

Munich Cancer Registry



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Munich, 81377
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<http://www.tumorregister-muenchen.de/en>

Cancer statistics: Baseline statistics

C91-C95: Leukaemias

Year of diagnosis	1998-2013
Patients	8,485
Diseases	8,567
Creation date	05/19/2015
Export date	12/30/2014
Population	4.64 m



http://www.tumorregister-muenchen.de/en/facts/base/base_C9195E.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.-	Lymphoid leukaemia
C92.-	Myeloid leukaemia
C93.-	Monocytic leukaemia
C94.-	Other leukaemias of specified cell type
C95.-	Leukaemia of unspecified cell type

INCIDENCE

Table 1

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

Year of diagnosis	Cases n	DCO cases n	Prop. DCO %	Prop. mult. primaries %	Prop. deaths %	Prop. actively followed %
1998	299	85	28.4	18.7	81.9	98.7
1999	308	76	24.7	21.8	74.7	98.4
2000	328	92	28.0	22.6	72.9	97.9
2001	360	126	35.0	22.8	76.4	98.6
2002	564	195	34.6	25.7	75.2	96.5 #
2003	570	193	33.9	24.4	74.0	97.5
2004	620	193	31.1	27.7	67.1	95.8
2005	587	180	30.7	31.2	71.6	96.3
2006	601	176	29.3	33.4	72.0	94.5
2007	649	160	24.7	27.7	63.8	85.7 # ##
2008	644	164	25.5	32.3	60.4	76.2
2009	658	157	23.9	29.5	61.1	75.1
2010	678	154	22.7	32.7	59.9	76.3
2011	640	138	21.6	33.9	55.5	75.6
2012	671	175	26.1	31.0	54.1	76.2
2013	390	163	41.8	37.7	60.5	97.2 ###
1998-2013	8567	2427	28.3	29.1	66.2	87.9

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

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

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

Table 1a

Patient cohorts by year of diagnosis and gender
including DCO cases

Year of diagnosis	All n	Males n	Females n	Prop. males %
1998	299	165	134	55.2
1999	308	165	143	53.6
2000	328	179	149	54.6
2001	360	195	165	54.2
2002	564	306	258	54.3
2003	570	316	254	55.4
2004	620	332	288	53.5
2005	587	343	244	58.4
2006	601	363	238	60.4
2007	649	362	287	55.8
2008	644	363	281	56.4
2009	658	350	308	53.2
2010	678	360	318	53.1
2011	640	352	288	55.0
2012	671	369	302	55.0
2013	390	231	159	59.2
1998-2013	8567	4751	3816	55.5

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)

Year of diagnosis	Males n	Females n	Males Inc. raw	Fem. Inc. raw	Males Inc. WS	Fem. Inc. WS	Males Inc. ES	Fem. Inc. ES	Males Inc. BRD-S	Fem. Inc. BRD-S
1998	165	134	14.9	11.4	10.2	6.2	13.9	8.1	17.1	9.7
1999	165	143	14.7	12.1	9.8	7.6	13.6	9.2	17.0	10.5
2000	179	149	15.7	12.4	11.3	7.3	14.8	9.2	18.0	10.7
2001	195	165	16.8	13.6	11.4	7.0	15.3	9.3	18.7	11.3
2002	306	258	16.4	13.2	10.9	6.4	14.5	8.7	18.0	10.7
2003	316	254	16.9	12.9	10.5	6.8	14.5	8.8	18.5	10.6
2004	332	288	17.6	14.6	11.4	7.9	15.1	10.1	18.6	12.1
2005	343	244	18.1	12.3	11.6	6.7	15.2	8.4	19.4	10.2
2006	363	238	19.0	11.8	12.0	5.9	15.9	7.6	19.6	9.5
2007	362	287	16.3	12.4	9.9	6.9	13.2	8.7	16.8	10.3
2008	363	281	16.3	12.1	10.6	6.2	13.2	8.0	16.2	9.8
2009	350	308	15.7	13.2	8.8	6.7	12.2	8.7	15.4	10.4
2010	360	318	16.0	13.6	9.3	6.8	12.5	8.8	15.8	10.7
2011	352	288	15.4	12.2	9.4	6.6	12.2	8.1	14.6	9.4
2012	369	302	16.2	12.8	9.3	7.4	12.2	8.9	15.7	10.3
2013	231	159	10.1	6.7	5.1	2.9	7.3	3.9	9.8	5.2
1998-2013	4751	3816	16.0	12.3	9.9	6.5	13.2	8.3	16.5	10.0

The computation of the incidence measures includes all primaries, irrespective of first or subsequent malignancy.

Table 3

Age distribution parameters by year of diagnosis (All)
(incl. DCO)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	299	64.4	20.3	0.9	95.8	37.1	55.3	68.0	78.9	86.5
1999	308	63.6	20.7	0.3	104	39.0	55.9	68.2	77.0	85.2
2000	328	62.6	20.3	0.4	97.6	35.5	53.6	66.7	76.3	85.6
2001	360	64.9	19.5	1.4	96.4	38.3	57.2	67.6	78.1	86.3
2002	564	66.0	19.4	1.0	99.3	40.4	58.8	69.5	78.9	86.4
2003	570	66.3	19.9	0.3	98.9	41.5	57.9	70.4	80.4	86.4
2004	620	65.3	20.0	0.4	98.6	39.0	58.5	68.7	79.3	85.5
2005	587	65.4	21.7	0.0	98.2	34.4	58.4	71.6	79.6	85.0
2006	601	66.6	20.6	0.6	95.4	38.7	60.7	71.7	79.7	86.2
2007	649	65.4	20.2	0.3	99.8	39.4	57.3	70.1	79.6	85.3
2008	644	65.6	21.3	0.4	98.1	35.3	60.3	70.9	79.6	85.7
2009	658	67.1	19.1	1.3	100	42.1	58.4	71.4	80.7	86.9
2010	678	67.5	20.4	0.3	101	42.6	59.6	72.2	81.4	87.8
2011	640	65.8	21.3	0.3	101	40.5	56.7	71.2	80.3	86.7
2012	671	65.8	21.9	0.0	102	33.9	57.3	72.2	80.9	86.5
2013	390	71.2	18.3	0.5	100	48.8	66.4	75.6	83.5	87.7
1998-2013	8567	66.0	20.4	0.0	104	38.9	58.2	70.9	79.9	86.4

Table 3a

Age distribution parameters by year of diagnosis (MALES)
(incl. DCO)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	165	63.1	20.6	0.9	95.8	37.1	55.0	65.2	77.8	86.4
1999	165	63.3	19.3	0.3	94.1	39.5	55.6	67.5	77.0	84.0
2000	179	61.5	20.5	0.4	97.6	34.1	52.9	66.5	74.9	84.0
2001	195	61.5	18.7	1.4	96.4	37.9	54.5	64.0	75.1	80.8
2002	306	62.8	20.1	1.0	98.3	32.3	55.6	67.6	75.8	82.2
2003	316	65.0	19.1	1.6	93.6	40.6	58.7	68.4	78.0	84.1
2004	332	64.1	20.1	0.4	96.1	37.2	58.5	67.4	77.5	84.6
2005	343	64.2	21.7	0.0	94.6	34.0	56.7	70.8	78.3	84.1
2006	363	64.6	20.5	1.0	95.4	36.1	58.4	69.9	77.5	84.1
2007	362	64.5	19.3	0.3	97.8	39.6	56.3	69.8	78.0	83.2
2008	363	63.6	22.2	0.4	98.1	26.7	58.8	70.0	77.9	83.4
2009	350	66.4	17.8	2.2	97.0	45.0	57.9	70.1	77.9	84.6
2010	360	66.8	20.0	0.3	101	43.2	60.2	71.6	79.8	86.5
2011	352	64.8	20.6	2.5	101	40.7	56.6	69.6	78.1	85.0
2012	369	65.9	21.0	2.4	95.2	30.8	59.5	72.2	80.1	84.7
2013	231	70.6	18.1	0.5	100	49.6	67.6	74.6	81.8	87.2
1998-2013	4751	64.7	20.1	0.0	101	37.6	57.4	69.7	78.1	84.5

Table 3b

Age distribution parameters by year of diagnosis (FEMALES)
(incl. DCO)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	134	66.0	19.8	1.3	93.9	38.4	57.2	70.9	81.3	86.6
1999	143	63.8	22.2	1.5	104	39.0	56.2	69.5	77.1	87.2
2000	149	63.8	20.0	2.1	95.1	36.3	54.5	66.8	77.3	86.2
2001	165	68.8	19.8	2.8	95.5	50.1	61.8	72.4	81.9	88.5
2002	258	69.9	17.8	2.9	99.3	46.9	61.8	73.2	82.6	89.0
2003	254	67.9	20.8	0.3	98.9	42.5	57.5	73.6	82.3	88.9
2004	288	66.7	19.7	0.7	98.6	41.0	58.5	69.9	80.8	86.9
2005	244	67.0	21.6	0.6	98.2	37.0	61.0	74.0	81.3	85.8
2006	238	69.7	20.5	0.6	95.1	43.5	65.1	74.9	82.7	88.5
2007	287	66.5	21.3	1.0	99.8	38.7	59.8	71.6	81.1	86.5
2008	281	68.3	19.9	1.4	97.4	42.6	61.0	72.5	82.0	87.3
2009	308	67.9	20.5	1.3	100	40.3	58.9	72.5	82.9	88.4
2010	318	68.3	20.7	0.8	98.7	41.9	59.2	73.4	82.7	88.9
2011	288	67.0	22.2	0.3	96.7	40.1	57.5	73.1	82.3	88.5
2012	302	65.6	23.0	0.0	102	33.9	56.5	72.4	82.1	88.5
2013	159	72.1	18.8	3.2	97.9	47.3	64.9	77.2	84.7	89.4
1998-2013	3816	67.5	20.7	0.0	104	40.2	59.2	72.6	82.1	88.0

Table 4

Age distribution by 5-year age group and gender for period 1998-2013
(incl. DC0)

Age at diagnosis Years	Cases			Males			Females		
	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
0-4	219	2.6	2.6	124	2.6	2.6	95	2.5	2.5
5-9	111	1.3	3.9	67	1.4	4.0	44	1.2	3.6
10-14	76	0.9	4.7	41	0.9	4.9	35	0.9	4.6
15-19	81	0.9	5.7	52	1.1	6.0	29	0.8	5.3
20-24	65	0.8	6.4	36	0.8	6.7	29	0.8	6.1
25-29	74	0.9	7.3	43	0.9	7.6	31	0.8	6.9
30-34	99	1.2	8.5	66	1.4	9.0	33	0.9	7.8
35-39	167	1.9	10.4	87	1.8	10.9	80	2.1	9.9
40-44	242	2.8	13.2	139	2.9	13.8	103	2.7	12.6
45-49	274	3.2	16.4	150	3.2	16.9	124	3.2	15.8
50-54	394	4.6	21.0	242	5.1	22.0	152	4.0	19.8
55-59	544	6.3	27.4	307	6.5	28.5	237	6.2	26.0
60-64	733	8.6	35.9	439	9.2	37.7	294	7.7	33.7
65-69	1032	12.0	48.0	631	13.3	51.0	401	10.5	44.2
70-74	1164	13.6	61.6	703	14.8	65.8	461	12.1	56.3
75-79	1170	13.7	75.2	664	14.0	79.8	506	13.3	69.5
80-84	1040	12.1	87.4	529	11.1	90.9	511	13.4	82.9
85+	1082	12.6	100.0	431	9.1	100.0	651	17.1	100.0
All ages	8567	100.0		4751	100.0		3816	100.0	

Included in the statistics are 39.7% multiple primaries in males and 32.1% in females.

Table 5

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

Age at diagnosis Years	Males n	Females n	Males Age- spec. incid.	Females Age- spec. incid.	Males DCO rate n=1197 %	Females DCO rate n=1214 %	Males Prop.all cancers n=158258 %	Females Prop.all cancers n=153136 %
0- 4	124	95	8.4	6.7			38.3	38.9
5- 9	67	44	4.5	3.1	1.5		38.1	35.2
10-14	41	35	2.7	2.4			24.7	20.6
15-19	52	29	3.4	2.0	3.8	3.4	14.7	9.9
20-24	36	29	2.0	1.6	5.6	10.3	5.9	5.5
25-29	43	31	2.1	1.5	2.3	3.2	4.4	2.8
30-34	66	33	2.9	1.5	9.1	3.0	4.4	1.6
35-39	87	80	3.5	3.4	8.0	7.5	3.9	2.1
40-44	139	103	5.3	4.1	7.9	5.8	4.3	1.7
45-49	150	122	6.4	5.3	6.0	11.5	2.8	1.4
50-54	242	152	12.0	7.4	10.3	13.2	2.8	1.4
55-59	307	237	16.7	12.3	13.7	13.1	2.1	1.7
60-64	437	293	24.7	15.6	14.0	15.4	2.0	1.7
65-69	631	401	40.0	23.2	18.7	21.4	2.3	2.1
70-74	698	459	54.5	30.2	23.6	23.1	2.6	2.5
75-79	661	500	80.0	42.1	31.5	34.6	3.2	2.8
80-84	525	508	104.9	54.5	48.4	54.3	3.8	3.2
85+	429	648	125.8	72.5	66.4	68.7	4.3	3.8
All ages	4735	3799			25.3	32.0	3.0	2.5
Incidence								
Raw			15.9	12.2				
WS			9.9	6.5				
ES			13.2	8.3				
BRD-S			16.4	9.9				

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 1998-2013

MALES

Diagnosis	Observed n	Expected n	SIR	LCL 95%	UCL 95%	EAR	DCO %
C03-C06 Oral cavity	2	1.2	1.7	0.2	6.0	0.8	
C07-C08 Salivary gland	5	0.3	16.0	5.2	37.3 #	4.9	
C09-C10 Oropharynx	3	1.5	2.0	0.4	6.0	1.6	
C15 Oesophagus	5	2.5	2.0	0.7	4.7	2.6	
C16 Stomach	15	5.8	2.6	1.4	4.3 #	9.6	
C18 Colon	25	13.9	1.8	1.2	2.7 #	11.5	4.0
C19-C20 Rectum	17	7.8	2.2	1.3	3.5 #	9.5	
C22 Liver	8	3.9	2.1	0.9	4.1	4.3	12.5
C25 Pancreas	7	5.0	1.4	0.6	2.9	2.1	
C33-C34 Lung	41	16.6	2.5	1.8	3.3 #	25.4	2.4
C38,C45 Mesothelioma	3	0.9	3.2	0.7	9.3	2.1	33.3
C43 Malign. melanoma	26	5.7	4.6	3.0	6.7 #	21.1	
C46,C49 Soft tissue	4	0.8	5.3	1.4	13.6 #	3.4	
C50 Breast	2	0.4	5.6	0.7	20.0	1.7	
C61 Prostate	90	41.9	2.1	1.7	2.6 #	50.0	5.6
C62 Testis	2	0.5	4.0	0.5	14.6	1.6	
C64 Kidney	6	5.0	1.2	0.4	2.6	1.1	
C65 Renal pelvis	2	0.6	3.4	0.4	12.4	1.5	
C67 Bladder	13	6.2	2.1	1.1	3.6 #	7.1	7.7
C70-C72 CNS cancer	5	1.9	2.6	0.9	6.2	3.2	
C73 Thyroid	2	0.9	2.1	0.3	7.7	1.1	
C76-C79 CUP	6	2.4	2.5	0.9	5.5	3.8	
C81 Hodgkin lymphoma	7	0.3	21.9	8.8	45.2 #	6.9	
C82-C85 NHL	26	5.6	4.6	3.0	6.7 #	21.2	15.4
C90 Mult. myeloma	7	1.8	3.9	1.6	8.0 #	5.4	
C91-C96 Leukaemia	29	2.3	12.6	8.4	18.0 #	27.7	34.5
Other primaries	5	2.3	2.2	0.7	5.1	2.8	
Not observed	0	4.8	0.0	0.0	0.8 #	-5.0	
All mult. primaries	363	142.7	2.5	2.3	2.8 #	229.1	6.6

Patients 2667
 Median age at second malignancy (years) 71.3
 Person-years 9619
 Mean observation time (years) 3.6
 Median observation time (years) 2.5

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 95%	UCL 95%	EAR	DCO %
C09-C10 Oropharynx	3	0.3	11.2	2.3	32.7 #	4.0	
C15 Oesophagus	2	0.4	5.2	0.6	18.8	2.4	
C16 Stomach	6	2.5	2.4	0.9	5.2	5.1	
C18 Colon	16	6.9	2.3	1.3	3.7 #	13.3	18.8
C19-C20 Rectum	4	3.0	1.3	0.4	3.4	1.4	
C21 Anus/canal	2	0.4	5.6	0.7	20.3	2.4	
C22 Liver	2	0.8	2.5	0.3	9.2	1.8	50.0
C23-C24 Bile	2	1.0	2.0	0.2	7.2	1.5	
C25 Pancreas	5	3.0	1.7	0.5	3.9	2.9	20.0
C33-C34 Lung	14	4.8	2.9	1.6	4.9 #	13.5	
C43 Malign. melanoma	7	2.4	2.9	1.2	5.9 #	6.7	
C50 Breast	45	20.5	2.2	1.6	2.9 #	35.9	
C53 Cervix uteri	3	0.9	3.3	0.7	9.5	3.1	66.7
C54 Corpus uteri	10	3.9	2.6	1.2	4.8 #	9.0	
C56 Ovary	3	2.9	1.0	0.2	3.1	0.2	
C73 Thyroid	3	1.2	2.5	0.5	7.2	2.6	
C76-C79 CUP	3	1.2	2.5	0.5	7.3	2.6	
C82-C85 NHL	13	2.7	4.9	2.6	8.3 #	15.2	23.1
C90 Mult. myeloma	3	0.9	3.5	0.7	10.1	3.1	
C91-C96 Leukaemia	10	1.1	9.0	4.3	16.5 #	13.0	20.0
Other primaries	7	3.4	2.0	0.8	4.2	5.2	14.3
Not observed	0	4.6	0.0	0.0	0.8 #	-6.8	
All mult. primaries	163	68.8	2.4	2.0	2.8 #	138.2	8.0

Patients 1994
 Median age at second malignancy (years) 71.6
 Person-years 6813
 Mean observation time (years) 3.4
 Median observation time (years) 2.1

The occurrence of second malignancy is statistically significant.

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

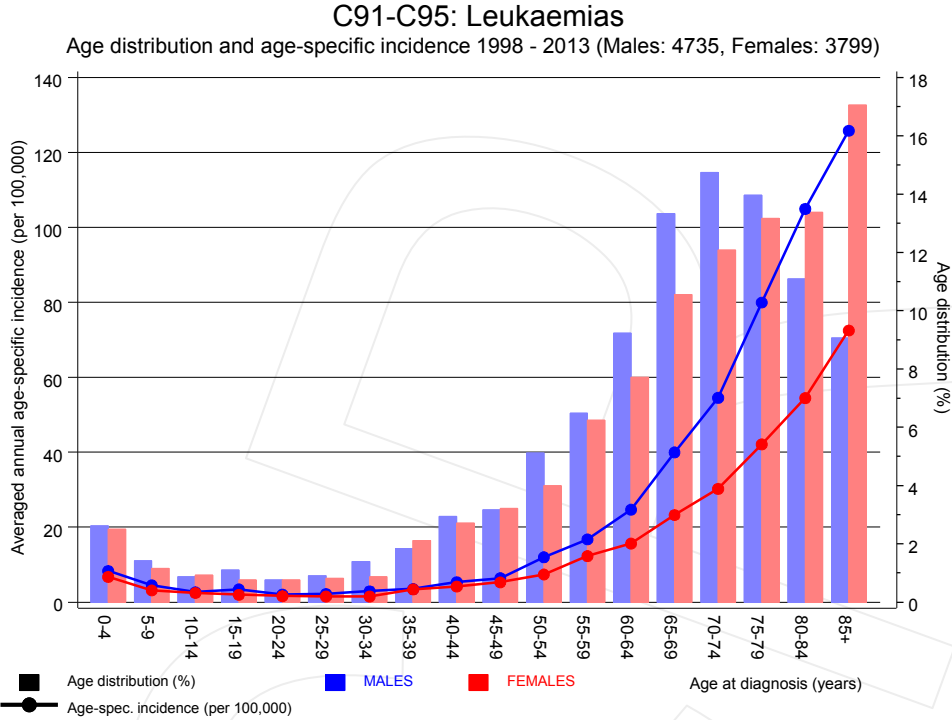


Figure 7. Age distribution and age-specific incidence

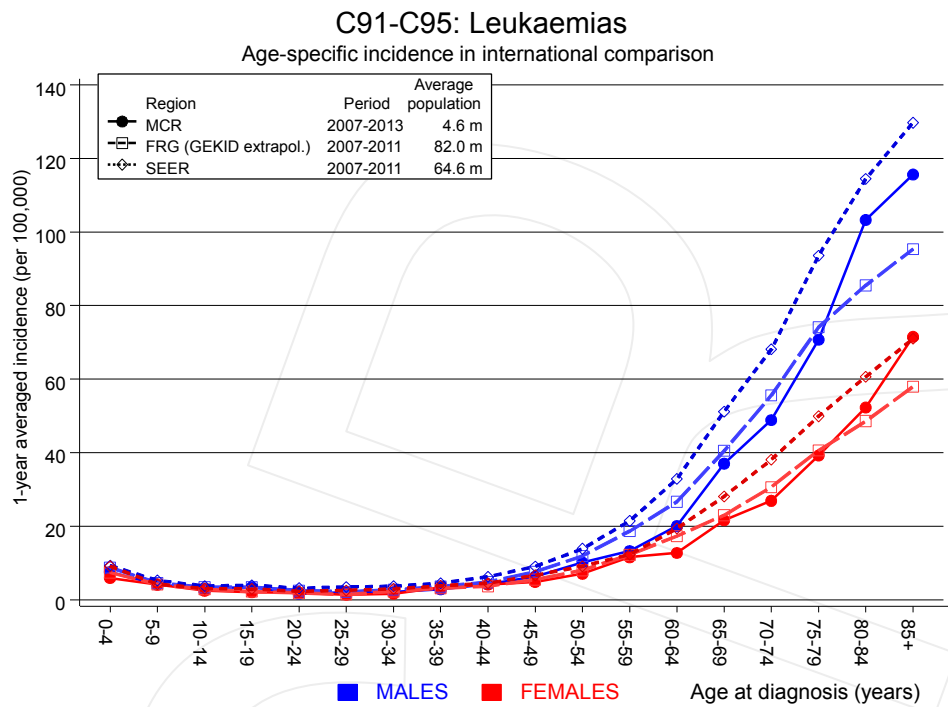


Figure 7a. Age-specific incidence in MCR registry areas compared to Germany (FRG, GEKID extrapolation) and SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

Extrapolated age-specific patient population of Germany, data status middle of 2010. Association of Population-based Cancer Registries in Germany (GEKID e.V.). Berlin, 2014. <http://www.gekid.de>. Last access: 02/11/2015

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>.

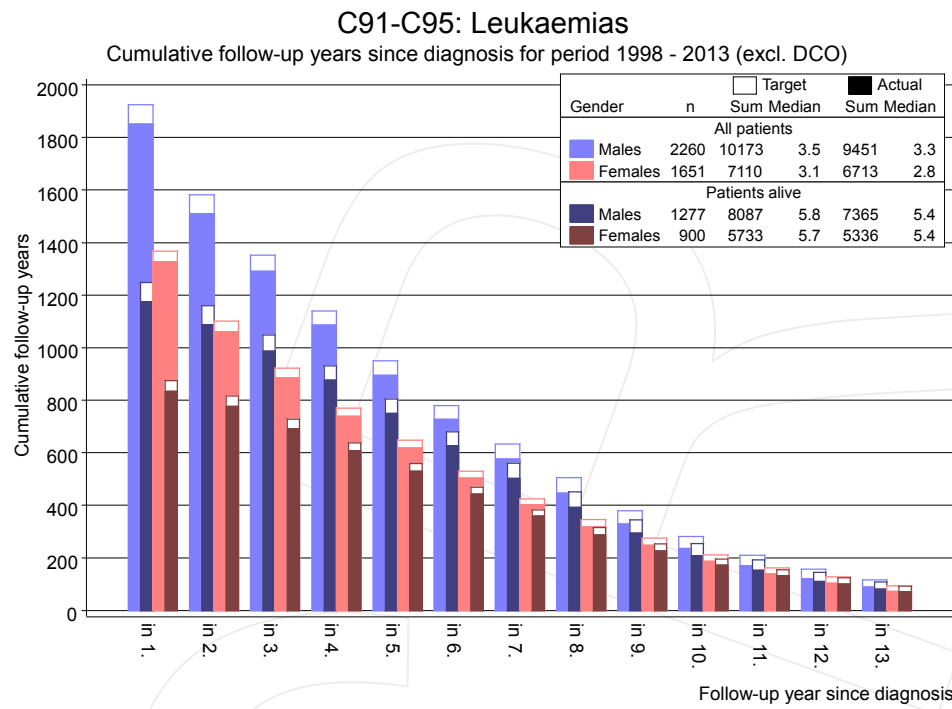
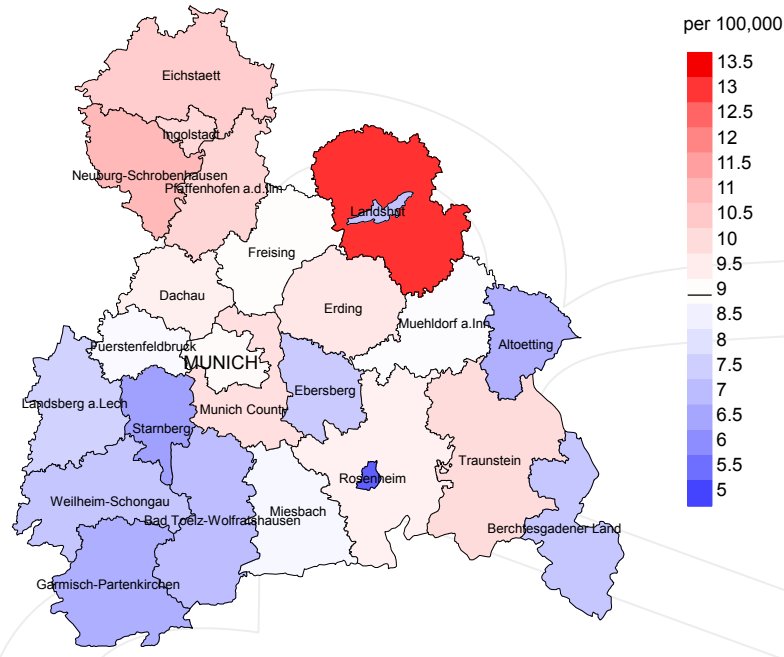


Figure 8. Cumulative follow-up years depending on time since diagnosis

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

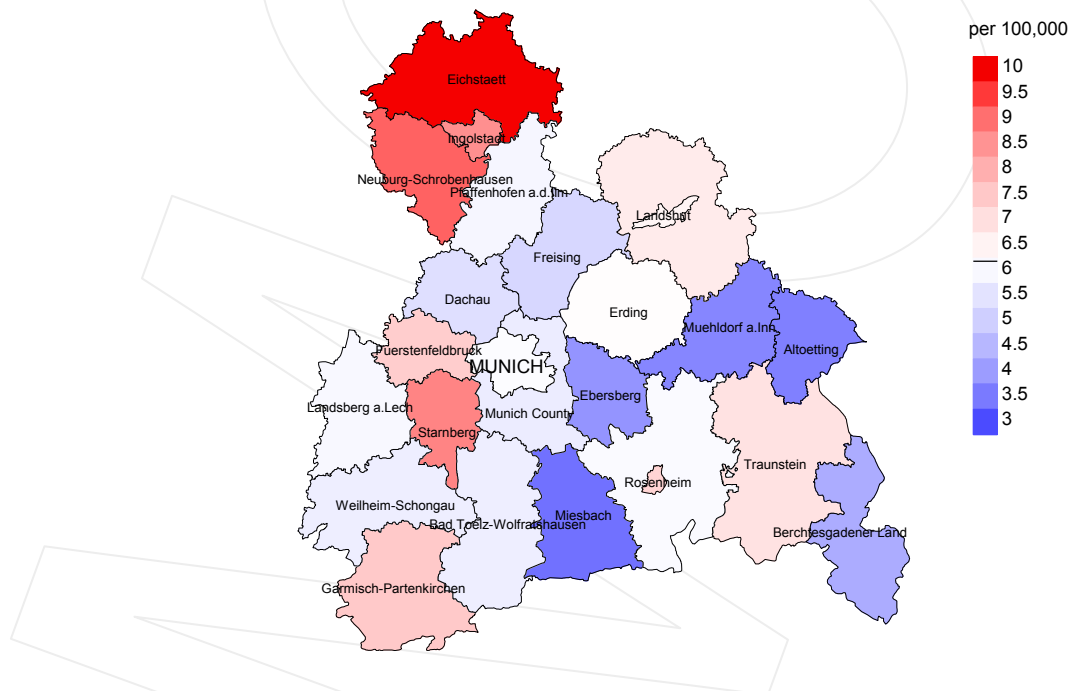
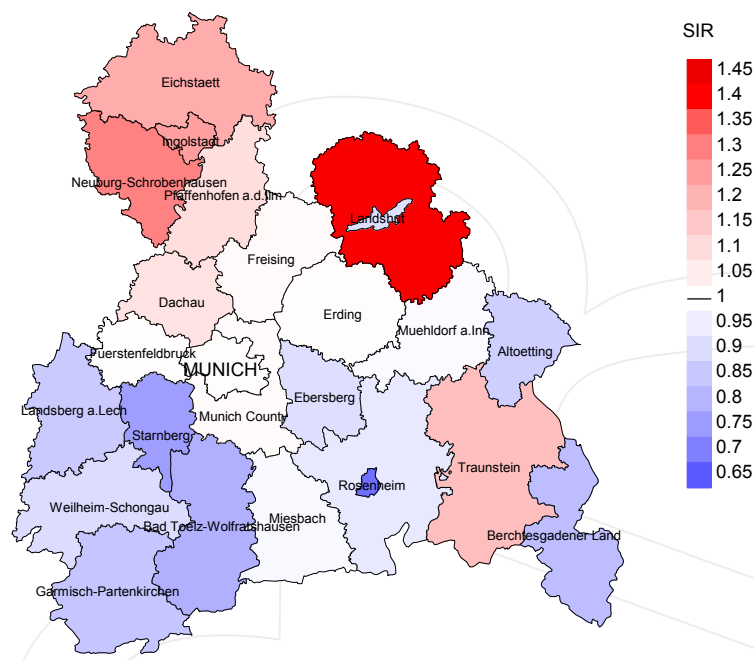


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 8.9/100,000 WS N=2,378, females 6.2/100,000 WS N=1,932).

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 39 women were identified with newly diagnosed leukaemias. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 3.9/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 2.1 and 7.5/100,000.

Standardized incidence ratio (SIR) 2007 - 2013: Males



Standardized incidence ratio (SIR) 2007 - 2013: Females

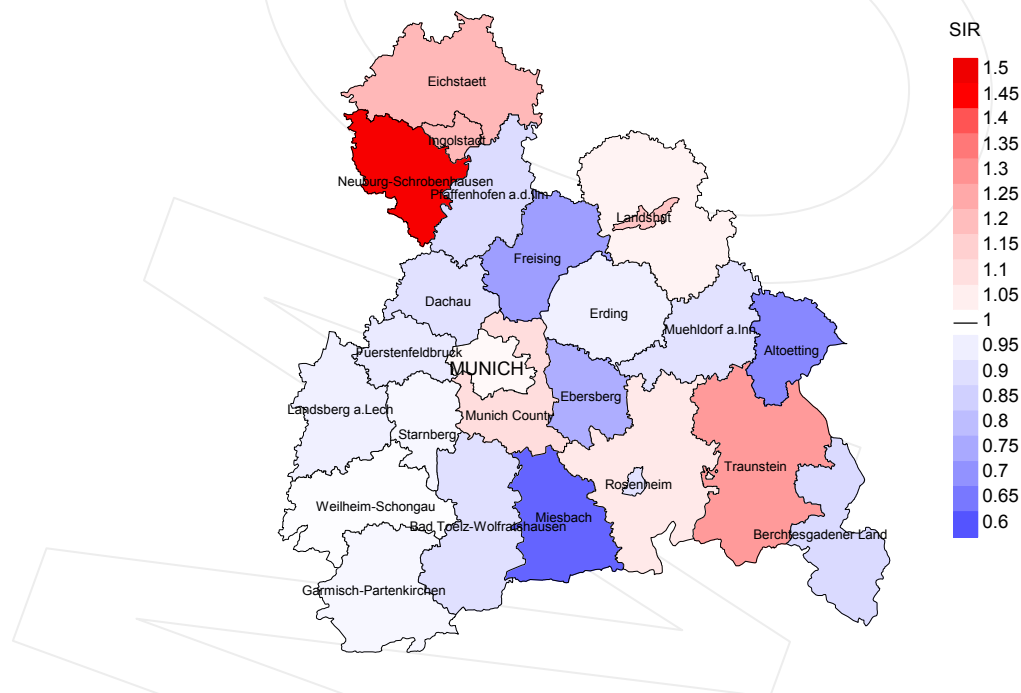


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=2,378, females N=1,932).

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 39 women were identified with newly diagnosed leukaemias. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.76. Though, the value of this parameter may vary with an underlying probability of 99% between 0.49 and 1.14, 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)

Year of diagnosis	Incident cases n	Prop. actively followed %	Prop. DCO %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	299	98.7	28.4	245	81.9	98.0
1999	308	98.4	24.7	230	74.7	96.5
2000	328	97.9	28.0	239	72.9	97.1
2001	360	98.6	35.0	275	76.4	97.5
2002	564	96.5	34.6	424	75.2	98.1
2003	570	97.5	33.9	422	74.0	99.1
2004	620	95.8	31.1	416	67.1	99.0
2005	587	96.3	30.7	420	71.6	98.6
2006	601	94.5	29.3	433	72.0	97.5
2007	649	85.7	24.7	414	63.8	98.8
2008	644	76.2	25.5	389	60.4	97.9
2009	658	75.1	23.9	402	61.1	97.5
2010	678	76.3	22.7	406	59.9	97.8
2011	640	75.6	21.6	355	55.5	98.0
2012	671	76.2	26.1	363	54.1	97.5
2013	390	97.2	41.8	236	60.5	97.0
1998-2013	8567	87.9	28.3	5669	66.2	98.0

Table 10b

Annual cohorts of incident cancers and deaths, proportion of death certificates and cases deceased the same year of cancer diagnosis
(incl. DCO)
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002,
and from 3.96 to 4.64 m as of 2007, respectively)

Year of diagnosis/ death	Incident cases n	Deaths n	Prop. deaths with death certific. %	Deaths in same year n	Prop. deaths in same year %
1998	299	222	98.2	113	37.8
1999	308	204	96.6	93	30.2
2000	328	222	96.4	112	34.1
2001	360	267	97.0	134	37.2
2002	564	342	98.2	225	39.9
2003	570	336	98.2	234	41.1
2004	620	339	98.8	221	35.6
2005	587	405	99.8	231	39.4
2006	601	379	98.7	242	40.3
2007	649	399	98.2	217	33.4
2008	644	404	98.3	218	33.9
2009	658	399	97.7	231	35.1
2010	678	447	97.8	251	37.0
2011	640	461	98.9	220	34.4
2012	671	475	98.5	251	37.4
2013	390	454	98.7	215	55.1
1998-2013	8567	5755	98.3	3208	37.4

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)

Year of death	Deaths n	Prop. cancer- related %	Prop. non-cancer- related %	Prop. cancer recorded on death certificate %
1998	222	65.8	34.2	95.9
1999	204	70.1	29.9	95.4
2000	222	74.3	25.7	97.7
2001	267	71.5	28.5	95.8
2002	342	81.3	18.7	97.3
2003	336	83.0	17.0	95.8
2004	339	86.7	13.3	96.1
2005	405	86.2	13.8	97.5
2006	379	86.5	13.5	95.7
2007	399	84.7	15.3	95.4
2008	404	81.4	18.6	91.4
2009	399	84.7	15.3	93.1
2010	447	83.4	16.6	95.0
2011	461	83.3	16.7	93.0
2012	475	81.7	18.3	92.3
2013	454	74.9	25.1	89.5
1998-2013	5755	81.0	19.0	94.5

Table 11a

Medians of age at death according to the grouping in Table 10

MALES					
Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	122	69.7	67.7	74.4	69.8
1999	116	72.4	68.9	81.1	71.8
2000	133	72.1	70.5	77.1	72.1
2001	130	72.4	71.9	74.7	72.0
2002	176	73.2	72.3	75.9	73.8
2003	181	72.3	71.2	76.0	72.0
2004	184	74.7	74.4	80.0	74.7
2005	227	75.2	73.9	78.6	74.4
2006	224	74.0	73.4	77.6	73.9
2007	214	73.8	73.1	81.6	73.5
2008	232	73.4	73.3	76.6	73.6
2009	211	75.2	74.8	79.1	75.3
2010	246	75.8	74.6	80.6	75.8
2011	252	75.2	74.6	78.3	75.3
2012	282	76.6	75.0	81.5	75.8
2013	268	76.1	75.3	78.1	76.1
1998-2013	3198	74.4	73.5	78.6	74.3

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 11b

Medians of age at death according to the grouping in Table 10

FEMALES

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	100	76.0	73.6	82.0	76.0
1999	88	77.0	76.0	82.8	76.7
2000	89	77.7	75.2	86.1	77.7
2001	137	77.0	75.3	82.7	76.5
2002	166	77.4	74.2	85.7	77.0
2003	155	77.9	75.8	84.5	77.8
2004	155	77.1	76.4	82.8	76.9
2005	178	77.9	76.0	85.2	77.9
2006	155	77.3	76.6	81.8	77.0
2007	185	76.0	74.1	86.1	76.0
2008	172	78.7	76.4	84.7	77.9
2009	188	78.7	77.7	83.4	78.3
2010	201	80.4	78.9	82.8	80.7
2011	209	77.6	74.0	83.7	75.9
2012	193	77.3	76.6	82.0	76.9
2013	186	79.6	77.7	82.5	78.8
1998-2013	2557	77.8	76.2	83.6	77.5

By 2010, life expectancy for a newborn male in Germany is 77.5 years compared with 82.6 years for his female counterpart.

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

Table 12a

Mortality measures (cancer-related death) and mortality-incidence-index
by year of death

MALES

Year of death	Deaths n	Mort. raw	MI-Index raw	Mort. WS	MI-Index WS	Mort. ES	MI-Index ES	Mort. BRD-S	MI-Index BRD-S
1998	85	7.7	0.52	5.3	0.52	7.2	0.52	9.0	0.53
1999	79	7.1	0.48	4.7	0.48	6.5	0.48	8.2	0.48
2000	101	8.9	0.56	5.8	0.51	8.2	0.55	10.7	0.59
2001	99	8.5	0.51	5.0	0.43	7.5	0.49	10.3	0.55
2002	148	7.9	0.49	4.5	0.41	6.8	0.47	9.3	0.52
2003	155	8.3	0.49	4.6	0.44	7.0	0.48	9.3	0.50
2004	161	8.6	0.49	4.5	0.39	6.9	0.46	9.7	0.53
2005	191	10.1	0.56	5.2	0.45	8.0	0.53	11.0	0.57
2006	192	10.0	0.53	5.0	0.41	7.7	0.48	10.6	0.54
2007	186	8.4	0.51	4.4	0.45	6.4	0.49	8.9	0.53
2008	193	8.7	0.54	4.2	0.40	6.4	0.49	8.7	0.54
2009	178	8.0	0.51	3.7	0.42	5.8	0.47	8.1	0.53
2010	201	8.9	0.56	4.0	0.44	6.3	0.50	8.7	0.56
2011	216	9.5	0.61	4.4	0.46	6.6	0.54	9.2	0.63
2012	224	9.8	0.61	4.4	0.47	6.8	0.56	9.4	0.60
2013	198	8.7	0.87	3.6	0.72	5.8	0.80	8.3	0.86
1998-2013	2607	8.8	0.55	4.5	0.45	6.8	0.51	9.3	0.57

Table 12b

Mortality measures (cancer-related death) and mortality-incidence-index
by year of death

FEMALES

Year of death	Deaths n	Mort. raw	MI-Index raw	Mort. WS	MI-Index WS	Mort. ES	MI-Index ES	Mort. BRD-S	MI-Index BRD-S
1998	61	5.2	0.46	2.9	0.47	3.7	0.45	4.4	0.45
1999	64	5.4	0.45	2.3	0.30	3.4	0.36	4.5	0.42
2000	64	5.3	0.43	2.5	0.34	3.5	0.37	4.4	0.41
2001	92	7.6	0.56	3.3	0.47	4.8	0.52	6.4	0.57
2002	130	6.6	0.51	2.9	0.46	4.2	0.49	5.5	0.52
2003	124	6.3	0.49	2.6	0.38	3.9	0.44	5.1	0.48
2004	133	6.7	0.46	2.7	0.35	4.0	0.39	5.4	0.44
2005	158	7.9	0.65	3.2	0.49	4.7	0.57	6.1	0.60
2006	136	6.8	0.58	2.7	0.45	3.9	0.52	5.4	0.58
2007	152	6.6	0.53	2.8	0.41	4.0	0.46	5.2	0.51
2008	136	5.9	0.49	2.3	0.38	3.4	0.43	4.5	0.46
2009	160	6.9	0.52	2.7	0.40	4.0	0.46	5.3	0.51
2010	172	7.3	0.55	2.6	0.38	3.9	0.44	5.4	0.51
2011	169	7.2	0.59	2.8	0.43	4.1	0.51	5.4	0.58
2012	164	7.0	0.55	2.6	0.36	3.8	0.43	5.2	0.51
2013	143	6.1	0.90	2.2	0.76	3.2	0.83	4.5	0.86
1998-2013	2058	6.6	0.54	2.7	0.42	3.9	0.47	5.2	0.52

Table 13

Age distribution of age at death (cancer-related) for period 1998-2013
(incl. multiple primaries)

Age at death Years	Cases			Males			Females		
	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
0-4	10	0.2	0.2	4	0.2	0.2	6	0.3	0.3
5-9	16	0.3	0.5	9	0.3	0.5	7	0.3	0.6
10-14	23	0.5	1.0	11	0.4	0.9	12	0.6	1.2
15-19	22	0.5	1.5	12	0.5	1.4	10	0.5	1.7
20-24	25	0.5	2.0	17	0.6	2.0	8	0.4	2.1
25-29	28	0.6	2.6	21	0.8	2.8	7	0.3	2.4
30-34	31	0.7	3.3	21	0.8	3.6	10	0.5	2.9
35-39	63	1.3	4.6	34	1.3	4.9	29	1.4	4.3
40-44	78	1.6	6.3	46	1.7	6.6	32	1.5	5.8
45-49	99	2.1	8.4	47	1.8	8.4	52	2.5	8.3
50-54	126	2.7	11.0	74	2.8	11.2	52	2.5	10.8
55-59	250	5.3	16.3	141	5.3	16.5	109	5.3	16.1
60-64	353	7.5	23.8	213	8.0	24.5	140	6.7	22.8
65-69	559	11.8	35.6	362	13.6	38.1	197	9.5	32.3
70-74	748	15.8	51.4	456	17.2	55.3	292	14.1	46.4
75-79	861	18.2	69.6	500	18.8	74.2	361	17.4	63.8
80-84	747	15.8	85.4	379	14.3	88.5	368	17.7	81.5
85+	690	14.6	100.0	306	11.5	100.0	384	18.5	100.0
All ages	4729	100.0		2653	100.0		2076	100.0	

Included in the statistics are 39.7% multiple primaries in males and 32.1% in females.

Table 14

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

Age at death Years	Males n	Females n	Males Age- spec. mortal.	MI-index	Females Age- spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4	4	6	0.3	0.03	0.4	0.06	12.1	23.1
5- 9	9	7	0.6	0.13	0.5	0.16	23.7	17.5
10-14	11	12	0.7	0.27	0.8	0.34	31.4	38.7
15-19	12	10	0.8	0.23	0.7	0.34	26.7	27.0
20-24	17	8	1.0	0.47	0.4	0.28	18.9	15.7
25-29	21	7	1.0	0.49	0.3	0.23	19.4	6.1
30-34	21	10	0.9	0.32	0.5	0.30	11.3	4.4
35-39	34	29	1.4	0.39	1.2	0.36	8.5	5.6
40-44	46	32	1.8	0.33	1.3	0.31	5.4	2.8
45-49	47	52	2.0	0.31	2.3	0.42	2.6	2.6
50-54	74	52	3.7	0.31	2.5	0.34	2.2	1.7
55-59	141	109	7.7	0.46	5.7	0.46	2.4	2.3
60-64	213	140	12.0	0.49	7.5	0.48	2.4	2.1
65-69	362	197	22.9	0.57	11.4	0.49	3.0	2.4
70-74	456	292	35.6	0.65	19.2	0.63	3.4	3.0
75-79	500	361	60.5	0.75	30.4	0.71	3.8	3.4
80-84	379	368	75.7	0.72	39.4	0.72	3.5	3.3
85+	306	384	89.7	0.71	43.0	0.59	3.4	2.8
All ages	2653	2076					3.3	2.9
Mortality								
Raw			8.9	0.56	6.7	0.54		
WS			4.6	0.46	2.7	0.42		
ES			6.9	0.52	4.0	0.48		
BRD-S			9.5	0.57	5.3	0.53		
PYLL-70								
per 100,000			50.7		37.4			
ES			48.6		36.6			
AYLL-70			13.4		14.8			

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 ←%
C16	Stomach	23	1.8	10	43.5	1	4.3	12	52.2
C18	Colon	86	6.8	42	48.8	13	15.1	31	36.0
C19-C20	Rectum	45	3.6	17	37.8	8	17.8	20	44.4
C25	Pancreas	16	1.3	1	6.3	3	18.8	12	75.0
C33-C34	Lung	96	7.6	19	19.8	22	22.9	55	57.3
C43	Malign. melanoma	53	4.2	28	52.8	5	9.4	20	37.7
C44	Skin others	205	16.2	29	14.1	11	5.4	165	80.5
C46,C49	Soft tissue	15	1.2	7	46.7			8	53.3
C61	Prostate	206	16.3	136	66.0	22	10.7	48	23.3
C64	Kidney	35	2.8	25	71.4	3	8.6	7	20.0
C67	Bladder	68	5.4	45	66.2	5	7.4	18	26.5
C70-C72	CNS cancer	18	1.4	3	16.7	6	33.3	9	50.0
C76-C79	CUP	13	1.0	2	15.4	3	23.1	8	61.5
C81	Hodgkin lymphoma	18	1.4	9	50.0	2	11.1	7	38.9
C82-C85	NHL	45	3.6			11	24.4	34	75.6
C90	Mult. myeloma	24	1.9	12	50.0	8	33.3	4	16.7
C91-C96	Leukaemia	207	16.4			59	28.5	148	71.5
Other primaries		89	7.1	41	46.1	13	14.6	35	39.3
All mult. primaries		1262	100.0	426	33.8	195	15.5	641	50.8

Multiple primaries with number of cases 1 to 10 are pooled in category "Other primaries".

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

Table 15b

Multiple primaries in deaths in period 1998-2013
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C16	Stomach	14	1.7	6	42.9	4	28.6	4	28.6
C18	Colon	47	5.7	22	46.8	7	14.9	18	38.3
C19-C20	Rectum	19	2.3	11	57.9	2	10.5	6	31.6
C25	Pancreas	11	1.3	1	9.1	3	27.3	7	63.6
C33-C34	Lung	29	3.5	7	24.1	5	17.2	17	58.6
C43	Malign. melanoma	25	3.1	22	88.0			3	12.0
C44	Skin others	90	11.0	30	33.3	4	4.4	56	62.2
C50	Breast	185	22.6	142	76.8	13	7.0	30	16.2
C53	Cervix uteri	18	2.2	12	66.7	2	11.1	4	22.2
C54	Corpus uteri	39	4.8	27	69.2	4	10.3	8	20.5
C56	Ovary	18	2.2	9	50.0	3	16.7	6	33.3
C64	Kidney	10	1.2	3	30.0	3	30.0	4	40.0
C67	Bladder	19	2.3	12	63.2	3	15.8	4	21.1
C70-C72	CNS cancer	18	2.2	9	50.0	2	11.1	7	38.9
C73	Thyroid	16	2.0	15	93.8			1	6.3
C82-C85	NHL	20	2.4			2	10.0	18	90.0
C90	Mult. myeloma	17	2.1	6	35.3	5	29.4	6	35.3
C91-C96	Leukaemia	157	19.2			43	27.4	114	72.6
Other primaries		66	8.1	27	40.9	3	4.5	36	54.5
All mult. primaries		818	100.0	361	44.1	108	13.2	349	42.7

Multiple primaries with number of cases 1 to 8 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 1998-2013
(Singular primaries only *)

Age at death Years	Males n	Females n	Males Age- spec. mortal.	MI-index	Females Age- spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4	4	6	0.3	0.03	0.4	0.06	14.3	25.0
5- 9	9	7	0.6	0.14	0.5	0.16	25.0	18.9
10-14	11	12	0.7	0.28	0.8	0.34	31.4	41.4
15-19	12	9	0.8	0.24	0.6	0.32	28.6	27.3
20-24	16	7	0.9	0.47	0.4	0.25	19.0	14.9
25-29	18	7	0.9	0.44	0.3	0.24	18.2	6.4
30-34	21	10	0.9	0.33	0.5	0.33	11.6	5.0
35-39	31	26	1.2	0.39	1.1	0.34	8.3	5.6
40-44	41	26	1.6	0.32	1.0	0.29	5.2	2.6
45-49	41	43	1.7	0.30	1.9	0.42	2.5	2.5
50-54	60	40	3.0	0.28	1.9	0.34	2.1	1.5
55-59	120	81	6.5	0.45	4.2	0.42	2.4	2.0
60-64	163	110	9.2	0.47	5.9	0.47	2.2	2.1
65-69	273	154	17.3	0.57	8.9	0.51	2.8	2.3
70-74	343	213	26.8	0.70	14.0	0.61	3.2	2.7
75-79	350	268	42.3	0.76	22.6	0.73	3.5	3.1
80-84	274	280	54.8	0.78	30.0	0.73	3.4	3.2
85+	213	286	62.5	0.73	32.0	0.56	3.2	2.6
All ages	2000	1585					3.1	2.7
Mortality								
Raw			6.7	0.55	5.1	0.53		
WS			3.5	0.43	2.1	0.39		
ES			5.3	0.50	3.1	0.45		
BRD-S			7.1	0.56	4.0	0.51		
PYLL-70								
per 100,000			44.5		31.9			
ES			43.3		31.9			
AYLL-70			14.5		15.7			

* 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 *)

Age at death Years	Males n	Females n	Males Age- spec. mortal.	MI-index	Females Age- spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4	4	6	0.3	0.03	0.4	0.06	14.8	25.0
5- 9	8	6	0.5	0.12	0.4	0.14	22.9	16.7
10-14	11	10	0.7	0.29	0.7	0.29	31.4	37.0
15-19	12	9	0.8	0.24	0.6	0.32	28.6	32.1
20-24	14	6	0.8	0.42	0.3	0.22	17.7	13.6
25-29	17	7	0.8	0.41	0.3	0.25	18.5	6.8
30-34	21	10	0.9	0.35	0.5	0.36	12.0	5.5
35-39	27	23	1.1	0.35	1.0	0.32	7.5	5.4
40-44	39	25	1.5	0.31	1.0	0.28	5.2	2.7
45-49	37	38	1.6	0.28	1.6	0.40	2.4	2.5
50-54	56	36	2.8	0.30	1.8	0.35	2.1	1.5
55-59	108	74	5.9	0.47	3.8	0.44	2.3	2.1
60-64	132	99	7.4	0.47	5.3	0.47	2.0	2.1
65-69	212	139	13.4	0.53	8.1	0.52	2.5	2.4
70-74	272	183	21.2	0.66	12.1	0.57	3.0	2.8
75-79	285	229	34.5	0.70	19.3	0.68	3.6	3.2
80-84	224	251	44.8	0.69	26.9	0.69	3.5	3.4
85+	183	257	53.7	0.65	28.8	0.52	3.4	2.7
All ages	1662	1408					3.1	2.8
Mortality								
Raw			5.6	0.51	4.5	0.50		
WS			3.0	0.40	1.9	0.37		
ES			4.4	0.47	2.7	0.43		
BRD-S			5.9	0.52	3.6	0.49		
PYLL-70								
per 100,000			40.5		29.1			
ES			39.6		29.1			
AYLL-70			15.5		15.8			

* See corresponding tables with multiple primaries.

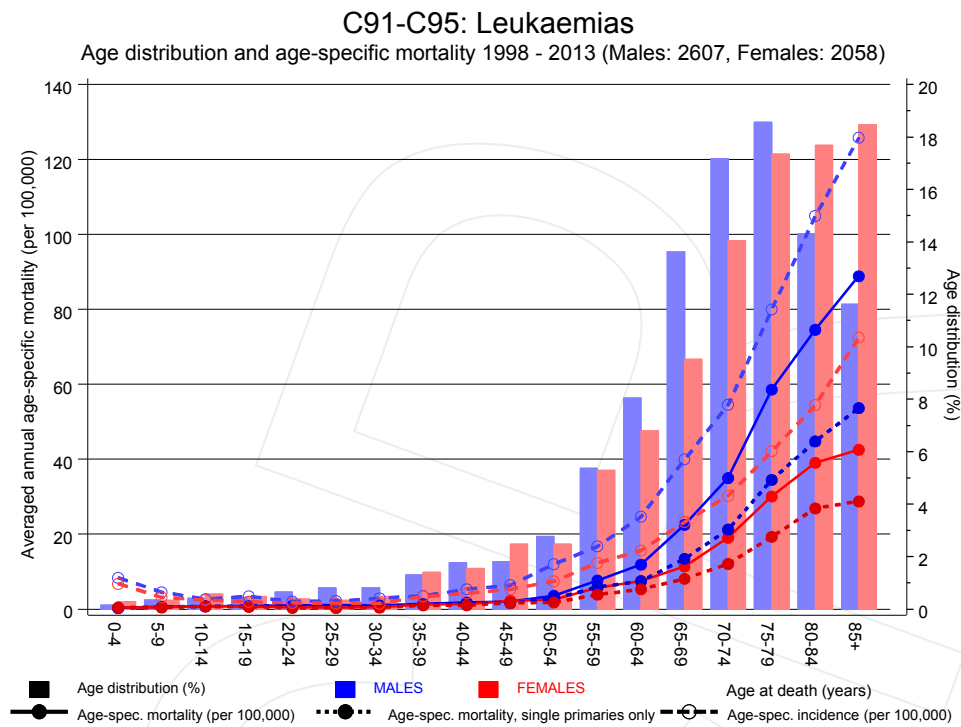
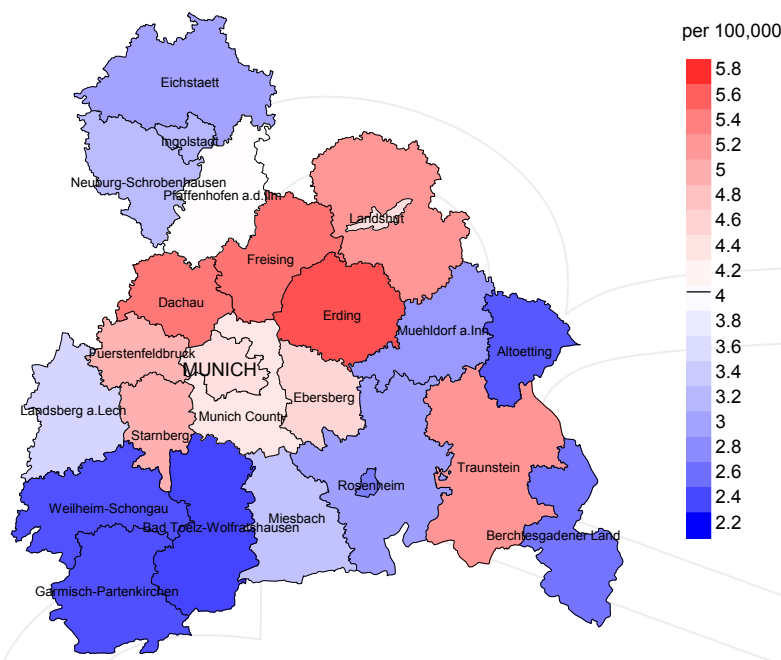


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

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



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

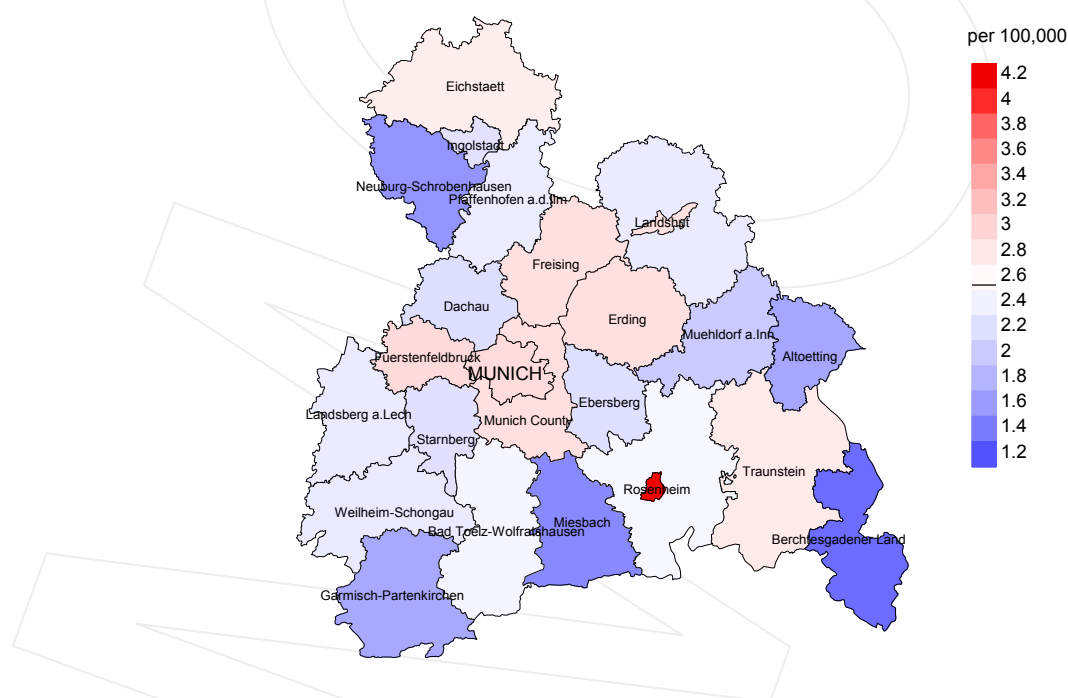
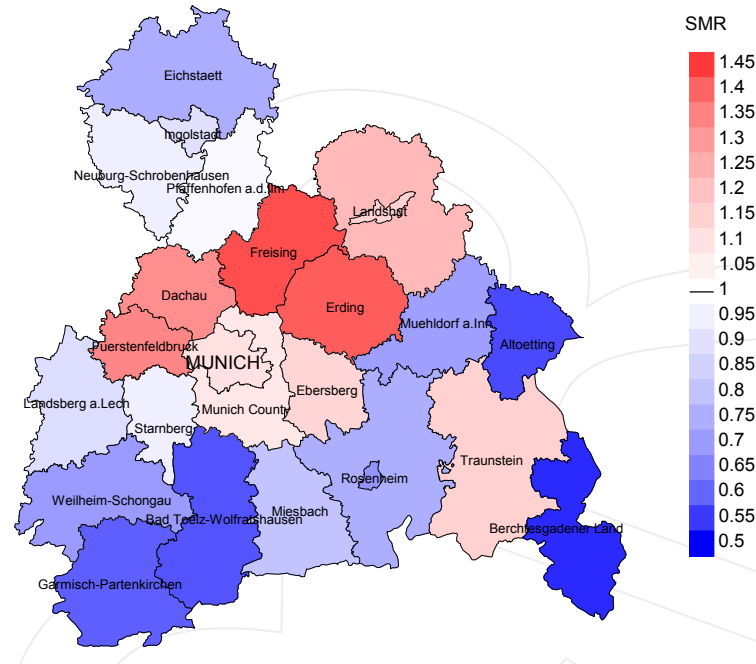


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2013. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 4.1/100,000 WS N=1,371, females 2.5/100,000 WS N=1,080).

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 28 women died from leukaemias. Therefore, the mean mortality 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 1.2 and 3.9/100,000.

Standardized mortality ratio (SMR) 2007 - 2013: Males



Standardized mortality ratio (SMR) 2007 - 2013: Females

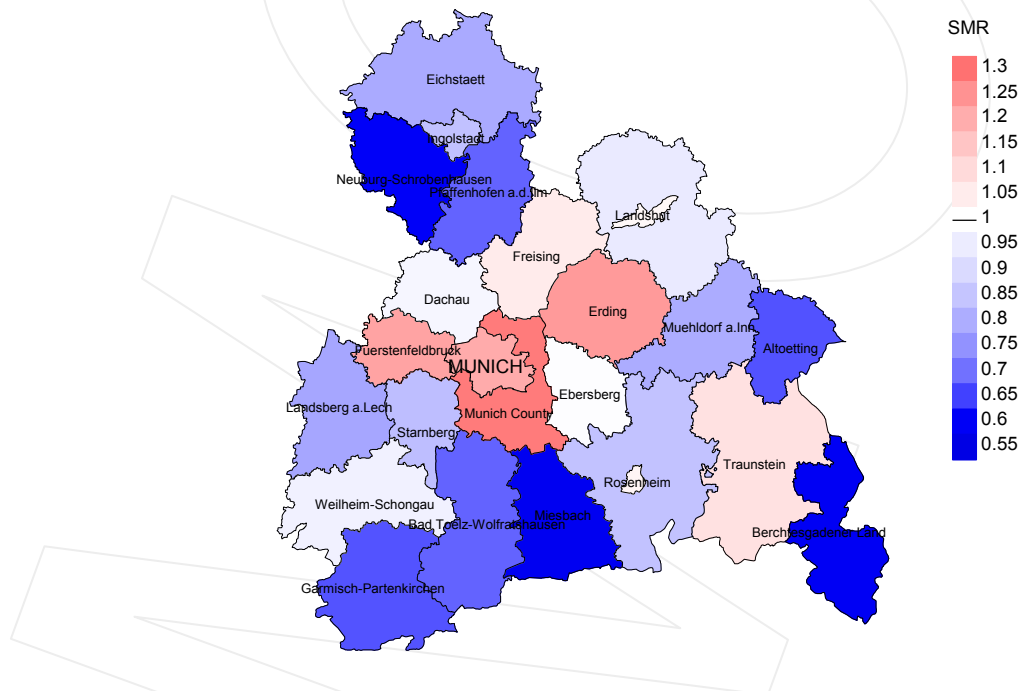


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2013. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=1,371, females N=1,080).

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 28 women died from leukaemias. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.00. Though, the value of this parameter may vary with an underlying probability of 99% between 0.58 and 1.59, 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

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