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

ALL: Acute lymphobl. leukaemia (morph.)

Year of diagnosis	1998-2011
Patients	588
Diseases	588
Creation date	04/02/2013
Export date	01/03/2013
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, 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
C91.0	Acute lymphoblastic leukaemia [ALL]

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

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

				Prop.		Prop.
		DCO	Prop.	mult.	Prop.	actively
Year of	Cases #	cases	DCO	primaries	deaths	followed
diagnosis	n	n	%	્ર	%	90
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	33	6	18.2	6.1	48.5	93.9
2002	38	5	13.2	23.7	52.6	92.1
2003	40	5	12.5	5.0	42.5	87.5
2004	48	4	8.3	14.6	37.5	87.5
2005	59	4	6.8	5.1	32.2	88.1
2006	54	8	14.8	13.0	40.7	85.2
2007	59	4	6.8	10.2	39.0	59.3 ##
2008	54	6	11.1	11.1	31.5	59.3
2009	39	1	2.6	17.9	35.9	76.9
2010	52	4	7.7	5.8	32.7	100.0
2011	53	2	3.8	9.4	13.2	73.6 ###
1998-2011	588	51	8.7	10.4	37.4	82.3

[#] 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	%	
1998	14	1,1	3	78.6	
1999	23/	9	14	39.1	
2000	22	/ 11	11	50.0	
2001	33	23	10	69.7	
2002	38	25	13	65.8	
2003	40	24	16	60.0	
2004	48	33	15/	68.8	
2005	59	39	20	66.1	
2006	54	39	1/5	72.2	
2007	59	25	34	42.4	
2008	54	33	21	61.1	
2009	39	15	24	38.5	
2010	52	28	24	53.8	
2011	53	31	22	58.5	
1998-2011	588	346	242	58.8	

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)

			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	10	2.0	0.8	2.5	1.5	2.3	1.1	2.0	0.8
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	33	15 /	1.8	0.8	2.5	/1.4	2.0	1.0	1.8	0.8
2005	39	20 <	2.1	1.0	2.9	1.6	2.4	1.3	2.2	1.1
2006	39	15	2.0	0.7	2.8	1.3	2.4	1.0	2.0	0.8
2007	25	34	1.1	1.5	1.6	2.1	1.3	1.7	1.2	1.5
2008	33	21	1.5	0.9	2.4	1.3	1.9	1.1	1.5	1.0
2009	15	24	0.7	1.0	0.8	1.3	0.8	1.2	0.7	1.1
2010	28	24	1.2	1.0	1.8	1.5	1.5	1.3	1.3	1.0
2011	31	22	1.4	0.9	2.1	1.7	1.7	1.3	1.4	1.0
1998-2011	346	242	1.4	0.9	2.0	1.5	1.6	1.2	1.4	0.9



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	33	30.0	25,2	1.4	77.3	3.0	6.3	17.0	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	48	24.6	21.9	1.4	82.8	2.3	5.9	17.8	36.0	63.5
2005	59	28.5	26.8	0.6	80.8	2.6	3.9	20.5	54.8	71.0
2006	54	31.8	30.7	1.3	92.2	2,7	4.0	17.9	65.6	78.3
2007	59	33.0	28.9	0.3	84.1	3.8	6.5	21.1	62.4	77.3
2008	54	26.1	25.1	0.4	88.3	3.3	5.7	15.5	39.6	66.3
2009	39	37.4	26.6	1.3	88.1	4.6	11.3	43.0	58.3	70.3
2010	52	30.9	28.4	0.3	89.5	1.6	4.2	22.2	53.9	75.4
2011	53	25.8	27.6	2.5	87.4	3.5	5.1	12.7	44.1	73.5
1998-2011	588	29.1	27.0	0.3	92.2	2.8	4.7	17.8	52.7	71.7

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	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	33	26.4	21.8	1.4	77.3	2.0	7.5	24.7	37.5	63.5
2005	39	30.9	28.8	0.7	80.8	2.6	3.9	20.5	58.0	76.9
2006	39	33.5	30.7	1.3	92.2	2.7	4.4	19.4	66.4	79.7
2007	25	31.0	26.5	0.3	84.1	4.1	9.0	19.8	57.1	69.0
2008	33	21.7	22.6	0.4	74.0	3.3	4.3	11.8	30.7	63.7
2009	15	40.8	31.2	2.2	88.1	4.9	7.6	53.5	69.6	85.3
2010	28	29.6	28.0	0.3	80.5	1.5	4.1	18.8	53.9	75.4
2011	31	27.9	28.8	2.5	85.6	3.6	4.4	12.7	48.6	73.5
1998-2011	346	29.2	26.7	0.3	92.2	2.9	5.1	18.5	52.5	71.9

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	10	18.5	23.8	2.8	75.3	2.9	3.0	5.8	34.3	56.2
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	15	20.5	22.4	4.2	82.8	4.3	4.7	11.4	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	34	34.4	30.8	1.0	83.2	1.9	5.7	21.9	64.0	80.1
2008	21	32.8	27.8	1.4	88.3	3.7	8.7	22.0	54.7	68.8
2009	24	35.3	23.8	1.3	80.5	4.6	12.4	39.4	53.3	68.6
2010	24	32.3	29.5	0.8	89.5	2.3	5.4	28.7	54.3	82.3
2011	22	22.7	26.2	2.5	87.4	3.5	5.5	12.2	31.5	70.8
1998-2011	242	29.0	27.4	0.3	90.7	2.8	4.6	16.5	53.8	70.8

Table 4

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

Age at									
diagnosis	Cases			Males			Females		
Years	n	%	Cum.%	n	96	Cum.%	n	용	Cum.%
0-4	155	26.4	26.4	86	24.9	24.9	69	28.5	28.5
5-9	72	12.2	38.6	44	12.7	37.6	28	11.6	40.1
10-14	46	7.8	46.4	25	7.2	44.8	21	8.7	48.8
15-19	39	6.6	53.1	27	7.8	52.6	12	5.0	53.7
20-24	23	3.9	57.0	12	3.5	56.1	11	4.5	58.3
25-29	14	2.4	59.4	8	2.3	58.4	6	2.5	60.7
30-34	17	2.9	62.2	14	4.0	62.4	3	1.2	62.0
35-39	24	4.1	66.3	15	4.3	66.8	9	3.7	65.7
40-44	22	3.7	70.1	13	3.8	70.5	9	3.7	69.4
45-49	22	3.7	73.8	14	4.0	74.6	8	3.3	72.7
50-54	22	3.7	77.6	13	3.8	78.3	9	3.7	76.4
55-59	21	3.6	81.1	11	3.2	81.5	10	4.1	80.6
60-64	20	3.4	84.5	10	2.9	84.4	10	4.1	84.7
65-69	26	4.4	88.9	15	4.3	88.7	11	4.5	89.3
70-74	19	3.2	92.2	13	3.8	92.5	6	2.5	91.7
75-79	18	3.1	95.2	12	3.5	96.0	6	2.5	94.2
80-84	16	2.7	98.0	7	2.0	98.0	9	3.7	97.9
85+	12	2.0	100.0	7	2.0	100.0	5	2.1	100.0
All ages	588	100.0		346	100.0		242	100.0	

Included in the statistics are 11.0% multiple primaries in males and 13.2% in females.

Table 5 Age-specific incidence, DCO rate and proportion of all cancers for period 1998-2011

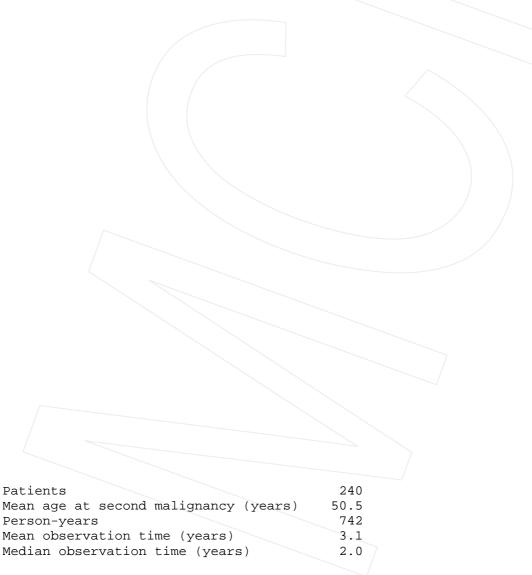
			TOT F	period i	990-2011			
							Males	Females
			Males	Females	Males	Females		Prop.all
Age at				Age-		DCO rate	_	cancers
diagnosis	Males	Females	spec.	_	n=28	n=23		n=129521
Years	n	n		incid.	%	%	%	%
10012							v	ŭ
0- 4	86	69	6.8	5.8		1.4	30.4	33.2
5- 9	44	28	3.4	2.3	2.3	3.6	28.6	26.9
10-14	25	21	1.9	1.7			18.8	13.8
15-19	27	12	2.1	1.0	3.7		9.3	5.0
20-24	12	11	0.8	0.7		9.1	2.4	2.5
25-29	8	6	0.5	0.3	12.5		1.0	0.7
30-34	14	3	0.7	0.2	7./1		1.1	0.2
35-39	15	9	0.7	0.4			0.8	0.3
40-44	13	9	0.6	0.4	7.7		0.5	0.2
45-49	14	8	0.7	0.4	7.1		0.3	0.1
50-54	13	9	0.8	0.5	7.7	44.4	0.2	0.1
55-59	11	10	0.7	0.6			0.1	0.1
60-64	10	10	0.7	0.6		20.0	0.1	0.1
65-69	15	/11	1.1	0.7	20.0	36.4	0.1	0.1
70-74	13	6	1.3	0.5	46.2		0.1	0.0
75-79	12	6	1.8	0.6	50.0	33.3	0.1	0.0
80-84	7	9	1.7	1.1	42.9	44.4	0.1	0.1
85+	7	5	2.5	0.7	42.9	80.0	0.1	0.0
All ages	346	242			8.1	9.5	0.3	0.2
AII ages	340	242			0.1	5.5	0.3	0.2
Incidence								
Raw			1.4	0.9				
WS			2.0					
ES			1.6	1.2				
BRD-S			1.4	0.9				

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	LC SIR 95		EAR	DCO %
C73 Thyroid	2	0.0	90.3 10.	9 326.0 #	26.6	
Other primaries Not observed	6 0	0.9	7.0 0.0 2.	11	69.2 -11.3	
All mult. primaries	8	1.7	4.6 2.	0 9.2 #	84.6	



The occurrence of second malignancy is statistically significant.

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

DCO

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 Expecte		LCL UCL 95% 95%	EAR
Other primaries Not observed	4 0 0.1 0.6		9.8 92.3 # 9.0 5.9	76.9 -12.4
Not observed All mult. primaries	0 0.6		0.0 5.9 #	
Patients Mean age at second mal Person-years Mean observation time Median observation time	(years)	147 32.8 506 3.4 2.1		

The occurrence of second malignancy is statistically significant.

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



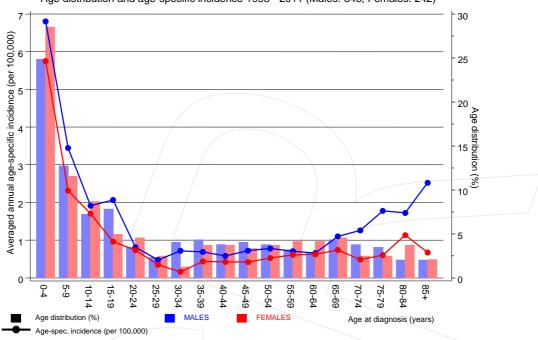
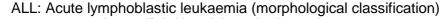


Figure 7. Age distribution and age-specific incidence





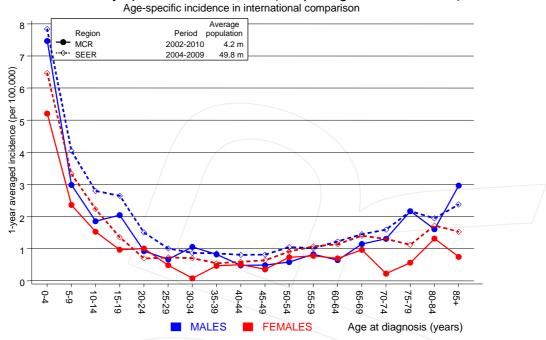


Figure 7a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).



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.

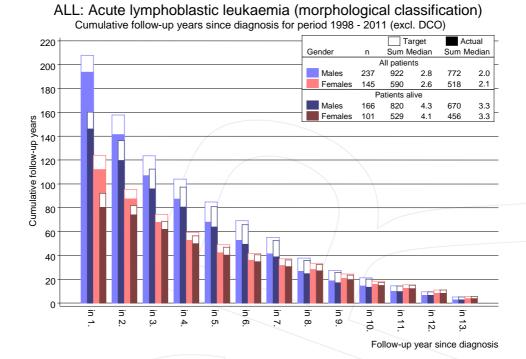
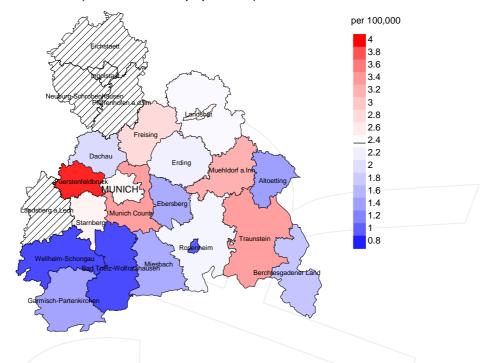


Figure 8. Cumulative follow-up years depending on time since diagnosis

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

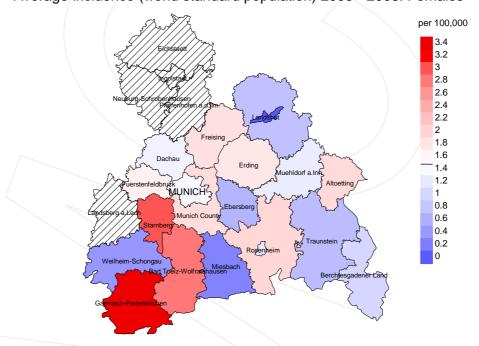


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 2.4/100,000 WS N=186, females 1.5/100,000 WS N=110). 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

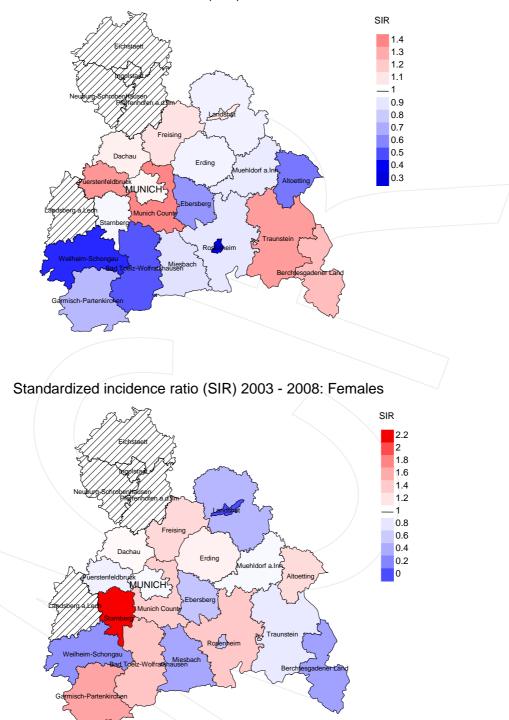


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=186, females N=110). 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 0.55. Though, the value of this parameter may vary with an underlying probability of 99% between 0.03 and 2.57, and is therefore not statistically striking.

MORTALITY

Table 10a

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

		Prop.				Prop. deaths
	Incident	actively	Prop.		Prop.	with death
Year of	cases	followed	DCO	Deaths	deaths	certific.
diagnosis	n	%	%	/ n /	%	%
1998	14	100.0		8	57.1	100.0
1999	23	87.0		1/1	47.8	100.0
2000	22	95.5	9.1	11	50.0	90.9
2001	33	93.9	18.2	16	48.5	100.0
2002	38	92.1	13.2	20	52.6	100.0
2003	40	87.5	12.5	17	42.5	100.0
2004	48	87.5	8.3	18	37.5	100.0
2005	59	88.1	6.8	19	32.2	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	54	59.3	11.1	17	31.5	100.0
2009	39	76.9	2.6	14	35.9	100.0
2010	52	100.0	7.7	17	32.7	100.0
2011	53	73.6	3.8	7	13.2	100.0
1998-2011	588	82.3	8.7	220	37.4	98.2

Table 10b

Annual cohorts of incident cancers and deaths, proportion of death certificates and cases deceased the same year of cancer diagnosis (incl. DCO)

(with respect to registry area expansion from $2.51\ \mathrm{to}\ 3.96\ \mathrm{m}$ as of 2002, and from 3.96 to 4.52 m as of 2007, respectively)

			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	33	17	100.0	6	18.2
2002	38	17	100.0	9	23.7
2003	40	17	100.0	8	20.0
2004	48	20	100.0	8	16.7
2005	59	13	100.0	8	13.6
2006	54	18	100.0	12	22.2
2007	59	26	88.5	10	16.9
2008	54	22	100.0	9	16.7
2009	39	16	100.0	_ 3	7.7
2010	52	19	100.0		21.2
2011	53	19	100.0	4	7.5
1998-2011	588	230	98.7	98	16.7

Table 10c

Annual cohorts of deaths, proportion of cancer-related and not cancerrelated deaths, and cancer recorded on death certificates (incl. DCO)

(with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.52 m as of 2007, respectively)

				Prop.	
				cancer	
		Prop.	Prop.	recorded	
		cancer-	not cancer-	on death	
Year of	Deaths	related	related	certificate	
death	n	%	%	૪	
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	20	100.0		95.0	
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	78.9	21.1	100.0	
2011	19	100.0		100.0	
1998-2011	230	93.0	7.0	98.2	

Table 11a Means of age at death according to the grouping in Table 10 MALES

					Age at
		Age at	Age at	Age at	death
		death	death	death	(according
		(all	(cancer-	(not cancer-	to death
Year of	Deaths	causes)	related)	related)	certificate)
death	n	Years	Years	Years	Years
1998	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	11	47.9	47.9		47.9
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
1998-2011	130	46.9	46.7	49.3	47.6

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

Table 11b Means of age at death according to the grouping in Table 10 FEMALES

					Age at
		Age at	Age at	Age at	death
		death	death	death	(according
		(all	(cancer-	(not cancer-	to death
Year of	Deaths	causes)	related)	related)	certificate)
death	n	Years	Years	Years	Years
1998	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	52.3	33.1	48.5
2011	12	47.4	47.4		47.4
1998-2011	100	48.8	48.2	58.8	49.3



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	0.36	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	11	0.6	0.33	0.5	0.19	0.5	0.25	0.6	0.35
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	0.68	0.7	0.43	0.7	0.54	0.8	0.66
2008	11	0.5	0.33	0.4	0.16	0.4	0.23	0.5	0.33
2009	7	0.3	0.47	0.2	0.23	0.3	0.34	0.3	0.40
2010	7	0.3	0.25	0.2	0.10	0.3	0.17	0.3	0.24
2011	7	0.3	0.23	0.3	0.14	0.3	0.18	0.4	0.27
1998-2011	120	0.5	0.35	0.4	0.22	0.5	0.28	0.5	0.36

Table 12b Mortality measures (cancer-related death) and mortality-incidence-index by year of death FEMALES

Year of	Deaths	Mort.	MI-Index	Mort.	MI-Index	Mort.	MI-Index	Mort.	MI-Index
death	n	raw	raw	WS	WS	ES	ES	BRD-S	BRD-S
1998	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	0.70	0.3	0.21	0.4	0.38	0.5	0.65
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	0.60	0.4	0.31	0.4	0.39	0.4	0.52
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	0.21	0.3	0.14	0.3	0.17	0.3	0.19
2008	9	0.4	0.43	0.3	0.23	0.3	0.29	0.3	0.33
2009	8	0.3	0.33	0.4	0.29	0.4	0.32	0.4	0.37
2010	8	0.3	0.33	0.3	0.17	0.3	0.23	0.3	0.32
2011	12	0.5	0.55	0.4	0.27	0.5	0.38	0.5	0.50
1998-2011	94	0.4	0.39	0.3	0.23	0.3	0.29	0.4	0.37

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.%
0 - 4	5	2.3 2.3	3	2.5	2.5	2	2.1	2.1
5-9	11	5.1 7.5	6	5.0	7.5	5	5.3	7.4
10-14	14	6.5 14.0	/ 7	5.8	13.3	7	7.4	14.9
15-19	9	4.2 18.2	4	3.3	16.7	5	5.3	20.2
20-24	16	7.5 25.7	/ 11	9.2	25.8	5	5.3	25.5
25-29	7	3.3 29.0	5	4.2	30.0	2	2.1	27.7
30-34	8	3.7 / 32.7/	7	5.8	35.8	1	1.1	28.7
35-39	20	9.3 42.1	10	8.3	44.2	10	10.6	39.4
40 - 44	4	1.9 43.9	4	3.3	47.5			39.4
45-49	13	6.1 50.0	5	4.2	51,7	8	8.5	47.9
50-54	11	5.1 55.1	7	5.8	57.5	4	4.3	52.1
55-59	16	7.5 62.6	9	7.5	65.0	7	7.4	59.6
60-64	16	7.5 70.1	7	5.8	70.8	9	9.6	69.1
65-69	20	9.3 79.4	10	8.3	79.2	10	10.6	79.8
70-74	12	5.6 85.0	7	5.8	85.0	5	5.3	85.1
75-79	13	6.1 91.1	7	5.8	90.8	6	6.4	91.5
80-84	11	5.1 96.3	6	5.0	95.8	5	5.3	96.8
85+	8	3.7 100.0	5	4.2	100.0	3	3.2	100.0
All ages	214	100.0	120	100.0		94	100.0	

Included in the statistics are 11.0% multiple primaries in males and 13.2% in females.

Table 14 Age-specific mortality (cancer-related) and proportion of all cancers for period 1998-2011 (incl. multiple primaries)

7			Males		Females		Males	Females
Age at death	Malag	Females	Age- spec.		Age- spec.		cancers	Prop.all cancers
Years	nares	n		MI-index		MT-index		%
icais	11	11	mortar.	MI INGCK	morcar.	mi index	0	8
0- 4	3	2	0.2	0.03	0.2	0.03	10.3	9.1
5- 9	6	5	0.5	0.14	0.4		19.4	13.9
10-14	7	7	0.5	0.28	0.6	0.33	24.1	29.2
15-19	4	5	0.3	0.15	0.4	0.42	10.5	17.2
20-24	11	5	0.7	0.92	0.3	0.45	13.8	11.6
25-29	5	2 /	0.3	0.63	0.1	0.33	5.7	2.0
30-34	7	1 <	0.4	0.50	0.1	0.33	4.2	0.5
35-39	10	10	0.5	0.67	0.5	1.11	2.7	2.2
40-44	4		0.2		0.0		0.5	
45-49	5	8	0.3		0.4		0.3	0.5
50-54	7	4	0.4		0.2	0.44	0.2	0.2
55-59	9	7	0.6		0.4		0.2	0.2
60-64	7	9	0.5	0.70	0.6	0.90	0.1	0.2
65-69	10	10	0.7	0.67	0.7		0.1	0.1
70-74	7	5	0.7		0.4		0.1	0.1
75-79	7 /	6	1.0		0.6	1.00	0.1	0.1
80-84	6	5	1.5	0.86	0.6	0.56	0.1	0.1
85+	5	3	1.8	0.71	0.4	0.60	0.1	0.0
	\	\ .					\	
All ages	120	94					0.2	0.2
3.11								
Mortality			٥. ٦	0.25	0 4	0 20		
Raw			0.5	0.35	0.4			
WS			0.4		0.3			
ES			0.5	0.28	0.3			
BRD-S			0.5	0.36	0.4	0.37		
PYLL-70								
per 100,000			13.4		9.9			
ES			14.9		11.5			
AYLL-70			32.1		29.7			

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

Table 15a Multiple primaries in deaths in period 1998-2011 MALES

					Syn- chron	Syn- chron		
	Total	Total	Pre	Pre	±30d	±30d	Post	Post
Diagnosis	n /	%↓	n	←%	n	~ %	n	←%
C03-C06 Oral cavity	1	3.0					1	100.0
C12-C13 Hypopharynx	/1	3.0					1	100.0
C25 Pancreas	/ 1	3.0			1	100.0		
C33-C34 Lung	/ 1	3.0					1	100.0
C43 Malign. melanoma	/ 1	3.0					1	100.0
C44 Skin others	/ 2 /	6.1	2	100.0				
C46,C49 Soft tissue	4	12.1	2	50.0			2	50.0
C61 Prostate	5	15.2	5	100.0				
C62 Testis	2	6.1	1	50.0			1	50.0
C70-C72 CNS cancer	3	9.1			2	66.7	1	33.3
C81 Hodgkin lymphoma	1	3.0	1	100.0				
C82-C85 NHL	3	9.1			1	33.3	2	66.7
C90 Mult. myeloma	1	3.0	1	100.0				
C91-C96 Leukaemia	7	21.2			2	28.6	5	71.4
All mult. primaries	33	100.0	12	36.4	. 6	18.2	15	45.5

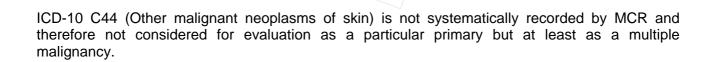


Table 15b Multiple primaries in deaths in period 1998-2011 FEMALES

		ГĿ	MALES					
Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
Diagnobib		/ * ,				~ 0		₩ 0
C18 Colon C19-C20 Rectum C25 Pancreas C33-C34 Lung C50 Breast	1 1 1 5	5.6 5.6 5.6 27.8	1 1 1 4	100.0 100.0 100.0 80.0	1	20.0	1	100.0
C56 Ovary	/ 1	5.6	1	100.0				
C67 Bladder	/ 1	5.6	1	100.0				
C69 Eye lymphoma C70-C72 CNS cancer C82-C85 NHL	1 4 1	5.6 22.2 5.6	1	100.0			4	100.0
C91-C96 Leukaemia	1	5.6		100.0	1	100.0		
							_	
All mult. primaries	18	100.0	11	61.1	2	11.1	5	27.8

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 1998-2011 (Singular 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	2	0.2	0.04	0.2	0.03	12.5	9.1
5- 9	6	5	0.5		0.4		20.7	15.2
10-14	7	7	0,5		0.6	0.33	24.1	30.4
15-19	4	5	0.3	0.15	0.4	0.42	11.4	18.5
20-24	11	5 /	0.7		0.3		14.7	12.8
25-29	4	2 /	0.2	0.57	0.1	0.33	4.9	2.1
30-34	7	1 <	0.4		0.1	0.33	4.3	0.6
35-39	9	9	0.4		0.4	1.13	2.6	2.2
40-44	4		0.2	0.33	0.0		0.6	
45-49	3	7	0.2	0.23	0.4	1.40	0.2	0.5
50-54	6	4	0.4	0.55	0.2	0.57	0.2	0.2
55-59	7	5	0.4	0.70	0.3	0.71	0.2	0.1
60-64	6	8	0.4	0.67	0.5	1.14	0.1	0.2
65-69	9	8	0.7	0.64	0.5	0.89	0.1	0.1
70-74	3 /	3	0.3	0.33	0.2	1.00	0.0	0.0
75-79	5	6	0.7	0.56	0.6	1.00	0.1	0.1
80-84	4	/ 3	1.0	1.00	0.4	0.50	0.1	0.0
85+	2	1	0.7	1.00	0.1	1.00	0.0	0.0
All ages	100	81					0.2	0.2
Mortality								
Raw			0.4	0.31	0.3	0.38		
WS			0.4	0.20	0.3	0.22		
ES			0.4	0.26	0.3	0.28		
BRD-S			0.4	0.32	0.3	0.36		
PYLL-70								
per 100,000			12.6		9.5			
ES			14.3		11.2			
AYLL-70			33.4		31.4			

^{*} 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 *)

			Males		Females		Males	Females
Age at	_	_	Age-		Age-			Prop.all
death		Females	_ /		spec.	! 3	cancers	cancers
Years	n	n	mortal.	MI-index	mortal.	MI-index	%	%
0 4	2	0		0.04	0.0	0.00	12.0	0 1
0 - 4	3	2	0.2	0.04	0.2		13.0	9.1
5- 9	5	4	0.4		0.3		17.9	12.5
10-14	7	6	0.5		0.5		24.1	27.3
15-19	4	5	0.3		0.4		11.4	21.7
20-24	9	4	0.6		0.3		12.9	11.1
25-29	3	2	0.2		0.1		4.0	2.2
30-34	7	1 <	0.4		0.1		4.4	0.6
35-39	8	9	0.4		0.4	1.13	2.5	2.4
40-44	3		0.1		0.0		0.5	
45-49	3	6	0.2	0.23	0.3		0.2	0.4
50-54	6	4	0.4	0.60	0.2		0.3	0.2
55-59	7	5	0.4		0.3		0.2	0.2
60-64	5	8	0.3		0.5		0.1	0.2
65-69	9	8	0.7		0.5		0.1	0.2
70-74	3	3	0.3		0.2		0.0	0.1
75-79	5	6	0.7		0.6	1.00	0.1	0.1
80-84	4	3	1.0		0.4		0.1	0.0
85+	2	1	0.7	1.00	0.1	1.00	0.0	0.0
All ages	93	77					0.2	0.2
Mortality								
Raw			0.4		0.3	0.36		
WS			0.4	0.19	0.3			
ES			0.4	0.24	0.3	0.27		
BRD-S			0.4	0.30	0.3	0.34		
PYLL-70								
per 100,000			11.5		8.6			
ES			13.0		10.1			
AYLL-70			33.0		30.4			

^{*} See corresponding tables with multiple primaries.



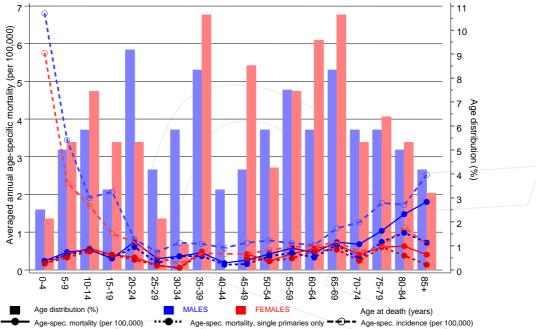
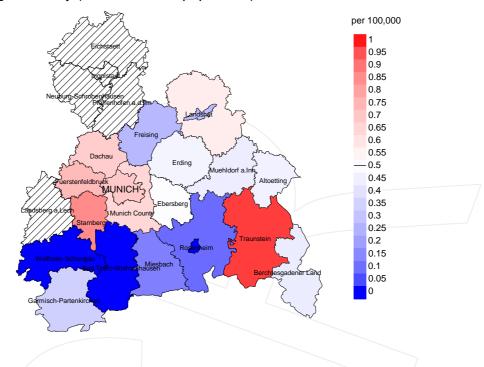


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

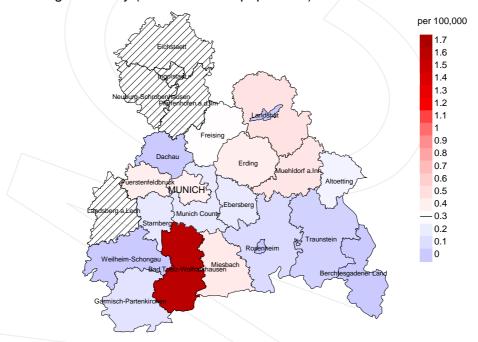


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 0.5/100,000 WS N=64, 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

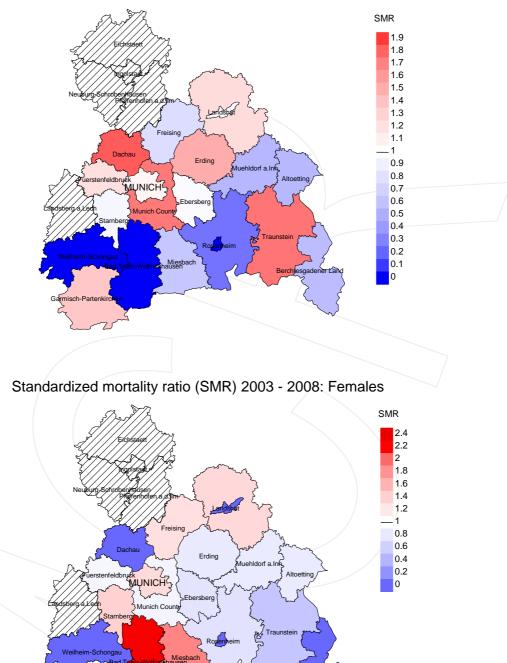


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=64, 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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