Munich Cancer Registry

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ICD-10 C48: Peritoneal cancer

Incidence and Mortality

Year of diagnosis	1998-2014
Patients	792
Diseases	792
Creation date	04/13/2016
Export date	12/23/2015
Population	4.64 m

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

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

http://www.tumorregister-muenchen.de/en/facts/base/bC48__E-ICD-10-C48-Peritoneal-cancer-incidence-and-mortality.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 4.64 million inhabitants, account for the frequency of cancer diseases[##] and the achieved long term results. Additionally, the long term survival evaluated by the Munich Cancer Registry (MCR) is compared with the results of the population-based registry in the USA (SEER), which is useful for checking the consistency of the data on an international level.

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

The foot notes describe the currentness of the data. The baseline statistics and survival data are updated annually. This yearly analysis comprises the Annual Report of the MCR.

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 2016

[#] 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).

[##] 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.

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

Code	Description
C48.-	Malignant neoplasm of retroperitoneum and peritoneum
C48.0	Retroperitoneum
C48.1	Specified parts of peritoneum
C48.2	Peritoneum, unspecified
C48.8	Overlapping lesion of retroperitoneum and peritoneum

INCIDENCE

Table 1

All patients with invasive cancer by year of diagnosis, proportions of DCO, multiple primaries, deaths, and active follow-up (incl. DCO)

Year of diagnosis	Cases n	DCO cases n	Prop. DCO %	Prop. mult. primaries %	Prop. deaths %	Prop. actively followed %	
1998	21	4	19.0	19.0	76.2	100.0	
1999	28	5	17.9	42.9	82.1	100.0	
2000	17	1	5.9	17.6	76.5	100.0	
2001	21	3	14.3	4.8	76.2	100.0	
2002	40	5	12.5	20.0	82.5	100.0	#
2003	39	4	10.3	23.1	92.3	100.0	
2004	52	7	13.5	25.0	69.2	96.2	
2005	29	1	3.4	27.6	82.8	96.6	
2006	45	2	4.4	26.7	71.1	97.8	
2007	61	4	6.6	39.3	78.7	96.7	#
2008	51	2	3.9	25.5	74.5	90.2	
2009	64	1	1.6	26.6	57.8	82.8	
2010	75	3	4.0	38.7	54.7	80.0	
2011	78			28.2	51.3	75.6	
2012	62			25.8	48.4	82.3	
2013	56			32.1	33.9	100.0	
2014	53	3	5.7	28.3	22.6	98.1	##
1998-2014	792	45	5.7	28.3	62.4	91.4	

The increases of incident cases in 2002 and 2007 reflect the expansion to additional registry areas.

Please be aware that data of recent annual patient cohorts may not yet be fully processed. The years under evaluation can be found in the respective headings.

Table 1a

All patients with invasive cancer
by year of diagnosis and gender
(incl. DCO)

Year of diagnosis	All n	Males n	Females n	Prop. males %
1998	21	9	12	42.9
1999	28	11	17	39.3
2000	17	6	11	35.3
2001	21	6	15	28.6
2002	40	9	31	22.5
2003	39	10	29	25.6
2004	52	23	29	44.2
2005	29	8	21	27.6
2006	45	8	37	17.8
2007	61	14	47	23.0
2008	51	9	42	17.6
2009	64	13	51	20.3
2010	75	16	59	21.3
2011	78	16	62	20.5
2012	62	12	50	19.4
2013	56	10	46	17.9
2014	53	11	42	20.8
1998-2014	792	191	601	24.1

Table 2

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

Year of diagnosis	Males n	Females n	Males Inc. raw	Fem. Inc. raw	Males Inc. WS	Fem. Inc. WS	Males Inc. ES	Fem. Inc. ES	Males Inc. BRD-S	Fem. Inc. BRD-S
1998	9	12	0.8	1.0	0.7	0.5	0.8	0.7	0.8	0.9
1999	11	17	1.0	1.4	0.7	0.7	0.9	1.0	1.1	1.3
2000	6	11	0.5	0.9	0.5	0.4	0.5	0.6	0.5	0.8
2001	6	15	0.5	1.2	0.3	0.7	0.5	0.9	0.7	1.1
2002	9	31	0.5	1.6	0.3	0.9	0.4	1.3	0.5	1.5
2003	10	29	0.5	1.5	0.3	0.8	0.5	1.1	0.6	1.3
2004	23	29	1.2	1.5	0.9	0.7	1.1	0.9	1.2	1.2
2005	8	21	0.4	1.1	0.2	0.6	0.3	0.8	0.4	0.9
2006	8	37	0.4	1.8	0.3	1.1	0.4	1.4	0.5	1.7
2007	14	47	0.6	2.0	0.4	0.8	0.5	1.2	0.5	1.6
2008	9	42	0.4	1.8	0.2	0.9	0.3	1.3	0.4	1.5
2009	13	51	0.6	2.2	0.4	1.2	0.5	1.6	0.6	1.9
2010	16	59	0.7	2.5	0.4	1.2	0.6	1.7	0.7	2.1
2011	16	62	0.7	2.6	0.4	1.2	0.6	1.8	0.6	2.1
2012	12	50	0.5	2.1	0.3	1.0	0.4	1.4	0.5	1.7
2013	10	46	0.4	1.9	0.3	1.0	0.4	1.3	0.4	1.7
2014	11	42	0.5	1.8	0.2	0.8	0.3	1.2	0.5	1.5
1998-2014	191	601	0.6	1.8	0.4	0.9	0.5	1.3	0.6	1.5

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 patients)
(incl. DCO)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	21	62.3	18.4	13.4	85.2	33.1	59.7	62.5	74.5	78.1
1999	28	62.9	15.2	28.9	87.1	39.6	53.7	67.5	74.3	78.9
2000	17	63.2	24.1	3.6	93.7	24.4	61.2	69.0	76.5	89.3
2001	21	63.6	16.9	32.5	84.3	41.7	49.0	65.8	78.2	82.8
2002	40	64.3	13.2	23.4	82.9	43.8	57.4	66.9	73.1	79.3
2003	39	63.6	15.5	16.3	89.3	40.7	54.0	66.1	75.0	82.8
2004	52	63.8	16.7	16.7	90.7	39.6	57.2	66.3	75.4	82.7
2005	29	63.0	18.8	1.9	90.4	40.0	52.8	66.7	77.6	82.4
2006	45	62.4	17.1	13.7	90.3	39.0	56.1	63.9	74.0	82.0
2007	61	68.7	12.0	28.8	89.4	56.1	64.9	69.2	77.0	81.7
2008	51	65.8	13.6	35.5	88.1	43.9	57.1	68.4	73.9	81.5
2009	64	63.4	16.8	0.2	87.1	46.3	56.6	68.0	74.9	78.6
2010	75	65.7	15.0	29.2	88.4	42.0	58.4	69.0	76.4	83.5
2011	78	66.8	13.2	29.8	92.3	44.5	61.6	69.7	74.4	82.5
2012	62	68.8	14.3	0.4	97.8	54.9	61.1	70.4	76.4	85.0
2013	56	64.3	15.3	20.7	87.4	45.1	56.3	67.9	74.5	78.6
2014	53	68.1	15.0	21.8	89.3	49.6	61.1	72.4	77.7	81.4
1998-2014	792	65.3	15.4	0.2	97.8	43.9	58.2	68.3	75.6	82.1

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	9	58.7	23.2	13.4	85.2	13.4	59.7	68.3	69.3	85.2
1999	11	58.8	16.7	28.9	77.1	39.6	43.4	66.7	74.1	74.4
2000	6	48.0	27.4	3.6	71.6	3.6	24.4	62.0	64.2	71.6
2001	6	69.9	12.3	48.8	81.9	48.8	65.8	72.5	78.2	81.9
2002	9	67.9	12.3	40.2	82.8	40.2	65.5	71.0	72.7	82.8
2003	10	64.2	11.9	41.5	77.6	46.3	56.9	66.1	75.2	77.0
2004	23	58.6	18.4	16.7	90.7	33.8	47.8	61.2	70.3	74.4
2005	8	58.9	14.1	37.5	75.2	37.5	46.0	62.8	70.3	75.2
2006	8	62.8	26.6	20.9	90.3	20.9	43.9	72.0	79.8	90.3
2007	14	57.1	13.7	28.8	70.7	35.9	44.9	63.0	65.9	69.8
2008	9	66.8	17.3	37.6	88.1	37.6	67.7	69.8	77.8	88.1
2009	13	54.2	24.5	0.2	79.9	30.6	39.8	57.2	74.5	78.6
2010	16	63.8	13.5	41.0	85.9	45.6	55.8	62.3	76.2	82.5
2011	16	59.5	17.5	29.8	84.0	30.7	43.4	68.1	72.2	76.8
2012	12	67.3	10.7	51.1	85.5	57.0	58.7	67.0	72.9	85.0
2013	10	62.0	18.0	25.9	87.3	32.6	55.9	65.5	73.0	81.6
2014	11	67.6	9.6	49.2	80.1	55.9	61.1	70.5	75.2	77.7
1998-2014	191	61.3	17.3	0.2	90.7	37.6	53.1	66.5	73.0	78.4

Table 3b

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	12	65.1	14.4	33.1	85.0	54.3	57.4	62.1	77.8	78.1
1999	17	65.6	14.1	31.9	87.1	45.5	56.3	68.7	75.3	80.3
2000	11	71.6	18.4	25.5	93.7	61.2	61.7	73.8	83.4	89.3
2001	15	61.1	18.1	32.5	84.3	33.2	48.9	61.0	81.7	82.9
2002	31	63.3	13.5	23.4	82.9	47.1	57.0	65.1	73.5	79.0
2003	29	63.4	16.8	16.3	89.3	40.2	54.0	66.1	74.2	83.1
2004	29	67.9	14.3	34.4	88.7	43.1	64.9	68.5	76.8	83.7
2005	21	64.5	20.3	1.9	90.4	40.1	52.8	67.5	79.1	82.4
2006	37	62.3	14.8	13.7	85.7	46.5	56.1	62.3	73.3	81.5
2007	47	72.1	9.1	46.1	89.4	63.9	67.1	70.4	79.1	82.3
2008	42	65.6	12.9	35.5	86.9	50.2	57.1	68.3	73.5	81.5
2009	51	65.8	13.6	2.2	87.1	52.8	58.7	68.0	75.3	78.6
2010	59	66.2	15.5	29.2	88.4	36.5	58.4	70.6	76.7	83.9
2011	62	68.7	11.3	38.0	92.3	54.0	62.9	69.9	77.2	82.5
2012	50	69.1	15.2	0.4	97.8	53.8	61.1	71.7	77.7	84.4
2013	46	64.8	14.8	20.7	87.4	45.6	56.7	69.3	74.6	78.6
2014	42	68.2	16.3	21.8	89.3	49.6	59.8	72.9	79.7	82.9
1998-2014	601	66.5	14.5	0.4	97.8	47.1	59.0	69.0	76.5	82.6

Table 4

Age distribution by 5-year age group and gender for period 2007-2014 (incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4	3	0.6	0.6	1	1.0	1.0	2	0.5	0.5
5-9	0	0.0	0.6			1.0			0.5
10-14	0	0.0	0.6			1.0			0.5
15-19	0	0.0	0.6			1.0			0.5
20-24	3	0.6	1.2			1.0	3	0.8	1.3
25-29	8	1.6	2.8	3	3.0	4.0	5	1.3	2.5
30-34	4	0.8	3.6	3	3.0	6.9	1	0.3	2.8
35-39	14	2.8	6.4	7	6.9	13.9	7	1.8	4.5
40-44	11	2.2	8.6	4	4.0	17.8	7	1.8	6.3
45-49	18	3.6	12.2	4	4.0	21.8	14	3.5	9.8
50-54	26	5.2	17.4	4	4.0	25.7	22	5.5	15.3
55-59	44	8.8	26.2	10	9.9	35.6	34	8.5	23.8
60-64	50	10.0	36.2	12	11.9	47.5	38	9.5	33.3
65-69	87	17.4	53.6	18	17.8	65.3	69	17.3	50.6
70-74	94	18.8	72.4	15	14.9	80.2	79	19.8	70.4
75-79	66	13.2	85.6	12	11.9	92.1	54	13.5	84.0
80-84	47	9.4	95.0	3	3.0	95.0	44	11.0	95.0
85+	25	5.0	100.0	5	5.0	100.0	20	5.0	100.0
All ages	500	100.0		101	100.0		399	100.0	

Included in the statistics are 33.7% multiple primaries in males and 39.1% in females.

Table 5

Age-specific incidence, DCO rate and proportion of all cancers
for period 2007-2014

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=6 %	Females DCO rate n=7 %	Males Prop.all cancers n=91183 %	Females Prop.all cancers n=89596 %
0- 4	1	2	0.1	0.2			0.6	1.4
5- 9			0.0	0.0				
10-14			0.0	0.0				
15-19			0.0	0.0				
20-24		3	0.0	0.3				1.0
25-29	3	5	0.2	0.4			0.5	0.8
30-34	3	1	0.2	0.1			0.4	0.1
35-39	7	7	0.5	0.6			0.6	0.4
40-44	4	7	0.2	0.5			0.2	0.2
45-49	4	14	0.3	0.9			0.1	0.3
50-54	4	22	0.3	1.7			0.1	0.3
55-59	10	34	0.9	3.0			0.1	0.5
60-64	12	38	1.2	3.6			0.1	0.4
65-69	18	69	1.9	6.6			0.1	0.6
70-74	15	79	1.6	7.6	6.7		0.1	0.7
75-79	12	54	2.2	7.6	25.0	1.9	0.1	0.5
80-84	3	44	0.9	7.8		4.5	0.0	0.5
85+	5	20	2.2	3.5	40.0	20.0	0.1	0.2
All ages	101	399			5.9	1.8	0.1	0.4
Incidence								
Raw			0.6	2.1				
WS			0.3	1.0				
ES			0.5	1.4				
BRD-S			0.5	1.8				

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).

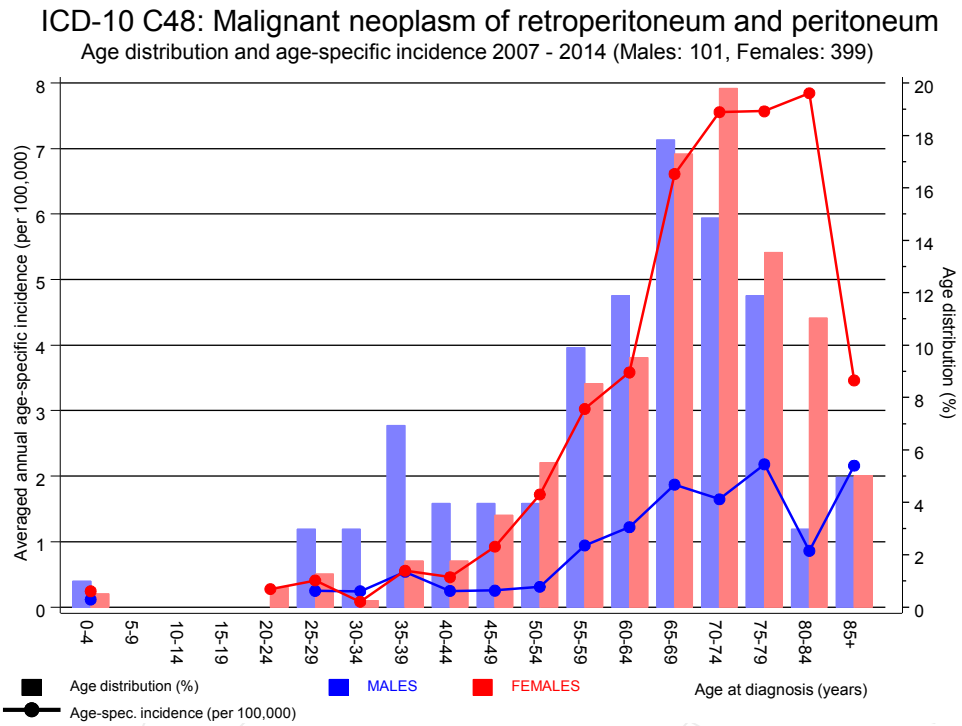


Figure 6. Age distribution and age-specific incidence

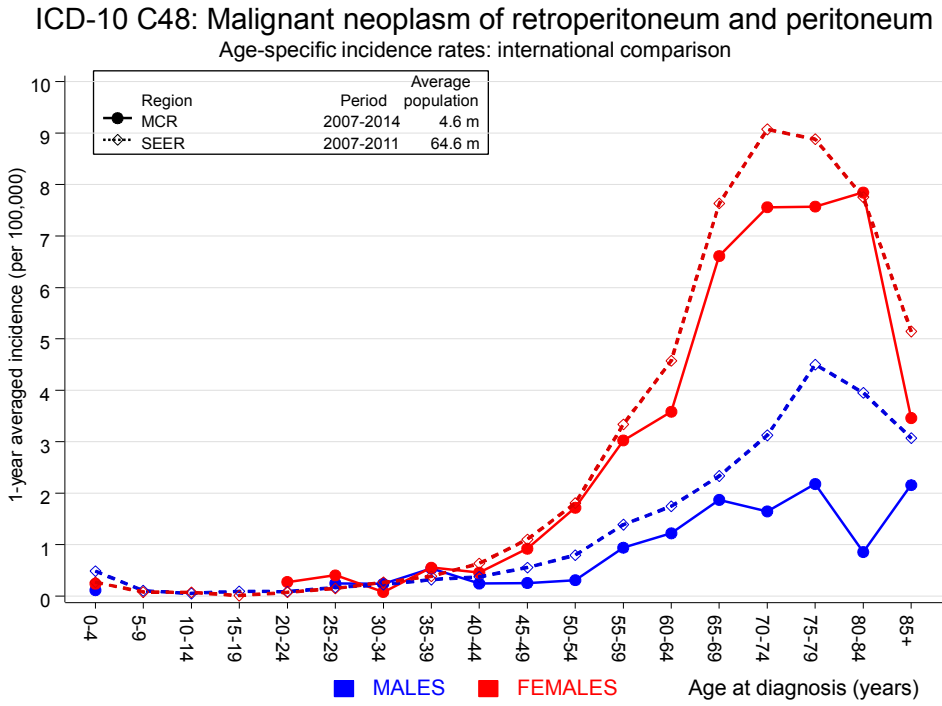


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 18 Regs Research Data, released April 2014, based on the November 2013 submission. http://www.seer.cancer.gov.

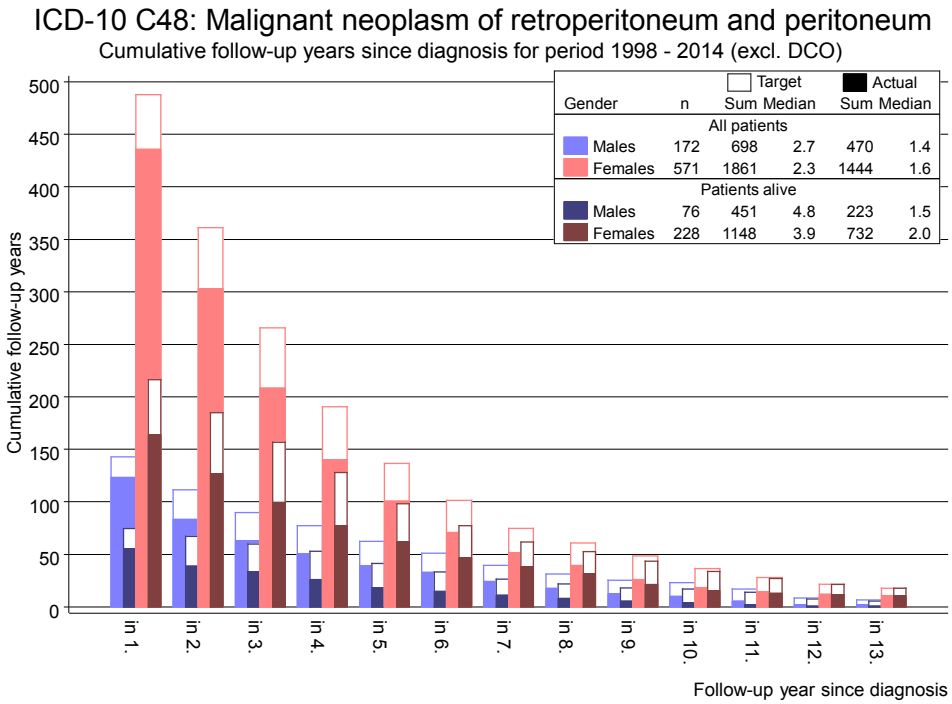


Figure 7. Cumulative follow-up years depending on time since diagnosis

The increase of the lost to follow-up rate can be interpreted as a consequence of a declining number of survivors over time.

Table 8a

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries for period 1998–2014
MALES

Diagnosis	Observed n	Expected n	SIR	LCL 95%	UCL 95%	EAR	DCO %
C61 Prostate	3	1.9	1.6	0.3	4.6	23.4	
C62 Testis	2	0.0	61.9	7.5	223.6 #	41.9	
C64 Kidney	2	0.2	8.8	1.1	31.8 #	37.7	
Other primaries	10	3.0	3.3	1.6	6.1 #	148.8	20.0
Not observed	0	1.2	0.0	0.0	3.0	-26.2	
All mult. primaries	17	6.4	2.7	1.5	4.3 #	225.6	11.8

Patients	180
Median age at second malignancy (years)	65.6
Person-years	470
Mean observation time (years)	2.6
Median observation time (years)	1.2

The occurrence of second malignancy is statistically significant.

Observed second primaries with count 1 are pooled in category “Other primaries”

Table 8b

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries for period 1998–2014
FEMALES

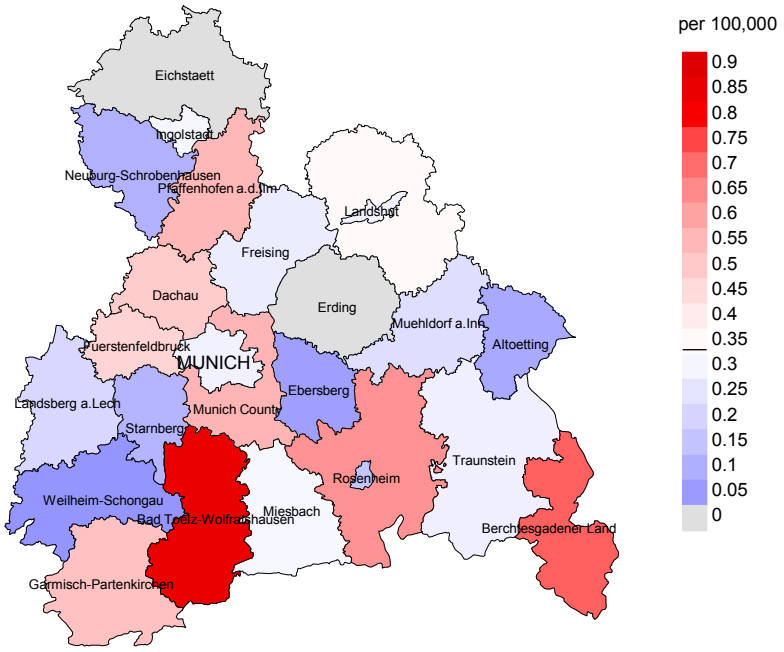
Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C16	Stomach	2	0.4	4.7	0.6	16.8		11.0	
C17	Small intestine	2	0.1	27.9	3.4	100.8	#	13.5	
C18	Colon	3	1.2	2.4	0.5	7.1		12.4	33.3
C50	Breast	6	4.5	1.3	0.5	2.9		10.7	
C53	Cervix uteri	2	0.2	10.0	1.2	36.0	#	12.6	
C54	Corpus uteri	7	0.8	8.6	3.4	17.7	#	43.4	
C56	Ovary	38	0.6	66.1	46.8	90.7	#	262.6	86.8
C64	Kidney	2	0.3	5.8	0.7	20.8		11.6	
C82–C85	NHL	2	0.5	3.9	0.5	13.9		10.4	
C91–C96	Leukaemia	2	0.2	9.3	1.1	33.7	#	12.5	
Other primaries		6	2.5	2.4	0.9	5.2		24.4	33.3
Not observed		0	2.6	0.0	0.0	1.4		−18.3	
All mult. primaries		72	14.0	5.1	4.0	6.5	#	406.8	50.0

Patients	576
Median age at second malignancy (years)	72.5
Person-years	1425
Mean observation time (years)	2.5
Median observation time (years)	1.6

The occurrence of second malignancy is statistically significant.

Observed second primaries with count 1 are pooled in category “Other primaries”

Average incidence (world standard population) 2007 - 2014: Males



Average incidence (world standard population) 2007 - 2014: Females

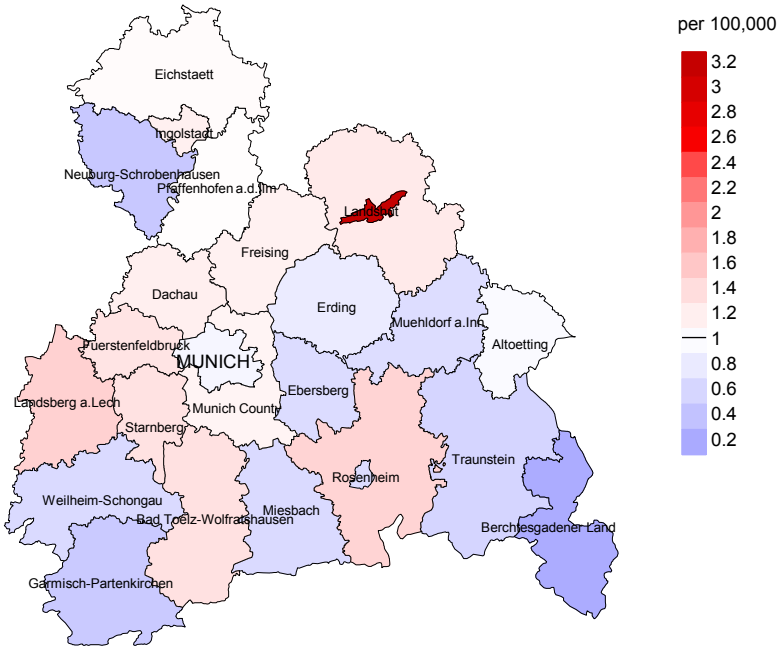
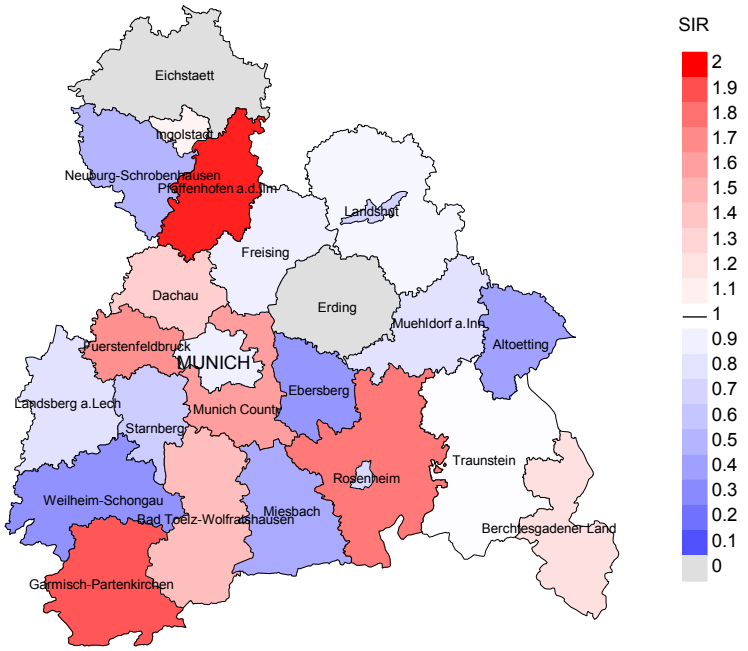


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 0.3/100,000 WS N=101, females 1.0/100,000 WS N=399).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,347 female residents (averaged) in the period from 2007 to 2014 a total of 7 women were identified with newly diagnosed peritoneal cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 0.6/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.2 and 1.8/100,000.

Standardized incidence ratio (SIR) 2007 - 2014: Males



Standardized incidence ratio (SIR) 2007 - 2014: Females

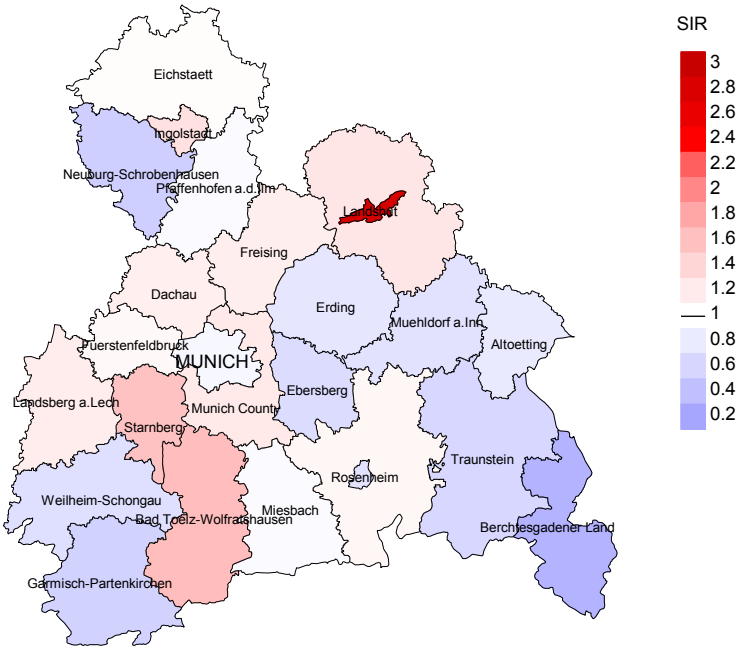


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=101, females N=399).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,924 female residents (averaged) in the period from 2007 to 2014 a total of 7 women were identified with newly diagnosed peritoneal cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.65. Though, the value of this parameter may vary with an underlying probability of 99% between 0.19 and 1.59, 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 4.64 m as of 2007, respectively)

Year of diagnosis	Incident cases n	Prop. actively followed %	Prop. DCO %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	21	100.0	19.0	16	76.2	93.8
1999	28	100.0	17.9	23	82.1	95.7
2000	17	100.0	5.9	13	76.5	92.3
2001	21	100.0	14.3	16	76.2	93.8
2002	40	100.0	12.5	33	82.5	90.9
2003	39	100.0	10.3	36	92.3	91.7
2004	52	96.2	13.5	36	69.2	100.0
2005	29	96.6	3.4	24	82.8	100.0
2006	45	97.8	4.4	32	71.1	96.9
2007	61	96.7	6.6	48	78.7	100.0
2008	51	90.2	3.9	38	74.5	100.0
2009	64	82.8	1.6	37	57.8	97.3
2010	75	80.0	4.0	41	54.7	100.0
2011	78	75.6		40	51.3	97.5
2012	62	82.3		30	48.4	90.0
2013	56	100.0		19	33.9	89.5
2014	53	98.1	5.7	12	22.6	100.0
1998-2014	792	91.4	5.7	494	62.4	96.4

Table 10b

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

Year of diagnosis/ death	Incident cases n	Deaths n	Prop. deaths with death certific. %	Deaths in same year n	Prop. deaths in same year %
1998	21	13	92.3	6	28.6
1999	28	13	84.6	7	25.0
2000	17	20	95.0	3	17.6
2001	21	21	90.5	5	23.8
2002	40	22	100.0	13	32.5
2003	39	17	82.4	7	17.9
2004	52	27	92.6	9	17.3
2005	29	32	100.0	9	31.0
2006	45	27	96.3	7	15.6
2007	61	35	100.0	9	14.8
2008	51	26	100.0	6	11.8
2009	64	42	95.2	11	17.2
2010	75	48	100.0	9	12.0
2011	78	47	100.0	16	20.5
2012	62	46	100.0	6	9.7
2013	56	47	97.9	7	12.5
2014	53	57	96.5	11	20.8
1998-2014	792	540	96.9	141	17.8

Table 10c

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

Year of death	Deaths n	Prop. cancer-related %	Prop. non-cancer-related %	Prop. cancer recorded on death certificate %
1998	13	84.6	15.4	100.0
1999	13	69.2	30.8	100.0
2000	20	95.0	5.0	100.0
2001	21	95.2	4.8	100.0
2002	22	95.5	4.5	100.0
2003	17	94.1	5.9	85.7
2004	27	96.3	3.7	100.0
2005	32	93.8	6.3	96.9
2006	27	96.3	3.7	100.0
2007	35	94.3	5.7	97.1
2008	26	100.0		100.0
2009	42	85.7	14.3	92.5
2010	48	95.8	4.2	95.8
2011	47	97.9	2.1	100.0
2012	46	97.8	2.2	95.7
2013	47	95.7	4.3	97.8
2014	57	94.7	5.3	98.2
1998-2014	540	94.3	5.7	97.5

Table 11a

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	2	77.7	77.7		77.7
1999	8	73.2	68.3	75.9	73.2
2000	9	67.7	67.7		67.7
2001	7	65.9	65.9		68.6
2002	7	69.1	69.1		69.1
2003	8	73.5	71.4	92.4	73.5
2004	4	68.5	68.5		68.5
2005	6	65.9	65.9		65.9
2006	6	68.5	68.5		68.5
2007	13	66.3	60.6	78.4	63.4
2008	7	72.0	72.0		72.0
2009	12	73.0	69.7	81.2	70.1
2010	10	76.2	78.4	74.0	78.4
2011	8	69.8	69.7	72.2	69.8
2012	7	81.7	81.7		81.7
2013	8	72.4	73.6	71.1	73.6
2014	10	73.6	73.3	81.9	73.3
1998-2014	132	71.1	70.0	75.9	70.5

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

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	11	78.0	77.6	81.4	77.8
1999	5	80.3	78.3	80.3	80.3
2000	11	78.9	79.5	67.8	79.5
2001	14	74.8	73.5	81.7	76.1
2002	15	68.3	68.0	71.5	68.3
2003	9	64.5	64.5		66.0
2004	23	75.8	74.5	76.8	75.8
2005	26	73.4	73.4	77.5	71.9
2006	21	73.3	71.7	80.0	74.2
2007	22	74.7	74.7		74.7
2008	19	70.5	70.5		70.5
2009	30	73.2	71.8	89.6	73.2
2010	38	73.5	72.8	93.7	72.8
2011	39	74.1	74.1		74.1
2012	39	75.8	75.7	91.7	75.7
2013	39	73.3	73.2	91.9	73.2
2014	47	73.7	73.7	80.2	73.5
1998-2014	408	74.1	73.5	81.7	73.8

By 2010, life expectancy at birth was 77.5 years for boys and 82.6 years for girls.

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	2	0.2	0.22	0.1	0.17	0.2	0.22	0.2	0.25
1999	5	0.4	0.45	0.3	0.43	0.4	0.46	0.5	0.50
2000	9	0.8	1.50	0.5	0.96	0.7	1.35	0.8	1.54
2001	7	0.6	1.17	0.4	1.23	0.5	1.08	0.7	0.99
2002	7	0.4	0.78	0.2	0.83	0.3	0.82	0.4	0.76
2003	7	0.4	0.70	0.2	0.63	0.3	0.65	0.4	0.74
2004	4	0.2	0.17	0.1	0.13	0.2	0.15	0.2	0.16
2005	6	0.3	0.75	0.2	0.93	0.3	0.82	0.3	0.84
2006	6	0.3	0.75	0.2	0.62	0.3	0.72	0.3	0.60
2007	11	0.5	0.79	0.3	0.75	0.4	0.81	0.5	0.97
2008	7	0.3	0.78	0.2	0.75	0.3	0.84	0.3	0.87
2009	8	0.4	0.62	0.2	0.42	0.3	0.49	0.3	0.54
2010	9	0.4	0.56	0.2	0.44	0.3	0.50	0.4	0.61
2011	7	0.3	0.44	0.2	0.42	0.3	0.46	0.3	0.47
2012	7	0.3	0.58	0.1	0.43	0.2	0.46	0.3	0.61
2013	7	0.3	0.70	0.1	0.53	0.2	0.60	0.3	0.70
2014	9	0.4	0.82	0.1	0.63	0.2	0.70	0.3	0.76
1998-2014	118	0.4	0.62	0.2	0.53	0.3	0.58	0.4	0.64

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	9	0.8	0.75	0.3	0.57	0.5	0.64	0.7	0.79
1999	4	0.3	0.24	0.1	0.17	0.2	0.18	0.2	0.17
2000	10	0.8	0.91	0.3	0.76	0.5	0.87	0.7	0.88
2001	13	1.1	0.87	0.4	0.67	0.7	0.75	0.9	0.80
2002	14	0.7	0.45	0.3	0.37	0.5	0.40	0.6	0.43
2003	9	0.5	0.31	0.3	0.35	0.3	0.31	0.4	0.32
2004	22	1.1	0.76	0.5	0.70	0.7	0.75	0.9	0.81
2005	24	1.2	1.14	0.5	0.78	0.7	0.94	1.0	1.08
2006	20	1.0	0.54	0.4	0.39	0.6	0.41	0.8	0.49
2007	22	1.0	0.47	0.3	0.42	0.5	0.43	0.7	0.46
2008	19	0.8	0.45	0.3	0.36	0.5	0.37	0.6	0.43
2009	28	1.2	0.55	0.5	0.42	0.8	0.46	1.0	0.51
2010	37	1.6	0.63	0.6	0.49	0.9	0.55	1.3	0.60
2011	39	1.7	0.63	0.6	0.51	1.0	0.55	1.3	0.60
2012	38	1.6	0.76	0.6	0.59	1.0	0.69	1.3	0.79
2013	38	1.6	0.83	0.6	0.61	0.9	0.69	1.2	0.75
2014	45	1.9	1.07	0.8	0.95	1.2	1.01	1.5	0.98
1998-2014	391	1.2	0.65	0.5	0.52	0.7	0.57	1.0	0.62

Table 13

Age distribution of age at death (cancer-related) for period 2007-2014
(**incl. multiple primaries**)

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
20-24	1	0.3	0.3	1	1.5	1.5			0.0
25-29	0	0.0	0.3			1.5			0.0
30-34	2	0.6	0.9	2	3.1	4.6			0.0
35-39	4	1.2	2.1	2	3.1	7.7	2	0.8	0.8
40-44	3	0.9	3.0			7.7	3	1.1	1.9
45-49	5	1.5	4.5	2	3.1	10.8	3	1.1	3.0
50-54	11	3.3	7.9	4	6.2	16.9	7	2.6	5.6
55-59	24	7.3	15.1	5	7.7	24.6	19	7.1	12.8
60-64	25	7.6	22.7	4	6.2	30.8	21	7.9	20.7
65-69	50	15.1	37.8	8	12.3	43.1	42	15.8	36.5
70-74	66	19.9	57.7	13	20.0	63.1	53	19.9	56.4
75-79	61	18.4	76.1	10	15.4	78.5	51	19.2	75.6
80-84	51	15.4	91.5	10	15.4	93.8	41	15.4	91.0
85+	28	8.5	100.0	4	6.2	100.0	24	9.0	100.0
All ages	331	100.0		65	100.0		266	100.0	

Included in the statistics are 33.7% multiple primaries in males and 39.1% in females.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2014
(**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		0.1	1.00	0.0		2.1	
25-29			0.0		0.0			
30-34	2		0.2	0.67	0.0		2.3	
35-39	2	2	0.2	0.29	0.2	0.29	1.1	0.8
40-44		3	0.0		0.2	0.43		0.5
45-49	2	3	0.1	0.50	0.2	0.21	0.2	0.2
50-54	4	7	0.3	1.00	0.5	0.32	0.2	0.4
55-59	5	19	0.5	0.50	1.7	0.56	0.2	0.7
60-64	4	21	0.4	0.33	2.0	0.55	0.1	0.6
65-69	8	42	0.8	0.44	4.0	0.61	0.1	0.8
70-74	13	53	1.4	0.87	5.1	0.67	0.1	0.8
75-79	10	51	1.8	0.83	7.1	0.94	0.1	0.8
80-84	10	41	2.9	3.33	7.3	0.93	0.1	0.6
85+	4	24	1.7	0.80	4.2	1.20	0.1	0.3
All ages	65	266					0.1	0.6
Mortality								
Raw			0.4	0.64	1.4	0.67		
WS			0.2	0.53	0.6	0.54		
ES			0.3	0.59	0.8	0.59		
BRD-S			0.4	0.67	1.1	0.64		
PYLL-70								
per 100,000			2.6		5.3			
ES			2.4		4.4			
AYLL-70			14.8		8.6			

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

Table 15a

Multiple primaries in deaths in period 1998-2014
MALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C16	Stomach	4	7.8	3	75.0			1	25.0
C18	Colon	2	3.9	2	100.0				
C19-C20	Rectum	2	3.9	1	50.0			1	50.0
C22	Liver	1	2.0			1	100.0		
C23-C24	Bile	1	2.0			1	100.0		
C25	Pancreas	1	2.0			1	100.0		
C33-C34	Lung	4	7.8	2	50.0	1	25.0	1	25.0
C38,C45	Mesothelioma	1	2.0	1	100.0				
C43	Malign. melanoma	1	2.0					1	100.0
C44	Skin others	5	9.8	5	100.0				
C61	Prostate	10	19.6	8	80.0			2	20.0
C62	Testis	1	2.0	1	100.0				
C64	Kidney	5	9.8	3	60.0	1	20.0	1	20.0
C65	Renal pelvis	1	2.0	1	100.0				
C67	Bladder	6	11.8	4	66.7			2	33.3
C68	Urethra	1	2.0					1	100.0
C70-C72	CNS cancer	1	2.0			1	100.0		
C76-C79	CUP	1	2.0	1	100.0				
C82-C85	NHL	2	3.9	1	50.0			1	50.0
C91-C96	Leukaemia	1	2.0					1	100.0
All mult. primaries		51	100.0	33	64.7	6	11.8	12	23.5

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 15b

Multiple primaries in deaths in period 1998-2014
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C16	Stomach	2	1.1	2	100.0				
C18	Colon	11	6.2	3	27.3	4	36.4	4	36.4
C19-C20	Rectum	2	1.1	2	100.0				
C25	Pancreas	3	1.7			2	66.7	1	33.3
C33-C34	Lung	2	1.1	1	50.0			1	50.0
C43	Malign. melanoma	8	4.5	7	87.5			1	12.5
C44	Skin others	12	6.8	7	58.3	3	25.0	2	16.7
C48	Peritoneal	3	1.7			1	33.3	2	66.7
C50	Breast	28	15.8	22	78.6	3	10.7	3	10.7
C53	Cervix uteri	4	2.3	4	100.0				
C54	Corpus uteri	12	6.8	5	41.7	6	50.0	1	8.3
C56	Ovary	61	34.5	12	19.7	9	14.8	40	65.6
C64	Kidney	3	1.7	1	33.3	1	33.3	1	33.3
C66	Ureter	2	1.1			1	50.0	1	50.0
C67	Bladder	2	1.1	1	50.0			1	50.0
C73	Thyroid	2	1.1	2	100.0				
C82-C85	NHL	4	2.3	3	75.0	1	25.0		
C90	Mult. myeloma	5	2.8	2	40.0	1	20.0	2	40.0
C91-C96	Leukaemia	3	1.7					3	100.0
Other primaries		8	4.5	4	50.0	1	12.5	3	37.5
All mult. primaries		177	100.0	78	44.1	33	18.6	66	37.3

Multiple primaries with number of cases 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 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2014
(**First primaries only** *)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	Males MI-index	Females Age-spec. mortal.	Females 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		0.1	1.00	0.0		2.3	
25-29			0.0		0.0			
30-34	2		0.2	0.67	0.0		2.3	
35-39	2	1	0.2	0.29	0.1	0.17	1.2	0.4
40-44		3	0.0		0.2	0.50		0.5
45-49	2	3	0.1	0.50	0.2	0.33	0.2	0.3
50-54	4	6	0.3	1.00	0.5	0.29	0.3	0.4
55-59	5	14	0.5	0.56	1.2	0.48	0.2	0.7
60-64	2	17	0.2	0.20	1.6	0.61	0.1	0.6
65-69	5	30	0.5	0.42	2.9	0.56	0.1	0.7
70-74	7	41	0.8	0.78	3.9	0.68	0.1	0.8
75-79	9	39	1.6	1.13	5.5	0.95	0.1	0.8
80-84	8	25	2.3	2.67	4.5	0.86	0.1	0.5
85+	3	20	1.3	1.00	3.5	1.25	0.1	0.3
All ages	50	199					0.1	0.6
Mortality								
Raw			0.3	0.63	1.1	0.64		
WS			0.1	0.50	0.4	0.51		
ES			0.2	0.57	0.6	0.56		
BRD-S			0.3	0.66	0.8	0.61		
PYLL-70								
per 100,000			2.4		4.2			
ES			2.3		3.5			
AYLL-70			17.1		9.0			

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2014
(**Single primaries only** *)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	Males MI-index	Females Age-spec. mortal.	Females 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		0.1	1.00	0.0		2.6	
25-29			0.0		0.0			
30-34	2		0.2	0.67	0.0		2.4	
35-39	2	1	0.2	0.29	0.1	0.17	1.3	0.5
40-44		3	0.0		0.2	0.50		0.6
45-49	2	2	0.1	0.67	0.1	0.25	0.2	0.2
50-54	3	3	0.2	0.75	0.2	0.18	0.2	0.2
55-59	4	12	0.4	0.50	1.1	0.44	0.2	0.6
60-64	2	15	0.2	0.22	1.4	0.60	0.1	0.6
65-69	4	23	0.4	0.36	2.2	0.52	0.1	0.7
70-74	7	33	0.8	0.78	3.2	0.60	0.1	0.8
75-79	8	32	1.5	1.14	4.5	0.86	0.2	0.8
80-84	5	19	1.4	1.67	3.4	0.83	0.1	0.5
85+	2	16	0.9	1.00	2.8	1.07	0.1	0.3
All ages	42	159					0.1	0.6
Mortality								
Raw			0.2	0.58	0.8	0.58		
WS			0.1	0.48	0.3	0.46		
ES			0.2	0.53	0.5	0.50		
BRD-S			0.2	0.61	0.7	0.55		
PYLL-70								
per 100,000			2.2		3.4			
ES			2.1		2.8			
AYLL-70			18.0		9.0			

* See corresponding tables with multiple primaries.

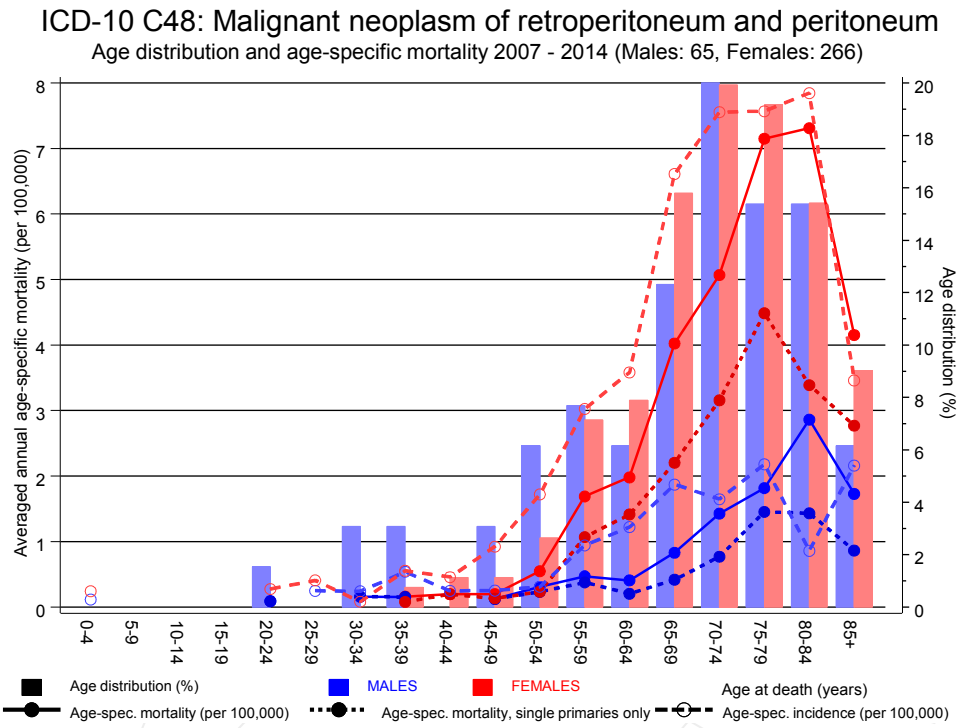
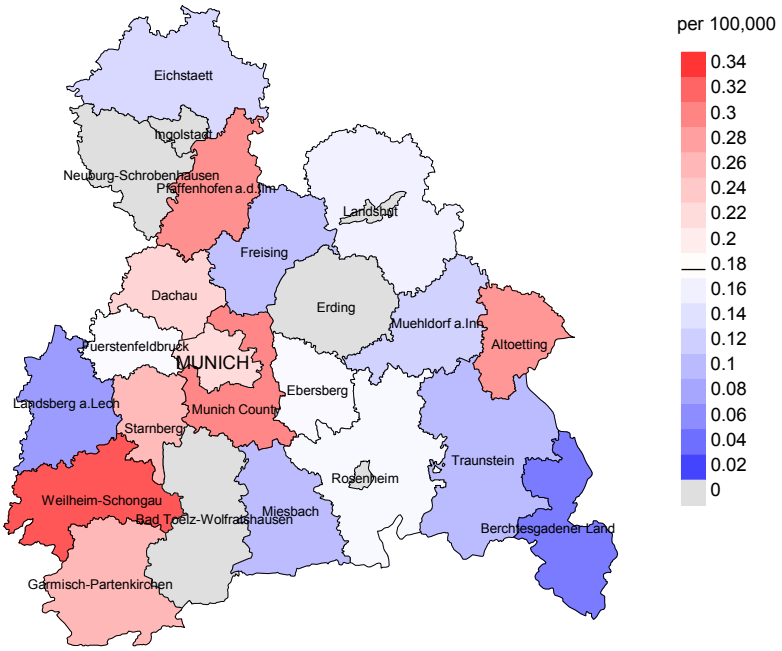


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

The difference between age at diagnosis (Table 3) and age at peritoneal cancer-related death (see Table 10) should be considered.

Average mortality (world standard population) 2007 - 2014: Males



Average mortality (world standard population) 2007 - 2014: Females

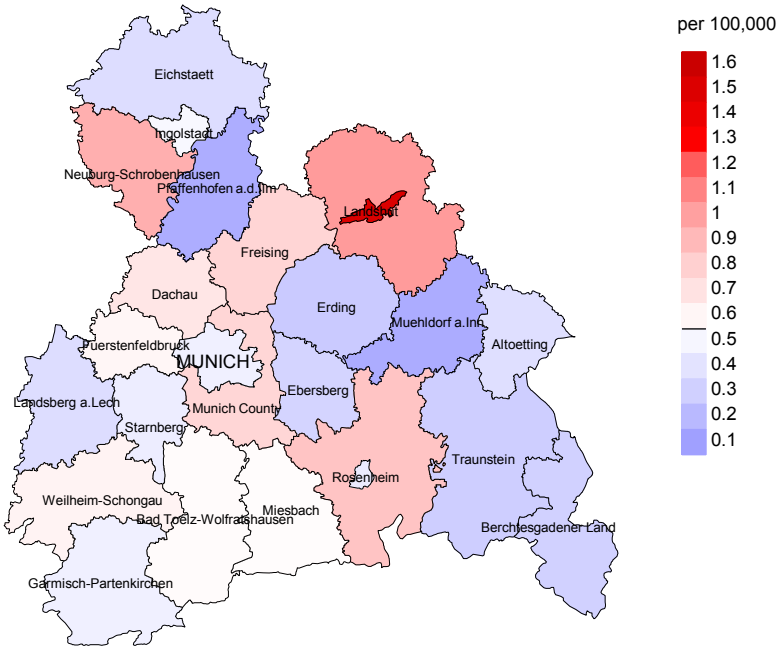
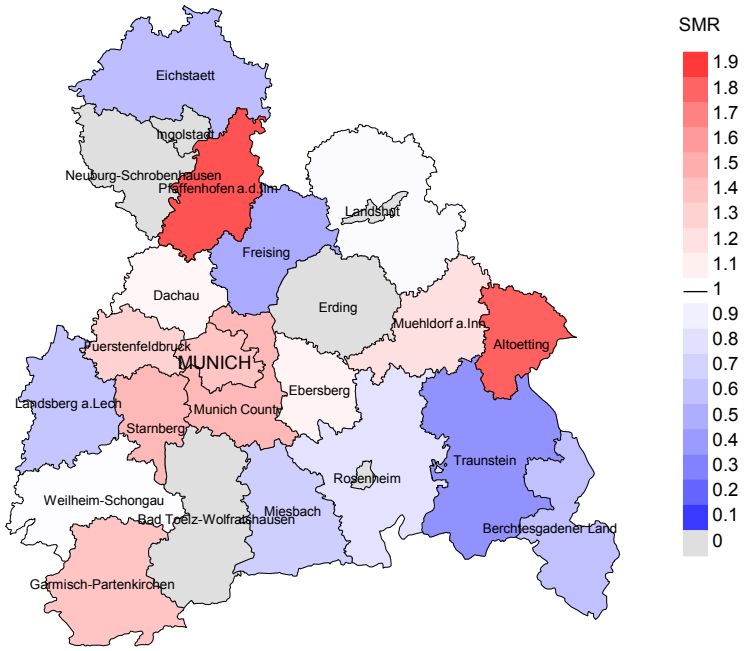


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2014. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 0.2/100,000 WS N=65, females 0.5/100,000 WS N=264).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,347 female residents (averaged) in the period from 2007 to 2014 a total of 5 women died from peritoneal cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.3/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.1 and 1.1/100,000.

Standardized mortality ratio (SMR) 2007 - 2014: Males



Standardized mortality ratio (SMR) 2007 - 2014: Females

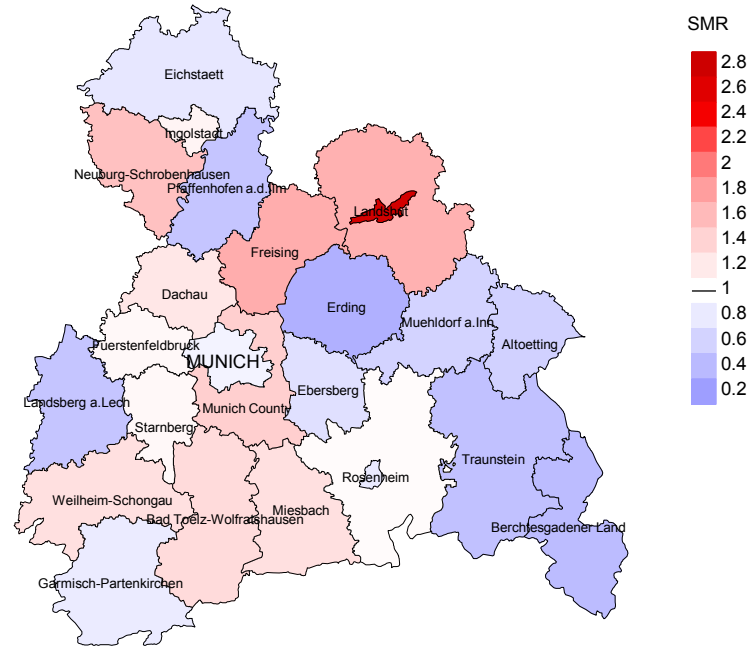


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=65, females N=264).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,924 female residents (averaged) in the period from 2007 to 2014 a total of 5 women died from peritoneal cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.71. Though, the value of this parameter may vary with an underlying probability of 99% between 0.15 and 2.02, 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, where applicable. For mortality statistics patients, diagnoses and progressive course of disease are presented. In the calculations, all courses of disease are considered whereby progressions occurred and/or death certificate identified progressive cancers were ascertained. Additionally there are three groups of disease course to consider:

1. **All multiple primaries included**

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

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

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

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

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

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

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

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

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

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

Shortcuts

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

Recommended Citation

Munich Cancer Registry. ICD-10 C48: Peritoneal cancer - Incidence and Mortality [Internet]. 2016 [updated 2016 Apr 13; cited 2016 Jun 1]. Available from: http://www.tumorregister-muenchen.de/en/facts/base/bC48__E-ICD-10-C48-Peritoneal-cancer-incidence-and-mortality.pdf

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