Munich Cancer Registry

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

Cancer statistics: Baseline statistics

C18-C20: Colorectal cancer

Year of diagnosis	1998-2011
Patients	36626
Diseases	37474
Creation date	04/02/2013
Export date	01/03/2013
Population	4.5 m

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

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	1810	98	5.4	23.7	70.2	98.0
1999	1831	112	6.1	23.2	68.9	97.9
2000	1682	96	5.7	25.3	67.0	98.1
2001	1828	118	6.5	25.5	62.1	97.5
2002	3137	365	11.6	23.9	64.9	97.8
2003	3136	297	9.5	24.0	59.9	97.8
2004	3018	240	8.0	24.1	60.2	97.3
2005	2928	211	7.2	26.1	58.3	97.0
2006	2991	154	5.1	25.7	52.0	94.8
2007	3333	199	6.0	23.1	49.5	82.9 ##
2008	3273	195	6.0	24.7	45.4	68.6
2009	3178	174	5.5	24.5	40.2	68.9
2010	2888	175	6.1	23.4	33.8	91.4
2011	2441	145	5.9	22.0	22.5	73.6 ###
1998–2011	37474	2579	6.9	24.2	52.6	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	1810	915	895	50.6
1999	1831	939	892	51.3
2000	1682	866	816	51.5
2001	1828	955	873	52.2
2002	3137	1665	1472	53.1
2003	3136	1674	1462	53.4
2004	3018	1617	1401	53.6
2005	2928	1557	1371	53.2
2006	2991	1645	1346	55.0
2007	3333	1834	1499	55.0
2008	3273	1823	1450	55.7
2009	3178	1791	1387	56.4
2010	2888	1622	1266	56.2
2011	2441	1348	1093	55.2
1998-2011	37474	20251	17223	54.0

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	915	895	82.6	76.1	49.6	32.3	74.5	48.8	97.2	64.1
1999	939	892	83.9	75.2	49.7	31.9	75.1	48.1	98.4	62.8
2000	866	816	76.0	67.9	44.5	27.6	67.4	42.3	87.2	55.7
2001	955	873	82.4	71.8	48.3	30.6	72.4	46.1	92.6	60.1
2002	1665	1472	89.4	75.2	49.8	30.4	75.3	46.1	98.5	60.4
2003	1674	1462	89.3	74.2	49.0	30.2	73.9	45.7	96.2	59.3
2004	1617	1401	85.9	70.9	45.8	29.4	69.3	43.9	90.6	56.6
2005	1557	1371	82.2	68.9	43.6	26.9	65.5	40.7	85.1	53.6
2006	1645	1346	85.9	67.0	44.9	27.2	67.4	40.6	87.5	53.1
2007	1834	1499	82.8	64.9	43.0	25.9	64.2	38.9	83.5	50.5
2008	1823	1450	81.9	62.5	41.0	24.3	61.9	36.8	81.0	48.0
2009	1791	1387	80.2	59.6	39.6	23.1	59.4	34.8	77.9	45.8
2010	1622	1266	72.0	54.1	35.4	20.4	53.1	30.9	69.1	40.9
2011	1348	1093	59.8	46.7	29.3	18.5	44.0	27.7	57.0	35.4
1998-2011	20251	17223	80.6	65.4	42.5	26.2	63.9	39.5	83.1	51.6

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	1810	70.0	12.4	13.2	102	54.1	61.0	71.1	78.7	86.2
1999	1831	70.4	12.4	24.9	102	54.3	61.8	71.1	79.4	86.4
2000	1682	70.6	12.1	24.7	103	55.1	61.8	71.6	79.3	86.8
2001	1828	70.1	12.4	28.3	103	54.5	61.7	70.4	79.4	86.5
2002	3137	71.0	12.1	17.7	104	55.5	62.7	71.9	80.1	86.8
2003	3136	71.1	11.8	23.5	101	56.1	63.1	71.5	79.9	86.1
2004	3018	70.7	12.3	13.8	101	55.2	63.0	71.2	79.9	85.6
2005	2928	71.4	12.2	15.1	99.9	55.6	63.8	71.8	80.4	86.2
2006	2991	70.7	12.1	17.9	102	54.9	63.4	71.1	79.8	85.3
2007	3333	70.8	12.4	15.8	103	54.3	63.9	71.4	80.2	85.8
2008	3273	71.6	12.2	18.9	105	55.5	64.2	72.2	80.4	86.5
2009	3178	71.3	12.2	15.9	102	54.8	64.1	72.1	80.3	86.0
2010	2888	71.5	12.5	14.9	101	54.4	63.7	72.5	80.9	86.3
2011	2441	71.1	12.7	17.1	101	53.7	63.3	72.0	80.5	86.7
1998-2011	37474	70.9	12.3	13.2	105	54.9	63.1	71.7	80.1	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	915	67.9	11.7	31.4	98.1	53.7	59.5	68.3	75.9	83.9
1999	939	68.3	11.5	24.9	95.5	54.5	60.3	69.0	76.6	83.3
2000	866	68.3	11.0	34.4	95.9	54.2	60.4	68.1	76.6	83.1
2001	955	68.4	11.4	31.3	102	54.2	61.2	68.0	76.0	83.6
2002	1665	69.1	11.0	20.9	98.5	55.6	61.9	69.6	76.7	82.5
2003	1674	69.3	11.0	25.7	99.4	55.6	62.6	69.6	76.6	82.7
2004	1617	69.4	11.0	27.8	101	55.7	62.4	69.3	77.1	83.5
2005	1557	69.3	11.3	19.0	99.6	54.6	62.9	69.6	77.1	83.7
2006	1645	69.2	11.1	17.9	102	54.8	62.7	69.4	77.4	82.9
2007	1834	69.1	11.7	15.8	99.4	54.3	62.9	69.7	77.6	83.0
2008	1823	70.0	11.2	19.3	105	55.2	63.7	70.5	77.9	83.4
2009	1791	69.7	11.3	20.7	99.0	54.4	63.2	71.0	77.9	83.1
2010	1622	69.8	11.7	21.1	98.9	54.0	62.4	70.9	78.2	83.9
2011	1348	69.7	11.7	26.3	97.3	53.8	63.0	70.8	77.8	84.1
1998-2011	20251	69.2	11.3	15.8	105	54.6	62.2	69.8	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	895	72.2	12.7	13.2	102	54.7	63.3	74.2	81.6	87.5
1999	892	72.5	13.0	26.9	102	54.3	63.6	74.6	82.1	88.0
2000	816	73.1	12.6	24.7	103	56.3	63.5	75.2	81.9	88.5
2001	873	71.9	13.2	28.3	103	54.8	62.4	74.6	81.1	88.4
2002	1472	73.2	12.9	17.7	104	55.5	63.9	75.3	82.2	88.9
2003	1462	73.1	12.4	23.5	101	56.4	64.3	74.6	82.5	88.5
2004	1401	72.2	13.4	13.8	100	54.7	64.0	74.0	82.7	87.9
2005	1371	73.8	12.8	15.1	99.9	57.2	65.5	75.5	83.3	89.8
2006	1346	72.5	12.9	21.2	98.7	54.9	64.3	74.4	82.4	86.9
2007	1499	72.9	13.0	17.8	103	54.4	65.1	74.5	82.9	87.5
2008	1450	73.5	13.1	18.9	102	55.9	65.3	74.6	83.6	88.6
2009	1387	73.4	13.1	15.9	102	55.7	65.5	75.2	83.3	88.5
2010	1266	73.6	13.2	14.9	101	55.3	66.4	75.5	83.4	88.7
2011	1093	72.7	13.7	17.1	101	53.4	63.6	74.2	83.9	88.6
1998-2011	17223	73.0	13.0	13.2	104	55.3	64.4	74.7	82.8	88.3

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	23	0.1	0.1	8	0.0	0.1	15	0.1	0.2
25-29	60	0.2	0.3	26	0.1	0.2	34	0.2	0.4
30-34	132	0.4	0.6	72	0.4	0.5	60	0.3	0.7
35-39	243	0.6	1.3	137	0.7	1.2	106	0.6	1.3
40-44	534	1.4	2.7	291	1.4	2.7	243	1.4	2.7
45-49	1001	2.7	5.4	550	2.7	5.4	451	2.6	5.4
50-54	1775	4.7	10.1	1026	5.1	10.4	749	4.3	9.7
55-59	2968	7.9	18.0	1822	9.0	19.4	1146	6.7	16.4
60-64	4563	12.2	30.2	2868	14.2	33.6	1695	9.8	26.2
65-69	5428	14.5	44.7	3465	17.1	50.7	1963	11.4	37.6
70-74	5821	15.5	60.2	3543	17.5	68.2	2278	13.2	50.8
75-79	5484	14.6	74.9	2907	14.4	82.6	2577	15.0	65.8
80-84	4810	12.8	87.7	2063	10.2	92.7	2747	15.9	81.7
85+	4614	12.3	100.0	1469	7.3	100.0	3145	18.3	100.0
All ages	37474	100.0		20251	100.0		17223	100.0	

Included in the statistics are 29.8% multiple primaries in males and 24.2% 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=1011 %	Females DCO rate n=1560 %	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	15	0.5	1.0	12.5		1.6	3.4
25-29	24	34	1.4	2.0			3.0	3.7
30-34	72	59	3.7	3.1			5.5	3.4
35-39	134	105	6.1	5.1		1.0	6.8	3.2
40-44	289	243	13.0	11.5	0.7	0.4	10.5	4.6
45-49	545	448	28.0	23.4	0.9	1.6	12.2	6.2
50-54	1012	743	60.6	43.3	2.0	0.9	13.9	8.0
55-59	1799	1136	115.3	69.4	1.6	1.5	14.4	9.7
60-64	2834	1676	186.2	104.6	2.0	2.0	15.1	11.3
65-69	3397	1945	249.3	130.7	2.6	2.6	14.5	12.0
70-74	3465	2249	336.0	182.2	3.8	4.7	16.0	14.9
75-79	2852	2543	422.1	255.7	6.0	7.0	16.9	17.3
80-84	2014	2712	495.8	341.1	9.0	10.6	18.3	20.1
85+	1445	3114	520.9	419.3	22.6	28.0	17.5	21.4
All ages	19894	17036			5.1	9.2	15.0	13.2
Incidence								
Raw			79.2	64.7				
WS			41.8	26.0				
ES			62.8	39.1				
BRD-S			81.6	51.1				

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	8.2		0.4	
C03-C06	Oral cavity	6	7.2	0.8	0.3	1.8		-0.2	
C07-C08	Salivary gland	3	2.1	1.4	0.3	4.2		0.2	
C09-C10	Oropharynx	10	8.8	1.1	0.5	2.1		0.2	
C12-C13	Hypopharynx	6	4.9	1.2	0.4	2.7		0.2	16.7
C15	Oesophagus	33	15.7	2.1	1.4	2.9	#	3.4	15.2
C16	Stomach	92	42.9	2.1	1.7	2.6	#	9.8	7.6
C17	Small intestine	33	4.1	8.0	5.5	11.2	#	5.7	3.0
C18	Colon	277	100.0	2.8	2.5	3.1	#	35.1	1.4
C19-C20	Rectum	129	53.8	2.4	2.0	2.9	#	14.9	2.3
C21	Anus/canal	3	1.7	1.8	0.4	5.1		0.3	
C22	Liver	57	25.8	2.2	1.7	2.9	#	6.2	22.8
C23-C24	Bile	20	9.3	2.1	1.3	3.3	#	2.1	
C25	Pancreas	67	33.9	2.0	1.5	2.5	#	6.6	26.9
C32	Larynx	14	9.4	1.5	0.8	2.5		0.9	7.1
C33-C34	Lung	198	113.7	1.7	1.5	2.0	#	16.7	12.6
C38,C45	Mesothelioma	7	6.1	1.1	0.5	2.4		0.2	
C43	Malign. melanoma	62	33.9	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	4.9		0.4	
C61	Prostate	432	284.8	1.5	1.4	1.7	#	29.2	5.8
C62	Testis	6	1.8	3.3	1.2	7.1	#	0.8	16.7
C64	Kidney	86	32.5	2.6	2.1	3.3	#	10.6	7.0
C65	Renal pelvis	10	3.9	2.6	1.2	4.8	#	1.2	
C66	Ureter	10	2.1	4.7	2.3	8.7	#	1.6	
C67	Bladder	73	43.5	1.7	1.3	2.1	#	5.9	8.2
C68	Urinary org.	3	0.5	6.2	1.3	18.2	#	0.5	66.7
C70-C72	CNS cancer	27	12.3	2.2	1.5	3.2	#	2.9	25.9
C73	Thyroid	9	5.5	1.6	0.8	3.1		0.7	22.2
C76-C79	CUP	21	16.7	1.3	0.8	1.9		0.9	4.8
C81	Hodgkin lymphoma	2	1.6	1.2	0.1	4.4		0.1	
C82-C85	NHL	69	37.6	1.8	1.4	2.3	#	6.2	4.3
C90	Mult. myeloma	19	12.3	1.5	0.9	2.4		1.3	21.1
C91-C96	Leukaemia	29	15.2	1.9	1.3	2.7	#	2.7	37.9
Other primaries		4	5.0	0.8	0.2	2.1		-0.2	
Not observed		0	5.9	0.0	0.0	0.6	#	-1.2	
All mult. primaries		1838	965.1	1.9	1.8	2.0	#	173.2	8.0

Patients	14341
Mean age at second malignancy (years)	72.9
Person-years	50387
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	5	1.9	2.6	0.8	6.0		0.7	
C15 Oesophagus	5	2.9	1.7	0.6	4.0		0.5	
C16 Stomach	53	25.0	2.1	1.6	2.8	#	6.5	22.6
C17 Small intestine	20	2.3	8.8	5.4	13.5	#	4.1	5.0
C18 Colon	172	66.4	2.6	2.2	3.0	#	24.4	1.2
C19-C20 Rectum	70	27.3	2.6	2.0	3.2	#	9.9	2.9
C21 Anus/canal	6	2.9	2.0	0.8	4.5		0.7	
C22 Liver	20	6.9	2.9	1.8	4.5	#	3.0	45.0
C23-C24 Bile	14	9.8	1.4	0.8	2.4		1.0	28.6
C25 Pancreas	49	27.3	1.8	1.3	2.4	#	5.0	20.4
C33-C34 Lung	81	37.3	2.2	1.7	2.7	#	10.1	13.6
C43 Malign. melanoma	35	17.5	2.0	1.4	2.8	#	4.1	2.9
C46,C49 Soft tissue	6	3.1	1.9	0.7	4.1		0.7	
C48 Peritoneal	3	1.6	1.9	0.4	5.6		0.3	33.3
C50 Breast	251	157.3	1.6	1.4	1.8	#	21.7	4.4
C51 Vulva	13	6.0	2.2	1.1	3.7	#	1.6	7.7
C52 Vagina	4	1.2	3.2	0.9	8.3		0.6	25.0
C53 Cervix uteri	11	6.9	1.6	0.8	2.9		0.9	9.1
C54 Corpus uteri	64	29.9	2.1	1.6	2.7	#	7.9	1.6
C55,C57 Fem. genitals un	4	2.0	2.0	0.5	5.1		0.5	25.0
C56 Ovary	72	24.0	3.0	2.3	3.8	#	11.1	26.4
C64 Kidney	44	14.5	3.0	2.2	4.1	#	6.8	13.6
C65 Renal pelvis	7	1.8	4.0	1.6	8.2	#	1.2	
C67 Bladder	26	12.3	2.1	1.4	3.1	#	3.2	19.2
C70-C72 CNS cancer	10	8.0	1.3	0.6	2.3		0.5	60.0
C73 Thyroid	11	8.0	1.4	0.7	2.5		0.7	9.1
C74-C80 Cancer others	3	3.5	0.9	0.2	2.5		-0.1	66.7
C76-C79 CUP	6	11.6	0.5	0.2	1.1		-1.3	
C82-C85 NHL	36	22.7	1.6	1.1	2.2	#	3.1	19.4
C90 Mult. myeloma	11	7.5	1.5	0.7	2.6		0.8	27.3
C91-C96 Leukaemia	22	9.4	2.3	1.5	3.5	#	2.9	45.5
Other primaries	21	11.3	1.9	1.2	2.8	#	2.2	4.8
Not observed	0	2.4	0.0	0.0	1.5		-0.6	
All mult. primaries	1155	572.8	2.0	1.9	2.1	#	134.6	11.2

Patients	12343
Mean age at second malignancy (years)	74.9
Person-years	43255
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".

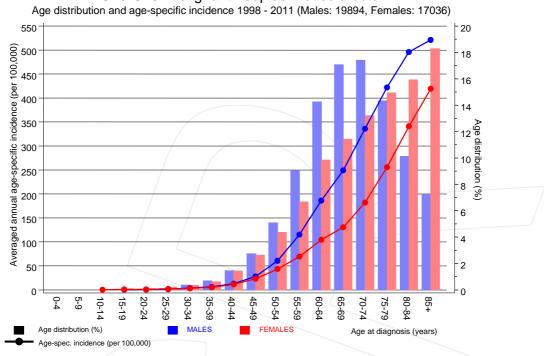## C18-C20: Malignant neoplasm of colorectum
Age distribution and age-specific incidence 1998 - 2011 (Males: 19894, Females: 17036)

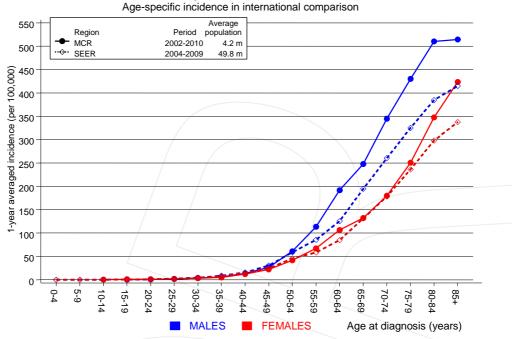**Figure 7.** Age distribution and age-specific incidence

Figure 7a. 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 2012, based on the November 2011 submission. http://www.seer.cancer.gov.

C18-C20: Malignant neoplasm of colorectum
Cumulative follow-up years since diagnosis for period 1998 - 2011 (excl. DCO)

Gender	n	Target		Actual	
		Sum	Median	Sum	Median
All patients					
Males	14073	55765	3.1	52837	2.9
Females	11973	47864	3.1	45049	2.9
Patients alive					
Males	7969	42310	4.7	39383	4.4
Females	6731	36965	4.8	34150	4.5
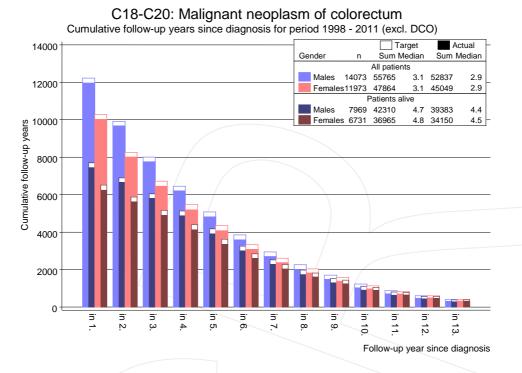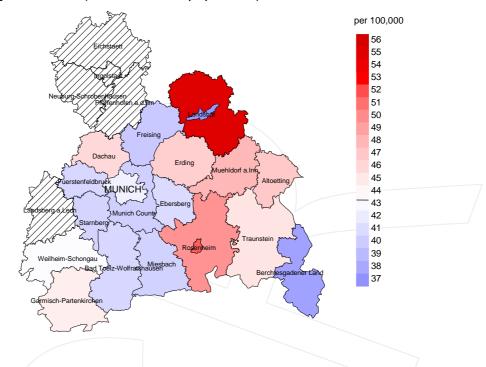
Figure 8. Cumulative follow-up years depending on time since diagnosis

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
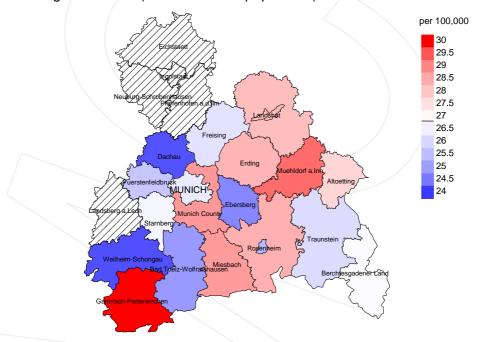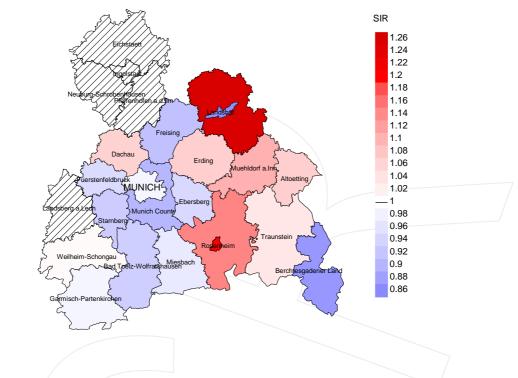
Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 43.4/100,000 WS N=9,482, females 26.8/100,000 WS N=8,054). 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 203 women were identified with newly diagnosed colorectal cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 24.7/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 20.0 and 30.5/100,000.

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=9,482, females N=8,054). 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 203 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 0.88. Though, the value of this parameter may vary with an underlying probability of 99% between 0.73 and 1.05, 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	1810	98.0	5.4	1270	70.2	93.4
1999	1831	97.9	6.1	1261	68.9	94.6
2000	1682	98.1	5.7	1127	67.0	96.2
2001	1828	97.5	6.5	1135	62.1	97.2
2002	3137	97.8	11.6	2036	64.9	97.5
2003	3136	97.8	9.5	1879	59.9	97.9
2004	3018	97.3	8.0	1817	60.2	97.9
2005	2928	97.0	7.2	1708	58.3	98.1
2006	2991	94.8	5.1	1555	52.0	99.0
2007	3333	82.9	6.0	1651	49.5	98.5
2008	3273	68.6	6.0	1487	45.4	98.4
2009	3178	68.9	5.5	1278	40.2	98.5
2010	2888	91.4	6.1	976	33.8	97.5
2011	2441	73.6	5.9	549	22.5	97.6
1998-2011	37474	89.1	6.9	19729	52.6	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	1810	1041	90.3	297	16.4
1999	1831	1074	91.0	312	17.0
2000	1682	1044	93.8	282	16.8
2001	1828	1111	95.6	286	15.6
2002	3137	1581	98.1	692	22.1
2003	3136	1697	97.8	594	18.9
2004	3018	1705	98.3	551	18.3
2005	2928	1806	96.5	540	18.4
2006	2991	1870	97.6	508	17.0
2007	3333	1979	97.7	572	17.2
2008	3273	2070	98.7	606	18.5
2009	3178	2112	98.7	538	16.9
2010	2888	2176	98.7	520	18.0
2011	2441	2004	98.6	380	15.6
1998-2011	37474	23270	97.1	6678	17.8

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	1041	71.9	28.1	86.9
1999	1074	73.6	26.4	86.6
2000	1044	73.6	26.4	86.0
2001	1111	69.4	30.6	84.8
2002	1581	75.4	24.6	87.2
2003	1697	73.8	26.2	86.7
2004	1705	76.1	23.9	86.6
2005	1806	71.6	28.4	81.8
2006	1870	71.7	28.3	82.9
2007	1979	72.0	28.0	83.6
2008	2070	71.7	28.3	82.0
2009	2112	69.6	30.4	79.8
2010	2176	66.5	33.5	78.7
2011	2004	66.1	33.9	77.7
1998-2011	23270	71.3	28.7	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	510	73.4	71.6	78.0	73.0
1999	530	73.0	71.3	77.7	72.4
2000	546	74.0	71.7	80.8	73.1
2001	538	73.3	70.9	79.4	72.3
2002	818	73.6	71.6	79.9	72.6
2003	874	73.7	71.8	79.6	72.9
2004	881	74.9	73.3	80.3	74.2
2005	945	74.4	72.1	80.5	72.8
2006	1028	75.1	73.0	80.7	73.8
2007	1080	75.2	73.5	80.2	74.2
2008	1161	75.5	73.6	81.0	74.2
2009	1120	75.0	73.2	79.5	73.9
2010	1183	75.8	73.4	80.8	74.6
2011	1107	75.4	72.7	81.4	74.0
1998-2011	12321	74.7	72.6	80.2	73.6

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.
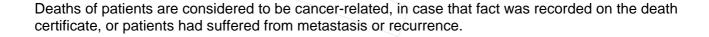
Table 11b

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	531	77.3	75.0	83.2	77.3
1999	544	78.3	76.2	84.0	78.2
2000	498	78.6	76.5	84.2	77.7
2001	573	79.0	76.0	85.3	77.8
2002	763	79.4	77.5	84.9	78.7
2003	823	79.0	76.7	85.0	77.8
2004	824	78.8	77.0	84.5	77.7
2005	861	79.7	77.5	84.7	78.4
2006	842	80.0	77.8	85.7	78.8
2007	899	79.4	76.7	85.5	77.8
2008	909	80.2	77.5	85.9	78.7
2009	992	79.9	76.9	86.4	78.1
2010	993	80.3	77.1	86.1	78.5
2011	897	81.1	77.4	87.3	78.8
1998-2011	10949	79.5	76.9	85.5	78.2

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	366	33.0	0.40	19.2	0.39	30.3	0.41	41.1	0.42
1999	391	34.9	0.42	20.1	0.41	31.7	0.43	44.1	0.45
2000	407	35.7	0.47	20.0	0.45	31.8	0.47	43.8	0.51
2001	385	33.2	0.41	18.8	0.39	29.4	0.41	39.4	0.43
2002	623	33.4	0.38	18.0	0.37	28.2	0.38	38.1	0.39
2003	658	35.1	0.40	18.3	0.38	28.9	0.40	40.1	0.42
2004	679	36.1	0.43	17.9	0.40	28.8	0.42	40.7	0.46
2005	694	36.6	0.46	18.1	0.42	28.4	0.44	39.5	0.48
2006	741	38.7	0.46	18.7	0.43	30.0	0.46	41.8	0.49
2007	800	36.1	0.44	16.9	0.40	26.9	0.43	37.8	0.46
2008	867	39.0	0.49	17.8	0.45	28.6	0.47	40.3	0.51
2009	789	35.4	0.45	16.3	0.42	25.7	0.44	35.2	0.46
2010	810	35.9	0.51	15.7	0.46	25.0	0.48	35.3	0.52
2011	764	33.9	0.58	15.6	0.54	24.3	0.56	32.8	0.59
1998-2011	8974	35.7	0.45	17.6	0.42	27.8	0.44	38.5	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	383	32.6	0.43	12.3	0.38	19.4	0.40	27.1	0.43
1999	400	33.7	0.45	11.9	0.38	19.2	0.40	26.5	0.43
2000	361	30.1	0.45	10.8	0.39	17.2	0.41	23.1	0.42
2001	386	31.7	0.45	11.6	0.38	18.4	0.40	25.3	0.42
2002	570	29.1	0.39	9.8	0.32	15.7	0.34	21.8	0.36
2003	596	30.3	0.41	10.6	0.35	16.8	0.37	23.0	0.39
2004	619	31.3	0.45	10.5	0.36	16.9	0.39	23.6	0.42
2005	599	30.1	0.44	9.9	0.37	15.9	0.40	22.0	0.42
2006	601	29.9	0.45	9.5	0.35	15.4	0.38	22.0	0.42
2007	626	27.1	0.42	9.3	0.36	14.6	0.38	20.2	0.40
2008	619	26.7	0.43	8.6	0.36	13.7	0.38	19.0	0.40
2009	680	29.2	0.50	9.7	0.43	15.2	0.44	20.8	0.46
2010	640	27.3	0.51	8.7	0.43	13.9	0.45	18.9	0.47
2011	564	24.1	0.52	7.7	0.42	12.1	0.44	16.6	0.48
1998-2011	7644	29.0	0.45	9.8	0.38	15.6	0.40	21.5	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	22	0.1	0.2	14	0.2	0.2	8	0.1	0.2
35-39	60	0.3	0.6	30	0.3	0.5	30	0.4	0.6
40-44	149	0.9	1.4	86	0.9	1.5	63	0.8	1.4
45-49	252	1.5	2.9	131	1.4	2.9	121	1.5	2.9
50-54	521	3.0	5.9	308	3.3	6.2	213	2.7	5.6
55-59	918	5.3	11.3	586	6.3	12.5	332	4.2	9.8
60-64	1498	8.7	20.0	1007	10.8	23.3	491	6.2	16.1
65-69	2074	12.1	32.1	1382	14.8	38.1	692	8.8	24.9
70-74	2577	15.0	47.0	1600	17.2	55.3	977	12.4	37.3
75-79	2862	16.7	63.7	1628	17.5	72.8	1234	15.7	53.0
80-84	2898	16.9	80.6	1378	14.8	87.6	1520	19.3	72.3
85+	3340	19.4	100.0	1157	12.4	100.0	2183	27.7	100.0
All ages	17186	100.0		9314	100.0		7872	100.0	

Included in the statistics are 29.8% multiple primaries in males and 24.2% 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	0.07	2.5	2.3
25-29	5	7	0.3	0.19	0.4	0.21	5.7	6.9
30-34	14	8	0.7	0.19	0.4	0.13	8.3	3.9
35-39	30	30	1.4	0.22	1.5	0.28	8.2	6.6
40-44	86	63	3.9	0.30	3.0	0.26	11.3	6.3
45-49	131	121	6.7	0.24	6.3	0.27	8.5	7.0
50-54	308	213	18.4	0.30	12.4	0.28	10.9	8.1
55-59	586	332	37.6	0.32	20.3	0.29	11.4	8.1
60-64	1007	491	66.2	0.35	30.6	0.29	13.1	8.8
65-69	1382	692	101.4	0.40	46.5	0.35	13.3	9.8
70-74	1600	977	155.1	0.45	79.1	0.43	14.5	12.2
75-79	1628	1234	240.9	0.56	124.1	0.48	14.9	13.7
80-84	1378	1520	339.2	0.67	191.2	0.55	15.7	15.9
85+	1157	2183	417.1	0.79	293.9	0.69	16.2	19.2
All ages	9314	7872					13.9	12.9
Mortality								
Raw			37.1	0.46	29.9	0.46		
WS			18.2	0.43	10.0	0.38		
ES			28.9	0.45	16.0	0.40		
BRD-S			40.0	0.48	22.1	0.43		
PYLL-70								
per 100,000			135.6		85.9			
ES			118.4		73.2			
AYLL-70			8.7		9.9			

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	53	1.6	7	13.2	13	24.5	33	62.3
C16	Stomach	186	5.5	55	29.6	42	22.6	89	47.8
C17	Small intestine	30	0.9	2	6.7	12	40.0	16	53.3
C18	Colon	261	7.7			90	34.5	171	65.5
C19-C20	Rectum	145	4.3			89	61.4	56	38.6
C22	Liver	103	3.0	4	3.9	24	23.3	75	72.8
C25	Pancreas	128	3.8	10	7.8	23	18.0	95	74.2
C32	Larynx	51	1.5	37	72.5	1	2.0	13	25.5
C33-C34	Lung	384	11.4	64	16.7	51	13.3	269	70.1
C43	Malign. melanoma	122	3.6	70	57.4	2	1.6	50	41.0
C44	Skin others	145	4.3	74	51.0	17	11.7	54	37.2
C61	Prostate	742	21.9	405	54.6	66	8.9	271	36.5
C64	Kidney	134	4.0	60	44.8	31	23.1	43	32.1
C67	Bladder	255	7.5	118	46.3	22	8.6	115	45.1
C70-C72	CNS cancer	65	1.9	20	30.8	4	6.2	41	63.1
C76-C79	CUP	37	1.1	6	16.2	8	21.6	23	62.2
C82-C85	NHL	137	4.1	56	40.9	24	17.5	57	41.6
C90	Mult. myeloma	33	1.0	11	33.3	4	12.1	18	54.5
C91-C96	Leukaemia	76	2.2	20	26.3	9	11.8	47	61.8
Other primaries		259	7.7	100	38.6	21	8.1	138	53.3
All mult. primaries		3382	100.0	1147	33.9	555	16.4	1680	49.7

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	135	5.3	41	30.4	27	20.0	67	49.6
C18	Colon	173	6.8			48	27.7	125	72.3
C19-C20	Rectum	96	3.8			54	56.3	42	43.8
C21	Anus/canal	22	0.9	7	31.8	8	36.4	7	31.8
C22	Liver	32	1.3	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	105	4.2	8	7.6	16	15.2	81	77.1
C33-C34	Lung	150	5.9	25	16.7	12	8.0	113	75.3
C43	Malign. melanoma	67	2.6	44	65.7	5	7.5	18	26.9
C44	Skin others	59	2.3	29	49.2	7	11.9	23	39.0
C50	Breast	643	25.4	429	66.7	46	7.2	168	26.1
C51	Vulva	21	0.8	11	52.4	2	9.5	8	38.1
C53	Cervix uteri	96	3.8	74	77.1	9	9.4	13	13.5
C54	Corpus uteri	169	6.7	112	66.3	10	5.9	47	27.8
C56	Ovary	184	7.3	60	32.6	47	25.5	77	41.8
C64	Kidney	55	2.2	28	50.9	8	14.5	19	34.5
C67	Bladder	89	3.5	44	49.4	2	2.2	43	48.3
C70-C72	CNS cancer	45	1.8	19	42.2	6	13.3	20	44.4
C73	Thyroid	24	0.9	13	54.2	3	12.5	8	33.3
C76-C79	CUP	21	0.8	7	33.3	4	19.0	10	47.6
C82-C85	NHL	65	2.6	24	36.9	8	12.3	33	50.8
C90	Mult. myeloma	36	1.4	8	22.2	3	8.3	25	69.4
C91-C96	Leukaemia	53	2.1	8	15.1	6	11.3	39	73.6
Other primaries		157	6.2	62	39.5	24	15.3	71	45.2
All mult. primaries		2530	100.0	1064	42.1	367	14.5	1099	43.4

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	0.07	2.7	2.6
25-29	5	7	0.3	0.23	0.4	0.21	6.2	7.3
30-34	13	8	0.7	0.19	0.4	0.14	7.9	4.5
35-39	27	24	1.2	0.22	1.2	0.24	7.9	5.8
40-44	80	58	3.6	0.29	2.7	0.26	11.4	6.7
45-49	124	110	6.4	0.25	5.7	0.26	8.9	7.3
50-54	273	183	16.4	0.29	10.7	0.27	11.0	8.2
55-59	521	292	33.4	0.32	17.8	0.29	11.6	8.4
60-64	870	409	57.2	0.35	25.5	0.28	13.4	8.9
65-69	1149	583	84.3	0.41	39.2	0.35	13.6	10.2
70-74	1287	786	124.8	0.46	63.7	0.42	14.6	12.2
75-79	1230	971	182.0	0.56	97.6	0.47	14.7	13.4
80-84	1029	1190	253.3	0.68	149.7	0.54	15.4	15.6
85+	867	1761	312.6	0.80	237.1	0.67	15.8	19.1
All ages	7477	6383					13.8	12.8
Mortality								
Raw			29.7	0.46	24.3	0.44		
WS			14.9	0.42	8.3	0.37		
ES			23.3	0.45	13.1	0.39		
BRD-S			31.8	0.48	18.0	0.42		
PYLL-70								
per 100,000			120.3		74.8			
ES			105.2		63.9			
AYLL-70			8.9		10.1			

* 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	0.07	2.9	2.8
25-29	5	7	0.3	0.24	0.4	0.21	6.7	7.8
30-34	13	7	0.7	0.19	0.4	0.13	8.2	4.3
35-39	26	22	1.2	0.22	1.1	0.23	8.0	5.8
40-44	78	57	3.5	0.29	2.7	0.26	11.7	7.1
45-49	119	104	6.1	0.25	5.4	0.27	9.1	7.6
50-54	259	175	15.5	0.29	10.2	0.28	11.4	8.8
55-59	482	272	30.9	0.32	16.6	0.29	11.8	8.8
60-64	774	370	50.9	0.34	23.1	0.28	13.4	9.2
65-69	993	506	72.9	0.39	34.0	0.33	13.6	10.3
70-74	1058	687	102.6	0.43	55.7	0.40	14.2	12.6
75-79	991	844	146.7	0.51	84.9	0.44	14.5	13.8
80-84	789	1020	194.2	0.57	128.3	0.49	14.7	15.8
85+	662	1520	238.7	0.65	204.7	0.61	14.8	19.0
All ages	6251	5592					13.5	13.0
Mortality								
Raw			24.9	0.42	21.2	0.42		
WS			12.6	0.39	7.4	0.35		
ES			19.6	0.41	11.6	0.37		
BRD-S			26.3	0.43	15.8	0.39		
PYLL-70								
per 100,000			111.3		69.8			
ES			97.5		59.7			
AYLL-70			9.2		10.3			

* See corresponding tables with multiple primaries.

C18-C20: Malignant neoplasm of colorectum
Age distribution and age-specific mortality 1998 - 2011 (Males: 8974, Females: 7644)
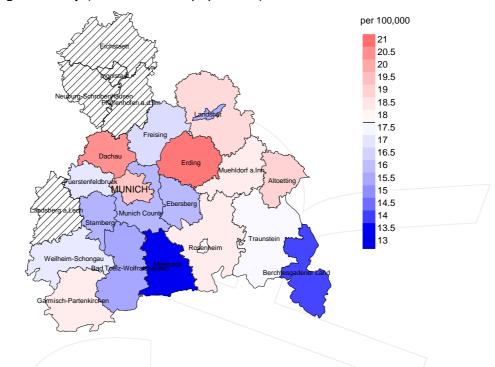
Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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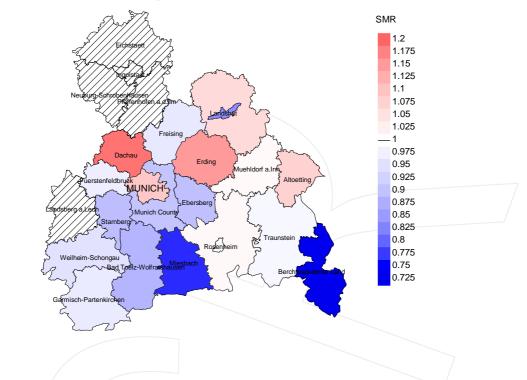
Average mortality (world standard population) 2003 - 2008: Females

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 17.8/100,000 WS N=4,224, females 9.7/100,000 WS N=3,510). 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 101 women died from colorectal cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 9.7/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 7.1 and 13.4/100,000.

Standardized mortality ratio (SMR) 2003 - 2008: Males

Standardized mortality ratio (SMR) 2003 - 2008: Females
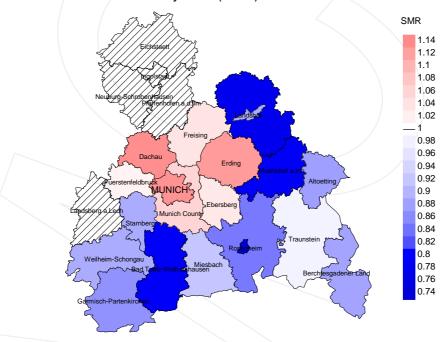
Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=4,224, females N=3,510). 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 101 women died from colorectal cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.03. Though, the value of this parameter may vary with an underlying probability of 99% between 0.79 and 1.33, 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

Recommended Citation

Munich Cancer Registry. Baseline statistics C18-C20: Colorectal cancer [Internet]. 2013 [updated 2013 Apr 2; cited 2013 Jun 1]. Available from: http://www.tumorregister-muenchen.de/en/facts/base/base_C1820E.pdf

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