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

P-NET: Pancr. neuroend. tumor

Year of diagnosis	1998-2011
Patients	226
Diseases	226
Creation date	04/02/2013
Export date	01/03/2013
Population	4.5 m

http://www.tumorregister-muenchen.de/en/facts/base/base_hPNETE.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.

ICD-10 codes used for specifying cancer site

Code	Description
C25.-	Malignant neoplasm of pancreas
C25.0	Head of pancreas
C25.1	Body of pancreas
C25.2	Tail of pancreas
C25.3	Pancreatic duct
C25.4	Endocrine pancreas
C25.7	Other parts of pancreas
C25.8	Overlapping lesion of pancreas
C25.9	Pancreas, unspecified

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

Code	Description
8013/3	Large cell neuroendocrine carcinoma
8041/3	Small cell carcinoma, NOS
8150/0	Islet cell adenoma
8150/3	Islet cell carcinoma
8151/3	Insulinoma, malignant
8152/3	Glucagonoma, malignant
8153/3	Gastrinoma, malignant
8155/3	Vipoma, malignant
8156/3	Somatostatinoma, malignant
8240/3	Carcinoid tumor, NOS
8241/3	Enterochromaffin cell carcinoid
8246/3	Neuroendocrine carcinoma, NOS
8249/3	Atypical carcinoid tumor

Reference:

Bosman FT, Carneiro F, Hruban RH, Theise ND, editors. WHO Classification of Tumours of the Digestive System 4th edition, IARC, Lyon (2010).

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	9			22.2	77.8	100.0
1999	6			33.3	50.0	83.3
2000	5				60.0	100.0
2001	4			75.0	50.0	100.0
2002	13			7.7	53.8	100.0
2003	14			21.4	64.3	92.9
2004	11			27.3	54.5	100.0
2005	16			25.0	43.8	100.0
2006	14			28.6	64.3	100.0
2007	23			21.7	52.2	95.7 ##
2008	16			18.8	25.0	81.3
2009	24			12.5	54.2	87.5
2010	35			34.3	31.4	94.3
2011	36			13.9	16.7	66.7 ###
1998-2011	226			22.1	43.8	89.8

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

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

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

Table 1a

Patient cohorts by year of diagnosis and gender
including DCO cases

Year of diagnosis	All n	Males n	Females n	Prop. males %
1998	9	6	3	66.7
1999	6	5	1	83.3
2000	5	3	2	60.0
2001	4	2	2	50.0
2002	13	10	3	76.9
2003	14	6	8	42.9
2004	11	9	2	81.8
2005	16	9	7	56.3
2006	14	12	2	85.7
2007	23	15	8	65.2
2008	16	5	11	31.3
2009	24	13	11	54.2
2010	35	19	16	54.3
2011	36	18	18	50.0
1998-2011	226	132	94	58.4

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	6	3	0.5	0.3	0.3	0.2	0.5	0.2	0.6	0.3
1999	5	1	0.4	0.1	0.3	0.0	0.4	0.1	0.5	0.1
2000	3	2	0.3	0.2	0.2	0.1	0.2	0.1	0.3	0.1
2001	2	2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1
2002	10	3	0.5	0.2	0.4	0.0	0.5	0.1	0.5	0.1
2003	6	8	0.3	0.4	0.2	0.3	0.3	0.4	0.3	0.4
2004	9	2	0.5	0.1	0.3	0.1	0.4	0.1	0.5	0.1
2005	9	7	0.5	0.4	0.2	0.2	0.4	0.3	0.5	0.3
2006	12	2	0.6	0.1	0.4	0.0	0.5	0.1	0.6	0.1
2007	15	8	0.7	0.3	0.4	0.2	0.6	0.3	0.6	0.3
2008	5	11	0.2	0.5	0.2	0.3	0.2	0.3	0.2	0.4
2009	13	11	0.6	0.5	0.3	0.2	0.5	0.3	0.6	0.4
2010	19	16	0.8	0.7	0.5	0.4	0.6	0.5	0.8	0.6
2011	18	18	0.8	0.8	0.5	0.4	0.7	0.6	0.7	0.6
1998-2011	132	94	0.5	0.4	0.3	0.2	0.4	0.3	0.5	0.3

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	9	59.0	14.1	28.2	77.8	28.2	57.0	62.0	63.4	77.8
1999	6	63.8	6.7	53.5	72.2	53.5	59.7	64.9	67.7	72.2
2000	5	57.9	17.5	33.1	74.8	33.1	50.0	57.5	73.9	74.8
2001	4	56.6	12.2	38.6	65.1	38.6	49.3	61.3	63.8	65.1
2002	13	59.9	15.2	36.0	87.6	42.3	49.0	64.3	66.3	83.5
2003	14	58.2	11.1	37.1	77.0	46.6	50.2	56.5	67.3	74.6
2004	11	60.7	12.2	40.8	77.5	46.1	48.3	62.3	74.1	76.2
2005	16	63.9	13.3	36.2	83.5	42.1	59.2	68.2	71.2	77.5
2006	14	58.6	19.3	16.8	78.1	29.1	42.3	64.8	73.1	76.8
2007	23	59.8	11.7	35.3	82.3	45.5	51.2	57.6	69.8	71.5
2008	16	57.6	19.1	23.8	81.2	28.0	46.2	56.8	75.4	79.4
2009	24	65.5	13.1	27.9	84.9	50.2	58.7	67.6	74.2	78.7
2010	35	62.6	12.8	37.5	83.6	46.3	52.3	62.4	74.6	79.0
2011	36	61.3	12.7	34.6	80.5	42.3	50.2	64.1	71.0	74.4
1998-2011	226	61.1	13.6	16.8	87.6	42.3	51.2	62.9	71.5	77.5

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	6	66.0	7.1	58.9	77.8	58.9	62.0	63.0	71.5	77.8
1999	5	64.7	7.1	53.5	72.2	53.5	62.3	67.5	67.7	72.2
2000	3	60.5	12.2	50.0	73.9	50.0	50.0	57.5	73.9	73.9
2001	2	61.3	1.7	60.1	62.5	60.1	60.1	61.3	62.5	62.5
2002	10	54.2	11.0	36.0	66.8	39.2	46.4	53.1	65.1	66.2
2003	6	63.2	10.4	48.1	77.0	48.1	55.1	64.9	69.2	77.0
2004	9	62.7	12.4	40.8	77.5	40.8	58.7	63.0	74.1	77.5
2005	9	67.4	13.5	36.2	83.5	36.2	64.5	70.4	74.9	83.5
2006	12	56.9	20.5	16.8	78.1	29.1	40.4	60.8	73.9	76.8
2007	15	57.3	10.1	35.3	70.9	44.9	51.2	56.0	67.3	69.8
2008	5	48.4	19.7	28.0	79.4	28.0	35.4	49.3	50.1	79.4
2009	13	65.5	11.1	46.7	84.3	50.2	60.3	67.3	68.9	78.7
2010	19	65.8	11.1	44.6	83.6	46.4	58.0	65.4	74.6	82.7
2011	18	61.8	10.2	43.8	80.5	48.4	52.2	63.5	69.8	73.1
1998-2011	132	61.5	12.7	16.8	84.3	44.9	52.9	62.8	70.2	77.0

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	3	45.0	15.0	28.2	57.0	28.2	28.2	49.7	57.0	57.0
1999	1	59.7		59.7	59.7	59.7	59.7	59.7	59.7	59.7
2000	2	54.0	29.5	33.1	74.8	33.1	33.1	54.0	74.8	74.8
2001	2	51.8	18.8	38.6	65.1	38.6	38.6	51.8	65.1	65.1
2002	3	79.1	11.3	66.3	87.6	66.3	66.3	83.5	87.6	87.6
2003	8	54.5	10.8	37.1	74.6	37.1	48.4	55.6	58.0	74.6
2004	2	52.0	8.3	46.1	57.8	46.1	46.1	52.0	57.8	57.8
2005	7	59.4	12.6	42.1	69.6	42.1	42.5	67.8	69.2	69.6
2006	2	68.7	0.2	68.5	68.8	68.5	68.5	68.7	68.8	68.8
2007	8	64.6	13.6	45.5	82.3	45.5	52.4	67.0	75.2	82.3
2008	11	61.8	18.2	23.8	81.2	43.7	48.8	66.9	76.0	78.8
2009	11	65.6	15.8	27.9	84.9	52.2	57.5	72.0	75.3	78.6
2010	16	58.9	13.9	37.5	80.2	43.9	48.9	53.1	74.1	78.4
2011	18	60.8	15.1	34.6	79.2	38.7	43.7	66.6	72.3	77.6
1998-2011	94	60.5	14.9	23.8	87.6	40.8	48.9	63.3	72.7	78.6

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.%
15-19	1	0.4	0.4	1	0.8	0.8			0.0
20-24	1	0.4	0.9			0.8	1	1.1	1.1
25-29	4	1.8	2.7	2	1.5	2.3	2	2.1	3.2
30-34	2	0.9	3.5			2.3	2	2.1	5.3
35-39	9	4.0	7.5	5	3.8	6.1	4	4.3	9.6
40-44	13	5.8	13.3	6	4.5	10.6	7	7.4	17.0
45-49	21	9.3	22.6	10	7.6	18.2	11	11.7	28.7
50-54	18	8.0	30.5	12	9.1	27.3	6	6.4	35.1
55-59	25	11.1	41.6	13	9.8	37.1	12	12.8	47.9
60-64	32	14.2	55.8	27	20.5	57.6	5	5.3	53.2
65-69	36	15.9	71.7	23	17.4	75.0	13	13.8	67.0
70-74	31	13.7	85.4	16	12.1	87.1	15	16.0	83.0
75-79	22	9.7	95.1	12	9.1	96.2	10	10.6	93.6
80-84	10	4.4	99.6	5	3.8	100.0	5	5.3	98.9
85+	1	0.4	100.0			100.0	1	1.1	100.0
All ages	226	100.0		132	100.0		94	100.0	

Included in the statistics are 34.8% multiple primaries in males and 22.3% 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=0 %	Females DCO rate n=0 %	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	1		0.1	0.0			0.3	
20-24		1	0.0	0.1				0.2
25-29	2	2	0.1	0.1			0.2	0.2
30-34		2	0.0	0.1				0.1
35-39	5	4	0.2	0.2			0.3	0.1
40-44	6	7	0.3	0.3			0.2	0.1
45-49	10	11	0.5	0.6			0.2	0.2
50-54	12	6	0.7	0.3			0.2	0.1
55-59	13	12	0.8	0.7			0.1	0.1
60-64	27	5	1.8	0.3			0.1	0.0
65-69	23	13	1.7	0.9			0.1	0.1
70-74	16	15	1.6	1.2			0.1	0.1
75-79	12	10	1.8	1.0			0.1	0.1
80-84	5	5	1.2	0.6			0.0	0.0
85+		1	0.0	0.1				0.0
All ages	132	94			0.0	0.0	0.1	0.1
Incidence								
Raw			0.5	0.4				
WS			0.3	0.2				
ES			0.4	0.3				
BRD-S			0.5	0.3				

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 %
C33-C34 Lung	2	0.5	4.2	0.5	15.2		52.6	
C61 Prostate	4	1.1	3.6	1.0	9.3		100.0	
C64 Kidney	2	0.1	14.1	1.7	50.9	#	64.1	
Other primaries	2	0.2	11.6	1.4	41.9	#	63.0	
Not observed	0	2.0	0.0	0.0	1.9		-68.3	
All mult. primaries	10	3.9	2.6	1.2	4.8	#	211.4	

Patients	93
Mean age at second malignancy (years)	69.2
Person-years	290
Mean observation time (years)	3.1
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".

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 %
C50 Breast	2	0.5	4.2	0.5	15.3	89.4	
Other primaries	2	0.1	29.8	3.6	107.7 #	113.2	50.0
Not observed	0	0.9	0.0	0.0	4.0	-53.8	
All mult. primaries	4	1.5	2.7	0.7	7.0	148.8	25.0

Patients	54
Mean age at second malignancy (years)	64.1
Person-years	171
Mean observation time (years)	3.2
Median observation time (years)	2.8

The occurrence of second malignancy is statistically significant.

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

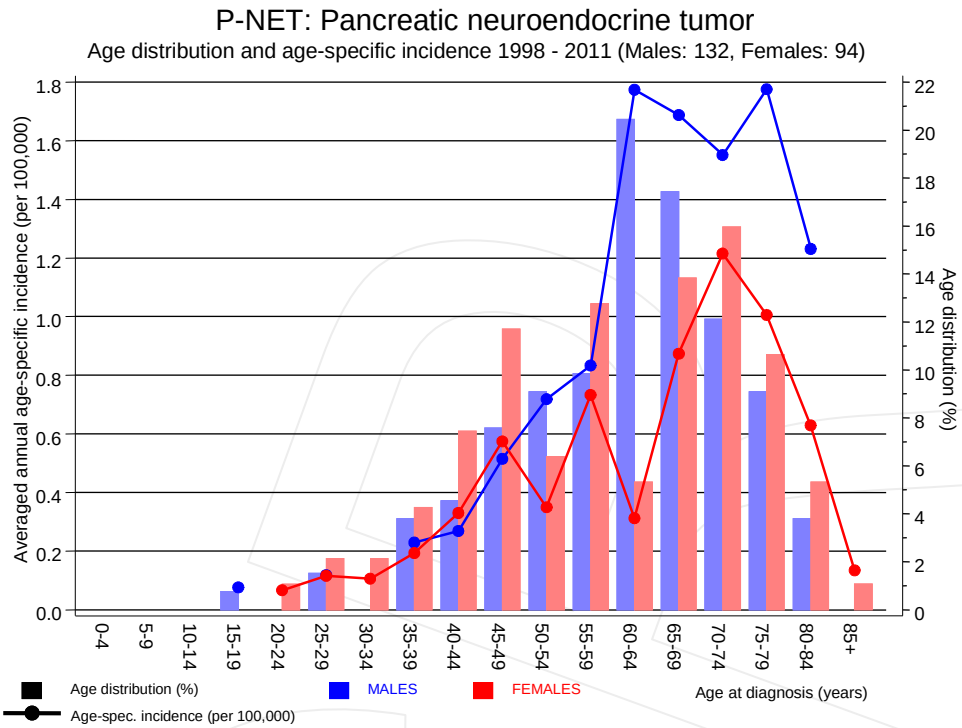


Figure 7. Age distribution and age-specific incidence

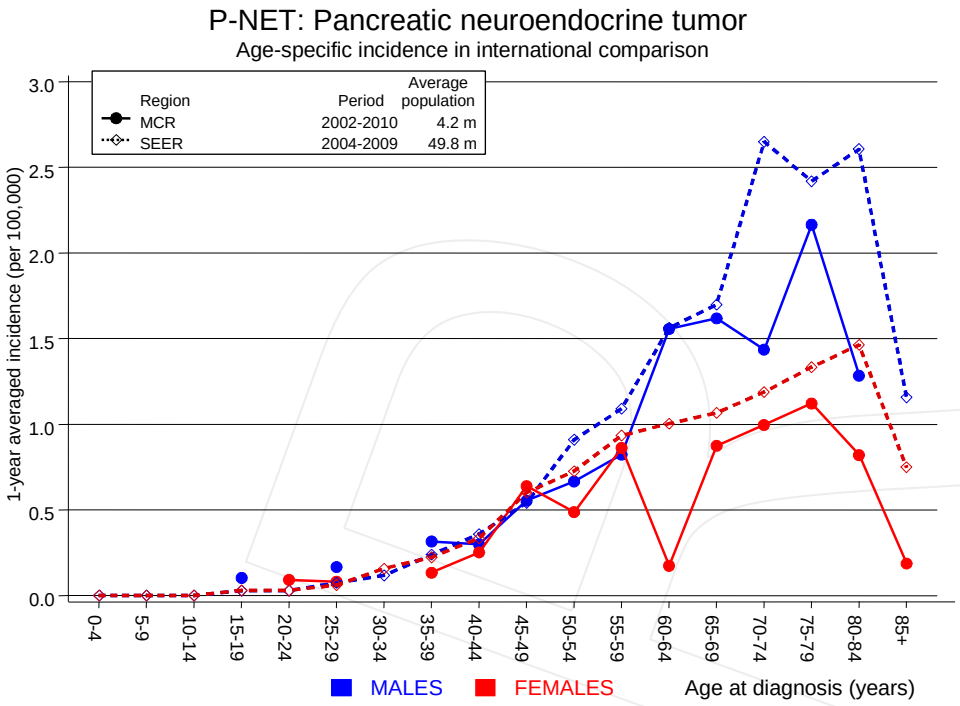


Figure 7a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 18 Regs Research Data, released April 2012, based on the November 2011 submission. http://www.seer.cancer.gov.

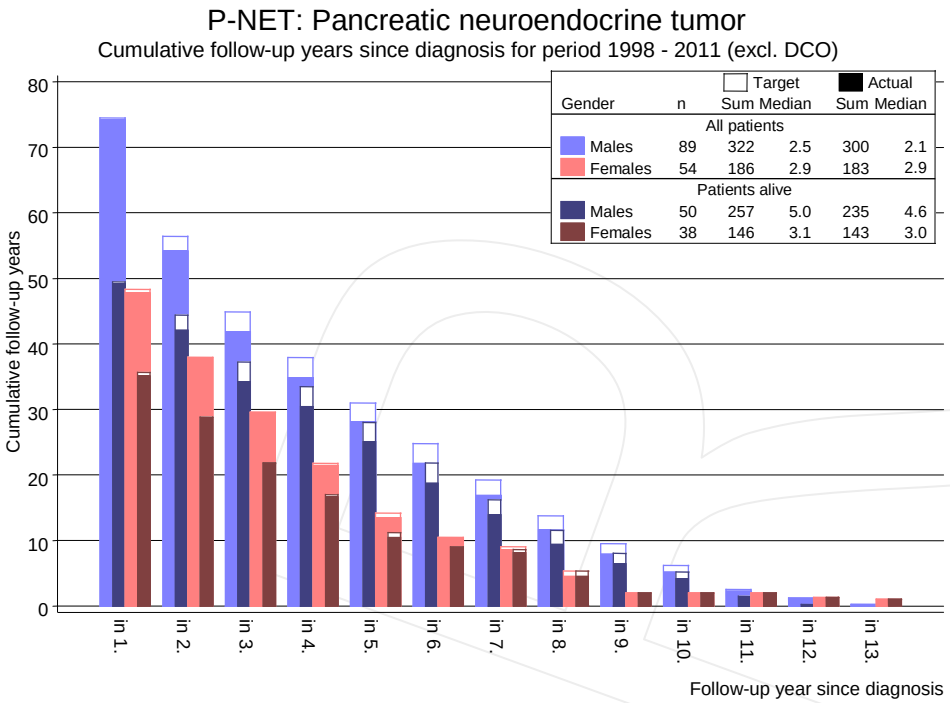
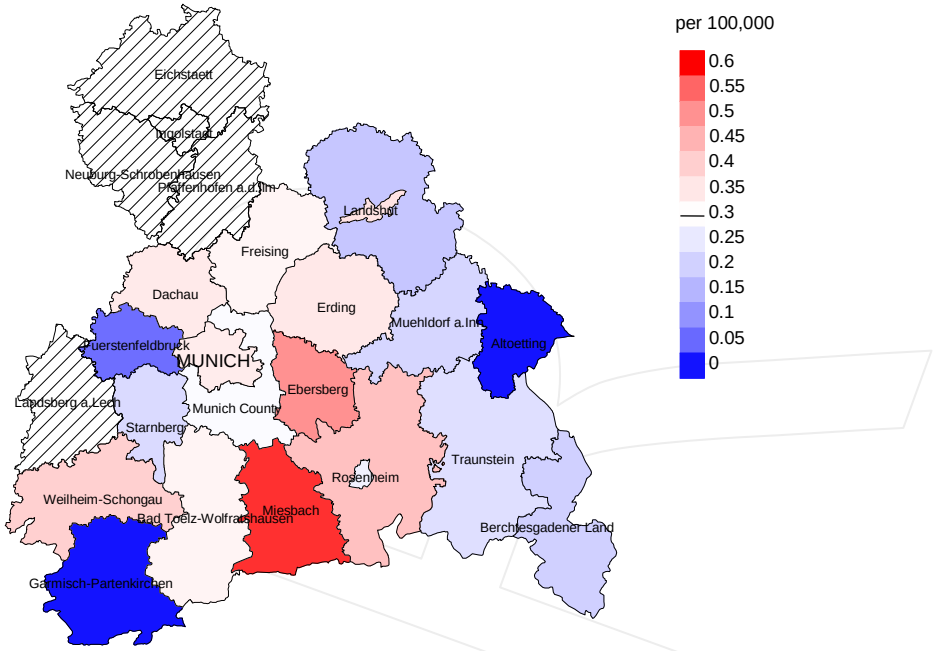


Figure 8. Cumulative follow-up years depending on time since diagnosis

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

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



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

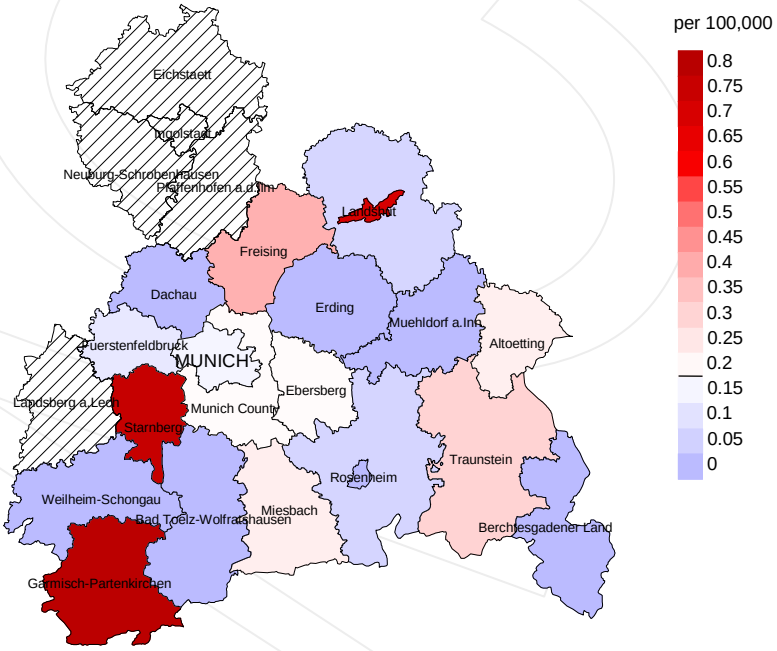
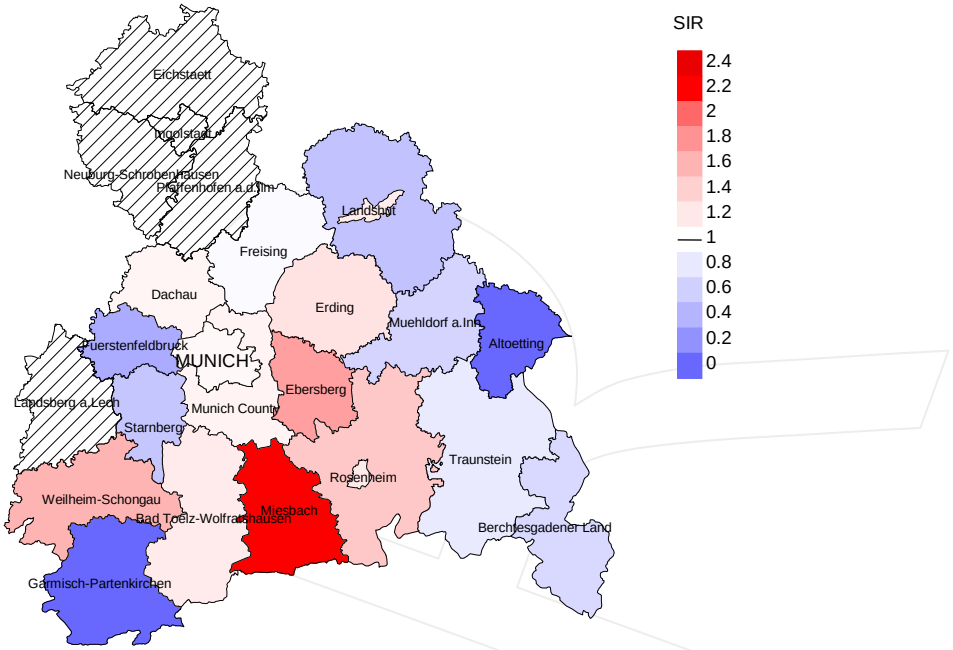


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 0.3/100,000 WS N=54, females 0.2/100,000 WS N=36). 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 1 women were identified with newly diagnosed pancr. neuroend. tumor. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 0.2/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 1.4/100,000.

Standardized incidence ratio (SIR) 2003 - 2008: Males



Standardized incidence ratio (SIR) 2003 - 2008: Females

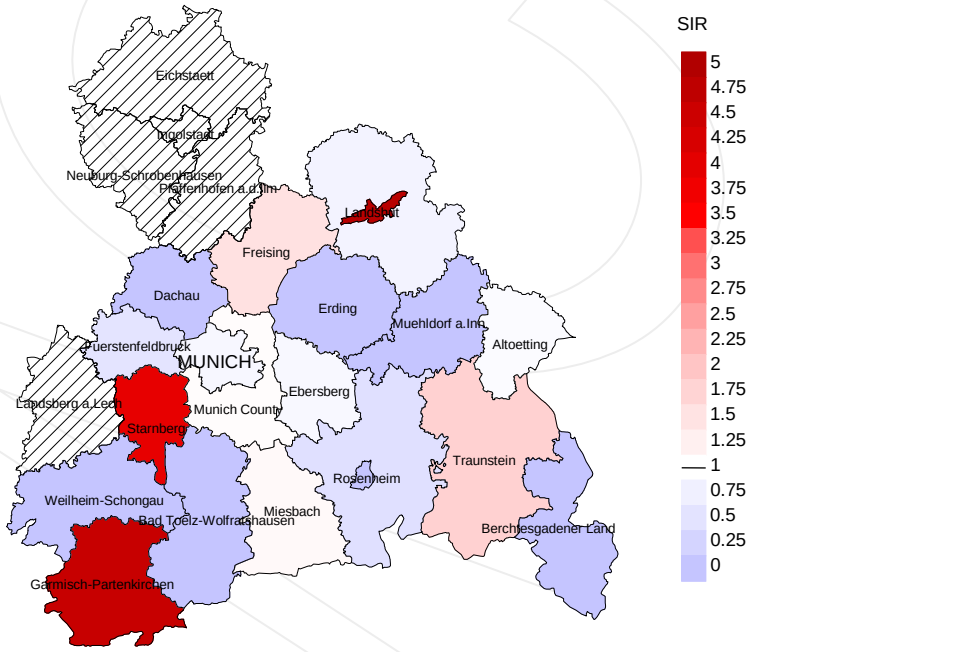


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=54, females N=36). 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 1 women were identified with newly diagnosed pancr. neuroend. tumor. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.89. Though, the value of this parameter may vary with an underlying probability of 99% between 0.00 and 6.63, 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	9	100.0		7	77.8	85.7
1999	6	83.3		3	50.0	100.0
2000	5	100.0		3	60.0	100.0
2001	4	100.0		2	50.0	100.0
2002	13	100.0		7	53.8	85.7
2003	14	92.9		9	64.3	100.0
2004	11	100.0		6	54.5	100.0
2005	16	100.0		7	43.8	100.0
2006	14	100.0		9	64.3	100.0
2007	23	95.7		12	52.2	100.0
2008	16	81.3		4	25.0	100.0
2009	24	87.5		13	54.2	92.3
2010	35	94.3		11	31.4	100.0
2011	36	66.7		6	16.7	100.0
1998-2011	226	89.8		99	43.8	97.0

Table 10b

Annual cohorts of incident cancers and deaths, proportion of death certificates and cases deceased the same year of cancer diagnosis
(incl. DCO)
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002, and from 3.96 to 4.52 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	9	2	50.0	1	11.1
1999	6	6	100.0	2	33.3
2000	5	3	100.0	1	20.0
2001	4	3	100.0		
2002	13	6	100.0	1	7.7
2003	14	7	100.0	2	14.3
2004	11	6	100.0	1	9.1
2005	16	6	100.0	3	18.8
2006	14	7	100.0	2	14.3
2007	23	14	100.0	4	17.4
2008	16	9	100.0	1	6.3
2009	24	11	90.9	6	25.0
2010	35	17	94.1	3	8.6
2011	36	14	100.0	4	11.1
1998-2011	226	111	97.3	31	13.7

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	2	100.0		100.0
1999	6	100.0		100.0
2000	3	100.0		100.0
2001	3	100.0		100.0
2002	6	100.0		83.3
2003	7	100.0		100.0
2004	6	83.3	16.7	83.3
2005	6	100.0		100.0
2006	7	100.0		100.0
2007	14	92.9	7.1	92.9
2008	9	88.9	11.1	88.9
2009	11	81.8	18.2	90.0
2010	17	88.2	11.8	81.3
2011	14	85.7	14.3	100.0
1998-2011	111	91.9	8.1	92.6

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	2	71.9	71.9		65.7
1999	6	61.3	61.3		61.3
2000	2	59.5	59.5		59.5
2001	1	64.6	64.6		64.6
2002	5	66.1	66.1		65.3
2003	4	64.8	64.8		64.8
2004	3	66.7	66.7		66.7
2005	5	72.5	72.5		72.5
2006	7	69.3	69.3		69.3
2007	6	62.5	62.5		62.5
2008	6	55.6	55.6		55.6
2009	5	55.6	58.7	43.5	58.7
2010	10	73.3	72.9	75.1	72.5
2011	6	70.2	70.2		70.2
1998-2011	68	65.8	65.9	64.6	65.4

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

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					
1999					
2000	1	54.7	54.7		54.7
2001	2	69.9	69.9		69.9
2002	1	66.4	66.4		66.4
2003	3	39.8	39.8		39.8
2004	3	58.5	54.8	65.9	54.8
2005	1	90.8	90.8		90.8
2006					
2007	8	63.8	65.9	48.9	65.9
2008	3	74.9	71.5	81.8	71.5
2009	6	64.3	59.8	86.8	59.8
2010	7	61.4	61.4		61.8
2011	8	67.7	64.9	76.0	67.7
1998-2011	43	63.7	62.2	72.6	63.1

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	2	0.2	0.33	0.1	0.34	0.2	0.38	0.2	0.44
1999	6	0.5	1.20	0.3	1.14	0.4	1.06	0.5	1.04
2000	2	0.2	0.67	0.1	0.75	0.2	0.71	0.2	0.67
2001	1	0.1	0.50	0.0	0.50	0.1	0.50	0.1	0.50
2002	5	0.3	0.50	0.2	0.43	0.2	0.44	0.2	0.45
2003	4	0.2	0.67	0.1	0.63	0.2	0.65	0.2	0.69
2004	3	0.2	0.33	0.1	0.30	0.1	0.33	0.2	0.35
2005	5	0.3	0.56	0.1	0.50	0.2	0.53	0.3	0.59
2006	7	0.4	0.58	0.2	0.40	0.3	0.48	0.3	0.53
2007	6	0.3	0.40	0.2	0.36	0.2	0.39	0.3	0.47
2008	6	0.3	1.20	0.2	1.25	0.3	1.25	0.3	1.18
2009	4	0.2	0.31	0.1	0.38	0.2	0.36	0.2	0.30
2010	8	0.4	0.42	0.2	0.35	0.3	0.40	0.4	0.45
2011	6	0.3	0.33	0.1	0.26	0.2	0.28	0.2	0.33
1998-2011	65	0.3	0.49	0.1	0.46	0.2	0.48	0.3	0.51

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									
1999									
2000	1	0.1	0.50	0.1	0.63	0.1	0.68	0.1	0.57
2001	2	0.2	1.00	0.1	0.87	0.1	0.98	0.2	1.11
2002	1	0.1	0.33	0.0	0.62	0.0	0.52	0.0	0.41
2003	3	0.2	0.38	0.1	0.47	0.1	0.38	0.2	0.38
2004	2	0.1	1.00	0.1	0.96	0.1	0.88	0.1	0.92
2005	1	0.1	0.14	0.0	0.05	0.0	0.07	0.0	0.09
2006									
2007	7	0.3	0.88	0.2	0.85	0.2	0.87	0.3	0.84
2008	2	0.1	0.18	0.0	0.16	0.1	0.18	0.1	0.20
2009	5	0.2	0.45	0.1	0.53	0.2	0.52	0.2	0.45
2010	7	0.3	0.44	0.2	0.45	0.2	0.41	0.3	0.43
2011	6	0.3	0.33	0.1	0.29	0.2	0.30	0.2	0.34
1998-2011	37	0.1	0.39	0.1	0.39	0.1	0.39	0.1	0.39

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.%
15-19	1	1.0	1.0	1	1.5	1.5			0.0
20-24	0	0.0	1.0			1.5			0.0
25-29	2	2.0	2.9			1.5	2	5.4	5.4
30-34	0	0.0	2.9			1.5			5.4
35-39	3	2.9	5.9	2	3.1	4.6	1	2.7	8.1
40-44	2	2.0	7.8			4.6	2	5.4	13.5
45-49	4	3.9	11.8			4.6	4	10.8	24.3
50-54	10	9.8	21.6	6	9.2	13.8	4	10.8	35.1
55-59	6	5.9	27.5	4	6.2	20.0	2	5.4	40.5
60-64	18	17.6	45.1	15	23.1	43.1	3	8.1	48.6
65-69	21	20.6	65.7	16	24.6	67.7	5	13.5	62.2
70-74	13	12.7	78.4	6	9.2	76.9	7	18.9	81.1
75-79	14	13.7	92.2	10	15.4	92.3	4	10.8	91.9
80-84	6	5.9	98.0	4	6.2	98.5	2	5.4	97.3
85+	2	2.0	100.0	1	1.5	100.0	1	2.7	100.0
All ages	102	100.0		65	100.0		37	100.0	

Included in the statistics are 34.8% multiple primaries in males and 22.3% 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	1		0.1	1.00	0.0		2.6	
20-24			0.0		0.0			
25-29		2	0.0		0.1	1.00		2.0
30-34			0.0		0.0			
35-39	2	1	0.1	0.40	0.0	0.25	0.5	0.2
40-44		2	0.0		0.1	0.29		0.2
45-49		4	0.0		0.2	0.36		0.2
50-54	6	4	0.4	0.50	0.2	0.67	0.2	0.2
55-59	4	2	0.3	0.31	0.1	0.17	0.1	0.0
60-64	15	3	1.0	0.56	0.2	0.60	0.2	0.1
65-69	16	5	1.2	0.70	0.3	0.38	0.2	0.1
70-74	6	7	0.6	0.38	0.6	0.47	0.1	0.1
75-79	10	4	1.5	0.83	0.4	0.40	0.1	0.0
80-84	4	2	1.0	0.80	0.3	0.40	0.0	0.0
85+	1	1	0.4	1.00	0.1	1.00	0.0	0.0
All ages	65	37					0.1	0.1
Mortality								
Raw			0.3	0.49	0.1	0.39		
WS			0.1	0.46	0.1	0.39		
ES			0.2	0.48	0.1	0.39		
BRD-S			0.3	0.51	0.1	0.39		
PYLL-70								
per 100,000			1.9		1.7			
ES			1.7		1.6			
AYLL-70			9.7		17.1			

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	4	21.1	4	100.0				
C18	Colon	2	10.5	1	50.0	1	50.0		
C19-C20	Rectum	1	5.3			1	100.0		
C23-C24	Bile	1	5.3	1	100.0				
C25	Pancreas	1	5.3			1	100.0		
C33-C34	Lung	1	5.3	1	100.0				
C43	Malign. melanoma	2	10.5	2	100.0				
C44	Skin others	1	5.3	1	100.0				
C61	Prostate	5	26.3	4	80.0			1	20.0
C67	Bladder	1	5.3	1	100.0				
All mult. primaries		19	100.0	15	78.9	3	15.8	1	5.3

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 ←%
C16	Stomach	1	20.0					1	100.0
C23-C24	Bile	1	20.0			1	100.0		
C33-C34	Lung	1	20.0					1	100.0
C50	Breast	1	20.0					1	100.0
C73	Thyroid	1	20.0	1	100.0				
All mult. primaries		5	100.0	1	20.0	1	20.0	3	60.0

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	1		0.1	1.00	0.0		2.9	
20-24			0.0		0.0			
25-29		2	0.0		0.1	1.00		2.1
30-34			0.0		0.0			
35-39	2	1	0.1	0.40	0.0	0.25	0.6	0.2
40-44		2	0.0		0.1	0.33		0.2
45-49		3	0.0		0.2	0.30		0.2
50-54	6	4	0.4	0.50	0.2	0.80	0.2	0.2
55-59	2	2	0.1	0.20	0.1	0.22	0.0	0.1
60-64	13	3	0.9	0.59	0.2	0.60	0.2	0.1
65-69	14	5	1.0	0.82	0.3	0.42	0.2	0.1
70-74	5	7	0.5	0.50	0.6	0.54	0.1	0.1
75-79	4	3	0.6	0.67	0.3	0.38	0.0	0.0
80-84	4	2	1.0	1.00	0.3	0.50	0.1	0.0
85+	1	1	0.4	1.00	0.1	1.00	0.0	0.0
All ages	52	35					0.1	0.1
Mortality								
Raw			0.2	0.50	0.1	0.43		
WS			0.1	0.47	0.1	0.42		
ES			0.2	0.48	0.1	0.42		
BRD-S			0.2	0.51	0.1	0.42		
PYLL-70								
per 100,000			1.7		1.6			
ES			1.6		1.5			
AYLL-70			10.0		16.8			

* 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	1		0.1	1.00	0.0		2.9	
20-24			0.0		0.0			
25-29		2	0.0		0.1	1.00		2.2
30-34			0.0		0.0			
35-39	2	1	0.1	0.40	0.0	0.33	0.6	0.3
40-44		2	0.0		0.1	0.33		0.3
45-49		2	0.0		0.1	0.22		0.1
50-54	6	4	0.4	0.50	0.2	0.80	0.3	0.2
55-59	2	2	0.1	0.20	0.1	0.22	0.0	0.1
60-64	13	3	0.9	0.65	0.2	0.75	0.2	0.1
65-69	14	3	1.0	0.82	0.2	0.30	0.2	0.1
70-74	4	7	0.4	0.44	0.6	0.58	0.1	0.1
75-79	4	3	0.6	0.80	0.3	0.38	0.1	0.0
80-84	4	2	1.0	1.00	0.3	0.50	0.1	0.0
85+	1	1	0.4	1.00	0.1	1.00	0.0	0.0
All ages	51	32					0.1	0.1
Mortality								
Raw			0.2	0.51	0.1	0.42		
WS			0.1	0.47	0.1	0.41		
ES			0.2	0.49	0.1	0.41		
BRD-S			0.2	0.52	0.1	0.41		
PYLL-70								
per 100,000			1.7		1.5			
ES			1.6		1.4			
AYLL-70			10.0		18.0			

* See corresponding tables with multiple primaries.

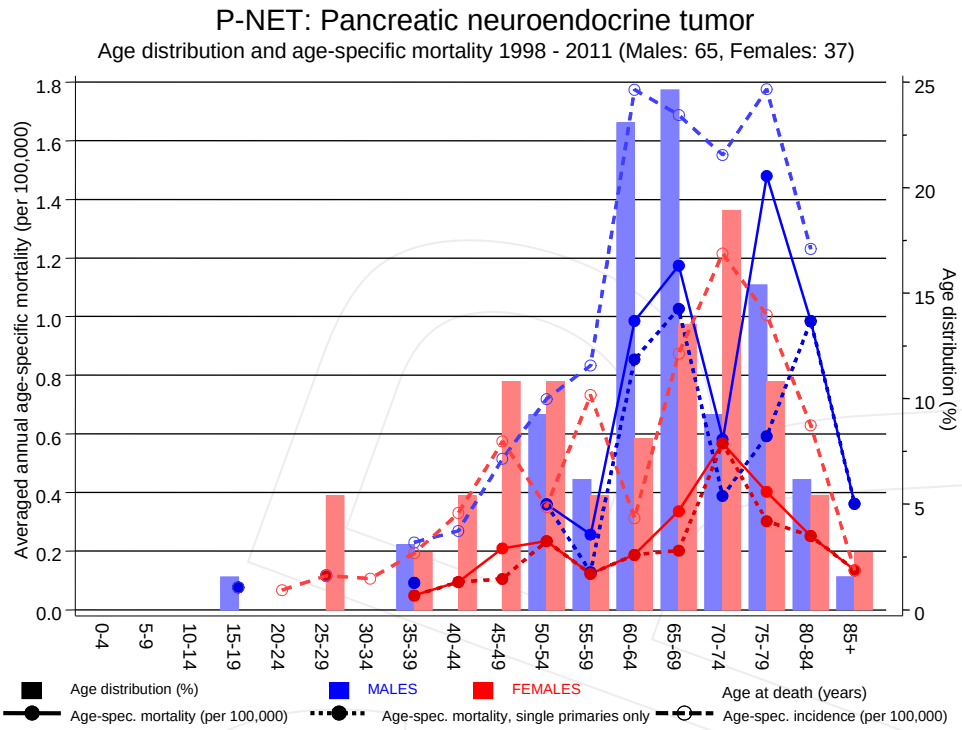
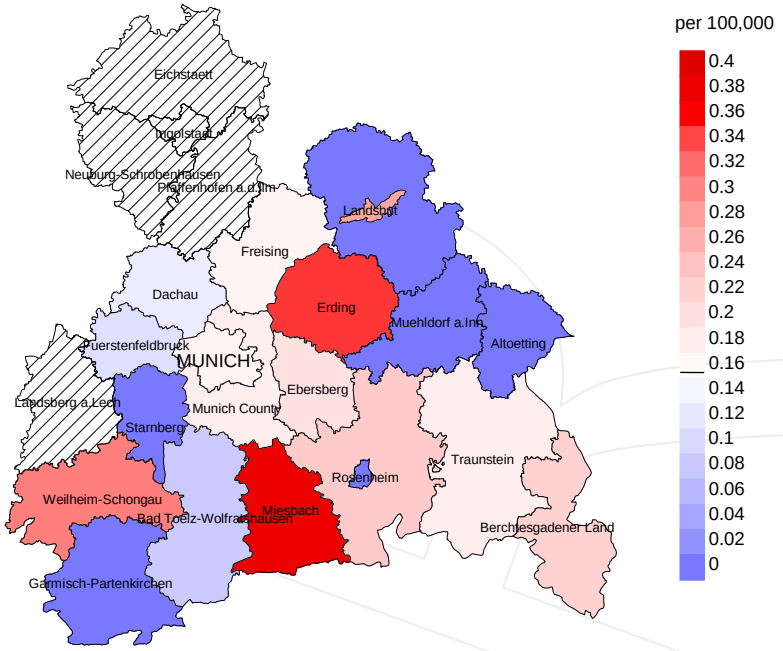


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

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



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

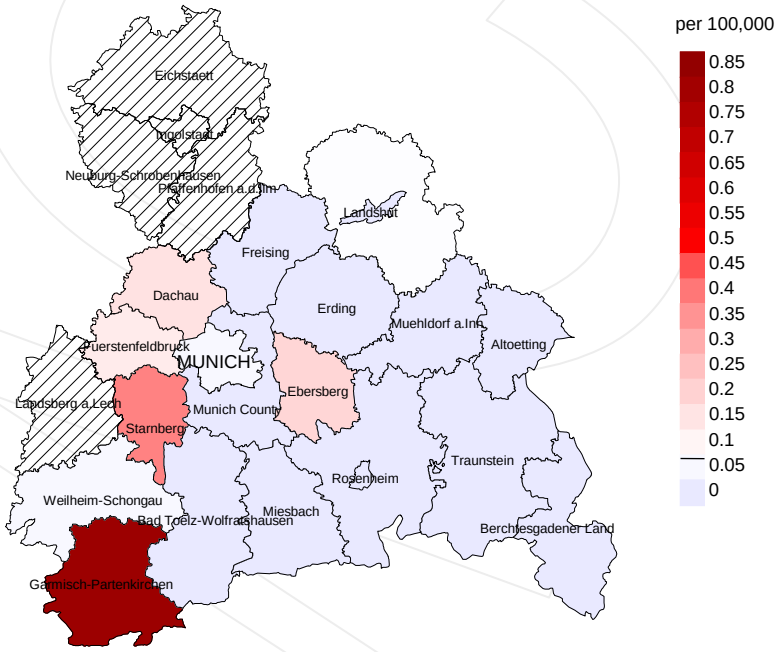
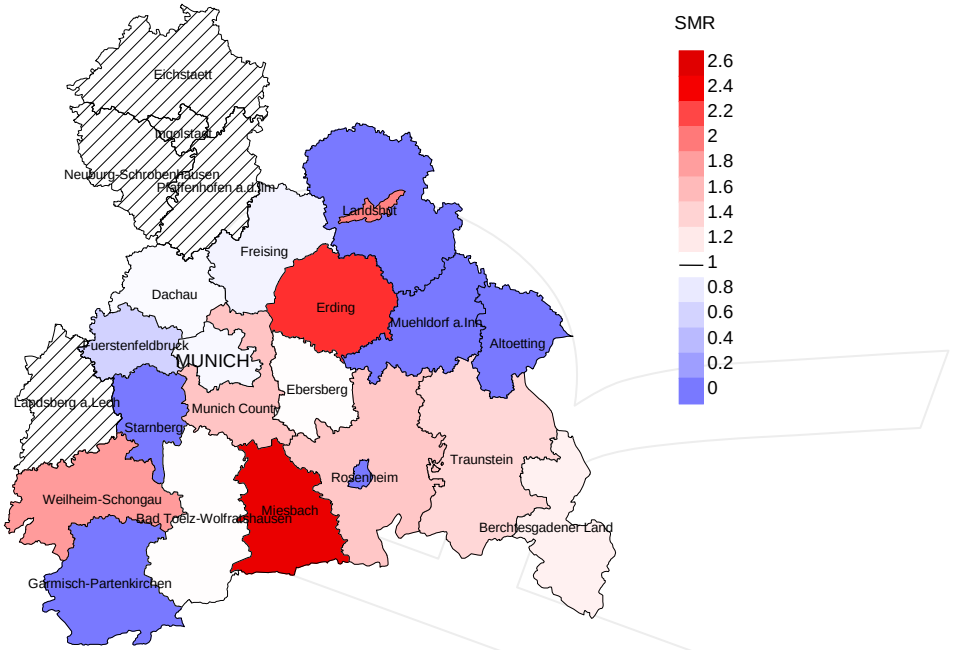


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 0.2/100,000 WS N=31, females 0.1/100,000 WS N=14). 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 1 women died from pancr. neuroend. tumor. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.2/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 1.4/100,000.

Standardized mortality ratio (SMR) 2003 - 2008: Males



Standardized mortality ratio (SMR) 2003 - 2008: Females

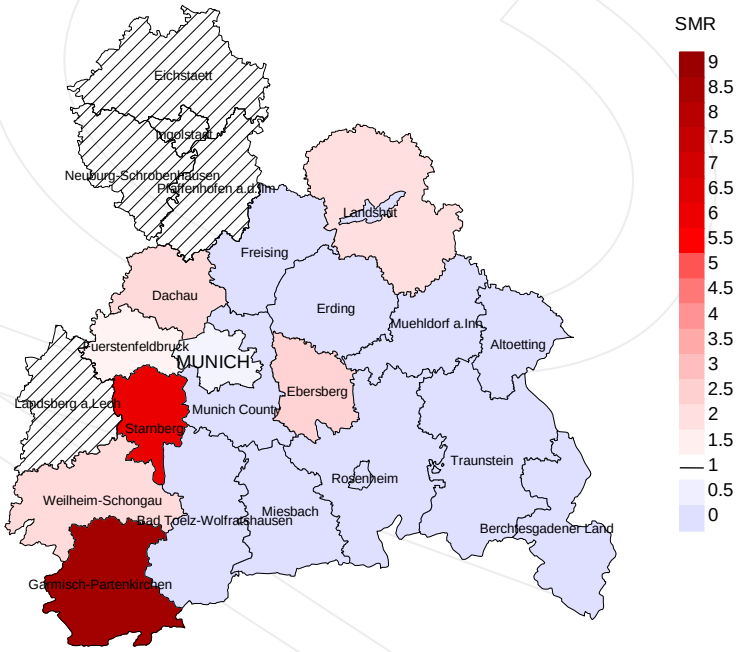


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=31, females N=14). 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 1 women died from pancr. neuroend. tumor. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 2.37. Though, the value of this parameter may vary with an underlying probability of 99% between 0.01 and 17.61, 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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