Munich Cancer Registry

- Survival
- Selection Matrix
- Homepage

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

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

Cancer statistics: Baseline statistics

C18: Colon cancer

Year of diagnosis	1998-2011
Patients	23981
Diseases	24389
Creation date	04/02/2013
Export date	01/03/2013
Population	4.5 m

http://www.tumorregister-muenchen.de/en/facts/base/base_C18__E.pdf

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

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

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

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

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

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

Munich Cancer Registry, April 2013

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

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

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

ICD-10 codes used for specifying cancer site

ICD-10	Description
C18.-	Malignant neoplasm of colon
C18.0	Caecum
C18.1	Appendix
C18.2	Ascending colon
C18.3	Hepatic flexure
C18.4	Transverse colon
C18.5	Splenic flexure
C18.6	Descending colon
C18.7	Sigmoid colon
C18.8	Overlapping lesion of colon
C18.9	Colon, unspecified

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	1253	80	6.4	24.4	71.1	98.4
1999	1194	87	7.3	25.1	69.8	97.9
2000	1078	73	6.8	26.8	67.9	98.0
2001	1205	96	8.0	26.1	65.4	98.0
2002	2029	288	14.2	24.1	65.7	97.5
2003	2055	232	11.3	25.6	61.6	97.9
2004	2028	195	9.6	24.5	62.2	97.7
2005	1898	166	8.7	28.5	59.8	96.5
2006	1929	121	6.3	26.7	53.0	94.5
2007	2117	158	7.5	24.5	50.2	82.2 ##
2008	2142	147	6.9	26.8	47.2	69.3
2009	2085	124	5.9	26.9	40.9	68.3
2010	1849	134	7.2	25.1	34.8	93.0
2011	1527	116	7.6	23.6	25.0	77.3 ###
1998-2011	24389	2017	8.3	25.7	54.2	89.4

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	1253	602	651	48.0
1999	1194	579	615	48.5
2000	1078	521	557	48.3
2001	1205	598	607	49.6
2002	2029	1021	1008	50.3
2003	2055	1053	1002	51.2
2004	2028	1042	986	51.4
2005	1898	967	931	50.9
2006	1929	1005	924	52.1
2007	2117	1104	1013	52.1
2008	2142	1141	1001	53.3
2009	2085	1124	961	53.9
2010	1849	969	880	52.4
2011	1527	780	747	51.1
1998-2011	24389	12506	11883	51.3

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 4.52 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	602	651	54.3	55.3	32.4	23.1	49.3	35.1	65.9	46.5
1999	579	615	51.7	51.8	30.3	21.3	46.5	32.4	62.9	42.8
2000	521	557	45.7	46.4	26.4	18.8	40.6	28.8	54.0	38.1
2001	598	607	51.6	49.9	29.9	20.3	45.6	31.1	58.9	41.5
2002	1021	1008	54.8	51.5	29.9	20.0	46.0	30.6	62.1	40.6
2003	1053	1002	56.2	50.9	30.1	19.8	46.1	30.4	61.7	40.2
2004	1042	986	55.4	49.9	28.8	19.8	44.4	29.9	59.9	39.1
2005	967	931	51.1	46.8	26.3	17.5	40.2	26.9	53.8	35.8
2006	1005	924	52.5	46.0	26.8	18.2	41.0	27.4	54.7	36.2
2007	1104	1013	49.8	43.9	25.4	17.0	38.3	25.6	51.2	33.7
2008	1141	1001	51.3	43.1	24.8	16.4	38.4	24.9	51.4	32.7
2009	1124	961	50.4	41.3	24.2	15.2	36.8	23.2	49.4	31.2
2010	969	880	43.0	37.6	20.4	13.9	31.1	21.0	41.6	28.0
2011	780	747	34.6	31.9	16.4	12.0	25.0	18.3	33.3	24.0
1998-2011	12506	11883	49.8	45.1	25.6	17.5	39.1	26.6	52.2	35.2

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	1253	70.8	12.3	13.2	98.1	54.7	62.1	72.2	79.6	86.3
1999	1194	71.4	12.4	24.9	101	55.5	63.3	72.7	79.8	86.6
2000	1078	71.3	11.9	24.7	103	56.3	62.7	72.7	79.4	86.8
2001	1205	71.1	12.4	30.8	103	55.7	62.7	71.7	80.5	87.2
2002	2029	72.2	12.2	17.7	101	56.6	63.9	73.6	81.2	87.5
2003	2055	72.2	11.6	23.5	99.4	57.2	64.3	73.0	80.9	87.1
2004	2028	72.0	12.3	13.8	101	56.4	64.3	73.1	81.0	86.9
2005	1898	72.6	12.3	15.1	99.9	57.2	65.2	73.7	81.9	87.2
2006	1929	71.7	11.9	17.9	102	55.7	64.2	72.4	80.7	85.8
2007	2117	71.7	12.7	15.8	103	54.9	64.7	72.6	81.1	86.4
2008	2142	72.5	12.3	18.9	105	56.4	65.5	73.3	81.6	87.2
2009	2085	72.5	12.1	15.9	99.1	56.7	65.4	73.3	81.4	87.0
2010	1849	72.5	12.5	14.9	101	55.6	65.2	73.7	81.8	86.9
2011	1527	72.5	12.3	17.1	101	56.2	64.8	73.7	81.9	87.4
1998-2011	24389	72.0	12.2	13.2	105	56.2	64.3	73.1	81.1	86.9

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	602	69.0	11.5	31.4	98.1	55.0	60.7	69.5	77.0	84.2
1999	579	69.6	11.4	24.9	95.5	56.2	62.4	70.2	77.8	83.8
2000	521	69.3	10.6	36.0	93.0	56.0	61.9	69.7	77.0	82.6
2001	598	69.2	11.7	31.3	102	54.5	61.7	69.0	77.0	85.6
2002	1021	70.4	11.0	20.9	98.5	56.8	63.2	71.6	78.2	83.2
2003	1053	70.4	11.0	25.7	99.4	56.7	63.3	71.0	78.1	83.4
2004	1042	70.8	11.1	27.8	101	57.0	63.9	71.5	78.6	84.5
2005	967	70.6	11.5	28.3	98.5	56.6	64.2	70.9	78.7	84.5
2006	1005	70.6	11.1	17.9	102	56.2	63.7	71.2	78.4	84.0
2007	1104	69.9	12.2	15.8	99.4	54.4	63.6	71.1	78.7	83.9
2008	1141	71.2	11.3	19.3	105	56.3	65.2	71.8	79.3	84.9
2009	1124	70.7	11.3	20.9	99.0	55.8	64.3	71.7	79.1	83.7
2010	969	71.0	11.4	27.9	98.9	55.1	64.0	71.5	79.4	84.5
2011	780	71.2	11.6	31.2	97.3	56.5	64.6	72.1	79.6	85.1
1998-2011	12506	70.4	11.4	15.8	105	56.1	63.5	71.1	78.5	84.1

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	651	72.6	12.9	13.2	96.7	54.5	63.9	75.0	82.1	87.4
1999	615	73.1	13.0	26.9	101	54.9	64.3	75.1	82.8	88.5
2000	557	73.2	12.8	24.7	103	56.3	64.4	75.3	82.0	88.5
2001	607	73.0	12.7	30.8	103	55.9	64.0	75.4	81.7	89.0
2002	1008	74.1	12.9	17.7	101	56.4	65.0	76.5	83.0	89.5
2003	1002	74.1	12.0	23.5	98.9	57.9	65.4	75.9	82.9	88.9
2004	986	73.1	13.3	13.8	100	55.6	64.7	75.2	83.3	88.7
2005	931	74.7	12.8	15.1	99.9	57.9	66.9	76.6	84.0	90.2
2006	924	73.0	12.7	24.6	97.1	55.2	65.1	75.2	82.8	87.0
2007	1013	73.6	13.1	17.8	103	55.6	66.5	75.5	83.5	87.7
2008	1001	74.1	13.2	18.9	101	56.8	66.4	75.5	84.1	88.8
2009	961	74.5	12.8	15.9	99.1	58.1	67.6	76.5	83.9	88.8
2010	880	74.2	13.4	14.9	101	56.0	67.2	76.2	83.8	89.2
2011	747	74.0	12.9	17.1	101	55.5	65.4	75.4	84.5	88.8
1998-2011	11883	73.7	12.9	13.2	103	56.3	65.5	75.7	83.4	88.7

Table 4

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

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
10-14	3	0.0	0.0			0.0	3	0.0	0.0
15-19	14	0.1	0.1	3	0.0	0.0	11	0.1	0.1
20-24	15	0.1	0.1	6	0.0	0.1	9	0.1	0.2
25-29	45	0.2	0.3	20	0.2	0.2	25	0.2	0.4
30-34	92	0.4	0.7	48	0.4	0.6	44	0.4	0.8
35-39	155	0.6	1.3	81	0.6	1.3	74	0.6	1.4
40-44	295	1.2	2.5	154	1.2	2.5	141	1.2	2.6
45-49	550	2.3	4.8	288	2.3	4.8	262	2.2	4.8
50-54	968	4.0	8.8	519	4.2	8.9	449	3.8	8.6
55-59	1693	6.9	15.7	964	7.7	16.7	729	6.1	14.7
60-64	2674	11.0	26.7	1588	12.7	29.4	1086	9.1	23.8
65-69	3370	13.8	40.5	2050	16.4	45.7	1320	11.1	34.9
70-74	3812	15.6	56.1	2254	18.0	63.8	1558	13.1	48.1
75-79	3789	15.5	71.7	1970	15.8	79.5	1819	15.3	63.4
80-84	3501	14.4	86.0	1505	12.0	91.6	1996	16.8	80.2
85+	3413	14.0	100.0	1056	8.4	100.0	2357	19.8	100.0
All ages	24389	100.0		12506	100.0		11883	100.0	

Included in the statistics are 33.9% multiple primaries in males and 25.5% 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=777 %	Females DCO rate n=1240 %	Males Prop.all cancers n=132509 %	Females Prop.all cancers n=129521 %
0- 4			0.0	0.0				
5- 9			0.0	0.0				
10-14		3	0.0	0.2				2.0
15-19	3	11	0.2	0.9			1.0	4.6
20-24	6	9	0.4	0.6	16.7		1.2	2.1
25-29	19	25	1.1	1.4			2.4	2.7
30-34	48	43	2.5	2.3			3.7	2.5
35-39	78	74	3.6	3.6		1.4	3.9	2.3
40-44	153	141	6.9	6.6	1.3		5.5	2.7
45-49	287	260	14.8	13.6	1.4	2.3	6.4	3.6
50-54	516	444	30.9	25.9	2.5	1.6	7.1	4.8
55-59	956	724	61.3	44.2	1.9	2.1	7.7	6.2
60-64	1571	1079	103.2	67.3	2.6	2.3	8.3	7.3
65-69	2025	1312	148.6	88.1	2.7	3.2	8.7	8.1
70-74	2225	1543	215.7	125.0	4.5	5.1	10.3	10.3
75-79	1946	1806	288.0	181.6	6.9	7.7	11.6	12.3
80-84	1479	1978	364.1	248.8	10.2	11.3	13.4	14.6
85+	1037	2341	373.9	315.2	24.8	30.0	12.5	16.1
All ages	12349	11793			6.3	10.5	9.3	9.1
Incidence								
Raw			49.1	44.8				
WS			25.3	17.4				
ES			38.6	26.4				
BRD-S			51.6	34.9				

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

Table 6a

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

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C00	Lip	3	0.7	4.3	0.9	12.5		0.7	
C03-C06	Oral cavity	5	4.3	1.2	0.4	2.7		0.2	
C09-C10	Oropharynx	7	5.2	1.3	0.5	2.8		0.6	
C12-C13	Hypopharynx	4	2.9	1.4	0.4	3.6		0.4	25.0
C15	Oesophagus	24	9.7	2.5	1.6	3.7	#	4.6	16.7
C16	Stomach	64	28.1	2.3	1.8	2.9	#	11.7	9.4
C17	Small intestine	26	2.6	10.0	6.6	14.7	#	7.6	3.8
C18	Colon	180	65.1	2.8	2.4	3.2	#	37.4	1.1
C19-C20	Rectum	149	33.9	4.4	3.7	5.2	#	37.5	0.7
C21	Anus/canal	3	1.1	2.8	0.6	8.3		0.6	
C22	Liver	31	16.4	1.9	1.3	2.7	#	4.8	35.5
C23-C24	Bile	12	6.0	2.0	1.0	3.5	#	1.9	
C25	Pancreas	51	21.9	2.3	1.7	3.1	#	9.5	29.4
C32	Larynx	10	5.7	1.7	0.8	3.2		1.4	
C33-C34	Lung	131	72.2	1.8	1.5	2.2	#	19.2	14.5
C38,C45	Mesothelioma	4	3.9	1.0	0.3	2.6		0.0	
C43	Malign. melanoma	44	21.2	2.1	1.5	2.8	#	7.4	2.3
C46,C49	Soft tissue	7	3.2	2.2	0.9	4.5		1.2	
C50	Breast	3	1.5	2.0	0.4	5.8		0.5	
C61	Prostate	278	181.2	1.5	1.4	1.7	#	31.5	5.8
C62	Testis	4	1.1	3.7	1.0	9.6	#	1.0	25.0
C64	Kidney	60	20.4	2.9	2.2	3.8	#	12.9	6.7
C65	Renal pelvis	7	2.5	2.8	1.1	5.7	#	1.5	
C66	Ureter	6	1.4	4.4	1.6	9.5	#	1.5	
C67	Bladder	52	28.7	1.8	1.4	2.4	#	7.6	9.6
C68	Urinary org.	3	0.3	9.1	1.9	26.6	#	0.9	66.7
C70-C72	CNS cancer	14	7.7	1.8	1.0	3.0		2.0	35.7
C73	Thyroid	5	3.3	1.5	0.5	3.5		0.6	20.0
C76-C79	CUP	14	10.8	1.3	0.7	2.2		1.0	7.1
C82-C85	NHL	52	24.2	2.1	1.6	2.8	#	9.0	5.8
C90	Mult. myeloma	16	7.9	2.0	1.2	3.3	#	2.6	18.8
C91-C96	Leukaemia	17	10.0	1.7	1.0	2.7		2.3	35.3
Other primaries		7	7.0	1.0	0.4	2.1		0.0	
Not observed		0	3.8	0.0	0.0	1.0	#	-1.2	
All mult. primaries		1293	616.0	2.1	2.0	2.2	#	220.6	8.4

Patients	8938
Mean age at second malignancy (years)	73.5
Person-years	30690
Mean observation time (years)	3.4
Median observation time (years)	2.5

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 %
C03-C06	Oral cavity	2	2.1	0.9	0.1	3.4		-0.0	
C09-C10	Oropharynx	5	1.3	3.9	1.3	9.1	#	1.3	
C15	Oesophagus	3	2.0	1.5	0.3	4.4		0.4	
C16	Stomach	43	17.6	2.4	1.8	3.3	#	8.8	23.3
C17	Small intestine	16	1.5	10.4	5.9	16.9	#	5.0	6.3
C18	Colon	121	46.4	2.6	2.2	3.1	#	25.7	0.8
C19-C20	Rectum	80	18.9	4.2	3.4	5.3	#	21.0	1.3
C21	Anus/canal	3	2.0	1.5	0.3	4.4		0.3	
C22	Liver	17	4.8	3.5	2.1	5.7	#	4.2	41.2
C23-C24	Bile	7	6.9	1.0	0.4	2.1		0.0	42.9
C25	Pancreas	42	19.1	2.2	1.6	3.0	#	7.9	21.4
C32	Larynx	2	0.6	3.1	0.4	11.3		0.5	
C33-C34	Lung	58	25.3	2.3	1.7	3.0	#	11.2	12.1
C38,C45	Mesothelioma	2	0.7	2.8	0.3	10.0		0.4	
C40-C41	Bone	2	0.3	6.8	0.8	24.6		0.6	
C43	Malign. melanoma	19	11.8	1.6	1.0	2.5		2.5	
C46,C49	Soft tissue	3	2.2	1.4	0.3	4.1		0.3	
C48	Peritoneal	3	1.1	2.8	0.6	8.3		0.7	33.3
C50	Breast	163	106.3	1.5	1.3	1.8	#	19.5	5.5
C51	Vulva	9	4.2	2.1	1.0	4.0		1.6	
C53	Cervix uteri	7	4.7	1.5	0.6	3.1		0.8	
C54	Corpus uteri	50	20.3	2.5	1.8	3.2	#	10.2	
C56	Ovary	53	16.4	3.2	2.4	4.2	#	12.6	28.3
C64	Kidney	34	10.0	3.4	2.4	4.8	#	8.3	14.7
C65	Renal pelvis	4	1.2	3.3	0.9	8.4		1.0	
C66	Ureter	2	0.5	3.7	0.4	13.3		0.5	
C67	Bladder	20	8.7	2.3	1.4	3.6	#	3.9	15.0
C70-C72	CNS cancer	8	5.4	1.5	0.6	2.9		0.9	62.5
C73	Thyroid	8	5.3	1.5	0.7	3.0		0.9	12.5
C74-C80	Cancer others	3	2.5	1.2	0.2	3.5		0.2	66.7
C76-C79	CUP	4	8.1	0.5	0.1	1.3		-1.4	
C82-C85	NHL	31	15.6	2.0	1.3	2.8	#	5.3	22.6
C90	Mult. myeloma	7	5.2	1.4	0.5	2.8		0.6	14.3
C91-C96	Leukaemia	16	6.6	2.4	1.4	4.0	#	3.3	43.8
Other primaries		7	4.9	1.4	0.6	2.9		0.7	14.3
Not observed		0	2.5	0.0	0.0	1.5		-0.8	
All mult. primaries		854	393.0	2.2	2.0	2.3	#	158.7	11.2

Patients	8497
Mean age at second malignancy (years)	75.1
Person-years	29049
Mean observation time (years)	3.4
Median observation time (years)	2.5

The occurrence of second malignancy is statistically significant.

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

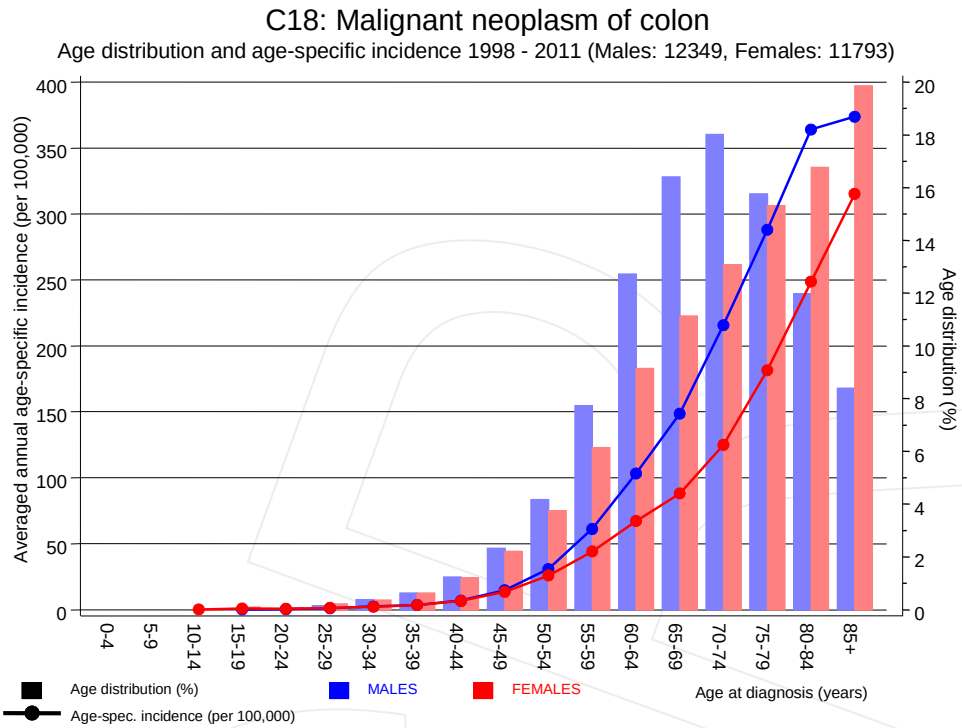


Figure 7. Age distribution and age-specific incidence

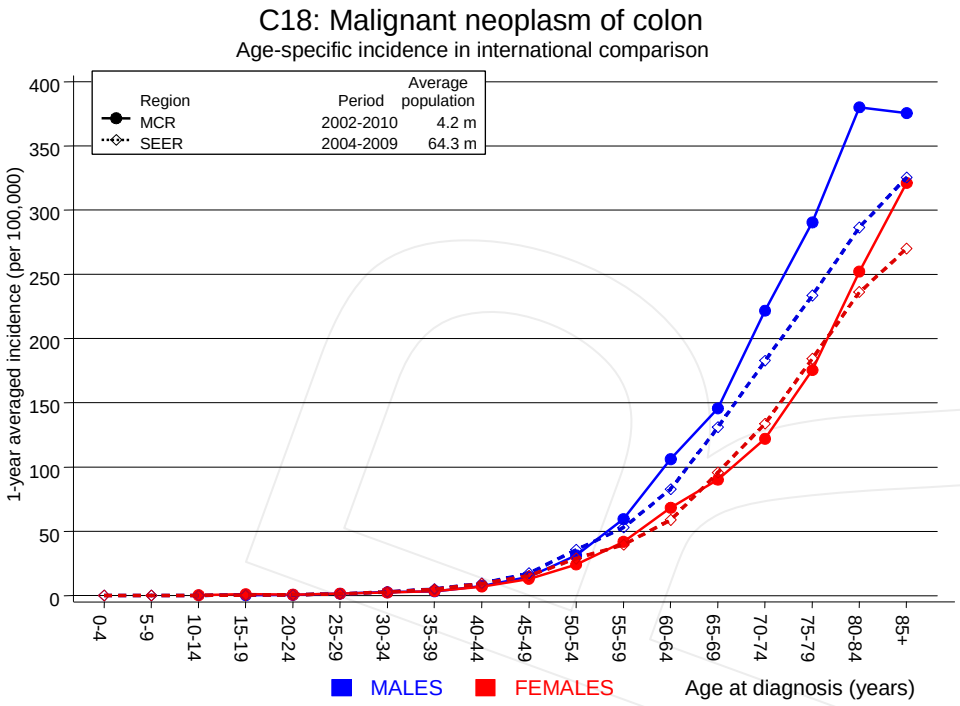


Figure 7a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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.

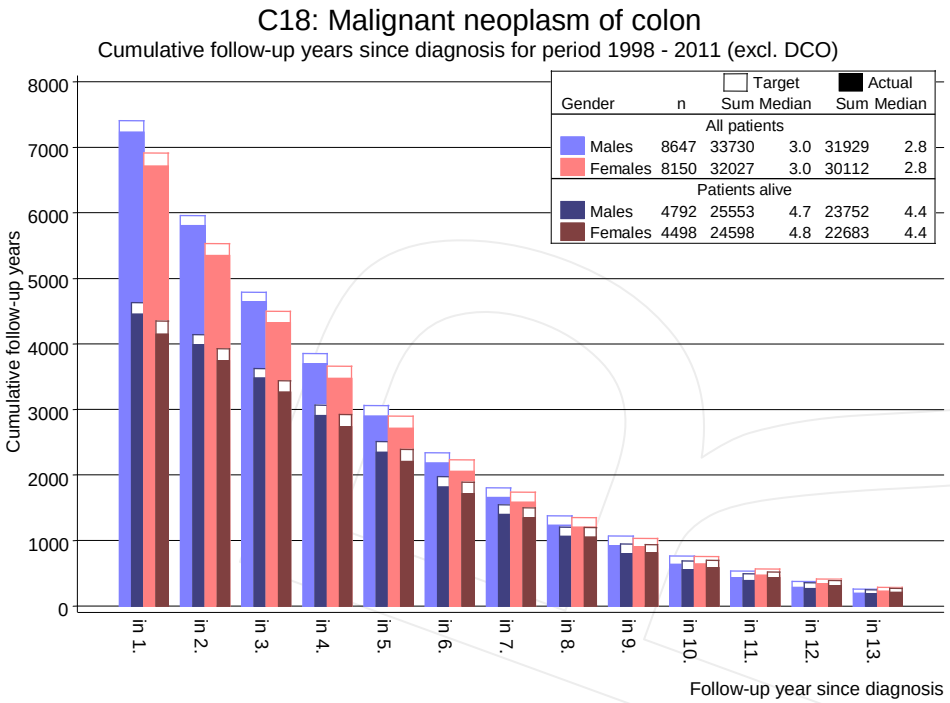
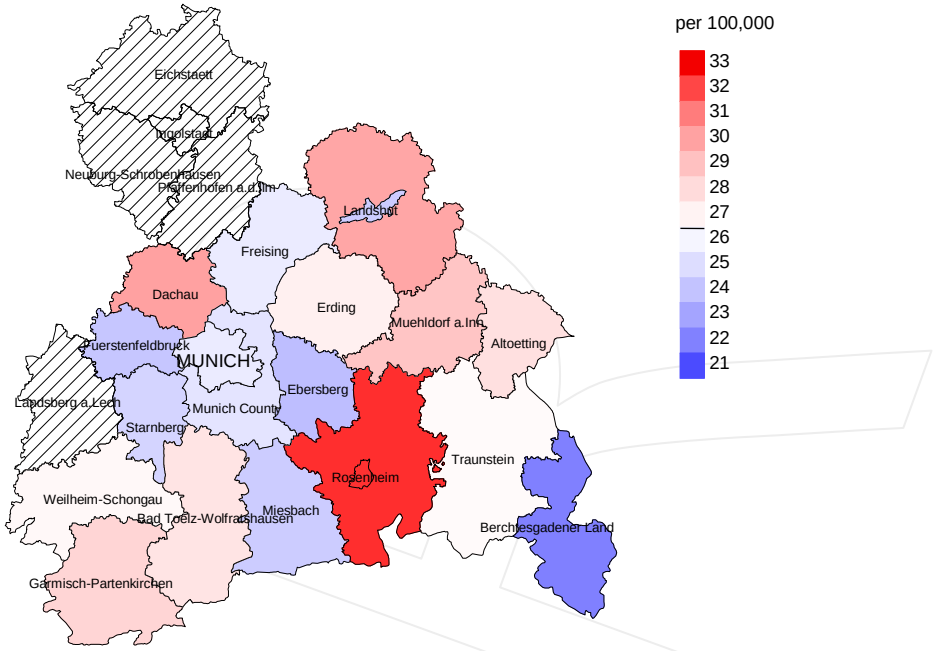


Figure 8. Cumulative follow-up years depending on time since diagnosis

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

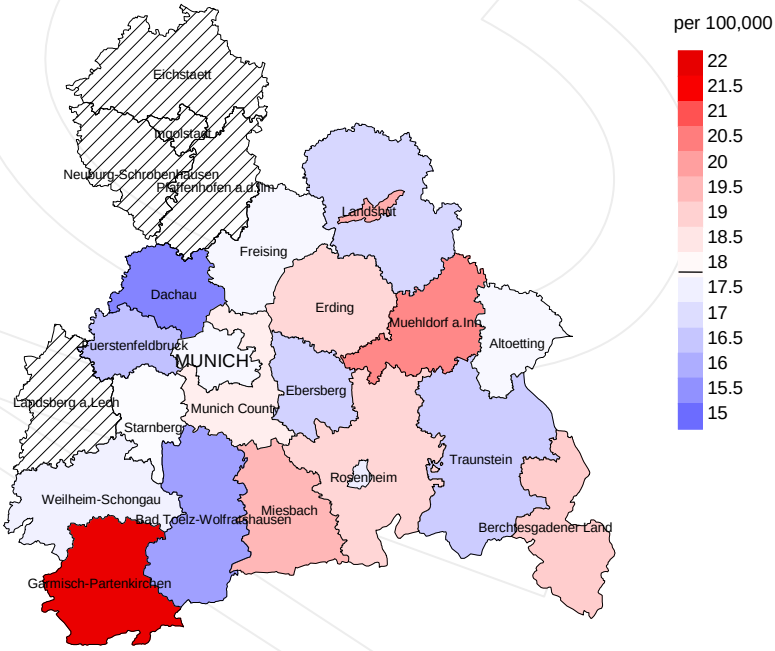
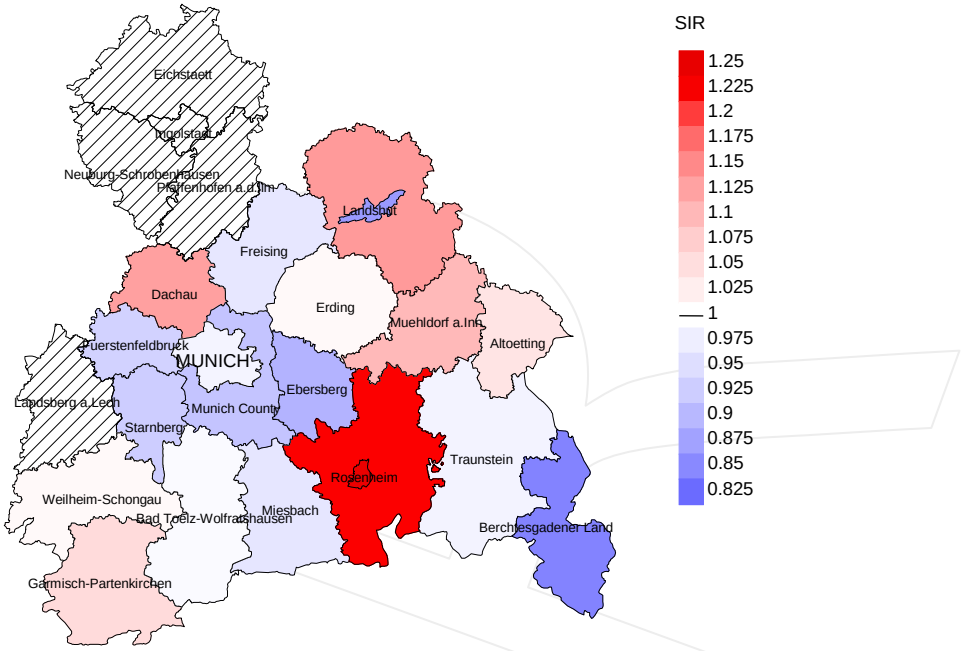


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 26.5/100,000 WS N=5,938, females 17.9/100,000 WS N=5,554). 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 144 women were identified with newly diagnosed colon cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 16.8/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 13.0 and 21.7/100,000.

Standardized incidence ratio (SIR) 2003 - 2008: Males



Standardized incidence ratio (SIR) 2003 - 2008: Females

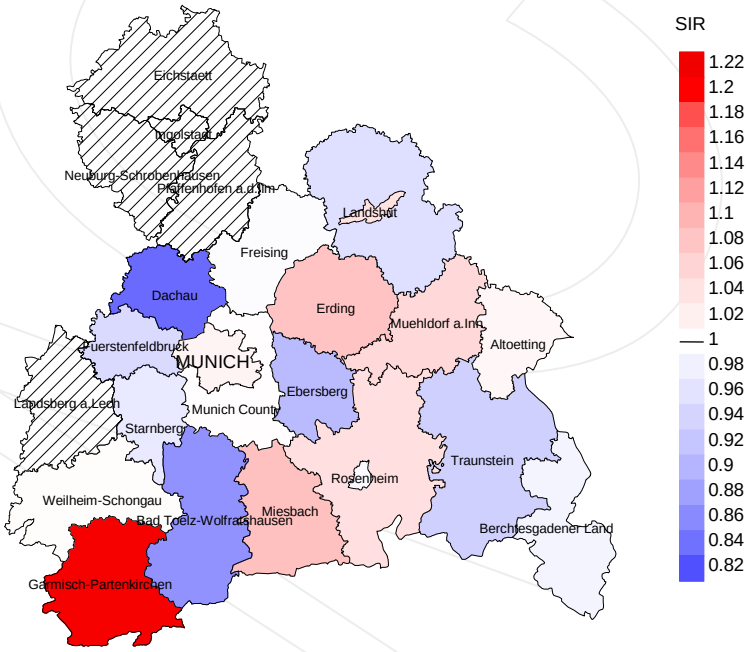


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=5,938, females N=5,554). 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 144 women were identified with newly diagnosed colon cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.91. Though, the value of this parameter may vary with an underlying probability of 99% between 0.73 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	1253	98.4	6.4	891	71.1	93.7
1999	1194	97.9	7.3	833	69.8	94.7
2000	1078	98.0	6.8	732	67.9	96.6
2001	1205	98.0	8.0	788	65.4	97.0
2002	2029	97.5	14.2	1333	65.7	98.0
2003	2055	97.9	11.3	1265	61.6	97.9
2004	2028	97.7	9.6	1261	62.2	97.5
2005	1898	96.5	8.7	1135	59.8	98.2
2006	1929	94.5	6.3	1022	53.0	99.4
2007	2117	82.2	7.5	1062	50.2	98.6
2008	2142	69.3	6.9	1010	47.2	98.6
2009	2085	68.3	5.9	852	40.9	98.6
2010	1849	93.0	7.2	643	34.8	97.7
2011	1527	77.3	7.6	382	25.0	97.9
1998-2011	24389	89.4	8.3	13209	54.2	97.6

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 4.52 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	1253	715	91.0	236	18.8
1999	1194	721	92.2	227	19.0
2000	1078	706	94.1	206	19.1
2001	1205	742	95.7	211	17.5
2002	2029	1048	98.3	503	24.8
2003	2055	1136	97.8	449	21.8
2004	2028	1138	98.4	429	21.2
2005	1898	1233	96.8	399	21.0
2006	1929	1205	97.6	345	17.9
2007	2117	1300	97.7	402	19.0
2008	2142	1340	98.6	448	20.9
2009	2085	1365	98.2	379	18.2
2010	1849	1407	98.4	348	18.8
2011	1527	1274	99.1	272	17.8
1998-2011	24389	15330	97.2	4854	19.9

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	715	72.2	27.8	86.8
1999	721	71.6	28.4	84.8
2000	706	72.9	27.1	85.4
2001	742	69.0	31.0	84.2
2002	1048	74.1	25.9	86.8
2003	1136	72.2	27.8	85.4
2004	1138	76.4	23.6	85.9
2005	1233	70.6	29.4	80.0
2006	1205	68.5	31.5	81.5
2007	1300	70.5	29.5	82.5
2008	1340	70.5	29.5	81.3
2009	1365	67.5	32.5	77.0
2010	1407	64.9	35.1	77.3
2011	1274	63.9	36.1	74.7
1998-2011	15330	70.0	30.0	81.8

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	336	73.8	72.1	78.5	73.4
1999	316	74.4	72.3	79.2	73.3
2000	356	75.0	72.7	81.6	74.1
2001	341	73.9	71.7	79.8	72.7
2002	513	74.2	72.2	80.6	73.2
2003	572	75.3	73.5	80.3	74.5
2004	559	75.8	74.2	81.5	75.2
2005	615	75.3	73.0	81.1	73.6
2006	629	76.1	73.9	80.7	74.7
2007	680	76.3	74.5	80.9	75.2
2008	730	76.2	74.4	81.3	75.0
2009	686	76.3	74.7	79.7	75.3
2010	732	76.8	74.5	81.2	75.6
2011	661	76.2	73.4	81.8	74.5
1998-2011	7726	75.6	73.6	80.7	74.5

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

Table 11b

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (not cancer-related) Years	Age at death (according to death certificate) Years
1998	379	77.4	75.3	82.6	77.4
1999	405	78.9	76.8	84.5	78.8
2000	350	79.0	76.7	84.7	78.2
2001	401	80.0	77.2	85.6	78.8
2002	535	79.7	77.5	85.3	79.0
2003	564	79.4	77.0	85.1	78.2
2004	579	79.2	77.2	85.2	78.0
2005	618	79.9	77.4	85.4	78.5
2006	576	80.6	78.1	86.2	79.2
2007	620	79.8	77.1	85.9	78.1
2008	610	80.9	78.2	86.5	79.5
2009	679	80.7	78.0	86.3	78.9
2010	675	80.7	77.4	86.4	78.8
2011	613	81.9	78.0	88.0	79.4
1998-2011	7604	80.0	77.4	85.8	78.7

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	246	22.2	0.41	12.9	0.40	20.5	0.42	28.2	0.43
1999	221	19.7	0.38	11.3	0.38	18.1	0.39	25.6	0.41
2000	266	23.4	0.51	12.9	0.49	20.8	0.51	29.5	0.55
2001	247	21.3	0.41	11.9	0.40	18.9	0.41	25.6	0.44
2002	393	21.1	0.39	11.3	0.38	17.9	0.39	24.5	0.40
2003	424	22.6	0.40	11.4	0.38	18.6	0.41	26.8	0.44
2004	435	23.1	0.42	11.3	0.40	18.5	0.42	26.5	0.45
2005	443	23.4	0.47	11.3	0.44	18.1	0.46	25.7	0.49
2006	428	22.3	0.43	10.5	0.40	17.1	0.42	24.6	0.46
2007	491	22.2	0.45	10.1	0.41	16.4	0.44	23.5	0.47
2008	540	24.3	0.49	10.8	0.45	17.6	0.47	25.4	0.51
2009	463	20.7	0.42	9.2	0.38	14.8	0.41	21.2	0.44
2010	483	21.4	0.51	9.1	0.46	14.8	0.49	21.2	0.52
2011	442	19.6	0.57	8.8	0.55	13.9	0.56	19.0	0.58
1998-2011	5522	22.0	0.45	10.6	0.42	17.0	0.44	24.1	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	270	23.0	0.42	8.6	0.37	13.6	0.39	19.0	0.41
1999	295	24.9	0.48	8.6	0.40	13.9	0.43	19.4	0.45
2000	249	20.7	0.45	7.3	0.39	11.7	0.41	16.0	0.42
2001	265	21.8	0.44	7.4	0.37	12.1	0.39	17.0	0.41
2002	384	19.6	0.38	6.6	0.33	10.6	0.35	14.7	0.36
2003	396	20.1	0.40	6.9	0.35	11.0	0.36	15.3	0.38
2004	435	22.0	0.44	7.2	0.37	11.7	0.39	16.5	0.42
2005	427	21.5	0.46	7.1	0.41	11.4	0.43	15.6	0.44
2006	398	19.8	0.43	6.2	0.34	10.2	0.37	14.3	0.40
2007	428	18.5	0.43	6.2	0.36	9.8	0.39	13.6	0.41
2008	407	17.5	0.41	5.4	0.33	8.8	0.36	12.5	0.38
2009	459	19.7	0.48	6.2	0.41	9.9	0.43	13.7	0.45
2010	431	18.4	0.50	5.8	0.42	9.2	0.44	12.5	0.45
2011	373	15.9	0.51	5.0	0.42	7.9	0.44	10.9	0.46
1998-2011	5217	19.8	0.44	6.5	0.37	10.5	0.40	14.5	0.42

Table 13

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

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
20-24	2	0.0	0.0	2	0.0	0.0			0.0
25-29	10	0.1	0.1	4	0.1	0.1	6	0.1	0.1
30-34	17	0.2	0.3	10	0.2	0.3	7	0.1	0.2
35-39	37	0.3	0.6	16	0.3	0.6	21	0.4	0.6
40-44	90	0.8	1.4	45	0.8	1.4	45	0.8	1.5
45-49	136	1.2	2.7	69	1.2	2.6	67	1.3	2.7
50-54	302	2.7	5.4	164	2.9	5.5	138	2.6	5.3
55-59	521	4.7	10.1	306	5.4	10.9	215	4.0	9.4
60-64	848	7.7	17.9	547	9.7	20.5	301	5.7	15.0
65-69	1252	11.4	29.3	795	14.0	34.6	457	8.6	23.6
70-74	1565	14.2	43.5	929	16.4	50.9	636	11.9	35.6
75-79	1882	17.1	60.6	1034	18.2	69.2	848	15.9	51.5
80-84	1974	18.0	78.6	958	16.9	86.1	1016	19.1	70.6
85+	2355	21.4	100.0	788	13.9	100.0	1567	29.4	100.0
All ages	10991	100.0		5667	100.0		5324	100.0	

Included in the statistics are 33.9% multiple primaries in males and 25.5% in females.

Table 14

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

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4			0.0		0.0			
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24	2		0.1	0.33	0.0		2.5	
25-29	4	6	0.2	0.20	0.3	0.24	4.6	5.9
30-34	10	7	0.5	0.21	0.4	0.16	6.0	3.4
35-39	16	21	0.7	0.20	1.0	0.28	4.4	4.6
40-44	45	45	2.0	0.29	2.1	0.32	5.9	4.5
45-49	69	67	3.6	0.24	3.5	0.26	4.5	3.9
50-54	164	138	9.8	0.32	8.0	0.31	5.8	5.3
55-59	306	215	19.6	0.32	13.1	0.29	5.9	5.3
60-64	547	301	35.9	0.34	18.8	0.28	7.1	5.4
65-69	795	457	58.3	0.39	30.7	0.35	7.7	6.5
70-74	929	636	90.1	0.41	51.5	0.41	8.4	7.9
75-79	1034	848	153.0	0.52	85.3	0.47	9.5	9.4
80-84	958	1016	235.8	0.64	127.8	0.51	10.9	10.6
85+	788	1567	284.1	0.75	211.0	0.66	11.1	13.8
All ages	5667	5324					8.4	8.7
Mortality								
Raw			22.5	0.45	20.2	0.45		
WS			10.8	0.42	6.6	0.38		
ES			17.5	0.45	10.7	0.40		
BRD-S			24.7	0.47	14.8	0.42		
PYLL-70								
per 100,000			73.6		55.2			
ES			64.2		47.0			
AYLL-70			8.5		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 ←%
C15	Oesophagus	36	1.6	4	11.1	9	25.0	23	63.9
C16	Stomach	134	5.8	40	29.9	36	26.9	58	43.3
C17	Small intestine	20	0.9	2	10.0	9	45.0	9	45.0
C18	Colon	175	7.6			76	43.4	99	56.6
C19-C20	Rectum	204	8.8	62	30.4	96	47.1	46	22.5
C22	Liver	69	3.0	3	4.3	19	27.5	47	68.1
C25	Pancreas	93	4.0	9	9.7	15	16.1	69	74.2
C32	Larynx	36	1.6	24	66.7			12	33.3
C33-C34	Lung	253	10.9	47	18.6	34	13.4	172	68.0
C43	Malign. melanoma	67	2.9	36	53.7	2	3.0	29	43.3
C44	Skin others	94	4.1	53	56.4	11	11.7	30	31.9
C61	Prostate	475	20.5	266	56.0	36	7.6	173	36.4
C64	Kidney	90	3.9	42	46.7	17	18.9	31	34.4
C67	Bladder	168	7.3	83	49.4	16	9.5	69	41.1
C70-C72	CNS cancer	40	1.7	11	27.5	2	5.0	27	67.5
C76-C79	CUP	27	1.2	5	18.5	5	18.5	17	63.0
C82-C85	NHL	90	3.9	34	37.8	17	18.9	39	43.3
C91-C96	Leukaemia	53	2.3	13	24.5	5	9.4	35	66.0
Other primaries		192	8.3	78	40.6	18	9.4	96	50.0
All mult. primaries		2316	100.0	812	35.1	423	18.3	1081	46.7

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 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 ←%
C03-C06 Oral cavity	10	0.5	4	40.0			6	60.0
C15 Oesophagus	10	0.5	1	10.0	2	20.0	7	70.0
C16 Stomach	106	5.7	30	28.3	24	22.6	52	49.1
C18 Colon	125	6.7			41	32.8	84	67.2
C19-C20 Rectum	128	6.9	39	30.5	53	41.4	36	28.1
C21 Anus/canal	14	0.8	5	35.7	3	21.4	6	42.9
C22 Liver	25	1.3	2	8.0	7	28.0	16	64.0
C23-C24 Bile	26	1.4	8	30.8	2	7.7	16	61.5
C25 Pancreas	78	4.2	5	6.4	14	17.9	59	75.6
C33-C34 Lung	110	5.9	21	19.1	10	9.1	79	71.8
C43 Malign. melanoma	48	2.6	33	68.8	4	8.3	11	22.9
C44 Skin others	43	2.3	24	55.8	5	11.6	14	32.6
C50 Breast	459	24.7	312	68.0	29	6.3	118	25.7
C51 Vulva	15	0.8	10	66.7	1	6.7	4	26.7
C53 Cervix uteri	49	2.6	36	73.5	7	14.3	6	12.2
C54 Corpus uteri	106	5.7	70	66.0	10	9.4	26	24.5
C55,C57 Fem. genitals un	11	0.6	11	100.0				
C56 Ovary	139	7.5	46	33.1	35	25.2	58	41.7
C64 Kidney	41	2.2	20	48.8	6	14.6	15	36.6
C67 Bladder	63	3.4	31	49.2	1	1.6	31	49.2
C70-C72 CNS cancer	32	1.7	16	50.0	1	3.1	15	46.9
C73 Thyroid	16	0.9	8	50.0	2	12.5	6	37.5
C76-C79 CUP	15	0.8	7	46.7	2	13.3	6	40.0
C82-C85 NHL	50	2.7	20	40.0	5	10.0	25	50.0
C90 Mult. myeloma	21	1.1	5	23.8	2	9.5	14	66.7
C91-C96 Leukaemia	40	2.1	5	12.5	5	12.5	30	75.0
Other primaries	81	4.4	27	33.3	17	21.0	37	45.7
All mult. primaries	1861	100.0	796	42.8	288	15.5	777	41.8

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 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2011
(**Singular primaries only** *)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4			0.0		0.0			
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24	2		0.1	0.33	0.0		2.7	
25-29	4	6	0.2	0.24	0.3	0.25	4.9	6.3
30-34	9	7	0.5	0.20	0.4	0.18	5.5	3.9
35-39	14	15	0.6	0.21	0.7	0.22	4.1	3.6
40-44	41	41	1.8	0.28	1.9	0.32	5.9	4.7
45-49	64	60	3.3	0.25	3.1	0.25	4.6	4.0
50-54	140	116	8.4	0.31	6.8	0.29	5.6	5.2
55-59	272	188	17.4	0.32	11.5	0.30	6.1	5.4
60-64	467	247	30.7	0.35	15.4	0.27	7.2	5.4
65-69	642	380	47.1	0.39	25.5	0.34	7.6	6.6
70-74	739	506	71.7	0.42	41.0	0.40	8.4	7.9
75-79	781	658	115.6	0.53	66.2	0.46	9.3	9.1
80-84	699	778	172.1	0.65	97.8	0.48	10.5	10.2
85+	578	1269	208.4	0.75	170.9	0.65	10.5	13.7
All ages	4452	4271					8.2	8.6
Mortality								
Raw			17.7	0.45	16.2	0.43		
WS			8.7	0.42	5.4	0.37		
ES			13.8	0.44	8.6	0.39		
BRD-S			19.2	0.47	11.9	0.41		
PYLL-70								
per 100,000			64.1		47.3			
ES			56.0		40.4			
AYLL-70			8.8		10.1			

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2011
(**Single primaries only** *)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4			0.0		0.0			
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24	2		0.1	0.33	0.0		2.9	
25-29	4	6	0.2	0.25	0.3	0.25	5.3	6.7
30-34	9	6	0.5	0.21	0.3	0.16	5.7	3.7
35-39	14	13	0.6	0.22	0.6	0.19	4.3	3.4
40-44	41	40	1.8	0.29	1.9	0.32	6.2	5.0
45-49	62	56	3.2	0.25	2.9	0.25	4.7	4.1
50-54	131	114	7.8	0.31	6.6	0.31	5.8	5.7
55-59	256	178	16.4	0.33	10.9	0.30	6.3	5.8
60-64	401	223	26.3	0.33	13.9	0.26	7.0	5.6
65-69	546	336	40.1	0.37	22.6	0.33	7.5	6.9
70-74	614	439	59.5	0.40	35.6	0.38	8.3	8.1
75-79	622	567	92.0	0.48	57.0	0.43	9.1	9.3
80-84	543	660	133.7	0.56	83.0	0.44	10.1	10.2
85+	443	1087	159.7	0.62	146.4	0.58	9.9	13.6
All ages	3688	3725					8.0	8.7
Mortality								
Raw			14.7	0.41	14.2	0.40		
WS			7.3	0.39	4.8	0.35		
ES			11.5	0.41	7.6	0.37		
BRD-S			15.8	0.43	10.4	0.38		
PYLL-70								
per 100,000			59.1		44.3			
ES			51.8		38.0			
AYLL-70			9.2		10.3			

* See corresponding tables with multiple primaries.

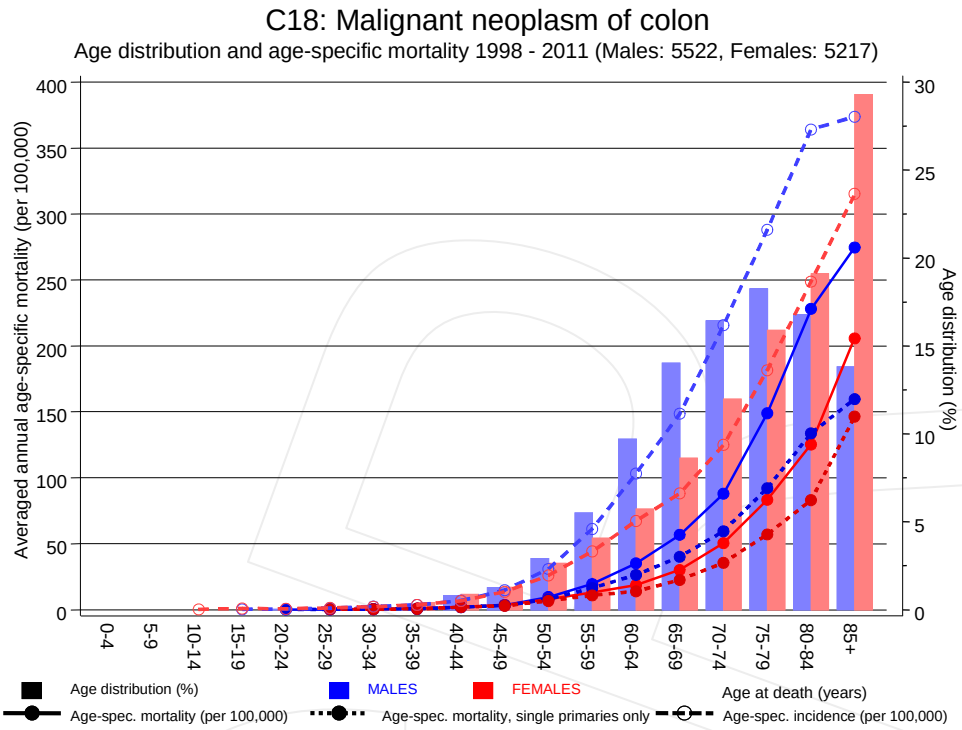
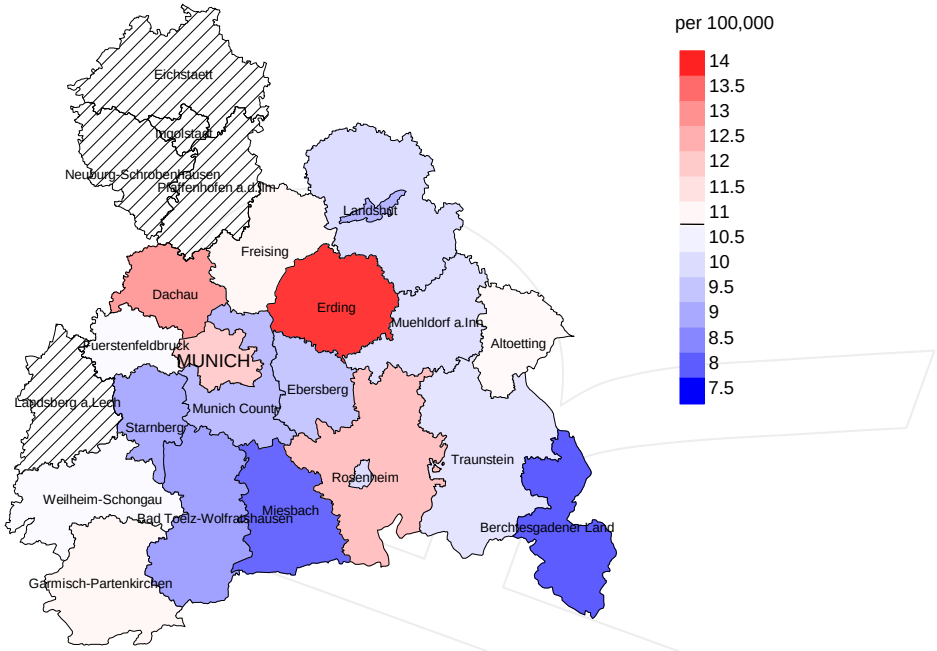


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

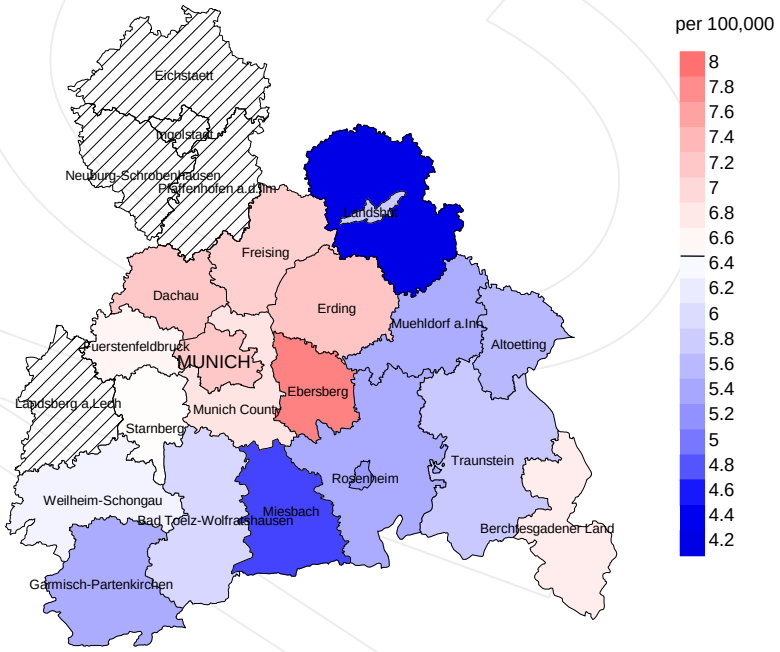
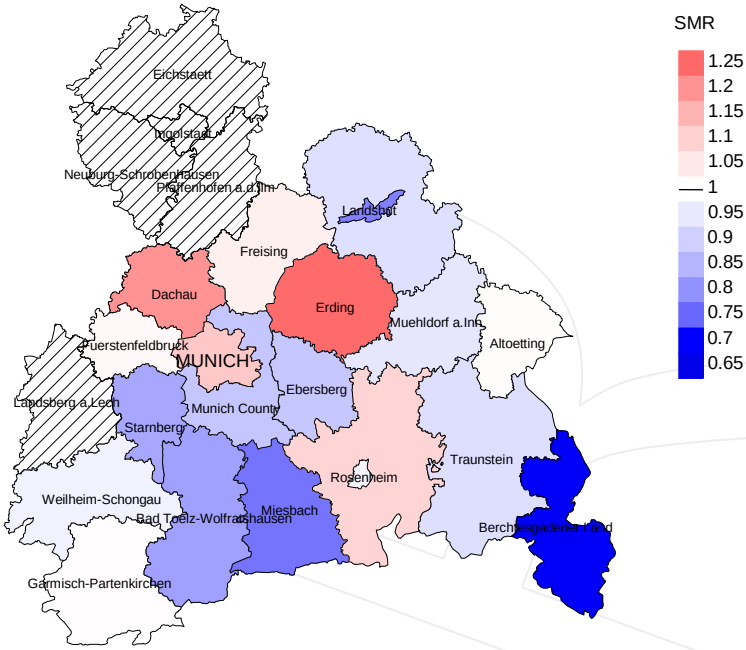


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 10.8/100,000 WS N=2,630, females 6.5/100,000 WS N=2,394). 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 80 women died from colon cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 7.9/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 5.5 and 11.4/100,000.

Standardized mortality ratio (SMR) 2003 - 2008: Males



Standardized mortality ratio (SMR) 2003 - 2008: Females

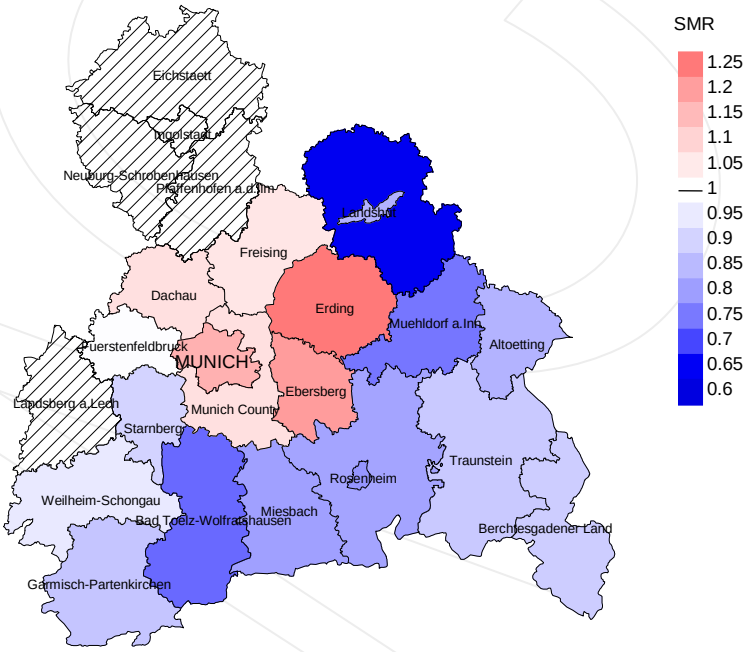


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=2,630, females N=2,394). 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 80 women died from colon cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.20. Though, the value of this parameter may vary with an underlying probability of 99% between 0.88 and 1.59, and is therefore not statistically striking.

Statistical Notes

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

1. **All multiple primaries included**

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

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

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

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

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

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

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

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

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

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

Shortcuts

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

Recommended Citation

Munich Cancer Registry. Baseline statistics C18: Colon cancer [Internet]. 2013 [updated 2013 Apr 2; cited 2013 Jun 1]. Available from: http://www.tumorregister-muenchen.de/en/facts/base/base_C18__E.pdf

Copyright

Disclaimer

Index of figures and tables