

# Munich Cancer Registry



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## ICD-10 C69: Eye cancer

### Incidence and Mortality

Year of diagnosis	1998-2019
Patients	742
Diseases	743
Creation date	01/25/2021
Database export	01/07/2021
Population	4.92 m



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

[https://www.tumorregister-muenchen.de/en/facts/base/bC69\\_\\_E-ICD-10-C69-Eye-cancer-incidence-and-mortality.pdf](https://www.tumorregister-muenchen.de/en/facts/base/bC69__E-ICD-10-C69-Eye-cancer-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<sup>#</sup>, with a total of 4.69 million inhabitants, account for the frequency of cancer diseases<sup>##</sup> 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<sup>###</sup> 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](mailto:tumor@ibe.med.uni-muenchen.de).

Munich Cancer Registry, January 2021

<sup>#</sup> 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).

<sup>##</sup> 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.

<sup>###</sup> 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
C69.-	Malignant neoplasm of eye and adnexa
C69.0	Conjunctiva
C69.1	Cornea
C69.2	Retina
C69.3	Choroid
C69.4	Ciliary body
C69.5	Lacrimal gland and duct
C69.6	Orbit
C69.8	Overlapping lesion of eye and adnexa
C69.9	Eye, unspecified

## 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	24	0.0	16.0	66.7	91.7
1999	23	4.3	15.9	56.5	95.7
2000	28	9.3	15.7	85.7	96.4
2001	14	14.6	15.2	78.6	100.0
2002	36	14.4	15.0	63.9	86.1 #
2003	41	13.3	15.3	56.1	85.4
2004	54	13.2	14.9	68.5	85.2
2005	55	12.4	14.5	70.9	92.7
2006	46	12.5	14.5	58.7	89.1
2007	49	12.7	13.4	69.4	87.8 #
2008	47	13.7	13.6	61.7	97.9
2009	50	13.7	13.4	48.0	98.0
2010	48	13.8	12.8	56.3	93.8
2011	42	13.8	12.7	52.4	100.0
2012	34	14.0	14.4	47.1	94.1
2013	35	13.9	15.1	57.1	100.0
2014	34	14.4	15.3	35.3	100.0
2015	22	15.1	10.4	45.5	95.5
2016	28	15.5	14.0	53.6	100.0
2017	23	15.8	12.5	26.1	100.0
2018	6	16.0	11.1	50.0	100.0
2019	4	16.2	25.0	25.0	75.0 ##
1998-2019	743	16.2	16.0	58.1	93.7

743 cases diagnosed 1998-2019 are related to a total of 742 patients. Currently, in 225 (30.3 %) of these 742 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 167 / 35 / 23 (22.5 % / 4.7 % / 3.1 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:

In 2017, a subgroup of 23 cases has been diagnosed, of which 15.8 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 12.5 % 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	9	37.5	0.0	16.3	55.6	100.0
1999	11	47.8	5.0	16.7	45.5	100.0
2000	16	57.1	8.3	16.7	93.8	100.0
2001	6	42.9	11.9	16.0	100.0	100.0
2002	25	69.4	11.9	16.0	72.0	84.0 #
2003	16	39.0	12.0	16.6	56.3	87.5
2004	25	46.3	12.0	16.8	72.0	84.0
2005	23	41.8	13.0	15.7	73.9	100.0
2006	19	41.3	13.3	15.9	52.6	89.5
2007	26	53.1	13.6	14.5	57.7	84.6 #
2008	26	55.3	14.4	15.5	53.8	100.0
2009	23	46.0	14.7	14.3	60.9	100.0
2010	25	52.1	15.6	13.7	64.0	96.0
2011	20	47.6	16.7	13.0	50.0	100.0
2012	21	61.8	16.5	15.5	52.4	90.5
2013	17	48.6	16.2	18.3	58.8	100.0
2014	17	50.0	16.3	18.5	29.4	100.0
2015	15	68.2	17.9	10.4	60.0	93.3
2016	14	50.0	17.8	14.7	57.1	100.0
2017	14	60.9	18.5	10.0	28.6	100.0
2018	3	50.0	18.6	16.7	33.3	100.0
2019	3	75.0	18.7	33.3	33.3	66.7 ##
1998-2019	374	50.3	18.7	16.3	59.1	94.4

374 cases diagnosed 1998-2019 are related to a total of 374 patients. Currently, in 121 (32.4 %) of these 374 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 87 / 20 / 14 (23.3 % / 5.3 % / 3.7 %) 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 retrieved from the respective headings.

How to interpret:

In 2017, a subgroup of 14 cases has been diagnosed, of which 18.5 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 10.0 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 1b

Cases with invasive cancer by year of diagnosis, proportions of 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	15	62.5	0.0	15.6	73.3	86.7
1999	12	52.2	3.7	15.1	66.7	91.7
2000	12	42.9	10.3	14.8	75.0	91.7
2001	8	57.1	17.0	14.4	62.5	100.0
2002	11	30.6	17.2	14.1	45.5	90.9 #
2003	25	61.0	14.5	14.0	56.0	84.0
2004	29	53.7	14.3	13.0	65.5	86.2
2005	32	58.2	11.8	13.3	68.8	87.5
2006	27	58.7	11.7	13.0	63.0	88.9
2007	23	46.9	11.9	12.1	82.6	91.3 #
2008	21	44.7	13.0	11.4	71.4	95.2
2009	27	54.0	12.8	12.3	37.0	96.3
2010	23	47.9	12.1	11.8	47.8	91.3
2011	22	52.4	11.1	12.4	54.5	100.0
2012	13	38.2	11.7	13.0	38.5	100.0
2013	18	51.4	11.6	10.9	55.6	100.0
2014	17	50.0	12.5	10.9	41.2	100.0
2015	7	31.8	12.3	10.3	14.3	100.0
2016	14	50.0	13.2	13.0	50.0	100.0
2017	9	39.1	13.2	16.7	22.2	100.0
2018	3	50.0	13.3	0.0	66.7	100.0
2019	1	25.0	13.6	0.0		100.0 ##
1998-2019	369	49.7	13.6	15.6	57.2	93.0

369 cases diagnosed 1998-2019 are related to a total of 368 patients. Currently, in 104 (28.3 %) of these 368 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 80 / 15 / 9 (21.7 % / 4.1 % / 2.4 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:

In 2017, a subgroup of 9 cases has been diagnosed, of which 13.2 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 16.7 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 2

Incidence measures by year of diagnosis  
(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,  
and from 4.10 to 4.92 m as of 2007, respectively)

Year of diagnosis	Males n	Females n	Males Inc. raw	Fem. Inc. raw	Males Inc. WS	Fem. Inc. WS	Males Inc. ES	Fem. Inc. ES	Males Inc. BRD-S	Fem. Inc. BRD-S
1998	9	15	0.8	1.3	0.6	0.8	0.8	1.0	1.1	1.1
1999	11	12	1.0	1.0	0.7	0.5	0.9	0.8	0.9	0.9
2000	16	12	1.4	1.0	0.8	0.6	1.2	0.8	1.7	0.9
2001	6	8	0.5	0.7	0.3	0.3	0.5	0.5	0.5	0.6
2002	25	11	1.3	0.6	1.0	0.4	1.2	0.5	1.3	0.5
2003	16	25	0.9	1.3	0.6	1.0	0.8	1.1	0.9	1.2
2004	25	29	1.3	1.5	0.8	1.1	1.1	1.3	1.3	1.3
2005	23	32	1.2	1.6	0.9	0.7	1.1	1.0	1.3	1.3
2006	19	27	1.0	1.3	0.6	0.7	0.8	0.9	0.9	1.1
2007	26	23	1.2	1.0	0.7	0.5	0.9	0.7	1.2	0.9
2008	26	21	1.2	0.9	0.7	0.4	0.9	0.6	1.1	0.7
2009	23	27	1.0	1.2	0.6	0.8	0.8	1.0	1.0	1.1
2010	25	23	1.1	1.0	0.6	0.7	0.8	0.8	1.0	0.9
2011	20	22	0.9	0.9	0.4	0.7	0.7	0.8	0.9	0.8
2012	21	13	0.9	0.6	0.8	0.3	0.8	0.4	0.9	0.5
2013	17	18	0.7	0.8	0.6	0.5	0.6	0.6	0.7	0.6
2014	17	17	0.7	0.7	0.4	0.3	0.6	0.5	0.6	0.6
2015	15	7	0.6	0.3	0.3	0.2	0.4	0.2	0.6	0.3
2016	14	14	0.6	0.6	0.3	0.3	0.4	0.4	0.5	0.5
2017	14	9	0.6	0.4	0.2	0.1	0.3	0.2	0.5	0.3
2018	3	3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2019	3	1	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.0
1998-2019	374	369	0.8	0.8	0.5	0.5	0.7	0.6	0.8	0.7

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

Table 3

Age distribution parameters by year of diagnosis (ALL PATIENTS)

Year of diagnosis	Cases n	Std.		Median						
		Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	24	58.9	24.1	0.5	89.9	31.1	42.1	63.7	76.7	82.2
1999	23	60.6	10.9	31.8	81.1	50.4	54.7	60.5	66.9	75.1
2000	28	66.6	15.2	27.5	88.6	40.9	57.4	71.6	76.7	84.2
2001	14	65.6	11.5	39.8	83.3	53.7	57.5	67.3	71.9	80.8
2002	36	56.9	21.6	0.2	90.9	16.7	50.3	62.1	71.2	75.0
2003	41	56.0	22.0	0.2	91.7	31.0	47.9	60.8	70.2	77.3
2004	54	61.1	19.5	1.5	86.8	45.4	57.6	64.4	72.9	79.4
2005	55	66.1	19.4	0.3	91.9	39.3	58.9	70.9	81.6	84.0
2006	46	64.9	16.2	7.3	94.2	48.2	56.8	65.2	74.3	85.2
2007	49	65.3	17.4	0.2	96.8	42.7	53.2	69.4	78.5	83.7
2008	47	66.8	14.9	28.8	89.6	41.9	59.2	68.9	76.2	83.4
2009	50	60.8	18.7	1.0	87.1	39.5	49.7	63.0	74.7	82.5
2010	48	61.0	21.4	0.2	86.4	31.6	52.7	68.5	74.1	83.1
2011	42	65.3	19.7	0.4	97.2	54.9	58.5	66.9	77.8	84.0
2012	34	56.8	26.1	0.0	84.2	2.6	47.2	63.7	74.8	82.6
2013	35	59.6	21.5	0.7	89.7	24.6	54.4	68.0	72.0	77.8
2014	34	64.4	15.2	30.4	89.0	44.6	55.5	67.3	74.6	84.3
2015	22	70.6	16.1	28.3	93.4	54.3	58.6	75.3	83.4	86.2
2016	28	66.7	16.8	6.5	88.5	52.1	57.1	69.8	79.4	84.2
2017	23	73.6	10.2	49.0	87.2	59.1	65.1	77.7	80.7	82.9
2018	6	63.2	13.7	42.1	80.9	42.1	52.9	66.5	70.4	80.9
2019	4	79.3	4.9	74.1	85.8	74.1	76.1	78.6	82.5	85.8
1998-2019	743	63.2	19.0	0.0	97.2	40.9	55.2	66.6	75.9	82.9



Table 3a

Age distribution parameters by year of diagnosis (MALES)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	Median				
						10%	25%	50%	75%	90%
1998	9	60.5	25.8	0.5	82.2	0.5	54.9	70.5	75.3	82.2
1999	11	60.0	7.5	46.5	68.4	50.4	51.6	61.0	66.9	67.1
2000	16	68.8	13.6	39.0	88.6	40.9	63.2	72.7	76.7	80.4
2001	6	60.8	12.4	39.8	71.7	39.8	53.7	64.9	69.9	71.7
2002	25	56.7	21.5	0.2	81.6	16.7	53.2	62.2	69.1	74.0
2003	16	59.0	19.6	0.6	91.7	44.1	53.3	60.7	70.8	76.6
2004	25	64.5	19.4	2.0	81.8	58.8	62.2	66.9	77.0	80.6
2005	23	61.8	22.7	0.3	89.7	34.3	55.8	65.6	74.8	82.3
2006	19	62.5	10.3	40.8	81.8	49.6	55.1	64.1	68.2	79.2
2007	26	63.7	19.3	0.2	86.7	42.0	48.7	69.8	78.5	81.3
2008	26	64.4	16.8	28.8	89.6	35.7	54.1	67.9	75.7	84.7
2009	23	65.2	18.7	1.1	87.1	42.8	58.6	70.3	76.5	82.2
2010	25	65.9	19.7	0.4	86.4	37.8	66.3	71.0	73.8	84.1
2011	20	70.6	9.9	54.9	88.5	55.6	63.9	69.5	78.5	83.9
2012	21	52.3	28.1	0.0	82.9	1.8	45.1	62.2	72.0	80.7
2013	17	57.7	23.5	0.7	79.3	13.8	54.4	65.8	71.8	78.9
2014	17	63.5	13.1	30.4	84.3	44.6	56.9	67.7	71.6	74.6
2015	15	76.1	11.2	54.3	93.4	60.0	68.4	77.5	85.9	89.0
2016	14	69.2	11.9	52.1	88.5	52.9	57.0	71.1	79.3	82.9
2017	14	74.9	10.8	49.0	87.2	56.0	72.1	78.7	80.8	84.0
2018	3	72.7	7.3	66.8	80.9	66.8	66.8	70.4	80.9	80.9
2019	3	79.7	5.9	74.1	85.8	74.1	74.1	79.2	85.8	85.8
1998-2019	374	64.0	18.6	0.0	93.4	42.8	57.0	67.9	75.5	81.8

Table 3b

Age distribution parameters by year of diagnosis (FEMALES)

Year of diagnosis	Cases n	Std.		Median						
		Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	15	57.9	23.8	5.4	89.9	31.1	38.1	60.5	77.0	85.4
1999	12	61.1	13.5	31.8	81.1	52.1	55.0	59.4	70.5	80.2
2000	12	63.7	17.2	27.5	86.8	49.0	52.8	63.2	77.7	84.2
2001	8	69.2	10.0	57.3	83.3	57.3	60.4	68.4	77.9	83.3
2002	11	57.2	23.0	9.2	90.9	31.0	44.1	62.0	72.4	75.0
2003	25	54.1	23.5	0.2	81.2	8.2	43.5	61.8	69.1	78.0
2004	29	58.2	19.4	1.5	86.8	35.3	52.8	60.8	69.5	78.6
2005	32	69.1	16.4	30.7	91.9	40.2	63.2	72.8	82.1	84.0
2006	27	66.6	19.3	7.3	94.2	40.9	57.7	67.7	82.8	91.5
2007	23	67.2	15.2	40.4	96.8	47.4	53.2	66.6	79.5	84.4
2008	21	69.9	11.8	41.9	84.2	54.8	65.3	71.0	76.2	83.0
2009	27	57.1	18.2	1.0	86.4	36.8	46.3	59.0	69.5	82.8
2010	23	55.6	22.3	0.2	85.8	31.6	43.6	58.5	74.5	76.2
2011	22	60.4	24.9	0.4	97.2	27.9	55.3	61.9	75.4	90.6
2012	13	64.1	21.6	2.6	84.2	46.2	58.8	66.7	76.3	83.8
2013	18	61.4	19.9	1.1	89.7	32.3	54.9	69.3	72.7	76.7
2014	17	65.3	17.5	33.0	89.0	43.6	51.1	60.6	79.8	88.3
2015	7	59.0	19.5	28.3	83.8	28.3	49.0	55.3	83.2	83.8
2016	14	64.1	20.7	6.5	87.6	44.4	57.2	68.3	79.4	84.2
2017	9	71.5	9.5	59.1	81.0	59.1	62.2	76.7	79.8	81.0
2018	3	53.7	12.0	42.1	66.1	42.1	42.1	52.9	66.1	66.1
2019	1	78.1		78.1	78.1	78.1	78.1	78.1	78.1	78.1
1998-2019	369	62.3	19.4	0.2	97.2	39.7	53.3	64.8	76.1	83.8

Table 4

Age distribution by 5-year age group and sex for period 2007-2019

Age at diagnosis Years	Cases			Males			Females		
	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
0-4	14	3.3	3.3	8	3.6	3.6	6	3.0	3.0
5-9	2	0.5	3.8			3.6	2	1.0	4.0
10-14	1	0.2	4.0	1	0.4	4.0			4.0
15-19	0	0.0	4.0			4.0			4.0
20-24	1	0.2	4.3	1	0.4	4.5			4.0
25-29	4	0.9	5.2	2	0.9	5.4	2	1.0	5.1
30-34	7	1.7	6.9	2	0.9	6.3	5	2.5	7.6
35-39	6	1.4	8.3	5	2.2	8.5	1	0.5	8.1
40-44	20	4.7	13.0	8	3.6	12.1	12	6.1	14.1
45-49	20	4.7	17.8	8	3.6	15.6	12	6.1	20.2
50-54	25	5.9	23.7	10	4.5	20.1	15	7.6	27.8
55-59	39	9.2	32.9	14	6.3	26.3	25	12.6	40.4
60-64	43	10.2	43.1	22	9.8	36.2	21	10.6	51.0
65-69	48	11.4	54.5	29	12.9	49.1	19	9.6	60.6
70-74	65	15.4	69.9	45	20.1	69.2	20	10.1	70.7
75-79	52	12.3	82.2	27	12.1	81.3	25	12.6	83.3
80-84	49	11.6	93.8	28	12.5	93.8	21	10.6	93.9
85+	26	6.2	100.0	14	6.3	100.0	12	6.1	100.0
All ages	422	100.0		224	100.0		198	100.0	

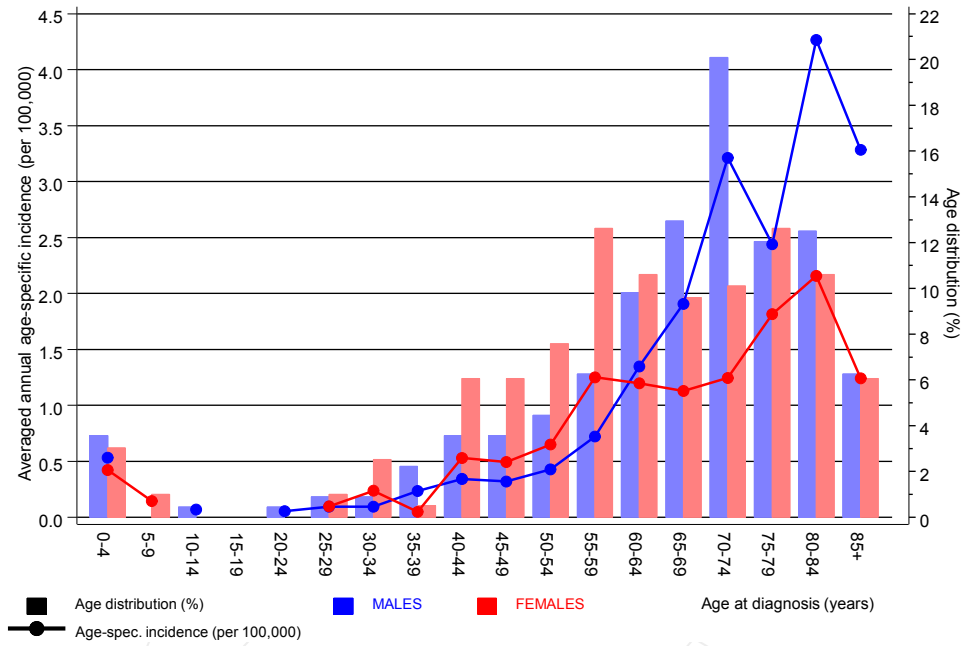
Table 5

Age-specific incidence and proportion of all cancers for period 2007-2019

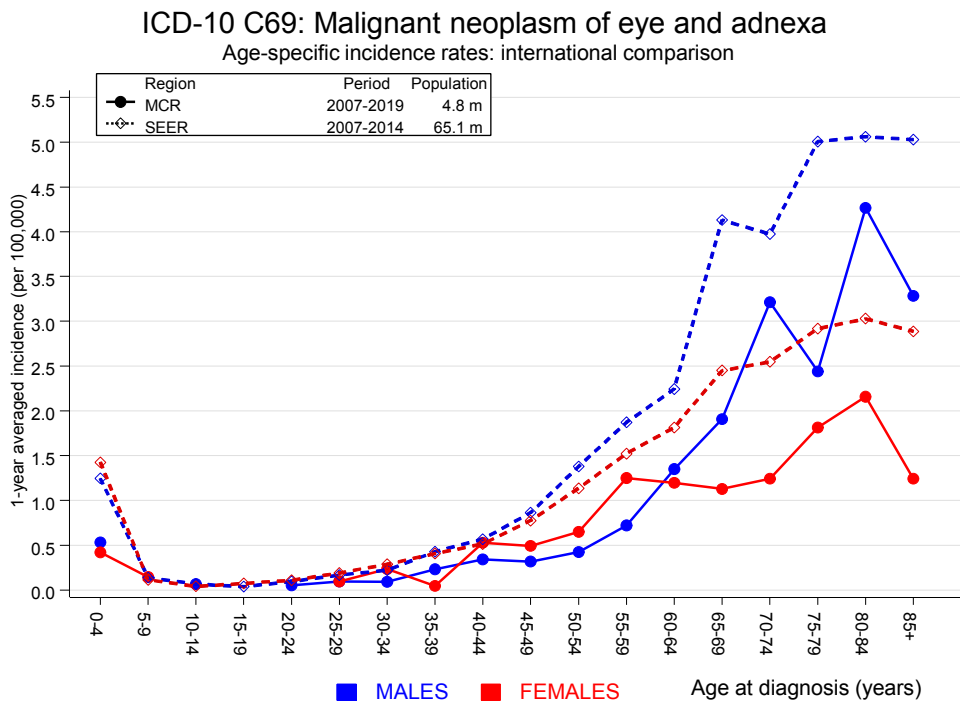
Age at diagnosis Years	Males n	Females n	Males Age- spec. incid.	Females Age- spec. incid.	Males Prop.all cancers n=143063 %	Females Prop.all cancers n=144724 %
0- 4	8	6	0.5	0.4	3.8	3.7
5- 9		2		0.1		2.2
10-14	1		0.1		0.8	
15-19						
20-24	1		0.1		0.2	
25-29	2	2	0.1	0.1	0.2	0.2
30-34	2	5	0.1	0.2	0.2	0.3
35-39	5	1	0.2	0.0	0.3	0.0
40-44	8	12	0.3	0.5	0.3	0.2
45-49	8	12	0.3	0.5	0.2	0.1
50-54	10	15	0.4	0.6	0.1	0.1
55-59	14	25	0.7	1.3	0.1	0.2
60-64	22	21	1.3	1.2	0.1	0.1
65-69	29	19	1.9	1.1	0.1	0.1
70-74	45	20	3.2	1.2	0.2	0.1
75-79	27	25	2.4	1.8	0.1	0.1
80-84	28	21	4.3	2.2	0.2	0.1
85+	14	12	3.3	1.2	0.1	0.1
All ages	224	198			0.2	0.1
Incidence						
Raw			0.7	0.6		
WS			0.4	0.4		
ES			0.6	0.5		
BRD-S			0.7	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).

ICD-10 C69: Malignant neoplasm of eye and adnexa  
 Age distribution and age-specific incidence 2007 - 2019 (Males: 224, Females: 198)



**Figure 6.** Age distribution (males: mean=65.5 yrs, median=70.3 yrs; females: mean=62.6 yrs, median=64.9 yrs) and age-specific incidence.



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

Reference:

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

Table 7a

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

MALES

Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C07-C08 Salivary gland	1	0.1	14.5	0.4	80.7	5.3	
C15 Oesophagus	2	0.6	3.6	0.4	13.1	8.2	
C16 Stomach	1	1.2	0.8	0.0	4.7	-1.0	
C18 Colon	5	2.9	1.7	0.6	4.1	12.1	
C19-C20 Rectum	2	1.5	1.3	0.2	4.7	2.7	
C21 Anus/canal	1	0.1	14.7	0.4	82.1	5.3	
C25 Pancreas	1	1.1	0.9	0.0	4.9	-0.8	
C33-C34 Lung	13	3.4	3.8	2.0	6.5 #	54.3	23.1
C43 Malign. melanoma	9	1.3	7.1	3.2	13.5 #	43.8	
C61 Prostate	17	8.3	2.0	1.2	3.3 #	49.3	5.9
C64 Kidney	4	1.0	4.0	1.1	10.3 #	17.0	
C67 Bladder	3	1.4	2.2	0.4	6.3	9.1	
C70-C72 CNS cancer	1	0.4	2.7	0.1	15.2	3.6	
C73 Thyroid	1	0.2	5.6	0.1	31.1	4.7	
C76-C79 CUP	1	0.5	2.0	0.1	11.1	2.8	
C90 Mult. myeloma	1	0.4	2.6	0.1	14.3	3.5	
Not observed	0	5.2	0.0	0.0	0.7 #	-29.5	
All further malignancies	63	29.4	2.1	1.6	2.7 #	190.2	6.3

Patients 349  
 Median age at next malignancy (years) 73.7  
 Person-years 1765  
 Mean observation time (years) 5.1  
 Median observation time (years) 3.8

# The occurrence of further specified malignancy is statistically significant.

Table 7b

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

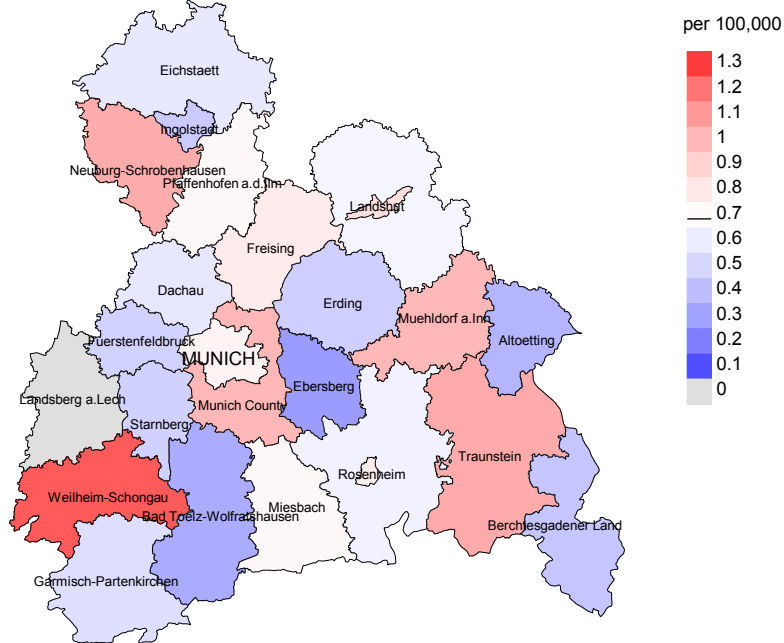
## FEMALES

Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C07-C08 Salivary gland	1	0.0	31.3	0.8	174.4	5.0	
C16 Stomach	2	0.7	3.0	0.4	10.8	6.8	50.0
C17 Small intestine	1	0.1	9.5	0.2	52.8	4.6	
C18 Colon	2	1.9	1.1	0.1	3.8	0.6	
C19-C20 Rectum	1	0.8	1.3	0.0	7.1	1.1	
C21 Anus/canal	1	0.1	9.2	0.2	51.2	4.6	
C22 Liver	2	0.2	8.3	1.0	30.0 #	9.0	
C23-C24 Bile	1	0.3	3.7	0.1	20.4	3.7	
C25 Pancreas	1	0.9	1.1	0.0	6.2	0.5	
C33-C34 Lung	4	1.5	2.7	0.7	6.9	12.8	25.0
C40-C41 Bone	1	0.0	54.9	1.4	305.9 #	5.0	
C43 Malign. melanoma	4	0.8	5.3	1.5	13.6 #	16.7	25.0
C50 Breast	20	6.1	3.3	2.0	5.1 #	71.2	5.0
C54 Corpus uteri	2	1.1	1.8	0.2	6.7	4.7	
C56 Ovary	4	0.8	5.1	1.4	13.0 #	16.5	
C67 Bladder	1	0.4	2.6	0.1	14.6	3.2	
C69 Eye carcinoma	1	0.0	225.1	5.7	1254 #	5.1	
C69 Eye lymphoma	1	0.0	159.8	4.0	890.3 #	5.1	
C70-C72 CNS cancer	2	0.3	7.9	1.0	28.5	9.0	
C73 Thyroid	1	0.3	2.9	0.1	16.3	3.4	
C76-C79 CUP	4	0.4	11.2	3.1	28.7 #	18.7	
C82-C85 NHL	3	0.8	4.0	0.8	11.6	11.5	
Not observed	0	2.5	0.0	0.0	1.5	-12.8	
All further malignancies	60	19.8	3.0	2.3	3.9 #	205.8	6.7
Patients		341					
Median age at next malignancy (years)		67.9					
Person-years		1951					
Mean observation time (years)		5.7					
Median observation time (years)		4.9					

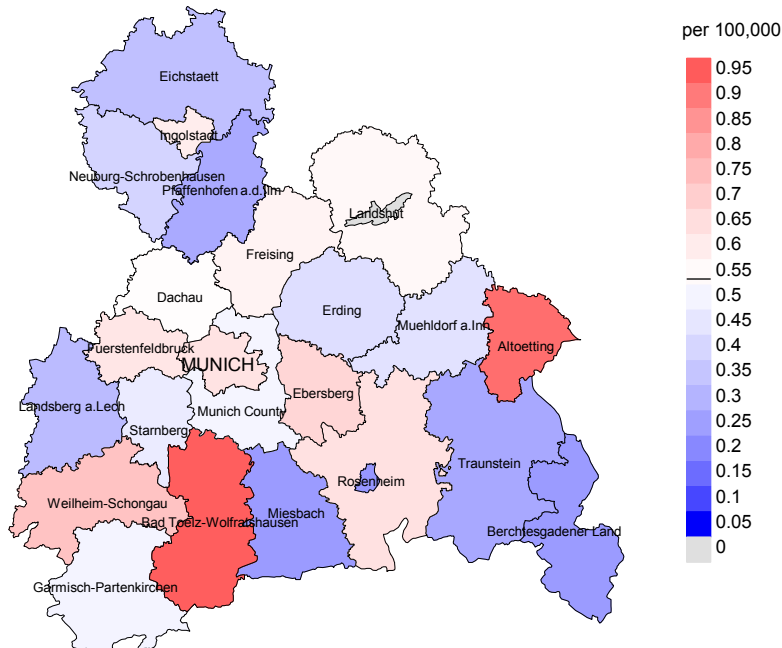
# The occurrence of further specified malignancy is statistically significant.



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



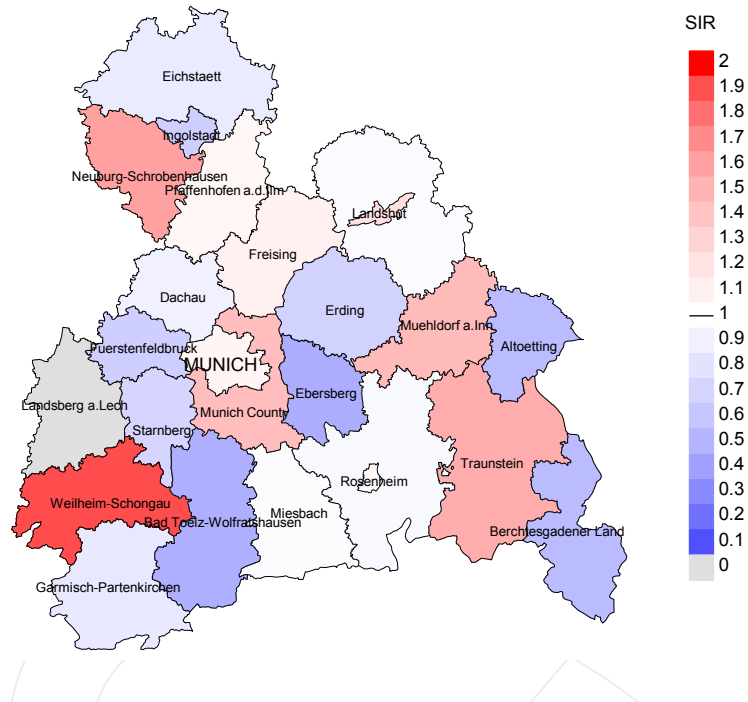
Average incidence (Germany 1987 standard population) 2007 - 2019: Females



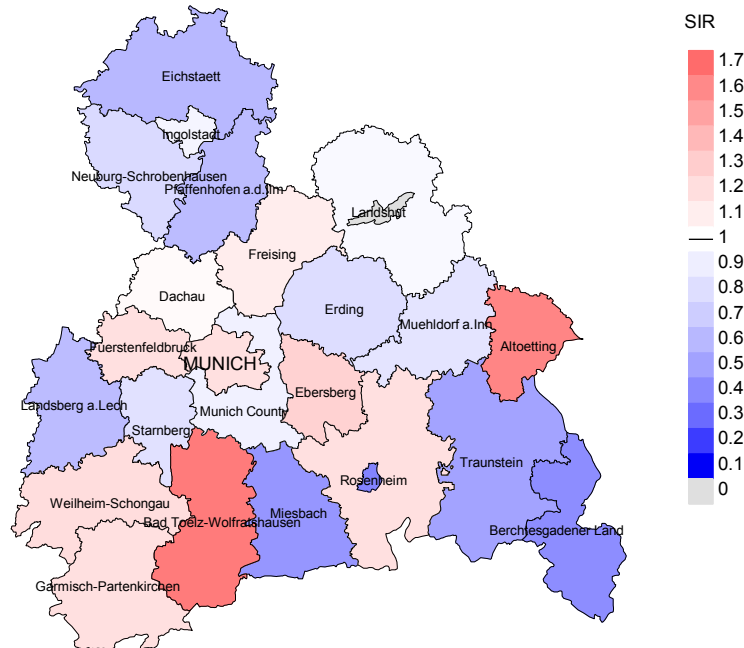
**Figure 8a.** Map of cancer incidence (german standard population) by county averaged for period 2007 to 2019. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 0.7/100,000 WS N=224, females 0.5/100,000 WS N=198).

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 7 women were identified with newly diagnosed eye cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 0.7/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.2 and 1.7/100,000.

Standardized incidence ratio (SIR) 2007 - 2019: Males



Standardized incidence ratio (SIR) 2007 - 2019: Females



**Figure 8b.** Map of standardized incidence ratio (SIR) by county averaged for period 2007 to 2019. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=224, females N=198).

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 7 women were identified with newly diagnosed eye cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.27. Though, the value of this parameter may vary with an underlying probability of 99% between 0.37 and 3.12, and is therefore not statistically striking.

## MORTALITY

Table 9a

Annual cohorts: Incident cancers, follow-up status,  
and deaths among the annual cohorts

(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,  
and from 4.10 to 4.92 m as of 2007, respectively)

Year of diagnosis	Incident cases n	Prop. actively followed %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	24	91.7	16	66.7	93.8
1999	23	95.7	13	56.5	92.3
2000	28	96.4	24	85.7	95.8
2001	14	100.0	11	78.6	100.0
2002	36	86.1	23	63.9	82.6
2003	41	85.4	23	56.1	87.0
2004	54	85.2	37	68.5	86.5
2005	55	92.7	39	70.9	92.3
2006	46	89.1	27	58.7	96.3
2007	49	87.8	34	69.4	94.1
2008	47	97.9	29	61.7	82.8
2009	50	98.0	24	48.0	95.8
2010	48	93.8	27	56.3	92.6
2011	42	100.0	22	52.4	95.5
2012	34	94.1	16	47.1	87.5
2013	35	100.0	20	57.1	90.0
2014	34	100.0	12	35.3	66.7
2015	22	95.5	10	45.5	80.0
2016	28	100.0	15	53.6	80.0
2017	23	100.0	6	26.1	83.3
2018	6	100.0	3	50.0	66.7
2019	4	75.0	1	25.0	100.0
1998-2019	743	93.7	432	58.1	89.6

Table 9b

Annual cohorts of incident cancers and deaths,  
and cases deceased within the same year of being diagnosed with cancer

(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,  
and from 4.10 to 4.92 m as of 2007, respectively)

Year of diagnosis/ death	Incident cases n	Deaths n	Deaths in same year n	Prop. deaths in same year %
1998	24	18	1	4.2
1999	23	14	1	4.3
2000	28	19	1	3.6
2001	14	12		
2002	36	29		
2003	41	31	3	7.3
2004	54	34	3	5.6
2005	55	37	9	16.4
2006	46	31	3	6.5
2007	49	34	3	6.1
2008	47	38	1	2.1
2009	50	42	4	8.0
2010	48	39	1	2.1
2011	42	48	5	11.9
2012	34	28	1	2.9
2013	35	44	3	8.6
2014	34	41	2	5.9
2015	22	40	1	4.5
2016	28	42	3	10.7
2017	23	39	2	8.7
2018	6	22	1	16.7
2019	4	20	1	25.0
1998-2019	743	702	49	6.6

Table 9c

Annual cohorts of deaths, and proportion of cancer-related and non-cancer-related deaths

(with respect to registry area expansion from 2.65 to 4.10 m as of 2002, and from 4.10 to 4.92 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer- related %	Prop. non-cancer- related %	Prop. cancer recorded on death certificate %
1998	18	72.2	27.8	70.6
1999	14	64.3	35.7	75.0
2000	19	68.4	31.6	77.8
2001	12	58.3	41.7	63.6
2002	29	72.4	27.6	77.8
2003	31	77.4	22.6	85.7
2004	34	76.5	23.5	82.4
2005	37	73.0	27.0	82.9
2006	31	58.1	41.9	73.3
2007	34	73.5	26.5	76.5
2008	38	76.3	23.7	85.7
2009	42	76.2	23.8	78.0
2010	39	64.1	35.9	73.7
2011	48	66.7	33.3	75.6
2012	28	60.7	39.3	64.3
2013	44	68.2	31.8	74.4
2014	41	61.0	39.0	61.0
2015	40	62.5	37.5	60.5
2016	42	71.4	28.6	78.0
2017	39	56.4	43.6	57.1
2018	22	50.0	50.0	50.0
2019	20	55.0	45.0	77.8
1998–2019	702	67.2	32.8	73.6

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	5	77.4	77.4	71.0	67.0
1999	5	86.2	86.2	82.4	83.3
2000	6	78.1	76.4	78.2	78.6
2001	4	79.3	79.3	80.3	79.3
2002	16	71.2	70.4	72.3	72.0
2003	15	62.9	62.9	72.9	65.9
2004	16	72.5	71.4	83.5	71.0
2005	20	74.6	70.6	82.3	72.5
2006	15	76.8	73.8	85.4	73.8
2007	11	73.3	65.5	81.3	67.4
2008	19	69.9	68.1	85.1	68.3
2009	20	76.7	69.0	84.1	69.0
2010	17	80.0	78.9	81.3	79.7
2011	25	75.0	75.0	76.7	74.2
2012	17	77.4	68.7	86.8	69.6
2013	20	76.0	74.1	77.7	76.6
2014	26	76.9	74.4	85.4	75.3
2015	24	77.1	75.6	88.1	75.5
2016	19	73.7	73.6	86.5	73.7
2017	20	84.0	81.4	84.9	70.3
2018	10	78.5	67.5	82.6	71.6
2019	9	83.0	75.2	86.4	76.0
1998-2019	339	76.0	73.2	84.0	73.4

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	13	78.3	74.7	90.5	74.7
1999	9	65.3	70.3	27.6	75.3
2000	13	75.6	71.7	78.7	71.7
2001	8	75.3	74.8	93.6	75.8
2002	13	80.8	74.9	85.9	74.9
2003	16	71.2	66.8	87.5	67.2
2004	18	74.0	71.1	83.4	71.6
2005	17	82.4	78.2	86.1	78.4
2006	16	80.3	63.6	83.7	73.2
2007	23	71.0	69.6	88.6	69.6
2008	19	79.0	69.4	91.6	73.3
2009	22	74.0	71.1	87.2	71.1
2010	22	78.4	66.9	90.3	67.2
2011	23	81.8	78.7	86.4	76.3
2012	11	73.6	63.1	87.0	63.1
2013	24	75.0	70.4	83.4	71.3
2014	15	79.9	75.7	92.4	76.0
2015	16	78.1	73.8	85.3	73.8
2016	23	83.4	70.4	85.1	67.9
2017	19	81.3	79.0	82.4	80.2
2018	12	80.2	79.4	81.0	74.5
2019	11	75.4	73.8	83.7	74.8
1998-2019	363	78.4	71.7	85.6	72.7

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	3	0.3	0.33	0.1	0.23	0.3	0.32	0.3	0.32
1999	1	0.1	0.09	0.0	0.06	0.1	0.10	0.1	0.12
2000	4	0.4	0.25	0.2	0.24	0.3	0.25	0.4	0.25
2001	2	0.2	0.33	0.1	0.22	0.1	0.32	0.3	0.61
2002	13	0.7	0.52	0.4	0.36	0.6	0.47	0.7	0.57
2003	13	0.7	0.81	0.4	0.66	0.6	0.74	0.7	0.83
2004	12	0.6	0.48	0.3	0.41	0.5	0.50	0.7	0.51
2005	15	0.8	0.65	0.4	0.51	0.7	0.62	0.9	0.67
2006	10	0.5	0.53	0.2	0.42	0.4	0.48	0.6	0.61
2007	6	0.3	0.23	0.2	0.22	0.2	0.24	0.3	0.24
2008	16	0.7	0.62	0.4	0.57	0.5	0.58	0.7	0.58
2009	13	0.6	0.57	0.3	0.46	0.4	0.52	0.6	0.57
2010	12	0.5	0.48	0.2	0.37	0.4	0.47	0.5	0.55
2011	17	0.8	0.85	0.3	0.69	0.5	0.75	0.7	0.83
2012	11	0.5	0.52	0.3	0.32	0.4	0.47	0.5	0.55
2013	16	0.7	0.94	0.3	0.53	0.5	0.75	0.6	0.90
2014	16	0.7	0.94	0.3	0.67	0.4	0.77	0.6	0.94
2015	17	0.7	1.13	0.3	0.98	0.4	1.02	0.6	1.14
2016	16	0.7	1.14	0.3	1.02	0.4	1.07	0.6	1.12
2017	10	0.4	0.71	0.1	0.72	0.3	0.77	0.3	0.66
2018	4	0.2	1.33	0.1	1.71	0.1	1.56	0.2	1.44
2019	4	0.2	1.33	0.1	1.73	0.1	1.49	0.1	1.35
1998-2019	231	0.5	0.62	0.2	0.47	0.4	0.56	0.5	0.63



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	10	0.9	0.67	0.4	0.43	0.5	0.57	0.7	0.62
1999	8	0.7	0.67	0.3	0.63	0.5	0.61	0.6	0.72
2000	9	0.7	0.75	0.3	0.58	0.5	0.65	0.6	0.63
2001	5	0.4	0.63	0.2	0.59	0.3	0.62	0.3	0.61
2002	8	0.4	0.73	0.2	0.38	0.2	0.49	0.3	0.64
2003	11	0.6	0.44	0.3	0.31	0.4	0.38	0.5	0.42
2004	14	0.7	0.48	0.3	0.30	0.5	0.37	0.6	0.45
2005	12	0.6	0.38	0.2	0.30	0.3	0.33	0.4	0.35
2006	8	0.4	0.30	0.2	0.30	0.3	0.32	0.4	0.33
2007	19	0.8	0.83	0.4	0.72	0.5	0.73	0.6	0.74
2008	13	0.6	0.62	0.2	0.62	0.4	0.64	0.5	0.62
2009	19	0.8	0.70	0.4	0.44	0.5	0.55	0.6	0.61
2010	13	0.6	0.57	0.3	0.45	0.4	0.49	0.5	0.57
2011	15	0.6	0.68	0.2	0.30	0.3	0.41	0.4	0.49
2012	6	0.3	0.46	0.1	0.40	0.2	0.47	0.2	0.42
2013	14	0.6	0.78	0.3	0.59	0.4	0.70	0.5	0.77
2014	9	0.4	0.53	0.2	0.58	0.2	0.50	0.3	0.50
2015	8	0.3	1.14	0.1	0.72	0.2	0.88	0.3	0.99
2016	14	0.6	1.00	0.2	0.72	0.4	0.83	0.4	0.90
2017	12	0.5	1.33	0.2	1.17	0.2	1.19	0.3	1.21
2018	7	0.3	2.33	0.1	1.14	0.1	1.34	0.2	1.90
2019	7	0.3	7.00	0.1	14.3	0.2	10.8	0.2	7.11
1998-2019	241	0.5	0.65	0.2	0.48	0.3	0.55	0.4	0.60

Table 12

Age distribution of age at death (cancer-related) for period 2007-2019  
(incl. multiple malignancies)

Age at death Years	Cases			Males			Females		
	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
0-4									
5-9									
10-14	1	0.3	0.3			0.0	1	0.6	0.6
15-19	0	0.0	0.3			0.0			0.6
20-24	1	0.3	0.6			0.0	1	0.6	1.3
25-29	0	0.0	0.6			0.0			1.3
30-34	1	0.3	1.0	1	0.6	0.6			1.3
35-39	1	0.3	1.3			0.6	1	0.6	1.9
40-44	7	2.2	3.5	4	2.5	3.2	3	1.9	3.8
45-49	5	1.6	5.1	1	0.6	3.8	4	2.6	6.4
50-54	14	4.5	9.6	6	3.8	7.6	8	5.1	11.5
55-59	26	8.3	17.8	11	7.0	14.6	15	9.6	21.2
60-64	26	8.3	26.1	13	8.2	22.8	13	8.3	29.5
65-69	42	13.4	39.5	18	11.4	34.2	24	15.4	44.9
70-74	58	18.5	58.0	34	21.5	55.7	24	15.4	60.3
75-79	49	15.6	73.6	30	19.0	74.7	19	12.2	72.4
80-84	39	12.4	86.0	21	13.3	88.0	18	11.5	84.0
85+	44	14.0	100.0	19	12.0	100.0	25	16.0	100.0
All ages	314	100.0		158	100.0		156	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		1			0.1	1.00		4.3
15-19								
20-24		1			0.1	1.00		2.6
25-29								
30-34	1		0.0	0.50			0.8	
35-39		1			0.0	1.00		0.3
40-44	4	3	0.2	0.50	0.1	0.25	0.7	0.4
45-49	1	4	0.0	0.13	0.2	0.33	0.1	0.3
50-54	6	8	0.3	0.60	0.3	0.53	0.2	0.3
55-59	11	15	0.6	0.79	0.8	0.60	0.3	0.4
60-64	13	13	0.8	0.59	0.7	0.62	0.2	0.3
65-69	18	24	1.2	0.62	1.4	1.26	0.2	0.4
70-74	34	24	2.4	0.76	1.5	1.20	0.3	0.3
75-79	30	19	2.7	1.11	1.4	0.76	0.3	0.2
80-84	21	18	3.2	0.75	1.8	0.86	0.2	0.2
85+	19	25	4.5	1.36	2.6	2.08	0.2	0.2
All ages	158	156					0.2	0.3
Mortality								
Raw			0.5	0.71	0.5	0.79		
WS			0.2	0.54	0.2	0.58		
ES			0.4	0.64	0.3	0.66		
BRD-S			0.5	0.70	0.4	0.72		
PYLL-70								
per 100,000			2.1		3.0			
ES			1.8		2.7			
AYLL-70			10.3		11.4			

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 ←%
C07-C08 Salivary gland	1	0.9	1	100.0				
C09-C10 Oropharynx	2	1.8					2	100.0
C11 Nasopharynx	1	0.9					1	100.0
C18 Colon	9	8.1			1	11.1	8	88.9
C19-C20 Rectum	3	2.7	1	33.3	1	33.3	1	33.3
C22 Liver	5	4.5					5	100.0
C23-C24 Bile	2	1.8	1	50.0			1	50.0
C25 Pancreas	3	2.7	1	33.3			2	66.7
C30-C31 Sinuses	1	0.9					1	100.0
C33-C34 Lung	17	15.3	1	5.9			16	94.1
C43 Malign. melanoma	11	9.9	6	54.5	3	27.3	2	18.2
C44 Skin others	12	10.8	8	66.7			4	33.3
C46,C49 Soft tissue	1	0.9					1	100.0
C61 Prostate	18	16.2	8	44.4	1	5.6	9	50.0
C64 Kidney	6	5.4	3	50.0			3	50.0
C66 Ureter	1	0.9					1	100.0
C67 Bladder	4	3.6	1	25.0	1	25.0	2	50.0
C69 Eye carcinoma	1	0.9					1	100.0
C69 Eye sarcoma	1	0.9					1	100.0
C70-C72 CNS cancer	1	0.9	1	100.0				
C73 Thyroid	1	0.9					1	100.0
C76-C79 CUP	2	1.8					2	100.0
C82-C85 NHL	5	4.5	2	40.0			3	60.0
C90 Mult. myeloma	2	1.8	2	100.0				
C91-C96 Leukaemia	1	0.9					1	100.0
All further malignancies	111	100.0	36	32.4	7	6.3	68	61.3

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 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 ←%
C07-C08 Salivary gland	1	1.0					1	100.0
C16 Stomach	3	3.0	1	33.3			2	66.7
C17 Small intestine	1	1.0	1	100.0				
C18 Colon	4	4.0	2	50.0			2	50.0
C19-C20 Rectum	2	2.0	1	50.0			1	50.0
C22 Liver	4	4.0	1	25.0			3	75.0
C23-C24 Bile	2	2.0					2	100.0
C25 Pancreas	3	3.0					3	100.0
C33-C34 Lung	11	11.0	2	18.2	2	18.2	7	63.6
C43 Malign. melanoma	13	13.0	3	23.1			10	76.9
C44 Skin others	1	1.0	1	100.0				
C46,C49 Soft tissue	1	1.0	1	100.0				
C50 Breast	29	29.0	18	62.1	2	6.9	9	31.0
C53 Cervix uteri	2	2.0					2	100.0
C54 Corpus uteri	7	7.0	3	42.9			4	57.1
C56 Ovary	2	2.0					2	100.0
C64 Kidney	1	1.0					1	100.0
C67 Bladder	1	1.0			1	100.0		
C69 Eye melanoma	1	1.0	1	100.0				
C70-C72 CNS cancer	3	3.0					3	100.0
C73 Thyroid	2	2.0	1	50.0			1	50.0
C76-C79 CUP	3	3.0			1	33.3	2	66.7
C82-C85 NHL	2	2.0	1	50.0			1	50.0
C91-C96 Leukaemia	1	1.0					1	100.0
All further malignancies	100	100.0	37	37.0	6	6.0	57	57.0

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

Table 15

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

Age at death Years	Males n	Females n	Males Age- spec. mortal. MI-index	Females Age- spec. mortal. MI-index	Males Prop.all cancers %	Females Prop.all cancers %		
0- 4								
5- 9								
10-14		1		0.1	1.00	5.3		
15-19								
20-24		1		0.1	1.00	2.7		
25-29								
30-34	1		0.0	0.50	0.8			
35-39		1		0.0	1.00	0.3		
40-44	4	2	0.2	0.50	0.1	0.25	0.8	0.3
45-49	1	3	0.0	0.13	0.1	0.27	0.1	0.2
50-54	5	7	0.2	0.56	0.3	0.50	0.2	0.3
55-59	10	15	0.5	0.91	0.8	0.71	0.3	0.5
60-64	11	11	0.7	0.61	0.6	0.65	0.2	0.3
65-69	13	23	0.9	0.57	1.4	1.92	0.2	0.4
70-74	29	15	2.1	0.85	0.9	0.83	0.3	0.2
75-79	26	18	2.3	1.37	1.3	0.90	0.3	0.3
80-84	13	15	2.0	0.76	1.5	0.94	0.2	0.2
85+	13	20	3.0	1.63	2.1	2.22	0.2	0.2
All ages	126	132					0.3	0.3
Mortality								
Raw			0.4	0.73	0.4	0.81		
WS			0.2	0.54	0.2	0.58		
ES			0.3	0.65	0.3	0.68		
BRD-S			0.4	0.72	0.3	0.74		
PYLL-70								
per 100,000			1.9		2.7			
ES			1.6		2.4			
AYLL-70			11.1		11.1			

\* See corresponding tables with multiple malignancies.

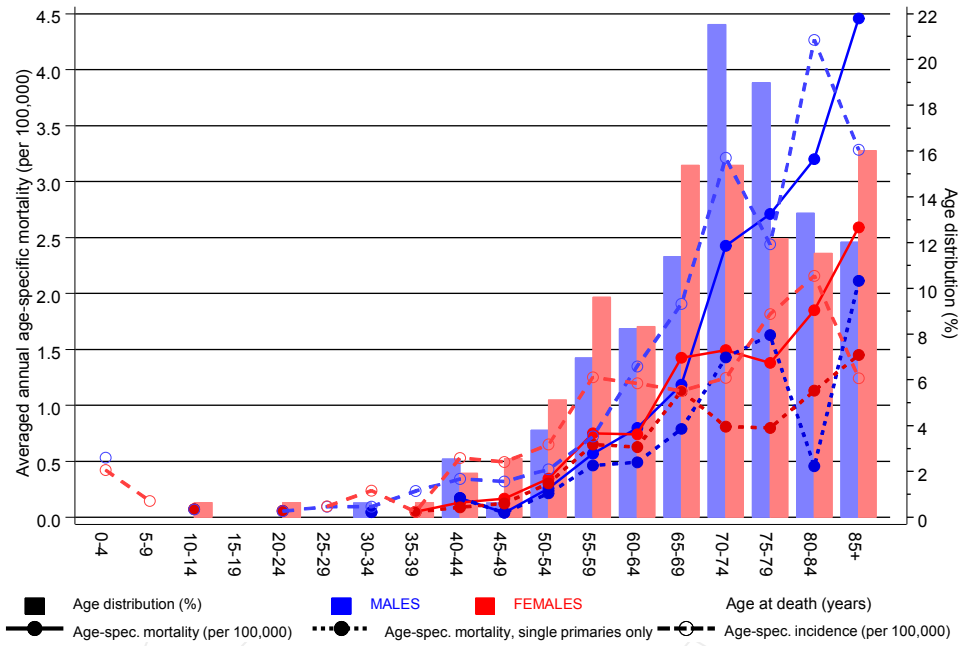
Table 16

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. MI-index	Females Age- spec. mortal. MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4						
5- 9						
10-14		1		0.1	1.00	5.3
15-19						
20-24		1		0.1	1.00	2.8
25-29						
30-34	1		0.0	0.50	0.8	
35-39		1		0.0	1.00	0.3
40-44	4	2	0.2	0.50	0.1	0.29
45-49	1	3	0.0	0.13	0.1	0.27
50-54	5	7	0.2	0.56	0.3	0.64
55-59	9	13	0.5	1.00	0.7	0.65
60-64	8	11	0.5	0.57	0.6	0.85
65-69	12	19	0.8	0.67	1.1	1.58
70-74	20	13	1.4	0.74	0.8	0.87
75-79	18	11	1.6	1.00	0.8	0.61
80-84	3	11	0.5	0.21	1.1	0.85
85+	9	14	2.1	1.29	1.5	1.56
All ages	90	107			0.2	0.2
Mortality						
Raw			0.3	0.60	0.3	0.74
WS			0.1	0.47	0.2	0.56
ES			0.2	0.56	0.2	0.65
BRD-S			0.3	0.59	0.3	0.69
PYLL-70						
per 100,000			1.7		2.6	
ES			1.5		2.3	
AYLL-70			11.5		11.6	

\* See corresponding tables with multiple malignancies.

ICD-10 C69: Malignant neoplasm of eye and adnexa  
 Age distribution and age-specific mortality 2007 - 2019 (Males: 158, Females: 156)

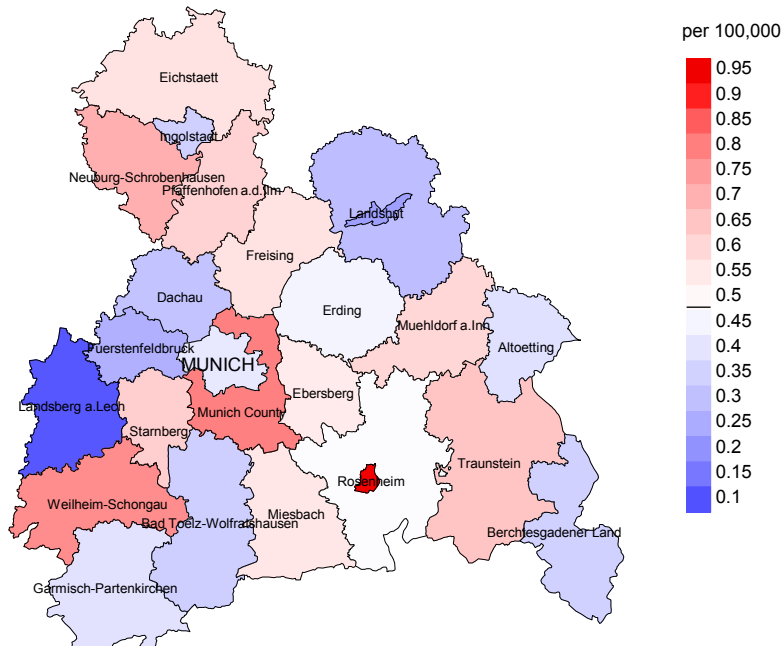


**Figure 17.** Distribution of age at death (bars; males: mean=64.1 yrs, median=65.7 yrs; females: mean=63.1 yrs, median=63.9 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

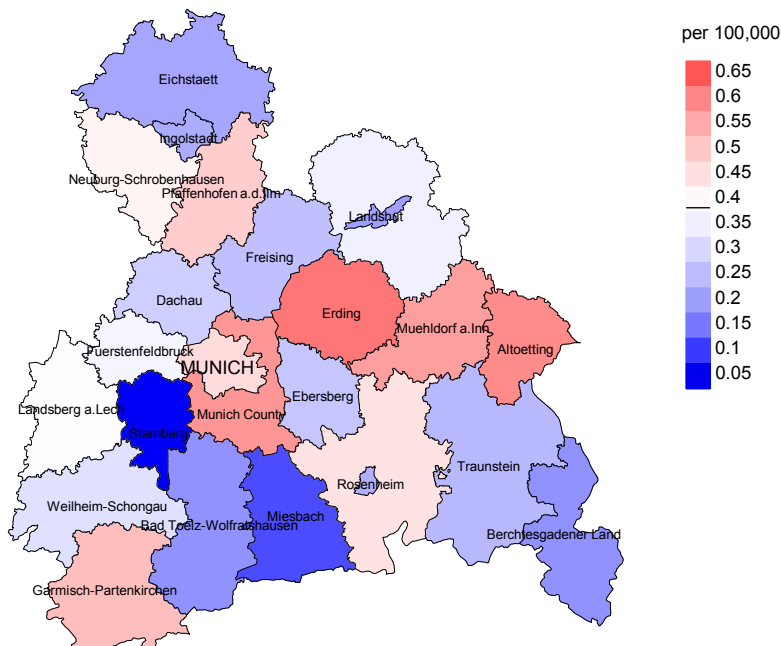
The difference between age at diagnosis (Table 3) and age at eye cancer-related death (see Table 10) should be considered.



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



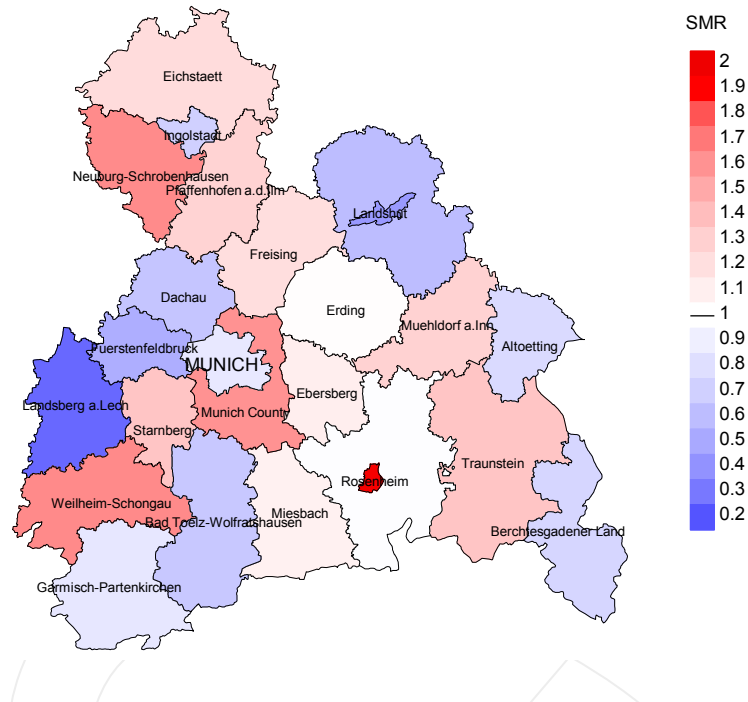
Average mortality (Germany 1987 standard population) 2007 - 2019: Females



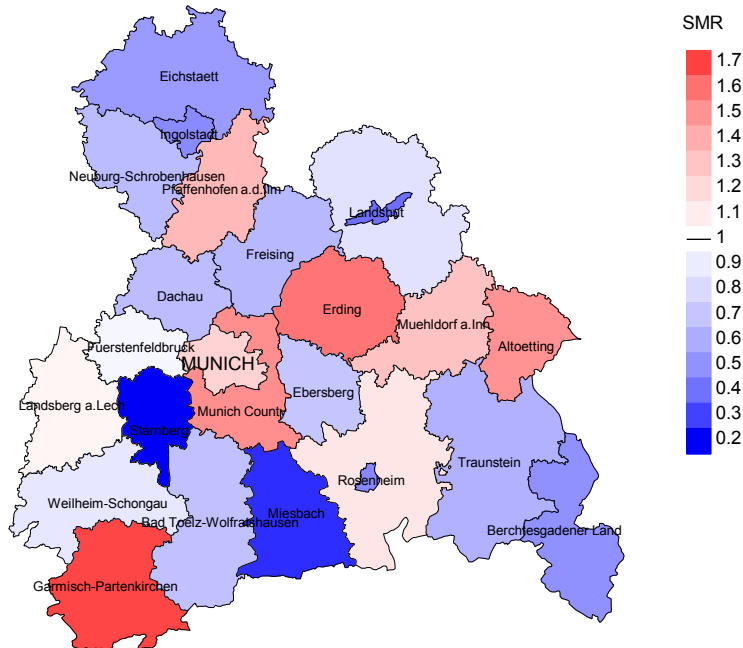
**Figure 18a.** Map of cancer mortality (german standard population) by county averaged for period 2007 to 2019. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 0.5/100,000 WS N=158, females 0.4/100,000 WS N=156).

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 3 women died from eye cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.3/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 1.1/100,000.

Standardized mortality ratio (SMR) 2007 - 2019: Males



Standardized mortality ratio (SMR) 2007 - 2019: Females



**Figure 18b.** Map of standardized mortality ratio (SMR) by county averaged for period 2007 to 2019. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=158, females N=156).

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 3 women died from eye cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.71. Though, the value of this parameter may vary with an underlying probability of 99% between 0.08 and 2.59, 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

**Recommended Citation**

Munich Cancer Registry. ICD-10 C69: Eye cancer - Incidence and Mortality [Internet]. 2021 [updated 2021 Jan 25; cited 2021 Mar 1]. Available from: [https://www.tumorregister-muenchen.de/en/facts/base/bC69\\_\\_E-ICD-10-C69-Eye-cancer-incidence-and-mortality.pdf](https://www.tumorregister-muenchen.de/en/facts/base/bC69__E-ICD-10-C69-Eye-cancer-incidence-and-mortality.pdf)

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