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: Kidney cancer

Year of diagnosis	1998-2012
Patients	8,640
Diseases	8,819
Creation date	03/20/2014
Export date	02/12/2014
Population	4.5 m

http://www.tumorregister-muenchen.de/en/facts/base/base_C64__E.pdf

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

In these analyses, the clinics and physicians of Upper Bavaria and the city and county of Landshut[#], with a total of 4.5 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.

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	394	36	9.1	29.9	57.1	97.5	
1999	390	29	7.4	28.7	58.7	97.2	
2000	361	35	9.7	30.7	55.4	96.7	
2001	352	43	12.2	28.4	55.1	97.7	
2002	605	89	14.7	33.4	59.7	97.9	#
2003	613	67	10.9	29.7	54.6	96.6	#
2004	621	73	11.8	33.3	46.5	96.9	#
2005	651	39	6.0	33.6	40.6	95.9	#
2006	634	47	7.4	31.4	42.1	92.4	#
2007	739	72	9.7	29.4	41.1	78.3	# ##
2008	754	64	8.5	31.0	36.2	59.8	
2009	766	72	9.4	33.6	34.1	58.6	
2010	719	61	8.5	29.2	29.2	55.5	
2011	642	45	7.0	24.9	29.0	57.8	
2012	578	53	9.2	27.5	22.5	97.8	###
1998-2012	8819	825	9.4	30.5	42.3	82.4	

\# 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	394	244	150	61.9
1999	390	239	151	61.3
2000	361	238	123	65.9
2001	352	211	141	59.9
2002	605	362	243	59.8
2003	613	382	231	62.3
2004	621	385	236	62.0
2005	651	415	236	63.7
2006	634	405	229	63.9
2007	739	474	265	64.1
2008	754	487	267	64.6
2009	766	476	290	62.1
2010	719	457	262	63.6
2011	642	409	233	63.7
2012	578	379	199	65.6
1998-2012	8819	5563	3256	63.1

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	244	150	22.0	12.8	14.2	6.2	19.9	8.8	23.9	11.0
1999	239	151	21.4	12.7	13.2	6.6	19.0	9.2	23.4	11.1
2000	238	123	20.9	10.2	13.3	4.8	18.7	7.0	22.5	8.8
2001	211	141	18.2	11.6	11.0	5.4	15.8	8.0	19.6	9.9
2002	362	243	19.4	12.4	11.3	5.8	16.5	8.3	20.7	10.5
2003	382	231	20.4	11.7	12.2	5.4	17.1	7.7	20.8	9.7
2004	385	236	20.5	11.9	12.2	5.5	17.0	7.9	20.7	9.9
2005	415	236	21.9	11.9	12.6	5.5	17.9	7.8	21.5	10.0
2006	405	229	21.1	11.4	12.2	5.6	17.0	7.7	20.6	9.4
2007	474	265	21.4	11.5	12.1	5.2	17.0	7.3	20.9	9.2
2008	487	267	21.9	11.5	12.1	5.5	17.2	7.7	21.0	9.7
2009	476	290	21.3	12.5	11.6	5.7	16.6	8.0	20.6	10.2
2010	457	262	20.3	11.2	10.9	4.5	15.5	6.7	19.0	8.6
2011	409	233	17.9	9.9	9.8	4.9	13.8	6.5	16.7	8.0
2012	379	199	16.6	8.4	8.6	3.5	12.5	5.2	15.6	6.8
1998-2012	5563	3256	20.3	11.3	11.6	5.3	16.4	7.5	20.0	9.4

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	394	65.1	13.7	2.8	99.7	49.4	58.7	65.8	74.6	79.5
1999	390	65.2	13.5	1.1	94.3	49.6	57.6	65.4	74.9	81.8
2000	361	65.5	13.2	0.3	93.5	48.8	57.9	66.2	74.9	80.8
2001	352	66.5	12.4	1.9	96.4	51.8	59.0	66.3	75.6	80.6
2002	605	67.7	12.9	2.4	96.2	50.1	60.7	68.9	76.8	82.3
2003	613	66.9	13.6	0.4	96.2	50.8	60.3	67.8	75.8	82.7
2004	621	66.5	13.9	0.0	94.1	49.0	60.4	67.6	76.0	81.8
2005	651	66.6	12.9	0.7	95.1	51.3	59.7	67.7	75.4	81.3
2006	634	66.2	14.4	0.2	95.5	48.4	59.6	67.9	75.4	81.7
2007	739	67.2	14.6	1.2	99.1	48.3	60.5	69.0	76.4	82.8
2008	754	67.0	13.5	0.6	98.1	50.1	59.4	68.2	76.2	82.8
2009	766	67.4	14.2	0.5	96.9	50.2	59.5	69.7	77.1	82.8
2010	719	67.9	13.6	5.4	100	48.5	59.7	70.0	77.1	83.6
2011	642	67.2	15.0	0.5	96.9	49.7	60.5	69.5	76.5	82.9
2012	578	68.5	12.7	9.7	93.1	51.7	60.8	70.2	77.8	83.2
1998-2012	8819	66.9	13.7	0.0	100	49.7	59.7	68.4	76.2	82.4

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	244	63.2	13.4	5.0	91.9	46.7	56.4	64.3	72.1	78.1
1999	239	64.3	12.8	2.3	88.4	49.7	57.5	64.5	72.2	80.3
2000	238	63.6	13.4	0.3	93.5	47.6	56.2	64.9	72.0	78.5
2001	211	64.9	11.1	1.9	89.9	51.8	58.6	64.3	72.9	78.7
2002	362	66.1	12.6	32.7	96.2	47.3	58.6	67.6	74.7	80.4
2003	382	64.7	13.4	0.4	96.2	48.1	59.2	65.3	73.1	78.6
2004	385	64.8	13.9	0.0	93.6	48.6	58.0	66.3	73.6	79.8
2005	415	65.1	11.5	0.7	92.4	51.2	58.7	65.8	73.1	78.1
2006	405	65.0	13.0	0.8	95.4	48.4	59.1	66.6	73.4	78.5
2007	474	65.5	13.2	2.6	93.1	48.3	58.6	67.5	74.1	80.4
2008	487	65.9	13.0	1.8	98.1	49.3	58.1	67.5	74.4	81.5
2009	476	66.1	13.8	0.5	96.1	49.6	58.6	68.6	75.6	81.8
2010	457	65.5	13.0	5.4	93.5	47.2	56.7	68.1	74.6	80.8
2011	409	66.3	13.2	1.5	96.9	49.7	59.3	68.2	74.5	82.3
2012	379	67.0	12.8	28.9	93.1	50.3	58.7	69.2	76.2	82.6
1998-2012	5563	65.4	13.0	0.0	98.1	48.9	58.4	66.8	74.1	80.2

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	150	68.1	13.7	2.8	99.7	55.6	61.3	69.8	76.8	83.7
1999	151	66.6	14.4	1.1	94.3	49.4	57.7	67.1	77.6	83.9
2000	123	69.1	12.2	37.2	91.4	54.5	60.6	70.5	77.9	85.7
2001	141	68.8	13.8	30.6	96.4	52.1	61.3	70.4	78.8	85.1
2002	243	70.0	13.1	2.4	93.6	54.7	63.6	72.3	78.9	83.8
2003	231	70.6	13.2	2.5	95.2	54.3	63.8	72.0	80.1	85.3
2004	236	69.4	13.4	18.5	94.1	52.5	63.5	70.5	78.2	84.7
2005	236	69.2	14.8	4.2	95.1	51.8	62.4	72.4	79.7	83.7
2006	229	68.5	16.3	0.2	95.5	49.0	60.9	71.6	79.2	85.7
2007	265	70.1	16.3	1.2	99.1	49.3	66.0	72.4	79.8	85.8
2008	267	69.0	14.2	0.6	96.1	52.0	61.6	69.8	78.9	84.2
2009	290	69.5	14.6	2.5	96.9	50.7	63.4	71.4	79.7	84.5
2010	262	72.1	13.7	5.4	100	54.3	65.9	73.0	81.1	88.2
2011	233	68.8	17.7	0.5	96.5	49.1	64.1	73.3	79.3	85.3
2012	199	71.5	11.9	9.7	92.4	56.4	66.5	72.9	80.0	84.3
1998-2012	3256	69.6	14.5	0.2	100	52.1	62.9	71.7	79.1	85.0

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	0.7	0.7	32	0.6	0.6	28	0.9	0.9
5-9	17	0.2	0.9	9	0.2	0.7	8	0.2	1.1
10-14	3	0.0	0.9	2	0.0	0.8	1	0.0	1.1
15-19	3	0.0	0.9			0.8	3	0.1	1.2
20-24	9	0.1	1.0	3	0.1	0.8	6	0.2	1.4
25-29	15	0.2	1.2	9	0.2	1.0	6	0.2	1.6
30-34	50	0.6	1.8	28	0.5	1.5	22	0.7	2.3
35-39	152	1.7	3.5	104	1.9	3.4	48	1.5	3.7
40-44	214	2.4	5.9	160	2.9	6.2	54	1.7	5.4
45-49	377	4.3	10.2	286	5.1	11.4	91	2.8	8.2
50-54	534	6.1	16.3	401	7.2	18.6	133	4.1	12.3
55-59	830	9.4	25.7	591	10.6	29.2	239	7.3	19.6
60-64	1158	13.1	38.8	806	14.5	43.7	352	10.8	30.4
65-69	1476	16.7	55.5	988	17.8	61.5	488	15.0	45.4
70-74	1386	15.7	71.3	892	16.0	77.5	494	15.2	60.6
75-79	1230	13.9	85.2	670	12.0	89.5	560	17.2	77.8
80-84	769	8.7	93.9	377	6.8	96.3	392	12.0	89.8
85+	536	6.1	100.0	205	3.7	100.0	331	10.2	100.0
All ages	8819	100.0		5563	100.0		3256	100.0	

Included in the statistics are 39.6% multiple primaries in males and 30.7% 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=415 %	Females DCO rate n=408 %	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	6	0.2	0.4			0.5	1.2
25-29	9	6	0.5	0.3			1.0	0.6
30-34	28	22	1.3	1.1	3.6		2.0	1.2
35-39	104	46	4.5	2.1			4.9	1.3
40-44	157	54	6.5	2.3	0.6		5.2	0.9
45-49	280	90	13.0	4.3		1.1	5.7	1.1
50-54	390	133	21.1	7.0	1.8		4.9	1.3
55-59	577	237	34.0	13.3	2.3	2.1	4.3	1.9
60-64	793	347	48.1	19.9	3.4	0.3	3.9	2.2
65-69	968	480	66.0	29.9	5.4	3.5	3.8	2.7
70-74	883	490	76.2	35.5	5.2	8.2	3.6	2.9
75-79	667	556	88.5	50.8	12.0	9.5	3.5	3.4
80-84	374	389	82.4	45.0	23.0	24.4	3.0	2.6
85+	205	330	66.1	40.3	49.8	59.4	2.2	2.1
All ages	5479	3224			7.6	12.7	3.7	2.3
Incidence								
Raw			20.0	11.2				
WS			11.4	5.2				
ES			16.1	7.4				
BRD-S			19.8	9.3				

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	2.2	1.8	0.5	4.7		1.2	
C09-C10	Oropharynx	7	2.7	2.6	1.0	5.3	#	2.8	
C15	Oesophagus	7	4.5	1.5	0.6	3.2		1.6	14.3
C16	Stomach	15	10.7	1.4	0.8	2.3		2.8	20.0
C17	Small intestine	6	1.2	4.9	1.8	10.7	#	3.1	
C18	Colon	56	25.5	2.2	1.7	2.9	#	19.7	8.9
C19-C20	Rectum	19	14.5	1.3	0.8	2.0		2.9	
C22	Liver	18	7.1	2.5	1.5	4.0	#	7.0	16.7
C23-C24	Bile	3	2.4	1.2	0.3	3.6		0.4	33.3
C25	Pancreas	12	9.0	1.3	0.7	2.3		2.0	33.3
C32	Larynx	8	2.7	3.0	1.3	5.8	#	3.4	
C33-C34	Lung	76	30.6	2.5	2.0	3.1	#	29.3	10.5
C38,C45	Mesothelioma	2	1.7	1.2	0.1	4.2		0.2	50.0
C43	Malign. melanoma	33	9.9	3.3	2.3	4.7	#	14.9	3.0
C46,C49	Soft tissue	4	1.3	3.0	0.8	7.8		1.7	
C48	Peritoneal	2	0.2	11.2	1.4	40.4	#	1.2	
C61	Prostate	207	77.3	2.7	2.3	3.1	#	83.8	2.4
C62	Testis	5	0.7	7.3	2.4	17.0	#	2.8	
C64	Kidney	98	9.1	10.8	8.7	13.1	#	57.5	1.0
C65	Renal pelvis	8	1.0	7.8	3.4	15.4	#	4.5	
C66	Ureter	3	0.6	5.2	1.1	15.3	#	1.6	
C67	Bladder	33	11.0	3.0	2.1	4.2	#	14.2	
C70-C72	CNS cancer	5	3.4	1.5	0.5	3.4		1.0	
C73	Thyroid	7	1.7	4.2	1.7	8.7	#	3.4	
C76-C79	CUP	5	4.3	1.2	0.4	2.7		0.5	20.0
C82-C85	NHL	35	10.1	3.5	2.4	4.8	#	16.1	5.7
C90	Mult. myeloma	7	3.2	2.2	0.9	4.5		2.4	
C91-C96	Leukaemia	8	4.0	2.0	0.9	3.9		2.6	25.0
Other primaries		11	5.7	1.9	1.0	3.4		3.4	18.2
Not observed		0	1.7	0.0	0.0	2.2		-1.1	
All mult. primaries		704	260.1	2.7	2.5	2.9	#	286.9	5.7

Patients	3677
Mean age at second malignancy (years)	69.7
Person-years	15472
Mean observation time (years)	4.2
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".

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	4.2	2.1	1.0	4.1		5.4	
C18	Colon	20	11.6	1.7	1.1	2.7	#	9.4	5.0
C19-C20	Rectum	9	5.0	1.8	0.8	3.4		4.5	11.1
C22	Liver	2	1.3	1.6	0.2	5.7		0.8	50.0
C23-C24	Bile	8	1.7	4.7	2.0	9.3	#	7.1	25.0
C25	Pancreas	9	4.9	1.8	0.8	3.5		4.6	22.2
C33-C34	Lung	25	7.5	3.3	2.2	4.9	#	19.6	8.0
C43	Malign. melanoma	3	3.6	0.8	0.2	2.4		-0.7	
C46,C49	Soft tissue	2	0.6	3.3	0.4	12.0		1.6	
C50	Breast	57	31.4	1.8	1.4	2.3	#	28.7	7.0
C53	Cervix uteri	3	1.3	2.2	0.5	6.5		1.9	
C54	Corpus uteri	11	6.1	1.8	0.9	3.2		5.5	9.1
C56	Ovary	2	4.6	0.4	0.1	1.6		-2.9	
C64	Kidney	42	2.8	14.8	10.6	19.9	#	43.9	2.4
C65	Renal pelvis	3	0.3	8.7	1.8	25.3	#	3.0	
C66	Ureter	2	0.2	11.6	1.4	41.9	#	2.0	50.0
C67	Bladder	10	2.1	4.7	2.3	8.7	#	8.8	
C73	Thyroid	14	1.7	8.1	4.5	13.7	#	13.8	
C76-C79	CUP	5	2.0	2.5	0.8	5.9		3.4	20.0
C82-C85	NHL	13	4.3	3.0	1.6	5.2	#	9.7	7.7
C90	Mult. myeloma	2	1.4	1.4	0.2	5.1		0.6	
C91-C96	Leukaemia	4	1.8	2.3	0.6	5.8		2.5	25.0
Other primaries		7	5.1	1.4	0.6	2.8		2.1	14.3
Not observed		0	3.3	0.0	0.0	1.1		-3.7	
All mult. primaries		262	109.0	2.4	2.1	2.7	#	171.5	7.6

Patients	2078
Mean age at second malignancy (years)	71.2
Person-years	8920
Mean observation time (years)	4.3
Median observation time (years)	3.3

The occurrence of second malignancy is statistically significant.

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

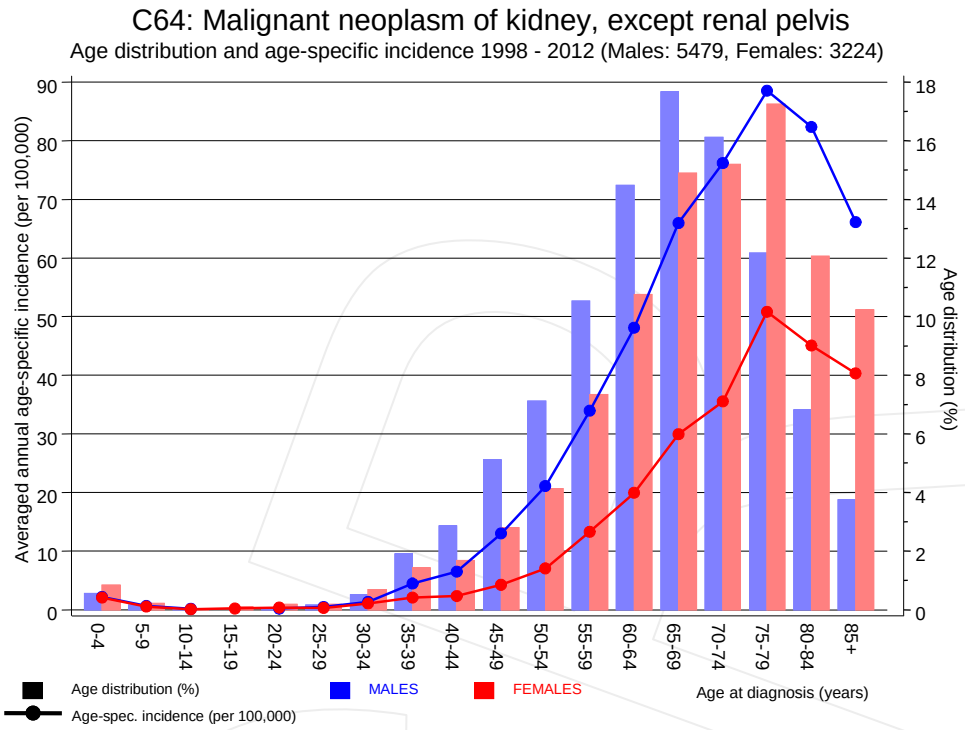


Figure 7. Age distribution and age-specific incidence

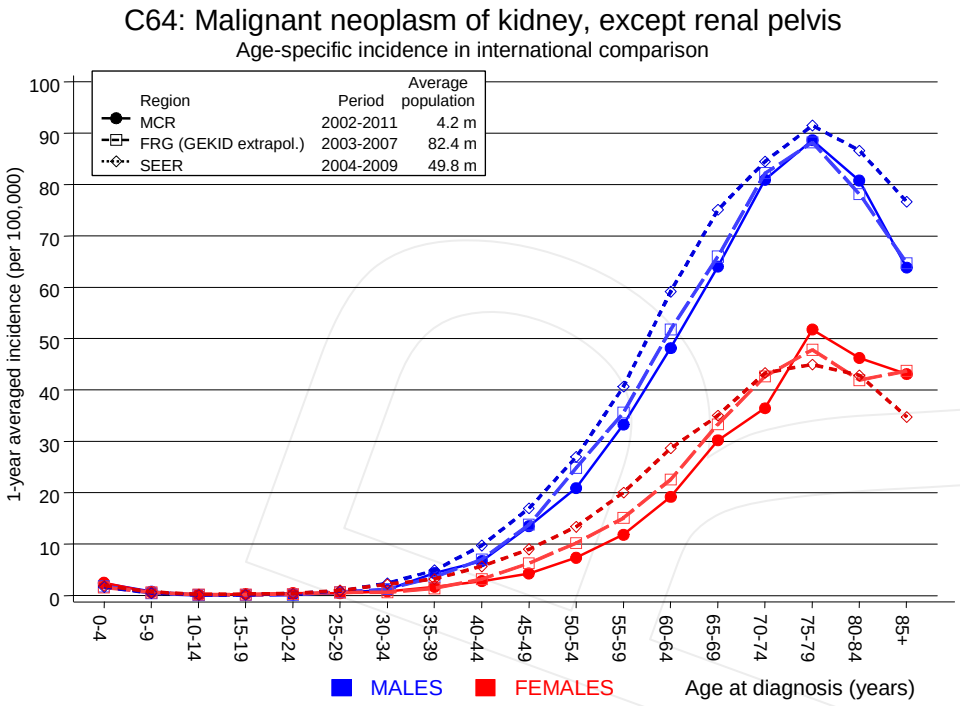


Figure 7a. Age-specific incidence in MCR registry areas compared to Germany (FRG, GEKID extrapolation) and SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

Extrapolated age-specific patient population of Germany, data status middle of 2010. Association of Population-based Cancer Registries in Germany (GEKID e.V.). Berlin, 2011. http://www.gekid.de. Last access: 05/12/2011

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.

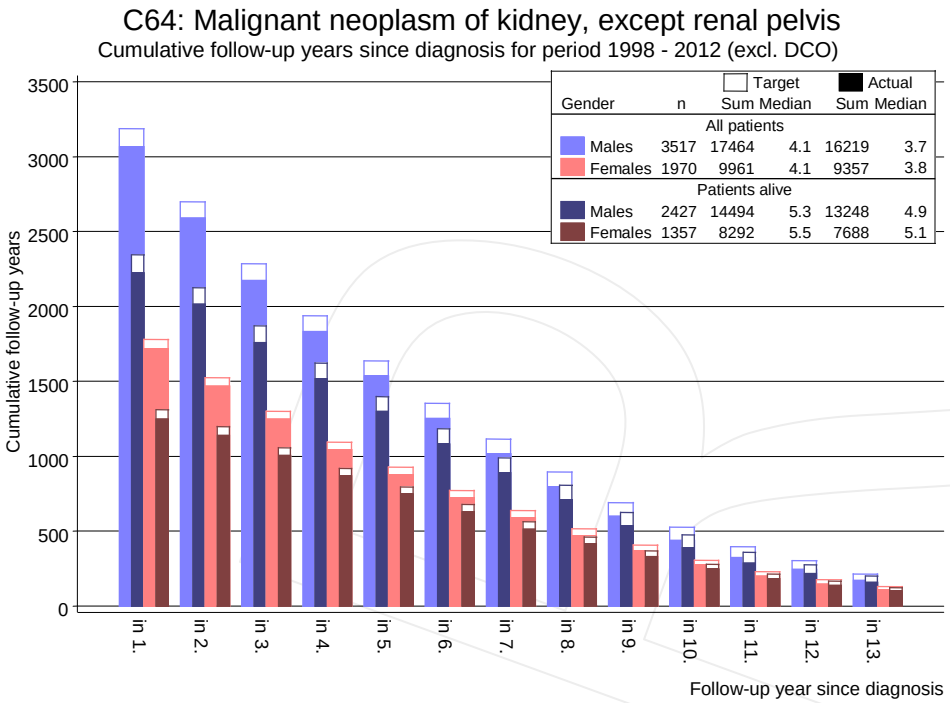
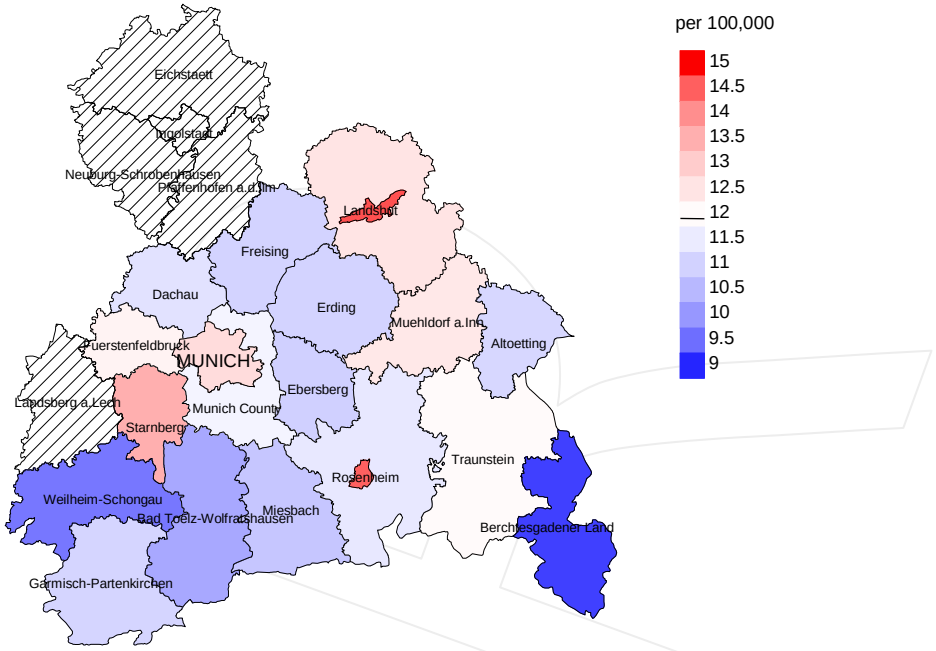


Figure 8. Cumulative follow-up years depending on time since diagnosis

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

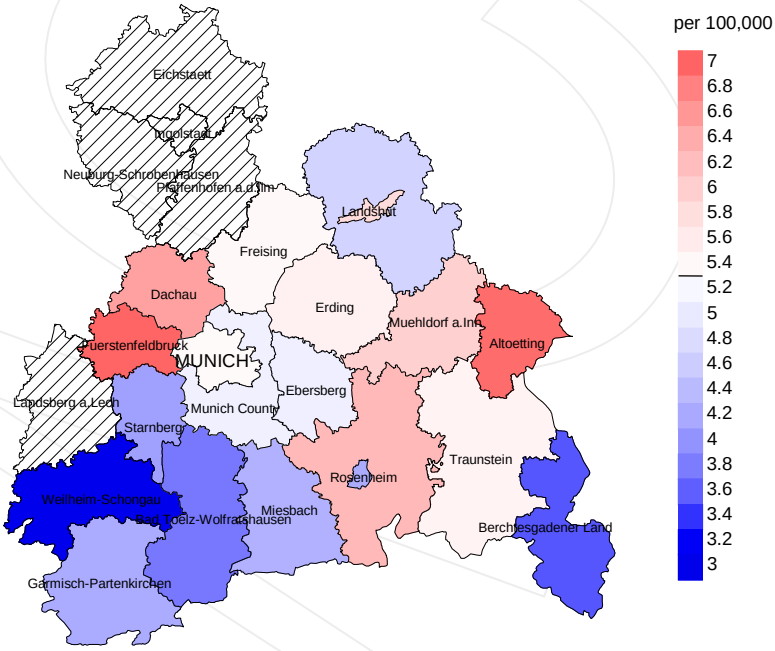
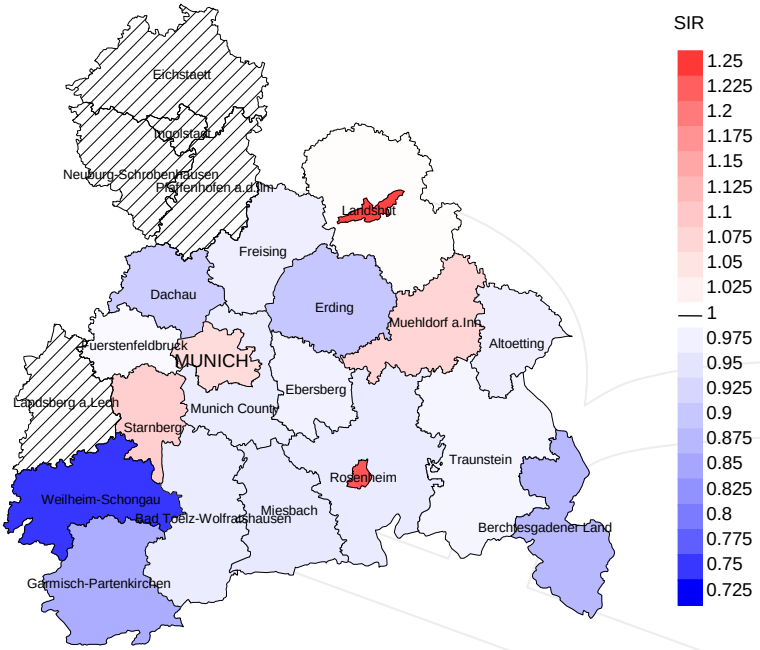


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 11.9/100,000 WS N=2,391, females 5.3/100,000 WS N=1,372). 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 37 women were identified with newly diagnosed kidney cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 5.1/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 2.8 and 9.4/100,000.

Standardized incidence ratio (SIR) 2003 - 2008: Males



Standardized incidence ratio (SIR) 2003 - 2008: Females

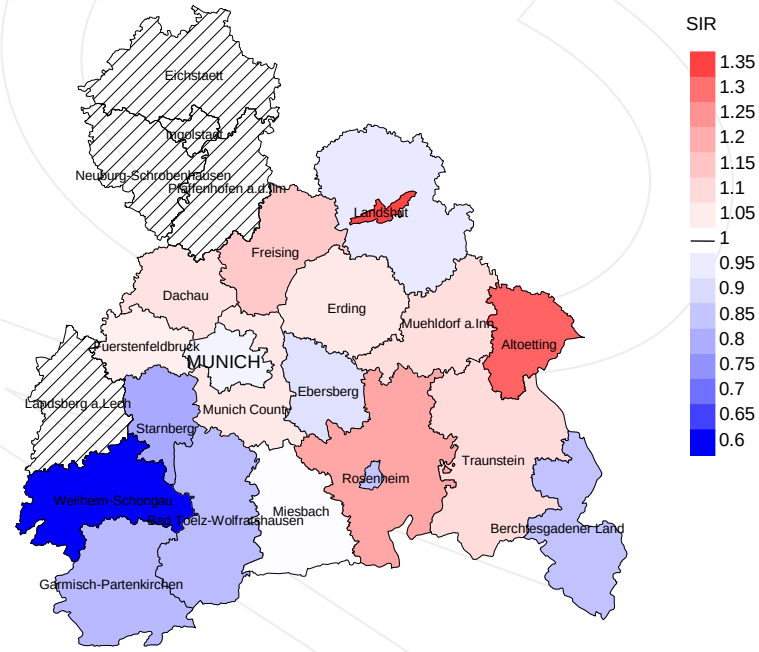


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=2,391, females N=1,372). 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 37 women were identified with newly diagnosed kidney cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.92. Though, the value of this parameter may vary with an underlying probability of 99% between 0.58 and 1.39, 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	394	97.5	9.1	225	57.1	93.3
1999	390	97.2	7.4	229	58.7	94.3
2000	361	96.7	9.7	200	55.4	95.0
2001	352	97.7	12.2	194	55.1	99.0
2002	605	97.9	14.7	361	59.7	96.4
2003	613	96.6	10.9	335	54.6	98.2
2004	621	96.9	11.8	289	46.5	97.9
2005	651	95.9	6.0	264	40.6	98.5
2006	634	92.4	7.4	267	42.1	97.4
2007	739	78.3	9.7	304	41.1	98.4
2008	754	59.8	8.5	273	36.2	99.3
2009	766	58.6	9.4	261	34.1	98.9
2010	719	55.5	8.5	210	29.2	99.0
2011	642	57.8	7.0	186	29.0	97.8
2012	578	97.8	9.2	130	22.5	94.6
1998-2012	8819	82.4	9.4	3728	42.3	97.3

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	394	212	93.9	58	14.7
1999	390	212	95.3	63	16.2
2000	361	207	95.2	54	15.0
2001	352	219	95.0	57	16.2
2002	605	322	96.9	125	20.7
2003	613	327	96.9	114	18.6
2004	621	342	96.5	110	17.7
2005	651	309	95.1	75	11.5
2006	634	345	97.7	91	14.4
2007	739	379	98.2	114	15.4
2008	754	407	99.3	108	14.3
2009	766	426	99.1	129	16.8
2010	719	454	98.5	119	16.6
2011	642	412	98.3	105	16.4
2012	578	464	98.9	107	18.5
1998-2012	8819	5037	97.4	1429	16.2

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	212	65.1	34.9	79.9
1999	212	71.7	28.3	84.7
2000	207	71.5	28.5	81.7
2001	219	73.1	26.9	85.6
2002	322	70.2	29.8	85.6
2003	327	73.4	26.6	86.1
2004	342	69.0	31.0	81.8
2005	309	72.2	27.8	82.3
2006	345	69.9	30.1	77.2
2007	379	71.8	28.2	79.6
2008	407	69.8	30.2	80.9
2009	426	72.1	27.9	80.6
2010	454	66.5	33.5	76.7
2011	412	63.8	36.2	78.8
2012	464	60.1	39.9	71.0
1998-2012	5037	68.9	31.1	80.2

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	142	71.5	69.7	75.6	70.5
1999	138	72.7	70.5	78.2	71.4
2000	124	72.1	69.8	77.9	71.3
2001	147	70.4	69.1	74.3	69.6
2002	188	73.3	72.6	75.0	73.1
2003	195	72.9	71.3	78.0	72.3
2004	203	73.0	71.6	76.2	72.6
2005	186	72.9	71.4	76.5	72.3
2006	220	71.9	70.8	75.0	71.3
2007	230	73.9	72.0	79.6	72.9
2008	264	74.1	72.5	77.7	73.4
2009	268	73.6	71.9	78.0	72.5
2010	275	74.2	72.7	76.9	73.0
2011	267	74.4	71.6	80.0	73.1
2012	267	75.9	74.0	78.8	74.6
1998-2012	3114	73.4	71.6	77.4	72.5

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	70	79.5	77.3	82.2	79.5
1999	74	76.5	74.0	82.9	76.1
2000	83	75.8	75.1	77.5	76.1
2001	72	78.0	75.9	83.2	76.6
2002	134	76.6	74.8	80.3	75.9
2003	132	76.4	75.2	79.1	76.0
2004	139	78.8	77.2	82.1	78.6
2005	123	77.0	74.7	83.7	75.3
2006	125	78.1	77.3	79.4	77.4
2007	149	79.2	77.9	81.5	79.0
2008	143	78.0	76.3	82.0	76.9
2009	158	78.6	75.8	85.1	76.9
2010	179	79.3	76.8	84.5	78.1
2011	145	79.8	76.0	85.4	77.8
2012	197	78.8	76.2	82.5	76.9
1998-2012	1923	78.2	76.1	82.3	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	99	8.9	0.41	5.2	0.37	8.1	0.41	10.9	0.45
1999	99	8.8	0.42	5.1	0.39	8.0	0.42	10.9	0.47
2000	89	7.8	0.38	4.5	0.34	6.9	0.38	9.5	0.43
2001	109	9.4	0.52	5.4	0.49	8.2	0.52	10.6	0.54
2002	136	7.3	0.38	3.9	0.35	6.3	0.38	8.7	0.42
2003	147	7.8	0.39	4.1	0.34	6.4	0.38	8.9	0.43
2004	144	7.7	0.38	4.0	0.33	6.2	0.37	8.4	0.41
2005	132	7.0	0.33	3.5	0.29	5.4	0.31	7.3	0.35
2006	162	8.5	0.41	4.3	0.36	6.4	0.39	8.6	0.43
2007	176	7.9	0.38	3.9	0.33	6.1	0.37	8.3	0.40
2008	183	8.2	0.38	3.9	0.33	6.1	0.36	8.4	0.40
2009	197	8.8	0.42	4.1	0.36	6.3	0.39	8.8	0.43
2010	181	8.0	0.40	3.6	0.34	5.6	0.37	7.9	0.42
2011	177	7.7	0.44	3.6	0.37	5.5	0.40	7.4	0.45
2012	163	7.1	0.44	3.0	0.35	4.8	0.39	6.7	0.44
1998-2012	2194	8.0	0.40	4.0	0.35	6.2	0.38	8.4	0.43

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	39	3.3	0.26	1.1	0.18	1.8	0.21	2.5	0.23
1999	53	4.5	0.36	1.7	0.27	2.7	0.30	3.7	0.34
2000	59	4.9	0.48	1.8	0.38	2.9	0.41	4.1	0.47
2001	51	4.2	0.36	1.5	0.28	2.5	0.31	3.5	0.36
2002	90	4.6	0.37	1.7	0.30	2.7	0.33	3.6	0.35
2003	93	4.7	0.41	1.7	0.32	2.7	0.35	3.7	0.39
2004	92	4.7	0.40	1.5	0.29	2.4	0.32	3.5	0.36
2005	92	4.6	0.40	1.7	0.33	2.6	0.35	3.5	0.36
2006	79	3.9	0.35	1.3	0.23	2.0	0.27	2.9	0.31
2007	97	4.2	0.37	1.3	0.24	2.1	0.30	3.2	0.34
2008	101	4.4	0.38	1.4	0.26	2.3	0.29	3.2	0.34
2009	111	4.8	0.39	1.7	0.29	2.6	0.32	3.5	0.35
2010	121	5.2	0.46	1.6	0.36	2.6	0.39	3.9	0.45
2011	86	3.6	0.37	1.2	0.25	1.9	0.30	2.7	0.34
2012	116	4.9	0.59	1.6	0.44	2.5	0.49	3.7	0.55
1998-2012	1280	4.5	0.40	1.5	0.29	2.4	0.33	3.4	0.37

Table 13

Age distribution of age at death (cancer-related) for period 1998-2012
(**incl. multiple primaries**)

Age at death	Cases			Males			Females		
Years	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
0-4	1	0.0	0.0	1	0.0	0.0			0.0
5-9	5	0.1	0.2	2	0.1	0.1	3	0.2	0.2
10-14	0	0.0	0.2			0.1			0.2
15-19	0	0.0	0.2			0.1			0.2
20-24	2	0.1	0.2	2	0.1	0.2			0.2
25-29	3	0.1	0.3	1	0.0	0.3	2	0.2	0.4
30-34	2	0.1	0.4	1	0.0	0.3	1	0.1	0.5
35-39	11	0.3	0.7	8	0.4	0.7	3	0.2	0.7
40-44	22	0.6	1.3	15	0.7	1.3	7	0.5	1.2
45-49	50	1.4	2.7	38	1.7	3.0	12	0.9	2.1
50-54	107	3.0	5.7	78	3.4	6.4	29	2.2	4.4
55-59	216	6.0	11.7	170	7.5	13.9	46	3.5	7.9
60-64	337	9.4	21.2	249	11.0	24.9	88	6.7	14.6
65-69	505	14.1	35.3	356	15.7	40.6	149	11.4	26.0
70-74	620	17.3	52.6	432	19.1	59.7	188	14.4	40.4
75-79	640	17.9	70.5	391	17.3	77.0	249	19.0	59.4
80-84	577	16.1	86.7	304	13.4	90.4	273	20.9	80.3
85+	476	13.3	100.0	218	9.6	100.0	258	19.7	100.0
All ages	3574	100.0		2266	100.0		1308	100.0	

Included in the statistics are 39.6% multiple primaries in males and 30.7% 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		0.1	0.67	0.0		2.4	
25-29	1	2	0.1	0.11	0.1	0.33	1.0	1.8
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	0.06	2.1	0.6
40-44	15	7	0.6	0.09	0.3	0.13	1.9	0.7
45-49	38	12	1.8	0.13	0.6	0.13	2.2	0.6
50-54	78	29	4.2	0.19	1.5	0.22	2.5	1.0
55-59	170	46	10.0	0.29	2.6	0.19	3.1	1.0
60-64	249	88	15.1	0.31	5.1	0.25	3.0	1.5
65-69	356	149	24.3	0.36	9.3	0.31	3.2	1.9
70-74	432	188	37.3	0.48	13.6	0.38	3.5	2.1
75-79	391	249	51.9	0.58	22.8	0.44	3.2	2.5
80-84	304	273	66.9	0.81	31.6	0.70	3.1	2.6
85+	218	258	70.3	1.06	31.5	0.78	2.7	2.0
All ages	2266	1308					3.1	2.0
Mortality								
Raw			8.3	0.41	4.6	0.40		
WS			4.1	0.35	1.6	0.30		
ES			6.4	0.39	2.5	0.33		
BRD-S			8.7	0.43	3.5	0.37		
PYLL-70								
per 100,000			32.9		12.2			
ES			29.3		10.6			
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	15	1.3	6	40.0	2	13.3	7	46.7
C15 Oesophagus	16	1.4	3	18.8	1	6.3	12	75.0
C16 Stomach	47	4.0	15	31.9	4	8.5	28	59.6
C18 Colon	103	8.8	36	35.0	19	18.4	48	46.6
C19-C20 Rectum	47	4.0	11	23.4	14	29.8	22	46.8
C22 Liver	29	2.5	4	13.8	7	24.1	18	62.1
C23-C24 Bile	11	0.9	2	18.2	1	9.1	8	72.7
C25 Pancreas	31	2.6	1	3.2	6	19.4	24	77.4
C32 Larynx	11	0.9	8	72.7	1	9.1	2	18.2
C33-C34 Lung	140	11.9	25	17.9	23	16.4	92	65.7
C43 Malign. melanoma	32	2.7	17	53.1	3	9.4	12	37.5
C44 Skin others	30	2.6	10	33.3	2	6.7	18	60.0
C61 Prostate	231	19.7	88	38.1	33	14.3	110	47.6
C64 Kidney	81	6.9			26	32.1	55	67.9
C65 Renal pelvis	22	1.9	4	18.2	9	40.9	9	40.9
C66 Ureter	13	1.1	4	30.8	3	23.1	6	46.2
C67 Bladder	105	8.9	41	39.0	17	16.2	47	44.8
C70-C72 CNS cancer	25	2.1	7	28.0	4	16.0	14	56.0
C73 Thyroid	11	0.9	3	27.3			8	72.7
C76-C79 CUP	19	1.6	11	57.9	2	10.5	6	31.6
C82-C85 NHL	41	3.5	8	19.5	7	17.1	26	63.4
C90 Mult. myeloma	25	2.1	7	28.0	6	24.0	12	48.0
C91-C96 Leukaemia	26	2.2	4	15.4	2	7.7	20	76.9
Other primaries	64	5.4	27	42.2	9	14.1	28	43.8
All mult. primaries	1175	100.0	342	29.1	201	17.1	632	53.8

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	21	3.6	5	23.8	7	33.3	9	42.9
C18	Colon	40	6.9	12	30.0	6	15.0	22	55.0
C19-C20	Rectum	21	3.6	4	19.0	5	23.8	12	57.1
C22	Liver	9	1.6	2	22.2	3	33.3	4	44.4
C23-C24	Bile	12	2.1			3	25.0	9	75.0
C25	Pancreas	33	5.7	2	6.1	5	15.2	26	78.8
C33-C34	Lung	55	9.5	7	12.7	6	10.9	42	76.4
C43	Malign. melanoma	15	2.6	8	53.3	1	6.7	6	40.0
C44	Skin others	15	2.6	11	73.3			4	26.7
C50	Breast	116	20.1	59	50.9	12	10.3	45	38.8
C53	Cervix uteri	14	2.4	8	57.1	1	7.1	5	35.7
C54	Corpus uteri	22	3.8	11	50.0	4	18.2	7	31.8
C56	Ovary	23	4.0	8	34.8	6	26.1	9	39.1
C64	Kidney	31	5.4			10	32.3	21	67.7
C67	Bladder	35	6.1	10	28.6	9	25.7	16	45.7
C70-C72	CNS cancer	18	3.1	2	11.1	5	27.8	11	61.1
C73	Thyroid	18	3.1	8	44.4	1	5.6	9	50.0
C76-C79	CUP	11	1.9	2	18.2	1	9.1	8	72.7
C82-C85	NHL	19	3.3	6	31.6	5	26.3	8	42.1
C91-C96	Leukaemia	14	2.4	2	14.3	2	14.3	10	71.4
Other primaries		34	5.9	13	38.2	8	23.5	13	38.2
All mult. primaries		576	100.0	180	31.3	100	17.4	296	51.4

Multiple primaries with number of cases n<5 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		0.1	0.67	0.0		2.6	
25-29	1	2	0.1	0.11	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	13	5	0.5	0.09	0.2	0.11	1.7	0.5
45-49	36	8	1.7	0.14	0.4	0.10	2.3	0.5
50-54	57	23	3.1	0.17	1.2	0.21	2.1	1.0
55-59	146	39	8.6	0.30	2.2	0.20	3.0	1.0
60-64	207	63	12.6	0.32	3.6	0.23	2.9	1.3
65-69	277	127	18.9	0.37	7.9	0.32	3.0	2.0
70-74	328	140	28.3	0.52	10.2	0.36	3.3	2.0
75-79	288	203	38.2	0.62	18.6	0.45	3.1	2.6
80-84	208	219	45.8	0.84	25.4	0.75	2.8	2.6
85+	157	217	50.6	1.20	26.5	0.81	2.6	2.1
All ages	1731	1051					2.9	1.9
Mortality								
Raw			6.3	0.41	3.7	0.40		
WS			3.2	0.35	1.2	0.29		
ES			4.9	0.38	2.0	0.33		
BRD-S			6.6	0.43	2.8	0.37		
PYLL-70								
per 100,000			27.4		9.3			
ES			24.3		7.9			
AYLL-70			9.1		8.4			

* 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		0.1	0.33	0.0		1.4	
25-29	1	2	0.1	0.11	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	0.09	0.0	0.03	2.3	0.2
40-44	11	4	0.5	0.08	0.2	0.10	1.5	0.5
45-49	33	6	1.5	0.14	0.3	0.08	2.3	0.4
50-54	47	21	2.5	0.15	1.1	0.20	1.9	1.0
55-59	127	33	7.5	0.30	1.9	0.19	2.9	1.0
60-64	171	48	10.4	0.30	2.8	0.20	2.8	1.1
65-69	218	105	14.9	0.35	6.5	0.30	2.8	2.0
70-74	242	105	20.9	0.45	7.6	0.29	2.9	1.7
75-79	205	162	27.2	0.52	14.8	0.39	2.7	2.4
80-84	136	173	29.9	0.61	20.0	0.64	2.3	2.5
85+	106	175	34.2	0.82	21.4	0.68	2.1	2.0
All ages	1309	836					2.6	1.8
Mortality								
Raw			4.8	0.35	2.9	0.35		
WS			2.5	0.31	1.0	0.25		
ES			3.7	0.33	1.6	0.28		
BRD-S			4.9	0.37	2.2	0.32		
PYLL-70								
per 100,000			23.4		7.4			
ES			20.7		6.4			
AYLL-70			9.3		8.3			

* See corresponding tables with multiple primaries.

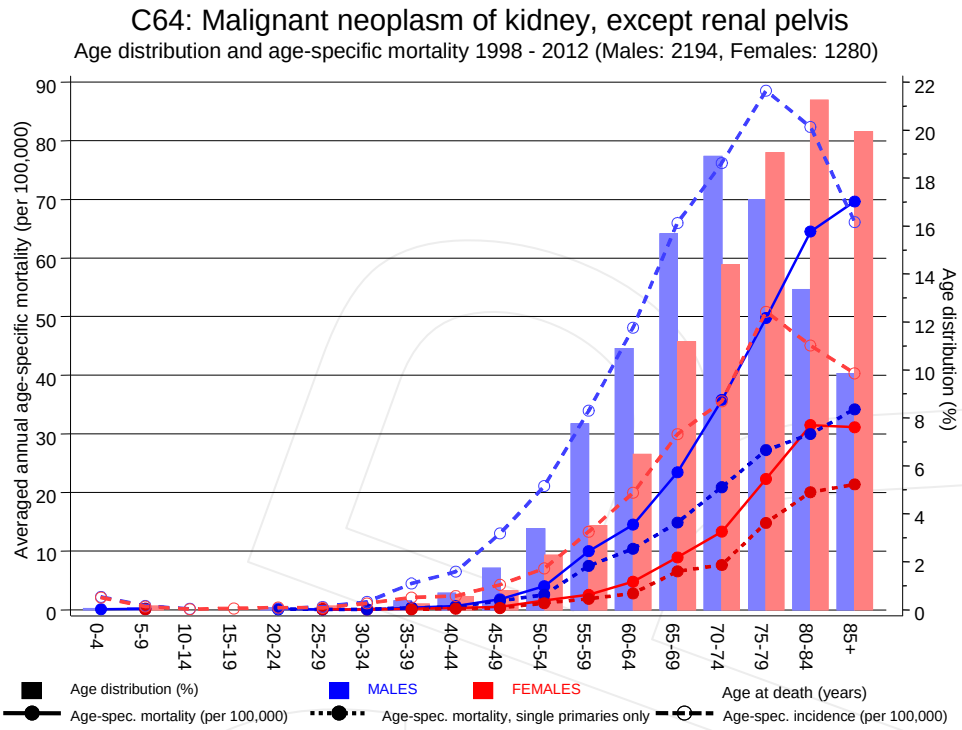
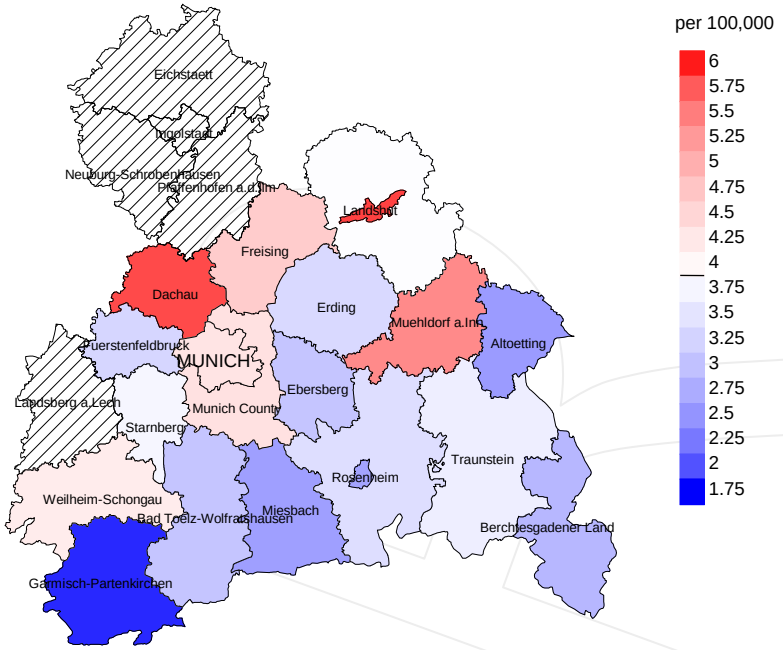


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

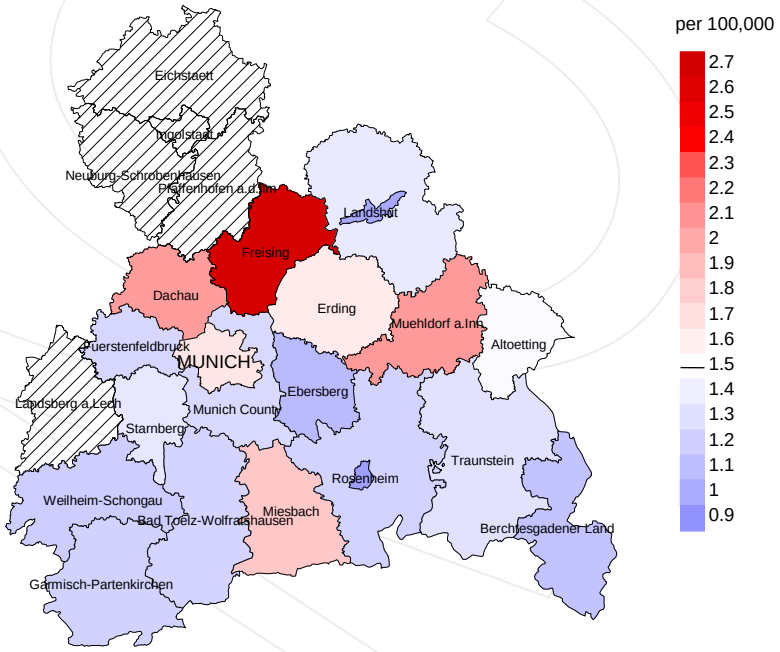
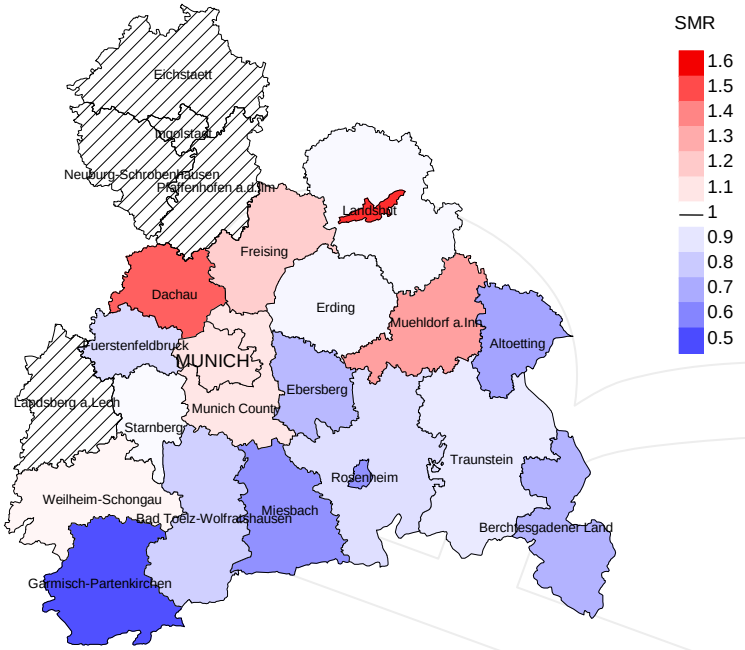


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 3.9/100,000 WS N=897, females 1.5/100,000 WS N=534). 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 12 women died from kidney cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 1.1/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.4 and 2.5/100,000.

Standardized mortality ratio (SMR) 2003 - 2008: Males



Standardized mortality ratio (SMR) 2003 - 2008: Females

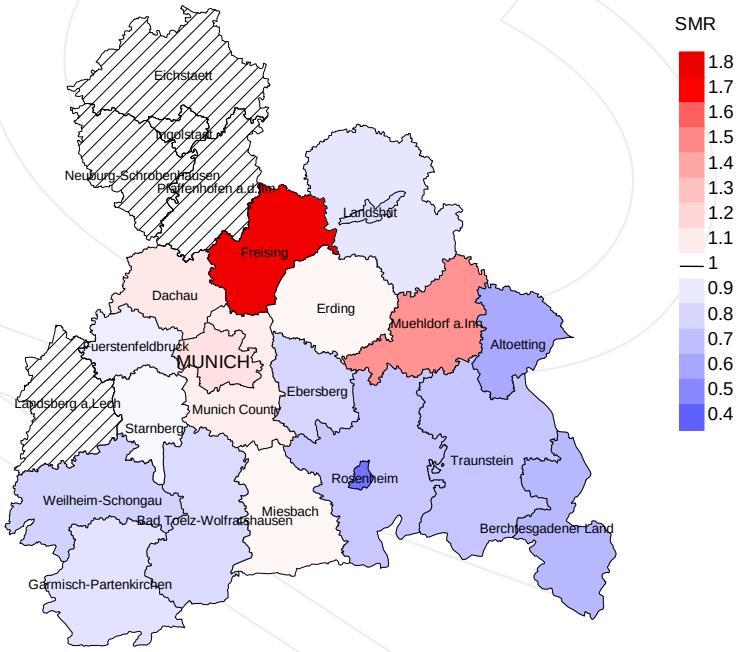


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=897, females N=534). 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 12 women died from kidney cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.80. Though, the value of this parameter may vary with an underlying probability of 99% between 0.33 and 1.61, 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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Munich Cancer Registry. Baseline statistics C64: Kidney cancer [Internet]. 2014 [updated 2014 Mar 20; cited 2014 May 1]. Available from: http://www.tumorregister-muenchen.de/en/facts/base/base_C64__E.pdf

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