Munich Cancer Registry

- Survival
- Selection Matrix
- Homepage
- *Deutsch*

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

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

Cancer statistics: Baseline statistics

C33, C34: Small cell LC

Year of diagnosis	1998-2013
Patients	4,499
Diseases	4,500
Creation date	05/19/2015
Export date	12/30/2014
Population	4.64 m

http://www.tumorregister-muenchen.de/en/facts/base/base_C34s_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 4.64 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, May 2015

[#] 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 2014 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.

ICD-10 codes (ICD-10 2015) used for specifying cancer site

Code	Description
C33	Malignant neoplasm of trachea
C34.-	Malignant neoplasm of bronchus and lung
C34.0	Main bronchus
C34.1	Upper lobe, bronchus or lung
C34.2	Middle lobe, bronchus or lung
C34.3	Lower lobe, bronchus or lung
C34.8	Overlapping lesion of bronchus and lung
C34.9	Bronchus or lung, unspecified

`... if additionally existing any of ...`

Morphology codes (ICD-O-3 2011) used for specifying cancer site

Code	Description
8002/3	Malignant tumor, small cell type
8041/3	Small cell carcinoma, NOS
8042/3	Oat cell carcinoma
8043/3	Small cell carcinoma, fusiform cell
8044/3	Small cell carcinoma, intermediate cell
8045/3	Combined small cell carcinoma

INCIDENCE

Table 1

Patient cohorts by year of diagnosis including multiple primaries, and with proportion of deaths and active follow-up

Year of diagnosis	Cases n	Prop. mult. primaries %	Prop. deaths %	Prop. actively followed %	
1998	178	12.4	93.8	97.2	
1999	173	13.9	96.0	99.4	
2000	156	15.4	94.2	99.4	
2001	183	12.6	94.5	98.9	
2002	280	13.6	95.0	97.9	#
2003	280	18.2	96.8	100.0	
2004	288	15.3	96.9	99.0	
2005	301	20.3	97.0	99.0	
2006	293	16.4	93.9	98.0	
2007	354	16.7	93.8	98.3	# ##
2008	337	16.3	92.0	93.8	
2009	371	17.3	92.7	95.1	
2010	365	19.5	92.6	96.7	
2011	379	22.4	91.0	96.3	
2012	333	17.1	80.2	96.1	
2013	229	24.5	60.3	98.3	###
1998-2013	4500	17.4	91.3	97.4	

Due to the pathohistological classification of the tumor and the lack of information on morphology on the death certificates, the proportion of DCO cases can not be determined.

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	178	113	65	63.5
1999	173	119	54	68.8
2000	156	108	48	69.2
2001	183	125	58	68.3
2002	280	193	87	68.9
2003	280	179	101	63.9
2004	288	184	104	63.9
2005	301	206	95	68.4
2006	293	187	106	63.8
2007	354	219	135	61.9
2008	337	214	123	63.5
2009	371	237	134	63.9
2010	365	238	127	65.2
2011	379	236	143	62.3
2012	333	193	140	58.0
2013	229	122	107	53.3
1998-2013	4500	2873	1627	63.8

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 4.64 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	113	65	10.2	5.5	6.2	3.0	9.0	4.2	11.3	5.0
1999	119	54	10.6	4.6	6.5	2.5	9.4	3.5	11.3	4.1
2000	108	48	9.5	4.0	5.7	2.3	8.3	3.2	10.3	3.6
2001	125	58	10.8	4.8	6.5	2.6	9.4	3.7	11.3	4.4
2002	193	87	10.4	4.4	6.1	2.5	8.9	3.4	11.0	4.0
2003	179	101	9.5	5.1	5.4	2.9	7.9	4.0	9.9	4.6
2004	184	104	9.8	5.3	5.5	2.9	7.9	4.0	9.7	4.6
2005	206	95	10.9	4.8	6.1	2.6	8.7	3.6	10.6	4.2
2006	187	106	9.8	5.3	5.5	2.8	7.9	4.0	9.5	4.6
2007	219	135	9.9	5.8	5.5	3.2	7.9	4.5	9.5	5.2
2008	214	123	9.6	5.3	5.2	2.8	7.6	4.0	9.4	4.6
2009	237	134	10.6	5.8	5.7	2.9	8.3	4.2	10.3	4.9
2010	238	127	10.6	5.4	5.5	2.9	8.0	4.0	10.0	4.7
2011	236	143	10.3	6.1	5.4	3.0	7.8	4.2	9.7	5.0
2012	193	140	8.4	5.9	4.4	3.1	6.3	4.3	7.8	5.0
2013	122	107	5.3	4.5	2.7	2.3	4.0	3.3	5.0	3.9
1998-2013	2873	1627	9.7	5.2	5.3	2.8	7.7	3.9	9.5	4.6

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	178	64.8	10.0	31.5	84.4	53.5	57.6	65.1	72.6	77.1
1999	173	64.7	10.4	36.4	94.7	52.7	57.6	64.9	71.2	78.6
2000	156	64.4	11.2	30.9	90.5	49.8	58.0	64.4	71.7	79.3
2001	183	65.8	9.5	42.7	91.7	53.7	59.2	65.7	73.1	78.1
2002	280	64.8	10.8	32.2	89.4	50.4	57.7	64.8	73.8	78.2
2003	280	65.8	10.3	39.5	88.7	52.5	59.0	66.0	73.2	79.3
2004	288	65.4	10.0	39.6	88.4	51.9	60.1	64.9	73.0	78.2
2005	301	66.2	9.9	40.5	93.7	54.1	59.4	66.9	72.4	79.5
2006	293	66.2	9.3	42.9	97.5	55.1	59.3	65.4	72.7	78.9
2007	354	65.7	9.7	36.8	91.2	52.7	59.5	66.2	72.2	78.2
2008	337	66.4	10.1	39.0	89.2	53.7	59.2	66.5	74.0	79.8
2009	371	67.3	9.9	37.0	91.2	53.7	60.6	67.7	74.7	80.0
2010	365	67.2	9.6	31.8	88.4	53.6	61.2	67.5	73.8	80.1
2011	379	67.8	9.6	42.7	93.7	54.9	62.8	68.4	74.0	79.7
2012	333	67.3	9.7	42.7	93.2	53.8	61.0	68.2	74.1	78.7
2013	229	67.4	8.8	39.7	84.2	54.9	61.3	69.0	74.0	77.8
1998-2013	4500	66.3	9.9	30.9	97.5	53.2	59.6	66.5	73.4	79.1

Table 3a

Age distribution parameters by year of diagnosis (MALES)
(incl. DCO)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	113	64.9	10.0	31.5	83.1	54.5	57.7	65.1	72.6	77.1
1999	119	65.0	10.2	36.4	94.7	53.0	58.3	65.3	70.5	78.7
2000	108	64.9	10.9	30.9	90.5	50.8	58.2	64.6	72.3	78.9
2001	125	66.0	9.1	44.1	91.7	54.6	60.3	65.7	72.4	77.9
2002	193	64.9	10.6	32.2	86.1	52.0	57.9	65.3	74.1	78.2
2003	179	66.6	10.2	39.9	84.2	52.4	60.8	67.8	74.2	79.3
2004	184	66.0	9.9	39.6	85.4	51.9	61.5	66.3	73.1	77.9
2005	206	66.3	9.8	40.5	93.7	54.2	59.9	67.0	72.4	79.2
2006	187	66.3	9.1	42.9	87.1	53.5	59.3	66.2	72.9	78.6
2007	219	66.0	9.4	43.1	91.2	53.2	59.9	66.4	71.8	77.7
2008	214	66.7	10.1	42.9	87.1	53.7	59.3	67.3	74.5	79.7
2009	237	67.3	10.3	37.0	91.2	52.5	60.8	68.1	75.2	80.0
2010	238	67.9	10.2	31.8	88.4	53.1	61.0	68.0	75.2	81.1
2011	236	67.9	9.6	42.7	93.7	55.6	62.7	68.6	74.7	79.7
2012	193	67.8	9.7	42.7	92.8	53.8	61.7	68.3	74.5	79.4
2013	122	67.9	9.1	39.7	84.1	57.0	61.5	69.8	74.2	79.0
1998-2013	2873	66.5	9.9	30.9	94.7	53.3	59.9	67.0	73.6	79.1

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	65	64.8	10.2	38.9	84.4	49.3	57.6	64.6	72.1	75.7
1999	54	64.3	11.0	41.5	87.3	49.0	57.4	64.0	72.9	78.6
2000	48	63.3	11.9	41.1	89.0	46.2	53.9	63.2	70.4	80.8
2001	58	65.5	10.4	42.7	84.7	52.8	56.9	65.1	74.6	80.5
2002	87	64.6	11.3	35.2	89.4	47.7	57.2	63.4	73.5	79.4
2003	101	64.4	10.5	39.5	88.7	52.6	57.5	63.7	71.3	79.0
2004	104	64.5	10.0	42.6	88.4	51.9	58.7	63.3	71.6	79.2
2005	95	65.9	10.1	41.8	85.6	53.0	58.8	65.8	72.7	80.0
2006	106	66.2	9.7	42.9	97.5	55.7	59.2	64.5	71.4	80.4
2007	135	65.2	10.1	36.8	87.2	50.7	58.3	66.0	72.4	78.4
2008	123	65.9	10.2	39.0	89.2	54.0	59.0	65.6	72.4	80.2
2009	134	67.2	9.2	48.1	89.9	55.0	60.4	67.3	73.1	80.0
2010	127	66.0	8.1	48.1	85.6	54.0	61.4	65.8	71.6	76.4
2011	143	67.7	9.5	44.3	92.6	54.5	62.9	67.6	73.4	78.1
2012	140	66.5	9.7	43.6	93.2	53.4	59.7	68.0	73.1	77.8
2013	107	66.9	8.5	45.5	84.2	54.3	60.7	66.9	73.0	77.1
1998-2013	1627	65.8	9.9	35.2	97.5	52.8	59.1	65.8	72.7	78.9

Table 4

Age distribution by 5-year age group and gender for period 1998-2013 (incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
30-34	5	0.1	0.1	5	0.2	0.2			0.0
35-39	14	0.3	0.4	9	0.3	0.5	5	0.3	0.3
40-44	71	1.6	2.0	49	1.7	2.2	22	1.4	1.7
45-49	179	4.0	6.0	104	3.6	5.8	75	4.6	6.3
50-54	326	7.2	13.2	198	6.9	12.7	128	7.9	14.1
55-59	585	13.0	26.2	361	12.6	25.3	224	13.8	27.9
60-64	803	17.8	44.1	485	16.9	42.2	318	19.5	47.4
65-69	853	19.0	63.0	553	19.2	61.4	300	18.4	65.9
70-74	754	16.8	79.8	508	17.7	79.1	246	15.1	81.0
75-79	550	12.2	92.0	366	12.7	91.8	184	11.3	92.3
80-84	281	6.2	98.2	188	6.5	98.4	93	5.7	98.0
85+	79	1.8	100.0	47	1.6	100.0	32	2.0	100.0
All ages	4500	100.0		2873	100.0		1627	100.0	

Included in the statistics are 21.6% multiple primaries in males and 20.1% in females.

Table 5

Age-specific incidence, DCO rate and proportion of all cancers
for period 1998-2013

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=2 %	Females DCO rate n=0 %	Males Prop.all cancers n=158258 %	Females Prop.all cancers n=153136 %
0- 4			0.0	0.0				
5- 9			0.0	0.0				
10-14			0.0	0.0				
15-19			0.0	0.0				
20-24			0.0	0.0				
25-29			0.0	0.0				
30-34	5		0.2	0.0			0.3	
35-39	9	5	0.4	0.2			0.4	0.1
40-44	49	22	1.9	0.9			1.5	0.4
45-49	104	75	4.4	3.2			1.9	0.9
50-54	198	128	9.8	6.2			2.3	1.2
55-59	361	224	19.7	11.7			2.5	1.6
60-64	484	318	27.3	17.0			2.2	1.8
65-69	553	300	35.0	17.4			2.0	1.6
70-74	508	246	39.7	16.2			1.9	1.3
75-79	366	184	44.3	15.5	0.5		1.8	1.0
80-84	188	93	37.6	10.0			1.4	0.6
85+	47	32	13.8	3.6			0.5	0.2
All ages	2872	1627			0.1	0.0	1.8	1.1
Incidence								
Raw			9.7	5.2				
WS			5.3	2.8				
ES			7.7	3.9				
BRD-S			9.5	4.6				

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 1998-2013
MALES

Diagnosis	Observed n	Expected n	SIR	LCL 95%	UCL 95%	EAR	DCO %
C09-C10 Oropharynx	4	0.4	9.9	2.7	25.3 #	16.9	
C15 Oesophagus	2	0.6	3.2	0.4	11.7	6.5	100.0
C18 Colon	4	3.2	1.2	0.3	3.2	3.7	
C19-C20 Rectum	3	1.9	1.5	0.3	4.5	5.0	33.3
C22 Liver	3	0.9	3.3	0.7	9.6	9.8	33.3
C25 Pancreas	8	1.1	7.3	3.1	14.3 #	32.5	62.5
C32 Larynx	4	0.4	10.3	2.8	26.3 #	17.0	25.0
C33-C34 Lung	17	4.1	4.2	2.4	6.7 #	60.8	11.8
C61 Prostate	9	10.4	0.9	0.4	1.6	-6.4	11.1
C64 Kidney	5	1.2	4.1	1.3	9.5 #	17.7	20.0
C70-C72 CNS cancer	2	0.4	4.5	0.5	16.2	7.3	100.0
C82-C85 NHL	3	1.3	2.3	0.5	6.9	8.1	
C91-C96 Leukaemia	2	0.5	4.1	0.5	14.9	7.1	50.0
Other primaries	7	3.8	1.8	0.7	3.8	14.9	28.6
Not observed	0	3.7	0.0	0.0	1.0 #	-17.6	
All mult. primaries	73	34.0	2.1	1.7	2.7 #	183.3	26.0

Patients	2032
Median age at second malignancy (years)	70.7
Person-years	2126
Mean observation time (years)	1.0
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 1998-2013
FEMALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%	EAR	DCO %
C25	Pancreas	2	0.5	3.9	0.5	14.1	10.1	50.0
C33-C34	Lung	9	1.1	8.1	3.7	15.3 #	53.5	11.1
C50	Breast	4	5.0	0.8	0.2	2.0	-6.8	25.0
C67	Bladder	3	0.2	14.6	3.0	42.8 #	19.0	
C70-C72	CNS cancer	2	0.2	9.7	1.2	35.2 #	12.2	
C91-C96	Leukaemia	2	0.2	10.3	1.2	37.2 #	12.3	
Other primaries		10	3.6	2.8	1.3	5.1 #	43.5	50.0
Not observed		0	3.8	0.0	0.0	1.0 #	-26.0	
All mult. primaries		32	14.7	2.2	1.5	3.1 #	117.6	25.0

Patients	1140
Median age at second malignancy (years)	65.8
Person-years	1474
Mean observation time (years)	1.3
Median observation time (years)	0.8

The occurrence of second malignancy is statistically significant.

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

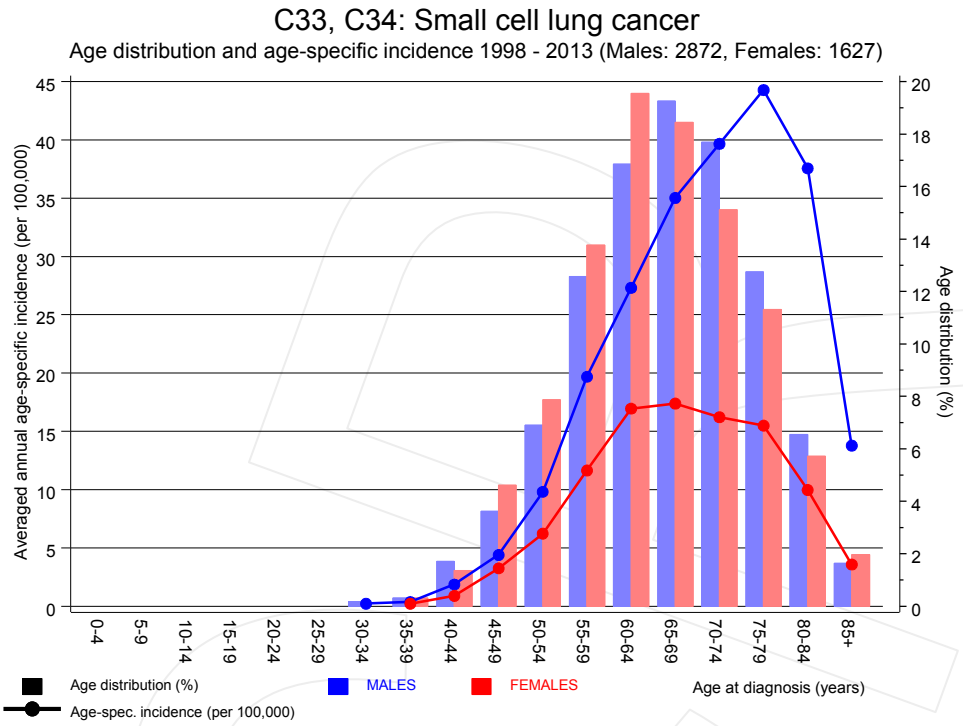


Figure 7. Age distribution and age-specific incidence

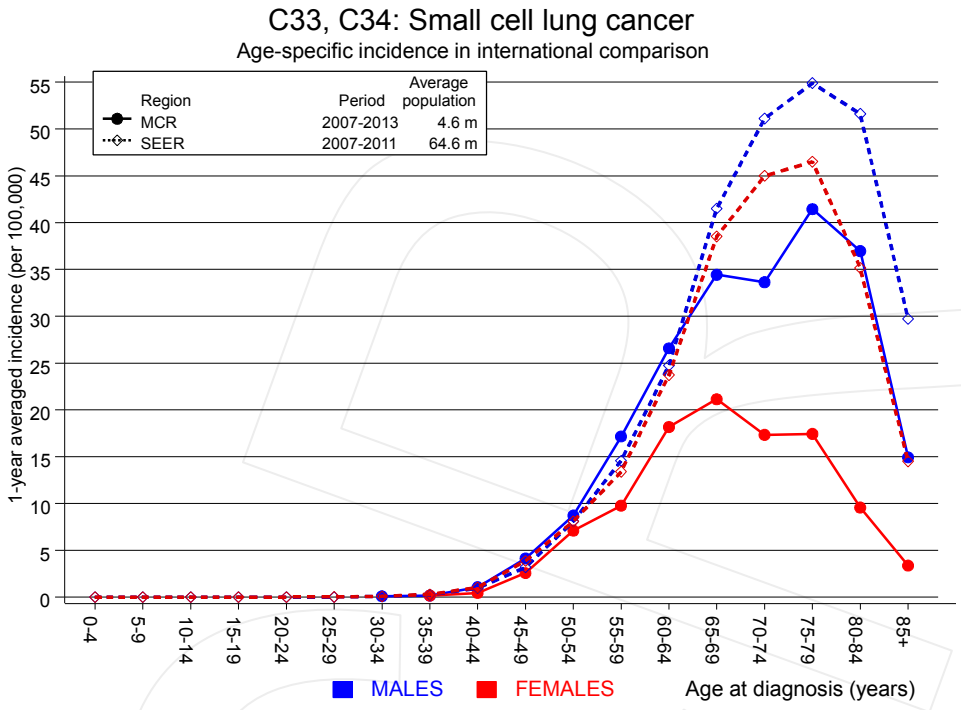


Figure 7a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 18 Regs Research Data, released April 2014, based on the November 2013 submission. http://www.seer.cancer.gov.

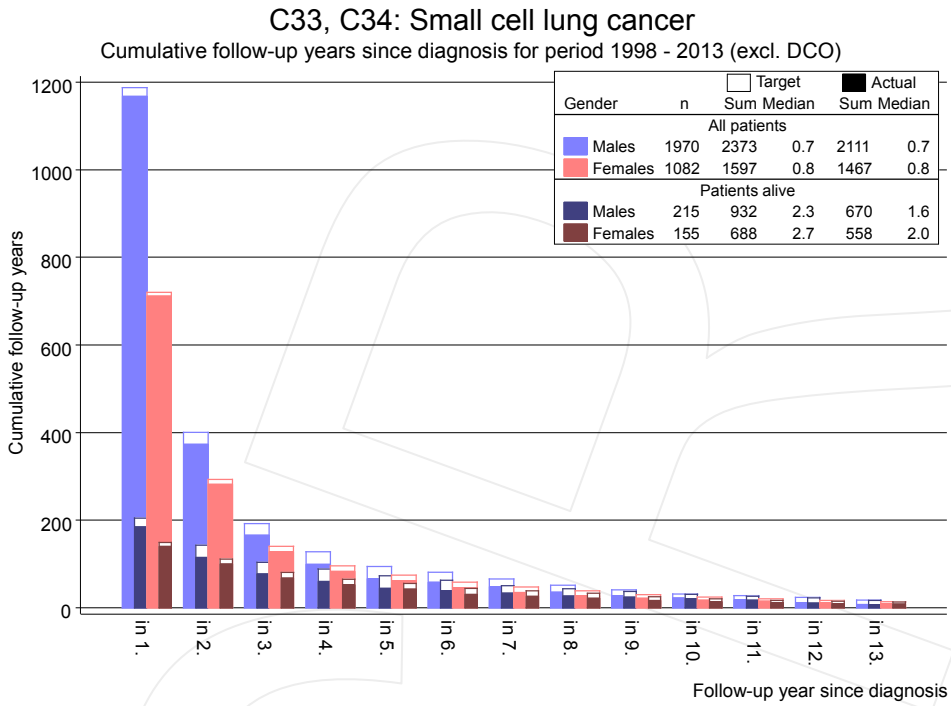


Figure 8. Cumulative follow-up years depending on time since diagnosis

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

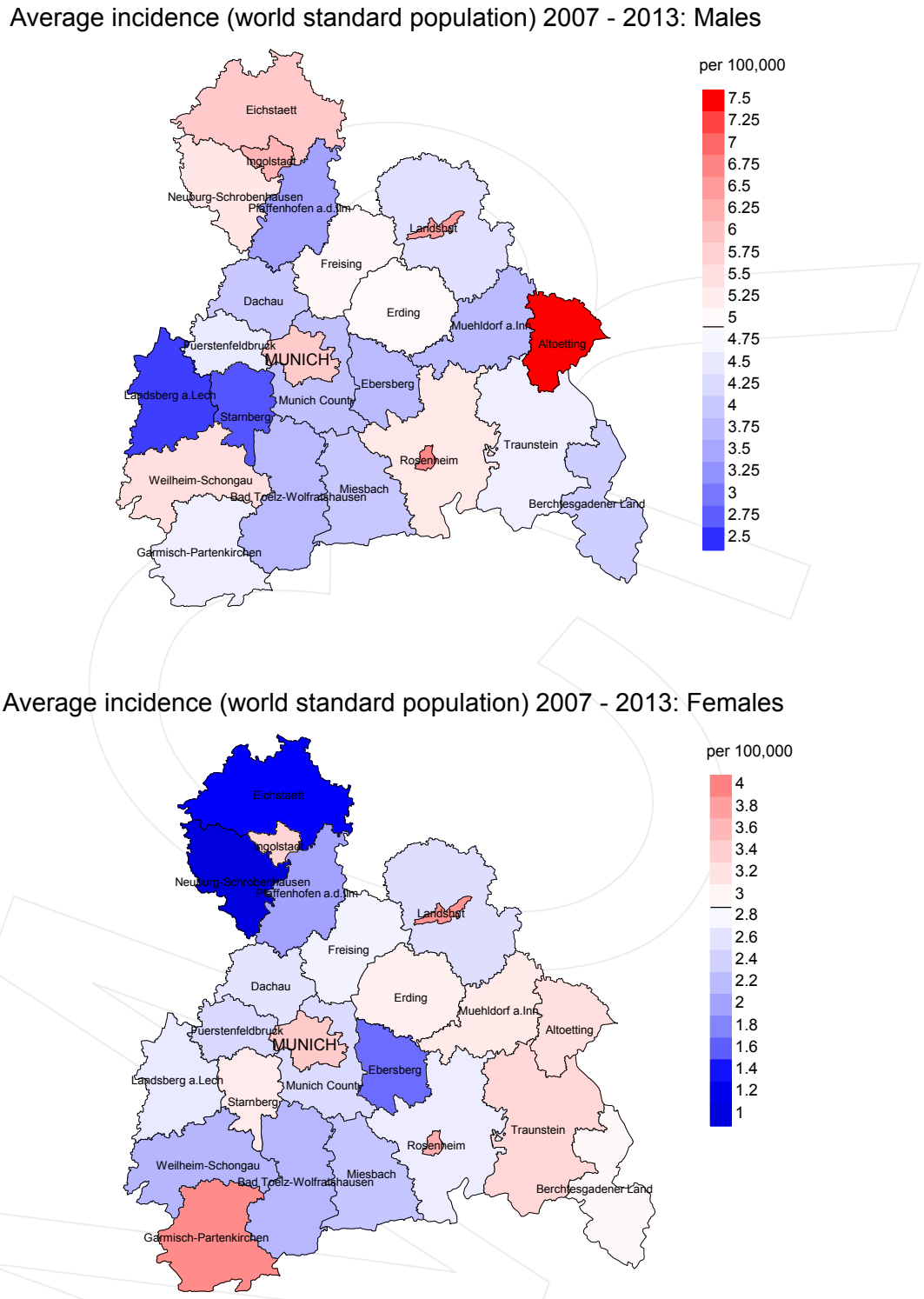
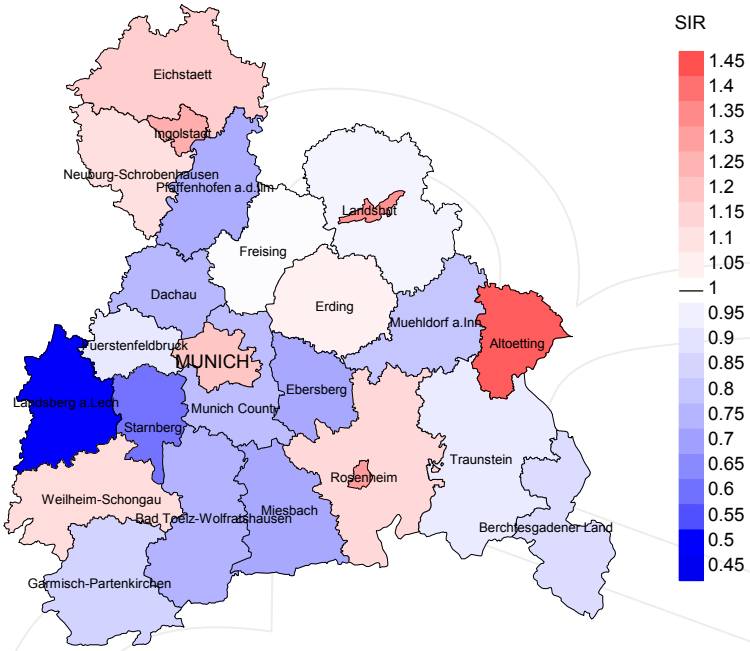


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 4.9/100,000 WS N=1,458, females 2.9/100,000 WS N=909).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,928 female residents (averaged) in the period from 2007 to 2013 a total of 15 women were identified with newly diagnosed small cell LC. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 1.7/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.7 and 3.3/100,000.

Standardized incidence ratio (SIR) 2007 - 2013: Males



Standardized incidence ratio (SIR) 2007 - 2013: Females

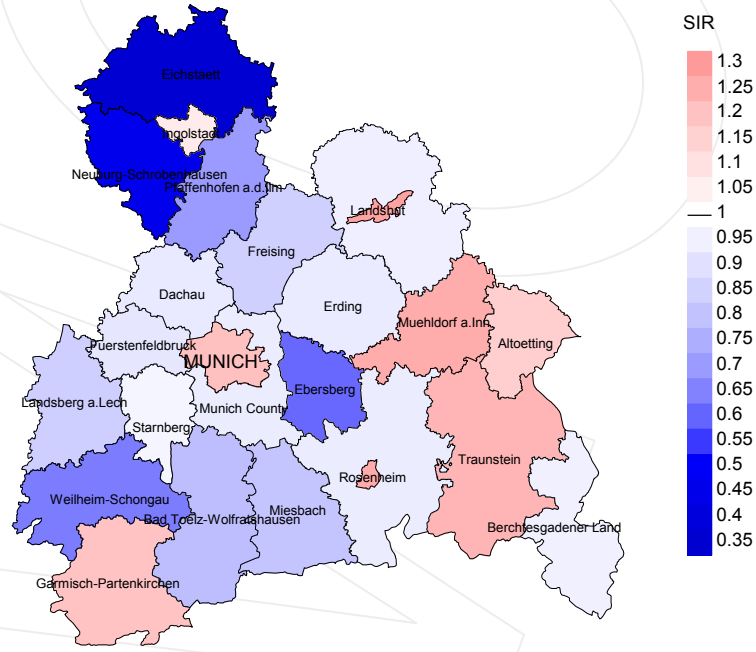


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=1,458, females N=909).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,642 female residents (averaged) in the period from 2007 to 2013 a total of 15 women were identified with newly diagnosed small cell LC. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.61. Though, the value of this parameter may vary with an underlying probability of 99% between 0.28 and 1.14, 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 4.64 m as of 2007, respectively)

Year of diagnosis	Incident cases n	Prop. actively followed %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	178	97.2	167	93.8	91.0
1999	173	99.4	166	96.0	95.2
2000	156	99.4	147	94.2	92.5
2001	183	98.9	173	94.5	94.2
2002	280	97.9	266	95.0	95.9
2003	280	100.0	271	96.8	97.4
2004	288	99.0	279	96.9	95.3
2005	301	99.0	292	97.0	98.3
2006	293	98.0	275	93.9	98.9
2007	354	98.3	332	93.8	99.4
2008	337	93.8	310	92.0	98.4
2009	371	95.1	344	92.7	98.8
2010	365	96.7	338	92.6	99.7
2011	379	96.3	345	91.0	99.7
2012	333	96.1	267	80.2	94.4
2013	229	98.3	138	60.3	81.9
1998-2013	4500	97.4	4110	91.3	96.7

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 4.64 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	178	141	89.4	57	32.0
1999	173	156	91.0	66	38.2
2000	156	156	95.5	60	38.5
2001	183	156	90.4	61	33.3
2002	280	241	96.3	108	38.6
2003	280	246	98.8	106	37.9
2004	288	282	97.2	115	39.9
2005	301	276	96.7	122	40.5
2006	293	283	97.9	113	38.6
2007	354	328	98.5	141	39.8
2008	337	322	99.7	125	37.1
2009	371	343	98.8	140	37.7
2010	365	352	99.1	155	42.5
2011	379	366	99.7	159	42.0
2012	333	328	99.4	120	36.0
2013	229	278	98.6	83	36.2
1998-2013	4500	4254	97.5	1731	38.5

Table 10c

Annual cohorts of deaths, proportion of cancer-related and non-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 4.64 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer-related %	Prop. non-cancer-related %	Prop. cancer recorded on death certificate %
1998	141	95.7	4.3	99.2
1999	156	94.2	5.8	99.3
2000	156	95.5	4.5	98.7
2001	156	93.6	6.4	97.9
2002	241	96.3	3.7	99.1
2003	246	98.8	1.2	99.2
2004	282	98.9	1.1	99.3
2005	276	97.5	2.5	99.3
2006	283	96.8	3.2	98.2
2007	328	97.3	2.7	98.1
2008	322	98.4	1.6	99.1
2009	343	98.3	1.7	99.7
2010	352	98.9	1.1	98.9
2011	366	98.4	1.6	99.5
2012	328	97.6	2.4	98.8
2013	278	98.9	1.1	99.3
1998-2013	4254	97.6	2.4	99.0

Table 11a

Medians 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 (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	94	65.3	65.2	70.4	66.6
1999	105	65.8	66.2	58.6	67.0
2000	108	67.4	67.5	66.2	68.1
2001	110	66.4	66.5	65.6	67.4
2002	164	66.8	66.7	71.7	66.9
2003	172	67.7	67.9	49.4	67.9
2004	182	67.9	67.2	74.6	67.9
2005	188	68.6	68.7	65.8	68.7
2006	196	67.3	67.2	81.0	67.3
2007	214	68.4	68.4	66.0	68.5
2008	198	67.6	67.6	68.0	67.6
2009	215	68.1	67.9	71.7	68.1
2010	240	69.9	69.8	72.2	69.9
2011	226	68.8	68.8	65.5	68.8
2012	208	69.0	68.8	74.4	68.9
2013	157	69.1	69.1	81.9	69.1
1998-2013	2777	68.1	68.1	69.2	68.3

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

Medians 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 (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	47	64.2	64.1	75.6	64.2
1999	51	67.1	67.1	67.7	66.7
2000	48	65.6	65.6		65.8
2001	46	67.8	65.9	75.5	66.0
2002	77	65.1	64.3	72.0	64.3
2003	74	66.0	65.8	77.9	65.8
2004	100	66.6	66.4	89.3	66.2
2005	88	64.3	64.1	81.4	63.8
2006	87	65.1	65.1	74.7	65.0
2007	114	67.1	67.9	60.9	68.1
2008	124	67.2	67.2		67.2
2009	128	67.9	67.7	78.7	67.9
2010	112	67.2	67.2		67.4
2011	140	67.0	67.0	67.0	67.1
2012	120	68.2	68.3	67.4	68.3
2013	121	70.2	70.2	72.9	70.2
1998-2013	1477	66.9	66.9	73.6	66.9

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	91	8.2	0.81	5.1	0.82	7.3	0.81	9.0	0.80
1999	98	8.8	0.82	5.2	0.80	7.7	0.82	9.8	0.86
2000	101	8.9	0.94	5.3	0.93	7.9	0.94	9.9	0.97
2001	105	9.1	0.84	5.4	0.83	7.9	0.84	9.8	0.87
2002	159	8.5	0.82	4.9	0.81	7.2	0.81	9.0	0.82
2003	171	9.1	0.96	5.1	0.93	7.4	0.95	9.6	0.97
2004	180	9.6	0.98	5.3	0.95	7.7	0.98	9.7	1.01
2005	182	9.6	0.88	5.1	0.85	7.6	0.87	9.6	0.91
2006	189	9.9	1.01	5.4	0.98	7.8	0.98	9.5	1.00
2007	208	9.4	0.95	4.9	0.90	7.3	0.94	9.3	0.98
2008	193	8.7	0.90	4.6	0.89	6.8	0.89	8.4	0.89
2009	211	9.5	0.89	5.0	0.88	7.3	0.88	9.0	0.87
2010	236	10.5	0.99	5.2	0.95	7.7	0.97	10.1	1.01
2011	224	9.8	0.95	5.0	0.92	7.3	0.93	9.2	0.95
2012	201	8.8	1.04	4.5	1.03	6.5	1.03	8.2	1.05
2013	156	6.8	1.28	3.5	1.29	5.1	1.28	6.3	1.27
1998-2013	2705	9.1	0.94	4.9	0.92	7.2	0.93	9.0	0.95

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	44	3.7	0.68	2.0	0.65	2.8	0.68	3.3	0.66
1999	49	4.1	0.91	2.1	0.81	2.9	0.83	3.7	0.91
2000	48	4.0	1.00	2.3	0.97	3.1	0.98	3.7	1.02
2001	41	3.4	0.71	1.9	0.73	2.6	0.70	3.0	0.70
2002	73	3.7	0.84	2.0	0.81	2.9	0.83	3.4	0.84
2003	72	3.7	0.71	1.9	0.67	2.7	0.68	3.2	0.70
2004	99	5.0	0.95	2.6	0.90	3.6	0.91	4.4	0.95
2005	87	4.4	0.92	2.4	0.93	3.3	0.92	3.8	0.91
2006	85	4.2	0.80	2.3	0.80	3.1	0.79	3.7	0.80
2007	111	4.8	0.82	2.4	0.77	3.5	0.79	4.2	0.80
2008	124	5.3	1.01	2.7	0.96	3.8	0.97	4.6	0.99
2009	126	5.4	0.94	2.7	0.92	3.8	0.92	4.6	0.94
2010	112	4.8	0.88	2.5	0.85	3.5	0.86	4.0	0.86
2011	136	5.8	0.95	3.0	0.99	4.2	0.99	4.9	0.97
2012	119	5.0	0.85	2.5	0.83	3.6	0.83	4.2	0.84
2013	119	5.0	1.11	2.3	0.99	3.3	1.02	4.1	1.07
1998-2013	1445	4.7	0.89	2.4	0.85	3.4	0.86	4.0	0.88

Table 13

Age distribution of age at death (cancer-related) for period 1998-2013
(**incl. multiple primaries**)

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
30-34	1	0.0	0.0	1	0.0	0.0			0.0
35-39	10	0.2	0.3	6	0.2	0.3	4	0.3	0.3
40-44	42	1.0	1.3	29	1.1	1.3	13	0.9	1.2
45-49	141	3.4	4.7	87	3.2	4.5	54	3.7	4.9
50-54	242	5.8	10.5	148	5.5	10.0	94	6.5	11.4
55-59	496	11.9	22.4	314	11.6	21.6	182	12.6	24.0
60-64	685	16.5	38.9	419	15.5	37.1	266	18.4	42.4
65-69	841	20.3	59.2	558	20.6	57.7	283	19.6	62.0
70-74	745	17.9	77.1	507	18.7	76.4	238	16.5	78.5
75-79	527	12.7	89.8	360	13.3	89.7	167	11.6	90.0
80-84	330	7.9	97.8	223	8.2	97.9	107	7.4	97.4
85+	93	2.2	100.0	56	2.1	100.0	37	2.6	100.0
All ages	4153	100.0		2708	100.0		1445	100.0	

Included in the statistics are 21.6% multiple primaries in males and 20.1% in females.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2013
(**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			0.0		0.0			
20-24			0.0		0.0			
25-29			0.0		0.0			
30-34	1		0.0	0.20	0.0		0.5	
35-39	6	4	0.2	0.67	0.2	0.80	1.5	0.8
40-44	29	13	1.1	0.59	0.5	0.59	3.4	1.1
45-49	87	54	3.7	0.84	2.3	0.72	4.8	2.7
50-54	148	94	7.3	0.75	4.6	0.73	4.5	3.0
55-59	314	182	17.1	0.87	9.5	0.81	5.3	3.8
60-64	419	266	23.6	0.86	14.2	0.84	4.7	4.1
65-69	558	283	35.3	1.01	16.4	0.94	4.7	3.4
70-74	507	238	39.6	1.00	15.7	0.97	3.7	2.4
75-79	360	167	43.6	0.98	14.1	0.91	2.7	1.6
80-84	223	107	44.6	1.19	11.5	1.15	2.1	1.0
85+	56	37	16.4	1.19	4.1	1.16	0.6	0.3
All ages	2708	1445					3.4	2.0
Mortality								
Raw			9.1	0.94	4.7	0.89		
WS			4.9	0.92	2.4	0.85		
ES			7.2	0.93	3.4	0.86		
BRD-S			9.0	0.95	4.0	0.88		
PYLL-70								
per 100,000			52.4		31.4			
ES			46.0		26.6			
AYLL-70			9.0		9.3			

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

Table 15a

Multiple primaries in deaths in period 1998-2013
MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	22	3.7	20	90.9	1	4.5	1	4.5
C09-C10 Oropharynx	18	3.0	14	77.8	2	11.1	2	11.1
C12-C13 Hypopharynx	9	1.5	6	66.7	1	11.1	2	22.2
C15 Oesophagus	10	1.7	3	30.0	1	10.0	6	60.0
C16 Stomach	12	2.0	8	66.7	2	16.7	2	16.7
C18 Colon	32	5.4	22	68.8	5	15.6	5	15.6
C19-C20 Rectum	19	3.2	15	78.9	3	15.8	1	5.3
C22 Liver	8	1.3	2	25.0	2	25.0	4	50.0
C25 Pancreas	11	1.8			2	18.2	9	81.8
C32 Larynx	30	5.0	24	80.0	4	13.3	2	6.7
C33-C34 Lung	59	9.9			21	35.6	38	64.4
C43 Malign. melanoma	13	2.2	13	100.0				
C44 Skin others	39	6.5	30	76.9	1	2.6	8	20.5
C61 Prostate	108	18.1	92	85.2	6	5.6	10	9.3
C62 Testis	6	1.0	6	100.0				
C64 Kidney	21	3.5	14	66.7	3	14.3	4	19.0
C65 Renal pelvis	8	1.3	7	87.5			1	12.5
C67 Bladder	74	12.4	64	86.5	5	6.8	5	6.8
C70-C72 CNS cancer	15	2.5	5	33.3	5	33.3	5	33.3
C76-C79 CUP	6	1.0	4	66.7	1	16.7	1	16.7
C82-C85 NHL	27	4.5	21	77.8	2	7.4	4	14.8
C90 Mult. myeloma	8	1.3	3	37.5	1	12.5	4	50.0
C91-C96 Leukaemia	9	1.5	5	55.6	1	11.1	3	33.3
Other primaries	34	5.7	26	76.5	4	11.8	4	11.8
All mult. primaries	598	100.0	404	67.6	73	12.2	121	20.2

Multiple primaries with number of cases 1 to 4 are pooled in category "Other primaries".

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

Table 15b

Multiple primaries in deaths in period 1998-2013
FEMALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	8	2.9	6	75.0	1	12.5	1	12.5
C09-C10 Oropharynx	3	1.1	3	100.0				
C15 Oesophagus	3	1.1	1	33.3	1	33.3	1	33.3
C18 Colon	11	4.0	5	45.5	2	18.2	4	36.4
C19-C20 Rectum	5	1.8	4	80.0			1	20.0
C21 Anus/canal	3	1.1	2	66.7	1	33.3		
C23-C24 Bile	3	1.1	3	100.0				
C25 Pancreas	4	1.4			2	50.0	2	50.0
C32 Larynx	3	1.1	3	100.0				
C33-C34 Lung	20	7.2			2	10.0	18	90.0
C43 Malign. melanoma	5	1.8	5	100.0				
C44 Skin others	10	3.6	10	100.0				
C50 Breast	91	32.7	81	89.0	5	5.5	5	5.5
C51 Vulva	6	2.2	4	66.7	1	16.7	1	16.7
C53 Cervix uteri	18	6.5	17	94.4			1	5.6
C54 Corpus uteri	13	4.7	12	92.3			1	7.7
C56 Ovary	7	2.5	7	100.0				
C64 Kidney	8	2.9	7	87.5	1	12.5		
C67 Bladder	17	6.1	14	82.4	2	11.8	1	5.9
C70-C72 CNS cancer	7	2.5	2	28.6			5	71.4
C73 Thyroid	3	1.1	3	100.0				
C76-C79 CUP	4	1.4	4	100.0				
C82-C85 NHL	12	4.3	10	83.3	1	8.3	1	8.3
C91-C96 Leukaemia	4	1.4	1	25.0	1	25.0	2	50.0
Other primaries	10	3.6	8	80.0	1	10.0	1	10.0
All mult. primaries	278	100.0	212	76.3	21	7.6	45	16.2

Multiple primaries with number of cases 1 to 2 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 1998-2013
(**Singular primaries only** *)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4			0.0		0.0			
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24			0.0		0.0			
25-29			0.0		0.0			
30-34	1		0.0	0.20	0.0		0.6	
35-39	6	4	0.2	0.67	0.2	0.80	1.6	0.9
40-44	28	13	1.1	0.61	0.5	0.62	3.5	1.3
45-49	83	47	3.5	0.84	2.0	0.73	5.1	2.7
50-54	142	81	7.0	0.75	3.9	0.72	4.9	3.1
55-59	290	165	15.8	0.89	8.6	0.83	5.7	4.1
60-64	382	228	21.6	0.90	12.2	0.84	5.1	4.3
65-69	467	247	29.6	1.00	14.3	0.98	4.8	3.7
70-74	401	201	31.3	1.00	13.2	0.95	3.8	2.6
75-79	272	134	32.9	0.99	11.3	0.94	2.7	1.6
80-84	173	92	34.6	1.22	9.9	1.18	2.1	1.0
85+	42	27	12.3	1.17	3.0	1.17	0.6	0.2
All ages	2287	1239					3.6	2.1
Mortality								
Raw			7.7	0.94	4.0	0.90		
WS			4.2	0.92	2.1	0.86		
ES			6.1	0.93	2.9	0.87		
BRD-S			7.6	0.95	3.4	0.89		
PYLL-70								
per 100,000			48.6		27.7			
ES			42.8		23.5			
AYLL-70			9.3		9.4			

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2013
(**Single primaries only** *)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4			0.0		0.0			
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24			0.0		0.0			
25-29			0.0		0.0			
30-34	1		0.0	0.20	0.0		0.6	
35-39	6	4	0.2	0.67	0.2	0.80	1.7	0.9
40-44	28	13	1.1	0.62	0.5	0.62	3.7	1.4
45-49	81	45	3.4	0.84	1.9	0.75	5.3	2.9
50-54	140	80	6.9	0.75	3.9	0.73	5.4	3.4
55-59	284	161	15.5	0.88	8.4	0.82	6.1	4.5
60-64	371	225	20.9	0.90	12.0	0.84	5.6	4.9
65-69	452	244	28.6	1.00	14.1	0.98	5.4	4.3
70-74	389	194	30.4	0.99	12.8	0.94	4.4	3.0
75-79	258	131	31.2	0.97	11.0	0.94	3.2	1.8
80-84	168	89	33.6	1.18	9.5	1.16	2.6	1.2
85+	41	27	12.0	1.14	3.0	1.17	0.8	0.3
All ages	2219	1213					4.1	2.4
Mortality								
Raw			7.5	0.94	3.9	0.90		
WS			4.1	0.92	2.0	0.86		
ES			5.9	0.93	2.9	0.87		
BRD-S			7.3	0.95	3.4	0.88		
PYLL-70								
per 100,000			47.6		27.2			
ES			41.9		23.0			
AYLL-70			9.3		9.3			

* See corresponding tables with multiple primaries.

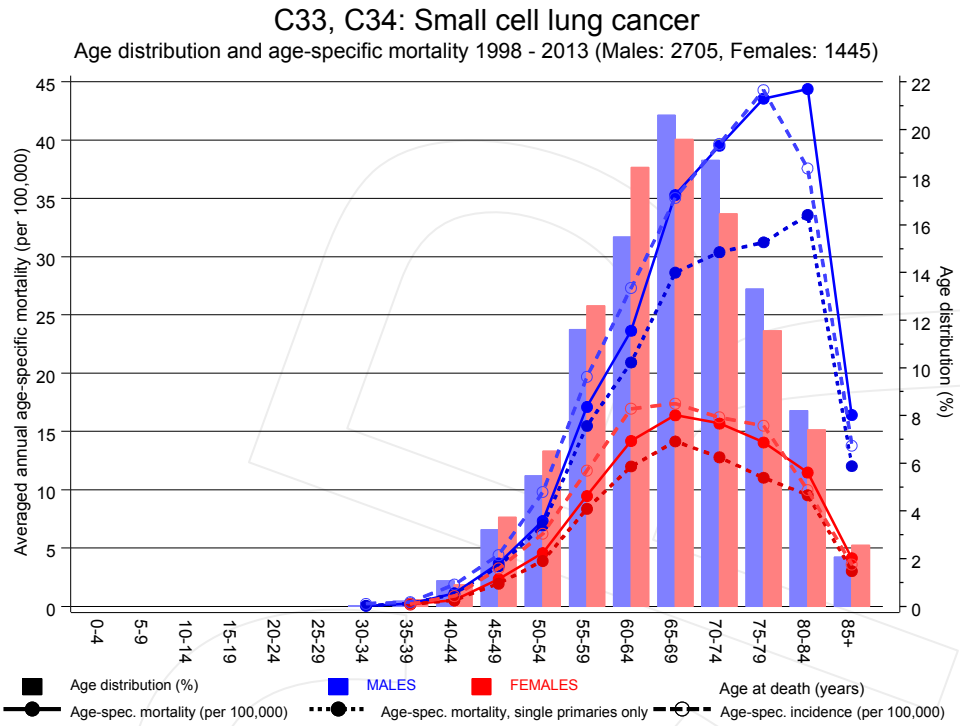
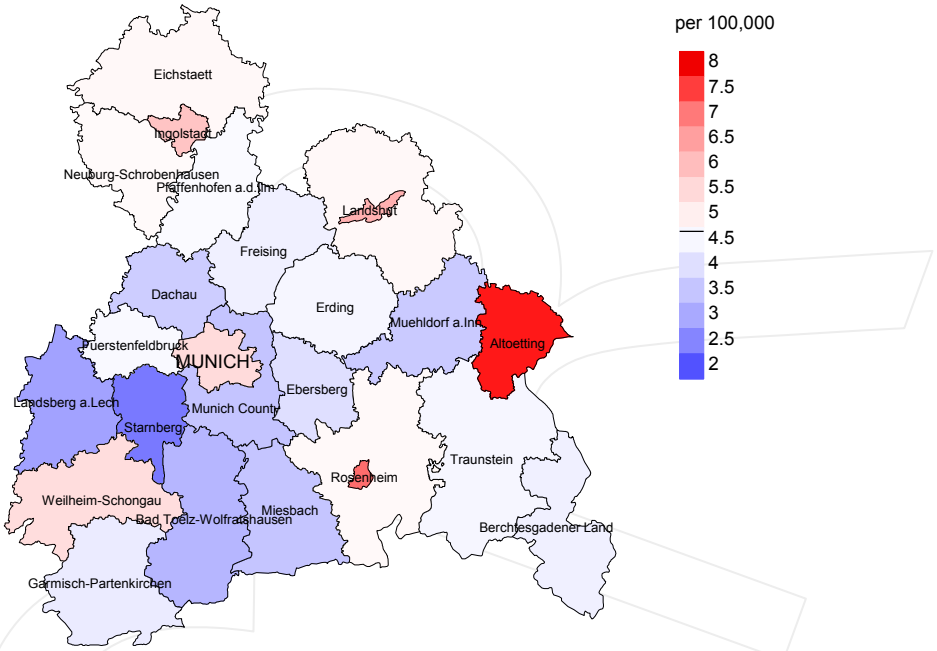


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

Average mortality (world standard population) 2007 - 2013: Males



Average mortality (world standard population) 2007 - 2013: Females

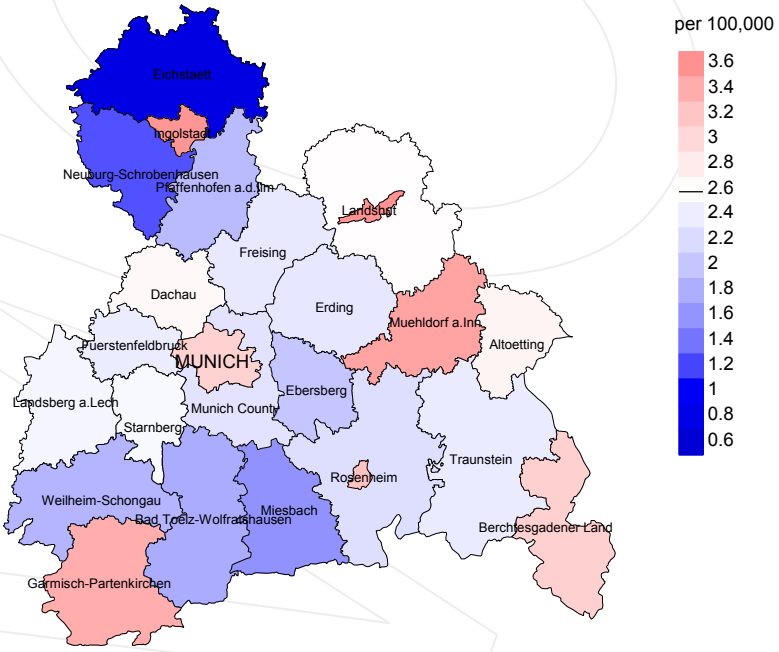
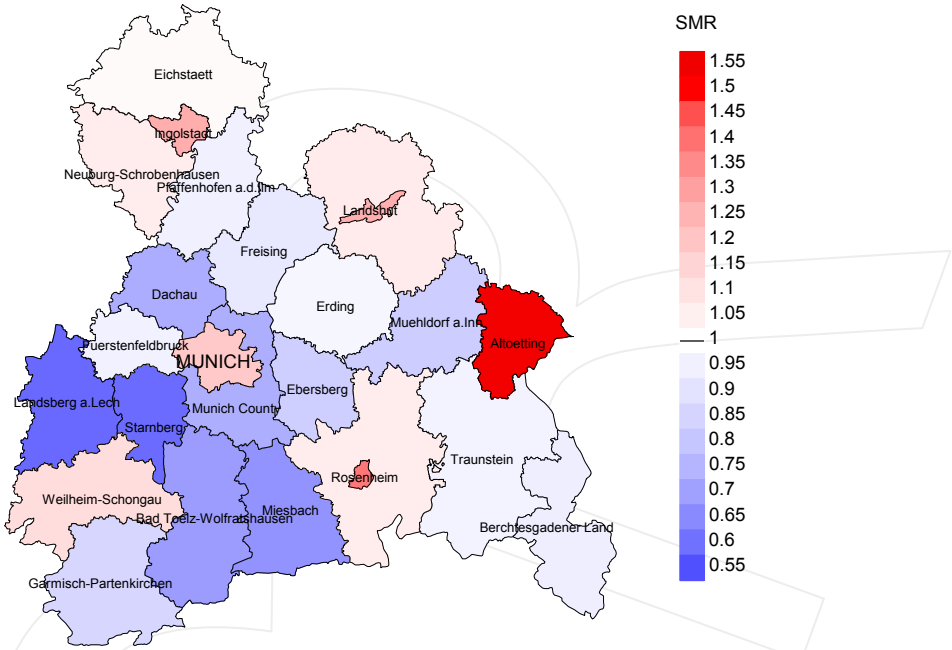


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2013. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 4.7/100,000 WS N=1,426, females 2.6/100,000 WS N=847).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,928 female residents (averaged) in the period from 2007 to 2013 a total of 18 women died from small cell LC. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 2.0/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.9 and 3.8/100,000.

Standardized mortality ratio (SMR) 2007 - 2013: Males



Standardized mortality ratio (SMR) 2007 - 2013: Females

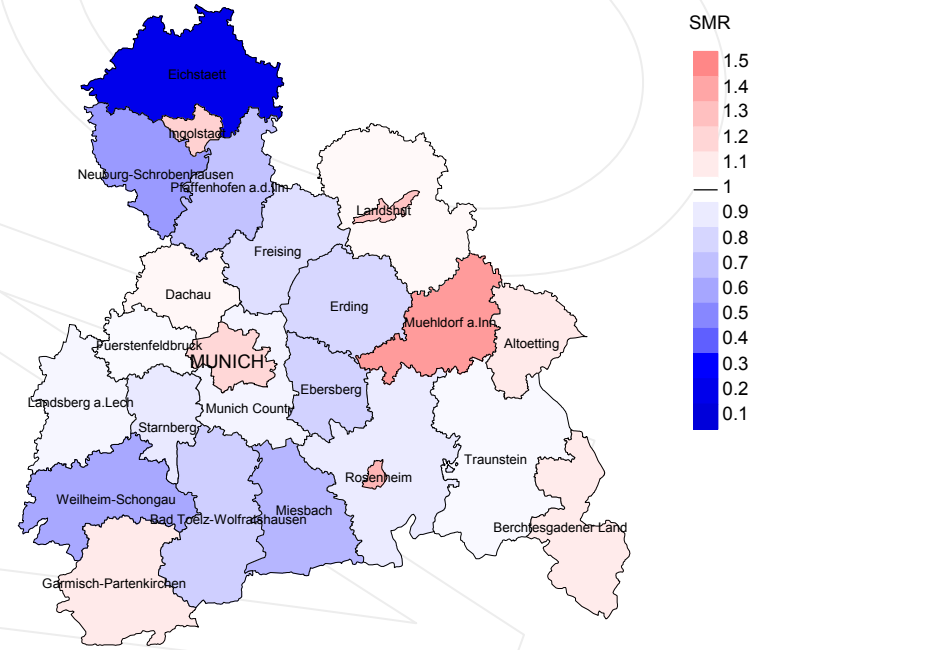


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=1,426, females N=847).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,642 female residents (averaged) in the period from 2007 to 2013 a total of 18 women died from small cell LC. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.78. Though, the value of this parameter may vary with an underlying probability of 99% between 0.39 and 1.40, 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 cancer-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

FRG	Federal Republic of Germany
GEKID	Association of Population-based Cancer Registries in Germany (Gesellschaft der epidemiologischen Krebsregister in Deutschland e.V.)
MCR	Munich Cancer Registry (Tumorregister München)
SEER	Surveillance, Epidemiology, and End Results (USA)
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)
LCL	Lower confidence limit
MI-index	Ratio between mortality and incidence
PYLL-70	Potential years of life lost prior to age 70 given a person dies before that age
SIR	Standardized incidence ratio
SMR	Standardized mortality ratio
UCL	Upper confidence limit
WS	World standard population

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