Munich Cancer Registry

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ICD-10 C22: Liver cancer

Incidence and Mortality

Year of diagnosis	1998-2016
Patients	7,316
Diseases	7,324
Creation date	08/21/2018
Export date	08/09/2018
Population	4.81 m

Munich Cancer Registry
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https://www.tumorregister-muenchen.de/en

https://www.tumorregister-muenchen.de/en/facts/base/bC22__E-ICD-10-C22-Liver-cancer-incidence-and-mortality.pdf

Index of figures and tables

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 4.69 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, August 2018

[#] 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 2.65 million to 4.10 in 2002, and to 4.69 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
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

Cases with invasive cancer by year of diagnosis, proportions of DCO, further malignancies, deaths, and active follow-up (ALL PATIENTS) (incl. DCO)

Year of diagnosis	All cases n	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	192	70	36.5	9.4	3.6	97.4	100.0
1999	215	84	39.1	8.4	3.6	97.2	99.1
2000	224	94	42.0	8.1	3.6	95.1	100.0
2001	195	70	35.9	8.8	3.6	97.9	99.0
2002	351	147	41.9	9.9	3.7	98.3	100.0 #
2003	332	133	40.1	10.7	3.7	96.4	99.4
2004	340	135	39.7	11.5	3.7	95.0	98.8
2005	352	126	35.8	12.3	3.6	96.0	99.1
2006	398	126	31.7	13.0	3.7	94.7	98.7
2007	455	133	29.2	13.2	3.7	93.0	96.5 #
2008	481	107	22.2	13.6	3.7	90.2	94.2
2009	467	110	23.6	14.1	3.5	89.3	93.4
2010	448	98	21.9	14.6	3.2	91.5	95.5
2011	450	99	22.0	15.0	3.2	86.7	94.0
2012	515	106	20.6	15.3	3.1	86.2	93.8
2013	506	99	19.6	15.5	2.7	83.0	93.3
2014	497	105	21.1	15.8	2.5	78.5	93.8
2015	502	113	22.5	16.0	2.1	70.3	98.2
2016	404	104	25.7	16.2	1.5	54.7	81.9 ##
1998-2016	7324	2059	28.1	16.2	3.6	87.5	95.6

7,324 cases diagnosed 1998-2016 are related to a total of 7,316 patients. Currently, in 1,471 (20.1 %) of these 7,316 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 1,213 / 193 / 65 (16.6 % / 2.6 % / 0.9 %) patients exist having 2 / 3 / 4+ malignancies.

\# 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 retreived from the respective headings.

How to interpret:
In 2014, a subgroup of 497 cases has been diagnosed, of which 15.8 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 2.5 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 1a

Cases with invasive cancer by year of diagnosis, proportions of DCO, further malignancies, deaths, and active follow-up (MALES) (incl. DCO)

Year of diagnosis	Males n	Males %	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	135	70.3	52	38.5	10.4	4.0	98.5	100.0
1999	144	67.0	58	40.3	9.0	4.0	97.9	98.6
2000	160	71.4	58	36.3	8.7	4.0	95.6	100.0
2001	155	79.5	53	34.2	8.9	4.0	98.1	99.4
2002	252	71.8	98	38.9	9.8	4.1	98.0	100.0 #
2003	240	72.3	92	38.3	10.7	4.0	96.3	99.2
2004	251	73.8	90	35.9	11.6	4.1	94.8	98.4
2005	254	72.2	80	31.5	12.4	4.0	96.5	99.6
2006	287	72.1	83	28.9	12.9	4.1	95.8	99.0
2007	339	74.5	101	29.8	13.1	4.1	92.9	96.5 #
2008	355	73.8	72	20.3	13.3	4.1	90.7	94.4
2009	338	72.4	66	19.5	13.7	3.9	89.3	93.8
2010	352	78.6	70	19.9	14.5	3.7	91.2	95.7
2011	341	75.8	70	20.5	15.0	3.7	86.2	93.8
2012	365	70.9	68	18.6	15.5	3.7	87.7	95.3
2013	350	69.2	58	16.6	15.5	3.2	80.9	92.9
2014	361	72.6	66	18.3	15.9	2.9	77.6	93.9
2015	357	71.1	69	19.3	16.2	2.2	68.9	98.3
2016	300	74.3	74	24.7	16.5	1.7	54.7	81.3 ##
1998-2016	5336	72.9	1378	25.8	16.5	4.0	87.4	95.7

5,336 cases diagnosed 1998-2016 are related to a total of 5,330 patients. Currently, in 1,097 (20.6 %) of these 5,330 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 891 / 151 / 55 (16.7 % / 2.8 % / 1.0 %) patients exist having 2 / 3 / 4+ malignancies.

\# 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 retreived from the respective headings.

How to interpret:
In 2014, a subgroup of 361 cases has been diagnosed, of which 15.9 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 2.9 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 1b

Cases with invasive cancer by year of diagnosis, proportions of DCO, further malignancies, deaths, and active follow-up (FEMALES)
(incl. DCO)

Year of diagnosis	Females n	Females %	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %	
1998	57	29.7	18	31.6	7.0	2.6	94.7	100.0	
1999	71	33.0	26	36.6	7.0	2.5	95.8	100.0	
2000	64	28.6	36	56.3	6.8	2.5	93.8	100.0	
2001	40	20.5	17	42.5	8.6	2.5	97.5	97.5	
2002	99	28.2	49	49.5	10.3	2.5	99.0	100.0	#
2003	92	27.7	41	44.6	10.6	2.7	96.7	100.0	
2004	89	26.2	45	50.6	11.1	2.6	95.5	100.0	
2005	98	27.8	46	46.9	12.1	2.5	94.9	98.0	
2006	111	27.9	43	38.7	13.0	2.6	91.9	98.2	
2007	116	25.5	32	27.6	13.6	2.6	93.1	96.6	#
2008	126	26.2	35	27.8	14.4	2.6	88.9	93.7	
2009	129	27.6	44	34.1	14.9	2.4	89.1	92.2	
2010	96	21.4	28	29.2	15.1	1.8	92.7	94.8	
2011	109	24.2	29	26.6	15.0	1.8	88.1	94.5	
2012	150	29.1	38	25.3	14.9	1.5	82.7	90.0	
2013	156	30.8	41	26.3	15.3	1.5	87.8	94.2	
2014	136	27.4	39	28.7	15.6	1.6	80.9	93.4	
2015	145	28.9	44	30.3	15.4	2.0	73.8	97.9	
2016	104	25.7	30	28.8	15.5	1.0	54.8	83.7	##
1998-2016	1988	27.1	681	34.3	15.5	2.6	87.7	95.4	

1,988 cases diagnosed 1998-2016 are related to a total of 1,986 patients. Currently, in 374 (18.8 %) of these 1,986 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 322 / 42 / 10 (16.2 % / 2.1 % / 0.5 %) patients exist having 2 / 3 / 4+ malignancies.

\# 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 retreived from the respective headings.

How to interpret:
In 2014, a subgroup of 136 cases has been diagnosed, of which 15.6 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 1.6 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 2

Incidence measures by year of diagnosis including DCO cases
(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,
and from 4.10 to 4.81 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	135	57	12.2	4.8	7.6	2.0	11.1	3.1	14.2	4.1
1999	144	71	12.9	6.0	7.6	2.4	11.4	3.7	15.0	4.9
2000	160	64	14.0	5.3	8.4	2.1	12.5	3.3	15.7	4.6
2001	155	40	13.4	3.3	7.9	1.5	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	240	92	12.8	4.7	6.9	1.8	10.4	2.8	13.8	3.8
2004	251	89	13.3	4.5	7.3	1.9	11.0	2.7	14.2	3.6
2005	254	98	13.4	4.9	7.2	2.2	10.6	3.0	13.5	3.7
2006	287	111	15.0	5.5	7.9	2.2	11.8	3.3	15.1	4.2
2007	339	116	15.3	5.0	8.2	2.1	12.1	3.1	15.4	3.9
2008	355	126	16.0	5.4	8.5	2.4	12.3	3.4	15.5	4.4
2009	338	129	15.1	5.5	7.7	2.1	11.3	3.2	14.4	4.3
2010	352	96	15.6	4.1	7.8	1.5	11.6	2.2	14.8	2.9
2011	341	109	15.2	4.7	7.6	2.0	11.0	2.8	14.1	3.5
2012	365	150	16.1	6.4	7.9	2.7	11.6	3.9	14.8	5.0
2013	350	156	15.2	6.5	7.6	2.8	11.1	4.0	13.9	5.2
2014	361	136	15.5	5.6	7.6	2.4	11.1	3.4	14.1	4.2
2015	357	145	15.0	6.0	7.2	2.3	10.7	3.4	13.7	4.4
2016	300	104	12.5	4.2	5.8	1.7	8.6	2.5	11.3	3.2
1998-2016	5336	1988	14.5	5.2	7.5	2.1	11.1	3.1	14.2	4.1

The computation of the incidence measures includes all cancers, 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	192	68.2	12.2	16.5	92.2	53.6	60.7	68.5	76.7	83.6
1999	215	70.0	11.7	10.8	95.7	57.5	62.5	70.2	78.2	84.0
2000	224	70.4	11.8	25.1	94.3	57.2	63.7	70.0	78.5	86.1
2001	195	68.1	12.6	28.2	98.8	52.2	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	332	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	352	69.3	13.0	1.0	100	57.0	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	455	69.3	12.1	0.3	96.7	54.7	62.1	70.5	77.8	84.1
2008	481	68.5	12.5	1.1	97.9	54.5	62.2	69.4	76.8	83.0
2009	467	70.5	11.5	1.4	95.8	57.2	65.1	71.0	77.7	84.1
2010	448	70.7	11.3	0.8	98.5	56.8	63.8	71.2	78.2	85.1
2011	450	69.7	12.9	0.7	98.3	54.7	63.8	71.0	77.7	83.3
2012	515	69.7	12.0	1.5	97.8	54.9	64.0	71.7	77.5	82.4
2013	506	69.7	12.0	0.6	96.7	55.8	63.1	70.9	77.7	83.4
2014	497	70.3	11.2	0.5	98.1	56.3	63.6	71.4	77.4	84.2
2015	502	70.9	11.2	22.1	99.2	56.6	63.4	72.5	78.2	84.3
2016	404	71.3	12.0	3.0	101	56.8	65.1	73.1	79.0	84.3
1998-2016	7324	69.9	11.9	0.3	101	55.8	63.1	70.8	77.9	83.7

Table 3a

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	135	67.0	11.6	16.5	89.1	55.0	60.3	66.3	74.7	82.6
1999	144	68.1	11.2	10.8	95.7	56.4	61.8	69.0	75.8	79.8
2000	160	69.3	12.1	25.1	94.3	55.5	62.9	68.5	76.2	87.7
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	240	68.8	11.2	25.1	92.4	56.1	62.5	68.6	76.9	82.1
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	339	68.5	11.4	0.3	96.7	56.0	61.5	69.8	76.0	81.1
2008	355	67.8	11.1	6.5	97.9	54.5	61.5	68.8	74.6	80.8
2009	338	69.5	11.5	1.4	94.7	56.6	63.9	70.4	76.6	83.4
2010	352	69.5	10.9	0.8	94.9	56.2	62.4	70.7	76.6	82.6
2011	341	69.1	11.1	0.8	92.3	55.4	63.5	70.4	76.3	81.2
2012	365	69.2	11.0	1.5	91.3	54.9	63.5	71.0	76.6	81.5
2013	350	69.2	11.4	0.6	96.7	55.9	62.5	69.7	76.9	82.3
2014	361	69.8	10.4	18.4	95.6	56.3	62.9	70.8	76.9	82.0
2015	357	70.0	10.2	28.1	99.2	56.9	63.4	72.0	76.6	82.6
2016	300	71.0	11.6	10.0	91.6	57.0	65.1	73.1	78.8	83.4
1998-2016	5336	69.0	11.0	0.3	99.2	55.8	62.4	69.9	76.4	82.0

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	57	71.1	13.1	34.6	92.2	51.1	62.2	74.9	78.8	87.3
1999	71	73.8	11.8	35.7	94.0	59.5	64.4	75.7	83.3	88.1
2000	64	73.1	10.7	33.9	93.4	60.8	65.7	75.3	80.4	84.5
2001	40	71.2	15.5	28.2	98.8	53.4	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	98	72.2	18.7	1.0	100	55.2	65.4	75.4	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	116	71.7	13.6	25.9	94.8	53.8	64.5	73.1	82.6	87.1
2008	126	70.6	15.6	1.1	96.7	52.5	64.0	73.5	81.4	86.0
2009	129	73.1	11.1	39.7	95.8	58.4	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	109	71.5	17.3	0.7	98.3	47.8	66.4	75.4	82.1	88.0
2012	150	70.7	14.0	1.5	97.8	54.4	65.3	73.8	79.4	85.8
2013	156	70.8	13.2	2.7	95.4	54.5	63.8	72.3	79.9	85.1
2014	136	71.8	13.0	0.5	98.1	57.0	65.8	72.8	78.8	87.1
2015	145	73.1	13.2	22.1	95.6	55.2	63.6	75.2	83.3	89.3
2016	104	71.9	13.2	3.0	101	55.4	64.9	73.2	80.3	86.4
1998-2016	1988	72.2	13.8	0.5	101	55.9	65.3	74.1	81.6	87.3

Table 4

Age distribution by 5-year age group and sex for period 2007-2016
(incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4	17	0.4	0.4	9	0.3	0.3	8	0.6	0.6
5-9	4	0.1	0.4	4	0.1	0.4			0.6
10-14	0	0.0	0.4			0.4			0.6
15-19	6	0.1	0.6	4	0.1	0.5	2	0.2	0.8
20-24	5	0.1	0.7	2	0.1	0.5	3	0.2	1.0
25-29	6	0.1	0.8	4	0.1	0.7	2	0.2	1.2
30-34	13	0.3	1.1	8	0.2	0.9	5	0.4	1.6
35-39	21	0.4	1.5	10	0.3	1.2	11	0.9	2.4
40-44	32	0.7	2.2	20	0.6	1.8	12	0.9	3.4
45-49	94	2.0	4.2	65	1.9	3.6	29	2.3	5.7
50-54	228	4.8	9.0	177	5.1	8.8	51	4.0	9.7
55-59	385	8.1	17.2	306	8.8	17.6	79	6.2	15.9
60-64	554	11.7	28.9	451	13.0	30.7	103	8.1	24.1
65-69	760	16.1	45.0	592	17.1	47.8	168	13.3	37.3
70-74	968	20.5	65.5	740	21.4	69.2	228	18.0	55.3
75-79	752	15.9	81.4	553	16.0	85.2	199	15.7	71.0
80-84	518	11.0	92.3	347	10.0	95.2	171	13.5	84.5
85+	362	7.7	100.0	166	4.8	100.0	196	15.5	100.0
All ages	4725	100.0		3458	100.0		1267	100.0	

Table 5

Age-specific incidence, DCO rate and proportion of all cancers
for period 2007-2016

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=713 %	Females DCO rate n=360 %	Males Prop.all cancers n=113978 %	Females Prop.all cancers n=112253 %
0- 4	9	8	0.8	0.8		12.5	4.6	5.4
5- 9	4		0.4				3.8	
10-14								
15-19	4	2	0.3	0.2			1.6	1.0
20-24	2	3	0.1	0.2			0.4	0.8
25-29	4	2	0.3	0.1			0.6	0.2
30-34	8	5	0.5	0.3	12.5	20.0	0.8	0.3
35-39	10	11	0.6	0.7	20.0		0.7	0.4
40-44	20	12	1.1	0.7	5.0	8.3	0.9	0.3
45-49	65	29	3.3	1.5	10.8	10.3	1.7	0.4
50-54	177	51	10.2	3.0	17.5	7.8	2.9	0.6
55-59	306	79	21.6	5.4	11.1	10.1	3.3	0.8
60-64	451	103	36.8	7.7	14.9	16.5	3.4	0.9
65-69	592	168	50.0	12.9	19.4	14.9	3.2	1.2
70-74	740	228	66.9	18.0	17.0	21.1	3.5	1.5
75-79	553	198	69.4	19.8	20.8	23.2	3.3	1.5
80-84	346	171	75.2	24.2	34.1	38.0	3.1	1.6
85+	166	196	54.2	26.7	57.8	71.9	2.1	1.5
All ages	3457	1266			20.6	28.4	3.0	1.1
Incidence								
Raw			15.1	5.3				
WS			7.6	2.2				
ES			11.1	3.2				
BRD-S			14.1	4.1				

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).

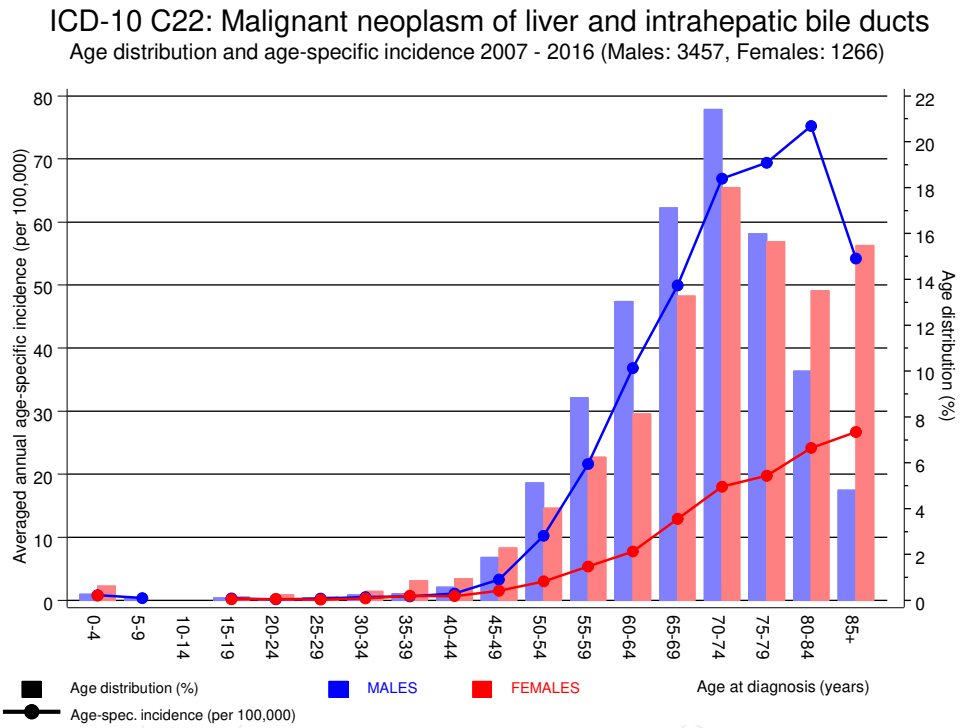


Figure 6. Age distribution (males: mean=69.3 yrs, median=70.5 yrs; females: mean=71.9 yrs, median=73.6 yrs) and age-specific incidence.

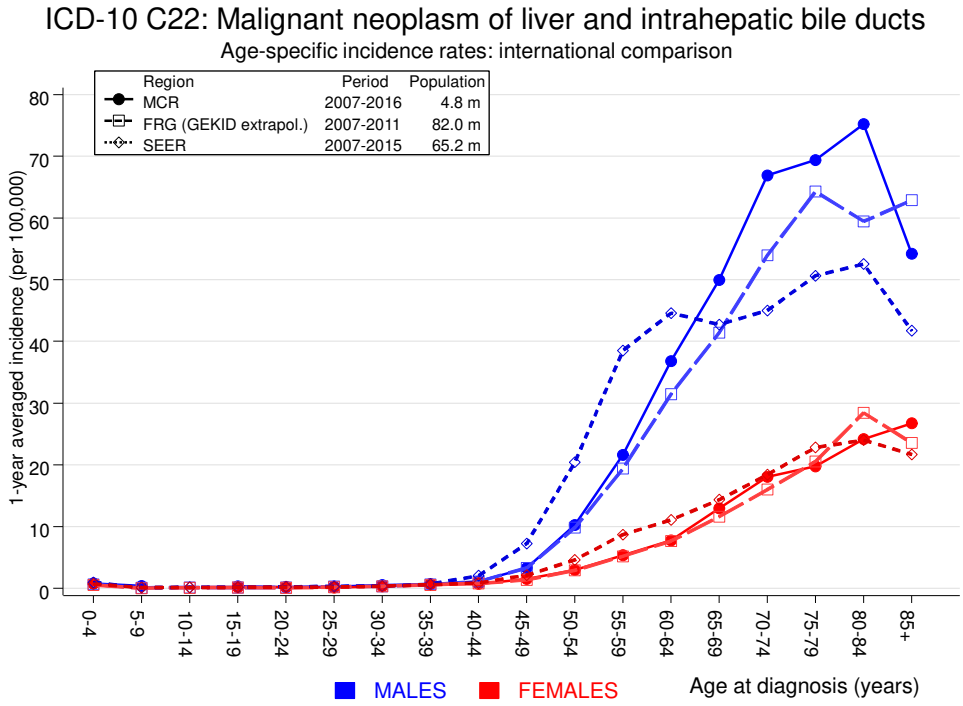


Figure 6a. Age-specific incidence in MCR registry areas compared to Germany (FRG, GEKID extrapolation) and SEER (Surveillance, Epidemiology, and End Results, USA).

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.

Table 7a

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of further malignancies for period 1998–2016

MALES

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C03–C06	Oral cavity	7	0.8	9.0	3.6	18.5	#	11.1	
C12–C13	Hypopharynx	2	0.5	3.8	0.5	13.6		2.6	
C15	Oesophagus	11	1.8	6.0	3.0	10.8	#	16.4	9.1
C16	Stomach	9	3.7	2.4	1.1	4.6	#	9.5	
C17	Small intestine	2	0.5	3.8	0.5	13.8		2.6	
C18	Colon	26	9.0	2.9	1.9	4.2	#	30.4	15.4
C19–C20	Rectum	7	5.1	1.4	0.6	2.8		3.4	57.1
C22	Liver	6	2.8	2.1	0.8	4.7		5.7	66.7
C23–C24	Bile	5	0.9	5.3	1.7	12.4	#	7.2	20.0
C25	Pancreas	14	3.6	3.9	2.1	6.6	#	18.6	14.3
C33–C34	Lung	41	11.4	3.6	2.6	4.9	#	52.8	29.3
C43	Malign. melanoma	6	4.2	1.4	0.5	3.1		3.3	
C50	Breast	2	0.2	8.1	1.0	29.2		3.1	50.0
C61	Prostate	35	27.4	1.3	0.9	1.8		13.6	25.7
C64	Kidney	19	3.3	5.7	3.4	8.9	#	28.0	10.5
C67	Bladder	14	4.1	3.4	1.8	5.7	#	17.6	7.1
C73	Thyroid	3	0.6	4.9	1.0	14.3	#	4.3	33.3
C76–C79	CUP	4	1.6	2.6	0.7	6.6		4.4	
C82–C85	NHL	15	3.8	4.0	2.2	6.5	#	20.0	20.0
C90	Mult. myeloma	3	1.2	2.5	0.5	7.2		3.2	66.7
C91–C96	Leukaemia	6	1.5	4.0	1.5	8.6	#	8.0	33.3
Others, specified		8	3.2	2.5	1.1	4.9	#	8.5	12.5
Not observed		0	4.0	0.0	0.0	0.9	#	-7.1	
All further malignancies		245	95.3	2.6	2.3	2.9	#	267.2	20.4

Patients	4057
Median age at next malignancy (years)	71.8
Person-years	5604
Mean observation time (years)	1.4
Median observation time (years)	0.6

The occurrence of further malignancy listed is statistically significant.

Observed further malignancies with count 1 are pooled in category “Others, specified”.

Table 7b

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of further malignancies for period 1998–2016

FEMALES

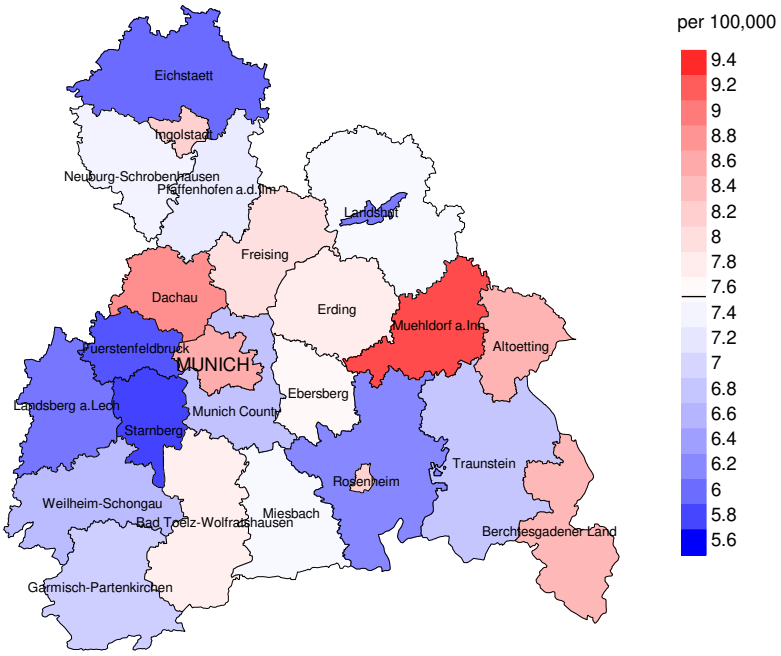
Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C09–C10	Oropharynx	2	0.1	24.9	3.0	90.1	#	10.7	
C16	Stomach	5	0.7	7.3	2.4	17.0	#	24.0	20.0
C18	Colon	15	1.9	7.7	4.3	12.7	#	72.6	26.7
C22	Liver	2	0.3	7.7	0.9	27.9		9.7	
C23–C24	Bile	2	0.3	7.0	0.8	25.2		9.5	
C33–C34	Lung	7	1.6	4.5	1.8	9.3	#	30.3	28.6
C50	Breast	12	6.1	2.0	1.0	3.4	#	32.8	16.7
C54	Corpus uteri	2	1.2	1.7	0.2	6.3		4.7	
C64	Kidney	5	0.5	9.8	3.2	22.9	#	25.0	60.0
C70–C72	CNS cancer	2	0.3	7.3	0.9	26.4		9.6	50.0
C73	Thyroid	2	0.3	6.1	0.7	22.0		9.3	50.0
C82–C85	NHL	2	0.8	2.6	0.3	9.2		6.8	
Others, specified		11	3.4	3.3	1.6	5.8	#	42.4	9.1
Not observed		0	3.0	0.0	0.0	1.2		−16.6	
All further malignancies		69	20.3	3.4	2.6	4.3	#	270.6	21.7

Patients	1401
Median age at next malignancy (years)	74.9
Person-years	1799
Mean observation time (years)	1.3
Median observation time (years)	0.5

The occurrence of further malignancy listed is statistically significant.

Observed further malignancies with count 1 are pooled in category “Others, specified”.

Average incidence (world standard population) 2007 - 2016: Males



Average incidence (world standard population) 2007 - 2016: Females

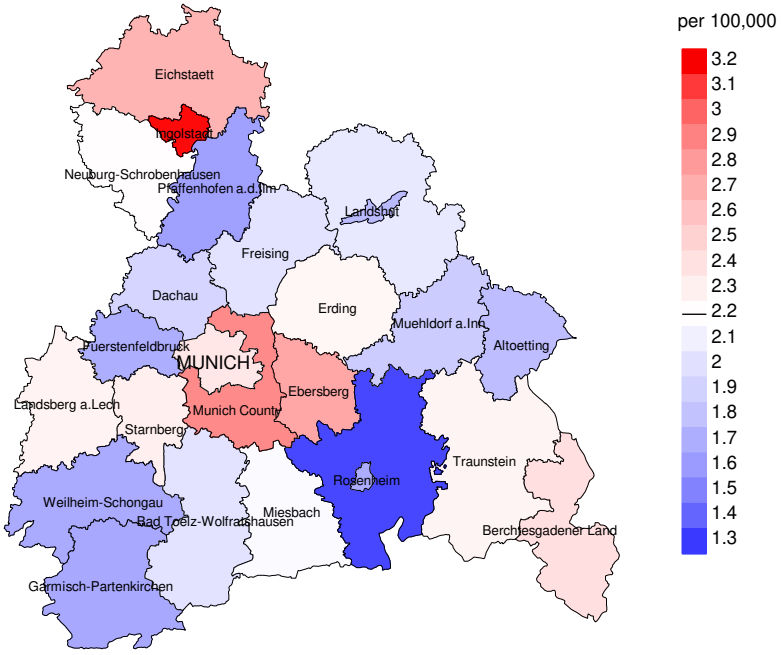
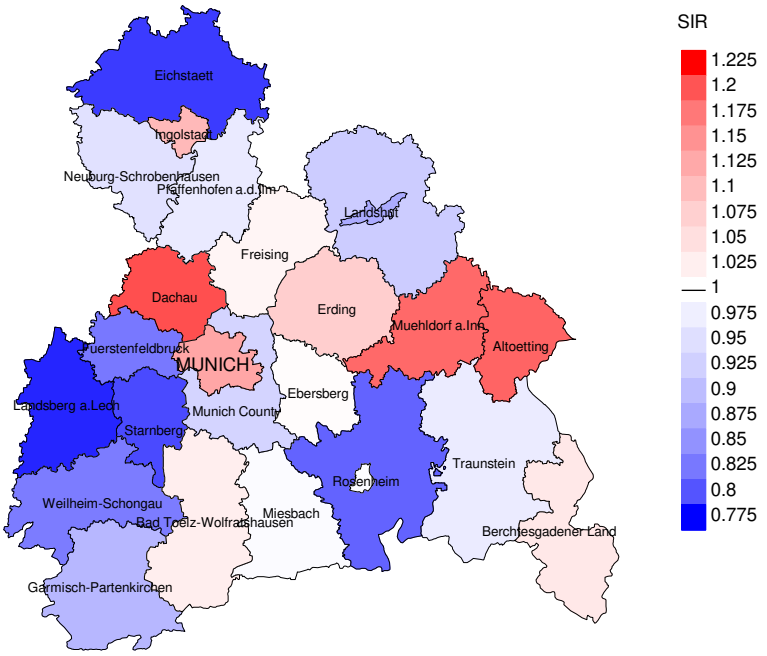


Figure 8a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 7.6/100,000 WS N=3,457, females 2.2/100,000 WS N=1,266).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 42 women were identified with newly diagnosed liver cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 2.7/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.7 and 4.3/100,000.

Standardized incidence ratio (SIR) 2007 - 2016: Males



Standardized incidence ratio (SIR) 2007 - 2016: Females

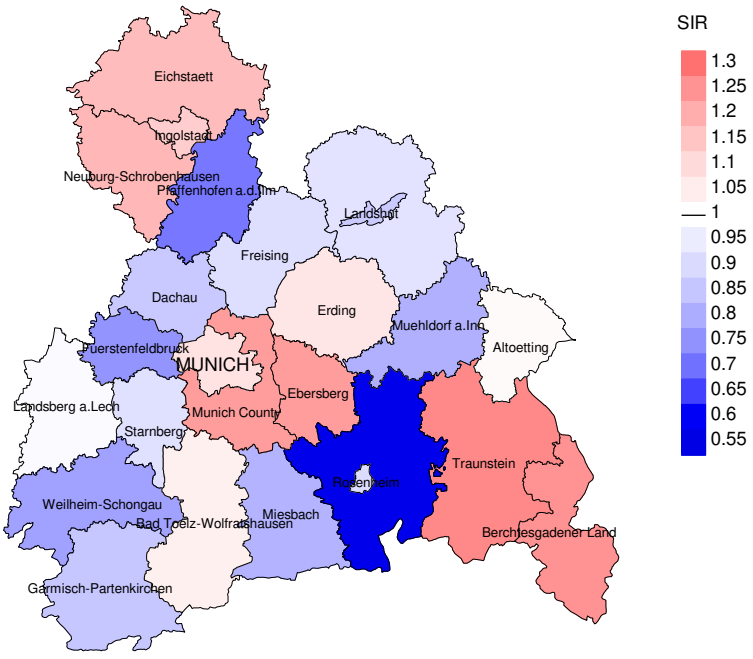


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=3,457, females N=1,266).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 42 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 1.23. Though, the value of this parameter may vary with an underlying probability of 99% between 0.80 and 1.81, and is therefore not statistically striking.

MORTALITY

Table 9a

Annual cohorts: Incident cancers, follow-up status,
proportion of DCO, deaths among the annual cohorts
and proportion of available death certificates
(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,
and from 4.10 to 4.81 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	192	100.0	36.5	187	97.4	96.3
1999	215	99.1	39.1	209	97.2	97.1
2000	224	100.0	42.0	213	95.1	95.8
2001	195	99.0	35.9	191	97.9	95.8
2002	351	100.0	41.9	345	98.3	98.0
2003	332	99.4	40.1	320	96.4	97.5
2004	340	98.8	39.7	323	95.0	98.1
2005	352	99.1	35.8	338	96.0	98.2
2006	398	98.7	31.7	377	94.7	99.2
2007	455	96.5	29.2	423	93.0	97.6
2008	481	94.2	22.2	434	90.2	98.8
2009	467	93.4	23.6	417	89.3	99.0
2010	448	95.5	21.9	410	91.5	99.0
2011	450	94.0	22.0	390	86.7	98.7
2012	515	93.8	20.6	444	86.2	98.2
2013	506	93.3	19.6	420	83.0	97.4
2014	497	93.8	21.1	390	78.5	99.0
2015	502	98.2	22.5	353	70.3	97.2
2016	404	81.9	25.7	221	54.7	92.8
1998-2016	7324	95.6	28.1	6405	87.5	97.9

Table 9b

Annual cohorts of incident cancers and deaths, proportion of death certificates and cases deceased within the same year of being diagnosed with cancer (incl. DCO)
(with respect to registry area expansion from 2.65 to 4.10 m as of 2002, and from 4.10 to 4.81 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	192	171	97.1	118	61.5
1999	215	197	95.4	138	64.2
2000	224	192	97.4	135	60.3
2001	195	185	96.8	111	56.9
2002	351	266	98.1	222	63.2
2003	332	272	98.2	198	59.6
2004	340	257	98.1	188	55.3
2005	352	287	96.2	197	56.0
2006	398	334	98.5	233	58.5
2007	455	319	97.8	229	50.3
2008	481	352	98.9	234	48.6
2009	467	356	98.3	229	49.0
2010	448	361	98.9	210	46.9
2011	450	369	98.4	208	46.2
2012	515	384	98.7	239	46.4
2013	506	387	98.2	232	45.8
2014	497	423	97.9	228	45.9
2015	502	463	99.4	243	48.4
2016	404	374	97.6	210	52.0
1998-2016	7324	5949	98.1	3802	51.9

Table 9c

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 2.65 to 4.10 m as of 2002, and from 4.10 to 4.81 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	90.9	9.1	97.1
2006	334	93.7	6.3	98.5
2007	319	89.7	10.3	95.5
2008	352	90.3	9.7	96.0
2009	356	93.8	6.2	98.3
2010	361	89.8	10.2	93.8
2011	369	89.2	10.8	94.5
2012	384	86.2	13.8	94.7
2013	387	89.9	10.1	94.5
2014	423	87.5	12.5	93.2
2015	463	88.3	11.7	93.7
2016	374	86.9	13.1	95.1
1998-2016	5949	89.9	10.1	95.8

Table 10a

Medians of age at death according to the grouping in Table 9
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	71.3	70.0
2007	247	71.7	71.4	72.8	71.7
2008	262	69.4	69.4	71.4	69.4
2009	258	69.9	69.9	73.6	70.1
2010	268	72.1	72.1	71.9	72.1
2011	284	70.9	71.2	69.1	71.3
2012	289	71.7	71.9	70.1	71.8
2013	274	72.7	72.7	71.9	72.8
2014	311	72.0	71.6	74.0	72.0
2015	343	72.7	72.8	71.8	72.9
2016	278	74.0	74.0	73.5	74.1
1998-2016	4375	71.0	71.0	71.0	71.2

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 10b

Medians of age at death according to the grouping in Table 9
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	74.8	65.3	74.8
2006	82	76.7	76.2	82.5	76.7
2007	72	74.0	73.2	76.4	74.0
2008	90	75.2	74.8	78.1	75.5
2009	98	74.7	74.7	75.1	74.7
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	113	74.5	74.3	82.2	74.5
2014	112	74.3	73.8	75.0	73.8
2015	120	75.2	74.4	83.0	75.0
2016	96	75.2	75.2	75.2	75.2
1998-2016	1574	75.2	75.0	76.5	75.4

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 11a

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	0.76	5.5	0.72	8.3	0.75	11.0	0.77
1999	114	10.2	0.79	6.0	0.79	9.2	0.80	12.4	0.83
2000	120	10.5	0.75	6.0	0.72	9.3	0.74	12.3	0.79
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	0.80	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	236	12.3	0.83	6.4	0.81	9.5	0.81	12.4	0.82
2007	221	10.0	0.65	5.0	0.61	7.6	0.63	10.2	0.66
2008	238	10.7	0.67	5.6	0.66	8.3	0.67	10.8	0.70
2009	243	10.9	0.72	5.4	0.71	8.2	0.72	10.4	0.72
2010	240	10.6	0.68	5.0	0.64	7.6	0.65	10.3	0.70
2011	251	11.2	0.74	5.4	0.71	8.0	0.73	10.5	0.74
2012	249	11.0	0.68	5.0	0.64	7.6	0.65	10.1	0.68
2013	241	10.5	0.69	4.8	0.63	7.3	0.65	9.6	0.69
2014	270	11.6	0.75	5.5	0.72	8.2	0.73	10.5	0.75
2015	297	12.5	0.83	5.7	0.79	8.5	0.80	11.3	0.83
2016	240	10.0	0.80	4.5	0.77	6.7	0.78	9.0	0.79
1998-2016	3909	10.6	0.73	5.3	0.71	8.0	0.72	10.5	0.74

Table 11b

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	0.71	1.5	0.73	2.2	0.73	3.0	0.74
1999	59	5.0	0.83	1.9	0.78	3.0	0.81	4.1	0.83
2000	56	4.7	0.88	1.7	0.82	2.8	0.84	4.0	0.88
2001	39	3.2	0.98	1.5	0.98	2.2	1.00	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	78	3.9	0.80	1.5	0.65	2.2	0.74	2.9	0.78
2006	77	3.8	0.69	1.6	0.72	2.3	0.69	2.9	0.69
2007	65	2.8	0.56	1.1	0.52	1.6	0.52	2.1	0.53
2008	80	3.4	0.63	1.3	0.54	2.0	0.59	2.6	0.61
2009	91	3.9	0.71	1.5	0.72	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	0.72	1.3	0.65	1.9	0.71	2.5	0.71
2012	82	3.5	0.55	1.3	0.49	2.0	0.51	2.6	0.52
2013	107	4.5	0.69	1.8	0.63	2.6	0.65	3.5	0.67
2014	100	4.2	0.74	1.7	0.70	2.4	0.72	3.2	0.76
2015	112	4.6	0.77	1.7	0.76	2.6	0.76	3.4	0.78
2016	85	3.5	0.82	1.3	0.76	2.0	0.78	2.6	0.79
1998-2016	1441	3.8	0.73	1.5	0.68	2.2	0.70	2.9	0.72

Table 12

Age distribution of age at death (cancer-related) for period 2007-2016
(**incl. multiple malignancies**)

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4	2	0.1	0.1	1	0.0	0.0	1	0.1	0.1
5-9	1	0.0	0.1	1	0.0	0.1			0.1
10-14	2	0.1	0.1	2	0.1	0.2			0.1
15-19	4	0.1	0.3	2	0.1	0.2	2	0.2	0.3
20-24	2	0.1	0.3	1	0.0	0.3	1	0.1	0.5
25-29	1	0.0	0.4	1	0.0	0.3			0.5
30-34	6	0.2	0.5	4	0.2	0.5	2	0.2	0.7
35-39	13	0.4	0.9	7	0.3	0.8	6	0.7	1.4
40-44	17	0.5	1.4	13	0.5	1.3	4	0.5	1.8
45-49	58	1.7	3.1	43	1.7	3.0	15	1.7	3.5
50-54	122	3.6	6.8	102	4.1	7.1	20	2.3	5.8
55-59	239	7.1	13.8	186	7.5	14.6	53	6.0	11.8
60-64	377	11.2	25.0	298	12.0	26.5	79	8.9	20.7
65-69	520	15.4	40.4	402	16.1	42.7	118	13.3	34.0
70-74	674	20.0	60.4	523	21.0	63.7	151	17.1	51.1
75-79	639	18.9	79.3	485	19.5	83.2	154	17.4	68.6
80-84	407	12.1	91.4	281	11.3	94.5	126	14.3	82.8
85+	290	8.6	100.0	138	5.5	100.0	152	17.2	100.0
All ages	3374	100.0		2490	100.0		884	100.0	

Table 13

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2016
(**incl. multiple malignancies**)

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	1	0.1	0.11	0.1	0.13	6.7	6.7
5- 9	1		0.1	0.25			4.2	
10-14	2		0.2	1.00			8.7	
15-19	2	2	0.2	0.50	0.2	1.00	4.5	9.1
20-24	1	1	0.1	0.50	0.1	0.33	1.8	3.0
25-29	1		0.1	0.25			1.4	
30-34	4	2	0.3	0.50	0.1	0.40	3.8	1.7
35-39	7	6	0.4	0.70	0.4	0.55	3.5	2.1
40-44	13	4	0.7	0.65	0.2	0.33	2.6	0.6
45-49	43	15	2.2	0.66	0.8	0.52	3.7	1.1
50-54	102	20	5.9	0.58	1.2	0.39	5.0	1.0
55-59	186	53	13.1	0.61	3.6	0.67	5.5	1.9
60-64	298	79	24.3	0.66	5.9	0.77	6.0	2.1
65-69	402	118	33.9	0.68	9.1	0.70	5.5	2.2
70-74	523	151	47.3	0.71	11.9	0.66	5.6	2.2
75-79	485	154	60.9	0.88	15.4	0.78	5.4	2.2
80-84	281	126	61.1	0.81	17.8	0.74	3.7	1.8
85+	138	152	45.1	0.83	20.7	0.78	2.1	1.6
All ages	2490	884					4.8	1.9
Mortality								
Raw			10.9	0.72	3.7	0.70		
WS			5.2	0.68	1.4	0.65		
ES			7.8	0.70	2.1	0.67		
BRD-S			10.2	0.73	2.8	0.69		
PYLL-70								
per 100,000			47.0		14.2			
ES			41.5		12.4			
AYLL-70			8.9		9.4			

Table 14a

Further malignancies in deaths in period 1998–2016
MALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03–C06	Oral cavity	26	3.0	20	76.9	2	7.7	4	15.4
C09–C10	Oropharynx	19	2.2	17	89.5	2	10.5		
C12–C13	Hypopharynx	13	1.5	10	76.9	2	15.4	1	7.7
C15	Oesophagus	25	2.9	8	32.0	9	36.0	8	32.0
C16	Stomach	26	3.0	12	46.2	9	34.6	5	19.2
C18	Colon	108	12.4	76	70.4	25	23.1	7	6.5
C19–C20	Rectum	56	6.4	44	78.6	9	16.1	3	5.4
C25	Pancreas	16	1.8	1	6.3	8	50.0	7	43.8
C32	Larynx	22	2.5	20	90.9	2	9.1		
C33–C34	Lung	81	9.3	28	34.6	23	28.4	30	37.0
C43	Malign. melanoma	31	3.5	24	77.4	3	9.7	4	12.9
C44	Skin others	68	7.8	49	72.1	1	1.5	18	26.5
C61	Prostate	184	21.1	155	84.2	10	5.4	19	10.3
C62	Testis	9	1.0	9	100.0				
C64	Kidney	52	5.9	35	67.3	10	19.2	7	13.5
C67	Bladder	39	4.5	21	53.8	6	15.4	12	30.8
C76–C79	CUP	9	1.0	6	66.7	1	11.1	2	22.2
C82–C85	NHL	30	3.4	20	66.7	5	16.7	5	16.7
C91–C96	Leukaemia	9	1.0	4	44.4			5	55.6
Others, specified		51	5.8	28	54.9	12	23.5	11	21.6
All further malignancies		874	100.0	587	67.2	139	15.9	148	16.9

Further malignancies with number of cases 1 to 7 are pooled in category “Others, specified”.

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 further malignancy.

Table 14b

Further malignancies in deaths in period 1998–2016
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03–C06	Oral cavity	6	2.1	5	83.3	1	16.7		
C16	Stomach	10	3.5	4	40.0	4	40.0	2	20.0
C18	Colon	37	12.9	25	67.6	9	24.3	3	8.1
C19–C20	Rectum	7	2.4	6	85.7	1	14.3		
C23–C24	Bile	4	1.4	2	50.0	1	25.0	1	25.0
C33–C34	Lung	11	3.8	6	54.5	2	18.2	3	27.3
C43	Malign. melanoma	9	3.1	9	100.0				
C44	Skin others	22	7.7	14	63.6	1	4.5	7	31.8
C50	Breast	79	27.5	67	84.8	4	5.1	8	10.1
C51	Vulva	4	1.4	3	75.0			1	25.0
C53	Cervix uteri	6	2.1	6	100.0				
C54	Corpus uteri	16	5.6	13	81.3	1	6.3	2	12.5
C56	Ovary	9	3.1	8	88.9			1	11.1
C64	Kidney	11	3.8	4	36.4	4	36.4	3	27.3
C67	Bladder	3	1.0	2	66.7	1	33.3		
C69	Eye melanoma	4	1.4	4	100.0				
C73	Thyroid	7	2.4	5	71.4	1	14.3	1	14.3
C76–C79	CUP	6	2.1	2	33.3	3	50.0	1	16.7
C82–C85	NHL	14	4.9	11	78.6	3	21.4		
Others, specified		22	7.7	12	54.5	3	13.6	7	31.8
All further malignancies		287	100.0	208	72.5	39	13.6	40	13.9

Further malignancies with number of cases 1 to 2 are pooled in category “Others, specified”.

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 further malignancy.

Table 15

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2016
(**First 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	1	0.1	0.11	0.1	0.13	7.1	6.7
5- 9	1		0.1	0.25			4.3	
10-14	2		0.2	1.00			8.7	
15-19	2	2	0.2	0.50	0.2	1.00	4.8	10.0
20-24	1	1	0.1	0.50	0.1	0.33	2.0	3.2
25-29	1		0.1	0.25			1.5	
30-34	4		0.3	0.50			3.9	
35-39	7	5	0.4	0.70	0.3	0.50	3.7	1.9
40-44	13	4	0.7	0.65	0.2	0.40	2.8	0.7
45-49	39	14	2.0	0.66	0.7	0.52	3.7	1.2
50-54	87	17	5.0	0.55	1.0	0.38	4.8	1.0
55-59	174	47	12.3	0.63	3.2	0.68	5.9	2.0
60-64	253	67	20.7	0.64	5.0	0.76	6.1	2.2
65-69	335	99	28.3	0.69	7.6	0.74	5.7	2.3
70-74	422	123	38.1	0.73	9.7	0.66	5.9	2.3
75-79	354	120	44.4	0.90	12.0	0.79	5.3	2.2
80-84	210	102	45.7	0.82	14.4	0.73	3.8	1.9
85+	102	121	33.3	0.80	16.5	0.75	2.1	1.6
All ages	2008	723					4.9	2.0
Mortality								
Raw			8.8	0.72	3.1	0.70		
WS			4.3	0.68	1.2	0.64		
ES			6.4	0.70	1.8	0.67		
BRD-S			8.2	0.73	2.3	0.69		
PYLL-70								
per 100,000			42.0		12.2			
ES			37.3		10.7			
AYLL-70			9.2		9.5			

* See corresponding tables with multiple malignancies.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2016
(**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	1	0.1	0.11	0.1	0.13	7.1	6.7
5- 9	1		0.1	0.25			4.3	
10-14	2		0.2	1.00			8.7	
15-19	2	2	0.2	0.50	0.2	1.00	4.8	10.5
20-24	1	1	0.1	0.50	0.1	0.33	2.0	3.2
25-29	1		0.1	0.33			1.5	
30-34	4		0.3	0.50			3.9	
35-39	7	5	0.4	0.70	0.3	0.50	3.7	2.0
40-44	13	4	0.7	0.65	0.2	0.44	2.9	0.7
45-49	39	14	2.0	0.66	0.7	0.52	3.8	1.3
50-54	87	17	5.0	0.57	1.0	0.40	4.9	1.0
55-59	169	45	11.9	0.65	3.1	0.68	5.8	1.9
60-64	249	66	20.3	0.66	5.0	0.77	6.1	2.2
65-69	323	98	27.3	0.69	7.5	0.74	5.7	2.4
70-74	400	119	36.2	0.73	9.4	0.65	5.8	2.3
75-79	340	116	42.7	0.88	11.6	0.79	5.4	2.2
80-84	196	98	42.6	0.81	13.9	0.73	3.8	1.9
85+	91	117	29.7	0.73	15.9	0.73	2.1	1.7
All ages	1926	703					4.9	2.0
Mortality								
Raw			8.4	0.72	3.0	0.69		
WS			4.1	0.68	1.2	0.64		
ES			6.1	0.70	1.7	0.67		
BRD-S			7.9	0.72	2.3	0.69		
PYLL-70								
per 100,000			41.4		12.1			
ES			36.7		10.6			
AYLL-70			9.3		9.5			

* See corresponding tables with multiple malignancies.

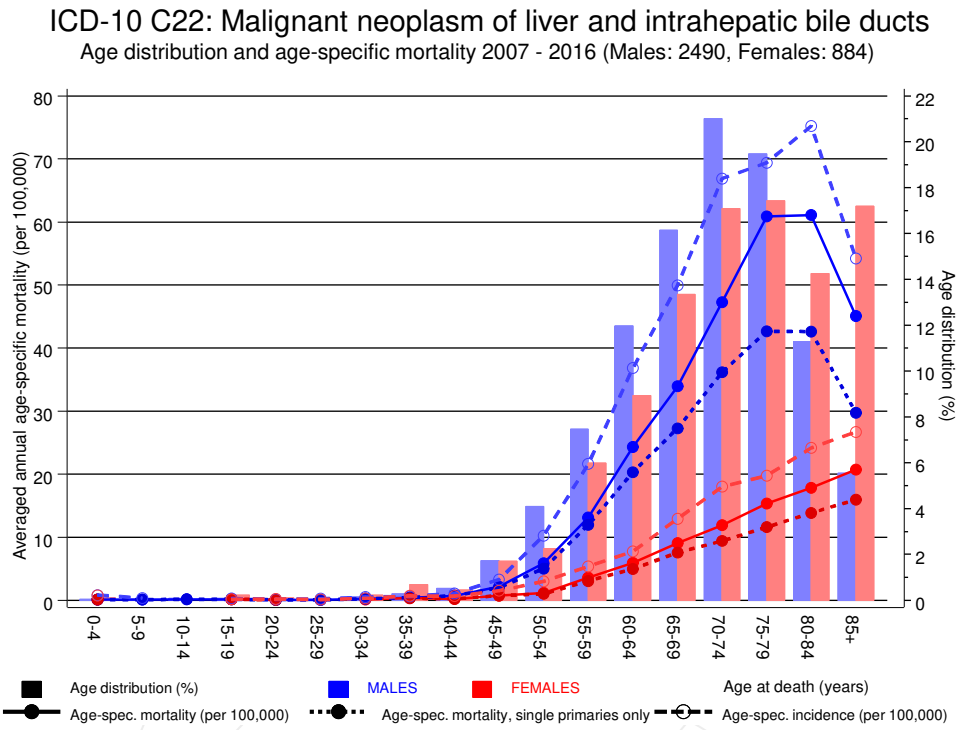


Figure 17. Distribution of age at death (bars; males: mean=69.5 yrs, median=70.6 yrs; females: mean=72.6 yrs, median=73.7 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

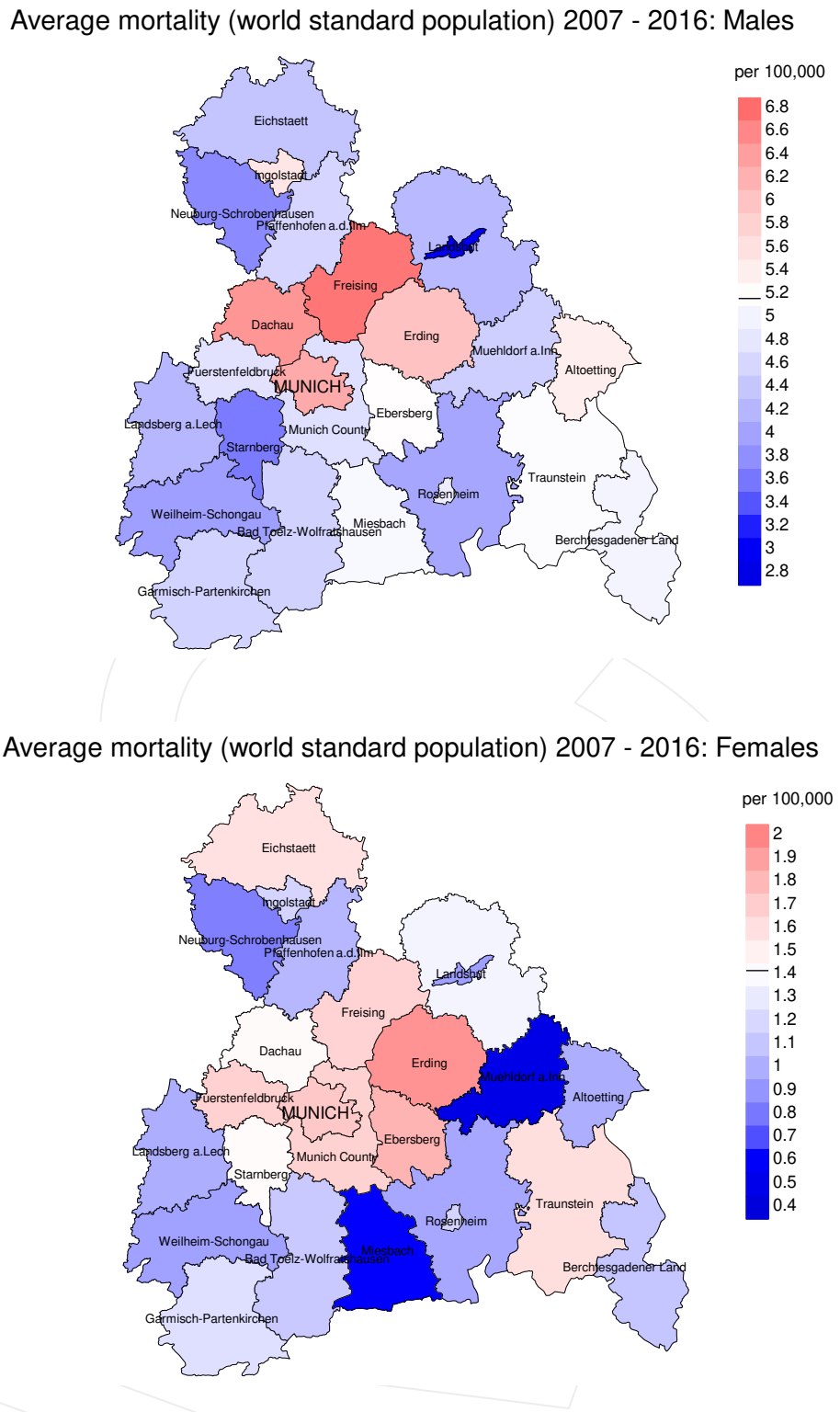
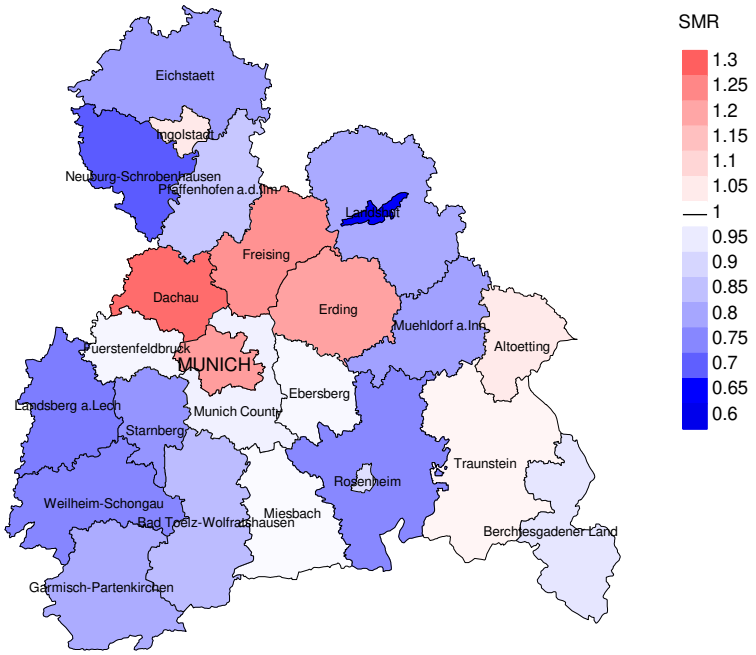


Figure 18a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2016. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 5.2/100,000 WS N=2,490, females 1.4/100,000 WS N=884).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 33 women died from liver cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 1.8/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.0 and 3.1/100,000.

Standardized mortality ratio (SMR) 2007 - 2016: Males



Standardized mortality ratio (SMR) 2007 - 2016: Females

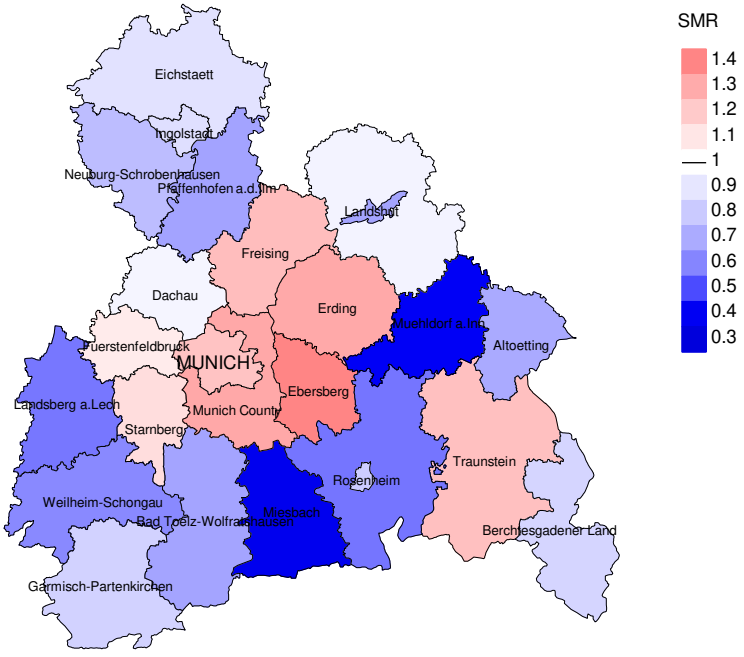


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=2,490, females N=884).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 33 women died from liver cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.40. Though, the value of this parameter may vary with an underlying probability of 99% between 0.85 and 2.15, 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

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

Recommended Citation

Munich Cancer Registry. ICD-10 C22: Liver cancer - Incidence and Mortality [Internet]. 2018 [updated 2018 Aug 21; cited 2018 Oct 1]. Available from: https://www.tumorregister-muenchen.de/en/facts/base/bC22__E-ICD-10-C22-Liver-cancer-incidence-and-mortality.pdf

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