

Munich Cancer Registry



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

ICD-10 C71: Glioblastoma

Incidence and Mortality

Year of diagnosis	1998-2019
Patients	3,155
Diseases	3,155
Creation date	01/25/2021
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/bC71G_E-ICD-10-C71-Glioblastoma-incidence-and-mortality.pdf

Index of figures and tables

Fig./Tbl.		Page
1	Annual cases, mult. malignancies, follow-up / yr	4
2	Incidence by year of diagnosis	7
3	Age distribution parameters by year of diagnosis	8
4	Age distribution by 5-year age group and sex	11
5	Age-specific incidence, proportion malignancies	12
6	Age distribution and age-specific incidence (chart)	13
6a	Age-specific incidence internationally (chart)	14
7	Standardized incidence ratio of further malignancies	15
8a	Map of cancer incidence (BRD-S) by county (chart)	17
8b	Standardized incidence ratio (SIR) by county (chart)	18
9a	Pts incident cohorts and mortality / yr	19
9b	Incidence and mortality by year of diagnosis	20
9c	Cancer-related deaths, death certification available / yr	21
10	Medians of age at death / yr	22
11	Mortality by year of death	24
12	Distribution of age at death	26
13	Age-specific mortality	27
14	Further malignancies in deaths	28
15	Age-specific mortality (first primaries)	30
16	Age-specific mortality (single primaries)	31
17	Age distribution and age-specific mortality (chart)	32
18a	Map of cancer mortality (BRD-S) by county (chart)	33
18b	Standardized mortality ratio (SMR) by county (chart)	34

**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
C71	Malignant neoplasm of brain

... if additionally existing any of ...

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

Code	Description
9440/3	Glioblastoma – IV
9441/3	Giant cell glioblastoma – IV
9442/3	Gliosarcoma – IV

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	47	4.3	1.2	95.7	100.0
1999	47	5.3	1.2	100.0	100.0
2000	65	5.7	1.2	90.8	98.5
2001	81	6.3	1.1	97.5	98.8
2002	130	5.9	1.2	95.4	98.5 #
2003	142	6.4	1.2	96.5	98.6
2004	130	7.0	1.2	96.2	98.5
2005	163	7.7	1.2	94.5	99.4
2006	150	8.5	1.2	96.7	99.3
2007	142	8.8	1.3	93.7	95.8 #
2008	184	8.7	1.3	94.0	99.5
2009	247	9.0	1.1	90.3	98.8
2010	202	9.4	1.1	96.0	98.5
2011	214	10.0	1.1	89.3	99.5
2012	208	10.2	1.3	92.3	100.0
2013	206	10.6	1.3	91.7	99.5
2014	219	10.9	1.3	93.2	99.1
2015	199	10.8	0.9	91.5	99.5
2016	154	10.7	1.1	90.9	100.0
2017	102	11.2	0.9	82.4	100.0
2018	62	11.4	0.0	61.3	100.0
2019	61	11.6	0.0	50.8	85.2 ##
1998-2019	3155	11.6	1.2	91.6	98.8

3,155 cases diagnosed 1998-2019 are related to a total of 3,155 patients. Currently, in 420 (13.3 %) of these 3,155 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 360 / 45 / 15 (11.4 % / 1.4 % / 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 2017, a subgroup of 102 cases has been diagnosed, of which 11.2 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 0.9 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 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	28	59.6	7.1	1.4	92.9	100.0
1999	27	57.4	3.6	1.4	100.0	100.0
2000	38	58.5	5.4	1.3	92.1	97.4
2001	42	51.9	5.2	1.3	100.0	100.0
2002	71	54.6	6.3	1.3	93.0	98.6 #
2003	77	54.2	6.0	1.3	97.4	98.7
2004	74	56.9	7.3	1.3	98.6	100.0
2005	95	58.3	8.6	1.3	96.8	100.0
2006	95	63.3	9.3	1.4	95.8	98.9
2007	79	55.6	9.6	1.4	94.9	96.2 #
2008	116	63.0	9.4	1.4	94.8	100.0
2009	154	62.3	9.6	1.2	90.9	98.7
2010	114	56.4	10.1	1.3	96.5	98.2
2011	121	56.5	10.8	1.3	94.2	99.2
2012	113	54.3	10.7	1.4	91.2	100.0
2013	131	63.6	11.5	1.7	90.8	100.0
2014	133	60.7	11.6	1.5	93.2	99.2
2015	118	59.3	11.3	0.9	92.4	100.0
2016	85	55.2	11.1	1.3	89.4	100.0
2017	65	63.7	11.7	0.7	81.5	100.0
2018	38	61.3	12.1	0.0	71.1	100.0
2019	40	65.6	12.1	0.0	45.0	80.0 ##
1998-2019	1854	58.8	12.1	1.4	92.0	98.9

1,854 cases diagnosed 1998-2019 are related to a total of 1,854 patients. Currently, in 254 (13.7 %) of these 1,854 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 210 / 33 / 11 (11.3 % / 1.8 % / 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 65 cases has been diagnosed, of which 11.7 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 0.7 % 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	19	40.4	0.0	0.9	100.0	100.0
1999	20	42.6	7.7	0.9	100.0	100.0
2000	27	41.5	6.1	1.0	88.9	100.0
2001	39	48.1	7.6	0.9	94.9	97.4
2002	59	45.4	5.5	0.9	98.3	98.3 #
2003	65	45.8	7.0	1.0	95.4	98.5
2004	56	43.1	6.7	1.0	92.9	96.4
2005	68	41.7	6.5	1.0	91.2	98.5
2006	55	36.7	7.4	1.1	98.2	100.0
2007	63	44.4	7.6	1.1	92.1	95.2 #
2008	68	37.0	7.8	1.1	92.6	98.5
2009	93	37.7	8.2	0.9	89.2	98.9
2010	88	43.6	8.3	0.9	95.5	98.9
2011	93	43.5	8.9	0.9	82.8	100.0
2012	95	45.7	9.5	1.0	93.7	100.0
2013	75	36.4	9.4	0.8	93.3	98.7
2014	86	39.3	9.8	1.0	93.0	98.8
2015	81	40.7	10.0	0.9	90.1	98.8
2016	69	44.8	10.2	0.7	92.8	100.0
2017	37	36.3	10.5	1.2	83.8	100.0
2018	24	38.7	10.5	0.0	45.8	100.0
2019	21	34.4	10.8	0.0	61.9	95.2 ##
1998-2019	1301	41.2	10.8	0.9	91.0	98.8

1,301 cases diagnosed 1998-2019 are related to a total of 1,301 patients. Currently, in 166 (12.8 %) of these 1,301 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 150 / 12 / 4 (11.5 % / 0.9 % / 0.3 %) 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 37 cases has been diagnosed, of which 10.5 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 1.2 % 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	28	19	2.5	1.6	1.8	0.8	2.4	1.2	2.6	1.4
1999	27	20	2.4	1.7	1.7	0.9	2.3	1.3	2.6	1.6
2000	38	27	3.3	2.2	2.3	1.4	3.0	1.9	3.4	2.0
2001	42	39	3.6	3.2	2.2	1.8	3.1	2.4	3.8	2.9
2002	71	59	3.8	3.0	2.5	1.8	3.3	2.4	3.6	2.8
2003	77	65	4.1	3.3	2.5	1.8	3.4	2.5	4.0	3.0
2004	74	56	3.9	2.8	2.4	1.7	3.4	2.2	3.8	2.5
2005	95	68	5.0	3.4	2.9	1.8	4.0	2.5	4.8	2.9
2006	95	55	5.0	2.7	3.0	1.4	4.0	2.0	4.6	2.4
2007	79	63	3.6	2.7	2.2	1.5	2.9	2.0	3.3	2.4
2008	116	68	5.2	2.9	3.0	1.6	4.2	2.1	5.0	2.5
2009	154	93	6.9	4.0	3.9	2.2	5.4	3.1	6.5	3.5
2010	114	88	5.1	3.8	2.8	1.9	4.0	2.7	4.8	3.2
2011	121	93	5.4	4.0	3.0	2.0	4.2	2.8	5.1	3.3
2012	113	95	5.0	4.0	2.6	2.0	3.7	2.8	4.5	3.3
2013	131	75	5.7	3.1	3.2	1.7	4.4	2.3	5.2	2.7
2014	133	86	5.7	3.6	3.3	1.7	4.4	2.5	5.1	2.9
2015	118	81	5.0	3.3	2.8	1.8	3.9	2.3	4.6	2.9
2016	85	69	3.5	2.8	1.8	1.3	2.6	1.8	3.2	2.3
2017	65	37	2.7	1.5	1.3	0.6	1.9	0.9	2.4	1.1
2018	38	24	1.6	1.0	0.8	0.4	1.2	0.6	1.4	0.8
2019	40	21	1.6	0.8	0.8	0.3	1.2	0.5	1.5	0.6
1998-2019	1854	1301	4.2	2.8	2.4	1.5	3.4	2.0	4.0	2.4

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	47	61.4	11.6	30.9	79.2	46.8	53.5	62.9	69.6	75.8
1999	47	61.9	13.5	20.0	89.2	45.8	51.6	65.1	71.3	77.8
2000	65	58.5	16.0	8.0	84.2	36.7	52.6	60.0	67.8	77.2
2001	81	62.5	13.0	23.6	85.2	44.1	57.0	62.3	71.7	76.2
2002	130	61.6	13.4	7.1	87.7	44.0	55.3	63.2	70.0	76.1
2003	142	63.6	12.3	17.7	89.8	47.6	57.6	65.2	72.1	77.1
2004	130	61.9	12.3	6.2	86.7	46.0	55.5	63.6	69.0	77.3
2005	163	64.0	12.6	7.8	92.8	46.1	58.0	65.3	71.5	80.3
2006	150	62.8	13.4	22.3	88.0	44.2	54.8	65.2	70.7	79.0
2007	142	63.0	13.3	13.3	88.0	43.9	56.2	64.2	72.2	78.4
2008	184	64.3	12.7	0.1	88.2	47.8	58.4	66.5	72.5	78.1
2009	247	64.2	13.0	6.8	87.8	45.9	58.0	65.8	72.8	80.0
2010	202	64.8	13.2	16.2	90.8	45.5	56.6	67.8	74.5	79.4
2011	214	63.8	14.2	11.1	92.4	46.0	54.2	66.1	74.6	80.2
2012	208	65.5	13.1	21.2	90.4	46.0	56.4	67.1	74.5	80.9
2013	206	64.4	13.0	8.6	93.9	48.8	57.5	66.6	74.1	77.2
2014	219	64.2	14.4	8.5	90.8	45.3	54.9	67.5	74.8	79.1
2015	199	64.0	13.3	20.2	85.4	45.2	57.9	66.3	74.6	78.6
2016	154	67.2	11.4	40.2	85.0	50.1	58.1	69.3	76.5	81.5
2017	102	69.6	10.4	27.2	94.3	56.6	62.3	71.4	76.7	81.5
2018	62	67.0	12.1	38.9	85.5	48.0	58.6	69.9	76.9	79.8
2019	61	68.3	11.0	42.8	86.3	53.9	58.6	70.2	77.1	81.7
1998-2019	3155	64.2	13.1	0.1	94.3	46.5	56.5	66.0	73.7	79.0

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	28	57.8	10.6	40.0	78.2	46.7	49.2	55.7	67.2	74.8
1999	27	58.6	13.5	20.0	79.4	42.2	49.3	59.6	68.7	71.8
2000	38	56.9	16.2	8.0	84.2	30.5	51.7	59.9	65.8	77.2
2001	42	61.8	12.1	33.3	84.2	45.6	57.0	62.0	71.3	75.6
2002	71	60.2	14.5	7.1	87.7	41.7	54.2	63.0	69.2	74.7
2003	77	62.8	12.1	22.7	81.4	44.3	57.6	64.7	69.7	76.8
2004	74	62.0	10.8	35.2	86.7	46.2	55.0	62.4	68.3	77.3
2005	95	63.0	13.6	7.8	92.8	44.1	55.8	65.1	70.7	80.3
2006	95	61.2	12.8	22.3	88.0	43.4	54.2	64.1	69.7	75.6
2007	79	62.4	12.9	13.3	84.5	43.9	58.6	63.9	70.7	76.4
2008	116	64.0	11.2	24.0	82.3	47.8	56.8	66.0	72.2	78.1
2009	154	64.4	13.5	6.8	87.8	44.1	58.4	66.3	73.4	80.5
2010	114	64.3	14.0	16.2	90.8	44.6	55.2	67.0	75.1	80.5
2011	121	62.2	14.2	20.8	86.2	43.1	52.3	63.8	73.7	79.2
2012	113	65.1	13.3	21.2	89.9	45.9	55.0	67.5	74.5	80.5
2013	131	63.5	12.9	11.6	93.9	47.6	55.7	65.8	73.1	76.5
2014	133	63.0	15.4	8.5	90.8	45.3	53.8	65.6	73.9	79.0
2015	118	64.2	11.7	20.2	85.4	50.5	58.6	65.7	73.3	77.8
2016	85	65.8	12.5	40.2	85.0	48.2	55.9	67.8	76.2	81.6
2017	65	68.0	10.4	27.2	86.3	56.3	61.0	70.3	76.0	78.7
2018	38	66.3	11.8	40.7	85.5	48.0	56.3	67.2	75.8	82.7
2019	40	66.9	10.4	47.8	86.3	54.4	57.8	66.9	74.3	81.0
1998-2019	1854	63.3	13.1	6.8	93.9	45.6	55.9	65.1	72.9	78.5

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	19	66.8	11.2	30.9	79.2	54.4	62.9	67.9	75.0	78.1
1999	20	66.4	12.3	45.8	89.2	48.5	55.2	69.7	75.3	81.2
2000	27	60.7	15.6	8.4	81.3	37.4	55.9	65.0	70.0	77.5
2001	39	63.1	14.1	23.6	85.2	42.4	56.3	64.5	72.2	79.3
2002	59	63.4	11.8	22.9	87.1	49.8	56.2	64.3	71.7	76.8
2003	65	64.6	12.6	17.7	89.8	49.6	58.3	65.5	74.1	77.8
2004	56	61.7	14.1	6.2	82.8	45.8	56.0	64.9	69.4	77.2
2005	68	65.4	10.9	37.7	85.9	49.6	58.9	65.7	71.8	81.3
2006	55	65.4	14.0	26.9	86.5	46.5	56.8	66.8	76.1	81.3
2007	63	63.7	13.9	26.1	88.0	43.5	54.1	65.3	73.4	81.5
2008	68	64.7	15.1	0.1	88.2	47.8	61.6	67.8	73.3	79.4
2009	93	63.9	12.3	27.9	87.1	46.5	57.6	65.0	71.3	78.7
2010	88	65.4	12.1	31.6	86.7	46.5	57.5	68.1	73.8	77.7
2011	93	65.9	13.9	11.1	92.4	49.9	55.9	68.9	74.9	81.5
2012	95	66.1	13.0	30.6	90.4	46.8	58.5	66.4	74.6	82.0
2013	75	65.8	13.0	8.6	87.6	51.3	60.2	67.5	75.5	78.1
2014	86	66.2	12.5	30.2	87.4	45.3	57.8	69.0	75.1	79.5
2015	81	63.8	15.4	22.0	83.4	43.2	54.8	66.4	76.5	78.9
2016	69	68.8	9.7	44.9	84.0	55.4	61.2	69.9	76.7	80.6
2017	37	72.3	9.9	53.2	94.3	56.8	66.1	73.7	79.2	85.3
2018	24	68.1	12.8	38.9	84.1	47.8	59.4	70.9	77.8	79.5
2019	21	71.1	11.7	42.8	85.6	50.7	69.9	75.0	78.3	81.7
1998-2019	1301	65.3	13.1	0.1	94.3	47.7	58.0	67.0	74.9	79.8

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	1	0.0	0.0			0.0	1	0.1	0.1
5-9	3	0.1	0.2	2	0.2	0.2	1	0.1	0.2
10-14	5	0.2	0.4	4	0.3	0.5	1	0.1	0.3
15-19	2	0.1	0.5	2	0.2	0.6			0.3
20-24	9	0.4	0.9	6	0.5	1.1	3	0.3	0.7
25-29	15	0.7	1.6	8	0.6	1.7	7	0.8	1.5
30-34	23	1.0	2.6	13	1.0	2.7	10	1.1	2.6
35-39	27	1.2	3.9	16	1.2	3.9	11	1.2	3.8
40-44	84	3.8	7.7	53	4.1	8.0	31	3.5	7.3
45-49	116	5.3	13.0	76	5.8	13.8	40	4.5	11.8
50-54	171	7.8	20.7	106	8.1	21.9	65	7.3	19.0
55-59	248	11.3	32.0	159	12.2	34.0	89	10.0	29.0
60-64	261	11.9	43.9	162	12.4	46.4	99	11.1	40.1
65-69	337	15.3	59.2	199	15.2	61.7	138	15.5	55.5
70-74	379	17.2	76.4	216	16.5	78.2	163	18.3	73.8
75-79	322	14.6	91.0	183	14.0	92.2	139	15.6	89.4
80-84	145	6.6	97.6	78	6.0	98.2	67	7.5	96.9
85+	52	2.4	100.0	24	1.8	100.0	28	3.1	100.0
All ages	2200	100.0		1307	100.0		893	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		1		0.1		0.6
5- 9	2	1	0.1	0.1	1.8	1.1
10-14	4	1	0.3	0.1	3.0	0.9
15-19	2		0.1		0.7	
20-24	6	3	0.3	0.2	1.0	0.6
25-29	8	7	0.4	0.3	0.9	0.6
30-34	13	10	0.6	0.5	1.1	0.5
35-39	16	11	0.7	0.5	0.9	0.3
40-44	53	31	2.3	1.4	2.0	0.5
45-49	76	40	3.0	1.6	1.6	0.5
50-54	106	65	4.5	2.8	1.4	0.6
55-59	159	89	8.2	4.5	1.3	0.7
60-64	162	99	9.9	5.6	1.0	0.7
65-69	199	138	13.1	8.2	0.9	0.8
70-74	216	163	15.4	10.1	0.8	0.9
75-79	183	139	16.5	10.1	0.8	0.8
80-84	78	67	11.9	6.9	0.6	0.5
85+	24	28	5.6	2.9	0.2	0.2
All ages	1307	893			0.9	0.6
Incidence						
Raw			4.3	2.9		
WS			2.4	1.4		
ES			3.3	2.0		
BRD-S			4.0	2.4		

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).

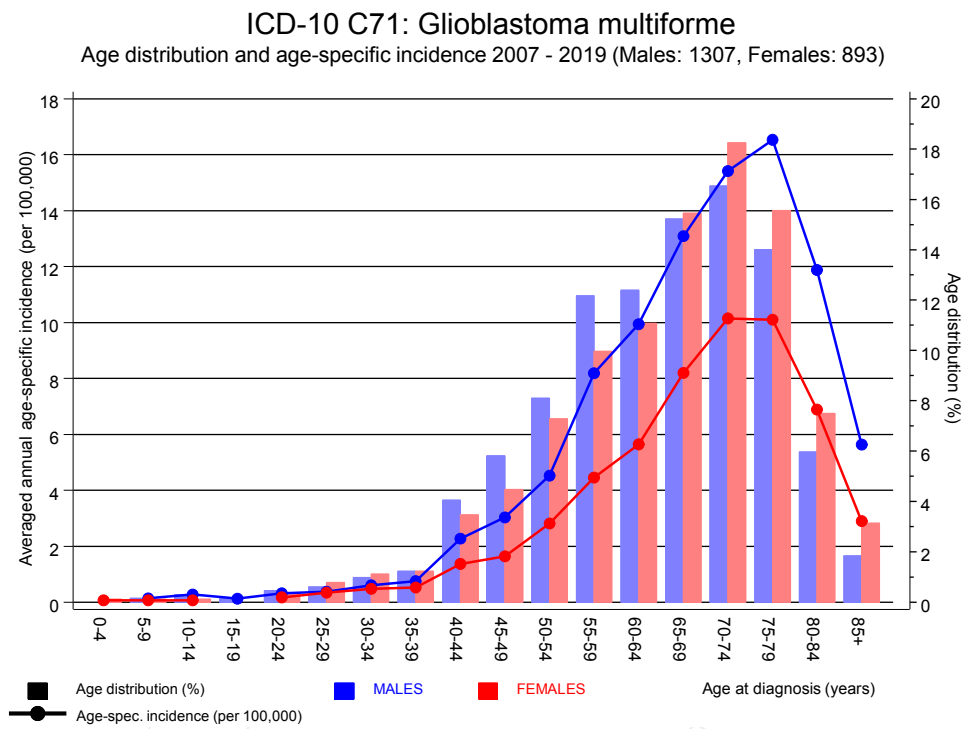


Figure 6. Age distribution (males: mean=64.2 yrs, median=66.2 yrs; females: mean=65.9 yrs, median=68.1 yrs) and age-specific incidence.

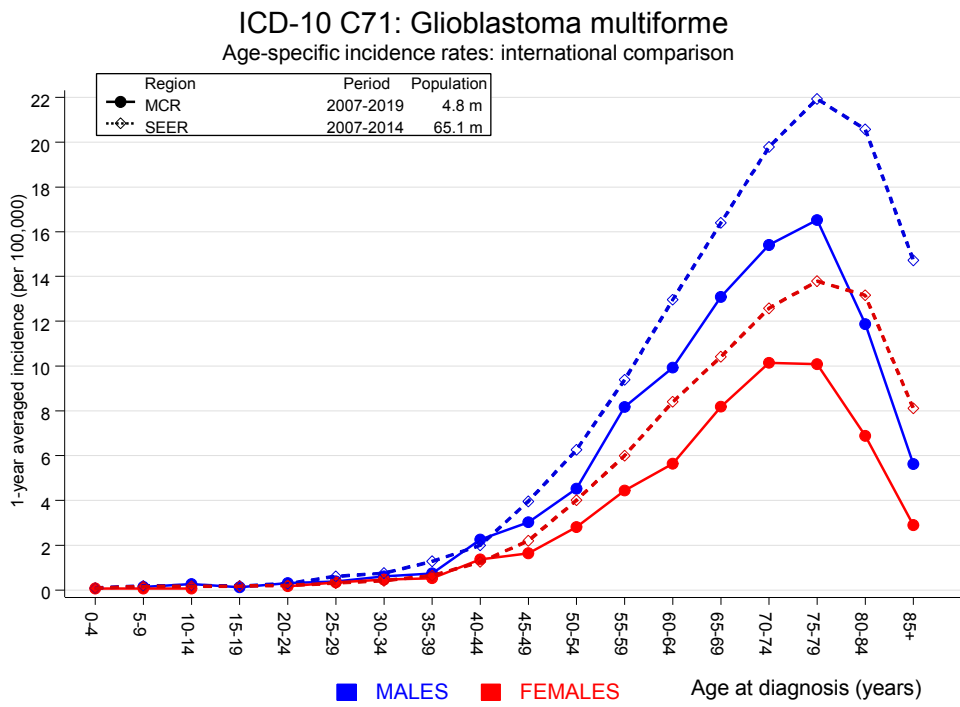


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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 %
C07–C08 Salivary gland	1	0.0	20.5	0.5	114.2	4.2	
C17 Small intestine	1	0.1	6.8	0.2	38.0	3.8	100.0
C18 Colon	2	2.0	1.0	0.1	3.5	-0.2	
C19–C20 Rectum	1	1.3	0.8	0.0	4.2	-1.4	100.0
C23–C24 Bile	1	0.2	4.5	0.1	24.8	3.4	100.0
C25 Pancreas	3	0.9	3.5	0.7	10.3	9.6	33.3
C40–C41 Bone	1	0.0	43.6	1.1	243.1 #	4.3	
C43 Malign. melanoma	3	1.1	2.6	0.5	7.6	8.2	33.3
C46,C49 Soft tissue	1	0.1	7.5	0.2	41.9	3.9	
C61 Prostate	5	6.6	0.8	0.2	1.8	-7.2	
C64 Kidney	4	0.9	4.6	1.2	11.7 #	13.9	25.0
C67 Bladder	3	0.9	3.3	0.7	9.7	9.3	
C82–C85 NHL	1	1.0	1.0	0.0	5.8	0.2	
C91–C96 Leukaemia	1	0.3	3.1	0.1	17.2	3.0	100.0
Not observed	0	8.2	0.0	0.0	0.4 #	-36.5	
All further malignancies	28	23.8	1.2	0.8	1.7	18.6	25.0
Patients		1822					
Median age at next malignancy (years)		64.3					
Person-years		2248					
Mean observation time (years)		1.2					
Median observation time (years)		0.8					

The occurrence of further specified malignancy is statistically significant.

Table 7b

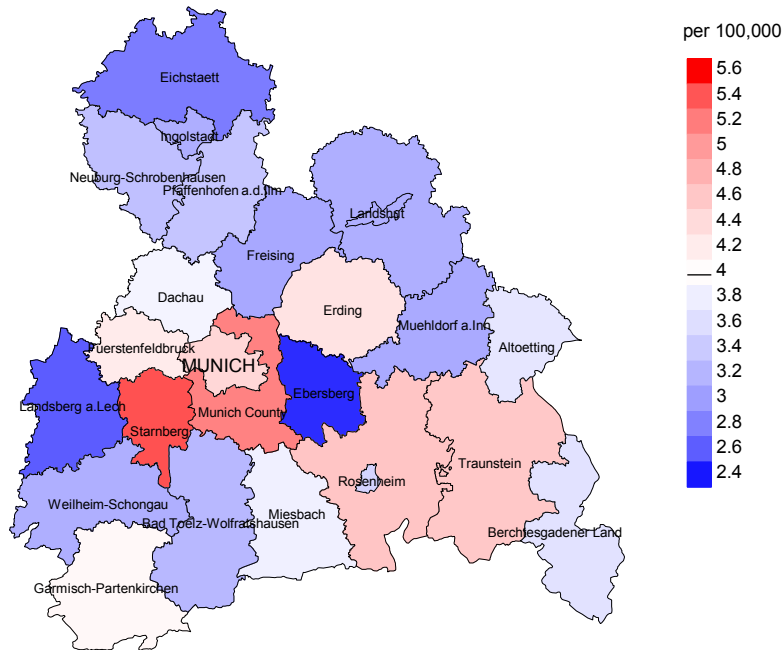
Standardized incidence ratio (SIR, with 95% confidence limits),
excess absolute risk (EAR) and DCO rate of further malignancies
for period 1998–2019

FEMALES

Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C19–C20 Rectum	1	0.5	2.2	0.1	12.2	3.6	
C30–C31 Sinuses	1	0.0	55.5	1.4	309.4 #	6.5	
C43 Malign. melanoma	1	0.6	1.8	0.0	10.1	3.0	
C50 Breast	6	4.5	1.3	0.5	2.9	9.8	16.7
C54 Corpus uteri	1	0.8	1.3	0.0	7.1	1.4	
C82–C85 NHL	2	0.5	4.4	0.5	15.7	10.3	
Not observed	0	6.3	0.0	0.0	0.6 #	-41.8	
All further malignancies	12	13.1	0.9	0.5	1.6	-7.1	8.3
Patients		1284					
Median age at next malignancy (years)		68.5					
Person-years		1501					
Mean observation time (years)		1.2					
Median observation time (years)		0.7					

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

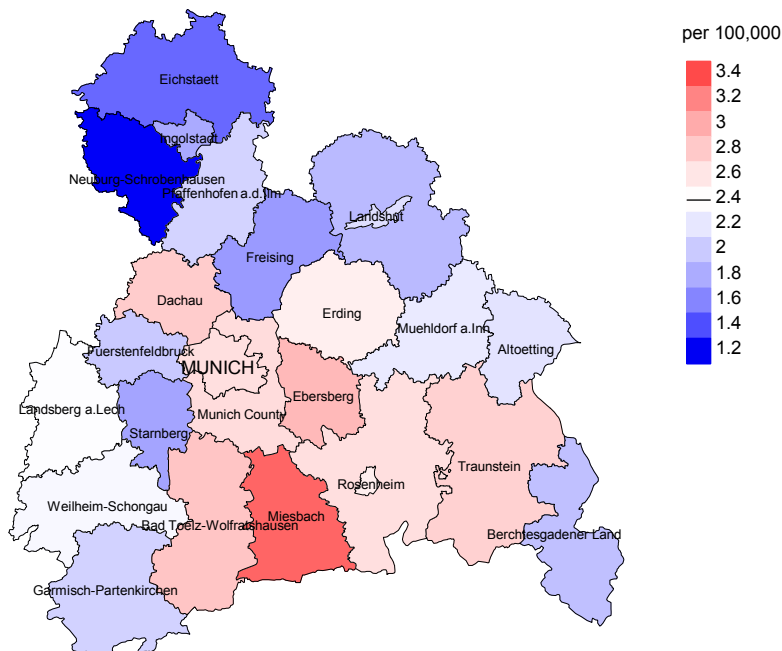
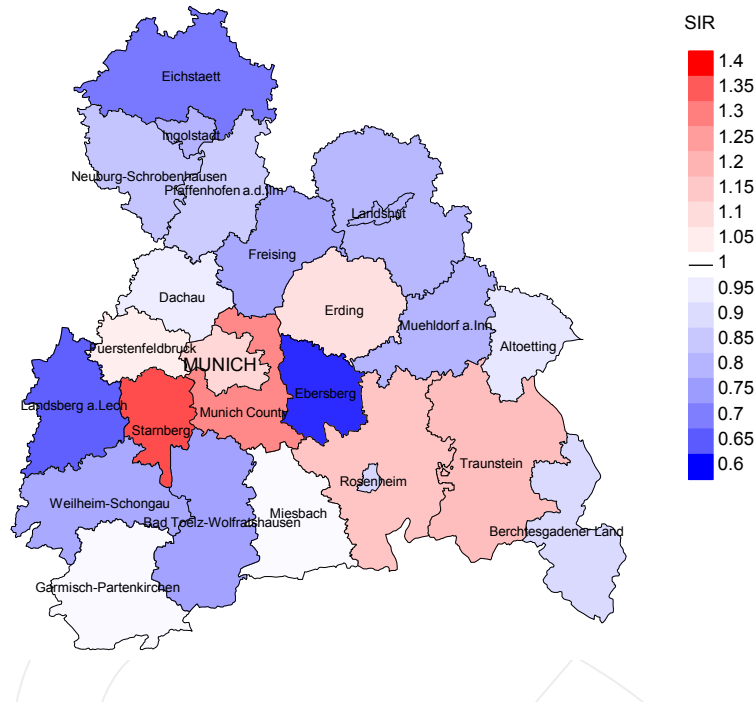


Figure 8a. Map of cancer incidence (german standard population) by county averaged for period 2007 to 2019. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 4.0/100,000 WS N=1,307, females 2.4/100,000 WS N=893).

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 30 women were identified with newly diagnosed glioblastoma. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 2.9/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.7 and 4.6/100,000.

Standardized incidence ratio (SIR) 2007 - 2019: Males



Standardized incidence ratio (SIR) 2007 - 2019: Females

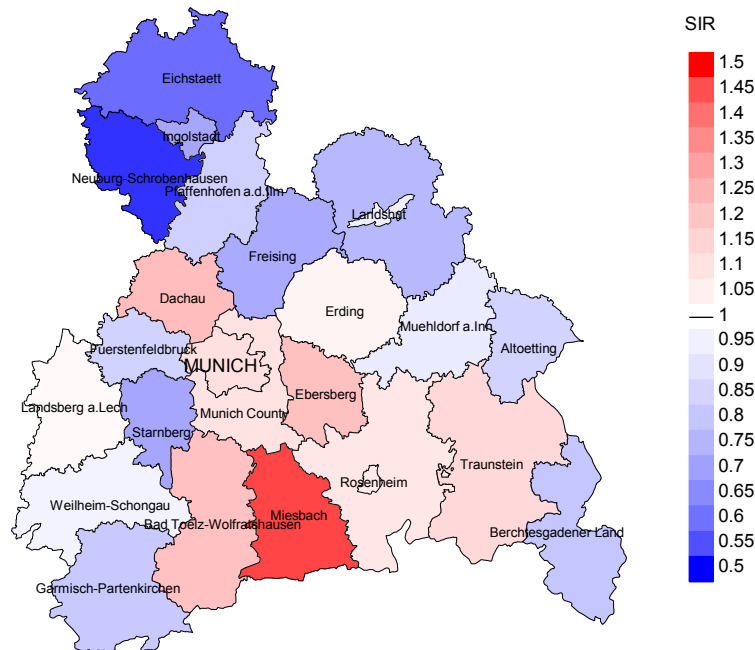


Figure 8b. Map of standardized incidence ratio (SIR) by county averaged for period 2007 to 2019. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=1,307, females N=893).

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 30 women were identified with newly diagnosed glioblastoma. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.21. Though, the value of this parameter may vary with an underlying probability of 99% between 0.72 and 1.91, 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	47	100.0	45	95.7	97.8
1999	47	100.0	47	100.0	93.6
2000	65	98.5	59	90.8	93.2
2001	81	98.8	79	97.5	87.3
2002	130	98.5	124	95.4	98.4
2003	142	98.6	137	96.5	94.2
2004	130	98.5	125	96.2	96.0
2005	163	99.4	154	94.5	96.1
2006	150	99.3	145	96.7	97.9
2007	142	95.8	133	93.7	97.7
2008	184	99.5	173	94.0	97.7
2009	247	98.8	223	90.3	96.9
2010	202	98.5	194	96.0	97.9
2011	214	99.5	191	89.3	97.9
2012	208	100.0	192	92.3	95.3
2013	206	99.5	189	91.7	94.2
2014	219	99.1	204	93.2	95.6
2015	199	99.5	182	91.5	95.1
2016	154	100.0	140	90.9	90.7
2017	102	100.0	84	82.4	70.2
2018	62	100.0	38	61.3	34.2
2019	61	85.2	31	50.8	83.9
1998-2019	3155	98.8	2889	91.6	94.1

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	47	27	12	25.5
1999	47	52	24	51.1
2000	65	48	19	29.2
2001	81	60	32	39.5
2002	130	107	41	31.5
2003	142	132	53	37.3
2004	130	137	46	35.4
2005	163	119	58	35.6
2006	150	139	54	36.0
2007	142	148	50	35.2
2008	184	127	47	25.5
2009	247	186	74	30.0
2010	202	208	68	33.7
2011	214	180	63	29.4
2012	208	208	75	36.1
2013	206	179	59	28.6
2014	219	207	71	32.4
2015	199	174	63	31.7
2016	154	214	72	46.8
2017	102	160	38	37.3
2018	62	76	13	21.0
2019	61	67	14	23.0
1998-2019	3155	2955	1046	33.2

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	27	88.9	11.1	100.0
1999	52	73.1	26.9	98.0
2000	48	77.1	22.9	100.0
2001	60	85.0	15.0	100.0
2002	107	90.7	9.3	100.0
2003	132	95.5	4.5	99.2
2004	137	94.2	5.8	99.2
2005	119	92.4	7.6	98.3
2006	139	92.8	7.2	99.3
2007	148	98.0	2.0	98.6
2008	127	95.3	4.7	99.2
2009	186	91.4	8.6	98.9
2010	208	95.7	4.3	99.0
2011	180	97.2	2.8	99.4
2012	208	93.8	6.3	98.5
2013	179	93.9	6.1	98.8
2014	207	97.6	2.4	99.5
2015	174	97.7	2.3	99.4
2016	214	96.7	3.3	99.5
2017	160	93.1	6.9	98.7
2018	76	47.4	52.6	100.0
2019	67	52.2	47.8	100.0
1998–2019	2955	91.8	8.2	99.1

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	10	57.8	57.8	62.6	57.8
1999	30	64.1	66.5	58.1	65.3
2000	24	59.0	59.0	59.2	61.6
2001	36	62.0	61.6	70.1	61.8
2002	66	63.3	63.7	61.0	63.6
2003	61	66.8	66.8	65.5	66.9
2004	74	64.0	64.2	56.5	64.0
2005	75	65.3	64.1	69.7	64.2
2006	82	65.1	65.1	63.7	65.1
2007	89	66.4	66.3	74.0	66.4
2008	75	64.3	64.0	73.8	64.2
2009	113	69.5	69.4	70.1	69.3
2010	141	68.8	68.9	64.2	69.1
2011	103	68.0	68.0	67.1	67.9
2012	113	68.4	68.4	66.5	68.3
2013	105	67.2	67.1	73.4	67.2
2014	128	67.4	67.1	75.5	67.8
2015	108	70.2	70.2	65.9	70.2
2016	121	65.7	64.6	71.7	66.6
2017	93	64.8	64.8	70.8	64.8
2018	49	70.7	70.7	70.5	70.7
2019	43	67.1	65.1	68.3	65.4
1998-2019	1739	66.8	66.7	69.1	66.8

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	17	67.1	70.5	56.9	67.1
1999	22	68.6	68.6	71.1	69.5
2000	24	67.1	66.4	72.2	67.1
2001	24	66.7	66.7	66.6	66.7
2002	41	67.1	67.1	65.3	67.1
2003	71	67.6	67.6	69.2	67.6
2004	63	64.9	64.7	65.8	64.7
2005	44	65.6	65.6	71.7	65.6
2006	57	68.1	68.3	67.5	68.6
2007	59	66.3	65.9	77.7	65.9
2008	52	68.2	68.6	56.1	68.8
2009	73	68.5	68.6	64.4	68.6
2010	67	69.2	68.8	73.2	69.1
2011	77	70.7	71.1	67.4	71.6
2012	95	68.2	68.3	66.7	68.4
2013	74	67.5	66.9	75.3	66.9
2014	79	68.8	68.8		68.8
2015	66	68.9	68.9	67.8	69.8
2016	93	69.4	69.1	70.4	69.4
2017	67	73.3	71.8	79.9	73.6
2018	27	70.4	70.9	65.7	70.9
2019	24	72.9	72.6	73.0	70.4
1998-2019	1216	68.4	68.3	69.9	68.5

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	8	0.7	0.29	0.5	0.25	0.6	0.27	0.6	0.24
1999	22	2.0	0.81	1.3	0.78	1.8	0.81	2.2	0.86
2000	16	1.4	0.42	1.0	0.41	1.3	0.42	1.3	0.37
2001	30	2.6	0.71	1.6	0.71	2.3	0.72	2.8	0.73
2002	58	3.1	0.82	1.9	0.76	2.6	0.80	3.0	0.82
2003	59	3.1	0.77	1.8	0.73	2.6	0.75	3.2	0.79
2004	69	3.7	0.93	2.2	0.92	3.0	0.90	3.6	0.96
2005	68	3.6	0.72	2.1	0.72	2.9	0.73	3.4	0.72
2006	77	4.0	0.81	2.3	0.77	3.2	0.80	3.8	0.83
2007	88	4.0	1.11	2.2	1.03	3.1	1.07	3.8	1.13
2008	72	3.2	0.62	1.9	0.65	2.6	0.63	3.0	0.61
2009	100	4.5	0.65	2.3	0.61	3.4	0.63	4.3	0.67
2010	135	6.0	1.18	3.2	1.14	4.5	1.13	5.7	1.17
2011	101	4.5	0.83	2.4	0.78	3.4	0.82	4.2	0.83
2012	107	4.7	0.95	2.5	0.94	3.5	0.94	4.3	0.95
2013	100	4.3	0.76	2.4	0.73	3.3	0.73	3.9	0.76
2014	123	5.3	0.92	2.9	0.88	4.0	0.91	4.7	0.93
2015	106	4.5	0.90	2.3	0.81	3.3	0.83	4.0	0.87
2016	115	4.8	1.35	2.5	1.38	3.6	1.37	4.4	1.35
2017	89	3.7	1.37	2.0	1.53	2.8	1.46	3.3	1.38
2018	23	0.9	0.61	0.5	0.57	0.7	0.59	0.8	0.60
2019	23	0.9	0.58	0.6	0.72	0.8	0.63	0.9	0.62
1998-2019	1589	3.6	0.86	2.0	0.83	2.8	0.84	3.4	0.86

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	16	1.4	0.84	0.7	0.80	1.0	0.82	1.2	0.86
1999	16	1.3	0.80	0.8	0.89	1.1	0.84	1.3	0.82
2000	21	1.7	0.78	0.9	0.66	1.4	0.73	1.6	0.79
2001	21	1.7	0.54	1.0	0.58	1.4	0.56	1.6	0.55
2002	39	2.0	0.66	1.1	0.62	1.5	0.62	1.8	0.64
2003	67	3.4	1.03	1.8	0.99	2.6	1.03	3.1	1.04
2004	60	3.0	1.07	1.8	1.07	2.4	1.09	2.7	1.10
2005	42	2.1	0.62	1.1	0.63	1.5	0.61	1.8	0.62
2006	52	2.6	0.95	1.4	0.97	1.8	0.92	2.2	0.91
2007	57	2.5	0.90	1.3	0.86	1.8	0.86	2.1	0.88
2008	49	2.1	0.72	1.1	0.69	1.5	0.72	1.8	0.73
2009	70	3.0	0.75	1.5	0.66	2.1	0.67	2.5	0.71
2010	64	2.7	0.73	1.3	0.68	1.8	0.69	2.3	0.73
2011	74	3.2	0.80	1.5	0.73	2.1	0.76	2.6	0.78
2012	88	3.7	0.93	1.8	0.92	2.5	0.91	3.1	0.94
2013	68	2.9	0.91	1.4	0.85	2.0	0.89	2.4	0.89
2014	79	3.3	0.92	1.6	0.94	2.2	0.90	2.7	0.93
2015	64	2.6	0.79	1.2	0.69	1.7	0.74	2.2	0.76
2016	92	3.7	1.33	1.8	1.45	2.5	1.38	3.1	1.36
2017	60	2.4	1.62	1.1	1.84	1.5	1.74	1.9	1.73
2018	13	0.5	0.54	0.2	0.53	0.3	0.52	0.4	0.54
2019	12	0.5	0.57	0.2	0.59	0.3	0.59	0.3	0.55
1998-2019	1124	2.5	0.86	1.2	0.84	1.7	0.84	2.1	0.86

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	2	0.1	0.1	1	0.1	0.1	1	0.1	0.1
10-14	2	0.1	0.2	1	0.1	0.2	1	0.1	0.3
15-19	5	0.3	0.5	4	0.3	0.5	1	0.1	0.4
20-24	5	0.3	0.7	3	0.3	0.8	2	0.3	0.6
25-29	10	0.5	1.2	6	0.5	1.3	4	0.5	1.1
30-34	6	0.3	1.5	3	0.3	1.5	3	0.4	1.5
35-39	22	1.1	2.6	14	1.2	2.7	8	1.0	2.5
40-44	50	2.5	5.2	37	3.1	5.8	13	1.6	4.2
45-49	126	6.4	11.6	80	6.8	12.6	46	5.8	10.0
50-54	129	6.5	18.1	81	6.9	19.5	48	6.1	16.1
55-59	181	9.2	27.3	124	10.5	29.9	57	7.2	23.3
60-64	245	12.4	39.7	151	12.8	42.7	94	11.9	35.2
65-69	318	16.1	55.8	176	14.9	57.6	142	18.0	53.2
70-74	367	18.6	74.4	224	19.0	76.6	143	18.1	71.3
75-79	302	15.3	89.8	169	14.3	90.9	133	16.8	88.1
80-84	149	7.6	97.3	82	6.9	97.8	67	8.5	96.6
85+	53	2.7	100.0	26	2.2	100.0	27	3.4	100.0
All ages	1972	100.0		1182	100.0		790	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.	Males MI-index	Females Age- spec. mortal.	Females MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4								
5- 9	1	1	0.1	0.50	0.1	1.00	4.0	4.3
10-14	1	1	0.1	0.25	0.1	1.00	3.7	4.3
15-19	4	1	0.3	2.00	0.1	1.00	8.5	4.0
20-24	3	2	0.2	0.50	0.1	0.67	4.5	5.1
25-29	6	4	0.3	0.75	0.2	0.57	7.1	4.3
30-34	3	3	0.1	0.23	0.1	0.30	2.3	1.9
35-39	14	8	0.7	0.88	0.4	0.73	5.8	2.2
40-44	37	13	1.6	0.70	0.6	0.42	6.5	1.6
45-49	80	46	3.2	1.05	1.9	1.15	6.0	2.9
50-54	81	48	3.5	0.76	2.1	0.74	3.2	2.0
55-59	124	57	6.4	0.78	2.9	0.64	3.0	1.6
60-64	151	94	9.3	0.93	5.4	0.95	2.5	2.0
65-69	176	142	11.6	0.88	8.4	1.03	2.0	2.2
70-74	224	143	16.0	1.04	8.9	0.88	2.0	1.7
75-79	169	133	15.3	0.92	9.7	0.96	1.5	1.5
80-84	82	67	12.5	1.05	6.9	1.00	0.9	0.8
85+	26	27	6.1	1.08	2.8	0.96	0.3	0.2
All ages	1182	790					1.8	1.4
Mortality								
Raw			3.9	0.90	2.5	0.88		
WS			2.1	0.88	1.2	0.85		
ES			3.0	0.89	1.7	0.86		
BRD-S			3.6	0.90	2.1	0.88		
PYLL-70								
per 100,000			32.6		18.4			
ES			28.4		15.8			
AYLL-70			12.7		11.5			

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 ←%
C09-C10 Oropharynx	3	1.3	3	100.0				
C11 Nasopharynx	1	0.4	1	100.0				
C16 Stomach	5	2.2	5	100.0				
C17 Small intestine	3	1.3	1	33.3	1	33.3	1	33.3
C18 Colon	20	8.8	17	85.0	3	15.0		
C19-C20 Rectum	10	4.4	9	90.0			1	10.0
C21 Anus/canal	1	0.4	1	100.0				
C22 Liver	1	0.4	1	100.0				
C23-C24 Bile	1	0.4					1	100.0
C25 Pancreas	4	1.8	1	25.0	1	25.0	2	50.0
C32 Larynx	1	0.4	1	100.0				
C33-C34 Lung	3	1.3	2	66.7	1	33.3		
C38,C45 Mesothelioma	1	0.4	1	100.0				
C40-C41 Bone	2	0.9	1	50.0			1	50.0
C43 Malign. melanoma	12	5.3	11	91.7			1	8.3
C44 Skin others	18	7.9	10	55.6	4	22.2	4	22.2
C46,C49 Soft tissue	1	0.4					1	100.0
C60 Penis	2	0.9	2	100.0				
C61 Prostate	85	37.4	78	91.8	2	2.4	5	5.9
C62 Testis	5	2.2	5	100.0				
C64 Kidney	12	5.3	8	66.7	2	16.7	2	16.7
C67 Bladder	6	2.6	3	50.0	1	16.7	2	33.3
C68 Urinary org.	1	0.4	1	100.0				
C70-C72 CNS cancer	10	4.4			3	30.0	7	70.0
C73 Thyroid	5	2.2	5	100.0				
C76-C79 CUP	1	0.4	1	100.0				
C82-C85 NHL	9	4.0	8	88.9	1	11.1		
C90 Mult. myeloma	2	0.9	2	100.0				
C91-C96 Leukaemia	2	0.9	1	50.0			1	50.0
All further malignancies	227	100.0	179	78.9	19	8.4	29	12.8

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

Table 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 ←%
C03-C06 Oral cavity	1	0.7	1	100.0				
C16 Stomach	2	1.4	2	100.0				
C18 Colon	7	5.0	7	100.0				
C19-C20 Rectum	2	1.4	1	50.0			1	50.0
C32 Larynx	1	0.7	1	100.0				
C33-C34 Lung	1	0.7	1	100.0				
C43 Malign. melanoma	9	6.5	8	88.9			1	11.1
C44 Skin others	8	5.8	5	62.5	2	25.0	1	12.5
C46,C49 Soft tissue	2	1.4	2	100.0				
C50 Breast	57	41.0	49	86.0	3	5.3	5	8.8
C52 Vagina	1	0.7	1	100.0				
C53 Cervix uteri	5	3.6	5	100.0				
C54 Corpus uteri	10	7.2	9	90.0			1	10.0
C56 Ovary	6	4.3	6	100.0				
C64 Kidney	2	1.4	2	100.0				
C65 Renal pelvis	1	0.7	1	100.0				
C67 Bladder	1	0.7	1	100.0				
C69 Eye melanoma	1	0.7	1	100.0				
C70-C72 CNS cancer	8	5.8					8	100.0
C73 Thyroid	6	4.3	6	100.0				
C76-C79 CUP	1	0.7	1	100.0				
C81 Hodgkin lymphoma	1	0.7	1	100.0				
C82-C85 NHL	4	2.9	2	50.0	2	50.0		
C91-C96 Leukaemia	2	1.4	1	50.0			1	50.0
All further malignancies	139	100.0	114	82.0	7	5.0	18	12.9

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	Males Prop.all cancers %	Females Prop.all cancers %
0- 4								
5- 9	1	1	0.1	0.50	0.1	1.00	4.2	4.3
10-14	1	1	0.1	0.25	0.1	1.00	3.7	5.3
15-19	4	1	0.3	2.00	0.1	1.00	8.9	4.3
20-24	3	2	0.2	0.50	0.1	0.67	5.0	5.4
25-29	6	4	0.3	0.75	0.2	0.57	7.8	4.7
30-34	3	3	0.1	0.23	0.1	0.30	2.4	2.2
35-39	14	8	0.7	0.88	0.4	0.80	6.2	2.4
40-44	35	11	1.5	0.69	0.5	0.41	6.6	1.6
45-49	80	45	3.2	1.08	1.9	1.18	6.5	3.3
50-54	76	44	3.2	0.75	1.9	0.72	3.4	2.1
55-59	120	51	6.2	0.81	2.6	0.64	3.3	1.7
60-64	135	84	8.3	0.95	4.8	0.93	2.7	2.2
65-69	157	121	10.3	0.90	7.2	1.06	2.3	2.4
70-74	179	117	12.8	1.05	7.3	0.89	2.1	1.8
75-79	132	106	11.9	0.97	7.7	0.93	1.6	1.5
80-84	65	58	9.9	1.07	6.0	1.00	1.0	0.9
85+	15	25	3.5	1.00	2.6	1.04	0.3	0.3
All ages	1026	682					2.1	1.5
Mortality								
Raw			3.4	0.91	2.2	0.89		
WS			1.9	0.88	1.1	0.85		
ES			2.6	0.89	1.5	0.86		
BRD-S			3.1	0.91	1.8	0.88		
PYLL-70								
per 100,000			31.2		17.1			
ES			27.3		14.7			
AYLL-70			13.1		11.9			

* 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								
5- 9	1	1	0.1	0.50	0.1	1.00	4.2	4.3
10-14	1	1	0.1	0.25	0.1	1.00	3.7	5.3
15-19	4	1	0.3	2.00	0.1	1.00	8.9	4.5
20-24	3	2	0.2	0.50	0.1	0.67	5.0	5.6
25-29	6	4	0.3	0.75	0.2	0.57	7.8	4.8
30-34	3	3	0.1	0.27	0.1	0.30	2.4	2.2
35-39	12	8	0.6	0.75	0.4	0.80	5.3	2.5
40-44	35	11	1.5	0.70	0.5	0.41	6.7	1.6
45-49	80	45	3.2	1.08	1.9	1.25	6.6	3.4
50-54	76	42	3.2	0.75	1.8	0.69	3.5	2.1
55-59	119	50	6.1	0.81	2.5	0.63	3.4	1.7
60-64	133	83	8.2	0.95	4.7	0.93	2.7	2.2
65-69	154	121	10.1	0.90	7.2	1.07	2.3	2.4
70-74	175	114	12.5	1.04	7.1	0.89	2.1	1.9
75-79	131	105	11.8	0.98	7.6	0.92	1.6	1.6
80-84	64	57	9.7	1.05	5.9	1.00	1.0	0.9
85+	15	25	3.5	1.00	2.6	1.04	0.3	0.3
All ages	1012	673					2.1	1.5
Mortality								
Raw			3.4	0.91	2.2	0.88		
WS			1.9	0.88	1.1	0.85		
ES			2.6	0.89	1.5	0.86		
BRD-S			3.1	0.91	1.8	0.88		
PYLL-70								
per 100,000			30.9		16.8			
ES			26.9		14.5			
AYLL-70			13.1		11.9			

* See corresponding tables with multiple malignancies.

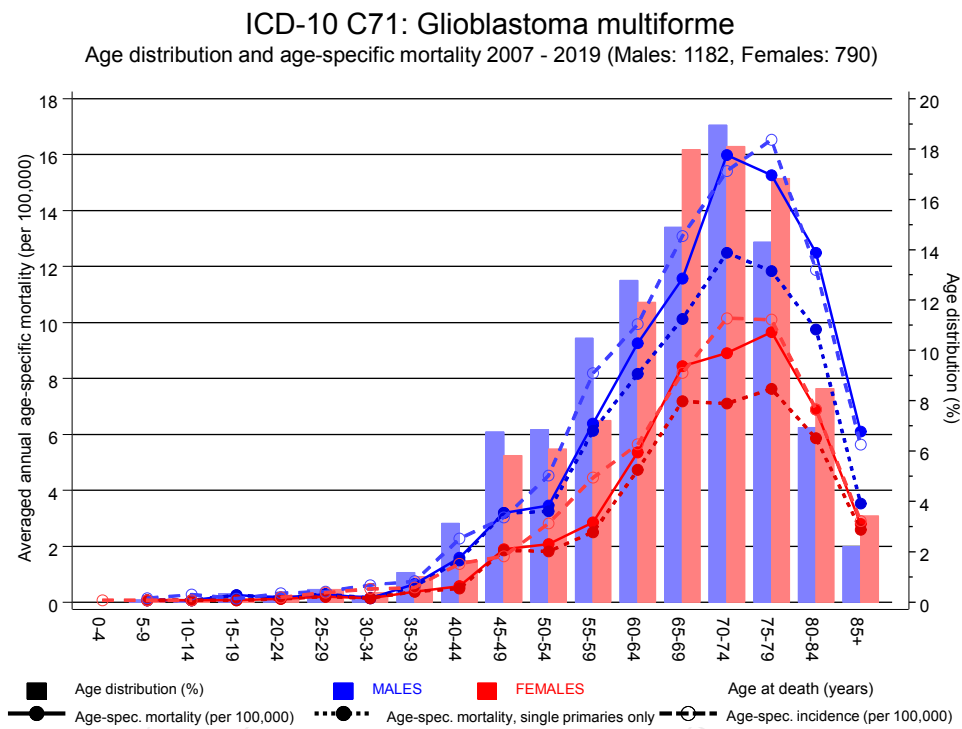
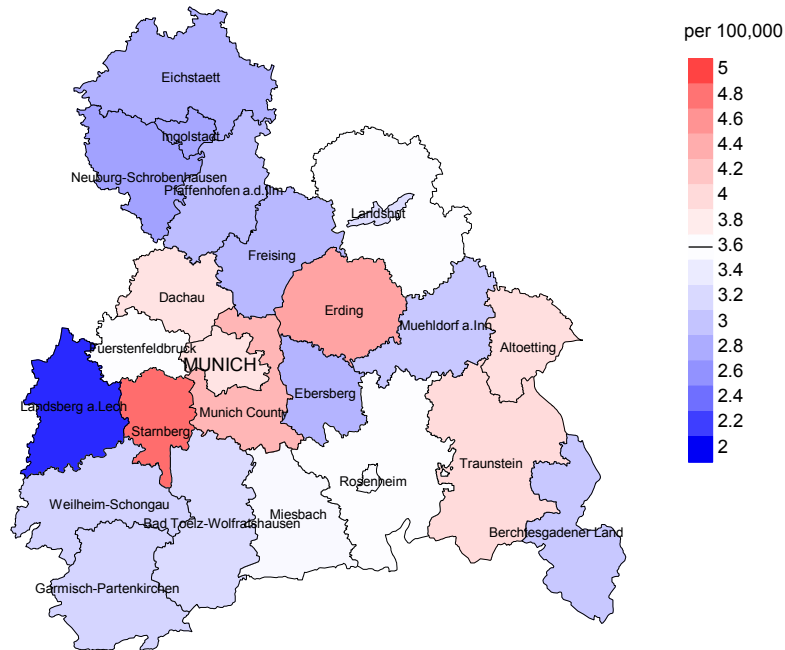


Figure 17. Distribution of age at death (bars; males: mean=64.1 yrs, median=66.3 yrs; females: mean=66.0 yrs, median=67.8 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

The difference between age at diagnosis (Table 3) and age at glioblastoma-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

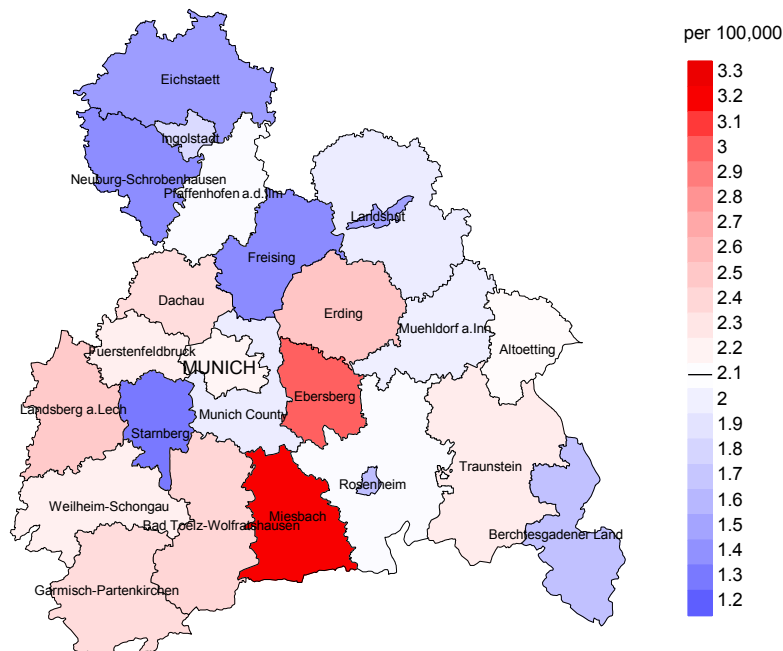
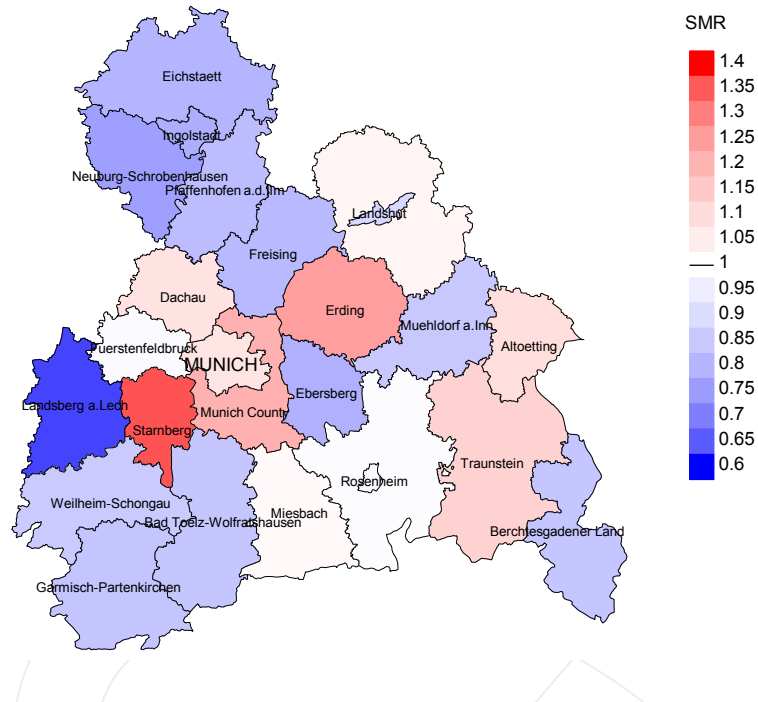


Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2019. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 3.6/100,000 WS N=1,182, females 2.1/100,000 WS N=790).

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 31 women died from glioblastoma. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 3.0/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.8 and 4.7/100,000.

Standardized mortality ratio (SMR) 2007 - 2019: Males



Standardized mortality ratio (SMR) 2007 - 2019: Females

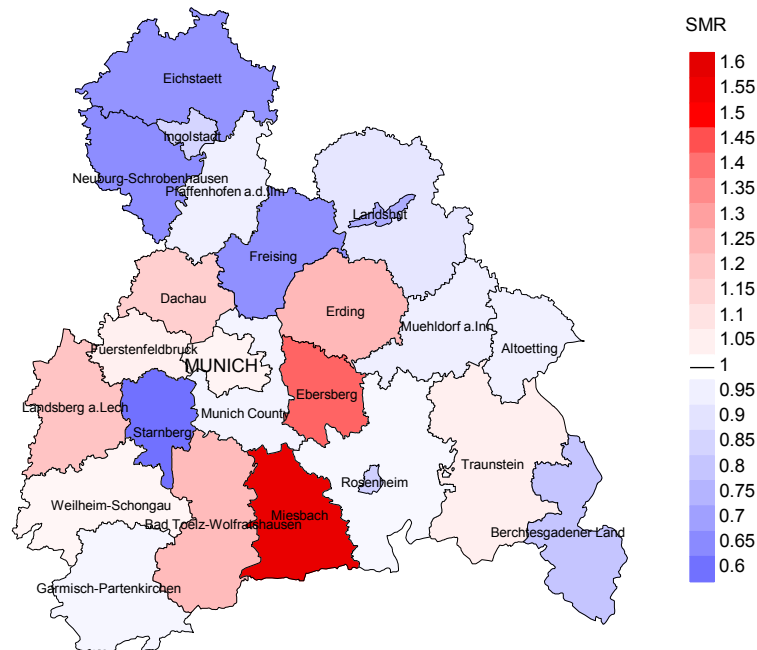


Figure 18b. Map of standardized mortality ratio (SMR) by county averaged for period 2007 to 2019. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=1,182, females N=790).

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 31 women died from glioblastoma. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.42. Though, the value of this parameter may vary with an underlying probability of 99% between 0.85 and 2.22, 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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