

Munich Cancer Registry



- ▶ Survival
- ▶ Selection Matrix
- ▶ Homepage
- ▶ *Deutsch*

ICD-10 C69: Eye cancer

Incidence and Mortality

Year of diagnosis	1998-2016
Patients	545
Diseases	546
Creation date	08/21/2018
Export date	08/09/2018
Population	4.81 m





Munich Cancer Registry
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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

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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, 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
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	23	0.0	14.5	65.2	91.3
1999	22	4.4	14.4	54.5	95.5
2000	26	9.9	14.0	84.6	96.2
2001	13	14.3	13.3	84.6	92.3
2002	35	14.3	13.0	48.6	77.1 #
2003	39	13.3	13.1	43.6	76.9
2004	48	13.6	12.4	62.5	79.2
2005	50	12.5	12.0	60.0	90.0
2006	43	12.4	11.6	51.2	81.4
2007	46	12.8	9.9	69.6	80.4 #
2008	42	13.4	9.7	59.5	81.0
2009	32	13.8	8.4	50.0	81.3
2010	34	14.1	8.1	61.8	76.5
2011	30	14.3	6.6	56.7	76.7
2012	22	14.5	9.7	50.0	68.2
2013	22	14.2	7.5	50.0	77.3
2014	14	14.8	5.6	28.6	85.7
2015	3	14.9	0.0	100.0	100.0
2016	2	15.0	0.0		100.0 ##
1998-2016	546	15.0	14.5	57.9	82.2

546 cases diagnosed 1998-2016 are related to a total of 545 patients. Currently, in 150 (27.5 %) of these 545 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 110 / 21 / 19 (20.2 % / 3.9 % / 3.5 %) 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 2014, a subgroup of 14 cases has been diagnosed, of which 14.8 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 5.6 % 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	39.1	0.0	14.8	55.6	100.0
1999	11	50.0	5.0	15.3	36.4	100.0
2000	14	53.8	8.8	15.2	92.9	100.0
2001	6	46.2	12.5	14.0	100.0	100.0
2002	24	68.6	12.5	13.9	54.2	79.2 #
2003	14	35.9	12.8	14.5	50.0	78.6
2004	23	47.9	12.9	14.5	60.9	73.9
2005	20	40.0	13.2	14.1	60.0	100.0
2006	18	41.9	13.7	13.9	50.0	83.3
2007	24	52.2	14.1	12.0	58.3	75.0 #
2008	24	57.1	13.9	12.8	54.2	75.0
2009	15	46.9	14.4	10.6	66.7	100.0
2010	19	55.9	15.4	9.9	73.7	78.9
2011	14	46.7	16.2	7.4	50.0	71.4
2012	16	72.7	16.7	10.0	56.3	62.5
2013	13	59.1	16.3	8.3	38.5	69.2
2014	9	64.3	16.8	9.1	44.4	88.9
2015	2	66.7	17.1	0.0	100.0	100.0
2016	0 ##					
1998-2016	275	50.4	17.1	14.8	58.5	82.5

275 cases diagnosed 1998-2016 are related to a total of 275 patients. Currently, in 80 (29.1 %) of these 275 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 54 / 14 / 12 (19.6 % / 5.1 % / 4.4 %) 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 2014, a subgroup of 9 cases has been diagnosed, of which 16.8 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 9.1 % 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 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	14	60.9	0.0	14.2	71.4	85.7
1999	11	50.0	4.0	13.4	72.7	90.9
2000	12	46.2	10.8	12.8	75.0	91.7
2001	7	53.8	15.9	12.6	71.4	85.7
2002	11	31.4	16.4	12.1	36.4	72.7 #
2003	25	64.1	13.8	11.8	40.0	76.0
2004	25	52.1	14.3	10.2	64.0	84.0
2005	30	60.0	11.9	9.8	60.0	83.3
2006	25	58.1	11.3	9.0	52.0	80.0
2007	22	47.8	11.5	7.3	81.8	86.4 #
2008	18	42.9	13.0	5.7	66.7	88.9
2009	17	53.1	13.4	5.8	35.3	64.7
2010	15	44.1	12.9	5.8	46.7	73.3
2011	16	53.3	12.5	5.4	62.5	81.3
2012	6	27.3	12.2	9.1	33.3	83.3
2013	9	40.9	12.2	6.3	66.7	88.9
2014	5	35.7	12.7	0.0		80.0
2015	1	33.3	12.6	0.0	100.0	100.0
2016	2	100.0	12.9	0.0		100.0 ##
1998-2016	271	49.6	12.9	14.2	57.2	81.9

271 cases diagnosed 1998-2016 are related to a total of 270 patients. Currently, in 70 (25.9 %) of these 270 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 56 / 7 / 7 (20.7 % / 2.6 % / 2.6 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:

In 2014, a subgroup of 5 cases has been diagnosed, of which 12.7 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 0.0 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 2

Incidence measures by year of diagnosis
 (with respect to registry area expansion from 2.65 to 4.10 m as of 2002,
 and from 4.10 to 4.81 m as of 2007, respectively)

Year of diagnosis	Males n	Females n	Males Inc. raw	Fem. Inc. raw	Males Inc. WS	Fem. Inc. WS	Males Inc. ES	Fem. Inc. ES	Males Inc. BRD-S	Fem. Inc. BRD-S
1998	9	14	0.8	1.2	0.6	0.8	0.8	0.9	1.1	1.0
1999	11	11	1.0	0.9	0.7	0.5	0.9	0.7	0.9	0.8
2000	14	12	1.2	1.0	0.7	0.6	1.1	0.8	1.5	0.9
2001	6	7	0.5	0.6	0.3	0.3	0.5	0.4	0.5	0.5
2002	24	11	1.3	0.6	1.0	0.4	1.2	0.5	1.3	0.5
2003	14	25	0.7	1.3	0.6	1.0	0.7	1.1	0.7	1.2
2004	23	25	1.2	1.3	0.8	1.0	1.0	1.1	1.3	1.2
2005	20	30	1.1	1.5	0.8	0.7	1.0	0.9	1.1	1.2
2006	18	25	0.9	1.2	0.6	0.7	0.8	0.9	0.9	1.0
2007	24	22	1.1	1.0	0.7	0.5	0.9	0.7	1.1	0.8
2008	24	18	1.1	0.8	0.6	0.3	0.8	0.5	1.0	0.6
2009	15	17	0.7	0.7	0.4	0.5	0.5	0.6	0.7	0.7
2010	19	15	0.8	0.6	0.5	0.5	0.6	0.6	0.8	0.5
2011	14	16	0.6	0.7	0.3	0.5	0.4	0.6	0.6	0.6
2012	16	6	0.7	0.3	0.7	0.2	0.6	0.2	0.7	0.2
2013	13	9	0.6	0.4	0.5	0.2	0.5	0.3	0.5	0.3
2014	9	5	0.4	0.2	0.2	0.1	0.3	0.1	0.3	0.2
2015	2	1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0
2016		2		0.1		0.0		0.1		0.1
1998-2016	275	271	0.7	0.7	0.5	0.4	0.6	0.5	0.7	0.6

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

Table 3

Age distribution parameters by year of diagnosis (ALL PATIENTS)

Year of diagnosis	Cases n	Std.		Median						
		Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	23	58.1	24.3	0.5	89.9	31.1	41.2	63.3	77.0	82.2
1999	22	60.7	11.1	31.8	81.1	50.4	54.7	60.8	66.9	75.1
2000	26	66.0	15.6	27.5	88.6	40.9	55.8	70.9	76.2	84.2
2001	13	66.3	11.7	39.8	83.3	53.7	59.9	69.8	71.9	80.8
2002	35	56.6	21.8	0.2	90.9	16.7	47.8	62.0	71.9	75.0
2003	39	54.7	21.6	0.2	81.2	8.2	47.5	60.6	69.1	77.3
2004	48	60.8	20.4	1.5	86.8	35.3	57.5	65.0	73.2	80.6
2005	50	65.3	19.4	0.3	91.9	39.8	56.5	70.4	80.6	83.9
2006	43	64.8	16.4	7.3	94.2	48.2	55.1	65.6	74.3	85.2
2007	46	65.3	17.5	0.2	96.8	43.1	53.2	69.0	78.7	83.7
2008	42	68.2	14.7	28.8	89.6	44.0	63.7	69.9	79.3	83.4
2009	32	59.5	21.0	1.0	86.4	38.6	48.3	63.7	75.3	82.2
2010	34	60.2	23.8	0.2	86.4	28.4	44.9	70.3	74.5	84.1
2011	30	65.0	21.3	0.4	97.2	49.8	56.2	67.6	79.5	83.9
2012	22	55.2	31.9	0.0	84.2	1.8	45.1	71.2	80.7	83.8
2013	22	58.3	25.5	0.7	89.7	13.8	54.4	69.1	74.4	77.8
2014	14	67.2	12.4	43.6	84.3	47.1	56.9	69.5	75.8	83.8
2015	3	76.1	15.2	58.6	86.2	58.6	58.6	83.4	86.2	86.2
2016	2	61.9	24.7	44.4	79.4	44.4	44.4	61.9	79.4	79.4
1998–2016	546	62.1	20.2	0.0	97.2	39.0	54.1	66.0	75.3	82.9

Table 3a

Age distribution parameters by year of diagnosis (MALES)

Year of diagnosis	Cases n	Std.		Median						
		Mean	dev.	Min.	Max.	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	14	67.9	14.4	39.0	88.6	40.9	61.1	72.5	76.2	80.4
2001	6	60.8	12.4	39.8	71.7	39.8	53.7	64.9	69.9	71.7
2002	24	56.3	21.8	0.2	81.6	16.7	53.0	62.0	69.8	74.0
2003	14	55.8	18.3	0.6	76.6	44.1	53.0	59.5	65.4	71.4
2004	23	64.8	20.3	2.0	81.8	58.8	62.2	67.3	78.0	80.6
2005	20	60.0	23.6	0.3	89.7	19.7	53.1	65.2	74.4	83.8
2006	18	62.8	10.5	40.8	81.8	49.6	55.1	64.4	68.2	79.2
2007	24	63.9	19.3	0.2	86.7	42.0	51.5	69.8	78.6	81.3
2008	24	66.0	16.9	28.8	89.6	35.7	58.2	69.7	77.5	84.7
2009	15	64.1	20.6	1.1	82.2	38.6	61.2	70.3	76.5	80.3
2010	19	64.9	22.2	0.4	86.4	28.4	62.7	71.8	82.9	84.2
2011	14	72.9	10.7	55.1	88.5	56.2	65.9	72.8	83.6	84.0
2012	16	52.9	32.6	0.0	83.8	1.1	24.2	66.8	77.7	82.9
2013	13	54.4	25.8	0.7	78.9	13.8	43.7	65.8	71.4	77.8
2014	9	67.3	10.5	47.1	84.3	47.1	66.4	68.2	71.6	84.3
2015	2	84.8	2.0	83.4	86.2	83.4	83.4	84.8	86.2	86.2
1998–2016	275	62.3	20.1	0.0	89.7	39.0	55.9	66.9	74.7	81.8

Table 3b

Age distribution parameters by year of diagnosis (FEMALES)

Year of diagnosis	Cases n	Std. dev.		Min. Max.		10% 25%		Median		
		Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	14	56.6	24.2	5.4	89.9	31.1	38.1	60.3	77.0	85.4
1999	11	61.3	14.2	31.8	81.1	52.1	54.7	60.1	75.1	80.2
2000	12	63.7	17.2	27.5	86.8	49.0	52.8	63.2	77.7	84.2
2001	7	70.9	9.5	57.5	83.3	57.5	63.3	71.9	80.8	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	25	57.1	20.1	1.5	86.8	35.3	52.8	58.3	67.3	77.2
2005	30	68.8	15.5	36.6	91.9	41.9	62.9	71.2	82.0	83.9
2006	25	66.1	19.7	7.3	94.2	40.9	57.7	67.7	77.3	91.5
2007	22	66.9	15.5	40.4	96.8	47.4	53.2	66.0	79.5	84.4
2008	18	71.2	10.7	44.0	84.2	54.8	65.3	72.4	82.4	83.4
2009	17	55.5	21.2	1.0	86.4	36.8	46.3	53.2	69.5	85.8
2010	15	54.2	25.2	0.2	85.8	6.4	43.6	58.5	74.5	75.7
2011	16	58.0	25.8	0.4	97.2	1.1	55.3	59.8	73.6	81.8
2012	6	61.4	32.0	2.6	84.2	2.6	46.2	75.8	83.8	84.2
2013	9	63.9	25.6	1.1	89.7	1.1	59.7	72.7	76.1	89.7
2014	5	67.1	16.8	43.6	83.8	43.6	55.5	75.8	76.7	83.8
2015	1	58.6		58.6	58.6	58.6	58.6	58.6	58.6	58.6
2016	2	61.9	24.7	44.4	79.4	44.4	44.4	61.9	79.4	79.4
1998-2016	271	61.8	20.4	0.2	97.2	39.3	52.3	64.9	76.2	83.8

Table 4

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

Age at diagnosis Years	Cases n	Males			Females				
		%	Cum.%	n	%	Cum.%	n	%	Cum.%
0-4	14	5.7	5.7	8	5.9	5.9	6	5.4	5.4
5-9	1	0.4	6.1			5.9	1	0.9	6.3
10-14	1	0.4	6.5	1	0.7	6.6			6.3
15-19	0	0.0	6.5			6.6			6.3
20-24	1	0.4	6.9	1	0.7	7.4			6.3
25-29	2	0.8	7.7	2	1.5	8.8			6.3
30-34	2	0.8	8.5	1	0.7	9.6	1	0.9	7.2
35-39	5	2.0	10.5	4	2.9	12.5	1	0.9	8.1
40-44	14	5.7	16.2	5	3.7	16.2	9	8.1	16.2
45-49	12	4.9	21.1	5	3.7	19.9	7	6.3	22.5
50-54	12	4.9	25.9	3	2.2	22.1	9	8.1	30.6
55-59	20	8.1	34.0	7	5.1	27.2	13	11.7	42.3
60-64	18	7.3	41.3	11	8.1	35.3	7	6.3	48.6
65-69	27	10.9	52.2	19	14.0	49.3	8	7.2	55.9
70-74	42	17.0	69.2	29	21.3	70.6	13	11.7	67.6
75-79	29	11.7	81.0	13	9.6	80.1	16	14.4	82.0
80-84	35	14.2	95.1	21	15.4	95.6	14	12.6	94.6
85+	12	4.9	100.0	6	4.4	100.0	6	5.4	100.0
All ages	247	100.0		136	100.0		111	100.0	

Table 5

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

Age at diagnosis Years	Males n	Females n	Males Age- spec. incid.	Females Age- spec. incid.	Males Prop.all cancers n=113978 %	Females Prop.all cancers n=112253 %
0- 4	8	6	0.7	0.6	4.1	4.0
5- 9		1		0.1		1.2
10-14	1		0.1		0.9	
15-19						
20-24	1		0.1		0.2	
25-29	2		0.1		0.3	
30-34	1	1	0.1	0.1	0.1	0.1
35-39	4	1	0.2	0.1	0.3	0.0
40-44	5	9	0.3	0.5	0.2	0.2
45-49	5	7	0.3	0.4	0.1	0.1
50-54	3	9	0.2	0.5	0.0	0.1
55-59	7	13	0.5	0.9	0.1	0.1
60-64	11	7	0.9	0.5	0.1	0.1
65-69	19	8	1.6	0.6	0.1	0.1
70-74	29	13	2.6	1.0	0.1	0.1
75-79	13	16	1.6	1.6	0.1	0.1
80-84	21	14	4.6	2.0	0.2	0.1
85+	6	6	2.0	0.8	0.1	0.0
All ages	136	111			0.1	0.1
Incidence						
Raw			0.6	0.5		
WS			0.4	0.3		
ES			0.5	0.4		
BRD-S			0.6	0.4		

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 - 2016 (Males: 136, Females: 111)

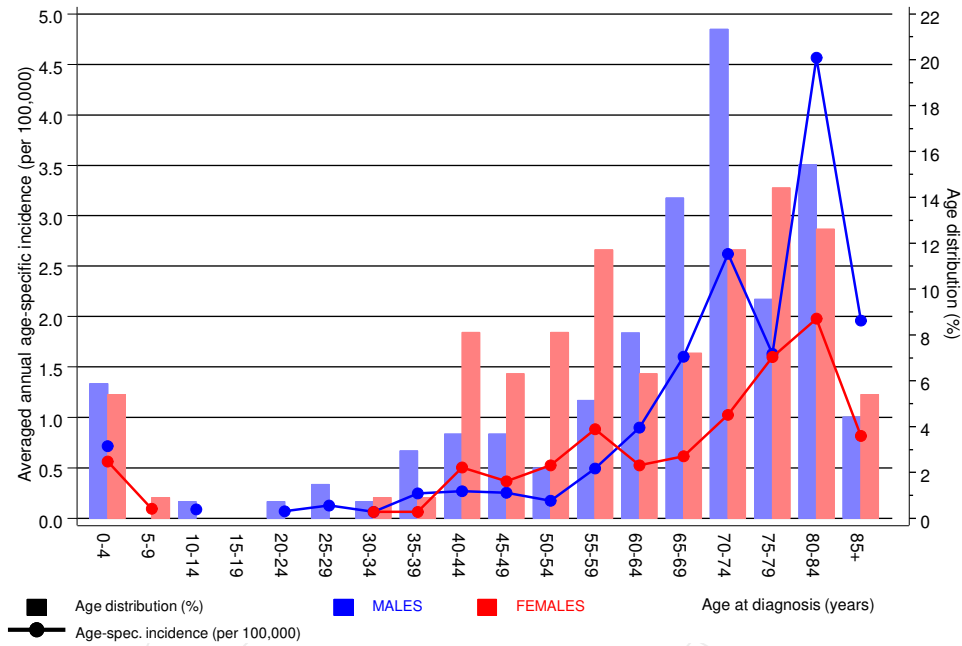


Figure 6. Age distribution (males: mean=63.7 yrs, median=70.2 yrs; females: mean=62.2 yrs, median=65.4 yrs) and age-specific incidence.

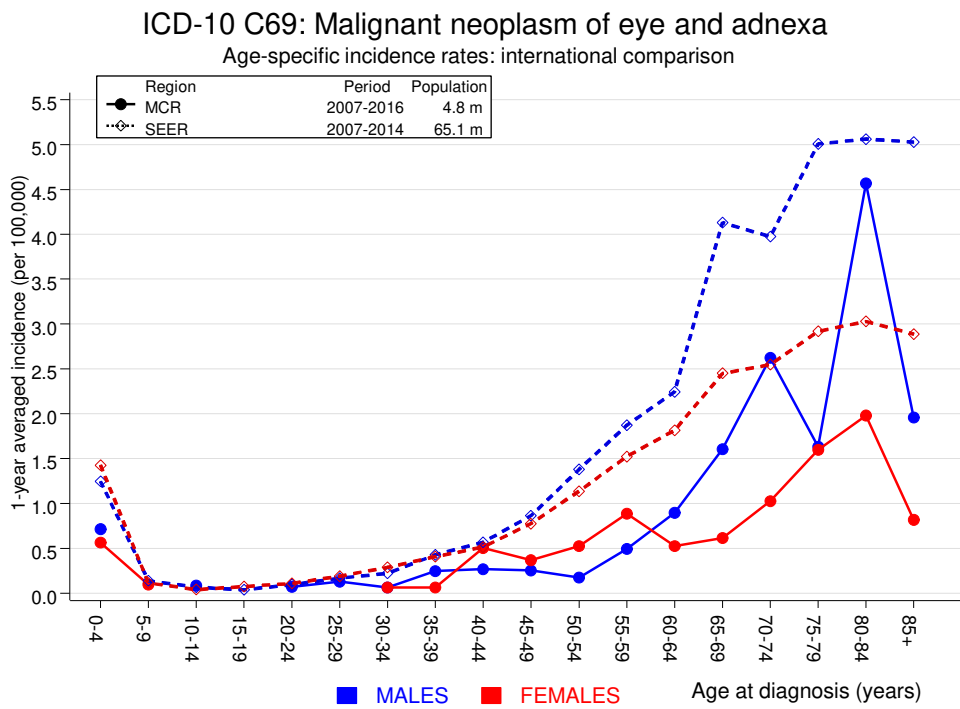


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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 %	
C15	Oesophagus	2	0.4	5.6	0.7	20.4	14.2		
C18	Colon	3	2.0	1.5	0.3	4.5	9.0		
C19–C20	Rectum	2	1.1	1.9	0.2	6.9	8.2		
C33–C34	Lung	9	2.3	3.9	1.8	7.4 #	57.7	22.2	
C43	Malign. melanoma	7	0.8	8.5	3.4	17.4 #	53.3		
C61	Prostate	12	5.8	2.1	1.1	3.6 #	53.8	8.3	
C64	Kidney	3	0.7	4.4	0.9	12.9	20.0		
C67	Bladder	3	0.9	3.3	0.7	9.5	17.9		
Others, specified		5	0.8	6.2	2.0	14.4 #	36.2		
Not observed		0	5.3	0.0	0.0	0.7 #	-45.9		
All further malignancies		46	20.0	2.3	1.7	3.1 #	224.5	6.5	
Patients									260
Median age at next malignancy (years)									74.3
Person-years									1158
Mean observation time (years)									4.5
Median observation time (years)									2.9

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

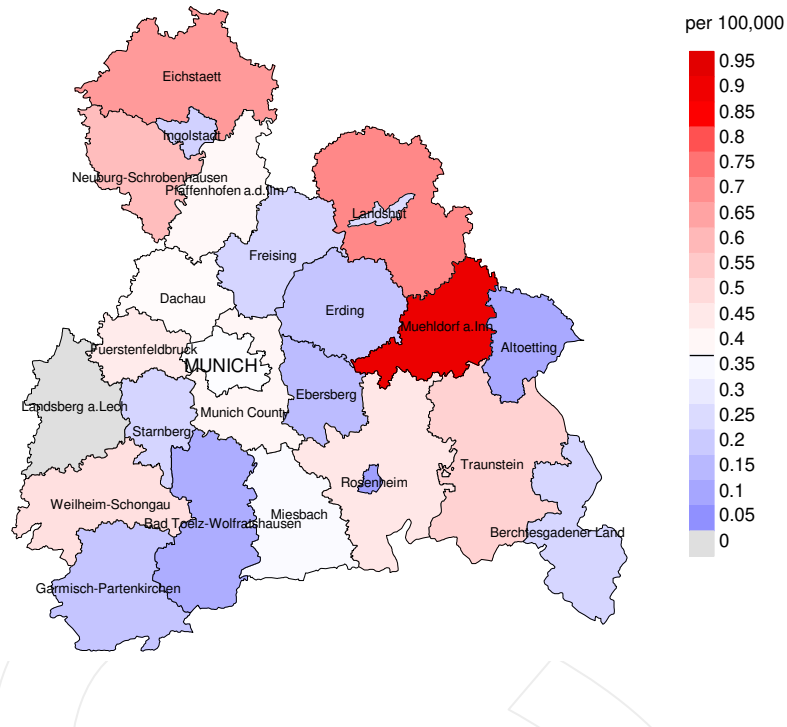
FEMALES

Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C16 Stomach	2	0.5	4.0	0.5	14.4	11.4	50.0
C22 Liver	2	0.2	12.2	1.5	44.0 #	14.0	
C43 Malign. melanoma	3	0.5	5.8	1.2	17.0 #	19.0	33.3
C50 Breast	11	4.2	2.6	1.3	4.7 #	52.3	9.1
C54 Corpus uteri	2	0.7	2.7	0.3	9.8	9.7	
C56 Ovary	3	0.6	5.4	1.1	15.8 #	18.7	
C70–C72 CNS cancer	2	0.2	10.8	1.3	39.1 #	13.9	
C82–C85 NHL	2	0.5	3.7	0.5	13.5	11.2	
Others, specified	12	3.5	3.4	1.8	5.9 #	64.7	
Not observed	0	2.9	0.0	0.0	1.3	-22.5	
All further malignancies	39	13.8	2.8	2.0	3.9 #	192.3	7.7
Patients		251					
Median age at next malignancy (years)		67.0					
Person-years		1309					
Mean observation time (years)		5.2					
Median observation time (years)		4.5					

The occurrence of further malignancy listed is statistically significant.

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

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



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

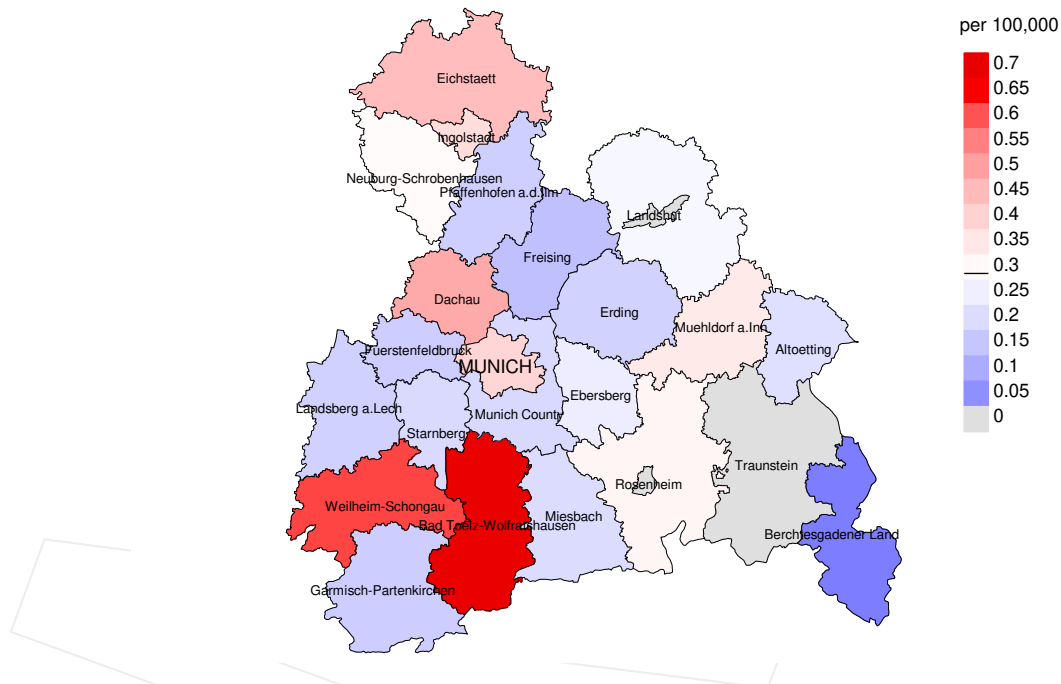
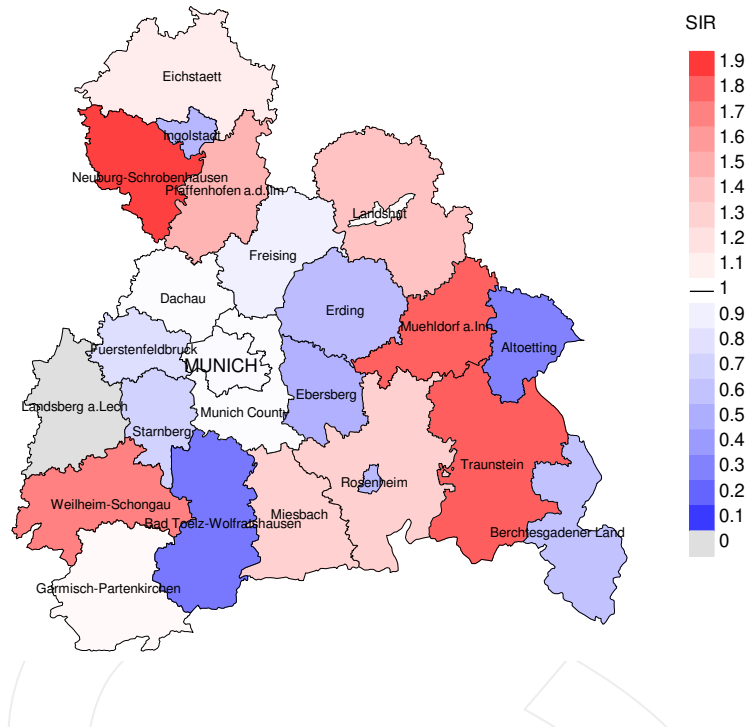


Figure 8a. Map of cancer incidence (world standard population) by county averaged for period 2007 to 2016. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 0.4/100,000 WS N=136, females 0.3/100,000 WS N=111).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 3 women were identified with newly diagnosed eye cancer. 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 1.3/100,000.

Standardized incidence ratio (SIR) 2007 - 2016: Males



Standardized incidence ratio (SIR) 2007 - 2016: Females

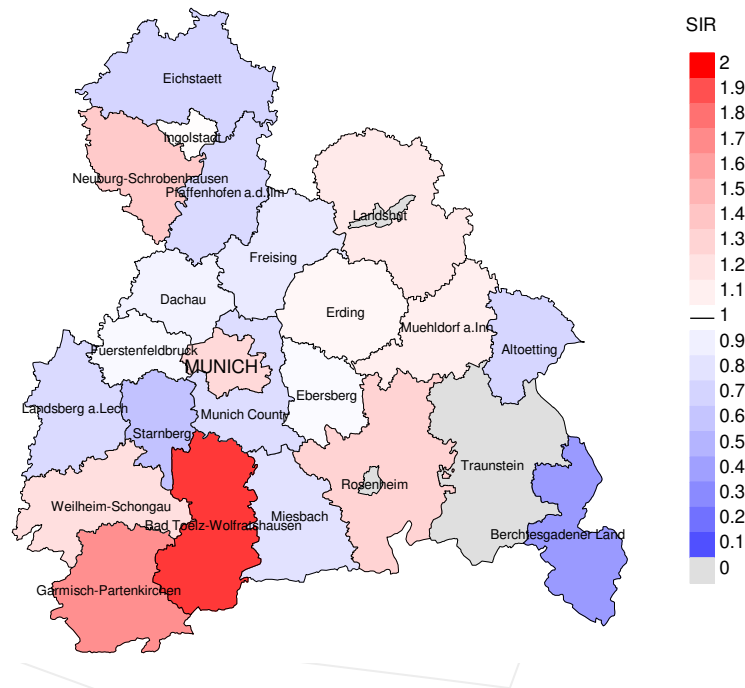


Figure 8b. Map of standardized incidence ratio (SIR) by county averaged for period 2007 to 2016. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=136, females N=111).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 3 women 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 0.97. Though, the value of this parameter may vary with an underlying probability of 99% between 0.11 and 3.55, and is therefore not statistically striking.

MORTALITY

Table 9a

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

(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,
and from 4.10 to 4.81 m as of 2007, respectively)

Year of diagnosis	Incident cases n	Prop. actively followed %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	23	91.3	15	65.2	93.3
1999	22	95.5	12	54.5	91.7
2000	26	96.2	22	84.6	95.5
2001	13	92.3	11	84.6	100.0
2002	35	77.1	17	48.6	94.1
2003	39	76.9	17	43.6	94.1
2004	48	79.2	30	62.5	90.0
2005	50	90.0	30	60.0	93.3
2006	43	81.4	22	51.2	100.0
2007	46	80.4	32	69.6	93.8
2008	42	81.0	25	59.5	88.0
2009	32	81.3	16	50.0	100.0
2010	34	76.5	21	61.8	95.2
2011	30	76.7	17	56.7	100.0
2012	22	68.2	11	50.0	100.0
2013	22	77.3	11	50.0	100.0
2014	14	85.7	4	28.6	100.0
2015	3	100.0	3	100.0	100.0
2016	2	100.0			
1998-2016	546	82.2	316	57.9	94.9

Table 9b

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

(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,
and from 4.10 to 4.81 m as of 2007, respectively)

Year of diagnosis/ death	Incident cases n	Deaths n	Deaths in same year n	Prop. deaths in same year %
1998	23	17		
1999	22	14	1	4.5
2000	26	19	1	3.8
2001	13	11		
2002	35	27		
2003	39	31	2	5.1
2004	48	32	2	4.2
2005	50	36	8	16.0
2006	43	30	2	4.7
2007	46	34	3	6.5
2008	42	36	2	4.8
2009	32	42	4	12.5
2010	34	38		
2011	30	46	2	6.7
2012	22	26	1	4.5
2013	22	39	1	4.5
2014	14	37	2	14.3
2015	3	38	1	33.3
2016	2	20		
1998-2016	546	573	32	5.9

Table 9c

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

(with respect to registry area expansion from 2.65 to 4.10 m as of 2002, and from 4.10 to 4.81 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer- related %	Prop. non-cancer- related %	Prop. cancer recorded on death certificate %
1998	17	70.6	29.4	68.8
1999	14	64.3	35.7	75.0
2000	19	68.4	31.6	77.8
2001	11	63.6	36.4	70.0
2002	27	74.1	25.9	76.0
2003	31	77.4	22.6	85.7
2004	32	75.0	25.0	81.3
2005	36	75.0	25.0	82.4
2006	30	60.0	40.0	72.4
2007	34	73.5	26.5	76.5
2008	36	75.0	25.0	84.8
2009	42	76.2	23.8	78.0
2010	38	63.2	36.8	73.0
2011	46	67.4	32.6	74.4
2012	26	61.5	38.5	61.5
2013	39	64.1	35.9	71.8
2014	37	64.9	35.1	62.2
2015	38	60.5	39.5	58.3
2016	20	60.0	40.0	70.0
1998-2016	573	68.6	31.4	73.8

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	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	3	81.8	79.3	87.2	79.3
2002	14	69.8	69.8	70.8	70.4
2003	15	62.9	62.9	72.9	65.9
2004	15	71.8	71.0	83.5	68.0
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	17	72.3	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	15	76.1	66.8	86.1	66.8
2013	15	77.8	78.6	77.7	80.8
2014	23	76.7	74.4	84.6	76.0
2015	23	77.1	76.1	88.1	76.1
2016	9	73.7	73.7	78.2	73.7
1998-2016	273	75.5	73.2	83.4	73.5

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	12	78.7	72.9	90.5	72.9
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	17	73.4	70.6	83.4	71.1
2005	16	82.3	78.2	85.6	78.2
2006	15	80.0	63.6	83.8	68.4
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	21	81.6	67.2	90.3	67.5
2011	21	81.2	77.6	81.8	75.4
2012	11	73.6	63.1	87.0	63.1
2013	24	75.0	70.4	83.4	71.3
2014	14	82.7	73.0	92.4	75.7
2015	15	78.6	74.8	85.3	74.8
2016	11	71.9	67.9	77.7	63.8
1998–2016	300	77.4	70.9	85.6	71.2

By 2010, life expectancy at birth was 77.5 years for boys and 82.6 years for girls.

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

Table 11a

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

MALES

Year of death	Deaths n	Mort. raw	MI-Index raw	Mort. WS	MI-Index WS	Mort. ES	MI-Index ES	Mort. BRD-S	MI-Index BRD-S
1998	3	0.3	0.33	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	0.29	0.2	0.27	0.3	0.29	0.4	0.29
2001	2	0.2	0.33	0.1	0.22	0.1	0.32	0.3	0.61
2002	12	0.6	0.50	0.4	0.35	0.5	0.45	0.7	0.52
2003	13	0.7	0.93	0.4	0.72	0.6	0.85	0.7	0.97
2004	11	0.6	0.48	0.3	0.40	0.5	0.49	0.6	0.50
2005	15	0.8	0.75	0.4	0.55	0.7	0.69	0.9	0.79
2006	10	0.5	0.56	0.2	0.44	0.4	0.51	0.6	0.64
2007	6	0.3	0.25	0.2	0.23	0.2	0.26	0.3	0.26
2008	14	0.6	0.58	0.3	0.55	0.5	0.57	0.6	0.56
2009	13	0.6	0.87	0.3	0.67	0.4	0.81	0.6	0.87
2010	12	0.5	0.63	0.2	0.47	0.4	0.62	0.5	0.72
2011	17	0.8	1.21	0.3	1.08	0.5	1.12	0.7	1.14
2012	10	0.4	0.63	0.3	0.38	0.4	0.58	0.4	0.63
2013	11	0.5	0.85	0.2	0.41	0.3	0.64	0.4	0.82
2014	16	0.7	1.78	0.3	1.40	0.4	1.56	0.6	1.79
2015	16	0.7	8.00	0.2	9.71	0.4	8.32	0.6	7.66
2016	5	0.2		0.1		0.1		0.2	
1998-2016	191	0.5	0.69	0.2	0.51	0.4	0.63	0.5	0.72

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	9	0.8	0.64	0.3	0.42	0.5	0.55	0.6	0.59
1999	8	0.7	0.73	0.3	0.68	0.5	0.67	0.6	0.78
2000	9	0.7	0.75	0.3	0.58	0.5	0.65	0.6	0.63
2001	5	0.4	0.71	0.2	0.70	0.3	0.74	0.3	0.70
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	13	0.7	0.52	0.3	0.33	0.5	0.41	0.6	0.50
2005	12	0.6	0.40	0.2	0.31	0.3	0.35	0.4	0.37
2006	8	0.4	0.32	0.2	0.32	0.3	0.34	0.4	0.36
2007	19	0.8	0.86	0.4	0.74	0.5	0.75	0.6	0.78
2008	13	0.6	0.72	0.2	0.74	0.4	0.75	0.5	0.72
2009	19	0.8	1.12	0.4	0.69	0.5	0.88	0.6	0.99
2010	12	0.5	0.80	0.3	0.57	0.4	0.67	0.4	0.82
2011	14	0.6	0.88	0.2	0.37	0.3	0.52	0.4	0.63
2012	6	0.3	1.00	0.1	0.76	0.2	1.05	0.2	0.90
2013	14	0.6	1.56	0.3	1.19	0.4	1.51	0.5	1.65
2014	8	0.3	1.60	0.2	2.14	0.2	1.69	0.2	1.44
2015	7	0.3	7.00	0.1	4.19	0.2	4.39	0.2	6.05
2016	7	0.3	3.50	0.1	2.79	0.2	3.01	0.2	3.13
1998-2016	202	0.5	0.75	0.2	0.55	0.3	0.64	0.4	0.70

Table 12

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

Age at death Years	Cases			Males			Females		
	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
0-4									
5-9									
10-14	1	0.4	0.4			0.0	1	0.8	0.8
15-19	0	0.0	0.4			0.0			0.8
20-24	1	0.4	0.8			0.0	1	0.8	1.7
25-29	0	0.0	0.8			0.0			1.7
30-34	1	0.4	1.3	1	0.8	0.8			1.7
35-39	0	0.0	1.3			0.8			1.7
40-44	5	2.1	3.3	3	2.5	3.3	2	1.7	3.4
45-49	4	1.7	5.0			3.3	4	3.4	6.7
50-54	9	3.8	8.8	4	3.3	6.7	5	4.2	10.9
55-59	23	9.6	18.4	9	7.5	14.2	14	11.8	22.7
60-64	21	8.8	27.2	11	9.2	23.3	10	8.4	31.1
65-69	35	14.6	41.8	13	10.8	34.2	22	18.5	49.6
70-74	42	17.6	59.4	25	20.8	55.0	17	14.3	63.9
75-79	37	15.5	74.9	22	18.3	73.3	15	12.6	76.5
80-84	28	11.7	86.6	18	15.0	88.3	10	8.4	84.9
85+	32	13.4	100.0	14	11.7	100.0	18	15.1	100.0
All ages	239	100.0		120	100.0		119	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		1			0.1	1.00		4.2
15-19								
20-24		1			0.1	1.00		3.0
25-29								
30-34	1		0.1	1.00			1.0	
35-39								
40-44	3	2	0.2	0.60	0.1	0.22	0.6	0.3
45-49		4			0.2	0.57		0.3
50-54	4	5	0.2	1.33	0.3	0.56	0.2	0.3
55-59	9	14	0.6	1.29	1.0	1.08	0.3	0.5
60-64	11	10	0.9	1.00	0.8	1.43	0.2	0.3
65-69	13	22	1.1	0.68	1.7	2.75	0.2	0.4
70-74	25	17	2.3	0.86	1.3	1.31	0.3	0.3
75-79	22	15	2.8	1.69	1.5	0.94	0.2	0.2
80-84	18	10	3.9	0.86	1.4	0.71	0.2	0.1
85+	14	18	4.6	2.33	2.5	3.00	0.2	0.2
All ages	120	119					0.2	0.3
Mortality								
Raw			0.5	0.88	0.5	1.07		
WS			0.2	0.63	0.2	0.79		
ES			0.4	0.79	0.3	0.92		
BRD-S			0.5	0.89	0.4	0.99		
PYLL-70								
per 100,000			2.1		3.2			
ES			1.8		2.9			
AYLL-70			10.2		10.9			

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 ←%
C07-C08 Salivary gland	1	1.0	1	100.0				
C09-C10 Oropharynx	2	2.1					2	100.0
C11 Nasopharynx	1	1.0					1	100.0
C15 Oesophagus	1	1.0					1	100.0
C18 Colon	9	9.4			1	11.1	8	88.9
C19-C20 Rectum	3	3.1	1	33.3	1	33.3	1	33.3
C22 Liver	4	4.2					4	100.0
C23-C24 Bile	2	2.1	1	50.0			1	50.0
C25 Pancreas	2	2.1	1	50.0			1	50.0
C33-C34 Lung	14	14.6	1	7.1			13	92.9
C43 Malign. melanoma	11	11.5	6	54.5	3	27.3	2	18.2
C44 Skin others	9	9.4	5	55.6	1	11.1	3	33.3
C61 Prostate	17	17.7	8	47.1	1	5.9	8	47.1
C64 Kidney	6	6.3	3	50.0			3	50.0
C67 Bladder	4	4.2	1	25.0	1	25.0	2	50.0
C69 Eye carcinoma	1	1.0					1	100.0
C70-C72 CNS cancer	1	1.0					1	100.0
C73 Thyroid	1	1.0					1	100.0
C76-C79 CUP	2	2.1					2	100.0
C82-C85 NHL	3	3.1	1	33.3			2	66.7
C90 Mult. myeloma	1	1.0	1	100.0				
C91-C96 Leukaemia	1	1.0					1	100.0
All further malignancies	96	100.0	30	31.3	8	8.3	58	60.4

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 14b

Further malignancies in deaths in period 1998-2016
FEMALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C07-C08 Salivary gland	1	1.2					1	100.0
C16 Stomach	3	3.5	1	33.3			2	66.7
C18 Colon	2	2.3	1	50.0			1	50.0
C19-C20 Rectum	2	2.3	1	50.0			1	50.0
C22 Liver	4	4.7					4	100.0
C23-C24 Bile	2	2.3					2	100.0
C25 Pancreas	3	3.5					3	100.0
C33-C34 Lung	8	9.3	2	25.0	1	12.5	5	62.5
C43 Malign. melanoma	12	14.0	3	25.0			9	75.0
C46,C49 Soft tissue	1	1.2	1	100.0				
C50 Breast	28	32.6	17	60.7	2	7.1	9	32.1
C53 Cervix uteri	2	2.3					2	100.0
C54 Corpus uteri	6	7.0	2	33.3			4	66.7
C56 Ovary	2	2.3					2	100.0
C64 Kidney	1	1.2					1	100.0
C67 Bladder	1	1.2			1	100.0		
C69 Eye carcinoma	1	1.2					1	100.0
C70-C72 CNS cancer	3	3.5					3	100.0
C73 Thyroid	2	2.3	1	50.0			1	50.0
C91-C96 Leukaemia	2	2.3					2	100.0
All further malignancies	86	100.0	29	33.7	4	4.7	53	61.6

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		1			0.1	1.00		4.8
15-19								
20-24		1			0.1	1.00		3.2
25-29								
30-34	1		0.1	1.00			1.0	
35-39								
40-44	3	1	0.2	0.60	0.1	0.17	0.7	0.2
45-49		3			0.2	0.43		0.3
50-54	4	4	0.2	1.33	0.2	0.50	0.2	0.2
55-59	8	14	0.6	1.60	1.0	1.17	0.3	0.6
60-64	9	9	0.7	1.00	0.7	1.80	0.2	0.3
65-69	9	21	0.8	0.60	1.6	4.20	0.2	0.5
70-74	21	10	1.9	0.91	0.8	0.91	0.3	0.2
75-79	19	15	2.4	2.11	1.5	1.15	0.3	0.3
80-84	11	7	2.4	0.79	1.0	0.64	0.2	0.1
85+	10	16	3.3	3.33	2.2	2.67	0.2	0.2
All ages	95	102					0.2	0.3
Mortality								
Raw			0.4	0.89	0.4	1.10		
WS			0.2	0.61	0.2	0.79		
ES			0.3	0.79	0.3	0.94		
BRD-S			0.4	0.89	0.3	1.02		
PYLL-70								
per 100,000			1.9		2.8			
ES			1.6		2.6			
AYLL-70			11.2		10.5			

* 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. 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	4.8
15-19						
20-24		1		0.1	1.00	3.2
25-29						
30-34	1		0.1	1.00	1.0	
35-39						
40-44	3	1	0.2	0.60	0.7	0.2
45-49		3		0.2	0.43	0.3
50-54	4	4	0.2	1.33	0.2	0.2
55-59	8	12	0.6	2.00	0.3	0.5
60-64	6	9	0.5	0.75	0.7	1.80
65-69	9	17	0.8	0.60	1.3	3.40
70-74	15	9	1.4	0.75	0.7	0.90
75-79	12	11	1.5	1.50	1.1	0.85
80-84	3	4	0.7	0.27	0.6	0.40
85+	6	10	2.0	2.00	1.4	1.67
All ages	67	82			0.2	0.2
Mortality						
Raw			0.3	0.69	0.3	0.93
WS			0.1	0.50	0.2	0.72
ES			0.2	0.63	0.2	0.84
BRD-S			0.3	0.68	0.3	0.89
PYLL-70						
per 100,000			1.8		2.7	
ES			1.5		2.4	
AYLL-70			11.5		11.0	

* See corresponding tables with multiple malignancies.

ICD-10 C69: Malignant neoplasm of eye and adnexa
 Age distribution and age-specific mortality 2007 - 2016 (Males: 120, Females: 119)

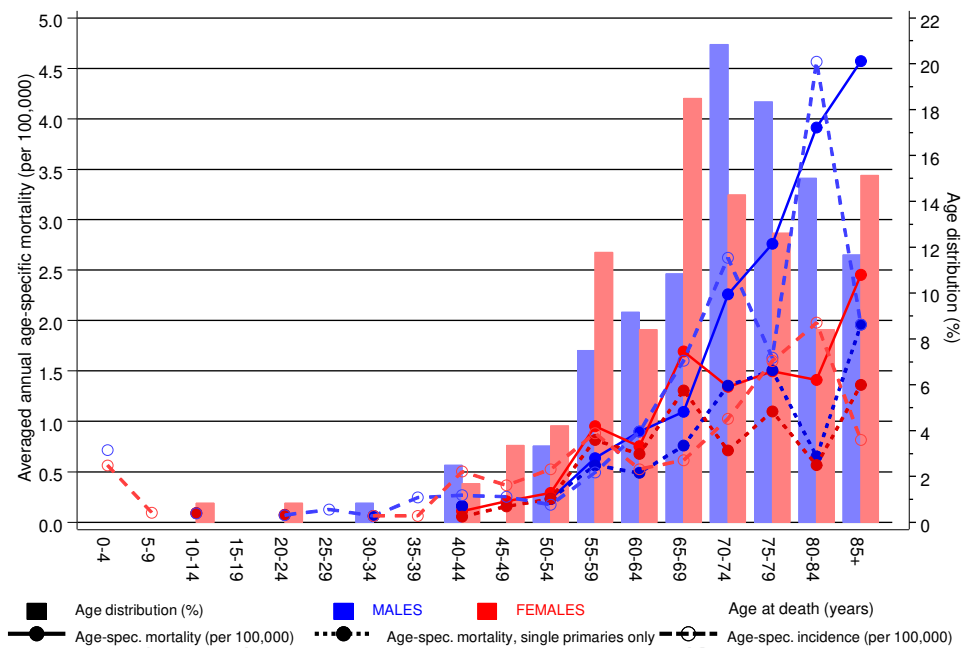
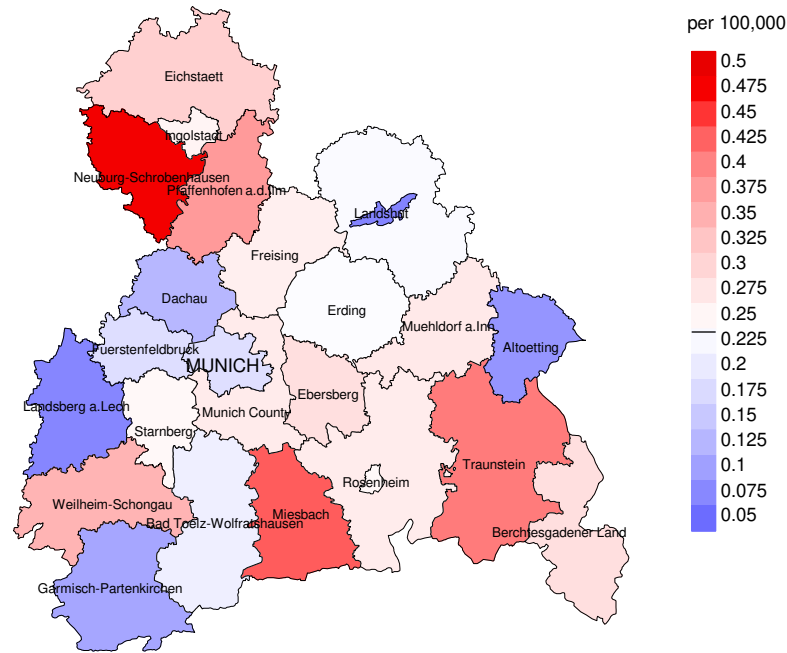


Figure 17. Distribution of age at death (bars; males: mean=64.6 yrs, median=66.4 yrs; females: mean=62.0 yrs, median=62.6 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

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



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

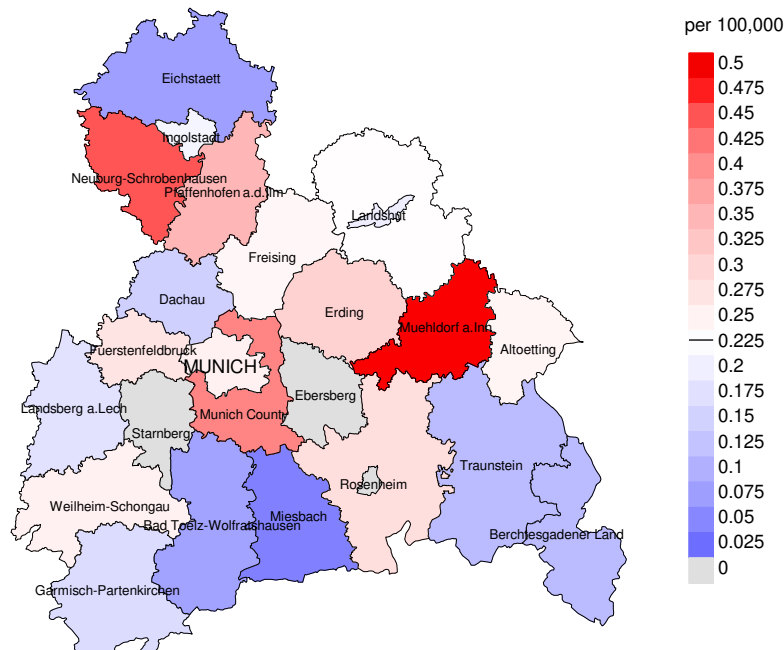
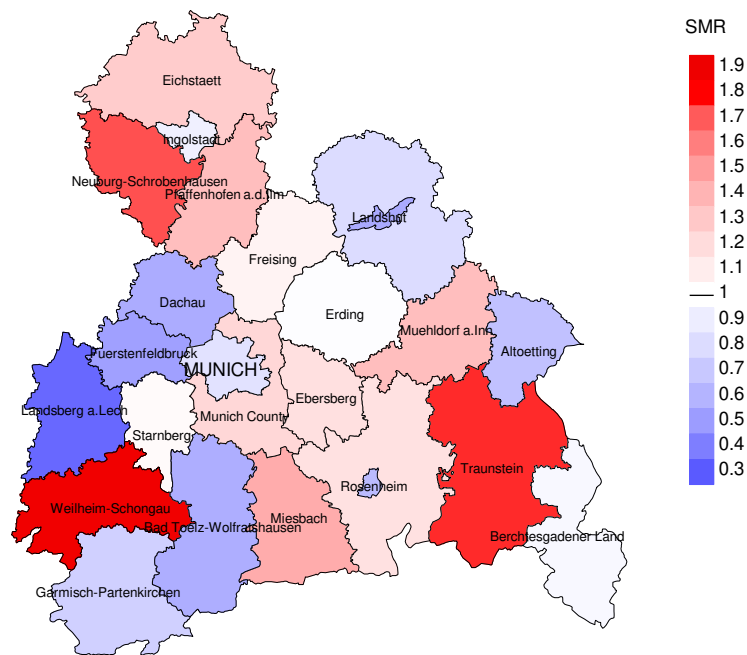


Figure 18a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2016. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 0.2/100,000 WS N=120, females 0.2/100,000 WS N=119).

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

Standardized mortality ratio (SMR) 2007 - 2016: Males



Standardized mortality ratio (SMR) 2007 - 2016: Females

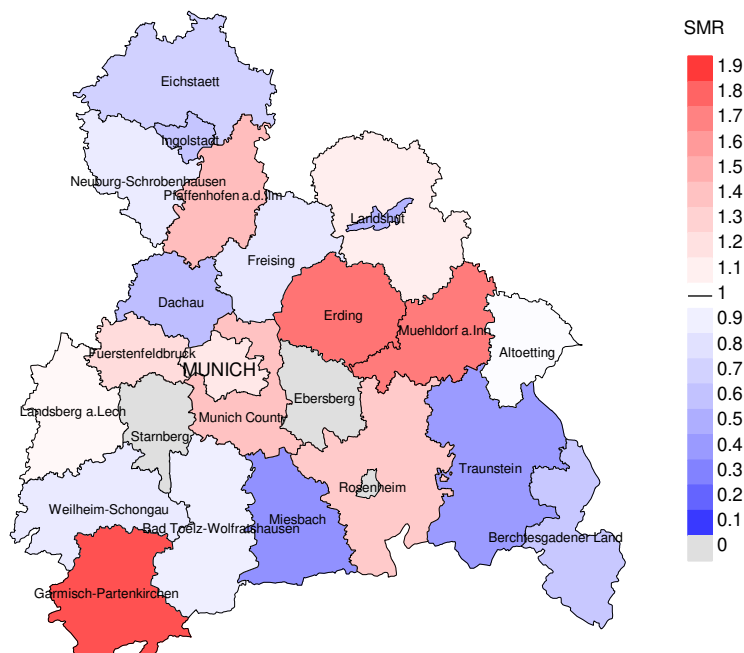


Figure 18b. Map of standardized mortality ratio (SMR) by county averaged for period 2007 to 2016. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=120, females N=119).

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 0 women died from eye cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.00. Though, the value of this parameter may vary with an underlying probability of 99% between 0.00 and 1.65, and is therefore not statistically striking.

Statistical Notes

In all tables and figures the respective reference values should be carefully considered. The incidence rates include diagnoses (with multiple primary), and death certificate only (DCO) cases, where applicable. For mortality statistics patients, diagnoses and progressive course of disease are presented. In the calculations, all courses of disease are considered whereby progressions occurred and/or death certificate identified progressive cancers were ascertained. Additionally there are three groups of disease course to consider:

1. All multiple primaries included

The mortality statistic describes the tumor-specific death, independent of any malignancy. The patient perspective, induced secondary malignancies, and the problem of multiple malignancies from the same primary tumor all have reasons for their inclusion.

2. First singular primary (no information about other prior or synchronous malignancy)

The mortality statistic describes the cancer-related death for patients who have no therapeutic restrictions due to a previous or synchronous cancer. These statistics are comparable to studies that have exclusion criteria based on a second malignancy.

3. Single primary (no information about other prior, syn- or metachronous malignancy)

The mortality statistic describes the tumor-specific death that occurs without any impact through secondary primaries, earlier, synchronous, later or induced. Precisely the difference between disease group 1 and 2 highlight the magnitude of the problem of secondary malignancies.

For this reason differences appear concerning official mono-causal mortality statistics. To judge the maximum deviation, 2 further tables are presented. In the first table the distribution of secondary malignancies before, at or after the described cancer are shown, that could be an alternative cause of death. In the second table, the age-specific mortality rates for all courses of disease, without designation of secondary malignancies are shown.

A previously minimally acknowledged statistic is the **age at death**, which allows for a good assessment of the quality of classification of the apparent tumor-specific death. For assumed tumor-independent deaths, the age of death should be estimated from the age of diagnosis and the normal life expectancy, whereas tumor-dependent deaths can be estimated from the age of diagnosis plus the average tumor-specific life expectancy. The comparison of different tumors demonstrates this association, if the causes of cancer and the competing cause of death are independent of each other (e.g. breast and colon versus head/neck and lung).

The index from mortality and incidence (Mortality-Incidence ratio, **MI-index**) is a statistic that allows for the evaluation of the quality of data. For diseases with poor prognoses, comparable values are obtained from all age groups, because to a large extent, the numerator and denominator contain the same cases. For tumors with a good prognosis, increasing and decreasing incidence and age-specific differences in prognosis can more strongly alter the MI- index. Additionally, attention should be paid to the confidence intervals where fewer cases are reported.

The complexity of problems identified here emphasizes the importance of relative survival data for the appropriate analysis of long term results.

As a measurement of the burden of disease, the number of potential life years loss due to premature deaths in a cohort can be calculated (**PYLL**, potential years of life lost, standardized per 100,000 persons or per European standard) as well as the average loss of life years per individual (**AYLL**, average years of life lost). Depending upon the analytic aim (health economy, prevention, health care research) different methods exist for the generation of these measurements. In the results presented here, the age for a premature death is considered to be before 70 years, according to the guidelines of the OECD and the WHO (as seen in the abbreviation PYLL-70 or AYLL-70).

Shortcuts

MCR	Munich Cancer Registry (Tumorregister München)
GEKID	Association of Population-based Cancer Registries in Germany (Gesellschaft der epidemiologischen Krebsregister in Deutschland e.V.)
SEER	Surveillance, Epidemiology, and End Results (USA)
DCO	Death certificate only
BRD-S	German standard population
ES	European standard population (old)
WS	World standard population
SIR	Standardized incidence ratio
CI	Confidence interval
EAR	Excess absolute risk = excess cancer cases (O - E) per 10,000 person-years
PYLL-70	Potential years of life lost prior to age 70 given a person dies before that age
AYLL-70	Average years of life lost prior to age 70 given a person dies before that age
SMR	Standardized mortality ratio
MI-index	Ratio between mortality and incidence
FRG	Federal Republic of Germany

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