Munich Cancer Registry

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

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

Cancer statistics: Baseline statistics

C01.9, C05.1, C05.2, C09, C10: Oropharynx cancer

Year of diagnosis	1998-2011
Patients	2329
Diseases	2346
Creation date	04/02/2013
Export date	01/03/2013
Population	4.5 m

http://www.tumorregister-muenchen.de/en/facts/base/base_C0910E.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
C01	Base of tongue
C05.1	Soft palate
C05.2	Uvula
C09	Tonsil
C10	Oropharynx excl. topography code C10.1 Anterior surface of epiglottis

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	105	3	2.9	24.8	81.9	100.0
1999	121			20.7	80.2	100.0
2000	92	1	1.1	32.6	77.2	98.9
2001	98	5	5.1	35.7	75.5	95.9
2002	164	9	5.5	31.7	64.0	99.4
2003	197	8	4.1	36.0	73.1	98.5
2004	177	7	4.0	24.3	67.8	97.2
2005	197	8	4.1	29.9	58.9	97.0
2006	183	1	0.5	26.2	57.9	96.2
2007	194	12	6.2	24.2	52.1	86.6 ##
2008	215	5	2.3	27.9	51.6	80.5
2009	213	2	0.9	31.0	49.3	82.6
2010	206	4	1.9	24.3	37.4	87.4
2011	184	7	3.8	25.5	26.6	70.1 ###
1998-2011	2346	72	3.1	28.1	58.1	90.9

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	105	83	22	79.0
1999	121	98	23	81.0
2000	92	64	28	69.6
2001	98	75	23	76.5
2002	164	130	34	79.3
2003	197	147	50	74.6
2004	177	144	33	81.4
2005	197	152	45	77.2
2006	183	135	48	73.8
2007	194	153	41	78.9
2008	215	155	60	72.1
2009	213	157	56	73.7
2010	206	153	53	74.3
2011	184	140	44	76.1
1998-2011	2346	1786	560	76.1

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	83	22	7.5	1.9	5.2	1.1	6.8	1.6	7.2	1.7
1999	98	23	8.8	1.9	5.8	1.2	7.8	1.6	8.3	1.8
2000	64	28	5.6	2.3	3.6	1.5	5.0	2.0	5.7	2.2
2001	75	23	6.5	1.9	4.4	1.1	6.0	1.5	6.6	1.7
2002	130	34	7.0	1.7	4.6	1.1	6.3	1.4	6.7	1.6
2003	147	50	7.8	2.5	5.1	1.5	7.0	2.1	7.6	2.3
2004	144	33	7.7	1.7	4.8	0.9	6.6	1.3	7.3	1.5
2005	152	45	8.0	2.3	5.2	1.3	7.1	1.8	7.6	2.0
2006	135	48	7.0	2.4	4.5	1.6	6.2	2.1	6.9	2.3
2007	153	41	6.9	1.8	4.3	1.1	6.0	1.5	6.6	1.6
2008	155	60	7.0	2.6	4.2	1.4	5.9	2.0	6.7	2.2
2009	157	56	7.0	2.4	4.3	1.3	6.0	1.9	6.7	2.1
2010	153	53	6.8	2.3	4.0	1.4	5.6	1.9	6.3	2.0
2011	140	44	6.2	1.9	3.6	1.1	5.1	1.5	5.8	1.7
1998-2011	1786	560	7.1	2.1	4.5	1.3	6.2	1.7	6.8	1.9

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	105	56.7	11.3	0.9	83.1	44.9	50.8	56.4	62.6	71.0
1999	121	58.3	10.3	37.1	91.7	47.1	51.3	57.6	63.6	72.6
2000	92	59.9	10.6	35.6	89.6	48.0	52.3	59.0	66.7	74.1
2001	98	59.3	11.1	28.7	92.5	48.3	51.6	57.6	65.2	74.6
2002	164	58.8	9.7	36.7	96.8	47.4	53.1	58.3	62.9	72.1
2003	197	60.7	9.6	38.3	87.5	49.9	54.3	59.4	65.8	75.0
2004	177	61.1	10.0	38.3	85.5	48.0	54.8	60.8	67.0	75.4
2005	197	60.5	10.3	4.1	103	49.9	54.4	60.6	65.4	71.6
2006	183	59.9	11.0	19.0	90.3	46.7	51.8	59.3	66.8	74.7
2007	194	60.9	11.0	35.2	91.6	47.7	52.9	60.3	68.3	74.8
2008	215	63.6	9.9	38.3	91.8	50.1	57.3	62.6	69.2	77.0
2009	213	62.8	11.1	26.7	95.5	50.1	55.5	61.7	69.6	77.3
2010	206	62.9	9.8	37.1	92.1	49.5	55.9	63.5	69.3	75.9
2011	184	63.5	10.7	40.0	93.8	49.9	55.2	63.0	70.6	77.5
1998-2011	2346	61.0	10.5	0.9	103	48.4	53.8	60.2	67.4	75.1

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	83	56.1	11.2	0.9	81.1	44.4	50.3	56.4	62.6	70.7
1999	98	57.0	9.2	37.1	85.7	46.4	50.9	56.4	62.4	68.2
2000	64	60.2	10.6	35.6	89.6	49.1	52.4	59.1	66.7	74.1
2001	75	57.9	9.8	28.7	85.1	47.0	51.6	57.2	63.6	71.2
2002	130	58.4	9.1	36.7	96.8	47.3	52.9	58.3	62.9	69.7
2003	147	59.9	9.2	38.3	87.5	48.1	53.8	59.3	65.5	73.2
2004	144	60.5	9.8	38.3	85.5	47.9	54.5	60.6	66.2	73.8
2005	152	59.9	9.7	4.1	87.1	49.9	54.2	60.3	65.3	70.4
2006	135	60.6	10.2	38.7	86.7	47.2	52.7	59.4	66.9	74.7
2007	153	61.0	10.7	37.1	91.6	47.7	53.2	60.9	68.3	74.7
2008	155	63.1	9.6	38.3	87.0	50.1	57.3	62.3	68.8	76.3
2009	157	62.5	10.3	26.7	90.7	50.1	56.6	61.9	68.6	75.7
2010	153	63.2	10.0	38.0	92.1	50.1	56.0	63.6	69.9	76.2
2011	140	63.3	10.7	40.0	89.2	49.8	54.2	62.7	70.6	77.0
1998-2011	1786	60.6	10.2	0.9	96.8	48.2	53.6	60.1	66.8	74.2

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	22	59.0	11.6	31.1	83.1	50.8	52.7	56.6	66.0	77.8
1999	23	63.9	12.6	41.9	91.7	48.7	52.1	65.1	74.5	77.9
2000	28	59.0	10.6	38.5	79.7	45.2	51.3	58.8	66.5	74.9
2001	23	64.0	13.7	41.3	92.5	49.6	50.6	63.0	74.5	83.0
2002	34	60.3	11.9	37.3	81.7	47.6	53.3	58.0	68.0	78.9
2003	50	63.3	10.3	43.7	84.2	52.7	55.8	61.3	71.7	79.0
2004	33	63.4	10.4	44.7	82.5	50.9	55.9	60.9	69.3	77.8
2005	45	62.8	11.7	44.9	103	50.2	55.8	61.1	66.5	79.3
2006	48	57.8	12.9	19.0	90.3	45.4	49.6	57.6	65.0	72.5
2007	41	60.7	12.2	35.2	89.4	47.8	51.4	57.9	68.1	76.0
2008	60	64.7	10.5	45.6	91.8	51.1	57.4	65.0	69.5	80.7
2009	56	63.7	13.1	41.0	95.5	49.6	54.4	60.1	72.2	84.4
2010	53	62.1	9.2	37.1	85.1	49.5	55.5	63.0	68.1	72.6
2011	44	64.2	11.1	41.0	93.8	53.4	57.0	63.6	70.7	78.3
1998-2011	560	62.2	11.6	19.0	103	49.0	54.1	60.7	69.2	78.3

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	2	0.1	0.1	2	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	1	0.0	0.1			0.1	1	0.2	0.2
20-24	0	0.0	0.1			0.1			0.2
25-29	2	0.1	0.2	2	0.1	0.2			0.2
30-34	2	0.1	0.3	1	0.1	0.3	1	0.2	0.4
35-39	25	1.1	1.4	20	1.1	1.4	5	0.9	1.3
40-44	76	3.2	4.6	63	3.5	4.9	13	2.3	3.6
45-49	207	8.8	13.4	156	8.7	13.7	51	9.1	12.7
50-54	366	15.6	29.0	281	15.7	29.4	85	15.2	27.9
55-59	474	20.2	49.2	362	20.3	49.7	112	20.0	47.9
60-64	430	18.3	67.6	344	19.3	68.9	86	15.4	63.2
65-69	317	13.5	81.1	240	13.4	82.4	77	13.8	77.0
70-74	207	8.8	89.9	161	9.0	91.4	46	8.2	85.2
75-79	123	5.2	95.1	89	5.0	96.4	34	6.1	91.3
80-84	70	3.0	98.1	39	2.2	98.5	31	5.5	96.8
85+	44	1.9	100.0	26	1.5	100.0	18	3.2	100.0
All ages	2346	100.0		1786	100.0		560	100.0	

Included in the statistics are 35.4% multiple primaries in males and 33.2% 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=57 %	Females DCO rate n=15 %	Males Prop.all cancers n=132509 %	Females Prop.all cancers n=129521 %
0- 4	2		0.2	0.0	50.0		0.7	
5- 9			0.0	0.0				
10-14			0.0	0.0				
15-19		1	0.0	0.1				0.4
20-24			0.0	0.0				
25-29	2		0.1	0.0			0.2	
30-34	1	1	0.1	0.1			0.1	0.1
35-39	19	5	0.9	0.2			1.0	0.2
40-44	63	13	2.8	0.6			2.3	0.2
45-49	155	50	8.0	2.6	3.2		3.5	0.7
50-54	281	82	16.8	4.8	1.8		3.9	0.9
55-59	361	110	23.1	6.7	1.7	0.9	2.9	0.9
60-64	341	85	22.4	5.3	2.9	1.2	1.8	0.6
65-69	238	77	17.5	5.2	3.4		1.0	0.5
70-74	161	46	15.6	3.7	5.0	4.3	0.7	0.3
75-79	89	34	13.2	3.4	6.7	5.9	0.5	0.2
80-84	39	31	9.6	3.9	5.1	12.9	0.4	0.2
85+	26	18	9.4	2.4	23.1	27.8	0.3	0.1
All ages	1778	553			3.2	2.7	1.3	0.4
Incidence								
Raw			7.1	2.1				
WS			4.5	1.2				
ES			6.1	1.7				
BRD-S			6.8	1.9				

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	21	0.6	34.3	21.2	52.4	#	51.1	9.5
C09-C10	Oropharynx	7	0.8	8.6	3.4	17.6	#	15.5	
C12-C13	Hypopharynx	13	0.5	28.2	15.0	48.3	#	31.4	7.7
C15	Oesophagus	29	1.0	28.6	19.2	41.1	#	70.1	34.5
C16	Stomach	6	1.8	3.3	1.2	7.3	#	10.5	16.7
C18	Colon	8	4.3	1.9	0.8	3.7		9.3	12.5
C19-C20	Rectum	3	2.9	1.0	0.2	3.0		0.2	
C22	Liver	6	1.3	4.5	1.7	9.8	#	11.7	33.3
C25	Pancreas	5	1.6	3.1	1.0	7.3	#	8.5	40.0
C30-C31	Sinuses	2	0.1	23.1	2.8	83.4	#	4.8	
C32	Larynx	22	0.7	33.5	21.0	50.7	#	53.5	40.9
C33-C34	Lung	44	6.0	7.3	5.3	9.9	#	95.3	11.4
C43	Malign. melanoma	4	2.0	2.0	0.5	5.0		4.9	
C61	Prostate	13	13.7	1.0	0.5	1.6		-1.7	
C64	Kidney	4	1.8	2.2	0.6	5.6		5.5	
C67	Bladder	4	1.7	2.3	0.6	6.0		5.8	25.0
C73	Thyroid	2	0.4	4.5	0.5	16.1		3.9	
C76-C79	CUP	2	0.8	2.5	0.3	9.2		3.0	
C82-C85	NHL	3	1.8	1.7	0.3	4.9		3.0	
C91-C96	Leukaemia	3	0.6	4.8	1.0	13.9		5.9	33.3
Other primaries		6	2.0	3.1	1.1	6.7	#	10.1	
Not observed		0	2.0	0.0	0.0	1.8		-5.1	
All mult. primaries		207	48.5	4.3	3.7	4.9	#	397.2	16.9

Patients	1348
Mean age at second malignancy (years)	62.0
Person-years	3990
Mean observation time (years)	3.0
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".

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 %
C03-C06 Oral cavity	2	0.1	21.0	2.5	76.0	#	13.2	
C09-C10 Oropharynx	5	0.1	63.8	20.7	149.0	#	34.1	
C12-C13 Hypopharynx	5	0.0	249.3	80.9	581.7	#	34.5	
C15 Oesophagus	9	0.1	112.6	51.5	213.8	#	61.8	
C16 Stomach	2	0.4	4.5	0.5	16.3		10.8	
C18 Colon	5	1.2	4.0	1.3	9.4	#	26.0	
C19-C20 Rectum	2	0.6	3.4	0.4	12.3		9.8	
C32 Larynx	6	0.0	191.7	70.3	417.2	#	41.4	16.7
C33-C34 Lung	15	1.0	14.5	8.1	23.9	#	96.7	20.0
C50 Breast	4	4.8	0.8	0.2	2.2		-5.2	25.0
C53 Cervix uteri	4	0.2	18.4	5.0	47.0	#	26.2	
C56 Ovary	2	0.6	3.3	0.4	12.1		9.7	50.0
Other primaries	5	2.0	2.4	0.8	5.7		20.5	
Not observed	0	2.9	0.0	0.0	1.3		-20.3	
All mult. primaries	66	14.2	4.7	3.6	5.9	#	359.2	9.1

Patients	413
Mean age at second malignancy (years)	63.9
Person-years	1443
Mean observation time (years)	3.5
Median observation time (years)	2.5

The occurrence of second malignancy is statistically significant.

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

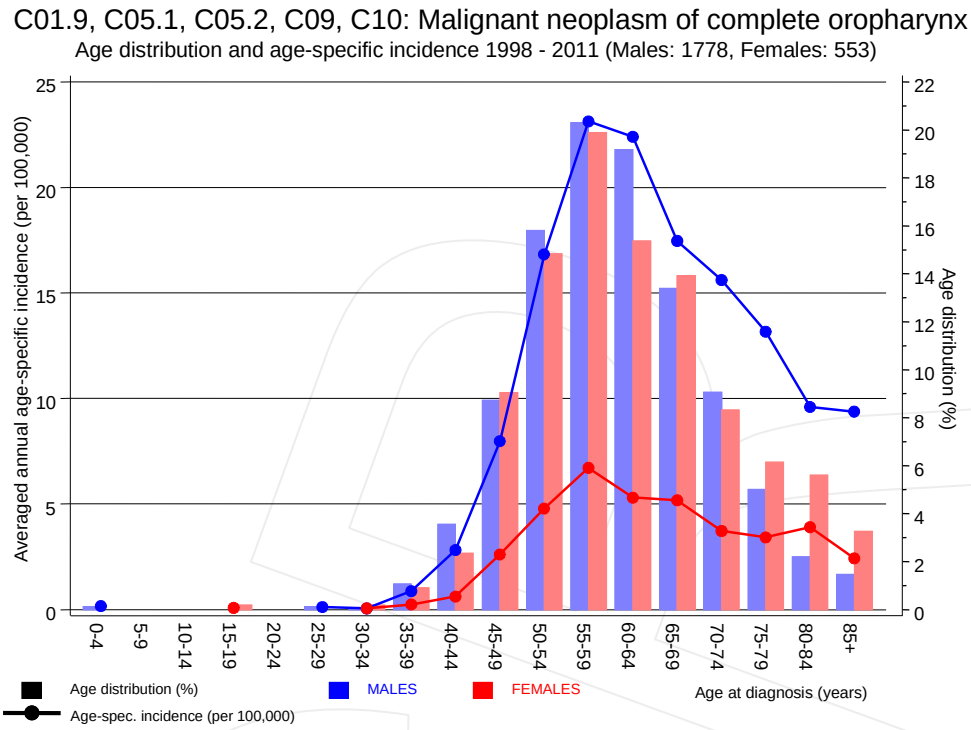


Figure 7. Age distribution and age-specific incidence

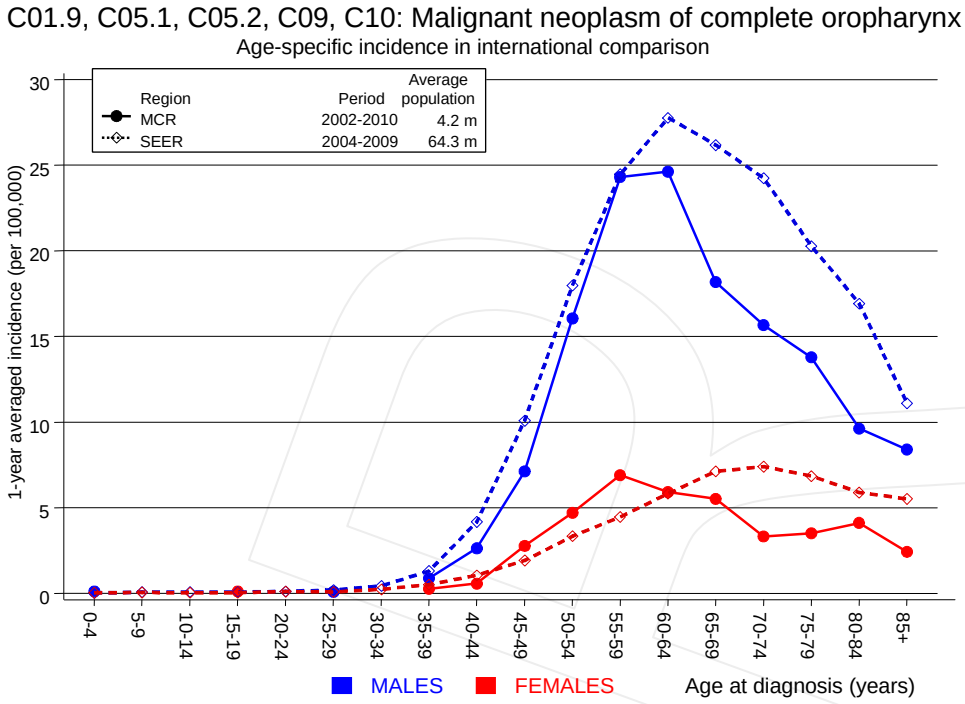


Figure 7a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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.

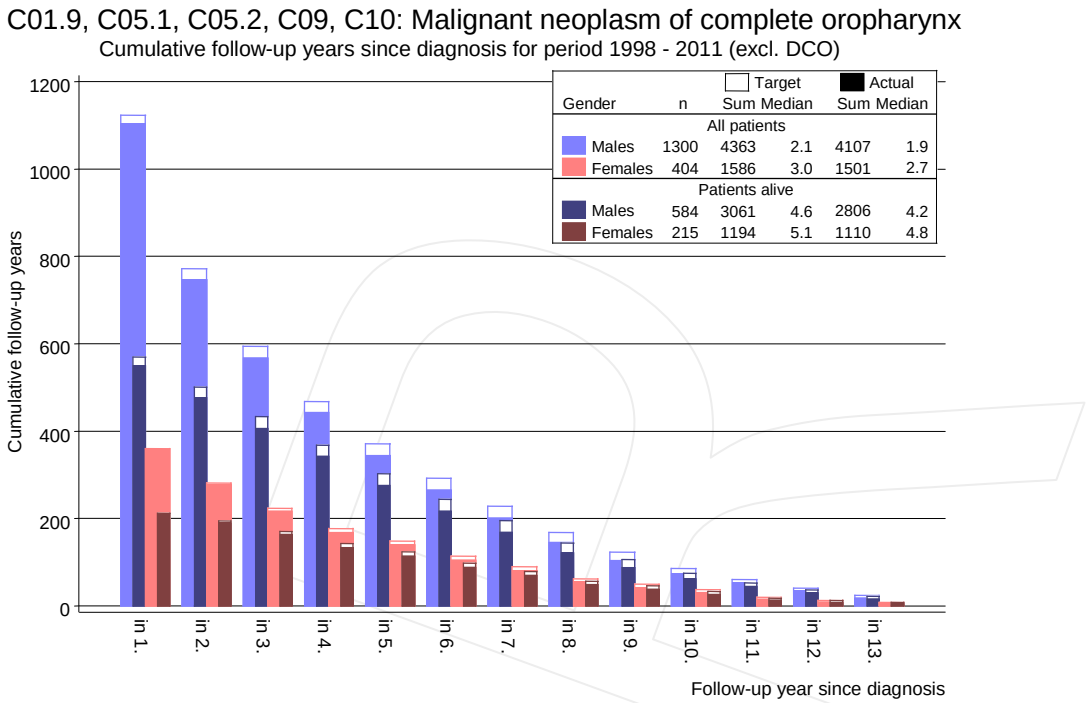
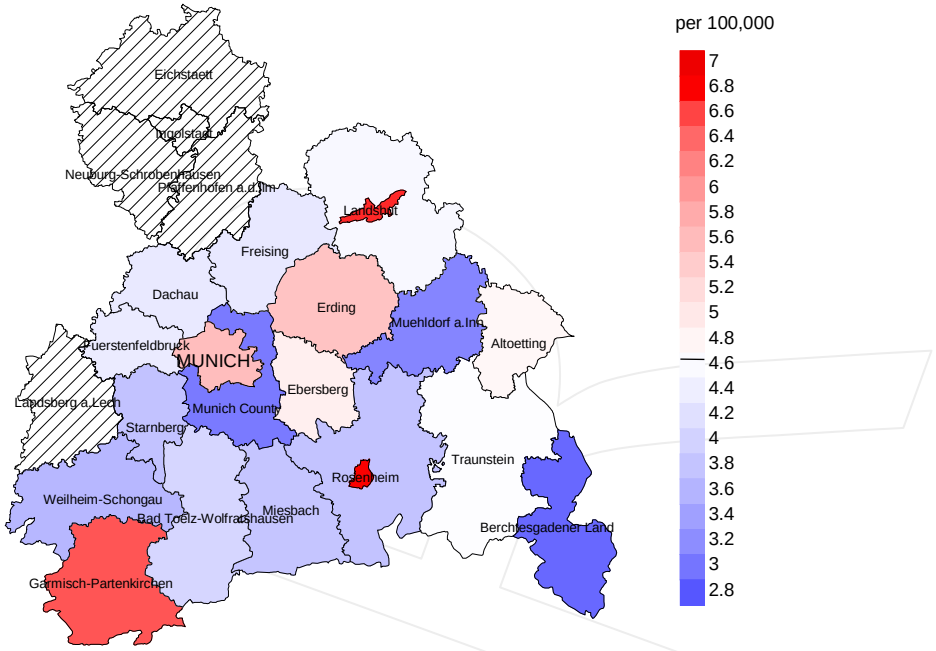


Figure 8. Cumulative follow-up years depending on time since diagnosis

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

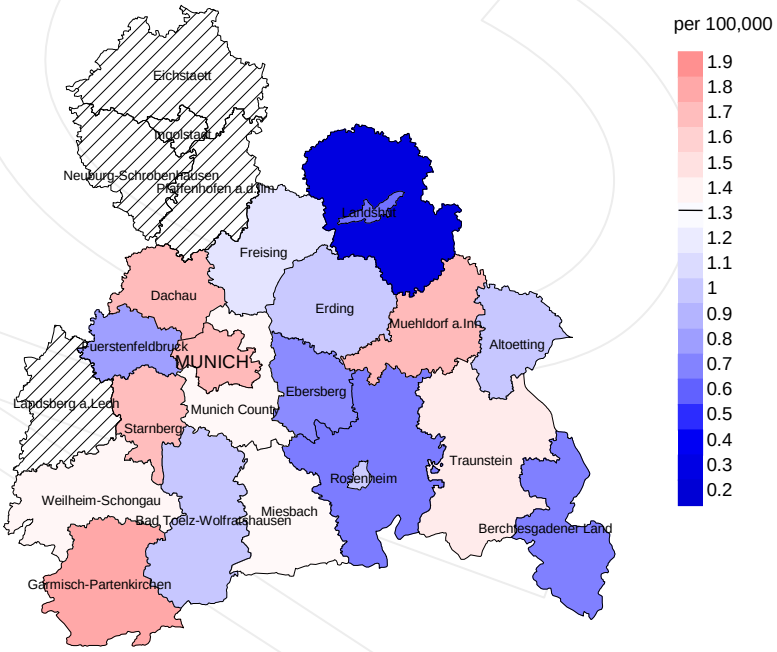
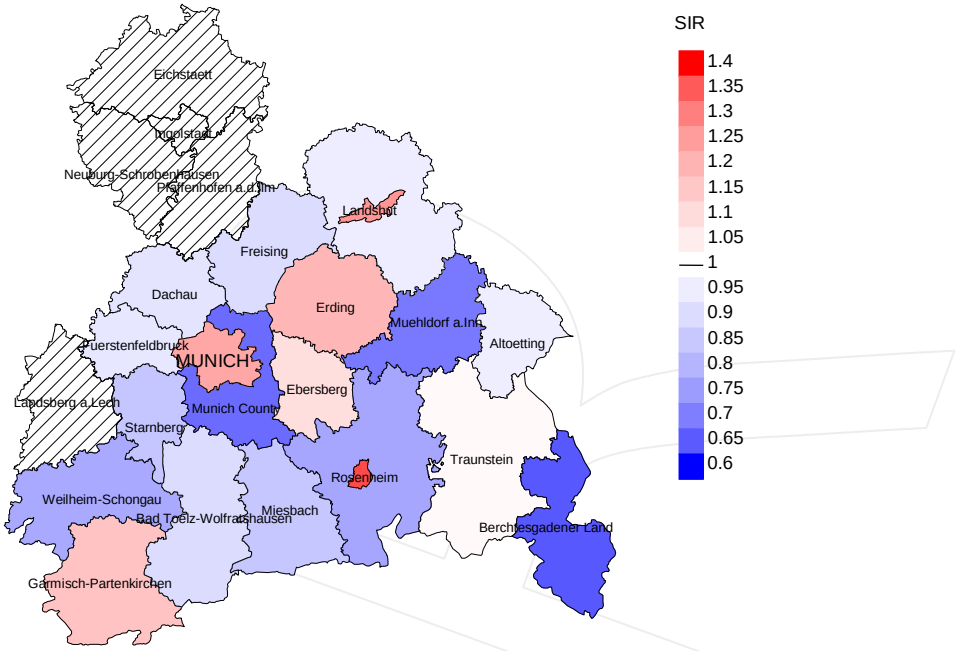


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 4.7/100,000 WS N=846, females 1.3/100,000 WS N=269). Since cancer data are not available in some counties until 2007, the local incidence rates were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 4 women were identified with newly diagnosed oropharynx cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 0.7/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.1 and 2.4/100,000.

Standardized incidence ratio (SIR) 2003 - 2008: Males



Standardized incidence ratio (SIR) 2003 - 2008: Females

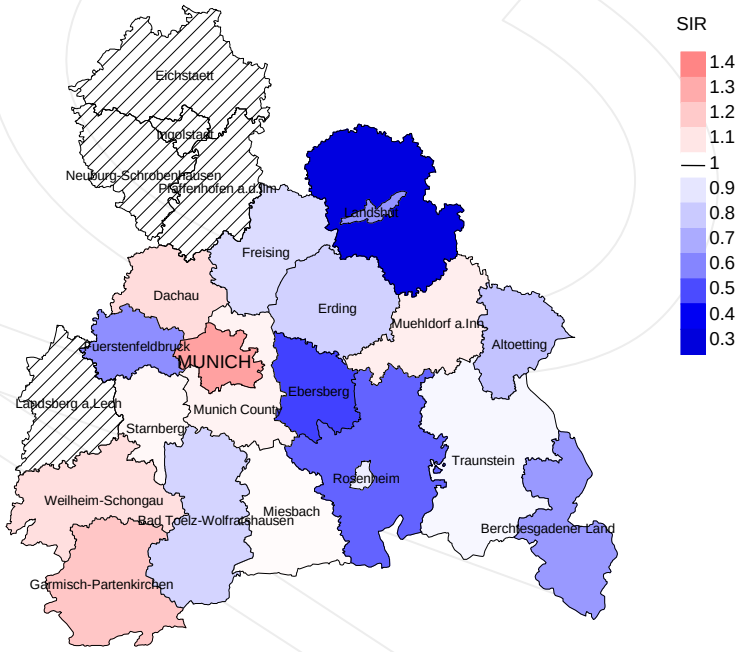


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=846, females N=269). Since cancer data are not available in some counties until 2007, the local SIR values were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 4 women were identified with newly diagnosed oropharynx cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.49. Though, the value of this parameter may vary with an underlying probability of 99% between 0.08 and 1.53, 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	105	100.0	2.9	86	81.9	95.3
1999	121	100.0		97	80.2	87.6
2000	92	98.9	1.1	71	77.2	98.6
2001	98	95.9	5.1	74	75.5	95.9
2002	164	99.4	5.5	105	64.0	97.1
2003	197	98.5	4.1	144	73.1	96.5
2004	177	97.2	4.0	120	67.8	99.2
2005	197	97.0	4.1	116	58.9	98.3
2006	183	96.2	0.5	106	57.9	97.2
2007	194	86.6	6.2	101	52.1	99.0
2008	215	80.5	2.3	111	51.6	98.2
2009	213	82.6	0.9	105	49.3	100.0
2010	206	87.4	1.9	77	37.4	97.4
2011	184	70.1	3.8	49	26.6	93.9
1998-2011	2346	90.9	3.1	1362	58.1	96.9

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	105	78	92.3	12	11.4
1999	121	85	85.9	19	15.7
2000	92	87	94.3	11	12.0
2001	98	76	97.4	20	20.4
2002	164	113	97.3	19	11.6
2003	197	125	95.2	38	19.3
2004	177	129	98.4	24	13.6
2005	197	133	97.0	34	17.3
2006	183	137	97.8	26	14.2
2007	194	150	96.0	30	15.5
2008	215	140	100.0	30	14.0
2009	213	147	99.3	29	13.6
2010	206	151	99.3	27	13.1
2011	184	150	98.7	29	15.8
1998-2011	2346	1701	96.9	348	14.8

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	78	80.8	19.2	91.7
1999	85	68.2	31.8	89.0
2000	87	79.3	20.7	87.8
2001	76	81.6	18.4	95.9
2002	113	81.4	18.6	89.1
2003	125	76.8	23.2	91.6
2004	129	87.6	12.4	95.3
2005	133	88.0	12.0	94.6
2006	137	83.9	16.1	91.0
2007	150	82.7	17.3	89.6
2008	140	77.9	22.1	85.7
2009	147	85.0	15.0	95.9
2010	151	80.8	19.2	92.0
2011	150	77.3	22.7	86.5
1998-2011	1701	81.2	18.8	91.1

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	57	59.7	57.5	70.0	58.6
1999	66	61.0	58.9	66.6	59.3
2000	66	61.7	60.3	66.6	60.5
2001	61	60.3	59.8	62.4	60.7
2002	93	61.6	60.5	67.3	60.6
2003	97	62.0	61.6	63.5	61.5
2004	103	62.6	62.1	67.0	62.4
2005	106	62.4	62.4	62.7	62.1
2006	103	65.9	65.3	69.4	65.3
2007	127	63.9	62.4	70.9	63.1
2008	108	65.3	64.5	68.4	65.0
2009	114	63.8	63.2	67.4	63.8
2010	117	66.6	65.7	70.8	66.0
2011	119	66.8	64.8	73.7	65.6
1998-2011	1337	63.5	62.5	68.2	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	21	68.9	66.3	77.2	68.9
1999	19	63.4	57.7	69.7	58.2
2000	21	60.6	59.1	69.7	60.9
2001	15	66.9	63.3	77.1	65.7
2002	20	66.2	66.5	65.6	66.8
2003	28	65.7	66.4	64.6	67.1
2004	26	68.1	67.2	73.3	67.8
2005	27	65.0	63.7	72.7	63.6
2006	34	68.8	67.3	76.1	68.1
2007	23	70.5	70.5	70.1	69.5
2008	32	66.9	63.9	74.6	63.8
2009	33	67.1	66.6	69.8	66.9
2010	34	67.1	66.0	70.1	66.1
2011	31	71.1	70.1	74.7	69.3
1998-2011	364	67.1	65.8	71.4	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	47	4.2	0.57	3.0	0.58	3.9	0.57	4.1	0.56
1999	48	4.3	0.49	2.8	0.49	3.9	0.49	4.3	0.51
2000	51	4.5	0.80	2.9	0.79	4.0	0.78	4.6	0.81
2001	51	4.4	0.68	2.8	0.64	3.8	0.64	4.3	0.65
2002	78	4.2	0.60	2.8	0.60	3.8	0.61	4.4	0.65
2003	78	4.2	0.54	2.6	0.53	3.7	0.54	4.1	0.54
2004	91	4.8	0.64	3.0	0.63	4.2	0.63	4.8	0.65
2005	94	5.0	0.63	3.0	0.58	4.2	0.60	4.7	0.63
2006	87	4.5	0.64	2.6	0.59	3.7	0.60	4.3	0.62
2007	105	4.7	0.69	2.9	0.67	4.1	0.68	4.6	0.70
2008	86	3.9	0.55	2.2	0.53	3.2	0.53	3.6	0.53
2009	98	4.4	0.62	2.6	0.60	3.7	0.61	4.2	0.62
2010	97	4.3	0.64	2.5	0.63	3.5	0.64	4.2	0.66
2011	92	4.1	0.66	2.3	0.65	3.4	0.67	3.9	0.69
1998-2011	1103	4.4	0.62	2.7	0.60	3.7	0.61	4.2	0.63

Table 12b

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

Year of death	Deaths n	Mort. raw	MI-Index raw	Mort. WS	MI-Index WS	Mort. ES	MI-Index ES	Mort. BRD-S	MI-Index BRD-S
1998	16	1.4	0.73	0.7	0.63	1.0	0.62	1.2	0.74
1999	10	0.8	0.43	0.6	0.48	0.8	0.49	0.8	0.45
2000	18	1.5	0.64	0.9	0.59	1.2	0.60	1.4	0.63
2001	11	0.9	0.48	0.5	0.47	0.7	0.45	0.8	0.46
2002	14	0.7	0.41	0.4	0.36	0.6	0.38	0.7	0.41
2003	18	0.9	0.37	0.5	0.34	0.7	0.34	0.8	0.35
2004	22	1.1	0.67	0.6	0.61	0.8	0.59	1.0	0.64
2005	23	1.2	0.51	0.7	0.52	1.0	0.53	1.1	0.52
2006	28	1.4	0.58	0.7	0.44	1.0	0.48	1.2	0.53
2007	19	0.8	0.48	0.4	0.35	0.5	0.37	0.6	0.41
2008	23	1.0	0.38	0.5	0.38	0.8	0.39	0.8	0.37
2009	28	1.2	0.51	0.6	0.48	0.9	0.49	1.0	0.50
2010	25	1.1	0.49	0.6	0.44	0.8	0.46	0.9	0.48
2011	24	1.0	0.57	0.5	0.47	0.7	0.47	0.8	0.50
1998-2011	279	1.1	0.50	0.6	0.46	0.8	0.47	0.9	0.49

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	0.1	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	0	0.0	0.1			0.1			0.0
35-39	8	0.6	0.6	7	0.6	0.7	1	0.4	0.4
40-44	34	2.4	3.1	30	2.7	3.4	4	1.4	1.8
45-49	94	6.7	9.8	77	6.9	10.3	17	6.0	7.8
50-54	171	12.3	22.1	143	12.8	23.2	28	10.0	17.8
55-59	252	18.1	40.2	203	18.2	41.4	49	17.4	35.2
60-64	286	20.5	60.7	236	21.2	62.6	50	17.8	53.0
65-69	202	14.5	75.2	168	15.1	77.7	34	12.1	65.1
70-74	140	10.0	85.2	106	9.5	87.2	34	12.1	77.2
75-79	108	7.7	93.0	79	7.1	94.3	29	10.3	87.5
80-84	50	3.6	96.6	35	3.1	97.5	15	5.3	92.9
85+	48	3.4	100.0	28	2.5	100.0	20	7.1	100.0
All ages	1394	100.0		1113	100.0		281	100.0	

Included in the statistics are 35.4% multiple primaries in males and 33.2% 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	0.50	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	7	1	0.3	0.35	0.0	0.20	1.9	0.2
40-44	30	4	1.3	0.48	0.2	0.31	4.0	0.4
45-49	77	17	4.0	0.49	0.9	0.33	5.0	1.0
50-54	143	28	8.6	0.51	1.6	0.33	5.0	1.1
55-59	203	49	13.0	0.56	3.0	0.44	3.9	1.2
60-64	236	50	15.5	0.69	3.1	0.58	3.1	0.9
65-69	168	34	12.3	0.70	2.3	0.44	1.6	0.5
70-74	106	34	10.3	0.66	2.8	0.74	1.0	0.4
75-79	79	29	11.7	0.89	2.9	0.85	0.7	0.3
80-84	35	15	8.6	0.90	1.9	0.48	0.4	0.2
85+	28	20	10.1	1.08	2.7	1.11	0.4	0.2
All ages	1113	281					1.7	0.5
Mortality								
Raw			4.4	0.62	1.1	0.50		
WS			2.7	0.60	0.6	0.45		
ES			3.8	0.61	0.8	0.47		
BRD-S			4.3	0.63	0.9	0.49		
PYLL-70								
per 100,000			44.3		9.3			
ES			40.1		8.1			
AYLL-70			11.7		11.4			

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	26	5.0			2	7.7	24	92.3
C09-C10 Oropharynx	49	9.4			14	28.6	35	71.4
C12-C13 Hypopharynx	33	6.3	10	30.3	13	39.4	10	30.3
C15 Oesophagus	59	11.3	15	25.4	6	10.2	38	64.4
C16 Stomach	13	2.5	5	38.5	2	15.4	6	46.2
C18 Colon	18	3.5	6	33.3	2	11.1	10	55.6
C22 Liver	9	1.7			1	11.1	8	88.9
C25 Pancreas	14	2.7	2	14.3			12	85.7
C32 Larynx	51	9.8	22	43.1	10	19.6	19	37.3
C33-C34 Lung	96	18.4	18	18.8	8	8.3	70	72.9
C44 Skin others	27	5.2	6	22.2	5	18.5	16	59.3
C61 Prostate	24	4.6	10	41.7			14	58.3
C64 Kidney	13	2.5	5	38.5	2	15.4	6	46.2
C67 Bladder	19	3.6	8	42.1	1	5.3	10	52.6
C76-C79 CUP	16	3.1	11	68.8	2	12.5	3	18.8
C82-C85 NHL	5	1.0	2	40.0			3	60.0
Other primaries	49	9.4	21	42.9	3	6.1	25	51.0
All mult. primaries	521	100.0	141	27.1	71	13.6	309	59.3

Multiple primaries with number of cases n<5 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	5	3.6					5	100.0
C09-C10 Oropharynx	18	13.1			3	16.7	15	83.3
C11 Nasopharynx	1	0.7			1	100.0		
C12-C13 Hypopharynx	4	2.9			2	50.0	2	50.0
C14 ENT cancer	1	0.7			1	100.0		
C15 Oesophagus	15	10.9	3	20.0	1	6.7	11	73.3
C16 Stomach	2	1.5			1	50.0	1	50.0
C18 Colon	7	5.1	4	57.1	1	14.3	2	28.6
C19-C20 Rectum	1	0.7					1	100.0
C21 Anus/canal	3	2.2	2	66.7			1	33.3
C22 Liver	1	0.7					1	100.0
C25 Pancreas	1	0.7					1	100.0
C26 GI cancer	1	0.7					1	100.0
C30-C31 Sinuses	1	0.7					1	100.0
C32 Larynx	10	7.3	3	30.0	2	20.0	5	50.0
C33-C34 Lung	21	15.3	3	14.3	2	9.5	16	76.2
C44 Skin others	4	2.9	1	25.0			3	75.0
C50 Breast	12	8.8	9	75.0			3	25.0
C53 Cervix uteri	7	5.1	6	85.7			1	14.3
C54 Corpus uteri	2	1.5	2	100.0				
C56 Ovary	1	0.7					1	100.0
C67 Bladder	2	1.5	1	50.0			1	50.0
C68 Urethra	1	0.7	1	100.0				
C70-C72 CNS cancer	1	0.7					1	100.0
C73 Thyroid	2	1.5	1	50.0	1	50.0		
C76-C79 CUP	9	6.6	7	77.8			2	22.2
C82-C85 NHL	2	1.5	1	50.0			1	50.0
C90 Mult. myeloma	1	0.7	1	100.0				
C91-C96 Leukaemia	1	0.7					1	100.0
All mult. primaries	137	100.0	45	32.8	15	10.9	77	56.2

Multiple primaries with number of cases n<1 are pooled in category "Other primaries".

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

Table 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	5	1	0.2	0.29	0.0	0.20	1.5	0.2
40-44	27	3	1.2	0.49	0.1	0.25	3.9	0.3
45-49	63	16	3.2	0.46	0.8	0.36	4.5	1.1
50-54	126	21	7.5	0.50	1.2	0.30	5.1	0.9
55-59	166	43	10.6	0.56	2.6	0.48	3.7	1.2
60-64	184	34	12.1	0.68	2.1	0.46	2.8	0.7
65-69	129	26	9.5	0.67	1.7	0.42	1.5	0.5
70-74	87	26	8.4	0.73	2.1	0.72	1.0	0.4
75-79	59	22	8.7	0.98	2.2	0.81	0.7	0.3
80-84	27	8	6.6	0.96	1.0	0.36	0.4	0.1
85+	21	14	7.6	1.05	1.9	1.08	0.4	0.2
All ages	894	214					1.7	0.4
Mortality								
Raw			3.6	0.62	0.8	0.47		
WS			2.2	0.59	0.4	0.43		
ES			3.0	0.60	0.6	0.44		
BRD-S			3.4	0.62	0.7	0.46		
PYLL-70								
per 100,000			36.5		7.5			
ES			33.0		6.6			
AYLL-70			11.9		11.8			

* 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	5	1	0.2	0.29	0.0	0.20	1.5	0.3
40-44	25	3	1.1	0.50	0.1	0.30	3.8	0.4
45-49	51	10	2.6	0.43	0.5	0.25	3.9	0.7
50-54	103	20	6.2	0.46	1.2	0.32	4.5	1.0
55-59	126	33	8.1	0.49	2.0	0.45	3.1	1.1
60-64	145	26	9.5	0.61	1.6	0.39	2.5	0.6
65-69	98	24	7.2	0.59	1.6	0.41	1.3	0.5
70-74	60	20	5.8	0.57	1.6	0.63	0.8	0.4
75-79	44	13	6.5	0.77	1.3	0.57	0.6	0.2
80-84	19	7	4.7	0.73	0.9	0.39	0.4	0.1
85+	18	9	6.5	0.90	1.2	0.69	0.4	0.1
All ages	694	166					1.5	0.4
Mortality								
Raw			2.8	0.54	0.6	0.41		
WS			1.7	0.52	0.4	0.38		
ES			2.4	0.53	0.5	0.39		
BRD-S			2.7	0.55	0.6	0.40		
PYLL-70								
per 100,000			29.5		6.0			
ES			26.6		5.3			
AYLL-70			12.1		11.6			

* See corresponding tables with multiple primaries.

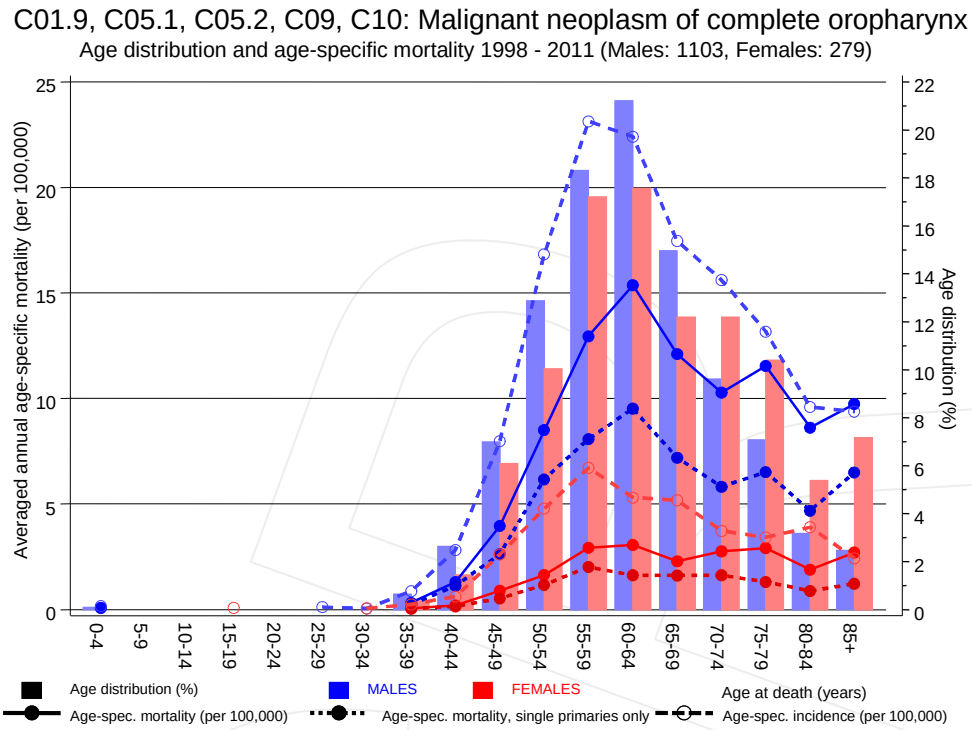
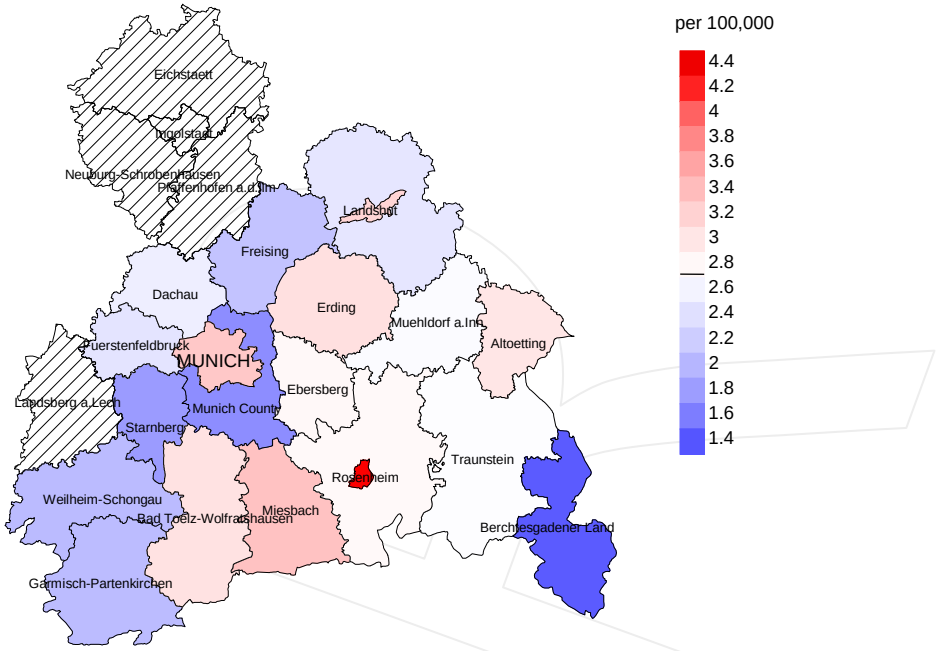


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

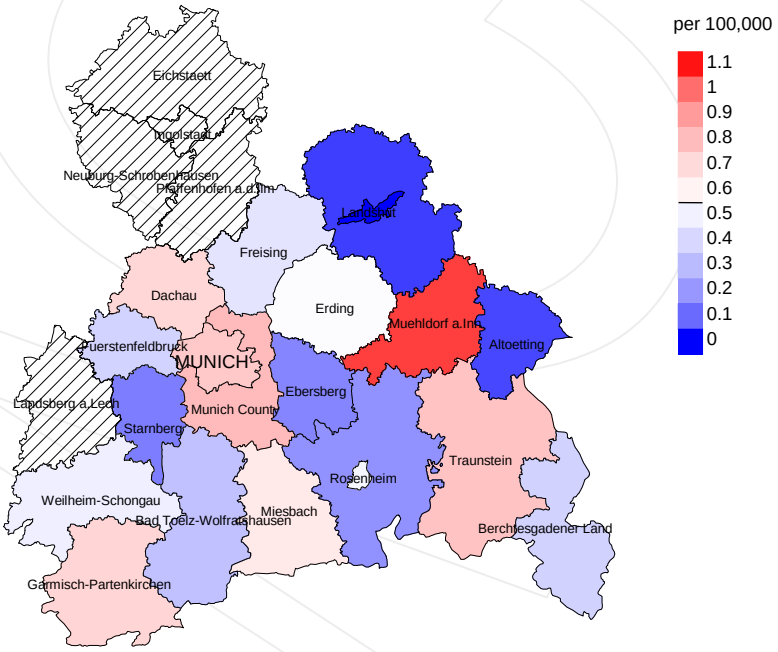
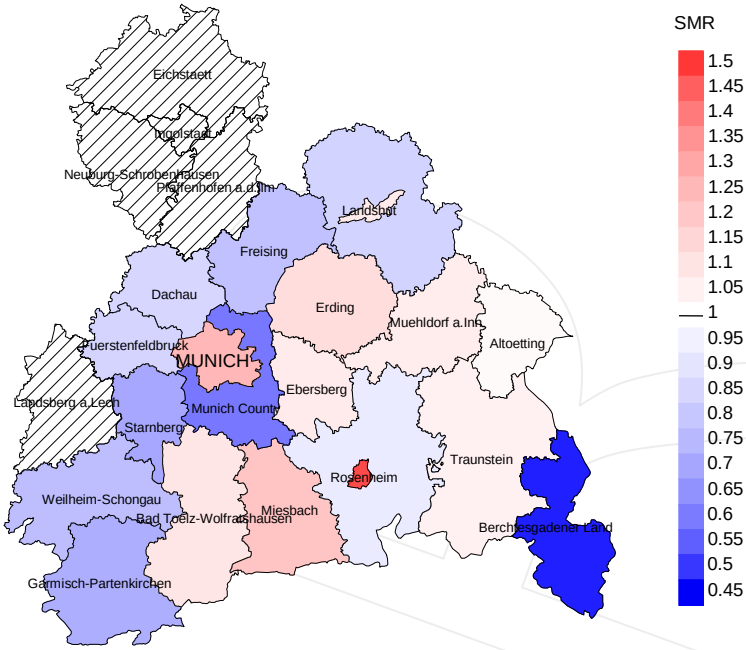


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 2.7/100,000 WS N=519, females 0.6/100,000 WS N=128). Since cancer data are not available in some counties until 2007, the local mortality rates were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 1 women died from oropharynx 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) 2003 - 2008: Males



Standardized mortality ratio (SMR) 2003 - 2008: Females

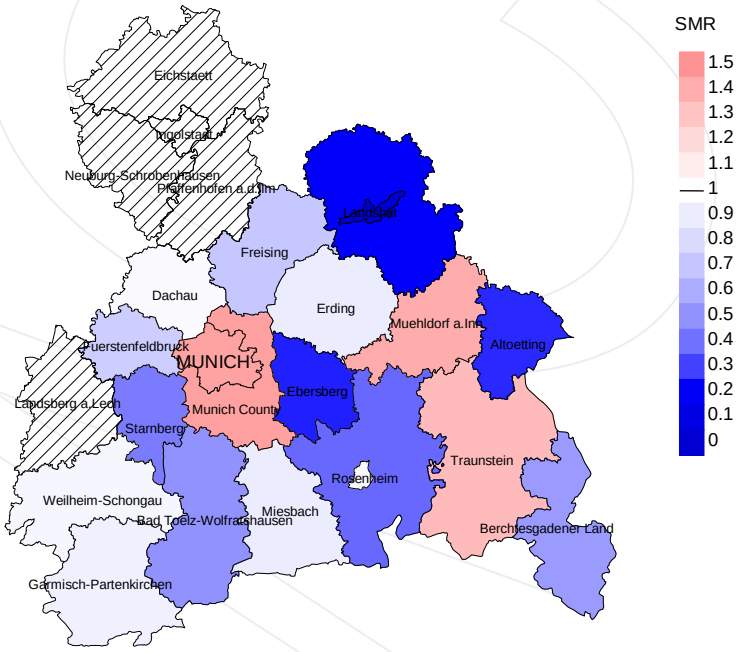


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=519, females N=128). Since cancer data are not available in some counties until 2007, the local SMR values were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 1 women died from oropharynx cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.26. Though, the value of this parameter may vary with an underlying probability of 99% between 0.00 and 1.94, 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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