Munich Cancer Registry

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

Cancer statistics: Baseline statistics

C18-C21: Colorectal cancer

Year of diagnosis	1998-2012
Patients	41,036
Diseases	42,042
Creation date	03/20/2014
Export date	02/12/2014
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, March 2014

[#]   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 2013 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	1868	97	5.2	24.4	70.9	98.1
1999	1871	115	6.1	23.6	70.2	97.8
2000	1732	95	5.5	26.0	68.0	98.2
2001	1887	121	6.4	26.3	64.0	97.4
2002	3211	367	11.4	24.8	66.7	97.9 #
2003	3225	300	9.3	24.9	61.4	97.8 #
2004	3115	243	7.8	24.8	61.2	97.4 #
2005	3035	212	7.0	26.8	59.9	96.8 #
2006	3122	158	5.1	26.8	54.0	94.8 #
2007	3475	203	5.8	24.5	52.3	84.3 # ##
2008	3415	195	5.7	26.1	48.4	69.9
2009	3362	173	5.1	25.8	43.9	67.2
2010	3148	181	5.7	25.5	39.8	65.9
2011	2995	153	5.1	24.0	33.0	69.1
2012	2581	164	6.4	24.6	24.9	96.4 ###
1998–2012	42042	2777	6.6	25.3	53.2	87.1

\#   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	1868	932	936	49.9
1999	1871	952	919	50.9
2000	1732	882	850	50.9
2001	1887	978	909	51.8
2002	3211	1688	1523	52.6
2003	3225	1704	1521	52.8
2004	3115	1642	1473	52.7
2005	3035	1589	1446	52.4
2006	3122	1686	1436	54.0
2007	3475	1899	1576	54.6
2008	3415	1870	1545	54.8
2009	3362	1866	1496	55.5
2010	3148	1747	1401	55.5
2011	2995	1630	1365	54.4
2012	2581	1399	1182	54.2
1998-2012	42042	22464	19578	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	932	936	84.1	79.6	50.5	34.1	75.9	51.4	98.9	67.1
1999	952	919	85.1	77.4	50.4	33.0	76.2	49.7	99.7	64.6
2000	882	850	77.4	70.8	45.3	29.2	68.7	44.5	88.7	58.2
2001	978	909	84.4	74.7	49.4	32.1	74.0	48.2	94.6	62.6
2002	1688	1523	90.6	77.8	50.6	31.7	76.3	48.0	99.8	62.6
2003	1704	1521	90.9	77.2	50.0	31.9	75.3	47.9	97.9	61.8
2004	1642	1473	87.3	74.5	46.6	31.1	70.4	46.3	92.0	59.6
2005	1589	1446	83.9	72.7	44.6	28.6	66.9	43.2	86.8	56.8
2006	1686	1436	88.0	71.5	46.2	29.4	69.1	43.8	89.4	56.9
2007	1899	1576	85.7	68.2	44.6	27.5	66.6	41.0	86.5	53.2
2008	1870	1545	84.0	66.6	42.2	26.3	63.7	39.5	82.9	51.2
2009	1866	1496	83.6	64.3	41.5	25.4	62.1	38.0	81.1	49.6
2010	1747	1401	77.5	59.9	38.1	23.0	57.2	34.6	74.4	45.5
2011	1630	1365	71.3	57.8	34.7	22.9	52.0	34.0	67.4	43.5
2012	1399	1182	61.2	50.1	29.5	20.3	44.5	30.0	58.0	38.3
1998-2012	22464	19578	81.8	68.2	42.9	27.6	64.4	41.4	83.6	53.7

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	71.0	78.7	86.1
1999	1871	70.2	12.6	24.9	102	54.2	61.6	71.1	79.3	86.4
2000	1732	70.4	12.1	24.7	103	54.6	61.5	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	3211	70.9	12.1	17.7	104	55.2	62.6	71.8	80.0	86.7
2003	3225	70.9	11.9	23.5	101	55.6	63.0	71.4	79.9	86.0
2004	3115	70.6	12.3	13.8	101	54.9	62.8	71.0	79.9	85.4
2005	3035	71.3	12.3	15.1	99.9	55.3	63.7	71.8	80.4	86.1
2006	3122	70.4	12.2	17.9	102	54.4	63.2	70.9	79.7	85.2
2007	3475	70.7	12.5	15.8	103	54.1	63.8	71.2	80.2	85.8
2008	3415	71.4	12.3	18.9	105	55.1	64.1	72.0	80.4	86.5
2009	3362	71.0	12.4	12.4	102	54.2	63.7	71.9	80.1	85.9
2010	3148	71.3	12.7	14.9	101	54.0	63.5	72.4	80.9	86.3
2011	2995	71.2	12.8	17.1	101	53.4	63.2	72.2	80.7	86.9
2012	2581	71.1	12.9	13.7	101	54.4	63.0	72.5	80.4	86.4
1998-2012	42042	70.8	12.4	12.4	105	54.5	62.9	71.6	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	932	67.7	11.8	31.4	98.1	53.6	59.4	68.1	75.9	83.9
1999	952	68.2	11.6	24.9	95.5	54.2	60.2	68.9	76.6	83.3
2000	882	68.2	11.0	34.4	95.9	54.1	60.3	68.0	76.5	83.0
2001	978	68.2	11.4	31.3	102	54.1	61.0	67.9	75.8	83.4
2002	1688	69.1	11.0	20.9	98.5	55.2	61.8	69.5	76.6	82.5
2003	1704	69.2	11.1	25.7	99.4	55.3	62.5	69.5	76.5	82.7
2004	1642	69.3	11.1	27.8	101	55.4	62.4	69.2	77.1	83.4
2005	1589	69.2	11.3	19.0	99.6	54.5	62.6	69.4	77.1	83.5
2006	1686	69.0	11.2	17.9	102	54.5	62.5	69.3	77.2	82.8
2007	1899	69.1	11.7	15.8	99.4	54.2	62.8	69.6	77.6	83.0
2008	1870	69.8	11.2	19.3	105	55.0	63.4	70.4	77.8	83.4
2009	1866	69.5	11.5	12.4	102	53.7	63.0	70.9	77.8	83.0
2010	1747	69.8	11.8	21.1	98.9	53.6	62.4	70.9	78.2	84.1
2011	1630	69.9	11.7	26.3	97.3	53.5	63.1	71.2	78.3	84.2
2012	1399	70.4	11.4	25.8	101	55.3	63.0	71.7	78.3	83.9
1998-2012	22464	69.2	11.4	12.4	105	54.4	62.2	69.9	77.3	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	936	72.0	12.8	13.2	102	54.4	63.0	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	850	72.7	12.8	24.7	103	55.8	63.0	74.7	81.7	88.2
2001	909	71.7	13.3	28.3	103	53.9	62.2	74.2	81.2	88.4
2002	1523	73.0	13.0	17.7	104	55.2	63.6	75.0	82.1	88.8
2003	1521	72.8	12.6	23.5	101	56.1	63.8	74.2	82.3	88.5
2004	1473	72.0	13.4	13.8	100	54.4	63.7	73.7	82.7	87.7
2005	1446	73.6	12.8	15.1	99.9	56.8	65.3	75.4	83.2	89.2
2006	1436	72.1	13.1	21.2	98.7	54.2	64.1	74.0	82.2	86.7
2007	1576	72.7	13.1	17.8	103	54.0	64.9	74.1	82.8	87.5
2008	1545	73.2	13.3	18.9	102	55.3	65.1	74.2	83.6	88.5
2009	1496	72.9	13.2	15.9	102	54.6	64.9	74.6	83.1	88.4
2010	1401	73.3	13.4	14.9	101	54.6	65.3	75.2	83.3	88.6
2011	1365	72.7	13.8	17.1	101	53.4	63.5	74.2	83.8	88.8
2012	1182	72.0	14.4	13.7	100	53.3	62.9	74.2	83.0	88.9
1998-2012	19578	72.7	13.2	13.2	104	54.6	64.0	74.5	82.7	88.2

Table 4

Age distribution by 5-year age group and gender for period 1998-2012
(incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
10-14	5	0.0	0.0	1	0.0	0.0	4	0.0	0.0
15-19	21	0.0	0.1	4	0.0	0.0	17	0.1	0.1
20-24	31	0.1	0.1	8	0.0	0.1	23	0.1	0.2
25-29	78	0.2	0.3	34	0.2	0.2	44	0.2	0.4
30-34	151	0.4	0.7	81	0.4	0.6	70	0.4	0.8
35-39	282	0.7	1.4	152	0.7	1.2	130	0.7	1.5
40-44	631	1.5	2.9	333	1.5	2.7	298	1.5	3.0
45-49	1175	2.8	5.6	619	2.8	5.5	556	2.8	5.8
50-54	2065	4.9	10.6	1169	5.2	10.7	896	4.6	10.4
55-59	3356	8.0	18.5	2028	9.0	19.7	1328	6.8	17.2
60-64	5051	12.0	30.6	3123	13.9	33.6	1928	9.8	27.0
65-69	5995	14.3	44.8	3795	16.9	50.5	2200	11.2	38.3
70-74	6538	15.6	60.4	3919	17.4	68.0	2619	13.4	51.7
75-79	6118	14.6	74.9	3242	14.4	82.4	2876	14.7	66.3
80-84	5360	12.7	87.7	2320	10.3	92.7	3040	15.5	81.9
85+	5185	12.3	100.0	1636	7.3	100.0	3549	18.1	100.0
All ages	42042	100.0		22464	100.0		19578	100.0	

Included in the statistics are 31.4% multiple primaries in males and 25.6% in females.

Table 5

Age-specific incidence, DCO rate and proportion of all cancers
for period 1998-2012

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=1086 %	Females DCO rate n=1679 %	Males Prop.all cancers n=146755 %	Females Prop.all cancers n=142297 %
0- 4			0.0	0.0				
5- 9			0.0	0.0				
10-14	1	4	0.1	0.3			0.7	2.5
15-19	4	17	0.3	1.2			1.3	6.4
20-24	8	23	0.5	1.4	12.5		1.4	4.7
25-29	32	44	1.7	2.3			3.6	4.3
30-34	81	69	3.8	3.4			5.7	3.7
35-39	149	129	6.4	5.8		1.6	7.0	3.7
40-44	331	298	13.7	12.9	0.6	0.3	11.1	5.1
45-49	613	552	28.4	26.1	0.8	1.3	12.4	6.9
50-54	1149	889	62.2	47.1	1.7	0.9	14.3	8.7
55-59	2002	1315	117.8	73.8	1.6	1.4	14.8	10.3
60-64	3082	1904	187.0	109.4	1.9	1.9	15.1	11.8
65-69	3719	2179	253.5	135.9	2.6	2.4	14.5	12.3
70-74	3833	2579	330.8	187.0	3.6	4.3	15.6	15.3
75-79	3183	2839	422.4	259.5	5.7	6.6	16.8	17.5
80-84	2261	3000	497.9	347.4	9.0	10.2	18.0	20.3
85+	1609	3507	518.8	428.2	21.6	27.1	17.5	21.9
All ages	22057	19348			4.9	8.7	15.0	13.6
Incidence								
Raw			80.4	67.4				
WS			42.2	27.3				
ES			63.3	40.9				
BRD-S			82.1	53.1				

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 1998-2012
MALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C00	Lip	3	1.2	2.4	0.5	7.1		0.3	
C03-C06	Oral cavity	9	8.1	1.1	0.5	2.1		0.2	
C07-C08	Salivary gland	3	2.4	1.3	0.3	3.7		0.1	
C09-C10	Oropharynx	14	9.8	1.4	0.8	2.4		0.8	
C12-C13	Hypopharynx	8	5.5	1.5	0.6	2.9		0.4	12.5
C15	Oesophagus	36	17.8	2.0	1.4	2.8	#	3.2	13.9
C16	Stomach	110	47.8	2.3	1.9	2.8	#	11.1	6.4
C17	Small intestine	38	4.9	7.7	5.5	10.6	#	5.9	2.6
C18	Colon	298	111.6	2.7	2.4	3.0	#	33.1	1.0
C19-C20	Rectum	142	59.7	2.4	2.0	2.8	#	14.6	2.1
C21	Anus/canal	4	2.0	2.0	0.5	5.0		0.3	
C22	Liver	63	29.2	2.2	1.7	2.8	#	6.0	22.2
C23-C24	Bile	21	10.6	2.0	1.2	3.0	#	1.9	
C25	Pancreas	71	38.4	1.8	1.4	2.3	#	5.8	25.4
C32	Larynx	18	10.4	1.7	1.0	2.7	#	1.3	16.7
C33-C34	Lung	223	126.3	1.8	1.5	2.0	#	17.2	13.0
C38,C45	Mesothelioma	7	7.0	1.0	0.4	2.1		-0.0	
C43	Malign. melanoma	71	39.1	1.8	1.4	2.3	#	5.7	1.4
C46,C49	Soft tissue	12	5.6	2.1	1.1	3.7	#	1.1	
C50	Breast	6	2.7	2.2	0.8	4.8		0.6	16.7
C60	Penis	5	2.5	2.0	0.7	4.7		0.5	
C61	Prostate	505	325.4	1.6	1.4	1.7	#	31.9	5.1
C62	Testis	7	2.0	3.4	1.4	7.1	#	0.9	14.3
C64	Kidney	97	36.6	2.7	2.2	3.2	#	10.7	6.2
C65	Renal pelvis	12	4.4	2.7	1.4	4.7	#	1.3	
C66	Ureter	10	2.5	4.0	1.9	7.4	#	1.3	
C67	Bladder	90	50.2	1.8	1.4	2.2	#	7.1	7.8
C68	Urinary org.	3	0.6	5.0	1.0	14.7	#	0.4	66.7
C70-C72	CNS cancer	28	13.7	2.0	1.4	3.0	#	2.5	25.0
C73	Thyroid	9	6.1	1.5	0.7	2.8		0.5	22.2
C76-C79	CUP	26	18.9	1.4	0.9	2.0		1.3	3.8
C81	Hodgkin lymphoma	3	1.9	1.5	0.3	4.5		0.2	
C82-C85	NHL	74	43.0	1.7	1.4	2.2	#	5.5	4.1
C90	Mult. myeloma	22	13.9	1.6	1.0	2.4		1.4	22.7
C91-C96	Leukaemia	31	17.8	1.7	1.2	2.5	#	2.3	38.7
	Other primaries	7	7.1	1.0	0.4	2.0		-0.0	14.3
	Not observed	0	5.3	0.0	0.0	0.7	#	-0.9	
	All mult. primaries	2086	1091.9	1.9	1.8	2.0	#	176.8	7.6

Patients	15217
Mean age at second malignancy (years)	72.9
Person-years	56243
Mean observation time (years)	3.7
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 1998-2012
FEMALES

Diagnosis	Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C09-C10 Oropharynx	7	2.2	3.1	1.3	6.4	#	0.9	
C12-C13 Hypopharynx	3	0.6	5.0	1.0	14.5	#	0.5	33.3
C15 Oesophagus	6	3.5	1.7	0.6	3.7		0.5	
C16 Stomach	58	28.8	2.0	1.5	2.6	#	5.8	22.4
C17 Small intestine	29	2.8	10.3	6.9	14.8	#	5.2	3.4
C18 Colon	210	76.6	2.7	2.4	3.1	#	26.6	3.3
C19-C20 Rectum	77	31.5	2.4	1.9	3.1	#	9.1	2.6
C21 Anus/canal	6	3.4	1.8	0.6	3.8		0.5	
C22 Liver	21	8.1	2.6	1.6	4.0	#	2.6	47.6
C23-C24 Bile	15	11.2	1.3	0.7	2.2		0.7	26.7
C25 Pancreas	60	32.0	1.9	1.4	2.4	#	5.6	20.0
C33-C34 Lung	109	43.8	2.5	2.0	3.0	#	13.0	12.8
C38,C45 Mesothelioma	3	1.2	2.4	0.5	7.1		0.4	
C43 Malign. melanoma	42	21.0	2.0	1.4	2.7	#	4.2	
C46,C49 Soft tissue	8	3.6	2.2	0.9	4.3		0.9	
C48 Peritoneal	5	2.0	2.5	0.8	5.9		0.6	20.0
C50 Breast	302	183.2	1.6	1.5	1.8	#	23.6	4.6
C51 Vulva	17	7.1	2.4	1.4	3.8	#	2.0	5.9
C52 Vagina	5	1.4	3.6	1.2	8.3	#	0.7	20.0
C53 Cervix uteri	17	8.0	2.1	1.2	3.4	#	1.8	17.6
C54 Corpus uteri	77	34.9	2.2	1.7	2.8	#	8.4	2.6
C55,C57 Fem. genitals un	4	2.2	1.8	0.5	4.6		0.4	25.0
C56 Ovary	78	27.6	2.8	2.2	3.5	#	10.0	26.9
C64 Kidney	49	16.8	2.9	2.2	3.9	#	6.4	14.3
C65 Renal pelvis	7	2.1	3.3	1.3	6.8	#	1.0	
C67 Bladder	31	14.6	2.1	1.4	3.0	#	3.3	19.4
C70-C72 CNS cancer	11	9.1	1.2	0.6	2.2		0.4	63.6
C73 Thyroid	16	9.3	1.7	1.0	2.8		1.3	6.3
C74-C80 Cancer others	3	3.9	0.8	0.2	2.3		-0.2	66.7
C76-C79 CUP	7	13.7	0.5	0.2	1.1		-1.3	
C82-C85 NHL	45	26.7	1.7	1.2	2.3	#	3.6	17.8
C90 Mult. myeloma	15	8.7	1.7	1.0	2.8		1.3	26.7
C91-C96 Leukaemia	28	11.2	2.5	1.7	3.6	#	3.3	42.9
Other primaries	18	12.5	1.4	0.9	2.3		1.1	5.6
Not observed	0	1.7	0.0	0.0	2.2		-0.3	
All mult. primaries	1389	667.3	2.1	2.0	2.2	#	143.7	11.2

```
Patients                                  13491
Mean age at second malignancy (years)      74.8
Person-years                              50232
Mean observation time (years)               3.7
Median observation time (years)             2.7
```

The occurrence of second malignancy is statistically significant.

Observed second malignancies with count 1 to 2 are pooled in category "Other primaries".
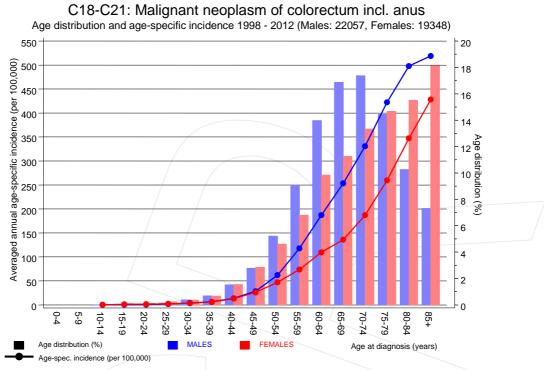
C18-C21: Malignant neoplasm of colorectum incl. anus
Age distribution and age-specific incidence 1998 - 2012 (Males: 22057, Females: 19348)

Figure 7. Age distribution and age-specific incidence

C18-C21: Malignant neoplasm of colorectum incl. anus
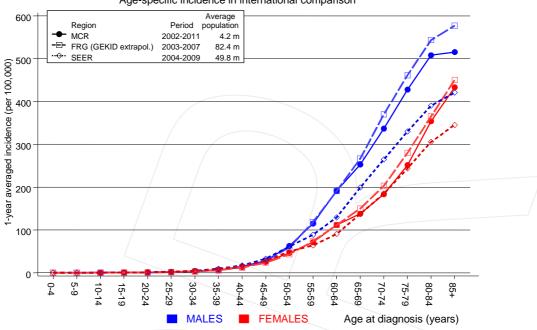### Age-specific incidence in international comparison

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.

C18-C21: Malignant neoplasm of colorectum incl. anus
Cumulative follow-up years since diagnosis for period 1998 - 2012 (excl. DCO)

Gender	n	Target Sum	Median	Actual Sum	Median
All patients					
Males	14833	62229	3.2	58760	3.1
Females	13038	55602	3.2	52207	3.0
Patients alive					
Males	8268	47009	5.0	43540	4.7
Females	7300	42916	5.2	39521	4.8
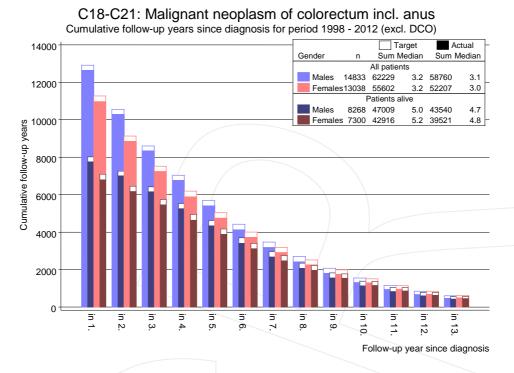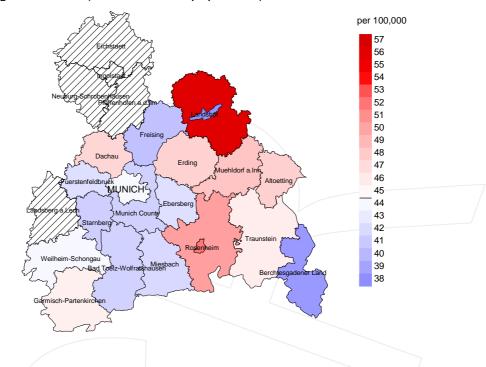
Figure 8. Cumulative follow-up years depending on time since diagnosis

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
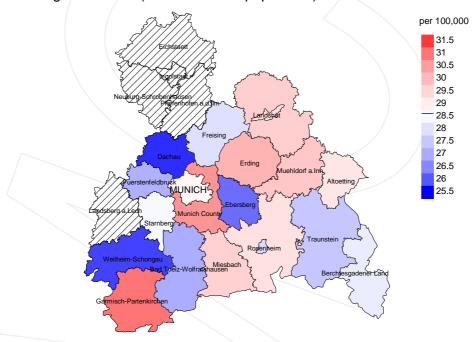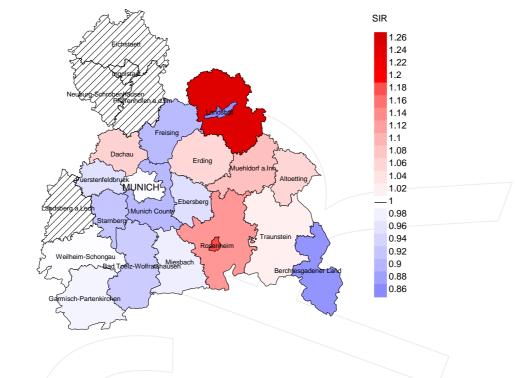
Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 44.5/100,000 WS N=9,711, females 28.6/100,000 WS N=8,503). 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 213 women were identified with newly diagnosed colorectal cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 26.2/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 21.4 and 32.1/100,000.

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=9,711, females N=8,503). 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 213 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	1868	98.1	5.2	1324	70.9	93.4
1999	1871	97.8	6.1	1313	70.2	94.2
2000	1732	98.2	5.5	1177	68.0	95.8
2001	1887	97.4	6.4	1208	64.0	96.9
2002	3211	97.9	11.4	2141	66.7	97.4
2003	3225	97.8	9.3	1981	61.4	98.0
2004	3115	97.4	7.8	1905	61.2	97.7
2005	3035	96.8	7.0	1818	59.9	98.2
2006	3122	94.8	5.1	1687	54.0	98.7
2007	3475	84.3	5.8	1818	52.3	98.3
2008	3415	69.9	5.7	1652	48.4	98.4
2009	3362	67.2	5.1	1477	43.9	98.2
2010	3148	65.9	5.7	1253	39.8	97.8
2011	2995	69.1	5.1	987	33.0	97.5
2012	2581	96.4	6.4	642	24.9	96.0
1998–2012	42042	87.1	6.6	22383	53.2	97.3

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	1868	1055	90.2	301	16.1
1999	1871	1084	90.9	313	16.7
2000	1732	1060	93.6	286	16.5
2001	1887	1139	95.6	294	15.6
2002	3211	1619	98.1	698	21.7
2003	3225	1724	97.9	599	18.6
2004	3115	1743	98.3	557	17.9
2005	3035	1855	96.5	552	18.2
2006	3122	1913	97.6	515	16.5
2007	3475	2027	97.5	581	16.7
2008	3415	2121	98.6	611	17.9
2009	3362	2152	98.7	541	16.1
2010	3148	2250	98.7	542	17.2
2011	2995	2242	98.6	516	17.2
2012	2581	2166	99.2	479	18.6
1998-2012	42042	26150	97.3	7385	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	75.6	24.4	87.3
2003	1724	74.0	26.0	86.8
2004	1743	76.1	23.9	86.6
2005	1855	71.8	28.2	82.0
2006	1913	71.5	28.5	82.8
2007	2027	71.6	28.4	83.5
2008	2121	71.7	28.3	82.1
2009	2152	69.4	30.6	80.0
2010	2250	66.8	33.2	79.0
2011	2242	67.2	32.8	78.8
2012	2166	65.6	34.4	77.6
1998-2012	26150	70.9	29.1	82.7

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	80.2	72.7
2006	1042	75.0	72.9	80.5	73.7
2007	1098	75.2	73.5	80.1	74.3
2008	1181	75.4	73.4	80.9	74.1
2009	1132	75.0	73.1	79.4	73.9
2010	1215	75.6	73.3	80.6	74.5
2011	1228	75.4	72.9	81.3	74.2
2012	1185	76.4	74.1	81.2	75.0
1998-2012	13793	74.8	72.7	80.2	73.7

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

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	850	78.9	77.0	84.7	77.8
2005	894	79.5	77.3	84.7	78.3
2006	871	79.9	77.7	85.3	78.7
2007	929	79.3	76.6	85.4	77.7
2008	940	80.1	77.4	85.9	78.6
2009	1020	79.7	76.8	86.2	77.9
2010	1035	80.2	77.0	86.1	78.4
2011	1014	80.8	77.5	86.8	78.8
2012	981	80.9	77.2	87.4	78.7
1998-2012	12357	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	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	0.40	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	629	33.8	0.38	18.3	0.36	28.5	0.38	38.4	0.39
2003	666	35.5	0.39	18.6	0.38	29.3	0.39	40.5	0.42
2004	687	36.5	0.42	18.1	0.39	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	749	39.1	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	880	39.5	0.48	18.1	0.44	29.0	0.47	40.9	0.51
2009	795	35.6	0.43	16.4	0.40	25.9	0.42	35.4	0.45
2010	836	37.1	0.49	16.3	0.44	25.9	0.46	36.4	0.50
2011	860	37.6	0.54	17.0	0.50	26.6	0.52	35.9	0.54
2012	791	34.6	0.58	15.2	0.53	24.3	0.56	33.7	0.60
1998-2012	9968	36.3	0.45	17.7	0.42	28.0	0.44	38.7	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	0.37	19.9	0.39	27.6	0.41
1999	404	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	0.40	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	0.34	22.8	0.37
2003	611	31.0	0.40	10.8	0.34	17.3	0.36	23.6	0.38
2004	640	32.4	0.44	10.8	0.35	17.5	0.38	24.4	0.41
2005	628	31.6	0.44	10.4	0.37	16.7	0.39	23.1	0.41
2006	621	30.9	0.44	9.8	0.34	16.0	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	699	30.1	0.47	10.0	0.40	15.8	0.42	21.4	0.44
2010	669	28.6	0.48	9.2	0.41	14.6	0.43	19.7	0.44
2011	649	27.5	0.48	8.7	0.38	13.7	0.41	18.8	0.44
2012	629	26.7	0.54	8.6	0.43	13.6	0.46	18.6	0.49
1998-2012	8592	29.9	0.44	10.0	0.37	16.0	0.39	22.0	0.41

Table 13

Age distribution of age at death (cancer-related) for period 1998-2012
(**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	13	0.1	0.1	5	0.0	0.1	8	0.1	0.1
30-34	25	0.1	0.2	16	0.2	0.2	9	0.1	0.2
35-39	66	0.3	0.6	35	0.3	0.6	31	0.3	0.6
40-44	166	0.9	1.4	97	0.9	1.5	69	0.8	1.3
45-49	294	1.5	3.0	146	1.4	2.9	148	1.7	3.0
50-54	588	3.1	6.0	347	3.3	6.3	241	2.7	5.7
55-59	1036	5.4	11.4	653	6.3	12.6	383	4.3	10.1
60-64	1670	8.7	20.1	1112	10.7	23.3	558	6.3	16.4
65-69	2273	11.8	31.9	1512	14.6	37.9	761	8.6	24.9
70-74	2859	14.9	46.8	1754	16.9	54.8	1105	12.5	37.4
75-79	3183	16.6	63.4	1824	17.6	72.4	1359	15.3	52.8
80-84	3238	16.8	80.2	1540	14.9	87.3	1698	19.2	71.9
85+	3805	19.8	100.0	1319	12.7	100.0	2486	28.1	100.0
All ages	19220	100.0		10362	100.0		8858	100.0	

Included in the statistics are 31.4% multiple primaries in males and 25.6% in females.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2012
(**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	0.25	0.1	0.09	2.4	4.3
25-29	5	8	0.3	0.15	0.4	0.18	5.2	7.3
30-34	16	9	0.8	0.20	0.4	0.13	9.1	4.2
35-39	35	31	1.5	0.23	1.4	0.24	9.1	6.2
40-44	97	69	4.0	0.29	3.0	0.23	12.0	6.4
45-49	146	148	6.8	0.24	7.0	0.27	8.6	7.9
50-54	347	241	18.8	0.30	12.8	0.27	11.3	8.4
55-59	653	383	38.4	0.32	21.5	0.29	11.8	8.6
60-64	1112	558	67.5	0.36	32.1	0.29	13.3	9.2
65-69	1512	761	103.1	0.40	47.4	0.35	13.4	9.9
70-74	1754	1105	151.4	0.45	80.1	0.42	14.2	12.3
75-79	1824	1359	242.1	0.56	124.2	0.47	15.1	13.8
80-84	1540	1698	339.1	0.66	196.6	0.56	15.6	16.2
85+	1319	2486	425.3	0.81	303.5	0.70	16.4	19.8
All ages	10362	8858					14.0	13.2
Mortality								
Raw			37.7	0.46	30.9	0.45		
WS			18.4	0.43	10.3	0.37		
ES			29.1	0.45	16.4	0.40		
BRD-S			40.3	0.48	22.7	0.42		
PYLL-70								
per 100,000			138.7		90.0			
ES			120.9		76.7			
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 1998-2012
MALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03-C06	Oral cavity	44	1.1	34	77.3	2	4.5	8	18.2
C09-C10	Oropharynx	34	0.9	16	47.1	4	11.8	14	41.2
C15	Oesophagus	59	1.5	9	15.3	13	22.0	37	62.7
C16	Stomach	209	5.4	58	27.8	50	23.9	101	48.3
C17	Small intestine	37	1.0	3	8.1	15	40.5	19	51.4
C18	Colon	299	7.7			105	35.1	194	64.9
C19-C20	Rectum	167	4.3			97	58.1	70	41.9
C22	Liver	113	2.9	5	4.4	28	24.8	80	70.8
C23-C24	Bile	31	0.8			3	9.7	28	90.3
C25	Pancreas	136	3.5	9	6.6	24	17.6	103	75.7
C32	Larynx	62	1.6	45	72.6	1	1.6	16	25.8
C33-C34	Lung	424	11.0	68	16.0	59	13.9	297	70.0
C43	Malign. melanoma	145	3.7	85	58.6	3	2.1	57	39.3
C44	Skin others	175	4.5	90	51.4	17	9.7	68	38.9
C61	Prostate	851	22.0	472	55.5	74	8.7	305	35.8
C64	Kidney	154	4.0	72	46.8	35	22.7	47	30.5
C67	Bladder	304	7.9	136	44.7	25	8.2	143	47.0
C70-C72	CNS cancer	72	1.9	22	30.6	5	6.9	45	62.5
C76-C79	CUP	44	1.1	9	20.5	8	18.2	27	61.4
C82-C85	NHL	157	4.1	65	41.4	25	15.9	67	42.7
C90	Mult. myeloma	41	1.1	13	31.7	5	12.2	23	56.1
C91-C96	Leukaemia	85	2.2	24	28.2	8	9.4	53	62.4
Other primaries		225	5.8	89	39.6	16	7.1	120	53.3
All mult. primaries		3868	100.0	1324	34.2	622	16.1	1922	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 1998-2012
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C16	Stomach	153	5.2	45	29.4	31	20.3	77	50.3
C18	Colon	198	6.8			58	29.3	140	70.7
C19-C20	Rectum	106	3.6			61	57.5	45	42.5
C22	Liver	33	1.1	2	6.1	8	24.2	23	69.7
C23-C24	Bile	35	1.2	9	25.7	5	14.3	21	60.0
C25	Pancreas	120	4.1	9	7.5	18	15.0	93	77.5
C33-C34	Lung	187	6.4	32	17.1	16	8.6	139	74.3
C43	Malign. melanoma	69	2.4	46	66.7	5	7.2	18	26.1
C44	Skin others	76	2.6	37	48.7	7	9.2	32	42.1
C50	Breast	733	25.1	478	65.2	58	7.9	197	26.9
C51	Vulva	31	1.1	15	48.4	2	6.5	14	45.2
C53	Cervix uteri	118	4.0	90	76.3	10	8.5	18	15.3
C54	Corpus uteri	190	6.5	124	65.3	10	5.3	56	29.5
C56	Ovary	198	6.8	66	33.3	50	25.3	82	41.4
C64	Kidney	66	2.3	33	50.0	12	18.2	21	31.8
C67	Bladder	104	3.6	50	48.1	3	2.9	51	49.0
C70-C72	CNS cancer	56	1.9	24	42.9	9	16.1	23	41.1
C73	Thyroid	31	1.1	16	51.6	3	9.7	12	38.7
C76-C79	CUP	24	0.8	7	29.2	5	20.8	12	50.0
C82-C85	NHL	90	3.1	37	41.1	10	11.1	43	47.8
C90	Mult. myeloma	41	1.4	9	22.0	3	7.3	29	70.7
C91-C96	Leukaemia	63	2.2	10	15.9	7	11.1	46	73.0
Other primaries		197	6.7	73	37.1	32	16.2	92	46.7
All mult. primaries		2919	100.0	1212	41.5	423	14.5	1284	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 1998-2012
(**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	0.25	0.1	0.09	2.6	4.7
25-29	5	8	0.3	0.17	0.4	0.19	5.6	7.8
30-34	15	9	0.7	0.19	0.4	0.14	8.7	4.8
35-39	31	25	1.3	0.23	1.1	0.21	8.6	5.6
40-44	92	62	3.8	0.29	2.7	0.23	12.3	6.6
45-49	137	135	6.4	0.24	6.4	0.26	8.9	8.3
50-54	306	205	16.6	0.29	10.9	0.26	11.4	8.5
55-59	570	339	33.5	0.31	19.0	0.30	11.9	9.0
60-64	953	463	57.8	0.35	26.6	0.28	13.6	9.3
65-69	1250	641	85.2	0.41	40.0	0.35	13.7	10.3
70-74	1408	883	121.5	0.46	64.0	0.41	14.4	12.3
75-79	1369	1064	181.7	0.56	97.3	0.46	14.8	13.4
80-84	1138	1323	250.6	0.68	153.2	0.54	15.3	15.9
85+	984	1999	317.3	0.83	244.1	0.69	16.1	19.6
All ages	8260	7158					13.9	13.2
Mortality								
Raw			30.1	0.46	24.9	0.44		
WS			14.9	0.42	8.5	0.36		
ES			23.3	0.44	13.5	0.39		
BRD-S			31.8	0.48	18.4	0.41		
PYLL-70								
per 100,000			122.1		78.3			
ES			106.5		66.8			
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 1998-2012
(**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	0.25	0.1	0.09	2.7	5.0
25-29	5	8	0.3	0.18	0.4	0.19	6.0	8.2
30-34	15	8	0.7	0.20	0.4	0.13	9.0	4.7
35-39	29	23	1.2	0.22	1.0	0.19	8.5	5.6
40-44	89	60	3.7	0.29	2.6	0.23	12.5	7.0
45-49	130	127	6.0	0.24	6.0	0.27	9.1	8.7
50-54	289	196	15.6	0.29	10.4	0.26	11.8	9.0
55-59	521	313	30.7	0.32	17.6	0.30	11.9	9.3
60-64	847	412	51.4	0.35	23.7	0.28	13.6	9.5
65-69	1083	554	73.8	0.40	34.5	0.33	13.8	10.4
70-74	1151	765	99.3	0.43	55.5	0.39	14.0	12.6
75-79	1104	924	146.5	0.52	84.5	0.44	14.8	13.9
80-84	871	1124	191.8	0.58	130.2	0.49	14.7	16.1
85+	739	1725	238.3	0.66	210.6	0.62	14.9	19.7
All ages	6875	6241					13.6	13.3
Mortality								
Raw			25.0	0.42	21.7	0.41		
WS			12.6	0.40	7.5	0.35		
ES			19.5	0.41	11.8	0.37		
BRD-S			26.2	0.44	16.1	0.39		
PYLL-70								
per 100,000			112.3		72.6			
ES			98.1		62.1			
AYLL-70			9.2		10.5			

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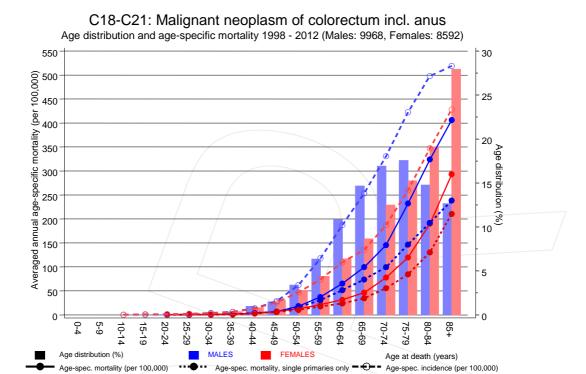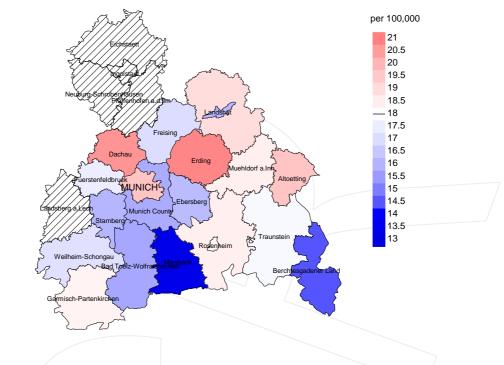
Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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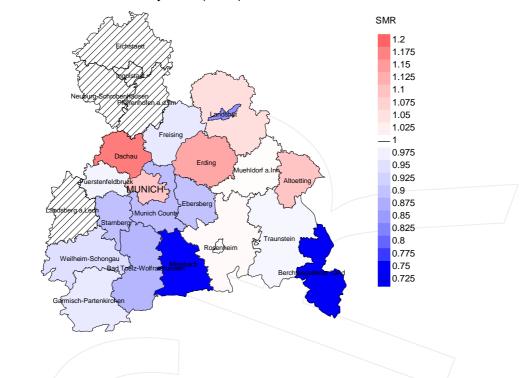
Average mortality (world standard population) 2003 - 2008: Females

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=4,278, females 10.0/100,000 WS N=3,635). 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
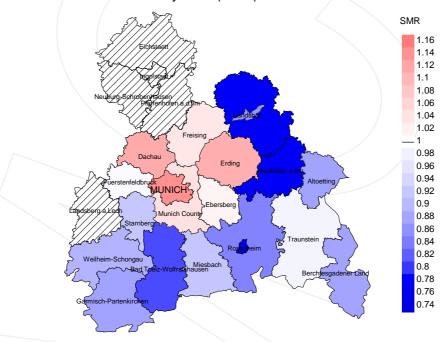
Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=4,278, females N=3,635). 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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