Munich Cancer Registry

- Survival
- Selection Matrix
- Homepage
- *Deutsch*

ICD-10 C33, C34: Small cell LC

Incidence and Mortality

Year of diagnosis	1998-2014
Patients	4,795
Diseases	4,796
Creation date	04/13/2016
Export date	12/23/2015
Population	4.64 m

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

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

http://www.tumorregister-muenchen.de/en/facts/base/bC34s_E-ICD-10-C33-C34-Small-cell-LC-incidence-and-mortality.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.

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 2016

[#] 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).

[##] 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.

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

All patients with invasive cancer by year of diagnosis, proportions of multiple primaries, 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	14.5	96.5	99.4
2000	156	15.4	94.2	99.4
2001	183	12.6	95.1	99.5
2002	280	13.6	95.0	97.9 #
2003	281	18.5	96.8	99.6
2004	288	15.3	97.2	99.0
2005	301	20.3	97.0	99.0
2006	293	16.4	94.2	98.0
2007	354	16.7	94.4	98.3 #
2008	338	16.6	92.3	94.4
2009	371	17.8	92.7	96.0
2010	366	19.4	93.4	97.3
2011	379	22.7	92.9	97.4
2012	336	17.6	86.0	97.6
2013	349	22.6	81.7	99.1
2014	170	28.8	38.8	91.8 ##
1998-2014	4796	18.0	91.0	97.7

The increases of incident cases in 2002 and 2007 reflect the expansion to additional registry areas.

Please be aware that data of recent annual patient cohorts may not yet be fully processed. The years under evaluation can be found in the respective headings.

Table 1a

All patients with invasive cancer
by year of diagnosis and gender

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	281	180	101	64.1
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	338	215	123	63.6
2009	371	237	134	63.9
2010	366	238	128	65.0
2011	379	236	143	62.3
2012	336	195	141	58.0
2013	349	208	141	59.6
2014	170	98	72	57.6
1998-2014	4796	3061	1735	63.8

Table 2

Incidence measures by year of diagnosis
(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	180	101	9.6	5.1	5.4	2.9	7.9	4.0	10.0	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	215	123	9.7	5.3	5.2	2.8	7.7	4.0	9.5	4.6
2009	237	134	10.6	5.8	5.7	2.9	8.3	4.2	10.3	4.9
2010	238	128	10.6	5.5	5.5	2.9	8.0	4.1	10.0	4.7
2011	236	143	10.3	6.1	5.4	3.0	7.8	4.2	9.7	5.0
2012	195	141	8.5	6.0	4.4	3.1	6.4	4.4	7.9	5.1
2013	208	141	9.1	6.0	4.7	2.9	6.8	4.2	8.5	5.0
2014	98	72	4.3	3.1	2.1	1.6	3.1	2.3	3.9	2.6
1998-2014	3061	1735	9.6	5.2	5.2	2.7	7.6	3.9	9.3	4.5

The computation of the incidence measures includes all primaries, irrespective of first or subsequent malignancy.

Table 3

Age distribution parameters by year of diagnosis (All patients)

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	281	65.8	10.3	39.5	88.7	52.6	59.1	66.1	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	338	66.4	10.1	39.0	89.2	53.7	59.2	66.5	74.0	80.2
2009	371	67.3	9.9	37.0	91.2	53.7	60.6	67.7	74.7	80.0
2010	366	67.2	9.6	31.8	88.4	53.4	61.1	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	336	67.2	9.7	42.7	93.2	53.3	60.9	68.1	74.0	78.7
2013	349	68.0	9.6	39.7	91.5	54.2	61.6	69.4	74.6	79.7
2014	170	68.2	9.2	42.0	89.1	55.1	62.0	68.5	74.7	80.2
1998-2014	4796	66.4	9.9	30.9	97.5	53.3	59.7	66.7	73.5	79.2

Table 3a

Age distribution parameters by year of diagnosis (MALES)

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	180	66.6	10.2	39.9	84.2	52.7	60.8	67.8	74.3	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	215	66.7	10.1	42.9	87.1	53.7	59.3	67.3	74.6	79.8
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	195	67.7	9.7	42.7	92.8	53.8	61.5	68.2	74.5	79.4
2013	208	68.0	10.1	39.7	91.5	53.6	61.5	69.3	74.9	80.9
2014	98	69.7	8.5	49.5	89.1	57.5	63.4	70.4	75.6	80.6
1998-2014	3061	66.7	9.9	30.9	94.7	53.4	60.1	67.2	73.8	79.3

Table 3b

Age distribution parameters by year of diagnosis (FEMALES)

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	128	65.9	8.3	46.5	85.6	53.4	61.3	65.7	71.5	76.4
2011	143	67.7	9.5	44.3	92.6	54.5	62.9	67.6	73.4	78.1
2012	141	66.4	9.8	43.6	93.2	52.7	59.7	68.0	73.0	77.6
2013	141	68.0	9.0	45.5	91.0	55.1	62.3	69.4	74.1	77.6
2014	72	66.2	9.8	42.0	88.5	53.6	60.2	65.9	72.2	79.4
1998-2014	1735	65.9	9.9	35.2	97.5	52.9	59.1	65.8	72.9	79.0

Table 4

Age distribution by 5-year age group and gender for period 2007-2014

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
30-34	1	0.0	0.0	1	0.1	0.1			0.0
35-39	4	0.2	0.2	2	0.1	0.2	2	0.2	0.2
40-44	24	0.9	1.1	17	1.0	1.2	7	0.7	0.9
45-49	98	3.7	4.8	60	3.6	4.9	38	3.7	4.6
50-54	198	7.4	12.2	111	6.7	11.6	87	8.6	13.2
55-59	283	10.6	22.8	176	10.7	22.3	107	10.5	23.7
60-64	438	16.4	39.3	253	15.4	37.7	185	18.2	41.9
65-69	544	20.4	59.7	328	19.9	57.6	216	21.2	63.1
70-74	487	18.3	78.0	309	18.8	76.4	178	17.5	80.6
75-79	343	12.9	90.9	219	13.3	89.7	124	12.2	92.8
80-84	183	6.9	97.7	134	8.1	97.8	49	4.8	97.6
85+	60	2.3	100.0	36	2.2	100.0	24	2.4	100.0
All ages	2663	100.0		1646	100.0		1017	100.0	

Included in the statistics are 25.2% multiple primaries in males and 22.2% in females.

Table 5

Age-specific incidence and proportion of all cancers
for period 2007-2014

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males Prop.all cancers n=91183 %	Females Prop.all cancers n=89596 %
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		0.1	0.0	0.1	
35-39	2	2	0.2	0.2	0.2	0.1
40-44	17	7	1.0	0.5	0.9	0.2
45-49	60	38	3.8	2.5	1.9	0.7
50-54	111	87	8.6	6.8	2.3	1.3
55-59	176	107	16.6	9.5	2.4	1.4
60-64	252	185	25.7	17.4	2.3	2.0
65-69	328	216	34.1	20.7	2.1	1.9
70-74	309	178	34.0	17.0	1.8	1.5
75-79	219	124	39.8	17.4	1.8	1.2
80-84	134	49	38.4	8.7	1.6	0.6
85+	36	24	15.5	4.2	0.6	0.2
All ages	1645	1017			1.8	1.1
Incidence						
Raw			9.1	5.4		
WS			4.8	2.8		
ES			6.9	4.0		
BRD-S			8.6	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).

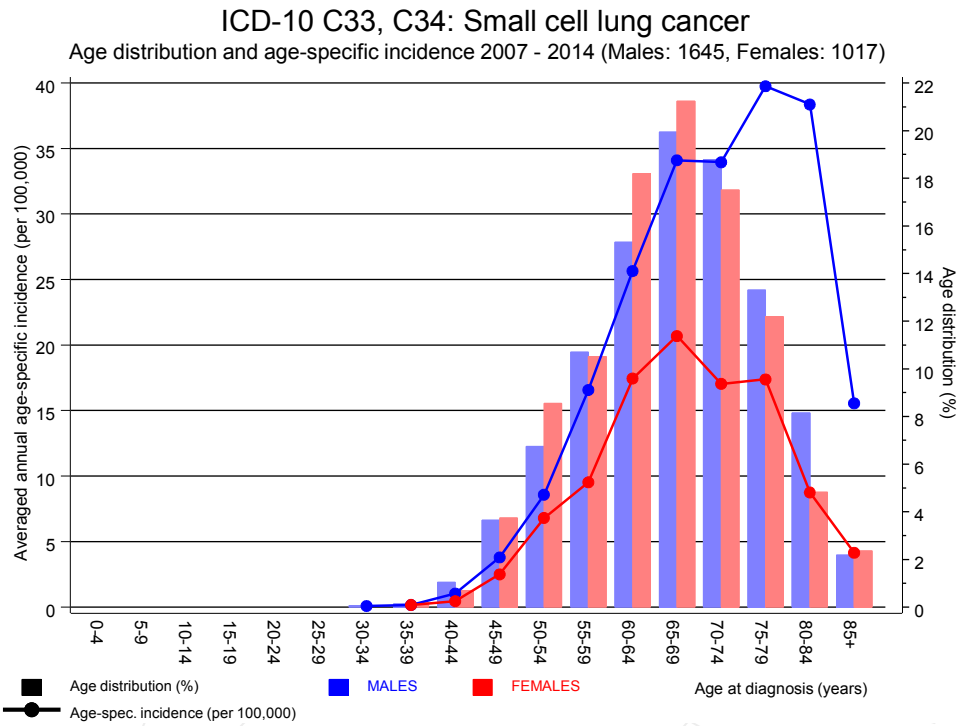


Figure 6. Age distribution and age-specific incidence

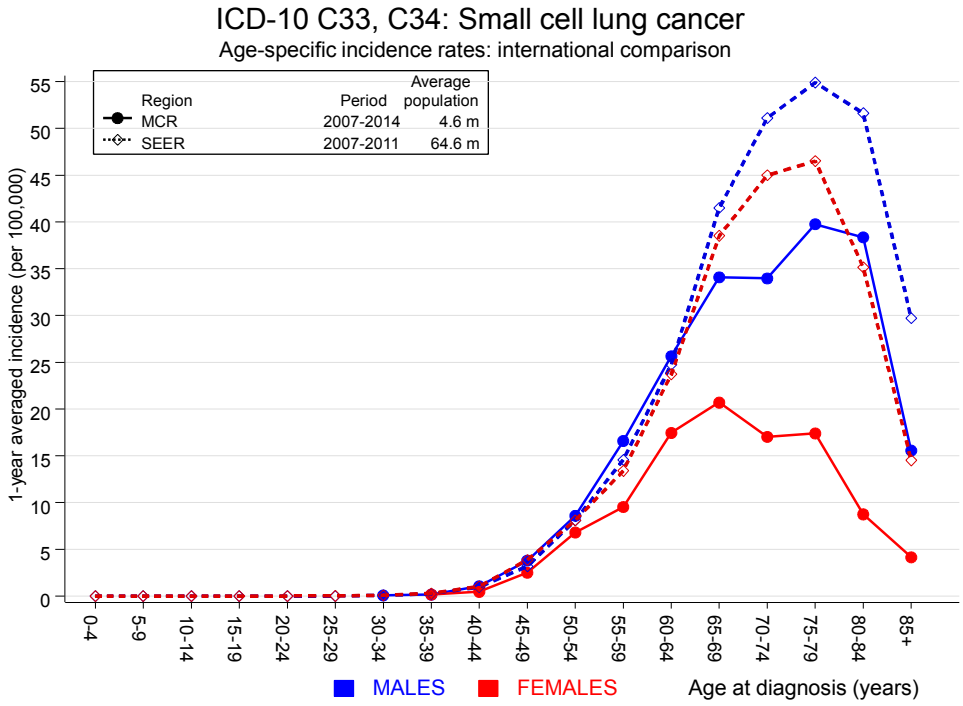


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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.

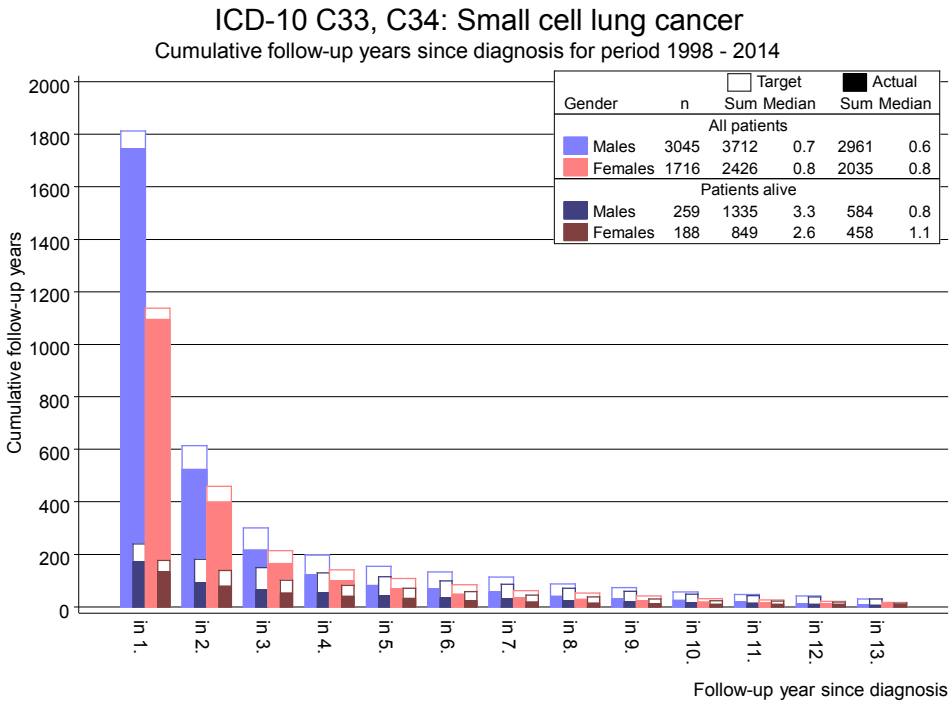


Figure 7. Cumulative follow-up years depending on time since diagnosis

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

Table 8a

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries for period 1998-2014
MALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C09-C10	Oropharynx	6	0.6	10.8	4.0	23.5	#	18.5	
C15	Oesophagus	4	0.9	4.6	1.3	11.8	#	10.6	100.0
C18	Colon	10	4.2	2.4	1.1	4.3	#	19.5	30.0
C19-C20	Rectum	3	2.6	1.2	0.2	3.4		1.5	33.3
C22	Liver	6	1.3	4.8	1.7	10.3	#	16.1	33.3
C25	Pancreas	11	1.6	7.1	3.5	12.7	#	32.1	63.6
C32	Larynx	4	0.5	7.7	2.1	19.7	#	11.8	25.0
C33-C34	Lung	25	5.5	4.5	2.9	6.7	#	66.1	12.0
C61	Prostate	15	13.7	1.1	0.6	1.8		4.3	20.0
C64	Kidney	7	1.7	4.2	1.7	8.7	#	18.1	28.6
C67	Bladder	4	1.8	2.2	0.6	5.6		7.4	50.0
C70-C72	CNS cancer	3	0.6	4.9	1.0	14.3	#	8.1	100.0
C82-C85	NHL	5	1.7	2.9	0.9	6.7		11.1	20.0
C91-C96	Leukaemia	4	0.7	5.9	1.6	15.2	#	11.3	75.0
Other primaries		10	4.4	2.3	1.1	4.2	#	19.0	30.0
Not observed		0	4.2	0.0	0.0	0.9	#	-14.4	
All mult. primaries		117	46.0	2.5	2.1	3.0	#	241.0	32.5

Patients	3021
Median age at second malignancy (years)	70.7
Person-years	2947
Mean observation time (years)	1.0
Median observation time (years)	0.6

The occurrence of second malignancy is statistically significant.

Observed second primaries with count 1 are pooled in category “Other primaries”

Table 8b

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries for period 1998–2014
FEMALES

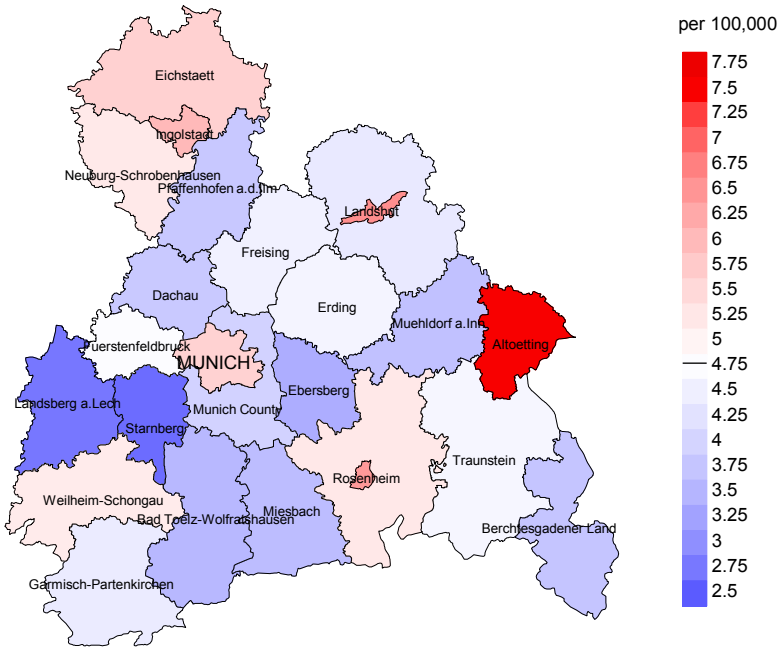
Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%	EAR	DCO %
C18	Colon	3	1.6	1.9	0.4	5.5	6.9	66.7
C25	Pancreas	3	0.7	4.2	0.9	12.2	11.3	66.7
C33-C34	Lung	11	1.6	6.9	3.4	12.4 #	46.7	9.1
C50	Breast	9	6.8	1.3	0.6	2.5	10.7	55.6
C67	Bladder	3	0.3	10.6	2.2	31.1 #	13.5	
C70-C72	CNS cancer	2	0.3	7.2	0.9	25.9	8.5	
C91-C96	Leukaemia	2	0.3	7.4	0.9	26.9	8.6	
Other primaries		14	5.9	2.4	1.3	4.0 #	40.3	42.9
Not observed		0	2.6	0.0	0.0	1.4	-12.7	
All mult. primaries		47	20.0	2.3	1.7	3.1 #	133.8	34.0

Patients	1707
Median age at second malignancy (years)	66.4
Person-years	2015
Mean observation time (years)	1.2
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”

Average incidence (world standard population) 2007 - 2014: Males



Average incidence (world standard population) 2007 - 2014: Females

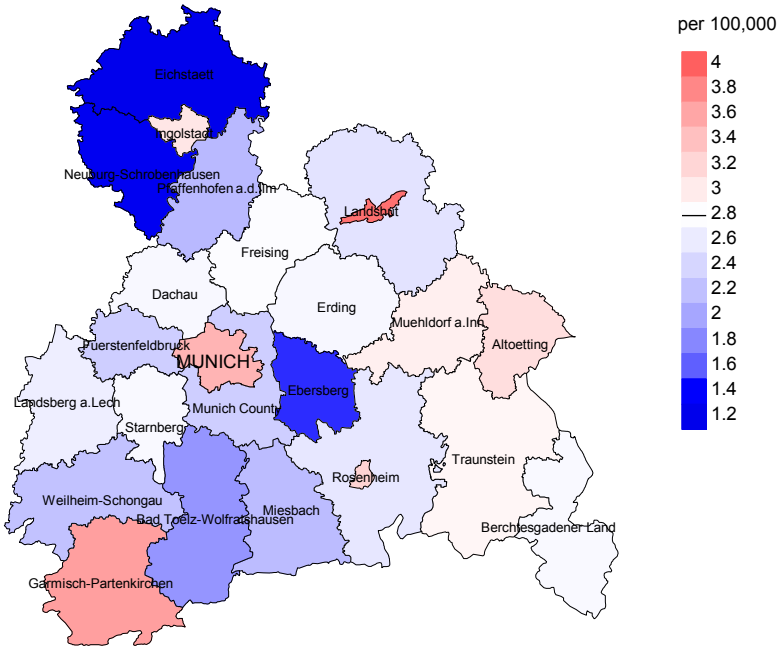
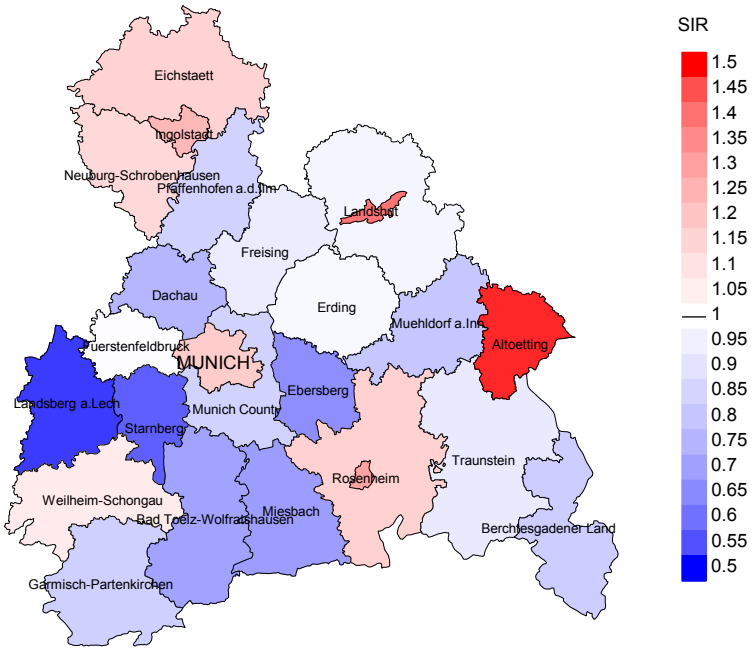


Figure 9a. Map of cancer incidence (world standard population) by county averaged for period 2007 to 2014. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 4.8/100,000 WS N=1,645, females 2.8/100,000 WS N=1,017).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,347 female residents (averaged) in the period from 2007 to 2014 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 1.4/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.6 and 2.9/100,000.

Standardized incidence ratio (SIR) 2007 - 2014: Males



Standardized incidence ratio (SIR) 2007 - 2014: Females

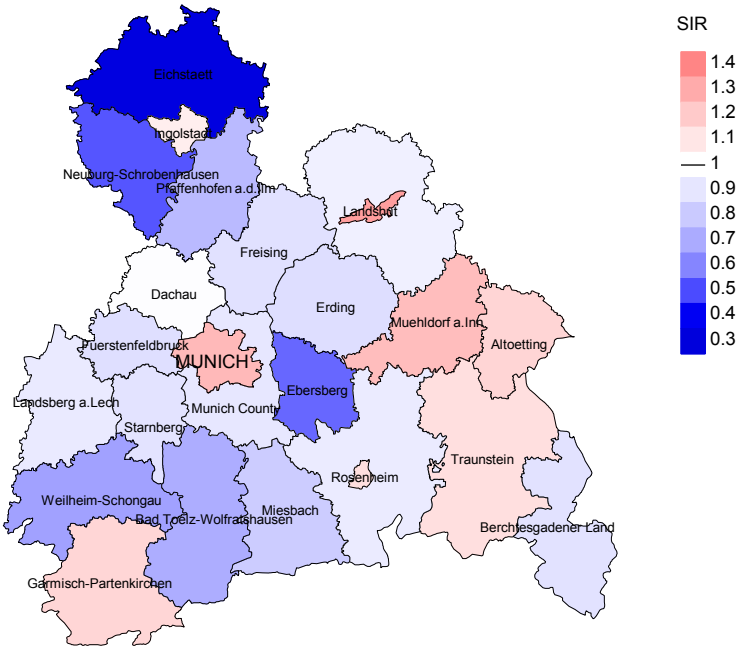


Figure 9b. Map of standardized incidence ratio (SIR) by county averaged for period 2007 to 2014. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=1,645, females N=1,017).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,924 female residents (averaged) in the period from 2007 to 2014 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 0.54. Though, the value of this parameter may vary with an underlying probability of 99% between 0.25 and 1.01, and is therefore not statistically striking.

MORTALITY

Table 10a

Patient cohorts of incident cancers by year of diagnosis, follow-up status, and deaths among the annual cohorts

(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	167	96.5	94.6
2000	156	99.4	147	94.2	92.5
2001	183	99.5	174	95.1	94.3
2002	280	97.9	266	95.0	95.9
2003	281	99.6	272	96.8	97.4
2004	288	99.0	280	97.2	95.4
2005	301	99.0	292	97.0	98.6
2006	293	98.0	276	94.2	98.6
2007	354	98.3	334	94.4	99.4
2008	338	94.4	312	92.3	98.4
2009	371	96.0	344	92.7	98.8
2010	366	97.3	342	93.4	99.7
2011	379	97.4	352	92.9	99.7
2012	336	97.6	289	86.0	98.3
2013	349	99.1	285	81.7	97.2
2014	170	91.8	66	38.8	92.4
1998-2014	4796	97.7	4365	91.0	97.4

Table 10b

Annual cohorts of incident cancers and deaths,
and cases deceased the same year of cancer diagnosis

(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	Deaths in same year n	Prop. deaths in same year %
1998	178	141	57	32.0
1999	173	156	66	38.2
2000	156	156	60	38.5
2001	183	156	61	33.3
2002	280	241	108	38.6
2003	281	246	106	37.7
2004	288	282	115	39.9
2005	301	276	122	40.5
2006	293	283	113	38.6
2007	354	328	141	39.8
2008	338	323	126	37.3
2009	371	343	140	37.7
2010	366	352	155	42.3
2011	379	366	159	42.0
2012	336	328	120	35.7
2013	349	343	143	41.0
2014	170	256	53	31.2
1998-2014	4796	4576	1845	38.5

Table 10c

Annual cohorts of deaths, and proportion of cancer-related and non-cancer-related deaths

(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	323	98.5	1.5	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	343	98.3	1.7	99.1
2014	256	96.5	3.5	98.0
1998-2014	4576	97.5	2.5	98.9

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	199	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	201	70.1	69.9	86.7	69.9
2014	148	70.3	70.3	78.2	70.3
1998-2014	2970	68.3	68.3	70.5	68.5

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	142	70.3	70.3	72.9	70.3
2014	108	69.0	69.0	70.4	69.0
1998-2014	1606	67.1	67.0	73.6	67.0

By 2010, life expectancy at birth was 77.5 years for boys and 82.6 years for girls.

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	0.95	5.1	0.93	7.4	0.94	9.6	0.96
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	194	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	1.03	4.5	1.02	6.5	1.02	8.2	1.04
2013	199	8.7	0.96	4.4	0.94	6.4	0.94	8.1	0.96
2014	143	6.3	1.46	3.1	1.48	4.6	1.48	5.8	1.47
1998-2014	2892	9.0	0.95	4.8	0.92	7.1	0.93	8.9	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	0.84	3.5	0.85	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	0.84	2.5	0.82	3.6	0.82	4.2	0.83
2013	138	5.8	0.98	2.6	0.92	3.9	0.93	4.8	0.96
2014	104	4.4	1.44	2.1	1.29	3.0	1.34	3.6	1.41
1998-2014	1568	4.7	0.90	2.4	0.87	3.4	0.88	4.0	0.89

Table 13

Age distribution of age at death (cancer-related) for period 2007-2014
(**incl. multiple primaries**)

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
35-39	3	0.1	0.1	1	0.1	0.1	2	0.2	0.2
40-44	17	0.7	0.8	13	0.8	0.9	4	0.4	0.6
45-49	77	3.0	3.7	54	3.3	4.2	23	2.4	3.0
50-54	161	6.2	10.0	92	5.7	9.9	69	7.1	10.1
55-59	263	10.2	20.1	162	10.0	19.9	101	10.4	20.5
60-64	381	14.7	34.9	221	13.7	33.6	160	16.5	37.0
65-69	536	20.7	55.6	328	20.3	53.9	208	21.4	58.5
70-74	511	19.8	75.3	321	19.9	73.7	190	19.6	78.0
75-79	352	13.6	88.9	229	14.2	87.9	123	12.7	90.7
80-84	215	8.3	97.3	153	9.5	97.3	62	6.4	97.1
85+	71	2.7	100.0	43	2.7	100.0	28	2.9	100.0
All ages	2587	100.0		1617	100.0		970	100.0	

Included in the statistics are 25.2% multiple primaries in males and 22.2% in females.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2014
(**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			0.0		0.0			
35-39	1	2	0.1	0.50	0.2	1.00	0.6	0.8
40-44	13	4	0.8	0.76	0.3	0.57	2.8	0.6
45-49	54	23	3.4	0.90	1.5	0.61	5.3	1.9
50-54	92	69	7.1	0.83	5.4	0.79	4.9	3.9
55-59	162	101	15.3	0.92	9.0	0.94	5.2	3.9
60-64	221	160	22.5	0.87	15.1	0.86	4.6	4.5
65-69	328	208	34.1	1.00	19.9	0.96	4.6	4.0
70-74	321	190	35.3	1.04	18.2	1.07	3.5	2.9
75-79	229	123	41.6	1.05	17.2	0.99	2.7	2.0
80-84	153	62	43.8	1.14	11.1	1.27	2.1	0.9
85+	43	28	18.6	1.19	4.8	1.17	0.7	0.3
All ages	1617	970					3.2	2.2
Mortality								
Raw			9.0	0.98	5.2	0.95		
WS			4.6	0.95	2.6	0.91		
ES			6.7	0.97	3.7	0.92		
BRD-S			8.5	0.98	4.4	0.94		
PYLL-70								
per 100,000			48.2		30.8			
ES			42.0		26.1			
AYLL-70			8.9		8.6			

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

Table 15a

Multiple primaries in deaths in period 1998–2014
MALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03–C06	Oral cavity	22	3.4	20	90.9	1	4.5	1	4.5
C09–C10	Oropharynx	21	3.2	16	76.2	2	9.5	3	14.3
C12–C13	Hypopharynx	10	1.5	6	60.0	2	20.0	2	20.0
C15	Oesophagus	10	1.5	3	30.0	1	10.0	6	60.0
C16	Stomach	13	2.0	9	69.2	2	15.4	2	15.4
C18	Colon	33	5.1	22	66.7	6	18.2	5	15.2
C19–C20	Rectum	20	3.1	16	80.0	3	15.0	1	5.0
C22	Liver	8	1.2	2	25.0	2	25.0	4	50.0
C25	Pancreas	12	1.8			2	16.7	10	83.3
C32	Larynx	31	4.8	25	80.6	4	12.9	2	6.5
C33–C34	Lung	63	9.7			21	33.3	42	66.7
C43	Malign. melanoma	15	2.3	15	100.0				
C44	Skin others	48	7.4	35	72.9	1	2.1	12	25.0
C61	Prostate	121	18.6	104	86.0	7	5.8	10	8.3
C64	Kidney	22	3.4	15	68.2	3	13.6	4	18.2
C65	Renal pelvis	8	1.2	7	87.5			1	12.5
C67	Bladder	80	12.3	68	85.0	5	6.3	7	8.8
C70–C72	CNS cancer	16	2.5	5	31.3	6	37.5	5	31.3
C82–C85	NHL	29	4.5	22	75.9	3	10.3	4	13.8
C90	Mult. myeloma	8	1.2	3	37.5	1	12.5	4	50.0
C91–C96	Leukaemia	10	1.5	5	50.0	1	10.0	4	40.0
Other primaries		51	7.8	40	78.4	6	11.8	5	9.8
All mult. primaries		651	100.0	438	67.3	79	12.1	134	20.6

Multiple primaries with number of cases 1 to 6 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 1998-2014
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03-C06	Oral cavity	10	3.3	8	80.0	1	10.0	1	10.0
C18	Colon	13	4.3	6	46.2	2	15.4	5	38.5
C19-C20	Rectum	5	1.6	4	80.0			1	20.0
C21	Anus/canal	4	1.3	3	75.0	1	25.0		
C25	Pancreas	4	1.3			2	50.0	2	50.0
C32	Larynx	4	1.3	3	75.0			1	25.0
C33-C34	Lung	23	7.5			3	13.0	20	87.0
C43	Malign. melanoma	6	2.0	6	100.0				
C44	Skin others	10	3.3	10	100.0				
C50	Breast	100	32.8	89	89.0	5	5.0	6	6.0
C51	Vulva	8	2.6	6	75.0	1	12.5	1	12.5
C53	Cervix uteri	19	6.2	18	94.7			1	5.3
C54	Corpus uteri	13	4.3	12	92.3			1	7.7
C56	Ovary	8	2.6	7	87.5			1	12.5
C64	Kidney	8	2.6	7	87.5	1	12.5		
C67	Bladder	18	5.9	15	83.3	2	11.1	1	5.6
C70-C72	CNS cancer	7	2.3	2	28.6			5	71.4
C76-C79	CUP	4	1.3	4	100.0				
C82-C85	NHL	13	4.3	11	84.6	1	7.7	1	7.7
C91-C96	Leukaemia	4	1.3	1	25.0	1	25.0	2	50.0
Other primaries		24	7.9	19	79.2	3	12.5	2	8.3
All mult. primaries		305	100.0	231	75.7	23	7.5	51	16.7

Multiple primaries with number of cases 1 to 3 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 2007-2014
(**First 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			0.0		0.0			
35-39	1	2	0.1	0.50	0.2	1.00	0.6	0.9
40-44	13	4	0.8	0.76	0.3	0.57	3.1	0.7
45-49	51	18	3.2	0.89	1.2	0.58	5.5	1.8
50-54	90	57	7.0	0.85	4.5	0.77	5.6	3.8
55-59	147	88	13.8	0.93	7.8	0.97	5.6	4.1
60-64	196	137	20.0	0.91	12.9	0.87	5.0	4.8
65-69	272	175	28.3	0.98	16.8	0.99	4.8	4.3
70-74	254	158	27.9	1.08	15.1	1.05	3.6	3.1
75-79	169	102	30.7	1.06	14.3	1.11	2.7	2.1
80-84	113	51	32.4	1.23	9.1	1.24	2.1	1.0
85+	31	20	13.4	1.19	3.5	1.18	0.7	0.3
All ages	1337	812					3.5	2.4
Mortality								
Raw			7.4	0.99	4.3	0.97		
WS			3.9	0.96	2.2	0.92		
ES			5.6	0.97	3.1	0.94		
BRD-S			7.0	1.00	3.7	0.95		
PYLL-70								
per 100,000			44.3		26.2			
ES			38.7		22.1			
AYLL-70			9.2		8.6			

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2014
(**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			0.0		0.0			
35-39	1	2	0.1	0.50	0.2	1.00	0.6	1.0
40-44	13	4	0.8	0.76	0.3	0.67	3.3	0.8
45-49	49	17	3.1	0.89	1.1	0.55	5.7	1.9
50-54	87	56	6.7	0.84	4.4	0.76	6.1	4.2
55-59	144	85	13.6	0.92	7.6	0.96	6.2	4.5
60-64	186	134	18.9	0.90	12.6	0.86	5.5	5.5
65-69	260	172	27.0	0.98	16.5	0.99	5.5	5.1
70-74	247	154	27.1	1.07	14.7	1.04	4.4	3.7
75-79	160	97	29.1	1.03	13.6	1.08	3.3	2.4
80-84	110	49	31.5	1.20	8.7	1.23	2.7	1.2
85+	30	20	13.0	1.15	3.5	1.18	0.9	0.4
All ages	1287	790					4.1	2.8
Mortality								
Raw			7.1	0.98	4.2	0.96		
WS			3.7	0.95	2.1	0.91		
ES			5.4	0.96	3.0	0.92		
BRD-S			6.7	0.98	3.6	0.94		
PYLL-70								
per 100,000			42.8		25.5			
ES			37.4		21.6			
AYLL-70			9.3		8.6			

* See corresponding tables with multiple primaries.

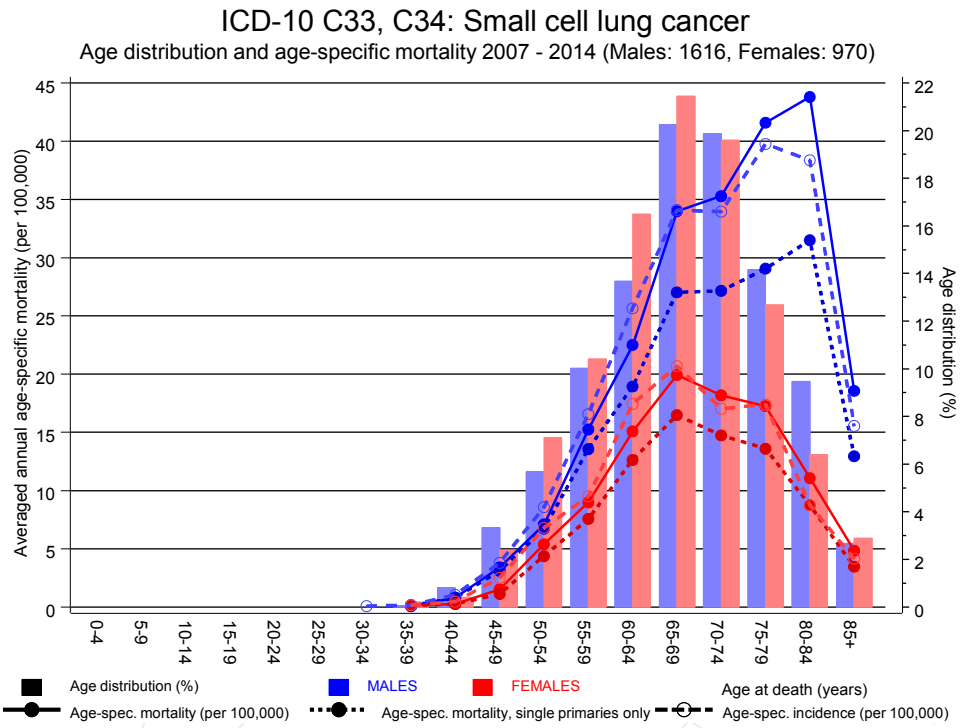
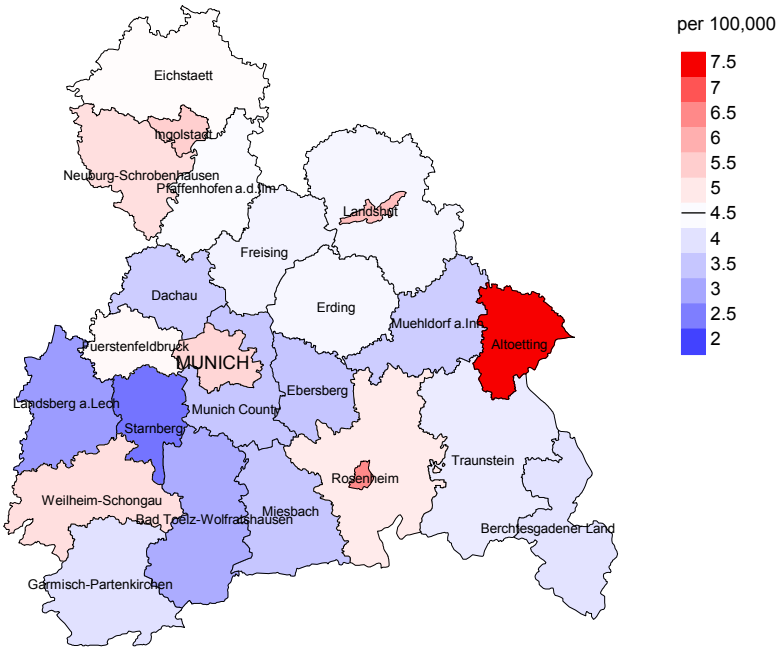


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

Average mortality (world standard population) 2007 - 2014: Males



Average mortality (world standard population) 2007 - 2014: Females

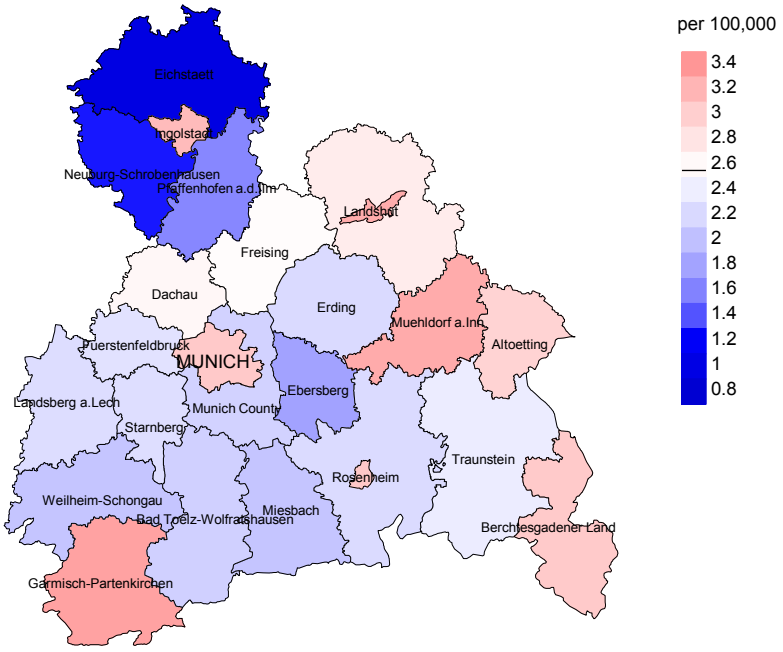


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2014. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 4.6/100,000 WS N=1,612, females 2.6/100,000 WS N=969).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,347 female residents (averaged) in the period from 2007 to 2014 a total of 19 women died from small cell LC. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 1.8/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.9 and 3.4/100,000.

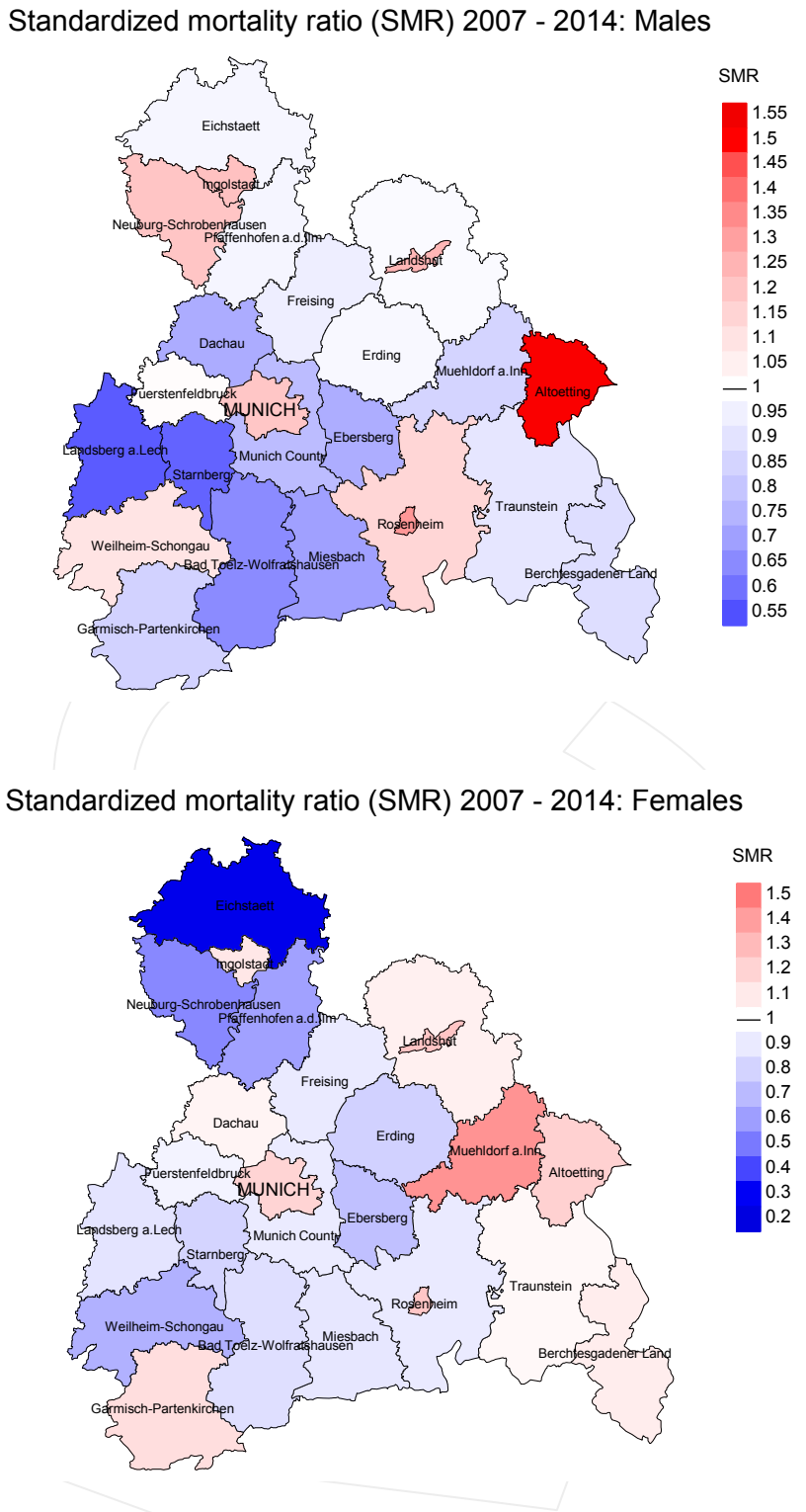


Figure 19b. Map of standardized mortality ratio (SMR) by county averaged for period 2007 to 2014. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=1,612, females N=969).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,924 female residents (averaged) in the period from 2007 to 2014 a total of 19 women died from small cell LC. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.72. Though, the value of this parameter may vary with an underlying probability of 99% between 0.37 and 1.27, 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, where applicable. 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

Recommended Citation

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Index of figures and tables