## **Munich Cancer Registry**



- ▶ Survival
- ▶ Selection Matrix
- ▶ Homepage

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

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

## **Cancer statistics: Baseline statistics**

## C02: Tongue excl. base of tongue

Year of diagnosis	1998-2011
Patients	924
Diseases	928
Creation date	04/02/2013
Export date	01/03/2013
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<sup>#</sup>, with a total of 4.5 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\*\*\*\* are concerned. In other cases the individual tumor diagnosis is the basis for calculation, for example with incidence.

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

Clinics and physicians have access to essentially more detailed data, with which they can check, compare and in the best case optimize their own data and results.

We would be pleased to receive corrections, critique and useful suggestions. Just send an e-mail to tumor@ibe.med.uni-muenchen.de.

Munich Cancer Registry, April 2013

- Base data has been collected since 1998. An increase in new diseases is apparent, which is an effect of two extensions in the MCR catchment area (from a base population of 2.51 million to 3.96 in 2002, and to 4.52 million in 2007). Death certificates from 2011 are incorporated into these analyses.
- Due to the high frequency and good prognosis of non-malignant skin cancer (C44), no systematic ascertainment is performed for this diagnosis. C44 is not designated as a primary, but rather as a secondary tumor.
- DCO (death certificate only) identifies a cancer case that first becomes available to the MCR through the death certificate. A high proportion of DCO cases (≥5%) in particular cancer types indicate insufficient participation of specific cancer specializations.

#### 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.

base\_C02\_\_E.pdf

### ICD-10 codes used for specifying cancer site

ICD-10	Description
C02 C02.0 C02.1 C02.2 C02.3 C02.4 C02.8 C02.9	Other and unspecified parts of tongue Dorsal surface of tongue Border of tongue Ventral surface of tongue Anterior two-thirds of tongue, part unspecified Lingual tonsil Overlapping lesion of tongue 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

				Prop.		Prop.
		DCO	Prop.	mult.	Prop.	actively
Year of	Cases #	cases	DCO	primaries	deaths	followed
diagnosis	n	'n	%	%	%	%
1998	49	2	4.1	34.7	79.6	95.9
1999	44			38.6	79.5	97.7
2000	44	2	4.5	27.3	77.3	100.0
2001	53			20.8	73.6	100.0
2002	73			35.6	67.1	98.6
2003	63	2	3.2	28.6	68.3	100.0
2004	64			23.4	68.8	98.4
2005	65			20.0	60.0	96.9
2006	71	2	2.8	21.1	57.7	94.4
2007	86	4	4.7	24.4	55.8	91.9 ##
2008	88			23.9	38.6	69.3
2009	77 /	1	1.3	26.0	36.4	79.2
2010	87	1	1.1	17.2	34.5	90.8
2011	64	1	1.6	18.8	17.2	64.1 ###
1998-2011	928	15	1.6	25.1	55.4	90.1

<sup>#</sup> The increases of incident cases in 2002 and 2007 reflect the expansion to additional registry areas.

<sup>##</sup> 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.

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

Table 1a

Patient cohorts by year of diagnosis and gender including DCO cases

Year of	All	Males	Females	Prop. males	
diagnosis	n	n	n	%	
1998	49	32	17	65.3	
1999	44	25	19	56.8	
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	86	61	25	70.9	
2008	88	54	34	61.4	
2009	77	45	32	58.4	
2010	87	56	31	64.4	
2011	64	39	25	60.9	
1998-2011	928	610	318	65.7	

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		Females		Fem.	Males Inc. WS	Fem.	Males Inc. ES	Fem.	Males Inc.	Inc.
diagnosis	n	n	raw	raw	WS	WS	FD	FD	BRD-S	BKD-2
1998	32	17	2.9	1.4	1.9	0.8	2.6	1.1	3.0	1.3
1999	25	19	2.2	1.6	1.6	0.9	2.1	1.3	2.3	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	25	2.8	1.1	1.7	0.7	2.3	0.9	2.6	1.0
2008	54	34	2.4	1.5	1.6	0.9	2.1	1.2	2.3	1.3
2009	45	32	2.0	1.4	1.3	0.7	1.7	1.0	1.9	1.2
2010	56	31	2.5	1.3	1.5	0.7	2.0	1.0	2.3	1.1
2011	39	25	1.7	1.1	1.1	0.6	1.5	0.8	1.6	0.9
1998-2011	610	318	2.4	1.2	1.6	0.7	2.1	0.9	2.3	1.1



subsequent malignancy.

Table 3

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

Year of	Cases		Std.					Median		
diagnosis	n	Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	49	61.4	11.7	32.0	91.4	48.0	52.1	60.4	67.4	77.8
1999	44	59.0	14.4	25.6	90.8	42.2	50.0	57.1	68.4	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	86	60.0	12.4	26.0	101	44.2	52.1	60.4	67.7	75.7
2008	88	60.3	12.1	21.8	87.1	45.1	52.3	60.4	69.1	75.2
2009	77	62.8	12.1	30.2	88.9	48.2	54.2	62.2	71.4	79.9
2010	87	61.5	14.1	24.5	92.8	45.4	50.9	60.8	70.7	83.3
2011	64	61.8	14.7	29.2	92.8	40.8	53.6	62.2	70.9	80.3
1998-2011	928	60.5	12.8	21.8	101	45.1	51.8	60.2	68.7	78.1

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	32	59.5	9.2	44.0	81.3	48.0	52.0	59.5	65.2	71.0
1999	25	55.0	12.8	33.3	90.8	41.2	49.9	51.5	60.3	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	54	58.8	11.0	21.8	87.1	46.4	51.8	58.7	67.2	70.5
2009	45	60.8	11.1	30.2	79.9	48.2	53.2	62.2	69.0	73.8
2010	56	61.0	14.8	24.5	92.8	45.2	49.9	59.8	70.5	84.0
2011	39	60.0	13.6	29.2	88.6	39.0	53.1	59.1	68.8	78.1
1998-2011	610	58.9	11.9	21.8	101	44.5	51.1	58.4	66.5	74.0

Table 3b

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

Year of	Cases		Std.					Median		
diagnosis	n	Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	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	25	61.3	12.4	34.4	83.6	45.5	53.7	62.8	67.4	78.9
2008	34	62.6	13.6	26.7	86.9	43.9	54.5	63.4	73.4	78.7
2009	32	65.7	13.1	39.0	88.9	48.4	55.1	66.5	76.8	82.8
2010	31	62.4	12.7	43.2	88.5	46.3	50.9	61.1	72.0	78.4
2011	25	64.4	16.1	31.2	92.8	40.8	58.1	64.5	75.1	86.6
1998-2011	318	63.5	13.8	25.6	98.2	45.9	54.0	63.3	73.2	82.0

Age at									
diagnosis	Cases			Males	3		Females		
Years	n	<b>ે</b>	Cum.%	n	%	Cum.%	n	%	Cum.%
20-24	2	0.2	0.2	2	0.3	0.3			0.0
25-29	8	0.9	1,1	5	0.8	1.1	3	0.9	0.9
30-34	12	1.3	2.4	7	1.1	2.3	5	1.6	2.5
35-39	19	2.0	4.4	12	2.0	4.3	7	2.2	4.7
40 - 44	51	5.5	9.9	38	6.2	10.5	13	4.1	8.8
45-49	96	10.3	20.3	73	12.0	22.5	23	7.2	16.0
50-54	125	13.5	33.7	89	14.6	37.0	36	11.3	27.4
55-59	145	15.6	49.4	112	18.4	55.4	33	10.4	37.7
60-64	155	16.7	66.1	96	15.7	71.1	59	18.6	56.3
65-69	114	12.3	78.3	76	12.5	83.6	38	11.9	68.2
70-74	76	8.2	86.5	48	7.9	91.5	28	8.8	77.0
75-79	58	6.3	92.8	27	4.4	95.9	31	9.7	86.8
80-84	35	3.8	96.6	11	1.8	97.7	24	7.5	94.3
85+	32	3.4	100.0	14	2.3	100.0	18	5.7	100.0
All ages	928	100.0		610	100.0		318	100.0	

Included in the statistics are 32.0% multiple primaries in males and 29.7% in females.

Table 5

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

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

Table 6a Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries  $\,$ for period 1998-2011

MALES

	Observed	Expected		LCL	UCL		DCO
Diagnosis	n	n	SIR	95%	95%	EAR	%
C03-C06 Oral cavity	3	0.2	13.9	2.9	40.7 #	18.5	
C09-C10 Oropharynx	9	0.3	32.3	14.7	61.2 #	58.1	
C12-C13 Hypopharynx	9	0.2	55.6	25.4	105.6 #	58.9	33.3
C15 Oesophagus	10 /	0.3	29.5	14.1	54.2 #	64.3	
C18 Colon	2	1.5	1.4	0.2	5.0	3.7	
C19-C20 Rectum	3	1.0	3.0	0.6	8.8	13.4	
C22 Liver	3	0.4	6.8	1.4	19.8 #	17.0	33.3
C32 Larynx	6	0.2	27.1	9.9	58.9 #	38.5	16.7
C33-C34 Lung	19	2.0	9.5	5.7	14.8 #	113.1	31.6
C61 Prostate	4	4.6	0.9	0.2	2.2	-4.0	
C67 Bladder	2	0.6	3.5	0.4	12.5	9.5	50.0
C82-C85 NHL	3	0.6	4.8	1.0	14.1	15.8	33.3
C91-C96 Leukaemia	2	0.2	9.2	1.1	33.4 #	11.9	
Other primaries	6	2.9	2.1	0.8	4.5	20.7	33.3
Not observed	0	1.4	0.0	0.0	2.6	-9.6	
All mult. primaries	81	16.5	4.9	3.9	6.1 #	429.7	18.5

Patients	473
Mean age at second malignancy (years)	62.5
Person-years	1502
Mean observation time (years)	3.2
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

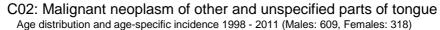
Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries for period 1998-2011 FEMALES

	Observed	Expected		LCL	UCL		DCO
Diagnosis	n	n	SIR	95%	95%	EAR	%
C03-C06 Oral cavity	3 /	0.1	56.8	11.7	166.0 #	34.6	
C09-C10 Oropharynx	4	0.0	101.3	27.6	259.4 #	46.5	
C12-C13 Hypopharynx	3 /	0.0	292.5	60.3	854.7 #	35.1	66.7
C15 Oesophagus	3 /	0.0	67.5	13.9	197.1 #	34.7	
C22 Liver	2	0.1	23.6	2.9	85.3 #	22.5	50.0
C23-C24 Bile	2	0.1	18.4	2.2	66.5 #	22.2	
C32 Larynx	3	0.0	175.1	36.1	511.7 #	35.0	33.3
C33-C34 Lung	12	0.6	20.6	10.7	36.1 #	134.0	8.3
C50 Breast	2	2.7	0.7	0.1	2.7	-8.0	
C67 Bladder	2	0.1	15.5	1.9	55.8 #	22.0	100.0
Other primaries	5	1.3	3.8	1.2	8.8 #	43.1	
Not observed	0	3.2	0.0	0.0	1.2	-37.4	
All mult. primaries	41	8.3	5.0	3.6	6.7 #	384.3	17.1

Patients	235
Mean age at second malignancy (years)	65.5
Person-years	852
Mean observation time (years)	3.6
Median observation time (years)	2.5

# The occurrence of second malignancy is statistically significant.

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



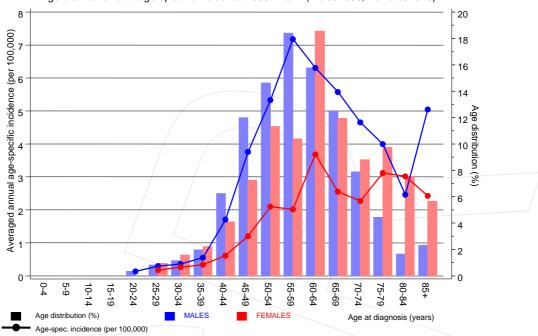
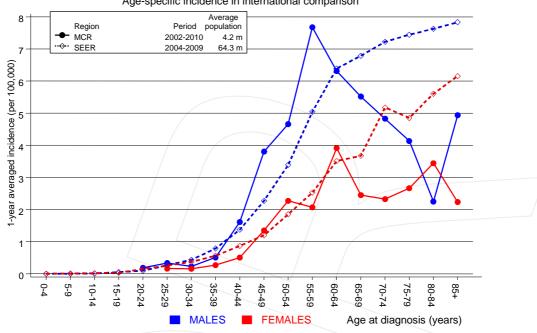


Figure 7. Age distribution and age-specific incidence



## C02: Malignant neoplasm of other and unspecified parts of tongue 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.

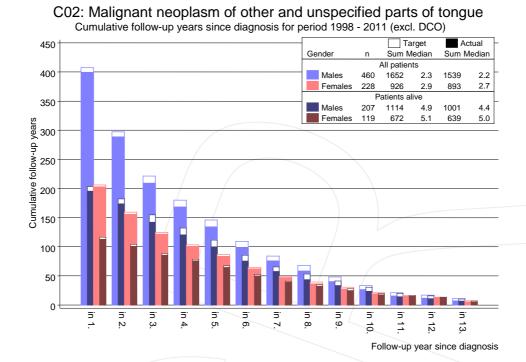
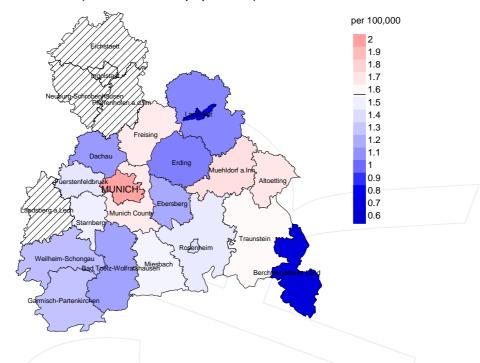


Figure 8. Cumulative follow-up years depending on time since diagnosis

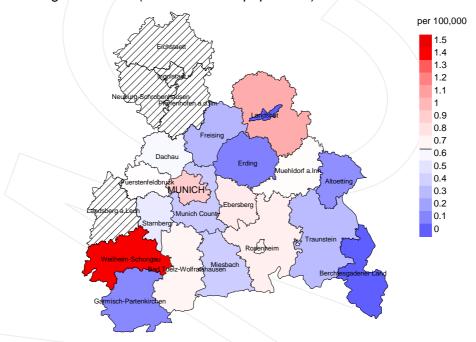
The increase of the lost to follow-up rate can be interpreted as a consequence of a declining number of survivors over time.



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



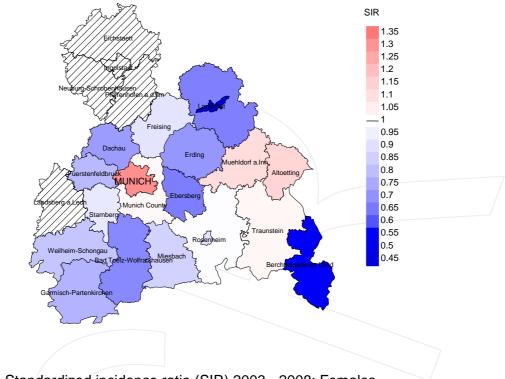
#### Average incidence (world standard population) 2003 - 2008: Females



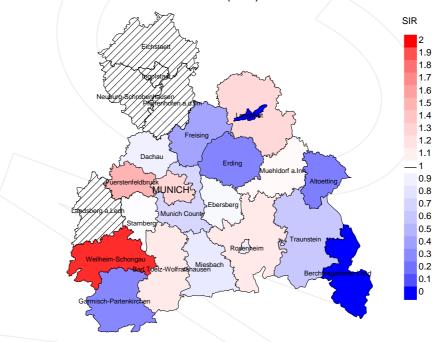
**Figure 9a.** Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 1.6/100,000 WS N=280, females 0.6/100,000 WS N=139). Since cancer data are not available in some counties until 2007, the local incidence rates were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 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=139). Since cancer data are not available in some counties until 2007, the local SIR values were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 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 0.95. Though, the value of this parameter may vary with an underlying probability of 99% between 0.16 and 3.01, and is therefore not statistically striking.

#### **MORTALITY**

Table 10a

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

		Prop.				Prop. deaths
	Incident	actively	Prop.		Prop.	with death
Year of	cases	followed	DCO	Deaths	deaths	certific.
diagnosis	n	%	%	/ n /	%	%
1998	49	95.9	4.1	39	79.6	94.9
1999	44	97.7		35	79.5	91.4
2000	44	100.0	4.5	34	77.3	97.1
2001	53	100.0		39	73.6	94.9
2002	73	98.6		49	67.1	98.0
2003	63	100.0	3.2	43	68.3	100.0
2004	64	98.4		44	68.8	95.5
2005	65	96.9		39	60.0	100.0
2006	71	94.4	2.8	41	57.7	100.0
2007	86	91.9	4.7	48	55.8	100.0
2008	88	69.3		34	38.6	100.0
2009	77	79.2	1.3	28	36.4	96.4
2010	87	90.8	1.1	30	34.5	96.7
2011	64	64.1	1.6	11	17.2	90.9
1998-2011	928	90.1	1.6	514	55.4	97.3

Table 10b

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

			Prop. deaths		Prop.
Year of	Incident		with death	Deaths in	deaths in
diagnosis/	cases	Deaths	certific.	same year	same year
death	n	n	%	n	%
1998	49	30	90.0	4	8.2
1999	44	23	82.6	4	9.1
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	86	74	100.0	15	17.4
2008	88	58	94.8	6	6.8
2009	77	60	98.3	_ 4	5.2
2010	87	64	100.0	6	6.9
2011	64	56	98.2	4	6.3
1998-2011	928	707	96.2	100	10.8

Table 10c

Annual cohorts of deaths, proportion of cancer-related and not 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 4.52 m as of 2007, respectively)

				Prop.	
				cancer	
		Prop.	Prop.	recorded	
		cancer-	not cancer-	on death	
Year of	Deaths	related	related	certificate	
death	n	%	%	00	
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	56	82.1	17.9	85.5	
1998-2011	707	76.7	23.3	89.1	

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

					Age at
		Age at	Age at	Age at	death
		death	death	death	(according
		(all	(cancer-	(not cancer-	to death
Year of	Deaths	causes)	related)	related)	certificate)
death	n	Years	Years	Years	Years
1998	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	42	67.7	67.0	71.0	66.0
1998-2011	489	63.3	62.4	66.2	62.7

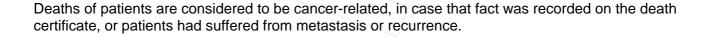


Table 11b Means of age at death according to the grouping in Table 10 FEMALES

					Age at
		Age at	Age at	Age at	death
		death	death	death	(according
		(all	(cancer-	(not cancer-	to death
Year of	Deaths	causes)	related)	related)	certificate)
death	n	Years	Years	Years	Years
1998	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
1998-2011	218	70.7	69.0	76.3	69.4



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	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	12	1.1	0.38	0.6	0.32	0.9	0.34	1.1	0.37
1999	9	0.8	0.36	0.6	0.36	0.8	0.37	0.9	0.41
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	0.61	0.9	0.57	1.3	0.60	1.5	0.66
2009	27	1.2	0.60	0.7	0.54	1.0	0.56	1.1	0.59
2010	35	1.6	0.63	0.9	0.61	1.3	0.64	1.4	0.62
2011	35	1.6	0.90	0.9	0.79	1.2	0.82	1.5	0.90
1998-2011	377	1.5	0.62	0.9	0.59	1.3	0.61	1.5	0.63

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	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	0.68	0.3	0.42	0.4	0.47	0.6	0.57
2008	12	0.5	0.35	0.3	0.34	0.4	0.34	0.5	0.37
2009	19	0.8	0.59	0.4	0.57	0.6	0.60	0.7	0.59
2010	17	0.7	0.55	0.4	0.53	0.5	0.54	0.6	0.55
2011	11	0.5	0.44	0.2	0.36	0.3	0.38	0.4	0.43
1998-2011	165	0.6	0.52	0.3	0.44	0.4	0.46	0.5	0.49

Table 13

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

Age at									
death	Cases			Males			Females		
Years	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
20-24	1	0.2	0.2	1	0.3	0.3			0.0
25-29	1	0.2	0.4			0.3	1	0.6	0.6
30-34	0	0.0	0.4			0.3			0.6
35-39	5	0.9	1.3	3	0.8	1.1	2	1.2	1.8
40-44	11	2.0	3.3	10	2.6	3.7	1	0.6	2.4
45-49	32	5.9	9.2	26	6.9	10.6	6	3.6	6.0
50-54	68	12.5	21.6	54	14.2	24.8	14	8.4	14.4
55-59	90	16.5	38.1	70	18.5	43.3	20	12.0	26.3
60-64	90	16.5	54.6	68	17.9	61.2	22	13.2	39.5
65-69	82	15.0	69.6	57	15.0	76,3	25	15.0	54.5
70-74	54	9.9	79.5	40	10.6	86.8	14	8.4	62.9
75-79	45	8.2	87.7	26	6.9	93.7	19	11.4	74.3
80-84	39	7.1	94.9	15	4.0	97.6	24	14.4	88.6
85+	28	5.1	100.0	9	2.4	100.0	19	11.4	100.0
All ages	546	100.0		379	100.0		167	100.0	

Included in the statistics are 32.0% multiple primaries in males and 29.7% in females.

Table 14

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

			Males		Females		Males	Females
Age at			Age-		Age-		Prop.all	Prop.all
death	Males	Females	spec.		spec.		cancers	cancers
Years	n	n	mortal.	MI-index	mortal.	MI-index	%	%
0 - 4			0.0		0.0			
5- 9			0.0		0.0			
10-14			0,0		0.0			
15-19			0.0		0.0			
20-24	1		0.1	0.50	0.0		1.3	
25-29		1 /	0.0		0.1	0.33		1.0
30-34			0.0		0.0			
35-39	3	2	0.1		0.1	0.29	0.8	0.4
40-44	10	1	0.4	0.26	0.0	0.08	1.3	0.1
45-49	26	6	1.3	0.36	0.3	0.26	1.7	0.3
50-54	54	14	3.2	0.61	0.8	0.39	1.9	0.5
55-59	70	20	4.5	0.63	1.2		1.4	0.5
60-64	68	22	4.5		1.4	0.37	0.9	0.4
65-69	57	25	4.2		1.7		0.5	0.4
70-74	40	14	3.9		1.1	0.50	0.4	0.2
75-79	26	19	3.8		1.9	0.61	0.2	0.2
80-84	15	24	3.7		3.0	1.00	0.2	0.3
85+	9	19	3.2	0.64	2.6	1.06	0.1	0.2
All ages	379	167					0.6	0.3
Mortality								
Raw			1.5	0.62	0.6	0.53		
WS			0.9	0.59	0.3	0.44		
ES			1.3		0.4	0.47		
BRD-S			1.5	0.63	0.5	0.50		
PYLL-70								
per 100,000			15.3		4.4			
ES			13.9		3.8			
AYLL-70			12.0		10.9			

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

Table 15a

Multiple primaries in deaths in period 1998-2011

MALES

	Total	Total	Pre	Pre	Syn- chron ±30d	Syn- chron ±30d	Post	Post
Diagnosis	n /	% ↓	n	<b>←%</b>	n	<b>←</b> %	n	<b>←</b> %
G00 T.		1 1	1				-	F0 0
C00 Lip	2	1.1	1	50.0	\	10 5	1	50.0
C03-C06 Oral cavity	19	10.0			2	10.5	17	89.5
C09-C10 Oropharynx	16	8.4	_		1	6.3	15	93.8
C12-C13 Hypopharynx	16	8.4	6	37.5	1	6.3	9	56.3
C15 Oesophagus	16	8.4	1	6.3	1	6.3	14	87.5
C16 Stomach	3 /	1.6		/			3	100.0
C17 Small intestine	1	0.5	1	100.0				
C18 Colon	1	0.5					1	100.0
C19-C20 Rectum	8	4.2	1	12.5			7	87.5
C22 Liver	3	1.6					3	100.0
C23-C24 Bile	1	0.5					1	100.0
C25 Pancreas	3	1.6					3	100.0
C32 Larynx	18	9.5	10	55.6	4	22.2	4	22.2
C33-C34 Lung	43	22.6	3	7.0	3	7.0	37	86.0
C43 Malign. melanoma	4	2.1	2	50.0			/ 2	50.0
C44 Skin others	6	3.2	2	33.3			4	66.7
C61 Prostate	9	4.7	6	66.7			3	33.3
C62 Testis	1	0.5	1	100.0				
C67 Bladder	6	3.2	2	33.3	1	16.7	3	50.0
C70-C72 CNS cancer	1	0.5	1	100.0				
C73 Thyroid	1	0.5	1	100.0				
C76-C79 CUP	4	2.1	2	50.0			2	50.0
C82-C85 NHL	4	2.1	2	50.0	1	25.0	1	25.0
C90 Mult. myeloma	1	0.5	1	100.0				
C91-C96 Leukaemia	3	1.6	1	33.3			2	66.7
All mult. primaries	190	100.0	44	23.2	14	7.4	132	69.5

Multiple primaries with number of cases n<1 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 1998-2011 FEMALES

					Syn- chron	Syn- chron		
	Total	Total	Pre	Pre	±30d	±30d	Post	Post
Diagnosis	n	%↓	n	-%	n	±30α ←%	n	-%
	** /	• •				. •		. •
C03-C06 Oral cavity	11	11.8					11	100.0
C09-C10 Oropharynx	10	10.8					10	100.0
C12-C13 Hypopharynx	4	4.3					4	100.0
C15 Oesophagus	7	7.5					7	100.0
C18 Colon	4	4.3	3	75.0			1	25.0
C19-C20 Rectum	/ 1 /	1.1	1	100.0				
C22 Liver	/ 1 /	1.1					1	100.0
C23-C24 Bile	2	2.2					2	100.0
C25 Pancreas	1	1.1	1	100.0				
C26 GI cancer	1	1.1					1	100.0
C32 Larynx	3	3.2	1	33.3			2	66.7
C33-C34 Lung	15	16.1					15	100.0
C43 Malign. melanoma	1	1.1					1	100.0
C44 Skin others	1	1.1					1	100.0
C50 Breast	17	18.3	10	58.8			7	41.2
C51 Vulva	1	1.1					/1	100.0
C53 Cervix uteri	1	1.1	1	100.0				
C55,C57 Fem. genitals un	1	1.1	1	100.0				
C56 Ovary	2	2.2	1	50.0			1	50.0
C65 Renal pelvis	1	1.1					1	100.0
C67 Bladder	3	3.2	1	33.3			2	66.7
C70-C72 CNS cancer	1	1.1					1	100.0
C82-C85 NHL	1	1.1					1	100.0
C90 Mult. myeloma	2	2.2	1	50.0			1	50.0
C91-C96 Leukaemia	1	1.1	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 1998-2011

(Singular primaries only \*)

			Males		Females		Males	Females
Age at	7		Age-		Age-		_	Prop.all
death		Females	_ /		spec.		cancers	cancers
Years	n	n	mortal.	MI-index	mortal.	MI-index	%	%
0- 4			0.0		0.0			
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24	1		0.1	0.50	0.0		1.3	
25-29	_	1 /	0.0		0.1	0.33		1.0
30-34			0.0		0.0			
35-39	3	2	0.1	0.25	0.1	0.29	0.9	0.5
40-44	10	1	0.4	0.26	0.0	0.08	1.4	0.1
45-49	25	6	1.3	0.37	0.3	0.26	1.8	0.4
50-54	45	12	2.7	0.64	0.7	0.39	1.8	0.5
55-59	54	18	3.5	0.56	1.1	0.67	1.2	0.5
60-64	57	19	3.7	0.70	1.2	0.37	0.9	0.4
65-69	51	19	3.7	0.77	1.3	0.58	0.6	0.3
70-74	36		3.5	0.88	0.9	0.46	0.4	0.2
75-79	18	19	2.7		1.9		0.2	0.3
80-84	9	18	2.2		2.3		0.1	0.2
85+	9	16	3.2	0.82	2.2	1.14	0.2	0.2
	212	1.10					\	
All ages	318	142					0.6	0.3
Na								
Mortality Raw			1.3	0.61	0 5	0 51		
Kaw WS			0.8		0.5			
ws ES			1.1		0.3			
BRD-S			1.1		0.4			
PKD-2			1.2	0.02	0.5	0.49		
PYLL-70								
per 100,000			13.2		4.0			
ES			11.9		3.5			
AYLL-70			12.2		11.5			

<sup>\*</sup> See corresponding tables with multiple primaries.

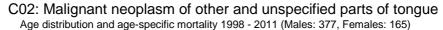
Table 17

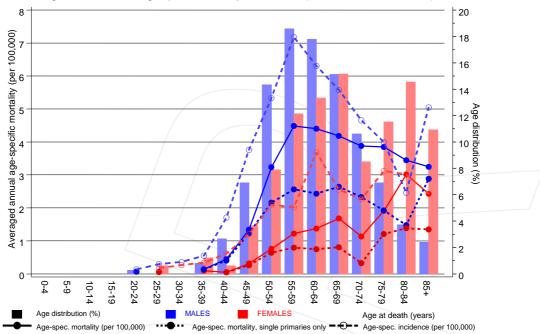
Age-specific mortality (cancer-related) and proportion of all cancers for period 1998-2011

(Single primaries only \*)

Age at death	Maleg	Females	Males Age- spec.		Females Age- spec.		Males Prop.all cancers	Females Prop.all cancers
Years	n	n		MI-index		MT-index		%
icais	11	11	mortar.	MI-IIIQEX	mortar.	MI-IIIGEX	6	6
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 /	0.0		0.1	1.00		1.1
30-34			0.0		0.0			
35-39	3		0.1	0.25	0.0		0.9	
40-44	9	1	0.4	0.24	0.0	0.08	1.4	0.1
45-49	24	5	1.2	0.41	0.3	0.25	1.8	0.4
50-54	36	11	2.2	0.60	0.6	0.37	1.6	0.6
55-59	40	13	2.6	0.51	0.8	0.57	1.0	0.4
60-64	37	12	2.4	0.51	0.7	0.29	0.6	0.3
65-69	36	12	2.6	0.65	0.8	0.48	0.5	0.2
70-74	24	4	2.3	0.69	0.3	0.19	0.3	0.1
75-79	13	1,2	1.9	0.68	1.2	0.50	0.2	0.2
80-84	6	11	1.5	0.86	1.4	0.73	0.1	0.2
85+	8	10	2.9	0.73	1.3	0.83	0.2	0.1
All ages	237	92					0.5	0.2
Mortality								
Raw			0.9	0.52	0.3	0.39		
WS			0.6	0.50	0.2	0.34		
ES			0.8	0.51	0.2	0.36		
BRD-S			0.9	0.52	0.3	0.38		
PYLL-70								
per 100,000			10.7		2.9			
ES			9.7		2.6			
AYLL-70			13.1		12.0			

<sup>\*</sup> See corresponding tables with multiple primaries.



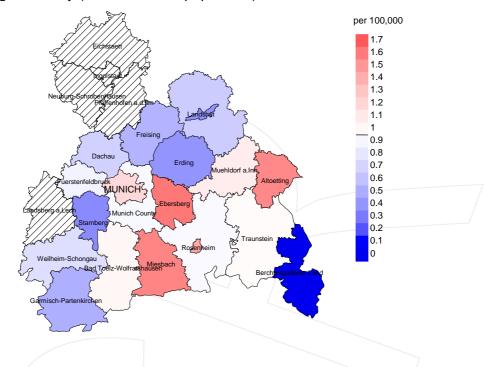


**Figure 18.** Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

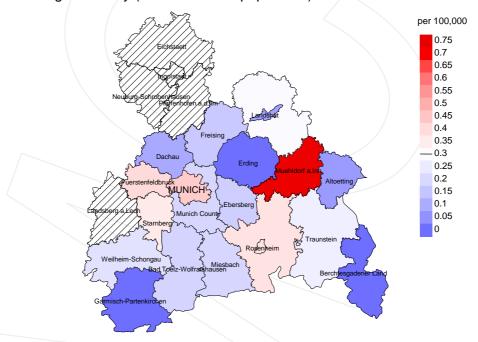
The difference between age at diagnosis (Table 3) and age at tongue excl. base of tongue-related death (see Table 10) should be considered.



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



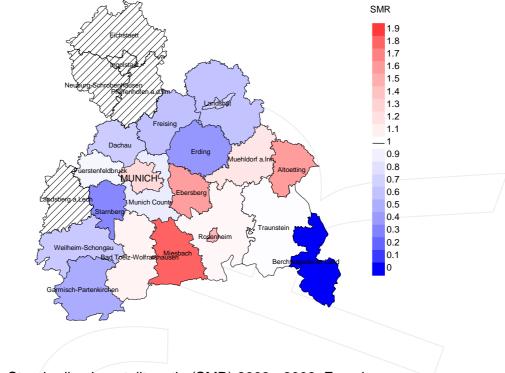
#### Average mortality (world standard population) 2003 - 2008: Females

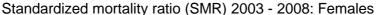


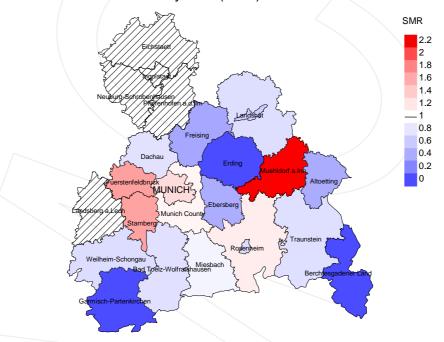
**Figure 19a.** Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 1.0/100,000 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







**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

#### **Recommended Citation**

Munich Cancer Registry. Baseline statistics C02: Tongue excl. base of tongue [Internet]. 2013 [updated 2013 Apr 2; cited 2013 Jun 1]. Available from: http://www.tumorregister-muenchen.de/en/facts/base/base\_C02\_\_E.pdf

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