Munich Cancer Registry

- Survival
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ICD-10 C72: Spinal cord cancer

Incidence and Mortality

Year of diagnosis	1998-2020
Patients	732
Diseases	732
Creation date	12/21/2021
Database export	12/20/2021
Population	4.95 m

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

https://www.tumorregister-muenchen.de/en/facts/base/bC72__E-ICD-10-C72-Spinal-cord-cancer-incidence-and-mortality.pdf

Index of figures and tables

Global Statements about the statistics on the Internet −
Baseline Statistics (grey button), **Survival** (red button)

In these analyses, the clinics and physicians of Upper Bavaria and the city and county of Landshut[#], with a total of 4.69 million inhabitants, account for the frequency of cancer diseases[##] and the achieved long term results. Additionally, the long term survival evaluated by the Munich Cancer Registry (MCR) is compared with the results of the population-based registry in the USA (SEER), which is useful for checking the consistency of the data on an international level.

In comparing several tables, inconsistent figures may be detected. This is based on the fact that different patient cohorts are included in the base calculation, for example when proportions of multiple tumors or DCO-cases[###] are concerned. In other cases the individual tumor diagnosis is the basis for calculation, for example with incidence.

The foot notes describe the currentness of the data. The baseline statistics and survival data are updated annually. This yearly analysis comprises the Annual Report of the MCR.

Clinics and physicians have access to essentially more detailed data, with which they can check, compare and in the best case optimize their own data and results.

We would be pleased to receive corrections, critique and useful suggestions. Just send an e-mail to tumor@ibe.med.uni-muenchen.de.

Munich Cancer Registry, December 2021

[#] Base data has been collected since 1998. An increase in new diseases is apparent, which is an effect of two extensions in the MCR catchment area (from a base population of 2.65 million to 4.10 in 2002, and to 4.69 million in 2007).

[##] Due to the high frequency and good prognosis of non-malignant skin cancer (C44), no systematic ascertainment is performed for this diagnosis. C44 is not designated as a primary, but rather as a secondary tumor.

[###] DCO (death certificate only) identifies a cancer case that first becomes available to the MCR through the death certificate.

ICD-10 codes (ICD-10 2015) used for specifying cancer site

Code	Description
C72.-	Malignant neoplasm of spinal cord, cranial nerves and other parts of central nervous system
C72.0	Spinal cord
C72.1	Cauda equina
C72.2	Olfactory nerve
C72.3	Optic nerve
C72.4	Acoustic nerve
C72.5	Other and unspecified cranial nerves
C72.8	Overlapping lesion of brain and other parts of central nervous system
C72.9	Central nervous system, unspecified

INCIDENCE

Table 1

Cases with invasive cancer by year of diagnosis, proportions of DCO, further malignancies, deaths, and active follow-up (ALL PATIENTS) (incl. DCO)

Year of diagnosis	All cases n	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	39			12.8	6.2	84.6	100.0
1999	37			11.8	6.0	75.7	94.6
2000	30			11.3	6.0	70.0	90.0
2001	42			11.5	6.0	81.0	95.2
2002	60			11.5	5.9	71.7	96.7 #
2003	47			11.4	5.2	61.7	100.0
2004	40			10.8	4.9	65.0	95.0
2005	37			11.4	4.9	73.0	94.6
2006	30			11.3	4.8	63.3	90.0
2007	37			11.5	4.7	54.1	94.6 #
2008	45	1	2.2	11.3	4.6	64.4	97.8
2009	36	1	2.8	11.0	3.8	58.3	100.0
2010	47			11.4	4.4	70.2	93.6
2011	34			11.4	3.4	52.9	100.0
2012	38			12.2	2.4	63.2	100.0
2013	40	1	2.5	12.2	2.3	75.0	97.5
2014	27			12.6	2.2	77.8	96.3
2015	14			12.6	0.0	64.3	100.0
2016	17			13.1	0.0	58.8	94.1
2017	18			13.0	0.0	27.8	100.0
2018	7			12.9	0.0		100.0
2019	4			12.8	0.0		100.0
2020	6			12.8	0.0	33.3	100.0 ##
1998-2020	732	3	0.4	12.8	6.2	65.8	96.6

732 cases diagnosed 1998-2020 are related to a total of 732 patients. Currently, in 136 (18.6 %) of these 732 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 99 / 32 / 5 (13.5 % / 4.4 % / 0.7 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:
In 2018, a subgroup of 7 cases has been diagnosed, of which 12.9 % 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 1a

Cases with invasive cancer by year of diagnosis, proportions of DCO, further malignancies, deaths, and active follow-up (MALES) (incl. DCO)

Year of diagnosis	Males n	Males %	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %	
1998	22	56.4			13.6	7.4	86.4	100.0	
1999	19	51.4			12.2	7.3	68.4	89.5	
2000	15	50.0			10.7	7.4	66.7	93.3	
2001	26	61.9			11.0	7.1	80.8	92.3	
2002	39	65.0			11.6	7.1	71.8	100.0	#
2003	22	46.8			11.9	6.6	59.1	100.0	
2004	21	52.5			11.0	6.0	76.2	100.0	
2005	20	54.1			13.0	6.1	65.0	90.0	
2006	16	53.3			13.0	6.3	62.5	87.5	
2007	13	35.1			13.1	6.2	53.8	92.3	#
2008	29	64.4	1	3.4	12.8	5.6	75.9	100.0	
2009	14	38.9	1	7.1	12.1	4.6	57.1	100.0	
2010	28	59.6			12.3	5.0	71.4	92.9	
2011	17	50.0			12.0	5.4	64.7	100.0	
2012	25	65.8			12.3	3.2	64.0	100.0	
2013	23	57.5			12.6	2.9	78.3	95.7	
2014	13	48.1			13.5	2.1	69.2	92.3	
2015	8	57.1			13.5	0.0	62.5	100.0	
2016	10	58.8			13.9	0.0	60.0	90.0	
2017	9	50.0			13.9	0.0	11.1	100.0	
2018	4	57.1			13.7	0.0		100.0	
2019	1	25.0			13.7	0.0		100.0	
2020	2	33.3			13.6	0.0	100.0	100.0	##
1998-2020	396	54.1	2	0.5	13.6	7.4	67.7	96.2	

396 cases diagnosed 1998-2020 are related to a total of 396 patients. Currently, in 81 (20.5 %) of these 396 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 57 / 19 / 5 (14.4 % / 4.8 % / 1.3 %) 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 retreived from the respective headings.

How to interpret:
In 2018, a subgroup of 4 cases has been diagnosed, of which 13.7 % 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 1b

Cases with invasive cancer by year of diagnosis, proportions of DCO, further malignancies, deaths, and active follow-up (FEMALES)
(incl. DCO)

Year of diagnosis	Females n	Females %	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %	
1998	17	43.6			11.8	4.8	82.4	100.0	
1999	18	48.6			11.4	4.4	83.3	100.0	
2000	15	50.0			12.0	4.4	73.3	86.7	
2001	16	38.1			12.1	4.6	81.3	100.0	
2002	21	35.0			11.5	4.5	71.4	90.5	#
2003	25	53.2			10.7	3.7	64.0	100.0	
2004	19	47.5			10.7	3.6	52.6	89.5	
2005	17	45.9			9.5	3.4	82.4	100.0	
2006	14	46.7			9.3	3.2	64.3	92.9	
2007	24	64.9			9.7	2.9	54.2	95.8	#
2008	16	35.6			9.4	3.4	43.8	93.8	
2009	22	61.1			9.8	3.0	59.1	100.0	
2010	19	40.4			10.3	3.6	68.4	94.7	
2011	17	50.0			10.8	1.1	41.2	100.0	
2012	13	34.2			12.1	1.3	61.5	100.0	
2013	17	42.5	1	5.9	11.7	1.6	70.6	100.0	
2014	14	51.9			11.5	2.2	85.7	100.0	
2015	6	42.9			11.6	0.0	66.7	100.0	
2016	7	41.2			12.0	0.0	57.1	100.0	
2017	9	50.0			12.0	0.0	44.4	100.0	
2018	3	42.9			11.9	0.0		100.0	
2019	3	75.0			11.7	0.0		100.0	
2020	4	66.7			11.9	0.0		100.0	##
1998-2020	336	45.9	1	0.3	11.9	4.8	63.7	97.0	

336 cases diagnosed 1998-2020 are related to a total of 336 patients. Currently, in 55 (16.4 %) of these 336 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 42 / 13 / 0 (12.5 % / 3.9 % / 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 retreived from the respective headings.

How to interpret:
In 2018, a subgroup of 3 cases has been diagnosed, of which 11.9 % 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 2

Incidence measures by year of diagnosis including DCO cases
(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,
and from 4.10 to 4.94 m as of 2007, respectively)

Year of diagnosis	Males n	Females n	Males Inc. raw	Fem. Inc. raw	Males Inc. WS	Fem. Inc. WS	Males Inc. ES	Fem. Inc. ES	Males Inc. BRD-S	Fem. Inc. BRD-S
1998	22	17	2.0	1.4	1.4	1.2	1.8	1.4	2.0	1.5
1999	19	18	1.7	1.5	1.4	1.0	1.6	1.2	1.7	1.3
2000	15	15	1.3	1.2	1.1	0.9	1.3	1.1	1.4	1.2
2001	26	16	2.2	1.3	1.6	0.7	2.0	1.0	2.1	1.2
2002	39	21	2.1	1.1	1.4	0.7	1.8	0.9	2.2	1.0
2003	22	25	1.2	1.3	1.0	0.9	1.1	1.1	1.2	1.2
2004	21	19	1.1	1.0	0.8	0.8	1.0	0.9	1.1	0.9
2005	20	17	1.1	0.9	0.7	0.5	0.8	0.6	1.0	0.7
2006	16	14	0.8	0.7	0.5	0.5	0.7	0.6	0.8	0.7
2007	13	24	0.6	1.0	0.6	0.9	0.6	0.9	0.5	1.0
2008	29	16	1.3	0.7	1.2	0.7	1.3	0.7	1.4	0.7
2009	14	22	0.6	0.9	0.4	0.8	0.5	0.8	0.6	0.8
2010	28	19	1.2	0.8	0.9	0.5	1.1	0.6	1.1	0.7
2011	17	17	0.8	0.7	0.6	0.4	0.7	0.6	0.7	0.6
2012	25	13	1.1	0.6	0.8	0.3	1.0	0.4	1.1	0.5
2013	23	17	1.0	0.7	0.7	0.5	0.8	0.5	0.9	0.6
2014	13	14	0.6	0.6	0.3	0.3	0.4	0.4	0.5	0.5
2015	8	6	0.3	0.2	0.2	0.1	0.3	0.2	0.3	0.2
2016	10	7	0.4	0.3	0.3	0.2	0.3	0.2	0.4	0.3
2017	9	9	0.4	0.4	0.2	0.3	0.3	0.3	0.3	0.3
2018	4	3	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.1
2019	1	3	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.1
2020	2	4	0.1	0.2	0.0	0.1	0.0	0.1	0.1	0.2
1998–2020	396	336	0.9	0.7	0.6	0.5	0.7	0.6	0.8	0.6

The computation of the incidence measures includes all cancers, irrespective of first or subsequent malignancy.

Table 3

Age distribution parameters by year of diagnosis (ALL PATIENTS)
(incl. DCO)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	39	53.0	17.4	3.4	83.3	32.4	44.2	54.6	63.6	77.2
1999	37	51.8	18.3	1.6	87.1	26.5	40.6	55.3	64.1	74.2
2000	30	53.6	22.1	4.4	88.2	25.8	35.8	57.7	70.8	77.1
2001	42	58.6	18.5	1.0	87.6	37.2	51.2	59.9	71.2	79.4
2002	60	57.4	16.4	22.4	87.5	33.0	46.2	61.8	68.6	75.4
2003	47	50.0	18.8	7.8	83.2	22.8	40.0	50.8	65.6	75.4
2004	40	55.7	19.5	0.3	84.4	34.7	47.3	61.1	68.4	73.5
2005	37	60.9	17.7	18.6	86.5	26.4	49.1	65.8	71.8	77.9
2006	30	58.3	17.2	19.0	88.7	32.4	47.5	60.1	71.8	76.6
2007	37	49.6	26.2	0.8	86.4	1.9	30.0	58.9	69.0	80.7
2008	45	48.1	25.1	0.0	82.3	4.4	32.8	55.5	68.8	77.7
2009	36	56.2	23.3	0.4	85.3	21.1	42.8	65.2	72.8	80.7
2010	47	59.3	19.8	2.7	87.0	29.7	51.1	64.5	69.4	81.6
2011	34	56.7	18.5	1.7	78.0	37.8	45.3	62.3	70.1	76.5
2012	38	59.1	19.7	0.4	84.3	31.1	51.6	63.4	72.3	78.4
2013	40	59.1	20.9	2.7	84.6	24.7	51.2	68.1	73.4	78.5
2014	27	67.4	10.5	43.5	83.7	53.6	60.1	66.5	75.2	81.7
2015	14	59.6	22.9	8.2	80.9	27.5	39.9	69.7	78.3	78.5
2016	17	55.8	21.8	9.4	83.6	13.0	46.0	56.0	76.1	79.7
2017	18	61.8	21.1	5.0	84.0	23.9	52.9	66.4	77.7	82.6
2018	7	29.6	25.8	1.3	70.3	1.3	10.1	18.7	58.2	70.3
2019	4	51.4	31.9	5.9	74.4	5.9	29.2	62.6	73.5	74.4
2020	6	57.0	23.8	24.5	81.5	24.5	32.8	61.4	80.4	81.5
1998-2020	732	55.9	20.4	0.0	88.7	26.5	43.8	60.7	70.3	78.1

Table 3a

Age distribution parameters by year of diagnosis (MALES)
(incl. DCO)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	22	53.8	17.1	3.4	83.3	35.8	44.2	55.1	63.6	72.7
1999	19	47.5	19.9	1.6	76.1	21.7	32.7	50.2	63.9	74.2
2000	15	50.6	23.5	4.4	88.2	23.0	29.4	52.7	73.3	77.6
2001	26	55.2	20.0	1.0	87.6	30.3	48.1	59.6	67.4	73.1
2002	39	55.7	17.4	22.5	81.8	30.5	39.5	61.7	69.9	75.6
2003	22	47.3	20.5	7.8	83.2	19.0	37.6	45.6	61.7	78.1
2004	21	57.3	18.3	0.3	77.3	38.3	47.4	64.3	69.8	73.6
2005	20	59.3	18.9	18.6	81.3	25.4	46.3	66.1	71.5	77.5
2006	16	58.6	14.8	26.4	76.7	41.0	45.9	61.2	70.9	75.7
2007	13	45.1	29.8	1.5	86.4	1.9	26.8	42.2	68.2	81.0
2008	29	48.1	24.4	0.0	80.7	8.6	32.1	55.5	67.9	78.8
2009	14	56.1	18.3	21.1	84.7	38.3	41.7	57.8	69.3	80.4
2010	28	56.8	19.5	4.0	86.9	29.7	43.9	62.5	68.1	83.7
2011	17	52.7	22.4	1.7	77.1	9.2	42.1	59.3	69.3	76.4
2012	25	57.3	20.1	0.4	84.3	31.1	49.7	63.0	69.3	76.6
2013	23	56.7	20.7	5.4	78.4	20.4	45.7	65.7	72.8	74.1
2014	13	67.9	11.4	43.5	83.7	56.6	61.0	69.6	75.2	82.8
2015	8	55.7	27.9	8.2	78.5	8.2	31.1	70.0	78.4	78.5
2016	10	57.5	20.6	13.0	78.6	25.7	46.0	61.5	76.1	78.2
2017	9	64.5	13.1	44.6	77.8	44.6	52.9	62.8	77.3	77.8
2018	4	40.5	27.9	14.8	70.3	14.8	16.8	38.4	64.2	70.3
2019	1	5.9		5.9	5.9	5.9	5.9	5.9	5.9	5.9
2020	2	70.1	14.6	59.7	80.4	59.7	59.7	70.1	80.4	80.4
1998-2020	396	54.5	20.4	0.0	88.2	25.6	41.6	59.4	69.5	77.3

Table 3b

Age distribution parameters by year of diagnosis (FEMALES)
(incl. DCO)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	17	52.0	18.3	13.0	80.8	16.0	46.1	54.1	61.5	77.2
1999	18	56.3	15.9	29.2	87.1	33.0	43.0	58.4	64.6	81.4
2000	15	56.6	21.0	9.0	79.6	29.0	35.8	68.5	70.8	75.6
2001	16	64.1	14.7	39.7	85.3	44.4	52.4	64.4	77.8	84.6
2002	21	60.6	14.3	22.4	87.5	47.0	56.3	62.0	67.2	74.4
2003	25	52.4	17.2	13.7	75.8	25.5	42.1	54.6	66.5	74.6
2004	19	54.1	21.1	2.9	84.4	4.4	47.1	60.6	66.2	73.5
2005	17	62.7	16.5	26.4	86.5	39.5	57.7	65.8	71.8	85.3
2006	14	58.0	20.2	19.0	88.7	30.2	49.6	59.2	71.8	84.4
2007	24	52.0	24.3	0.8	80.9	24.7	31.0	59.7	70.4	79.4
2008	16	48.0	27.2	0.0	82.3	1.6	34.6	54.9	71.0	77.6
2009	22	56.2	26.3	0.4	85.3	3.6	47.0	66.7	74.7	80.7
2010	19	63.1	20.1	2.7	87.0	22.4	59.1	67.8	76.3	81.6
2011	17	60.7	13.2	40.2	78.0	41.3	48.7	64.7	70.1	77.8
2012	13	62.7	18.9	8.0	81.4	51.6	56.5	67.6	72.7	78.4
2013	17	62.5	21.4	2.7	84.6	29.0	54.1	68.6	77.4	83.5
2014	14	66.9	10.0	52.3	81.7	53.6	60.1	66.3	75.1	79.6
2015	6	64.8	14.6	39.9	80.9	39.9	56.1	69.4	73.0	80.9
2016	7	53.3	24.8	9.4	83.6	9.4	42.8	53.9	79.7	83.6
2017	9	59.2	27.5	5.0	84.0	5.0	53.3	69.8	78.0	84.0
2018	3	15.0	16.7	1.3	33.6	1.3	1.3	10.1	33.6	33.6
2019	3	66.5	12.2	52.4	74.4	52.4	52.4	72.7	74.4	74.4
2020	4	50.5	26.6	24.5	81.5	24.5	28.6	48.0	72.3	81.5
1998-2020	336	57.4	20.3	0.0	88.7	29.0	47.9	61.5	71.8	79.6

Table 4

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

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4	20	5.4	5.4	8	4.1	4.1	12	6.9	6.9
5-9	7	1.9	7.3	5	2.6	6.6	2	1.1	8.0
10-14	3	0.8	8.1	2	1.0	7.7	1	0.6	8.6
15-19	6	1.6	9.7	6	3.1	10.7			8.6
20-24	6	1.6	11.4	2	1.0	11.7	4	2.3	10.9
25-29	8	2.2	13.5	5	2.6	14.3	3	1.7	12.6
30-34	11	3.0	16.5	5	2.6	16.8	6	3.4	16.1
35-39	17	4.6	21.1	12	6.1	23.0	5	2.9	19.0
40-44	19	5.1	26.2	14	7.1	30.1	5	2.9	21.8
45-49	14	3.8	30.0	7	3.6	33.7	7	4.0	25.9
50-54	22	5.9	35.9	8	4.1	37.8	14	8.0	33.9
55-59	33	8.9	44.9	20	10.2	48.0	13	7.5	41.4
60-64	36	9.7	54.6	20	10.2	58.2	16	9.2	50.6
65-69	58	15.7	70.3	31	15.8	74.0	27	15.5	66.1
70-74	34	9.2	79.5	15	7.7	81.6	19	10.9	77.0
75-79	44	11.9	91.4	23	11.7	93.4	21	12.1	89.1
80-84	27	7.3	98.6	10	5.1	98.5	17	9.8	98.9
85+	5	1.4	100.0	3	1.5	100.0	2	1.1	100.0
All ages	370	100.0		196	100.0		174	100.0	

Table 5

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

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=2 %	Females DCO rate n=1 %	Males Prop.all cancers n=153686 %	Females Prop.all cancers n=155051 %
0- 4	8	12	0.5	0.8			3.6	7.0
5- 9	5	2	0.3	0.1			4.3	2.0
10-14	2	1	0.1	0.1			1.5	0.8
15-19	6		0.3				1.9	
20-24	2	4	0.1	0.2			0.3	0.8
25-29	5	3	0.2	0.1			0.5	0.3
30-34	5	6	0.2	0.3			0.4	0.3
35-39	12	5	0.5	0.2			0.7	0.1
40-44	14	5	0.6	0.2			0.5	0.1
45-49	7	7	0.3	0.3			0.1	0.1
50-54	8	14	0.3	0.6			0.1	0.1
55-59	20	13	0.9	0.6			0.2	0.1
60-64	20	16	1.1	0.8			0.1	0.1
65-69	31	27	1.9	1.5	3.2	3.7	0.1	0.1
70-74	15	19	1.0	1.1			0.1	0.1
75-79	23	21	1.9	1.4	4.3		0.1	0.1
80-84	10	17	1.4	1.6			0.1	0.1
85+	3	2	0.6	0.2			0.0	0.0
All ages	196	174			1.0	0.6	0.1	0.1
Incidence								
Raw			0.6	0.5				
WS			0.5	0.4				
ES			0.5	0.4				
BRD-S			0.6	0.5				

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).

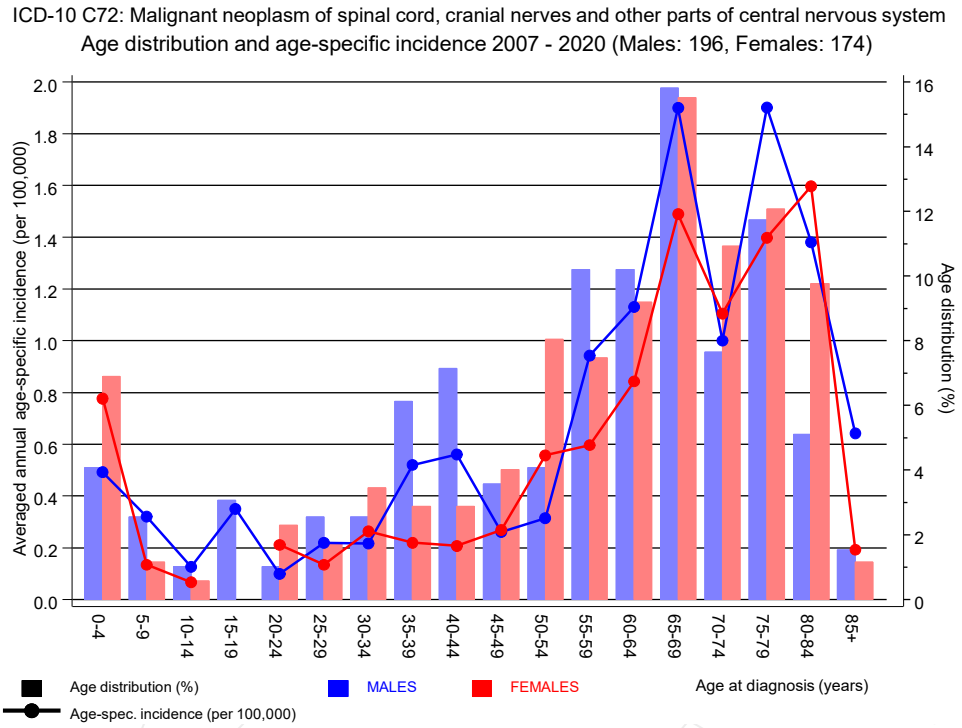


Figure 6. Age distribution (males: mean=55.0 yrs, median=61.7 yrs; females: mean=57.7 yrs, median=64.3 yrs) and age-specific incidence.

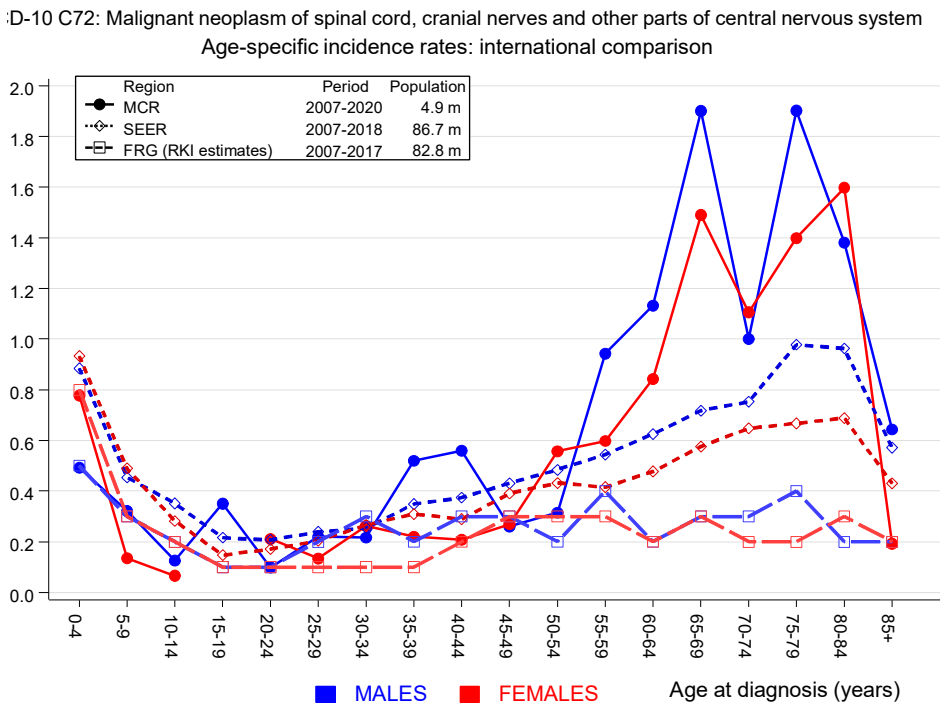


Figure 6a. Age-specific incidence in MCR registry areas compared to Germany (FRG, RKI estimates) and SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

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

Table 7a

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

MALES

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C16	Stomach	2	0.3	6.0	0.7	21.9		14.0	
C18	Colon	5	0.8	6.2	2.0	14.6	#	35.2	
C19–C20	Rectum	2	0.5	4.0	0.5	14.4		12.6	
C22	Liver	1	0.3	3.9	0.1	21.8		6.2	
C30–C31	Sinuses	1	0.0	53.7	1.4	299.1	#	8.2	
C33–C34	Lung	2	1.1	1.9	0.2	6.8		7.9	
C43	Malign. melanoma	4	0.5	8.8	2.4	22.5	#	29.7	
C61	Prostate	7	2.5	2.8	1.1	5.7	#	37.4	28.6
C62	Testis	3	0.1	27.4	5.7	80.1	#	24.3	
C64	Kidney	1	0.3	3.0	0.1	16.6		5.6	
C70–C72	CNS cancer	2	0.1	13.9	1.7	50.2	#	15.6	
C73	Thyroid	1	0.1	11.2	0.3	62.2		7.6	
C76–C79	CUP	1	0.1	7.0	0.2	39.1		7.2	
Not observed		0	2.4	0.0	0.0	1.5		-20.5	
All further malignancies		32	9.2	3.5	2.4	4.9	#	191.1	6.3

Patients	387
Median age at next malignancy (years)	66.6
Person-years	1192
Mean observation time (years)	3.1
Median observation time (years)	1.1

The occurrence of further specified malignancy is statistically significant.

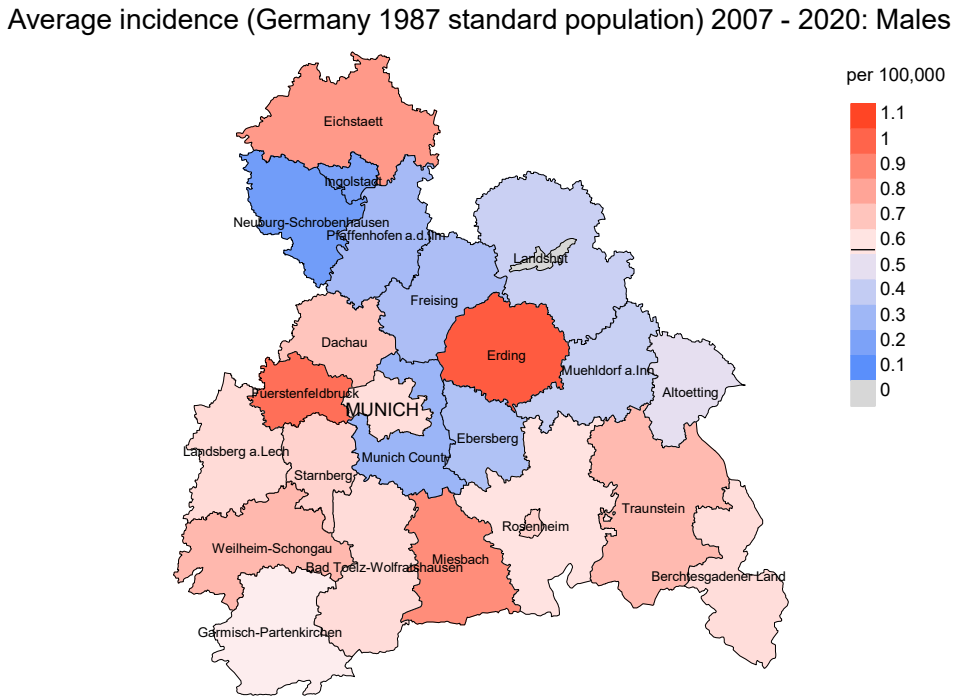
Table 7b

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

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C18	Colon	2	0.5	4.1	0.5	14.9		15.3	
C23–C24	Bile	1	0.1	15.1	0.4	84.1		9.4	
C25	Pancreas	1	0.2	4.5	0.1	25.1		7.8	100.0
C33–C34	Lung	1	0.5	2.0	0.1	11.3		5.1	
C50	Breast	5	2.3	2.1	0.7	5.0		26.9	
C54	Corpus uteri	2	0.4	5.2	0.6	18.9		16.3	
C64	Kidney	1	0.1	7.1	0.2	39.8		8.7	
C67	Bladder	1	0.1	11.6	0.3	64.6		9.2	
C70–C72	CNS cancer	1	0.1	10.7	0.3	59.7		9.1	
C73	Thyroid	1	0.2	5.7	0.1	31.7		8.3	
C82–C85	NHL	3	0.2	13.1	2.7	38.3	#	27.9	33.3
C90	Mult. myeloma	1	0.1	15.0	0.4	83.8		9.4	
Not observed		0	1.8	0.0	0.0	2.1		−18.1	
All further malignancies		20	6.6	3.0	1.9	4.7	#	135.4	10.0

Patients	331
Median age at next malignancy (years)	63.9
Person-years	992
Mean observation time (years)	3.0
Median observation time (years)	1.0

The occurrence of further specified malignancy is statistically significant.



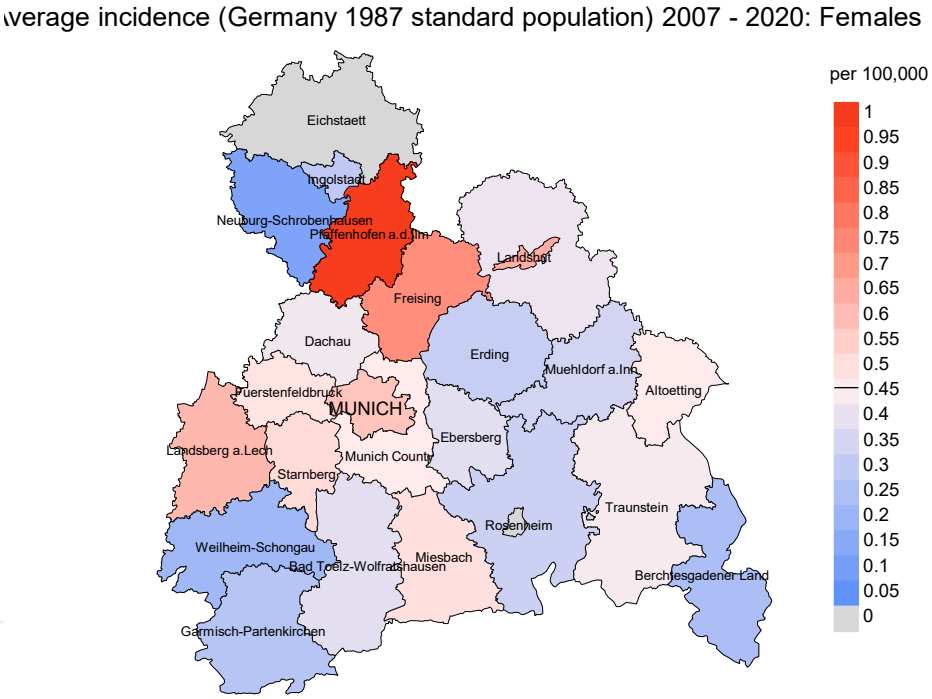
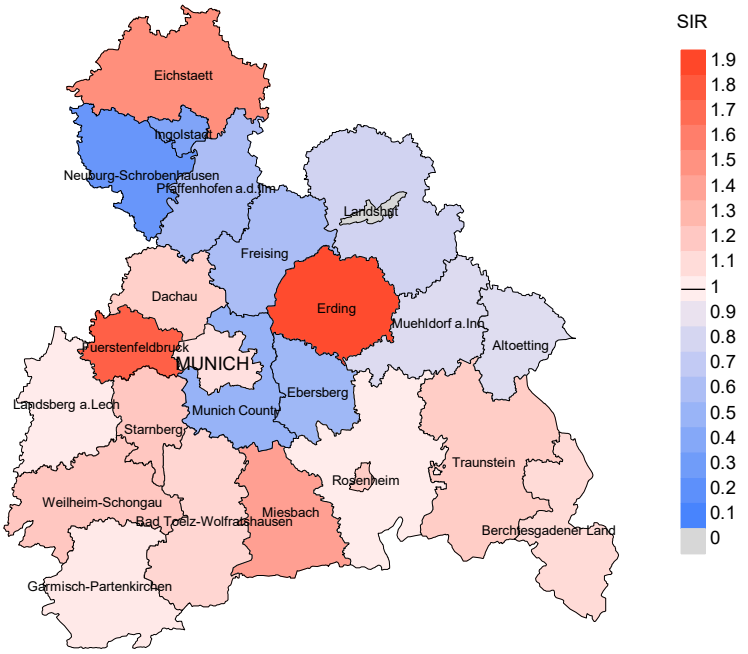


Figure 8a. Map of cancer incidence (german standard population, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 0.6/100,000 WS N=196, females 0.5/100,000 WS N=174).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,727 female residents (averaged) in the period from 2007 to 2020 a total of 4 women were identified with newly diagnosed spinal cord cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 0.4/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.1 and 1.3/100,000.

Standardized incidence ratio (SIR) 2007 - 2020: Males



Standardized incidence ratio (SIR) 2007 - 2020: Females

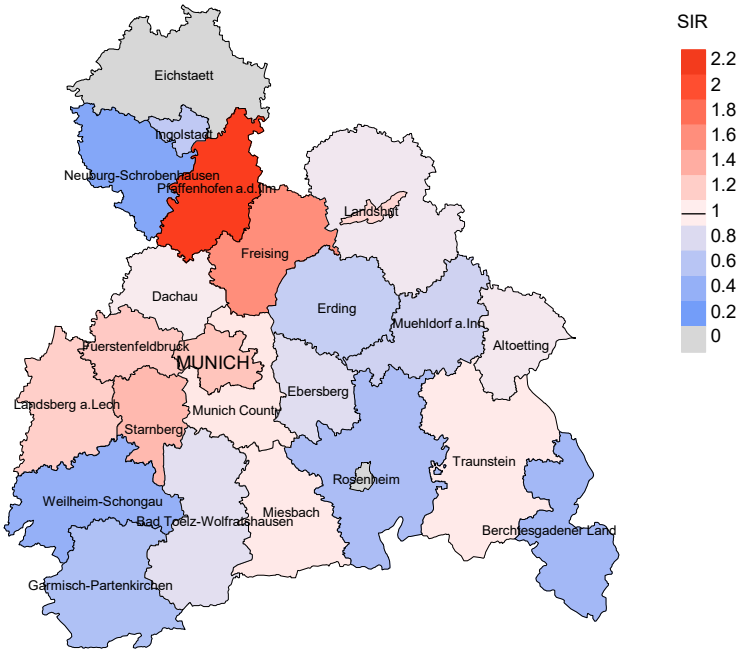


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=196, females N=174).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,153 female residents (averaged) in the period from 2007 to 2020 a total of 4 women were identified with newly diagnosed spinal cord cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.83. Though, the value of this parameter may vary with an underlying probability of 99% between 0.14 and 2.61, and is therefore not statistically striking.

MORTALITY

Table 9a

Annual cohorts: Incident cancers, follow-up status, proportion of DCO, deaths among the annual cohorts and proportion of available death certificates (with respect to registry area expansion from 2.65 to 4.10 m as of 2002, and from 4.10 to 4.94 m as of 2007, respectively)

Year of diagnosis	Incident cases n	Prop. actively followed %	Prop. DCO %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	39	100.0		33	84.6	87.9
1999	37	94.6		28	75.7	100.0
2000	30	90.0		21	70.0	85.7
2001	42	95.2		34	81.0	94.1
2002	60	96.7		43	71.7	97.7
2003	47	100.0		29	61.7	96.6
2004	40	95.0		26	65.0	96.2
2005	37	94.6		27	73.0	100.0
2006	30	90.0		19	63.3	94.7
2007	37	94.6		20	54.1	100.0
2008	45	97.8	2.2	29	64.4	96.6
2009	36	100.0	2.8	21	58.3	100.0
2010	47	93.6		33	70.2	100.0
2011	34	100.0		18	52.9	100.0
2012	38	100.0		24	63.2	95.8
2013	40	97.5	2.5	30	75.0	100.0
2014	27	96.3		21	77.8	100.0
2015	14	100.0		9	64.3	100.0
2016	17	94.1		10	58.8	90.0
2017	18	100.0		5	27.8	100.0
2018	7	100.0				
2019	4	100.0				
2020	6	100.0		2	33.3	100.0
1998-2020	732	96.6	0.4	482	65.8	96.7

Table 9b

Annual cohorts of incident cancers and deaths, proportion of death certificates and cases deceased within the same year of being diagnosed with cancer (incl. DCO)
(with respect to registry area expansion from 2.65 to 4.10 m as of 2002, and from 4.10 to 4.94 m as of 2007, respectively)

Year of diagnosis/ death	Incident cases n	Deaths n	Prop. deaths with death certific. %	Deaths in same year n	Prop. deaths in same year %
1998	39	27	81.5	9	23.1
1999	37	30	96.7	6	16.2
2000	30	25	96.0	1	3.3
2001	42	42	88.1	13	31.0
2002	60	37	97.3	17	28.3
2003	47	35	82.9	9	19.1
2004	40	33	100.0	7	17.5
2005	37	37	97.3	11	29.7
2006	30	27	100.0	5	16.7
2007	37	32	96.9	13	35.1
2008	45	34	97.1	14	31.1
2009	36	33	100.0	13	36.1
2010	47	34	100.0	16	34.0
2011	34	33	100.0	7	20.6
2012	38	16	93.8	7	18.4
2013	40	35	100.0	16	40.0
2014	27	32	100.0	9	33.3
2015	14	21	95.2	4	28.6
2016	17	19	100.0	1	5.9
2017	18	18	100.0	2	11.1
2018	7	9	77.8		
2019	4	6	50.0		
2020	6	14	92.9	2	33.3
1998–2020	732	629	95.2	182	24.9

Table 9c

Annual cohorts of deaths, proportion of cancer-related and non-cancer-related deaths, and cancer recorded on death certificates (incl. DCO)
(with respect to registry area expansion from 2.65 to 4.10 m as of 2002, and from 4.10 to 4.94 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer-related %	Prop. non-cancer-related %	Prop. cancer recorded on death certificate %
1998	27	63.0	37.0	100.0
1999	30	90.0	10.0	96.6
2000	25	72.0	28.0	95.8
2001	42	81.0	19.0	97.3
2002	37	89.2	10.8	100.0
2003	35	85.7	14.3	100.0
2004	33	93.9	6.1	97.0
2005	37	97.3	2.7	100.0
2006	27	88.9	11.1	88.9
2007	32	81.3	18.8	96.8
2008	34	94.1	5.9	97.0
2009	33	93.9	6.1	90.9
2010	34	91.2	8.8	94.1
2011	33	84.8	15.2	87.9
2012	16	87.5	12.5	93.3
2013	35	94.3	5.7	100.0
2014	32	87.5	12.5	87.5
2015	21	90.5	9.5	90.0
2016	19	89.5	10.5	89.5
2017	18	77.8	22.2	83.3
2018	9	55.6	44.4	71.4
2019	6	33.3	66.7	100.0
2020	14	42.9	57.1	100.0
1998-2020	629	85.2	14.8	94.7

Table 10a

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	19	55.3	56.3	51.5	53.6
1999	15	55.5	55.4	71.3	55.5
2000	9	56.3	54.4	61.3	61.0
2001	24	60.1	60.2	59.9	62.5
2002	23	66.7	68.4	56.8	66.7
2003	23	57.3	59.8	46.4	60.9
2004	18	69.5	66.3	81.5	68.9
2005	19	66.2	66.2		66.2
2006	10	68.6	68.6		69.2
2007	10	67.9	67.4	75.5	67.9
2008	21	67.5	67.5	57.2	67.5
2009	19	62.5	57.6	75.5	56.2
2010	22	67.2	67.3	35.8	67.2
2011	14	66.6	66.3	77.2	66.3
2012	8	65.1	63.1	84.7	63.1
2013	23	69.9	70.1	61.6	69.9
2014	16	69.7	69.8	69.5	69.5
2015	11	67.3	67.3		67.3
2016	13	66.8	68.6	58.0	66.8
2017	12	74.9	76.7	73.0	73.8
2018	3	83.4	14.4	84.8	14.4
2019	4	83.0	87.8	81.6	67.0
2020	8	70.2	69.7	70.7	70.2
1998–2020	344	65.6	65.5	66.3	65.6

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

Table 10b

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	8	63.3	68.1	55.2	64.8
1999	15	55.4	51.0	85.3	55.4
2000	16	60.7	62.0	57.3	62.0
2001	18	68.9	67.4	79.9	67.4
2002	14	74.3	74.5	67.4	74.5
2003	12	68.5	66.6	75.4	68.5
2004	15	58.8	58.8		58.8
2005	18	65.5	64.1	67.1	64.1
2006	17	67.0	61.8	73.9	63.3
2007	22	73.4	71.2	80.7	71.7
2008	13	67.1	67.1		67.1
2009	14	68.6	68.6		68.6
2010	12	74.6	71.2	78.4	71.2
2011	19	70.5	69.5	71.7	70.0
2012	8	68.0	63.9	78.7	63.9
2013	12	69.2	70.2	62.2	69.2
2014	16	74.6	74.3	80.9	74.3
2015	10	63.2	63.2	70.5	67.8
2016	6	60.1	60.1		60.1
2017	6	76.6	80.7	72.5	80.7
2018	6	76.2	71.9	90.4	71.9
2019	2	70.5	73.3	67.8	73.3
2020	6	69.4	82.4	58.7	58.7
1998-2020	285	68.0	67.4	74.8	67.4

By 2018, Bavarians' life expectancy at birth is estimated at 79.3 years for boys and 83.8 years for girls.

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

Table 11a

Mortality measures (cancer-related death) and mortality-incidence-index
by year of death
MALES

Year of death	Deaths n	Mort. raw	MI-Index raw	Mort. WS	MI-Index WS	Mort. ES	MI-Index ES	Mort. BRD-S	MI-Index BRD-S
1998	11	1.0	0.50	0.7	0.52	0.9	0.49	1.0	0.50
1999	13	1.2	0.68	0.7	0.54	1.0	0.62	1.0	0.61
2000	5	0.4	0.33	0.3	0.29	0.4	0.33	0.4	0.30
2001	19	1.6	0.73	1.0	0.61	1.4	0.71	1.7	0.81
2002	22	1.2	0.56	0.7	0.49	1.0	0.56	1.3	0.61
2003	19	1.0	0.86	0.7	0.65	0.9	0.79	1.0	0.80
2004	16	0.9	0.76	0.6	0.73	0.8	0.80	0.9	0.88
2005	19	1.0	0.95	0.6	0.91	0.8	0.98	1.0	0.97
2006	10	0.5	0.63	0.3	0.59	0.4	0.63	0.5	0.66
2007	9	0.4	0.69	0.2	0.37	0.3	0.57	0.4	0.71
2008	19	0.9	0.66	0.5	0.42	0.7	0.53	0.9	0.64
2009	17	0.8	1.21	0.6	1.60	0.7	1.37	0.7	1.23
2010	21	0.9	0.75	0.5	0.58	0.7	0.68	0.8	0.72
2011	13	0.6	0.76	0.3	0.54	0.4	0.65	0.5	0.71
2012	7	0.3	0.28	0.2	0.23	0.3	0.27	0.3	0.27
2013	22	1.0	0.96	0.6	0.89	0.7	0.88	0.9	0.93
2014	15	0.6	1.15	0.4	1.20	0.5	1.14	0.6	1.09
2015	11	0.5	1.38	0.2	0.93	0.3	1.26	0.4	1.34
2016	11	0.5	1.10	0.3	0.91	0.3	1.02	0.4	1.09
2017	9	0.4	1.00	0.2	1.12	0.3	1.02	0.3	1.00
2018	1	0.0	0.25	0.1	0.40	0.1	0.34	0.0	0.25
2019	1	0.0	1.00	0.0	0.14	0.0	0.41	0.0	0.75
2020	3	0.1	1.50	0.1	2.13	0.1	1.80	0.1	1.68
1998-2020	293	0.6	0.74	0.4	0.62	0.5	0.69	0.6	0.73

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	0.35	0.4	0.32	0.4	0.31	0.5	0.36
1999	14	1.2	0.78	1.0	1.06	1.1	0.91	1.1	0.85
2000	13	1.1	0.87	0.8	0.82	0.9	0.82	1.0	0.80
2001	15	1.2	0.94	0.7	1.00	1.0	0.96	1.1	0.95
2002	11	0.6	0.52	0.3	0.38	0.4	0.44	0.5	0.52
2003	11	0.6	0.44	0.3	0.36	0.5	0.40	0.5	0.45
2004	15	0.8	0.79	0.5	0.67	0.7	0.76	0.7	0.79
2005	17	0.9	1.00	0.5	1.02	0.7	1.02	0.7	0.98
2006	14	0.7	1.00	0.4	0.89	0.6	0.92	0.6	0.91
2007	17	0.7	0.71	0.3	0.37	0.5	0.52	0.7	0.65
2008	13	0.6	0.81	0.3	0.49	0.4	0.62	0.5	0.73
2009	14	0.6	0.64	0.5	0.61	0.5	0.59	0.5	0.61
2010	10	0.4	0.53	0.2	0.39	0.3	0.45	0.4	0.50
2011	15	0.6	0.88	0.3	0.73	0.4	0.78	0.5	0.87
2012	7	0.3	0.54	0.3	0.77	0.3	0.63	0.3	0.65
2013	11	0.5	0.65	0.2	0.45	0.3	0.55	0.4	0.62
2014	13	0.5	0.93	0.2	0.68	0.3	0.73	0.4	0.83
2015	8	0.3	1.33	0.2	1.25	0.2	1.33	0.3	1.30
2016	6	0.2	0.86	0.1	0.54	0.2	0.69	0.2	0.83
2017	5	0.2	0.56	0.1	0.24	0.1	0.36	0.1	0.45
2018	4	0.2	1.33	0.1	0.30	0.1	0.60	0.1	1.02
2019	1	0.0	0.33	0.0	0.29	0.0	0.30	0.0	0.33
2020	3	0.1	0.75	0.0	0.37	0.1	0.47	0.1	0.53
1998-2020	243	0.5	0.72	0.3	0.59	0.4	0.65	0.4	0.70

Table 12

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

Age at death	Cases			Males			Females		
Years	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
0-4	2	0.7	0.7		0.0		2	1.6	1.6
5-9	3	1.0	1.7	3	1.9	1.9			1.6
10-14	4	1.4	3.1	4	2.5	4.4			1.6
15-19	3	1.0	4.2	1	0.6	5.0	2	1.6	3.1
20-24	2	0.7	4.9	1	0.6	5.7	1	0.8	3.9
25-29	2	0.7	5.6	1	0.6	6.3	1	0.8	4.7
30-34	1	0.3	5.9	1	0.6	6.9			4.7
35-39	6	2.1	8.0	4	2.5	9.4	2	1.6	6.3
40-44	7	2.4	10.5	5	3.1	12.6	2	1.6	7.9
45-49	14	4.9	15.4	9	5.7	18.2	5	3.9	11.8
50-54	13	4.5	19.9	8	5.0	23.3	5	3.9	15.7
55-59	25	8.7	28.7	13	8.2	31.4	12	9.4	25.2
60-64	26	9.1	37.8	15	9.4	40.9	11	8.7	33.9
65-69	53	18.5	56.3	33	20.8	61.6	20	15.7	49.6
70-74	47	16.4	72.7	27	17.0	78.6	20	15.7	65.4
75-79	41	14.3	87.1	21	13.2	91.8	20	15.7	81.1
80-84	26	9.1	96.2	7	4.4	96.2	19	15.0	96.1
85+	11	3.8	100.0	6	3.8	100.0	5	3.9	100.0
All ages	286	100.0		159	100.0		127	100.0	

Table 13

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2020
(**incl. multiple malignancies**)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	Males MI-index	Females Age-spec. mortal.	Females MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4		2			0.1	0.17		12.5
5- 9	3		0.2	0.60			10.7	
10-14	4		0.3	2.00			14.3	
15-19	1	2	0.1	0.17	0.1	1.00	2.1	8.0
20-24	1	1	0.0	0.50	0.1	0.25	1.4	2.3
25-29	1	1	0.0	0.20	0.0	0.33	1.1	1.0
30-34	1		0.0	0.20			0.7	
35-39	4	2	0.2	0.33	0.1	0.40	1.5	0.5
40-44	5	2	0.2	0.36	0.1	0.40	0.8	0.2
45-49	9	5	0.3	1.29	0.2	0.71	0.6	0.3
50-54	8	5	0.3	1.00	0.2	0.36	0.3	0.2
55-59	13	12	0.6	0.65	0.6	0.92	0.3	0.3
60-64	15	11	0.8	0.75	0.6	0.69	0.2	0.2
65-69	33	20	2.0	1.06	1.1	0.74	0.4	0.3
70-74	27	20	1.8	1.80	1.2	1.05	0.2	0.2
75-79	21	20	1.7	0.91	1.3	0.95	0.2	0.2
80-84	7	19	1.0	0.70	1.8	1.12	0.1	0.2
85+	6	5	1.3	2.00	0.5	2.50	0.1	0.0
All ages	159	127					0.2	0.2
Mortality								
Raw			0.5	0.81	0.4	0.73		
WS			0.3	0.65	0.2	0.52		
ES			0.4	0.74	0.3	0.60		
BRD-S			0.4	0.79	0.3	0.68		
PYLL-70								
per 100,000			5.5		3.3			
ES			5.5		3.3			
AYLL-70			16.0		14.8			

Table 14a

Further malignancies in deaths in period 1998–2020
MALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03–C06	Oral cavity	2	2.4	2	100.0				
C07–C08	Salivary gland	1	1.2					1	100.0
C16	Stomach	2	2.4					2	100.0
C18	Colon	3	3.5			1	33.3	2	66.7
C19–C20	Rectum	6	7.1	5	83.3	1	16.7		
C22	Liver	1	1.2					1	100.0
C25	Pancreas	1	1.2					1	100.0
C30–C31	Sinuses	1	1.2			1	100.0		
C32	Larynx	1	1.2	1	100.0				
C33–C34	Lung	6	7.1			1	16.7	5	83.3
C37	Thymus	1	1.2	1	100.0				
C43	Malign. melanoma	8	9.4	4	50.0			4	50.0
C61	Prostate	19	22.4	14	73.7	2	10.5	3	15.8
C62	Testis	3	3.5	1	33.3	1	33.3	1	33.3
C64	Kidney	6	7.1	4	66.7			2	33.3
C65	Renal pelvis	2	2.4					2	100.0
C67	Bladder	1	1.2					1	100.0
C70–C72	CNS cancer	10	11.8					10	100.0
C73	Thyroid	3	3.5	2	66.7			1	33.3
C76–C79	CUP	1	1.2					1	100.0
C82–C85	NHL	5	5.9	4	80.0			1	20.0
C90	Mult. myeloma	2	2.4	1	50.0			1	50.0
All further malignancies		85	100.0	39	45.9	7	8.2	39	45.9

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 14b

Further malignancies in deaths in period 1998–2020
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C17	Small intestine	1	1.9	1	100.0				
C18	Colon	2	3.8	1	50.0			1	50.0
C25	Pancreas	2	3.8	1	50.0			1	50.0
C33–C34	Lung	3	5.8	2	66.7			1	33.3
C43	Malign. melanoma	2	3.8	1	50.0			1	50.0
C44	Skin others	1	1.9					1	100.0
C46,C49	Soft tissue	1	1.9					1	100.0
C50	Breast	19	36.5	9	47.4	4	21.1	6	31.6
C51	Vulva	1	1.9					1	100.0
C53	Cervix uteri	1	1.9	1	100.0				
C54	Corpus uteri	1	1.9	1	100.0				
C64	Kidney	3	5.8	1	33.3	2	66.7		
C67	Bladder	1	1.9					1	100.0
C70–C72	CNS cancer	4	7.7					4	100.0
C73	Thyroid	1	1.9	1	100.0				
C81	Hodgkin lymphoma	1	1.9					1	100.0
C82–C85	NHL	4	7.7					4	100.0
C90	Mult. myeloma	1	1.9					1	100.0
C91–C96	Leukaemia	3	5.8	2	66.7			1	33.3
All further malignancies		52	100.0	21	40.4	6	11.5	25	48.1

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

Table 15

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2020
(**First primaries only** *)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4		2			0.1	0.17		13.3
5- 9	3		0.2	0.60			11.1	
10-14	4		0.3	2.00			14.3	
15-19	1	2	0.1	0.17	0.1	1.00	2.2	8.7
20-24	1	1	0.0	0.50	0.1	0.25	1.5	2.4
25-29	1	1	0.0	0.20	0.0	0.33	1.2	1.1
30-34	1		0.0	0.25			0.7	
35-39	4	2	0.2	0.36	0.1	0.40	1.6	0.5
40-44	4	2	0.2	0.33	0.1	0.40	0.7	0.3
45-49	8	5	0.3	1.14	0.2	0.83	0.6	0.3
50-54	7	4	0.3	1.00	0.2	0.36	0.3	0.2
55-59	11	10	0.5	0.69	0.5	0.91	0.3	0.3
60-64	13	9	0.7	0.87	0.5	0.64	0.2	0.2
65-69	24	18	1.5	0.96	1.0	0.72	0.3	0.3
70-74	23	17	1.5	1.77	1.0	1.42	0.3	0.3
75-79	15	17	1.2	0.94	1.1	1.00	0.2	0.2
80-84	6	16	0.8	0.67	1.5	1.23	0.1	0.2
85+	5	5	1.1	2.50	0.5	2.50	0.1	0.1
All ages	131	111					0.2	0.2
Mortality								
Raw			0.4	0.79	0.3	0.75		
WS			0.3	0.63	0.2	0.52		
ES			0.3	0.72	0.2	0.61		
BRD-S			0.4	0.77	0.3	0.70		
PYLL-70								
per 100,000			5.0		3.1			
ES			5.2		3.2			
AYLL-70			17.5		15.5			

* See corresponding tables with multiple malignancies.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2020
(**Single primaries only** *)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	Males MI-index	Females Age-spec. mortal.	Females MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4		2			0.1	0.18		13.3
5- 9	3		0.2	0.60			11.1	
10-14	4		0.3	2.00			14.3	
15-19	1	1	0.1	0.17	0.1	1.00	2.2	4.5
20-24	1	1	0.0	0.50	0.1	0.25	1.5	2.5
25-29	1	1	0.0	0.20	0.0	0.33	1.2	1.1
30-34	1		0.0	0.25			0.7	
35-39	4	2	0.2	0.40	0.1	0.40	1.6	0.5
40-44	4	2	0.2	0.33	0.1	0.40	0.7	0.3
45-49	8	4	0.3	1.14	0.2	0.67	0.6	0.3
50-54	7	4	0.3	1.00	0.2	0.36	0.3	0.2
55-59	9	8	0.4	0.64	0.4	0.73	0.2	0.3
60-64	9	7	0.5	0.75	0.4	0.58	0.2	0.2
65-69	23	18	1.4	0.92	1.0	0.72	0.3	0.3
70-74	20	16	1.3	1.82	0.9	1.45	0.2	0.2
75-79	13	14	1.1	0.81	0.9	0.82	0.1	0.2
80-84	6	16	0.8	0.67	1.5	1.23	0.1	0.2
85+	3	4	0.6	1.50	0.4	2.00	0.1	0.0
All ages	117	100					0.2	0.2
Mortality								
Raw			0.4	0.75	0.3	0.69		
WS			0.2	0.60	0.2	0.48		
ES			0.3	0.68	0.2	0.56		
BRD-S			0.3	0.72	0.2	0.64		
PYLL-70								
per 100,000			4.8		2.7			
ES			5.0		2.7			
AYLL-70			18.4		15.1			

* See corresponding tables with multiple malignancies.

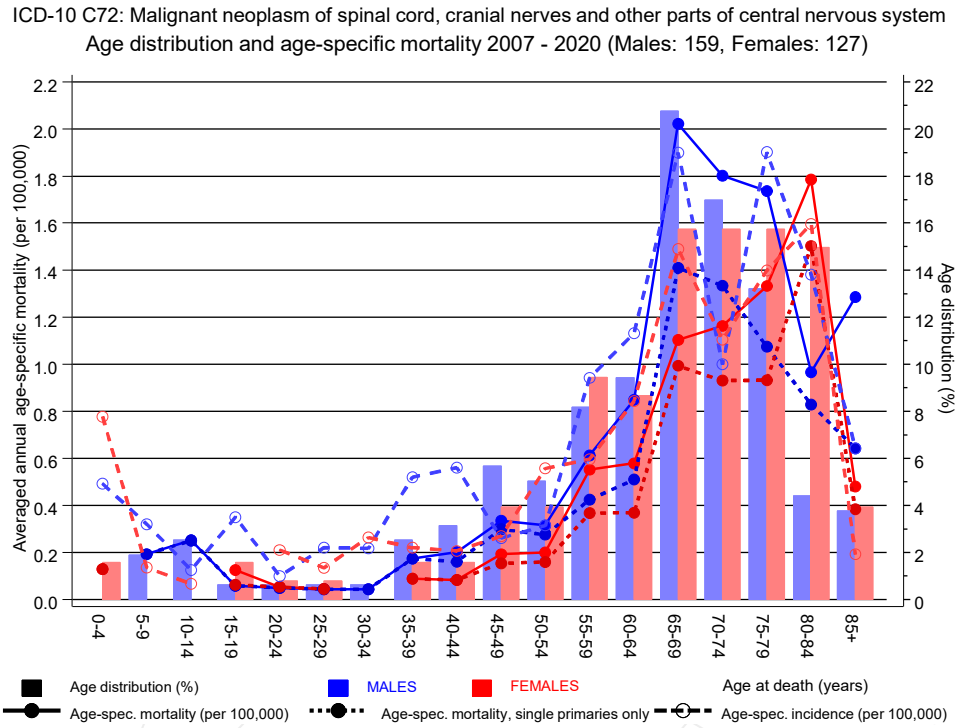


Figure 17. Distribution of age at death (bars; males: mean=58.6 yrs, median=63.8 yrs; females: mean=62.2 yrs, median=67.3 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

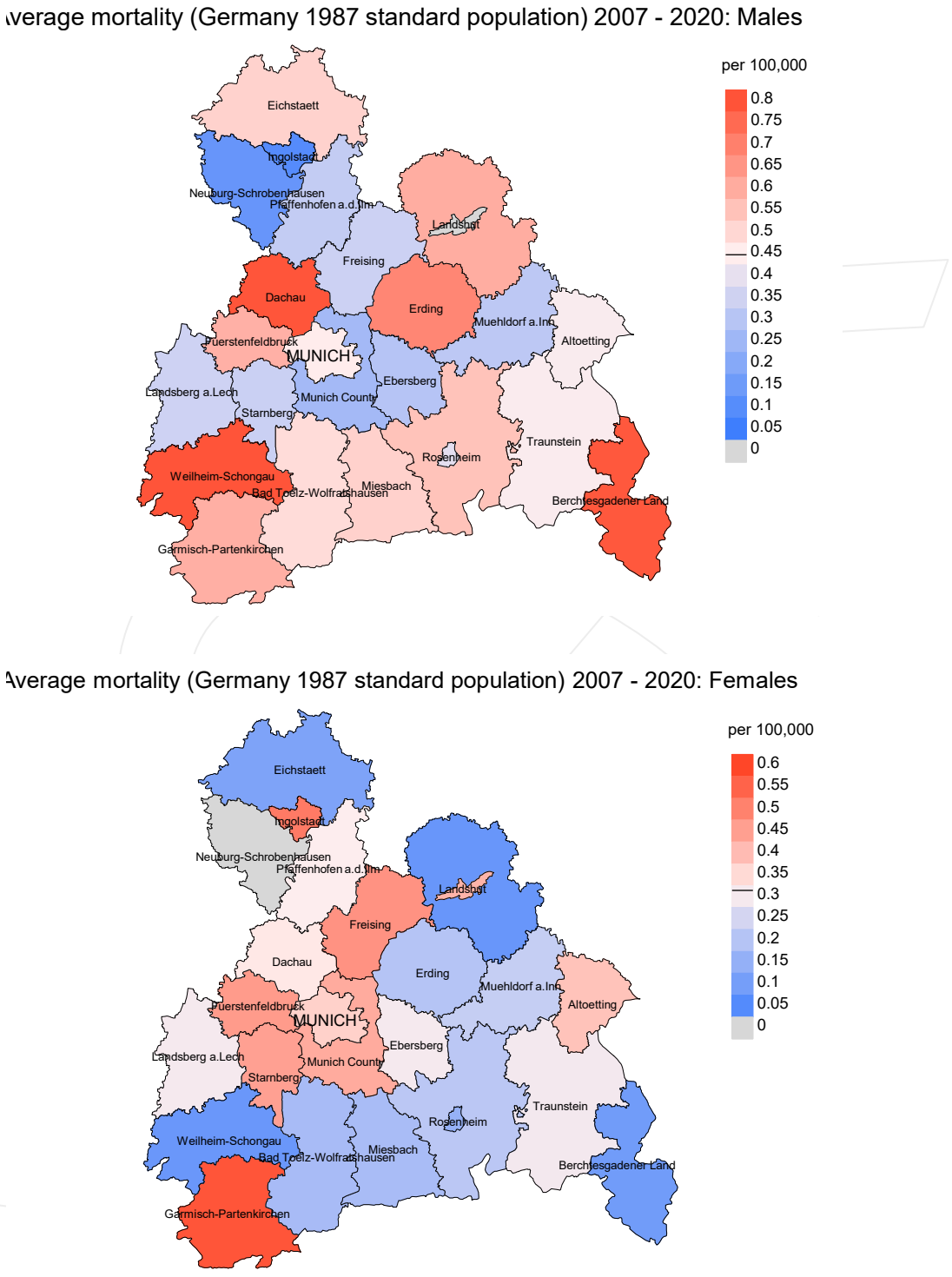
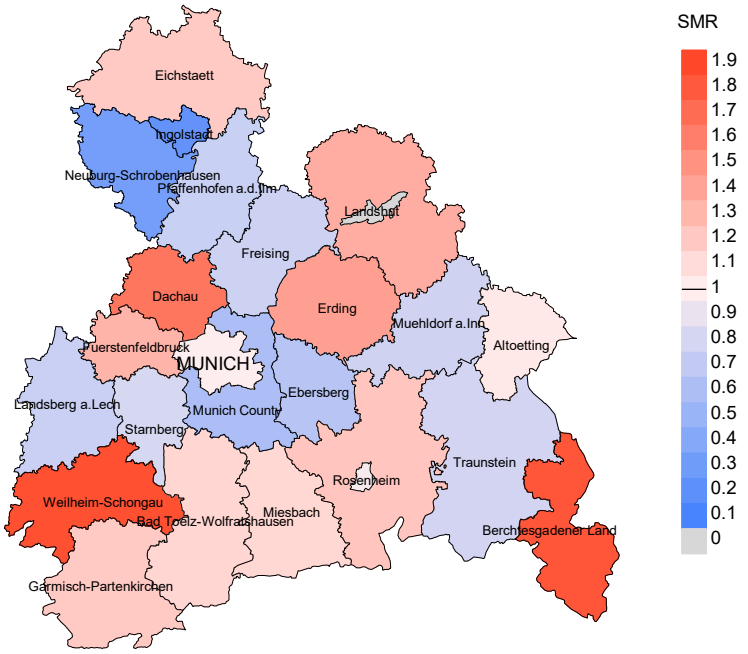


Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2020. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 0.4/100,000 WS N=159, females 0.3/100,000 WS N=127).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,727 female residents (averaged) in the period from 2007 to 2020 a total of 3 women died from spinal cord cancer. 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 - 2020: Males



Standardized mortality ratio (SMR) 2007 - 2020: Females

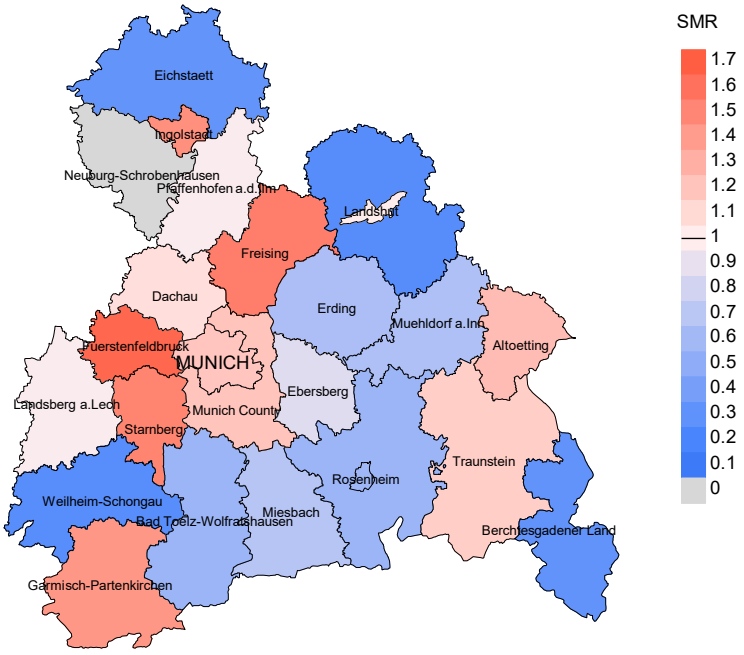


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=159, females N=127).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,153 female residents (averaged) in the period from 2007 to 2020 a total of 3 women died from spinal cord cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.86. Though, the value of this parameter may vary with an underlying probability of 99% between 0.10 and 3.14, 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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