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-C66, C68: Urinary tract cancer

Year of diagnosis	1998-2012
Patients	10,079
Diseases	10,375
Creation date	03/20/2014
Export date	02/12/2014
Population	4.5 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[#], 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, March 2014

[#] 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 2013 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
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	453	38	8.4	34.9	60.9	97.6	
1999	442	33	7.5	32.4	61.5	97.5	
2000	413	40	9.7	34.6	57.4	97.1	
2001	417	45	10.8	32.1	59.7	98.1	
2002	716	103	14.4	37.0	62.8	98.2	#
2003	703	76	10.8	33.1	57.0	96.7	#
2004	708	81	11.4	36.7	49.6	96.8	#
2005	773	44	5.7	38.6	45.3	96.2	#
2006	749	50	6.7	36.2	45.9	92.5	#
2007	857	78	9.1	33.1	45.0	79.8	# ##
2008	895	73	8.2	35.9	40.1	64.0	
2009	892	73	8.2	37.8	37.6	61.7	
2010	864	66	7.6	35.8	34.4	60.6	
2011	797	58	7.3	33.6	31.6	63.1	
2012	696	64	9.2	34.2	25.3	97.3	###
1998-2012	10375	922	8.9	35.3	45.6	83.8	

\# 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	453	280	173	61.8
1999	442	271	171	61.3
2000	413	267	146	64.6
2001	417	245	172	58.8
2002	716	432	284	60.3
2003	703	437	266	62.2
2004	708	438	270	61.9
2005	773	493	280	63.8
2006	749	464	285	61.9
2007	857	556	301	64.9
2008	895	568	327	63.5
2009	892	558	334	62.6
2010	864	553	311	64.0
2011	797	507	290	63.6
2012	696	446	250	64.1
1998-2012	10375	6515	3860	62.8

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	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	284	23.2	14.5	13.3	6.7	19.7	9.6	25.0	12.2
2003	437	266	23.3	13.5	13.7	5.9	19.4	8.6	24.1	11.0
2004	438	270	23.3	13.7	13.6	6.2	19.3	8.9	23.9	11.3
2005	493	280	26.0	14.1	14.7	6.4	21.2	9.1	25.8	11.7
2006	464	285	24.2	14.2	13.6	6.8	19.3	9.5	23.9	11.6
2007	556	301	25.1	13.0	13.8	5.7	19.8	8.1	24.6	10.4
2008	568	327	25.5	14.1	13.9	6.4	19.9	9.1	24.6	11.7
2009	558	334	25.0	14.4	13.5	6.3	19.3	9.0	24.1	11.7
2010	553	311	24.5	13.3	12.7	5.3	18.3	8.0	23.1	10.3
2011	507	290	22.2	12.3	11.7	5.7	16.7	7.8	20.7	9.7
2012	446	250	19.5	10.6	10.0	4.3	14.7	6.4	18.5	8.5
1998-2012	6515	3860	23.7	13.4	13.3	6.0	19.1	8.7	23.7	11.0

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	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	716	68.4	12.8	2.4	99.5	51.0	61.3	69.6	77.2	82.7
2003	703	67.8	13.6	0.4	99.6	51.6	60.8	68.7	76.8	83.3
2004	708	67.2	13.6	0.0	94.6	49.4	60.8	68.5	76.5	82.2
2005	773	67.4	13.0	0.7	95.1	51.5	60.3	68.2	76.6	82.1
2006	749	67.3	14.0	0.2	95.5	49.7	60.3	68.9	76.3	83.3
2007	857	68.0	14.2	1.2	99.1	50.0	61.7	69.8	76.9	83.6
2008	895	68.0	13.2	0.6	98.1	51.3	60.7	69.0	77.1	83.3
2009	892	68.0	13.9	0.5	96.9	50.3	60.5	70.2	77.8	83.1
2010	864	68.8	13.2	5.4	100	50.8	60.7	70.7	77.8	83.9
2011	797	68.5	14.4	0.5	96.9	51.0	61.6	70.5	77.6	84.6
2012	696	69.4	12.5	9.7	93.1	52.8	61.7	70.9	78.8	83.5
1998-2012	10375	67.8	13.5	0.0	100	51.0	60.6	69.2	77.0	83.1

Table 3a

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	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	437	65.6	13.5	0.4	99.6	48.6	59.8	65.8	74.4	80.7
2004	438	65.5	13.6	0.0	93.6	49.0	58.8	67.3	74.7	80.1
2005	493	66.0	11.8	0.7	93.3	51.4	59.2	66.7	73.7	79.7
2006	464	66.0	12.9	0.8	95.4	49.5	59.9	67.3	74.4	80.3
2007	556	66.4	13.0	2.6	93.1	49.6	59.4	68.3	75.0	80.6
2008	568	66.6	12.7	1.8	98.1	50.1	59.1	68.1	74.7	81.9
2009	558	66.6	13.5	0.5	96.1	49.6	59.0	69.0	75.8	81.8
2010	553	67.0	12.8	5.4	93.5	48.2	59.6	69.4	76.0	81.6
2011	507	67.6	12.9	1.5	96.9	51.0	60.7	69.3	75.9	82.8
2012	446	67.8	12.7	28.9	93.1	51.3	59.8	69.6	76.8	83.1
1998-2012	6515	66.3	12.9	0.0	99.6	49.8	59.1	67.7	75.0	81.1

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	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	284	70.6	13.2	2.4	99.5	54.7	63.7	72.4	79.9	85.0
2003	266	71.4	13.0	2.5	96.5	56.3	64.5	72.4	80.8	85.8
2004	270	70.0	13.2	18.5	94.6	53.9	63.6	71.8	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	285	69.3	15.4	0.2	95.5	52.1	62.1	71.8	79.1	85.9
2007	301	70.9	15.9	1.2	99.1	53.0	66.2	73.2	80.5	85.8
2008	327	70.3	13.9	0.6	96.1	54.6	63.6	71.6	80.0	84.9
2009	334	70.3	14.3	2.5	96.9	51.4	65.4	72.7	79.9	84.6
2010	311	72.1	13.2	5.4	100	54.7	65.9	73.3	80.9	87.9
2011	290	69.9	16.7	0.5	96.5	51.1	65.2	73.4	79.7	86.2
2012	250	72.2	11.6	9.7	92.8	56.9	67.2	74.0	80.4	84.3
1998-2012	3860	70.3	14.1	0.2	100	53.6	63.7	72.3	79.7	85.3

Table 4

Age distribution by 5-year age group and gender for period 1998-2012 (incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4	60	0.6	0.6	32	0.5	0.5	28	0.7	0.7
5-9	17	0.2	0.7	9	0.1	0.6	8	0.2	0.9
10-14	3	0.0	0.8	2	0.0	0.7	1	0.0	1.0
15-19	3	0.0	0.8			0.7	3	0.1	1.0
20-24	10	0.1	0.9	3	0.0	0.7	7	0.2	1.2
25-29	16	0.2	1.1	10	0.2	0.9	6	0.2	1.4
30-34	51	0.5	1.5	29	0.4	1.3	22	0.6	1.9
35-39	157	1.5	3.1	107	1.6	2.9	50	1.3	3.2
40-44	227	2.2	5.2	168	2.6	5.5	59	1.5	4.8
45-49	403	3.9	9.1	306	4.7	10.2	97	2.5	7.3
50-54	596	5.7	14.9	445	6.8	17.1	151	3.9	11.2
55-59	915	8.8	23.7	645	9.9	27.0	270	7.0	18.2
60-64	1308	12.6	36.3	905	13.9	40.8	403	10.4	28.6
65-69	1696	16.3	52.6	1129	17.3	58.2	567	14.7	43.3
70-74	1693	16.3	69.0	1098	16.9	75.0	595	15.4	58.7
75-79	1495	14.4	83.4	825	12.7	87.7	670	17.4	76.1
80-84	1020	9.8	93.2	517	7.9	95.6	503	13.0	89.1
85+	705	6.8	100.0	285	4.4	100.0	420	10.9	100.0
All ages	10375	100.0		6515	100.0		3860	100.0	

Included in the statistics are 48.6% multiple primaries in males and 37.2% in females.

Table 5

Age-specific incidence, DCO rate and proportion of all cancers
for period 1998-2012

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=466 %	Females DCO rate n=450 %	Males Prop.all cancers n=146755 %	Females Prop.all cancers n=142297 %
0- 4	30	27	2.2	2.1			9.8	11.9
5- 9	9	7	0.6	0.5			5.5	6.2
10-14	2	1	0.1	0.1			1.4	0.6
15-19		3	0.0	0.2				1.1
20-24	3	7	0.2	0.4			0.5	1.4
25-29	10	6	0.5	0.3			1.1	0.6
30-34	29	22	1.4	1.1	3.4		2.1	1.2
35-39	107	48	4.6	2.2			5.1	1.4
40-44	164	59	6.8	2.6	0.6		5.5	1.0
45-49	300	96	13.9	4.5	0.3	1.0	6.1	1.2
50-54	430	150	23.3	7.9	1.9		5.4	1.5
55-59	628	268	37.0	15.0	2.4	2.2	4.6	2.1
60-64	885	398	53.7	22.9	3.4	0.3	4.3	2.5
65-69	1101	556	75.0	34.7	4.7	3.4	4.3	3.1
70-74	1071	586	92.4	42.5	5.0	7.3	4.4	3.5
75-79	816	659	108.3	60.2	10.8	8.5	4.3	4.1
80-84	508	495	111.9	57.3	18.1	21.0	4.0	3.3
85+	283	417	91.3	50.9	43.8	52.8	3.1	2.6
All ages	6376	3805			7.3	11.8	4.3	2.7
Incidence								
Raw			23.2	13.3				
WS			13.0	6.0				
ES			18.6	8.6				
BRD-S			23.2	10.9				

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 1998-2012
MALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C03-C06	Oral cavity	4	2.4	1.7	0.5	4.2		0.9	
C09-C10	Oropharynx	7	3.0	2.3	0.9	4.8		2.3	
C12-C13	Hypopharynx	2	1.7	1.2	0.1	4.2		0.2	
C15	Oesophagus	11	5.1	2.2	1.1	3.9	#	3.4	18.2
C16	Stomach	18	12.3	1.5	0.9	2.3		3.3	16.7
C17	Small intestine	7	1.4	5.1	2.0	10.4	#	3.3	
C18	Colon	60	29.3	2.0	1.6	2.6	#	17.8	8.3
C19-C20	Rectum	22	16.5	1.3	0.8	2.0		3.2	
C22	Liver	20	8.1	2.5	1.5	3.8	#	6.9	20.0
C23-C24	Bile	4	2.8	1.4	0.4	3.7		0.7	25.0
C25	Pancreas	17	10.3	1.7	1.0	2.6		3.9	29.4
C32	Larynx	9	3.0	3.0	1.4	5.7	#	3.5	
C33-C34	Lung	91	34.8	2.6	2.1	3.2	#	32.6	14.3
C38,C45	Mesothelioma	2	1.9	1.0	0.1	3.7		0.0	50.0
C43	Malign. melanoma	38	11.2	3.4	2.4	4.7	#	15.6	2.6
C46,C49	Soft tissue	5	1.5	3.3	1.1	7.7	#	2.0	
C48	Peritoneal	2	0.2	9.9	1.2	35.7	#	1.0	
C60	Penis	2	0.7	3.0	0.4	11.0		0.8	
C61	Prostate	257	88.0	2.9	2.6	3.3	#	98.1	4.3
C62	Testis	5	0.7	6.7	2.2	15.7	#	2.5	
C64	Kidney	107	10.3	10.4	8.5	12.6	#	56.1	4.7
C65	Renal pelvis	24	1.2	20.2	13.0	30.1	#	13.2	
C66	Ureter	20	0.7	30.3	18.5	46.8	#	11.2	
C67	Bladder	102	12.8	8.0	6.5	9.7	#	51.8	4.9
C68	Urethra	3	0.2	19.1	3.9	55.9	#	1.7	
C70-C72	CNS cancer	6	3.9	1.5	0.6	3.4		1.2	
C73	Thyroid	7	1.9	3.8	1.5	7.8	#	3.0	
C76-C79	CUP	5	4.9	1.0	0.3	2.4		0.0	20.0
C82-C85	NHL	37	11.5	3.2	2.3	4.4	#	14.8	8.1
C90	Mult. myeloma	7	3.7	1.9	0.8	3.9		1.9	
C91-C96	Leukaemia	8	4.7	1.7	0.7	3.4		1.9	25.0
Other primaries		10	4.3	2.3	1.1	4.3	#	3.3	30.0
Not observed		0	1.6	0.0	0.0	2.3		-0.9	
All mult. primaries		919	296.7	3.1	2.9	3.3	#	361.3	7.1

Patients	4308
Mean age at second malignancy (years)	70.2
Person-years	17224
Mean observation time (years)	4.0
Median observation time (years)	3.0

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 1998-2012
FEMALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C16	Stomach	9	4.9	1.8	0.8	3.5		4.0	
C18	Colon	22	13.4	1.6	1.0	2.5	#	8.5	4.5
C19-C20	Rectum	10	5.8	1.7	0.8	3.2		4.2	10.0
C22	Liver	2	1.5	1.4	0.2	4.9		0.5	50.0
C23-C24	Bile	9	2.0	4.6	2.1	8.7	#	6.9	22.2
C25	Pancreas	11	5.7	1.9	1.0	3.4		5.2	27.3
C33-C34	Lung	31	8.6	3.6	2.4	5.1	#	22.1	6.5
C43	Malign. melanoma	3	4.1	0.7	0.2	2.1		-1.1	
C46,C49	Soft tissue	2	0.7	2.9	0.4	10.5		1.3	
C50	Breast	69	35.9	1.9	1.5	2.4	#	32.7	8.7
C53	Cervix uteri	4	1.5	2.6	0.7	6.7		2.4	
C54	Corpus uteri	11	7.0	1.6	0.8	2.8		4.0	9.1
C56	Ovary	3	5.3	0.6	0.1	1.7		-2.3	
C64	Kidney	50	3.3	15.3	11.3	20.2	#	46.2	12.0
C65	Renal pelvis	9	0.4	22.4	10.3	42.6	#	8.5	
C66	Ureter	12	0.2	60.2	31.1	105.1	#	11.7	
C67	Bladder	44	2.5	17.9	13.0	24.0	#	41.0	2.3
C73	Thyroid	14	1.9	7.2	3.9	12.1	#	11.9	
C76-C79	CUP	5	2.3	2.2	0.7	5.0		2.7	20.0
C82-C85	NHL	14	5.0	2.8	1.5	4.7	#	8.9	7.1
C90	Mult. myeloma	2	1.6	1.2	0.1	4.4		0.4	
C91-C96	Leukaemia	5	2.0	2.4	0.8	5.7		2.9	20.0
Other primaries		8	6.3	1.3	0.6	2.5		1.7	12.5
Not observed		0	3.4	0.0	0.0	1.1		-3.4	
All mult. primaries		349	125.3	2.8	2.5	3.1	#	221.0	8.0

Patients	2480
Mean age at second malignancy (years)	72.1
Person-years	10123
Mean observation time (years)	4.1
Median observation time (years)	3.0

The occurrence of second malignancy is statistically significant.

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

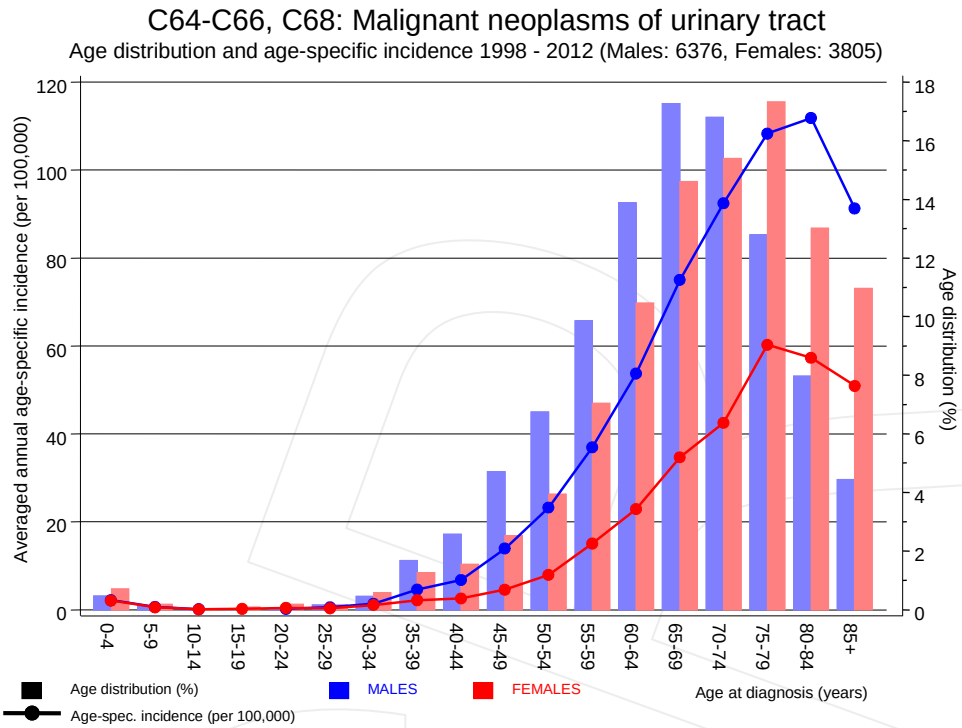


Figure 7. Age distribution and age-specific incidence

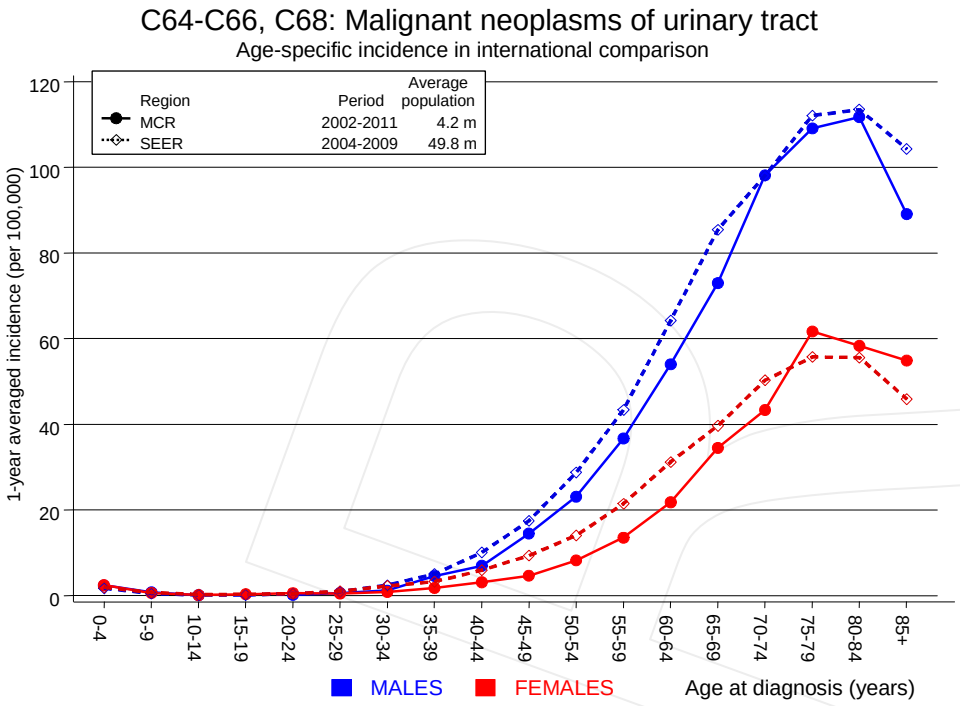


Figure 7a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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.

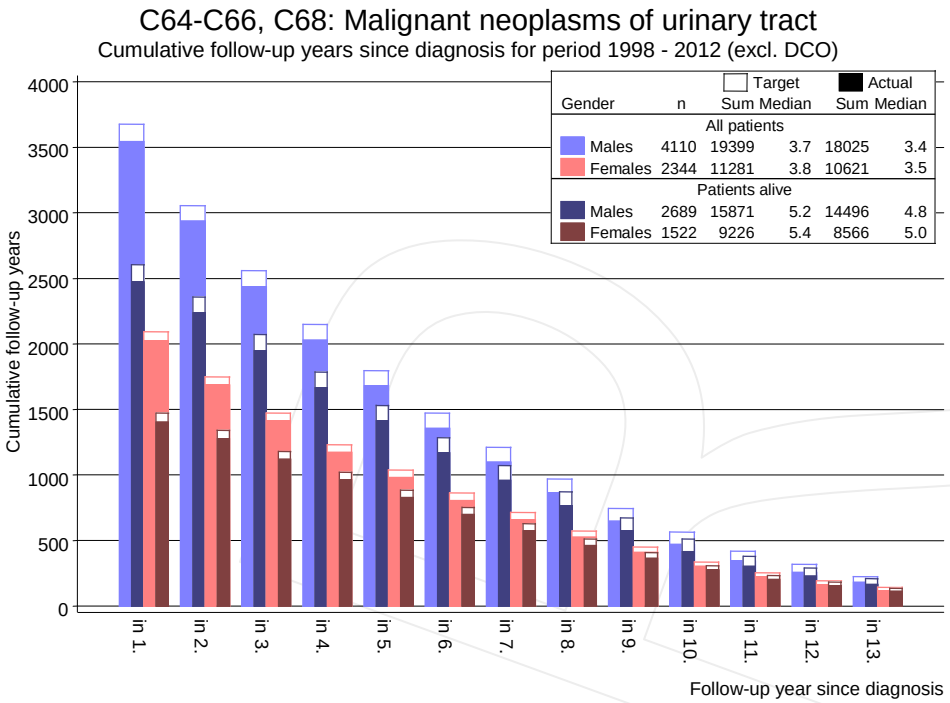
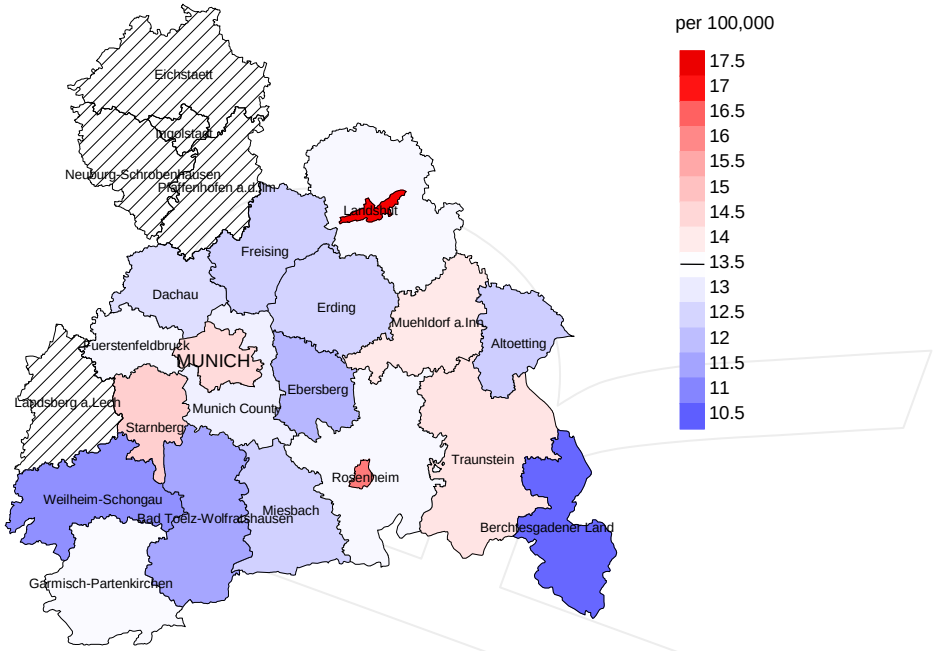


Figure 8. Cumulative follow-up years depending on time since diagnosis

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

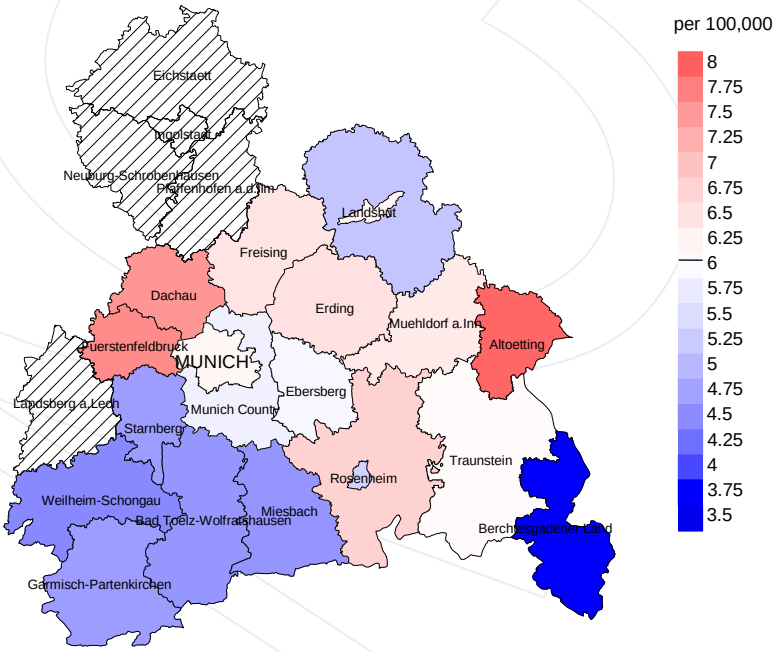
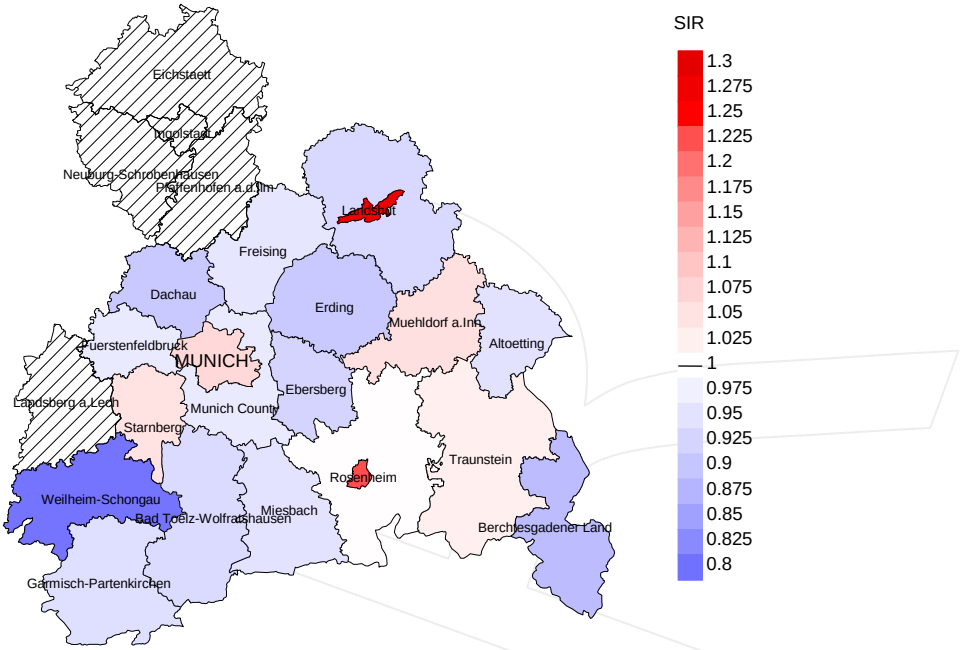


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 13.5/100,000 WS N=2,762, females 6.1/100,000 WS N=1,619). 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 46 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 5.9/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 3.5 and 10.3/100,000.

Standardized incidence ratio (SIR) 2003 - 2008: Males



Standardized incidence ratio (SIR) 2003 - 2008: Females

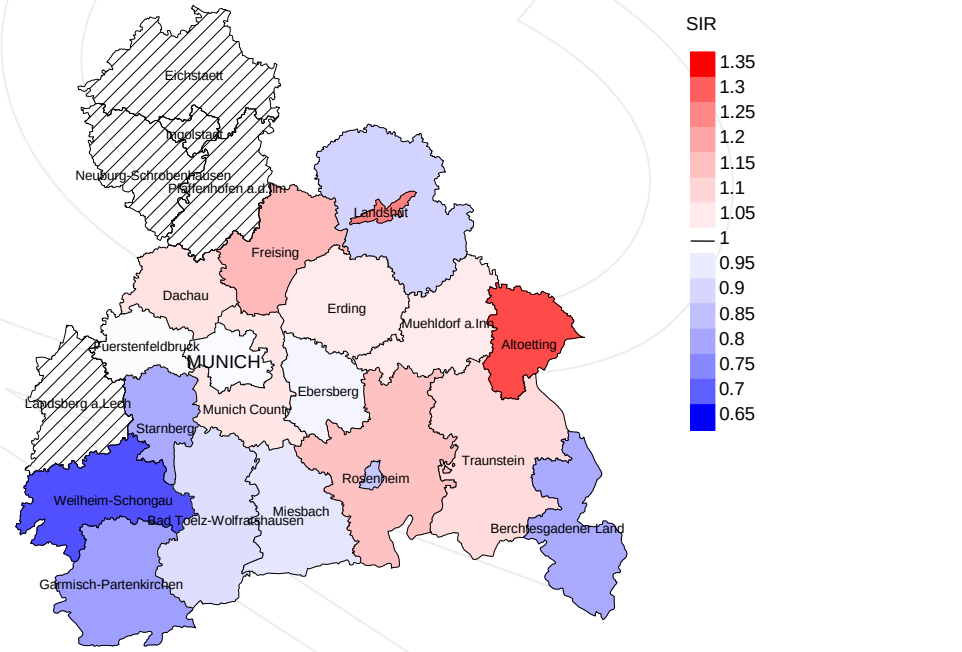


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=2,762, females N=1,619). 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 46 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 0.97. Though, the value of this parameter may vary with an underlying probability of 99% between 0.64 and 1.41, 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	453	97.6	8.4	276	60.9	94.2
1999	442	97.5	7.5	272	61.5	94.5
2000	413	97.1	9.7	237	57.4	95.4
2001	417	98.1	10.8	249	59.7	98.8
2002	716	98.2	14.4	450	62.8	96.4
2003	703	96.7	10.8	401	57.0	98.3
2004	708	96.8	11.4	351	49.6	97.7
2005	773	96.2	5.7	350	45.3	97.7
2006	749	92.5	6.7	344	45.9	98.0
2007	857	79.8	9.1	386	45.0	97.9
2008	895	64.0	8.2	359	40.1	99.4
2009	892	61.7	8.2	335	37.6	98.8
2010	864	60.6	7.6	297	34.4	99.0
2011	797	63.1	7.3	252	31.6	98.4
2012	696	97.3	9.2	176	25.3	92.6
1998-2012	10375	83.8	8.9	4735	45.6	97.4

Table 10b

Annual cohorts of incident cancers and deaths, proportion of death certificates and cases deceased the same year of cancer diagnosis
(incl. DCO)
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.52 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	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	716	377	97.3	149	20.8
2003	703	410	96.3	141	20.1
2004	708	399	96.5	129	18.2
2005	773	375	95.7	101	13.1
2006	749	419	97.6	105	14.0
2007	857	466	97.6	140	16.3
2008	895	494	99.4	136	15.2
2009	892	510	99.2	153	17.2
2010	864	542	98.5	142	16.4
2011	797	541	98.3	144	18.1
2012	696	546	99.1	133	19.1
1998-2012	10375	6096	97.5	1753	16.9

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	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	399	69.9	30.1	82.1
2005	375	74.1	25.9	83.3
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	542	68.3	31.7	78.1
2011	541	68.2	31.8	81.4
2012	546	61.7	38.3	72.1
1998-2012	6096	70.4	29.6	81.2

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	162	71.5	69.8	75.5	70.5
1999	157	72.9	71.1	78.3	71.7
2000	161	72.0	69.5	78.5	71.3
2001	169	71.2	69.7	75.3	70.4
2002	218	73.5	72.9	75.1	73.4
2003	249	73.9	72.4	78.9	73.3
2004	231	73.3	72.2	76.4	73.0
2005	221	73.1	71.7	76.8	72.6
2006	260	72.4	71.1	76.1	71.8
2007	290	73.7	72.1	79.0	72.8
2008	312	74.5	73.0	78.0	73.8
2009	323	73.7	72.1	78.2	72.5
2010	326	74.3	72.9	77.3	73.3
2011	352	75.2	73.0	80.5	74.1
2012	317	76.2	74.4	79.3	75.0
1998-2012	3748	73.7	72.1	77.8	72.9

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	88	79.4	76.8	82.6	78.8
1999	94	76.7	74.8	82.1	76.4
2000	97	76.2	75.3	78.4	76.3
2001	89	77.9	75.5	83.6	76.7
2002	159	76.8	75.0	80.7	75.9
2003	161	76.6	75.5	79.4	76.4
2004	168	79.2	77.8	81.9	78.8
2005	154	77.0	74.9	83.9	75.4
2006	159	77.6	76.4	80.0	76.5
2007	176	79.2	77.9	81.7	79.0
2008	182	78.1	76.4	82.7	77.1
2009	187	78.3	75.7	84.7	76.6
2010	216	79.1	76.8	84.1	77.8
2011	189	79.8	76.5	85.4	78.0
2012	229	78.4	75.9	82.2	76.4
1998-2012	2348	78.1	76.1	82.4	77.1

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	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	0.44	11.7	0.49
2004	167	8.9	0.39	4.5	0.33	7.1	0.37	9.9	0.42
2005	161	8.5	0.34	4.3	0.30	6.6	0.32	9.0	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	0.40	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	0.41	4.4	0.36	6.9	0.39	9.7	0.43
2011	249	10.9	0.50	4.8	0.42	7.5	0.46	10.3	0.51
2012	200	8.8	0.46	3.6	0.37	5.9	0.41	8.2	0.46
1998-2012	2695	9.8	0.42	4.8	0.37	7.6	0.41	10.4	0.45

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	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	0.39	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	112	5.7	0.42	1.8	0.30	2.9	0.34	4.2	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	0.31	4.0	0.35
2007	119	5.2	0.40	1.6	0.28	2.6	0.33	4.0	0.38
2008	133	5.7	0.42	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	0.48	2.0	0.38	3.2	0.41	4.8	0.47
2011	120	5.1	0.42	1.6	0.29	2.6	0.34	3.7	0.38
2012	137	5.8	0.56	1.9	0.44	3.0	0.48	4.4	0.53
1998-2012	1601	5.6	0.42	1.9	0.32	3.0	0.35	4.3	0.39

Table 13

Age distribution of age at death (cancer-related) for period 1998-2012
(**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	0.1	0.1	3	0.2	0.2
10-14	0	0.0	0.1			0.1			0.2
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	0.3	1	0.0	0.2	2	0.1	0.4
30-34	2	0.0	0.3	1	0.0	0.2	1	0.1	0.4
35-39	11	0.2	0.6	8	0.3	0.5	3	0.2	0.6
40-44	30	0.7	1.2	19	0.7	1.2	11	0.7	1.3
45-49	55	1.2	2.5	41	1.4	2.7	14	0.8	2.1
50-54	125	2.8	5.2	91	3.2	5.9	34	2.1	4.2
55-59	273	6.1	11.3	212	7.5	13.4	61	3.7	7.9
60-64	404	9.0	20.3	292	10.3	23.7	112	6.8	14.6
65-69	599	13.4	33.7	419	14.8	38.5	180	10.9	25.5
70-74	796	17.8	51.5	551	19.5	58.0	245	14.8	40.3
75-79	812	18.1	69.6	497	17.6	75.6	315	19.0	59.4
80-84	743	16.6	86.2	400	14.1	89.7	343	20.7	80.1
85+	620	13.8	100.0	291	10.3	100.0	329	19.9	100.0
All ages	4482	100.0		2828	100.0		1654	100.0	

Included in the statistics are 48.6% multiple primaries in males and 37.2% in females.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2012
(**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		3.2	
5- 9	2	3	0.1	0.22	0.2	0.38	5.7	7.7
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24	2	1	0.1	0.67	0.1	0.14	2.4	2.1
25-29	1	2	0.1	0.10	0.1	0.33	1.0	1.8
30-34	1	1	0.0	0.03	0.0	0.05	0.6	0.5
35-39	8	3	0.3	0.07	0.1	0.06	2.1	0.6
40-44	19	11	0.8	0.11	0.5	0.19	2.3	1.0
45-49	41	14	1.9	0.13	0.7	0.14	2.4	0.7
50-54	91	34	4.9	0.20	1.8	0.23	3.0	1.2
55-59	212	61	12.5	0.33	3.4	0.23	3.8	1.4
60-64	292	112	17.7	0.32	6.4	0.28	3.5	1.9
65-69	419	180	28.6	0.37	11.2	0.32	3.7	2.3
70-74	551	245	47.6	0.50	17.8	0.41	4.5	2.7
75-79	497	315	66.0	0.60	28.8	0.47	4.1	3.2
80-84	400	343	88.1	0.77	39.7	0.68	4.0	3.3
85+	291	329	93.8	1.02	40.2	0.78	3.6	2.6
All ages	2828	1654					3.8	2.5
Mortality								
Raw			10.3	0.43	5.8	0.43		
WS			5.1	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			38.6		15.2			
ES			34.3		13.1			
AYLL-70			8.8		8.8			

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

Table 15a

Multiple primaries in deaths in period 1998-2012
MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C09-C10 Oropharynx	19	1.1	10	52.6	2	10.5	7	36.8
C15 Oesophagus	20	1.2	4	20.0	1	5.0	15	75.0
C16 Stomach	52	3.0	17	32.7	4	7.7	31	59.6
C18 Colon	132	7.6	55	41.7	22	16.7	55	41.7
C19-C20 Rectum	59	3.4	19	32.2	15	25.4	25	42.4
C22 Liver	30	1.7	4	13.3	7	23.3	19	63.3
C23-C24 Bile	13	0.8	2	15.4	2	15.4	9	69.2
C25 Pancreas	38	2.2	2	5.3	6	15.8	30	78.9
C32 Larynx	16	0.9	11	68.8	1	6.3	4	25.0
C33-C34 Lung	172	9.9	37	21.5	24	14.0	111	64.5
C43 Malign. melanoma	38	2.2	21	55.3	3	7.9	14	36.8
C44 Skin others	43	2.5	21	48.8	2	4.7	20	46.5
C46,C49 Soft tissue	11	0.6	4	36.4	2	18.2	5	45.5
C61 Prostate	315	18.2	140	44.4	48	15.2	127	40.3
C64 Kidney	94	5.4			29	30.9	65	69.1
C65 Renal pelvis	37	2.1			10	27.0	27	73.0
C66 Ureter	41	2.4			22	53.7	19	46.3
C67 Bladder	341	19.7	164	48.1	53	15.5	124	36.4
C70-C72 CNS cancer	30	1.7	10	33.3	4	13.3	16	53.3
C73 Thyroid	11	0.6	3	27.3			8	72.7
C76-C79 CUP	24	1.4	14	58.3	3	12.5	7	29.2
C82-C85 NHL	52	3.0	14	26.9	9	17.3	29	55.8
C90 Mult. myeloma	30	1.7	8	26.7	6	20.0	16	53.3
C91-C96 Leukaemia	30	1.7	6	20.0	2	6.7	22	73.3
Other primaries	81	4.7	31	38.3	9	11.1	41	50.6
All mult. primaries	1729	100.0	597	34.5	286	16.5	846	48.9

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 15b

Multiple primaries in deaths in period 1998-2012
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C16	Stomach	25	3.1	6	24.0	7	28.0	12	48.0
C18	Colon	53	6.5	18	34.0	11	20.8	24	45.3
C19-C20	Rectum	25	3.1	7	28.0	5	20.0	13	52.0
C22	Liver	9	1.1	2	22.2	3	33.3	4	44.4
C23-C24	Bile	12	1.5			3	25.0	9	75.0
C25	Pancreas	36	4.4	2	5.6	5	13.9	29	80.6
C33-C34	Lung	66	8.1	10	15.2	7	10.6	49	74.2
C43	Malign. melanoma	15	1.8	8	53.3	1	6.7	6	40.0
C44	Skin others	21	2.6	14	66.7	2	9.5	5	23.8
C50	Breast	145	17.7	80	55.2	11	7.6	54	37.2
C53	Cervix uteri	24	2.9	17	70.8	1	4.2	6	25.0
C54	Corpus uteri	27	3.3	16	59.3	4	14.8	7	25.9
C56	Ovary	27	3.3	12	44.4	6	22.2	9	33.3
C64	Kidney	39	4.8			10	25.6	29	74.4
C65	Renal pelvis	15	1.8			3	20.0	12	80.0
C66	Ureter	19	2.3			13	68.4	6	31.6
C67	Bladder	126	15.4	39	31.0	21	16.7	66	52.4
C70-C72	CNS cancer	18	2.2	2	11.1	5	27.8	11	61.1
C73	Thyroid	20	2.4	10	50.0	1	5.0	9	45.0
C76-C79	CUP	13	1.6	3	23.1	1	7.7	9	69.2
C82-C85	NHL	23	2.8	8	34.8	6	26.1	9	39.1
C91-C96	Leukaemia	17	2.1	3	17.6	3	17.6	11	64.7
Other primaries		44	5.4	17	38.6	8	18.2	19	43.2
All mult. primaries		819	100.0	274	33.5	137	16.7	408	49.8

Multiple primaries with number of cases n<8 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 1998-2012
(**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	0.1	0.22	0.1	0.17	6.1	2.8
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24	2	1	0.1	0.67	0.1	0.14	2.6	2.3
25-29	1	2	0.1	0.10	0.1	0.33	1.1	1.9
30-34	1	1	0.0	0.04	0.0	0.05	0.6	0.5
35-39	8	3	0.3	0.08	0.1	0.07	2.2	0.7
40-44	16	8	0.7	0.11	0.3	0.16	2.1	0.9
45-49	38	10	1.8	0.14	0.5	0.11	2.5	0.6
50-54	64	27	3.5	0.18	1.4	0.22	2.4	1.1
55-59	162	47	9.5	0.31	2.6	0.22	3.4	1.3
60-64	231	76	14.0	0.33	4.4	0.24	3.3	1.5
65-69	311	149	21.2	0.39	9.3	0.34	3.4	2.4
70-74	372	170	32.1	0.51	12.3	0.38	3.8	2.4
75-79	333	243	44.2	0.62	22.2	0.46	3.6	3.1
80-84	250	263	55.1	0.80	30.5	0.74	3.4	3.2
85+	192	261	61.9	1.11	31.9	0.80	3.1	2.6
All ages	1983	1262					3.3	2.3
Mortality								
Raw			7.2	0.42	4.4	0.42		
WS			3.6	0.36	1.5	0.31		
ES			5.6	0.40	2.4	0.35		
BRD-S			7.6	0.44	3.3	0.39		
PYLL-70								
per 100,000			30.3		11.3			
ES			26.8		9.7			
AYLL-70			9.0		8.5			

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2012
(**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	0.1	0.22	0.1	0.17	6.3	2.9
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	2.5
25-29	1	2	0.1	0.10	0.1	0.33	1.2	2.1
30-34	1		0.0	0.04	0.0		0.6	
35-39	8	1	0.3	0.08	0.0	0.03	2.3	0.2
40-44	13	6	0.5	0.10	0.3	0.13	1.8	0.7
45-49	35	7	1.6	0.14	0.3	0.09	2.4	0.5
50-54	53	24	2.9	0.16	1.3	0.21	2.2	1.1
55-59	138	39	8.1	0.31	2.2	0.20	3.2	1.2
60-64	188	57	11.4	0.31	3.3	0.22	3.0	1.3
65-69	237	123	16.2	0.36	7.7	0.32	3.0	2.3
70-74	272	123	23.5	0.47	8.9	0.31	3.3	2.0
75-79	227	191	30.1	0.52	17.5	0.40	3.0	2.9
80-84	161	204	35.5	0.59	23.6	0.65	2.7	2.9
85+	125	201	40.3	0.77	24.5	0.66	2.5	2.3
All ages	1462	980					2.9	2.1
Mortality								
Raw			5.3	0.36	3.4	0.37		
WS			2.7	0.32	1.2	0.27		
ES			4.2	0.35	1.9	0.30		
BRD-S			5.5	0.38	2.6	0.34		
PYLL-70								
per 100,000			25.5		8.9			
ES			22.6		7.7			
AYLL-70			9.3		8.4			

* See corresponding tables with multiple primaries.

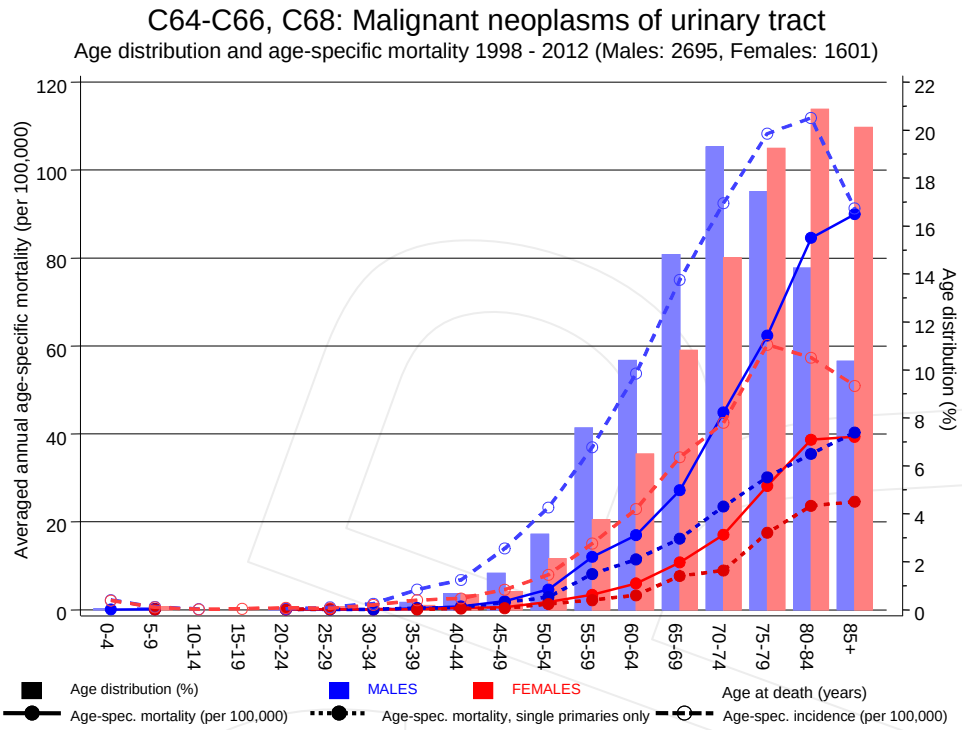
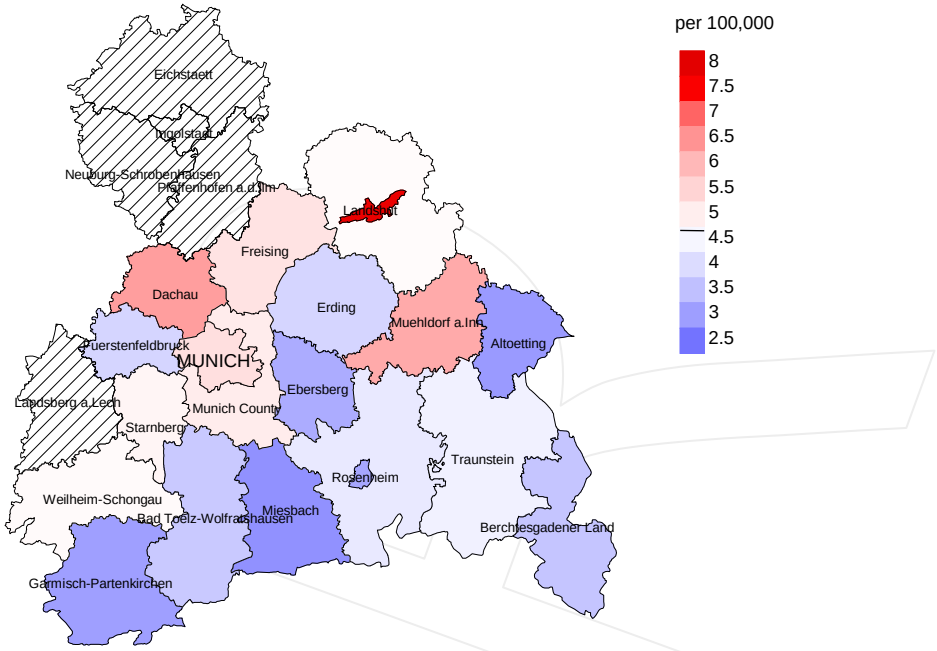


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

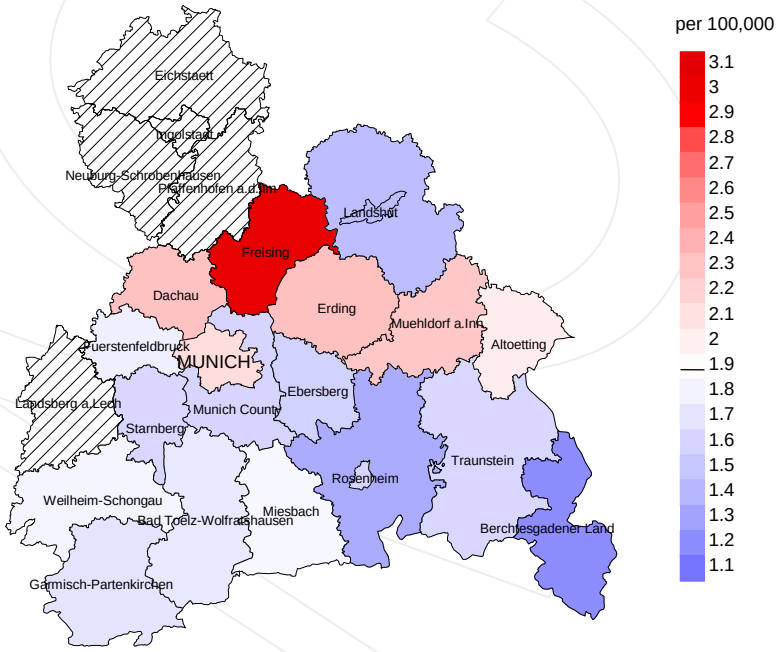
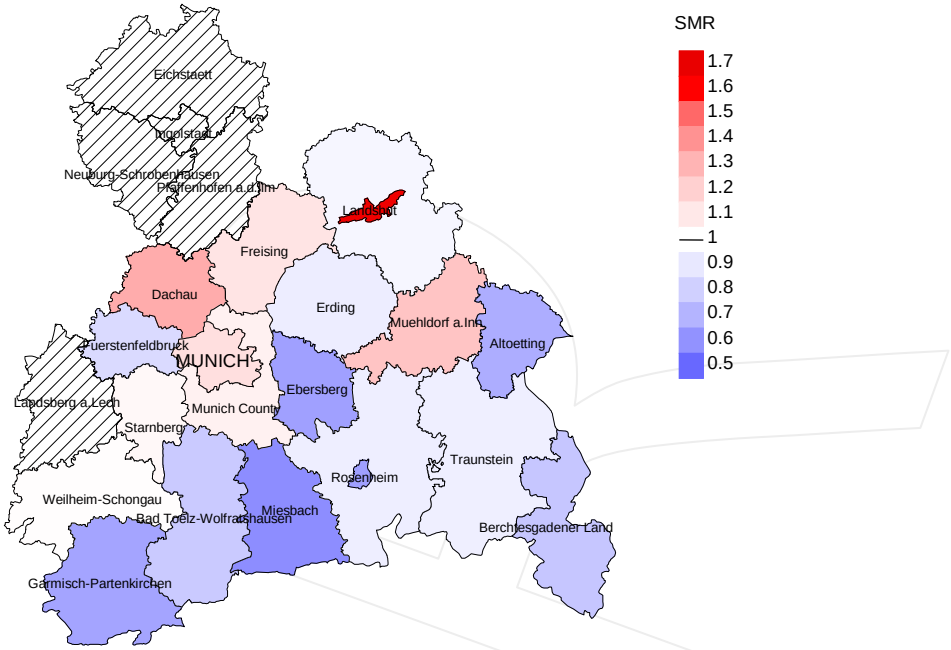


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 4.7/100,000 WS N=1,092, females 1.9/100,000 WS N=674). 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 17 women died from urinary tract cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 1.6/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.7 and 3.2/100,000.

Standardized mortality ratio (SMR) 2003 - 2008: Males



Standardized mortality ratio (SMR) 2003 - 2008: Females

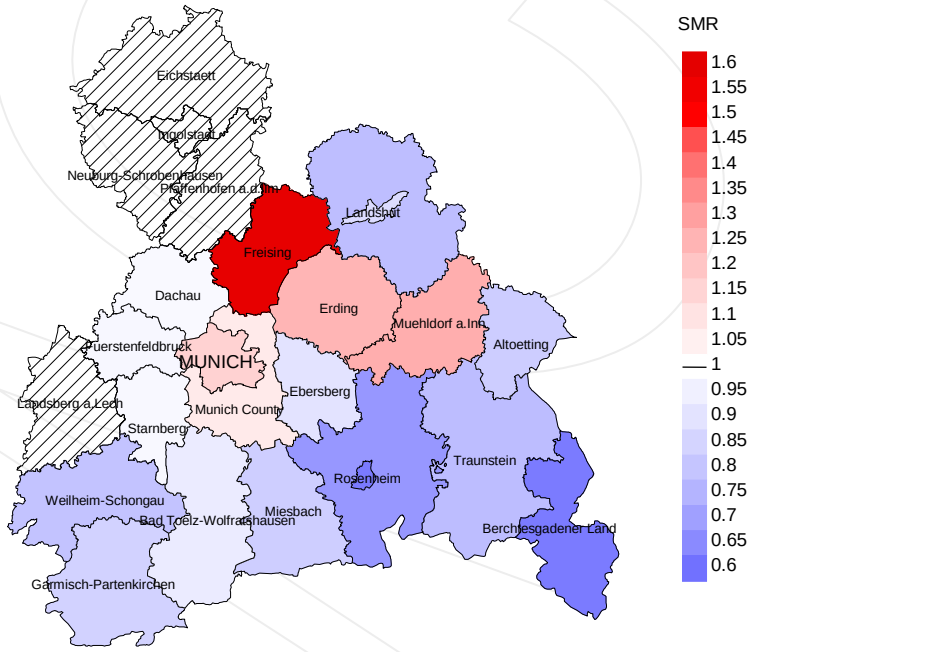


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=1,092, females N=674). 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 17 women died from urinary tract cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.90. Though, the value of this parameter may vary with an underlying probability of 99% between 0.44 and 1.63, 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

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