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

C09: Tonsil cancer

Year of diagnosis	1998-2011
Patients	1152
Diseases	1158
Creation date	04/02/2013
Export date	01/03/2013
Population	4.5 m

http://www.tumorregister-muenchen.de/en/facts/base/base_C09__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, 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.

ICD-10 codes used for specifying cancer site

ICD-10	Description
C09.-	Malignant neoplasm of tonsil
C09.0	Tonsillar fossa
C09.1	Tonsillar pillar (anterior)(posterior)
C09.8	Overlapping lesion of tonsil
C09.9	Tonsil, 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	52	3	5.8	21.2	78.8	100.0
1999	56			16.1	73.2	100.0
2000	43			23.3	76.7	100.0
2001	49	1	2.0	34.7	69.4	91.8
2002	87			27.6	56.3	100.0
2003	104	1	1.0	28.8	68.3	97.1
2004	91	1	1.1	28.6	60.4	98.9
2005	92	3	3.3	28.3	54.3	98.9
2006	96			25.0	56.3	95.8
2007	94	9	9.6	22.3	40.4	85.1 ##
2008	111	1	0.9	25.2	40.5	76.6
2009	101	1	1.0	28.7	39.6	76.2
2010	104	1	1.0	17.3	34.6	87.5
2011	78			29.5	20.5	70.5 ###
1998-2011	1158	21	1.8	25.6	52.1	90.2

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	52	40	12	76.9
1999	56	44	12	78.6
2000	43	32	11	74.4
2001	49	40	9	81.6
2002	87	72	15	82.8
2003	104	72	32	69.2
2004	91	77	14	84.6
2005	92	66	26	71.7
2006	96	69	27	71.9
2007	94	75	19	79.8
2008	111	74	37	66.7
2009	101	73	28	72.3
2010	104	78	26	75.0
2011	78	60	18	76.9
1998-2011	1158	872	286	75.3

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	40	12	3.6	1.0	2.6	0.6	3.3	0.9	3.4	0.9
1999	44	12	3.9	1.0	2.7	0.5	3.6	0.7	3.9	0.9
2000	32	11	2.8	0.9	1.8	0.5	2.5	0.8	2.9	0.8
2001	40	9	3.5	0.7	2.2	0.5	3.1	0.7	3.4	0.7
2002	72	15	3.9	0.8	2.5	0.5	3.5	0.6	3.7	0.7
2003	72	32	3.8	1.6	2.5	0.9	3.5	1.3	3.8	1.5
2004	77	14	4.1	0.7	2.7	0.4	3.6	0.5	4.0	0.6
2005	66	26	3.5	1.3	2.2	0.8	3.0	1.1	3.2	1.2
2006	69	27	3.6	1.3	2.3	0.9	3.2	1.2	3.5	1.3
2007	75	19	3.4	0.8	2.1	0.5	2.9	0.6	3.3	0.7
2008	74	37	3.3	1.6	2.0	0.8	2.8	1.1	3.2	1.3
2009	73	28	3.3	1.2	2.0	0.7	2.8	1.0	3.1	1.1
2010	78	26	3.5	1.1	2.1	0.7	2.9	0.9	3.2	1.0
2011	60	18	2.7	0.8	1.6	0.5	2.2	0.7	2.5	0.7
1998-2011	872	286	3.5	1.1	2.2	0.6	3.0	0.9	3.3	1.0

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	52	54.8	12.6	0.9	83.1	41.3	49.3	55.2	60.2	69.2
1999	56	60.2	11.4	37.1	91.7	47.1	52.3	59.1	65.8	75.2
2000	43	62.1	9.8	49.0	89.6	51.6	55.3	59.1	69.2	75.5
2001	49	59.3	10.0	41.3	88.3	46.7	53.0	57.9	64.8	74.5
2002	87	59.2	10.1	37.3	96.8	46.8	52.9	59.2	62.9	74.5
2003	104	60.7	9.9	41.4	87.5	49.7	53.8	58.7	66.0	75.0
2004	91	59.4	10.5	38.3	85.1	47.0	51.8	58.3	65.0	74.9
2005	92	61.2	9.6	41.9	103	51.4	54.2	61.0	66.0	71.2
2006	96	60.4	10.4	41.2	90.3	47.2	52.6	59.2	66.7	72.7
2007	94	61.2	11.5	39.1	91.6	47.8	52.4	61.0	68.7	77.6
2008	111	63.8	10.2	45.2	91.8	50.1	57.5	62.4	69.2	77.1
2009	101	63.1	11.6	40.8	95.5	50.2	54.5	61.7	69.9	79.9
2010	104	62.3	9.0	37.1	85.1	50.5	55.1	62.4	68.7	73.4
2011	78	62.1	10.3	47.1	91.7	49.9	53.6	60.8	68.8	75.4
1998-2011	1158	61.0	10.6	0.9	103	48.7	53.6	59.9	67.3	75.4

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	40	53.8	13.3	0.9	81.1	40.6	47.8	55.2	61.3	69.8
1999	44	57.6	10.3	37.1	85.7	46.4	50.4	55.6	63.9	68.2
2000	32	62.6	10.2	49.0	89.6	51.6	55.6	60.9	70.5	75.5
2001	40	59.1	8.6	42.0	81.2	48.8	53.8	58.1	64.7	70.0
2002	72	59.1	9.3	41.7	96.8	47.4	53.5	59.2	62.9	69.5
2003	72	59.5	9.3	41.4	87.5	49.3	53.6	58.4	64.8	73.5
2004	77	58.4	10.0	38.3	85.1	45.4	51.2	57.2	64.3	73.0
2005	66	61.0	7.6	41.9	79.5	52.5	56.0	61.6	65.6	70.4
2006	69	60.8	10.1	42.5	86.7	47.6	52.7	59.1	67.7	74.7
2007	75	60.5	11.2	39.1	91.6	47.2	52.3	60.9	68.7	75.7
2008	74	62.5	9.8	45.2	87.0	49.9	56.4	60.9	68.8	76.3
2009	73	62.9	10.4	40.8	90.7	50.9	54.8	62.2	69.4	75.7
2010	78	62.9	8.8	45.8	81.9	51.4	56.0	63.0	69.1	75.0
2011	60	62.1	10.3	47.1	89.2	49.8	53.2	61.1	69.0	77.2
1998-2011	872	60.4	10.1	0.9	96.8	48.2	53.5	59.7	66.6	73.9

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	12	58.0	9.4	50.7	83.1	50.8	52.3	55.0	58.3	69.2
1999	12	69.4	11.2	52.1	91.7	57.2	60.1	69.9	74.9	82.4
2000	11	60.4	8.7	51.1	77.0	51.6	53.4	58.0	65.0	74.9
2001	9	59.9	15.3	41.3	88.3	41.3	49.6	53.6	73.0	88.3
2002	15	59.5	13.7	37.3	80.8	46.8	48.1	56.1	77.7	78.9
2003	32	63.4	10.8	43.7	84.2	52.6	56.4	61.3	72.0	81.3
2004	14	64.9	11.6	44.7	82.5	50.9	56.0	64.3	75.7	80.5
2005	26	61.9	13.7	44.9	103	48.0	52.6	59.3	67.0	81.2
2006	27	59.4	11.3	41.2	90.3	45.4	51.8	59.4	62.6	72.5
2007	19	64.0	12.7	47.8	89.4	48.7	53.6	62.8	71.3	84.8
2008	37	66.3	10.6	45.9	91.8	52.6	61.2	66.3	70.3	81.4
2009	28	63.6	14.5	43.2	95.5	47.6	53.8	59.5	75.1	85.9
2010	26	60.6	9.7	37.1	85.1	49.5	53.4	60.7	67.4	69.6
2011	18	62.0	10.3	50.6	91.7	51.9	54.8	58.1	64.9	75.4
1998-2011	286	62.6	11.8	37.1	103	49.5	53.8	60.9	69.3	80.8

Table 4

Age distribution by 5-year age group and gender for period 1998-2011 (incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4	1	0.1	0.1	1	0.1	0.1			0.0
5-9	0	0.0	0.1			0.1			0.0
10-14	0	0.0	0.1			0.1			0.0
15-19	0	0.0	0.1			0.1			0.0
20-24	0	0.0	0.1			0.1			0.0
25-29	0	0.0	0.1			0.1			0.0
30-34	1	0.1	0.2	1	0.1	0.2			0.0
35-39	5	0.4	0.6	3	0.3	0.6	2	0.7	0.7
40-44	42	3.6	4.2	35	4.0	4.6	7	2.4	3.1
45-49	110	9.5	13.7	85	9.7	14.3	25	8.7	11.9
50-54	196	16.9	30.7	148	17.0	31.3	48	16.8	28.7
55-59	231	19.9	50.6	176	20.2	51.5	55	19.2	47.9
60-64	211	18.2	68.8	165	18.9	70.4	46	16.1	64.0
65-69	149	12.9	81.7	113	13.0	83.4	36	12.6	76.6
70-74	93	8.0	89.7	73	8.4	91.7	20	7.0	83.6
75-79	53	4.6	94.3	38	4.4	96.1	15	5.2	88.8
80-84	41	3.5	97.8	21	2.4	98.5	20	7.0	95.8
85+	25	2.2	100.0	13	1.5	100.0	12	4.2	100.0
All ages	1158	100.0		872	100.0		286	100.0	

Included in the statistics are 31.5% 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

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=14 %	Females DCO rate n=7 %	Males Prop.all cancers n=132509 %	Females Prop.all cancers n=129521 %
0- 4	1		0.1	0.0	100.0		0.4	
5- 9			0.0	0.0				
10-14			0.0	0.0				
15-19			0.0	0.0				
20-24			0.0	0.0				
25-29			0.0	0.0				
30-34	1		0.1	0.0			0.1	
35-39	3	2	0.1	0.1			0.2	0.1
40-44	35	7	1.6	0.3			1.3	0.1
45-49	84	24	4.3	1.3			1.9	0.3
50-54	148	47	8.9	2.7	0.7		2.0	0.5
55-59	176	55	11.3	3.4			1.4	0.5
60-64	163	45	10.7	2.8	2.5	2.2	0.9	0.3
65-69	113	36	8.3	2.4	0.9		0.5	0.2
70-74	73	20	7.1	1.6	2.7	5.0	0.3	0.1
75-79	38	15	5.6	1.5	5.3		0.2	0.1
80-84	21	20	5.2	2.5	9.5	10.0	0.2	0.1
85+	13	12	4.7	1.6	7.7	25.0	0.2	0.1
All ages	869	283			1.6	2.5	0.7	0.2
Incidence								
Raw			3.5	1.1				
WS			2.2	0.6				
ES			3.0	0.9				
BRD-S			3.3	1.0				

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

Diagnosis	Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C03-C06 Oral cavity	12	0.3	37.1	19.2	64.8	#	55.0	8.3
C09-C10 Oropharynx	3	0.4	7.0	1.4	20.4	#	12.1	
C12-C13 Hypopharynx	8	0.2	32.8	14.2	64.6	#	36.5	
C15 Oesophagus	9	0.5	16.8	7.7	31.9	#	39.9	
C16 Stomach	4	0.9	4.2	1.2	10.8	#	14.4	25.0
C18 Colon	3	2.3	1.3	0.3	3.9		3.5	
C22 Liver	3	0.7	4.3	0.9	12.5		10.8	33.3
C25 Pancreas	3	0.8	3.6	0.7	10.5		10.2	33.3
C32 Larynx	11	0.3	31.8	15.9	56.9	#	50.2	18.2
C33-C34 Lung	20	3.1	6.4	3.9	9.8	#	79.4	5.0
C43 Malign. melanoma	2	1.1	1.9	0.2	6.7		4.3	
C61 Prostate	7	7.2	1.0	0.4	2.0		-1.0	
C67 Bladder	2	0.9	2.3	0.3	8.1		5.2	50.0
C73 Thyroid	2	0.2	8.4	1.0	30.3	#	8.3	
Other primaries	8	3.4	2.3	1.0	4.6	#	21.5	12.5
Not observed	0	2.9	0.0	0.0	1.3		-13.7	
All mult. primaries	97	25.5	3.8	3.1	4.6	#	336.8	9.3

Patients	672
Mean age at second malignancy (years)	61.5
Person-years	2123
Mean observation time (years)	3.2
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 1998-2011
FEMALES

Diagnosis	Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C09-C10 Oropharynx	3	0.0	68.9	14.2	201.5	#	37.4	
C12-C13 Hypopharynx	3	0.0	266.0	54.9	777.4	#	37.8	
C15 Oesophagus	3	0.0	67.8	14.0	198.1	#	37.4	
C18 Colon	4	0.7	5.9	1.6	15.1	#	42.1	
C32 Larynx	2	0.0	115.6	14.0	417.5	#	25.1	
C33-C34 Lung	6	0.6	10.6	3.9	23.1	#	68.8	
C50 Breast	2	2.6	0.8	0.1	2.8		-7.6	
C53 Cervix uteri	2	0.1	16.7	2.0	60.4	#	23.8	
C56 Ovary	2	0.3	6.2	0.8	22.4		21.2	50.0
Other primaries	3	0.6	5.1	1.0	14.8	#	30.5	
Not observed	0	2.7	0.0	0.0	1.4		-34.3	
All mult. primaries	30	7.7	3.9	2.6	5.6	#	282.4	3.3

Patients	215
Mean age at second malignancy (years)	61.7
Person-years	790
Mean observation time (years)	3.7
Median observation time (years)	2.8

The occurrence of second malignancy is statistically significant.

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

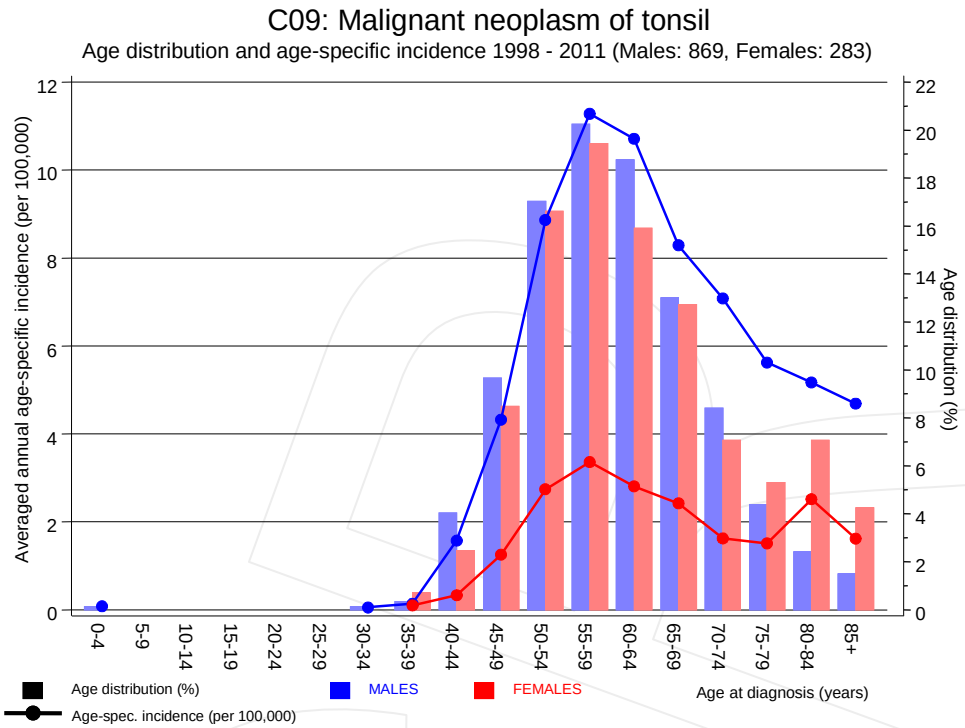


Figure 7. Age distribution and age-specific incidence

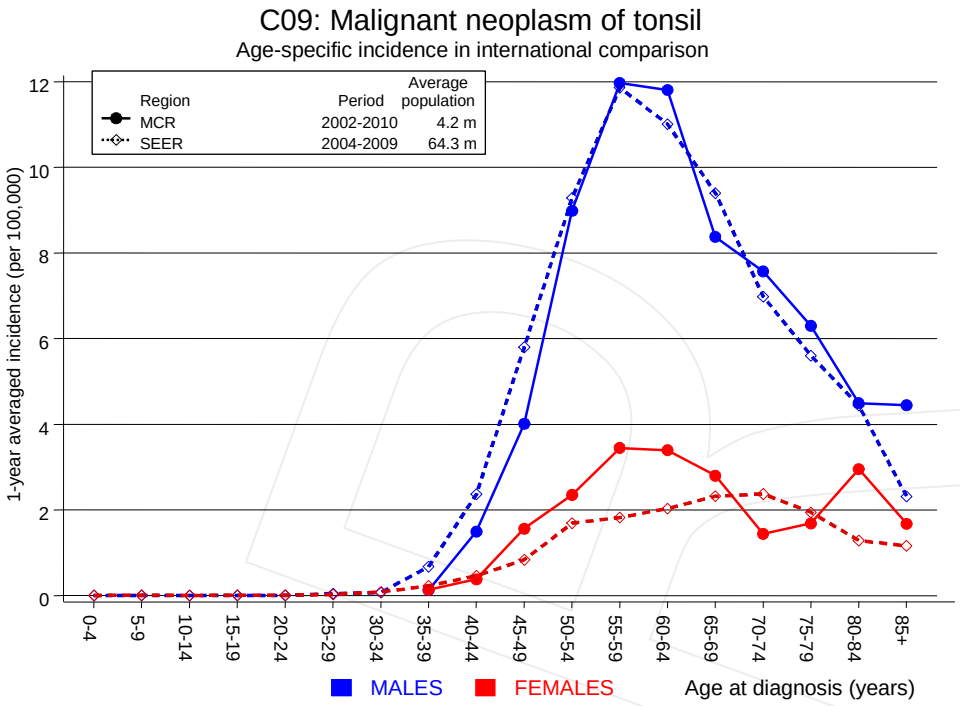


Figure 7a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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.

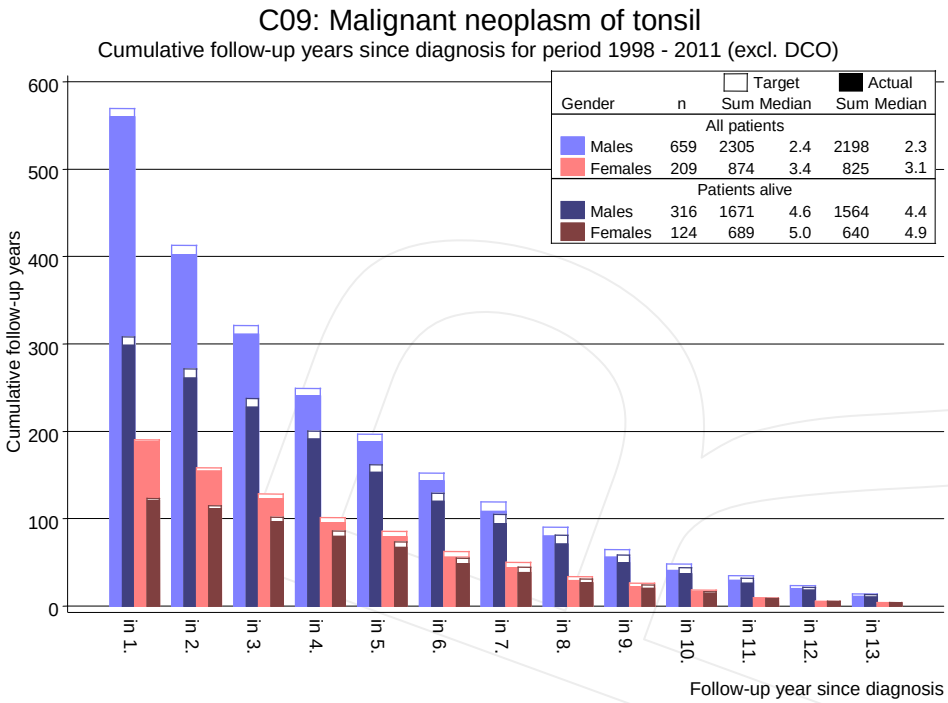
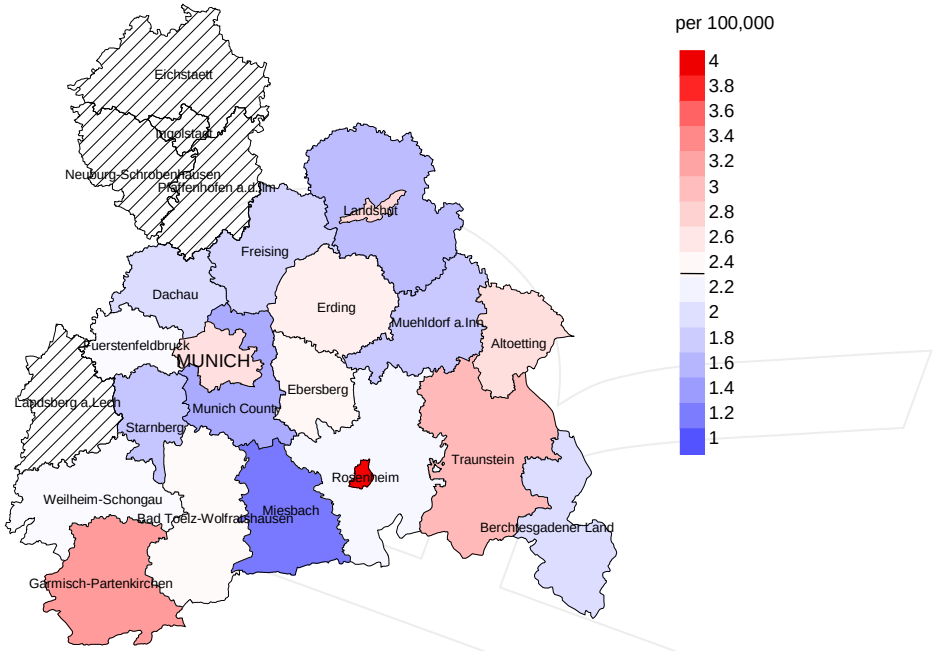


Figure 8. Cumulative follow-up years depending on time since diagnosis

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

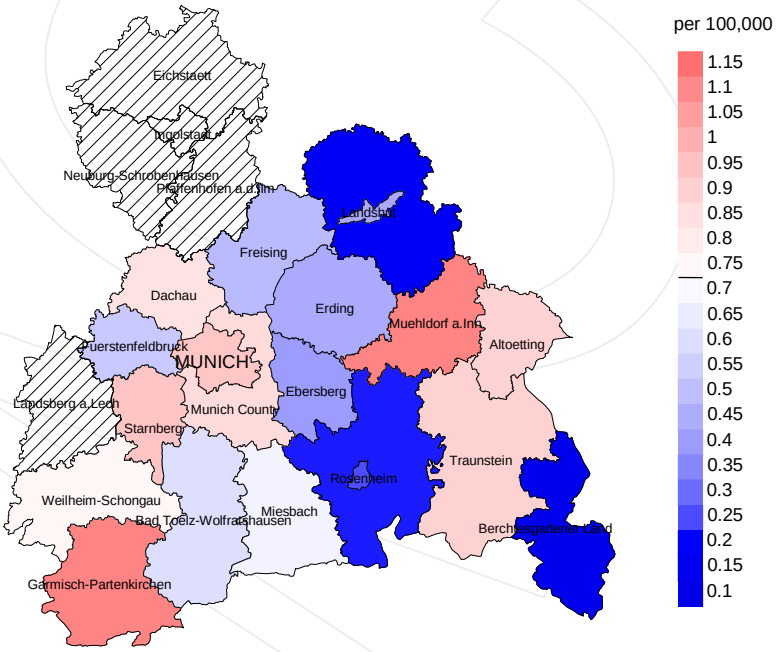
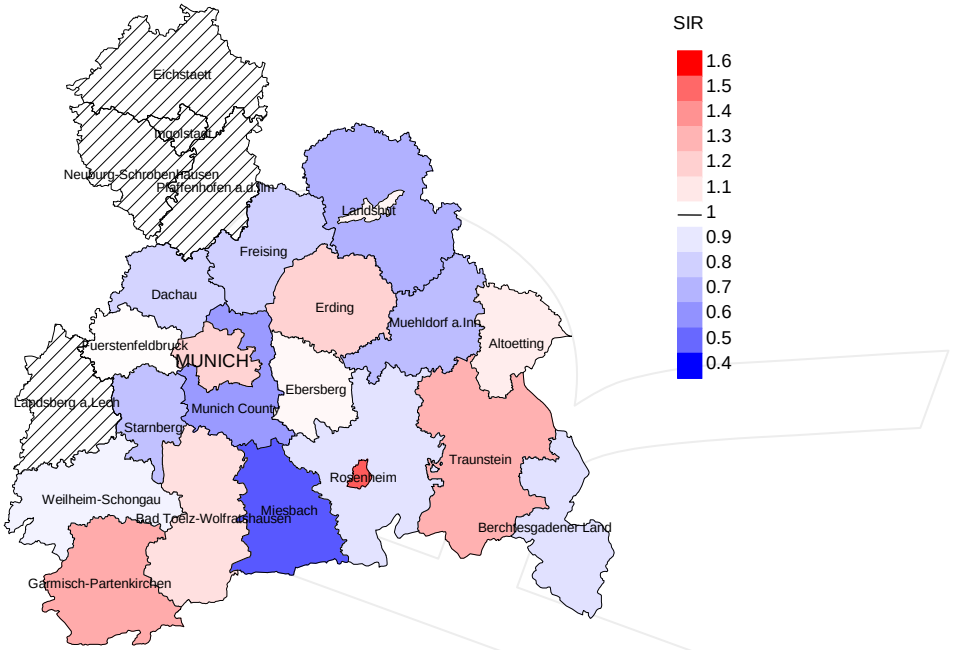


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 2.3/100,000 WS N=421, females 0.7/100,000 WS N=153). 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 2 women were identified with newly diagnosed tonsil 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 0.0 and 1.9/100,000.

Standardized incidence ratio (SIR) 2003 - 2008: Males



Standardized incidence ratio (SIR) 2003 - 2008: Females

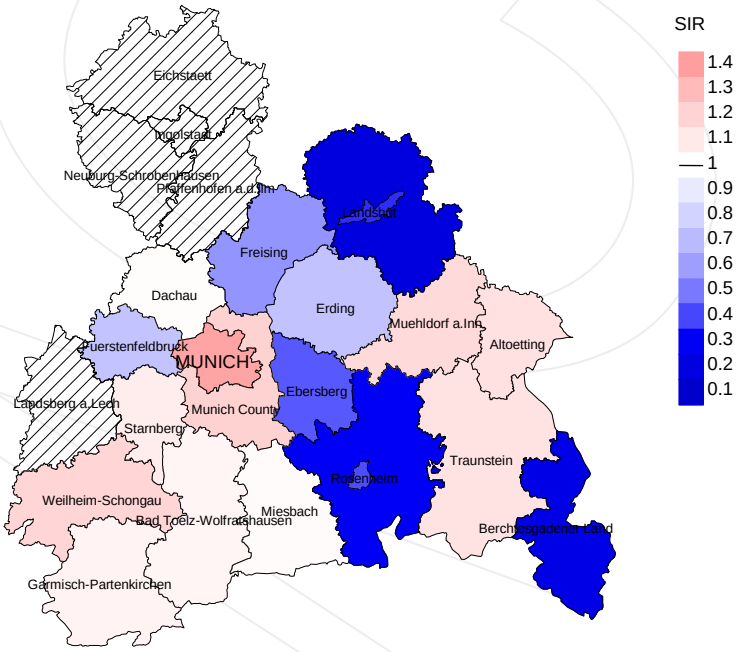


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=421, females N=153). 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 2 women were identified with newly diagnosed tonsil cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.43. Though, the value of this parameter may vary with an underlying probability of 99% between 0.02 and 1.99, 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	52	100.0	5.8	41	78.8	95.1
1999	56	100.0		41	73.2	78.0
2000	43	100.0		33	76.7	100.0
2001	49	91.8	2.0	34	69.4	94.1
2002	87	100.0		49	56.3	95.9
2003	104	97.1	1.0	71	68.3	97.2
2004	91	98.9	1.1	55	60.4	98.2
2005	92	98.9	3.3	50	54.3	98.0
2006	96	95.8		54	56.3	98.1
2007	94	85.1	9.6	38	40.4	100.0
2008	111	76.6	0.9	45	40.5	95.6
2009	101	76.2	1.0	40	39.6	100.0
2010	104	87.5	1.0	36	34.6	100.0
2011	78	70.5		16	20.5	93.8
1998-2011	1158	90.2	1.8	603	52.1	96.2

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	52	42	90.5	10	19.2
1999	56	38	78.9	10	17.9
2000	43	31	93.5	4	9.3
2001	49	33	97.0	12	24.5
2002	87	54	96.3	8	9.2
2003	104	60	96.7	16	15.4
2004	91	70	97.1	8	8.8
2005	92	66	95.5	15	16.3
2006	96	59	96.6	10	10.4
2007	94	71	98.6	16	17.0
2008	111	66	100.0	11	9.9
2009	101	63	98.4	14	13.9
2010	104	64	98.4	10	9.6
2011	78	63	98.4	11	14.1
1998-2011	1158	780	96.2	155	13.4

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	42	73.8	26.2	89.5
1999	38	55.3	44.7	83.3
2000	31	83.9	16.1	93.1
2001	33	78.8	21.2	93.8
2002	54	72.2	27.8	80.8
2003	60	76.7	23.3	93.1
2004	70	84.3	15.7	92.6
2005	66	89.4	10.6	95.2
2006	59	78.0	22.0	86.0
2007	71	81.7	18.3	88.6
2008	66	68.2	31.8	77.3
2009	63	81.0	19.0	98.4
2010	64	75.0	25.0	88.9
2011	63	71.4	28.6	82.3
1998-2011	780	76.9	23.1	88.7

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	33	59.7	56.1	73.0	57.3
1999	28	63.5	60.1	69.5	60.5
2000	22	61.1	61.0	61.5	61.0
2001	26	62.8	61.6	67.7	63.8
2002	46	64.2	62.1	70.7	62.2
2003	48	63.5	63.5	63.5	63.2
2004	55	61.0	60.2	65.1	60.7
2005	54	62.0	61.6	64.6	61.7
2006	46	65.3	64.7	68.1	64.6
2007	63	64.6	62.0	75.8	63.1
2008	46	67.4	65.7	71.2	66.8
2009	49	62.8	61.6	69.0	63.0
2010	47	66.1	65.1	70.0	65.4
2011	50	66.8	64.6	73.2	65.2
1998-2011	613	63.8	62.3	69.6	63.0

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	72.9	71.2	75.1	73.1
1999	10	67.1	55.3	72.2	55.0
2000	9	64.6	63.4	74.0	64.6
2001	7	65.4	63.8	69.4	64.2
2002	8	68.4	70.1	66.6	71.8
2003	12	68.1	65.4	71.7	68.1
2004	15	70.1	70.5	67.3	69.7
2005	12	62.1	61.8	65.9	61.8
2006	13	71.9	70.5	74.2	71.0
2007	8	69.0	70.6	58.2	69.0
2008	20	70.5	67.9	75.4	67.6
2009	14	71.7	71.5	72.2	70.9
2010	17	65.9	63.9	68.7	64.3
2011	13	71.2	67.4	77.2	67.4
1998-2011	167	68.7	67.1	71.9	67.3

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	26	2.3	0.65	1.7	0.67	2.2	0.67	2.3	0.66
1999	18	1.6	0.41	1.0	0.38	1.4	0.39	1.7	0.43
2000	18	1.6	0.56	1.0	0.55	1.4	0.54	1.6	0.53
2001	21	1.8	0.53	1.2	0.52	1.6	0.51	1.9	0.55
2002	35	1.9	0.49	1.2	0.47	1.7	0.48	1.9	0.53
2003	39	2.1	0.54	1.3	0.51	1.8	0.52	2.1	0.55
2004	46	2.4	0.61	1.6	0.60	2.2	0.61	2.4	0.61
2005	48	2.5	0.74	1.6	0.71	2.2	0.72	2.4	0.75
2006	38	2.0	0.55	1.2	0.52	1.7	0.52	1.8	0.53
2007	51	2.3	0.68	1.4	0.66	2.0	0.68	2.2	0.67
2008	32	1.4	0.43	0.8	0.40	1.2	0.41	1.3	0.41
2009	42	1.9	0.58	1.2	0.59	1.6	0.59	1.8	0.58
2010	38	1.7	0.49	1.0	0.47	1.4	0.49	1.6	0.51
2011	37	1.6	0.63	0.9	0.59	1.3	0.62	1.6	0.66
1998-2011	489	1.9	0.56	1.2	0.54	1.7	0.55	1.9	0.57

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	0.42	0.2	0.29	0.3	0.31	0.4	0.41
1999	3	0.3	0.25	0.2	0.33	0.2	0.30	0.2	0.27
2000	8	0.7	0.73	0.4	0.67	0.5	0.67	0.6	0.77
2001	5	0.4	0.56	0.2	0.47	0.3	0.47	0.3	0.45
2002	4	0.2	0.27	0.1	0.22	0.2	0.25	0.2	0.23
2003	7	0.4	0.22	0.2	0.21	0.3	0.22	0.3	0.22
2004	13	0.7	0.93	0.3	0.80	0.4	0.81	0.6	0.91
2005	11	0.6	0.42	0.3	0.44	0.5	0.44	0.5	0.43
2006	8	0.4	0.30	0.2	0.21	0.3	0.23	0.3	0.27
2007	7	0.3	0.39	0.1	0.33	0.2	0.34	0.3	0.37
2008	13	0.6	0.35	0.3	0.32	0.4	0.33	0.4	0.32
2009	10	0.4	0.36	0.2	0.31	0.3	0.31	0.3	0.31
2010	10	0.4	0.40	0.2	0.36	0.3	0.39	0.4	0.40
2011	8	0.3	0.47	0.2	0.39	0.2	0.40	0.3	0.43
1998-2011	112	0.4	0.40	0.2	0.35	0.3	0.36	0.4	0.38

Table 13

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

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4	1	0.2	0.2	1	0.2	0.2			0.0
5-9	0	0.0	0.2			0.2			0.0
10-14	0	0.0	0.2			0.2			0.0
15-19	0	0.0	0.2			0.2			0.0
20-24	0	0.0	0.2			0.2			0.0
25-29	0	0.0	0.2			0.2			0.0
30-34	0	0.0	0.2			0.2			0.0
35-39	2	0.3	0.5	2	0.4	0.6			0.0
40-44	18	3.0	3.5	16	3.3	3.9	2	1.8	1.8
45-49	35	5.8	9.3	32	6.5	10.4	3	2.7	4.5
50-54	77	12.7	22.0	69	14.0	24.4	8	7.1	11.6
55-59	118	19.5	41.6	93	18.9	43.3	25	22.3	33.9
60-64	118	19.5	61.1	100	20.3	63.6	18	16.1	50.0
65-69	90	14.9	76.0	74	15.0	78.7	16	14.3	64.3
70-74	56	9.3	85.3	45	9.1	87.8	11	9.8	74.1
75-79	41	6.8	92.1	30	6.1	93.9	11	9.8	83.9
80-84	26	4.3	96.4	18	3.7	97.6	8	7.1	91.1
85+	22	3.6	100.0	12	2.4	100.0	10	8.9	100.0
All ages	604	100.0		492	100.0		112	100.0	

Included in the statistics are 31.5% 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**)

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	1		0.1	1.00	0.0		3.4	
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		0.1	0.67	0.0		0.5	
40-44	16	2	0.7	0.46	0.1	0.29	2.1	0.2
45-49	32	3	1.6	0.38	0.2	0.12	2.1	0.2
50-54	69	8	4.1	0.47	0.5	0.17	2.4	0.3
55-59	93	25	6.0	0.53	1.5	0.45	1.8	0.6
60-64	100	18	6.6	0.61	1.1	0.39	1.3	0.3
65-69	74	16	5.4	0.65	1.1	0.44	0.7	0.2
70-74	45	11	4.4	0.62	0.9	0.55	0.4	0.1
75-79	30	11	4.4	0.79	1.1	0.73	0.3	0.1
80-84	18	8	4.4	0.86	1.0	0.40	0.2	0.1
85+	12	10	4.3	0.92	1.3	0.83	0.2	0.1
All ages	492	112					0.7	0.2
Mortality								
Raw			2.0	0.56	0.4	0.39		
WS			1.2	0.55	0.2	0.34		
ES			1.7	0.55	0.3	0.36		
BRD-S			1.9	0.57	0.4	0.37		
PYLL-70								
per 100,000			20.2		3.3			
ES			18.4		2.9			
AYLL-70			11.9		10.4			

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

Table 15a

Multiple primaries in deaths in period 1998-2011
MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	30	13.8	11	36.7	6	20.0	13	43.3
C09-C10 Oropharynx	11	5.0			5	45.5	6	54.5
C12-C13 Hypopharynx	18	8.3	6	33.3	10	55.6	2	11.1
C14 ENT cancer	2	0.9			1	50.0	1	50.0
C15 Oesophagus	21	9.6	7	33.3	2	9.5	12	57.1
C16 Stomach	6	2.8	2	33.3	2	33.3	2	33.3
C18 Colon	7	3.2	3	42.9	1	14.3	3	42.9
C22 Liver	6	2.8			1	16.7	5	83.3
C25 Pancreas	5	2.3					5	100.0
C32 Larynx	18	8.3	6	33.3	6	33.3	6	33.3
C33-C34 Lung	40	18.3	10	25.0	5	12.5	25	62.5
C43 Malign. melanoma	2	0.9					2	100.0
C44 Skin others	12	5.5	3	25.0	2	16.7	7	58.3
C61 Prostate	10	4.6	6	60.0			4	40.0
C64 Kidney	5	2.3	2	40.0	1	20.0	2	40.0
C67 Bladder	5	2.3	3	60.0			2	40.0
C73 Thyroid	2	0.9	1	50.0			1	50.0
C76-C79 CUP	4	1.8	2	50.0			2	50.0
C82-C85 NHL	2	0.9	1	50.0			1	50.0
C91-C96 Leukaemia	2	0.9	1	50.0			1	50.0
Other primaries	10	4.6	3	30.0			7	70.0
All mult. primaries	218	100.0	67	30.7	42	19.3	109	50.0

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 1998-2011
FEMALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	11	18.0	6	54.5	1	9.1	4	36.4
C09-C10 Oropharynx	2	3.3					2	100.0
C12-C13 Hypopharynx	1	1.6					1	100.0
C15 Oesophagus	4	6.6	1	25.0	1	25.0	2	50.0
C18 Colon	4	6.6	2	50.0	1	25.0	1	25.0
C21 Anus/canal	2	3.3	1	50.0			1	50.0
C22 Liver	1	1.6					1	100.0
C26 GI cancer	1	1.6					1	100.0
C30-C31 Sinuses	1	1.6					1	100.0
C32 Larynx	3	4.9	1	33.3			2	66.7
C33-C34 Lung	8	13.1	1	12.5			7	87.5
C44 Skin others	1	1.6					1	100.0
C50 Breast	7	11.5	5	71.4			2	28.6
C53 Cervix uteri	5	8.2	4	80.0			1	20.0
C54 Corpus uteri	1	1.6	1	100.0				
C56 Ovary	1	1.6					1	100.0
C67 Bladder	1	1.6					1	100.0
C68 Urethra	1	1.6	1	100.0				
C70-C72 CNS cancer	1	1.6					1	100.0
C76-C79 CUP	3	4.9	2	66.7			1	33.3
C82-C85 NHL	1	1.6	1	100.0				
C91-C96 Leukaemia	1	1.6					1	100.0
All mult. primaries	61	100.0	26	42.6	3	4.9	32	52.5

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** *)

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	2		0.1	1.00	0.0		0.6	
40-44	14	2	0.6	0.44	0.1	0.29	2.0	0.2
45-49	27	3	1.4	0.35	0.2	0.14	1.9	0.2
50-54	58	7	3.5	0.45	0.4	0.17	2.3	0.3
55-59	76	21	4.9	0.52	1.3	0.47	1.7	0.6
60-64	76	11	5.0	0.58	0.7	0.28	1.2	0.2
65-69	54	14	4.0	0.62	0.9	0.47	0.6	0.2
70-74	38	8	3.7	0.73	0.6	0.53	0.4	0.1
75-79	22	8	3.3	0.73	0.8	0.73	0.3	0.1
80-84	14	5	3.4	0.82	0.6	0.29	0.2	0.1
85+	9	7	3.2	0.82	0.9	0.70	0.2	0.1
All ages	390	86					0.7	0.2
Mortality								
Raw			1.6	0.55	0.3	0.36		
WS			1.0	0.53	0.2	0.32		
ES			1.3	0.53	0.2	0.34		
BRD-S			1.5	0.55	0.3	0.35		
PYLL-70								
per 100,000			16.4		2.8			
ES			14.8		2.4			
AYLL-70			12.1		10.8			

* 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 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	2		0.1	1.00	0.0		0.6	
40-44	13	2	0.6	0.45	0.1	0.33	2.0	0.3
45-49	21	2	1.1	0.30	0.1	0.10	1.6	0.1
50-54	50	7	3.0	0.42	0.4	0.19	2.2	0.4
55-59	59	14	3.8	0.45	0.9	0.36	1.4	0.5
60-64	59	7	3.9	0.50	0.4	0.20	1.0	0.2
65-69	44	13	3.2	0.56	0.9	0.46	0.6	0.3
70-74	29	6	2.8	0.62	0.5	0.46	0.4	0.1
75-79	18	3	2.7	0.64	0.3	0.33	0.3	0.0
80-84	10	5	2.5	0.67	0.6	0.31	0.2	0.1
85+	6	5	2.2	0.55	0.7	0.50	0.1	0.1
All ages	311	64					0.7	0.1
Mortality								
Raw			1.2	0.48	0.2	0.30		
WS			0.8	0.46	0.1	0.27		
ES			1.1	0.47	0.2	0.28		
BRD-S			1.2	0.48	0.2	0.28		
PYLL-70								
per 100,000			13.5		2.1			
ES			12.2		1.9			
AYLL-70			12.3		10.7			

* See corresponding tables with multiple primaries.

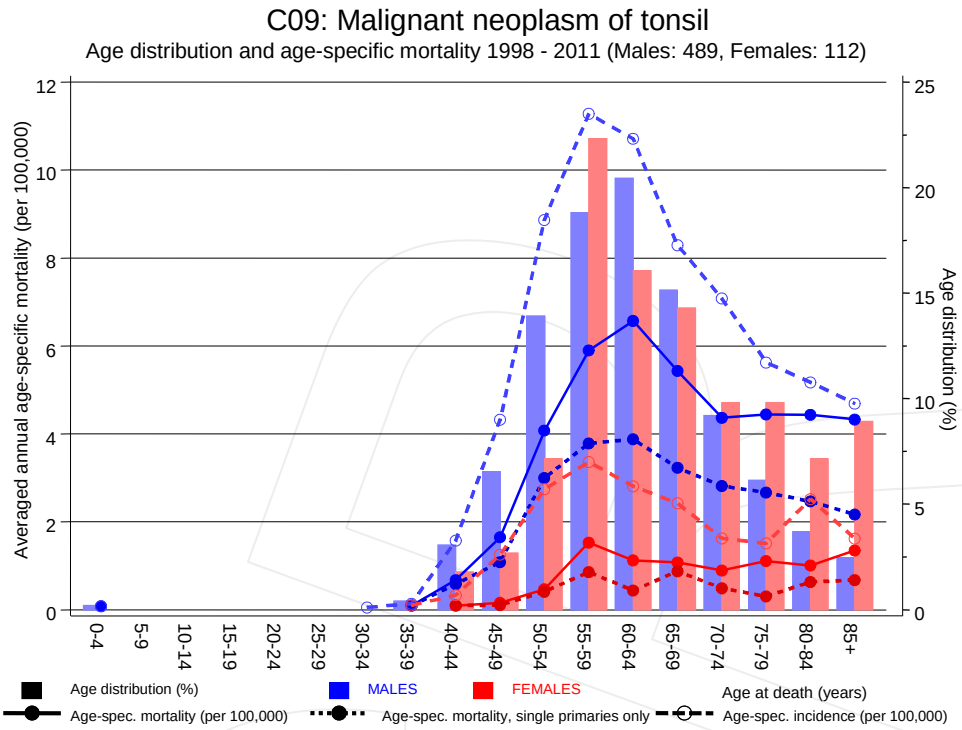
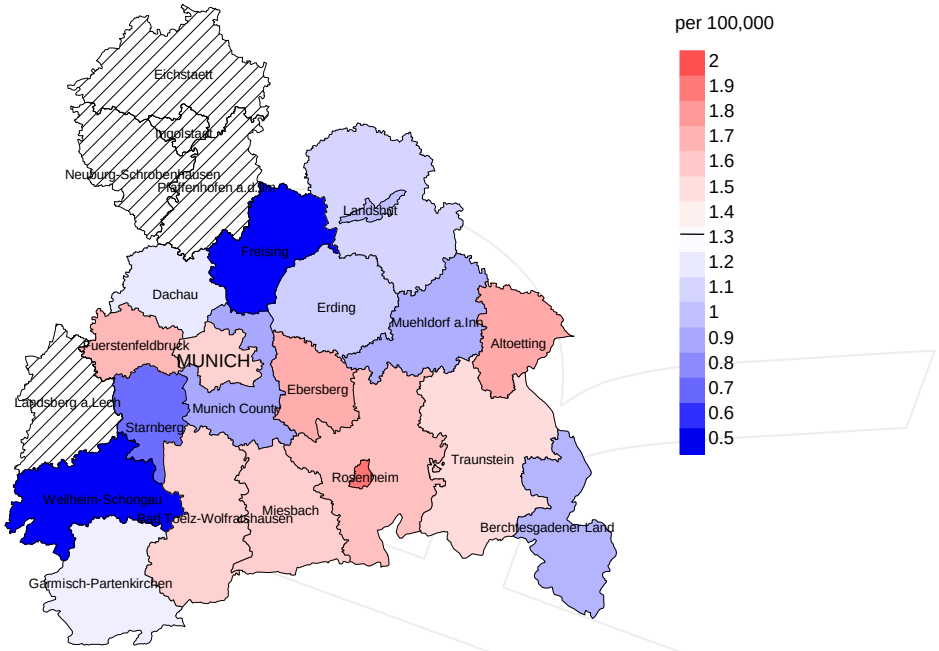


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

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



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

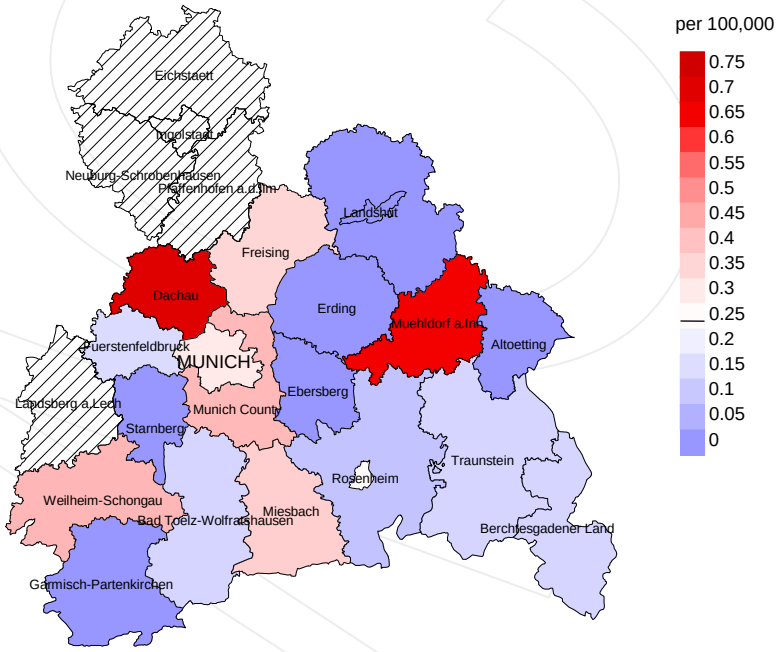
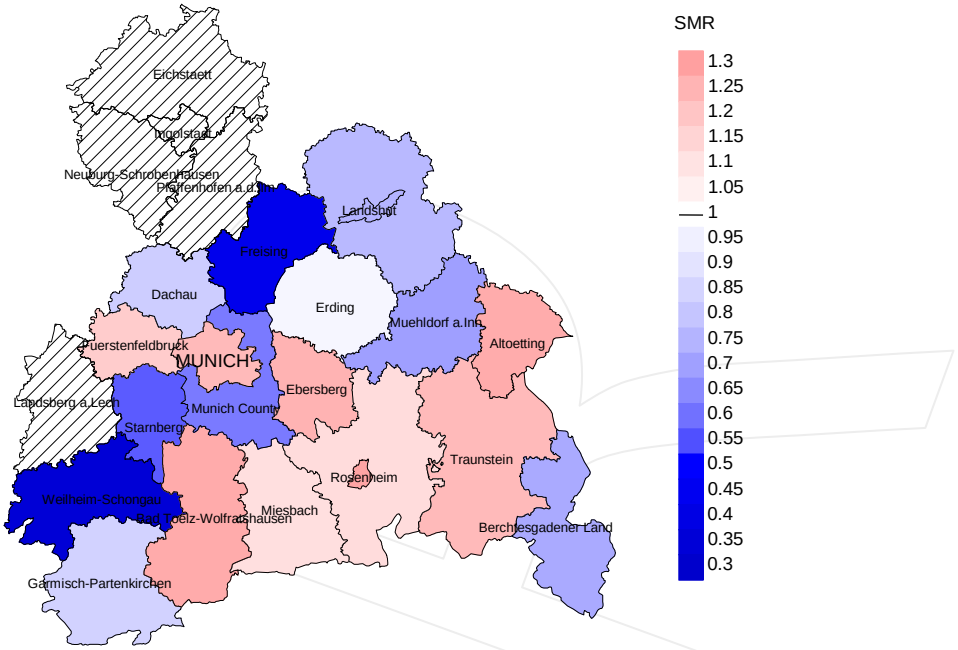


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 1.3/100,000 WS N=248, females 0.2/100,000 WS N=58). Since cancer data are not available in some counties until 2007, the local mortality rates were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 0 women died from tonsil cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.0/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 1.4/100,000.

Standardized mortality ratio (SMR) 2003 - 2008: Males



Standardized mortality ratio (SMR) 2003 - 2008: Females

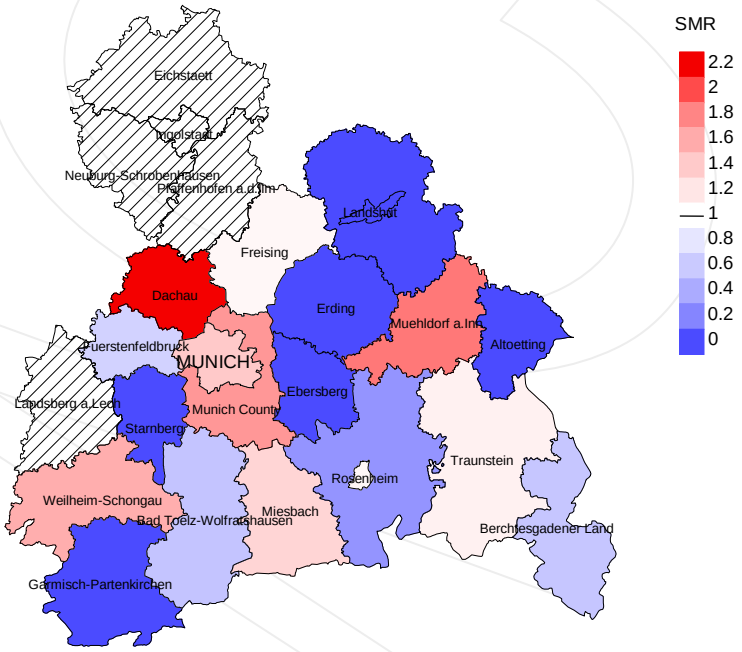


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=248, females N=58). Since cancer data are not available in some counties until 2007, the local SMR values were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 0 women died from tonsil cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.00. Though, the value of this parameter may vary with an underlying probability of 99% between 0.00 and 3.08, 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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