Munich Cancer Registry



- ▶ Survival
- ▶ Selection Matrix
- ▶ Homepage
- ▶ Deutsch

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

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

Cancer statistics: Baseline statistics

ALL: Acute lymphobl. leukaemia

Year of diagnosis	1998-2013
Patients	709
Diseases	709
Creation date	05/19/2015
Export date	12/30/2014
Population	4.64 m



http://www.tumorregister-muenchen.de/en/facts/base/base_C910_E.pdf

Global Statements about the statistics on the Internet – Baseline Statistics (grey button ——), Survival (red button ——)

In these analyses, the clinics and physicians of Upper Bavaria and the city and county of Landshut[#], with a total of 4.64 million inhabitants, account for the frequency of cancer diseases^{##} and the achieved long term results. Additionally, the long term survival evaluated by the Munich Cancer Registry (MCR) is compared with the results of the population-based registry in the USA (SEER), which is useful for checking the consistency of the data on an international level.

In comparing several tables, inconsistent figures may be detected. This is based on the fact that different patient cohorts are included in the base calculation, for example when proportions of multiple tumors or DCO-cases**** are concerned. In other cases the individual tumor diagnosis is the basis for calculation, for example with incidence.

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

Clinics and physicians have access to essentially more detailed data, with which they can check, compare and in the best case optimize their own data and results.

We would be pleased to receive corrections, critique and useful suggestions. Just send an e-mail to tumor@ibe.med.uni-muenchen.de.

Munich Cancer Registry, May 2015

- Base data has been collected since 1998. An increase in new diseases is apparent, which is an effect of two extensions in the MCR catchment area (from a base population of 2.51 million to 3.96 in 2002, and to 4.52 million in 2007). Death certificates from 2014 are incorporated into these analyses.
- Due to the high frequency and good prognosis of non-malignant skin cancer (C44), no systematic ascertainment is performed for this diagnosis. C44 is not designated as a primary, but rather as a secondary tumor.
- DCO (death certificate only) identifies a cancer case that first becomes available to the MCR through the death certificate. A high proportion of DCO cases (≥5%) in particular cancer types indicate insufficient participation of specific cancer specializations.

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 (ICD-10 2015) used for specifying cancer site

Code	Description
C91.0	Acute lymphoblastic leukaemia [ALL]

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	%	8	%	%
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	40	5	12.5	22.5	52.5	90.0 #
2003	39	4	10.3	7.7	43.6	89.7
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	61.0 # ##
2008	61	5	8.2	9.8	31.1	52.5
2009	44			15.9	38.6	52.3
2010	53	4	7.5	5.7	35.8	47.2
2011	57	2	3.5	14.0	26.3	47.4
2012	75	8	10.7	8.0	26.7	54.7
2013	30	2	6.7	3.3	26.7	96.7 ###
1998-2013	709	57	8.0	9.9	37.1	72.1

[#] 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	8
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	40	26	14	65.0
2003	39	24	1/5	61.5
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	53	29	24	54.7
2011	57	32	25	56.1
2012	75	42	33	56.0
2013	30	14	16	46.7
1998-2013	709	408	301	57.5

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 4.64 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	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	26	14 <	1.4	0.7	1.9	0.9	1.6	0.8	1.4	0.8
2003	24	15	1.3	0.8	1.9	1.4	1.6	1.0	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	29	24	1.3	1.0	1.9	1.5	1.6	1.3	1.3	1.0
2011	32	25	1.4	1.1	2.1	1.7	1.7	1.3	1.4	1.1
2012	42	33	1.8	1.4	2.6	2.2	2.2	1.8	1.9	1.5
2013	14	16	0.6	0.7	0.8	0.7	0.7	0.7	0.6	0.7
1998-2013	408	301	1.4	1.0	2.0	1.5	1.6	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	Cases		Std.					Median		
diagnosis	n	Mean	dev.	Min.	Max.	10%	25%	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	40	31.3	26.6	2.6	88.2	3.4	5.4	26.4	51.9	72.1
2003	39	26.3	27.5	0.3	81.9	1.8	3.4	14.7	46.6	76.5
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	53	30.4	28.4	0.3	89.5	1.6	4.2	19.7	53.8	75.4
2011	57	29.0	29.2	2.5	87.4	3.5	5.5	12.8	48.6	78.9
2012	75 /	30.0	27.4	0.6	87.1	3.7	6.5	18.9	55.1	73.4
2013	30	39.2	28.2	2.8	91.4	6.1	14.3	36.1	68.8	78.0
1998-2013	709	29.5	27.2	0.3	92.2	2.9	5.2	18.1	53.0	73.3

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	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	26	28.5	28.2	2.6	88.2	3.1	5.2	22.0	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	29	28.8	27.9	0.3	80.5	1.5	3.8	17.9	53.8	75.4
2011	32	28.9	29.0	2.5	85.6	3.6	4.8	12.7	51.4	73.5
2012	42	32.3	30.2	2.4	87.1	3.2	5.9	20.0	62.8	78.9
2013	14	31.8	22.8	2.8	69.5	6.6	13.0	30.9	47.8	68.8
1998-2013	408	29.3	27.0	0.3	92.2	2.9	5.2	18.3	52.7	72.8

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	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	14	36.5	23.3	2.9	69.9	12.6	14.6	31.5	59.8	67.2
2003	15	26.3	31.6	0.3	79.6	0.8	2.6	3.8	63.0	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	25	29.1	30.1	2.5	87.4	3.5	6.5	13.1	47.7	78.9
2012	33 /	27.1	23.5	0.6	87.1	3.8	7.5	18.4	42.8	56.5
2013	16	45.7	31.4	3.2	91.4	5.7	17.8	36.1	76.7	84.2
1998-2013	301	29.7	27.5	0.3	91.4	3.0	4.9	17.7	54.7	73.4

Table 4

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

Age at									
diagnosis	Cases			Males			Females		
Years	n	%	Cum.%	'n	%	Cum.%	n	%	Cum.%
0-4	176	24.8	24.8	100	24.5	24.5	76	25.2	25.2
5-9	92	13.0	37.8	54	13.2	37.7	38	12.6	37.9
10-14	56	7.9	45.7	30	7.4	45.1	26	8.6	46.5
15-19	50	7.1	52.8	31	7.6	52.7	19	6.3	52.8
20-24	28	3.9	56.7	15	3.7	56.4	13	4.3	57.1
25-29	18	2.5	59.2	11	2.7	59.1	7	2.3	59.5
30-34	19	2.7	61.9	14	3.4	62.5	5	1.7	61.1
35-39	31	4.4	66.3	17	4.2	66.7	14	4.7	65.8
40-44	28	3.9	70.2	16	3.9	70.6	12	4.0	69.8
45-49	23	3.2	73.5	14	3.4	74.0	9	3.0	72.8
50-54	24	3.4	76.9	15	3.7	77.7	9	3.0	75.7
55-59	27	3.8	80.7	13	3.2	80.9	14	4.7	80.4
60-64	22	3.1	83.8	12	2.9	83.8	10	3.3	83.7
65-69	30	4.2	88.0	18	4.4	88.2	12	4.0	87.7
70-74	27	3.8	91.8	17	4.2	92.4	10	3.3	91.0
75-79	23	3.2	95.1	13	3.2	95.6	10	3.3	94.4
80-84	17	2.4	97.5	7	1.7	97.3	10	3.3	97.7
85+	18	2.5	100.0	11	2.7	100.0	7	2.3	100.0
All ages	709	100.0		408	100.0		301	100.0	

Included in the statistics are 11.0% multiple primaries in males and 12.6% in females.

Table 5

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

							Males	Females
			Males	Females	Males	Females	Prop.all	Prop.all
Age at			Age-	Age-	DCO rate	DCO rate	cancers	cancers
diagnosis	Males	Females	spec.	spec.	n=32	n=25	n=158258	n=153136
Years	n	n	incid.	incid.	%	%	%	%
0- 4	100	76	6.7	5.4			30.9	31.1
5- 9	54	38	3.6	2.7	1.9		30.7	30.4
10-14	30	26	2.0	1.8			18.1	15.3
15-19	31	19	2.0	1.3	3.2	5.3	8.8	6.5
20-24	15	13	0.8	0.7		7.7	2.4	2.5
25-29	11	7	0.5	0.3	9.1		1.1	0.6
30-34	14	5	0.6	0.2			0.9	0.2
35-39	17	14	0.7	0.6		7.1	0.8	0.4
40-44	16	12	0.6	0.5	6.3		0.5	0.2
45-49	14	9	0.6	0.4	7.1		0.3	0.1
50-54	15	9	0.7	0.4	6.7	44.4	0.2	0.1
55-59	13	14	0.7	0.7			0.1	0.1
60-64	12	10 /	0.7	0.5		20.0	0.1	0.1
65-69	18	12	1.1	0.7	16.7	25.0	0.1	0.1
70-74	17	10	1.3	0.7	35.3		0.1	0.1
75-79	13	10	1.6	0.8	53.8	30.0	0.1	0.1
80-84	7	10	1.4	1.1	42.9	50.0	0.1	0.1
85+	11	7	3.2	0.8	63.6	71.4	0.1	0.0
All ages	408	301			7.8	8.3	0.3	0.2
Incidence								
Raw			1.4	1.0				
Kaw WS			2.0	1.5				
ws ES				1.3				
BRD-S			1.6 1.4	1.0				
מ-מאם			1.4	1.0				

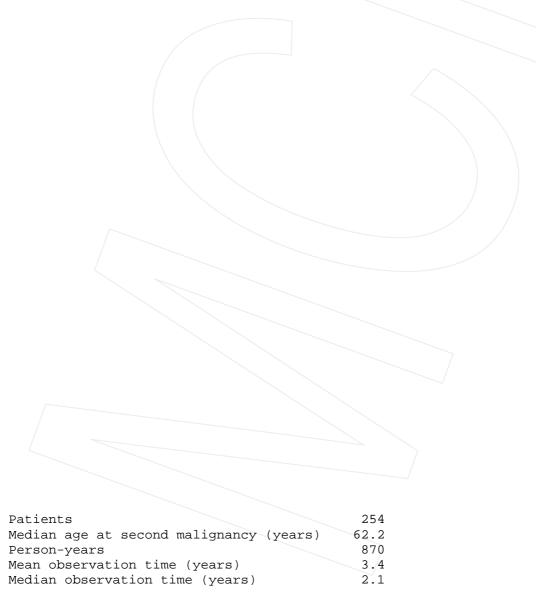
The age-specific incidence characterizes the disease risk in a particular age group. The age distribution depends on the patient population frequency in each age group and reflects the tangible clinical picture of everyday patients care (see following chart).

Table 6a

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries for period 1998-2013

MALES

Diagnosis	Observed n	Expected n	SIR	LCL 95%	UCL 95%	EAR	DCO %
C73 Thyroid C82-C85 NHL	2 2	0.0	75.4 21.0	9.1 2.5	272.5 # 75.7 #	22.7 21.9	
Other primaries Not observed	70	1.3	5.6 0.0	2.2	11.5 # 4.7	66.1 -9.1	
All mult. primaries	11	2.2	5.1	2.5	9.1 #	101.5	



The occurrence of second malignancy is statistically significant.

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

Table 6b

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries for period 1998-2013

FEMALES

Diagnosis	Observed n	Expected n	SIR	LCL UCL 95% 95%	EAR	DCO %
Other primaries	3	0.1	29.6	6.1 86.4 #	45.3	
Not observed	0	0.8	0.0	0.0 4.7	-12.2	
All mult. primaries	3	0.9	3.4	0.7 9.9	33.1	

Patients	166	
Median age at second malignancy (years)	11.7	
Person-years	640	
Mean observation time (years)	3.9	

The occurrence of second malignancy is statistically significant.

Median observation time (years)

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

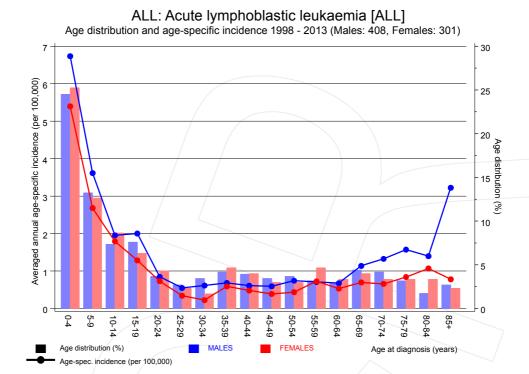
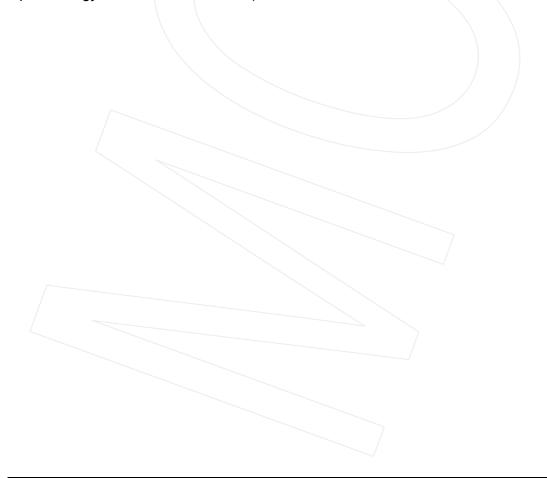


Figure 7. Age distribution and age-specific incidence



ALL: Acute lymphoblastic leukaemia [ALL] Age-specific incidence in international comparison Average Region Period population 4.6 m MCR 2007-2013 2007-2011 SEER 64.6 m 1-year averaged incidence (per 100,000) 0 2 35-39 50-54 55-59 Age at diagnosis (years)

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



Reference:

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

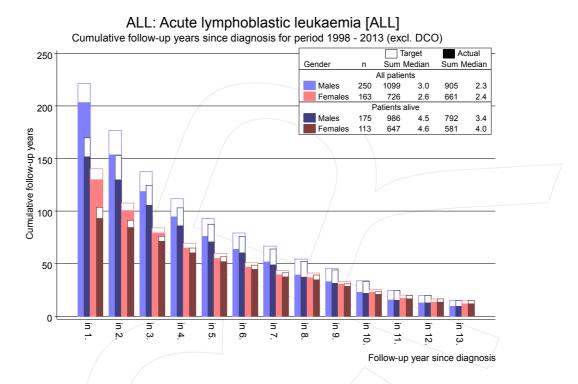
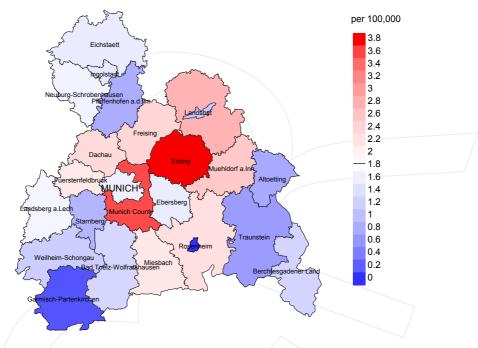


Figure 8. Cumulative follow-up years depending on time since diagnosis

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



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



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

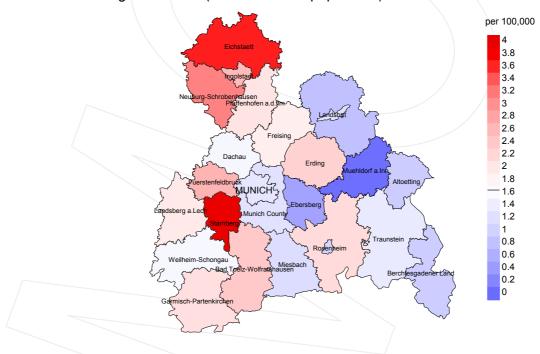
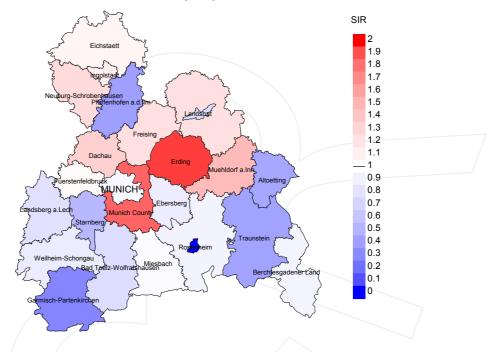


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 1.8/100,000 WS N=195, females 1.6/100,000 WS N=184).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,928 female residents (averaged) in the period from 2007 to 2013 a total of 4 women were identified with newly diagnosed acute lymphobl. leukaemia. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 0.5/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.1 and 1.6/100,000.

Standardized incidence ratio (SIR) 2007 - 2013: Males



Standardized incidence ratio (SIR) 2007 - 2013: Females

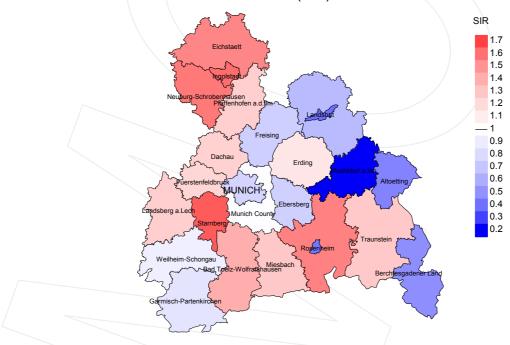


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=195, females N=184).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,642 female residents (averaged) in the period from 2007 to 2013 a total of 4 women were identified with newly diagnosed acute lymphobl. leukaemia. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.75. Though, the value of this parameter may vary with an underlying probability of 99% between 0.13 and 2.37, and is therefore not statistically striking.

MORTALITY

Table 10a

Patient cohorts of incident cancers by year of diagnosis, follow-up status, proportion of DCO, deaths among the annual cohorts, and proportion of available death certificates (with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.64 m as of 2007, respectively)

	Incident	Prop. actively	Prop.		Prop.	Prop. deaths with death
Year of	cases	followed	DCO	Deaths	deaths	certific.
diagnosis	n	%	%	n	%	%
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	40	90.0	12.5	21/	52.5	100.0
2003	39	89.7	10.3	1/7	43.6	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	61.0	6.8	23	39.0	95.7
2008	61	52.5	8.2	19	31.1	100.0
2009	44	52.3		17	38.6	94.1
2010	53	47.2	7.5	19	35.8	94.7
2011	57	47.4	3.5	15	26.3	100.0
2012	75	54.7	10.7	20	26.7	100.0
2013	30	96.7	6.7	8	26.7	100.0
1998-2013	709	72.1	8.0	263	37.1	97.7
1770 2013	, 0 2	72.1	0.0	200	J , • ±	21.1

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	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	40	17	100.0	9	22.5
2003	39	16	100.0	7	17.9
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	53	19	100.0	11	20.8
2011	57	19	100.0	4	7.0
2012	75	23	100.0	9	12.0
2013	30	22	100.0	9 5	16.7
1998-2013	709	273	98.9	110	15.5

Table 10c

Annual cohorts of deaths, proportion of cancer-related and non-cancer-related deaths, and cancer recorded on death certificates (incl. DCO)

(with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.64 m as of 2007, respectively)

				Prop.
				cancer
		Prop.	Prop.	recorded
		cancer-	non-cancer-	on death
Year of	Deaths	related	related	certificate
death	n/	%	8	%
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	16	93.8	6.3	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	23	82.6	17.4	100.0
2013	22	90.9	9.1	95.5
1998-2013	273	92.3	7.7	98.1

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate)
1998	6	42.2	36.3	53.1	42.2
1999	5	20.2	20.2		20.2
2000	8	17.8	15.3	44.0	17.8
2001	10	56.5	62.5	47.7	56.5
2002	9	45.2	45.2		45.2
2003	10	54.9	54.0	78.6	54.9
2004	10	52.0	52.0		52.0
2005	8	24.4	24.4		24.4
2006	11 /	48.2	48.2		48.2
2007	18	55.3	59.2	1.4	59.5
2008	1,1	63.1	63.1		63.1
2009	/7	42.5	42.5		58.5
2010	9	58.5	58.5	67.0	58.5
2011	7	30.8	30.8		30.8
2012	13	55.2	50.0	79.0	55.2
2013	10	70.1	70.1		70.1
1998-2013	152	51.3	50.2	53.3	53.1

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 $\begin{tabular}{ll} \begin{tabular}{ll} \begin{tabula$

Year of death	Deaths n	Age at death (all causes)	Age at death (cancer-related) Years	Age at death (non-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	37.7	37.7		37.7
2001	7	63.3	63.3		63.3
2002	8	43.5	43.5		43.5
2003	6	53.5	53.5		53.5
2004	9	68.9	68.9		69.0
2005	5	64.8	64.8		64.8
2006	7	50.7	50.7		50.7
2007	8	64.7	63.3	77.9	66.0
2008	1,1	67.6	67.6	74.7	69.5
2009	9	45.5	40.8	59.2	40.8
2010	10	43.3	36.0	59.7	43.3
2011	12	46.9	46.9		46.9
2012	10	63.7	58.3	79.7	63.7
2013	12	64.3	64.3	64.9	62.2
1998-2013	121	56.0	53.8	71.4	55.6

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	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	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	0.35	0.4	0.21	0.5	0.29	0.6	0.41
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	0.24	0.2	0.09	0.3	0.16	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	0.24	0.4	0.16	0.4	0.20	0.4	0.22
2013	10	0.4	0.71	0.3	0.32	0.3	0.47	0.4	0.69
1998-2013	139	0.5	0.34	0.4	0.21	0.4	0.27	0.5	0.34

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 n raw raw WS WS ES ES BRD-S BRD-S death 0.30 0.1 0.30 1998 1 0.1 0.33 0.2 0.1 0.33 0.14 0.2 0.2 0.12 0.2 0.13 1999 2 0.2 0.10 4 0.3 0.36 0.4 0.3 0.37 2000 0.32 0.4 0.34 7 2001 0.6 0.64 0.3 0.19 0.4 0.34 0.5 0.56 0.49 0.4 C. 0.20 0.3 0.30 0.43 0.4 0.57 2002 8 0.4 0.4 0.59 2003 6 0.3 0.40 0.3 0.20 0.3 0.43 9 0.5 5 0.3 0.25 2004 0.4 0.35 0.4 0.43 0.4 0.56 2005 0.2 0.09 0.2 0.15 0.2 0.18 0.4 0.36 2006 7 0.3 0.47 0.4 0.27 0.4 0.52 0.3 0.20 2007 7 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 0.48 0.4 0.26 0.5 0.36 0.5 0.45 2012 9 0.4 0.27 0.3 0.14 0.3 0.18 0.3 0.22 2013 10 0.4 0.63 0.4 0.52 0.4 0.57 0.4 0.57

Table 13

Age distribution of age at death (cancer-related) for period 1998-2013

(incl. multiple primaries)

Age at								
death	Cases		Males			Females		
Years	n	% Cum.%	'n	%	Cum.%	n	%	Cum.%
0-4	6	2.4 2.4	/ 3	2.2	2.2	3	2.7	2.7
5-9	13	5.2 7.5	/ 7	5.0	7.2	6	5.3	8.0
10-14	17	6.7 /14.3	8	5.8	12.9	9	8.0	15.9
15-19	10	4.0 18.3	4	2.9	15.8	6	5.3	21.2
20-24	16	6.3 24.6	11	7.9	23.7	5	4.4	25.7
25-29	9	3.6 28.2	7	5.0	28.8	2	1.8	27.4
30-34	8	3.2 31.3	6	4.3	33.1	2	1.8	29.2
35-39	21	8.3 39.7	11	7.9	41.0	10	8.8	38.1
40 - 44	8	3.2 42.9	7	5.0	46.0	1	0.9	38.9
45-49	14	5.6 48.4	5	3.6	49.6	9	8.0	46.9
50-54	11	4.4 52.8	7	5.0	54.7	4	3.5	50.4
55-59	20	7.9 60.7	11	7.9	62.6	9	8.0	58.4
60-64	19	7.5 68.3	9	6.5	69.1	10	8.8	67.3
65-69	23	9.1 77.4	12	8.6	77.7	11	9.7	77.0
70-74	18	7.1 84.5	9	6.5	84.2	9	8.0	85.0
75-79	17	6.7 91.3	10	7.2	91.4	7	6.2	91.2
80-84	12	4.8 96.0	6	4.3	95.7	6	5.3	96.5
85+	10	4.0 100.0	6	4.3	100.0	4	3.5	100.0
All ages	252	100.0	139	100.0		113	100.0	

Included in the statistics are 11.0% multiple primaries in males and 12.6% in females.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers for period 1998-2013 (incl. multiple primaries)

			Males		Females		Males	Females
Age at			Age-		Age-			Prop.all
death	Males	Females	spec.		spec.		cancers	cancers
Years	n	n	mortal.	MI-index	mortal.	MI-index	%	%
0 - 4	3	3	0.2	0.03	0.2	0.04	9.1	11.5
5- 9	7	6	0.5	0.13	0.4	0.16	18.4	15.0
10-14	8	9	0.5	0.27	0.6	0.35	22.9	29.0
15-19	4	6	0.3	0.13	0.4	0.32	8.9	16.2
20-24	11	5	0.6	0.73	0.3	0.38	12.2	9.8
25-29	7	2	0.3	0.64	0.1	0.29	6.5	1.7
30-34	6	2	0.3	0.43	0.1	0.40	3.2	0.9
35-39	11	10	0.4	0.65	0.4	0.71	2.8	1.9
40-44	7	1	0.3	0.44	0.0	0.08	0.8	0.1
45-49	5	9	0.2	0.36	0.4	1.00	0.3	0.4
50-54	7	4	0.3	0.47	0.2	0.44	0.2	0.1
55-59	11 /	9	0.6	0.85	0.5	0.64	0.2	0.2
60-64	9	1,0	0.5	0.75	0.5	1.00	0.1	0.2
65-69	12	11	0.8	0.67	0.6	0.92	0.1	0.1
70-74	9	9	0.7	0.53	0.6	0.90	0.1	0.1
75-79	10	7	1.2	0.77	0.6	0.70	0.1	0.1
80-84	6	6	1.2	0.86	0.6	0.60	0.1	0.1
85+	6	4	1.8	0.55	0.4	0.57	0.1	0.0
All ages	139	113					0.2	0.2
_								
Mortality								
Raw			0.5	0.34	0.4	0.38		
WS			0.4	0.21	0.3	0.23		
ES			0.4	0.27	0.3	0.28		
BRD-S			0.5	0.34	0.4	0.35		
PYLL-70								
per 100,000			12.6		10.0			
ES			14.0		11.8			
AYLL-70			31.3		30.4			

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

Table 15a

Multiple primaries in deaths in period 1998-2013

MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	/ 1	2.5					1	100.0
	1	2.5					1	100.0
C12-C13 Hypopharynx							1	
C16 Stomach	/ 1 /	2.5					_	100.0
C19-C20 Rectum	1	2.5				100 0	1	100.0
C25 Pancreas	1	2.5			/ 1	100.0	_	
C33-C34 Lung	1	2.5					1	100.0
C43 Malign. melanoma	1	2.5					1	100.0
C44 Skin others	2	5.0	2	100.0				
C46,C49 Soft tissue	4	10.0	2	50.0			2	50.0
C61 Prostate	6	15.0	6	100.0				
C62 Testis	2	5.0	1	50.0			1	50.0
C67 Bladder	1	2.5					1	100.0
C70-C72 CNS cancer	3	7.5			_ 2	66.7	/1	33.3
C81 Hodgkin lymphoma	1	2.5	1	100.0				
C82-C85 NHL	4	10.0			1	25.0	3	75.0
C90 Mult. myeloma	1	2.5	1	100.0				
C91-C96 Leukaemia	9	22.5			3	33.3	6	66.7
	-				-		-	
All mult. primaries	40	100.0	13	32.5	7	17.5	20	50.0

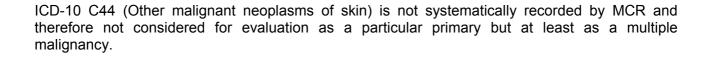


Table 15b

Multiple primaries in deaths in period 1998-2013
FEMALES

					Syn- chron	Syn- chron		
	Total	Total	Pre	Pre	±30d	±30d	Post	Post
Diagnosis	n /	%↓	n	← %	n	~ %	n	~ %
C18 Colon	1	4.0	1	100.0				
C19-C20 Rectum	/1	4.0	1	100.0				
C25 Pancreas	/ 1	4.0					1	100.0
C33-C34 Lung	/ 1	4.0					1	100.0
C40-C41 Bone	1	4.0	1	100.0				
C44 Skin others	1	4.0					1	100.0
C46,C49 Soft tissue	1	4.0					1	100.0
C48 Peritoneal	1	4.0	1	100.0				
C50 Breast	6	24.0	5	83.3	1	16.7		
C56 Ovary	1	4.0	1	100.0				
C67 Bladder	1	4.0	1	100.0				
C69 Eye lymphoma	1	4.0	1	100.0				
C70-C72 CNS cancer	6	24.0	2	33.3			4	66.7
C82-C85 NHL	/ 1	4.0	1	100.0				
C91-C96 Leukaemia	1	4.0			_ 1	100.0		
All mult. primaries	25	100.0	15	60.0	2	8.0	8	32.0

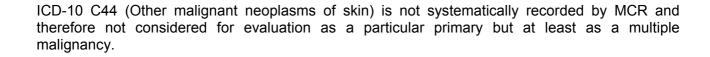


Table 16

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

(Singular primaries only *)

			Males		Females		Males	Females
Age at			Age-		Age-		Prop.all	Prop.all
death	Males	Females	spec.		spec.		cancers	cancers
Years	n	n	mortal.	MI-index	mortal.	MI-index	%	8
0 - 4	3	3	0.2	0.03	0.2	0.04	10.7	12.5
5- 9	7	6	0.5	0.13	0.4	0.16	19.4	16.2
10-14	8	9 /	0.5	0.27	0.6	0.35	22.9	31.0
15-19	4	5 <	0.3	0.13	0.3/	0.28	9.5	15.2
20-24	11	5	0.6	0.73	0.3	0.38	13.1	10.6
25-29	6	2	0.3	0.60	0.1	0.29	6.1	1.8
30-34	6	2	0.3	0.43	0.1	0.40	3.3	1.0
35-39	10	9	0.4	0.67	0.4	0.69	2.7	1.9
40-44	7	1	0.3	0.47	0.0	0.10	0.9	0.1
45-49	3	8	0.1	0.23	0.3	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	0.75	0.3	0.67	0.2	0.1
60-64	8	9	0.5	0.80	0.5	1.29	0.1	0.2
65-69	10	8	0.6	0.59	0.5	0.80	0.1	0.1
70-74	5	7	0.4	0.38	0.5	1.00	0.0	0.1
75-79	8	7	1.0	0.80	0.6	0.70	0.1	0.1
80-84	4	4	0.8	1.33	0.4	0.57	0.0	0.0
85+	2	2	0.6	0.40	0.2	1.00	0.0	0.0
All ages	117	97					0.2	0.2
Mortality								
Raw			0.4	0.31	0.3	0.36		
WS			0.4		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			11.9		9.4			
ES			13.4		11.2			
AYLL-70			32.7		32.3			

^{*} See corresponding tables with multiple primaries.

Table 17

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

(Single primaries only *)

			Males		Females		Males	Females
Age at			Age-		Age-		Prop.all	Prop.all
death	Males	Females	/ - /		spec.		cancers	cancers
Years	n	n	mortal.	MI-index	mortal.	MI-index	%	%
0 - 4	3	3	0.2		0.2	0.04	11.1	12.5
5- 9	6	5	0.4		0.4	0.14	17.1	13.9
10-14	8	7 /	0.5		0.5	0.27	22.9	25.9
15-19	4	5 <	0.3		0.3/	0.28	9.5	17.9
20-24	9	4	0.5		0.2	0.31	11.4	9.1
25-29	5	2	0.2		0.1	0.29	5.4	1.9
30-34	6	2	0.3	0.46	0.1	0.40	3.4	1.1
35-39	9	9	0.4		0.4	0.69	2.5	2.1
40-44	6	1	0.2	0.40	0.0	0.10	0.8	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	8 /	6	0.4	0.67	0.3	0.67	0.2	0.2
60-64	6	9	0.3	0.60	0.5	1.29	0.1	0.2
65-69	9	8	0.6	0.53	0.5	0.80	0.1	0.1
70-74	5	7	0.4	0.38	0.5	1.00	0.1	0.1
75-79	8	7	1.0	0.80	0.6	0.70	0.1	0.1
80-84	4	4	0.8	1.33	0.4	0.67	0.1	0.1
85+	2	2	0.6	0.40	0.2	1.00	0.0	0.0
All ages	107	91					0.2	0.2
Mortality								
Raw			0.4	0.29	0.3	0.34		
WS			0.3		0.3	0.20		
ES			0.4		0.3	0.25		
BRD-S			0.4		0.3	0.32		
PYLL-70								
per 100,000			10.9		8.4			
ES			12.2		9.9			
AYLL-70			33.1		31.2			
			//					

^{*} See corresponding tables with multiple primaries.

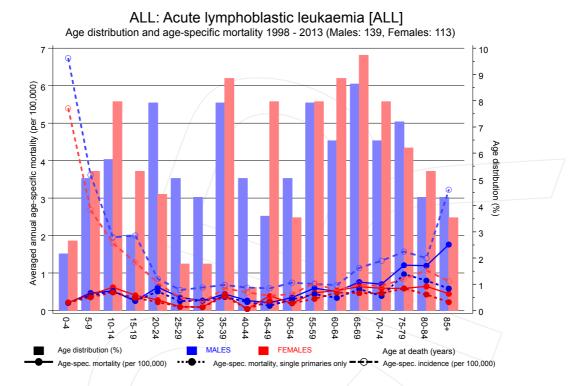


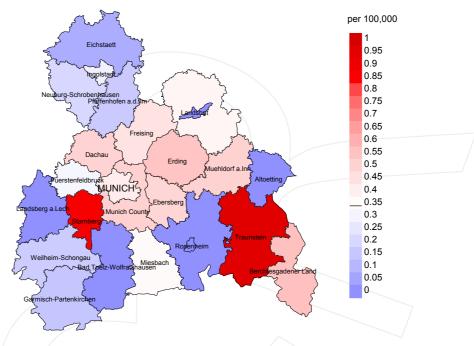
Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

05/19/2015



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



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

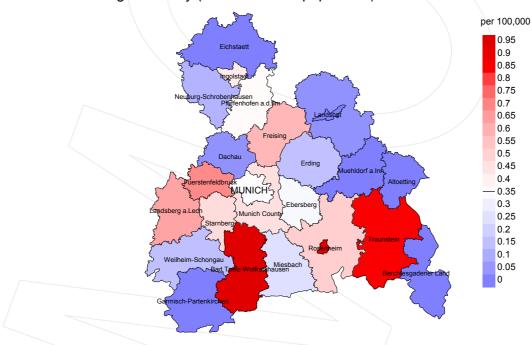
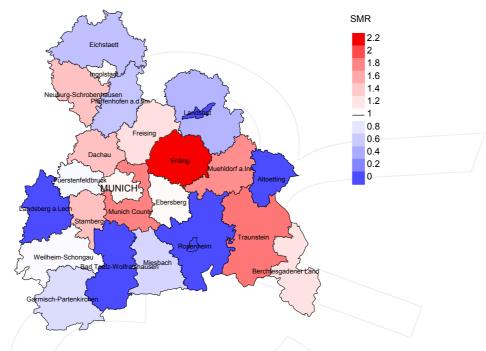


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2013. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 0.3/100,000 WS N=69, females 0.4/100,000 WS N=64).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,928 female residents (averaged) in the period from 2007 to 2013 a total of 3 women died from acute lymphobl. leukaemia. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.3/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 1.4/100,000.

Standardized mortality ratio (SMR) 2007 - 2013: Males



Standardized mortality ratio (SMR) 2007 - 2013: Females

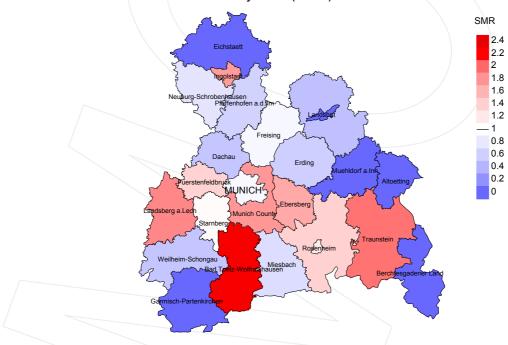


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=69, females N=64).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,642 female residents (averaged) in the period from 2007 to 2013 a total of 3 women died from acute lymphobl. leukaemia. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.67. Though, the value of this parameter may vary with an underlying probability of 99% between 0.19 and 6.11, and is therefore not statistically striking.

Statistical Notes

In all tables and figures the respective reference values should be carefully considered. The incidence rates include diagnoses (with multiple primary), and death certificate only (DCO) cases. For mortality statistics patients, diagnoses and progressive course of disease are presented. In the calculations, all courses of disease are considered whereby progressions occurred and/or death certificate identified progressive cancers were ascertained. Additionally there are three groups of disease course to consider:

1. All multiple primaries included

The mortality statistic describes the tumor-specific death, independent of any malignancy. The patient perspective, induced secondary malignancies, and the problem of multiple malignancies from the same primary tumor all have reasons for their inclusion.

2. First singular primary (no information about other prior or synchronous malignancy)

The mortality statistic describes the cancer-related death for patients who have no therapeutic restrictions due to a previous or synchronous cancer. These statistics are comparable to studies that have exclusion criteria based on a second malignancy.

3. Single primary (no information about other prior, syn- or metachronous malignancy)

The mortality statistic describes the tumor-specific death that occurs without any impact through secondary primaries, earlier, synchronous, later or induced. Precisely the difference between disease group 1 and 2 highlight the magnitude of the problem of secondary malignancies.

For this reason differences appear concerning official mono-causal mortality statistics. To judge the maximum deviation, 2 further tables are presented. In the first table the distribution of secondary malignancies before, at or after the described cancer are shown, that could be an alternative cause of death. In the second table, the age-specific mortality rates for all courses of disease, without designation of secondary malignancies are shown.

A previously minimally acknowledged statistic is the **age at death**, which allows for a good assessment of the quality of classification of the apparent tumor-specific death. For assumed tumor-independent deaths, the age of death should be estimated from the age of diagnosis and the normal life expectancy, whereas tumor-dependent deaths can be estimated from the age of diagnosis plus the average tumor-specific life expectancy. The comparison of different tumors demonstrates this association, if the causes of cancer and the competing cause of death are independent of each other (e.g. breast and colon versus head/neck and lung).

The index from mortality and incidence (Mortality-Incidence ratio, **MI-index**) is a statistic that allows for the evaluation of the quality of data. For diseases with poor prognoses, comparable values are obtained from all age groups, because to a large extent, the numerator and denominator contain the same cases. For tumors with a good prognosis, increasing and decreasing incidence and age-specific differences in prognosis can more strongly alter the MI- index. Additionally, attention should be paid to the confidence intervals where fewer cases are reported.

The complexity of problems identified here emphasizes the importance of relative survival data for the appropriate analysis of long term results.

As a measurement of the burden of disease, the number of potential life years loss due to premature deaths in a cohort can be calculated (**PYLL**, potential years of life lost, standardized per 100,000 persons or per European standard) as well as the average loss of life years per individual (**AYLL**, average years of life lost). Depending upon the analytic aim (health economy, prevention, health care research) different methods exist for the generation of these measurements. In the results presented here, the age for a premature death is considered to be before 70 years, according to the guidelines of the OECD and the WHO (as seen in the abbreviation PYLL-70 or AYLL-70).

Shortcuts

FRG Federal Republic of Germany

GEKID Association of Population-based Cancer Registries in Germany

(Gesellschaft der epidemiologischen Krebsregister in Deutschland e.V.)

MCR Munich Cancer Registry (Tumorregister München)
SEER Surveillance, Epidemiology, and End Results (USA)

AYLL-70 Average years of life lost prior to age 70 given a person dies before that age

BRD-S German standard population

DCO Death certificate only EAR Excess absolute risk

= excess cancer cases (O - E) per 10,000 person-years

ES European standard population (old)

LCL Lower confidence limit

MI-index Ratio between mortality and incidence

PYLL-70 Potential years of life lost prior to age 70 given a person dies before that age

SIR Standardized incidence ratio
SMR Standardized mortality ratio
UCL Upper confidence limit
WS World standard population

Recommended Citation

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Index of figures and tables

Fig./Tbl	l.	Page
1	Pts cohorts, DCO, mult. prim., follow-up / yr	3
1a	Gender distribution by year of diagnosis	4
2	Incidence by year of diagnosis	5
3	Age distribution parameters by year of diagnosis	6
4	Age distribution by 5-year age group and gender	8
5	Age-specific incidence and DCO rate	9
6	Standardized incidence ratio of second primaries	10
7	Age distribution and age-specific incidence (chart)	12
7a	Age-specific incidence internationally (chart)	13
8	Cumulative follow-up years (chart)	14
9a	Map of cancer incidence (WS) by county (chart)	15
9b	Standardized incidence ratio (SIR) by county (chart)	16
10a	Pts incident cohorts and mortality / yr	17
10b	Incidence and mortality by year of diagnosis	18
10c	Cancer-related deaths, death certification available / yr	19
11	Medians of age at death / yr	20
12	Mortality by year of death	22
13	Distribution of age at death	23
14	Age-specific mortality	24
15	Multiple primaries in deaths	25
16	Age-specific mortality (first primaries)	27
17	Age-specific mortality (single primaries)	28
18	Age distribution and age-specific mortality (chart)	29
19a	Map of cancer mortality (WS) by county (chart)	30
19b	Standardized mortality ratio (SMR) by county (chart)	31