Munich Cancer Registry

- Survival
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- *Deutsch*

ICD-10 C45.0: Pleural mesothelioma

Incidence and Mortality

Year of diagnosis	1998-2019
Patients	1,482
Diseases	1,482
Creation date	01/25/2021
Database export	01/07/2021
Population	4.92 m

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

https://www.tumorregister-muenchen.de/en/facts/base/bC450_E-ICD-10-C45.0-Pleural-mesothelioma-incidence-and-mortality.pdf

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

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

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

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

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

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

Munich Cancer Registry, January 2021

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

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

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

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

Code	Description
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	3	10.3	3.4	3.1	100.0	100.0
1999	25	3	12.0	5.6	3.1	100.0	100.0
2000	37	20	54.1	8.8	3.2	100.0	100.0
2001	39	9	23.1	8.5	3.2	100.0	100.0
2002	56	18	32.1	9.7	3.3	98.2	100.0 #
2003	59	14	23.7	11.0	3.2	98.3	100.0
2004	70	9	12.9	10.8	3.3	98.6	98.6
2005	67	9	13.4	11.0	3.3	97.0	97.0
2006	69	8	11.6	11.8	3.1	95.7	97.1
2007	93	5	5.4	12.3	3.0	91.4	97.8 #
2008	97	7	7.2	12.8	2.8	99.0	100.0
2009	82	5	6.1	13.7	3.0	93.9	100.0
2010	84	9	10.7	14.9	2.5	92.9	98.8
2011	88	5	5.7	15.4	2.4	89.8	95.5
2012	92	4	4.3	15.8	2.2	98.9	100.0
2013	79	9	11.4	16.2	2.0	94.9	100.0
2014	71	8	11.3	16.8	1.9	93.0	100.0
2015	97	2	2.1	17.9	2.3	95.9	99.0
2016	73	3	4.1	18.7	1.6	86.3	100.0
2017	62	8	12.9	18.9	1.1	80.6	100.0
2018	69	5	7.2	19.3	0.0	68.1	98.6
2019	44			19.6	0.0	43.2	81.8 ##
1998-2019	1482	163	11.0	19.6	3.1	91.9	98.5

1,482 cases diagnosed 1998-2019 are related to a total of 1,482 patients. Currently, in 335 (22.6 %) of these 1,482 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 284 / 40 / 11 (19.2 % / 2.7 % / 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 2017, a subgroup of 62 cases has been diagnosed, of which 18.9 % 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 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	3	15.0	5.0	3.0	100.0	100.0	
1999	19	76.0	1	5.3	5.1	3.0	100.0	100.0	
2000	29	78.4	15	51.7	7.4	3.1	100.0	100.0	
2001	25	64.1	5	20.0	7.5	3.0	100.0	100.0	
2002	43	76.8	11	25.6	10.3	3.1	97.7	100.0	#
2003	48	81.4	9	18.8	12.0	3.0	97.9	100.0	
2004	63	90.0	9	14.3	11.3	3.0	100.0	100.0	
2005	53	79.1	6	11.3	11.7	3.0	96.2	96.2	
2006	57	82.6	6	10.5	12.6	2.8	94.7	96.5	
2007	75	80.6	4	5.3	13.0	2.9	94.7	98.7	#
2008	78	80.4	4	5.1	13.3	2.6	100.0	100.0	
2009	66	80.5	4	6.1	13.9	2.8	93.9	100.0	
2010	65	77.4	9	13.8	15.4	2.4	96.9	100.0	
2011	74	84.1	3	4.1	15.8	2.4	90.5	95.9	
2012	74	80.4	2	2.7	16.3	2.1	98.6	100.0	
2013	66	83.5	8	12.1	16.5	1.7	95.5	100.0	
2014	58	81.7	5	8.6	17.3	1.5	91.4	100.0	
2015	83	85.6	2	2.4	18.6	1.8	96.4	98.8	
2016	57	78.1	2	3.5	19.2	1.5	84.2	100.0	
2017	51	82.3	6	11.8	19.5	1.4	78.4	100.0	
2018	56	81.2	5	8.9	19.8	0.0	71.4	100.0	
2019	36	81.8			20.2	0.0	47.2	80.6	##
1998-2019	1196	80.7	119	9.9	20.2	3.0	92.4	98.7	

1,196 cases diagnosed 1998-2019 are related to a total of 1,196 patients. Currently, in 277 (23.2 %) of these 1,196 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 238 / 30 / 9 (19.9 % / 2.5 % / 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 2017, a subgroup of 51 cases has been diagnosed, of which 19.5 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 1.4 % 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 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	3.5	100.0	100.0	
1999	6	24.0	2	33.3	6.7	3.6	100.0	100.0	
2000	8	21.6	5	62.5	13.0	3.7	100.0	100.0	
2001	14	35.9	4	28.6	10.8	3.8	100.0	100.0	
2002	13	23.2	7	53.8	8.0	4.0	100.0	100.0	#
2003	11	18.6	5	45.5	8.2	4.3	100.0	100.0	
2004	7	10.0			8.8	4.5	85.7	85.7	
2005	14	20.9	3	21.4	8.5	4.6	100.0	100.0	
2006	12	17.4	2	16.7	8.5	4.5	100.0	100.0	
2007	18	19.4	1	5.6	9.8	3.7	77.8	94.4	#
2008	19	19.6	3	15.8	10.7	3.5	94.7	100.0	
2009	16	19.5	1	6.3	12.9	3.9	93.8	100.0	
2010	19	22.6			12.7	2.9	78.9	94.7	
2011	14	15.9	2	14.3	13.9	2.5	85.7	92.9	
2012	18	19.6	2	11.1	13.6	2.8	100.0	100.0	
2013	13	16.5	1	7.7	15.2	3.4	92.3	100.0	
2014	13	18.3	3	23.1	14.7	4.0	100.0	100.0	
2015	14	14.4			15.1	4.8	92.9	100.0	
2016	16	21.9	1	6.3	16.5	2.1	93.8	100.0	
2017	11	17.7	2	18.2	16.6	0.0	90.9	100.0	
2018	13	18.8			16.9	0.0	53.8	92.3	
2019	8	18.2			17.1	0.0	25.0	87.5	##
1998-2019	286	19.3	44	15.4	17.1	3.5	89.9	97.9	

286 cases diagnosed 1998-2019 are related to a total of 286 patients. Currently, in 58 (20.3 %) of these 286 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 46 / 10 / 2 (16.1 % / 3.5 % / 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 2017, a subgroup of 11 cases has been diagnosed, of which 16.6 % 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 4.92 m as of 2007, respectively)

Year of diagnosis	Males n	Females n	Males Inc. raw	Fem. Inc. raw	Males Inc. WS	Fem. Inc. WS	Males Inc. ES	Fem. Inc. ES	Males Inc. BRD-S	Fem. Inc. BRD-S
1998	20	9	1.8	0.8	1.1	0.4	1.6	0.6	2.1	0.7
1999	19	6	1.7	0.5	1.0	0.2	1.5	0.3	1.9	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	7	3.3	0.4	1.7	0.2	2.5	0.2	3.3	0.3
2005	53	14	2.8	0.7	1.4	0.3	2.1	0.5	2.9	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	19	2.9	0.8	1.3	0.3	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	74	18	3.3	0.8	1.4	0.3	2.2	0.5	3.0	0.6
2013	66	13	2.9	0.5	1.3	0.2	2.0	0.3	2.6	0.4
2014	58	13	2.5	0.5	1.0	0.2	1.5	0.3	2.2	0.4
2015	83	14	3.5	0.6	1.3	0.2	2.2	0.3	3.1	0.4
2016	57	16	2.4	0.7	0.9	0.2	1.4	0.4	2.1	0.5
2017	51	11	2.1	0.4	0.7	0.2	1.2	0.3	1.8	0.3
2018	56	13	2.3	0.5	1.0	0.1	1.5	0.2	2.0	0.4
2019	36	8	1.5	0.3	0.5	0.1	0.8	0.2	1.2	0.2
1998–2019	1196	286	2.7	0.6	1.3	0.2	2.0	0.4	2.6	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	25	67.2	8.8	50.8	81.3	56.1	60.9	67.3	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	70	70.8	7.7	53.1	90.1	62.6	65.5	69.4	75.3	82.0
2005	67	71.1	8.8	45.1	88.3	62.1	64.7	70.7	77.7	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	84	72.0	9.5	36.2	93.6	59.7	67.6	72.0	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	92	73.0	9.7	41.3	95.6	60.1	68.9	73.4	79.4	84.7
2013	79	73.4	9.1	49.4	95.4	61.3	67.9	73.7	80.0	85.5
2014	71	75.2	8.1	55.1	92.1	66.2	70.3	75.2	80.5	85.2
2015	97	75.1	9.7	26.1	91.6	66.4	71.2	76.2	80.0	87.4
2016	73	74.9	9.3	45.1	91.6	63.6	71.2	75.9	81.2	83.5
2017	62	75.0	10.5	43.5	92.6	58.0	69.3	77.0	81.3	86.0
2018	69	74.8	10.0	45.1	91.5	62.7	69.9	75.6	81.5	86.0
2019	44	74.8	11.5	34.2	90.1	56.9	69.7	78.5	82.5	84.5
1998–2019	1482	72.1	9.9	26.1	97.3	59.1	66.1	72.8	79.2	84.1

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	20	67.1	10.4	49.4	89.2	53.9	60.8	65.6	72.6	83.2
1999	19	65.3	8.8	50.8	81.0	54.5	58.8	62.3	71.6	80.6
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	53	70.7	8.8	45.1	86.8	62.1	65.0	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	74	73.3	7.8	53.7	88.8	62.8	69.3	73.5	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	83	74.9	9.6	26.1	91.6	66.7	71.2	76.2	79.5	85.6
2016	57	75.6	8.9	45.1	91.6	67.9	71.7	76.6	81.2	83.6
2017	51	76.0	10.4	43.5	92.6	58.4	72.6	78.4	83.0	87.2
2018	56	74.1	10.6	45.1	91.5	62.4	68.8	75.1	81.5	86.0
2019	36	74.7	12.2	34.2	87.8	56.2	69.9	79.6	82.5	84.4
1998–2019	1196	71.9	9.5	26.1	97.3	59.4	66.1	72.6	78.7	83.5

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	7	68.2	11.9	53.1	84.7	53.1	57.5	65.0	78.8	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	19	72.3	12.4	36.2	93.6	54.6	67.7	73.8	78.2	87.1
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	13	78.2	9.3	59.6	92.1	68.1	70.3	80.3	84.1	88.6
2015	14	76.3	10.8	53.5	90.8	60.6	68.9	78.0	84.6	87.7
2016	16	72.4	10.5	51.8	91.3	55.3	68.3	74.7	77.8	83.0
2017	11	70.4	10.0	55.3	85.2	57.8	59.1	74.3	78.6	80.9
2018	13	77.9	6.8	62.7	87.7	69.9	75.5	77.9	81.8	85.8
2019	8	75.2	8.5	66.0	90.1	66.0	68.7	73.1	81.2	90.1
1998–2019	286	72.9	11.3	35.6	95.6	57.4	66.4	74.3	81.4	85.8

Table 4

Age distribution by 5-year age group and sex for period 2007-2019
(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	1	0.1	0.2	1	0.1	0.2			0.0
35-39	1	0.1	0.3			0.2	1	0.5	0.5
40-44	7	0.7	1.0	3	0.4	0.6	4	2.1	2.6
45-49	11	1.1	2.0	8	1.0	1.5	3	1.6	4.2
50-54	24	2.3	4.4	19	2.3	3.8	5	2.6	6.8
55-59	51	4.9	9.3	42	5.0	8.8	9	4.7	11.5
60-64	74	7.2	16.5	65	7.7	16.6	9	4.7	16.1
65-69	170	16.5	33.0	140	16.7	33.3	30	15.6	31.8
70-74	226	21.9	54.9	191	22.8	56.0	35	18.2	50.0
75-79	207	20.1	75.0	171	20.4	76.4	36	18.8	68.8
80-84	162	15.7	90.7	132	15.7	92.1	30	15.6	84.4
85+	96	9.3	100.0	66	7.9	100.0	30	15.6	100.0
All ages	1031	100.0		839	100.0		192	100.0	

Table 5

Age-specific incidence, DCO rate and proportion of all cancers
for period 2007–2019

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=54 %	Females DCO rate n=16 %	Males Prop.all cancers n=143063 %	Females Prop.all cancers n=144724 %
0– 4								
5– 9								
10–14								
15–19								
20–24								
25–29	1		0.0				0.1	
30–34	1		0.0				0.1	
35–39		1		0.0				0.0
40–44	3	4	0.1	0.2			0.1	0.1
45–49	8	3	0.3	0.1			0.2	0.0
50–54	19	5	0.8	0.2	5.3		0.2	0.0
55–59	42	9	2.2	0.5			0.4	0.1
60–64	65	9	4.0	0.5	3.1		0.4	0.1
65–69	140	30	9.2	1.8	4.3		0.6	0.2
70–74	191	35	13.6	2.2	4.7	2.9	0.7	0.2
75–79	171	36	15.4	2.6	4.7	2.8	0.8	0.2
80–84	132	30	20.1	3.1	12.9	16.7	0.9	0.2
85+	66	30	15.5	3.1	16.7	30.0	0.7	0.2
All ages	839	192			6.4	8.3	0.6	0.1
Incidence								
Raw			2.8	0.6				
WS			1.2	0.2				
ES			1.9	0.3				
BRD-S			2.6	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).

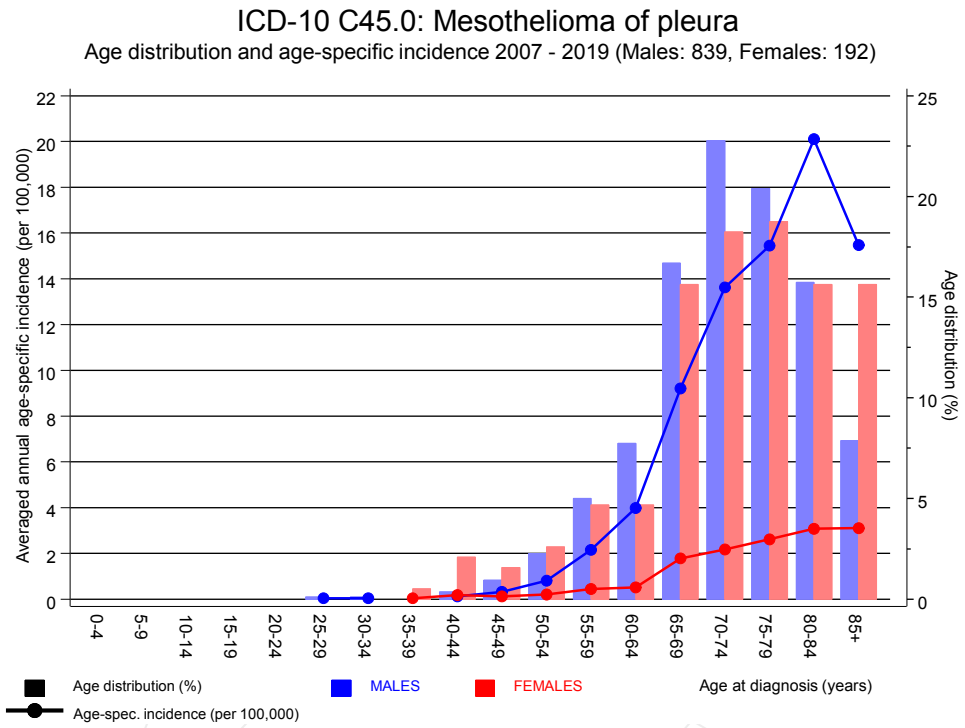


Figure 6. Age distribution (males: mean=73.1 yrs, median=73.8 yrs; females: mean=73.9 yrs, median=75.1 yrs) and age-specific incidence.

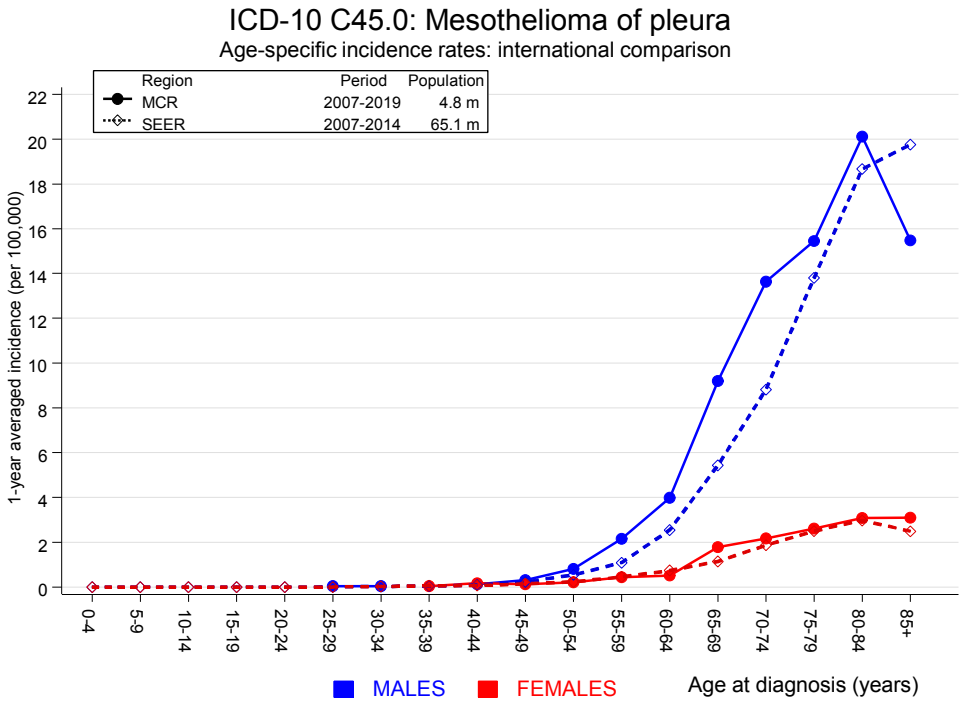


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:
Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 18 Regs Research Data, released April 2019, based on the November 2018 submission. http://www.seer.cancer.gov.

Table 7a

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

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C03–C06	Oral cavity	1	0.2	4.7	0.1	26.3		5.2	
C17	Small intestine	1	0.2	6.2	0.2	34.7		5.5	
C18	Colon	4	2.6	1.5	0.4	3.9		9.1	
C19–C20	Rectum	2	1.5	1.4	0.2	5.0		3.6	
C22	Liver	1	0.8	1.2	0.0	6.8		1.2	100.0
C33–C34	Lung	15	3.3	4.6	2.6	7.6	#	77.2	73.3
C38,C45	Mesothelioma	1	0.2	4.9	0.1	27.3		5.2	
C43	Malign. melanoma	1	1.2	0.8	0.0	4.6		−1.3	100.0
C61	Prostate	5	8.0	0.6	0.2	1.5		−19.6	40.0
C64	Kidney	2	0.9	2.1	0.3	7.6		6.9	
C70–C72	CNS cancer	1	0.3	3.0	0.1	16.4		4.3	
C73	Thyroid	1	0.2	6.1	0.2	34.1		5.5	100.0
C76–C79	CUP	1	0.4	2.2	0.1	12.4		3.6	
C82–C85	NHL	4	1.1	3.5	1.0	9.1		18.9	50.0
C91–C96	Leukaemia	2	0.4	5.0	0.6	17.9		10.5	50.0
Not observed		0	6.3	0.0	0.0	0.6	#	−41.2	
All further malignancies		42	27.6	1.5	1.1	2.1	#	94.6	45.2

Patients	1100
Median age at next malignancy (years)	73.8
Person-years	1521
Mean observation time (years)	1.4
Median observation time (years)	1.0

The occurrence of further specified malignancy is statistically significant.

Table 7b

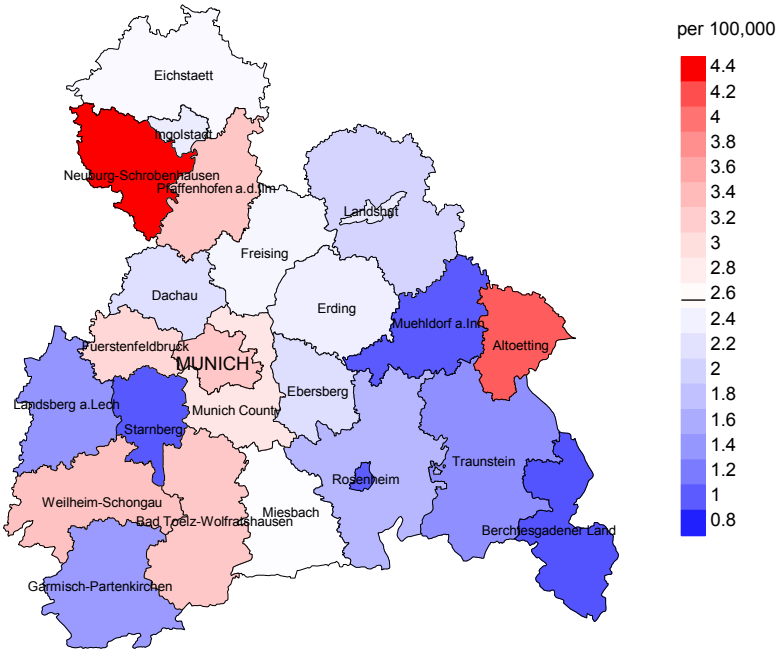
Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of further malignancies for period 1998–2019
FEMALES

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C16	Stomach	1	0.1	8.0	0.2	44.4	26.7	100.0
C25	Pancreas	1	0.2	5.5	0.1	30.5	25.0	
C33–C34	Lung	2	0.3	6.6	0.8	24.0	51.9	100.0
C50	Breast	1	1.2	0.9	0.0	4.8	−4.9	100.0
C54	Corpus uteri	1	0.2	4.6	0.1	25.6	23.9	
C56	Ovary	1	0.2	6.4	0.2	35.8	25.8	100.0
Not observed		0	1.7	0.0	0.0	2.2	−51.2	
All further malignancies		7	3.8	1.8	0.7	3.8	97.4	71.4

Patients	249
Median age at next malignancy (years)	71.0
Person-years	327
Mean observation time (years)	1.3
Median observation time (years)	0.8

The occurrence of further specified malignancy is statistically significant.

Average incidence (Germany 1987 standard population) 2007 - 2019: Males



Average incidence (Germany 1987 standard population) 2007 - 2019: Females

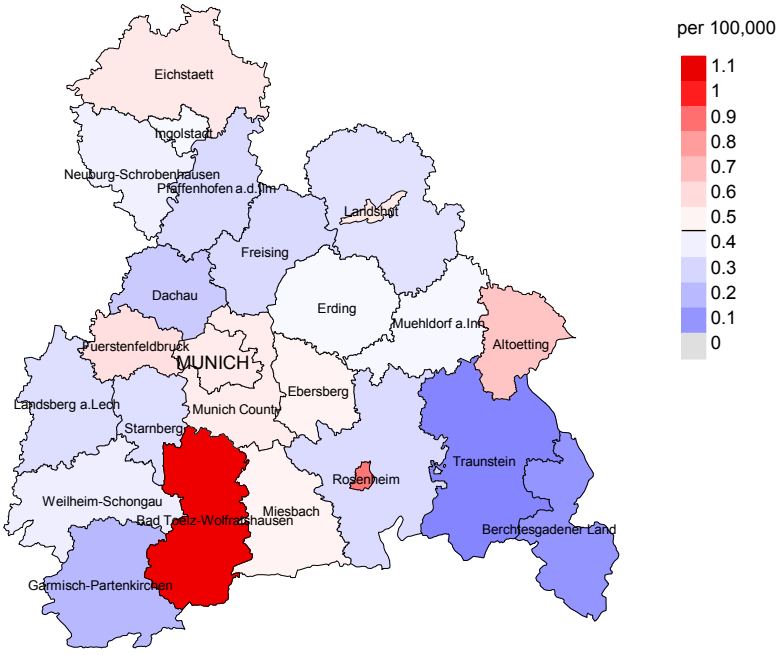
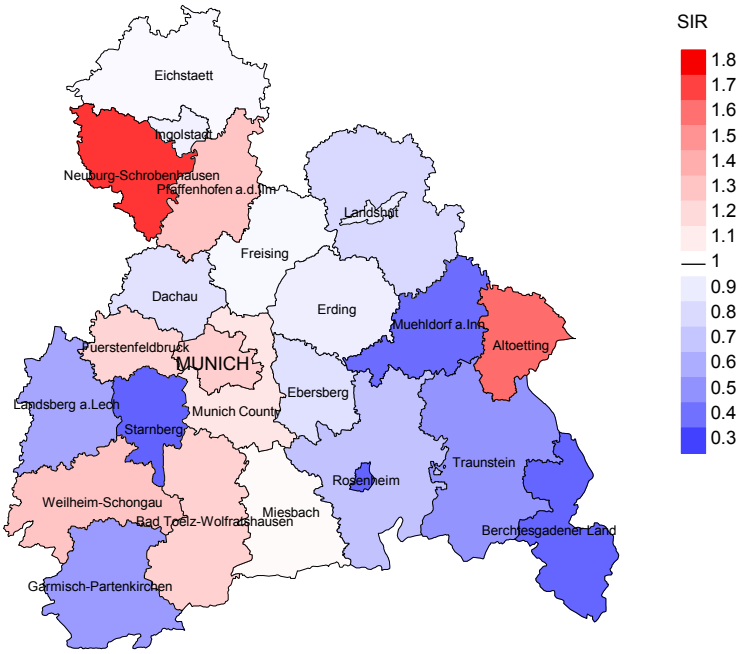


Figure 8a. Map of cancer incidence (german standard population, incl. DCO cases) by county averaged for period 2007 to 2019. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 2.6/100,000 WS N=839, females 0.5/100,000 WS N=192).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,462 female residents (averaged) in the period from 2007 to 2019 a total of 6 women were identified with newly diagnosed pleural mesothelioma. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 0.5/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.1 and 1.4/100,000.

Standardized incidence ratio (SIR) 2007 - 2019: Males



Standardized incidence ratio (SIR) 2007 - 2019: Females

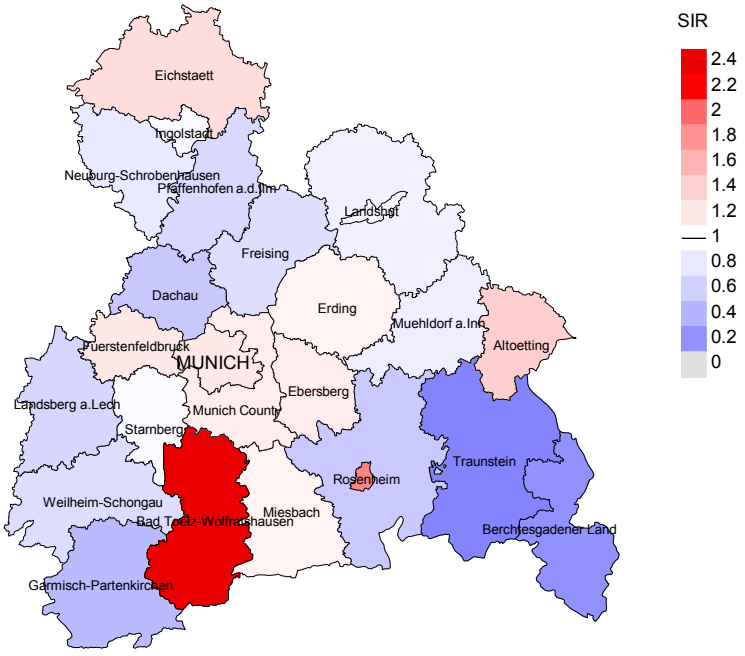


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2019. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=839, females N=192).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,153 female residents (averaged) in the period from 2007 to 2019 a total of 6 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 1.16. Though, the value of this parameter may vary with an underlying probability of 99% between 0.30 and 3.02, 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 4.92 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	10.3	29	100.0	89.7
1999	25	100.0	12.0	25	100.0	92.0
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	32.1	55	98.2	98.2
2003	59	100.0	23.7	58	98.3	94.8
2004	70	98.6	12.9	69	98.6	95.7
2005	67	97.0	13.4	65	97.0	100.0
2006	69	97.1	11.6	66	95.7	98.5
2007	93	97.8	5.4	85	91.4	97.6
2008	97	100.0	7.2	96	99.0	99.0
2009	82	100.0	6.1	77	93.9	94.8
2010	84	98.8	10.7	78	92.9	96.2
2011	88	95.5	5.7	79	89.8	100.0
2012	92	100.0	4.3	91	98.9	97.8
2013	79	100.0	11.4	75	94.9	100.0
2014	71	100.0	11.3	66	93.0	95.5
2015	97	99.0	2.1	93	95.9	89.2
2016	73	100.0	4.1	63	86.3	79.4
2017	62	100.0	12.9	50	80.6	70.0
2018	69	98.6	7.2	47	68.1	57.4
2019	44	81.8		19	43.2	94.7
1998–2019	1482	98.5	11.0	1362	91.9	93.2

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 4.92 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	25	21	90.5	6	24.0
2000	37	36	94.4	18	48.6
2001	39	34	94.1	18	46.2
2002	56	46	95.7	24	42.9
2003	59	41	92.7	23	39.0
2004	70	51	96.1	19	27.1
2005	67	58	96.6	21	31.3
2006	69	62	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	84	83	96.4	26	31.0
2011	88	80	97.5	25	28.4
2012	92	86	100.0	28	30.4
2013	79	82	98.8	30	38.0
2014	71	68	100.0	23	32.4
2015	97	63	100.0	23	23.7
2016	73	87	98.9	19	26.0
2017	62	80	98.8	20	32.3
2018	69	55	29.1	19	27.5
2019	44	49	57.1	7	15.9
1998–2019	1482	1327	93.2	457	30.8

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 4.92 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer-related %	Prop. non-cancer-related %	Prop. cancer recorded on death certificate %
1998	24	87.5	12.5	95.7
1999	21	90.5	9.5	100.0
2000	36	91.7	8.3	100.0
2001	34	91.2	8.8	100.0
2002	46	93.5	6.5	100.0
2003	41	90.2	9.8	100.0
2004	51	92.2	7.8	100.0
2005	58	96.6	3.4	94.6
2006	62	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	86	95.3	4.7	96.5
2013	82	96.3	3.7	98.8
2014	68	94.1	5.9	97.1
2015	63	95.2	4.8	100.0
2016	87	95.4	4.6	98.8
2017	80	96.3	3.8	100.0
2018	55	52.7	47.3	100.0
2019	49	69.4	30.6	100.0
1998-2019	1327	91.9	8.1	98.9

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	22	65.1	65.7	55.1	65.6
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	53	71.1	71.2	66.2	71.4
2006	52	72.7	73.0	54.4	73.0
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	54	76.8	77.1	72.2	76.8
2016	72	77.2	77.3	74.6	77.2
2017	65	77.5	77.3	82.8	77.5
2018	42	79.1	80.5	76.2	83.0
2019	38	77.5	74.4	78.7	80.8
1998–2019	1081	73.6	73.3	75.7	73.3

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	9	65.2	65.2		64.5
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	16	77.5	77.1	86.7	77.5
2013	17	74.7	74.7		74.7
2014	11	74.9	74.7	88.6	74.9
2015	9	84.7	84.7		84.7
2016	15	78.7	77.7	91.5	78.7
2017	15	65.0	64.8	65.0	64.8
2018	13	77.4	75.6	82.1	75.6
2019	11	76.5	73.3	79.9	74.9
1998–2019	246	75.5	74.8	78.7	75.2

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	17	1.5	0.85	0.9	0.83	1.4	0.84	1.7	0.82
1999	16	1.4	0.84	0.9	0.85	1.3	0.87	1.6	0.87
2000	22	1.9	0.76	1.1	0.80	1.7	0.78	2.3	0.80
2001	20	1.7	0.80	1.0	0.76	1.4	0.74	1.7	0.74
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	51	2.7	0.96	1.3	0.94	2.0	0.96	2.8	0.95
2006	51	2.7	0.89	1.2	0.82	1.9	0.85	2.8	0.92
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	0.91	1.3	0.93	2.0	0.92	2.8	0.93
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	51	2.1	0.61	0.7	0.53	1.2	0.57	1.9	0.61
2016	69	2.9	1.21	1.1	1.24	1.8	1.24	2.6	1.19
2017	63	2.6	1.24	0.9	1.19	1.5	1.20	2.3	1.25
2018	20	0.8	0.36	0.2	0.25	0.4	0.28	0.7	0.34
2019	29	1.2	0.81	0.5	0.96	0.7	0.89	1.0	0.84
1998-2019	998	2.3	0.83	1.0	0.81	1.6	0.82	2.2	0.84

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	9	0.5	1.29	0.2	1.43	0.3	1.38	0.4	1.27
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	0.95	0.2	0.70	0.4	0.76	0.5	0.82
2011	10	0.4	0.71	0.1	0.64	0.2	0.66	0.3	0.69
2012	15	0.6	0.83	0.2	0.67	0.3	0.73	0.5	0.83
2013	17	0.7	1.31	0.2	1.33	0.4	1.36	0.5	1.33
2014	10	0.4	0.77	0.2	0.93	0.2	0.85	0.3	0.74
2015	9	0.4	0.64	0.1	0.51	0.2	0.55	0.2	0.58
2016	14	0.6	0.88	0.2	0.77	0.3	0.77	0.4	0.86
2017	14	0.6	1.27	0.2	1.37	0.4	1.32	0.4	1.31
2018	9	0.4	0.69	0.1	0.91	0.2	0.84	0.3	0.78
2019	5	0.2	0.63	0.1	0.70	0.1	0.67	0.2	0.63
1998-2019	222	0.5	0.78	0.2	0.75	0.3	0.76	0.4	0.77

Table 12

Age distribution of age at death (cancer-related) for period 2007-2019
(**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	0.3	0.3	1	0.1	0.1	2	1.3	1.3
45-49	10	1.1	1.5	7	1.0	1.1	3	1.9	3.2
50-54	18	2.1	3.6	13	1.8	2.9	5	3.2	6.4
55-59	31	3.6	7.1	24	3.4	6.3	7	4.5	10.8
60-64	58	6.7	13.8	50	7.0	13.3	8	5.1	15.9
65-69	141	16.2	29.9	127	17.8	31.0	14	8.9	24.8
70-74	194	22.2	52.2	159	22.2	53.3	35	22.3	47.1
75-79	183	21.0	73.2	153	21.4	74.7	30	19.1	66.2
80-84	147	16.9	90.0	121	16.9	91.6	26	16.6	82.8
85+	87	10.0	100.0	60	8.4	100.0	27	17.2	100.0
All ages	872	100.0		715	100.0		157	100.0	

Table 13

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2019
(**incl. multiple malignancies**)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	Males MI-index	Females Age-spec. mortal.	Females MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4								
5- 9								
10-14								
15-19								
20-24								
25-29								
30-34								
35-39								
40-44	1	2	0.0	0.33	0.1	0.50	0.2	0.2
45-49	7	3	0.3	0.88	0.1	1.00	0.5	0.2
50-54	13	5	0.6	0.68	0.2	1.00	0.5	0.2
55-59	24	7	1.2	0.57	0.4	0.78	0.6	0.2
60-64	50	8	3.1	0.77	0.5	0.89	0.8	0.2
65-69	127	14	8.4	0.91	0.8	0.47	1.5	0.2
70-74	159	35	11.3	0.83	2.2	1.00	1.4	0.4
75-79	153	30	13.8	0.89	2.2	0.83	1.3	0.3
80-84	121	26	18.4	0.92	2.7	0.87	1.3	0.3
85+	60	27	14.1	0.91	2.8	0.90	0.7	0.2
All ages	715	157					1.1	0.3
Mortality								
Raw			2.4	0.85	0.5	0.82		
WS			1.0	0.83	0.2	0.77		
ES			1.6	0.84	0.3	0.79		
BRD-S			2.2	0.85	0.4	0.81		
PYLL-70								
per 100,000			5.3		1.5			
ES			4.4		1.2			
AYLL-70			6.3		10.1			

Table 14a

Further malignancies in deaths in period 1998–2019
MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03–C06 Oral cavity	2	0.8	1	50.0			1	50.0
C07–C08 Salivary gland	1	0.4	1	100.0				
C09–C10 Oropharynx	2	0.8	2	100.0				
C12–C13 Hypopharynx	1	0.4	1	100.0				
C15 Oesophagus	1	0.4	1	100.0				
C16 Stomach	4	1.6	4	100.0				
C17 Small intestine	3	1.2	2	66.7			1	33.3
C18 Colon	21	8.6	15	71.4	4	19.0	2	9.5
C19–C20 Rectum	13	5.3	11	84.6	2	15.4		
C22 Liver	2	0.8	1	50.0	1	50.0		
C30–C31 Sinuses	1	0.4	1	100.0				
C32 Larynx	1	0.4	1	100.0				
C33–C34 Lung	18	7.4	2	11.1	6	33.3	10	55.6
C38,C45 Mesothelioma	3	1.2			1	33.3	2	66.7
C43 Malign. melanoma	13	5.3	12	92.3			1	7.7
C44 Skin others	29	11.9	20	69.0	2	6.9	7	24.1
C46,C49 Soft tissue	2	0.8	2	100.0				
C60 Penis	1	0.4	1	100.0				
C61 Prostate	81	33.3	73	90.1	4	4.9	4	4.9
C62 Testis	1	0.4	1	100.0				
C64 Kidney	13	5.3	11	84.6	1	7.7	1	7.7
C67 Bladder	7	2.9	6	85.7	1	14.3		
C70–C72 CNS cancer	1	0.4					1	100.0
C73 Thyroid	2	0.8	1	50.0			1	50.0
C76–C79 CUP	3	1.2	2	66.7			1	33.3
C81 Hodgkin lymphoma	1	0.4	1	100.0				
C82–C85 NHL	12	4.9	7	58.3	2	16.7	3	25.0
C90 Mult. myeloma	2	0.8	2	100.0				
C91–C96 Leukaemia	2	0.8			1	50.0	1	50.0
All further malignancies	243	100.0	182	74.9	25	10.3	36	14.8

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

Table 14b

Further malignancies in deaths in period 1998–2019
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C16	Stomach	2	3.8	1	50.0			1	50.0
C18	Colon	6	11.5	6	100.0				
C25	Pancreas	1	1.9					1	100.0
C33–C34	Lung	3	5.8	1	33.3			2	66.7
C43	Malign. melanoma	2	3.8	2	100.0				
C44	Skin others	3	5.8	2	66.7			1	33.3
C50	Breast	15	28.8	14	93.3			1	6.7
C53	Cervix uteri	1	1.9	1	100.0				
C54	Corpus uteri	4	7.7	3	75.0			1	25.0
C56	Ovary	2	3.8	1	50.0			1	50.0
C64	Kidney	1	1.9	1	100.0				
C67	Bladder	2	3.8	2	100.0				
C70–C72	CNS cancer	1	1.9	1	100.0				
C73	Thyroid	4	7.7	4	100.0				
C76–C79	CUP	1	1.9			1	100.0		
C81	Hodgkin lymphoma	2	3.8	2	100.0				
C82–C85	NHL	1	1.9	1	100.0				
C90	Mult. myeloma	1	1.9	1	100.0				
All further malignancies		52	100.0	43	82.7	1	1.9	8	15.4

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

Table 15

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

Age at death Years	Males 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	0.0	0.33	0.0	0.33	0.2	0.1
45-49	7	3	0.3	0.88	0.1	1.00	0.6	0.2
50-54	12	5	0.5	0.80	0.2	1.00	0.5	0.2
55-59	23	5	1.2	0.56	0.3	0.71	0.6	0.2
60-64	46	7	2.8	0.81	0.4	1.00	0.9	0.2
65-69	109	9	7.2	0.95	0.5	0.43	1.6	0.2
70-74	127	28	9.1	0.86	1.7	0.90	1.5	0.4
75-79	104	23	9.4	0.87	1.7	0.92	1.2	0.3
80-84	85	24	12.9	0.97	2.5	0.96	1.3	0.4
85+	39	20	9.1	0.93	2.1	0.91	0.7	0.2
All ages	553	125					1.1	0.3
Mortality								
Raw			1.8	0.87	0.4	0.84		
WS			0.8	0.85	0.1	0.79		
ES			1.2	0.85	0.2	0.80		
BRD-S			1.7	0.87	0.3	0.83		
PYLL-70								
per 100,000			4.9		1.2			
ES			4.1		1.0			
AYLL-70			6.6		10.7			

* See corresponding tables with multiple malignancies.

Table 16

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

Age at death Years	Males 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	0.0	0.33	0.0	0.33	0.2	0.1
45-49	7	3	0.3	0.88	0.1	1.00	0.6	0.2
50-54	12	5	0.5	0.80	0.2	1.00	0.5	0.2
55-59	23	5	1.2	0.56	0.3	0.71	0.6	0.2
60-64	46	7	2.8	0.84	0.4	1.00	0.9	0.2
65-69	105	8	6.9	0.94	0.5	0.40	1.6	0.2
70-74	119	24	8.5	0.84	1.5	0.83	1.5	0.4
75-79	100	23	9.0	0.86	1.7	0.92	1.3	0.3
80-84	83	24	12.6	0.95	2.5	1.00	1.3	0.4
85+	37	19	8.7	0.90	2.0	0.86	0.7	0.2
All ages	533	119					1.1	0.3
Mortality								
Raw			1.8	0.86	0.4	0.82		
WS			0.8	0.84	0.1	0.76		
ES			1.2	0.85	0.2	0.78		
BRD-S			1.6	0.86	0.3	0.82		
PYLL-70								
per 100,000			4.9		1.2			
ES			4.1		1.0			
AYLL-70			6.6		10.9			

* See corresponding tables with multiple malignancies.

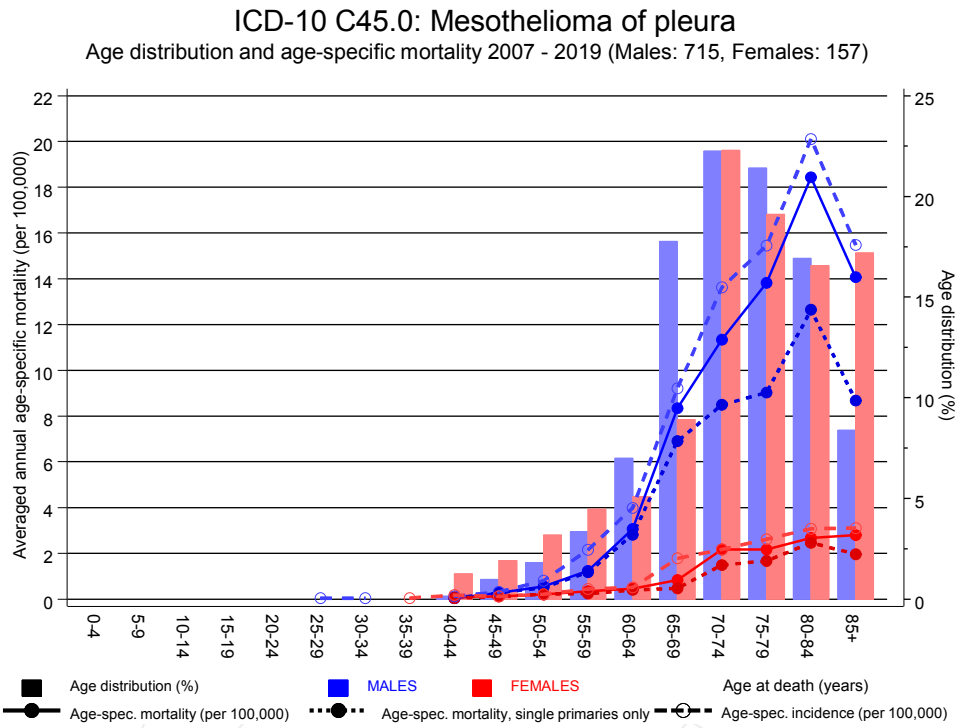


Figure 17. Distribution of age at death (bars; males: mean=72.4 yrs, median=72.9 yrs; females: mean=73.4 yrs, median=74.2 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

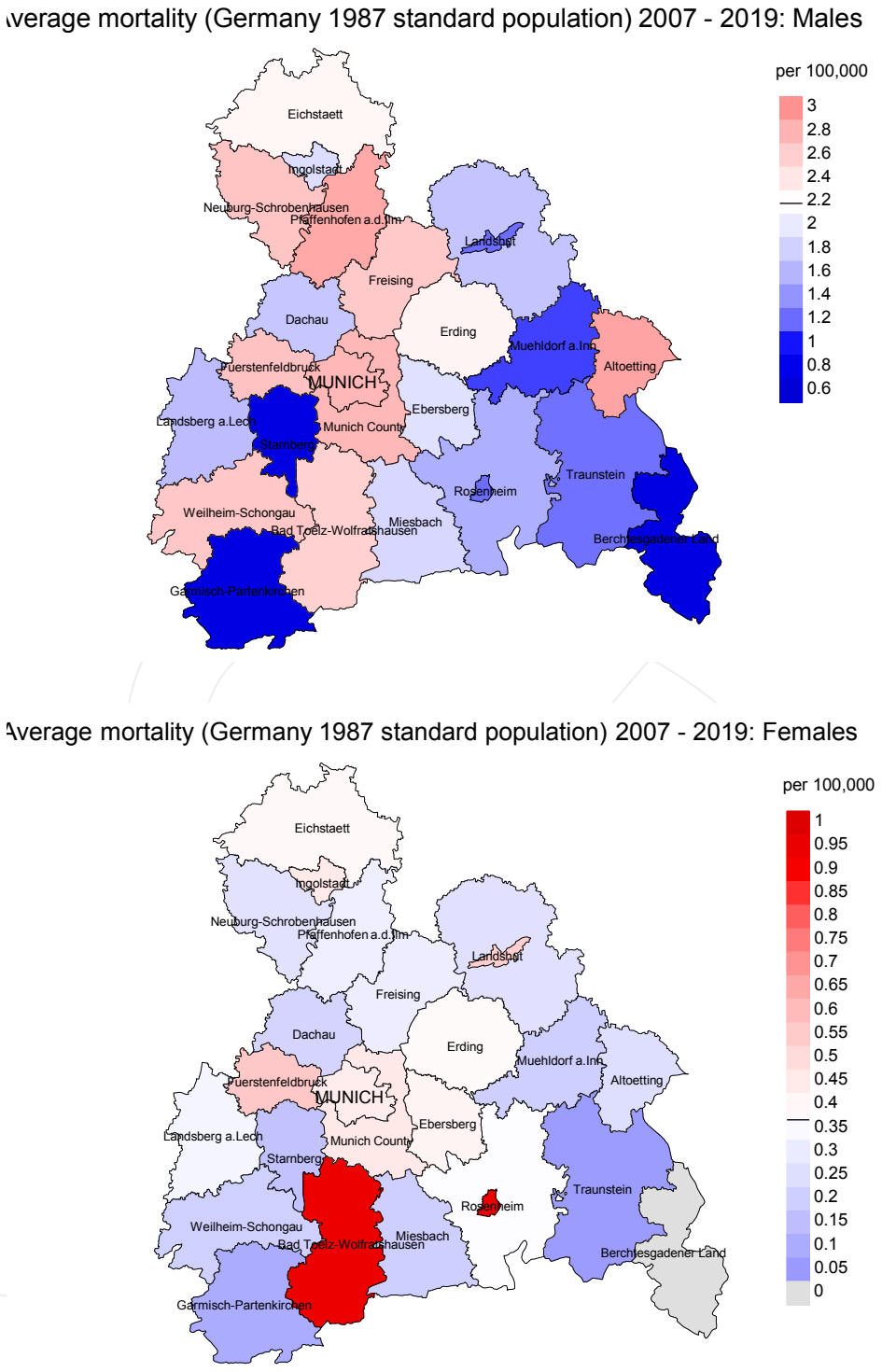
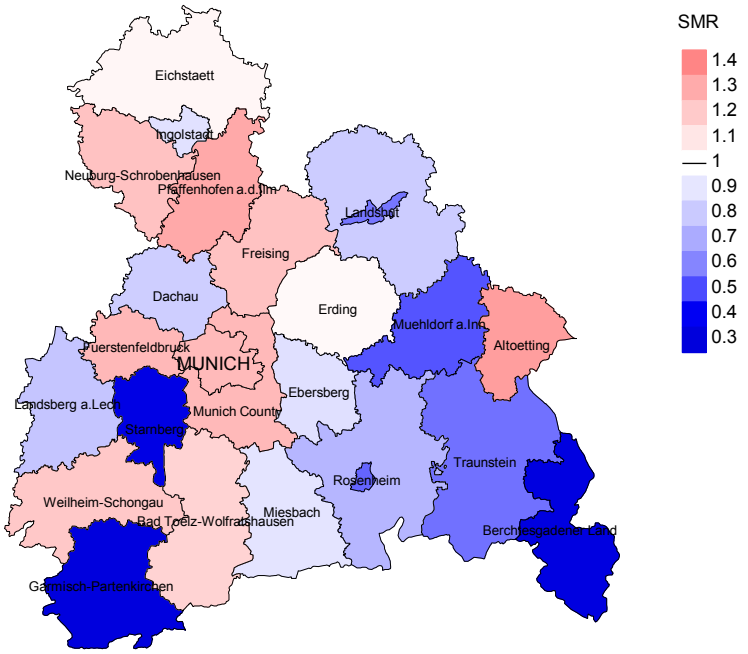


Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2019. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 2.2/100,000 WS N=715, females 0.4/100,000 WS N=157).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,462 female residents (averaged) in the period from 2007 to 2019 a total of 5 women died from pleural mesothelioma. Therefore, the mean mortality 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 mortality ratio (SMR) 2007 - 2019: Males



Standardized mortality ratio (SMR) 2007 - 2019: Females

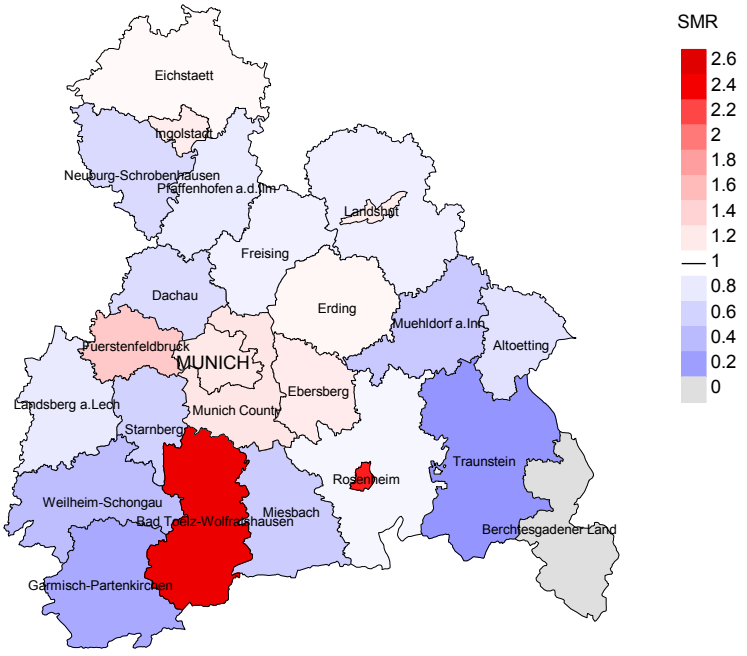


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2019. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=715, females N=157).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,153 female residents (averaged) in the period from 2007 to 2019 a total of 5 women died from pleural mesothelioma. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.18. Though, the value of this parameter may vary with an underlying probability of 99% between 0.25 and 3.34, 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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