.8	2.0	#	173.0	7.9

Patients	14586
Mean age at second malignancy (years)	72.8
Person-years	51260
Mean observation time (years)	3.5
Median observation time (years)	2.7

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 1998-2011
FEMALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C09-C10	Oropharynx	6	2.0	3.0	1.1	6.4	#	0.9	
C15	Oesophagus	6	3.0	2.0	0.7	4.3		0.7	
C16	Stomach	55	25.9	2.1	1.6	2.8	#	6.4	21.8
C17	Small intestine	22	2.4	9.2	5.8	14.0	#	4.3	4.5
C18	Colon	182	68.8	2.6	2.3	3.1	#	24.9	2.7
C19-C20	Rectum	71	28.4	2.5	2.0	3.2	#	9.4	2.8
C21	Anus/canal	6	3.1	2.0	0.7	4.3		0.6	
C22	Liver	20	7.2	2.8	1.7	4.3	#	2.8	45.0
C23-C24	Bile	14	10.1	1.4	0.8	2.3		0.8	28.6
C25	Pancreas	51	28.4	1.8	1.3	2.4	#	5.0	19.6
C33-C34	Lung	90	38.9	2.3	1.9	2.8	#	11.2	13.3
C43	Malign. melanoma	36	18.3	2.0	1.4	2.7	#	3.9	2.8
C46,C49	Soft tissue	6	3.3	1.8	0.7	4.0		0.6	
C48	Peritoneal	3	1.6	1.8	0.4	5.3		0.3	33.3
C50	Breast	265	164.5	1.6	1.4	1.8	#	22.1	4.5
C51	Vulva	16	6.3	2.6	1.5	4.1	#	2.1	6.3
C52	Vagina	4	1.3	3.1	0.9	8.0		0.6	25.0
C53	Cervix uteri	14	7.2	1.9	1.1	3.2	#	1.5	14.3
C54	Corpus uteri	64	31.2	2.1	1.6	2.6	#	7.2	1.6
C55,C57	Fem. genitals un	4	2.1	1.9	0.5	5.0		0.4	25.0
C56	Ovary	73	25.0	2.9	2.3	3.7	#	10.6	26.0
C64	Kidney	45	15.1	3.0	2.2	4.0	#	6.6	13.3
C65	Renal pelvis	7	1.8	3.8	1.5	7.9	#	1.1	
C67	Bladder	26	12.8	2.0	1.3	3.0	#	2.9	19.2
C70-C72	CNS cancer	11	8.3	1.3	0.7	2.4		0.6	63.6
C73	Thyroid	14	8.4	1.7	0.9	2.8		1.2	7.1
C74-C80	Cancer others	3	3.6	0.8	0.2	2.4		-0.1	66.7
C76-C79	CUP	7	12.0	0.6	0.2	1.2		-1.1	
C82-C85	NHL	38	23.5	1.6	1.1	2.2	#	3.2	18.4
C90	Mult. myeloma	11	7.8	1.4	0.7	2.5		0.7	27.3
C91-C96	Leukaemia	24	9.8	2.5	1.6	3.6	#	3.1	45.8
Other primaries		21	11.8	1.8	1.1	2.7	#	2.0	4.8
Not observed		0	2.5	0.0	0.0	1.5		-0.6	
All mult. primaries		1215	596.5	2.0	1.9	2.2	#	136.2	11.3

Patients	12893
Mean age at second malignancy (years)	74.7
Person-years	45397
Mean observation time (years)	3.5
Median observation time (years)	2.6

The occurrence of second malignancy is statistically significant.

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

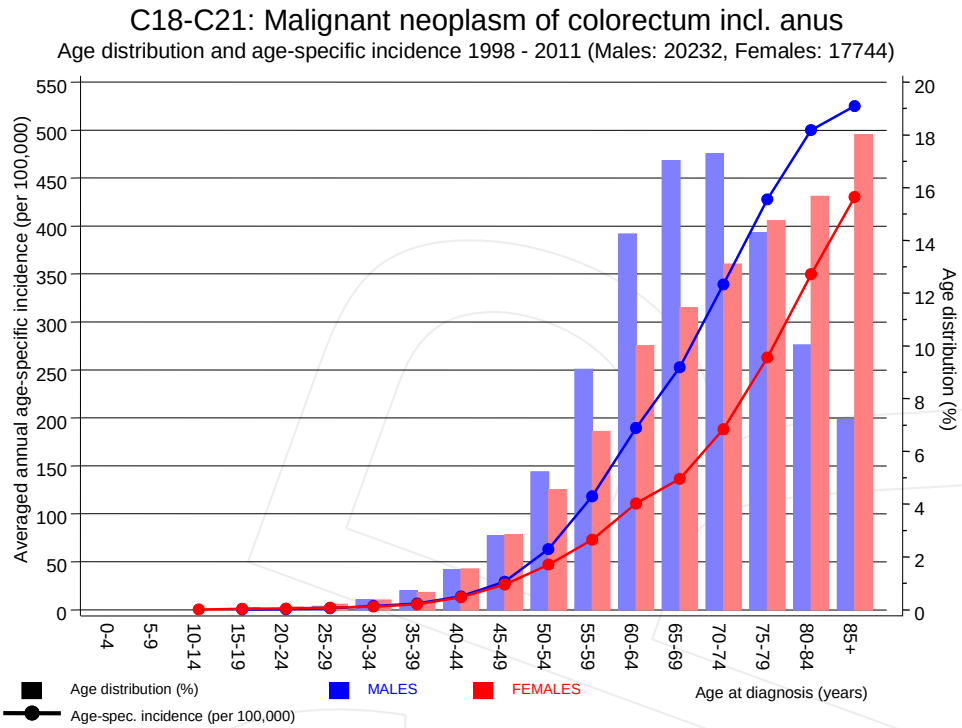


Figure 7. Age distribution and age-specific incidence

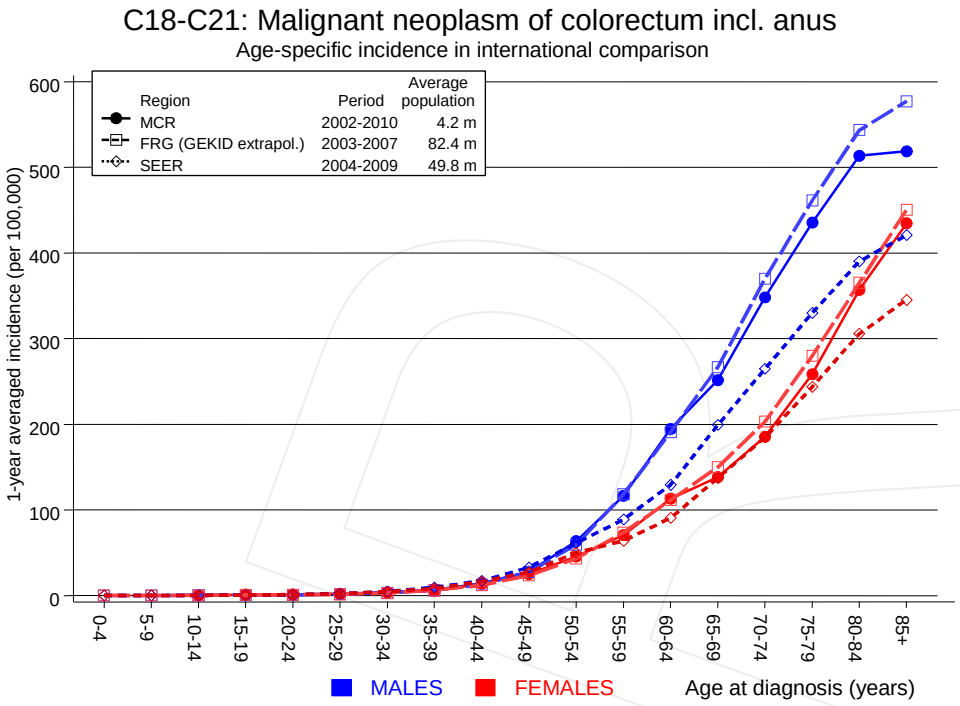


Figure 7a. Age-specific incidence in MCR registry areas compared to Germany (FRG, GEKID extrapolation) and SEER (Surveillance, Epidemiology, and End Results, USA).

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, 2011. http://www.gekid.de. Last access: 05/12/2011

Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 18 Regs Research Data, released April 2012, based on the November 2011 submission. http://www.seer.cancer.gov.

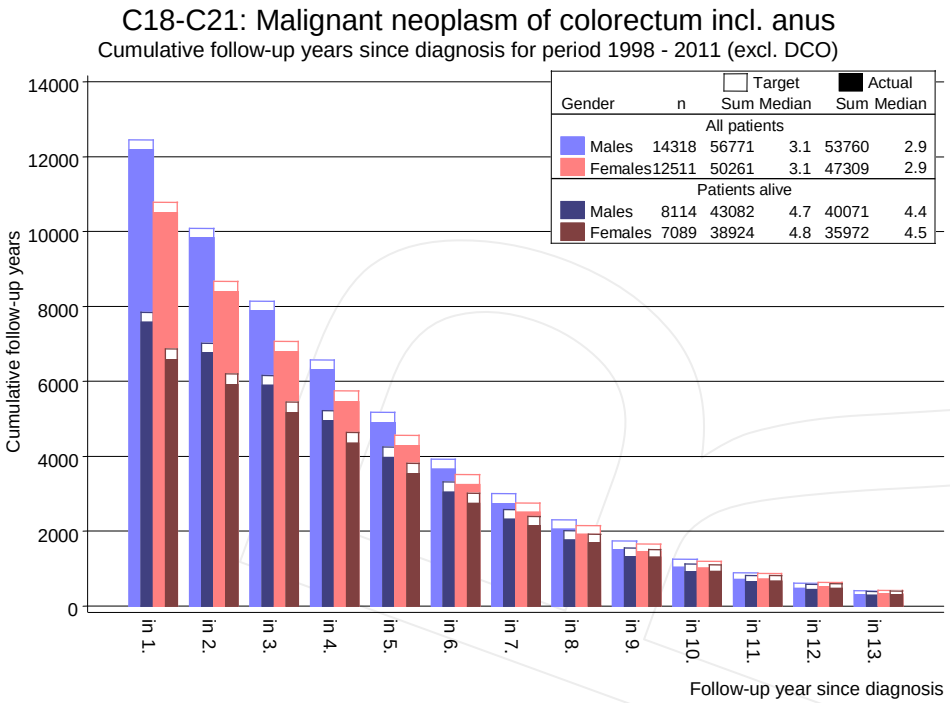
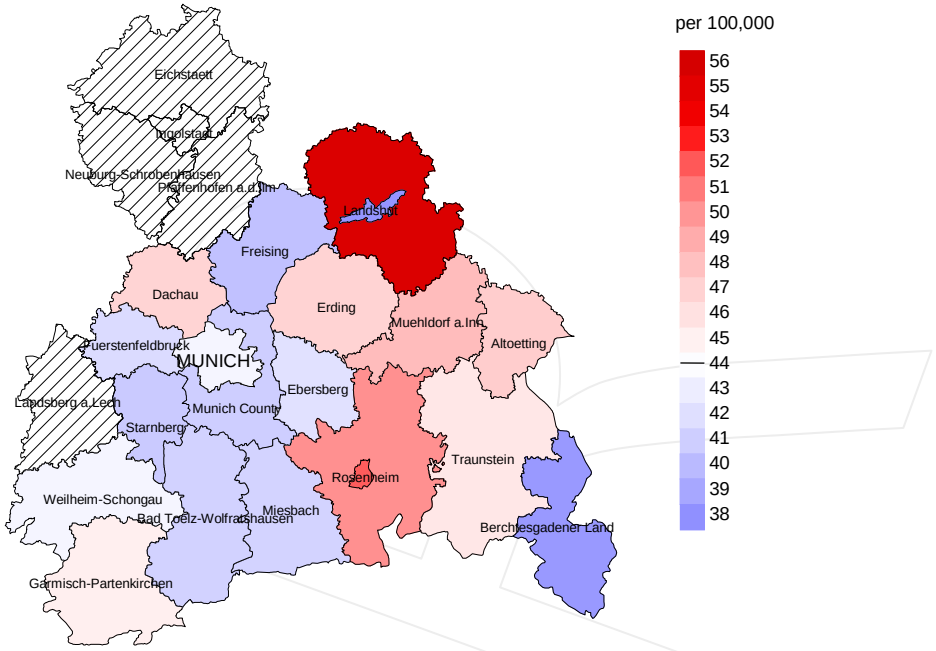


Figure 8. Cumulative follow-up years depending on time since diagnosis

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) 2003 - 2008: Males



Average incidence (world standard population) 2003 - 2008: Females

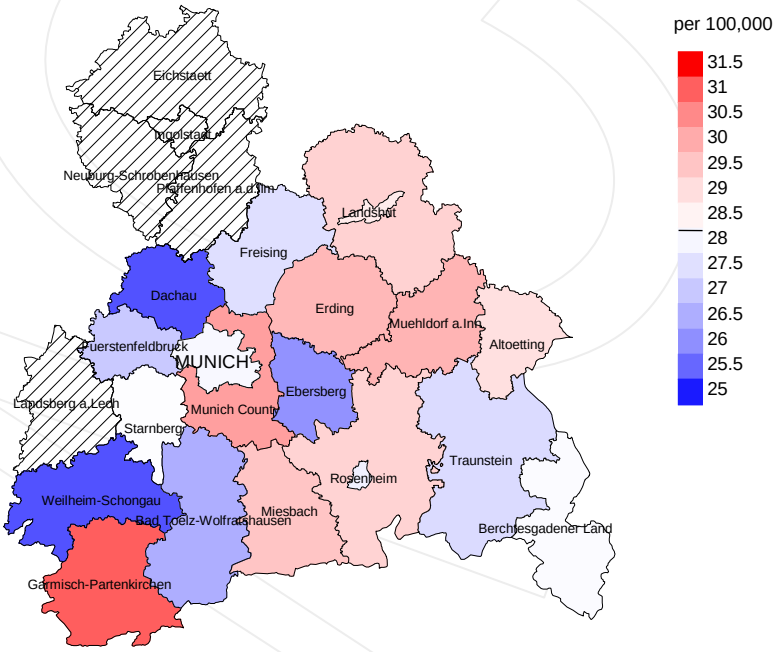
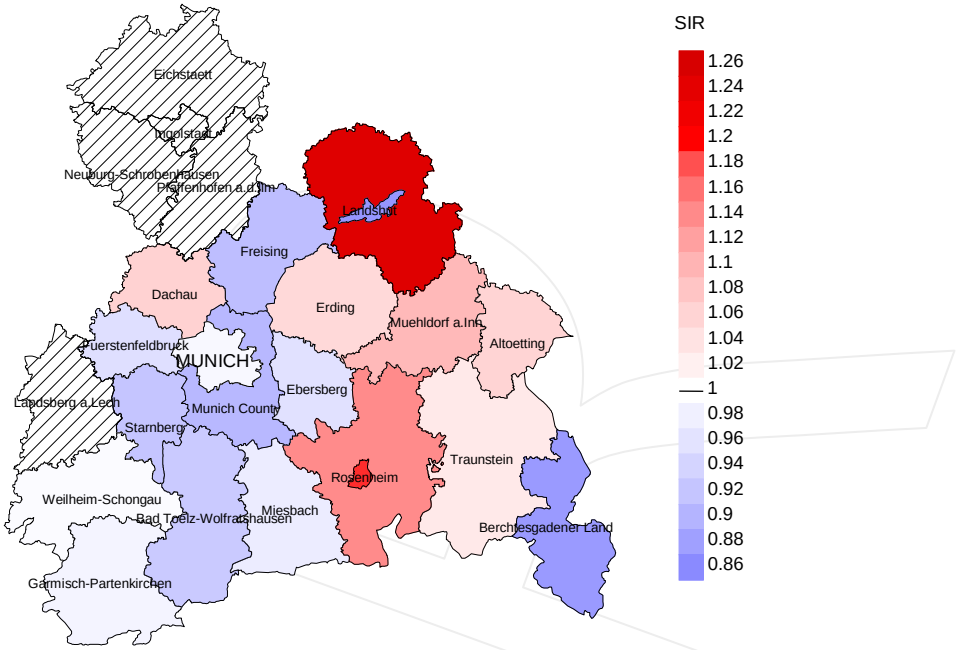


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 44.1/100,000 WS N=9,624, females 28.2/100,000 WS N=8,389). Since cancer data are not available in some counties until 2007, the local incidence rates were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 211 women were identified with newly diagnosed colorectal cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 26.0/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 21.2 and 32.0/100,000.

Standardized incidence ratio (SIR) 2003 - 2008: Males



Standardized incidence ratio (SIR) 2003 - 2008: Females

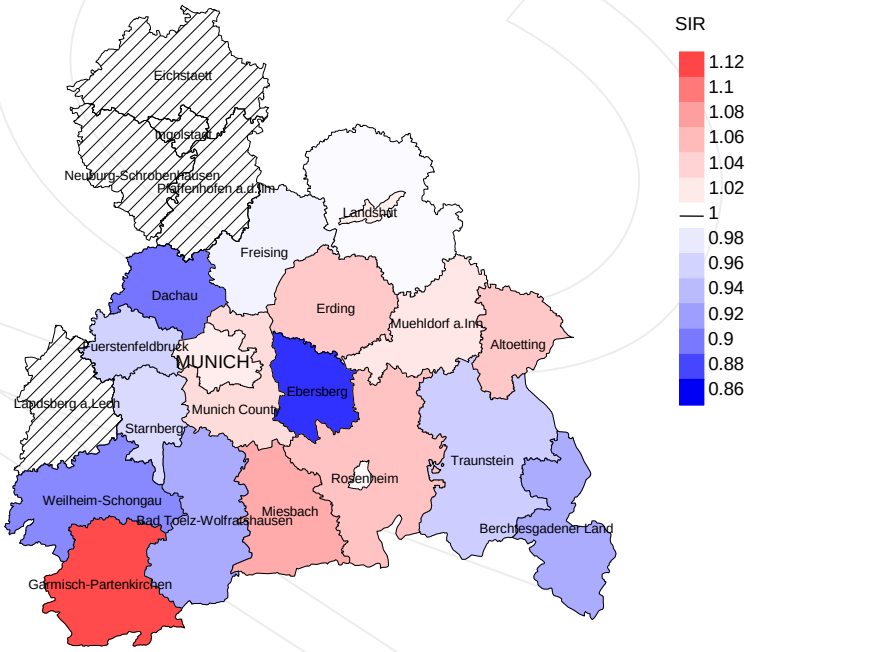


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=9,624, females N=8,389). Since cancer data are not available in some counties until 2007, the local SIR values were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 211 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 0.87. Though, the value of this parameter may vary with an underlying probability of 99% between 0.73 and 1.04, 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 4.52 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	1857	98.0	5.3	1298	69.9	93.3
1999	1867	97.9	6.2	1281	68.6	94.5
2000	1729	98.1	5.6	1155	66.8	96.2
2001	1885	97.4	6.4	1170	62.1	97.2
2002	3207	97.8	11.4	2077	64.8	97.5
2003	3209	97.7	9.3	1908	59.5	98.0
2004	3100	97.4	7.8	1847	59.6	97.9
2005	3008	96.9	7.0	1750	58.2	98.1
2006	3071	94.8	5.1	1589	51.7	99.1
2007	3426	83.0	5.9	1694	49.4	98.5
2008	3362	68.8	5.8	1523	45.3	98.4
2009	3283	69.2	5.3	1310	39.9	98.5
2010	3002	91.4	6.0	1016	33.8	97.5
2011	2529	73.2	5.8	561	22.2	97.5
1998-2011	38535	89.1	6.8	20179	52.4	97.4

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 4.52 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	1857	1055	90.2	301	16.2
1999	1867	1084	90.9	313	16.8
2000	1729	1060	93.6	286	16.5
2001	1885	1139	95.6	294	15.6
2002	3207	1619	98.1	700	21.8
2003	3209	1724	97.9	599	18.7
2004	3100	1741	98.3	556	17.9
2005	3008	1854	96.5	551	18.3
2006	3071	1913	97.6	515	16.8
2007	3426	2022	97.6	580	16.9
2008	3362	2117	98.7	612	18.2
2009	3283	2151	98.7	542	16.5
2010	3002	2244	98.7	540	18.0
2011	2529	2064	98.5	390	15.4
1998-2011	38535	23787	97.1	6779	17.6

Table 10c

Annual cohorts of deaths, proportion of cancer-related and not 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 4.52 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer-related %	Prop. not cancer-related %	Prop. cancer recorded on death certificate %
1998	1055	71.8	28.2	87.0
1999	1084	73.3	26.7	86.5
2000	1060	73.8	26.2	86.2
2001	1139	69.2	30.8	84.8
2002	1619	75.7	24.3	87.3
2003	1724	74.0	26.0	86.8
2004	1741	76.1	23.9	86.6
2005	1854	71.8	28.2	81.9
2006	1913	71.5	28.5	82.8
2007	2022	71.7	28.3	83.5
2008	2117	71.8	28.2	82.1
2009	2151	69.5	30.5	80.0
2010	2244	66.7	33.3	78.9
2011	2064	66.4	33.6	77.9
1998-2011	23787	71.4	28.6	83.1

Table 11a

Means 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 (not cancer-related) Years	Age at death (according to death certificate) Years
1998	513	73.3	71.5	77.8	72.9
1999	533	72.9	71.3	77.4	72.4
2000	550	73.9	71.6	80.8	73.0
2001	549	73.3	70.9	79.3	72.3
2002	829	73.4	71.4	79.7	72.5
2003	884	73.6	71.6	79.6	72.7
2004	893	74.9	73.3	80.2	74.2
2005	961	74.2	72.0	80.3	72.7
2006	1042	75.0	72.9	80.5	73.7
2007	1094	75.2	73.5	80.0	74.3
2008	1178	75.3	73.4	80.8	74.1
2009	1130	75.0	73.1	79.5	73.9
2010	1211	75.6	73.4	80.5	74.5
2011	1129	75.3	72.6	81.4	73.9
1998-2011	12496	74.6	72.5	80.0	73.5

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

Means 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 (not cancer-related) Years	Age at death (according to death certificate) Years
1998	542	77.2	74.9	83.2	77.3
1999	551	78.2	76.1	84.0	78.2
2000	510	78.4	76.4	83.9	77.6
2001	590	79.0	75.9	85.3	77.8
2002	790	79.3	77.6	84.8	78.7
2003	840	79.0	76.7	85.0	77.8
2004	848	78.9	76.9	84.7	77.7
2005	893	79.5	77.4	84.7	78.3
2006	871	79.9	77.7	85.3	78.7
2007	928	79.3	76.6	85.4	77.7
2008	939	80.1	77.5	85.9	78.7
2009	1021	79.7	76.8	86.2	77.9
2010	1033	80.2	77.0	86.1	78.4
2011	935	80.8	77.2	87.1	78.6
1998-2011	11291	79.4	76.9	85.4	78.1

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	0.39	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	393	33.9	0.41	19.2	0.39	30.0	0.41	40.1	0.43
2002	630	33.8	0.38	18.3	0.37	28.6	0.38	38.5	0.39
2003	666	35.5	0.40	18.6	0.38	29.3	0.39	40.5	0.42
2004	687	36.5	0.43	18.1	0.40	29.1	0.42	41.2	0.46
2005	705	37.2	0.46	18.4	0.43	28.8	0.44	40.0	0.48
2006	749	39.1	0.46	19.0	0.42	30.4	0.45	42.3	0.49
2007	807	36.4	0.44	17.0	0.40	27.1	0.42	38.1	0.46
2008	880	39.5	0.49	18.1	0.45	29.0	0.47	40.9	0.51
2009	795	35.6	0.44	16.4	0.41	25.9	0.43	35.4	0.45
2010	832	36.9	0.51	16.2	0.46	25.7	0.49	36.2	0.53
2011	781	34.7	0.57	15.9	0.54	24.9	0.56	33.5	0.58
1998-2011	9094	36.2	0.45	17.8	0.42	28.2	0.44	39.0	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	391	33.2	0.42	12.6	0.38	19.9	0.39	27.6	0.42
1999	404	34.0	0.44	12.1	0.37	19.4	0.40	26.8	0.42
2000	373	31.1	0.44	11.2	0.39	17.8	0.40	23.9	0.42
2001	395	32.5	0.44	11.9	0.37	18.9	0.39	25.9	0.42
2002	596	30.4	0.39	10.2	0.32	16.4	0.35	22.8	0.37
2003	611	31.0	0.41	10.8	0.34	17.3	0.37	23.6	0.39
2004	638	32.3	0.44	10.8	0.36	17.4	0.38	24.3	0.42
2005	627	31.5	0.44	10.4	0.37	16.7	0.40	23.1	0.42
2006	621	30.9	0.45	9.8	0.35	16.0	0.38	22.7	0.41
2007	645	27.9	0.42	9.6	0.36	15.1	0.38	20.8	0.40
2008	641	27.6	0.43	8.9	0.35	14.2	0.37	19.7	0.40
2009	700	30.1	0.49	10.0	0.41	15.8	0.43	21.5	0.45
2010	667	28.5	0.50	9.2	0.42	14.5	0.44	19.7	0.46
2011	593	25.3	0.52	8.2	0.42	12.9	0.45	17.6	0.48
1998-2011	7902	30.0	0.45	10.1	0.37	16.1	0.39	22.2	0.42

Table 13

Age distribution of age at death (cancer-related) for period 1998-2011
(**incl. multiple primaries**)

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
20-24	3	0.0	0.0	2	0.0	0.0	1	0.0	0.0
25-29	12	0.1	0.1	5	0.1	0.1	7	0.1	0.1
30-34	23	0.1	0.2	14	0.1	0.2	9	0.1	0.2
35-39	62	0.4	0.6	32	0.3	0.6	30	0.4	0.6
40-44	160	0.9	1.5	94	1.0	1.6	66	0.8	1.4
45-49	276	1.6	3.0	139	1.5	3.0	137	1.7	3.1
50-54	543	3.1	6.1	317	3.4	6.4	226	2.8	5.8
55-59	947	5.4	11.5	602	6.4	12.8	345	4.2	10.1
60-64	1534	8.7	20.2	1020	10.8	23.6	514	6.3	16.4
65-69	2117	12.0	32.3	1403	14.9	38.4	714	8.8	25.1
70-74	2624	14.9	47.2	1618	17.1	55.5	1006	12.3	37.5
75-79	2903	16.5	63.7	1643	17.4	72.9	1260	15.5	52.9
80-84	2958	16.8	80.5	1388	14.7	87.6	1570	19.3	72.2
85+	3432	19.5	100.0	1167	12.4	100.0	2265	27.8	100.0
All ages	17594	100.0		9444	100.0		8150	100.0	

Included in the statistics are 29.7% multiple primaries in males and 24.5% in females.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2011
(**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	1	0.1	0.25	0.1	0.06	2.5	2.3
25-29	5	7	0.3	0.18	0.4	0.19	5.7	6.9
30-34	14	9	0.7	0.19	0.5	0.14	8.3	4.4
35-39	32	30	1.5	0.22	1.5	0.26	8.8	6.6
40-44	94	66	4.2	0.30	3.1	0.24	12.4	6.6
45-49	139	137	7.2	0.24	7.2	0.27	9.0	7.9
50-54	317	226	19.0	0.30	13.2	0.28	11.2	8.6
55-59	602	345	38.6	0.32	21.1	0.29	11.7	8.5
60-64	1020	514	67.0	0.35	32.1	0.29	13.2	9.2
65-69	1403	714	102.9	0.40	48.0	0.35	13.5	10.1
70-74	1618	1006	156.9	0.45	81.5	0.43	14.6	12.5
75-79	1643	1260	243.1	0.56	126.7	0.48	15.1	14.0
80-84	1388	1570	341.7	0.67	197.5	0.56	15.8	16.4
85+	1167	2265	420.7	0.79	305.0	0.70	16.4	19.9
All ages	9444	8150					14.1	13.4
Mortality								
Raw			37.6	0.46	31.0	0.45		
WS			18.5	0.43	10.4	0.38		
ES			29.3	0.45	16.6	0.40		
BRD-S			40.5	0.48	22.9	0.43		
PYLL-70								
per 100,000			139.9		90.7			
ES			122.1		77.4			
AYLL-70			8.8		10.0			

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

Table 15a

Multiple primaries in deaths in period 1998-2011
MALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03-C06	Oral cavity	36	1.1	28	77.8	2	5.6	6	16.7
C15	Oesophagus	55	1.6	8	14.5	13	23.6	34	61.8
C16	Stomach	188	5.5	56	29.8	42	22.3	90	47.9
C17	Small intestine	30	0.9	2	6.7	12	40.0	16	53.3
C18	Colon	263	7.7			90	34.2	173	65.8
C19-C20	Rectum	147	4.3			88	59.9	59	40.1
C22	Liver	104	3.0	5	4.8	24	23.1	75	72.1
C25	Pancreas	128	3.7	10	7.8	23	18.0	95	74.2
C32	Larynx	52	1.5	38	73.1	1	1.9	13	25.0
C33-C34	Lung	390	11.4	64	16.4	53	13.6	273	70.0
C43	Malign. melanoma	123	3.6	71	57.7	2	1.6	50	40.7
C44	Skin others	150	4.4	76	50.7	17	11.3	57	38.0
C61	Prostate	747	21.8	406	54.4	67	9.0	274	36.7
C64	Kidney	135	3.9	61	45.2	31	23.0	43	31.9
C67	Bladder	258	7.5	119	46.1	23	8.9	116	45.0
C70-C72	CNS cancer	67	2.0	20	29.9	5	7.5	42	62.7
C76-C79	CUP	37	1.1	6	16.2	8	21.6	23	62.2
C82-C85	NHL	140	4.1	58	41.4	24	17.1	58	41.4
C90	Mult. myeloma	33	1.0	11	33.3	4	12.1	18	54.5
C91-C96	Leukaemia	77	2.3	20	26.0	9	11.7	48	62.3
Other primaries		261	7.6	98	37.5	22	8.4	141	54.0
All mult. primaries		3421	100.0	1157	33.8	560	16.4	1704	49.8

Multiple primaries with number of cases n<30 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 1998-2011
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C16	Stomach	140	5.3	42	30.0	27	19.3	71	50.7
C18	Colon	185	7.0			50	27.0	135	73.0
C19-C20	Rectum	98	3.7			54	55.1	44	44.9
C22	Liver	32	1.2	2	6.3	8	25.0	22	68.8
C23-C24	Bile	33	1.3	9	27.3	4	12.1	20	60.6
C25	Pancreas	107	4.1	8	7.5	16	15.0	83	77.6
C33-C34	Lung	161	6.1	27	16.8	13	8.1	121	75.2
C43	Malign. melanoma	67	2.5	44	65.7	5	7.5	18	26.9
C44	Skin others	61	2.3	30	49.2	7	11.5	24	39.3
C50	Breast	661	25.1	437	66.1	50	7.6	174	26.3
C51	Vulva	27	1.0	14	51.9	2	7.4	11	40.7
C53	Cervix uteri	108	4.1	84	77.8	9	8.3	15	13.9
C54	Corpus uteri	174	6.6	114	65.5	10	5.7	50	28.7
C56	Ovary	185	7.0	61	33.0	47	25.4	77	41.6
C64	Kidney	57	2.2	29	50.9	9	15.8	19	33.3
C67	Bladder	91	3.5	46	50.5	2	2.2	43	47.3
C70-C72	CNS cancer	49	1.9	20	40.8	7	14.3	22	44.9
C73	Thyroid	27	1.0	13	48.1	3	11.1	11	40.7
C76-C79	CUP	22	0.8	7	31.8	4	18.2	11	50.0
C82-C85	NHL	74	2.8	29	39.2	8	10.8	37	50.0
C90	Mult. myeloma	37	1.4	8	21.6	3	8.1	26	70.3
C91-C96	Leukaemia	57	2.2	9	15.8	6	10.5	42	73.7
Other primaries		181	6.9	67	37.0	31	17.1	83	45.9
All mult. primaries		2634	100.0	1100	41.8	375	14.2	1159	44.0

Multiple primaries with number of cases n<20 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 1998-2011
(**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	1	0.1	0.25	0.1	0.06	2.7	2.6
25-29	5	7	0.3	0.21	0.4	0.21	6.2	7.3
30-34	13	9	0.7	0.18	0.5	0.15	7.9	5.0
35-39	28	24	1.3	0.21	1.2	0.22	8.2	5.8
40-44	88	59	3.9	0.30	2.8	0.23	12.6	6.8
45-49	130	126	6.7	0.25	6.6	0.27	9.3	8.3
50-54	281	193	16.8	0.29	11.3	0.27	11.3	8.7
55-59	535	304	34.3	0.32	18.6	0.29	12.0	8.8
60-64	881	428	57.9	0.35	26.7	0.28	13.5	9.3
65-69	1166	599	85.6	0.41	40.2	0.35	13.8	10.4
70-74	1301	807	126.1	0.46	65.4	0.42	14.8	12.6
75-79	1239	989	183.4	0.56	99.5	0.47	14.8	13.7
80-84	1038	1229	255.5	0.68	154.6	0.54	15.6	16.1
85+	875	1825	315.5	0.80	245.7	0.68	15.9	19.8
All ages	7582	6600					14.0	13.3
Mortality								
Raw			30.2	0.45	25.1	0.44		
WS			15.1	0.42	8.6	0.37		
ES			23.6	0.44	13.6	0.39		
BRD-S			32.2	0.47	18.6	0.41		
PYLL-70								
per 100,000			123.9		78.9			
ES			108.3		67.5			
AYLL-70			9.0		10.2			

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2011
(**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	1	0.1	0.25	0.1	0.06	2.9	2.8
25-29	5	7	0.3	0.23	0.4	0.21	6.7	7.8
30-34	13	8	0.7	0.19	0.4	0.14	8.2	4.9
35-39	26	22	1.2	0.20	1.1	0.21	8.0	5.8
40-44	85	57	3.8	0.30	2.7	0.24	12.8	7.1
45-49	123	120	6.3	0.25	6.3	0.27	9.4	8.8
50-54	266	184	15.9	0.29	10.7	0.27	11.7	9.2
55-59	494	282	31.7	0.32	17.2	0.29	12.1	9.1
60-64	781	383	51.3	0.34	23.9	0.27	13.6	9.6
65-69	1006	517	73.8	0.39	34.7	0.33	13.8	10.6
70-74	1070	704	103.7	0.43	57.0	0.39	14.4	12.9
75-79	998	860	147.7	0.51	86.5	0.44	14.6	14.1
80-84	797	1048	196.2	0.58	131.8	0.49	14.9	16.3
85+	670	1572	241.5	0.66	211.7	0.61	14.9	19.7
All ages	6336	5765					13.7	13.4
Mortality								
Raw			25.2	0.42	21.9	0.41		
WS			12.8	0.39	7.6	0.35		
ES			19.8	0.41	12.0	0.37		
BRD-S			26.6	0.43	16.3	0.39		
PYLL-70								
per 100,000			114.1		73.3			
ES			100.0		62.9			
AYLL-70			9.3		10.5			

* See corresponding tables with multiple primaries.

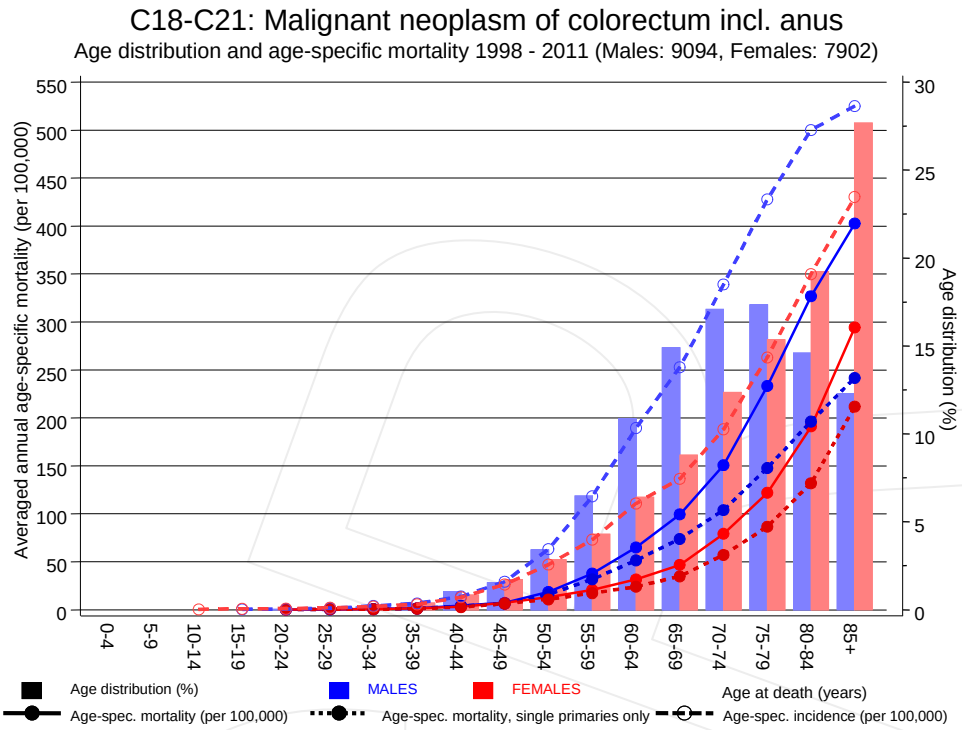
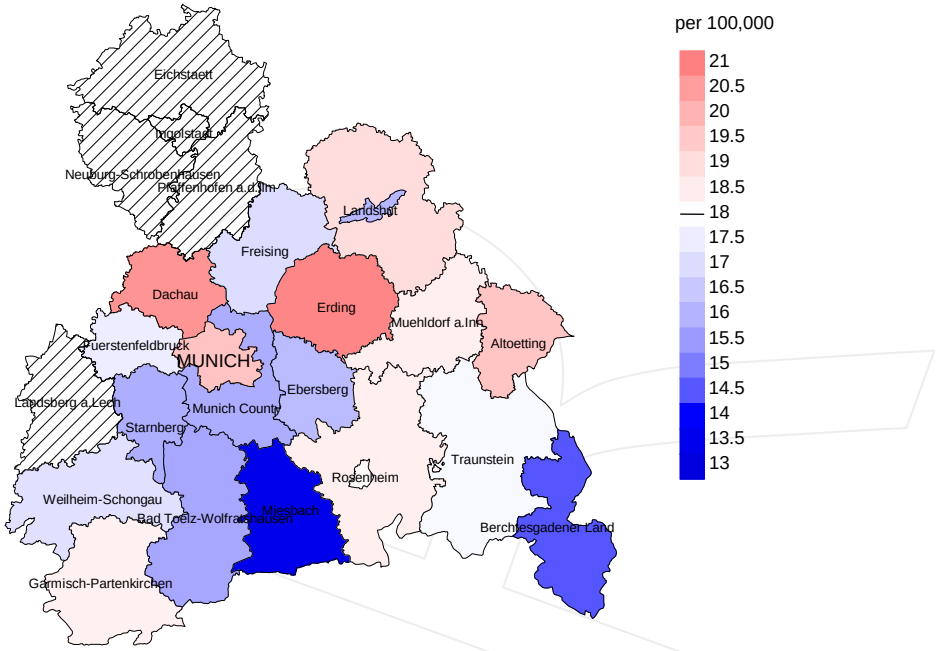


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

Average mortality (world standard population) 2003 - 2008: Males



Average mortality (world standard population) 2003 - 2008: Females

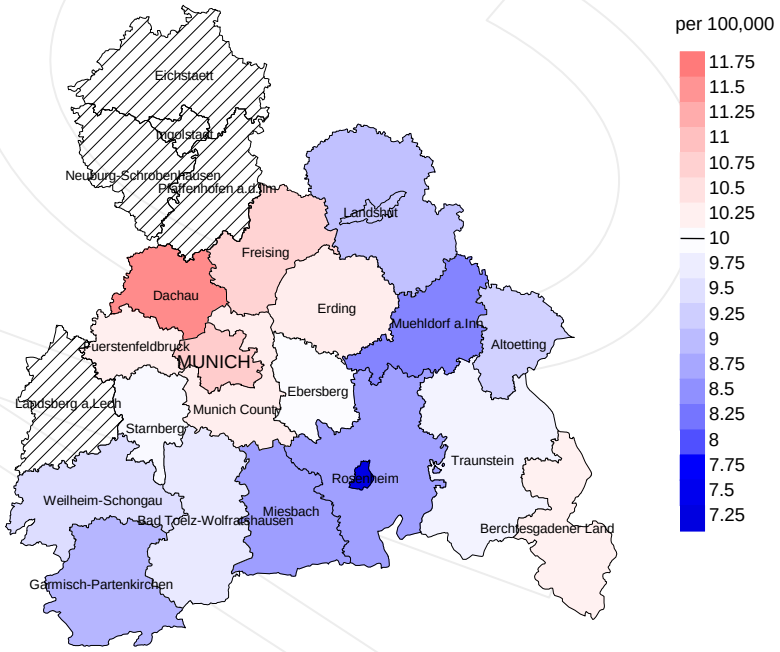
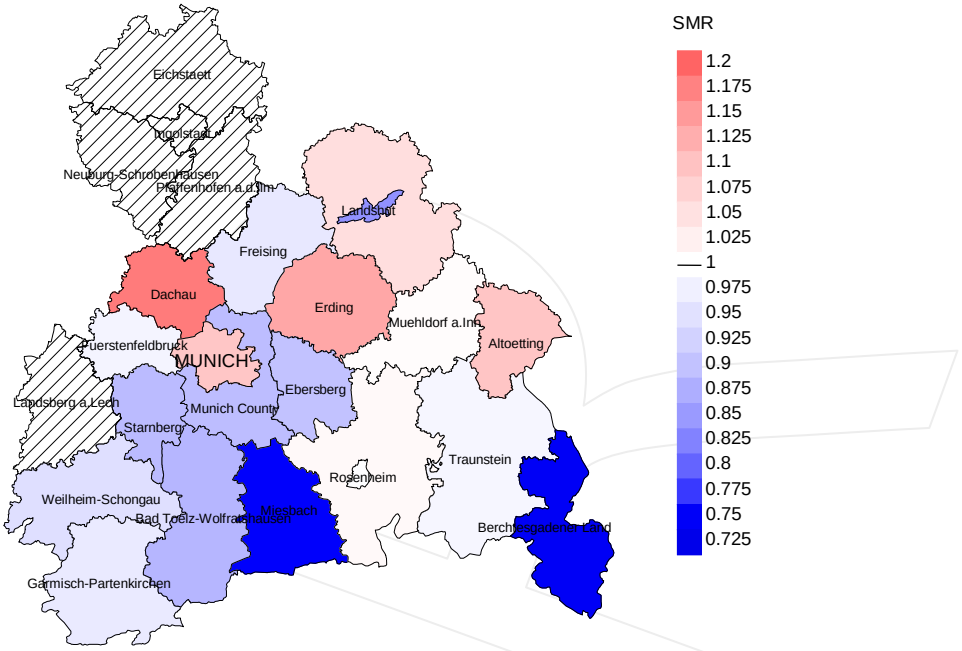


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 18.0/100,000 WS N=4,277, females 10.0/100,000 WS N=3,632). Since cancer data are not available in some counties until 2007, the local mortality rates were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 103 women died from colorectal cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 10.0/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 7.3 and 13.7/100,000.

Standardized mortality ratio (SMR) 2003 - 2008: Males



Standardized mortality ratio (SMR) 2003 - 2008: Females

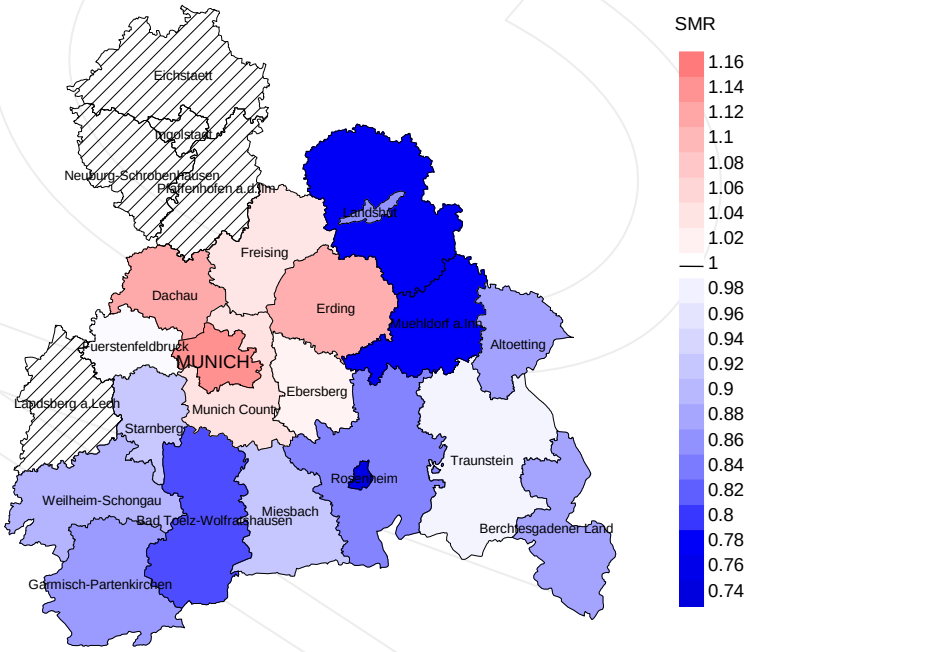


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=4,277, females N=3,632). Since cancer data are not available in some counties until 2007, the local SMR values were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 103 women died from colorectal cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.02. Though, the value of this parameter may vary with an underlying probability of 99% between 0.78 and 1.31, 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 tumor-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

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)
FRG	Federal Republic of Germany
GEKID	Association of Population-based Cancer Registries in Germany (Gesellschaft der epidemiologischen Krebsregister in Deutschland e.V.)
LCL	Lower confidence limit
MI-index	Ratio between mortality and incidence
MCR	Munich Cancer Registry (Tumorregister München)
PYLL-70	Potential years of life lost prior to age 70 given a person dies before that age
SEER	Surveillance, Epidemiology, and End Results (USA)
SIR	Standardized incidence ratio
SMR	Standardized mortality ratio
UCL	Upper confidence limit
WS	World standard population

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