Munich Cancer Registry

Munich Cancer Registry at Munich Cancer Center
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Munich, 81377
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http://www.tumorregister-muenchen.de/en

Cancer statistics: Baseline statistics

C19, C20: Rectal cancer

Year of diagnosis	1998-2013
Patients	15,150
Diseases	15,169
Creation date	05/19/2015
Export date	12/30/2014
Population	4.64 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 4.64 million inhabitants, account for the frequency of cancer diseases[##] and the achieved long term results. Additionally, the long term survival evaluated by the Munich Cancer Registry (MCR) is compared with the results of the population-based registry in the USA (SEER), which is useful for checking the consistency of the data on an international level.

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

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

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

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

Munich Cancer Registry, May 2015

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

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

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

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

Code	Description
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	558	18	3.2	23.1	70.8	97.1
1999	637	25	3.9	21.2	70.3	98.0
2000	604	22	3.6	23.3	68.5	98.5
2001	624	22	3.5	26.0	58.3	96.5
2002	1111	77	6.9	24.6	66.7	98.4 #
2003	1092	65	6.0	22.9	60.6	97.8
2004	993	45	4.5	24.6	59.4	96.7
2005	1036	45	4.3	22.4	59.8	98.0
2006	1080	33	3.1	25.3	54.4	95.4
2007	1231	41	3.3	22.4	54.7	86.4 # ##
2008	1145	48	4.2	22.7	48.5	70.2
2009	1113	49	4.4	20.8	46.6	65.7
2010	1091	43	3.9	22.1	42.3	62.8
2011	1077	31	2.9	21.4	36.0	63.8
2012	1027	43	4.2	21.3	29.0	70.6
2013	750	35	4.7	18.4	17.7	98.3 ###
1998–2013	15169	642	4.2	22.6	51.7	85.5

\#   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	558	313	245	56.1
1999	637	360	277	56.5
2000	604	346	258	57.3
2001	624	358	266	57.4
2002	1111	645	466	58.1
2003	1092	624	468	57.1
2004	993	573	420	57.7
2005	1036	594	442	57.3
2006	1080	644	436	59.6
2007	1231	740	491	60.1
2008	1145	685	460	59.8
2009	1113	684	429	61.5
2010	1091	683	408	62.6
2011	1077	658	419	61.1
2012	1027	617	410	60.1
2013	750	465	285	62.0
1998-2013	15169	8989	6180	59.3

Table 2

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

Year of diagnosis	Males n	Females n	Males Inc. raw	Fem. Inc. raw	Males Inc. WS	Fem. Inc. WS	Males Inc. ES	Fem. Inc. ES	Males Inc. BRD-S	Fem. Inc. BRD-S
1998	313	245	28.2	20.8	17.2	9.3	25.2	13.9	31.4	17.7
1999	360	277	32.2	23.3	19.4	10.5	28.6	15.6	35.5	20.0
2000	346	258	30.4	21.5	18.1	8.8	26.8	13.4	33.3	17.6
2001	358	266	30.9	21.9	18.4	10.3	26.9	15.0	33.7	18.7
2002	645	466	34.6	23.8	20.0	10.4	29.3	15.6	36.4	19.8
2003	624	468	33.3	23.8	19.0	10.6	27.9	15.5	34.7	19.4
2004	573	420	30.5	21.2	17.0	9.6	24.8	14.1	30.6	17.7
2005	594	442	31.4	22.2	17.4	9.4	25.4	13.9	31.5	17.8
2006	644	436	33.6	21.7	18.2	9.4	26.5	13.7	33.0	17.5
2007	740	491	33.4	21.3	17.8	9.0	26.2	13.3	32.7	17.0
2008	685	460	30.8	19.8	16.2	8.2	23.7	12.2	29.7	15.6
2009	684	429	30.6	18.4	15.8	7.9	23.2	11.7	29.2	14.7
2010	683	408	30.3	17.4	15.7	7.0	23.0	10.5	28.6	13.7
2011	658	419	28.8	17.8	14.7	7.6	21.5	11.0	26.7	13.5
2012	617	410	27.0	17.4	13.7	7.3	20.4	10.8	25.6	13.5
2013	465	285	20.4	12.1	10.4	5.4	15.1	7.8	18.9	9.7
1998-2013	8989	6180	30.2	19.9	16.5	8.6	24.1	12.6	30.0	16.0

The computation of the incidence measures includes all primaries, irrespective of first or subsequent malignancy.
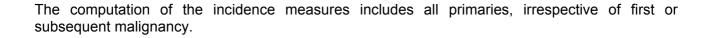
Table 3

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	558	68.2	12.3	30.5	102	53.5	59.4	68.3	77.2	85.1
1999	637	68.4	12.3	34.1	102	52.4	59.3	69.0	77.2	85.6
2000	604	69.4	12.2	33.4	95.9	54.0	60.4	69.1	79.0	86.7
2001	624	68.0	12.1	28.3	97.1	52.9	60.5	67.2	76.8	83.8
2002	1111	68.8	11.7	29.9	104	54.1	61.0	69.3	77.0	83.0
2003	1092	68.9	11.8	27.1	101	53.9	61.2	68.8	77.3	83.8
2004	993	68.2	11.9	21.3	97.3	53.5	60.9	67.9	77.3	83.5
2005	1036	69.1	11.8	19.0	99.6	54.0	61.2	68.9	77.8	84.2
2006	1080	68.6	12.1	21.2	98.7	52.8	62.1	68.6	78.0	83.7
2007	1231	69.3	11.8	30.5	97.5	53.1	62.6	69.3	78.1	84.4
2008	1145	69.6	11.9	28.2	102	53.9	62.4	69.9	78.5	84.7
2009	1113	69.0	12.1	20.7	102	51.9	61.6	70.2	77.7	84.1
2010	1091	69.6	12.6	21.1	101	52.8	61.6	70.9	79.0	85.3
2011	1077	69.1	12.9	20.1	99.1	51.1	60.6	70.3	78.4	85.8
2012	1027	69.3	12.4	26.1	99.6	52.9	60.0	70.6	78.0	84.9
2013	750	68.0	12.7	25.3	98.2	50.4	59.1	70.4	76.4	83.3
1998-2013	15169	68.9	12.1	19.0	104	53.0	61.0	69.4	77.8	84.5

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	313	65.8	11.8	32.6	94.4	51.6	58.2	64.0	74.0	82.9
1999	360	66.3	11.4	34.1	94.2	52.0	58.3	65.6	73.5	82.6
2000	346	66.8	11.5	34.4	95.9	53.0	58.9	65.3	74.8	83.6
2001	358	67.0	10.6	36.4	93.6	53.9	60.6	65.9	73.7	81.1
2002	645	67.1	10.6	32.8	93.0	53.9	60.6	66.8	74.1	81.3
2003	624	67.4	10.7	27.1	93.1	53.9	60.7	67.7	74.6	81.2
2004	573	66.9	10.4	29.9	93.3	54.3	60.7	66.3	74.9	79.8
2005	594	67.1	10.7	19.0	99.6	53.8	60.3	67.1	74.2	80.6
2006	644	67.0	10.8	25.7	94.7	52.8	60.4	67.3	74.6	81.0
2007	740	68.0	10.9	31.1	95.5	53.2	62.1	68.0	75.3	81.8
2008	685	68.0	10.7	28.2	96.0	53.9	62.1	68.5	75.1	80.7
2009	684	68.0	11.2	20.7	95.4	52.0	61.4	69.6	75.4	80.9
2010	683	68.1	12.0	21.1	98.3	52.7	60.6	69.4	75.9	83.1
2011	658	68.0	11.5	26.3	93.6	51.9	61.0	69.7	75.8	82.1
2012	617	68.4	11.4	26.1	99.6	53.4	59.7	69.5	76.8	82.7
2013	465	67.6	11.5	26.1	98.2	51.1	60.0	69.9	75.3	81.2
1998-2013	8989	67.5	11.1	19.0	99.6	53.2	60.4	67.9	75.1	81.5

Table 3b

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	245	71.2	12.2	30.5	102	55.3	62.2	72.5	78.6	87.7
1999	277	71.1	12.8	38.4	102	52.7	61.5	73.0	79.8	87.5
2000	258	73.0	12.3	33.4	94.7	55.7	62.7	75.0	81.8	88.2
2001	266	69.4	13.8	28.3	97.1	51.7	60.1	70.2	79.6	86.7
2002	466	71.2	12.6	29.9	104	54.5	62.3	72.8	80.3	87.6
2003	468	70.8	12.9	29.2	101	54.3	61.7	71.4	81.2	86.8
2004	420	70.0	13.4	21.3	97.3	51.7	61.4	71.3	80.6	86.2
2005	442	71.8	12.6	32.8	96.8	54.6	63.2	72.2	81.4	87.1
2006	436	71.0	13.4	21.2	98.7	52.5	63.5	72.3	81.2	86.6
2007	491	71.4	12.8	30.5	97.5	53.0	63.7	72.4	81.5	87.0
2008	460	72.2	13.0	29.3	102	53.6	63.4	73.1	82.3	87.8
2009	429	70.8	13.4	29.2	102	51.7	61.8	71.4	80.7	87.2
2010	408	72.0	13.1	23.0	101	52.9	63.4	74.0	82.4	87.1
2011	419	70.8	14.8	20.1	99.1	50.4	60.2	71.7	82.8	89.3
2012	410	70.7	13.7	26.1	97.4	52.1	61.6	72.3	81.5	87.0
2013	285	68.7	14.4	25.3	96.5	48.7	57.6	72.1	78.8	86.1
1998-2013	6180	71.1	13.2	20.1	104	52.6	62.2	72.4	81.2	87.2

Table 4

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

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
15-19	1	0.0	0.0	1	0.0	0.0			0.0
20-24	10	0.1	0.1	2	0.0	0.0	8	0.1	0.1
25-29	22	0.1	0.2	9	0.1	0.1	13	0.2	0.3
30-34	55	0.4	0.6	30	0.3	0.5	25	0.4	0.7
35-39	100	0.7	1.2	59	0.7	1.1	41	0.7	1.4
40-44	276	1.8	3.1	161	1.8	2.9	115	1.9	3.3
45-49	535	3.5	6.6	302	3.4	6.3	233	3.8	7.0
50-54	953	6.3	12.9	594	6.6	12.9	359	5.8	12.8
55-59	1494	9.8	22.7	1007	11.2	24.1	487	7.9	20.7
60-64	2105	13.9	36.6	1433	15.9	40.0	672	10.9	31.6
65-69	2316	15.3	51.9	1588	17.7	57.7	728	11.8	43.4
70-74	2397	15.8	67.7	1539	17.1	74.8	858	13.9	57.3
75-79	1991	13.1	80.8	1114	12.4	87.2	877	14.2	71.5
80-84	1516	10.0	90.8	667	7.4	94.6	849	13.7	85.2
85+	1398	9.2	100.0	483	5.4	100.0	915	14.8	100.0
All ages	15169	100.0		8989	100.0		6180	100.0	

Included in the statistics are 29.1% multiple primaries in males and 26.0% in females.

Table 5

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

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=274 %	Females DCO rate n=367 %	Males Prop.all cancers n=158258 %	Females Prop.all cancers n=153136 %
0- 4			0.0	0.0				
5- 9			0.0	0.0				
10-14			0.0	0.0				
15-19	1		0.1	0.0			0.3	
20-24	2	8	0.1	0.4			0.3	1.5
25-29	9	13	0.4	0.6			0.9	1.2
30-34	30	25	1.3	1.1			2.0	1.2
35-39	59	41	2.4	1.7			2.6	1.1
40-44	161	115	6.1	4.6		0.9	5.0	1.8
45-49	302	233	12.8	10.1	0.3	0.4	5.7	2.7
50-54	594	359	29.4	17.5	1.0	0.3	6.9	3.2
55-59	1007	487	54.9	25.3	1.2	0.4	7.0	3.6
60-64	1433	671	80.8	35.8	1.1	1.5	6.6	3.9
65-69	1586	727	100.5	42.1	2.3	1.5	5.8	3.8
70-74	1538	856	120.1	56.4	2.4	3.4	5.7	4.7
75-79	1112	877	134.5	73.8	3.9	5.4	5.4	5.0
80-84	666	849	133.1	91.0	6.0	8.4	4.9	5.4
85+	483	915	141.6	102.4	17.0	21.2	4.9	5.3
All ages	8983	6176			3.1	5.9	5.7	4.0
Incidence								
Raw			30.2	19.9				
WS			16.4	8.6				
ES			24.1	12.6				
BRD-S			29.9	16.0				

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

Table 6a

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

Diagnosis	Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C03-C06 Oral cavity	2	3.5	0.6	0.1	2.0		-0.6	
C07-C08 Salivary gland	2	0.9	2.2	0.3	7.8		0.5	
C09-C10 Oropharynx	5	4.3	1.2	0.4	2.7		0.3	
C12-C13 Hypopharynx	3	2.4	1.2	0.3	3.6		0.2	
C15 Oesophagus	11	7.5	1.5	0.7	2.6		1.5	9.1
C16 Stomach	34	17.8	1.9	1.3	2.7	#	6.8	2.9
C17 Small intestine	10	2.0	4.9	2.4	9.0	#	3.3	
C18 Colon	183	42.6	4.3	3.7	5.0	#	59.0	1.1
C19-C20 Rectum	8	23.9	0.3	0.1	0.7	#	-6.7	25.0
C22 Liver	34	11.7	2.9	2.0	4.1	#	9.4	8.8
C23-C24 Bile	10	4.1	2.4	1.2	4.4	#	2.5	10.0
C25 Pancreas	22	15.1	1.5	0.9	2.2		2.9	18.2
C32 Larynx	7	4.4	1.6	0.6	3.3		1.1	28.6
C33-C34 Lung	88	50.3	1.7	1.4	2.2	#	15.8	10.2
C38,C45 Mesothelioma	3	2.8	1.1	0.2	3.1		0.1	
C43 Malign. melanoma	26	16.5	1.6	1.0	2.3	#	4.0	
C46,C49 Soft tissue	4	2.2	1.8	0.5	4.6		0.7	
C60 Penis	3	1.0	3.1	0.6	9.2		0.9	
C61 Prostate	189	129.9	1.5	1.3	1.7	#	24.8	5.3
C62 Testis	2	0.9	2.3	0.3	8.2		0.5	
C64 Kidney	30	14.9	2.0	1.4	2.9	#	6.3	6.7
C65 Renal pelvis	3	1.7	1.7	0.4	5.0		0.5	
C66 Ureter	4	1.0	4.1	1.1	10.6	#	1.3	
C67 Bladder	31	19.0	1.6	1.1	2.3	#	5.1	6.5
C70-C72 CNS cancer	16	5.5	2.9	1.7	4.7	#	4.4	25.0
C73 Thyroid	5	2.6	1.9	0.6	4.4		1.0	20.0
C76-C79 CUP	8	7.2	1.1	0.5	2.2		0.3	
C81 Hodgkin lymphoma	2	0.8	2.4	0.3	8.7		0.5	
C82-C85 NHL	22	16.9	1.3	0.8	2.0		2.1	4.5
C90 Mult. myeloma	4	5.5	0.7	0.2	1.9		-0.6	25.0
C91-C96 Leukaemia	14	6.8	2.1	1.1	3.4	#	3.0	35.7
Other primaries	3	2.2	1.3	0.3	3.9		0.3	
Not observed	0	5.3	0.0	0.0	0.7	#	-2.2	
All mult. primaries	788	433.3	1.8	1.7	2.0	#	149.0	6.5

Patients	5982
Median age at second malignancy (years)	71.9
Person-years	23806
Mean observation time (years)	4.0
Median observation time (years)	3.0

The occurrence of second malignancy is statistically significant.

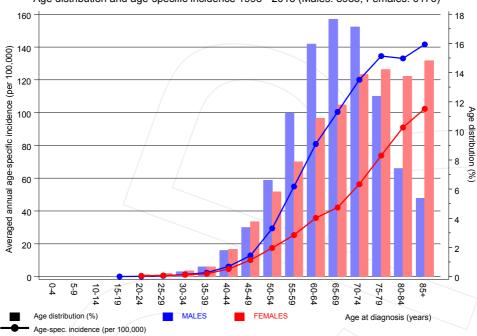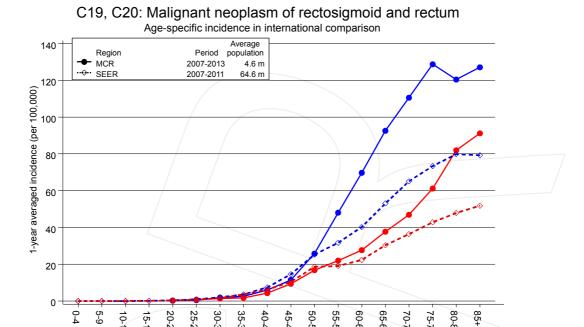Observed second primaries with count 1 are pooled in category "Other primaries".

Table 6b

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

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C11	Nasopharynx	2	0.1	27.0	3.3	97.5	#	1.1	
C15	Oesophagus	3	1.2	2.5	0.5	7.3		1.0	
C16	Stomach	12	9.1	1.3	0.7	2.3		1.7	16.7
C17	Small intestine	7	1.0	7.2	2.9	14.8	#	3.5	
C18	Colon	98	24.4	4.0	3.3	4.9	#	42.7	2.0
C19-C20	Rectum	7	10.2	0.7	0.3	1.4		-1.8	14.3
C21	Anus/canal	4	1.1	3.5	1.0	9.0		1.7	
C22	Liver	3	2.7	1.1	0.2	3.3		0.2	66.7
C23-C24	Bile	8	3.6	2.2	1.0	4.4		2.6	12.5
C25	Pancreas	11	10.4	1.1	0.5	1.9		0.4	18.2
C33-C34	Lung	26	14.9	1.7	1.1	2.6	#	6.4	19.2
C43	Malign. melanoma	18	7.2	2.5	1.5	4.0	#	6.3	
C46,C49	Soft tissue	4	1.2	3.2	0.9	8.3		1.6	
C48	Peritoneal	2	0.7	2.7	0.3	9.9		0.7	
C50	Breast	107	62.4	1.7	1.4	2.1	#	25.9	3.7
C51	Vulva	4	2.3	1.7	0.5	4.5		1.0	25.0
C52	Vagina	4	0.4	9.0	2.5	23.0	#	2.1	25.0
C53	Cervix uteri	4	2.7	1.5	0.4	3.8		0.8	25.0
C54	Corpus uteri	23	11.8	1.9	1.2	2.9	#	6.5	8.7
C55,C57	Fem. genitals un	3	0.7	4.5	0.9	13.3		1.4	
C56	Ovary	24	9.1	2.6	1.7	3.9	#	8.6	20.8
C64	Kidney	13	5.6	2.3	1.2	4.0	#	4.3	15.4
C65	Renal pelvis	3	0.7	4.3	0.9	12.5		1.3	
C67	Bladder	10	4.6	2.2	1.0	4.0	#	3.1	30.0
C69	Eye melanoma	2	0.3	6.7	0.8	24.3		1.0	
C70-C72	CNS cancer	2	3.0	0.7	0.1	2.4		-0.6	50.0
C73	Thyroid	5	3.3	1.5	0.5	3.6		1.0	
C76-C79	CUP	2	4.3	0.5	0.1	1.7		-1.4	
C82-C85	NHL	8	8.8	0.9	0.4	1.8		-0.5	
C90	Mult. myeloma	6	2.9	2.1	0.8	4.5		1.8	50.0
C91-C96	Leukaemia	9	3.7	2.5	1.1	4.7	#	3.1	44.4
Other primaries		7	2.0	3.5	1.4	7.2	#	2.9	14.3
Not observed		0	4.9	0.0	0.0	0.8	#	-2.8	
All mult. primaries		441	221.2	2.0	1.8	2.2	#	127.4	9.8

Patients	4262
Median age at second malignancy (years)	75.3
Person-years	17260
Mean observation time (years)	4.0
Median observation time (years)	2.9

The occurrence of second malignancy is statistically significant.

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

C19, C20: Malignant neoplasm of rectosigmoid and rectum
Age distribution and age-specific incidence 1998 - 2013 (Males: 8983, Females: 6176)

Figure 7. Age distribution and age-specific incidence

C19, C20: Malignant neoplasm of rectosigmoid and rectum
Age-specific incidence in international comparison

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 2014, based on the November 2013 submission. http://www.seer.cancer.gov.

C19, C20: Malignant neoplasm of rectosigmoid and rectum
Cumulative follow-up years since diagnosis for period 1998 - 2013 (excl. DCO)

			Target		Actual	
Gender	n	Sum	Median		Sum	Median
All patients						
Males	5729	25864	3.5		24387	3.3
Females	4064	18827	3.5		17689	3.2
Patients alive						
Males	3248	19467	5.2		17989	4.9
Females	2308	14487	5.5		13350	5.2
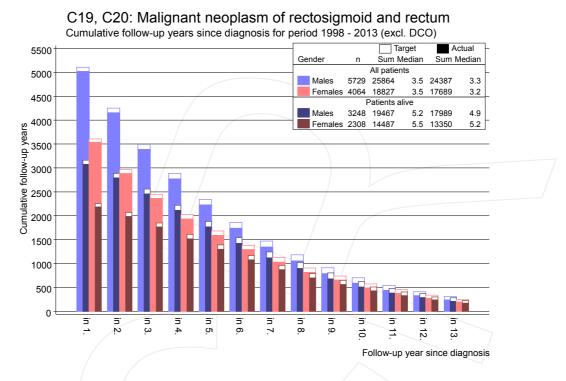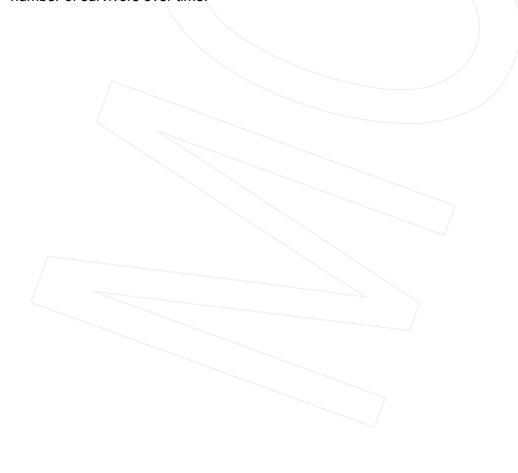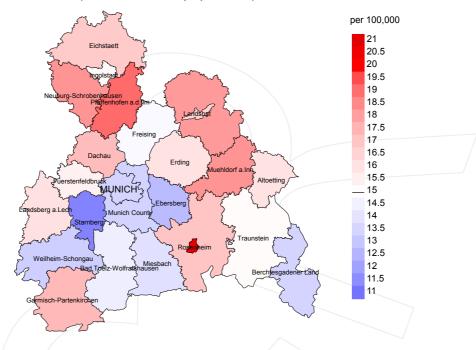
Figure 8. Cumulative follow-up years depending on time since diagnosis
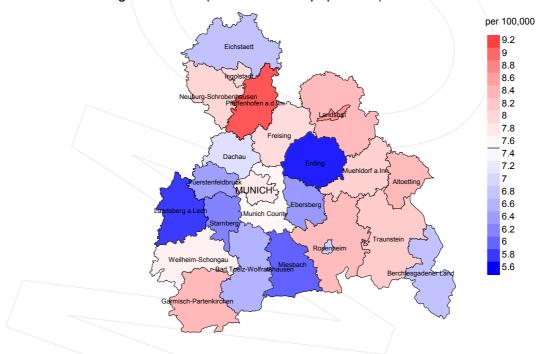
The increase of the lost to follow-up rate can be interpreted as a consequence of a declining number of survivors over time.

Average incidence (world standard population) 2007 - 2013: Males
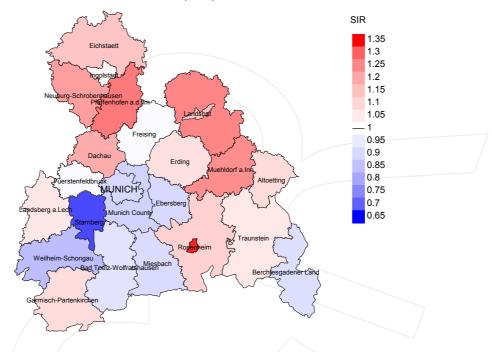
Average incidence (world standard population) 2007 - 2013: Females
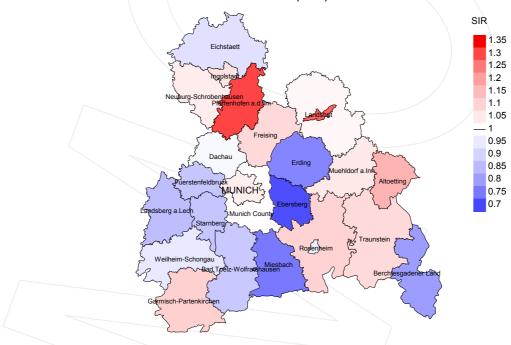
Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 15.0/100,000 WS N=4,529, females 7.5/100,000 WS N=2,900).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,928 female residents (averaged) in the period from 2007 to 2013 a total of 54 women were identified with newly diagnosed rectal cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 6.4/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 4.2 and 9.6/100,000.

Standardized incidence ratio (SIR) 2007 - 2013: Males

Standardized incidence ratio (SIR) 2007 - 2013: Females

Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=4,529, females N=2,900).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,642 female residents (averaged) in the period from 2007 to 2013 a total of 54 women were identified with newly diagnosed rectal cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.71. Though, the value of this parameter may vary with an underlying probability of 99% between 0.48 and 0.99.

MORTALITY

Table 10a

Patient cohorts of incident cancers by year of diagnosis, follow-up status,
proportion of DCO, deaths among the annual cohorts,
and proportion of available death certificates
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002,
and from 3.96 to 4.64 m as of 2007, respectively)

Year of diagnosis	Incident cases n	Prop. actively followed %	Prop. DCO %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	558	97.1	3.2	395	70.8	92.2
1999	637	98.0	3.9	448	70.3	94.4
2000	604	98.5	3.6	414	68.5	94.4
2001	624	96.5	3.5	364	58.3	97.5
2002	1111	98.4	6.9	741	66.7	96.8
2003	1092	97.8	6.0	662	60.6	97.9
2004	993	96.7	4.5	590	59.4	99.0
2005	1036	98.0	4.3	620	59.8	97.4
2006	1080	95.4	3.1	587	54.4	97.8
2007	1231	86.4	3.3	673	54.7	97.3
2008	1145	70.2	4.2	555	48.5	97.7
2009	1113	65.7	4.4	519	46.6	97.5
2010	1091	62.8	3.9	461	42.3	97.2
2011	1077	63.8	2.9	388	36.0	96.9
2012	1027	70.6	4.2	298	29.0	93.0
2013	750	98.3	4.7	133	17.7	86.5
1998-2013	15169	85.5	4.2	7848	51.7	96.6

Table 10b

Annual cohorts of incident cancers and deaths, proportion of death certificates
and cases deceased the same year of cancer diagnosis
(incl. DCO)
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002,
and from 3.96 to 4.64 m as of 2007, respectively)

Year of diagnosis/ death	Incident cases n	Deaths n	Prop. deaths with death certific. %	Deaths in same year n	Prop. deaths in same year %
1998	558	337	88.7	61	10.9
1999	637	372	88.7	85	13.3
2000	604	350	93.4	76	12.6
2001	624	392	95.7	75	12.0
2002	1111	557	97.5	189	17.0
2003	1092	584	97.8	145	13.3
2004	993	598	98.2	122	12.3
2005	1036	614	96.1	141	13.6
2006	1080	702	97.4	163	15.1
2007	1231	712	97.9	170	13.8
2008	1145	775	99.0	158	13.8
2009	1113	794	99.5	159	14.3
2010	1091	825	99.0	173	15.9
2011	1077	827	97.2	150	13.9
2012	1027	802	98.5	158	15.4
2013	750	740	97.7	96	12.8
1998-2013	15169	9981	97.1	2121	14.0

Table 10c

Annual cohorts of deaths, proportion of cancer-related and non-cancer-
related deaths, and cancer recorded on death certificates
(incl. DCO)
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002,
and from 3.96 to 4.64 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer-related %	Prop. non-cancer-related %	Prop. cancer recorded on death certificate %
1998	337	71.2	28.8	87.6
1999	372	75.8	24.2	89.7
2000	350	75.4	24.6	87.8
2001	392	71.2	28.8	86.9
2002	557	78.1	21.9	88.4
2003	584	77.1	22.9	89.5
2004	598	75.3	24.7	88.1
2005	614	73.3	26.7	85.8
2006	702	76.8	23.2	85.8
2007	712	74.7	25.3	85.8
2008	775	73.8	26.2	83.3
2009	794	72.8	27.2	85.1
2010	825	69.6	30.4	81.5
2011	827	71.3	28.7	83.8
2012	802	69.8	30.2	81.0
2013	740	65.5	34.5	78.7
1998-2013	9981	72.9	27.1	84.9

Table 11a

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	179	72.3	70.2	78.1	72.1
1999	220	70.7	70.3	73.5	70.9
2000	198	72.6	69.9	79.8	71.7
2001	213	73.3	70.0	80.3	71.8
2002	321	72.7	71.1	80.2	72.0
2003	315	71.0	68.8	81.7	70.4
2004	338	74.8	72.6	80.0	73.6
2005	356	73.7	71.1	80.3	71.8
2006	427	74.8	72.3	80.3	73.8
2007	422	73.2	71.7	78.5	72.4
2008	456	75.4	73.3	80.5	74.0
2009	459	73.1	70.5	79.4	71.9
2010	491	75.2	73.5	81.8	74.0
2011	502	75.5	72.7	81.8	74.2
2012	492	76.0	74.4	81.5	75.0
2013	425	76.4	73.5	81.5	75.1
1998-2013	5814	74.1	72.0	80.4	73.1

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

Table 11b

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	158	79.6	75.9	85.7	79.1
1999	152	78.7	77.2	81.8	78.1
2000	152	79.2	77.8	83.2	78.8
2001	179	78.8	74.9	86.9	77.0
2002	236	80.3	79.5	84.5	79.6
2003	269	80.2	78.2	83.9	79.0
2004	260	81.2	79.4	84.7	80.1
2005	258	81.2	80.3	83.8	80.7
2006	275	80.8	79.3	85.6	80.0
2007	290	80.7	78.7	85.0	80.0
2008	319	81.3	79.4	86.0	80.0
2009	335	81.6	77.6	87.1	79.1
2010	334	82.2	78.6	86.4	79.8
2011	325	82.0	78.2	86.4	79.8
2012	310	82.9	79.1	88.7	80.7
2013	315	82.9	78.0	87.1	80.4
1998-2013	4167	81.0	78.5	86.1	79.7

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	124	11.2	0.40	6.5	0.38	10.1	0.40	13.4	0.43
1999	172	15.4	0.48	8.9	0.46	13.8	0.48	18.8	0.53
2000	148	13.0	0.43	7.4	0.41	11.5	0.43	15.1	0.45
2001	152	13.1	0.42	7.5	0.41	11.6	0.43	15.2	0.45
2002	241	12.9	0.37	7.1	0.35	10.8	0.37	14.2	0.39
2003	245	13.1	0.39	7.2	0.38	10.8	0.39	14.0	0.40
2004	257	13.7	0.45	6.8	0.40	10.8	0.44	15.1	0.49
2005	266	14.0	0.45	7.1	0.41	10.9	0.43	14.6	0.47
2006	332	17.3	0.52	8.7	0.48	13.6	0.51	18.3	0.55
2007	324	14.6	0.44	7.1	0.40	11.0	0.42	14.9	0.45
2008	345	15.5	0.50	7.3	0.45	11.5	0.49	15.8	0.53
2009	343	15.4	0.50	7.5	0.47	11.4	0.49	14.8	0.51
2010	350	15.5	0.51	7.0	0.44	10.9	0.47	15.1	0.53
2011	371	16.2	0.57	7.5	0.51	11.6	0.54	15.3	0.58
2012	344	15.1	0.56	6.8	0.49	10.7	0.52	14.6	0.57
2013	287	12.6	0.62	5.7	0.55	8.8	0.58	12.1	0.64
1998-2013	4301	14.5	0.48	7.2	0.44	11.2	0.46	15.0	0.50

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	116	9.9	0.47	3.9	0.41	6.0	0.43	8.3	0.47
1999	110	9.3	0.40	3.5	0.33	5.5	0.35	7.5	0.38
2000	116	9.7	0.45	3.6	0.41	5.6	0.42	7.4	0.42
2001	127	10.4	0.48	4.3	0.42	6.6	0.44	8.7	0.46
2002	194	9.9	0.42	3.3	0.31	5.3	0.34	7.5	0.38
2003	205	10.4	0.44	3.7	0.35	5.9	0.38	7.9	0.41
2004	193	9.8	0.46	3.4	0.35	5.3	0.38	7.4	0.42
2005	184	9.2	0.42	3.0	0.31	4.8	0.35	6.9	0.39
2006	207	10.3	0.48	3.3	0.35	5.4	0.39	7.8	0.45
2007	208	9.0	0.42	3.3	0.37	5.1	0.38	6.9	0.41
2008	227	9.8	0.49	3.3	0.41	5.2	0.43	7.0	0.45
2009	235	10.1	0.55	3.7	0.46	5.6	0.48	7.5	0.51
2010	224	9.6	0.55	3.1	0.44	5.0	0.47	6.8	0.50
2011	219	9.3	0.52	3.0	0.39	4.7	0.43	6.4	0.48
2012	216	9.2	0.53	3.0	0.41	4.7	0.44	6.4	0.48
2013	198	8.4	0.70	2.8	0.51	4.4	0.56	5.9	0.61
1998-2013	2979	9.6	0.48	3.3	0.39	5.2	0.41	7.2	0.45

Table 13

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

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
20-24	2	0.0	0.0			0.0	2	0.1	0.1
25-29	3	0.0	0.1	2	0.0	0.0	1	0.0	0.1
30-34	8	0.1	0.2	5	0.1	0.2	3	0.1	0.2
35-39	24	0.3	0.5	15	0.3	0.5	9	0.3	0.5
40-44	60	0.8	1.3	42	1.0	1.5	18	0.6	1.1
45-49	129	1.8	3.1	67	1.6	3.0	62	2.1	3.2
50-54	254	3.5	6.6	169	3.9	7.0	85	2.9	6.0
55-59	458	6.3	12.9	321	7.5	14.4	137	4.6	10.6
60-64	755	10.4	23.2	539	12.5	26.9	216	7.2	17.9
65-69	946	13.0	36.2	667	15.5	42.4	279	9.4	27.2
70-74	1193	16.4	52.6	793	18.4	60.8	400	13.4	40.7
75-79	1160	15.9	68.5	713	16.6	77.4	447	15.0	55.7
80-84	1104	15.1	83.6	525	12.2	89.6	579	19.4	75.1
85+	1193	16.4	100.0	450	10.4	100.0	743	24.9	100.0
All ages	7289	100.0		4308	100.0		2981	100.0	

Included in the statistics are 29.1% multiple primaries in males and 26.0% in females.

Table 14

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

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4			0.0		0.0			
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24		2	0.0		0.1	0.25		3.9
25-29	2	1	0.1	0.22	0.0	0.08	1.9	0.9
30-34	5	3	0.2	0.17	0.1	0.12	2.7	1.3
35-39	15	9	0.6	0.25	0.4	0.22	3.8	1.7
40-44	42	18	1.6	0.26	0.7	0.16	4.9	1.6
45-49	67	62	2.8	0.22	2.7	0.27	3.7	3.1
50-54	169	85	8.4	0.28	4.1	0.24	5.1	2.7
55-59	321	137	17.5	0.32	7.1	0.28	5.4	2.9
60-64	539	216	30.4	0.38	11.5	0.32	6.1	3.3
65-69	667	279	42.3	0.42	16.2	0.38	5.6	3.4
70-74	793	400	61.9	0.52	26.3	0.47	5.8	4.0
75-79	713	447	86.3	0.64	37.6	0.51	5.4	4.2
80-84	525	579	104.9	0.79	62.1	0.68	4.8	5.2
85+	450	743	132.0	0.93	83.1	0.81	5.1	5.4
All ages	4308	2981					5.4	4.1
Mortality								
Raw			14.5	0.48	9.6	0.48		
WS			7.2	0.44	3.3	0.39		
ES			11.2	0.46	5.2	0.41		
BRD-S			15.0	0.50	7.2	0.45		
PYLL-70								
per 100,000			60.1		30.0			
ES			52.5		25.5			
AYLL-70			8.8		9.8			

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

Table 15a

Multiple primaries in deaths in period 1998-2013
MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	25	1.5	21	84.0			4	16.0
C15 Oesophagus	26	1.5	5	19.2	5	19.2	16	61.5
C16 Stomach	69	4.1	18	26.1	11	15.9	40	58.0
C17 Small intestine	16	0.9	2	12.5	3	18.8	11	68.8
C18 Colon	276	16.3	63	22.8	132	47.8	81	29.3
C19-C20 Rectum	11	0.6			3	27.3	8	72.7
C22 Liver	39	2.3	1	2.6	5	12.8	33	84.6
C23-C24 Bile	15	0.9			1	6.7	14	93.3
C25 Pancreas	51	3.0	3	5.9	10	19.6	38	74.5
C32 Larynx	22	1.3	17	77.3	1	4.5	4	18.2
C33-C34 Lung	163	9.6	21	12.9	20	12.3	122	74.8
C38,C45 Mesothelioma	11	0.6			1	9.1	10	90.9
C43 Malign. melanoma	76	4.5	51	67.1			25	32.9
C44 Skin others	91	5.4	42	46.2	9	9.9	40	44.0
C61 Prostate	362	21.4	194	53.6	35	9.7	133	36.7
C64 Kidney	56	3.3	26	46.4	17	30.4	13	23.2
C67 Bladder	124	7.3	50	40.3	8	6.5	66	53.2
C70-C72 CNS cancer	31	1.8	9	29.0	2	6.5	20	64.5
C76-C79 CUP	13	0.8	2	15.4	3	23.1	8	61.5
C82-C85 NHL	63	3.7	29	46.0	10	15.9	24	38.1
C90 Mult. myeloma	18	1.1	7	38.9			11	61.1
C91-C96 Leukaemia	34	2.0	11	32.4	4	11.8	19	55.9
Other primaries	101	6.0	52	51.5	8	7.9	41	40.6
All mult. primaries	1693	100.0	624	36.9	288	17.0	781	46.1

Multiple primaries with number of cases 1 to 10 are pooled in category "Other primaries".

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

Table 15b

Multiple primaries in deaths in period 1998-2013
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C16	Stomach	39	3.9	16	41.0	4	10.3	19	48.7
C18	Colon	168	16.8	49	29.2	76	45.2	43	25.6
C23-C24	Bile	10	1.0	1	10.0	2	20.0	7	70.0
C25	Pancreas	37	3.7	3	8.1	4	10.8	30	81.1
C33-C34	Lung	50	5.0	5	10.0	3	6.0	42	84.0
C43	Malign. melanoma	22	2.2	13	59.1	1	4.5	8	36.4
C44	Skin others	24	2.4	9	37.5	2	8.3	13	54.2
C50	Breast	238	23.8	154	64.7	19	8.0	65	27.3
C53	Cervix uteri	51	5.1	41	80.4	2	3.9	8	15.7
C54	Corpus uteri	72	7.2	48	66.7			24	33.3
C56	Ovary	54	5.4	18	33.3	13	24.1	23	42.6
C64	Kidney	22	2.2	12	54.5	4	18.2	6	27.3
C67	Bladder	36	3.6	17	47.2	2	5.6	17	47.2
C70-C72	CNS cancer	17	1.7	5	29.4	5	29.4	7	41.2
C73	Thyroid	10	1.0	7	70.0	1	10.0	2	20.0
C82-C85	NHL	22	2.2	8	36.4	4	18.2	10	45.5
C90	Mult. myeloma	18	1.8	5	27.8	1	5.6	12	66.7
C91-C96	Leukaemia	16	1.6	3	18.8	2	12.5	11	68.8
Other primaries		92	9.2	26	28.3	15	16.3	51	55.4
All mult. primaries		998	100.0	440	44.1	160	16.0	398	39.9

Multiple primaries with number of cases 1 to 8 are pooled in category "Other primaries".

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

Table 16

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

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4			0.0		0.0			
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24		2	0.0		0.1	0.25		4.3
25-29	2	1	0.1	0.29	0.0	0.08	2.0	0.9
30-34	5	3	0.2	0.17	0.1	0.12	2.8	1.5
35-39	14	9	0.6	0.25	0.4	0.23	3.7	1.9
40-44	41	17	1.6	0.26	0.7	0.16	5.2	1.7
45-49	65	57	2.8	0.23	2.5	0.26	4.0	3.3
50-54	155	76	7.7	0.28	3.7	0.23	5.4	2.9
55-59	280	122	15.3	0.31	6.3	0.29	5.5	3.0
60-64	467	187	26.3	0.37	10.0	0.32	6.3	3.5
65-69	570	244	36.1	0.43	14.1	0.41	5.9	3.6
70-74	640	324	50.0	0.52	21.3	0.45	6.0	4.1
75-79	535	362	64.7	0.64	30.5	0.51	5.4	4.2
80-84	406	472	81.1	0.80	50.6	0.69	5.0	5.3
85+	347	589	101.8	0.96	65.9	0.79	5.2	5.3
All ages	3527	2465					5.5	4.2
Mortality								
Raw			11.9	0.47	7.9	0.47		
WS			6.0	0.43	2.8	0.38		
ES			9.2	0.45	4.4	0.40		
BRD-S			12.2	0.49	6.0	0.44		
PYLL-70								
per 100,000			54.0		27.0			
ES			47.1		23.0			
AYLL-70			9.0		10.0			

* See corresponding tables with multiple primaries.
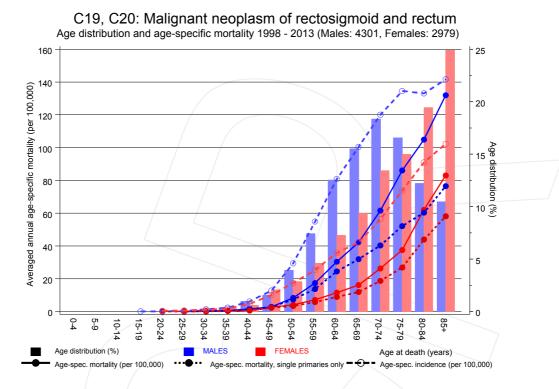
Table 17

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

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4			0.0		0.0			
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24		2	0.0		0.1	0.25		4.5
25-29	2	1	0.1	0.29	0.0	0.08	2.2	1.0
30-34	5	3	0.2	0.17	0.1	0.12	2.9	1.6
35-39	13	9	0.5	0.23	0.4	0.23	3.6	2.1
40-44	39	17	1.5	0.26	0.7	0.17	5.2	1.9
45-49	62	54	2.6	0.23	2.3	0.26	4.0	3.5
50-54	149	70	7.4	0.28	3.4	0.23	5.7	3.0
55-59	253	111	13.8	0.30	5.8	0.28	5.5	3.1
60-64	434	167	24.5	0.37	8.9	0.31	6.6	3.6
65-69	505	206	32.0	0.43	11.9	0.38	6.0	3.6
70-74	517	284	40.4	0.47	18.7	0.42	5.8	4.3
75-79	431	319	52.1	0.57	26.9	0.48	5.4	4.4
80-84	302	410	60.4	0.65	44.0	0.63	4.7	5.5
85+	261	520	76.5	0.77	58.2	0.73	4.8	5.5
All ages	2973	2173					5.5	4.3
Mortality								
Raw			10.0	0.43	7.0	0.45		
WS			5.2	0.40	2.5	0.36		
ES			7.8	0.42	3.9	0.39		
BRD-S			10.2	0.45	5.3	0.42		
PYLL-70								
per 100,000			50.2		24.9			
ES			43.9		21.3			
AYLL-70			9.2		10.3			

* See corresponding tables with multiple primaries.

C19, C20: Malignant neoplasm of rectosigmoid and rectum
Age distribution and age-specific mortality 1998 - 2013 (Males: 4301, Females: 2979)
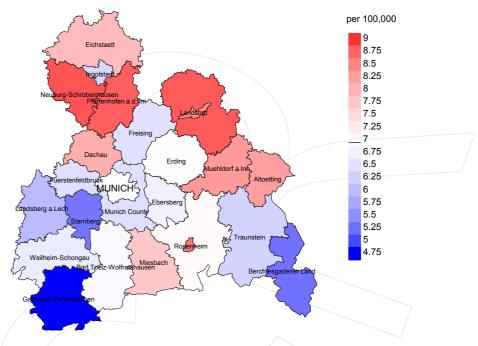
Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).
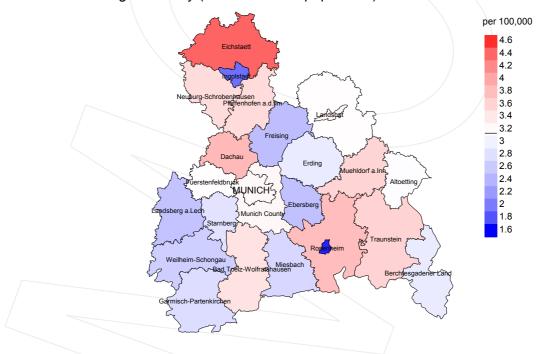
The difference between age at diagnosis (Table 3) and age at rectal cancer-related death (see Table 10) should be considered.

Average mortality (world standard population) 2007 - 2013: Males
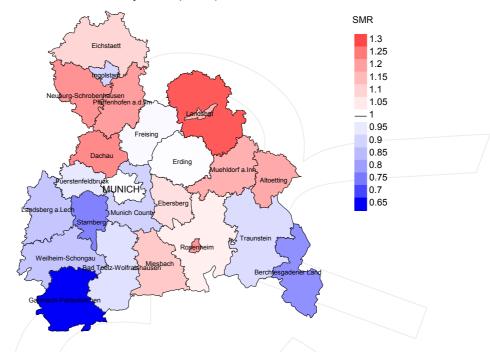
Average mortality (world standard population) 2007 - 2013: Females
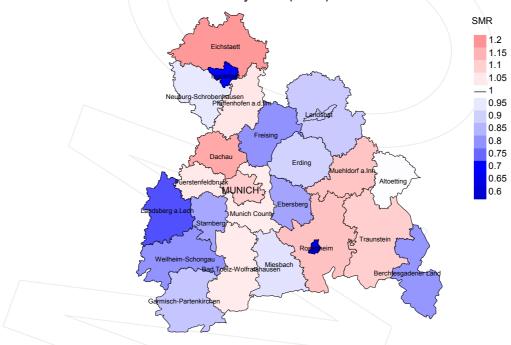
Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2013. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 7.0/100,000 WS N=2,343, females 3.1/100,000 WS N=1,511).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,928 female residents (averaged) in the period from 2007 to 2013 a total of 32 women died from rectal cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 2.5/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.4 and 4.2/100,000.

Standardized mortality ratio (SMR) 2007 - 2013: Males

Standardized mortality ratio (SMR) 2007 - 2013: Females

Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=2,343, females N=1,511).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,642 female residents (averaged) in the period from 2007 to 2013 a total of 32 women died from rectal cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.83. Though, the value of this parameter may vary with an underlying probability of 99% between 0.50 and 1.28, and is therefore not statistically striking.

Statistical Notes

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

1. **All multiple primaries included**

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

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

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

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

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

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

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

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

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

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

Shortcuts

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

Recommended Citation

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