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

C33, C34: Lung cancer

Year of diagnosis	1998-2011
Patients	24042
Diseases	24242
Creation date	04/02/2013
Export date	01/03/2013
Population	4.5 m

http://www.tumorregister-muenchen.de/en/facts/base/base_C3334E.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.

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	1030	158	15.3	14.3	93.2	99.0
1999	1079	165	15.3	16.7	92.4	99.2
2000	1095	219	20.0	17.7	91.7	99.2
2001	1113	186	16.7	18.8	92.5	99.0
2002	1797	371	20.6	20.3	91.4	98.8
2003	1843	323	17.5	21.6	91.4	99.3
2004	1821	315	17.3	21.3	91.2	99.1
2005	1814	271	14.9	22.3	90.6	98.4
2006	1855	281	15.1	22.7	87.1	98.1
2007	2209	307	13.9	21.1	85.4	95.0 ##
2008	2209	247	11.2	23.4	83.0	90.8
2009	2251	272	12.1	23.6	80.2	90.8
2010	2192	259	11.8	24.3	75.2	94.8
2011	1934	246	12.7	24.3	60.7	85.6 ###
1998-2011	24242	3620	14.9	21.5	84.9	95.6

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	1030	681	349	66.1
1999	1079	747	332	69.2
2000	1095	745	350	68.0
2001	1113	771	342	69.3
2002	1797	1214	583	67.6
2003	1843	1212	631	65.8
2004	1821	1185	636	65.1
2005	1814	1198	616	66.0
2006	1855	1223	632	65.9
2007	2209	1433	776	64.9
2008	2209	1428	781	64.6
2009	2251	1430	821	63.5
2010	2192	1365	827	62.3
2011	1934	1191	743	61.6
1998-2011	24242	15823	8419	65.3

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	681	349	61.5	29.7	37.1	14.8	55.2	21.3	70.3	26.2
1999	747	332	66.7	28.0	40.7	14.0	59.6	20.2	74.5	25.0
2000	745	350	65.4	29.1	39.0	14.9	57.7	21.3	73.2	25.8
2001	771	342	66.5	28.1	40.1	14.2	58.5	20.4	72.8	25.0
2002	1214	583	65.2	29.8	36.9	14.5	55.1	21.1	71.3	25.8
2003	1212	631	64.7	32.0	36.2	15.9	53.8	22.8	68.4	27.6
2004	1185	636	63.0	32.2	34.3	15.5	51.2	22.3	65.8	27.5
2005	1198	616	63.2	31.0	34.1	14.9	50.4	21.6	64.4	26.3
2006	1223	632	63.9	31.5	33.9	14.9	50.2	21.6	63.9	26.3
2007	1433	776	64.7	33.6	33.8	16.8	50.3	23.9	65.3	28.8
2008	1428	781	64.2	33.7	33.3	16.4	49.3	23.6	63.0	28.5
2009	1430	821	64.1	35.3	33.1	16.6	48.9	23.8	61.8	29.1
2010	1365	827	60.6	35.3	31.0	16.9	45.3	24.2	57.2	29.2
2011	1191	743	52.8	31.7	26.9	14.9	39.5	21.4	49.9	26.0
1998-2011	15823	8419	63.0	32.0	34.0	15.4	50.3	22.2	64.0	27.1

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	1030	66.9	11.2	28.1	93.1	52.5	58.4	67.3	75.4	81.2
1999	1079	66.8	11.2	24.9	96.3	52.6	58.8	67.2	74.7	81.7
2000	1095	67.0	11.7	15.8	96.0	51.9	58.9	67.1	75.5	81.5
2001	1113	66.8	11.3	17.0	96.4	52.3	59.5	66.8	74.7	80.9
2002	1797	68.0	11.6	14.1	99.5	52.8	60.3	68.5	76.5	82.0
2003	1843	68.0	11.1	17.5	97.6	53.5	60.6	68.3	75.8	82.2
2004	1821	68.3	11.1	24.4	98.0	53.8	61.1	68.1	76.6	82.2
2005	1814	68.1	11.2	18.1	98.5	54.2	61.0	68.4	76.6	82.5
2006	1855	68.4	10.8	28.7	102	54.8	61.5	68.1	76.6	82.4
2007	2209	68.3	11.3	7.5	99.1	53.8	61.3	68.6	76.5	81.9
2008	2209	68.5	10.9	22.3	99.4	54.5	61.4	68.8	76.4	82.0
2009	2251	68.8	11.2	20.3	102	54.3	61.5	69.2	76.6	83.1
2010	2192	68.7	11.0	0.5	97.8	54.6	61.9	69.1	76.3	82.3
2011	1934	68.6	11.1	22.2	97.6	53.4	61.6	69.3	76.2	82.8
1998-2011	24242	68.1	11.2	0.5	102	53.6	60.8	68.4	76.2	82.2

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	681	66.4	10.5	28.1	91.7	53.7	58.8	66.8	74.1	79.3
1999	747	66.3	10.7	24.9	96.3	53.0	58.8	66.7	73.3	80.3
2000	745	66.7	10.9	28.1	94.2	53.0	59.1	66.3	74.1	80.8
2001	771	66.4	10.8	17.0	96.4	52.8	59.8	66.2	73.5	80.0
2002	1214	67.9	11.0	14.1	94.9	53.6	61.0	67.9	75.8	81.7
2003	1212	67.9	10.3	36.8	95.4	54.5	61.3	68.2	75.2	81.2
2004	1185	68.2	10.6	35.7	94.3	54.4	61.4	68.5	76.2	81.5
2005	1198	68.2	10.6	18.1	98.5	55.3	61.7	68.3	75.8	81.5
2006	1223	68.2	10.0	28.7	102	55.2	61.8	68.0	75.7	80.7
2007	1433	68.8	10.6	7.5	97.3	55.2	62.4	69.1	76.6	81.6
2008	1428	68.7	10.4	22.3	99.4	55.6	61.9	69.2	76.4	81.4
2009	1430	68.9	10.7	25.6	100	55.4	61.7	69.1	76.4	82.4
2010	1365	68.7	10.8	0.5	97.5	54.8	62.3	69.4	75.8	81.9
2011	1191	68.5	10.8	28.1	94.3	54.0	62.0	69.5	75.7	82.3
1998-2011	15823	68.1	10.6	0.5	102	54.4	61.2	68.4	75.7	81.4

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	349	67.7	12.5	35.8	93.1	50.8	57.8	68.7	76.5	84.4
1999	332	68.0	12.2	33.2	94.8	51.7	58.6	68.9	77.7	83.7
2000	350	67.6	13.3	15.8	96.0	49.9	58.8	69.2	78.0	84.0
2001	342	67.6	12.4	24.4	93.9	50.0	58.8	68.6	76.3	82.9
2002	583	68.1	12.8	27.5	99.5	51.5	59.0	69.5	78.2	83.3
2003	631	68.1	12.5	17.5	97.6	52.1	59.3	68.6	77.5	83.2
2004	636	68.3	12.1	24.4	98.0	52.6	60.2	67.6	78.2	83.5
2005	616	68.1	12.4	21.6	96.1	52.6	59.0	68.4	78.0	83.9
2006	632	68.9	12.2	30.4	100	53.7	60.2	68.1	78.6	84.7
2007	776	67.4	12.3	22.0	99.1	51.0	59.3	67.8	76.5	82.6
2008	781	67.9	11.9	29.4	97.3	53.2	60.5	67.9	76.6	82.9
2009	821	68.8	11.9	20.3	102	53.1	60.9	69.4	77.3	83.8
2010	827	68.6	11.3	33.2	97.8	54.0	61.5	68.2	76.9	83.5
2011	743	68.7	11.4	22.2	97.6	52.6	61.0	68.6	77.2	84.0
1998-2011	8419	68.2	12.1	15.8	102	52.2	59.9	68.5	77.4	83.6

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	0.0	0.0	2	0.0	0.0			0.0
5-9	1	0.0	0.0	1	0.0	0.0			0.0
10-14	1	0.0	0.0	1	0.0	0.0			0.0
15-19	7	0.0	0.0	5	0.0	0.1	2	0.0	0.0
20-24	11	0.0	0.1	4	0.0	0.1	7	0.1	0.1
25-29	22	0.1	0.2	12	0.1	0.2	10	0.1	0.2
30-34	45	0.2	0.4	22	0.1	0.3	23	0.3	0.5
35-39	133	0.5	0.9	71	0.4	0.7	62	0.7	1.2
40-44	353	1.5	2.4	202	1.3	2.0	151	1.8	3.0
45-49	813	3.4	5.7	469	3.0	5.0	344	4.1	7.1
50-54	1533	6.3	12.0	932	5.9	10.9	601	7.1	14.3
55-59	2657	11.0	23.0	1729	10.9	21.8	928	11.0	25.3
60-64	3666	15.1	38.1	2465	15.6	37.4	1201	14.3	39.5
65-69	4210	17.4	55.5	2924	18.5	55.9	1286	15.3	54.8
70-74	3861	15.9	71.4	2715	17.2	73.0	1146	13.6	68.4
75-79	3331	13.7	85.2	2197	13.9	86.9	1134	13.5	81.9
80-84	2233	9.2	94.4	1360	8.6	95.5	873	10.4	92.3
85+	1363	5.6	100.0	712	4.5	100.0	651	7.7	100.0
All ages	24242	100.0		15823	100.0		8419	100.0	

Included in the statistics are 26.0% multiple primaries in males and 24.5% 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=2231 %	Females DCO rate n=1383 %	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	1		0.1	0.0			0.6	
10-14	1		0.1	0.0			0.8	
15-19	5	2	0.4	0.2			1.7	0.8
20-24	4	7	0.3	0.5	25.0		0.8	1.6
25-29	12	10	0.7	0.6		10.0	1.5	1.1
30-34	22	23	1.1	1.2		4.3	1.7	1.3
35-39	71	62	3.3	3.0	2.8	6.5	3.6	1.9
40-44	202	150	9.1	7.1	3.5	2.7	7.3	2.8
45-49	466	343	24.0	17.9	5.8	6.4	10.4	4.7
50-54	928	599	55.6	34.9	5.9	6.0	12.7	6.5
55-59	1724	922	110.5	56.3	7.8	6.0	13.8	7.8
60-64	2450	1193	161.0	74.4	9.5	8.0	13.0	8.0
65-69	2906	1284	213.2	86.2	9.6	8.1	12.4	7.9
70-74	2699	1139	261.7	92.3	13.0	12.2	12.4	7.6
75-79	2187	1130	323.6	113.6	18.3	19.9	13.0	7.7
80-84	1356	871	333.8	109.5	27.9	34.1	12.3	6.4
85+	712	651	256.7	87.7	50.8	61.4	8.6	4.5
All ages	15748	8386			14.2	16.5	11.9	6.5
Incidence								
Raw			62.7	31.9				
WS			33.8	15.4				
ES			50.1	22.1				
BRD-S			63.7	26.9				

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 %
C00	Lip	2	0.3	7.4	0.9	26.6		1.1	50.0
C03-C06	Oral cavity	14	2.2	6.2	3.4	10.5	#	7.7	21.4
C09-C10	Oropharynx	26	2.9	9.1	5.9	13.3	#	15.2	11.5
C12-C13	Hypopharynx	12	1.6	7.4	3.8	12.9	#	6.8	8.3
C15	Oesophagus	24	4.5	5.3	3.4	7.9	#	12.8	8.3
C16	Stomach	35	10.7	3.3	2.3	4.6	#	16.0	14.3
C17	Small intestine	4	1.1	3.5	1.0	9.0		1.9	
C18	Colon	46	25.5	1.8	1.3	2.4	#	13.5	17.4
C19-C20	Rectum	27	14.9	1.8	1.2	2.6	#	8.0	11.1
C22	Liver	27	7.0	3.8	2.5	5.6	#	13.1	25.9
C23-C24	Bile	3	2.4	1.3	0.3	3.7		0.4	33.3
C25	Pancreas	32	8.7	3.7	2.5	5.2	#	15.3	37.5
C32	Larynx	31	2.9	10.8	7.4	15.4	#	18.5	22.6
C33-C34	Lung	112	31.4	3.6	2.9	4.3	#	52.9	5.4
C38,C45	Mesothelioma	2	1.6	1.2	0.1	4.4		0.2	
C40-C41	Bone	2	0.2	11.2	1.4	40.3	#	1.2	100.0
C43	Malign. melanoma	12	9.5	1.3	0.7	2.2		1.7	
C46,C49	Soft tissue	5	1.3	3.9	1.3	9.0	#	2.4	
C61	Prostate	94	77.0	1.2	1.0	1.5		11.2	18.1
C64	Kidney	30	9.2	3.3	2.2	4.7	#	13.7	23.3
C65	Renal pelvis	8	1.0	8.1	3.5	15.9	#	4.6	
C67	Bladder	33	10.5	3.1	2.2	4.4	#	14.8	15.2
C70-C72	CNS cancer	5	3.5	1.4	0.5	3.4		1.0	60.0
C73	Thyroid	4	1.7	2.4	0.6	6.1		1.5	
C76-C79	CUP	6	4.2	1.4	0.5	3.1		1.2	16.7
C82-C85	NHL	23	9.7	2.4	1.5	3.5	#	8.7	17.4
C90	Mult. myeloma	4	3.1	1.3	0.3	3.3		0.6	50.0
C91-C96	Leukaemia	14	3.7	3.8	2.1	6.3	#	6.8	42.9
Other primaries		10	3.6	2.7	1.3	5.0	#	4.2	40.0
Not observed		0	2.9	0.0	0.0	1.3		-1.9	
All mult. primaries		647	258.6	2.5	2.3	2.7	#	255.0	17.0

Patients	10929
Mean age at second malignancy (years)	70.5
Person-years	15229
Mean observation time (years)	1.4
Median observation time (years)	0.7

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 %
C09-C10	Oropharynx	3	0.4	6.7	1.4	19.6	#	2.8	
C15	Oesophagus	2	0.5	3.7	0.5	13.4		1.6	
C16	Stomach	15	3.4	4.4	2.5	7.3	#	13.0	26.7
C17	Small intestine	4	0.4	9.0	2.5	23.2	#	4.0	25.0
C18	Colon	25	9.4	2.6	1.7	3.9	#	17.4	16.0
C19-C20	Rectum	4	4.3	0.9	0.3	2.4		-0.3	25.0
C22	Liver	2	1.0	1.9	0.2	7.0		1.1	
C23-C24	Bile	2	1.3	1.5	0.2	5.4		0.7	100.0
C25	Pancreas	12	3.9	3.1	1.6	5.3	#	9.0	33.3
C32	Larynx	2	0.2	10.1	1.2	36.5	#	2.0	
C33-C34	Lung	47	7.1	6.7	4.9	8.9	#	44.6	6.4
C43	Malign. melanoma	6	3.3	1.8	0.7	3.9		3.0	16.7
C50	Breast	56	30.7	1.8	1.4	2.4	#	28.3	21.4
C51	Vulva	6	0.8	7.1	2.6	15.5	#	5.8	16.7
C53	Cervix uteri	5	1.3	3.8	1.2	8.8	#	4.1	40.0
C54	Corpus uteri	8	5.7	1.4	0.6	2.8		2.6	37.5
C55,C57	Fem. genitals un	2	0.2	10.2	1.2	36.7	#	2.0	100.0
C56	Ovary	7	4.2	1.7	0.7	3.4		3.1	28.6
C57.9	Fem. urogen.	2	0.0	185.2	22.4	669.0	#	2.2	
C64	Kidney	10	2.4	4.1	2.0	7.5	#	8.4	30.0
C65	Renal pelvis	2	0.3	7.5	0.9	27.1		1.9	
C67	Bladder	6	1.6	3.7	1.4	8.1	#	4.9	16.7
C70-C72	CNS cancer	5	1.4	3.5	1.1	8.2	#	4.0	40.0
C73	Thyroid	6	1.9	3.1	1.1	6.8	#	4.5	16.7
C76-C79	CUP	3	1.5	1.9	0.4	5.7		1.6	
C82-C85	NHL	5	3.6	1.4	0.4	3.2		1.6	40.0
C90	Mult. myeloma	2	1.2	1.7	0.2	6.2		0.9	50.0
C91-C96	Leukaemia	5	1.4	3.5	1.2	8.3	#	4.0	40.0
Other primaries		11	2.7	4.1	2.1	7.4	#	9.3	9.1
Not observed		0	1.4	0.0	0.0	2.7		-1.5	
All mult. primaries		265	97.8	2.7	2.4	3.1	#	186.6	20.8

Patients	5694
Mean age at second malignancy (years)	68.8
Person-years	8959
Mean observation time (years)	1.6
Median observation time (years)	0.8

The occurrence of second malignancy is statistically significant.

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

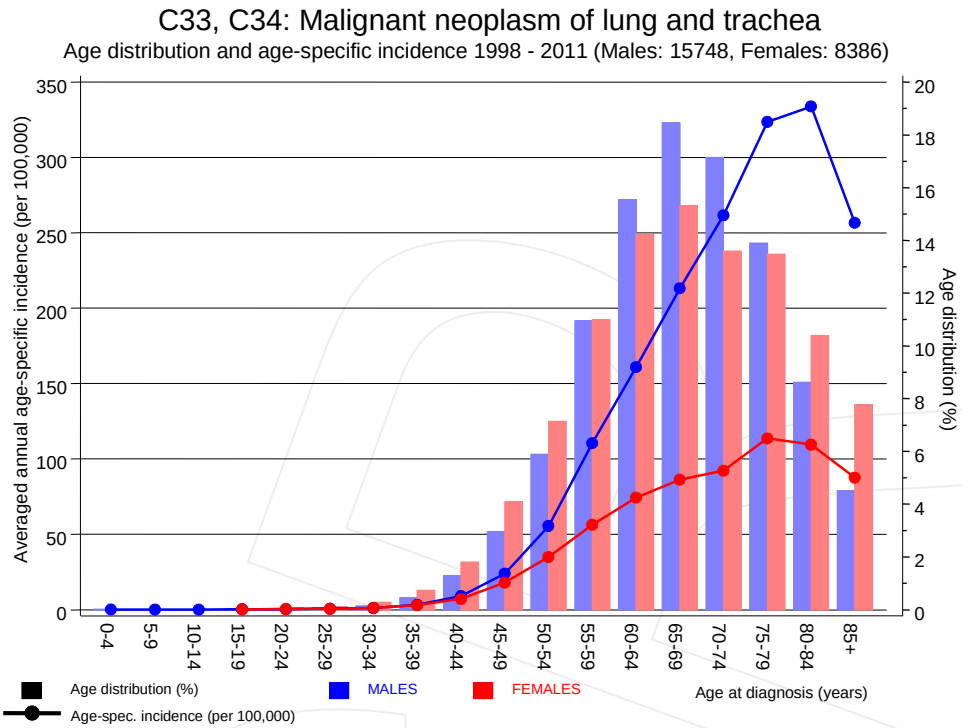


Figure 7. Age distribution and age-specific incidence

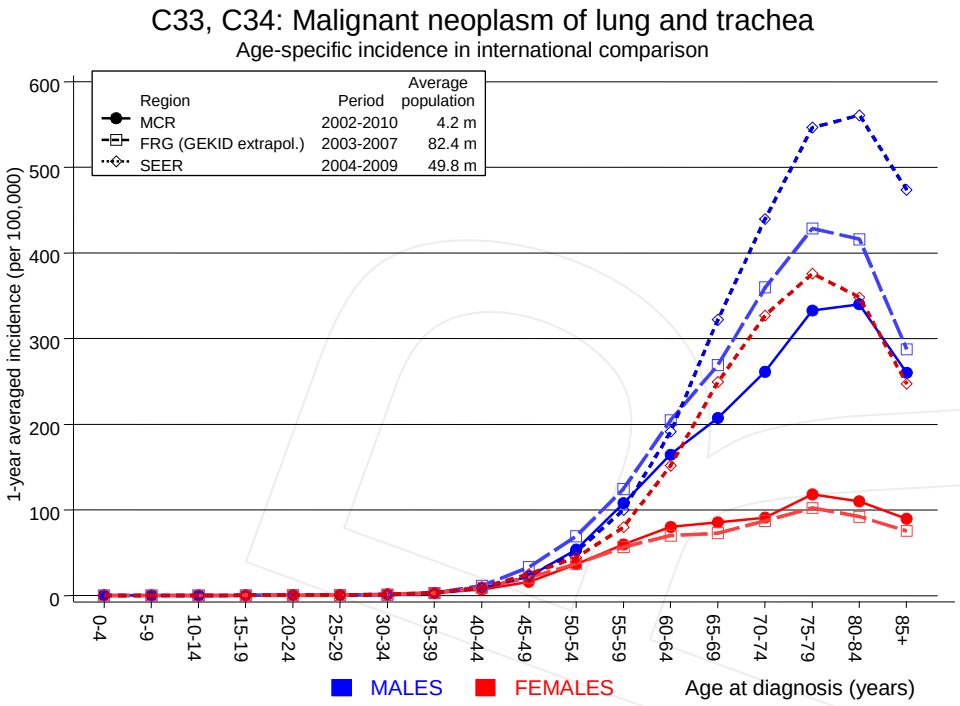


Figure 7a. Age-specific incidence in MCR registry areas compared to Germany (FRG, GEKID extrapolation) and SEER (Surveillance, Epidemiology, and End Results, USA).

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.

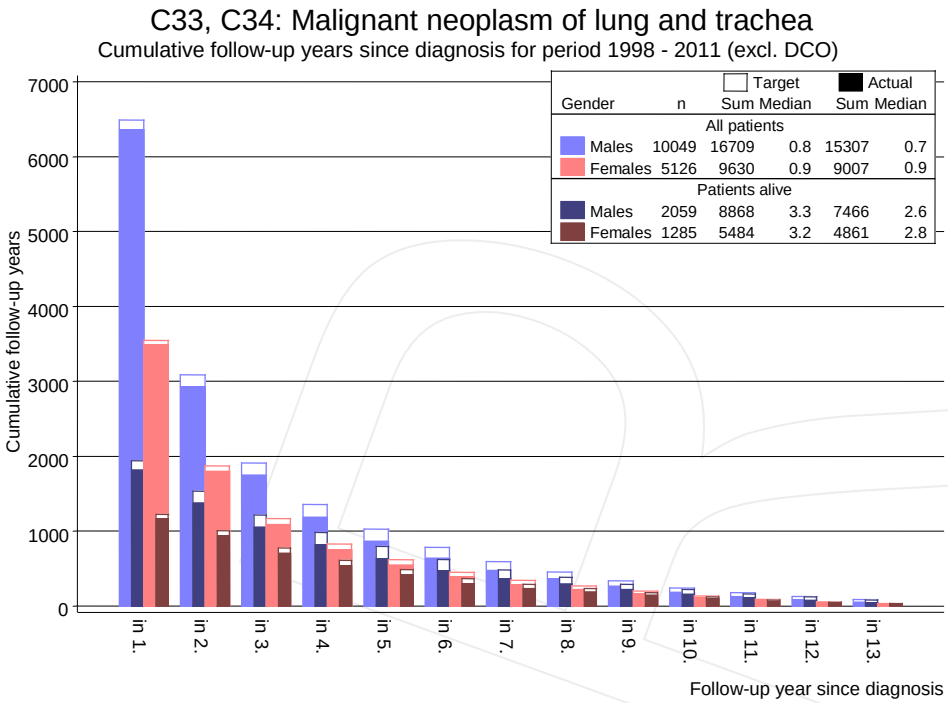
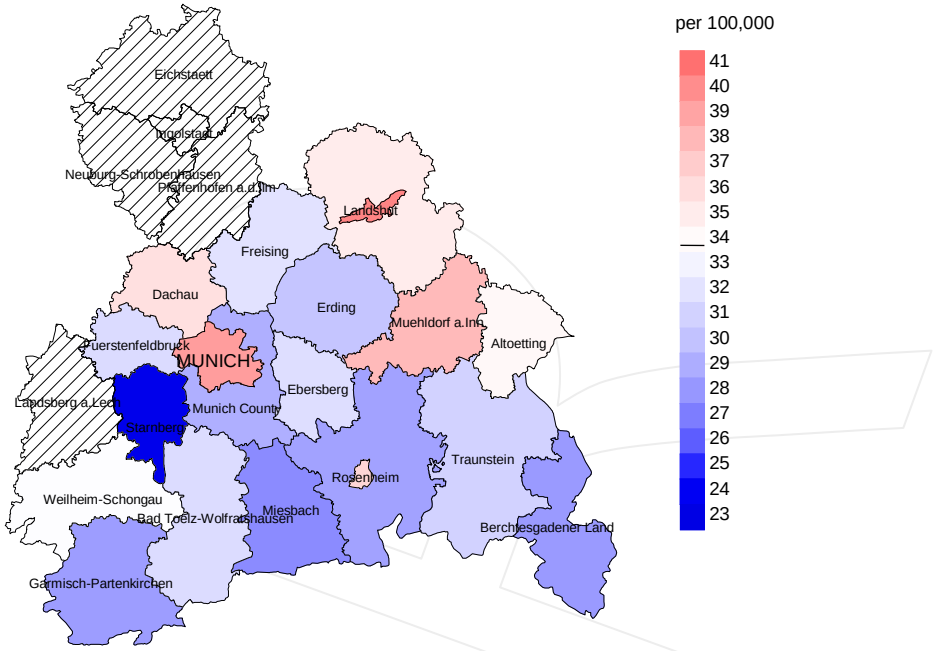


Figure 8. Cumulative follow-up years depending on time since diagnosis

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

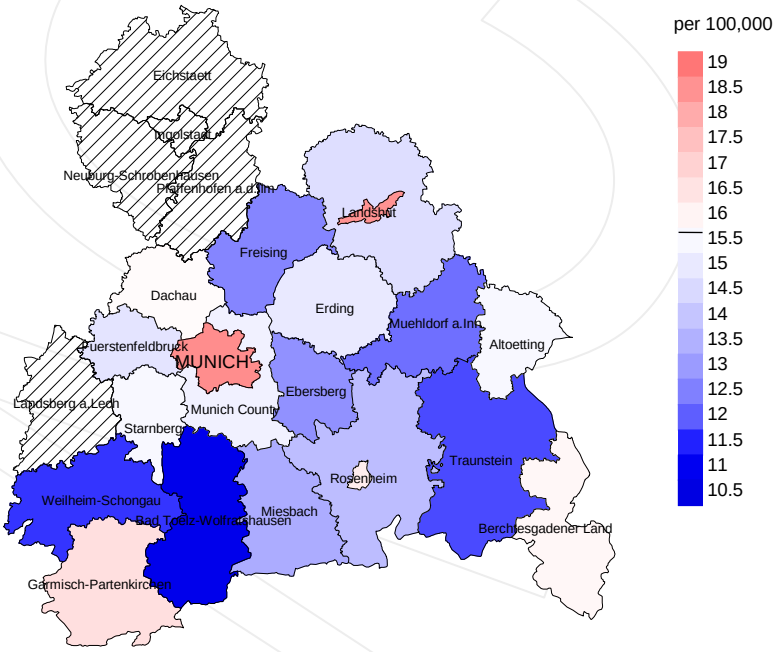
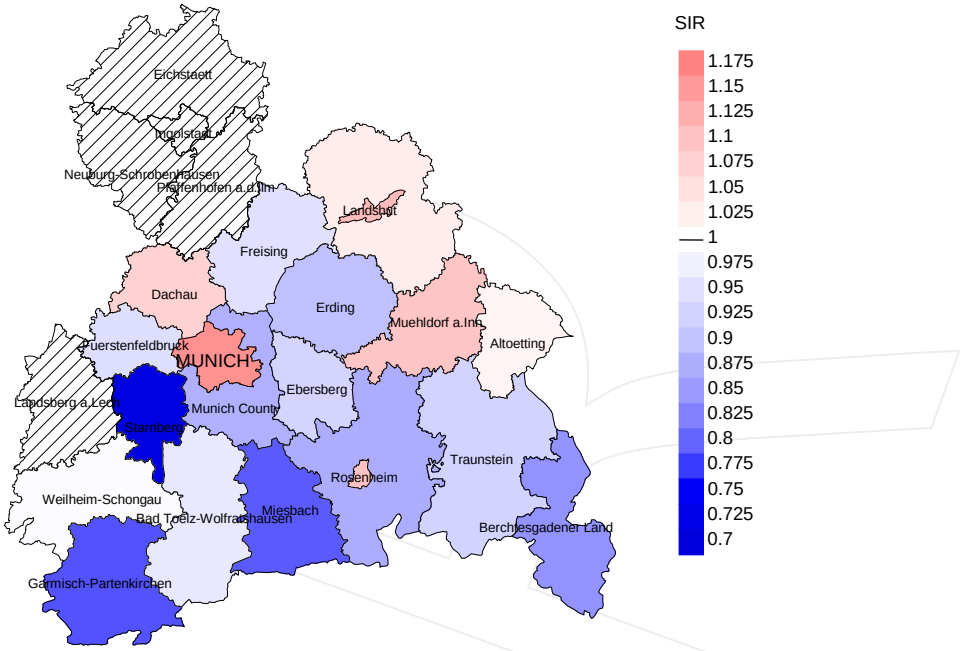


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 33.8/100,000 WS N=7,256, females 15.7/100,000 WS N=3,896). 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 95 women were identified with newly diagnosed lung cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 12.8/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 9.5 and 17.0/100,000.

Standardized incidence ratio (SIR) 2003 - 2008: Males



Standardized incidence ratio (SIR) 2003 - 2008: Females

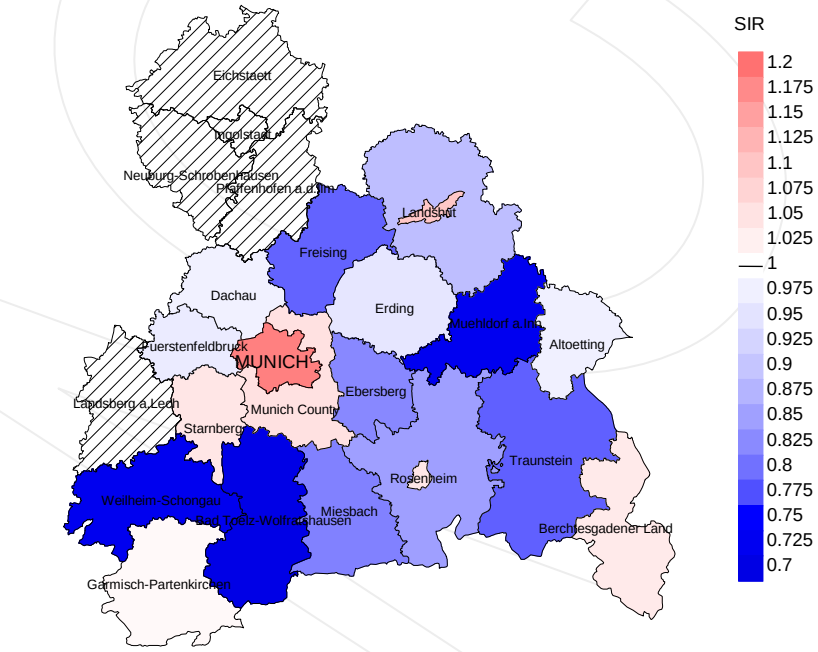


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=7,256, females N=3,896). 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 95 women were identified with newly diagnosed lung cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.82. Though, the value of this parameter may vary with an underlying probability of 99% between 0.62 and 1.07, 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	1030	99.0	15.3	960	93.2	92.7
1999	1079	99.2	15.3	997	92.4	95.1
2000	1095	99.2	20.0	1004	91.7	95.7
2001	1113	99.0	16.7	1029	92.5	95.0
2002	1797	98.8	20.6	1642	91.4	97.6
2003	1843	99.3	17.5	1685	91.4	97.6
2004	1821	99.1	17.3	1661	91.2	97.9
2005	1814	98.4	14.9	1644	90.6	98.7
2006	1855	98.1	15.1	1615	87.1	98.9
2007	2209	95.0	13.9	1887	85.4	99.0
2008	2209	90.8	11.2	1834	83.0	99.1
2009	2251	90.8	12.1	1805	80.2	99.1
2010	2192	94.8	11.8	1648	75.2	98.4
2011	1934	85.6	12.7	1173	60.7	97.8
1998-2011	24242	95.6	14.9	20584	84.9	97.7

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	1030	889	91.9	438	42.5
1999	1079	918	94.4	437	40.5
2000	1095	1004	95.2	483	44.1
2001	1113	999	94.1	463	41.6
2002	1797	1407	97.5	820	45.6
2003	1843	1518	97.8	829	45.0
2004	1821	1579	97.8	799	43.9
2005	1814	1544	97.9	811	44.7
2006	1855	1614	98.0	791	42.6
2007	2209	1762	98.6	919	41.6
2008	2209	1770	99.2	856	38.8
2009	2251	1856	99.2	879	39.0
2010	2192	1931	99.0	929	42.4
2011	1934	1749	99.4	781	40.4
1998-2011	24242	20540	97.6	10235	42.2

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	889	84.3	15.7	97.4
1999	918	89.2	10.8	97.3
2000	1004	91.1	8.9	98.3
2001	999	88.2	11.8	96.8
2002	1407	92.5	7.5	97.2
2003	1518	93.4	6.6	97.6
2004	1579	95.0	5.0	98.0
2005	1544	93.3	6.7	97.0
2006	1614	92.9	7.1	97.3
2007	1762	94.0	6.0	97.2
2008	1770	94.9	5.1	97.4
2009	1856	93.8	6.2	97.4
2010	1931	93.8	6.2	97.2
2011	1749	93.9	6.1	96.8
1998-2011	20540	92.8	7.2	97.3

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	611	68.4	67.7	71.8	68.8
1999	630	68.6	68.4	70.5	69.0
2000	681	68.4	68.2	70.1	68.5
2001	690	68.6	68.2	71.1	69.0
2002	981	68.9	68.6	72.8	68.8
2003	1060	68.7	68.4	72.3	68.6
2004	1051	69.0	68.9	71.4	69.1
2005	1029	69.7	69.4	73.1	69.7
2006	1103	69.7	69.5	72.3	69.7
2007	1178	69.7	69.4	74.1	69.7
2008	1178	69.5	69.2	75.1	69.3
2009	1230	70.4	70.1	74.7	70.2
2010	1240	70.4	70.0	75.6	70.2
2011	1111	70.3	70.0	74.7	70.1
1998-2011	13773	69.4	69.2	72.9	69.4

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	278	68.5	68.1	71.2	69.3
1999	288	69.9	69.8	71.3	70.0
2000	323	68.9	68.1	78.3	68.9
2001	309	70.5	69.7	77.4	70.2
2002	426	69.0	68.6	75.6	69.0
2003	458	69.9	69.6	73.9	69.7
2004	528	70.2	69.7	78.8	69.9
2005	515	69.2	68.8	78.0	69.2
2006	511	70.1	69.8	75.3	69.8
2007	584	69.8	69.5	75.5	69.5
2008	592	69.9	69.5	79.2	69.6
2009	626	69.4	68.7	80.9	69.2
2010	691	70.2	69.9	76.5	70.0
2011	638	70.2	69.9	75.9	70.1
1998-2011	6767	69.7	69.3	76.1	69.6

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	506	45.7	0.74	27.4	0.74	41.2	0.75	53.7	0.77
1999	563	50.3	0.75	29.7	0.73	45.1	0.76	59.8	0.80
2000	618	54.3	0.83	31.8	0.82	48.1	0.84	62.5	0.86
2001	605	52.2	0.79	30.5	0.76	45.7	0.79	59.4	0.82
2002	904	48.5	0.75	27.2	0.74	40.7	0.74	52.9	0.74
2003	986	52.6	0.82	29.1	0.81	43.4	0.81	55.9	0.82
2004	1001	53.2	0.85	28.6	0.84	43.1	0.84	56.2	0.86
2005	947	50.0	0.79	26.0	0.77	39.1	0.78	51.4	0.80
2006	1022	53.4	0.84	27.5	0.81	41.3	0.83	54.1	0.85
2007	1105	49.9	0.78	25.4	0.76	38.3	0.77	50.6	0.78
2008	1111	49.9	0.78	25.5	0.77	38.2	0.78	49.6	0.79
2009	1148	51.4	0.81	25.5	0.77	38.2	0.79	50.0	0.81
2010	1149	51.0	0.85	25.1	0.82	37.5	0.83	48.6	0.86
2011	1035	45.9	0.88	22.5	0.84	33.7	0.86	43.6	0.88
1998-2011	12700	50.5	0.81	26.6	0.79	39.9	0.80	52.1	0.82

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	243	20.7	0.70	10.1	0.69	14.7	0.69	17.8	0.68
1999	256	21.6	0.78	10.0	0.72	14.8	0.74	19.0	0.77
2000	297	24.7	0.85	12.4	0.83	17.9	0.84	22.1	0.86
2001	277	22.8	0.81	10.8	0.76	15.8	0.77	19.8	0.79
2002	397	20.3	0.68	9.7	0.67	14.2	0.67	17.4	0.68
2003	432	21.9	0.69	10.2	0.65	15.1	0.66	18.7	0.68
2004	499	25.2	0.79	11.6	0.75	17.0	0.76	21.5	0.78
2005	493	24.8	0.80	11.7	0.79	17.0	0.79	20.9	0.80
2006	478	23.8	0.76	10.9	0.73	15.9	0.73	19.7	0.75
2007	552	23.9	0.72	11.2	0.67	16.3	0.69	20.1	0.71
2008	568	24.5	0.73	11.3	0.69	16.5	0.71	20.4	0.72
2009	593	25.5	0.72	12.0	0.72	17.3	0.73	21.0	0.72
2010	662	28.3	0.81	12.8	0.76	18.4	0.77	22.9	0.79
2011	607	25.9	0.82	11.8	0.79	17.1	0.80	21.1	0.81
1998-2011	6354	24.1	0.76	11.2	0.73	16.3	0.74	20.2	0.75

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	0.0	0.0	1	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	0.0	1	0.0	0.0			0.0
20-24	4	0.0	0.0	4	0.0	0.0			0.0
25-29	7	0.0	0.1	4	0.0	0.1	3	0.0	0.0
30-34	7	0.0	0.1	4	0.0	0.1	3	0.0	0.1
35-39	73	0.4	0.5	40	0.3	0.4	33	0.5	0.6
40-44	220	1.1	1.6	117	0.9	1.3	103	1.6	2.2
45-49	544	2.8	4.4	320	2.5	3.8	224	3.5	5.7
50-54	1045	5.4	9.9	648	5.0	8.9	397	6.2	11.9
55-59	1926	10.0	19.9	1264	9.8	18.7	662	10.3	22.2
60-64	2755	14.3	34.2	1889	14.7	33.4	866	13.5	35.8
65-69	3349	17.4	51.5	2372	18.4	51.8	977	15.2	51.0
70-74	3195	16.6	68.1	2270	17.6	69.5	925	14.4	65.4
75-79	2886	15.0	83.1	1966	15.3	84.7	920	14.4	79.8
80-84	2069	10.7	93.8	1319	10.3	95.0	750	11.7	91.5
85+	1187	6.2	100.0	643	5.0	100.0	544	8.5	100.0
All ages	19269	100.0		12862	100.0		6407	100.0	

Included in the statistics are 26.0% multiple primaries in males and 24.5% 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	1		0.1	0.20	0.0		2.6	
20-24	4		0.3	1.00	0.0		5.0	
25-29	4	3	0.2	0.33	0.2	0.30	4.6	2.9
30-34	4	3	0.2	0.18	0.2	0.13	2.4	1.5
35-39	40	33	1.8	0.56	1.6	0.53	11.0	7.2
40-44	117	103	5.2	0.58	4.9	0.68	15.4	10.3
45-49	320	224	16.5	0.68	11.7	0.65	20.8	12.9
50-54	648	397	38.8	0.70	23.2	0.66	22.9	15.1
55-59	1264	662	81.0	0.73	40.4	0.71	24.6	16.2
60-64	1889	866	124.1	0.77	54.0	0.72	24.5	15.5
65-69	2372	977	174.0	0.81	65.6	0.76	22.9	13.8
70-74	2270	925	220.1	0.84	74.9	0.81	20.5	11.5
75-79	1966	920	290.9	0.89	92.5	0.81	18.0	10.2
80-84	1319	750	324.7	0.97	94.3	0.86	15.0	7.8
85+	643	544	231.8	0.90	73.2	0.84	9.0	4.8
All ages	12862	6407					19.2	10.5
Mortality								
Raw			51.2	0.81	24.3	0.76		
WS			26.9	0.79	11.3	0.73		
ES			40.4	0.80	16.4	0.74		
BRD-S			52.7	0.82	20.4	0.75		
PYLL-70								
per 100,000			262.0		147.8			
ES			231.5		126.7			
AYLL-70			8.9		10.2			

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	132	3.9	110	83.3	9	6.8	13	9.8
C09-C10 Oropharynx	103	3.1	72	69.9	11	10.7	20	19.4
C12-C13 Hypopharynx	65	1.9	44	67.7	12	18.5	9	13.8
C15 Oesophagus	75	2.2	25	33.3	25	33.3	25	33.3
C16 Stomach	130	3.9	70	53.8	24	18.5	36	27.7
C18 Colon	270	8.1	176	65.2	40	14.8	54	20.0
C19-C20 Rectum	142	4.2	102	71.8	22	15.5	18	12.7
C22 Liver	50	1.5	16	32.0	15	30.0	19	38.0
C25 Pancreas	50	1.5	8	16.0	11	22.0	31	62.0
C32 Larynx	161	4.8	116	72.0	17	10.6	28	17.4
C33-C34 Lung	179	5.4			56	31.3	123	68.7
C43 Malign. melanoma	92	2.8	78	84.8	8	8.7	6	6.5
C44 Skin others	185	5.5	126	68.1	26	14.1	33	17.8
C61 Prostate	632	18.9	507	80.2	46	7.3	79	12.5
C62 Testis	31	0.9	28	90.3	1	3.2	2	6.5
C64 Kidney	129	3.9	79	61.2	25	19.4	25	19.4
C67 Bladder	400	12.0	331	82.8	22	5.5	47	11.8
C70-C72 CNS cancer	50	1.5	26	52.0	12	24.0	12	24.0
C76-C79 CUP	45	1.3	27	60.0	12	26.7	6	13.3
C81 Hodgkin lymphoma	31	0.9	30	96.8	1	3.2		
C82-C85 NHL	120	3.6	80	66.7	20	16.7	20	16.7
C91-C96 Leukaemia	44	1.3	19	43.2	11	25.0	14	31.8
Other primaries	227	6.8	148	65.2	31	13.7	48	21.1
All mult. primaries	3343	100.0	2218	66.3	457	13.7	668	20.0

Multiple primaries with number of cases n<30 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	32	2.1	30	93.8	2	6.3		
C09-C10 Oropharynx	21	1.4	17	81.0	1	4.8	3	14.3
C12-C13 Hypopharynx	10	0.7	9	90.0	1	10.0		
C15 Oesophagus	11	0.7	6	54.5	1	9.1	4	36.4
C16 Stomach	36	2.3	16	44.4	6	16.7	14	38.9
C18 Colon	114	7.4	81	71.1	13	11.4	20	17.5
C19-C20 Rectum	38	2.5	31	81.6	3	7.9	4	10.5
C21 Anus/canal	13	0.8	10	76.9	1	7.7	2	15.4
C23-C24 Bile	10	0.7	5	50.0	1	10.0	4	40.0
C25 Pancreas	29	1.9	11	37.9	6	20.7	12	41.4
C32 Larynx	14	0.9	9	64.3	2	14.3	3	21.4
C33-C34 Lung	58	3.8			17	29.3	41	70.7
C43 Malign. melanoma	42	2.7	39	92.9	1	2.4	2	4.8
C44 Skin others	39	2.5	25	64.1	3	7.7	11	28.2
C50 Breast	448	29.2	373	83.3	35	7.8	40	8.9
C51 Vulva	17	1.1	13	76.5	2	11.8	2	11.8
C53 Cervix uteri	84	5.5	71	84.5	7	8.3	6	7.1
C54 Corpus uteri	88	5.7	77	87.5	3	3.4	8	9.1
C55,C57 Fem. genitals un	11	0.7	9	81.8	1	9.1	1	9.1
C56 Ovary	41	2.7	28	68.3	6	14.6	7	17.1
C64 Kidney	46	3.0	32	69.6	5	10.9	9	19.6
C67 Bladder	69	4.5	53	76.8	6	8.7	10	14.5
C70-C72 CNS cancer	45	2.9	17	37.8	10	22.2	18	40.0
C73 Thyroid	29	1.9	19	65.5	6	20.7	4	13.8
C76-C79 CUP	27	1.8	16	59.3	4	14.8	7	25.9
C81 Hodgkin lymphoma	10	0.7	9	90.0	1	10.0		
C82-C85 NHL	50	3.3	41	82.0	4	8.0	5	10.0
C90 Mult. myeloma	12	0.8	3	25.0	3	25.0	6	50.0
C91-C96 Leukaemia	27	1.8	7	25.9	9	33.3	11	40.7
Other primaries	63	4.1	36	57.1	10	15.9	17	27.0
All mult. primaries	1534	100.0	1093	71.3	170	11.1	271	17.7

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 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	1		0.1	0.50	0.0		4.2	
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19	1		0.1	0.25	0.0		2.9	
20-24	4		0.3	1.00	0.0		5.3	
25-29	3	3	0.2	0.27	0.2	0.30	3.7	3.1
30-34	4	2	0.2	0.18	0.1	0.10	2.4	1.1
35-39	38	29	1.7	0.58	1.4	0.50	11.1	7.0
40-44	111	95	5.0	0.59	4.5	0.70	15.9	10.9
45-49	297	198	15.3	0.70	10.3	0.65	21.2	13.1
50-54	573	356	34.3	0.68	20.8	0.68	23.0	16.0
55-59	1114	582	71.4	0.74	35.5	0.73	24.9	16.8
60-64	1602	719	105.3	0.77	44.9	0.74	24.6	15.7
65-69	1924	793	141.2	0.81	53.3	0.78	22.8	13.8
70-74	1829	731	177.3	0.86	59.2	0.81	20.7	11.4
75-79	1480	743	219.0	0.89	74.7	0.82	17.7	10.3
80-84	986	592	242.7	0.99	74.5	0.86	14.8	7.7
85+	470	440	169.4	0.88	59.2	0.82	8.6	4.8
All ages	10437	5283					19.3	10.6
Mortality								
Raw			41.5	0.81	20.1	0.77		
WS			22.2	0.79	9.4	0.74		
ES			33.0	0.80	13.7	0.75		
BRD-S			42.4	0.82	16.9	0.76		
PYLL-70								
per 100,000			230.1		129.0			
ES			203.7		110.9			
AYLL-70			9.2		10.5			

* 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	1		0.1	0.50	0.0		4.3	
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19	1		0.1	0.25	0.0		2.9	
20-24	3		0.2	1.00	0.0		4.3	
25-29	3	3	0.2	0.27	0.2	0.30	4.0	3.3
30-34	4	2	0.2	0.18	0.1	0.11	2.5	1.2
35-39	37	29	1.7	0.57	1.4	0.52	11.3	7.6
40-44	111	94	5.0	0.60	4.4	0.71	16.7	11.8
45-49	294	192	15.1	0.70	10.0	0.65	22.5	14.1
50-54	562	351	33.7	0.69	20.5	0.70	24.8	17.6
55-59	1095	564	70.2	0.75	34.4	0.74	26.8	18.3
60-64	1539	697	101.1	0.77	43.5	0.74	26.7	17.4
65-69	1830	756	134.3	0.81	50.8	0.78	25.1	15.4
70-74	1738	694	168.5	0.86	56.2	0.79	23.4	12.7
75-79	1377	708	203.8	0.87	71.2	0.81	20.2	11.6
80-84	929	564	228.7	0.95	70.9	0.84	17.3	8.8
85+	450	431	162.2	0.86	58.0	0.81	10.0	5.4
All ages	9974	5085					21.6	11.9
Mortality								
Raw			39.7	0.81	19.3	0.76		
WS			21.3	0.79	9.1	0.74		
ES			31.6	0.80	13.2	0.75		
BRD-S			40.5	0.82	16.2	0.76		
PYLL-70								
per 100,000			224.5		125.7			
ES			198.8		108.2			
AYLL-70			9.3		10.6			

* See corresponding tables with multiple primaries.

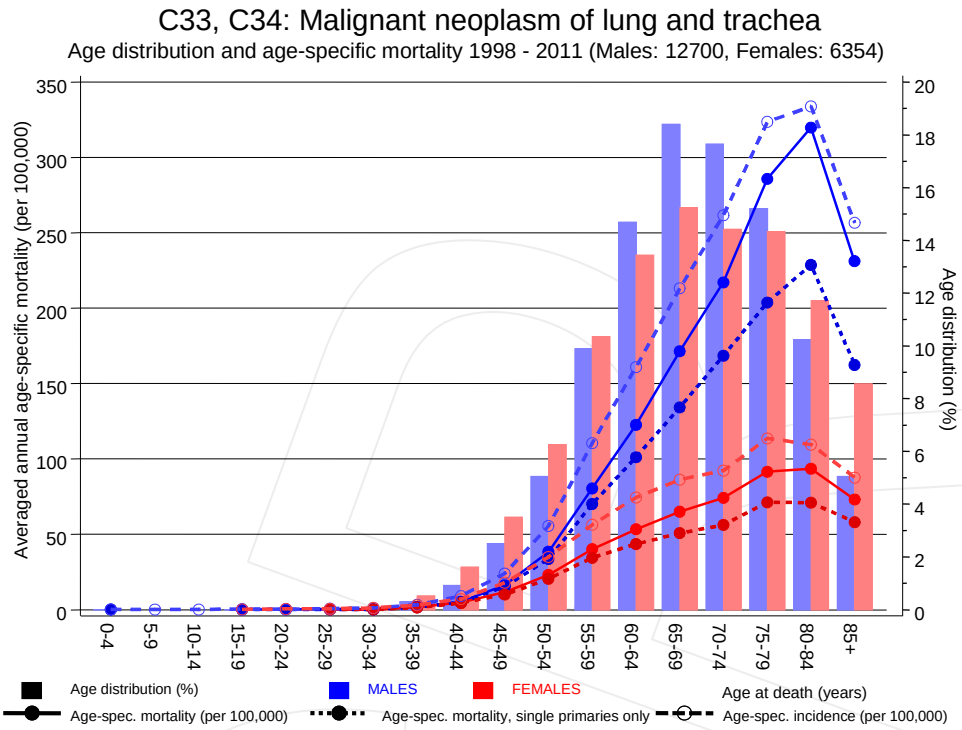
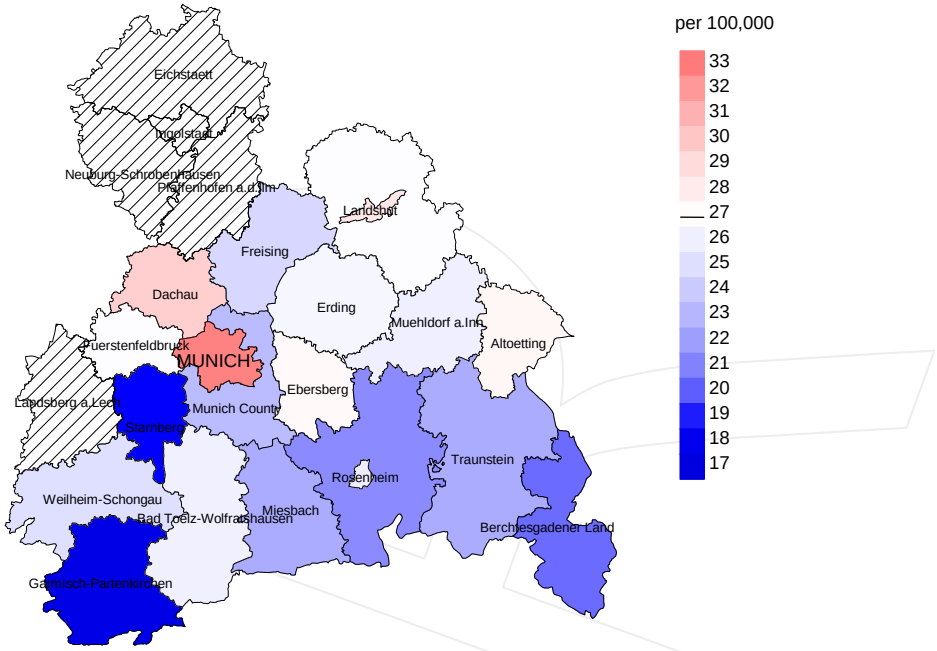


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

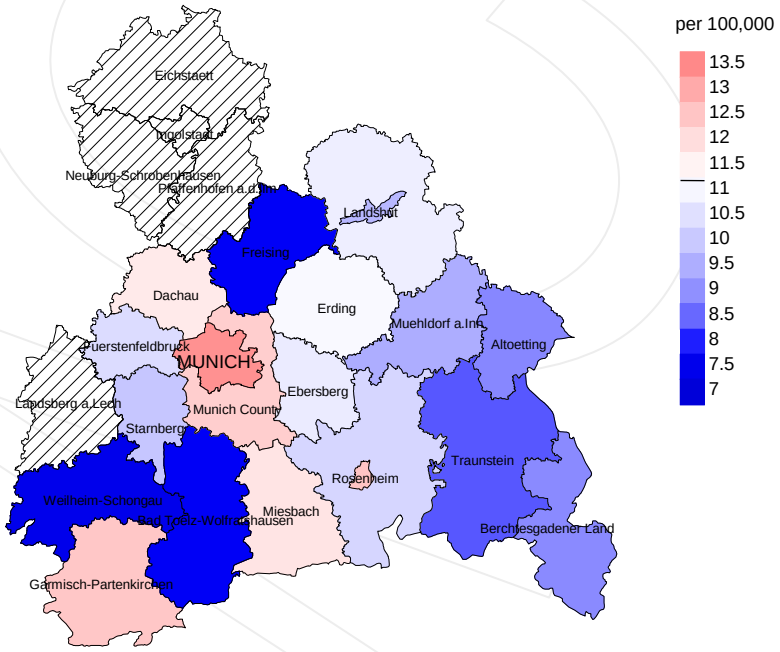
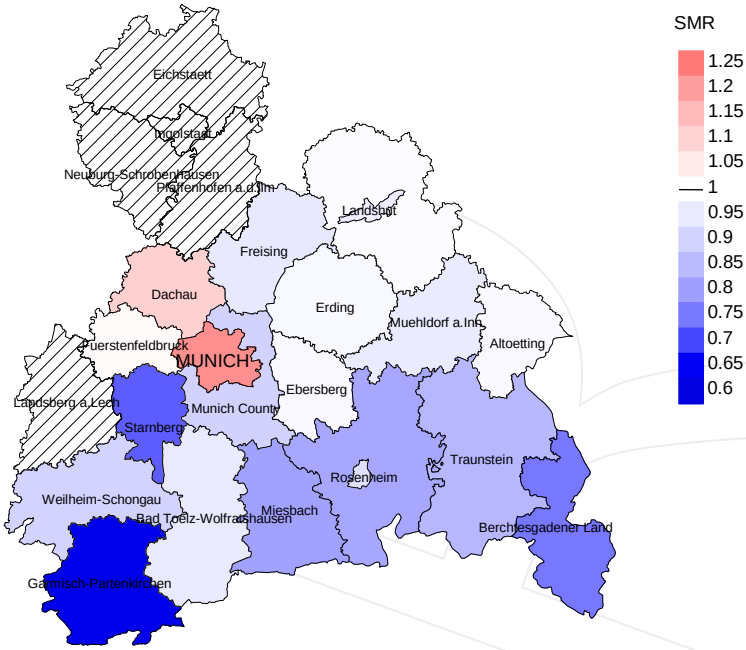


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 26.9/100,000 WS N=5,910, females 11.2/100,000 WS N=2,923). 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 82 women died from lung cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 10.7/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 7.7 and 14.6/100,000.

Standardized mortality ratio (SMR) 2003 - 2008: Males



Standardized mortality ratio (SMR) 2003 - 2008: Females

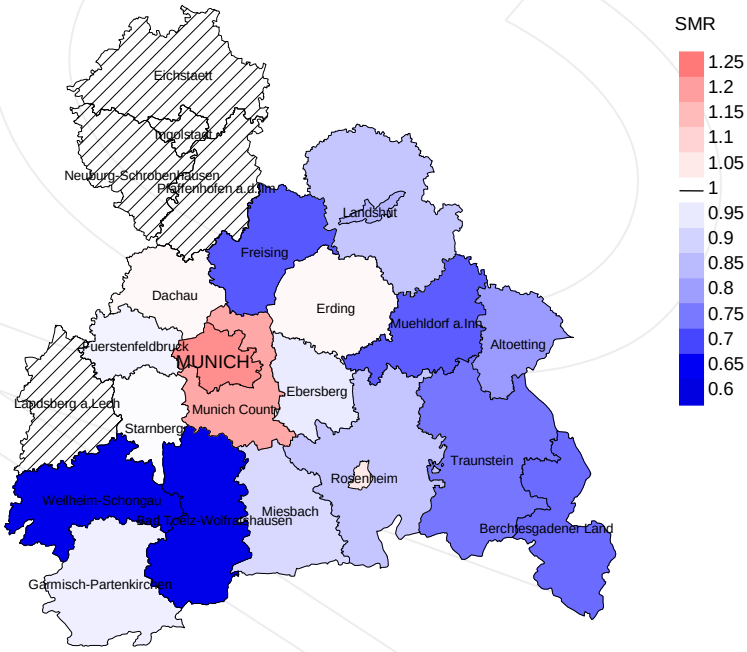


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=5,910, females N=2,923). 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 82 women died from lung cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.95. Though, the value of this parameter may vary with an underlying probability of 99% between 0.70 and 1.26, 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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