Munich Cancer Registry

- Survival
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- *Deutsch*

BNET: Pulm. neuroend. tumor

Incidence and Mortality

Year of diagnosis	1998-2016
Patients	906
Diseases	908
Creation date	08/21/2018
Export date	08/09/2018
Population	4.81 m

Munich Cancer Registry
Cancer Registry Bavaria - Upper Bavaria Regional Center
at Klinikum Grosshadern/IBE
Marchioninistr. 15
Munich, 81377
Germany

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

https://www.tumorregister-muenchen.de/en/facts/base/bhBNETE-BNET-Pulm.-neuroend.-tumor-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, August 2018

[#] 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.

Topography codes (ICD-O-3 2000) used for specifying cancer site

Code	Description
C33	Malignant neoplasm of trachea
C34.-	Malignant neoplasm of bronchus and lung
C34.0	Main bronchus
C34.1	Upper lobe, bronchus or lung
C34.2	Middle lobe, bronchus or lung
C34.3	Lower lobe, bronchus or lung
C34.8	Overlapping lesion of bronchus and lung
C34.9	Bronchus or lung, unspecified

... if additionally existing any of ...

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

Code	Description
8013/3	Large cell neuroendocrine carcinoma
8240/3	Carcinoid tumor, NOS
8249/3	Atypical carcinoid tumor

Reference:

Travis WD, Brambilla E, Muller-Hermelink HK, Harris CC, editors. WHO Classification of Tumours. Pathology and Genetics of Tumours of the Lung, Pleura, Thymus and Heart. IARC, Lyon (2004).

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	12	8.3	7.4	50.0	83.3
1999	23	14.3	7.4	65.2	95.7
2000	21	16.1	7.4	52.4	100.0
2001	21	14.3	7.3	61.9	100.0
2002	25	13.7	7.3	44.0	92.0 #
2003	22	13.7	7.0	54.5	95.5
2004	29	13.7	7.0	37.9	96.6
2005	29	14.8	7.0	37.9	86.2
2006	30	13.7	7.1	40.0	86.7
2007	41	13.0	6.8	53.7	78.0 #
2008	60	16.0	6.6	46.7	68.3
2009	57	16.8	5.7	38.6	63.2
2010	51	18.1	4.8	49.0	64.7
2011	77	17.7	4.6	45.5	70.1
2012	71	18.5	4.0	53.5	71.8
2013	77	20.1	4.6	48.1	68.8
2014	95	20.2	3.9	43.2	70.5
2015	80	21.2	3.7	43.8	98.8
2016	87	21.5	4.7	16.1	65.5 ##
1998-2016	908	21.5	7.4	43.9	77.1

908 cases diagnosed 1998-2016 are related to a total of 906 patients. Currently, in 256 (28.3 %) of these 906 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 200 / 45 / 11 (22.1 % / 5.0 % / 1.2 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:
In 2014, a subgroup of 95 cases has been diagnosed, of which 20.2 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 3.9 % 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	6	50.0	0.0	7.6	83.3	83.3	
1999	11	47.8	11.8	7.5	63.6	100.0	
2000	8	38.1	16.0	7.2	62.5	100.0	
2001	14	66.7	12.8	7.1	64.3	100.0	
2002	12	48.0	15.7	7.4	66.7	100.0	#
2003	9	40.9	15.0	7.1	66.7	100.0	
2004	14	48.3	14.9	7.0	35.7	100.0	
2005	17	58.6	16.5	7.2	41.2	94.1	
2006	18	60.0	15.6	7.0	55.6	88.9	
2007	24	58.5	15.0	6.8	58.3	79.2	#
2008	29	48.3	16.0	6.7	65.5	79.3	
2009	26	45.6	16.0	5.6	50.0	69.2	
2010	29	56.9	18.4	5.0	65.5	75.9	
2011	40	51.9	17.5	5.2	62.5	82.5	
2012	36	50.7	18.8	4.7	66.7	86.1	
2013	41	53.2	19.8	5.7	56.1	73.2	
2014	48	50.5	20.2	3.4	47.9	77.1	
2015	38	47.5	19.8	2.8	44.7	100.0	
2016	36	41.4	20.2	5.6	13.9	50.0	##
1998-2016	456	50.2	20.2	7.6	53.5	82.0	

456 cases diagnosed 1998-2016 are related to a total of 455 patients. Currently, in 126 (27.7 %) of these 455 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 101 / 21 / 4 (22.2 % / 4.6 % / 0.9 %) 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 2014, a subgroup of 48 cases has been diagnosed, of which 20.2 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 3.4 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 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	6	50.0	16.7	7.2	16.7	83.3
1999	12	52.2	16.7	7.3	66.7	91.7
2000	13	61.9	16.1	7.5	46.2	100.0
2001	7	33.3	15.8	7.5	57.1	100.0
2002	13	52.0	11.8	7.2	23.1	84.6 #
2003	13	59.1	12.5	6.9	46.2	92.3
2004	15	51.7	12.7	7.1	40.0	93.3
2005	12	41.4	13.2	6.9	33.3	75.0
2006	12	40.0	11.7	7.1	16.7	83.3
2007	17	41.5	10.8	6.8	47.1	76.5 #
2008	31	51.7	15.9	6.5	29.0	58.1
2009	31	54.4	17.6	5.8	29.0	58.1
2010	22	43.1	17.6	4.6	27.3	50.0
2011	37	48.1	17.8	4.1	27.0	56.8
2012	35	49.3	18.1	3.4	40.0	57.1
2013	36	46.8	20.5	3.5	38.9	63.9
2014	47	49.5	20.3	4.4	38.3	63.8
2015	42	52.5	22.7	4.4	42.9	97.6
2016	51	58.6	22.8	4.0	17.6	76.5 ##
1998-2016	452	49.8	22.8	7.2	34.3	72.1

452 cases diagnosed 1998-2016 are related to a total of 451 patients. Currently, in 130 (28.8 %) of these 451 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 99 / 24 / 7 (22.0 % / 5.3 % / 1.6 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:
In 2014, a subgroup of 47 cases has been diagnosed, of which 20.3 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 4.4 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 2

Incidence measures by year of diagnosis
(with respect to registry area expansion from 2.65 to 4.10 m as of 2002, and from 4.10 to 4.81 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	6	6	0.5	0.5	0.4	0.3	0.5	0.4	0.6	0.5
1999	11	12	1.0	1.0	0.6	0.5	0.9	0.7	1.1	0.9
2000	8	13	0.7	1.1	0.4	0.8	0.6	1.0	0.7	1.1
2001	14	7	1.2	0.6	0.9	0.4	1.1	0.5	1.3	0.5
2002	12	13	0.6	0.7	0.4	0.4	0.6	0.6	0.7	0.6
2003	9	13	0.5	0.7	0.3	0.4	0.4	0.5	0.5	0.6
2004	14	15	0.7	0.8	0.4	0.5	0.6	0.6	0.7	0.7
2005	17	12	0.9	0.6	0.7	0.4	0.9	0.5	0.9	0.6
2006	18	12	0.9	0.6	0.5	0.4	0.7	0.5	0.9	0.6
2007	24	17	1.1	0.7	0.7	0.4	0.9	0.6	1.1	0.7
2008	29	31	1.3	1.3	0.7	0.8	1.0	1.1	1.2	1.2
2009	26	31	1.2	1.3	0.7	0.8	1.0	1.1	1.1	1.2
2010	29	22	1.3	0.9	0.7	0.6	1.0	0.7	1.2	0.8
2011	40	37	1.8	1.6	1.0	0.9	1.4	1.2	1.7	1.4
2012	36	35	1.6	1.5	0.9	0.8	1.3	1.1	1.5	1.2
2013	41	36	1.8	1.5	1.0	0.8	1.3	1.1	1.6	1.2
2014	48	47	2.1	2.0	1.1	1.0	1.5	1.4	1.8	1.7
2015	38	42	1.6	1.7	0.9	0.8	1.3	1.1	1.4	1.4
2016	36	51	1.5	2.1	0.8	1.2	1.1	1.6	1.3	1.8
1998-2016	456	452	1.2	1.2	0.7	0.7	1.0	0.9	1.2	1.0

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

Table 3

Age distribution parameters by year of diagnosis (ALL PATIENTS)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	12	60.1	8.0	49.4	70.9	50.9	51.9	60.3	68.3	69.6
1999	23	64.3	13.8	32.9	81.2	45.5	54.6	67.2	76.7	78.9
2000	21	59.2	15.8	15.8	80.5	44.9	52.5	63.2	71.3	74.9
2001	21	56.2	17.1	17.0	79.8	31.3	41.3	62.2	69.3	70.7
2002	25	63.1	13.4	31.0	82.8	48.2	53.9	67.4	74.9	75.6
2003	22	63.6	10.6	43.9	84.4	49.4	60.1	63.2	72.7	79.5
2004	29	58.8	15.2	27.6	84.1	37.8	47.8	62.6	69.2	78.6
2005	29	51.7	16.3	18.1	82.9	21.7	41.6	52.3	64.9	71.2
2006	30	59.0	15.9	27.5	82.6	32.8	47.3	61.0	70.6	79.0
2007	41	60.0	17.0	18.7	84.2	39.9	47.5	65.8	72.1	79.2
2008	60	63.8	12.3	29.4	88.0	42.5	59.5	64.8	72.0	77.9
2009	57	62.5	12.0	25.9	89.3	48.1	55.8	62.7	70.1	76.7
2010	51	63.2	12.4	15.6	82.0	47.5	56.0	66.0	71.0	75.2
2011	77	63.4	12.2	33.0	85.6	46.7	55.5	63.0	71.5	80.5
2012	71	66.3	10.5	39.5	89.1	54.3	58.5	68.3	74.2	78.1
2013	77	65.8	10.2	36.7	85.4	51.4	58.8	67.5	73.2	78.9
2014	95	65.1	12.9	15.9	85.1	48.1	57.4	66.7	73.9	79.3
2015	80	65.7	11.6	38.0	86.6	51.1	57.0	65.2	76.3	79.5
2016	87	63.7	14.1	20.9	91.0	45.1	55.2	65.5	74.8	79.1
1998-2016	908	63.1	13.2	15.6	91.0	45.5	55.6	64.8	72.5	78.8

Table 3a

Age distribution parameters by year of diagnosis (MALES)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	6	57.4	10.0	49.4	70.9	49.4	50.9	51.9	69.6	70.9
1999	11	63.4	13.2	38.6	80.4	45.5	53.5	66.2	74.2	78.9
2000	8	58.7	9.9	44.9	77.6	44.9	53.2	56.6	64.0	77.6
2001	14	56.5	19.5	17.0	79.8	29.8	38.4	65.1	70.7	72.6
2002	12	66.7	10.6	49.8	82.8	53.5	57.3	69.4	74.9	75.4
2003	9	63.5	12.3	49.4	84.4	49.4	53.2	62.7	65.5	84.4
2004	14	58.3	14.6	37.8	80.5	38.9	41.0	60.6	69.2	78.6
2005	17	50.9	15.8	18.1	71.2	21.7	42.5	52.3	64.9	70.1
2006	18	62.4	15.4	28.7	82.6	35.1	56.4	66.2	72.3	80.9
2007	24	61.3	15.9	18.7	80.7	44.2	53.7	65.9	72.1	79.2
2008	29	65.0	12.3	32.3	88.0	41.3	60.2	66.8	72.3	80.1
2009	26	61.4	9.5	30.8	76.7	52.2	55.8	62.6	69.0	70.6
2010	29	63.6	14.7	15.6	82.0	43.8	54.6	69.3	72.7	81.7
2011	40	65.1	11.8	34.4	83.0	50.0	57.1	66.4	74.6	80.7
2012	36	66.7	9.7	44.0	85.1	55.5	59.7	68.0	72.5	81.9
2013	41	65.7	10.4	36.7	82.5	51.7	58.6	65.8	73.2	79.2
2014	48	65.2	10.6	37.3	84.1	49.4	56.5	66.1	73.6	78.6
2015	38	63.9	11.4	38.2	86.6	51.0	57.0	60.9	72.7	79.2
2016	36	64.7	13.8	25.5	91.0	47.8	56.7	67.2	75.2	78.4
1998-2016	456	63.3	12.8	15.6	91.0	46.7	56.0	65.0	72.1	79.0

Table 3b

Age distribution parameters by year of diagnosis (FEMALES)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	6	62.8	4.7	56.6	68.7	56.6	59.9	61.8	67.8	68.7
1999	12	65.2	14.8	32.9	81.2	47.0	56.8	71.6	77.1	78.4
2000	13	59.5	19.0	15.8	80.5	29.3	52.5	67.2	72.2	74.9
2001	7	55.6	12.2	38.0	69.3	38.0	41.3	55.5	66.9	69.3
2002	13	59.8	15.3	31.0	76.2	33.6	51.4	65.9	72.8	75.6
2003	13	63.7	9.8	43.9	79.5	49.2	60.4	63.8	72.7	73.0
2004	15	59.3	16.2	27.6	84.1	29.9	47.8	64.9	69.4	73.2
2005	12	52.9	17.7	21.6	82.9	32.2	41.6	52.3	62.3	77.4
2006	12	54.0	15.8	27.5	78.6	30.4	43.8	56.6	63.9	74.3
2007	17	58.3	18.7	22.3	84.2	29.1	43.9	59.7	72.9	81.5
2008	31	62.6	12.3	29.4	79.9	43.3	56.3	64.3	71.7	75.8
2009	31	63.4	13.8	25.9	89.3	47.2	55.6	62.7	72.7	79.5
2010	22	62.6	8.8	39.9	75.8	51.2	60.0	65.3	68.3	71.8
2011	37	61.5	12.5	33.0	85.6	45.9	53.4	61.5	68.1	80.4
2012	35	65.9	11.3	39.5	89.1	51.2	56.0	69.0	74.9	76.9
2013	36	65.8	10.1	45.0	85.4	51.4	59.3	68.2	73.1	78.2
2014	47	65.0	15.0	15.9	85.1	43.9	58.9	68.2	75.1	81.3
2015	42	67.4	11.7	38.0	84.8	53.2	57.0	70.8	77.5	79.6
2016	51	63.0	14.3	20.9	87.0	44.4	54.0	64.9	73.8	79.1
1998-2016	452	62.9	13.6	15.8	89.3	44.4	55.3	64.3	72.8	78.6

Table 4

Age distribution by 5-year age group and sex for period 2007-2016

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4									
5-9									
10-14									
15-19	3	0.4	0.4	2	0.6	0.6	1	0.3	0.3
20-24	2	0.3	0.7			0.6	2	0.6	0.9
25-29	6	0.9	1.6	2	0.6	1.2	4	1.1	2.0
30-34	9	1.3	2.9	4	1.2	2.3	5	1.4	3.4
35-39	10	1.4	4.3	4	1.2	3.5	6	1.7	5.2
40-44	21	3.0	7.3	9	2.6	6.1	12	3.4	8.6
45-49	30	4.3	11.6	14	4.0	10.1	16	4.6	13.2
50-54	58	8.3	20.0	28	8.1	18.2	30	8.6	21.8
55-59	86	12.4	32.3	48	13.8	32.0	38	10.9	32.7
60-64	116	16.7	49.0	54	15.6	47.6	62	17.8	50.4
65-69	106	15.2	64.2	55	15.9	63.4	51	14.6	65.0
70-74	113	16.2	80.5	66	19.0	82.4	47	13.5	78.5
75-79	83	11.9	92.4	36	10.4	92.8	47	13.5	92.0
80-84	41	5.9	98.3	20	5.8	98.6	21	6.0	98.0
85+	12	1.7	100.0	5	1.4	100.0	7	2.0	100.0
All ages	696	100.0		347	100.0		349	100.0	

Table 5

Age-specific incidence and proportion of all cancers
for period 2007-2016

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males Prop.all cancers n=113978 %	Females Prop.all cancers n=112253 %
0- 4						
5- 9						
10-14						
15-19	2	1	0.2	0.1	0.8	0.5
20-24		2		0.1		0.5
25-29	2	4	0.1	0.3	0.3	0.5
30-34	4	5	0.3	0.3	0.4	0.3
35-39	4	6	0.2	0.4	0.3	0.2
40-44	9	12	0.5	0.7	0.4	0.3
45-49	14	16	0.7	0.8	0.4	0.2
50-54	28	30	1.6	1.8	0.5	0.3
55-59	48	38	3.4	2.6	0.5	0.4
60-64	54	62	4.4	4.7	0.4	0.5
65-69	55	51	4.6	3.9	0.3	0.4
70-74	66	47	6.0	3.7	0.3	0.3
75-79	36	47	4.5	4.7	0.2	0.4
80-84	20	21	4.3	3.0	0.2	0.2
85+	5	7	1.6	1.0	0.1	0.1
All ages	347	349			0.3	0.3
Incidence						
Raw			1.5	1.5		
WS			0.9	0.8		
ES			1.2	1.1		
BRD-S			1.4	1.3		

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).

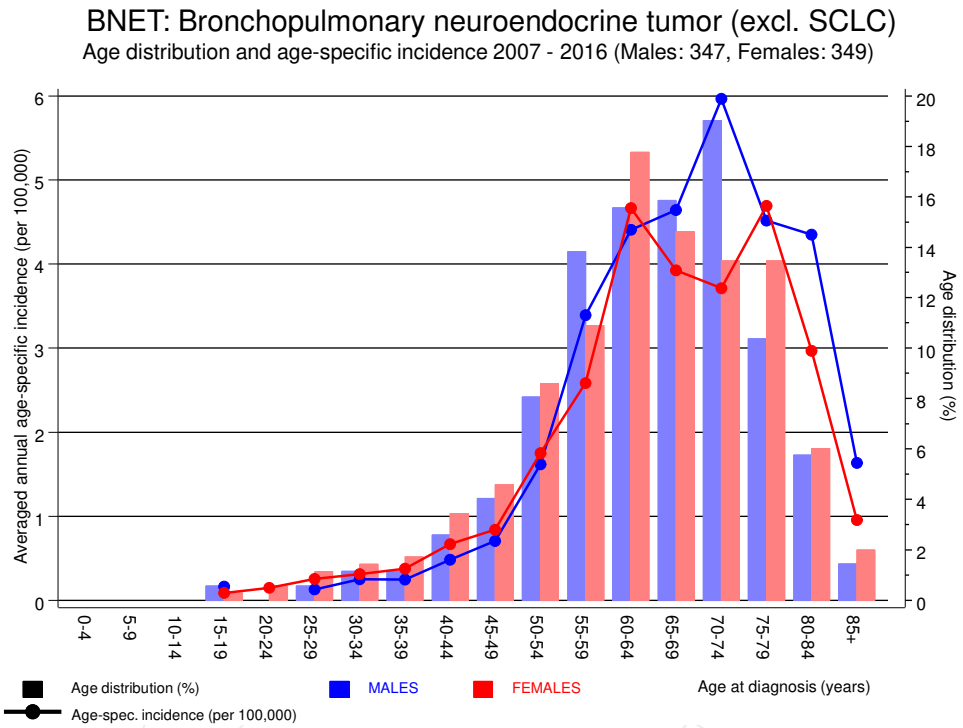


Figure 6. Age distribution (males: mean=64.5 yrs, median=65.8 yrs; females: mean=64.0 yrs, median=65.0 yrs) and age-specific incidence.

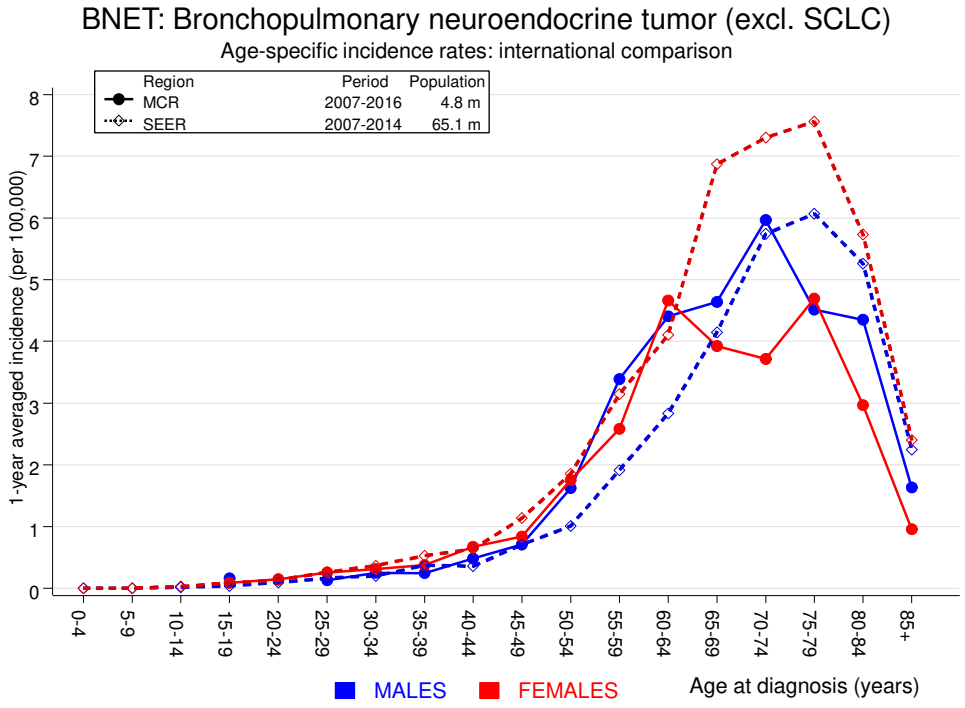


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:
Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 18 Regs Research Data, released April 2014, based on the November 2013 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 1998–2016

MALES

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C16	Stomach	4	0.6	7.2	2.0	18.4	#	32.8	
C18	Colon	5	1.3	3.7	1.2	8.7	#	34.9	
C19–C20	Rectum	3	0.8	3.8	0.8	11.2		21.1	
C23–C24	Bile	2	0.1	14.3	1.7	51.8	#	17.7	
C32	Larynx	2	0.2	12.6	1.5	45.5	#	17.5	
C33–C34	Lung	12	1.8	6.8	3.5	12.0	#	97.5	
C61	Prostate	3	4.1	0.7	0.2	2.1		−10.3	
C67	Bladder	3	0.6	4.9	1.0	14.3	#	22.7	
Others, specified		6	2.4	2.5	0.9	5.5		34.5	
Not observed		0	2.8	0.0	0.0	1.3		−26.6	
All further malignancies		40	14.6	2.7	2.0	3.7	#	241.9	

Patients	419
Median age at next malignancy (years)	70.9
Person-years	1051
Mean observation time (years)	2.5
Median observation time (years)	1.0

The occurrence of further malignancy listed is statistically significant.

Observed further malignancies with count 1 are pooled in category “Others, specified”.

Table 7b

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of further malignancies for period 1998–2016
FEMALES

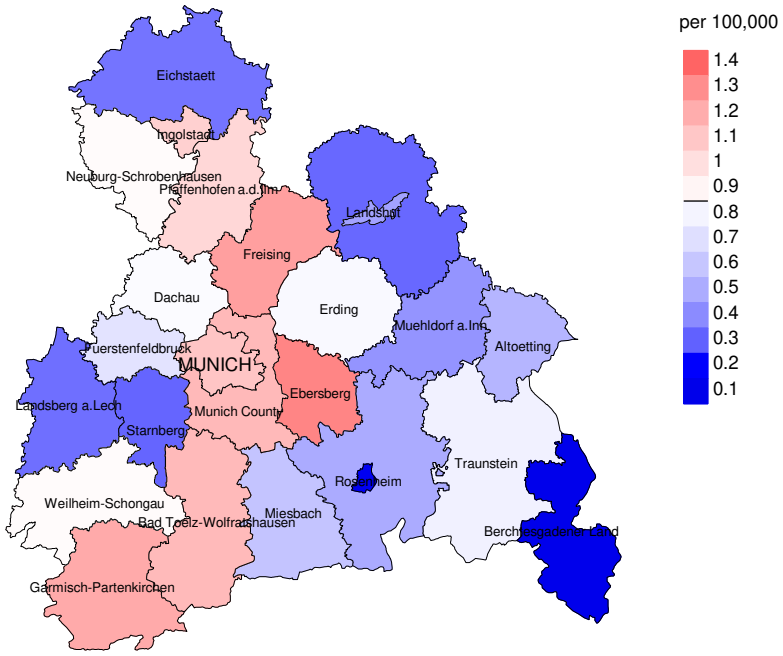
Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C33–C34 Lung	12	0.9	13.4	6.9	23.4	#	97.8	
C50 Breast	10	3.6	2.8	1.3	5.2	#	56.7	
C54 Corpus uteri	3	0.7	4.6	0.9	13.4		20.7	
C56 Ovary	2	0.5	4.4	0.5	15.8		13.6	
C73 Thyroid	2	0.2	9.2	1.1	33.1	#	15.7	
C91–C96 Leukaemia	2	0.2	12.1	1.5	43.7	#	16.2	
Others, specified	6	2.0	3.0	1.1	6.4	#	34.9	
Not observed	0	3.1	0.0	0.0	1.2		−27.5	
All further malignancies	37	11.1	3.3	2.3	4.6	#	228.0	

Patients	401
Median age at next malignancy (years)	69.4
Person-years	1135
Mean observation time (years)	2.8
Median observation time (years)	1.2

The occurrence of further malignancy listed is statistically significant.

Observed further malignancies with count 1 are pooled in category “Others, specified”.

Average incidence (world standard population) 2007 - 2016: Males



Average incidence (world standard population) 2007 - 2016: Females

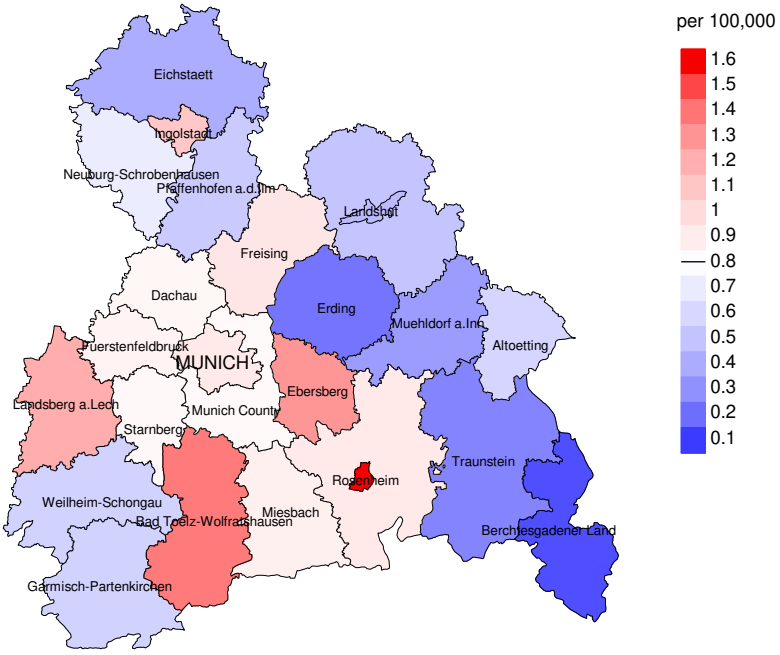
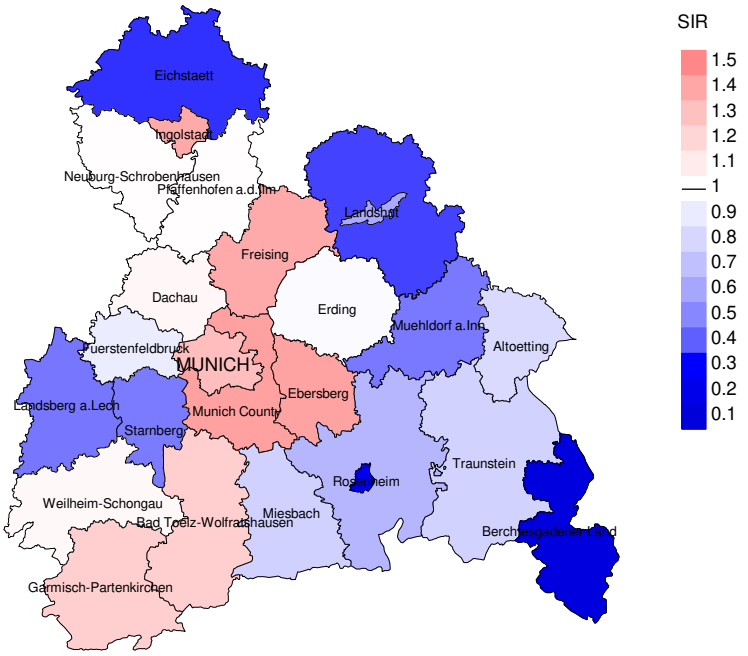


Figure 8a. Map of cancer incidence (world standard population) by county averaged for period 2007 to 2016. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 0.9/100,000 WS N=347, females 0.8/100,000 WS N=349).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 13 women were identified with newly diagnosed pulm. neuroend. tumor. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 1.3/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.5 and 2.7/100,000.

Standardized incidence ratio (SIR) 2007 - 2016: Males



Standardized incidence ratio (SIR) 2007 - 2016: Females

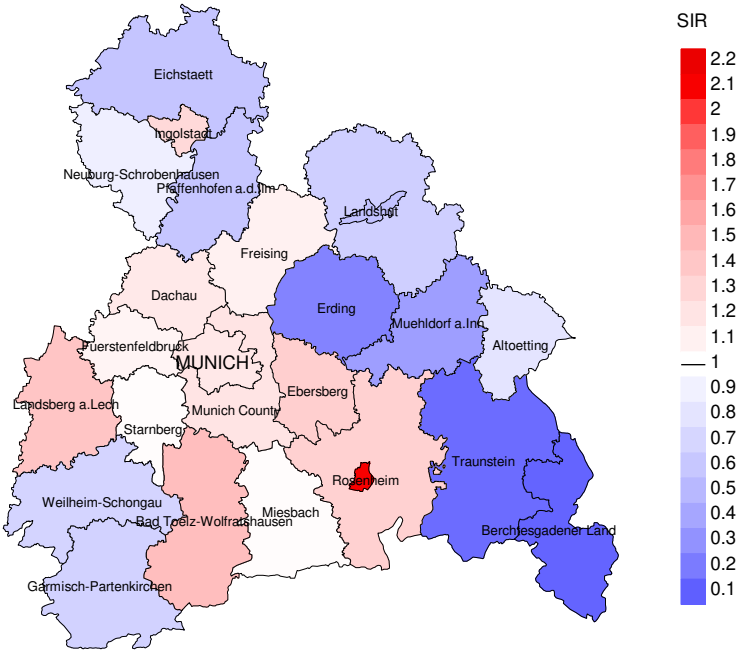


Figure 8b. Map of standardized incidence ratio (SIR) by county averaged for period 2007 to 2016. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=347, females N=349).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 13 women were identified with newly diagnosed pulm. neuroend. tumor. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.35. Though, the value of this parameter may vary with an underlying probability of 99% between 0.58 and 2.65, 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 4.81 m as of 2007, respectively)

Year of diagnosis	Incident cases n	Prop. actively followed %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	12	83.3	6	50.0	100.0
1999	23	95.7	15	65.2	100.0
2000	21	100.0	11	52.4	90.9
2001	21	100.0	13	61.9	100.0
2002	25	92.0	11	44.0	81.8
2003	22	95.5	12	54.5	83.3
2004	29	96.6	11	37.9	100.0
2005	29	86.2	11	37.9	100.0
2006	30	86.7	12	40.0	100.0
2007	41	78.0	22	53.7	100.0
2008	60	68.3	28	46.7	96.4
2009	57	63.2	22	38.6	95.5
2010	51	64.7	25	49.0	100.0
2011	77	70.1	35	45.5	97.1
2012	71	71.8	38	53.5	97.4
2013	77	68.8	37	48.1	100.0
2014	95	70.5	41	43.2	100.0
2015	80	98.8	35	43.8	91.4
2016	87	65.5	14	16.1	64.3
1998-2016	908	77.1	399	43.9	95.7

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 4.81 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	12	5	2	16.7
1999	23	8	1	4.3
2000	21	9	2	9.5
2001	21	6	1	4.8
2002	25	12	5	20.0
2003	22	9	3	13.6
2004	29	10	2	6.9
2005	29	15	3	10.3
2006	30	16	2	6.7
2007	41	17	6	14.6
2008	60	24	9	15.0
2009	57	25	10	17.5
2010	51	28	7	13.7
2011	77	34	12	15.6
2012	71	46	15	21.1
2013	77	39	13	16.9
2014	95	47	12	12.6
2015	80	64	23	28.8
2016	87	41	9	10.3
1998–2016	908	455	137	15.1

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 4.81 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer-related %	Prop. non-cancer-related %	Prop. cancer recorded on death certificate %
1998	5	100.0		80.0
1999	8	75.0	25.0	100.0
2000	9	77.8	22.2	88.9
2001	6	83.3	16.7	80.0
2002	12	83.3	16.7	91.7
2003	9	88.9	11.1	88.9
2004	10	80.0	20.0	88.9
2005	15	73.3	26.7	85.7
2006	16	68.8	31.3	87.5
2007	17	70.6	29.4	81.3
2008	24	79.2	20.8	79.2
2009	25	96.0	4.0	95.8
2010	28	85.7	14.3	92.6
2011	34	85.3	14.7	85.3
2012	46	91.3	8.7	91.1
2013	39	89.7	10.3	92.3
2014	47	93.6	6.4	95.7
2015	64	87.5	12.5	84.4
2016	41	75.6	24.4	82.5
1998-2016	455	85.1	14.9	88.3

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	3	71.0	71.0		64.7
1999	4	69.7	69.7		69.7
2000	3	77.7	77.7		77.7
2001	4	60.7	56.1	65.3	62.3
2002	9	68.0	69.1	65.9	68.5
2003	7	71.3	70.0	71.3	70.0
2004	5	57.1	57.1		57.1
2005	10	70.7	71.0	70.7	71.0
2006	13	71.8	75.2	56.1	71.8
2007	11	67.1	66.9	67.1	66.9
2008	17	72.1	69.9	74.2	69.9
2009	18	68.5	68.5		68.5
2010	18	66.3	67.3	65.3	67.7
2011	23	73.3	71.8	87.6	72.4
2012	29	68.7	68.0	83.5	68.3
2013	27	72.0	72.0	72.6	71.3
2014	22	69.7	69.7		69.7
2015	34	69.6	66.4	78.8	65.6
2016	22	73.5	72.6	77.2	73.3
1998-2016	279	70.0	69.3	75.9	69.4

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	2	74.6	74.6		74.6
1999	4	72.0	77.2	59.5	73.0
2000	6	78.6	76.6	78.7	79.0
2001	2	58.7	58.7		58.7
2002	3	72.9	72.9		72.9
2003	2	73.2	73.2		73.2
2004	5	74.9	73.8	75.5	76.2
2005	5	82.2	82.2	78.2	82.6
2006	3	80.4		80.4	80.4
2007	6	71.6	64.2	76.1	67.4
2008	7	77.3	72.4	84.1	72.4
2009	7	72.8	66.4	86.6	72.8
2010	10	76.2	73.2	80.6	73.2
2011	11	71.4	70.9	78.2	71.4
2012	17	70.3	69.7	87.3	69.7
2013	12	70.9	70.9	74.3	70.9
2014	25	70.8	70.4	83.6	70.6
2015	30	74.5	73.0	77.8	74.2
2016	19	75.2	69.6	82.4	70.0
1998-2016	176	73.1	71.1	79.2	71.7

By 2010, life expectancy at birth was 77.5 years for boys and 82.6 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	3	0.3	0.50	0.2	0.40	0.2	0.44	0.3	0.50
1999	4	0.4	0.36	0.2	0.32	0.3	0.36	0.4	0.36
2000	3	0.3	0.38	0.1	0.30	0.2	0.36	0.4	0.58
2001	3	0.3	0.21	0.2	0.19	0.2	0.22	0.3	0.21
2002	7	0.4	0.58	0.2	0.55	0.3	0.54	0.4	0.54
2003	6	0.3	0.67	0.2	0.62	0.3	0.69	0.4	0.73
2004	5	0.3	0.36	0.2	0.42	0.3	0.44	0.3	0.39
2005	8	0.4	0.47	0.2	0.31	0.3	0.38	0.5	0.51
2006	11	0.6	0.61	0.3	0.51	0.4	0.63	0.6	0.73
2007	8	0.4	0.33	0.2	0.29	0.3	0.30	0.3	0.30
2008	15	0.7	0.52	0.3	0.44	0.5	0.48	0.7	0.58
2009	18	0.8	0.69	0.4	0.57	0.6	0.59	0.7	0.68
2010	15	0.7	0.52	0.4	0.50	0.5	0.52	0.6	0.49
2011	19	0.8	0.48	0.4	0.42	0.6	0.43	0.8	0.49
2012	26	1.1	0.72	0.6	0.66	0.9	0.70	1.1	0.74
2013	25	1.1	0.61	0.5	0.53	0.8	0.56	1.0	0.61
2014	22	0.9	0.46	0.5	0.42	0.7	0.44	0.8	0.46
2015	28	1.2	0.74	0.6	0.71	0.9	0.70	1.1	0.74
2016	18	0.7	0.50	0.3	0.42	0.5	0.46	0.7	0.50
1998-2016	244	0.7	0.54	0.3	0.47	0.5	0.51	0.6	0.55

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	2	0.2	0.33	0.1	0.24	0.1	0.27	0.2	0.38
1999	2	0.2	0.18	0.1	0.13	0.1	0.15	0.2	0.19
2000	4	0.3	0.31	0.1	0.15	0.2	0.20	0.3	0.28
2001	2	0.2	0.29	0.1	0.33	0.2	0.32	0.2	0.35
2002	3	0.2	0.23	0.1	0.16	0.1	0.18	0.1	0.23
2003	2	0.1	0.15	0.0	0.09	0.1	0.10	0.1	0.13
2004	3	0.2	0.20	0.1	0.11	0.1	0.14	0.1	0.17
2005	3	0.2	0.25	0.0	0.12	0.1	0.14	0.1	0.19
2006									
2007	4	0.2	0.24	0.1	0.21	0.1	0.22	0.1	0.22
2008	4	0.2	0.13	0.1	0.09	0.1	0.10	0.1	0.12
2009	6	0.3	0.19	0.1	0.17	0.2	0.17	0.2	0.17
2010	9	0.4	0.41	0.1	0.26	0.2	0.29	0.3	0.33
2011	10	0.4	0.27	0.2	0.18	0.2	0.20	0.3	0.25
2012	16	0.7	0.46	0.3	0.39	0.4	0.41	0.5	0.43
2013	10	0.4	0.28	0.2	0.23	0.3	0.24	0.3	0.26
2014	22	0.9	0.47	0.4	0.41	0.6	0.43	0.8	0.45
2015	28	1.2	0.67	0.5	0.58	0.7	0.59	0.9	0.63
2016	13	0.5	0.25	0.2	0.19	0.3	0.21	0.4	0.23
1998-2016	143	0.4	0.32	0.2	0.24	0.2	0.26	0.3	0.29

Table 12

Age distribution of age at death (cancer-related) for period 2007-2016
(**incl. multiple malignancies**)

Age at death	Cases			Males			Females		
Years	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
0-4									
5-9									
10-14									
15-19									
20-24									
25-29									
30-34									
35-39									
40-44	6	1.9	1.9	4	2.1	2.1	2	1.6	1.6
45-49	11	3.5	5.4	7	3.6	5.7	4	3.3	4.9
50-54	16	5.1	10.4	10	5.2	10.8	6	4.9	9.8
55-59	30	9.5	19.9	21	10.8	21.6	9	7.4	17.2
60-64	41	13.0	32.9	23	11.9	33.5	18	14.8	32.0
65-69	55	17.4	50.3	39	20.1	53.6	16	13.1	45.1
70-74	55	17.4	67.7	34	17.5	71.1	21	17.2	62.3
75-79	52	16.5	84.2	29	14.9	86.1	23	18.9	81.1
80-84	34	10.8	94.9	20	10.3	96.4	14	11.5	92.6
85+	16	5.1	100.0	7	3.6	100.0	9	7.4	100.0
All ages	316	100.0		194	100.0		122	100.0	

Table 13

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2016
(**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								
10-14								
15-19								
20-24								
25-29								
30-34								
35-39								
40-44	4	2	0.2	0.44	0.1	0.17	0.8	0.3
45-49	7	4	0.4	0.50	0.2	0.25	0.6	0.3
50-54	10	6	0.6	0.36	0.4	0.20	0.5	0.3
55-59	21	9	1.5	0.44	0.6	0.24	0.6	0.3
60-64	23	18	1.9	0.43	1.4	0.29	0.5	0.5
65-69	39	16	3.3	0.71	1.2	0.31	0.5	0.3
70-74	34	21	3.1	0.52	1.7	0.45	0.4	0.3
75-79	29	23	3.6	0.81	2.3	0.49	0.3	0.3
80-84	20	14	4.3	1.00	2.0	0.67	0.3	0.2
85+	7	9	2.3	1.40	1.2	1.29	0.1	0.1
All ages	194	122					0.4	0.3
Mortality								
Raw			0.8	0.56	0.5	0.35		
WS			0.4	0.50	0.2	0.28		
ES			0.6	0.53	0.3	0.30		
BRD-S			0.8	0.56	0.4	0.33		
PYLL-70								
per 100,000			4.8		2.7			
ES			4.1		2.2			
AYLL-70			9.4		9.8			

Table 14a

Further malignancies in deaths in period 1998-2016
MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	2	2.6	2	100.0				
C09-C10 Oropharynx	4	5.1	2	50.0	1	25.0	1	25.0
C15 Oesophagus	1	1.3	1	100.0				
C16 Stomach	5	6.4	3	60.0	1	20.0	1	20.0
C18 Colon	5	6.4	2	40.0	2	40.0	1	20.0
C19-C20 Rectum	3	3.8	3	100.0				
C22 Liver	3	3.8			2	66.7	1	33.3
C23-C24 Bile	1	1.3					1	100.0
C33-C34 Lung	13	16.7			5	38.5	8	61.5
C43 Malign. melanoma	6	7.7	5	83.3			1	16.7
C44 Skin others	7	9.0	4	57.1	1	14.3	2	28.6
C48 Peritoneal	1	1.3					1	100.0
C50 Breast	1	1.3	1	100.0				
C61 Prostate	10	12.8	8	80.0			2	20.0
C64 Kidney	4	5.1	3	75.0			1	25.0
C66 Ureter	1	1.3					1	100.0
C67 Bladder	5	6.4	2	40.0	1	20.0	2	40.0
C69 Eye melanoma	1	1.3	1	100.0				
C70-C72 CNS cancer	2	2.6	1	50.0			1	50.0
C81 Hodgkin lymphoma	1	1.3	1	100.0				
C82-C85 NHL	2	2.6	2	100.0				
All further malignancies	78	100.0	41	52.6	13	16.7	24	30.8

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 1998-2016
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C07-C08	Salivary gland	1	1.4	1	100.0				
C09-C10	Oropharynx	2	2.8	2	100.0				
C16	Stomach	2	2.8			2	100.0		
C18	Colon	6	8.5	3	50.0	1	16.7	2	33.3
C19-C20	Rectum	3	4.2	3	100.0				
C21	Anus/canal	1	1.4	1	100.0				
C22	Liver	2	2.8	1	50.0	1	50.0		
C32	Larynx	1	1.4	1	100.0				
C33-C34	Lung	11	15.5			5	45.5	6	54.5
C43	Malign. melanoma	2	2.8	2	100.0				
C44	Skin others	2	2.8	2	100.0				
C50	Breast	20	28.2	18	90.0			2	10.0
C51	Vulva	1	1.4					1	100.0
C53	Cervix uteri	3	4.2	1	33.3	2	66.7		
C54	Corpus uteri	3	4.2	3	100.0				
C56	Ovary	3	4.2	2	66.7	1	33.3		
C64	Kidney	3	4.2	2	66.7	1	33.3		
C73	Thyroid	1	1.4			1	100.0		
C74-C80	Cancer others	1	1.4	1	100.0				
C90	Mult. myeloma	2	2.8	1	50.0			1	50.0
C91-C96	Leukaemia	1	1.4					1	100.0
All further malignancies		71	100.0	44	62.0	14	19.7	13	18.3

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 2007-2016
(**First 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								
5- 9								
10-14								
15-19								
20-24								
25-29								
30-34								
35-39								
40-44	4	1	0.2	0.44	0.1	0.09	0.9	0.2
45-49	6	4	0.3	0.50	0.2	0.27	0.6	0.4
50-54	9	4	0.5	0.35	0.2	0.19	0.5	0.2
55-59	20	8	1.4	0.50	0.5	0.29	0.7	0.3
60-64	18	12	1.5	0.44	0.9	0.27	0.4	0.4
65-69	32	8	2.7	0.73	0.6	0.22	0.5	0.2
70-74	25	11	2.3	0.61	0.9	0.38	0.3	0.2
75-79	21	13	2.6	0.75	1.3	0.45	0.3	0.2
80-84	10	9	2.2	0.91	1.3	0.60	0.2	0.2
85+	4	5	1.3	2.00	0.7	0.83	0.1	0.1
All ages	149	75					0.4	0.2
Mortality								
Raw			0.7	0.56	0.3	0.30		
WS			0.3	0.51	0.1	0.24		
ES			0.5	0.53	0.2	0.26		
BRD-S			0.6	0.56	0.3	0.28		
PYLL-70								
per 100,000			4.3		2.0			
ES			3.7		1.6			
AYLL-70			9.7		10.7			

* See corresponding tables with multiple malignancies.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2016
(**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								
5- 9								
10-14								
15-19								
20-24								
25-29								
30-34								
35-39								
40-44	4	1	0.2	0.44	0.1	0.09	0.9	0.2
45-49	6	4	0.3	0.55	0.2	0.31	0.6	0.4
50-54	9	3	0.5	0.39	0.2	0.15	0.5	0.2
55-59	20	8	1.4	0.50	0.5	0.32	0.7	0.3
60-64	16	11	1.3	0.44	0.8	0.25	0.4	0.4
65-69	31	7	2.6	0.74	0.5	0.21	0.5	0.2
70-74	23	9	2.1	0.58	0.7	0.35	0.3	0.2
75-79	19	12	2.4	0.73	1.2	0.43	0.3	0.2
80-84	9	8	2.0	0.90	1.1	0.53	0.2	0.2
85+	3	5	1.0	1.50	0.7	0.83	0.1	0.1
All ages	140	68					0.4	0.2
Mortality								
Raw			0.6	0.56	0.3	0.28		
WS			0.3	0.51	0.1	0.23		
ES			0.5	0.53	0.2	0.25		
BRD-S			0.6	0.56	0.2	0.27		
PYLL-70								
per 100,000			4.2		1.9			
ES			3.6		1.5			
AYLL-70			9.9		10.9			

* See corresponding tables with multiple malignancies.

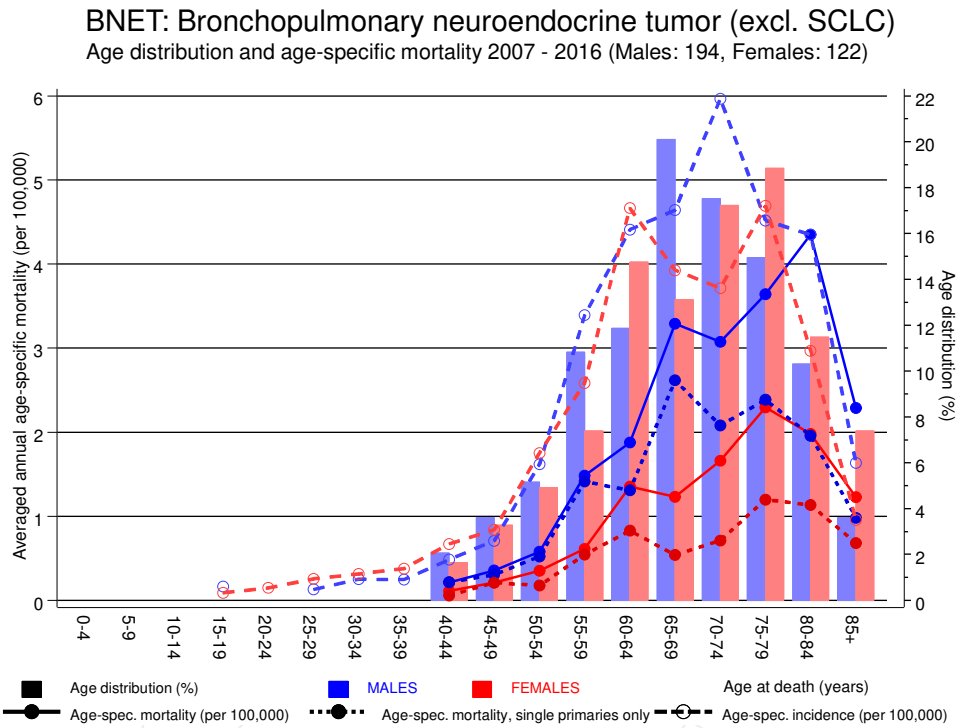


Figure 17. Distribution of age at death (bars; males: mean=66.4 yrs, median=67.9 yrs; females: mean=67.2 yrs, median=69.0 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

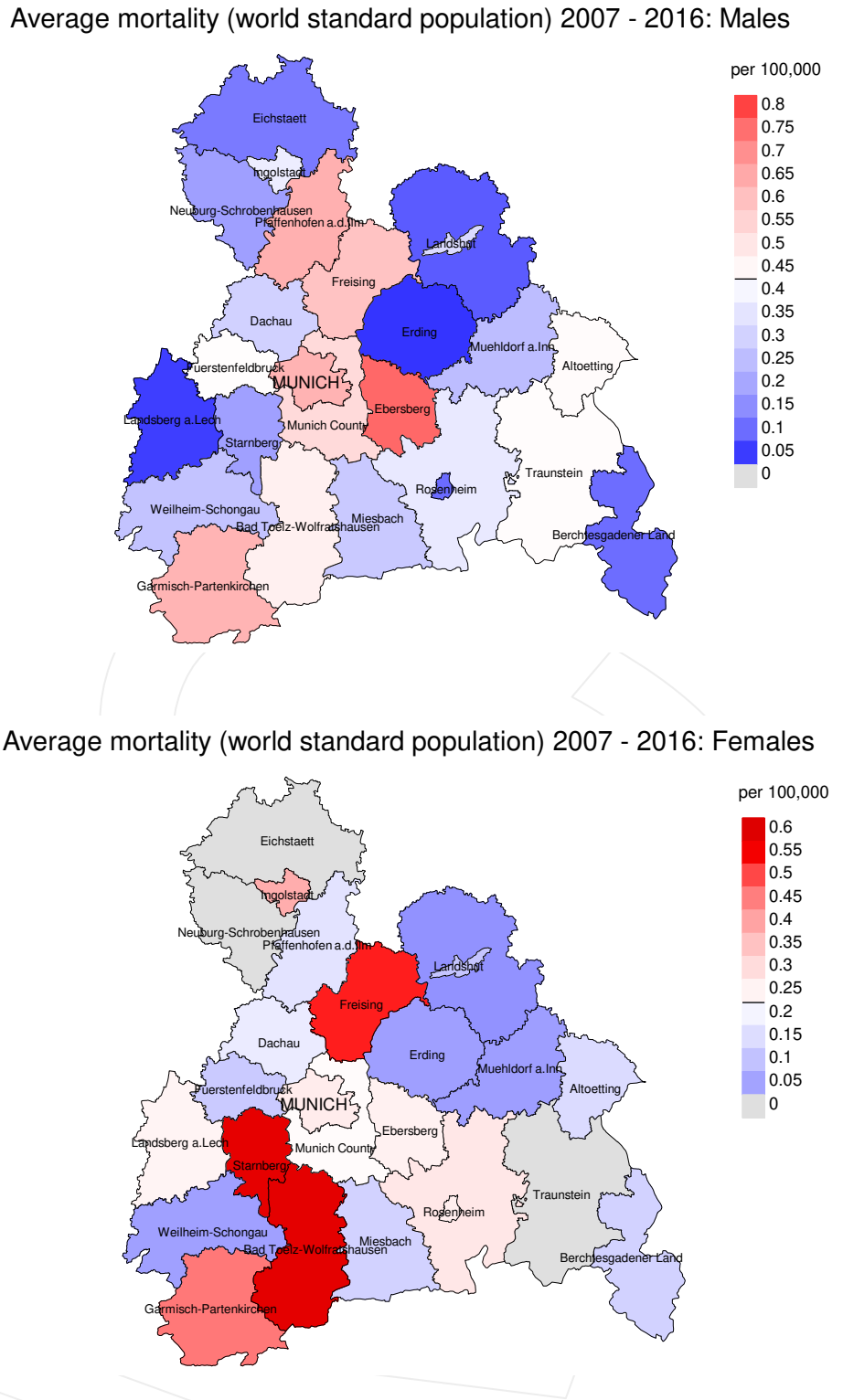


Figure 18a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2016. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 0.4/100,000 WS N=194, females 0.2/100,000 WS N=122).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 3 women died from pulm. neuroend. tumor. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.3/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 1.3/100,000.

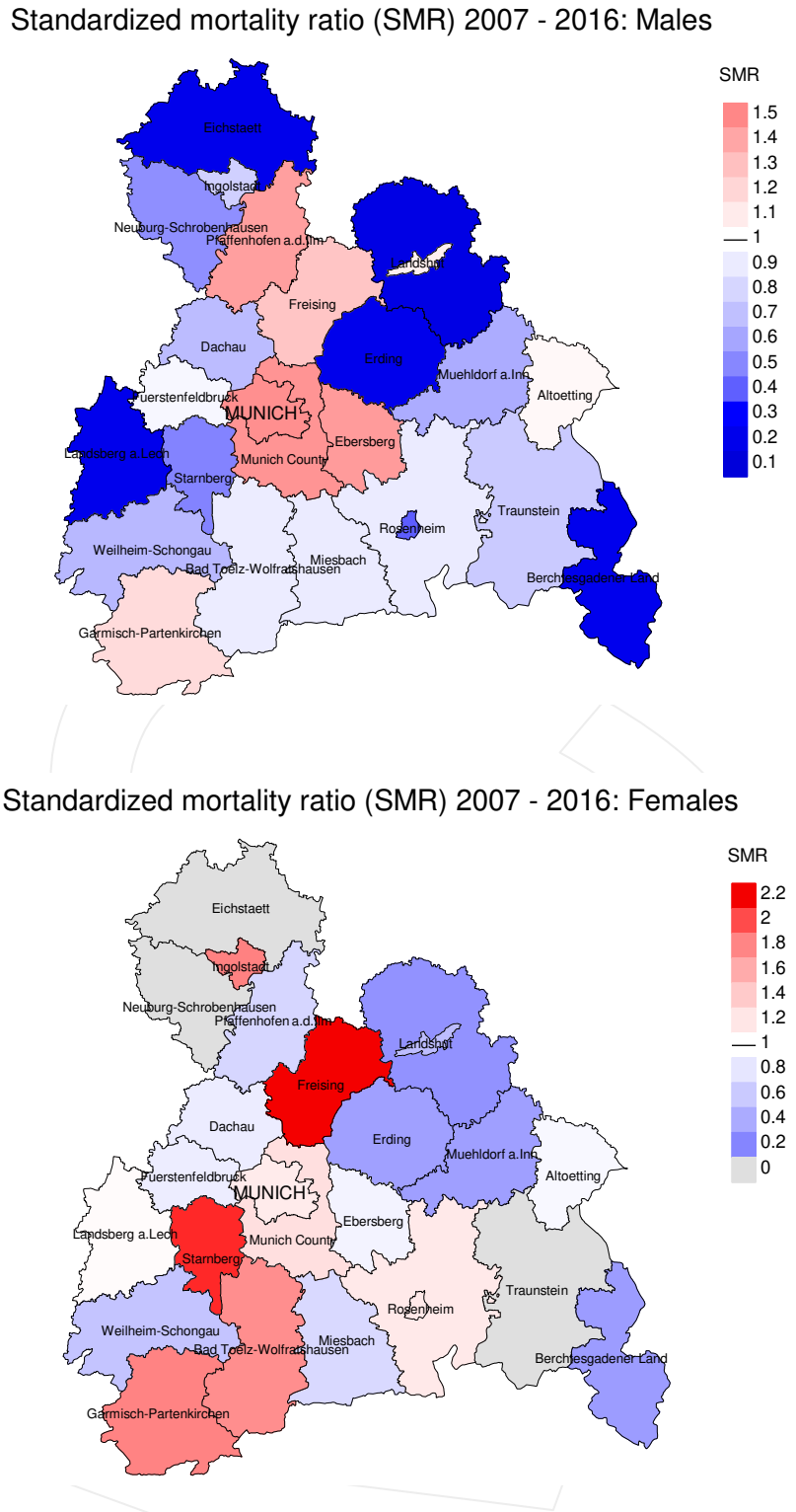


Figure 18b. Map of standardized mortality ratio (SMR) by county averaged for period 2007 to 2016. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=194, females N=122).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 3 women died from pulm. neuroend. tumor. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.90. Though, the value of this parameter may vary with an underlying probability of 99% between 0.10 and 3.31, 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 index from mortality and incidence (Mortality-Incidence ratio, **MI-index**) is a statistic 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 MI- index. 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 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 between mortality and incidence
FRG	Federal Republic of Germany

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