Munich Cancer Registry

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

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

Cancer statistics: Baseline statistics

C19, C20: Rectal cancer

Year of diagnosis	1998-2011
Patients	13071
Diseases	13085
Creation date	04/02/2013
Export date	01/03/2013
Population	4.5 m

http://www.tumorregister-muenchen.de/en/facts/base/base_C1920E.pdf

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

In these analyses, the clinics and physicians of Upper Bavaria and the city and county of Landshut[#], with a total of 4.5 million inhabitants, account for the frequency of cancer diseases[##] and the achieved long term results. Additionally, the long term survival evaluated by the Munich Cancer Registry (MCR) is compared with the results of the population-based registry in the USA (SEER), which is useful for checking the consistency of the data on an international level.

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

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

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

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

Munich Cancer Registry, April 2013

[#] Base data has been collected since 1998. An increase in new diseases is apparent, which is an effect of two extensions in the MCR catchment area (from a base population of 2.51 million to 3.96 in 2002, and to 4.52 million in 2007). Death certificates from 2011 are incorporated into these analyses.

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

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

ICD-10 codes used for specifying cancer site

ICD-10	Description
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	557	18	3.2	22.1	68.0	97.1
1999	637	25	3.9	19.6	67.2	98.0
2000	604	23	3.8	22.5	65.4	98.3
2001	623	22	3.5	24.4	55.7	96.5
2002	1108	77	6.9	23.6	63.4	98.4
2003	1081	65	6.0	21.1	56.8	97.8
2004	990	45	4.5	23.3	56.2	96.6
2005	1030	45	4.4	21.7	55.6	98.0
2006	1062	33	3.1	23.9	50.2	95.3
2007	1216	41	3.4	20.7	48.4	84.1 ##
2008	1131	48	4.2	20.7	42.2	67.3
2009	1093	50	4.6	19.9	39.0	70.1
2010	1039	41	3.9	20.4	32.1	88.7
2011	914	29	3.2	19.1	18.3	67.3 ###
1998-2011	13085	562	4.3	21.6	49.8	88.4

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	557	313	244	56.2
1999	637	360	277	56.5
2000	604	345	259	57.1
2001	623	357	266	57.3
2002	1108	644	464	58.1
2003	1081	621	460	57.4
2004	990	575	415	58.1
2005	1030	590	440	57.3
2006	1062	640	422	60.3
2007	1216	730	486	60.0
2008	1131	682	449	60.3
2009	1093	667	426	61.0
2010	1039	653	386	62.8
2011	914	568	346	62.1
1998-2011	13085	7745	5340	59.2

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	313	244	28.2	20.7	17.2	9.3	25.2	13.8	31.4	17.6
1999	360	277	32.2	23.3	19.4	10.5	28.6	15.6	35.5	20.0
2000	345	259	30.3	21.6	18.0	8.8	26.8	13.5	33.2	17.7
2001	357	266	30.8	21.9	18.4	10.3	26.8	15.0	33.7	18.7
2002	644	464	34.6	23.7	20.0	10.4	29.3	15.5	36.4	19.7
2003	621	460	33.1	23.4	18.9	10.4	27.8	15.3	34.5	19.1
2004	575	415	30.6	21.0	17.0	9.5	24.9	13.9	30.7	17.5
2005	590	440	31.1	22.1	17.3	9.3	25.3	13.8	31.3	17.8
2006	640	422	33.4	21.0	18.1	9.0	26.4	13.2	32.8	16.8
2007	730	486	33.0	21.0	17.6	8.9	25.9	13.2	32.3	16.8
2008	682	449	30.6	19.3	16.2	7.9	23.6	11.9	29.5	15.2
2009	667	426	29.9	18.3	15.4	7.9	22.6	11.6	28.5	14.6
2010	653	386	29.0	16.5	15.0	6.6	22.0	9.9	27.4	12.9
2011	568	346	25.2	14.8	13.0	6.5	19.0	9.3	23.6	11.4
1998-2011	7745	5340	30.8	20.3	17.0	8.7	24.8	12.9	30.9	16.4

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	557	68.2	12.3	30.5	102	53.5	59.4	68.4	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	60.5	69.1	79.0	86.7
2001	623	68.0	12.1	28.3	97.1	52.9	60.5	67.2	76.9	83.8
2002	1108	68.8	11.7	29.9	104	54.0	61.0	69.2	76.9	83.1
2003	1081	68.9	11.8	27.1	101	53.9	61.2	68.8	77.3	83.8
2004	990	68.1	11.9	21.3	97.3	53.4	60.8	67.8	77.3	83.4
2005	1030	69.2	11.8	19.0	99.6	54.1	61.3	69.0	77.9	84.2
2006	1062	68.7	12.1	21.2	98.7	52.8	62.1	68.6	78.1	83.7
2007	1216	69.3	11.8	30.5	97.5	53.1	62.5	69.3	78.1	84.4
2008	1131	69.7	11.8	28.2	102	53.9	62.4	69.9	78.5	84.7
2009	1093	69.1	12.1	20.7	102	52.0	61.7	70.2	77.8	84.2
2010	1039	69.7	12.4	21.1	101	52.9	61.6	71.0	78.9	85.2
2011	914	68.6	13.0	20.1	99.1	51.1	60.3	69.8	77.8	85.2
1998-2011	13085	68.9	12.1	19.0	104	53.1	61.1	69.2	77.8	84.4

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	345	66.8	11.5	34.4	95.9	53.0	58.9	65.4	74.8	83.6
2001	357	67.0	10.6	36.4	93.6	53.9	60.6	65.9	73.7	81.1
2002	644	67.1	10.6	32.8	93.0	53.9	60.5	66.8	74.1	81.3
2003	621	67.4	10.7	27.1	93.1	53.9	60.7	67.7	74.6	81.2
2004	575	66.8	10.4	29.9	93.3	54.3	60.7	66.3	74.9	79.8
2005	590	67.2	10.7	19.0	99.6	53.7	60.3	67.3	74.3	80.6
2006	640	67.0	10.9	25.7	94.7	52.8	60.5	67.4	74.6	81.0
2007	730	68.0	10.9	31.1	95.5	53.2	62.1	68.0	75.3	81.8
2008	682	68.0	10.7	28.2	96.0	53.9	62.1	68.5	75.1	80.6
2009	667	68.0	11.2	20.7	95.4	52.0	61.5	69.6	75.4	80.9
2010	653	68.1	11.9	21.1	98.3	52.7	60.5	69.5	75.9	82.9
2011	568	67.7	11.5	26.3	93.6	51.9	60.6	69.4	75.4	81.5
1998-2011	7745	67.4	11.0	19.0	99.6	53.2	60.4	67.7	74.9	81.3

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	244	71.3	12.2	30.5	102	55.3	62.2	72.5	78.7	87.7
1999	277	71.1	12.8	38.4	102	52.7	61.5	73.0	79.8	87.5
2000	259	72.9	12.3	33.4	94.7	55.7	62.7	74.9	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	464	71.2	12.7	29.9	104	54.5	62.2	72.8	80.3	87.6
2003	460	70.8	12.9	29.2	101	54.0	61.8	71.5	81.2	86.6
2004	415	69.9	13.5	21.3	97.3	51.7	61.2	71.3	80.6	85.9
2005	440	71.9	12.5	32.8	96.8	55.0	63.5	72.3	81.4	87.2
2006	422	71.2	13.4	21.2	98.7	52.8	63.4	72.5	81.2	86.6
2007	486	71.3	12.8	30.5	97.5	53.0	63.6	72.3	81.4	87.0
2008	449	72.3	13.0	38.1	102	53.4	63.5	73.3	82.4	87.9
2009	426	70.8	13.3	29.2	102	51.9	61.8	71.5	80.7	87.1
2010	386	72.4	12.7	28.7	101	53.7	63.5	74.0	82.3	87.2
2011	346	70.1	14.9	20.1	99.1	49.2	60.1	71.2	82.3	88.4
1998-2011	5340	71.2	13.1	20.1	104	53.1	62.4	72.4	81.2	87.2

Table 4

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

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
15-19	1	0.0	0.0	1	0.0	0.0			0.0
20-24	8	0.1	0.1	2	0.0	0.0	6	0.1	0.1
25-29	15	0.1	0.2	6	0.1	0.1	9	0.2	0.3
30-34	40	0.3	0.5	24	0.3	0.4	16	0.3	0.6
35-39	88	0.7	1.2	56	0.7	1.1	32	0.6	1.2
40-44	239	1.8	3.0	137	1.8	2.9	102	1.9	3.1
45-49	451	3.4	6.4	262	3.4	6.3	189	3.5	6.6
50-54	807	6.2	12.6	507	6.5	12.8	300	5.6	12.2
55-59	1275	9.7	22.3	858	11.1	23.9	417	7.8	20.1
60-64	1889	14.4	36.8	1280	16.5	40.5	609	11.4	31.5
65-69	2058	15.7	52.5	1415	18.3	58.7	643	12.0	43.5
70-74	2009	15.4	67.9	1289	16.6	75.4	720	13.5	57.0
75-79	1695	13.0	80.8	937	12.1	87.5	758	14.2	71.2
80-84	1309	10.0	90.8	558	7.2	94.7	751	14.1	85.2
85+	1201	9.2	100.0	413	5.3	100.0	788	14.8	100.0
All ages	13085	100.0		7745	100.0		5340	100.0	

Included in the statistics are 27.3% multiple primaries in males and 24.5% in females.

Table 5

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

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=238 %	Females DCO rate n=323 %	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			0.0	0.0				
15-19	1		0.1	0.0			0.3	
20-24	2	6	0.1	0.4			0.4	1.4
25-29	6	9	0.4	0.5			0.7	1.0
30-34	24	16	1.2	0.8			1.8	0.9
35-39	56	32	2.6	1.5			2.8	1.0
40-44	137	102	6.1	4.8		1.0	5.0	1.9
45-49	262	189	13.5	9.9	0.4	0.5	5.8	2.6
50-54	507	300	30.4	17.5	1.4		7.0	3.2
55-59	858	417	55.0	25.5	1.2	0.5	6.9	3.5
60-64	1280	608	84.1	37.9	1.3	1.5	6.8	4.1
65-69	1414	642	103.8	43.1	2.3	1.4	6.0	4.0
70-74	1288	719	124.9	58.2	2.6	3.8	5.9	4.8
75-79	935	758	138.4	76.2	3.9	5.4	5.5	5.2
80-84	557	751	137.1	94.5	5.7	8.5	5.1	5.6
85+	413	788	148.9	106.1	16.9	21.4	5.0	5.4
All ages	7740	5337			3.1	6.1	5.8	4.1
Incidence								
Raw			30.8	20.3				
WS			17.0	8.7				
ES			24.8	12.9				
BRD-S			30.9	16.4				

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 %
C07-C08	Salivary gland	2	0.8	2.6	0.3	9.4		0.6	
C09-C10	Oropharynx	3	3.7	0.8	0.2	2.3		-0.4	
C12-C13	Hypopharynx	2	2.1	0.9	0.1	3.4		-0.1	
C15	Oesophagus	11	6.2	1.8	0.9	3.2		2.4	9.1
C16	Stomach	28	15.3	1.8	1.2	2.6	#	6.3	3.6
C17	Small intestine	9	1.6	5.7	2.6	10.8	#	3.7	
C18	Colon	159	36.1	4.4	3.7	5.1	#	60.5	1.3
C19-C20	Rectum	8	20.6	0.4	0.2	0.8	#	-6.2	25.0
C22	Liver	28	9.7	2.9	1.9	4.2	#	9.0	7.1
C23-C24	Bile	9	3.4	2.6	1.2	5.0	#	2.8	
C25	Pancreas	17	12.4	1.4	0.8	2.2		2.3	17.6
C32	Larynx	4	3.8	1.1	0.3	2.7		0.1	25.0
C33-C34	Lung	71	42.9	1.7	1.3	2.1	#	13.8	8.5
C38,C45	Mesothelioma	3	2.3	1.3	0.3	3.8		0.3	
C43	Malign. melanoma	18	13.2	1.4	0.8	2.2		2.4	
C46,C49	Soft tissue	3	1.8	1.6	0.3	4.7		0.6	
C60	Penis	3	0.8	3.9	0.8	11.3		1.1	
C61	Prostate	163	107.1	1.5	1.3	1.8	#	27.5	5.5
C62	Testis	2	0.8	2.6	0.3	9.3		0.6	
C64	Kidney	27	12.5	2.2	1.4	3.1	#	7.1	7.4
C65	Renal pelvis	3	1.4	2.2	0.4	6.3		0.8	
C66	Ureter	4	0.8	5.2	1.4	13.4	#	1.6	
C67	Bladder	22	15.3	1.4	0.9	2.2		3.3	4.5
C70-C72	CNS cancer	14	4.7	3.0	1.6	5.0	#	4.6	21.4
C73	Thyroid	4	2.3	1.8	0.5	4.5		0.9	25.0
C76-C79	CUP	7	6.0	1.2	0.5	2.4		0.5	
C82-C85	NHL	17	13.8	1.2	0.7	2.0		1.6	
C90	Mult. myeloma	3	4.5	0.7	0.1	2.0		-0.7	33.3
C91-C96	Leukaemia	12	5.4	2.2	1.1	3.9	#	3.2	41.7
Other primaries		4	4.8	0.8	0.2	2.2		-0.4	
Not observed		0	4.9	0.0	0.0	0.8	#	-2.4	
All mult. primaries		660	360.9	1.8	1.7	2.0	#	147.2	6.1

Patients	5620
Mean age at second malignancy (years)	71.1
Person-years	20319
Mean observation time (years)	3.6
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".

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 %
C15	Oesophagus	2	1.0	2.1	0.3	7.6		0.7	
C16	Stomach	10	7.7	1.3	0.6	2.4		1.6	20.0
C17	Small intestine	4	0.8	5.3	1.4	13.5	#	2.2	
C18	Colon	82	20.6	4.0	3.2	5.0	#	42.3	1.2
C19-C20	Rectum	5	8.7	0.6	0.2	1.3		-2.5	20.0
C21	Anus/canal	3	0.9	3.2	0.7	9.2		1.4	
C22	Liver	3	2.2	1.4	0.3	4.1		0.6	66.7
C23-C24	Bile	7	3.0	2.3	0.9	4.8		2.7	14.3
C25	Pancreas	7	8.5	0.8	0.3	1.7		-1.0	14.3
C33-C34	Lung	23	12.3	1.9	1.2	2.8	#	7.4	17.4
C43	Malign. melanoma	16	5.7	2.8	1.6	4.5	#	7.1	6.3
C46,C49	Soft tissue	3	1.0	3.0	0.6	8.6		1.4	
C50	Breast	90	52.2	1.7	1.4	2.1	#	26.1	3.3
C51	Vulva	4	1.9	2.1	0.6	5.5		1.5	25.0
C52	Vagina	3	0.4	7.9	1.6	23.0	#	1.8	33.3
C53	Cervix uteri	4	2.3	1.8	0.5	4.5		1.2	25.0
C54	Corpus uteri	14	9.9	1.4	0.8	2.4		2.8	7.1
C55,C57	Fem. genitals un	3	0.6	5.2	1.1	15.2	#	1.7	
C56	Ovary	23	7.8	3.0	1.9	4.4	#	10.5	21.7
C64	Kidney	10	4.7	2.1	1.0	3.9	#	3.7	10.0
C65	Renal pelvis	3	0.6	5.4	1.1	15.8	#	1.7	
C67	Bladder	6	3.7	1.6	0.6	3.5		1.6	33.3
C69	Eye melanoma	2	0.3	7.2	0.9	26.1		1.2	
C70-C72	CNS cancer	2	2.6	0.8	0.1	2.8		-0.4	50.0
C73	Thyroid	3	2.8	1.1	0.2	3.1		0.1	
C76-C79	CUP	2	3.5	0.6	0.1	2.0		-1.1	
C82-C85	NHL	5	7.2	0.7	0.2	1.6		-1.5	
C90	Mult. myeloma	4	2.4	1.7	0.5	4.3		1.1	50.0
C91-C96	Leukaemia	6	3.0	2.0	0.7	4.4		2.1	50.0
Other primaries		5	0.5	10.5	3.4	24.6	#	3.1	20.0
Not observed		0	5.9	0.0	0.0	0.6	#	-4.0	
All mult. primaries		354	184.2	1.9	1.7	2.1	#	117.0	9.9

Patients	3962
Mean age at second malignancy (years)	74.4
Person-years	14512
Mean observation time (years)	3.7
Median observation time (years)	2.8

The occurrence of second malignancy is statistically significant.

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

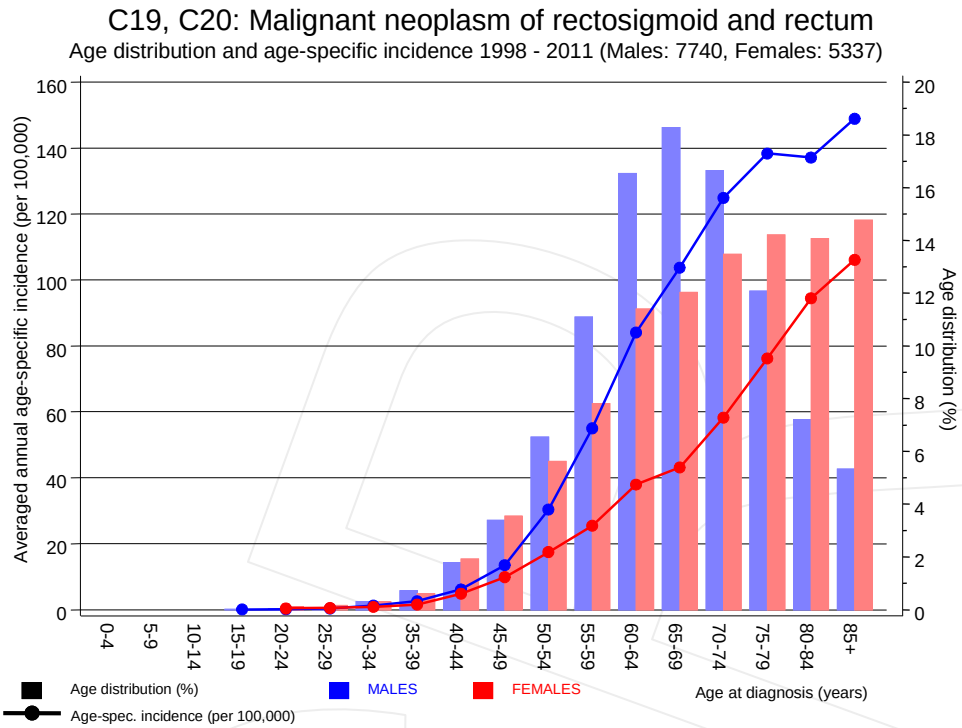


Figure 7. Age distribution and age-specific incidence

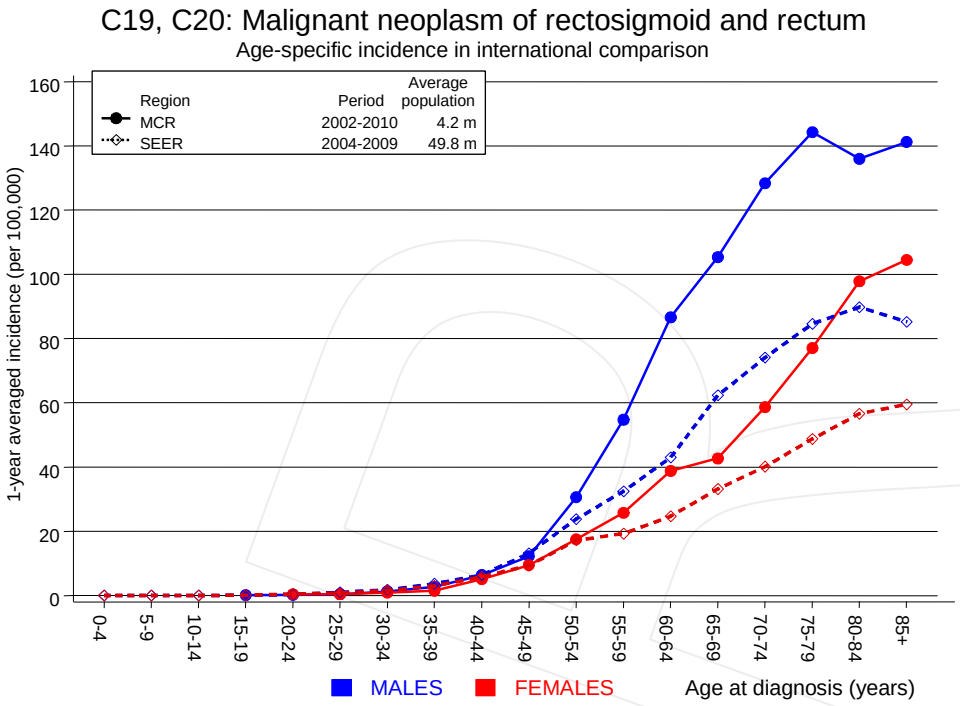


Figure 7a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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.

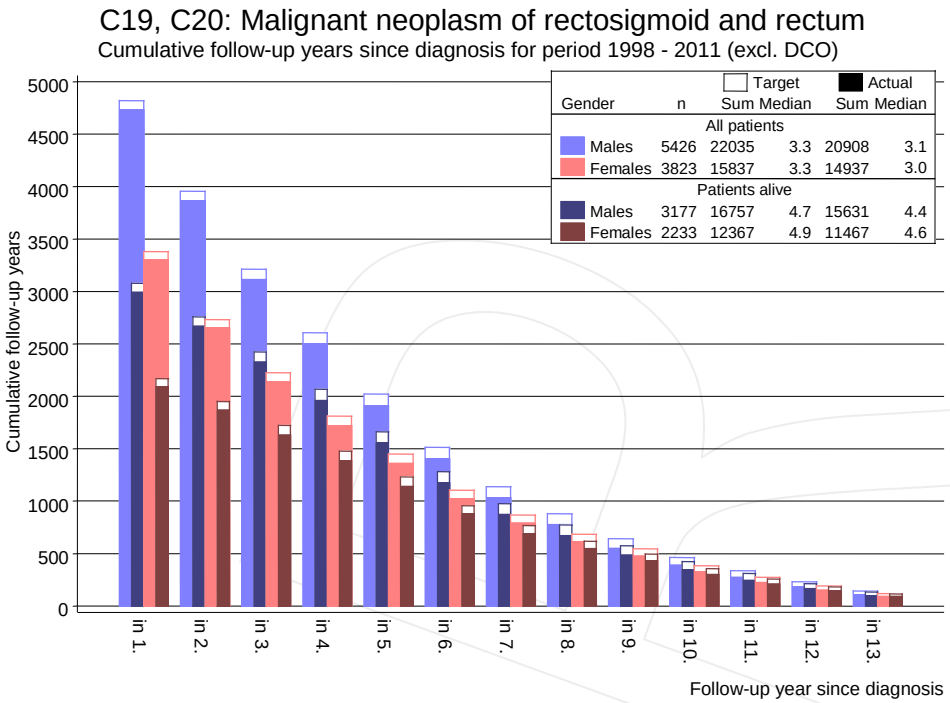
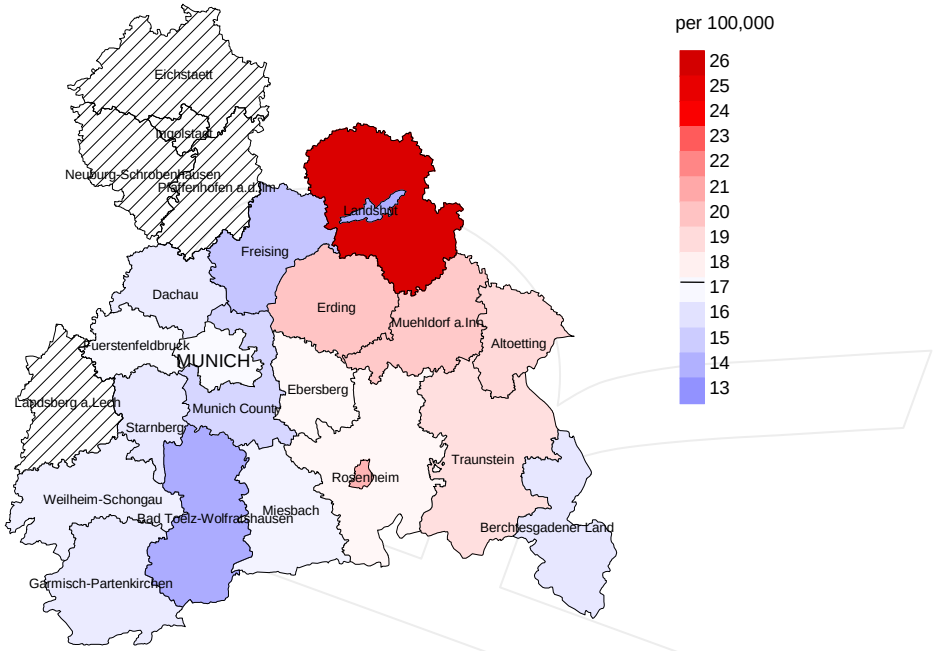


Figure 8. Cumulative follow-up years depending on time since diagnosis

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

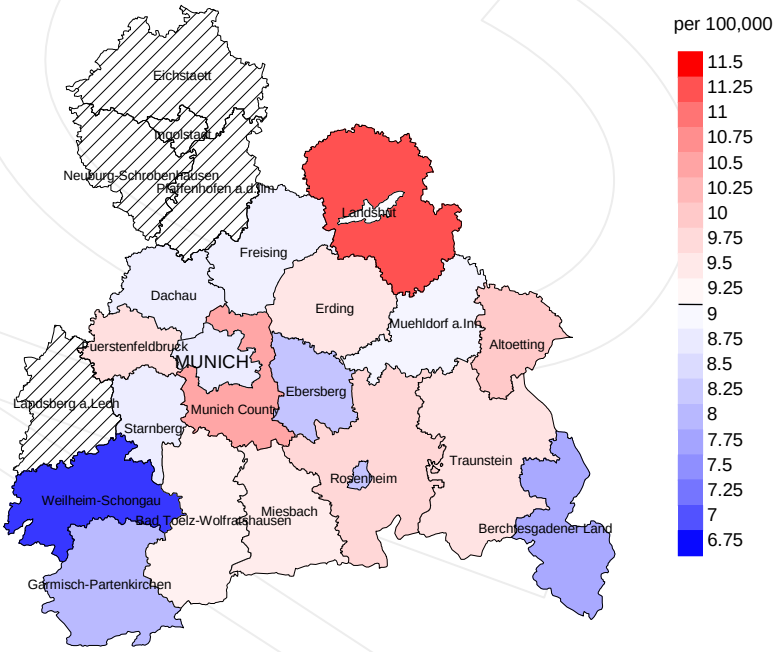
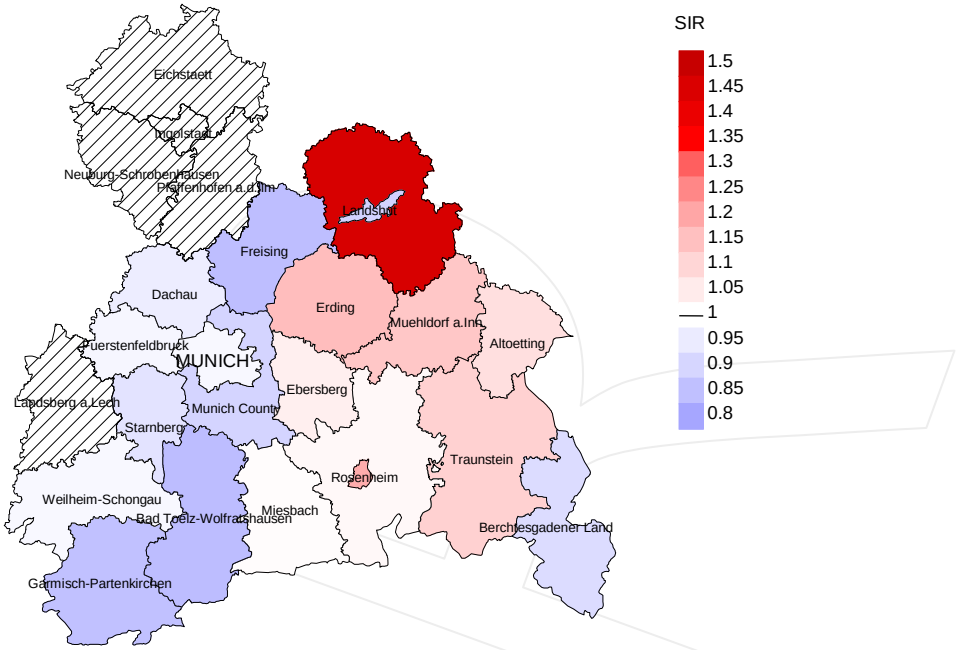


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 17.3/100,000 WS N=3,642, females 9.1/100,000 WS N=2,547). 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 60 women were identified with newly diagnosed rectal cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 8.1/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 5.6 and 11.6/100,000.

Standardized incidence ratio (SIR) 2003 - 2008: Males



Standardized incidence ratio (SIR) 2003 - 2008: Females

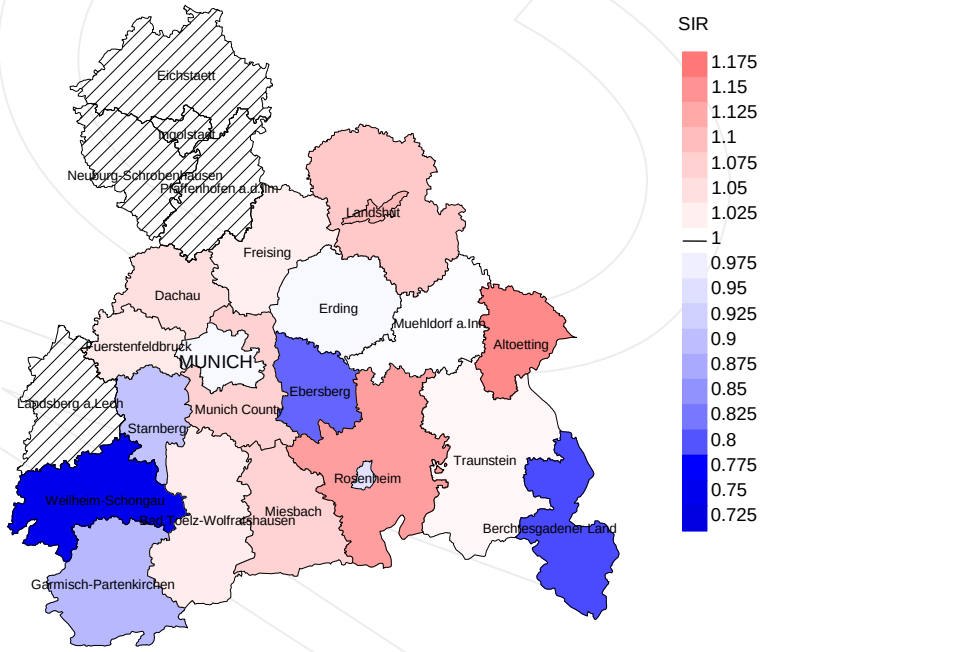


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=3,642, females N=2,547). 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 60 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 0.81. Though, the value of this parameter may vary with an underlying probability of 99% between 0.57 and 1.12, 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	557	97.1	3.2	379	68.0	92.6
1999	637	98.0	3.9	428	67.2	94.4
2000	604	98.3	3.8	395	65.4	95.4
2001	623	96.5	3.5	347	55.7	97.7
2002	1108	98.4	6.9	703	63.4	96.7
2003	1081	97.8	6.0	614	56.8	97.9
2004	990	96.6	4.5	556	56.2	98.6
2005	1030	98.0	4.4	573	55.6	97.9
2006	1062	95.3	3.1	533	50.2	98.3
2007	1216	84.1	3.4	589	48.4	98.5
2008	1131	67.3	4.2	477	42.2	97.9
2009	1093	70.1	4.6	426	39.0	98.4
2010	1039	88.7	3.9	333	32.1	97.3
2011	914	67.3	3.2	167	18.3	97.0
1998-2011	13085	88.4	4.3	6520	49.8	97.2

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	557	337	88.7	61	11.0
1999	637	372	88.7	85	13.3
2000	604	350	93.4	76	12.6
2001	623	392	95.7	75	12.0
2002	1108	557	97.5	189	17.1
2003	1081	584	97.8	145	13.4
2004	990	597	98.2	122	12.3
2005	1030	614	96.1	141	13.7
2006	1062	701	97.6	163	15.3
2007	1216	712	97.9	170	14.0
2008	1131	775	99.0	158	14.0
2009	1093	794	99.5	159	14.5
2010	1039	826	99.0	172	16.6
2011	914	767	97.7	108	11.8
1998-2011	13085	8378	97.0	1824	13.9

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	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	597	75.2	24.8	88.1
2005	614	73.5	26.5	85.8
2006	701	76.7	23.3	85.8
2007	712	74.7	25.3	85.8
2008	775	73.8	26.2	83.3
2009	794	72.9	27.1	85.1
2010	826	69.5	30.5	81.5
2011	767	70.8	29.2	83.4
1998-2011	8378	73.9	26.1	85.8

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	179	72.5	70.4	77.4	72.2
1999	220	71.1	70.2	74.2	71.4
2000	198	72.4	70.1	79.3	71.5
2001	213	72.3	69.6	79.0	71.7
2002	321	72.6	70.6	78.6	71.6
2003	315	70.9	68.8	78.3	70.3
2004	338	73.7	72.2	78.6	73.0
2005	356	72.9	70.8	79.2	71.5
2006	426	73.8	72.0	80.4	72.7
2007	422	73.5	71.9	78.6	72.7
2008	456	74.3	72.3	80.4	73.0
2009	458	73.0	71.0	78.7	72.2
2010	491	74.4	72.1	79.9	73.2
2011	472	74.2	71.7	80.9	73.2
1998-2011	4865	73.2	71.2	79.2	72.3

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	158	77.2	74.2	85.2	77.3
1999	152	76.4	74.3	81.8	76.6
2000	152	77.6	75.9	82.8	76.7
2001	179	76.7	73.4	84.7	75.4
2002	236	78.7	77.6	83.7	78.1
2003	269	78.2	76.2	84.6	77.4
2004	259	78.2	76.5	83.3	77.4
2005	258	79.1	77.6	82.9	78.2
2006	275	78.9	77.1	84.4	77.9
2007	290	78.2	75.8	84.4	77.1
2008	319	78.9	76.5	84.6	77.4
2009	336	78.4	75.0	86.4	76.5
2010	335	79.8	76.9	85.7	78.1
2011	295	79.4	76.4	85.6	77.7
1998-2011	3513	78.5	76.1	84.6	77.4

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	0.43	7.5	0.41	11.6	0.43	15.2	0.45
2002	241	12.9	0.37	7.1	0.36	10.8	0.37	14.2	0.39
2003	245	13.1	0.39	7.2	0.38	10.8	0.39	14.0	0.41
2004	257	13.7	0.45	6.8	0.40	10.8	0.44	15.1	0.49
2005	267	14.1	0.45	7.2	0.42	10.9	0.43	14.6	0.47
2006	331	17.3	0.52	8.7	0.48	13.6	0.52	18.3	0.56
2007	324	14.6	0.44	7.1	0.40	11.0	0.42	14.9	0.46
2008	345	15.5	0.51	7.3	0.45	11.5	0.49	15.8	0.53
2009	343	15.4	0.52	7.5	0.49	11.4	0.50	14.8	0.52
2010	349	15.5	0.53	6.9	0.46	10.9	0.49	15.0	0.55
2011	344	15.3	0.61	7.1	0.55	11.0	0.58	14.7	0.62
1998-2011	3642	14.5	0.47	7.4	0.43	11.4	0.46	15.3	0.49

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	0.48	3.9	0.42	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	0.32	5.3	0.34	7.5	0.38
2003	205	10.4	0.45	3.7	0.36	5.9	0.39	7.9	0.41
2004	192	9.7	0.46	3.4	0.35	5.3	0.38	7.4	0.42
2005	184	9.2	0.42	3.0	0.32	4.8	0.35	6.9	0.39
2006	207	10.3	0.49	3.3	0.37	5.4	0.41	7.8	0.46
2007	208	9.0	0.43	3.3	0.37	5.1	0.39	6.9	0.41
2008	227	9.8	0.51	3.3	0.42	5.2	0.44	7.0	0.46
2009	236	10.1	0.55	3.7	0.47	5.6	0.49	7.5	0.52
2010	225	9.6	0.58	3.1	0.48	5.0	0.50	6.8	0.53
2011	199	8.5	0.58	2.8	0.43	4.4	0.47	6.0	0.52
1998-2011	2546	9.7	0.48	3.4	0.39	5.3	0.41	7.3	0.45

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	1	0.0	0.0			0.0	1	0.0	0.0
25-29	2	0.0	0.0	1	0.0	0.0	1	0.0	0.1
30-34	5	0.1	0.1	4	0.1	0.1	1	0.0	0.1
35-39	23	0.4	0.5	14	0.4	0.5	9	0.4	0.5
40-44	59	1.0	1.5	41	1.1	1.6	18	0.7	1.2
45-49	116	1.9	3.3	62	1.7	3.3	54	2.1	3.3
50-54	219	3.5	6.9	144	3.9	7.3	75	2.9	6.2
55-59	397	6.4	13.3	280	7.7	15.0	117	4.6	10.8
60-64	650	10.5	23.8	460	12.6	27.6	190	7.5	18.3
65-69	822	13.3	37.0	587	16.1	43.7	235	9.2	27.5
70-74	1012	16.3	53.4	671	18.4	62.1	341	13.4	40.9
75-79	980	15.8	69.2	594	16.3	78.4	386	15.1	56.0
80-84	924	14.9	84.1	420	11.5	89.9	504	19.8	75.8
85+	985	15.9	100.0	369	10.1	100.0	616	24.2	100.0
All ages	6195	100.0		3647	100.0		2548	100.0	

Included in the statistics are 27.3% multiple primaries in males and 24.5% in females.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2011
(**incl. multiple primaries**)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4			0.0		0.0			
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24		1	0.0		0.1	0.17		2.3
25-29	1	1	0.1	0.17	0.1	0.11	1.1	1.0
30-34	4	1	0.2	0.17	0.1	0.06	2.4	0.5
35-39	14	9	0.6	0.25	0.4	0.28	3.8	2.0
40-44	41	18	1.8	0.30	0.8	0.18	5.4	1.8
45-49	62	54	3.2	0.24	2.8	0.29	4.0	3.1
50-54	144	75	8.6	0.28	4.4	0.25	5.1	2.9
55-59	280	117	17.9	0.33	7.1	0.28	5.4	2.9
60-64	460	190	30.2	0.36	11.9	0.31	6.0	3.4
65-69	587	235	43.1	0.41	15.8	0.37	5.7	3.3
70-74	671	341	65.1	0.52	27.6	0.47	6.1	4.3
75-79	594	386	87.9	0.63	38.8	0.51	5.4	4.3
80-84	420	504	103.4	0.75	63.4	0.67	4.8	5.3
85+	369	616	133.0	0.89	82.9	0.78	5.2	5.4
All ages	3647	2548					5.4	4.2
Mortality								
Raw			14.5	0.47	9.7	0.48		
WS			7.4	0.43	3.4	0.39		
ES			11.4	0.46	5.3	0.41		
BRD-S			15.3	0.49	7.3	0.45		
PYLL-70								
per 100,000			62.0		30.7			
ES			54.2		26.2			
AYLL-70			8.9		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	19	1.4	16	84.2			3	15.8
C15 Oesophagus	21	1.6	3	14.3	4	19.0	14	66.7
C16 Stomach	55	4.1	16	29.1	8	14.5	31	56.4
C17 Small intestine	10	0.7	1	10.0	2	20.0	7	70.0
C18 Colon	218	16.2	48	22.0	101	46.3	69	31.7
C22 Liver	37	2.7	1	2.7	5	13.5	31	83.8
C23-C24 Bile	13	1.0					13	100.0
C25 Pancreas	41	3.0	2	4.9	8	19.5	31	75.6
C32 Larynx	16	1.2	13	81.3	1	6.3	2	12.5
C33-C34 Lung	138	10.3	18	13.0	19	13.8	101	73.2
C38,C45 Mesothelioma	10	0.7			1	10.0	9	90.0
C43 Malign. melanoma	59	4.4	37	62.7			22	37.3
C44 Skin others	61	4.5	27	44.3	8	13.1	26	42.6
C61 Prostate	293	21.8	152	51.9	31	10.6	110	37.5
C64 Kidney	47	3.5	21	44.7	15	31.9	11	23.4
C67 Bladder	90	6.7	37	41.1	6	6.7	47	52.2
C70-C72 CNS cancer	27	2.0	9	33.3	2	7.4	16	59.3
C76-C79 CUP	10	0.7	1	10.0	3	30.0	6	60.0
C82-C85 NHL	49	3.6	23	46.9	7	14.3	19	38.8
C90 Mult. myeloma	15	1.1	6	40.0			9	60.0
C91-C96 Leukaemia	25	1.9	7	28.0	4	16.0	14	56.0
Other primaries	92	6.8	43	46.7	9	9.8	40	43.5
All mult. primaries	1346	100.0	481	35.7	234	17.4	631	46.9

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

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C16	Stomach	33	4.0	14	42.4	3	9.1	16	48.5
C18	Colon	140	16.8	43	30.7	62	44.3	35	25.0
C21	Anus/canal	8	1.0	2	25.0	5	62.5	1	12.5
C22	Liver	8	1.0			1	12.5	7	87.5
C23-C24	Bile	8	1.0	1	12.5	2	25.0	5	62.5
C25	Pancreas	29	3.5	3	10.3	2	6.9	24	82.8
C33-C34	Lung	40	4.8	4	10.0	2	5.0	34	85.0
C43	Malign. melanoma	19	2.3	11	57.9	1	5.3	7	36.8
C44	Skin others	18	2.2	5	27.8	2	11.1	11	61.1
C50	Breast	196	23.5	128	65.3	17	8.7	51	26.0
C53	Cervix uteri	49	5.9	40	81.6	2	4.1	7	14.3
C54	Corpus uteri	63	7.5	42	66.7			21	33.3
C56	Ovary	49	5.9	15	30.6	12	24.5	22	44.9
C64	Kidney	16	1.9	9	56.3	2	12.5	5	31.3
C67	Bladder	28	3.4	14	50.0	1	3.6	13	46.4
C70-C72	CNS cancer	13	1.6	3	23.1	5	38.5	5	38.5
C73	Thyroid	9	1.1	6	66.7	1	11.1	2	22.2
C82-C85	NHL	17	2.0	4	23.5	4	23.5	9	52.9
C90	Mult. myeloma	15	1.8	3	20.0	1	6.7	11	73.3
C91-C96	Leukaemia	13	1.6	3	23.1	1	7.7	9	69.2
Other primaries		64	7.7	22	34.4	9	14.1	33	51.6
All mult. primaries		835	100.0	372	44.6	135	16.2	328	39.3

Multiple primaries with number of cases n<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 1998-2011
(**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		1	0.0		0.1	0.17		2.6
25-29	1	1	0.1	0.20	0.1	0.11	1.2	1.0
30-34	4	1	0.2	0.17	0.1	0.06	2.4	0.6
35-39	13	9	0.6	0.23	0.4	0.29	3.8	2.2
40-44	39	17	1.7	0.29	0.8	0.18	5.6	2.0
45-49	60	50	3.1	0.24	2.6	0.28	4.3	3.3
50-54	133	67	8.0	0.28	3.9	0.24	5.3	3.0
55-59	249	104	16.0	0.32	6.3	0.29	5.6	3.0
60-64	403	162	26.5	0.35	10.1	0.31	6.2	3.5
65-69	507	203	37.2	0.43	13.6	0.38	6.0	3.5
70-74	548	280	53.1	0.54	22.7	0.45	6.2	4.4
75-79	449	313	66.4	0.64	31.5	0.50	5.4	4.3
80-84	330	412	81.2	0.76	51.8	0.68	5.0	5.4
85+	289	492	104.2	0.93	66.2	0.76	5.3	5.3
All ages	3025	2112					5.6	4.2
Mortality								
Raw			12.0	0.47	8.0	0.47		
WS			6.2	0.43	2.9	0.38		
ES			9.5	0.45	4.5	0.40		
BRD-S			12.5	0.49	6.1	0.43		
PYLL-70								
per 100,000			56.1		27.5			
ES			49.1		23.5			
AYLL-70			9.1		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		1	0.0		0.1	0.17		2.8
25-29	1	1	0.1	0.20	0.1	0.11	1.3	1.1
30-34	4	1	0.2	0.17	0.1	0.06	2.5	0.6
35-39	12	9	0.5	0.22	0.4	0.30	3.7	2.4
40-44	37	17	1.7	0.29	0.8	0.19	5.6	2.1
45-49	57	48	2.9	0.24	2.5	0.28	4.4	3.5
50-54	128	61	7.7	0.28	3.6	0.23	5.6	3.1
55-59	226	94	14.5	0.32	5.7	0.28	5.5	3.0
60-64	373	147	24.5	0.35	9.2	0.30	6.5	3.7
65-69	447	170	32.8	0.42	11.4	0.35	6.1	3.5
70-74	444	248	43.0	0.48	20.1	0.43	6.0	4.5
75-79	369	277	54.6	0.57	27.9	0.48	5.4	4.5
80-84	246	360	60.6	0.61	45.3	0.63	4.6	5.6
85+	219	433	79.0	0.75	58.3	0.69	4.9	5.4
All ages	2563	1867					5.5	4.4
Mortality								
Raw			10.2	0.43	7.1	0.44		
WS			5.4	0.40	2.6	0.36		
ES			8.1	0.42	4.0	0.38		
BRD-S			10.5	0.44	5.4	0.41		
PYLL-70								
per 100,000			52.2		25.4			
ES			45.7		21.8			
AYLL-70			9.2		10.5			

* See corresponding tables with multiple primaries.

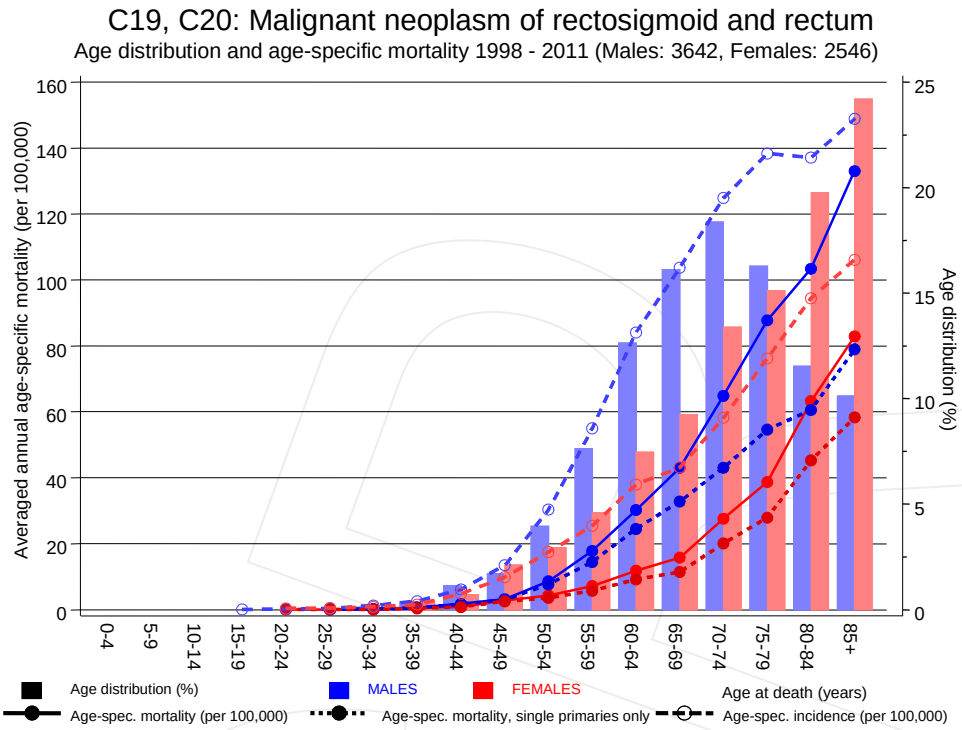
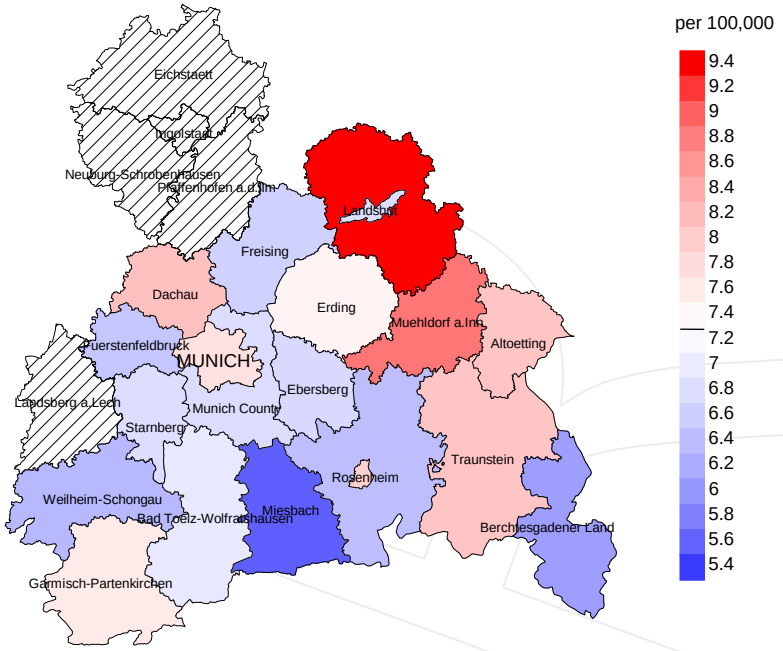


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

The difference between age at diagnosis (Table 3) and age at rectal 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

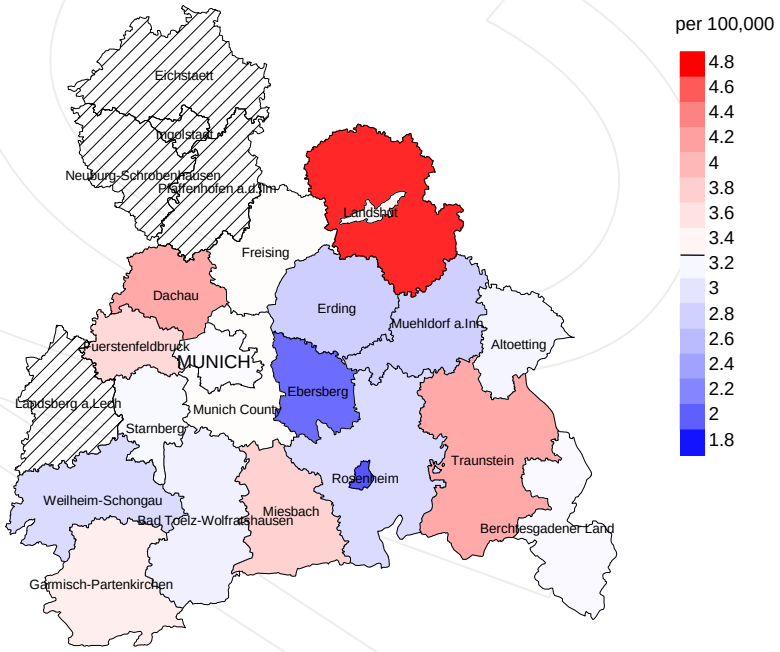
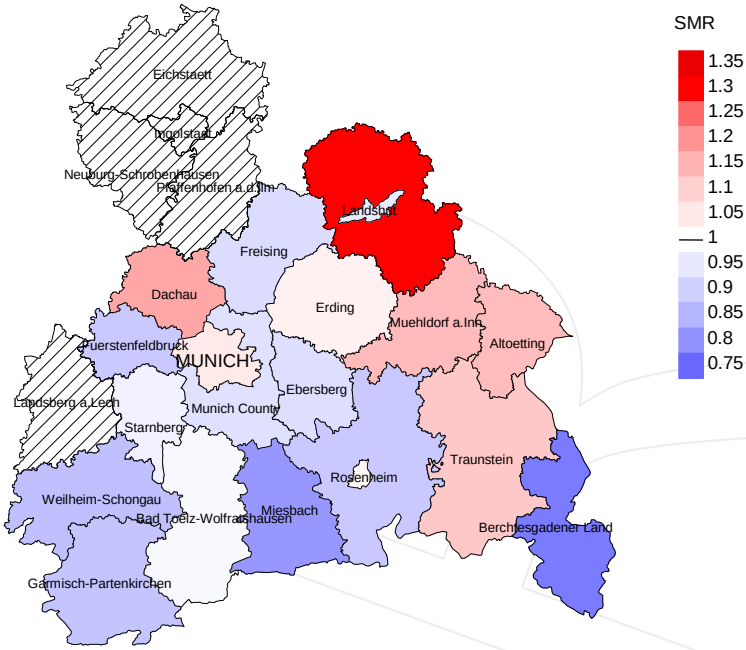


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 7.3/100,000 WS N=1,680, females 3.3/100,000 WS N=1,165). 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 22 women died from rectal cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 2.1/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.0 and 3.9/100,000.

Standardized mortality ratio (SMR) 2003 - 2008: Males



Standardized mortality ratio (SMR) 2003 - 2008: Females

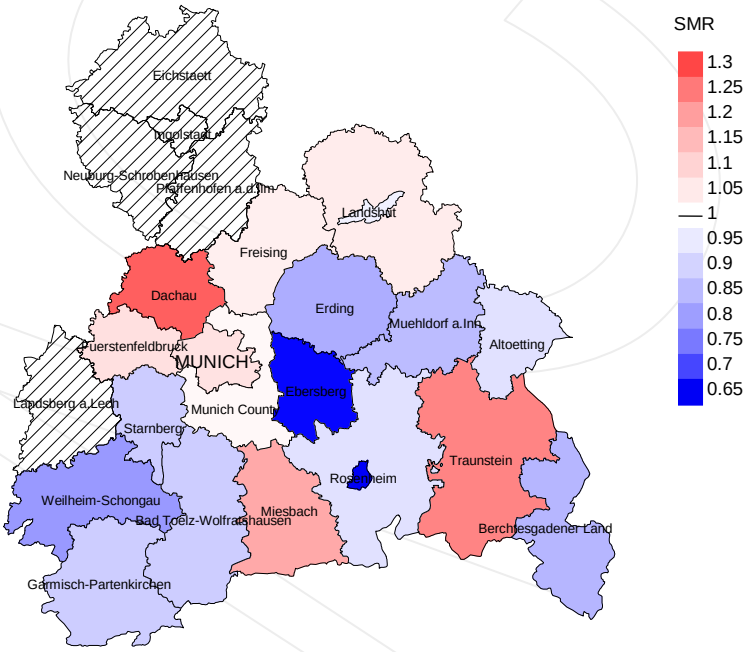


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=1,680, females N=1,165). 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 22 women died from rectal cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.68. Though, the value of this parameter may vary with an underlying probability of 99% between 0.36 and 1.14, 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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