Munich Cancer Registry

- Survival
- Selection Matrix
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- *Deutsch*

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

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

Cancer statistics: Baseline statistics

C66: Ureteral cancer

Year of diagnosis	1998-2013
Patients	496
Diseases	501
Creation date	05/19/2015
Export date	12/30/2014
Population	4.64 m

http://www.tumorregister-muenchen.de/en/facts/base/base_C66__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 4.64 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. 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, May 2015

[#] 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 2014 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 (ICD-10 2015) used for specifying cancer site

Code	Description
C66	Malignant neoplasm of ureter

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	20			85.0	85.0	100.0	
1999	11			81.8	81.8	100.0	
2000	12			66.7	58.3	100.0	
2001	24			62.5	95.8	100.0	
2002	30			56.7	80.0	100.0	#
2003	19			57.9	52.6	100.0	
2004	24			70.8	70.8	91.7	
2005	39			69.2	69.2	94.9	
2006	36			77.8	72.2	94.4	
2007	35			71.4	57.1	85.7	# ##
2008	39			66.7	53.8	71.8	
2009	43			72.1	58.1	79.1	
2010	48	1	2.1	81.3	60.4	79.2	
2011	44			77.3	36.4	75.0	
2012	38	1	2.6	76.3	44.7	78.9	
2013	39			71.8	28.2	97.4	###
1998-2013	501	2	0.4	72.1	59.7	87.8	

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	20	13	7	65.0
1999	11	7	4	63.6
2000	12	7	5	58.3
2001	24	13	11	54.2
2002	30	17	13	56.7
2003	19	10	9	52.6
2004	24	15	9	62.5
2005	39	28	11	71.8
2006	36	23	13	63.9
2007	35	27	8	77.1
2008	39	19	20	48.7
2009	43	29	14	67.4
2010	48	34	14	70.8
2011	44	26	18	59.1
2012	38	22	16	57.9
2013	39	19	20	48.7
1998-2013	501	309	192	61.7

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 4.64 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	13	7	1.2	0.6	0.8	0.3	1.1	0.4	1.5	0.5
1999	7	4	0.6	0.3	0.4	0.1	0.6	0.2	0.8	0.2
2000	7	5	0.6	0.4	0.4	0.2	0.6	0.2	0.8	0.4
2001	13	11	1.1	0.9	0.6	0.4	1.0	0.6	1.4	0.8
2002	17	13	0.9	0.7	0.5	0.3	0.8	0.5	1.0	0.6
2003	10	9	0.5	0.5	0.2	0.2	0.4	0.3	0.6	0.4
2004	15	9	0.8	0.5	0.4	0.2	0.6	0.3	0.9	0.4
2005	28	11	1.5	0.6	0.8	0.2	1.2	0.4	1.6	0.4
2006	23	13	1.2	0.6	0.6	0.2	0.9	0.4	1.2	0.5
2007	27	8	1.2	0.3	0.6	0.1	0.9	0.2	1.2	0.3
2008	19	20	0.9	0.9	0.5	0.3	0.7	0.5	0.9	0.7
2009	29	14	1.3	0.6	0.6	0.2	0.9	0.3	1.3	0.5
2010	34	14	1.5	0.6	0.6	0.3	1.0	0.4	1.5	0.5
2011	26	18	1.1	0.8	0.6	0.2	0.9	0.4	1.2	0.5
2012	22	16	1.0	0.7	0.4	0.2	0.6	0.3	1.0	0.5
2013	19	20	0.8	0.8	0.3	0.2	0.5	0.4	0.8	0.7
1998-2013	309	192	1.0	0.6	0.5	0.2	0.8	0.4	1.1	0.5

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)
(incl. DCO)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	20	70.4	9.0	49.0	83.3	57.1	66.9	70.0	78.3	81.1
1999	11	74.4	12.9	49.4	89.5	55.0	69.7	76.5	87.7	87.8
2000	12	71.2	10.4	45.2	81.7	62.8	66.7	73.1	79.8	80.6
2001	24	73.6	7.4	57.2	87.5	61.8	70.4	74.6	77.9	80.5
2002	30	70.0	9.9	51.7	91.1	56.6	62.3	71.5	75.3	82.7
2003	19	74.5	8.6	56.6	87.3	60.9	69.8	77.4	80.7	85.0
2004	24	72.8	11.4	46.3	94.6	54.9	69.6	74.2	79.8	84.2
2005	39	70.2	12.2	38.2	93.3	53.1	65.8	70.5	78.2	89.2
2006	36	72.7	9.4	50.5	88.7	59.2	66.4	72.7	80.3	84.6
2007	35	72.8	8.2	53.2	87.8	62.9	67.6	74.0	76.4	83.7
2008	39	72.1	9.4	49.3	87.2	61.2	64.5	73.5	79.7	84.9
2009	43	73.1	10.7	29.1	89.0	60.2	68.6	72.8	81.3	83.9
2010	48	74.0	8.8	52.4	92.7	60.0	70.0	74.0	80.4	84.6
2011	44	72.5	9.9	50.3	89.7	59.1	64.7	72.7	80.6	84.8
2012	38	75.9	9.1	53.2	92.8	63.2	68.5	77.5	82.7	83.9
2013	39	75.6	9.4	40.0	90.2	64.6	72.3	78.1	81.7	84.0
1998-2013	501	72.9	9.8	29.1	94.6	59.5	67.5	73.8	80.0	84.2

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	13	69.5	9.1	49.0	81.7	55.6	67.8	69.9	74.9	80.4
1999	7	70.5	14.1	49.4	89.5	49.4	55.0	72.3	80.9	89.5
2000	7	68.9	11.5	45.2	80.3	45.2	66.2	73.0	76.6	80.3
2001	13	73.7	6.6	61.6	86.8	64.0	70.5	74.8	76.9	78.0
2002	17	69.2	9.9	52.0	91.1	55.1	62.3	70.9	74.4	80.3
2003	10	74.4	10.8	56.6	87.3	58.8	63.9	79.1	81.2	86.1
2004	15	73.4	9.8	54.9	86.9	55.9	69.8	74.9	80.1	84.2
2005	28	70.5	12.1	47.6	93.3	53.1	65.8	69.5	78.1	89.2
2006	23	71.4	8.0	50.5	84.3	64.0	65.8	71.2	79.7	80.5
2007	27	72.2	8.7	53.2	87.8	62.9	66.9	72.1	76.3	86.4
2008	19	69.2	10.7	49.3	87.2	51.3	61.7	67.8	78.3	85.9
2009	29	70.5	11.4	29.1	89.0	59.5	65.0	70.2	77.6	82.9
2010	34	76.3	7.6	60.0	92.7	67.4	70.4	76.8	82.1	85.1
2011	26	69.7	9.6	50.3	84.9	58.5	62.3	67.8	79.5	82.6
2012	22	73.7	8.4	53.2	83.5	63.2	67.5	75.8	82.4	83.2
2013	19	74.5	10.3	40.0	86.3	64.6	71.7	76.1	81.7	84.0
1998-2013	309	71.9	9.8	29.1	93.3	59.1	66.5	72.8	79.3	83.4

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	7	72.2	9.1	58.5	83.3	58.5	64.7	72.4	80.2	83.3
1999	4	81.2	7.8	72.3	87.8	72.3	74.6	82.3	87.7	87.8
2000	5	74.3	8.7	62.8	81.7	62.8	67.3	79.2	80.6	81.7
2001	11	73.5	8.6	57.2	87.5	61.8	70.4	73.7	79.9	80.5
2002	13	71.1	10.1	51.7	87.0	58.6	65.3	72.7	76.0	85.0
2003	9	74.6	6.0	64.1	83.1	64.1	71.0	75.0	79.2	83.1
2004	9	71.8	14.3	46.3	94.6	46.3	69.4	73.5	79.4	94.6
2005	11	69.3	13.2	38.2	91.0	59.5	65.4	71.6	78.2	78.2
2006	13	74.9	11.5	52.1	88.7	58.1	71.9	75.1	84.6	87.4
2007	8	74.7	6.8	60.3	82.8	60.3	72.6	75.7	78.8	82.8
2008	20	74.7	7.3	63.4	85.7	64.1	68.6	74.5	81.0	84.5
2009	14	78.4	6.6	66.0	87.2	67.9	74.3	79.7	83.9	84.0
2010	14	68.5	9.4	52.4	79.8	54.6	59.4	72.4	75.6	78.5
2011	18	76.7	9.2	56.8	89.7	59.1	71.6	76.6	84.6	88.0
2012	16	78.8	9.6	56.7	92.8	67.2	73.7	80.0	83.6	91.5
2013	20	76.6	8.7	52.6	90.2	63.6	74.6	79.1	81.5	84.8
1998-2013	192	74.5	9.6	38.2	94.6	61.5	69.8	75.3	80.7	85.0

Table 4

Age distribution by 5-year age group and gender for period 1998-2013 (incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
25-29	1	0.2	0.2	1	0.3	0.3			0.0
30-34	0	0.0	0.2			0.3			0.0
35-39	2	0.4	0.6	1	0.3	0.6	1	0.5	0.5
40-44	0	0.0	0.6			0.6			0.5
45-49	7	1.4	2.0	6	1.9	2.6	1	0.5	1.0
50-54	18	3.6	5.6	12	3.9	6.5	6	3.1	4.2
55-59	24	4.8	10.4	14	4.5	11.0	10	5.2	9.4
60-64	44	8.8	19.2	32	10.4	21.4	12	6.3	15.6
65-69	73	14.6	33.7	54	17.5	38.8	19	9.9	25.5
70-74	105	21.0	54.7	63	20.4	59.2	42	21.9	47.4
75-79	102	20.4	75.0	57	18.4	77.7	45	23.4	70.8
80-84	85	17.0	92.0	49	15.9	93.5	36	18.8	89.6
85+	40	8.0	100.0	20	6.5	100.0	20	10.4	100.0
All ages	501	100.0		309	100.0		192	100.0	

Included in the statistics are 137.4% multiple primaries in males and 104.7% in females.

Table 5

Age-specific incidence, DCO rate and proportion of all cancers
for period 1998-2013

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=0 %	Females DCO rate n=2 %	Males Prop.all cancers n=158258 %	Females Prop.all cancers n=153136 %
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		0.0	0.0			0.1	
30-34			0.0	0.0				
35-39	1	1	0.0	0.0			0.0	0.0
40-44			0.0	0.0				
45-49	6	1	0.3	0.0			0.1	0.0
50-54	12	6	0.6	0.3			0.1	0.1
55-59	13	10	0.7	0.5			0.1	0.1
60-64	32	12	1.8	0.6			0.1	0.1
65-69	54	19	3.4	1.1			0.2	0.1
70-74	62	42	4.8	2.8			0.2	0.2
75-79	57	44	6.9	3.7		2.3	0.3	0.3
80-84	48	36	9.6	3.9		2.8	0.4	0.2
85+	20	20	5.9	2.2			0.2	0.1
All ages	306	191			0.0	1.0	0.2	0.1
Incidence								
Raw			1.0	0.6				
WS			0.5	0.2				
ES			0.8	0.4				
BRD-S			1.1	0.5				

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 1998-2013
MALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C15	Oesophagus	3	0.2	13.2	2.7	38.6	#	40.1	33.3
C33-C34	Lung	6	1.7	3.6	1.3	7.8	#	62.5	16.7
C61	Prostate	17	4.2	4.0	2.3	6.4	#	184.5	5.9
C64	Kidney	7	0.5	14.8	5.9	30.4	#	94.3	57.1
C65	Renal pelvis	24	0.1	369.3	236.6	549.5	#	346.0	
C67	Bladder	35	0.7	49.1	34.2	68.3	#	495.6	
C68	Urethra	4	0.0	398.7	108.6	1021	#	57.7	
Other primaries		8	4.2	1.9	0.8	3.7		54.4	12.5
Not observed		0	2.9	0.0	0.0	1.3		-41.8	
All mult. primaries		104	14.5	7.2	5.8	8.7	#	1293	7.7

Patients	222
Median age at second malignancy (years)	73.8
Person-years	692
Mean observation time (years)	3.1
Median observation time (years)	2.2

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 1998-2013
FEMALES

Diagnosis	Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C33-C34 Lung	2	0.4	4.6	0.6	16.6		34.3	
C50 Breast	3	1.7	1.8	0.4	5.2		28.6	
C64 Kidney	4	0.2	22.8	6.2	58.5	#	83.8	100.0
C65 Renal pelvis	9	0.0	395.2	180.7	750.1	#	196.7	
C67 Bladder	16	0.1	110.6	63.2	179.7	#	347.5	
Other primaries	5	1.0	4.9	1.6	11.5	#	87.4	
Not observed	0	3.0	0.0	0.0	1.2		-65.2	
All mult. primaries	39	6.5	6.0	4.3	8.3	#	713.2	10.3

Patients	137
Median age at second malignancy (years)	75.1
Person-years	456
Mean observation time (years)	3.3
Median observation time (years)	1.9

The occurrence of second malignancy is statistically significant.

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

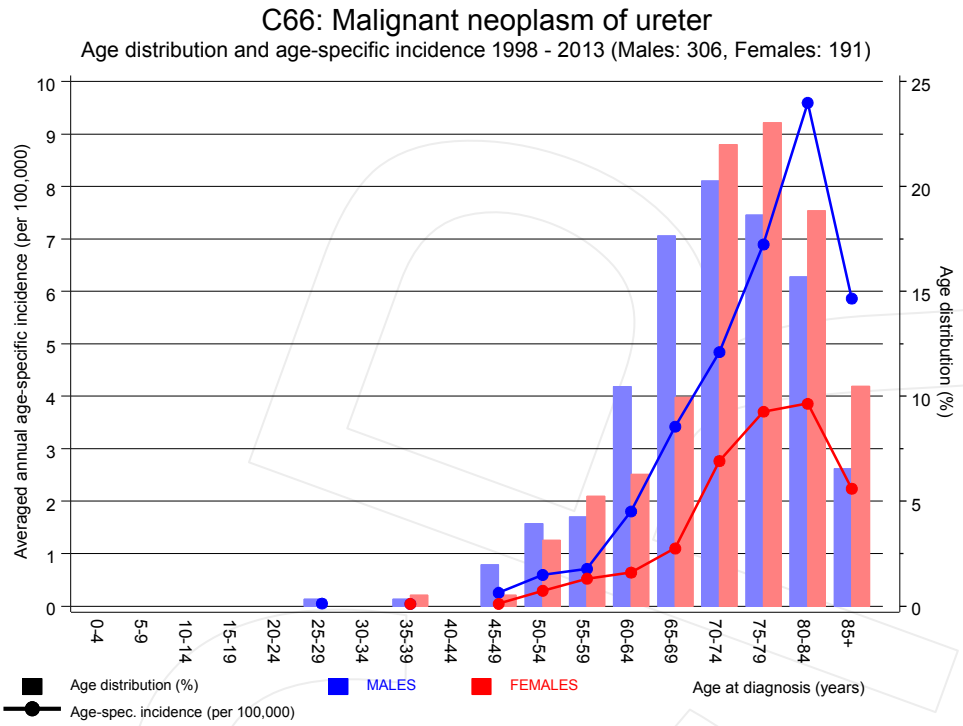


Figure 7. Age distribution and age-specific incidence

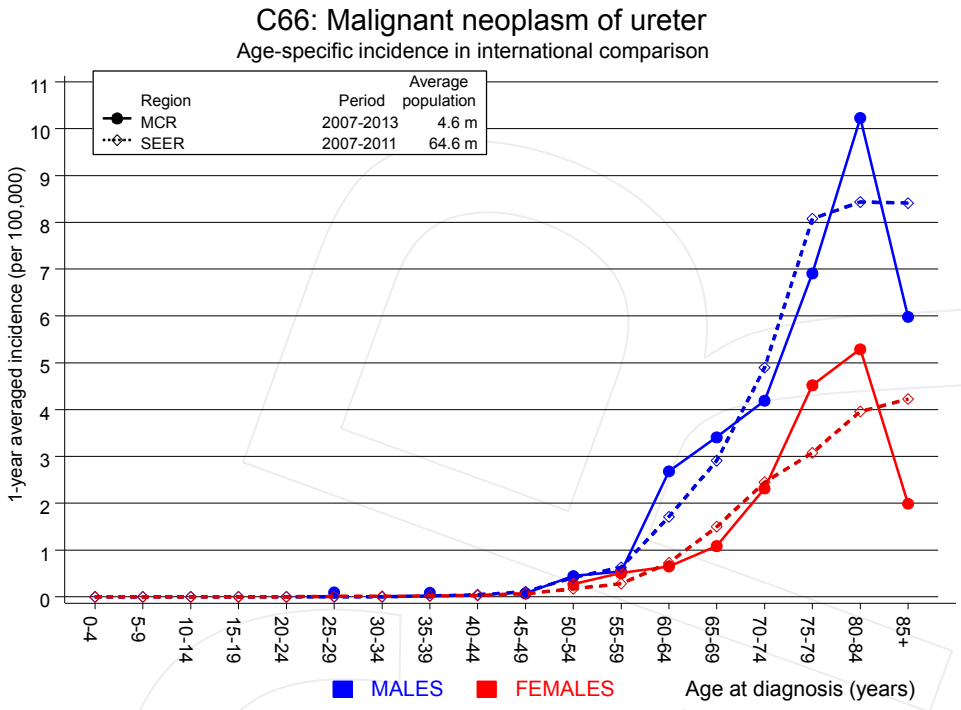


Figure 7a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

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

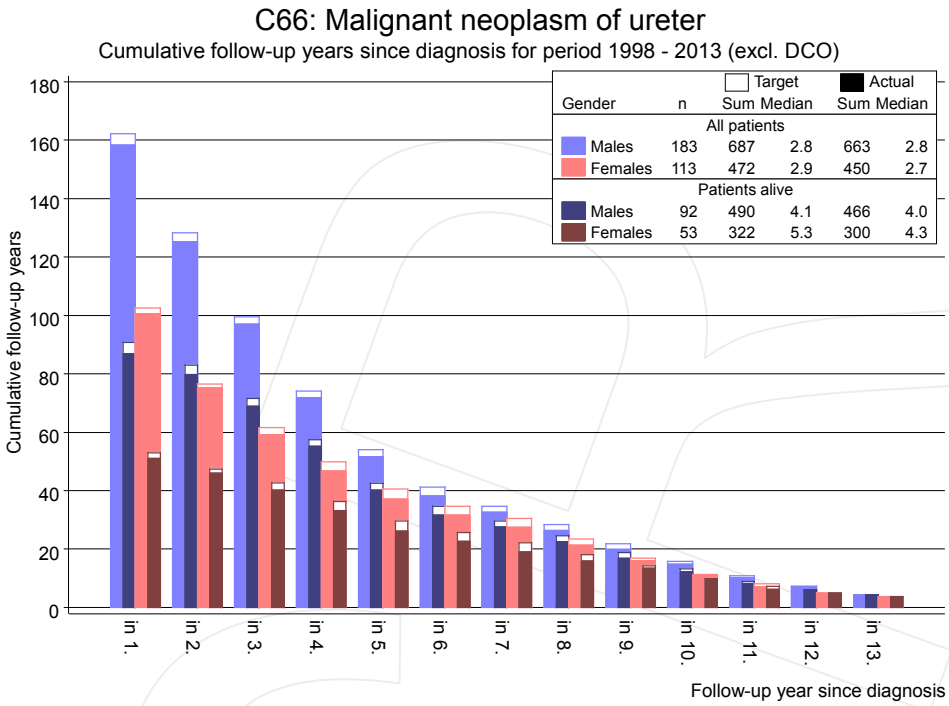
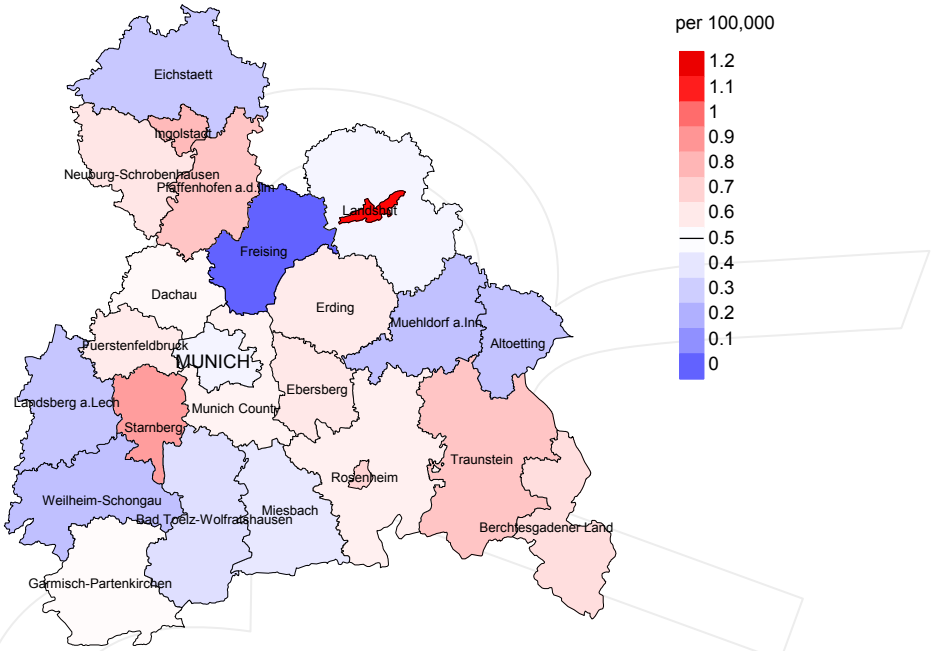


Figure 8. Cumulative follow-up years depending on time since diagnosis

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) 2007 - 2013: Males



Average incidence (world standard population) 2007 - 2013: Females

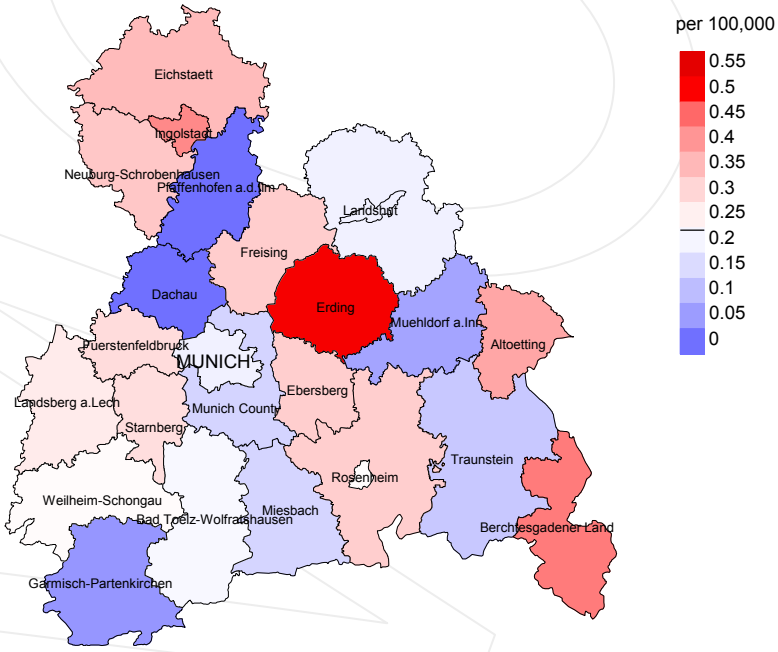
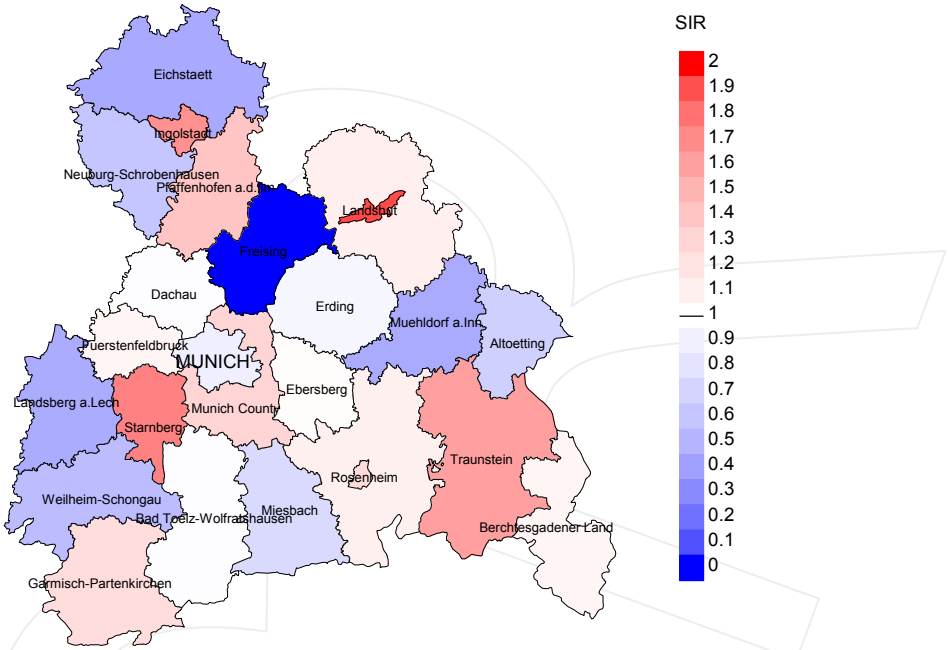


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 0.5/100,000 WS N=174, females 0.2/100,000 WS N=109).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,928 female residents (averaged) in the period from 2007 to 2013 a total of 3 women were identified with newly diagnosed ureteral cancer. Therefore, the mean incidence 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 0.0 and 1.3/100,000.

Standardized incidence ratio (SIR) 2007 - 2013: Males



Standardized incidence ratio (SIR) 2007 - 2013: Females

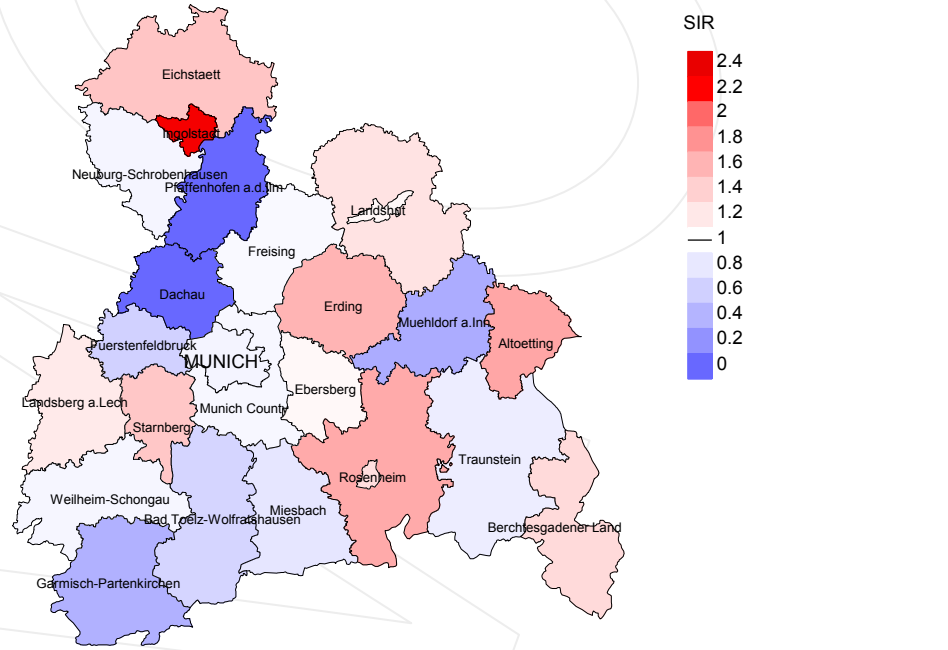


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=174, females N=109).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,642 female residents (averaged) in the period from 2007 to 2013 a total of 3 women were identified with newly diagnosed ureteral cancer. Therefore, the mean standardized incidence ratio (SIR) 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 0.12 and 3.87, 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	20	100.0		17	85.0	100.0
1999	11	100.0		9	81.8	100.0
2000	12	100.0		7	58.3	100.0
2001	24	100.0		23	95.8	100.0
2002	30	100.0		24	80.0	91.7
2003	19	100.0		10	52.6	100.0
2004	24	91.7		17	70.8	94.1
2005	39	94.9		27	69.2	92.6
2006	36	94.4		26	72.2	96.2
2007	35	85.7		20	57.1	100.0
2008	39	71.8		21	53.8	95.2
2009	43	79.1		25	58.1	100.0
2010	48	79.2	2.1	29	60.4	93.1
2011	44	75.0		16	36.4	87.5
2012	38	78.9	2.6	17	44.7	82.4
2013	39	97.4		11	28.2	81.8
1998-2013	501	87.8	0.4	299	59.7	94.6

Table 10b

Annual cohorts of incident cancers and deaths, proportion of death certificates and cases deceased the same year of cancer diagnosis
(incl. DCO)
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.64 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	20	13	84.6	3	15.0
1999	11	8	100.0	1	9.1
2000	12	9	100.0	2	16.7
2001	24	12	100.0	3	12.5
2002	30	10	100.0	1	3.3
2003	19	25	96.0	4	21.1
2004	24	13	100.0	1	4.2
2005	39	16	100.0	4	10.3
2006	36	24	95.8	2	5.6
2007	35	21	95.2	1	2.9
2008	39	33	100.0	2	5.1
2009	43	33	100.0	7	16.3
2010	48	27	100.0	3	6.3
2011	44	44	97.7	6	13.6
2012	38	26	100.0	4	10.5
2013	39	25	100.0	6	15.4
1998-2013	501	339	98.2	50	10.0

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	61.5	38.5	81.8
1999	8	75.0	25.0	87.5
2000	9	77.8	22.2	88.9
2001	12	75.0	25.0	83.3
2002	10	80.0	20.0	100.0
2003	25	84.0	16.0	87.5
2004	13	69.2	30.8	69.2
2005	16	81.3	18.8	81.3
2006	24	75.0	25.0	82.6
2007	21	85.7	14.3	95.0
2008	33	69.7	30.3	72.7
2009	33	84.8	15.2	90.9
2010	27	81.5	18.5	88.9
2011	44	79.5	20.5	88.4
2012	26	69.2	30.8	80.8
2013	25	76.0	24.0	88.0
1998-2013	339	77.3	22.7	85.3

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	4	65.2	66.6	61.3	66.6
1999	5	75.8	76.4	69.1	75.8
2000	6	71.8	67.0	71.8	70.6
2001	8	75.2	74.9	75.6	75.2
2002	6	74.6	73.4	78.8	74.6
2003	17	76.3	76.1	85.0	75.9
2004	7	75.6	74.6	94.7	74.6
2005	6	74.8	72.1	84.5	72.5
2006	15	78.8	77.6	82.0	78.2
2007	18	75.2	73.4	80.9	75.2
2008	19	77.6	76.1	79.7	76.8
2009	24	74.1	73.9	76.5	73.7
2010	16	75.8	75.2	78.1	75.8
2011	28	80.9	79.2	84.6	80.2
2012	19	77.3	75.8	79.3	77.3
2013	17	80.4	79.8	83.8	80.4
1998-2013	215	76.5	75.8	79.8	76.0

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	9	78.0	67.4	84.8	72.7
1999	3	77.2	79.5	77.2	79.5
2000	3	73.2	73.2		73.2
2001	4	75.0	69.6	83.7	69.6
2002	4	73.6	73.6		73.6
2003	8	82.4	80.7	89.2	82.4
2004	6	78.3	80.3	76.2	80.3
2005	10	76.2	75.2	77.2	74.7
2006	9	83.1	84.8	79.0	80.0
2007	3	83.3	83.3		83.3
2008	14	79.5	78.6	84.9	79.5
2009	9	76.3	78.5	65.0	76.3
2010	11	77.6	77.3	78.8	77.3
2011	16	81.5	80.8	84.4	81.5
2012	7	83.3	76.2	83.9	79.8
2013	8	81.6	82.3	79.4	80.9
1998-2013	124	79.5	79.1	80.2	79.1

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	3	0.3	0.23	0.2	0.24	0.2	0.22	0.3	0.19
1999	4	0.4	0.57	0.2	0.43	0.3	0.52	0.6	0.66
2000	4	0.4	0.57	0.2	0.46	0.3	0.54	0.4	0.54
2001	7	0.6	0.54	0.3	0.54	0.5	0.53	0.8	0.57
2002	4	0.2	0.24	0.1	0.23	0.2	0.23	0.2	0.23
2003	14	0.7	1.40	0.4	1.43	0.6	1.46	0.9	1.46
2004	6	0.3	0.40	0.2	0.40	0.3	0.42	0.4	0.41
2005	4	0.2	0.14	0.1	0.14	0.2	0.14	0.2	0.13
2006	11	0.6	0.50	0.2	0.44	0.5	0.53	0.7	0.61
2007	15	0.7	0.58	0.3	0.59	0.5	0.62	0.7	0.64
2008	11	0.5	0.58	0.2	0.44	0.4	0.51	0.6	0.64
2009	20	0.9	0.69	0.4	0.62	0.6	0.67	0.8	0.67
2010	14	0.6	0.41	0.3	0.46	0.4	0.45	0.6	0.43
2011	22	1.0	0.88	0.3	0.63	0.6	0.75	0.9	0.82
2012	15	0.7	0.68	0.3	0.66	0.4	0.68	0.6	0.61
2013	14	0.6	0.74	0.3	0.78	0.4	0.79	0.6	0.74
1998-2013	168	0.6	0.55	0.3	0.51	0.4	0.55	0.6	0.57

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	5	0.4	0.71	0.2	0.82	0.3	0.76	0.4	0.72
1999	2	0.2	0.50	0.1	0.66	0.1	0.62	0.2	0.72
2000	3	0.2	0.60	0.1	0.70	0.2	0.67	0.2	0.52
2001	2	0.2	0.18	0.1	0.18	0.1	0.17	0.1	0.18
2002	4	0.2	0.31	0.1	0.23	0.1	0.25	0.2	0.32
2003	7	0.4	0.78	0.1	0.67	0.2	0.67	0.2	0.64
2004	3	0.2	0.33	0.0	0.19	0.1	0.22	0.1	0.28
2005	9	0.5	0.82	0.2	0.62	0.3	0.68	0.3	0.73
2006	7	0.3	0.54	0.1	0.42	0.2	0.45	0.2	0.46
2007	3	0.1	0.38	0.0	0.37	0.1	0.33	0.1	0.33
2008	12	0.5	0.60	0.2	0.51	0.3	0.54	0.4	0.56
2009	8	0.3	0.57	0.1	0.66	0.2	0.64	0.2	0.50
2010	8	0.3	0.57	0.1	0.45	0.2	0.47	0.3	0.50
2011	13	0.6	0.72	0.1	0.54	0.2	0.60	0.4	0.72
2012	3	0.1	0.20	0.0	0.22	0.1	0.21	0.1	0.19
2013	5	0.2	0.25	0.0	0.17	0.1	0.19	0.1	0.22
1998-2013	94	0.3	0.49	0.1	0.43	0.2	0.44	0.2	0.45

Table 13

Age distribution of age at death (cancer-related) for period 1998-2013
(**incl. multiple primaries**)

Age at death	Cases			Males			Females		
Years	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
50-54	7	2.7	2.7	6	3.5	3.5	1	1.1	1.1
55-59	11	4.2	6.8	8	4.7	8.2	3	3.2	4.3
60-64	19	7.2	14.0	12	7.1	15.3	7	7.4	11.7
65-69	27	10.2	24.2	18	10.6	25.9	9	9.6	21.3
70-74	47	17.8	42.0	33	19.4	45.3	14	14.9	36.2
75-79	52	19.7	61.7	36	21.2	66.5	16	17.0	53.2
80-84	52	19.7	81.4	29	17.1	83.5	23	24.5	77.7
85+	49	18.6	100.0	28	16.5	100.0	21	22.3	100.0
All ages	264	100.0		170	100.0		94	100.0	

Included in the statistics are 137.4% multiple primaries in males and 104.7% in females.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2013
(**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			0.0		0.0			
30-34			0.0		0.0			
35-39			0.0		0.0			
40-44			0.0		0.0			
45-49			0.0		0.0			
50-54	6	1	0.3	0.50	0.0	0.17	0.2	0.0
55-59	8	3	0.4	0.57	0.2	0.30	0.1	0.1
60-64	12	7	0.7	0.38	0.4	0.58	0.1	0.1
65-69	18	9	1.1	0.33	0.5	0.47	0.2	0.1
70-74	33	14	2.6	0.52	0.9	0.33	0.2	0.1
75-79	36	16	4.4	0.63	1.3	0.36	0.3	0.1
80-84	29	23	5.8	0.59	2.5	0.64	0.3	0.2
85+	28	21	8.2	1.40	2.3	1.05	0.3	0.2
All ages	170	94					0.2	0.1
Mortality								
Raw			0.6	0.55	0.3	0.49		
WS			0.3	0.51	0.1	0.43		
ES			0.4	0.55	0.2	0.44		
BRD-S			0.6	0.57	0.2	0.45		
PYLL-70								
per 100,000			1.3		0.5			
ES			1.1		0.4			
AYLL-70			7.7		6.5			

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

Table 15a

Multiple primaries in deaths in period 1998-2013
MALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C15	Oesophagus	4	1.7	1	25.0			3	75.0
C18	Colon	11	4.6	8	72.7	1	9.1	2	18.2
C19-C20	Rectum	5	2.1	3	60.0	1	20.0	1	20.0
C32	Larynx	3	1.3	1	33.3	1	33.3	1	33.3
C33-C34	Lung	8	3.3	1	12.5	1	12.5	6	75.0
C43	Malign. melanoma	4	1.7	2	50.0			2	50.0
C44	Skin others	7	2.9	7	100.0				
C61	Prostate	20	8.4	12	60.0	4	20.0	4	20.0
C64	Kidney	16	6.7	6	37.5	4	25.0	6	37.5
C65	Renal pelvis	26	10.9	3	11.5	15	57.7	8	30.8
C66	Ureter	7	2.9			3	42.9	4	57.1
C67	Bladder	95	39.7	41	43.2	13	13.7	41	43.2
C68	Urethra	4	1.7	2	50.0			2	50.0
C68	Urinary org.	7	2.9	1	14.3	2	28.6	4	57.1
C82-C85	NHL	5	2.1	3	60.0	2	40.0		
C91-C96	Leukaemia	3	1.3	1	33.3			2	66.7
Other primaries		14	5.9	8	57.1			6	42.9
All mult. primaries		239	100.0	100	41.8	47	19.7	92	38.5

Multiple primaries with number of cases 1 to 2 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 1998-2013
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C15	Oesophagus	1	1.0					1	100.0
C16	Stomach	2	2.0					2	100.0
C18	Colon	8	8.1	5	62.5	2	25.0	1	12.5
C19-C20	Rectum	1	1.0					1	100.0
C33-C34	Lung	3	3.0			1	33.3	2	66.7
C44	Skin others	1	1.0					1	100.0
C48	Peritoneal	1	1.0			1	100.0		
C50	Breast	9	9.1	6	66.7			3	33.3
C53	Cervix uteri	3	3.0	3	100.0				
C54	Corpus uteri	2	2.0	2	100.0				
C56	Ovary	1	1.0	1	100.0				
C64	Kidney	7	7.1	1	14.3	2	28.6	4	57.1
C65	Renal pelvis	16	16.2	3	18.8	8	50.0	5	31.3
C66	Ureter	3	3.0			1	33.3	2	66.7
C67	Bladder	34	34.3	8	23.5	7	20.6	19	55.9
C68	Urinary org.	3	3.0	1	33.3	1	33.3	1	33.3
C73	Thyroid	1	1.0	1	100.0				
C76-C79	CUP	1	1.0					1	100.0
C82-C85	NHL	1	1.0	1	100.0				
C90	Mult. myeloma	1	1.0					1	100.0
All mult. primaries		99	100.0	32	32.3	23	23.2	44	44.4

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 1998-2013
(**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			0.0		0.0			
30-34			0.0		0.0			
35-39			0.0		0.0			
40-44			0.0		0.0			
45-49			0.0		0.0			
50-54	3	1	0.1	0.33	0.0	0.50	0.1	0.0
55-59	5	1	0.3	0.71	0.1	0.20	0.1	0.0
60-64	5	3	0.3	0.29	0.2	0.60	0.1	0.1
65-69	10	7	0.6	0.40	0.4	0.58	0.1	0.1
70-74	10	6	0.8	0.42	0.4	0.24	0.1	0.1
75-79	14	11	1.7	0.61	0.9	0.46	0.1	0.1
80-84	10	13	2.0	0.56	1.4	0.76	0.1	0.1
85+	11	13	3.2	1.10	1.5	0.93	0.2	0.1
All ages	68	55					0.1	0.1
Mortality								
Raw			0.2	0.50	0.2	0.52		
WS			0.1	0.46	0.1	0.46		
ES			0.2	0.50	0.1	0.47		
BRD-S			0.2	0.51	0.1	0.49		
PYLL-70								
per 100,000			0.7		0.3			
ES			0.6		0.2			
AYLL-70			7.7		5.8			

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2013
(**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			0.0		0.0			
35-39			0.0		0.0			
40-44			0.0		0.0			
45-49			0.0		0.0			
50-54	3	1	0.1	0.50	0.0	1.00	0.1	0.0
55-59	1		0.1	0.14	0.0		0.0	
60-64	3	2	0.2	0.38	0.1	1.00	0.0	0.0
65-69	4	6	0.3	0.33	0.3	0.60	0.0	0.1
70-74	5	3	0.4	0.42	0.2	0.18	0.1	0.0
75-79	3	7	0.4	0.25	0.6	0.47	0.0	0.1
80-84	6	7	1.2	0.60	0.8	0.64	0.1	0.1
85+	5	7	1.5	1.67	0.8	0.70	0.1	0.1
All ages	30	33					0.1	0.1
Mortality								
Raw			0.1	0.42	0.1	0.49		
WS			0.0	0.39	0.0	0.46		
ES			0.1	0.41	0.1	0.46		
BRD-S			0.1	0.42	0.1	0.47		
PYLL-70								
per 100,000			0.4		0.2			
ES			0.3		0.1			
AYLL-70			8.9		5.3			

* See corresponding tables with multiple primaries.

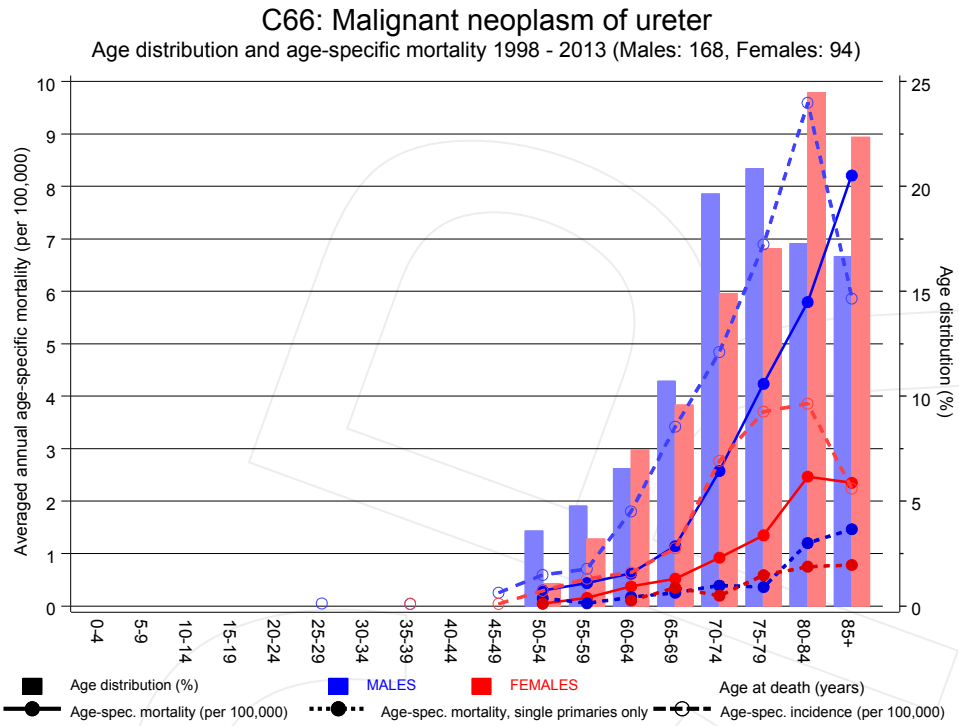
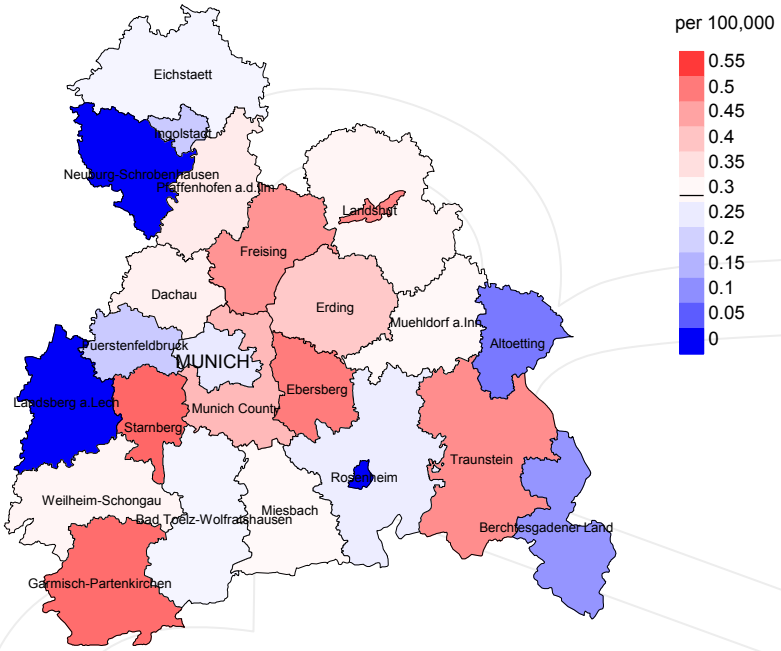


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

Average mortality (world standard population) 2007 - 2013: Males



Average mortality (world standard population) 2007 - 2013: Females

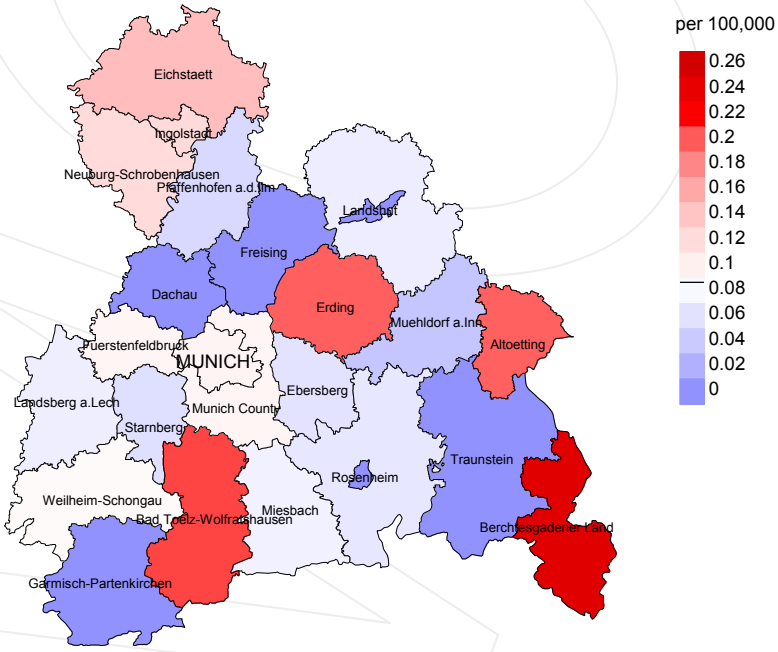
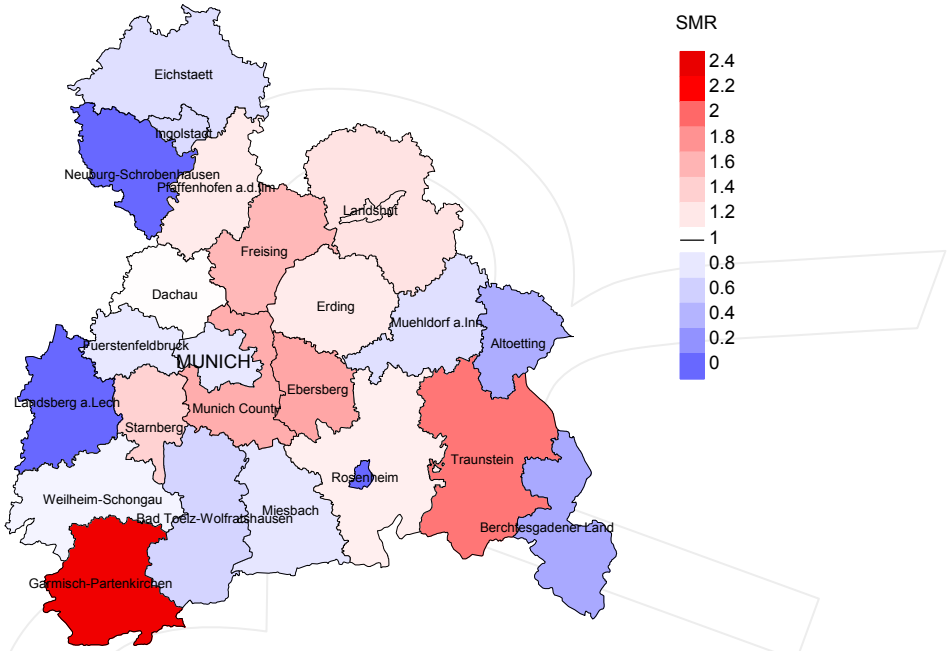


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2013. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 0.3/100,000 WS N=106, females 0.1/100,000 WS N=50).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,928 female residents (averaged) in the period from 2007 to 2013 a total of 1 women died from ureteral cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.1/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 0.5/100,000.

Standardized mortality ratio (SMR) 2007 - 2013: Males



Standardized mortality ratio (SMR) 2007 - 2013: Females

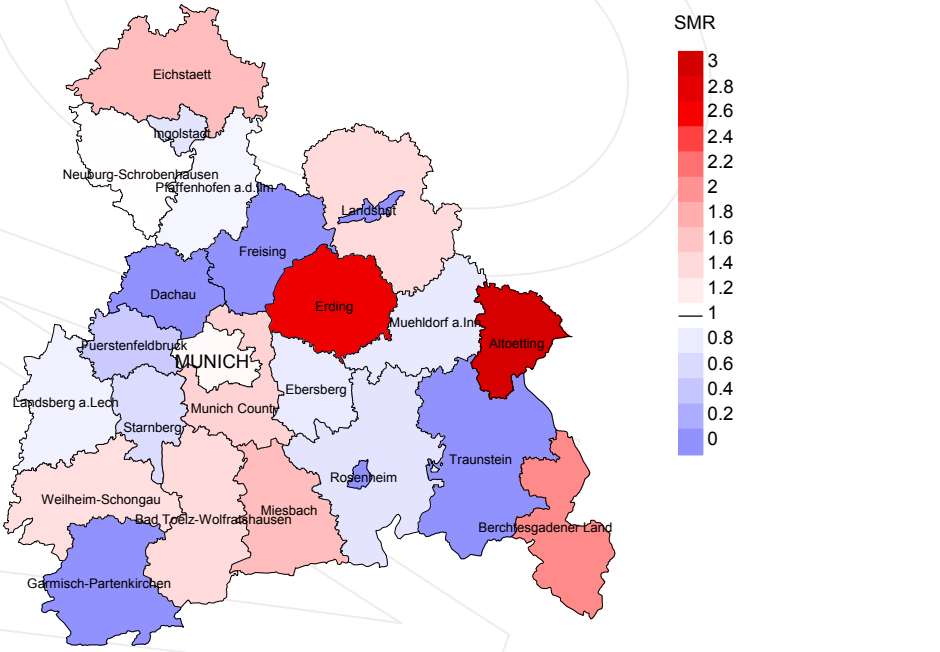


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=106, females N=50).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,642 female residents (averaged) in the period from 2007 to 2013 a total of 1 women died from ureteral cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.79. Though, the value of this parameter may vary with an underlying probability of 99% between 0.00 and 5.85, 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 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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