Munich Cancer Registry

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

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

Cancer statistics: Baseline statistics

C02: Tongue excl. base of tongue

Year of diagnosis	1998-2012
Patients	1,007
Diseases	1,010
Creation date	03/20/2014
Export date	02/12/2014
Population	4.5 m

http://www.tumorregister-muenchen.de/en/facts/base/base_C02__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, 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
C02.-	Other and unspecified parts of tongue
C02.0	Dorsal surface of tongue
C02.1	Border of tongue
C02.2	Ventral surface of tongue
C02.3	Anterior two-thirds of tongue, part unspecified
C02.4	Lingual tonsil
C02.8	Overlapping lesion of tongue
C02.9	Tongue, 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	49	2	4.1	34.7	81.6	98.0	
1999	43			39.5	86.0	100.0	
2000	44	2	4.5	29.5	77.3	100.0	
2001	53			22.6	77.4	100.0	
2002	73			37.0	68.5	98.6	#
2003	63	2	3.2	31.7	68.3	100.0	#
2004	64			23.4	71.9	100.0	#
2005	65			21.5	64.6	96.9	#
2006	71	2	2.8	22.5	57.7	94.4	#
2007	87	4	4.6	27.6	60.9	90.8	# ##
2008	90			23.3	42.2	68.9	
2009	79	1	1.3	26.6	41.8	75.9	
2010	90	1	1.1	22.2	38.9	76.7	
2011	73	1	1.4	21.9	27.4	72.6	
2012	66	2	3.0	21.2	21.2	92.4	###
1998-2012	1010	17	1.7	26.4	56.1	89.2	

\# 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	49	32	17	65.3
1999	43	24	19	55.8
2000	44	33	11	75.0
2001	53	40	13	75.5
2002	73	46	27	63.0
2003	63	45	18	71.4
2004	64	44	20	68.8
2005	65	44	21	67.7
2006	71	46	25	64.8
2007	87	61	26	70.1
2008	90	55	35	61.1
2009	79	46	33	58.2
2010	90	58	32	64.4
2011	73	46	27	63.0
2012	66	40	26	60.6
1998-2012	1010	660	350	65.3

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	32	17	2.9	1.4	1.9	0.8	2.6	1.1	3.0	1.3
1999	24	19	2.1	1.6	1.5	0.9	2.0	1.3	2.2	1.5
2000	33	11	2.9	0.9	2.0	0.6	2.6	0.8	2.9	0.8
2001	40	13	3.5	1.1	2.2	0.6	3.0	0.8	3.4	1.0
2002	46	27	2.5	1.4	1.7	0.8	2.2	1.1	2.4	1.2
2003	45	18	2.4	0.9	1.7	0.4	2.3	0.6	2.4	0.7
2004	44	20	2.3	1.0	1.5	0.5	2.0	0.7	2.2	0.9
2005	44	21	2.3	1.1	1.5	0.7	1.9	0.9	2.1	1.0
2006	46	25	2.4	1.2	1.4	0.7	2.1	0.9	2.4	1.1
2007	61	26	2.8	1.1	1.7	0.7	2.3	0.9	2.6	1.0
2008	55	35	2.5	1.5	1.6	0.9	2.2	1.2	2.3	1.4
2009	46	33	2.1	1.4	1.3	0.7	1.8	1.0	2.0	1.2
2010	58	32	2.6	1.4	1.5	0.8	2.1	1.0	2.4	1.1
2011	46	27	2.0	1.1	1.3	0.6	1.7	0.8	1.9	1.0
2012	40	26	1.8	1.1	1.0	0.7	1.4	0.9	1.6	1.0
1998-2012	660	350	2.4	1.2	1.5	0.7	2.1	0.9	2.3	1.1

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	49	61.4	11.7	32.0	91.4	48.0	52.1	60.4	67.4	77.8
1999	43	59.2	14.5	25.6	90.8	42.2	49.9	57.9	68.6	77.7
2000	44	56.3	11.7	33.5	84.8	41.4	46.3	55.4	64.9	71.3
2001	53	59.6	12.3	33.7	90.0	44.0	50.6	60.2	65.4	76.0
2002	73	58.8	12.0	26.4	89.8	44.9	51.6	58.8	65.6	71.9
2003	63	60.5	14.0	28.1	98.2	45.6	52.4	57.8	69.5	81.2
2004	64	60.4	12.4	29.5	88.4	43.2	50.2	61.4	68.1	75.4
2005	65	58.5	11.1	33.0	92.0	43.3	49.9	60.5	64.5	69.8
2006	71	63.4	12.8	33.8	96.2	47.5	55.3	61.7	71.7	81.2
2007	87	60.3	12.6	26.0	101	44.2	52.1	60.6	67.9	76.7
2008	90	60.7	12.2	21.8	87.1	45.1	52.6	62.2	69.2	75.8
2009	79	62.5	12.5	30.2	88.9	47.5	53.9	62.2	71.4	79.9
2010	90	61.7	13.9	24.5	92.8	45.4	50.9	61.5	70.7	82.7
2011	73	61.7	14.4	29.2	92.8	42.8	53.6	62.4	69.7	80.0
2012	66	60.6	14.9	21.5	88.7	36.5	53.1	63.6	72.0	76.6
1998-2012	1010	60.6	12.9	21.5	101	44.5	52.1	60.5	68.9	77.8

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	32	59.5	9.2	44.0	81.3	48.0	52.0	59.5	65.2	71.0
1999	24	55.2	13.1	33.3	90.8	41.2	48.5	51.7	60.8	67.1
2000	33	57.3	10.3	35.8	75.4	45.1	48.3	56.2	64.8	71.3
2001	40	58.5	12.8	33.7	90.0	43.5	48.5	58.8	64.4	77.2
2002	46	56.2	11.1	26.4	79.9	40.5	48.9	56.6	62.3	69.5
2003	45	56.4	10.3	28.1	86.1	45.6	50.9	55.1	61.9	70.0
2004	44	58.5	11.2	38.4	88.4	43.2	49.3	59.0	65.2	70.7
2005	44	57.5	10.9	36.8	82.5	42.9	48.1	59.2	65.3	69.8
2006	46	62.8	12.0	33.8	92.0	46.0	55.6	60.9	71.7	76.4
2007	61	59.5	12.5	26.0	101	44.2	52.1	59.6	67.7	72.9
2008	55	59.4	11.2	21.8	87.1	45.1	52.5	59.7	69.1	70.5
2009	46	60.9	11.0	30.2	79.9	48.2	53.2	62.2	69.0	73.8
2010	58	61.2	14.6	24.5	92.8	45.2	50.9	60.9	70.3	84.0
2011	46	60.5	13.3	29.2	88.6	42.9	53.6	59.6	68.8	78.1
2012	40	62.2	13.0	25.7	85.9	41.4	53.2	65.1	72.1	75.5
1998-2012	660	59.2	12.0	21.8	101	44.5	51.4	59.1	67.1	74.4

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	17	65.0	15.0	32.0	91.4	49.5	55.2	64.8	75.8	84.4
1999	19	64.3	15.0	25.6	87.3	42.2	53.3	68.2	75.3	79.3
2000	11	53.3	15.4	33.5	84.8	37.8	39.8	53.2	66.3	67.5
2001	13	63.1	10.0	44.0	76.2	52.0	56.9	60.5	72.4	76.0
2002	27	63.2	12.3	44.9	89.8	47.0	53.5	61.2	68.0	82.9
2003	18	70.9	16.7	35.5	98.2	44.8	63.1	71.6	84.0	91.2
2004	20	64.7	13.9	29.5	82.9	44.4	57.6	67.2	74.9	80.0
2005	21	60.5	11.5	33.0	92.0	50.7	54.2	61.6	63.9	68.4
2006	25	64.4	14.2	37.9	96.2	47.5	54.9	62.3	71.7	82.5
2007	26	62.1	12.9	34.4	83.6	45.5	53.7	63.1	69.4	79.8
2008	35	62.7	13.4	26.7	86.9	43.9	54.5	64.0	73.4	78.7
2009	33	64.7	14.1	32.4	88.9	47.5	54.2	65.8	75.4	82.8
2010	32	62.5	12.5	43.2	88.5	46.3	51.1	62.2	71.9	78.4
2011	27	63.6	16.3	31.2	92.8	40.8	50.0	64.5	75.1	86.6
2012	26	58.2	17.3	21.5	88.7	30.0	48.4	62.1	71.9	76.9
1998-2012	350	63.1	14.2	21.5	98.2	45.1	53.9	63.3	73.0	81.3

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.%
20-24	3	0.3	0.3	2	0.3	0.3	1	0.3	0.3
25-29	10	1.0	1.3	6	0.9	1.2	4	1.1	1.4
30-34	16	1.6	2.9	7	1.1	2.3	9	2.6	4.0
35-39	22	2.2	5.0	15	2.3	4.5	7	2.0	6.0
40-44	54	5.3	10.4	40	6.1	10.6	14	4.0	10.0
45-49	100	9.9	20.3	74	11.2	21.8	26	7.4	17.4
50-54	129	12.8	33.1	92	13.9	35.8	37	10.6	28.0
55-59	154	15.2	48.3	118	17.9	53.6	36	10.3	38.3
60-64	167	16.5	64.9	103	15.6	69.2	64	18.3	56.6
65-69	130	12.9	77.7	87	13.2	82.4	43	12.3	68.9
70-74	89	8.8	86.5	58	8.8	91.2	31	8.9	77.7
75-79	64	6.3	92.9	30	4.5	95.8	34	9.7	87.4
80-84	38	3.8	96.6	13	2.0	97.7	25	7.1	94.6
85+	34	3.4	100.0	15	2.3	100.0	19	5.4	100.0
All ages	1010	100.0		660	100.0		350	100.0	

Included in the statistics are 34.7% multiple primaries in males and 30.4% 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=12 %	Females DCO rate n=5 %	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	2	1	0.1	0.1			0.4	0.2
25-29	6	4	0.3	0.2			0.7	0.4
30-34	7	9	0.3	0.4			0.5	0.5
35-39	15	7	0.6	0.3			0.7	0.2
40-44	40	14	1.7	0.6			1.3	0.2
45-49	74	26	3.4	1.2			1.5	0.3
50-54	92	37	5.0	2.0			1.1	0.4
55-59	118	36	6.9	2.0	1.7		0.9	0.3
60-64	103	64	6.3	3.7		1.6	0.5	0.4
65-69	87	43	5.9	2.7	2.3	2.3	0.3	0.2
70-74	58	31	5.0	2.2	3.4		0.2	0.2
75-79	30	34	4.0	3.1	3.3		0.2	0.2
80-84	12	25	2.6	2.9	8.3		0.1	0.2
85+	15	19	4.8	2.3	26.7	15.8	0.2	0.1
All ages	659	350			1.8	1.4	0.4	0.2
Incidence								
Raw			2.4	1.2				
WS			1.5	0.7				
ES			2.1	0.9				
BRD-S			2.3	1.1				

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 %
C03-C06 Oral cavity	2	0.2	8.4	1.0	30.4	#	10.7	
C09-C10 Oropharynx	12	0.3	39.5	20.4	68.9	#	71.0	
C12-C13 Hypopharynx	10	0.2	57.1	27.4	105.0	#	59.7	30.0
C15 Oesophagus	10	0.4	25.9	12.4	47.6	#	58.4	
C18 Colon	3	1.6	1.8	0.4	5.4		8.3	33.3
C19-C20 Rectum	3	1.1	2.7	0.6	7.9		11.5	
C22 Liver	3	0.5	5.9	1.2	17.3	#	15.1	33.3
C32 Larynx	6	0.2	24.7	9.1	53.8	#	35.0	16.7
C33-C34 Lung	22	2.2	9.8	6.2	14.9	#	120.0	27.3
C61 Prostate	5	5.3	0.9	0.3	2.2		-2.1	
C64 Kidney	2	0.7	2.9	0.3	10.3		7.9	
C67 Bladder	2	0.7	3.0	0.4	10.7		8.1	50.0
C82-C85 NHL	3	0.7	4.2	0.9	12.3		13.9	33.3
C91-C96 Leukaemia	2	0.3	7.8	0.9	28.2		10.6	
Other primaries	7	2.7	2.6	1.0	5.3	#	25.9	42.9
Not observed	0	1.5	0.0	0.0	2.5		-9.1	
All mult. primaries	92	18.7	4.9	4.0	6.0	#	444.9	18.5

Patients	492
Mean age at second malignancy (years)	62.9
Person-years	1647
Mean observation time (years)	3.3
Median observation time (years)	2.1

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 %
C03-C06 Oral cavity	3	0.1	50.0	10.3	146.2	#	30.8	
C09-C10 Oropharynx	5	0.0	113.3	36.8	264.3	#	52.0	
C12-C13 Hypopharynx	3	0.0	254.2	52.4	743.0	#	31.3	66.7
C15 Oesophagus	3	0.1	56.9	11.7	166.2	#	30.9	
C22 Liver	2	0.1	20.3	2.5	73.2	#	19.9	50.0
C23-C24 Bile	2	0.1	16.1	1.9	58.0	#	19.7	
C32 Larynx	3	0.0	159.3	32.8	465.5	#	31.3	33.3
C33-C34 Lung	12	0.7	18.0	9.3	31.4	#	118.9	8.3
C50 Breast	3	3.0	1.0	0.2	2.9		-0.3	
C67 Bladder	2	0.2	13.1	1.6	47.4	#	19.4	100.0
C82-C85 NHL	2	0.3	5.9	0.7	21.1		17.4	
Other primaries	4	1.2	3.4	0.9	8.7		29.7	
Not observed	0	3.6	0.0	0.0	1.0		-38.3	
All mult. primaries	44	9.4	4.7	3.4	6.3	#	362.8	15.9

Patients	244
Mean age at second malignancy (years)	65.0
Person-years	953
Mean observation time (years)	3.9
Median observation time (years)	2.6

The occurrence of second malignancy is statistically significant.

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

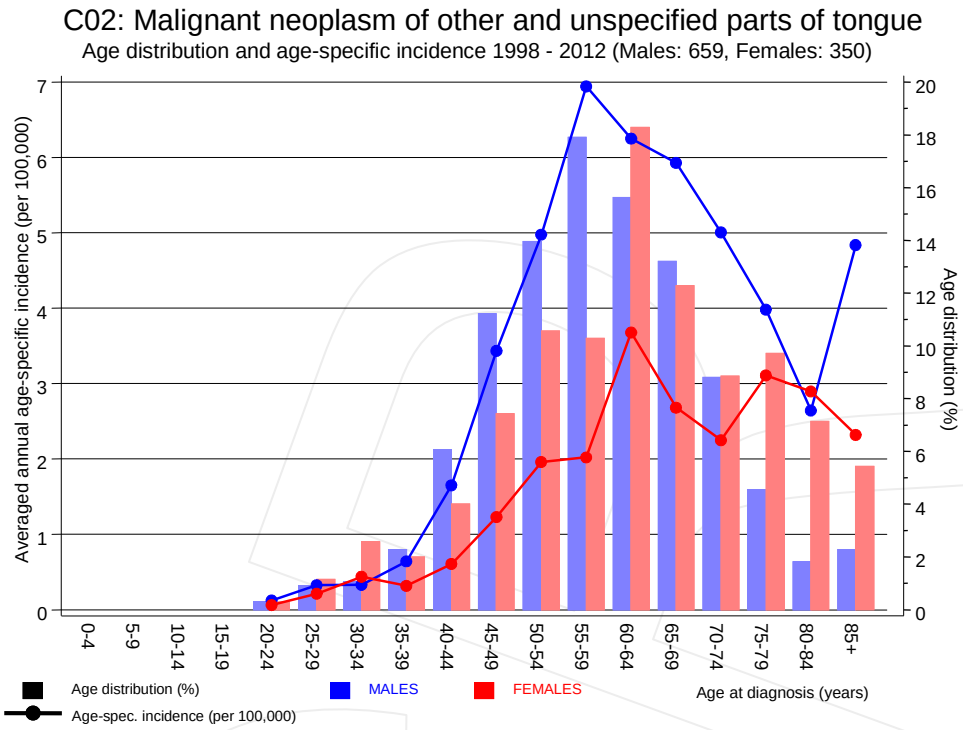


Figure 7. Age distribution and age-specific incidence

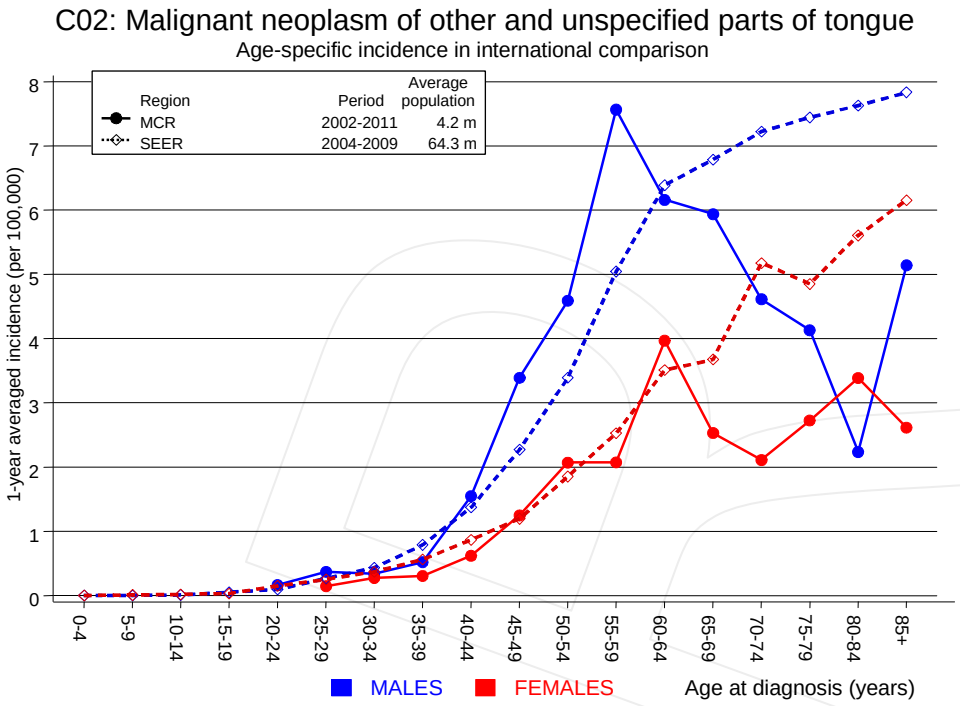


Figure 7a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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.

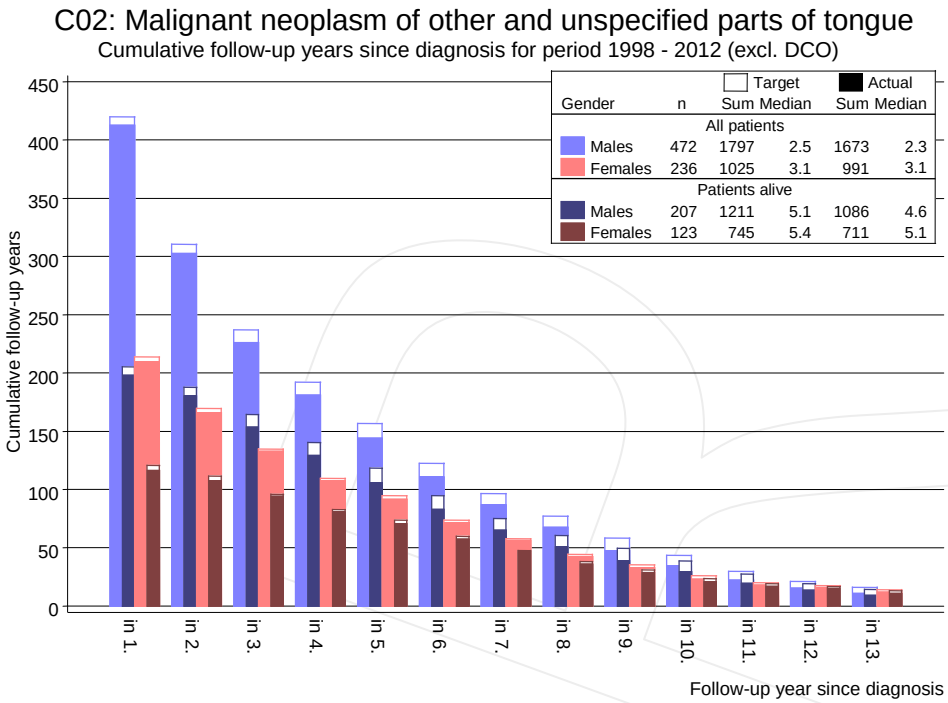
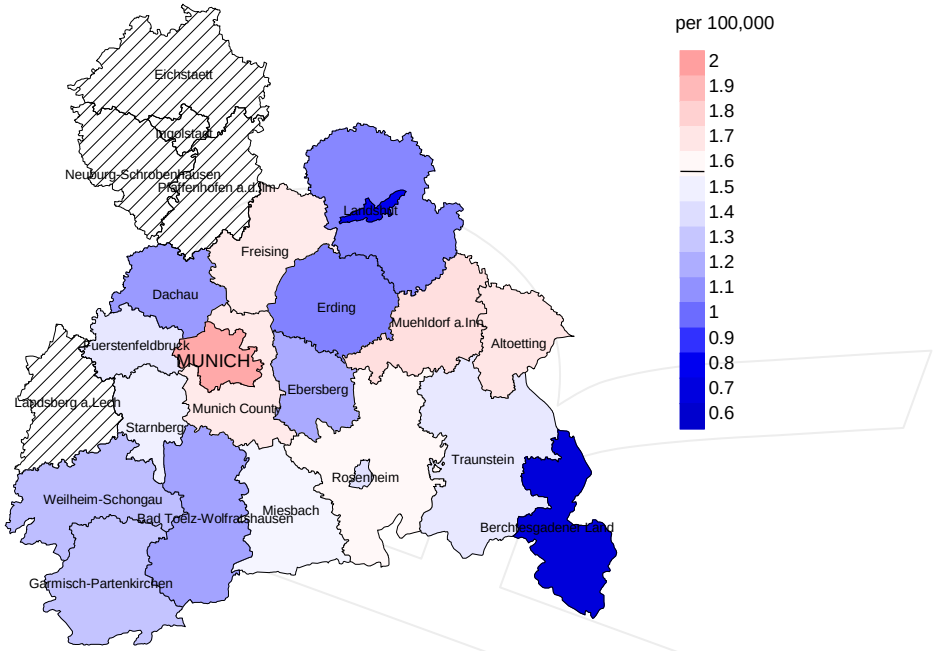


Figure 8. Cumulative follow-up years depending on time since diagnosis

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

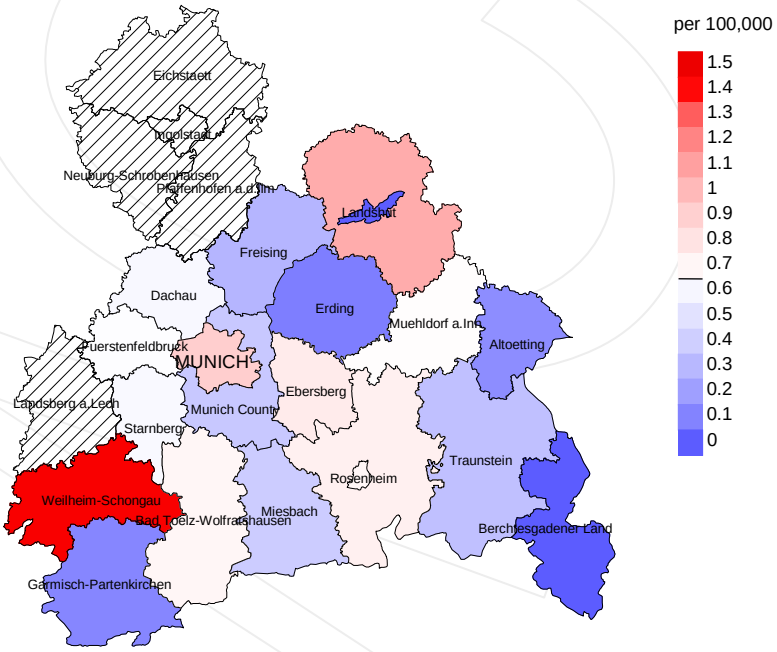
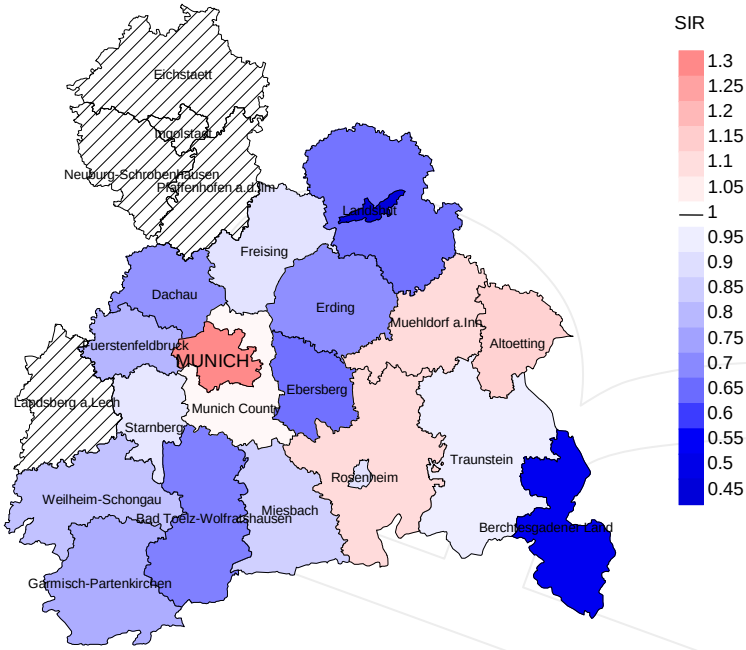


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 1.6/100,000 WS N=280, females 0.7/100,000 WS N=141). 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 4 women were identified with newly diagnosed tongue excl. base of tongue. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 0.8/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.1 and 2.5/100,000.

Standardized incidence ratio (SIR) 2003 - 2008: Males



Standardized incidence ratio (SIR) 2003 - 2008: Females

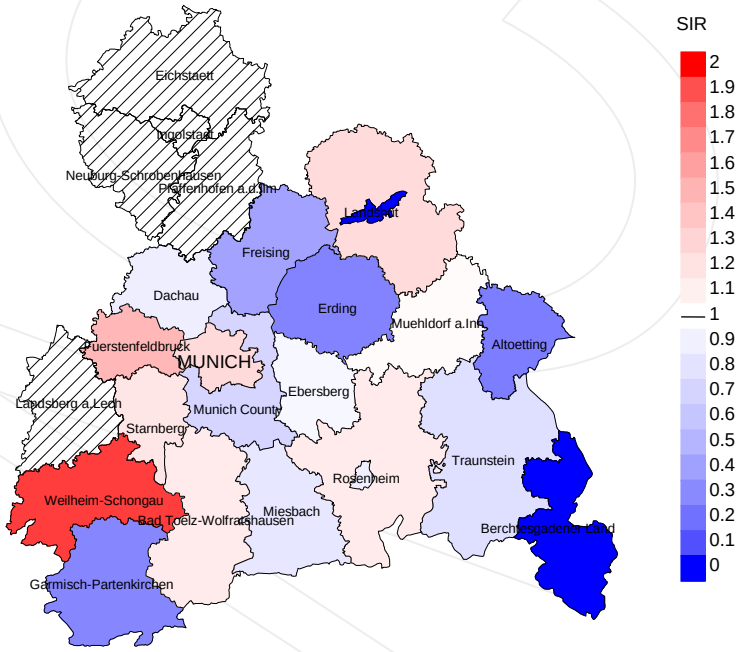


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=280, females N=141). 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 4 women were identified with newly diagnosed tongue excl. base of tongue. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.94. Though, the value of this parameter may vary with an underlying probability of 99% between 0.16 and 2.96, 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	49	98.0	4.1	40	81.6	95.0
1999	43	100.0		37	86.0	91.9
2000	44	100.0	4.5	34	77.3	97.1
2001	53	100.0		41	77.4	95.1
2002	73	98.6		50	68.5	98.0
2003	63	100.0	3.2	43	68.3	100.0
2004	64	100.0		46	71.9	95.7
2005	65	96.9		42	64.6	100.0
2006	71	94.4	2.8	41	57.7	100.0
2007	87	90.8	4.6	53	60.9	100.0
2008	90	68.9		38	42.2	100.0
2009	79	75.9	1.3	33	41.8	100.0
2010	90	76.7	1.1	35	38.9	97.1
2011	73	72.6	1.4	20	27.4	95.0
2012	66	92.4	3.0	14	21.2	100.0
1998-2012	1010	89.2	1.7	567	56.1	97.7

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	49	30	90.0	4	8.2
1999	43	23	82.6	4	9.3
2000	44	33	84.8	6	13.6
2001	53	39	89.7	9	17.0
2002	73	50	98.0	9	12.3
2003	63	51	98.0	7	11.1
2004	64	54	100.0	10	15.6
2005	65	53	100.0	6	9.2
2006	71	62	93.5	10	14.1
2007	87	74	100.0	15	17.2
2008	90	58	94.8	6	6.7
2009	79	60	98.3	4	5.1
2010	90	64	100.0	6	6.7
2011	73	58	98.3	6	8.2
2012	66	59	100.0	9	13.6
1998-2012	1010	768	96.5	111	11.0

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	30	56.7	43.3	85.2
1999	23	52.2	47.8	78.9
2000	33	69.7	30.3	96.4
2001	39	82.1	17.9	94.3
2002	50	74.0	26.0	91.8
2003	51	72.5	27.5	82.0
2004	54	81.5	18.5	90.7
2005	53	84.9	15.1	94.3
2006	62	67.7	32.3	81.0
2007	74	86.5	13.5	93.2
2008	58	77.6	22.4	90.9
2009	60	76.7	23.3	86.4
2010	64	81.3	18.8	92.2
2011	58	81.0	19.0	86.0
2012	59	81.4	18.6	91.5
1998-2012	768	77.0	23.0	89.3

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	21	62.4	62.6	62.0	64.4
1999	17	59.5	60.6	58.2	59.6
2000	24	62.1	61.6	63.1	62.9
2001	28	61.1	60.0	65.4	59.6
2002	42	64.0	63.9	64.1	62.6
2003	32	64.7	62.6	73.8	63.1
2004	36	60.3	58.0	69.9	59.0
2005	30	62.1	61.1	68.8	61.8
2006	42	62.0	61.3	63.5	62.1
2007	55	63.0	62.5	66.3	62.5
2008	39	63.4	62.8	67.0	62.7
2009	35	64.2	63.0	68.0	64.1
2010	46	65.2	63.4	71.0	64.4
2011	44	67.9	67.0	72.2	66.4
2012	44	62.8	61.8	67.3	62.0
1998-2012	535	63.3	62.4	66.4	62.7

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	9	67.6	67.3	67.9	66.5
1999	6	71.2	73.1	69.4	73.1
2000	9	70.7	66.4	85.7	70.7
2001	11	65.7	67.6	47.3	65.7
2002	8	66.0	62.8	75.6	66.0
2003	19	73.8	71.5	76.9	72.4
2004	18	72.9	73.3	70.7	72.8
2005	23	69.0	66.8	79.3	68.3
2006	20	77.6	73.7	84.9	72.9
2007	19	75.3	74.5	82.3	76.0
2008	19	66.4	63.2	72.0	63.9
2009	25	71.0	68.4	79.0	69.1
2010	18	65.1	64.1	82.0	64.1
2011	14	72.1	71.0	76.1	69.9
2012	15	68.3	65.1	81.1	66.6
1998-2012	233	70.6	68.7	76.5	69.2

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	12	1.1	0.38	0.6	0.32	0.9	0.34	1.1	0.37
1999	9	0.8	0.38	0.6	0.37	0.8	0.39	0.9	0.42
2000	16	1.4	0.48	0.9	0.47	1.3	0.49	1.5	0.53
2001	22	1.9	0.56	1.2	0.56	1.7	0.58	2.0	0.60
2002	31	1.7	0.67	1.0	0.60	1.4	0.65	1.7	0.72
2003	26	1.4	0.58	0.9	0.51	1.2	0.53	1.3	0.56
2004	29	1.5	0.66	1.0	0.68	1.4	0.69	1.4	0.65
2005	26	1.4	0.59	0.9	0.57	1.2	0.61	1.3	0.63
2006	29	1.5	0.63	0.9	0.65	1.3	0.61	1.4	0.59
2007	47	2.1	0.77	1.3	0.74	1.8	0.77	2.0	0.80
2008	33	1.5	0.60	0.9	0.56	1.3	0.59	1.5	0.64
2009	27	1.2	0.59	0.7	0.53	1.0	0.55	1.1	0.58
2010	35	1.6	0.60	0.9	0.58	1.3	0.61	1.4	0.60
2011	36	1.6	0.78	0.9	0.70	1.3	0.72	1.5	0.78
2012	36	1.6	0.90	0.9	0.90	1.3	0.91	1.4	0.91
1998-2012	414	1.5	0.63	0.9	0.60	1.3	0.62	1.5	0.64

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	5	0.4	0.29	0.2	0.33	0.3	0.32	0.4	0.30
1999	3	0.3	0.16	0.1	0.10	0.2	0.12	0.2	0.14
2000	7	0.6	0.64	0.3	0.55	0.5	0.58	0.5	0.61
2001	10	0.8	0.77	0.4	0.71	0.6	0.72	0.8	0.80
2002	6	0.3	0.22	0.2	0.23	0.3	0.25	0.3	0.24
2003	11	0.6	0.61	0.2	0.60	0.3	0.60	0.4	0.63
2004	15	0.8	0.75	0.3	0.54	0.4	0.58	0.6	0.63
2005	19	1.0	0.90	0.5	0.70	0.7	0.78	0.8	0.83
2006	13	0.6	0.52	0.2	0.35	0.4	0.40	0.5	0.45
2007	17	0.7	0.65	0.3	0.41	0.4	0.46	0.6	0.55
2008	12	0.5	0.34	0.3	0.33	0.4	0.33	0.5	0.36
2009	19	0.8	0.58	0.4	0.54	0.6	0.57	0.7	0.57
2010	17	0.7	0.53	0.4	0.52	0.5	0.53	0.6	0.53
2011	11	0.5	0.41	0.2	0.33	0.3	0.35	0.4	0.39
2012	12	0.5	0.46	0.3	0.43	0.4	0.44	0.4	0.43
1998-2012	177	0.6	0.51	0.3	0.43	0.4	0.45	0.5	0.48

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.%
20-24	1	0.2	0.2	1	0.2	0.2			0.0
25-29	2	0.3	0.5	1	0.2	0.5	1	0.6	0.6
30-34	0	0.0	0.5			0.5			0.6
35-39	6	1.0	1.5	4	1.0	1.4	2	1.1	1.7
40-44	12	2.0	3.5	11	2.6	4.1	1	0.6	2.2
45-49	37	6.2	9.7	29	7.0	11.0	8	4.5	6.7
50-54	70	11.7	21.5	56	13.4	24.5	14	7.8	14.5
55-59	99	16.6	38.1	78	18.7	43.2	21	11.7	26.3
60-64	98	16.4	54.5	72	17.3	60.4	26	14.5	40.8
65-69	91	15.3	69.8	63	15.1	75.5	28	15.6	56.4
70-74	64	10.7	80.5	49	11.8	87.3	15	8.4	64.8
75-79	48	8.1	88.6	29	7.0	94.2	19	10.6	75.4
80-84	39	6.5	95.1	15	3.6	97.8	24	13.4	88.8
85+	29	4.9	100.0	9	2.2	100.0	20	11.2	100.0
All ages	596	100.0		417	100.0		179	100.0	

Included in the statistics are 34.7% multiple primaries in males and 30.4% 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	1		0.1	0.50	0.0		1.2	
25-29	1	1	0.1	0.17	0.1	0.25	1.0	0.9
30-34			0.0		0.0			
35-39	4	2	0.2	0.27	0.1	0.29	1.0	0.4
40-44	11	1	0.5	0.28	0.0	0.07	1.4	0.1
45-49	29	8	1.3	0.39	0.4	0.31	1.7	0.4
50-54	56	14	3.0	0.61	0.7	0.38	1.8	0.5
55-59	78	21	4.6	0.66	1.2	0.58	1.4	0.5
60-64	72	26	4.4	0.70	1.5	0.41	0.9	0.4
65-69	63	28	4.3	0.72	1.7	0.65	0.6	0.4
70-74	49	15	4.2	0.84	1.1	0.48	0.4	0.2
75-79	29	19	3.8	0.97	1.7	0.56	0.2	0.2
80-84	15	24	3.3	1.15	2.8	0.96	0.2	0.2
85+	9	20	2.9	0.60	2.4	1.05	0.1	0.2
All ages	417	179					0.6	0.3
Mortality								
Raw			1.5	0.63	0.6	0.51		
WS			0.9	0.60	0.3	0.43		
ES			1.3	0.62	0.4	0.46		
BRD-S			1.5	0.64	0.5	0.48		
PYLL-70								
per 100,000			15.5		4.4			
ES			13.9		3.8			
AYLL-70			12.2		10.8			

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	2	0.9	1	50.0			1	50.0
C03-C06	Oral cavity	23	10.8			2	8.7	21	91.3
C09-C10	Oropharynx	20	9.4			1	5.0	19	95.0
C12-C13	Hypopharynx	17	8.0	6	35.3	1	5.9	10	58.8
C15	Oesophagus	17	8.0	1	5.9	1	5.9	15	88.2
C16	Stomach	3	1.4					3	100.0
C18	Colon	3	1.4	1	33.3			2	66.7
C19-C20	Rectum	8	3.8	1	12.5			7	87.5
C22	Liver	3	1.4					3	100.0
C25	Pancreas	4	1.9					4	100.0
C32	Larynx	19	9.0	11	57.9	4	21.1	4	21.1
C33-C34	Lung	47	22.2	3	6.4	4	8.5	40	85.1
C43	Malign. melanoma	4	1.9	2	50.0			2	50.0
C44	Skin others	6	2.8	2	33.3			4	66.7
C61	Prostate	12	5.7	8	66.7			4	33.3
C67	Bladder	6	2.8	2	33.3	1	16.7	3	50.0
C76-C79	CUP	4	1.9	2	50.0			2	50.0
C82-C85	NHL	4	1.9	2	50.0	1	25.0	1	25.0
C91-C96	Leukaemia	3	1.4	1	33.3			2	66.7
Other primaries		7	3.3	5	71.4			2	28.6
All mult. primaries		212	100.0	48	22.6	15	7.1	149	70.3

Multiple primaries with number of cases n<2 are pooled in category "Other primaries".

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 ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	12	12.2					12	100.0
C09-C10 Oropharynx	10	10.2					10	100.0
C12-C13 Hypopharynx	5	5.1					5	100.0
C15 Oesophagus	7	7.1					7	100.0
C18 Colon	4	4.1	3	75.0			1	25.0
C19-C20 Rectum	1	1.0	1	100.0				
C22 Liver	1	1.0					1	100.0
C23-C24 Bile	2	2.0					2	100.0
C25 Pancreas	1	1.0	1	100.0				
C26 GI cancer	1	1.0					1	100.0
C32 Larynx	3	3.1	1	33.3			2	66.7
C33-C34 Lung	16	16.3	1	6.3			15	93.8
C43 Malign. melanoma	2	2.0					2	100.0
C44 Skin others	1	1.0					1	100.0
C50 Breast	18	18.4	11	61.1			7	38.9
C51 Vulva	1	1.0					1	100.0
C53 Cervix uteri	1	1.0	1	100.0				
C55,C57 Fem. genitals un	1	1.0	1	100.0				
C56 Ovary	2	2.0	1	50.0			1	50.0
C65 Renal pelvis	1	1.0					1	100.0
C67 Bladder	3	3.1	1	33.3			2	66.7
C70-C72 CNS cancer	1	1.0					1	100.0
C82-C85 NHL	1	1.0					1	100.0
C90 Mult. myeloma	2	2.0	1	50.0			1	50.0
C91-C96 Leukaemia	1	1.0	1	100.0				

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	1		0.1	0.50	0.0		1.3	
25-29	1	1	0.1	0.17	0.1	0.25	1.1	1.0
30-34			0.0		0.0			
35-39	4	2	0.2	0.29	0.1	0.29	1.1	0.4
40-44	11	1	0.5	0.28	0.0	0.07	1.5	0.1
45-49	28	7	1.3	0.41	0.3	0.28	1.8	0.4
50-54	47	12	2.5	0.64	0.6	0.39	1.8	0.5
55-59	59	18	3.5	0.58	1.0	0.60	1.2	0.5
60-64	61	22	3.7	0.70	1.3	0.39	0.9	0.4
65-69	56	22	3.8	0.76	1.4	0.58	0.6	0.4
70-74	42	12	3.6	0.88	0.9	0.46	0.4	0.2
75-79	20	19	2.7	0.95	1.7	0.63	0.2	0.2
80-84	9	18	2.0	1.13	2.1	0.90	0.1	0.2
85+	9	17	2.9	0.75	2.1	1.13	0.1	0.2
All ages	348	151					0.6	0.3
Mortality								
Raw			1.3	0.62	0.5	0.49		
WS			0.8	0.59	0.3	0.41		
ES			1.1	0.61	0.4	0.44		
BRD-S			1.2	0.63	0.4	0.47		
PYLL-70								
per 100,000			13.4		3.9			
ES			12.0		3.4			
AYLL-70			12.4		11.1			

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2012
(**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	1		0.1	0.50	0.0		1.4	
25-29	1	1	0.1	0.17	0.1	0.50	1.2	1.0
30-34			0.0		0.0			
35-39	4		0.2	0.29	0.0		1.2	
40-44	10	1	0.4	0.26	0.0	0.07	1.4	0.1
45-49	27	6	1.3	0.47	0.3	0.27	1.9	0.4
50-54	38	11	2.1	0.58	0.6	0.38	1.6	0.5
55-59	43	13	2.5	0.55	0.7	0.50	1.0	0.4
60-64	38	14	2.3	0.53	0.8	0.33	0.6	0.3
65-69	38	14	2.6	0.61	0.9	0.48	0.5	0.3
70-74	29	5	2.5	0.69	0.4	0.23	0.4	0.1
75-79	13	12	1.7	0.62	1.1	0.44	0.2	0.2
80-84	6	11	1.3	0.75	1.3	0.69	0.1	0.2
85+	8	11	2.6	0.67	1.3	0.85	0.2	0.1
All ages	256	99					0.5	0.2
Mortality								
Raw			0.9	0.53	0.3	0.38		
WS			0.6	0.51	0.2	0.33		
ES			0.8	0.52	0.2	0.35		
BRD-S			0.9	0.53	0.3	0.37		
PYLL-70								
per 100,000			10.8		2.9			
ES			9.7		2.5			
AYLL-70			13.4		11.7			

* See corresponding tables with multiple primaries.

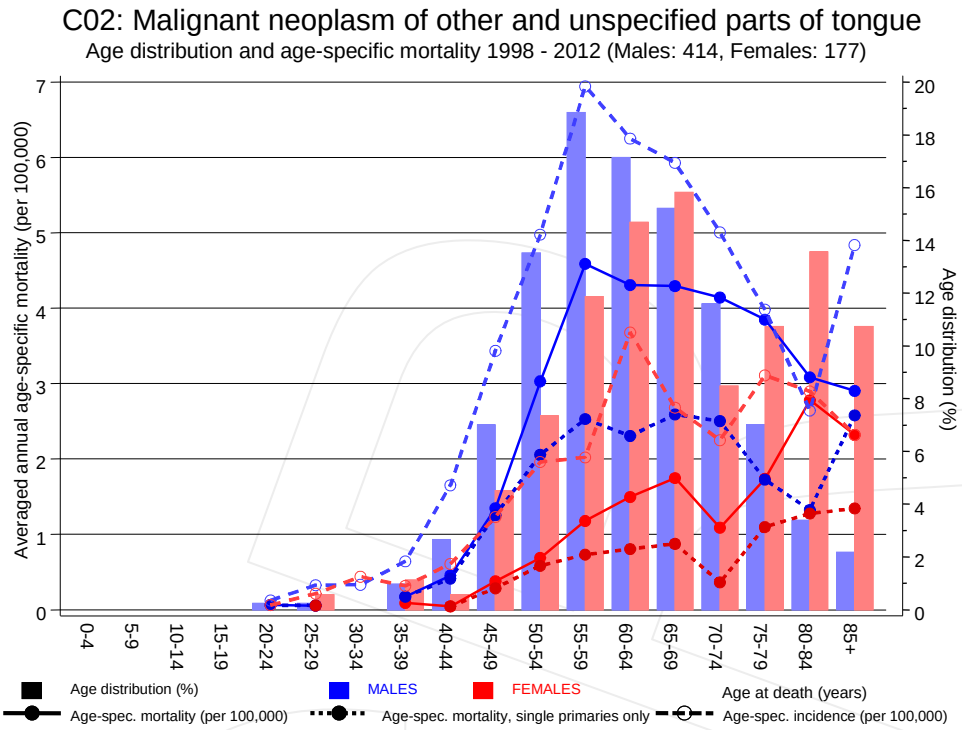
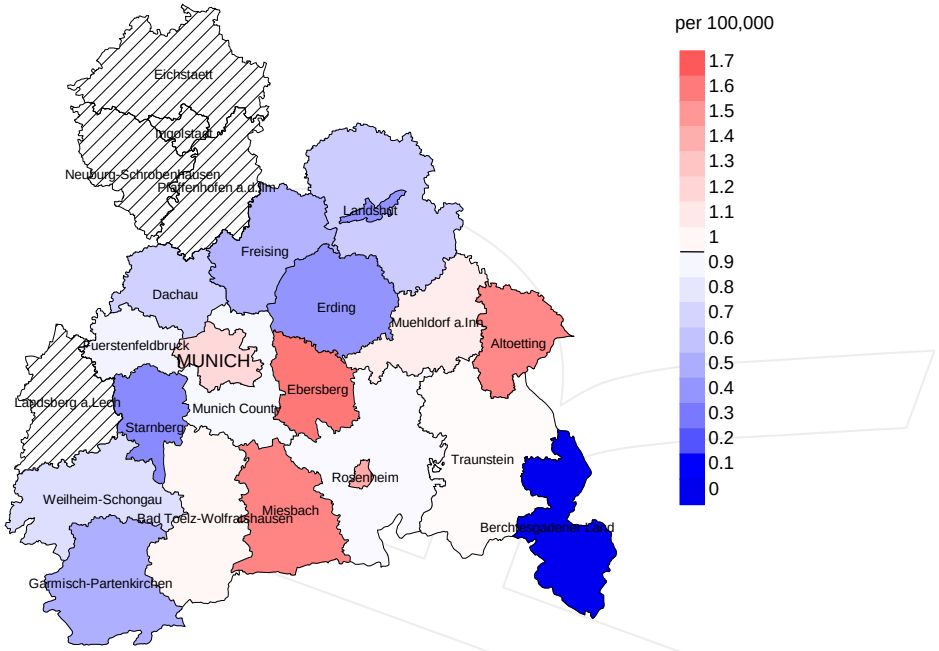


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

The difference between age at diagnosis (Table 3) and age at tongue excl. base of tongue-related death (see Table 10) should be considered.

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



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

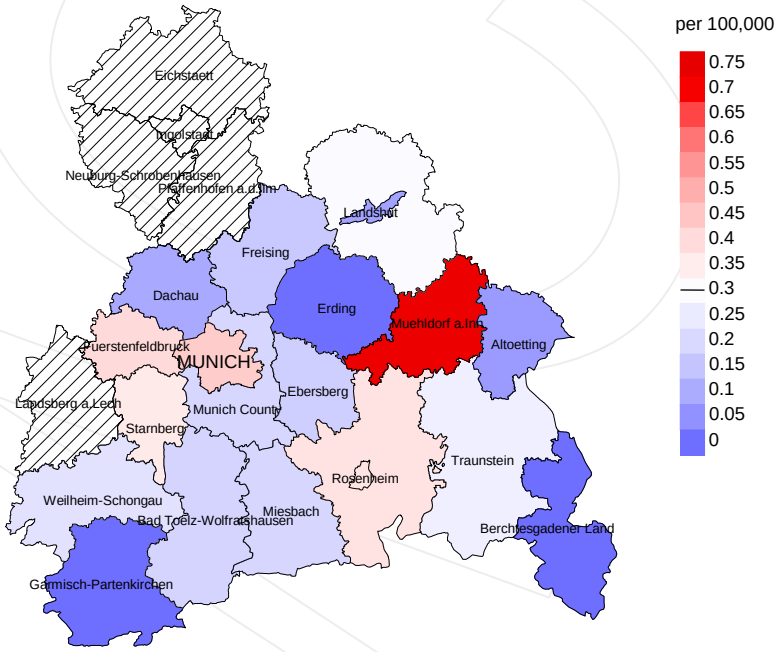
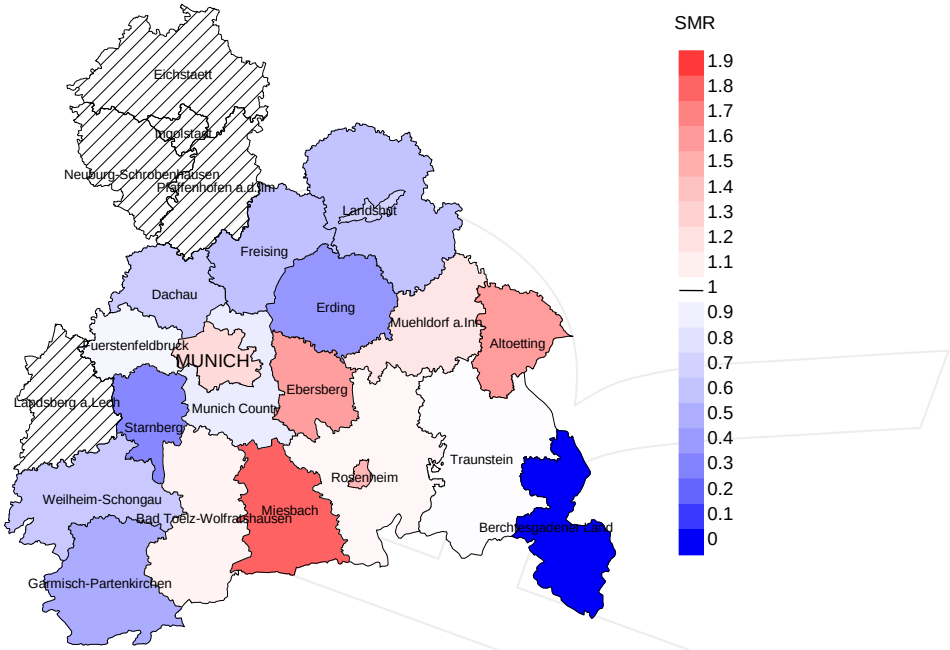


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 1.0/100,000 WS N=176, females 0.3/100,000 WS N=83). 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 1 women died from tongue excl. base of tongue. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.2/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 1.3/100,000.

Standardized mortality ratio (SMR) 2003 - 2008: Males



Standardized mortality ratio (SMR) 2003 - 2008: Females

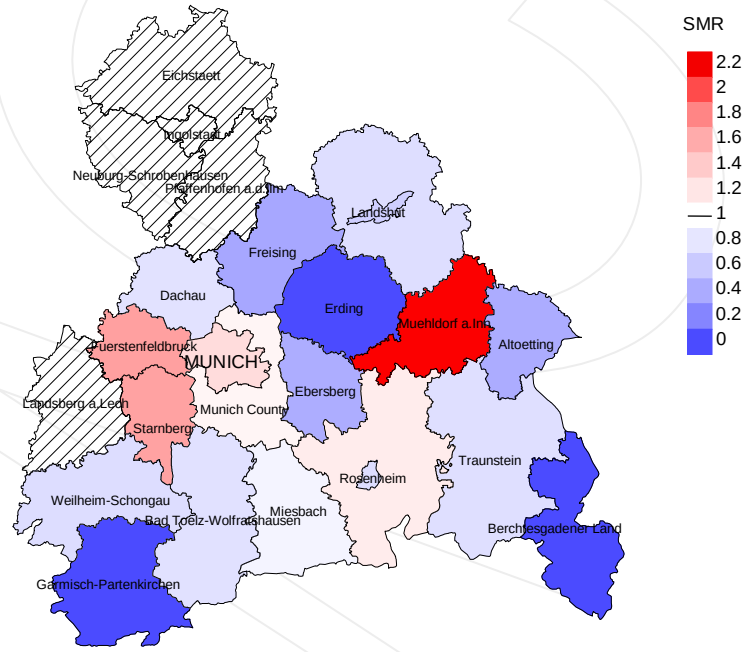


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=176, females N=83). 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 1 women died from tongue excl. base of tongue. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.42. Though, the value of this parameter may vary with an underlying probability of 99% between 0.00 and 3.10, 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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