Munich Cancer Registry

ICD-10 C70-C72: Brain/nerves cancer

Incidence and Mortality

Year of diagnosis	1998-2020
Patients	6,982
Diseases	6,991
Creation date	12/21/2021
Database export	12/20/2021
Population	4.95 m

BERLIN

GERMANY

BAVARIA

MUNICH

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

https://www.tumorregister-muenchen.de/en/facts/base/bC7072E-ICD-10-C70-C72-Brain-nerves-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
C70.-	Malignant neoplasm of meninges
C70.0	Cerebral meninges
C70.1	Spinal meninges
C70.9	Meninges, unspecified
C71.-	Malignant neoplasm of brain
C71.0	Cerebrum, except lobes and ventricles
C71.1	Frontal lobe
C71.2	Temporal lobe
C71.3	Parietal lobe
C71.4	Occipital lobe
C71.5	Cerebral ventricle
C71.6	Cerebellum
C71.7	Brain stem
C71.8	Overlapping lesion of brain
C71.9	Brain, unspecified
C72.-	Malignant neoplasm of spinal cord, cranial nerves and other parts of central nervous system
C72.0	Spinal cord
C72.1	Cauda equina
C72.2	Olfactory nerve
C72.3	Optic nerve
C72.4	Acoustic nerve
C72.5	Other and unspecified cranial nerves
C72.8	Overlapping lesion of brain and other parts of central nervous system
C72.9	Central nervous system, 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	193	54	28.0	9.3	2.6	88.1	97.9
1999	185	58	31.4	10.3	2.6	90.8	97.3
2000	202	54	26.7	9.8	2.6	84.2	97.0
2001	237	59	24.9	9.5	2.5	87.8	96.6
2002	341	64	18.8	9.4	2.6	84.8	98.5 #
2003	379	75	19.8	9.3	2.4	84.2	98.7
2004	338	73	21.6	9.3	2.4	84.9	97.9
2005	373	65	17.4	9.7	2.3	83.4	97.6
2006	303	40	13.2	9.8	2.3	85.8	96.7
2007	350	50	14.3	9.9	2.2	78.0	94.6 #
2008	409	57	13.9	9.9	2.1	80.2	98.5
2009	451	56	12.4	10.1	1.7	81.4	98.2
2010	404	54	13.4	10.3	1.8	82.4	98.0
2011	406	46	11.3	10.7	1.6	76.4	98.8
2012	407	42	10.3	10.8	1.5	78.9	99.3
2013	392	41	10.5	11.0	1.5	81.9	98.5
2014	364	33	9.1	11.3	1.4	81.9	98.1
2015	336	38	11.3	11.4	0.9	80.1	98.8
2016	308	36	11.7	11.3	1.0	76.9	99.0
2017	253	39	15.4	11.6	0.7	66.8	100.0
2018	176	25	14.2	11.7	0.6	60.8	100.0
2019	100	2	2.0	11.8	0.5	64.0	100.0
2020	84			11.9	0.0	51.2	100.0 ##
1998-2020	6991	1061	15.2	11.9	2.6	80.4	98.2

6,991 cases diagnosed 1998-2020 are related to a total of 6,982 patients. Currently, in 1,022 (14.6 %) of these 6,982 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 853 / 144 / 25 (12.2 % / 2.1 % / 0.4 %) 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 retrieved from the respective headings.

How to interpret:
In 2018, a subgroup of 176 cases has been diagnosed, of which 11.7 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 0.6 % 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 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	98	50.8	24	24.5	9.2	2.5	88.8	98.0
1999	93	50.3	28	30.1	9.9	2.5	90.3	96.8
2000	105	52.0	23	21.9	9.5	2.5	81.9	97.1
2001	117	49.4	26	22.2	8.7	2.5	88.0	96.6
2002	175	51.3	24	13.7	9.0	2.5	82.9	98.9 #
2003	197	52.0	34	17.3	8.8	2.4	85.8	99.5
2004	169	50.0	28	16.6	9.0	2.3	89.9	99.4
2005	199	53.4	30	15.1	9.8	2.1	86.9	97.0
2006	172	56.8	17	9.9	10.0	2.2	86.6	96.5
2007	187	53.4	23	12.3	10.0	2.2	76.5	94.1 #
2008	230	56.2	26	11.3	10.2	2.1	84.8	99.1
2009	263	58.3	26	9.9	10.4	1.7	79.8	98.1
2010	225	55.7	25	11.1	10.5	1.7	82.2	97.8
2011	216	53.2	19	8.8	11.1	1.6	80.1	99.1
2012	217	53.3	19	8.8	11.1	1.3	79.3	99.5
2013	225	57.4	18	8.0	11.6	1.4	86.2	99.6
2014	204	56.0	12	5.9	11.8	1.3	81.4	98.5
2015	182	54.2	18	9.9	11.9	0.7	84.6	98.9
2016	166	53.9	15	9.0	11.8	0.9	75.9	98.2
2017	151	59.7	19	12.6	12.0	0.3	68.2	100.0
2018	110	62.5	14	12.7	12.3	0.0	60.9	100.0
2019	62	62.0	1	1.6	12.4	0.0	66.1	100.0
2020	49	58.3			12.5	0.0	57.1	100.0 ##
1998-2020	3812	54.5	469	12.3	12.5	2.5	81.5	98.3

3,812 cases diagnosed 1998-2020 are related to a total of 3,805 patients. Currently, in 568 (14.9 %) of these 3,805 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 469 / 81 / 18 (12.3 % / 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 retrieved from the respective headings.

How to interpret:
In 2018, a subgroup of 110 cases has been diagnosed, of which 12.3 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 0.0 % 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	95	49.2	30	31.6	9.5	2.8	87.4	97.9
1999	92	49.7	30	32.6	10.7	2.7	91.3	97.8
2000	97	48.0	31	32.0	10.2	2.7	86.6	96.9
2001	120	50.6	33	27.5	10.4	2.6	87.5	96.7
2002	166	48.7	40	24.1	9.8	2.7	86.7	98.2 #
2003	182	48.0	41	22.5	9.8	2.5	82.4	97.8
2004	169	50.0	45	26.6	9.6	2.5	79.9	96.4
2005	174	46.6	35	20.1	9.7	2.5	79.3	98.3
2006	131	43.2	23	17.6	9.5	2.3	84.7	96.9
2007	163	46.6	27	16.6	9.7	2.2	79.8	95.1 #
2008	179	43.8	31	17.3	9.6	2.1	74.3	97.8
2009	188	41.7	30	16.0	9.8	1.8	83.5	98.4
2010	179	44.3	29	16.2	9.9	1.9	82.7	98.3
2011	190	46.8	27	14.2	10.2	1.5	72.1	98.4
2012	190	46.7	23	12.1	10.5	1.6	78.4	98.9
2013	167	42.6	23	13.8	10.4	1.6	76.0	97.0
2014	160	44.0	21	13.1	10.7	1.5	82.5	97.5
2015	154	45.8	20	13.0	10.8	1.1	74.7	98.7
2016	142	46.1	21	14.8	10.8	1.1	78.2	100.0
2017	102	40.3	20	19.6	11.0	1.3	64.7	100.0
2018	66	37.5	11	16.7	11.1	1.4	60.6	100.0
2019	38	38.0	1	2.6	11.2	1.4	60.5	100.0
2020	35	41.7			11.2	0.0	42.9	100.0 ##
1998–2020	3179	45.5	592	18.6	11.2	2.8	79.2	98.0

3,179 cases diagnosed 1998-2020 are related to a total of 3,177 patients. Currently, in 454 (14.3 %) of these 3,177 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 384 / 63 / 7 (12.1 % / 2.0 % / 0.2 %) 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 retrieved from the respective headings.

How to interpret:
In 2018, a subgroup of 66 cases has been diagnosed, of which 11.1 % 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	98	95	8.8	8.1	6.2	5.4	8.0	6.6	9.0	7.6
1999	93	92	8.3	7.8	5.7	4.6	7.6	6.0	9.0	6.9
2000	105	97	9.2	8.1	6.6	4.9	8.4	6.2	10.0	7.1
2001	117	120	10.1	9.9	6.9	5.8	9.1	7.5	10.7	8.7
2002	175	166	9.4	8.5	6.7	4.9	8.3	6.4	9.4	7.6
2003	197	182	10.5	9.2	7.3	5.7	9.3	7.3	10.8	8.3
2004	169	169	9.0	8.5	5.9	5.6	7.8	6.7	9.1	7.4
2005	199	174	10.5	8.7	7.1	5.3	8.9	6.6	10.3	7.5
2006	172	131	9.0	6.5	5.9	3.7	7.6	4.8	8.6	5.6
2007	187	163	8.4	7.1	5.9	4.4	7.3	5.5	8.1	6.4
2008	230	179	10.3	7.7	6.9	5.2	8.8	6.1	10.3	6.7
2009	263	188	11.8	8.1	7.8	4.9	9.9	6.2	11.5	7.0
2010	225	179	10.0	7.6	6.4	4.6	8.2	5.7	9.5	6.5
2011	216	190	9.7	8.1	6.1	4.4	7.9	5.8	9.2	6.9
2012	217	190	9.6	8.1	6.4	4.9	7.8	6.1	9.0	6.9
2013	225	167	9.8	7.0	6.2	4.2	7.9	5.2	9.0	6.0
2014	204	160	8.7	6.6	5.5	3.5	7.0	4.7	8.0	5.4
2015	182	154	7.7	6.3	4.7	3.6	6.1	4.6	7.1	5.4
2016	166	142	6.9	5.8	4.2	3.2	5.5	4.1	6.4	4.8
2017	151	102	6.3	4.1	3.7	2.2	4.9	2.9	5.7	3.4
2018	110	66	4.5	2.7	2.7	1.7	3.6	2.0	4.2	2.2
2019	62	38	2.5	1.5	1.5	0.7	2.0	1.0	2.3	1.2
2020	49	35	2.0	1.4	1.3	0.7	1.6	1.0	1.9	1.2
1998-2020	3812	3179	8.2	6.6	5.4	3.9	6.8	4.9	7.8	5.6

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	193	57.5	18.6	1.8	90.6	32.6	47.5	59.2	72.2	79.7
1999	185	60.5	18.0	1.6	93.4	36.5	51.0	63.2	73.8	79.7
2000	202	59.3	18.6	2.9	93.8	34.7	48.4	62.5	72.3	79.7
2001	237	60.5	18.0	1.0	92.0	37.0	51.0	62.1	73.3	80.4
2002	341	59.8	18.5	0.8	91.2	32.2	50.4	63.0	72.9	80.8
2003	379	58.4	18.5	0.6	95.4	31.5	45.7	62.0	72.9	79.7
2004	338	59.7	19.3	0.0	92.8	34.0	48.8	63.1	73.7	81.9
2005	373	59.6	19.5	0.8	94.3	33.1	47.7	64.4	73.2	81.3
2006	303	60.5	18.5	3.0	97.0	34.8	48.3	64.2	73.2	81.3
2007	350	58.3	20.1	0.8	93.5	30.7	43.9	62.5	73.2	80.9
2008	409	58.9	20.5	0.0	94.1	29.4	47.8	63.9	73.7	80.8
2009	451	60.7	19.1	0.2	94.2	34.3	51.4	64.8	74.2	82.3
2010	404	60.9	19.3	0.6	91.6	35.7	49.4	65.7	74.2	81.7
2011	406	60.8	18.2	1.7	94.0	37.2	48.5	63.8	75.6	81.8
2012	407	60.1	20.2	0.0	96.0	32.8	48.1	64.9	74.1	82.6
2013	392	61.1	18.6	0.1	93.9	37.1	52.4	65.6	74.2	80.6
2014	364	62.1	18.0	2.6	95.0	37.5	52.4	65.6	75.0	82.6
2015	336	61.8	18.0	0.5	95.8	34.4	52.3	65.1	75.2	80.8
2016	308	62.1	18.0	0.4	94.5	36.4	50.9	65.6	76.1	82.0
2017	253	63.2	19.0	1.5	94.3	36.8	54.1	67.6	76.7	83.2
2018	176	62.2	19.6	1.3	98.3	37.3	49.9	66.3	76.6	84.1
2019	100	64.6	15.3	5.9	94.9	45.1	55.3	67.0	75.5	81.7
2020	84	60.8	17.5	17.8	86.0	32.8	50.4	63.3	76.3	80.7
1998-2020	6991	60.4	18.9	0.0	98.3	34.3	49.9	64.0	74.3	81.4

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	98	55.1	15.7	3.4	83.3	32.6	46.7	56.7	66.2	74.8
1999	93	59.5	16.7	1.6	89.2	38.9	51.6	61.2	71.8	77.8
2000	105	56.8	18.2	4.1	88.2	30.0	47.3	59.9	68.9	78.3
2001	117	58.7	17.2	1.0	91.2	37.0	50.8	60.3	71.3	77.4
2002	175	56.2	18.2	0.8	87.7	30.9	45.4	61.7	68.8	75.9
2003	197	56.8	18.8	6.2	89.4	28.3	44.3	60.8	71.8	78.1
2004	169	59.2	16.8	0.1	90.1	37.1	48.5	61.0	70.4	81.9
2005	199	58.4	19.7	0.8	94.3	31.6	46.4	63.5	72.1	80.3
2006	172	58.3	17.2	3.0	90.4	34.7	46.9	62.6	69.7	76.9
2007	187	56.7	19.4	1.5	92.6	30.9	43.9	60.2	69.8	79.2
2008	230	58.3	18.8	0.0	94.1	31.9	47.4	63.3	72.9	78.7
2009	263	59.5	19.4	0.9	90.3	33.5	49.5	63.4	73.6	81.5
2010	225	59.6	18.6	2.7	90.8	34.4	48.7	62.9	73.4	80.8
2011	216	58.8	18.3	1.7	91.9	36.6	45.3	60.4	73.7	80.5
2012	217	59.1	20.7	0.3	96.0	30.5	47.0	64.8	73.6	80.8
2013	225	60.2	18.5	0.1	93.9	37.3	52.1	64.1	73.7	78.2
2014	204	60.2	18.4	2.6	93.6	35.4	50.2	62.8	73.8	81.7
2015	182	61.8	17.6	0.5	95.1	36.1	54.9	64.7	73.8	79.0
2016	166	60.7	18.2	0.4	93.0	34.9	48.9	63.7	75.5	81.0
2017	151	62.4	17.9	1.5	90.4	41.4	55.5	65.4	76.0	78.8
2018	110	62.3	17.8	1.9	98.3	41.7	49.9	64.1	75.8	82.6
2019	62	62.5	15.7	5.9	86.3	46.2	55.2	63.8	73.2	81.7
2020	49	58.8	17.5	17.8	84.1	28.1	51.2	59.9	70.4	79.6
1998-2020	3812	59.1	18.4	0.0	98.3	33.5	48.6	62.3	72.7	79.5

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	95	59.9	21.0	1.8	90.6	30.9	49.6	63.4	77.2	83.4
1999	92	61.5	19.3	4.7	93.4	33.4	50.8	64.4	76.5	84.0
2000	97	62.0	18.7	2.9	93.8	35.7	55.5	67.6	74.2	81.3
2001	120	62.3	18.6	2.3	92.0	36.6	51.2	65.5	76.1	81.9
2002	166	63.6	18.2	2.6	91.2	34.9	54.2	67.2	78.1	83.0
2003	182	60.2	17.9	0.6	95.4	36.2	48.9	62.9	74.1	80.3
2004	169	60.1	21.6	0.0	92.8	29.6	51.8	65.1	76.4	82.6
2005	174	61.1	19.3	2.7	91.7	34.5	48.5	65.1	75.4	83.4
2006	131	63.5	19.6	7.3	97.0	35.1	54.1	67.3	77.7	85.8
2007	163	60.1	20.7	0.8	93.5	30.6	44.1	65.8	77.7	82.3
2008	179	59.7	22.6	0.0	92.9	27.7	47.8	65.8	77.1	85.1
2009	188	62.3	18.6	0.2	94.2	37.3	53.1	65.4	75.6	83.6
2010	179	62.4	20.1	0.6	91.6	37.3	51.9	68.1	75.9	83.4
2011	190	63.1	17.9	11.1	94.0	38.0	50.0	67.0	77.0	82.5
2012	190	61.2	19.6	0.0	90.4	34.9	50.0	65.0	74.6	83.3
2013	167	62.3	18.8	0.7	92.8	34.7	52.8	66.4	76.3	84.3
2014	160	64.5	17.1	3.2	95.0	42.7	53.8	67.6	76.2	83.1
2015	154	61.8	18.5	5.9	95.8	34.2	49.7	65.5	76.6	82.7
2016	142	63.7	17.6	7.1	94.5	41.3	53.9	66.8	76.8	83.5
2017	102	64.3	20.6	5.0	94.3	33.0	53.2	70.8	79.2	85.3
2018	66	62.0	22.6	1.3	97.4	30.9	48.2	68.9	77.0	86.3
2019	38	68.0	14.1	35.3	94.9	44.0	57.0	72.7	77.3	81.8
2020	35	63.5	17.4	24.5	86.0	36.4	49.9	66.7	79.5	81.7
1998−2020	3179	62.0	19.3	0.0	97.4	34.9	51.1	66.2	76.6	83.2

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	64	1.4	1.4	34	1.4	1.4	30	1.5	1.5
5-9	43	1.0	2.4	26	1.0	2.4	17	0.9	2.4
10-14	30	0.7	3.1	20	0.8	3.2	10	0.5	2.9
15-19	36	0.8	3.9	21	0.8	4.1	15	0.8	3.7
20-24	61	1.4	5.3	38	1.5	5.6	23	1.2	4.9
25-29	94	2.1	7.4	55	2.2	7.8	39	2.0	6.9
30-34	129	2.9	10.3	68	2.7	10.5	61	3.1	10.0
35-39	154	3.5	13.8	84	3.4	13.9	70	3.6	13.6
40-44	221	5.0	18.7	138	5.5	19.5	83	4.2	17.8
45-49	261	5.9	24.6	157	6.3	25.8	104	5.3	23.1
50-54	332	7.5	32.1	191	7.7	33.5	141	7.2	30.4
55-59	395	8.9	41.0	253	10.2	43.6	142	7.3	37.6
60-64	403	9.1	50.1	241	9.7	53.3	162	8.3	45.9
65-69	534	12.0	62.1	303	12.2	65.5	231	11.8	57.8
70-74	576	13.0	75.1	313	12.6	78.1	263	13.5	71.2
75-79	530	11.9	87.0	293	11.8	89.9	237	12.1	83.4
80-84	336	7.6	94.6	158	6.4	96.2	178	9.1	92.5
85+	241	5.4	100.0	94	3.8	100.0	147	7.5	100.0
All ages	4440	100.0		2487	100.0		1953	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=235 %	Females DCO rate n=284 %	Males Prop.all cancers n=153686 %	Females Prop.all cancers n=155051 %
0- 4	34	30	2.1	1.9			15.5	17.5
5- 9	26	17	1.7	1.1	3.8		22.2	17.0
10-14	20	10	1.3	0.7			14.6	7.8
15-19	21	15	1.2	0.9	4.8		6.6	5.7
20-24	38	23	1.9	1.2	2.6		6.0	4.4
25-29	55	39	2.4	1.7	3.6		5.8	3.3
30-34	68	61	2.9	2.7		6.6	5.2	2.8
35-39	84	70	3.6	3.1	3.6		4.6	2.0
40-44	138	83	5.5	3.4	1.4	1.2	4.9	1.3
45-49	157	104	5.8	4.0	2.5	2.9	3.1	1.1
50-54	191	141	7.5	5.6	2.6	6.4	2.3	1.1
55-59	253	142	11.9	6.5	4.0	4.2	2.0	1.1
60-64	240	162	13.6	8.5	4.6	4.3	1.4	1.0
65-69	302	231	18.5	12.7	5.3	5.2	1.2	1.2
70-74	313	262	20.9	15.2	8.9	11.1	1.1	1.3
75-79	293	237	24.2	15.8	16.4	16.5	1.2	1.2
80-84	158	178	21.8	16.7	27.8	36.5	1.0	1.2
85+	94	147	20.1	14.1	62.8	74.1	0.9	0.9
All ages	2485	1952			9.5	14.5	1.6	1.3
Incidence								
Raw			7.6	5.8				
WS			4.9	3.4				
ES			6.2	4.3				
BRD-S			7.1	4.9				

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).

ICD-10 C70-C72: Malignant neoplasm of brain and nerves
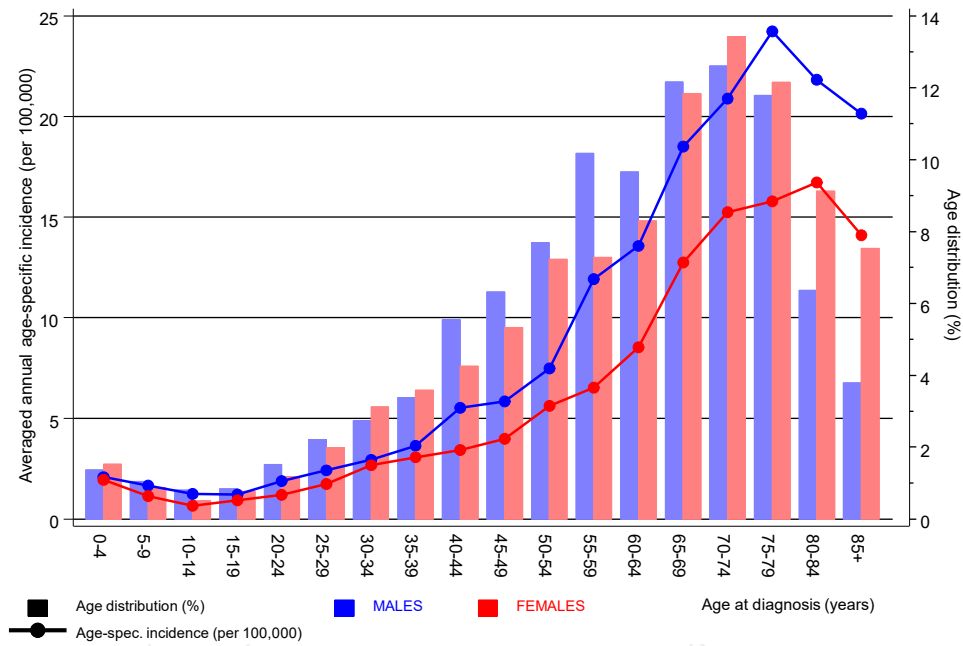Age distribution and age-specific incidence 2007 - 2020 (Males: 2485, Females: 1952)

Figure 6. Age distribution (males: mean=59.8 yrs, median=63.3 yrs; females: mean=62.3 yrs, median=66.5 yrs) and age-specific incidence.

ICD-10 C70-C72: Malignant neoplasm of brain and nerves
Age-specific incidence rates: international comparison

Region	Period	Population
MCR	2007-2020	4.9 m
SEER	2007-2018	86.7 m
FRG (RKI estimates)	2007-2017	82.8 m

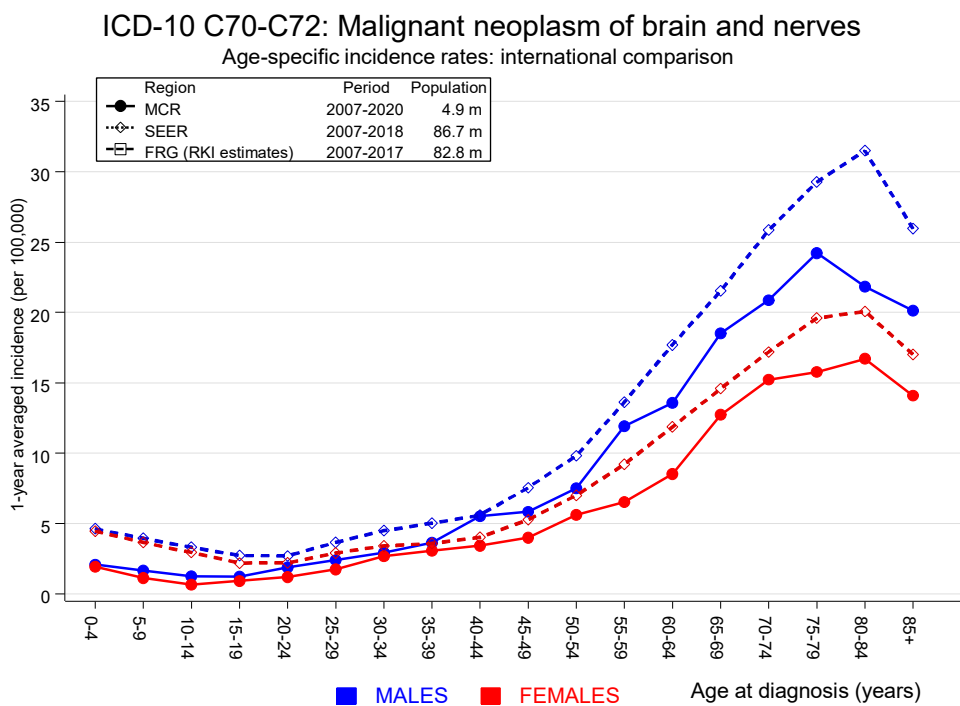■ MALES   ■ FEMALES   Age at diagnosis (years)

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 %
C07-C08 Salivary gland	1	0.1	7.9	0.2	43.8		1.1	
C12-C13 Hypopharynx	1	0.5	2.2	0.1	12.0		0.7	100.0
C16 Stomach	2	2.1	1.0	0.1	3.5		-0.1	
C17 Small intestine	1	0.4	2.7	0.1	14.9		0.8	100.0
C18 Colon	11	5.0	2.2	1.1	4.0	#	7.6	
C19-C20 Rectum	4	3.2	1.2	0.3	3.2		1.0	25.0
C22 Liver	1	1.7	0.6	0.0	3.4		-0.8	
C23-C24 Bile	1	0.5	1.9	0.0	10.4		0.6	100.0
C25 Pancreas	5	2.1	2.4	0.8	5.7		3.7	20.0
C30-C31 Sinuses	2	0.1	15.7	1.9	56.6	#	2.3	
C33-C34 Lung	8	6.8	1.2	0.5	2.3		1.5	
C40-C41 Bone	1	0.1	13.5	0.3	75.2		1.2	
C43 Malign. melanoma	8	3.0	2.6	1.1	5.2	#	6.2	25.0
C46,C49 Soft tissue	3	0.4	8.2	1.7	23.9	#	3.3	
C61 Prostate	21	15.6	1.3	0.8	2.1		6.8	9.5
C62 Testis	3	0.8	3.9	0.8	11.5		2.8	
C64 Kidney	7	2.2	3.2	1.3	6.6	#	6.0	14.3
C67 Bladder	4	2.2	1.8	0.5	4.7		2.3	
C69 Eye melanoma	1	0.1	13.9	0.4	77.6		1.2	
C70-C72 CNS cancer	6	0.9	6.4	2.3	13.9	#	6.3	
C73 Thyroid	1	0.7	1.5	0.0	8.5		0.4	
C76-C79 CUP	2	0.9	2.2	0.3	8.0		1.4	
C81 Hodgkin lymphoma	1	0.2	4.1	0.1	22.7		0.9	
C82-C85 NHL	2	2.4	0.8	0.1	3.0		-0.5	
C91-C96 Leukaemia	1	0.8	1.2	0.0	6.7		0.2	100.0
Not observed	0	6.0	0.0	0.0	0.6	#	-7.5	
All further malignancies	98	58.6	1.7	1.4	2.0	#	49.4	11.2

Patients	3491
Median age at next malignancy (years)	65.9
Person-years	7975
Mean observation time (years)	2.3
Median observation time (years)	1.0

\# 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 %
C18	Colon	6	3.3	1.8	0.7	4.0	4.0	16.7
C19-C20	Rectum	3	1.5	2.0	0.4	5.8	2.2	33.3
C23-C24	Bile	2	0.5	4.3	0.5	15.6	2.3	50.0
C25	Pancreas	2	1.6	1.3	0.2	4.6	0.7	50.0
C30-C31	Sinuses	1	0.1	16.9	0.4	94.0	1.4	
C33-C34	Lung	3	3.3	0.9	0.2	2.7	-0.4	
C40-C41	Bone	1	0.0	20.1	0.5	111.8	1.4	
C43	Malign. melanoma	5	2.0	2.5	0.8	5.8	4.4	
C46,C49	Soft tissue	2	0.2	8.1	1.0	29.1	2.6	
C50	Breast	28	15.3	1.8	1.2	2.6 #	18.7	10.7
C51	Vulva	1	0.4	2.6	0.1	14.5	0.9	
C53	Cervix uteri	1	0.9	1.1	0.0	6.2	0.1	
C54	Corpus uteri	6	2.4	2.5	0.9	5.4	5.3	
C56	Ovary	2	1.7	1.2	0.1	4.2	0.4	
C64	Kidney	2	0.9	2.2	0.3	8.0	1.6	
C67	Bladder	1	0.6	1.6	0.0	9.0	0.6	
C70-C72	CNS cancer	2	0.6	3.3	0.4	12.0	2.1	
C73	Thyroid	3	1.2	2.5	0.5	7.4	2.7	
C82-C85	NHL	6	1.5	4.0	1.5	8.7 #	6.6	16.7
C90	Mult. myeloma	2	0.4	4.5	0.5	16.1	2.3	
C91-C96	Leukaemia	4	0.6	7.0	1.9	17.8 #	5.1	
Not observed		0	4.7	0.0	0.0	0.8 #	-6.9	
All further malignancies		83	43.8	1.9	1.5	2.4 #	58.0	9.6

Patients	2790
Median age at next malignancy (years)	66.8
Person-years	6766
Mean observation time (years)	2.4
Median observation time (years)	0.9

The occurrence of further specified malignancy is statistically significant.

Average incidence (Germany 1987 standard population) 2007 - 2020: Males
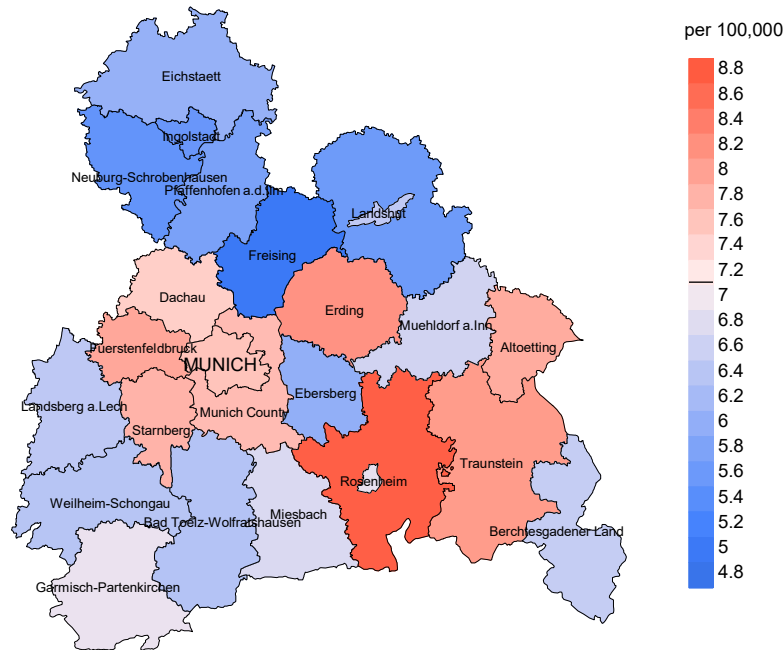
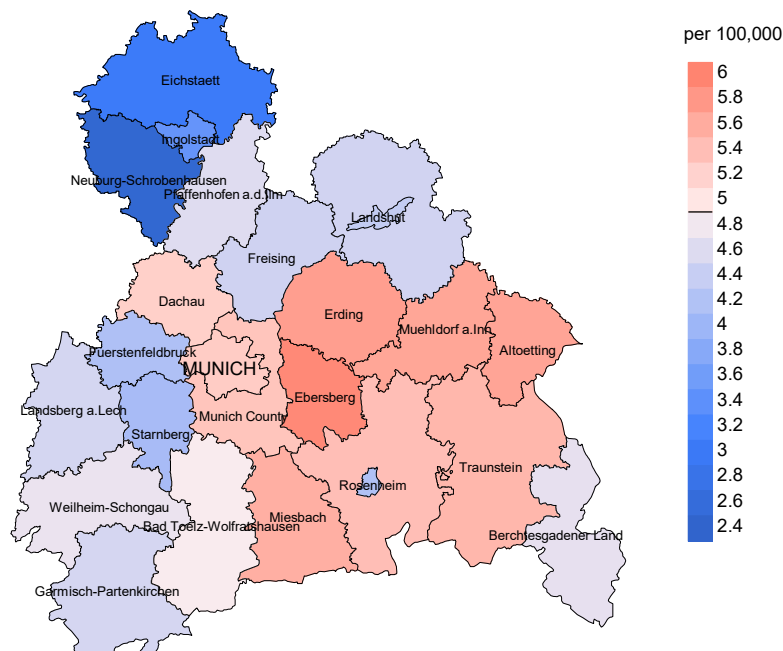Average incidence (Germany 1987 standard population) 2007 - 2020: Females

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 7.1/100,000 WS N=2,485, females 4.9/100,000 WS N=1,952).

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 62 women were identified with newly diagnosed brain/nerves cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 5.9/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 4.1 and 8.3/100,000.

Standardized incidence ratio (SIR) 2007 - 2020: Males
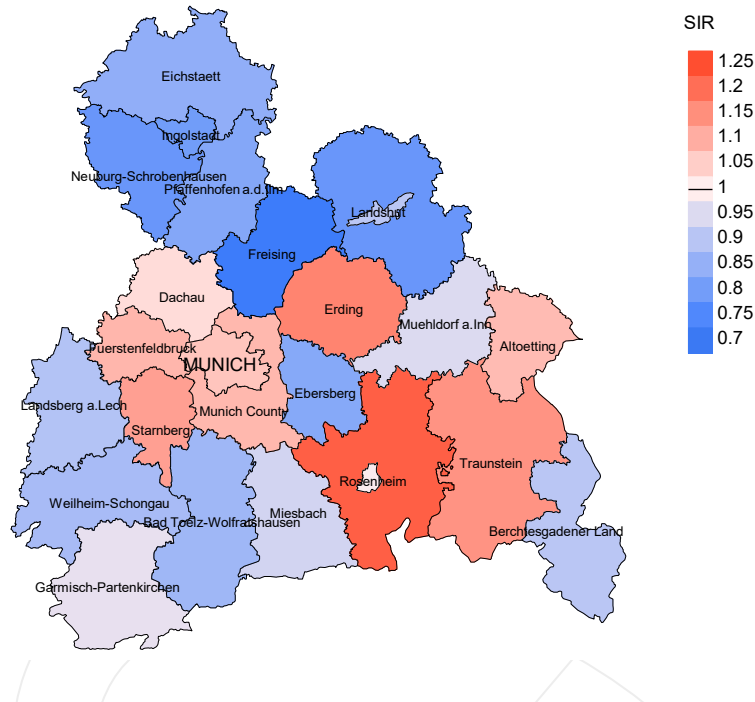
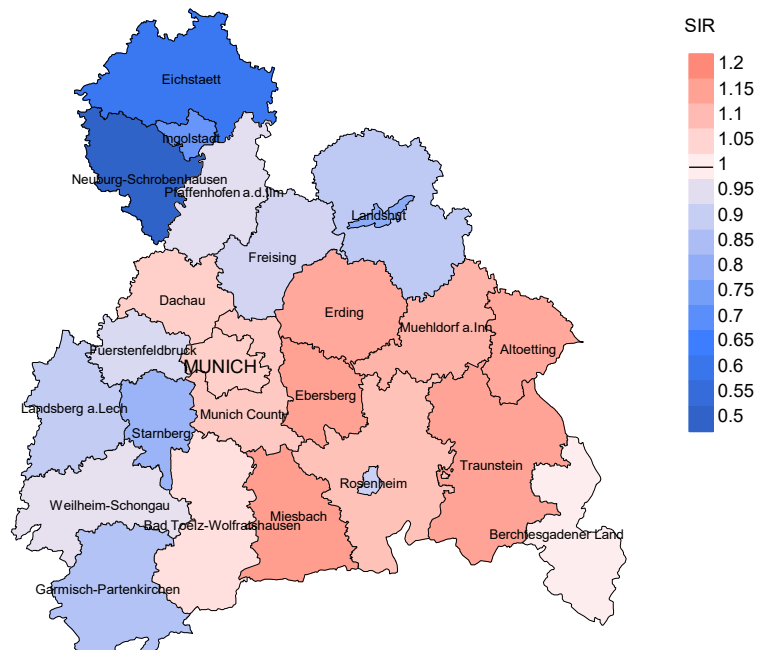## Standardized incidence ratio (SIR) 2007 - 2020: Females

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=2,485, females N=1,952).

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 62 women were identified with newly diagnosed brain/nerves cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.15. Though, the value of this parameter may vary with an underlying probability of 99% between 0.81 and 1.58, 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	193	97.9	28.0	170	88.1	96.5
1999	185	97.3	31.4	168	90.8	95.8
2000	202	97.0	26.7	170	84.2	94.1
2001	237	96.6	24.9	208	87.8	93.3
2002	341	98.5	18.8	289	84.8	98.3
2003	379	98.7	19.8	319	84.2	94.7
2004	338	97.9	21.6	287	84.9	97.2
2005	373	97.6	17.4	311	83.4	97.1
2006	303	96.7	13.2	260	85.8	96.9
2007	350	94.6	14.3	273	78.0	96.0
2008	409	98.5	13.9	328	80.2	96.0
2009	451	98.2	12.4	367	81.4	96.5
2010	404	98.0	13.4	333	82.4	98.5
2011	406	98.8	11.3	310	76.4	97.1
2012	407	99.3	10.3	321	78.9	95.0
2013	392	98.5	10.5	321	81.9	95.0
2014	364	98.1	9.1	298	81.9	96.0
2015	336	98.8	11.3	269	80.1	96.3
2016	308	99.0	11.7	237	76.9	95.4
2017	253	100.0	15.4	169	66.8	84.6
2018	176	100.0	14.2	107	60.8	69.2
2019	100	100.0	2.0	64	64.0	82.8
2020	84	100.0		43	51.2	97.7
1998–2020	6991	98.2	15.2	5622	80.4	95.2

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	193	136	95.6	77	39.9
1999	185	172	97.1	91	49.2
2000	202	156	94.9	78	38.6
2001	237	192	92.2	106	44.7
2002	341	232	97.0	124	36.4
2003	379	253	95.7	127	33.5
2004	338	273	97.4	122	36.1
2005	373	256	97.3	138	37.0
2006	303	266	96.2	108	35.6
2007	350	258	97.3	122	34.9
2008	409	266	97.0	127	31.1
2009	451	311	98.1	142	31.5
2010	404	357	98.3	146	36.1
2011	406	321	98.8	123	30.3
2012	407	304	96.7	127	31.2
2013	392	305	96.7	120	30.6
2014	364	325	98.5	116	31.9
2015	336	305	97.7	115	34.2
2016	308	328	99.4	115	37.3
2017	253	281	95.7	92	36.4
2018	176	177	70.6	49	27.8
2019	100	129	47.3	21	21.0
2020	84	135	91.1	25	29.8
1998-2020	6991	5738	95.0	2411	34.5

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	136	71.3	28.7	100.0
1999	172	78.5	21.5	97.6
2000	156	78.2	21.8	98.0
2001	192	83.3	16.7	98.9
2002	232	91.4	8.6	99.6
2003	253	93.3	6.7	98.8
2004	273	93.4	6.6	98.9
2005	256	91.0	9.0	98.0
2006	266	91.0	9.0	96.9
2007	258	93.4	6.6	98.0
2008	266	94.4	5.6	98.4
2009	311	91.3	8.7	96.7
2010	357	93.0	7.0	97.4
2011	321	93.1	6.9	96.8
2012	304	91.8	8.2	98.3
2013	305	92.8	7.2	98.0
2014	325	96.0	4.0	97.8
2015	305	94.1	5.9	97.3
2016	328	95.1	4.9	98.5
2017	281	92.9	7.1	96.7
2018	177	71.2	28.8	94.4
2019	129	48.1	51.9	98.4
2020	135	70.4	29.6	95.9
1998-2020	5738	89.2	10.8	97.8

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	66	57.8	57.6	61.6	57.8
1999	91	62.1	61.4	63.5	62.1
2000	69	63.5	63.3	68.8	65.9
2001	104	64.1	63.4	67.8	64.9
2002	130	63.1	63.5	57.9	63.4
2003	123	66.3	66.6	56.0	66.8
2004	142	65.8	65.4	69.7	65.5
2005	147	65.3	64.0	73.3	64.2
2006	136	64.1	64.2	63.7	64.2
2007	138	66.2	66.2	65.0	66.4
2008	146	64.8	64.3	72.1	64.6
2009	186	68.6	66.7	70.6	66.4
2010	223	68.6	68.5	68.6	68.7
2011	171	67.4	67.1	72.6	67.1
2012	166	67.8	67.4	70.2	67.4
2013	173	67.1	67.1	61.8	67.1
2014	189	66.9	66.1	75.5	67.1
2015	178	67.4	67.3	67.9	67.9
2016	180	65.9	65.0	72.1	66.1
2017	163	65.7	64.8	70.4	64.8
2018	109	69.0	69.4	67.0	69.0
2019	82	66.1	62.3	67.9	63.9
2020	86	64.8	65.3	63.6	65.8
1998–2020	3198	66.1	65.9	68.4	66.1

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

Table 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	70	72.2	72.7	70.7	72.5
1999	81	68.3	64.6	79.2	69.1
2000	87	69.2	66.4	73.6	69.3
2001	88	70.3	67.8	78.7	70.3
2002	102	70.3	70.4	70.3	70.4
2003	130	67.2	66.6	75.4	67.6
2004	131	66.5	66.2	68.6	66.5
2005	109	67.8	67.7	68.4	67.8
2006	130	68.1	68.0	69.1	68.6
2007	120	69.9	68.6	78.4	69.4
2008	120	67.9	67.9	71.8	68.2
2009	125	69.2	68.9	77.4	69.2
2010	134	69.2	68.8	78.1	69.2
2011	150	70.4	69.6	71.7	70.5
2012	138	68.7	68.2	78.7	69.1
2013	132	67.0	66.9	74.7	66.9
2014	136	70.1	70.0	77.5	70.0
2015	127	70.8	70.5	75.8	71.3
2016	148	68.6	68.5	70.4	68.6
2017	118	70.6	69.8	75.4	70.8
2018	68	72.9	72.9	75.0	72.9
2019	47	70.4	69.5	73.0	71.5
2020	49	68.8	66.4	76.1	66.4
1998-2020	2540	69.2	68.6	75.0	69.2

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	46	4.2	0.47	3.0	0.48	3.8	0.48	4.3	0.47
1999	73	6.5	0.78	4.3	0.75	5.9	0.77	7.1	0.79
2000	51	4.5	0.49	2.9	0.44	4.0	0.48	4.6	0.46
2001	86	7.4	0.74	4.4	0.64	6.5	0.71	8.2	0.77
2002	120	6.4	0.69	4.0	0.61	5.5	0.67	6.5	0.69
2003	115	6.1	0.58	3.6	0.49	5.1	0.55	6.4	0.59
2004	133	7.1	0.79	4.4	0.75	6.0	0.77	7.3	0.80
2005	133	7.0	0.67	4.3	0.61	5.8	0.66	6.9	0.68
2006	127	6.6	0.74	4.4	0.74	5.6	0.74	6.4	0.74
2007	132	6.0	0.71	3.4	0.57	4.7	0.65	5.8	0.71
2008	137	6.2	0.60	3.8	0.54	5.0	0.57	5.9	0.57
2009	164	7.3	0.62	4.3	0.55	5.8	0.59	7.1	0.62
2010	212	9.4	0.94	5.3	0.83	7.3	0.89	8.9	0.93
2011	161	7.2	0.75	4.0	0.65	5.6	0.71	6.8	0.74
2012	156	6.9	0.72	4.0	0.63	5.3	0.68	6.4	0.71
2013	160	7.0	0.71	4.0	0.64	5.3	0.67	6.3	0.71
2014	182	7.8	0.89	4.6	0.84	6.1	0.87	7.1	0.88
2015	171	7.2	0.94	4.1	0.87	5.5	0.90	6.5	0.92
2016	165	6.9	0.99	3.8	0.90	5.2	0.96	6.2	0.97
2017	153	6.3	1.01	3.6	0.96	4.9	1.00	5.7	1.01
2018	75	3.1	0.68	1.7	0.62	2.3	0.65	2.8	0.67
2019	39	1.6	0.64	1.0	0.68	1.3	0.66	1.5	0.66
2020	61	2.5	1.24	1.4	1.15	1.9	1.20	2.3	1.25
1998-2020	2852	6.1	0.75	3.6	0.67	4.9	0.72	5.8	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	51	4.3	0.54	2.1	0.38	3.0	0.45	4.0	0.52
1999	62	5.2	0.67	3.4	0.73	4.2	0.70	4.7	0.68
2000	71	5.9	0.73	3.5	0.71	4.5	0.73	5.2	0.72
2001	74	6.1	0.62	3.5	0.60	4.5	0.60	5.4	0.62
2002	92	4.7	0.55	2.4	0.49	3.3	0.52	4.1	0.54
2003	121	6.1	0.66	3.5	0.61	4.7	0.65	5.5	0.66
2004	122	6.2	0.72	3.7	0.66	4.7	0.70	5.4	0.73
2005	100	5.0	0.57	2.7	0.52	3.6	0.54	4.3	0.57
2006	115	5.7	0.88	3.0	0.81	4.1	0.85	4.8	0.87
2007	109	4.7	0.67	2.3	0.53	3.3	0.60	4.0	0.63
2008	114	4.9	0.64	2.9	0.56	3.6	0.60	4.2	0.62
2009	120	5.2	0.64	2.6	0.53	3.5	0.56	4.1	0.59
2010	120	5.1	0.67	2.7	0.58	3.6	0.64	4.3	0.67
2011	138	5.9	0.73	3.1	0.69	4.1	0.70	4.9	0.70
2012	123	5.2	0.65	2.8	0.58	3.7	0.61	4.4	0.64
2013	123	5.2	0.74	2.8	0.66	3.7	0.71	4.3	0.71
2014	130	5.4	0.81	2.7	0.77	3.6	0.78	4.4	0.81
2015	116	4.8	0.75	2.1	0.59	3.1	0.67	3.8	0.70
2016	147	6.0	1.04	3.1	0.97	4.2	1.00	5.0	1.04
2017	108	4.4	1.06	2.1	0.92	2.9	1.00	3.5	1.03
2018	51	2.1	0.77	0.9	0.53	1.3	0.63	1.6	0.71
2019	23	0.9	0.61	0.5	0.73	0.6	0.66	0.7	0.60
2020	34	1.4	0.97	0.7	0.89	0.9	0.95	1.1	0.91
1998-2020	2264	4.7	0.71	2.5	0.63	3.3	0.67	3.9	0.69

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	13	0.4	0.4	7	0.4	0.4	6	0.4	0.4
5-9	23	0.7	1.1	10	0.5	0.9	13	0.9	1.3
10-14	17	0.5	1.5	12	0.6	1.5	5	0.3	1.6
15-19	18	0.5	2.1	11	0.6	2.0	7	0.5	2.1
20-24	13	0.4	2.5	8	0.4	2.4	5	0.3	2.5
25-29	32	0.9	3.4	22	1.1	3.6	10	0.7	3.2
30-34	31	0.9	4.3	20	1.0	4.6	11	0.8	3.9
35-39	62	1.8	6.1	44	2.2	6.8	18	1.2	5.2
40-44	130	3.8	9.9	82	4.2	11.0	48	3.3	8.4
45-49	217	6.3	16.2	136	6.9	17.9	81	5.6	14.0
50-54	226	6.6	22.8	138	7.0	24.9	88	6.0	20.1
55-59	309	9.0	31.9	189	9.6	34.5	120	8.2	28.3
60-64	367	10.7	42.6	222	11.3	45.8	145	10.0	38.3
65-69	475	13.9	56.5	262	13.3	59.1	213	14.6	52.9
70-74	542	15.8	72.3	320	16.3	75.4	222	15.2	68.1
75-79	466	13.6	85.9	256	13.0	88.4	210	14.4	82.6
80-84	287	8.4	94.3	145	7.4	95.7	142	9.8	92.3
85+	196	5.7	100.0	84	4.3	100.0	112	7.7	100.0
All ages	3424	100.0		1968	100.0		1456	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	7	6	0.4	0.21	0.4	0.20	36.8	37.5
5- 9	10	13	0.6	0.38	0.9	0.76	35.7	52.0
10-14	12	5	0.8	0.60	0.3	0.50	42.9	21.7
15-19	11	7	0.6	0.52	0.4	0.47	22.9	28.0
20-24	8	5	0.4	0.21	0.3	0.22	11.0	11.6
25-29	22	10	1.0	0.40	0.4	0.26	23.7	10.1
30-34	20	11	0.9	0.29	0.5	0.18	14.0	6.1
35-39	44	18	1.9	0.52	0.8	0.26	16.5	4.4
40-44	82	48	3.3	0.59	2.0	0.58	13.5	5.6
45-49	136	81	5.1	0.87	3.1	0.78	9.6	4.8
50-54	138	88	5.4	0.72	3.5	0.62	5.2	3.3
55-59	189	120	8.9	0.75	5.5	0.85	4.3	3.1
60-64	222	145	12.6	0.93	7.6	0.90	3.5	2.9
65-69	262	213	16.1	0.87	11.7	0.92	2.8	3.1
70-74	320	222	21.3	1.02	12.9	0.85	2.7	2.5
75-79	256	210	21.2	0.87	14.0	0.89	2.0	2.1
80-84	145	142	20.0	0.92	13.3	0.80	1.4	1.5
85+	84	112	18.0	0.89	10.7	0.76	0.9	0.9
All ages	1968	1456					2.8	2.4

Mortality						
Raw	6.0	0.79	4.3	0.75
WS	3.5	0.71	2.2	0.65
ES	4.7	0.75	3.0	0.70
BRD-S	5.6	0.78	3.6	0.72

PYLL-70		
per 100,000	63.7	40.1
ES	59.4	38.0
AYLL-70	15.7	14.7

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 ←%
C03-C06 Oral cavity	3	0.6	3	100.0				
C07-C08 Salivary gland	3	0.6	2	66.7			1	33.3
C09-C10 Oropharynx	4	0.8	4	100.0				
C11 Nasopharynx	1	0.2	1	100.0				
C12-C13 Hypopharynx	1	0.2					1	100.0
C15 Oesophagus	1	0.2					1	100.0
C16 Stomach	9	1.9	7	77.8			2	22.2
C17 Small intestine	4	0.8	1	25.0	1	25.0	2	50.0
C18 Colon	34	7.1	27	79.4	4	11.8	3	8.8
C19-C20 Rectum	23	4.8	21	91.3	1	4.3	1	4.3
C21 Anus/canal	1	0.2	1	100.0				
C22 Liver	3	0.6	1	33.3			2	66.7
C23-C24 Bile	2	0.4					2	100.0
C25 Pancreas	8	1.7	1	12.5	2	25.0	5	62.5
C30-C31 Sinuses	1	0.2			1	100.0		
C32 Larynx	3	0.6	2	66.7			1	33.3
C33-C34 Lung	21	4.4	7	33.3	4	19.0	10	47.6
C37 Thymus	1	0.2	1	100.0				
C38,C45 Mesothelioma	1	0.2	1	100.0				
C40-C41 Bone	5	1.0	2	40.0	1	20.0	2	40.0
C43 Malign. melanoma	33	6.8	26	78.8			7	21.2
C44 Skin others	25	5.2	14	56.0	5	20.0	6	24.0
C46,C49 Soft tissue	4	0.8	2	50.0			2	50.0
C60 Penis	2	0.4	2	100.0				
C61 Prostate	148	30.7	131	88.5	9	6.1	8	5.4
C62 Testis	11	2.3	7	63.6	2	18.2	2	18.2
C64 Kidney	27	5.6	19	70.4	2	7.4	6	22.2
C65 Renal pelvis	2	0.4					2	100.0
C66 Ureter	1	0.2	1	100.0				
C67 Bladder	16	3.3	11	68.8	2	12.5	3	18.8
C68 Urinary org.	1	0.2	1	100.0				
C69 Eye melanoma	1	0.2					1	100.0
C70-C72 CNS cancer	33	6.8			5	15.2	28	84.8
C73 Thyroid	8	1.7	7	87.5			1	12.5
C76-C79 CUP	6	1.2	3	50.0			3	50.0
C81 Hodgkin lymphoma	2	0.4	2	100.0				
C82-C85 NHL	21	4.4	19	90.5	1	4.8	1	4.8
C90 Mult. myeloma	6	1.2	4	66.7	1	16.7	1	16.7
C91-C96 Leukaemia	5	1.0	2	40.0	1	20.0	2	40.0
C96 Systemic	1	0.2			1	100.0		

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 ←%
All further malignancies	482	100.0	333	69.1	43	8.9	106	22.0

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	1	0.3	1	100.0				
C09–C10 Oropharynx	1	0.3	1	100.0				
C16 Stomach	2	0.6	2	100.0				
C17 Small intestine	1	0.3	1	100.0				
C18 Colon	22	6.5	17	77.3	1	4.5	4	18.2
C19–C20 Rectum	7	2.1	3	42.9	2	28.6	2	28.6
C21 Anus/canal	1	0.3	1	100.0				
C22 Liver	1	0.3	1	100.0				
C23–C24 Bile	1	0.3					1	100.0
C25 Pancreas	3	0.9	1	33.3			2	66.7
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	8	2.3	5	62.5			3	37.5
C38,C45 Mesothelioma	1	0.3					1	100.0
C40–C41 Bone	1	0.3					1	100.0
C43 Malign. melanoma	24	7.0	19	79.2			5	20.8
C44 Skin others	16	4.7	9	56.3	2	12.5	5	31.3
C46,C49 Soft tissue	5	1.5	2	40.0	1	20.0	2	40.0
C50 Breast	116	34.0	90	77.6	9	7.8	17	14.7
C51 Vulva	1	0.3					1	100.0
C52 Vagina	1	0.3	1	100.0				
C53 Cervix uteri	10	2.9	10	100.0				
C54 Corpus uteri	23	6.7	17	73.9			6	26.1
C55,C57 Fem. genitals un	1	0.3	1	100.0				
C56 Ovary	11	3.2	8	72.7	2	18.2	1	9.1
C64 Kidney	11	3.2	9	81.8	2	18.2		
C65 Renal pelvis	1	0.3	1	100.0				
C67 Bladder	4	1.2	1	25.0			3	75.0
C69 Eye melanoma	3	0.9	3	100.0				
C70–C72 CNS cancer	22	6.5			1	4.5	21	95.5
C73 Thyroid	10	2.9	10	100.0				
C76–C79 CUP	1	0.3	1	100.0				
C81 Hodgkin lymphoma	2	0.6	1	50.0			1	50.0
C82–C85 NHL	14	4.1	6	42.9	2	14.3	6	42.9
C90 Mult. myeloma	3	0.9	1	33.3			2	66.7
C91–C96 Leukaemia	9	2.6	4	44.4			5	55.6
All further malignancies	341	100.0	229	67.2	23	6.7	89	26.1

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	7	6	0.4	0.21	0.4	0.20	36.8	40.0
5- 9	9	13	0.6	0.35	0.9	0.81	33.3	52.0
10-14	12	5	0.8	0.60	0.3	0.50	42.9	26.3
15-19	10	7	0.6	0.48	0.4	0.50	21.7	30.4
20-24	8	5	0.4	0.21	0.3	0.22	12.1	12.2
25-29	21	10	0.9	0.39	0.4	0.27	24.7	11.0
30-34	20	10	0.9	0.30	0.4	0.16	14.5	6.3
35-39	44	18	1.9	0.53	0.8	0.26	17.7	4.9
40-44	78	45	3.1	0.60	1.9	0.61	14.0	6.0
45-49	130	78	4.8	0.88	3.0	0.80	10.1	5.4
50-54	129	81	5.1	0.72	3.2	0.63	5.5	3.6
55-59	180	103	8.5	0.77	4.7	0.82	4.7	3.2
60-64	199	129	11.3	0.97	6.8	0.88	3.7	3.2
65-69	226	188	13.8	0.89	10.4	0.94	3.1	3.4
70-74	254	182	16.9	1.05	10.6	0.91	2.8	2.7
75-79	193	165	16.0	0.94	11.0	0.87	2.1	2.2
80-84	114	124	15.7	0.92	11.6	0.83	1.5	1.7
85+	54	97	11.6	0.82	9.3	0.78	0.8	1.0
All ages	1688	1266					3.2	2.6
Mortality								
Raw			5.2	0.79	3.8	0.75		
WS			3.1	0.70	2.0	0.65		
ES			4.1	0.75	2.6	0.69		
BRD-S			4.8	0.78	3.1	0.72		
PYLL-70								
per 100,000			60.5		37.6			
ES			56.4		35.9			
AYLL-70			16.2		15.2			

* 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	7	6	0.4	0.21	0.4	0.21	36.8	40.0
5- 9	9	13	0.6	0.35	0.9	0.81	33.3	52.0
10-14	12	5	0.8	0.60	0.3	0.50	42.9	26.3
15-19	10	6	0.6	0.48	0.4	0.43	21.7	27.3
20-24	8	5	0.4	0.21	0.3	0.22	12.1	12.5
25-29	19	9	0.8	0.35	0.4	0.24	22.4	10.2
30-34	20	10	0.9	0.31	0.4	0.17	14.6	6.4
35-39	41	18	1.8	0.51	0.8	0.28	16.5	4.9
40-44	76	45	3.0	0.59	1.9	0.62	13.7	6.0
45-49	129	75	4.8	0.88	2.9	0.78	10.1	5.3
50-54	127	76	5.0	0.71	3.0	0.62	5.5	3.4
55-59	176	98	8.3	0.78	4.5	0.79	4.6	3.1
60-64	192	126	10.9	0.98	6.6	0.89	3.6	3.2
65-69	217	186	13.3	0.88	10.3	0.94	3.0	3.4
70-74	244	176	16.3	1.04	10.2	0.91	2.8	2.7
75-79	185	156	15.3	0.92	10.4	0.83	2.1	2.1
80-84	112	121	15.5	0.90	11.4	0.82	1.6	1.7
85+	52	95	11.1	0.79	9.1	0.76	0.9	1.1
All ages	1636	1226					3.2	2.6
Mortality								
Raw			5.0	0.78	3.7	0.74		
WS			3.0	0.69	1.9	0.64		
ES			4.0	0.74	2.5	0.69		
BRD-S			4.6	0.77	3.0	0.71		
PYLL-70								
per 100,000			59.0		36.4			
ES			55.1		34.8			
AYLL-70			16.2		15.2			

* See corresponding tables with multiple malignancies.

ICD-10 C70-C72: Malignant neoplasm of brain and nerves
Age distribution and age-specific mortality 2007 - 2020 (Males: 1968, Females: 1456)
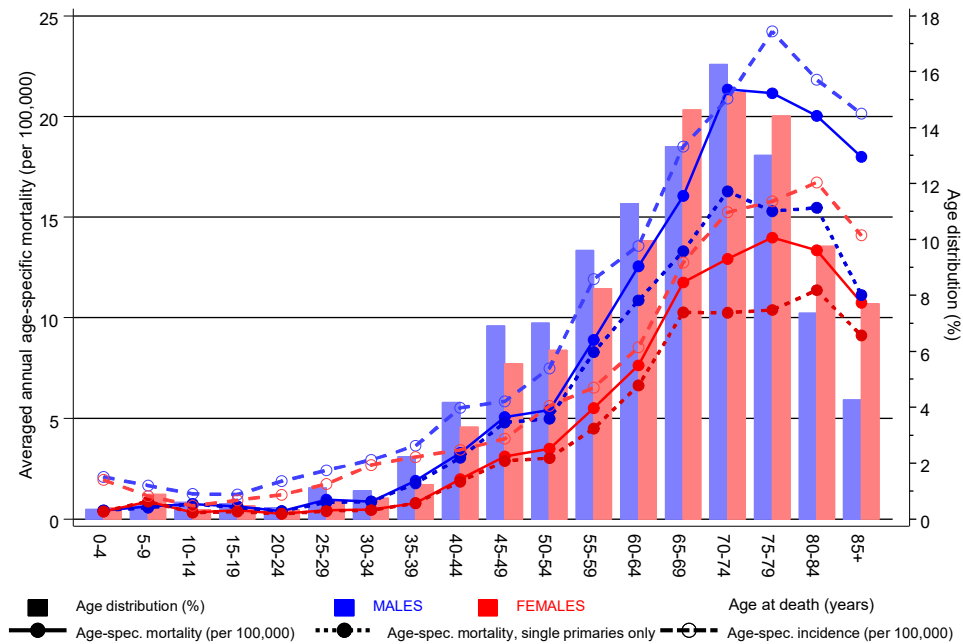
Figure 17. Distribution of age at death (bars; males: mean=61.4 yrs, median=64.7 yrs; females: mean=63.8 yrs, median=67.1 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

Average mortality (Germany 1987 standard population) 2007 - 2020: Males
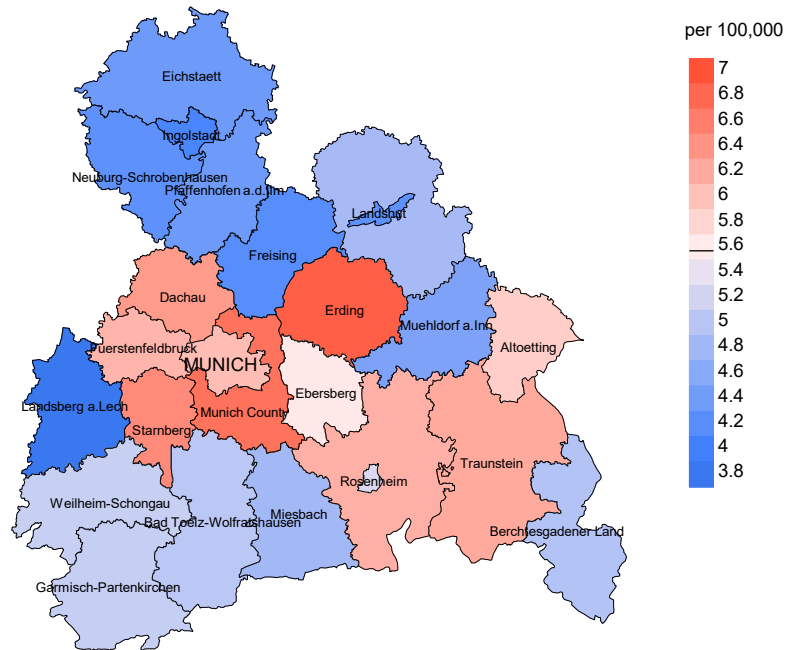
Average mortality (Germany 1987 standard population) 2007 - 2020: Females
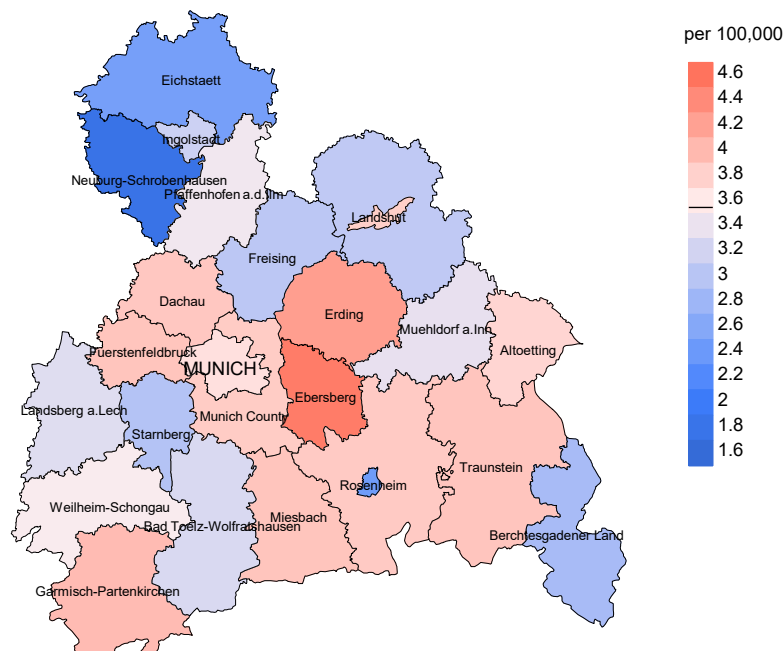
Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2020. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 5.6/100,000 WS N=1,968, females 3.6/100,000 WS N=1,456).

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 died from brain/nerves cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 4.5/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 3.0 and 6.5/100,000.

Standardized mortality ratio (SMR) 2007 - 2020: Males
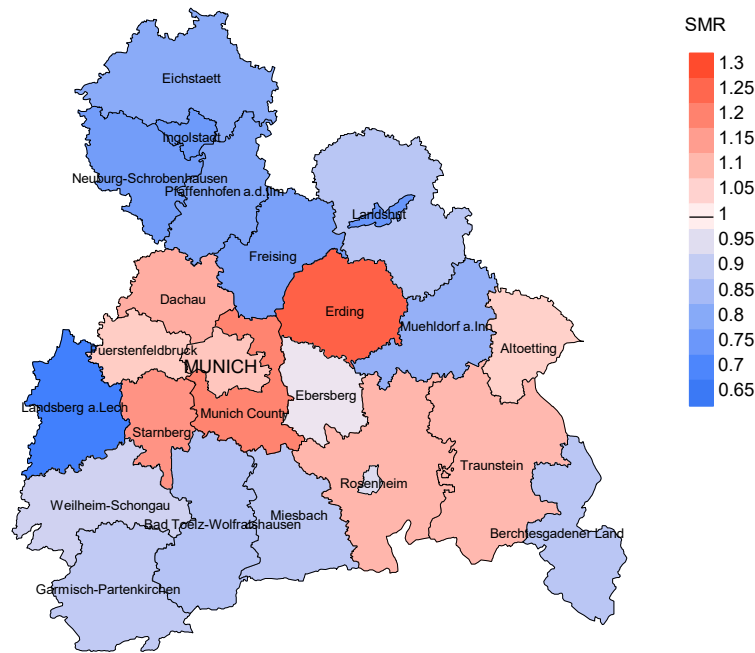
Standardized mortality ratio (SMR) 2007 - 2020: Females
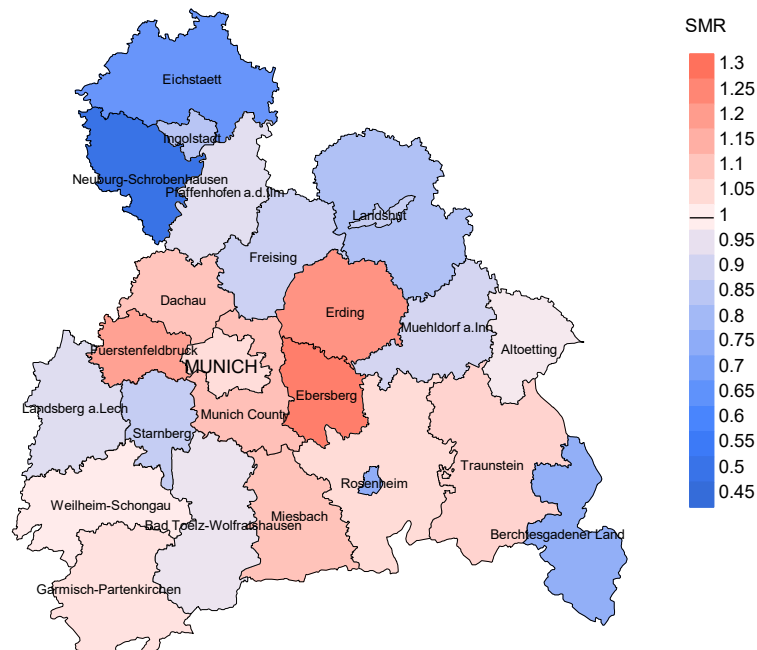
Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=1,968, females N=1,456).

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 died from brain/nerves cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.27. Though, the value of this parameter may vary with an underlying probability of 99% between 0.86 and 1.80, 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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