Munich Cancer Registry

- Survival
- Selection Matrix
- Homepage
- *Deutsch*

ICD-10 C22: Liver cancer

Incidence and Mortality

Year of diagnosis	1998-2020
Patients	8,953
Diseases	8,958
Creation date	12/20/2021
Database export	12/20/2021
Population	4.95 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, December 2021

[#] 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	73	38.0	9.4	3.9	98.4	100.0
1999	215	88	40.9	8.4	4.0	98.1	99.1
2000	225	98	43.6	8.1	4.0	96.9	100.0
2001	195	74	37.9	8.8	4.0	97.9	99.0
2002	352	152	43.2	9.9	4.0	99.1	100.0 #
2003	333	137	41.1	10.6	4.0	97.0	99.4
2004	339	139	41.0	11.5	4.0	95.9	99.1
2005	353	129	36.5	12.3	4.0	96.3	99.2
2006	398	129	32.4	12.9	4.1	95.0	98.7
2007	456	136	29.8	13.1	4.1	95.2	98.9 #
2008	480	114	23.8	13.5	4.1	92.7	99.4
2009	468	116	24.8	14.0	3.9	91.7	99.8
2010	448	105	23.4	14.5	3.7	94.2	100.0
2011	451	102	22.6	14.9	3.7	91.4	99.6
2012	519	113	21.8	15.3	3.6	92.3	99.4
2013	510	100	19.6	15.4	3.4	89.6	99.0
2014	512	110	21.5	15.9	3.4	88.7	99.4
2015	536	118	22.0	16.1	3.2	86.8	98.1
2016	503	119	23.7	16.2	2.9	88.5	99.8
2017	456	105	23.0	16.6	2.5	82.9	99.8
2018	382	58	15.2	16.8	2.1	67.8	100.0
2019	332	6	1.8	17.1	2.4	62.3	99.7
2020	303	2	0.7	17.3	2.0	48.8	99.7 ##
1998-2020	8958	2323	25.9	17.3	3.9	88.8	99.4

8,958 cases diagnosed 1998-2020 are related to a total of 8,953 patients. Currently, in 1,916 (21.4 %) of these 8,953 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 1,543 / 285 / 88 (17.2 % / 3.2 % / 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 2018, a subgroup of 382 cases has been diagnosed, of which 16.8 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 2.1 % 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	53	39.3	10.4	4.4	98.5	100.0	
1999	144	67.0	61	42.4	9.0	4.4	98.6	98.6	
2000	161	71.6	59	36.6	8.6	4.4	97.5	100.0	
2001	155	79.5	54	34.8	8.9	4.4	98.1	99.4	
2002	253	71.9	103	40.7	9.8	4.5	99.2	100.0	#
2003	240	72.1	95	39.6	10.7	4.4	97.1	99.2	
2004	251	74.0	95	37.8	11.6	4.5	95.6	98.8	
2005	255	72.2	81	31.8	12.3	4.4	96.9	99.6	
2006	286	71.9	84	29.4	12.8	4.5	96.2	99.0	
2007	339	74.3	102	30.1	13.0	4.5	95.6	98.8	#
2008	354	73.8	77	21.8	13.2	4.5	92.7	99.2	
2009	339	72.4	67	19.8	13.6	4.3	92.0	100.0	
2010	352	78.6	74	21.0	14.4	4.2	94.0	100.0	
2011	343	76.1	72	21.0	14.9	4.2	91.3	99.4	
2012	367	70.7	72	19.6	15.4	4.2	94.0	99.7	
2013	352	69.0	59	16.8	15.4	3.9	89.8	98.9	
2014	375	73.2	71	18.9	15.9	3.8	88.8	99.2	
2015	382	71.3	73	19.1	16.3	3.4	86.4	97.9	
2016	368	73.2	83	22.6	16.5	3.1	89.4	99.7	
2017	325	71.3	72	22.2	16.9	2.7	83.1	99.7	
2018	258	67.5	32	12.4	17.0	2.4	65.1	100.0	
2019	243	73.2	6	2.5	17.3	2.6	62.6	100.0	
2020	227	74.9	1	0.4	17.5	1.8	50.2	99.6	##
1998-2020	6504	72.6	1546	23.8	17.5	4.4	89.1	99.4	

6,504 cases diagnosed 1998-2020 are related to a total of 6,501 patients. Currently, in 1,418 (21.8 %) of these 6,501 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 1,123 / 221 / 74 (17.3 % / 3.4 % / 1.1 %) 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 2018, a subgroup of 258 cases has been diagnosed, of which 17.0 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 2.4 % 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	20	35.1	7.0	2.9	98.2	100.0	
1999	71	33.0	27	38.0	7.0	2.8	97.2	100.0	
2000	64	28.4	39	60.9	6.8	2.8	95.3	100.0	
2001	40	20.5	20	50.0	8.6	2.8	97.5	97.5	
2002	99	28.1	49	49.5	10.3	2.8	99.0	100.0	#
2003	93	27.9	42	45.2	10.6	3.0	96.8	100.0	
2004	88	26.0	44	50.0	11.1	2.9	96.6	100.0	
2005	98	27.8	48	49.0	12.1	2.9	94.9	98.0	
2006	112	28.1	45	40.2	13.0	3.0	92.0	98.2	
2007	117	25.7	34	29.1	13.6	3.0	94.0	99.1	#
2008	126	26.3	37	29.4	14.4	3.0	92.9	100.0	
2009	129	27.6	49	38.0	14.9	2.8	90.7	99.2	
2010	96	21.4	31	32.3	15.0	2.4	94.8	100.0	
2011	108	23.9	30	27.8	14.9	2.3	91.7	100.0	
2012	152	29.3	41	27.0	14.9	2.2	88.2	98.7	
2013	158	31.0	41	25.9	15.4	2.3	89.2	99.4	
2014	137	26.8	39	28.5	15.7	2.4	88.3	100.0	
2015	154	28.7	45	29.2	15.6	2.6	87.7	98.7	
2016	135	26.8	36	26.7	15.5	2.2	85.9	100.0	
2017	131	28.7	33	25.2	15.8	1.9	82.4	100.0	
2018	124	32.5	26	21.0	16.2	1.4	73.4	100.0	
2019	89	26.8			16.7	1.9	61.8	98.9	
2020	76	25.1	1	1.3	16.7	2.7	44.7	100.0	##
1998-2020	2454	27.4	777	31.7	16.7	2.9	88.1	99.5	

2,454 cases diagnosed 1998-2020 are related to a total of 2,452 patients. Currently, in 498 (20.3 %) of these 2,452 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 420 / 64 / 14 (17.1 % / 2.6 % / 0.6 %) 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 2018, a subgroup of 124 cases has been diagnosed, of which 16.2 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 1.4 % 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 4.94 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	161	64	14.1	5.3	8.4	2.1	12.6	3.3	15.8	4.6
2001	155	40	13.4	3.3	7.9	1.5	11.7	2.2	15.2	2.7
2002	253	99	13.6	5.1	7.6	2.0	11.4	3.0	14.6	4.2
2003	240	93	12.8	4.7	6.9	1.9	10.4	2.8	13.8	3.9
2004	251	88	13.3	4.5	7.3	1.9	11.0	2.7	14.2	3.5
2005	255	98	13.5	4.9	7.2	2.2	10.6	3.0	13.5	3.7
2006	286	112	14.9	5.6	7.8	2.2	11.7	3.3	15.1	4.3
2007	339	117	15.3	5.1	8.2	2.2	12.1	3.2	15.4	3.9
2008	354	126	15.9	5.4	8.5	2.4	12.3	3.4	15.4	4.4
2009	339	129	15.2	5.5	7.8	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	343	108	15.3	4.6	7.6	2.0	11.1	2.7	14.2	3.5
2012	367	152	16.2	6.4	7.9	2.7	11.6	3.9	14.9	5.1
2013	352	158	15.3	6.6	7.7	2.8	11.2	4.1	14.0	5.2
2014	375	137	16.1	5.7	8.0	2.4	11.6	3.4	14.6	4.2
2015	382	154	16.1	6.3	7.7	2.5	11.3	3.7	14.7	4.7
2016	368	135	15.3	5.5	7.2	2.2	10.6	3.2	13.9	4.1
2017	325	131	13.5	5.3	6.0	2.2	9.0	3.2	12.0	4.0
2018	258	124	10.6	5.0	4.8	1.9	7.2	2.8	9.4	3.7
2019	243	89	10.0	3.6	4.9	1.7	7.1	2.4	8.9	2.9
2020	227	76	9.3	3.1	4.3	1.3	6.4	1.9	8.3	2.4
1998-2020	6504	2454	14.0	5.1	7.1	2.1	10.4	3.1	13.4	3.9

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	225	70.4	11.8	25.1	94.3	57.2	63.7	70.1	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	352	69.5	11.0	29.3	94.0	55.8	62.4	69.9	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	339	69.8	12.0	3.1	93.4	54.4	62.0	70.5	78.2	84.3
2005	353	69.2	13.0	1.0	100	56.9	63.1	68.9	77.6	83.7
2006	398	69.8	11.3	20.4	96.6	54.3	62.8	69.8	78.3	84.6
2007	456	69.3	12.1	0.3	96.7	54.7	62.1	70.4	77.8	84.1
2008	480	68.5	12.4	1.1	97.9	54.0	62.1	69.3	76.8	82.8
2009	468	70.4	11.5	1.4	95.8	57.0	65.0	70.9	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	451	69.6	12.9	0.7	98.3	54.7	63.8	70.9	77.7	83.1
2012	519	69.7	12.0	1.5	97.8	54.8	64.1	71.7	77.5	82.6
2013	510	69.7	12.0	0.6	96.7	55.8	63.1	70.9	77.7	83.4
2014	512	70.2	11.6	0.4	98.1	56.3	63.8	71.4	77.4	84.0
2015	536	70.9	11.9	7.0	99.2	56.6	63.6	72.6	78.6	84.5
2016	503	71.4	12.3	2.0	104	56.9	64.8	73.5	79.1	84.7
2017	456	71.6	11.7	2.1	98.0	57.4	65.3	73.4	79.5	84.6
2018	382	71.5	10.7	35.1	98.1	56.5	64.5	73.1	78.6	83.6
2019	332	69.2	10.2	33.3	91.2	55.7	63.1	70.2	76.5	81.2
2020	303	69.8	11.4	24.9	91.9	54.9	61.9	71.9	78.4	82.9
1998-2020	8958	70.0	11.9	0.3	104	55.8	63.2	71.0	78.0	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	161	69.3	12.1	25.1	94.3	55.6	63.0	68.5	76.2	87.6
2001	155	67.4	11.6	31.6	95.3	50.5	61.0	68.3	75.6	81.6
2002	253	68.2	10.1	36.0	93.8	55.6	62.1	68.1	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	255	68.1	9.8	34.4	93.0	56.9	62.2	67.4	75.2	80.4
2006	286	68.7	10.4	41.8	96.6	55.0	62.0	69.1	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	354	67.7	11.0	6.5	97.9	54.5	61.5	68.7	74.5	80.5
2009	339	69.4	11.5	1.4	94.7	56.5	63.4	70.3	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	343	69.0	11.1	0.8	92.3	55.2	63.5	70.4	76.3	81.2
2012	367	69.3	11.0	1.5	91.3	54.9	63.5	71.2	76.7	82.0
2013	352	69.2	11.4	0.6	96.7	55.9	62.4	69.7	77.0	82.4
2014	375	69.6	10.9	0.4	95.6	56.2	63.0	70.8	76.9	82.0
2015	382	70.2	10.8	9.2	99.2	56.9	63.7	72.2	77.2	82.9
2016	368	71.1	11.5	10.0	104	57.0	64.9	73.3	78.7	83.6
2017	325	71.5	10.2	33.7	94.4	57.5	65.0	73.2	79.1	82.8
2018	258	70.5	10.3	41.3	98.1	55.2	62.7	72.6	78.0	82.5
2019	243	69.4	9.7	33.3	88.1	56.1	63.4	70.4	76.5	81.0
2020	227	70.0	10.8	24.9	91.9	56.3	62.1	71.6	78.3	82.0
1998-2020	6504	69.2	11.0	0.3	104	55.9	62.7	70.1	76.7	82.1

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	93	73.4	13.4	10.9	98.8	60.3	66.3	77.0	81.0	86.0
2004	88	73.1	14.4	3.1	93.4	51.3	65.3	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	112	72.9	13.1	20.4	95.3	54.2	66.0	72.8	83.1	86.7
2007	117	71.6	13.6	25.9	94.8	53.8	64.1	73.1	81.8	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	108	71.4	17.3	0.7	98.3	47.8	66.1	75.3	82.2	88.0
2012	152	70.8	14.0	1.5	97.8	54.7	65.3	74.0	79.3	85.5
2013	158	70.8	13.1	2.7	95.4	54.5	63.9	72.0	79.8	85.1
2014	137	71.8	13.0	0.5	98.1	57.0	65.8	72.8	79.0	87.1
2015	154	72.6	14.2	7.0	95.6	54.7	63.4	75.0	83.3	89.3
2016	135	72.4	14.2	2.0	101	55.4	64.6	74.6	80.8	87.5
2017	131	71.9	14.6	2.1	98.0	55.6	65.7	73.5	80.2	87.0
2018	124	73.5	11.3	35.1	95.3	59.4	67.4	75.1	80.9	87.0
2019	89	68.6	11.6	35.2	91.2	50.7	62.9	68.9	76.9	82.9
2020	76	69.1	12.8	26.2	89.5	51.9	60.3	72.6	79.1	83.3
1998–2020	2454	72.0	13.7	0.5	101	55.4	65.2	73.9	81.3	87.1

Table 4

Age distribution by 5-year age group and sex for period 2007-2020
(incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4	20	0.3	0.3	10	0.2	0.2	10	0.6	0.6
5-9	6	0.1	0.4	5	0.1	0.3	1	0.1	0.6
10-14	0	0.0	0.4			0.3			0.6
15-19	6	0.1	0.5	4	0.1	0.4	2	0.1	0.8
20-24	7	0.1	0.6	3	0.1	0.5	4	0.2	1.0
25-29	8	0.1	0.7	5	0.1	0.6	3	0.2	1.2
30-34	18	0.3	1.0	12	0.3	0.8	6	0.3	1.5
35-39	27	0.4	1.4	11	0.2	1.1	16	0.9	2.4
40-44	48	0.8	2.2	29	0.6	1.7	19	1.1	3.5
45-49	127	2.0	4.2	86	1.9	3.6	41	2.4	5.9
50-54	307	4.8	9.0	235	5.1	8.7	72	4.2	10.0
55-59	500	7.9	16.9	399	8.6	17.3	101	5.8	15.9
60-64	738	11.6	28.5	588	12.7	30.0	150	8.7	24.5
65-69	1012	15.9	44.4	779	16.8	46.8	233	13.5	38.0
70-74	1238	19.5	63.9	934	20.2	67.0	304	17.6	55.5
75-79	1089	17.1	81.0	799	17.3	84.3	290	16.7	72.3
80-84	725	11.4	92.4	501	10.8	95.2	224	12.9	85.2
85+	480	7.6	100.0	224	4.8	100.0	256	14.8	100.0
All ages	6356	100.0		4624	100.0		1732	100.0	

Table 5

Age-specific incidence, DCO rate and proportion of all cancers
for period 2007–2020

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=861 %	Females DCO rate n=443 %	Males Prop.all cancers n=153686 %	Females Prop.all cancers n=155051 %
0- 4	10	10	0.6	0.6		10.0	4.5	5.8
5- 9	5	1	0.3	0.1			4.3	1.0
10-14								
15-19	4	2	0.2	0.1			1.3	0.8
20-24	3	4	0.1	0.2			0.5	0.8
25-29	5	3	0.2	0.1			0.5	0.3
30-34	12	6	0.5	0.3	8.3	16.7	0.9	0.3
35-39	11	16	0.5	0.7	18.2		0.6	0.5
40-44	29	19	1.2	0.8	3.4	5.3	1.0	0.3
45-49	86	41	3.2	1.6	8.1	7.3	1.7	0.4
50-54	235	72	9.2	2.9	14.5	6.9	2.8	0.6
55-59	399	101	18.8	4.6	9.8	8.9	3.1	0.8
60-64	588	150	33.3	7.9	14.1	13.3	3.3	1.0
65-69	779	233	47.7	12.9	17.5	11.6	3.2	1.2
70-74	934	304	62.3	17.7	15.5	17.8	3.4	1.5
75-79	799	289	66.0	19.2	18.5	22.5	3.3	1.5
80-84	501	224	69.2	21.0	28.9	36.2	3.3	1.5
85+	224	256	48.0	24.6	53.6	68.8	2.1	1.6
All ages	4624	1731			18.6	25.6	3.0	1.1
Incidence								
Raw			14.2	5.2				
WS			6.9	2.1				
ES			10.2	3.1				
BRD-S			13.0	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).

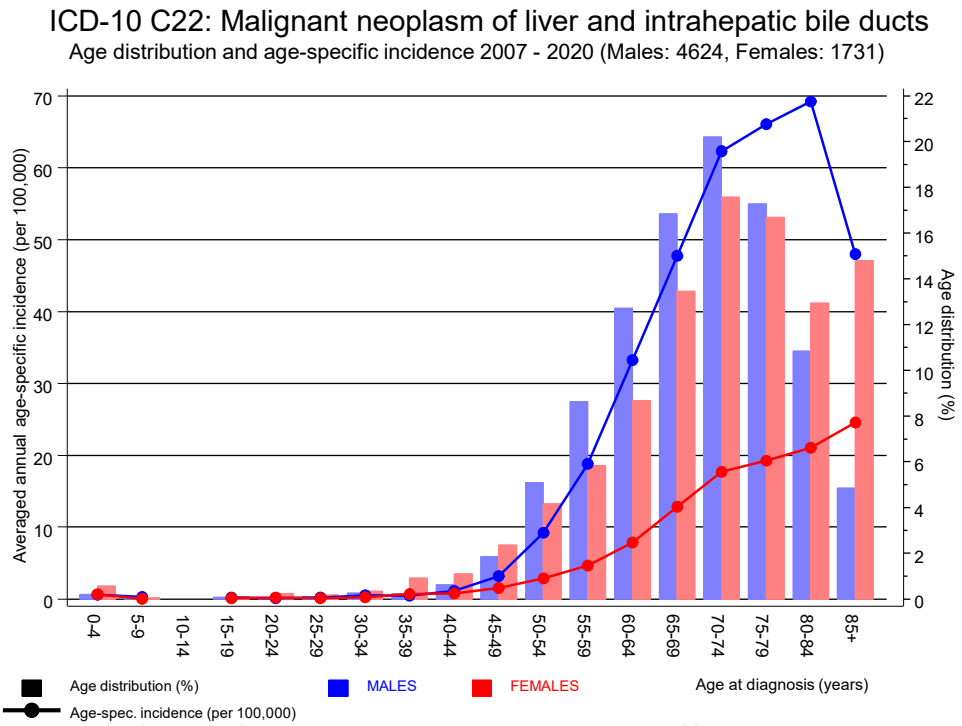


Figure 6. Age distribution (males: mean=69.6 yrs, median=70.8 yrs; females: mean=71.7 yrs, median=73.4 yrs) and age-specific incidence.

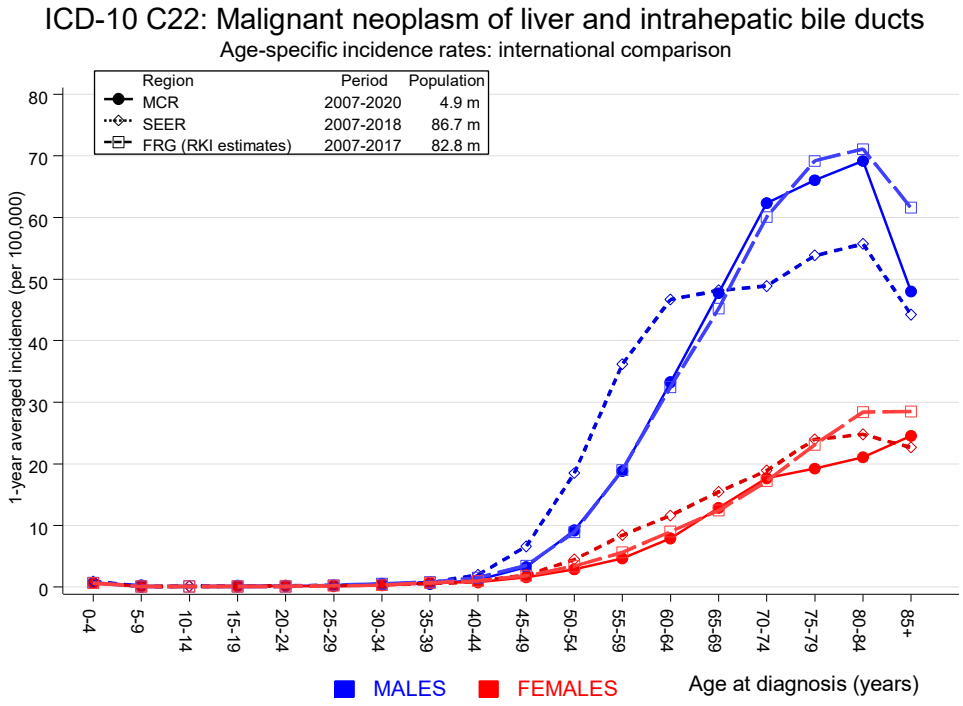


Figure 6a. Age-specific incidence in MCR registry areas compared to Germany (FRG, RKI estimates) and SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

Estimated age-specific patient population of Germany, latest update: 16 March 2021. German Centre for Cancer Registry Data, Robert Koch Institute (RKI), based on data of the population based cancer registries. http://www.krebsdaten.de. Last access: 08/17/2021
Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 21 Regs Research Data, released April 2021, based on the November 2020 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 1998–2020

MALES

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C00	Lip	1	0.1	7.3	0.2	40.6		1.1	
C03–C06	Oral cavity	11	1.0	10.5	5.2	18.8	#	12.3	
C07–C08	Salivary gland	1	0.3	3.3	0.1	18.5		0.9	
C09–C10	Oropharynx	3	1.3	2.3	0.5	6.7		2.1	
C12–C13	Hypopharynx	2	0.7	2.8	0.3	10.2		1.6	
C15	Oesophagus	20	2.7	7.4	4.5	11.4	#	21.3	5.0
C16	Stomach	10	4.9	2.0	1.0	3.7		6.2	
C17	Small intestine	2	0.8	2.5	0.3	9.0		1.5	
C18	Colon	32	12.4	2.6	1.8	3.6	#	24.2	9.4
C19–C20	Rectum	10	6.9	1.5	0.7	2.7		3.9	50.0
C22	Liver	3	3.9	0.8	0.2	2.2		-1.1	33.3
C23–C24	Bile	5	1.4	3.5	1.1	8.3	#	4.4	20.0
C25	Pancreas	18	5.2	3.5	2.1	5.5	#	15.8	11.1
C30–C31	Sinuses	1	0.2	4.2	0.1	23.2		0.9	
C32	Larynx	2	1.3	1.6	0.2	5.7		0.9	
C33–C34	Lung	52	15.5	3.4	2.5	4.4	#	45.1	25.0
C38,C45	Mesothelioma	1	0.9	1.1	0.0	6.1		0.1	100.0
C43	Malign. melanoma	10	6.0	1.7	0.8	3.1		5.0	10.0
C48	Peritoneal	2	0.1	18.6	2.3	67.2	#	2.3	
C50	Breast	3	0.4	8.2	1.7	23.9	#	3.2	33.3
C61	Prostate	45	36.9	1.2	0.9	1.6		10.0	22.2
C64	Kidney	28	4.5	6.3	4.2	9.0	#	29.0	14.3
C67	Bladder	16	6.0	2.7	1.5	4.3	#	12.3	12.5
C68	Urethra	1	0.1	7.5	0.2	41.9		1.1	
C68	Urinary org.	1	0.1	12.9	0.3	72.1		1.1	100.0
C73	Thyroid	5	0.8	6.1	2.0	14.3	#	5.2	20.0
C76–C79	CUP	9	2.1	4.3	1.9	8.1	#	8.5	
C82–C85	NHL	18	5.4	3.3	2.0	5.3	#	15.6	16.7
C90	Mult. myeloma	3	1.7	1.8	0.4	5.2		1.6	66.7
C91–C96	Leukaemia	6	1.9	3.1	1.1	6.8	#	5.0	33.3
Not observed		0	5.5	0.0	0.0	0.7	#	-6.8	
All further malignancies		321	131.0	2.4	2.2	2.7	#	234.3	16.8

Patients	5336
Median age at next malignancy (years)	71.9
Person-years	8108
Mean observation time (years)	1.5
Median observation time (years)	0.6

The occurrence of further specified malignancy is statistically significant.

Table 7b

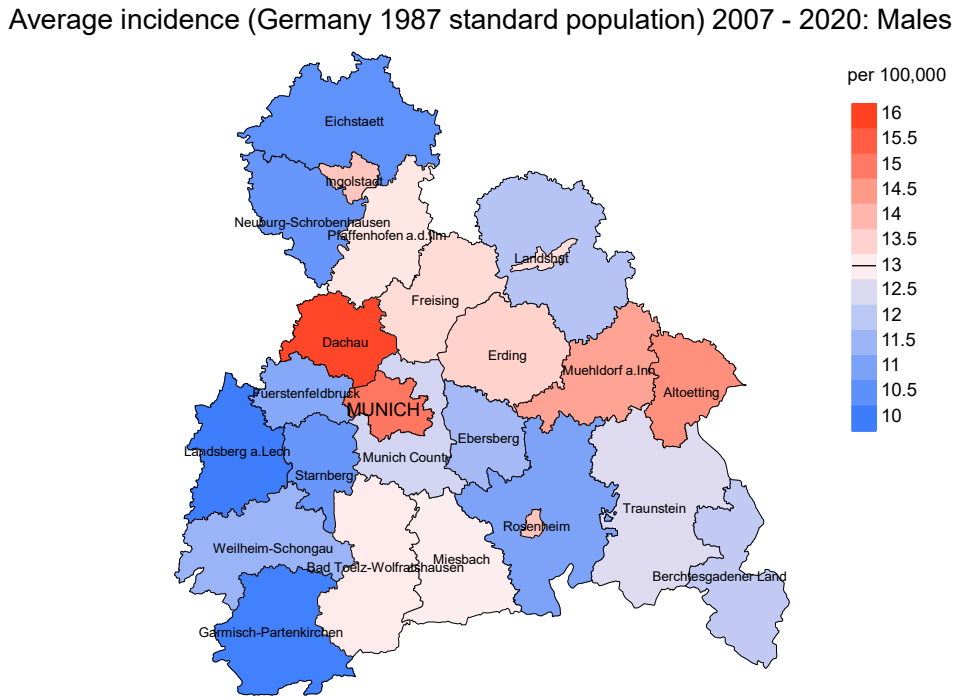
Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of further malignancies for period 1998–2020

FEMALES

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C03–C06	Oral cavity	1	0.2	6.1	0.2	34.1		3.1	
C09–C10	Oropharynx	3	0.1	24.6	5.1	72.0	#	10.7	
C11	Nasopharynx	1	0.0	103.0	2.6	574.0	#	3.7	
C15	Oesophagus	1	0.2	4.9	0.1	27.3		3.0	100.0
C16	Stomach	5	0.9	5.4	1.8	12.6	#	15.2	20.0
C17	Small intestine	1	0.2	6.1	0.2	34.0		3.1	
C18	Colon	17	2.7	6.3	3.7	10.1	#	53.3	23.5
C22	Liver	2	0.4	5.3	0.6	19.3		6.1	
C23–C24	Bile	3	0.4	7.5	1.5	21.9	#	9.7	
C25	Pancreas	2	1.4	1.5	0.2	5.3		2.4	50.0
C32	Larynx	1	0.1	18.8	0.5	104.9		3.5	
C33–C34	Lung	14	2.3	6.0	3.3	10.1	#	43.5	14.3
C37	Thymus	1	0.0	51.2	1.3	285.4	#	3.7	
C40–C41	Bone	1	0.0	35.7	0.9	199.1		3.6	100.0
C43	Malign. melanoma	2	1.1	1.8	0.2	6.5		3.3	50.0
C50	Breast	19	9.1	2.1	1.3	3.3	#	37.0	21.1
C51	Vulva	1	0.3	3.2	0.1	18.0		2.6	
C54	Corpus uteri	2	1.7	1.2	0.1	4.3		1.2	
C56	Ovary	1	1.2	0.9	0.0	4.8		−0.6	
C64	Kidney	6	0.7	8.9	3.3	19.4	#	19.9	50.0
C69	Eye carcinoma	1	0.0	158.5	4.0	883.1	#	3.7	
C70–C72	CNS cancer	2	0.4	5.5	0.7	19.9		6.1	50.0
C73	Thyroid	2	0.4	4.5	0.5	16.4		5.8	50.0
C76–C79	CUP	1	0.5	2.0	0.1	11.3		1.9	
C82–C85	NHL	2	1.1	1.8	0.2	6.5		3.3	
Not observed		0	3.9	0.0	0.0	0.9	#	−14.6	
All further malignancies		92	29.2	3.2	2.5	3.9	#	234.2	21.7

Patients	1882
Median age at next malignancy (years)	74.7
Person-years	2682
Mean observation time (years)	1.4
Median observation time (years)	0.5

The occurrence of further specified malignancy is statistically significant.



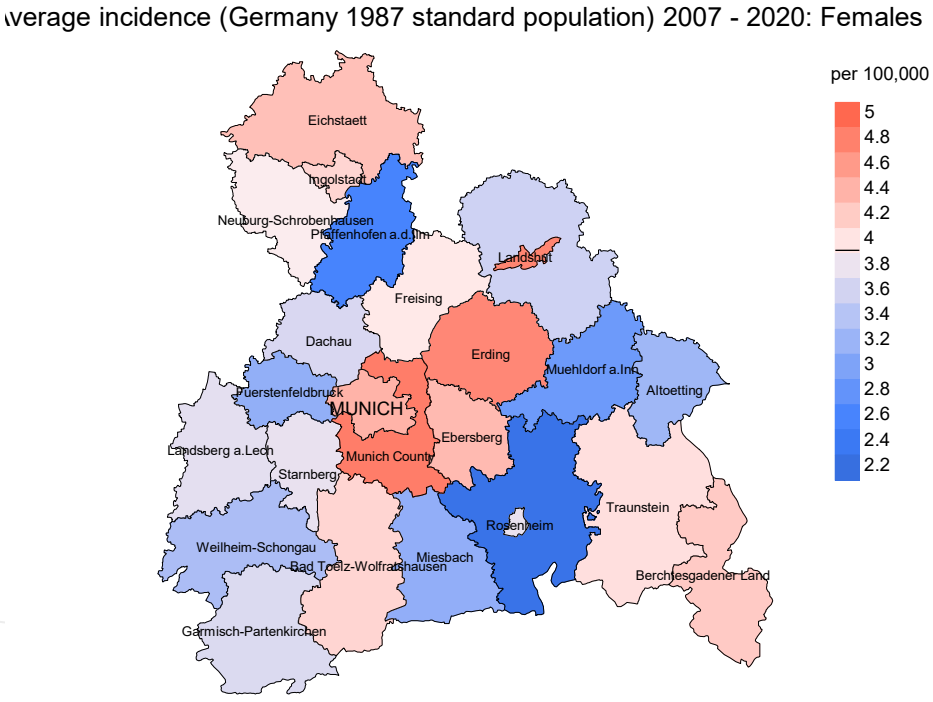


Figure 8a. Map of cancer incidence (german standard population, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 13.0/100,000 WS N=4,624, females 3.9/100,000 WS N=1,731).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,727 female residents (averaged) in the period from 2007 to 2020 a total of 51 women were identified with newly diagnosed liver cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 4.3/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 2.9 and 6.2/100,000.

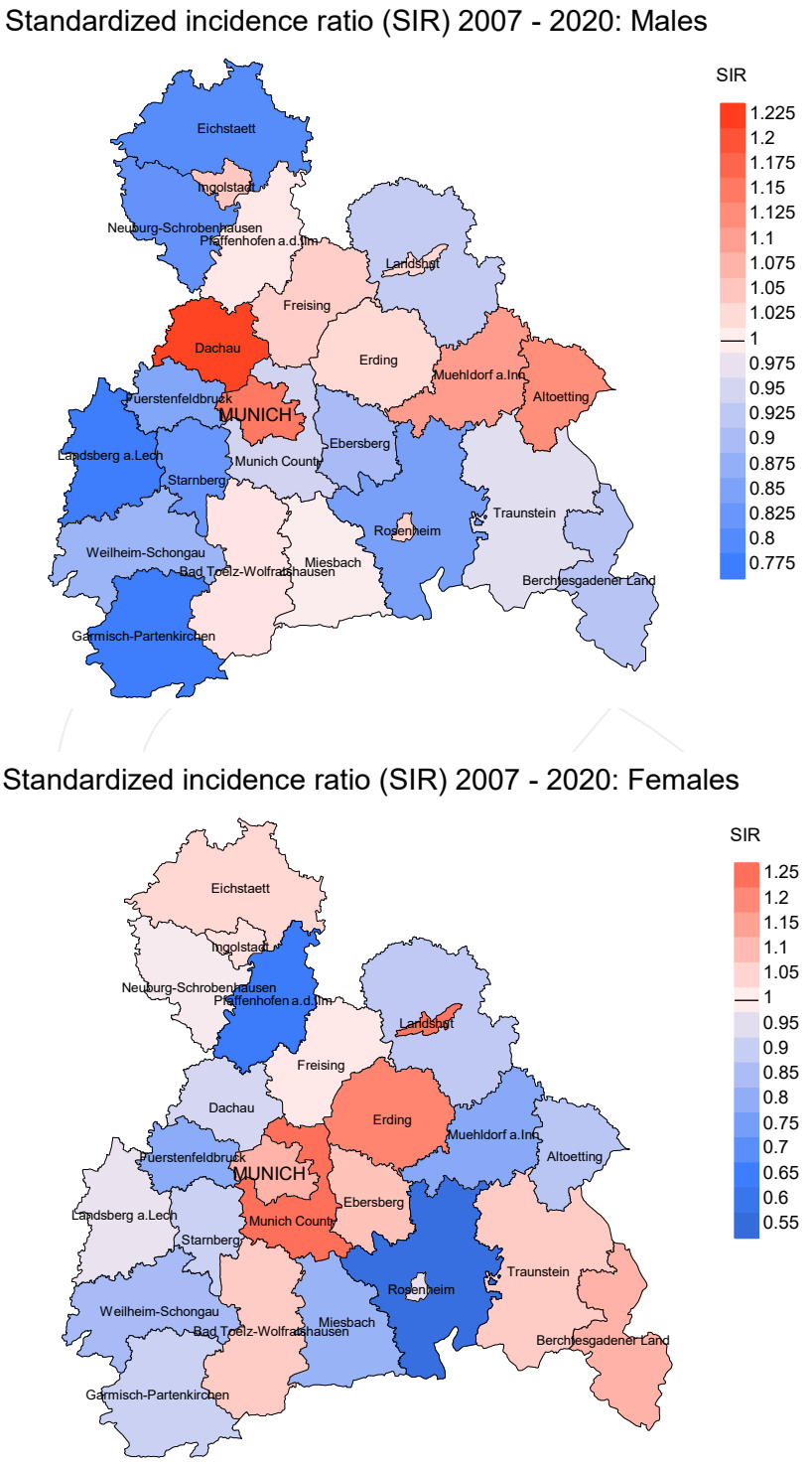


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=4,624, females N=1,731).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,153 female residents (averaged) in the period from 2007 to 2020 a total of 51 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 1.09. Though, the value of this parameter may vary with an underlying probability of 99% between 0.74 and 1.54, 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 4.94 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	38.0	189	98.4	95.8
1999	215	99.1	40.9	211	98.1	96.7
2000	225	100.0	43.6	218	96.9	95.4
2001	195	99.0	37.9	191	97.9	95.8
2002	352	100.0	43.2	349	99.1	97.7
2003	333	99.4	41.1	323	97.0	97.2
2004	339	99.1	41.0	325	95.9	97.8
2005	353	99.2	36.5	340	96.3	97.9
2006	398	98.7	32.4	378	95.0	99.2
2007	456	98.9	29.8	434	95.2	97.5
2008	480	99.4	23.8	445	92.7	98.2
2009	468	99.8	24.8	429	91.7	98.4
2010	448	100.0	23.4	422	94.2	98.8
2011	451	99.6	22.6	412	91.4	97.6
2012	519	99.4	21.8	479	92.3	97.3
2013	510	99.0	19.6	457	89.6	96.7
2014	512	99.4	21.5	454	88.7	95.6
2015	536	98.1	22.0	465	86.8	94.2
2016	503	99.8	23.7	445	88.5	92.8
2017	456	99.8	23.0	378	82.9	88.6
2018	382	100.0	15.2	259	67.8	65.3
2019	332	99.7	1.8	207	62.3	79.2
2020	303	99.7	0.7	148	48.8	93.2
1998-2020	8958	99.4	25.9	7958	88.8	95.0

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 4.94 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	225	192	97.4	135	60.0
2001	195	186	96.8	111	56.9
2002	352	266	98.1	222	63.1
2003	333	272	98.2	198	59.5
2004	339	257	98.1	187	55.2
2005	353	288	95.8	196	55.5
2006	398	334	98.5	232	58.3
2007	456	319	97.8	229	50.2
2008	480	352	98.9	233	48.5
2009	468	356	98.3	229	48.9
2010	448	361	98.9	210	46.9
2011	451	369	98.4	208	46.1
2012	519	384	98.7	238	45.9
2013	510	388	98.2	232	45.5
2014	512	428	97.7	230	44.9
2015	536	466	98.9	245	45.7
2016	503	440	98.0	250	49.7
2017	456	366	96.2	200	43.9
2018	382	326	71.2	138	36.1
2019	332	290	47.2	101	30.4
2020	303	309	96.4	101	33.3
1998–2020	8958	7317	94.6	4381	48.9

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 4.94 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	186	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	288	90.6	9.4	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	388	89.9	10.1	94.5
2014	428	86.9	13.1	92.8
2015	466	88.4	11.6	93.7
2016	440	87.5	12.5	94.7
2017	366	89.1	10.9	93.8
2018	326	70.6	29.4	87.9
2019	290	63.4	36.6	83.2
2020	309	83.2	16.8	85.9
1998-2020	7317	87.7	12.3	94.7

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	145	68.4	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	205	68.2	68.1	69.4	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	275	72.7	72.7	71.9	72.8
2014	313	71.9	71.5	73.8	72.0
2015	345	72.8	72.9	71.5	72.9
2016	332	73.8	73.9	70.4	73.9
2017	261	73.0	72.8	74.1	73.1
2018	221	74.9	75.2	73.6	75.9
2019	223	74.8	72.9	77.1	76.8
2020	229	73.4	72.0	77.7	72.4
1998-2020	5370	71.4	71.3	72.3	71.6

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 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	115	74.2	73.5	76.2	73.5
2015	121	75.0	74.4	81.9	74.9
2016	108	74.7	74.6	75.7	74.8
2017	105	77.3	76.3	81.3	77.4
2018	105	76.6	75.9	78.3	77.4
2019	67	72.5	71.2	73.1	73.2
2020	80	75.5	73.5	77.5	73.1
1998–2020	1947	75.1	74.9	77.1	75.4

By 2018, Bavarians' life expectancy at birth is estimated at 79.3 years for boys and 83.8 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	103	9.3	0.76	5.5	0.73	8.4	0.76	11.1	0.78
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	0.78
2001	135	11.6	0.87	6.8	0.86	10.2	0.88	13.2	0.87
2002	167	9.0	0.66	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	0.71	7.6	0.72	9.9	0.73
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	0.70	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	0.73	5.4	0.71	8.0	0.73	10.5	0.74
2012	249	11.0	0.68	5.0	0.63	7.6	0.65	10.1	0.68
2013	242	10.5	0.69	4.8	0.63	7.3	0.65	9.7	0.69
2014	269	11.5	0.72	5.5	0.69	8.1	0.70	10.5	0.72
2015	300	12.6	0.79	5.7	0.75	8.6	0.76	11.4	0.78
2016	287	11.9	0.78	5.3	0.74	8.0	0.76	10.7	0.77
2017	231	9.6	0.71	4.5	0.74	6.6	0.73	8.6	0.71
2018	151	6.2	0.59	2.5	0.52	3.9	0.54	5.4	0.58
2019	140	5.8	0.58	2.5	0.51	3.8	0.54	5.1	0.57
2020	191	7.8	0.84	3.6	0.83	5.4	0.83	7.0	0.84
1998-2020	4674	10.0	0.72	4.9	0.69	7.4	0.71	9.7	0.72

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	0.72	2.0	0.71	2.6	0.68
2004	67	3.4	0.76	1.2	0.64	1.9	0.70	2.6	0.74
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	0.70	2.3	0.68	2.9	0.68
2007	65	2.8	0.56	1.1	0.52	1.6	0.51	2.1	0.52
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	0.73	1.3	0.65	1.9	0.71	2.5	0.71
2012	82	3.5	0.54	1.3	0.49	2.0	0.51	2.6	0.51
2013	107	4.5	0.68	1.8	0.62	2.6	0.64	3.5	0.66
2014	103	4.3	0.75	1.7	0.72	2.5	0.74	3.3	0.77
2015	112	4.6	0.73	1.7	0.69	2.6	0.71	3.4	0.73
2016	98	4.0	0.73	1.6	0.70	2.3	0.72	3.0	0.72
2017	95	3.9	0.73	1.4	0.61	2.1	0.66	2.8	0.69
2018	79	3.2	0.64	1.1	0.58	1.7	0.60	2.3	0.62
2019	44	1.8	0.49	0.8	0.47	1.1	0.47	1.4	0.48
2020	66	2.7	0.87	1.1	0.80	1.5	0.81	2.0	0.83
1998-2020	1741	3.6	0.71	1.4	0.66	2.1	0.68	2.8	0.70

Table 12

Age distribution of age at death (cancer-related) for period 2007-2020
(**incl. multiple malignancies**)

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4	2	0.0	0.0	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	3	0.1	0.1	3	0.1	0.2			0.1
15-19	4	0.1	0.2	2	0.1	0.2	2	0.2	0.3
20-24	3	0.1	0.3	2	0.1	0.3	1	0.1	0.3
25-29	3	0.1	0.4	2	0.1	0.3	1	0.1	0.4
30-34	9	0.2	0.6	7	0.2	0.6	2	0.2	0.6
35-39	24	0.5	1.1	13	0.4	1.0	11	0.9	1.5
40-44	23	0.5	1.6	17	0.5	1.5	6	0.5	2.0
45-49	71	1.6	3.2	51	1.6	3.0	20	1.7	3.7
50-54	156	3.5	6.7	124	3.8	6.9	32	2.7	6.4
55-59	298	6.7	13.5	235	7.2	14.1	63	5.3	11.7
60-64	487	11.0	24.4	382	11.7	25.8	105	8.9	20.6
65-69	670	15.1	39.5	515	15.8	41.7	155	13.1	33.7
70-74	864	19.5	59.0	655	20.1	61.8	209	17.7	51.4
75-79	860	19.4	78.4	651	20.0	81.8	209	17.7	69.0
80-84	565	12.7	91.1	398	12.2	94.0	167	14.1	83.1
85+	394	8.9	100.0	194	6.0	100.0	200	16.9	100.0
All ages	4437	100.0		3253	100.0		1184	100.0	

Table 13

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2020
(**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	0.10	0.1	0.10	5.3	6.3
5- 9	1		0.1	0.20			3.6	
10-14	3		0.2	1.00			10.7	
15-19	2	2	0.1	0.50	0.1	1.00	4.2	8.0
20-24	2	1	0.1	0.67	0.1	0.25	2.7	2.3
25-29	2	1	0.1	0.40	0.0	0.33	2.2	1.0
30-34	7	2	0.3	0.58	0.1	0.33	4.9	1.1
35-39	13	11	0.6	1.18	0.5	0.69	4.9	2.7
40-44	17	6	0.7	0.59	0.2	0.32	2.8	0.7
45-49	51	20	1.9	0.59	0.8	0.49	3.6	1.2
50-54	124	32	4.9	0.53	1.3	0.44	4.7	1.2
55-59	235	63	11.1	0.59	2.9	0.62	5.3	1.7
60-64	382	105	21.6	0.65	5.5	0.70	6.0	2.1
65-69	515	155	31.6	0.66	8.5	0.67	5.6	2.2
70-74	655	209	43.7	0.70	12.2	0.69	5.5	2.4
75-79	651	209	53.8	0.81	13.9	0.72	5.2	2.1
80-84	398	167	55.0	0.79	15.7	0.75	3.8	1.8
85+	194	200	41.5	0.87	19.2	0.78	2.1	1.7
All ages	3253	1184					4.7	1.9
Mortality								
Raw			10.0	0.70	3.5	0.68		
WS			4.7	0.67	1.3	0.63		
ES			7.0	0.69	2.0	0.65		
BRD-S			9.2	0.71	2.6	0.67		
PYLL-70								
per 100,000			42.4		13.6			
ES			36.9		11.6			
AYLL-70			9.0		9.6			

Table 14a

Further malignancies in deaths in period 1998–2020
MALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C00	Lip	3	0.3	2	66.7			1	33.3
C03–C06	Oral cavity	29	2.6	22	75.9	2	6.9	5	17.2
C07–C08	Salivary gland	2	0.2	1	50.0	1	50.0		
C09–C10	Oropharynx	24	2.2	21	87.5	2	8.3	1	4.2
C12–C13	Hypopharynx	15	1.3	12	80.0	2	13.3	1	6.7
C15	Oesophagus	34	3.1	10	29.4	11	32.4	13	38.2
C16	Stomach	32	2.9	17	53.1	10	31.3	5	15.6
C17	Small intestine	6	0.5	3	50.0	2	33.3	1	16.7
C18	Colon	129	11.6	90	69.8	29	22.5	10	7.8
C19–C20	Rectum	69	6.2	54	78.3	11	15.9	4	5.8
C22	Liver	4	0.4					4	100.0
C23–C24	Bile	6	0.5	2	33.3	4	66.7		
C25	Pancreas	17	1.5	1	5.9	9	52.9	7	41.2
C32	Larynx	30	2.7	28	93.3	2	6.7		
C33–C34	Lung	95	8.5	35	36.8	24	25.3	36	37.9
C40–C41	Bone	2	0.2	1	50.0	1	50.0		
C43	Malign. melanoma	50	4.5	40	80.0	4	8.0	6	12.0
C44	Skin others	96	8.6	66	68.8	4	4.2	26	27.1
C46,C49	Soft tissue	3	0.3	2	66.7	1	33.3		
C48	Peritoneal	2	0.2			1	50.0	1	50.0
C50	Breast	4	0.4	2	50.0			2	50.0
C60	Penis	3	0.3	3	100.0				
C61	Prostate	233	21.0	195	83.7	13	5.6	25	10.7
C62	Testis	12	1.1	12	100.0				
C64	Kidney	61	5.5	40	65.6	11	18.0	10	16.4
C65	Renal pelvis	2	0.2	2	100.0				
C67	Bladder	51	4.6	32	62.7	6	11.8	13	25.5
C69	Eye melanoma	4	0.4	4	100.0				
C70–C72	CNS cancer	3	0.3	2	66.7			1	33.3
C73	Thyroid	11	1.0	9	81.8			2	18.2
C76–C79	CUP	14	1.3	7	50.0	2	14.3	5	35.7
C81	Hodgkin lymphoma	3	0.3	3	100.0				
C82–C85	NHL	40	3.6	30	75.0	5	12.5	5	12.5
C90	Mult. myeloma	8	0.7	5	62.5	1	12.5	2	25.0
C91–C96	Leukaemia	10	0.9	5	50.0			5	50.0
Others, specified		5	0.4	1	20.0	1	20.0	3	60.0
All further malignancies		1112	100.0	759	68.3	159	14.3	194	17.4

Further malignancies with number of cases 1 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 1998–2020
FEMALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03–C06 Oral cavity	6	1.6	5	83.3	1	16.7		
C09–C10 Oropharynx	4	1.1	3	75.0			1	25.0
C11 Nasopharynx	1	0.3			1	100.0		
C12–C13 Hypopharynx	1	0.3			1	100.0		
C15 Oesophagus	3	0.8	2	66.7			1	33.3
C16 Stomach	11	2.9	4	36.4	4	36.4	3	27.3
C17 Small intestine	2	0.5	1	50.0	1	50.0		
C18 Colon	43	11.5	28	65.1	12	27.9	3	7.0
C19–C20 Rectum	10	2.7	9	90.0	1	10.0		
C22 Liver	2	0.5					2	100.0
C23–C24 Bile	4	1.1	2	50.0	1	25.0	1	25.0
C25 Pancreas	3	0.8	1	33.3	1	33.3	1	33.3
C26 GI cancer	1	0.3			1	100.0		
C30–C31 Sinuses	1	0.3	1	100.0				
C32 Larynx	1	0.3			1	100.0		
C33–C34 Lung	17	4.5	9	52.9	2	11.8	6	35.3
C37 Thymus	1	0.3	1	100.0				
C40–C41 Bone	1	0.3					1	100.0
C43 Malign. melanoma	17	4.5	15	88.2			2	11.8
C44 Skin others	29	7.7	21	72.4	1	3.4	7	24.1
C48 Peritoneal	1	0.3	1	100.0				
C50 Breast	107	28.5	92	86.0	7	6.5	8	7.5
C51 Vulva	5	1.3	4	80.0			1	20.0
C52 Vagina	1	0.3	1	100.0				
C53 Cervix uteri	10	2.7	10	100.0				
C54 Corpus uteri	19	5.1	16	84.2	1	5.3	2	10.5
C56 Ovary	10	2.7	9	90.0			1	10.0
C64 Kidney	14	3.7	6	42.9	5	35.7	3	21.4
C67 Bladder	3	0.8	2	66.7	1	33.3		
C69 Eye carcinoma	1	0.3					1	100.0
C69 Eye melanoma	5	1.3	5	100.0				
C70–C72 CNS cancer	2	0.5			1	50.0	1	50.0
C73 Thyroid	9	2.4	6	66.7	1	11.1	2	22.2
C76–C79 CUP	6	1.6	2	33.3	3	50.0	1	16.7
C81 Hodgkin lymphoma	3	0.8	3	100.0				
C82–C85 NHL	17	4.5	13	76.5	4	23.5		
C90 Mult. myeloma	2	0.5	2	100.0				
C91–C96 Leukaemia	2	0.5	2	100.0				
All further malignancies	375	100.0	276	73.6	51	13.6	48	12.8

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 2007-2020
(**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	0.10	0.1	0.10	5.3	6.7
5- 9	1		0.1	0.20			3.7	
10-14	3		0.2	1.00			10.7	
15-19	2	2	0.1	0.50	0.1	1.00	4.3	8.7
20-24	2	1	0.1	0.67	0.1	0.25	3.0	2.4
25-29	2	1	0.1	0.40	0.0	0.33	2.4	1.1
30-34	7		0.3	0.58			5.1	
35-39	13	10	0.6	1.18	0.4	0.67	5.2	2.7
40-44	17	5	0.7	0.61	0.2	0.33	3.0	0.7
45-49	46	18	1.7	0.60	0.7	0.49	3.6	1.3
50-54	107	26	4.2	0.50	1.0	0.44	4.6	1.2
55-59	218	54	10.3	0.61	2.5	0.63	5.7	1.7
60-64	325	91	18.4	0.64	4.8	0.69	6.1	2.2
65-69	425	129	26.0	0.68	7.1	0.70	5.8	2.3
70-74	524	166	35.0	0.73	9.7	0.67	5.8	2.5
75-79	479	154	39.6	0.83	10.3	0.72	5.3	2.0
80-84	289	127	39.9	0.81	11.9	0.73	3.9	1.8
85+	139	160	29.8	0.86	15.3	0.75	2.1	1.7
All ages	2600	945					4.9	1.9
Mortality								
Raw			8.0	0.71	2.8	0.68		
WS			3.8	0.67	1.1	0.62		
ES			5.7	0.69	1.6	0.65		
BRD-S			7.3	0.71	2.1	0.66		
PYLL-70								
per 100,000			37.9		11.6			
ES			33.1		9.9			
AYLL-70			9.3		9.7			

* See corresponding tables with multiple malignancies.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2020
(**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	0.10	0.1	0.10	5.3	6.7
5- 9	1		0.1	0.20			3.7	
10-14	3		0.2	1.00			10.7	
15-19	2	2	0.1	0.50	0.1	1.00	4.3	9.1
20-24	2	1	0.1	0.67	0.1	0.25	3.0	2.5
25-29	2	1	0.1	0.50	0.0	0.33	2.4	1.1
30-34	7		0.3	0.58			5.1	
35-39	11	10	0.5	1.00	0.4	0.67	4.4	2.7
40-44	17	5	0.7	0.61	0.2	0.38	3.1	0.7
45-49	46	18	1.7	0.60	0.7	0.50	3.6	1.3
50-54	107	26	4.2	0.52	1.0	0.48	4.6	1.2
55-59	214	50	10.1	0.64	2.3	0.60	5.6	1.6
60-64	315	89	17.8	0.64	4.7	0.71	6.0	2.2
65-69	405	128	24.8	0.67	7.1	0.70	5.7	2.4
70-74	501	161	33.4	0.74	9.4	0.67	5.7	2.5
75-79	459	149	37.9	0.82	9.9	0.73	5.3	2.1
80-84	270	121	37.3	0.79	11.4	0.72	3.9	1.7
85+	125	155	26.8	0.79	14.9	0.74	2.1	1.7
All ages	2488	917					4.8	1.9
Mortality								
Raw			7.6	0.71	2.7	0.68		
WS			3.7	0.67	1.1	0.63		
ES			5.4	0.69	1.6	0.65		
BRD-S			7.0	0.71	2.0	0.67		
PYLL-70								
per 100,000			37.1		11.3			
ES			32.4		9.7			
AYLL-70			9.4		9.7			

* See corresponding tables with multiple malignancies.

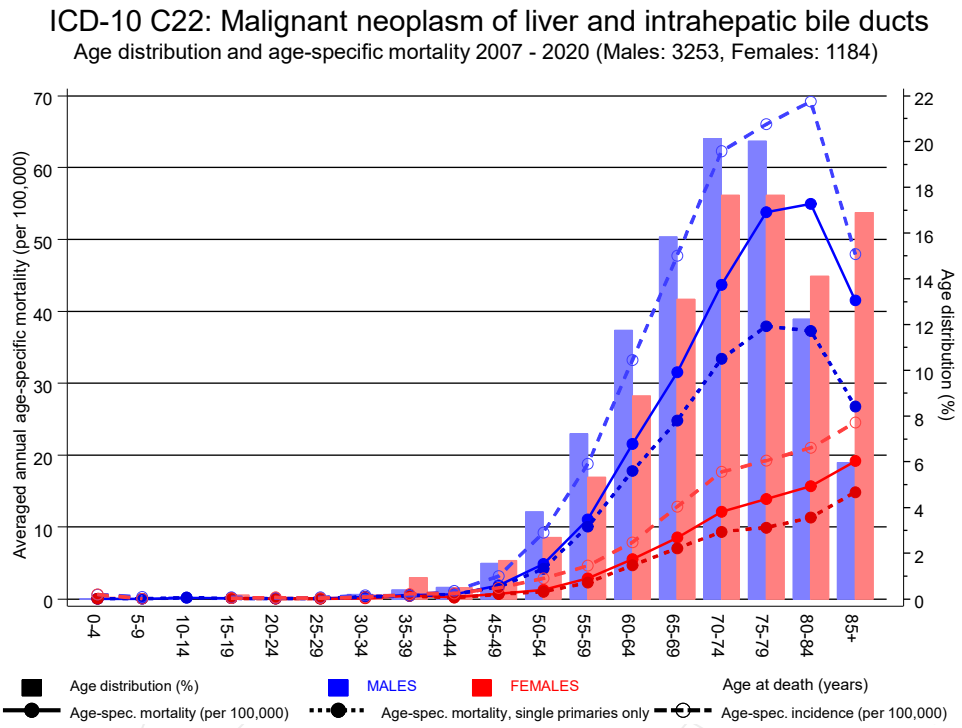
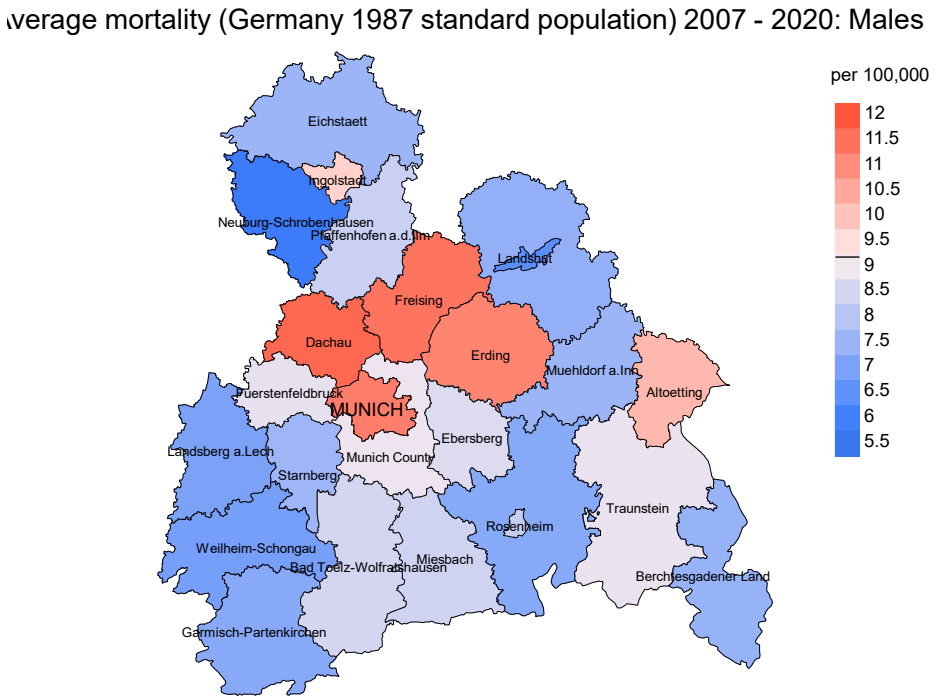


Figure 17. Distribution of age at death (bars; males: mean=69.6 yrs, median=70.9 yrs; females: mean=72.4 yrs, median=73.4 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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



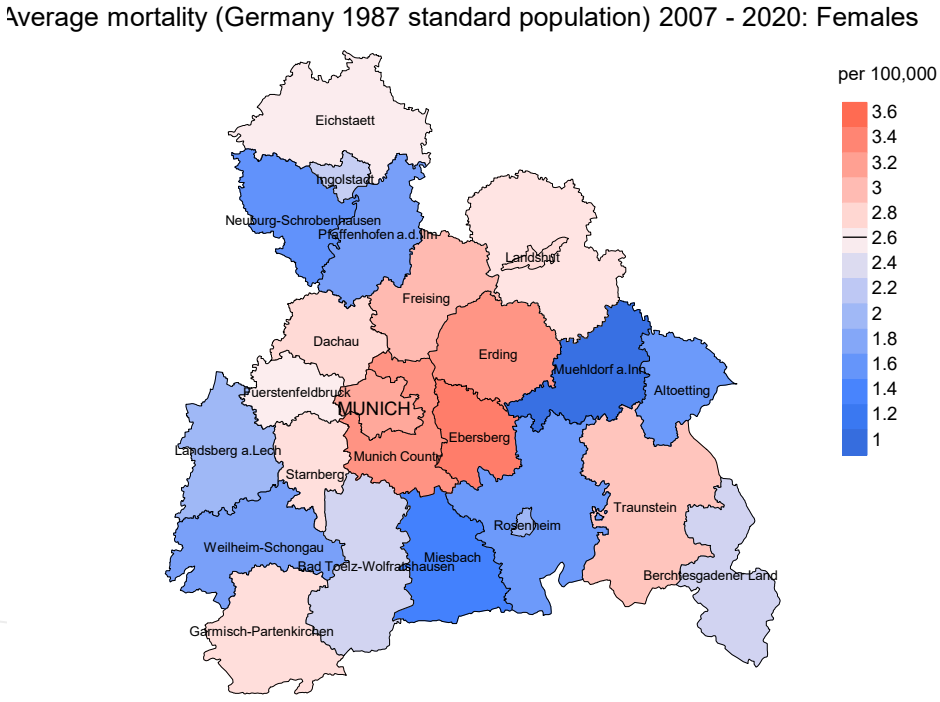
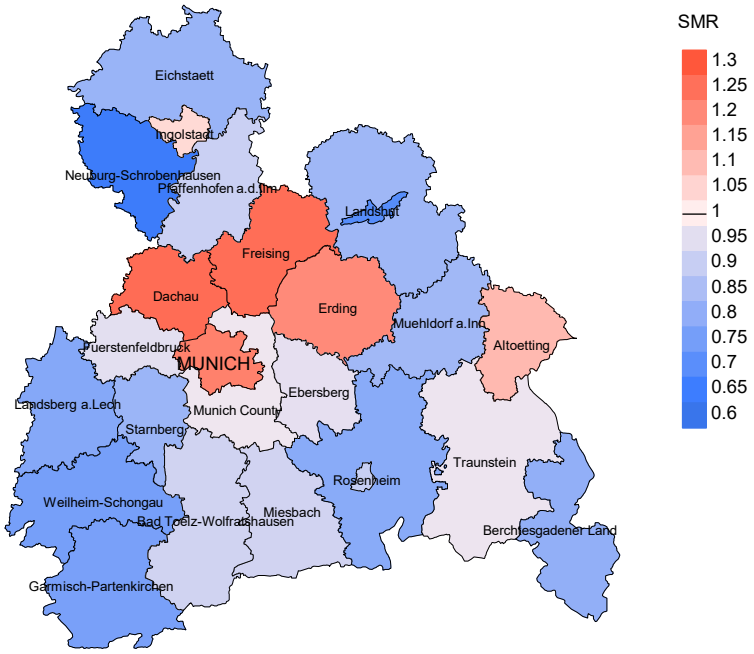


Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2020. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 9.2/100,000 WS N=3,253, females 2.6/100,000 WS N=1,184).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,727 female residents (averaged) in the period from 2007 to 2020 a total of 43 women died from liver cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 3.5/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 2.2 and 5.1/100,000.

Standardized mortality ratio (SMR) 2007 - 2020: Males



Standardized mortality ratio (SMR) 2007 - 2020: Females

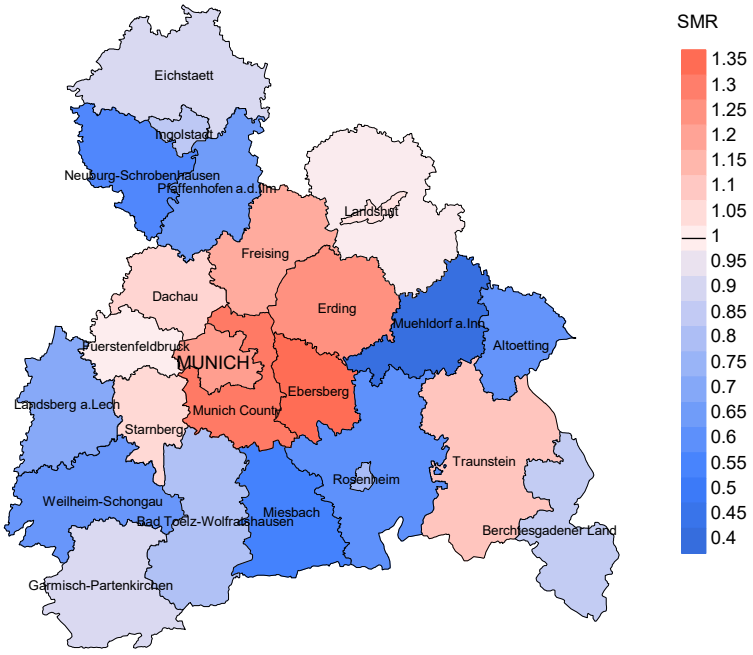


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=3,253, females N=1,184).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,153 female residents (averaged) in the period from 2007 to 2020 a total of 43 women died from liver cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.35. Though, the value of this parameter may vary with an underlying probability of 99% between 0.88 and 1.97, 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 ratio of mortality and incidence (mortality-to-incidence ratio, **MIR**, **MI-Index**) is a statistical index 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 MIR. 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 (FRG) 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 of mortality to incidence, MIR
FRG	Federal Republic of Germany

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