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

AML: Acute myelobl. leukemia (morph.)

Year of diagnosis	1998-2011
Patients	1975
Diseases	1977
Creation date	04/02/2013
Export date	01/03/2013
Population	4.5 m



http://www.tumorregister-muenchen.de/en/facts/base/base_hAML_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
C92.0	Acute myeloblastic leukaemia

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

Code	Description
9840/3	Acute myeloid leukemia, M6 type
9861/3	Acute myeloid leukemia, NOS
9866/3	Acute promyelocytic leukemia
9867/3	Acute myelomonocytic leukemia
9870/3	Acute basophilic leukemia
9871/3	Acute myeloid leukemia with abnormal marrow eosinophils
9872/3	Acute myeloid leukemia, minimal differentiation
9873/3	Acute myeloid leukemia without maturation
9874/3	Acute myeloid leukemia with maturation
9891/3	Acute monocytic leukemia
9895/3	Acute myeloid leukemia with multilineage dysplasia
9896/3	Acute myeloid leukemia, t(8;21)
9897/3	Acute myeloid leukemia, 11q23 abnormalities
9910/3	Acute megakaryoblastic leukemia
9920/3	Therapy-related acute myeloid leukemia, NOS
9931/3	Acute panmyelosis with myelofibrosis

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	%	%
1998	48	/ 2 /	4.2	14.6	85.4	100.0
1999	47	2	4.3	17.0	76.6	100.0
2000	79	19	24.1	13.9	74.7	98.7
2001	96	42	43.8	21.9	87.5	99.0
2002	119	41	34.5	16.8	82.4	96.6
2003	161	60	37.3	21.7	84.5	98.8
2004	169	67	39.6	27.2	81.1	98.2
2005	160	55	34.4	28.1	81.3	96.9
2006	189	73	38.6	31.7	88.9	97.9
2007	174	53	30.5	26.4	82.2	96.6 ##
2008	174	52	29.9	32.2	78.2	90.2
2009	187	44	23.5	30.5	78.6	92.5
2010	232	47	20.3	35.3	74.6	97.4
2011	142	34	23.9	39.4	62.7	85.9 ###
1998-2011	1977	591	29.9	27.8	79.8	95.8

[#] 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	48	22	26	45.8	
1999	47/	32	15	68.1	
2000	79	39	40	49.4	
2001	96	51	45	53.1	
2002	119	62	57	52.1	
2003	161	83	78	51.6	
2004	169	77	92	45.6	
2005	160	81	79	50.6	
2006	189	109	80	57.7	
2007	174	96	78	55.2	
2008	174	88	86	50.6	
2009	187	90	97	48.1	
2010	232	116	116	50.0	
2011	142	68	74	47.9	
1998-2011	1977	1014	963	51.3	

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	22	26	2.0	2.2	1.6	1.6	1.9	1.8	2.3	2.0
1999	32	15	2.9	1.3	1.8	0.8	2.5	1.0	2.9	1.2
2000	39	40	3.4	3.3	2.8	2.2	3.3	2.7	3.8	3.0
2001	51	45	4.4	3.7	2.6	1.8	3.7	2.7	4.8	3.3
2002	62	57	3.3	2.9	2.3	1.5	3.0	2.0	3.6	2.5
2003	83	78	4.4	4.0	2.5	2.2	3.7	2.8	4.9	3.4
2004	77	92	4.1	4.7	2.4	2.7	3.4	3.4	4.2	4.0
2005	81	79 🤇	4.3	4.0	2.6	2.3	3.5	2.8	4.5	3.4
2006	109	80	5.7	4.0	3.2	1.8	4.5	2.4	5.9	3.2
2007	96	78	4.3	3.4	2.6	1.8	3.5	2.4	4.4	2.9
2008	88	86	4.0	3.7	2.6	1.8	3.2	2.5	3.9	3.1
2009	90	97	4.0	4.2	2.3	2.1	3.1	2.8	3.9	3.4
2010	116	116	5.1	5.0	2.8	2.4	4.0	3.2	5.0	3.9
2011	68	74	3.0	3.2	1.7	2.0	2.4	2.3	2.9	2.7
1998-2011	1014	963	4.0	3.7	2.5	2.0	3.3	2.6	4.2	3.1



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.			100	0.50	Median	550	0.00
diagnosis	n	Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	48	57.2	23.5	0.9	88.3	24.3	42.3	60.4	75.9	85.4
1999	47	62.0	18.0	12.6	88.2	38.9	54.4	65.1	75.1	79.3
2000	79	55.9	21.5	0.4	94.3	23.2	40.4	60.2	72.7	80.3
2001	96	65.2	13.6	26.8	89.5	45.0	57.3	66.2	76.2	81.0
2002	119	62.7	18.8	2.0	94.9	36.6	52.1	67.5	77.5	83.1
2003	161	65.6	17.2	1.0	93.6	42.7	55.4	67.6	79.4	83.6
2004	169	64.9	18.8	0.4	92.3	39.1	57.0	68.3	78.3	84.2
2005	160	63.3	19.8	0.6	91.3	37.4	52.4	68.2	78.4	83.2
2006	189	67.7	17.8	1.0	95.1	40.8	62.9	72.3	79.5	84.8
2007	174	64.1	18.0	3.0	94.5	39.8	56.1	68.6	76.0	82.3
2008	174	64.7	19.7	0.6	94.8	35.0	56.6	69.4	77.9	83.9
2009	187	65.3	18.9	4.2	99.2	37.0	54.0	71.3	78.4	86.3
2010	232	67.7	17.3	1.3	94.2	46.5	59.8	70.8	78.2	86.4
2011	142	62.8	21.7	0.3	98.4	31.4	50.2	69.9	77.4	84.7
1998-2011	1977	64.5	18.9	0.3	99.2	38.7	55.5	69.2	77.9	83.9

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	22	55.7	25.0	0.9	88.3	24.3	39.4	59.5	75.2	84.3
1999	32	61.1	15.7	26.3	86.9	39.5	51.1	61.3	73.8	77.7
2000	39	53.8	24.2	0.4	86.5	8.6	37.0	61.2	72.7	80.3
2001	51	63.9	13.2	30.9	89.0	45.0	56.5	64.8	76.0	79.9
2002	62	60.1	20.4	2.0	94.9	30.6	51.9	64.0	73.8	81.2
2003	83	67.9	15.1	10.1	93.6	49.3	59.6	68.7	79.2	85.6
2004	77	66.2	17.7	0.4	89.2	40.2	61.6	68.8	78.6	85.0
2005	81	62.9	18.8	2.7	91.3	36.4	52.8	68.2	77.1	81.0
2006	109	65.8	17.2	1.0	93.6	40.8	60.7	70.6	76.3	81.6
2007	96	62.8	18.1	3.0	94.5	36.4	50.3	67.9	75.1	81.9
2008	88	61.5	22.4	0.6	93.8	25.9	49.2	68.9	75.7	82.4
2009	90	63.9	18.7	4.2	87.9	36.9	53.2	70.1	75.9	81.9
2010	116	67.1	16.1	2.9	92.8	48.5	60.6	70.1	76.7	83.9
2011	68	64.5	19.9	6.4	98.4	39.2	53.5	69.6	77.3	85.1
1998-2011	1014	63.7	18.6	0.4	98.4	38.4	55.0	68.7	76.3	82.4

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	26	58.3	22.5	1.3	87.5	27.9	43.1	60.4	76.6	85.4
1999	15	63.9	22.8	12.6	88.2	15.1	54.9	72.3	76.8	87.9
2000	40	57.9	18.5	16,5	94.3	34.7	45.0	60.1	71.8	79.9
2001	45	66.7	14.0	26.8	89.5	52.7	57.8	71.1	76.3	81.9
2002	57	65.6	16.6	13.5	89.0	42.8	55.9	69.0	80.1	83.5
2003	78	63.3	19.0	1.0	89.1	39.9	49.9	66.0	80.1	83.6
2004	92	63.9	19.7	0.7	92.3	37.9	55.1	67.2	78.2	83.4
2005	79	63.7	21.0	0.6	90.8	38.6	51.8	67.9	80.6	84.7
2006	80	70.3	18.4	1.8	95.1	43.2	65.8	75.6	82.4	86.7
2007	78	65.7	17.8	3.5	94.3	42.1	60.4	69.3	76.8	84.3
2008	86	68.0	16.0	15.7	94.8	45.9	61.7	70.9	79.0	84.0
2009	97	66.5	19.1	17.8	99.2	37.0	54.9	71.8	81.2	86.9
2010	116	68.2	18.4	1.3	94.2	44.0	59.1	71.2	81.5	87.5
2011	74	61.2	23.3	0.3	90.0	23.2	45.9	70.6	77.9	84.7
1998-2011	963	65.3	19.1	0.3	99.2	38.9	56.1	69.6	79.3	85.1

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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	ક	Cum.%	n	%	Cum.%	n	%	Cum.%
0-4	29	1.5	1.5	17	1.7	1.7	12	1.2	1.2
5-9	13	0.7	2.1	/ 8	0.8	2.5	5	0.5	1.8
10-14	13	0.7	2.8	5	0.5	3.0	8	0.8	2.6
15-19	17	0.9	3.6	8	0.8	3.7	9	0.9	3.5
20-24	23	1.2	4.8	10	1.0	4.7	13	1.3	4.9
25-29	21	1.1	5.9	13	1.3	6.0	8	0.8	5.7
30-34	41	2.1	7.9	26	2.6	8.6	15	1.6	7.3
35-39	59	3.0	10.9	26	2.6	/ 11.1/	33	3.4	10.7
40-44	90	4.6	15.5	48	4.7	15.9	42	4.4	15.1
45-49	81	4.1	19.6	37	3.6	19.5	44	4.6	19.6
50-54	99	5.0	24.6	56	5.5	25.0	43	4.5	24.1
55-59	130	6.6	31.2	56	5.5	30.6	74	7.7	31.8
60-64	166	8.4	39.6	100	9.9	40.4	66	6.9	38.6
65-69	262	13.3	52.8	145	14.3	54.7	117	12.1	50.8
70-74	268	13.6	66.4	155	15.3	70.0	113	11.7	62.5
75-79	281	14.2	80.6	146	14.4	84.4	135	14.0	76.5
80-84	222	11.2	91.8	96	9.5	93.9	126	13.1	89.6
85+	162	8.2	100.0	62	6.1	100.0	100	10.4	100.0
All ages	1977	100.0		1014	100.0		963	100.0	

Included in the statistics are 34.1% multiple primaries in males and 33.2% in females.

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

			TOT F	period is	990-2011			
Age at diagnosis Years	Males n	Females n	Age- spec.	Females Age- spec. incid.		Females DCO rate n=293	cancers	Females Prop.all cancers n=129521
0- 4 5- 9 10-14 15-19 20-24 25-29 30-34 35-39 40-44 45-49 50-54 55-59 60-64 65-69 70-74 75-79 80-84 85+	17 8 5 8 10 13 26 48 37 56 56 100 145 155 145 96	12 5 8 9 13 8 15 33 42 44 43 74 66 117 113 135 126 100	1.3 0.6 0.4 0.6 0.7 0.8 1.3 1.2 2.2 1.9 3.4 3.6 6.6 10.6 15.0 21.5 23.6 22.4	0.7 0.9 0.5 0.8 1.6 2.0 2.3 2.5 4.5	10.0 11.5 26.9 10.4 16.2 21.4 17.9 23.0 30.3 31.0 33.8 53.1 61.3	7.7 6.1 9.5 15.9 23.3 24.3 21.2 33.3 24.8 39.3 54.8 48.0	6.0 5.2 3.8 2.7 2.0 1.6 2.0 1.3 1.7 0.8 0.4 0.5 0.6 0.7 0.9 0.9	5.8 4.8 5.3 3.8 3.0 0.9 0.9 1.0 0.8 0.6 0.5 0.6 0.7 0.8
All ages	1013	963			29.3	30.4	0.8	0.7
Incidence Raw WS ES BRD-S			4.0 2.5 3.3 4.2					

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

C18 Colon	Diagnosis	n	Expected n	SIR	LCL 95%	UCL 95%	EAR	DCO %
C82-C85 NHL 6 0.5 13.3 4.9 29.0 # 51.2 C90 Mult. myeloma 3 0.1 21.2 4.4 61.9 # 26.4 C91-C96 Leukaemia 5 0.2 28.5 9.3 66.6 # 44.5 80.0 Other primaries 7 1.4 4.9 2.0 10.2 # 51.5 Not observed 0 3.1 0.0 0.0 1.2 -29.0	C33-C34 Lung C43 Malign. melanoma	4 2	1.4 0.5	2.9 4.3	0.8	7.3 15.5	24.1 14.1	20.0
Not observed 0 3.1 0.0 0.0 1.2 -29.0	C82-C85 NHL C90 Mult. myeloma	6 3	0.5 0.1	13.3 21.2	4.9 4.4	29.0 # 61.9 #	51.2	
All mult. primaries 34 11.7 2.9 2.0 4.1 # 205.8 14.7								
	All mult. primaries	34	11.7	2.9	2.0	4.1 #	205.8	14.7

The occurrence of second malignancy is statistically significant.

Median observation time (years)

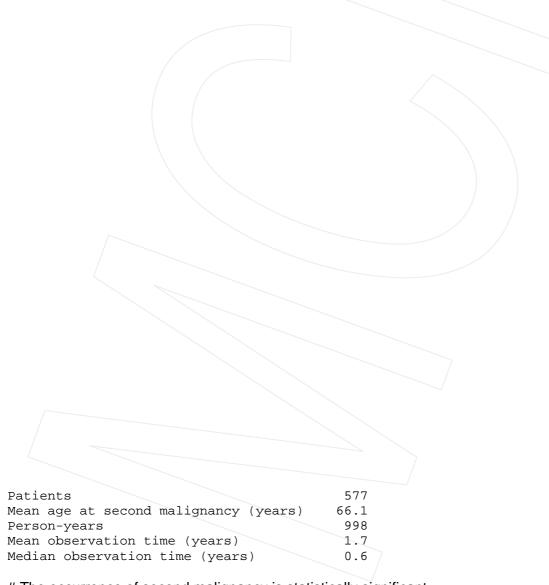
Observed second primaries with count 1 are pooled in category "Other primaries".

0.7

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

	Observed Ex	pected		LCL	UCL		DCO
Diagnosis	n	n	SIR	95%	95%	EAR	%
C33-C34 Lung C50 Breast C53 Cervix uteri C54 Corpus uteri	3 3 2 2	0.5 2.5 0.1 0.4	5.6 1.2 14.8 4.6	1.2 0.2 1.8 0.6	16.5 # 3.5 53.6 # 16.5	4.6	100.0
Other primaries Not observed	5 0	0.8	6.0	1.9	13.9 # 1.2	41.7	
All mult. primaries	15	7.7	2.0	1.1	3.2 #	73.4	13.3



The occurrence of second malignancy is statistically significant.

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



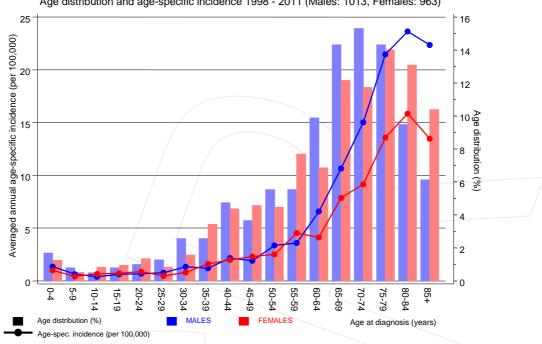
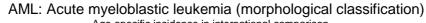


Figure 7. Age distribution and age-specific incidence





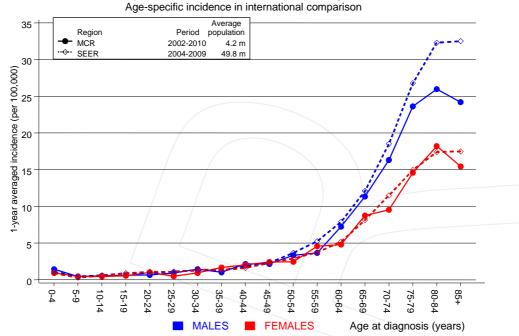


Figure 7a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).



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.

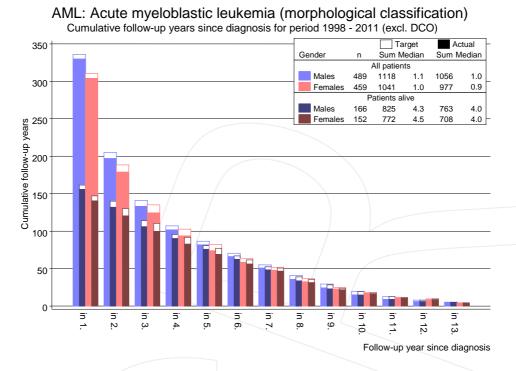
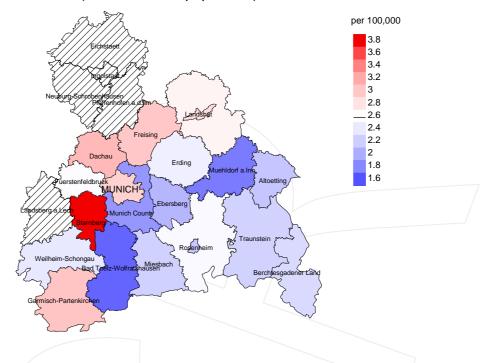


Figure 8. Cumulative follow-up years depending on time since diagnosis

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

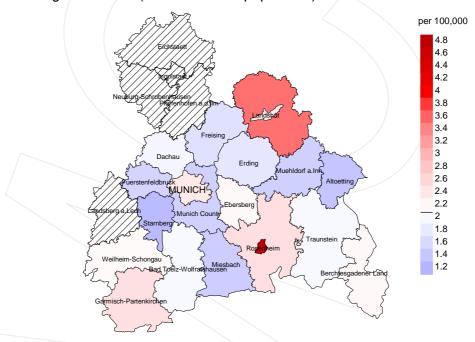


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 2.6/100,000 WS N=502, females 2.1/100,000 WS N=477). Since cancer data are not available in some counties until 2007, the local incidence rates were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 10 women were identified with newly diagnosed acute myelobl. leukemia (morph.). Therefore, the mean incidence rate for this cancer type in this area can be calculated at 2.2/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.6 and 6.3/100,000.

Standardized incidence ratio (SIR) 2003 - 2008: Males

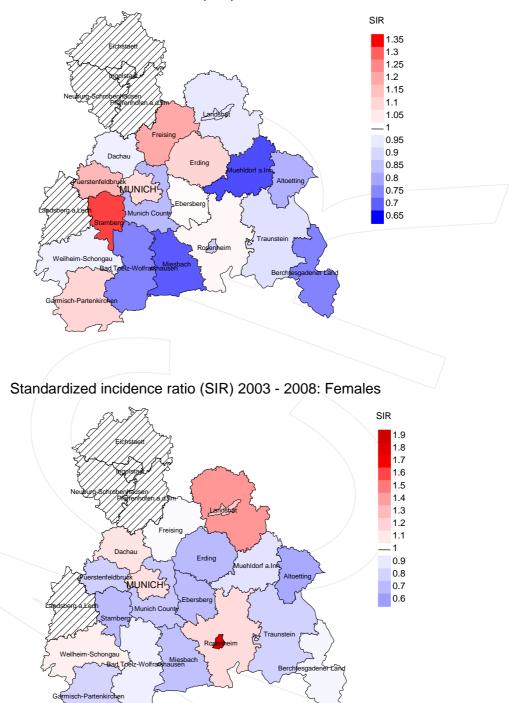


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=502, females N=477). Since cancer data are not available in some counties until 2007, the local SIR values were not calculated, and the map tiles show as shaded.

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 63,131 female residents (averaged) in the period from 2003 to 2008 a total of 10 women were identified with newly diagnosed acute myelobl. leukemia (morph.). Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.71. Though, the value of this parameter may vary with an underlying probability of 99% between 0.26 and 1.52, 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	48	100.0	4.2	41	85.4	97.6
1999	47	100.0	4.3	36	76.6	94.4
2000	79	98.7	24.1	59	74.7	94.9
2001	96	99.0	43.8	84	87.5	100.0
2002	119	96.6	34.5	98	82.4	96.9
2003	161	98.8	37.3	136	84.5	99.3
2004	169	98.2	39.6	137	81.1	99.3
2005	160	96.9	34.4	130	81.3	99.2
2006	189	97.9	38.6	168	88.9	98.2
2007	174	96.6	30.5	143	82.2	98.6
2008	174	90.2	29.9	136	78.2	99.3
2009	187	92.5	23.5	147	78.6	98.6
2010	232	97.4	20.3	173	74.6	98.8
2011	142	85.9	23.9	89	62.7	100.0
1998-2011	1977	95.8	29.9	1577	79.8	98.6

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	0/0	n	%
1998	48	47	97.9	21	43.8
1999	47	30	96.7	11	23.4
2000	79	52	98.1	32	40.5
2001	96	86	97.7	50	52.1
2002	119	84	97.6	54	45.4
2003	161	111	98.2	81	50.3
2004	169	100	99.0	79	46.7
2005	160	142	99.3	86	53.8
2006	189	130	98.5	112	59.3
2007	174	135	98.5	86	49.4
2008	174	135	98.5	89	51.1
2009	187	131	96.9	90	48.1
2010	232	172	98.8	116	50.0
2011	142	135	98.5	67	47.2
1998-2011	1977	1490	98.3	974	49.3

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.	Prop.	Prop. cancer recorded on death	
Year of	Deaths	related	related	certificate	
death	n	%	8	%	
1998	47	80.9	19.1	95.7	
1999	30	80.0	20.0	96.6	
2000	52	96.2	3.8	100.0	
2001	86	88.4	/11.6/	98.8	
2002	84	94.0	6.0	100.0	
2003	111	94.6	5.4	99.1	
2004	100	96.0	4.0	99.0	
2005	142	95.1	4.9	100.0	
2006	130	94.6	5.4	98.4	
2007	135	94.1	5.9	98.5	
2008	135	93.3	6.7	96.2	
2009	131	95.4	4.6	96.9	
2010	172	95.3	4.7	98.8	
2011	135	93.3	6.7	97.0	
1998-2011	1490	93.6	6.4	98.3	

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	24	53.5	52.0	59.4	53.8
1999	17	65.5	64.4	69.0	65.9
2000	33	62.4	62.5	61.4	62.7
2001	44	68.2	68.5	65.6	68.4
2002	43	65.9	65.3	78.9	66.1
2003	64	69.6	69.0	78.5	69.5
2004	49	69.9	70.2	64.7	70.0
2005	70	69.6	70.0	63.3	69.6
2006	76	68.4	68.4	68.4	68.0
2007	67	65.8	66.9	28.3	66.5
2008	70	69.0	68.8	70.7	68.7
2009	66	68.5	68.6	67.0	69.2
2010	84	70.7	70.9	66.9	70.6
2011	62	69.0	69.1	67.8	69.3
1998-2011	769	67.9	68.0	66.2	68.0

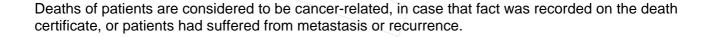
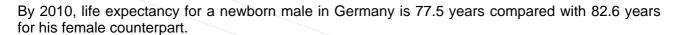


Table 11b Means of age at death according to the grouping in Table 10 FEMALES

					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	23	60.7	56.3	81.8	59.1
1999	13	71.9	73.4	63.9	73.4
2000	19	65.6	65.6		65.6
2001	42	65.4	66.0	61.9	66.3
2002	41	69.4	69.7	66.5	69.4
2003	47	69.0	69.4	61.0	69.0
2004	51	72.0	71.8	76.9	72.2
2005	72	67.0	68.0	29.8	67.7
2006	54	72.1	72.0	76.7	72.1
2007	68	67.1	67.9	57.9	67.5
2008	65	72.2	71.6	83.1	71.9
2009	65	71.8	71.8	71.8	71.9
2010	88	74.1	74.3	70.5	74.3
2011	73	71.5	70.8	83.3	71.8
1998-2011	721	70.0	70.1	68.1	70.2



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	19	1.7	0.86	1.5	0.98	1.7	0.89	2.0	0.86
1999	13	1.2	0.41/	0.7	0.37	1.0	0.39	1.1	0.39
2000	31	2.7	0.79	1.7	0.59	2.4	0.72	3.0	0.81
2001	40	3.5	0.78	2.0	0.77	3.0	0.81	4.3	0.88
2002	41	2.2	0.66	1.4	0.60	1.9	0.65	2.4	0.68
2003	60	3.2	0.72	1.8	0.73	2.7	0.72	3.5	0.72
2004	47	2.5	0.62	1.3	0.55	2.0	0.61	2.9	0.69
2005	65	3.4	0.80	1.7	0.68	2.7	0.77	3.7	0.82
2006	70	3.7	0.64	1.8	0.57	2.8	0.61	3.8	0.64
2007	65	2.9	0.68	1.6	0.61	2.2	0.65	3.1	0.70
2008	64	2.9	0.73	1.4	0.56	2.1	0.66	2.9	0.73
2009	62	2.8	0.69	1.4	0.58	2.0	0.65	2.8	0.72
2010	80	3.5	0.69	1.7	0.61	2.6	0.66	3.4	0.68
2011	57	2.5	0.84	1.2	0.69	1.8	0.77	2.5	0.87
1998-2011	714	2.8	0.70	1.5	0.63	2.3	0.68	3.0	0.73

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	19	1.6	0.73	1.2	0.79	1.4	0.76	1.5	0.78
1999	11	0.9	0.73	0.4	0.46	0.6	0.57	0.8	0.65
2000	19	1.6	0.48	0.8	0.35	1.0	0.39	1.3	0.44
2001	36	3.0	0.80	1.6	0.89	2.2	0.82	2.7	0.81
2002	38	1.9	0.67	0.9	0.58	1.2	0.61	1.6	0.67
2003	45	2.3	0.58	1.0	0.45	1.5	0.51	1.9	0.56
2004	49	2.5	0.53	1.0	0.39	1.5	0.45	2.0	0.50
2005	70	3.5	0.89	1.7	0.75	2.3	0.81	2.8	0.85
2006	53	2.6	0.66	1.0	0.59	1.5	0.64	2.2	0.68
2007	62	2.7	0.79	1.3	0.72	1.8	0.76	2.3	0.78
2008	62	2.7	0.72	1.1	0.62	1.6	0.66	2.1	0.67
2009	63	2.7	0.65	1.1	0.56	1.7	0.61	2.2	0.65
2010	84	3.6	0.72	1.3	0.54	1.9	0.60	2.7	0.67
2011	69	2.9	0.93	1.2	0.60	1.8	0.77	2.3	0.87
1998-2011	680	2.6	0.71	1.1	0.58	1.6	0.64	2.1	0.68

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	3	0.2 0.2		0.1	0.1	2	0.3	0.3
5-9	2	0.1 0.4	. 2	0.3	0.4			0.3
10-14	6	0.4 0.8	3	0.4	0.8	3	0.4	0.7
15-19	8	0.6 1.4	4	0.6	1.4	4	0.6	1.3
20-24	7	0.5 /1.9	5	0.7	2.1	2	0.3	1.6
25-29	14	1.0 / 2.9	9	1.3	3.3	5	0.7	2.4
30-34	13	0.9 / 3.8	9	1.3	4.6	4	0.6	2.9
35-39	28	2.0 / 5.8	15	2.1	6.7/	13	1.9	4.9
40-44	37	2.6 8.4	18	2.5	9.2	19	2.8	7.6
45-49	37	2.6 11.1	. 19	2.6	11.9	18	2.6	10.3
50-54	55	3.9 15.0	32	4.5	16.3	23	3.4	13.7
55-59	83	5.9 21.0	35	4.9	21.2	48	7.1	20.7
60-64	124	8.9 29.8	67	9.3	30.5	57	8.4	29.1
65-69	191	13.7 43.5	107	14.9	45.5	84	12.4	41.5
70-74	208	14.9 58.4	119	16.6	62.1	89	13.1	54.6
75-79	259	18.5 77.0	139	19.4	81.5	120	17.6	72.2
80-84	192	13.7 90.7	83	11.6	93.0	109	16.0	88.2
85+	130	9.3 100.0	50	7.0	100.0	80	11.8	100.0
All ages	1397	100.0	717	100.0		680	100.0	

Included in the statistics are 34.1% multiple primaries in males and 33.2% in females.

Table 14

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

			Males		Females		Males	Females
Age at	_	_	Age-		Age-		_	Prop.all
death		Females	spec.		spec.		cancers	cancers
Years	n	n	mortal.	MI-index	mortal.	MI-index	8	%
		•				\		0 1
0 - 4	1	2	0.1	0.06	0.2	0.17	3.4	9.1
5- 9	2	2	0.2		0.0	0 20	6.5	10 5
10-14	3	3	0.2		0.2		10.3	12.5
15-19	4	4	0.3		0.3		10.5	13.8
20-24	5	2	0.3		0.1	0.15	6.3	4.7
25-29	9	5	0.5	0.69	0.3	0.63	10.3	4.9
30-34	9	4	0.5	0.35	0.2		5.4	2.0
35-39	15	13	0.7		0.6		4.1	2.8
40-44	18	19	0.8		0.9	0.45	2.4	1.9
45-49	19	18	1.0	0.51	0.9		1.2	1.0
50-54	32	23	1.9	0.57	1.3		1.1	0.9
55-59	35	48	2.2		2.9		0.7	1.2
60-64	67	57	4.4	0.67	3.6	0.86	0.9	1.0
65-69	107	84	7.9	0.74	5.6		1.0	1.2
70-74	119	89	11.5	0.77	7.2	0.79	1.1	1.1
75-79	139	120	20.6	0.95	12.1	0.89	1.3	1.3
80-84	83	109	20.4	0.86	13.7	0.87	0.9	1.1
85+	50	80	18.0	0.81	10.8	0.80	0.7	0.7
All ages	717	680					1.1	1.1
Mortality								
Raw			2.9	0.71	2.6	0.71		
WS			1.5	0.63	1.1	0.58		
ES			2.3	0.68	1.6	0.64		
BRD-S			3.0	0.73	2.1	0.68		
PYLL-70								
per 100,000			20.7		17.6			
ES			19.6		16.4			
AYLL-70			14.4		14.1			

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

Table 15a

Multiple primaries in deaths in period 1998-2011

MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	2	0.7	2	100.0				
C09-C10 Oropharynx	/2	0.7	1	50.0	\ 1	50.0		
C16 Stomach	3	1.1	3	100.0				
C17 Small intestine	2	0.7	1	50.0			1	50.0
C18 Colon	23	8.5	18	78.3	3	13.0	2	8.7
C19-C20 Rectum	/ 8 /	2.9	6	75.0	1	12.5	1	12.5
C25 Pancreas	3	1.1					3	100.0
C33-C34 Lung	9	3.3	5	55.6	4	44.4		
C43 Malign. melanoma	9	3.3	9	100.0				
C44 Skin others	7	2.6	2	28.6			5	71.4
C61 Prostate	50	18.4	47	94.0	2	4.0	1	2.0
C64 Kidney	6	2.2	6	100.0				
C67 Bladder	14	5.1	11	78.6	1	7.1	2	14.3
C70-C72 CNS cancer	7	2.6	3	42.9	2	28.6	2	28.6
C81 Hodgkin lymphoma	4	1.5	4	100.0				
C82-C85 NHL	25	9.2	17	68.0	_ 3	12.0		20.0
C90 Mult. myeloma	4	1.5	3	75.0	1	25.0		
C91-C96 Leukaemia	84	30.9			28	33.3	56	66.7
Other primaries	10	3.7	5	50.0	1	10.0	4	40.0
All mult. primaries	272	100.0	143	52.6	47	17.3	82	30.1

Multiple primaries with number of cases n<2 are pooled in category "Other primaries".

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

Table 15b $\label{eq:multiple primaries in deaths in period 1998-2011 FEMALES }$

					Syn- chron	Syn- chron		
	Total	Total	Pre	Pre	±30d	±30d	Post	Post
Diagnosis	n	%↓	n	← %	n	← %	n	← %
C15 Oesophagus	2	0.8					2	100.0
C16 Stomach	4	1.6	4	100.0				
C18 Colon	/ 8	3.2	7	87.5	1	12.5		
C19-C20 Rectum	5	2.0	2	40.0	1	20.0	2	40.0
C33-C34 Lung	/ 7	2.8	4	57.1	1	14.3	2	28.6
C43 Malign. melanoma	5	2.0	5	100.0				
C44 Skin others	6	2.4	4	66.7			2	33.3
C46,C49 Soft tissue	2	0.8	1	50.0			1	50.0
C50 Breast	75	29.8	69	92.0	3	4.0	3	4.0
C53 Cervix uteri	5	2.0	3	60.0	1	20.0	1	20.0
C54 Corpus uteri	15	6.0	12	80.0	2	13.3	1	6.7
C56 Ovary	5	2.0	5	100.0				
C65 Renal pelvis	2	0.8					2	100.0
C67 Bladder	7	2.8	5	71.4	1	14.3	1	14.3
C70-C72 CNS cancer	2	0.8	2	100.0				
C73 Thyroid	8	3.2	8	100.0				
C76-C79 CUP	2	0.8					2	100.0
C81 Hodgkin lymphoma	4	1.6	4	100.0				
C82-C85 NHL	12	4.8	12	100.0				
C90 Mult. myeloma	6	2.4	4	66.7	2	33.3		
C91-C96 Leukaemia	65	25.8			27	41.5	38	58.5
Other primaries	5	2.0	4	80.0			1	20.0
All mult. primaries	252	100.0	155	61.5	39	15.5	58	23.0
				- · · -		-/-		

Multiple primaries with number of cases n<2 are pooled in category "Other primaries".

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

Table 16

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

(Singular primaries only *)

			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	1	2	0.1		0.2	0.17	4.2	9.1
5- 9	2		0.2		0.0		6.9	
10-14	3	3	0.2		0.2	0.38	10.3	13.0
15-19	4	4	0.3	0.50	0.3	0.44	11.4	14.8
20-24	4	1 /	0.3	0.50	/0.1	0.08	5.3	2.6
25-29	8	5 /	0.5	0.67	0.3	0.63	9.9	5.2
30-34	9	4	0.5	0.38	0.2	0.27	5.5	2.2
35-39	15	11	0.7	0.63	0.5	0.35	4.4	2.6
40-44	14	16	0.6	0.33	0.8	0.43	2.0	1.8
45-49	17	16	0.9	0.53	0.8	0.44	1.2	1.1
50-54	29	17	1.7	0.59	1.0	0.57	1.2	0.8
55-59	34	36	2.2	0.68	2.2	0.61	0.8	1.0
60-64	48	40	3.2	0.63	2.5	0.93	0.7	0.9
65-69	66	66	4.8	0.68	4.4	0.74	0.8	1.2
70-74	83	52	8.0	0.81	4.2	0.69	0.9	0.8
75-79	87	85	12.9		8.5	0.90	1.0	1.2
80-84	57	82	14.0	0.85	10.3	0.91	0.9	1.1
85+	30	55	10.8	0.75	7.4	0.75	0.5	0.6
All ages	511	495					0.9	1.0
5	· \							
Mortality								
Raw			2.0	0.68	1.9	0.68		
WS			1.2		0.9			
ES			1.6		1.2	0.61		
BRD-S			2.1		1.6	0.66		
BRB B			2.1	0.70	1.0	0.00		
PYLL-70								
per 100,000			18.3		14.6			
ES ES			17.5		13.9			
AYLL-70			16.4		14.9			
עו חדוי			10.4		17.9			

^{*} See corresponding tables with multiple primaries.

Table 17

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

(Single primaries only *)

			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	1	2	0.1		0.2	0.17	4.3	9.1
5- 9	2		0.2		0.0		7.1	
10-14	3	3	0.2		0.2	0.38	10.3	13.6
15-19	4	4	0.3	0.50	0.3	0.44	11.4	17.4
20-24	4	1 /	0.3	0.57	0.1	0.08	5.7	2.8
25-29	8	5 /	0.5	0.67	0.3	0.63	10.7	5.6
30-34	9	4	0.5	0.38	0.2	0.29	5.7	2.5
35-39	13	10	0.6	0.57	0.5	0.32	4.0	2.6
40-44	14	15	0.6	0.34	0.7	0.43	2.1	1.9
45-49	15	15	0.8	0.48	0.8	0.43	1.1	1.1
50-54	27	17	1.6	0.59	1.0	0.61	1.2	0.9
55-59	33	34	2.1	0.73	2.1	0.61	0.8	1.1
60-64	45	39	3.0	0.64	2.4	1.00	0.8	1.0
65-69	63	62	4.6	0.68	4.2	0.71	0.9	1.3
70-74	80	51/	7.8	0.82	4.1	0.71	1.1	0.9
75-79	83	82	12.3	0.88	8.2	0.90	1.2	1.3
80-84	57	81	14.0	0.86	10.2	0.91	1.1	1.3
85+	29	53	10.5	0.76	7.1	0.74	0.6	0.7
All ages	490	478					1.1	1.1
5								
Mortality								
Raw			1.9	0.68	1.8	0.68		
WS			1.1	0.59	0.8			
ES			1.6		1.2	0.61		
BRD-S			2.1		1.5			
BRB B			2.1	0.70	1.3	0.00		
PYLL-70								
per 100,000			17.4		14.1			
ES ES			16.8		13.4			
AYLL-70			16.5		15.4			
VITIT- \ 0			10.5		13.0			

^{*} See corresponding tables with multiple primaries.

Age-spec. incidence (per 100,000)

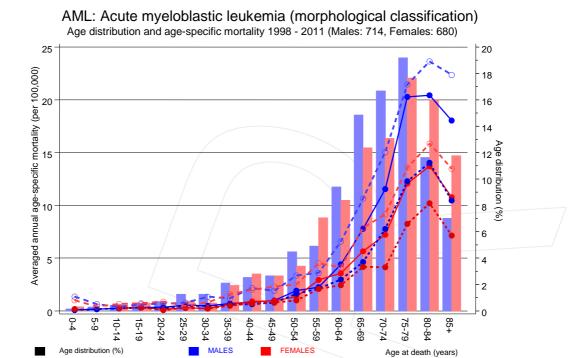


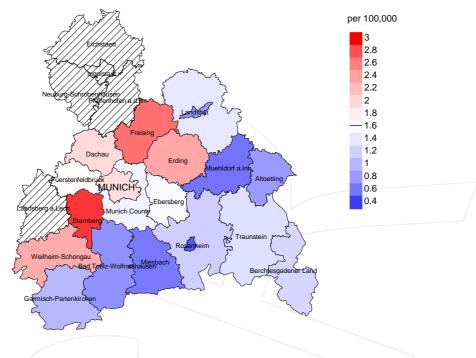
Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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



Age-spec. mortality (per 100,000)

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



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



Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 1.6/100,000 WS N=357, females 1.2/100,000 WS N=331). 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 8 women died from acute myelobl. leukemia (morph.). Therefore, the mean mortality rate for this cancer type in this area can be calculated at 1.3/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.4 and 3.2/100,000.

Standardized mortality ratio (SMR) 2003 - 2008: Males

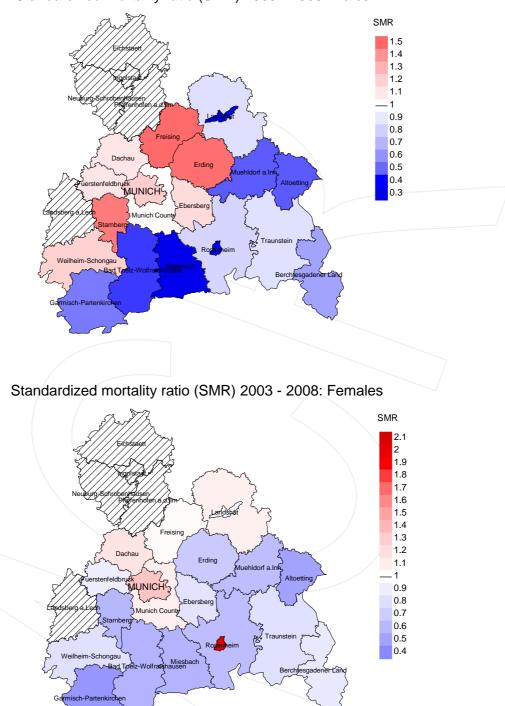


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=357, females N=331). 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 8 women died from acute myelobl. leukemia (morph.). Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.83. Though, the value of this parameter may vary with an underlying probability of 99% between 0.27 and 1.93, 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

Recommended Citation

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