Munich Cancer Registry

- Survival
- Selection Matrix
- Homepage

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

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

Cancer statistics: Baseline statistics

C00-C14: HN cancer

Year of diagnosis	1998-2011
Patients	7150
Diseases	7352
Creation date	04/02/2013
Export date	01/03/2013
Population	4.5 m

http://www.tumorregister-muenchen.de/en/facts/base/base_C0014E.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
C00	Lip
C01	Base of tongue
C02	Tongue, other parts
C03	Gum
C04	Floor of mouth
C05	Palate
C06	Mouth, other parts
C07	Parotid gland
C08	Major salivary glands
C09	Tonsil
C10	Oropharynx excl. C10.1 Anterior surface of epiglottis
C11	Nasopharynx
C12	Piriform sinus
C13	Hypopharynx
C14	Lip, oral cavity and pharynx, other parts

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	352	18	5.1	29.0	77.6	99.1
1999	383	12	3.1	30.3	76.5	97.4
2000	342	14	4.1	29.2	76.3	98.0
2001	356	21	5.9	29.5	71.6	96.9
2002	556	37	6.7	31.1	68.3	98.2
2003	561	23	4.1	33.0	69.7	98.8
2004	538	24	4.5	29.6	67.1	97.6
2005	562	26	4.6	29.9	61.6	96.6
2006	544	10	1.8	27.0	60.1	96.7
2007	647	40	6.2	27.4	58.7	89.0 ##
2008	676	21	3.1	26.5	51.2	77.2
2009	651	12	1.8	28.6	49.6	81.6
2010	667	35	5.2	26.1	39.9	87.3
2011	517	26	5.0	24.4	26.1	70.2 ###
1998-2011	7352	319	4.3	28.5	59.0	90.7

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	352	267	85	75.9
1999	383	277	106	72.3
2000	342	261	81	76.3
2001	356	264	92	74.2
2002	556	410	146	73.7
2003	561	414	147	73.8
2004	538	411	127	76.4
2005	562	415	147	73.8
2006	544	386	158	71.0
2007	647	478	169	73.9
2008	676	491	185	72.6
2009	651	471	180	72.4
2010	667	492	175	73.8
2011	517	359	158	69.4
1998-2011	7352	5396	1956	73.4

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	267	85	24.1	7.2	16.2	3.9	21.8	5.5	24.1	6.4
1999	277	106	24.7	8.9	16.1	5.1	22.4	6.9	24.8	7.9
2000	261	81	22.9	6.7	15.2	3.9	21.0	5.4	23.4	6.1
2001	264	92	22.8	7.6	15.0	4.3	20.6	5.9	22.9	6.6
2002	410	146	22.0	7.5	14.2	3.9	19.5	5.5	21.4	6.5
2003	414	147	22.1	7.5	14.5	4.2	19.9	5.8	21.6	6.6
2004	411	127	21.8	6.4	14.0	3.3	19.1	4.6	21.5	5.6
2005	415	147	21.9	7.4	13.9	4.2	18.8	5.7	21.0	6.5
2006	386	158	20.2	7.9	12.7	4.7	17.7	6.3	20.0	7.1
2007	478	169	21.6	7.3	13.2	4.0	18.3	5.5	20.7	6.3
2008	491	185	22.1	8.0	13.6	4.3	18.7	5.9	21.1	6.8
2009	471	180	21.1	7.7	12.7	4.2	17.6	5.8	19.8	6.6
2010	492	175	21.8	7.5	13.0	4.0	18.1	5.5	20.5	6.2
2011	359	158	15.9	6.8	9.4	3.7	13.0	5.1	14.9	5.8
1998-2011	5396	1956	21.5	7.4	13.5	4.1	18.6	5.6	20.8	6.5

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	352	59.2	12.6	0.9	97.4	46.4	51.8	58.0	65.9	76.0
1999	383	60.4	12.4	13.9	91.9	47.9	52.0	58.8	66.9	78.7
2000	342	60.0	11.7	31.0	91.9	46.0	51.6	58.6	67.5	76.4
2001	356	61.0	12.4	16.4	96.4	47.5	53.1	60.1	67.0	77.1
2002	556	61.4	11.9	26.4	99.0	47.0	53.7	60.9	68.2	78.6
2003	561	60.5	11.7	10.7	98.2	47.0	53.2	59.5	67.7	76.1
2004	538	61.6	12.4	24.7	97.9	45.8	53.4	61.3	69.3	78.4
2005	562	61.4	12.0	4.1	103	47.2	53.6	61.1	67.5	77.7
2006	544	61.4	12.5	17.6	101	46.8	53.2	60.1	69.2	78.0
2007	647	62.3	12.3	7.7	101	47.3	53.7	62.6	70.5	77.8
2008	676	63.3	11.6	19.8	100	49.5	55.3	62.5	69.6	79.4
2009	651	63.1	12.0	16.6	98.4	48.4	54.9	62.6	70.7	79.9
2010	667	62.8	12.8	18.2	95.3	47.7	53.8	63.1	70.8	78.7
2011	517	63.4	12.7	14.4	94.6	48.2	55.0	63.6	71.8	79.1
1998-2011	7352	61.8	12.3	0.9	103	47.5	53.6	61.1	69.5	78.2

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	267	57.6	11.2	0.9	87.6	46.1	51.4	57.3	63.8	71.0
1999	277	59.2	11.2	32.0	90.8	47.9	51.4	57.6	64.3	75.2
2000	261	59.5	10.6	35.6	89.7	47.5	51.7	58.5	66.5	73.6
2001	264	59.5	11.1	28.7	94.9	46.5	52.0	59.0	65.3	74.5
2002	410	59.8	10.4	26.4	96.8	46.6	53.0	60.0	65.3	73.3
2003	414	59.5	10.0	28.1	94.5	47.5	53.2	59.0	65.6	72.6
2004	411	60.2	11.4	26.7	92.4	45.5	52.9	60.1	66.3	75.3
2005	415	60.5	11.3	4.1	99.0	46.7	53.4	61.0	66.9	74.7
2006	386	61.0	11.3	17.6	92.0	47.2	53.4	59.6	67.5	77.0
2007	478	61.5	11.3	15.7	101	47.2	53.2	61.5	69.5	75.7
2008	491	62.5	10.8	19.8	100	49.5	54.8	62.0	69.0	77.1
2009	471	62.5	10.9	16.6	90.7	48.9	54.9	62.3	70.0	76.1
2010	492	62.2	12.4	18.2	95.3	47.7	53.6	61.8	70.3	77.5
2011	359	62.9	12.1	14.4	90.5	48.2	53.8	63.0	71.1	78.2
1998-2011	5396	60.8	11.3	0.9	101	47.4	53.2	60.3	68.0	75.6

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	85	63.9	15.4	9.5	97.4	49.6	54.5	61.8	75.9	83.1
1999	106	63.8	14.6	13.9	91.9	47.8	55.1	64.7	74.9	81.6
2000	81	61.6	14.7	31.0	91.9	43.3	51.4	59.6	74.0	81.3
2001	92	65.4	14.5	16.4	96.4	50.2	56.4	63.3	73.0	87.8
2002	146	65.9	14.3	31.4	99.0	48.1	55.5	63.9	77.7	84.2
2003	147	63.5	15.2	10.7	98.2	44.8	53.2	62.8	75.7	83.7
2004	127	66.2	14.2	24.7	97.9	48.9	57.0	67.0	76.8	83.1
2005	147	63.9	13.6	22.8	103	49.6	54.5	62.3	72.1	81.4
2006	158	62.3	15.0	19.0	101	45.9	52.7	61.8	71.5	84.0
2007	169	64.7	14.6	7.7	98.2	47.5	55.3	63.6	74.8	84.6
2008	185	65.7	13.5	25.6	98.4	49.7	57.2	65.7	74.0	83.5
2009	180	64.6	14.5	16.8	98.4	47.8	55.0	63.5	74.8	83.7
2010	175	64.5	13.7	21.9	91.8	47.8	54.1	65.9	72.1	85.0
2011	158	64.6	13.9	17.2	94.6	48.5	57.0	64.6	73.1	84.1
1998-2011	1956	64.4	14.3	7.7	103	47.6	55.1	63.9	74.7	83.7

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	3	0.0	0.0	3	0.1	0.1			0.0
5-9	2	0.0	0.1			0.1	2	0.1	0.1
10-14	4	0.1	0.1	2	0.0	0.1	2	0.1	0.2
15-19	10	0.1	0.3	5	0.1	0.2	5	0.3	0.5
20-24	12	0.2	0.4	5	0.1	0.3	7	0.4	0.8
25-29	29	0.4	0.8	18	0.3	0.6	11	0.6	1.4
30-34	53	0.7	1.5	28	0.5	1.1	25	1.3	2.7
35-39	96	1.3	2.8	63	1.2	2.3	33	1.7	4.3
40-44	253	3.4	6.3	196	3.6	5.9	57	2.9	7.3
45-49	642	8.7	15.0	515	9.5	15.5	127	6.5	13.8
50-54	1059	14.4	29.4	844	15.6	31.1	215	11.0	24.7
55-59	1224	16.6	46.1	953	17.7	48.8	271	13.9	38.6
60-64	1231	16.7	62.8	950	17.6	66.4	281	14.4	53.0
65-69	996	13.5	76.4	735	13.6	80.0	261	13.3	66.3
70-74	672	9.1	85.5	491	9.1	89.1	181	9.3	75.6
75-79	470	6.4	91.9	297	5.5	94.6	173	8.8	84.4
80-84	326	4.4	96.3	174	3.2	97.8	152	7.8	92.2
85+	270	3.7	100.0	117	2.2	100.0	153	7.8	100.0
All ages	7352	100.0		5396	100.0		1956	100.0	

Included in the statistics are 34.5% multiple primaries in males and 31.1% 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=211 %	Females DCO rate n=102 %	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		2	0.0	0.2				1.9
10-14	2	2	0.2	0.2			1.5	1.3
15-19	5	5	0.4	0.4			1.7	2.1
20-24	5	7	0.3	0.5			1.0	1.6
25-29	17	11	1.0	0.6			2.1	1.2
30-34	28	25	1.4	1.3		4.0	2.1	1.4
35-39	62	33	2.8	1.6		3.0	3.1	1.0
40-44	195	57	8.7	2.7	1.0		7.1	1.1
45-49	507	125	26.1	6.5	2.2	2.4	11.3	1.7
50-54	833	207	49.9	12.1	2.4	1.4	11.4	2.2
55-59	939	268	60.2	16.4	2.2	2.2	7.5	2.3
60-64	929	278	61.0	17.3	3.4	2.5	4.9	1.9
65-69	725	258	53.2	17.3	3.4	1.6	3.1	1.6
70-74	487	180	47.2	14.6	7.2	2.8	2.2	1.2
75-79	295	170	43.7	17.1	6.1	5.9	1.8	1.2
80-84	172	150	42.3	18.9	11.0	9.3	1.6	1.1
85+	116	153	41.8	20.6	23.3	31.4	1.4	1.1
All ages	5319	1931			4.0	5.3	4.0	1.5
Incidence								
Raw			21.2	7.3				
WS			13.3	4.0				
ES			18.3	5.5				
BRD-S			20.5	6.4				

The age-specific incidence characterizes the disease risk in a particular age group. The age distribution depends on the patient population frequency in each age group and reflects the tangible clinical picture of everyday patients care (see following chart).

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 %
C00	Lip	2	0.1	13.7	1.7	49.6	#	1.5	
C03-C06	Oral cavity	35	1.8	19.2	13.4	26.7	#	27.2	8.6
C09-C10	Oropharynx	40	2.4	16.7	11.9	22.7	#	30.8	2.5
C12-C13	Hypopharynx	40	1.4	29.2	20.9	39.8	#	31.7	12.5
C15	Oesophagus	80	3.1	26.2	20.8	32.6	#	63.1	17.5
C16	Stomach	19	5.8	3.3	2.0	5.1	#	10.8	15.8
C17	Small intestine	2	0.7	2.7	0.3	9.9		1.0	50.0
C18	Colon	26	13.8	1.9	1.2	2.8	#	10.0	3.8
C19-C20	Rectum	21	9.1	2.3	1.4	3.5	#	9.8	
C21	Anus/canal	4	0.3	11.7	3.2	29.9	#	3.0	
C22	Liver	20	4.1	4.9	3.0	7.5	#	13.0	20.0
C25	Pancreas	12	5.0	2.4	1.2	4.2	#	5.7	25.0
C30-C31	Sinuses	3	0.3	11.3	2.3	33.1	#	2.2	
C32	Larynx	43	2.0	21.7	15.7	29.2	#	33.6	25.6
C33-C34	Lung	165	18.5	8.9	7.6	10.4	#	120.0	13.9
C43	Malign. melanoma	10	6.3	1.6	0.8	2.9		3.1	
C46,C49	Soft tissue	2	0.8	2.4	0.3	8.7		1.0	
C61	Prostate	43	43.3	1.0	0.7	1.3		-0.2	9.3
C62	Testis	2	0.7	3.0	0.4	10.8		1.1	
C64	Kidney	16	5.6	2.8	1.6	4.6	#	8.5	12.5
C67	Bladder	14	5.5	2.5	1.4	4.3	#	6.9	14.3
C70-C72	CNS cancer	2	2.3	0.9	0.1	3.2		-0.2	
C73	Thyroid	6	1.3	4.5	1.6	9.7	#	3.8	16.7
C76-C79	CUP	8	2.5	3.2	1.4	6.4	#	4.5	
C81	Hodgkin lymphoma	2	0.3	5.8	0.7	20.9		1.4	
C82-C85	NHL	15	5.7	2.6	1.5	4.4	#	7.6	20.0
C91-C96	Leukaemia	9	2.0	4.4	2.0	8.4	#	5.7	33.3
Other primaries		7	5.0	1.4	0.6	2.9		1.6	14.3
Not observed		0	2.2	0.0	0.0	1.7		-1.8	
All mult. primaries		648	152.0	4.3	3.9	4.6	#	406.6	13.1

Patients	3965
Mean age at second malignancy (years)	64.0
Person-years	12200
Mean observation time (years)	3.1
Median observation time (years)	1.9

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	7	0.3	21.0	8.5	43.3	#	12.9	
C07-C08	Salivary gland	3	0.1	35.5	7.3	103.7	#	5.7	
C09-C10	Oropharynx	18	0.2	73.0	43.3	115.4	#	34.5	
C12-C13	Hypopharynx	9	0.1	138.7	63.4	263.3	#	17.3	22.2
C15	Oesophagus	19	0.3	65.8	39.6	102.8	#	36.3	
C16	Stomach	4	1.9	2.1	0.6	5.4		4.1	
C18	Colon	8	5.2	1.5	0.7	3.0		5.5	
C19-C20	Rectum	3	2.3	1.3	0.3	3.8		1.3	
C22	Liver	5	0.6	9.0	2.9	20.9	#	8.6	20.0
C23-C24	Bile	2	0.7	2.7	0.3	9.8		2.5	
C25	Pancreas	5	2.1	2.3	0.8	5.4		5.5	40.0
C30-C31	Sinuses	3	0.1	49.7	10.3	145.3	#	5.7	33.3
C32	Larynx	10	0.1	94.2	45.2	173.3	#	19.2	20.0
C33-C34	Lung	46	3.7	12.4	9.1	16.5	#	82.1	17.4
C43	Malign. melanoma	4	1.8	2.2	0.6	5.6		4.2	
C50	Breast	25	16.8	1.5	1.0	2.2		16.0	8.0
C51	Vulva	2	0.5	4.2	0.5	15.1		3.0	
C53	Cervix uteri	6	0.8	7.7	2.8	16.8	#	10.1	16.7
C54	Corpus uteri	2	2.9	0.7	0.1	2.4		-1.8	
C56	Ovary	5	2.2	2.2	0.7	5.2		5.3	20.0
C64	Kidney	2	1.3	1.6	0.2	5.7		1.4	
C67	Bladder	2	0.9	2.2	0.3	8.0		2.1	100.0
C70-C72	CNS cancer	3	0.8	3.9	0.8	11.5		4.3	66.7
C73	Thyroid	4	1.1	3.7	1.0	9.4		5.6	
C82-C85	NHL	4	1.9	2.1	0.6	5.3		4.0	
C91-C96	Leukaemia	2	0.8	2.6	0.3	9.3		2.4	50.0
Other primaries		3	0.1	26.2	5.4	76.7	#	5.6	
Not observed		0	3.6	0.0	0.0	1.0		-6.9	
All mult. primaries		206	53.2	3.9	3.4	4.4	#	296.5	12.1

Patients	1410
Mean age at second malignancy (years)	66.4
Person-years	5152
Mean observation time (years)	3.7
Median observation time (years)	2.7

The occurrence of second malignancy is statistically significant.

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

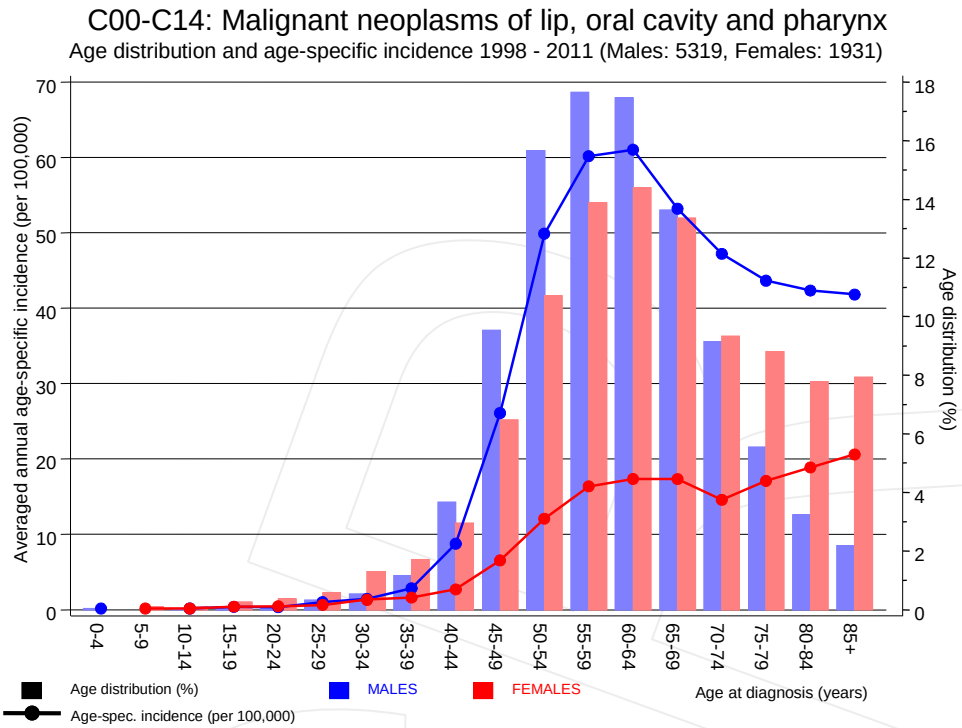


Figure 7. Age distribution and age-specific incidence

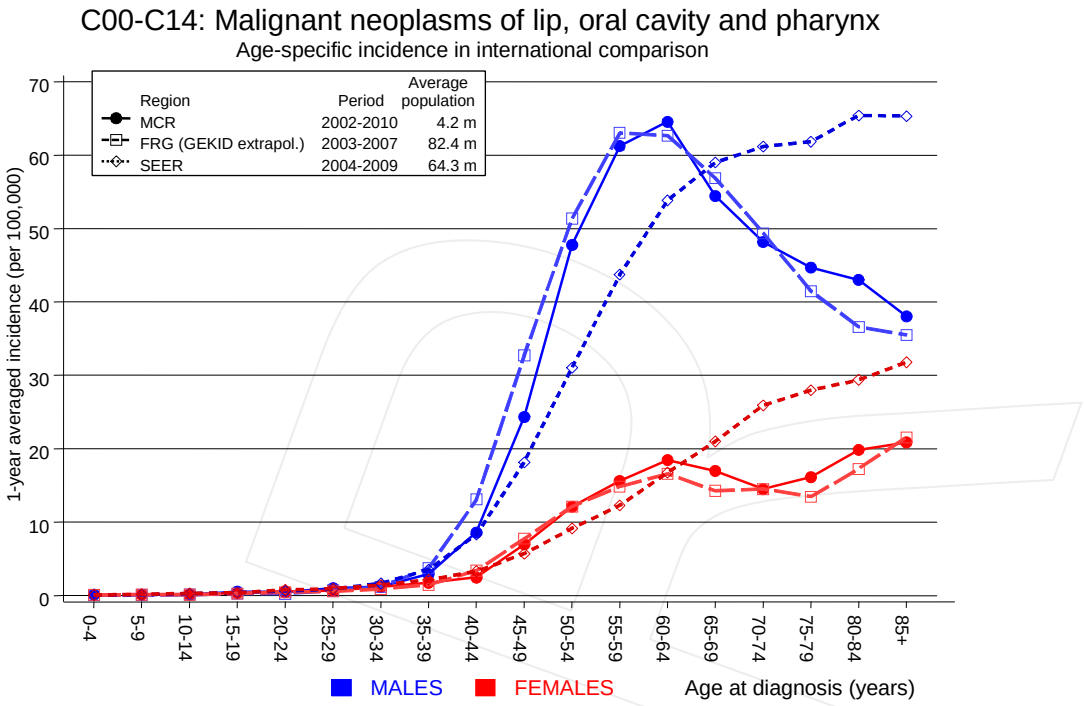


Figure 7a. Age-specific incidence in MCR registry areas compared to Germany (FRG, GEKID extrapolation) and SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

Extrapolated age-specific patient population of Germany, data status middle of 2010. Association of Population-based Cancer Registries in Germany (GEKID e.V.). Berlin, 2011. http://www.gekid.de. Last access: 05/12/2011

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.

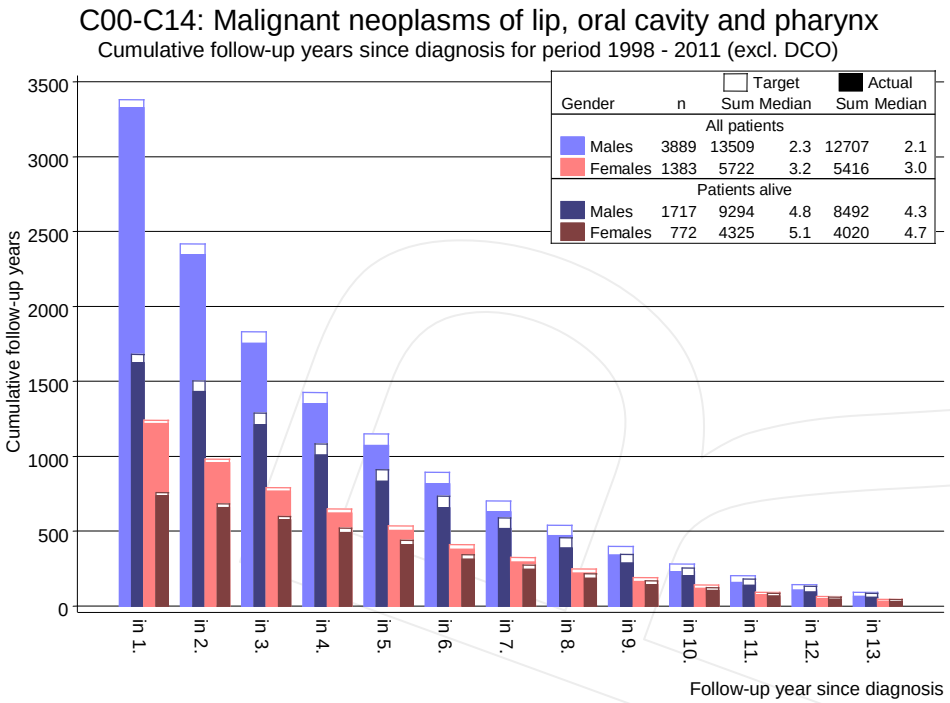
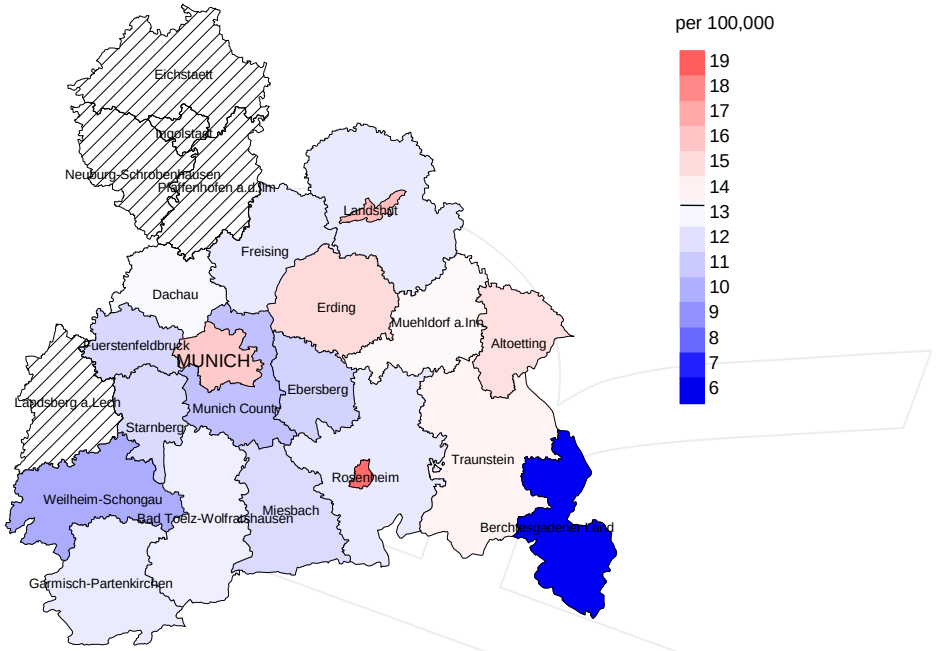


Figure 8. Cumulative follow-up years depending on time since diagnosis

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

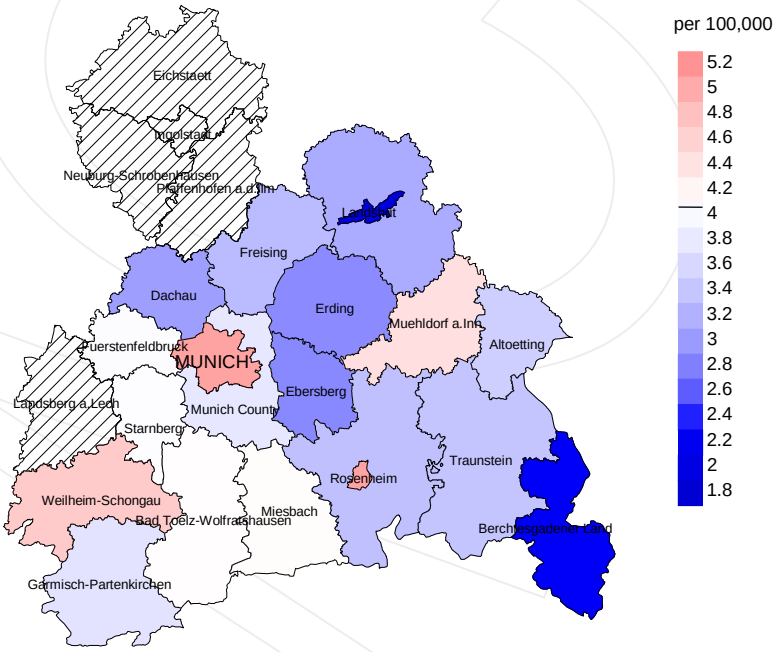
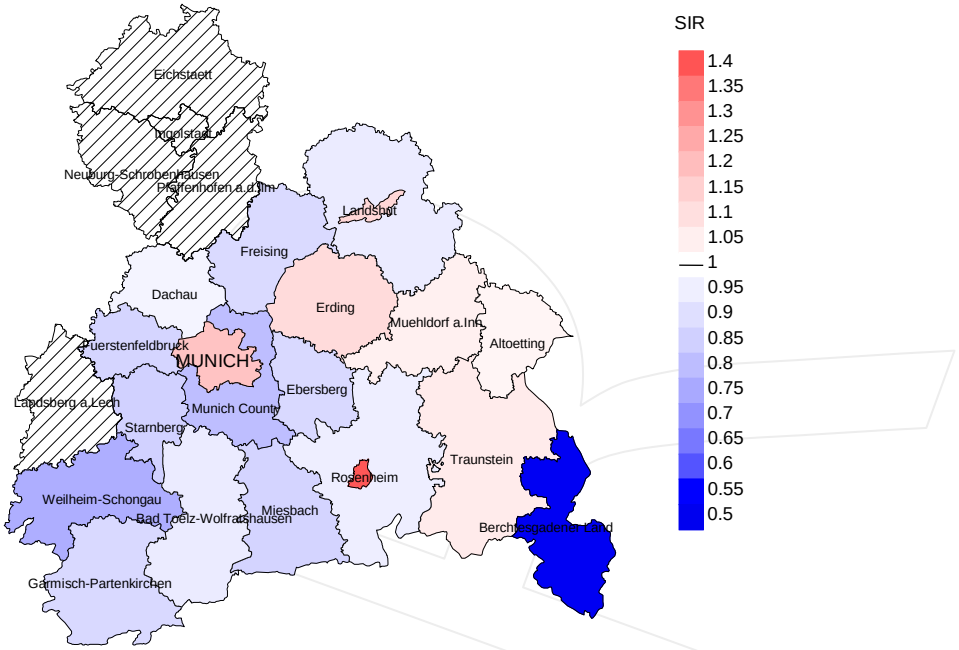


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 13.4/100,000 WS N=2,435, females 4.1/100,000 WS N=892). 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 18 women were identified with newly diagnosed HN cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 2.9/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.4 and 5.3/100,000.

Standardized incidence ratio (SIR) 2003 - 2008: Males



Standardized incidence ratio (SIR) 2003 - 2008: Females

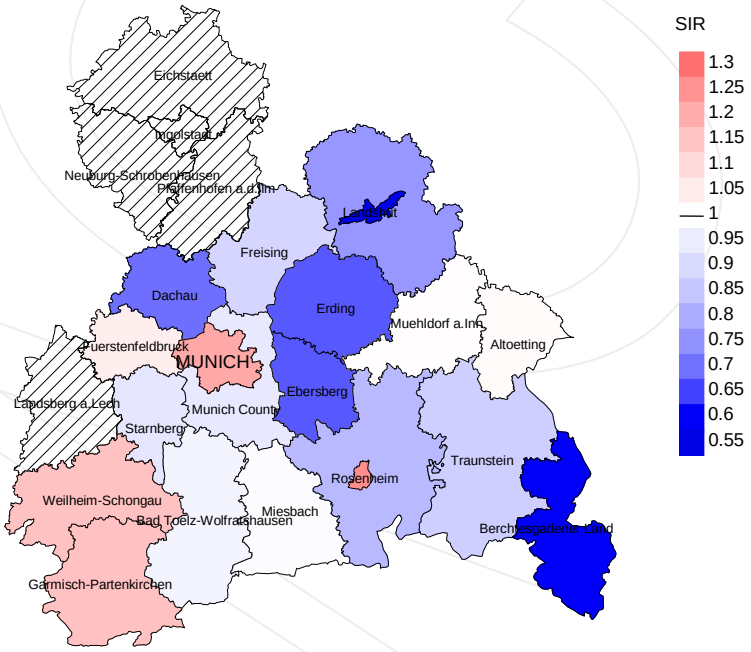


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=2,435, females N=892). 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 18 women were identified with newly diagnosed HN cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.67. Though, the value of this parameter may vary with an underlying probability of 99% between 0.33 and 1.20, 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	352	99.1	5.1	273	77.6	96.0
1999	383	97.4	3.1	293	76.5	89.8
2000	342	98.0	4.1	261	76.3	95.4
2001	356	96.9	5.9	255	71.6	95.3
2002	556	98.2	6.7	380	68.3	95.5
2003	561	98.8	4.1	391	69.7	96.9
2004	538	97.6	4.5	361	67.1	96.7
2005	562	96.6	4.6	346	61.6	98.6
2006	544	96.7	1.8	327	60.1	98.2
2007	647	89.0	6.2	380	58.7	97.9
2008	676	77.2	3.1	346	51.2	98.0
2009	651	81.6	1.8	323	49.6	98.5
2010	667	87.3	5.2	266	39.9	98.1
2011	517	70.2	5.0	135	26.1	95.6
1998-2011	7352	90.7	4.3	4337	59.0	96.6

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	352	236	91.5	53	15.1
1999	383	244	89.3	54	14.1
2000	342	251	93.6	48	14.0
2001	356	279	91.0	61	17.1
2002	556	378	97.6	87	15.6
2003	561	394	96.2	86	15.3
2004	538	409	96.6	93	17.3
2005	562	377	97.3	85	15.1
2006	544	428	97.0	85	15.6
2007	647	467	97.4	104	16.1
2008	676	439	98.2	96	14.2
2009	651	483	98.6	90	13.8
2010	667	481	99.0	100	15.0
2011	517	460	98.3	80	15.5
1998-2011	7352	5326	96.5	1122	15.3

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	236	72.9	27.1	90.3
1999	244	68.0	32.0	86.2
2000	251	77.3	22.7	89.8
2001	279	75.3	24.7	89.4
2002	378	78.3	21.7	90.5
2003	394	76.9	23.1	87.1
2004	409	80.2	19.8	91.6
2005	377	82.2	17.8	91.0
2006	428	77.8	22.2	87.0
2007	467	79.2	20.8	89.0
2008	439	78.1	21.9	87.2
2009	483	79.1	20.9	89.7
2010	481	80.0	20.0	90.1
2011	460	74.1	25.9	85.0
1998-2011	5326	77.6	22.4	88.8

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	171	61.8	59.8	67.4	61.7
1999	187	61.3	60.4	63.8	60.0
2000	193	63.8	63.1	66.0	63.8
2001	218	61.9	60.9	64.8	61.9
2002	294	63.4	62.4	67.4	62.5
2003	304	64.4	63.4	68.4	63.6
2004	315	63.6	62.3	68.9	62.8
2005	271	65.0	63.8	71.3	64.4
2006	326	64.8	63.5	69.8	64.0
2007	369	64.8	63.3	71.0	63.9
2008	329	65.6	64.6	69.7	65.0
2009	354	66.4	65.3	71.3	65.7
2010	371	66.3	65.1	71.3	65.5
2011	356	67.7	66.1	72.8	66.5
1998-2011	4058	64.7	63.5	69.2	64.0

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	65	70.6	68.9	74.4	69.9
1999	57	71.2	66.7	76.1	67.7
2000	58	66.1	63.8	74.8	65.8
2001	61	70.9	69.2	75.4	69.5
2002	84	71.0	69.4	74.9	70.2
2003	90	69.1	66.7	74.6	68.2
2004	94	72.1	71.8	73.0	72.0
2005	106	70.4	67.5	81.0	68.5
2006	102	73.9	71.5	79.7	71.7
2007	98	72.9	70.6	79.3	71.5
2008	110	70.3	67.1	77.5	67.9
2009	129	71.8	69.2	78.8	70.3
2010	110	70.1	67.4	78.7	67.9
2011	104	73.5	71.2	78.3	71.7
1998-2011	1268	71.2	68.8	77.2	69.7

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	127	11.5	0.48	7.5	0.47	10.3	0.48	11.6	0.49
1999	136	12.2	0.50	7.7	0.49	10.9	0.50	12.3	0.51
2000	149	13.1	0.57	8.1	0.54	11.7	0.56	14.2	0.61
2001	166	14.3	0.64	9.3	0.63	13.0	0.64	14.6	0.65
2002	236	12.7	0.58	7.9	0.56	11.2	0.58	12.8	0.60
2003	241	12.9	0.60	7.9	0.56	11.2	0.57	12.8	0.60
2004	255	13.6	0.63	8.4	0.61	11.8	0.63	13.5	0.64
2005	227	12.0	0.55	7.0	0.51	10.0	0.53	11.6	0.56
2006	262	13.7	0.69	8.3	0.66	11.6	0.66	13.3	0.67
2007	298	13.5	0.63	8.0	0.61	11.3	0.63	13.1	0.64
2008	267	12.0	0.55	6.9	0.52	9.8	0.53	11.5	0.55
2009	289	12.9	0.63	7.3	0.59	10.4	0.61	12.2	0.63
2010	301	13.4	0.62	7.6	0.59	10.9	0.61	12.6	0.63
2011	272	12.1	0.77	6.7	0.73	9.6	0.75	11.4	0.79
1998-2011	3226	12.8	0.61	7.7	0.58	10.9	0.59	12.6	0.61

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	45	3.8	0.53	1.8	0.46	2.6	0.48	3.4	0.52
1999	30	2.5	0.29	1.3	0.26	1.9	0.27	2.2	0.28
2000	46	3.8	0.57	2.1	0.54	2.9	0.55	3.4	0.55
2001	44	3.6	0.48	1.7	0.41	2.5	0.42	3.0	0.46
2002	60	3.1	0.41	1.5	0.38	2.2	0.40	2.6	0.40
2003	63	3.2	0.43	1.7	0.40	2.4	0.42	2.8	0.43
2004	73	3.7	0.58	1.6	0.48	2.3	0.51	3.0	0.54
2005	83	4.2	0.57	2.1	0.52	3.1	0.55	3.6	0.56
2006	72	3.6	0.46	1.5	0.34	2.3	0.37	2.8	0.40
2007	72	3.1	0.44	1.4	0.36	2.1	0.38	2.5	0.41
2008	76	3.3	0.41	1.6	0.39	2.3	0.40	2.7	0.40
2009	94	4.0	0.53	1.9	0.47	2.8	0.49	3.2	0.50
2010	84	3.6	0.50	1.8	0.46	2.5	0.48	3.0	0.50
2011	70	3.0	0.45	1.3	0.36	1.9	0.38	2.3	0.39
1998-2011	912	3.5	0.47	1.7	0.41	2.4	0.43	2.9	0.45

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	2	0.0	0.0	2	0.1	0.1			0.0
5-9	0	0.0	0.0			0.1			0.0
10-14	0	0.0	0.0			0.1			0.0
15-19	0	0.0	0.0			0.1			0.0
20-24	2	0.0	0.1	2	0.1	0.1			0.0
25-29	1	0.0	0.1			0.1	1	0.1	0.1
30-34	3	0.1	0.2	1	0.0	0.1	2	0.2	0.3
35-39	27	0.6	0.8	20	0.6	0.7	7	0.7	1.0
40-44	87	2.0	2.8	72	2.1	2.9	15	1.6	2.6
45-49	262	6.0	8.8	221	6.5	9.4	41	4.3	6.9
50-54	509	11.7	20.5	435	12.8	22.1	74	7.7	14.6
55-59	723	16.6	37.0	597	17.6	39.7	126	13.1	27.7
60-64	790	18.1	55.2	638	18.8	58.5	152	15.8	43.5
65-69	651	14.9	70.1	529	15.6	74.0	122	12.7	56.1
70-74	469	10.8	80.8	367	10.8	84.8	102	10.6	66.7
75-79	368	8.4	89.3	267	7.9	92.7	101	10.5	77.2
80-84	244	5.6	94.9	149	4.4	97.1	95	9.9	87.1
85+	224	5.1	100.0	100	2.9	100.0	124	12.9	100.0
All ages	4362	100.0		3400	100.0		962	100.0	

Included in the statistics are 34.5% multiple primaries in males and 31.1% 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	2		0.2	0.67	0.0		6.9	
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24	2		0.1	0.40	0.0		2.5	
25-29		1	0.0		0.1	0.09		1.0
30-34	1	2	0.1	0.04	0.1	0.08	0.6	1.0
35-39	20	7	0.9	0.32	0.3	0.21	5.5	1.5
40-44	72	15	3.2	0.37	0.7	0.26	9.5	1.5
45-49	221	41	11.4	0.43	2.1	0.32	14.4	2.4
50-54	435	74	26.1	0.52	4.3	0.34	15.3	2.8
55-59	597	126	38.3	0.63	7.7	0.46	11.6	3.1
60-64	638	152	41.9	0.67	9.5	0.54	8.3	2.7
65-69	529	122	38.8	0.72	8.2	0.47	5.1	1.7
70-74	367	102	35.6	0.75	8.3	0.56	3.3	1.3
75-79	267	101	39.5	0.90	10.2	0.58	2.4	1.1
80-84	149	95	36.7	0.86	11.9	0.63	1.7	1.0
85+	100	124	36.1	0.85	16.7	0.81	1.4	1.1
All ages	3400	962					5.1	1.6
Mortality								
Raw			13.5	0.63	3.7	0.49		
WS			8.1	0.60	1.8	0.43		
ES			11.5	0.62	2.5	0.45		
BRD-S			13.2	0.64	3.0	0.47		
PYLL-70								
per 100,000			127.7		26.6			
ES			116.0		23.0			
AYLL-70			11.5		11.1			

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	84	5.6			4	4.8	80	95.2
C09-C10 Oropharynx	95	6.3			24	25.3	71	74.7
C12-C13 Hypopharynx	74	4.9			23	31.1	51	68.9
C15 Oesophagus	163	10.8	33	20.2	23	14.1	107	65.6
C16 Stomach	38	2.5	11	28.9	2	5.3	25	65.8
C18 Colon	49	3.2	17	34.7	4	8.2	28	57.1
C19-C20 Rectum	46	3.0	11	23.9	2	4.3	33	71.7
C22 Liver	37	2.5	2	5.4	5	13.5	30	81.1
C25 Pancreas	29	1.9	5	17.2	1	3.4	23	79.3
C32 Larynx	46	3.0			10	21.7	36	78.3
C33-C34 Lung	329	21.8	41	12.5	31	9.4	257	78.1
C43 Malign. melanoma	24	1.6	12	50.0	3	12.5	9	37.5
C44 Skin others	127	8.4	46	36.2	18	14.2	63	49.6
C61 Prostate	90	6.0	50	55.6	4	4.4	36	40.0
C64 Kidney	26	1.7	10	38.5	4	15.4	12	46.2
C67 Bladder	60	4.0	31	51.7	2	3.3	27	45.0
C76-C79 CUP	40	2.6	24	60.0	3	7.5	13	32.5
C82-C85 NHL	31	2.1	15	48.4	5	16.1	11	35.5
C91-C96 Leukaemia	17	1.1	5	29.4	1	5.9	11	64.7
Other primaries	105	7.0	45	42.9	8	7.6	52	49.5
All mult. primaries	1510	100.0	358	23.7	177	11.7	975	64.6

Multiple primaries with number of cases n<10 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	18	4.2			1	5.6	17	94.4
C09-C10 Oropharynx	22	5.2			3	13.6	19	86.4
C12-C13 Hypopharynx	12	2.8			2	16.7	10	83.3
C15 Oesophagus	35	8.2	3	8.6	5	14.3	27	77.1
C16 Stomach	10	2.3	2	20.0	2	20.0	6	60.0
C18 Colon	21	4.9	11	52.4	1	4.8	9	42.9
C19-C20 Rectum	6	1.4	2	33.3			4	66.7
C21 Anus/canal	4	0.9	2	50.0			2	50.0
C22 Liver	5	1.2			1	20.0	4	80.0
C25 Pancreas	7	1.6	1	14.3	1	14.3	5	71.4
C30-C31 Sinuses	6	1.4	1	16.7			5	83.3
C32 Larynx	17	4.0	7	41.2	2	11.8	8	47.1
C33-C34 Lung	70	16.4	3	4.3	6	8.6	61	87.1
C44 Skin others	22	5.2	8	36.4	2	9.1	12	54.5
C50 Breast	71	16.6	44	62.0	4	5.6	23	32.4
C51 Vulva	4	0.9	1	25.0			3	75.0
C53 Cervix uteri	14	3.3	11	78.6			3	21.4
C54 Corpus uteri	8	1.9	5	62.5	1	12.5	2	25.0
C56 Ovary	10	2.3	4	40.0			6	60.0
C67 Bladder	7	1.6	4	57.1			3	42.9
C70-C72 CNS cancer	6	1.4			1	16.7	5	83.3
C73 Thyroid	4	0.9	3	75.0	1	25.0		
C76-C79 CUP	10	2.3	7	70.0			3	30.0
C82-C85 NHL	9	2.1	3	33.3	1	11.1	5	55.6
C91-C96 Leukaemia	4	0.9	1	25.0			3	75.0
Other primaries	25	5.9	6	24.0	5	20.0	14	56.0
All mult. primaries	427	100.0	129	30.2	39	9.1	259	60.7

Multiple primaries with number of cases n<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 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	2		0.1	0.40	0.0		2.7	
25-29		1	0.0		0.1	0.09		1.0
30-34	1	2	0.1	0.04	0.1	0.09	0.6	1.1
35-39	17	5	0.8	0.30	0.2	0.16	5.0	1.2
40-44	64	13	2.9	0.35	0.6	0.24	9.1	1.5
45-49	192	36	9.9	0.42	1.9	0.32	13.7	2.4
50-54	369	60	22.1	0.51	3.5	0.34	14.8	2.7
55-59	493	105	31.6	0.62	6.4	0.47	11.0	3.0
60-64	506	119	33.2	0.65	7.4	0.49	7.8	2.6
65-69	407	92	29.9	0.71	6.2	0.44	4.8	1.6
70-74	290	78	28.1	0.81	6.3	0.57	3.3	1.2
75-79	195	84	28.9	1.00	8.4	0.62	2.3	1.2
80-84	101	69	24.9	0.84	8.7	0.59	1.5	0.9
85+	70	98	25.2	0.93	13.2	0.81	1.3	1.1
All ages	2707	762					5.0	1.5
Mortality								
Raw			10.8	0.62	2.9	0.47		
WS			6.5	0.59	1.4	0.41		
ES			9.2	0.61	2.0	0.43		
BRD-S			10.5	0.63	2.4	0.45		
PYLL-70								
per 100,000			106.4		21.9			
ES			96.4		19.0			
AYLL-70			11.8		11.4			

* 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	2		0.1	0.40	0.0		2.9	
25-29		1	0.0		0.1	0.11		1.1
30-34	1	1	0.1	0.04	0.1	0.05	0.6	0.6
35-39	17	3	0.8	0.33	0.1	0.10	5.2	0.8
40-44	60	12	2.7	0.36	0.6	0.26	9.0	1.5
45-49	168	25	8.6	0.41	1.3	0.25	12.8	1.8
50-54	298	54	17.8	0.47	3.1	0.34	13.1	2.7
55-59	383	82	24.5	0.56	5.0	0.42	9.4	2.7
60-64	372	86	24.4	0.55	5.4	0.40	6.5	2.1
65-69	295	67	21.6	0.59	4.5	0.38	4.0	1.4
70-74	192	53	18.6	0.63	4.3	0.43	2.6	1.0
75-79	132	56	19.5	0.75	5.6	0.49	1.9	0.9
80-84	68	49	16.7	0.61	6.2	0.48	1.3	0.8
85+	56	80	20.2	0.81	10.8	0.70	1.2	1.0
All ages	2044	569					4.4	1.3
Mortality								
Raw			8.1	0.53	2.2	0.40		
WS			5.0	0.51	1.1	0.35		
ES			7.0	0.53	1.5	0.37		
BRD-S			7.9	0.54	1.8	0.38		
PYLL-70								
per 100,000			86.4		17.1			
ES			78.2		14.9			
AYLL-70			12.3		11.6			

* See corresponding tables with multiple primaries.

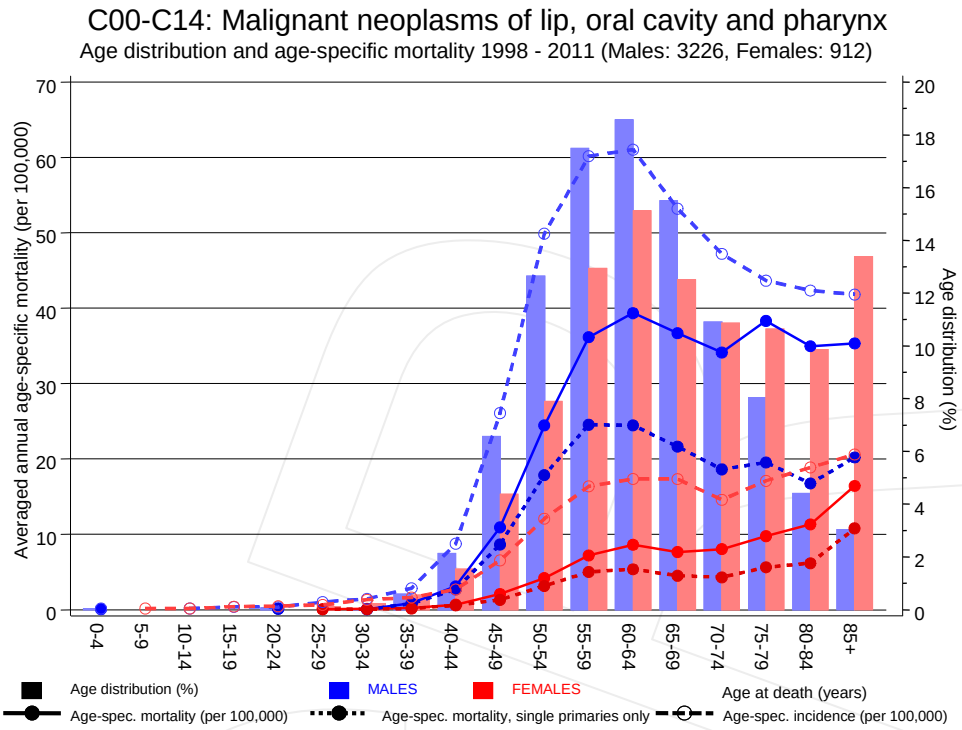
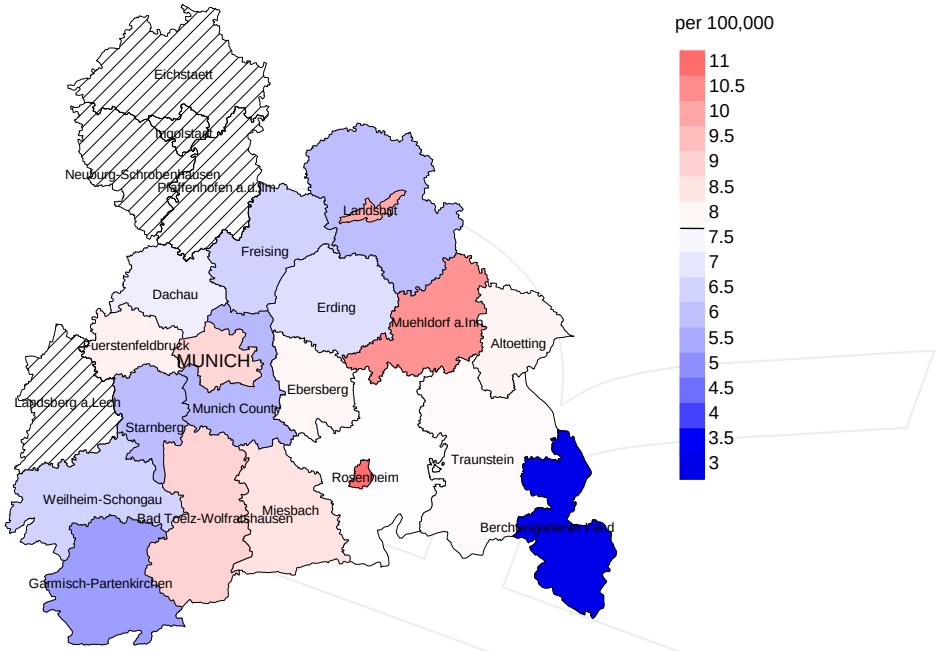


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

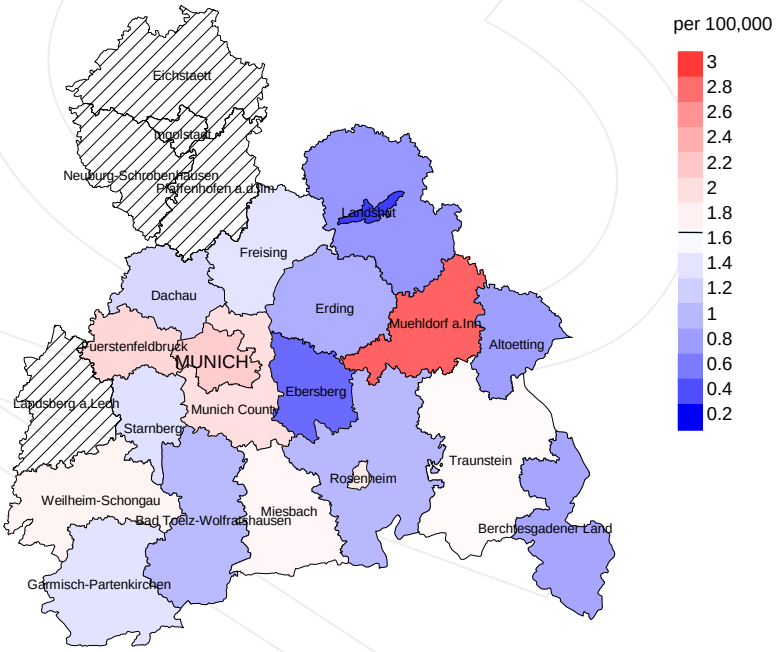
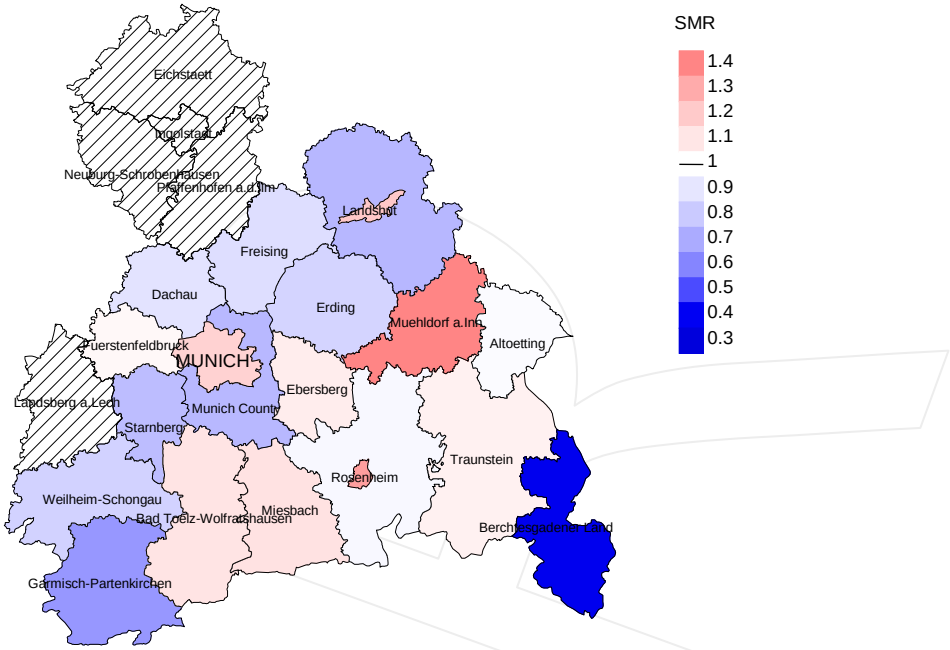


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 7.7/100,000 WS N=1,481, females 1.7/100,000 WS N=427). 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 4 women died from HN cancer. Therefore, the mean mortality 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 0.1 and 1.8/100,000.

Standardized mortality ratio (SMR) 2003 - 2008: Males



Standardized mortality ratio (SMR) 2003 - 2008: Females

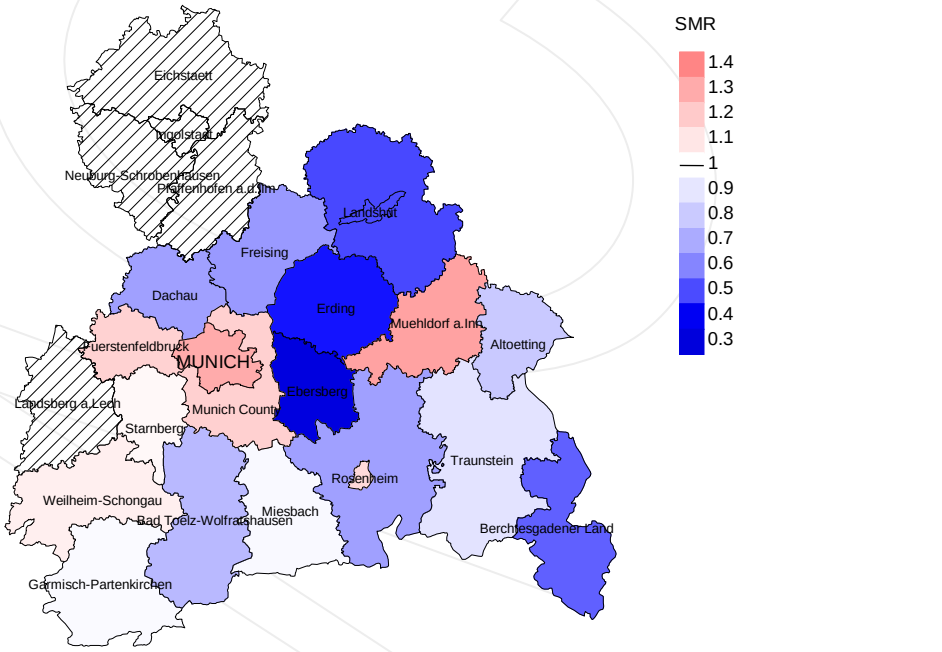


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=1,481, females N=427). 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 4 women died from HN cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.32. Though, the value of this parameter may vary with an underlying probability of 99% between 0.05 and 1.01, 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

Recommended Citation

Munich Cancer Registry. Baseline statistics C00-C14: HN cancer [Internet]. 2013 [updated 2013 Apr 2; cited 2013 Jun 1]. Available from: http://www.tumorregister-muenchen.de/en/facts/base/base_C0014E.pdf

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Index of figures and tables

Fig./Tbl.		Page
1	Pts cohorts, DCO, mult. prim., follow-up / yr	4
1a	Gender distribution by year of diagnosis	5
2	Incidence by year of diagnosis	6
3	Age distribution parameters by year of diagnosis	7
4	Age distribution by 5-year age group and gender	9
5	Age-specific incidence and DCO rate	10
6	Standardized incidence ratio of second primaries	11
7	Age distribution and age-specific incidence (chart)	13
7a	Age-specific incidence internationally (chart)	14
8	Cumulative follow-up years (chart)	15
9a	Map of cancer incidence (WS) by county (chart)	16
9b	Standardized incidence ratio (SIR) by county (chart)	17
10a	Pts incident cohorts and mortality / yr	18
10b	Incidence and mortality by year of diagnosis	19
10c	Cancer-related deaths, death certification available / yr	20
11	Means of age at death / yr	21
12	Mortality by year of death	23
13	Distribution of age at death	24
14	Age-specific mortality	25
15	Multiple primaries in deaths	26
16	Age-specific mortality (first primaries)	28
17	Age-specific mortality (single primaries)	29
18	Age distribution and age-specific mortality (chart)	30
19a	Map of cancer mortality (WS) by county (chart)	31
19b	Standardized mortality ratio (SMR) by county (chart)	32