Munich Cancer Registry

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GI-NET: Gastroint. neuroend. tumor

Incidence and Mortality

Year of diagnosis	1998-2014
Patients	1,973
Diseases	1,990
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/bhGNETE-GI-NET-Gastroint.-neuroend.-tumor-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.

Topography codes (ICD-O-3 2000) used for specifying cancer site

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

Morphology codes (ICD-O-3 2011) 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	Mixed adenoneuroendocrine carcinoma
8245/1	Tubular 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

All patients with invasive cancer by year of diagnosis, proportions of multiple primaries, deaths, and active follow-up

Year of diagnosis	Cases n	Prop. mult. primaries %	Prop. deaths %	Prop. actively followed %
1998	46	26.1	60.9	100.0
1999	53	22.6	50.9	94.3
2000	41	29.3	46.3	97.6
2001	48	37.5	50.0	100.0
2002	76	22.4	43.4	94.7 #
2003	80	30.0	52.5	91.3
2004	110	30.0	43.6	93.6
2005	99	33.3	47.5	92.9
2006	136	30.9	45.6	90.4
2007	147	30.6	41.5	72.8 #
2008	154	26.0	38.3	70.8
2009	148	27.7	37.2	68.2
2010	162	28.4	28.4	67.3
2011	175	25.1	25.1	64.0
2012	191	26.7	25.7	72.3
2013	187	24.6	16.6	98.4
2014	137	27.0	16.8	99.3 ##
1998-2014	1990	27.8	35.1	82.6

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 with invasive cancer
by year of diagnosis and gender

Year of diagnosis	All n	Males n	Females n	Prop. males %
1998	46	25	21	54.3
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	80	42	38	52.5
2004	110	60	50	54.5
2005	99	55	44	55.6
2006	136	79	57	58.1
2007	147	95	52	64.6
2008	154	79	75	51.3
2009	148	77	71	52.0
2010	162	82	80	50.6
2011	175	99	76	56.6
2012	191	92	99	48.2
2013	187	106	81	56.7
2014	137	71	66	51.8
1998-2014	1990	1071	919	53.8

Table 2

Incidence measures by year of diagnosis
(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	25	21	2.3	1.8	1.4	1.0	2.0	1.3	2.3	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	38	2.2	1.9	1.3	1.1	1.9	1.5	2.2	1.7
2004	60	50	3.2	2.5	1.9	1.5	2.7	1.9	3.2	2.3
2005	55	44	2.9	2.2	1.8	1.1	2.4	1.6	2.9	1.9
2006	79	57	4.1	2.8	2.2	1.6	3.2	2.1	4.0	2.5
2007	95	52	4.3	2.3	2.7	1.3	3.6	1.7	4.2	1.9
2008	79	75	3.5	3.2	2.1	1.8	2.9	2.3	3.5	2.8
2009	77	71	3.5	3.1	2.0	1.8	2.8	2.4	3.3	2.8
2010	82	80	3.6	3.4	2.1	2.1	2.9	2.8	3.4	3.1
2011	99	76	4.3	3.2	2.4	2.0	3.3	2.5	4.1	2.9
2012	92	99	4.0	4.2	2.3	2.8	3.2	3.3	3.8	3.8
2013	106	81	4.6	3.4	2.8	2.1	3.8	2.7	4.4	3.1
2014	71	66	3.1	2.8	1.9	1.5	2.5	2.0	3.0	2.4
1998-2014	1071	919	3.3	2.7	2.0	1.6	2.8	2.1	3.3	2.4

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)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	46	63.6	15.1	13.2	87.9	46.6	56.0	64.3	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	80	63.2	13.3	23.5	87.5	49.6	56.5	63.9	72.6	79.1
2004	110	61.6	14.9	13.8	93.3	39.8	52.8	63.9	72.2	78.2
2005	99	65.1	14.7	16.1	90.8	46.9	57.6	66.8	75.5	82.5
2006	136	64.8	12.3	29.9	91.9	46.4	56.6	66.3	73.8	79.9
2007	147	61.9	15.6	15.8	91.2	40.4	54.3	64.3	71.6	81.2
2008	154	62.7	15.2	18.9	93.9	42.4	54.3	65.8	72.7	79.9
2009	148	63.2	16.5	12.4	92.6	38.6	54.9	64.2	74.8	84.0
2010	162	61.4	14.4	14.9	92.4	42.3	54.1	61.5	71.7	79.8
2011	175	62.2	16.7	15.5	92.9	41.1	50.8	64.5	75.3	81.7
2012	191	60.9	18.9	9.7	90.6	30.4	52.1	64.9	74.9	80.8
2013	187	59.8	16.3	15.7	96.5	35.3	48.5	62.2	72.7	77.0
2014	137	61.5	17.3	20.3	91.1	36.7	49.7	64.7	74.9	82.7
1998-2014	1990	62.0	15.8	9.7	96.5	40.1	53.4	64.0	73.4	80.4

Table 3a

Age distribution parameters by year of diagnosis (MALES)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	25	62.4	11.2	32.1	81.7	46.6	57.7	64.1	66.8	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	60	62.3	11.8	27.8	78.9	48.0	54.0	63.9	71.2	76.5
2005	55	64.5	13.6	19.0	87.6	48.7	57.8	66.3	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	95	61.4	14.9	15.8	91.2	39.7	54.8	63.6	70.9	78.7
2008	79	62.8	13.1	19.3	85.6	48.2	55.6	64.3	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	82	63.2	12.7	26.3	92.4	49.0	55.7	63.2	72.1	79.8
2011	99	64.4	14.1	15.5	89.3	45.2	53.5	66.7	75.9	81.7
2012	92	63.2	15.4	9.7	89.0	44.0	53.8	65.1	75.0	80.7
2013	106	60.7	14.6	19.4	90.4	44.2	50.6	62.3	72.1	78.1
2014	71	59.5	17.6	20.3	87.6	34.4	45.9	62.6	73.2	78.5
1998-2014	1071	62.7	13.9	9.7	92.4	45.1	55.1	64.2	72.6	78.9

Table 3b

Age distribution parameters by year of diagnosis (FEMALES)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	Median 10%	25%	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	38	61.7	16.3	23.5	87.5	33.0	53.0	63.9	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	57	63.5	14.5	29.9	91.9	43.5	52.4	63.8	73.8	82.8
2007	52	62.9	16.9	17.8	88.4	41.7	53.5	65.3	74.3	81.7
2008	75	62.7	17.3	18.9	93.9	39.2	50.4	67.4	73.1	82.2
2009	71	61.5	18.9	15.9	92.6	35.1	49.4	62.3	76.5	84.2
2010	80	59.6	15.8	14.9	89.6	39.0	50.8	60.2	70.5	79.3
2011	76	59.3	19.3	17.1	92.9	30.3	47.3	61.1	72.7	84.5
2012	99	58.8	21.6	13.7	90.6	21.9	45.6	63.4	74.8	85.5
2013	81	58.7	18.4	15.7	96.5	32.6	46.3	61.8	73.3	76.4
2014	66	63.5	16.9	24.4	91.1	40.6	50.4	66.0	76.9	85.9
1998-2014	919	61.3	17.8	13.2	96.5	35.0	50.4	63.8	74.3	82.5

Table 4

Age distribution by 5-year age group and gender for period 2007-2014

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
5-9	1	0.1	0.1	1	0.1	0.1			0.0
10-14	3	0.2	0.3	1	0.1	0.3	2	0.3	0.3
15-19	19	1.5	1.8	4	0.6	0.9	15	2.5	2.8
20-24	24	1.8	3.6	7	1.0	1.9	17	2.8	5.7
25-29	27	2.1	5.7	13	1.9	3.7	14	2.3	8.0
30-34	29	2.2	7.9	10	1.4	5.1	19	3.2	11.2
35-39	36	2.8	10.7	12	1.7	6.8	24	4.0	15.2
40-44	54	4.2	14.8	30	4.3	11.1	24	4.0	19.2
45-49	85	6.5	21.4	47	6.7	17.8	38	6.3	25.5
50-54	109	8.4	29.7	62	8.8	26.7	47	7.8	33.3
55-59	134	10.3	40.0	76	10.8	37.5	58	9.7	43.0
60-64	161	12.4	52.4	105	15.0	52.5	56	9.3	52.3
65-69	177	13.6	66.0	103	14.7	67.2	74	12.3	64.7
70-74	162	12.5	78.5	86	12.3	79.5	76	12.7	77.3
75-79	136	10.5	88.9	76	10.8	90.3	60	10.0	87.3
80-84	80	6.1	95.1	48	6.8	97.1	32	5.3	92.7
85+	64	4.9	100.0	20	2.9	100.0	44	7.3	100.0
All ages	1301	100.0		701	100.0		600	100.0	

Included in the statistics are 41.6% multiple primaries in males and 25.5% in females.

Table 5

Age-specific incidence 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 Prop.all cancers n=91183 %	Females Prop.all cancers n=89596 %
0- 4			0.0	0.0		
5- 9	1		0.1	0.0	1.0	
10-14	1	2	0.1	0.2	1.0	2.2
15-19	4	15	0.4	1.6	1.9	9.1
20-24	7	17	0.6	1.6	1.9	5.5
25-29	13	14	1.1	1.1	2.3	2.1
30-34	10	19	0.8	1.5	1.3	1.6
35-39	12	24	0.9	1.9	1.0	1.2
40-44	30	24	1.8	1.6	1.6	0.6
45-49	47	37	3.0	2.4	1.5	0.7
50-54	62	47	4.8	3.7	1.3	0.7
55-59	76	58	7.2	5.2	1.0	0.8
60-64	103	56	10.5	5.3	1.0	0.6
65-69	101	74	10.5	7.1	0.6	0.6
70-74	84	76	9.2	7.3	0.5	0.6
75-79	76	58	13.8	8.1	0.6	0.6
80-84	47	32	13.5	5.7	0.5	0.4
85+	20	44	8.6	7.6	0.3	0.4
All ages	694	597			0.8	0.7
Incidence						
Raw			3.8	3.2		
WS			2.3	1.9		
ES			3.1	2.5		
BRD-S			3.7	2.8		

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).

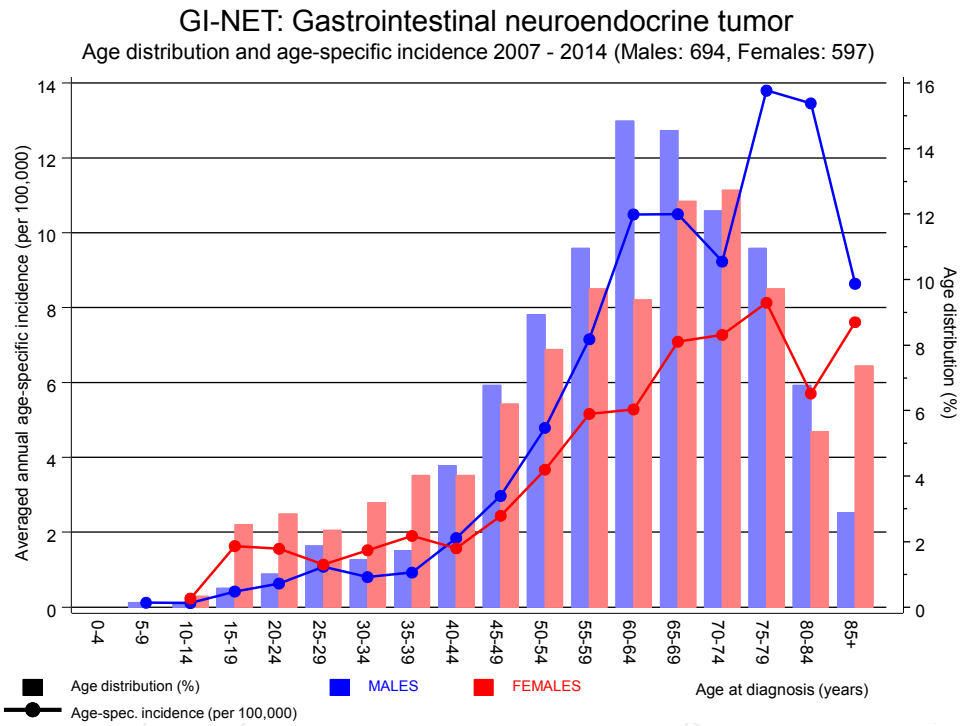


Figure 6. Age distribution and age-specific incidence

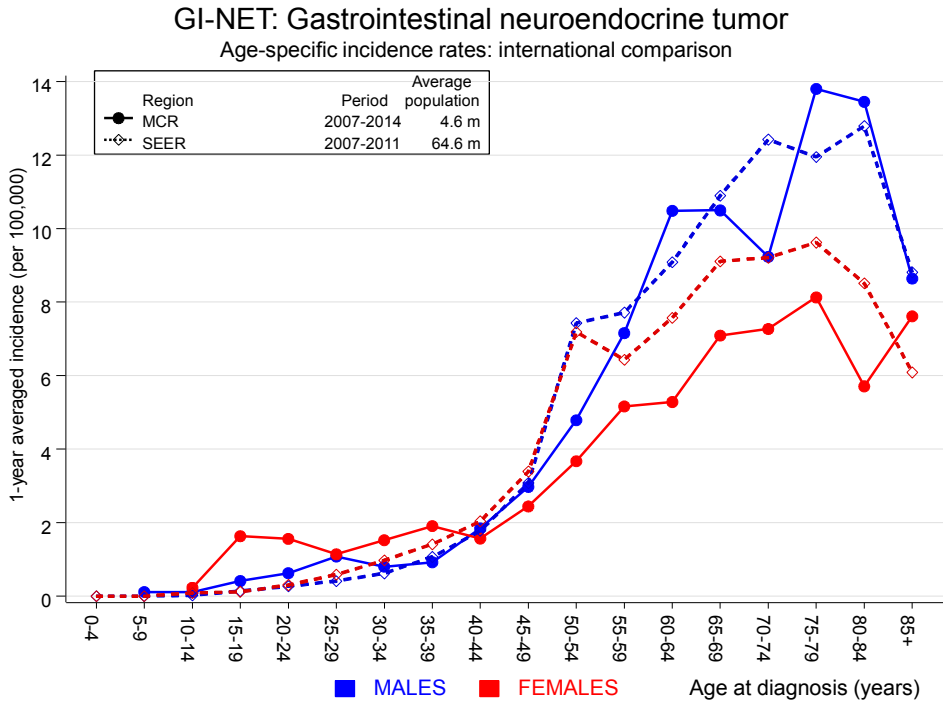


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 18 Regs Research Data, released April 2014, based on the November 2013 submission. http://www.seer.cancer.gov.

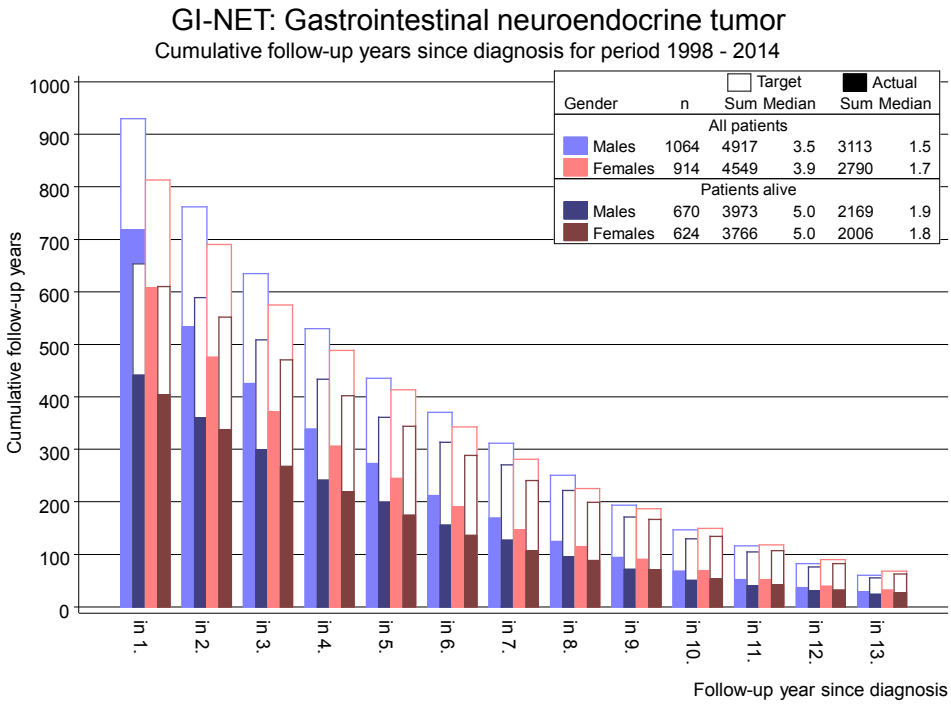


Figure 7. Cumulative follow-up years depending on time since diagnosis

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 %
C12-C13	Hypopharynx	2	0.3	7.1	0.9	25.7		5.6	
C15	Oesophagus	6	0.8	7.1	2.6	15.4	#	16.8	
C16	Stomach	6	1.7	3.6	1.3	7.8	#	14.1	
C17	Small intestine	5	0.2	21.2	6.9	49.4	#	15.5	
C18	Colon	28	4.1	6.8	4.5	9.8	#	77.9	
C19-C20	Rectum	14	2.4	5.7	3.1	9.6	#	37.7	
C22	Liver	6	1.2	4.8	1.8	10.5	#	15.5	16.7
C23-C24	Bile	2	0.4	4.8	0.6	17.3		5.2	
C25	Pancreas	11	1.6	6.9	3.5	12.4	#	30.7	
C33-C34	Lung	10	5.3	1.9	0.9	3.5		15.5	10.0
C43	Malign. melanoma	8	2.0	4.0	1.7	7.9	#	19.6	
C46,C49	Soft tissue	2	0.2	8.6	1.0	31.1	#	5.8	
C61	Prostate	24	12.9	1.9	1.2	2.8	#	36.1	
C64	Kidney	8	1.6	5.0	2.2	9.9	#	20.9	
C65	Renal pelvis	2	0.2	11.1	1.4	40.3	#	5.9	
C66	Ureter	2	0.1	19.3	2.3	69.7	#	6.2	
C67	Bladder	3	1.8	1.6	0.3	4.8		3.8	
C70-C72	CNS cancer	2	0.6	3.3	0.4	12.0		4.6	
C73	Thyroid	2	0.3	6.1	0.7	22.2		5.5	
C76-C79	CUP	2	0.7	2.8	0.3	10.2		4.2	
C82-C85	NHL	10	1.7	5.8	2.8	10.7	#	27.0	
C91-C96	Leukaemia	2	0.7	2.9	0.3	10.4		4.2	100.0
Other primaries		4	1.0	4.2	1.1	10.7	#	9.9	
Not observed		0	2.5	0.0	0.0	1.5		-8.3	
All mult. primaries		161	44.5	3.6	3.1	4.2	#	379.8	2.5

Patients	1041
Median age at second malignancy (years)	70.1
Person-years	3066
Mean observation time (years)	2.9
Median observation time (years)	1.5

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

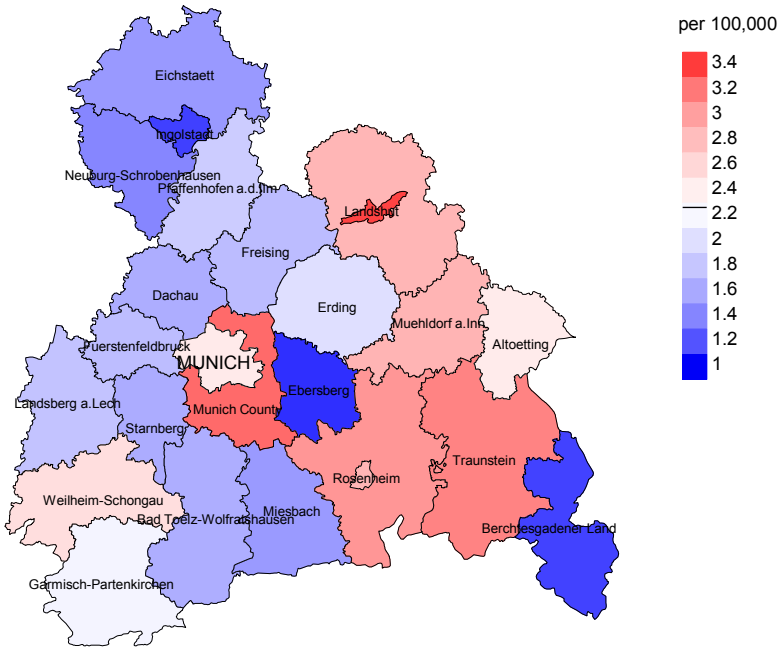
Diagnosis		Observed n	Expected n	SIR	LCL 95%	UCL 95%		EAR	DCO %
C15	Oesophagus	2	0.2	12.1	1.5	43.8	#	6.6	
C16	Stomach	5	0.9	5.4	1.8	12.7	#	14.7	20.0
C17	Small intestine	4	0.1	29.9	8.2	76.6	#	14.0	
C18	Colon	19	2.6	7.4	4.4	11.5	#	59.2	
C19-C20	Rectum	7	1.1	6.2	2.5	12.8	#	21.2	14.3
C25	Pancreas	8	1.2	6.9	3.0	13.6	#	24.7	
C33-C34	Lung	5	2.0	2.5	0.8	5.9		10.9	20.0
C43	Malign. melanoma	3	1.1	2.9	0.6	8.3		7.0	
C50	Breast	13	8.5	1.5	0.8	2.6		16.4	
C54	Corpus uteri	4	1.5	2.6	0.7	6.7		8.9	
C56	Ovary	5	1.1	4.5	1.5	10.5	#	14.0	20.0
C64	Kidney	4	0.7	6.0	1.6	15.5	#	12.0	25.0
C82-C85	NHL	6	1.0	5.8	2.1	12.7	#	17.9	
Other primaries		6	1.7	3.6	1.3	7.7	#	15.6	16.7
Not observed		0	3.7	0.0	0.0	1.0	#	-13.4	
All mult. primaries		91	27.3	3.3	2.7	4.1	#	229.8	6.6

Patients	901
Median age at second malignancy (years)	69.4
Person-years	2771
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”

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



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

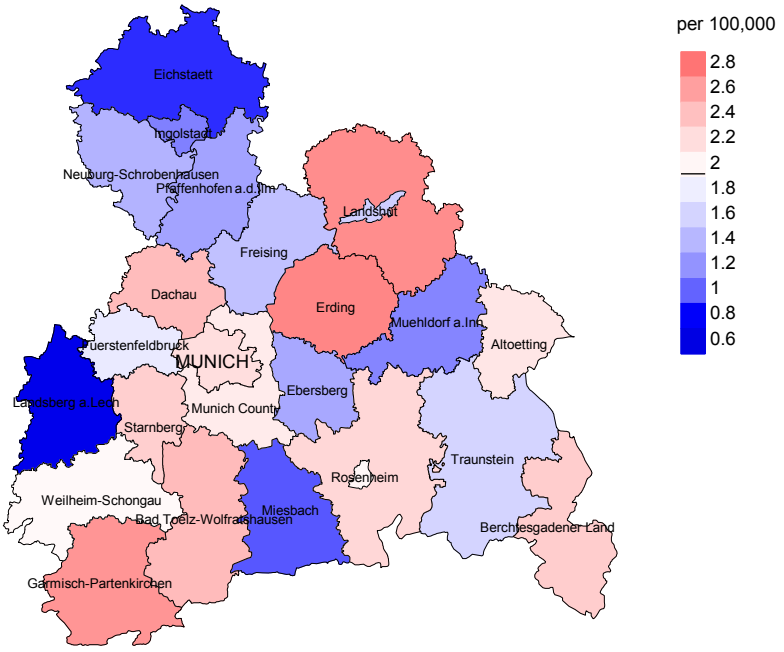
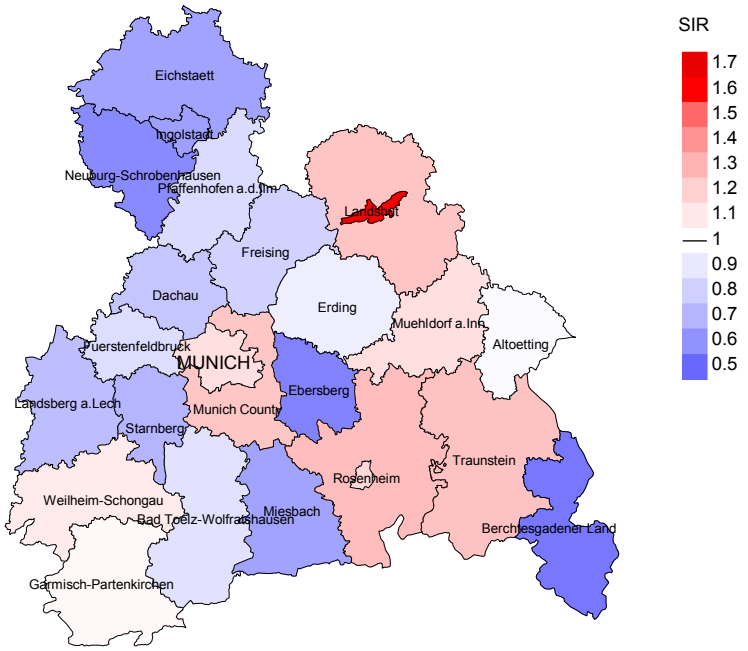


Figure 9a. Map of cancer incidence (world standard population) by county averaged for period 2007 to 2014. According to their individual incidence rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 2.3/100,000 WS N=694, females 1.9/100,000 WS N=597).

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 11 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 1.3/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.5 and 3.0/100,000.

Standardized incidence ratio (SIR) 2007 - 2014: Males



Standardized incidence ratio (SIR) 2007 - 2014: Females

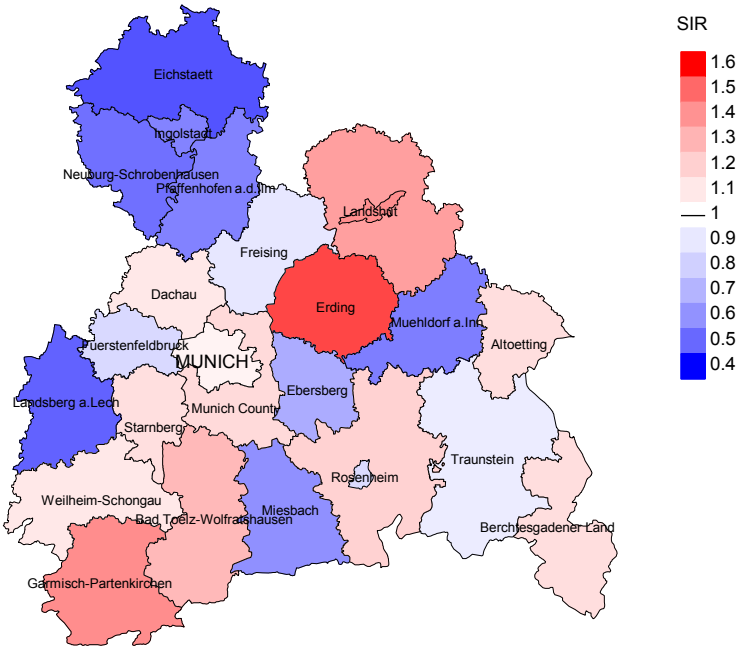


Figure 9b. Map of standardized incidence ratio (SIR) by county averaged for period 2007 to 2014. According to their individual SIR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=694, females N=597).

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 11 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 0.68. Though, the value of this parameter may vary with an underlying probability of 99% between 0.27 and 1.41, and is therefore not statistically striking.

MORTALITY

Table 10a

Patient cohorts of incident cancers by year of diagnosis, follow-up status, and deaths among the annual cohorts

(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 %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	46	100.0	28	60.9	92.9
1999	53	94.3	27	50.9	100.0
2000	41	97.6	19	46.3	89.5
2001	48	100.0	24	50.0	95.8
2002	76	94.7	33	43.4	100.0
2003	80	91.3	42	52.5	100.0
2004	110	93.6	48	43.6	97.9
2005	99	92.9	47	47.5	97.9
2006	136	90.4	62	45.6	98.4
2007	147	72.8	61	41.5	96.7
2008	154	70.8	59	38.3	96.6
2009	148	68.2	55	37.2	100.0
2010	162	67.3	46	28.4	93.5
2011	175	64.0	44	25.1	95.5
2012	191	72.3	49	25.7	91.8
2013	187	98.4	31	16.6	100.0
2014	137	99.3	23	16.8	95.7
1998-2014	1990	82.6	698	35.1	96.8

Table 10b

Annual cohorts of incident cancers and deaths,
and cases deceased the same year of cancer diagnosis

(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	Deaths in same year n	Prop. deaths in same year %
1998	46	9	4	8.7
1999	53	9	4	7.5
2000	41	20	5	12.2
2001	48	10	3	6.3
2002	76	19	8	10.5
2003	80	33	11	13.8
2004	110	38	10	9.1
2005	99	46	16	16.2
2006	136	41	11	8.1
2007	147	53	12	8.2
2008	154	64	17	11.0
2009	148	65	18	12.2
2010	162	59	18	11.1
2011	175	54	12	6.9
2012	191	83	25	13.1
2013	187	91	15	8.0
2014	137	81	18	13.1
1998-2014	1990	775	207	10.4

Table 10c

Annual cohorts of deaths, and proportion of cancer-related and non-cancer-related deaths

(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	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	38	71.1	28.9	78.9
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	65	66.2	33.8	76.9
2010	59	69.5	30.5	75.9
2011	54	77.8	22.2	86.5
2012	83	72.3	27.7	78.5
2013	91	76.9	23.1	80.9
2014	81	71.6	28.4	72.8
1998-2014	775	73.9	26.1	80.2

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	3	70.5	70.9	59.3	71.3
1999	5	73.6	70.8	83.7	70.8
2000	14	68.7	67.8	84.5	67.8
2001	9	72.1	68.6	87.5	68.6
2002	13	70.0	68.3	92.4	70.0
2003	16	76.2	73.2	76.3	74.7
2004	16	71.8	63.1	75.1	64.1
2005	27	74.6	74.6	75.4	74.6
2006	19	75.4	73.8	76.8	73.8
2007	30	70.3	71.4	69.7	71.4
2008	43	69.2	68.0	77.2	68.0
2009	41	73.0	70.7	77.5	70.3
2010	35	72.3	69.1	73.5	69.1
2011	32	71.1	69.4	80.8	69.5
2012	38	78.2	77.9	80.4	77.8
2013	51	75.5	73.8	79.5	73.8
2014	51	74.1	70.3	77.2	70.3
1998-2014	443	72.7	70.8	76.6	70.8

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	6	83.7	83.6	88.1	83.7
1999	4	81.0	81.0		81.0
2000	6	77.5	71.6	77.5	85.6
2001	1	92.2		92.2	
2002	6	74.1	75.8	72.4	70.2
2003	17	75.1	76.0	75.1	79.3
2004	22	77.9	77.7	79.1	77.9
2005	19	77.9	73.8	86.2	74.0
2006	22	74.8	74.4	75.1	76.1
2007	23	74.1	67.4	84.0	67.4
2008	21	80.1	75.7	92.0	80.3
2009	24	77.4	75.4	84.7	76.9
2010	24	78.9	67.3	81.9	70.5
2011	22	76.0	73.0	87.1	74.1
2012	45	80.1	73.2	89.9	74.8
2013	40	75.5	71.7	88.1	74.5
2014	30	77.2	75.2	85.4	73.9
1998-2014	332	77.1	74.2	84.9	75.7

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	2	0.2	0.08	0.1	0.08	0.2	0.09	0.2	0.09
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	0.13	0.2	0.12	0.4	0.14	0.5	0.14
2005	19	1.0	0.35	0.5	0.28	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	0.20	0.8	0.23	1.1	0.27
2008	37	1.7	0.47	0.9	0.42	1.3	0.45	1.6	0.46
2009	26	1.2	0.34	0.6	0.29	0.9	0.31	1.1	0.34
2010	26	1.2	0.32	0.6	0.30	0.9	0.30	1.2	0.34
2011	26	1.1	0.26	0.6	0.24	0.9	0.26	1.1	0.26
2012	26	1.1	0.29	0.5	0.21	0.8	0.25	1.2	0.31
2013	41	1.8	0.39	0.8	0.29	1.3	0.34	1.8	0.41
2014	36	1.6	0.52	0.8	0.43	1.2	0.49	1.5	0.53
1998-2014	331	1.0	0.31	0.5	0.26	0.8	0.29	1.1	0.33

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	0.32	0.3	0.22	0.4	0.25	0.5	0.28
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	0.34	0.3	0.22	0.5	0.25	0.7	0.30
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	17	0.7	0.24	0.3	0.16	0.4	0.19	0.5	0.20
2010	15	0.6	0.19	0.3	0.15	0.5	0.16	0.6	0.18
2011	16	0.7	0.21	0.3	0.15	0.4	0.17	0.6	0.19
2012	34	1.4	0.35	0.6	0.21	0.9	0.27	1.0	0.28
2013	29	1.2	0.36	0.5	0.23	0.7	0.27	1.0	0.31
2014	22	0.9	0.34	0.4	0.25	0.6	0.28	0.7	0.32
1998-2014	242	0.7	0.26	0.3	0.18	0.4	0.21	0.6	0.23

Table 13

Age distribution of age at death (cancer-related) for period 2007-2014
(**incl. multiple primaries**)

Age at death	Cases			Males			Females		
Years	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
25-29	2	0.5	0.5	2	0.8	0.8			0.0
30-34	1	0.2	0.7			0.8	1	0.6	0.6
35-39	4	1.0	1.7			0.8	4	2.4	3.0
40-44	9	2.2	3.9	3	1.2	2.0	6	3.6	6.6
45-49	10	2.4	6.3	4	1.6	3.7	6	3.6	10.2
50-54	19	4.6	10.9	12	4.9	8.5	7	4.2	14.4
55-59	38	9.2	20.1	24	9.8	18.3	14	8.4	22.8
60-64	44	10.7	30.8	30	12.2	30.5	14	8.4	31.1
65-69	64	15.5	46.2	44	17.9	48.4	20	12.0	43.1
70-74	60	14.5	60.8	38	15.4	63.8	22	13.2	56.3
75-79	64	15.5	76.3	45	18.3	82.1	19	11.4	67.7
80-84	58	14.0	90.3	31	12.6	94.7	27	16.2	83.8
85+	40	9.7	100.0	13	5.3	100.0	27	16.2	100.0
All ages	413	100.0		246	100.0		167	100.0	

Included in the statistics are 41.6% multiple primaries in males and 25.5% 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	2		0.2	0.15	0.0		3.2	
30-34		1	0.0		0.1	0.05		0.9
35-39		4	0.0		0.3	0.17		1.6
40-44	3	6	0.2	0.10	0.4	0.25	0.7	0.9
45-49	4	6	0.3	0.09	0.4	0.16	0.4	0.5
50-54	12	7	0.9	0.19	0.5	0.15	0.6	0.4
55-59	24	14	2.3	0.32	1.2	0.24	0.8	0.5
60-64	30	14	3.1	0.29	1.3	0.25	0.6	0.4
65-69	44	20	4.6	0.43	1.9	0.27	0.6	0.4
70-74	38	22	4.2	0.44	2.1	0.29	0.4	0.3
75-79	45	19	8.2	0.59	2.7	0.32	0.5	0.3
80-84	31	27	8.9	0.65	4.8	0.84	0.4	0.4
85+	13	27	5.6	0.65	4.7	0.61	0.2	0.3
All ages	246	167					0.5	0.4
Mortality								
Raw			1.4	0.35	0.9	0.28		
WS			0.7	0.29	0.4	0.19		
ES			1.0	0.32	0.5	0.22		
BRD-S			1.3	0.36	0.7	0.24		
PYLL-70								
per 100,000			6.9		5.8			
ES			6.1		4.9			
AYLL-70			9.3		12.8			

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 ←%
C12-C13 Hypopharynx	2	1.1					2	100.0
C15 Oesophagus	2	1.1					2	100.0
C16 Stomach	3	1.7					3	100.0
C17 Small intestine	15	8.5			6	40.0	9	60.0
C18 Colon	27	15.3			21	77.8	6	22.2
C19-C20 Rectum	9	5.1			4	44.4	5	55.6
C22 Liver	4	2.3			1	25.0	3	75.0
C23-C24 Bile	3	1.7			1	33.3	2	66.7
C25 Pancreas	11	6.2	1	9.1	6	54.5	4	36.4
C33-C34 Lung	15	8.5	5	33.3	2	13.3	8	53.3
C43 Malign. melanoma	2	1.1					2	100.0
C44 Skin others	8	4.5	4	50.0			4	50.0
C46,C49 Soft tissue	2	1.1	1	50.0			1	50.0
C61 Prostate	32	18.1	22	68.8	3	9.4	7	21.9
C62 Testis	2	1.1	2	100.0				
C64 Kidney	7	4.0	3	42.9	2	28.6	2	28.6
C65 Renal pelvis	2	1.1					2	100.0
C66 Ureter	2	1.1					2	100.0
C67 Bladder	10	5.6	7	70.0			3	30.0
C76-C79 CUP	3	1.7	2	66.7	1	33.3		
C82-C85 NHL	6	3.4	2	33.3	1	16.7	3	50.0
C91-C96 Leukaemia	5	2.8	2	40.0			3	60.0
Other primaries	5	2.8	1	20.0	1	20.0	3	60.0
All mult. primaries	177	100.0	52	29.4	49	27.7	76	42.9

Multiple primaries with number of cases 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 1998-2014
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C16	Stomach	6	5.4			2	33.3	4	66.7
C17	Small intestine	4	3.6			3	75.0	1	25.0
C18	Colon	14	12.5			7	50.0	7	50.0
C19-C20	Rectum	5	4.5			2	40.0	3	60.0
C25	Pancreas	3	2.7					3	100.0
C33-C34	Lung	8	7.1	3	37.5			5	62.5
C43	Malign. melanoma	4	3.6	4	100.0				
C44	Skin others	3	2.7	2	66.7			1	33.3
C48	Peritoneal	2	1.8	1	50.0	1	50.0		
C50	Breast	25	22.3	19	76.0	2	8.0	4	16.0
C51	Vulva	2	1.8	2	100.0				
C54	Corpus uteri	6	5.4	2	33.3	3	50.0	1	16.7
C56	Ovary	10	8.9	4	40.0	4	40.0	2	20.0
C64	Kidney	3	2.7	1	33.3	1	33.3	1	33.3
C67	Bladder	3	2.7	2	66.7			1	33.3
C70-C72	CNS cancer	3	2.7					3	100.0
C82-C85	NHL	5	4.5	1	20.0			4	80.0
Other primaries		6	5.4	1	16.7	1	16.7	4	66.7
All mult. primaries		112	100.0	42	37.5	26	23.2	44	39.3

Multiple primaries with number of cases 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 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.	Males MI-index	Females Age-spec. mortal.	Females 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	2		0.2	0.15	0.0		3.6	
30-34		1	0.0		0.1	0.05		1.1
35-39		2	0.0		0.2	0.09		0.9
40-44	2	6	0.1	0.07	0.4	0.25	0.5	1.1
45-49	4	6	0.3	0.10	0.4	0.18	0.4	0.6
50-54	11	5	0.8	0.22	0.4	0.12	0.7	0.3
55-59	17	11	1.6	0.27	1.0	0.22	0.7	0.5
60-64	24	13	2.4	0.29	1.2	0.27	0.6	0.5
65-69	32	14	3.3	0.46	1.3	0.30	0.6	0.3
70-74	25	16	2.7	0.46	1.5	0.28	0.4	0.3
75-79	27	12	4.9	0.69	1.7	0.31	0.4	0.2
80-84	13	18	3.7	0.68	3.2	0.69	0.2	0.4
85+	10	20	4.3	0.83	3.5	0.65	0.2	0.3
All ages	167	124					0.4	0.4
Mortality								
Raw			0.9	0.33	0.7	0.25		
WS			0.5	0.27	0.3	0.17		
ES			0.7	0.30	0.4	0.20		
BRD-S			0.9	0.33	0.5	0.22		
PYLL-70								
per 100,000			5.6		4.8			
ES			5.0		4.0			
AYLL-70			9.7		13.1			

* 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.	Males MI-index	Females Age-spec. mortal.	Females 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	2		0.2	0.15	0.0		3.9	
30-34		1	0.0		0.1	0.05		1.2
35-39		2	0.0		0.2	0.09		1.0
40-44	2	6	0.1	0.07	0.4	0.26	0.5	1.2
45-49	4	6	0.3	0.10	0.4	0.18	0.5	0.7
50-54	11	5	0.8	0.23	0.4	0.13	0.8	0.4
55-59	16	9	1.5	0.26	0.8	0.18	0.7	0.5
60-64	24	12	2.4	0.32	1.1	0.26	0.7	0.5
65-69	25	11	2.6	0.39	1.1	0.25	0.5	0.3
70-74	18	15	2.0	0.38	1.4	0.27	0.3	0.4
75-79	20	8	3.6	0.51	1.1	0.22	0.4	0.2
80-84	12	14	3.4	0.63	2.5	0.58	0.3	0.3
85+	7	20	3.0	0.58	3.5	0.65	0.2	0.4
All ages	141	109					0.4	0.4
Mortality								
Raw			0.8	0.29	0.6	0.23		
WS			0.4	0.25	0.3	0.16		
ES			0.6	0.27	0.4	0.18		
BRD-S			0.8	0.30	0.4	0.20		
PYLL-70								
per 100,000			5.4		4.5			
ES			4.8		3.8			
AYLL-70			10.3		13.8			

* See corresponding tables with multiple primaries.

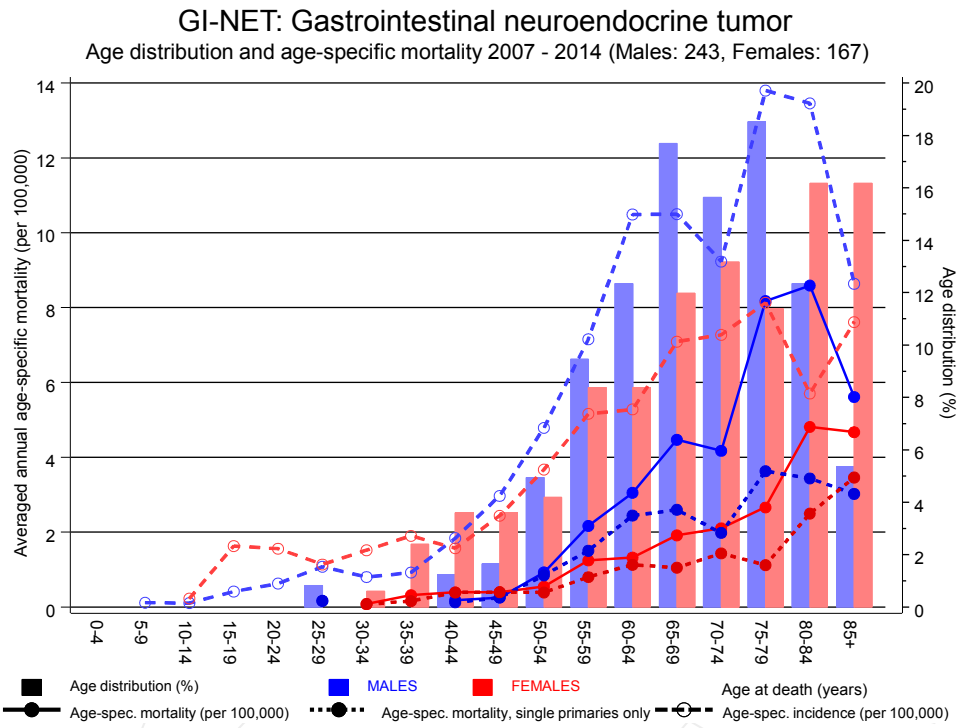
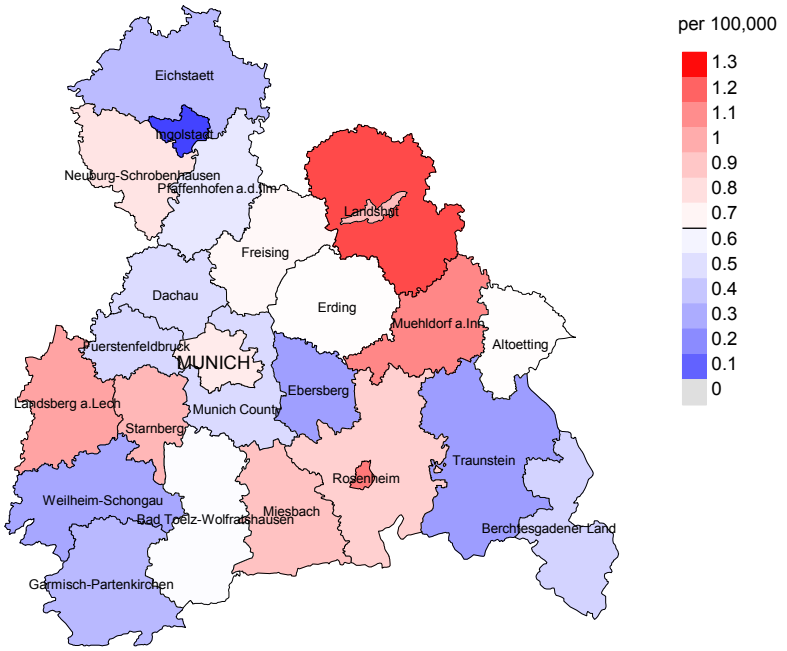


Figure 18. Distribution of age at death (bars) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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) 2007 - 2014: Males



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

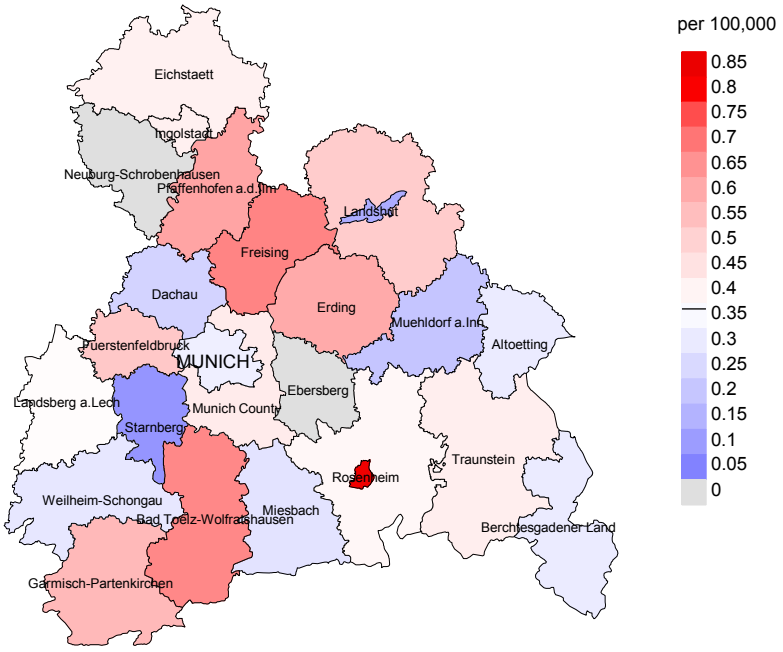
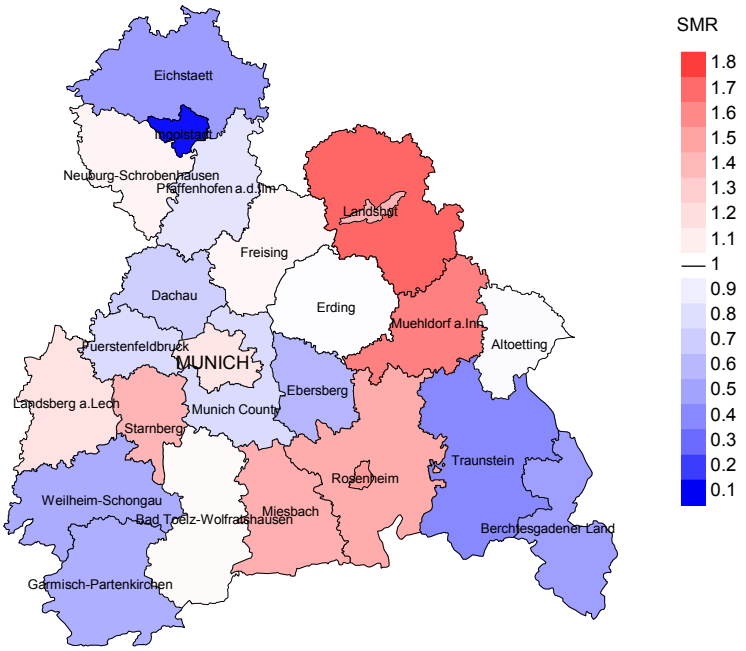


Figure 19a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2014. According to their individual mortality rates, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population mean (males 0.7/100,000 WS N=239, females 0.4/100,000 WS N=163).

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 0 women died from gastroint. neuroend. tumor. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.0/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 1.0/100,000.

Standardized mortality ratio (SMR) 2007 - 2014: Males



Standardized mortality ratio (SMR) 2007 - 2014: Females

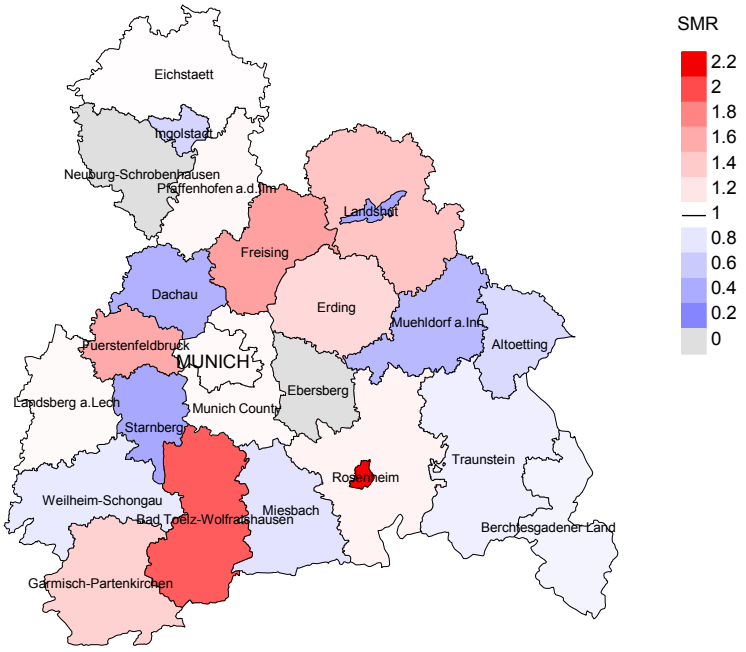


Figure 19b. Map of standardized mortality ratio (SMR) by county averaged for period 2007 to 2014. According to their individual SMR values, the counties are displayed in different red and blue color temperatures where the fine white color indicates the population overall of 1.0 (males N=239, females N=163).

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 0 women died from gastroint. neuroend. tumor. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.00. Though, the value of this parameter may vary with an underlying probability of 99% between 0.00 and 1.22, 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

Recommended Citation

Munich Cancer Registry. GI-NET: Gastroint. neuroend. tumor - Incidence and Mortality [Internet]. 2016 [updated 2016 Apr 13; cited 2016 Jun 1]. Available from: http://www.tumorregister-muenchen.de/en/facts/base/bhGNETE-GI-NET-Gastroint.-neuroend.-tumor-incidence-and-mortality.pdf

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