Munich Cancer Registry

- Survival
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- Homepage

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

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

Cancer statistics: Baseline statistics

C90: Plasmacytoma

Year of diagnosis	1998-2012
Patients	3,244
Diseases	3,246
Creation date	03/20/2014
Export date	02/12/2014
Population	4.5 m

http://www.tumorregister-muenchen.de/en/facts/base/base_C90__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, March 2014

[#] 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 2013 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 plasmacytomas 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.

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	124	30	24.2	18.5	88.7	98.4	
1999	128	27	21.1	22.7	91.4	99.2	
2000	132	39	29.5	14.4	95.5	99.2	
2001	112	33	29.5	26.8	92.0	99.1	
2002	234	76	32.5	22.2	84.6	98.7	#
2003	231	58	25.1	22.5	85.3	97.4	#
2004	234	65	27.8	24.8	83.3	98.7	#
2005	229	46	20.1	27.1	79.0	97.8	#
2006	234	41	17.5	23.5	74.4	98.7	#
2007	305	66	21.6	23.0	75.4	91.5	# ##
2008	311	57	18.3	20.6	67.5	80.1	
2009	266	41	15.4	22.2	62.0	86.1	
2010	256	48	18.8	26.2	54.7	77.3	
2011	273	59	21.6	23.8	47.6	85.0	
2012	177	40	22.6	27.7	40.1	99.4	###
1998-2012	3246	726	22.4	23.2	72.3	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	124	73	51	58.9
1999	128	65	63	50.8
2000	132	78	54	59.1
2001	112	54	58	48.2
2002	234	123	111	52.6
2003	231	138	93	59.7
2004	234	120	114	51.3
2005	229	118	111	51.5
2006	234	119	115	50.9
2007	305	168	137	55.1
2008	311	174	137	55.9
2009	266	135	131	50.8
2010	256	151	105	59.0
2011	273	149	124	54.6
2012	177	93	84	52.5
1998-2012	3246	1758	1488	54.2

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	73	51	6.6	4.3	4.1	2.0	5.9	2.9	7.3	3.6
1999	65	63	5.8	5.3	3.6	2.2	5.3	3.3	7.0	4.4
2000	78	54	6.8	4.5	3.8	1.9	6.1	2.9	8.5	3.8
2001	54	58	4.7	4.8	2.7	2.2	4.2	3.2	5.7	4.2
2002	123	111	6.6	5.7	3.7	2.3	5.6	3.5	7.3	4.6
2003	138	93	7.4	4.7	4.0	2.0	6.0	3.0	7.8	3.9
2004	120	114	6.4	5.8	3.5	2.3	5.3	3.4	6.8	4.6
2005	118	111	6.2	5.6	3.1	2.2	4.8	3.4	6.5	4.6
2006	119	115	6.2	5.7	3.2	2.2	4.8	3.4	6.3	4.5
2007	168	137	7.6	5.9	3.8	2.3	5.8	3.5	7.8	4.6
2008	174	137	7.8	5.9	3.9	2.3	5.8	3.6	7.5	4.9
2009	135	131	6.0	5.6	2.9	2.1	4.3	3.2	5.6	4.2
2010	151	105	6.7	4.5	3.3	1.7	4.9	2.6	6.4	3.4
2011	149	124	6.5	5.3	2.9	2.1	4.5	3.2	6.1	4.1
2012	93	84	4.1	3.6	1.8	1.3	2.8	2.0	3.8	2.8
1998-2012	1758	1488	6.4	5.2	3.3	2.1	5.0	3.1	6.6	4.1

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 diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	124	67.3	12.9	26.1	94.0	52.7	58.7	67.7	75.6	84.9
1999	128	69.4	13.0	23.9	92.8	53.2	60.1	70.9	78.7	85.6
2000	132	71.7	11.7	38.2	94.4	55.7	64.6	72.6	79.6	85.8
2001	112	68.8	11.1	36.1	93.7	50.9	61.3	70.1	77.1	81.2
2002	234	70.9	12.1	32.7	93.5	55.9	62.7	71.8	79.9	86.3
2003	231	69.7	11.2	31.4	99.0	55.8	62.2	69.5	78.3	83.7
2004	234	70.7	11.7	37.1	93.4	55.9	63.4	70.8	79.4	84.5
2005	229	71.8	11.0	38.9	102	56.6	65.2	73.2	79.6	84.7
2006	234	71.2	11.8	27.5	94.9	56.0	65.1	71.5	79.6	85.3
2007	305	71.5	10.9	30.9	93.2	58.6	65.2	72.0	80.2	85.2
2008	311	71.3	11.7	33.8	97.9	56.4	65.6	72.1	79.5	85.2
2009	266	71.9	11.2	34.7	94.6	57.2	66.0	72.0	80.2	85.7
2010	256	71.2	12.5	5.0	97.2	54.0	64.4	72.4	79.9	86.3
2011	273	71.7	12.1	33.3	97.4	53.8	66.3	73.2	79.8	85.4
2012	177	72.5	11.5	44.0	97.5	54.8	66.1	73.1	81.1	86.6
1998-2012	3246	71.0	11.7	5.0	102	55.3	63.9	71.8	79.5	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	73	64.8	13.4	26.1	92.3	49.5	56.2	64.7	73.6	83.9
1999	65	66.5	13.5	23.9	91.7	48.5	58.5	68.2	76.8	83.7
2000	78	70.9	11.5	38.2	92.3	55.6	61.6	71.6	79.5	86.5
2001	54	67.3	10.7	44.4	85.3	49.1	59.2	69.6	76.0	78.5
2002	123	69.1	12.0	32.7	93.5	54.4	62.1	69.7	78.0	83.6
2003	138	68.4	10.2	36.7	99.0	55.2	61.8	68.0	75.8	81.6
2004	120	68.6	12.2	37.1	93.4	51.4	60.7	69.6	76.4	83.6
2005	118	70.8	11.0	38.9	102	56.6	65.2	71.1	78.0	84.5
2006	119	69.4	12.0	27.5	94.8	53.7	63.8	69.7	76.9	84.4
2007	168	70.1	11.4	30.9	93.2	55.9	63.5	70.9	79.3	82.9
2008	174	70.0	12.2	33.8	97.9	52.3	64.9	70.5	78.7	85.2
2009	135	70.1	10.6	34.7	89.4	54.9	65.3	71.1	77.7	83.8
2010	151	69.7	12.7	5.0	93.0	51.9	63.8	71.0	78.2	84.7
2011	149	71.3	11.7	33.3	97.4	51.6	67.9	73.0	78.7	84.2
2012	93	71.5	11.3	44.0	92.5	54.2	65.6	72.1	77.9	85.5
1998-2012	1758	69.5	11.8	5.0	102	53.3	62.9	70.5	77.7	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	51	70.7	11.5	37.6	94.0	57.6	62.1	70.7	78.6	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	111	73.0	11.9	38.9	93.2	56.3	63.7	74.3	82.6	87.8
2003	93	71.7	12.4	31.4	94.2	55.8	63.8	72.6	80.4	85.6
2004	114	72.8	10.7	38.8	92.1	58.0	66.4	73.7	81.6	84.5
2005	111	72.9	11.0	42.1	96.8	56.7	65.3	74.8	81.8	84.7
2006	115	73.0	11.3	40.7	94.9	59.7	66.3	74.3	81.9	85.7
2007	137	73.3	10.0	44.4	92.3	60.9	66.9	73.1	81.8	86.5
2008	137	72.9	10.8	37.5	94.3	58.8	66.4	74.3	81.0	85.5
2009	131	73.9	11.5	36.3	94.6	60.6	67.6	73.8	83.8	87.1
2010	105	73.2	11.9	40.5	97.2	56.2	66.5	73.5	82.2	87.3
2011	124	72.2	12.6	41.9	97.1	54.5	63.3	73.9	82.0	87.8
2012	84	73.6	11.7	46.7	97.5	55.8	66.5	75.5	83.4	87.3
1998-2012	1488	72.7	11.4	31.4	97.5	56.9	65.7	73.8	81.5	86.3

Table 4

Age distribution by 5-year age group and gender for period 1998-2012 (incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4	1	0.0	0.0	1	0.1	0.1			0.0
5-9	0	0.0	0.0			0.1			0.0
10-14	0	0.0	0.0			0.1			0.0
15-19	0	0.0	0.0			0.1			0.0
20-24	1	0.0	0.1	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	0.3	0.6	1	0.1	0.1
35-39	21	0.6	1.0	14	0.8	1.4	7	0.5	0.5
40-44	46	1.4	2.4	31	1.8	3.1	15	1.0	1.5
45-49	110	3.4	5.8	79	4.5	7.6	31	2.1	3.6
50-54	121	3.7	9.5	69	3.9	11.5	52	3.5	7.1
55-59	231	7.1	16.6	125	7.1	18.7	106	7.1	14.2
60-64	341	10.5	27.1	205	11.7	30.3	136	9.1	23.4
65-69	532	16.4	43.5	305	17.3	47.7	227	15.3	38.6
70-74	540	16.6	60.2	324	18.4	66.1	216	14.5	53.2
75-79	537	16.5	76.7	277	15.8	81.9	260	17.5	70.6
80-84	411	12.7	89.4	177	10.1	91.9	234	15.7	86.4
85+	345	10.6	100.0	142	8.1	100.0	203	13.6	100.0
All ages	3246	100.0		1758	100.0		1488	100.0	

Included in the statistics are 30.7% multiple primaries in males and 24.8% in females.

Table 5

Age-specific incidence, DCO rate and proportion of all cancers
for period 1998-2012

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=353 %	Females DCO rate n=372 %	Males Prop.all cancers n=146755 %	Females Prop.all cancers n=142297 %
0- 4	1		0.1	0.0			0.3	
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	0.0			0.4	0.1
35-39	14	7	0.6	0.3	7.1	14.3	0.7	0.2
40-44	31	15	1.3	0.7			1.0	0.3
45-49	79	31	3.7	1.5	5.1		1.6	0.4
50-54	69	52	3.7	2.8	5.8	5.8	0.9	0.5
55-59	125	106	7.4	5.9	4.0	2.8	0.9	0.8
60-64	205	136	12.4	7.8	8.8	8.1	1.0	0.8
65-69	305	227	20.8	14.2	12.1	13.7	1.2	1.3
70-74	324	216	28.0	15.7	17.0	17.1	1.3	1.3
75-79	277	260	36.8	23.8	24.5	22.7	1.5	1.6
80-84	177	234	39.0	27.1	42.4	38.0	1.4	1.6
85+	142	202	45.8	24.7	60.6	68.3	1.5	1.3
All ages	1758	1487			20.1	25.0	1.2	1.0
Incidence								
Raw			6.4	5.2				
WS			3.3	2.1				
ES			5.0	3.1				
BRD-S			6.6	4.1				

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 1998-2012
MALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C15	Oesophagus	4	1.0	4.1	1.1	10.5	#	9.4	25.0
C16	Stomach	5	2.2	2.2	0.7	5.2		8.6	
C18	Colon	7	5.3	1.3	0.5	2.7		5.2	
C19-C20	Rectum	6	3.1	1.9	0.7	4.2		9.0	
C22	Liver	2	1.5	1.3	0.2	4.8		1.5	50.0
C25	Pancreas	2	1.9	1.1	0.1	3.8		0.4	50.0
C33-C34	Lung	12	6.5	1.8	1.0	3.2		17.0	8.3
C40-C41	Bone	3	0.0	71.4	14.7	208.6	#	9.2	
C43	Malign. melanoma	4	2.1	1.9	0.5	4.9		5.9	
C61	Prostate	34	16.5	2.1	1.4	2.9	#	54.2	2.9
C64	Kidney	5	1.9	2.6	0.8	6.0		9.5	
C67	Bladder	3	2.3	1.3	0.3	3.8		2.2	
C70-C72	CNS cancer	2	0.7	2.8	0.3	10.0		4.0	
C73	Thyroid	2	0.4	5.6	0.7	20.1		5.1	
C76-C79	CUP	3	0.9	3.3	0.7	9.7		6.5	
C82-C85	NHL	16	2.1	7.6	4.3	12.3	#	43.1	6.3
C91-C96	Leukaemia	6	0.8	7.3	2.7	15.8	#	16.1	
Other primaries		7	2.9	2.4	1.0	5.0		12.7	14.3
Not observed		0	2.9	0.0	0.0	1.3		-8.9	
All mult. primaries		123	55.2	2.2	1.9	2.7	#	210.7	5.7

Patients	1038
Mean age at second malignancy (years)	71.5
Person-years	3221
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 1998-2012
FEMALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C16	Stomach	3	1.1	2.8	0.6	8.1		7.7	
C18	Colon	4	3.0	1.3	0.4	3.4		4.0	
C25	Pancreas	2	1.3	1.6	0.2	5.6		2.9	50.0
C33-C34	Lung	2	2.1	0.9	0.1	3.4		-0.5	
C43	Malign. melanoma	4	1.0	4.0	1.1	10.1	#	12.0	
C50	Breast	12	9.0	1.3	0.7	2.3		12.0	8.3
C56	Ovary	3	1.3	2.4	0.5	6.9		7.0	33.3
C73	Thyroid	2	0.5	3.8	0.5	13.9		5.9	
C76-C79	CUP	2	0.5	4.0	0.5	14.3		6.0	
C82-C85	NHL	9	1.2	7.8	3.6	14.8	#	31.5	22.2
C91-C96	Leukaemia	4	0.5	8.6	2.3	22.0	#	14.2	
Other primaries		13	4.2	3.1	1.6	5.2	#	35.1	15.4
Not observed		0	4.2	0.0	0.0	0.9	#	-17.0	
All mult. primaries		60	29.9	2.0	1.5	2.6	#	120.8	11.7

Patients	840
Mean age at second malignancy (years)	72.5
Person-years	2493
Mean observation time (years)	3.0
Median observation time (years)	2.0

The occurrence of second malignancy is statistically significant.

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

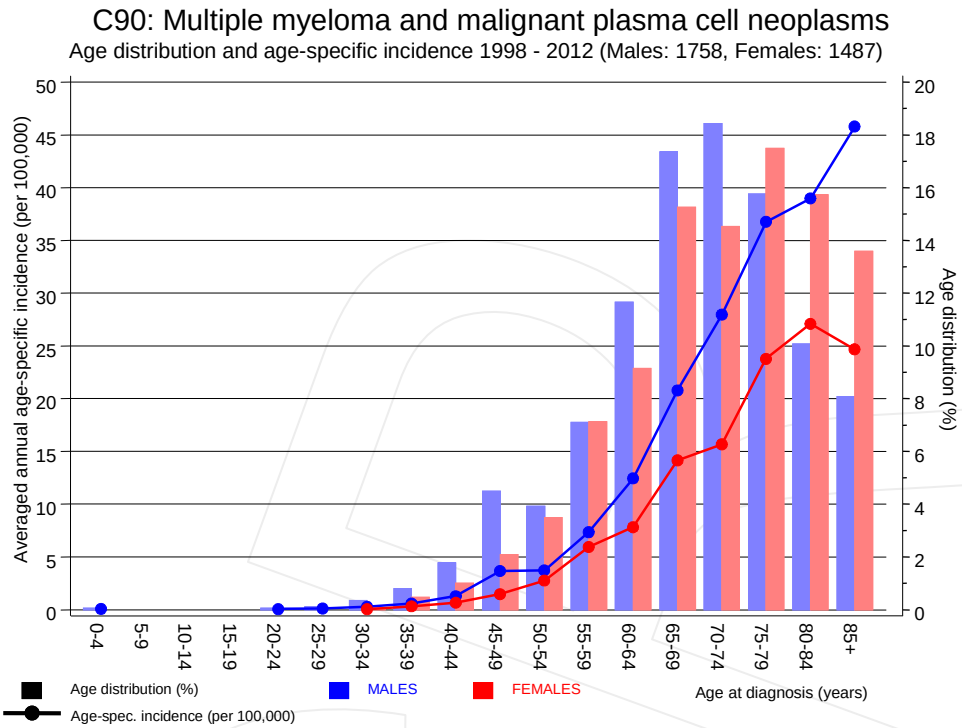


Figure 7. Age distribution and age-specific incidence

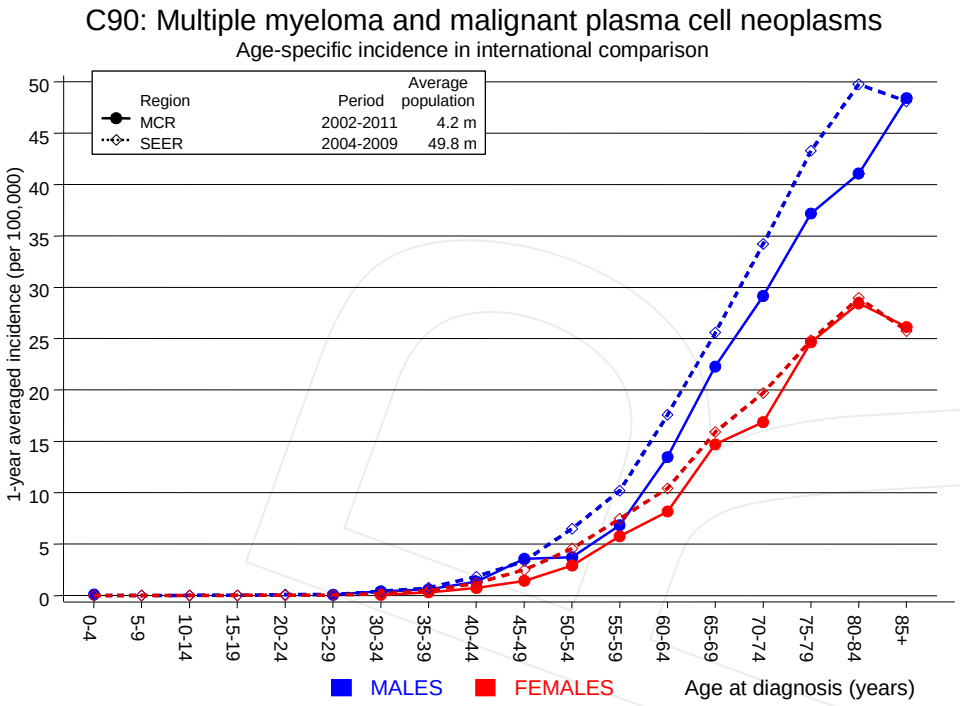


Figure 7a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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.

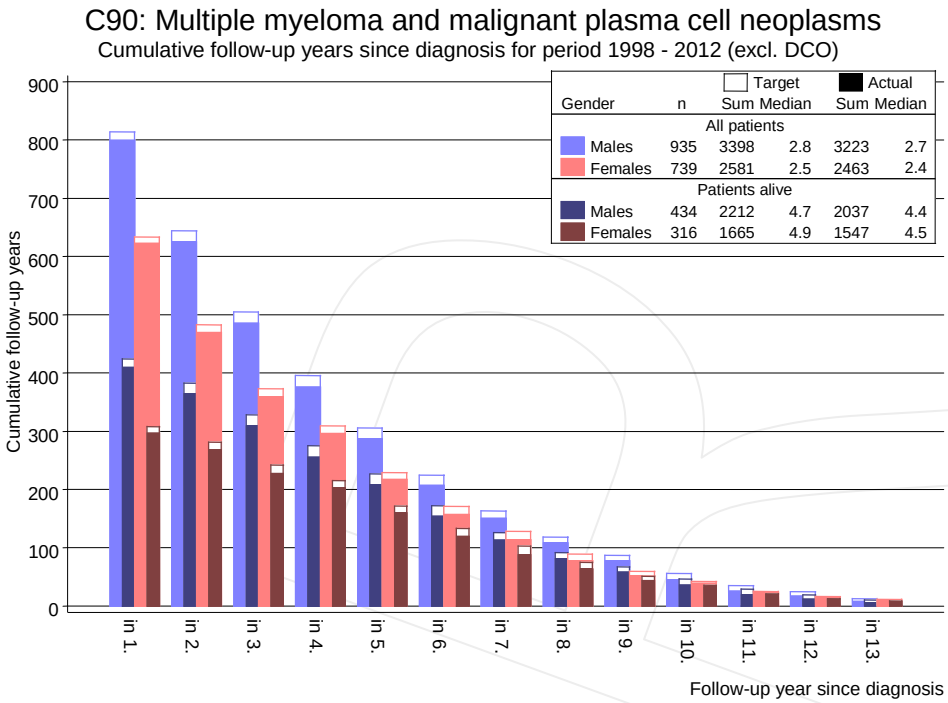
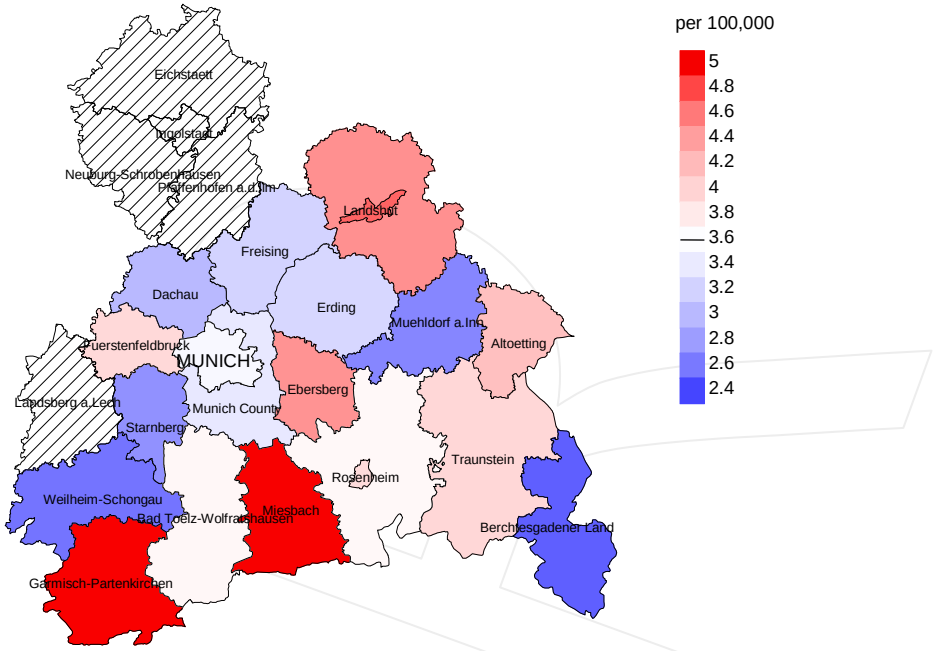


Figure 8. Cumulative follow-up years depending on time since diagnosis

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

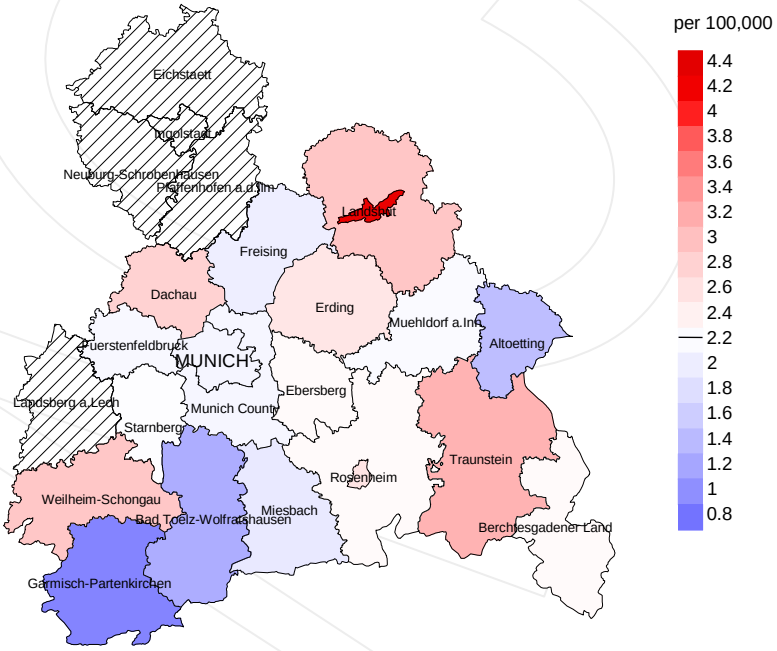
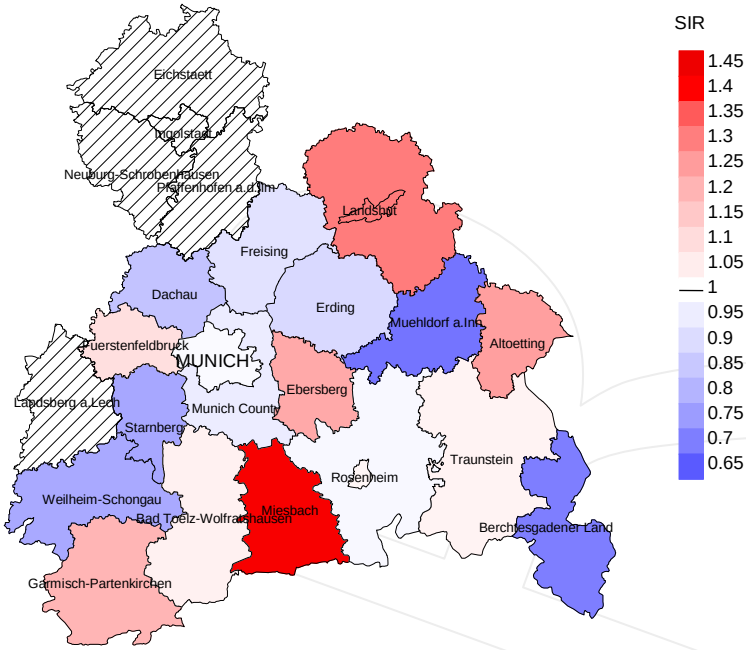


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 3.6/100,000 WS N=802, females 2.2/100,000 WS N=675). 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 plasmacytoma. 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

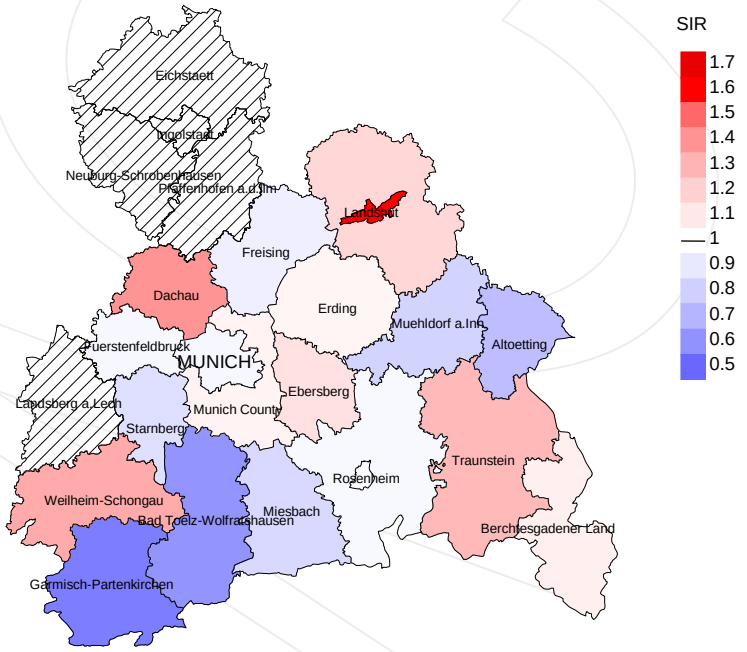


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=802, females N=675). 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 plasmacytoma. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.13. Though, the value of this parameter may vary with an underlying probability of 99% between 0.60 and 1.91, 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	124	98.4	24.2	110	88.7	93.6
1999	128	99.2	21.1	117	91.4	94.0
2000	132	99.2	29.5	126	95.5	95.2
2001	112	99.1	29.5	103	92.0	96.1
2002	234	98.7	32.5	198	84.6	98.0
2003	231	97.4	25.1	197	85.3	98.0
2004	234	98.7	27.8	195	83.3	98.5
2005	229	97.8	20.1	181	79.0	98.9
2006	234	98.7	17.5	174	74.4	98.3
2007	305	91.5	21.6	230	75.4	98.3
2008	311	80.1	18.3	210	67.5	99.0
2009	266	86.1	15.4	165	62.0	97.0
2010	256	77.3	18.8	140	54.7	98.6
2011	273	85.0	21.6	130	47.6	100.0
2012	177	99.4	22.6	71	40.1	98.6
1998-2012	3246	92.3	22.4	2347	72.3	97.7

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	124	84	92.9	35	28.2
1999	128	97	95.9	41	32.0
2000	132	110	91.8	45	34.1
2001	112	101	95.0	36	32.1
2002	234	143	95.8	87	37.2
2003	231	162	99.4	79	34.2
2004	234	193	98.4	91	38.9
2005	229	148	98.0	66	28.8
2006	234	154	97.4	67	28.6
2007	305	183	98.9	90	29.5
2008	311	214	97.7	83	26.7
2009	266	214	97.2	71	26.7
2010	256	223	99.1	74	28.9
2011	273	232	98.7	83	30.4
2012	177	195	99.0	57	32.2
1998-2012	3246	2453	97.5	1005	31.0

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	97	75.3	24.7	96.8
2000	110	65.5	34.5	97.0
2001	101	60.4	39.6	99.0
2002	143	81.1	18.9	97.1
2003	162	80.9	19.1	96.9
2004	193	83.4	16.6	96.8
2005	148	83.1	16.9	95.2
2006	154	84.4	15.6	96.7
2007	183	85.8	14.2	95.6
2008	214	85.0	15.0	92.3
2009	214	82.2	17.8	96.6
2010	223	83.0	17.0	90.5
2011	232	81.9	18.1	93.0
2012	195	85.1	14.9	93.3
1998-2012	2453	80.2	19.8	95.0

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	50	71.6	70.3	75.9	71.8
2000	62	72.0	70.4	74.6	72.8
2001	46	74.1	73.7	74.9	74.5
2002	73	70.7	70.9	70.0	71.0
2003	83	72.2	71.6	74.7	72.1
2004	103	72.4	71.4	76.6	72.8
2005	76	73.6	73.2	75.8	73.5
2006	80	72.2	71.6	75.1	71.9
2007	94	73.4	72.8	78.0	73.4
2008	123	73.2	72.0	81.4	72.8
2009	113	73.4	72.8	75.9	73.7
2010	117	73.8	73.6	74.8	73.3
2011	128	74.6	73.8	80.1	74.6
2012	98	74.0	73.4	78.0	74.4
1998-2012	1281	73.0	72.3	76.1	73.1

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

Table 11b

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	48	76.4	75.7	78.1	76.2
2001	55	74.7	72.2	78.0	74.0
2002	70	75.6	74.5	81.9	75.8
2003	79	75.0	73.7	80.2	74.9
2004	90	74.6	73.8	79.5	74.6
2005	72	75.4	73.4	85.7	74.8
2006	74	75.4	75.4	75.3	75.5
2007	89	76.9	76.3	79.5	76.8
2008	91	75.2	74.0	80.3	74.7
2009	101	74.9	73.4	81.7	74.7
2010	106	75.9	75.5	78.3	75.7
2011	104	76.0	73.7	82.9	75.4
2012	97	76.1	75.3	80.0	75.4
1998-2012	1172	75.7	74.5	80.1	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	0.28
1999	38	3.4	0.58	2.1	0.57	3.1	0.59	4.3	0.62
2000	39	3.4	0.50	1.9	0.49	3.0	0.50	4.5	0.53
2001	30	2.6	0.56	1.4	0.49	2.2	0.54	3.4	0.61
2002	57	3.1	0.46	1.7	0.45	2.6	0.46	3.5	0.48
2003	68	3.6	0.49	1.9	0.47	2.9	0.49	4.0	0.52
2004	84	4.5	0.70	2.3	0.65	3.6	0.67	4.8	0.72
2005	63	3.3	0.53	1.6	0.53	2.6	0.55	3.6	0.56
2006	67	3.5	0.56	1.7	0.51	2.6	0.54	3.6	0.58
2007	84	3.8	0.50	1.8	0.47	2.9	0.49	4.0	0.52
2008	108	4.9	0.62	2.4	0.61	3.6	0.63	4.8	0.64
2009	93	4.2	0.69	1.9	0.67	3.0	0.70	4.0	0.71
2010	94	4.2	0.62	1.8	0.53	2.8	0.58	3.9	0.62
2011	112	4.9	0.75	2.1	0.71	3.3	0.74	4.7	0.78
2012	84	3.7	0.90	1.6	0.85	2.5	0.87	3.5	0.93
1998-2012	1043	3.8	0.59	1.8	0.56	2.9	0.58	4.0	0.61

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	0.45	0.9	0.45	1.3	0.45	1.7	0.46
1999	35	2.9	0.56	1.1	0.49	1.7	0.51	2.4	0.54
2000	33	2.7	0.61	1.0	0.55	1.6	0.56	2.2	0.59
2001	31	2.5	0.53	1.1	0.49	1.7	0.52	2.3	0.54
2002	59	3.0	0.53	1.2	0.52	1.8	0.51	2.4	0.52
2003	63	3.2	0.68	1.3	0.64	1.9	0.65	2.6	0.67
2004	77	3.9	0.68	1.5	0.66	2.3	0.67	3.2	0.68
2005	60	3.0	0.54	1.2	0.52	1.8	0.53	2.4	0.53
2006	63	3.1	0.55	1.1	0.49	1.7	0.51	2.5	0.56
2007	73	3.2	0.54	1.1	0.46	1.7	0.49	2.4	0.53
2008	74	3.2	0.54	1.2	0.50	1.8	0.51	2.5	0.52
2009	83	3.6	0.63	1.4	0.65	2.1	0.64	2.7	0.64
2010	91	3.9	0.87	1.3	0.77	2.1	0.79	2.8	0.84
2011	78	3.3	0.63	1.2	0.58	1.9	0.59	2.6	0.62
2012	82	3.5	0.98	1.2	0.93	1.9	0.94	2.5	0.90
1998-2012	925	3.2	0.62	1.2	0.58	1.9	0.59	2.5	0.61

Table 13

Age distribution of age at death (cancer-related) for period 1998-2012
(**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	2	0.1	0.2	2	0.2	0.3			0.0
35-39	6	0.3	0.5	5	0.5	0.8	1	0.1	0.1
40-44	15	0.8	1.2	11	1.1	1.8	4	0.4	0.5
45-49	23	1.2	2.4	18	1.7	3.5	5	0.5	1.1
50-54	50	2.5	4.9	28	2.7	6.2	22	2.4	3.5
55-59	91	4.6	9.5	46	4.4	10.6	45	4.9	8.3
60-64	184	9.3	18.9	114	10.9	21.6	70	7.6	15.9
65-69	311	15.8	34.7	170	16.3	37.8	141	15.2	31.1
70-74	389	19.8	54.4	207	19.8	57.7	182	19.7	50.8
75-79	354	18.0	72.4	192	18.4	76.1	162	17.5	68.3
80-84	303	15.4	87.8	143	13.7	89.8	160	17.3	85.6
85+	240	12.2	100.0	107	10.2	100.0	133	14.4	100.0
All ages	1969	100.0		1044	100.0		925	100.0	

Included in the statistics are 30.7% multiple primaries in males and 24.8% in females.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2012
(**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		1.0	
30-34	2		0.1	0.33	0.0		1.1	
35-39	5	1	0.2	0.36	0.0	0.14	1.3	0.2
40-44	11	4	0.5	0.35	0.2	0.27	1.4	0.4
45-49	18	5	0.8	0.23	0.2	0.16	1.1	0.3
50-54	28	22	1.5	0.41	1.2	0.42	0.9	0.8
55-59	46	45	2.7	0.37	2.5	0.42	0.8	1.0
60-64	114	70	6.9	0.56	4.0	0.51	1.4	1.2
65-69	170	141	11.6	0.56	8.8	0.62	1.5	1.8
70-74	207	182	17.9	0.64	13.2	0.84	1.7	2.0
75-79	192	162	25.5	0.69	14.8	0.62	1.6	1.6
80-84	143	160	31.5	0.81	18.5	0.68	1.4	1.5
85+	107	133	34.5	0.75	16.2	0.66	1.3	1.1
All ages	1044	925					1.4	1.4
Mortality								
Raw			3.8	0.59	3.2	0.62		
WS			1.9	0.56	1.2	0.58		
ES			2.9	0.58	1.9	0.59		
BRD-S			4.0	0.61	2.5	0.61		
PYLL-70								
per 100,000			13.5		8.5			
ES			11.5		7.0			
AYLL-70			8.4		7.2			

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

Table 15a

Multiple primaries in deaths in period 1998-2012
MALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C15	Oesophagus	4	1.2	1	25.0	2	50.0	1	25.0
C16	Stomach	9	2.7	5	55.6	2	22.2	2	22.2
C18	Colon	19	5.8	10	52.6	3	15.8	6	31.6
C19-C20	Rectum	18	5.5	9	50.0	3	16.7	6	33.3
C22	Liver	6	1.8	1	16.7	1	16.7	4	66.7
C25	Pancreas	5	1.5			1	20.0	4	80.0
C32	Larynx	3	0.9	2	66.7			1	33.3
C33-C34	Lung	14	4.3	3	21.4	2	14.3	9	64.3
C40-C41	Bone	5	1.5			1	20.0	4	80.0
C43	Malign. melanoma	16	4.9	13	81.3	1	6.3	2	12.5
C44	Skin others	24	7.3	14	58.3			10	41.7
C46,C49	Soft tissue	3	0.9	1	33.3			2	66.7
C61	Prostate	81	24.7	58	71.6	5	6.2	18	22.2
C62	Testis	3	0.9	2	66.7	1	33.3		
C64	Kidney	19	5.8	9	47.4	4	21.1	6	31.6
C67	Bladder	12	3.7	6	50.0			6	50.0
C70-C72	CNS cancer	8	2.4	2	25.0	2	25.0	4	50.0
C76-C79	CUP	5	1.5					5	100.0
C82-C85	NHL	26	7.9	5	19.2	7	26.9	14	53.8
C90	Mult. myeloma	20	6.1			3	15.0	17	85.0
C91-C96	Leukaemia	14	4.3	2	14.3	1	7.1	11	78.6
Other primaries		14	4.3	6	42.9			8	57.1
All mult. primaries		328	100.0	149	45.4	39	11.9	140	42.7

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 1998-2012
FEMALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	2	0.9	1	50.0			1	50.0
C16 Stomach	5	2.2			2	40.0	3	60.0
C18 Colon	15	6.5	10	66.7			5	33.3
C19-C20 Rectum	13	5.7	10	76.9	1	7.7	2	15.4
C21 Anus/canal	3	1.3	3	100.0				
C25 Pancreas	5	2.2			1	20.0	4	80.0
C33-C34 Lung	6	2.6	3	50.0	1	16.7	2	33.3
C43 Malign. melanoma	11	4.8	7	63.6			4	36.4
C44 Skin others	10	4.3	4	40.0	1	10.0	5	50.0
C50 Breast	71	30.9	58	81.7	4	5.6	9	12.7
C51 Vulva	2	0.9	2	100.0				
C53 Cervix uteri	3	1.3	3	100.0				
C54 Corpus uteri	7	3.0	6	85.7			1	14.3
C56 Ovary	6	2.6	3	50.0	1	16.7	2	33.3
C64 Kidney	4	1.7	4	100.0				
C67 Bladder	4	1.7	1	25.0	1	25.0	2	50.0
C70-C72 CNS cancer	6	2.6	5	83.3			1	16.7
C76-C79 CUP	3	1.3	1	33.3			2	66.7
C82-C85 NHL	18	7.8	5	27.8	5	27.8	8	44.4
C90 Mult. myeloma	16	7.0			1	6.3	15	93.8
C91-C96 Leukaemia	11	4.8	3	27.3	3	27.3	5	45.5
Other primaries	9	3.9	4	44.4			5	55.6
All mult. primaries	230	100.0	133	57.8	21	9.1	76	33.0

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 1998-2012
(**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		1.1	
30-34	2		0.1	0.40	0.0		1.2	
35-39	4	1	0.2	0.31	0.0	0.14	1.1	0.2
40-44	10	4	0.4	0.33	0.2	0.27	1.3	0.4
45-49	16	4	0.7	0.22	0.2	0.15	1.0	0.2
50-54	27	20	1.5	0.43	1.1	0.44	1.0	0.8
55-59	44	39	2.6	0.40	2.2	0.41	0.9	1.0
60-64	105	63	6.4	0.58	3.6	0.54	1.5	1.3
65-69	147	116	10.0	0.57	7.2	0.66	1.6	1.9
70-74	179	152	15.4	0.68	11.0	0.84	1.8	2.1
75-79	149	136	19.8	0.75	12.4	0.63	1.6	1.7
80-84	105	131	23.1	0.86	15.2	0.69	1.4	1.6
85+	79	109	25.5	0.71	13.3	0.65	1.3	1.1
All ages	868	775					1.5	1.4
Mortality								
Raw			3.2	0.61	2.7	0.63		
WS			1.6	0.57	1.0	0.58		
ES			2.4	0.59	1.6	0.60		
BRD-S			3.3	0.62	2.1	0.62		
PYLL-70								
per 100,000			12.4		7.5			
ES			10.6		6.2			
AYLL-70			8.6		7.4			

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 1998-2012
(**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		1.2	
30-34	2		0.1	0.40	0.0		1.2	
35-39	4	1	0.2	0.31	0.0	0.14	1.2	0.2
40-44	9	4	0.4	0.30	0.2	0.29	1.3	0.5
45-49	16	4	0.7	0.23	0.2	0.17	1.1	0.3
50-54	26	18	1.4	0.45	1.0	0.42	1.1	0.8
55-59	40	39	2.4	0.40	2.2	0.45	0.9	1.2
60-64	92	57	5.6	0.55	3.3	0.53	1.5	1.3
65-69	129	107	8.8	0.56	6.7	0.64	1.6	2.0
70-74	164	143	14.2	0.68	10.4	0.82	2.0	2.4
75-79	134	124	17.8	0.74	11.3	0.61	1.8	1.9
80-84	90	123	19.8	0.81	14.2	0.67	1.5	1.8
85+	71	103	22.9	0.67	12.6	0.62	1.4	1.2
All ages	778	723					1.5	1.5
Mortality								
Raw			2.8	0.59	2.5	0.62		
WS			1.4	0.55	0.9	0.58		
ES			2.2	0.57	1.5	0.59		
BRD-S			2.9	0.61	2.0	0.61		
PYLL-70								
per 100,000			11.4		7.0			
ES			9.8		5.8			
AYLL-70			8.8		7.5			

* See corresponding tables with multiple primaries.

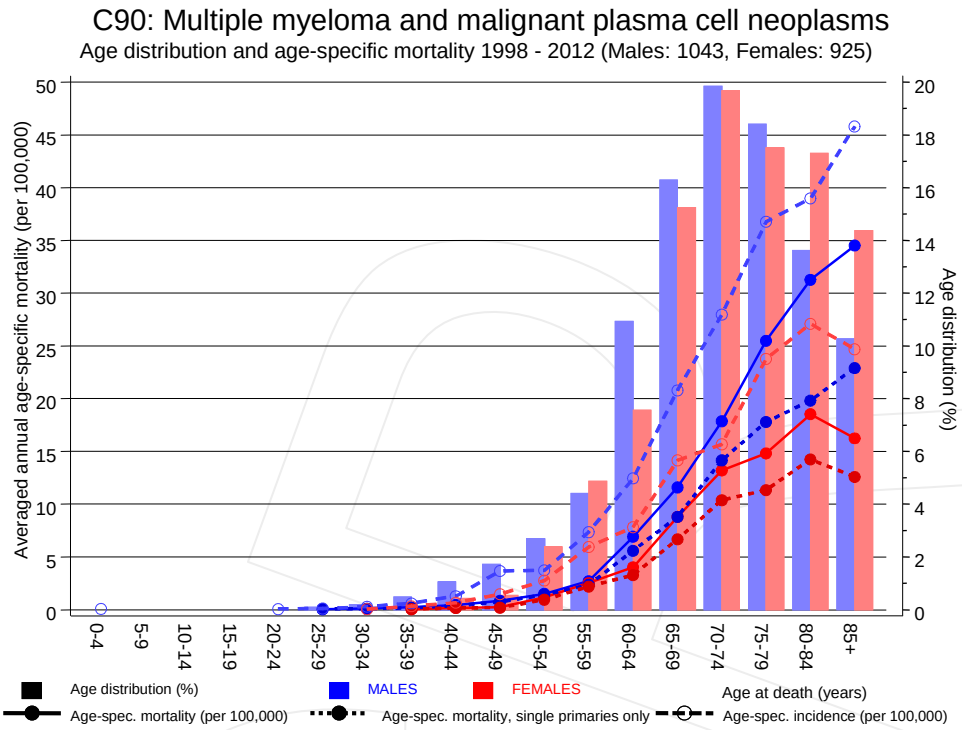
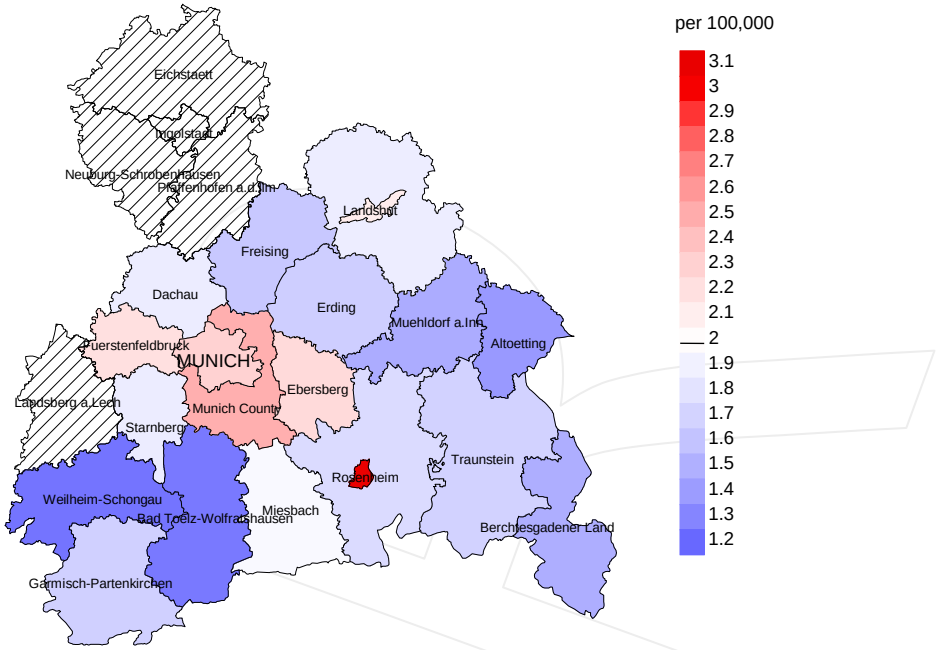


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

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



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

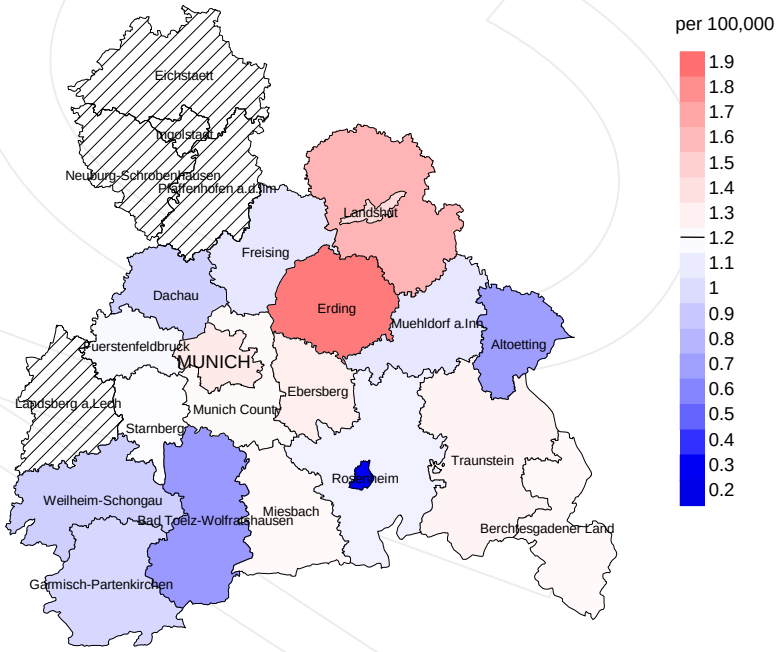
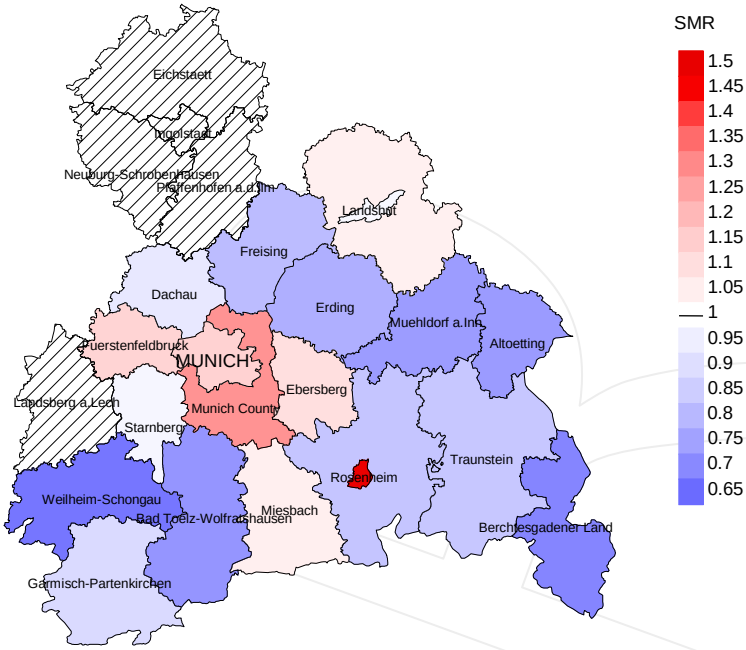


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 2.0/100,000 WS N=465, females 1.2/100,000 WS N=400). 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 plasmacytoma. 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

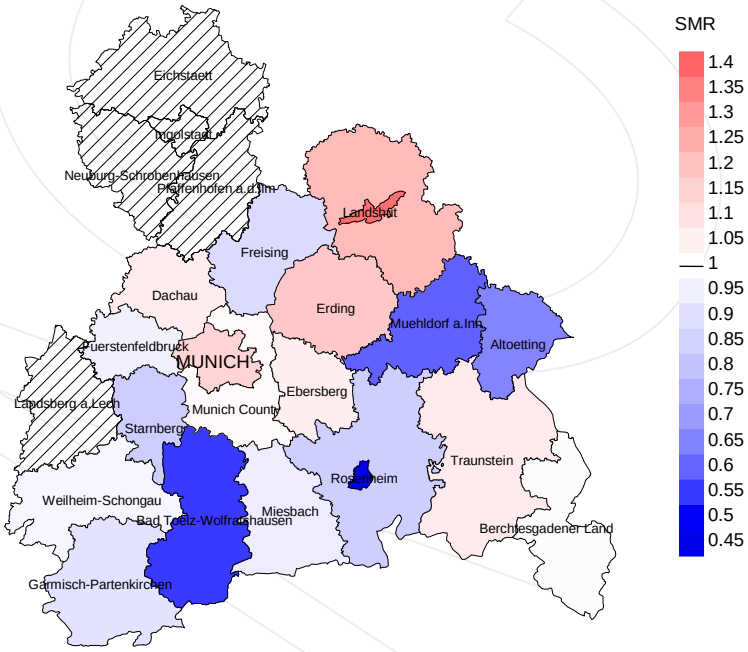


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=465, females N=400). 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 plasmacytoma. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 1.05. Though, the value of this parameter may vary with an underlying probability of 99% between 0.43 and 2.11, and is therefore not statistically striking.

Statistical Notes

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

1. **All multiple primaries included**

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

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

   The mortality statistic describes the 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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