Munich Cancer Registry

- Survival
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- *Deutsch*

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

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

Cancer statistics: Baseline statistics

C07, C08: Salivary gland cancer

Year of diagnosis	1998-2013
Patients	644
Diseases	645
Creation date	05/19/2015
Export date	12/30/2014
Population	4.64 m

http://www.tumorregister-muenchen.de/en/facts/base/base_C0708E.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. 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, May 2015

[#] 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 2014 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 (ICD-10 2015) used for specifying cancer site

Code	Description
C07	Malignant neoplasm of parotid gland
C08.-	Malignant neoplasm of other and unspecified major salivary glands
C08.0	Submandibular gland
C08.1	Sublingual gland
C08.8	Overlapping lesion of major salivary glands
C08.9	Major salivary gland, 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	25	6	24.0	28.0	68.0	100.0	
1999	23	2	8.7	26.1	60.9	87.0	
2000	30	4	13.3	26.7	70.0	96.7	
2001	26	5	19.2	15.4	61.5	88.5	
2002	46	3	6.5	41.3	63.0	95.7	#
2003	31	3	9.7	29.0	54.8	96.8	
2004	39	5	12.8	33.3	59.0	100.0	
2005	42	3	7.1	40.5	57.1	95.2	
2006	37	1	2.7	27.0	48.6	89.2	
2007	49	2	4.1	40.8	51.0	85.7	# ##
2008	53	2	3.8	24.5	50.9	62.3	
2009	48			43.8	60.4	79.2	
2010	68	6	8.8	44.1	42.6	75.0	
2011	56	3	5.4	23.2	26.8	55.4	
2012	46	1	2.2	26.1	30.4	80.4	
2013	26	2	7.7	26.9	23.1	96.2	###
1998-2013	645	48	7.4	32.4	50.2	83.7	

\# 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	25	14	11	56.0
1999	23	10	13	43.5
2000	30	16	14	53.3
2001	26	12	14	46.2
2002	46	23	23	50.0
2003	31	15	16	48.4
2004	39	23	16	59.0
2005	42	26	16	61.9
2006	37	20	17	54.1
2007	49	28	21	57.1
2008	53	35	18	66.0
2009	48	28	20	58.3
2010	68	49	19	72.1
2011	56	32	24	57.1
2012	46	22	24	47.8
2013	26	14	12	53.8
1998-2013	645	367	278	56.9

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 4.64 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	14	11	1.3	0.9	0.8	0.6	1.1	0.7	1.6	0.8
1999	10	13	0.9	1.1	0.5	0.6	0.8	0.7	0.9	0.9
2000	16	14	1.4	1.2	0.8	0.4	1.3	0.7	1.6	1.0
2001	12	14	1.0	1.2	0.6	0.7	0.9	0.9	1.2	1.0
2002	23	23	1.2	1.2	0.7	0.5	1.0	0.7	1.3	1.0
2003	15	16	0.8	0.8	0.5	0.4	0.7	0.6	0.8	0.7
2004	23	16	1.2	0.8	0.7	0.4	1.0	0.6	1.4	0.7
2005	26	16	1.4	0.8	0.8	0.4	1.1	0.6	1.4	0.7
2006	20	17	1.0	0.8	0.6	0.6	0.8	0.7	1.1	0.8
2007	28	21	1.3	0.9	0.7	0.5	1.0	0.6	1.3	0.7
2008	35	18	1.6	0.8	0.9	0.4	1.2	0.5	1.5	0.6
2009	28	20	1.3	0.9	0.7	0.5	0.9	0.6	1.2	0.7
2010	49	19	2.2	0.8	1.2	0.4	1.7	0.5	2.1	0.6
2011	32	24	1.4	1.0	0.7	0.6	1.0	0.8	1.3	0.9
2012	22	24	1.0	1.0	0.5	0.5	0.7	0.7	0.9	0.8
2013	14	12	0.6	0.5	0.4	0.3	0.5	0.4	0.6	0.4
1998-2013	367	278	1.2	0.9	0.7	0.5	1.0	0.6	1.3	0.7

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	25	63.1	22.1	9.5	97.4	31.9	51.4	62.3	81.9	85.6
1999	23	66.7	19.2	13.9	90.9	33.0	60.9	69.0	80.7	85.3
2000	30	70.8	13.0	48.8	91.9	52.3	60.0	73.3	80.7	87.9
2001	26	65.3	18.1	16.4	95.8	42.4	56.2	66.7	78.6	84.0
2002	46	67.6	14.7	31.4	96.4	46.6	60.1	68.8	78.6	84.6
2003	31	61.7	17.7	22.9	90.5	36.2	51.4	61.8	75.5	81.1
2004	39	66.9	19.2	24.7	94.9	37.7	50.1	70.5	81.9	90.6
2005	42	64.5	16.2	31.9	93.1	40.9	51.6	65.6	79.0	82.0
2006	37	60.1	17.1	21.6	89.7	38.8	45.1	63.5	73.9	83.9
2007	49	64.3	18.4	7.7	92.9	33.2	55.9	67.9	76.1	86.6
2008	53	67.5	17.5	19.8	98.4	47.4	60.1	68.5	81.1	86.4
2009	48	66.6	18.7	16.6	96.1	38.7	61.0	68.8	80.6	85.8
2010	68	65.7	19.7	18.2	95.3	33.3	49.6	70.2	80.8	89.1
2011	56	67.6	17.0	14.4	95.5	46.1	58.3	70.3	78.3	87.1
2012	46	68.8	14.9	36.3	94.3	45.0	59.0	72.3	78.4	86.7
2013	26	59.2	21.1	19.0	93.6	29.1	42.5	62.8	75.6	87.5
1998-2013	645	65.7	17.8	7.7	98.4	40.3	54.5	68.6	78.9	86.4

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	14	62.1	18.0	31.9	85.6	34.1	51.4	60.4	82.4	84.2
1999	10	62.5	18.7	32.0	90.4	32.5	54.0	66.4	72.3	84.5
2000	16	67.1	12.6	48.8	89.7	50.0	58.7	64.8	75.1	88.3
2001	12	66.9	11.8	48.6	84.0	52.0	57.8	66.6	76.4	83.9
2002	23	64.1	12.0	40.1	84.6	46.6	55.0	65.2	73.9	78.6
2003	15	58.3	13.7	29.1	81.1	36.2	51.4	61.3	69.0	72.6
2004	23	66.7	19.0	26.7	92.4	44.8	46.3	70.5	81.9	90.2
2005	26	65.7	15.7	31.9	87.8	40.9	61.2	70.0	77.8	82.0
2006	20	63.5	14.3	39.1	84.3	42.1	54.4	64.0	77.7	81.7
2007	28	63.0	17.1	15.7	84.6	33.1	54.0	69.3	75.2	77.9
2008	35	67.4	14.4	19.8	89.1	49.4	60.1	68.0	78.1	84.3
2009	28	68.6	15.6	16.6	86.8	48.2	63.5	69.9	80.6	85.5
2010	49	66.5	19.4	18.2	95.3	36.1	52.3	70.4	80.6	89.1
2011	32	70.9	15.6	14.4	95.5	51.9	65.0	72.7	80.9	87.1
2012	22	70.7	13.8	45.0	94.3	50.9	60.9	71.5	82.4	86.7
2013	14	58.3	23.1	19.0	88.0	25.3	43.3	65.0	75.5	87.5
1998-2013	367	65.9	16.3	14.4	95.5	43.8	55.0	68.5	77.9	84.6

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	11	64.4	27.3	9.5	97.4	29.6	42.5	73.6	81.9	93.7
1999	13	69.9	19.8	13.9	90.9	55.1	64.3	75.7	81.6	85.3
2000	14	75.1	12.7	51.7	91.9	52.9	66.4	79.0	84.7	87.6
2001	14	63.9	22.5	16.4	95.8	27.1	56.2	66.7	78.6	90.7
2002	23	71.1	16.5	31.4	96.4	48.2	63.5	71.5	82.4	89.4
2003	16	65.0	20.6	22.9	90.5	30.3	50.1	74.1	79.9	85.2
2004	16	67.1	20.2	24.7	94.9	37.1	57.1	70.1	79.4	93.2
2005	16	62.5	17.4	33.8	93.1	38.9	50.4	60.3	79.6	83.7
2006	17	56.1	19.6	21.6	89.7	26.6	41.3	54.5	69.9	84.0
2007	21	65.9	20.4	7.7	92.9	40.5	58.5	67.5	85.0	88.1
2008	18	67.6	22.8	25.6	98.4	28.7	51.8	74.3	82.8	90.7
2009	20	63.8	22.4	16.8	96.1	25.1	51.3	67.8	81.0	87.4
2010	19	63.6	20.9	27.9	90.4	29.5	44.5	70.0	82.4	89.8
2011	24	63.1	18.0	17.2	94.6	40.3	51.7	66.0	75.2	84.8
2012	24	67.0	16.0	36.3	89.7	43.6	55.1	72.8	77.3	85.7
2013	12	60.2	19.4	34.8	93.6	39.4	42.2	59.6	75.7	82.9
1998-2013	278	65.5	19.6	7.7	98.4	37.1	53.9	69.0	80.3	88.0

Table 4

Age distribution by 5-year age group and gender for period 1998-2013 (incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
5-9	2	0.3	0.3			0.0	2	0.7	0.7
10-14	2	0.3	0.6	1	0.3	0.3	1	0.4	1.1
15-19	9	1.4	2.0	5	1.4	1.6	4	1.4	2.5
20-24	3	0.5	2.5			1.6	3	1.1	3.6
25-29	13	2.0	4.5	6	1.6	3.3	7	2.5	6.1
30-34	17	2.6	7.1	10	2.7	6.0	7	2.5	8.6
35-39	17	2.6	9.8	6	1.6	7.6	11	4.0	12.6
40-44	29	4.5	14.3	12	3.3	10.9	17	6.1	18.7
45-49	30	4.7	18.9	21	5.7	16.6	9	3.2	21.9
50-54	45	7.0	25.9	29	7.9	24.5	16	5.8	27.7
55-59	29	4.5	30.4	16	4.4	28.9	13	4.7	32.4
60-64	65	10.1	40.5	43	11.7	40.6	22	7.9	40.3
65-69	82	12.7	53.2	49	13.4	54.0	33	11.9	52.2
70-74	86	13.3	66.5	56	15.3	69.2	30	10.8	62.9
75-79	72	11.2	77.7	42	11.4	80.7	30	10.8	73.7
80-84	65	10.1	87.8	36	9.8	90.5	29	10.4	84.2
85+	79	12.2	100.0	35	9.5	100.0	44	15.8	100.0
All ages	645	100.0		367	100.0		278	100.0	

Included in the statistics are 55.2% multiple primaries in males and 35.3% in females.

Table 5

Age-specific incidence, DCO rate and proportion of all cancers
for period 1998-2013

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=18 %	Females DCO rate n=30 %	Males Prop.all cancers n=158258 %	Females Prop.all cancers n=153136 %
0- 4			0.0	0.0				
5- 9		2	0.0	0.1				1.6
10-14	1	1	0.1	0.1			0.6	0.6
15-19	5	4	0.3	0.3			1.4	1.4
20-24		3	0.0	0.2				0.6
25-29	6	7	0.3	0.3			0.6	0.6
30-34	10	7	0.4	0.3			0.7	0.3
35-39	6	11	0.2	0.5			0.3	0.3
40-44	12	17	0.5	0.7			0.4	0.3
45-49	21	9	0.9	0.4	4.8	11.1	0.4	0.1
50-54	29	16	1.4	0.8		6.3	0.3	0.1
55-59	16	13	0.9	0.7			0.1	0.1
60-64	43	22	2.4	1.2		4.5	0.2	0.1
65-69	49	33	3.1	1.9	2.0		0.2	0.2
70-74	56	30	4.4	2.0	3.6	3.3	0.2	0.2
75-79	42	30	5.1	2.5	9.5	10.0	0.2	0.2
80-84	36	29	7.2	3.1	13.9	6.9	0.3	0.2
85+	35	44	10.3	4.9	14.3	47.7	0.4	0.3
All ages	367	278			4.9	10.8	0.2	0.2
Incidence								
Raw			1.2	0.9				
WS			0.7	0.5				
ES			1.0	0.6				
BRD-S			1.3	0.7				

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 1998-2013
MALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%	EAR	DCO %
C16	Stomach	2	0.5	3.7	0.4	13.3	15.9	
C18	Colon	2	1.3	1.5	0.2	5.6	7.7	
C19-C20	Rectum	2	0.7	2.7	0.3	9.7	13.7	
C32	Larynx	2	0.1	13.8	1.7	50.0 #	20.3	
C33-C34	Lung	11	1.6	7.1	3.5	12.6 #	103.1	9.1
C61	Prostate	8	3.9	2.0	0.9	4.0	44.2	25.0
C67	Bladder	3	0.6	5.2	1.1	15.1 #	26.4	
C82-C85	NHL	2	0.5	3.8	0.5	13.7	16.1	
Other primaries		10	1.7	6.0	2.9	10.9 #	90.8	20.0
Not observed		0	2.5	0.0	0.0	1.5	-27.4	
All mult. primaries		42	13.5	3.1	2.2	4.2 #	310.8	11.9

Patients	230
Median age at second malignancy (years)	72.5
Person-years	916
Mean observation time (years)	4.0
Median observation time (years)	2.8

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 1998-2013
FEMALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%	EAR	DCO %
C18	Colon	2	1.0	1.9	0.2	7.0	11.9	
C25	Pancreas	2	0.4	4.7	0.6	16.9	19.2	100.0
C33-C34	Lung	6	0.6	10.5	3.8	22.8 #	66.3	50.0
C50	Breast	5	2.5	2.0	0.6	4.7	30.5	20.0
C73	Thyroid	2	0.1	13.8	1.7	50.0 #	22.7	50.0
Other primaries		9	1.2	7.2	3.3	13.7 #	94.7	11.1
Not observed		0	3.1	0.0	0.0	1.2	-38.2	
All mult. primaries		26	9.0	2.9	1.9	4.2 #	207.0	30.8

Patients	187
Median age at second malignancy (years)	75.5
Person-years	819
Mean observation time (years)	4.4
Median observation time (years)	3.2

The occurrence of second malignancy is statistically significant.

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

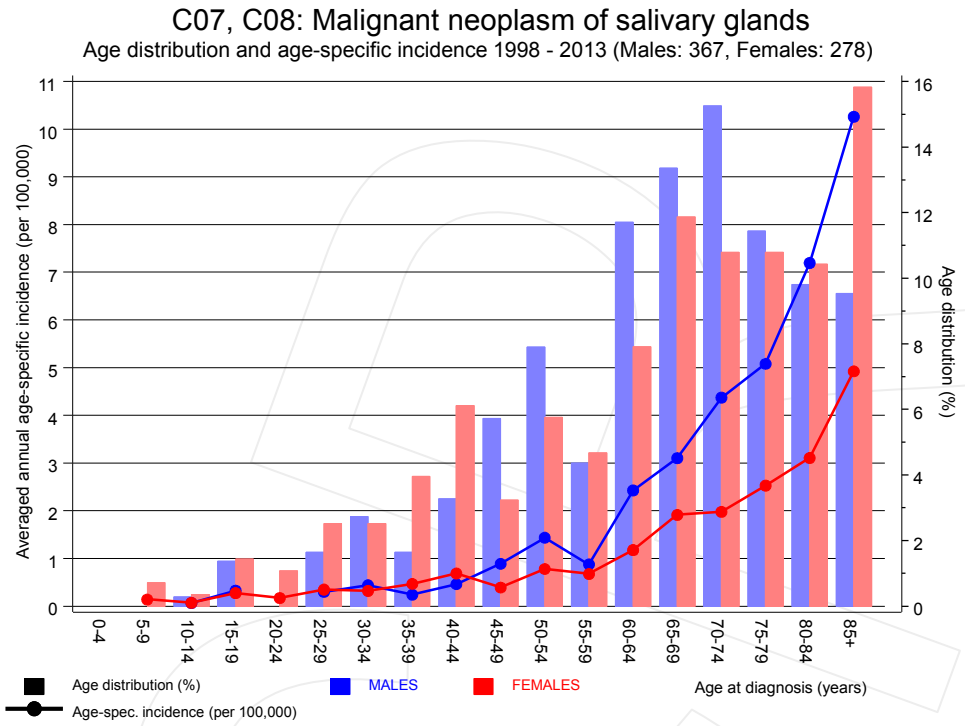


Figure 7. Age distribution and age-specific incidence

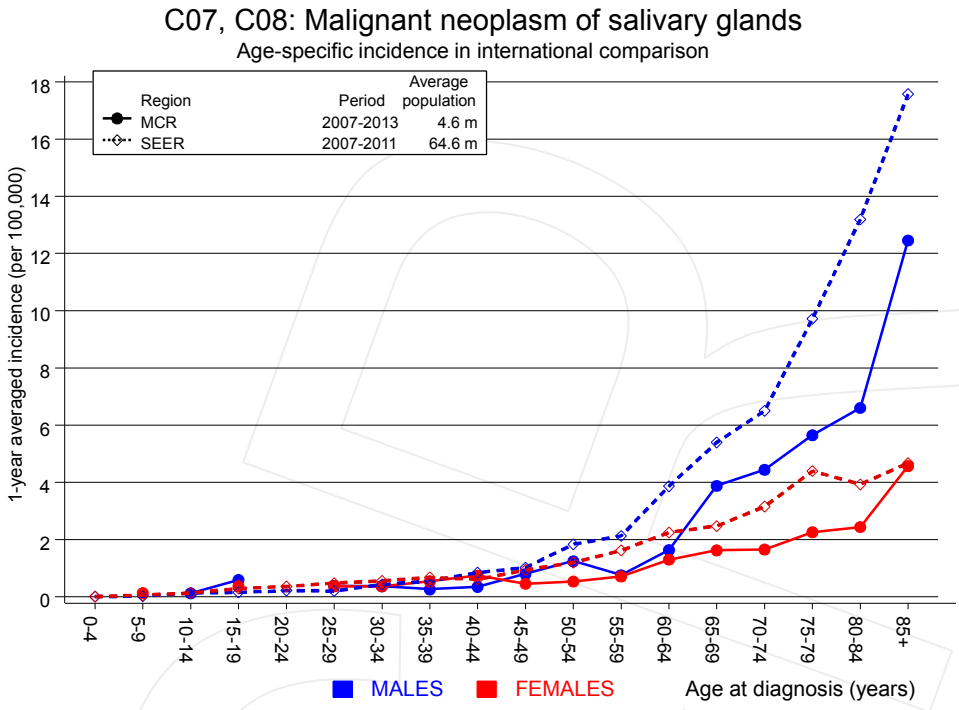


Figure 7a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

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

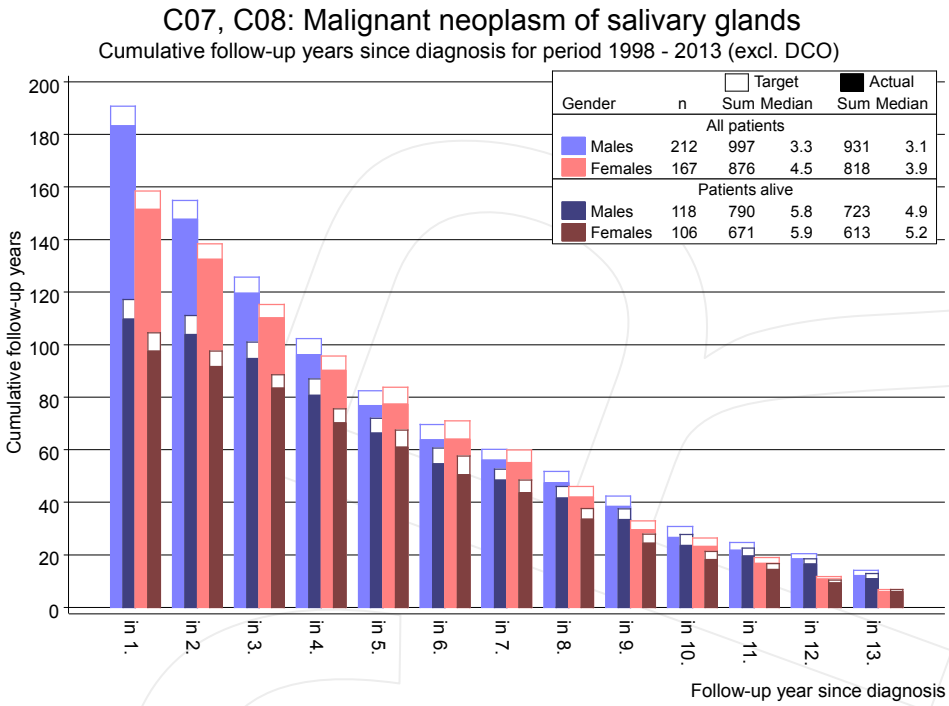
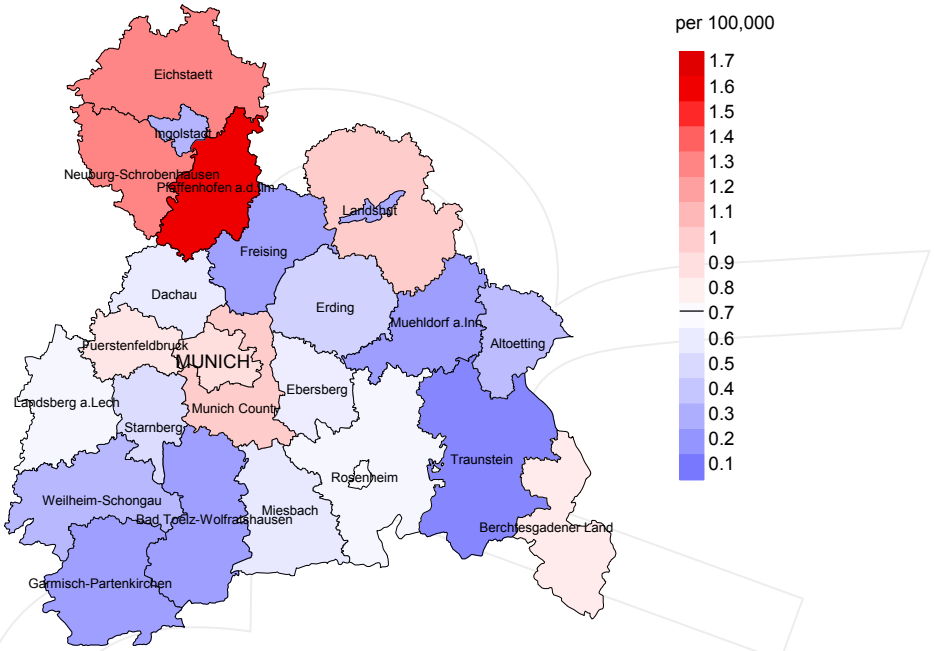


Figure 8. Cumulative follow-up years depending on time since diagnosis

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) 2007 - 2013: Males



Average incidence (world standard population) 2007 - 2013: Females

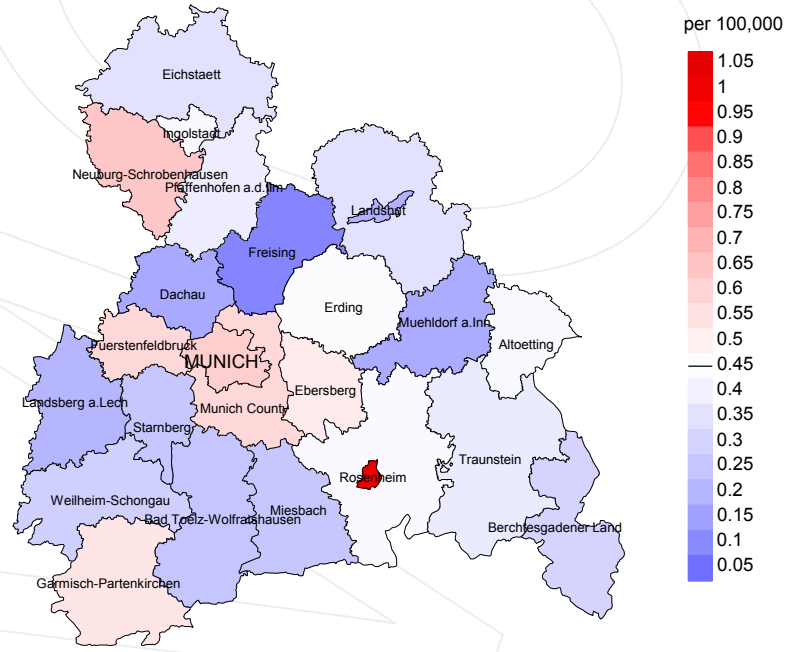
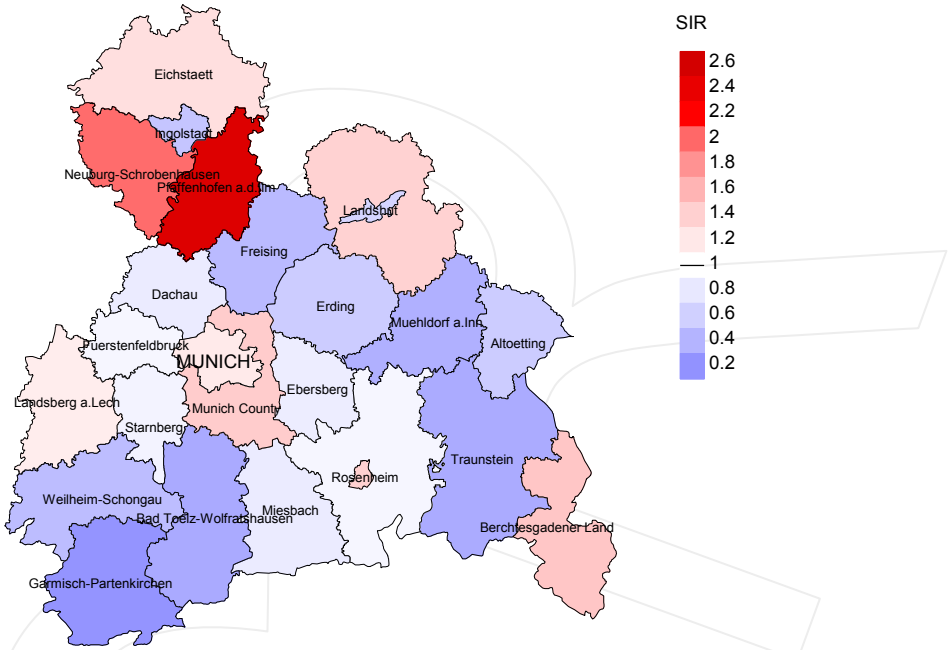


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 0.7/100,000 WS N=208, females 0.5/100,000 WS N=138).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,928 female residents (averaged) in the period from 2007 to 2013 a total of 2 women were identified with newly diagnosed salivary gland cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 0.5/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 2.9/100,000.

Standardized incidence ratio (SIR) 2007 - 2013: Males



Standardized incidence ratio (SIR) 2007 - 2013: Females

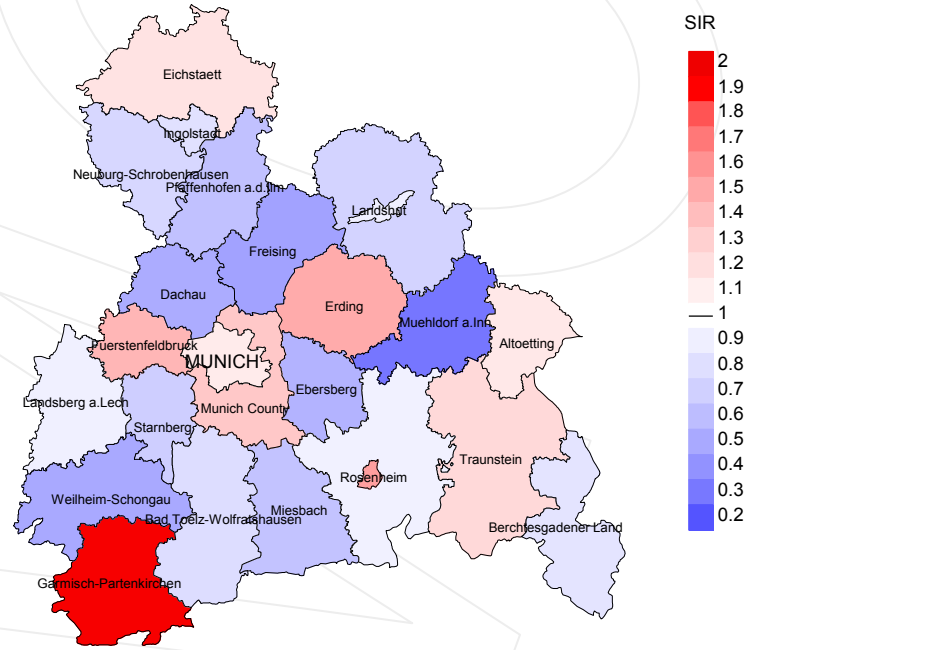


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=208, females N=138).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,642 female residents (averaged) in the period from 2007 to 2013 a total of 2 women were identified with newly diagnosed salivary gland cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.54. Though, the value of this parameter may vary with an underlying probability of 99% between 0.03 and 2.52, 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	25	100.0	24.0	17	68.0	94.1
1999	23	87.0	8.7	14	60.9	100.0
2000	30	96.7	13.3	21	70.0	95.2
2001	26	88.5	19.2	16	61.5	93.8
2002	46	95.7	6.5	29	63.0	96.6
2003	31	96.8	9.7	17	54.8	88.2
2004	39	100.0	12.8	23	59.0	87.0
2005	42	95.2	7.1	24	57.1	100.0
2006	37	89.2	2.7	18	48.6	100.0
2007	49	85.7	4.1	25	51.0	100.0
2008	53	62.3	3.8	27	50.9	92.6
2009	48	79.2		29	60.4	100.0
2010	68	75.0	8.8	29	42.6	100.0
2011	56	55.4	5.4	15	26.8	93.3
2012	46	80.4	2.2	14	30.4	92.9
2013	26	96.2	7.7	6	23.1	100.0
1998-2013	645	83.7	7.4	324	50.2	96.0

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	25	16	87.5	7	28.0
1999	23	16	100.0	3	13.0
2000	30	17	100.0	6	20.0
2001	26	13	92.3	5	19.2
2002	46	27	92.6	4	8.7
2003	31	20	95.0	4	12.9
2004	39	31	90.3	10	25.6
2005	42	18	100.0	5	11.9
2006	37	20	95.0	6	16.2
2007	49	23	95.7	3	6.1
2008	53	25	100.0	4	7.5
2009	48	35	100.0	6	12.5
2010	68	34	97.1	9	13.2
2011	56	39	100.0	3	5.4
2012	46	43	95.3	5	10.9
2013	26	38	100.0	5	19.2
1998-2013	645	415	96.6	85	13.2

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	16	43.8	56.3	85.7
1999	16	50.0	50.0	68.8
2000	17	94.1	5.9	100.0
2001	13	69.2	30.8	75.0
2002	27	63.0	37.0	80.0
2003	20	80.0	20.0	84.2
2004	31	77.4	22.6	100.0
2005	18	50.0	50.0	72.2
2006	20	65.0	35.0	84.2
2007	23	65.2	34.8	72.7
2008	25	84.0	16.0	84.0
2009	35	74.3	25.7	82.9
2010	34	88.2	11.8	90.9
2011	39	61.5	38.5	74.4
2012	43	69.8	30.2	85.4
2013	38	84.2	15.8	92.1
1998-2013	415	71.6	28.4	84.0

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	4	78.9	75.4	82.4	82.4
1999	8	70.5	71.6	58.3	70.5
2000	7	82.0	82.0		82.0
2001	6	71.6	74.0	66.2	74.0
2002	17	71.8	71.8	72.5	73.2
2003	11	78.4	78.4		78.5
2004	19	76.6	77.8	76.6	75.7
2005	5	80.2	79.5	82.3	80.2
2006	12	76.5	74.4	79.2	74.5
2007	15	78.4	78.0	79.8	77.8
2008	15	72.6	71.6	78.1	70.7
2009	27	74.7	70.7	78.8	73.4
2010	22	74.4	74.4		74.5
2011	27	78.0	73.0	86.2	77.1
2012	24	80.4	78.2	83.7	78.7
2013	22	82.8	82.9	82.8	82.9
1998-2013	241	77.1	75.1	79.3	76.2

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	12	80.7	78.5	87.6	79.4
1999	8	84.6	74.1	86.2	83.1
2000	10	80.3	80.7	70.0	80.3
2001	7	88.3	83.9	88.3	83.9
2002	10	81.4	78.3	84.6	74.0
2003	9	81.4	70.7	83.7	72.4
2004	12	82.9	82.9	82.5	84.6
2005	13	79.3	75.5	82.1	77.4
2006	8	89.8	89.7	89.9	89.7
2007	8	86.8	85.3	88.6	89.3
2008	10	76.9	67.2	85.0	70.1
2009	8	86.4	87.2	85.7	81.1
2010	12	77.8	73.5	86.6	73.5
2011	12	84.2	76.7	91.3	78.6
2012	19	78.1	77.6	83.2	77.6
2013	16	86.1	83.1	90.0	84.2
1998-2013	174	82.5	79.0	85.8	80.0

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	1	0.1	0.07	0.0	0.05	0.1	0.07	0.1	0.10
1999	5	0.4	0.50	0.3	0.49	0.4	0.53	0.6	0.63
2000	7	0.6	0.44	0.3	0.40	0.6	0.44	0.8	0.52
2001	5	0.4	0.42	0.2	0.39	0.4	0.42	0.6	0.48
2002	11	0.6	0.48	0.3	0.43	0.5	0.49	0.7	0.55
2003	11	0.6	0.73	0.3	0.54	0.5	0.70	0.7	0.92
2004	14	0.7	0.61	0.4	0.56	0.6	0.62	0.9	0.65
2005	2	0.1	0.08	0.0	0.05	0.1	0.06	0.1	0.10
2006	8	0.4	0.40	0.2	0.33	0.3	0.37	0.4	0.40
2007	11	0.5	0.39	0.2	0.27	0.4	0.35	0.6	0.43
2008	14	0.6	0.40	0.3	0.37	0.5	0.40	0.6	0.41
2009	21	0.9	0.75	0.5	0.68	0.7	0.73	0.9	0.72
2010	22	1.0	0.45	0.5	0.38	0.7	0.42	1.0	0.45
2011	19	0.8	0.59	0.4	0.52	0.6	0.56	0.8	0.61
2012	17	0.7	0.77	0.3	0.68	0.5	0.77	0.7	0.76
2013	19	0.8	1.36	0.4	0.87	0.6	1.16	0.8	1.41
1998-2013	187	0.6	0.51	0.3	0.43	0.5	0.49	0.7	0.54

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	6	0.5	0.55	0.1	0.19	0.2	0.33	0.4	0.47
1999	3	0.3	0.23	0.1	0.20	0.2	0.22	0.2	0.26
2000	9	0.7	0.64	0.2	0.55	0.4	0.56	0.6	0.59
2001	4	0.3	0.29	0.1	0.13	0.2	0.18	0.2	0.21
2002	6	0.3	0.26	0.1	0.22	0.2	0.22	0.2	0.23
2003	5	0.3	0.31	0.1	0.27	0.2	0.28	0.2	0.29
2004	10	0.5	0.63	0.2	0.38	0.3	0.47	0.4	0.54
2005	7	0.4	0.44	0.1	0.34	0.2	0.38	0.3	0.41
2006	5	0.2	0.29	0.0	0.08	0.1	0.13	0.1	0.17
2007	4	0.2	0.19	0.0	0.07	0.1	0.11	0.1	0.17
2008	7	0.3	0.39	0.1	0.36	0.2	0.40	0.2	0.36
2009	5	0.2	0.25	0.1	0.13	0.1	0.17	0.1	0.19
2010	8	0.3	0.42	0.2	0.37	0.2	0.40	0.3	0.43
2011	5	0.2	0.21	0.1	0.11	0.1	0.14	0.2	0.18
2012	13	0.6	0.54	0.2	0.42	0.3	0.44	0.4	0.47
2013	13	0.6	1.08	0.1	0.51	0.2	0.63	0.3	0.76
1998-2013	110	0.4	0.40	0.1	0.25	0.2	0.30	0.3	0.34

Table 13

Age distribution of age at death (cancer-related) for period 1998-2013
(**incl. multiple primaries**)

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
20-24	1	0.3	0.3	1	0.5	0.5			0.0
25-29	0	0.0	0.3			0.5			0.0
30-34	1	0.3	0.7			0.5	1	0.9	0.9
35-39	0	0.0	0.7			0.5			0.9
40-44	7	2.4	3.0	5	2.7	3.2	2	1.8	2.7
45-49	11	3.7	6.7	7	3.7	7.0	4	3.6	6.4
50-54	8	2.7	9.4	7	3.7	10.7	1	0.9	7.3
55-59	13	4.4	13.8	10	5.3	16.0	3	2.7	10.0
60-64	21	7.1	20.9	11	5.9	21.9	10	9.1	19.1
65-69	28	9.4	30.3	21	11.2	33.2	7	6.4	25.5
70-74	43	14.5	44.8	30	16.0	49.2	13	11.8	37.3
75-79	50	16.8	61.6	33	17.6	66.8	17	15.5	52.7
80-84	43	14.5	76.1	28	15.0	81.8	15	13.6	66.4
85+	71	23.9	100.0	34	18.2	100.0	37	33.6	100.0
All ages	297	100.0		187	100.0		110	100.0	

Included in the statistics are 55.2% multiple primaries in males and 35.3% in females.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2013
(**incl. multiple primaries**)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4			0.0		0.0			
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24	1		0.1	1.00	0.0		1.1	
25-29			0.0		0.0			
30-34		1	0.0		0.0	0.14		0.4
35-39			0.0		0.0			
40-44	5	2	0.2	0.42	0.1	0.12	0.6	0.2
45-49	7	4	0.3	0.33	0.2	0.44	0.4	0.2
50-54	7	1	0.3	0.24	0.0	0.06	0.2	0.0
55-59	10	3	0.5	0.63	0.2	0.23	0.2	0.1
60-64	11	10	0.6	0.26	0.5	0.45	0.1	0.2
65-69	21	7	1.3	0.43	0.4	0.21	0.2	0.1
70-74	30	13	2.3	0.54	0.9	0.43	0.2	0.1
75-79	33	17	4.0	0.79	1.4	0.57	0.3	0.2
80-84	28	15	5.6	0.78	1.6	0.52	0.3	0.1
85+	34	37	10.0	0.97	4.1	0.84	0.4	0.3
All ages	187	110					0.2	0.2
Mortality								
Raw			0.6	0.51	0.4	0.40		
WS			0.3	0.43	0.1	0.25		
ES			0.5	0.49	0.2	0.30		
BRD-S			0.7	0.54	0.3	0.34		
PYLL-70								
per 100,000			2.7		1.2			
ES			2.4		1.0			
AYLL-70			11.7		11.8			

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

Table 15a

Multiple primaries in deaths in period 1998-2013
MALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C00	Lip	2	1.4	2	100.0				
C03-C06	Oral cavity	2	1.4	1	50.0	1	50.0		
C09-C10	Oropharynx	4	2.8	2	50.0			2	50.0
C16	Stomach	2	1.4	1	50.0			1	50.0
C18	Colon	2	1.4					2	100.0
C19-C20	Rectum	4	2.8	2	50.0			2	50.0
C22	Liver	3	2.1			2	66.7	1	33.3
C25	Pancreas	2	1.4					2	100.0
C30	Middle/inner ear	2	1.4	2	100.0				
C32	Larynx	2	1.4	1	50.0			1	50.0
C33-C34	Lung	11	7.8			1	9.1	10	90.9
C43	Malign. melanoma	3	2.1	1	33.3	1	33.3	1	33.3
C44	Skin others	56	39.7	27	48.2	7	12.5	22	39.3
C61	Prostate	16	11.3	11	68.8	3	18.8	2	12.5
C67	Bladder	8	5.7	5	62.5			3	37.5
C70-C72	CNS cancer	2	1.4	1	50.0			1	50.0
C76-C79	CUP	2	1.4	1	50.0	1	50.0		
C82-C85	NHL	8	5.7	5	62.5	1	12.5	2	25.0
C91-C96	Leukaemia	2	1.4					2	100.0
Other primaries		8	5.7	4	50.0			4	50.0
All mult. primaries		141	100.0	66	46.8	17	12.1	58	41.1

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 1998-2013
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C00	Lip	1	1.7			1	100.0		
C12-C13	Hypopharynx	1	1.7					1	100.0
C15	Oesophagus	1	1.7					1	100.0
C16	Stomach	3	5.2	1	33.3			2	66.7
C19-C20	Rectum	1	1.7					1	100.0
C23-C24	Bile	1	1.7					1	100.0
C25	Pancreas	4	6.9					4	100.0
C26	GI cancer	1	1.7			1	100.0		
C33-C34	Lung	8	13.8					8	100.0
C44	Skin others	10	17.2	4	40.0			6	60.0
C50	Breast	13	22.4	6	46.2			7	53.8
C54	Corpus uteri	2	3.4	1	50.0	1	50.0		
C56	Ovary	2	3.4	1	50.0			1	50.0
C64	Kidney	2	3.4					2	100.0
C69	Eye carcinoma	1	1.7	1	100.0				
C73	Thyroid	2	3.4	1	50.0			1	50.0
C82-C85	NHL	4	6.9	1	25.0			3	75.0
C91-C96	Leukaemia	1	1.7					1	100.0
All mult. primaries		58	100.0	16	27.6	3	5.2	39	67.2

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

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2013
(**Singular primaries only** *)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4			0.0		0.0			
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24	1		0.1	1.00	0.0		1.2	
25-29			0.0		0.0			
30-34		1	0.0		0.0	0.25		0.5
35-39			0.0		0.0			
40-44	5	2	0.2	0.45	0.1	0.13	0.6	0.2
45-49	7	4	0.3	0.33	0.2	0.44	0.4	0.2
50-54	4	1	0.2	0.17	0.0	0.07	0.1	0.0
55-59	10	1	0.5	0.63	0.1	0.08	0.2	0.0
60-64	8	10	0.5	0.22	0.5	0.50	0.1	0.2
65-69	12	4	0.8	0.36	0.2	0.17	0.1	0.1
70-74	19	10	1.5	0.51	0.7	0.40	0.2	0.1
75-79	22	14	2.7	1.05	1.2	0.64	0.2	0.2
80-84	18	12	3.6	0.72	1.3	0.52	0.2	0.1
85+	17	32	5.0	1.06	3.6	0.84	0.3	0.3
All ages	123	91					0.2	0.2
Mortality								
Raw			0.4	0.46	0.3	0.39		
WS			0.2	0.38	0.1	0.24		
ES			0.3	0.43	0.2	0.29		
BRD-S			0.4	0.49	0.2	0.33		
PYLL-70								
per 100,000			2.3		1.1			
ES			2.1		0.9			
AYLL-70			13.4		12.9			

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2013
(**Single primaries only** *)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4			0.0		0.0			
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24	1		0.1	1.00	0.0		1.3	
25-29			0.0		0.0			
30-34			0.0		0.0			
35-39			0.0		0.0			
40-44	5	2	0.2	0.50	0.1	0.15	0.7	0.2
45-49	6	2	0.3	0.30	0.1	0.29	0.4	0.1
50-54	3	1	0.1	0.14	0.0	0.08	0.1	0.0
55-59	7	1	0.4	0.64	0.1	0.10	0.2	0.0
60-64	8	7	0.5	0.24	0.4	0.41	0.1	0.2
65-69	9	3	0.6	0.35	0.2	0.14	0.1	0.1
70-74	12	9	0.9	0.43	0.6	0.43	0.1	0.1
75-79	14	8	1.7	0.82	0.7	0.47	0.2	0.1
80-84	14	7	2.8	0.58	0.8	0.35	0.2	0.1
85+	15	27	4.4	1.00	3.0	0.75	0.3	0.3
All ages	94	67					0.2	0.1
Mortality								
Raw			0.3	0.41	0.2	0.33		
WS			0.2	0.34	0.1	0.20		
ES			0.2	0.39	0.1	0.24		
BRD-S			0.3	0.43	0.1	0.27		
PYLL-70								
per 100,000			2.0		0.7			
ES			1.8		0.6			
AYLL-70			13.9		11.9			

* See corresponding tables with multiple primaries.

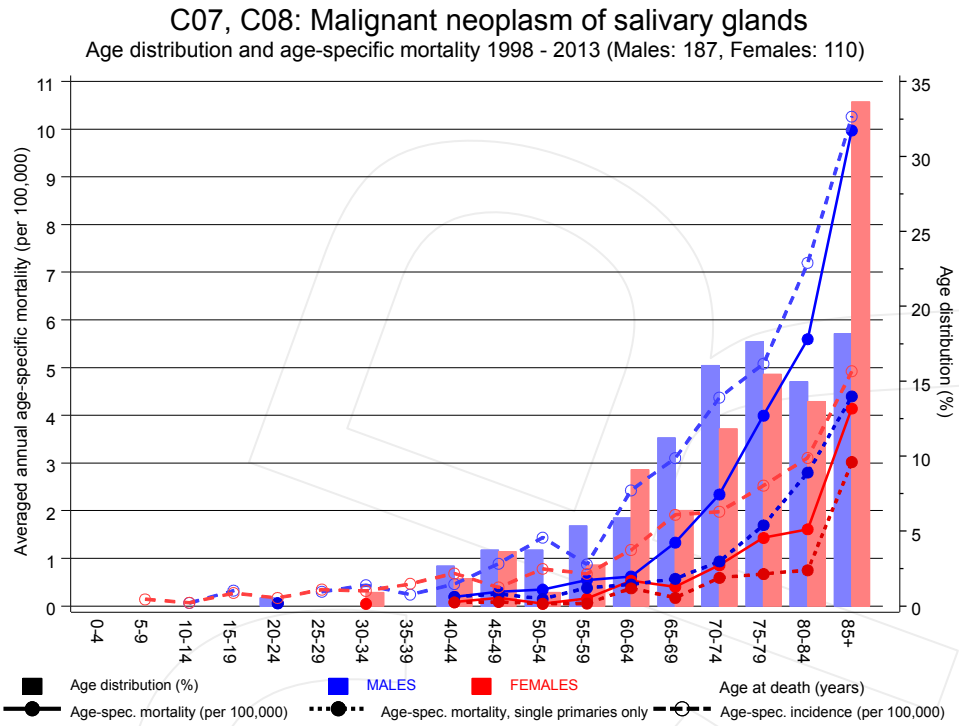
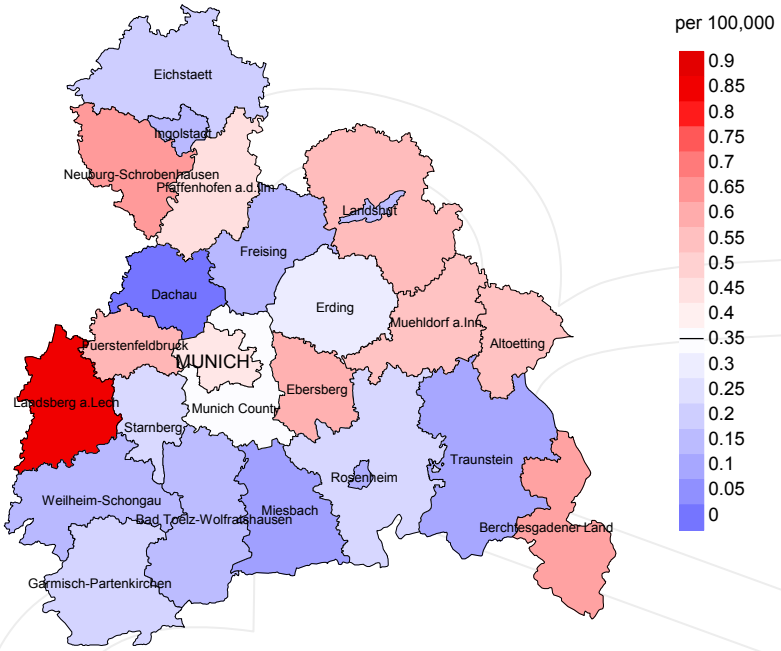


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

Average mortality (world standard population) 2007 - 2013: Males



Average mortality (world standard population) 2007 - 2013: Females

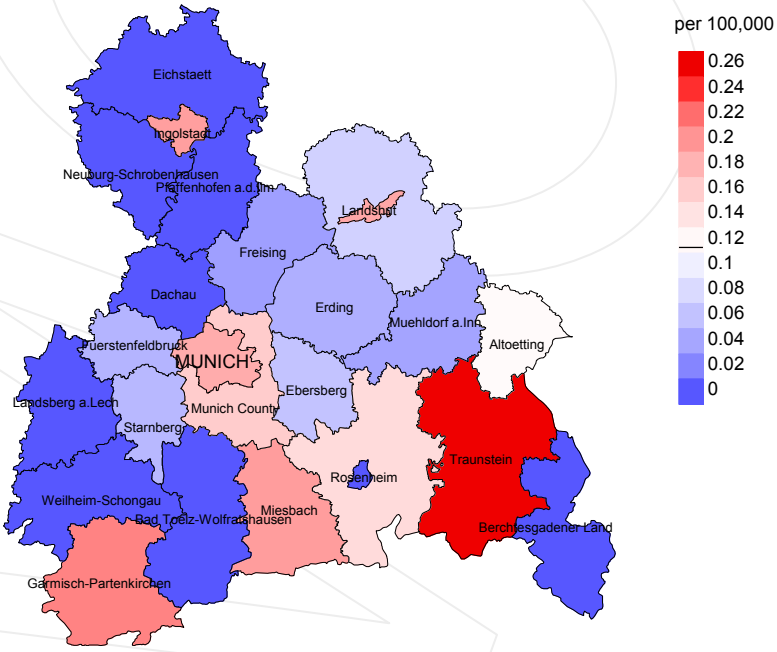
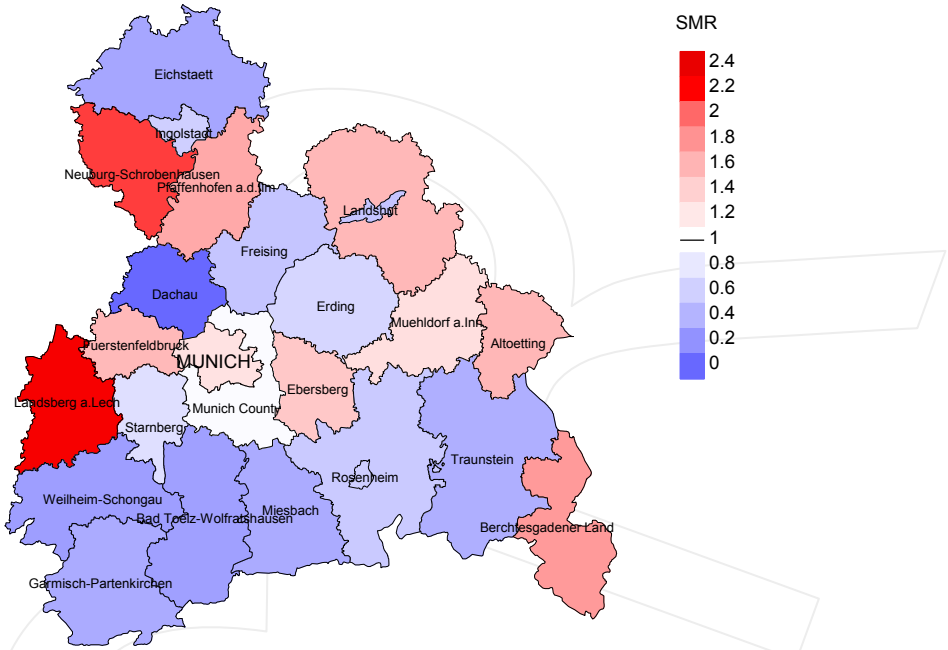


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2013. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 0.4/100,000 WS N=123, females 0.1/100,000 WS N=55).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,928 female residents (averaged) in the period from 2007 to 2013 a total of 1 women died from salivary gland cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.1/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 0.5/100,000.

Standardized mortality ratio (SMR) 2007 - 2013: Males



Standardized mortality ratio (SMR) 2007 - 2013: Females

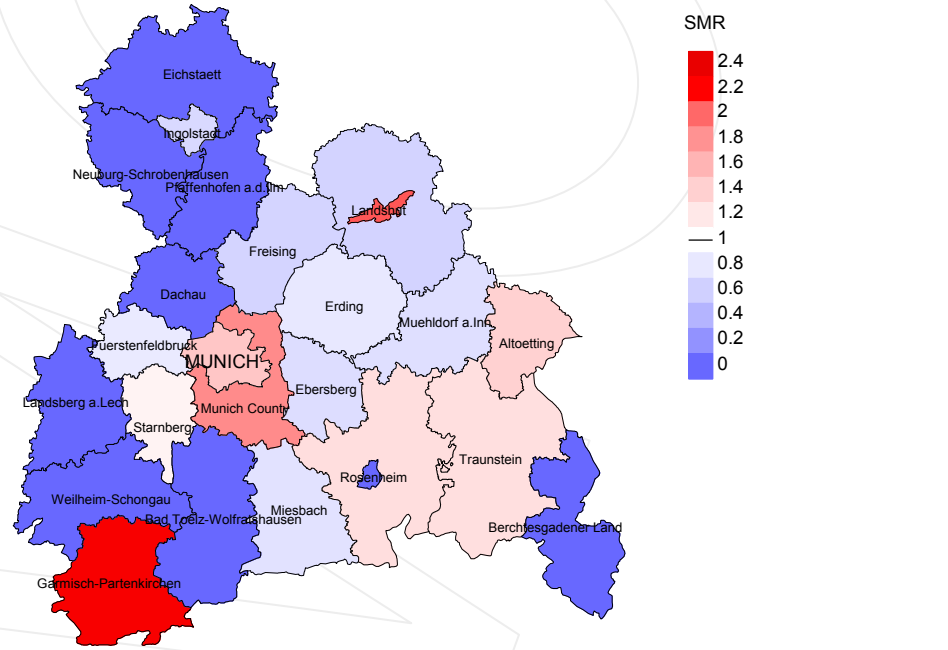


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=123, females N=55).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,642 female residents (averaged) in the period from 2007 to 2013 a total of 1 women died from salivary gland cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.71. Though, the value of this parameter may vary with an underlying probability of 99% between 0.00 and 5.27, 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 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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