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

CLL: Chronic lymph. leukaemia (morph.)

Year of diagnosis	1998-2011
Patients	2452
Diseases	2455
Creation date	04/02/2013
Export date	01/03/2013
Population	4.5 m

http://www.tumorregister-muenchen.de/en/facts/base/base_hCLL_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, April 2013

[#] Base data has been collected since 1998. An increase in new diseases is apparent, which is an effect of two extensions in the MCR catchment area (from a base population of 2.51 million to 3.96 in 2002, and to 4.52 million in 2007). Death certificates from 2011 are incorporated into these analyses.

[##] Due to the high frequency and good prognosis of non-malignant skin cancer (C44), no systematic ascertainment is performed for this diagnosis. C44 is not designated as a primary, but rather as a secondary tumor.

[###] DCO (death certificate only) identifies a cancer case that first becomes available to the MCR through the death certificate. A high proportion of DCO cases (≥5%) in particular cancer types indicate insufficient participation of specific cancer specializations.

Some remarks regarding this cancer type

The results for leukemias should be interpreted with caution. As with other primarily non-surgically or non-radiologically treated cancer diseases, the MCR hardly manages to obtain even the simplest information on this cancer. The proportion of DCO cases indicates a situation that is far away from a satisfying cooperation. In the group of institutions that potentially participate in reporting are a few hospitals that refuse any contribution to MCR.

ICD-10 codes used for specifying cancer site

ICD-10	Description
C91.1	Chronic lymphocytic leukaemia of B-cell type

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

Code	Description
9670/3	Malignant lymphoma, small B lymphocytic, NOS
9823/3	B-cell chronic lymphocytic leukemia/small lymphocytic lymphoma

INCIDENCE

Table 1

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

Year of diagnosis	Cases # n	DCO cases n	Prop. DCO %	Prop. mult. primaries %	Prop. deaths %	Prop. actively followed %
1998	97	8	8.2	22.7	69.1	96.9
1999	91	7	7.7	36.3	67.0	98.9
2000	94	16	17.0	36.2	73.4	96.8
2001	137	36	26.3	25.5	70.1	99.3
2002	248	74	29.8	29.0	75.4	96.8
2003	208	64	30.8	26.0	64.4	97.6
2004	220	52	23.6	30.0	58.6	93.6
2005	191	53	27.7	35.1	66.0	94.8
2006	202	34	16.8	41.6	54.0	92.1
2007	237	54	22.8	28.3	48.5	84.0 ##
2008	203	44	21.7	38.4	46.8	76.8
2009	202	48	23.8	28.2	40.1	76.2
2010	172	52	30.2	32.6	44.2	89.5
2011	153	49	32.0	33.3	38.6	84.3 ###
1998-2011	2455	591	24.1	31.6	57.2	90.4

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

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

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

Table 1a

Patient cohorts by year of diagnosis and gender
including DCO cases

Year of diagnosis	All n	Males n	Females n	Prop. males %
1998	97	52	45	53.6
1999	91	47	44	51.6
2000	94	58	36	61.7
2001	137	73	64	53.3
2002	248	138	110	55.6
2003	208	130	78	62.5
2004	220	123	97	55.9
2005	191	119	72	62.3
2006	202	130	72	64.4
2007	237	139	98	58.6
2008	203	114	89	56.2
2009	202	115	87	56.9
2010	172	98	74	57.0
2011	153	82	71	53.6
1998-2011	2455	1418	1037	57.8

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 4.52 m as of 2007, respectively)

Year of diagnosis	Males n	Females n	Males Inc. raw	Fem. Inc. raw	Males Inc. WS	Fem. Inc. WS	Males Inc. ES	Fem. Inc. ES	Males Inc. BRD-S	Fem. Inc. BRD-S
1998	52	45	4.7	3.8	2.8	1.7	4.2	2.6	5.5	3.2
1999	47	44	4.2	3.7	2.4	1.9	3.7	2.7	4.9	3.3
2000	58	36	5.1	3.0	3.1	1.3	4.6	2.0	5.4	2.5
2001	73	64	6.3	5.3	3.7	2.2	5.6	3.3	7.2	4.2
2002	138	110	7.4	5.6	4.2	2.2	6.2	3.3	8.0	4.4
2003	130	78	6.9	4.0	3.7	1.5	5.7	2.4	7.5	3.1
2004	123	97	6.5	4.9	3.5	2.1	5.3	3.0	7.0	3.9
2005	119	72	6.3	3.6	3.1	1.3	4.9	2.1	6.7	2.9
2006	130	72	6.8	3.6	3.5	1.3	5.4	2.0	7.1	2.7
2007	139	98	6.3	4.2	3.1	1.6	4.8	2.5	6.6	3.2
2008	114	89	5.1	3.8	2.4	1.4	3.7	2.1	5.0	2.8
2009	115	87	5.2	3.7	2.6	1.3	3.9	2.0	5.0	2.6
2010	98	74	4.3	3.2	1.9	1.0	3.1	1.6	4.3	2.2
2011	82	71	3.6	3.0	1.7	0.9	2.6	1.5	3.4	2.0
1998-2011	1418	1037	5.6	3.9	2.9	1.5	4.5	2.3	5.9	3.0

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	97	68.2	12.9	33.9	95.8	54.0	59.7	67.5	77.8	84.2
1999	91	66.7	12.0	31.9	89.4	52.3	58.5	67.4	76.8	80.4
2000	94	69.0	11.2	46.5	91.2	54.7	60.5	67.8	77.2	86.5
2001	137	71.1	11.8	40.5	94.0	57.1	63.6	69.4	78.7	87.7
2002	248	71.4	12.3	28.6	95.0	55.9	63.0	71.2	80.3	88.3
2003	208	71.7	12.1	35.6	98.9	55.7	63.5	72.4	80.7	87.7
2004	220	71.0	12.3	29.8	98.6	56.1	63.6	72.1	79.9	86.4
2005	191	73.3	11.2	34.4	97.1	58.5	65.9	75.1	80.5	86.3
2006	202	72.3	11.8	30.0	95.4	56.9	65.1	73.1	80.7	86.5
2007	237	72.2	12.8	37.6	99.8	53.1	63.5	73.7	81.9	87.3
2008	203	74.1	10.6	42.6	97.4	61.2	67.2	73.1	81.7	88.2
2009	202	72.5	12.9	28.2	98.6	55.7	63.2	72.9	82.9	88.1
2010	172	75.9	12.0	42.8	101	60.0	68.5	77.1	84.3	89.5
2011	153	74.5	12.7	41.8	101	55.0	67.5	74.9	84.3	90.0
1998-2011	2455	72.1	12.2	28.2	101	56.1	63.9	72.6	81.1	87.7

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	52	66.2	13.2	33.9	95.8	51.8	57.7	64.6	75.8	82.5
1999	47	66.3	12.8	31.9	89.4	52.0	56.4	64.6	78.7	82.6
2000	58	67.6	10.5	46.5	91.1	53.5	60.5	67.3	72.3	85.0
2001	73	68.1	11.1	40.5	90.7	56.2	61.4	67.9	76.2	83.2
2002	138	68.5	11.7	28.6	90.9	54.1	61.9	68.1	76.8	84.1
2003	130	69.9	11.0	35.6	90.7	55.8	63.1	70.3	77.4	84.0
2004	123	70.1	11.7	29.8	95.2	57.6	62.9	70.6	77.8	82.5
2005	119	71.6	11.1	34.4	91.3	55.9	65.7	72.4	79.3	85.1
2006	130	70.8	11.5	30.0	95.4	55.5	63.1	71.6	78.2	85.4
2007	139	70.3	12.5	37.6	97.8	50.5	61.1	71.9	80.1	85.0
2008	114	73.0	8.9	49.5	93.7	61.5	67.5	71.5	78.7	85.5
2009	115	70.2	11.8	42.1	97.0	53.7	61.1	70.9	77.8	86.5
2010	98	74.5	12.0	45.3	101	55.4	67.1	75.9	83.3	88.6
2011	82	71.5	11.7	41.8	101	54.1	65.3	71.9	80.2	86.1
1998-2011	1418	70.3	11.6	28.6	101	54.9	63.0	70.9	78.5	85.1

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	45	70.6	12.3	39.8	90.3	55.6	61.8	74.1	78.7	86.7
1999	44	67.1	11.3	39.1	88.4	52.3	60.4	68.5	75.1	78.2
2000	36	71.2	12.0	49.3	91.2	54.7	60.5	71.7	81.3	88.6
2001	64	74.4	11.9	51.2	94.0	59.4	64.9	74.2	84.9	92.5
2002	110	75.1	12.1	40.4	95.0	58.4	65.8	77.5	84.9	90.1
2003	78	74.8	13.3	47.3	98.9	53.7	65.0	77.5	83.5	92.1
2004	97	72.2	12.8	41.0	98.6	52.1	64.9	73.0	81.8	87.4
2005	72	76.2	10.9	43.7	97.1	62.4	69.2	77.5	84.1	90.3
2006	72	75.0	11.7	32.7	93.9	60.0	68.4	77.4	82.9	88.4
2007	98	74.9	12.9	39.5	99.8	56.7	64.8	77.9	85.0	89.2
2008	89	75.6	12.4	42.6	97.4	60.7	67.2	78.0	85.3	91.5
2009	87	75.5	13.7	28.2	98.6	58.4	69.2	79.4	85.9	89.6
2010	74	77.9	11.9	42.8	97.5	61.2	71.2	79.3	86.9	92.2
2011	71	78.0	12.9	44.4	96.7	57.8	70.2	81.1	89.1	91.2
1998-2011	1037	74.6	12.6	28.2	99.8	57.9	65.8	76.4	84.3	89.7

Table 4

Age distribution by 5-year age group and gender for period 1998-2011 (incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
25-29	4	0.2	0.2	3	0.2	0.2	1	0.1	0.1
30-34	5	0.2	0.4	4	0.3	0.5	1	0.1	0.2
35-39	10	0.4	0.8	7	0.5	1.0	3	0.3	0.5
40-44	33	1.3	2.1	17	1.2	2.2	16	1.5	2.0
45-49	55	2.2	4.4	34	2.4	4.6	21	2.0	4.1
50-54	112	4.6	8.9	79	5.6	10.2	33	3.2	7.2
55-59	173	7.0	16.0	117	8.3	18.4	56	5.4	12.6
60-64	287	11.7	27.7	177	12.5	30.9	110	10.6	23.2
65-69	355	14.5	42.1	232	16.4	47.2	123	11.9	35.1
70-74	366	14.9	57.0	241	17.0	64.2	125	12.1	47.2
75-79	363	14.8	71.8	207	14.6	78.8	156	15.0	62.2
80-84	306	12.5	84.3	155	10.9	89.8	151	14.6	76.8
85+	386	15.7	100.0	145	10.2	100.0	241	23.2	100.0
All ages	2455	100.0		1418	100.0		1037	100.0	

Included in the statistics are 47.7% multiple primaries in males and 32.9% in females.

Table 5

Age-specific incidence, DCO rate and proportion of all cancers
for period 1998-2011

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=272 %	Females DCO rate n=318 %	Males Prop.all cancers n=132509 %	Females Prop.all cancers n=129521 %
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	3	1	0.2	0.1		100.0	0.4	0.1
30-34	4	1	0.2	0.1			0.3	0.1
35-39	7	3	0.3	0.1			0.4	0.1
40-44	17	16	0.8	0.8	5.9		0.6	0.3
45-49	34	21	1.7	1.1			0.8	0.3
50-54	79	33	4.7	1.9	3.8		1.1	0.4
55-59	117	56	7.5	3.4	5.1	1.8	0.9	0.5
60-64	177	110	11.6	6.9	8.5	6.4	0.9	0.7
65-69	232	123	17.0	8.3	9.5	6.5	1.0	0.8
70-74	241	125	23.4	10.1	12.9	16.8	1.1	0.8
75-79	207	156	30.6	15.7	24.6	26.3	1.2	1.1
80-84	155	151	38.2	19.0	33.5	53.0	1.4	1.1
85+	145	240	52.3	32.3	62.8	66.3	1.8	1.6
All ages	1418	1036			19.2	30.7	1.1	0.8
Incidence								
Raw			5.6	3.9				
WS			2.9	1.5				
ES			4.5	2.3				
BRD-S			5.9	3.0				

The age-specific incidence characterizes the disease risk in a particular age group. The age distribution depends on the patient population frequency in each age group and reflects the tangible clinical picture of everyday patients care (see following chart).

Table 6a

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries for period 1998-2011
MALES

Diagnosis	Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C07-C08 Salivary gland	5	0.2	32.4	10.5	75.7	#	12.4	
C15 Oesophagus	3	1.2	2.5	0.5	7.3		4.6	
C16 Stomach	7	3.0	2.3	0.9	4.8		10.2	
C18 Colon	13	7.1	1.8	1.0	3.1		15.0	7.7
C19-C20 Rectum	9	4.0	2.3	1.0	4.3	#	12.8	
C22 Liver	6	1.9	3.1	1.1	6.8	#	10.4	16.7
C33-C34 Lung	23	8.4	2.7	1.7	4.1	#	37.2	
C43 Malign. melanoma	10	2.6	3.8	1.8	7.1	#	18.9	
C46,C49 Soft tissue	3	0.4	8.3	1.7	24.2	#	6.7	
C50 Breast	2	0.2	11.4	1.4	41.2	#	4.7	
C61 Prostate	46	20.7	2.2	1.6	3.0	#	64.5	4.3
C64 Kidney	4	2.5	1.6	0.4	4.2		3.9	
C67 Bladder	10	3.0	3.3	1.6	6.1	#	17.8	10.0
C70-C72 CNS cancer	2	0.9	2.1	0.3	7.7		2.7	
C76-C79 CUP	3	1.2	2.5	0.5	7.4		4.6	
C81 Hodgkin lymphoma	3	0.1	23.5	4.9	68.8	#	7.3	
C82-C85 NHL	6	2.7	2.2	0.8	4.8		8.4	33.3
C91-C96 Leukaemia	6	1.1	5.6	2.1	12.2	#	12.6	33.3
Other primaries	8	5.0	1.6	0.7	3.1		7.6	12.5
Not observed	0	4.3	0.0	0.0	0.9	#	-11.1	
All mult. primaries	169	70.5	2.4	2.0	2.8	#	251.2	5.9

Patients	922
Mean age at second malignancy (years)	72.3
Person-years	3922
Mean observation time (years)	4.3
Median observation time (years)	3.8

The occurrence of second malignancy is statistically significant.

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

Table 6b

Standardized incidence ratio (SIR, with 95% confidence limits),
excess absolute risk (EAR) and DCO rate of second primaries
for period 1998-2011
FEMALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C16	Stomach	5	1.2	4.1	1.3	9.6	#	15.2	
C18	Colon	6	3.3	1.8	0.7	4.0		10.8	16.7
C25	Pancreas	3	1.4	2.2	0.4	6.4		6.5	
C33-C34	Lung	6	2.1	2.8	1.0	6.2	#	15.5	
C43	Malign. melanoma	3	1.0	3.0	0.6	8.9		8.0	
C50	Breast	20	9.0	2.2	1.4	3.4	#	43.9	
C54	Corpus uteri	4	1.7	2.3	0.6	5.9		9.0	
C56	Ovary	3	1.3	2.3	0.5	6.6		6.7	
C73	Thyroid	2	0.5	4.0	0.5	14.6		6.0	
C82-C85	NHL	8	1.2	6.6	2.9	13.1	#	27.2	25.0
C91-C96	Leukaemia	2	0.5	4.2	0.5	15.1		6.1	
Other primaries		10	3.6	2.8	1.3	5.1	#	25.6	
Not observed		0	4.1	0.0	0.0	0.9	#	-16.2	
All mult. primaries		72	30.9	2.3	1.8	2.9	#	164.3	4.2

Patients	604
Mean age at second malignancy (years)	71.9
Person-years	2500
Mean observation time (years)	4.1
Median observation time (years)	3.7

The occurrence of second malignancy is statistically significant.

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

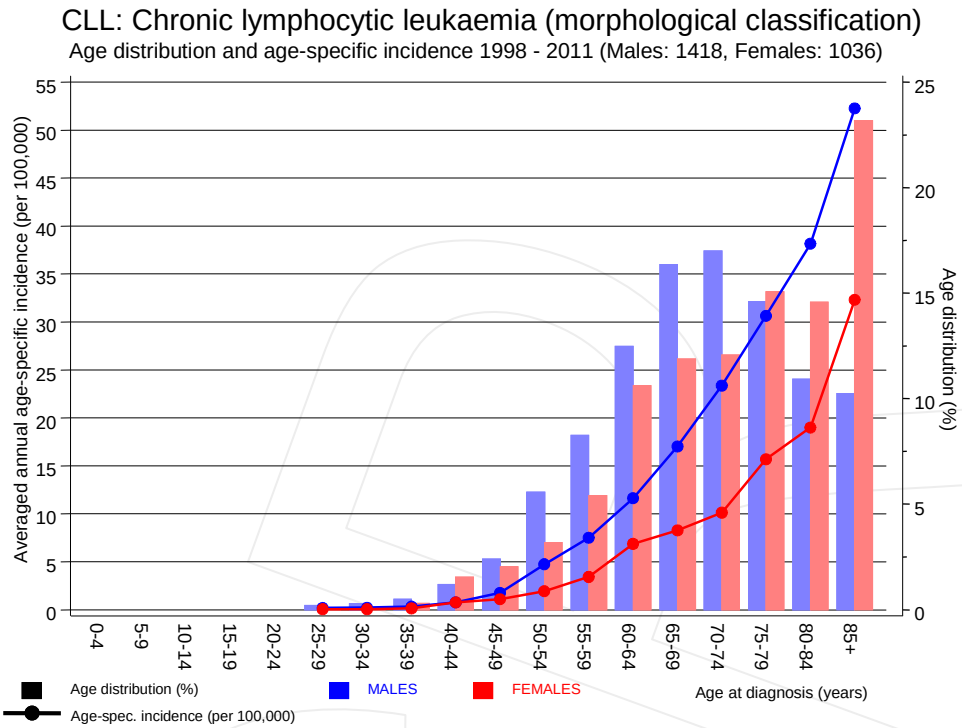


Figure 7. Age distribution and age-specific incidence

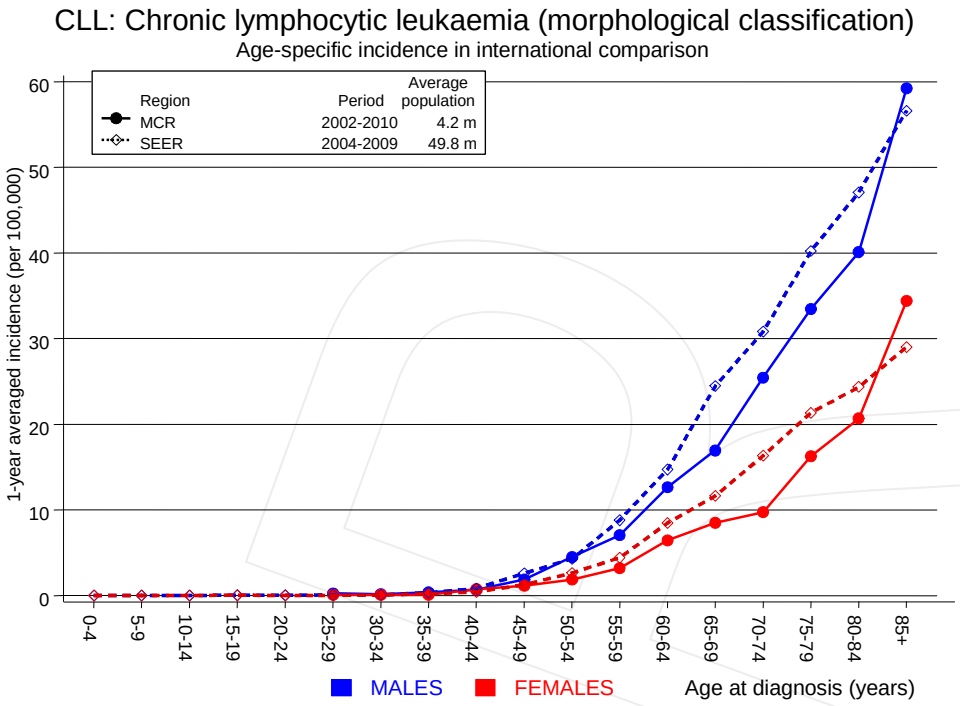


Figure 7a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

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

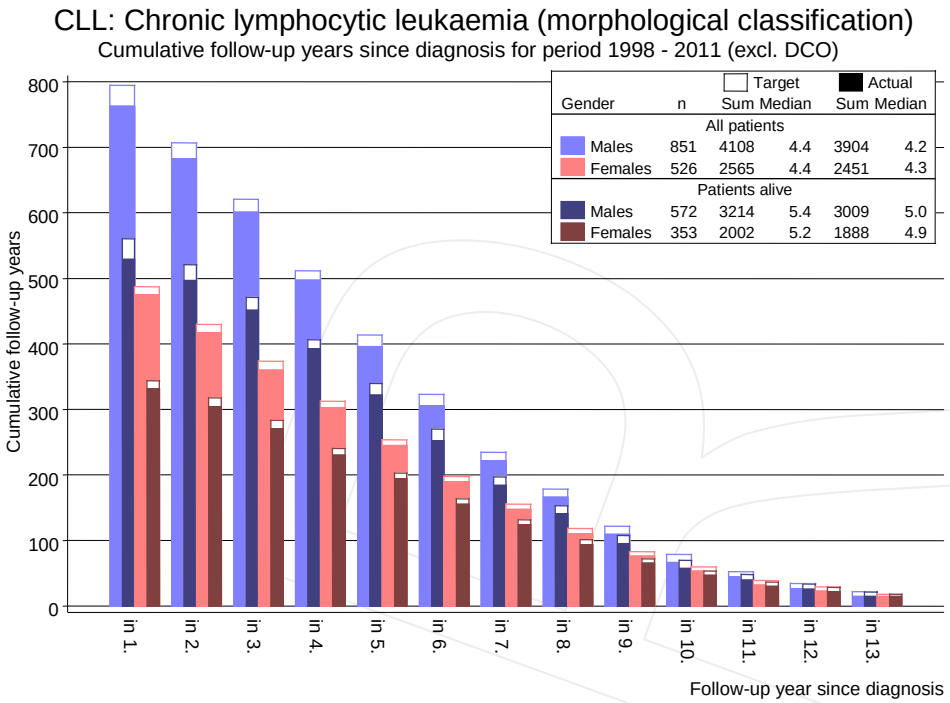
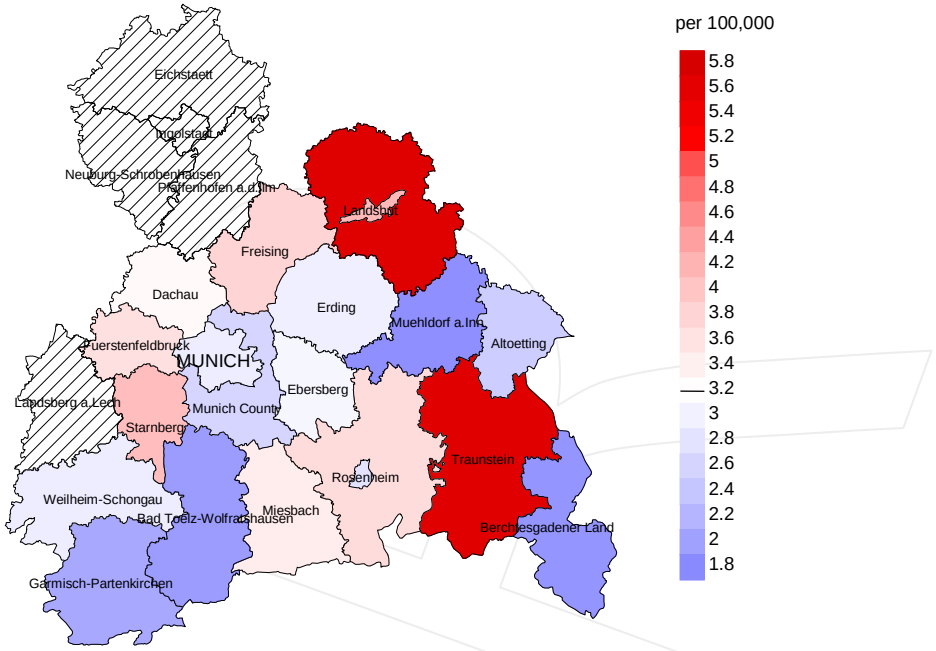


Figure 8. Cumulative follow-up years depending on time since diagnosis

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

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



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

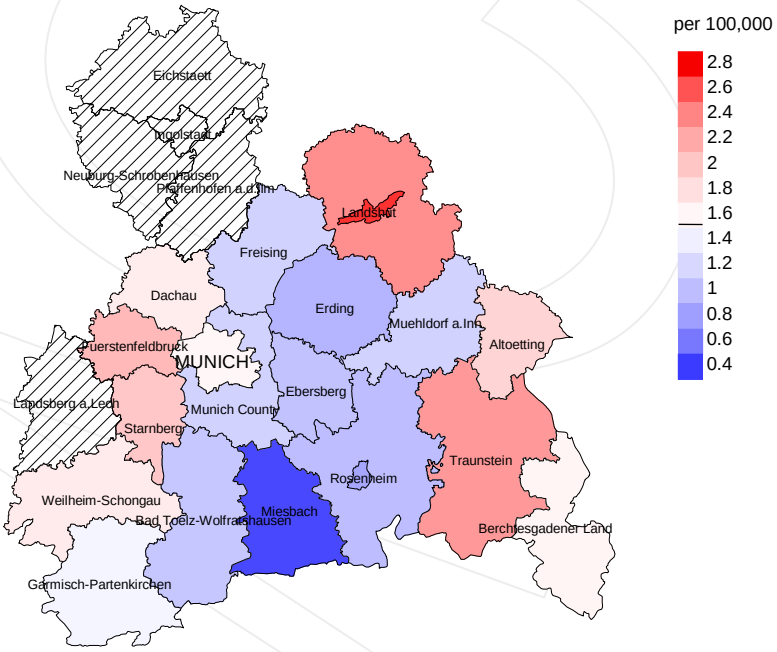
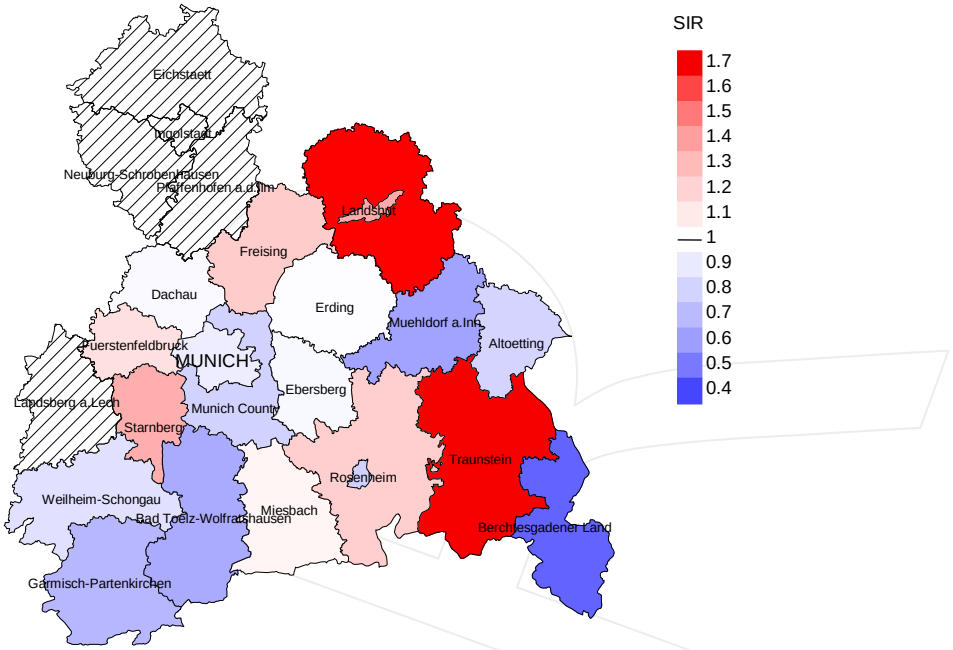


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 3.2/100,000 WS N=721, females 1.5/100,000 WS N=486). 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 10 women were identified with newly diagnosed chronic lymph. leukaemia (morph.). Therefore, the mean incidence rate for this cancer type in this area can be calculated at 1.0/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.3 and 2.5/100,000.

Standardized incidence ratio (SIR) 2003 - 2008: Males



Standardized incidence ratio (SIR) 2003 - 2008: Females

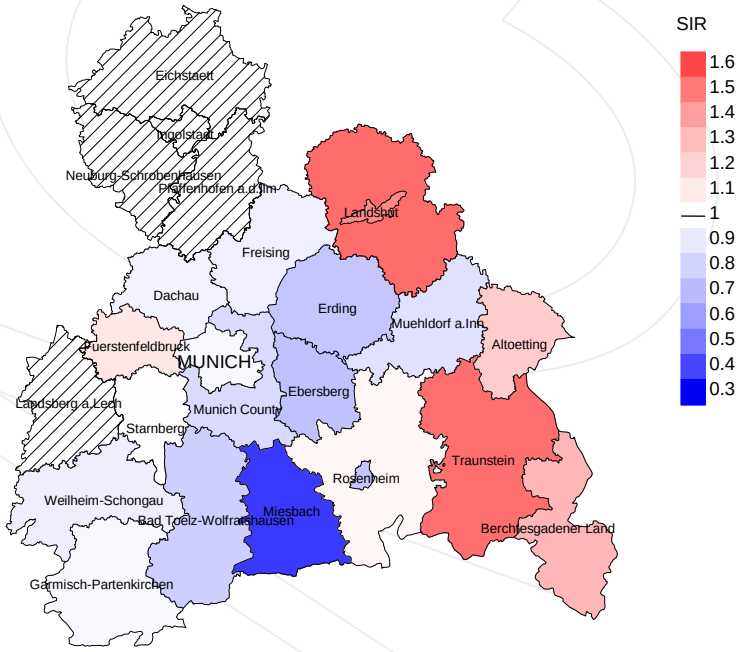


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=721, females N=486). 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 10 women were identified with newly diagnosed chronic lymph. leukaemia (morph.). Therefore, the mean standardized incidence ratio (SIR) 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 0.27 and 1.55, and is therefore not statistically striking.

MORTALITY

Table 10a

Patient cohorts of incident cancers by year of diagnosis, follow-up status, proportion of DCO, deaths among the annual cohorts, and proportion of available death certificates (with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.52 m as of 2007, respectively)

Year of diagnosis	Incident cases n	Prop. actively followed %	Prop. DCO %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	97	96.9	8.2	67	69.1	98.5
1999	91	98.9	7.7	61	67.0	95.1
2000	94	96.8	17.0	69	73.4	98.6
2001	137	99.3	26.3	96	70.1	97.9
2002	248	96.8	29.8	187	75.4	98.9
2003	208	97.6	30.8	134	64.4	99.3
2004	220	93.6	23.6	129	58.6	99.2
2005	191	94.8	27.7	126	66.0	99.2
2006	202	92.1	16.8	109	54.0	99.1
2007	237	84.0	22.8	115	48.5	100.0
2008	203	76.8	21.7	95	46.8	96.8
2009	202	76.2	23.8	81	40.1	98.8
2010	172	89.5	30.2	76	44.2	100.0
2011	153	84.3	32.0	59	38.6	98.3
1998-2011	2455	90.4	24.1	1404	57.2	98.7

Table 10b

Annual cohorts of incident cancers and deaths, proportion of death certificates and cases deceased the same year of cancer diagnosis
(incl. DCO)
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.52 m as of 2007, respectively)

Year of diagnosis/ death	Incident cases n	Deaths n	Prop. deaths with death certific. %	Deaths in same year n	Prop. deaths in same year %
1998	97	40	97.5	7	7.2
1999	91	50	92.0	5	5.5
2000	94	50	92.0	14	14.9
2001	137	89	96.6	41	29.9
2002	248	132	98.5	83	33.5
2003	208	120	98.3	75	36.1
2004	220	118	100.0	55	25.0
2005	191	148	100.0	63	33.0
2006	202	140	97.9	49	24.3
2007	237	154	100.0	66	27.8
2008	203	152	98.7	54	26.6
2009	202	134	99.3	52	25.7
2010	172	157	98.7	62	36.0
2011	153	144	99.3	51	33.3
1998-2011	2455	1628	98.5	677	27.6

Table 10c

Annual cohorts of deaths, proportion of cancer-related and not cancer-related deaths, and cancer recorded on death certificates (incl. DCO)
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.52 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer-related %	Prop. not cancer-related %	Prop. cancer recorded on death certificate %
1998	40	62.5	37.5	89.7
1999	50	62.0	38.0	87.0
2000	50	62.0	38.0	97.8
2001	89	59.6	40.4	93.0
2002	132	76.5	23.5	96.2
2003	120	80.0	20.0	94.1
2004	118	87.3	12.7	95.8
2005	148	79.7	20.3	96.6
2006	140	77.9	22.1	92.0
2007	154	74.0	26.0	89.6
2008	152	82.2	17.8	90.0
2009	134	82.8	17.2	94.0
2010	157	80.3	19.7	93.5
2011	144	75.7	24.3	90.2
1998-2011	1628	76.9	23.1	93.0

Table 11a

Means of age at death according to the grouping in Table 10
MALES

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (not cancer-related) Years	Age at death (according to death certificate) Years
1998	23	74.5	70.8	84.9	74.4
1999	28	74.9	69.5	82.2	73.7
2000	34	74.1	71.2	80.0	74.2
2001	42	74.7	73.3	78.0	74.5
2002	76	75.0	74.9	75.4	75.2
2003	67	74.7	74.8	74.5	74.8
2004	75	74.1	73.1	82.4	74.4
2005	89	76.2	74.7	81.3	75.8
2006	83	74.8	73.2	80.7	74.0
2007	82	77.1	75.6	81.8	76.4
2008	94	75.7	74.9	79.0	75.6
2009	78	75.7	74.6	81.9	75.7
2010	92	77.2	76.1	81.6	76.9
2011	95	76.3	75.5	79.2	76.4
1998-2011	958	75.6	74.4	80.0	75.4

Deaths of patients are considered to be cancer-related, in case that fact was recorded on the death certificate, or patients had suffered from metastasis or recurrence.

Table 11b

Means of age at death according to the grouping in Table 10
FEMALES

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (not cancer-related) Years	Age at death (according to death certificate) Years
1998	17	79.1	76.0	81.8	77.6
1999	22	77.7	75.7	81.9	76.4
2000	16	82.7	75.9	89.4	81.9
2001	47	78.9	76.2	81.7	78.6
2002	56	81.1	78.0	87.7	80.9
2003	53	78.1	75.8	86.7	77.9
2004	43	77.5	76.1	84.5	77.0
2005	59	80.2	78.5	88.8	80.0
2006	57	79.5	78.8	81.9	78.8
2007	72	80.2	77.2	87.7	79.9
2008	58	80.7	79.1	89.5	80.2
2009	56	77.9	76.4	84.2	77.9
2010	65	81.5	79.8	88.6	81.4
2011	49	81.4	79.5	85.8	81.2
1998-2011	670	79.8	77.7	85.7	79.5

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	17	1.5	0.33	0.9	0.34	1.4	0.34	1.7	0.32
1999	16	1.4	0.34	0.8	0.35	1.3	0.35	1.7	0.34
2000	23	2.0	0.40	1.2	0.39	1.8	0.40	2.3	0.42
2001	29	2.5	0.40	1.4	0.37	2.2	0.40	3.0	0.42
2002	63	3.4	0.46	1.7	0.41	2.8	0.45	4.1	0.51
2003	54	2.9	0.42	1.4	0.39	2.4	0.41	3.3	0.44
2004	67	3.6	0.54	1.8	0.51	2.9	0.55	3.9	0.56
2005	69	3.6	0.58	1.7	0.54	2.8	0.56	4.1	0.60
2006	65	3.4	0.50	1.6	0.45	2.5	0.46	3.6	0.51
2007	62	2.8	0.45	1.2	0.39	2.1	0.42	3.1	0.47
2008	76	3.4	0.67	1.5	0.63	2.5	0.67	3.5	0.70
2009	66	3.0	0.57	1.3	0.51	2.1	0.54	3.0	0.61
2010	74	3.3	0.76	1.3	0.68	2.2	0.70	3.3	0.77
2011	75	3.3	0.91	1.4	0.80	2.2	0.86	3.3	0.95
1998-2011	756	3.0	0.53	1.4	0.48	2.3	0.51	3.3	0.56

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	8	0.7	0.18	0.3	0.14	0.4	0.16	0.5	0.17
1999	15	1.3	0.34	0.5	0.25	0.7	0.28	1.0	0.32
2000	8	0.7	0.22	0.2	0.18	0.4	0.20	0.5	0.20
2001	24	2.0	0.38	0.7	0.33	1.1	0.34	1.6	0.38
2002	38	1.9	0.35	0.7	0.31	1.1	0.33	1.5	0.34
2003	42	2.1	0.54	0.7	0.48	1.2	0.50	1.7	0.54
2004	36	1.8	0.37	0.6	0.30	1.0	0.32	1.4	0.36
2005	49	2.5	0.68	0.8	0.60	1.3	0.63	1.8	0.64
2006	44	2.2	0.61	0.7	0.52	1.1	0.56	1.7	0.62
2007	52	2.3	0.53	0.7	0.46	1.2	0.48	1.7	0.51
2008	49	2.1	0.55	0.6	0.44	1.0	0.48	1.5	0.53
2009	45	1.9	0.52	0.6	0.49	1.0	0.52	1.4	0.54
2010	52	2.2	0.70	0.6	0.59	1.0	0.64	1.5	0.68
2011	34	1.5	0.48	0.4	0.41	0.6	0.43	1.0	0.48
1998-2011	496	1.9	0.48	0.6	0.40	1.0	0.43	1.4	0.47

Table 13

Age distribution of age at death (cancer-related) for period 1998-2011
(**incl. multiple primaries**)

Age at death	Cases			Males			Females		
Years	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
30-34	1	0.1	0.1	1	0.1	0.1			0.0
35-39	0	0.0	0.1			0.1			0.0
40-44	4	0.3	0.4	3	0.4	0.5	1	0.2	0.2
45-49	11	0.9	1.3	7	0.9	1.5	4	0.8	1.0
50-54	22	1.8	3.0	12	1.6	3.0	10	2.0	3.0
55-59	49	3.9	6.9	34	4.5	7.5	15	3.0	6.0
60-64	92	7.3	14.3	62	8.2	15.7	30	6.0	12.0
65-69	165	13.1	27.4	122	16.1	31.8	43	8.6	20.7
70-74	215	17.1	44.5	141	18.6	50.4	74	14.9	35.5
75-79	244	19.4	63.9	153	20.2	70.6	91	18.3	53.8
80-84	226	18.0	81.9	121	16.0	86.5	105	21.1	74.9
85+	227	18.1	100.0	102	13.5	100.0	125	25.1	100.0
All ages	1256	100.0		758	100.0		498	100.0	

Included in the statistics are 47.7% multiple primaries in males and 32.9% in females.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2011
(**incl. multiple primaries**)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4			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	0.25	0.0		0.6	
35-39			0.0		0.0			
40-44	3	1	0.1	0.18	0.0	0.06	0.4	0.1
45-49	7	4	0.4	0.21	0.2	0.19	0.5	0.2
50-54	12	10	0.7	0.15	0.6	0.30	0.4	0.4
55-59	34	15	2.2	0.29	0.9	0.27	0.7	0.4
60-64	62	30	4.1	0.35	1.9	0.27	0.8	0.5
65-69	122	43	9.0	0.53	2.9	0.35	1.2	0.6
70-74	141	74	13.7	0.59	6.0	0.59	1.3	0.9
75-79	153	91	22.6	0.74	9.2	0.58	1.4	1.0
80-84	121	105	29.8	0.78	13.2	0.70	1.4	1.1
85+	102	125	36.8	0.70	16.8	0.52	1.4	1.1
All ages	758	498					1.1	0.8
Mortality								
Raw			3.0	0.53	1.9	0.48		
WS			1.4	0.48	0.6	0.40		
ES			2.3	0.51	1.0	0.43		
BRD-S			3.3	0.56	1.4	0.47		
PYLL-70								
per 100,000			7.4		3.6			
ES			6.3		3.0			
AYLL-70			7.0		7.9			

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

Table 15a

Multiple primaries in deaths in period 1998-2011
MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	5	1.1	1	20.0	2	40.0	2	40.0
C07-C08 Salivary gland	5	1.1			1	20.0	4	80.0
C15 Oesophagus	4	0.9	2	50.0			2	50.0
C16 Stomach	9	2.0	2	22.2			7	77.8
C18 Colon	37	8.1	16	43.2	5	13.5	16	43.2
C19-C20 Rectum	18	3.9	6	33.3	3	16.7	9	50.0
C25 Pancreas	5	1.1			1	20.0	4	80.0
C33-C34 Lung	47	10.2	5	10.6	11	23.4	31	66.0
C43 Malign. melanoma	24	5.2	8	33.3	3	12.5	13	54.2
C44 Skin others	128	27.9	13	10.2	6	4.7	109	85.2
C46,C49 Soft tissue	7	1.5	3	42.9			4	57.1
C61 Prostate	65	14.2	27	41.5	9	13.8	29	44.6
C64 Kidney	13	2.8	6	46.2	2	15.4	5	38.5
C67 Bladder	22	4.8	7	31.8	6	27.3	9	40.9
C70-C72 CNS cancer	6	1.3			1	16.7	5	83.3
C76-C79 CUP	6	1.3					6	100.0
C81 Hodgkin lymphoma	7	1.5	1	14.3	1	14.3	5	71.4
C82-C85 NHL	16	3.5			4	25.0	12	75.0
C90 Mult. myeloma	6	1.3	2	33.3	3	50.0	1	16.7
C91-C96 Leukaemia	10	2.2					10	100.0
Other primaries	19	4.1	7	36.8	5	26.3	7	36.8
All mult. primaries	459	100.0	106	23.1	63	13.7	290	63.2

Multiple primaries with number of cases n<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 1998-2011
FEMALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C07-C08 Salivary gland	1	0.5	1	100.0				
C09-C10 Oropharynx	1	0.5					1	100.0
C15 Oesophagus	1	0.5			1	100.0		
C16 Stomach	6	3.3	1	16.7	3	50.0	2	33.3
C18 Colon	13	7.1	6	46.2	1	7.7	6	46.2
C19-C20 Rectum	3	1.6	2	66.7			1	33.3
C22 Liver	1	0.5					1	100.0
C23-C24 Bile	3	1.6	1	33.3	1	33.3	1	33.3
C25 Pancreas	4	2.2					4	100.0
C33-C34 Lung	8	4.4			1	12.5	7	87.5
C43 Malign. melanoma	8	4.4	6	75.0			2	25.0
C44 Skin others	45	24.6	10	22.2	4	8.9	31	68.9
C48 Peritoneal	1	0.5					1	100.0
C50 Breast	34	18.6	20	58.8	3	8.8	11	32.4
C51 Vulva	4	2.2	3	75.0			1	25.0
C53 Cervix uteri	2	1.1	2	100.0				
C54 Corpus uteri	5	2.7	1	20.0	1	20.0	3	60.0
C55,C57 Fem. genitals un	1	0.5					1	100.0
C56 Ovary	7	3.8	2	28.6	2	28.6	3	42.9
C64 Kidney	6	3.3	2	33.3	3	50.0	1	16.7
C65 Renal pelvis	1	0.5					1	100.0
C67 Bladder	4	2.2	1	25.0	2	50.0	1	25.0
C68 Urethra	1	0.5			1	100.0		
C70-C72 CNS cancer	4	2.2	1	25.0	2	50.0	1	25.0
C73 Thyroid	2	1.1	1	50.0			1	50.0
C74-C80 Cancer others	1	0.5	1	100.0				
C76-C79 CUP	2	1.1	1	50.0			1	50.0
C82-C85 NHL	8	4.4					8	100.0
C90 Mult. myeloma	4	2.2			2	50.0	2	50.0
C91-C96 Leukaemia	2	1.1	1	50.0			1	50.0
All mult. primaries	183	100.0	63	34.4	27	14.8	93	50.8

Multiple primaries with number of cases n<1 are pooled in category "Other primaries".

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

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2011
(**Singular primaries only** *)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4			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	0.25	0.0		0.6	
35-39			0.0		0.0			
40-44	3	1	0.1	0.19	0.0	0.07	0.4	0.1
45-49	7	4	0.4	0.22	0.2	0.21	0.5	0.3
50-54	10	9	0.6	0.14	0.5	0.30	0.4	0.4
55-59	30	13	1.9	0.30	0.8	0.28	0.7	0.4
60-64	48	27	3.2	0.33	1.7	0.28	0.7	0.6
65-69	102	39	7.5	0.54	2.6	0.40	1.2	0.7
70-74	119	72	11.5	0.69	5.8	0.71	1.3	1.1
75-79	118	68	17.5	0.79	6.8	0.59	1.4	0.9
80-84	93	82	22.9	0.83	10.3	0.72	1.4	1.1
85+	76	96	27.4	0.78	12.9	0.49	1.4	1.0
All ages	607	411					1.1	0.8
Mortality								
Raw			2.4	0.55	1.6	0.49		
WS			1.1	0.49	0.5	0.42		
ES			1.9	0.53	0.8	0.44		
BRD-S			2.6	0.58	1.2	0.48		
PYLL-70								
per 100,000			6.3		3.3			
ES			5.4		2.7			
AYLL-70			7.2		7.9			

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2011
(**Single primaries only** *)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4			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	0.25	0.0		0.6	
35-39			0.0		0.0			
40-44	3	1	0.1	0.20	0.0	0.07	0.5	0.1
45-49	5	4	0.3	0.16	0.2	0.24	0.4	0.3
50-54	9	8	0.5	0.14	0.5	0.31	0.4	0.4
55-59	24	12	1.5	0.28	0.7	0.30	0.6	0.4
60-64	35	22	2.3	0.34	1.4	0.26	0.6	0.5
65-69	68	34	5.0	0.47	2.3	0.40	0.9	0.7
70-74	84	59	8.1	0.65	4.8	0.62	1.1	1.1
75-79	86	54	12.7	0.67	5.4	0.51	1.3	0.9
80-84	66	72	16.2	0.65	9.1	0.69	1.2	1.1
85+	59	80	21.3	0.63	10.8	0.43	1.3	1.0
All ages	440	346					1.0	0.8
Mortality								
Raw			1.8	0.48	1.3	0.45		
WS			0.8	0.43	0.4	0.39		
ES			1.3	0.46	0.7	0.41		
BRD-S			1.9	0.50	1.0	0.45		
PYLL-70								
per 100,000			4.9		2.9			
ES			4.3		2.5			
AYLL-70			7.7		8.1			

* See corresponding tables with multiple primaries.

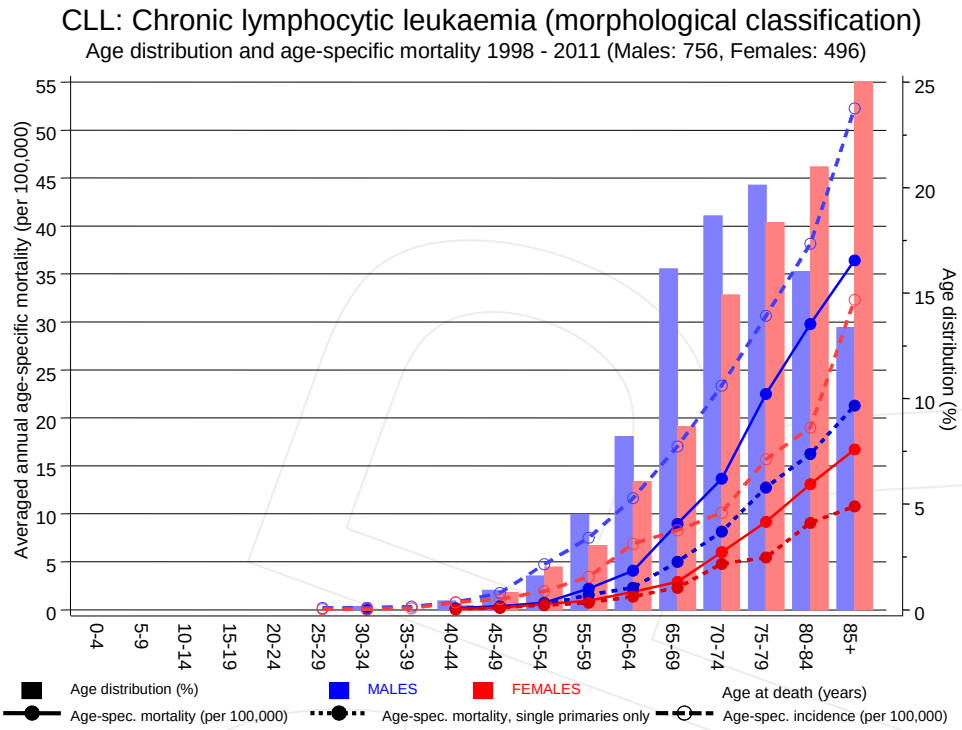
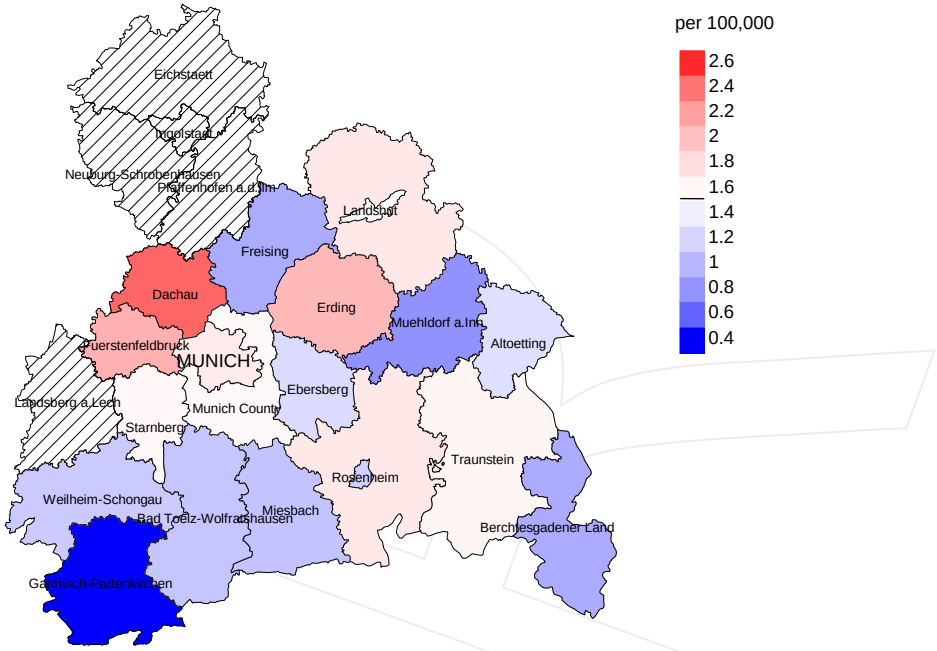


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

The difference between age at diagnosis (Table 3) and age at chronic lymph. leukaemia (morph.)-related death (see Table 10) should be considered.

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



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

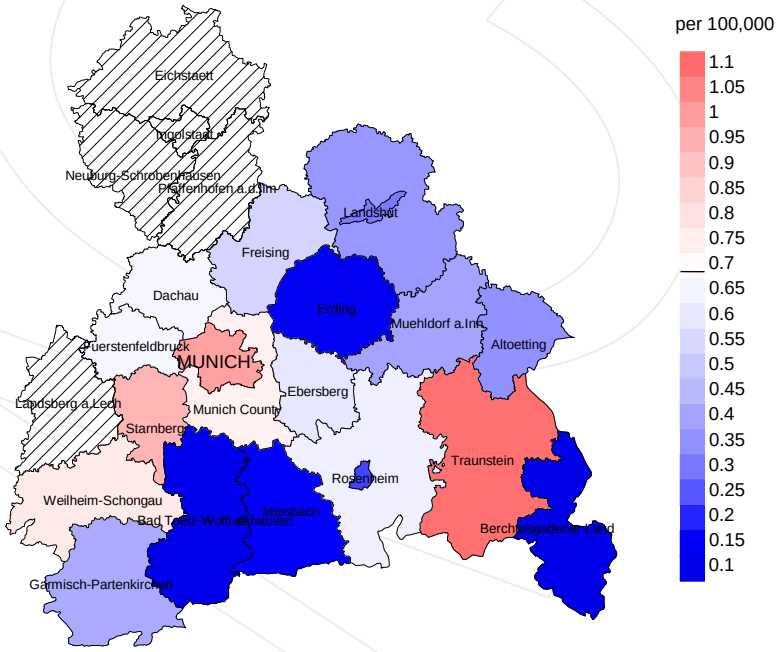
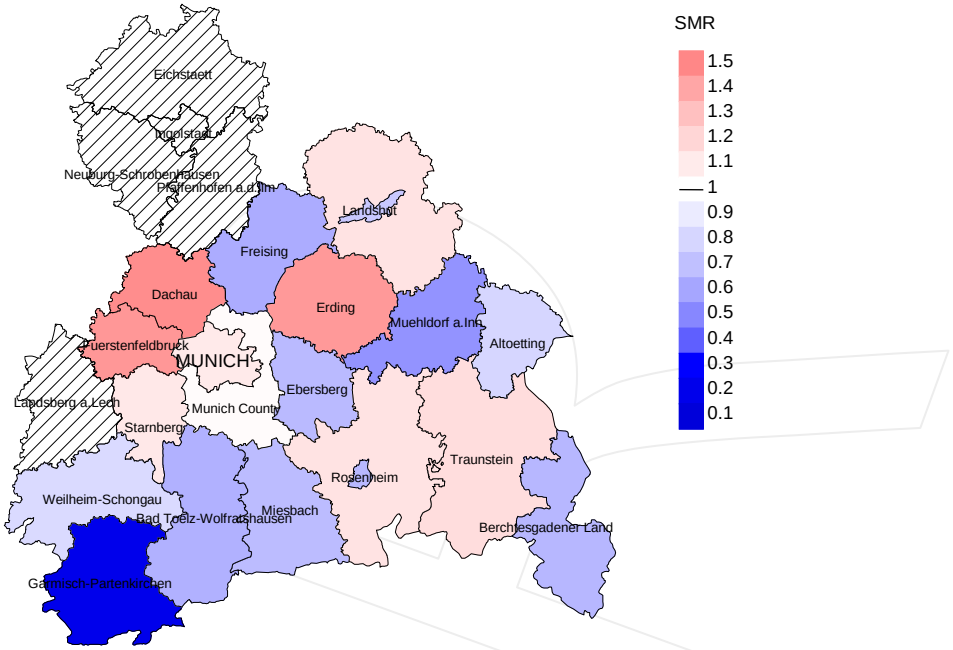


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 1.5/100,000 WS N=378, females 0.7/100,000 WS N=263). 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 7 women died from chronic lymph. leukaemia (morph.). Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.6/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.2 and 1.6/100,000.

Standardized mortality ratio (SMR) 2003 - 2008: Males



Standardized mortality ratio (SMR) 2003 - 2008: Females

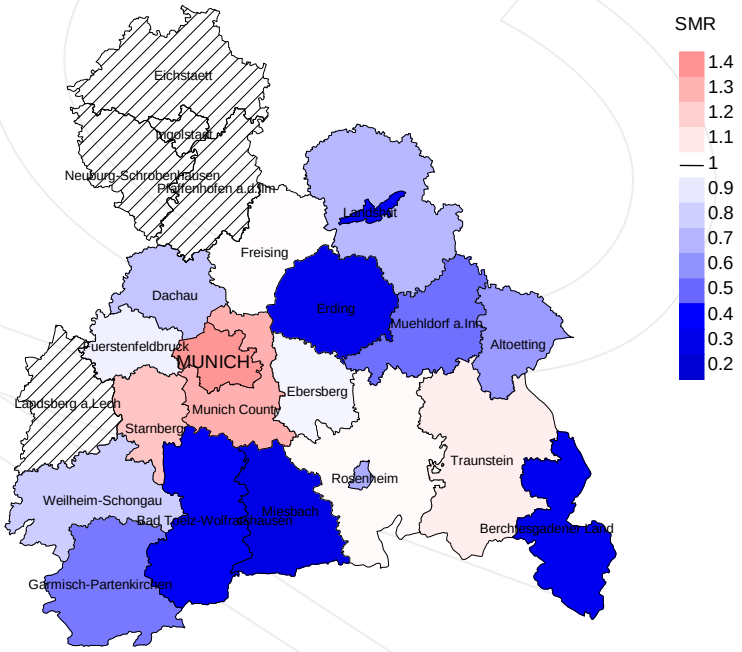


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=378, females N=263). 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 7 women died from chronic lymph. leukaemia (morph.). Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.96. Though, the value of this parameter may vary with an underlying probability of 99% between 0.28 and 2.34, 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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