Munich Cancer Registry

- Survival
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- Homepage

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

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

Cancer statistics: Baseline statistics

ALL: Acute lymphobl. leukaemia (morph.)

Year of diagnosis	1998-2012
Patients	656
Diseases	656
Creation date	03/20/2014
Export date	02/12/2014
Population	4.5 m

http://www.tumorregister-muenchen.de/en/facts/base/base_hALL_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.

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
C91.0	Acute lymphoblastic leukaemia [ALL]

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

Code	Description
9826/3	Burkitt cell leukemia
9835/3	Precursor cell lymphoblastic leukemia, NOS
9836/3	Precursor B-cell lymphoblastic leukemia
9837/3	Precursor T-cell lymphoblastic leukemia

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	14			7.1	57.1	100.0	
1999	23			8.7	47.8	87.0	
2000	22	2	9.1	4.5	50.0	95.5	
2001	34	6	17.6	5.9	47.1	94.1	
2002	38	5	13.2	23.7	55.3	92.1	#
2003	40	5	12.5	7.5	45.0	90.0	#
2004	46	3	6.5	13.0	37.0	89.1	#
2005	58	4	6.9	5.2	32.8	91.4	#
2006	54	8	14.8	13.0	40.7	85.2	#
2007	59	4	6.8	8.5	39.0	59.3	# ##
2008	61	6	9.8	9.8	31.1	54.1	
2009	44			15.9	34.1	45.5	
2010	52	4	7.7	5.8	34.6	46.2	
2011	55	2	3.6	12.7	21.8	50.9	
2012	56	8	14.3	7.1	23.2	96.4	###
1998-2012	656	57	8.7	10.1	37.0	75.0	

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	14	11	3	78.6
1999	23	9	14	39.1
2000	22	11	11	50.0
2001	34	23	11	67.6
2002	38	25	13	65.8
2003	40	24	16	60.0
2004	46	32	14	69.6
2005	58	38	20	65.5
2006	54	39	15	72.2
2007	59	24	35	40.7
2008	61	37	24	60.7
2009	44	17	27	38.6
2010	52	28	24	53.8
2011	55	32	23	58.2
2012	56	32	24	57.1
1998-2012	656	382	274	58.2

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	11	3	1.0	0.3	1.6	0.6	1.2	0.4	0.9	0.3
1999	9	14	0.8	1.2	1.3	2.2	1.0	1.7	0.8	1.2
2000	11	11	1.0	0.9	1.5	1.3	1.2	1.1	1.2	0.9
2001	23	11	2.0	0.9	2.5	1.7	2.3	1.2	2.0	1.0
2002	25	13	1.3	0.7	1.8	0.8	1.5	0.7	1.4	0.7
2003	24	16	1.3	0.8	1.9	1.4	1.6	1.1	1.4	0.8
2004	32	14	1.7	0.7	2.4	1.2	2.0	0.9	1.7	0.7
2005	38	20	2.0	1.0	2.9	1.6	2.4	1.3	2.1	1.1
2006	39	15	2.0	0.7	2.8	1.3	2.4	1.0	2.0	0.8
2007	24	35	1.1	1.5	1.5	2.1	1.3	1.8	1.1	1.5
2008	37	24	1.7	1.0	2.8	1.5	2.1	1.3	1.6	1.1
2009	17	27	0.8	1.2	1.0	1.7	0.9	1.4	0.8	1.2
2010	28	24	1.2	1.0	1.8	1.5	1.5	1.3	1.3	1.0
2011	32	23	1.4	1.0	2.1	1.7	1.7	1.3	1.4	1.0
2012	32	24	1.4	1.0	1.8	1.6	1.6	1.3	1.4	1.1
1998-2012	382	274	1.4	1.0	2.0	1.5	1.7	1.2	1.4	1.0

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	14	18.3	22.1	1.4	65.0	2.0	4.3	6.5	36.0	52.9
1999	23	21.3	26.3	0.3	73.4	2.1	3.1	5.4	49.6	58.9
2000	22	31.2	27.2	2.1	77.3	2.7	3.6	19.3	60.7	69.3
2001	34	29.6	25.0	1.4	77.3	3.0	6.3	16.8	52.3	68.6
2002	38	32.5	26.7	2.6	88.2	3.1	5.4	28.8	54.8	73.3
2003	40	27.3	27.8	0.3	81.9	2.2	3.6	15.3	50.2	75.5
2004	46	24.8	22.1	1.4	82.8	2.3	6.8	17.8	36.6	63.5
2005	58	28.0	26.6	0.6	80.8	2.6	3.9	20.4	49.1	71.0
2006	54	31.8	30.7	1.3	92.2	2.7	4.0	17.9	65.6	78.3
2007	59	33.5	28.8	0.3	84.1	3.8	6.5	21.8	62.4	77.3
2008	61	25.5	24.8	0.4	88.3	3.0	4.6	13.9	39.6	64.6
2009	44	33.7	27.1	1.3	88.1	4.5	6.1	27.4	57.2	69.6
2010	52	30.9	28.4	0.3	89.5	1.6	4.2	22.2	53.9	75.4
2011	55	27.4	28.4	2.5	87.4	3.5	5.1	12.8	47.7	78.9
2012	56	34.4	28.8	2.4	87.1	3.8	7.0	24.6	57.1	78.9
1998-2012	656	29.4	27.2	0.3	92.2	2.9	4.8	18.0	53.1	72.8

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	11	21.6	23.9	2.0	65.0	2.4	4.3	6.6	47.9	52.9
1999	9	20.9	24.5	0.3	58.2	0.3	2.5	6.3	47.5	58.2
2000	11	28.6	24.0	2.6	69.3	3.3	8.4	18.2	49.2	61.6
2001	23	35.1	24.6	1.4	77.3	6.3	9.4	42.0	54.5	68.6
2002	25	29.5	28.4	2.6	88.2	3.1	5.2	26.6	36.2	79.8
2003	24	26.4	25.2	1.6	81.9	3.0	5.7	16.2	40.6	76.5
2004	32	26.2	22.1	1.4	77.3	2.0	6.2	22.4	37.8	63.5
2005	38	30.1	28.7	0.7	80.8	2.6	3.9	20.4	57.7	76.9
2006	39	33.5	30.7	1.3	92.2	2.7	4.4	19.4	66.4	79.7
2007	24	31.8	26.8	0.3	84.1	4.1	7.8	20.5	59.7	69.0
2008	37	21.7	22.9	0.4	74.0	2.9	4.3	11.8	30.7	63.7
2009	17	36.6	31.5	2.2	88.1	4.5	6.4	22.7	58.3	85.3
2010	28	29.6	28.0	0.3	80.5	1.5	4.1	18.8	53.9	75.4
2011	32	28.9	29.0	2.5	85.6	3.6	4.8	12.7	51.4	73.5
2012	32	38.6	31.9	2.4	87.1	2.9	6.2	28.6	72.1	85.1
1998-2012	382	29.8	27.3	0.3	92.2	2.9	5.1	18.9	53.5	73.4

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	3	6.0	5.5	1.4	12.1	1.4	1.4	4.6	12.1	12.1
1999	14	21.6	28.3	1.5	73.4	2.6	3.2	4.3	49.6	72.2
2000	11	33.8	31.1	2.1	77.3	2.7	3.3	38.5	62.4	71.7
2001	11	18.2	22.6	2.8	75.3	3.0	3.0	6.3	34.3	37.2
2002	13	38.3	23.2	2.9	69.9	12.8	18.1	37.0	59.8	67.2
2003	16	28.7	32.1	0.3	79.6	0.8	2.7	5.3	64.2	74.4
2004	14	21.6	22.8	4.3	82.8	4.4	6.8	12.0	29.5	54.7
2005	20	23.9	22.3	0.6	68.8	2.5	5.0	18.6	36.7	65.7
2006	15	27.4	31.3	2.5	90.7	3.3	3.6	8.0	58.0	75.4
2007	35	34.6	30.4	1.0	83.2	1.9	5.7	22.1	64.0	80.1
2008	24	31.3	27.1	1.4	88.3	3.0	7.3	20.6	52.4	68.8
2009	27	31.9	24.5	1.3	80.5	3.0	5.7	29.9	50.1	68.6
2010	24	32.3	29.5	0.8	89.5	2.3	5.4	28.7	54.3	82.3
2011	23	25.2	28.1	2.5	87.4	3.5	5.5	12.8	42.0	78.9
2012	24	28.8	23.6	3.7	87.1	4.2	8.1	18.9	43.6	56.5
1998-2012	274	28.9	27.0	0.3	90.7	2.9	4.8	17.0	50.7	70.8

Table 4

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

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4	168	25.6	25.6	95	24.9	24.9	73	26.6	26.6
5-9	83	12.7	38.3	49	12.8	37.7	34	12.4	39.1
10-14	50	7.6	45.9	27	7.1	44.8	23	8.4	47.4
15-19	47	7.2	53.0	29	7.6	52.4	18	6.6	54.0
20-24	24	3.7	56.7	12	3.1	55.5	12	4.4	58.4
25-29	16	2.4	59.1	10	2.6	58.1	6	2.2	60.6
30-34	18	2.7	61.9	14	3.7	61.8	4	1.5	62.0
35-39	26	4.0	65.9	15	3.9	65.7	11	4.0	66.1
40-44	27	4.1	70.0	15	3.9	69.6	12	4.4	70.4
45-49	22	3.4	73.3	13	3.4	73.0	9	3.3	73.7
50-54	24	3.7	77.0	15	3.9	77.0	9	3.3	77.0
55-59	25	3.8	80.8	12	3.1	80.1	13	4.7	81.8
60-64	22	3.4	84.1	12	3.1	83.2	10	3.6	85.4
65-69	27	4.1	88.3	16	4.2	87.4	11	4.0	89.4
70-74	24	3.7	91.9	17	4.5	91.9	7	2.6	92.0
75-79	20	3.0	95.0	13	3.4	95.3	7	2.6	94.5
80-84	16	2.4	97.4	7	1.8	97.1	9	3.3	97.8
85+	17	2.6	100.0	11	2.9	100.0	6	2.2	100.0
All ages	656	100.0		382	100.0		274	100.0	

Included in the statistics are 11.3% multiple primaries in males and 13.1% 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 n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=32 %	Females DCO rate n=25 %	Males Prop.all cancers n=146755 %	Females Prop.all cancers n=142297 %
0- 4	95	73	6.9	5.6			31.0	32.3
5- 9	49	34	3.5	2.6	2.0	2.9	29.9	30.1
10-14	27	23	1.9	1.7			18.4	14.2
15-19	29	18	2.0	1.3	3.4	5.6	9.1	6.7
20-24	12	12	0.7	0.7		8.3	2.2	2.5
25-29	10	6	0.5	0.3	10.0		1.1	0.6
30-34	14	4	0.7	0.2			1.0	0.2
35-39	15	11	0.6	0.5		9.1	0.7	0.3
40-44	15	12	0.6	0.5	6.7		0.5	0.2
45-49	13	9	0.6	0.4	7.7		0.3	0.1
50-54	15	9	0.8	0.5	6.7	44.4	0.2	0.1
55-59	12	13	0.7	0.7			0.1	0.1
60-64	12	10	0.7	0.6		20.0	0.1	0.1
65-69	16	11	1.1	0.7	18.8	36.4	0.1	0.1
70-74	17	7	1.5	0.5	35.3		0.1	0.0
75-79	13	7	1.7	0.6	53.8	28.6	0.1	0.0
80-84	7	9	1.5	1.0	42.9	44.4	0.1	0.1
85+	11	6	3.5	0.7	63.6	83.3	0.1	0.0
All ages	382	274			8.4	9.1	0.3	0.2
Incidence								
Raw			1.4	1.0				
WS			2.0	1.5				
ES			1.7	1.2				
BRD-S			1.4	1.0				

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 1998-2012
MALES

Diagnosis	Observed n	Expected n	SIR	LCL 95%	UCL 95%	EAR	DCO %
C73 Thyroid	2	0.0	83.2	10.1	300.7 #	24.5	
Other primaries	8	1.2	6.5	2.8	12.9 #	84.1	
Not observed	0	0.7	0.0	0.0	5.1	-8.9	
All mult. primaries	10	2.0	5.1	2.4	9.3 #	99.8	

Patients	249
Mean age at second malignancy (years)	55.3
Person-years	805
Mean observation time (years)	3.2
Median observation time (years)	2.0

The occurrence of second malignancy is statistically significant.

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

Table 6b

Standardized incidence ratio (SIR, with 95% confidence limits),
excess absolute risk (EAR) and DCO rate of second primaries
for period 1998-2012
FEMALES

Diagnosis	Observed n	Expected n	SIR	LCL 95%	UCL 95%	EAR	DCO %
Other primaries	3	0.1	31.6	6.5	92.3 #	51.0	
Not observed	0	0.7	0.0	0.0	5.1	-12.7	
All mult. primaries	3	0.8	3.7	0.8	10.7	38.3	

Patients	159
Mean age at second malignancy (years)	28.6
Person-years	569
Mean observation time (years)	3.6
Median observation time (years)	2.1

The occurrence of second malignancy is statistically significant.

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

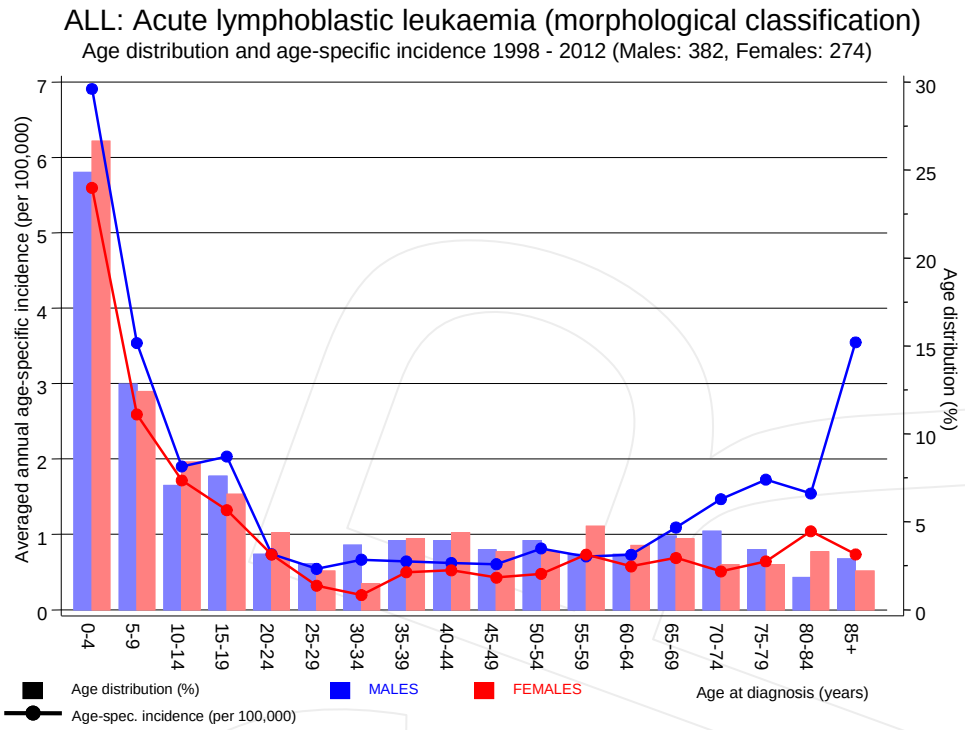


Figure 7. Age distribution and age-specific incidence

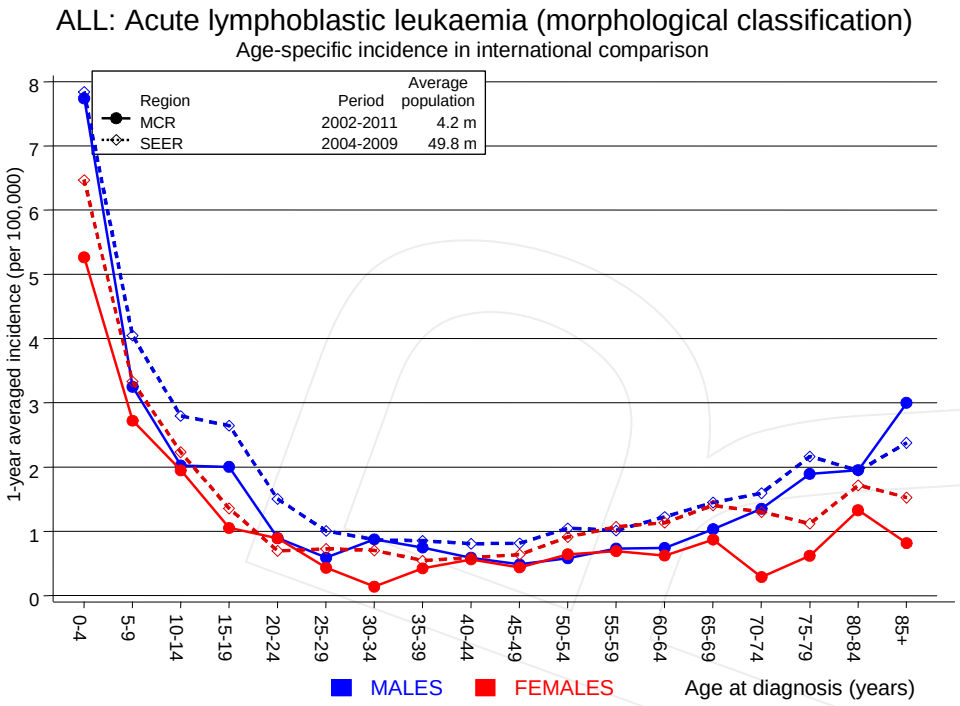


Figure 7a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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.

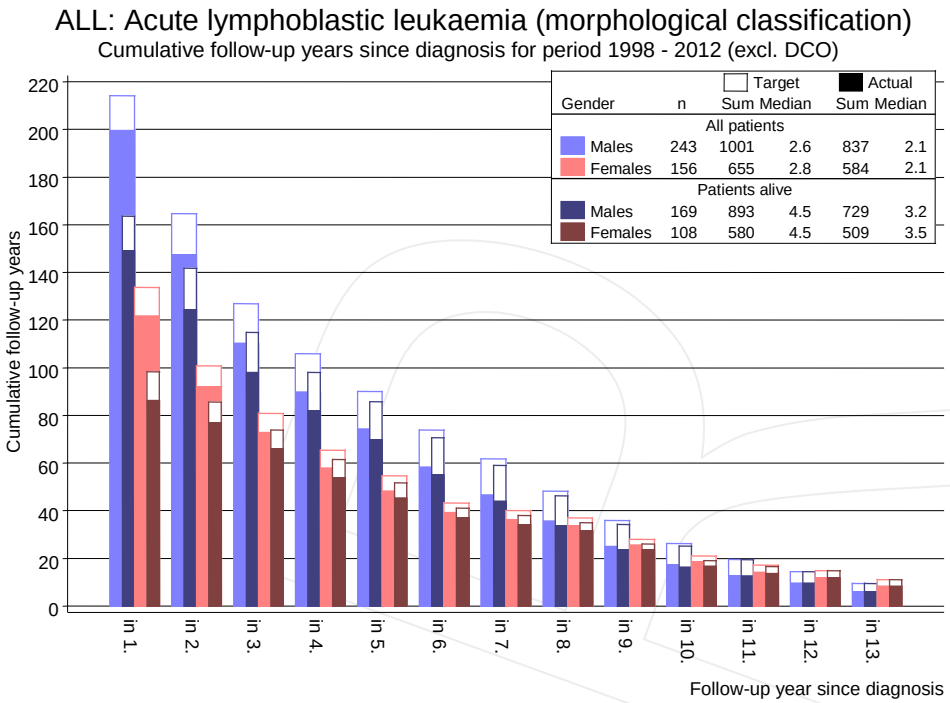
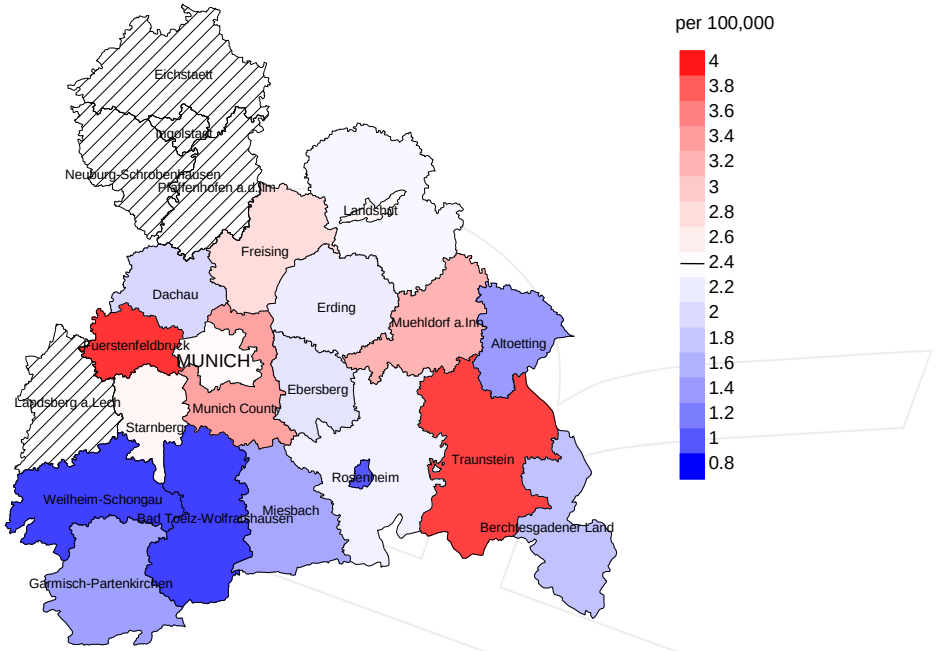


Figure 8. Cumulative follow-up years depending on time since diagnosis

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

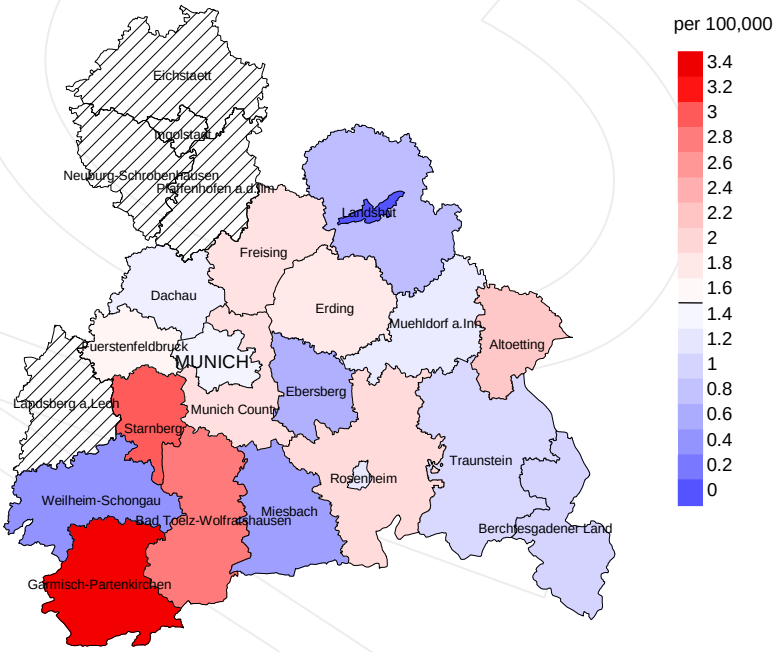
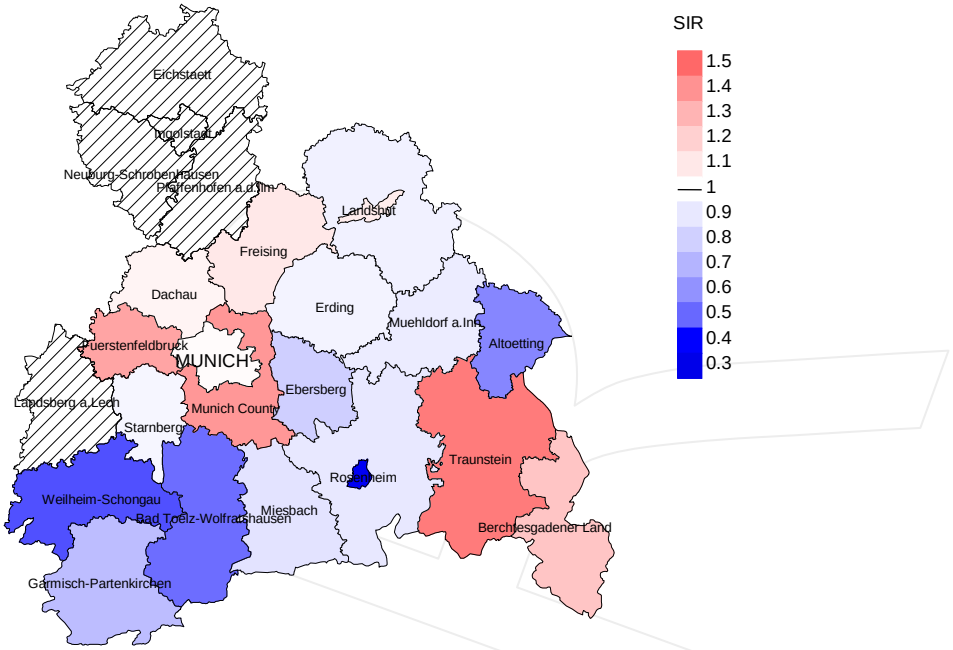


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 2.4/100,000 WS N=187, females 1.5/100,000 WS N=113). 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 2 women were identified with newly diagnosed acute lymphobl. leukaemia (morph.). Therefore, the mean incidence 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 0.0 and 3.6/100,000.

Standardized incidence ratio (SIR) 2003 - 2008: Males



Standardized incidence ratio (SIR) 2003 - 2008: Females

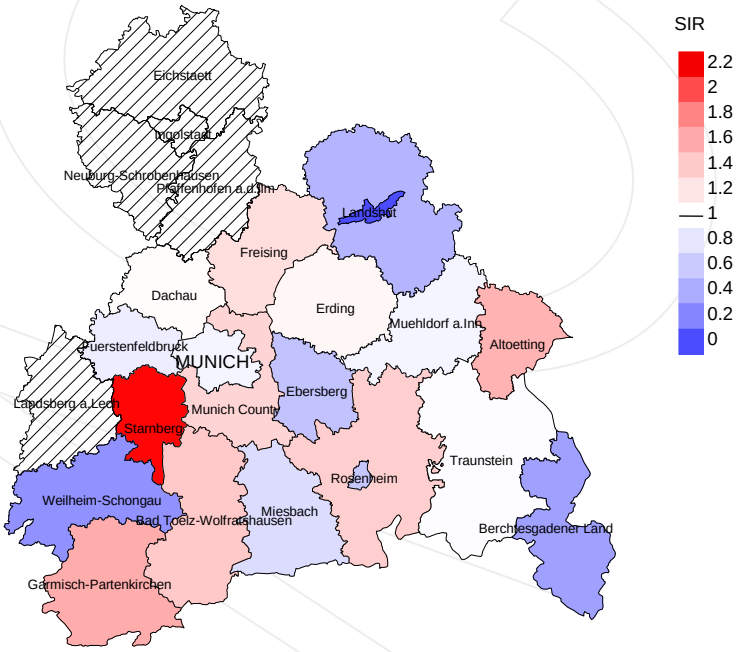


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=187, females N=113). 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 2 women were identified with newly diagnosed acute lymphobl. leukaemia (morph.). 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 0.03 and 2.49, 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	14	100.0		8	57.1	100.0
1999	23	87.0		11	47.8	100.0
2000	22	95.5	9.1	11	50.0	90.9
2001	34	94.1	17.6	16	47.1	100.0
2002	38	92.1	13.2	21	55.3	100.0
2003	40	90.0	12.5	18	45.0	100.0
2004	46	89.1	6.5	17	37.0	100.0
2005	58	91.4	6.9	19	32.8	100.0
2006	54	85.2	14.8	22	40.7	90.9
2007	59	59.3	6.8	23	39.0	95.7
2008	61	54.1	9.8	19	31.1	100.0
2009	44	45.5		15	34.1	100.0
2010	52	46.2	7.7	18	34.6	100.0
2011	55	50.9	3.6	12	21.8	83.3
2012	56	96.4	14.3	13	23.2	100.0
1998-2012	656	75.0	8.7	243	37.0	97.5

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	14	7	100.0	3	21.4
1999	23	7	100.0	2	8.7
2000	22	12	100.0	5	22.7
2001	34	17	100.0	6	17.6
2002	38	17	100.0	9	23.7
2003	40	17	100.0	8	20.0
2004	46	19	100.0	7	15.2
2005	58	13	100.0	8	13.8
2006	54	18	100.0	12	22.2
2007	59	26	88.5	10	16.9
2008	61	22	100.0	9	14.8
2009	44	16	100.0	3	6.8
2010	52	19	100.0	11	21.2
2011	55	19	100.0	4	7.3
2012	56	22	100.0	9	16.1
1998-2012	656	251	98.8	106	16.2

Table 10c

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

Year of death	Deaths n	Prop. cancer-related %	Prop. not cancer-related %	Prop. cancer recorded on death certificate %
1998	7	85.7	14.3	100.0
1999	7	100.0		100.0
2000	12	83.3	16.7	100.0
2001	17	82.4	17.6	100.0
2002	17	100.0		100.0
2003	17	94.1	5.9	100.0
2004	19	100.0		94.7
2005	13	100.0		100.0
2006	18	100.0		100.0
2007	26	92.3	7.7	100.0
2008	22	90.9	9.1	95.5
2009	16	93.8	6.3	87.5
2010	19	84.2	15.8	100.0
2011	19	100.0		100.0
2012	22	81.8	18.2	100.0
1998-2012	251	92.4	7.6	98.4

Table 11a

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (not cancer-related) Years	Age at death (according to death certificate) Years
1998	6	38.5	35.6	53.1	38.5
1999	5	20.5	20.5		20.5
2000	8	27.6	22.2	44.0	27.6
2001	10	53.8	57.1	46.1	53.8
2002	9	49.6	49.6		49.6
2003	10	48.6	45.2	78.6	48.6
2004	10	49.3	49.3		49.3
2005	8	31.0	31.0		31.0
2006	11	53.8	53.8		53.8
2007	18	46.6	49.3	1.4	51.6
2008	11	55.6	55.6		55.6
2009	7	57.7	57.7		61.0
2010	9	62.6	61.3	67.0	62.6
2011	7	40.4	40.4		40.4
2012	13	49.2	46.5	58.3	49.2
1998-2012	142	47.2	46.7	51.4	47.8

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 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	1	7.8	7.8		7.8
1999	2	34.4	34.4		34.4
2000	4	39.5	39.5		39.5
2001	7	58.6	58.6		58.6
2002	8	42.1	42.1		42.1
2003	7	49.6	49.6		49.6
2004	9	50.9	50.9		53.9
2005	5	54.5	54.5		54.5
2006	7	44.1	44.1		44.1
2007	8	55.3	52.1	77.9	63.0
2008	11	60.1	56.9	74.7	59.6
2009	9	39.9	37.5	59.2	37.5
2010	10	48.5	47.2	59.7	48.5
2011	12	47.4	47.4		47.4
2012	9	54.3	51.1	79.7	54.3
1998-2012	109	49.3	48.0	71.0	49.7

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	5	0.5	0.45	0.6	0.35	0.5	0.43	0.5	0.54
1999	5	0.4	0.56	0.7	0.52	0.5	0.53	0.5	0.67
2000	6	0.5	0.55	0.8	0.54	0.6	0.52	0.5	0.45
2001	7	0.6	0.30	0.5	0.19	0.6	0.26	0.6	0.31
2002	9	0.5	0.36	0.4	0.22	0.5	0.31	0.6	0.42
2003	9	0.5	0.38	0.4	0.23	0.5	0.31	0.5	0.39
2004	10	0.5	0.31	0.4	0.17	0.5	0.23	0.6	0.33
2005	8	0.4	0.21	0.6	0.19	0.5	0.21	0.4	0.21
2006	11	0.6	0.28	0.4	0.15	0.5	0.22	0.6	0.29
2007	17	0.8	0.71	0.7	0.45	0.7	0.57	0.8	0.68
2008	11	0.5	0.30	0.4	0.14	0.4	0.21	0.5	0.29
2009	7	0.3	0.41	0.2	0.19	0.3	0.29	0.3	0.35
2010	7	0.3	0.25	0.2	0.10	0.3	0.17	0.3	0.24
2011	7	0.3	0.22	0.3	0.13	0.3	0.17	0.4	0.26
2012	10	0.4	0.31	0.4	0.23	0.4	0.28	0.4	0.30
1998-2012	129	0.5	0.34	0.4	0.21	0.5	0.28	0.5	0.34

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	1	0.1	0.33	0.2	0.30	0.1	0.30	0.1	0.33
1999	2	0.2	0.14	0.2	0.10	0.2	0.12	0.2	0.13
2000	4	0.3	0.36	0.4	0.32	0.4	0.34	0.3	0.37
2001	7	0.6	0.64	0.3	0.19	0.4	0.34	0.5	0.56
2002	8	0.4	0.62	0.4	0.55	0.4	0.59	0.4	0.63
2003	7	0.4	0.44	0.3	0.22	0.3	0.32	0.4	0.45
2004	9	0.5	0.64	0.4	0.35	0.4	0.43	0.4	0.56
2005	5	0.3	0.25	0.2	0.09	0.2	0.15	0.2	0.18
2006	7	0.3	0.47	0.4	0.27	0.4	0.36	0.4	0.52
2007	7	0.3	0.20	0.3	0.14	0.3	0.16	0.3	0.18
2008	9	0.4	0.38	0.3	0.20	0.3	0.25	0.3	0.29
2009	8	0.3	0.30	0.4	0.24	0.4	0.27	0.4	0.32
2010	9	0.4	0.38	0.4	0.24	0.4	0.28	0.4	0.37
2011	12	0.5	0.52	0.4	0.26	0.5	0.37	0.5	0.47
2012	8	0.3	0.33	0.3	0.19	0.3	0.24	0.3	0.27
1998-2012	103	0.4	0.38	0.3	0.22	0.3	0.28	0.4	0.35

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.%
0-4	5	2.2	2.2	3	2.3	2.3	2	1.9	1.9
5-9	13	5.6	7.8	7	5.4	7.8	6	5.8	7.8
10-14	16	6.9	14.7	8	6.2	14.0	8	7.8	15.5
15-19	10	4.3	19.0	4	3.1	17.1	6	5.8	21.4
20-24	16	6.9	25.9	11	8.5	25.6	5	4.9	26.2
25-29	8	3.4	29.3	6	4.7	30.2	2	1.9	28.2
30-34	7	3.0	32.3	6	4.7	34.9	1	1.0	29.1
35-39	20	8.6	40.9	10	7.8	42.6	10	9.7	38.8
40-44	7	3.0	44.0	6	4.7	47.3	1	1.0	39.8
45-49	14	6.0	50.0	5	3.9	51.2	9	8.7	48.5
50-54	11	4.7	54.7	7	5.4	56.6	4	3.9	52.4
55-59	19	8.2	62.9	11	8.5	65.1	8	7.8	60.2
60-64	17	7.3	70.3	8	6.2	71.3	9	8.7	68.9
65-69	22	9.5	79.7	11	8.5	79.8	11	10.7	79.6
70-74	13	5.6	85.3	7	5.4	85.3	6	5.8	85.4
75-79	13	5.6	90.9	7	5.4	90.7	6	5.8	91.3
80-84	11	4.7	95.7	6	4.7	95.3	5	4.9	96.1
85+	10	4.3	100.0	6	4.7	100.0	4	3.9	100.0
All ages	232	100.0		129	100.0		103	100.0	

Included in the statistics are 11.3% multiple primaries in males and 13.1% in females.

Table 14

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

Age at death Years	Males n	Females n	Males Age-spec. mortal.	Males MI-index	Females Age-spec. mortal.	Females MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4	3	2	0.2	0.03	0.2	0.03	9.7	8.7
5- 9	7	6	0.5	0.14	0.5	0.18	20.0	15.4
10-14	8	8	0.6	0.30	0.6	0.35	24.2	28.6
15-19	4	6	0.3	0.14	0.4	0.33	9.5	17.6
20-24	11	5	0.7	0.92	0.3	0.42	13.3	10.6
25-29	6	2	0.3	0.60	0.1	0.33	6.3	1.8
30-34	6	1	0.3	0.43	0.0	0.25	3.4	0.5
35-39	10	10	0.4	0.67	0.5	0.91	2.6	2.0
40-44	6	1	0.2	0.40	0.0	0.08	0.7	0.1
45-49	5	9	0.2	0.38	0.4	1.00	0.3	0.5
50-54	7	4	0.4	0.47	0.2	0.44	0.2	0.1
55-59	11	8	0.6	0.92	0.4	0.62	0.2	0.2
60-64	8	9	0.5	0.67	0.5	0.90	0.1	0.1
65-69	11	11	0.7	0.69	0.7	1.00	0.1	0.1
70-74	7	6	0.6	0.41	0.4	0.86	0.1	0.1
75-79	7	6	0.9	0.54	0.5	0.86	0.1	0.1
80-84	6	5	1.3	0.86	0.6	0.56	0.1	0.0
85+	6	4	1.9	0.55	0.5	0.67	0.1	0.0
All ages	129	103					0.2	0.2
Mortality								
Raw			0.5	0.34	0.4	0.38		
WS			0.4	0.21	0.3	0.22		
ES			0.5	0.28	0.3	0.28		
BRD-S			0.5	0.34	0.4	0.35		
PYLL-70								
per 100,000			13.2		10.0			
ES			14.7		11.8			
AYLL-70			31.7		30.1			

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

Table 15a

Multiple primaries in deaths in period 1998-2012
MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	1	2.6					1	100.0
C12-C13 Hypopharynx	1	2.6					1	100.0
C16 Stomach	1	2.6					1	100.0
C19-C20 Rectum	1	2.6					1	100.0
C25 Pancreas	1	2.6			1	100.0		
C33-C34 Lung	1	2.6					1	100.0
C43 Malign. melanoma	1	2.6					1	100.0
C44 Skin others	2	5.3	2	100.0				
C46,C49 Soft tissue	4	10.5	2	50.0			2	50.0
C61 Prostate	6	15.8	6	100.0				
C62 Testis	2	5.3	1	50.0			1	50.0
C67 Bladder	1	2.6					1	100.0
C70-C72 CNS cancer	3	7.9			2	66.7	1	33.3
C81 Hodgkin lymphoma	1	2.6	1	100.0				
C82-C85 NHL	3	7.9			1	33.3	2	66.7
C90 Mult. myeloma	1	2.6	1	100.0				
C91-C96 Leukaemia	8	21.1			3	37.5	5	62.5
All mult. primaries	38	100.0	13	34.2	7	18.4	18	47.4

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

Table 15b

Multiple primaries in deaths in period 1998-2012
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C18	Colon	1	4.3	1	100.0				
C19-C20	Rectum	1	4.3	1	100.0				
C25	Pancreas	1	4.3					1	100.0
C33-C34	Lung	2	8.7	1	50.0			1	50.0
C44	Skin others	1	4.3					1	100.0
C46,C49	Soft tissue	1	4.3					1	100.0
C50	Breast	6	26.1	5	83.3	1	16.7		
C56	Ovary	1	4.3	1	100.0				
C67	Bladder	1	4.3	1	100.0				
C69	Eye lymphoma	1	4.3	1	100.0				
C70-C72	CNS cancer	5	21.7	1	20.0			4	80.0
C82-C85	NHL	1	4.3	1	100.0				
C91-C96	Leukaemia	1	4.3			1	100.0		
All mult. primaries		23	100.0	13	56.5	2	8.7	8	34.8

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

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2012
(**Singular primaries only** *)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	Males MI-index	Females Age-spec. mortal.	Females MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4	3	2	0.2	0.03	0.2	0.03	11.5	8.7
5- 9	7	6	0.5	0.14	0.5	0.18	21.2	16.7
10-14	8	8	0.6	0.30	0.6	0.35	24.2	30.8
15-19	4	5	0.3	0.14	0.4	0.29	10.3	16.1
20-24	11	5	0.7	0.92	0.3	0.42	14.1	11.6
25-29	5	2	0.3	0.56	0.1	0.33	5.6	1.9
30-34	6	1	0.3	0.43	0.0	0.25	3.5	0.5
35-39	9	9	0.4	0.69	0.4	0.90	2.5	2.0
40-44	6	1	0.2	0.43	0.0	0.10	0.8	0.1
45-49	3	8	0.1	0.25	0.4	1.14	0.2	0.5
50-54	6	4	0.3	0.46	0.2	0.57	0.2	0.2
55-59	9	6	0.5	0.82	0.3	0.75	0.2	0.2
60-64	7	8	0.4	0.70	0.5	1.14	0.1	0.2
65-69	10	8	0.7	0.67	0.5	0.89	0.1	0.1
70-74	3	4	0.3	0.23	0.3	1.00	0.0	0.1
75-79	5	6	0.7	0.50	0.5	0.86	0.1	0.1
80-84	4	3	0.9	1.33	0.3	0.50	0.1	0.0
85+	2	2	0.6	0.40	0.2	1.00	0.0	0.0
All ages	108	88					0.2	0.2
Mortality								
Raw			0.4	0.31	0.3	0.36		
WS			0.4	0.20	0.3	0.21		
ES			0.4	0.25	0.3	0.27		
BRD-S			0.4	0.31	0.3	0.34		
PYLL-70								
per 100,000			12.5		9.4			
ES			14.1		11.2			
AYLL-70			32.9		31.7			

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2012
(**Single primaries only** *)

Age at death Years	Males n	Females n	Males Age-spec. mortal.	Males MI-index	Females Age-spec. mortal.	Females MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4	3	2	0.2	0.03	0.2	0.03	12.0	8.7
5- 9	6	5	0.4	0.13	0.4	0.15	18.8	14.3
10-14	8	6	0.6	0.32	0.4	0.26	24.2	25.0
15-19	4	5	0.3	0.14	0.4	0.29	10.3	19.2
20-24	9	4	0.6	0.75	0.2	0.33	12.3	10.0
25-29	4	2	0.2	0.44	0.1	0.33	4.8	2.1
30-34	6	1	0.3	0.46	0.0	0.25	3.6	0.6
35-39	8	9	0.3	0.62	0.4	0.90	2.3	2.2
40-44	5	1	0.2	0.36	0.0	0.10	0.7	0.1
45-49	3	6	0.1	0.25	0.3	0.86	0.2	0.4
50-54	6	4	0.3	0.50	0.2	0.57	0.2	0.2
55-59	9	6	0.5	0.82	0.3	0.75	0.2	0.2
60-64	5	8	0.3	0.50	0.5	1.14	0.1	0.2
65-69	9	8	0.6	0.60	0.5	0.89	0.1	0.2
70-74	3	4	0.3	0.23	0.3	1.00	0.0	0.1
75-79	5	6	0.7	0.50	0.5	0.86	0.1	0.1
80-84	4	3	0.9	1.33	0.3	0.60	0.1	0.0
85+	2	2	0.6	0.40	0.2	1.00	0.0	0.0
All ages	99	82					0.2	0.2
Mortality								
Raw			0.4	0.29	0.3	0.34		
WS			0.4	0.19	0.3	0.19		
ES			0.4	0.23	0.3	0.25		
BRD-S			0.4	0.29	0.3	0.32		
PYLL-70								
per 100,000			11.4		8.3			
ES			12.9		9.8			
AYLL-70			33.1		30.6			

* See corresponding tables with multiple primaries.

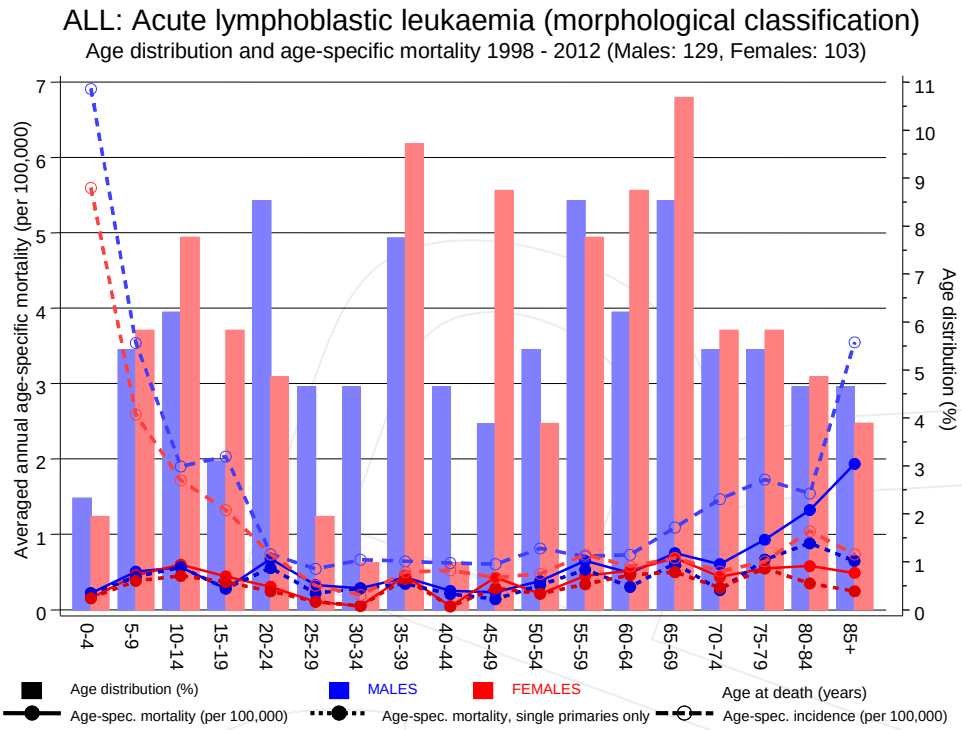
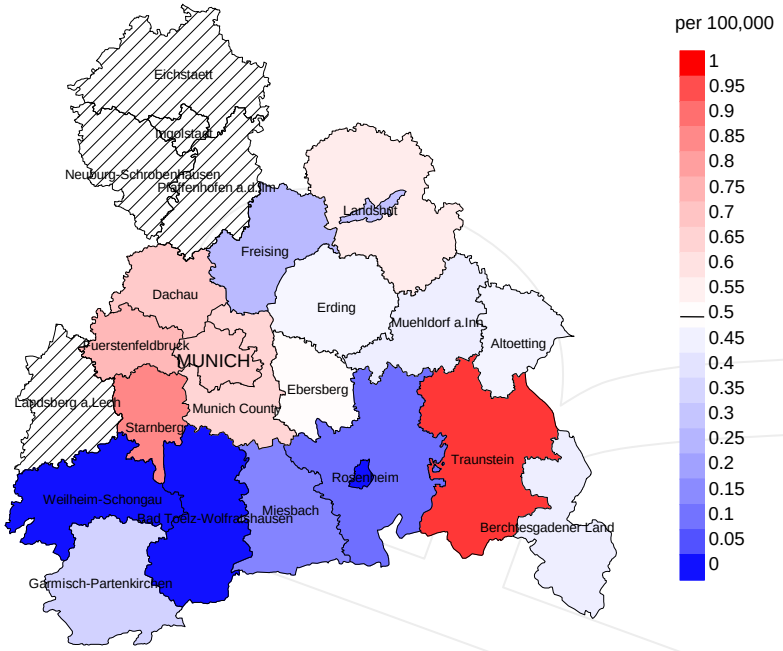


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

The difference between age at diagnosis (Table 3) and age at acute lymphobl. 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

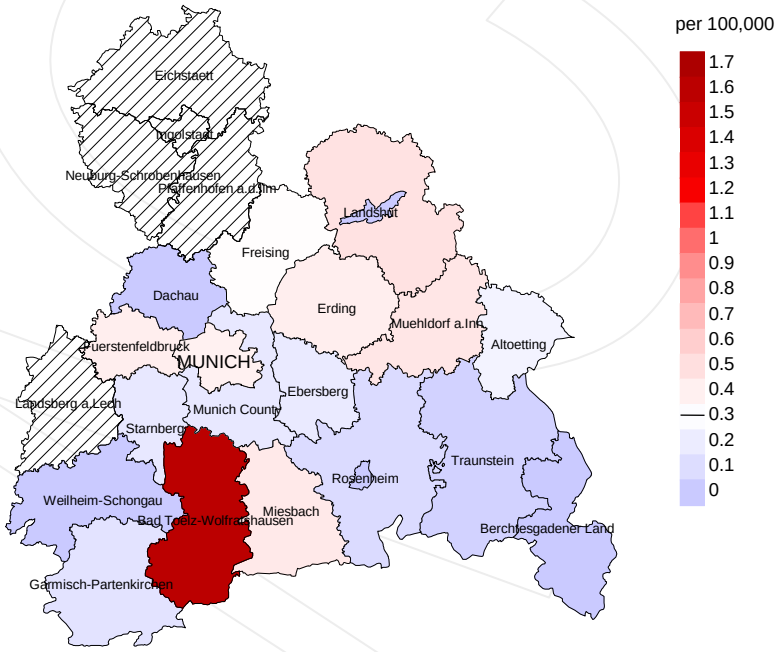
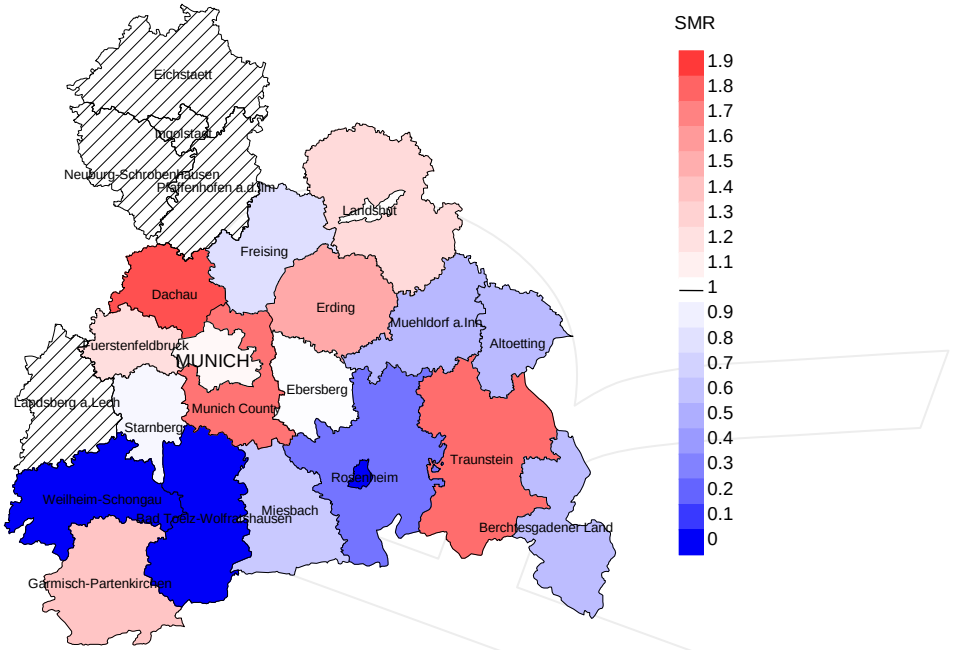


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 0.5/100,000 WS N=63, females 0.3/100,000 WS N=42). 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 1 women died from acute lymphobl. leukaemia (morph.). Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.2/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 1.3/100,000.

Standardized mortality ratio (SMR) 2003 - 2008: Males



Standardized mortality ratio (SMR) 2003 - 2008: Females

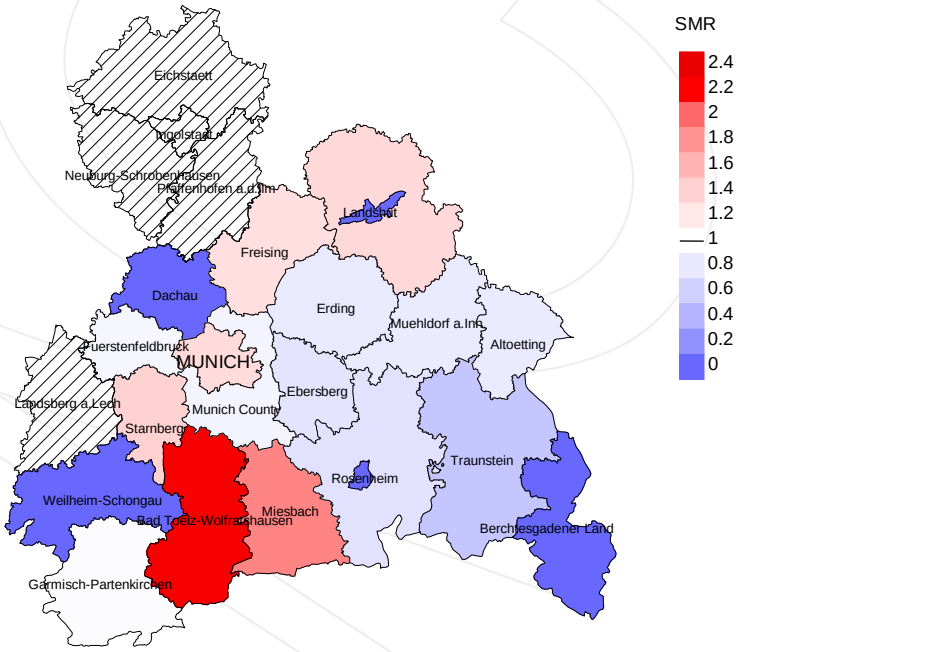


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=63, females N=42). 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 1 women died from acute lymphobl. leukaemia (morph.). Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.77. Though, the value of this parameter may vary with an underlying probability of 99% between 0.00 and 5.71, 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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