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

C12, C13: Hypopharynx cancer

Year of diagnosis	1998-2013
Patients	1,453
Diseases	1,453
Creation date	05/19/2015
Export date	12/30/2014
Population	4.64 m

http://www.tumorregister-muenchen.de/en/facts/base/base_C1213E.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
C12	Malignant neoplasm of piriform sinus
C13.-	Malignant neoplasm of hypopharynx
C13.0	Postcricoid region
C13.1	Aryepiglottic fold, hypopharyngeal aspect
C13.2	Posterior wall of hypopharynx
C13.8	Overlapping lesion of hypopharynx
C13.9	Hypopharynx, 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	61			24.6	88.5	100.0	
1999	68	5	7.4	29.4	86.8	98.5	
2000	66	2	3.0	22.7	87.9	97.0	
2001	67	3	4.5	26.9	82.1	97.0	
2002	92	4	4.3	26.1	87.0	97.8	#
2003	98	1	1.0	36.7	85.7	100.0	
2004	83	2	2.4	31.3	89.2	100.0	
2005	114	7	6.1	31.6	74.6	98.2	
2006	100	3	3.0	22.0	76.0	100.0	
2007	123	7	5.7	29.3	76.4	95.1	# ##
2008	127	7	5.5	28.3	78.0	89.8	
2009	117	4	3.4	21.4	73.5	86.3	
2010	112	6	5.4	32.1	65.2	83.9	
2011	99	3	3.0	32.3	57.6	85.9	
2012	81	5	6.2	28.4	58.0	84.0	
2013	45	1	2.2	28.9	42.2	100.0	###
1998-2013	1453	60	4.1	28.4	75.7	93.9	

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	61	56	5	91.8
1999	68	62	6	91.2
2000	66	59	7	89.4
2001	67	60	7	89.6
2002	92	85	7	92.4
2003	98	91	7	92.9
2004	83	73	10	88.0
2005	114	99	15	86.8
2006	100	88	12	88.0
2007	123	106	17	86.2
2008	127	107	20	84.3
2009	117	101	16	86.3
2010	112	100	12	89.3
2011	99	85	14	85.9
2012	81	70	11	86.4
2013	45	37	8	82.2
1998-2013	1453	1279	174	88.0

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	56	5	5.1	0.4	3.3	0.2	4.5	0.2	4.8	0.3
1999	62	6	5.5	0.5	3.7	0.3	5.1	0.4	5.7	0.5
2000	59	7	5.2	0.6	3.5	0.3	4.9	0.4	5.4	0.5
2001	60	7	5.2	0.6	3.5	0.4	4.7	0.6	5.1	0.6
2002	85	7	4.6	0.4	3.0	0.2	4.1	0.3	4.3	0.3
2003	91	7	4.9	0.4	3.2	0.2	4.5	0.3	4.7	0.3
2004	73	10	3.9	0.5	2.6	0.3	3.5	0.4	3.7	0.4
2005	99	15	5.2	0.8	3.4	0.4	4.5	0.6	5.1	0.7
2006	88	12	4.6	0.6	2.9	0.4	4.1	0.5	4.5	0.5
2007	106	17	4.8	0.7	2.9	0.5	4.0	0.7	4.5	0.7
2008	107	20	4.8	0.9	3.0	0.5	4.1	0.6	4.5	0.7
2009	101	16	4.5	0.7	2.7	0.4	3.8	0.5	4.2	0.6
2010	100	12	4.4	0.5	2.7	0.3	3.7	0.4	4.1	0.4
2011	85	14	3.7	0.6	2.1	0.3	2.9	0.5	3.4	0.5
2012	70	11	3.1	0.5	1.7	0.3	2.3	0.4	2.8	0.4
2013	37	8	1.6	0.3	1.0	0.2	1.3	0.3	1.5	0.3
1998-2013	1279	174	4.3	0.6	2.7	0.3	3.7	0.4	4.1	0.5

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	61	59.4	9.2	37.3	86.7	48.6	54.0	58.1	64.5	70.7
1999	68	59.4	10.1	44.2	87.0	49.6	51.2	56.9	64.5	75.6
2000	66	59.4	10.2	43.1	88.6	49.3	52.1	57.6	65.3	78.8
2001	67	59.0	8.6	29.2	80.9	48.3	53.3	58.2	65.5	69.9
2002	92	58.8	8.4	39.2	77.7	47.0	52.7	58.5	64.4	68.8
2003	98	58.9	9.2	39.6	81.2	47.1	52.8	57.4	66.1	72.6
2004	83	58.5	9.8	38.5	87.8	47.0	52.0	58.9	63.9	69.4
2005	114	60.9	9.5	45.8	84.8	48.1	53.4	61.9	67.4	72.0
2006	100	60.2	9.6	30.6	86.2	49.5	54.6	58.9	66.4	71.8
2007	123	61.5	9.9	30.1	86.0	49.1	53.7	62.6	67.3	74.7
2008	127	62.6	9.8	35.5	91.4	48.6	57.6	61.7	68.3	74.1
2009	117	62.2	9.7	42.7	87.9	49.6	54.7	62.1	69.6	72.9
2010	112	60.2	10.8	35.1	92.3	46.7	52.1	59.5	68.7	73.3
2011	99	64.0	10.3	40.6	91.6	49.3	56.2	64.2	71.8	75.7
2012	81	66.0	10.8	39.9	91.7	50.0	60.6	65.6	73.9	78.4
2013	45	63.5	9.2	44.9	84.4	50.6	58.0	63.4	69.7	75.7
1998-2013	1453	61.0	9.9	29.2	92.3	48.6	53.6	60.7	67.6	74.1

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	56	58.2	7.8	37.3	76.7	47.6	53.7	57.6	63.4	68.9
1999	62	59.3	10.3	44.2	87.0	49.6	51.1	56.9	64.8	74.6
2000	59	58.8	9.8	45.2	88.6	49.3	51.2	57.2	64.3	71.2
2001	60	59.4	8.9	29.2	80.9	48.8	53.2	59.5	65.8	70.0
2002	85	58.4	8.2	39.2	77.7	47.0	52.4	57.7	64.0	68.4
2003	91	59.0	9.0	39.6	81.2	48.4	52.9	57.4	66.2	71.4
2004	73	57.4	9.4	38.5	83.9	46.2	51.1	57.1	63.5	66.8
2005	99	60.5	9.5	45.8	84.8	47.7	53.0	61.6	67.4	70.5
2006	88	59.8	9.5	30.6	85.0	48.9	54.6	58.7	66.3	72.1
2007	106	62.1	9.8	41.0	86.0	49.3	53.7	64.0	67.9	76.3
2008	107	61.8	8.8	40.7	84.5	48.6	56.1	61.5	67.9	71.8
2009	101	61.9	9.8	42.7	87.9	49.6	54.0	61.6	69.0	72.7
2010	100	60.1	10.5	38.7	92.3	46.5	52.3	59.5	68.4	73.5
2011	85	63.9	10.4	40.6	86.3	49.2	55.2	64.8	71.8	75.5
2012	70	66.1	11.0	39.9	91.7	48.9	60.6	66.7	74.5	78.6
2013	37	64.0	9.2	47.2	84.4	53.5	58.0	63.4	70.6	75.7
1998-2013	1279	60.7	9.8	29.2	92.3	48.3	53.4	60.4	67.4	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	5	73.4	12.9	59.4	86.7	59.4	60.7	75.4	84.9	86.7
1999	6	59.7	9.1	51.2	75.6	51.2	53.1	57.9	62.6	75.6
2000	7	63.9	13.5	43.1	81.3	43.1	56.9	60.4	79.9	81.3
2001	7	55.0	4.1	47.3	60.0	47.3	53.8	55.1	57.5	60.0
2002	7	63.9	9.4	45.5	73.0	45.5	60.5	66.0	71.6	73.0
2003	7	57.2	12.7	43.6	79.8	43.6	44.7	57.4	65.6	79.8
2004	10	66.9	9.5	56.5	87.8	57.7	60.3	64.8	71.4	82.0
2005	15	64.0	9.6	47.8	81.5	51.5	57.6	64.3	68.5	77.5
2006	12	62.8	10.3	51.6	86.2	52.7	54.4	60.8	70.7	71.5
2007	17	57.9	9.8	30.1	68.0	44.6	54.0	59.8	63.1	67.6
2008	20	66.7	13.2	35.5	91.4	52.7	60.6	66.5	72.5	86.6
2009	16	64.5	9.2	46.5	79.9	49.3	58.9	66.6	71.3	74.4
2010	12	60.3	13.4	35.1	82.4	48.8	49.6	62.7	69.6	71.8
2011	14	64.6	10.4	50.8	91.6	54.5	57.3	62.7	67.7	75.7
2012	11	65.1	10.1	52.5	90.6	54.4	60.3	63.9	69.1	71.3
2013	8	61.0	9.4	44.9	71.7	44.9	55.1	62.0	68.8	71.7
1998-2013	174	63.1	10.9	30.1	91.6	49.8	57.2	62.4	69.0	77.4

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.%
25-29	1	0.1	0.1	1	0.1	0.1			0.0
30-34	2	0.1	0.2	1	0.1	0.2	1	0.6	0.6
35-39	11	0.8	1.0	9	0.7	0.9	2	1.1	1.7
40-44	36	2.5	3.4	31	2.4	3.3	5	2.9	4.6
45-49	143	9.8	13.3	133	10.4	13.7	10	5.7	10.3
50-54	243	16.7	30.0	223	17.4	31.1	20	11.5	21.8
55-59	249	17.1	47.1	222	17.4	48.5	27	15.5	37.4
60-64	278	19.1	66.3	237	18.5	67.0	41	23.6	60.9
65-69	230	15.8	82.1	202	15.8	82.8	28	16.1	77.0
70-74	132	9.1	91.2	114	8.9	91.7	18	10.3	87.4
75-79	76	5.2	96.4	66	5.2	96.9	10	5.7	93.1
80-84	35	2.4	98.8	31	2.4	99.3	4	2.3	95.4
85+	17	1.2	100.0	9	0.7	100.0	8	4.6	100.0
All ages	1453	100.0		1279	100.0		174	100.0	

Included in the statistics are 36.0% multiple primaries in males and 48.3% 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=49 %	Females DCO rate n=11 %	Males Prop.all cancers n=158258 %	Females Prop.all cancers n=153136 %
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	1		0.0	0.0			0.1	
30-34	1	1	0.0	0.0			0.1	0.0
35-39	9	2	0.4	0.1		50.0	0.4	0.1
40-44	31	5	1.2	0.2	3.2		1.0	0.1
45-49	133	10	5.6	0.4	3.0	10.0	2.5	0.1
50-54	223	20	11.0	1.0	4.0		2.6	0.2
55-59	222	27	12.1	1.4	1.4	3.7	1.5	0.2
60-64	237	41	13.4	2.2	2.1	7.3	1.1	0.2
65-69	202	28	12.8	1.6	3.5	3.6	0.7	0.1
70-74	114	18	8.9	1.2	7.9	5.6	0.4	0.1
75-79	66	10	8.0	0.8	3.0	10.0	0.3	0.1
80-84	31	4	6.2	0.4	16.1	25.0	0.2	0.0
85+	9	8	2.6	0.9	44.4	12.5	0.1	0.0
All ages	1279	174			3.8	6.3	0.8	0.1
Incidence								
Raw			4.3	0.6				
WS			2.7	0.3				
ES			3.7	0.4				
BRD-S			4.1	0.5				

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 %
C03-C06 Oral cavity	12	0.4	31.2	16.1	54.4	#	47.3	8.3
C09-C10 Oropharynx	22	0.5	44.2	27.7	66.9	#	87.5	
C15 Oesophagus	22	0.6	34.4	21.6	52.1	#	86.9	9.1
C16 Stomach	3	1.1	2.7	0.6	8.0		7.8	
C18 Colon	5	2.7	1.9	0.6	4.4		9.5	
C19-C20 Rectum	3	1.8	1.7	0.3	4.9		4.9	
C22 Liver	3	0.8	3.6	0.7	10.5		8.8	
C25 Pancreas	3	1.0	3.0	0.6	8.8		8.1	
C32 Larynx	5	0.4	12.4	4.0	28.8	#	18.7	
C33-C34 Lung	43	3.7	11.6	8.4	15.6	#	160.0	11.6
C61 Prostate	10	8.9	1.1	0.5	2.1		4.5	10.0
C64 Kidney	4	1.2	3.5	0.9	8.9		11.6	50.0
C65 Renal pelvis	2	0.1	18.9	2.3	68.2	#	7.7	
C67 Bladder	4	1.1	3.7	1.0	9.4	#	11.9	
C73 Thyroid	2	0.3	7.2	0.9	25.9		7.0	50.0
C76-C79 CUP	2	0.5	4.2	0.5	15.1		6.2	
Other primaries	4	1.7	2.3	0.6	6.0		9.3	25.0
Not observed	0	3.9	0.0	0.0	0.9	#	-16.0	
All mult. primaries	149	30.7	4.9	4.1	5.7	#	481.6	8.7

Patients	927
Median age at second malignancy (years)	64.0
Person-years	2457
Mean observation time (years)	2.7
Median observation time (years)	1.6

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 %
C09-C10 Oropharynx	6	0.0	277.5	101.8	603.9	#	150.9	
C15 Oesophagus	4	0.0	156.8	42.7	401.6	#	100.3	
C22 Liver	3	0.0	82.9	17.1	242.3	#	74.8	33.3
C33-C34 Lung	5	0.3	17.0	5.5	39.7	#	118.8	20.0
C50 Breast	4	1.3	3.0	0.8	7.7		67.5	
Other primaries	7	0.5	14.2	5.7	29.3	#	164.2	28.6
Not observed	0	1.5	0.0	0.0	2.4		-38.7	
All mult. primaries	29	3.7	7.8	5.2	11.2	#	637.7	13.8

Patients	125
Median age at second malignancy (years)	67.4
Person-years	396
Mean observation time (years)	3.2
Median observation time (years)	1.8

The occurrence of second malignancy is statistically significant.

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

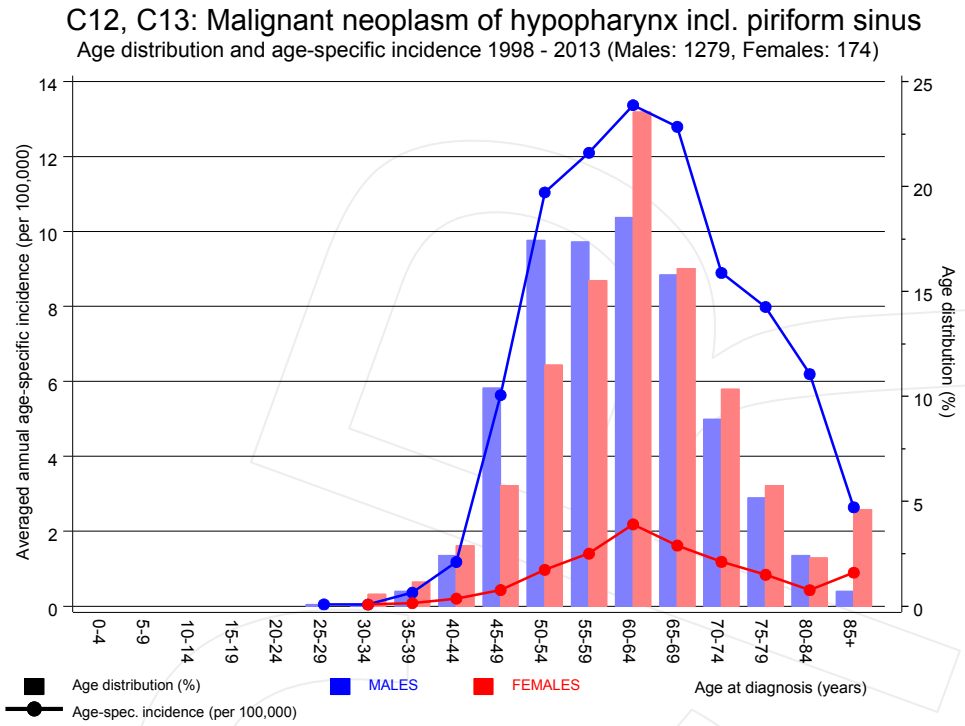


Figure 7. Age distribution and age-specific incidence

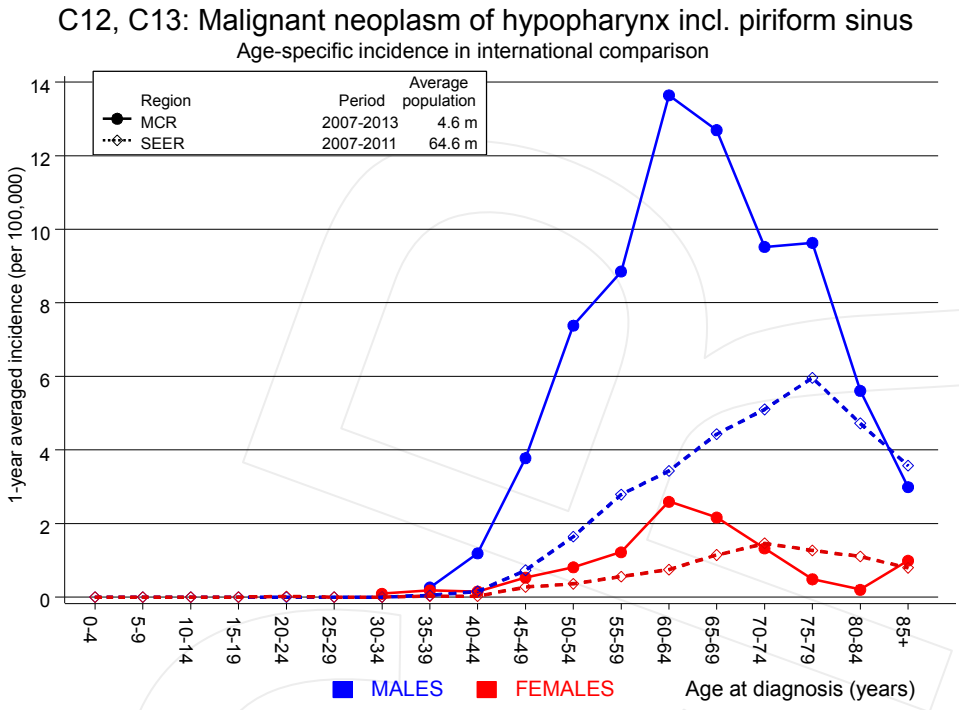


Figure 7a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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.

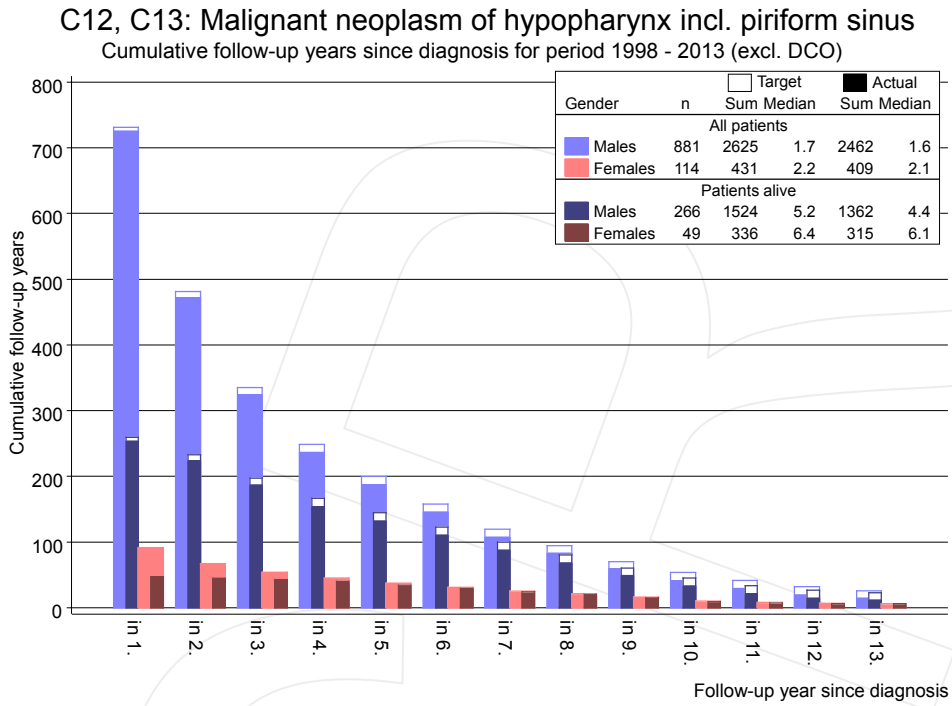
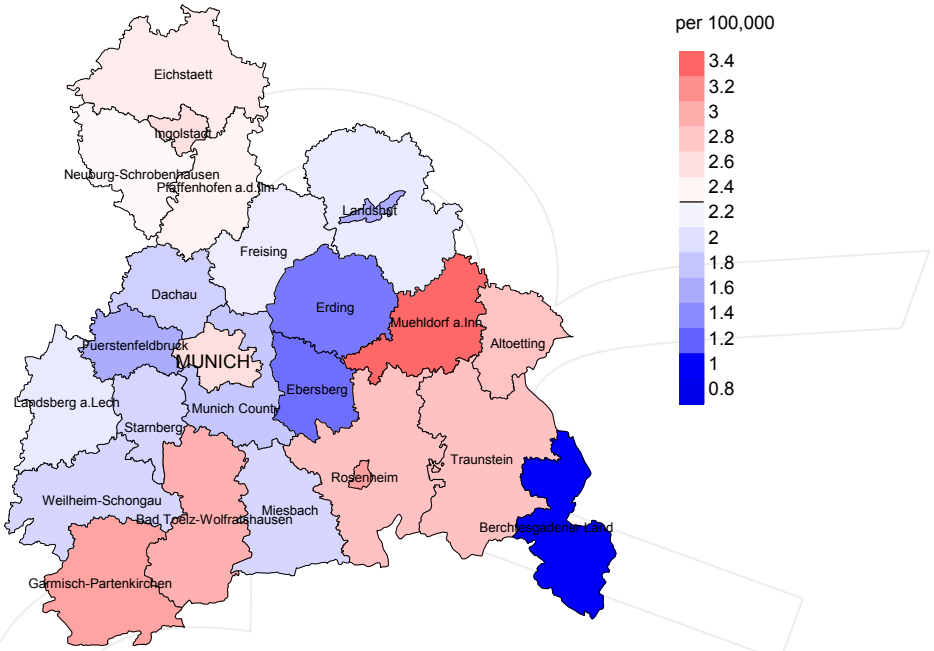


Figure 8. Cumulative follow-up years depending on time since diagnosis

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

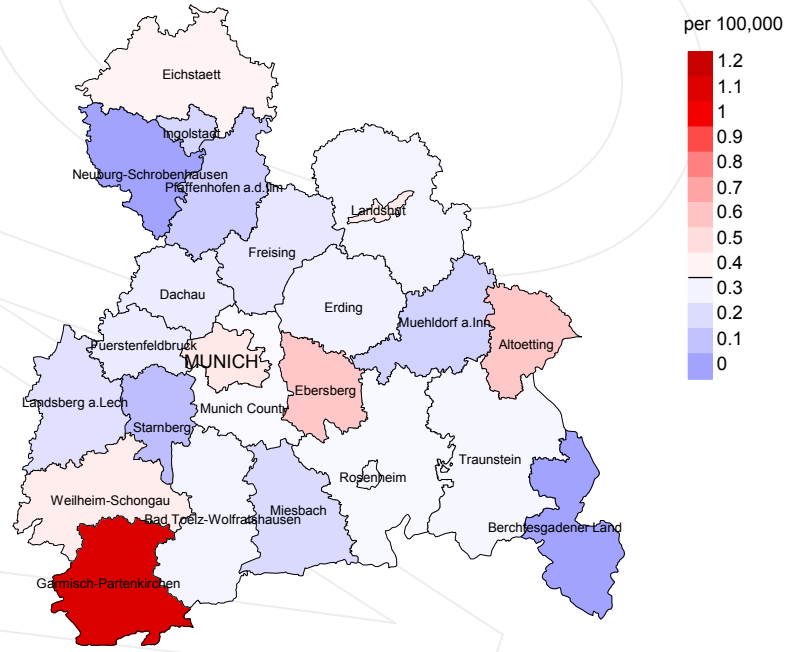
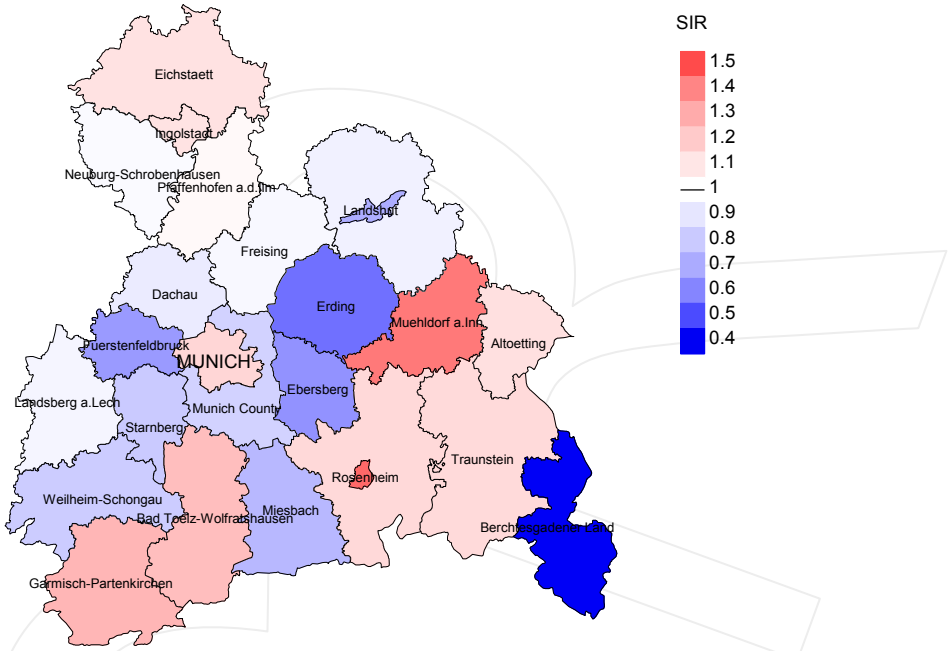


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 2.3/100,000 WS N=606, females 0.4/100,000 WS N=98).

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 5 women were identified with newly diagnosed hypopharynx cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 0.6/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.1 and 1.8/100,000.

Standardized incidence ratio (SIR) 2007 - 2013: Males



Standardized incidence ratio (SIR) 2007 - 2013: Females

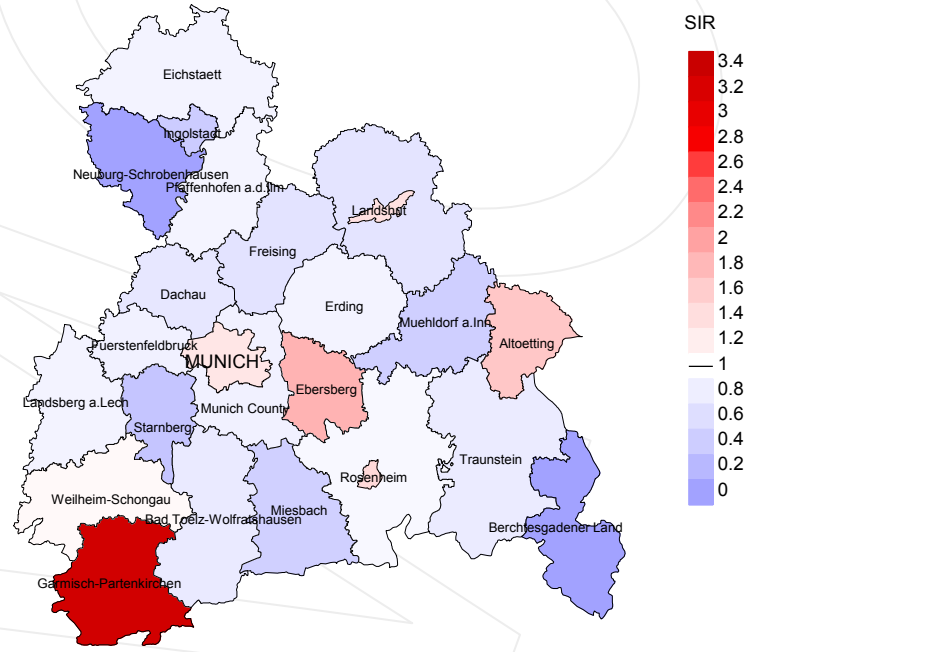


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=606, females N=98).

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 5 women were identified with newly diagnosed hypopharynx cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.86. Though, the value of this parameter may vary with an underlying probability of 99% between 0.40 and 5.26, 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	61	100.0		54	88.5	98.1
1999	68	98.5	7.4	59	86.8	94.9
2000	66	97.0	3.0	58	87.9	91.4
2001	67	97.0	4.5	55	82.1	98.2
2002	92	97.8	4.3	80	87.0	95.0
2003	98	100.0	1.0	84	85.7	96.4
2004	83	100.0	2.4	74	89.2	93.2
2005	114	98.2	6.1	85	74.6	97.6
2006	100	100.0	3.0	76	76.0	98.7
2007	123	95.1	5.7	94	76.4	96.8
2008	127	89.8	5.5	99	78.0	99.0
2009	117	86.3	3.4	86	73.5	97.7
2010	112	83.9	5.4	73	65.2	100.0
2011	99	85.9	3.0	57	57.6	93.0
2012	81	84.0	6.2	47	58.0	95.7
2013	45	100.0	2.2	19	42.2	84.2
1998-2013	1453	93.9	4.1	1100	75.7	96.4

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	61	45	88.9	13	21.3
1999	68	61	91.8	17	25.0
2000	66	50	96.0	11	16.7
2001	67	55	87.3	10	14.9
2002	92	68	98.5	18	19.6
2003	98	75	96.0	12	12.2
2004	83	84	95.2	16	19.3
2005	114	66	95.5	19	16.7
2006	100	96	99.0	23	23.0
2007	123	116	99.1	27	22.0
2008	127	102	98.0	28	22.0
2009	117	93	98.9	20	17.1
2010	112	99	99.0	23	20.5
2011	99	93	96.8	22	22.2
2012	81	112	96.4	25	30.9
2013	45	74	100.0	11	24.4
1998-2013	1453	1289	96.7	295	20.3

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	45	80.0	20.0	95.0
1999	61	80.3	19.7	96.4
2000	50	88.0	12.0	93.8
2001	55	78.2	21.8	89.6
2002	68	91.2	8.8	98.5
2003	75	85.3	14.7	97.2
2004	84	82.1	17.9	91.3
2005	66	89.4	10.6	95.2
2006	96	88.5	11.5	93.7
2007	116	86.2	13.8	93.9
2008	102	89.2	10.8	96.0
2009	93	82.8	17.2	96.7
2010	99	88.9	11.1	94.9
2011	93	79.6	20.4	85.6
2012	112	83.0	17.0	93.5
2013	74	85.1	14.9	93.2
1998-2013	1289	85.1	14.9	94.0

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	38	57.9	56.5	63.2	58.6
1999	54	58.8	58.8	60.2	58.8
2000	47	59.7	58.8	65.5	59.4
2001	47	58.4	56.5	69.2	57.8
2002	62	59.7	59.8	59.2	59.7
2003	68	63.8	63.6	67.1	63.7
2004	75	60.1	59.8	62.9	60.0
2005	62	62.4	62.7	54.1	62.7
2006	86	62.7	61.6	67.1	62.5
2007	99	62.9	61.7	64.7	62.0
2008	86	64.3	63.5	66.7	64.8
2009	78	65.2	65.2	62.4	65.2
2010	92	62.6	61.6	72.3	61.8
2011	83	65.4	65.2	69.4	65.4
2012	100	65.9	65.9	68.9	65.8
2013	64	66.5	67.0	64.1	66.0
1998-2013	1141	62.7	62.0	65.5	62.6

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	7	67.4	62.0	85.2	67.4
1999	7	62.2	62.9	54.4	62.6
2000	3	54.2	54.2		54.2
2001	8	61.5	60.9	63.2	61.4
2002	6	68.6	66.2	73.8	68.6
2003	7	59.9	58.6	79.1	59.9
2004	9	67.7	74.7	65.4	75.7
2005	4	68.4	60.0	69.9	69.3
2006	10	65.6	65.6		65.6
2007	17	67.0	63.1	71.0	67.0
2008	16	64.6	66.3	61.9	64.7
2009	15	68.7	68.6	70.2	69.5
2010	7	62.0	61.2	81.5	62.0
2011	10	62.1	62.1	65.3	60.9
2012	12	69.3	69.3		69.3
2013	10	68.6	68.6	71.4	68.6
1998-2013	148	65.5	64.9	67.6	66.2

By 2010, life expectancy for a newborn male in Germany is 77.5 years compared with 82.6 years for his female counterpart.

Deaths of patients are considered to be cancer-related, in case that fact was recorded on the death certificate, or patients had suffered from metastasis or recurrence.

Table 12a

Mortality measures (cancer-related death) and mortality-incidence-index
by year of death
MALES

Year of death	Deaths n	Mort. raw	MI-Index raw	Mort. WS	MI-Index WS	Mort. ES	MI-Index ES	Mort. BRD-S	MI-Index BRD-S
1998	30	2.7	0.54	1.7	0.53	2.4	0.54	2.7	0.56
1999	44	3.9	0.71	2.5	0.67	3.5	0.68	3.8	0.67
2000	41	3.6	0.69	2.3	0.66	3.3	0.68	3.8	0.71
2001	37	3.2	0.62	2.2	0.62	3.0	0.64	3.3	0.64
2002	57	3.1	0.67	2.0	0.65	2.7	0.66	2.9	0.68
2003	58	3.1	0.64	1.9	0.58	2.6	0.58	2.9	0.62
2004	62	3.3	0.85	2.1	0.82	3.0	0.85	3.1	0.84
2005	57	3.0	0.58	1.8	0.54	2.5	0.56	2.9	0.57
2006	75	3.9	0.85	2.4	0.83	3.4	0.84	3.8	0.86
2007	85	3.8	0.80	2.4	0.82	3.3	0.82	3.7	0.81
2008	77	3.5	0.72	2.0	0.67	2.9	0.69	3.3	0.72
2009	67	3.0	0.66	1.7	0.63	2.4	0.64	2.8	0.68
2010	82	3.6	0.82	2.2	0.80	3.1	0.82	3.4	0.84
2011	66	2.9	0.78	1.7	0.80	2.3	0.79	2.6	0.77
2012	81	3.5	1.16	1.9	1.15	2.8	1.18	3.3	1.17
2013	55	2.4	1.49	1.3	1.38	1.9	1.42	2.2	1.44
1998-2013	974	3.3	0.76	2.0	0.74	2.8	0.75	3.1	0.77

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	1.20	0.3	1.92	0.4	1.66	0.4	1.30
1999	5	0.4	0.83	0.2	0.60	0.3	0.64	0.4	0.76
2000	3	0.2	0.43	0.2	0.49	0.2	0.48	0.2	0.45
2001	6	0.5	0.86	0.3	0.63	0.3	0.62	0.4	0.79
2002	5	0.3	0.71	0.1	0.66	0.2	0.71	0.2	0.70
2003	6	0.3	0.86	0.2	0.90	0.3	0.91	0.3	0.89
2004	7	0.4	0.70	0.2	0.69	0.2	0.67	0.3	0.73
2005	2	0.1	0.13	0.1	0.15	0.1	0.15	0.1	0.13
2006	10	0.5	0.83	0.2	0.68	0.3	0.65	0.4	0.71
2007	15	0.6	0.88	0.4	0.74	0.5	0.80	0.6	0.87
2008	14	0.6	0.70	0.3	0.71	0.4	0.71	0.5	0.70
2009	10	0.4	0.63	0.2	0.51	0.3	0.51	0.3	0.54
2010	6	0.3	0.50	0.2	0.60	0.2	0.59	0.2	0.54
2011	8	0.3	0.57	0.2	0.62	0.3	0.61	0.3	0.59
2012	12	0.5	1.09	0.2	0.89	0.4	0.96	0.4	0.97
2013	8	0.3	1.00	0.2	0.92	0.3	0.92	0.3	0.97
1998-2013	123	0.4	0.71	0.2	0.66	0.3	0.67	0.3	0.68

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.%
35-39	7	0.6	0.6	5	0.5	0.5	2	1.6	1.6
40-44	14	1.3	1.9	13	1.3	1.8	1	0.8	2.4
45-49	69	6.3	8.2	64	6.6	8.4	5	4.1	6.5
50-54	146	13.3	21.5	137	14.1	22.5	9	7.3	13.8
55-59	215	19.6	41.1	198	20.3	42.8	17	13.8	27.6
60-64	216	19.7	60.8	188	19.3	62.1	28	22.8	50.4
65-69	177	16.1	76.9	150	15.4	77.5	27	22.0	72.4
70-74	123	11.2	88.1	109	11.2	88.7	14	11.4	83.7
75-79	73	6.7	94.8	68	7.0	95.7	5	4.1	87.8
80-84	39	3.6	98.4	33	3.4	99.1	6	4.9	92.7
85+	18	1.6	100.0	9	0.9	100.0	9	7.3	100.0
All ages	1097	100.0		974	100.0		123	100.0	

Included in the statistics are 36.0% multiple primaries in males and 48.3% 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			0.0		0.0			
25-29			0.0		0.0			
30-34			0.0		0.0			
35-39	5	2	0.2	0.56	0.1	1.00	1.3	0.4
40-44	13	1	0.5	0.42	0.0	0.20	1.5	0.1
45-49	64	5	2.7	0.48	0.2	0.50	3.5	0.2
50-54	137	9	6.8	0.61	0.4	0.45	4.2	0.3
55-59	198	17	10.8	0.89	0.9	0.63	3.3	0.4
60-64	188	28	10.6	0.79	1.5	0.68	2.1	0.4
65-69	150	27	9.5	0.74	1.6	0.96	1.3	0.3
70-74	109	14	8.5	0.96	0.9	0.78	0.8	0.1
75-79	68	5	8.2	1.03	0.4	0.50	0.5	0.0
80-84	33	6	6.6	1.06	0.6	1.50	0.3	0.1
85+	9	9	2.6	1.00	1.0	1.13	0.1	0.1
All ages	974	123					1.2	0.2
Mortality								
Raw			3.3	0.76	0.4	0.71		
WS			2.0	0.74	0.2	0.66		
ES			2.8	0.75	0.3	0.67		
BRD-S			3.1	0.77	0.3	0.68		
PYLL-70								
per 100,000			32.2		3.2			
ES			29.0		2.7			
AYLL-70			11.4		9.6			

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 ←%
C03-C06 Oral cavity	54	12.6	29	53.7	4	7.4	21	38.9
C09-C10 Oropharynx	50	11.6	11	22.0	22	44.0	17	34.0
C12-C13 Hypopharynx	24	5.6			5	20.8	19	79.2
C15 Oesophagus	52	12.1	8	15.4	8	15.4	36	69.2
C16 Stomach	6	1.4	1	16.7			5	83.3
C18 Colon	16	3.7	10	62.5			6	37.5
C19-C20 Rectum	6	1.4	2	33.3			4	66.7
C22 Liver	9	2.1			2	22.2	7	77.8
C25 Pancreas	6	1.4	1	16.7	1	16.7	4	66.7
C33-C34 Lung	78	18.1	12	15.4	13	16.7	53	67.9
C44 Skin others	30	7.0	11	36.7	3	10.0	16	53.3
C61 Prostate	22	5.1	12	54.5	2	9.1	8	36.4
C64 Kidney	8	1.9	4	50.0	1	12.5	3	37.5
C67 Bladder	16	3.7	9	56.3			7	43.8
C76-C79 CUP	13	3.0	9	69.2			4	30.8
Other primaries	40	9.3	18	45.0	6	15.0	16	40.0
All mult. primaries	430	100.0	137	31.9	67	15.6	226	52.6

Multiple primaries with number of cases 1 to 4 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 ←%
C03-C06	Oral cavity	10	14.3	9	90.0			1	10.0
C07-C08	Salivary gland	1	1.4	1	100.0				
C09-C10	Oropharynx	6	8.6	3	50.0	3	50.0		
C11	Nasopharynx	1	1.4			1	100.0		
C15	Oesophagus	8	11.4			4	50.0	4	50.0
C16	Stomach	1	1.4					1	100.0
C18	Colon	1	1.4					1	100.0
C19-C20	Rectum	1	1.4					1	100.0
C22	Liver	1	1.4					1	100.0
C30-C31	Sinuses	1	1.4					1	100.0
C32	Larynx	3	4.3	2	66.7			1	33.3
C33-C34	Lung	12	17.1			2	16.7	10	83.3
C50	Breast	13	18.6	9	69.2	2	15.4	2	15.4
C51	Vulva	2	2.9	1	50.0			1	50.0
C53	Cervix uteri	1	1.4	1	100.0				
C54	Corpus uteri	2	2.9	1	50.0			1	50.0
C56	Ovary	1	1.4	1	100.0				
C70-C72	CNS cancer	1	1.4			1	100.0		
C73	Thyroid	2	2.9	2	100.0				
C82-C85	NHL	1	1.4	1	100.0				
C91-C96	Leukaemia	1	1.4					1	100.0
All mult. primaries		70	100.0	31	44.3	13	18.6	26	37.1

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			0.0		0.0			
25-29			0.0		0.0			
30-34			0.0		0.0			
35-39	4		0.2	0.50	0.0		1.1	
40-44	11	1	0.4	0.42	0.0	0.25	1.4	0.1
45-49	54	3	2.3	0.49	0.1	0.43	3.3	0.2
50-54	117	7	5.8	0.60	0.3	0.50	4.1	0.3
55-59	172	14	9.4	0.91	0.7	0.67	3.4	0.3
60-64	154	20	8.7	0.78	1.1	0.63	2.1	0.4
65-69	117	21	7.4	0.75	1.2	1.00	1.2	0.3
70-74	87	8	6.8	1.02	0.5	0.73	0.8	0.1
75-79	51	4	6.2	1.06	0.3	0.57	0.5	0.0
80-84	18	5	3.6	0.90	0.5	1.67	0.2	0.1
85+	8	5	2.3	1.14	0.6	1.25	0.1	0.0
All ages	793	88					1.2	0.2
Mortality								
Raw			2.7	0.76	0.3	0.70		
WS			1.6	0.74	0.2	0.65		
ES			2.3	0.75	0.2	0.66		
BRD-S			2.5	0.77	0.2	0.68		
PYLL-70								
per 100,000			27.2		2.2			
ES			24.6		1.9			
AYLL-70			11.6		9.0			

* 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			0.0		0.0			
25-29			0.0		0.0			
30-34			0.0		0.0			
35-39	4		0.2	0.57	0.0		1.1	
40-44	10	1	0.4	0.48	0.0	0.33	1.3	0.1
45-49	50	1	2.1	0.48	0.0	0.17	3.3	0.1
50-54	102	5	5.1	0.57	0.2	0.42	3.9	0.2
55-59	149	12	8.1	0.87	0.6	0.63	3.2	0.3
60-64	128	18	7.2	0.74	1.0	0.64	1.9	0.4
65-69	94	16	6.0	0.69	0.9	0.84	1.1	0.3
70-74	62	6	4.8	0.87	0.4	0.60	0.7	0.1
75-79	31	2	3.8	0.76	0.2	0.29	0.4	0.0
80-84	15	4	3.0	0.83	0.4	2.00	0.2	0.1
85+	7	4	2.1	1.00	0.4	1.00	0.1	0.0
All ages	652	69					1.2	0.1
Mortality								
Raw			2.2	0.70	0.2	0.62		
WS			1.4	0.69	0.1	0.58		
ES			1.9	0.70	0.2	0.59		
BRD-S			2.1	0.70	0.2	0.60		
PYLL-70								
per 100,000			23.8		1.7			
ES			21.5		1.5			
AYLL-70			11.9		8.7			

* See corresponding tables with multiple primaries.

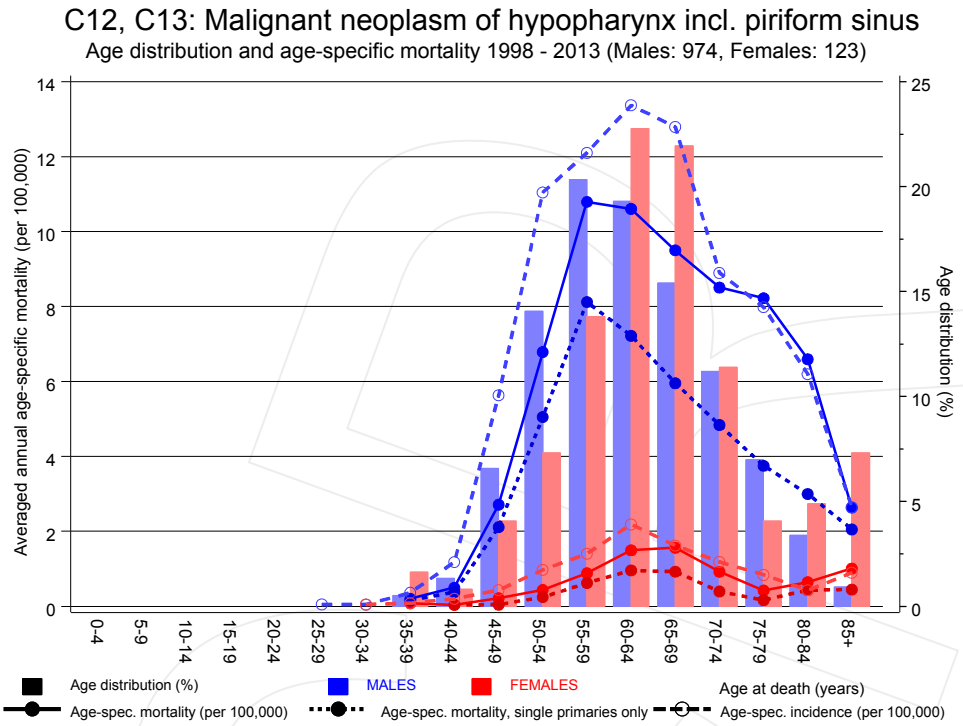
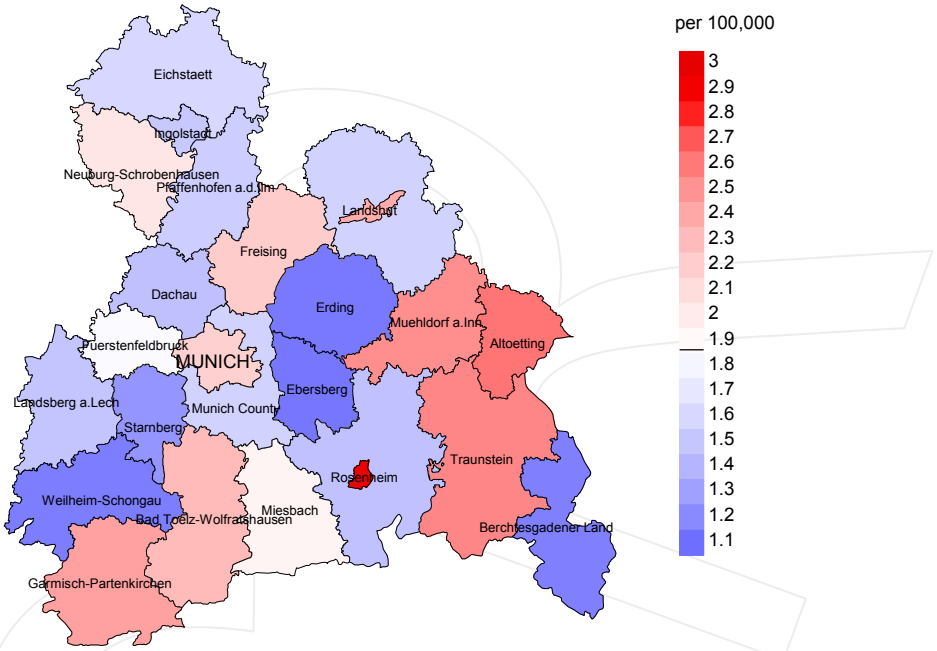


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

The difference between age at diagnosis (Table 3) and age at hypopharynx 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

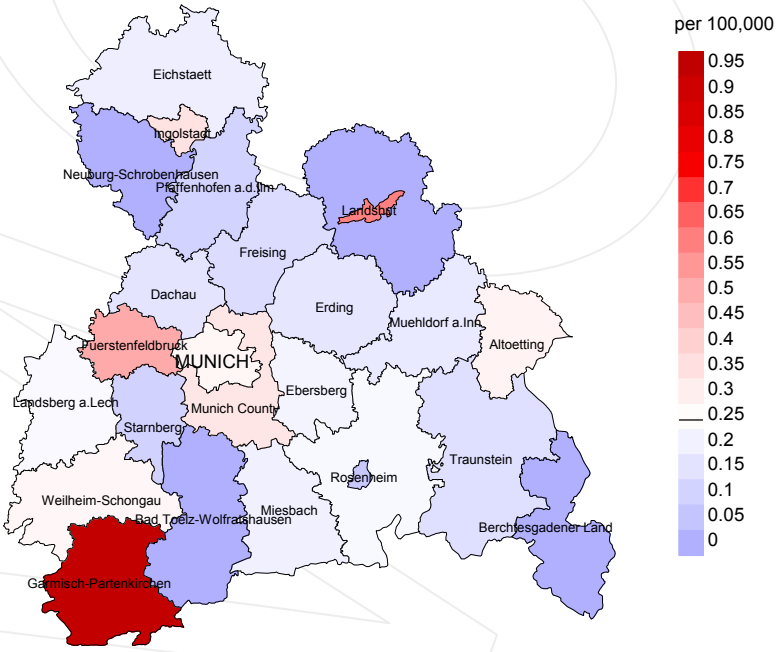
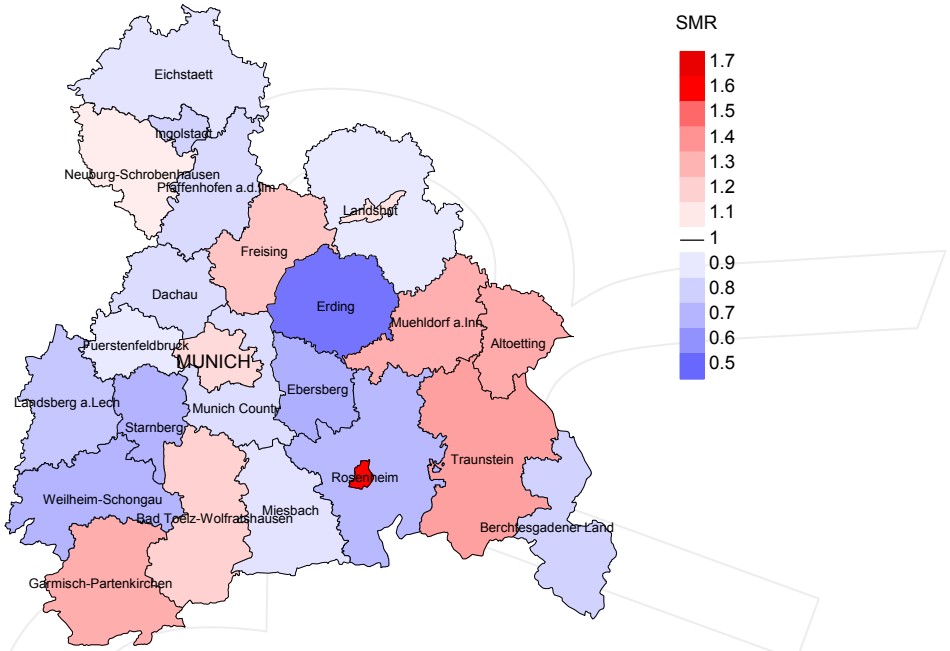


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2013. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 1.9/100,000 WS N=506, females 0.2/100,000 WS N=72).

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 died from hypopharynx 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 1.2/100,000.

Standardized mortality ratio (SMR) 2007 - 2013: Males



Standardized mortality ratio (SMR) 2007 - 2013: Females

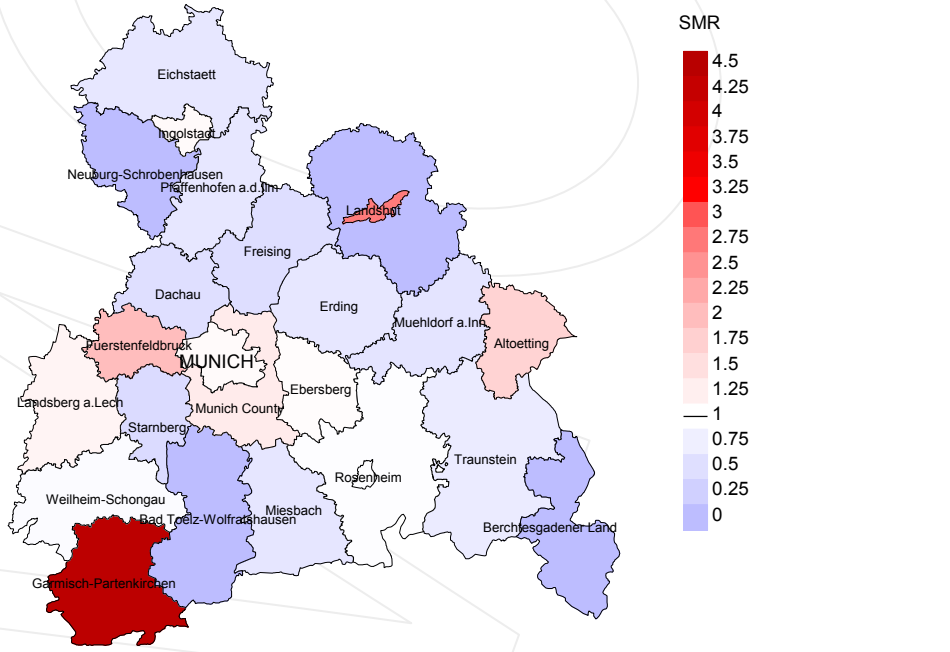


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=506, females N=72).

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 died from hypopharynx cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.02. Though, the value of this parameter may vary with an underlying probability of 99% between 0.05 and 4.74, 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

Recommended Citation

Munich Cancer Registry. Baseline statistics C12, C13: Hypopharynx cancer [Internet]. 2015 [updated 2015 May 19; cited 2015 Jul 1]. Available from: http://www.tumorregister-muenchen.de/en/facts/base/base_C1213E.pdf

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