Munich Cancer Registry

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

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

Cancer statistics: Baseline statistics

C88,C90: Immunoprolif. disease

Year of diagnosis	1998-2011
Patients	3042
Diseases	3044
Creation date	04/02/2013
Export date	01/03/2013
Population	4.5 m

http://www.tumorregister-muenchen.de/en/facts/base/base_C8890E.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 immunoproliferative and plasma cell neosplasms 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
C88.-	Other B-cell lymphoma[malignant immunoproliferative diseases]
C88.0	Waldenström macroglobulinaemia
C88.2	Other heavy chain disease
C88.3	Immunoproliferative small intestinal disease
C88.4	Extranodal marginal zone B-cell lymphoma of mucosa-associated lymphoid tissue [MALT-lyphoma]
C88.7	Other malignant immunoproliferative diseases
C88.9	Malignant immunoproliferative disease, unspecified
C90.-	Multiple myeloma and malignant plasma cell neoplasms
C90.0	Multiple myeloma
C90.1	Plasma cell leukaemia
C90.2	Extramedullary plasmacytoma
C90.3	Solitary plasmacytoma

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

Code	Bezeichnung
9699/3	Marginal zone B-cell lymphoma, NOS (MALT lymphoma, mucosal-associated only)
9731/3	Plasmacytoma, NOS
9732/3	Multiple myeloma
9734/3	Plasmacytoma, extramedullary (not occurring in bone)
9760/3	Immunoproliferative disease, NOS
9761/3	Waldenström macroglobulinemia
9762/3	Heavy chain disease, NOS
9764/3	Immunoproliferative small intestinal disease

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	126	30	23.8	18.3	88.9	98.4
1999	129	27	20.9	22.5	90.7	99.2
2000	133	39	29.3	13.5	94.0	98.5
2001	116	33	28.4	27.6	88.8	99.1
2002	238	76	31.9	21.8	83.2	98.7
2003	235	58	24.7	21.7	83.0	97.4
2004	244	65	26.6	24.2	79.9	98.8
2005	238	46	19.3	27.3	76.5	97.5
2006	247	43	17.4	23.1	69.2	98.8
2007	305	66	21.6	21.3	72.5	90.8 ##
2008	305	59	19.3	20.3	62.6	77.4
2009	265	42	15.8	20.4	57.4	85.3
2010	247	54	21.9	26.7	49.0	90.7
2011	216	61	28.2	20.8	42.1	77.3 ###
1998-2011	3044	699	23.0	22.3	71.4	92.3

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 diagnosis	All n	Males n	Females n	Prop. males %
1998	126	74	52	58.7
1999	129	66	63	51.2
2000	133	79	54	59.4
2001	116	58	58	50.0
2002	238	126	112	52.9
2003	235	141	94	60.0
2004	244	126	118	51.6
2005	238	124	114	52.1
2006	247	121	126	49.0
2007	305	167	138	54.8
2008	305	170	135	55.7
2009	265	135	130	50.9
2010	247	145	102	58.7
2011	216	116	100	53.7
1998-2011	3044	1648	1396	54.1

Table 2

Incidence measures by year of diagnosis and gender including DCO cases
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002,
and from 3.96 to 4.52 m as of 2007, respectively)

Year of diagnosis	Males n	Females n	Males Inc. raw	Fem. Inc. raw	Males Inc. WS	Fem. Inc. WS	Males Inc. ES	Fem. Inc. ES	Males Inc. BRD-S	Fem. Inc. BRD-S
1998	74	52	6.7	4.4	4.1	2.0	6.0	3.0	7.3	3.7
1999	66	63	5.9	5.3	3.7	2.2	5.4	3.3	7.1	4.4
2000	79	54	6.9	4.5	3.9	1.9	6.2	2.9	8.6	3.8
2001	58	58	5.0	4.8	2.9	2.2	4.5	3.2	6.0	4.2
2002	126	112	6.8	5.7	3.8	2.3	5.7	3.6	7.5	4.6
2003	141	94	7.5	4.8	4.1	2.0	6.1	3.0	7.9	3.9
2004	126	118	6.7	6.0	3.7	2.4	5.6	3.6	7.1	4.8
2005	124	114	6.5	5.7	3.3	2.3	5.1	3.5	6.8	4.7
2006	121	126	6.3	6.3	3.3	2.5	4.9	3.7	6.4	4.9
2007	167	138	7.5	6.0	3.8	2.3	5.8	3.5	7.8	4.6
2008	170	135	7.6	5.8	3.8	2.3	5.7	3.5	7.4	4.7
2009	135	130	6.0	5.6	2.9	2.1	4.3	3.2	5.6	4.2
2010	145	102	6.4	4.4	3.0	1.7	4.6	2.6	6.2	3.3
2011	116	100	5.1	4.3	2.4	1.7	3.7	2.6	4.8	3.3
1998-2011	1648	1396	6.6	5.3	3.4	2.1	5.2	3.2	6.8	4.3

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	126	67.3	12.9	26.1	94.0	52.7	58.4	67.7	75.7	84.9
1999	129	69.4	13.0	23.9	92.8	53.2	60.1	70.8	78.6	85.6
2000	133	71.7	11.7	38.2	94.4	55.7	64.6	72.7	79.5	85.8
2001	116	68.7	11.0	36.1	93.7	50.9	60.5	69.6	77.1	81.2
2002	238	70.9	12.1	32.7	93.5	55.6	62.7	71.8	79.8	86.3
2003	235	69.5	11.2	31.4	99.0	55.6	62.1	69.1	78.0	83.7
2004	244	70.7	11.6	37.1	93.4	55.9	63.4	70.8	79.2	84.5
2005	238	71.6	11.1	38.9	102	55.9	65.2	72.9	79.5	84.7
2006	247	71.1	11.7	27.5	94.9	56.0	64.7	71.5	79.7	85.3
2007	305	71.7	10.7	30.9	93.2	59.2	65.3	72.3	80.2	85.2
2008	305	71.5	11.5	33.8	97.9	56.9	65.9	72.0	79.6	85.5
2009	265	71.8	11.3	34.7	94.6	56.3	65.7	71.9	80.0	85.7
2010	247	71.6	11.9	40.5	97.2	54.0	65.0	72.5	79.9	86.4
2011	216	71.5	12.8	33.3	97.5	51.7	65.3	73.3	79.9	86.8
1998-2011	3044	70.9	11.7	23.9	102	55.4	63.7	71.6	79.4	85.2

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	74	64.7	13.3	26.1	92.3	49.5	56.2	64.6	73.6	83.9
1999	66	66.5	13.4	23.9	91.7	48.5	58.5	68.0	76.8	83.7
2000	79	71.0	11.5	38.2	92.3	55.6	61.6	71.8	79.5	86.5
2001	58	67.2	10.6	44.4	85.3	49.1	59.2	69.0	76.0	79.1
2002	126	68.9	12.0	32.7	93.5	52.9	62.1	68.8	77.4	83.6
2003	141	68.2	10.2	36.7	99.0	55.6	61.3	67.8	75.6	81.4
2004	126	68.9	12.2	37.1	93.4	52.6	60.7	69.9	76.5	84.0
2005	124	70.6	11.0	38.9	102	56.6	64.8	70.3	78.1	83.8
2006	121	69.2	12.0	27.5	94.8	55.8	63.8	69.6	76.6	83.7
2007	167	70.3	11.2	30.9	93.2	57.0	63.6	70.5	79.3	82.9
2008	170	70.4	12.0	33.8	97.9	52.6	65.1	70.5	78.9	85.3
2009	135	70.2	10.8	34.7	89.4	54.9	65.2	71.1	78.0	83.8
2010	145	70.6	11.5	41.8	93.0	53.3	64.5	71.9	78.7	84.7
2011	116	70.4	12.4	33.3	97.4	50.5	66.2	72.7	77.9	85.1
1998-2011	1648	69.4	11.7	23.9	102	53.4	62.7	70.3	77.6	83.8

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	52	70.9	11.5	37.6	94.0	57.6	62.3	70.8	78.7	85.8
1999	63	72.4	11.9	49.2	92.8	56.1	62.1	74.6	80.1	87.9
2000	54	72.8	12.1	40.6	94.4	55.7	66.9	76.0	80.1	85.8
2001	58	70.1	11.3	36.1	93.7	57.3	63.3	70.7	79.1	83.2
2002	112	73.0	11.9	38.9	93.2	56.3	64.0	75.1	82.4	87.8
2003	94	71.4	12.4	31.4	94.2	55.8	63.4	72.3	80.4	85.6
2004	118	72.6	10.7	38.8	92.1	57.8	66.4	73.4	81.3	84.5
2005	114	72.7	11.2	42.1	96.8	55.9	65.3	74.8	81.4	84.7
2006	126	72.9	11.3	40.7	94.9	57.3	65.9	74.1	81.2	85.7
2007	138	73.4	9.9	44.4	92.3	61.4	66.9	73.2	81.8	86.5
2008	135	73.0	10.9	37.5	94.3	58.8	66.4	74.2	81.2	85.9
2009	130	73.4	11.6	36.3	94.6	59.4	67.4	73.1	83.4	87.1
2010	102	72.9	12.3	40.5	97.2	55.9	65.8	73.3	82.6	87.3
2011	100	72.8	13.1	41.9	97.5	54.5	63.3	75.3	82.9	89.3
1998-2011	1396	72.6	11.5	31.4	97.5	56.9	65.4	73.6	81.4	86.3

Table 4

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

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
20-24	1	0.0	0.0	1	0.1	0.1			0.0
25-29	2	0.1	0.1	2	0.1	0.2			0.0
30-34	7	0.2	0.3	6	0.4	0.5	1	0.1	0.1
35-39	20	0.7	1.0	13	0.8	1.3	7	0.5	0.6
40-44	44	1.4	2.4	28	1.7	3.0	16	1.1	1.7
45-49	104	3.4	5.8	76	4.6	7.6	28	2.0	3.7
50-54	110	3.6	9.5	62	3.8	11.4	48	3.4	7.2
55-59	226	7.4	16.9	130	7.9	19.3	96	6.9	14.0
60-64	330	10.8	27.7	193	11.7	31.0	137	9.8	23.9
65-69	508	16.7	44.4	295	17.9	48.9	213	15.3	39.1
70-74	489	16.1	60.5	287	17.4	66.3	202	14.5	53.6
75-79	505	16.6	77.1	264	16.0	82.3	241	17.3	70.8
80-84	375	12.3	89.4	158	9.6	91.9	217	15.5	86.4
85+	323	10.6	100.0	133	8.1	100.0	190	13.6	100.0
All ages	3044	100.0		1648	100.0		1396	100.0	

Included in the statistics are 29.8% multiple primaries in males and 22.9% in females.

Table 5

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

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=343 %	Females DCO rate n=355 %	Males Prop.all cancers n=132509 %	Females Prop.all cancers n=129521 %
0- 4			0.0	0.0				
5- 9			0.0	0.0				
10-14			0.0	0.0				
15-19			0.0	0.0				
20-24	1		0.1	0.0			0.2	
25-29	2		0.1	0.0			0.2	
30-34	6	1	0.3	0.1			0.5	0.1
35-39	13	7	0.6	0.3	7.7	14.3	0.7	0.2
40-44	28	16	1.3	0.8			1.0	0.3
45-49	76	28	3.9	1.5	5.3		1.7	0.4
50-54	62	48	3.7	2.8		6.3	0.9	0.5
55-59	130	96	8.3	5.9	4.6	2.1	1.0	0.8
60-64	193	137	12.7	8.5	8.8	7.3	1.0	0.9
65-69	295	213	21.6	14.3	12.5	14.1	1.3	1.3
70-74	287	202	27.8	16.4	18.1	18.3	1.3	1.3
75-79	264	241	39.1	24.2	26.9	23.7	1.6	1.6
80-84	158	217	38.9	27.3	44.9	38.7	1.4	1.6
85+	133	189	47.9	25.4	63.2	69.3	1.6	1.3
All ages	1648	1395			20.8	25.4	1.2	1.1
Incidence								
Raw			6.6	5.3				
WS			3.4	2.1				
ES			5.2	3.2				
BRD-S			6.8	4.3				

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	SIR	LCL 95%	UCL 95%		EAR	DCO %
C15	Oesophagus	2	0.9	2.2	0.3	7.8		3.5	
C16	Stomach	6	2.2	2.8	1.0	6.1	#	12.3	
C18	Colon	7	5.1	1.4	0.6	2.8		6.1	
C19-C20	Rectum	6	3.0	2.0	0.7	4.3		9.6	
C22	Liver	2	1.4	1.4	0.2	5.1		1.8	50.0
C25	Pancreas	3	1.8	1.7	0.3	4.9		3.9	33.3
C33-C34	Lung	11	6.3	1.8	0.9	3.1		15.1	9.1
C40-C41	Bone	3	0.0	80.6	16.6	235.5	#	9.5	
C43	Malign. melanoma	6	2.0	3.1	1.1	6.7	#	13.0	
C61	Prostate	28	15.4	1.8	1.2	2.6	#	40.5	3.6
C64	Kidney	4	1.8	2.2	0.6	5.6		6.9	
C67	Bladder	3	2.1	1.4	0.3	4.1		2.8	
C70-C72	CNS cancer	2	0.7	2.9	0.3	10.3		4.2	
C73	Thyroid	2	0.3	5.7	0.7	20.7		5.3	
C76-C79	CUP	3	0.9	3.5	0.7	10.2		6.9	
C82-C85	NHL	15	2.0	7.6	4.2	12.5	#	41.8	6.7
C91-C96	Leukaemia	6	0.8	8.0	2.9	17.3	#	16.8	
Other primaries		6	2.8	2.2	0.8	4.7		10.4	16.7
Not observed		0	2.7	0.0	0.0	1.4		-8.8	
All mult. primaries		115	52.1	2.2	1.8	2.6	#	201.8	5.2

Patients	1016
Mean age at second malignancy (years)	70.9
Person-years	3117
Mean observation time (years)	3.1
Median observation time (years)	2.2

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 1998-2011
FEMALES

Diagnosis	Observed n	Expected n	SIR	LCL 95%	UCL 95%	EAR	DCO %
C16 Stomach	3	1.0	3.0	0.6	8.7	8.4	
C18 Colon	3	2.8	1.1	0.2	3.1	0.8	
C33-C34 Lung	3	2.0	1.5	0.3	4.5	4.4	
C43 Malign. melanoma	3	0.9	3.3	0.7	9.5	8.8	
C50 Breast	11	8.5	1.3	0.6	2.3	10.8	9.1
C56 Ovary	3	1.2	2.5	0.5	7.4	7.7	33.3
C76-C79 CUP	2	0.5	4.3	0.5	15.7	6.5	
C82-C85 NHL	9	1.1	8.5	3.9	16.2 #	33.6	22.2
C91-C96 Leukaemia	3	0.4	7.1	1.5	20.9 #	10.9	
Other primaries	14	5.3	2.7	1.5	4.5 #	36.9	14.3
Not observed	0	4.3	0.0	0.0	0.9 #	-18.1	
All mult. primaries	54	27.8	1.9	1.5	2.5 #	110.8	11.1

Patients	824
Mean age at second malignancy (years)	73.1
Person-years	2362
Mean observation time (years)	2.9
Median observation time (years)	2.0

The occurrence of second malignancy is statistically significant.

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

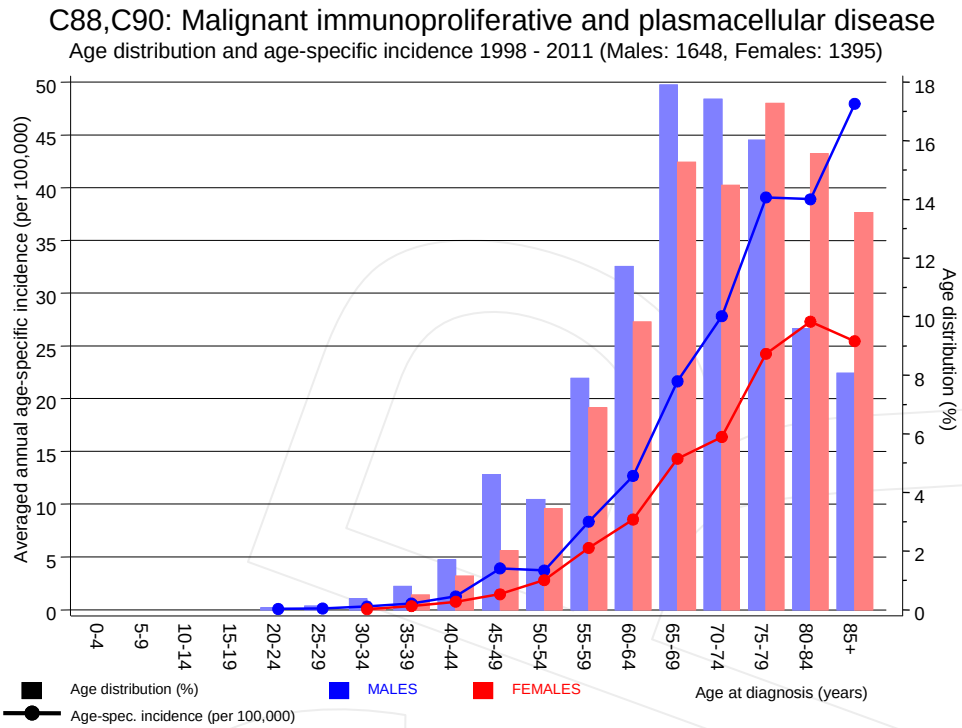


Figure 7. Age distribution and age-specific incidence

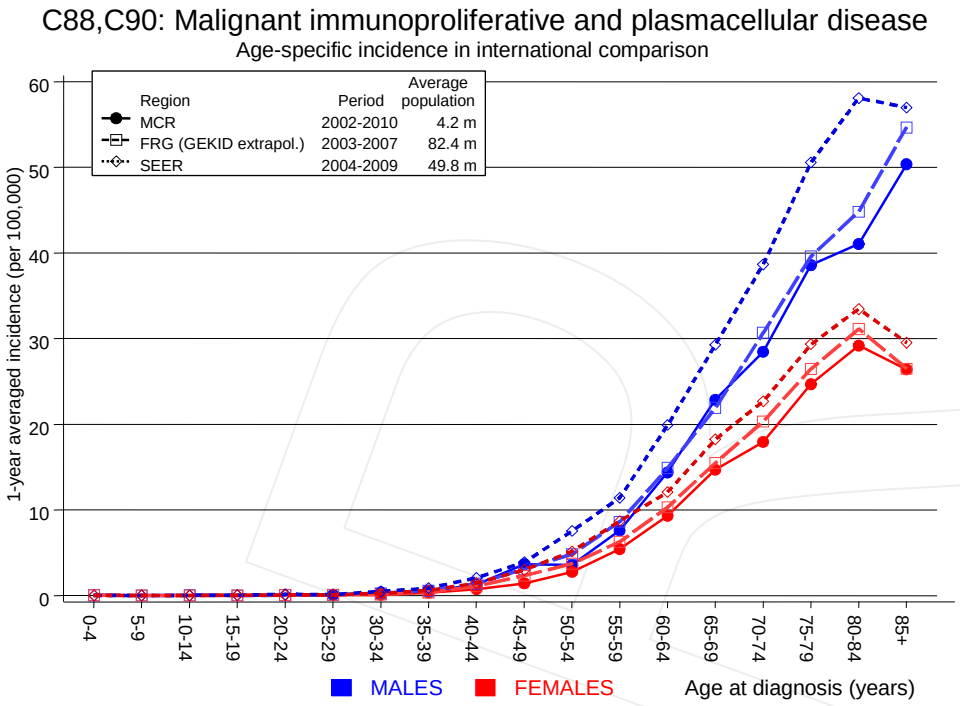


Figure 7a. Age-specific incidence in MCR registry areas compared to Germany (FRG, GEKID extrapolation) and SEER (Surveillance, Epidemiology, and End Results, USA).

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, 2011. http://www.gekid.de. Last access: 05/12/2011

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.

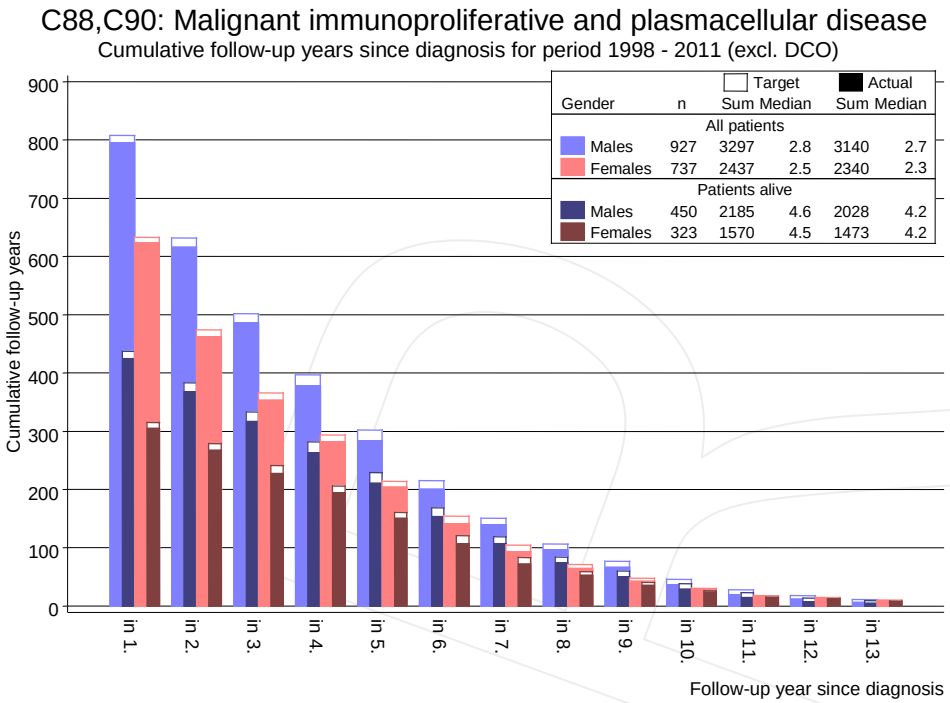
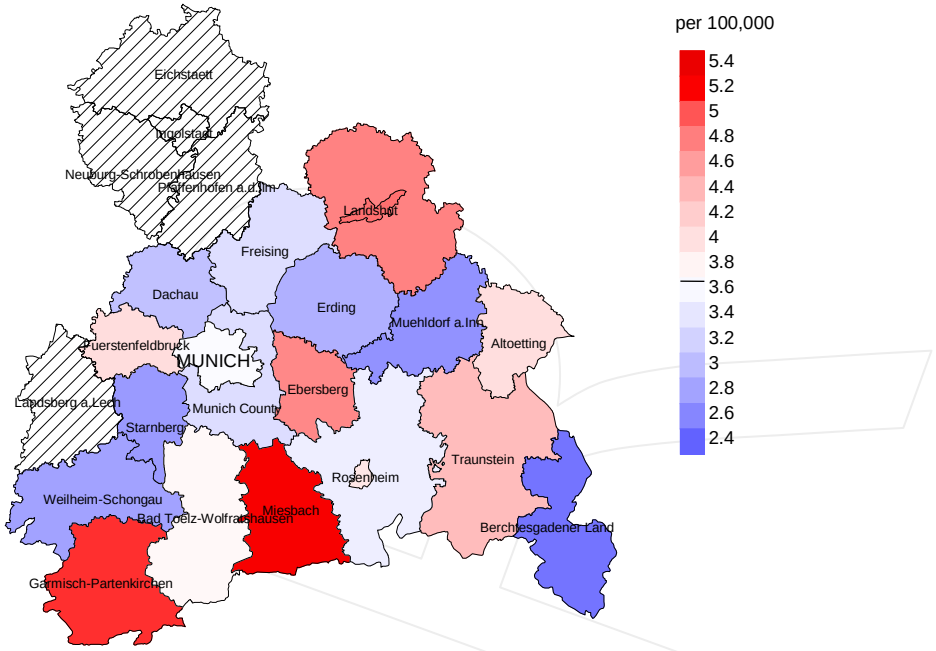


Figure 8. Cumulative follow-up years depending on time since diagnosis

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

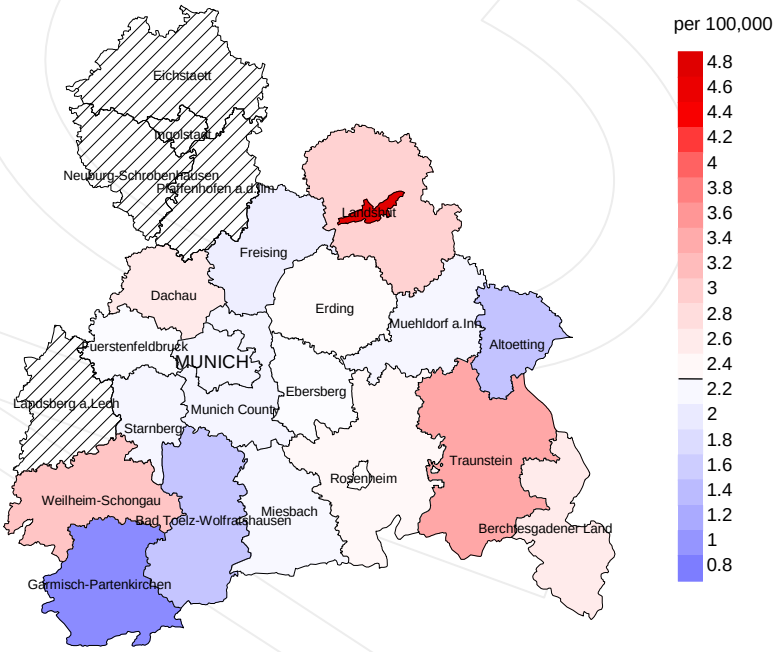
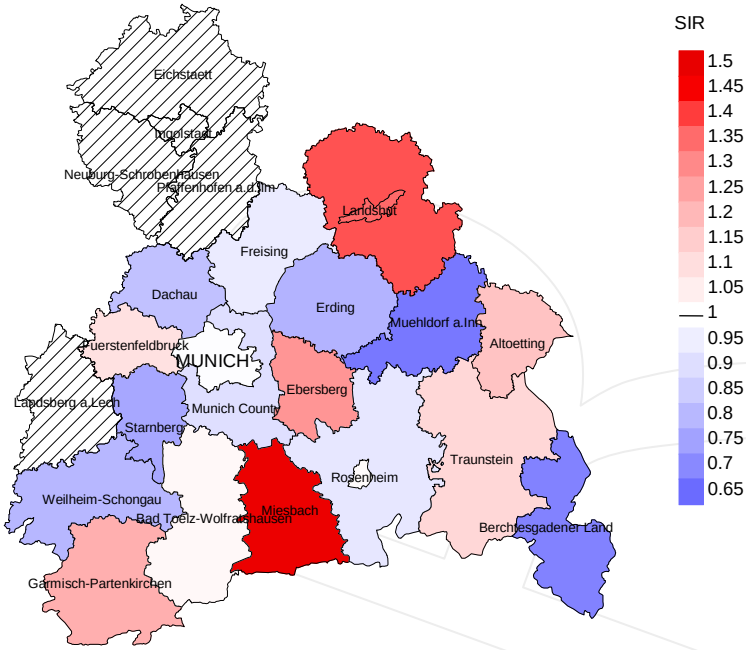


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 3.7/100,000 WS N=818, females 2.3/100,000 WS N=695). 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 22 women were identified with newly diagnosed immunoprolif. disease. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 2.3/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.1 and 4.2/100,000.

Standardized incidence ratio (SIR) 2003 - 2008: Males



Standardized incidence ratio (SIR) 2003 - 2008: Females

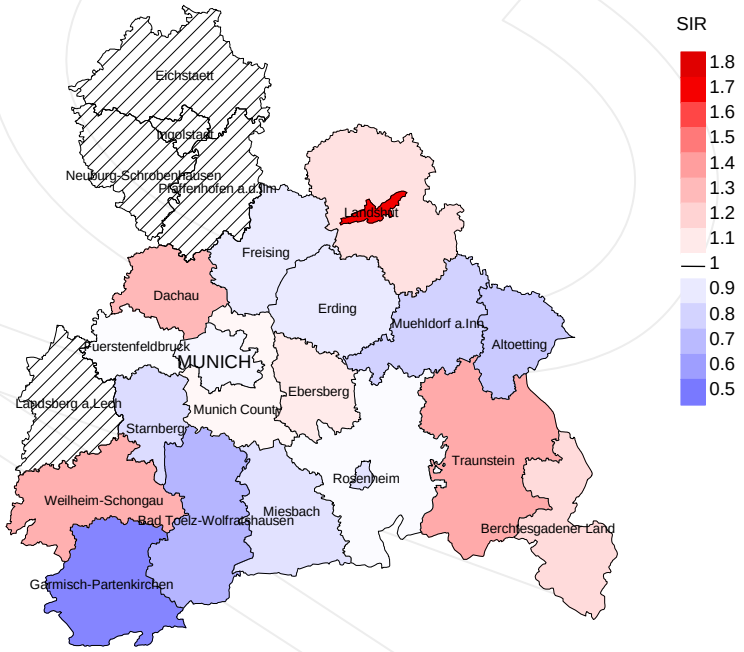


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=818, females N=695). 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 22 women were identified with newly diagnosed immunoprolif. disease. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.09. Though, the value of this parameter may vary with an underlying probability of 99% between 0.59 and 1.85, and is therefore not statistically striking.

MORTALITY

Table 10a

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

Year of diagnosis	Incident cases n	Prop. actively followed %	Prop. DCO %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	126	98.4	23.8	112	88.9	93.8
1999	129	99.2	20.9	117	90.7	94.0
2000	133	98.5	29.3	125	94.0	95.2
2001	116	99.1	28.4	103	88.8	96.1
2002	238	98.7	31.9	198	83.2	98.0
2003	235	97.4	24.7	195	83.0	97.9
2004	244	98.8	26.6	195	79.9	98.5
2005	238	97.5	19.3	182	76.5	98.4
2006	247	98.8	17.4	171	69.2	98.8
2007	305	90.8	21.6	221	72.5	99.1
2008	305	77.4	19.3	191	62.6	99.0
2009	265	85.3	15.8	152	57.4	98.7
2010	247	90.7	21.9	121	49.0	99.2
2011	216	77.3	28.2	91	42.1	100.0
1998-2011	3044	92.3	23.0	2174	71.4	97.8

Table 10b

Annual cohorts of incident cancers and deaths, proportion of death certificates and cases deceased the same year of cancer diagnosis
(incl. DCO)
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.52 m as of 2007, respectively)

Year of diagnosis/ death	Incident cases n	Deaths n	Prop. deaths with death certific. %	Deaths in same year n	Prop. deaths in same year %
1998	126	84	92.9	35	27.8
1999	129	98	95.9	41	31.8
2000	133	111	91.9	45	33.8
2001	116	102	95.1	36	31.0
2002	238	146	95.9	87	36.6
2003	235	166	99.4	79	33.6
2004	244	196	98.5	92	37.7
2005	238	149	98.0	66	27.7
2006	247	158	97.5	70	28.3
2007	305	191	99.0	91	29.8
2008	305	221	97.7	85	27.9
2009	265	218	97.7	71	26.8
2010	247	231	99.1	79	32.0
2011	216	217	98.6	74	34.3
1998-2011	3044	2288	97.5	951	31.2

Table 10c

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

Year of death	Deaths n	Prop. cancer-related %	Prop. not cancer-related %	Prop. cancer recorded on death certificate %
1998	84	53.6	46.4	94.9
1999	98	75.5	24.5	96.8
2000	111	65.8	34.2	97.1
2001	102	60.8	39.2	99.0
2002	146	80.1	19.9	96.4
2003	166	81.3	18.7	97.0
2004	196	83.7	16.3	96.9
2005	149	82.6	17.4	95.2
2006	158	84.2	15.8	96.8
2007	191	84.8	15.2	94.7
2008	221	85.5	14.5	92.1
2009	218	82.6	17.4	96.7
2010	231	82.3	17.7	89.5
2011	217	84.3	15.7	92.5
1998-2011	2288	80.0	20.0	94.9

Table 11a

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (not cancer-related) Years	Age at death (according to death certificate) Years
1998	35	70.1	65.7	77.4	71.5
1999	51	71.7	70.4	75.9	71.8
2000	62	72.0	70.4	74.6	72.8
2001	47	74.4	74.1	74.9	74.8
2002	74	70.9	70.9	70.8	71.2
2003	87	72.3	71.8	74.7	72.2
2004	105	72.4	71.4	76.6	72.7
2005	77	73.8	73.2	76.4	73.6
2006	81	72.1	71.5	75.1	71.8
2007	97	73.3	72.8	77.7	73.3
2008	124	73.3	72.2	81.4	72.9
2009	117	73.5	72.9	76.2	73.9
2010	121	74.1	73.9	74.8	73.4
2011	119	73.7	72.9	80.9	73.7
1998-2011	1197	72.9	72.2	76.0	72.9

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

Table 11b

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (not cancer-related) Years	Age at death (according to death certificate) Years
1998	49	75.8	71.7	79.4	75.7
1999	47	78.2	77.0	81.5	78.2
2000	49	76.5	75.9	78.1	76.3
2001	55	74.7	72.2	78.0	74.0
2002	72	76.0	74.7	82.5	76.0
2003	79	75.0	73.7	80.2	74.9
2004	91	74.6	73.8	79.5	74.5
2005	72	75.4	73.4	85.7	74.8
2006	77	75.7	75.6	76.2	75.9
2007	94	76.6	76.0	79.0	76.6
2008	97	75.1	74.0	80.3	74.7
2009	101	74.8	73.5	81.3	74.7
2010	110	76.0	75.5	78.7	75.7
2011	98	75.7	73.6	83.6	74.8
1998-2011	1091	75.6	74.4	80.2	75.4

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	22	2.0	0.30	1.2	0.30	1.7	0.29	2.0	0.27
1999	39	3.5	0.59	2.1	0.58	3.2	0.60	4.4	0.62
2000	39	3.4	0.49	1.9	0.49	3.0	0.49	4.5	0.52
2001	31	2.7	0.53	1.4	0.48	2.3	0.52	3.5	0.59
2002	57	3.1	0.45	1.7	0.43	2.6	0.45	3.5	0.47
2003	72	3.8	0.51	2.0	0.48	3.1	0.50	4.3	0.54
2004	86	4.6	0.68	2.3	0.64	3.6	0.65	5.0	0.69
2005	63	3.3	0.51	1.6	0.50	2.6	0.52	3.6	0.53
2006	68	3.6	0.56	1.7	0.51	2.6	0.54	3.7	0.58
2007	86	3.9	0.51	1.9	0.49	2.9	0.51	4.1	0.53
2008	109	4.9	0.64	2.4	0.63	3.7	0.65	4.9	0.66
2009	96	4.3	0.71	2.0	0.69	3.1	0.71	4.1	0.72
2010	97	4.3	0.67	1.8	0.59	2.9	0.63	4.1	0.66
2011	106	4.7	0.91	2.1	0.88	3.3	0.91	4.6	0.95
1998-2011	971	3.9	0.59	1.9	0.56	3.0	0.58	4.1	0.60

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	23	2.0	0.44	0.9	0.45	1.3	0.44	1.7	0.45
1999	35	2.9	0.56	1.1	0.49	1.7	0.51	2.4	0.54
2000	34	2.8	0.63	1.1	0.56	1.7	0.57	2.3	0.61
2001	31	2.5	0.53	1.1	0.49	1.7	0.52	2.3	0.54
2002	60	3.1	0.54	1.2	0.52	1.8	0.51	2.4	0.52
2003	63	3.2	0.67	1.3	0.63	1.9	0.64	2.6	0.66
2004	78	3.9	0.66	1.5	0.64	2.3	0.65	3.2	0.66
2005	60	3.0	0.53	1.2	0.51	1.8	0.52	2.4	0.51
2006	65	3.2	0.52	1.1	0.45	1.8	0.47	2.6	0.52
2007	76	3.3	0.55	1.1	0.48	1.8	0.51	2.5	0.55
2008	80	3.4	0.59	1.3	0.55	2.0	0.56	2.7	0.57
2009	84	3.6	0.65	1.4	0.64	2.1	0.65	2.7	0.65
2010	93	4.0	0.91	1.4	0.80	2.1	0.82	2.9	0.90
2011	77	3.3	0.77	1.2	0.73	1.9	0.74	2.6	0.77
1998-2011	859	3.3	0.62	1.2	0.57	1.9	0.58	2.6	0.61

Table 13

Age distribution of age at death (cancer-related) for period 1998-2011
(**incl. multiple primaries**)

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
25-29	1	0.1	0.1	1	0.1	0.1			0.0
30-34	1	0.1	0.1	1	0.1	0.2			0.0
35-39	6	0.3	0.4	5	0.5	0.7	1	0.1	0.1
40-44	14	0.8	1.2	10	1.0	1.7	4	0.5	0.6
45-49	22	1.2	2.4	17	1.7	3.5	5	0.6	1.2
50-54	43	2.3	4.8	25	2.6	6.1	18	2.1	3.3
55-59	84	4.6	9.3	45	4.6	10.7	39	4.5	7.8
60-64	177	9.7	19.0	108	11.1	21.8	69	8.0	15.8
65-69	299	16.3	35.3	167	17.2	39.0	132	15.4	31.2
70-74	361	19.7	55.1	192	19.8	58.7	169	19.7	50.9
75-79	325	17.7	72.8	174	17.9	76.6	151	17.6	68.5
80-84	283	15.5	88.3	127	13.1	89.7	156	18.2	86.6
85+	215	11.7	100.0	100	10.3	100.0	115	13.4	100.0
All ages	1831	100.0		972	100.0		859	100.0	

Included in the statistics are 29.8% multiple primaries in males and 22.9% in females.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2011
(**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			0.0		0.0			
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24			0.0		0.0			
25-29	1		0.1	0.50	0.0		1.1	
30-34	1		0.1	0.17	0.0		0.6	
35-39	5	1	0.2	0.38	0.0	0.14	1.4	0.2
40-44	10	4	0.4	0.36	0.2	0.25	1.3	0.4
45-49	17	5	0.9	0.22	0.3	0.18	1.1	0.3
50-54	25	18	1.5	0.40	1.0	0.38	0.9	0.7
55-59	45	39	2.9	0.35	2.4	0.41	0.9	1.0
60-64	108	69	7.1	0.56	4.3	0.50	1.4	1.2
65-69	167	132	12.3	0.57	8.9	0.62	1.6	1.9
70-74	192	169	18.6	0.67	13.7	0.84	1.7	2.1
75-79	174	151	25.7	0.66	15.2	0.63	1.6	1.7
80-84	127	156	31.3	0.80	19.6	0.72	1.4	1.6
85+	100	115	36.1	0.75	15.5	0.61	1.4	1.0
All ages	972	859					1.4	1.4
Mortality								
Raw			3.9	0.59	3.3	0.62		
WS			1.9	0.56	1.2	0.57		
ES			3.0	0.58	1.9	0.58		
BRD-S			4.1	0.61	2.6	0.61		
PYLL-70								
per 100,000			13.8		8.4			
ES			11.8		6.9			
AYLL-70			8.3		7.1			

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 ←%
C16	Stomach	9	2.9	5	55.6	2	22.2	2	22.2
C18	Colon	14	4.6	5	35.7	3	21.4	6	42.9
C19-C20	Rectum	17	5.6	9	52.9	3	17.6	5	29.4
C22	Liver	7	2.3	1	14.3	1	14.3	5	71.4
C25	Pancreas	6	2.0			1	16.7	5	83.3
C32	Larynx	4	1.3	2	50.0			2	50.0
C33-C34	Lung	14	4.6	3	21.4	2	14.3	9	64.3
C40-C41	Bone	5	1.6			1	20.0	4	80.0
C43	Malign. melanoma	17	5.6	12	70.6	1	5.9	4	23.5
C44	Skin others	26	8.5	14	53.8			12	46.2
C46,C49	Soft tissue	4	1.3	2	50.0			2	50.0
C61	Prostate	73	23.9	49	67.1	6	8.2	18	24.7
C62	Testis	3	1.0	2	66.7	1	33.3		
C64	Kidney	19	6.2	9	47.4	4	21.1	6	31.6
C67	Bladder	11	3.6	5	45.5			6	54.5
C70-C72	CNS cancer	7	2.3	2	28.6	2	28.6	3	42.9
C76-C79	CUP	4	1.3					4	100.0
C82-C85	NHL	18	5.9			5	27.8	13	72.2
C90	Mult. myeloma	20	6.5			5	25.0	15	75.0
C91-C96	Leukaemia	11	3.6	2	18.2	1	9.1	8	72.7
Other primaries		17	5.6	7	41.2			10	58.8
All mult. primaries		306	100.0	129	42.2	38	12.4	139	45.4

Multiple primaries with number of cases n<3 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 1998-2011
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03-C06	Oral cavity	2	1.0	1	50.0			1	50.0
C16	Stomach	4	1.9			1	25.0	3	75.0
C18	Colon	15	7.2	10	66.7			5	33.3
C19-C20	Rectum	12	5.8	9	75.0	1	8.3	2	16.7
C25	Pancreas	4	1.9			1	25.0	3	75.0
C33-C34	Lung	7	3.4	3	42.9	1	14.3	3	42.9
C43	Malign. melanoma	10	4.8	7	70.0			3	30.0
C44	Skin others	9	4.3	3	33.3	1	11.1	5	55.6
C50	Breast	64	30.9	52	81.3	4	6.3	8	12.5
C51	Vulva	2	1.0	2	100.0				
C53	Cervix uteri	3	1.4	3	100.0				
C54	Corpus uteri	5	2.4	4	80.0			1	20.0
C56	Ovary	6	2.9	2	33.3	1	16.7	3	50.0
C64	Kidney	4	1.9	4	100.0				
C67	Bladder	4	1.9	1	25.0	1	25.0	2	50.0
C70-C72	CNS cancer	7	3.4	6	85.7			1	14.3
C76-C79	CUP	4	1.9	1	25.0	1	25.0	2	50.0
C82-C85	NHL	10	4.8			3	30.0	7	70.0
C90	Mult. myeloma	16	7.7			1	6.3	15	93.8
C91-C96	Leukaemia	10	4.8	3	30.0	3	30.0	4	40.0
Other primaries		9	4.3	4	44.4			5	55.6
All mult. primaries		207	100.0	115	55.6	19	9.2	73	35.3

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** *)

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			0.0		0.0			
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24			0.0		0.0			
25-29	1		0.1	0.50	0.0		1.2	
30-34	1		0.1	0.20	0.0		0.6	
35-39	4	1	0.2	0.33	0.0	0.14	1.2	0.2
40-44	9	4	0.4	0.33	0.2	0.25	1.3	0.5
45-49	15	4	0.8	0.21	0.2	0.17	1.1	0.3
50-54	24	17	1.4	0.43	1.0	0.40	1.0	0.8
55-59	43	34	2.8	0.38	2.1	0.39	1.0	1.0
60-64	99	61	6.5	0.59	3.8	0.52	1.5	1.3
65-69	142	111	10.4	0.57	7.5	0.65	1.7	1.9
70-74	166	144	16.1	0.71	11.7	0.84	1.9	2.2
75-79	139	127	20.6	0.71	12.8	0.64	1.7	1.8
80-84	94	126	23.1	0.82	15.8	0.69	1.4	1.6
85+	79	96	28.5	0.76	12.9	0.61	1.4	1.0
All ages	816	725					1.5	1.5
Mortality								
Raw			3.2	0.60	2.8	0.62		
WS			1.6	0.57	1.0	0.57		
ES			2.5	0.59	1.6	0.59		
BRD-S			3.4	0.62	2.2	0.61		
PYLL-70								
per 100,000			12.5		7.5			
ES			10.8		6.2			
AYLL-70			8.4		7.3			

* 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** *)

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			0.0		0.0			
5- 9			0.0		0.0			
10-14			0.0		0.0			
15-19			0.0		0.0			
20-24			0.0		0.0			
25-29	1		0.1	0.50	0.0		1.3	
30-34	1		0.1	0.20	0.0		0.6	
35-39	4	1	0.2	0.33	0.0	0.14	1.2	0.3
40-44	8	4	0.4	0.30	0.2	0.27	1.2	0.5
45-49	15	4	0.8	0.22	0.2	0.18	1.1	0.3
50-54	23	15	1.4	0.46	0.9	0.37	1.0	0.8
55-59	38	34	2.4	0.37	2.1	0.43	0.9	1.1
60-64	87	55	5.7	0.56	3.4	0.51	1.5	1.4
65-69	123	103	9.0	0.56	6.9	0.63	1.7	2.1
70-74	150	136	14.5	0.69	11.0	0.83	2.0	2.5
75-79	126	115	18.6	0.70	11.6	0.61	1.8	1.9
80-84	78	119	19.2	0.74	15.0	0.67	1.5	1.8
85+	69	91	24.9	0.70	12.3	0.59	1.5	1.1
All ages	723	677					1.6	1.6
Mortality								
Raw			2.9	0.58	2.6	0.60		
WS			1.5	0.55	1.0	0.56		
ES			2.2	0.57	1.5	0.58		
BRD-S			3.0	0.60	2.0	0.59		
PYLL-70								
per 100,000			11.5		7.0			
ES			9.9		5.8			
AYLL-70			8.7		7.4			

* See corresponding tables with multiple primaries.

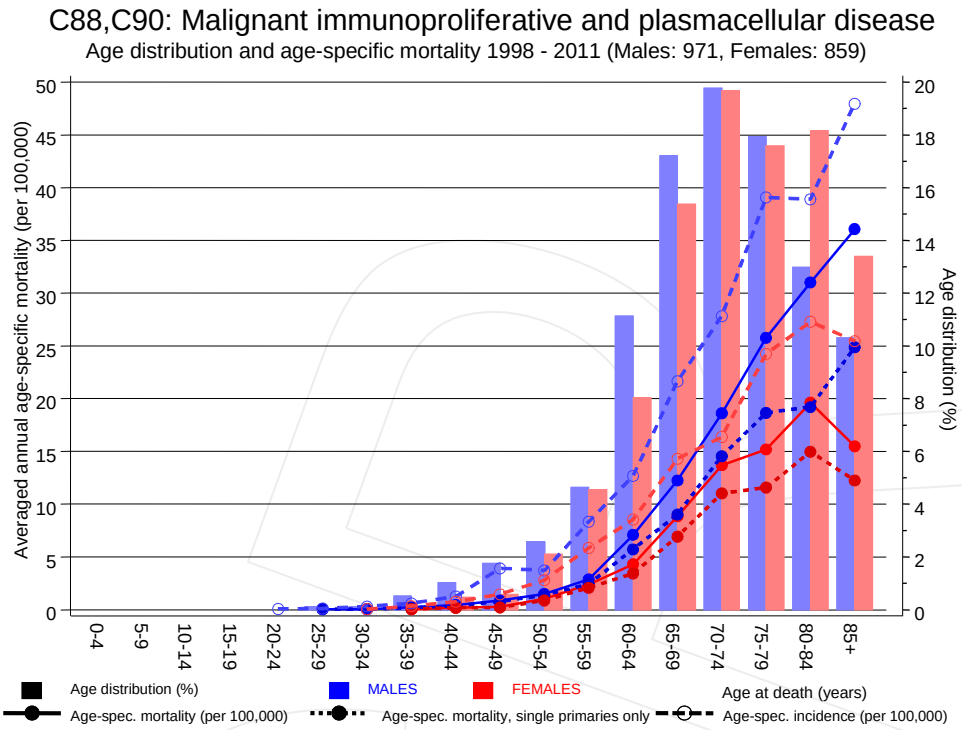
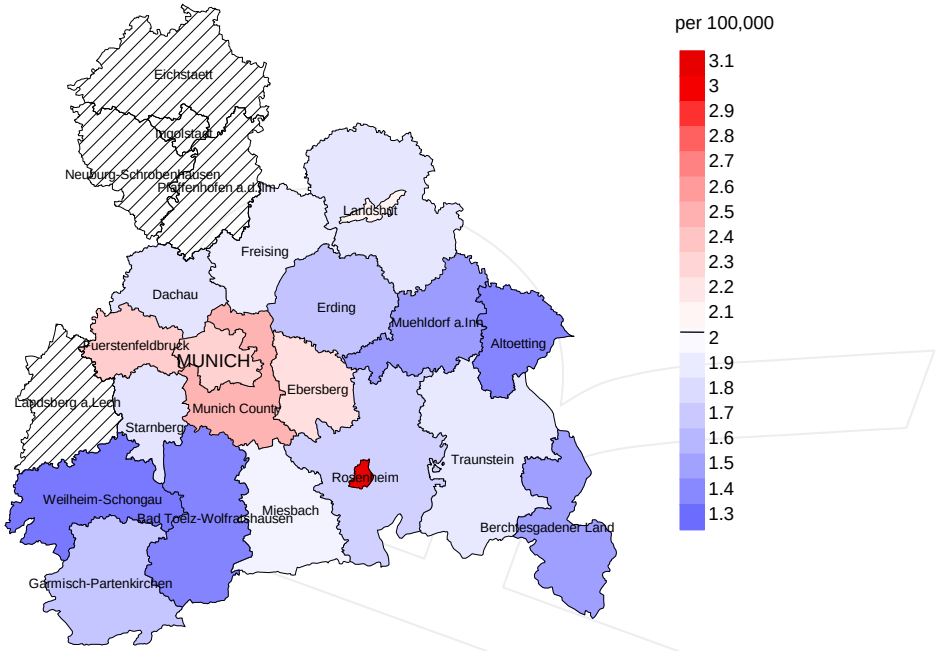


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

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



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

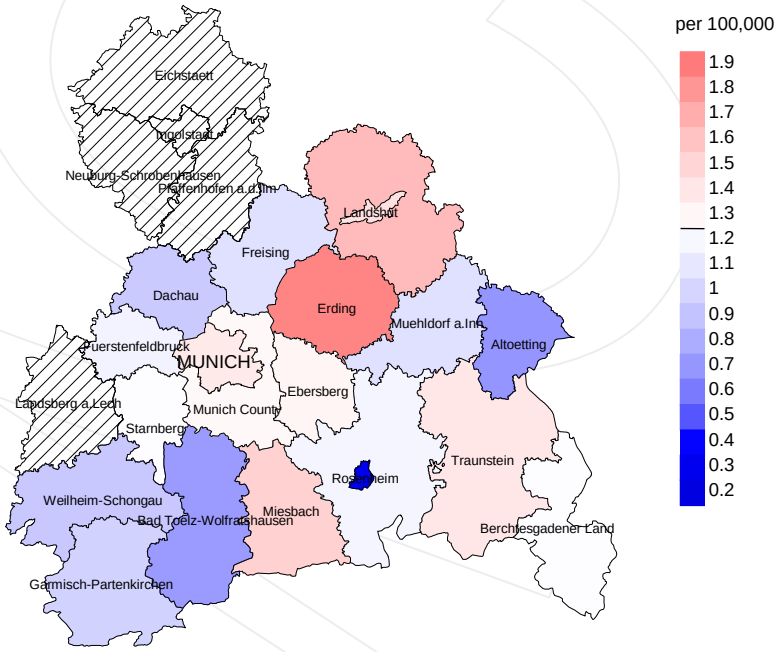
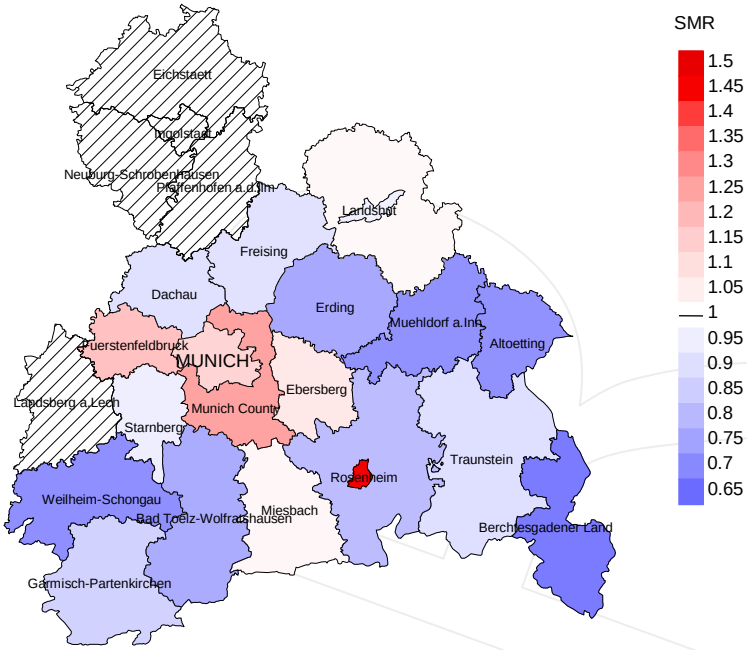


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 2.0/100,000 WS N=476, females 1.2/100,000 WS N=411). 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 12 women died from immunoprolif. disease. 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 0.5 and 2.9/100,000.

Standardized mortality ratio (SMR) 2003 - 2008: Males



Standardized mortality ratio (SMR) 2003 - 2008: Females

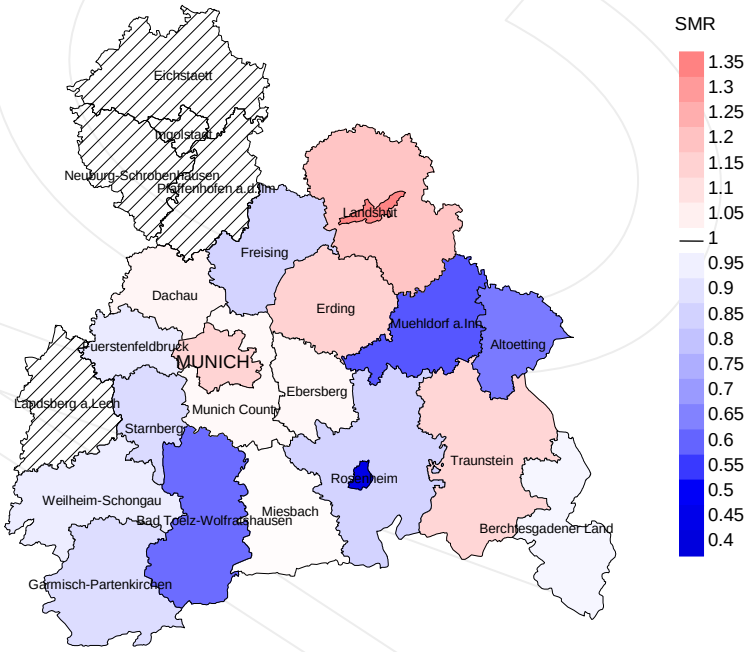


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=476, females N=411). 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 12 women died from immunoprolif. disease. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.02. Though, the value of this parameter may vary with an underlying probability of 99% between 0.42 and 2.06, 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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