Munich Cancer Registry

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ICD-10 C67: Bladder cancer

Incidence and Mortality

Year of diagnosis	1998-2014
Patients	9,073
Diseases	9,076
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/bC67__E-ICD-10-C67-Bladder-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
C67.-	Malignant neoplasm of bladder
C67.0	Trigone of bladder
C67.1	Dome of bladder
C67.2	Lateral wall of bladder
C67.3	Anterior wall of bladder
C67.4	Posterior wall of bladder
C67.5	Bladder neck
C67.6	Ureteric orifice
C67.7	Urachus
C67.8	Overlapping lesion of bladder
C67.9	Bladder, unspecified

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	297	21	7.1	30.0	80.1	98.7
1999	279	20	7.2	36.2	79.6	99.3
2000	284	29	10.2	36.3	79.9	98.6
2001	296	21	7.1	39.9	74.0	98.0
2002	606	78	12.9	38.0	80.5	98.5 #
2003	590	73	12.4	37.6	75.6	97.5
2004	566	65	11.5	39.6	74.6	98.4
2005	527	53	10.1	37.4	67.6	95.4
2006	597	48	8.0	37.0	72.2	93.5
2007	609	45	7.4	39.7	65.4	84.2 #
2008	652	59	9.0	41.7	67.0	82.5
2009	661	54	8.2	43.7	65.8	80.3
2010	652	58	8.9	44.8	62.1	80.2
2011	668	48	7.2	43.4	57.9	80.5
2012	670	49	7.3	43.4	50.9	78.8
2013	679	60	8.8	45.4	44.9	99.6
2014	443	45	10.2	40.4	27.8	97.5 ##
1998-2014	9076	826	9.1	40.4	64.8	90.4

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	297	208	89	70.0
1999	279	214	65	76.7
2000	284	194	90	68.3
2001	296	197	99	66.6
2002	606	432	174	71.3
2003	590	435	155	73.7
2004	566	404	162	71.4
2005	527	368	159	69.8
2006	597	430	167	72.0
2007	609	427	182	70.1
2008	652	472	180	72.4
2009	661	485	176	73.4
2010	652	461	191	70.7
2011	668	482	186	72.2
2012	670	500	170	74.6
2013	679	492	187	72.5
2014	443	317	126	71.6
1998–2014	9076	6518	2558	71.8

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	208	89	18.8	7.6	11.1	2.9	17.4	4.6	23.9	6.1
1999	214	65	19.1	5.5	11.0	2.2	17.2	3.4	23.4	4.6
2000	194	90	17.0	7.5	9.5	2.6	15.1	4.2	21.7	5.8
2001	197	99	17.0	8.1	9.9	3.0	15.2	4.7	19.8	6.5
2002	432	174	23.2	8.9	12.1	3.2	19.4	5.0	27.2	6.8
2003	435	155	23.2	7.9	12.1	2.8	19.1	4.4	26.5	6.0
2004	404	162	21.5	8.2	10.9	2.7	17.2	4.5	23.8	6.2
2005	368	159	19.4	8.0	9.6	2.9	15.2	4.4	21.0	5.9
2006	430	167	22.5	8.3	11.1	3.2	17.4	4.8	24.2	6.4
2007	427	182	19.3	7.9	9.4	2.8	14.7	4.4	19.8	6.1
2008	472	180	21.2	7.8	9.9	2.9	15.8	4.4	21.7	5.8
2009	485	176	21.7	7.6	10.0	2.5	15.8	4.0	21.9	5.5
2010	461	191	20.5	8.2	9.4	2.4	14.7	4.0	19.8	5.6
2011	482	186	21.1	7.9	9.6	3.0	14.9	4.5	20.1	5.8
2012	500	170	21.9	7.2	9.4	2.4	15.0	3.9	21.1	5.3
2013	492	187	21.5	7.9	9.3	2.8	14.8	4.3	20.5	5.6
2014	317	126	13.9	5.3	6.0	1.8	9.6	2.8	13.4	3.9
1998-2014	6518	2558	20.4	7.7	9.8	2.7	15.5	4.2	21.3	5.7

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 patients)
(incl. DCO)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	297	72.4	12.9	26.3	96.1	55.0	65.1	73.4	82.8	88.1
1999	279	71.2	10.8	42.1	94.1	55.6	63.7	71.9	79.3	85.3
2000	284	73.3	10.4	39.3	99.7	59.7	65.1	74.5	80.6	86.5
2001	296	71.7	12.0	30.9	95.8	55.5	62.8	72.8	81.0	87.1
2002	606	74.1	10.6	36.1	99.5	60.7	66.8	74.8	81.8	88.2
2003	590	73.5	11.6	25.4	103	59.5	65.7	74.5	81.8	88.0
2004	566	73.6	11.6	33.3	99.0	58.7	64.8	75.4	81.6	88.3
2005	527	73.5	11.7	28.0	101	58.9	65.2	74.5	82.1	88.0
2006	597	73.2	12.1	3.0	101	57.3	66.0	74.4	81.9	87.0
2007	609	73.2	11.6	1.3	101	57.0	66.8	73.7	81.4	86.9
2008	652	74.0	11.7	6.6	100	57.8	66.9	74.7	82.6	87.7
2009	661	74.0	10.9	39.9	103	59.3	66.7	75.0	82.4	87.3
2010	652	74.2	11.9	31.5	100	57.1	67.2	75.3	83.3	88.3
2011	668	73.4	12.4	1.5	97.6	56.7	66.1	74.6	82.5	88.5
2012	670	74.3	10.6	37.0	103	59.4	68.3	75.2	81.7	87.2
2013	679	74.3	11.2	33.4	99.0	59.5	68.0	74.7	82.4	88.0
2014	443	74.4	10.9	36.9	107	59.5	68.2	75.3	82.1	88.4
1998-2014	9076	73.6	11.5	1.3	107	58.3	66.4	74.5	82.0	87.7

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	208	71.4	12.7	26.3	95.6	55.1	64.3	72.4	80.3	87.1
1999	214	70.3	10.7	42.6	94.1	55.6	62.8	70.5	78.2	84.9
2000	194	71.6	10.3	39.3	99.7	58.3	64.0	73.7	78.9	84.1
2001	197	69.5	11.2	44.0	95.1	54.1	61.6	69.5	77.8	85.4
2002	432	73.1	10.2	37.0	97.6	60.4	66.0	73.5	80.4	86.1
2003	435	72.5	11.1	25.4	101	59.3	65.2	73.3	80.1	86.1
2004	404	71.9	11.2	37.8	98.8	58.2	63.6	73.1	79.9	85.5
2005	368	72.4	10.6	38.6	101	59.0	65.0	73.3	80.4	85.1
2006	430	72.7	11.3	3.0	101	58.2	65.3	73.4	80.6	86.0
2007	427	72.4	11.4	1.3	101	56.9	66.5	72.5	80.3	86.6
2008	472	73.6	11.3	37.5	100	57.8	66.6	74.2	81.6	87.4
2009	485	73.1	10.5	46.0	97.4	59.1	66.2	74.3	81.0	86.2
2010	461	72.4	11.6	31.5	99.1	56.0	65.8	72.7	81.1	86.9
2011	482	73.0	12.1	1.5	95.4	56.7	66.3	74.3	81.8	87.5
2012	500	73.7	10.1	39.9	103	59.6	68.2	74.8	80.6	85.3
2013	492	73.9	10.5	40.5	98.6	59.7	68.0	74.2	81.8	87.2
2014	317	73.8	10.5	44.6	95.2	58.3	67.5	74.8	81.3	86.6
1998-2014	6518	72.7	11.0	1.3	103	58.0	65.6	73.4	80.7	86.3

Table 3b

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	Median 10%	25%	50%	75%	90%
1998	89	74.8	13.1	35.3	96.1	54.2	69.1	77.4	85.7	89.7
1999	65	74.1	10.8	42.1	91.3	56.4	70.4	76.5	80.3	86.0
2000	90	77.0	9.7	56.1	94.5	62.5	69.6	78.8	85.9	89.0
2001	99	76.1	12.5	30.9	95.8	56.7	68.2	78.0	84.8	90.2
2002	174	76.5	11.4	36.1	99.5	62.6	68.3	78.5	85.7	89.3
2003	155	76.5	12.5	25.4	103	61.9	69.2	78.7	85.2	90.7
2004	162	77.7	11.5	33.3	99.0	59.5	72.4	79.0	86.1	90.6
2005	159	76.2	13.7	28.0	98.8	57.2	66.5	79.6	85.8	91.8
2006	167	74.6	13.9	4.3	96.7	55.5	67.1	76.8	84.6	91.4
2007	182	75.0	12.0	34.4	98.4	57.9	69.0	77.8	83.8	87.8
2008	180	75.0	12.6	6.6	97.0	58.6	68.2	76.3	85.0	88.1
2009	176	76.4	11.5	39.9	103	61.4	69.3	78.6	84.7	89.2
2010	191	78.8	11.3	37.0	100	64.2	71.1	81.0	87.3	91.1
2011	186	74.3	13.2	12.3	97.6	57.2	65.0	74.9	84.2	90.6
2012	170	76.0	11.7	37.0	96.4	59.1	69.0	78.3	84.7	89.5
2013	187	75.2	12.7	33.4	99.0	56.7	68.1	76.4	85.5	91.1
2014	126	76.0	11.5	36.9	107	60.6	70.1	76.0	83.1	89.9
1998-2014	2558	76.0	12.3	4.3	107	58.9	68.8	77.9	85.1	90.1

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	2	0.0	0.0	2	0.1	0.1			0.0
5-9	1	0.0	0.1			0.1	1	0.1	0.1
10-14	1	0.0	0.1			0.1	1	0.1	0.1
15-19	0	0.0	0.1			0.1			0.1
20-24	0	0.0	0.1			0.1			0.1
25-29	0	0.0	0.1			0.1			0.1
30-34	3	0.1	0.1	1	0.0	0.1	2	0.1	0.3
35-39	10	0.2	0.3	5	0.1	0.2	5	0.4	0.6
40-44	35	0.7	1.0	26	0.7	0.9	9	0.6	1.3
45-49	94	1.9	2.9	70	1.9	2.9	24	1.7	3.0
50-54	174	3.5	6.4	132	3.6	6.5	42	3.0	6.0
55-59	283	5.6	12.0	209	5.7	12.2	74	5.3	11.3
60-64	403	8.0	20.0	313	8.6	20.8	90	6.4	17.7
65-69	678	13.5	33.5	537	14.8	35.6	141	10.1	27.8
70-74	865	17.2	50.6	641	17.6	53.2	224	16.0	43.8
75-79	839	16.7	67.3	644	17.7	71.0	195	13.9	57.8
80-84	792	15.7	83.0	550	15.1	86.1	242	17.3	75.1
85+	854	17.0	100.0	506	13.9	100.0	348	24.9	100.0
All ages	5034	100.0		3636	100.0		1398	100.0	

Included in the statistics are 63.3% multiple primaries in males and 41.3% 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=247 %	Females DCO rate n=170 %	Males Prop.all cancers n=91183 %	Females Prop.all cancers n=89596 %
0- 4	2		0.2	0.0			1.1	
5- 9		1	0.0	0.1				1.3
10-14		1	0.0	0.1				1.1
15-19			0.0	0.0				
20-24			0.0	0.0				
25-29			0.0	0.0				
30-34	1	2	0.1	0.2			0.1	0.2
35-39	5	5	0.4	0.4			0.4	0.3
40-44	26	9	1.6	0.6			1.4	0.2
45-49	70	24	4.4	1.6			2.2	0.4
50-54	132	42	10.2	3.3		2.4	2.7	0.6
55-59	209	74	19.7	6.6	1.4		2.9	1.0
60-64	313	90	31.9	8.5	2.2	5.6	2.9	1.0
65-69	537	141	55.8	13.5	2.8	2.1	3.4	1.2
70-74	641	224	70.4	21.4	3.3	3.1	3.8	1.9
75-79	644	195	116.9	27.3	7.3	3.6	5.2	1.9
80-84	548	242	156.9	43.2	8.9	15.3	6.4	2.8
85+	506	348	218.6	60.2	20.8	31.6	8.3	3.4
All ages	3634	1398			6.8	12.2	4.0	1.6
Incidence								
Raw			20.1	7.5				
WS			9.1	2.6				
ES			14.4	4.0				
BRD-S			19.7	5.4				

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

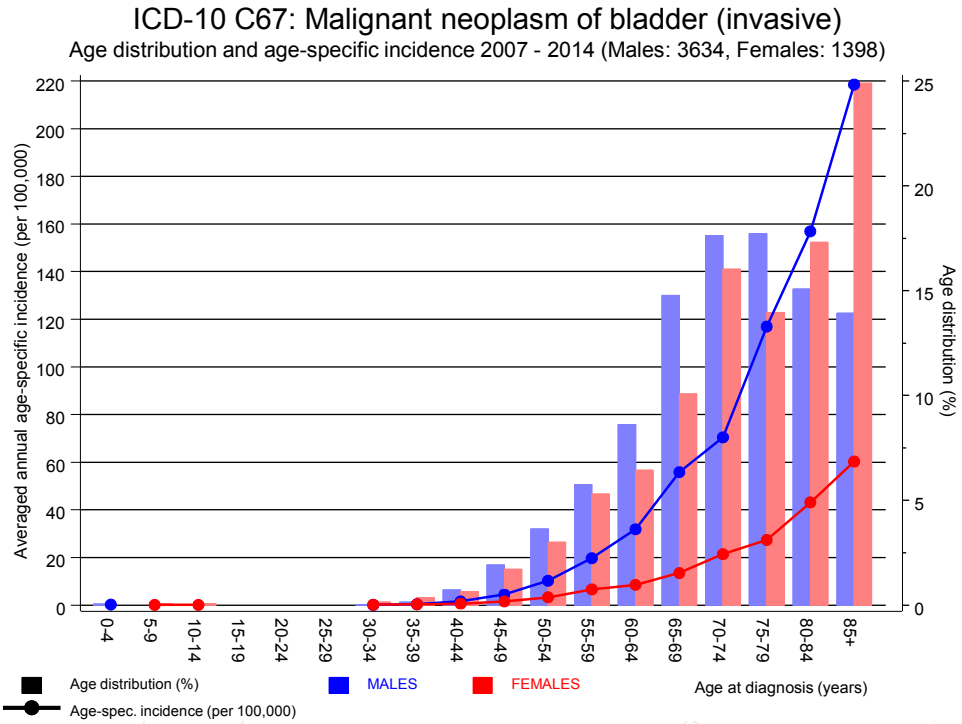


Figure 6. Age distribution and age-specific incidence

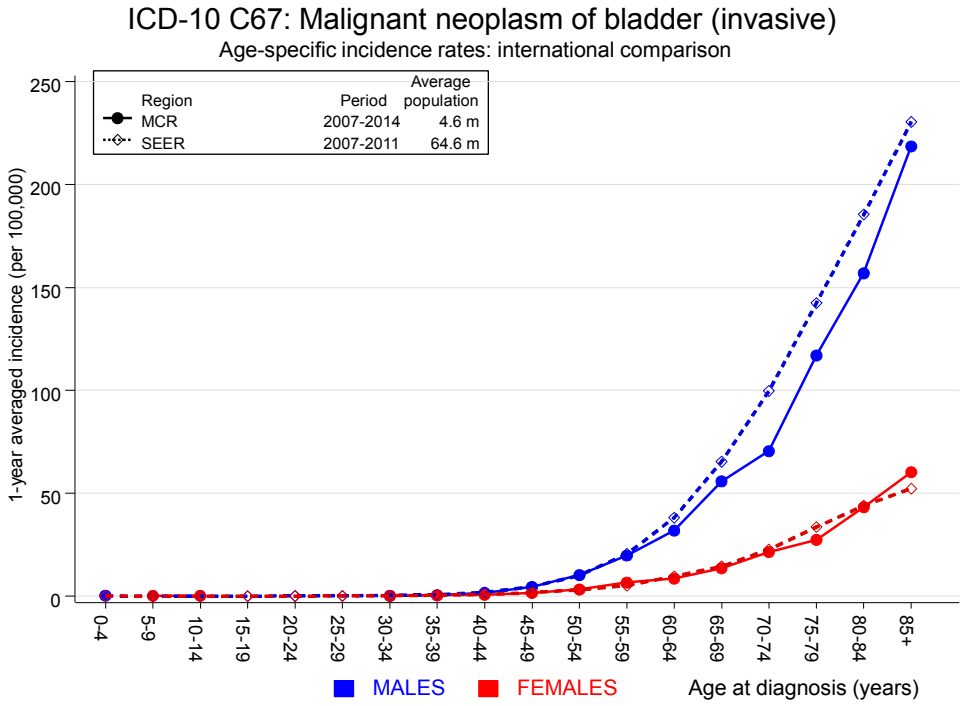


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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.

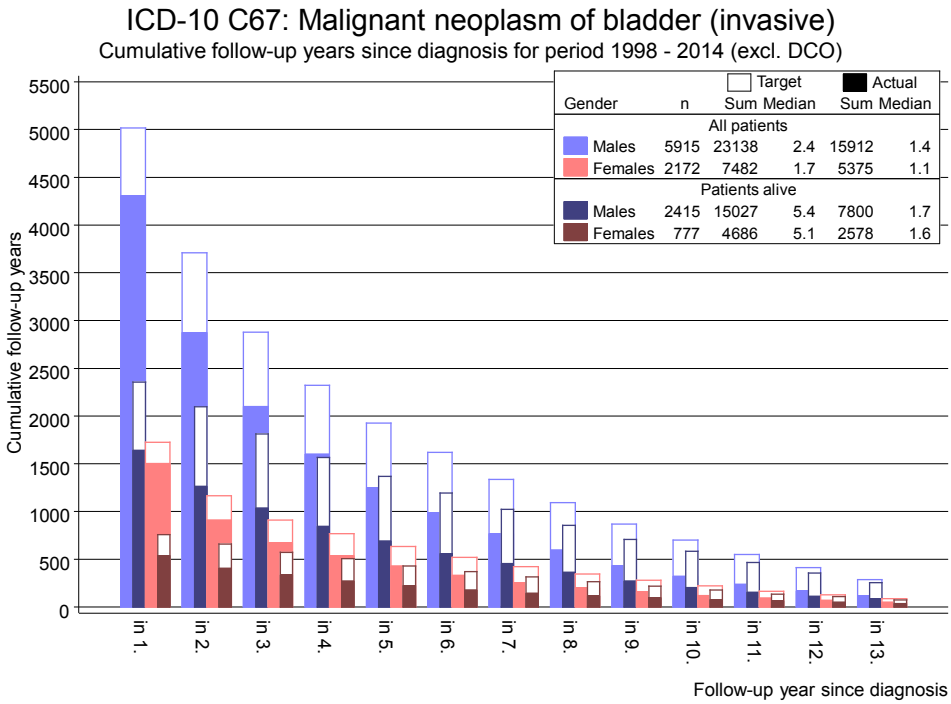


Figure 7. Cumulative follow-up years depending on time since diagnosis

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 %
C03-C06	Oral cavity	6	2.2	2.7	1.0	5.9		2.4	16.7
C07-C08	Salivary gland	2	0.8	2.6	0.3	9.5		0.8	
C09-C10	Oropharynx	4	2.6	1.5	0.4	3.9		0.9	
C12-C13	Hypopharynx	4	1.4	2.8	0.8	7.3		1.6	
C15	Oesophagus	14	5.3	2.6	1.4	4.4	#	5.5	14.3
C16	Stomach	29	14.5	2.0	1.3	2.9	#	9.1	
C17	Small intestine	3	1.6	1.9	0.4	5.6		0.9	
C18	Colon	83	34.1	2.4	1.9	3.0	#	30.7	7.2
C19-C20	Rectum	31	17.1	1.8	1.2	2.6	#	8.7	6.5
C21	Anus/canal	2	0.6	3.2	0.4	11.4		0.9	
C22	Liver	17	8.7	1.9	1.1	3.1	#	5.2	11.8
C23-C24	Bile	4	3.3	1.2	0.3	3.1		0.4	25.0
C25	Pancreas	25	12.2	2.0	1.3	3.0	#	8.0	28.0
C32	Larynx	4	2.9	1.4	0.4	3.5		0.7	
C33-C34	Lung	173	37.6	4.6	3.9	5.3	#	84.9	13.9
C38,C45	Mesothelioma	2	2.1	0.9	0.1	3.4		-0.1	50.0
C43	Malign. melanoma	21	12.6	1.7	1.0	2.5	#	5.2	
C46,C49	Soft tissue	2	1.8	1.1	0.1	4.1		0.1	
C48	Peritoneal	2	0.2	8.9	1.1	32.1	#	1.1	50.0
C60	Penis	3	0.8	3.9	0.8	11.5		1.4	
C61	Prostate	932	95.6	9.7	9.1	10.4	#	524.6	4.6
C64	Kidney	54	10.8	5.0	3.8	6.5	#	27.1	27.8
C65	Renal pelvis	53	1.4	36.7	27.5	48.0	#	32.3	
C66	Ureter	36	0.8	43.8	30.7	60.6	#	22.1	
C67	Bladder	3	16.3	0.2	0.0	0.5	#	-8.3	66.7
C68	Urethra	48	0.2	195.0	143.7	258.5	#	30.0	
C68	Urinary org.	3	0.2	12.9	2.7	37.6	#	1.7	100.0
C70-C72	CNS cancer	7	4.0	1.7	0.7	3.6		1.9	14.3
C73	Thyroid	2	1.7	1.2	0.1	4.3		0.2	
C76-C79	CUP	20	5.8	3.4	2.1	5.3	#	8.9	10.0
C82-C85	NHL	23	13.4	1.7	1.1	2.6	#	6.0	13.0
C90	Mult. myeloma	8	4.3	1.8	0.8	3.6		2.3	12.5
C91-C96	Leukaemia	11	5.8	1.9	0.9	3.4		3.3	45.5
Other primaries		6	3.9	1.5	0.6	3.3		1.3	16.7
Not observed		0	1.9	0.0	0.0	1.9		-1.2	
All mult. primaries		1637	328.8	5.0	4.7	5.2	#	820.5	7.5

Patients	6038
Median age at second malignancy (years)	72.7
Person-years	15944
Mean observation time (years)	2.6
Median observation time (years)	1.3

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

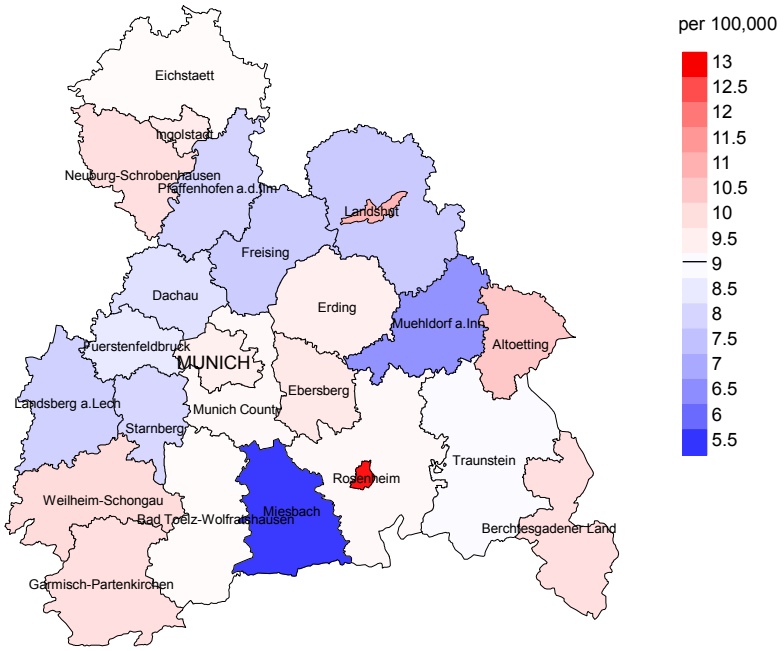
Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C15	Oesophagus	4	0.4	9.5	2.6	24.4	#	6.6	25.0
C16	Stomach	6	3.2	1.9	0.7	4.1		5.2	16.7
C17	Small intestine	3	0.3	9.1	1.9	26.7	#	4.9	
C18	Colon	16	8.7	1.8	1.0	3.0	#	13.5	
C19–C20	Rectum	13	3.4	3.8	2.0	6.5	#	17.7	7.7
C23–C24	Bile	2	1.3	1.6	0.2	5.6		1.3	50.0
C25	Pancreas	16	3.8	4.2	2.4	6.8	#	22.5	37.5
C33–C34	Lung	31	5.1	6.1	4.2	8.7	#	48.0	22.6
C43	Malign. melanoma	2	2.4	0.8	0.1	3.0		−0.8	50.0
C50	Breast	44	20.0	2.2	1.6	3.0	#	44.4	11.4
C51	Vulva	2	0.9	2.3	0.3	8.3		2.1	
C52	Vagina	2	0.2	12.4	1.5	44.8	#	3.4	
C53	Cervix uteri	12	0.8	14.5	7.5	25.3	#	20.7	8.3
C54	Corpus uteri	7	3.9	1.8	0.7	3.7		5.7	14.3
C55,C57	Fem. genitals un	4	0.3	15.4	4.2	39.3	#	6.9	25.0
C56	Ovary	8	3.0	2.6	1.1	5.2	#	9.2	37.5
C64	Kidney	18	1.9	9.3	5.5	14.8	#	29.7	33.3
C65	Renal pelvis	29	0.3	113.2	75.8	162.6	#	53.2	
C66	Ureter	18	0.1	137.0	81.2	216.5	#	33.1	
C68	Urethra	3	0.0	127.6	26.3	372.8	#	5.5	
C68	Urinary org.	2	0.0	48.0	5.8	173.5	#	3.6	100.0
C76–C79	CUP	4	1.6	2.4	0.7	6.3		4.4	
C82–C85	NHL	7	3.1	2.3	0.9	4.7		7.3	28.6
C91–C96	Leukaemia	7	1.3	5.2	2.1	10.7	#	10.5	28.6
Other primaries		12	5.0	2.4	1.2	4.2	#	13.0	16.7
Not observed		0	4.0	0.0	0.0	0.9	#	−7.4	
All mult. primaries		272	75.2	3.6	3.2	4.1	#	364.1	15.8

Patients	2261
Median age at second malignancy (years)	77.2
Person-years	5405
Mean observation time (years)	2.4
Median observation time (years)	1.0

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

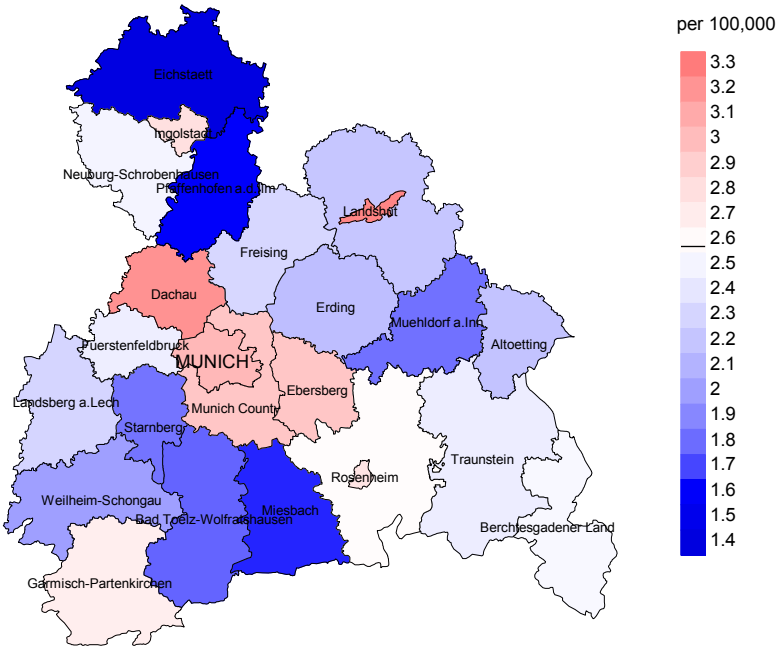
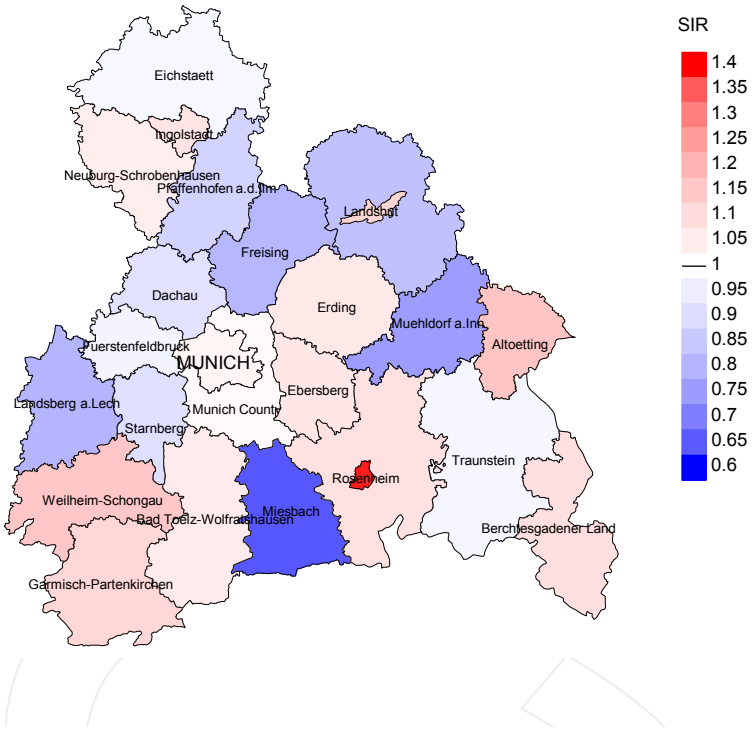


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 9.1/100,000 WS N=3,634, females 2.6/100,000 WS N=1,398).

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 39 women were identified with newly diagnosed bladder cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 2.9/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.7 and 5.2/100,000.

Standardized incidence ratio (SIR) 2007 - 2014: Males



Standardized incidence ratio (SIR) 2007 - 2014: Females

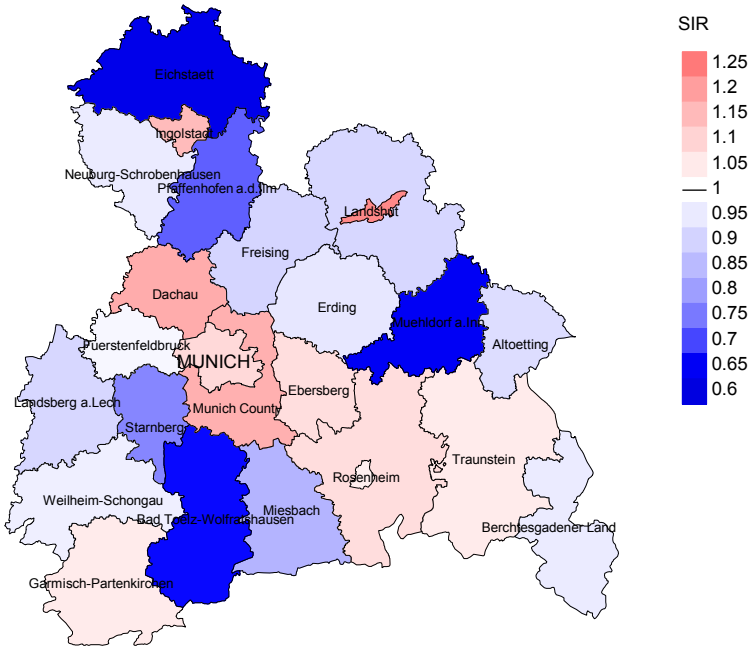


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=3,634, females N=1,398).

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 39 women were identified with newly diagnosed bladder cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.08. Though, the value of this parameter may vary with an underlying probability of 99% between 0.68 and 1.61, 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	297	98.7	7.1	238	80.1	93.7
1999	279	99.3	7.2	222	79.6	96.4
2000	284	98.6	10.2	227	79.9	96.9
2001	296	98.0	7.1	219	74.0	94.5
2002	606	98.5	12.9	488	80.5	97.5
2003	590	97.5	12.4	446	75.6	98.0
2004	566	98.4	11.5	422	74.6	99.1
2005	527	95.4	10.1	356	67.6	97.8
2006	597	93.5	8.0	431	72.2	99.5
2007	609	84.2	7.4	398	65.4	98.5
2008	652	82.5	9.0	437	67.0	99.1
2009	661	80.3	8.2	435	65.8	98.9
2010	652	80.2	8.9	405	62.1	98.8
2011	668	80.5	7.2	387	57.9	97.4
2012	670	78.8	7.3	341	50.9	98.2
2013	679	99.6	8.8	305	44.9	96.7
2014	443	97.5	10.2	123	27.8	90.2
1998-2014	9076	90.4	9.1	5880	64.8	97.7

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	297	244	91.4	66	22.2
1999	279	219	94.5	64	22.9
2000	284	225	95.1	64	22.5
2001	296	218	96.3	51	17.2
2002	606	333	96.1	151	24.9
2003	590	411	97.3	148	25.1
2004	566	406	97.5	136	24.0
2005	527	413	97.6	114	21.6
2006	597	421	97.6	132	22.1
2007	609	490	97.6	132	21.7
2008	652	467	98.5	142	21.8
2009	661	534	99.3	171	25.9
2010	652	551	98.7	154	23.6
2011	668	506	98.6	143	21.4
2012	670	559	98.6	149	22.2
2013	679	550	99.1	153	22.5
2014	443	521	98.7	101	22.8
1998-2014	9076	7068	97.7	2071	22.8

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	244	63.5	36.5	83.9
1999	219	64.4	35.6	81.2
2000	225	67.1	32.9	85.0
2001	218	66.5	33.5	84.8
2002	333	72.7	27.3	86.3
2003	411	67.9	32.1	84.5
2004	406	71.7	28.3	86.6
2005	413	70.0	30.0	84.1
2006	421	72.0	28.0	83.7
2007	490	73.7	26.3	84.7
2008	467	71.5	28.5	83.7
2009	534	71.5	28.5	85.5
2010	551	69.5	30.5	84.0
2011	506	68.8	31.2	84.6
2012	559	68.7	31.3	82.4
2013	550	69.6	30.4	82.0
2014	521	68.3	31.7	81.3
1998-2014	7068	69.7	30.3	83.9

Table 11a

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	164	79.7	79.7	79.7	80.2
1999	154	79.5	77.4	81.3	78.3
2000	159	78.6	76.7	80.8	77.6
2001	143	79.5	77.8	81.8	78.4
2002	231	77.6	76.5	79.9	77.1
2003	309	77.5	75.7	80.8	77.0
2004	283	79.2	78.2	81.4	78.3
2005	292	78.6	77.8	80.0	78.5
2006	283	77.0	76.1	80.6	76.6
2007	343	79.0	78.3	80.5	78.3
2008	334	78.7	77.3	81.7	77.5
2009	385	79.3	77.1	82.9	78.3
2010	386	79.7	77.8	83.0	79.1
2011	356	79.2	76.4	81.8	78.1
2012	413	79.9	79.0	82.7	79.2
2013	405	78.5	77.3	80.9	78.3
2014	380	79.5	76.5	84.8	77.6
1998-2014	5020	78.9	77.3	81.6	78.1

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

Table 11b

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	80	82.3	81.3	85.7	82.3
1999	65	80.0	79.8	80.0	80.1
2000	66	82.0	80.6	84.7	81.9
2001	75	84.0	81.2	88.3	84.0
2002	102	81.5	80.9	86.3	81.7
2003	102	81.5	81.4	82.1	81.0
2004	123	83.1	80.2	89.0	81.4
2005	121	83.1	82.6	84.5	83.0
2006	138	81.9	81.2	87.4	81.8
2007	147	81.8	81.0	87.2	81.2
2008	133	81.8	80.0	85.6	81.5
2009	149	80.9	79.5	83.5	80.3
2010	165	83.3	82.3	85.9	82.7
2011	150	82.3	79.6	88.7	80.8
2012	146	83.8	80.4	89.0	82.9
2013	145	81.1	79.6	85.3	79.9
2014	141	82.5	80.2	87.9	81.9
1998-2014	2048	82.3	80.8	86.4	81.8

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	95	8.6	0.46	4.6	0.41	8.0	0.46	12.2	0.51
1999	93	8.3	0.43	4.5	0.41	7.7	0.45	11.7	0.50
2000	100	8.8	0.52	4.7	0.50	8.0	0.53	12.0	0.55
2001	95	8.2	0.48	4.3	0.43	7.4	0.49	11.2	0.57
2002	164	8.8	0.38	4.4	0.36	7.4	0.38	10.8	0.40
2003	205	10.9	0.47	5.4	0.45	9.0	0.47	13.0	0.49
2004	198	10.5	0.49	5.0	0.45	8.5	0.49	12.5	0.53
2005	200	10.6	0.54	4.8	0.50	8.1	0.54	12.4	0.59
2006	202	10.5	0.47	4.9	0.44	8.1	0.46	11.7	0.48
2007	250	11.3	0.59	5.0	0.53	8.5	0.57	12.4	0.63
2008	237	10.6	0.50	4.5	0.45	7.6	0.48	11.4	0.52
2009	271	12.1	0.56	5.1	0.51	8.5	0.54	12.3	0.56
2010	273	12.1	0.59	5.0	0.53	8.4	0.57	12.1	0.61
2011	248	10.9	0.51	4.5	0.47	7.4	0.49	10.3	0.51
2012	280	12.3	0.56	5.0	0.53	8.3	0.56	11.9	0.57
2013	280	12.3	0.57	4.9	0.52	8.1	0.55	11.7	0.57
2014	260	11.4	0.82	4.7	0.78	7.8	0.81	11.0	0.82
1998-2014	3451	10.8	0.53	4.8	0.49	8.0	0.52	11.7	0.55

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	60	5.1	0.67	1.6	0.55	2.7	0.59	4.0	0.66
1999	48	4.0	0.74	1.3	0.58	2.1	0.62	3.1	0.66
2000	51	4.2	0.57	1.3	0.49	2.2	0.52	3.2	0.54
2001	50	4.1	0.51	1.2	0.39	2.0	0.43	3.1	0.48
2002	78	4.0	0.45	1.3	0.40	2.1	0.41	2.9	0.43
2003	74	3.8	0.48	1.1	0.41	1.9	0.44	2.7	0.45
2004	93	4.7	0.57	1.4	0.52	2.4	0.53	3.3	0.53
2005	89	4.5	0.56	1.2	0.42	2.1	0.47	3.1	0.52
2006	101	5.0	0.60	1.6	0.49	2.5	0.53	3.6	0.56
2007	111	4.8	0.61	1.4	0.51	2.4	0.54	3.4	0.57
2008	97	4.2	0.54	1.3	0.46	2.2	0.49	3.0	0.52
2009	111	4.8	0.63	1.5	0.58	2.4	0.61	3.4	0.62
2010	110	4.7	0.58	1.3	0.54	2.2	0.55	3.1	0.56
2011	100	4.2	0.54	1.4	0.46	2.2	0.49	3.1	0.53
2012	104	4.4	0.61	1.4	0.56	2.2	0.57	3.0	0.58
2013	103	4.4	0.55	1.4	0.49	2.2	0.51	3.0	0.54
2014	96	4.1	0.76	1.2	0.68	2.0	0.70	2.8	0.72
1998-2014	1476	4.4	0.58	1.3	0.50	2.2	0.52	3.1	0.55

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.%
10-14	1	0.0	0.0			0.0	1	0.1	0.1
15-19	0	0.0	0.0			0.0			0.1
20-24	0	0.0	0.0			0.0			0.1
25-29	0	0.0	0.0			0.0			0.1
30-34	0	0.0	0.0			0.0			0.1
35-39	3	0.1	0.1			0.0	3	0.4	0.5
40-44	6	0.2	0.3	4	0.2	0.2	2	0.2	0.7
45-49	36	1.2	1.6	23	1.1	1.3	13	1.6	2.3
50-54	65	2.2	3.8	43	2.0	3.3	22	2.6	4.9
55-59	122	4.2	7.9	91	4.3	7.7	31	3.7	8.7
60-64	160	5.5	13.4	124	5.9	13.6	36	4.3	13.0
65-69	276	9.4	22.8	214	10.2	23.7	62	7.5	20.4
70-74	481	16.4	39.2	370	17.6	41.3	111	13.3	33.8
75-79	494	16.8	56.0	365	17.4	58.7	129	15.5	49.3
80-84	582	19.8	75.8	417	19.8	78.5	165	19.8	69.1
85+	709	24.2	100.0	452	21.5	100.0	257	30.9	100.0
All ages	2935	100.0		2103	100.0		832	100.0	

Included in the statistics are 63.3% multiple primaries in males and 41.3% 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		1	0.0		0.1	1.00		5.0
15-19			0.0		0.0			
20-24			0.0		0.0			
25-29			0.0		0.0			
30-34			0.0		0.0			
35-39		3	0.0		0.2	0.60		1.2
40-44	4	2	0.2	0.15	0.1	0.22	0.9	0.3
45-49	23	13	1.5	0.33	0.9	0.54	2.2	1.1
50-54	43	22	3.3	0.33	1.7	0.52	2.3	1.2
55-59	91	31	8.6	0.44	2.8	0.42	2.9	1.2
60-64	124	36	12.6	0.40	3.4	0.40	2.6	1.0
65-69	214	62	22.2	0.40	5.9	0.44	3.0	1.2
70-74	370	111	40.7	0.58	10.6	0.50	4.1	1.7
75-79	365	129	66.3	0.57	18.1	0.66	4.3	2.1
80-84	417	165	119.4	0.76	29.4	0.68	5.7	2.5
85+	452	257	195.2	0.89	44.5	0.74	7.5	3.0
All ages	2103	832					4.2	1.9
Mortality								
Raw			11.6	0.58	4.4	0.60		
WS			4.8	0.53	1.4	0.53		
ES			8.1	0.56	2.2	0.55		
BRD-S			11.6	0.59	3.1	0.57		
PYLL-70								
per 100,000			24.9		10.7			
ES			21.7		9.3			
AYLL-70			8.0		10.0			

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 ←%
C15	Oesophagus	28	1.1	7	25.0	1	3.6	20	71.4
C16	Stomach	62	2.5	20	32.3	3	4.8	39	62.9
C18	Colon	143	5.7	82	57.3	12	8.4	49	34.3
C19–C20	Rectum	78	3.1	45	57.7	5	6.4	28	35.9
C22	Liver	27	1.1	7	25.9	4	14.8	16	59.3
C25	Pancreas	41	1.6	4	9.8	3	7.3	34	82.9
C32	Larynx	23	0.9	17	73.9			6	26.1
C33–C34	Lung	281	11.3	35	12.5	19	6.8	227	80.8
C43	Malign. melanoma	62	2.5	39	62.9	2	3.2	21	33.9
C44	Skin others	97	3.9	48	49.5	5	5.2	44	45.4
C61	Prostate	844	33.8	262	31.0	231	27.4	351	41.6
C64	Kidney	87	3.5	38	43.7	13	14.9	36	41.4
C65	Renal pelvis	119	4.8	33	27.7	16	13.4	70	58.8
C66	Ureter	107	4.3	38	35.5	15	14.0	54	50.5
C67	Bladder	159	6.4					159	100.0
C68	Urethra	60	2.4	4	6.7	16	26.7	40	66.7
C76–C79	CUP	27	1.1	6	22.2	1	3.7	20	74.1
C82–C85	NHL	46	1.8	24	52.2	5	10.9	17	37.0
C91–C96	Leukaemia	33	1.3	4	12.1	2	6.1	27	81.8
Other primaries		170	6.8	72	42.4	11	6.5	87	51.2
All mult. primaries		2494	100.0	785	31.5	364	14.6	1345	53.9

Multiple primaries with number of cases 1 to 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 1998–2014
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C16	Stomach	14	2.0	6	42.9	1	7.1	7	50.0
C18	Colon	56	7.9	31	55.4	3	5.4	22	39.3
C19–C20	Rectum	24	3.4	14	58.3	1	4.2	9	37.5
C25	Pancreas	20	2.8	1	5.0	1	5.0	18	90.0
C33–C34	Lung	50	7.0	5	10.0	8	16.0	37	74.0
C43	Malign. melanoma	11	1.5	8	72.7			3	27.3
C44	Skin others	14	2.0	4	28.6			10	71.4
C50	Breast	116	16.3	79	68.1	7	6.0	30	25.9
C51	Vulva	8	1.1	6	75.0	1	12.5	1	12.5
C53	Cervix uteri	57	8.0	46	80.7	7	12.3	4	7.0
C54	Corpus uteri	41	5.8	32	78.0	6	14.6	3	7.3
C56	Ovary	23	3.2	11	47.8	1	4.3	11	47.8
C64	Kidney	28	3.9	13	46.4	6	21.4	9	32.1
C65	Renal pelvis	56	7.9	20	35.7	11	19.6	25	44.6
C66	Ureter	42	5.9	16	38.1	11	26.2	15	35.7
C67	Bladder	43	6.0					43	100.0
C76–C79	CUP	12	1.7	1	8.3			11	91.7
C82–C85	NHL	14	2.0	7	50.0	2	14.3	5	35.7
C91–C96	Leukaemia	13	1.8			2	15.4	11	84.6
Other primaries		71	10.0	29	40.8	9	12.7	33	46.5
All mult. primaries		713	100.0	329	46.1	77	10.8	307	43.1

Multiple primaries with number of cases 1 to 6 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.	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		1	0.0		0.1	1.00		5.3
15-19			0.0		0.0			
20-24			0.0		0.0			
25-29			0.0		0.0			
30-34			0.0		0.0			
35-39		3	0.0		0.2	0.60		1.3
40-44	4	1	0.2	0.20	0.1	0.14	0.9	0.2
45-49	21	12	1.3	0.32	0.8	0.57	2.3	1.2
50-54	36	18	2.8	0.33	1.4	0.53	2.3	1.2
55-59	70	24	6.6	0.42	2.1	0.41	2.7	1.1
60-64	96	25	9.8	0.40	2.4	0.36	2.4	0.9
65-69	145	43	15.1	0.40	4.1	0.43	2.6	1.0
70-74	227	74	24.9	0.55	7.1	0.49	3.3	1.5
75-79	225	89	40.9	0.59	12.5	0.66	3.6	1.8
80-84	252	110	72.1	0.81	19.6	0.66	4.7	2.2
85+	281	191	121.4	0.89	33.1	0.71	6.4	2.8
All ages	1357	591					3.5	1.7
Mortality								
Raw			7.5	0.57	3.2	0.58		
WS			3.2	0.51	1.0	0.51		
ES			5.3	0.55	1.6	0.53		
BRD-S			7.5	0.58	2.2	0.56		
PYLL-70								
per 100,000			19.8		8.6			
ES			17.3		7.5			
AYLL-70			8.5		10.7			

* 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		1	0.0		0.1	1.00		5.6
15-19			0.0		0.0			
20-24			0.0		0.0			
25-29			0.0		0.0			
30-34			0.0		0.0			
35-39		3	0.0		0.2	0.60		1.5
40-44	4	1	0.2	0.20	0.1	0.14	1.0	0.2
45-49	19	11	1.2	0.32	0.7	0.55	2.2	1.2
50-54	29	17	2.2	0.34	1.3	0.57	2.0	1.3
55-59	50	21	4.7	0.39	1.9	0.40	2.1	1.1
60-64	65	22	6.6	0.35	2.1	0.35	1.9	0.9
65-69	75	37	7.8	0.29	3.5	0.40	1.6	1.1
70-74	136	59	14.9	0.44	5.6	0.43	2.4	1.4
75-79	142	74	25.8	0.46	10.4	0.59	2.9	1.9
80-84	171	93	49.0	0.67	16.6	0.58	4.2	2.3
85+	210	172	90.7	0.73	29.8	0.65	6.1	3.1
All ages	901	511					2.9	1.8
Mortality								
Raw			5.0	0.47	2.7	0.53		
WS			2.1	0.43	0.9	0.48		
ES			3.5	0.46	1.4	0.50		
BRD-S			5.0	0.48	1.9	0.51		
PYLL-70								
per 100,000			14.6		7.9			
ES			12.8		6.9			
AYLL-70			9.7		11.0			

* See corresponding tables with multiple primaries.

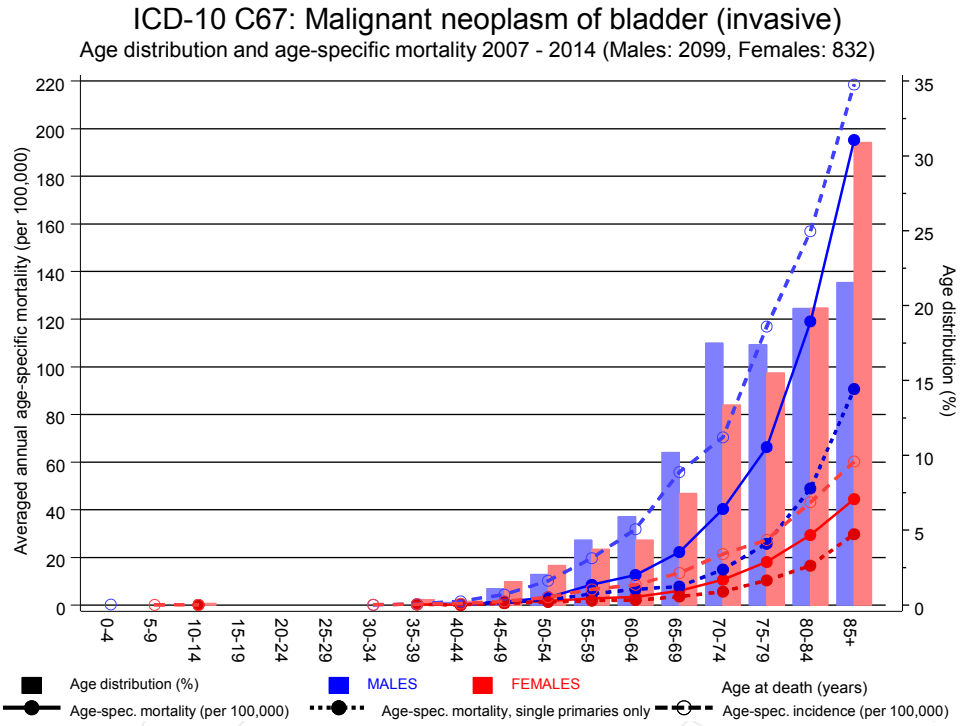
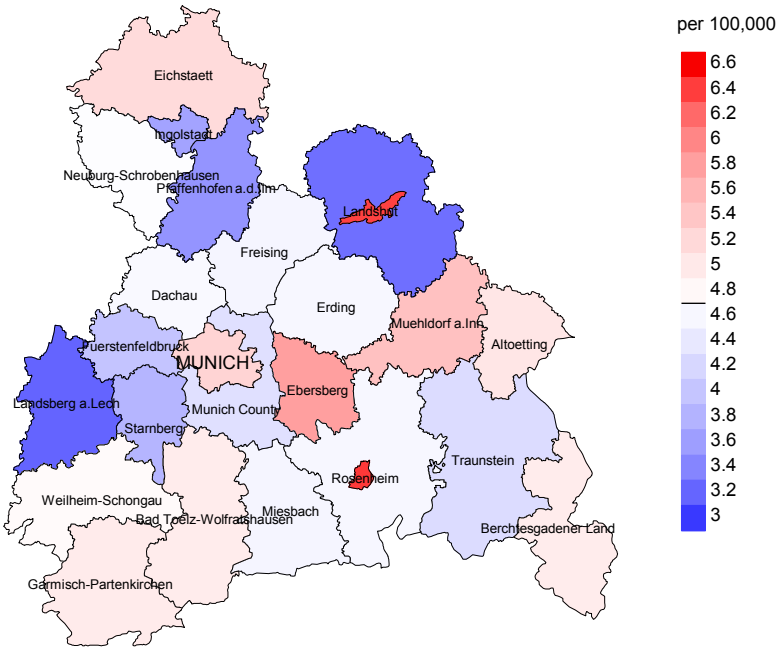


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

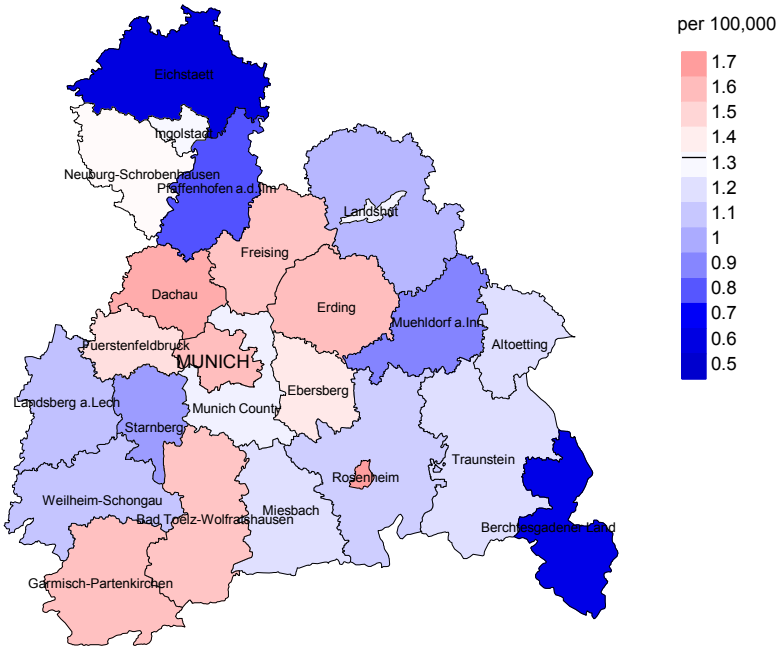
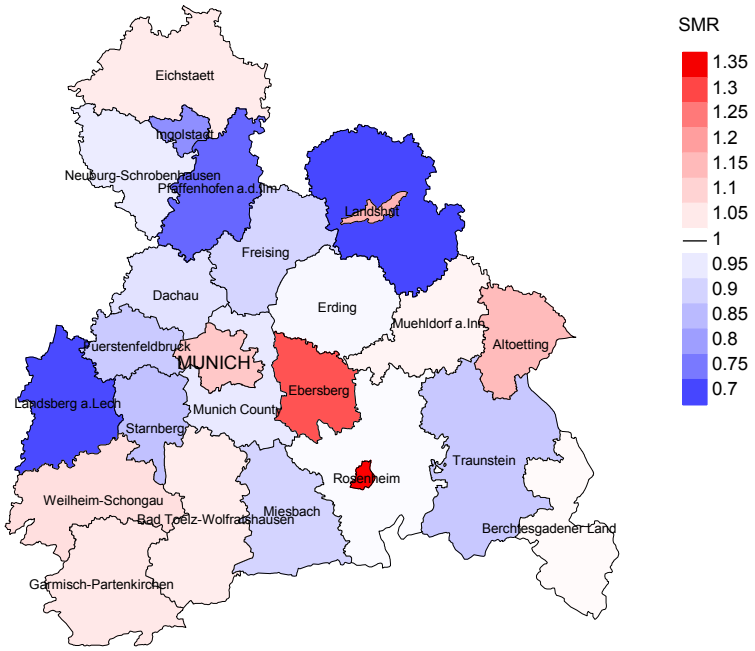


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2014. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 4.7/100,000 WS N=2,053, females 1.3/100,000 WS N=814).

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 22 women died from bladder cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 1.4/100,000 (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 mortality ratio (SMR) 2007 - 2014: Males



Standardized mortality ratio (SMR) 2007 - 2014: Females

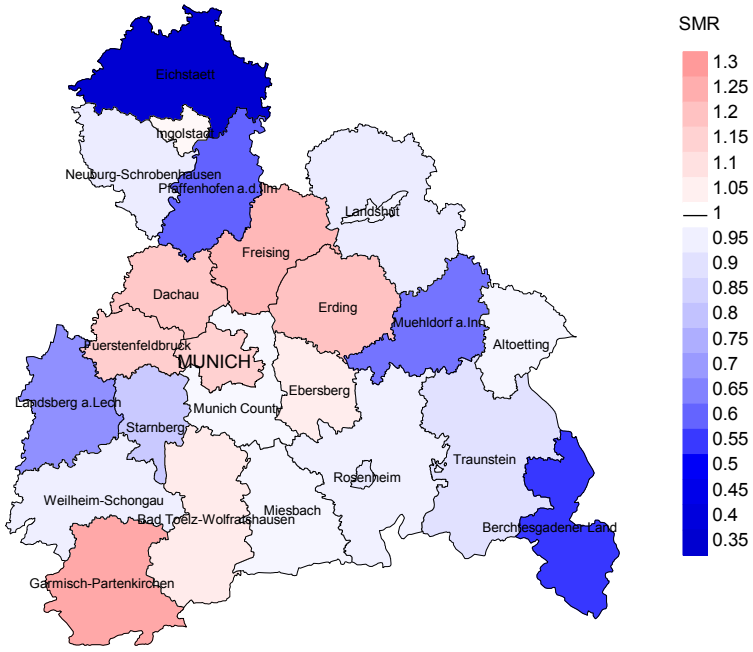


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=2,053, females N=814).

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 22 women died from bladder cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.06. Though, the value of this parameter may vary with an underlying probability of 99% between 0.57 and 1.79, 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

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