Munich Cancer Registry



- ▶ Survival
- ▶ Selection Matrix
- ▶ Homepage

Munich Cancer Registry at Munich Cancer Center Marchioninistr. 15 Munich, 81377 Germany

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

Cancer statistics: Baseline statistics

C69: Eye cancer

Year of diagnosis	1998-2011
Patients	439
Diseases	441
Creation date	04/02/2013
Export date	01/03/2013
Population	4.5 m



http://www.tumorregister-muenchen.de/en/facts/base/base_C69__E.pdf

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 4.5 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.

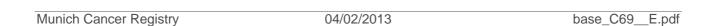
The foot notes describe the currentness of the data. The baseline statistics and survival data are updated annually. This yearly analysis comprises the Annual Report of the MCR. The time-delayed acquisition of data and the occasionally high DCO-rates indicate optimizing reserves, among others, because of current financial and legal conditions that hinder the analyses.

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, April 2013

- 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 2.51 million to 3.96 in 2002, and to 4.52 million in 2007). Death certificates from 2011 are incorporated into these analyses.
- 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. A high proportion of DCO cases (≥5%) in particular cancer types indicate insufficient participation of specific cancer specializations.



INCIDENCE

Table 1

Patient cohorts by year of diagnosis including DCO cases and multiple primaries, and with proportion of deaths and active follow-up

				Prop.		Prop.
		DCO	Prop.	mult.	Prop.	actively
Year of	Cases #	cases	DCO	primaries	deaths	followed
diagnosis	n	n	%	90	%	90
1998	22			13.6	59.1	90.9
1999	23			21.7	39.1	91.3
2000	27			48.1	70.4	96.3
2001	13			46.2	69.2	100.0
2002	32			25.0	46.9	84.4
2003	38			26.3	42.1	78.9
2004	50			32.0	56.0	78.0
2005	53	1	1.9	20.8	50.9	90.6
2006	42			28.6	40.5	73.8
2007	45			22.2	51.1	68.9 ##
2008	41			22.0	29.3	58.5
2009	31 /			32.3	25.8	54.8
2010	16			31.3	31.3	100.0
2011	8			37.5	12.5	87.5 ###
1998-2011	441	1	0.2	27.4	45.8	79.4

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

^{##} Since 2007 the percentage of actively followed patients sharply declined compared to the previous years. This is a consequence of ambiguous data protection rules that currently forbid cancer registries in Bavaria to obtain the essential life status informations from competent registration offices.

^{###} Please be aware that data of recent annual patient cohorts may not yet be fully processed. Therefore, the presented figures and tables are potentially related to different time periods as pointed out in the respective headlines or legends.

Table 1a

Patient cohorts by year of diagnosis and gender including DCO cases

Year of	All	Males	Females	Prop. males	
diagnosis	n	n	n	%	
1998	22 /	9	13	40.9	
1999	23	/11	12	47.8	
2000	27	/ 15	12	55.6	
2001	13	6	7	46.2	
2002	32	21	11	65.6	
2003	38	/ 15	23 /	39.5	
2004	50	23	27	46.0	
2005	53	21	32	39.6	
2006	42	18	24	42.9	
2007	45	25	20	55.6	
2008	41	24	17	58.5	
2009	31	13	18	41.9	
2010	16	8	8	50.0	
2011	8	5	3	62.5	
1998-2011	441	214	227	48.5	

Table 2

Incidence measures by year of diagnosis and gender including DCO cases (with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.52 m as of 2007, respectively)

			Males	Fem.	Males	Fem.	Males	Fem.	Males	Fem.
Year of	Males	Females	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.
diagnosis	n	n	raw	raw	WS	WS	ES	ES	BRD-S	BRD-S
1998	9	13	0.8	1.1	0.6	0.7	0.8	0.8	1.1	0.9
1999	11	12	1.0	1.0	0.7	0.5	0.9	0.8	0.9	0.9
2000	15	12	1.3	1.0	0.7	0.6	1.1	0.8	1.6	0.9
2001	6	7	0.5	0.6	0.3	0.3	0.5	0.4	0.5	0.5
2002	21	11	/ 1.1/	0.6	0.9	0.4	1.0	0.5	1.1	0.5
2003	15	23	0.8	1.2	0.6	0.9	0.8	1.0	0.8	1.1
2004	23	27	1.2	1.4	0.8	1.0	1.0	1.2	1.2	1.2
2005	21	32	1.1	1.6	0.8	0.7	1.0	1.0	1.2	1.3
2006	18	24	0.9	1.2	0.6	0.7	0.8	0.8	0.9	0.9
2007	25	20	1.1	0.9	0.7	0.4	0.9	0.6	1.2	0.7
2008	24	17	1.1	0.7	0.6	0.3	0.9	0.4	1.1	0.6
2009	13	18	0.6	0.8	0.4	0.5	0.5	0.6	0.6	0.7
2010	8	8	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3
2011	5	3	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.1
1998-2011	214	227	0.9	0.9	0.6	0.5	0.7	0.7	0.8	0.7

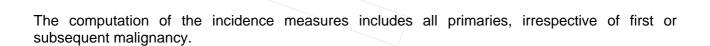


Table 3

Age distribution parameters by year of diagnosis (All) (incl. DCO)

Year of	Cases		Std.					Median		
diagnosis	n	Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	22	58.5	24.8	0.5	89.9	31.1	41.2	63.7	77.0	82.2
1999	23	60.6	10.9	31.8	81.1	50.4	54.7	60.5	66.9	75.1
2000	27	65.8	15.3	27,5	88.6	40.9	55.8	70.3	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	32	56.2	22.6	0.2	90.9	16.7	49.8	62.1	71.2	75.0
2003	38	55.2	21.5	0.2	81.2	8.2	47.9	60.7	69.1	77.3
2004	50	60.5	19.8	1.5	86.8	40.6	57.6	64.1	72.5	80.0
2005	53	65.5	19.7	0.3	91.9	39.3	58.9	70.9	80.6	83.8
2006	42	64.8	16.6	7.3	94.2	48.2	55.1	65.9	74.3	85.2
2007	45	66.4	17.2	0.2	96.8	44.6	54.3	70.2	78.7	83.7
2008	41	67.8	15.1	28.8	89.6	44.0	60.4	69.9	79.3	83.4
2009	31	58.3	21.0	1.0	86.4	38.6	47.0	61.2	74.7	82.2
2010	16	58.2	26.9	0.2	86.4	0.4	44.3	65.8	75.2	85.8
2011	8	52.1	32.5	0.4	78.5	0.4	28.7	65.2	75.3	78.5
1998-2011	441	62.0	19.6	0.2	96.8	39.8	53.7	65.4	75.1	82.2

Table 3a

Age distribution parameters by year of diagnosis (MALES)
(incl. DCO)

Year of	Cases		Std.					Median		
diagnosis	n	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	15	67.6	13.9	39.0	88.6	40.9	61.1	71.8	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	21	55.7	23.0	0.2	81.6	16.7	53.2	62.2	69.1	74.0
2003	15	55.3	17.7	0.6	76.6	44.1	48.8	58.5	65.4	71.4
2004	23	64.0	20.1	2.0	81.8	58.8	61.0	66.9	78.0	80.6
2005	21	62.1	23.7	0.3	89.7	34.3	56.5	70.6	74.8	82.3
2006	18	62.8	10.5	40.8	81.8	49.6	55.1	64.4	68.2	79.2
2007	25	64.5	19.2	0.2	86.7	42.0	54.3	70.2	78.5	81.3
2008	24	65.2	17.1	28.8	89.6	35.7	55.7	69.3	77.5	84.7
2009	13	61.9	21.3	1.1	82.2	38.6	61.2	65.6	73.8	77.5
2010	8	57.0	28.4	0.4	86.4	0.4	41.4	65.4	77.7	86.4
2011	5	68.1	9.0	56.2	78.5	56.2	63.7	66.7	75.1	78.5
1998-2011	214	62.0	18.9	0.2	89.7	39.8	55.4	65.6	74.3	80.6

Table 3b

Age distribution parameters by year of diagnosis (FEMALES) (incl. DCO)

Year of	Cases		Std.					Median		
diagnosis	n	Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	13	57.1	25.1	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	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	23	55.1	24.1	0.2	81.2	8.2	43.5	62.6	75.2	78.0
2004	27	57.5	19.4	1.5	86.8	35.3	52.8	60.8	67.3	77.2
2005	32	67.7	16.5	30.7	91.9	40.2	60.3	71.2	81.9	83.8
2006	24	66.3	20.1	7.3	94.2	40.9	55.5	67.7	80.7	91.5
2007	20	68.9	14.6	43.1	96.8	49.7	56.7	68.6	81.2	84.4
2008	17	71.6	11.0	44.0	84.2	54.8	65.3	73.9	82.4	83.4
2009	18	55.7	21.0	1.0	86.4	36.8	46.3	51.5	74.7	85.8
2010	8	59.5	27.3	0.2	85.8	0.2	50.9	69.0	75.2	85.8
2011	3	25.6	43.1	0.4	75.4	0.4	0.4	1.1	75.4	75.4
1998-2011	227	62.1	20.3	0.2	96.8	38.1	52.3	65.3	76.2	83.8

Age at									
diagnosis	Cases			Males			Females		
Years	n	%	Cum.%	n	96	Cum.%	n	%	Cum.%
0 - 4	17	3.9	3.9	9	4.2	4.2	8	3.5	3.5
5-9	6	1.4	5.2	2	0.9	5.1	4	1.8	5.3
10-14	0	0.0	5.2			5.1			5.3
15-19	1	0.2	5.4	/ 1	0.5	5.6			5.3
20-24	0	0.0	5.4			5.6			5.3
25-29	2	0.5	5.9	1	0.5	6.1	1	0.4	5.7
30-34	7	1.6	7.5	2	0.9	7.0	5	2.2	7.9
35-39	14	3.2	10.7	7	3.3	10.3	7	3.1	11.0
40-44	19	4.3	15.0	8	3.7	14.0	11	4.8	15.9
45-49	22	5.0	20.0	7	3.3	17.3	15	6.6	22.5
50-54	33	7.5	27.4	15	7.0	24.3	18	7.9	30.4
55-59	33	7.5	34.9	16	7.5	31.8	17	7.5	37.9
60-64	61	13.8	48.8	35	16.4	48.1	26	11.5	49.3
65-69	57	12.9	61.7	32	15.0	63.1	25	11.0	60.4
70-74	57	12.9	74.6	32	15.0	78.0	25	11.0	71.4
75-79	43	9.8	84.4	22	10.3	88.3	21	9.3	80.6
80-84	46	10.4	94.8	18	8.4	96.7	28	12.3	93.0
85+	23	5.2	100.0	7	3.3	100.0	16	7.0	100.0
All ages	441	100.0		214	100.0		227	100.0	

Included in the statistics are 37.9% multiple primaries in males and 32.0% in females.

Table 5

Age-specific incidence, DCO rate and proportion of all cancers for period 1998-2011

Age at diagnosis Years	Males n	Females	Age- spec.	Age-	Males DCO rate n=1	Females DCO rate n=0 %	cancers	Females Prop.all cancers n=129521
0- 4	9	8	0.7	0.7			3.2	3.8
5- 9	2	4	0.2	0.3			1.3	3.8
10-14 15-19	1		0.0	0.0			0.3	
20-24			0.0	0.0			0.3	
25-29	1	1	0.1				0.1	0.1
30-34	2	5	0.1	0.3			0.2	0.3
35-39	7	7	0.3	0.3			0.4	0.2
40-44	8	11	0.4	0.5			0.3	0.2
45-49	7	15	0.4	0.8			0.2	0.2
50-54	15	18	0.9	1.0			0.2	0.2
55-59	16	17	1.0	1.0			0.1	0.1
60-64	35	25	2.3	1.6			0.2	0.2
65-69	32	25	2.3	1.7			0.1	0.2
70-74 75-79	32	25	3.1 3.3	2.0			0.1	0.2
75-79 80-84	22 18	21 28	4.4	2.1 3.5	5.6		0.1 0.2	0.1 0.2
85+	7	16	2.5	2.2	3.0		0.2	0.1
031	,	10	2.5	2.2			V.1	0.1
					0.5	0 0	\	0.2
All ages	214	226			0.5	0.0	0.2	0.2
All ages Incidence	214	226			0.5	0.0	0.2	0.2
	214	226	0.9	0.9	0.5	0.0	0.2	0.2
Incidence Raw WS	214	226	0.6	0.5	0.5	0.0	0.2	0.2
Incidence Raw WS ES	214	226	0.6 0.7	0.5 0.7	0.5	0.0	0.2	0.2
Incidence Raw WS	214	226	0.6	0.5	0.3	0.0	0.2	0.2
Incidence Raw WS ES	214	226	0.6 0.7	0.5 0.7	0.3	0.0	0.2	0.2
Incidence Raw WS ES	214	226	0.6 0.7	0.5 0.7	0.3	0.0	0.2	0.2
Incidence Raw WS ES	214	226	0.6 0.7	0.5 0.7	0.3	0.0	0.2	0.2
Incidence Raw WS ES	214	226	0.6 0.7	0.5 0.7	0.3	0.0	0.2	0.2
Incidence Raw WS ES	214	226	0.6 0.7	0.5 0.7	0.3	0.0	0.2	0.2
Incidence Raw WS ES	214	226	0.6 0.7	0.5 0.7	0.3	0.0	0.2	0.2
Incidence Raw WS ES	214	226	0.6 0.7	0.5 0.7	0.5	0.0	0.2	0.2
Incidence Raw WS ES	214	226	0.6 0.7	0.5 0.7	0.5	0.0	0.2	0.2
Incidence Raw WS ES	214	226	0.6 0.7	0.5 0.7	0.5	0.0	0.2	0.2
Incidence Raw WS ES	214	226	0.6 0.7	0.5 0.7	0.5	0.0	0.2	0.2
Incidence Raw WS ES	214	226	0.6 0.7	0.5 0.7	0.5	0.0	0.2	0.2
Incidence Raw WS ES	214	226	0.6 0.7	0.5 0.7	0.5	0.0	0.2	0.2
Incidence Raw WS ES	214	226	0.6 0.7	0.5 0.7	0.5		0.2	0.2
Incidence Raw WS ES	214	226	0.6 0.7	0.5 0.7	0.5		0.2	0.2
Incidence Raw WS ES	214	226	0.6 0.7	0.5 0.7	0.5		0.2	0.2

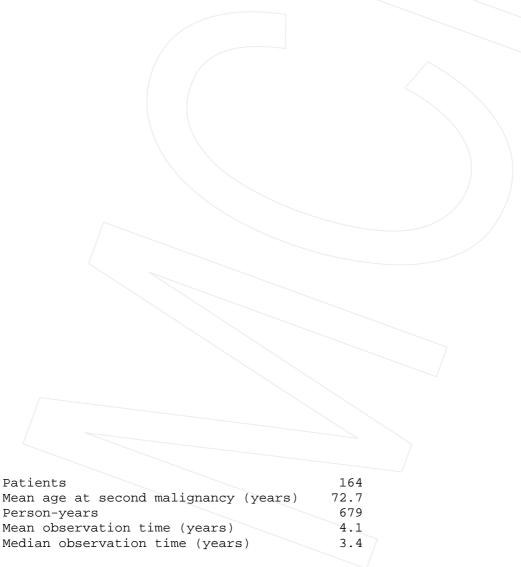
The age-specific incidence characterizes the disease risk in a particular age group. The age distribution depends on the patient population frequency in each age group and reflects the tangible clinical picture of everyday patients care (see following chart).

Table 6a

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries for period 1998-2011

MALES

Observed Ex	rpected		LCL UCL		DCO
'n	n	SIR	95% 95%	EAR	%
	0.6		0 4 11 0	000	
/ 2 /	0.6	\3.⊥	0.4 11.3	20.0	
8	1.3	5.9	2.6 11.7 #	97.9	25.0
a / 2 /	0.4	4.9	0.6 17.5	23.4	
9 /	3.3	2.7	1.2 5.1 #	83.3	11.1/
8	2.7	3.0	1.3 5.9 #	78.2	
0	3.0	0.0	0.0 1.2	-43.8	
29	11.4	2.5	1.7 3.7 #	259.0	10.3
	n 2 8 2 9 8 0	2 0.6 8 1.3 0.4 9 3.3 8 2.7 0 3.0	n n SIR 2 0.6 3.1 8 1.3 5.9 2 0.4 4.9 9 3.3 2.7 8 2.7 3.0 0 3.0 0.0	n n SIR 95% 95% 2 0.6 3.1 0.4 11.3 8 1.3 5.9 2.6 11.7 # 2 0.4 4.9 0.6 17.5 9 3.3 2.7 1.2 5.1 # 8 2.7 3.0 1.3 5.9 # 0 3.0 0.0 0.0 1.2	n n SIR 95% 95% EAR 2 0.6 3.1 0.4 11.3 20.0 8 1.3 5.9 2.6 11.7 # 97.9 2 0.4 4.9 0.6 17.5 23.4 9 3.3 2.7 1.2 5.1 # 83.3 8 2.7 3.0 1.3 5.9 # 78.2 0 3.0 0.0 0.0 1.2 -43.8



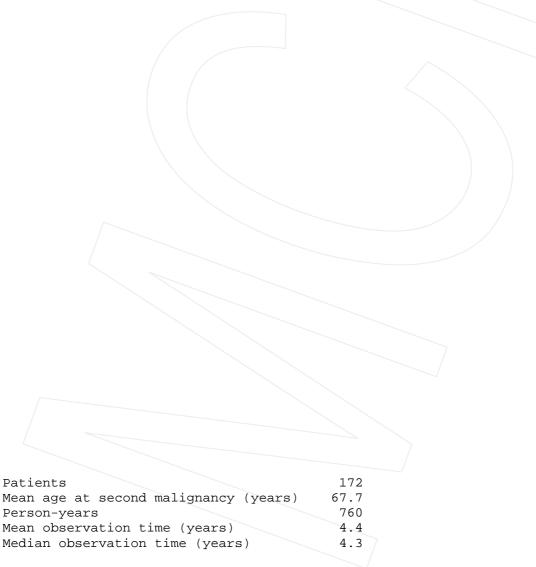
The occurrence of second malignancy is statistically significant.

Observed second primaries with count 1 are pooled in category "Other primaries".

Table 6b

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries for period 1998-2011 FEMALES

	Observed	Expected		LCL	UCL		DCO
Diagnosis	n	/ n	SIR	95%	95%	EAR	용
C16 Stomach	2	0.3	5.9	0.7	21.5	21.9	50.0
C50 Breast	7	2.5	2.8	1.1	5.8 #	59.5	14.3
C70-C72 CNS cancer	2	0.1	17.2	2.1	62.2 #	24.8	
C76-C79 CUP	2	0.2	12.6	1.5	45.4 #	24.2	
C82-C85 NHL	2	0.3	6.3	0.8	22.6	22.1	
Other primaries	13	2.8	4.6	2.4	7.8 #	133.6	
Not observed	<u></u> 0	2.2	0.0	0.0	1.7	-28.4	
1.00 02201.00			_ 7,5			20.1	
All mult. primaries	28	8.4	3.3	2.2	4.8 #	257.7	7.1
mare. Primaries	20	<u> </u>	3.3	2	1.0 π	237.7	, • ±



The occurrence of second malignancy is statistically significant.

Observed second malignancy with count 1 are pooled in category "Other primaries".

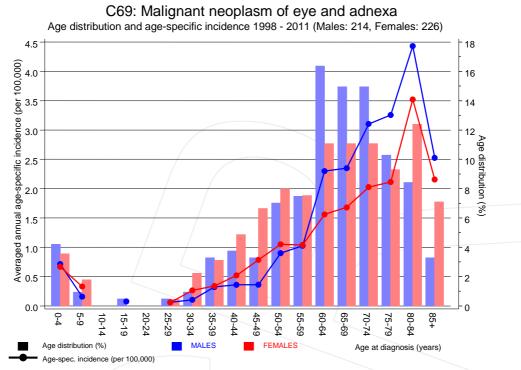


Figure 7. Age distribution and age-specific incidence



C69: Malignant neoplasm of eye and adnexa

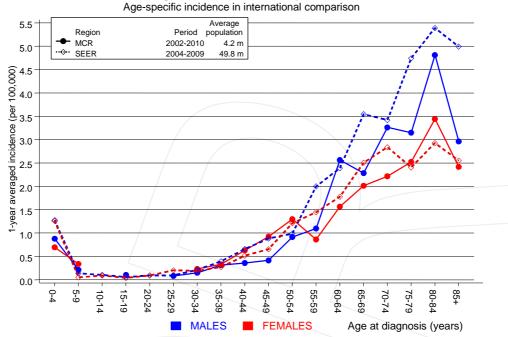


Figure 7a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).



Reference:

Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 18 Regs Research Data, released April 2012, based on the November 2011 submission. http://www.seer.cancer.gov.

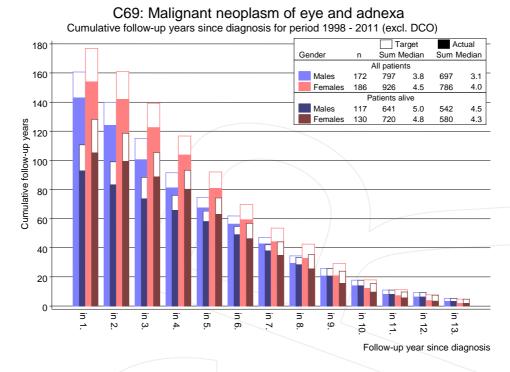
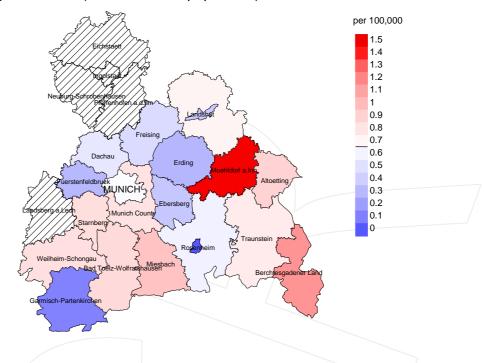


Figure 8. Cumulative follow-up years depending on time since diagnosis

The increase of the lost to follow-up rate can be interpreted as a consequence of a declining number of survivors over time.



Average incidence (world standard population) 2003 - 2008: Males



Average incidence (world standard population) 2003 - 2008: Females

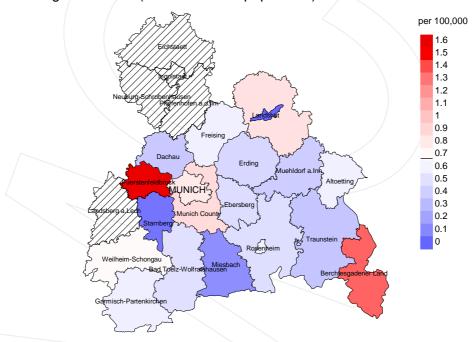
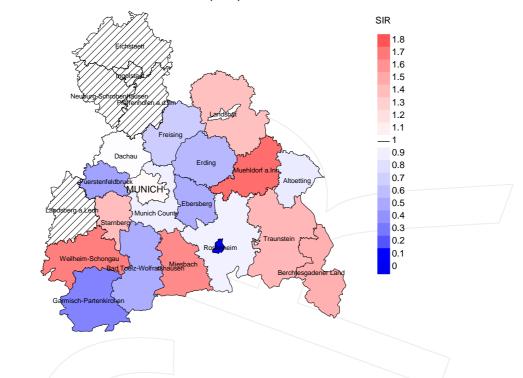


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 0.7/100,000 WS N=119, females 0.7/100,000 WS N=139). Since cancer data are not available in some counties until 2007, the local incidence rates were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 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 0.5/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 1.9/100,000.

Standardized incidence ratio (SIR) 2003 - 2008: Males



Standardized incidence ratio (SIR) 2003 - 2008: Females



Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=119, females N=139). Since cancer data are not available in some counties until 2007, the local SIR values were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 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 0.72. Though, the value of this parameter may vary with an underlying probability of 99% between 0.08 and 2.62, and is therefore not statistically striking.

MORTALITY

Table 10a

Patient cohorts of incident cancers by year of diagnosis, follow-up status, proportion of DCO, deaths among the annual cohorts, and proportion of available death certificates (with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.52 m as of 2007, respectively)

		Prop.				Prop. deaths
	Incident	actively	Prop.		Prop.	with death
Year of	cases	followed	DCO	Deaths	deaths	certific.
diagnosis	n	%	%	/ n /	%	%
1000	2.2	00.0		1.7	FO 1	00.2
1998	22	90.9		13	59.1	92.3
1999	23	91.3		9	39.1	100.0
2000	27	96.3		19	70.4	94.7
2001	13	100.0		9	69.2	100.0
2002	32	84.4		15	46.9	93.3
2003	38	78.9		16	42.1	93.8
2004	50	78.0		28	56.0	89.3
2005	53	90.6	1.9	27	50.9	92.6
2006	42	73.8		1/7	40.5	100.0
2007	45	68.9		23	51.1	91.3
2008	41	58.5		12	29.3	83.3
2009	31	54.8		8	25.8	100.0
2010	16	100.0		5	31.3	100.0
2011	8	87.5		1	12.5	100.0
1998-2011	441	79.4	0.2	202	45.8	93.6

Table 10b

Annual cohorts of incident cancers and deaths, proportion of death certificates and cases deceased the same year of cancer diagnosis (incl. DCO)

(with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.52~m as of 2007, respectively)

			Prop.		
			deaths		Prop.
Year of	Incident		with death	Deaths in	deaths in
diagnosis/	cases	Deaths	certific.	same year	same year
death	n	n	%	n	%
1998	22		94.1		
1999	23	14	85.7	1	4.3
2000	27	19	94.7	1	3.7
2001	13	11	90.9		
2002	32	28	92.9		
2003	38	31	90.3	2	5.3
2004	50	32	100.0	2	4.0
2005	53	37	94.6	8	15.1
2006	42	30	96.7	2	4.8
2007	45	34	100.0	3	6.7
2008	41	36	91.7	1	2.4
2009	31	42	97.6	4	12.9
2010	16 /	38	97.4	1	6.3
2011	8	42	97.6		
1998-2011	441	411	95.4	25	5.7

Table 10c

Annual cohorts of deaths, proportion of cancer-related and not cancer-related deaths, and cancer recorded on death certificates (incl. DCO)

(with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.52 m as of 2007, respectively)

				Prop.	
				cancer	
		Prop.	Prop.	recorded	
		cancer-	not cancer-	on death	
Year of	Deaths	related	related	certificate	
death	n /	%	%	%	
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	28	71.4	28.6	76.9	
2003	31	74.2	25.8	85.7	
2004	32	75.0	25.0	81.3	
2005	37	73.0	27.0	82.9	
2006	30	66.7	33.3	72.4	
2007	34	73.5	26.5	76.5	
2008	36	72.2	27.8	84.8	
2009	42	76.2	23.8	78.0	
2010	38	63.2	36.8	73.0	
2011	42	66.7	33.3	73.2	
1998-2011	411	70.6	29.4	77.6	

Table 11a $\begin{tabular}{ll} \begin{tabular}{ll} \begin{tabula$

					Age at
		Age at	Age at	Age at	death
		death	death	death	(according
		(all	(cancer-	(not cancer-	to death
Year of	Deaths	causes)	related)	related)	certificate)
death	n	Years	Years	Years	Years
1998	5	72.0	72.6	71.0	67.4
1999	5	81.2	86.2	79.9	83.3
2000	6	76.6	75.9	78.2	76.5
2001	3	81.9	79.3	87.2	79.3
2002	15	69.6	69.2	71.3	69.2
2003	15	64.9	65.5	61.0	65.3
2004	15	71.4	68.1	80.4	67.9
2005	20	72.7	69.5	82.0	70.1
2006	15	77.0	73.0	88.0	71.8
2007	11	72.1	66.4	78.9	68.5
2008	17	70.5	67.3	85.3	67.9
2009	20	75.3	71.2	83.0	71.2
2010	17/	77.1	75.1	82.0	76.3
2011	23	74.8	75.0	74.5	74.5
1998-2011	187	73.3	70.8	79.4	70.9

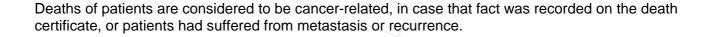


Table 11b Means of age at death according to the grouping in Table 10 FEMALES

					Age at
		Age at	Age at	Age at	death
		death	death	death	(according
		(all	(cancer-	(not cancer-	to death
Year of	Deaths	causes)	related)	related)	certificate)
death	n	Years	Years	Years	Years
1998	12	77.6	74.5	86.9	72.6
1999	9	62.3	66.7	27.6	69.9
2000	13	72.3	69.2	79.4	69.2
2001	8	77.3	73.7	83.3	78.2
2002	13	77.0	72.2	84.6	72.2
2003	16	71.7	65.4	82.2	65.4
2004	17	73.8	70.3	85.3	70.0
2005	17	79.7	77.1	85.7	77.8
2006	15	72.2	64.3	84.1	67.1
2007	23	74.3	71.2	89.3	71.2
2008	19	76.4	69.2	88.9	73.3
2009	22	72.0	69.7	86.7	69.7
2010	21	77.6	68.2	90.2	69.5
2011	19	81.7	80.1	84.5	78.0
1998-2011	224	75.1	70.9	84.9	71.6



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 12a $\begin{tabular}{ll} Mortality measures (cancer-related death) and mortality-incidence-index \\ by year of death \\ \hline MALES \\ \end{tabular}$

Year of	Deaths	Mort.	MI-Index	Mort.	MI-Index	Mort.	MI-Index	Mort.	MI-Index
death	n	raw	raw	WS	WS	ES	ES	BRD-S	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	0.27	0.2	0.25	0.3	0.27	0.4	0.27
2001	2	0.2	0.33	0.1	0.22	0.1	0.32	0.3	0.61
2002	12	0.6	0.57	0.4	0.39	0.5	0.51	0.7	0.60
2003	13	0.7	0.87	0.4	0.67	0.6	0.81	0.7	0.94
2004	11	0.6	0.48	0.3	0.40	0.5	0.49	0.6	0.52
2005	15	0.8	0.71	0.4	0.55	0.7	0.68	0.9	0.73
2006	11	0.6	0.61	0.3	0.48	0.4	0.58	0.6	0.71
2007	6	0.3	0.24	0.2	0.23	0.2	0.25	0.3	0.25
2008	14	0.6	0.58	0.3	0.54	0.5	0.56	0.6	0.56
2009	13	0.6	1.00	0.3	0.71	0.4	0.90	0.6	1.05
2010	12	0.5	1.50	0.2	0.84	0.4	1.23	0.5	1.68
2011	16	0.7	3.20	0.3	2.35	0.5	2.56	0.7	2.95
1998-2011	133	0.5	0.62	0.3	0.48	0.4	0.58	0.6	0.66

Table 12b

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

FEMALES

Year of	Deaths	Mort.	MI-Index	Mort.	MI-Index	Mort.	MI-Index	Mort.	MI-Index
death	n	raw	raw	WS	WS	ES	ES	BRD-S	BRD-S
1998	9	0.8	0.69	0.3	0.46	0.5	0.61	0.6	0.65
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	0.71	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	10	0.5	0.43	0.3	0.29	0.4	0.37	0.4	0.41
2004	13	0.7	0.50	0.3	0.32	0.5	0.39	0.6	0.48
2005	12	0.6	0.38	0.2	0.28	0.3	0.32	0.4	0.34
2006	9	0.4	0.38	0.2	0.35	0.3	0.38	0.4	0.40
2007	19	0.8	0.95	0.4	0.86	0.5	0.86	0.6	0.86
2008	12	0.5	0.71	0.2	0.75	0.3	0.75	0.4	0.69
2009	19	0.8	1.06	0.4	0.67	0.5	0.85	0.6	0.94
2010	12	0.5	1.50	0.3	1.03	0.4	1.31	0.4	1.53
2011	12	0.5	4.00	0.2	0.67	0.3	1.49	0.3	2.48
1998-2011	157	0.6	0.69	0.3	0.50	0.4	0.59	0.5	0.65

Table 13

Age distribution of age at death (cancer-related) for period 1998-2011 (incl. multiple primaries)

Age at									
death	Cases			Males			Females		
Years	n	왕	Cum.%	n	%	Cum.%	n	%	Cum.%
30-34	2	0.7	0.7			0.0	2	1.3	1.3
35-39	3	1.0	1.7	/ 1	0.8	0.8	2	1.3	2.5
40-44	5	1.7	3.4	/ 3	2.3	3.0	2	1.3	3.8
45-49	6	2.1	5.5	2	1.5	4.5	4	2.5	6.3
50-54	18	6.2	11.7	/ 7	5.3	9.8	11	7.0	13.3
55-59	24	8.2	19.9	13	9.8	19.5	11	7.0	20.3
60-64	29	10.0	29.9	15	11.3	30.8	14	8.9	29.1
65-69	44	15.1	45.0	15	11.3	42.1/	29	18.4	47.5
70-74	46	15.8	60.8	25	18.8	60.9	21	13.3	60.8
75-79	42	14.4	75.3	22	16.5	77.4	20	12.7	73.4
80-84	34	11.7	86.9	17	12.8	90.2	17	10.8	84.2
85+	38	13.1	100.0	13	9.8	100.0	25	15.8	100.0
All ages	291	100.0		133	100.0		158	100.0	

Included in the statistics are 37.9% multiple primaries in males and 32.0% in females.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers for period 1998-2011 (incl. multiple primaries)

			Males		Females		Males	Females
Age at			Age-		Age-		Prop.all	Prop.all
death	Males	Females	spec.		spec.		cancers	cancers
Years	n	n	mortal.	MI-index	mortal.	MI-index	%	%
0 - 4			0.0		0.0			
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24			0.0		0.0			
25-29			0.0		0.0			
30-34		2	0.0		0.1	0.40		1.0
35-39	1	2	0.0	0.14	0.1	0.29	0.3	0.4
40-44	3	2	0.1	0.38	0.1	0.18	0.4	0.2
45-49	2	4	0.1	0.29	0.2	0.27	0.1	0.2
50-54	7	11	0.4	0.47	0.6	0.61	0.2	0.4
55-59	13	11	0.8	0.81	0.7	0.65	0.3	0.3
60-64	15	14	1.0	0.43	0.9	0.54	0.2	0.3
65-69	15	29	1.1		1.9	1.16	0.1	0.4
70-74	25	21	2.4		1.7	0.84	0.2	0.3
75-79	22	20	3.3	1.00	2.0	0.95	0.2	0.2
80-84	17	17	4.2	0.94	2.1	0.61	0.2	0.2
85+	13	25	4.7	1.86	3.4	1.56	0.2	0.2
All ages	133	158					0.2	0.3
Mortality								
Raw			0.5	0.62	0.6	0.70		
WS			0.3	0.48	0.3	0.50		
ES			0.4	0.58	0.4	0.59		
BRD-S			0.6	0.66	0.5	0.65		
PYLL-70								
per 100,000			2.6		3.5			
ES			2.3		3.0			
AYLL-70			10.6		10.6			

The rates underestimate the prognosis if other synchronous cancers are prognostic unfavorable.

Table 15a $\begin{tabular}{ll} Multiple primaries in deaths in period 1998-2011 \\ MALES \end{tabular}$

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C09-C10 Oropharynx	1	/1.5					1	100.0
C11 Nasopharynx	/1	1.5					1	100.0
C18 Colon	6	9.0			1	16.7	5	83.3
C19-C20 Rectum	2	3.0	1	50.0	1	50.0		
C22 Liver	3	4.5					3	100.0
C23-C24 Bile	2 /	3.0	1	50.0			1	50.0
C25 Pancreas	/ 1 /	1.5					1	100.0
C33-C34 Lung	12	17.9					12	100.0
C43 Malign. melanoma	6	9.0	2	33.3	2	33.3	2	33.3
C44 Skin others	2	3.0	1	50.0			1	50.0
C61 Prostate	12	17.9	3	25.0	1	8.3	8	66.7
C64 Kidney	5	7.5	2	40.0			3	60.0
C67 Bladder	2	3.0					2	100.0
C69 Eye carcinoma	1	1.5					1	100.0
C70-C72 CNS cancer	2	3.0	1	50.0			1	50.0
C73 Thyroid	1	1.5					/1	100.0
C76-C79 CUP	2	3.0					2	100.0
C82-C85 NHL	1	1.5					1	100.0
C90 Mult. myeloma	2	3.0	2	100.0				
C91-C96 Leukaemia	3	4.5					3	100.0
All mult. primaries	67	100.0	13	19.4	5	7.5	49	73.1

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 multiple malignancy.

Table 15b $\label{eq:multiple primaries in deaths in period 1998-2011 FEMALES }$

					Syn- chron	Syn- chron		
	Total	Total	Pre	Pre	±30d	±30d	Post	Post
Diagnosis	n /	%↓	n	←%	n	~ %	n	← %
C07-C08 Salivary gland	1	/1.4					1	100.0
C16 Stomach	/2	2.7					2	100.0
C18 Colon	2	2.7	1	50.0			1	50.0
C19-C20 Rectum	/ 2	2.7	1	50.0			1	50.0
C22 Liver	/ 3 /	4.1					3	100.0
C23-C24 Bile	/ 1 /	1.4					1	100.0
C25 Pancreas	/ 3 <	4.1					3	100.0
C33-C34 Lung	6	8.1	1	16.7			5	83.3
C43 Malign. melanoma	11	14.9	2	18.2			9	81.8
C46,C49 Soft tissue	1	1.4	1	100.0				
C50 Breast	21	28.4	11	52.4	1	4.8	9	42.9
C53 Cervix uteri	1	1.4					1	100.0
C54 Corpus uteri	6	8.1	2	33.3			4	66.7
C56 Ovary	2	2.7					2	100.0
C64 Kidney	1	1.4					1	100.0
C67 Bladder	1	1.4			_ 1	100.0		
C69 Eye melanoma	1	1.4			1	100.0		
C70-C72 CNS cancer	3	4.1					3	100.0
C73 Thyroid	1	1.4	1	100.0				
C76-C79 CUP	1	1.4			1	100.0		
C90 Mult. myeloma	2	2.7					2	100.0
C91-C96 Leukaemia	2	2.7					2	100.0
All mult. primaries	74	100.0	20	27.0	4	5.4	50	67.6

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 multiple malignancy.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers for period 1998-2011

(Singular primaries only *)

Age at			Males Age-		Females Age-		_	Females Prop.all
death		Females	spec.		spec.		cancers	cancers
Years	n	n	mortal.	MI-index	mortal.	MI-index	ે	%
0- 4			0.0		0.0			
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24			0.0		0.0			
25-29			0.0		0.0			
30-34		2	0.0		0.1	0.40		1.1
35-39	1	2	0.0	0.14	0.1	0.29	0.3	0.5
40-44	3	2	0.1	0.38	0.1	0.20	0.4	0.2
45-49	2	4	0.1	0.29	0.2	0.29	0.1	0.3
50-54	7	11	0.4	0.50	0.6	0.61	0.3	0.5
55-59	11	10	0.7	1.00	0.6	0.77	0.2	0.3
60-64	13	11	0.9		0.7	0.58	0.2	0.2
65-69	13	26	1.0		1.7		0.2	0.5
70-74	22	16	2.1		1.3	0.70	0.2	0.2
75-79	20	18	3.0		1.8		0.2	0.2
80-84	15	15	3.7		1.9		0.2	0.2
85+	12	22	4.3	6.00	3.0	1.57	0.2	0.2
7.7.7	110	1.20					0.0	0 2
All ages	119	139					0.2	0.3
Mortality								
Raw			0.5	0.68	0.5	0.72		
WS			0.2	0.51	0.2			
ES			0.4		0.3			
BRD-S			0.5	0.73	0.4			
PYLL-70								
per 100,000			2.4		3.3			
ES			2.1		2.9			
AYLL-70			11.0		11.0			

^{*} See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers for period 1998-2011

(Single primaries only *)

Age at death		Females			Females Age- spec.		cancers	Females Prop.all cancers
Years	n	n	mortal.	MI-index	mortal.	MI-index	રુ	%
0- 4			0.0		0.0			
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24			0.0		0.0			
25-29			0.0		0.0			
30-34		2 <	0.0		0.1	0.40		1.2
35-39	1	2	0.0	0.14	0.1	0.29	0.3	0.5
40-44	2	2	0.1		0.1	0.22	0.3	0.3
45-49	2	2	0.1	0.29	0.1	0.15	0.2	0.1
50-54	6	8	0.4	0.43	0.5	0.57	0.3	0.4
55-59	10	8	0.6	1.11	0.5	0.80	0.2	0.3
60-64	9	/11	0.6	0.43	0.7	0.69	0.2	0.3
65-69	13	21	1.0	0.54	1.4		0.2	0.4
70-74	15	9	1.5	0.65	0.7		0.2	0.2
75-79	11/	1/1	1.6		1.1		0.2	0.2
80-84	7	9	1.7		1.1		0.1	0.1
85+	7	14	2.5	3.50	1.9	1.17	0.2	0.2
	\	\ _					\	
All ages	83	99					0.2	0.2
Masskalites								
Mortality Raw			0.3	0.54	0.4	0.60		
WS			0.3		0.4			
ws ES			0.2		0.2			
BRD-S			0.3	0.56	0.3			
BKD 5			0.3	0.50	0.5	0.50		
PYLL-70								
per 100,000			2.0		2.7			
ES			1.8		2.3			
AYLL-70			10.8		11.0			

^{*} See corresponding tables with multiple primaries.

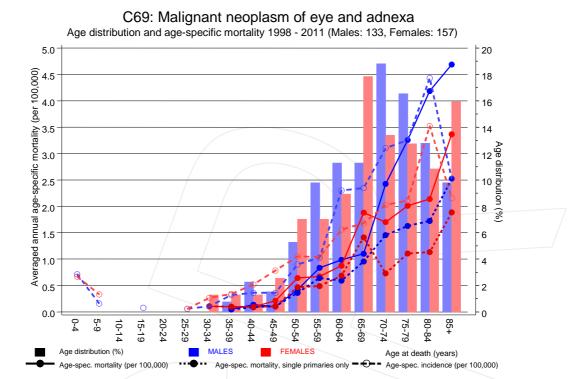
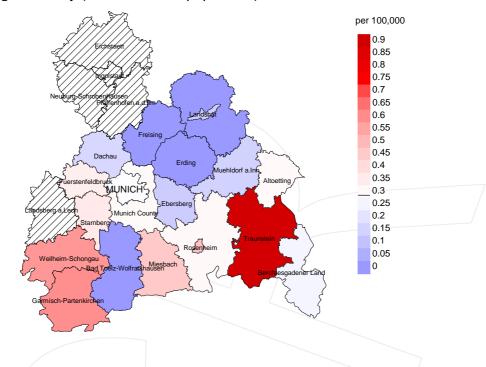


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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) 2003 - 2008: Males



Average mortality (world standard population) 2003 - 2008: Females

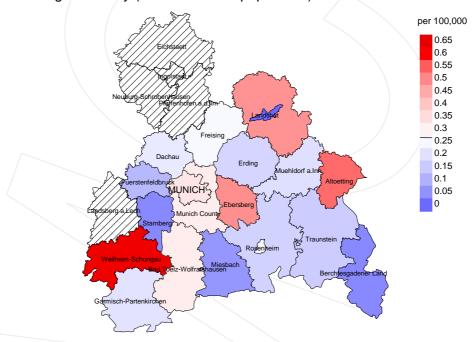
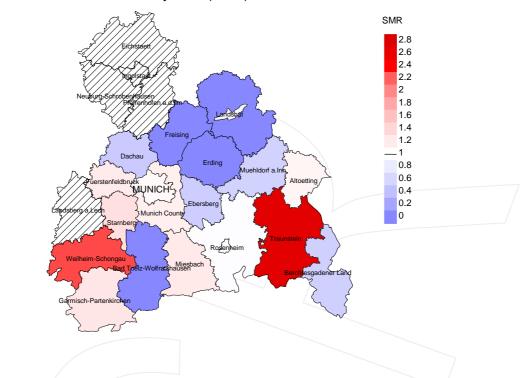


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 0.3/100,000 WS N=62, females 0.3/100,000 WS N=72). Since cancer data are not available in some counties until 2007, the local mortality rates were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 4 women died from eye cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.5/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.1 and 1.7/100,000.

Standardized mortality ratio (SMR) 2003 - 2008: Males

Baseline statistics C69: Eye cancer



Standardized mortality ratio (SMR) 2003 - 2008: Females

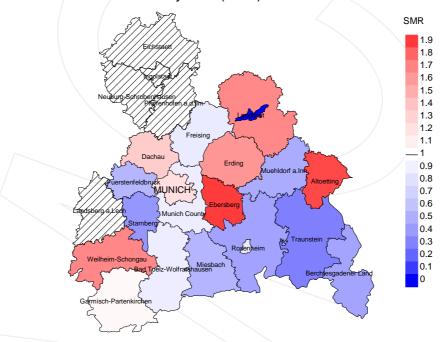


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=62, females N=72). Since cancer data are not available in some counties until 2007, the local SMR values were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 4 women died from eye cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.89. Though, the value of this parameter may vary with an underlying probability of 99% between 0.32 and 5.97, 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. 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 tumor-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

AYLL-70 Average years of life lost prior to age 70 given a person dies before that age

BRD-S German standard population

DCO Death certificate only EAR Excess absolute risk

= excess cancer cases (O - E) per 10,000 person-years

ES European standard population (old) FRG Federal Republic of Germany

GEKID Association of Population-based Cancer Registries in Germany

(Gesellschaft der epidemiologischen Krebsregister in Deutschland e.V.)

LCL Lower confidence limit

MI-index Ratio between mortality and incidence

MCR Munich Cancer Registry (Tumorregister München)

PYLL-70 Potential years of life lost prior to age 70 given a person dies before that age

SEER Surveillance, Epidemiology, and End Results (USA)

SIR Standardized incidence ratio
SMR Standardized mortality ratio
UCL Upper confidence limit
WS World standard population

Recommended Citation

Munich Cancer Registry. Baseline statistics C69: Eye cancer [Internet]. 2013 [updated 2013 Apr 2; cited 2013 Jun 1]. Available from: http://www.tumorregister-muenchen.de/en/facts/base_C69__E.pdf

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