Munich Cancer Registry

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ICD-10 C01: Base of tongue cancer

Incidence and Mortality

Year of diagnosis	1998-2014
Patients	692
Diseases	694
Creation date	04/13/2016
Export date	12/23/2015
Population	4.64 m

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

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

http://www.tumorregister-muenchen.de/en/facts/base/bC01__E-ICD-10-C01-Base-of-tongue-cancer-incidence-and-mortality.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 4.64 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.

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 2016

[#] 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).

[##] 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.

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.

Topography codes (ICD-O-3 2000) used for specifying cancer site

Code	Description
C01.9	Base of tongue, NOS

INCIDENCE

Table 1

All patients with invasive cancer by year of diagnosis, proportions of DCO, multiple primaries, deaths, and active follow-up (incl. DCO)

Year of diagnosis	Cases n	DCO cases n	Prop. DCO %	Prop. mult. primaries %	Prop. deaths %	Prop. actively followed %	
1998	14			21.4	78.6	100.0	
1999	22			36.4	90.9	95.5	
2000	13	1	7.7	38.5	84.6	100.0	
2001	19	2	10.5	31.6	84.2	100.0	
2002	33			30.3	75.8	97.0	#
2003	42	5	11.9	57.1	88.1	100.0	
2004	49	4	8.2	22.4	73.5	93.9	
2005	53	3	5.7	35.8	60.4	92.5	
2006	50	1	2.0	30.0	68.0	96.0	
2007	55	1	1.8	32.7	65.5	81.8	#
2008	55	4	7.3	25.5	65.5	83.6	
2009	47			34.0	51.1	95.7	
2010	57	1	1.8	26.3	56.1	82.5	
2011	67	2	3.0	32.8	41.8	76.1	
2012	55	1	1.8	38.2	38.2	81.8	
2013	48	1	2.1	25.0	39.6	100.0	
2014	15	1	6.7	26.7	26.7	100.0	##
1998-2014	694	27	3.9	32.1	60.8	90.2	

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

Please be aware that data of recent annual patient cohorts may not yet be fully processed. The years under evaluation can be found in the respective headings.

Table 1a

All patients with invasive cancer
by year of diagnosis and gender
(incl. DCO)

Year of diagnosis	All n	Males n	Females n	Prop. males %
1998	14	10	4	71.4
1999	22	18	4	81.8
2000	13	9	4	69.2
2001	19	12	7	63.2
2002	33	26	7	78.8
2003	42	37	5	88.1
2004	49	33	16	67.3
2005	53	40	13	75.5
2006	50	37	13	74.0
2007	55	44	11	80.0
2008	55	43	12	78.2
2009	47	32	15	68.1
2010	57	41	16	71.9
2011	67	51	16	76.1
2012	55	44	11	80.0
2013	48	36	12	75.0
2014	15	12	3	80.0
1998-2014	694	525	169	75.6

Table 2

Incidence measures by year of diagnosis including DCO cases
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002,
and from 3.96 to 4.64 m as of 2007, respectively)

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	10	4	0.9	0.3	0.6	0.2	0.8	0.2	0.9	0.3
1999	18	4	1.6	0.3	1.1	0.2	1.4	0.3	1.5	0.3
2000	9	4	0.8	0.3	0.5	0.2	0.7	0.3	0.9	0.3
2001	12	7	1.0	0.6	0.7	0.3	1.0	0.4	1.1	0.5
2002	26	7	1.4	0.4	0.9	0.2	1.3	0.3	1.4	0.3
2003	37	5	2.0	0.3	1.2	0.1	1.7	0.2	2.0	0.2
2004	33	16	1.8	0.8	1.0	0.4	1.4	0.6	1.6	0.7
2005	40	13	2.1	0.7	1.4	0.3	1.9	0.5	2.1	0.6
2006	37	13	1.9	0.6	1.2	0.4	1.7	0.5	1.9	0.6
2007	44	11	2.0	0.5	1.3	0.3	1.8	0.4	1.9	0.5
2008	43	12	1.9	0.5	1.2	0.3	1.7	0.4	1.9	0.5
2009	32	15	1.4	0.6	0.8	0.3	1.2	0.5	1.4	0.5
2010	41	16	1.8	0.7	1.0	0.3	1.5	0.5	1.7	0.6
2011	51	16	2.2	0.7	1.3	0.3	1.8	0.5	2.0	0.6
2012	44	11	1.9	0.5	1.1	0.3	1.6	0.4	1.8	0.4
2013	36	12	1.6	0.5	0.9	0.3	1.3	0.4	1.5	0.4
2014	12	3	0.5	0.1	0.3	0.1	0.5	0.1	0.5	0.1
1998-2014	525	169	1.6	0.5	1.0	0.3	1.4	0.4	1.6	0.4

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 patients)
(incl. DCO)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	14	57.7	13.2	31.1	78.2	44.9	50.3	58.0	67.5	77.8
1999	22	58.6	9.0	40.4	74.9	48.5	52.2	59.7	64.3	70.5
2000	13	60.3	14.0	35.9	78.3	42.5	47.6	65.5	68.7	78.2
2001	19	63.2	13.6	48.6	92.5	49.0	50.6	61.3	71.2	85.1
2002	33	60.5	9.0	43.8	81.5	50.3	54.8	58.2	65.1	72.1
2003	42	63.1	9.1	45.1	83.3	52.1	56.0	62.7	69.4	76.9
2004	49	63.6	10.0	38.6	93.3	52.0	58.2	62.5	69.5	75.4
2005	53	61.3	13.4	4.1	87.2	50.1	54.8	61.1	65.9	78.5
2006	50	60.8	12.0	19.0	84.8	45.9	53.4	61.4	68.0	76.3
2007	55	57.6	9.5	35.2	76.9	45.0	52.3	57.9	63.3	69.5
2008	55	63.5	10.2	38.3	87.7	50.1	56.0	62.4	71.1	77.4
2009	47	63.6	10.8	36.7	87.3	48.0	57.0	63.0	72.6	76.2
2010	57	64.6	11.2	38.0	92.1	50.0	57.6	65.9	72.6	77.9
2011	67	64.5	10.9	40.0	93.8	49.9	56.5	64.1	72.0	77.5
2012	55	62.4	10.7	39.8	87.9	49.7	53.6	62.0	70.1	76.3
2013	48	63.7	10.5	48.9	91.0	50.6	55.1	64.2	69.5	78.8
2014	15	62.3	11.7	47.4	93.5	49.5	55.0	60.6	70.4	72.9
1998-2014	694	62.3	11.0	4.1	93.8	49.5	55.1	61.8	69.5	76.5

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	10	57.3	10.8	44.9	78.2	46.1	50.3	54.9	60.4	75.2
1999	18	56.9	8.8	40.4	72.5	43.1	50.5	58.4	63.4	70.5
2000	9	59.7	15.8	35.9	78.3	35.9	47.6	59.2	73.3	78.3
2001	12	61.1	12.1	48.6	85.1	49.0	50.4	59.2	68.2	78.7
2002	26	59.7	8.4	43.8	80.2	48.0	54.6	58.2	64.2	70.8
2003	37	62.3	8.9	45.1	83.3	50.6	56.0	62.4	66.7	76.9
2004	33	62.9	8.8	38.6	80.3	54.8	58.9	62.5	68.3	72.5
2005	40	59.5	14.1	4.1	87.1	46.3	52.9	59.8	65.6	78.2
2006	37	61.7	10.3	38.7	84.8	47.5	55.3	61.3	66.8	77.4
2007	44	58.4	9.4	37.1	76.9	45.6	55.1	58.5	64.3	69.5
2008	43	63.5	9.6	38.3	85.9	52.5	56.5	62.4	71.1	76.3
2009	32	62.4	10.8	36.7	81.1	48.0	56.3	62.4	71.4	76.2
2010	41	63.8	12.0	38.0	92.1	50.0	56.5	64.8	70.7	78.7
2011	51	63.9	10.6	40.0	86.5	49.9	55.0	64.6	71.0	76.5
2012	44	62.8	10.7	39.8	87.9	49.7	54.0	62.1	70.4	76.3
2013	36	63.5	10.4	48.9	91.0	50.6	55.5	63.0	68.8	77.4
2014	12	60.7	12.5	47.4	93.5	49.5	52.6	58.2	64.2	70.9
1998-2014	525	61.7	10.7	4.1	93.5	49.3	54.8	61.3	68.7	76.3

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	4	58.8	20.0	31.1	77.8	31.1	45.0	63.2	72.6	77.8
1999	4	66.1	6.6	59.0	74.9	59.0	61.6	65.3	70.6	74.9
2000	4	61.8	10.6	46.0	68.2	46.0	55.7	66.5	67.9	68.2
2001	7	66.8	16.2	50.2	92.5	50.2	50.6	63.0	83.0	92.5
2002	7	63.3	11.4	50.3	81.5	50.3	55.2	58.3	73.9	81.5
2003	5	68.8	9.6	53.1	77.3	53.1	68.5	69.4	75.7	77.3
2004	16	65.3	12.2	48.0	93.3	50.3	56.4	62.1	74.7	81.4
2005	13	66.9	9.3	57.1	87.2	57.2	60.9	64.4	72.9	79.3
2006	13	58.1	15.9	19.0	76.4	45.9	48.1	65.4	70.1	71.3
2007	11	54.5	9.8	35.2	70.5	45.0	47.5	57.9	61.3	62.0
2008	12	63.3	12.8	45.6	87.7	49.7	52.4	62.5	73.0	77.4
2009	15	66.2	10.6	45.8	87.3	54.2	57.8	66.8	73.7	75.6
2010	16	66.5	8.7	47.1	77.9	53.4	60.6	67.8	73.2	77.8
2011	16	66.3	12.2	48.6	93.8	54.5	56.7	62.3	72.9	84.0
2012	11	60.7	11.0	45.5	83.5	50.0	52.7	57.5	68.4	71.1
2013	12	64.1	11.3	49.4	85.2	50.0	53.1	64.7	69.5	78.9
2014	3	68.9	4.9	63.3	72.9	63.3	63.3	70.4	72.9	72.9
1998-2014	169	63.9	11.8	19.0	93.8	49.5	56.5	64.3	71.4	77.8

Table 4

Age distribution by 5-year age group and gender for period 2007-2014
(incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
35-39	8	2.0	2.0	7	2.3	2.3	1	1.0	1.0
40-44	7	1.8	3.8	7	2.3	4.6			1.0
45-49	29	7.3	11.0	18	5.9	10.6	11	11.5	12.5
50-54	48	12.0	23.1	38	12.5	23.1	10	10.4	22.9
55-59	73	18.3	41.4	58	19.1	42.2	15	15.6	38.5
60-64	69	17.3	58.6	55	18.2	60.4	14	14.6	53.1
65-69	61	15.3	73.9	46	15.2	75.6	15	15.6	68.8
70-74	49	12.3	86.2	34	11.2	86.8	15	15.6	84.4
75-79	34	8.5	94.7	25	8.3	95.0	9	9.4	93.8
80-84	10	2.5	97.2	8	2.6	97.7	2	2.1	95.8
85+	11	2.8	100.0	7	2.3	100.0	4	4.2	100.0
All ages	399	100.0		303	100.0		96	100.0	

Included in the statistics are 40.3% multiple primaries in males and 35.8% in females.

Table 5

Age-specific incidence, DCO rate and proportion of all cancers
for period 2007-2014

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=8 %	Females DCO rate n=3 %	Males Prop.all cancers n=91183 %	Females Prop.all cancers n=89596 %
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	7	1	0.5	0.1			0.6	0.1
40-44	7		0.4	0.0			0.4	
45-49	18	11	1.1	0.7			0.6	0.2
50-54	38	10	2.9	0.8			0.8	0.1
55-59	58	15	5.5	1.3	1.7		0.8	0.2
60-64	55	14	5.6	1.3	3.6		0.5	0.2
65-69	46	14	4.8	1.3	2.2		0.3	0.1
70-74	34	15	3.7	1.4	2.9	13.3	0.2	0.1
75-79	25	9	4.5	1.3	8.0		0.2	0.1
80-84	8	2	2.3	0.4			0.1	0.0
85+	7	4	3.0	0.7	14.3	25.0	0.1	0.0
All ages	303	95			2.6	3.2	0.3	0.1
Incidence								
Raw			1.7	0.5				
WS			1.0	0.3				
ES			1.4	0.4				
BRD-S			1.6	0.4				

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).

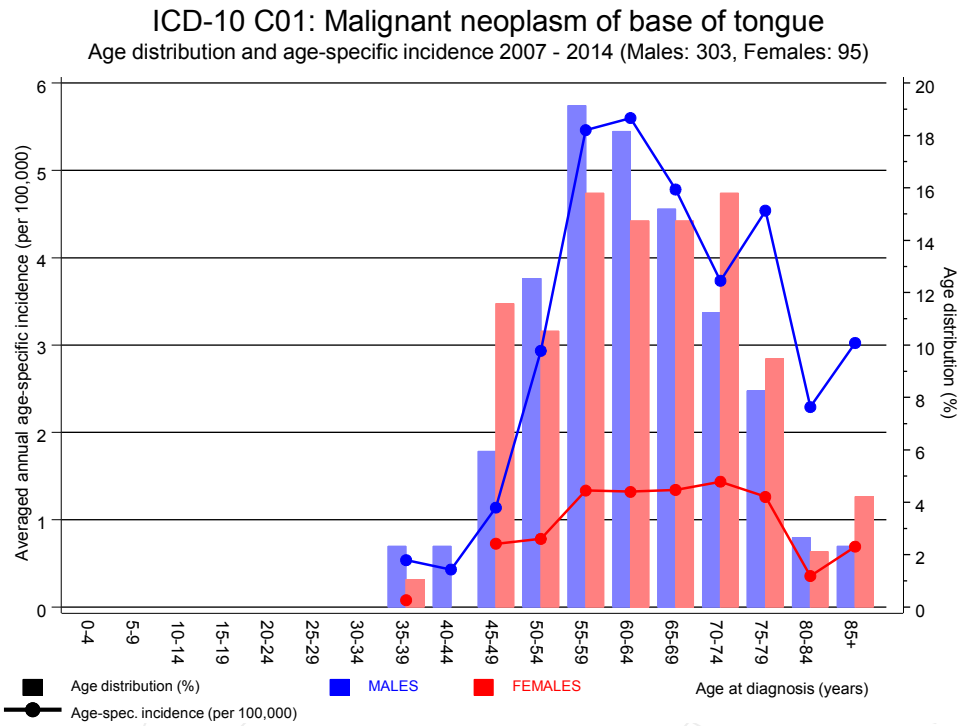


Figure 6. Age distribution and age-specific incidence

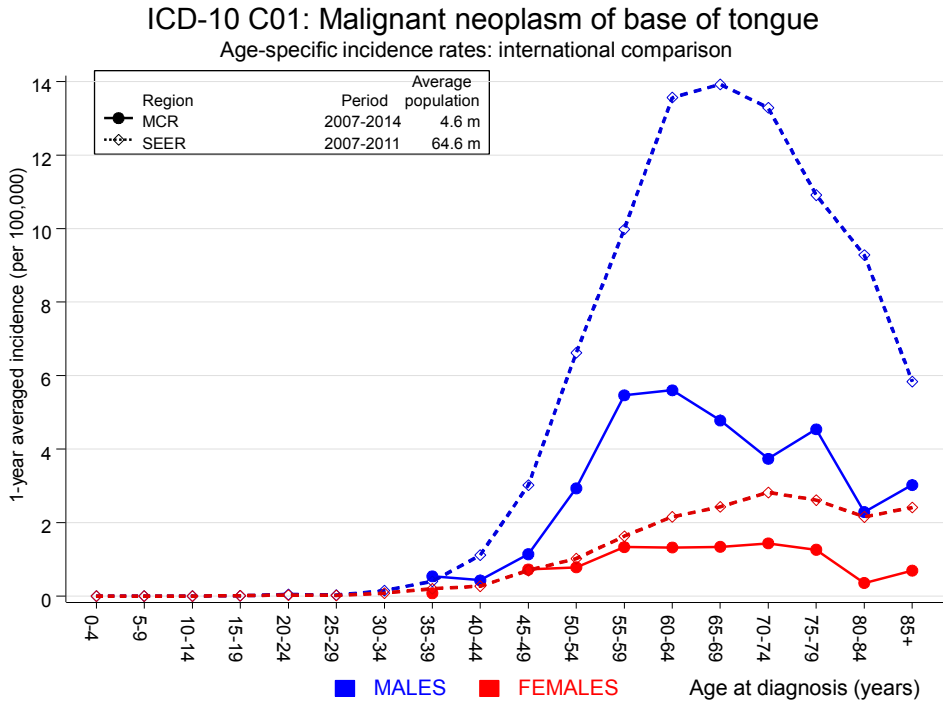


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

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

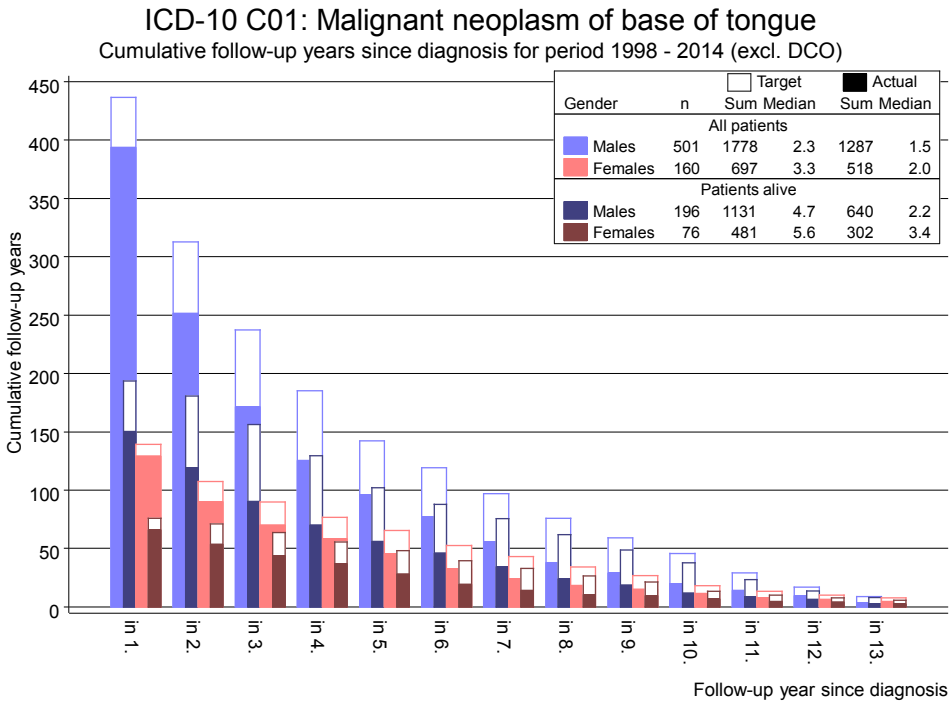


Figure 7. Cumulative follow-up years depending on time since diagnosis

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

Table 8a

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries for period 1998-2014
MALES

Diagnosis	Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C03-C06 Oral cavity	7	0.2	37.0	14.9	76.3	#	53.0	
C09-C10 Oropharynx	4	0.3	15.9	4.3	40.7	#	29.1	
C12-C13 Hypopharynx	3	0.1	22.6	4.7	66.0	#	22.3	
C15 Oesophagus	5	0.4	14.2	4.6	33.1	#	36.1	20.0
C18 Colon	2	1.5	1.4	0.2	4.9		4.1	
C19-C20 Rectum	2	0.9	2.1	0.3	7.7		8.2	
C22 Liver	2	0.5	4.3	0.5	15.5		11.9	50.0
C32 Larynx	6	0.2	29.9	11.0	65.1	#	45.1	66.7
C33-C34 Lung	18	2.0	9.0	5.3	14.2	#	124.4	11.1
C61 Prostate	8	4.7	1.7	0.7	3.3		25.4	
C64 Kidney	6	0.6	9.8	3.6	21.3	#	41.9	
C67 Bladder	2	0.7	3.0	0.4	11.0		10.4	
C82-C85 NHL	2	0.6	3.2	0.4	11.4		10.6	
C91-C96 Leukaemia	3	0.2	12.2	2.5	35.6	#	21.4	33.3
Other primaries	9	2.7	3.3	1.5	6.3	#	49.0	11.1
Not observed	0	1.1	0.0	0.0	3.2		-8.9	
All mult. primaries	79	16.7	4.7	3.7	5.9	#	484.1	12.7

Patients	501
Median age at second malignancy (years)	64.6
Person-years	1286
Mean observation time (years)	2.6
Median observation time (years)	1.5

The occurrence of second malignancy is statistically significant.

Observed second primaries with count 1 are pooled in category “Other primaries”

Table 8b

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries for period 1998–2014
FEMALES

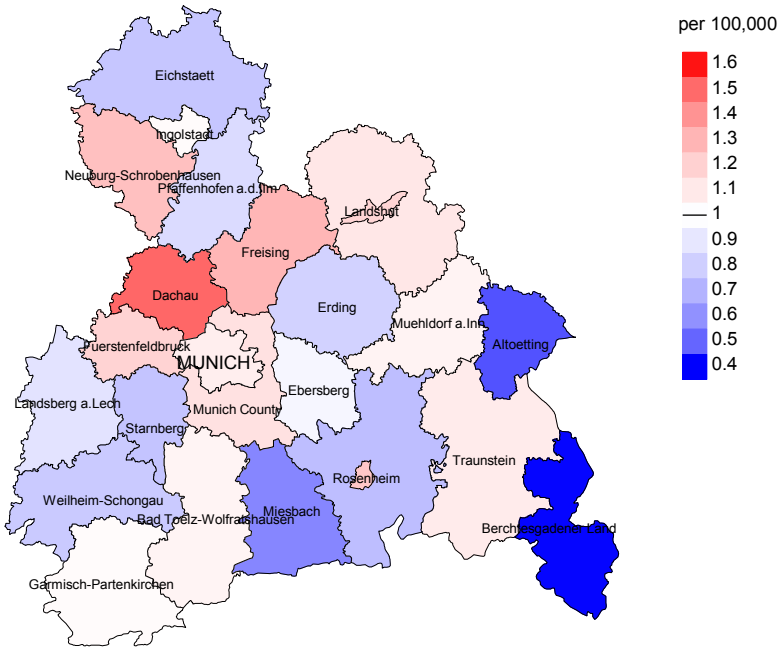
Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C03–C06	Oral cavity	3	0.0	87.0	17.9	254.2	#	56.8	
C09–C10	Oropharynx	3	0.0	117.2	24.2	342.5	#	56.9	
C15	Oesophagus	2	0.0	59.8	7.2	215.9	#	37.6	
C19–C20	Rectum	2	0.2	9.0	1.1	32.6	#	34.0	
C32	Larynx	2	0.0	176.8	21.4	638.7	#	38.1	50.0
C33–C34	Lung	5	0.4	12.1	3.9	28.3	#	87.8	40.0
C50	Breast	3	1.7	1.7	0.4	5.0		24.0	33.3
C53	Cervix uteri	2	0.1	26.5	3.2	95.8	#	36.8	
Other primaries		5	0.6	8.2	2.6	19.0	#	84.0	
Not observed		0	2.3	0.0	0.0	1.6		-44.5	
All mult. primaries		27	5.5	4.9	3.2	7.1	#	411.6	14.8

Patients	161
Median age at second malignancy (years)	65.2
Person-years	522
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”

Average incidence (world standard population) 2007 - 2014: Males



Average incidence (world standard population) 2007 - 2014: Females

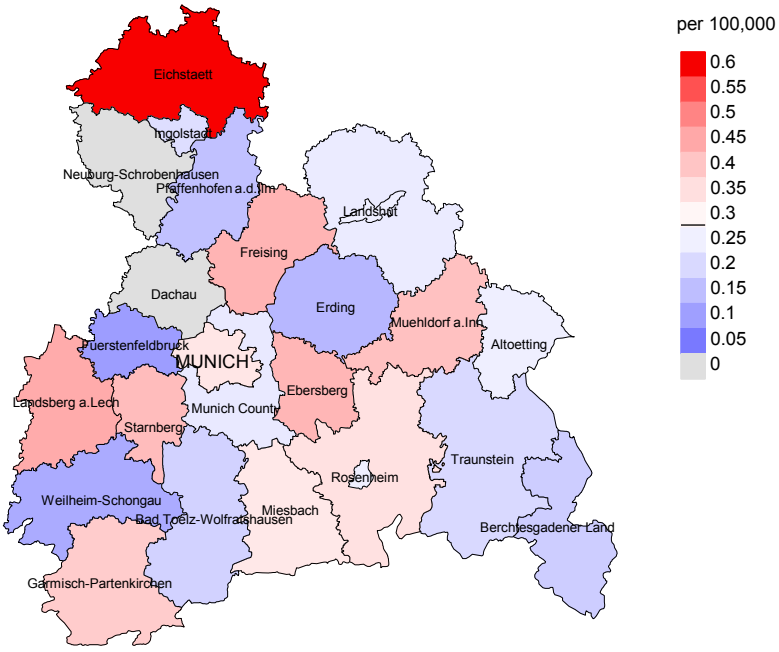
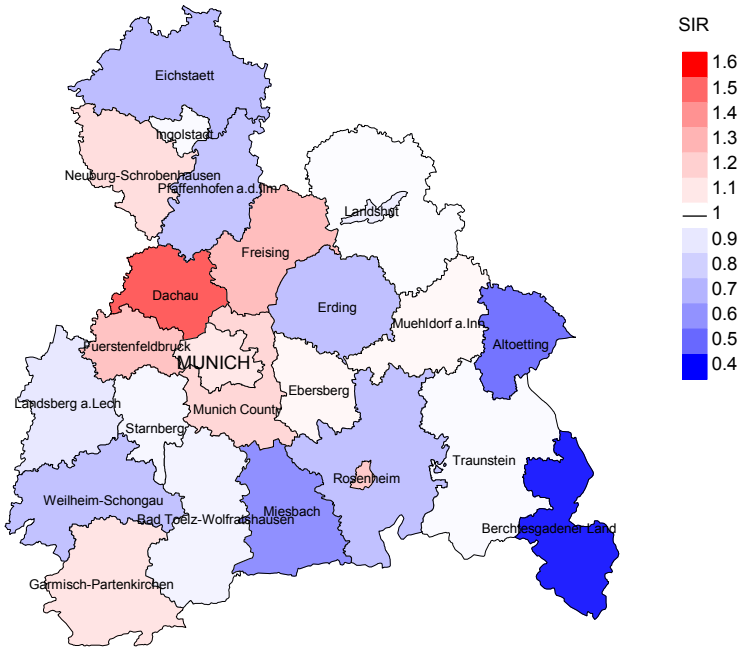


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 1.0/100,000 WS N=303, females 0.3/100,000 WS N=95).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,347 female residents (averaged) in the period from 2007 to 2014 a total of 4 women were identified with newly diagnosed base of tongue cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 0.4/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.1 and 1.4/100,000.

Standardized incidence ratio (SIR) 2007 - 2014: Males



Standardized incidence ratio (SIR) 2007 - 2014: Females

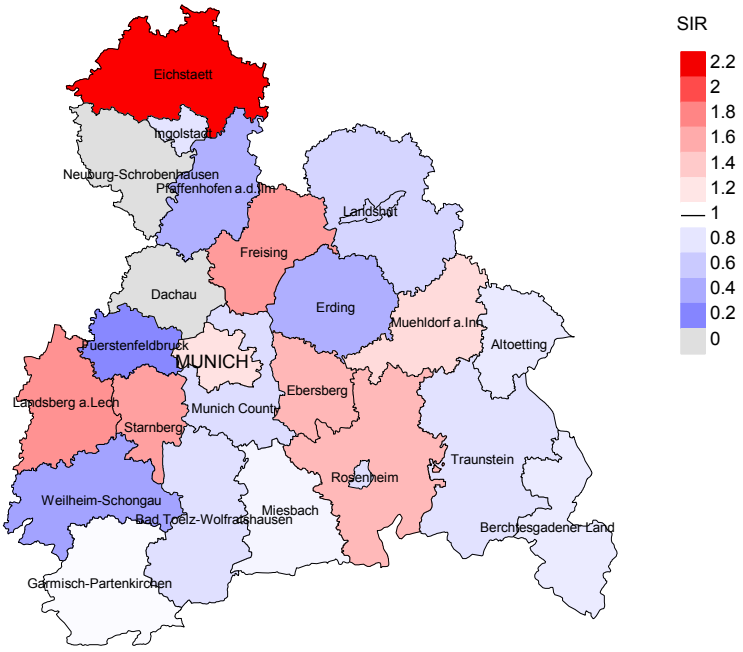


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=303, females N=95).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,924 female residents (averaged) in the period from 2007 to 2014 a total of 4 women were identified with newly diagnosed base of tongue cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.53. Though, the value of this parameter may vary with an underlying probability of 99% between 0.26 and 4.81, and is therefore not statistically striking.

MORTALITY

Table 10a

Patient cohorts of incident cancers by year of diagnosis, follow-up status, proportion of DCO, deaths among the annual cohorts and proportion of available death certificates (with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.64 m as of 2007, respectively)

Year of diagnosis	Incident cases n	Prop. actively followed %	Prop. DCO %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	14	100.0		11	78.6	100.0
1999	22	95.5		20	90.9	90.0
2000	13	100.0	7.7	11	84.6	100.0
2001	19	100.0	10.5	16	84.2	93.8
2002	33	97.0		25	75.8	96.0
2003	42	100.0	11.9	37	88.1	94.6
2004	49	93.9	8.2	36	73.5	100.0
2005	53	92.5	5.7	32	60.4	100.0
2006	50	96.0	2.0	34	68.0	97.1
2007	55	81.8	1.8	36	65.5	100.0
2008	55	83.6	7.3	36	65.5	100.0
2009	47	95.7		24	51.1	100.0
2010	57	82.5	1.8	32	56.1	100.0
2011	67	76.1	3.0	28	41.8	96.4
2012	55	81.8	1.8	21	38.2	100.0
2013	48	100.0	2.1	19	39.6	100.0
2014	15	100.0	6.7	4	26.7	100.0
1998-2014	694	90.2	3.9	422	60.8	98.1

Table 10b

Annual cohorts of incident cancers and deaths, proportion of death certificates and cases deceased the same year of cancer diagnosis
(incl. DCO)
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.64 m as of 2007, respectively)

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	14	12	91.7		
1999	22	11	90.9	1	4.5
2000	13	18	100.0	3	23.1
2001	19	16	93.8	4	21.1
2002	33	20	100.0		
2003	42	24	91.7	10	23.8
2004	49	29	100.0	10	20.4
2005	53	26	100.0	7	13.2
2006	50	47	97.9	12	24.0
2007	55	32	96.9	7	12.7
2008	55	30	96.7	12	21.8
2009	47	34	100.0	4	8.5
2010	57	39	100.0	10	17.5
2011	67	46	100.0	6	9.0
2012	55	39	97.4	4	7.3
2013	48	37	100.0	8	16.7
2014	15	40	100.0	3	20.0
1998-2014	694	500	98.2	101	14.6

Table 10c

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

Year of death	Deaths n	Prop. cancer-related %	Prop. non-cancer-related %	Prop. cancer recorded on death certificate %
1998	12	75.0	25.0	90.9
1999	11	72.7	27.3	90.0
2000	18	66.7	33.3	72.2
2001	16	75.0	25.0	93.3
2002	20	95.0	5.0	100.0
2003	24	62.5	37.5	90.9
2004	29	93.1	6.9	96.6
2005	26	96.2	3.8	96.2
2006	47	89.4	10.6	95.7
2007	32	78.1	21.9	90.3
2008	30	83.3	16.7	96.6
2009	34	85.3	14.7	91.2
2010	39	87.2	12.8	94.9
2011	46	84.8	15.2	89.1
2012	39	79.5	20.5	92.1
2013	37	86.5	13.5	91.9
2014	40	85.0	15.0	87.5
1998-2014	500	83.6	16.4	92.1

Table 11a

Medians 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 (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	8	63.2	61.8	65.7	62.1
1999	8	62.6	59.6	64.2	59.6
2000	16	65.7	61.8	70.4	61.5
2001	12	61.0	58.6	76.6	60.1
2002	15	60.5	56.3	67.3	60.5
2003	21	62.6	63.2	56.5	63.2
2004	23	63.1	62.7	86.1	62.7
2005	19	64.0	63.5	70.1	63.5
2006	33	66.2	66.1	72.2	66.1
2007	25	62.2	62.2	62.7	64.2
2008	25	61.0	61.2	59.2	60.7
2009	28	63.8	62.5	66.4	63.8
2010	28	65.0	65.6	61.8	65.0
2011	38	66.5	64.4	75.8	65.0
2012	31	70.1	68.2	70.7	66.3
2013	24	67.6	65.7	69.4	66.2
2014	31	66.7	64.0	77.6	64.0
1998-2014	385	64.6	64.0	68.1	64.1

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

Medians 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 (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	4	63.2	52.8	85.2	63.2
1999	3	58.4	55.9	70.0	58.4
2000	2	71.4	71.4		71.4
2001	4	74.4	59.3	84.7	71.9
2002	5	71.9	71.9		71.9
2003	3	52.1	85.4	51.8	68.4
2004	6	65.2	61.3	81.6	65.2
2005	7	62.1	62.1		62.1
2006	14	65.0	65.0		65.0
2007	7	74.2	72.1	74.2	69.3
2008	5	66.7	58.3	71.9	62.5
2009	6	60.7	61.4	60.0	61.4
2010	11	72.7	67.7	76.0	70.6
2011	8	72.4	70.7	85.4	70.7
2012	8	67.0	65.0	72.3	65.3
2013	13	76.9	73.0	92.1	73.0
2014	9	68.0	67.0	79.1	67.0
1998-2014	115	68.2	65.6	77.0	66.0

By 2010, life expectancy at birth was 77.5 years for boys and 82.6 years for girls.

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	6	0.5	0.60	0.4	0.60	0.4	0.54	0.5	0.53
1999	6	0.5	0.33	0.3	0.32	0.5	0.33	0.5	0.33
2000	10	0.9	1.11	0.5	1.02	0.8	1.08	1.1	1.28
2001	10	0.9	0.83	0.6	0.83	0.8	0.79	0.8	0.72
2002	14	0.8	0.54	0.5	0.55	0.7	0.56	0.9	0.65
2003	14	0.7	0.39	0.5	0.38	0.6	0.38	0.7	0.36
2004	22	1.2	0.67	0.7	0.68	1.0	0.69	1.2	0.76
2005	18	1.0	0.45	0.6	0.39	0.8	0.42	0.9	0.45
2006	28	1.5	0.76	0.8	0.70	1.2	0.70	1.4	0.73
2007	21	0.9	0.48	0.6	0.45	0.8	0.46	0.9	0.48
2008	22	1.0	0.51	0.6	0.49	0.8	0.49	0.9	0.48
2009	24	1.1	0.75	0.6	0.74	0.9	0.74	1.0	0.72
2010	26	1.2	0.63	0.6	0.62	0.9	0.63	1.1	0.65
2011	32	1.4	0.63	0.8	0.63	1.2	0.66	1.4	0.67
2012	26	1.1	0.59	0.6	0.52	0.9	0.55	1.0	0.58
2013	21	0.9	0.58	0.5	0.53	0.7	0.54	0.9	0.60
2014	26	1.1	2.17	0.6	1.94	0.9	2.01	1.0	2.11
1998-2014	326	1.0	0.62	0.6	0.59	0.8	0.61	1.0	0.63

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	3	0.3	0.75	0.2	1.00	0.2	0.94	0.3	0.90
1999	2	0.2	0.50	0.1	0.56	0.2	0.58	0.2	0.51
2000	2	0.2	0.50	0.1	0.27	0.1	0.31	0.1	0.42
2001	2	0.2	0.29	0.1	0.40	0.2	0.35	0.2	0.37
2002	5	0.3	0.71	0.1	0.60	0.2	0.59	0.2	0.68
2003	1	0.1	0.20	0.0	0.09	0.0	0.11	0.0	0.11
2004	5	0.3	0.31	0.2	0.35	0.2	0.33	0.2	0.33
2005	7	0.4	0.54	0.2	0.64	0.3	0.64	0.3	0.61
2006	14	0.7	1.08	0.4	0.83	0.5	0.95	0.6	0.94
2007	4	0.2	0.36	0.1	0.24	0.1	0.25	0.1	0.28
2008	3	0.1	0.25	0.1	0.26	0.1	0.26	0.1	0.25
2009	5	0.2	0.33	0.1	0.39	0.2	0.36	0.2	0.37
2010	8	0.3	0.50	0.2	0.51	0.3	0.51	0.3	0.50
2011	7	0.3	0.44	0.1	0.37	0.2	0.37	0.2	0.36
2012	5	0.2	0.45	0.1	0.43	0.2	0.41	0.2	0.41
2013	11	0.5	1.00	0.2	0.75	0.3	0.83	0.4	1.01
2014	8	0.3	2.67	0.2	3.00	0.2	3.10	0.3	2.77
1998-2014	92	0.3	0.55	0.1	0.51	0.2	0.52	0.2	0.53

Table 13

Age distribution of age at death (cancer-related) for period 2007-2014
(**incl. multiple primaries**)

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
35-39	2	0.8	0.8	2	1.0	1.0			0.0
40-44	5	2.0	2.8	5	2.5	3.5			0.0
45-49	7	2.8	5.6	4	2.0	5.6	3	5.9	5.9
50-54	32	12.9	18.5	26	13.1	18.7	6	11.8	17.6
55-59	36	14.5	32.9	32	16.2	34.8	4	7.8	25.5
60-64	41	16.5	49.4	32	16.2	51.0	9	17.6	43.1
65-69	41	16.5	65.9	35	17.7	68.7	6	11.8	54.9
70-74	35	14.1	79.9	24	12.1	80.8	11	21.6	76.5
75-79	25	10.0	90.0	20	10.1	90.9	5	9.8	86.3
80-84	12	4.8	94.8	10	5.1	96.0	2	3.9	90.2
85+	13	5.2	100.0	8	4.0	100.0	5	9.8	100.0
All ages	249	100.0		198	100.0		51	100.0	

Included in the statistics are 40.3% multiple primaries in males and 35.8% in females.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2014
(**incl. multiple primaries**)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	Males MI-index	Females Age-spec. mortal.	Females 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	2		0.2	0.29	0.0		1.1	
40-44	5		0.3	0.71	0.0		1.1	
45-49	4	3	0.3	0.22	0.2	0.27	0.4	0.2
50-54	26	6	2.0	0.68	0.5	0.60	1.4	0.3
55-59	32	4	3.0	0.55	0.4	0.27	1.0	0.2
60-64	32	9	3.3	0.58	0.8	0.64	0.7	0.3
65-69	35	6	3.6	0.76	0.6	0.40	0.5	0.1
70-74	24	11	2.6	0.71	1.1	0.73	0.3	0.2
75-79	20	5	3.6	0.80	0.7	0.56	0.2	0.1
80-84	10	2	2.9	1.25	0.4	1.00	0.1	0.0
85+	8	5	3.5	1.14	0.9	1.25	0.1	0.1
All ages	198	51					0.4	0.1
Mortality								
Raw			1.1	0.65	0.3	0.53		
WS			0.6	0.62	0.1	0.48		
ES			0.9	0.64	0.2	0.49		
BRD-S			1.0	0.66	0.2	0.50		
PYLL-70								
per 100,000			9.2		1.9			
ES			8.2		1.6			
AYLL-70			10.8		10.9			

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

Table 15a

Multiple primaries in deaths in period 1998-2014
MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	5	2.8			1	20.0	4	80.0
C09-C10 Oropharynx	14	8.0			2	14.3	12	85.7
C12-C13 Hypopharynx	9	5.1	4	44.4	3	33.3	2	22.2
C15 Oesophagus	14	8.0	5	35.7	1	7.1	8	57.1
C16 Stomach	4	2.3	2	50.0			2	50.0
C18 Colon	5	2.8	1	20.0	1	20.0	3	60.0
C22 Liver	2	1.1					2	100.0
C25 Pancreas	5	2.8	2	40.0			3	60.0
C32 Larynx	14	8.0	8	57.1	1	7.1	5	35.7
C33-C34 Lung	28	15.9	5	17.9	1	3.6	22	78.6
C43 Malign. melanoma	3	1.7	3	100.0				
C44 Skin others	14	8.0	5	35.7	1	7.1	8	57.1
C46,C49 Soft tissue	3	1.7	2	66.7			1	33.3
C61 Prostate	8	4.5	3	37.5	1	12.5	4	50.0
C62 Testis	4	2.3	4	100.0				
C64 Kidney	8	4.5	2	25.0	1	12.5	5	62.5
C67 Bladder	9	5.1	5	55.6			4	44.4
C70-C72 CNS cancer	2	1.1	1	50.0	1	50.0		
C73 Thyroid	3	1.7	1	33.3	1	33.3	1	33.3
C76-C79 CUP	9	5.1	7	77.8	2	22.2		
C82-C85 NHL	2	1.1			1	50.0	1	50.0
C91-C96 Leukaemia	2	1.1					2	100.0
Other primaries	9	5.1	6	66.7			3	33.3
All mult. primaries	176	100.0	66	37.5	18	10.2	92	52.3

Multiple primaries with number of cases 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 1998-2014
FEMALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	2	4.5					2	100.0
C09-C10 Oropharynx	8	18.2			2	25.0	6	75.0
C12-C13 Hypopharynx	2	4.5			1	50.0	1	50.0
C15 Oesophagus	5	11.4	2	40.0			3	60.0
C16 Stomach	1	2.3			1	100.0		
C19-C20 Rectum	1	2.3	1	100.0				
C25 Pancreas	1	2.3					1	100.0
C32 Larynx	4	9.1	1	25.0	2	50.0	1	25.0
C33-C34 Lung	9	20.5	1	11.1	3	33.3	5	55.6
C44 Skin others	2	4.5	2	100.0				
C50 Breast	4	9.1	2	50.0			2	50.0
C53 Cervix uteri	1	2.3					1	100.0
C54 Corpus uteri	1	2.3	1	100.0				
C76-C79 CUP	3	6.8	3	100.0				
All mult. primaries	44	100.0	13	29.5	9	20.5	22	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 2007-2014
(**First 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	1		0.1	0.20	0.0		0.6	
40-44	4		0.2	0.80	0.0		0.9	
45-49	2	3	0.1	0.13	0.2	0.33	0.2	0.3
50-54	22	4	1.7	0.63	0.3	0.50	1.4	0.3
55-59	24	3	2.3	0.55	0.3	0.27	0.9	0.1
60-64	24	7	2.4	0.62	0.7	0.58	0.6	0.2
65-69	28	3	2.9	0.74	0.3	0.30	0.5	0.1
70-74	16	8	1.8	0.80	0.8	0.67	0.2	0.2
75-79	13	2	2.4	0.81	0.3	0.33	0.2	0.0
80-84	6	2	1.7	1.50	0.4	2.00	0.1	0.0
85+	6	3	2.6	1.20	0.5	1.50	0.1	0.0
All ages	146	35					0.4	0.1
Mortality								
Raw			0.8	0.65	0.2	0.49		
WS			0.5	0.61	0.1	0.44		
ES			0.7	0.63	0.1	0.44		
BRD-S			0.8	0.65	0.2	0.46		
PYLL-70								
per 100,000			7.0		1.5			
ES			6.3		1.3			
AYLL-70			10.7		11.8			

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2014
(**Single primaries only** *)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	Males MI-index	Females Age-spec. mortal.	Females 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	1		0.1	0.20	0.0		0.6	
40-44	3		0.2	0.75	0.0		0.8	
45-49	1	3	0.1	0.07	0.2	0.33	0.1	0.3
50-54	20	4	1.5	0.59	0.3	0.50	1.4	0.3
55-59	19	2	1.8	0.44	0.2	0.22	0.8	0.1
60-64	21	4	2.1	0.57	0.4	0.40	0.6	0.2
65-69	21	2	2.2	0.66	0.2	0.20	0.4	0.1
70-74	11	4	1.2	0.65	0.4	0.36	0.2	0.1
75-79	10	2	1.8	0.63	0.3	0.33	0.2	0.1
80-84	4	2	1.1	1.33	0.4	2.00	0.1	0.0
85+	6	3	2.6	1.20	0.5	1.50	0.2	0.1
All ages	117	26					0.4	0.1
Mortality								
Raw			0.6	0.56	0.1	0.39		
WS			0.4	0.53	0.1	0.35		
ES			0.5	0.54	0.1	0.36		
BRD-S			0.6	0.56	0.1	0.37		
PYLL-70								
per 100,000			5.8		1.2			
ES			5.3		1.1			
AYLL-70			10.9		13.2			

* See corresponding tables with multiple primaries.

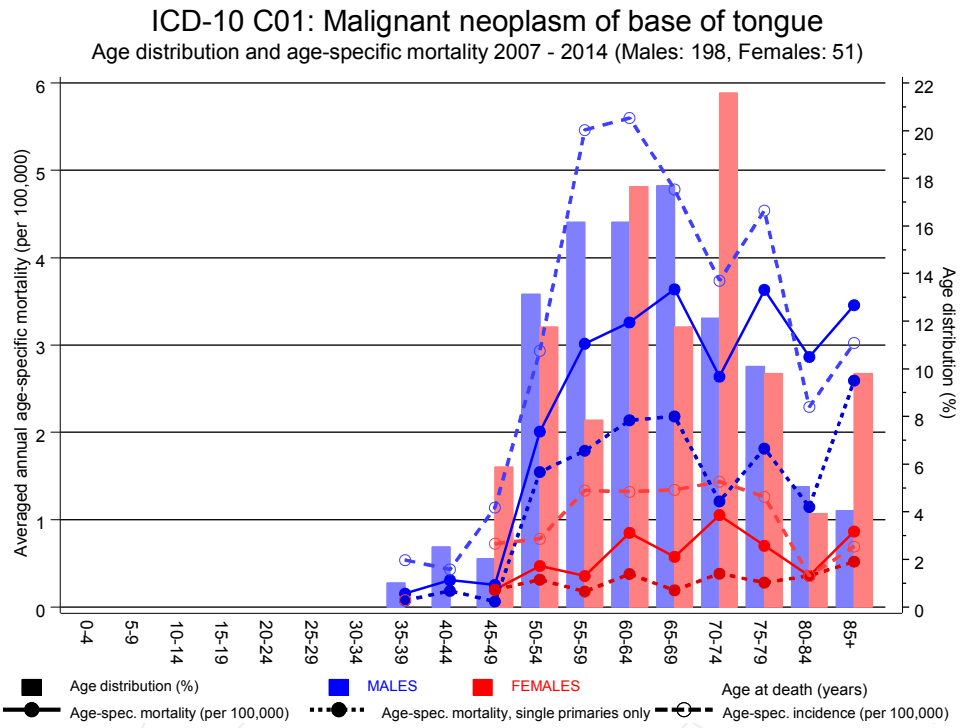
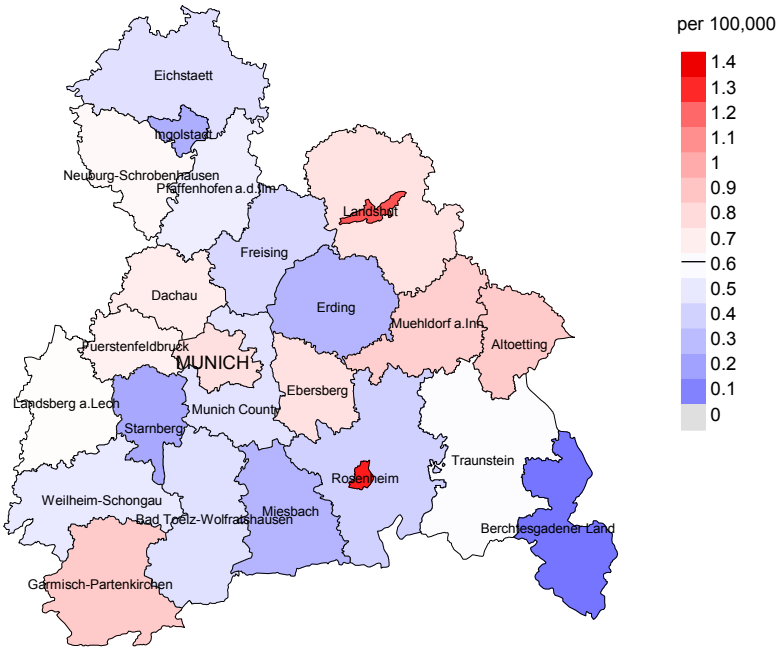


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

Average mortality (world standard population) 2007 - 2014: Males



Average mortality (world standard population) 2007 - 2014: Females

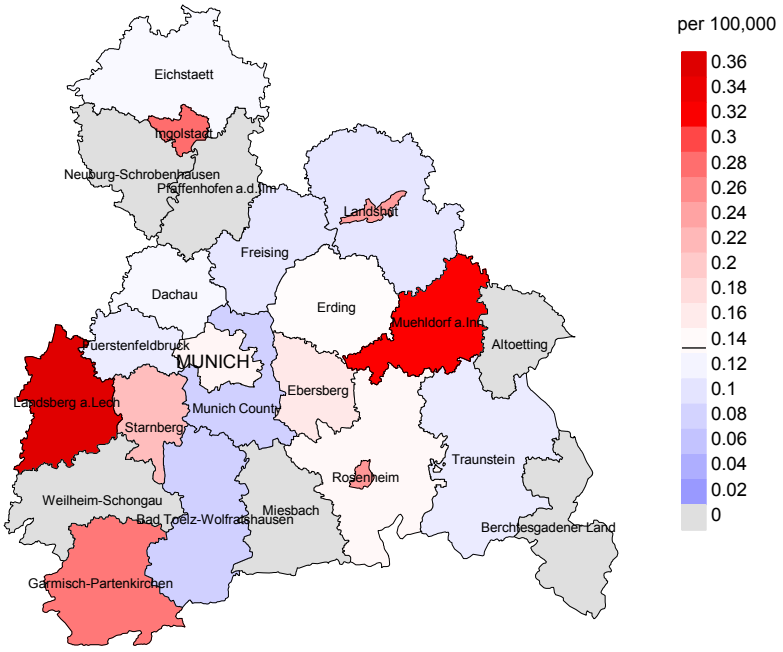
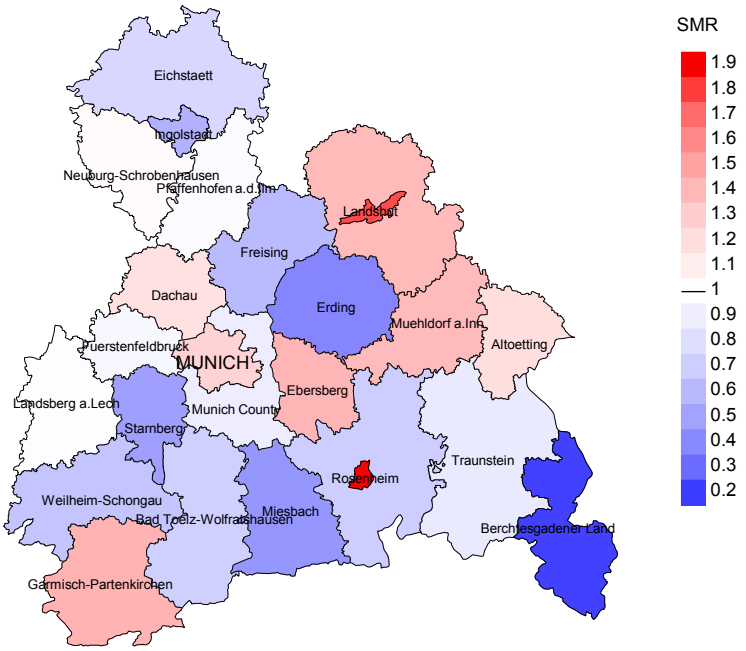


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2014. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 0.6/100,000 WS N=197, females 0.1/100,000 WS N=51).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,347 female residents (averaged) in the period from 2007 to 2014 a total of 2 women died from base of tongue cancer. 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 0.9/100,000.

Standardized mortality ratio (SMR) 2007 - 2014: Males



Standardized mortality ratio (SMR) 2007 - 2014: Females

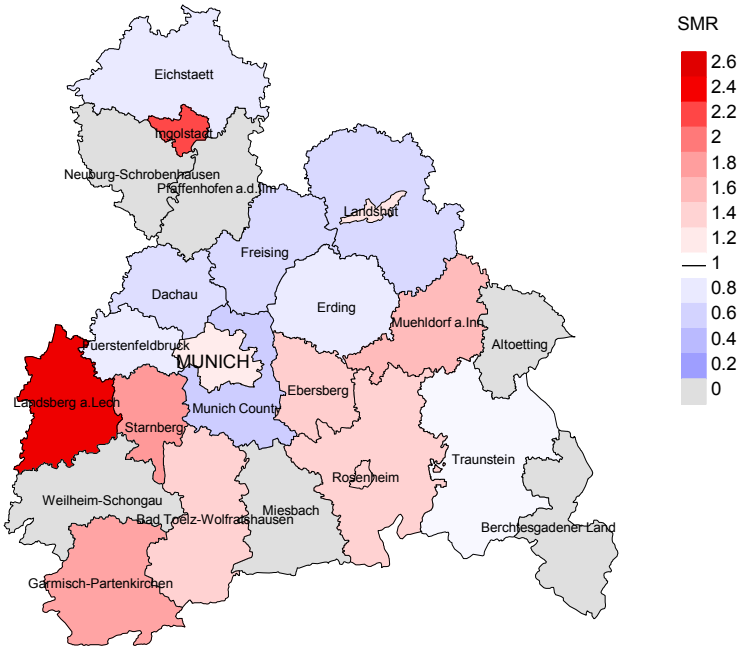


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=197, females N=51).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,924 female residents (averaged) in the period from 2007 to 2014 a total of 2 women died from base of tongue cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.45. Though, the value of this parameter may vary with an underlying probability of 99% between 0.07 and 6.72, 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, where applicable. For mortality statistics patients, diagnoses and progressive course of disease are presented. In the calculations, all courses of disease are considered whereby progressions occurred and/or death certificate identified progressive cancers were ascertained. Additionally there are three groups of disease course to consider:

1. **All multiple primaries included**

   The mortality statistic describes the tumor-specific death, independent of any malignancy. The patient perspective, induced secondary malignancies, and the problem of multiple malignancies from the same primary tumor all have reasons for their inclusion.

2. **First singular primary** (no information about other prior or synchronous malignancy)

   The mortality statistic describes the cancer-related death for patients who have no therapeutic restrictions due to a previous or synchronous cancer. These statistics are comparable to studies that have exclusion criteria based on a second malignancy.

3. **Single primary** (no information about other prior, syn- or metachronous malignancy)

   The mortality statistic describes the tumor-specific death that occurs without any impact through secondary primaries, earlier, synchronous, later or induced. Precisely the difference between disease group 1 and 2 highlight the magnitude of the problem of secondary malignancies.

For this reason differences appear concerning official mono-causal mortality statistics. To judge the maximum deviation, 2 further tables are presented. In the first table the distribution of secondary malignancies before, at or after the described cancer are shown, that could be an alternative cause of death. In the second table, the age-specific mortality rates for all courses of disease, without designation of secondary malignancies are shown.

A previously minimally acknowledged statistic is the **age at death**, which allows for a good assessment of the quality of classification of the apparent tumor-specific death. For assumed tumor-independent deaths, the age of death should be estimated from the age of diagnosis and the normal life expectancy, whereas tumor-dependent deaths can be estimated from the age of diagnosis plus the average tumor-specific life expectancy. The comparison of different tumors demonstrates this association, if the causes of cancer and the competing cause of death are independent of each other (e.g. breast and colon versus head/neck and lung).

The index from mortality and incidence (Mortality-Incidence ratio, **MI-index**) is a statistic that allows for the evaluation of the quality of data. For diseases with poor prognoses, comparable values are obtained from all age groups, because to a large extent, the numerator and denominator contain the same cases. For tumors with a good prognosis, increasing and decreasing incidence and age-specific differences in prognosis can more strongly alter the MI- index. Additionally, attention should be paid to the confidence intervals where fewer cases are reported.

The complexity of problems identified here emphasizes the importance of relative survival data for the appropriate analysis of long term results.

As a measurement of the burden of disease, the number of potential life years loss due to premature deaths in a cohort can be calculated (**PYLL**, potential years of life lost, standardized per 100,000 persons or per European standard) as well as the average loss of life years per individual (**AYLL**, average years of life lost). Depending upon the analytic aim (health economy, prevention, health care research) different methods exist for the generation of these measurements. In the results presented here, the age for a premature death is considered to be before 70 years, according to the guidelines of the OECD and the WHO (as seen in the abbreviation PYLL-70 or AYLL-70).

Shortcuts

FRG	Federal Republic of Germany
GEKID	Association of Population-based Cancer Registries in Germany (Gesellschaft der epidemiologischen Krebsregister in Deutschland e.V.)
MCR	Munich Cancer Registry (Tumorregister München)
SEER	Surveillance, Epidemiology, and End Results (USA)
AYLL-70	Average years of life lost prior to age 70 given a person dies before that age
BRD-S	German standard population
DCO	Death certificate only
EAR	Excess absolute risk = excess cancer cases (O - E) per 10,000 person-years
ES	European standard population (old)
LCL	Lower confidence limit
MI-index	Ratio between mortality and incidence
PYLL-70	Potential years of life lost prior to age 70 given a person dies before that age
SIR	Standardized incidence ratio
SMR	Standardized mortality ratio
UCL	Upper confidence limit
WS	World standard population

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