Munich Cancer Registry

Munich Cancer Registry at Munich Cancer Center
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Munich, 81377
Germany

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

Cancer statistics: Baseline statistics

C00: Lip cancer

Year of diagnosis	1998-2012
Patients	275
Diseases	275
Creation date	03/20/2014
Export date	02/12/2014
Population	4.5 m

BERLIN

GERMANY

BAVARIA

MUNICH

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, March 2014

[#] 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 2013 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.

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.

ICD-10 codes used for specifying cancer site

ICD-10	Description
C00.-	Malignant neoplasm of lip
C00.0	External upper lip
C00.1	External lower lip
C00.2	External lip, unspecified
C00.3	Upper lip, inner aspect
C00.4	Lower lip, inner aspect
C00.5	Lip, unspecified, inner aspect
C00.6	Commissure of lip
C00.8	Overlapping lesion of lip
C00.9	Lip, 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

Year of diagnosis	Cases n	DCO cases n	Prop. DCO %	Prop. mult. primaries %	Prop. deaths %	Prop. actively followed %
1998	18			44.4	50.0	94.4
1999	18			38.9	55.6	94.4
2000	9			44.4	77.8	100.0
2001	10			50.0	40.0	80.0
2002	32	2	6.3	46.9	56.3	100.0 #
2003	24	2	8.3	16.7	62.5	100.0 #
2004	17	1	5.9	58.8	52.9	94.1 #
2005	24			45.8	25.0	100.0 #
2006	9			66.7	77.8	88.9 #
2007	20	2	10.0	35.0	50.0	75.0 # ##
2008	25			24.0	36.0	72.0
2009	18			44.4	33.3	50.0
2010	18			44.4	22.2	50.0
2011	28	1	3.6	32.1	17.9	50.0
2012	5			20.0		100.0 ###
1998–2012	275	8	2.9	39.6	43.3	81.8

\#   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 diagnosis	All n	Males n	Females n	Prop. males %
1998	18	12	6	66.7
1999	18	12	6	66.7
2000	9	8	1	88.9
2001	10	8	2	80.0
2002	32	21	11	65.6
2003	24	11	13	45.8
2004	17	12	5	70.6
2005	24	15	9	62.5
2006	9	4	5	44.4
2007	20	11	9	55.0
2008	25	19	6	76.0
2009	18	14	4	77.8
2010	18	8	10	44.4
2011	28	20	8	71.4
2012	5	4	1	80.0
1998-2012	275	179	96	65.1

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)

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	12	6	1.1	0.5	0.8	0.2	1.0	0.3	1.1	0.4
1999	12	6	1.1	0.5	0.6	0.2	1.0	0.3	1.5	0.4
2000	8	1	0.7	0.1	0.5	0.1	0.7	0.1	0.9	0.1
2001	8	2	0.7	0.2	0.4	0.1	0.6	0.1	0.7	0.1
2002	21	11	1.1	0.6	0.6	0.2	1.0	0.4	1.3	0.4
2003	11	13	0.6	0.7	0.3	0.2	0.5	0.4	0.6	0.5
2004	12	5	0.6	0.3	0.3	0.1	0.5	0.1	0.7	0.2
2005	15	9	0.8	0.5	0.4	0.2	0.6	0.3	0.9	0.4
2006	4	5	0.2	0.2	0.1	0.1	0.2	0.1	0.3	0.2
2007	11	9	0.5	0.4	0.2	0.1	0.4	0.2	0.5	0.3
2008	19	6	0.9	0.3	0.4	0.1	0.7	0.1	0.9	0.2
2009	14	4	0.6	0.2	0.3	0.0	0.4	0.1	0.6	0.1
2010	8	10	0.4	0.4	0.2	0.1	0.3	0.2	0.4	0.3
2011	20	8	0.9	0.3	0.4	0.2	0.6	0.3	0.9	0.3
2012	4	1	0.2	0.0	0.1	0.0	0.1	0.0	0.2	0.0
1998-2012	179	96	0.7	0.3	0.3	0.1	0.5	0.2	0.7	0.3

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

Table 3

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	18	66.4	13.4	26.4	85.0	53.8	61.9	66.1	74.1	84.7
1999	18	73.4	10.9	55.0	86.8	55.6	62.3	76.9	80.8	85.8
2000	9	62.9	12.7	47.9	82.7	47.9	54.4	57.3	73.3	82.7
2001	10	70.6	15.6	54.4	94.9	54.4	62.4	64.6	87.4	94.9
2002	32	72.8	11.3	53.9	94.4	58.7	64.8	71.9	81.4	86.0
2003	24	72.9	13.9	41.7	94.5	51.3	63.0	74.8	84.3	90.0
2004	17	73.1	8.1	60.7	87.9	62.1	66.6	75.2	75.8	84.4
2005	24	70.2	12.9	36.9	99.0	53.7	64.4	71.5	78.3	82.5
2006	9	80.2	9.6	59.3	93.2	59.3	76.1	81.5	85.1	93.2
2007	20	73.3	10.2	43.7	84.3	60.1	68.1	76.0	80.7	82.8
2008	25	72.7	11.1	51.5	90.8	55.0	65.0	72.1	81.8	86.2
2009	18	73.9	11.8	45.8	88.3	53.1	67.3	76.3	82.6	87.7
2010	18	74.5	9.7	53.7	85.9	56.2	68.2	77.5	81.1	85.8
2011	28	69.2	13.6	34.0	90.5	50.6	61.0	69.2	79.9	86.1
2012	5	71.2	10.6	59.5	83.8	59.5	61.1	73.7	78.0	83.8
1998-2012	275	71.9	12.0	26.4	99.0	55.0	64.0	73.2	81.1	85.8

Table 3a

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	12	61.9	12.2	26.4	74.1	54.4	61.9	64.5	67.8	69.8
1999	12	73.2	11.1	55.0	86.8	55.6	65.0	75.2	81.4	85.4
2000	8	64.0	13.2	47.9	82.7	47.9	52.8	61.9	75.9	82.7
2001	8	68.5	14.8	54.4	94.9	54.4	58.4	64.6	76.3	94.9
2002	21	72.2	9.4	53.9	86.0	62.2	65.8	72.6	79.4	85.7
2003	11	67.9	14.8	41.7	94.5	51.3	60.2	69.8	75.8	84.4
2004	12	71.7	8.0	60.7	87.9	62.1	65.7	71.9	75.7	80.9
2005	15	68.6	10.4	47.0	82.5	53.7	60.7	71.0	75.6	81.9
2006	4	76.7	11.8	59.3	85.1	59.3	70.0	81.1	83.3	85.1
2007	11	70.1	11.1	43.7	81.1	57.7	64.0	73.6	78.0	79.7
2008	19	69.8	10.7	51.5	86.2	52.1	64.3	68.9	78.7	83.8
2009	14	72.0	12.0	45.8	87.7	53.1	66.1	73.7	82.1	84.5
2010	8	75.1	10.3	56.2	85.9	56.2	67.8	78.8	82.6	85.9
2011	20	71.8	13.9	34.0	90.5	55.3	63.1	74.7	81.5	88.2
2012	4	69.5	11.5	59.5	83.8	59.5	60.3	67.4	78.8	83.8
1998-2012	179	70.2	11.7	26.4	94.9	54.4	62.6	70.8	79.0	84.5

Table 3b

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	6	75.4	11.7	53.8	85.0	53.8	72.9	78.1	84.7	85.0
1999	6	73.6	11.7	55.9	85.8	55.9	62.3	79.0	79.7	85.8
2000	1	54.7		54.7	54.7	54.7	54.7	54.7	54.7	54.7
2001	2	79.1	22.2	63.5	94.8	63.5	63.5	79.1	94.8	94.8
2002	11	73.9	14.7	58.4	94.4	58.7	58.9	69.3	91.0	92.8
2003	13	77.1	12.1	48.5	90.0	63.8	69.6	79.7	86.6	90.0
2004	5	76.4	8.0	64.2	84.4	64.2	75.2	75.3	82.8	84.4
2005	9	72.9	16.6	36.9	99.0	36.9	68.8	72.3	78.5	99.0
2006	5	83.0	7.6	75.6	93.2	75.6	76.1	82.0	87.9	93.2
2007	9	77.2	7.8	62.5	84.3	62.5	76.9	80.5	81.8	84.3
2008	6	81.7	6.8	72.1	90.8	72.1	77.6	81.1	87.4	90.8
2009	4	80.4	9.2	68.2	88.3	68.2	73.3	82.5	87.5	88.3
2010	10	74.0	9.7	53.7	85.3	58.8	70.8	75.4	81.1	85.1
2011	8	62.8	11.0	49.4	79.1	49.4	53.7	61.4	71.8	79.1
2012	1	78.0		78.0	78.0	78.0	78.0	78.0	78.0	78.0
1998-2012	96	75.0	12.0	36.9	99.0	58.4	66.7	77.8	84.0	88.3

Table 4

Age distribution by 5-year age group and gender for period 1998-2012
(incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
25-29	1	0.4	0.4	1	0.6	0.6			0.0
30-34	1	0.4	0.7	1	0.6	1.1			0.0
35-39	1	0.4	1.1			1.1	1	1.0	1.0
40-44	2	0.7	1.8	2	1.1	2.2			1.0
45-49	5	1.8	3.6	3	1.7	3.9	2	2.1	3.1
50-54	17	6.2	9.8	13	7.3	11.2	4	4.2	7.3
55-59	17	6.2	16.0	11	6.1	17.3	6	6.3	13.5
60-64	33	12.0	28.0	25	14.0	31.3	8	8.3	21.9
65-69	39	14.2	42.2	30	16.8	48.0	9	9.4	31.3
70-74	32	11.6	53.8	25	14.0	62.0	7	7.3	38.5
75-79	51	18.5	72.4	27	15.1	77.1	24	25.0	63.5
80-84	41	14.9	87.3	24	13.4	90.5	17	17.7	81.3
85+	35	12.7	100.0	17	9.5	100.0	18	18.8	100.0
All ages	275	100.0		179	100.0		96	100.0	

Included in the statistics are 66.5% multiple primaries in males and 42.7% in females.

Table 5

Age-specific incidence, DCO rate and proportion of all cancers
for period 1998-2012

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=7 %	Females DCO rate n=1 %	Males Prop.all cancers n=146755 %	Females Prop.all cancers n=142297 %
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		0.1	0.0			0.1	
30-34	1		0.0	0.0			0.1	
35-39		1	0.0	0.0				0.0
40-44	2		0.1	0.0			0.1	
45-49	3	2	0.1	0.1			0.1	0.0
50-54	13	4	0.7	0.2	7.7		0.2	0.0
55-59	11	6	0.6	0.3			0.1	0.0
60-64	25	8	1.5	0.5	4.0		0.1	0.0
65-69	30	9	2.0	0.6			0.1	0.1
70-74	25	7	2.2	0.5	8.0		0.1	0.0
75-79	27	24	3.6	2.2			0.1	0.1
80-84	24	17	5.3	2.0			0.2	0.1
85+	17	18	5.5	2.2	17.6	5.6	0.2	0.1
All ages	179	96			3.9	1.0	0.1	0.1
Incidence								
Raw			0.7	0.3				
WS			0.3	0.1				
ES			0.5	0.2				
BRD-S			0.7	0.3				

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 1998-2012
MALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C16	Stomach	2	0.6	3.3	0.4	11.8		21.2	
C19-C20	Rectum	2	0.7	2.8	0.3	10.0		19.5	
C22	Liver	3	0.4	8.6	1.8	25.0	#	40.4	33.3
C33-C34	Lung	11	1.5	7.2	3.6	12.9	#	144.6	9.1
C43	Malign. melanoma	2	0.5	4.4	0.5	15.7		23.5	
C61	Prostate	2	4.1	0.5	0.1	1.8		-31.4	
C82-C85	NHL	2	0.5	3.8	0.5	13.6		22.4	
Other primaries		5	1.5	3.4	1.1	7.9	#	53.9	20.0
Not observed		0	3.7	0.0	0.0	1.0	#	-57.1	
All mult. primaries		29	13.5	2.2	1.4	3.1	#	237.0	10.3

Patients	121
Mean age at second malignancy (years)	76.6
Person-years	655
Mean observation time (years)	5.4
Median observation time (years)	5.1

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 1998-2012
FEMALES

Diagnosis	Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C50 Breast	3	1.2	2.5	0.5	7.3		57.2	
C82-C85 NHL	2	0.2	10.7	1.3	38.7	#	57.8	
Other primaries	7	0.8	8.4	3.4	17.2	#	196.4	
Not observed	0	2.4	0.0	0.0	1.6		-74.9	
All mult. primaries	12	4.6	2.6	1.4	4.6	#	236.5	

Patients	70
Mean age at second malignancy (years)	74.9
Person-years	314
Mean observation time (years)	4.5
Median observation time (years)	4.1

The occurrence of second malignancy is statistically significant.

Observed second malignancies with count 1 are pooled in category "Other primaries".
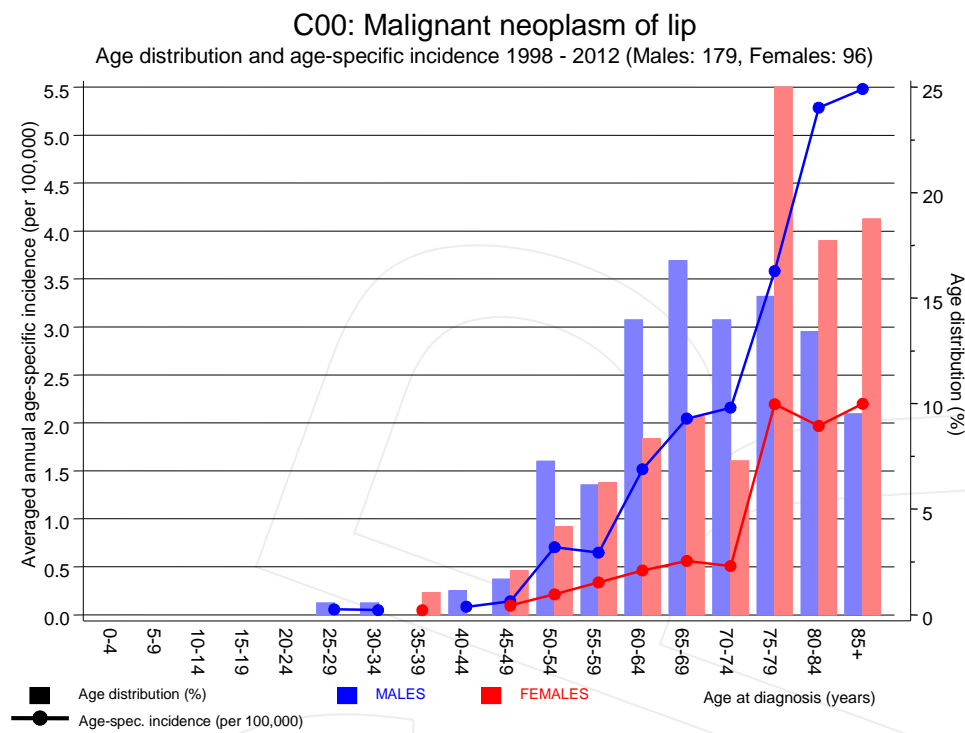
Figure 7. Age distribution and age-specific incidence

C00: Malignant neoplasm of lip
Age-specific incidence in international comparison
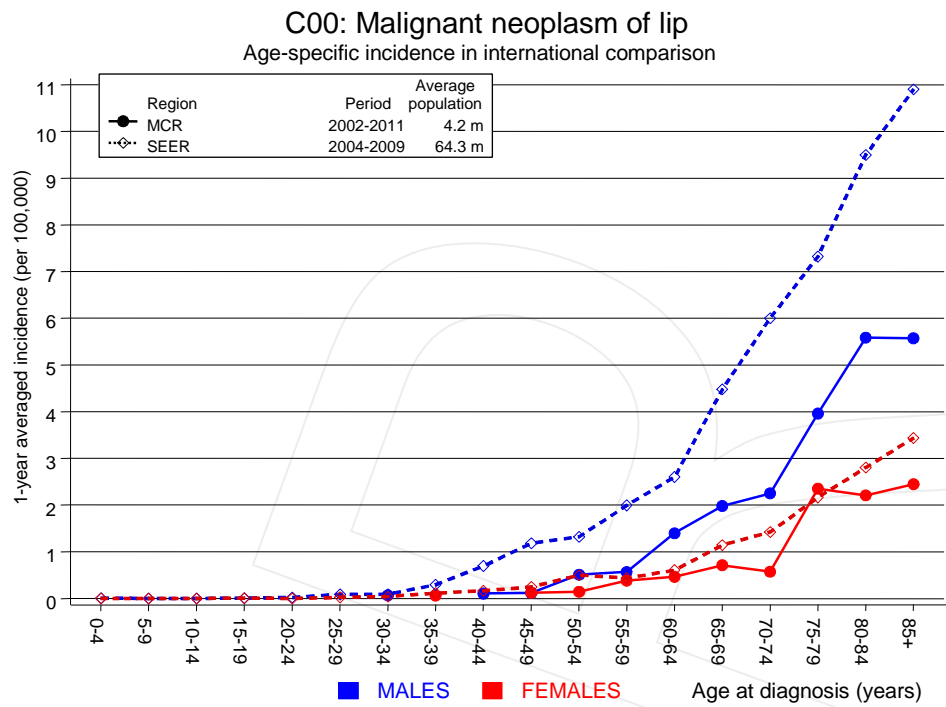
Figure 7a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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.
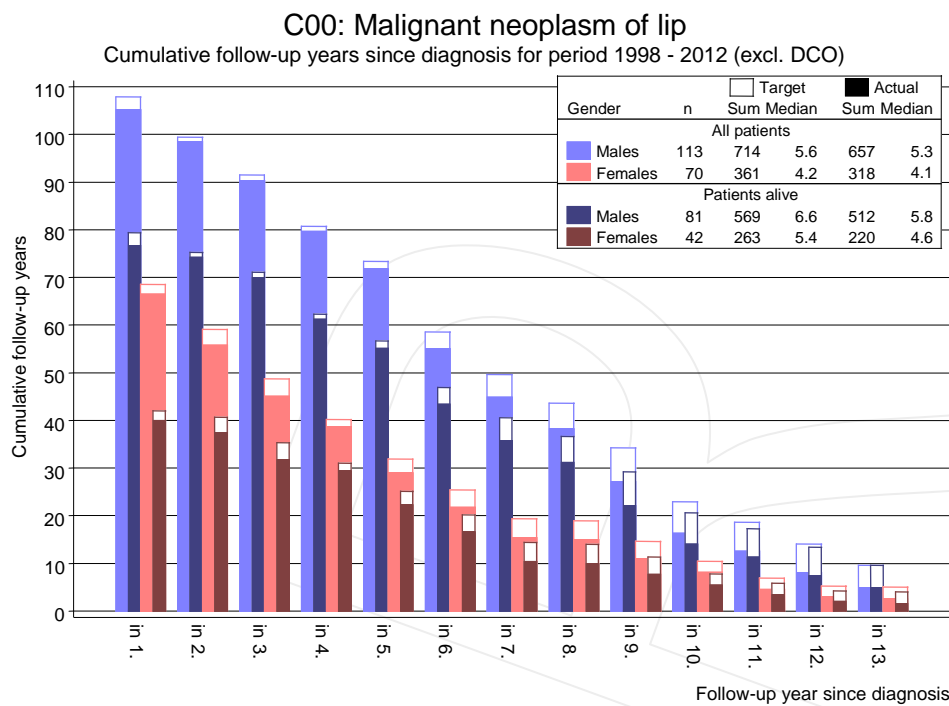
C00: Malignant neoplasm of lip
Cumulative follow-up years since diagnosis for period 1998 - 2012 (excl. DCO)

Gender	n	Target Sum	Median	Actual Sum	Median
All patients					
Males	113	714	5.6	657	5.3
Females	70	361	4.2	318	4.1
Patients alive					
Males	81	569	6.6	512	5.8
Females	42	263	5.4	220	4.6

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
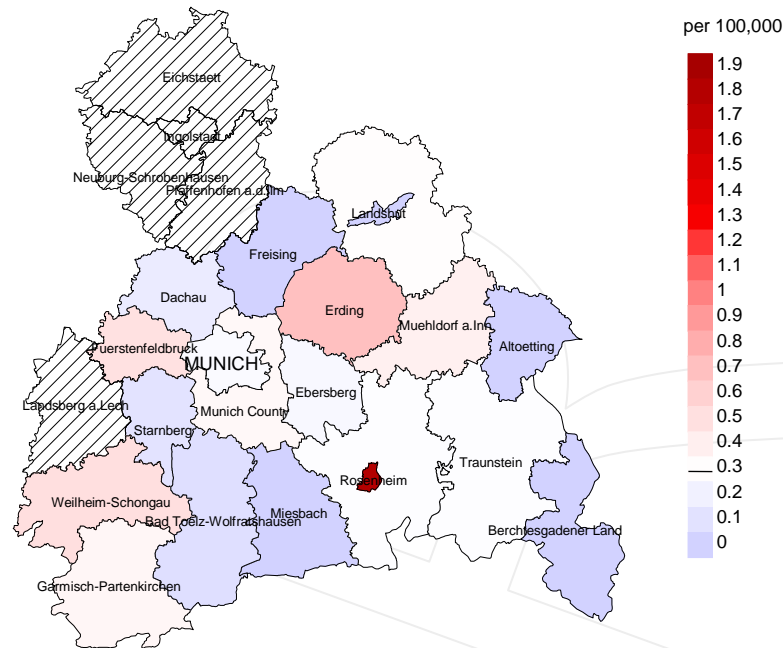
Average incidence (world standard population) 2003 - 2008: Females
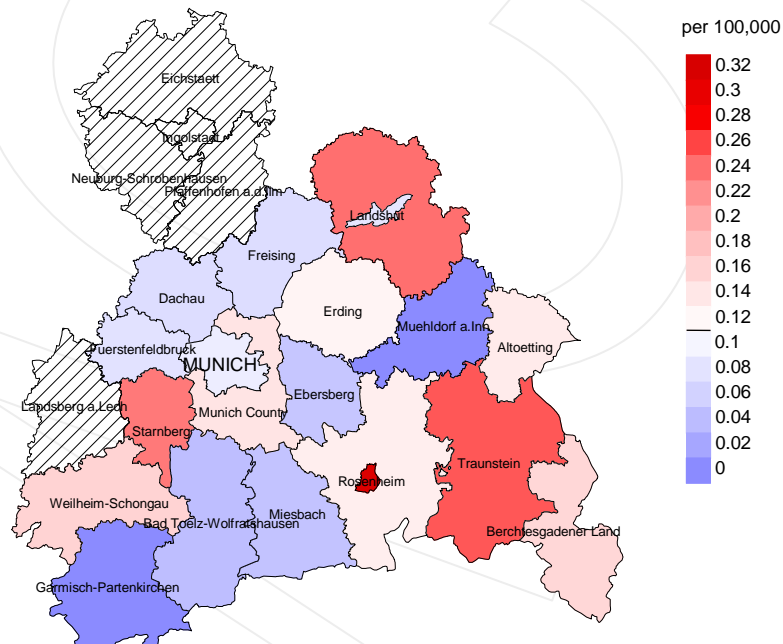
Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 0.3/100,000 WS N=66, females 0.1/100,000 WS N=42). 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 1 women were identified with newly diagnosed lip 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 0.4/100,000.

Standardized incidence ratio (SIR) 2003 - 2008: Males
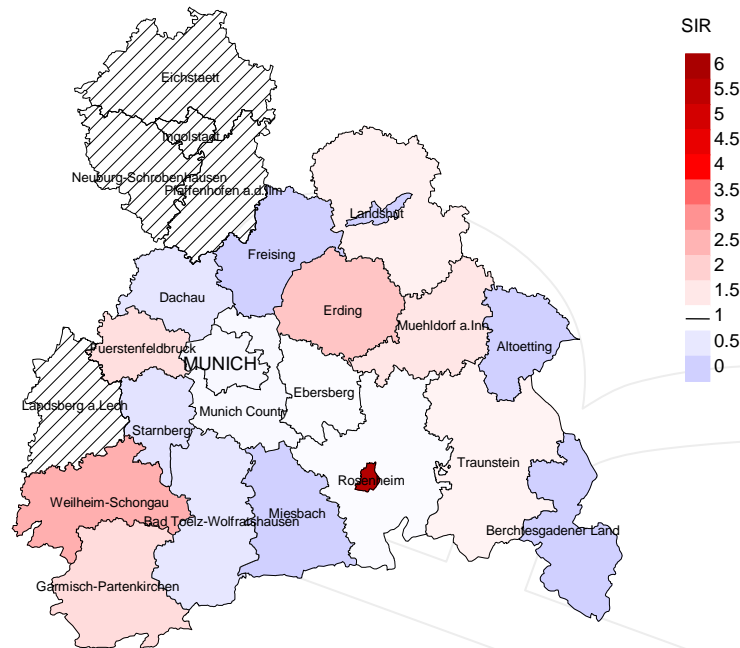
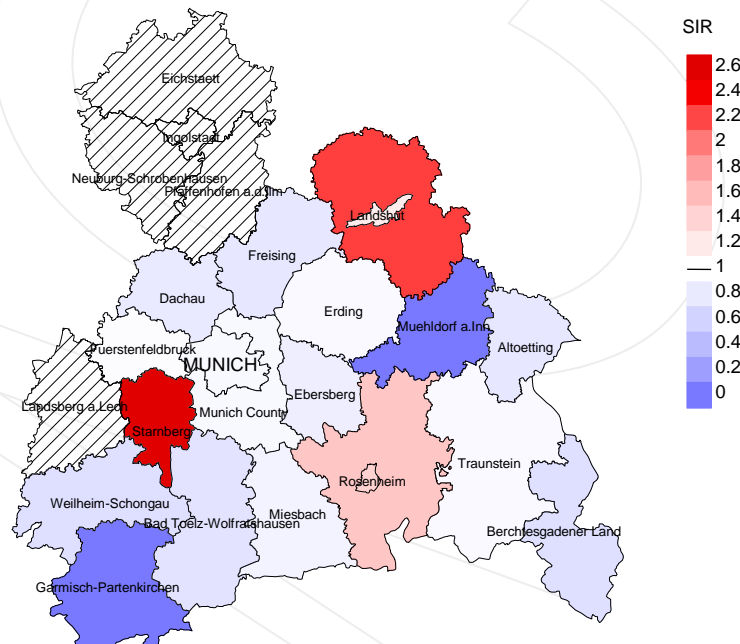## Standardized incidence ratio (SIR) 2003 - 2008: Females

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=66, females N=42). 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 1 women were identified with newly diagnosed lip cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.85. Though, the value of this parameter may vary with an underlying probability of 99% between 0.00 and 6.32, 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)

Year of diagnosis	Incident cases n	Prop. actively followed %	Prop. DCO %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	18	94.4		9	50.0	100.0
1999	18	94.4		10	55.6	90.0
2000	9	100.0		7	77.8	100.0
2001	10	80.0		4	40.0	100.0
2002	32	100.0	6.3	18	56.3	83.3
2003	24	100.0	8.3	15	62.5	100.0
2004	17	94.1	5.9	9	52.9	88.9
2005	24	100.0		6	25.0	100.0
2006	9	88.9		7	77.8	100.0
2007	20	75.0	10.0	10	50.0	100.0
2008	25	72.0		9	36.0	100.0
2009	18	50.0		6	33.3	100.0
2010	18	50.0		4	22.2	100.0
2011	28	50.0	3.6	5	17.9	100.0
2012	5	100.0				
1998-2012	275	81.8	2.9	119	43.3	95.8

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)

Year of diagnosis/ death	Incident cases n	Deaths n	Prop. deaths with death certific. %	Deaths in same year n	Prop. deaths in same year %
1998	18	8	100.0	1	5.6
1999	18	11	90.9		
2000	9	6	100.0		
2001	10	10	80.0	1	10.0
2002	32	10	100.0	3	9.4
2003	24	16	87.5	1	4.2
2004	17	11	100.0	2	11.8
2005	24	16	100.0	1	4.2
2006	9	18	100.0	1	11.1
2007	20	14	100.0	1	5.0
2008	25	21	95.2	2	8.0
2009	18	18	100.0	1	5.6
2010	18	20	95.0	1	5.6
2011	28	14	100.0	2	7.1
2012	5	20	95.0		
1998-2012	275	213	96.2	17	6.2

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)

Year of death	Deaths n	Prop. cancer-related %	Prop. not cancer-related %	Prop. cancer recorded on death certificate %
1998	8	37.5	62.5	62.5
1999	11	54.5	45.5	60.0
2000	6	83.3	16.7	83.3
2001	10	30.0	70.0	50.0
2002	10	70.0	30.0	80.0
2003	16	31.3	68.8	28.6
2004	11	72.7	27.3	81.8
2005	16	25.0	75.0	43.8
2006	18	38.9	61.1	44.4
2007	14	50.0	50.0	64.3
2008	21	28.6	71.4	40.0
2009	18	33.3	66.7	38.9
2010	20	35.0	65.0	42.1
2011	14	50.0	50.0	71.4
2012	20	40.0	60.0	47.4
1998-2012	213	41.8	58.2	52.2

Table 11a

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (not cancer-related) Years	Age at death (according to death certificate) Years
1998	6	71.3	77.5	68.1	71.5
1999	6	77.2	76.6	78.6	71.1
2000	5	75.7	73.9	82.8	73.9
2001	8	76.6	70.4	80.2	73.8
2002	9	79.6	80.5	76.5	80.5
2003	15	76.2	73.1	77.7	71.7
2004	9	80.9	79.8	84.7	79.5
2005	9	81.4	78.3	82.3	77.4
2006	9	77.6	71.4	82.6	71.4
2007	10	78.8	77.2	81.3	76.9
2008	13	80.3	83.3	79.0	83.1
2009	9	82.7	81.8	83.4	81.8
2010	15	76.0	71.0	79.3	72.9
2011	9	83.4	82.7	84.7	80.8
2012	12	77.9	78.6	77.3	77.5
1998-2012	144	78.5	77.4	79.6	76.8

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 11b

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (not cancer-related) Years	Age at death (according to death certificate) Years
1998	2	85.3	83.5	87.1	83.5
1999	5	80.0	81.0	79.3	82.7
2000	1	79.9	79.9		79.9
2001	2	84.5		84.5	
2002	1	91.0		91.0	91.0
2003	1	95.3		95.3	
2004	2	88.3	85.5	91.0	85.5
2005	7	86.2	77.1	89.9	77.1
2006	9	83.5	84.3	83.0	82.3
2007	4	80.8	67.4	85.2	67.4
2008	8	86.5	77.6	89.5	81.6
2009	9	80.8	73.8	82.8	81.8
2010	5	80.3	64.8	84.1	64.8
2011	5	83.5	88.4	82.3	82.9
2012	8	83.4	78.8	85.0	78.8
1998-2012	69	83.6	78.9	85.3	80.9

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.

Table 12a

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	2	0.2	0.17	0.1	0.14	0.2	0.18	0.2	0.19
1999	4	0.4	0.33	0.2	0.36	0.3	0.33	0.5	0.32
2000	4	0.4	0.50	0.2	0.40	0.3	0.45	0.5	0.57
2001	3	0.3	0.38	0.2	0.38	0.3	0.42	0.3	0.44
2002	7	0.4	0.33	0.2	0.28	0.3	0.33	0.5	0.40
2003	5	0.3	0.45	0.1	0.44	0.2	0.49	0.3	0.50
2004	7	0.4	0.58	0.2	0.51	0.3	0.63	0.5	0.73
2005	2	0.1	0.13	0.0	0.11	0.1	0.12	0.1	0.15
2006	4	0.2	1.00	0.1	1.12	0.2	0.95	0.2	0.95
2007	6	0.3	0.55	0.1	0.45	0.2	0.50	0.3	0.57
2008	4	0.2	0.21	0.1	0.17	0.1	0.22	0.2	0.23
2009	4	0.2	0.29	0.0	0.17	0.1	0.22	0.2	0.35
2010	6	0.3	0.75	0.1	0.80	0.2	0.75	0.3	0.70
2011	6	0.3	0.30	0.1	0.22	0.2	0.28	0.3	0.29
2012	6	0.3	1.50	0.1	0.97	0.1	1.12	0.3	1.58
1998-2012	70	0.3	0.39	0.1	0.33	0.2	0.38	0.3	0.43

Table 12b

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	1	0.1	0.17	0.0	0.11	0.0	0.13	0.1	0.19
1999	2	0.2	0.33	0.0	0.20	0.1	0.25	0.1	0.28
2000	1	0.1	1.00	0.0	0.34	0.0	0.48	0.1	0.93
2001									
2002									
2003									
2004	1	0.1	0.20	0.0	0.14	0.0	0.17	0.0	0.12
2005	2	0.1	0.22	0.0	0.15	0.1	0.20	0.1	0.28
2006	3	0.1	0.60	0.0	0.85	0.1	0.74	0.1	0.64
2007	1	0.0	0.11	0.0	0.19	0.0	0.15	0.0	0.09
2008	2	0.1	0.33	0.0	0.39	0.0	0.41	0.1	0.47
2009	2	0.1	0.50	0.0	0.81	0.1	0.66	0.1	0.68
2010	1	0.0	0.10	0.0	0.20	0.0	0.16	0.0	0.12
2011	1	0.0	0.13	0.0	0.03	0.0	0.05	0.0	0.05
2012	2	0.1	2.00	0.0	1.68	0.0	1.68	0.1	1.84
1998-2012	19	0.1	0.20	0.0	0.16	0.0	0.17	0.1	0.20

Table 13

Age distribution of age at death (cancer-related) for period 1998-2012
(**incl. multiple primaries**)

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
45-49	2	2.2	2.2	2	2.9	2.9			0.0
50-54	2	2.2	4.5	2	2.9	5.7			0.0
55-59	1	1.1	5.6	1	1.4	7.1			0.0
60-64	4	4.5	10.1	2	2.9	10.0	2	10.5	10.5
65-69	8	9.0	19.1	7	10.0	20.0	1	5.3	15.8
70-74	10	11.2	30.3	9	12.9	32.9	1	5.3	21.1
75-79	21	23.6	53.9	13	18.6	51.4	8	42.1	63.2
80-84	20	22.5	76.4	17	24.3	75.7	3	15.8	78.9
85+	21	23.6	100.0	17	24.3	100.0	4	21.1	100.0
All ages	89	100.0		70	100.0		19	100.0	

Included in the statistics are 66.5% multiple primaries in males and 42.7% in females.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2012
(**incl. multiple primaries**)

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			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			0.0		0.0			
35-39			0.0		0.0			
40-44			0.0		0.0			
45-49	2		0.1	0.67	0.0		0.1	
50-54	2		0.1	0.15	0.0		0.1	
55-59	1		0.1	0.09	0.0		0.0	
60-64	2	2	0.1	0.08	0.1	0.25	0.0	0.0
65-69	7	1	0.5	0.23	0.1	0.11	0.1	0.0
70-74	9	1	0.8	0.36	0.1	0.14	0.1	0.0
75-79	13	8	1.7	0.48	0.7	0.33	0.1	0.1
80-84	17	3	3.7	0.71	0.3	0.18	0.2	0.0
85+	17	4	5.5	1.00	0.5	0.22	0.2	0.0
All ages	70	19					0.1	0.0
Mortality								
Raw			0.3	0.39	0.1	0.20		
WS			0.1	0.33	0.0	0.16		
ES			0.2	0.38	0.0	0.17		
BRD-S			0.3	0.43	0.1	0.20		
PYLL-70								
per 100,000			0.5		0.1			
ES			0.4		0.1			
AYLL-70			8.9		5.8			

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

Table 15a

Multiple primaries in deaths in period 1998-2012
MALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C00	Lip	1	1.1					1	100.0
C03-C06	Oral cavity	4	4.4			1	25.0	3	75.0
C07-C08	Salivary gland	2	2.2					2	100.0
C09-C10	Oropharynx	1	1.1	1	100.0				
C12-C13	Hypopharynx	1	1.1	1	100.0				
C15	Oesophagus	1	1.1					1	100.0
C16	Stomach	5	5.6	2	40.0			3	60.0
C18	Colon	4	4.4	2	50.0			2	50.0
C19-C20	Rectum	4	4.4	1	25.0			3	75.0
C22	Liver	2	2.2					2	100.0
C30-C31	Sinuses	1	1.1	1	100.0				
C32	Larynx	2	2.2	2	100.0				
C33-C34	Lung	22	24.4			1	4.5	21	95.5
C43	Malign. melanoma	2	2.2					2	100.0
C44	Skin others	16	17.8	4	25.0	1	6.3	11	68.8
C46,C49	Soft tissue	1	1.1	1	100.0				
C61	Prostate	10	11.1	5	50.0			5	50.0
C67	Bladder	4	4.4					4	100.0
C76-C79	CUP	1	1.1					1	100.0
C82-C85	NHL	4	4.4	2	50.0			2	50.0
C91-C96	Leukaemia	2	2.2					2	100.0
All mult. primaries		90	100.0	22	24.4	3	3.3	65	72.2

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 1998-2012
FEMALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Synchron ±30d n	Synchron ±30d ←%	Post n	Post ←%
C07-C08 Salivary gland	1	5.6			1	100.0		
C16 Stomach	1	5.6	1	100.0				
C18 Colon	2	11.1					2	100.0
C19-C20 Rectum	2	11.1	1	50.0			1	50.0
C25 Pancreas	1	5.6			1	100.0		
C30-C31 Sinuses	1	5.6					1	100.0
C43 Malign. melanoma	2	11.1					2	100.0
C44 Skin others	3	16.7			2	66.7	1	33.3
C50 Breast	2	11.1			2	100.0		
C51 Vulva	1	5.6					1	100.0
C56 Ovary	1	5.6					1	100.0
C82-C85 NHL	1	5.6	1	100.0				
All mult. primaries	18	100.0	3	16.7	6	33.3	9	50.0

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

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2012
(**Singular 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			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			0.0		0.0			
35-39			0.0		0.0			
40-44			0.0		0.0			
45-49	1		0.0	0.50	0.0		0.1	
50-54	2		0.1	0.17	0.0		0.1	
55-59			0.0		0.0			
60-64	1	1	0.1	0.06	0.1	0.25	0.0	0.0
65-69	6	1	0.4	0.22	0.1	0.13	0.1	0.0
70-74	6		0.5	0.40	0.0		0.1	
75-79	12	6	1.6	0.75	0.5	0.35	0.1	0.1
80-84	11	1	2.4	0.85	0.1	0.08	0.1	0.0
85+	10	2	3.2	0.91	0.2	0.14	0.2	0.0
All ages	49	11					0.1	0.0
Mortality								
Raw			0.2	0.38	0.0	0.15		
WS			0.1	0.30	0.0	0.12		
ES			0.1	0.36	0.0	0.13		
BRD-S			0.2	0.43	0.0	0.16		
PYLL-70								
per 100,000			0.3		0.0			
ES			0.3		0.0			
AYLL-70			8.0		5.0			

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1999-2012
(**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			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			0.0		0.0			
35-39			0.0		0.0			
40-44			0.0		0.0			
45-49			0.0		0.0			
50-54	1		0.1	0.09	0.0		0.0	
55-59			0.0		0.0			
60-64			0.0		0.0			
65-69	2		0.1	0.09	0.0		0.0	
70-74	1		0.1	0.11	0.0		0.0	
75-79	3	4	0.4	0.28	0.4	0.28	0.0	0.1
80-84	1		0.2	0.10	0.0		0.0	
85+	4	2	1.3	0.52	0.3	0.16	0.1	0.0
All ages	12	6					0.0	0.0
Mortality								
Raw			0.0	0.12	0.0	0.10		
WS			0.0	0.10	0.0	0.06		
ES			0.0	0.12	0.0	0.08		
BRD-S			0.1	0.14	0.0	0.10		
PYLL-70								
per 100,000			0.1					
ES			0.1					
AYLL-70			7.5					

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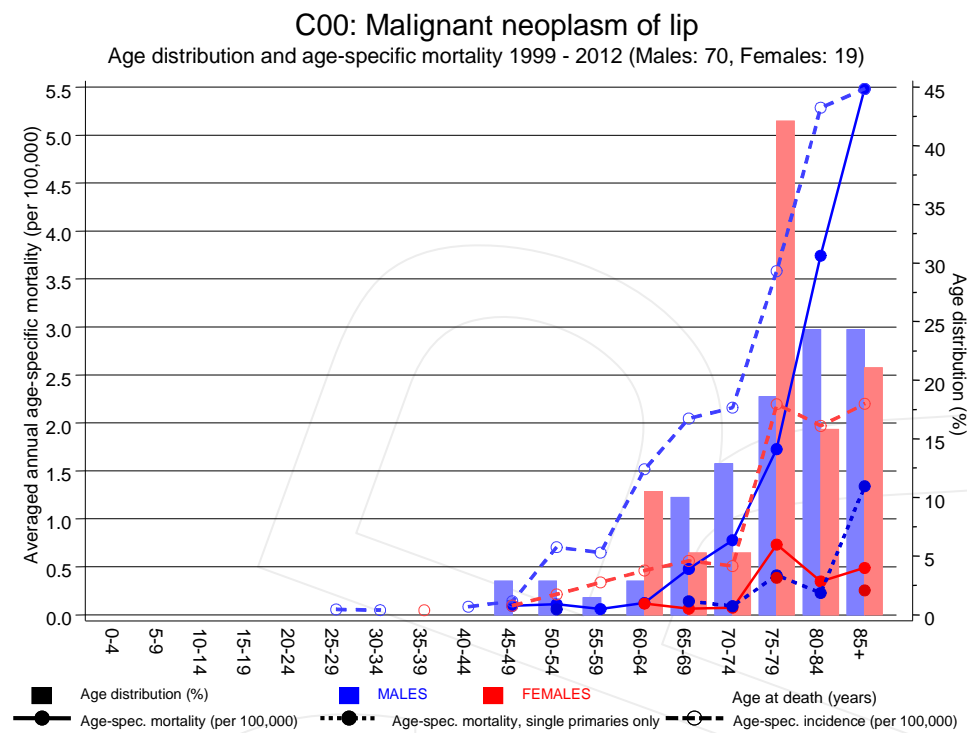
Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

Average mortality (world standard population) 2003 - 2008: Males
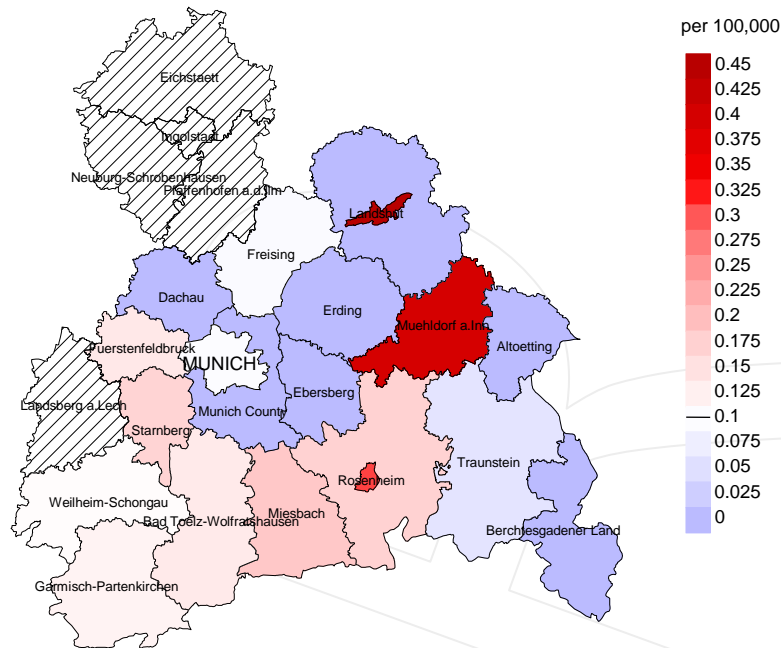
Average mortality (world standard population) 2003 - 2008: Females
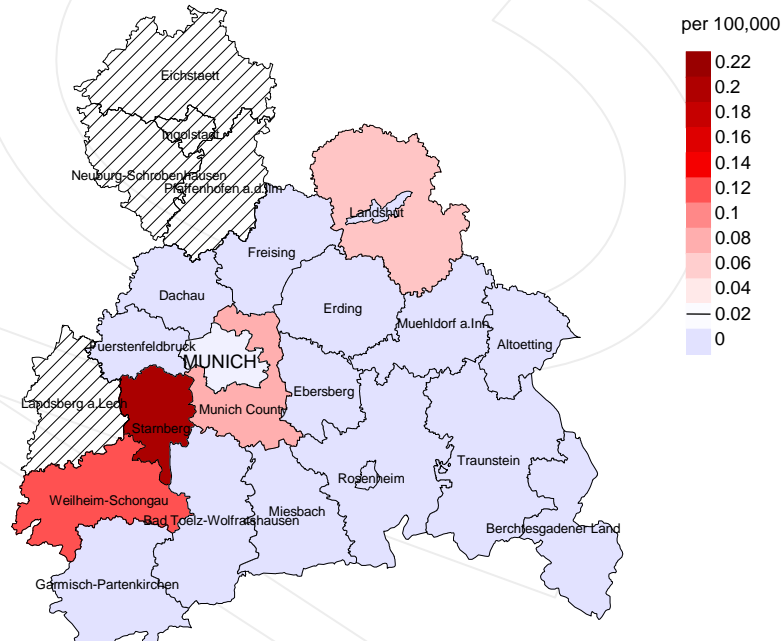
Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 0.1/100,000 WS N=26, females 0.0/100,000 WS N=9). 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 0 women died from lip 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 1.4/100,000.

Standardized mortality ratio (SMR) 2003 - 2008: Males
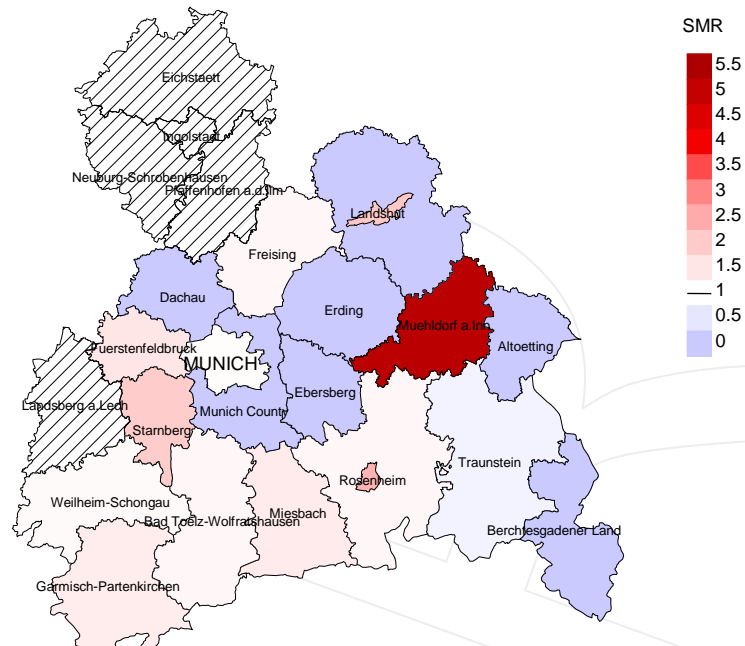
Standardized mortality ratio (SMR) 2003 - 2008: Females
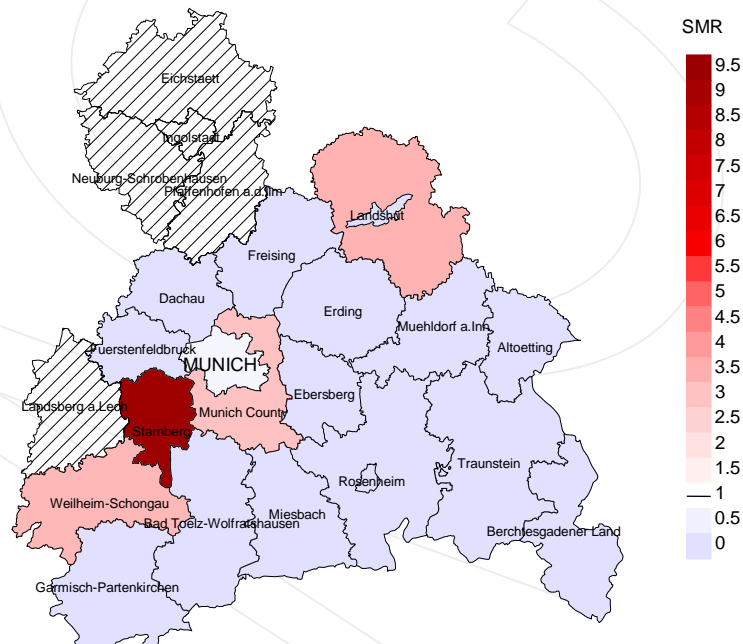
Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=26, females N=9). 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 0 women died from lip 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 21.02, 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

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