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: Non-small cell LC

Year of diagnosis	1998-2012
Patients	17,400
Diseases	17,555
Creation date	03/20/2014
Export date	02/12/2014
Population	4.5 m

http://www.tumorregister-muenchen.de/en/facts/base/base_C34n_E.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, March 2014

[#] 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 2013 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	619			15.5	91.1	99.4	
1999	683	2	0.3	19.8	89.9	98.5	
2000	663			20.2	88.4	98.5	
2001	694	2	0.3	21.0	90.5	98.6	
2002	1078			21.7	88.7	98.7	#
2003	1158	1	0.1	22.9	88.1	98.9	#
2004	1152	1	0.1	22.3	87.7	98.8	#
2005	1161			23.3	87.4	97.8	#
2006	1214			24.5	83.4	97.9	#
2007	1480			22.6	81.7	93.9	# ##
2008	1575			26.0	80.4	89.0	
2009	1576			24.9	77.0	88.8	
2010	1594			26.0	74.0	87.7	
2011	1615			25.5	68.7	88.0	
2012	1293			27.8	50.7	97.4	###
1998-2012	17555	6	0.0	23.7	80.0	94.4	

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	619	425	194	68.7
1999	683	473	210	69.3
2000	663	463	200	69.8
2001	694	490	204	70.6
2002	1078	736	342	68.3
2003	1158	766	392	66.1
2004	1152	770	382	66.8
2005	1161	779	382	67.1
2006	1214	813	401	67.0
2007	1480	973	507	65.7
2008	1575	1029	546	65.3
2009	1576	1010	566	64.1
2010	1594	1011	583	63.4
2011	1615	1011	604	62.6
2012	1293	789	504	61.0
1998-2012	17555	11538	6017	65.7

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	425	194	38.4	16.5	23.6	8.7	34.2	12.4	41.9	14.9
1999	473	210	42.3	17.7	26.1	9.2	37.5	13.2	45.9	16.3
2000	463	200	40.7	16.6	24.8	9.3	35.6	13.0	43.0	15.3
2001	490	204	42.3	16.8	26.0	9.2	37.1	12.9	44.8	15.3
2002	736	342	39.5	17.5	23.0	9.3	33.4	13.3	41.9	15.8
2003	766	392	40.9	19.9	23.4	10.6	34.1	15.0	42.0	17.8
2004	770	382	40.9	19.3	22.7	10.2	33.4	14.3	41.9	17.1
2005	779	382	41.1	19.2	22.7	10.3	32.9	14.5	40.9	16.8
2006	813	401	42.5	20.0	23.0	10.2	33.6	14.5	41.9	17.3
2007	973	507	43.9	22.0	23.2	11.6	34.1	16.3	44.1	19.3
2008	1029	546	46.2	23.5	24.1	12.3	35.4	17.4	44.9	20.5
2009	1010	566	45.3	24.3	24.0	12.2	34.9	17.3	43.0	20.7
2010	1011	583	44.9	24.9	23.2	12.6	33.7	17.8	42.1	21.2
2011	1011	604	44.3	25.6	22.7	12.4	33.0	17.7	41.3	21.2
2012	789	504	34.5	21.4	17.2	10.3	25.3	14.7	32.7	17.8
1998-2012	11538	6017	42.0	21.0	23.0	10.7	33.4	15.2	41.8	18.1

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	619	65.3	10.4	28.1	91.7	51.7	57.8	65.5	73.3	78.0
1999	683	65.6	10.3	32.0	93.0	51.8	58.3	66.5	73.0	78.5
2000	663	64.7	10.7	15.8	88.6	51.1	57.8	65.1	72.7	78.3
2001	694	65.0	10.9	17.0	93.6	50.3	58.5	65.5	72.4	78.3
2002	1078	66.1	10.8	14.1	91.7	52.0	59.2	66.5	74.3	79.4
2003	1158	66.4	10.4	17.5	95.0	52.7	59.4	66.9	73.9	79.5
2004	1152	66.6	10.6	24.4	92.2	53.1	59.7	66.6	74.8	80.2
2005	1161	66.2	10.8	18.1	92.7	52.6	59.5	66.6	74.2	79.5
2006	1214	66.9	10.5	27.5	92.7	53.4	60.3	67.1	74.7	80.3
2007	1480	67.1	11.0	7.5	97.2	53.1	60.5	67.8	75.4	80.6
2008	1575	67.5	10.6	22.3	95.7	53.8	60.9	68.3	75.1	80.3
2009	1576	67.3	10.6	20.3	95.2	53.6	60.5	68.1	74.6	80.9
2010	1594	67.5	10.5	3.5	97.8	53.7	61.1	68.5	75.0	80.3
2011	1615	67.8	10.9	22.2	94.7	53.1	60.8	68.8	75.5	81.7
2012	1293	68.7	10.8	18.5	96.6	54.1	62.4	69.7	76.5	82.2
1998-2012	17555	66.9	10.7	3.5	97.8	52.8	60.0	67.5	74.6	80.3

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	425	64.9	9.8	28.1	91.7	52.6	58.1	64.8	72.2	77.0
1999	473	65.0	9.9	32.0	90.6	52.1	58.2	65.7	72.2	77.7
2000	463	64.7	10.0	28.1	88.6	52.1	58.3	64.9	71.7	77.9
2001	490	65.0	10.2	17.0	93.6	52.0	59.0	65.4	71.6	77.7
2002	736	66.3	10.3	14.1	91.7	52.5	60.1	66.4	73.9	79.4
2003	766	66.7	9.6	36.8	93.5	53.8	60.3	66.8	73.6	78.9
2004	770	67.1	10.1	35.7	92.2	54.0	60.5	67.0	74.6	80.2
2005	779	66.9	10.3	18.1	92.7	54.4	61.0	67.3	74.3	79.3
2006	813	67.2	9.9	28.7	92.1	54.1	61.2	67.2	74.5	79.5
2007	973	68.0	10.4	7.5	94.1	54.7	61.9	68.4	75.8	80.6
2008	1029	68.2	10.1	22.3	93.9	55.0	61.9	68.9	75.3	80.4
2009	1010	67.7	10.1	25.6	93.1	55.1	60.9	68.2	74.5	80.5
2010	1011	67.9	10.4	3.5	93.2	54.2	61.7	69.2	75.0	80.2
2011	1011	67.8	10.6	28.1	91.2	53.4	61.2	69.3	75.3	81.3
2012	789	69.2	10.5	27.0	96.6	55.6	63.5	70.1	77.0	82.3
1998-2012	11538	67.2	10.3	3.5	96.6	53.9	60.7	67.7	74.5	80.0

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	194	66.0	11.6	35.8	89.6	50.3	57.1	66.8	75.3	80.6
1999	210	66.9	11.3	32.9	93.0	51.2	58.5	68.6	76.1	79.5
2000	200	64.7	12.3	15.8	87.6	49.2	56.0	66.5	74.0	78.7
2001	204	65.1	12.4	24.4	92.6	48.0	56.7	66.6	74.5	80.4
2002	342	65.6	11.8	27.5	89.7	50.7	57.6	67.2	75.1	79.5
2003	392	65.9	11.7	17.5	95.0	51.3	57.5	67.2	74.4	80.3
2004	382	65.6	11.5	24.4	92.1	50.5	57.9	65.3	74.9	80.2
2005	382	64.8	11.6	21.6	89.3	50.5	56.7	65.3	73.6	79.8
2006	401	66.4	11.6	27.5	92.7	51.7	59.1	66.1	75.2	81.6
2007	507	65.5	11.9	22.0	97.2	50.1	57.3	65.9	74.6	80.6
2008	546	66.0	11.4	29.4	95.7	51.7	58.7	66.3	74.3	80.2
2009	566	66.8	11.5	20.3	95.2	51.8	59.6	68.1	74.9	81.5
2010	583	66.9	10.7	33.2	97.8	52.7	60.1	67.2	74.9	80.5
2011	604	67.9	11.4	22.2	94.7	51.9	59.9	68.0	76.0	82.8
2012	504	67.8	11.2	18.5	91.8	52.5	60.7	68.8	76.1	81.6
1998-2012	6017	66.3	11.5	15.8	97.8	51.1	58.5	67.0	75.0	80.9

Table 4

Age distribution by 5-year age group and gender for period 1998-2012 (incl. DCO)

Age at diagnosis 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	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	8	0.0	0.1	5	0.0	0.1	3	0.0	0.0
20-24	10	0.1	0.1	3	0.0	0.1	7	0.1	0.2
25-29	23	0.1	0.3	13	0.1	0.2	10	0.2	0.3
30-34	41	0.2	0.5	16	0.1	0.3	25	0.4	0.7
35-39	121	0.7	1.2	67	0.6	0.9	54	0.9	1.6
40-44	293	1.7	2.8	157	1.4	2.3	136	2.3	3.9
45-49	636	3.6	6.5	365	3.2	5.5	271	4.5	8.4
50-54	1215	6.9	13.4	720	6.2	11.7	495	8.2	16.6
55-59	2045	11.6	25.0	1331	11.5	23.2	714	11.9	28.5
60-64	2755	15.7	40.7	1865	16.2	39.4	890	14.8	43.3
65-69	3274	18.6	59.4	2251	19.5	58.9	1023	17.0	60.3
70-74	2937	16.7	76.1	2047	17.7	76.6	890	14.8	75.1
75-79	2354	13.4	89.5	1552	13.5	90.1	802	13.3	88.4
80-84	1359	7.7	97.3	865	7.5	97.6	494	8.2	96.6
85+	481	2.7	100.0	278	2.4	100.0	203	3.4	100.0
All ages	17555	100.0		11538	100.0		6017	100.0	

Included in the statistics are 29.3% multiple primaries in males and 27.7% in females.

Table 5

Age-specific incidence, DCO rate and proportion of all cancers
for period 1998-2012

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=5 %	Females DCO rate n=1 %	Males Prop.all cancers n=146755 %	Females Prop.all cancers n=142297 %
0- 4	1		0.1	0.0			0.3	
5- 9	1		0.1	0.0			0.6	
10-14	1		0.1	0.0			0.7	
15-19	5	3	0.4	0.2			1.6	1.1
20-24	3	7	0.2	0.4			0.5	1.4
25-29	13	10	0.7	0.5			1.5	1.0
30-34	16	25	0.8	1.2			1.1	1.3
35-39	67	54	2.9	2.4			3.2	1.5
40-44	157	135	6.5	5.9			5.2	2.3
45-49	362	271	16.8	12.8			7.3	3.4
50-54	717	494	38.8	26.2			8.9	4.9
55-59	1328	709	78.1	39.8	0.1		9.8	5.5
60-64	1854	881	112.5	50.6	0.1		9.1	5.5
65-69	2239	1022	152.6	63.7			8.7	5.8
70-74	2037	885	175.8	64.2	0.1	0.1	8.3	5.2
75-79	1542	800	204.7	73.1	0.1		8.2	4.9
80-84	861	494	189.6	57.2			6.9	3.3
85+	278	203	89.6	24.8			3.0	1.3
All ages	11482	5993			0.0	0.0	7.8	4.2
Incidence								
Raw			41.8	20.9				
WS			22.8	10.7				
ES			33.3	15.2				
BRD-S			41.6	18.1				

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 1998-2012
MALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C00	Lip	2	0.2	8.0	1.0	28.9		1.3	50.0
C03-C06	Oral cavity	12	2.0	5.9	3.1	10.4	#	7.3	25.0
C09-C10	Oropharynx	22	2.6	8.6	5.4	13.0	#	14.3	9.1
C12-C13	Hypopharynx	11	1.5	7.5	3.8	13.5	#	7.0	9.1
C15	Oesophagus	23	4.2	5.5	3.5	8.3	#	13.8	4.3
C16	Stomach	31	9.5	3.3	2.2	4.7	#	15.8	12.9
C17	Small intestine	4	1.1	3.7	1.0	9.4		2.1	
C18	Colon	40	22.8	1.8	1.3	2.4	#	12.7	20.0
C19-C20	Rectum	24	13.2	1.8	1.2	2.7	#	7.9	8.3
C22	Liver	23	6.4	3.6	2.3	5.4	#	12.2	21.7
C23-C24	Bile	3	2.2	1.4	0.3	4.1		0.6	33.3
C25	Pancreas	21	7.9	2.7	1.6	4.1	#	9.6	33.3
C32	Larynx	24	2.5	9.4	6.0	14.0	#	15.8	16.7
C33-C34	Lung	113	28.0	4.0	3.3	4.8	#	62.4	1.8
C43	Malign. melanoma	11	8.8	1.2	0.6	2.2		1.6	
C46,C49	Soft tissue	5	1.2	4.3	1.4	10.0	#	2.8	
C61	Prostate	84	70.6	1.2	0.9	1.5		9.8	16.7
C64	Kidney	26	8.3	3.1	2.1	4.6	#	13.0	23.1
C65	Renal pelvis	7	0.9	7.7	3.1	16.0	#	4.5	
C67	Bladder	30	9.6	3.1	2.1	4.4	#	15.0	13.3
C70-C72	CNS cancer	4	3.1	1.3	0.4	3.3		0.7	25.0
C73	Thyroid	5	1.5	3.3	1.1	7.7	#	2.6	
C76-C79	CUP	4	3.8	1.1	0.3	2.7		0.2	25.0
C82-C85	NHL	22	8.9	2.5	1.5	3.7	#	9.6	18.2
C90	Mult. myeloma	2	2.9	0.7	0.1	2.5		-0.6	50.0
C91-C96	Leukaemia	13	3.5	3.7	2.0	6.4	#	7.0	38.5
Other primaries		10	3.9	2.5	1.2	4.7	#	4.5	40.0
Not observed		0	3.7	0.0	0.0	1.0	#	-2.7	
All mult. primaries		576	234.8	2.5	2.3	2.7	#	250.6	14.1

Patients	8397
Mean age at second malignancy (years)	70.3
Person-years	13618
Mean observation time (years)	1.6
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 1998-2012
FEMALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C09-C10	Oropharynx	3	0.4	7.6	1.6	22.2	#	3.3	
C15	Oesophagus	3	0.5	6.0	1.2	17.6	#	3.2	
C16	Stomach	12	3.0	4.0	2.1	7.1	#	11.4	33.3
C17	Small intestine	2	0.4	4.8	0.6	17.4		2.0	
C18	Colon	22	8.3	2.6	1.7	4.0	#	17.2	13.6
C19-C20	Rectum	5	3.8	1.3	0.4	3.1		1.5	20.0
C22	Liver	3	0.9	3.2	0.7	9.3		2.6	33.3
C23-C24	Bile	2	1.2	1.7	0.2	6.1		1.0	100.0
C25	Pancreas	10	3.6	2.8	1.3	5.1	#	8.1	30.0
C32	Larynx	3	0.2	17.5	3.6	51.3	#	3.6	
C33-C34	Lung	39	6.4	6.1	4.3	8.3	#	41.1	2.6
C43	Malign. melanoma	6	3.1	2.0	0.7	4.3		3.7	16.7
C50	Breast	47	27.2	1.7	1.3	2.3	#	24.9	17.0
C51	Vulva	4	0.8	5.2	1.4	13.2	#	4.1	
C53	Cervix uteri	6	1.2	5.1	1.9	11.1	#	6.1	33.3
C54	Corpus uteri	7	5.1	1.4	0.6	2.8		2.4	14.3
C55,C57	Fem. genitals un	2	0.2	12.8	1.5	46.2	#	2.3	100.0
C56	Ovary	8	3.7	2.1	0.9	4.2		5.4	25.0
C57.9	Fem. urogen.	2	0.0	219.8	26.6	793.8	#	2.5	
C64	Kidney	7	2.2	3.2	1.3	6.5	#	6.0	42.9
C65	Renal pelvis	3	0.3	11.7	2.4	34.1	#	3.5	
C67	Bladder	3	1.5	2.0	0.4	6.0		1.9	33.3
C70-C72	CNS cancer	3	1.3	2.4	0.5	6.9		2.2	66.7
C73	Thyroid	7	1.7	4.2	1.7	8.6	#	6.7	14.3
C76-C79	CUP	3	1.4	2.2	0.4	6.3		2.0	
C82-C85	NHL	6	3.3	1.8	0.7	4.0		3.4	16.7
C90	Mult. myeloma	2	1.1	1.9	0.2	6.8		1.2	50.0
C91-C96	Leukaemia	3	1.3	2.3	0.5	6.7		2.1	66.7
Other primaries		7	1.2	6.0	2.4	12.4	#	7.4	14.3
Not observed		0	2.5	0.0	0.0	1.5		-3.1	
All mult. primaries		230	87.5	2.6	2.3	3.0	#	179.7	18.7

Patients	4285
Mean age at second malignancy (years)	68.7
Person-years	7929
Mean observation time (years)	1.9
Median observation time (years)	0.9

The occurrence of second malignancy is statistically significant.

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

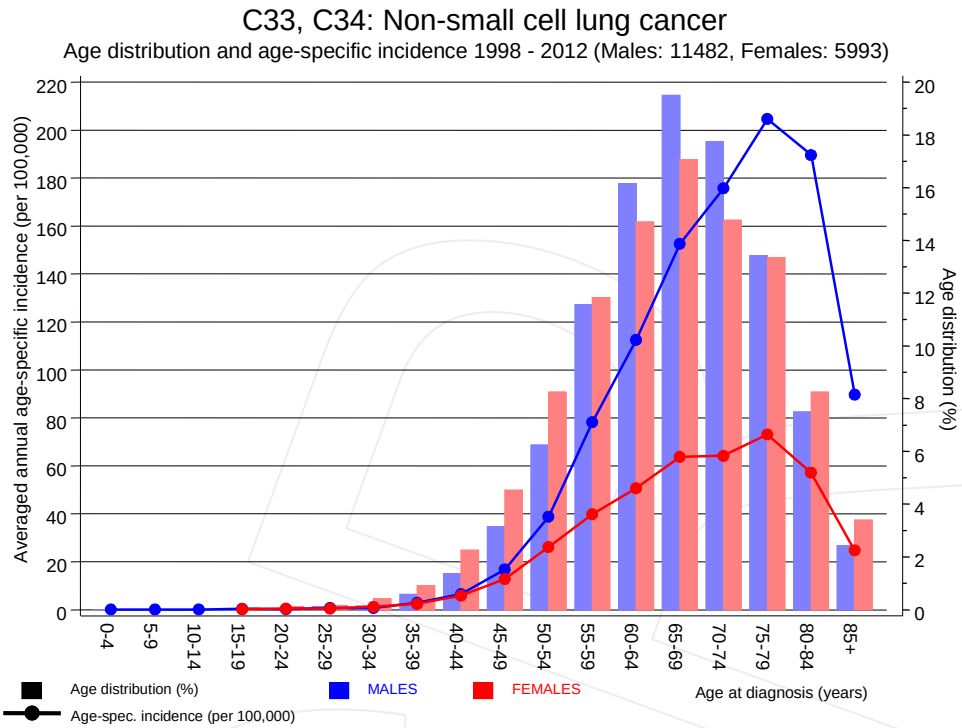


Figure 7. Age distribution and age-specific incidence

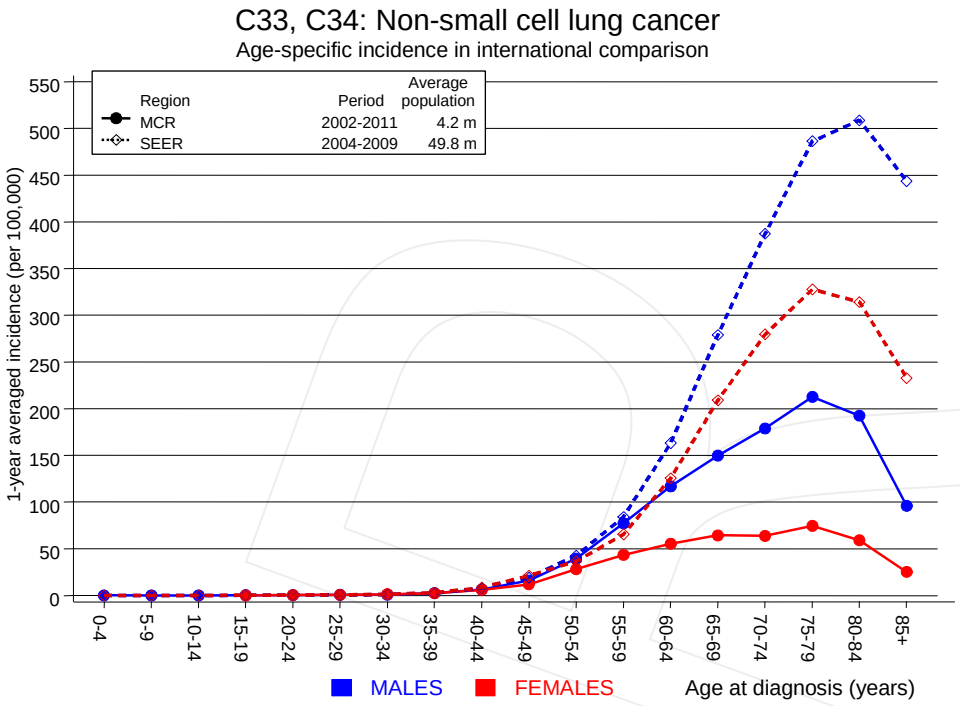


Figure 7a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 18 Regs Research Data, released April 2012, based on the November 2011 submission. http://www.seer.cancer.gov.

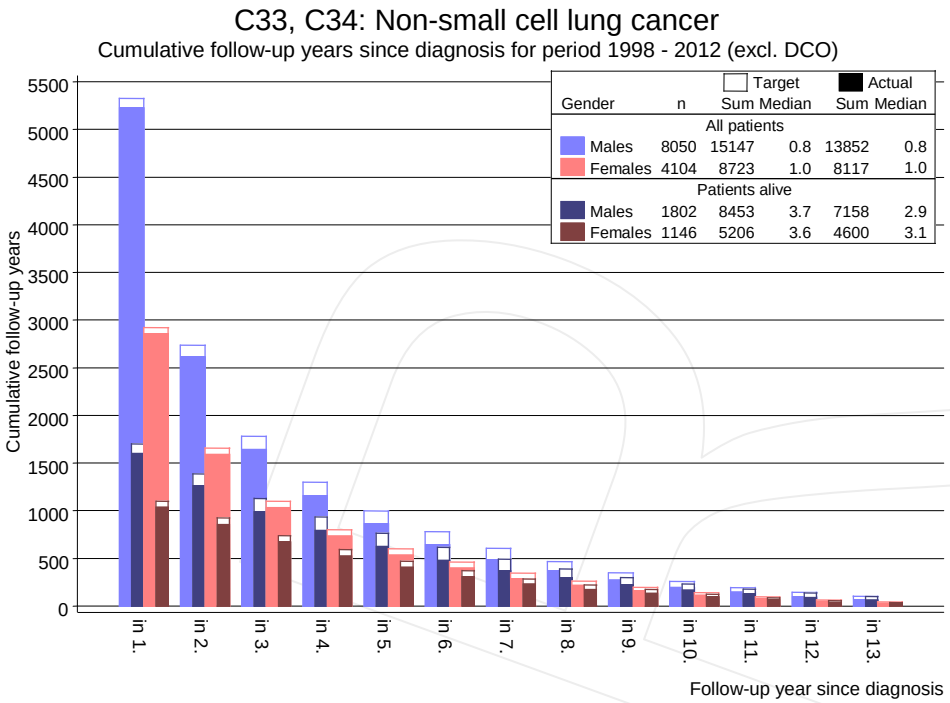
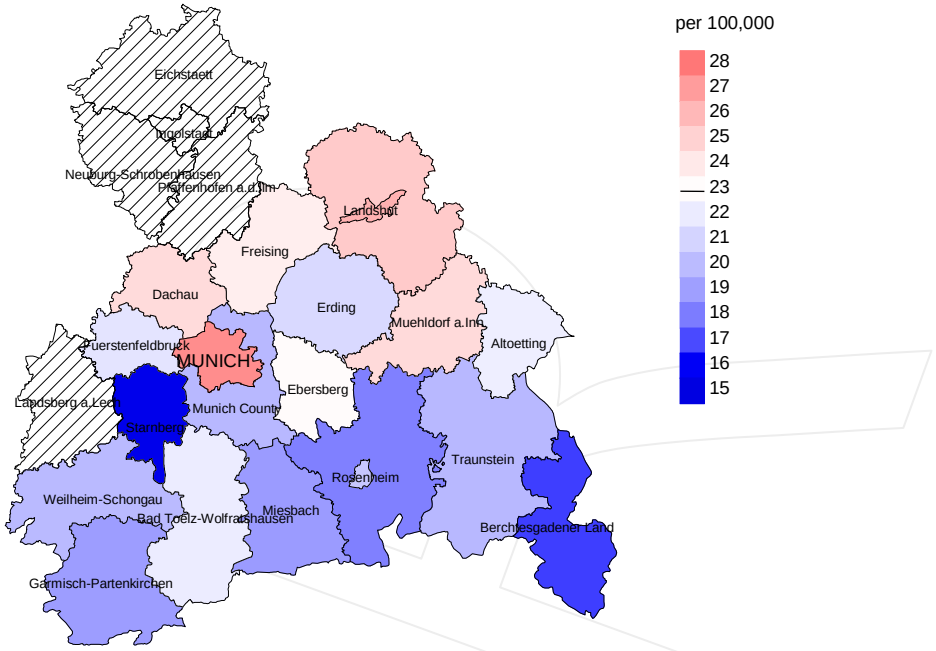


Figure 8. Cumulative follow-up years depending on time since diagnosis

The increase of the lost to follow-up rate can be interpreted as a consequence of a declining number of survivors over time.

Average incidence (world standard population) 2003 - 2008: Males



Average incidence (world standard population) 2003 - 2008: Females

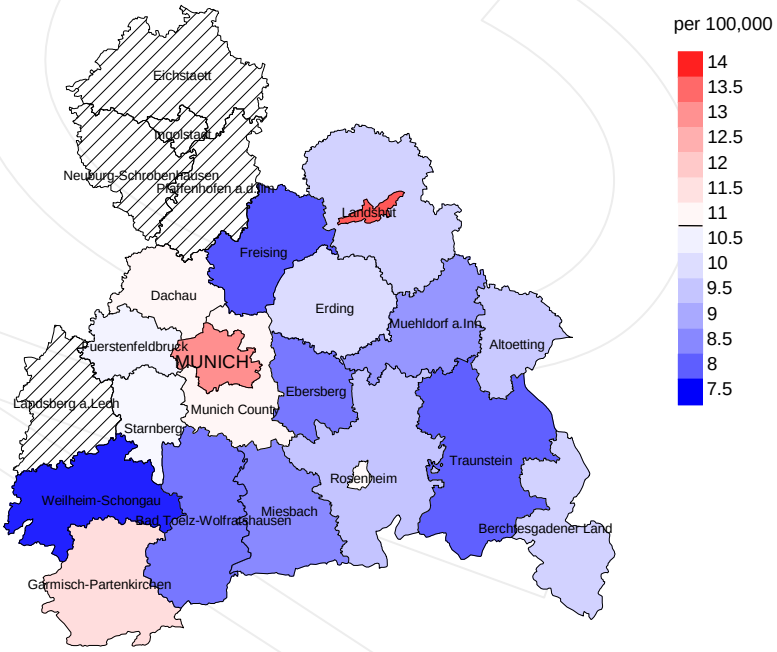
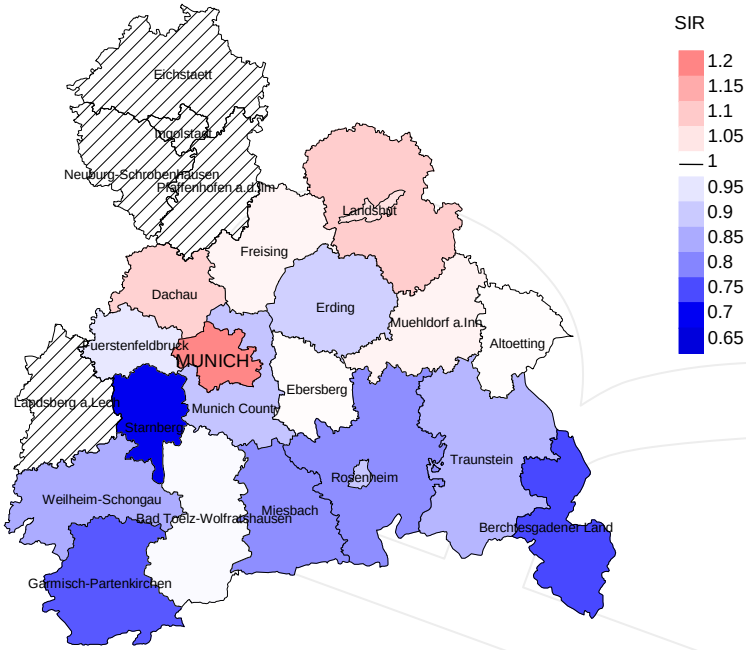


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 22.9/100,000 WS N=4,846, females 10.8/100,000 WS N=2,491). 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 58 women were identified with newly diagnosed non-small cell LC. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 8.3/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 5.6 and 11.8/100,000.

Standardized incidence ratio (SIR) 2003 - 2008: Males



Standardized incidence ratio (SIR) 2003 - 2008: Females

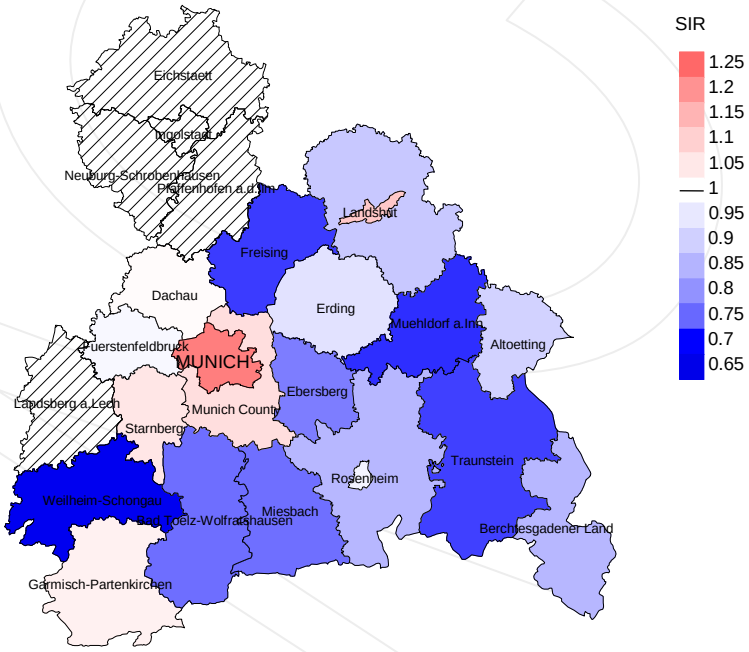


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=4,846, females N=2,491). 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 58 women were identified with newly diagnosed non-small cell LC. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.77. Though, the value of this parameter may vary with an underlying probability of 99% between 0.54 and 1.08, 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	619	99.4		564	91.1	91.0
1999	683	98.5	0.3	614	89.9	93.2
2000	663	98.5		586	88.4	94.4
2001	694	98.6	0.3	628	90.5	93.6
2002	1078	98.7		956	88.7	97.1
2003	1158	98.9	0.1	1020	88.1	96.8
2004	1152	98.8	0.1	1010	87.7	97.7
2005	1161	97.8		1015	87.4	98.2
2006	1214	97.9		1013	83.4	98.4
2007	1480	93.9		1209	81.7	98.5
2008	1575	89.0		1266	80.4	99.4
2009	1576	88.8		1214	77.0	99.1
2010	1594	87.7		1179	74.0	98.4
2011	1615	88.0		1109	68.7	97.7
2012	1293	97.4		655	50.7	95.6
1998-2012	17555	94.4	0.0	14038	80.0	97.2

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	619	498	89.6	202	32.6
1999	683	521	92.7	205	30.0
2000	663	553	92.8	210	31.7
2001	694	567	92.2	215	31.0
2002	1078	855	97.2	348	32.3
2003	1158	977	97.0	400	34.5
2004	1152	1008	97.3	375	32.6
2005	1161	1001	97.6	403	34.7
2006	1214	1062	97.5	389	32.0
2007	1480	1177	98.4	461	31.1
2008	1575	1239	98.8	481	30.5
2009	1576	1299	99.2	477	30.3
2010	1594	1381	99.0	506	31.7
2011	1615	1413	99.2	543	33.6
2012	1293	1313	98.9	432	33.4
1998-2012	17555	14864	97.4	5647	32.2

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	498	84.7	15.3	95.7
1999	521	89.1	10.9	96.1
2000	553	90.6	9.4	97.7
2001	567	88.4	11.6	96.0
2002	855	91.7	8.3	95.7
2003	977	92.4	7.6	96.6
2004	1008	94.1	5.9	97.1
2005	1001	92.3	7.7	95.9
2006	1062	92.0	8.0	96.6
2007	1177	93.2	6.8	96.7
2008	1239	93.7	6.3	96.5
2009	1299	93.1	6.9	96.7
2010	1381	92.8	7.2	96.6
2011	1413	93.2	6.8	95.8
2012	1313	92.1	7.9	95.8
1998-2012	14864	92.2	7.8	96.4

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	348	66.9	66.5	69.4	67.1
1999	367	67.4	67.2	69.2	67.6
2000	385	66.6	66.4	68.7	66.7
2001	401	67.1	66.7	70.0	67.4
2002	609	67.6	67.1	72.3	67.4
2003	694	67.8	67.5	71.3	67.7
2004	699	68.4	68.3	70.5	68.4
2005	682	69.1	68.7	73.3	69.0
2006	742	69.7	69.6	70.8	69.6
2007	802	69.3	68.9	74.1	69.2
2008	843	69.2	68.7	76.1	68.9
2009	892	70.1	69.7	74.3	69.8
2010	897	70.1	69.6	75.5	69.9
2011	927	70.2	69.8	75.1	69.8
2012	828	70.5	69.8	78.1	70.2
1998-2012	10116	69.0	68.7	73.0	68.9

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	150	66.2	66.4	64.8	67.2
1999	154	68.5	68.3	69.9	68.7
2000	168	67.0	66.5	74.8	67.1
2001	166	68.5	67.8	74.4	68.1
2002	246	66.9	66.6	71.4	66.7
2003	283	67.7	67.5	70.8	67.4
2004	309	68.6	67.9	77.4	68.2
2005	319	67.2	66.7	76.9	67.1
2006	320	68.7	68.4	73.5	68.3
2007	375	68.6	68.1	76.9	68.2
2008	396	69.0	68.4	78.7	68.5
2009	407	67.7	67.1	79.8	67.4
2010	484	69.2	68.9	75.3	68.9
2011	486	69.9	69.5	77.4	69.8
2012	485	70.4	70.1	76.7	70.1
1998-2012	4748	68.6	68.2	74.8	68.4

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	292	26.4	0.69	16.1	0.68	23.6	0.69	29.9	0.71
1999	328	29.3	0.69	17.5	0.67	26.1	0.70	34.1	0.74
2000	344	30.2	0.75	18.1	0.73	26.6	0.75	33.4	0.78
2001	353	30.5	0.72	18.1	0.70	26.6	0.72	33.4	0.75
2002	552	29.6	0.75	16.9	0.74	24.8	0.74	31.6	0.76
2003	638	34.0	0.84	19.2	0.82	28.1	0.83	35.4	0.85
2004	661	35.1	0.86	19.1	0.85	28.5	0.86	36.7	0.88
2005	619	32.7	0.80	17.2	0.76	25.6	0.78	33.1	0.81
2006	678	35.4	0.84	18.2	0.79	27.4	0.82	35.8	0.86
2007	742	33.5	0.77	17.2	0.75	25.7	0.76	33.7	0.77
2008	787	35.4	0.77	18.2	0.76	27.0	0.77	35.0	0.79
2009	821	36.8	0.82	18.3	0.77	27.4	0.79	35.6	0.83
2010	818	36.3	0.82	17.9	0.78	26.7	0.80	34.4	0.82
2011	856	37.5	0.85	18.3	0.81	27.3	0.83	35.5	0.86
2012	753	33.0	0.96	16.1	0.94	23.8	0.94	31.1	0.95
1998-2012	9242	33.7	0.80	17.8	0.78	26.4	0.79	34.1	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	130	11.1	0.67	5.8	0.66	8.2	0.66	9.8	0.66
1999	136	11.5	0.65	5.6	0.61	8.2	0.63	10.4	0.64
2000	157	13.1	0.79	6.8	0.74	9.7	0.75	11.8	0.78
2001	149	12.2	0.73	6.2	0.67	9.0	0.70	11.0	0.72
2002	232	11.8	0.68	6.0	0.65	8.6	0.65	10.5	0.67
2003	265	13.5	0.68	6.7	0.64	9.8	0.65	11.9	0.67
2004	288	14.6	0.76	7.1	0.70	10.3	0.72	12.9	0.76
2005	305	15.3	0.80	7.8	0.76	11.1	0.77	13.3	0.79
2006	299	14.9	0.75	7.1	0.69	10.3	0.71	12.6	0.73
2007	355	15.4	0.71	7.5	0.66	10.9	0.67	13.2	0.69
2008	374	16.1	0.69	7.6	0.63	11.1	0.65	13.6	0.67
2009	388	16.7	0.69	8.3	0.68	11.8	0.68	14.0	0.68
2010	463	19.8	0.80	9.2	0.74	13.2	0.75	16.3	0.78
2011	461	19.5	0.76	9.0	0.72	12.9	0.73	15.9	0.75
2012	456	19.3	0.91	8.5	0.83	12.5	0.85	15.5	0.88
1998-2012	4458	15.5	0.74	7.4	0.70	10.8	0.71	13.2	0.73

Table 13

Age distribution of age at death (cancer-related) for period 1998-2012
(**incl. multiple primaries**)

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
15-19	1	0.0	0.0	1	0.0	0.0			0.0
20-24	4	0.0	0.0	4	0.0	0.1			0.0
25-29	6	0.0	0.1	3	0.0	0.1	3	0.1	0.1
30-34	5	0.0	0.1	3	0.0	0.1	2	0.0	0.1
35-39	64	0.5	0.6	35	0.4	0.5	29	0.6	0.8
40-44	176	1.3	1.8	86	0.9	1.4	90	2.0	2.8
45-49	408	2.9	4.8	246	2.6	4.0	162	3.6	6.4
50-54	805	5.8	10.6	492	5.3	9.3	313	7.0	13.3
55-59	1402	10.1	20.7	915	9.8	19.1	487	10.8	24.1
60-64	2036	14.7	35.4	1434	15.3	34.4	602	13.4	37.5
65-69	2475	17.9	53.3	1752	18.7	53.1	723	16.1	53.6
70-74	2441	17.6	70.9	1718	18.4	71.5	723	16.1	69.6
75-79	2100	15.2	86.0	1436	15.3	86.8	664	14.8	84.4
80-84	1363	9.8	95.9	899	9.6	96.4	464	10.3	94.7
85+	571	4.1	100.0	333	3.6	100.0	238	5.3	100.0
All ages	13857	100.0		9357	100.0		4500	100.0	

Included in the statistics are 29.3% multiple primaries in males and 27.7% in females.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2012
(**incl. multiple primaries**)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4			0.0		0.0			
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19	1		0.1	0.20	0.0		2.4	
20-24	4		0.2	1.33	0.0		4.8	
25-29	3	3	0.2	0.23	0.2	0.30	3.1	2.8
30-34	3	2	0.1	0.19	0.1	0.08	1.7	0.9
35-39	35	29	1.5	0.52	1.3	0.54	9.1	5.8
40-44	86	90	3.5	0.55	3.9	0.66	10.6	8.4
45-49	246	162	11.4	0.67	7.7	0.60	14.5	8.6
50-54	492	313	26.6	0.68	16.6	0.63	16.0	10.9
55-59	915	487	53.8	0.69	27.3	0.68	16.5	11.0
60-64	1434	602	87.0	0.77	34.6	0.68	17.2	10.0
65-69	1752	723	119.4	0.78	45.1	0.71	15.6	9.4
70-74	1718	723	148.3	0.84	52.4	0.81	13.9	8.0
75-79	1436	664	190.6	0.93	60.7	0.83	11.9	6.7
80-84	899	464	198.0	1.04	53.7	0.94	9.1	4.4
85+	333	238	107.4	1.20	29.1	1.17	4.1	1.9
All ages	9357	4500					12.6	6.7
Mortality								
Raw			34.1	0.81	15.7	0.75		
WS			18.0	0.78	7.5	0.70		
ES			26.7	0.80	10.9	0.71		
BRD-S			34.6	0.83	13.3	0.73		
PYLL-70								
per 100,000			180.5		102.5			
ES			158.8		87.7			
AYLL-70			9.0		10.4			

The rates underestimate the prognosis if other synchronous cancers are prognostic unfavorable.

Table 15a

Multiple primaries in deaths in period 1998-2012
MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	99	3.8	82	82.8	5	5.1	12	12.1
C09-C10 Oropharynx	80	3.1	54	67.5	7	8.8	19	23.8
C12-C13 Hypopharynx	45	1.7	28	62.2	8	17.8	9	20.0
C15 Oesophagus	63	2.4	22	34.9	21	33.3	20	31.7
C16 Stomach	93	3.5	42	45.2	20	21.5	31	33.3
C18 Colon	210	8.0	135	64.3	30	14.3	45	21.4
C19-C20 Rectum	114	4.3	78	68.4	18	15.8	18	15.8
C22 Liver	33	1.3	10	30.3	8	24.2	15	45.5
C25 Pancreas	39	1.5	8	20.5	9	23.1	22	56.4
C32 Larynx	121	4.6	84	69.4	14	11.6	23	19.0
C33-C34 Lung	184	7.0			58	31.5	126	68.5
C43 Malign. melanoma	80	3.1	66	82.5	7	8.8	7	8.8
C44 Skin others	154	5.9	105	68.2	22	14.3	27	17.5
C61 Prostate	492	18.8	394	80.1	29	5.9	69	14.0
C62 Testis	26	1.0	23	88.5	1	3.8	2	7.7
C64 Kidney	93	3.5	57	61.3	16	17.2	20	21.5
C67 Bladder	309	11.8	241	78.0	20	6.5	48	15.5
C70-C72 CNS cancer	31	1.2	17	54.8	5	16.1	9	29.0
C76-C79 CUP	31	1.2	19	61.3	7	22.6	5	16.1
C81 Hodgkin lymphoma	27	1.0	27	100.0				
C82-C85 NHL	93	3.5	62	66.7	15	16.1	16	17.2
C90 Mult. myeloma	22	0.8	10	45.5	6	27.3	6	27.3
C91-C96 Leukaemia	35	1.3	17	48.6	6	17.1	12	34.3
Other primaries	147	5.6	92	62.6	17	11.6	38	25.9
All mult. primaries	2621	100.0	1673	63.8	349	13.3	599	22.9

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 1998-2012
FEMALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	27	2.2	25	92.6	2	7.4		
C09-C10 Oropharynx	11	0.9	8	72.7	1	9.1	2	18.2
C16 Stomach	31	2.5	14	45.2	5	16.1	12	38.7
C18 Colon	95	7.8	66	69.5	9	9.5	20	21.1
C19-C20 Rectum	22	1.8	17	77.3	1	4.5	4	18.2
C21 Anus/canal	12	1.0	10	83.3			2	16.7
C25 Pancreas	28	2.3	9	32.1	4	14.3	15	53.6
C32 Larynx	11	0.9	6	54.5	2	18.2	3	27.3
C33-C34 Lung	67	5.5			19	28.4	48	71.6
C43 Malign. melanoma	30	2.5	27	90.0			3	10.0
C44 Skin others	45	3.7	27	60.0	4	8.9	14	31.1
C50 Breast	323	26.5	263	81.4	24	7.4	36	11.1
C51 Vulva	17	1.4	13	76.5	2	11.8	2	11.8
C53 Cervix uteri	69	5.7	57	82.6	6	8.7	6	8.7
C54 Corpus uteri	65	5.3	56	86.2	2	3.1	7	10.8
C55,C57 Fem. genitals un	10	0.8	8	80.0	1	10.0	1	10.0
C56 Ovary	30	2.5	19	63.3	3	10.0	8	26.7
C64 Kidney	33	2.7	21	63.6	4	12.1	8	24.2
C67 Bladder	51	4.2	40	78.4	3	5.9	8	15.7
C70-C72 CNS cancer	44	3.6	20	45.5	9	20.5	15	34.1
C73 Thyroid	23	1.9	15	65.2	5	21.7	3	13.0
C76-C79 CUP	17	1.4	8	47.1	3	17.6	6	35.3
C81 Hodgkin lymphoma	11	0.9	10	90.9	1	9.1		
C82-C85 NHL	44	3.6	38	86.4	2	4.5	4	9.1
C90 Mult. myeloma	14	1.1	4	28.6	3	21.4	7	50.0
C91-C96 Leukaemia	18	1.5	7	38.9	3	16.7	8	44.4
Other primaries	73	6.0	38	52.1	11	15.1	24	32.9
All mult. primaries	1221	100.0	826	67.6	129	10.6	266	21.8

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 1998-2012
(**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		0.1	0.25	0.0		2.6	
20-24	4		0.2	1.33	0.0		5.1	
25-29	2	3	0.1	0.17	0.2	0.30	2.2	2.9
30-34	3	2	0.1	0.19	0.1	0.09	1.7	1.1
35-39	34	25	1.5	0.54	1.1	0.49	9.5	5.6
40-44	80	82	3.3	0.55	3.6	0.67	10.7	8.8
45-49	228	144	10.6	0.69	6.8	0.59	14.9	8.9
50-54	434	277	23.5	0.67	14.7	0.65	16.2	11.4
55-59	805	419	47.4	0.70	23.5	0.70	16.8	11.1
60-64	1206	490	73.2	0.77	28.2	0.70	17.2	9.9
65-69	1422	575	96.9	0.79	35.9	0.72	15.6	9.2
70-74	1374	557	118.6	0.88	40.4	0.81	14.0	7.8
75-79	1069	541	141.9	0.94	49.5	0.85	11.6	6.8
80-84	641	352	141.2	1.10	40.8	0.94	8.6	4.2
85+	232	186	74.8	1.21	22.7	1.16	3.8	1.8
All ages	7535	3653					12.7	6.7
Mortality								
Raw			27.5	0.82	12.7	0.76		
WS			14.7	0.79	6.2	0.71		
ES			21.7	0.80	8.9	0.72		
BRD-S			27.6	0.83	10.9	0.74		
PYLL-70								
per 100,000			158.0		88.4			
ES			139.3		75.9			
AYLL-70			9.3		10.8			

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2012
(**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	1		0.1	0.25	0.0		2.6	
20-24	3		0.2	1.50	0.0		4.1	
25-29	2	3	0.1	0.17	0.2	0.30	2.4	3.1
30-34	3	2	0.1	0.19	0.1	0.09	1.8	1.2
35-39	33	25	1.4	0.53	1.1	0.51	9.6	6.1
40-44	80	81	3.3	0.56	3.5	0.69	11.3	9.4
45-49	225	140	10.4	0.69	6.6	0.59	15.7	9.6
50-54	423	273	22.9	0.68	14.5	0.66	17.3	12.6
55-59	791	400	46.5	0.71	22.5	0.69	18.1	11.9
60-64	1153	471	70.0	0.78	27.1	0.71	18.6	10.9
65-69	1341	537	91.4	0.79	33.5	0.72	17.0	10.1
70-74	1295	524	111.8	0.87	38.0	0.80	15.7	8.7
75-79	979	511	129.9	0.92	46.7	0.84	13.1	7.7
80-84	587	326	129.3	1.04	37.7	0.91	9.9	4.7
85+	218	178	70.3	1.17	21.7	1.12	4.4	2.0
All ages	7134	3471					14.2	7.4
Mortality								
Raw			26.0	0.81	12.1	0.75		
WS			14.0	0.79	5.9	0.71		
ES			20.6	0.80	8.5	0.72		
BRD-S			26.0	0.83	10.3	0.74		
PYLL-70								
per 100,000			153.5		85.7			
ES			135.4		73.7			
AYLL-70			9.4		10.9			

* See corresponding tables with multiple primaries.

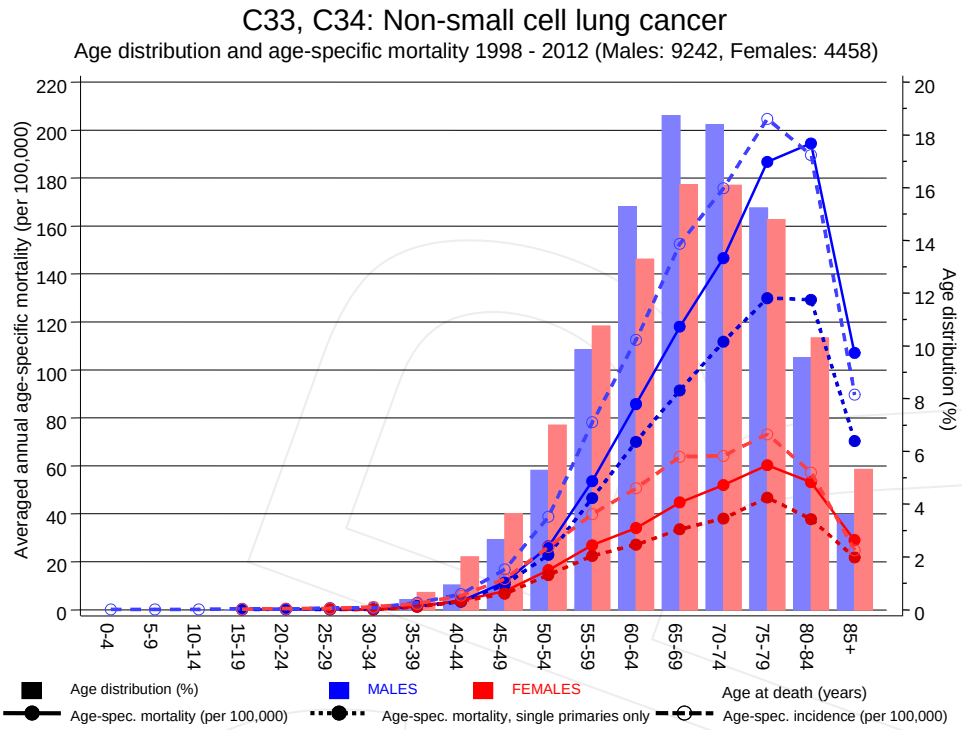
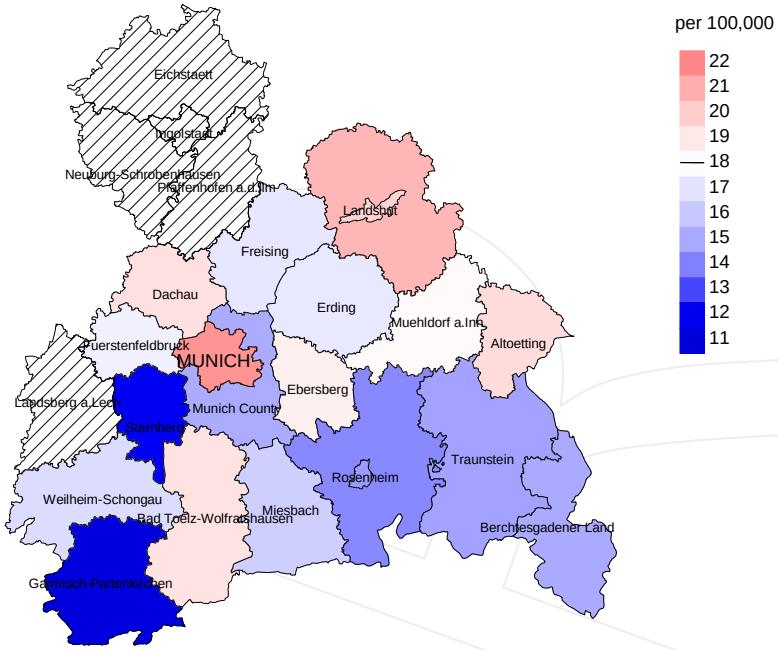


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

The difference between age at diagnosis (Table 3) and age at non-small cell LC-related death (see Table 10) should be considered.

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



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

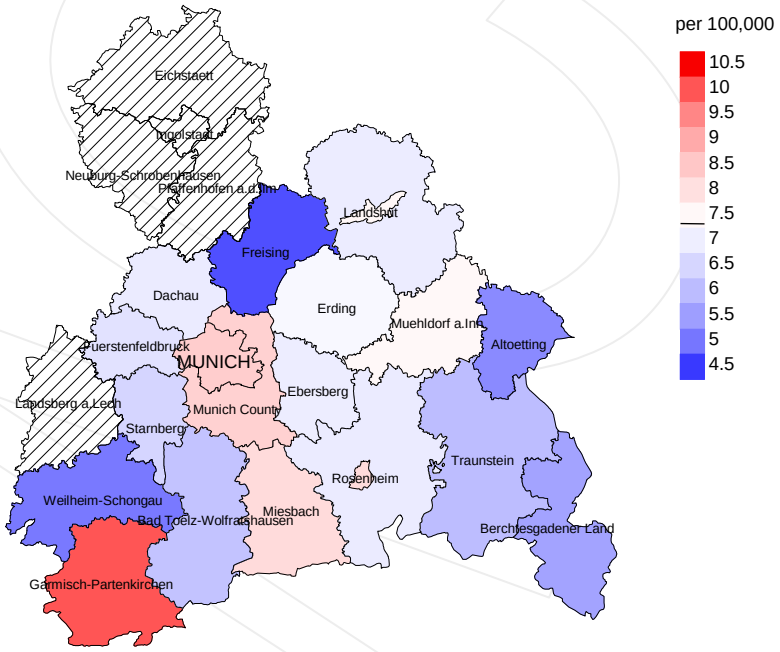
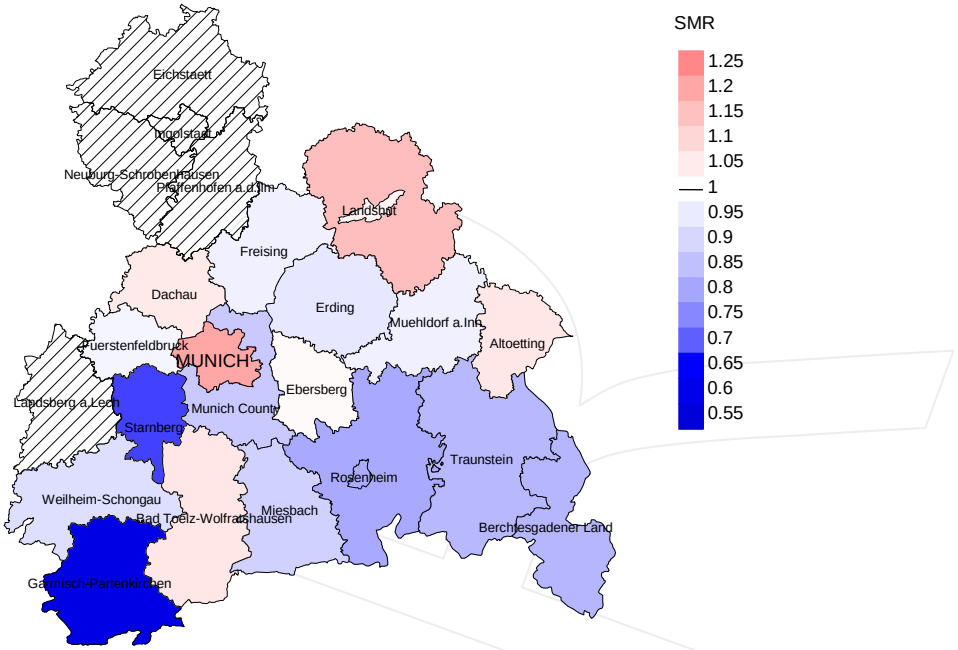


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 18.1/100,000 WS N=3,935, females 7.3/100,000 WS N=1,816). 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 50 women died from non-small cell LC. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 7.0/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 4.5 and 10.3/100,000.

Standardized mortality ratio (SMR) 2003 - 2008: Males



Standardized mortality ratio (SMR) 2003 - 2008: Females

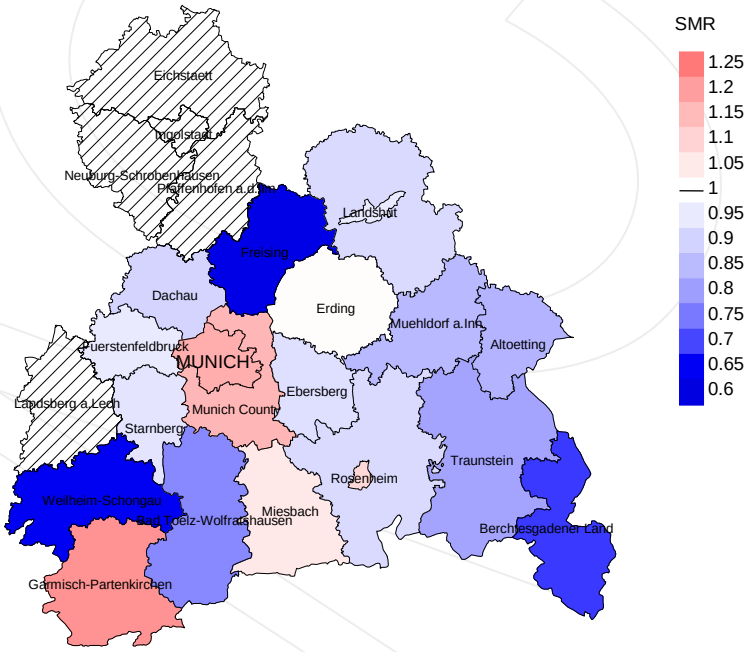


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=3,935, females N=1,816). 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 50 women died from non-small cell LC. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.93. Though, the value of this parameter may vary with an underlying probability of 99% between 0.62 and 1.32, 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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