Munich Cancer Registry

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ICD-10 C65: Renal pelvis cancer

Incidence and Mortality

Year of diagnosis	1998-2014
Patients	1,031
Diseases	1,041
Creation date	04/13/2016
Export date	12/23/2015
Population	4.64 m

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

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

http://www.tumorregister-muenchen.de/en/facts/base/bC65__E-ICD-10-C65-Renal-pelvis-cancer-incidence-and-mortality.pdf

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

In these analyses, the clinics and physicians of Upper Bavaria and the city and county of Landshut[#], with a total of 4.64 million inhabitants, account for the frequency of cancer diseases[##] and the achieved long term results. Additionally, the long term survival evaluated by the Munich Cancer Registry (MCR) is compared with the results of the population-based registry in the USA (SEER), which is useful for checking the consistency of the data on an international level.

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

The foot notes describe the currentness of the data. The baseline statistics and survival data are updated annually. This yearly analysis comprises the Annual Report of the MCR.

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 2016

[#] 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).

[##] 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.

ICD-10 codes (ICD-10 2015) used for specifying cancer site

Code	Description
C65	Malignant neoplasm of renal pelvis

INCIDENCE

Table 1

All patients with invasive cancer by year of diagnosis, proportions of DCO, multiple primaries, deaths, and active follow-up (incl. DCO)

Year of diagnosis	Cases n	DCO cases n	Prop. DCO %	Prop. mult. primaries %	Prop. deaths %	Prop. actively followed %	
1998	33	1	3.0	57.6	84.8	97.0	
1999	35			62.9	85.7	100.0	
2000	33	1	3.0	66.7	78.8	97.0	
2001	33			45.5	78.8	100.0	
2002	65	2	3.1	53.8	80.0	100.0	#
2003	55	3	5.5	60.0	80.0	96.4	
2004	52	4	7.7	57.7	80.8	98.1	
2005	70			68.6	72.9	98.6	
2006	66	1	1.5	60.6	65.2	90.9	
2007	72			56.9	76.4	91.7	#
2008	76	1	1.3	59.2	63.2	84.2	
2009	71			62.0	66.2	87.3	
2010	82	1	1.2	62.2	69.5	90.2	
2011	80	2	2.5	68.8	53.8	76.3	
2012	87	1	1.1	65.5	62.1	86.2	
2013	79	1	1.3	60.8	49.4	98.7	
2014	52	1	1.9	55.8	28.8	98.1	##
1998-2014	1041	19	1.8	60.9	67.2	92.3	

\# The increases of incident cases in 2002 and 2007 reflect the expansion to additional registry areas.

\## Please be aware that data of recent annual patient cohorts may not yet be fully processed. The years under evaluation can be found in the respective headings.

Table 1a

All patients with invasive cancer
by year of diagnosis and gender
(incl. DCO)

Year of diagnosis	All n	Males n	Females n	Prop. males %
1998	33	20	13	60.6
1999	35	22	13	62.9
2000	33	19	14	57.6
2001	33	17	16	51.5
2002	65	41	24	63.1
2003	55	37	18	67.3
2004	52	31	21	59.6
2005	70	43	27	61.4
2006	66	31	35	47.0
2007	72	50	22	69.4
2008	76	46	30	60.5
2009	71	44	27	62.0
2010	82	49	33	59.8
2011	80	48	32	60.0
2012	87	48	39	55.2
2013	79	54	25	68.4
2014	52	27	25	51.9
1998-2014	1041	627	414	60.2

Table 2

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

Year of diagnosis	Males n	Females n	Males Inc. raw	Fem. Inc. raw	Males Inc. WS	Fem. Inc. WS	Males Inc. ES	Fem. Inc. ES	Males Inc. BRD-S	Fem. Inc. BRD-S
1998	20	13	1.8	1.1	1.0	0.5	1.7	0.8	2.4	1.0
1999	22	13	2.0	1.1	1.3	0.5	1.8	0.8	2.1	1.0
2000	19	14	1.7	1.2	0.9	0.6	1.5	0.8	2.1	1.0
2001	17	16	1.5	1.3	0.8	0.6	1.2	0.9	1.6	1.1
2002	41	24	2.2	1.2	1.2	0.5	1.8	0.7	2.6	1.0
2003	37	18	2.0	0.9	1.0	0.3	1.6	0.5	2.2	0.7
2004	31	21	1.6	1.1	0.9	0.4	1.3	0.6	1.8	0.8
2005	43	27	2.3	1.4	1.2	0.5	1.8	0.8	2.3	1.1
2006	31	35	1.6	1.7	0.7	0.7	1.2	1.1	1.8	1.4
2007	50	22	2.3	1.0	1.1	0.3	1.7	0.5	2.3	0.7
2008	46	30	2.1	1.3	1.0	0.5	1.5	0.7	2.0	1.0
2009	44	27	2.0	1.2	1.0	0.4	1.4	0.6	1.8	0.9
2010	49	33	2.2	1.4	1.0	0.5	1.5	0.8	2.1	1.1
2011	48	32	2.1	1.4	0.9	0.5	1.4	0.8	1.9	1.0
2012	48	39	2.1	1.7	0.9	0.6	1.5	0.9	2.0	1.3
2013	54	25	2.4	1.1	1.0	0.3	1.6	0.5	2.2	0.8
2014	27	25	1.2	1.1	0.5	0.4	0.8	0.6	1.1	0.9
1998-2014	627	414	2.0	1.2	1.0	0.5	1.5	0.7	2.0	1.0

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 patients)
(incl. DCO)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	33	73.5	10.9	46.8	90.1	56.7	70.3	74.8	81.4	86.7
1999	35	66.6	11.6	41.5	88.2	49.1	61.4	69.0	74.7	78.2
2000	33	70.6	10.6	37.3	88.4	58.2	65.5	71.6	77.2	82.5
2001	33	70.4	10.0	51.1	86.8	61.0	63.7	69.7	79.2	84.6
2002	65	71.9	11.7	46.0	96.4	56.3	62.6	72.9	81.0	83.8
2003	55	72.7	12.0	38.4	97.3	60.2	65.6	74.2	81.3	84.7
2004	52	72.3	10.1	50.6	87.9	57.6	64.7	74.8	80.1	83.5
2005	70	70.8	12.0	37.7	92.1	55.3	64.4	71.4	80.2	84.7
2006	66	73.3	10.0	52.1	91.8	59.6	66.4	73.5	80.8	85.9
2007	72	72.0	11.0	40.5	90.5	59.0	66.1	73.8	79.2	85.2
2008	76	72.6	11.1	20.5	91.1	60.3	67.4	73.1	80.9	84.4
2009	71	71.4	11.1	41.3	95.9	57.0	65.4	72.8	78.9	84.8
2010	82	73.4	9.2	51.6	92.9	60.4	67.9	73.8	80.2	84.7
2011	80	72.9	10.2	42.2	96.9	61.3	67.4	71.9	80.5	86.5
2012	87	73.4	10.2	41.4	90.9	59.7	67.7	75.2	80.9	85.3
2013	79	73.2	10.4	35.6	91.2	56.0	69.0	74.1	81.1	84.2
2014	52	73.1	8.9	50.7	93.5	60.2	68.7	74.1	79.0	81.9
1998-2014	1041	72.3	10.7	20.5	97.3	57.7	66.7	73.3	80.1	84.7

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	20	76.4	9.7	56.1	90.1	60.7	72.8	76.7	84.9	88.2
1999	22	63.4	12.3	41.5	78.2	41.9	53.8	68.3	74.0	76.3
2000	19	73.2	8.7	56.3	88.4	61.2	67.2	73.0	80.9	85.5
2001	17	71.1	9.6	51.7	86.8	61.0	64.0	69.7	78.3	86.5
2002	41	70.8	10.2	46.0	88.2	58.4	62.6	72.7	79.0	82.5
2003	37	71.1	12.9	38.4	97.3	50.7	64.1	73.8	81.1	83.4
2004	31	70.1	10.0	50.6	83.8	54.7	60.6	73.1	78.9	81.2
2005	43	69.5	12.0	37.7	92.1	54.6	63.3	69.1	79.1	84.2
2006	31	74.2	9.6	53.4	87.6	56.5	69.8	76.2	82.9	84.6
2007	50	70.6	10.3	42.8	89.3	56.5	65.8	72.0	78.3	81.5
2008	46	71.0	9.3	49.3	90.0	58.0	65.9	71.4	75.9	83.5
2009	44	68.9	10.4	44.8	87.9	55.9	63.4	70.4	75.6	80.8
2010	49	73.3	8.8	51.6	92.9	60.4	68.1	72.6	78.7	84.2
2011	48	73.3	9.8	48.1	96.9	60.5	68.3	72.2	80.8	85.4
2012	48	72.4	11.2	41.4	89.6	53.2	65.3	74.6	79.9	87.1
2013	54	71.6	11.0	35.6	88.6	55.0	67.0	73.8	80.5	83.0
2014	27	74.1	9.7	50.7	93.5	60.2	68.7	74.3	80.6	85.8
1998-2014	627	71.4	10.6	35.6	97.3	56.3	65.9	72.6	79.0	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	13	68.9	11.5	46.8	86.0	53.6	59.3	72.2	74.8	82.5
1999	13	71.9	8.2	61.4	88.2	63.6	67.0	69.4	78.2	84.0
2000	14	67.2	12.3	37.3	82.5	50.1	60.6	70.9	75.9	79.0
2001	16	69.5	10.6	51.1	84.9	53.1	62.2	69.1	80.4	84.6
2002	24	73.8	13.9	47.0	96.4	51.0	62.8	78.5	83.0	92.7
2003	18	76.1	9.3	60.9	93.1	61.7	68.9	77.5	82.6	87.8
2004	21	75.7	9.6	57.6	87.9	60.1	71.2	79.0	81.4	86.5
2005	27	73.0	11.8	43.7	91.7	56.2	66.4	74.9	80.9	85.1
2006	35	72.5	10.4	52.1	91.8	60.1	64.5	72.7	78.0	87.9
2007	22	75.3	12.1	40.5	90.5	60.7	69.3	77.7	83.8	87.3
2008	30	75.1	13.1	20.5	91.1	63.6	69.4	78.8	82.7	86.6
2009	27	75.5	11.2	41.3	95.9	63.1	70.1	76.9	82.3	86.6
2010	33	73.7	10.0	54.7	89.9	57.6	66.2	75.7	81.0	84.8
2011	32	72.2	11.0	42.2	90.9	63.4	67.4	71.8	77.7	87.8
2012	39	74.7	8.8	53.0	90.9	61.4	68.9	77.0	81.0	84.8
2013	25	76.8	7.9	61.5	91.2	68.2	70.4	75.3	84.0	87.7
2014	25	72.0	8.0	53.0	81.3	59.5	68.0	74.0	78.1	81.1
1998-2014	414	73.5	10.7	20.5	96.4	60.1	67.5	74.8	81.0	85.8

Table 4

Age distribution by 5-year age group and gender for period 2007-2014
(incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
20-24	1	0.2	0.2			0.0	1	0.4	0.4
25-29	0	0.0	0.2			0.0			0.4
30-34	0	0.0	0.2			0.0			0.4
35-39	1	0.2	0.3	1	0.3	0.3			0.4
40-44	6	1.0	1.3	3	0.8	1.1	3	1.3	1.7
45-49	9	1.5	2.8	8	2.2	3.3	1	0.4	2.1
50-54	22	3.7	6.5	17	4.6	7.9	5	2.1	4.3
55-59	27	4.5	11.0	18	4.9	12.8	9	3.9	8.2
60-64	47	7.8	18.9	30	8.2	21.0	17	7.3	15.5
65-69	91	15.2	34.1	56	15.3	36.3	35	15.0	30.5
70-74	134	22.4	56.4	95	26.0	62.3	39	16.7	47.2
75-79	108	18.0	74.5	56	15.3	77.6	52	22.3	69.5
80-84	96	16.0	90.5	56	15.3	92.9	40	17.2	86.7
85+	57	9.5	100.0	26	7.1	100.0	31	13.3	100.0
All ages	599	100.0		366	100.0		233	100.0	

Included in the statistics are 111.0% multiple primaries in males and 84.7% in females.

Table 5

Age-specific incidence, DCO rate and proportion of all cancers
for period 2007-2014

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=4 %	Females DCO rate n=3 %	Males Prop.all cancers n=91183 %	Females Prop.all cancers n=89596 %
0- 4			0.0	0.0				
5- 9			0.0	0.0				
10-14			0.0	0.0				
15-19			0.0	0.0				
20-24		1	0.0	0.1				0.3
25-29			0.0	0.0				
30-34			0.0	0.0				
35-39	1		0.1	0.0			0.1	
40-44	3	3	0.2	0.2			0.2	0.1
45-49	8	1	0.5	0.1			0.2	0.0
50-54	17	5	1.3	0.4			0.3	0.1
55-59	17	9	1.6	0.8			0.2	0.1
60-64	30	17	3.1	1.6			0.3	0.2
65-69	56	33	5.8	3.2		3.0	0.4	0.3
70-74	94	39	10.3	3.7	1.1		0.6	0.3
75-79	56	52	10.2	7.3	5.4		0.4	0.5
80-84	56	40	16.0	7.1		2.5	0.7	0.5
85+	26	31	11.2	5.4		3.2	0.4	0.3
All ages	364	231			1.1	1.3	0.4	0.3
Incidence								
Raw			2.0	1.2				
WS			0.9	0.4				
ES			1.4	0.7				
BRD-S			1.9	1.0				

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).

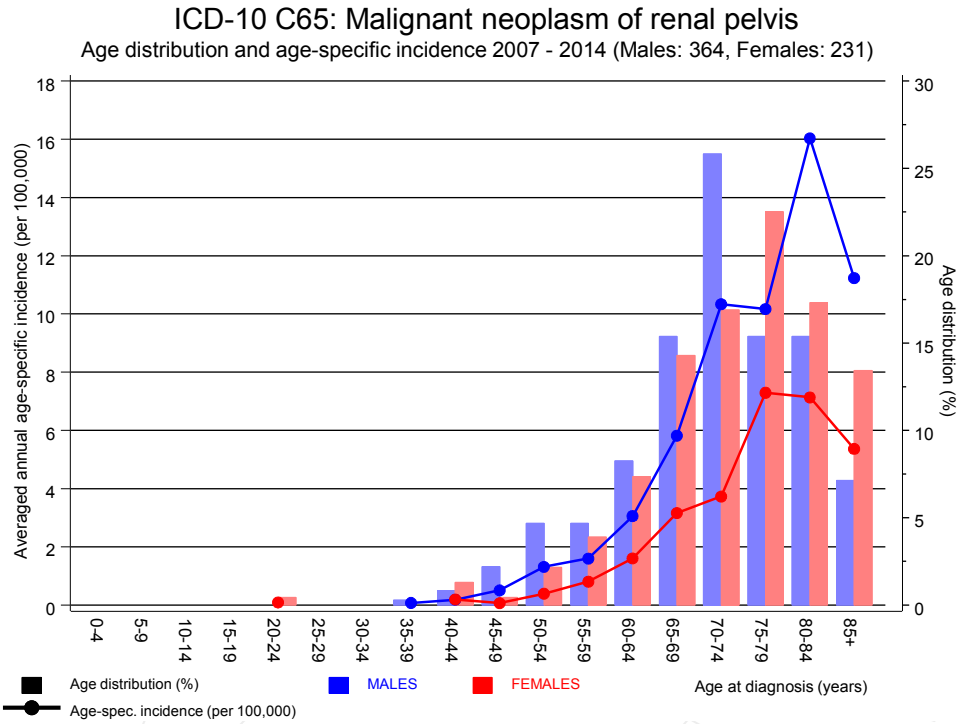


Figure 6. Age distribution and age-specific incidence

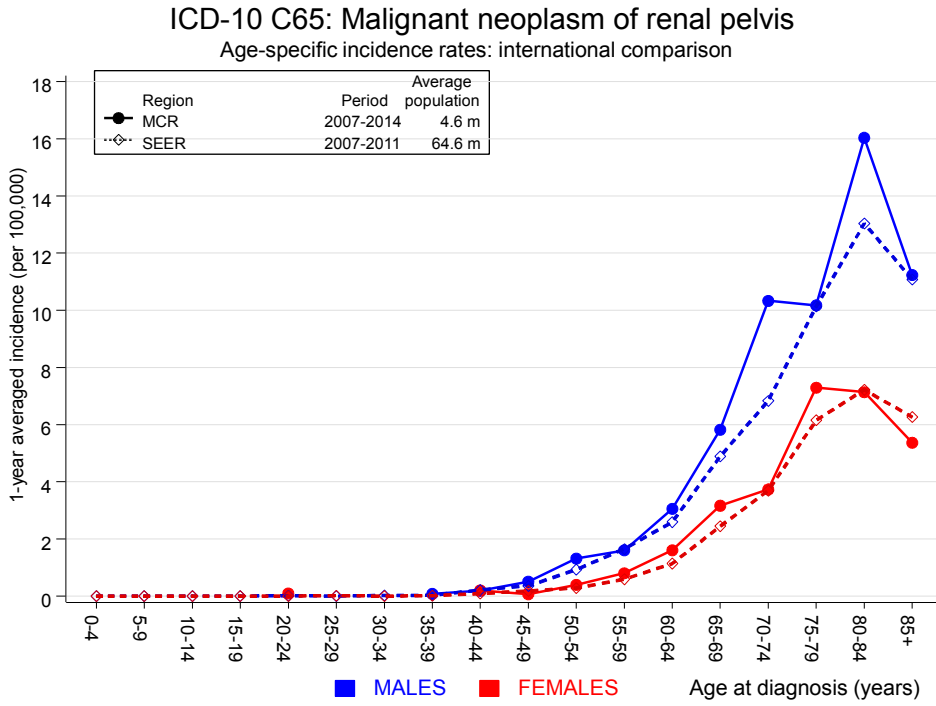


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

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

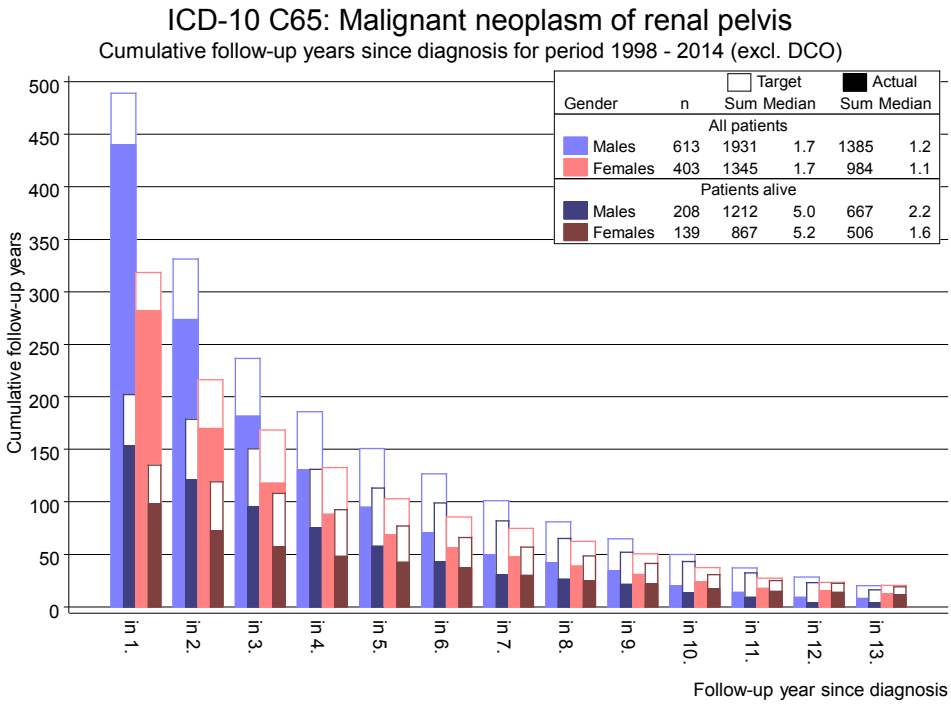


Figure 7. Cumulative follow-up years depending on time since diagnosis

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

Table 8a

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries for period 1998-2014
MALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C16	Stomach	2	1.2	1.6	0.2	5.9		5.7	
C17	Small intestine	2	0.1	14.8	1.8	53.5	#	13.7	
C18	Colon	5	2.9	1.7	0.6	4.0		15.5	
C19-C20	Rectum	2	1.5	1.4	0.2	4.9		3.9	
C22	Liver	2	0.8	2.7	0.3	9.6		9.1	50.0
C25	Pancreas	4	1.0	3.8	1.0	9.8	#	21.6	
C33-C34	Lung	10	3.2	3.1	1.5	5.7	#	49.7	40.0
C43	Malign. melanoma	4	1.1	3.6	1.0	9.2		21.2	
C60	Penis	2	0.1	30.8	3.7	111.2	#	14.2	
C61	Prostate	33	8.1	4.1	2.8	5.7	#	182.0	6.1
C64	Kidney	11	0.9	11.9	5.9	21.3	#	73.7	
C65	Renal pelvis	5	0.1	39.0	12.7	91.0	#	35.7	
C66	Ureter	26	0.1	363.4	237.4	532.5	#	189.8	
C67	Bladder	51	1.4	37.0	27.6	48.7	#	363.2	21.6
C68	Urethra	4	0.0	181.8	49.5	465.6	#	29.1	
Other primaries		6	1.8	3.4	1.2	7.4	#	30.9	33.3
Not observed		0	3.7	0.0	0.0	1.0	#	-27.2	
All mult. primaries		169	28.0	6.0	5.2	7.0	#	1032	11.8

Patients	606
Median age at second malignancy (years)	73.7
Person-years	1366
Mean observation time (years)	2.3
Median observation time (years)	1.2

The occurrence of second malignancy is statistically significant.

Observed second primaries with count 1 are pooled in category “Other primaries”

Table 8b

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries for period 1998–2014
FEMALES

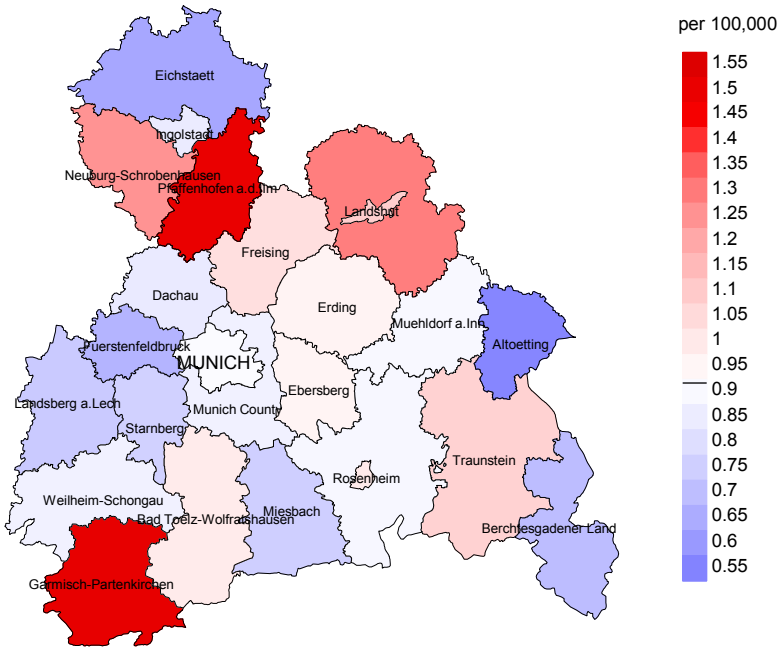
Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C25	Pancreas	3	0.6	4.6	1.0	13.5		24.0	33.3
C33–C34	Lung	7	0.9	7.8	3.1	16.0	#	62.2	14.3
C50	Breast	12	3.6	3.3	1.7	5.8	#	85.4	33.3
C64	Kidney	7	0.3	20.8	8.4	42.9	#	68.0	28.6
C65	Renal pelvis	5	0.0	109.5	35.6	255.5	#	50.5	
C66	Ureter	15	0.0	653.5	365.8	1078	#	152.7	
C67	Bladder	44	0.3	154.9	112.6	208.0	#	445.8	15.9
C68	Urinary org.	2	0.0	304.5	36.9	1100	#	20.3	100.0
C82–C85	NHL	2	0.5	3.8	0.5	13.8		15.1	
Other primaries		3	0.7	4.1	0.8	11.9		23.1	
Not observed		0	6.0	0.0	0.0	0.6	#	-60.8	
All mult. primaries		100	13.1	7.6	6.2	9.3	#	886.3	17.0

Patients	402
Median age at second malignancy (years)	76.3
Person-years	981
Mean observation time (years)	2.4
Median observation time (years)	1.0

The occurrence of second malignancy is statistically significant.

Observed second primaries with count 1 are pooled in category “Other primaries”

Average incidence (world standard population) 2007 - 2014: Males



Average incidence (world standard population) 2007 - 2014: Females

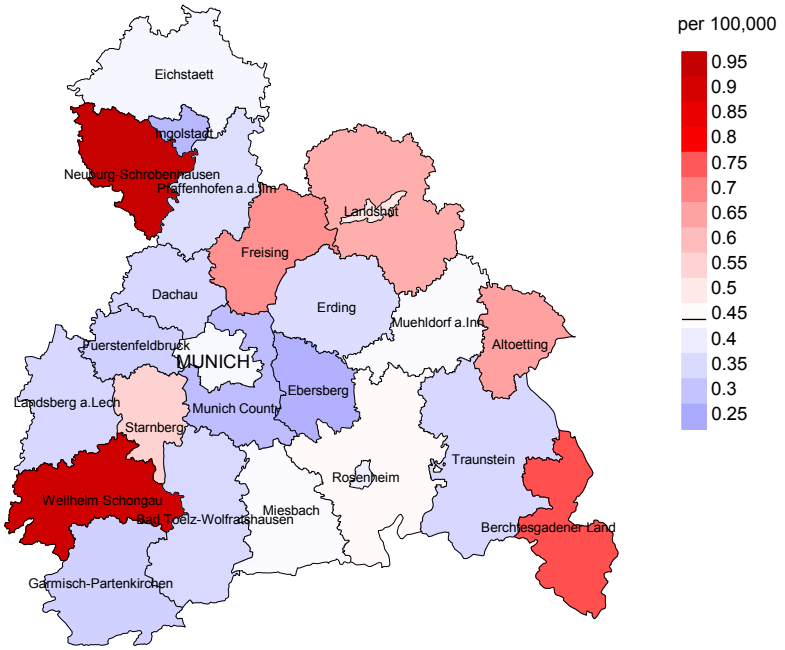
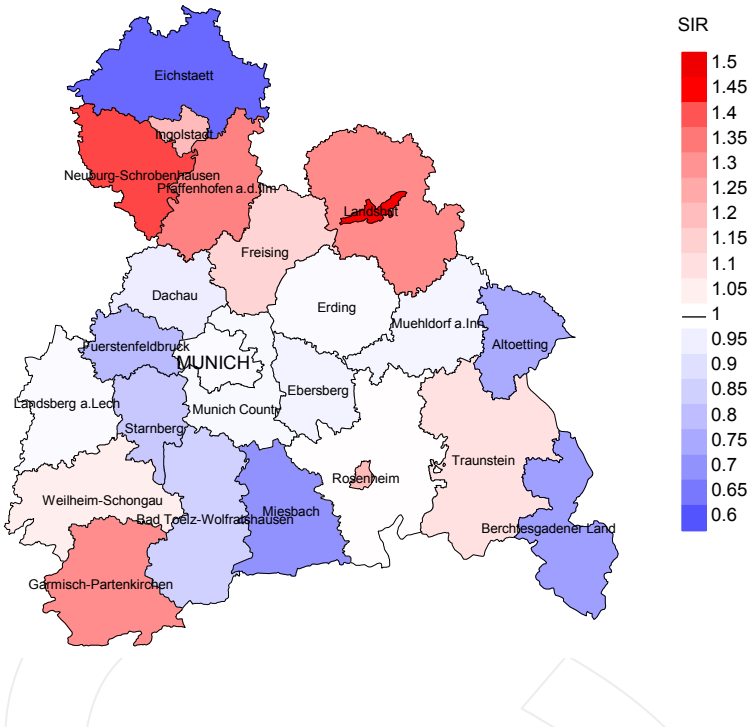


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 0.9/100,000 WS N=364, females 0.4/100,000 WS N=231).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,347 female residents (averaged) in the period from 2007 to 2014 a total of 5 women were identified with newly diagnosed renal pelvis cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 0.3/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.1 and 0.9/100,000.

Standardized incidence ratio (SIR) 2007 - 2014: Males



Standardized incidence ratio (SIR) 2007 - 2014: Females

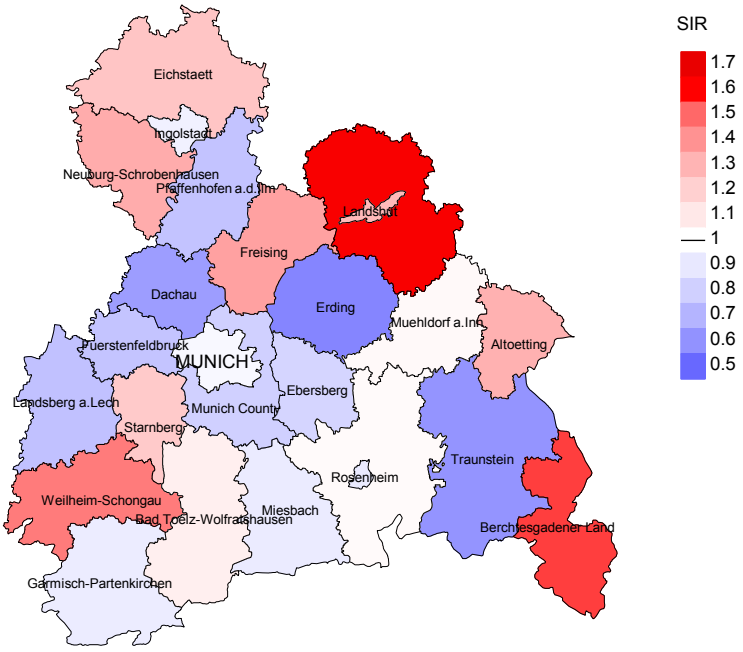


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=364, females N=231).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,924 female residents (averaged) in the period from 2007 to 2014 a total of 5 women were identified with newly diagnosed renal pelvis cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.82. Though, the value of this parameter may vary with an underlying probability of 99% between 0.18 and 2.33, and is therefore not statistically striking.

MORTALITY

Table 10a

Patient cohorts of incident cancers by year of diagnosis, follow-up status, proportion of DCO, deaths among the annual cohorts and proportion of available death certificates (with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.64 m as of 2007, respectively)

Year of diagnosis	Incident cases n	Prop. actively followed %	Prop. DCO %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	33	97.0	3.0	28	84.8	96.4
1999	35	100.0		30	85.7	93.3
2000	33	97.0	3.0	26	78.8	96.2
2001	33	100.0		26	78.8	96.2
2002	65	100.0	3.1	52	80.0	98.1
2003	55	96.4	5.5	44	80.0	97.7
2004	52	98.1	7.7	42	80.8	97.6
2005	70	98.6		51	72.9	96.1
2006	66	90.9	1.5	43	65.2	100.0
2007	72	91.7		55	76.4	96.4
2008	76	84.2	1.3	48	63.2	100.0
2009	71	87.3		47	66.2	100.0
2010	82	90.2	1.2	57	69.5	100.0
2011	80	76.3	2.5	43	53.8	100.0
2012	87	86.2	1.1	54	62.1	98.1
2013	79	98.7	1.3	39	49.4	100.0
2014	52	98.1	1.9	15	28.8	93.3
1998-2014	1041	92.3	1.8	700	67.2	98.0

Table 10b

Annual cohorts of incident cancers and deaths, proportion of death certificates and cases deceased the same year of cancer diagnosis
(incl. DCO)
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.64 m as of 2007, respectively)

Year of diagnosis/ death	Incident cases n	Deaths n	Prop. deaths with death certific. %	Deaths in same year n	Prop. deaths in same year %
1998	33	15	93.3	4	12.1
1999	35	20	100.0	8	22.9
2000	33	29	93.1	7	21.2
2001	33	25	100.0	10	30.3
2002	65	34	100.0	11	16.9
2003	55	48	93.8	16	29.1
2004	52	38	94.7	14	26.9
2005	70	46	97.8	15	21.4
2006	66	44	100.0	9	13.6
2007	72	62	95.2	19	26.4
2008	76	44	100.0	12	15.8
2009	71	56	100.0	16	22.5
2010	82	60	100.0	17	20.7
2011	80	79	97.5	17	21.3
2012	87	53	98.1	18	20.7
2013	79	70	100.0	16	20.3
2014	52	66	100.0	12	23.1
1998-2014	1041	789	98.1	221	21.2

Table 10c

Annual cohorts of deaths, proportion of cancer-related and non-cancer-related deaths, and cancer recorded on death certificates (incl. DCO)
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.64 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer-related %	Prop. non-cancer-related %	Prop. cancer recorded on death certificate %
1998	15	66.7	33.3	64.3
1999	20	85.0	15.0	80.0
2000	29	65.5	34.5	88.9
2001	25	68.0	32.0	84.0
2002	34	79.4	20.6	79.4
2003	48	75.0	25.0	86.7
2004	38	76.3	23.7	86.1
2005	46	87.0	13.0	88.9
2006	44	79.5	20.5	84.1
2007	62	77.4	22.6	86.4
2008	44	86.4	13.6	90.9
2009	56	76.8	23.2	78.6
2010	60	75.0	25.0	83.3
2011	79	86.1	13.9	93.5
2012	53	69.8	30.2	75.0
2013	70	74.3	25.7	82.9
2014	66	84.8	15.2	93.9
1998-2014	789	78.2	21.8	85.3

Table 11a

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	10	75.6	76.3	74.9	81.0
1999	8	81.0	77.1	85.8	77.1
2000	21	76.5	73.1	85.6	76.1
2001	14	74.5	71.9	79.7	73.8
2002	17	73.6	77.6	65.4	77.6
2003	32	77.5	76.3	82.5	76.7
2004	20	78.4	77.2	82.3	77.2
2005	26	70.3	68.8	74.4	68.8
2006	26	74.2	73.0	79.1	74.0
2007	41	76.0	73.8	78.8	75.4
2008	25	77.0	76.0	83.7	75.9
2009	34	73.6	71.7	80.2	71.7
2010	34	78.5	77.5	85.5	77.6
2011	52	75.0	73.9	89.3	73.9
2012	29	77.5	75.0	87.3	77.3
2013	41	75.8	75.5	75.8	74.9
2014	39	76.5	75.1	84.9	75.5
1998-2014	469	75.8	74.5	81.4	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

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	5	82.7	72.1	85.7	72.1
1999	12	75.6	76.3	73.9	75.2
2000	8	77.0	74.5	88.9	75.4
2001	11	77.6	70.2	87.9	74.9
2002	17	79.8	79.6	80.5	79.6
2003	16	76.5	77.4	75.6	77.4
2004	18	80.0	79.5	83.5	79.5
2005	20	74.7	71.6	88.0	71.6
2006	18	76.8	74.2	85.0	73.0
2007	21	78.4	76.9	85.6	77.5
2008	19	80.0	76.5	87.5	79.5
2009	22	78.9	76.2	92.7	77.4
2010	26	79.8	79.3	85.1	78.9
2011	27	82.2	78.8	90.1	80.6
2012	24	76.5	75.8	77.9	75.7
2013	29	81.1	77.2	83.5	80.1
2014	27	78.5	77.8	88.7	78.5
1998-2014	320	78.6	76.8	84.9	77.8

By 2010, life expectancy at birth was 77.5 years for boys and 82.6 years for girls.

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	7	0.6	0.37	0.3	0.35	0.6	0.36	0.7	0.32
1999	7	0.6	0.33	0.3	0.27	0.6	0.34	0.9	0.44
2000	14	1.2	0.74	0.7	0.75	1.1	0.75	1.6	0.75
2001	10	0.9	0.59	0.5	0.61	0.8	0.61	1.0	0.58
2002	15	0.8	0.37	0.4	0.35	0.7	0.36	1.0	0.38
2003	25	1.3	0.68	0.6	0.63	1.1	0.69	1.6	0.73
2004	17	0.9	0.55	0.4	0.46	0.7	0.50	1.1	0.60
2005	23	1.2	0.53	0.6	0.49	0.9	0.52	1.3	0.54
2006	21	1.1	0.68	0.5	0.73	0.8	0.69	1.1	0.64
2007	32	1.4	0.64	0.7	0.63	1.1	0.65	1.5	0.65
2008	23	1.0	0.50	0.4	0.44	0.7	0.49	1.1	0.56
2009	27	1.2	0.64	0.5	0.59	0.8	0.61	1.1	0.64
2010	27	1.2	0.55	0.5	0.54	0.8	0.55	1.2	0.57
2011	45	2.0	0.94	0.8	0.88	1.3	0.92	1.8	0.94
2012	20	0.9	0.42	0.3	0.37	0.6	0.39	0.8	0.40
2013	30	1.3	0.56	0.6	0.56	0.9	0.58	1.3	0.58
2014	34	1.5	1.26	0.6	1.22	1.0	1.24	1.4	1.31
1998-2014	377	1.2	0.61	0.5	0.57	0.9	0.60	1.3	0.62

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	3	0.3	0.23	0.1	0.22	0.2	0.21	0.2	0.24
1999	10	0.8	0.77	0.3	0.55	0.5	0.65	0.7	0.77
2000	5	0.4	0.36	0.2	0.32	0.3	0.34	0.4	0.37
2001	7	0.6	0.44	0.3	0.42	0.4	0.42	0.5	0.42
2002	12	0.6	0.50	0.2	0.44	0.4	0.48	0.5	0.53
2003	11	0.6	0.61	0.2	0.63	0.3	0.62	0.4	0.67
2004	12	0.6	0.57	0.2	0.52	0.3	0.53	0.5	0.56
2005	17	0.9	0.63	0.3	0.66	0.5	0.65	0.7	0.62
2006	14	0.7	0.40	0.3	0.36	0.4	0.39	0.6	0.42
2007	16	0.7	0.73	0.2	0.71	0.4	0.74	0.6	0.81
2008	15	0.6	0.50	0.2	0.52	0.4	0.50	0.5	0.49
2009	16	0.7	0.59	0.2	0.63	0.4	0.60	0.5	0.59
2010	18	0.8	0.56	0.2	0.43	0.4	0.47	0.6	0.54
2011	23	1.0	0.74	0.3	0.63	0.5	0.67	0.7	0.70
2012	17	0.7	0.44	0.3	0.43	0.4	0.42	0.5	0.39
2013	22	0.9	0.88	0.3	0.76	0.4	0.80	0.7	0.86
2014	22	0.9	0.88	0.3	0.71	0.5	0.74	0.7	0.78
1998-2014	240	0.7	0.58	0.2	0.52	0.4	0.54	0.6	0.57

Table 13

Age distribution of age at death (cancer-related) for period 2007-2014
(**incl. multiple primaries**)

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
20-24	1	0.3	0.3			0.0	1	0.7	0.7
25-29	0	0.0	0.3			0.0			0.7
30-34	0	0.0	0.3			0.0			0.7
35-39	0	0.0	0.3			0.0			0.7
40-44	2	0.5	0.8			0.0	2	1.3	2.0
45-49	5	1.3	2.1	4	1.7	1.7	1	0.7	2.6
50-54	13	3.3	5.4	11	4.6	6.3	2	1.3	4.0
55-59	20	5.1	10.5	15	6.3	12.6	5	3.3	7.3
60-64	25	6.4	16.9	17	7.1	19.7	8	5.3	12.6
65-69	35	9.0	25.9	23	9.6	29.3	12	7.9	20.5
70-74	84	21.5	47.4	56	23.4	52.7	28	18.5	39.1
75-79	71	18.2	65.6	39	16.3	69.0	32	21.2	60.3
80-84	77	19.7	85.4	46	19.2	88.3	31	20.5	80.8
85+	57	14.6	100.0	28	11.7	100.0	29	19.2	100.0
All ages	390	100.0		239	100.0		151	100.0	

Included in the statistics are 111.0% multiple primaries in males and 84.7% in females.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2014
(**incl. multiple primaries**)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4			0.0		0.0			
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24		1	0.0		0.1	1.00		3.6
25-29			0.0		0.0			
30-34			0.0		0.0			
35-39			0.0		0.0			
40-44		2	0.0		0.1	0.67		0.3
45-49	4	1	0.3	0.50	0.1	1.00	0.4	0.1
50-54	11	2	0.8	0.65	0.2	0.40	0.6	0.1
55-59	15	5	1.4	0.83	0.4	0.56	0.5	0.2
60-64	17	8	1.7	0.57	0.8	0.47	0.4	0.2
65-69	23	12	2.4	0.41	1.1	0.34	0.3	0.2
70-74	56	28	6.2	0.59	2.7	0.72	0.6	0.4
75-79	39	32	7.1	0.70	4.5	0.62	0.5	0.5
80-84	46	31	13.2	0.82	5.5	0.78	0.6	0.5
85+	28	29	12.1	1.08	5.0	0.94	0.5	0.3
All ages	239	151					0.5	0.3
Mortality								
Raw			1.3	0.65	0.8	0.65		
WS			0.6	0.62	0.3	0.58		
ES			0.9	0.65	0.4	0.60		
BRD-S			1.3	0.67	0.6	0.62		
PYLL-70								
per 100,000			4.1		2.0			
ES			3.6		1.7			
AYLL-70			9.4		10.1			

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

Table 15a

Multiple primaries in deaths in period 1998-2014
MALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C18	Colon	22	5.5	15	68.2	1	4.5	6	27.3
C19-C20	Rectum	6	1.5	6	100.0				
C25	Pancreas	6	1.5	1	16.7	1	16.7	4	66.7
C33-C34	Lung	24	6.0	9	37.5			15	62.5
C44	Skin others	5	1.2	2	40.0			3	60.0
C61	Prostate	52	12.9	31	59.6	10	19.2	11	21.2
C64	Kidney	18	4.5	5	27.8	9	50.0	4	22.2
C65	Renal pelvis	8	2.0					8	100.0
C66	Ureter	36	9.0	8	22.2	23	63.9	5	13.9
C67	Bladder	171	42.5	101	59.1	20	11.7	50	29.2
C68	Urethra	6	1.5	1	16.7	1	16.7	4	66.7
C68	Urinary org.	6	1.5	2	33.3	2	33.3	2	33.3
C90	Mult. myeloma	5	1.2	1	20.0			4	80.0
Other primaries		37	9.2	24	64.9	1	2.7	12	32.4
All mult. primaries		402	100.0	206	51.2	68	16.9	128	31.8

Multiple primaries with number of cases 1 to 4 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 1998-2014
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C17	Small intestine	2	1.0	1	50.0			1	50.0
C18	Colon	4	2.1	2	50.0	2	50.0		
C19-C20	Rectum	4	2.1	3	75.0			1	25.0
C25	Pancreas	3	1.6					3	100.0
C33-C34	Lung	9	4.7	4	44.4	1	11.1	4	44.4
C44	Skin others	2	1.0			2	100.0		
C50	Breast	26	13.5	19	73.1			7	26.9
C53	Cervix uteri	6	3.1	5	83.3			1	16.7
C54	Corpus uteri	2	1.0	2	100.0				
C55,C57	Fem. genitals un	2	1.0	1	50.0			1	50.0
C56	Ovary	3	1.6	3	100.0				
C64	Kidney	6	3.1	2	33.3	1	16.7	3	50.0
C65	Renal pelvis	4	2.1			1	25.0	3	75.0
C66	Ureter	28	14.5	9	32.1	13	46.4	6	21.4
C67	Bladder	81	42.0	26	32.1	16	19.8	39	48.1
C68	Urinary org.	3	1.6	1	33.3			2	66.7
C82-C85	NHL	2	1.0	1	50.0			1	50.0
C90	Mult. myeloma	2	1.0	1	50.0			1	50.0
Other primaries		4	2.1	3	75.0			1	25.0
All mult. primaries		193	100.0	83	43.0	36	18.7	74	38.3

Multiple primaries with number of cases 1 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 2007-2014
(**First primaries only** *)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	Males MI-index	Females Age-spec. mortal.	Females MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4			0.0		0.0			
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24		1	0.0		0.1	1.00		3.8
25-29			0.0		0.0			
30-34			0.0		0.0			
35-39			0.0		0.0			
40-44		2	0.0		0.1	1.00		0.4
45-49	4	1	0.3	0.50	0.1	1.00	0.4	0.1
50-54	5		0.4	0.63	0.0		0.3	
55-59	6	1	0.6	0.55	0.1	0.20	0.2	0.0
60-64	11	2	1.1	0.61	0.2	0.22	0.3	0.1
65-69	12	10	1.2	0.55	1.0	0.45	0.2	0.2
70-74	29	16	3.2	0.64	1.5	0.76	0.4	0.3
75-79	23	22	4.2	0.82	3.1	0.59	0.4	0.5
80-84	23	15	6.6	1.10	2.7	0.63	0.4	0.3
85+	10	19	4.3	1.00	3.3	0.95	0.2	0.3
All ages	123	89					0.3	0.3
Mortality								
Raw			0.7	0.71	0.5	0.62		
WS			0.3	0.65	0.2	0.55		
ES			0.5	0.68	0.2	0.56		
BRD-S			0.7	0.73	0.4	0.58		
PYLL-70								
per 100,000			2.3		1.1			
ES			2.0		1.0			
AYLL-70			9.6		10.4			

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2014
(**Single primaries only** *)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4			0.0		0.0			
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24		1	0.0		0.1	1.00		4.2
25-29			0.0		0.0			
30-34			0.0		0.0			
35-39			0.0		0.0			
40-44		2	0.0		0.1	1.00		0.4
45-49	4		0.3	0.50	0.0		0.5	
50-54	4		0.3	0.67	0.0		0.3	
55-59	4	1	0.4	0.80	0.1	0.20	0.2	0.1
60-64	10	2	1.0	0.71	0.2	0.40	0.3	0.1
65-69	7	7	0.7	0.47	0.7	0.47	0.1	0.2
70-74	19	11	2.1	0.73	1.1	0.65	0.3	0.3
75-79	12	14	2.2	0.67	2.0	0.45	0.2	0.4
80-84	13	13	3.7	0.76	2.3	0.93	0.3	0.3
85+	7	9	3.0	0.70	1.6	0.56	0.2	0.2
All ages	80	60					0.3	0.2
Mortality								
Raw			0.4	0.66	0.3	0.56		
WS			0.2	0.64	0.1	0.52		
ES			0.3	0.65	0.2	0.52		
BRD-S			0.4	0.67	0.2	0.54		
PYLL-70								
per 100,000			1.9		0.9			
ES			1.6		0.8			
AYLL-70			10.4		11.3			

* See corresponding tables with multiple primaries.

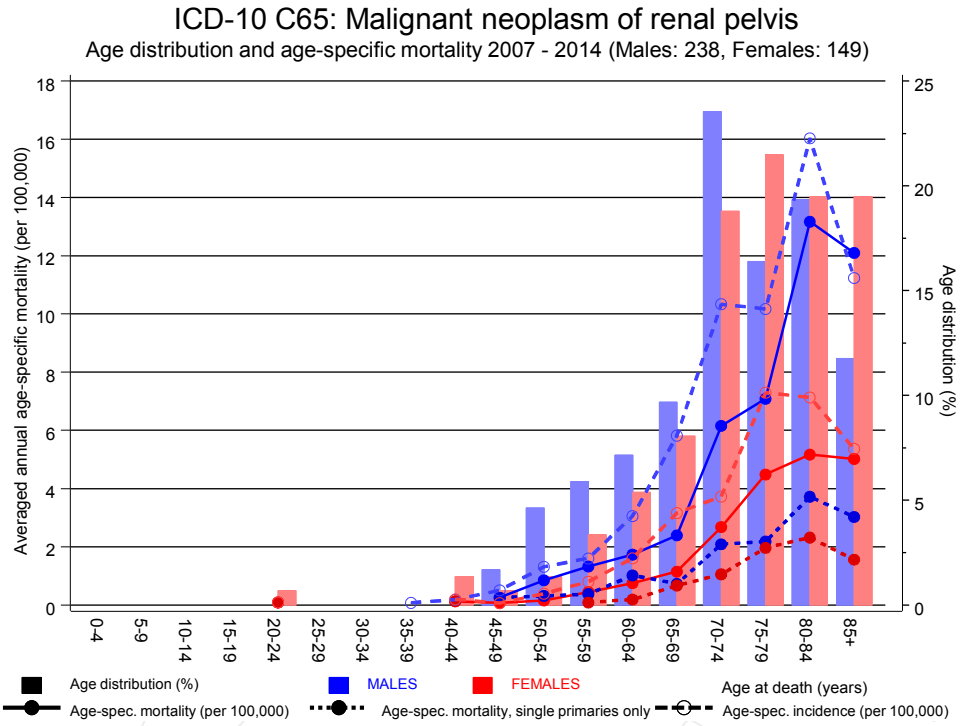
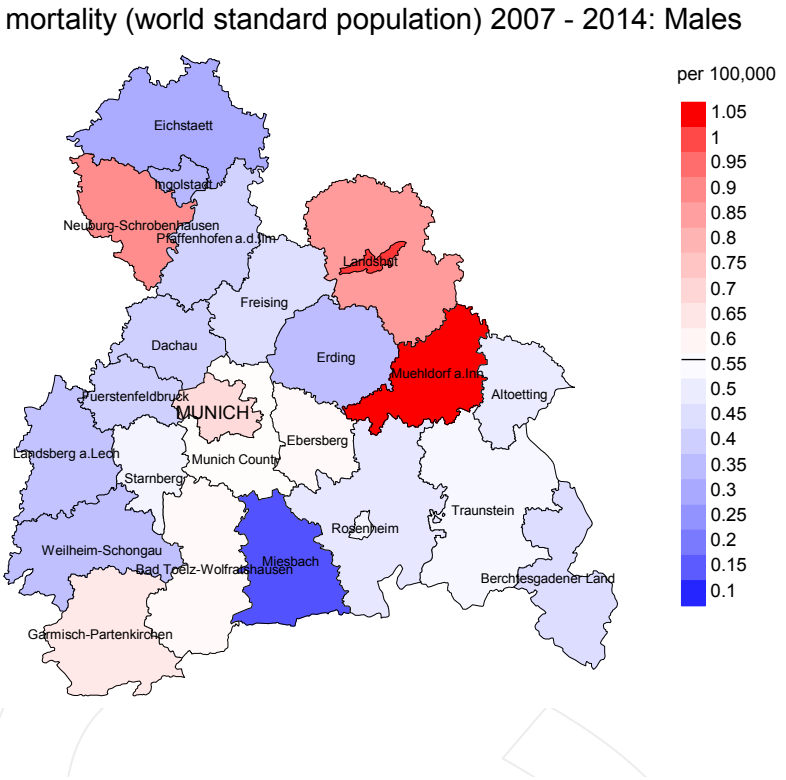


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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



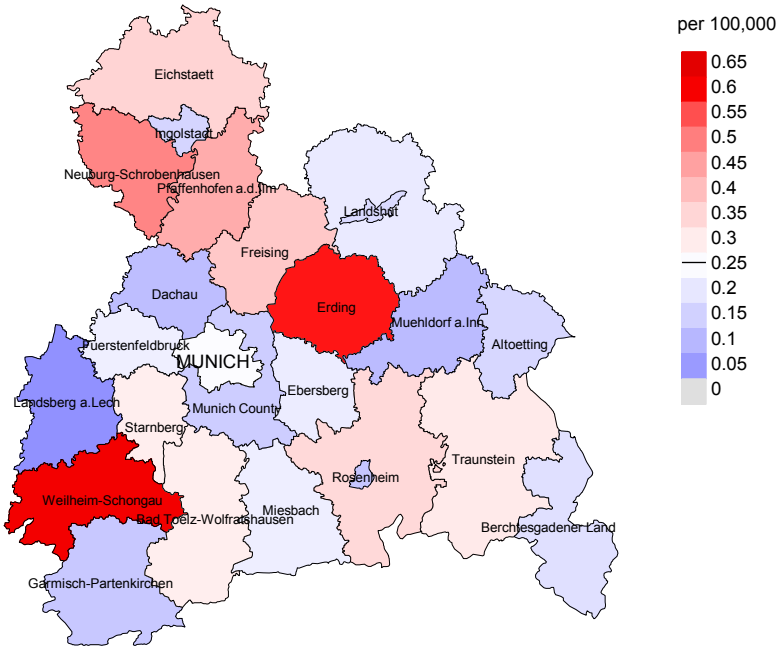
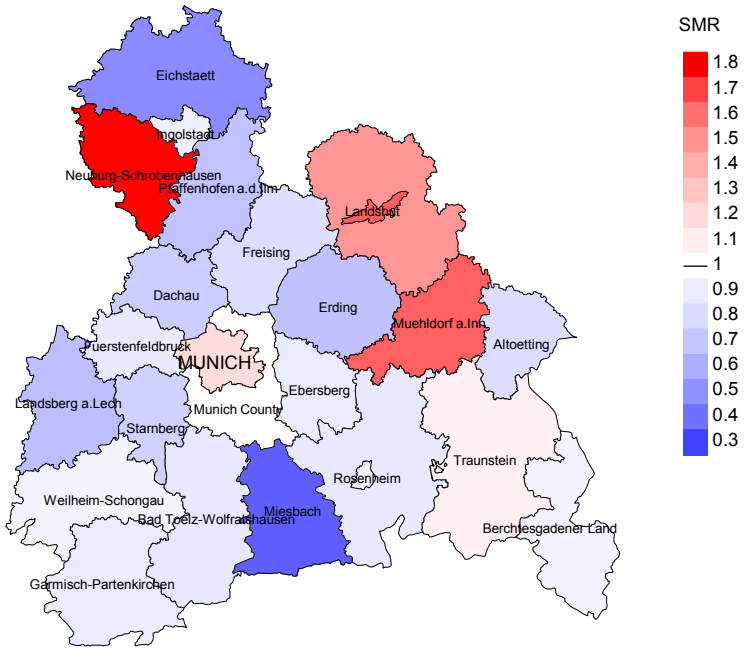


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2014. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 0.6/100,000 WS N=237, females 0.3/100,000 WS N=148).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,347 female residents (averaged) in the period from 2007 to 2014 a total of 5 women died from renal pelvis cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.2/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 0.6/100,000.

Standardized mortality ratio (SMR) 2007 - 2014: Males



Standardized mortality ratio (SMR) 2007 - 2014: Females

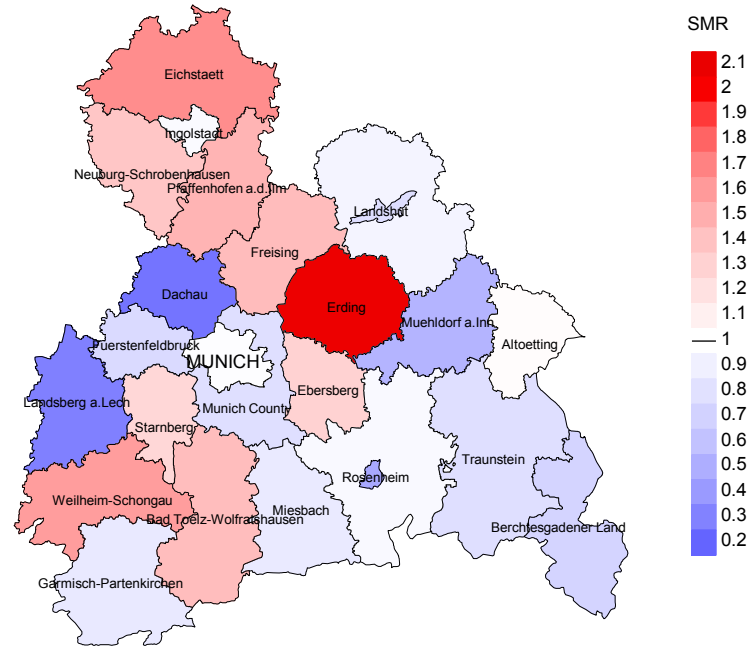


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=237, females N=148).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,924 female residents (averaged) in the period from 2007 to 2014 a total of 5 women died from renal pelvis cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.30. Though, the value of this parameter may vary with an underlying probability of 99% between 0.28 and 3.69, 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, where applicable. For mortality statistics patients, diagnoses and progressive course of disease are presented. In the calculations, all courses of disease are considered whereby progressions occurred and/or death certificate identified progressive cancers were ascertained. Additionally there are three groups of disease course to consider:

1. **All multiple primaries included**

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

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

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

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

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

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

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

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

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

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

Shortcuts

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

Recommended Citation

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