# **Munich Cancer Registry**



- ▶ Survival
- ▶ Selection Matrix
- ▶ Homepage
- ▶ Deutsch

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

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

# **Cancer statistics: Baseline statistics**

# C64-C66, C68: Urinary tract cancer

Year of diagnosis	1998-2013
Patients	10,931
Diseases	11,264
Creation date	05/19/2015
Export date	12/30/2014
Population	4.64 m



http://www.tumorregister-muenchen.de/en/facts/base/base\_C6466E.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<sup>#</sup>, with a total of 4.64 million inhabitants, account for the frequency of cancer diseases<sup>##</sup> 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
C64	Malignant neoplasm of kidney, except renal pelvis
C65	Malignant neoplasm of renal pelvis
C66	Malignant neoplasm of ureter
C68	Malignant neoplasm of other and unspecified urinary organs

### **INCIDENCE**

Table 1

Patient cohorts by year of diagnosis including DCO cases and multiple primaries, and with proportion of deaths and active follow-up

				Prop.		Prop.
		DCO	Prop.	mult.	Prop.	actively
Year of	Cases	cases	DCO	primaries	deaths	followed
diagnosis	n	n	%	8	%	%
1998	453	38	8.4	35.1	62.0	97.8
1999	442	33	7.5	33.0	62.2	97.5
2000	413	40	9.7	34.9	59.8	97.1
2001	417	45	10.8	32.4	61.9	98.1
2002	717	103	14.4	37.1	65.3	98.2 #
2003	706	76	10.8	33.4	58.6	96.7
2004	711	82	11.5	37.3	52.6	96.9
2005	775	44	5.7	39.2	47.7	96.3
2006	753	50	6.6	37.5	47.8	93.0
2007	859	78	9.1	34.2	46.8	80.9 # ##
2008	899	73	8.1	36.4	41.8	64.0
2009	898	73	8.1	38.8	40.3	63.8
2010	893	67	7.5	36.6	36.4	60.5
2011	835	59	7.1	35.3	35.8	62.3
2012	828	63	7.6	35.0	31.6	60.5
2013	665	58	8.7	32.8	21.2	97.9 ###
1998-2013	11264	982	8.7	35.8	46.3	82.2

<sup>#</sup> The increases of incident cases in 2002 and 2007 reflect the expansion to additional registry areas.

<sup>##</sup> 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.

<sup>###</sup> 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	All /	Males	Females	Prop. males
diagnosis	n	n	n	8
1998	453	280	173	61.8
1999	442	271	171	61.3
2000	413	267	146	64.6
2001	417 /	245	172	58.8
2002	/ 717	432	285	60.3
2003	706	439	267	62.2
2004	711	440	271	61.9
2005	775	495	280	63.9
2006	753	465	288	61.8
2007	859	557	302	64.8
2008	899	571	328	63.5
2009	898	562	336	62.6
2010	893	573	320	64.2
2011	835	532	303	63.7
2012	828	537	291	64.9
2013	665	426	239	64.1
1998-2013	11264	7092	4172	63.0

Table 2

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

			Males	Fem.	Males	Fem.	Males	Fem.	Males	Fem.
Year of	Males	Females	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.
diagnosis	n	n	raw	raw	WS	WS	ES	ES	BRD-S	BRD-S
1998	280	173	25.3	14.7	16.1	7.1	22.9	10.2	28.3	12.7
1999	271	171	24.2	14.4	15.1	7.3	21.7	10.2	26.8	12.5
2000	267	146	23.4	12.2	14.8	5.6	21.0	8.3	25.7	10.4
2001	245	172	21.1	14.1	12.6	6.5	18.3	9.6	23.1	12.1
2002	432	285	23.2	14.6	13.3	6.7	19.7	9.6	25.0	12.2
2003	439	267	23.4	13.6	13.8	5.9	19.5	8.6	24.2	11.1
2004	440	271	23.4	13.7	13.7	6.2	19.3	8.9	24.0	11.4
2005	495	280	26.1	14.1	14.8	6.4	21.3	9.1	25.9	11.7
2006	465	288	24.3	14.3	13.7	6.8	19.4	9.6	24.0	11.8
2007	557	302	25.1	13.1	13.9	5.8	19.9	8.1	24.7	10.5
2008	571	328	25.7	14.1	14.0	6.4	20.1	9.1	24.7	11.7
2009	562	336	25.2	14.4	13.5	6.3	19.4	9.1	24.3	11.8
2010	573	320	25.4	13.7	13.2	5.5	19.0	8.2	23.9	10.6
2011	532	303	23.3	12.8	12.2	6.0	17.5	8.2	21.7	10.2
2012	537	291	23.5	12.3	12.3	5.0	17.7	7.4	22.2	9.9
2013	426	239	18.6	10.1	9.6	4.5	13.9	6.4	17.6	8.1
1998-2013	7092	4172	23.9	13.4	13.3	6.0	19.0	8.6	23.7	11.0

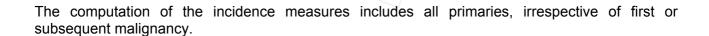


Table 3

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

Year of	Cases		Std.					Median		
diagnosis	n	Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	453	66.0	13.5	2.8	99.7	50.0	59.0	66.9	75.5	80.9
1999	442	65.7	13.4	1.1	94.3	49.7	57.8	65.9	75.7	81.8
2000	413	66.2	13.1	0.3	93.5	49.4	58.8	66.8	75.3	81.3
2001	417	67.3	12.2	1.9	96.4	52.3	60.7	67.5	76.7	81.2
2002	717	68.4	12.8	2.4	99.5	51.0	61.4	69.7	77.2	82.7
2003	706	67.8	13.6	0.4	99.6	51,5	60.8	68.7	76.8	83.3
2004	711	67.2	13.6	0.0	94.6	49.4	60.8	68.5	76.6	82.0
2005	775	67.4	13.0	0.7	95.1	51.5	60.3	68.1	76.6	82.1
2006	753	67.3	14.0	0.2	95.5	49.9	60.3	68.9	76.3	83.1
2007	859	68.0	14.2	1.2	99.1	50.0	61.7	69.9	77.0	83.6
2008	899	68.0	13.2	0.6	98.1	51.3	60.7	69.0	77.1	83.3
2009	898	68.0	13.9	0.5	96.9	50.3	60.6	70.2	77.8	83.1
2010	893	68.8	13.2	5.4	100	50.9	60.7	70.8	77.8	83.9
2011	835	68.5	14.5	0.5	96.9	51.3	61.8	70.6	77.6	84.6
2012	828	69.0	13.2	1.4	93.1	52.2	61.3	71.1	78.6	83.3
2013	665	68.4	14.1	0.3	101	50.6	60.8	70.7	78.2	83.8
1998-2013	11264	67.8	13.5	0.0	101	50.9	60.6	69.4	77.1	83.1

Table 3a

Age distribution parameters by year of diagnosis (MALES)

(incl. DCO)

Year of	Cases		Std.					Median		
diagnosis	n	Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	280	64.6	13.5	5.0	91.9	48.8	57.9	65.8	73.6	79.4
1999	271	64.5	12.8	2.3	89.5	49.5	57.4	65.5	73.0	80.2
2000	267	64.5	13.3	0.3	93.5	47.9	56.6	65.5	73.1	79.9
2001	245	65.8	11.1	1.9	89.9	51.8	59.3	65.3	74.7	80.0
2002	432	66.9	12.4	32.7	96.2	49.0	59.1	68.5	75.7	81.3
2003	439	65.5	13.5	0.4	99.6	48.3	59.8	65.8	74.4	80.7
2004	440	65.5	13.6	0.0	93.6	49.0	58.8	67.3	74.7	80.1
2005	495	66.0	11.7	0.7	93.3	51.4	59.2	66.6	73.7	79.7
2006	465	66.0	12.9	0.8	95.4	49.5	59.9	67.4	74.3	80.3
2007	557	66.5	13.0	2.6	93.1	49.6	59.5	68.3	75.0	80.6
2008	571	66.6	12.7	1.8	98.1	50.1	59.1	68.1	74.6	81.9
2009	562	66.7	13.5	0.5	96.1	49.7	59.0	69.0	75.9	82.0
2010	573	67.0	12.8	5.4	93.5	48.2	59.3	69.4	76.0	81.6
2011	532	67.8	12.9	1.5	96.9	51.3	60.7	69.4	75.9	82.9
2012	537	67.3	13.6	1.4	93.1	50.1	59.4	69.7	76.7	82.7
2013	426	67.5	13.1	2.0	94.1	49.8	59.8	69.5	76.8	82.5
1998-2013	7092	66.4	13.0	0.0	99.6	49.7	59.1	67.8	75.2	81.3

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Table 3b

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

Year of	Cases		Std.					Median		
diagnosis	n	Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	173	68.4	13.4	2.8	99.7	56.2	61.3	70.3	76.8	83.4
1999	171	67.6	14.1	1.1	94.3	51.8	58.7	68.8	77.8	84.9
2000	146	69.3	12.2	37.2	91.4	54.5	60.8	70.9	78.2	85.7
2001	172	69.4	13.3	30.6	96.4	53.1	61.7	70.9	78.9	85.1
2002	285	70.6	13.2	2.4	99.5	54.7	63.7	72.4	79.9	85.0
2003	267	71.5	12.9	2.5	96.5	56.3	64.5	72.5	80.9	85.8
2004	271	70.0	13.2	18.5	94.6	54.2	63.6	71.9	79.4	84.7
2005	280	69.8	14.6	4.2	95.1	52.6	63.0	72.7	80.2	84.2
2006	288	69.4	15.4	0.2	95.5	52.1	62.2	71.9	79.0	85.9
2007	302	70.9	15.9	1.2	99.1	53.0	66.2	73.1	80.5	85.8
2008	328	70.3	13.9	0.6	96.1	54.6	63.6	71.6	80.0	84.9
2009	336	70.3	14.3	2.5	96.9	51.4	65.3	72.7	79.9	84.6
2010	320	72.2	13.1	5.4	100	55.0	66.1	73.3	80.9	87.8
2011	303	69.8	16.8	0.5	96.5	51.4	64.9	73.3	79.8	86.1
2012	291	72.2	11.7	9.7	92.8	56.8	67.0	74.0	80.6	84.2
2013	239	70.2	15.6	0.3	101	52.2	62.2	73.2	79.9	86.3
1998-2013	4172	70.3	14.1	0.2	101	53.6	63.7	72.4	79.8	85.3

Table 4

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

Age at									
diagnosis	Cases			Males			Females		
Years	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
0-4	67	0.6	0.6	35	0.5	0.5	32	0.8	0.8
5-9	19	0.2	0.8	10	0.1	0.6	9	0.2	1.0
10-14	4	0.0	0.8	3	0.0	0.7	1	0.0	1.0
15-19	3	0.0	0.8			0.7	3	0.1	1.1
20-24	11	0.1	0.9	4	0.1	0.7	7	0.2	1.2
25-29	17	0.2	1.1	11	0.2	0.9	6	0.1	1.4
30-34	57	0.5	1.6	33	0.5	1.4	24	0.6	2.0
35-39	175	1.6	3.1	119	1.7	3.0	56	1.3	3.3
40 - 44	241	2.1	5.3	177	2.5	5.5	64	1.5	4.8
45-49	438	3.9	9.2	339	4.8	10.3	99	2.4	7.2
50-54	645	5.7	14.9	477	6.7	17.0	168	4.0	11.2
55-59	988	8.8	23.7	699	9.9	26.9	289	6.9	18.2
60-64	1397	12.4	36.1	966	13.6	40.5	431	10.3	28.5
65-69	1811	16.1	52.1	1211	17.1	57.6	600	14.4	42.9
70-74	1860	16.5	68.7	1208	17.0	74.6	652	15.6	58.5
75-79	1628	14.5	83.1	900	12.7	87.3	728	17.4	76.0
80-84	1137	10.1	93.2	586	8.3	95.6	551	13.2	89.2
85+	766	6.8	100.0	314	4.4	100.0	452	10.8	100.0
All ages	11264	100.0		7092	100.0		4172	100.0	

Included in the statistics are 49.9% multiple primaries in males and 38.1% 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	Age- spec.	Females Age- spec. incid.		Females DCO rate n=481	_	cancers
0 - 4	33	31	2.2	2.2			10.2	12.7
5- 9	10	8	0.7	0.6			5.7	6.4
10-14	3	1	0.2	0.1			1.8	0.6
15-19		3	0.0	0.2				1.0
20-24	4	7	0.2	0.4			0.7	1.3
25-29	11	6	0.5	0.3			1.1	0.5
30-34	33	24	1.5	1.1	3.0		2.2	1.2
35-39	119	54	4.8	2.3			5.3	1.4
40-44	173	64	6.6	2.6	0.6		5.4	1.0
45-49	333	98	14.1	4.2	0.3	1.0	6.2	1.1
50-54	462	167	22.9	8.1	1.7		5.4	1.5
55-59	682	287	37.2	14.9	2.6	2.4	4.7	2.1
60-64	946	425	53.4	22.7	3.2	0.7	4.4	2.5
65-69	1180	589	74.8	34.1	4.6	3.2	4.3	3.1
70-74	1180	643	92.1	42.4	4.8	7.0	4.4	3.5
75-79	889	714	107.6	60.1	10.2	8.5	4.3	4.1
80-84	573	541	114.5	58.0	17.6	20.1	4.2	3.4
85+	312	449	91.5	50.2	42.6	52.6	3.1	2.6
All ages	6943	4111			7.1	11.7	4.4	2.7
Incidence								
Raw			23.4	13.2				
WS			13.0	5.9				
ES			18.6	8.5				
BRD-S			23.2	10.8				

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).

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					
	Observed	Expected		LCL	UCL		DCO
Diagnosis	/ n /	n	SIR	95%	95%	EAR	%
_							
C03-C06 Oral cavity	4	2.7	1.5	0.4	3.8	0.7	
C09-C10 Oropharynx	10	3.3	3.1	1.5	5.7 #	3.6	
C12-C13 Hypopharynx	/ 3	1.8	1.6	0.3	4.8	0.6	
C15 Oesophagus	13	5.6	2.3	1.2	4.0 #	3.9	15.4
C16 Stomach	22	13.3	1.7	1.0	2.5 #	4.6	13.6
C17 Small intestine	7	1.6	4.5	1.8	9.2 #	2.9	
C18 Colon	63	32.0	2.0	1.5	2.5 #	16.5	7.9
C19-C20 Rectum	23	17.8	1.3	0.8	1.9	2.8	
C22 Liver	22	8.8	2.5	1.6	3.8 #	7.0	18.2
C23-C24 Bile	6	3.1	1.9	0.7	4.2	1.5	16.7
C25 Pancreas	19	11.4	1.7	1.0	2.6 #	4.0	26.3
C32 Larynx	9	3.3	2.7	1.3	5.2 #	3.0	
C33-C34 Lung	98	38.0	2.6	2.1	3.1 #	31.9	13.3
C38,C45 Mesothelioma	2	2.1	0.9/	0.1	3.4	-0.1	50.0
C43 Malign. melanoma	40	12.6	3.2	2.3	4.3 #	14.5	2.5
C46,C49 Soft tissue	8	1.7	4.8	2.1	9.4 #	3.4	
C48 Peritoneal	2	0.2	9.0	1.1	32.6 #	0.9	
C60 Penis	3	0.7	4.2	0.9	12.2	1.2	
C61 Prostate	276	96.2	2.9	2.5	3.2 #	95.4	4.7
C62 Testis	5	0.8	6.3	2.0	14.7 #	2.2	
C64 Kidney	115	11.3	10.2	8.4	12.2 #	55.0	4.3
C65 Renal pelvis	28	1.3	21.0	13.9	30.3 #	14.2	
C66 Ureter	26	0.7	35.1	22.9	51.4 #	13.4	
C67 Bladder	115	14.3	8.1	6.7	9.7 #	53.5	6.1
C68 Urethra	6	0.2	29.1	10.7	63.4 #	3.1	
C70-C72 CNS cancer	7	4.2	1.7	0.7	3.4	1.5	14.3
C73 Thyroid	7	2.0	3.4	1.4	7.1 #	2.6	
C76-C79 CUP	7	5.4	1.3	0.5	2.7	0.9	14.3
C82-C85 NHL	39	12.8	3.1	2.2	4.2 #	13.9	7.7
C90 Mult. myeloma	7	4.1	1.7	0.7	3.5	1.5	
C91-C96 Leukaemia	8	5.2	1.5	0.7	3.0	1.5	25.0
Other primaries	10	4.8	2.1	1.0	3.8 #	2.8	30.0
Not observed	0	1.8	0.0	0.0	2.0	-1.0	

Patients	4486
Median age at second malignancy (years)	71.3
Person-years	18844
Mean observation time (years)	4.2
Median observation time (years)	3.1

All mult. primaries

# The occurrence of second malignancy is statistically significant.

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

1010

325.1

3.1 2.9 3.3 # 363.5 6.9

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

	Observed	Expected		LCL	UCL		DCO
Diagnosis	/ n /	n	SIR	95%	95%	EAR	%
C15 Oesophagus	2	0.8	2.6	0.3	9.5	1.1	
C16 Stomach	10	5.4	1.9	0.9	3.4	4.2	
C18 Colon	26	14.7	1.8	1.2	2.6 #	10.1	3.8
C19-C20 Rectum	10	6.2	/1.6	0.8	2.9	3.4	10.0
C22 Liver	3	1.7	1.8	0.4	5.3	1.2	33.3
C23-C24 Bile	10	2.2	4.6	2.2	8.5 #	7.0	20.0
C25 Pancreas	12	6.4	1.9	1.0	3.3	5.0	33.3
C33-C34 Lung	31	9.5	3.2	2.2	4.6 #	19.3	6.5
C43 Malign. melanoma	5	4.6	1.1	0.4	2.5	0.4	20.0
C46,C49 Soft tissue	2	0.8	2.6	0.3	9.3	1.1	
C50 Breast	73	39.4	1.9	1.5	2.3 #	30.2	8.2
C53 Cervix uteri	4	1.7	2.4	0.7	6.2	2.1	
C54 Corpus uteri	11	7.7	1.4	~0.7	2.6	3.0	9.1
C56 Ovary	4	5.8	0.7/	0.2	1.8	-1.6	
C64 Kidney	52	3.6	14.4	10.7	18.8 #	43.5	11.5
C65 Renal pelvis	9	0.4	20.1	9.2	38.2 #	7.7	
C66 Ureter	12	0.2	51.5	26.6		10.6	
C67 Bladder	49	2.8	17.8	13.2		41.6	4.1
C73 Thyroid	15	2.1	7.2		11.8 #	11.6	
C76-C79 CUP	5	2.6	1.9	0.6	4.5	2.2	20.0
C82-C85 NHL	15	5.5	2.7	1.5	4.5 #	8.5	6.7
C90 Mult. myeloma	2	1.8	1.1	0.1	4.0	0.2	
C91-C96 Leukaemia	6	2.3	2.6	1.0	5.7	3.3	16.7
Other primaries	7	6.2	1.1	0.5	2.3	0.7	14.3
Not observed	0	3.7	0.0	0.0	1.0 #	-3.4	
		3.,	0.0	0.0		5.1	
All mult. primaries	375	138.0	2.7	2.4	3.0 #	213.1	8.3

Patients	2575
Median age at second malignancy (years)	73.1
Person-years	11123
Mean observation time (years)	4.3
Median observation time (years)	3.2

# The occurrence of second malignancy is statistically significant.

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

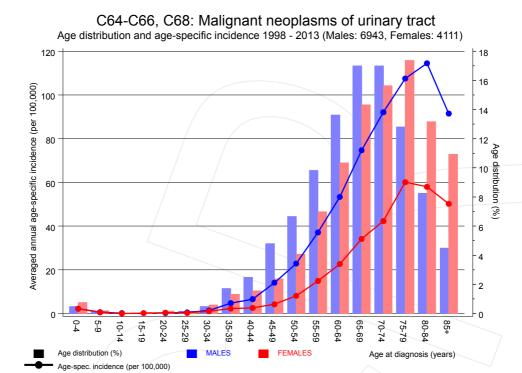
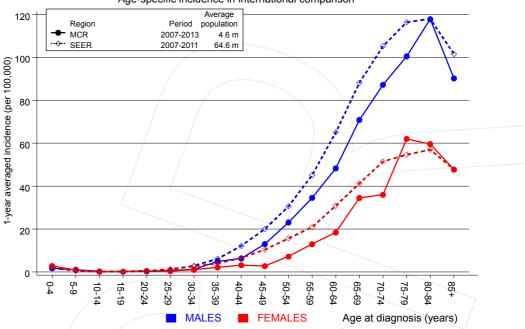


Figure 7. Age distribution and age-specific incidence



# C64-C66, C68: Malignant neoplasms of urinary tract Age-specific incidence in international comparison



**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.

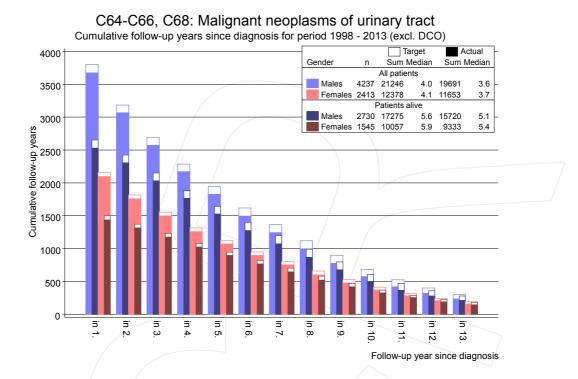
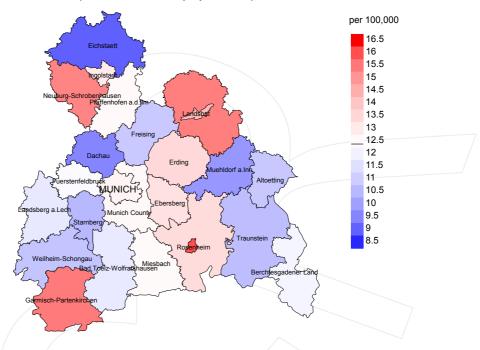


Figure 8. Cumulative follow-up years depending on time since diagnosis

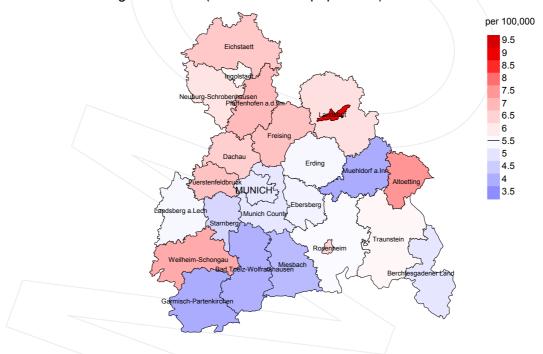
The increase of the lost to follow-up rate can be interpreted as a consequence of a declining number of survivors over time.



### Average incidence (world standard population) 2007 - 2013: Males



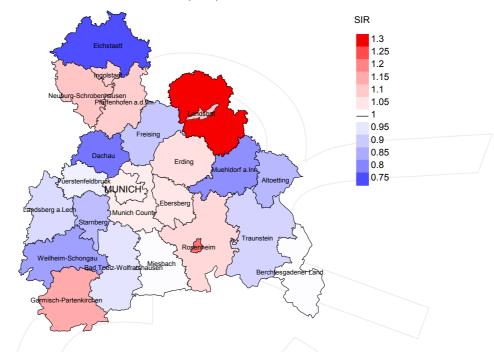
#### Average incidence (world standard population) 2007 - 2013: Females



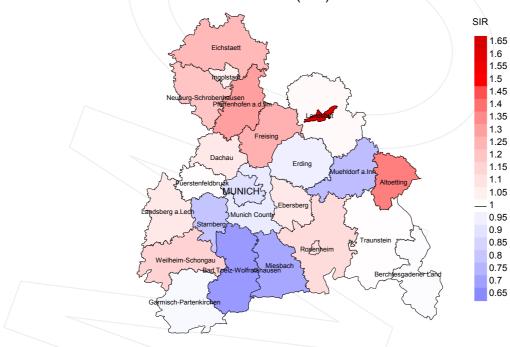
**Figure 9a.** Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 12.4/100,000 WS N=3,671, females 5.6/100,000 WS N=2,086).

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 60 women were identified with newly diagnosed urinary tract cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 5.3/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 3.6 and 7.7/100,000.

### 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=3,671, females N=2,086).

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 60 women were identified with newly diagnosed urinary tract cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.09. Though, the value of this parameter may vary with an underlying probability of 99% between 0.76 and 1.50, 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	Incident	Prop. actively followed	Prop. DCO	Deaths	Prop. deaths	Prop. deaths with death certific.
	cases					
diagnosis	n	%	%	n	%	%
1998	453	97.8	8.4	281	62.0	93.6
					62.0	
1999	442	97.5	7.5	275	62.2	94.5
2000	413	97.1	9.7	247	59.8	95.1
2001	41/7	98.1	10.8	258	61.9	98.1
2002	717	98.2	14.4	468	65.3	95.9
2003	706	96.7	10.8	414	58.6	98.1
2004	711	96.9	11.5	374	52.6	96.3
2005	775	96.3	5.7	370	47.7	96.8
2006	753	93.0	6.6	360	47.8	98.1
2007	859	80.9	9.1	402	46.8	97.8
2008	899	64.0	8.1	376	41.8	99.2
2009	898	63.8	8.1	362	40.3	98.3
2010	893	60.5	7.5	325	36.4	98.5
2011	835	62.3	7.1	299	35.8	97.3
2012	828	60.5	7.6	262	31.6	93.5
2013	665	97.9	8.7	141	21.2	95.0
1998-2013	11264	82.2	8.7	5214	46.3	96.8

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)

			Prop. deaths		Prop.
Year of	Incident		with death	Deaths in	deaths in
diagnosis/	cases	Deaths	certific.	same year	same year
death	n	n	%	n	%
1998	453	250	93.6	66	14.6
1999	442	251	96.0	76	17.2
2000	413	258	95.3	66	16.0
2001	417	258	95.7	72	17.3
2002	717	377	97.3	149	20.8
2003	706	410	96.3	141	20.0
2004	711	400	96.5	129	18.1
2005	775	377	95.8	102	13.2
2006	753	419	97.6	105	13.9
2007	859	466	97.6	140	16.3
2008	899	494	99.4	136	15.1
2009	898	510	99.2	153	17.0
2010	893	543	98.5	142	15.9
2011	835	543	98.2	145	17.4
2012	828	568	98.4	151	18.2
2013	665	532	99.1	109	16.4
1998-2013	11264	6656	97.5	1882	16.7

#### 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)

				Prop.
				cancer
		Prop.	Prop.	recorded
		cancer-	non-cancer-	on death
Year of	Deaths	related	related	certificate
death	n/	%	8	8
1998	250	65.2	34.8	79.9
1999	251	74.5	25.5	85.1
2000	258	72.1	27.9	83.7
2001	258	72.5	27.5	85.8
2002	377	71.4	28.6	85.8
2003	410	74.1	25.9	86.3
2004	400	70.0	30.0	82.1
2005	377	74.0	26.0	83.1
2006	419	71.1	28.9	78.5
2007	466	72.7	27.3	81.3
2008	494	71.7	28.3	81.7
2009	510	73.1	26.9	80.8
2010	543	68.1	31.9	77.9
2011	543	68.1	31.9	81.4
2012	568	62.0	38.0	72.1
2013	532	64.1	35.9	75.1
1998-2013	6656	69.9	30.1	80.6

Table 11a  $\begin{tabular}{ll} Medians of age at death according to the grouping in Table 10 \\ \hline MALES \end{tabular}$ 

Year of death	Deaths n	Age at death (all causes)	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate)
1998	162	71.4	69.5	76.6	70.5
1999	157	73.7	72.4	83.2	73.0
2000	161	73.0	69.3	78.9	72.4
2001	169	70.5	69.5	76.2	70.2
2002	218	74.3	73.6	74.6	74.7
2003	249	74.6	72.9	79.1	74.0
2004	231	74.3	73.2	77.3	73.6
2005	223	73.6	71.8	79.7	72.4
2006	260	73.9	72.4	77.4	73.0
2007	290	74.5	72.6	79.8	73.4
2008	312	74.9	73.4	79.0	74.5
2009	323	74.3	72.8	79.3	72.8
2010	327	75.5	74.3	78.6	74.6
2011	354	76.1	73.8	82.2	74.9
2012	332	77.3	75.3	80.7	75.7
2013	332	77.5	74.6	82.1	76.2
1998-2013	4100	74.8	73.1	79.3	73.9

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  $\label{eq:medians} \mbox{Medians of age at death according to the grouping in Table 10 }$ 

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)
1998	88	80.9	77.7	82.4	80.9
1999	94	77.3	76.7	80.5	78.7
2000	97	76.5	76.1	77.8	77.0
2001	89	78.9	75.9	84.2	77.8
2002	159	78.5	75.6	82.5	76.9
2003	161	78.8	77.6	80.5	78.4
2004	169	81.1	80.0	83.1	80.7
2005	154	78.2	75.2	83.1	76.1
2006	159	78.9	78.2	81.6	77.8
2007	176	79.9	78.7	82.3	79.9
2008	182	80.2	78.1	85.1	78.4
2009	187	80.8	77.4	85.7	78.2
2010	216	81.0	78.5	85.6	79.5
2011	189	81.9	79.2	87.3	80.5
2012	236	80.1	77.3	84.1	77.6
2013	200	80.7	76.2	85.0	78.5
1998-2013	2556	79.9	77.7	83.7	78.7

By 2010, life expectancy for a newborn male in Germany is 77.5 years compared with 82.6 years for his female counterpart.

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

Table 12a Mortality measures (cancer-related death) and mortality-incidence-index by year of death MALES

Year of	Deaths	Mort.	MI-Index	Mort.	MI-Index	Mort.	MI-Index	Mort.	MI-Index
death	n	raw	raw	WS	WS	ES	ES	BRD-S	BRD-S
1998	114	10.3	0.41	6.0	0.38	9.3	0.41	12.4	0.44
1999	118	10.5	0.44	6.0	0.40	9.5	0.44	13.3	0.50
2000	116	10.2	0.44	5.8	0.40	9.1	0.44	12.5	0.50
2001	125	10.8	0.52	6.1	0.50	9.4	0.52	12.3	0.54
2002	160	8.6	0.37	4.5	0.34	7.3	0.38	10.2	0.41
2003	190	10.1	0.44	5.2	0.39	8.3	0.43	11.7	0.49
2004	167	8.9	0.38	4.5	0.33	7.1	0.37	9.9	0.41
2005	162	8.6	0.34	4.3	0.30	6.7	0.32	9.1	0.36
2006	191	10.0	0.42	5.0	0.37	7.6	0.40	10.3	0.44
2007	221	10.0	0.41	4.9	0.36	7.7	0.40	10.4	0.43
2008	221	9.9	0.39	4.6	0.34	7.3	0.37	10.2	0.42
2009	240	10.8	0.44	5.0	0.38	7.7	0.41	10.6	0.45
2010	222	9.8	0.40	4.4	0.34	6.9	0.37	9.7	0.42
2011	250	10.9	0.48	4.9	0.41	7.6	0.44	10.3	0.48
2012	209	9.1	0.40	3.8	0.32	6.1	0.36	8.6	0.40
2013	227	9.9	0.54	4.3	0.45	6.8	0.49	9.5	0.55
1998-2013	2933	9.9	0.42	4.8	0.37	7.5	0.40	10.4	0.45

Table 12b

Mortality measures (cancer-related death) and mortality-incidence-index by year of death FEMALES

Year of	Deaths	Mort.	MI-Index	Mort.	MI-Index	Mort.	MI-Index	Mort.	MI-Index
death	n	raw	raw	WS	WS	ES	ES	BRD-S	BRD-S
1998	49	4.2	0.29	1.5	0.21	2.3	0.23	3.2	0.26
1999	69	5.8	0.41	2.2	0.30	3.5	0.35	4.8	0.39
2000	70	5.8	0.48	2.2	0.39	3.4	0.42	4.8	0.46
2001	62	5.1	0.37	1.9	0.30	3.0	0.32	4.2	0.36
2002	109	5.6	0.38	2.1	0.31	3.3	0.34	4.5	0.37
2003	114	5.8	0.43	2.1	0.35	3.2	0.38	4.5	0.41
2004	113	5.7	0.43	1.8	0.31	2.9	0.34	4.3	0.38
2005	118	5.9	0.43	2.2	0.37	3.4	0.38	4.5	0.40
2006	107	5.3	0.38	1.8	0.27	2.9	0.30	4.0	0.34
2007	119	5.2	0.40	1.6	0.27	2.6	0.33	4.0	0.38
2008	133	5.7	0.41	1.9	0.30	3.0	0.33	4.2	0.37
2009	134	5.8	0.40	2.0	0.32	3.1	0.35	4.3	0.37
2010	148	6.3	0.47	2.0	0.37	3.2	0.40	4.8	0.45
2011	120	5.1	0.41	1.6	0.28	2.6	0.33	3.7	0.37
2012	143	6.1	0.51	2.0	0.40	3.2	0.43	4.6	0.47
2013	114	4.8	0.48	1.6	0.35	2.5	0.39	3.5	0.44
1998-2013	1722	5.5	0.42	1.9	0.32	3.0	0.35	4.2	0.39

Table 13

Age distribution of age at death (cancer-related) for period 1998-2013

(incl. multiple primaries)

death Vears       Cases n       Males n       Females n         0-4       1       0.0       0.0       1       0.0       0.	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	
5-9     5     0.1     0.1     2     0.1     0.1     3     0.2     0       10-14     0     0.0     0.1     0.1     0.1       15-19     0     0.0     0.1     0.1     0.2       20-24     3     0.1     0.2     2     0.1     0.2     1     0.1     0.2       25-29     3     0.1     0.2     1     0.0     0.2     2     0.1     0.	%
5-9     5     0.1     0.1     2     0.1     0.1     3     0.2     0       10-14     0     0.0     0.1     0.1     0.1       15-19     0     0.0     0.1     0.1     0.2       20-24     3     0.1     0.2     2     0.1     0.2     1     0.1     0.2       25-29     3     0.1     0.2     1     0.0     0.2     2     0.1     0.	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	0
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	2 /
20-24       3       0.1       0.2       2       0.1       0.2       1       0.1       0.         25-29       3       0.1       0.2       1       0.0       0.2       2       0.1       0.	2
25-29 3 0.1 0.2 1 0.0 0.2 2 0.1 0.	2
	2
	3
30-34 3 0.1 0.3 2 0.1 0.3 1 0.1 0.	4
35-39 11 0.2 0.5 8 0.3 0.5 3 0.2 0.	6
40-44 32 0.7 1.2 20 0.6 1.2 12 0.7 1.	2
45-49 59 1.2 2.4 45 1.5 2.6 14 0.8 2.	0
50-54 141 2.9 5.3 103 3.3 6.0 38 2.1 4.	2
55-59 285 5.9 11.2 222 7.2 13.2 63 3.5 7.	7
60-64 441 9.1 20.2 322 10.4 23.6 119 6.7 14.	4
65-69 628 12.9 33.1 436 14.1 37.8 192 10.8 25.	2
70-74 883 18.2 51.3 605 19.6 57.4 278 15.6 40.	8
75-79 877 18.0 69.3 541 17.5 74.9 336 18.9 59.	6
80-84 813 16.7 86.0 446 14.5 89.4 367 20.6 80.	2
85+ 679 14.0 100.0 327 10.6 100.0 352 19.8 100.	0
All ages 4864 100.0 3083 100.0 1781 100.0	

Included in the statistics are 49.9% multiple primaries in males and 38.1% in females.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers for period 1998-2013 (incl. multiple primaries)

			Males		Females		Males	Females
Age at			Age-		Age-		Prop.all	Prop.all
death	Males	Females	spec.		spec.		cancers	cancers
Years	n	n	mortal.	MI-index	mortal.	MI-index	%	%
0 - 4	1		0.1	0.03	0.0		3.0	
5- 9	2	3 /	0.1	0.20	0.2	0.33	5.3	7.5
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24	2	1	0.1	0.50	0.1	0.14	2.2	2.0
25-29	1	2	0.0	0.09	0.1	0.33	0.9	1.7
30-34	2	1	0.1	0.06	0.0	0.04	1.1	0.4
35-39	8	3	0.3	0.07	0.1	0.05	2.0	0.6
40-44	20	12	0.8	0.11	0.5	0.19	2.3	1.1
45-49	45	14	1.9	0.13	0.6	0.14	2.5	0.7
50-54	103	38	5.1	0.22	1.8	0.23	3.1	1.2
55-59	222	63	12.1	0.32	3.3	0.22	3.8	1.3
60-64	322	119	18.2	0.33	6.3	0.28	3.6	1.8
65-69	436	192	27.6	0.36	11.1	0.32	3.6	2.3
70-74	605	278	47.2	0.50	18.3	0.43	4.4	2.8
75-79	541	336	65.5	0.60	28.3	0.46	4.1	3.1
80-84	446	367	89.1	0.76	39.3	0.67	4.1	3.3
85+	327	352	95.9	1.04	39.4	0.78	3.7	2.6
All ages	3083	1781					3.8	2.5
Mortality								
Raw			10.4	0.43	5.7	0.43		
WS			5.0	0.38	2.0	0.33		
ES			7.9	0.42	3.1	0.36		
BRD-S			10.9	0.46	4.4	0.40		
PYLL-70								
per 100,000			38.5		14.8			
ES			34.2		12.8			
AYLL-70			8.9		8.8			

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

Table 15a

Multiple primaries in deaths in period 1998-2013

MALES

					Syn-	Syn-		
					chron	chron		
	Total	Total	Pre	Pre	±30d	±30d	Post	Post
Diagnosis	n	%↓	n	<b>←</b> %	n	<b>~</b> %	n	<b>←</b> %
C09-C10 Oropharynx	21	/ 1.1	12	57.1	2	9.5	7	33.3
C15 Oesophagus	21	1.1	4	19.0	1	4.8	16	76.2
C16 Stomach	54	2.8	19	35.2	4	7.4	31	57.4
C18 Colon	145	7.4	64	44.1	24	16.6	57	39.3
C19-C20 Rectum	63	3.2	21	33.3	16	25.4	26	41.3
C22 Liver	37	1.9	5	13.5	8	21.6	24	64.9
C23-C24 Bile	15	0.8	2	13.3	2	13.3	11	73.3
C25 Pancreas	42	2.2	2	4.8	6	14.3	34	81.0
C32 Larynx	18	0.9	12	66.7	1	5.6	5	27.8
C33-C34 Lung	199	10.2	39	19.6	27	13.6	133	66.8
C43 Malign. melanoma	46	2.4	24	52.2	4	8.7	18	39.1
C44 Skin others	57	2.9	26	45.6	3	5.3	28	49.1
C46,C49 Soft tissue	12	0.6	5	41.7	_ 2	16.7	5	41.7
C61 Prostate	352	18.1	153	43.5	56	15.9	143	40.6
C64 Kidney	105	5.4			31	29.5	74	70.5
C65 Renal pelvis	37	1.9			10	27.0	27	73.0
C66 Ureter	48	2.5			26	54.2	22	45.8
C67 Bladder	387	19.9	188	48.6	60	15.5	139	35.9
C68 Urethra	11	0.6			1	9.1	10	90.9
C70-C72 CNS cancer	35	1.8	11	31.4	5	14.3	19	54.3
C73 Thyroid	11	0.6	3	27.3			8	72.7
C76-C79 CUP	27	1.4	14	51.9	3	11.1	10	37.0
C82-C85 NHL	61	3.1	17	27.9	11	18.0	33	54.1
C90 Mult. myeloma	33	1.7	8	24.2	6	18.2	19	57.6
C91-C96 Leukaemia	30	1.5	6	20.0	2	6.7	22	73.3
Other primaries	80	4.1	35	43.8	9	11.3	36	45.0
-								
All mult. primaries	1947	100.0	670	34.4	320	16.4	957	49.2
-								

Multiple primaries with number of cases 1 to 10 are pooled in category "Other primaries".

ICD-10 C44 (Other malignant neoplasms of skin) is not systematically recorded by MCR and therefore not considered for evaluation as a particular primary but at least as a multiple malignancy.

Table 15b

Multiple primaries in deaths in period 1998-2013
FEMALES

					Syn- chron	Syn- chron		
	Total	Total	Pre	Pre	±30d	±30d	Post	Post
Diagnosis	=/		n	+% F16	\	±30α ←%	n	POSC +%
Diagnosis	n	% ↓	11	~6	n	<b>←</b> %	11	~ 6
C16 Stomach	27	3.1	7	25.9	7	25.9	13	48.1
C18 Colon	56	6.3	19	33.9	12	21.4	25	44.6
C19-C20 Rectum	25	2.8	7	28.0	5	20.0	13	52.0
C22 Liver	9	1.0	2	22.2	3	33.3	4	44.4
C23-C24 Bile	12	1.4			3	25.0	9	75.0
C25 Pancreas	39	4.4	2	5.1	5	12.8	32	82.1
C33-C34 Lung	69	7.8	10	14.5	10	14.5	49	71.0
C43 Malign. melanoma	19	2.2	9	47.4	1	5.3	9	47.4
C44 Skin others	21	2.4	14	66.7	2	9.5	5	23.8
C50 Breast	155	17.6	85	54.8	12	7.7	58	37.4
C53 Cervix uteri	24	2.7	17	70.8	1	4.2	6	25.0
C54 Corpus uteri	30	3.4	18	60.0	4	13.3	8	26.7
C56 Ovary	34	3.9	14	41.2	_ 8	23.5	12	35.3
C64 Kidney	44	5.0			10	22.7	34	77.3
C65 Renal pelvis	16	1.8			3	18.8	13	81.3
C66 Ureter	21	2.4			14	66.7	7	33.3
C67 Bladder	139	15.7	44	31.7	25	18.0	70	50.4
C70-C72 CNS cancer	21	2.4	3	14.3	5	23.8	13	61.9
C73 Thyroid	20	2.3	10	50.0	1 \	5.0	9	45.0
C76-C79 CUP	14	1.6	3	21.4	1	7.1	10	71.4
C82-C85 NHL	24	2.7	8	33.3	6	25.0	10	41.7
C91-C96 Leukaemia	16	1.8	3	18.8	3	18.8	10	62.5
Other primaries	48	5.4	17	35.4	9	18.8	22	45.8
All mult. primaries	883	100.0	292	33.1	150	17.0	441	49.9

Multiple primaries with number of cases 1 to 7 are pooled in category "Other primaries".

ICD-10 C44 (Other malignant neoplasms of skin) is not systematically recorded by MCR and therefore not considered for evaluation as a particular primary but at least as a multiple malignancy.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers for period 1998-2013

(Singular primaries only \*)

			Males		Females		Males	Females
Age at			Age-		Age-		Prop.all	Prop.all
death	Males	Females	/ - /		spec.		cancers	cancers
Years	n	n	mortal.	MI-index	mortal.	MI-index	%	%
0 - 4			0.0		0.0			
5- 9	2	1 /	0.1	0.20	0.1	0.14	5.6	2.7
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24	2	1	0.1		0.1	0.14	2.4	2.1
25-29	1	2	0.0	0.09	0.1	0.33	1.0	1.8
30-34	2	1	0.1	0.07	0.0	0.05	1.1	0.5
35-39	8	3	0.3	0.07	0.1	0.06	2.1	0.6
40-44	17	9	0.6	0.11	0.4	0.17	2.2	0.9
45-49	42	10	1.8	0.14	0.4	0.11	2.6	0.6
50-54	69	29	3.4	0.18	1.4	0.21	2.4	1.1
55-59	168	48	9.2	0.30	2.5	0.21	3.3	1.2
60-64	253	81	14.3	0.33	4.3	0.25	3.4	1.5
65-69	325	160	20.6	0.38	9.3	0.34	3.4	2.4
70-74	406	192	31.7	0.51	12.6	0.39	3.8	2.5
75-79	361	260	43.7	0.63	21.9	0.46	3.6	3.0
80-84	278	280	55.6	0.82	30.0	0.72	3.4	3.2
85+	213	280	62.5	1.12	31.3	0.80	3.2	2.5
All ages	2147	1357					3.4	2.3
Mortality								
Raw			7.2	0.42	4.4	0.42		
WS			3.6	0.36	1.5	0.31		
ES			5.5		2.3			
BRD-S			7.5		3.3			
PYLL-70								
per 100,000			30.0		11.0			
ES			26.4		9.4			
AYLL-70			9.0		8.5			

<sup>\*</sup> See corresponding tables with multiple primaries.

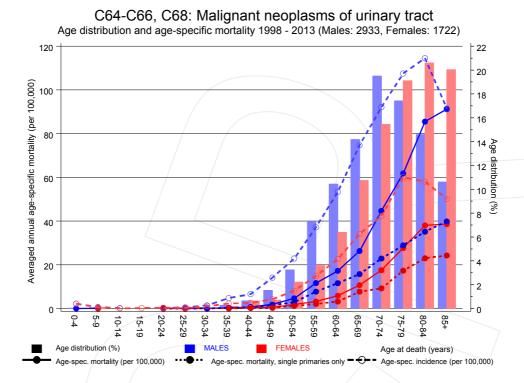
Table 17

Age-specific mortality (cancer-related) and proportion of all cancers for period 1998-2013

(Single primaries only \*)

			Males		Females		Males	Females
Age at			Age-		Age-			Prop.all
death	Males	Females			spec.		cancers	cancers
Years	n	n		MI-index		MT-index		%
			7				•	
0 - 4			0.0		0.0			
5- 9	2	1 /	0.1	0.20	0.1	0.14	5.7	2.8
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24	1	1	0.1	0.25	0.1	0.14	1.3	2.3
25-29	1	2	0.0	0.09	0.1	0.33	1.1	1.9
30-34	2		0.1	0.07	0.0		1.1	
35-39	8	1	0.3	0.08	0.0	0.02	2.2	0.2
40-44	14	6	0.5	0.10	0.2	0.12	1.9	0.7
45-49	38	7	1.6	0.14	0.3	0.09	2.5	0.5
50-54	58	25	2.9	0.17	1.2	0.20	2.2	1.1
55-59	142	40	7.7	0.30	2.1	0.19	3.1	1.1
60-64	206	60	11.6	0.32	3.2	0.22	3.1	1.3
65-69	249	133	15.8	0.36	7.7	0.33	3.0	2.3
70-74	293	140	22.9	0.46	9.2	0.33	3.3	2.1
75-79	239	206	28.9	0.51	17.3	0.41	3.0	2.9
80-84	176	215	35.2		23.0	0.63	2.8	2.9
85+	136	217	39.9	0.76	24.3	0.66	2.5	2.3
All ages	1565	1054					2.9	2.1
Mortality								
Raw			5.3		3.4			
WS			2.7		1.2			
ES			4.1		1.8			
BRD-S			5.4	0.37	2.6	0.34		
D								
PYLL-70			0= 0		0 0			
per 100,000			25.2		8.6			
ES			22.3		7.4			
AYLL-70			9.4		8.2			

<sup>\*</sup> See corresponding tables with multiple primaries.

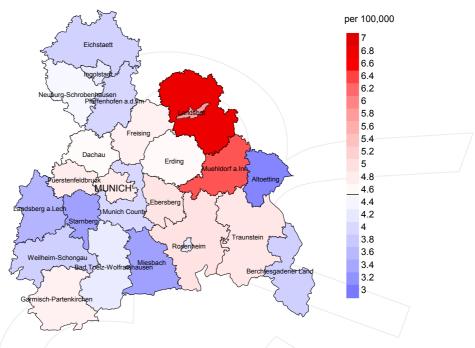


**Figure 18.** Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

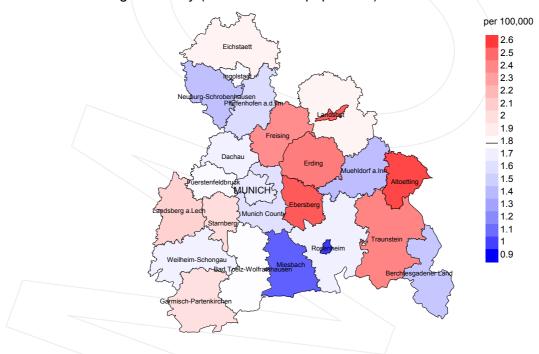
The difference between age at diagnosis (Table 3) and age at urinary tract cancer-related death (see Table 10) should be considered.



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



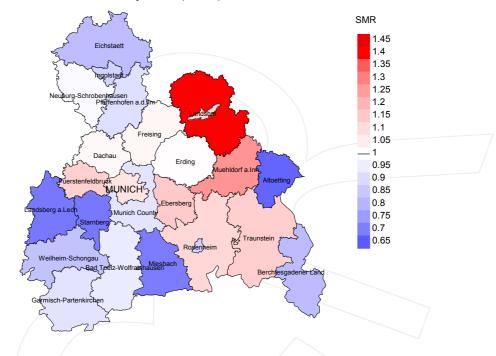
#### Average mortality (world standard population) 2007 - 2013: Females



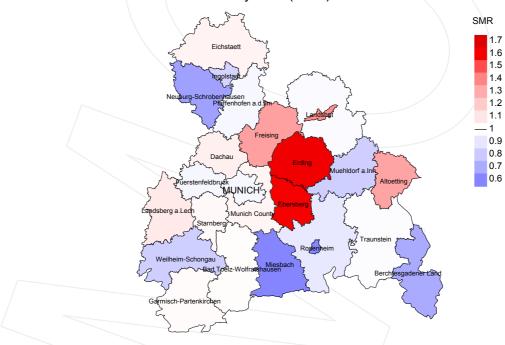
**Figure 19a.** Map of cancer mortality (world standard population) by county averaged for period 2007 to 2013. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 4.5/100,000 WS N=1,574, females 1.8/100,000 WS N=906).

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 37 women died from urinary tract cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 2.5/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.5 and 4.2/100,000.

### 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=1,574, females N=906).

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 37 women died from urinary tract cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.59. Though, the value of this parameter may vary with an underlying probability of 99% between 1.00 and 2.39, 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

#### **Recommended Citation**

Munich Cancer Registry. Baseline statistics C64-C66, C68: Urinary tract cancer [Internet]. 2015 [updated 2015 May 19; cited 2015 Jul 1]. Available from: http://www.tumorregister-muenchen.de/en/facts/base/base C6466E.pdf

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# Index of figures and tables

Fig./Tbl	l.	Page
1	Pts cohorts, DCO, mult. prim., follow-up / yr	3
1a	Gender distribution by year of diagnosis	4
2	Incidence by year of diagnosis	5
3	Age distribution parameters by year of diagnosis	6
4	Age distribution by 5-year age group and gender	8
5	Age-specific incidence and DCO rate	9
6	Standardized incidence ratio of second primaries	10
7	Age distribution and age-specific incidence (chart)	12
7a	Age-specific incidence internationally (chart)	13
8	Cumulative follow-up years (chart)	14
9a	Map of cancer incidence (WS) by county (chart)	15
9b	Standardized incidence ratio (SIR) by county (chart)	16
10a	Pts incident cohorts and mortality / yr	17
10b	Incidence and mortality by year of diagnosis	18
10c	Cancer-related deaths, death certification available / yr	19
11	Medians of age at death / yr	20
12	Mortality by year of death	22
13	Distribution of age at death	23
14	Age-specific mortality	24
15	Multiple primaries in deaths	25
16	Age-specific mortality (first primaries)	27
17	Age-specific mortality (single primaries)	28
18	Age distribution and age-specific mortality (chart)	29
19a	Map of cancer mortality (WS) by county (chart)	30
19b	Standardized mortality ratio (SMR) by county (chart)	31