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

C17: Small intestine cancer

Year of diagnosis	1998-2011
Patients	1162
Diseases	1163
Creation date	04/02/2013
Export date	01/03/2013
Population	4.5 m

http://www.tumorregister-muenchen.de/en/facts/base/base_C17__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
C17.-	Malignant neoplasm of small intestine
C17.0	Duodenum
C17.1	Jejunum
C17.2	Ileum
C17.3	Meckel's diverticulum
C17.8	Overlapping lesion of small intestine
C17.9	Small intestine, 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	27	1	3.7	22.2	70.4	100.0
1999	50	3	6.0	26.0	68.0	96.0
2000	39	2	5.1	28.2	66.7	97.4
2001	43	2	4.7	44.2	53.5	100.0
2002	65	8	12.3	32.3	55.4	98.5
2003	75	7	9.3	29.3	49.3	97.3
2004	104	5	4.8	29.8	50.0	96.2
2005	90	5	5.6	26.7	50.0	93.3
2006	98	1	1.0	35.7	49.0	92.9
2007	118	2	1.7	35.6	37.3	80.5 ##
2008	109	6	5.5	26.6	32.1	67.0
2009	119	7	5.9	26.1	37.0	73.9
2010	129	3	2.3	27.9	27.9	93.8
2011	97	1	1.0	23.7	15.5	73.2 ###
1998-2011	1163	53	4.6	29.5	42.5	87.4

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	27	16	11	59.3
1999	50	24	26	48.0
2000	39	24	15	61.5
2001	43	24	19	55.8
2002	65	31	34	47.7
2003	75	41	34	54.7
2004	104	66	38	63.5
2005	90	45	45	50.0
2006	98	53	45	54.1
2007	118	71	47	60.2
2008	109	56	53	51.4
2009	119	68	51	57.1
2010	129	63	66	48.8
2011	97	46	51	47.4
1998-2011	1163	628	535	54.0

Table 2

Incidence measures by year of diagnosis and gender including DCO cases
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002,
and from 3.96 to 4.52 m as of 2007, respectively)

Year of diagnosis	Males n	Females n	Males Inc. raw	Fem. Inc. raw	Males Inc. WS	Fem. Inc. WS	Males Inc. ES	Fem. Inc. ES	Males Inc. BRD-S	Fem. Inc. BRD-S
1998	16	11	1.4	0.9	0.9	0.5	1.3	0.7	1.8	0.8
1999	24	26	2.1	2.2	1.4	1.0	1.9	1.5	2.1	1.9
2000	24	15	2.1	1.2	1.3	0.7	1.8	1.0	2.1	1.1
2001	24	19	2.1	1.6	1.2	0.9	1.8	1.2	2.2	1.4
2002	31	34	1.7	1.7	1.0	0.9	1.4	1.3	1.8	1.6
2003	41	34	2.2	1.7	1.2	0.9	1.8	1.3	2.2	1.5
2004	66	38	3.5	1.9	2.0	1.0	2.9	1.4	3.6	1.6
2005	45	45	2.4	2.3	1.3	1.0	1.9	1.5	2.5	1.9
2006	53	45	2.8	2.2	1.5	1.1	2.3	1.6	2.8	1.9
2007	71	47	3.2	2.0	1.8	1.0	2.6	1.4	3.1	1.7
2008	56	53	2.5	2.3	1.4	1.1	2.0	1.6	2.4	1.9
2009	68	51	3.0	2.2	1.7	1.1	2.5	1.5	3.0	1.9
2010	63	66	2.8	2.8	1.6	1.6	2.2	2.2	2.6	2.5
2011	46	51	2.0	2.2	1.0	1.1	1.5	1.6	2.0	1.8
1998-2011	628	535	2.5	2.0	1.4	1.0	2.0	1.5	2.5	1.7

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

Table 3

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	27	66.9	12.3	45.1	90.0	50.5	55.9	66.2	74.6	85.1
1999	50	65.1	13.2	32.7	93.0	49.0	54.2	64.9	73.5	83.2
2000	39	62.8	13.9	34.4	93.2	42.9	53.7	64.3	73.1	77.4
2001	43	65.6	13.0	29.6	99.2	53.9	57.3	66.6	74.3	80.4
2002	65	66.4	13.2	28.7	101	47.7	59.4	67.8	74.8	82.7
2003	75	65.6	10.6	31.2	89.2	52.7	59.8	64.7	73.1	79.6
2004	104	65.1	12.7	36.6	94.4	47.7	56.3	66.3	73.3	81.8
2005	90	67.6	12.7	28.5	88.5	51.6	61.3	68.2	78.1	81.7
2006	98	66.5	12.6	38.6	93.7	49.1	57.0	66.2	75.6	83.0
2007	118	66.3	12.1	32.8	93.4	49.2	58.9	66.1	75.2	81.6
2008	109	65.6	12.2	27.2	88.0	49.6	57.6	66.5	73.4	80.2
2009	119	67.0	14.0	22.0	92.0	49.4	57.1	67.6	77.7	84.9
2010	129	63.8	12.2	26.3	90.1	47.3	56.2	63.9	72.1	79.8
2011	97	66.9	13.6	33.3	91.1	45.0	59.5	68.2	78.3	83.6
1998-2011	1163	65.9	12.7	22.0	101	49.2	57.9	66.4	74.9	81.6

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	16	66.2	12.7	45.1	85.7	46.1	57.2	65.8	74.6	83.1
1999	24	59.6	11.4	32.7	85.3	47.5	52.3	60.2	67.2	73.5
2000	24	63.1	13.1	37.6	92.1	43.1	55.8	63.9	73.2	74.8
2001	24	65.2	11.4	31.9	85.2	53.9	59.4	65.5	73.3	77.8
2002	31	65.4	14.1	28.7	90.4	47.7	59.5	65.1	78.1	83.2
2003	41	66.4	8.9	45.3	85.0	55.0	61.1	65.6	73.1	76.9
2004	66	64.0	12.3	36.6	88.0	47.1	56.3	64.6	73.4	81.2
2005	45	66.8	12.7	28.5	87.0	50.6	60.2	66.8	77.0	82.2
2006	53	66.3	11.3	38.6	88.1	53.2	59.0	66.3	74.8	80.3
2007	71	64.4	12.3	32.8	93.4	47.4	57.1	65.2	74.0	79.2
2008	56	64.0	12.0	36.6	80.8	46.9	54.5	65.8	73.4	79.3
2009	68	66.3	13.8	31.4	90.1	49.8	56.7	65.2	77.7	83.2
2010	63	63.9	13.2	26.3	90.1	49.0	55.6	63.9	72.9	80.1
2011	46	68.2	13.5	33.3	87.1	45.0	61.2	70.0	79.2	83.6
1998-2011	628	65.1	12.5	26.3	93.4	48.9	57.3	65.6	74.5	80.6

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	11	67.9	12.2	51.6	90.0	54.3	54.8	67.1	74.6	85.1
1999	26	70.2	12.8	46.8	93.0	52.5	61.7	70.8	78.7	88.5
2000	15	62.3	15.6	34.4	93.2	40.6	49.0	64.3	73.1	81.0
2001	19	66.2	15.1	29.6	99.2	51.5	56.9	66.9	78.6	83.3
2002	34	67.4	12.4	44.1	101	49.4	58.9	68.9	74.8	81.0
2003	34	64.6	12.5	31.2	89.2	51.5	59.4	64.1	72.7	79.7
2004	38	67.0	13.1	38.7	94.4	51.8	57.7	67.2	73.2	85.8
2005	45	68.5	12.7	33.7	88.5	55.4	62.3	70.4	78.8	81.2
2006	45	66.6	14.2	42.7	93.7	46.1	56.0	66.2	78.0	84.8
2007	47	69.2	11.4	41.7	89.5	53.5	60.9	68.8	79.3	83.6
2008	53	67.3	12.3	27.2	88.0	52.6	60.9	67.4	72.7	84.7
2009	51	67.9	14.4	22.0	92.0	49.4	60.5	69.8	76.6	85.6
2010	66	63.7	11.3	39.7	89.6	47.3	56.5	63.4	71.0	79.7
2011	51	65.7	13.7	35.0	91.1	49.8	56.3	67.4	75.4	82.2
1998-2011	535	66.7	13.0	22.0	101	49.8	58.6	67.2	76.4	83.1

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.%
20-24	1	0.1	0.1		0.0		1	0.2	0.2
25-29	5	0.4	0.5	3	0.5	0.5	2	0.4	0.6
30-34	14	1.2	1.7	9	1.4	1.9	5	0.9	1.5
35-39	15	1.3	3.0	7	1.1	3.0	8	1.5	3.0
40-44	38	3.3	6.3	25	4.0	7.0	13	2.4	5.4
45-49	56	4.8	11.1	30	4.8	11.8	26	4.9	10.3
50-54	89	7.7	18.7	52	8.3	20.1	37	6.9	17.2
55-59	132	11.3	30.1	72	11.5	31.5	60	11.2	28.4
60-64	182	15.6	45.7	103	16.4	47.9	79	14.8	43.2
65-69	183	15.7	61.5	98	15.6	63.5	85	15.9	59.1
70-74	158	13.6	75.1	83	13.2	76.8	75	14.0	73.1
75-79	134	11.5	86.6	75	11.9	88.7	59	11.0	84.1
80-84	97	8.3	94.9	49	7.8	96.5	48	9.0	93.1
85+	59	5.1	100.0	22	3.5	100.0	37	6.9	100.0
All ages	1163	100.0		628	100.0		535	100.0	

Included in the statistics are 40.4% multiple primaries in males and 32.4% 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=24 %	Females DCO rate n=29 %	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			0.0	0.0				
20-24		1	0.0	0.1				0.2
25-29	3	2	0.2	0.1			0.4	0.2
30-34	9	5	0.5	0.3			0.7	0.3
35-39	7	8	0.3	0.4			0.4	0.2
40-44	25	13	1.1	0.6			0.9	0.2
45-49	30	26	1.5	1.4			0.7	0.4
50-54	52	37	3.1	2.2			0.7	0.4
55-59	72	60	4.6	3.7	1.4	1.7	0.6	0.5
60-64	103	79	6.8	4.9	1.0	2.5	0.5	0.5
65-69	98	84	7.2	5.6	7.1	2.4	0.4	0.5
70-74	83	75	8.0	6.1	2.4	2.7	0.4	0.5
75-79	75	59	11.1	5.9	9.3	5.1	0.4	0.4
80-84	49	48	12.1	6.0	6.1	12.5	0.4	0.4
85+	22	37	7.9	5.0	13.6	35.1	0.3	0.3
All ages	628	534			3.8	5.4	0.5	0.4
Incidence								
Raw			2.5	2.0				
WS			1.4	1.0				
ES			2.0	1.5				
BRD-S			2.5	1.7				

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 %
C03-C06	Oral cavity	2	0.2	9.3	1.1	33.5	#	11.6	
C16	Stomach	6	1.0	5.9	2.1	12.7	#	32.3	
C18	Colon	12	2.4	5.0	2.6	8.7	#	62.4	
C19-C20	Rectum	5	1.4	3.6	1.2	8.3	#	23.4	
C23-C24	Bile	2	0.2	8.7	1.1	31.4	#	11.5	
C25	Pancreas	4	0.9	4.7	1.3	11.9	#	20.4	
C43	Malign. melanoma	3	1.0	3.2	0.7	9.2		13.3	
C46,C49	Soft tissue	3	0.1	23.5	4.8	68.7	#	18.7	33.3
C61	Prostate	8	7.0	1.1	0.5	2.2		6.2	
C73	Thyroid	2	0.2	11.7	1.4	42.3	#	11.9	
C82-C85	NHL	5	0.9	5.3	1.7	12.5	#	26.4	
C90	Mult. myeloma	2	0.3	6.6	0.8	23.8		11.0	
C91-C96	Leukaemia	2	0.4	5.5	0.7	19.7		10.6	100.0
Other primaries		8	5.3	1.5	0.7	3.0		17.5	
Not observed		0	3.1	0.0	0.0	1.2		-20.2	
All mult. primaries		64	24.4	2.6	2.0	3.3	#	257.1	4.7

Patients	456
Mean age at second malignancy (years)	69.3
Person-years	1538
Mean observation time (years)	3.4
Median observation time (years)	2.6

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 %
C16	Stomach	4	0.5	8.9	2.4	22.8	#	28.1	
C18	Colon	9	1.3	7.2	3.3	13.6	#	61.2	
C19-C20	Rectum	2	0.6	3.4	0.4	12.4		11.2	
C25	Pancreas	5	0.5	9.3	3.0	21.8	#	35.3	
C33-C34	Lung	3	1.0	3.1	0.6	8.9		15.9	
C50	Breast	5	4.3	1.2	0.4	2.7		5.7	
C53	Cervix uteri	3	0.2	16.3	3.4	47.6	#	22.3	33.3
C54	Corpus uteri	3	0.8	3.8	0.8	11.2		17.5	
C56	Ovary	2	0.6	3.4	0.4	12.5		11.2	
C64	Kidney	2	0.3	6.0	0.7	21.7		13.2	
C82-C85	NHL	2	0.5	4.1	0.5	14.8		11.9	
Other primaries		5	0.6	8.0	2.6	18.7	#	34.6	
Not observed		0	2.4	0.0	0.0	1.6		-18.7	
All mult. primaries		45	13.4	3.3	2.4	4.5	#	249.5	2.2

Patients	353
Mean age at second malignancy (years)	70.8
Person-years	1265
Mean observation time (years)	3.6
Median observation time (years)	2.7

The occurrence of second malignancy is statistically significant.

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

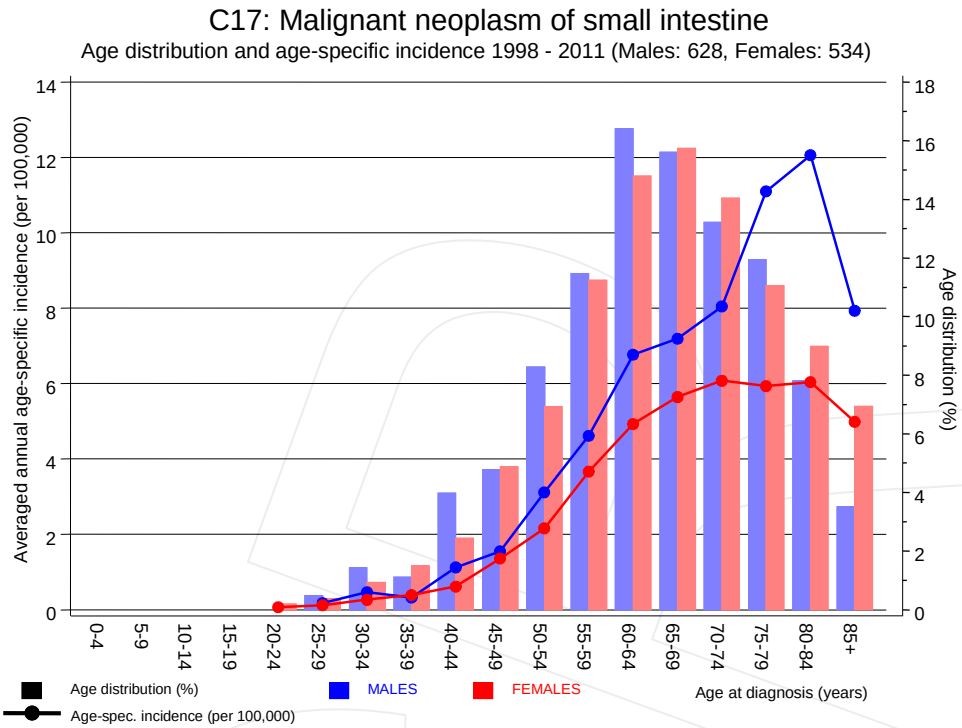


Figure 7. Age distribution and age-specific incidence

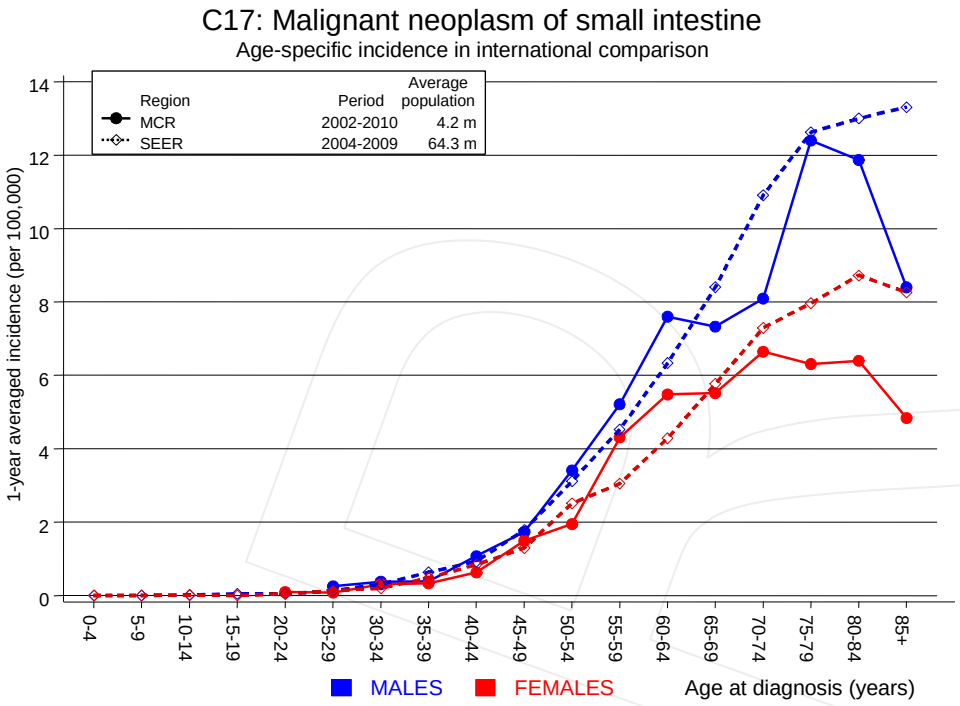


Figure 7a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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.

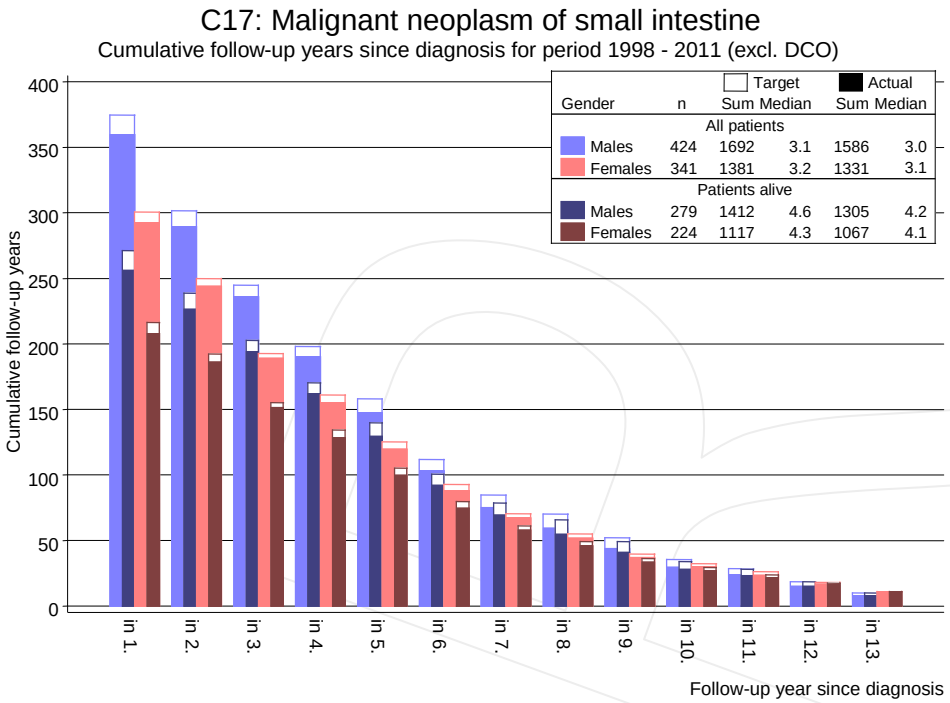
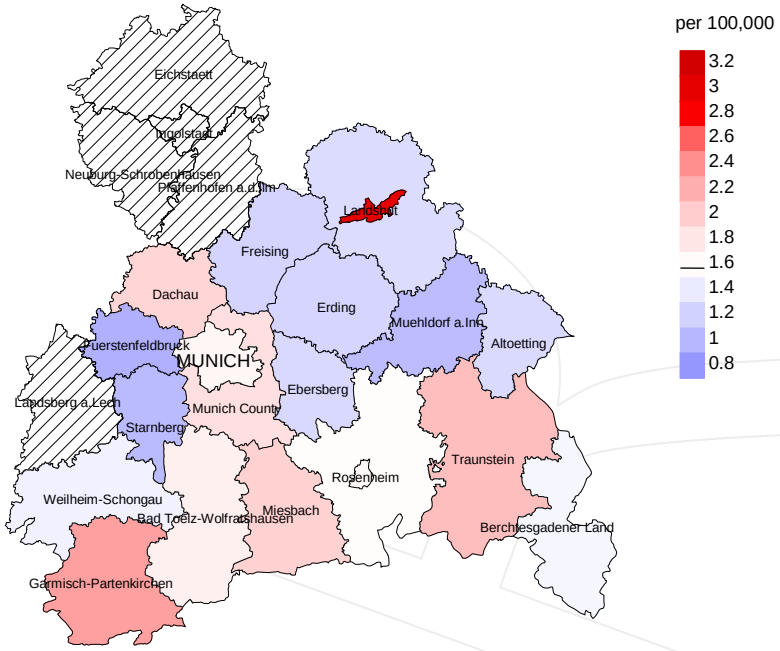


Figure 8. Cumulative follow-up years depending on time since diagnosis

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

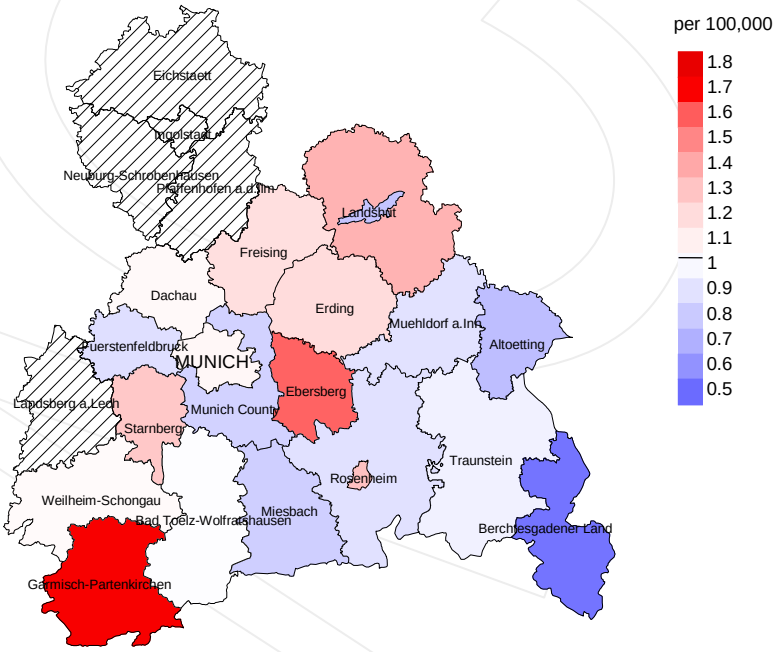
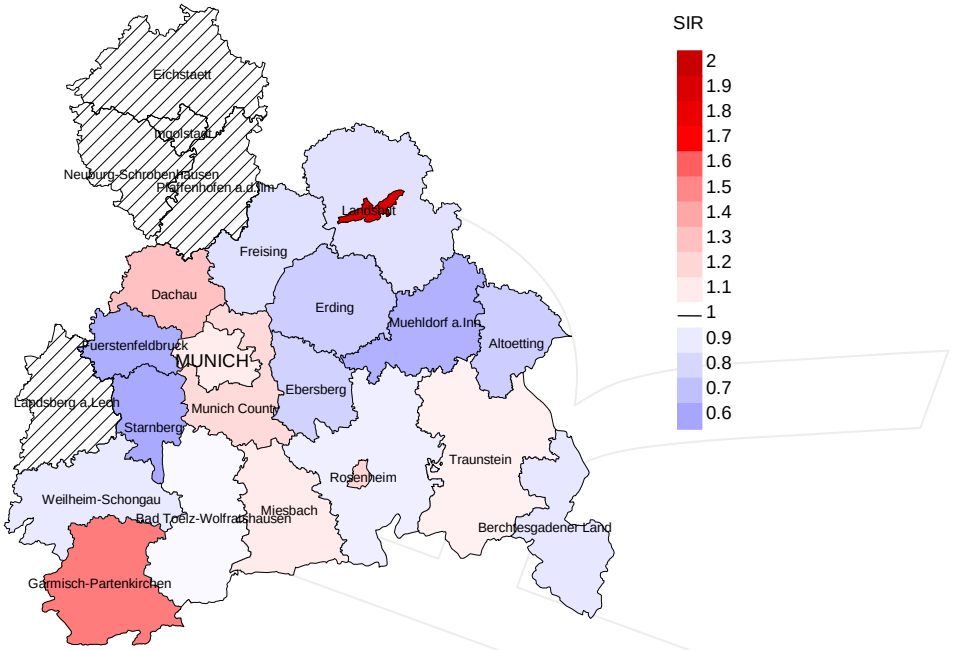


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 1.6/100,000 WS N=320, females 1.0/100,000 WS N=252). 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 12 women were identified with newly diagnosed small intestine cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 1.6/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.6 and 3.4/100,000.

Standardized incidence ratio (SIR) 2003 - 2008: Males



Standardized incidence ratio (SIR) 2003 - 2008: Females

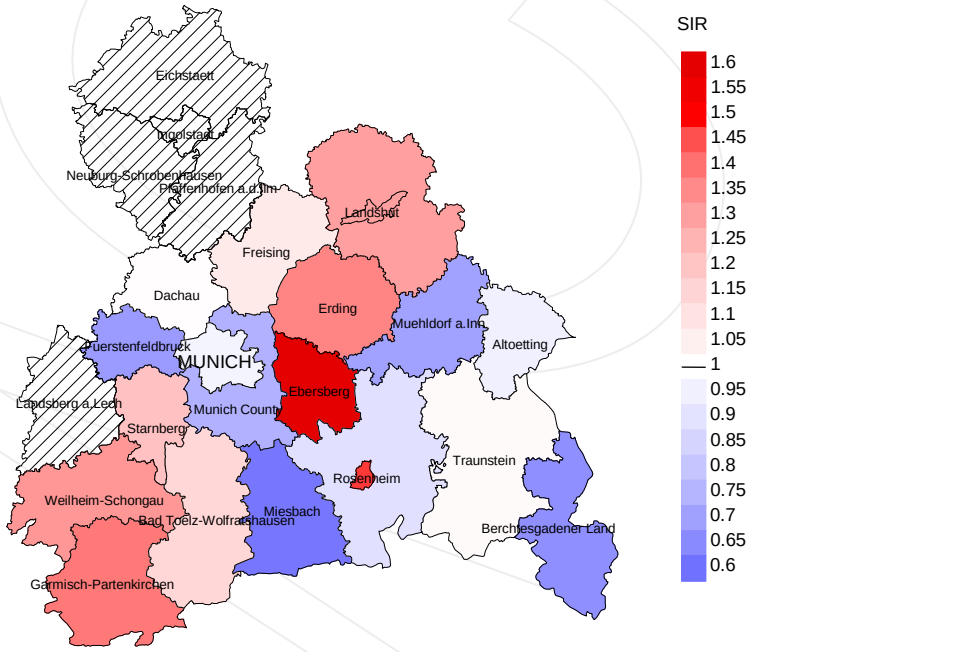


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=320, females N=252). 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 12 women were identified with newly diagnosed small intestine cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.60. Though, the value of this parameter may vary with an underlying probability of 99% between 0.66 and 3.22, 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	27	100.0	3.7	19	70.4	89.5
1999	50	96.0	6.0	34	68.0	100.0
2000	39	97.4	5.1	26	66.7	92.3
2001	43	100.0	4.7	23	53.5	100.0
2002	65	98.5	12.3	36	55.4	97.2
2003	75	97.3	9.3	37	49.3	97.3
2004	104	96.2	4.8	52	50.0	96.2
2005	90	93.3	5.6	45	50.0	97.8
2006	98	92.9	1.0	48	49.0	97.9
2007	118	80.5	1.7	44	37.3	97.7
2008	109	67.0	5.5	35	32.1	100.0
2009	119	73.9	5.9	44	37.0	100.0
2010	129	93.8	2.3	36	27.9	91.7
2011	97	73.2	1.0	15	15.5	93.3
1998-2011	1163	87.4	4.6	494	42.5	97.0

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	27	10	90.0	3	11.1
1999	50	24	91.7	11	22.0
2000	39	22	90.9	6	15.4
2001	43	17	100.0	6	14.0
2002	65	29	96.6	15	23.1
2003	75	28	96.4	12	16.0
2004	104	55	98.2	23	22.1
2005	90	35	97.1	11	12.2
2006	98	40	97.5	11	11.2
2007	118	44	100.0	9	7.6
2008	109	54	96.3	12	11.0
2009	119	62	100.0	20	16.8
2010	129	56	96.4	21	16.3
2011	97	52	98.1	9	9.3
1998-2011	1163	528	97.2	169	14.5

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	10	70.0	30.0	66.7
1999	24	75.0	25.0	95.5
2000	22	72.7	27.3	85.0
2001	17	76.5	23.5	64.7
2002	29	82.8	17.2	92.9
2003	28	71.4	28.6	85.2
2004	55	83.6	16.4	85.2
2005	35	91.4	8.6	91.2
2006	40	87.5	12.5	92.3
2007	44	86.4	13.6	84.1
2008	54	85.2	14.8	92.3
2009	62	79.0	21.0	87.1
2010	56	76.8	23.2	83.3
2011	52	86.5	13.5	92.2
1998-2011	528	81.8	18.2	87.3

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	6	62.0	62.6	59.3	62.6
1999	9	67.7	68.9	57.6	67.7
2000	14	67.1	65.0	79.6	65.0
2001	12	67.6	67.3	68.4	66.0
2002	17	70.2	68.9	76.5	71.0
2003	14	72.0	73.1	70.2	73.7
2004	32	70.3	67.7	79.5	68.8
2005	15	68.5	67.5	75.3	70.6
2006	20	73.1	73.5	69.2	73.7
2007	25	71.8	71.7	72.3	72.2
2008	29	70.9	69.9	76.7	69.6
2009	38	72.5	70.8	77.0	71.5
2010	35	74.6	74.4	75.3	74.3
2011	24	70.1	67.1	85.5	67.4
1998-2011	290	70.9	69.8	75.3	70.4

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	4	77.6	71.9	83.3	85.1
1999	15	78.6	77.8	80.0	78.6
2000	8	71.2	69.3	73.1	70.8
2001	5	84.6	82.7	92.2	77.1
2002	12	75.3	74.8	77.8	74.8
2003	14	76.6	75.4	80.7	75.4
2004	23	73.2	73.2	72.6	74.2
2005	20	71.7	71.1	83.6	71.1
2006	20	72.3	71.7	75.6	72.1
2007	19	74.0	74.1	73.3	73.5
2008	25	72.8	70.6	84.4	71.8
2009	24	75.2	75.5	73.0	74.7
2010	21	73.2	72.2	79.1	72.9
2011	28	68.1	66.8	78.8	67.4
1998-2011	238	73.5	72.6	78.5	72.8

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	5	0.5	0.31	0.3	0.32	0.4	0.30	0.6	0.34
1999	8	0.7	0.33	0.5	0.33	0.7	0.35	0.8	0.39
2000	12	1.1	0.50	0.7	0.55	1.0	0.54	1.2	0.60
2001	9	0.8	0.38	0.5	0.37	0.7	0.39	0.8	0.38
2002	14	0.8	0.45	0.4	0.42	0.6	0.46	0.8	0.47
2003	9	0.5	0.22	0.3	0.20	0.4	0.22	0.5	0.23
2004	25	1.3	0.38	0.7	0.36	1.0	0.36	1.3	0.36
2005	13	0.7	0.29	0.4	0.27	0.6	0.30	0.7	0.30
2006	18	0.9	0.34	0.4	0.29	0.7	0.32	1.0	0.36
2007	21	0.9	0.30	0.4	0.24	0.7	0.27	1.0	0.31
2008	25	1.1	0.45	0.6	0.41	0.9	0.45	1.2	0.49
2009	28	1.3	0.41	0.6	0.37	1.0	0.39	1.3	0.43
2010	25	1.1	0.40	0.5	0.33	0.8	0.37	1.1	0.41
2011	20	0.9	0.43	0.5	0.45	0.7	0.46	0.8	0.42
1998-2011	232	0.9	0.37	0.5	0.34	0.7	0.36	1.0	0.39

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	2	0.2	0.18	0.1	0.15	0.1	0.16	0.2	0.20
1999	10	0.8	0.38	0.3	0.31	0.5	0.33	0.6	0.32
2000	4	0.3	0.27	0.2	0.22	0.2	0.25	0.3	0.23
2001	4	0.3	0.21	0.1	0.11	0.1	0.13	0.2	0.17
2002	10	0.5	0.29	0.2	0.19	0.3	0.21	0.4	0.25
2003	11	0.6	0.32	0.2	0.20	0.3	0.22	0.4	0.27
2004	21	1.1	0.55	0.4	0.45	0.7	0.47	0.8	0.50
2005	19	1.0	0.42	0.4	0.40	0.6	0.40	0.8	0.39
2006	17	0.8	0.38	0.4	0.32	0.6	0.36	0.7	0.37
2007	17	0.7	0.36	0.3	0.28	0.4	0.30	0.6	0.34
2008	21	0.9	0.40	0.4	0.36	0.6	0.38	0.7	0.38
2009	21	0.9	0.41	0.3	0.29	0.5	0.34	0.7	0.35
2010	18	0.8	0.28	0.3	0.21	0.5	0.23	0.6	0.27
2011	25	1.1	0.49	0.5	0.49	0.7	0.47	0.9	0.47
1998-2011	200	0.8	0.37	0.3	0.31	0.5	0.32	0.6	0.35

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.%
25-29	2	0.5	0.5	1	0.4	0.4	1	0.5	0.5
30-34	2	0.5	0.9	1	0.4	0.9	1	0.5	1.0
35-39	2	0.5	1.4	1	0.4	1.3	1	0.5	1.5
40-44	7	1.6	3.0	6	2.6	3.9	1	0.5	2.0
45-49	10	2.3	5.3	5	2.2	6.0	5	2.5	4.5
50-54	15	3.5	8.8	11	4.7	10.8	4	2.0	6.5
55-59	46	10.6	19.4	23	9.9	20.7	23	11.5	18.0
60-64	43	10.0	29.4	31	13.4	34.1	12	6.0	24.0
65-69	65	15.0	44.4	30	12.9	47.0	35	17.5	41.5
70-74	73	16.9	61.3	40	17.2	64.2	33	16.5	58.0
75-79	58	13.4	74.8	35	15.1	79.3	23	11.5	69.5
80-84	51	11.8	86.6	25	10.8	90.1	26	13.0	82.5
85+	58	13.4	100.0	23	9.9	100.0	35	17.5	100.0
All ages	432	100.0		232	100.0		200	100.0	

Included in the statistics are 40.4% multiple primaries in males and 32.4% 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			0.0		0.0			
25-29	1	1	0.1	0.33	0.1	0.50	1.1	1.0
30-34	1	1	0.1	0.11	0.1	0.20	0.6	0.5
35-39	1	1	0.0	0.14	0.0	0.13	0.3	0.2
40-44	6	1	0.3	0.24	0.0	0.08	0.8	0.1
45-49	5	5	0.3	0.17	0.3	0.19	0.3	0.3
50-54	11	4	0.7	0.21	0.2	0.11	0.4	0.2
55-59	23	23	1.5	0.32	1.4	0.38	0.4	0.6
60-64	31	12	2.0	0.30	0.7	0.15	0.4	0.2
65-69	30	35	2.2	0.31	2.4	0.41	0.3	0.5
70-74	40	33	3.9	0.48	2.7	0.44	0.4	0.4
75-79	35	23	5.2	0.47	2.3	0.39	0.3	0.3
80-84	25	26	6.2	0.51	3.3	0.54	0.3	0.3
85+	23	35	8.3	1.05	4.7	0.95	0.3	0.3
All ages	232	200					0.3	0.3
Mortality								
Raw			0.9	0.37	0.8	0.37		
WS			0.5	0.34	0.3	0.30		
ES			0.7	0.36	0.5	0.32		
BRD-S			1.0	0.39	0.6	0.34		
PYLL-70								
per 100,000			5.2		3.5			
ES			4.6		3.0			
AYLL-70			10.8		9.5			

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	2	1.7					2	100.0
C09-C10 Oropharynx	1	0.9	1	100.0				
C12-C13 Hypopharynx	1	0.9	1	100.0				
C15 Oesophagus	2	1.7	2	100.0				
C16 Stomach	5	4.3	3	60.0	2	40.0		
C18 Colon	21	18.3	11	52.4	7	33.3	3	14.3
C19-C20 Rectum	9	7.8	6	66.7	2	22.2	1	11.1
C22 Liver	3	2.6	1	33.3			2	66.7
C23-C24 Bile	4	3.5	1	25.0	1	25.0	2	50.0
C25 Pancreas	7	6.1	1	14.3	4	57.1	2	28.6
C32 Larynx	2	1.7	2	100.0				
C33-C34 Lung	4	3.5	3	75.0	1	25.0		
C43 Malign. melanoma	2	1.7	2	100.0				
C44 Skin others	6	5.2	2	33.3			4	66.7
C46,C49 Soft tissue	1	0.9					1	100.0
C61 Prostate	14	12.2	9	64.3			5	35.7
C62 Testis	4	3.5	4	100.0				
C64 Kidney	5	4.3	3	60.0	2	40.0		
C65 Renal pelvis	1	0.9					1	100.0
C66 Ureter	1	0.9					1	100.0
C67 Bladder	8	7.0	5	62.5			3	37.5
C69 Eye carcinoma	1	0.9	1	100.0				
C70-C72 CNS cancer	1	0.9			1	100.0		
C81 Hodgkin lymphoma	1	0.9			1	100.0		
C82-C85 NHL	5	4.3	2	40.0			3	60.0
C90 Mult. myeloma	1	0.9					1	100.0
C91-C96 Leukaemia	3	2.6					3	100.0
All mult. primaries	115	100.0	60	52.2	21	18.3	34	29.6

Multiple primaries with number of cases n<1 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 ←%
C15	Oesophagus	1	1.2					1	100.0
C16	Stomach	5	5.9			4	80.0	1	20.0
C18	Colon	8	9.4	3	37.5	4	50.0	1	12.5
C19-C20	Rectum	7	8.2	2	28.6	5	71.4		
C21	Anus/canal	2	2.4	1	50.0	1	50.0		
C22	Liver	1	1.2					1	100.0
C23-C24	Bile	2	2.4	1	50.0			1	50.0
C25	Pancreas	6	7.1	1	16.7	3	50.0	2	33.3
C26	GI cancer	1	1.2	1	100.0				
C33-C34	Lung	7	8.2	2	28.6	3	42.9	2	28.6
C43	Malign. melanoma	2	2.4	1	50.0			1	50.0
C44	Skin others	1	1.2	1	100.0				
C46,C49	Soft tissue	1	1.2			1	100.0		
C50	Breast	22	25.9	20	90.9	2	9.1		
C52	Vagina	1	1.2	1	100.0				
C53	Cervix uteri	1	1.2					1	100.0
C54	Corpus uteri	3	3.5	2	66.7	1	33.3		
C56	Ovary	5	5.9	2	40.0	3	60.0		
C65	Renal pelvis	1	1.2					1	100.0
C67	Bladder	2	2.4	2	100.0				
C70-C72	CNS cancer	1	1.2					1	100.0
C74-C80	Cancer others	1	1.2	1	100.0				
C76-C79	CUP	3	3.5	1	33.3	1	33.3	1	33.3
C82-C85	NHL	1	1.2			1	100.0		
All mult. primaries		85	100.0	42	49.4	29	34.1	14	16.5

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			0.0		0.0			
25-29	1		0.1	0.33	0.0		1.2	
30-34	1	1	0.1	0.11	0.1	0.20	0.6	0.6
35-39	1	1	0.0	0.14	0.0	0.13	0.3	0.2
40-44	6	1	0.3	0.27	0.0	0.08	0.9	0.1
45-49	5	4	0.3	0.19	0.2	0.16	0.4	0.3
50-54	10	3	0.6	0.22	0.2	0.09	0.4	0.1
55-59	17	17	1.1	0.32	1.0	0.39	0.4	0.5
60-64	23	9	1.5	0.27	0.6	0.14	0.4	0.2
65-69	24	28	1.8	0.33	1.9	0.44	0.3	0.5
70-74	24	21	2.3	0.45	1.7	0.39	0.3	0.3
75-79	21	15	3.1	0.46	1.5	0.33	0.3	0.2
80-84	16	18	3.9	0.57	2.3	0.53	0.2	0.2
85+	17	24	6.1	0.94	3.2	0.89	0.3	0.3
All ages	166	142					0.3	0.3
Mortality								
Raw			0.7	0.36	0.5	0.34		
WS			0.4	0.33	0.2	0.28		
ES			0.5	0.35	0.3	0.29		
BRD-S			0.7	0.37	0.4	0.31		
PYLL-70								
per 100,000			4.4		2.6			
ES			3.9		2.2			
AYLL-70			11.5		9.2			

* 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			0.0		0.0			
25-29			0.0		0.0			
30-34		1	0.0		0.1	0.20		0.6
35-39	1	1	0.0	0.14	0.0	0.13	0.3	0.3
40-44	6	1	0.3	0.27	0.0	0.08	0.9	0.1
45-49	5	4	0.3	0.19	0.2	0.16	0.4	0.3
50-54	10	3	0.6	0.24	0.2	0.09	0.4	0.2
55-59	15	15	1.0	0.31	0.9	0.37	0.4	0.5
60-64	20	9	1.3	0.26	0.6	0.15	0.3	0.2
65-69	21	25	1.5	0.34	1.7	0.42	0.3	0.5
70-74	18	21	1.7	0.38	1.7	0.41	0.2	0.4
75-79	20	14	3.0	0.47	1.4	0.33	0.3	0.2
80-84	13	15	3.2	0.54	1.9	0.47	0.2	0.2
85+	14	23	5.0	0.82	3.1	0.85	0.3	0.3
All ages	143	132					0.3	0.3
Mortality								
Raw			0.6	0.34	0.5	0.33		
WS			0.3	0.31	0.2	0.27		
ES			0.5	0.33	0.3	0.29		
BRD-S			0.6	0.35	0.4	0.30		
PYLL-70								
per 100,000			3.8		2.5			
ES			3.4		2.1			
AYLL-70			11.2		9.4			

* See corresponding tables with multiple primaries.

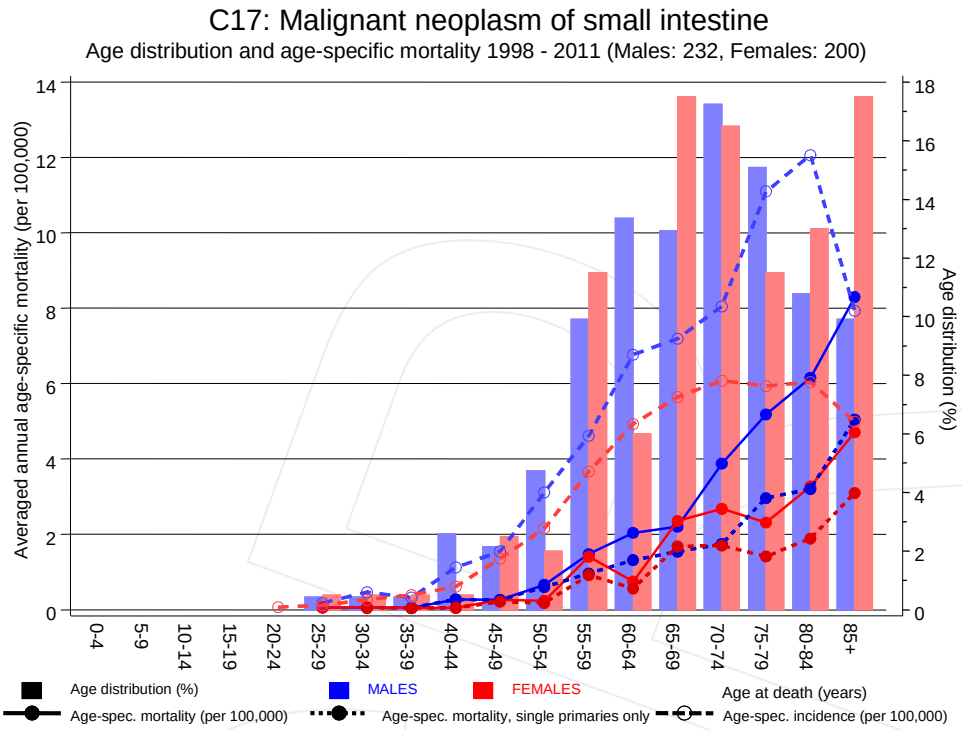
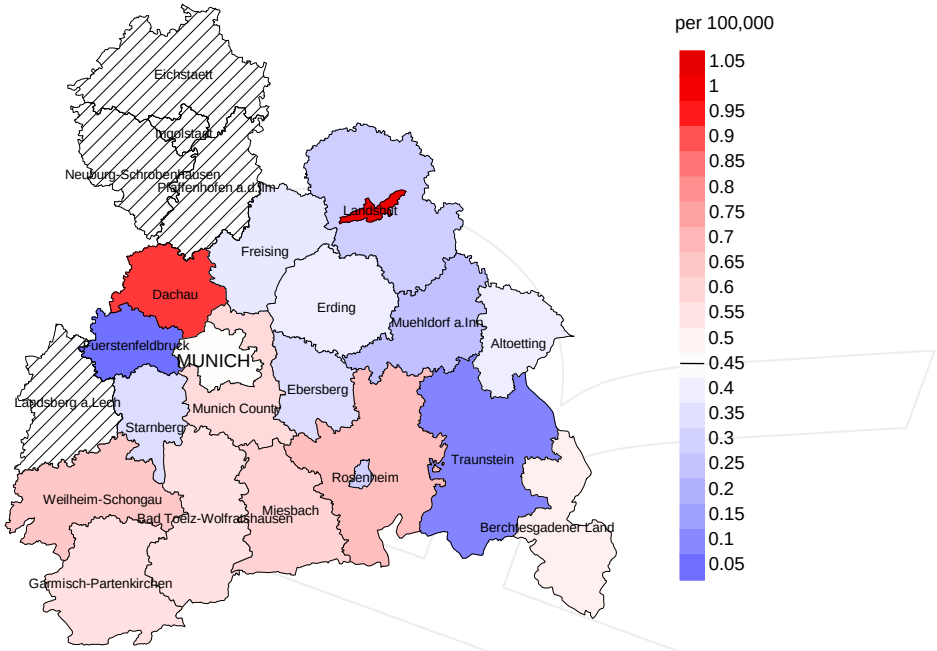


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

The difference between age at diagnosis (Table 3) and age at small intestine 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

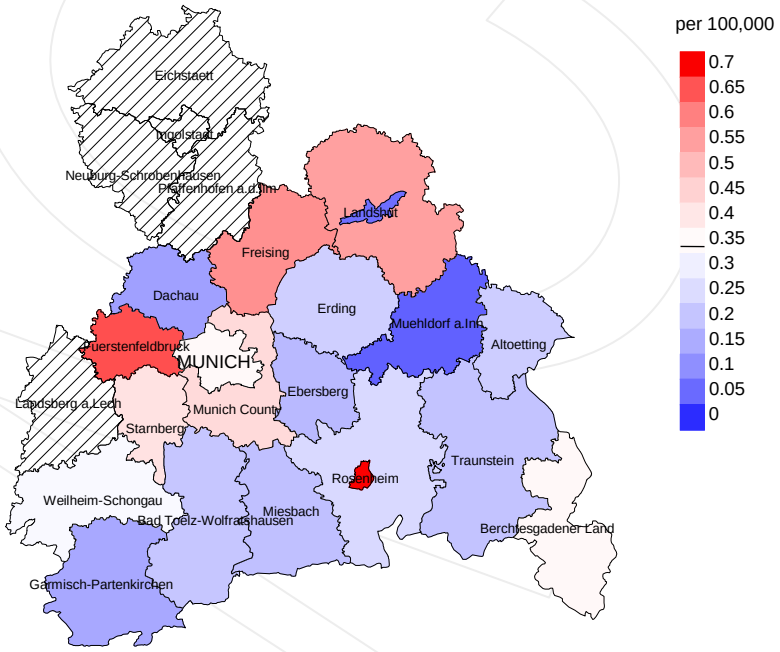
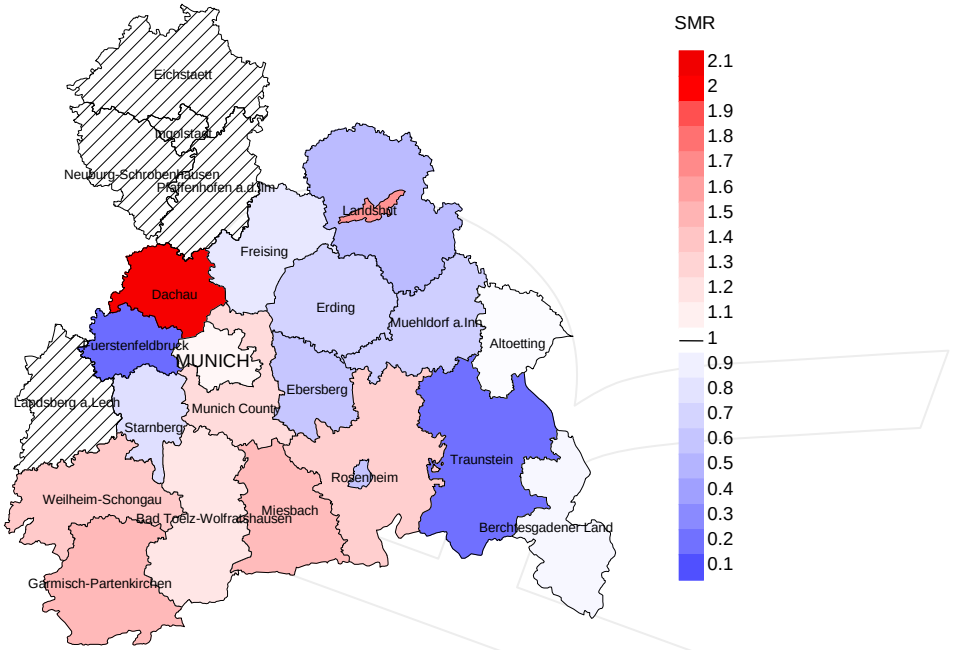


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 0.5/100,000 WS N=104, females 0.3/100,000 WS N=100). 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 1 women died from small intestine cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.2/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 1.3/100,000.

Standardized mortality ratio (SMR) 2003 - 2008: Males



Standardized mortality ratio (SMR) 2003 - 2008: Females

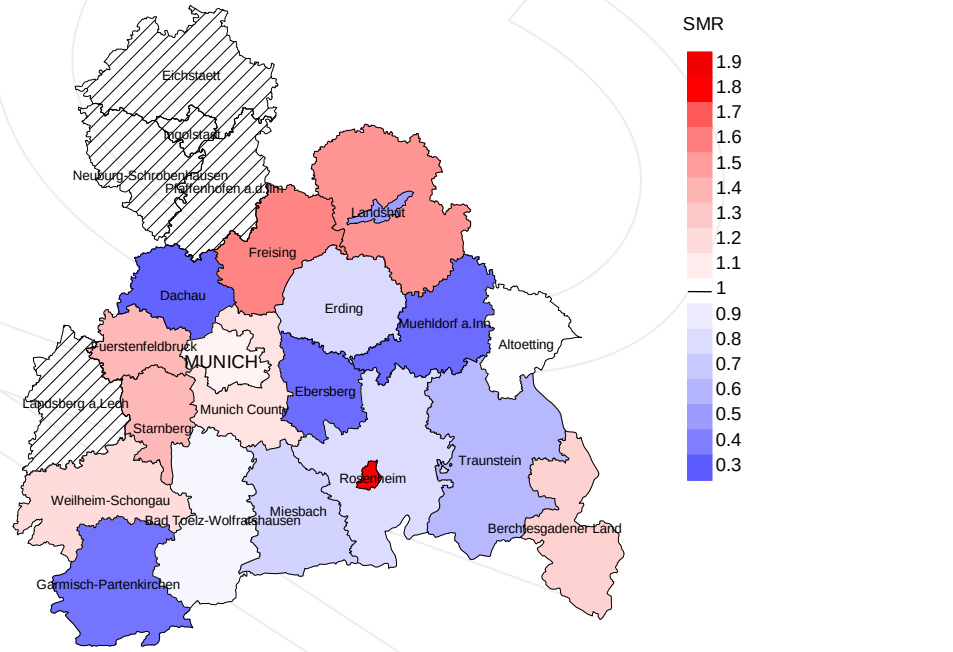


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=104, females N=100). 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 1 women died from small intestine cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.35. Though, the value of this parameter may vary with an underlying probability of 99% between 0.00 and 2.57, 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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