Munich Cancer Registry



- ▶ Survival
- ▶ Selection Matrix
- ▶ Homepage

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	1998-2012
Patients	4,229
Diseases	4,230
Creation date	03/20/2014
Export date	02/12/2014
Population	4.5 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 4.5 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.

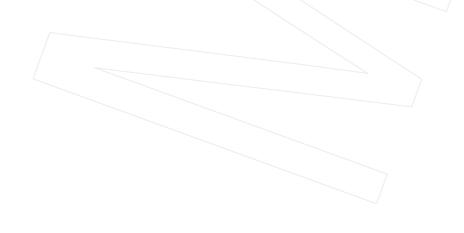
The foot notes describe the currentness of the data. The baseline statistics and survival data are updated annually. This yearly analysis comprises the Annual Report of the MCR. The time-delayed acquisition of data and the occasionally high DCO-rates indicate optimizing reserves, among others, because 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

				Prop.		Prop.
		DCO	Prop.	mult.	Prop.	actively
Year of	Cases	cases	DCO	primaries	deaths	followed
diagnosis	n	'n	%	%	%	%
1998	178	/ 1 /	0.6	12.4	93.8	97.2
1999	175			13.7	96.0	99.4
2000	156			15.4	94.2	100.0
2001	183			12.6	94.5	98.9
2002	282			13.5	94.7	97.9 #
2003	283			18.0	96.8	100.0 #
2004	293			15.0	96.6	99.0 #
2005	306	1	0.3	19.6	96.4	99.0 #
2006	295			16.9	93.9	98.0 #
2007	359			17.0	93.3	98.3 # ##
2008	338			16.3	91.4	93.5
2009	373			17.2	91.2	94.9
2010	362			18.8	90.6	96.1
2011	377			21.5	86.2	96.6
2012	270			18.5	63.0	98.9 ###
1998-2012	4230	2	0.0	16.9	91.2	97.6

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

^{##} Since 2007 the percentage of actively followed patients sharply declined compared to the previous years. This is a consequence of ambiguous data protection rules that currently forbid cancer registries in Bavaria to obtain the essential life status informations from competent registration offices.

^{###} Please be aware that data of recent annual patient cohorts may not yet be fully processed. Therefore, the presented figures and tables are potentially related to different time periods as pointed out in the respective headlines or legends.

Table 1a

Patient cohorts by year of diagnosis and gender including DCO cases

Year of	All	Males	Females	Prop. males	
diagnosis	n	n	n	%	
aragnobib			**	U	
1998	178	113	65	63.5	
1999	175	120	55	68.6	
2000	156	108	48	69.2	
2001	183	125	58	68.3	
2002	282	194	88	68.8	
2003	283	181	102	64.0	
2004	293	189	104	64.5	
2005	306	211	95	69.0	
2006	295	187	108	63.4	
2007	359	222	137	61.8	
2008	338	214	124	63.3	
2009	373	238	135	63.8	
2010	362	236	126	65.2	
2011	377	233	144	61.8	
2012	270	159	111	58.9	
1998-2012	4230	2730	1500	64.5	

Table 2

Incidence measures by year of diagnosis and gender including DCO cases (with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.52 m as of 2007, respectively)

			Males	Fem.	Males	Fem.	Males	Fem.	Males	Fem.
Year of	Males	Females	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.	Inc.
diagnosis	n	n	raw	raw	WS	WS	ES	ES	BRD-S	BRD-S
1998	113	65	10.2	5.5	6.2	3.0	9.0	4.2	11.3	5.0
1999	120	55	10.7	4.6	6.6	2.6	9.5	3.6	11.4	4.1
2000	108	48	9.5	4.0	5.7	2.3	8.3	3.2	10.2	3.6
2001	125	58	10.8	4.8	6.5	2.6	9.4	3.7	11.3	4.4
2002	194	88	10.4	4.5	6.1	2.5	8.9	3.5	11.0	4.1
2003	181	102	9.7	5.2	5.5	2.9	8.0	4.0	10.0	4.6
2004	189	104	10.0	5.3	5.7	2.9	8.2	4.0	9.9	4.6
2005	211	95	11.1	4.8	6.2	2.6	9.0	3.6	10.9	4.2
2006	187	108	9.8	5.4	5.5	2.9	7.9	4.1	9.5	4.7
2007	222	137	10.0	5.9	5.6	3.2	8.0	4.5	9.6	5.3
2008	214	124	9.6	5.3	5.2	2.8	7.6	4.0	9.4	4.6
2009	238	135	10.7	5.8	5.7	3.0	8.3	4.2	10.3	4.9
2010	236	126	10.5	5.4	5.4	2.9	7.9	4.0	9.9	4.6
2011	233	144	10.2	6.1	5.4	3.0	7.7	4.3	9.5	5.1
2012	159	111	7.0	4.7	3.7	2.4	5.3	3.4	6.4	4.0
1998-2012	2730	1500	9.9	5.2	5.5	2.8	8.0	3.9	9.8	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	Cases		Std.					Median		
diagnosis	n	Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	178	64.8	10.0	31.5	84.4	53.5	57.6	65.1	72.6	77.1
1999	175	64.7	10.4	36.4	94.7	52.7	57.6	64.6	71.2	78.6
2000	156	64.5	11.1	30.9	90.5	49.8	58.1	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	282	64.8	10.8	32.2	89.4	51.0	57.9	64.8	73.8	78.2
2003	283	65.8	10.3	39.5	88.7	52.6	58.9	66.1	73.2	79.3
2004	293	65.3	10.0	39.6	88.4	51.1	59.9	64.9	72.9	78.1
2005	306	66.1	9.9	40.5	93.7	53.3	59.2	66.8	72.4	79.5
2006	295	66.2	9.3	42.9	97.5	55,1	59.2	65.4	72.8	78.9
2007	359	65.7	9.6	36.8	91.2	52.7	59.5	66.2	72.3	78.2
2008	338	66.4	10.1	39.0	89.2	53.7	59.2	66.5	74.0	79.8
2009	373	67.3	9.9	37.0	91.2	53.7	60.6	67.7	74.4	80.0
2010	362	67.2	9.6	31.8	88.4	53.6	61.2	67.5	73.8	80.1
2011	377	67.8	9.6	42.7	93.7	54.8	62.8	68.4	73.8	79.7
2012	270	66.6	9.9	42.7	93.2	52.8	60.6	67.0	73.9	78.5
1998-2012	4230	66.1	10.0	30.9	97.5	53.0	59.5	66.3	73.2	79.1

Table 3a

Age distribution parameters by year of diagnosis (MALES)

(incl. DCO)

Year of	Cases		Std.					Median		
diagnosis	n	Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	113	64.9	10.0	31.5	83.1	54.5	57.7	65.1	72.6	77.1
1999	120	64.9	10.2	36.4	94.7	53.2	58.0	65.1	70.4	78.5
2000	108	65.0	10.8	30.9	90.5	50.8	58.3	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	194	64.9	10.6	32.2	86.1	52.0	57.9	65.1	74.1	78.2
2003	181	66.5	10.2	39.9	84.2	52.9	60.8	67.8	74.2	79.3
2004	189	65.7	10.0	39.6	85.4	50.5	60.8	66.2	73.0	77.9
2005	211	66.2	9.8	40.5	93.7	54.1	59.7	66.9	72.4	79.1
2006	187	66.3	9.1	42.9	87.1	53.5	59.3	66.2	72.9	78.6
2007	222	65.9	9.4	43.1	91.2	53.3	59.5	66.3	71.8	77.3
2008	214	66.7	10.1	42.9	87.1	53.7	59.3	67.3	74.5	79.7
2009	238	67.3	10.2	37.0	91.2	52.5	60.8	68.1	75.2	80.0
2010	236	67.9	10.2	31.8	88.4	53.1	61.1	68.0	75.3	81.1
2011	233	67.9	9.7	42.7	93.7	55.6	62.5	68.5	74.5	79.7
2012	159	66.7	10.1	42.7	92.8	52.5	60.8	66.8	74.1	80.0
1998-2012	2730	66.4	10.0	30.9	94.7	53.1	59.7	66.8	73.5	79.1

Table 3b

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

Year of	Cases		Std.					Median		
diagnosis	n	Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	65	64.8	10.2	38.9	84.4	49.3	57.6	64.6	72.1	75.7
1999	55	64.2	10.9	41.5	87.3	49.0	57.4	63.4	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	88	64.7	11.2	35.2	89.4	47.7	57.6	64.0	73.4	79.4
2003	102	64.5	10.5	39.5	88.7	52.6	57.5	63.9	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	108	66.2	9.7	42.9	97.5	55.7	59.2	64.5	71.7	80.4
2007	137	65.3	10.1	36.8	87.2	50.7	59.0	66.0	72.4	78.4
2008	124	66.0	10.2	39.0	89.2	54.0	59.1	65.8	72.7	80.2
2009	135	67.1	9.2	48.1	89.9	55.0	60.4	67.1	73.1	80.0
2010	126	65.9	8.1	48.1	85.6	54.0	61.4	65.7	71.3	75.6
2011	144	67.5	9.6	44.3	92.6	53.5	62.8	67.6	73.2	78.1
2012	111	66.6	9.7	43.6	93.2	53.1	60.4	67.3	73.8	77.6
1998-2012	1500	65.7	10.0	35.2	97.5	52.7	59.0	65.5	72.6	79.0

Age at									
diagnosis	Cases			Males			Females		
Years	n	%	Cum.%	n	96	Cum.%	n	%	Cum.%
30-34	5	0.1	0.1	5	0.2	0.2			0.0
35-39	13	0.3	0.4	8	0.3	0.5	5	0.3	0.3
40-44	70	1.7	2.1	48	1.8	2.2	22	1.5	1.8
45-49	175	4.1	6.2	104	3.8	6.0	71	4.7	6.5
50-54	315	7.4	13.7	197	7.2	13.3	118	7.9	14.4
55-59	554	13.1	26.8	347	12.7	26.0	207	13.8	28.2
60-64	762	18.0	44.8	465	17.0	43.0	297	19.8	48.0
65-69	805	19.0	63.8	529	19.4	62.4	276	18.4	66.4
70-74	686	16.2	80.0	466	17.1	79.5	220	14.7	81.1
75-79	503	11.9	91.9	337	12.3	91.8	166	11.1	92.1
80-84	264	6.2	98.2	177	6.5	98.3	87	5.8	97.9
85+	78	1.8	100.0	47	1.7	100.0	31	2.1	100.0
All ages	4230	100.0		2730	100.0		1500	100.0	

Included in the statistics are 20.6% multiple primaries in males and 20.1% in females.

Table 5

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

Age at diagnosis Years	Males n	Females	Age- spec. incid.	Age- spec. incid.	Males DCO rate n=2	Females DCO rate n=0 %	cancers	Females Prop.all cancers n=142297
0- 4 5- 9			0.0	0.0				
5- 9 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			0.4	
35-39	8	5	0.3	0.2			0.4	0.1
40 - 44	48	22	2.0	1.0			1.6	0.4
45-49	104	71	4.8	3.4			2.1	0.9
50-54	197	118	10.7	6.2			2.5	1.2
55-59	347	207	20.4	11.6			2.6	1.6
60-64 65-69	464	297	28.2	17.1			2.3	1.8
70-74	529 466	276 220	36.1 40.2	17.2 16.0			2.1 1.9	1.6 1.3
75-7 4 75-79	337	166	44.7	15.2	0.6		1.8	1.0
80-84	177	87	39.0	10.1	0.0		1.4	0.6
85+	47	31	15.2	3.8			0.5	0.2
All ages	2729	1500			0.1	0.0	1.9	1.1
- ' 1								
Incidence			9.9	г о				
Raw			5.5	5.2 2.8				
WS ES			8.0	3.9				
BRD-S			9.8	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 1998-2012

MALES

	Observed	Expected		LCL	UCL		DCO
Diagnosis	n	n	SIR	95%	95%	EAR	%
C09-C10 Oropharynx	4	0.4	10.1	2.7	25.8 #	17.3	
C15 Oesophagus	2	0.6	3.3	0.4	12.1	6.7	100.0
C18 Colon	4 /	3.1	1.3	0.3	3.3	4.3	
C19-C20 Rectum	3/	1.9	1.6	0.3	4.6	5.3	33.3
C22 Liver	3	0.9	3.4	0.7	9.9	10.2	33.3
C25 Pancreas	8	1.1	7.6	3.3	14.9 #	33.4	62.5
C32 Larynx	/ 4	0.4	10.5	2.9	26.9 #	17.4	25.0
C33-C34 Lung	16	4.0	4.0	2.3	6.6 #	57.9	12.5
C61 Prostate	9	10.0	0.9	0.4	1.7	-4.8	11.1
C64 Kidney	5	1.2	4.2	1.4	9.8 #	18.3	20.0
C70-C72 CNS cancer	2	0.4	4.6	0.6	16.5	7.5	100.0
C82-C85 NHL	3	1.2	2.4	0.5	7.1	8.5	
C91-C96 Leukaemia	2	0.5	4.3	0.5	15.6	7.4	50.0
Other primaries	7	3.7	1.9	0.8	3.9	15.9	28.6
Not observed	0	3.6	0.0	0.0	1.0	-17.3	
All mult. primaries	72	32.9	2.2	1.7	2.8 #	188.1	26.4

Patients	1990
Mean age at second malignancy (years)	69.3
Person-years	2079
Mean observation time (years)	1.0
Median observation time (years)	0.7

The occurrence of second malignancy is statistically significant.

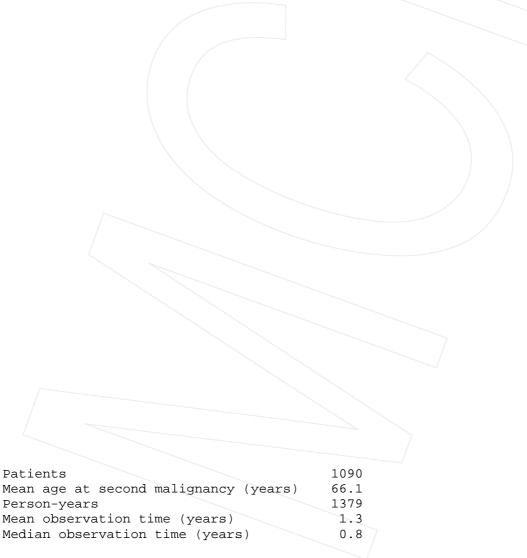
Observed second primaries with count 1 are pooled in category "Other primaries".

Table 6b

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries

for period 1998-2012 FEMALES

	Observed I	Expected		LCL	UCL		DCO
Diagnosis	n	n	SIR	95%	95%	EAR	%
C25 Pancreas	2	0.5	4.2	0.5	15.3	11.1	50.0
C33-C34 Lung	9	1.0	8.7	4.0	16.6 #	57.8	22.2
C50 Breast	4 /	4.7	0.9	0.2	2.2	-5.0	25.0
C67 Bladder	3/	0.2	16.1	3.3	47.0 #	20.4	
C70-C72 CNS cancer	2	0.2	10.2	1.2	36.8 #	13.1	
C91-C96 Leukaemia	2	0.2	11.1	1.3	40.0 #	13.2	
Other primaries	10	3.3	3.0	1.4	5.5 #	48.3	50.0
Not observed	0	3.6	0.0	0.0	1.0	-26.0	
All mult. primaries	32	13.7	2.3	1.6	3.3 #	132.8	28.1



The occurrence of second malignancy is statistically significant.

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

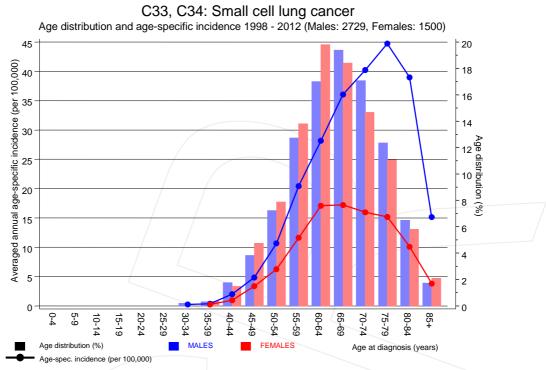


Figure 7. Age distribution and age-specific incidence



C33, C34: Small cell lung cancer Age-specific incidence in international comparison Average population 70 Region MCR Period 2002-2011 4.2 m ······· SEER 2004-2009 49.8 m 60 10 0-4 80-84 70-74 75-79

Age at diagnosis (years)

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

MALES



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.

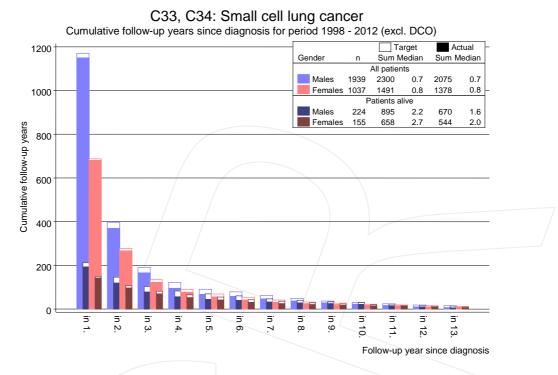
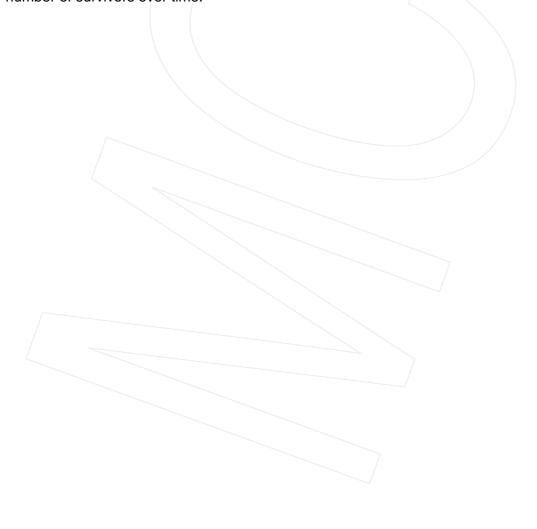
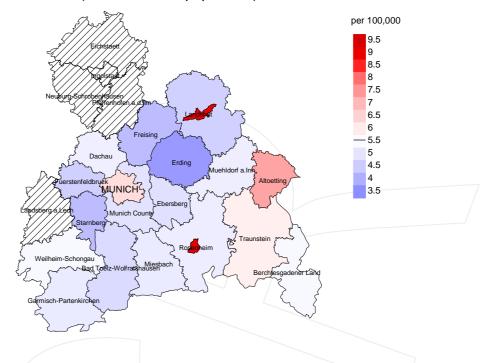


Figure 8. Cumulative follow-up years depending on time since diagnosis

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

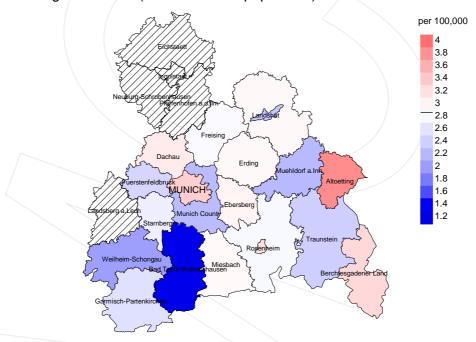
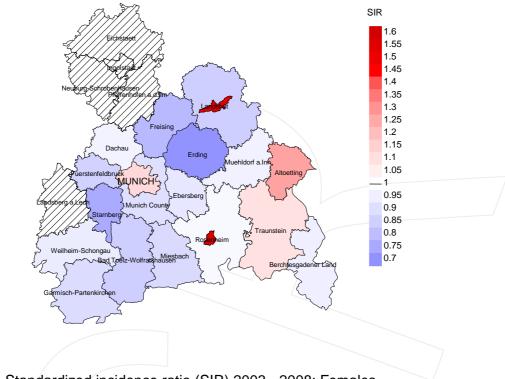


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 5.6/100,000 WS N=1,144, females 2.9/100,000 WS N=643). 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 20 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 3.0/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.5 and 5.4/100,000.

Standardized incidence ratio (SIR) 2003 - 2008: Males



Standardized incidence ratio (SIR) 2003 - 2008: Females

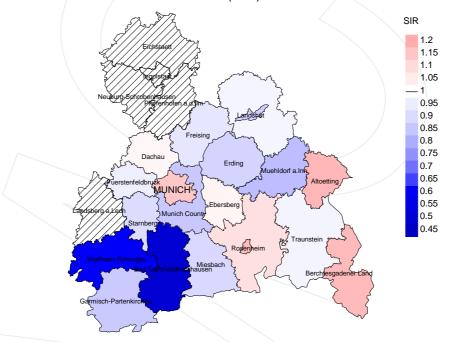


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=1,144, females N=643). 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 20 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 1.03. Though, the value of this parameter may vary with an underlying probability of 99% between 0.53 and 1.78, 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)

		Prop.				Prop. deaths
	Incident	actively	Prop.		Prop.	with death
Year of	cases	followed	DCO	Deaths	deaths	certific.
diagnosis	n	%	%	n	%	%
1998	178	97.2	0.6	167	93.8	91.0
1999	175	99.4		168	96.0	94.6
2000	156	100.0		147	94.2	93.2
2001	183	98.9		173	94.5	94.2
2002	282	97.9		267	94.7	95.5
2003	283	100.0		274	96.8	97.4
2004	293	99.0		283	96.6	95.4
2005	306	99.0	0.3	295	96.4	98.6
2006	295	98.0		277	93.9	98.9
2007	359	98.3		335	93.3	99.4
2008	338	93.5		309	91.4	98.4
2009	373	94.9		340	91.2	98.8
2010	362	96.1		328	90.6	99.1
2011	377	96.6		325	86.2	99.1
2012	270	98.9		170	63.0	95.3
1998-2012	4230	97.6	0.0	3858	91.2	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)

			Prop.		
			deaths		Prop.
Year of	Incident		with death	Deaths in	deaths in
diagnosis/	cases	Deaths	certific.	same year	same year
death	n	/ n /	%	n	%
1998	178	142	89.4	57	32.0
1999	175	157	91.1	66	37.7
2000	156	159	95.6	60	38.5
2001	183	156	90.4	61	33.3
2002	282	242	96.3	109	38.7
2003	283	249	98.8	107	37.8
2004	293	285	97.2	117	39.9
2005	306	278	96.8	123	40.2
2006	295	289	97.9	115	39.0
2007	359	332	98.5	144	40.1
2008	338	326	99.7	124	36.7
2009	373	344	98.8	140	37.5
2010	362	352	98.9	153	42.3
2011	377	365	99.7	158	41.9
2012	270	316	99.1	108	40.0
1998-2012	4230	3992	97.4	1642	38.8

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)

				Prop. cancer	
		Drop	Prop.	recorded	
		Prop.			
		cancer-	not cancer-	on death	
Year of	Deaths	related	related	certificate	
death	n	%	8	8	
1998	142	95.8	4.2	99.2	
1999	157	94.3	5.7	99.3	
2000	159	96.2	3.8	98.7	
2001	156	93.6	6.4	97.9	
2002	242	96.3	3.7	99.1	
2003	249	98.8	1.2	99.2	
2004	285	98.9	1.1	99.3	
2005	278	97.5	2.5	99.3	
2006	289	96.5	3.5	97.9	
2007	332	97.3	2.7	98.2	
2008	326	98.5	1.5	99.1	
2009	344	98.3	1.7/	99.7	
2010	352	98.9	1.1	98.9	
2011	365	98.4	1.6	99.5	
2012	316	97.5	2.5	98.7	
1998-2012	3992	97.5	2.5	98.9	

Table 11a $\begin{tabular}{ll} Means of age at death according to the grouping in Table 10 \\ \hline MALES \end{tabular}$

					Age at
		Age at	Age at	Age at	death
		death	death	death	(according
		(all	(cancer-	(not cancer-	to death
Year of	Deaths	causes)	related)	related)	certificate)
death	n	Years	Years	Years	Years
1998	95	65.7	65.6	68.9	66.3
1999	106	66.1	66.3	62.3	67.0
2000	109	67.3	67.2	69.6	67.5
2001	110	66.9	67.2	61.8	67.6
2002	164	67.0	67.0	67.5	67.0
2003	175	66.9	67.0	49.4	67.0
2004	185	67.1	67.0	74.6	67.1
2005	189	67.7	67.9	62.3	67.8
2006	200	66.9	66.4	78.2	66.7
2007	216	67.8	67.8	67.9	67.9
2008	202	67.6	67.6	68.6	67.7
2009	215	67.7	67.7	71.8	67.7
2010	240	69.3	69.3	73.3	69.3
2011	224	68.8	68.8	65.5	68.7
2012	200	68.2	67.9	74.9	68.1
1998-2012	2630	67.6	67.6	68.9	67.7

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

					Age at
		Age at	Age at	Age at	death
		death	death	death	(according
		(all	(cancer-	(not cancer-	to death
Year of	Deaths	causes)	related)	related)	certificate)
death	n	Years	Years	Years	Years
1998	47	65.2	64.9	69.8	65.5
1999	51	67.6	67.6	67.7	67.3
2000	50	64.3	64.3		64.5
2001	46	66.6	65.6	74.4	65.4
2002	78	65.8	65.6	71.0	65.7
2003	74	67.1	66.8	77.9	66.9
2004	100	66.9	66.6	89.3	66.5
2005	89	65.5	65.4	81.4	65.3
2006	89	66.1	65.9	74.7	65.8
2007	116	67.3	67.4	61.8	67.5
2008	124	67.5	67.5		67.5
2009	129	68.1	68.0	78.7	68.0
2010	112	67.0	67.0		67.0
2011	141	67.2	67.2	67.2	67.3
2012	116	67.4	67.4	67.4	67.4
1998-2012	1362	66.9	66.7	71.8	66.8



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 $\begin{tabular}{ll} Mortality measures (cancer-related death) and mortality-incidence-index \\ by year of death \\ \hline MALES \\ \end{tabular}$

Year of	Deaths	Mort.	MI-Index	Mort.	MI-Index	Mort.	MI-Index	Mort.	MI-Index
death	n	raw	raw	WS	WS	ES	ES	BRD-S	BRD-S
1998	92	8.3	0.81	5.1	0.83	7.4	0.82	9.2	0.82
1999	99	8.8	0.83	5.3	0.80	7.8	0.82	9.8	0.87
2000	103	9.0	0.95	5.4	0.94	8.0	0.96	10.0	0.98
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	0.80	7.2	0.81	9.0	0.81
2003	174	9.3	0.96	5.2	0.94	7.6	0.95	9.7	0.97
2004	183	9.7	0.97	5.4	0.94	7.9	0.97	9.9	1.00
2005	183	9.7	0.87	5.2	0.83	7.6	0.85	9.7	0.89
2006	192	10.0	1.03	5.5	1.01	7.9	1.00	9.7	1.01
2007	210	9.5	0.95	5.0	0.89	7.4	0.93	9.4	0.98
2008	197	8.9	0.92	4.7	0.90	6.9	0.90	8.6	0.91
2009	211	9.5	0.89	5.0	0.88	7.3	0.88	9.0	0.87
2010	236	10.5	1.00	5.2	0.96	7.7	0.98	10.1	1.01
2011	222	9.7	0.95	5.0	0.92	7.3	0.94	9.2	0.96
2012	193	8.4	1.21	4.4	1.17	6.3	1.19	7.8	1.22
1998-2012	2559	9.3	0.94	5.0	0.91	7.4	0.92	9.3	0.95

Table 12b

Mortality measures (cancer-related death) and mortality-incidence-index by year of death

FEMALES

Year of	Deaths	Mort.	MI-Index	Mort.	MI-Index	Mort.	MI-Index	Mort.	MI-Index
death	n	raw	raw	WS	WS	ES	ES	BRD-S	BRD-S
1998	44	3.7	0.68	2.0	0.65	2.8	0.68	3.3	0.66
1999	49	4.1	0.89	2.1	0.79	2.9	0.82	3.7	0.89
2000	50	4.2	1.04	2.4	1.02	3.3	1.03	3.8	1.06
2001	41	3.4	0.71	1.9	0.73	2.6	0.70	3.0	0.70
2002	74	3.8	0.84	2.0	0.81	2.9	0.83	3.4	0.84
2003	72	3.7	0.71	1.9	0.66	2.7	0.68	3.2	0.69
2004	99	5.0	0.95	2.6	0.90	3.6	0.91	4.4	0.95
2005	88	4.4	0.93	2.4	0.94	3.3	0.93	3.8	0.92
2006	87	4.3	0.81	2.3	0.80	3.2	0.79	3.8	0.81
2007	113	4.9	0.82	2.5	0.77	3.6	0.79	4.3	0.80
2008	124	5.3	1.00	2.7	0.96	3.8	0.96	4.6	0.98
2009	127	5.5	0.94	2.7	0.91	3.8	0.91	4.6	0.94
2010	112	4.8	0.89	2.5	0.85	3.5	0.86	4.0	0.87
2011	137	5.8	0.95	3.0	0.99	4.2	0.99	4.9	0.96
2012	115	4.9	1.04	2.5	1.00	3.5	1.01	4.1	1.02
1998-2012	1332	4.6	0.89	2.4	0.86	3.4	0.87	4.0	0.88

Table 13

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

Age at									
death	Cases			Males			Females		
Years	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
30-34	1	0.0	0.0	1	0.0	0.0			0.0
35-39	10	0.3	0.3	6	0.2	0.3	4	0.3	0.3
40-44	42	1.1	1.4	29	1.1	1.4	13	1.0	1.3
45-49	140	3.6	5.0	87	3.4	4.8	53	4.0	5.3
50-54	231	5.9	10.9	143	5.6	10.4	88	6.6	11.9
55-59	477	12.2	23.1	303	11.8	22.2	174	13.1	24.9
60-64	642	16.5	39.6	390	15.2	37.4	252	18.9	43.8
65-69	790	20.3	59.9	532	20.8	58.2	258	19.4	63.2
70-74	675	17.3	77.2	466	18.2	76.4	209	15.7	78.9
75-79	487	12.5	89.8	341	13.3	89.7	146	11.0	89.9
80-84	309	7.9	97.7	209	8.2	97.9	100	7.5	97.4
85+	90	2.3	100.0	55	2.1	100.0	35	2.6	100.0
All ages	3894	100.0		2562	100.0		1332	100.0	

Included in the statistics are 20.6% multiple primaries in males and 20.1% in females.

Table 14

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

Age at			Males Age-		Females Age-		Males	Females Prop.all
death	Males	Females			spec.		cancers	cancers
Years	n	n		MI-index		MI-index		%
			7				•	-
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	0.3		0.2	0.80	1.6	0.8
40-44	29	13	1.2		0.6	0.59	3.6	1.2
45-49	87	53	4.0	0.84	2.5		5.1	2.8
50-54	143	88	7.7	0.73	4.7		4.7	3.1
55-59	303	174	17.8	0.87	9.8		5.5	3.9
60-64	390	252	23.7		14.5		4.7	4.2
65-69	532	258	36.3		16.1		4.7	3.4
70-74	466	209	40.2	1.00	15.2		3.8	2.3
75-79	341	146	45.3		13.3		2.8	1.5
80-84	209	100	46.0	1.18	11.6		2.1	1.0
85+	55	35	17.7	1.17	4.3	1.13	0.7	0.3
	25.50	1000					\	
All ages	2562	1332					3.5	2.0
Na								
Mortality			9.3	0 04	1 (0 00		
Raw			5.0		4.6 2.4			
WS				0.91				
ES BRD-S			7.4 9.3	0.92 0.95	3.4 4.0	0.87		
BKD-2			9.3	0.95	4.0	0.00		
PYLL-70								
per 100,000			54.6		32.3			
ES			48.1		27.4			
AYLL-70			9.1		9.4			

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

Table 15a

Multiple primaries in deaths in period 1998-2012

MALES

	Total	Total	Pre	Pre	Syn- chron ±30d	Syn- chron ±30d	Post	Post
Diagnosis	n /	%↓	n	← %	n	← %	n	← %
	/			<u> </u>				
C03-C06 Oral cavity	22	4.1	20	90.9	\ 1	4.5	1	4.5
C09-C10 Oropharynx	16	3.0	12	75.0	2	12.5	2	12.5
C12-C13 Hypopharynx	9	1.7	6	66.7	1	11.1	2	22.2
C15 Oesophagus	9	1.7	2	22.2	1	11.1	6	66.7
C16 Stomach	/ 11	2.0	7	63.6	2	18.2	2	18.2
C18 Colon	/ 31 /	5.7	21	67.7	5	16.1	5	16.1
C19-C20 Rectum	17	3.1	14	82.4	2	11.8	1	5.9
C22 Liver	6	1.1	1	16.7	/ 1	16.7	4	66.7
C25 Pancreas	9	1.7			2	22.2	7	77.8
C32 Larynx	28	5.2	22	78.6	4	14.3	2	7.1
C33-C34 Lung	53	9.8			21	39.6	32	60.4
C43 Malign. melanoma	11	2.0	11	100.0				
C44 Skin others	34	6.3	26	76.5	1	2.9	7	20.6
C61 Prostate	94	17.4	78	83.0	6	6.4	10	10.6
C62 Testis	6	1.1	6	100.0				
C64 Kidney	19	3.5	13	68.4	_ 3	15.8	3	15.8
C65 Renal pelvis	5	0.9	4	80.0			1	20.0
C67 Bladder	66	12.2	57	86.4	4	6.1	5	7.6
C70-C72 CNS cancer	15	2.8	5	33.3	5	33.3	5	33.3
C76-C79 CUP	5	0.9	3	60.0	1	20.0	1	20.0
C82-C85 NHL	27	5.0	21	77.8	2	7.4	4	14.8
C90 Mult. myeloma	7	1.3	3	42.9	1 \	14.3	3	42.9
C91-C96 Leukaemia	8	1.5	4	50.0	1	12.5	3	37.5
Other primaries	33	6.1	25	75.8	4	12.1	4	12.1
All mult. primaries	541	100.0	361	66.7	70	12.9	110	20.3

Multiple primaries with number of cases n<5 are pooled in category "Other primaries".

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

Table 15b

Multiple primaries in deaths in period 1998-2012
FEMALES

					Syn- chron	Syn- chron		
	Total	Total	Pre	Pre	±30d	±30d	Post	Post
Diagnosis	n	%↓	n	-%	n	±30α ←%	n	-%
Diagnobio		• •				. •		. 0
C03-C06 Oral cavity	8	3.1	6	75.0	1	12.5	1	12.5
C09-C10 Oropharynx	3	1.2	3	100.0				
C15 Oesophagus	3	1.2	1	33.3	1	33.3	1	33.3
C16 Stomach	2	0.8	2	100.0				
C17 Small intestine	2	0.8	1	50.0			1	50.0
C18 Colon	/ 11 /	4.3	6	54.5	2	18.2	3	27.3
C19-C20 Rectum	/ 3	1.2	3	100.0			_	
C21 Anus/canal	2	0.8	1	50.0	/ 1	50.0		
C23-C24 Bile	2	0.8	2	100.0				
C25 Pancreas	4	1.6			2	50.0	2	50.0
C32 Larynx	2	0.8	2	100.0				
C33-C34 Lung	17	6.7			3	17.6	14	82.4
C43 Malign. melanoma	5	2.0	5	100.0				
C44 Skin others	7	2.7	7	100.0				
C50 Breast	82	32.2	72	87.8	5	6.1	5	6.1
C51 Vulva	6	2.4	4	66.7	_ 1	16.7	$\sqrt{1}$	16.7
C52 Vagina	2	0.8	2	100.0				
C53 Cervix uteri	18	7.1	17	94.4			1	5.6
C54 Corpus uteri	13	5.1	12	92.3			1	7.7
C56 Ovary	7	2.7	7	100.0				
C64 Kidney	8	3.1	7	87.5	1	12.5		
C67 Bladder	17	6.7	14	82.4	2	11.8	1	5.9
C70-C72 CNS cancer	7	2.7	2	28.6			5	71.4
C73 Thyroid	2	0.8	2	100.0				
C76-C79 CUP	3	1.2	3	100.0				
C82-C85 NHL	10	3.9	8	80.0	1	10.0	1	10.0
C91-C96 Leukaemia	4	1.6	1	25.0	1	25.0	2	50.0
Other primaries	5	2.0	4	80.0	1	20.0		
All mult. primaries	255	100.0	194	76.1	22	8.6	39	15.3

Multiple primaries with number of cases n<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 1998-2012

(Singular primaries only *)

Age at			Males Age-		Females Age-			Females Prop.all
death		Females		N/T - 1	spec.	N.T. ' 1	cancers	cancers
Years	n	n	mortal.	MI-index	mortal.	MI-index	%	%
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	0.3	0.75	0.2	0.80	1.7	0.9
40-44	28	13	1.2	0.62	0.6	0.62	3.7	1.4
45-49	83	46	3.9	0.84	2.2	0.75	5.4	2.8
50-54	138	76	7.5	0.73	4.0	0.73	5.1	3.1
55-59	280	158	16.5	0.89	8.9	0.86	5.8	4.2
60-64	357	216	21.7	0.88	12.4	0.85	5.1	4.4
65-69	445	226	30.3	0.98	14.1	0.97	4.9	3.6
70-74	376	177	32.4	1.01	12.8	0.95	3.8	2.5
75-79	258	115	34.2		10.5	0.90	2.8	1.5
80-84	167	86	36.8		10.0	1.18	2.2	1.0
85+	42	25	13.5	1.17	3.1	1.14	0.7	0.2
	\	.\					\	
All ages	2181	1142					3.7	2.1
Mass+ - 1 - +								
Mortality Raw			7.9	0.94	4.0	0 00		
Kaw WS			4.4			0.90 0.87		
ws ES			6.3		2.1 2.9	0.87		
BRD-S			7.8	0.95	3.4			
PKD-2			7.0	0.93	3.4	0.09		
PYLL-70								
per 100,000			50.8		28.6			
ES			44.8		24.3			
AYLL-70			9.4		9.5			

^{*} 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 *)

			Males		Females		Males	Females
Age at			Age-		Age-		_	Prop.all
death		Females	_ /		spec.		cancers	cancers
Years	n	n	mortal.	MI-index	mortal.	MI-index	%	%
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	4 0
35-39	6	4	0.3		0.2	0.80	1.7	1.0
40-44	28	13	1.2		0.6	0.62	3.9	1.5
45-49	82	44	3.8	0.85	2.1		5.7	3.0
50-54	136	75	7.4		4.0	0.74	5.6	3.4
55-59	276	154	16.2		8.6		6.3	4.6
60-64	348	213	21.1		12.2	0.85	5.6	4.9
65-69	432	224	29.4		14.0		5.5	4.2
70-74	364	170	31.4		12.3		4.4	2.8
75-79	244	112	32.4		10.2		3.3	1.7
80-84	161	83	35.5		9.6		2.7	1.2
85+	41	25	13.2	1.14	3.1	1.14	0.8	0.3
		\						
All ages	2119	1117					4.2	2.4
Mortality								
Raw			7.7		3.9			
WS			4.3		2.0	0.87		
ES			6.2		2.9			
BRD-S			7.6	0.94	3.4	0.89		
PYLL-70								
per 100,000			49.9		28.0			
ES			44.1		23.8			
AYLL-70			9.4		9.5			

^{*} See corresponding tables with multiple primaries.

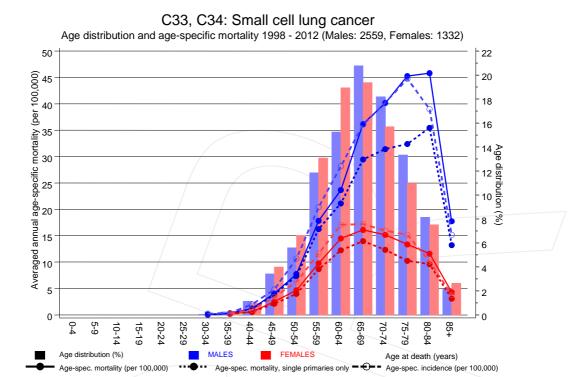
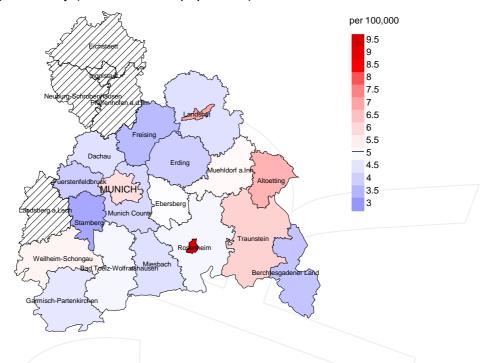


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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) 2003 - 2008: Males



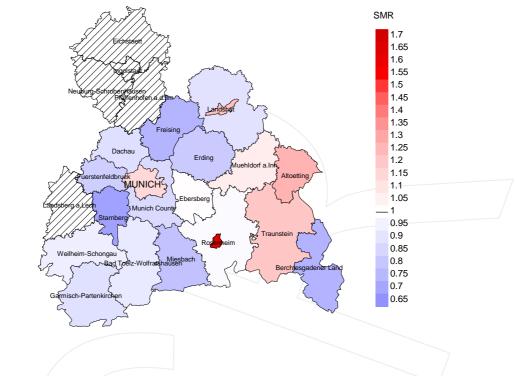
Average mortality (world standard population) 2003 - 2008: Females



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 5.1/100,000 WS N=1,085, females 2.4/100,000 WS N=560). 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 19 women died from small cell LC. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 2.6/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.3 and 4.8/100,000.

Standardized mortality ratio (SMR) 2003 - 2008: Males



Standardized mortality ratio (SMR) 2003 - 2008: Females



Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=1,085, females N=560). 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 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 1.13. Though, the value of this parameter may vary with an underlying probability of 99% between 0.57 and 1.98, 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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