Munich Cancer Registry

Tumorregister München (TRM)

Munich Cancer Registry (MCR)

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

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

Cancer statistics: Baseline statistics

C22: Liver cancer

Year of diagnosis	1998-2013
Patients	5,710
Diseases	5,718
Creation date	05/19/2015
Export date	12/30/2014
Population	4.64 m

BERLIN

GERMANY

BAVARIA

MUNICH

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. 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, May 2015

[#]   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 2014 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 (ICD-10 2015) used for specifying cancer site

Code	Description
C22.-	Malignant neoplasm of liver and intrahepatic bile ducts
C22.0	Liver cell carcinoma
C22.1	Intrahepatic bile duct carcinoma
C22.2	Hepatoblastoma
C22.3	Angiosarcoma of liver
C22.4	Other sarcomas of liver
C22.7	Other specified carcinomas of liver
C22.9	Liver, unspecified

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	182	67	36.8	9.3	96.7	100.0
1999	211	80	37.9	9.5	96.7	99.1
2000	218	88	40.4	11.5	94.5	100.0
2001	195	69	35.4	14.4	96.9	98.5
2002	351	147	41.9	16.8	98.3	100.0 #
2003	333	133	39.9	16.2	96.1	99.7
2004	340	135	39.7	19.1	94.1	98.8
2005	351	126	35.9	19.7	96.0	99.4
2006	398	126	31.7	20.6	92.5	98.7
2007	452	133	29.4	18.1	90.7	96.7 # ##
2008	479	107	22.3	20.7	87.3	92.9
2009	463	111	24.0	21.0	85.5	92.2
2010	445	98	22.0	23.1	87.2	93.3
2011	441	99	22.4	22.0	78.0	89.3
2012	500	105	21.0	22.0	70.6	90.8
2013	359	101	28.1	21.2	63.5	98.6 ###
1998–2013	5718	1725	30.2	18.9	87.5	96.0

\#   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	182	129	53	70.9
1999	211	141	70	66.8
2000	218	156	62	71.6
2001	195	155	40	79.5
2002	351	252	99	71.8
2003	333	241	92	72.4
2004	340	251	89	73.8
2005	351	254	97	72.4
2006	398	287	111	72.1
2007	452	337	115	74.6
2008	479	353	126	73.7
2009	463	334	129	72.1
2010	445	349	96	78.4
2011	441	335	106	76.0
2012	500	356	144	71.2
2013	359	243	116	67.7
1998-2013	5718	4173	1545	73.0

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 4.64 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	129	53	11.6	4.5	7.2	1.9	10.6	2.9	13.6	3.8
1999	141	70	12.6	5.9	7.4	2.4	11.2	3.7	14.6	4.9
2000	156	62	13.7	5.2	8.2	2.1	12.2	3.2	15.2	4.5
2001	155	40	13.4	3.3	7.9	1.7	11.7	2.2	15.2	2.7
2002	252	99	13.5	5.1	7.6	2.0	11.3	3.0	14.5	4.2
2003	241	92	12.9	4.7	6.9	1.8	10.4	2.8	13.9	3.8
2004	251	89	13.3	4.5	7.3	1.9	11.0	2.7	14.2	3.6
2005	254	97	13.4	4.9	7.2	2.1	10.6	2.9	13.5	3.7
2006	287	111	15.0	5.5	7.9	2.2	11.8	3.3	15.1	4.2
2007	337	115	15.2	5.0	8.1	2.1	12.0	3.1	15.4	3.8
2008	353	126	15.9	5.4	8.5	2.4	12.3	3.4	15.4	4.4
2009	334	129	15.0	5.5	7.5	2.1	11.1	3.2	14.2	4.3
2010	349	96	15.5	4.1	7.7	1.5	11.5	2.2	14.7	2.9
2011	335	106	14.7	4.5	7.3	1.9	10.7	2.7	13.7	3.4
2012	356	144	15.6	6.1	7.8	2.6	11.4	3.8	14.6	4.9
2013	243	116	10.6	4.9	5.2	2.1	7.9	3.0	10.1	3.8
1998-2013	4173	1545	14.0	5.0	7.4	2.1	11.0	3.0	14.1	3.9

The computation of the incidence measures includes all primaries, irrespective of first or subsequent malignancy.
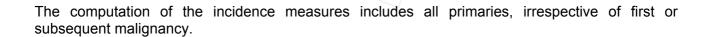
Table 3

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	182	68.4	12.1	16.5	92.2	54.9	60.8	68.7	76.8	83.6
1999	211	69.9	11.8	10.8	95.7	57.5	62.4	70.0	78.2	84.0
2000	218	70.2	11.8	25.1	94.3	55.8	63.5	69.7	77.9	86.1
2001	195	67.9	13.4	0.6	98.8	50.5	61.0	68.9	77.2	82.3
2002	351	69.5	11.1	29.3	94.0	55.8	62.4	69.8	77.5	82.3
2003	333	70.1	12.1	10.9	98.8	57.4	63.3	70.7	78.7	83.0
2004	340	69.7	12.0	3.1	93.4	54.6	62.1	70.5	78.1	84.3
2005	351	69.5	12.5	1.0	100	57.1	63.1	68.9	77.8	83.7
2006	398	69.8	11.3	20.4	96.6	54.6	62.8	69.8	78.3	84.6
2007	452	69.4	12.1	0.3	96.7	55.2	62.2	70.5	77.8	84.1
2008	479	68.5	12.5	1.1	97.9	55.0	62.2	69.4	76.8	83.0
2009	463	70.7	10.8	3.7	95.8	57.3	65.1	71.0	77.9	84.1
2010	445	70.9	11.2	0.8	98.5	57.0	63.9	71.3	78.2	85.1
2011	441	69.7	12.9	0.7	98.3	54.8	63.9	71.2	77.7	83.4
2012	500	69.6	12.0	1.5	97.8	54.8	64.0	71.6	77.1	82.6
2013	359	70.9	11.5	2.7	96.7	56.2	64.2	71.6	78.5	84.8
1998-2013	5718	69.8	11.9	0.3	100	55.7	63.0	70.5	77.9	83.8

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	129	67.1	11.5	16.5	89.1	55.0	60.6	66.6	74.7	82.6
1999	141	68.0	11.3	10.8	95.7	56.4	61.7	69.0	75.7	79.7
2000	156	69.2	12.2	25.1	94.3	55.5	62.6	68.4	76.0	87.9
2001	155	67.4	11.6	31.6	95.3	50.5	61.0	68.3	75.6	81.6
2002	252	68.2	10.1	36.0	93.8	55.6	62.1	68.0	75.4	81.2
2003	241	68.8	11.2	25.1	92.4	56.6	62.6	68.7	76.8	82.0
2004	251	68.6	10.9	22.5	93.4	54.7	61.2	69.0	75.9	81.9
2005	254	68.2	9.8	34.4	93.0	57.0	62.2	67.5	75.2	80.4
2006	287	68.6	10.4	41.8	96.6	55.0	61.8	69.0	76.1	81.9
2007	337	68.5	11.5	0.3	96.7	56.0	61.8	69.9	76.0	81.1
2008	353	67.8	11.1	6.5	97.9	55.5	61.5	68.8	74.6	80.8
2009	334	69.9	10.5	3.7	94.7	57.2	64.1	70.4	76.6	83.4
2010	349	69.7	10.7	0.8	94.9	56.2	62.7	70.7	76.7	82.6
2011	335	69.2	11.0	0.8	92.3	55.4	63.8	70.5	76.3	81.3
2012	356	69.2	10.9	1.5	91.3	54.9	63.7	70.9	76.4	81.5
2013	243	70.5	10.4	46.0	96.7	56.4	63.9	70.8	77.9	83.4
1998-2013	4173	68.8	10.9	0.3	97.9	55.6	62.3	69.5	76.2	81.8

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	53	71.5	13.2	34.6	92.2	52.8	64.3	74.9	79.6	87.3
1999	70	73.7	12.0	35.7	94.0	59.4	64.2	75.2	83.3	88.3
2000	62	72.7	10.6	33.9	93.4	60.8	65.6	74.8	80.3	83.6
2001	40	69.8	19.0	0.6	98.8	48.2	62.8	72.2	81.2	91.2
2002	99	72.8	12.6	29.3	94.0	58.3	65.3	76.5	80.7	86.9
2003	92	73.5	13.5	10.9	98.8	60.3	66.4	77.2	81.0	86.0
2004	89	73.0	14.3	3.1	93.4	51.3	65.2	74.3	83.6	89.3
2005	97	73.0	17.3	1.0	100	58.1	65.7	75.7	83.8	90.8
2006	111	73.0	13.0	20.4	95.3	54.2	66.0	73.1	83.1	86.7
2007	115	71.9	13.5	25.9	94.8	54.5	64.9	73.2	83.4	87.1
2008	126	70.6	15.6	1.1	96.7	52.5	64.0	73.5	81.4	86.0
2009	129	73.0	11.3	39.7	95.8	57.5	66.4	73.8	81.9	86.4
2010	96	75.0	11.9	15.6	98.5	60.8	69.0	74.7	85.2	87.7
2011	106	71.3	17.5	0.7	98.3	47.8	65.7	75.3	82.2	88.0
2012	144	70.6	14.2	1.6	97.8	54.2	64.5	73.4	79.5	86.0
2013	116	71.6	13.5	2.7	95.4	56.2	65.2	72.6	80.5	87.8
1998-2013	1545	72.3	14.0	0.6	100	56.2	65.4	74.3	81.8	87.3

Table 4

Age distribution by 5-year age group and gender for period 1998-2013
(incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4	17	0.3	0.3	7	0.2	0.2	10	0.6	0.6
5-9	3	0.1	0.3	2	0.0	0.2	1	0.1	0.7
10-14	2	0.0	0.4	1	0.0	0.2	1	0.1	0.8
15-19	4	0.1	0.5	2	0.0	0.3	2	0.1	0.9
20-24	6	0.1	0.6	2	0.0	0.3	4	0.3	1.2
25-29	7	0.1	0.7	4	0.1	0.4	3	0.2	1.4
30-34	16	0.3	1.0	8	0.2	0.6	8	0.5	1.9
35-39	27	0.5	1.4	15	0.4	1.0	12	0.8	2.7
40-44	46	0.8	2.2	31	0.7	1.7	15	1.0	3.6
45-49	133	2.3	4.6	103	2.5	4.2	30	1.9	5.6
50-54	262	4.6	9.1	208	5.0	9.2	54	3.5	9.1
55-59	496	8.7	17.8	409	9.8	19.0	87	5.6	14.7
60-64	734	12.8	30.7	591	14.2	33.1	143	9.3	23.9
65-69	992	17.3	48.0	786	18.8	52.0	206	13.3	37.3
70-74	1036	18.1	66.1	801	19.2	71.2	235	15.2	52.5
75-79	860	15.0	81.2	615	14.7	85.9	245	15.9	68.3
80-84	625	10.9	92.1	381	9.1	95.0	244	15.8	84.1
85+	452	7.9	100.0	207	5.0	100.0	245	15.9	100.0
All ages	5718	100.0		4173	100.0		1545	100.0	

Included in the statistics are 24.0% multiple primaries in males and 20.9% in females.

Table 5

Age-specific incidence, DCO rate and proportion of all cancers
for period 1998-2013

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=1159 %	Females DCO rate n=563 %	Males Prop.all cancers n=158258 %	Females Prop.all cancers n=153136 %
0- 4	7	10	0.5	0.7			2.2	4.1
5- 9	2	1	0.1	0.1			1.1	0.8
10-14	1	1	0.1	0.1			0.6	0.6
15-19	2	2	0.1	0.1			0.6	0.7
20-24	2	4	0.1	0.2	50.0		0.3	0.8
25-29	4	3	0.2	0.1		33.3	0.4	0.3
30-34	8	8	0.4	0.4	12.5	25.0	0.5	0.4
35-39	15	12	0.6	0.5	6.7		0.7	0.3
40-44	31	15	1.2	0.6	19.4	6.7	1.0	0.2
45-49	103	30	4.4	1.3	19.4	16.7	1.9	0.3
50-54	208	54	10.3	2.6	19.7	14.8	2.4	0.5
55-59	408	87	22.2	4.5	22.1	17.2	2.8	0.6
60-64	591	143	33.3	7.6	22.5	17.5	2.7	0.8
65-69	786	206	49.8	11.9	25.7	21.8	2.9	1.1
70-74	801	234	62.5	15.4	22.5	30.8	3.0	1.3
75-79	614	244	74.3	20.5	30.6	37.3	3.0	1.4
80-84	379	244	75.7	26.2	43.8	48.8	2.8	1.5
85+	207	245	60.7	27.4	62.8	73.1	2.1	1.4
All ages	4169	1543			27.8	36.5	2.6	1.0

Incidence		
Raw	14.0	5.0
WS	7.4	2.1
ES	11.0	3.0
BRD-S	14.1	3.9

The age-specific incidence characterizes the disease risk in a particular age group. The age distribution depends on the patient population frequency in each age group and reflects the tangible clinical picture of everyday patients care (see following chart).

Table 6a

Standardized incidence ratio (SIR, with 95% confidence limits),
excess absolute risk (EAR) and DCO rate of second primaries
for period 1998-2013
MALES

Diagnosis	Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C03-C06 Oral cavity	3	0.4	6.7	1.4	19.6	#	8.1	
C15 Oesophagus	3	1.0	3.1	0.6	9.2		6.5	
C16 Stomach	4	2.3	1.8	0.5	4.5		5.6	
C17 Small intestine	2	0.3	7.6	0.9	27.3		5.5	
C18 Colon	17	5.5	3.1	1.8	5.0	#	36.8	11.8
C19-C20 Rectum	3	3.1	1.0	0.2	2.9		-0.2	33.3
C22 Liver	5	1.5	3.3	1.1	7.7	#	11.1	80.0
C23-C24 Bile	3	0.5	5.7	1.2	16.6	#	7.9	33.3
C25 Pancreas	5	1.9	2.6	0.8	6.1		9.8	
C33-C34 Lung	23	6.5	3.5	2.2	5.3	#	52.5	30.4
C43 Malign. melanoma	2	2.1	0.9	0.1	3.4		-0.4	
C61 Prostate	14	16.5	0.8	0.5	1.4		-8.1	28.6
C64 Kidney	10	1.9	5.2	2.5	9.5	#	25.8	10.0
C67 Bladder	9	2.4	3.8	1.7	7.1	#	21.1	
C73 Thyroid	2	0.3	5.8	0.7	21.0		5.3	
C76-C79 CUP	2	0.9	2.2	0.3	8.0		3.5	
C82-C85 NHL	8	2.2	3.7	1.6	7.3	#	18.6	25.0
C91-C96 Leukaemia	3	0.9	3.5	0.7	10.1		6.8	33.3
Other primaries	9	2.5	3.6	1.6	6.8	#	20.6	22.2
Not observed	0	2.7	0.0	0.0	1.4		-8.6	
All mult. primaries	127	55.5	2.3	1.9	2.7	#	228.3	19.7

Patients	2193
Median age at second malignancy (years)	71.2
Person-years	3134
Mean observation time (years)	1.4
Median observation time (years)	0.6

The occurrence of second malignancy is statistically significant.

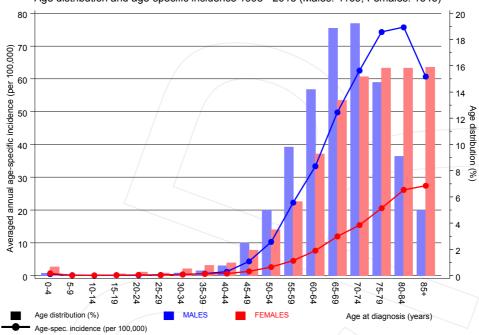Observed second primaries with count 1 are pooled in category "Other primaries".

Table 6b

Standardized incidence ratio (SIR, with 95% confidence limits),
excess absolute risk (EAR) and DCO rate of second primaries
for period 1998-2013
FEMALES
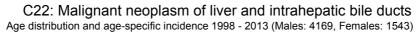
Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C16	Stomach	2	0.4	4.5	0.5	16.3		14.9	
C18	Colon	11	1.2	8.9	4.5	16.0	#	93.2	27.3
C22	Liver	2	0.1	13.9	1.7	50.2	#	17.7	
C23-C24	Bile	2	0.2	11.1	1.3	40.1	#	17.4	
C50	Breast	8	3.6	2.2	1.0	4.3		41.7	12.5
C54	Corpus uteri	2	0.7	2.9	0.3	10.3		12.4	
C82-C85	NHL	2	0.5	4.2	0.5	15.3		14.6	
Other primaries		12	2.9	4.1	2.1	7.1	#	86.5	25.0
Not observed		0	2.4	0.0	0.0	1.5		-23.1	
All mult. primaries		41	12.2	3.4	2.4	4.6	#	275.2	17.1

Patients	772
Median age at second malignancy (years)	75.4
Person-years	1048
Mean observation time (years)	1.4
Median observation time (years)	0.5

The occurrence of second malignancy is statistically significant.

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

C22: Malignant neoplasm of liver and intrahepatic bile ducts
Age distribution and age-specific incidence 1998 - 2013 (Males: 4169, Females: 1543)

Figure 7. Age distribution and age-specific incidence

C22: Malignant neoplasm of liver and intrahepatic bile ducts
Age-specific incidence in international comparison

Region	Period	Average population
MCR	2007-2013	4.6 m
FRG (GEKID extrapol.)	2007-2011	82.0 m
SEER	2007-2011	64.6 m

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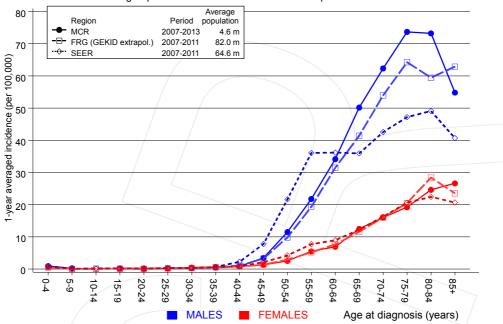
Figure 7a. Age-specific incidence in MCR registry areas compared to Germany (FRG, GEKID extrapolation) and SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

Extrapolated age-specific patient population of Germany, data status middle of 2010. Association of Population-based Cancer Registries in Germany (GEKID e.V.). Berlin, 2014. http://www.gekid.de. Last access: 02/11/2015

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.

C22: Malignant neoplasm of liver and intrahepatic bile ducts

Cumulative follow-up years since diagnosis for period 1998 - 2013 (excl. DCO)

Gender	n	Target Sum	Median	Actual Sum	Median
All patients					
Males	1843	3237	0.7	3016	0.7
Females	606	1058	0.7	993	0.6
Patients alive					
Males	349	1630	3.7	1409	3.2
Females	125	613	3.1	548	3.0
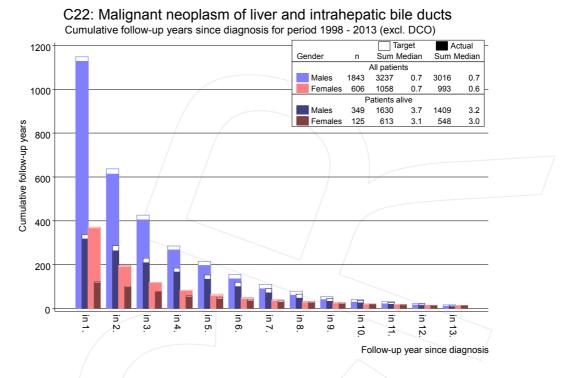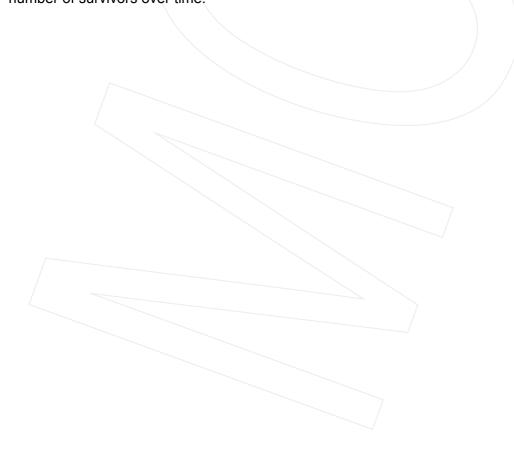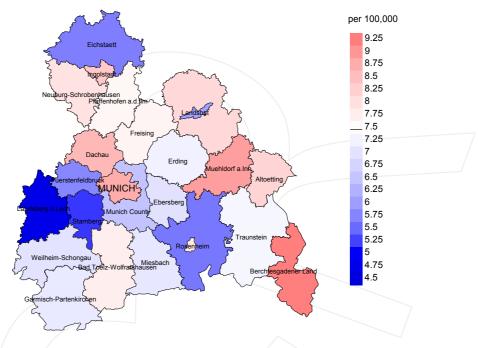
Figure 8. Cumulative follow-up years depending on time since diagnosis

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) 2007 - 2013: Males

Average incidence (world standard population) 2007 - 2013: Females
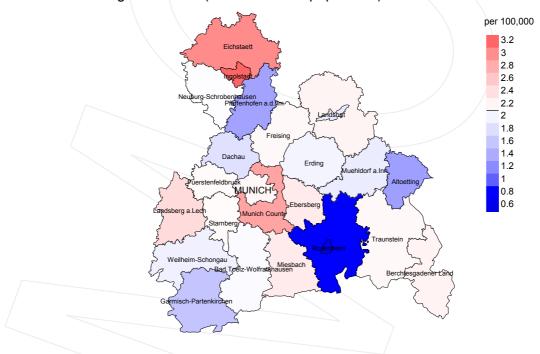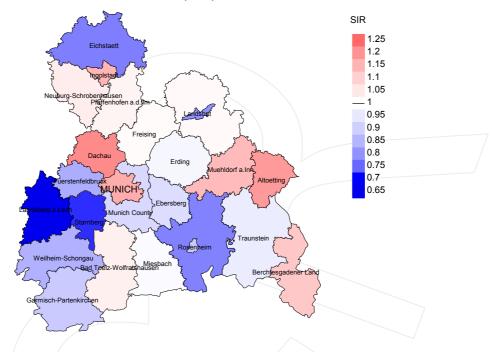
Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 7.5/100,000 WS N=2,306, females 2.1/100,000 WS N=831).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,928 female residents (averaged) in the period from 2007 to 2013 a total of 25 women were identified with newly diagnosed liver cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 2.3/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.2 and 4.1/100,000.

Standardized incidence ratio (SIR) 2007 - 2013: Males

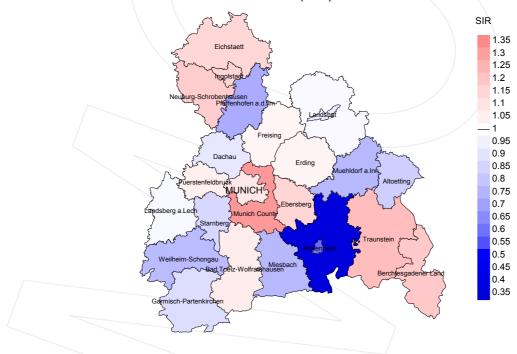## Standardized incidence ratio (SIR) 2007 - 2013: Females

Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=2,306, females N=831).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,642 female residents (averaged) in the period from 2007 to 2013 a total of 25 women were identified with newly diagnosed liver cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.15. Though, the value of this parameter may vary with an underlying probability of 99% between 0.64 and 1.88, 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	182	100.0	36.8	176	96.7	96.0
1999	211	99.1	37.9	204	96.7	97.1
2000	218	100.0	40.4	206	94.5	95.1
2001	195	98.5	35.4	189	96.9	95.8
2002	351	100.0	41.9	345	98.3	98.0
2003	333	99.7	39.9	320	96.1	97.5
2004	340	98.8	39.7	320	94.1	98.1
2005	351	99.4	35.9	337	96.0	98.2
2006	398	98.7	31.7	368	92.5	99.2
2007	452	96.7	29.4	410	90.7	97.6
2008	479	92.9	22.3	418	87.3	97.8
2009	463	92.2	24.0	396	85.5	98.5
2010	445	93.3	22.0	388	87.2	98.5
2011	441	89.3	22.4	344	78.0	98.3
2012	500	90.8	21.0	353	70.6	97.2
2013	359	98.6	28.1	228	63.5	96.5
1998-2013	5718	96.0	30.2	5002	87.5	97.7

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	182	171	97.1	112	61.5
1999	211	197	95.4	134	63.5
2000	218	192	97.4	129	59.2
2001	195	185	96.8	110	56.4
2002	351	266	98.1	222	63.2
2003	333	272	98.2	198	59.5
2004	340	257	98.1	188	55.3
2005	351	287	96.2	197	56.1
2006	398	334	98.5	233	58.5
2007	452	318	97.8	229	50.7
2008	479	352	98.9	234	48.9
2009	463	355	98.3	230	49.7
2010	445	362	98.9	211	47.4
2011	441	368	98.4	209	47.4
2012	500	383	99.0	240	48.0
2013	359	339	98.8	191	53.2
1998-2013	5718	4638	98.0	3067	53.6

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	171	83.0	17.0	95.8
1999	197	87.8	12.2	96.3
2000	192	91.7	8.3	95.2
2001	185	93.5	6.5	99.4
2002	266	92.5	7.5	98.1
2003	272	92.6	7.4	98.1
2004	257	93.4	6.6	98.0
2005	287	90.6	9.4	97.1
2006	334	94.3	5.7	98.5
2007	318	89.9	10.1	95.5
2008	352	90.6	9.4	96.0
2009	355	94.4	5.6	98.3
2010	362	89.8	10.2	93.9
2011	368	88.9	11.1	94.5
2012	383	85.9	14.1	94.7
2013	339	89.4	10.6	94.0
1998-2013	4638	90.6	9.4	96.3

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	123	68.5	68.7	66.2	69.2
1999	133	70.3	70.2	74.3	70.4
2000	130	70.9	71.3	67.3	71.3
2001	144	68.1	67.8	74.5	68.4
2002	181	68.7	68.8	68.1	68.8
2003	207	69.7	70.0	63.1	70.0
2004	187	69.8	69.7	71.6	69.8
2005	204	68.2	68.1	69.3	68.1
2006	252	69.6	69.5	71.8	70.0
2007	246	71.6	71.4	72.8	71.7
2008	262	69.4	69.4	73.6	69.4
2009	258	69.9	69.9	73.6	70.1
2010	269	72.1	72.1	71.9	72.1
2011	283	70.9	71.3	68.7	71.3
2012	288	71.8	71.9	69.6	71.8
2013	241	72.8	72.8	73.5	73.1
1998-2013	3408	70.4	70.4	70.0	70.7

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	48	75.2	73.7	79.0	75.3
1999	64	76.6	76.5	82.0	77.0
2000	62	76.7	77.0	71.8	77.0
2001	41	72.8	72.5	89.4	73.1
2002	85	75.4	75.2	76.6	75.3
2003	65	76.5	76.3	80.7	76.5
2004	70	77.2	76.3	79.7	77.0
2005	83	74.7	74.7	72.2	74.8
2006	82	76.7	76.5	80.2	76.7
2007	72	74.0	73.6	75.2	74.0
2008	90	75.2	74.8	78.1	75.5
2009	97	74.8	74.7	75.1	74.8
2010	93	76.6	76.7	74.3	76.6
2011	85	73.2	74.2	69.2	74.1
2012	95	74.7	75.1	71.9	75.6
2013	98	74.6	73.7	83.9	74.6
1998–2013	1230	75.5	75.2	76.6	75.6

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	102	9.2	0.79	5.5	0.76	8.3	0.79	11.0	0.80
1999	114	10.2	0.81	6.0	0.80	9.2	0.82	12.4	0.85
2000	120	10.5	0.77	6.0	0.74	9.3	0.76	12.3	0.81
2001	134	11.6	0.86	6.8	0.86	10.1	0.87	13.1	0.86
2002	167	9.0	0.67	5.0	0.66	7.5	0.66	9.8	0.68
2003	190	10.1	0.79	5.5	0.79	8.3	0.79	10.9	0.79
2004	173	9.2	0.69	5.0	0.68	7.6	0.69	9.7	0.69
2005	183	9.7	0.72	5.2	0.72	7.6	0.73	9.9	0.74
2006	237	12.4	0.83	6.4	0.82	9.6	0.82	12.4	0.82
2007	220	9.9	0.65	5.0	0.62	7.6	0.63	10.1	0.66
2008	239	10.7	0.68	5.6	0.66	8.3	0.68	10.8	0.71
2009	243	10.9	0.73	5.4	0.73	8.2	0.74	10.4	0.73
2010	241	10.7	0.69	5.0	0.65	7.7	0.66	10.4	0.71
2011	249	10.9	0.74	5.3	0.72	7.9	0.74	10.3	0.75
2012	247	10.8	0.69	5.0	0.64	7.5	0.66	10.1	0.69
2013	210	9.2	0.86	4.2	0.81	6.5	0.83	8.7	0.86
1998-2013	3069	10.3	0.74	5.3	0.71	8.0	0.73	10.5	0.75

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	40	3.4	0.77	1.5	0.79	2.2	0.79	3.0	0.81
1999	59	5.0	0.84	1.9	0.79	3.0	0.82	4.1	0.84
2000	56	4.7	0.90	1.7	0.83	2.8	0.86	4.0	0.91
2001	39	3.2	0.98	1.5	0.90	2.2	0.98	2.7	1.02
2002	79	4.0	0.80	1.6	0.79	2.4	0.79	3.3	0.78
2003	62	3.1	0.67	1.3	0.73	2.0	0.72	2.6	0.69
2004	67	3.4	0.75	1.2	0.63	1.9	0.69	2.6	0.73
2005	77	3.9	0.79	1.5	0.69	2.2	0.76	2.9	0.78
2006	78	3.9	0.70	1.6	0.72	2.3	0.70	3.0	0.70
2007	66	2.9	0.57	1.1	0.54	1.6	0.53	2.1	0.55
2008	80	3.4	0.63	1.3	0.54	2.0	0.59	2.6	0.61
2009	92	4.0	0.71	1.5	0.71	2.3	0.71	3.1	0.72
2010	84	3.6	0.88	1.2	0.77	1.9	0.83	2.7	0.92
2011	78	3.3	0.74	1.3	0.66	1.9	0.72	2.4	0.73
2012	82	3.5	0.57	1.3	0.51	2.0	0.53	2.6	0.54
2013	93	3.9	0.80	1.5	0.75	2.3	0.77	3.0	0.79
1998-2013	1132	3.6	0.73	1.4	0.68	2.1	0.71	2.9	0.73

Table 13

Age distribution of age at death (cancer-related) for period 1998-2013
(**incl. multiple primaries**)

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4	1	0.0	0.0			0.0	1	0.1	0.1
5-9	1	0.0	0.0	1	0.0	0.0			0.1
10-14	2	0.0	0.1	1	0.0	0.1	1	0.1	0.2
15-19	2	0.0	0.1	1	0.0	0.1	1	0.1	0.3
20-24	1	0.0	0.2	1	0.0	0.1			0.3
25-29	3	0.1	0.2	1	0.0	0.2	2	0.2	0.4
30-34	11	0.3	0.5	5	0.2	0.3	6	0.5	1.0
35-39	20	0.5	1.0	9	0.3	0.6	11	1.0	1.9
40-44	30	0.7	1.7	23	0.7	1.4	7	0.6	2.6
45-49	82	1.9	3.6	64	2.1	3.4	18	1.6	4.1
50-54	162	3.8	7.5	132	4.3	7.7	30	2.6	6.8
55-59	316	7.5	15.0	257	8.4	16.1	59	5.2	12.0
60-64	539	12.8	27.8	429	14.0	30.1	110	9.7	21.7
65-69	691	16.4	44.2	550	17.9	48.0	141	12.4	34.1
70-74	770	18.3	62.5	600	19.5	67.5	170	15.0	49.1
75-79	709	16.8	79.4	518	16.9	84.3	191	16.8	66.0
80-84	502	11.9	91.3	307	10.0	94.3	195	17.2	83.2
85+	366	8.7	100.0	175	5.7	100.0	191	16.8	100.0
All ages	4208	100.0		3074	100.0		1134	100.0	

Included in the statistics are 24.0% multiple primaries in males and 20.9% in females.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2013
(**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	0.0		0.1	0.10		3.8
5- 9	1		0.1	0.50	0.0		2.6	
10-14	1	1	0.1	1.00	0.1	1.00	2.9	3.2
15-19	1	1	0.1	0.50	0.1	0.50	2.2	2.7
20-24	1		0.1	0.50	0.0		1.1	
25-29	1	2	0.0	0.25	0.1	0.67	0.9	1.7
30-34	5	6	0.2	0.63	0.3	0.75	2.7	2.6
35-39	9	11	0.4	0.60	0.5	0.92	2.3	2.1
40-44	23	7	0.9	0.74	0.3	0.47	2.7	0.6
45-49	64	18	2.7	0.62	0.8	0.60	3.5	0.9
50-54	132	30	6.5	0.63	1.5	0.56	4.0	1.0
55-59	257	59	14.0	0.63	3.1	0.68	4.3	1.2
60-64	429	110	24.2	0.73	5.9	0.77	4.8	1.7
65-69	550	141	34.8	0.70	8.2	0.68	4.6	1.7
70-74	600	170	46.8	0.75	11.2	0.72	4.4	1.7
75-79	518	191	62.7	0.84	16.1	0.78	3.9	1.8
80-84	307	195	61.4	0.81	20.9	0.80	2.8	1.7
85+	175	191	51.3	0.85	21.4	0.78	2.0	1.4
All ages	3074	1134					3.8	1.6
Mortality								
Raw			10.3	0.74	3.7	0.73		
WS			5.3	0.72	1.4	0.68		
ES			8.0	0.73	2.1	0.71		
BRD-S			10.5	0.75	2.9	0.73		
PYLL-70								
per 100,000			48.3		14.6			
ES			42.5		12.7			
AYLL-70			8.8		10.0			

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

Table 15a

Multiple primaries in deaths in period 1998-2013
MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	20	2.8	16	80.0	2	10.0	2	10.0
C09-C10 Oropharynx	17	2.4	15	88.2	2	11.8		
C12-C13 Hypopharynx	10	1.4	8	80.0	2	20.0		
C15 Oesophagus	17	2.4	8	47.1	7	41.2	2	11.8
C16 Stomach	21	3.0	12	57.1	7	33.3	2	9.5
C18 Colon	89	12.5	61	68.5	23	25.8	5	5.6
C19-C20 Rectum	41	5.8	31	75.6	6	14.6	4	9.8
C25 Pancreas	8	1.1	1	12.5	5	62.5	2	25.0
C32 Larynx	18	2.5	16	88.9	2	11.1		
C33-C34 Lung	56	7.9	18	32.1	17	30.4	21	37.5
C43 Malign. melanoma	23	3.2	20	87.0			3	13.0
C44 Skin others	42	5.9	30	71.4			12	28.6
C61 Prostate	139	19.6	116	83.5	8	5.8	15	10.8
C62 Testis	8	1.1	8	100.0				
C64 Kidney	41	5.8	26	63.4	9	22.0	6	14.6
C67 Bladder	59	8.3	43	72.9	4	6.8	12	20.3
C70-C72 CNS cancer	9	1.3	8	88.9			1	11.1
C76-C79 CUP	9	1.3	6	66.7	1	11.1	2	22.2
C82-C85 NHL	23	3.2	15	65.2	5	21.7	3	13.0
C90 Mult. myeloma	12	1.7	5	41.7	3	25.0	4	33.3
C91-C96 Leukaemia	8	1.1	2	25.0	1	12.5	5	62.5
Other primaries	40	5.6	23	57.5	11	27.5	6	15.0
All mult. primaries	710	100.0	488	68.7	115	16.2	107	15.1

Multiple primaries with number of cases 1 to 5 are pooled in category "Other primaries".

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

Table 15b

Multiple primaries in deaths in period 1998-2013
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C03-C06	Oral cavity	6	2.6	5	83.3	1	16.7		
C16	Stomach	8	3.5	4	50.0	2	25.0	2	25.0
C18	Colon	26	11.3	16	61.5	7	26.9	3	11.5
C19-C20	Rectum	6	2.6	5	83.3	1	16.7		
C23-C24	Bile	3	1.3	1	33.3	1	33.3	1	33.3
C33-C34	Lung	6	2.6	4	66.7			2	33.3
C43	Malign. melanoma	4	1.7	4	100.0				
C44	Skin others	11	4.8	4	36.4	1	9.1	6	54.5
C50	Breast	62	26.8	55	88.7	4	6.5	3	4.8
C51	Vulva	5	2.2	4	80.0			1	20.0
C53	Cervix uteri	5	2.2	5	100.0				
C54	Corpus uteri	14	6.1	12	85.7	1	7.1	1	7.1
C56	Ovary	8	3.5	7	87.5			1	12.5
C64	Kidney	9	3.9	4	44.4	2	22.2	3	33.3
C67	Bladder	8	3.5	6	75.0	2	25.0		
C69	Eye melanoma	3	1.3	3	100.0				
C70-C72	CNS cancer	4	1.7	2	50.0			2	50.0
C73	Thyroid	7	3.0	5	71.4	1	14.3	1	14.3
C76-C79	CUP	5	2.2	1	20.0	3	60.0	1	20.0
C82-C85	NHL	10	4.3	8	80.0	2	20.0		
C90	Mult. myeloma	3	1.3	2	66.7	1	33.3		
Other primaries		18	7.8	11	61.1	4	22.2	3	16.7
All mult. primaries		231	100.0	168	72.7	33	14.3	30	13.0

Multiple primaries with number of cases 1 to 2 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 1998-2013
(**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		1	0.0		0.1	0.10		4.2
5- 9	1		0.1	0.50	0.0		2.8	
10-14	1	1	0.1	1.00	0.1	1.00	2.9	3.4
15-19	1	1	0.1	0.50	0.1	0.50	2.4	3.0
20-24	1		0.1	0.50	0.0		1.2	
25-29	1	2	0.0	0.25	0.1	0.67	1.0	1.8
30-34	5	3	0.2	0.63	0.1	0.60	2.8	1.5
35-39	9	11	0.4	0.60	0.5	0.92	2.4	2.4
40-44	22	7	0.8	0.71	0.3	0.50	2.8	0.7
45-49	58	17	2.5	0.60	0.7	0.63	3.5	1.0
50-54	119	25	5.9	0.63	1.2	0.51	4.1	1.0
55-59	232	52	12.6	0.63	2.7	0.67	4.5	1.3
60-64	382	97	21.6	0.73	5.2	0.78	5.1	1.8
65-69	474	124	30.0	0.70	7.2	0.72	4.9	1.8
70-74	499	145	39.0	0.77	9.6	0.74	4.7	1.9
75-79	399	150	48.3	0.87	12.6	0.77	4.0	1.8
80-84	237	163	47.4	0.82	17.5	0.80	2.9	1.8
85+	138	157	40.5	0.84	17.6	0.77	2.1	1.4
All ages	2579	956					4.0	1.6
Mortality								
Raw			8.7	0.74	3.1	0.73		
WS			4.5	0.72	1.2	0.68		
ES			6.8	0.73	1.8	0.70		
BRD-S			8.7	0.75	2.4	0.73		
PYLL-70								
per 100,000			43.6		12.9			
ES			38.5		11.3			
AYLL-70			8.9		10.1			

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2013
(**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		1	0.0		0.1	0.10		4.2
5- 9	1		0.1	0.50	0.0		2.9	
10-14	1	1	0.1	1.00	0.1	1.00	2.9	3.7
15-19	1	1	0.1	0.50	0.1	0.50	2.4	3.6
20-24	1		0.1	0.50	0.0		1.3	
25-29	1	2	0.0	0.25	0.1	0.67	1.1	1.9
30-34	5	3	0.2	0.63	0.1	0.60	2.9	1.6
35-39	9	11	0.4	0.64	0.5	0.92	2.5	2.6
40-44	22	7	0.8	0.71	0.3	0.54	2.9	0.8
45-49	57	16	2.4	0.60	0.7	0.59	3.7	1.0
50-54	119	25	5.9	0.65	1.2	0.54	4.6	1.1
55-59	227	49	12.4	0.64	2.5	0.66	4.9	1.4
60-64	369	95	20.8	0.73	5.1	0.79	5.6	2.0
65-69	462	123	29.3	0.71	7.1	0.72	5.5	2.2
70-74	481	141	37.6	0.76	9.3	0.73	5.4	2.1
75-79	386	146	46.7	0.87	12.3	0.77	4.8	2.0
80-84	225	159	45.0	0.82	17.0	0.81	3.5	2.1
85+	132	153	38.7	0.83	17.1	0.77	2.4	1.6
All ages	2499	933					4.6	1.9
Mortality								
Raw			8.4	0.74	3.0	0.74		
WS			4.4	0.72	1.2	0.68		
ES			6.6	0.73	1.8	0.71		
BRD-S			8.5	0.75	2.4	0.73		
PYLL-70								
per 100,000			42.8		12.6			
ES			37.8		11.0			
AYLL-70			9.0		10.0			

* See corresponding tables with multiple primaries.

C22: Malignant neoplasm of liver and intrahepatic bile ducts
Age distribution and age-specific mortality 1998 - 2013 (Males: 3069, Females: 1132)
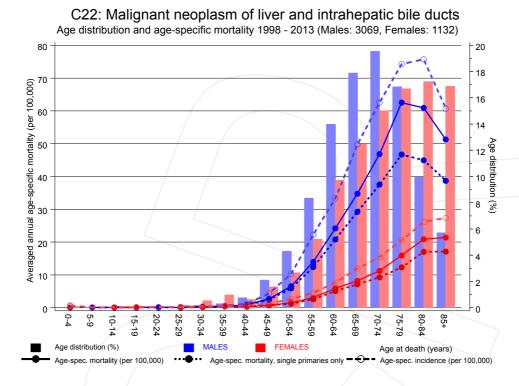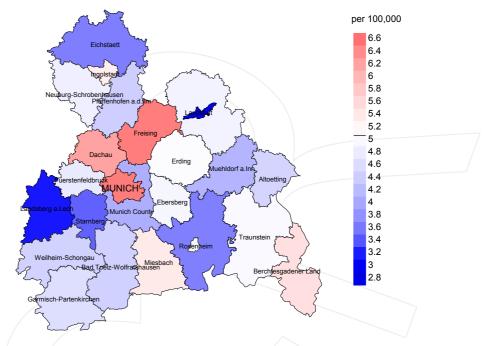
Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

Average mortality (world standard population) 2007 - 2013: Males

Average mortality (world standard population) 2007 - 2013: Females
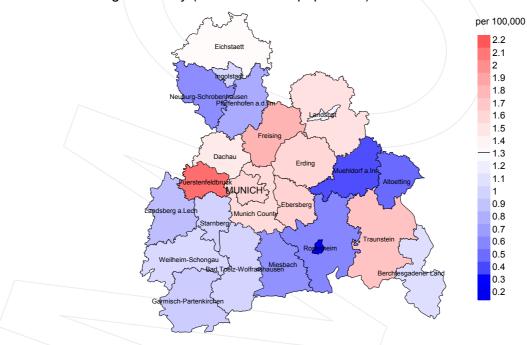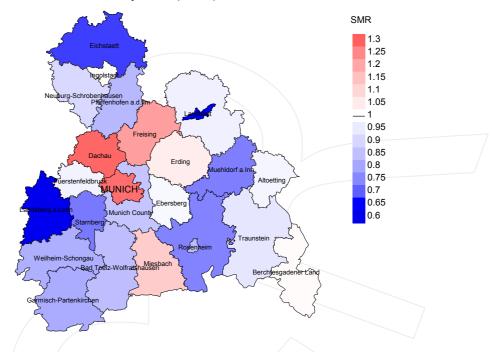
Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2013. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 5.1/100,000 WS N=1,641, females 1.3/100,000 WS N=573).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,928 female residents (averaged) in the period from 2007 to 2013 a total of 20 women died from liver cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 1.6/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.7 and 3.2/100,000.

Standardized mortality ratio (SMR) 2007 - 2013: Males

Standardized mortality ratio (SMR) 2007 - 2013: Females
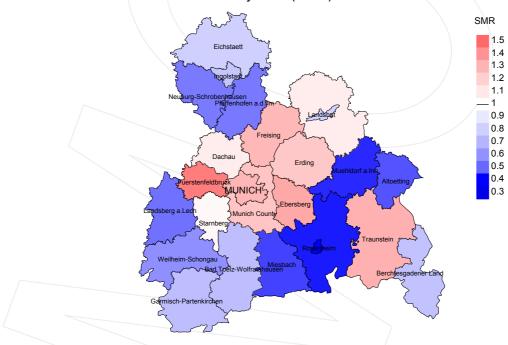
Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=1,641, females N=573).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,642 female residents (averaged) in the period from 2007 to 2013 a total of 20 women died from liver cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.34. Though, the value of this parameter may vary with an underlying probability of 99% between 0.69 and 2.32, 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 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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