Munich Cancer Registry

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ICD-10 C88,C90: Immunoprolif. disease

Incidence and Mortality

Year of diagnosis	1998-2014
Patients	3,882
Diseases	3,886
Creation date	04/13/2016
Export date	12/23/2015
Population	4.64 m

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

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

http://www.tumorregister-muenchen.de/en/facts/base/bC8890E-ICD-10-C88-C90-Immunoprolif.-disease-incidence-and-mortality.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.

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 2016

[#] 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).

[##] 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.

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 (ICD-10 2015) used for specifying cancer site

Code	Description
C88.-	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

INCIDENCE

Table 1

All patients by year of diagnosis,
proportions of DCO, multiple primaries, deaths, and active follow-up
(incl. DCO)

Year of diagnosis	Cases n	DCO cases n	Prop. DCO %	Prop. mult. primaries %	Prop. deaths %	Prop. actively followed %
1998	128	30	23.4	18.8	90.6	97.7
1999	129	27	20.9	22.5	91.5	98.4
2000	135	40	29.6	13.3	94.8	98.5
2001	118	33	28.0	30.5	90.7	99.2
2002	238	76	31.9	23.1	86.6	98.7 #
2003	244	58	23.8	24.2	84.4	97.1
2004	248	65	26.2	25.0	84.7	97.6
2005	244	45	18.4	28.3	81.1	96.3
2006	252	43	17.1	26.2	78.2	96.0
2007	322	66	20.5	23.9	78.6	90.4 #
2008	335	57	17.0	24.2	69.9	83.9
2009	283	43	15.2	23.7	69.6	87.6
2010	291	53	18.2	30.2	65.3	81.8
2011	314	64	20.4	25.8	55.1	84.4
2012	260	43	16.5	32.7	51.5	85.8
2013	238	47	19.7	29.4	43.7	98.7
2014	107	34	31.8	38.3	43.0	95.3 ##
1998-2014	3886	824	21.2	25.9	72.5	92.0

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

Please be aware that data of recent annual patient cohorts may not yet be fully processed. The years under evaluation can be found in the respective headings.

Table 1a

All patients
by year of diagnosis and gender
(incl. DCO)

Year of diagnosis	All n	Males n	Females n	Prop. males %
1998	128	75	53	58.6
1999	129	66	63	51.2
2000	135	80	55	59.3
2001	118	59	59	50.0
2002	238	125	113	52.5
2003	244	148	96	60.7
2004	248	129	119	52.0
2005	244	127	117	52.0
2006	252	124	128	49.2
2007	322	173	149	53.7
2008	335	188	147	56.1
2009	283	144	139	50.9
2010	291	175	116	60.1
2011	314	168	146	53.5
2012	260	143	117	55.0
2013	238	139	99	58.4
2014	107	51	56	47.7
1998-2014	3886	2114	1772	54.4

Table 2

Incidence measures by year of diagnosis 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	75	53	6.8	4.5	4.2	2.0	6.1	3.0	7.4	3.7
1999	66	63	5.9	5.3	3.7	2.2	5.4	3.3	7.1	4.4
2000	80	55	7.0	4.6	3.9	1.9	6.3	2.9	8.7	3.9
2001	59	59	5.1	4.9	3.0	2.3	4.6	3.3	6.2	4.2
2002	125	113	6.7	5.8	3.8	2.3	5.7	3.6	7.4	4.7
2003	148	96	7.9	4.9	4.3	2.1	6.4	3.1	8.3	4.0
2004	129	119	6.9	6.0	3.8	2.4	5.7	3.7	7.3	4.9
2005	127	117	6.7	5.9	3.4	2.4	5.2	3.6	6.9	4.8
2006	124	128	6.5	6.4	3.4	2.5	5.0	3.8	6.5	5.1
2007	173	149	7.8	6.5	3.9	2.6	6.0	3.8	8.0	5.1
2008	188	147	8.4	6.3	4.2	2.5	6.3	3.9	8.2	5.2
2009	144	139	6.5	6.0	3.1	2.3	4.6	3.5	6.0	4.5
2010	175	116	7.8	5.0	3.8	1.9	5.6	2.9	7.4	3.8
2011	168	146	7.4	6.2	3.3	2.4	5.1	3.7	6.8	4.8
2012	143	117	6.3	5.0	2.8	1.8	4.3	2.8	5.8	3.9
2013	139	99	6.1	4.2	2.7	1.6	4.2	2.5	5.8	3.3
2014	51	56	2.2	2.4	1.1	0.9	1.6	1.3	2.1	1.8
1998-2014	2114	1772	6.6	5.3	3.4	2.1	5.1	3.2	6.7	4.2

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 patients)
(incl. DCO)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	128	67.4	13.0	26.1	94.0	52.7	58.5	67.7	76.0	85.3
1999	129	69.4	13.0	23.9	92.8	53.2	60.1	70.8	78.6	85.6
2000	135	71.8	11.6	38.2	94.4	55.7	64.6	72.7	79.5	85.8
2001	118	68.7	11.0	36.1	93.7	50.9	60.6	69.6	77.3	81.4
2002	238	70.8	12.1	32.7	93.5	55.6	62.4	71.8	79.8	86.3
2003	244	69.4	11.1	31.4	99.0	55.6	62.2	68.7	78.0	83.3
2004	248	70.5	11.6	37.1	93.4	55.7	62.8	70.8	79.0	84.5
2005	244	71.5	11.0	38.9	102	56.6	65.2	72.3	79.4	84.5
2006	252	71.0	12.1	22.7	94.9	56.0	64.6	71.5	79.7	85.1
2007	322	71.3	10.8	30.9	93.2	58.6	65.0	71.6	79.8	84.5
2008	335	71.1	11.5	33.8	97.9	56.4	65.0	71.3	79.4	85.2
2009	283	71.8	11.3	34.7	94.6	56.3	65.7	71.9	79.9	85.7
2010	291	71.2	12.3	5.0	97.2	54.1	64.5	72.5	79.9	86.0
2011	314	71.8	12.2	33.3	97.5	52.9	66.3	73.3	79.8	86.0
2012	260	72.1	11.7	31.5	97.5	54.3	66.1	72.9	80.4	85.2
2013	238	72.1	12.0	38.5	93.1	53.8	64.0	74.4	81.2	85.2
2014	107	73.6	11.4	45.3	98.4	57.4	64.2	74.2	82.4	87.3
1998-2014	3886	71.1	11.7	5.0	102	55.2	63.8	72.1	79.6	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	75	64.6	13.2	26.1	92.3	49.5	56.2	64.4	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	80	71.0	11.4	38.2	92.3	56.1	62.3	71.9	79.5	85.9
2001	59	67.5	10.7	44.4	85.3	49.1	59.2	69.6	76.3	79.5
2002	125	69.0	12.0	32.7	93.5	52.9	62.1	69.3	77.4	83.6
2003	148	68.0	10.0	36.7	99.0	55.2	61.5	67.4	75.3	81.4
2004	129	68.8	12.0	37.1	93.4	52.6	60.7	69.8	76.4	84.0
2005	127	70.6	10.9	38.9	102	56.6	64.8	69.6	77.9	83.8
2006	124	69.2	11.9	27.5	94.8	55.8	63.8	69.6	76.7	83.7
2007	173	70.0	11.4	30.9	93.2	55.9	63.4	70.5	79.0	82.7
2008	188	69.8	12.1	33.8	97.9	51.6	64.4	70.4	78.4	85.1
2009	144	70.3	10.7	34.7	94.1	54.9	65.5	71.2	77.7	83.8
2010	175	70.0	12.2	5.0	93.0	53.4	64.0	71.5	78.2	84.6
2011	168	71.1	11.7	33.3	97.4	51.7	66.9	73.0	78.4	84.2
2012	143	71.3	11.5	41.0	93.0	53.5	64.9	72.3	79.0	84.6
2013	139	71.6	12.2	38.5	93.1	51.1	63.8	74.4	80.8	85.2
2014	51	73.4	11.8	45.3	96.6	58.2	63.4	73.7	84.1	87.3
1998-2014	2114	69.7	11.7	5.0	102	53.5	63.0	70.9	78.0	84.1

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	53	71.3	11.7	37.6	94.0	57.6	62.4	70.9	78.9	88.1
1999	63	72.4	11.9	49.2	92.8	56.1	62.1	74.6	80.1	87.9
2000	55	72.8	12.0	40.6	94.4	55.7	66.9	75.9	80.1	85.8
2001	59	70.0	11.2	36.1	93.7	57.3	62.9	70.5	79.1	83.2
2002	113	72.9	11.9	38.9	93.2	56.3	63.7	74.3	82.2	87.8
2003	96	71.5	12.4	31.4	94.2	55.8	63.5	72.6	80.5	85.6
2004	119	72.3	10.9	38.8	92.1	56.9	65.6	73.4	81.3	84.5
2005	117	72.5	11.1	42.1	96.8	55.9	65.3	74.7	80.6	84.7
2006	128	72.7	12.1	22.7	94.9	56.7	65.9	74.4	81.6	85.7
2007	149	72.9	9.8	44.4	92.3	61.4	66.7	73.1	80.9	86.1
2008	147	72.8	10.6	37.5	94.3	59.1	66.4	73.8	80.0	85.9
2009	139	73.4	11.6	36.3	94.6	58.8	67.3	73.3	83.4	87.1
2010	116	72.8	12.2	40.5	97.2	55.4	66.2	74.0	82.2	87.1
2011	146	72.6	12.7	41.9	97.5	54.4	65.3	74.3	81.7	87.9
2012	117	73.0	11.9	31.5	97.5	55.1	67.2	75.3	82.4	86.1
2013	99	72.8	11.7	43.3	92.2	55.9	64.1	75.2	81.2	86.4
2014	56	73.7	11.2	49.1	98.4	54.7	66.4	74.8	82.2	85.7
1998-2014	1772	72.6	11.5	22.7	98.4	56.7	65.3	73.8	81.3	86.2

Table 4

Age distribution by 5-year age group and gender for period 2007-2014
(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	0	0.0	0.0			0.1			0.0
25-29	0	0.0	0.0			0.1			0.0
30-34	5	0.2	0.3	4	0.3	0.4	1	0.1	0.1
35-39	8	0.4	0.7	6	0.5	0.9	2	0.2	0.3
40-44	34	1.6	2.2	25	2.1	3.0	9	0.9	1.2
45-49	73	3.4	5.6	48	4.1	7.1	25	2.6	3.8
50-54	91	4.2	9.9	50	4.2	11.3	41	4.2	8.0
55-59	117	5.4	15.3	56	4.7	16.1	61	6.3	14.3
60-64	198	9.2	24.5	116	9.8	25.9	82	8.5	22.8
65-69	320	14.9	39.4	179	15.2	41.1	141	14.6	37.4
70-74	408	19.0	58.4	260	22.0	63.1	148	15.3	52.6
75-79	352	16.4	74.7	185	15.7	78.7	167	17.2	69.9
80-84	297	13.8	88.6	144	12.2	90.9	153	15.8	85.7
85+	246	11.4	100.0	107	9.1	100.0	139	14.3	100.0
All ages	2150	100.0		1181	100.0		969	100.0	

Included in the statistics are 36.7% multiple primaries in males and 29.8% in females.

Table 5

Age-specific incidence, DCO rate and proportion of all cancers
for period 2007-2014

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males DCO rate n=201 %	Females DCO rate n=205 %	Males Prop.all cancers n=91183 %	Females Prop.all cancers n=89596 %
0- 4	1		0.1	0.0			0.6	
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			0.0	0.0				
30-34	4	1	0.3	0.1			0.5	0.1
35-39	6	2	0.5	0.2			0.5	0.1
40-44	25	9	1.5	0.6			1.4	0.2
45-49	48	25	3.0	1.6			1.5	0.5
50-54	50	41	3.9	3.2	8.0	4.9	1.0	0.6
55-59	56	61	5.3	5.4	3.6	3.3	0.8	0.8
60-64	116	82	11.8	7.7	6.9	7.3	1.1	0.9
65-69	179	141	18.6	13.5	8.9	9.2	1.1	1.2
70-74	260	148	28.6	14.2	12.7	10.8	1.5	1.2
75-79	185	167	33.6	23.4	19.5	18.6	1.5	1.7
80-84	144	153	41.2	27.3	29.9	30.7	1.7	1.7
85+	107	138	46.2	23.9	55.1	63.8	1.8	1.3
All ages	1181	968			17.0	21.2	1.3	1.1
Incidence								
Raw			6.5	5.2				
WS			3.1	2.0				
ES			4.7	3.1				
BRD-S			6.2	4.0				

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).

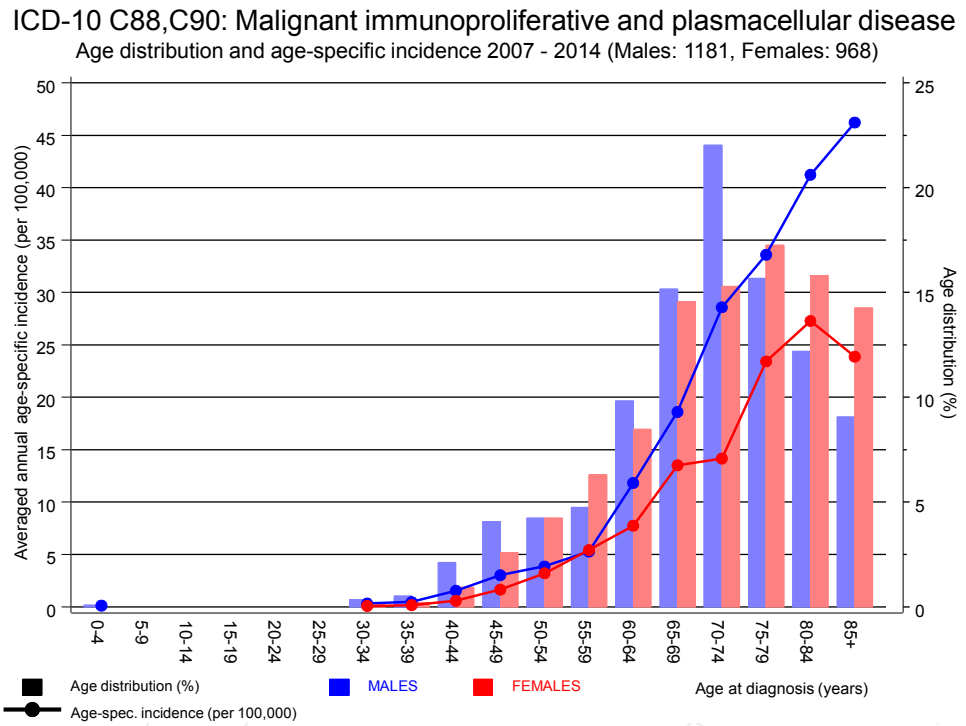


Figure 6. Age distribution and age-specific incidence

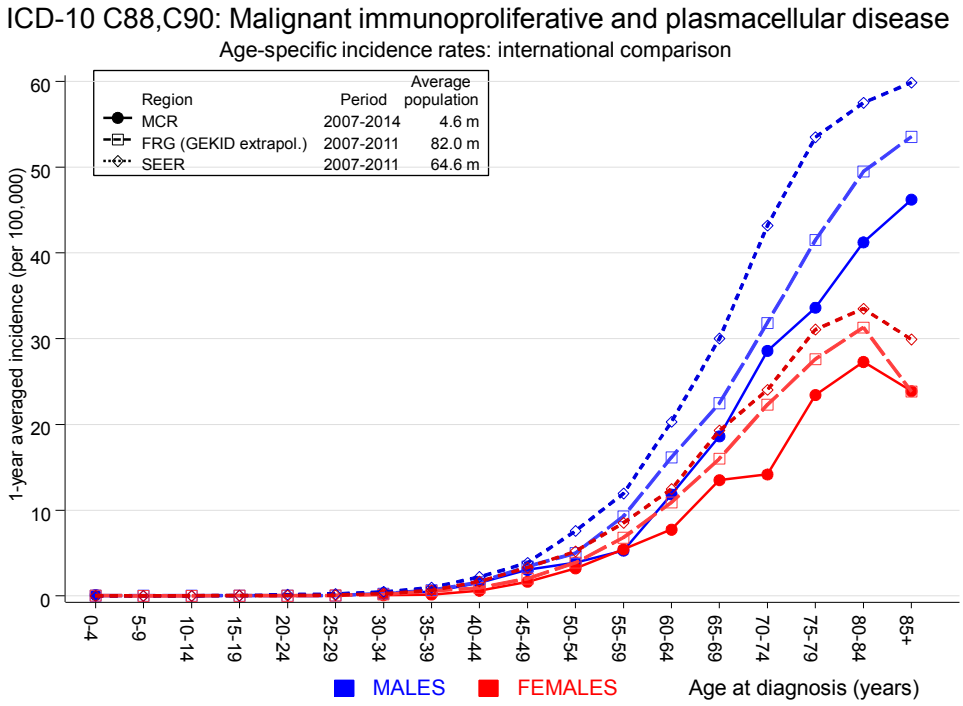


Figure 6a. Age-specific incidence in MCR registry areas compared to Germany (FRG, GEKID extrapolation) and SEER (Surveillance, Epidemiology, and End Results, USA).

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.

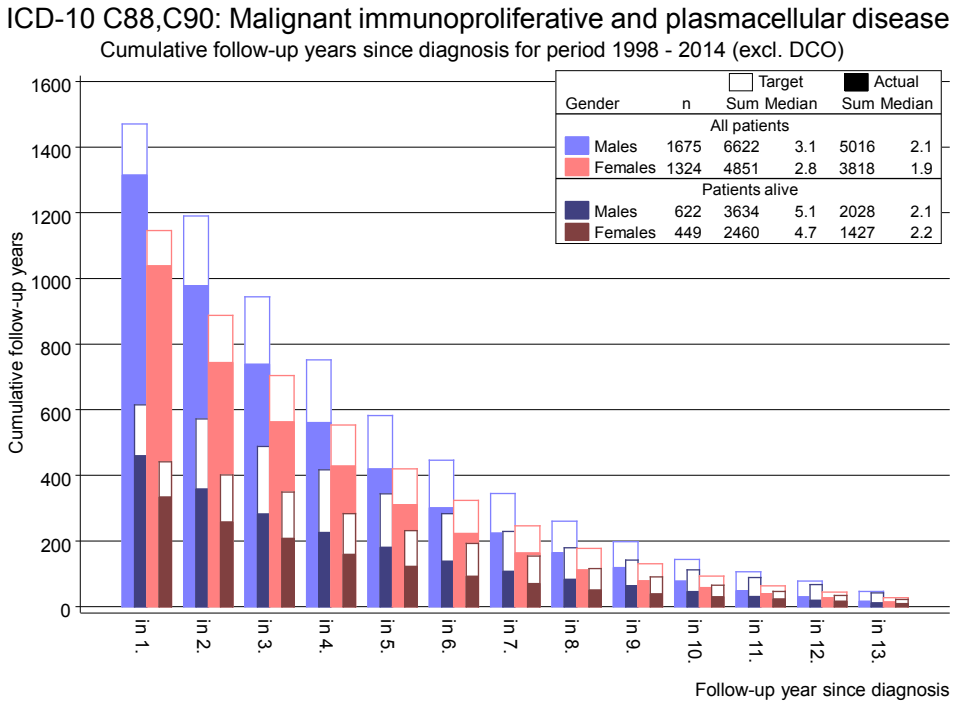


Figure 7. Cumulative follow-up years depending on time since diagnosis

The increase of the lost to follow-up rate can be interpreted as a consequence of a declining number of survivors over time.

Table 8a

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries for period 1998-2014
MALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C15	Oesophagus	6	1.6	3.8	1.4	8.3	#	8.7	16.7
C16	Stomach	8	3.4	2.4	1.0	4.6	#	9.1	
C18	Colon	11	8.2	1.3	0.7	2.4		5.5	
C19-C20	Rectum	7	4.7	1.5	0.6	3.1		4.5	
C22	Liver	4	2.4	1.7	0.5	4.3		3.2	25.0
C25	Pancreas	4	3.1	1.3	0.4	3.3		1.8	25.0
C33-C34	Lung	15	10.2	1.5	0.8	2.4		9.5	6.7
C38,C45	Mesothelioma	2	0.6	3.4	0.4	12.4		2.8	
C40-C41	Bone	3	0.1	43.5	9.0	127.1	#	5.8	
C43	Malign. melanoma	10	3.7	2.7	1.3	5.0	#	12.5	
C46,C49	Soft tissue	3	0.4	6.7	1.4	19.6	#	5.0	
C61	Prostate	54	25.6	2.1	1.6	2.8	#	55.9	1.9
C64	Kidney	7	3.0	2.3	0.9	4.8		7.8	14.3
C67	Bladder	8	3.7	2.2	0.9	4.2		8.5	
C70-C72	CNS cancer	5	1.1	4.4	1.4	10.3	#	7.6	20.0
C73	Thyroid	2	0.6	3.6	0.4	12.8		2.8	
C76-C79	CUP	5	1.4	3.5	1.2	8.3	#	7.1	
C82-C85	NHL	21	3.4	6.2	3.8	9.5	#	34.7	4.8
C90	Mult. myeloma	2	1.1	1.8	0.2	6.5		1.8	50.0
C91-C96	Leukaemia	9	1.4	6.6	3.0	12.5	#	15.1	11.1
Other primaries		9	4.1	2.2	1.0	4.2	#	9.7	
Not observed		0	3.0	0.0	0.0	1.2		-5.9	
All mult. primaries		195	86.7	2.2	1.9	2.6	#	213.5	5.1

Patients	1754
Median age at second malignancy (years)	73.3
Person-years	5074
Mean observation time (years)	2.9
Median observation time (years)	1.9

The occurrence of second malignancy is statistically significant.

Observed second primaries with count 1 are pooled in category “Other primaries”

Table 8b

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of second primaries for period 1998–2014
FEMALES

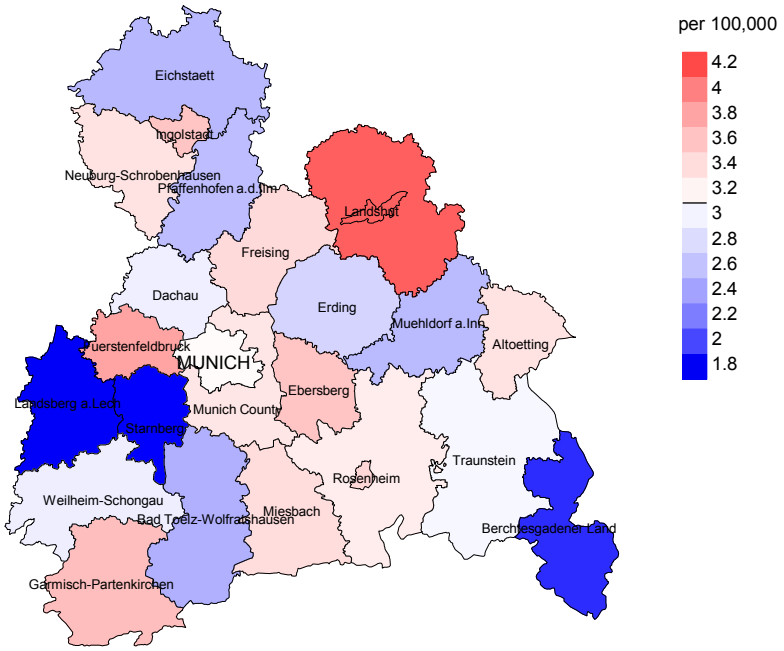
Diagnosis	Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C09–C10 Oropharynx	2	0.2	10.8	1.3	38.9	#	4.7	
C16 Stomach	3	1.6	1.9	0.4	5.5		3.6	
C18 Colon	10	4.5	2.2	1.1	4.0	#	14.0	
C19–C20 Rectum	2	2.0	1.0	0.1	3.7		0.1	
C25 Pancreas	2	2.1	1.0	0.1	3.5		−0.2	50.0
C33–C34 Lung	6	3.4	1.7	0.6	3.8		6.6	
C43 Malign. melanoma	8	1.7	4.7	2.1	9.4	#	16.2	
C48 Peritoneal	3	0.2	16.0	3.3	46.8	#	7.2	
C50 Breast	18	14.0	1.3	0.8	2.0		10.4	11.1
C54 Corpus uteri	2	2.7	0.7	0.1	2.7		−1.7	
C56 Ovary	3	1.9	1.6	0.3	4.6		2.8	33.3
C67 Bladder	2	0.9	2.3	0.3	8.4		2.9	
C73 Thyroid	2	0.8	2.6	0.3	9.5		3.2	
C76–C79 CUP	2	0.8	2.5	0.3	9.0		3.1	
C82–C85 NHL	14	1.8	7.7	4.2	13.0	#	31.4	14.3
C90 Mult. myeloma	2	0.6	3.4	0.4	12.3		3.6	50.0
C91–C96 Leukaemia	5	0.7	6.7	2.2	15.6	#	10.9	
Other primaries	10	2.9	3.5	1.7	6.4	#	18.3	20.0
Not observed	0	3.8	0.0	0.0	1.0	#	−9.8	
All mult. primaries	96	46.5	2.1	1.7	2.5	#	127.4	9.4

Patients	1409
Median age at second malignancy (years)	72.4
Person-years	3889
Mean observation time (years)	2.8
Median observation time (years)	1.7

The occurrence of second malignancy is statistically significant.

Observed second primaries with count 1 are pooled in category “Other primaries”

Average incidence (world standard population) 2007 - 2014: Males



Average incidence (world standard population) 2007 - 2014: Females

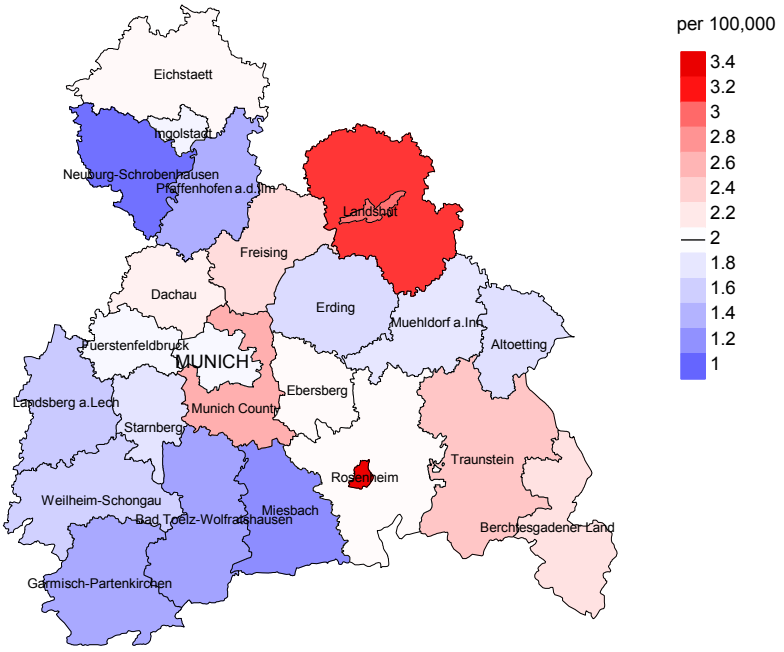
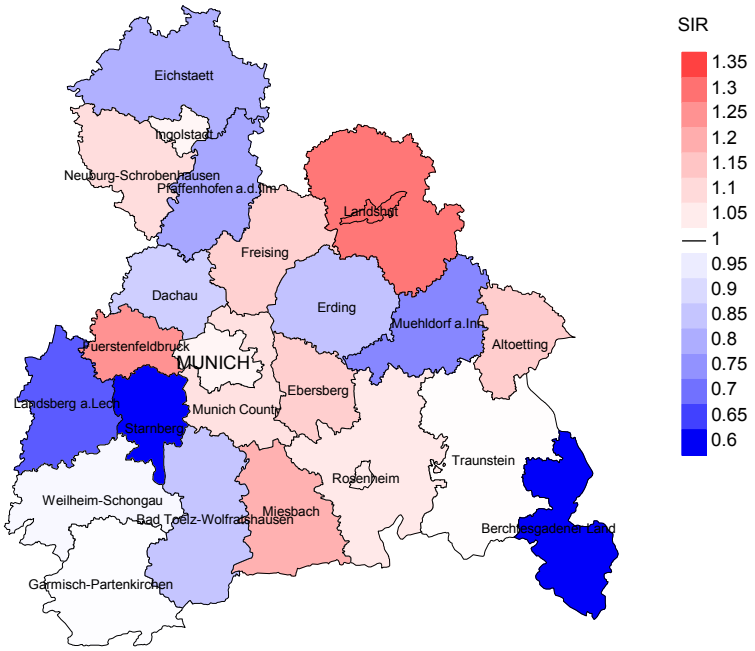


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 3.1/100,000 WS N=1,181, females 2.0/100,000 WS N=968).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,347 female residents (averaged) in the period from 2007 to 2014 a total of 25 women were identified with newly diagnosed immunoprolif. disease. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 2.0/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.1 and 3.6/100,000.

Standardized incidence ratio (SIR) 2007 - 2014: Males



Standardized incidence ratio (SIR) 2007 - 2014: Females

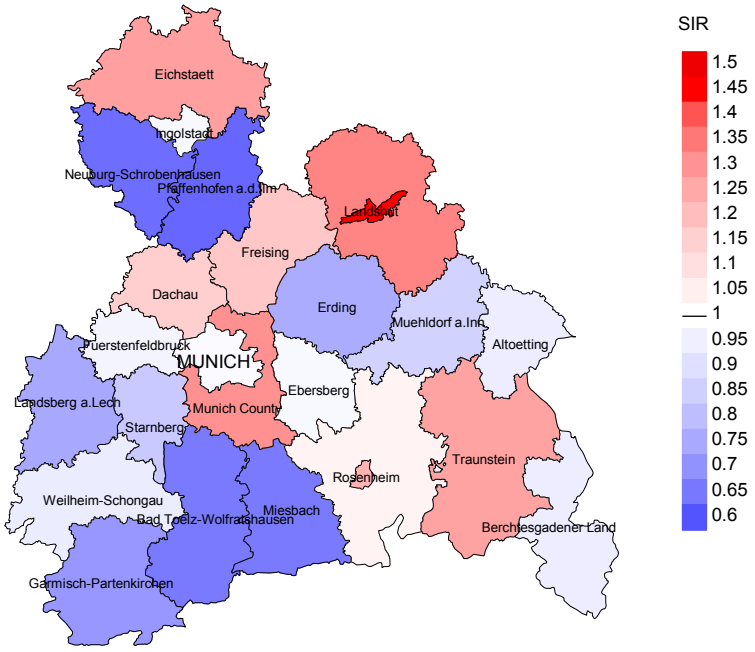


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=1,181, females N=968).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,924 female residents (averaged) in the period from 2007 to 2014 a total of 25 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 0.98. Though, the value of this parameter may vary with an underlying probability of 99% between 0.55 and 1.60, 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	128	97.7	23.4	116	90.6	94.0
1999	129	98.4	20.9	118	91.5	94.1
2000	135	98.5	29.6	128	94.8	95.3
2001	118	99.2	28.0	107	90.7	96.3
2002	238	98.7	31.9	206	86.6	98.1
2003	244	97.1	23.8	206	84.4	97.1
2004	248	97.6	26.2	210	84.7	98.1
2005	244	96.3	18.4	198	81.1	98.5
2006	252	96.0	17.1	197	78.2	99.0
2007	322	90.4	20.5	253	78.6	97.6
2008	335	83.9	17.0	234	69.9	98.7
2009	283	87.6	15.2	197	69.6	97.0
2010	291	81.8	18.2	190	65.3	98.9
2011	314	84.4	20.4	173	55.1	99.4
2012	260	85.8	16.5	134	51.5	99.3
2013	238	98.7	19.7	104	43.7	97.1
2014	107	95.3	31.8	46	43.0	97.8
1998-2014	3886	92.0	21.2	2817	72.5	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 4.64 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	128	84	92.9	35	27.3
1999	129	99	96.0	41	31.8
2000	135	112	92.0	45	33.3
2001	118	103	95.1	36	30.5
2002	238	147	95.9	87	36.6
2003	244	167	99.4	80	32.8
2004	248	196	98.5	92	37.1
2005	244	150	98.0	66	27.0
2006	252	157	97.5	69	27.4
2007	322	191	99.0	91	28.3
2008	335	223	97.3	84	25.1
2009	283	219	97.3	72	25.4
2010	291	232	99.1	80	27.5
2011	314	245	98.0	86	27.4
2012	260	223	97.3	65	25.0
2013	238	231	99.1	73	30.7
2014	107	218	97.7	45	42.1
1998–2014	3886	2997	97.5	1147	29.5

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	84	53.6	46.4	94.9
1999	99	75.8	24.2	96.8
2000	112	65.2	34.8	96.1
2001	103	61.2	38.8	99.0
2002	147	81.0	19.0	96.5
2003	167	80.8	19.2	97.0
2004	196	83.7	16.3	96.9
2005	150	83.3	16.7	95.2
2006	157	84.7	15.3	96.7
2007	191	84.8	15.2	94.7
2008	223	85.2	14.8	92.2
2009	219	81.7	18.3	96.7
2010	232	82.8	17.2	90.0
2011	245	82.4	17.6	92.9
2012	223	85.2	14.8	93.5
2013	231	84.0	16.0	93.0
2014	218	82.6	17.4	92.5
1998-2014	2997	80.8	19.2	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	35	68.9	66.1	78.5	71.7
1999	52	72.0	71.5	76.4	71.9
2000	62	75.4	72.1	77.0	77.8
2001	48	75.6	75.6	76.1	75.6
2002	74	71.3	71.8	70.1	71.7
2003	87	72.9	72.0	74.9	72.9
2004	105	73.4	73.1	77.2	73.5
2005	77	74.2	74.0	75.6	74.0
2006	80	73.6	73.3	79.5	73.3
2007	97	74.2	73.8	79.4	74.3
2008	126	72.6	70.6	81.6	71.7
2009	118	72.6	72.0	78.3	73.1
2010	120	74.2	73.8	76.8	73.8
2011	137	75.8	75.5	80.7	75.8
2012	118	75.2	74.7	81.3	76.4
2013	143	76.3	75.1	81.1	75.8
2014	120	78.0	76.7	79.6	77.6
1998-2014	1599	74.4	73.8	78.4	74.4

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	49	78.3	70.4	80.6	78.2
1999	47	78.4	76.8	82.5	78.4
2000	50	77.3	76.9	78.8	76.6
2001	55	76.9	73.9	78.2	76.6
2002	73	77.5	74.1	83.1	77.5
2003	80	75.1	73.3	81.1	75.1
2004	91	75.4	73.7	82.5	75.0
2005	73	76.3	74.6	85.0	75.5
2006	77	77.2	76.4	79.3	78.1
2007	94	78.0	77.3	81.5	78.2
2008	97	77.4	75.5	81.4	77.4
2009	101	73.5	71.9	81.1	73.2
2010	112	76.7	76.0	81.8	76.4
2011	108	76.0	73.9	84.5	75.5
2012	105	77.8	76.6	81.4	76.4
2013	88	79.1	78.8	79.8	79.1
2014	98	76.9	75.7	83.4	76.9
1998-2014	1398	76.8	75.3	81.7	76.5

By 2010, life expectancy at birth was 77.5 years for boys and 82.6 years for girls.

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	0.29	1.2	0.29	1.7	0.29	2.0	0.27
1999	40	3.6	0.61	2.2	0.59	3.3	0.61	4.5	0.64
2000	39	3.4	0.49	1.9	0.48	3.0	0.48	4.5	0.51
2001	32	2.8	0.54	1.4	0.49	2.4	0.53	3.7	0.59
2002	58	3.1	0.46	1.7	0.45	2.6	0.46	3.6	0.48
2003	72	3.8	0.49	2.0	0.46	3.1	0.48	4.3	0.52
2004	86	4.6	0.67	2.3	0.62	3.6	0.64	5.0	0.68
2005	64	3.4	0.50	1.7	0.49	2.7	0.52	3.7	0.53
2006	68	3.6	0.55	1.7	0.50	2.6	0.52	3.7	0.56
2007	86	3.9	0.50	1.9	0.47	2.9	0.49	4.1	0.51
2008	110	4.9	0.59	2.4	0.57	3.7	0.58	4.9	0.60
2009	96	4.3	0.67	2.0	0.65	3.1	0.67	4.1	0.68
2010	97	4.3	0.55	1.8	0.48	2.9	0.52	4.1	0.55
2011	121	5.3	0.72	2.3	0.69	3.7	0.72	5.1	0.75
2012	100	4.4	0.70	1.8	0.65	2.9	0.67	4.1	0.71
2013	117	5.1	0.84	2.1	0.76	3.4	0.80	4.9	0.84
2014	98	4.3	1.92	1.7	1.61	2.9	1.75	4.2	2.01
1998-2014	1306	4.1	0.62	1.9	0.57	3.1	0.60	4.3	0.64

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	0.43	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	0.62	1.1	0.55	1.7	0.57	2.3	0.60
2001	31	2.5	0.53	1.1	0.48	1.7	0.51	2.3	0.53
2002	61	3.1	0.54	1.2	0.52	1.9	0.52	2.5	0.53
2003	63	3.2	0.66	1.3	0.62	1.9	0.63	2.6	0.65
2004	78	3.9	0.66	1.5	0.63	2.3	0.64	3.2	0.65
2005	61	3.1	0.52	1.2	0.50	1.8	0.51	2.5	0.51
2006	65	3.2	0.51	1.1	0.43	1.8	0.46	2.6	0.51
2007	76	3.3	0.51	1.1	0.43	1.8	0.47	2.5	0.51
2008	80	3.4	0.54	1.3	0.50	2.0	0.51	2.7	0.52
2009	83	3.6	0.60	1.4	0.60	2.1	0.60	2.7	0.59
2010	95	4.1	0.82	1.4	0.71	2.1	0.74	3.0	0.79
2011	81	3.4	0.55	1.3	0.52	2.0	0.53	2.6	0.55
2012	90	3.8	0.77	1.3	0.71	2.1	0.73	2.8	0.71
2013	77	3.3	0.78	1.0	0.62	1.6	0.66	2.4	0.73
2014	82	3.5	1.46	1.2	1.36	1.9	1.42	2.7	1.47
1998-2014	1115	3.3	0.63	1.2	0.57	1.9	0.59	2.6	0.61

Table 13

Age distribution of age at death (cancer-related) for period 2007-2014
(**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	2	0.1	0.3	1	0.1	0.4	1	0.2	0.2
40-44	8	0.5	0.8	5	0.6	1.0	3	0.5	0.6
45-49	16	1.1	1.9	12	1.5	2.4	4	0.6	1.2
50-54	47	3.2	5.0	28	3.4	5.8	19	2.9	4.1
55-59	61	4.1	9.1	28	3.4	9.2	33	5.0	9.0
60-64	100	6.7	15.8	63	7.6	16.8	37	5.6	14.6
65-69	213	14.3	30.2	121	14.7	31.5	92	13.9	28.5
70-74	306	20.6	50.7	176	21.3	52.8	130	19.6	48.0
75-79	272	18.3	69.0	158	19.2	72.0	114	17.2	65.2
80-84	258	17.3	86.3	129	15.6	87.6	129	19.4	84.6
85+	204	13.7	100.0	102	12.4	100.0	102	15.4	100.0
All ages	1489	100.0		825	100.0		664	100.0	

Included in the statistics are 36.7% multiple primaries in males and 29.8% in females.

Table 14

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2014
(**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	1.00	0.0		1.6	
30-34	1		0.1	0.25	0.0		1.1	
35-39	1	1	0.1	0.17	0.1	0.50	0.6	0.4
40-44	5	3	0.3	0.20	0.2	0.33	1.1	0.5
45-49	12	4	0.8	0.25	0.3	0.16	1.2	0.3
50-54	28	19	2.2	0.56	1.5	0.46	1.5	1.1
55-59	28	33	2.6	0.50	2.9	0.54	0.9	1.3
60-64	63	37	6.4	0.54	3.5	0.45	1.3	1.0
65-69	121	92	12.6	0.68	8.8	0.65	1.7	1.8
70-74	176	130	19.3	0.68	12.4	0.88	1.9	2.0
75-79	158	114	28.7	0.85	16.0	0.68	1.9	1.8
80-84	129	129	36.9	0.90	23.0	0.84	1.7	2.0
85+	102	102	44.1	0.95	17.7	0.73	1.7	1.2
All ages	825	664					1.7	1.5
Mortality								
Raw			4.6	0.70	3.5	0.69		
WS			2.0	0.64	1.2	0.62		
ES			3.2	0.68	1.9	0.64		
BRD-S			4.5	0.72	2.7	0.66		
PYLL-70								
per 100,000			13.3		9.2			
ES			11.5		7.7			
AYLL-70			8.2		7.7			

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

Table 15a

Multiple primaries in deaths in period 1998–2014
MALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C15	Oesophagus	5	1.1	1	20.0	2	40.0	2	40.0
C16	Stomach	11	2.4	5	45.5	2	18.2	4	36.4
C18	Colon	24	5.2	12	50.0	3	12.5	9	37.5
C19–C20	Rectum	19	4.1	10	52.6	3	15.8	6	31.6
C22	Liver	7	1.5	1	14.3	1	14.3	5	71.4
C25	Pancreas	8	1.7			1	12.5	7	87.5
C32	Larynx	5	1.1	3	60.0			2	40.0
C33–C34	Lung	22	4.7	4	18.2	4	18.2	14	63.6
C40–C41	Bone	5	1.1			1	20.0	4	80.0
C43	Malign. melanoma	29	6.3	22	75.9	1	3.4	6	20.7
C44	Skin others	41	8.8	19	46.3	1	2.4	21	51.2
C61	Prostate	118	25.4	83	70.3	7	5.9	28	23.7
C64	Kidney	22	4.7	11	50.0	4	18.2	7	31.8
C67	Bladder	14	3.0	7	50.0			7	50.0
C70–C72	CNS cancer	13	2.8	3	23.1	3	23.1	7	53.8
C76–C79	CUP	6	1.3					6	100.0
C82–C85	NHL	22	4.7			5	22.7	17	77.3
C90	Mult. myeloma	41	8.8			6	14.6	35	85.4
C91–C96	Leukaemia	20	4.3	3	15.0	2	10.0	15	75.0
Other primaries		32	6.9	15	46.9	1	3.1	16	50.0
All mult. primaries		464	100.0	199	42.9	47	10.1	218	47.0

Multiple primaries with number of cases 1 to 4 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 1998-2014
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C16	Stomach	7	2.3	2	28.6	2	28.6	3	42.9
C18	Colon	23	7.5	13	56.5	1	4.3	9	39.1
C19-C20	Rectum	15	4.9	11	73.3	1	6.7	3	20.0
C21	Anus/canal	4	1.3	3	75.0			1	25.0
C25	Pancreas	6	2.0			2	33.3	4	66.7
C33-C34	Lung	9	3.0	3	33.3	1	11.1	5	55.6
C43	Malign. melanoma	17	5.6	12	70.6			5	29.4
C44	Skin others	12	3.9	6	50.0	1	8.3	5	41.7
C50	Breast	90	29.5	69	76.7	6	6.7	15	16.7
C53	Cervix uteri	6	2.0	6	100.0				
C54	Corpus uteri	9	3.0	8	88.9			1	11.1
C56	Ovary	5	1.6	2	40.0	1	20.0	2	40.0
C64	Kidney	5	1.6	5	100.0				
C67	Bladder	5	1.6	1	20.0	2	40.0	2	40.0
C70-C72	CNS cancer	8	2.6	6	75.0			2	25.0
C73	Thyroid	4	1.3	2	50.0			2	50.0
C76-C79	CUP	5	1.6	1	20.0	2	40.0	2	40.0
C82-C85	NHL	17	5.6			4	23.5	13	76.5
C90	Mult. myeloma	31	10.2			3	9.7	28	90.3
C91-C96	Leukaemia	11	3.6	3	27.3	3	27.3	5	45.5
Other primaries		16	5.2	9	56.3	1	6.3	6	37.5
All mult. primaries		305	100.0	162	53.1	30	9.8	113	37.0

Multiple primaries with number of cases 1 to 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 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2014
(**First 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	1.00	0.0		1.8	
30-34	1		0.1	0.25	0.0		1.2	
35-39	1	1	0.1	0.20	0.1	0.50	0.6	0.4
40-44	4	3	0.2	0.16	0.2	0.33	0.9	0.5
45-49	10	2	0.6	0.23	0.1	0.09	1.1	0.2
50-54	26	16	2.0	0.62	1.2	0.43	1.6	1.1
55-59	28	29	2.6	0.62	2.6	0.56	1.1	1.4
60-64	58	31	5.9	0.57	2.9	0.51	1.5	1.1
65-69	104	72	10.8	0.73	6.9	0.67	1.8	1.8
70-74	148	103	16.3	0.70	9.9	0.91	2.1	2.0
75-79	116	95	21.1	0.97	13.3	0.76	1.9	2.0
80-84	92	109	26.3	1.03	19.4	0.90	1.7	2.2
85+	67	76	28.9	0.87	13.2	0.70	1.5	1.1
All ages	656	537					1.7	1.6
Mortality								
Raw			3.6	0.72	2.9	0.71		
WS			1.6	0.67	1.0	0.63		
ES			2.6	0.70	1.6	0.65		
BRD-S			3.5	0.75	2.2	0.69		
PYLL-70								
per 100,000			12.2		7.7			
ES			10.6		6.5			
AYLL-70			8.4		7.9			

* See corresponding tables with multiple primaries.

Table 17

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2014
(**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	1.00	0.0		2.0	
30-34	1		0.1	0.25	0.0		1.2	
35-39	1	1	0.1	0.20	0.1	0.50	0.6	0.5
40-44	4	3	0.2	0.16	0.2	0.33	1.0	0.6
45-49	10	2	0.6	0.24	0.1	0.10	1.2	0.2
50-54	25	13	1.9	0.66	1.0	0.37	1.7	1.0
55-59	21	28	2.0	0.48	2.5	0.58	0.9	1.5
60-64	51	28	5.2	0.55	2.6	0.47	1.5	1.2
65-69	90	66	9.4	0.69	6.3	0.66	1.9	1.9
70-74	130	94	14.3	0.69	9.0	0.90	2.3	2.3
75-79	99	83	18.0	0.88	11.6	0.70	2.0	2.1
80-84	76	102	21.8	0.94	18.2	0.86	1.9	2.5
85+	57	74	24.6	0.77	12.8	0.69	1.7	1.3
All ages	566	494					1.8	1.7
Mortality								
Raw			3.1	0.68	2.6	0.68		
WS			1.4	0.62	0.9	0.61		
ES			2.2	0.65	1.4	0.63		
BRD-S			3.0	0.69	2.0	0.66		
PYLL-70								
per 100,000			11.0		7.0			
ES			9.5		5.9			
AYLL-70			8.6		7.9			

* See corresponding tables with multiple primaries.

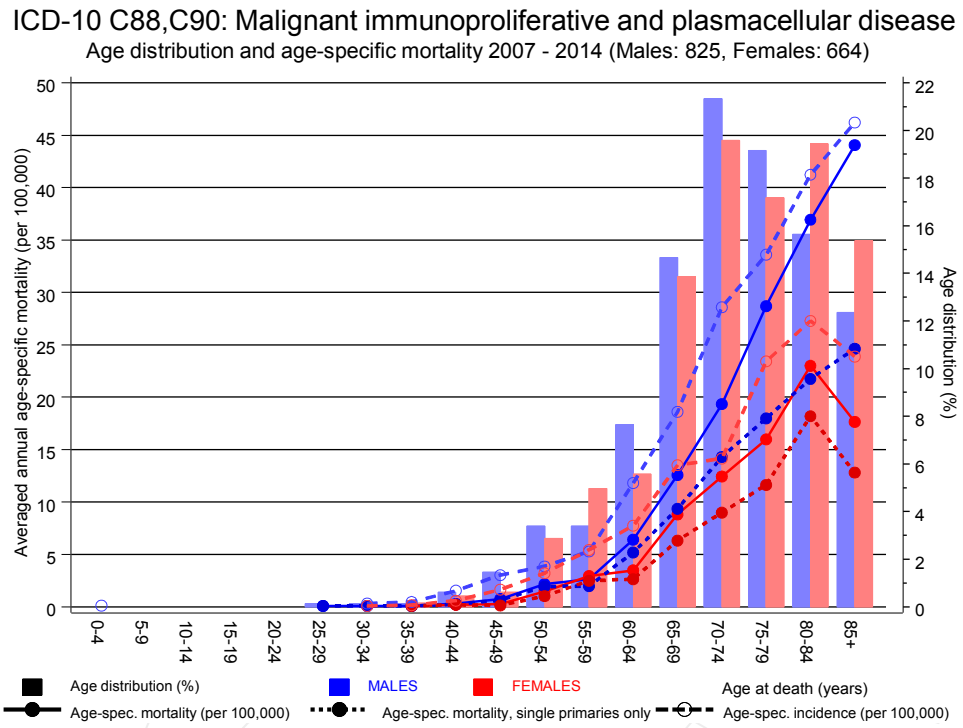
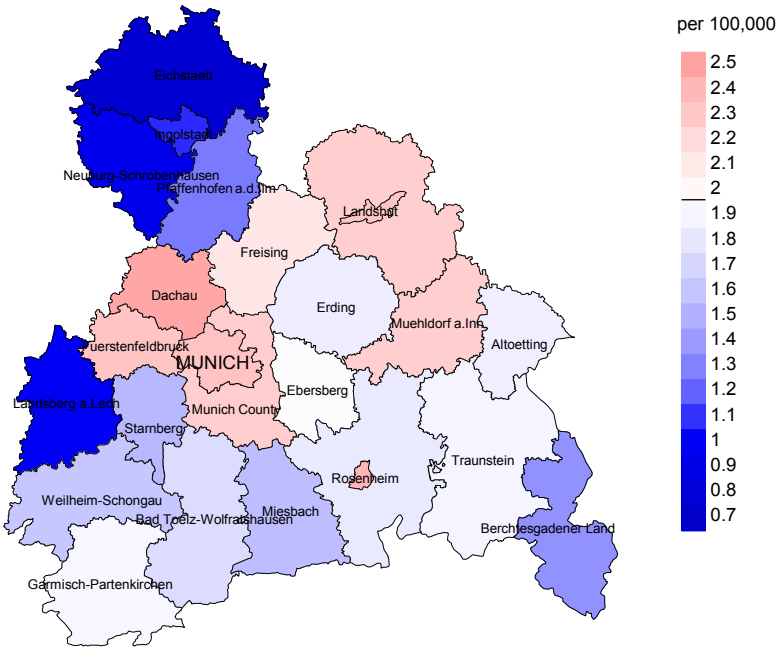


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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) 2007 - 2014: Males



Average mortality (world standard population) 2007 - 2014: Females

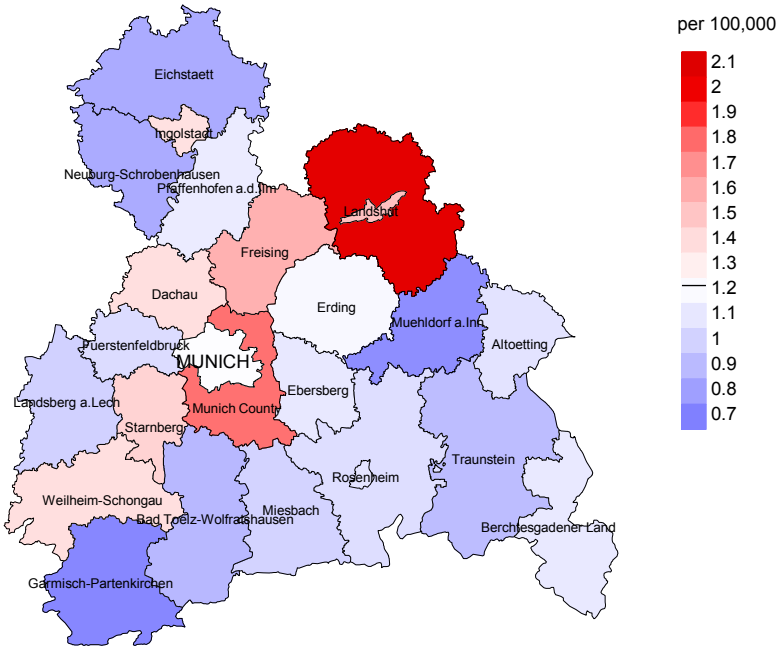
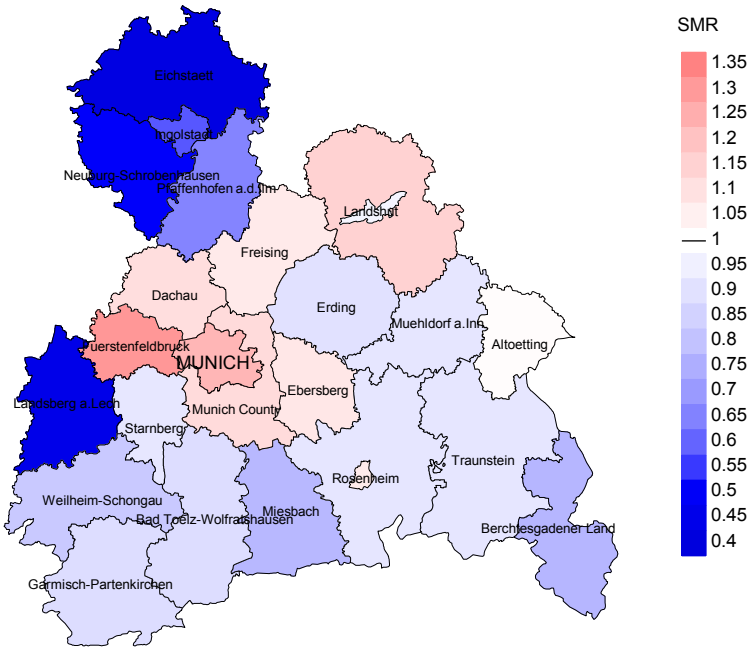


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2014. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 2.0/100,000 WS N=814, females 1.2/100,000 WS N=657).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 65,347 female residents (averaged) in the period from 2007 to 2014 a total of 17 women died from immunoprolif. disease. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 1.1/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.5 and 2.3/100,000.

Standardized mortality ratio (SMR) 2007 - 2014: Males



Standardized mortality ratio (SMR) 2007 - 2014: Females

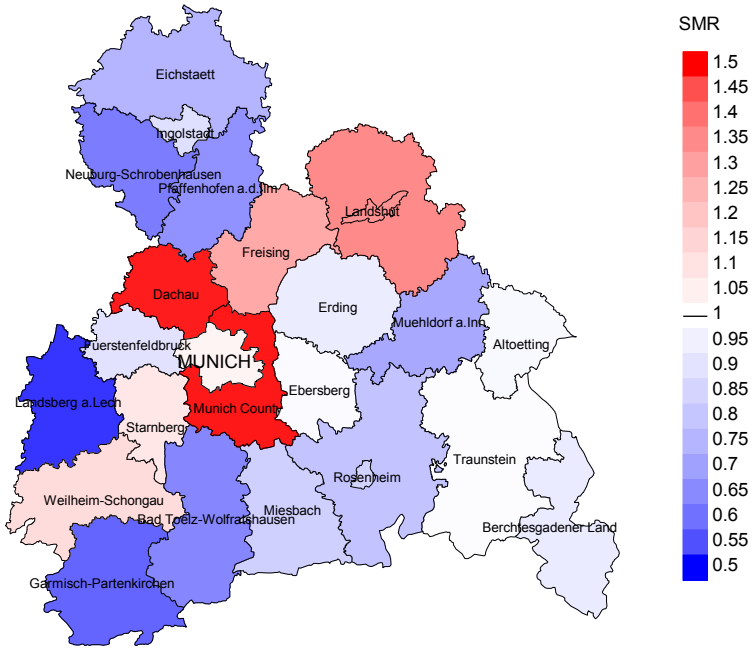


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2014. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=814, females N=657).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 64,924 female residents (averaged) in the period from 2007 to 2014 a total of 17 women died from immunoprolif. disease. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.99. Though, the value of this parameter may vary with an underlying probability of 99% between 0.48 and 1.79, 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, where applicable. 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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