# **Munich Cancer Registry**



- Survival
- Selection Matrix
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- Deutsch

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

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

### **Cancer statistics: Baseline statistics**

Year of diagnosis	1998-2013
Patients	233
Diseases	233
Creation date	05/19/2015
Export date	12/30/2014
Population	4.64 m



http://www.tumorregister-muenchen.de/en/facts/base/base\_C11\_E.pdf

### C11: Nasopharynx cancer

#### 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 4.64 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. 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, May 2015

- <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 2.51 million to 3.96 in 2002, and to 4.52 million in 2007). Death certificates from 2014 are incorporated into these analyses.
- <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.
- ### 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.

#### Some remarks regarding this cancer type

As a general rule, these few results from the TRM form the basis of sophisticated analyses. For head and neck tumors this is not the case. Therefore the results for head and neck tumors should be interpreted with caution. In part this is due to problems of classification because of limited specific details of locality. Additionally, with advanced tumors in a close topographic location it is often not possible to determine the exact ICD localization of a tumor.

Munich Cancer Registry

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

Code	Description
C11	Malignant neoplasm of nasopharynx
C11.0	Superior wall of nasopharynx
C11.1	Posterior wall of nasopharynx
C11.2	Lateral wall of nasopharynx
C11.3	Anterior wall of nasopharynx
C11.8	Overlapping lesion of nasopharynx
C11.9	Nasopharynx, unspecified

### 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	olo	90	olo	010
1998	10			40.0	50.0	100.0
1999	12			25.0	66.7	91.7
2000	7	1	14.3	28.6	57.1	71.4
2001	7				28.6	100.0
2002	14			21.4	71.4	92.9 #
2003	12			25.0	75.0	91.7
2004	10	1	10.0		50.0	90.0
2005	17	1	5.9	29.4	52.9	88.2
2006	16			37.5	50.0	100.0
2007	15	2	13.3	26.7	60.0	86.7 # ##
2008	23	1	4.3	13.0	43.5	60.9
2009	19	1	5.3	15.8	63.2	73.7
2010	24	1	4.2	29.2	45.8	79.2
2011	19	1	5.3	26.3	36.8	78.9
2012	19	1	5.3	31.6	26.3	73.7
2013	9			33.3	33.3	100.0 ###
1998-2013	233	10	4.3	24.5	50.2	83.7

# 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	8	
1998	10	9	1	90.0	
1999	12	9	3	75.0	
2000	7	4	3	57.1	
2001	7	6	1/	85.7	
2002	14	11	3 5	78.6	
2003	12	7	5	58.3	
2004	10	7	3	70.0	
2005	17	13	4	76.5	
2006	16	10	6	62.5	
2007	15	12	3	80.0	
2008	23	19	4	82.6	
2009	19	15	4	78.9	
2010	24	17	7	70.8	
2011	19	12	7	63.2	
2012	19	13	6	68.4	
2013	9	5	4	55.6	
1998-2013	233	169	64	72.5	

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 4.64 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	1	0.8	0.1	0.6	0.1	0.7	0.1	0.9	0.1
1999	9	3	0.8	0.3	0.6	0.2	0.8	0.2	0.8	0.2
2000	4	3	0.4	0.2	0.3	0.2	0.3	0.2	0.4	0.2
2001	6	1 /	0.5	0.1	0.4	0.0	0.4	0.0	0.5	0.1
2002	11	3	0.6	0.2	0.4	0.1	0.5	0.1	0.6	0.1
2003	7	5	0.4	0.3	0.2	0.2	0.3	0.2	0.4	0.2
2004	7	3	0.4	0.2	0.3	0.1	0.3	0.1	0.4	0.1
2005	13	4	0.7	0.2	0.5	0.1	0.6	0.2	0.6	0.2
2006	10	б	0.5	0.3	0.3	0.2	0.4	0.2	0.6	0.3
2007	12	3	0.5	0.1	0.3	0.1	0.4	0.1	0.5	0.1
2008	19	4	0.9	0.2	0.5	0.1	0.7	0.1	0.8	0.1
2009	15	4	0.7	0.2	0.4	0.1	0.6	0.1	0.6	0.1
2010	17	7	0.8	0.3	0.5	0.2		0.2	0.8	0.3
2011	12	7	0.5	0.3	0.3	0.2	0.4	0.2	0.5	0.3
		6								0.2
										0.1
2013	5	-	0.2	0.2	0.2	0.1	5.2	<u> </u>	0.2	0.1
1998-2013	169	64	0.6	0.2	0.4	0.1	0.5	0.2	0.5	0.2
2012 2013	13 5	6 4	0.6 0.2	0.3 0.2	0.4 0.2	0.1 0.1	0.5 0.2	0.2	0.5 0.2	0. 0.

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

Year of	Cases		Std.					Median		
diagnosis	n	Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	10	56.8	9.3	45.6	76.0	46.5	49.6	54.9	62.1	69.9
1999	12	55.9	13.2	32.7	79.4	38.2	51.0	52.9	66.1	69.7
2000	7	44.6	13.6	31.0	70.3	31.0	31.8	40.6	52.6	70.3
2001	7	53.3	20.0	29.5	84.8	29.5	31.4	54.9	66.1	84.8
2002	14	62.2	13.1	38.0	83.6	46.2	53.4	63.0	71.3	81.1
2003	12	57.7	12.6	38.9	73.8	40.0	47.1	60.0	68.9	71.6
2004	10	55.0	15.8	31.7	83.5	34.0	45.6	51.9	65.6	76.9
2005	17	54.0	17.4	12.8	76.2	29.9	43.2	50.3	65.9	76.2
2006	16	61.6	15.3	17.6	76.9	47.6	51.5	65.7	71.7	76.2
2007	15	64.3	9.9	48.1	82.6	50.1	55.7	65.4	72.0	73.6
2008	23	60.7	16.3	28.3	97.0	43.6	52.1	57.3	70.3	82.6
2009	19	61.5	12.3	42.1	86.2	43.6	51.7	62.2	70.5	78.8
2010	24	58.4	16.2	21.3	82.8	33.3	54.7	59.7	69.3	76.1
2011	19	58.1	17.0	24.5	89.5	32.1	45.3	56.4	70.8	79.0
2012	19	62.1	10.3	45.1	85.1	46.3	55.8	60.5	66.6	77.2
2013	9	66.0	14.9	38.2	91.4	38.2	60.5	64.1	74.8	91.4
1998-2013	233	59.0	14.6	12.8	97.0	39.8	50.1	60.5	70.0	76.2

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

#### 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	57.0	9.8	45.6	76.0	45.6	49.6	55.2	62.1	76.0
1999	9	60.1	10.5	50.2	79.4	50.2	51.9	53.8	68.0	79.4
2000	4	52.3	12.9	40.6	70.3	40.6	43.2	49.2	61.4	70.3
2001	6	48.1	15.8	29.5	66.1	29.5	31.4	49.1	63.2	66.1
2002	11	59.4	12.8	38.0	81.1	46.2	48.6	58.6	71.3	73.6
2003	7	63.2	11.4	45.3	73.8	45.3	48.9	66.9	71.6	73.8
2004	7	54.3	13.3	31.7	70.2	31.7	45.6	53.2	65.6	70.2
2005	13	52.1	18.6	12.8	76.2	29.9	42.7	50.1	65.9	74.0
2006	10	61.0	18.5	17.6	76.9	32.6	49.4	65.4	76.0	76.6
2007	12	63.7	9.2	48.1	73.6	50.1	55.8	66.5	71.9	72.2
2008	19	58.1	15.4	28.3	84.8	33.7	51.6	55.1	67.6	82.6
2009	15	58.4	10.8	42.1	73.6	43.6	45.2	61.1	69.6	70.7
2010	17	57.8	16.4	21.3	77.0	21.8	55.2	59.3	69.3	76.1
2011	12	57.9	14.2	32.1	79.0	38.6	49.5	58.6	70.4	71.3
2012	13	63.4	8.3	51.7	85.1	55.8	58.0	63.4	66.1	70.3
2013	5	59.7	13.3	38.2	74.8	38.2	60.5	60.9	64.1	74.8
1998-2013	169	58.3	13.7	12.8	85.1	41.7	50.2	60.2	69.2	74.0

#### Table 3b

#### Median Year of Cases Std. diagnosis 50% 75% 90% n Mean dev. Min. Max. 10% 25% 1998 1 54.5 54.5 54.5 54.5 54.5 54.5 54.5 54.5 1999 3 43.2 13.7 32.7 58.8 32.7 32.7 38.2 58.8 58.8 2000 3 34.2 4.9 31.0 39.8 31.0 31.0 31.8 39.8 39.8 2001 1 84.8 84.8 84.8 84.8 84.8 84.8 84.8 84.8 2002 3 72.3 10.4 63.1 83.6 63.1 63.1 70.1 83.6 83.6 2003 5 50.0 10.6 38.9 63.1 38.9 51.2 56.9 63.1 40.0 56.6 36.3 3 24.3 36.3 83.5 50.0 83.5 83.5 2004 36.3 57.9 2005 4 60.2 13.0 49.0 76.2 49.0 49.6 70.9 76.2 2006 б 62.7 9.4 48.7 71.7 48.7 53.6 65.7 70.5 71.7 2007 3 66.4 14.3 55.7 82.6 55.7 55.7 60.9 82.6 82.6 97.0 59.3 2008 4 73.0 16.7 59.3 62.3 67.8 83.7 97.0 64.0 2009 4 73.3 11.2 62.2 86.2 62.2 72.3 82.5 86.2 59.8 33.3 2010 7 16.7 33.3 82.8 65.9 68.9 82.8 44.8 58.3 7 22.3 24.5 89.5 24.5 55.0 77.4 89.5 2011 42.2 2012 59.3 77.2 45.1 55.7 75.4 77.2 6 14.2 45.1 46.3 2013 73.9 14.4 57.9 57.9 84.9 4 91.4 62.9 73.2 91.4 1998-2013 60.7 16.8 24.5 97.0 38.2 49.0 61.6 71.1 83.5 64

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

Age at									
diagnosis	Cases			Males			Females		
Years	n	00	Cum.%	n	010	Cum.%	n	010	Cum.%
10-14	1	0.4	0.4	/ 1	0.6	0.6			0.0
15-19	1	0.4	0.9	/ 1	0.6	1.2			0.0
20-24	3	1.3	2.1	2	1.2	2.4	1	1.6	1.6
25-29	3	1.3	3.4	3	1.8	4.1			1.6
30-34	8	3.4	6.9	4	2.4	6.5	4	6.3	7.8
35-39	9	3.9	10.7	4	2.4	8.9	5	7.8	15.6
40 - 44	11	4.7	15.5	9	5.3	14.2	2	3.1	18.8
45-49	22	9.4	24.9	16	9.5	23.7	б	9.4	28.1
50-54	29	12.4	37.3	24	14.2	37.9	5	7.8	35.9
55-59	27	11.6	48.9	19	11.2	49.1	8	12.5	48.4
60-64	34	14.6	63.5	30	17.8	66.9	4	6.3	54.7
65-69	27	11.6	75.1	18	10.7	77.5	9	14.1	68.8
70-74	29	12.4	87.6	24	14.2	91.7	5	7.8	76.6
75-79	15	6.4	94.0	9	5.3	97.0	б	9.4	85.9
80-84	9	3.9	97.9	4	2.4	99.4	5	7.8	93.8
85+	5	2.1	100.0	1	0.6	100.0	4	6.3	100.0
All ages	233	100.0		169	100.0		64	100.0	

Age distribution by 5-year age group and gender for period 1998-2013 (incl. DCO)

Included in the statistics are 27.2% multiple primaries in males and 46.9% in females.

			- 1					
							Males	Females
			Malag	Females	Males	Females	Prop.all	
Age at			Age-			DCO rate		cancers
diagnosis	Maleq	Females	spec.		n=2	n=8	n=158258	
Years	n	n		incid.	%	%	%	%
icarb			Incia.	incia.	0	ů	Ū	ů /
0- 4			0.0	0.0				
5-9			0.0	0.0				
10-14	1		0.1	0.0			0.6	
15-19	1		0.1	0.0			0.3	
20-24	2	1	0.1	0.1			0.3	0.2
25-29	3		0.1	0.0			0.3	
30-34	4	4	0.2	0.2		25.0	0.3	0.2
35-39	4	5	0.2	0.2			0.2	0.1
40 - 44	9	2	0.3	0.1			0.3	0.0
45-49	16	6	0.7	0.3			0.3	0.1
50-54	24	5	1.2	0.2		20.0	0.3	0.0
55-59	19	8	1.0	0.4	5.3		0.1	0.1
60-64	30	4	1.7	0.2			0.1	0.0
65-69	18	9	1.1	0.5	5.6	11.1	0.1	0.0
70-74	24	5	1.9	0.3			0.1	0.0
75-79	9	6	1.1	0.5		33.3	0.0	0.0
80-84	4	5	0.8	0.5		40.0	0.0	0.0
85+	1	4	0.3	0.4		25.0	0.0	0.0
All ages	169	64			1.2	12.5	0.1	0.0
Incidence			<u> </u>					
Raw			0.6	0.2				
WS			0.4	0.1				
ES			0.5	0.2				
BRD-S			0.5	0.2				

# Age-specific incidence, DCO rate and proportion of all cancers for period 1998-2013

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 1998-2013

°

#### MALES Observed Expected LCL UCL DCO Diagnosis SIR 95% 95% EAR n n C18 Colon 2 0.4 4.8 0.6 17.2 38.9 C19-C20 Rectum 2 0.3 7.4 0.9 26.6 42.5 C33-C34 Lung 2 0.6 3.6 0.4 12.9 35.4 Other primaries 5 0.5 10.6 3.4 24.7 # 111.4 20.0 Not observed 0 3.0 0.0 0.0 1.2 -72.7 All mult. primaries 11 4.7 2.4 1.2 4.2 # 155.6 9.1 Patients 116 Median age at second malignancy (years) 71.3 Person-years 406 Mean observation time (years) 3.5 Median observation time (years) 2.0

# The occurrence of second malignancy is statistically significant.

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

Table 6b

Diagnosis	Observed n	Expected n	SIR	LCL 95%	UCL 95%	EAR	DC( १
Other primaries Not observed	6 0	0.2 0.9	40.0 0.0	14.7 0.0	87.0 # 4.0	389.9 -61.9	16.7
All mult. primaries	6	1.1	5.6	2.0	12.1 #	328.0	16.

# The occurrence of second malignancy is statistically significant.

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

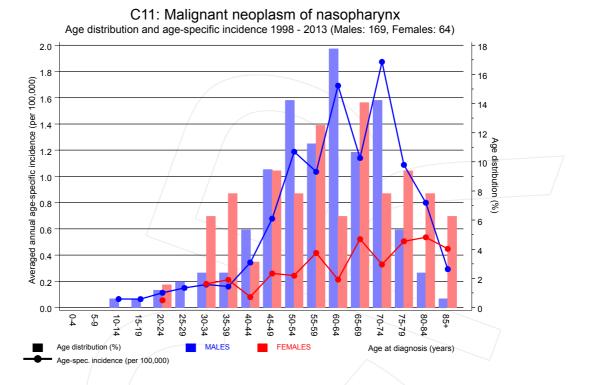
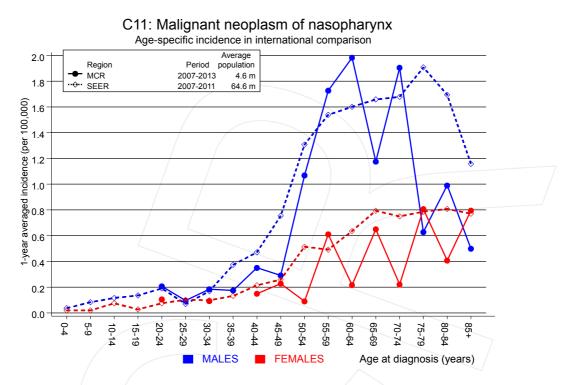


Figure 7. Age distribution and age-specific incidence

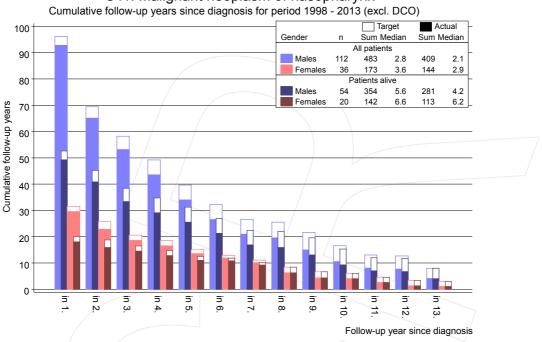


**Figure 7a.** Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).



Reference:

Surveillance, Epidemiology, and End Results (SEER) Program SEER\*Stat Database: Incidence - SEER 18 Regs Research Data, released April 2014, based on the November 2013 submission. http://www.seer.cancer.gov.

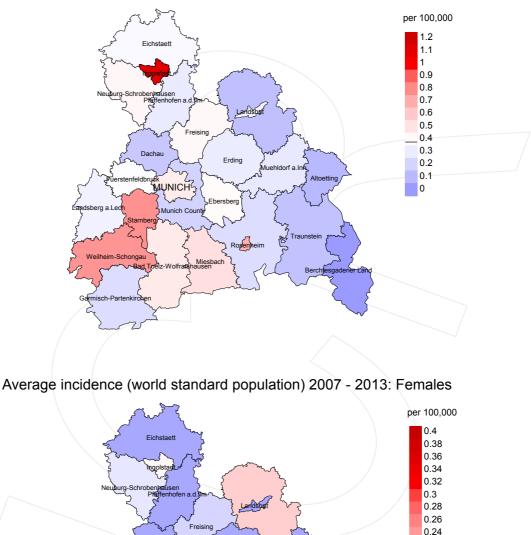


C11: Malignant neoplasm of nasopharynx

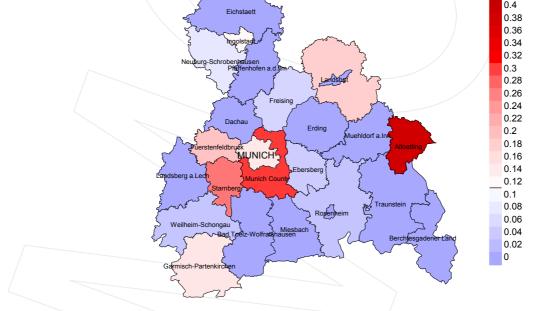
Figure 8. Cumulative follow-up years depending on time since diagnosis

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



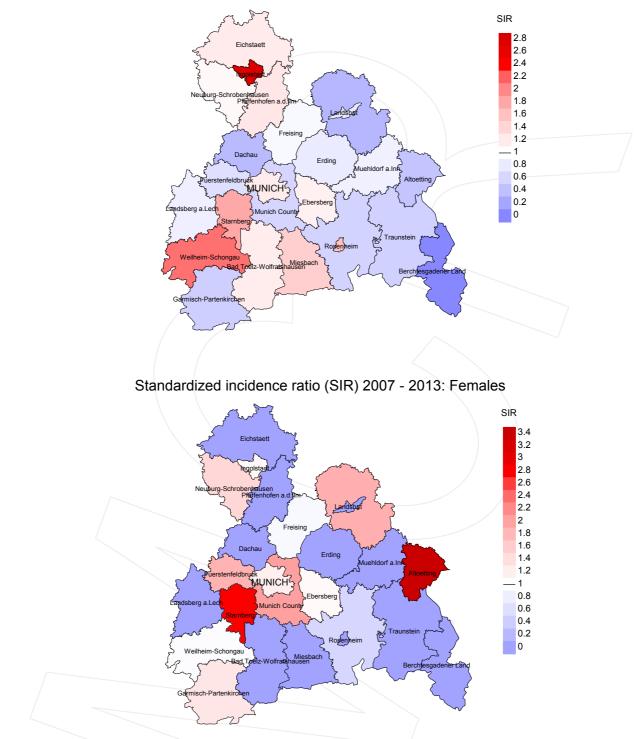


#### Average incidence (world standard population) 2007 - 2013: Males



**Figure 9a.** Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2013. 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 0.4/100,000 WS N=93, females 0.1/100,000 WS N=35).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,928 female residents (averaged) in the period from 2007 to 2013 a total of 1 women were identified with newly diagnosed nasopharynx cancer. Therefore, the mean incidence 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 0.3/100,000.



Standardized incidence ratio (SIR) 2007 - 2013: Males

**Figure 9b.** Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2013. 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=93, females N=35).

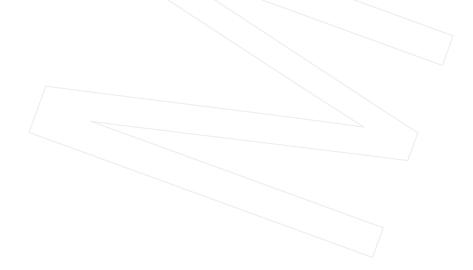
The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,642 female residents (averaged) in the period from 2007 to 2013 a total of 1 women were identified with newly diagnosed nasopharynx cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.06. Though, the value of this parameter may vary with an underlying probability of 99% between 0.01 and 7.89, 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 4.64 m as of 2007, respectively)

Year of diagnosis	Incident cases n	Prop. actively followed %	Prop. DCO %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	10	100.0		5	50.0	80.0
1999	12	91.7		8	66.7	100.0
2000	7	71.4	14.3	4	57.1	100.0
2001	7	100.0		2	28.6	100.0
2002	14	92.9		10	71.4	100.0
2003	12	91.7		9	75.0	100.0
2004	10	90.0	10.0	5	50.0	100.0
2005	17	88.2	5.9	9	52.9	100.0
2006	16	100.0		8	50.0	100.0
2007	15	86.7	13.3	9	60.0	88.9
2008	23	60.9	4.3	10	43.5	100.0
2009	19	73.7	5.3	12	63.2	91.7
2010	24	79.2	4.2	11	45.8	90.9
2011	19	78.9	5.3	7	36.8	100.0
2012	19	73.7	5.3	5	26.3	100.0
2013	9	100.0		3	33.3	100.0
1998-2013	233	83.7	4.3	117	50.2	96.6



#### 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 4.64 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	<b>%</b>	n	010
1998	10	12	83.3		
1999	12	6	83.3	1	8.3
2000	7	8	100.0	1	14.3
2001	7	5	100.0	1	14.3
2002	14	10	100.0	2	14.3
2003	12	15	100.0	2	16.7
2004	10	8	100.0		
2005	17	10	100.0	4	23.5
2006	16	10	100.0	2	12.5
2007	15	13	92.3	2	13.3
2008	23	9	88.9	2	8.7
2009	19	14	100.0	3	15.8
2010	24	13	100.0	3	12.5
2011	19	13	100.0	4	21.1
2012	19	13	100.0	2	10.5
2013	9	14	100.0	3	33.3
1998-2013	233	173	97.1	32	13.7



#### Table 10c

Annual cohorts of deaths, proportion of cancer-related and non-cancerrelated 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 4.64 m as of 2007, respectively)

Prop. cancer recorded Prop. Prop. cancernon-canceron death Year of Deaths related related certificate death % n Ŷ % 75.0 25.0 1998 12 100.0 50.0 1999 б 50.0 60.0 2000 8 87.5 12.5 87.5 5 40.0 60.0 80.0 2001 2002 10 60.0 40.0 90.0 2003 15 73.3 26.7 80.0 2004 8 50.0 50.0 62.5 2005 10 80.0 20.0 100.0 2006 10 90.0 10.0 100.0 2007 13 53.8 46.2 91.7 9 88.9 87.5 2008 11.1 78.6 2009 14 21.4 92.9 2010 7.7 100.0 13 92.3 76.9 13 23.1 2011 100.0 2012 13 84.6 15.4 92.3 2013 85.7 14.3 100.0 14 75.1 1998-2013 173 24.9 91.1



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	9	63.3	63.3	73.5	68.6
1999	4	54.3	63.5	52.0	63.5
2000	4	73.5	73.5		73.5
2001	4	58.0	59.8	54.5	58.0
2002	9	64.7	63.0	67.6	65.6
2003	13	64.2	57.8	76.8	58.1
2004	6	72.8	50.1	81.6	58.9
2005	5	70.8	70.8	75.0	70.8
2006	9	72.0	68.2	79.0	72.0
2007	6 7	77.3	70.7	77.6	77.3
2008	7	72.5	73.5	54.2	74.6
2009	10	72.7	69.6	77.0	70.7
2010	9	67.2	67.2		67.2
2011	11	63.4	62.2	78.0	63.4
2012	11	72.2	73.3	62.0	72.7
2013	7	71.0	72.2	69.1	71.0
1998-2013	124	68.5	66.7	73.5	68.5

#### Table 11a

Medians of age at death according to the grouping in Table 10 MALES

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.

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
3	51.5	63.7	51.5	51.5
2	80.4	72.7	88.1	72.7
4	58.8	58.5	75.3	58.5
1	67.3		67.3	
1	58.4	58.4		58.4
2	73.0	73.0		73.0
2	71.5	64.3	78.6	64.3
5	53.3	53.3		53.3
1	66.9	66.9		66.9
7	73.7	65.1	82.4	66.9
2	69.6	69.6		69.6
4	60.1	57.8	83.8	60.1
4	50.6	45.8	55.3	50.6
2	76.3	89.6	63.0	76.3
2	64.1	64.1		64.1
7	76.4	72.2	90.1	76.4
49	66.9	63.4	76.9	63.4
	n 3 2 4 1 1 2 2 5 1 7 2 4 4 2 2 7	death (all Deaths causes) n Years 3 51.5 2 80.4 4 58.8 1 67.3 1 58.4 2 73.0 2 71.5 5 53.3 1 66.9 7 73.7 2 69.6 4 60.1 4 50.6 2 76.3 2 64.1 7 76.4	death (alldeath (cancer- related) related)Deaths ncauses)related) related)nYearsYears351.563.7280.472.7458.858.5167.3158.458.4273.073.0271.564.3553.353.3166.966.9773.765.1269.669.6460.157.8450.645.8276.389.6264.164.1776.472.2	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

#### Table 11b

Medians of age at death according to the grouping in Table 10

By 2010, life expectancy for a newborn male in Germany is 77.5 years compared with 82.6 years for his female counterpart.

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.

### FEMALES

#### Table 12a

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

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	7	0.6	0.78	0.5	0.88	0.6	0.84	0.7	0.80
1999	2	0.2	0.22	0.1	0.19	0.2	0.22	0.2	0.28
2000	4	0.4	1,00	0.2	0.71	0.3	0.91	0.5	1.33
2001	2	0.2	0.33	0.1	0.32	0.2	0.37	0.2	0.37
2002	5	0.3	0.45	0.2	0.43	0.2	0.43	0.2	0.39
2003	9	0.5	1.29	0.3	1.32	0.4	1.39	0.5	1.19
2004	3	0.2	0.43	0.1	0.44	0.1	0.43	0.2	0.43
2005	3	0.2	0.23	0.1	0.16	0.1	0.22	0.2	0.28
2006	8	0.4	0.80	0.2	0.68	0.3	0.77	0.4	0.78
2007	3	0.1	0.25	0.1	0.19	0.1	0.21	0.1	0.26
2008	б	0.3	0.32	0.1	0.22	0.2	0.25	0.3	0.31
2009	8	0.4	0.53	0.2	0.42	0.3	0.48	0.3	0.59
2010	9	0.4	0.53	0.2	0.41	0.3	0.45	0.4	0.47
2011	9	0.4	0.75	0.2	0.71	0.3	0.72	0.4	0.76
2012	9	0.4	0.69	0.2	0.50	0.3	0.57	0.4	0.67
2013	б	0.3	1.20	0.1	0.80	0.2	0.94	0.2	1.20
1998-2013	93	0.3	0.55	0.2	0.47	0.3	0.52	0.3	0.57

#### 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	2	0.2	2.00	0.1	1.33	0.1	1.47	0.2	1.89
1999	1	0.1	0.33	0.0	0.25	0.1	0.30	0.1	0.38
2000	3	0.2	1.00	0.2	0.91	0.2	1.07	0.2	1.06
2001									
2002	1	0.1	0.33	0.0	0.54	0.1	0.56	0.1	0.40
2003	2	0.1	0.40	0.0	0.26	0.1	0.32	0.1	0.34
2004	1	0.1	0.33	0.0	0.35	0.0	0.36	0.0	0.31
2005	5	0.3	1.25	0.2	1.29	0.2	1.27	0.2	1.20
2006	1	0.0	0.17	0.0	0.13	0.0	0.13	0.0	0.13
2007	4	0.2	1.33	0.1	1.39	0.1	1.34	0.1	1.29
2008	2	0.1	0.50	0.0	0.51	0.1	0.48	0.1	0.51
2009	3	0.1	0.75	0.1	1.24	0.1	1.19	0.1	0.95
2010	3	0.1	0.43	0.1	0.42	0.1	0.41	0.1	0.49
2011	1	0.0	0.14	0.0	0.04	0.0	0.06	0.0	0.06
2012	2	0.1	0.33	0.1	0.38	0.1	0.35	0.1	0.31
2013	6	0.3	1.50	0.1	1.57	0.2	1.53	0.2	1.59
1998-2013	37	0.1	0.58	0.1	0.55	0.1	0.58	0.1	0.57

Age at death	Cases			Males			Females		
Years	n	00	Cum.%	n	00	Cum.%	n	00	Cum.%
30-34	2	1.5	1.5	1	1.1	1.1	1	2.7	2.7
35-39	1	0.8	2.3	1	1.1	2.2			2.7
40-44	1	0.8	3.1	1	1.1	3.2			2.7
45-49	10	7.7	10.8	7	7.5	10.8	3	8.1	10.8
50-54	14	10.8	21.5	10	10.8	21.5	4	10.8	21.6
55-59	18	13.8	35.4	11	11.8	33.3	7	18.9	40.5
60-64	17	13.1	48.5	12	12.9	46.2	5	13.5	54.1
65-69	19	14.6	63.1	13	14.0	60.2	б	16.2	70.3
70-74	20	15.4	78.5	18	19.4	79.6	2	5.4	75.7
75-79	16	12.3	90.8	12	12.9	92.5	4	10.8	86.5
80-84	8	6.2	96.9	б	6.5	98.9	2	5.4	91.9
85+	4	3.1	100.0	1	1.1	100.0	3	8.1	100.0
All ages	130	100.0		93	100.0		37	100.0	

# Age distribution of age at death (cancer-related) for period 1998-2013 (incl. multiple primaries)

Table 13

Included in the statistics are 27.2% multiple primaries in males and 46.9% in females.

#### Age-specific mortality (cancer-related) and proportion of all cancers for period 1998-2013 (incl. multiple primaries)

		Males		Females		Males	Females
Age at		Age-		Age-		Prop.all	Prop.all
death	Males Femal			spec.		cancers	cancers
Years	n n		MI-index	- \	MT-index		00 00
100110				mor our .		0	· /
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	1 1	0.0		0.0	0 05	0 5	0 1
30-34	1 1			0.0	0.25	0.5	0.4
35-39	1	0.0		0.0		0.3	
40-44	1	0.0		0.0		0.1	
45-49	7 3			0.1	0.50	0.4	0.1
50-54	10 4			0.2	0.80	0.3	0.1
55-59	11 7			0.4		0.2	0.1
60-64	12 5			0.3	1.25	0.1	0.1
65-69	13 6		0.72	0.3	0.67	0.1	0.1
70-74	18 2	1.4	0.75	0.1	0.40	0.1	0.0
75-79	12 4	1.5	1.33	0.3	0.67	0.1	0.0
80-84	6 2	1.2	1.50	0.2	0.40	0.1	0.0
85+	1 3	0.3	1.00	0.3	0.75	0.0	0.0
All ages	93 37					0.1	0.1
5							
Mortality							
Raw /		0.3	0.55	0.1	0.58		
WS		0.2		0.1			
ES		0.3		0.1			
BRD-S		0.3		0.1	0.57		
DRD D		0.5	0.57	0.1	0.57		
PYLL-70							
per 100,000		2.6		1.2			
ES		2.0		1.2			
AYLL-70		12.3		12.1			
AITT-10		12.3		12.1			

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

#### Table 15a

Multiple primaries in deaths in period 1998-2013 MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	1	2.0	1	100.0				
C07-C08 Salivary gland	1	2.0					1	100.0
C09-C10 Oropharynx	3	5.9	1	33.3	1	33.3	1	33.3
C12-C13 Hypopharynx	1 4	2.0					1	100.0
C16 Stomach	2	3.9	1	50.0			1	50.0
C18 Colon	3	5.9	1	33.3			2	66.7
C19-C20 Rectum	5	9.8	2	40.0	1	20.0	2	40.0
C25 Pancreas	3	5.9	1	33.3			2	66.7
C30-C31 Sinuses	1	2.0			1	100.0		
C32 Larynx	6	11.8	2	33.3			4	66.7
C33-C34 Lung	7	13.7	1	14.3			6	85.7
C43 Malign. melanoma	2	3.9			1	50.0	1	50.0
C44 Skin others	6	11.8	1	16.7	_ 1	16.7	4	66.7
C60 Penis	1	2.0	1	100.0				
C61 Prostate	2	3.9	1	50.0			1	50.0
C67 Bladder	1	2.0	1	100.0				
C69 Eye carcinoma	1	2.0	1	100.0				
C70-C72 CNS cancer	1	2.0					1	100.0
C76-C79 CUP	2	3.9	1	50.0			1	50.0
C81 Hodgkin lymphoma	2	3.9					2	100.0
All mult. primaries	51	100.0	16	31.4	5	9.8	30	58.8

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

#### Table 15b

### Multiple primaries in deaths in period 1998-2013 $${\rm FEMALES}$$

	Total	Total	Pre	Pre	Syn- chron ±30d	Syn- chron ±30d	Post	Post
Diagnosis	n	90↓	n	~%	n	olo	n	~%
C03-C06 Oral cavity C09-C10 Oropharynx C12-C13 Hypopharynx	1 2 2	4.8 9.5 9.5	1	100.0	1 2	50.0 100.0	1	50.0
C19-C20 Rectum C22 Liver	1	4.8 4.8	1	100.0			1	100.0
C30 Middle/inner ear	1	4.8					1	100.0
C30-C31 Sinuses	1	4.8	1	100.0				
C32 Larynx	1	4.8					1	100.0
C33-C34 Lung	1	4.8			1	100.0		
C50 Breast	7	33.3	6	85.7			1	14.3
C56 Ovary	1	4.8	1	100.0				
C67 Bladder	2	9.5	2	100.0				
All mult. primaries	21	100.0	12	57.1	4	19.0	5	23.8

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

#### Age-specific mortality (cancer-related) and proportion of all cancers for period 1998-2013 (Singular primaries only \*)

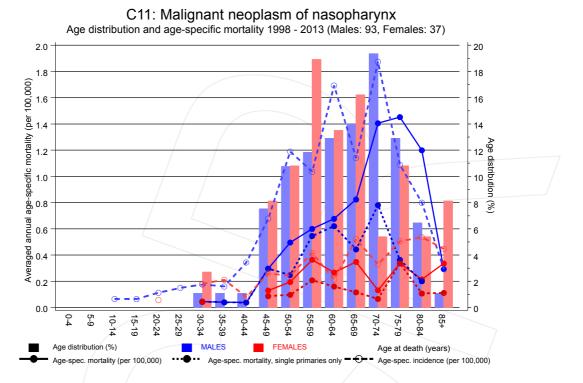
		Males		Females		Males	Females
Age at		Age-		Age-		Prop.all	Prop.all
death	Males Female			spec.		cancers	cancers
Years	n n		MI-index	mortal.	MI-index	00	010
0- 4		0.0		0.0			
5-9		0.0		0.0			
10-14		0.0		0.0			
15-19		0.0		0.0			
20-24		0.0		0.0			
25-29		0.0		0.0			
30-34	1 1	0.0	0.25	0.0	0.25	0.6	0.5
35-39	1	0.0	0.25	0.0		0.3	
40 - 44	1	0.0	0.11	0.0		0.1	
45-49	7 2	0.3	0.47	0.1	0.40	0.4	0.1
50-54	8 2	0.4	0.35	0.1	0.67	0.3	0.1
55-59	11 5	0.6	0.61	0.3	1.25	0.2	0.1
60-64	11 3	0.6	0.42	0.2	0.75	0.1	0.1
65-69	12 3	0.8	0.75	0.2	0.75	0.1	0.0
70-74	15 2	1.2	0.83	0.1	0.50	0.1	0.0
75-79	5 4	0.6	1.67	0.3	1.00	0.1	0.0
80-84	4 1	0.8	1.33	0.1	0.33	0.0	0.0
85+	1	0.0		0.1	1.00		0.0
All ages	76 24					0.1	0.0
Mortality							
Raw		0.3	0.52	0.1	0.55		
WS		0.2	0.45	0.0	0.48		
ES		0.2	0.49	0.1	0.52		
BRD-S		0.2	0.53	0.1	0.54		
PYLL-70							
per 100,000		2.4		0.8			
ES		2.1		0.7			
AYLL-70		12.4		13.1			

#### \* See corresponding tables with multiple primaries.

#### Age-specific mortality (cancer-related) and proportion of all cancers for period 1998-2013 (Single primaries only \*)

		Males		Females		Males	Females
Age at		Age-		Age-		Prop.all	Prop.all
death	Males Females			spec.		cancers	cancers
Years	n n		MI-index	mortal.	MI-index	00	00
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	1 1	0.0	0.25	0.0	0.25	0.6	0.5
35-39	1	0.0	0.25	0.0		0.3	
40-44	1	0.0		0.0		0.1	
45-49	7 2	0.3		0.1	0.50	0.5	0.1
50-54	5 2	0.2		0.1	0.67	0.2	0.1
55-59	10 4	0.5	0.56	0.2	1.33	0.2	0.1
60-64	11 3	0.6	0.46	0.2	0.75	0.2	0.1
65-69	7 2	0.4		0.1	0.67	0.1	0.0
70-74	10 1	0.8	0.63	0.1	0.33	0.1	0.0
75-79	3 4	0.4		0.3	1.00	0.0	0.1
80-84	1 1	0.2		0.1	0.33	0.0	0.0
85+		0.0		0.1	1.00		0.0
All ages	57 21					0.1	0.0
							0.00
Mortality							
Raw		0.2	0.42	0.1	0.53		
WS		0.1		0.0	0.46		
ES		0.2		0.1	0.50		
BRD-S		0.2		0.1	0.52		
DRD B		0.2	0.12	0.1	0.52		
PYLL-70							
per 100,000		2.1		0.7			
ES		1.9		0.6			
AYLL-70		13.2		13.9			
		+3.2		+3.7			

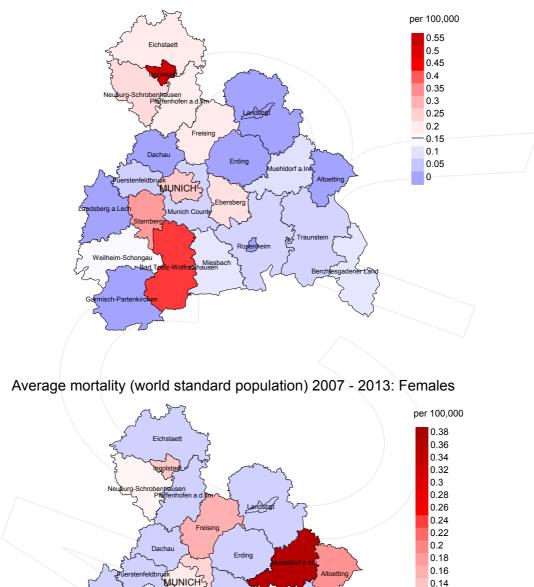
#### \* See corresponding tables with multiple primaries.



**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 nasopharynx cancer-related death (see Table 10) should be considered.



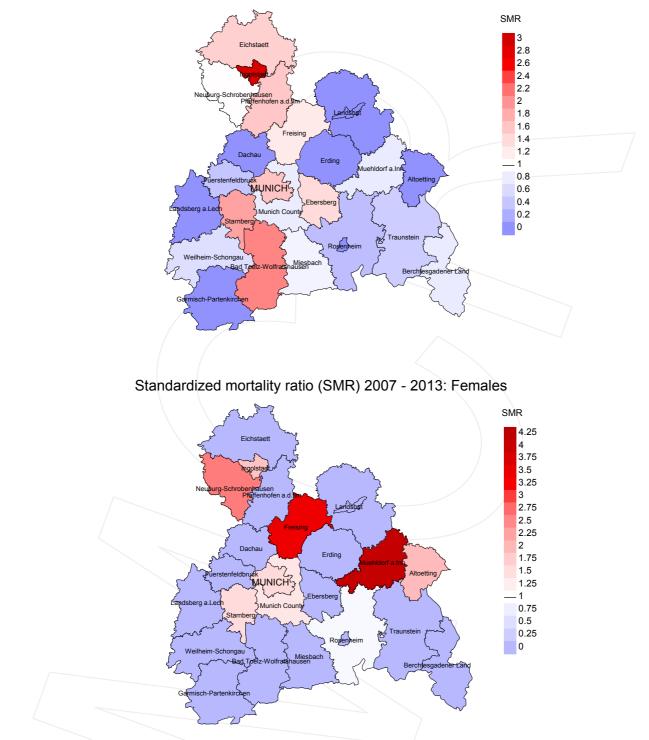


Average mortality (world standard population) 2007 - 2013: Males

**Figure 19a.** Map of cancer mortality (world standard population) by county averaged for period 2007 to 2013. 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 0.2/100,000 WS N=50, females 0.1/100,000 WS N=20).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,928 female residents (averaged) in the period from 2007 to 2013 a total of 0 women died from nasopharynx 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 1.2/100,000.

0.12 0.1 0.08 - 0.06 0.04 0.02 0



Standardized mortality ratio (SMR) 2007 - 2013: Males

**Figure 19b.** Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2013. 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=50, females N=20).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,642 female residents (averaged) in the period from 2007 to 2013 a total of 0 women died from nasopharynx 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 9.88, 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 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

FRG	Federal Republic of Germany
GEKID	Association of Population-based Cancer Registries in Germany
	(Gesellschaft der epidemiologischen Krebsregister in Deutschland e.V.)
MCR	Munich Cancer Registry (Tumorregister München)
SEER	Surveillance, Epidemiology, and End Results (USA)
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)
LCL	Lower confidence limit
MI-index	Ratio between mortality and incidence
PYLL-70	Potential years of life lost prior to age 70 given a person dies before that age
SIR	Standardized incidence ratio
SMR	Standardized mortality ratio
UCL	Upper confidence limit
WS	World standard population

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