

Munich Cancer Registry



- ▶ Survival
- ▶ Selection Matrix
- ▶ Homepage
- ▶ *Deutsch*

ICD-10 D33: CNS neoplasm

Incidence and Mortality

Year of diagnosis	1998-2019
Patients	911
Diseases	911
Creation date	01/26/2021
Database export	01/07/2021
Population	4.92 m





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

https://www.tumorregister-muenchen.de/en/facts/base/bD33__E-ICD-10-D33-CNS-neoplasm-incidence-and-mortality.pdf

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**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, January 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
D33.-	Benign neoplasm of brain and other parts of central nervous system
D33.0	Benign neoplasm of brain, supratentorial
D33.1	Benign neoplasm of brain, infratentorial
D33.2	Benign neoplasm of brain, unspecified
D33.3	Benign neoplasm of cranial nerves
D33.4	Benign neoplasm of spinal cord
D33.7	Benign neoplasm of other specified parts of central nervous system
D33.9	Benign neoplasm of central nervous system, unspecified

INCIDENCE

Table 1

Cases by year of diagnosis, proportions of further malignancies, deaths, and active follow-up (ALL PATIENTS)

Year of diagnosis	All cases n	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	9	0.0	15.4		100.0
1999	9	5.6	15.4	44.4	100.0
2000	11	3.4	14.9	18.2	90.9
2001	40	8.7	14.9	30.0	92.5
2002	52	7.4	15.1	17.3	86.5 #
2003	48	9.5	14.5	22.9	83.3
2004	55	8.5	14.1	10.9	90.9
2005	59	9.5	14.1	16.9	86.4
2006	53	9.5	14.0	18.9	90.6
2007	76	9.0	13.4	10.5	77.6 #
2008	68	9.8	14.2	17.6	91.2
2009	71	10.3	14.8	19.7	97.2
2010	41	10.8	14.6	17.1	100.0
2011	71	10.9	14.9	4.2	97.2
2012	74	11.4	15.1	5.4	95.9
2013	26	11.4	17.0	7.7	96.2
2014	32	11.8	20.0	15.6	87.5
2015	31	12.1	19.5	16.1	96.8
2016	26	12.7	21.7	7.7	88.5
2017	25	12.9	22.0	4.0	96.0
2018	19	13.1	26.5	15.8	78.9
2019	15	13.6	13.3	26.7	60.0 ##
1998-2019	911	13.6	15.4	14.7	90.5

911 cases diagnosed 1998-2019 are related to a total of 911 patients. Currently, in 244 (26.8 %) of these 911 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 193 / 36 / 15 (21.2 % / 4.0 % / 1.6 %) 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 retrieved from the respective headings.

How to interpret:

In 2017, a subgroup of 25 cases has been diagnosed, of which 12.9 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 22.0 % 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 1a

Cases by year of diagnosis, proportions of further malignancies, deaths, and active follow-up (MALES)

Year of diagnosis	Males n	Males %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	3	33.3	0.0	15.2		100.0
1999	6	66.7	0.0	15.3	50.0	100.0
2000	6	54.5	0.0	14.6		100.0
2001	22	55.0	8.1	14.5	36.4	86.4
2002	27	51.9	6.3	14.8	14.8	92.6 #
2003	27	56.3	8.8	14.6	22.2	92.6
2004	26	47.3	8.5	14.2	11.5	92.3
2005	27	45.8	10.4	13.2	18.5	81.5
2006	29	54.7	9.2	13.0	13.8	93.1
2007	28	36.8	9.0	11.7	14.3	71.4 #
2008	28	41.2	8.7	12.7	14.3	92.9
2009	30	42.3	9.3	13.5	13.3	100.0
2010	15	36.6	9.5	12.3	26.7	100.0
2011	29	40.8	9.9	11.5	6.9	96.6
2012	47	63.5	10.9	11.8	6.4	93.6
2013	15	57.7	10.7	11.1		100.0
2014	14	43.8	10.8	14.0	14.3	85.7
2015	11	35.5	11.5	16.3	27.3	90.9
2016	11	42.3	12.0	21.2	9.1	90.9
2017	11	44.0	11.9	13.0		100.0
2018	5	26.3	11.8	16.7		80.0
2019	7	46.7	12.0	0.0	28.6	57.1 ##
1998-2019	424	46.5	12.0	15.2	14.6	91.0

424 cases diagnosed 1998-2019 are related to a total of 424 patients. Currently, in 108 (25.5 %) of these 424 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 86 / 10 / 12 (20.3 % / 2.4 % / 2.8 %) 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 2017, a subgroup of 11 cases has been diagnosed, of which 11.9 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 13.0 % 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 by year of diagnosis, proportions of further malignancies, deaths, and active follow-up (FEMALES)

Year of diagnosis	Females n	Females %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	6	66.7	0.0	15.5		100.0
1999	3	33.3	11.1	15.5	33.3	100.0
2000	5	45.5	7.1	15.2	40.0	80.0
2001	18	45.0	9.4	15.1	22.2	100.0
2002	25	48.1	8.8	15.3	20.0	80.0 #
2003	21	43.8	10.3	14.5	23.8	71.4
2004	29	52.7	8.4	14.0	10.3	89.7
2005	32	54.2	8.6	14.9	15.6	90.6
2006	24	45.3	9.8	14.8	25.0	87.5
2007	48	63.2	9.0	14.6	8.3	81.3 #
2008	40	58.8	10.8	15.4	20.0	90.0
2009	41	57.7	11.3	15.7	24.4	95.1
2010	26	63.4	11.9	16.5	11.5	100.0
2011	42	59.2	11.7	17.9	2.4	97.6
2012	27	36.5	11.9	18.3	3.7	100.0
2013	11	42.3	12.1	21.2	18.2	90.9
2014	18	56.3	12.7	23.9	16.7	88.9
2015	20	64.5	12.6	21.4	10.0	100.0
2016	15	57.7	13.3	22.0	6.7	86.7
2017	14	56.0	13.8	27.8	7.1	92.9
2018	14	73.7	14.2	31.8	21.4	78.6
2019	8	53.3	15.0	25.0	25.0	62.5 ##
1998-2019	487	53.5	15.0	15.5	14.8	89.9

487 cases diagnosed 1998-2019 are related to a total of 487 patients. Currently, in 136 (27.9 %) of these 487 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 107 / 26 / 3 (22.0 % / 5.3 % / 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 retrieved from the respective headings.

How to interpret:

In 2017, a subgroup of 14 cases has been diagnosed, of which 13.8 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 27.8 % 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
(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,
and from 4.10 to 4.92 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	3	6	0.3	0.5	0.3	0.6	0.3	0.6	0.3	0.6
1999	6	3	0.5	0.3	0.4	0.1	0.5	0.2	0.4	0.2
2000	6	5	0.5	0.4	0.6	0.3	0.6	0.3	0.6	0.4
2001	22	18	1.9	1.5	1.4	1.0	1.7	1.2	2.0	1.4
2002	27	25	1.4	1.3	1.2	0.9	1.4	1.1	1.4	1.2
2003	27	21	1.4	1.1	1.0	0.7	1.2	0.9	1.4	1.0
2004	26	29	1.4	1.5	1.0	0.9	1.3	1.3	1.3	1.4
2005	27	32	1.4	1.6	1.1	1.1	1.3	1.4	1.4	1.5
2006	29	24	1.5	1.2	1.1	0.9	1.4	1.1	1.4	1.1
2007	28	48	1.3	2.1	0.9	1.5	1.1	1.9	1.2	2.0
2008	28	40	1.3	1.7	0.8	1.2	1.0	1.4	1.1	1.6
2009	30	41	1.3	1.8	0.9	1.2	1.1	1.5	1.2	1.6
2010	15	26	0.7	1.1	0.4	0.7	0.5	0.9	0.6	1.1
2011	29	42	1.3	1.8	1.1	1.3	1.2	1.6	1.2	1.7
2012	47	27	2.1	1.1	1.3	0.7	1.7	1.0	1.9	1.0
2013	15	11	0.7	0.5	0.6	0.3	0.6	0.4	0.6	0.4
2014	14	18	0.6	0.7	0.5	0.5	0.6	0.6	0.6	0.7
2015	11	20	0.5	0.8	0.4	0.5	0.4	0.7	0.4	0.7
2016	11	15	0.5	0.6	0.4	0.4	0.4	0.5	0.4	0.6
2017	11	14	0.5	0.6	0.4	0.3	0.4	0.5	0.5	0.5
2018	5	14	0.2	0.6	0.1	0.3	0.2	0.4	0.2	0.5
2019	7	8	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.3
1998-2019	424	487	1.0	1.1	0.7	0.7	0.9	0.9	0.9	1.0

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)

Year of diagnosis	Cases n	Std.		Median						
		Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	9	38.5	20.5	1.0	59.7	1.0	23.9	48.4	51.7	59.7
1999	9	53.6	14.9	26.1	78.0	26.1	43.9	55.9	60.9	78.0
2000	11	49.0	17.3	13.9	78.4	29.1	44.4	49.6	63.4	64.3
2001	40	53.6	17.2	9.1	84.7	33.9	40.1	51.3	67.3	74.8
2002	52	54.9	19.1	3.0	80.5	29.8	47.4	59.9	67.7	71.7
2003	48	54.3	16.3	10.2	81.0	32.1	43.6	57.8	66.4	76.2
2004	55	54.4	14.3	12.6	80.7	38.3	43.8	54.4	66.9	73.7
2005	59	51.9	18.1	2.2	88.3	32.0	39.1	50.9	64.4	75.8
2006	53	52.0	16.2	9.8	76.3	28.0	41.1	52.2	66.4	70.8
2007	76	52.7	17.0	1.9	84.3	30.5	41.2	53.7	64.6	75.5
2008	68	57.0	16.7	13.9	82.3	38.4	45.9	59.7	69.8	77.3
2009	71	54.2	16.0	12.1	81.2	37.1	41.5	56.0	68.4	75.1
2010	41	55.7	18.0	14.1	83.3	28.4	43.7	56.1	72.2	77.7
2011	71	52.1	18.5	0.7	78.5	26.3	41.7	57.1	66.5	71.7
2012	74	56.3	13.7	26.6	84.2	36.3	45.6	56.4	67.2	73.3
2013	26	50.9	19.4	3.1	85.7	30.9	39.1	53.0	61.4	73.9
2014	32	55.0	20.9	15.8	83.1	22.0	35.2	61.4	70.5	77.8
2015	31	56.1	15.9	0.2	86.4	40.1	49.0	57.8	66.5	69.8
2016	26	52.1	18.6	0.4	79.9	27.7	43.2	51.2	63.7	75.5
2017	25	53.6	18.8	17.0	79.2	33.4	39.0	54.5	69.6	75.0
2018	19	62.8	14.7	29.3	82.6	37.5	51.4	67.5	71.8	81.4
2019	15	61.5	16.7	29.7	82.5	40.9	46.0	69.7	77.7	77.9
1998-2019	911	54.1	17.1	0.2	88.3	31.8	43.7	55.7	67.5	75.0

Table 3a

Age distribution parameters by year of diagnosis (MALES)

Year of diagnosis	Cases n	Std.		Median						
		Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	3	37.2	20.8	18.3	59.6	18.3	18.3	33.7	59.6	59.6
1999	6	48.1	13.5	26.1	60.9	26.1	41.6	49.9	59.9	60.9
2000	6	38.8	14.4	13.9	50.3	13.9	29.1	44.8	49.6	50.3
2001	22	53.4	18.9	9.1	84.7	34.0	36.3	53.7	67.6	73.6
2002	27	53.2	21.8	3.0	80.4	4.3	48.7	58.3	67.8	71.5
2003	27	51.4	15.6	22.8	81.0	29.2	41.7	48.7	62.2	76.2
2004	26	51.5	15.3	12.6	73.7	27.9	41.5	53.0	66.9	70.1
2005	27	51.9	21.1	2.2	82.3	18.0	37.5	50.9	67.3	78.1
2006	29	52.7	14.6	19.5	76.3	29.7	43.8	52.2	64.4	70.8
2007	28	50.8	17.6	1.9	79.4	29.9	40.0	51.9	64.5	74.6
2008	28	56.8	16.2	19.2	77.4	35.2	45.8	63.5	70.3	74.9
2009	30	53.5	14.9	27.5	81.2	33.6	40.8	55.3	68.4	71.0
2010	15	56.6	19.1	14.1	80.8	38.5	40.8	58.9	72.6	77.7
2011	29	49.3	19.7	0.7	78.5	18.0	43.7	50.5	63.6	69.2
2012	47	57.3	12.7	26.6	79.0	41.0	46.5	59.7	67.3	71.9
2013	15	49.4	20.6	3.1	74.9	8.1	39.1	54.0	61.4	71.4
2014	14	47.0	19.0	19.8	71.1	22.0	27.6	48.7	67.1	69.8
2015	11	52.2	21.6	0.2	86.4	40.1	44.4	55.5	63.6	69.8
2016	11	51.3	24.8	0.4	79.9	27.7	28.9	55.0	74.0	79.7
2017	11	48.9	21.6	17.0	74.8	17.9	33.5	49.5	69.6	72.9
2018	5	55.3	18.1	29.3	75.2	29.3	50.9	51.4	69.6	75.2
2019	7	55.2	18.1	29.7	77.9	29.7	42.0	52.4	77.7	77.9
1998-2019	424	52.4	17.7	0.2	86.4	29.2	41.8	54.0	66.9	72.8

Table 3b

Age distribution parameters by year of diagnosis (FEMALES)

Year of diagnosis	Cases n	Std.		Min.	Max.	Median				
		Mean	dev.			10%	25%	50%	75%	90%
1998	6	39.2	22.3	1.0	59.7	1.0	23.9	49.5	51.7	59.7
1999	3	64.6	12.5	53.2	78.0	53.2	53.2	62.7	78.0	78.0
2000	5	61.3	11.8	48.5	78.4	48.5	51.9	63.4	64.3	78.4
2001	18	53.7	15.4	30.9	76.9	33.8	43.5	48.9	66.9	76.1
2002	25	56.7	16.0	19.8	80.5	32.4	46.0	62.0	67.6	74.3
2003	21	58.1	16.9	10.2	80.2	35.5	49.9	62.6	69.2	71.7
2004	29	57.0	13.1	34.9	80.7	38.8	47.5	57.8	60.5	76.9
2005	32	51.9	15.5	14.8	88.3	36.5	39.9	50.9	63.0	67.8
2006	24	51.1	18.4	9.8	75.6	27.0	35.3	53.8	66.6	72.4
2007	48	53.9	16.8	3.5	84.3	33.1	44.1	53.7	66.2	76.5
2008	40	57.1	17.2	13.9	82.3	38.6	46.9	59.1	68.4	79.4
2009	41	54.6	17.0	12.1	80.7	37.8	41.9	56.0	64.8	77.2
2010	26	55.2	17.8	25.3	83.3	28.1	43.7	53.5	71.5	78.7
2011	42	54.0	17.6	12.5	77.8	28.5	41.7	58.2	68.2	73.0
2012	27	54.4	15.3	28.3	84.2	33.0	42.9	53.5	67.0	74.5
2013	11	52.9	18.3	30.9	85.7	32.5	34.0	50.1	72.0	73.9
2014	18	61.2	20.6	15.8	83.1	19.1	56.6	65.6	76.3	81.8
2015	20	58.3	11.8	30.1	75.0	40.5	54.2	59.4	67.1	72.3
2016	15	52.6	13.4	25.8	75.5	34.8	49.3	50.6	62.0	74.5
2017	14	57.3	16.1	33.4	79.2	38.4	40.7	55.0	73.8	76.6
2018	14	65.5	13.0	37.5	82.6	44.8	58.3	67.5	71.8	81.4
2019	8	67.0	14.3	40.9	82.5	40.9	59.7	70.9	75.7	82.5
1998-2019	487	55.6	16.5	1.0	88.3	33.4	44.8	57.1	68.3	76.1

Table 4

Age distribution by 5-year age group and sex for period 2007-2019

Age at diagnosis Years	Cases			Males			Females		
	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
0-4	7	1.2	1.2	6	2.4	2.4	1	0.3	0.3
5-9	1	0.2	1.4	1	0.4	2.8			0.3
10-14	5	0.9	2.3	1	0.4	3.2	4	1.2	1.5
15-19	10	1.7	4.0	5	2.0	5.2	5	1.5	3.1
20-24	5	0.9	4.9	3	1.2	6.4	2	0.6	3.7
25-29	24	4.2	9.0	11	4.4	10.8	13	4.0	7.7
30-34	19	3.3	12.3	6	2.4	13.1	13	4.0	11.7
35-39	35	6.1	18.4	17	6.8	19.9	18	5.6	17.3
40-44	50	8.7	27.1	25	10.0	29.9	25	7.7	25.0
45-49	54	9.4	36.5	28	11.2	41.0	26	8.0	33.0
50-54	56	9.7	46.3	22	8.8	49.8	34	10.5	43.5
55-59	72	12.5	58.8	27	10.8	60.6	45	13.9	57.4
60-64	53	9.2	68.0	20	8.0	68.5	33	10.2	67.6
65-69	64	11.1	79.1	37	14.7	83.3	27	8.3	75.9
70-74	55	9.6	88.7	23	9.2	92.4	32	9.9	85.8
75-79	45	7.8	96.5	16	6.4	98.8	29	9.0	94.8
80-84	18	3.1	99.7	2	0.8	99.6	16	4.9	99.7
85+	2	0.3	100.0	1	0.4	100.0	1	0.3	100.0
All ages	575	100.0		251	100.0		324	100.0	

Table 5

Age-specific incidence
for period 2007-2019

Age at diagnosis Years	Males n	Females n	Males Age- spec. incid.	Females Age- spec. incid.
0- 4	6	1	0.4	0.1
5- 9	1		0.1	
10-14	1	4	0.1	0.3
15-19	5	5	0.3	0.3
20-24	3	2	0.2	0.1
25-29	11	13	0.5	0.6
30-34	6	13	0.3	0.6
35-39	17	18	0.8	0.9
40-44	25	25	1.1	1.1
45-49	28	26	1.1	1.1
50-54	22	34	0.9	1.5
55-59	27	45	1.4	2.3
60-64	20	33	1.2	1.9
65-69	37	27	2.4	1.6
70-74	23	32	1.6	2.0
75-79	16	29	1.4	2.1
80-84	2	16	0.3	1.6
85+	1	1	0.2	0.1
All ages	251	324		
Incidence				
Raw			0.8	1.0
WS			0.6	0.7
ES			0.7	0.9
BRD-S			0.8	1.0

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 D33: Benign neoplasm of brain and other parts of central nervous system

Age distribution and age-specific incidence 2007 - 2019 (Males: 251, Females: 324)

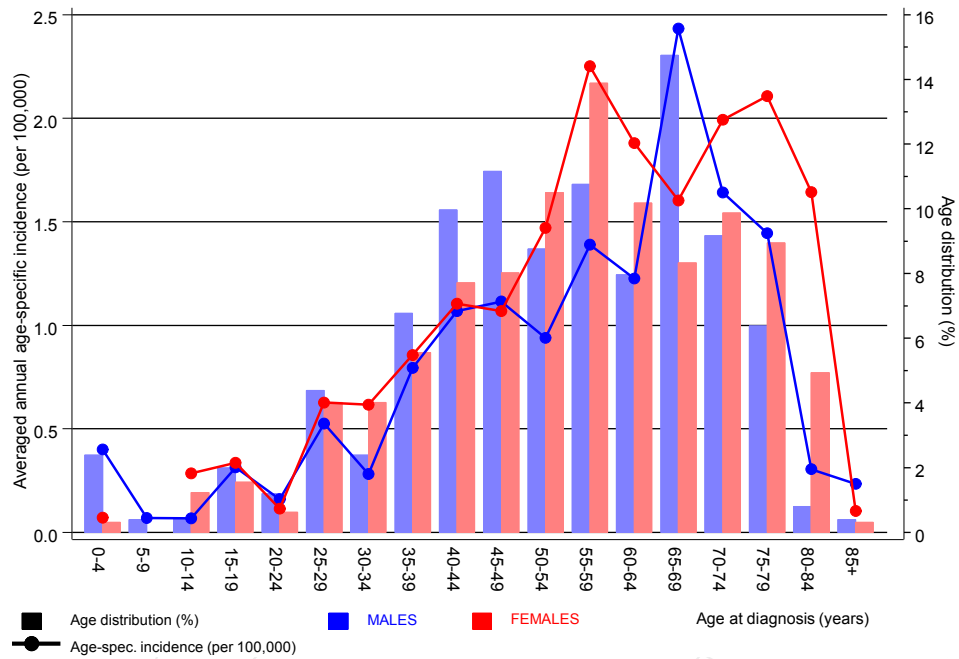


Figure 6. Age distribution (males: mean=53.1 yrs, median=55.0 yrs; females: mean=56.1 yrs, median=57.6 yrs) and age-specific incidence.

Table 7a

Standardized incidence ratio (SIR, with 95% confidence limits),
excess absolute risk (EAR) and DCO rate of further malignancies
for period 1998-2019

MALES

Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C03-C06 Oral cavity	1	0.2	4.6	0.1	25.4	3.9	
C09-C10 Oropharynx	1	0.3	3.7	0.1	20.6	3.6	
C15 Oesophagus	1	0.4	2.3	0.1	12.7	2.8	
C16 Stomach	1	0.8	1.3	0.0	7.1	1.1	
C18 Colon	6	1.9	3.2	1.2	6.9 #	20.5	
C19-C20 Rectum	2	1.1	1.7	0.2	6.3	4.3	
C22 Liver	1	0.6	1.6	0.0	9.1	1.9	
C23-C24 Bile	1	0.2	4.9	0.1	27.3	4.0	
C33-C34 Lung	4	2.5	1.6	0.4	4.1	7.5	
C43 Malign. melanoma	2	1.0	1.9	0.2	7.0	4.8	
C46,C49 Soft tissue	2	0.1	15.9	1.9	57.4 #	9.4	
C48 Peritoneal	1	0.0	55.6	1.4	309.9 #	4.9	
C61 Prostate	19	5.8	3.3	2.0	5.1 #	65.7	
C62 Testis	1	0.2	6.2	0.2	34.5	4.2	
C64 Kidney	4	0.8	5.2	1.4	13.3 #	16.1	25.0
C65 Renal pelvis	1	0.1	11.4	0.3	63.5	4.6	
C67 Bladder	1	0.9	1.1	0.0	6.3	0.6	
C70-C72 CNS cancer	3	0.3	9.8	2.0	28.6 #	13.4	
C73 Thyroid	1	0.2	5.3	0.1	29.8	4.1	
C82-C85 NHL	2	0.9	2.2	0.3	8.0	5.5	
C90 Mult. myeloma	2	0.3	7.4	0.9	26.9	8.6	50.0
C91-C96 Leukaemia	1	0.3	3.2	0.1	17.8	3.4	
Not observed	0	2.4	0.0	0.0	1.5	-11.9	
All further malignancies	58	21.3	2.7	2.1	3.5 #	183.0	3.4
Patients		403					
Median age at next malignancy (years)		67.1					
Person-years		2004					
Mean observation time (years)		5.0					
Median observation time (years)		3.8					

The occurrence of further specified malignancy is statistically significant.

Table 7b

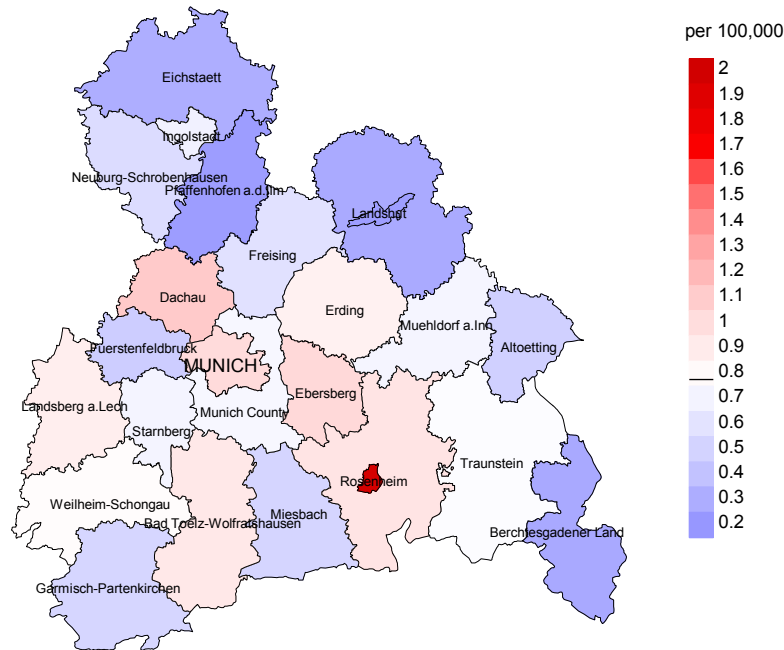
Standardized incidence ratio (SIR, with 95% confidence limits),
excess absolute risk (EAR) and DCO rate of further malignancies
for period 1998-2019

FEMALES

Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C15 Oesophagus	1	0.1	8.4	0.2	47.0	4.2	
C16 Stomach	3	0.5	5.6	1.1	16.2 #	11.7	
C17 Small intestine	1	0.1	9.9	0.3	55.4	4.3	
C18 Colon	4	1.6	2.6	0.7	6.6	11.6	
C19-C20 Rectum	2	0.7	2.9	0.4	10.6	6.2	50.0
C21 Anus/canal	2	0.1	19.1	2.3	68.9 #	9.0	
C25 Pancreas	3	0.7	4.0	0.8	11.8	10.7	33.3
C33-C34 Lung	2	1.4	1.4	0.2	5.1	2.8	
C40-C41 Bone	1	0.0	53.9	1.4	300.4 #	4.7	
C43 Malign. melanoma	5	0.8	6.5	2.1	15.2 #	20.1	
C50 Breast	14	6.0	2.3	1.3	3.9 #	38.0	
C51 Vulva	1	0.2	5.7	0.1	31.5	3.9	
C53 Cervix uteri	1	0.3	3.3	0.1	18.6	3.3	
C54 Corpus uteri	4	1.0	3.9	1.1	10.0 #	14.1	
C56 Ovary	1	0.7	1.4	0.0	7.6	1.3	
C64 Kidney	1	0.4	2.4	0.1	13.5	2.8	100.0
C66 Ureter	1	0.0	35.9	0.9	200.2	4.6	
C70-C72 CNS cancer	4	0.2	16.2	4.4	41.5 #	17.8	
C73 Thyroid	1	0.4	2.5	0.1	13.8	2.8	
C76-C79 CUP	2	0.3	6.8	0.8	24.6	8.1	
C82-C85 NHL	1	0.7	1.5	0.0	8.2	1.5	
Not observed	0	2.0	0.0	0.0	1.8	-9.7	
All further malignancies	55	18.4	3.0	2.3	3.9 #	173.8	5.5
Patients		464					
Median age at next malignancy (years)		65.7					
Person-years		2108					
Mean observation time (years)		4.5					
Median observation time (years)		3.0					

The occurrence of further specified malignancy is statistically significant.

Average incidence (Germany 1987 standard population) 2007 - 2019: Males



Average incidence (Germany 1987 standard population) 2007 - 2019: Females

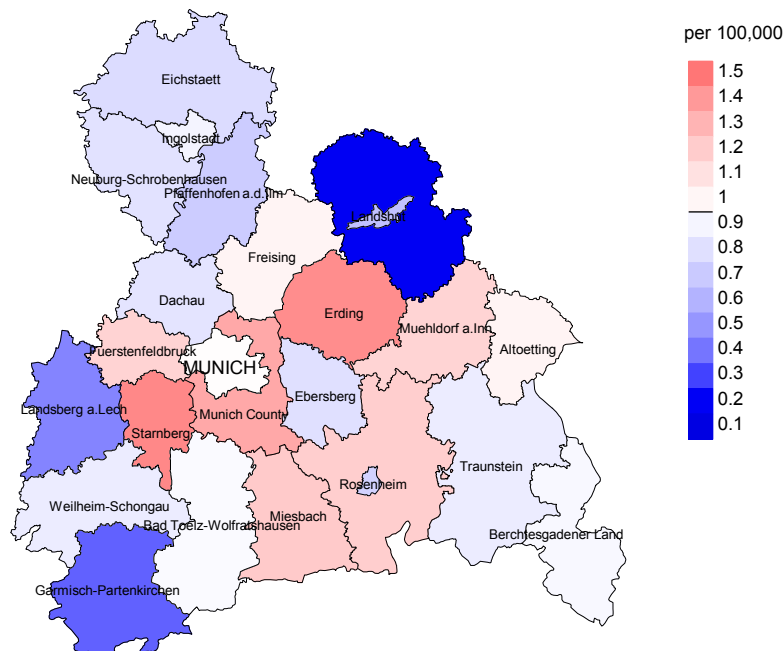
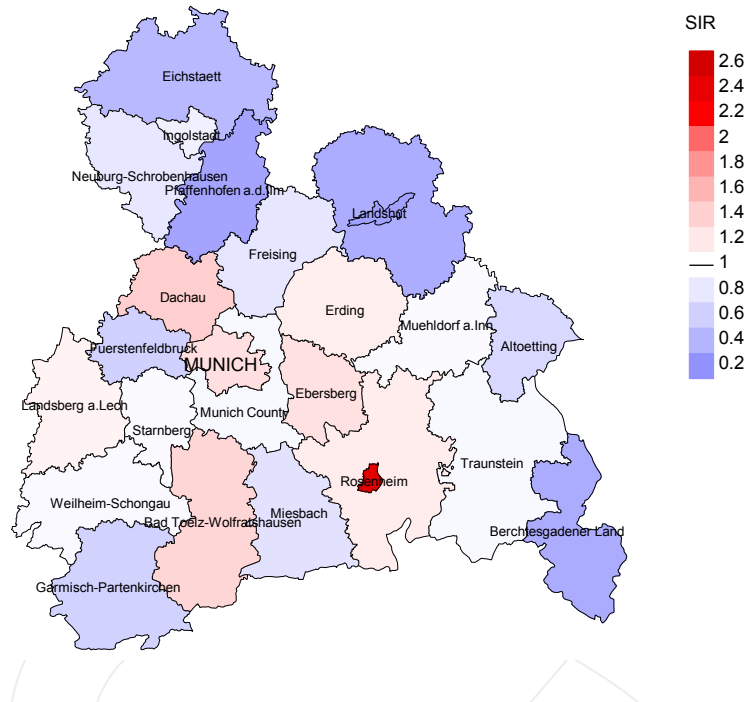


Figure 8a. Map of cancer incidence (german standard population) by county averaged for period 2007 to 2019. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 0.8/100,000 WS N=251, females 1.0/100,000 WS N=324).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,462 female residents (averaged) in the period from 2007 to 2019 a total of 7 women were identified with newly diagnosed CNS neoplasm. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 0.8/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.2 and 2.0/100,000.

Standardized incidence ratio (SIR) 2007 - 2019: Males



Standardized incidence ratio (SIR) 2007 - 2019: Females

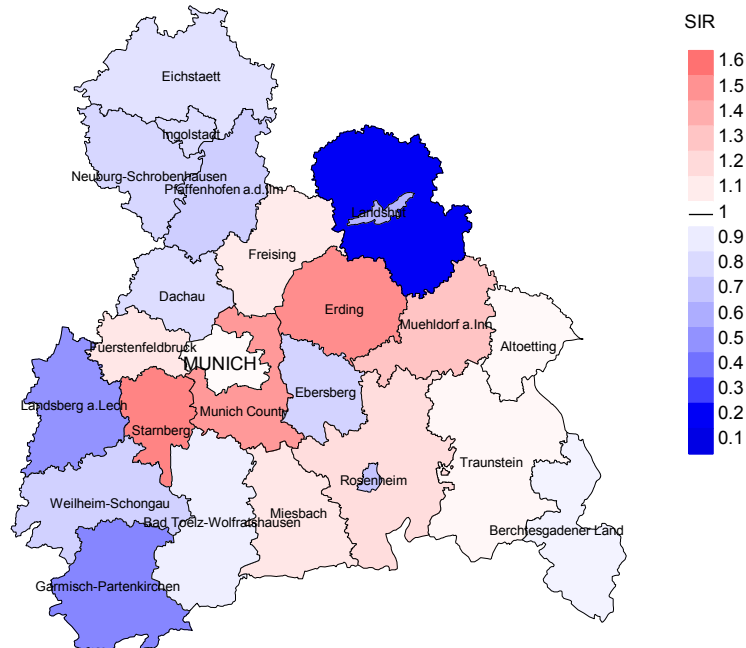


Figure 8b. Map of standardized incidence ratio (SIR) by county averaged for period 2007 to 2019. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=251, females N=324).

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 2019 a total of 7 women were identified with newly diagnosed CNS neoplasm. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.77. Though, the value of this parameter may vary with an underlying probability of 99% between 0.22 and 1.89, and is therefore not statistically striking.

MORTALITY

Table 9a

Annual cohorts: Incident cancers, follow-up status,
and deaths among the annual cohorts

(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,
and from 4.10 to 4.92 m as of 2007, respectively)

Year of diagnosis	Incident cases n	Prop. actively followed %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	9	100.0			
1999	9	100.0	4	44.4	75.0
2000	11	90.9	2	18.2	50.0
2001	40	92.5	12	30.0	83.3
2002	52	86.5	9	17.3	88.9
2003	48	83.3	11	22.9	90.9
2004	55	90.9	6	10.9	83.3
2005	59	86.4	10	16.9	80.0
2006	53	90.6	10	18.9	100.0
2007	76	77.6	8	10.5	75.0
2008	68	91.2	12	17.6	91.7
2009	71	97.2	14	19.7	100.0
2010	41	100.0	7	17.1	85.7
2011	71	97.2	3	4.2	100.0
2012	74	95.9	4	5.4	100.0
2013	26	96.2	2	7.7	100.0
2014	32	87.5	5	15.6	100.0
2015	31	96.8	5	16.1	100.0
2016	26	88.5	2	7.7	50.0
2017	25	96.0	1	4.0	
2018	19	78.9	3	15.8	66.7
2019	15	60.0	4	26.7	25.0
1998-2019	911	90.5	134	14.7	85.8

Table 9b

Annual cohorts of incident cancers and deaths,
and cases deceased within the same year of being diagnosed with cancer

(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,
and from 4.10 to 4.92 m as of 2007, respectively)

Year of diagnosis/ death	Incident cases n	Deaths n	Deaths in same year n	Prop. deaths in same year %
1998	9			
1999	9			
2000	11			
2001	40	2	2	5.0
2002	52	2		
2003	48	2		
2004	55	2		
2005	59	6	2	3.4
2006	53	8		
2007	76	4		
2008	68	6		
2009	71	6		
2010	41	11		
2011	71	9	1	1.4
2012	74	11	1	1.4
2013	26	7		
2014	32	18	2	6.3
2015	31	9	1	3.2
2016	26	16		
2017	25	16		
2018	19	13	1	5.3
2019	15	12	4	26.7
1998-2019	911	160	14	1.5

Table 9c

Annual cohorts of deaths, and proportion of cancer-related and non-cancer-related deaths

(with respect to registry area expansion from 2.65 to 4.10 m as of 2002, and from 4.10 to 4.92 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer- related %	Prop. non-cancer- related %	Prop. cancer recorded on death certificate %
2001	2	50.0	50.0	50.0
2002	2	50.0	50.0	50.0
2003	2	50.0	50.0	100.0
2004	2	100.0		100.0
2005	6	83.3	16.7	83.3
2006	8	75.0	25.0	75.0
2007	4	50.0	50.0	50.0
2008	6	66.7	33.3	83.3
2009	6	66.7	33.3	83.3
2010	11	45.5	54.5	54.5
2011	9	44.4	55.6	75.0
2012	11	45.5	54.5	54.5
2013	7	28.6	71.4	28.6
2014	18	77.8	22.2	88.9
2015	9	66.7	33.3	66.7
2016	16	37.5	62.5	60.0
2017	16	37.5	62.5	26.7
2018	13	7.7	92.3	40.0
2019	12	25.0	75.0	66.7
2001-2019	160	48.8	51.3	62.6

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
2001	2	65.5	84.9	46.2	84.9
2002	2	70.3	66.0	74.7	66.0
2003	1	59.2		59.2	
2004	1	68.7	68.7		68.7
2005	4	79.7	81.8	77.6	81.8
2006	2	75.5	83.9	67.1	83.9
2007	3	60.3	55.6	65.5	55.6
2008	5	71.0	69.6	80.9	69.6
2009	3	75.4	76.5	64.4	75.4
2010	5	81.8	83.7	73.6	83.7
2011	5	72.8	60.3	72.8	72.8
2012	6	77.7	76.1	79.2	76.1
2013	5	82.8	70.4	84.7	70.4
2014	8	81.6	80.9	81.7	81.5
2015	5	68.7	68.4	68.7	67.9
2016	5	69.4	68.7	78.4	69.1
2017	8	86.3	84.7	87.2	82.0
2018	5	84.4		84.4	84.9
2019	6	79.9	95.5	78.0	
2001-2019	81	77.1	74.7	78.4	73.6

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
2001					
2002					
2003	1	86.5	86.5		86.5
2004	1	56.8	56.8		56.8
2005	2	52.7	52.7		52.7
2006	6	80.2	78.9	81.5	78.9
2007	1	82.9		82.9	
2008	1	72.9		72.9	72.9
2009	3	69.8	69.8	75.1	69.8
2010	6	80.5	80.4	80.5	80.0
2011	4	79.8	68.3	86.0	82.2
2012	5	89.4	82.4	89.4	89.5
2013	2	76.1		76.1	
2014	10	80.0	75.9	88.2	78.3
2015	4	70.6	64.0	82.3	64.0
2016	11	80.3	80.4	78.9	80.4
2017	8	81.9	72.3	81.9	58.2
2018	8	73.8	68.0	77.0	77.0
2019	6	80.1	74.1	83.1	78.8
2001-2019	79	78.2	75.3	80.9	78.2

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
2001	1	0.1	0.05	0.0	0.02	0.1	0.04	0.2	0.08
2002	1	0.1	0.04	0.0	0.03	0.0	0.03	0.0	0.03
2003									
2004	1	0.1	0.04	0.0	0.03	0.0	0.03	0.0	0.03
2005	3	0.2	0.11	0.1	0.06	0.1	0.09	0.2	0.13
2006	1	0.1	0.03	0.0	0.01	0.0	0.02	0.1	0.05
2007	2	0.1	0.07	0.1	0.07	0.1	0.08	0.1	0.08
2008	4	0.2	0.14	0.2	0.19	0.2	0.15	0.2	0.13
2009	2	0.1	0.07	0.0	0.03	0.1	0.05	0.1	0.09
2010	3	0.1	0.20	0.0	0.11	0.1	0.15	0.1	0.21
2011	2	0.1	0.07	0.0	0.04	0.1	0.05	0.1	0.06
2012	3	0.1	0.06	0.1	0.04	0.1	0.05	0.1	0.07
2013	2	0.1	0.13	0.0	0.07	0.1	0.10	0.1	0.15
2014	6	0.3	0.43	0.1	0.15	0.1	0.24	0.3	0.42
2015	4	0.2	0.36	0.1	0.23	0.1	0.29	0.2	0.36
2016	3	0.1	0.27	0.1	0.20	0.1	0.26	0.1	0.26
2017	2	0.1	0.18	0.0	0.05	0.0	0.10	0.1	0.15
2018									
2019	1	0.0	0.14	0.0	0.06	0.0	0.11	0.0	0.11
2001-2019	41	0.1	0.10	0.0	0.07	0.1	0.08	0.1	0.11

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
2001									
2002									
2003	1	0.1	0.05	0.0	0.01	0.0	0.02	0.0	0.03
2004	1	0.1	0.03	0.0	0.04	0.1	0.04	0.1	0.04
2005	2	0.1	0.06	0.1	0.07	0.1	0.08	0.1	0.07
2006	5	0.2	0.21	0.1	0.07	0.1	0.11	0.2	0.19
2007									
2008									
2009	2	0.1	0.05	0.0	0.03	0.1	0.04	0.1	0.04
2010	2	0.1	0.08	0.0	0.02	0.0	0.04	0.1	0.07
2011	2	0.1	0.05	0.0	0.03	0.1	0.04	0.1	0.05
2012	2	0.1	0.07	0.0	0.02	0.0	0.03	0.1	0.05
2013									
2014	8	0.3	0.44	0.1	0.24	0.2	0.31	0.2	0.34
2015	2	0.1	0.10	0.1	0.10	0.1	0.10	0.1	0.10
2016	3	0.1	0.20	0.0	0.05	0.0	0.07	0.1	0.13
2017	4	0.2	0.29	0.1	0.20	0.1	0.22	0.1	0.23
2018	1	0.0	0.07	0.0	0.08	0.0	0.08	0.0	0.07
2019	2	0.1	0.25	0.0	0.21	0.1	0.23	0.1	0.24
2001-2019	37	0.1	0.08	0.0	0.05	0.1	0.06	0.1	0.07

Table 12

Age distribution of age at death (cancer-related) for period 2007-2019
(incl. multiple malignancies)

Age at death Years	Cases			Males			Females		
	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
0-4									
5-9	1	1.6	1.6	1	2.9	2.9			0.0
10-14	0	0.0	1.6			2.9			0.0
15-19	0	0.0	1.6			2.9			0.0
20-24	0	0.0	1.6			2.9			0.0
25-29	0	0.0	1.6			2.9			0.0
30-34	0	0.0	1.6			2.9			0.0
35-39	0	0.0	1.6			2.9			0.0
40-44	0	0.0	1.6			2.9			0.0
45-49	3	4.8	6.5	2	5.9	8.8	1	3.6	3.6
50-54	1	1.6	8.1	1	2.9	11.8			3.6
55-59	5	8.1	16.1	3	8.8	20.6	2	7.1	10.7
60-64	5	8.1	24.2	2	5.9	26.5	3	10.7	21.4
65-69	9	14.5	38.7	5	14.7	41.2	4	14.3	35.7
70-74	8	12.9	51.6	4	11.8	52.9	4	14.3	50.0
75-79	9	14.5	66.1	5	14.7	67.6	4	14.3	64.3
80-84	12	19.4	85.5	8	23.5	91.2	4	14.3	78.6
85+	9	14.5	100.0	3	8.8	100.0	6	21.4	100.0
All ages	62	100.0		34	100.0		28	100.0	

Table 13

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2019
(incl. multiple malignancies)

Age at death Years	Males n	Females n	Males Age- spec. mortal.	MI-index	Females Age- spec. mortal.	MI-index
0- 4						
5- 9	1		0.1	1.00		
10-14						
15-19						
20-24						
25-29						
30-34						
35-39						
40-44						
45-49	2	1	0.1	0.07	0.0	0.04
50-54	1		0.0	0.05		
55-59	3	2	0.2	0.11	0.1	0.04
60-64	2	3	0.1	0.10	0.2	0.09
65-69	5	4	0.3	0.14	0.2	0.15
70-74	4	4	0.3	0.17	0.2	0.13
75-79	5	4	0.5	0.31	0.3	0.14
80-84	8	4	1.2	4.00	0.4	0.25
85+	3	6	0.7	3.00	0.6	6.00
All ages	34	28				
Mortality						
Raw			0.1	0.14	0.1	0.09
WS			0.1	0.09	0.0	0.05
ES			0.1	0.11	0.1	0.06
BRD-S			0.1	0.14	0.1	0.07
PYLL-70						
per 100,000			0.7		0.3	
ES			0.7		0.2	
AYLL-70			13.6		8.0	

Table 14a

Further malignancies in deaths in period 2001-2019
MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	1	2.0	1	100.0				
C12-C13 Hypopharynx	1	2.0					1	100.0
C15 Oesophagus	1	2.0					1	100.0
C16 Stomach	1	2.0					1	100.0
C18 Colon	6	12.2	1	16.7			5	83.3
C19-C20 Rectum	1	2.0					1	100.0
C21 Anus/canal	1	2.0	1	100.0				
C23-C24 Bile	1	2.0			1	100.0		
C25 Pancreas	1	2.0					1	100.0
C33-C34 Lung	4	8.2	1	25.0			3	75.0
C43 Malign. melanoma	2	4.1					2	100.0
C44 Skin others	2	4.1	1	50.0			1	50.0
C46,C49 Soft tissue	1	2.0					1	100.0
C61 Prostate	7	14.3	2	28.6			5	71.4
C64 Kidney	4	8.2	2	50.0			2	50.0
C69 Eye carcinoma	1	2.0					1	100.0
C69 Eye melanoma	1	2.0					1	100.0
C70-C72 CNS cancer	4	8.2					4	100.0
C73 Thyroid	1	2.0					1	100.0
C82-C85 NHL	6	12.2	1	16.7			5	83.3
C90 Mult. myeloma	1	2.0					1	100.0
C91-C96 Leukaemia	1	2.0					1	100.0
All further malignancies	49	100.0	10	20.4	1	2.0	38	77.6

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 2001-2019
FEMALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C16 Stomach	1	2.4					1	100.0
C18 Colon	5	11.9			1	20.0	4	80.0
C19-C20 Rectum	1	2.4					1	100.0
C22 Liver	1	2.4	1	100.0				
C25 Pancreas	3	7.1			1	33.3	2	66.7
C44 Skin others	2	4.8			1	50.0	1	50.0
C50 Breast	14	33.3	8	57.1	1	7.1	5	35.7
C51 Vulva	1	2.4					1	100.0
C54 Corpus uteri	2	4.8	1	50.0			1	50.0
C56 Ovary	2	4.8					2	100.0
C64 Kidney	1	2.4					1	100.0
C66 Ureter	1	2.4					1	100.0
C70-C72 CNS cancer	3	7.1					3	100.0
C73 Thyroid	1	2.4	1	100.0				
C76-C79 CUP	2	4.8					2	100.0
C82-C85 NHL	2	4.8	1	50.0			1	50.0
All further malignancies	42	100.0	12	28.6	4	9.5	26	61.9

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 2007-2019 (First primaries only *)

Age at death Years	Males n	Females n	Males Age- spec. mortal.	MI-index	Females Age- spec. mortal.	MI-index
0- 4						
5- 9	1		0.1	1.00		
10-14						
15-19						
20-24						
25-29						
30-34						
35-39						
40-44						
45-49	2	1	0.1	0.07	0.0	0.04
50-54	1		0.0	0.05		
55-59	3	1	0.2	0.13	0.1	0.03
60-64	2	2	0.1	0.12	0.1	0.09
65-69	3	3	0.2	0.10	0.2	0.14
70-74	3	3	0.2	0.19	0.2	0.12
75-79	5	1	0.5	0.56	0.1	0.05
80-84	6	3	0.9	3.00	0.3	0.30
85+	2	3	0.5	1.00	0.3	1.00
All ages	28	17				
Mortality						
Raw			0.1	0.13	0.1	0.06
WS			0.0	0.09	0.0	0.04
ES			0.1	0.10	0.0	0.04
BRD-S			0.1	0.13	0.0	0.05
PYLL-70						
per 100,000			0.7		0.2	
ES			0.7		0.2	
AYLL-70			15.4		8.2	

* See corresponding tables with multiple malignancies.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers for period 2011-2019 (Single primaries only *)

Age at death Years	Males n	Females n	Males Age- spec. mortal.	MI-index	Females Age- spec. mortal.	MI-index
0- 4						
5- 9						
10-14						
15-19						
20-24						
25-29						
30-34						
35-39						
40-44						
45-49						
50-54						
55-59	1		0.1	0.07		
60-64						
65-69						
70-74		1			0.1	0.08
75-79	1	1	0.1	0.33	0.1	0.07
80-84		1			0.1	0.20
85+	2	2	0.6	1.00	0.3	1.00
All ages	4	5				
Mortality						
Raw			0.0	0.03	0.0	0.03
WS			0.0	0.01	0.0	0.01
ES			0.0	0.02	0.0	0.01
BRD-S			0.0	0.03	0.0	0.02
PYLL-70						
per 100,000			0.1			
ES			0.1			
AYLL-70			12.5			

* See corresponding tables with multiple malignancies.

ICD-10 D33: Benign neoplasm of brain and other parts of central nervous system
 Age distribution and age-specific mortality 2011 - 2019 (Males: 34, Females: 28)

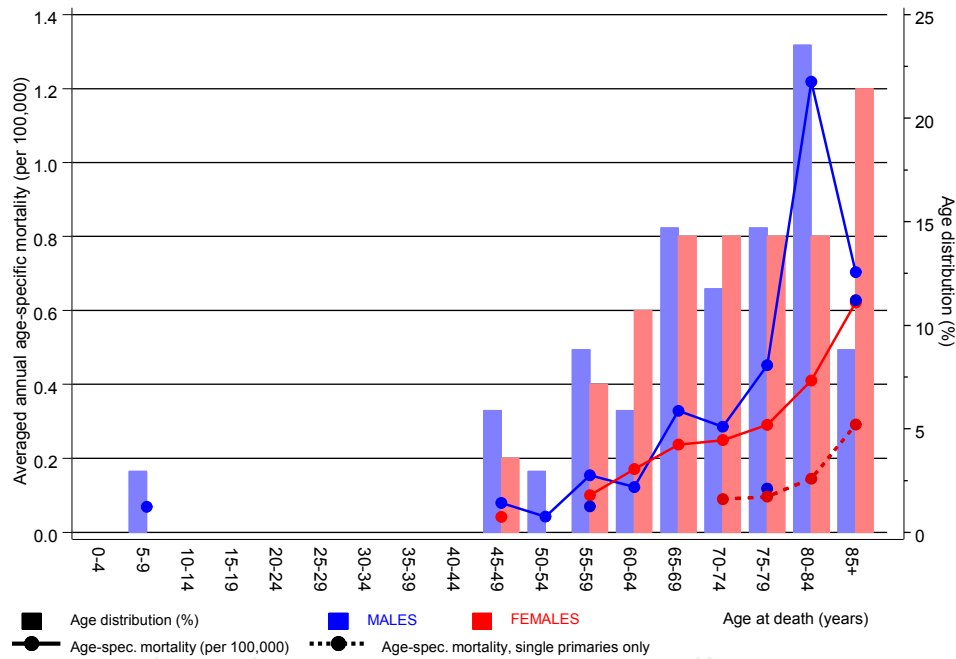
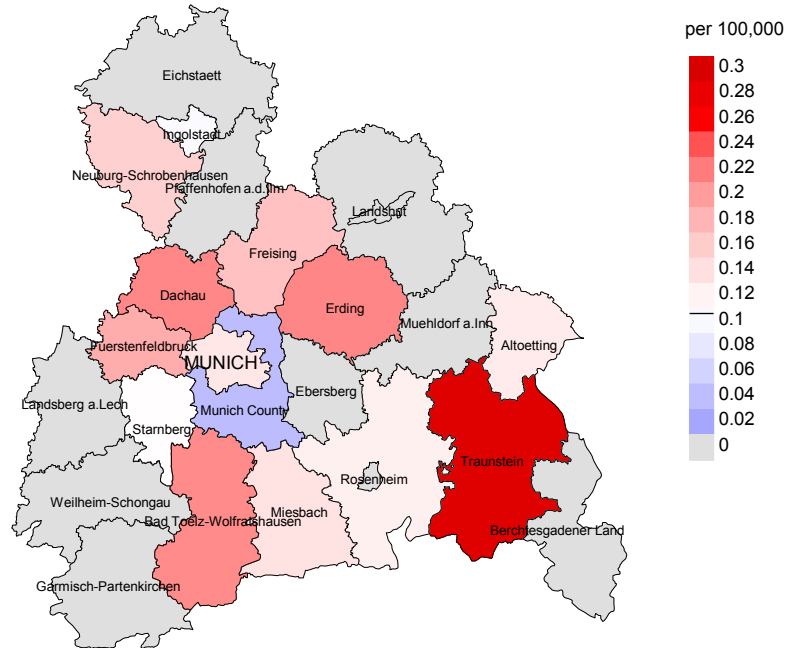


Figure 17. Distribution of age at death (bars; males: mean=57.5 yrs, median=60.7 yrs; females: mean=64.3 yrs, median=69.3 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line).

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

Average mortality (Germany 1987 standard population) 2007 - 2019: Males



Average mortality (Germany 1987 standard population) 2007 - 2019: Females

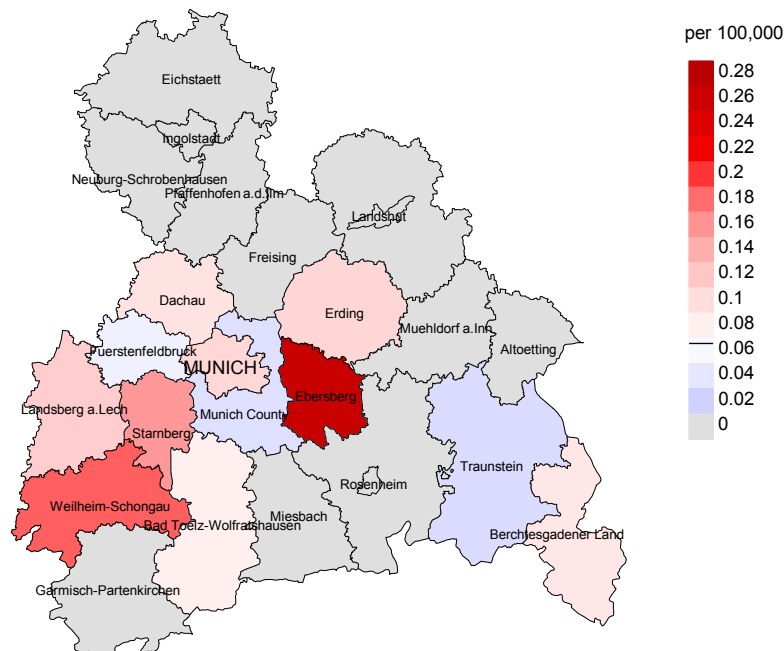
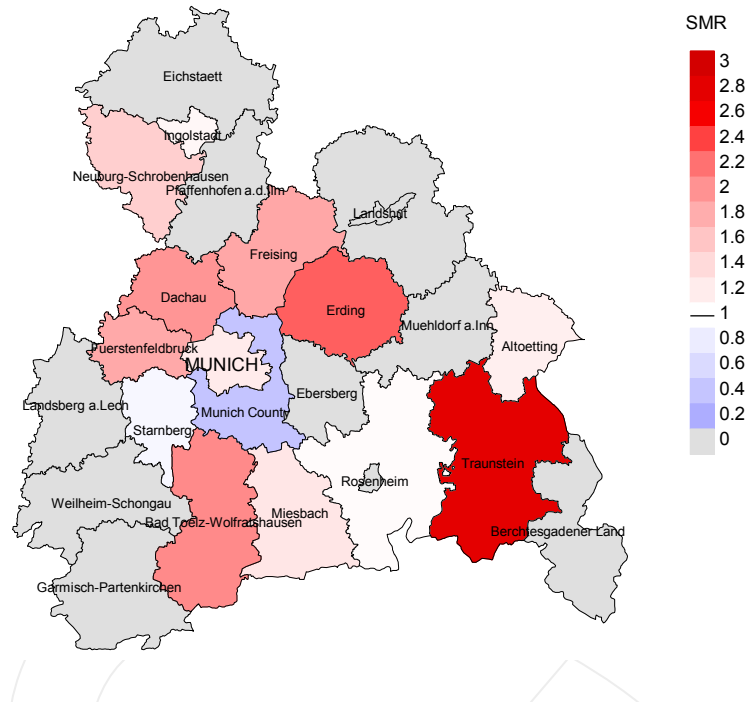


Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2019. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 0.1/100,000 WS N=34, females 0.1/100,000 WS N=28).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,462 female residents (averaged) in the period from 2007 to 2019 a total of 3 women died from CNS neoplasm. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.3/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 1.1/100,000.

Standardized mortality ratio (SMR) 2007 - 2019: Males



Standardized mortality ratio (SMR) 2007 - 2019: Females

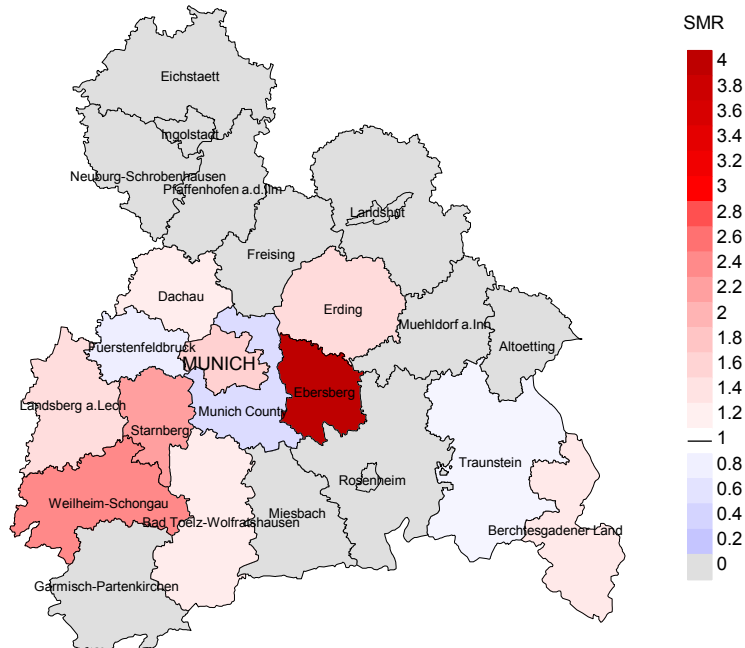


Figure 18b. Map of standardized mortality ratio (SMR) by county averaged for period 2007 to 2019. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=34, females N=28).

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 2019 a total of 3 women died from CNS neoplasm. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 4.00. Though, the value of this parameter may vary with an underlying probability of 99% between 0.45 and 14.64, 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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