Munich Cancer Registry

- Survival
- Selection Matrix
- Homepage
- *Deutsch*

ICD-10 C45.0: Pleural mesothelioma

Incidence and Mortality

Year of diagnosis	1998-2016
Patients	1,288
Diseases	1,288
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/bC450_E-ICD-10-C45.0-Pleural-mesothelioma-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.

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

Code	Description
C45.0	Mesothelioma of pleura

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	29	2	6.9	3.4	3.4	100.0	100.0
1999	26	2	7.7	5.5	3.4	100.0	100.0
2000	37	20	54.1	8.7	3.4	100.0	100.0
2001	39	9	23.1	8.4	3.5	100.0	100.0
2002	56	17	30.4	9.6	3.6	98.2	100.0 #
2003	59	12	20.3	11.0	3.5	98.3	100.0
2004	71	9	12.7	11.0	3.6	98.6	98.6
2005	69	8	11.6	11.1	3.7	97.1	97.1
2006	69	8	11.6	11.9	3.5	95.7	95.7
2007	93	5	5.4	12.4	3.4	91.4	95.7 #
2008	97	7	7.2	12.9	3.1	99.0	99.0
2009	82	4	4.9	13.8	3.5	92.7	95.1
2010	85	8	9.4	14.9	2.9	90.6	95.3
2011	88	4	4.5	15.4	2.8	85.2	89.8
2012	91	4	4.4	15.8	2.6	93.4	98.9
2013	79	9	11.4	16.3	2.4	91.1	96.2
2014	72	8	11.1	16.8	2.3	79.2	95.8
2015	85	2	2.4	17.9	3.5	65.9	98.8
2016	61	2	3.3	18.6	3.3	27.9	85.2 ##
1998-2016	1288	140	10.9	18.6	3.4	88.7	96.5

1,288 cases diagnosed 1998-2016 are related to a total of 1,288 patients. Currently, in 282 (21.9 %) of these 1,288 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 241 / 31 / 10 (18.7 % / 2.4 % / 0.8 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:
In 2014, a subgroup of 72 cases has been diagnosed, of which 16.8 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 2.3 % 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	20	69.0	2	10.0	5.0	3.2	100.0	100.0	
1999	20	76.9	1	5.0	5.0	3.2	100.0	100.0	
2000	29	78.4	15	51.7	7.2	3.2	100.0	100.0	
2001	25	64.1	5	20.0	7.4	3.2	100.0	100.0	
2002	43	76.8	10	23.3	10.2	3.3	97.7	100.0	#
2003	48	81.4	7	14.6	11.9	3.2	97.9	100.0	
2004	63	88.7	9	14.3	11.3	3.2	100.0	100.0	
2005	55	79.7	5	9.1	11.6	3.2	96.4	96.4	
2006	57	82.6	6	10.5	12.5	3.0	94.7	94.7	
2007	75	80.6	4	5.3	12.9	3.1	94.7	97.3	#
2008	78	80.4	4	5.1	13.3	2.9	100.0	100.0	
2009	66	80.5	3	4.5	13.8	3.1	92.4	93.9	
2010	65	76.5	8	12.3	15.4	2.6	95.4	98.5	
2011	74	84.1	2	2.7	15.7	2.6	85.1	90.5	
2012	73	80.2	2	2.7	16.3	2.2	94.5	98.6	
2013	66	83.5	8	12.1	16.5	1.6	90.9	95.5	
2014	58	80.6	5	8.6	17.3	1.1	81.0	96.6	
2015	73	85.9	2	2.7	18.5	1.7	67.1	98.6	
2016	50	82.0	1	2.0	19.0	2.0	28.0	86.0	##
1998-2016	1038	80.6	99	9.5	19.0	3.2	89.3	96.8	

1,038 cases diagnosed 1998-2016 are related to a total of 1,038 patients. Currently, in 231 (22.3 %) of these 1,038 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 198 / 25 / 8 (19.1 % / 2.4 % / 0.8 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:
In 2014, a subgroup of 58 cases has been diagnosed, of which 17.3 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 1.1 % 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	9	31.0			0.0	4.0	100.0	100.0	
1999	6	23.1	1	16.7	6.7	4.2	100.0	100.0	
2000	8	21.6	5	62.5	13.0	4.3	100.0	100.0	
2001	14	35.9	4	28.6	10.8	4.4	100.0	100.0	
2002	13	23.2	7	53.8	8.0	4.7	100.0	100.0	#
2003	11	18.6	5	45.5	8.2	5.1	100.0	100.0	
2004	8	11.3			10.1	5.3	87.5	87.5	
2005	14	20.3	3	21.4	9.6	5.6	100.0	100.0	
2006	12	17.4	2	16.7	9.5	5.5	100.0	100.0	
2007	18	19.4	1	5.6	10.6	4.6	77.8	88.9	#
2008	19	19.6	3	15.8	11.4	4.4	94.7	94.7	
2009	16	19.5	1	6.3	13.5	5.1	93.8	100.0	
2010	20	23.5			13.1	4.0	75.0	85.0	
2011	14	15.9	2	14.3	14.3	3.7	85.7	85.7	
2012	18	19.8	2	11.1	14.0	4.4	88.9	100.0	
2013	13	16.5	1	7.7	15.5	6.0	92.3	100.0	
2014	14	19.4	3	21.4	15.0	8.1	71.4	92.9	
2015	12	14.1			15.5	13.0	58.3	100.0	
2016	11	18.0	1	9.1	16.8	9.1	27.3	81.8	##
1998-2016	250	19.4	41	16.4	16.8	4.0	86.4	95.2	

250 cases diagnosed 1998-2016 are related to a total of 250 patients. Currently, in 51 (20.4 %) of these 250 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 43 / 6 / 2 (17.2 % / 2.4 % / 0.8 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:
In 2014, a subgroup of 14 cases has been diagnosed, of which 15.0 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 8.1 % 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 4.81 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	20	9	1.8	0.8	1.1	0.4	1.6	0.6	2.1	0.7
1999	20	6	1.8	0.5	1.1	0.2	1.6	0.3	2.0	0.5
2000	29	8	2.5	0.7	1.4	0.3	2.2	0.4	2.8	0.5
2001	25	14	2.2	1.2	1.3	0.6	1.9	0.8	2.3	1.0
2002	43	13	2.3	0.7	1.3	0.3	1.9	0.5	2.5	0.6
2003	48	11	2.6	0.6	1.4	0.2	2.1	0.3	2.6	0.4
2004	63	8	3.3	0.4	1.7	0.2	2.5	0.3	3.3	0.4
2005	55	14	2.9	0.7	1.5	0.3	2.2	0.5	3.0	0.6
2006	57	12	3.0	0.6	1.5	0.2	2.3	0.4	3.0	0.5
2007	75	18	3.4	0.8	1.7	0.4	2.6	0.5	3.4	0.7
2008	78	19	3.5	0.8	1.7	0.3	2.5	0.4	3.2	0.6
2009	66	16	3.0	0.7	1.4	0.2	2.1	0.4	2.9	0.5
2010	65	20	2.9	0.9	1.3	0.4	2.0	0.5	2.7	0.7
2011	74	14	3.3	0.6	1.5	0.2	2.3	0.3	3.1	0.5
2012	73	18	3.2	0.8	1.4	0.3	2.1	0.5	2.9	0.6
2013	66	13	2.9	0.5	1.3	0.2	2.0	0.3	2.6	0.4
2014	58	14	2.5	0.6	1.0	0.2	1.5	0.3	2.2	0.4
2015	73	12	3.1	0.5	1.2	0.2	1.9	0.3	2.7	0.3
2016	50	11	2.1	0.4	0.8	0.2	1.3	0.3	1.9	0.3
1998-2016	1038	250	2.8	0.7	1.4	0.3	2.1	0.4	2.8	0.5

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	29	66.7	10.4	48.8	89.2	51.1	60.1	66.0	70.5	84.0
1999	26	67.3	8.6	50.8	81.3	56.1	60.9	67.5	74.1	80.6
2000	37	70.2	13.3	35.6	92.8	55.9	59.4	69.3	78.8	89.3
2001	39	67.1	9.7	45.6	85.4	54.7	58.8	66.1	73.6	83.0
2002	56	69.0	11.3	46.4	88.5	51.9	61.4	66.7	77.0	84.9
2003	59	70.3	10.6	30.7	91.2	58.9	63.7	70.1	77.8	82.6
2004	71	70.8	7.6	53.1	90.1	63.1	65.5	69.8	75.3	81.7
2005	69	70.7	9.2	45.1	88.3	58.9	64.7	70.7	77.1	83.5
2006	69	69.9	9.7	40.6	87.8	57.0	64.9	70.6	77.2	81.7
2007	93	69.2	9.6	40.3	92.4	55.4	64.5	70.3	76.0	79.6
2008	97	71.9	9.0	42.4	88.1	61.5	67.2	71.9	77.2	84.6
2009	82	72.2	9.6	44.3	97.3	60.3	65.4	72.2	80.1	83.8
2010	85	71.9	9.5	36.2	93.6	59.7	67.6	71.9	78.1	83.1
2011	88	72.9	8.4	52.5	87.3	61.2	67.0	73.4	79.3	83.9
2012	91	72.9	9.8	41.3	95.6	60.1	68.6	73.4	79.6	84.7
2013	79	73.4	9.1	49.4	95.4	61.3	67.9	73.7	80.0	85.5
2014	72	74.7	8.9	42.7	92.1	62.1	70.3	75.1	80.4	85.2
2015	85	75.0	10.2	26.1	91.6	63.8	71.2	76.3	80.4	87.6
2016	61	75.1	9.0	45.1	91.6	66.7	71.2	75.9	80.5	83.5
1998-2016	1288	71.6	9.8	26.1	97.3	59.0	65.6	72.2	78.5	83.9

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	20	67.1	10.4	49.4	89.2	53.9	60.8	65.6	72.6	83.2
1999	20	65.5	8.6	50.8	81.0	55.3	59.5	63.3	71.0	79.0
2000	29	69.3	11.9	53.1	92.8	55.9	59.3	65.0	78.1	89.3
2001	25	65.4	9.3	45.6	83.2	54.7	57.4	65.6	72.9	78.9
2002	43	69.1	11.0	46.4	88.4	51.9	61.8	66.3	76.5	84.5
2003	48	68.8	10.2	30.7	90.3	58.9	62.9	69.6	74.2	81.2
2004	63	71.0	7.2	53.2	90.1	63.8	66.0	69.8	74.3	81.7
2005	55	70.3	9.3	45.1	86.8	58.9	64.7	70.5	76.9	83.4
2006	57	69.8	9.1	46.6	87.8	57.6	64.9	69.3	76.8	80.9
2007	75	69.9	8.8	44.4	92.4	58.2	64.5	70.4	76.1	79.6
2008	78	71.2	7.9	48.5	88.1	61.5	66.0	71.1	74.9	82.7
2009	66	71.3	9.6	44.3	97.3	59.5	65.2	70.5	79.6	82.6
2010	65	71.9	8.6	50.8	91.8	59.7	67.6	71.6	77.8	83.1
2011	74	72.4	8.4	52.5	87.0	61.2	66.6	73.1	78.7	83.7
2012	73	73.3	7.9	53.7	88.8	62.8	69.3	73.4	78.9	83.9
2013	66	72.6	8.9	49.4	92.4	61.0	67.1	73.1	79.0	82.2
2014	58	74.5	7.7	55.1	88.0	62.1	70.9	74.8	78.9	84.3
2015	73	74.9	10.1	26.1	91.6	66.4	71.3	76.2	78.8	87.3
2016	50	75.7	8.7	45.1	91.6	68.4	71.7	76.5	81.2	83.5
1998-2016	1038	71.4	9.2	26.1	97.3	59.4	65.6	71.9	77.9	83.1

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	9	65.8	11.0	48.8	85.2	48.8	60.1	66.0	69.8	85.2
1999	6	73.2	6.1	64.6	81.3	64.6	67.7	74.4	77.0	81.3
2000	8	73.3	17.9	35.6	90.6	35.6	66.7	78.0	85.5	90.6
2001	14	70.3	9.9	54.5	85.4	56.4	64.4	70.2	79.8	83.6
2002	13	68.9	12.9	48.9	88.5	53.8	57.4	67.0	79.1	85.6
2003	11	76.7	10.5	57.3	91.2	62.7	68.5	79.8	82.6	88.3
2004	8	68.6	11.1	53.1	84.7	53.1	59.6	68.0	77.7	84.7
2005	14	72.5	8.8	58.3	88.3	62.3	63.2	73.0	78.1	84.2
2006	12	70.4	12.5	40.6	83.9	57.0	63.2	74.2	78.7	81.9
2007	18	66.2	12.1	40.3	81.1	45.3	60.1	68.8	76.0	80.8
2008	19	74.8	12.4	42.4	87.8	48.2	69.6	75.8	84.2	87.2
2009	16	75.8	9.0	62.3	87.1	63.3	66.8	77.1	84.0	86.9
2010	20	71.8	12.3	36.2	93.6	58.2	66.5	72.9	78.2	84.6
2011	14	75.5	8.4	57.9	87.3	66.6	69.5	76.0	83.9	85.2
2012	18	71.5	15.5	41.3	95.6	43.1	59.6	72.2	84.7	87.6
2013	13	77.3	9.7	63.7	95.4	65.1	72.2	73.8	85.5	90.0
2014	14	75.7	13.0	42.7	92.1	59.6	70.0	79.5	84.1	88.6
2015	12	76.1	11.6	53.5	90.8	60.6	68.3	78.0	86.0	87.7
2016	11	72.2	10.0	55.3	91.3	57.3	66.7	73.9	76.4	79.2
1998-2016	250	72.5	11.7	35.6	95.6	57.3	65.6	73.7	81.4	86.6

Table 4

Age distribution by 5-year age group and sex for period 2007-2016
(incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4									
5-9									
10-14									
15-19									
20-24									
25-29	1	0.1	0.1	1	0.1	0.1			0.0
30-34	0	0.0	0.1			0.1			0.0
35-39	1	0.1	0.2			0.1	1	0.6	0.6
40-44	7	0.8	1.1	2	0.3	0.4	5	3.2	3.9
45-49	9	1.1	2.2	6	0.9	1.3	3	1.9	5.8
50-54	17	2.0	4.2	13	1.9	3.2	4	2.6	8.4
55-59	40	4.8	9.0	34	5.0	8.3	6	3.9	12.3
60-64	67	8.0	17.0	58	8.6	16.8	9	5.8	18.1
65-69	150	18.0	35.1	125	18.4	35.3	25	16.1	34.2
70-74	196	23.5	58.6	169	24.9	60.2	27	17.4	51.6
75-79	159	19.1	77.7	133	19.6	79.8	26	16.8	68.4
80-84	114	13.7	91.4	90	13.3	93.1	24	15.5	83.9
85+	72	8.6	100.0	47	6.9	100.0	25	16.1	100.0
All ages	833	100.0		678	100.0		155	100.0	

Table 5

Age-specific incidence, DCO rate 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 DCO rate n=39 %	Females DCO rate n=14 %	Males Prop.all cancers n=113978 %	Females Prop.all cancers n=112253 %
0- 4								
5- 9								
10-14								
15-19								
20-24								
25-29	1		0.1				0.1	
30-34								
35-39		1		0.1				0.0
40-44	2	5	0.1	0.3			0.1	0.1
45-49	6	3	0.3	0.2			0.2	0.0
50-54	13	4	0.8	0.2	7.7		0.2	0.0
55-59	34	6	2.4	0.4			0.4	0.1
60-64	58	9	4.7	0.7	3.4		0.4	0.1
65-69	125	25	10.5	1.9	4.8		0.7	0.2
70-74	169	27	15.3	2.1	4.7		0.8	0.2
75-79	133	26	16.7	2.6	5.3	3.8	0.8	0.2
80-84	90	24	19.6	3.4	11.1	16.7	0.8	0.2
85+	47	25	15.4	3.4	10.6	36.0	0.6	0.2
All ages	678	155			5.8	9.0	0.6	0.1
Incidence								
Raw			3.0	0.7				
WS			1.3	0.2				
ES			2.0	0.4				
BRD-S			2.8	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).

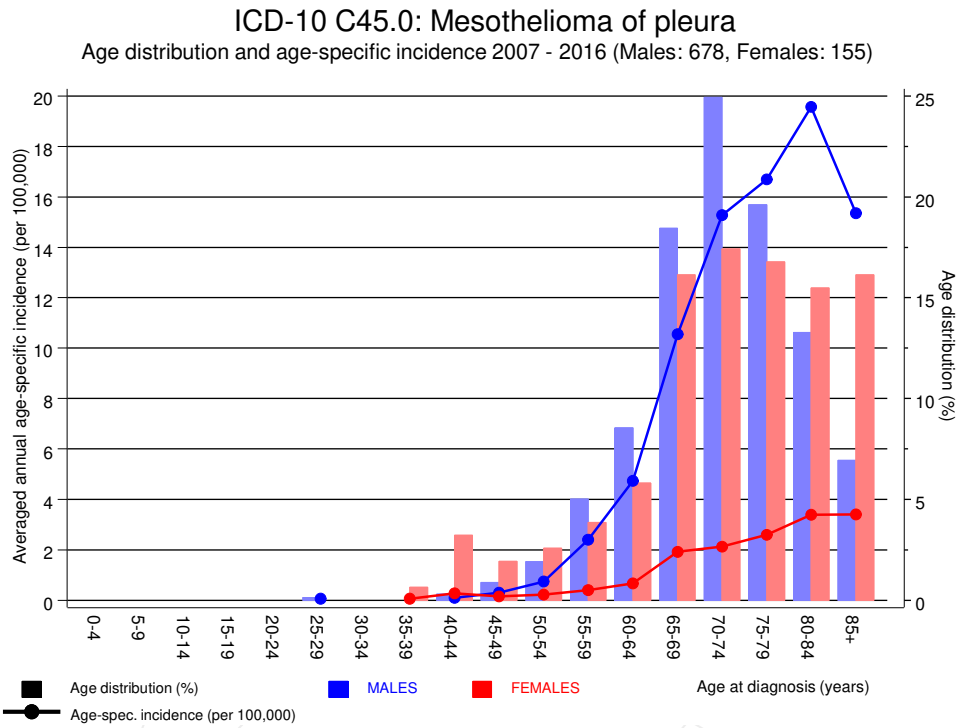


Figure 6. Age distribution (males: mean=72.6 yrs, median=73.3 yrs; females: mean=73.4 yrs, median=74.2 yrs) and age-specific incidence.

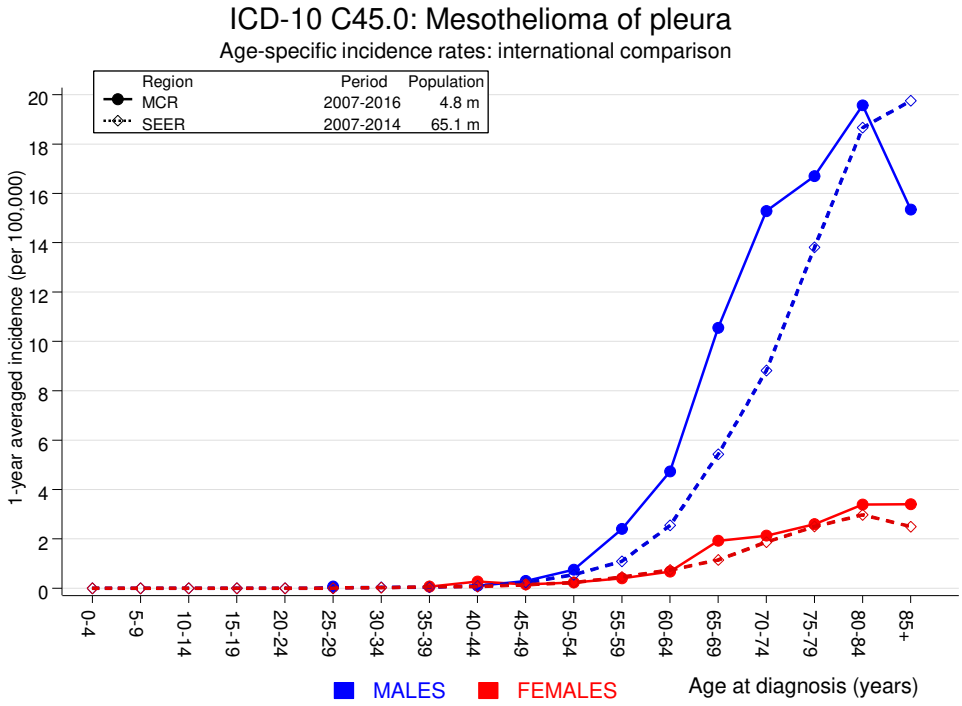


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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 %
C18	Colon	4	2.2	1.8	0.5	4.7		14.5	
C19–C20	Rectum	2	1.2	1.6	0.2	5.8		6.1	
C33–C34	Lung	14	2.8	5.1	2.8	8.5	#	89.7	78.6
C61	Prostate	5	6.9	0.7	0.2	1.7		−14.8	40.0
C64	Kidney	2	0.8	2.4	0.3	8.8		9.4	
C82–C85	NHL	2	0.9	2.2	0.3	7.9		8.7	50.0
Others, specified		7	3.0	2.3	0.9	4.7		31.6	42.9
Not observed		0	5.5	0.0	0.0	0.7	#	−43.5	
All further malignancies		36	23.3	1.5	1.1	2.1	#	101.6	47.2

Patients	933
Median age at next malignancy (years)	73.7
Person-years	1253
Mean observation time (years)	1.3
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

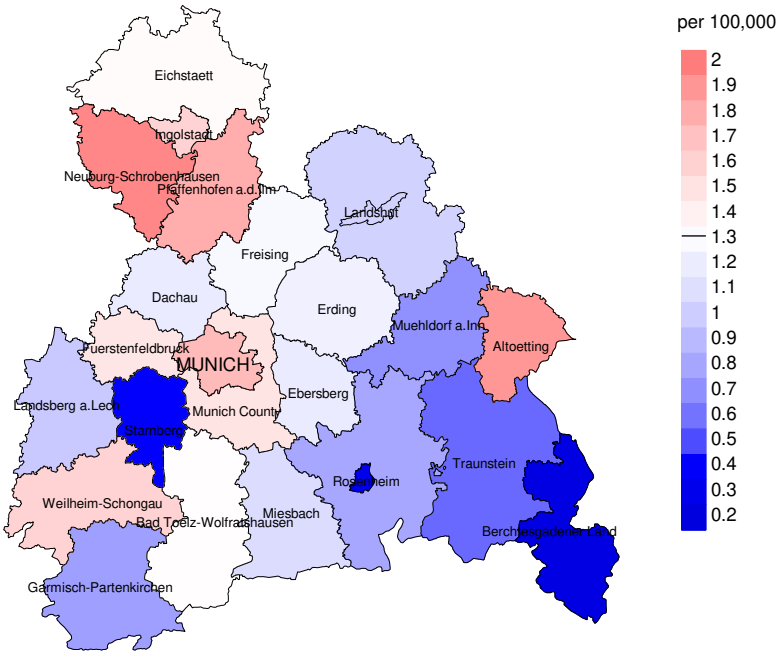
Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C33–C34 Lung	2	0.2	8.5	1.0	30.7	#	67.4	100.0
Others, specified	5	1.5	3.4	1.1	8.0	#	135.3	60.0
Not observed	0	1.4	0.0	0.0	2.7		−52.1	
All further malignancies	7	3.1	2.3	0.9	4.7		150.7	71.4

Patients	214
Median age at next malignancy (years)	71.0
Person-years	262
Mean observation time (years)	1.2
Median observation time (years)	0.7

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

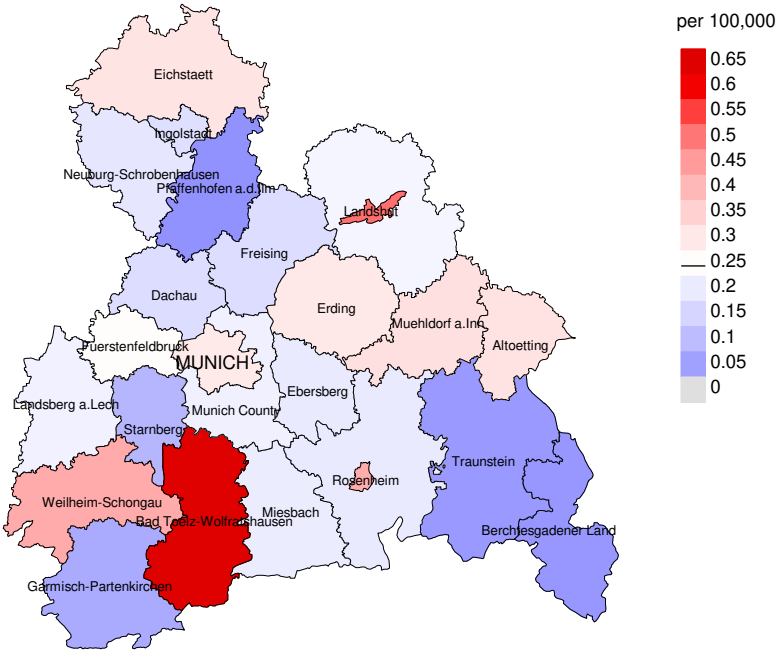
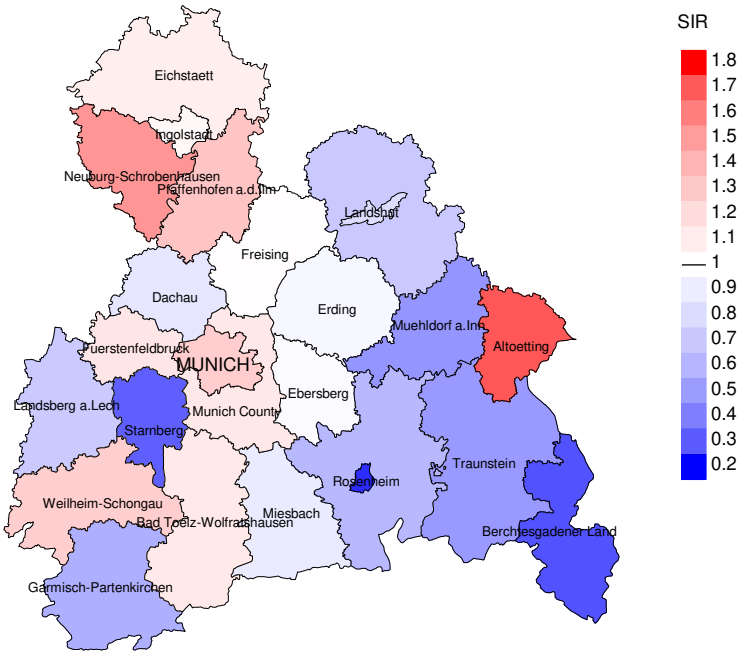


Figure 8a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 1.3/100,000 WS N=678, females 0.2/100,000 WS N=155).

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 5 women were identified with newly diagnosed pleural mesothelioma. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 0.2/100,000 (world 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 incidence ratio (SIR) 2007 - 2016: Males



Standardized incidence ratio (SIR) 2007 - 2016: Females

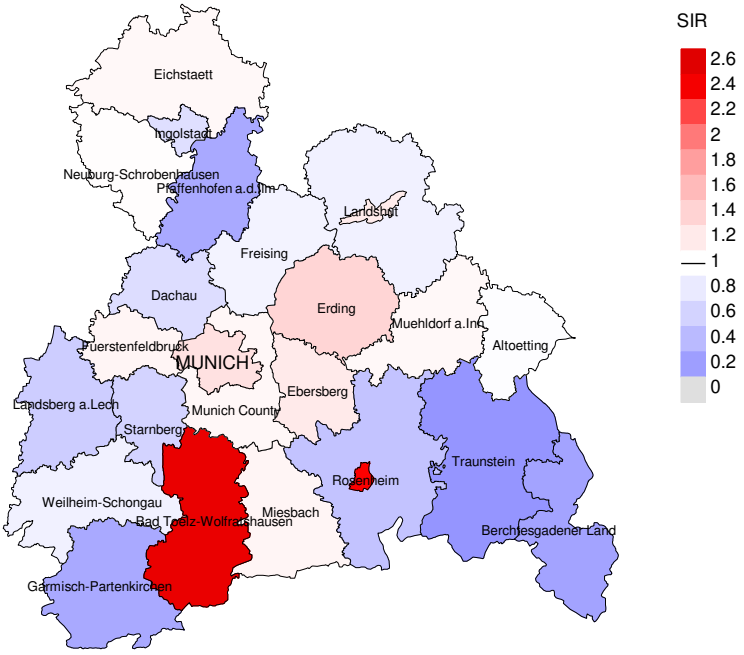


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=678, females N=155).

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 5 women were identified with newly diagnosed pleural mesothelioma. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.20. Though, the value of this parameter may vary with an underlying probability of 99% between 0.26 and 3.40, 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 4.81 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	29	100.0	6.9	29	100.0	89.7
1999	26	100.0	7.7	26	100.0	92.3
2000	37	100.0	54.1	37	100.0	94.6
2001	39	100.0	23.1	39	100.0	89.7
2002	56	100.0	30.4	55	98.2	98.2
2003	59	100.0	20.3	58	98.3	94.8
2004	71	98.6	12.7	70	98.6	95.7
2005	69	97.1	11.6	67	97.1	100.0
2006	69	95.7	11.6	66	95.7	98.5
2007	93	95.7	5.4	85	91.4	97.6
2008	97	99.0	7.2	96	99.0	99.0
2009	82	95.1	4.9	76	92.7	94.7
2010	85	95.3	9.4	77	90.6	97.4
2011	88	89.8	4.5	75	85.2	98.7
2012	91	98.9	4.4	85	93.4	100.0
2013	79	96.2	11.4	72	91.1	100.0
2014	72	95.8	11.1	57	79.2	96.5
2015	85	98.8	2.4	56	65.9	94.6
2016	61	85.2	3.3	17	27.9	82.4
1998-2016	1288	96.5	10.9	1143	88.7	96.8

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 4.81 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	29	24	95.8	12	41.4
1999	26	21	90.5	6	23.1
2000	37	36	94.4	18	48.6
2001	39	35	94.3	18	46.2
2002	56	46	95.7	24	42.9
2003	59	41	92.7	23	39.0
2004	71	52	96.2	20	28.2
2005	69	59	96.6	22	31.9
2006	69	63	98.4	20	29.0
2007	93	65	95.4	25	26.9
2008	97	87	98.9	34	35.1
2009	82	69	98.6	17	20.7
2010	85	83	96.4	26	30.6
2011	88	80	97.5	25	28.4
2012	91	87	100.0	28	30.8
2013	79	82	98.8	30	38.0
2014	72	68	100.0	23	31.9
2015	85	61	100.0	21	24.7
2016	61	75	100.0	14	23.0
1998-2016	1288	1134	97.5	406	31.5

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 4.81 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer-related %	Prop. non-cancer-related %	Prop. cancer recorded on death certificate %
1998	24	87.5	12.5	95.7
1999	21	90.5	9.5	100.0
2000	36	91.7	8.3	100.0
2001	35	91.4	8.6	100.0
2002	46	93.5	6.5	100.0
2003	41	90.2	9.8	100.0
2004	52	92.3	7.7	100.0
2005	59	96.6	3.4	94.7
2006	63	98.4	1.6	100.0
2007	65	92.3	7.7	100.0
2008	87	97.7	2.3	100.0
2009	69	95.7	4.3	100.0
2010	83	94.0	6.0	98.8
2011	80	93.8	6.3	98.7
2012	87	95.4	4.6	96.6
2013	82	96.3	3.7	98.8
2014	68	92.6	7.4	97.1
2015	61	95.1	4.9	100.0
2016	75	96.0	4.0	98.7
1998-2016	1134	94.4	5.6	98.8

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	69.1	69.1	65.9	69.1
1999	16	66.5	66.5		66.5
2000	24	67.9	67.5	79.6	68.0
2001	23	65.6	65.8	55.1	65.7
2002	39	66.8	67.2	57.9	67.0
2003	33	68.0	68.0	73.3	68.0
2004	42	70.8	70.8	74.2	71.0
2005	54	71.0	71.2	66.2	71.2
2006	53	73.0	73.1	54.4	73.1
2007	57	69.7	70.0	69.5	69.7
2008	71	70.0	70.0	69.3	69.8
2009	55	70.3	70.3	72.6	70.5
2010	65	74.4	74.3	74.9	74.6
2011	70	75.5	75.1	80.9	75.7
2012	70	73.8	73.6	79.8	73.6
2013	65	74.1	73.8	85.1	74.1
2014	57	74.3	74.2	80.9	74.3
2015	52	76.8	77.1	72.2	76.8
2016	63	77.3	77.3	78.2	77.2
1998-2016	928	72.6	72.6	73.0	72.7

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	5	70.4	69.7	85.6	70.4
1999	5	64.6	67.7	55.0	67.7
2000	12	79.3	81.4	75.2	81.4
2001	12	70.5	70.6	60.9	70.6
2002	7	64.9	64.3	80.3	64.3
2003	8	81.3	81.3	80.5	82.6
2004	10	67.4	67.4		65.2
2005	5	75.4	75.4		75.4
2006	10	73.4	73.4		73.4
2007	8	72.3	75.0	64.9	72.4
2008	16	75.3	75.3		75.3
2009	14	78.6	78.6		78.6
2010	18	75.9	75.9		75.9
2011	10	78.4	78.4		78.4
2012	17	77.1	75.0	86.7	77.1
2013	17	74.7	74.7		74.7
2014	11	74.9	74.4	87.6	74.9
2015	9	84.7	84.7		84.7
2016	12	77.7	76.7	91.5	77.7
1998-2016	206	74.9	74.7	79.3	74.9

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	17	1.5	0.85	0.9	0.83	1.4	0.84	1.7	0.82
1999	16	1.4	0.80	0.9	0.80	1.3	0.82	1.6	0.83
2000	22	1.9	0.76	1.1	0.80	1.7	0.78	2.3	0.80
2001	21	1.8	0.84	1.1	0.79	1.5	0.78	1.8	0.78
2002	37	2.0	0.86	1.1	0.85	1.7	0.86	2.1	0.82
2003	31	1.7	0.65	0.9	0.64	1.3	0.64	1.7	0.65
2004	38	2.0	0.60	1.0	0.61	1.6	0.62	2.1	0.63
2005	52	2.7	0.95	1.4	0.92	2.1	0.94	2.8	0.93
2006	52	2.7	0.91	1.3	0.84	2.0	0.87	2.8	0.94
2007	54	2.4	0.72	1.2	0.70	1.8	0.70	2.4	0.71
2008	69	3.1	0.88	1.5	0.90	2.3	0.91	3.0	0.92
2009	52	2.3	0.79	1.1	0.78	1.6	0.77	2.1	0.74
2010	60	2.7	0.92	1.2	0.88	1.8	0.90	2.6	0.94
2011	65	2.9	0.88	1.2	0.82	1.9	0.85	2.8	0.90
2012	67	3.0	0.92	1.3	0.94	2.0	0.93	2.8	0.94
2013	62	2.7	0.94	1.2	0.90	1.8	0.91	2.4	0.92
2014	54	2.3	0.93	1.0	1.04	1.5	0.99	2.1	0.94
2015	49	2.1	0.67	0.7	0.58	1.2	0.63	1.8	0.66
2016	61	2.5	1.22	0.9	1.23	1.6	1.25	2.3	1.20
1998-2016	879	2.4	0.85	1.1	0.83	1.7	0.84	2.4	0.85

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	4	0.3	0.44	0.2	0.39	0.2	0.41	0.3	0.45
1999	3	0.3	0.50	0.1	0.65	0.2	0.59	0.2	0.49
2000	11	0.9	1.38	0.3	1.27	0.5	1.35	0.8	1.46
2001	11	0.9	0.79	0.4	0.69	0.6	0.72	0.8	0.78
2002	6	0.3	0.46	0.1	0.46	0.2	0.45	0.3	0.45
2003	6	0.3	0.55	0.1	0.65	0.2	0.62	0.2	0.57
2004	10	0.5	1.25	0.3	1.37	0.4	1.33	0.4	1.24
2005	5	0.3	0.36	0.1	0.33	0.2	0.35	0.2	0.38
2006	10	0.5	0.83	0.2	0.97	0.3	0.92	0.5	0.89
2007	6	0.3	0.33	0.1	0.23	0.1	0.28	0.2	0.34
2008	16	0.7	0.84	0.3	0.97	0.4	0.93	0.5	0.87
2009	14	0.6	0.88	0.2	0.77	0.3	0.81	0.4	0.87
2010	18	0.8	0.90	0.2	0.64	0.4	0.70	0.5	0.77
2011	10	0.4	0.71	0.1	0.64	0.2	0.66	0.3	0.69
2012	16	0.7	0.89	0.2	0.77	0.4	0.81	0.5	0.90
2013	17	0.7	1.31	0.2	1.33	0.4	1.36	0.5	1.33
2014	9	0.4	0.64	0.1	0.73	0.2	0.69	0.3	0.63
2015	9	0.4	0.75	0.1	0.58	0.2	0.63	0.2	0.69
2016	11	0.4	1.00	0.1	0.84	0.2	0.85	0.3	0.99
1998-2016	192	0.5	0.77	0.2	0.71	0.3	0.73	0.4	0.76

Table 12

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

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4									
5-9									
10-14									
15-19									
20-24									
25-29									
30-34									
35-39									
40-44	3	0.4	0.4	1	0.2	0.2	2	1.6	1.6
45-49	6	0.8	1.3	4	0.7	0.8	2	1.6	3.2
50-54	15	2.1	3.3	12	2.0	2.9	3	2.4	5.6
55-59	24	3.3	6.7	21	3.5	6.4	3	2.4	7.9
60-64	52	7.2	13.9	47	7.9	14.3	5	4.0	11.9
65-69	129	17.9	31.8	117	19.7	34.1	12	9.5	21.4
70-74	169	23.5	55.4	137	23.1	57.2	32	25.4	46.8
75-79	149	20.7	76.1	127	21.4	78.6	22	17.5	64.3
80-84	101	14.0	90.1	79	13.3	91.9	22	17.5	81.7
85+	71	9.9	100.0	48	8.1	100.0	23	18.3	100.0
All ages	719	100.0		593	100.0		126	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	1	2	0.1	0.50	0.1	0.40	0.2	0.3
45-49	4	2	0.2	0.67	0.1	0.67	0.3	0.2
50-54	12	3	0.7	0.92	0.2	0.75	0.6	0.2
55-59	21	3	1.5	0.62	0.2	0.50	0.6	0.1
60-64	47	5	3.8	0.81	0.4	0.56	0.9	0.1
65-69	117	12	9.9	0.94	0.9	0.48	1.6	0.2
70-74	137	32	12.4	0.81	2.5	1.19	1.5	0.5
75-79	127	22	15.9	0.95	2.2	0.85	1.4	0.3
80-84	79	22	17.2	0.88	3.1	0.92	1.0	0.3
85+	48	23	15.7	1.02	3.1	0.92	0.7	0.2
All ages	593	126					1.1	0.3
Mortality								
Raw			2.6	0.87	0.5	0.81		
WS			1.1	0.86	0.2	0.72		
ES			1.8	0.87	0.3	0.75		
BRD-S			2.4	0.88	0.4	0.79		
PYLL-70								
per 100,000			6.1		1.3			
ES			5.2		1.1			
AYLL-70			6.1		9.5			

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 ←%
C16	Stomach	4	1.9	4	100.0				
C18	Colon	16	7.6	12	75.0	2	12.5	2	12.5
C19–C20	Rectum	13	6.2	11	84.6	2	15.4		
C33–C34	Lung	17	8.1	2	11.8	5	29.4	10	58.8
C43	Malign. melanoma	12	5.7	11	91.7			1	8.3
C44	Skin others	28	13.3	19	67.9	2	7.1	7	25.0
C61	Prostate	71	33.8	64	90.1	3	4.2	4	5.6
C64	Kidney	9	4.3	7	77.8	1	11.1	1	11.1
C67	Bladder	5	2.4	4	80.0	1	20.0		
C76–C79	CUP	3	1.4	2	66.7			1	33.3
C82–C85	NHL	9	4.3	6	66.7	2	22.2	1	11.1
Others, specified		23	11.0	16	69.6	2	8.7	5	21.7
All further malignancies		210	100.0	158	75.2	20	9.5	32	15.2

Further malignancies with number of cases 1 to 2 are pooled in category “Others, specified”.

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 ←%
C16	Stomach	1	2.4	1	100.0				
C18	Colon	4	9.5	4	100.0				
C33–C34	Lung	3	7.1	1	33.3			2	66.7
C43	Malign. melanoma	2	4.8	2	100.0				
C44	Skin others	2	4.8	1	50.0			1	50.0
C50	Breast	13	31.0	12	92.3			1	7.7
C53	Cervix uteri	1	2.4	1	100.0				
C54	Corpus uteri	4	9.5	3	75.0			1	25.0
C56	Ovary	2	4.8	1	50.0			1	50.0
C67	Bladder	2	4.8	2	100.0				
C70–C72	CNS cancer	1	2.4	1	100.0				
C73	Thyroid	4	9.5	4	100.0				
C81	Hodgkin lymphoma	1	2.4	1	100.0				
C82–C85	NHL	1	2.4	1	100.0				
C90	Mult. myeloma	1	2.4	1	100.0				
All further malignancies		42	100.0	36	85.7			6	14.3

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	1	1	0.1	0.50	0.1	0.25	0.2	0.2
45-49	4	2	0.2	0.67	0.1	0.67	0.4	0.2
50-54	11	3	0.6	1.10	0.2	0.75	0.6	0.2
55-59	20	2	1.4	0.59	0.1	0.50	0.7	0.1
60-64	43	4	3.5	0.84	0.3	0.57	1.0	0.1
65-69	100	8	8.4	0.97	0.6	0.50	1.7	0.2
70-74	110	26	9.9	0.85	2.1	1.13	1.5	0.5
75-79	88	18	11.0	0.95	1.8	0.90	1.3	0.3
80-84	56	20	12.2	0.90	2.8	1.00	1.0	0.4
85+	28	18	9.1	1.00	2.5	0.95	0.6	0.2
All ages	461	102					1.1	0.3
Mortality								
Raw			2.0	0.89	0.4	0.85		
WS			0.9	0.87	0.1	0.75		
ES			1.4	0.88	0.2	0.78		
BRD-S			1.9	0.89	0.3	0.83		
PYLL-70								
per 100,000			5.6		1.0			
ES			4.8		0.8			
AYLL-70			6.3		10.0			

* 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	1	1	0.1	0.50	0.1	0.25	0.2	0.2
45-49	4	2	0.2	0.67	0.1	0.67	0.4	0.2
50-54	11	3	0.6	1.10	0.2	0.75	0.6	0.2
55-59	20	2	1.4	0.59	0.1	0.50	0.7	0.1
60-64	43	4	3.5	0.88	0.3	0.57	1.0	0.1
65-69	96	7	8.1	0.95	0.5	0.47	1.7	0.2
70-74	103	22	9.3	0.83	1.7	1.05	1.5	0.4
75-79	84	18	10.5	0.93	1.8	0.90	1.3	0.3
80-84	54	20	11.7	0.89	2.8	1.05	1.0	0.4
85+	27	18	8.8	0.96	2.5	0.95	0.6	0.3
All ages	443	97					1.1	0.3
Mortality								
Raw			1.9	0.88	0.4	0.84		
WS			0.9	0.86	0.1	0.73		
ES			1.3	0.87	0.2	0.76		
BRD-S			1.8	0.88	0.3	0.81		
PYLL-70								
per 100,000			5.6		1.0			
ES			4.7		0.8			
AYLL-70			6.4		10.4			

* See corresponding tables with multiple malignancies.

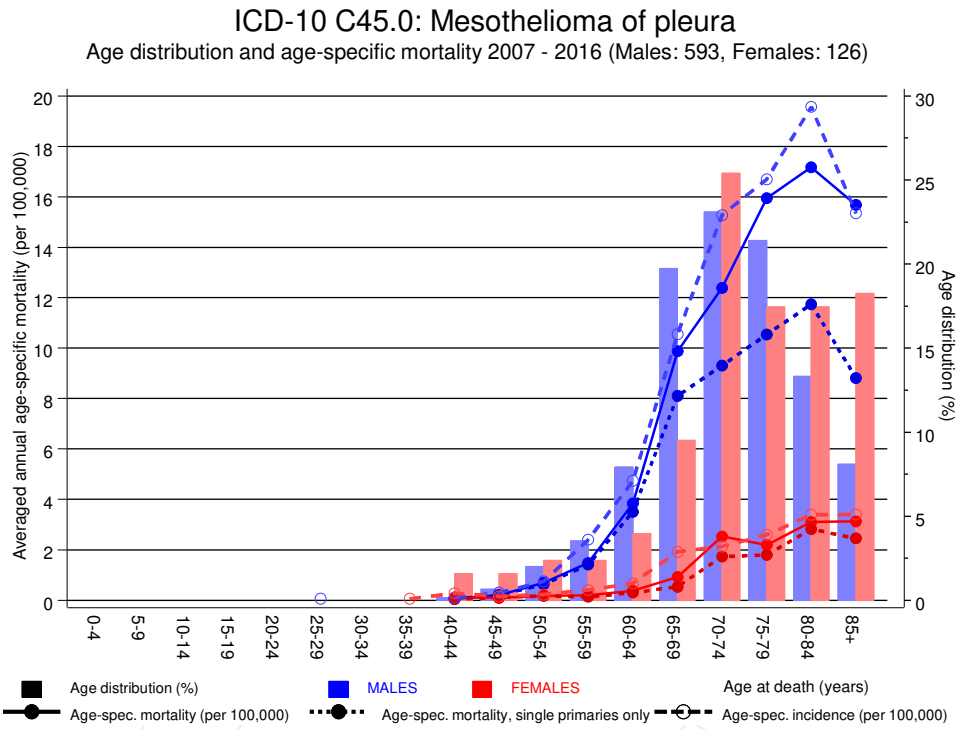
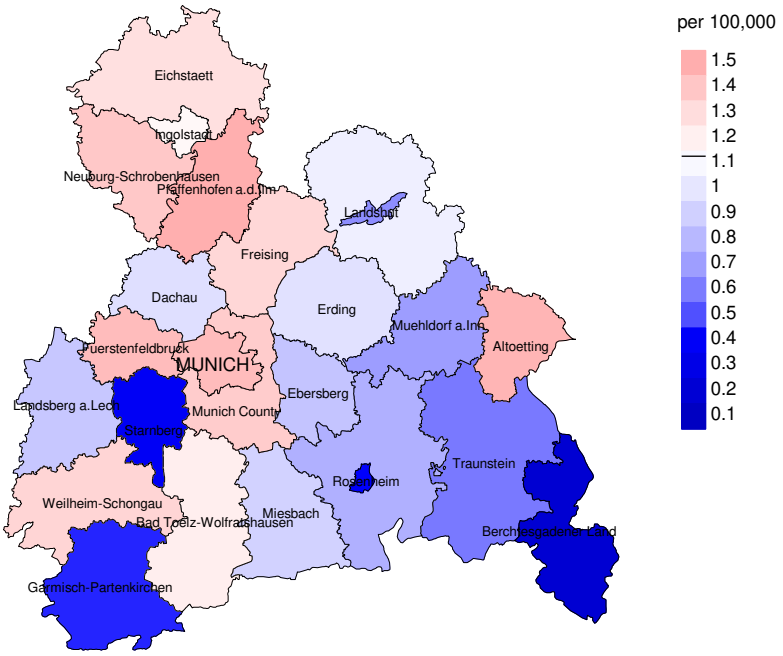


Figure 17. Distribution of age at death (bars; males: mean=71.8 yrs, median=72.2 yrs; females: mean=74.2 yrs, median=74.2 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

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



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

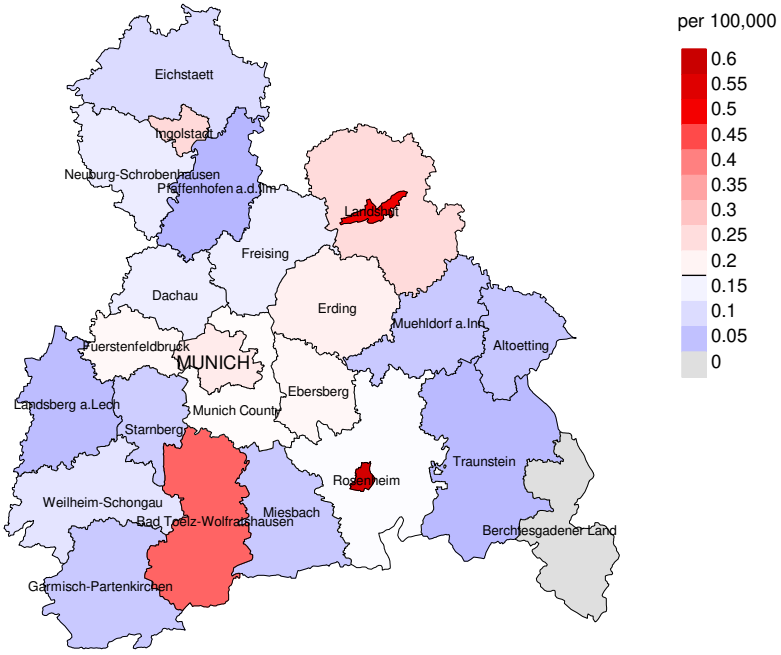
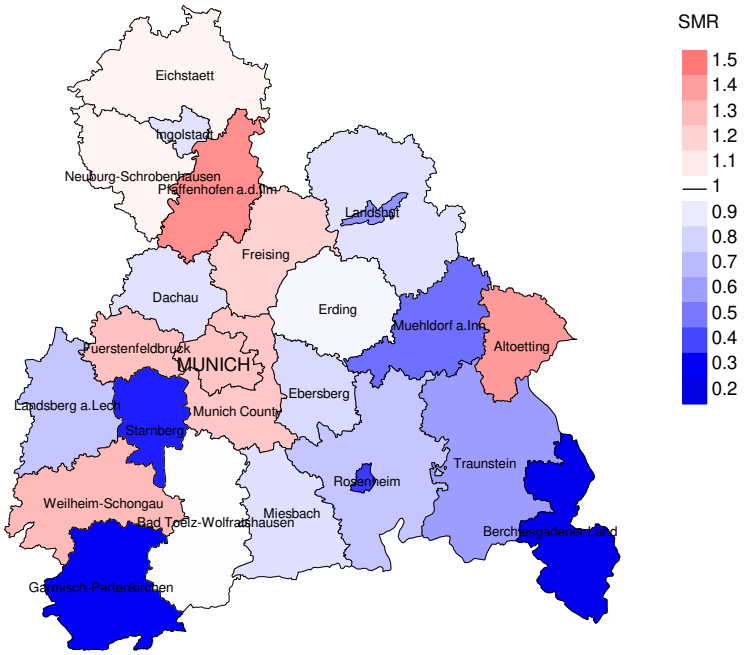


Figure 18a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2016. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 1.1/100,000 WS N=593, females 0.2/100,000 WS N=126).

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 5 women died from pleural mesothelioma. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.2/100,000 (world 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 - 2016: Males



Standardized mortality ratio (SMR) 2007 - 2016: Females

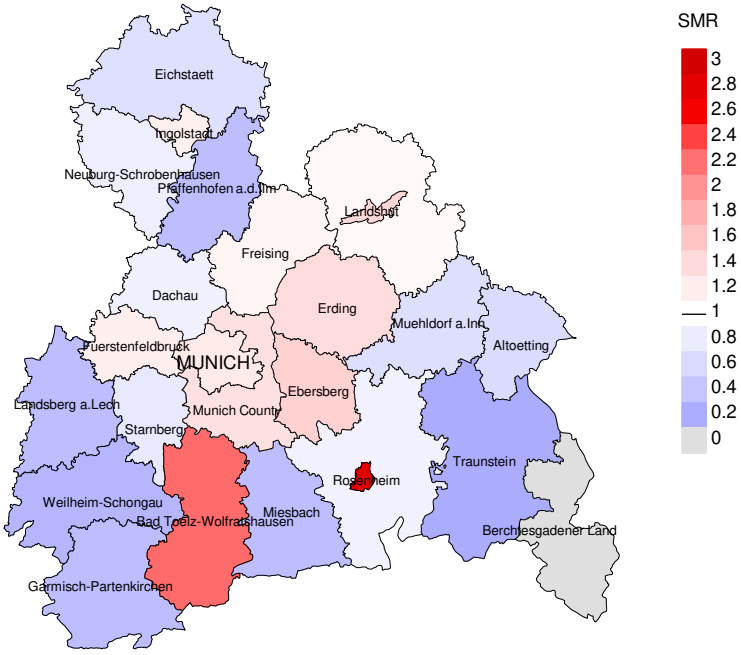


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=593, females N=126).

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 5 women died from pleural mesothelioma. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.48. Though, the value of this parameter may vary with an underlying probability of 99% between 0.32 and 4.20, 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

Recommended Citation

Munich Cancer Registry. ICD-10 C45.0: Pleural mesothelioma - Incidence and Mortality [Internet]. 2018 [updated 2018 Aug 21; cited 2018 Oct 1]. Available from: https://www.tumorregister-muenchen.de/en/facts/base/bC450_E-ICD-10-C45.0-Pleural-mesothelioma-incidence-and-mortality.pdf

Copyright

Disclaimer