Munich Cancer Registry

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ICD-10 C80: CUP syndrome

Incidence and Mortality

Year of diagnosis	1998-2014
Patients	3,234
Diseases	3,234
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/bC80__E-ICD-10-C80-CUP-syndrome-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
C80.-	Malignant neoplasm, without specification of site
C80.0	Malignant neoplasm, primary site unknown, so stated
C80.9	Malignant neoplasm, primary site unspecified

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	163	4	2.5	6.7	95.1	98.8	
1999	131	6	4.6	6.9	96.2	99.2	
2000	117	1	0.9	7.7	92.3	99.1	
2001	109	1	0.9	12.8	91.7	99.1	
2002	207	5	2.4	9.7	95.2	100.0	#
2003	200	3	1.5	10.5	94.0	100.0	
2004	236	1	0.4	8.5	89.4	97.5	
2005	198	6	3.0	14.6	91.4	96.5	
2006	190	1	0.5	12.1	83.2	96.8	
2007	228	2	0.9	9.2	89.5	94.3	#
2008	232	2	0.9	9.9	84.5	92.2	
2009	212	1	0.5	11.8	84.0	93.4	
2010	209	3	1.4	12.0	82.8	90.0	
2011	261	3	1.1	6.5	83.1	90.8	
2012	242	3	1.2	4.5	78.9	93.4	
2013	199	1	0.5	2.0	79.9	99.5	
2014	100	2	2.0	3.0	51.0	99.0	##
1998–2014	3234	45	1.4	8.8	86.4	95.9	

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	163	86	77	52.8
1999	131	67	64	51.1
2000	117	54	63	46.2
2001	109	61	48	56.0
2002	207	109	98	52.7
2003	200	112	88	56.0
2004	236	124	112	52.5
2005	198	94	104	47.5
2006	190	100	90	52.6
2007	228	119	109	52.2
2008	232	138	94	59.5
2009	212	102	110	48.1
2010	209	108	101	51.7
2011	261	143	118	54.8
2012	242	138	104	57.0
2013	199	101	98	50.8
2014	100	47	53	47.0
1998-2014	3234	1703	1531	52.7

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	86	77	7.8	6.5	5.0	2.5	7.2	3.9	8.6	5.5
1999	67	64	6.0	5.4	3.6	2.4	5.4	3.6	6.7	4.5
2000	54	63	4.7	5.2	3.1	2.6	4.3	3.7	5.1	4.4
2001	61	48	5.3	3.9	3.1	1.9	4.7	2.8	6.0	3.4
2002	109	98	5.9	5.0	3.4	2.1	5.1	3.2	6.4	4.1
2003	112	88	6.0	4.5	3.4	2.0	5.0	2.9	6.3	3.6
2004	124	112	6.6	5.7	3.8	2.5	5.5	3.6	6.8	4.6
2005	94	104	5.0	5.2	3.0	2.3	4.2	3.4	4.9	4.3
2006	100	90	5.2	4.5	2.9	2.0	4.2	2.8	5.3	3.6
2007	119	109	5.4	4.7	3.0	2.0	4.4	3.0	5.6	3.8
2008	138	94	6.2	4.1	3.2	1.7	4.7	2.5	6.0	3.3
2009	102	110	4.6	4.7	2.3	2.2	3.5	3.2	4.4	3.8
2010	108	101	4.8	4.3	2.4	1.8	3.6	2.7	4.6	3.3
2011	143	118	6.3	5.0	3.1	2.0	4.6	2.9	5.9	3.9
2012	138	104	6.0	4.4	3.3	1.6	4.6	2.5	5.6	3.3
2013	101	98	4.4	4.2	2.3	1.7	3.3	2.5	4.2	3.3
2014	47	53	2.1	2.2	0.9	0.9	1.4	1.4	1.9	1.7
1998-2014	1703	1531	5.3	4.6	2.9	1.9	4.3	2.9	5.3	3.7

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

Table 3

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	163	68.8	14.1	30.2	96.7	49.3	58.4	70.4	79.2	86.4
1999	131	69.8	12.3	23.4	93.9	54.6	60.9	69.1	77.9	87.2
2000	117	64.5	14.3	28.6	91.9	47.2	53.4	63.3	76.2	85.4
2001	109	67.1	13.5	36.8	97.6	50.1	57.4	65.4	78.1	84.2
2002	207	68.4	13.3	30.7	96.0	50.6	59.2	69.5	80.2	84.7
2003	200	68.3	13.5	33.4	100	51.5	58.0	68.5	77.7	86.0
2004	236	67.2	12.9	34.1	97.4	50.1	58.9	67.5	77.8	82.7
2005	198	67.3	13.2	22.5	96.6	51.3	58.4	67.3	77.0	84.4
2006	190	68.3	13.9	23.8	97.9	50.6	59.1	69.2	79.8	84.8
2007	228	69.0	13.1	16.5	99.2	51.3	60.4	69.6	78.9	84.9
2008	232	69.7	12.2	25.0	99.5	53.7	61.7	70.2	78.4	84.5
2009	212	68.7	13.3	31.6	92.4	50.9	59.1	69.2	79.2	86.0
2010	209	70.6	13.3	27.1	96.2	54.9	60.5	70.2	82.2	88.3
2011	261	71.1	12.0	38.1	99.9	55.0	63.4	71.5	80.6	85.4
2012	242	69.8	13.4	0.7	96.8	53.0	61.8	71.3	78.7	85.3
2013	199	69.8	11.8	26.0	92.7	54.2	62.3	70.9	78.9	83.7
2014	100	71.1	12.3	42.6	94.7	51.8	62.9	72.8	80.0	85.4
1998-2014	3234	68.9	13.1	0.7	100	51.7	59.9	69.5	78.9	85.3

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	86	64.0	13.7	30.2	93.3	46.1	53.7	65.1	73.7	85.3
1999	67	67.6	12.2	23.4	93.6	54.1	59.1	66.4	74.1	85.0
2000	54	61.9	11.5	41.2	89.0	48.4	51.5	60.6	69.8	78.0
2001	61	66.4	12.3	36.8	97.6	52.9	57.7	65.4	75.6	80.1
2002	109	65.6	13.5	30.7	89.9	48.3	56.1	67.1	76.3	81.9
2003	112	65.5	12.3	33.4	91.2	48.8	56.1	64.9	75.5	80.7
2004	124	65.0	11.7	34.4	92.9	49.4	56.4	64.7	73.1	81.5
2005	94	62.7	12.8	22.5	90.3	47.8	55.3	64.0	71.0	77.2
2006	100	66.6	13.6	27.6	91.5	50.5	58.8	68.1	77.2	83.3
2007	119	66.6	12.8	16.5	90.8	50.5	57.9	65.9	76.6	82.7
2008	138	68.7	10.0	31.9	88.4	55.5	61.6	68.6	76.6	80.9
2009	102	68.4	11.4	37.4	90.4	51.4	60.7	68.7	76.7	82.8
2010	108	69.6	12.8	31.5	95.4	55.2	60.8	69.1	79.8	87.2
2011	143	69.7	11.0	38.1	94.6	56.2	62.5	70.7	76.7	83.8
2012	138	67.1	12.7	0.7	89.6	51.7	61.2	68.5	73.9	81.6
2013	101	68.1	11.3	26.0	89.5	54.9	61.8	68.7	76.4	82.4
2014	47	70.6	11.0	42.6	87.4	51.8	63.5	73.3	78.3	82.8
1998-2014	1703	66.8	12.3	0.7	97.6	51.1	58.8	67.6	76.0	82.4

Table 3b

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	Median 10%	25%	50%	75%	90%
1998	77	74.3	12.5	43.7	96.7	55.2	65.5	77.1	82.6	90.3
1999	64	72.1	12.1	47.5	93.9	55.9	64.1	71.6	80.7	89.1
2000	63	66.7	16.0	28.6	91.9	44.8	56.1	69.5	79.9	87.8
2001	48	68.0	15.1	39.6	96.0	46.8	57.1	66.3	80.0	88.1
2002	98	71.5	12.5	38.9	96.0	53.8	62.1	73.6	81.5	86.3
2003	88	71.8	14.1	36.2	100	54.5	62.8	72.2	81.8	90.7
2004	112	69.7	13.8	34.1	97.4	50.6	62.2	69.8	81.2	84.6
2005	104	71.6	12.2	35.1	96.6	55.7	61.6	73.5	79.8	87.0
2006	90	70.2	14.1	23.8	97.9	51.2	61.0	70.8	81.5	85.9
2007	109	71.7	12.9	41.4	99.2	54.3	62.8	72.7	82.2	86.7
2008	94	71.2	14.8	25.0	99.5	48.3	62.3	74.6	81.9	87.5
2009	110	69.0	14.8	31.6	92.4	50.0	56.9	69.5	81.6	87.1
2010	101	71.6	13.7	27.1	96.2	54.9	60.2	71.4	83.2	89.1
2011	118	72.7	12.9	42.8	99.9	53.5	64.8	74.6	81.8	87.9
2012	104	73.4	13.4	37.3	96.8	53.0	63.3	76.0	84.0	88.9
2013	98	71.6	12.1	36.9	92.7	53.7	63.9	73.8	79.5	86.6
2014	53	71.5	13.4	44.7	94.7	51.7	61.7	72.2	82.7	87.7
1998-2014	1531	71.2	13.6	23.8	100	52.9	61.5	73.2	81.6	87.7

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.%
0-4	1	0.1	0.1	1	0.1	0.1			0.0
5-9	0	0.0	0.1			0.1			0.0
10-14	1	0.1	0.1	1	0.1	0.2			0.0
15-19	1	0.1	0.2	1	0.1	0.3			0.0
20-24	1	0.1	0.2			0.3	1	0.1	0.1
25-29	2	0.1	0.4	1	0.1	0.4	1	0.1	0.3
30-34	3	0.2	0.5	2	0.2	0.7	1	0.1	0.4
35-39	14	0.8	1.4	7	0.8	1.5	7	0.9	1.3
40-44	30	1.8	3.1	12	1.3	2.8	18	2.3	3.6
45-49	53	3.1	6.3	28	3.1	5.9	25	3.2	6.7
50-54	105	6.2	12.5	54	6.0	11.9	51	6.5	13.2
55-59	156	9.3	21.8	91	10.2	22.1	65	8.3	21.5
60-64	183	10.9	32.7	112	12.5	34.6	71	9.0	30.5
65-69	253	15.0	47.7	168	18.8	53.3	85	10.8	41.3
70-74	250	14.9	62.6	151	16.9	70.2	99	12.6	53.9
75-79	227	13.5	76.1	112	12.5	82.7	115	14.6	68.5
80-84	218	13.0	89.0	102	11.4	94.1	116	14.7	83.2
85+	185	11.0	100.0	53	5.9	100.0	132	16.8	100.0
All ages	1683	100.0		896	100.0		787	100.0	

Included in the statistics are 8.1% multiple primaries in males and 8.5% 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=9 %	Females DCO rate n=8 %	Males Prop.all cancers n=91183 %	Females Prop.all cancers n=89596 %
0- 4	1		0.1	0.0			0.6	
5- 9			0.0	0.0				
10-14	1		0.1	0.0			1.0	
15-19	1		0.1	0.0			0.5	
20-24		1	0.0	0.1				0.3
25-29	1	1	0.1	0.1			0.2	0.2
30-34	2	1	0.2	0.1			0.3	0.1
35-39	7	7	0.5	0.6			0.6	0.4
40-44	12	18	0.7	1.2			0.7	0.5
45-49	28	25	1.8	1.6			0.9	0.5
50-54	54	51	4.2	4.0			1.1	0.8
55-59	91	65	8.6	5.8			1.2	0.9
60-64	112	71	11.4	6.7			1.0	0.8
65-69	168	85	17.5	8.1	0.6		1.1	0.7
70-74	151	99	16.6	9.5	0.7		0.9	0.8
75-79	112	115	20.3	16.1	1.8		0.9	1.1
80-84	102	116	29.2	20.7	2.0	2.6	1.2	1.3
85+	53	132	22.9	22.8	5.7	3.8	0.9	1.3
All ages	896	787			1.0	1.0	1.0	0.9
Incidence								
Raw			5.0	4.2				
WS			2.6	1.7				
ES			3.8	2.6				
BRD-S			4.7	3.3				

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).

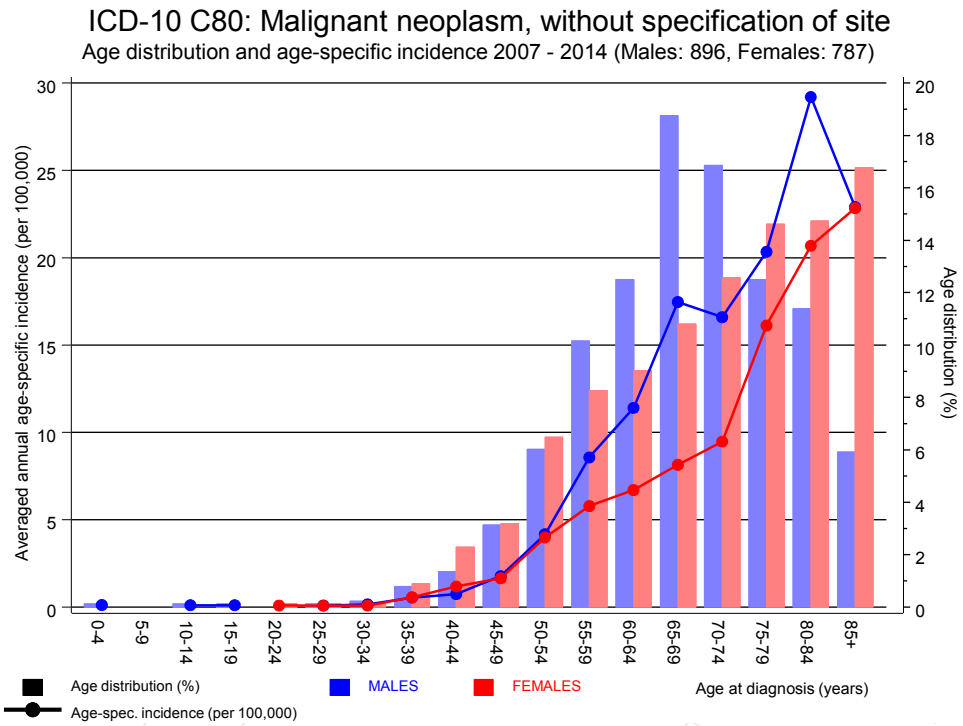


Figure 6. Age distribution and age-specific incidence

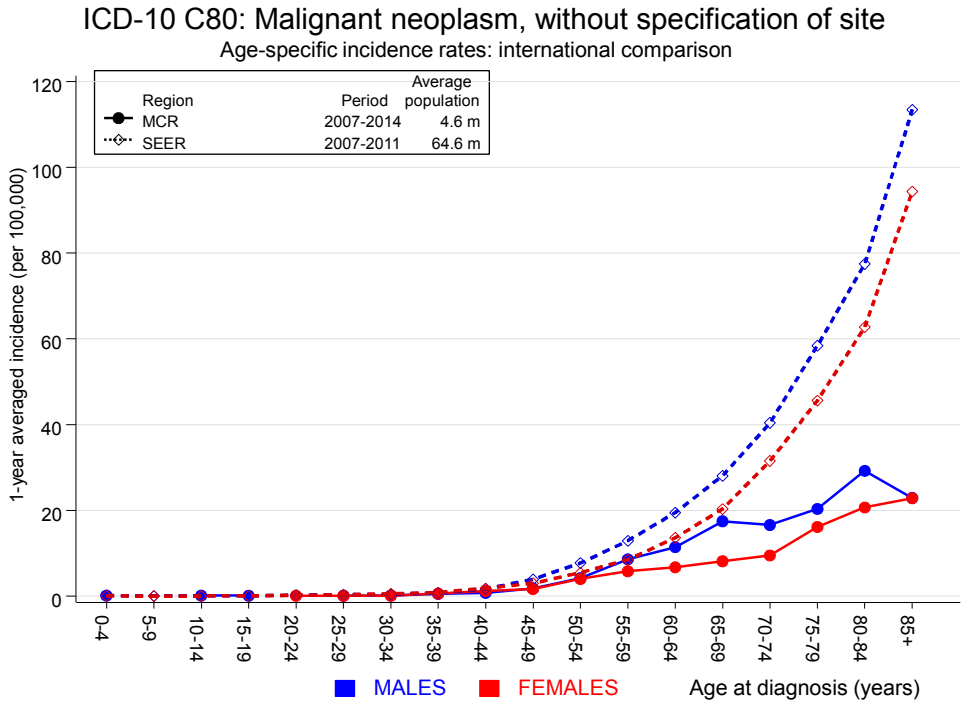


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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.

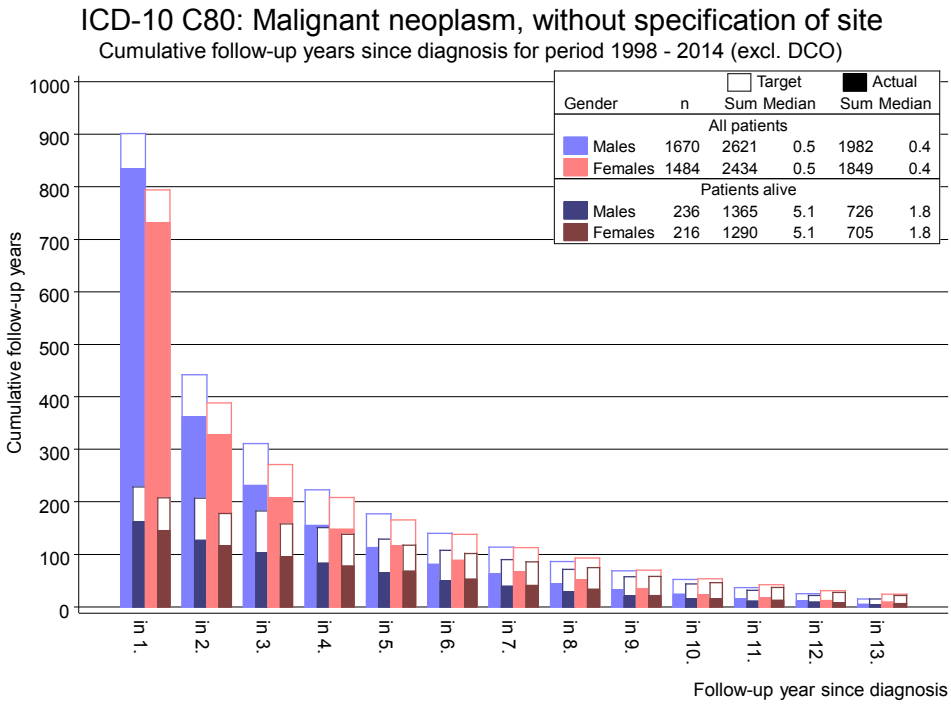


Figure 7. Cumulative follow-up years depending on time since diagnosis

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 %
C03-C06 Oral cavity	5	0.3	17.5	5.7	40.7	#	23.8	
C09-C10 Oropharynx	8	0.4	22.0	9.5	43.4	#	38.6	
C12-C13 Hypopharynx	8	0.2	41.0	17.7	80.8	#	39.4	25.0
C15 Oesophagus	2	0.6	3.5	0.4	12.8		7.3	
C16 Stomach	8	1.2	6.9	3.0	13.6	#	34.5	25.0
C18 Colon	7	2.8	2.5	1.0	5.2	#	21.4	28.6
C19-C20 Rectum	2	1.6	1.2	0.1	4.4		1.9	
C22 Liver	6	0.8	7.5	2.7	16.3	#	26.2	50.0
C23-C24 Bile	4	0.3	14.4	3.9	36.8	#	18.8	25.0
C25 Pancreas	6	1.0	5.9	2.1	12.7	#	25.1	50.0
C30-C31 Sinuses	2	0.1	39.6	4.8	143.1	#	9.8	
C32 Larynx	6	0.3	18.2	6.7	39.6	#	28.6	
C33-C34 Lung	27	3.5	7.8	5.1	11.3	#	118.7	33.3
C38,C45 Mesothelioma	4	0.2	21.3	5.8	54.6	#	19.2	
C61 Prostate	22	8.6	2.6	1.6	3.9	#	67.6	9.1
C64 Kidney	7	1.0	6.7	2.7	13.8	#	30.1	14.3
C67 Bladder	5	1.2	4.0	1.3	9.4	#	19.0	
C70-C72 CNS cancer	3	0.4	7.5	1.5	22.0	#	13.1	
C73 Thyroid	4	0.2	18.6	5.1	47.5	#	19.1	
C82-C85 NHL	3	1.1	2.6	0.5	7.7		9.4	33.3
Other primaries	11	2.3	4.8	2.4	8.7	#	44.1	36.4
Not observed	0	1.6	0.0	0.0	2.4		-7.8	
All mult. primaries	150	29.6	5.1	4.3	6.0	#	607.9	20.0

Patients	1677
Median age at second malignancy (years)	65.3
Person-years	1981
Mean observation time (years)	1.2
Median observation time (years)	0.4

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

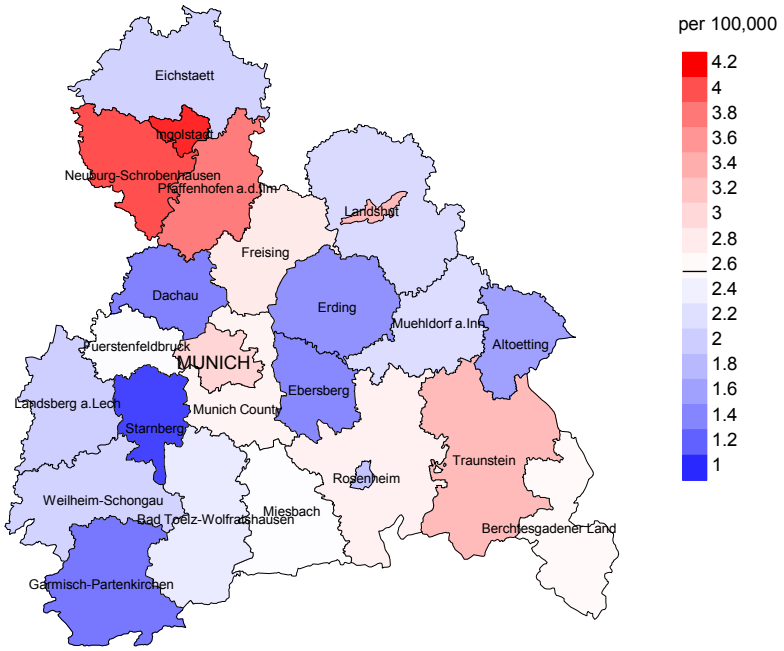
Diagnosis	Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C09–C10 Oropharynx	7	0.1	83.7	33.6	172.4	#	37.5	
C16 Stomach	4	0.8	5.1	1.4	12.9	#	17.4	
C17 Small intestine	3	0.1	31.8	6.6	93.0	#	15.8	
C18 Colon	8	2.1	3.7	1.6	7.3	#	31.7	50.0
C22 Liver	3	0.2	12.4	2.6	36.3	#	15.0	66.7
C23–C24 Bile	3	0.3	9.8	2.0	28.7	#	14.6	100.0
C25 Pancreas	5	0.9	5.5	1.8	12.8	#	22.2	60.0
C33–C34 Lung	18	1.5	12.4	7.4	19.6	#	89.8	38.9
C50 Breast	34	6.2	5.4	3.8	7.6	#	150.6	8.8
C54 Corpus uteri	3	1.1	2.7	0.5	7.8		10.2	
C56 Ovary	9	0.8	10.6	4.9	20.2	#	44.2	33.3
C64 Kidney	2	0.5	4.0	0.5	14.4		8.1	50.0
C67 Bladder	2	0.4	4.9	0.6	17.7		8.6	50.0
C82–C85 NHL	2	0.8	2.5	0.3	9.1		6.5	50.0
Other primaries	14	3.6	3.9	2.1	6.6	#	56.6	14.3
Not observed	0	1.4	0.0	0.0	2.7		−7.5	
All mult. primaries	117	20.9	5.6	4.6	6.7	#	521.4	25.6

Patients	1492
Median age at second malignancy (years)	68.7
Person-years	1843
Mean observation time (years)	1.2
Median observation time (years)	0.4

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

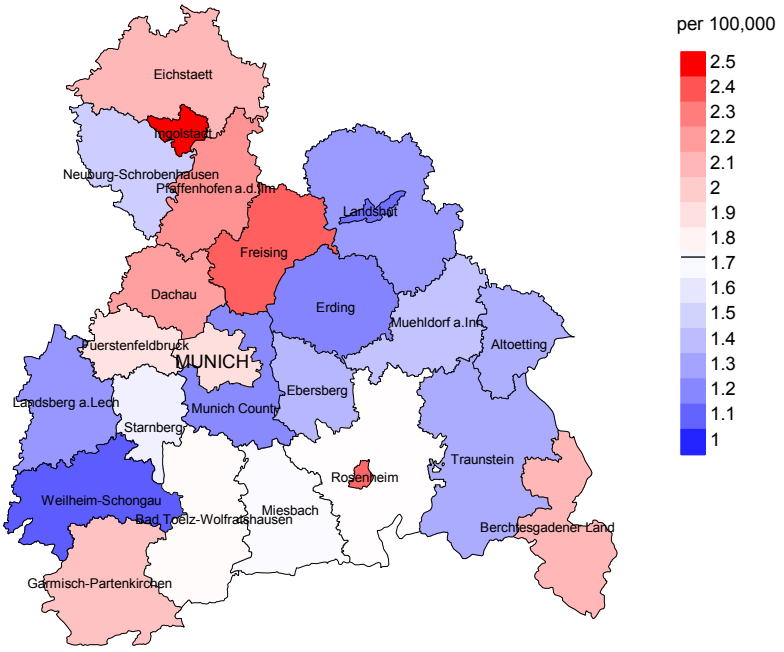
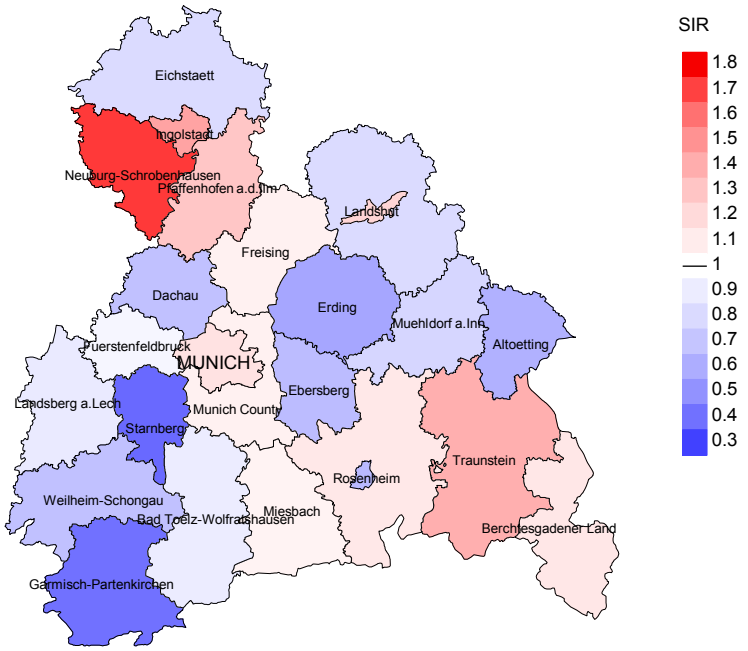


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 2.6/100,000 WS N=896, females 1.7/100,000 WS N=787).

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 17 women were identified with newly diagnosed CUP syndrome. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 1.4/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.6 and 2.7/100,000.

Standardized incidence ratio (SIR) 2007 - 2014: Males



Standardized incidence ratio (SIR) 2007 - 2014: Females

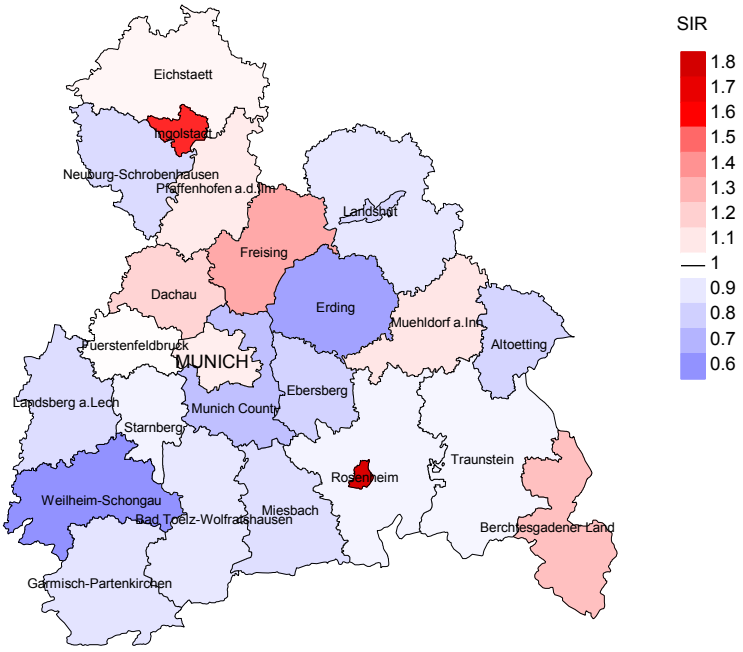


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=896, females N=787).

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 17 women were identified with newly diagnosed CUP syndrome. 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 0.40 and 1.48, 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	163	98.8	2.5	155	95.1	92.3
1999	131	99.2	4.6	126	96.2	90.5
2000	117	99.1	0.9	108	92.3	93.5
2001	109	99.1	0.9	100	91.7	97.0
2002	207	100.0	2.4	197	95.2	97.0
2003	200	100.0	1.5	188	94.0	98.4
2004	236	97.5	0.4	211	89.4	98.6
2005	198	96.5	3.0	181	91.4	97.8
2006	190	96.8	0.5	158	83.2	98.7
2007	228	94.3	0.9	204	89.5	97.5
2008	232	92.2	0.9	196	84.5	98.5
2009	212	93.4	0.5	178	84.0	97.8
2010	209	90.0	1.4	173	82.8	98.3
2011	261	90.8	1.1	217	83.1	98.2
2012	242	93.4	1.2	191	78.9	98.4
2013	199	99.5	0.5	159	79.9	95.6
2014	100	99.0	2.0	51	51.0	92.2
1998-2014	3234	95.9	1.4	2793	86.4	97.0

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	163	135	94.1	87	53.4
1999	131	135	89.6	72	55.0
2000	117	113	93.8	61	52.1
2001	109	93	95.7	53	48.6
2002	207	133	97.0	81	39.1
2003	200	170	96.5	86	43.0
2004	236	213	98.6	105	44.5
2005	198	188	97.3	92	46.5
2006	190	188	96.8	80	42.1
2007	228	204	98.5	108	47.4
2008	232	215	97.2	111	47.8
2009	212	188	98.9	89	42.0
2010	209	200	98.5	97	46.4
2011	261	219	98.6	136	52.1
2012	242	226	96.9	121	50.0
2013	199	200	98.5	103	51.8
2014	100	142	97.2	43	43.0
1998-2014	3234	2962	97.0	1525	47.2

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	135	100.0		96.9
1999	135	100.0		96.7
2000	113	100.0		93.4
2001	93	100.0		92.1
2002	133	100.0		94.6
2003	170	100.0		95.7
2004	213	100.0		96.7
2005	188	100.0		95.6
2006	188	100.0		95.1
2007	204	100.0		95.5
2008	215	100.0		94.3
2009	188	100.0		95.2
2010	200	100.0		92.4
2011	219	100.0		93.1
2012	226	100.0		92.7
2013	200	100.0		92.4
2014	142	100.0		91.3
1998-2014	2962	100.0		94.3

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	74	66.1	66.1		65.1
1999	74	69.0	69.0		67.9
2000	58	65.8	65.8		62.3
2001	47	67.7	67.7		68.2
2002	71	66.2	66.2		66.2
2003	90	68.7	68.7		68.7
2004	118	66.0	66.0		65.7
2005	100	66.5	66.5		66.5
2006	99	67.2	67.2		66.9
2007	100	67.4	67.4		67.4
2008	116	69.0	69.0		68.1
2009	102	71.5	71.5		70.4
2010	98	71.7	71.7		71.0
2011	119	71.1	71.1		70.9
2012	124	70.8	70.8		70.7
2013	103	70.0	70.0		69.3
2014	73	72.3	72.3		72.1
1998-2014	1566	69.0	69.0		68.6

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	61	77.4	77.4		76.8
1999	61	75.8	75.8		76.6
2000	55	69.5	69.5		68.6
2001	46	77.5	77.5		77.8
2002	62	78.1	78.1		75.7
2003	80	71.6	71.6		71.8
2004	95	75.8	75.8		75.9
2005	88	73.6	73.6		72.8
2006	89	72.6	72.6		72.5
2007	104	76.2	76.2		76.2
2008	99	74.6	74.6		74.6
2009	86	74.4	74.4		74.0
2010	102	74.4	74.4		73.7
2011	100	77.4	77.4		75.5
2012	102	77.5	77.5		76.8
2013	97	77.6	77.6		76.8
2014	69	73.9	73.9		72.8
1998-2014	1396	75.2	75.2		74.9

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	74	6.7	0.86	4.1	0.82	6.0	0.84	7.4	0.86
1999	74	6.6	1.10	4.2	1.15	6.2	1.16	7.8	1.15
2000	58	5.1	1.07	3.1	1.00	4.6	1.05	5.6	1.10
2001	47	4.1	0.77	2.4	0.78	3.7	0.78	4.8	0.80
2002	71	3.8	0.65	2.2	0.65	3.3	0.65	4.2	0.66
2003	90	4.8	0.80	2.7	0.77	4.0	0.80	5.3	0.84
2004	118	6.3	0.95	3.5	0.91	5.2	0.94	6.6	0.98
2005	100	5.3	1.06	3.0	1.01	4.3	1.04	5.3	1.07
2006	99	5.2	0.99	2.9	1.01	4.2	1.01	5.4	1.01
2007	100	4.5	0.84	2.5	0.82	3.6	0.82	4.5	0.82
2008	116	5.2	0.84	2.7	0.84	3.9	0.83	5.0	0.84
2009	102	4.6	1.00	2.3	0.97	3.5	1.02	4.6	1.04
2010	98	4.3	0.91	2.1	0.86	3.2	0.88	4.1	0.91
2011	119	5.2	0.83	2.5	0.80	3.8	0.82	4.9	0.84
2012	124	5.4	0.90	2.6	0.79	4.0	0.86	5.2	0.92
2013	103	4.5	1.02	2.3	1.00	3.4	1.01	4.2	1.00
2014	73	3.2	1.55	1.5	1.64	2.3	1.60	3.1	1.57
1998-2014	1566	4.9	0.92	2.6	0.89	3.9	0.91	4.9	0.93

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	61	5.2	0.79	1.9	0.76	3.0	0.77	4.1	0.75
1999	61	5.1	0.95	2.0	0.83	3.1	0.86	4.1	0.91
2000	55	4.6	0.87	2.1	0.83	3.1	0.84	3.9	0.88
2001	46	3.8	0.96	1.5	0.81	2.4	0.87	3.1	0.92
2002	62	3.2	0.63	1.3	0.59	1.9	0.61	2.6	0.63
2003	80	4.1	0.91	1.9	0.97	2.8	0.95	3.4	0.93
2004	95	4.8	0.85	1.8	0.72	2.8	0.76	3.7	0.82
2005	88	4.4	0.85	1.8	0.80	2.7	0.79	3.5	0.81
2006	89	4.4	0.99	1.9	0.96	2.8	0.99	3.6	0.99
2007	104	4.5	0.95	1.7	0.83	2.6	0.86	3.4	0.89
2008	99	4.3	1.05	1.7	1.01	2.5	1.01	3.3	0.99
2009	86	3.7	0.78	1.5	0.70	2.3	0.72	2.9	0.77
2010	102	4.4	1.01	1.7	0.94	2.6	0.96	3.4	1.01
2011	100	4.2	0.85	1.5	0.77	2.3	0.79	3.2	0.82
2012	102	4.3	0.98	1.6	0.97	2.5	0.97	3.3	1.00
2013	97	4.1	0.99	1.4	0.86	2.2	0.89	3.1	0.93
2014	69	2.9	1.30	1.2	1.27	1.8	1.25	2.2	1.28
1998-2014	1396	4.2	0.91	1.6	0.85	2.5	0.86	3.3	0.89

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.%
15-19	1	0.1	0.1	1	0.1	0.1			0.0
20-24	0	0.0	0.1			0.1			0.0
25-29	2	0.1	0.2			0.1	2	0.3	0.3
30-34	4	0.3	0.4	4	0.5	0.6			0.3
35-39	10	0.6	1.1	5	0.6	1.2	5	0.7	0.9
40-44	20	1.3	2.3	10	1.2	2.4	10	1.3	2.2
45-49	36	2.3	4.6	15	1.8	4.2	21	2.8	5.0
50-54	67	4.2	8.8	40	4.8	9.0	27	3.6	8.6
55-59	128	8.0	16.8	75	9.0	18.0	53	7.0	15.5
60-64	171	10.7	27.5	104	12.5	30.4	67	8.8	24.4
65-69	233	14.6	42.2	148	17.7	48.1	85	11.2	35.6
70-74	240	15.1	57.2	145	17.4	65.5	95	12.5	48.1
75-79	242	15.2	72.4	122	14.6	80.1	120	15.8	63.9
80-84	212	13.3	85.7	95	11.4	91.5	117	15.4	79.3
85+	228	14.3	100.0	71	8.5	100.0	157	20.7	100.0
All ages	1594	100.0		835	100.0		759	100.0	

Included in the statistics are 8.1% multiple primaries in males and 8.5% 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	1		0.1	1.00	0.0		2.8	
20-24			0.0		0.0			
25-29		2	0.0		0.2	2.00		3.1
30-34	4		0.3	2.00	0.0		4.5	
35-39	5	5	0.4	0.71	0.4	0.71	2.8	1.9
40-44	10	10	0.6	0.83	0.7	0.56	2.2	1.6
45-49	15	21	0.9	0.54	1.4	0.84	1.5	1.7
50-54	40	27	3.1	0.74	2.1	0.53	2.1	1.5
55-59	75	53	7.1	0.82	4.7	0.82	2.4	2.0
60-64	104	67	10.6	0.93	6.3	0.94	2.2	1.9
65-69	148	85	15.4	0.88	8.1	1.00	2.1	1.6
70-74	145	95	15.9	0.96	9.1	0.96	1.6	1.4
75-79	122	120	22.2	1.09	16.8	1.04	1.4	1.9
80-84	95	117	27.2	0.93	20.9	1.01	1.3	1.8
85+	71	157	30.7	1.34	27.2	1.19	1.2	1.8
All ages	835	759					1.7	1.7
Mortality								
Raw			4.6	0.93	4.1	0.96		
WS			2.3	0.90	1.5	0.89		
ES			3.5	0.92	2.3	0.91		
BRD-S			4.5	0.94	3.1	0.94		
PYLL-70								
per 100,000			23.5		18.0			
ES			20.8		15.2			
AYLL-70			9.4		10.5			

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 ←%
C03-C06 Oral cavity	7	4.0					7	100.0
C09-C10 Oropharynx	13	7.4					13	100.0
C12-C13 Hypopharynx	11	6.3					11	100.0
C15 Oesophagus	3	1.7					3	100.0
C16 Stomach	8	4.5					8	100.0
C18 Colon	10	5.7					10	100.0
C19-C20 Rectum	2	1.1					2	100.0
C22 Liver	7	4.0					7	100.0
C23-C24 Bile	3	1.7					3	100.0
C25 Pancreas	5	2.8					5	100.0
C26 GI cancer	2	1.1					2	100.0
C32 Larynx	6	3.4					6	100.0
C33-C34 Lung	27	15.3					27	100.0
C38,C45 Mesothelioma	4	2.3					4	100.0
C44 Skin others	14	8.0					14	100.0
C61 Prostate	16	9.1					16	100.0
C64 Kidney	8	4.5					8	100.0
C65 Renal pelvis	2	1.1					2	100.0
C67 Bladder	7	4.0					7	100.0
C70-C72 CNS cancer	7	4.0					7	100.0
C73 Thyroid	2	1.1					2	100.0
C82-C85 NHL	3	1.7					3	100.0
Other primaries	9	5.1					9	100.0

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 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 ←%
C09–C10	Oropharynx	9	7.1					9	100.0
C16	Stomach	4	3.1					4	100.0
C18	Colon	8	6.3					8	100.0
C22	Liver	4	3.1					4	100.0
C23–C24	Bile	3	2.4					3	100.0
C25	Pancreas	5	3.9					5	100.0
C33–C34	Lung	20	15.7					20	100.0
C43	Malign. melanoma	2	1.6					2	100.0
C50	Breast	33	26.0					33	100.0
C54	Corpus uteri	2	1.6					2	100.0
C56	Ovary	11	8.7					11	100.0
C64	Kidney	2	1.6					2	100.0
C70–C72	CNS cancer	2	1.6					2	100.0
C82–C85	NHL	4	3.1					4	100.0
C90	Mult. myeloma	4	3.1					4	100.0
Other primaries		14	11.0					14	100.0

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	1		0.1	1.00	0.0		3.0	
20-24			0.0		0.0			
25-29		2	0.0		0.2	2.00		3.4
30-34	4		0.3	2.00	0.0		4.7	
35-39	5	5	0.4	0.71	0.4	0.71	3.0	2.2
40-44	10	10	0.6	0.83	0.7	0.56	2.4	1.8
45-49	15	21	0.9	0.54	1.4	0.84	1.6	2.0
50-54	40	27	3.1	0.74	2.1	0.53	2.5	1.8
55-59	75	53	7.1	0.82	4.7	0.82	2.9	2.5
60-64	104	67	10.6	0.93	6.3	0.94	2.7	2.4
65-69	148	85	15.4	0.88	8.1	1.00	2.6	2.1
70-74	145	95	15.9	0.96	9.1	0.96	2.1	1.9
75-79	122	120	22.2	1.09	16.8	1.04	2.0	2.5
80-84	95	117	27.2	0.93	20.9	1.01	1.8	2.3
85+	71	157	30.7	1.34	27.2	1.19	1.6	2.3
All ages	835	759					2.2	2.2
Mortality								
Raw			4.6	0.93	4.1	0.96		
WS			2.3	0.90	1.5	0.89		
ES			3.5	0.92	2.3	0.91		
BRD-S			4.5	0.94	3.1	0.94		
PYLL-70								
per 100,000			23.5		18.0			
ES			20.8		15.2			
AYLL-70			9.4		10.5			

* 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	1		0.1	1.00	0.0		3.0	
20-24			0.0		0.0			
25-29		2	0.0		0.2	2.00		3.6
30-34	4		0.3	2.00	0.0		4.7	
35-39	5	5	0.4	0.71	0.4	0.83	3.2	2.4
40-44	9	10	0.6	0.90	0.7	0.59	2.3	2.0
45-49	15	18	0.9	0.58	1.2	0.86	1.7	2.0
50-54	35	23	2.7	0.70	1.8	0.51	2.4	1.7
55-59	71	46	6.7	0.84	4.1	0.75	3.1	2.4
60-64	89	58	9.1	0.88	5.5	0.91	2.6	2.4
65-69	133	72	13.8	0.87	6.9	0.95	2.8	2.1
70-74	124	90	13.6	0.89	8.6	0.95	2.2	2.2
75-79	106	108	19.2	1.02	15.1	1.05	2.2	2.7
80-84	89	103	25.5	0.92	18.4	0.94	2.2	2.5
85+	63	144	27.2	1.26	24.9	1.15	1.8	2.6
All ages	744	679					2.4	2.4
Mortality								
Raw			4.1	0.90	3.6	0.94		
WS			2.0	0.87	1.4	0.86		
ES			3.1	0.89	2.1	0.88		
BRD-S			4.0	0.90	2.7	0.91		
PYLL-70								
per 100,000			21.5		15.9			
ES			19.1		13.5			
AYLL-70			9.5		10.8			

* See corresponding tables with multiple primaries.

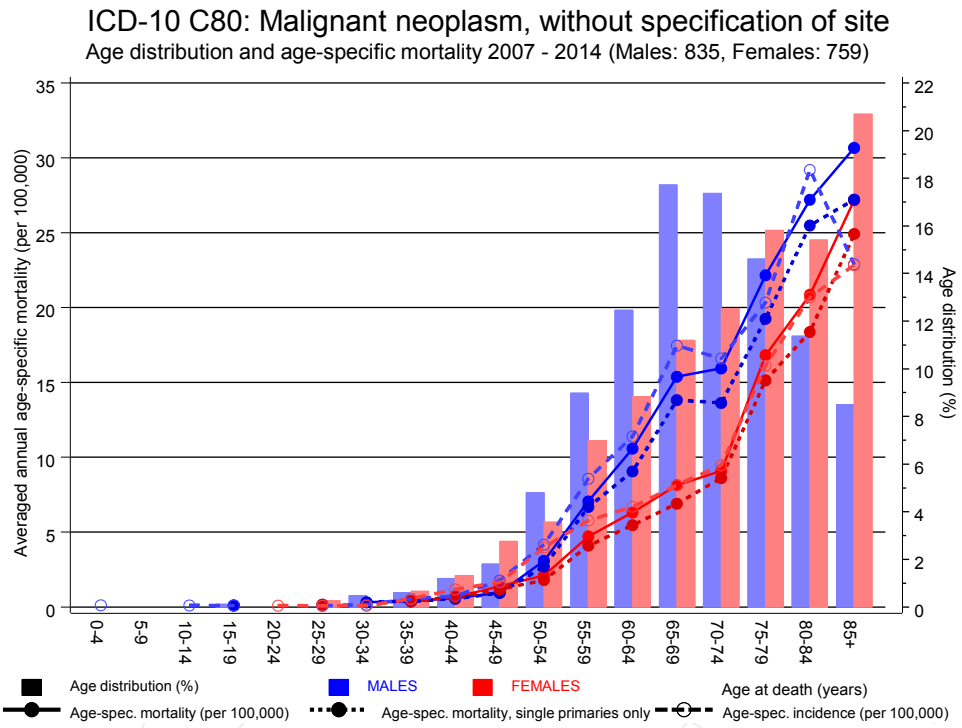
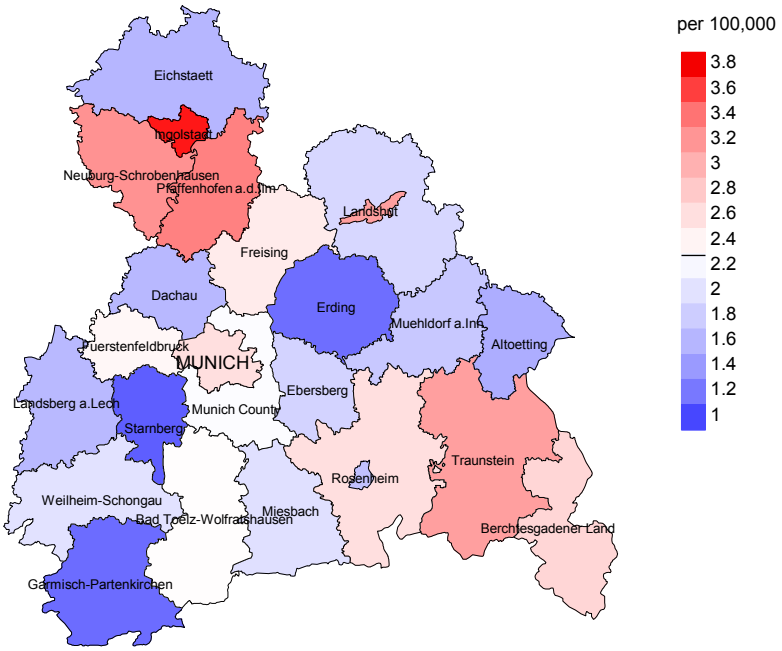


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

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



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

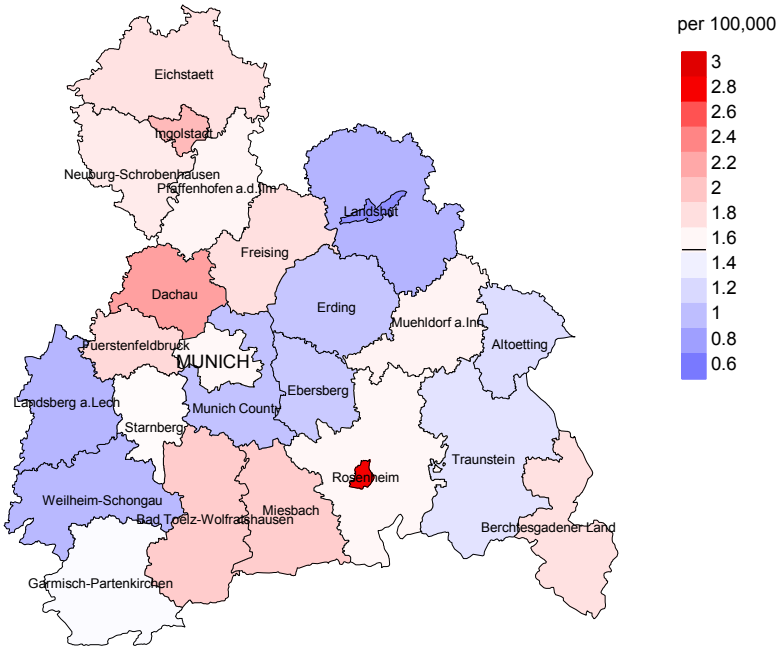
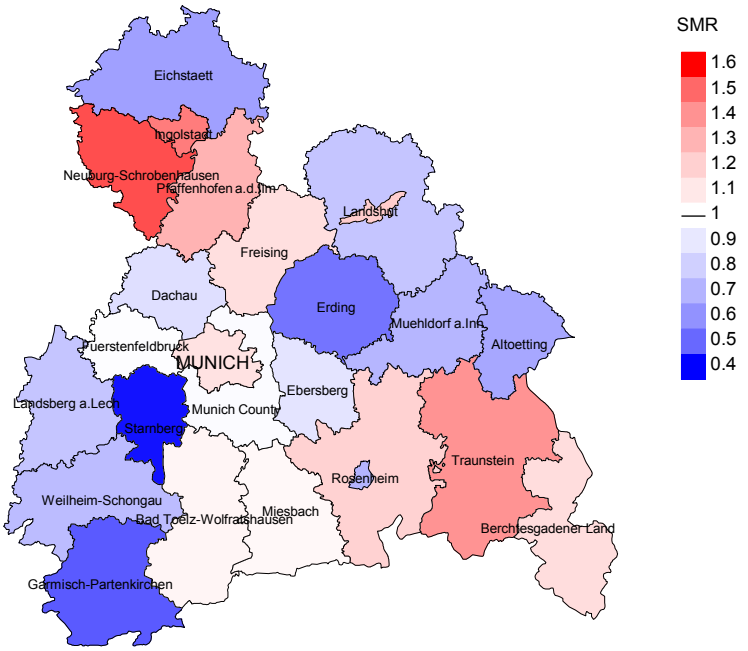


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2014. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 2.3/100,000 WS N=834, females 1.5/100,000 WS N=754).

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 16 women died from CUP syndrome. 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 0.5 and 2.2/100,000.

Standardized mortality ratio (SMR) 2007 - 2014: Males



Standardized mortality ratio (SMR) 2007 - 2014: Females

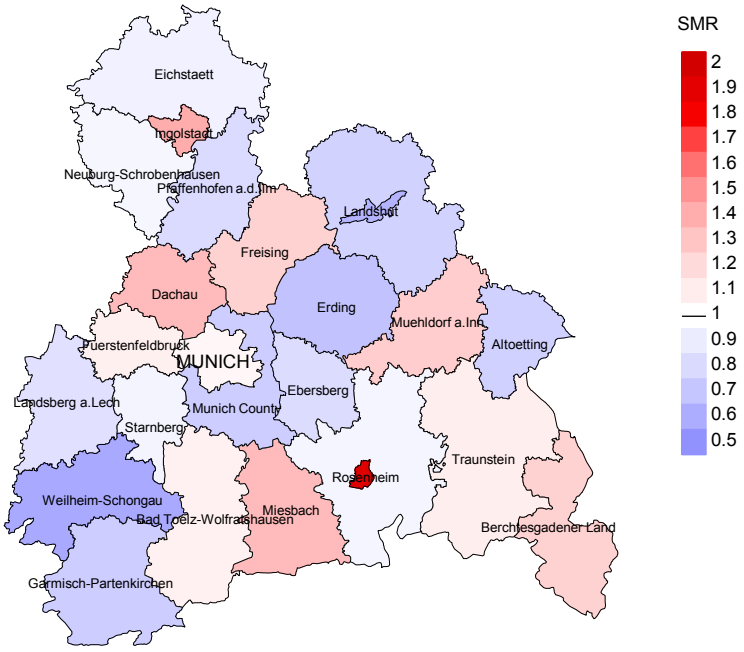


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=834, females N=754).

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 16 women died from CUP syndrome. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.81. Though, the value of this parameter may vary with an underlying probability of 99% between 0.38 and 1.50, 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

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