Munich Cancer Registry

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

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

Cancer statistics: Baseline statistics

C64-C68: Urinary tract cancer

Year of diagnosis	1998-2011
Patients	15923
Diseases	16436
Creation date	04/02/2013
Export date	01/03/2013
Population	4.5 m

http://www.tumorregister-muenchen.de/en/facts/base/base_C6468E.pdf

Global Statements about the statistics on the Internet − Baseline Statistics (grey button), Survival (red button)

In these analyses, the clinics and physicians of Upper Bavaria and the city and county of Landshut[#], with a total of 4.5 million inhabitants, account for the frequency of cancer diseases[##] and the achieved long term results. Additionally, the long term survival evaluated by the Munich Cancer Registry (MCR) is compared with the results of the population-based registry in the USA (SEER), which is useful for checking the consistency of the data on an international level.

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

The foot notes describe the currentness of the data. The baseline statistics and survival data are updated annually. This yearly analysis comprises the Annual Report of the MCR. The time-delayed acquisition of data and the occasionally high DCO-rates indicate optimizing reserves, among others, because of current financial and legal conditions that hinder the analyses.

Clinics and physicians have access to essentially more detailed data, with which they can check, compare and in the best case optimize their own data and results.

We would be pleased to receive corrections, critique and useful suggestions. Just send an e-mail to tumor@ibe.med.uni-muenchen.de.

Munich Cancer Registry, April 2013

[#] Base data has been collected since 1998. An increase in new diseases is apparent, which is an effect of two extensions in the MCR catchment area (from a base population of 2.51 million to 3.96 in 2002, and to 4.52 million in 2007). Death certificates from 2011 are incorporated into these analyses.

[##] Due to the high frequency and good prognosis of non-malignant skin cancer (C44), no systematic ascertainment is performed for this diagnosis. C44 is not designated as a primary, but rather as a secondary tumor.

[###] DCO (death certificate only) identifies a cancer case that first becomes available to the MCR through the death certificate. A high proportion of DCO cases (≥5%) in particular cancer types indicate insufficient participation of specific cancer specializations.

ICD-10 codes used for specifying cancer site

ICD-10	Description
C64	Kidney, except renal pelvis
C65	Renal pelvis
C66	Ureter
C67	Bladder
C68	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

Year of diagnosis	Cases # n	DCO cases n	Prop. DCO %	Prop. mult. primaries %	Prop. deaths %	Prop. actively followed %
1998	770	59	7.7	32.1	65.7	98.1
1999	732	53	7.2	33.2	66.1	98.1
2000	704	69	9.8	33.2	62.8	98.0
2001	720	66	9.2	33.9	62.5	98.1
2002	1333	180	13.5	36.5	67.7	98.2
2003	1310	148	11.3	33.7	63.2	97.3
2004	1293	146	11.3	36.7	58.3	97.4
2005	1332	98	7.4	35.7	51.5	96.5
2006	1370	98	7.2	33.7	54.1	93.1
2007	1477	125	8.5	32.7	49.0	81.2 ##
2008	1509	133	8.8	36.1	46.9	69.0
2009	1471	129	8.8	37.3	46.4	71.3
2010	1343	123	9.2	34.9	39.1	94.1
2011	1072	104	9.7	32.1	30.3	78.6 ###
1998-2011	16436	1531	9.3	34.7	53.3	89.2

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	770	502	268	65.2
1999	732	494	238	67.5
2000	704	464	240	65.9
2001	720	445	275	61.8
2002	1333	873	460	65.5
2003	1310	885	425	67.6
2004	1293	860	433	66.5
2005	1332	885	447	66.4
2006	1370	914	456	66.7
2007	1477	991	486	67.1
2008	1509	1013	496	67.1
2009	1471	979	492	66.6
2010	1343	892	451	66.4
2011	1072	724	348	67.5
1998-2011	16436	10921	5515	66.4

Table 2

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

Year of diagnosis	Males n	Females n	Males Inc. raw	Fem. Inc. raw	Males Inc. WS	Fem. Inc. WS	Males Inc. ES	Fem. Inc. ES	Males Inc. BRD-S	Fem. Inc. BRD-S
1998	502	268	45.3	22.8	27.9	10.2	41.5	15.1	53.6	19.2
1999	494	238	44.1	20.1	26.6	9.6	39.6	13.8	51.1	17.2
2000	464	240	40.7	20.0	24.3	8.3	36.4	12.6	47.9	16.5
2001	445	275	38.4	22.6	22.7	9.6	33.8	14.5	43.3	18.8
2002	873	460	46.9	23.5	25.7	9.9	39.5	14.7	52.7	19.1
2003	885	425	47.2	21.6	26.2	8.8	39.2	13.1	51.3	17.2
2004	860	433	45.7	21.9	25.0	8.9	37.2	13.4	48.8	17.6
2005	885	447	46.7	22.5	24.9	9.4	37.3	13.8	48.2	17.9
2006	914	456	47.7	22.7	25.2	10.0	37.5	14.4	49.1	18.2
2007	991	486	44.7	21.0	23.4	8.7	34.8	12.6	44.8	16.6
2008	1013	496	45.5	21.4	23.1	9.0	34.8	13.2	45.2	17.0
2009	979	492	43.9	21.2	22.1	8.5	33.1	12.5	43.2	16.5
2010	892	451	39.6	19.3	19.7	7.0	29.2	10.8	37.8	14.2
2011	724	348	32.1	14.9	16.1	6.7	23.9	9.3	30.8	11.5
1998-2011	10921	5515	43.5	21.0	23.2	8.8	34.7	12.9	45.1	16.7

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

Table 3

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	770	68.6	13.6	2.8	99.7	51.7	61.1	69.9	77.8	85.3
1999	732	67.9	12.7	1.1	94.3	52.6	59.5	68.3	77.1	84.1
2000	704	69.3	12.5	0.3	99.7	53.7	61.6	70.2	78.2	85.2
2001	720	69.2	12.3	1.9	96.4	53.5	61.5	69.4	78.3	85.0
2002	1333	70.9	12.2	2.4	99.5	55.4	63.4	72.2	79.6	85.9
2003	1310	70.4	13.0	0.4	103	54.5	63.2	71.3	79.2	85.6
2004	1293	70.1	13.1	0.0	99.0	54.2	62.7	71.1	79.1	85.1
2005	1332	69.9	12.8	0.7	101	54.6	62.7	70.8	79.1	84.6
2006	1370	70.0	13.5	0.2	101	53.7	63.1	71.2	79.0	85.3
2007	1477	70.1	13.4	1.2	101	53.4	63.9	71.3	79.3	85.3
2008	1509	70.5	12.9	0.6	100	53.2	63.6	71.5	79.7	85.7
2009	1471	70.6	13.2	0.5	103	53.7	63.5	71.9	79.8	85.3
2010	1343	70.9	13.1	5.4	100	53.1	62.9	72.3	80.4	86.4
2011	1072	70.3	14.3	0.5	97.6	53.2	63.1	71.7	79.9	86.5
1998-2011	16436	70.1	13.1	0.0	103	53.7	62.7	71.2	79.2	85.4

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	502	67.6	13.5	5.0	95.6	50.7	60.1	68.9	76.6	84.3
1999	494	67.1	12.3	2.3	94.1	52.6	59.4	67.1	76.0	82.7
2000	464	67.7	12.6	0.3	99.7	52.7	60.8	68.3	76.7	81.6
2001	445	67.5	11.2	1.9	95.1	53.3	60.8	67.4	75.6	81.4
2002	873	69.9	11.7	32.7	97.6	54.9	62.7	70.9	78.2	83.8
2003	885	69.0	12.8	0.4	101	53.3	62.1	69.7	77.6	83.7
2004	860	68.7	12.9	0.0	98.8	53.4	61.5	69.6	77.7	82.8
2005	885	68.8	11.7	0.7	101	54.6	61.8	69.0	77.1	82.9
2006	914	69.3	12.5	0.8	101	54.0	62.6	70.0	78.0	83.7
2007	991	69.0	12.6	1.3	101	53.2	62.8	70.1	77.3	83.6
2008	1013	69.8	12.4	1.8	100	52.6	62.9	70.8	78.5	84.9
2009	979	69.6	12.8	0.5	97.4	52.9	62.3	70.8	78.4	84.4
2010	892	69.0	12.7	5.4	99.1	51.6	60.9	70.5	78.0	83.9
2011	724	70.0	13.0	1.5	96.9	53.2	62.5	71.0	79.3	85.4
1998-2011	10921	69.0	12.5	0.0	101	53.2	61.7	69.9	77.7	83.8

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	268	70.6	13.6	2.8	99.7	55.0	62.6	72.4	79.3	86.2
1999	238	69.4	13.5	1.1	94.3	52.6	60.8	71.6	78.7	85.6
2000	240	72.4	11.9	37.2	94.5	58.7	63.6	73.9	81.0	87.4
2001	275	72.0	13.4	30.6	96.4	54.2	64.1	73.7	81.2	88.2
2002	460	72.8	12.9	2.4	99.5	57.7	65.2	74.1	81.9	87.8
2003	425	73.2	13.0	2.5	103	56.8	65.6	75.0	82.6	87.9
2004	433	72.8	13.1	18.5	99.0	56.5	65.0	74.7	82.2	87.9
2005	447	72.3	14.6	4.2	98.8	54.0	64.3	74.9	82.1	88.7
2006	456	71.4	15.0	0.2	96.7	52.8	64.7	74.0	82.0	87.7
2007	486	72.3	14.7	1.2	99.1	55.6	67.0	74.6	82.5	87.2
2008	496	72.0	13.7	0.6	97.0	55.8	64.7	73.7	82.1	86.9
2009	492	72.5	13.7	2.5	103	55.6	66.3	74.3	82.2	87.2
2010	451	74.7	13.1	5.4	100	56.4	68.3	75.9	84.7	89.6
2011	348	70.9	16.7	0.5	97.6	52.7	64.4	73.5	82.0	88.3
1998-2011	5515	72.3	13.9	0.2	103	55.4	64.9	74.1	82.0	87.7

Table 4

Age distribution by 5-year age group and gender for period 1998-2011 (incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4	63	0.4	0.4	34	0.3	0.3	29	0.5	0.5
5-9	17	0.1	0.5	9	0.1	0.4	8	0.1	0.7
10-14	4	0.0	0.5	2	0.0	0.4	2	0.0	0.7
15-19	3	0.0	0.5			0.4	3	0.1	0.8
20-24	10	0.1	0.6	3	0.0	0.4	7	0.1	0.9
25-29	19	0.1	0.7	11	0.1	0.5	8	0.1	1.0
30-34	51	0.3	1.0	26	0.2	0.8	25	0.5	1.5
35-39	167	1.0	2.0	113	1.0	1.8	54	1.0	2.5
40-44	258	1.6	3.6	191	1.7	3.6	67	1.2	3.7
45-49	502	3.1	6.7	376	3.4	7.0	126	2.3	6.0
50-54	777	4.7	11.4	579	5.3	12.3	198	3.6	9.6
55-59	1277	7.8	19.2	924	8.5	20.8	353	6.4	16.0
60-64	1936	11.8	30.9	1421	13.0	33.8	515	9.3	25.3
65-69	2514	15.3	46.2	1812	16.6	50.4	702	12.7	38.0
70-74	2602	15.8	62.1	1789	16.4	66.8	813	14.7	52.8
75-79	2520	15.3	77.4	1622	14.9	81.6	898	16.3	69.0
80-84	1931	11.7	89.1	1134	10.4	92.0	797	14.5	83.5
85+	1785	10.9	100.0	875	8.0	100.0	910	16.5	100.0
All ages	16436	100.0		10921	100.0		5515	100.0	

Included in the statistics are 45.4% multiple primaries in males and 33.3% in females.

Table 5

Age-specific incidence, DCO rate and proportion of all cancers
for period 1998-2011

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=810 %	Females DCO rate n=698 %	Males Prop.all cancers n=132509 %	Females Prop.all cancers n=129521 %
0- 4	33	28	2.6	2.3			11.7	13.5
5- 9	9	7	0.7	0.6			5.8	6.7
10-14	2	2	0.2	0.2			1.5	1.3
15-19		3	0.0	0.2				1.3
20-24	3	7	0.2	0.5			0.6	1.6
25-29	11	8	0.7	0.5			1.4	0.9
30-34	26	25	1.3	1.3	3.8		2.0	1.4
35-39	113	52	5.2	2.5			5.7	1.6
40-44	187	67	8.4	3.2	1.1		6.8	1.3
45-49	370	124	19.0	6.5	0.5	0.8	8.3	1.7
50-54	567	196	34.0	11.4	1.2	0.5	7.8	2.1
55-59	904	350	57.9	21.4	1.9	2.3	7.2	3.0
60-64	1396	510	91.7	31.8	3.1	1.0	7.4	3.4
65-69	1773	689	130.1	46.3	4.1	4.2	7.6	4.2
70-74	1737	798	168.4	64.6	4.8	5.6	8.0	5.3
75-79	1595	884	236.0	88.9	9.2	8.3	9.5	6.0
80-84	1118	785	275.2	98.7	14.8	18.3	10.1	5.8
85+	869	904	313.3	121.7	31.0	43.4	10.5	6.2
All ages	10713	5439			7.6	12.8	8.1	4.2
Incidence								
Raw			42.6	20.7				
WS			22.8	8.6				
ES			34.0	12.7				
BRD-S			44.2	16.5				

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 1998-2011
MALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C03-C06	Oral cavity	8	3.7	2.2	0.9	4.2		1.6	12.5
C07-C08	Salivary gland	2	1.1	1.9	0.2	6.8		0.4	
C09-C10	Oropharynx	9	4.6	2.0	0.9	3.7		1.7	
C12-C13	Hypopharynx	5	2.6	2.0	0.6	4.6		0.9	
C15	Oesophagus	17	8.0	2.1	1.2	3.4	#	3.4	17.6
C16	Stomach	34	21.6	1.6	1.1	2.2	#	4.7	8.8
C17	Small intestine	9	2.1	4.3	2.0	8.1	#	2.6	
C18	Colon	104	50.5	2.1	1.7	2.5	#	20.2	7.7
C19-C20	Rectum	42	27.2	1.5	1.1	2.1	#	5.6	7.1
C22	Liver	29	13.1	2.2	1.5	3.2	#	6.0	17.2
C23-C24	Bile	8	4.7	1.7	0.7	3.3		1.2	25.0
C25	Pancreas	34	17.1	2.0	1.4	2.8	#	6.4	32.4
C26	GI cancer	3	0.6	4.8	1.0	14.0		0.9	66.7
C32	Larynx	8	4.8	1.7	0.7	3.3		1.2	
C33-C34	Lung	179	57.9	3.1	2.7	3.6	#	45.7	14.0
C38,C45	Mesothelioma	2	3.1	0.6	0.1	2.3		-0.4	50.0
C43	Malign. melanoma	47	17.4	2.7	2.0	3.6	#	11.2	2.1
C46,C49	Soft tissue	6	2.5	2.4	0.9	5.2		1.3	
C48	Peritoneal	4	0.3	12.6	3.4	32.2	#	1.4	25.0
C60	Penis	4	1.1	3.7	1.0	9.6	#	1.1	
C61	Prostate	715	143.3	5.0	4.6	5.4	#	215.8	5.3
C62	Testis	6	1.0	5.7	2.1	12.5	#	1.9	
C64	Kidney	125	16.6	7.5	6.3	9.0	#	40.9	10.4
C65	Renal pelvis	41	2.0	20.9	15.0	28.3	#	14.7	
C66	Ureter	36	1.1	33.7	23.6	46.6	#	13.2	
C67	Bladder	84	21.9	3.8	3.1	4.8	#	23.4	7.1
C68	Urethra	12	0.2	63.9	33.0	111.7	#	4.5	
C70-C72	CNS cancer	8	6.3	1.3	0.5	2.5		0.6	
C73	Thyroid	8	2.9	2.8	1.2	5.5	#	1.9	
C76-C79	CUP	18	8.5	2.1	1.3	3.4	#	3.6	16.7
C81	Hodgkin lymphoma	2	0.8	2.4	0.3	8.6		0.4	
C82-C85	NHL	43	19.0	2.3	1.6	3.0	#	9.0	9.3
C90	Mult. myeloma	12	6.2	1.9	1.0	3.4		2.2	
C91-C96	Leukaemia	16	7.7	2.1	1.2	3.4	#	3.1	37.5
Other primaries		9	6.2	1.5	0.7	2.8		1.1	22.2
Not observed		0	1.0	0.0	0.0	3.5		-0.4	
All mult. primaries		1689	488.7	3.5	3.3	3.6	#	453.0	8.2

Patients	7631
Mean age at second malignancy (years)	71.3
Person-years	26497
Mean observation time (years)	3.5
Median observation time (years)	2.4

The occurrence of second malignancy is statistically significant.

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

Table 6b

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries for period 1998-2011
FEMALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C03-C06	Oral cavity	2	0.9	2.2	0.3	7.9		0.8	
C15	Oesophagus	2	0.8	2.4	0.3	8.5		0.9	
C16	Stomach	13	6.8	1.9	1.0	3.3	#	4.8	7.7
C17	Small intestine	2	0.7	3.0	0.4	10.7		1.0	
C18	Colon	33	18.4	1.8	1.2	2.5	#	11.2	6.1
C19-C20	Rectum	18	7.7	2.3	1.4	3.7	#	7.9	5.6
C22	Liver	2	1.9	1.0	0.1	3.7		0.0	50.0
C23-C24	Bile	10	2.7	3.7	1.8	6.8	#	5.6	30.0
C25	Pancreas	21	7.7	2.7	1.7	4.2	#	10.3	28.6
C26	GI cancer	2	0.4	5.7	0.7	20.4		1.3	
C33-C34	Lung	43	11.1	3.9	2.8	5.2	#	24.6	11.6
C43	Malign. melanoma	4	5.2	0.8	0.2	2.0		-0.9	25.0
C46,C49	Soft tissue	2	0.9	2.2	0.3	7.9		0.8	
C48	Peritoneal	2	0.5	4.1	0.5	14.9		1.2	
C50	Breast	90	46.3	1.9	1.6	2.4	#	33.7	8.9
C53	Cervix uteri	12	2.0	6.0	3.1	10.6	#	7.7	8.3
C54	Corpus uteri	16	9.0	1.8	1.0	2.9	#	5.4	
C56	Ovary	8	7.0	1.1	0.5	2.2		0.7	12.5
C64	Kidney	55	4.3	12.8	9.7	16.7	#	39.1	14.5
C65	Renal pelvis	17	0.5	33.2	19.3	53.1	#	12.7	
C66	Ureter	14	0.2	58.5	32.0	98.1	#	10.6	
C67	Bladder	35	3.3	10.5	7.3	14.5	#	24.4	2.9
C68	Urethra	2	0.1	35.8	4.3	129.3	#	1.5	
C70-C72	CNS cancer	2	2.4	0.8	0.1	3.1		-0.3	100.0
C73	Thyroid	14	2.5	5.7	3.1	9.6	#	8.9	
C76-C79	CUP	6	3.1	1.9	0.7	4.2		2.2	16.7
C82-C85	NHL	13	6.5	2.0	1.1	3.4	#	5.0	15.4
C91-C96	Leukaemia	8	2.7	3.0	1.3	5.9	#	4.1	25.0
Other primaries		8	7.0	1.1	0.5	2.3		0.8	
Not observed		0	2.3	0.0	0.0	1.6		-1.8	
All mult. primaries		456	164.9	2.8	2.5	3.0	#	224.3	10.1

Patients	3739
Mean age at second malignancy (years)	73.1
Person-years	12977
Mean observation time (years)	3.5
Median observation time (years)	2.3

The occurrence of second malignancy is statistically significant.

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

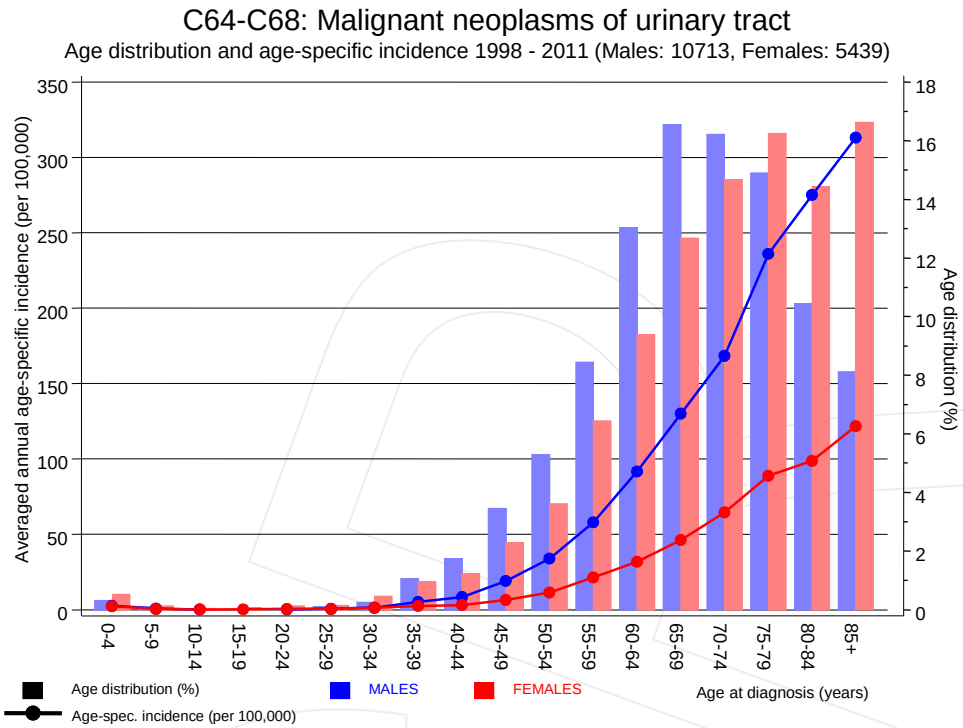


Figure 7. Age distribution and age-specific incidence

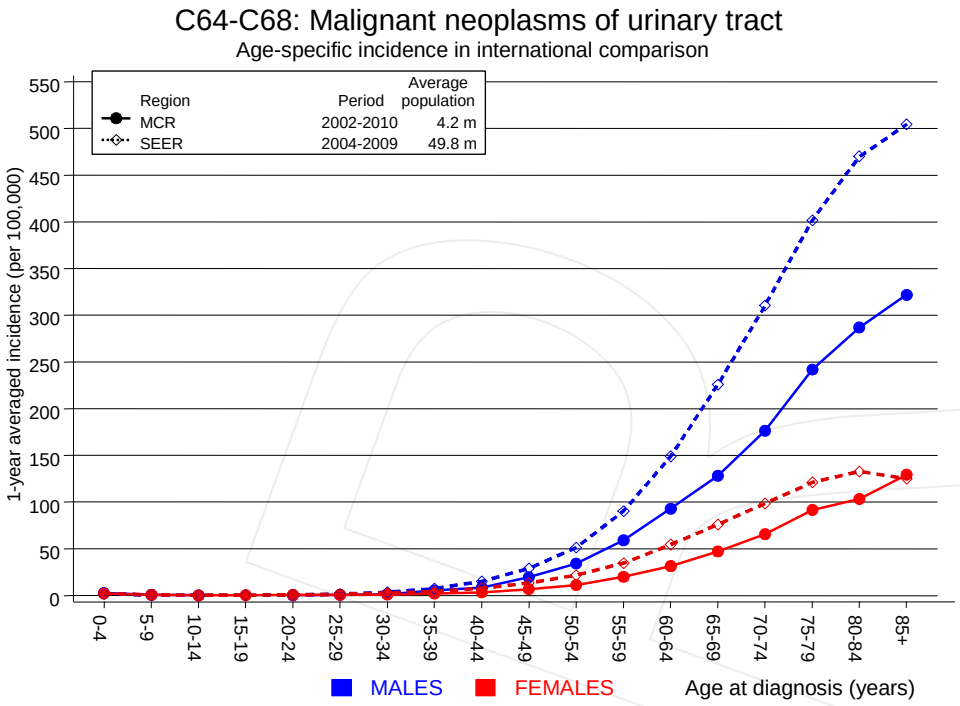


Figure 7a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 18 Regs Research Data, released April 2012, based on the November 2011 submission. http://www.seer.cancer.gov.

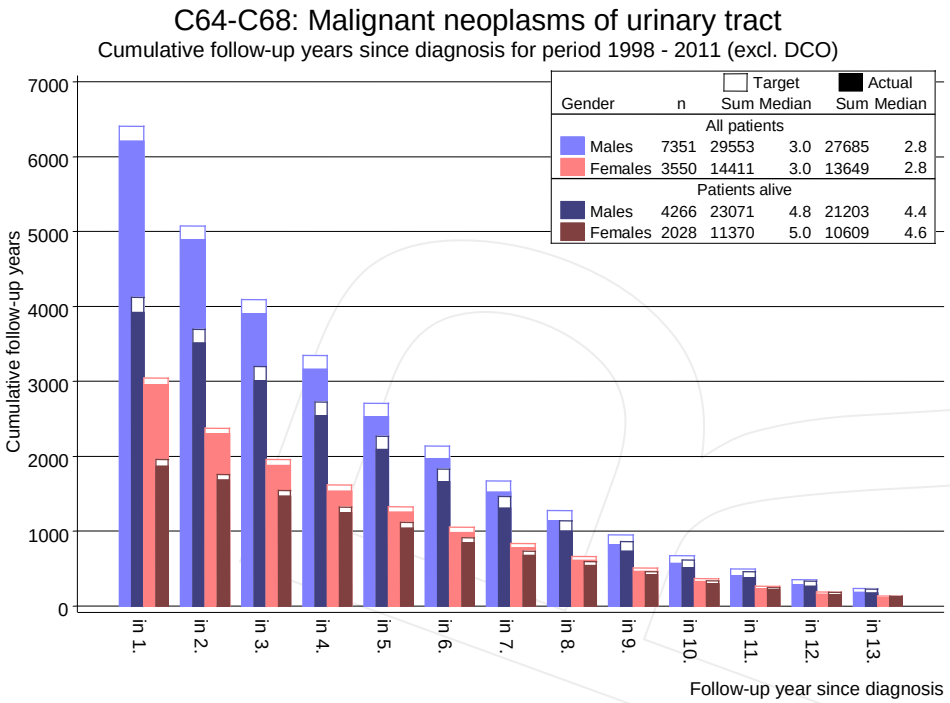
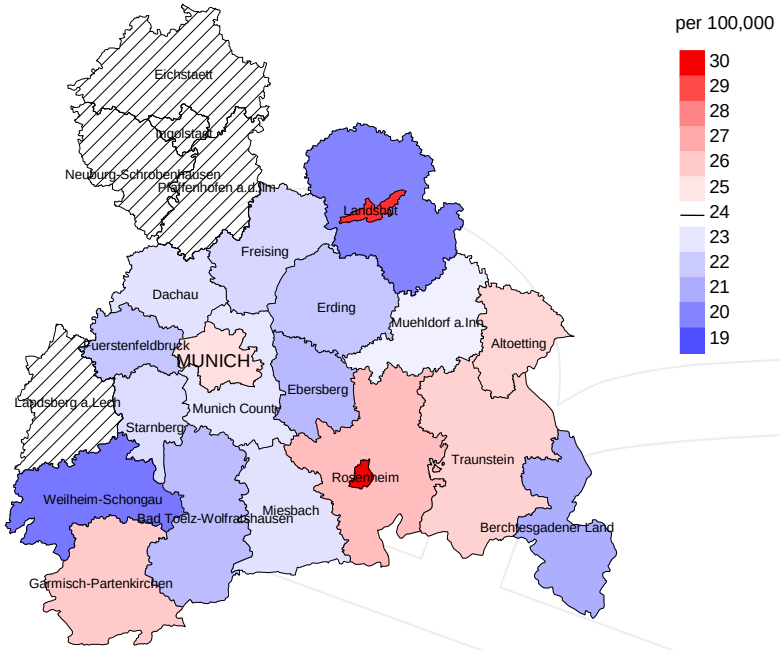


Figure 8. Cumulative follow-up years depending on time since diagnosis

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

Average incidence (world standard population) 2003 - 2008: Males



Average incidence (world standard population) 2003 - 2008: Females

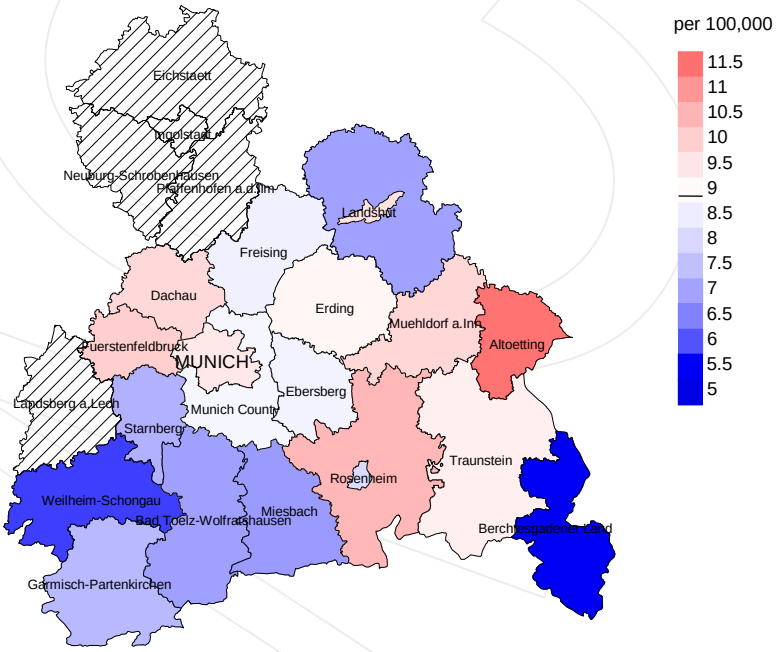
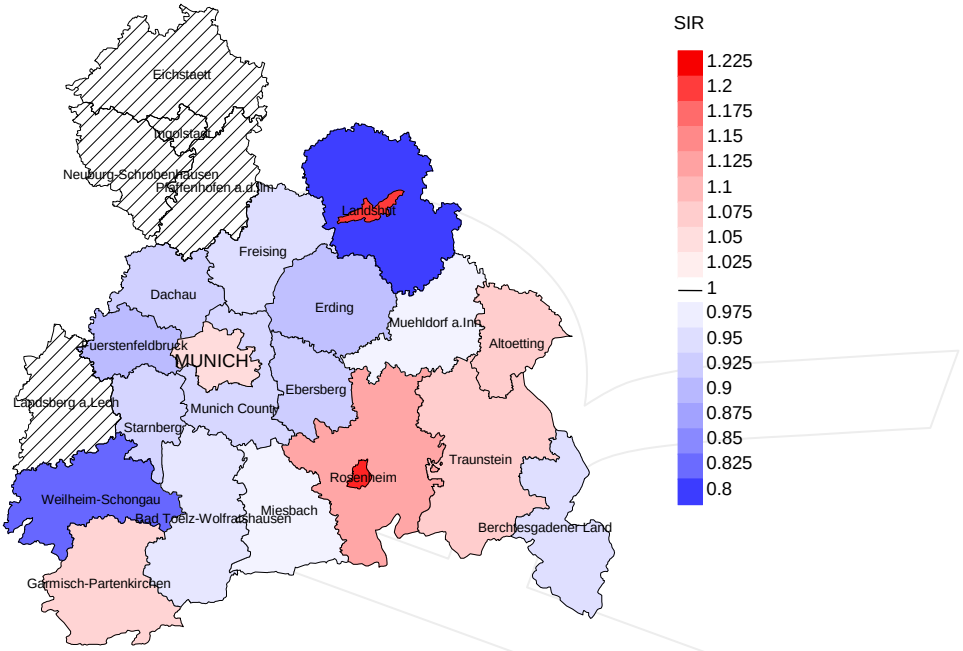


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 24.0/100,000 WS N=5,195, females 8.9/100,000 WS N=2,569). Since cancer data are not available in some counties until 2007, the local incidence rates were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 70 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 8.6/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 5.7 and 13.3/100,000.

Standardized incidence ratio (SIR) 2003 - 2008: Males



Standardized incidence ratio (SIR) 2003 - 2008: Females

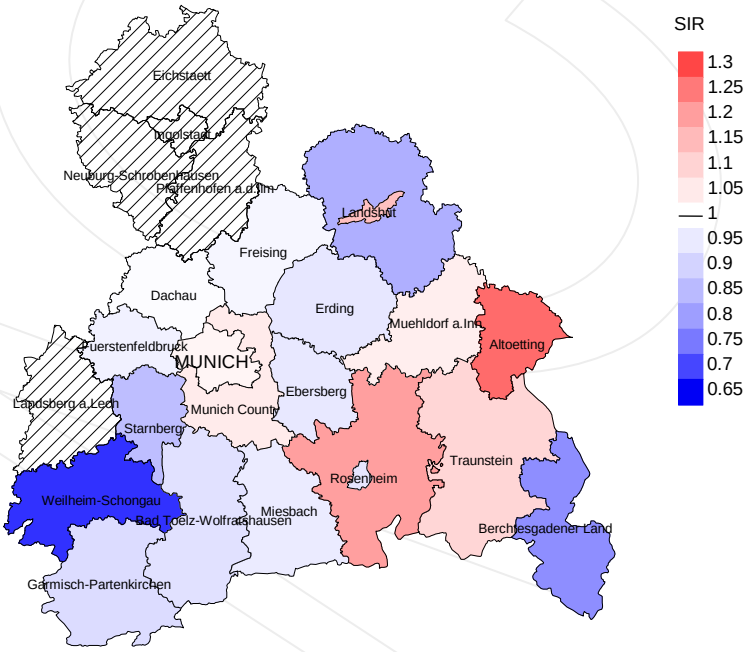


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=5,195, females N=2,569). Since cancer data are not available in some counties until 2007, the local SIR values were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 70 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 0.95. Though, the value of this parameter may vary with an underlying probability of 99% between 0.68 and 1.28, and is therefore not statistically striking.

MORTALITY

Table 10a

Patient cohorts of incident cancers by year of diagnosis, follow-up status, proportion of DCO, deaths among the annual cohorts, and proportion of available death certificates (with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.52 m as of 2007, respectively)

Year of diagnosis	Incident cases n	Prop. actively followed %	Prop. DCO %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	770	98.1	7.7	506	65.7	94.1
1999	732	98.1	7.2	484	66.1	95.5
2000	704	98.0	9.8	442	62.8	96.4
2001	720	98.1	9.2	450	62.5	96.9
2002	1333	98.2	13.5	902	67.7	96.9
2003	1310	97.3	11.3	828	63.2	97.9
2004	1293	97.4	11.3	754	58.3	98.3
2005	1332	96.5	7.4	686	51.5	97.4
2006	1370	93.1	7.2	741	54.1	99.1
2007	1477	81.2	8.5	723	49.0	98.2
2008	1509	69.0	8.8	707	46.9	99.6
2009	1471	71.3	8.8	682	46.4	98.8
2010	1343	94.1	9.2	525	39.1	97.9
2011	1072	78.6	9.7	325	30.3	95.4
1998-2011	16436	89.2	9.3	8755	53.3	97.5

Table 10b

Annual cohorts of incident cancers and deaths, proportion of death certificates and cases deceased the same year of cancer diagnosis
(incl. DCO)
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.52 m as of 2007, respectively)

Year of diagnosis/ death	Incident cases n	Deaths n	Prop. deaths with death certific. %	Deaths in same year n	Prop. deaths in same year %
1998	770	485	92.6	134	17.4
1999	732	458	95.2	142	19.4
2000	704	471	95.1	130	18.5
2001	720	476	95.8	124	17.2
2002	1333	702	96.6	301	22.6
2003	1310	810	96.8	290	22.1
2004	1293	794	96.9	265	20.5
2005	1332	783	96.6	219	16.4
2006	1370	833	97.4	235	17.2
2007	1477	948	97.8	273	18.5
2008	1509	947	98.9	278	18.4
2009	1471	1020	99.2	324	22.0
2010	1343	1063	98.6	295	22.0
2011	1072	908	98.8	229	21.4
1998-2011	16436	10698	97.3	3239	19.7

Table 10c

Annual cohorts of deaths, proportion of cancer-related and not cancer-related deaths, and cancer recorded on death certificates (incl. DCO)
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.52 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer-related %	Prop. not cancer-related %	Prop. cancer recorded on death certificate %
1998	485	64.3	35.7	81.7
1999	458	70.1	29.9	83.0
2000	471	69.0	31.0	83.7
2001	476	69.1	30.9	85.1
2002	702	71.4	28.6	85.7
2003	810	70.5	29.5	84.4
2004	794	70.3	29.7	84.0
2005	783	71.3	28.7	83.2
2006	833	71.2	28.8	80.9
2007	948	72.8	27.2	82.6
2008	947	71.5	28.5	82.2
2009	1020	71.7	28.3	82.9
2010	1063	68.0	32.0	80.2
2011	908	67.2	32.8	81.6
1998-2011	10698	70.1	29.9	82.8

Table 11a

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (not cancer-related) Years	Age at death (according to death certificate) Years
1998	320	74.9	73.4	77.8	74.6
1999	301	75.3	73.4	79.4	74.3
2000	310	75.0	72.5	79.9	74.4
2001	312	74.3	72.7	77.9	73.5
2002	443	75.3	74.1	78.4	74.8
2003	547	75.5	73.9	79.4	74.9
2004	509	75.8	74.6	78.6	75.3
2005	513	75.4	74.0	78.6	74.8
2006	534	74.8	73.5	78.3	74.3
2007	626	75.6	74.4	78.9	75.0
2008	642	76.3	75.0	79.5	75.5
2009	688	76.3	74.4	80.9	75.3
2010	687	76.4	74.8	80.0	75.6
2011	609	76.1	74.1	80.6	75.2
1998-2011	7041	75.6	74.1	79.3	74.9

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

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (not cancer-related) Years	Age at death (according to death certificate) Years
1998	165	80.0	78.4	82.7	79.9
1999	157	77.7	76.4	81.3	77.5
2000	161	77.4	76.7	79.3	77.6
2001	164	80.0	78.0	84.5	79.2
2002	259	78.0	76.6	81.8	77.6
2003	263	78.1	77.4	80.0	77.8
2004	285	79.9	78.5	83.3	79.6
2005	270	79.1	77.6	83.5	78.3
2006	299	79.2	77.5	83.0	78.2
2007	322	79.5	78.2	82.6	79.2
2008	305	78.8	77.0	83.6	78.0
2009	332	78.6	76.6	83.9	77.4
2010	376	80.3	78.3	84.5	79.5
2011	299	80.2	76.5	86.7	78.1
1998-2011	3657	79.2	77.4	83.3	78.4

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	207	18.7	0.42	10.5	0.38	17.2	0.42	24.5	0.46
1999	205	18.3	0.42	10.3	0.39	16.7	0.43	24.3	0.48
2000	206	18.1	0.45	10.0	0.42	16.3	0.46	23.3	0.49
2001	217	18.7	0.49	10.3	0.46	16.6	0.50	23.2	0.54
2002	315	16.9	0.37	8.7	0.34	14.3	0.37	20.4	0.39
2003	382	20.4	0.44	10.3	0.40	16.7	0.44	23.8	0.47
2004	356	18.9	0.42	9.3	0.38	15.2	0.42	21.8	0.46
2005	357	18.8	0.42	9.0	0.37	14.6	0.40	21.1	0.45
2006	386	20.2	0.43	9.7	0.39	15.5	0.42	21.6	0.45
2007	464	20.9	0.48	9.7	0.43	15.9	0.47	22.5	0.51
2008	456	20.5	0.46	9.0	0.40	14.8	0.43	21.6	0.48
2009	491	22.0	0.52	9.7	0.45	15.6	0.48	22.0	0.52
2010	471	20.9	0.54	9.0	0.47	14.5	0.51	20.7	0.56
2011	421	18.7	0.59	8.2	0.51	13.1	0.55	18.1	0.59
1998-2011	4934	19.6	0.46	9.4	0.41	15.2	0.45	21.6	0.49

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	106	9.0	0.40	3.0	0.29	4.9	0.33	7.1	0.38
1999	116	9.8	0.49	3.5	0.37	5.6	0.41	7.9	0.46
2000	119	9.9	0.50	3.4	0.41	5.5	0.44	7.9	0.48
2001	112	9.2	0.41	3.1	0.32	5.0	0.35	7.3	0.40
2002	186	9.5	0.41	3.3	0.34	5.3	0.37	7.3	0.39
2003	189	9.6	0.45	3.2	0.37	5.2	0.40	7.3	0.43
2004	202	10.2	0.48	3.2	0.37	5.2	0.40	7.4	0.43
2005	202	10.2	0.46	3.3	0.37	5.3	0.39	7.4	0.42
2006	207	10.3	0.46	3.4	0.34	5.4	0.38	7.6	0.42
2007	227	9.8	0.47	3.0	0.35	5.0	0.40	7.3	0.44
2008	221	9.5	0.46	3.1	0.35	4.9	0.38	6.9	0.42
2009	240	10.3	0.49	3.4	0.40	5.4	0.44	7.6	0.46
2010	253	10.8	0.57	3.2	0.47	5.3	0.50	7.7	0.55
2011	189	8.1	0.55	2.6	0.40	4.3	0.46	6.0	0.52
1998-2011	2569	9.8	0.47	3.2	0.37	5.1	0.40	7.3	0.44

Table 13

Age distribution of age at death (cancer-related) for period 1998-2011
(**incl. multiple primaries**)

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4	1	0.0	0.0	1	0.0	0.0			0.0
5-9	5	0.1	0.1	2	0.0	0.1	3	0.1	0.1
10-14	0	0.0	0.1			0.1			0.1
15-19	0	0.0	0.1			0.1			0.1
20-24	3	0.0	0.1	2	0.0	0.1	1	0.0	0.1
25-29	3	0.0	0.2	1	0.0	0.1	2	0.1	0.2
30-34	2	0.0	0.2	1	0.0	0.1	1	0.0	0.3
35-39	11	0.1	0.3	7	0.1	0.3	4	0.1	0.4
40-44	34	0.4	0.7	23	0.4	0.7	11	0.4	0.8
45-49	85	1.1	1.8	61	1.2	1.9	24	0.9	1.7
50-54	189	2.4	4.2	133	2.5	4.4	56	2.1	3.8
55-59	399	5.0	9.2	309	5.9	10.3	90	3.4	7.2
60-64	614	7.7	17.0	466	8.9	19.2	148	5.5	12.7
65-69	969	12.2	29.2	708	13.5	32.7	261	9.7	22.4
70-74	1273	16.1	45.2	910	17.3	50.0	363	13.5	35.9
75-79	1433	18.1	63.3	962	18.3	68.3	471	17.6	53.5
80-84	1453	18.3	81.6	893	17.0	85.3	560	20.9	74.4
85+	1457	18.4	100.0	770	14.7	100.0	687	25.6	100.0
All ages	7931	100.0		5249	100.0		2682	100.0	

Included in the statistics are 45.4% multiple primaries in males and 33.3% in females.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2011
(**incl. multiple primaries**)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4	1		0.1	0.03	0.0		3.4	
5- 9	2	3	0.2	0.22	0.2	0.38	6.5	8.3
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24	2	1	0.1	0.67	0.1	0.14	2.5	2.3
25-29	1	2	0.1	0.09	0.1	0.25	1.1	2.0
30-34	1	1	0.1	0.04	0.1	0.04	0.6	0.5
35-39	7	4	0.3	0.06	0.2	0.07	1.9	0.9
40-44	23	11	1.0	0.12	0.5	0.16	3.0	1.1
45-49	61	24	3.1	0.16	1.3	0.19	4.0	1.4
50-54	133	56	8.0	0.23	3.3	0.28	4.7	2.1
55-59	309	90	19.8	0.33	5.5	0.25	6.0	2.2
60-64	466	148	30.6	0.33	9.2	0.29	6.0	2.7
65-69	708	261	51.9	0.39	17.5	0.37	6.8	3.7
70-74	910	363	88.2	0.51	29.4	0.45	8.2	4.5
75-79	962	471	142.4	0.59	47.4	0.52	8.8	5.2
80-84	893	560	219.8	0.79	70.4	0.70	10.2	5.8
85+	770	687	277.6	0.88	92.5	0.75	10.8	6.0
All ages	5249	2682					7.8	4.4
Mortality								
Raw			20.9	0.48	10.2	0.49		
WS			10.0	0.43	3.3	0.38		
ES			16.2	0.47	5.4	0.42		
BRD-S			23.0	0.51	7.6	0.45		
PYLL-70								
per 100,000			61.8		23.0			
ES			54.6		19.9			
AYLL-70			8.2		8.6			

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

Table 15a

Multiple primaries in deaths in period 1998-2011
MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	20	0.7	7	35.0	2	10.0	11	55.0
C09-C10 Oropharynx	29	1.0	14	48.3	2	6.9	13	44.8
C15 Oesophagus	35	1.2	9	25.7	2	5.7	24	68.6
C16 Stomach	93	3.1	26	28.0	7	7.5	60	64.5
C18 Colon	210	7.1	100	47.6	28	13.3	82	39.0
C19-C20 Rectum	100	3.4	38	38.0	15	15.0	47	47.0
C22 Liver	47	1.6	10	21.3	9	19.1	28	59.6
C23-C24 Bile	21	0.7	3	14.3	2	9.5	16	76.2
C25 Pancreas	64	2.2	3	4.7	9	14.1	52	81.3
C32 Larynx	33	1.1	24	72.7	1	3.0	8	24.2
C33-C34 Lung	376	12.7	63	16.8	34	9.0	279	74.2
C43 Malign. melanoma	65	2.2	39	60.0	3	4.6	23	35.4
C44 Skin others	94	3.2	42	44.7	6	6.4	46	48.9
C61 Prostate	846	28.6	281	33.2	211	24.9	354	41.8
C64 Kidney	122	4.1			27	22.1	95	77.9
C65 Renal pelvis	110	3.7			16	14.5	94	85.5
C66 Ureter	64	2.2			17	26.6	47	73.4
C67 Bladder	223	7.5			38	17.0	185	83.0
C68 Urethra	23	0.8			7	30.4	16	69.6
C68 Urinary org.	23	0.8			2	8.7	21	91.3
C70-C72 CNS cancer	39	1.3	11	28.2	4	10.3	24	61.5
C76-C79 CUP	38	1.3	14	36.8	5	13.2	19	50.0
C82-C85 NHL	76	2.6	27	35.5	11	14.5	38	50.0
C90 Mult. myeloma	34	1.1	10	29.4	5	14.7	19	55.9
C91-C96 Leukaemia	46	1.6	7	15.2	4	8.7	35	76.1
Other primaries	128	4.3	57	44.5	10	7.8	61	47.7
All mult. primaries	2959	100.0	785	26.5	477	16.1	1697	57.4

Multiple primaries with number of cases n<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 1998-2011
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C16	Stomach	35	3.0	10	28.6	8	22.9	17	48.6
C18	Colon	95	8.2	41	43.2	12	12.6	42	44.2
C19-C20	Rectum	36	3.1	17	47.2	4	11.1	15	41.7
C22	Liver	12	1.0	2	16.7	4	33.3	6	50.0
C23-C24	Bile	15	1.3			3	20.0	12	80.0
C25	Pancreas	44	3.8	2	4.5	6	13.6	36	81.8
C33-C34	Lung	95	8.2	11	11.6	11	11.6	73	76.8
C43	Malign. melanoma	21	1.8	12	57.1	1	4.8	8	38.1
C44	Skin others	21	1.8	8	38.1	1	4.8	12	57.1
C50	Breast	229	19.8	138	60.3	16	7.0	75	32.8
C53	Cervix uteri	66	5.7	51	77.3	6	9.1	9	13.6
C54	Corpus uteri	50	4.3	36	72.0	8	16.0	6	12.0
C56	Ovary	33	2.8	15	45.5	6	18.2	12	36.4
C64	Kidney	48	4.1			12	25.0	36	75.0
C65	Renal pelvis	33	2.8			7	21.2	26	78.8
C66	Ureter	24	2.1			10	41.7	14	58.3
C67	Bladder	100	8.6			9	9.0	91	91.0
C70-C72	CNS cancer	18	1.6	4	22.2	3	16.7	11	61.1
C73	Thyroid	23	2.0	12	52.2	1	4.3	10	43.5
C76-C79	CUP	24	2.1	4	16.7	1	4.2	19	79.2
C82-C85	NHL	28	2.4	10	35.7	6	21.4	12	42.9
C91-C96	Leukaemia	27	2.3	2	7.4	4	14.8	21	77.8
Other primaries		81	7.0	29	35.8	12	14.8	40	49.4
All mult. primaries		1158	100.0	404	34.9	151	13.0	603	52.1

Multiple primaries with number of cases n<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 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2011
(**Singular primaries only** *)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4			0.0		0.0			
5- 9	2	1	0.2	0.22	0.1	0.17	6.9	3.0
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24	2	1	0.1	0.67	0.1	0.14	2.7	2.6
25-29	1	2	0.1	0.09	0.1	0.25	1.2	2.1
30-34	1	1	0.1	0.04	0.1	0.04	0.6	0.6
35-39	7	4	0.3	0.06	0.2	0.09	2.1	1.0
40-44	19	8	0.9	0.11	0.4	0.14	2.7	0.9
45-49	55	19	2.8	0.16	1.0	0.17	3.9	1.3
50-54	98	44	5.9	0.20	2.6	0.27	3.9	2.0
55-59	238	73	15.3	0.31	4.5	0.26	5.3	2.1
60-64	378	100	24.8	0.33	6.2	0.25	5.8	2.2
65-69	521	211	38.2	0.39	14.2	0.39	6.2	3.7
70-74	603	254	58.5	0.50	20.6	0.41	6.8	4.0
75-79	672	355	99.4	0.61	35.7	0.51	8.0	4.9
80-84	590	434	145.2	0.81	54.6	0.73	8.9	5.7
85+	534	541	192.5	0.89	72.8	0.75	9.7	5.9
All ages	3721	2048					6.9	4.1
Mortality								
Raw			14.8	0.46	7.8	0.48		
WS			7.2	0.41	2.5	0.36		
ES			11.5	0.45	4.1	0.40		
BRD-S			16.2	0.49	5.8	0.44		
PYLL-70								
per 100,000			48.9		17.6			
ES			43.1		15.1			
AYLL-70			8.4		8.6			

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2011
(**Single primaries only** *)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4			0.0		0.0			
5- 9	2	1	0.2	0.22	0.1	0.17	7.1	3.1
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24	1	1	0.1	0.33	0.1	0.14	1.4	2.8
25-29	1	2	0.1	0.09	0.1	0.25	1.3	2.2
30-34	1		0.1	0.04	0.0		0.6	
35-39	7	2	0.3	0.07	0.1	0.05	2.1	0.5
40-44	16	5	0.7	0.10	0.2	0.10	2.4	0.6
45-49	51	16	2.6	0.16	0.8	0.16	3.9	1.2
50-54	84	40	5.0	0.20	2.3	0.26	3.7	2.0
55-59	192	61	12.3	0.30	3.7	0.24	4.7	2.0
60-64	297	81	19.5	0.31	5.1	0.24	5.2	2.0
65-69	381	175	28.0	0.35	11.8	0.36	5.2	3.6
70-74	423	192	41.0	0.43	15.6	0.35	5.7	3.5
75-79	458	280	67.8	0.51	28.2	0.44	6.7	4.6
80-84	397	348	97.7	0.63	43.8	0.64	7.4	5.4
85+	387	456	139.5	0.70	61.4	0.66	8.6	5.7
All ages	2698	1660					5.8	3.9
Mortality								
Raw			10.7	0.40	6.3	0.42		
WS			5.3	0.35	2.0	0.32		
ES			8.4	0.38	3.3	0.36		
BRD-S			11.6	0.42	4.7	0.39		
PYLL-70								
per 100,000			40.1		14.5			
ES			35.5		12.5			
AYLL-70			8.8		8.5			

* See corresponding tables with multiple primaries.

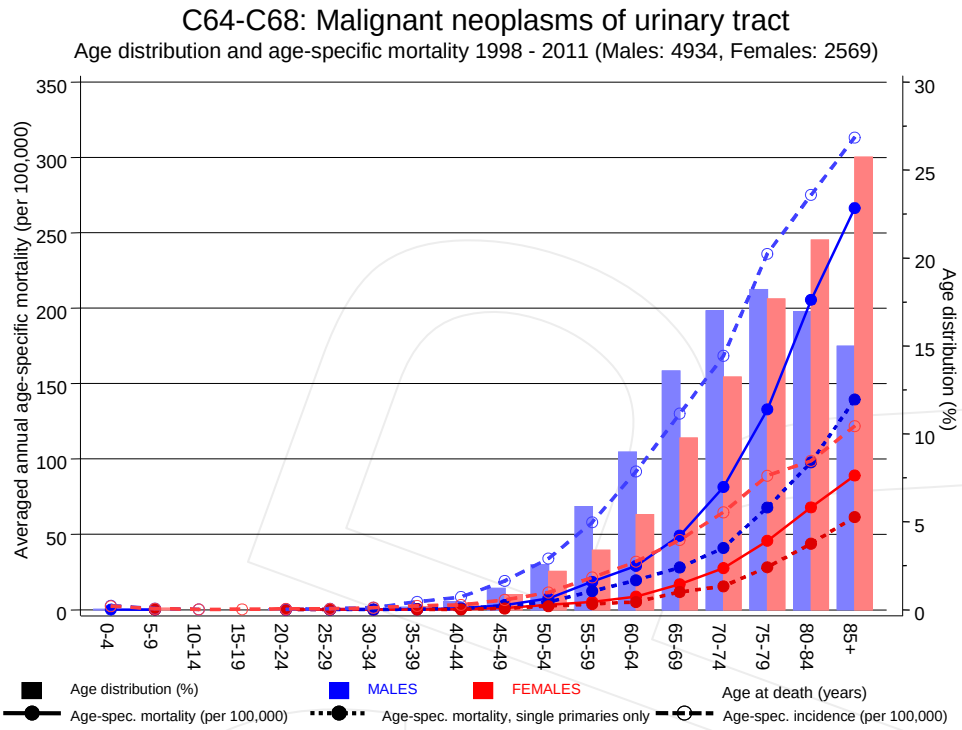
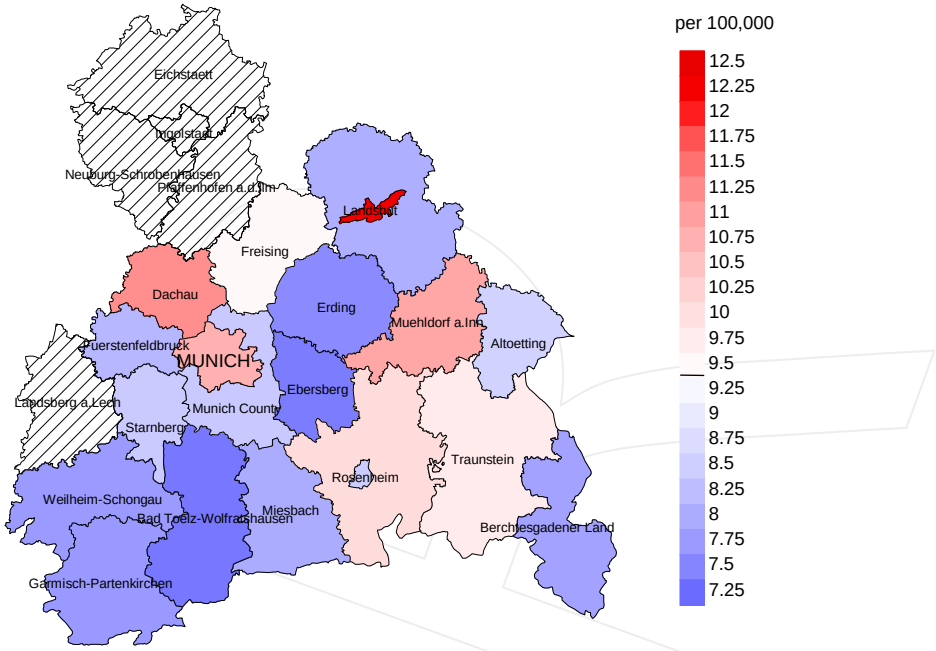


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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) 2003 - 2008: Males



Average mortality (world standard population) 2003 - 2008: Females

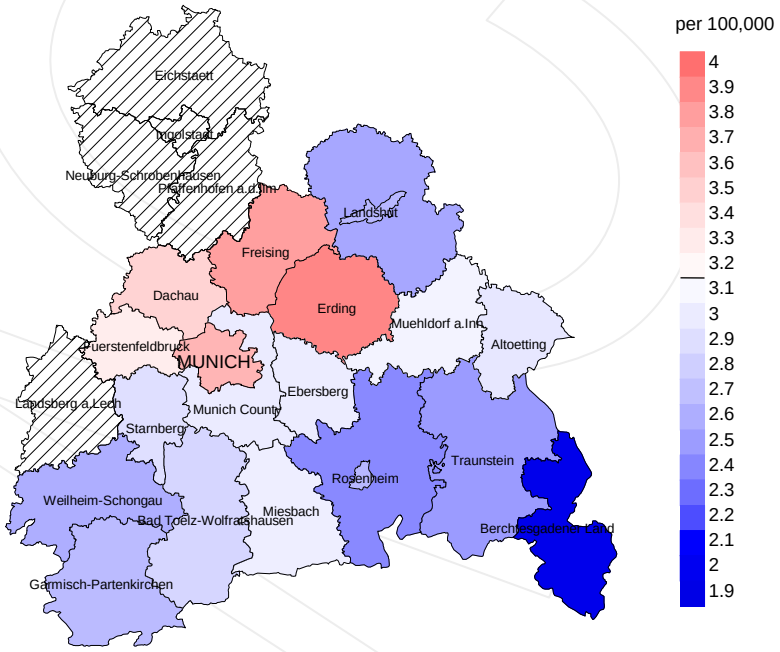
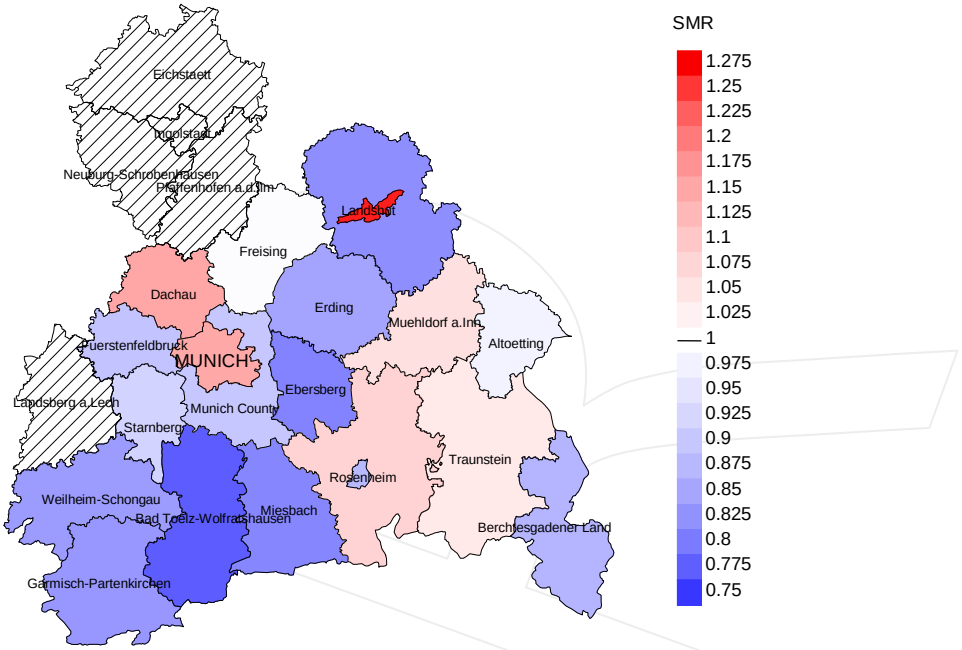


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 9.4/100,000 WS N=2,283, females 3.2/100,000 WS N=1,187). Since cancer data are not available in some counties until 2007, the local mortality rates were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 32 women died from urinary tract cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 3.0/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.7 and 5.0/100,000.

Standardized mortality ratio (SMR) 2003 - 2008: Males



Standardized mortality ratio (SMR) 2003 - 2008: Females

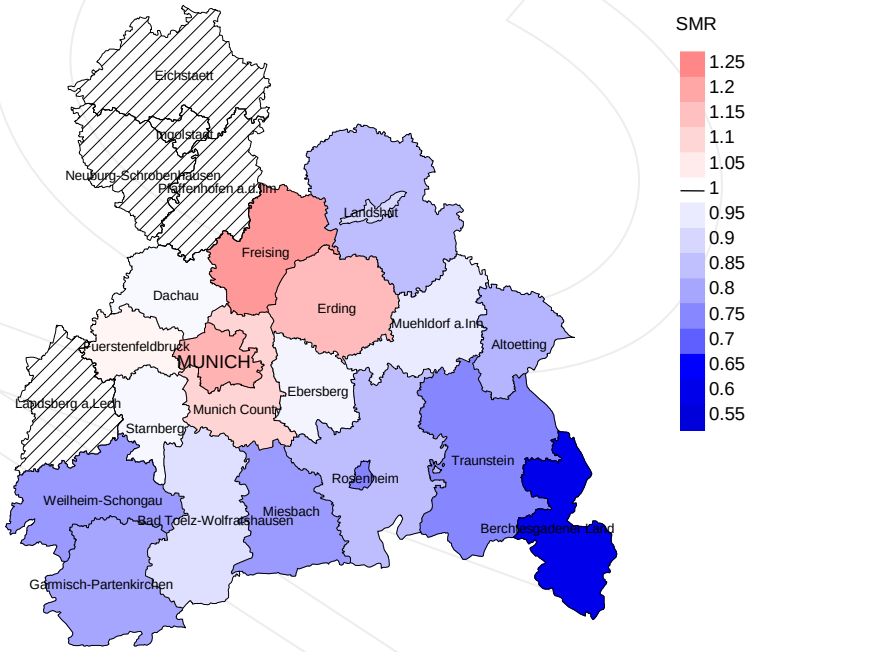


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=2,283, females N=1,187). Since cancer data are not available in some counties until 2007, the local SMR values were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 32 women died from urinary tract cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.97. Though, the value of this parameter may vary with an underlying probability of 99% between 0.59 and 1.51, and is therefore not statistically striking.

Statistical Notes

In all tables and figures the respective reference values should be carefully considered. The incidence rates include diagnoses (with multiple primary), and death certificate only (DCO) cases. For mortality statistics patients, diagnoses and progressive course of disease are presented. In the calculations, all courses of disease are considered whereby progressions occurred and/or death certificate identified progressive cancers were ascertained. Additionally there are three groups of disease course to consider:

1. **All multiple primaries included**

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

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

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

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

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

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

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

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

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

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

Shortcuts

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

Recommended Citation

Munich Cancer Registry. Baseline statistics C64-C68: Urinary tract cancer [Internet]. 2013 [updated 2013 Apr 2; cited 2013 Jun 1]. Available from: http://www.tumorregister-muenchen.de/en/facts/base/base_C6468E.pdf

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