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

GI-NET: Gastroint. neuroend. tumor

Year of diagnosis	1998-2012
Patients	1,587
Diseases	1,600
Creation date	03/20/2014
Export date	02/12/2014
Population	4.5 m

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

ICD-10 codes used for specifying cancer site

Code	Description
C16	Stomach
C17	Small intestine
C18	Colon
C19	Rectosigmoid junction
C20	Rectum

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

Code	Description
8013/3	Large cell neuroendocrine carcinoma
8041/3	Small cell carcinoma, NOS
8152/1	Glucagonoma, NOS
8153/3	Gastrinoma, malignant
8156/3	Somatostatinoma, malignant
8240/3	Carcinoid tumor, NOS
8241/3	Enterochromaffin cell carcinoid
8243/3	Goblet cell carcinoid
8244/3	Composite carcinoid
8245/1	Tubular carcinoid
8246/3	Neuroendocrine carcinoma, NOS
8249/3	Atypical carcinoid tumor
8683/0	Gangliocytic paraganglioma

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	45			24.4	60.0	100.0	
1999	53			22.6	50.9	94.3	
2000	41			26.8	41.5	97.6	
2001	48			37.5	45.8	100.0	
2002	76			22.4	40.8	96.1	#
2003	77			31.2	48.1	94.8	#
2004	109			29.4	40.4	93.6	#
2005	98			31.6	44.9	92.9	#
2006	135			29.6	40.7	90.4	#
2007	145			29.7	35.9	77.9	# ##
2008	151			24.5	33.8	62.3	
2009	147			26.5	32.7	61.2	
2010	156			27.6	23.7	61.5	
2011	163			23.3	19.0	69.9	
2012	156			27.6	18.6	97.4	###
1998-2012	1600			27.4	34.5	81.4	

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	45	24	21	53.3
1999	53	25	28	47.2
2000	41	19	22	46.3
2001	48	27	21	56.3
2002	76	38	38	50.0
2003	77	42	35	54.5
2004	109	59	50	54.1
2005	98	54	44	55.1
2006	135	79	56	58.5
2007	145	93	52	64.1
2008	151	77	74	51.0
2009	147	77	70	52.4
2010	156	78	78	50.0
2011	163	90	73	55.2
2012	156	74	82	47.4
1998-2012	1600	856	744	53.5

Table 2

Incidence measures by year of diagnosis and gender including DCO cases
(with respect to registry area expansion from 2.51 to 3.96 m as of 2002,
and from 3.96 to 4.52 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	24	21	2.2	1.8	1.3	1.0	1.9	1.3	2.2	1.6
1999	25	28	2.2	2.4	1.6	1.5	2.0	1.9	2.2	2.1
2000	19	22	1.7	1.8	1.0	1.0	1.5	1.4	1.8	1.6
2001	27	21	2.3	1.7	1.4	1.1	2.1	1.4	2.4	1.6
2002	38	38	2.0	1.9	1.3	1.2	1.8	1.5	2.0	1.8
2003	42	35	2.2	1.8	1.3	1.0	1.9	1.4	2.2	1.6
2004	59	50	3.1	2.5	1.9	1.5	2.6	1.9	3.2	2.3
2005	54	44	2.9	2.2	1.7	1.1	2.4	1.6	2.9	1.9
2006	79	56	4.1	2.8	2.2	1.6	3.2	2.1	4.0	2.4
2007	93	52	4.2	2.3	2.6	1.3	3.5	1.7	4.1	1.9
2008	77	74	3.5	3.2	2.0	1.8	2.8	2.3	3.4	2.8
2009	77	70	3.5	3.0	2.0	1.8	2.8	2.3	3.3	2.7
2010	78	78	3.5	3.3	2.0	2.1	2.8	2.7	3.2	3.0
2011	90	73	3.9	3.1	2.1	1.9	3.0	2.4	3.7	2.8
2012	74	82	3.2	3.5	1.8	2.3	2.5	2.7	3.1	3.2
1998-2012	856	744	3.1	2.6	1.8	1.6	2.6	2.0	3.1	2.3

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	45	63.5	15.2	13.2	87.9	46.6	56.0	64.1	72.5	83.3
1999	53	57.8	16.3	24.9	87.9	29.8	49.4	59.9	67.7	75.0
2000	41	61.8	16.8	24.7	92.1	39.8	49.5	61.0	75.5	80.6
2001	48	61.9	12.7	29.6	88.5	47.7	54.0	61.7	70.5	79.8
2002	76	61.6	16.3	17.7	90.9	35.0	51.2	63.5	73.1	80.3
2003	77	63.2	13.3	23.5	87.5	50.4	56.6	63.6	72.3	79.2
2004	109	61.5	14.9	13.8	93.3	39.1	52.8	63.9	72.2	78.3
2005	98	65.1	14.8	16.1	90.8	46.9	57.6	66.8	75.5	82.5
2006	135	64.8	12.3	29.9	91.9	46.4	56.2	66.3	73.8	79.9
2007	145	62.0	15.6	15.8	91.2	40.4	54.8	64.3	71.3	81.2
2008	151	63.3	14.8	18.9	93.9	44.8	54.7	65.8	73.1	79.9
2009	147	63.2	16.5	12.4	92.6	38.6	54.7	64.5	75.1	84.0
2010	156	61.1	14.3	14.9	92.4	41.4	53.9	61.5	71.5	78.5
2011	163	63.1	16.3	17.1	92.9	41.4	52.0	65.1	76.0	82.2
2012	156	60.9	18.8	13.7	90.6	28.8	50.4	65.0	75.0	80.4
1998-2012	1600	62.5	15.5	12.4	93.9	41.1	54.1	64.4	73.4	80.4

Table 3a

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	24	62.1	11.4	32.1	81.7	46.6	56.9	63.8	66.5	76.6
1999	25	55.4	17.1	24.9	85.3	27.4	43.0	59.2	66.5	73.7
2000	19	62.1	15.1	37.4	92.1	39.0	49.5	60.1	74.4	80.6
2001	27	62.1	11.9	34.3	88.5	50.5	54.0	60.0	69.1	79.8
2002	38	61.7	13.1	27.1	88.3	42.3	56.4	62.7	70.6	76.2
2003	42	64.5	10.0	32.4	85.0	55.0	58.8	63.9	70.9	76.7
2004	59	62.2	11.9	27.8	78.9	47.7	53.9	63.9	71.4	76.5
2005	54	64.4	13.7	19.0	87.6	48.7	57.8	66.5	74.8	77.6
2006	79	65.8	10.3	38.5	85.7	49.5	59.1	67.4	73.5	77.9
2007	93	61.5	15.0	15.8	91.2	39.7	55.2	63.6	69.6	78.7
2008	77	63.7	12.1	19.3	85.6	49.5	56.2	65.5	71.9	79.1
2009	77	64.7	13.8	12.4	89.0	47.7	56.9	65.4	74.6	81.8
2010	78	62.9	12.6	26.3	92.4	47.1	55.7	63.2	71.7	78.1
2011	90	65.8	13.1	32.0	89.3	46.0	56.6	67.8	76.7	81.7
2012	74	63.5	15.1	25.8	89.0	42.5	53.5	65.6	75.3	80.4
1998-2012	856	63.4	13.2	12.4	92.4	46.4	56.2	64.6	72.7	78.9

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	21	65.0	18.8	13.2	87.9	47.0	55.5	65.4	80.7	84.2
1999	28	59.9	15.4	26.9	87.9	38.4	51.0	62.0	72.2	76.9
2000	22	61.5	18.4	24.7	92.0	39.8	46.0	62.0	78.5	81.0
2001	21	61.6	14.0	29.6	84.4	47.7	53.9	62.6	71.8	75.7
2002	38	61.6	19.2	17.7	90.9	30.6	49.1	64.5	74.8	84.7
2003	35	61.7	16.5	23.5	87.5	33.0	53.0	63.2	74.0	79.9
2004	50	60.7	18.0	13.8	93.3	35.0	51.7	63.9	75.5	79.1
2005	44	65.9	16.1	16.1	90.8	40.7	56.6	68.7	78.4	83.0
2006	56	63.5	14.7	29.9	91.9	43.5	51.8	64.0	74.0	82.8
2007	52	62.9	16.9	17.8	88.4	41.7	53.5	65.3	74.3	81.7
2008	74	62.9	17.2	18.9	93.9	39.2	51.9	67.0	73.1	82.2
2009	70	61.5	19.0	15.9	92.6	35.1	49.4	62.6	76.5	84.6
2010	78	59.2	15.6	14.9	89.6	38.2	50.8	60.2	70.1	78.8
2011	73	59.9	19.2	17.1	92.9	30.4	50.1	61.4	73.0	84.5
2012	82	58.6	21.5	13.7	90.6	21.9	46.7	63.5	74.7	80.4
1998-2012	744	61.4	17.7	13.2	93.9	35.2	50.8	63.9	74.3	82.3

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.%
10-14	5	0.3	0.3	1	0.1	0.1	4	0.5	0.5
15-19	19	1.2	1.5	3	0.4	0.5	16	2.2	2.7
20-24	16	1.0	2.5	2	0.2	0.7	14	1.9	4.6
25-29	29	1.8	4.3	13	1.5	2.2	16	2.2	6.7
30-34	38	2.4	6.7	16	1.9	4.1	22	3.0	9.7
35-39	39	2.4	9.1	12	1.4	5.5	27	3.6	13.3
40-44	56	3.5	12.6	29	3.4	8.9	27	3.6	16.9
45-49	97	6.1	18.7	47	5.5	14.4	50	6.7	23.7
50-54	128	8.0	26.7	69	8.1	22.4	59	7.9	31.6
55-59	168	10.5	37.2	104	12.1	34.6	64	8.6	40.2
60-64	229	14.3	51.5	139	16.2	50.8	90	12.1	52.3
65-69	236	14.8	66.3	148	17.3	68.1	88	11.8	64.1
70-74	194	12.1	78.4	103	12.0	80.1	91	12.2	76.3
75-79	178	11.1	89.5	102	11.9	92.1	76	10.2	86.6
80-84	101	6.3	95.8	47	5.5	97.5	54	7.3	93.8
85+	67	4.2	100.0	21	2.5	100.0	46	6.2	100.0
All ages	1600	100.0		856	100.0		744	100.0	

Included in the statistics are 40.7% multiple primaries in males and 27.7% 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=0 %	Females DCO rate n=0 %	Males Prop.all cancers n=146755 %	Females Prop.all cancers n=142297 %
0- 4			0.0	0.0				
5- 9			0.0	0.0				
10-14	1	4	0.1	0.3			0.7	2.5
15-19	3	16	0.2	1.2			0.9	6.0
20-24	2	14	0.1	0.9			0.4	2.9
25-29	13	16	0.7	0.9			1.5	1.6
30-34	16	22	0.8	1.1			1.1	1.2
35-39	12	27	0.5	1.2			0.6	0.8
40-44	29	27	1.2	1.2			1.0	0.5
45-49	47	50	2.2	2.4			1.0	0.6
50-54	69	59	3.7	3.1			0.9	0.6
55-59	104	64	6.1	3.6			0.8	0.5
60-64	135	89	8.2	5.1			0.7	0.6
65-69	147	88	10.0	5.5			0.6	0.5
70-74	103	91	8.9	6.6			0.4	0.5
75-79	101	74	13.4	6.8			0.5	0.5
80-84	46	54	10.1	6.3			0.4	0.4
85+	21	46	6.8	5.6			0.2	0.3
All ages	849	741			0.0	0.0	0.6	0.5
Incidence								
Raw			3.1	2.6				
WS			1.8	1.5				
ES			2.5	2.0				
BRD-S			3.1	2.3				

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 1998-2012
MALES

Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C16	Stomach	4	1.2	3.3	0.9	8.5		12.9	
C17	Small intestine	2	0.2	12.9	1.6	46.6	#	8.5	
C18	Colon	16	2.9	5.5	3.1	8.9	#	60.4	
C19-C20	Rectum	11	1.8	6.2	3.1	11.1	#	42.6	
C22	Liver	6	0.9	6.9	2.5	15.0	#	23.7	16.7
C23-C24	Bile	2	0.3	7.0	0.8	25.3		7.9	
C25	Pancreas	7	1.1	6.6	2.6	13.5	#	27.4	
C33-C34	Lung	5	3.7	1.3	0.4	3.1		6.0	20.0
C43	Malign. melanoma	4	1.3	3.1	0.8	7.9		12.5	
C61	Prostate	18	9.3	1.9	1.2	3.1	#	40.4	
C64	Kidney	6	1.1	5.3	1.9	11.6	#	22.5	
C65	Renal pelvis	2	0.1	17.0	2.1	61.5	#	8.7	
C67	Bladder	2	1.2	1.6	0.2	5.9		3.6	
C73	Thyroid	2	0.2	8.5	1.0	30.9	#	8.2	
C76-C79	CUP	2	0.5	4.0	0.5	14.4		6.9	
C82-C85	NHL	5	1.2	4.2	1.4	9.8	#	17.6	
C91-C96	Leukaemia	2	0.5	4.3	0.5	15.5		7.1	100.0
Other primaries		7	1.9	3.8	1.5	7.7	#	23.7	
Not observed		0	2.1	0.0	0.0	1.8		-9.5	
All mult. primaries		103	31.3	3.3	2.7	4.0	#	331.1	3.9

Patients	590
Mean age at second malignancy (years)	68.6
Person-years	2165
Mean observation time (years)	3.7
Median observation time (years)	2.8

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	4	0.7	5.8	1.6	14.8	#	17.2	25.0
C18	Colon	11	1.9	5.8	2.9	10.4	#	47.3	
C19-C20	Rectum	6	0.8	7.1	2.6	15.5	#	26.8	16.7
C25	Pancreas	6	0.8	7.4	2.7	16.1	#	27.0	
C33-C34	Lung	4	1.4	3.0	0.8	7.6		13.8	
C43	Malign. melanoma	2	0.7	2.9	0.3	10.4		6.8	
C50	Breast	8	6.0	1.3	0.6	2.6		10.4	
C54	Corpus uteri	2	1.1	1.8	0.2	6.7		4.8	
C56	Ovary	3	0.8	3.7	0.8	10.8		11.4	33.3
C64	Kidney	3	0.5	6.3	1.3	18.5	#	13.1	33.3
C82-C85	NHL	5	0.7	6.9	2.2	16.0	#	22.2	
Other primaries		5	1.1	4.5	1.5	10.6	#	20.3	
Not observed		0	3.0	0.0	0.0	1.2		-15.3	
All mult. primaries		59	19.4	3.0	2.3	3.9	#	205.7	6.8

Patients	479
Mean age at second malignancy (years)	70.6
Person-years	1923
Mean observation time (years)	4.0
Median observation time (years)	3.0

The occurrence of second malignancy is statistically significant.

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

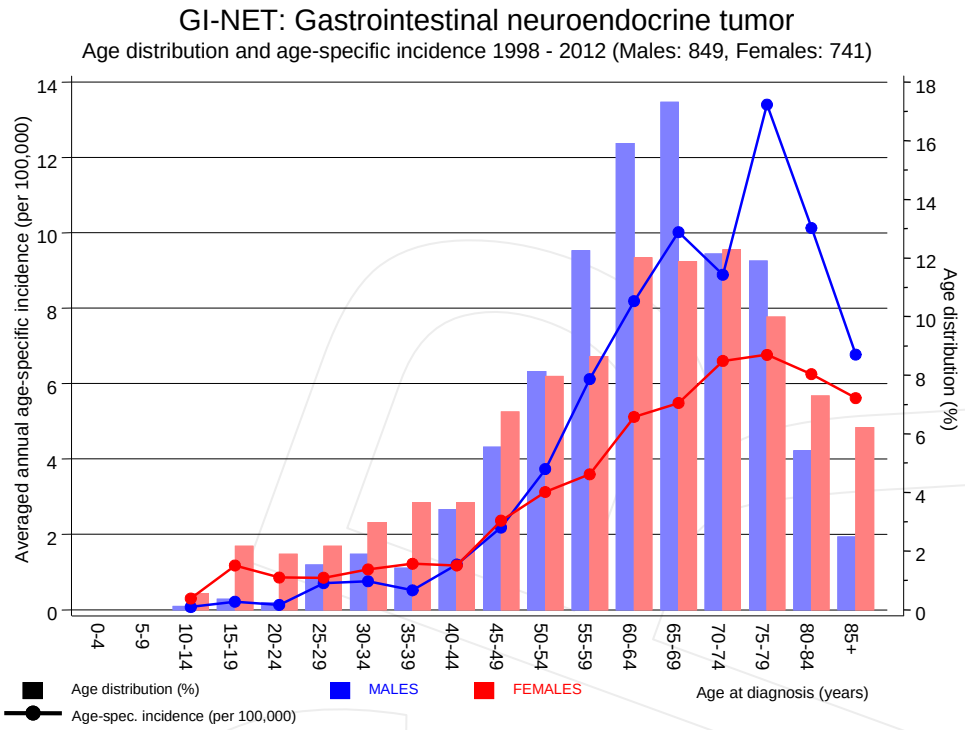


Figure 7. Age distribution and age-specific incidence

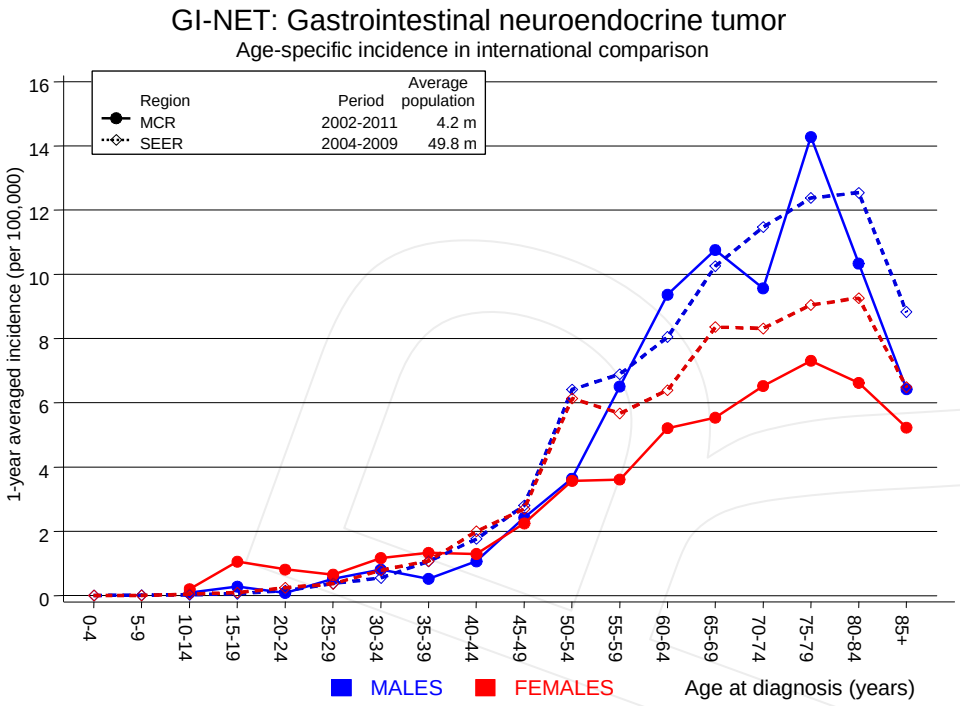


Figure 7a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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.

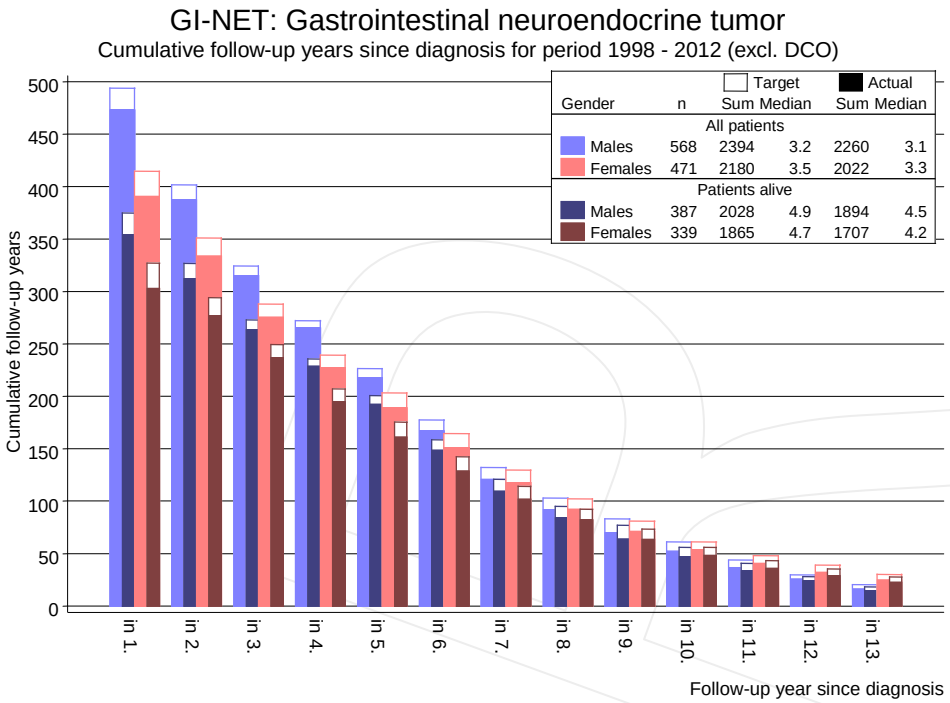
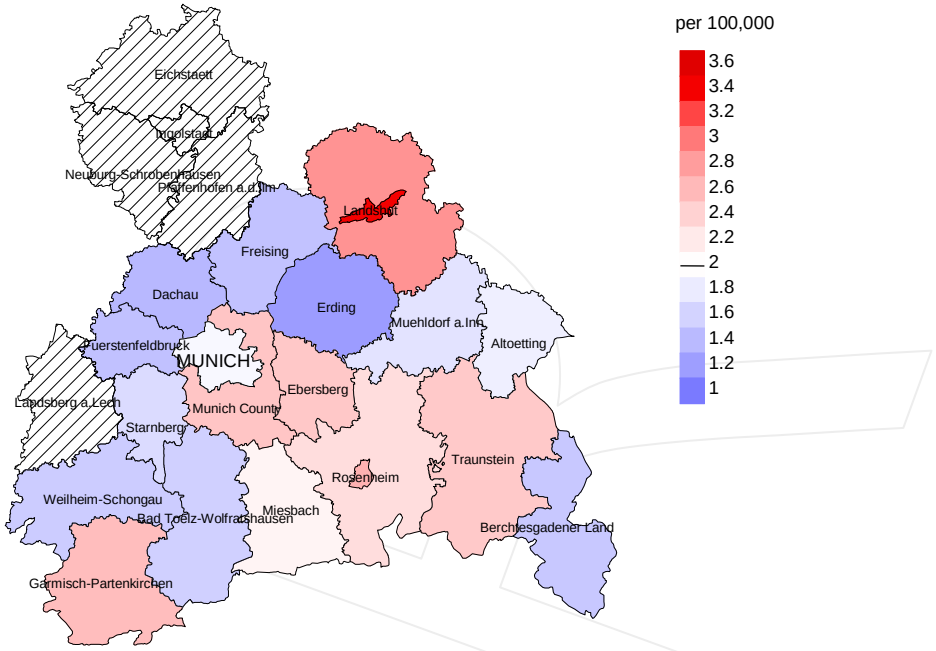


Figure 8. Cumulative follow-up years depending on time since diagnosis

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

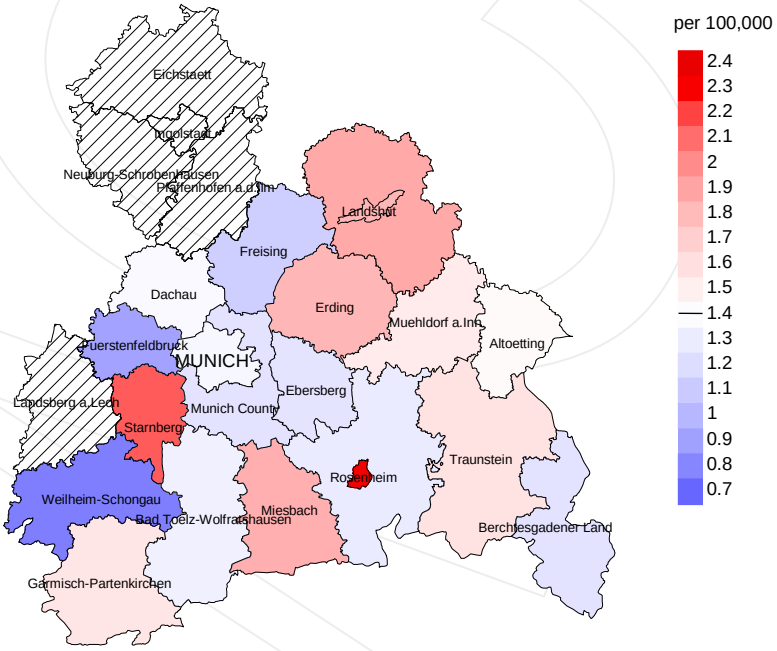
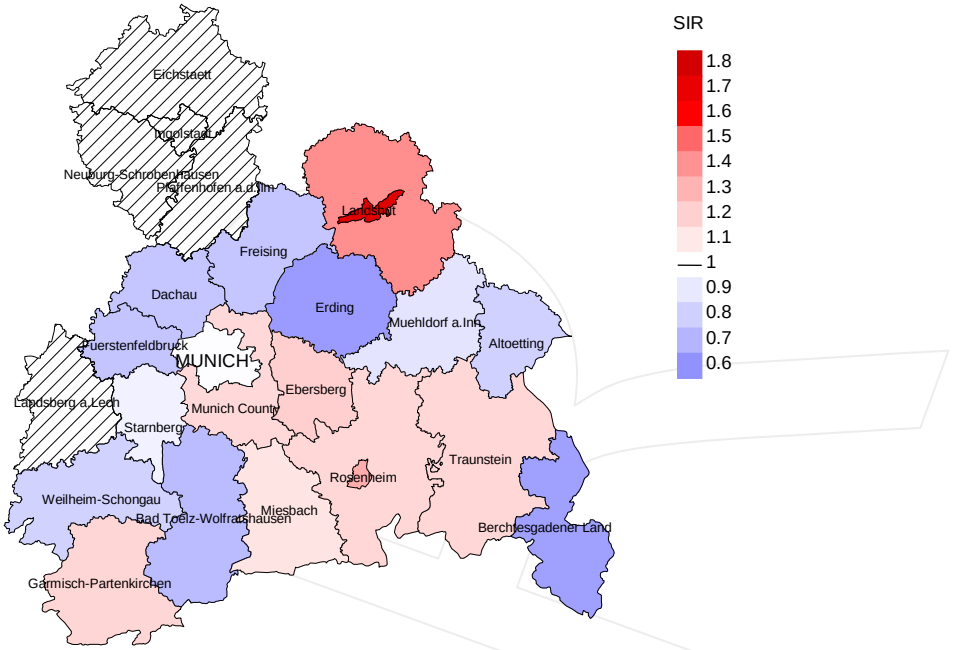


Figure 9a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 2.0/100,000 WS N=388, females 1.4/100,000 WS N=303). 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 10 women were identified with newly diagnosed gastroint. neuroend. tumor. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 1.2/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.4 and 3.0/100,000.

Standardized incidence ratio (SIR) 2003 - 2008: Males



Standardized incidence ratio (SIR) 2003 - 2008: Females

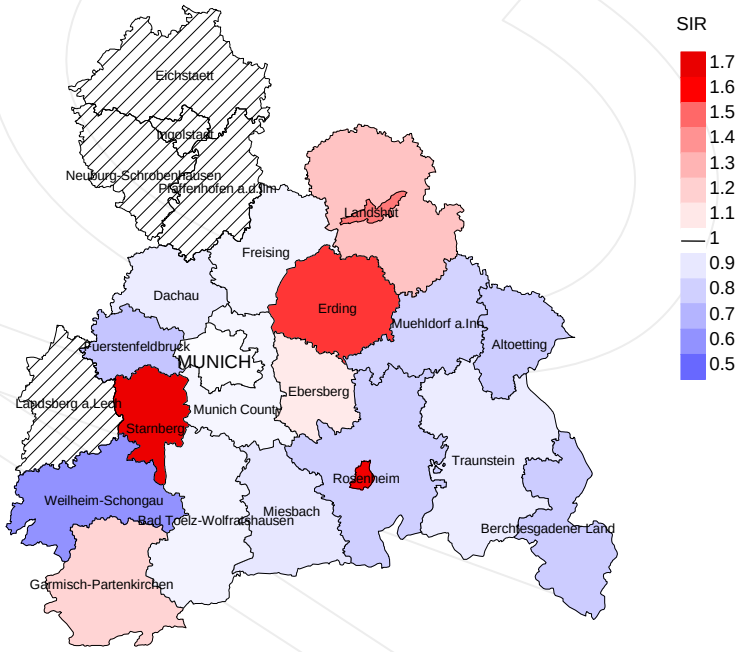


Figure 9b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=388, females N=303). 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 10 women were identified with newly diagnosed gastroint. neuroend. tumor. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.09. Though, the value of this parameter may vary with an underlying probability of 99% between 0.41 and 2.34, 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	45	100.0		27	60.0	92.6
1999	53	94.3		27	50.9	100.0
2000	41	97.6		17	41.5	88.2
2001	48	100.0		22	45.8	90.9
2002	76	96.1		31	40.8	100.0
2003	77	94.8		37	48.1	97.3
2004	109	93.6		44	40.4	97.7
2005	98	92.9		44	44.9	97.7
2006	135	90.4		55	40.7	98.2
2007	145	77.9		52	35.9	94.2
2008	151	62.3		51	33.8	96.1
2009	147	61.2		48	32.7	100.0
2010	156	61.5		37	23.7	91.9
2011	163	69.9		31	19.0	93.5
2012	156	97.4		29	18.6	96.6
1998-2012	1600	81.4		552	34.5	96.2

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	45	9	88.9	4	8.9
1999	53	9	100.0	4	7.5
2000	41	20	95.0	5	12.2
2001	48	10	100.0	3	6.3
2002	76	19	100.0	8	10.5
2003	77	33	97.0	11	14.3
2004	109	37	100.0	10	9.2
2005	98	46	93.5	16	16.3
2006	135	41	95.1	11	8.1
2007	145	53	98.1	12	8.3
2008	151	64	95.3	17	11.3
2009	147	64	100.0	18	12.2
2010	156	59	98.3	18	11.5
2011	163	54	96.3	12	7.4
2012	156	75	97.3	22	14.1
1998-2012	1600	593	97.1	171	10.7

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	9	77.8	22.2	62.5
1999	9	88.9	11.1	88.9
2000	20	65.0	35.0	73.7
2001	10	80.0	20.0	80.0
2002	19	78.9	21.1	89.5
2003	33	63.6	36.4	78.1
2004	37	73.0	27.0	78.4
2005	46	65.2	34.8	76.7
2006	41	82.9	17.1	87.2
2007	53	79.2	20.8	80.8
2008	64	84.4	15.6	93.4
2009	64	65.6	34.4	76.6
2010	59	69.5	30.5	75.9
2011	54	77.8	22.2	86.5
2012	75	72.0	28.0	78.1
1998-2012	593	73.9	26.1	81.1

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	3	67.0	70.9	59.3	71.3
1999	5	74.3	71.9	83.7	71.9
2000	14	69.7	66.5	81.2	66.5
2001	9	70.4	68.3	87.5	68.3
2002	13	68.0	66.0	92.4	68.0
2003	16	73.2	71.7	75.1	72.5
2004	16	70.9	68.3	73.5	69.0
2005	27	73.2	72.9	74.0	73.6
2006	19	72.7	71.4	77.8	71.4
2007	30	71.4	71.9	69.0	71.9
2008	43	69.0	67.8	76.1	68.1
2009	41	71.2	69.7	73.8	69.3
2010	35	70.6	68.6	76.3	68.6
2011	32	69.8	68.0	77.5	68.5
2012	35	76.2	73.8	81.5	73.8
1998-2012	338	71.4	69.8	76.0	70.1

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	6	82.4	81.2	88.1	82.2
1999	4	78.9	78.9		78.9
2000	6	73.9	71.6	75.0	77.2
2001	1	92.2		92.2	
2002	6	77.1	78.7	75.4	74.7
2003	17	74.9	73.3	78.6	73.8
2004	21	73.5	72.9	79.4	74.2
2005	19	76.0	70.5	83.5	72.5
2006	22	75.5	75.4	75.6	75.7
2007	23	71.1	68.9	77.3	68.9
2008	21	74.4	71.3	87.5	74.5
2009	23	74.7	71.5	82.0	73.3
2010	24	73.0	67.0	82.9	70.5
2011	22	73.7	69.1	85.8	71.7
2012	40	76.3	71.9	89.6	74.1
1998-2012	255	74.8	71.9	82.6	73.5

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

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

Table 12a

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

Year of death	Deaths n	Mort. raw	MI-Index raw	Mort. WS	MI-Index WS	Mort. ES	MI-Index ES	Mort. BRD-S	MI-Index BRD-S
1998	2	0.2	0.08	0.1	0.09	0.2	0.09	0.2	0.10
1999	4	0.4	0.16	0.2	0.15	0.3	0.17	0.5	0.22
2000	11	1.0	0.58	0.6	0.58	0.9	0.60	1.1	0.58
2001	8	0.7	0.31	0.4	0.28	0.6	0.30	0.9	0.37
2002	12	0.6	0.32	0.4	0.29	0.5	0.31	0.7	0.33
2003	9	0.5	0.21	0.3	0.20	0.4	0.22	0.6	0.25
2004	8	0.4	0.14	0.2	0.12	0.4	0.14	0.5	0.14
2005	19	1.0	0.36	0.5	0.29	0.8	0.33	1.1	0.38
2006	15	0.8	0.19	0.4	0.18	0.6	0.19	0.9	0.22
2007	25	1.1	0.27	0.5	0.21	0.8	0.23	1.1	0.27
2008	37	1.7	0.48	0.9	0.44	1.3	0.47	1.6	0.47
2009	26	1.2	0.34	0.6	0.29	0.9	0.31	1.1	0.34
2010	26	1.2	0.34	0.6	0.31	0.9	0.32	1.2	0.36
2011	26	1.1	0.29	0.6	0.28	0.9	0.29	1.1	0.28
2012	24	1.1	0.33	0.4	0.24	0.7	0.28	1.1	0.36
1998-2012	252	0.9	0.30	0.5	0.26	0.7	0.28	0.9	0.31

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	5	0.4	0.24	0.1	0.10	0.2	0.15	0.4	0.25
1999	4	0.3	0.14	0.1	0.08	0.2	0.10	0.2	0.10
2000	2	0.2	0.09	0.1	0.06	0.1	0.08	0.1	0.07
2001									
2002	3	0.2	0.08	0.1	0.04	0.1	0.05	0.1	0.06
2003	12	0.6	0.34	0.3	0.24	0.4	0.27	0.5	0.30
2004	19	1.0	0.38	0.4	0.24	0.6	0.30	0.8	0.34
2005	11	0.6	0.25	0.2	0.21	0.3	0.22	0.5	0.24
2006	19	0.9	0.35	0.3	0.22	0.5	0.26	0.7	0.31
2007	17	0.7	0.33	0.3	0.26	0.5	0.28	0.6	0.29
2008	17	0.7	0.23	0.3	0.15	0.4	0.17	0.6	0.20
2009	16	0.7	0.23	0.3	0.15	0.4	0.18	0.5	0.19
2010	15	0.6	0.19	0.3	0.15	0.5	0.17	0.6	0.18
2011	16	0.7	0.22	0.3	0.16	0.4	0.18	0.6	0.20
2012	30	1.3	0.37	0.5	0.22	0.8	0.28	0.9	0.30
1998-2012	186	0.6	0.25	0.3	0.17	0.4	0.20	0.5	0.22

Table 13

Age distribution of age at death (cancer-related) for period 1998-2012
(**incl. multiple primaries**)

Age at death	Cases			Males			Females		
Years	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
25-29	1	0.2	0.2	1	0.4	0.4			0.0
30-34	2	0.5	0.7			0.4	2	1.1	1.1
35-39	4	0.9	1.6			0.4	4	2.2	3.2
40-44	7	1.6	3.2	3	1.2	1.6	4	2.2	5.4
45-49	8	1.8	5.0	4	1.6	3.1	4	2.2	7.5
50-54	24	5.4	10.4	16	6.3	9.4	8	4.3	11.8
55-59	38	8.6	19.0	22	8.6	18.0	16	8.6	20.4
60-64	41	9.3	28.3	28	11.0	29.0	13	7.0	27.4
65-69	74	16.8	45.1	51	20.0	49.0	23	12.4	39.8
70-74	68	15.4	60.5	44	17.3	66.3	24	12.9	52.7
75-79	69	15.6	76.2	44	17.3	83.5	25	13.4	66.1
80-84	63	14.3	90.5	29	11.4	94.9	34	18.3	84.4
85+	42	9.5	100.0	13	5.1	100.0	29	15.6	100.0
All ages	441	100.0		255	100.0		186	100.0	

Included in the statistics are 40.7% multiple primaries in males and 27.7% 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	0.08	0.0		1.0	
30-34		2	0.0		0.1	0.09		0.9
35-39		4	0.0		0.2	0.15		0.8
40-44	3	4	0.1	0.10	0.2	0.15	0.4	0.4
45-49	4	4	0.2	0.09	0.2	0.08	0.2	0.2
50-54	16	8	0.9	0.23	0.4	0.14	0.5	0.3
55-59	22	16	1.3	0.21	0.9	0.25	0.4	0.4
60-64	28	13	1.7	0.20	0.7	0.14	0.3	0.2
65-69	51	23	3.5	0.34	1.4	0.26	0.5	0.3
70-74	44	24	3.8	0.43	1.7	0.26	0.4	0.3
75-79	44	25	5.8	0.43	2.3	0.33	0.4	0.3
80-84	29	34	6.4	0.62	3.9	0.63	0.3	0.3
85+	13	29	4.2	0.62	3.5	0.63	0.2	0.2
All ages	255	186					0.3	0.3
Mortality								
Raw			0.9	0.30	0.6	0.25		
WS			0.5	0.26	0.3	0.17		
ES			0.7	0.28	0.4	0.20		
BRD-S			1.0	0.31	0.5	0.22		
PYLL-70								
per 100,000			4.5		3.7			
ES			4.0		3.1			
AYLL-70			8.9		12.2			

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 ←%
C12-C13 Hypopharynx	1	0.8					1	100.0
C15 Oesophagus	3	2.4	2	66.7			1	33.3
C16 Stomach	3	2.4					3	100.0
C17 Small intestine	9	7.3			4	44.4	5	55.6
C18 Colon	15	12.2			14	93.3	1	6.7
C19-C20 Rectum	6	4.9			4	66.7	2	33.3
C21 Anus/canal	1	0.8					1	100.0
C22 Liver	4	3.3			1	25.0	3	75.0
C23-C24 Bile	2	1.6			1	50.0	1	50.0
C25 Pancreas	8	6.5	1	12.5	5	62.5	2	25.0
C33-C34 Lung	9	7.3	2	22.2	2	22.2	5	55.6
C38,C45 Mesothelioma	1	0.8					1	100.0
C43 Malign. melanoma	1	0.8					1	100.0
C44 Skin others	5	4.1	4	80.0			1	20.0
C46,C49 Soft tissue	2	1.6	1	50.0			1	50.0
C50 Breast	1	0.8	1	100.0				
C61 Prostate	23	18.7	16	69.6	2	8.7	5	21.7
C62 Testis	2	1.6	2	100.0				
C64 Kidney	5	4.1	2	40.0	2	40.0	1	20.0
C65 Renal pelvis	2	1.6					2	100.0
C66 Ureter	1	0.8					1	100.0
C67 Bladder	7	5.7	4	57.1			3	42.9
C70-C72 CNS cancer	1	0.8			1	100.0		
C76-C79 CUP	3	2.4	2	66.7	1	33.3		
C82-C85 NHL	5	4.1	2	40.0	1	20.0	2	40.0
C91-C96 Leukaemia	3	2.4					3	100.0
All mult. primaries	123	100.0	39	31.7	38	30.9	46	37.4

Multiple primaries with number of cases n<1 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 ←%
C15	Oesophagus	2	2.4			1	50.0	1	50.0
C16	Stomach	5	6.1			1	20.0	4	80.0
C17	Small intestine	3	3.7			3	100.0		
C18	Colon	10	12.2			5	50.0	5	50.0
C19-C20	Rectum	4	4.9			2	50.0	2	50.0
C21	Anus/canal	1	1.2	1	100.0				
C25	Pancreas	2	2.4					2	100.0
C33-C34	Lung	7	8.5	3	42.9			4	57.1
C43	Malign. melanoma	2	2.4	2	100.0				
C48	Peritoneal	1	1.2	1	100.0				
C50	Breast	19	23.2	14	73.7	2	10.5	3	15.8
C51	Vulva	2	2.4	2	100.0				
C53	Cervix uteri	1	1.2			1	100.0		
C54	Corpus uteri	4	4.9	2	50.0	2	50.0		
C56	Ovary	7	8.5	2	28.6	4	57.1	1	14.3
C64	Kidney	3	3.7	1	33.3	1	33.3	1	33.3
C67	Bladder	2	2.4	2	100.0				
C70-C72	CNS cancer	2	2.4					2	100.0
C76-C79	CUP	1	1.2					1	100.0
C82-C85	NHL	3	3.7	1	33.3			2	66.7
C91-C96	Leukaemia	1	1.2					1	100.0
All mult. primaries		82	100.0	31	37.8	22	26.8	29	35.4

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	0.08	0.0		1.1	
30-34		2	0.0		0.1	0.10		1.1
35-39		2	0.0		0.1	0.08		0.4
40-44	2	4	0.1	0.07	0.2	0.15	0.3	0.4
45-49	4	4	0.2	0.09	0.2	0.09	0.3	0.2
50-54	15	5	0.8	0.27	0.3	0.10	0.6	0.2
55-59	16	13	0.9	0.18	0.7	0.25	0.3	0.3
60-64	22	12	1.3	0.20	0.7	0.16	0.3	0.2
65-69	39	14	2.7	0.35	0.9	0.23	0.4	0.2
70-74	32	16	2.8	0.42	1.2	0.24	0.3	0.2
75-79	29	17	3.8	0.51	1.6	0.31	0.3	0.2
80-84	14	24	3.1	0.67	2.8	0.55	0.2	0.3
85+	9	21	2.9	0.75	2.6	0.58	0.1	0.2
All ages	183	134					0.3	0.2
Mortality								
Raw			0.7	0.28	0.5	0.22		
WS			0.4	0.24	0.2	0.15		
ES			0.5	0.27	0.3	0.17		
BRD-S			0.7	0.29	0.4	0.19		
PYLL-70								
per 100,000			3.7		2.9			
ES			3.3		2.5			
AYLL-70			9.2		12.8			

* 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	0.08	0.0		1.2	
30-34		2	0.0		0.1	0.10		1.2
35-39		2	0.0		0.1	0.08		0.5
40-44	2	4	0.1	0.08	0.2	0.15	0.3	0.5
45-49	4	4	0.2	0.09	0.2	0.09	0.3	0.3
50-54	15	5	0.8	0.29	0.3	0.11	0.6	0.2
55-59	16	10	0.9	0.20	0.6	0.20	0.4	0.3
60-64	22	11	1.3	0.24	0.6	0.16	0.4	0.3
65-69	33	12	2.2	0.34	0.7	0.21	0.4	0.2
70-74	23	15	2.0	0.34	1.1	0.23	0.3	0.2
75-79	23	16	3.1	0.43	1.5	0.32	0.3	0.2
80-84	14	21	3.1	0.74	2.4	0.51	0.2	0.3
85+	6	19	1.9	0.55	2.3	0.54	0.1	0.2
All ages	159	121					0.3	0.3
Mortality								
Raw			0.6	0.27	0.4	0.21		
WS			0.3	0.24	0.2	0.14		
ES			0.5	0.26	0.3	0.16		
BRD-S			0.6	0.28	0.3	0.18		
PYLL-70								
per 100,000			3.6		2.7			
ES			3.3		2.3			
AYLL-70			9.7		13.3			

* See corresponding tables with multiple primaries.

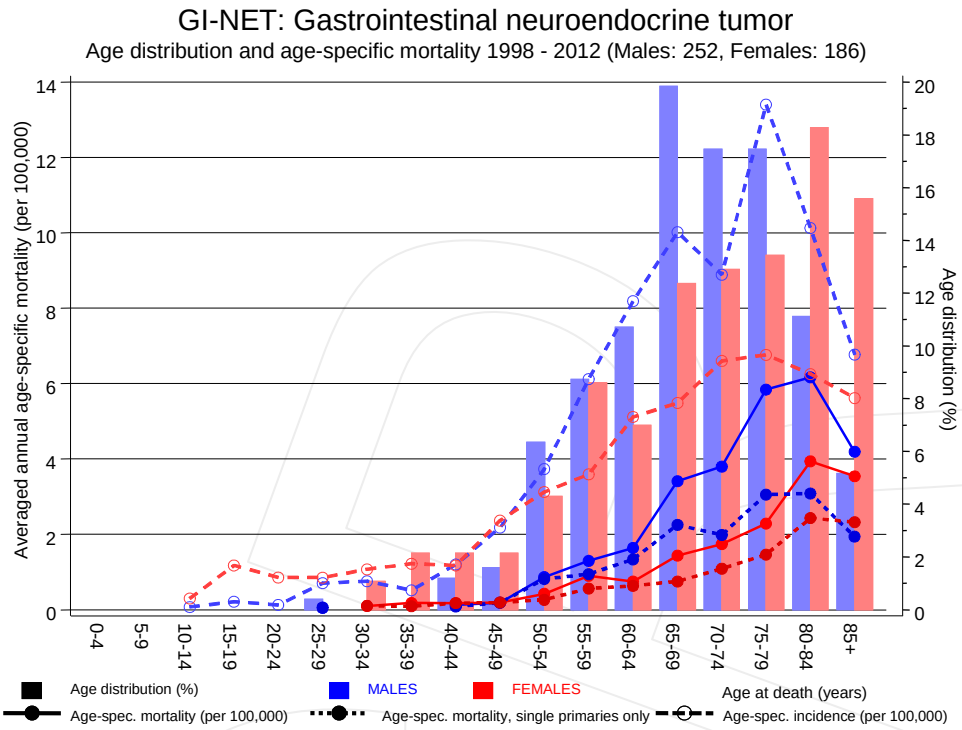
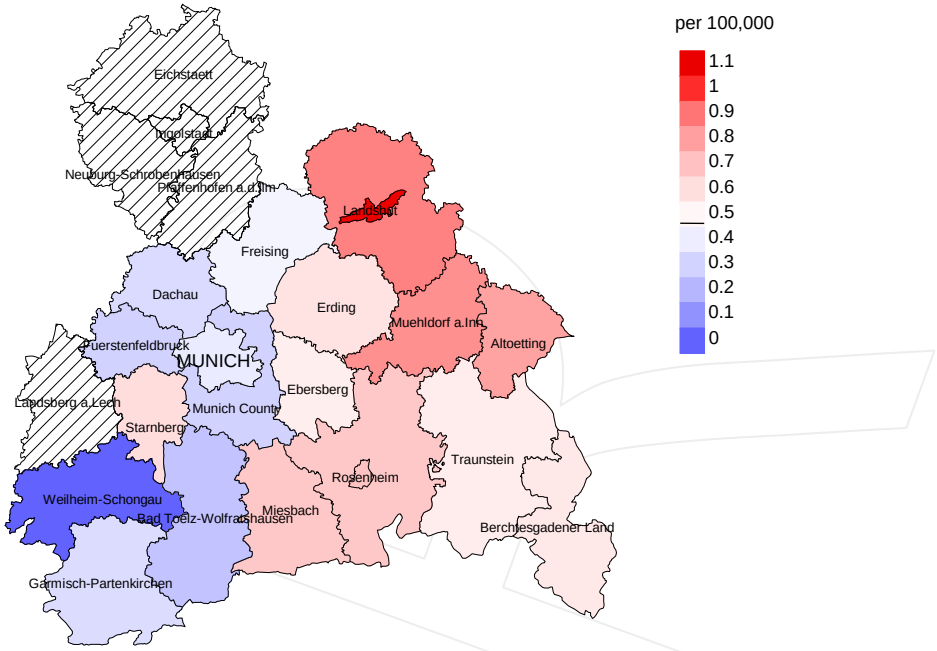


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

The difference between age at diagnosis (Table 3) and age at gastroint. 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

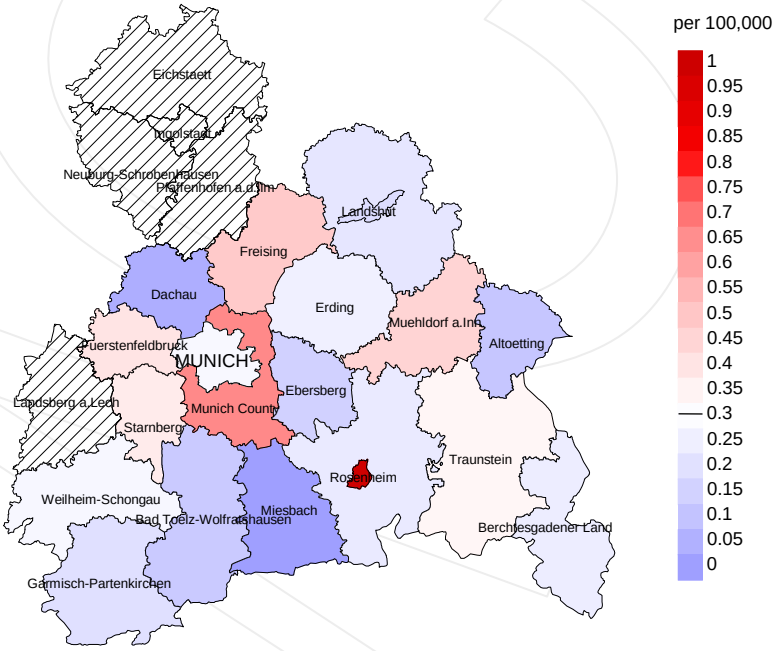
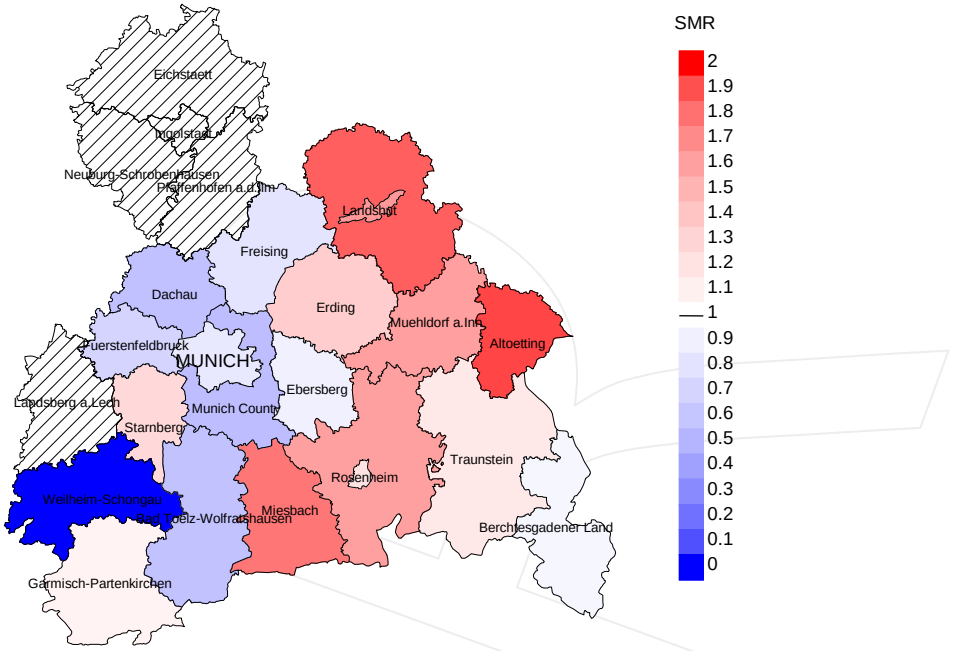


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2003 to 2008. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 0.5/100,000 WS N=106, females 0.3/100,000 WS N=92). 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 2 women died from gastroint. neuroend. tumor. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.1/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 0.7/100,000.

Standardized mortality ratio (SMR) 2003 - 2008: Males



Standardized mortality ratio (SMR) 2003 - 2008: Females

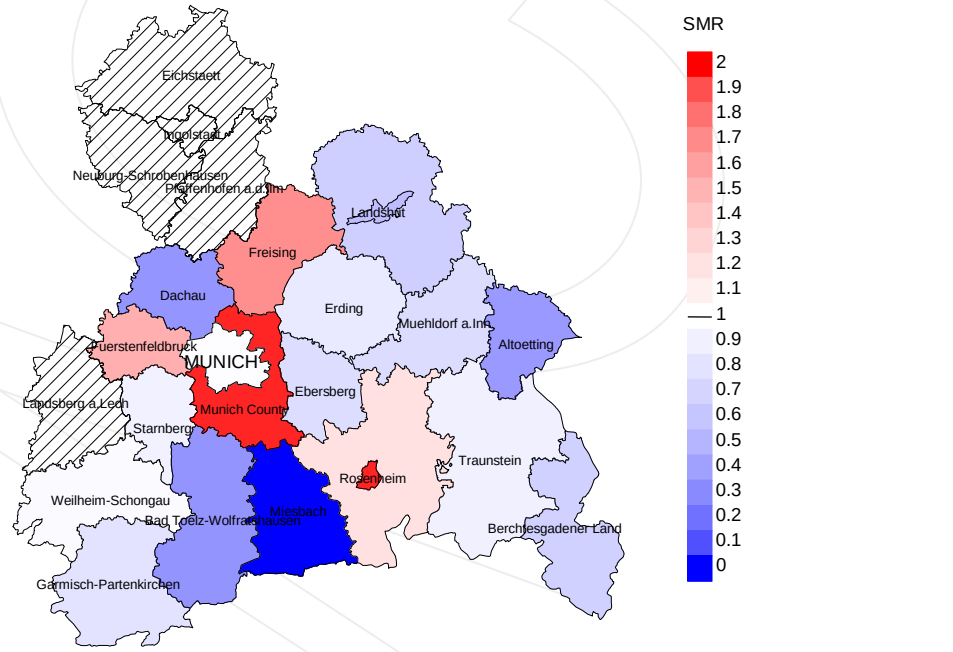


Figure 19b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2003 to 2008. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=106, females N=92). 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 2 women died from gastroint. neuroend. tumor. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.75. Though, the value of this parameter may vary with an underlying probability of 99% between 0.04 and 3.49, 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

Recommended Citation

Munich Cancer Registry. Baseline statistics GI-NET: Gastroint. neuroend. tumor [Internet]. 2014 [updated 2014 Mar 20; cited 2014 May 1]. Available from: http://www.tumorregister-muenchen.de/en/facts/base/base_hGNETE.pdf

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