Munich Cancer Registry

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

Cancer statistics: Baseline statistics

C00-C14,C30-C32: HN cancer

Year of diagnosis	1998-2011
Patients	9339
Diseases	9676
Creation date	04/02/2013
Export date	01/03/2013
Population	4.5 m

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
C11	Nasopharynx
C12	Piriform sinus
C13	Hypopharynx
C14	Lip, oral cavity and pharynx other parts
C30	Nasal cavity
C31	Accessory sinuses
C32	Larynx

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	478	23	4.8	29.1	74.9	97.5
1999	501	19	3.8	31.3	73.1	97.2
2000	456	20	4.4	29.8	73.9	97.8
2001	456	24	5.3	30.5	70.0	97.4
2002	759	53	7.0	31.8	67.6	98.2
2003	746	36	4.8	33.1	68.6	98.5
2004	705	38	5.4	30.6	65.2	97.4
2005	743	31	4.2	30.7	59.8	96.2
2006	715	20	2.8	28.1	58.6	96.8
2007	841	53	6.3	28.2	55.9	87.3 ##
2008	889	35	3.9	28.0	49.4	76.2
2009	863	24	2.8	28.3	46.3	79.4
2010	853	43	5.0	26.4	38.3	86.0
2011	671	38	5.7	24.3	25.5	69.2 ###
1998-2011	9676	457	4.7	29.2	57.2	90.0

\#   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	478	375	103	78.5
1999	501	373	128	74.5
2000	456	353	103	77.4
2001	456	349	107	76.5
2002	759	577	182	76.0
2003	746	564	182	75.6
2004	705	554	151	78.6
2005	743	571	172	76.9
2006	715	518	197	72.4
2007	841	637	204	75.7
2008	889	670	219	75.4
2009	863	644	219	74.6
2010	853	644	209	75.5
2011	671	476	195	70.9
1998-2011	9676	7305	2371	75.5

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	375	103	33.8	8.8	22.4	4.7	30.5	6.6	34.5	7.8
1999	373	128	33.3	10.8	21.4	5.9	29.9	8.2	33.4	9.6
2000	353	103	31.0	8.6	20.4	5.1	28.2	6.9	32.1	7.8
2001	349	107	30.1	8.8	19.6	4.9	27.0	6.7	30.5	7.6
2002	577	182	31.0	9.3	19.8	4.8	27.3	6.8	30.3	8.1
2003	564	182	30.1	9.2	19.3	5.1	26.8	7.0	29.6	8.2
2004	554	151	29.4	7.6	18.4	4.0	25.4	5.5	29.0	6.6
2005	571	172	30.1	8.6	18.7	4.8	25.7	6.6	28.9	7.5
2006	518	197	27.0	9.8	16.9	5.7	23.5	7.7	26.7	8.8
2007	637	204	28.8	8.8	17.4	4.9	24.3	6.6	27.7	7.6
2008	670	219	30.1	9.4	18.1	5.1	25.2	7.0	28.9	8.0
2009	644	219	28.9	9.4	17.0	5.0	23.7	6.9	27.2	8.0
2010	644	209	28.6	8.9	16.8	4.6	23.4	6.4	26.7	7.4
2011	476	195	21.1	8.3	12.1	4.5	17.0	6.2	19.8	7.2
1998-2011	7305	2371	29.1	9.0	17.9	4.9	24.9	6.8	28.2	7.8

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	478	60.1	12.3	0.9	97.4	47.2	52.6	58.7	67.4	76.3
1999	501	61.3	12.3	13.9	91.9	48.3	52.5	59.8	69.5	78.2
2000	456	60.5	12.3	19.7	91.9	46.0	52.0	59.1	68.4	78.6
2001	456	61.7	12.3	16.4	96.4	48.0	53.8	60.4	68.8	78.5
2002	759	62.0	11.5	26.4	99.0	47.9	54.7	61.2	68.5	78.5
2003	746	61.4	11.8	10.7	98.2	47.6	53.6	60.5	69.1	77.3
2004	705	62.1	12.2	24.7	97.9	46.4	54.5	62.1	70.0	78.9
2005	743	62.2	11.9	4.1	103	47.7	54.4	62.0	68.7	78.1
2006	715	62.0	12.2	17.6	101	47.5	54.0	61.7	69.6	78.0
2007	841	62.7	12.2	7.7	101	47.8	54.4	63.1	70.7	78.3
2008	889	63.9	11.9	14.1	100	49.5	55.9	63.8	70.4	79.5
2009	863	63.8	12.3	2.4	98.4	48.5	55.5	63.4	72.0	80.1
2010	853	63.5	12.7	16.6	103	48.1	54.8	64.3	71.8	78.9
2011	671	64.1	12.5	14.4	94.6	48.9	55.7	64.5	72.7	79.5
1998-2011	9676	62.4	12.2	0.9	103	47.9	54.3	62.0	70.2	78.7

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	375	59.0	11.4	0.9	87.6	46.5	52.1	58.1	65.9	74.0
1999	373	60.2	11.3	32.0	90.8	48.1	52.3	58.8	66.6	75.2
2000	353	60.2	11.2	20.4	89.7	47.6	52.4	59.0	67.2	75.2
2001	349	60.5	11.1	28.7	94.9	47.8	53.3	59.9	66.2	75.4
2002	577	60.7	10.4	26.4	96.8	47.6	53.9	60.8	66.4	74.5
2003	564	60.5	10.3	28.1	94.5	47.8	53.6	60.1	67.5	74.2
2004	554	61.1	11.5	25.9	92.4	46.1	53.7	61.2	68.1	76.2
2005	571	61.5	11.2	4.1	99.0	47.4	54.2	61.8	68.1	76.4
2006	518	61.6	11.1	17.6	92.0	47.6	54.2	61.2	68.2	76.9
2007	637	62.2	11.4	15.7	101	48.0	54.3	62.7	70.1	76.8
2008	670	63.4	11.1	19.8	100	49.5	55.9	63.1	69.8	78.3
2009	644	63.3	11.3	2.4	90.7	49.1	55.7	63.1	70.7	77.9
2010	644	62.8	12.3	16.6	95.3	48.1	54.4	63.6	71.1	78.0
2011	476	63.9	12.0	14.4	90.5	49.2	55.2	64.0	72.5	79.2
1998-2011	7305	61.7	11.3	0.9	101	47.9	54.0	61.4	69.1	76.6

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	103	64.1	14.6	9.5	97.4	49.9	55.1	62.5	75.8	82.2
1999	128	64.5	14.6	13.9	91.9	48.3	55.4	65.8	75.6	81.6
2000	103	61.6	15.6	19.7	91.9	42.8	51.1	59.7	73.5	84.2
2001	107	65.6	15.0	16.4	96.4	49.3	56.2	63.5	74.6	88.1
2002	182	66.3	13.7	31.4	99.0	48.7	55.9	64.8	77.7	82.9
2003	182	64.3	15.4	10.7	98.2	46.2	53.9	63.5	77.3	83.4
2004	151	65.8	14.1	24.7	97.9	48.9	57.0	66.7	76.2	82.9
2005	172	64.4	13.9	22.8	103	49.6	55.6	63.3	73.2	81.5
2006	197	63.0	14.5	19.0	101	46.3	53.8	62.6	71.7	83.2
2007	204	64.4	14.3	7.7	98.2	47.7	54.9	63.6	74.3	83.7
2008	219	65.3	14.0	14.1	98.4	49.7	55.9	65.3	73.4	84.3
2009	219	65.3	14.7	16.8	98.4	48.0	55.1	64.2	76.2	85.3
2010	209	65.7	13.8	21.9	103	48.1	56.2	66.9	73.9	85.3
2011	195	64.7	13.7	17.2	94.6	47.7	56.8	64.9	73.1	82.9
1998-2011	2371	64.7	14.4	7.7	103	47.8	55.3	64.4	75.2	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	4	0.0	0.0	4	0.1	0.1			0.0
5-9	2	0.0	0.1			0.1	2	0.1	0.1
10-14	5	0.1	0.1	2	0.0	0.1	3	0.1	0.2
15-19	14	0.1	0.3	7	0.1	0.2	7	0.3	0.5
20-24	15	0.2	0.4	7	0.1	0.3	8	0.3	0.8
25-29	33	0.3	0.8	19	0.3	0.5	14	0.6	1.4
30-34	62	0.6	1.4	34	0.5	1.0	28	1.2	2.6
35-39	127	1.3	2.7	89	1.2	2.2	38	1.6	4.2
40-44	314	3.2	6.0	249	3.4	5.6	65	2.7	7.0
45-49	775	8.0	14.0	620	8.5	14.1	155	6.5	13.5
50-54	1273	13.2	27.1	1025	14.0	28.1	248	10.5	24.0
55-59	1561	16.1	43.3	1236	16.9	45.1	325	13.7	37.7
60-64	1628	16.8	60.1	1295	17.7	62.8	333	14.0	51.7
65-69	1377	14.2	74.3	1065	14.6	77.4	312	13.2	64.9
70-74	983	10.2	84.5	751	10.3	87.7	232	9.8	74.7
75-79	693	7.2	91.6	471	6.4	94.1	222	9.4	84.0
80-84	452	4.7	96.3	258	3.5	97.6	194	8.2	92.2
85+	358	3.7	100.0	173	2.4	100.0	185	7.8	100.0
All ages	9676	100.0		7305	100.0		2371	100.0	

Included in the statistics are 34.3% multiple primaries in males and 30.8% 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=307 %	Females DCO rate n=135 %	Males Prop.all cancers n=132509 %	Females Prop.all cancers n=129521 %
0- 4	3		0.2	0.0	33.3		1.1	
5- 9		2	0.0	0.2				1.9
10-14	2	3	0.2	0.2			1.5	2.0
15-19	7	7	0.5	0.6			2.4	2.9
20-24	7	8	0.5	0.5			1.4	1.8
25-29	18	13	1.1	0.8			2.2	1.4
30-34	34	28	1.7	1.5		3.6	2.6	1.6
35-39	88	38	4.0	1.8	1.1	2.6	4.5	1.2
40-44	247	65	11.1	3.1	0.8	1.5	8.9	1.2
45-49	607	152	31.2	7.9	2.5	3.3	13.5	2.1
50-54	1005	240	60.2	14.0	2.2	1.7	13.8	2.6
55-59	1215	321	77.9	19.6	2.6	1.9	9.7	2.7
60-64	1266	328	83.2	20.5	3.3	2.4	6.7	2.2
65-69	1050	306	77.0	20.6	4.2	2.3	4.5	1.9
70-74	743	230	72.0	18.6	6.3	4.3	3.4	1.5
75-79	468	217	69.3	21.8	6.4	6.0	2.8	1.5
80-84	256	191	63.0	24.0	11.3	11.5	2.3	1.4
85+	170	183	61.3	24.6	25.3	31.1	2.1	1.3
All ages	7186	2332			4.3	5.8	5.4	1.8
Incidence								
Raw			28.6	8.9				
WS			17.6	4.8				
ES			24.5	6.6				
BRD-S			27.7	7.7				

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

Table 6a

Standardized incidence ratio (SIR, with 95% confidence limits),
excess absolute risk (EAR) and DCO rate of second primaries
for period 1998-2011
MALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C00	Lip	3	0.2	13.2	2.7	38.5	#	1.6	
C03-C06	Oral cavity	51	2.6	19.6	14.6	25.7	#	27.7	9.8
C09-C10	Oropharynx	56	3.4	16.4	12.4	21.4	#	30.1	3.6
C11	Nasopharynx	2	0.2	9.9	1.2	35.7	#	1.0	
C12-C13	Hypopharynx	50	1.9	25.9	19.2	34.1	#	27.5	10.0
C15	Oesophagus	95	4.6	20.9	16.9	25.5	#	51.7	16.8
C16	Stomach	29	9.1	3.2	2.1	4.6	#	11.4	10.3
C17	Small intestine	5	1.1	4.5	1.5	10.6	#	2.2	20.0
C18	Colon	47	21.6	2.2	1.6	2.9	#	14.5	2.1
C19-C20	Rectum	32	13.8	2.3	1.6	3.3	#	10.4	6.3
C21	Anus/canal	5	0.5	9.9	3.2	23.1	#	2.6	
C22	Liver	34	6.3	5.4	3.7	7.5	#	15.8	14.7
C23-C24	Bile	4	2.1	1.9	0.5	4.9		1.1	50.0
C25	Pancreas	20	7.8	2.6	1.6	4.0	#	7.0	25.0
C30-C31	Sinuses	8	0.4	20.0	8.6	39.4	#	4.3	12.5
C32	Larynx	37	2.9	12.7	8.9	17.4	#	19.5	29.7
C33-C34	Lung	236	28.4	8.3	7.3	9.4	#	118.8	13.1
C38,C45	Mesothelioma	2	1.4	1.4	0.2	5.0		0.3	
C43	Malign. melanoma	15	9.4	1.6	0.9	2.6		3.2	13.3
C46,C49	Soft tissue	2	1.2	1.6	0.2	5.8		0.4	
C61	Prostate	63	67.2	0.9	0.7	1.2		-2.4	6.3
C62	Testis	2	0.9	2.2	0.3	8.0		0.6	
C64	Kidney	24	8.5	2.8	1.8	4.2	#	8.9	12.5
C65	Renal pelvis	2	0.8	2.4	0.3	8.8		0.7	
C67	Bladder	18	8.8	2.0	1.2	3.2	#	5.3	11.1
C70-C72	CNS cancer	2	3.4	0.6	0.1	2.1		-0.8	
C73	Thyroid	8	1.9	4.1	1.8	8.2	#	3.5	12.5
C76-C79	CUP	14	3.8	3.7	2.0	6.1	#	5.8	
C81	Hodgkin lymphoma	4	0.5	7.9	2.2	20.3	#	2.0	
C82-C85	NHL	22	8.8	2.5	1.6	3.8	#	7.6	13.6
C90	Mult. myeloma	2	2.7	0.7	0.1	2.6		-0.4	
C91-C96	Leukaemia	11	3.2	3.4	1.7	6.1	#	4.5	27.3
Other primaries		4	1.3	3.1	0.9	8.1		1.6	
Not observed		0	2.7	0.0	0.0	1.3		-1.6	
All mult. primaries		909	233.7	3.9	3.6	4.2	#	386.3	11.9

Patients	5294
Mean age at second malignancy (years)	65.0
Person-years	17483
Mean observation time (years)	3.3
Median observation time (years)	2.2

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	10	0.4	24.9	12.0	45.9	#	15.5	
C07-C08	Salivary gland	3	0.1	29.2	6.0	85.3	#	4.7	
C09-C10	Oropharynx	21	0.3	71.0	43.9	108.5	#	33.4	
C11	Nasopharynx	2	0.0	90.3	10.9	326.1	#	3.2	50.0
C12-C13	Hypopharynx	10	0.1	129.2	61.9	237.6	#	16.0	20.0
C15	Oesophagus	21	0.3	60.3	37.3	92.2	#	33.3	
C16	Stomach	6	2.3	2.6	1.0	5.7		6.0	
C18	Colon	11	6.3	1.7	0.9	3.1		7.5	
C19-C20	Rectum	4	2.8	1.4	0.4	3.6		1.9	
C22	Liver	5	0.7	7.4	2.4	17.2	#	7.0	20.0
C23-C24	Bile	2	0.9	2.2	0.3	8.0		1.8	
C25	Pancreas	7	2.6	2.7	1.1	5.5	#	7.1	28.6
C30-C31	Sinuses	3	0.1	40.6	8.4	118.6	#	4.7	33.3
C32	Larynx	10	0.1	77.9	37.4	143.2	#	15.9	20.0
C33-C34	Lung	55	4.5	12.2	9.2	15.9	#	81.4	14.5
C43	Malign. melanoma	5	2.2	2.3	0.7	5.3		4.5	
C50	Breast	30	20.2	1.5	1.0	2.1	#	15.8	6.7
C51	Vulva	2	0.6	3.4	0.4	12.4		2.3	
C53	Cervix uteri	6	0.9	6.4	2.3	13.9	#	8.2	16.7
C54	Corpus uteri	3	3.6	0.8	0.2	2.5		-0.9	
C56	Ovary	5	2.7	1.8	0.6	4.3		3.7	20.0
C64	Kidney	2	1.5	1.3	0.2	4.7		0.7	
C67	Bladder	2	1.1	1.8	0.2	6.5		1.4	100.0
C70-C72	CNS cancer	3	0.9	3.2	0.7	9.5		3.3	66.7
C73	Thyroid	6	1.3	4.6	1.7	10.0	#	7.6	33.3
C76-C79	CUP	3	1.1	2.8	0.6	8.2		3.1	
C82-C85	NHL	4	2.4	1.7	0.5	4.3		2.6	
C91-C96	Leukaemia	4	0.9	4.2	1.2	10.8	#	4.9	25.0
	Other primaries	2	0.1	16.9	2.1	61.2	#	3.0	
	Not observed	0	3.3	0.0	0.0	1.1		-5.3	
	All mult. primaries	247	64.5	3.8	3.4	4.3	#	294.1	11.3

Patients	1698
Mean age at second malignancy (years)	66.7
Person-years	6205
Mean observation time (years)	3.7
Median observation time (years)	2.7

The occurrence of second malignancy is statistically significant.

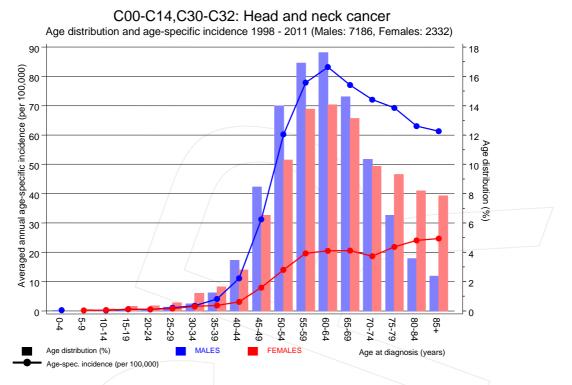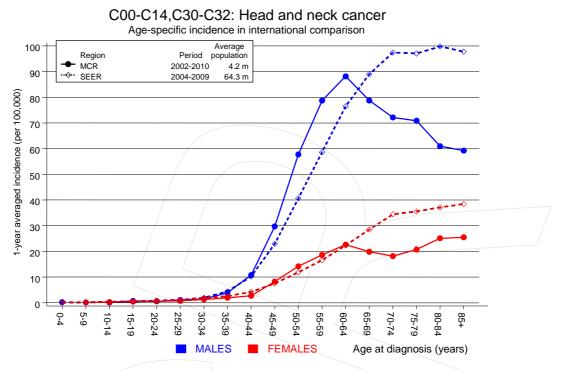Observed second malignancy with count 1 are pooled in category "Other primaries".
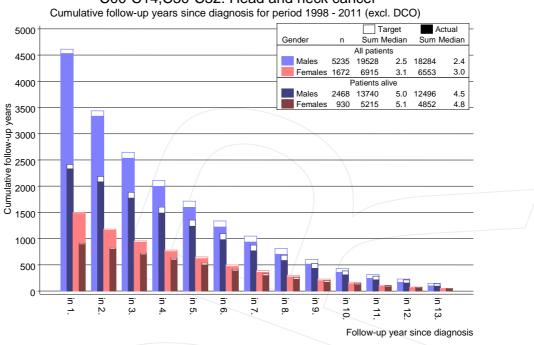
Figure 7. Age distribution and age-specific incidence

Figure 7a. Age-specific incidence in MCR registry areas compared to 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.
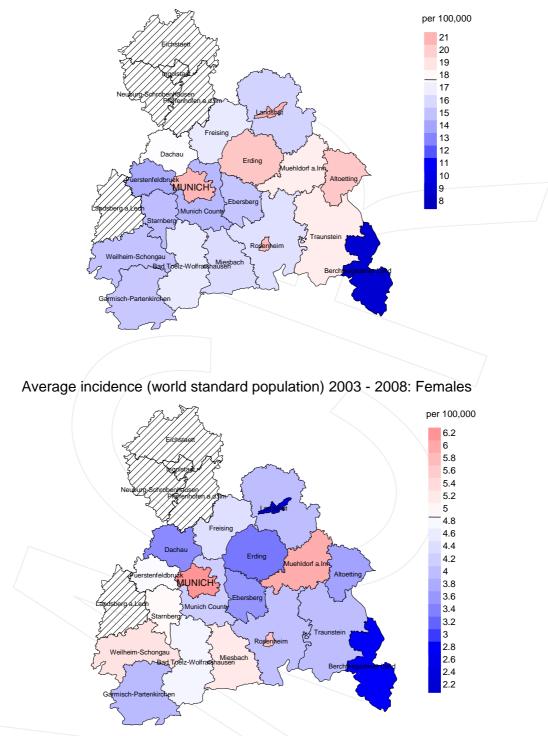
C00-C14,C30-C32: Head and neck cancer
Cumulative follow-up years since diagnosis for period 1998 - 2011 (excl. DCO)

Gender	n	Target Sum	Median	Actual Sum	Median
All patients					
Males	5235	19528	2.5	18284	2.4
Females	1672	6915	3.1	6553	3.0
Patients alive					
Males	2468	13740	5.0	12496	4.5
Females	930	5215	5.1	4852	4.8

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
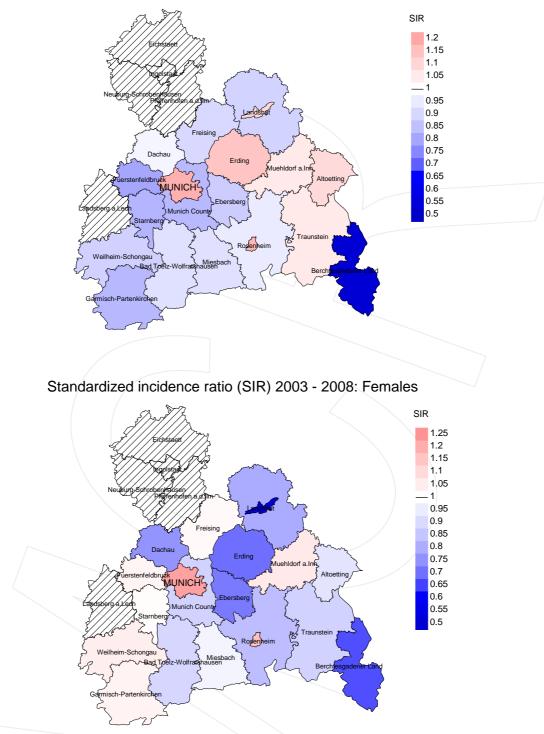
Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 17.8/100,000 WS N=3,288, females 4.9/100,000 WS N=1,075). 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.
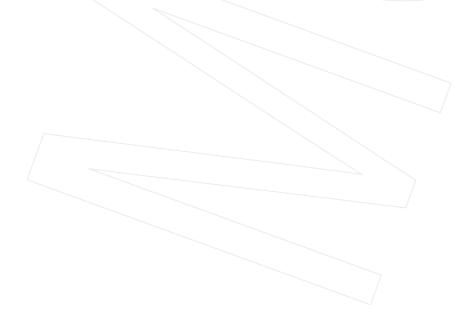
The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 23 women were identified with newly diagnosed HN cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 3.6/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.9 and 6.2/100,000.

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=3,288, females N=1,075). 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 23 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 0.71. Though, the value of this parameter may vary with an underlying probability of 99% between 0.39 and 1.19, 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	478	97.5	4.8	358	74.9	95.0
1999	501	97.2	3.8	366	73.1	91.3
2000	456	97.8	4.4	337	73.9	94.7
2001	456	97.4	5.3	319	70.0	94.4
2002	759	98.2	7.0	513	67.6	96.1
2003	746	98.5	4.8	512	68.6	97.1
2004	705	97.4	5.4	460	65.2	96.7
2005	743	96.2	4.2	444	59.8	98.6
2006	715	96.8	2.8	419	58.6	97.9
2007	841	87.3	6.3	470	55.9	98.1
2008	889	76.2	3.9	439	49.4	97.5
2009	863	79.4	2.8	400	46.3	98.8
2010	853	86.0	5.0	327	38.3	97.6
2011	671	69.2	5.7	171	25.5	96.5
1998-2011	9676	90.0	4.7	5535	57.2	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	478	311	91.6	64	13.4
1999	501	334	88.3	69	13.8
2000	456	327	94.8	56	12.3
2001	456	352	90.3	73	16.0
2002	759	504	97.0	119	15.7
2003	746	515	96.9	112	15.0
2004	705	527	96.6	116	16.5
2005	743	490	96.7	108	14.5
2006	715	564	96.8	106	14.8
2007	841	610	97.4	131	15.6
2008	889	603	98.2	126	14.2
2009	863	625	98.4	115	13.3
2010	853	623	98.6	127	14.9
2011	671	584	98.3	101	15.1
1998-2011	9676	6969	96.3	1423	14.7

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	311	70.4	29.6	88.8
1999	334	67.1	32.9	85.1
2000	327	74.9	25.1	87.4
2001	352	73.3	26.7	88.7
2002	504	74.8	25.2	87.3
2003	515	73.6	26.4	86.0
2004	527	76.7	23.3	88.8
2005	490	80.0	20.0	90.9
2006	564	74.6	25.4	84.8
2007	610	76.9	23.1	88.6
2008	603	76.8	23.2	87.0
2009	625	76.5	23.5	87.8
2010	623	78.2	21.8	88.4
2011	584	72.9	27.1	85.0
1998-2011	6969	75.2	24.8	87.4

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	231	63.1	61.0	68.2	62.9
1999	263	63.2	62.0	66.1	61.4
2000	255	64.9	63.7	68.6	64.9
2001	278	62.9	61.3	67.5	62.4
2002	399	65.5	64.2	69.6	64.4
2003	401	65.5	64.1	69.5	64.4
2004	413	65.0	63.4	70.7	63.9
2005	363	66.4	64.9	72.8	65.5
2006	437	66.5	64.8	72.1	65.4
2007	491	66.2	64.7	71.3	65.4
2008	474	67.5	66.1	72.6	66.8
2009	482	67.9	66.3	73.3	66.9
2010	489	67.6	66.2	73.0	66.5
2011	456	68.7	67.3	72.5	67.6
1998-2011	5432	66.1	64.7	70.8	65.3

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	80	71.1	68.7	76.3	70.2
1999	71	71.6	67.7	76.2	68.9
2000	72	67.0	64.3	75.8	66.2
2001	74	72.7	70.5	77.3	71.3
2002	105	71.6	69.9	75.5	70.6
2003	114	70.0	67.2	76.2	68.7
2004	114	72.3	72.2	72.5	71.8
2005	127	70.3	68.0	78.7	68.8
2006	127	74.3	72.4	78.8	72.7
2007	119	72.6	70.2	79.0	71.0
2008	129	71.0	68.0	77.3	68.9
2009	143	72.1	69.6	79.0	70.7
2010	134	71.3	68.9	78.5	69.3
2011	128	72.7	70.5	78.2	71.1
1998-2011	1537	71.6	69.3	77.2	70.1

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	164	14.8	0.44	9.6	0.44	13.3	0.44	15.5	0.45
1999	186	16.6	0.51	10.5	0.50	15.0	0.51	17.4	0.53
2000	191	16.8	0.54	10.4	0.51	15.0	0.53	18.1	0.57
2001	208	17.9	0.60	11.5	0.60	16.1	0.60	18.3	0.61
2002	304	16.3	0.53	9.9	0.51	14.3	0.53	16.9	0.56
2003	301	16.1	0.55	9.7	0.52	13.9	0.53	16.1	0.56
2004	319	17.0	0.58	10.3	0.57	14.6	0.58	17.0	0.60
2005	292	15.4	0.52	8.8	0.48	12.6	0.50	15.3	0.53
2006	333	17.4	0.65	10.2	0.61	14.4	0.62	17.1	0.65
2007	382	17.2	0.61	10.0	0.58	14.3	0.60	16.8	0.62
2008	375	16.8	0.57	9.4	0.53	13.6	0.55	16.2	0.57
2009	374	16.8	0.59	9.2	0.55	13.3	0.57	16.0	0.60
2010	388	17.2	0.61	9.5	0.58	13.7	0.60	16.3	0.62
2011	335	14.9	0.72	8.0	0.68	11.6	0.70	14.0	0.73
1998-2011	4152	16.5	0.58	9.7	0.55	13.8	0.57	16.4	0.59

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	55	4.7	0.53	2.2	0.47	3.3	0.50	4.1	0.53
1999	38	3.2	0.31	1.6	0.28	2.3	0.29	2.9	0.31
2000	55	4.6	0.54	2.5	0.49	3.5	0.51	4.1	0.53
2001	50	4.1	0.48	1.9	0.39	2.7	0.41	3.4	0.46
2002	73	3.7	0.40	1.8	0.37	2.6	0.38	3.1	0.39
2003	79	4.0	0.44	2.1	0.41	3.0	0.42	3.5	0.43
2004	85	4.3	0.57	1.8	0.46	2.7	0.49	3.5	0.52
2005	100	5.0	0.59	2.5	0.53	3.6	0.56	4.3	0.57
2006	89	4.4	0.46	1.8	0.33	2.8	0.36	3.5	0.40
2007	87	3.8	0.44	1.7	0.37	2.5	0.39	3.1	0.42
2008	88	3.8	0.40	1.8	0.36	2.6	0.37	3.1	0.38
2009	105	4.5	0.49	2.1	0.44	3.1	0.45	3.6	0.46
2010	100	4.3	0.49	2.0	0.45	2.9	0.47	3.5	0.48
2011	92	3.9	0.48	1.8	0.40	2.5	0.41	3.0	0.43
1998-2011	1096	4.2	0.47	2.0	0.41	2.8	0.43	3.4	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	0.0	0.0			0.0
5-9	0	0.0	0.0			0.0			0.0
10-14	0	0.0	0.0			0.0			0.0
15-19	1	0.0	0.1			0.0	1	0.1	0.1
20-24	3	0.1	0.1	3	0.1	0.1			0.1
25-29	3	0.1	0.2	1	0.0	0.1	2	0.2	0.3
30-34	4	0.1	0.2	2	0.0	0.2	2	0.2	0.4
35-39	33	0.6	0.8	25	0.6	0.7	8	0.7	1.1
40-44	100	1.8	2.6	84	1.9	2.6	16	1.4	2.5
45-49	295	5.3	7.8	249	5.6	8.2	46	3.9	6.4
50-54	599	10.7	18.5	514	11.5	19.8	85	7.3	13.7
55-59	850	15.1	33.6	710	16.0	35.7	140	12.0	25.7
60-64	964	17.2	50.8	792	17.8	53.5	172	14.7	40.4
65-69	894	15.9	66.7	738	16.6	70.1	156	13.4	53.8
70-74	637	11.3	78.0	502	11.3	81.4	135	11.6	65.3
75-79	539	9.6	87.6	411	9.2	90.6	128	11.0	76.3
80-84	373	6.6	94.3	251	5.6	96.2	122	10.4	86.7
85+	322	5.7	100.0	167	3.8	100.0	155	13.3	100.0
All ages	5619	100.0		4451	100.0		1168	100.0	

Included in the statistics are 34.3% multiple primaries in males and 30.8% 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	0.50	0.0		6.9	
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19		1	0.0		0.1	0.14		3.4
20-24	3		0.2	0.43	0.0		3.8	
25-29	1	2	0.1	0.05	0.1	0.14	1.1	2.0
30-34	2	2	0.1	0.06	0.1	0.07	1.2	1.0
35-39	25	8	1.1	0.28	0.4	0.21	6.9	1.8
40-44	84	16	3.8	0.34	0.8	0.25	11.1	1.6
45-49	249	46	12.8	0.40	2.4	0.30	16.2	2.7
50-54	514	85	30.8	0.50	5.0	0.34	18.1	3.2
55-59	710	140	45.5	0.57	8.5	0.43	13.8	3.4
60-64	792	172	52.0	0.61	10.7	0.52	10.3	3.1
65-69	738	156	54.2	0.69	10.5	0.50	7.1	2.2
70-74	502	135	48.7	0.67	10.9	0.58	4.5	1.7
75-79	411	128	60.8	0.87	12.9	0.58	3.8	1.4
80-84	251	122	61.8	0.97	15.3	0.63	2.9	1.3
85+	167	155	60.2	0.97	20.9	0.84	2.3	1.4
All ages	4451	1168					6.6	1.9

Mortality					
Raw	17.7	0.61	4.4	0.49
WS	10.4	0.58	2.1	0.43
ES	14.8	0.60	3.0	0.45
BRD-S	17.5	0.62	3.7	0.47

PYLL-70		
per 100,000	152.9	30.4
ES	138.5	26.4
AYLL-70	11.1	10.9

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	88	4.3			5	5.7	83	94.3
C09-C10 Oropharynx	99	4.9			24	24.2	75	75.8
C12-C13 Hypopharynx	75	3.7			23	30.7	52	69.3
C15 Oesophagus	191	9.4	35	18.3	27	14.1	129	67.5
C16 Stomach	55	2.7	13	23.6	4	7.3	38	69.1
C18 Colon	89	4.4	27	30.3	5	5.6	57	64.0
C19-C20 Rectum	61	3.0	12	19.7	3	4.9	46	75.4
C22 Liver	52	2.6	2	3.8	7	13.5	43	82.7
C25 Pancreas	43	2.1	5	11.6	3	7.0	35	81.4
C32 Larynx	63	3.1			11	17.5	52	82.5
C33-C34 Lung	483	23.7	62	12.8	47	9.7	374	77.4
C43 Malign. melanoma	36	1.8	16	44.4	3	8.3	17	47.2
C44 Skin others	154	7.6	55	35.7	20	13.0	79	51.3
C61 Prostate	153	7.5	74	48.4	10	6.5	69	45.1
C64 Kidney	36	1.8	11	30.6	5	13.9	20	55.6
C67 Bladder	94	4.6	40	42.6	3	3.2	51	54.3
C76-C79 CUP	55	2.7	28	50.9	4	7.3	23	41.8
C82-C85 NHL	43	2.1	19	44.2	6	14.0	18	41.9
C91-C96 Leukaemia	25	1.2	6	24.0	1	4.0	18	72.0
Other primaries	144	7.1	53	36.8	8	5.6	83	57.6
All mult. primaries	2039	100.0	458	22.5	219	10.7	1362	66.8

Multiple primaries with number of cases n<20 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	20	3.8			1	5.0	19	95.0
C09-C10 Oropharynx	27	5.2			4	14.8	23	85.2
C12-C13 Hypopharynx	14	2.7			2	14.3	12	85.7
C15 Oesophagus	37	7.1	4	10.8	5	13.5	28	75.7
C16 Stomach	12	2.3	2	16.7	2	16.7	8	66.7
C18 Colon	31	5.9	15	48.4	3	9.7	13	41.9
C19-C20 Rectum	8	1.5	2	25.0			6	75.0
C22 Liver	6	1.1			2	33.3	4	66.7
C25 Pancreas	9	1.7	1	11.1	1	11.1	7	77.8
C30-C31 Sinuses	5	1.0					5	100.0
C32 Larynx	10	1.9			1	10.0	9	90.0
C33-C34 Lung	85	16.3	6	7.1	8	9.4	71	83.5
C43 Malign. melanoma	6	1.1	1	16.7			5	83.3
C44 Skin others	28	5.4	8	28.6	3	10.7	17	60.7
C50 Breast	93	17.8	59	63.4	5	5.4	29	31.2
C51 Vulva	6	1.1	1	16.7			5	83.3
C53 Cervix uteri	16	3.1	13	81.3			3	18.8
C54 Corpus uteri	11	2.1	6	54.5	1	9.1	4	36.4
C56 Ovary	12	2.3	4	33.3			8	66.7
C67 Bladder	10	1.9	5	50.0			5	50.0
C70-C72 CNS cancer	10	1.9	1	10.0	2	20.0	7	70.0
C73 Thyroid	5	1.0	4	80.0	1	20.0		
C76-C79 CUP	12	2.3	7	58.3			5	41.7
C82-C85 NHL	11	2.1	4	36.4	1	9.1	6	54.5
C90 Mult. myeloma	5	1.0	3	60.0			2	40.0
C91-C96 Leukaemia	8	1.5	2	25.0			6	75.0
Other primaries	26	5.0	6	23.1	5	19.2	15	57.7
All mult. primaries	523	100.0	154	29.4	47	9.0	322	61.6

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 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2011
(**Singular primaries only ***)

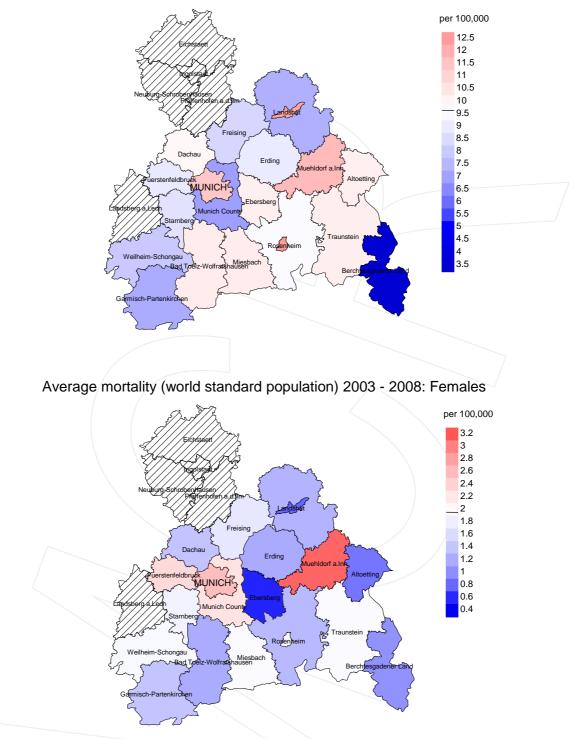| Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4			0.0		0.0			
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19		1	0.0		0.1	0.14		3.7
20-24	3		0.2	0.43	0.0		4.0	
25-29	1	2	0.1	0.06	0.1	0.17	1.2	2.1
30-34	2	2	0.1	0.06	0.1	0.08	1.2	1.1
35-39	22	6	1.0	0.27	0.3	0.17	6.5	1.4
40-44	75	14	3.4	0.33	0.7	0.23	10.7	1.6
45-49	210	40	10.8	0.38	2.1	0.29	15.0	2.6
50-54	433	70	25.9	0.49	4.1	0.33	17.4	3.1
55-59	594	117	38.1	0.57	7.1	0.43	13.3	3.4
60-64	625	134	41.1	0.59	8.4	0.48	9.6	2.9
65-69	574	116	42.1	0.68	7.8	0.47	6.8	2.0
70-74	397	99	38.5	0.72	8.0	0.57	4.5	1.5
75-79	306	105	45.3	0.94	10.6	0.62	3.6	1.5
80-84	183	87	45.1	1.01	10.9	0.59	2.7	1.1
85+	120	121	43.3	1.12	16.3	0.84	2.2	1.3
All ages	3545	914					6.5	1.8
Mortality								
Raw			14.1	0.60	3.5	0.47		
WS			8.3	0.56	1.7	0.41		
ES			11.9	0.58	2.4	0.43		
BRD-S			13.9	0.61	2.9	0.45		
PYLL-70								
per 100,000			127.0		25.2			
ES			114.9		21.9			
AYLL-70			11.4		11.3			
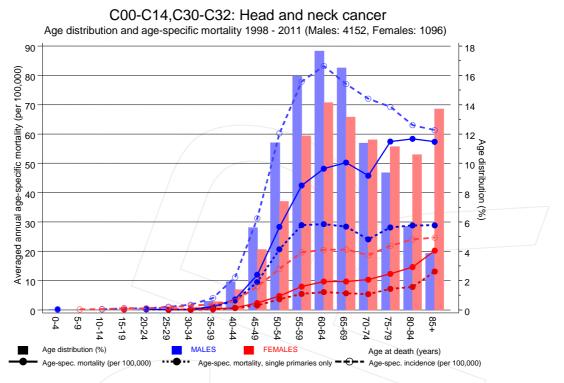
* See corresponding tables with multiple primaries.

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	3		0.2	0.43	0.0		4.3	
25-29	1	2	0.1	0.06	0.1	0.20	1.3	2.2
30-34	2	1	0.1	0.07	0.1	0.04	1.3	0.6
35-39	22	3	1.0	0.29	0.1	0.09	6.7	0.8
40-44	70	12	3.1	0.33	0.6	0.23	10.5	1.5
45-49	184	29	9.5	0.38	1.5	0.24	14.1	2.1
50-54	345	62	20.7	0.45	3.6	0.32	15.2	3.1
55-59	451	89	28.9	0.51	5.4	0.39	11.1	2.9
60-64	445	97	29.2	0.49	6.1	0.39	7.7	2.4
65-69	387	84	28.4	0.54	5.6	0.40	5.3	1.7
70-74	248	66	24.0	0.53	5.3	0.41	3.3	1.2
75-79	190	71	28.1	0.66	7.1	0.49	2.8	1.2
80-84	117	62	28.8	0.70	7.8	0.49	2.2	1.0
85+	80	97	28.8	0.83	13.1	0.72	1.8	1.2
All ages	2545	675					5.5	1.6
Mortality								
Raw			10.1	0.49	2.6	0.40		
WS			6.1	0.48	1.2	0.34		
ES			8.6	0.49	1.8	0.36		
BRD-S			9.9	0.50	2.1	0.38		
PYLL-70								
per 100,000			101.2		19.2			
ES			91.6		16.8			
AYLL-70			12.1		11.4			

* See corresponding tables with multiple primaries.

C00-C14,C30-C32: Head and neck cancer

Age distribution and age-specific mortality 1998 - 2011 (Males: 4152, Females: 1096)

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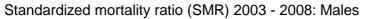
The difference between age at diagnosis (Table 3) and age at HN cancer-related death (see Table 10) should be considered.

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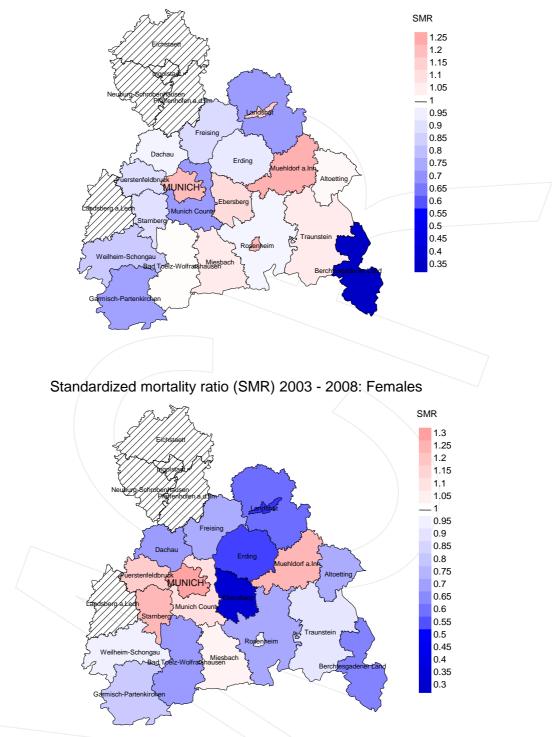
Average mortality (world standard population) 2003 - 2008: Females

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 9.7/100,000 WS N=1,904, females 2.0/100,000 WS N=510). 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 5 women died from HN cancer. Therefore, the mean mortality 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 1.9/100,000.

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=1,904, females N=510). 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 5 women died from HN cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.34. Though, the value of this parameter may vary with an underlying probability of 99% between 0.07 and 0.95.

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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