

Munich Cancer Registry



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

ICD-10 C71: Astrocytoma I-III

Incidence and Mortality

Year of diagnosis	1998-2019
Patients	883
Diseases	883
Creation date	01/25/2021
Database export	01/07/2021
Population	4.92 m





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

https://www.tumorregister-muenchen.de/en/facts/base/bC71A_E-ICD-10-C71-Astrocytoma-I-III-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
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C71	Malignant neoplasm of brain
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... if additionally existing any of ...

Morphology codes (ICD-O-3 2011) used for specifying cancer site

Code	Description
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9384/1	Subependymal giant cell astrocytoma – I
9400/3	Astrocytoma, NOS – II
9401/3	Astrocytoma, anaplastic – III
9410/3	Protoplasmic astrocytoma – II
9411/3	Gemistocytic astrocytoma – II
9420/3	Fibrillary astrocytoma – II
9421/1	Pilocytic astrocytoma – I
9424/3	Pleomorphic xanthoastrocytoma – II
9425/3	Pilomyxoid astrocytoma – II

INCIDENCE

Table 1

Cases with invasive cancer 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	39	5.1	2.8	71.8	94.9
1999	20	6.8	2.7	90.0	100.0
2000	28	8.0	2.7	71.4	92.9
2001	28	6.1	2.7	75.0	96.4
2002	33	6.1	2.6	69.7	97.0 #
2003	50	5.1	2.7	76.0	98.0
2004	41	4.6	2.8	70.7	100.0
2005	50	6.2	3.0	62.0	94.0
2006	34	5.9	2.9	76.5	97.1
2007	68	6.1	2.7	63.2	94.1 #
2008	66	5.9	2.2	65.2	100.0
2009	64	6.1	2.4	68.8	93.8
2010	41	6.0	2.2	75.6	97.6
2011	52	6.2	1.9	50.0	98.1
2012	60	6.5	1.9	61.7	98.3
2013	58	6.4	1.9	60.3	100.0
2014	42	6.7	2.0	50.0	97.6
2015	39	6.9	0.0	53.8	94.9
2016	26	7.0	0.0	38.5	100.0
2017	19	7.2	0.0	15.8	100.0
2018	13	7.5	0.0	15.4	100.0
2019	12	7.6	0.0	16.7	66.7 ##
1998-2019	883	7.6	2.8	62.5	96.7

883 cases diagnosed 1998-2019 are related to a total of 883 patients. Currently, in 96 (10.9 %) of these 883 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 84 / 12 / 0 (9.5 % / 1.4 % / 0.0 %) patients exist having 2 / 3 / 4+ malignancies.

The increases of incident cases in 2002 and 2007 reflect the expansion to additional registry areas.

Please be aware that data of recent annual patient cohorts may not yet be fully processed. The years under evaluation can be retrieved from the respective headings.

How to interpret:

In 2017, a subgroup of 19 cases has been diagnosed, of which 7.2 % 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 1a

Cases with invasive cancer 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	18	46.2	0.0	2.3	72.2	94.4
1999	11	55.0	6.9	2.2	90.9	100.0
2000	14	50.0	7.0	2.2	64.3	92.9
2001	14	50.0	5.3	2.3	71.4	92.9
2002	18	54.5	4.0	2.1	72.2	94.4 #
2003	27	54.0	2.9	2.2	85.2	100.0
2004	23	56.1	3.2	2.4	87.0	100.0
2005	26	52.0	4.6	2.5	73.1	92.3
2006	21	61.8	4.7	2.7	81.0	100.0
2007	41	60.3	5.2	2.6	58.5	92.7 #
2008	33	50.0	4.9	2.2	72.7	100.0
2009	37	57.8	5.3	2.1	59.5	91.9
2010	24	58.5	5.2	2.0	70.8	95.8
2011	30	57.7	5.9	2.3	56.7	100.0
2012	34	56.7	6.5	2.1	67.6	100.0
2013	31	53.4	6.5	1.8	64.5	100.0
2014	23	54.8	6.4	2.5	47.8	100.0
2015	17	43.6	6.8	0.0	64.7	94.1
2016	14	53.8	6.6	0.0	28.6	100.0
2017	11	57.9	6.9	0.0	18.2	100.0
2018	9	69.2	7.1	0.0	22.2	100.0
2019	8	66.7	7.4	0.0	25.0	75.0 ##
1998-2019	484	54.8	7.4	2.3	64.7	96.7

484 cases diagnosed 1998-2019 are related to a total of 484 patients. Currently, in 48 (9.9 %) of these 484 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 43 / 5 / 0 (8.9 % / 1.0 % / 0.0 %) patients exist having 2 / 3 / 4+ malignancies.

The increases of incident cases in 2002 and 2007 reflect the expansion to additional registry areas.

Please be aware that data of recent annual patient cohorts may not yet be fully processed. The years under evaluation can be retrieved from the respective headings.

How to interpret:

In 2017, a subgroup of 11 cases has been diagnosed, of which 6.9 % 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 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	21	53.8	9.5	3.5	71.4	95.2
1999	9	45.0	6.7	3.5	88.9	100.0
2000	14	50.0	9.1	3.3	78.6	92.9
2001	14	50.0	6.9	3.1	78.6	100.0
2002	15	45.5	8.2	3.3	66.7	100.0 #
2003	23	46.0	7.3	3.4	65.2	95.7
2004	18	43.9	6.1	3.3	50.0	100.0
2005	24	48.0	8.0	3.5	50.0	95.8
2006	13	38.2	7.3	3.1	69.2	92.3
2007	27	39.7	7.3	2.8	70.4	96.3 #
2008	33	50.0	7.1	2.3	57.6	100.0
2009	27	42.2	7.1	2.7	81.5	96.3
2010	17	41.5	7.1	2.5	82.4	100.0
2011	22	42.3	6.5	1.4	40.9	95.5
2012	26	43.3	6.6	1.6	53.8	96.2
2013	27	46.6	6.4	2.1	55.6	100.0
2014	19	45.2	7.2	1.4	52.6	94.7
2015	22	56.4	7.0	0.0	45.5	95.5
2016	12	46.2	7.6	0.0	50.0	100.0
2017	8	42.1	7.7	0.0	12.5	100.0
2018	4	30.8	7.8	0.0		100.0
2019	4	33.3	7.8	0.0		50.0 ##
1998-2019	399	45.2	7.8	3.5	59.9	96.7

399 cases diagnosed 1998-2019 are related to a total of 399 patients. Currently, in 48 (12.0 %) of these 399 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 41 / 7 / 0 (10.3 % / 1.8 % / 0.0 %) patients exist having 2 / 3 / 4+ malignancies.

The increases of incident cases in 2002 and 2007 reflect the expansion to additional registry areas.

Please be aware that data of recent annual patient cohorts may not yet be fully processed. The years under evaluation can be retrieved from the respective headings.

How to interpret:

In 2017, a subgroup of 8 cases has been diagnosed, of which 7.7 % 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 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	18	21	1.6	1.8	1.3	1.6	1.5	1.7	1.6	1.7
1999	11	9	1.0	0.8	0.6	0.5	0.9	0.6	1.0	0.6
2000	14	14	1.2	1.2	0.9	0.7	1.1	0.9	1.2	1.1
2001	14	14	1.2	1.2	0.9	0.8	1.1	1.0	1.2	1.0
2002	18	15	1.0	0.8	0.8	0.6	0.9	0.7	0.9	0.8
2003	27	23	1.4	1.2	1.2	0.8	1.4	1.0	1.4	1.1
2004	23	18	1.2	0.9	0.9	0.8	1.1	0.9	1.2	0.9
2005	26	24	1.4	1.2	1.1	1.2	1.3	1.2	1.3	1.2
2006	21	13	1.1	0.6	0.9	0.5	1.1	0.6	1.1	0.6
2007	41	27	1.9	1.2	1.4	0.8	1.7	1.0	1.7	1.1
2008	33	33	1.5	1.4	1.3	1.3	1.4	1.4	1.5	1.4
2009	37	27	1.7	1.2	1.4	0.9	1.5	1.1	1.6	1.1
2010	24	17	1.1	0.7	0.8	0.5	1.0	0.6	1.0	0.7
2011	30	22	1.3	0.9	1.1	0.8	1.2	0.9	1.2	0.9
2012	34	26	1.5	1.1	1.2	0.8	1.3	0.9	1.5	1.0
2013	31	27	1.3	1.1	1.1	0.8	1.2	1.0	1.2	1.1
2014	23	19	1.0	0.8	0.8	0.5	0.9	0.6	1.0	0.7
2015	17	22	0.7	0.9	0.5	0.6	0.6	0.8	0.7	0.8
2016	14	12	0.6	0.5	0.6	0.3	0.6	0.4	0.6	0.4
2017	11	8	0.5	0.3	0.3	0.3	0.4	0.3	0.4	0.3
2018	9	4	0.4	0.2	0.3	0.2	0.3	0.2	0.4	0.2
2019	8	4	0.3	0.2	0.3	0.1	0.3	0.2	0.3	0.1
1998-2019	484	399	1.1	0.9	0.9	0.7	1.0	0.8	1.1	0.8

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	39	45.6	19.4	4.2	85.2	21.3	32.4	46.3	60.2	72.4
1999	20	56.3	17.7	27.3	88.2	33.0	42.6	57.6	69.2	82.5
2000	28	54.1	13.4	28.2	79.5	36.2	45.2	54.4	64.6	70.2
2001	28	49.3	14.5	16.4	70.9	30.1	37.4	50.7	60.4	70.5
2002	33	45.0	19.2	4.8	83.3	22.3	32.1	42.4	57.7	69.5
2003	50	46.6	17.2	12.9	80.5	25.4	32.8	44.2	61.9	69.3
2004	41	45.3	16.2	11.6	79.4	28.4	32.5	45.5	53.6	63.8
2005	50	44.0	17.7	2.8	78.4	21.7	32.7	44.4	59.0	66.8
2006	34	45.9	19.9	9.1	81.7	22.0	32.2	42.8	62.3	75.5
2007	68	50.5	16.1	21.4	79.0	29.3	37.3	50.4	62.5	74.7
2008	66	43.8	18.0	6.0	80.3	22.7	29.4	41.1	60.1	69.1
2009	64	48.4	17.3	5.4	81.4	25.5	36.9	49.9	60.7	68.3
2010	41	51.7	18.5	14.7	81.1	30.4	35.8	52.1	70.5	72.3
2011	52	46.3	16.9	12.6	85.7	25.6	37.9	43.5	56.9	70.9
2012	60	50.5	19.3	5.6	84.9	24.7	37.2	48.9	66.4	74.1
2013	58	50.2	18.7	3.0	83.7	27.8	37.3	50.6	65.8	73.4
2014	42	51.7	17.1	23.9	85.9	29.6	36.8	50.3	68.8	74.2
2015	39	51.6	17.4	21.4	87.1	25.9	39.7	51.9	62.9	78.2
2016	26	47.0	20.1	4.0	86.6	26.4	30.0	43.9	59.8	71.7
2017	19	48.0	16.2	21.6	77.7	26.6	34.9	46.4	60.0	75.2
2018	13	50.3	17.9	19.1	78.7	32.7	37.3	49.9	59.6	74.2
2019	12	48.4	14.1	31.9	71.8	32.0	35.3	45.1	60.3	68.9
1998-2019	883	48.3	17.7	2.8	88.2	26.4	35.2	47.5	61.7	71.6

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	18	44.8	16.7	17.8	72.4	23.4	31.2	46.1	60.2	66.2
1999	11	62.5	14.7	36.5	85.5	43.9	54.8	60.2	73.4	79.5
2000	14	52.2	12.5	28.2	70.2	36.2	46.6	50.9	61.3	67.3
2001	14	48.4	15.3	16.4	70.5	28.1	37.0	52.7	58.2	66.3
2002	18	41.8	16.5	4.8	71.8	22.1	32.2	39.3	54.0	65.8
2003	27	43.6	17.3	12.9	72.9	24.3	27.1	41.5	58.7	67.8
2004	23	48.7	13.9	21.6	76.0	30.2	38.1	48.7	61.3	63.8
2005	26	46.8	17.9	2.8	78.4	26.5	36.0	49.9	59.1	67.9
2006	21	43.6	18.3	10.8	76.5	25.9	31.5	41.1	52.0	70.6
2007	41	48.9	12.9	25.3	72.0	30.9	40.6	49.2	57.7	64.3
2008	33	42.6	15.0	22.4	71.0	24.4	31.9	39.2	52.3	64.1
2009	37	45.9	18.2	5.4	81.4	23.5	35.2	46.5	59.1	69.5
2010	24	48.2	17.6	14.7	76.2	30.9	35.0	46.3	62.0	71.3
2011	30	45.2	15.5	12.6	85.7	26.6	38.2	42.6	55.7	64.6
2012	34	48.9	21.2	5.6	84.8	23.1	31.5	47.1	66.2	74.2
2013	31	47.6	19.7	3.0	79.1	27.8	37.1	45.2	65.7	73.4
2014	23	45.9	14.9	23.9	73.7	25.4	32.3	49.1	56.1	68.8
2015	17	50.7	18.9	21.4	86.4	25.9	33.7	52.1	64.0	78.2
2016	14	38.3	17.0	4.0	70.7	26.4	29.2	36.6	46.0	62.5
2017	11	52.7	14.0	31.4	75.2	34.9	38.1	55.6	61.9	68.3
2018	9	51.6	16.0	32.7	78.7	32.7	42.0	49.9	57.0	78.7
2019	8	48.9	16.4	31.9	71.8	31.9	33.6	44.9	65.4	71.8
1998-2019	484	47.0	16.9	2.8	86.4	25.9	34.6	46.6	59.5	70.5

Table 3b

Age distribution parameters by year of diagnosis (FEMALES)

Year of diagnosis	Cases n	Std.		Median						
		Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	21	46.2	21.8	4.2	85.2	21.3	38.4	46.4	54.3	77.9
1999	9	48.7	18.9	27.3	88.2	27.3	33.4	42.9	59.1	88.2
2000	14	55.9	14.4	33.7	79.5	38.0	45.0	56.9	64.8	76.4
2001	14	50.1	14.1	30.1	70.9	35.1	38.5	46.5	63.8	70.5
2002	15	48.7	21.9	13.2	83.3	22.3	27.1	51.2	67.2	82.5
2003	23	50.1	16.6	23.0	80.5	31.5	36.6	46.5	64.0	69.4
2004	18	40.9	18.2	11.6	79.4	12.4	30.5	38.2	48.1	74.2
2005	24	40.9	17.3	3.0	69.8	17.7	28.3	43.0	52.5	66.1
2006	13	49.5	22.7	9.1	81.7	13.8	38.5	45.5	67.0	76.6
2007	27	52.9	20.0	21.4	79.0	28.7	36.6	51.6	74.7	78.1
2008	33	45.0	20.8	6.0	80.3	17.5	29.1	43.1	63.4	69.5
2009	27	51.8	15.7	7.5	75.8	32.8	38.0	54.8	65.4	68.3
2010	17	56.5	19.1	22.5	81.1	27.0	46.1	61.5	70.9	77.9
2011	22	47.7	18.9	16.8	84.5	23.1	37.7	45.2	62.7	72.7
2012	26	52.5	16.6	24.5	84.9	29.8	38.3	49.6	66.5	73.9
2013	27	53.2	17.3	22.1	83.7	29.4	38.3	52.8	67.1	72.5
2014	19	58.7	17.3	29.6	85.9	31.8	44.7	59.1	74.2	81.8
2015	22	52.2	16.5	23.4	87.1	30.0	41.9	51.0	62.9	75.0
2016	12	57.2	19.2	17.2	86.6	41.1	46.7	56.1	68.7	84.5
2017	8	41.5	17.6	21.6	77.7	21.6	29.6	37.7	48.9	77.7
2018	4	47.4	24.1	19.1	73.7	19.1	28.2	48.5	66.7	73.7
2019	4	47.3	10.0	35.3	58.7	35.3	39.6	47.5	54.9	58.7
1998-2019	399	49.9	18.5	3.0	88.2	27.0	36.9	49.2	65.1	74.7

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	2	0.4	0.4	2	0.6	0.6			0.0
5-9	8	1.4	1.8	5	1.6	2.2	3	1.2	1.2
10-14	3	0.5	2.3	3	1.0	3.2			1.2
15-19	10	1.8	4.1	3	1.0	4.2	7	2.8	4.0
20-24	22	3.9	8.0	13	4.2	8.3	9	3.6	7.7
25-29	39	7.0	15.0	22	7.1	15.4	17	6.9	14.5
30-34	46	8.2	23.2	31	9.9	25.3	15	6.0	20.6
35-39	55	9.8	33.0	31	9.9	35.3	24	9.7	30.2
40-44	58	10.4	43.4	39	12.5	47.8	19	7.7	37.9
45-49	57	10.2	53.6	33	10.6	58.3	24	9.7	47.6
50-54	48	8.6	62.1	26	8.3	66.7	22	8.9	56.5
55-59	49	8.8	70.9	30	9.6	76.3	19	7.7	64.1
60-64	40	7.1	78.0	24	7.7	84.0	16	6.5	70.6
65-69	39	7.0	85.0	16	5.1	89.1	23	9.3	79.8
70-74	45	8.0	93.0	21	6.7	95.8	24	9.7	89.5
75-79	20	3.6	96.6	6	1.9	97.8	14	5.6	95.2
80-84	14	2.5	99.1	5	1.6	99.4	9	3.6	98.8
85+	5	0.9	100.0	2	0.6	100.0	3	1.2	100.0
All ages	560	100.0		312	100.0		248	100.0	

Table 5

Age-specific incidence and proportion of all cancers for period 2007-2019

Age at diagnosis Years	Males n	Females n	Males Age- spec. incid.	Females Age- spec. incid.	Males Prop.all cancers n=143063 %	Females Prop.all cancers n=144724 %
0- 4	2		0.1		0.9	
5- 9	5	3	0.3	0.2	4.4	3.2
10-14	3		0.2		2.3	
15-19	3	7	0.2	0.5	1.0	2.8
20-24	13	9	0.7	0.5	2.2	1.9
25-29	22	17	1.0	0.8	2.5	1.5
30-34	31	15	1.5	0.7	2.6	0.8
35-39	31	24	1.4	1.1	1.8	0.7
40-44	39	19	1.7	0.8	1.5	0.3
45-49	33	24	1.3	1.0	0.7	0.3
50-54	26	22	1.1	1.0	0.3	0.2
55-59	30	19	1.5	1.0	0.3	0.2
60-64	24	16	1.5	0.9	0.1	0.1
65-69	16	23	1.1	1.4	0.1	0.1
70-74	21	24	1.5	1.5	0.1	0.1
75-79	6	14	0.5	1.0	0.0	0.1
80-84	5	9	0.8	0.9	0.0	0.1
85+	2	3	0.5	0.3	0.0	0.0
All ages	312	248			0.2	0.2
Incidence						
Raw			1.0	0.8		
WS			0.8	0.6		
ES			1.0	0.7		
BRD-S			1.0	0.8		

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

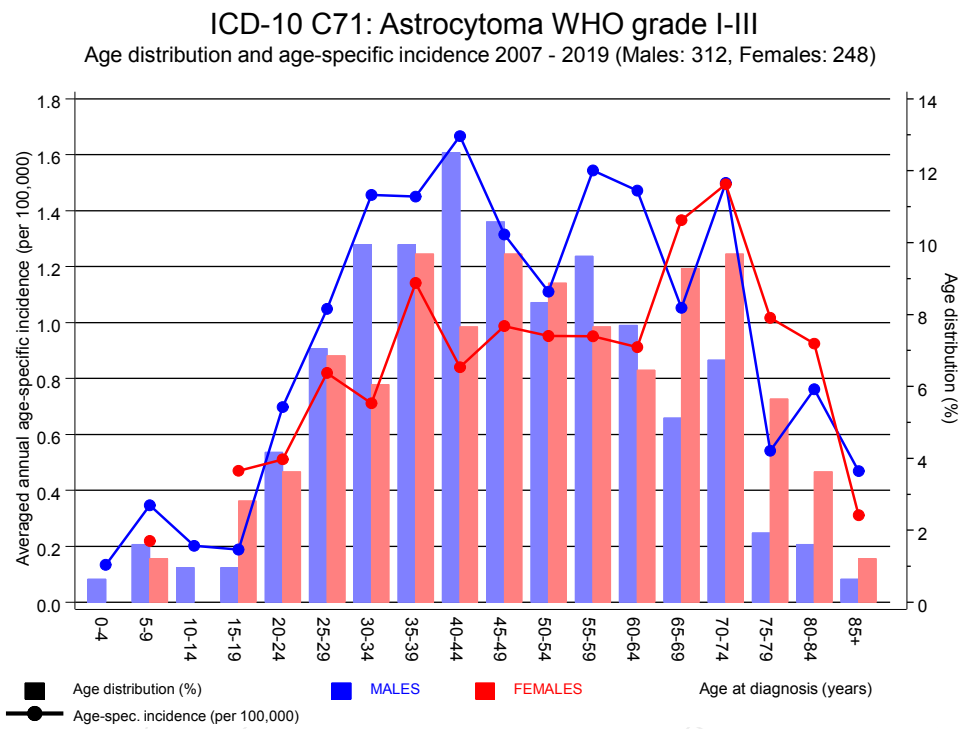


Figure 6. Age distribution (males: mean=47.0 yrs, median=46.3 yrs; females: mean=51.5 yrs, median=51.0 yrs) and age-specific incidence.

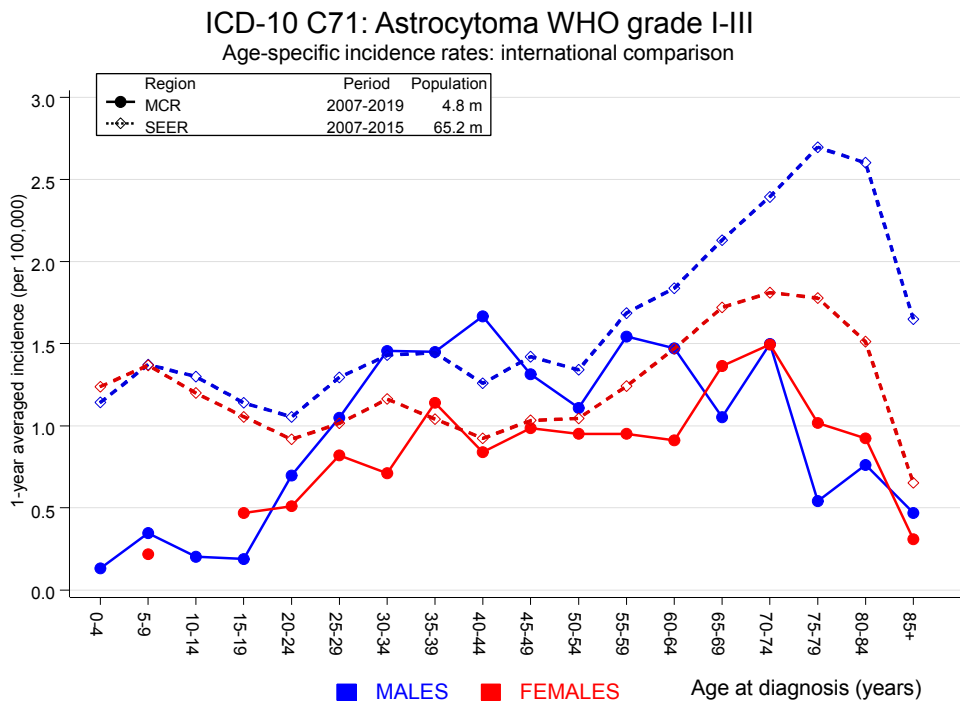


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 18 Regs Research Data, released April 2019, based on the November 2018 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 1998–2019

MALES

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C18	Colon	2	0.7	2.8	0.3	10.2	6.6	
C25	Pancreas	1	0.3	3.3	0.1	18.6	3.6	
C61	Prostate	1	2.2	0.5	0.0	2.6	-5.9	
C64	Kidney	1	0.4	2.7	0.1	15.2	3.3	
C67	Bladder	1	0.3	3.5	0.1	19.5	3.7	
C69	Eye melanoma	1	0.0	85.3	2.2	475.5 #	5.1	
C70–C72	CNS cancer	3	0.2	17.0	3.5	49.8 #	14.5	
C81	Hodgkin lymphoma	1	0.1	16.5	0.4	92.1	4.8	
Not observed		0	5.1	0.0	0.0	0.7 #	-26.0	
All further malignancies		11	9.1	1.2	0.6	2.2	9.6	
Patients				475				
Median age at next malignancy (years)				61.8				
Person-years				1950				
Mean observation time (years)				4.1				
Median observation time (years)				2.5				

The occurrence of further specified malignancy is statistically significant.

Table 7b

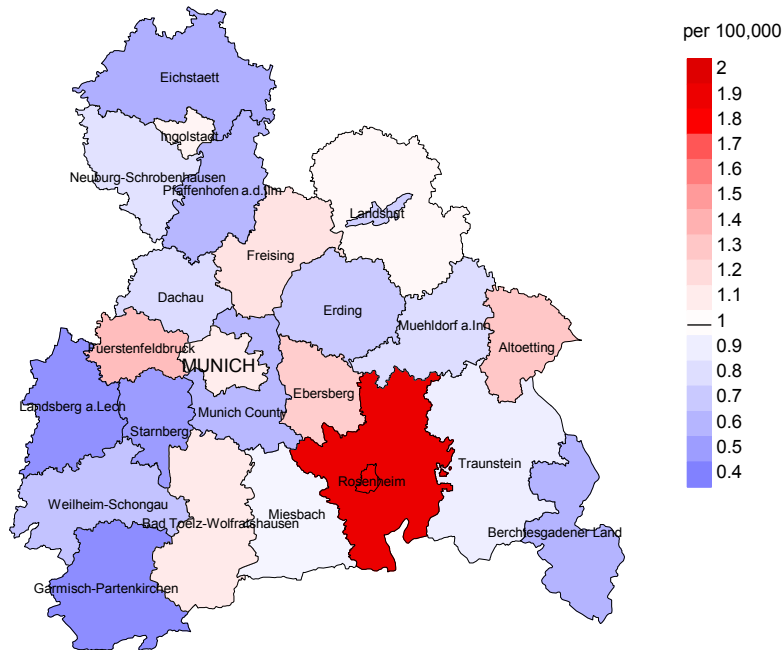
Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of further malignancies for period 1998-2019

FEMALES

Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C33-C34 Lung	1	0.4	2.3	0.1	12.9	3.7	
C40-C41 Bone	1	0.0	119.1	3.0	663.6 #	6.5	
C43 Malign. melanoma	2	0.4	5.3	0.6	19.3	10.7	
C50 Breast	4	2.6	1.6	0.4	4.0	9.5	25.0
C56 Ovary	1	0.2	4.0	0.1	22.5	5.0	
C64 Kidney	1	0.1	9.1	0.2	50.5	5.9	
Not observed	0	2.7	0.0	0.0	1.3	-18.1	
All further malignancies	10	6.5	1.5	0.7	2.8	23.2	10.0
Patients		389					
Median age at next malignancy (years)		46.9					
Person-years		1520					
Mean observation time (years)		3.9					
Median observation time (years)		2.3					

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

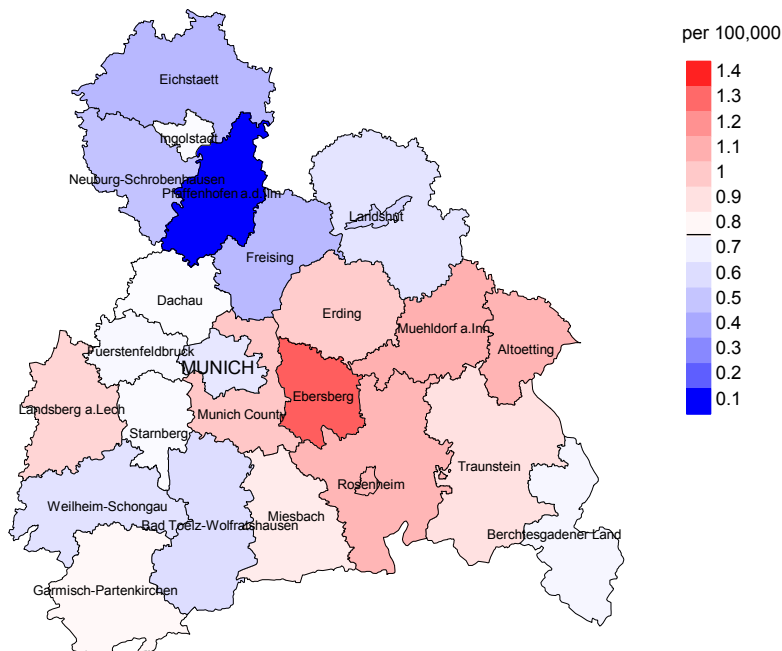
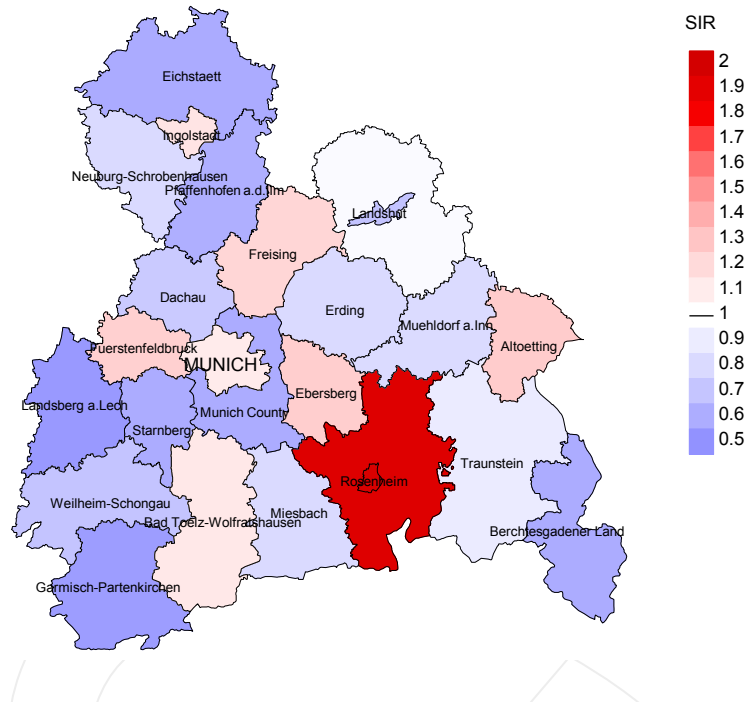


Figure 8a. Map of cancer incidence (german standard population) by county averaged for period 2007 to 2019. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 1.0/100,000 WS N=312, females 0.8/100,000 WS N=248).

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 11 women were identified with newly diagnosed astrocytoma I-III. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 1.3/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.5 and 2.8/100,000.

Standardized incidence ratio (SIR) 2007 - 2019: Males



Standardized incidence ratio (SIR) 2007 - 2019: Females

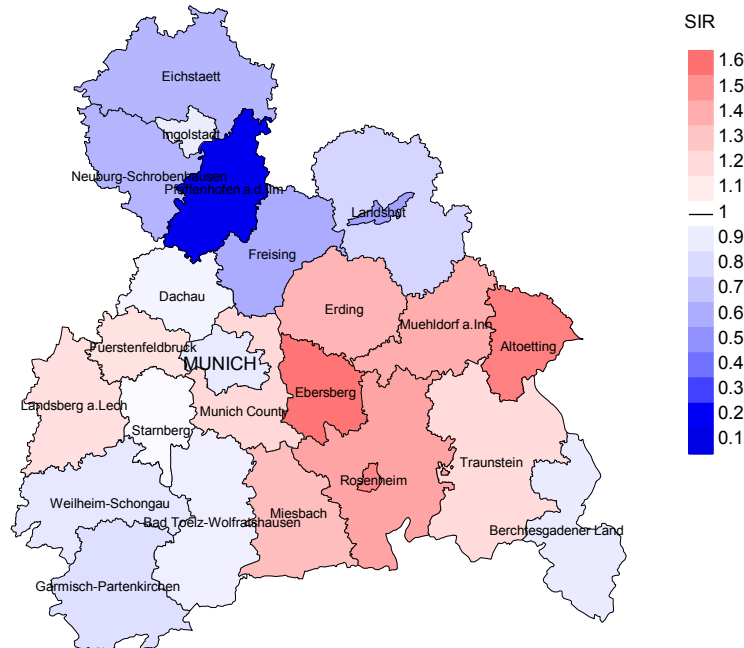


Figure 8b. Map of standardized incidence ratio (SIR) by county averaged for period 2007 to 2019. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=312, females N=248).

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 11 women were identified with newly diagnosed astrocytoma I-III. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.59. Though, the value of this parameter may vary with an underlying probability of 99% between 0.63 and 3.30, 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	39	94.9	28	71.8	100.0
1999	20	100.0	18	90.0	94.4
2000	28	92.9	20	71.4	100.0
2001	28	96.4	21	75.0	100.0
2002	33	97.0	23	69.7	100.0
2003	50	98.0	38	76.0	94.7
2004	41	100.0	29	70.7	96.6
2005	50	94.0	31	62.0	100.0
2006	34	97.1	26	76.5	96.2
2007	68	94.1	43	63.2	83.7
2008	66	100.0	43	65.2	93.0
2009	64	93.8	44	68.8	88.6
2010	41	97.6	31	75.6	100.0
2011	52	98.1	26	50.0	96.2
2012	60	98.3	37	61.7	89.2
2013	58	100.0	35	60.3	80.0
2014	42	97.6	21	50.0	90.5
2015	39	94.9	21	53.8	90.5
2016	26	100.0	10	38.5	90.0
2017	19	100.0	3	15.8	66.7
2018	13	100.0	2	15.4	50.0
2019	12	66.7	2	16.7	100.0
1998-2019	883	96.7	552	62.5	92.9

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	39	13	4	10.3
1999	20	23	7	35.0
2000	28	10	5	17.9
2001	28	15	3	10.7
2002	33	21	6	18.2
2003	50	21	3	6.0
2004	41	22	3	7.3
2005	50	26	3	6.0
2006	34	34	5	14.7
2007	68	28	7	10.3
2008	66	44	11	16.7
2009	64	36	3	4.7
2010	41	49	10	24.4
2011	52	41	4	7.7
2012	60	30	4	6.7
2013	58	35	3	5.2
2014	42	44	3	7.1
2015	39	48	5	12.8
2016	26	44	1	3.8
2017	19	32	1	5.3
2018	13	19		
2019	12	12	2	16.7
1998-2019	883	647	93	10.5

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 %
1998	13	84.6	15.4	100.0
1999	23	82.6	17.4	91.3
2000	10	90.0	10.0	100.0
2001	15	93.3	6.7	100.0
2002	21	100.0		100.0
2003	21	100.0		100.0
2004	22	90.9	9.1	100.0
2005	26	96.2	3.8	100.0
2006	34	97.1	2.9	100.0
2007	28	89.3	10.7	100.0
2008	44	95.5	4.5	100.0
2009	36	88.9	11.1	97.1
2010	49	95.9	4.1	97.9
2011	41	97.6	2.4	97.6
2012	30	90.0	10.0	100.0
2013	35	91.4	8.6	100.0
2014	44	93.2	6.8	100.0
2015	48	89.6	10.4	93.2
2016	44	93.2	6.8	100.0
2017	32	96.9	3.1	100.0
2018	19	36.8	63.2	80.0
2019	12	58.3	41.7	90.0
1998–2019	647	90.9	9.1	98.3

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	5	41.1	41.1		41.1
1999	16	60.4	60.4	65.2	59.9
2000	4	64.4	64.4		64.4
2001	6	60.6	60.6		60.6
2002	8	60.2	60.2		60.2
2003	8	54.4	54.4		54.4
2004	15	41.4	40.0	68.3	40.0
2005	18	53.2	58.1	41.7	53.2
2006	20	51.8	52.7	38.2	52.7
2007	15	52.9	52.7	55.4	52.7
2008	23	60.9	62.1	59.9	62.1
2009	25	55.3	54.9	61.9	54.9
2010	29	43.2	44.2	39.9	44.2
2011	23	51.4	51.1	51.4	51.1
2012	21	54.6	54.2	68.7	54.6
2013	19	56.5	56.5	55.1	56.5
2014	25	62.1	58.0	75.7	62.1
2015	26	50.1	49.2	61.6	49.7
2016	22	57.2	56.7	57.7	56.7
2017	14	45.8	45.9	28.4	45.9
2018	13	43.3	40.2	47.3	43.5
2019	10	68.7	62.7	73.4	67.9
1998-2019	365	55.3	54.6	59.0	55.2

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

Table 10b

Medians of age at death according to the grouping in Table 9

FEMALES

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	8	67.9	67.9	75.9	68.9
1999	7	55.3	55.3		55.3
2000	6	55.7	55.3	80.1	55.7
2001	9	64.6	64.2	71.0	64.6
2002	13	57.6	57.6		62.3
2003	13	61.0	61.0		61.0
2004	7	63.2	64.4	60.9	63.2
2005	8	30.2	30.2		30.2
2006	14	62.2	62.2		62.2
2007	13	57.7	57.7	59.4	57.7
2008	21	61.9	59.3	79.6	59.3
2009	11	51.3	51.3		51.3
2010	20	59.0	56.3	61.8	56.3
2011	18	61.0	61.0		61.0
2012	9	63.2	64.8	52.1	60.9
2013	16	61.2	62.8	46.9	62.8
2014	19	54.2	54.2	56.6	54.1
2015	22	70.5	68.4	75.7	70.5
2016	22	59.4	59.4		59.4
2017	18	59.3	59.3		59.3
2018	6	47.8	47.2	66.3	46.5
2019	2	56.8	62.9	50.7	56.8
1998-2019	282	60.8	59.4	66.3	59.6

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	5	0.5	0.28	0.3	0.25	0.4	0.28	0.4	0.25
1999	12	1.1	1.09	0.6	1.09	0.9	1.06	1.0	1.03
2000	4	0.4	0.29	0.2	0.23	0.3	0.26	0.3	0.27
2001	6	0.5	0.43	0.3	0.34	0.4	0.39	0.5	0.42
2002	8	0.4	0.44	0.3	0.35	0.4	0.43	0.4	0.47
2003	8	0.4	0.30	0.3	0.25	0.4	0.26	0.4	0.28
2004	14	0.7	0.61	0.6	0.62	0.7	0.62	0.7	0.59
2005	17	0.9	0.65	0.7	0.58	0.8	0.62	0.9	0.67
2006	19	1.0	0.90	0.8	0.87	0.9	0.86	0.9	0.80
2007	14	0.6	0.34	0.5	0.33	0.6	0.34	0.6	0.34
2008	22	1.0	0.67	0.7	0.53	0.8	0.59	0.9	0.61
2009	21	0.9	0.57	0.7	0.49	0.8	0.54	0.9	0.53
2010	28	1.2	1.17	1.0	1.17	1.1	1.17	1.1	1.13
2011	22	1.0	0.73	0.7	0.62	0.8	0.67	0.9	0.78
2012	20	0.9	0.59	0.6	0.50	0.7	0.56	0.8	0.57
2013	17	0.7	0.55	0.5	0.44	0.6	0.51	0.7	0.57
2014	24	1.0	1.04	0.8	1.01	0.9	1.00	1.0	0.99
2015	24	1.0	1.41	0.8	1.44	0.9	1.40	0.9	1.37
2016	19	0.8	1.36	0.5	0.95	0.7	1.20	0.7	1.24
2017	13	0.5	1.18	0.4	1.36	0.5	1.29	0.5	1.21
2018	4	0.2	0.44	0.1	0.53	0.2	0.49	0.2	0.46
2019	6	0.2	0.75	0.1	0.60	0.2	0.66	0.2	0.73
1998-2019	327	0.7	0.68	0.5	0.61	0.6	0.65	0.7	0.66

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	6	0.5	0.29	0.3	0.17	0.4	0.22	0.5	0.27
1999	7	0.6	0.78	0.5	0.91	0.5	0.83	0.5	0.77
2000	5	0.4	0.36	0.2	0.32	0.3	0.34	0.4	0.33
2001	8	0.7	0.57	0.5	0.70	0.6	0.61	0.6	0.59
2002	13	0.7	0.87	0.5	0.73	0.6	0.80	0.6	0.80
2003	13	0.7	0.57	0.4	0.51	0.5	0.56	0.6	0.54
2004	6	0.3	0.33	0.2	0.20	0.2	0.25	0.3	0.30
2005	8	0.4	0.33	0.5	0.40	0.5	0.37	0.4	0.36
2006	14	0.7	1.08	0.4	0.77	0.5	0.95	0.6	1.05
2007	11	0.5	0.41	0.3	0.40	0.4	0.42	0.5	0.41
2008	20	0.9	0.61	0.6	0.45	0.7	0.51	0.8	0.57
2009	11	0.5	0.41	0.3	0.37	0.4	0.38	0.4	0.38
2010	19	0.8	1.12	0.5	1.13	0.7	1.18	0.7	1.07
2011	18	0.8	0.82	0.4	0.56	0.6	0.68	0.6	0.70
2012	7	0.3	0.27	0.2	0.22	0.2	0.25	0.3	0.24
2013	15	0.6	0.56	0.4	0.46	0.5	0.53	0.5	0.51
2014	17	0.7	0.89	0.4	0.92	0.6	0.93	0.6	0.90
2015	19	0.8	0.86	0.3	0.54	0.5	0.66	0.6	0.71
2016	22	0.9	1.83	0.6	1.89	0.8	1.91	0.8	1.98
2017	18	0.7	2.25	0.4	1.41	0.5	1.78	0.6	1.75
2018	3	0.1	0.75	0.1	0.67	0.1	0.75	0.1	0.82
2019	1	0.0	0.25	0.0	0.23	0.0	0.23	0.0	0.26
1998-2019	261	0.6	0.65	0.4	0.54	0.5	0.60	0.5	0.61

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	1	0.2	0.2	1	0.4	0.4			0.0
5-9	4	1.0	1.2	3	1.3	1.7	1	0.6	0.6
10-14	2	0.5	1.7	1	0.4	2.1	1	0.6	1.1
15-19	2	0.5	2.2	2	0.9	3.0			1.1
20-24	3	0.7	2.9	2	0.9	3.8	1	0.6	1.7
25-29	11	2.7	5.5	8	3.4	7.3	3	1.7	3.3
30-34	18	4.3	9.9	11	4.7	12.0	7	3.9	7.2
35-39	22	5.3	15.2	19	8.1	20.1	3	1.7	8.8
40-44	47	11.3	26.5	28	12.0	32.1	19	10.5	19.3
45-49	41	9.9	36.4	26	11.1	43.2	15	8.3	27.6
50-54	42	10.1	46.5	23	9.8	53.0	19	10.5	38.1
55-59	47	11.3	57.8	24	10.3	63.2	23	12.7	50.8
60-64	47	11.3	69.2	28	12.0	75.2	19	10.5	61.3
65-69	38	9.2	78.3	19	8.1	83.3	19	10.5	71.8
70-74	46	11.1	89.4	22	9.4	92.7	24	13.3	85.1
75-79	28	6.7	96.1	10	4.3	97.0	18	9.9	95.0
80-84	10	2.4	98.6	5	2.1	99.1	5	2.8	97.8
85+	6	1.4	100.0	2	0.9	100.0	4	2.2	100.0
All ages	415	100.0		234	100.0		181	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		Males		Females		Females	
	n	n	Age- spec. mortal.	MI-index	Age- spec. mortal.	MI-index	Prop.all cancers %	Prop.all cancers %
0- 4	1		0.1	0.50			5.3	
5- 9	3	1	0.2	0.60	0.1	0.33	12.0	4.3
10-14	1	1	0.1	0.33	0.1	1.00	3.7	4.3
15-19	2		0.1	0.67			4.3	
20-24	2	1	0.1	0.15	0.1	0.11	3.0	2.6
25-29	8	3	0.4	0.36	0.1	0.18	9.4	3.2
30-34	11	7	0.5	0.35	0.3	0.47	8.6	4.4
35-39	19	3	0.9	0.61	0.1	0.13	7.8	0.8
40-44	28	19	1.2	0.72	0.8	1.00	4.9	2.4
45-49	26	15	1.0	0.79	0.6	0.63	1.9	0.9
50-54	23	19	1.0	0.88	0.8	0.86	0.9	0.8
55-59	24	23	1.2	0.80	1.2	1.21	0.6	0.7
60-64	28	19	1.7	1.17	1.1	1.19	0.5	0.4
65-69	19	19	1.2	1.19	1.1	0.83	0.2	0.3
70-74	22	24	1.6	1.05	1.5	1.00	0.2	0.3
75-79	10	18	0.9	1.67	1.3	1.29	0.1	0.2
80-84	5	5	0.8	1.00	0.5	0.56	0.1	0.1
85+	2	4	0.5	1.00	0.4	1.33	0.0	0.0
All ages	234	181					0.4	0.3
Mortality								
Raw			0.8	0.75	0.6	0.73		
WS			0.6	0.67	0.4	0.60		
ES			0.7	0.71	0.5	0.66		
BRD-S			0.7	0.73	0.5	0.67		
PYLL-70								
per 100,000			15.8		8.9			
ES			14.7		8.0			
AYLL-70			21.5		17.9			

Table 14a

Further malignancies in deaths in period 1998-2019
MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C15 Oesophagus	1	2.4					1	100.0
C16 Stomach	1	2.4	1	100.0				
C18 Colon	1	2.4	1	100.0				
C19-C20 Rectum	1	2.4	1	100.0				
C40-C41 Bone	1	2.4			1	100.0		
C43 Malign. melanoma	6	14.6	6	100.0				
C44 Skin others	1	2.4					1	100.0
C46,C49 Soft tissue	1	2.4					1	100.0
C61 Prostate	8	19.5	7	87.5	1	12.5		
C64 Kidney	3	7.3	3	100.0				
C67 Bladder	3	7.3	2	66.7	1	33.3		
C69 Eye melanoma	1	2.4					1	100.0
C70-C72 CNS cancer	8	19.5			2	25.0	6	75.0
C76-C79 CUP	2	4.9	1	50.0			1	50.0
C82-C85 NHL	2	4.9	2	100.0				
C91-C96 Leukaemia	1	2.4	1	100.0				
All further malignancies	41	100.0	25	61.0	5	12.2	11	26.8

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

Table 14b

Further malignancies in deaths in period 1998-2019
FEMALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C18 Colon	2	5.4	2	100.0				
C19-C20 Rectum	1	2.7			1	100.0		
C33-C34 Lung	1	2.7					1	100.0
C38,C45 Mesothelioma	1	2.7					1	100.0
C40-C41 Bone	1	2.7					1	100.0
C43 Malign. melanoma	5	13.5	3	60.0			2	40.0
C44 Skin others	2	5.4	2	100.0				
C46,C49 Soft tissue	1	2.7			1	100.0		
C50 Breast	9	24.3	7	77.8			2	22.2
C53 Cervix uteri	1	2.7	1	100.0				
C54 Corpus uteri	2	5.4	1	50.0			1	50.0
C55,C57 Fem. genitals un	1	2.7	1	100.0				
C56 Ovary	2	5.4	1	50.0			1	50.0
C64 Kidney	1	2.7	1	100.0				
C70-C72 CNS cancer	4	10.8			1	25.0	3	75.0
C73 Thyroid	2	5.4	2	100.0				
C91-C96 Leukaemia	1	2.7	1	100.0				
All further malignancies	37	100.0	22	59.5	3	8.1	12	32.4

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		Males		Females		Females	
	n	n	Age- spec. mortal.	MI-index	Age- spec. mortal.	MI-index	Prop.all cancers %	Prop.all cancers %
0- 4	1		0.1	0.50			5.3	
5- 9	3	1	0.2	0.60	0.1	0.33	12.5	4.3
10-14	1	1	0.1	0.33	0.1	1.00	3.7	5.3
15-19	1		0.1	0.33			2.2	
20-24	2	1	0.1	0.15	0.1	0.11	3.3	2.7
25-29	8	3	0.4	0.36	0.1	0.19	10.4	3.5
30-34	11	6	0.5	0.35	0.3	0.40	8.9	4.3
35-39	19	3	0.9	0.61	0.1	0.13	8.4	0.9
40-44	27	18	1.2	0.73	0.8	1.20	5.1	2.6
45-49	24	15	1.0	0.83	0.6	0.65	2.0	1.1
50-54	21	19	0.9	0.84	0.8	0.90	0.9	0.9
55-59	22	19	1.1	0.79	1.0	1.06	0.6	0.6
60-64	25	19	1.5	1.32	1.1	1.19	0.5	0.5
65-69	15	18	1.0	1.25	1.1	0.86	0.2	0.3
70-74	19	20	1.4	1.27	1.2	1.05	0.2	0.3
75-79	5	15	0.5	1.67	1.1	1.50	0.1	0.2
80-84	4	5	0.6	1.00	0.5	0.63	0.1	0.1
85+	1	2	0.2	1.00	0.2	1.00	0.0	0.0
All ages	209	165					0.4	0.4
Mortality								
Raw			0.7	0.74	0.5	0.73		
WS			0.5	0.66	0.3	0.59		
ES			0.6	0.70	0.4	0.66		
BRD-S			0.6	0.71	0.5	0.67		
PYLL-70								
per 100,000			15.0		8.4			
ES			14.0		7.6			
AYLL-70			22.1		17.9			

* See corresponding tables with multiple malignancies.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2019
(**Single primaries only ***)

Age at death Years	Males		Males		Females		Females	
	n	n	Age- spec. mortal.	MI-index	Age- spec. mortal.	MI-index	Prop.all cancers %	Prop.all cancers %
0- 4	1		0.1	0.50			5.3	
5- 9	3	1	0.2	0.60	0.1	0.33	12.5	4.3
10-14	1	1	0.1	0.33	0.1	1.00	3.7	5.3
15-19	1		0.1	0.33			2.2	
20-24	2	1	0.1	0.15	0.1	0.11	3.3	2.8
25-29	8	2	0.4	0.36	0.1	0.13	10.4	2.4
30-34	11	6	0.5	0.35	0.3	0.40	8.9	4.4
35-39	18	3	0.8	0.58	0.1	0.14	8.0	0.9
40-44	25	18	1.1	0.69	0.8	1.20	4.8	2.6
45-49	24	14	1.0	0.86	0.6	0.61	2.0	1.0
50-54	19	18	0.8	0.76	0.8	0.95	0.9	0.9
55-59	22	18	1.1	0.88	0.9	1.00	0.6	0.6
60-64	24	18	1.5	1.41	1.0	1.13	0.5	0.5
65-69	13	18	0.9	1.08	1.1	0.86	0.2	0.4
70-74	18	19	1.3	1.29	1.2	1.12	0.2	0.3
75-79	5	13	0.5	1.67	0.9	1.44	0.1	0.2
80-84	4	5	0.6	1.00	0.5	0.63	0.1	0.1
85+	1	2	0.2	1.00	0.2	1.00	0.0	0.0
All ages	200	157					0.4	0.4
Mortality								
Raw			0.7	0.73	0.5	0.72		
WS			0.5	0.64	0.3	0.58		
ES			0.6	0.69	0.4	0.65		
BRD-S			0.6	0.70	0.4	0.65		
PYLL-70								
per 100,000			14.5		8.0			
ES			13.5		7.2			
AYLL-70			22.4		17.8			

* See corresponding tables with multiple malignancies.

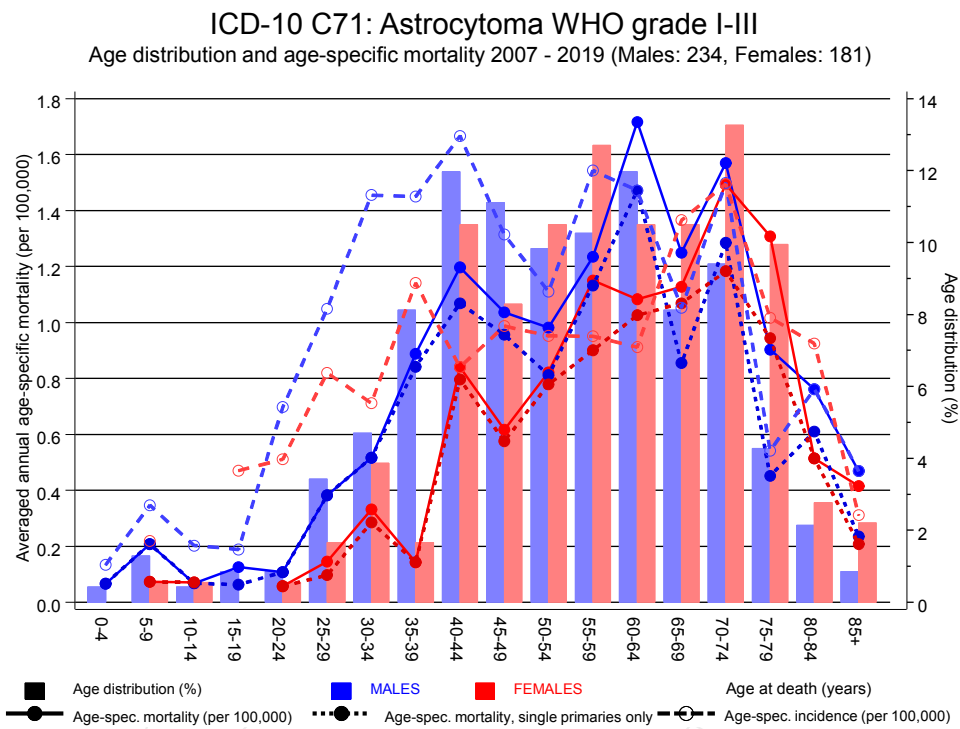
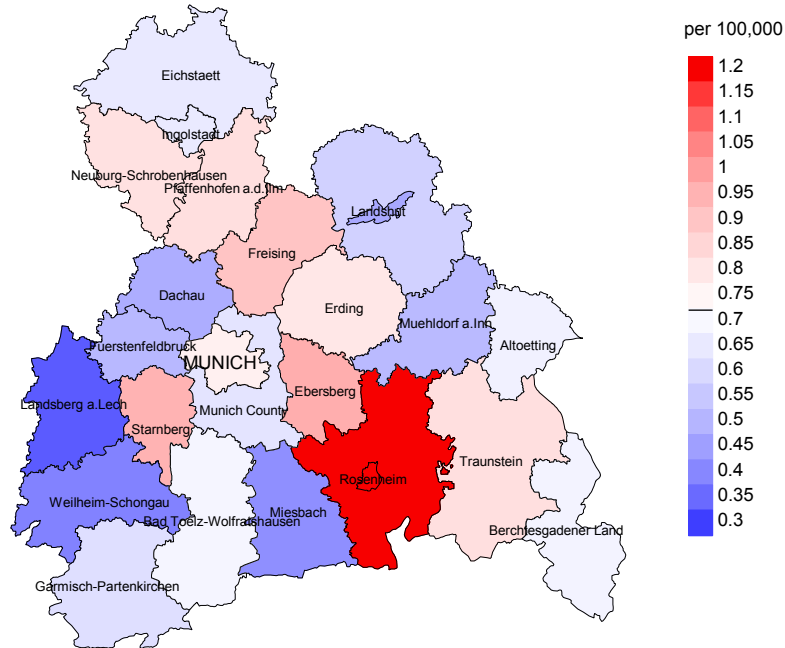


Figure 17. Distribution of age at death (bars; males: mean=48.2 yrs, median=48.7 yrs; females: mean=54.1 yrs, median=54.8 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

The difference between age at diagnosis (Table 3) and age at astrocytoma I-III-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

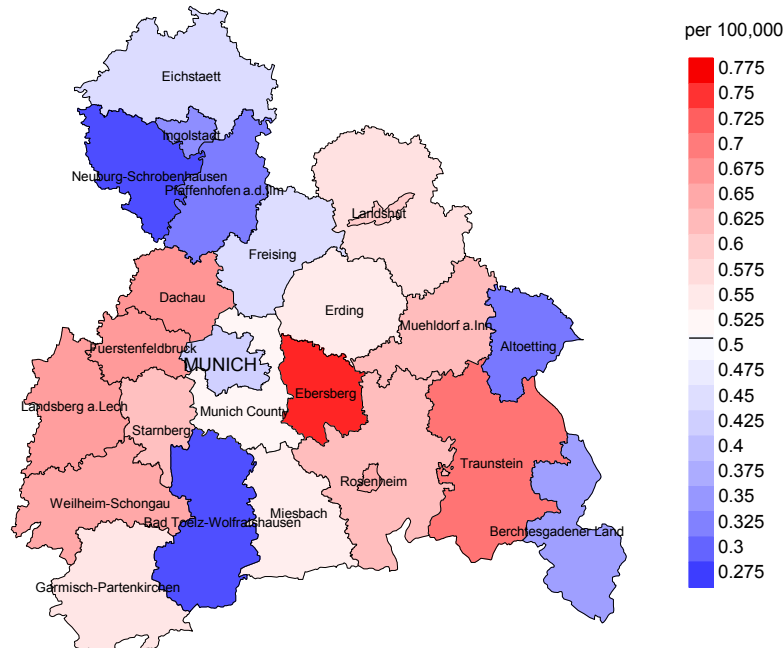
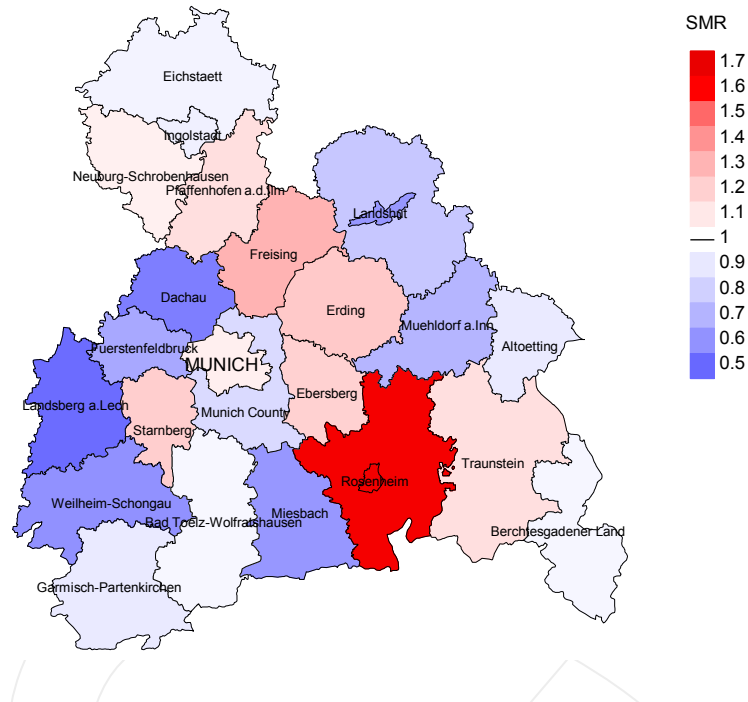


Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2019. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 0.7/100,000 WS N=234, females 0.5/100,000 WS N=181).

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 died from astrocytoma I-III. Therefore, the mean mortality 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 1.9/100,000.

Standardized mortality ratio (SMR) 2007 - 2019: Males



Standardized mortality ratio (SMR) 2007 - 2019: Females

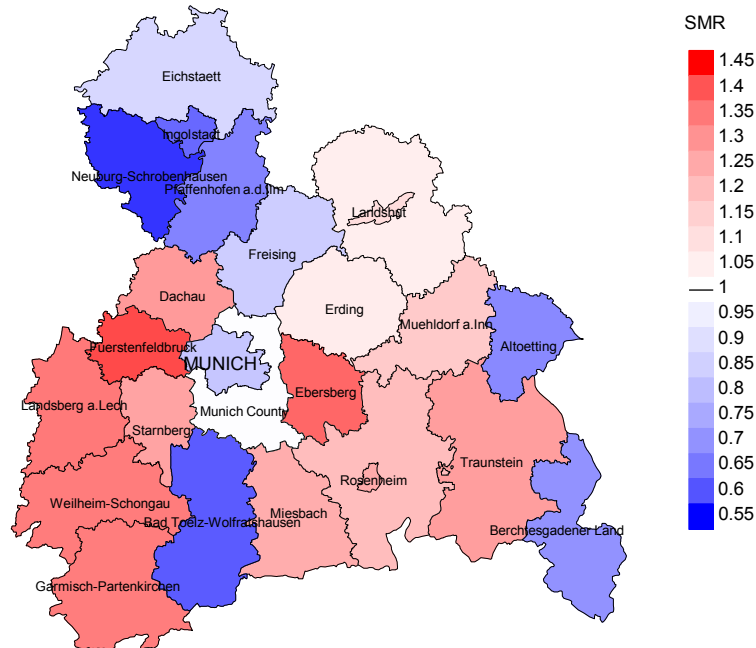


Figure 18b. Map of standardized mortality ratio (SMR) by county averaged for period 2007 to 2019. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=234, females N=181).

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 died from astrocytoma I-III. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.38. Though, the value of this parameter may vary with an underlying probability of 99% between 0.40 and 3.37, 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

Recommended Citation

Munich Cancer Registry. ICD-10 C71: Astrocytoma I-III - Incidence and Mortality [Internet]. 2021 [updated 2021 Jan 25; cited 2021 Mar 1]. Available from: https://www.tumorregister-muenchen.de/en/facts/base/bC71A_E-ICD-10-C71-Astrocytoma-I-III-incidence-and-mortality.pdf

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