Munich Cancer Registry

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

Cancer statistics: Baseline statistics

C64-C68: Urinary tract cancer

Year of diagnosis	1998-2012
Patients	17,723
Diseases	18,370
Creation date	03/20/2014
Export date	02/12/2014
Population	4.5 m

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
C67	Bladder
C68	Other and unspecified urinary organs

INCIDENCE

Table 1

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

Year of diagnosis	Cases n	DCO cases n	Prop. DCO %	Prop. mult. primaries %	Prop. deaths %	Prop. actively followed %
1998	771	59	7.7	32.9	67.8	98.1
1999	732	53	7.2	33.6	67.8	98.1
2000	707	69	9.8	34.7	65.3	97.7
2001	722	66	9.1	34.9	64.4	98.2
2002	1336	181	13.5	37.2	69.4	98.3 #
2003	1314	149	11.3	34.6	64.4	97.2 #
2004	1297	146	11.3	37.6	60.0	97.5 #
2005	1338	97	7.2	37.6	53.4	96.6 #
2006	1380	98	7.1	35.9	56.4	93.6 #
2007	1491	123	8.2	35.6	51.7	83.0 # ##
2008	1548	133	8.6	37.8	49.3	69.9
2009	1540	127	8.2	39.7	47.8	69.0
2010	1498	124	8.3	38.5	43.3	66.7
2011	1440	106	7.4	37.4	39.0	68.7
2012	1256	115	9.2	37.3	30.3	97.1 ###
1998-2012	18370	1646	9.0	36.7	53.6	86.6

\#   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	771	502	269	65.1
1999	732	494	238	67.5
2000	707	467	240	66.1
2001	722	447	275	61.9
2002	1336	874	462	65.4
2003	1314	889	425	67.7
2004	1297	861	436	66.4
2005	1338	891	447	66.6
2006	1380	921	459	66.7
2007	1491	999	492	67.0
2008	1548	1043	505	67.4
2009	1540	1031	509	66.9
2010	1498	999	499	66.7
2011	1440	973	467	67.6
2012	1256	855	401	68.1
1998-2012	18370	12246	6124	66.7

Table 2

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

Year of diagnosis	Males n	Females n	Males Inc. raw	Fem. Inc. raw	Males Inc. WS	Fem. Inc. WS	Males Inc. ES	Fem. Inc. ES	Males Inc. BRD-S	Fem. Inc. BRD-S
1998	502	269	45.3	22.9	27.9	10.3	41.5	15.1	53.6	19.3
1999	494	238	44.1	20.1	26.6	9.6	39.6	13.8	51.1	17.2
2000	467	240	41.0	20.0	24.5	8.3	36.6	12.6	48.2	16.5
2001	447	275	38.6	22.6	22.8	9.6	33.9	14.5	43.4	18.8
2002	874	462	46.9	23.6	25.7	10.0	39.5	14.8	52.8	19.2
2003	889	425	47.4	21.6	26.3	8.8	39.3	13.1	51.5	17.2
2004	861	436	45.8	22.1	25.0	9.0	37.3	13.5	48.9	17.7
2005	891	447	47.0	22.5	25.1	9.4	37.6	13.8	48.5	17.9
2006	921	459	48.1	22.8	25.4	10.1	37.8	14.5	49.5	18.3
2007	999	492	45.1	21.3	23.6	8.7	35.1	12.8	45.2	16.8
2008	1043	505	46.9	21.8	23.8	9.2	35.8	13.4	46.4	17.4
2009	1031	509	46.2	21.9	23.3	8.8	34.8	13.0	45.5	17.1
2010	999	499	44.3	21.3	21.8	7.7	32.5	11.9	42.2	15.8
2011	973	467	42.6	19.8	21.0	8.5	31.2	12.1	40.2	15.2
2012	855	401	37.4	17.0	17.6	6.5	26.9	9.8	35.7	13.2
1998-2012	12246	6124	44.6	21.3	23.5	8.8	35.2	13.0	45.9	16.9

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	771	68.6	13.6	2.8	99.7	51.7	61.0	69.9	77.8	85.3
1999	732	67.9	12.7	1.1	94.3	52.6	59.5	68.3	77.1	84.1
2000	707	69.3	12.6	0.3	99.7	53.7	61.5	70.1	78.2	85.2
2001	722	69.2	12.3	1.9	96.4	53.5	61.5	69.4	78.3	84.9
2002	1336	70.9	12.2	2.4	99.5	55.4	63.4	72.2	79.6	85.9
2003	1314	70.4	13.0	0.4	103	54.5	63.2	71.3	79.2	85.6
2004	1297	70.1	13.1	0.0	99.0	54.2	62.7	71.2	79.1	85.1
2005	1338	69.9	12.9	0.7	101	54.5	62.6	70.8	79.0	84.6
2006	1380	70.0	13.4	0.2	101	53.7	63.1	71.2	78.8	85.2
2007	1491	70.2	13.4	1.2	101	53.5	63.9	71.4	79.3	85.3
2008	1548	70.5	12.9	0.6	100	53.2	63.6	71.5	79.6	85.6
2009	1540	70.5	13.1	0.5	103	53.7	63.5	71.8	79.8	85.1
2010	1498	71.2	12.9	5.4	100	53.7	63.4	72.4	80.6	86.5
2011	1440	70.6	13.8	0.5	97.6	53.3	63.4	72.1	79.9	86.5
2012	1256	71.7	12.0	9.7	97.8	55.1	64.7	73.0	80.4	85.2
1998-2012	18370	70.2	13.0	0.0	103	53.9	62.9	71.4	79.3	85.5

Table 3a

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	502	67.6	13.5	5.0	95.6	50.7	60.1	68.9	76.6	84.3
1999	494	67.1	12.3	2.3	94.1	52.6	59.4	67.1	76.0	82.7
2000	467	67.7	12.6	0.3	99.7	52.6	60.7	68.2	76.7	81.6
2001	447	67.5	11.2	1.9	95.1	53.3	60.7	67.4	75.6	81.4
2002	874	69.9	11.7	32.7	97.6	54.8	62.7	70.9	78.2	83.8
2003	889	69.0	12.8	0.4	101	53.3	62.1	69.7	77.6	83.7
2004	861	68.6	12.9	0.0	98.8	53.4	61.5	69.7	77.6	82.8
2005	891	68.7	11.7	0.7	101	54.6	61.7	69.0	77.1	82.9
2006	921	69.3	12.5	0.8	101	54.1	62.7	70.1	77.9	83.6
2007	999	69.1	12.6	1.3	101	53.2	63.0	70.1	77.3	83.7
2008	1043	69.8	12.5	1.8	100	52.6	63.0	70.8	78.5	85.0
2009	1031	69.6	12.7	0.5	97.4	53.2	62.3	70.8	78.3	84.1
2010	999	69.4	12.6	5.4	99.1	52.3	61.4	70.9	78.5	84.1
2011	973	70.2	12.8	1.5	96.9	52.8	62.7	71.3	79.0	85.7
2012	855	70.8	11.9	28.9	97.8	54.1	63.2	72.4	79.3	84.6
1998-2012	12246	69.2	12.5	0.0	101	53.2	61.9	70.2	77.8	83.9

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	269	70.5	13.7	2.8	99.7	55.0	62.5	72.3	79.2	86.2
1999	238	69.4	13.5	1.1	94.3	52.6	60.8	71.6	78.7	85.6
2000	240	72.4	11.9	37.2	94.5	58.7	63.6	73.9	81.0	87.4
2001	275	72.0	13.4	30.6	96.4	54.2	64.1	73.7	81.2	88.2
2002	462	72.8	12.8	2.4	99.5	57.9	65.3	74.2	81.9	87.7
2003	425	73.2	13.0	2.5	103	56.8	65.6	75.0	82.6	87.9
2004	436	72.9	13.1	18.5	99.0	56.5	65.0	74.7	82.3	88.3
2005	447	72.3	14.6	4.2	98.8	54.0	64.3	74.9	82.1	88.7
2006	459	71.4	15.0	0.2	96.7	52.5	64.6	74.0	81.9	87.7
2007	492	72.4	14.6	1.2	99.1	55.6	67.0	74.8	82.4	87.1
2008	505	72.0	13.6	0.6	97.0	56.0	64.7	73.7	82.0	86.9
2009	509	72.4	13.7	2.5	103	55.5	66.3	74.3	82.1	87.2
2010	499	74.6	12.9	5.4	100	56.0	68.3	75.9	84.3	89.6
2011	467	71.6	15.7	0.5	97.6	53.6	65.0	74.1	81.7	88.3
2012	401	73.6	11.9	9.7	96.4	58.2	67.3	75.1	82.0	87.2
1998-2012	6124	72.4	13.7	0.2	103	55.6	65.2	74.2	81.9	87.7

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	64	0.3	0.3	35	0.3	0.3	29	0.5	0.5
5-9	18	0.1	0.4	9	0.1	0.4	9	0.1	0.6
10-14	4	0.0	0.5	2	0.0	0.4	2	0.0	0.7
15-19	3	0.0	0.5			0.4	3	0.0	0.7
20-24	10	0.1	0.5	3	0.0	0.4	7	0.1	0.8
25-29	20	0.1	0.6	12	0.1	0.5	8	0.1	0.9
30-34	58	0.3	1.0	31	0.3	0.8	27	0.4	1.4
35-39	180	1.0	1.9	121	1.0	1.7	59	1.0	2.4
40-44	286	1.6	3.5	211	1.7	3.5	75	1.2	3.6
45-49	548	3.0	6.5	413	3.4	6.8	135	2.2	5.8
50-54	871	4.7	11.2	656	5.4	12.2	215	3.5	9.3
55-59	1402	7.6	18.9	1007	8.2	20.4	395	6.5	15.7
60-64	2107	11.5	30.3	1555	12.7	33.1	552	9.0	24.8
65-69	2780	15.1	45.5	1992	16.3	49.4	788	12.9	37.6
70-74	2953	16.1	61.5	2045	16.7	66.1	908	14.8	52.4
75-79	2851	15.5	77.1	1840	15.0	81.1	1011	16.5	69.0
80-84	2217	12.1	89.1	1314	10.7	91.8	903	14.7	83.7
85+	1998	10.9	100.0	1000	8.2	100.0	998	16.3	100.0
All ages	18370	100.0		12246	100.0		6124	100.0	

Included in the statistics are 49.1% multiple primaries in males and 35.4% 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=866 %	Females DCO rate n=753 %	Males Prop.all cancers n=146755 %	Females Prop.all cancers n=142297 %
0- 4	33	28	2.4	2.1			10.8	12.4
5- 9	9	8	0.6	0.6			5.5	7.1
10-14	2	2	0.1	0.1			1.4	1.2
15-19		3	0.0	0.2				1.1
20-24	3	7	0.2	0.4			0.5	1.4
25-29	12	8	0.6	0.4			1.4	0.8
30-34	31	27	1.5	1.3	3.2		2.2	1.4
35-39	121	57	5.2	2.6			5.7	1.6
40-44	206	74	8.5	3.2	1.0		6.9	1.3
45-49	407	133	18.9	6.3	0.5	0.8	8.3	1.7
50-54	639	213	34.6	11.3	1.4	0.5	8.0	2.1
55-59	985	392	58.0	22.0	1.8	2.0	7.3	3.1
60-64	1522	547	92.4	31.4	2.8	0.9	7.4	3.4
65-69	1946	771	132.6	48.1	4.0	3.6	7.6	4.4
70-74	1987	891	171.5	64.6	4.4	5.8	8.1	5.3
75-79	1807	993	239.8	90.8	8.5	7.7	9.6	6.1
80-84	1290	885	284.1	102.5	14.0	18.6	10.3	6.0
85+	993	989	320.2	120.7	29.5	42.2	10.8	6.2
All ages	11993	6028			7.2	12.5	8.2	4.2

Incidence		
Raw	43.7	21.0
WS	23.0	8.7
ES	34.5	12.8
BRD-S	45.0	16.7

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	10	4.2	2.4	1.2	4.4	#	2.0	10.0
C07-C08	Salivary gland	2	1.2	1.6	0.2	5.9		0.3	
C09-C10	Oropharynx	10	5.0	2.0	1.0	3.6		1.7	
C12-C13	Hypopharynx	5	2.9	1.8	0.6	4.1		0.7	
C15	Oesophagus	20	9.1	2.2	1.3	3.4	#	3.7	15.0
C16	Stomach	39	24.2	1.6	1.1	2.2	#	5.0	7.7
C17	Small intestine	12	2.5	4.7	2.5	8.3	#	3.2	
C18	Colon	115	56.5	2.0	1.7	2.4	#	19.8	7.0
C19-C20	Rectum	48	30.3	1.6	1.2	2.1	#	6.0	6.3
C21	Anus/canal	3	1.1	2.8	0.6	8.3		0.7	33.3
C22	Liver	33	14.9	2.2	1.5	3.1	#	6.1	15.2
C23-C24	Bile	8	5.4	1.5	0.6	2.9		0.9	25.0
C25	Pancreas	39	19.5	2.0	1.4	2.7	#	6.6	33.3
C26	GI cancer	3	0.7	4.1	0.8	12.0		0.8	66.7
C32	Larynx	13	5.3	2.4	1.3	4.2	#	2.6	
C33-C34	Lung	203	64.4	3.2	2.7	3.6	#	46.9	13.3
C38,C45	Mesothelioma	3	3.6	0.8	0.2	2.5		-0.2	66.7
C43	Malign. melanoma	55	20.1	2.7	2.1	3.6	#	11.8	1.8
C46,C49	Soft tissue	7	2.9	2.5	1.0	5.1		1.4	
C48	Peritoneal	4	0.4	10.8	2.9	27.6	#	1.2	25.0
C60	Penis	4	1.2	3.2	0.9	8.2		0.9	
C61	Prostate	801	164.1	4.9	4.6	5.2	#	215.7	5.1
C62	Testis	6	1.1	5.2	1.9	11.4	#	1.6	
C64	Kidney	143	18.7	7.6	6.4	9.0	#	42.1	10.5
C65	Renal pelvis	49	2.3	21.6	16.0	28.5	#	15.8	
C66	Ureter	37	1.3	29.4	20.7	40.5	#	12.1	
C67	Bladder	95	25.4	3.7	3.0	4.6	#	23.6	5.3
C68	Urethra	20	0.3	69.6	42.5	107.5	#	6.7	
C68	Urinary org.	2	0.3	6.8	0.8	24.6		0.6	100.0
C70-C72	CNS cancer	9	7.0	1.3	0.6	2.4		0.7	
C73	Thyroid	8	3.2	2.5	1.1	5.0	#	1.6	
C76-C79	CUP	20	9.6	2.1	1.3	3.2	#	3.5	15.0
C81	Hodgkin lymphoma	2	1.0	2.0	0.2	7.2		0.3	
C82-C85	NHL	50	21.8	2.3	1.7	3.0	#	9.5	8.0
C90	Mult. myeloma	13	7.1	1.8	1.0	3.1		2.0	
C91-C96	Leukaemia	17	9.1	1.9	1.1	3.0	#	2.7	35.3
	Other primaries	7	5.7	1.2	0.5	2.5		0.4	
	Not observed	0	1.2	0.0	0.0	3.1		-0.4	
	All mult. primaries	1915	554.5	3.5	3.3	3.6	#	460.7	7.7

Patients	8116
Mean age at second malignancy (years)	71.5
Person-years	29534
Mean observation time (years)	3.6
Median observation time (years)	2.5

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 %
C03-C06 Oral cavity	2	1.0	1.9	0.2	7.0		0.7	
C15 Oesophagus	2	1.0	2.0	0.2	7.4		0.7	
C16 Stomach	14	7.6	1.9	1.0	3.1	#	4.5	7.1
C17 Small intestine	3	0.8	3.8	0.8	11.0		1.5	
C18 Colon	35	20.5	1.7	1.2	2.4	#	10.2	5.7
C19-C20 Rectum	20	8.6	2.3	1.4	3.6	#	8.0	10.0
C21 Anus/canal	2	0.9	2.1	0.3	7.7		0.7	
C22 Liver	2	2.2	0.9	0.1	3.3		-0.1	50.0
C23-C24 Bile	11	3.0	3.7	1.8	6.6	#	5.6	27.3
C25 Pancreas	24	8.7	2.8	1.8	4.1	#	10.7	29.2
C26 GI cancer	2	0.4	5.1	0.6	18.5		1.1	
C33-C34 Lung	51	12.4	4.1	3.1	5.4	#	26.9	13.7
C43 Malign. melanoma	5	5.9	0.8	0.3	2.0		-0.6	20.0
C46,C49 Soft tissue	2	1.0	2.0	0.2	7.2		0.7	
C48 Peritoneal	2	0.6	3.4	0.4	12.3		1.0	
C50 Breast	98	51.5	1.9	1.5	2.3	#	32.5	9.2
C51 Vulva	2	1.9	1.0	0.1	3.8		0.1	
C53 Cervix uteri	12	2.2	5.4	2.8	9.5	#	6.8	8.3
C54 Corpus uteri	18	10.0	1.8	1.1	2.8	#	5.6	11.1
C56 Ovary	10	7.7	1.3	0.6	2.4		1.6	20.0
C64 Kidney	61	4.8	12.8	9.8	16.4	#	39.3	16.4
C65 Renal pelvis	24	0.6	40.3	25.8	60.0	#	16.3	
C66 Ureter	18	0.3	61.5	36.4	97.2	#	12.4	
C67 Bladder	42	3.8	11.0	7.9	14.8	#	26.7	2.4
C68 Urethra	2	0.1	33.2	4.0	120.0	#	1.4	
C70-C72 CNS cancer	2	2.6	0.8	0.1	2.8		-0.4	100.0
C73 Thyroid	15	2.7	5.6	3.1	9.2	#	8.6	
C76-C79 CUP	7	3.6	2.0	0.8	4.0		2.4	14.3
C82-C85 NHL	17	7.4	2.3	1.3	3.7	#	6.7	11.8
C90 Mult. myeloma	3	2.4	1.2	0.3	3.6		0.4	
C91-C96 Leukaemia	9	3.1	2.9	1.3	5.6	#	4.1	22.2
Other primaries	5	2.5	2.0	0.6	4.6		1.7	
Not observed	0	2.6	0.0	0.0	1.4		-1.8	
All mult. primaries	522	184.3	2.8	2.6	3.1	#	235.8	10.7

Patients	3947
Mean age at second malignancy (years)	73.3
Person-years	14321
Mean observation time (years)	3.6
Median observation time (years)	2.4

The occurrence of second malignancy is statistically significant.

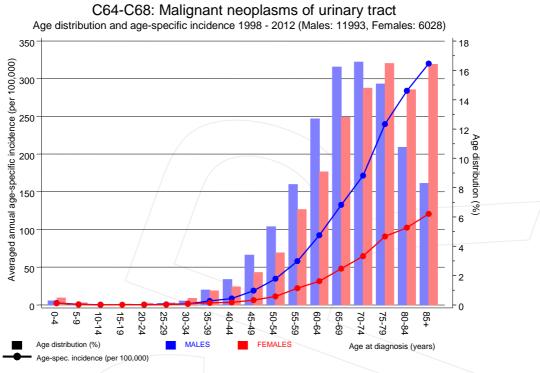Observed second malignancies with count 1 are pooled in category "Other primaries".

C64-C68: Malignant neoplasms of urinary tract
Age distribution and age-specific incidence 1998 - 2012 (Males: 11993, Females: 6028)

Figure 7. Age distribution and age-specific incidence

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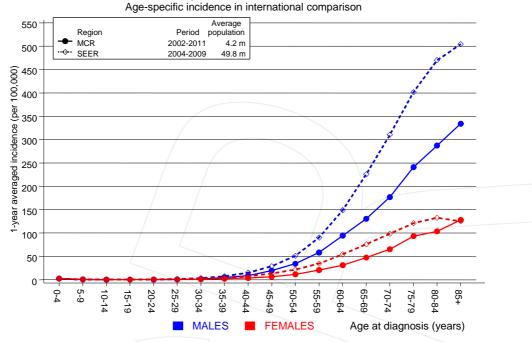### Age-specific incidence in international comparison

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

Reference:

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

C64-C68: Malignant neoplasms of urinary tract
Cumulative follow-up years since diagnosis for period 1998 - 2012 (excl. DCO)

Gender	n	Target Sum	Target Median	Actual Sum	Actual Median
All patients					
Males	7752	32895	3.1	30772	2.9
Females	3725	15900	3.1	15000	2.8
Patients alive					
Males	4451	25623	5.1	23500	4.7
Females	2101	12498	5.3	11598	4.9
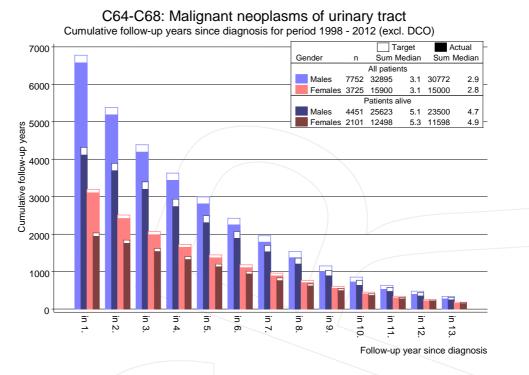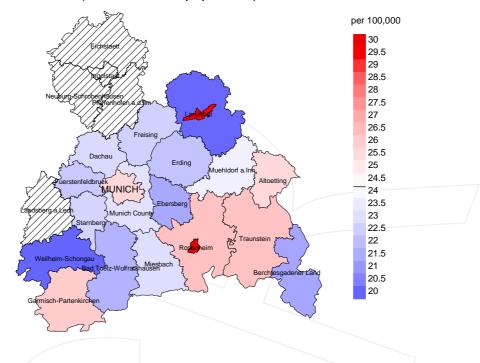
Figure 8. Cumulative follow-up years depending on time since diagnosis

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

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

Average incidence (world standard population) 2003 - 2008: Females
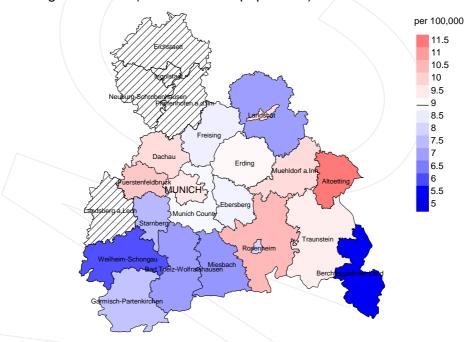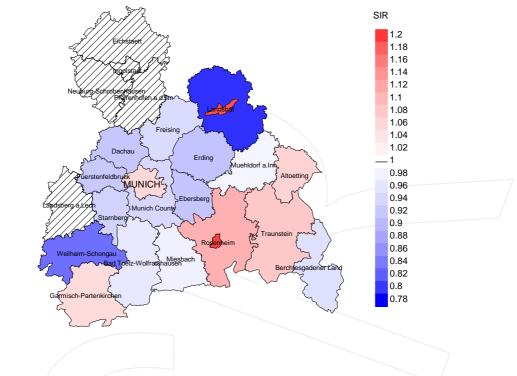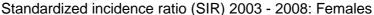
Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 24.2/100,000 WS N=5,248, females 9.0/100,000 WS N=2,590). 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 71 women were identified with newly diagnosed urinary tract cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 8.7/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 5.8 and 13.4/100,000.

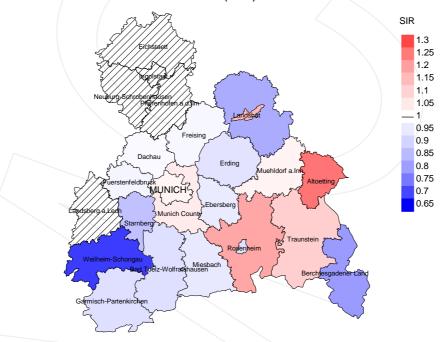Standardized incidence ratio (SIR) 2003 - 2008: Males

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=5,248, females N=2,590). 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 71 women were identified with newly diagnosed urinary tract cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.95. Though, the value of this parameter may vary with an underlying probability of 99% between 0.69 and 1.28, and is therefore not statistically striking.

MORTALITY

Table 10a

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

Year of diagnosis	Incident cases n	Prop. actively followed %	Prop. DCO %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	771	98.1	7.7	523	67.8	93.9
1999	732	98.1	7.2	496	67.8	95.2
2000	707	97.7	9.8	462	65.3	96.1
2001	722	98.2	9.1	465	64.4	96.8
2002	1336	98.3	13.5	927	69.4	96.8
2003	1314	97.2	11.3	846	64.4	97.9
2004	1297	97.5	11.3	778	60.0	98.3
2005	1338	96.6	7.2	714	53.4	97.5
2006	1380	93.6	7.1	779	56.4	98.8
2007	1491	83.0	8.2	771	51.7	98.3
2008	1548	69.9	8.6	763	49.3	99.2
2009	1540	69.0	8.2	736	47.8	99.0
2010	1498	66.7	8.3	648	43.3	98.8
2011	1440	68.7	7.4	562	39.0	96.8
2012	1256	97.1	9.2	381	30.3	95.0
1998-2012	18370	86.6	9.0	9851	53.6	97.5

Table 10b

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

Year of diagnosis/ death	Incident cases n	Deaths n	Prop. deaths with death certific. %	Deaths in same year n	Prop. deaths in same year %
1998	771	484	92.6	134	17.4
1999	732	458	95.2	142	19.4
2000	707	471	95.1	130	18.4
2001	722	476	95.8	124	17.2
2002	1336	702	96.6	301	22.5
2003	1314	810	96.8	290	22.1
2004	1297	794	96.9	265	20.4
2005	1338	783	96.6	218	16.3
2006	1380	835	97.4	237	17.2
2007	1491	950	97.8	274	18.4
2008	1548	947	98.9	278	18.0
2009	1540	1022	99.2	325	21.1
2010	1498	1065	98.7	295	19.7
2011	1440	1012	98.6	287	19.9
2012	1256	1055	99.1	270	21.5
1998-2012	18370	11864	97.5	3570	19.4

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	484	64.3	35.7	81.7
1999	458	70.1	29.9	83.0
2000	471	69.0	31.0	83.7
2001	476	69.1	30.9	85.1
2002	702	71.4	28.6	85.7
2003	810	70.5	29.5	84.4
2004	794	70.3	29.7	84.0
2005	783	71.3	28.7	83.2
2006	835	71.1	28.9	80.9
2007	950	72.7	27.3	82.6
2008	947	71.5	28.5	82.2
2009	1022	71.6	28.4	82.9
2010	1065	68.1	31.9	80.3
2011	1012	68.1	31.9	82.5
2012	1055	64.3	35.7	76.6
1998-2012	11864	69.6	30.4	82.3

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	319	75.0	73.5	77.8	74.7
1999	301	75.3	73.4	79.4	74.3
2000	310	75.0	72.5	79.9	74.4
2001	312	74.3	72.7	77.9	73.5
2002	443	75.3	74.1	78.4	74.8
2003	547	75.5	73.9	79.4	74.9
2004	509	75.8	74.6	78.6	75.3
2005	513	75.4	74.0	78.6	74.8
2006	536	74.8	73.5	78.2	74.3
2007	627	75.6	74.4	79.0	75.0
2008	642	76.3	75.0	79.5	75.5
2009	691	76.3	74.5	80.9	75.3
2010	690	76.4	74.8	80.0	75.6
2011	681	76.2	74.4	80.3	75.4
2012	692	77.6	75.8	80.7	76.6
1998-2012	7813	75.8	74.3	79.4	75.1

Deaths of patients are considered to be cancer-related, in case that fact was recorded on the death certificate, or patients had suffered from metastasis or recurrence.
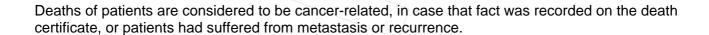
Table 11b

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (not cancer-related) Years	Age at death (according to death certificate) Years
1998	165	80.0	78.4	82.7	79.9
1999	157	77.7	76.4	81.3	77.5
2000	161	77.4	76.7	79.3	77.6
2001	164	80.0	78.0	84.5	79.2
2002	259	78.0	76.6	81.8	77.6
2003	263	78.1	77.4	80.0	77.8
2004	285	79.9	78.5	83.3	79.6
2005	270	79.1	77.6	83.5	78.3
2006	299	79.2	77.5	83.0	78.2
2007	323	79.5	78.2	82.6	79.2
2008	305	78.8	77.0	83.6	78.0
2009	331	78.6	76.6	83.9	77.4
2010	375	80.3	78.3	84.5	79.5
2011	331	80.2	76.7	86.3	78.2
2012	363	79.4	76.9	83.9	78.0
1998-2012	4051	79.2	77.4	83.3	78.4

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

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

Table 12a

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

Year of death	Deaths n	Mort. raw	MI-Index raw	Mort. WS	MI-Index WS	Mort. ES	MI-Index ES	Mort. BRD-S	MI-Index BRD-S
1998	206	18.6	0.41	10.4	0.38	17.1	0.42	24.4	0.46
1999	205	18.3	0.42	10.3	0.39	16.7	0.43	24.3	0.48
2000	206	18.1	0.45	10.0	0.42	16.3	0.45	23.3	0.49
2001	217	18.7	0.49	10.3	0.46	16.6	0.49	23.2	0.54
2002	315	16.9	0.37	8.7	0.34	14.3	0.37	20.4	0.39
2003	382	20.4	0.44	10.3	0.40	16.7	0.43	23.8	0.47
2004	356	18.9	0.42	9.3	0.38	15.2	0.42	21.8	0.46
2005	357	18.8	0.41	9.0	0.37	14.6	0.40	21.1	0.45
2006	387	20.2	0.43	9.7	0.39	15.5	0.42	21.7	0.45
2007	464	20.9	0.48	9.7	0.43	15.9	0.47	22.5	0.51
2008	456	20.5	0.44	9.0	0.39	14.8	0.42	21.6	0.47
2009	494	22.1	0.49	9.8	0.43	15.7	0.46	22.1	0.50
2010	473	21.0	0.49	9.0	0.42	14.6	0.46	20.8	0.51
2011	477	20.9	0.50	9.0	0.44	14.4	0.47	19.8	0.50
2012	447	19.6	0.54	8.0	0.47	13.2	0.51	18.8	0.54
1998-2012	5442	19.8	0.45	9.3	0.41	15.2	0.44	21.5	0.48

Table 12b

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

Year of death	Deaths n	Mort. raw	MI-Index raw	Mort. WS	MI-Index WS	Mort. ES	MI-Index ES	Mort. BRD-S	MI-Index BRD-S
1998	106	9.0	0.40	3.0	0.29	4.9	0.33	7.1	0.37
1999	116	9.8	0.49	3.5	0.37	5.6	0.41	7.9	0.46
2000	119	9.9	0.50	3.4	0.41	5.5	0.44	7.9	0.48
2001	112	9.2	0.41	3.1	0.32	5.0	0.35	7.3	0.40
2002	186	9.5	0.41	3.3	0.34	5.3	0.36	7.3	0.39
2003	189	9.6	0.45	3.2	0.37	5.2	0.40	7.3	0.43
2004	202	10.2	0.47	3.2	0.37	5.2	0.39	7.4	0.43
2005	202	10.2	0.46	3.3	0.37	5.3	0.39	7.4	0.42
2006	207	10.3	0.46	3.4	0.34	5.4	0.38	7.6	0.42
2007	228	9.9	0.47	3.0	0.35	5.0	0.39	7.4	0.44
2008	221	9.5	0.45	3.1	0.34	4.9	0.38	6.9	0.41
2009	239	10.3	0.48	3.4	0.39	5.4	0.42	7.5	0.45
2010	253	10.8	0.51	3.2	0.42	5.3	0.45	7.7	0.49
2011	212	9.0	0.47	2.9	0.35	4.6	0.40	6.5	0.44
2012	231	9.8	0.59	3.1	0.49	5.0	0.52	7.1	0.56
1998-2012	2823	9.8	0.47	3.2	0.37	5.1	0.40	7.3	0.44

Table 13

Age distribution of age at death (cancer-related) for period 1998-2012
(**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	0.0	0.1	3	0.1	0.1
10-14	0	0.0	0.1			0.1			0.1
15-19	0	0.0	0.1			0.1			0.1
20-24	3	0.0	0.1	2	0.0	0.1	1	0.0	0.1
25-29	3	0.0	0.1	1	0.0	0.1	2	0.1	0.2
30-34	2	0.0	0.2	1	0.0	0.1	1	0.0	0.2
35-39	14	0.2	0.3	8	0.1	0.3	6	0.2	0.4
40-44	41	0.5	0.8	26	0.4	0.7	15	0.5	0.9
45-49	93	1.1	1.9	66	1.1	1.8	27	0.9	1.9
50-54	209	2.4	4.2	148	2.6	4.4	61	2.1	3.9
55-59	429	4.9	9.1	330	5.7	10.1	99	3.4	7.3
60-64	667	7.6	16.8	504	8.7	18.8	163	5.5	12.8
65-69	1038	11.9	28.6	752	13.0	31.7	286	9.7	22.5
70-74	1414	16.2	44.8	1015	17.5	49.2	399	13.5	36.0
75-79	1584	18.1	62.9	1063	18.3	67.6	521	17.6	53.6
80-84	1611	18.4	81.3	994	17.1	84.7	617	20.9	74.5
85+	1641	18.7	100.0	888	15.3	100.0	753	25.5	100.0
All ages	8755	100.0		5801	100.0		2954	100.0	

Included in the statistics are 49.1% multiple primaries in males and 35.4% 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	0.33	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	0.08	0.1	0.25	1.0	1.8
30-34	1	1	0.0	0.03	0.0	0.04	0.6	0.5
35-39	8	6	0.3	0.07	0.3	0.10	2.1	1.2
40-44	26	15	1.1	0.12	0.7	0.20	3.2	1.4
45-49	66	27	3.1	0.16	1.3	0.20	3.9	1.4
50-54	148	61	8.0	0.23	3.2	0.28	4.8	2.1
55-59	330	99	19.4	0.33	5.6	0.25	6.0	2.2
60-64	504	163	30.6	0.32	9.4	0.30	6.0	2.7
65-69	752	286	51.3	0.38	17.8	0.36	6.7	3.7
70-74	1015	399	87.6	0.50	28.9	0.44	8.2	4.4
75-79	1063	521	141.1	0.58	47.6	0.52	8.8	5.3
80-84	994	617	218.9	0.76	71.4	0.68	10.0	5.9
85+	888	753	286.3	0.89	91.9	0.75	11.1	6.0
All ages	5801	2954					7.8	4.4
Mortality								
Raw			21.1	0.47	10.3	0.48		
WS			9.9	0.42	3.3	0.38		
ES			16.2	0.46	5.4	0.41		
BRD-S			23.0	0.50	7.6	0.45		
PYLL-70								
per 100,000			61.4		23.7			
ES			54.1		20.4			
AYLL-70			8.3		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	32	0.9	15	46.9	2	6.3	15	46.9
C15	Oesophagus	37	1.1	9	24.3	2	5.4	26	70.3
C16	Stomach	100	3.0	30	30.0	8	8.0	62	62.0
C18	Colon	239	7.1	112	46.9	32	13.4	95	39.7
C19-C20	Rectum	123	3.6	53	43.1	17	13.8	53	43.1
C22	Liver	49	1.5	11	22.4	9	18.4	29	59.2
C25	Pancreas	75	2.2	5	6.7	9	12.0	61	81.3
C32	Larynx	35	1.0	25	71.4	1	2.9	9	25.7
C33-C34	Lung	413	12.2	67	16.2	36	8.7	310	75.1
C43	Malign. melanoma	79	2.3	46	58.2	4	5.1	29	36.7
C44	Skin others	110	3.3	52	47.3	7	6.4	51	46.4
C61	Prostate	969	28.7	319	32.9	232	23.9	418	43.1
C64	Kidney	139	4.1			34	24.5	105	75.5
C65	Renal pelvis	118	3.5			17	14.4	101	85.6
C66	Ureter	80	2.4			18	22.5	62	77.5
C67	Bladder	271	8.0			39	14.4	232	85.6
C70-C72	CNS cancer	44	1.3	14	31.8	4	9.1	26	59.1
C76-C79	CUP	48	1.4	19	39.6	6	12.5	23	47.9
C82-C85	NHL	83	2.5	30	36.1	11	13.3	42	50.6
C90	Mult. myeloma	38	1.1	10	26.3	7	18.4	21	55.3
C91-C96	Leukaemia	57	1.7	9	15.8	4	7.0	44	77.2
Other primaries		239	7.1	77	32.2	26	10.9	136	56.9
All mult. primaries		3378	100.0	903	26.7	525	15.5	1950	57.7

Multiple primaries with number of cases n<30 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	37	2.8	11	29.7	8	21.6	18	48.6
C18	Colon	103	7.8	45	43.7	12	11.7	46	44.7
C19-C20	Rectum	45	3.4	20	44.4	6	13.3	19	42.2
C22	Liver	12	0.9	2	16.7	4	33.3	6	50.0
C23-C24	Bile	16	1.2			3	18.8	13	81.3
C25	Pancreas	52	3.9	2	3.8	6	11.5	44	84.6
C33-C34	Lung	108	8.2	13	12.0	12	11.1	83	76.9
C43	Malign. melanoma	25	1.9	15	60.0	1	4.0	9	36.0
C44	Skin others	33	2.5	17	51.5	2	6.1	14	42.4
C50	Breast	249	18.9	150	60.2	16	6.4	83	33.3
C51	Vulva	13	1.0	9	69.2	1	7.7	3	23.1
C53	Cervix uteri	69	5.2	53	76.8	6	8.7	10	14.5
C54	Corpus uteri	62	4.7	42	67.7	10	16.1	10	16.1
C56	Ovary	43	3.3	17	39.5	7	16.3	19	44.2
C64	Kidney	54	4.1			12	22.2	42	77.8
C65	Renal pelvis	39	3.0			8	20.5	31	79.5
C66	Ureter	28	2.1			12	42.9	16	57.1
C67	Bladder	118	8.9			13	11.0	105	89.0
C70-C72	CNS cancer	23	1.7	6	26.1	5	21.7	12	52.2
C73	Thyroid	24	1.8	13	54.2	1	4.2	10	41.7
C76-C79	CUP	25	1.9	4	16.0	1	4.0	20	80.0
C82-C85	NHL	34	2.6	12	35.3	8	23.5	14	41.2
C91-C96	Leukaemia	29	2.2	3	10.3	4	13.8	22	75.9
Other primaries		78	5.9	25	32.1	13	16.7	40	51.3
All mult. primaries		1319	100.0	459	34.8	171	13.0	689	52.2

Multiple primaries with number of cases n<10 are pooled in category "Other primaries".

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

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2012
(**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	0.14	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	0.08	0.1	0.25	1.1	1.9
30-34	1	1	0.0	0.04	0.0	0.04	0.6	0.5
35-39	8	6	0.3	0.07	0.3	0.12	2.2	1.3
40-44	22	10	0.9	0.12	0.4	0.16	2.9	1.1
45-49	59	21	2.7	0.16	1.0	0.18	3.8	1.3
50-54	110	48	6.0	0.20	2.5	0.27	4.1	2.0
55-59	258	79	15.2	0.32	4.4	0.25	5.4	2.1
60-64	404	109	24.5	0.33	6.3	0.25	5.7	2.2
65-69	547	228	37.3	0.38	14.2	0.37	6.0	3.7
70-74	674	279	58.2	0.49	20.2	0.41	6.9	3.9
75-79	727	394	96.5	0.60	36.0	0.51	7.9	5.0
80-84	648	468	142.7	0.79	54.2	0.72	8.7	5.6
85+	606	590	195.4	0.92	72.0	0.75	9.9	5.8
All ages	4069	2237					6.9	4.1
Mortality								
Raw			14.8	0.46	7.8	0.47		
WS			7.1	0.40	2.5	0.36		
ES			11.4	0.44	4.1	0.40		
BRD-S			16.0	0.49	5.8	0.44		
PYLL-70								
per 100,000			48.6		17.9			
ES			42.8		15.3			
AYLL-70			8.5		8.7			

* 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	0.14	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	0.08	0.1	0.25	1.2	2.1
30-34	1		0.0	0.04	0.0		0.6	
35-39	8	4	0.3	0.07	0.2	0.09	2.3	1.0
40-44	19	7	0.8	0.11	0.3	0.13	2.7	0.8
45-49	54	17	2.5	0.16	0.8	0.16	3.8	1.2
50-54	91	43	4.9	0.20	2.3	0.27	3.7	2.0
55-59	208	67	12.2	0.31	3.8	0.23	4.8	2.0
60-64	313	86	19.0	0.31	4.9	0.24	5.0	2.0
65-69	396	187	27.0	0.35	11.7	0.35	5.0	3.5
70-74	467	211	40.3	0.43	15.3	0.35	5.7	3.5
75-79	490	308	65.0	0.50	28.2	0.44	6.6	4.6
80-84	432	375	95.1	0.61	43.4	0.63	7.3	5.4
85+	433	492	139.6	0.72	60.1	0.66	8.7	5.6
All ages	2916	1801					5.8	3.9
Mortality								
Raw			10.6	0.40	6.3	0.42		
WS			5.2	0.35	2.0	0.32		
ES			8.2	0.38	3.3	0.36		
BRD-S			11.4	0.42	4.6	0.39		
PYLL-70								
per 100,000			39.5		14.7			
ES			34.8		12.6			
AYLL-70			8.9		8.7			

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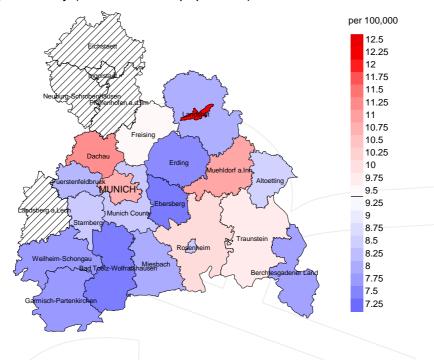
Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

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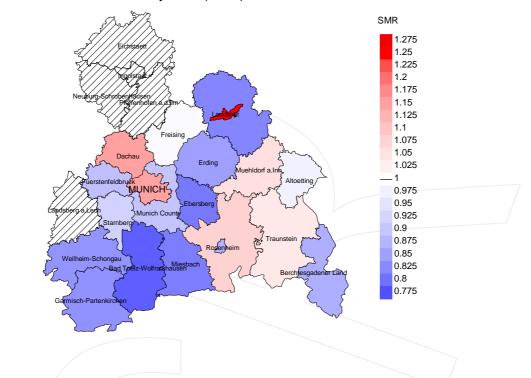
Average mortality (world standard population) 2003 - 2008: Females

Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 9.4/100,000 WS N=2,284, females 3.2/100,000 WS N=1,188). Since cancer data are not available in some counties until 2007, the local mortality rates were not calculated, and the map tiles show as shaded.

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

Standardized mortality ratio (SMR) 2003 - 2008: Males

Standardized mortality ratio (SMR) 2003 - 2008: Females
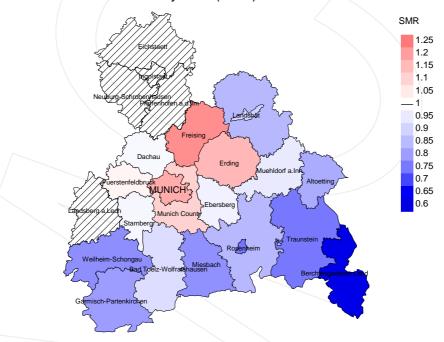
Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=2,284, females N=1,188). Since cancer data are not available in some counties until 2007, the local SMR values were not calculated, and the map tiles show as shaded.

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

Statistical Notes

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

1. **All multiple primaries included**

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

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

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

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

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

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

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

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

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

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

Shortcuts

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

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