

Munich Cancer Registry



- ▶ Survival
- ▶ Selection Matrix
- ▶ Homepage
- ▶ *Deutsch*

GI-NET: Gastroint. neuroend. tumor

Incidence and Mortality

Year of diagnosis	1998-2016
Patients	2,410
Diseases	2,430
Creation date	08/21/2018
Export date	08/09/2018
Population	4.81 m



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<https://www.tumorregister-muenchen.de/en>

<https://www.tumorregister-muenchen.de/en/facts/base/bhGNETE-GI-NET-Gastroint.-neuroend.-tumor-incidence-and-mortality.pdf>

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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 4.69 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, August 2018

- [#] 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 2.65 million to 4.10 in 2002, and to 4.69 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

Cases with invasive cancer by year of diagnosis, proportions of further malignancies, deaths, and active follow-up (ALL PATIENTS)

Year of diagnosis	All cases n	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	46	8.7	9.8	63.0	100.0
1999	52	13.3	9.6	57.7	94.2
2000	42	13.6	9.6	50.0	97.6
2001	49	15.3	9.5	51.0	95.9
2002	78	14.6	9.2	47.4	93.6 #
2003	81	13.8	9.0	53.1	92.6
2004	111	14.6	8.5	47.7	89.2
2005	100	16.1	8.2	51.0	91.0
2006	139	15.6	7.9	48.2	92.8
2007	149	16.1	7.3	45.0	72.5 #
2008	155	16.3	6.8	41.3	68.4
2009	151	16.8	6.4	39.7	62.9
2010	166	17.4	6.0	32.5	64.5
2011	179	17.4	5.6	31.3	62.6
2012	194	17.9	4.6	28.9	60.8
2013	211	18.1	5.2	25.1	60.2
2014	204	18.5	5.1	27.9	61.8
2015	163	18.9	4.4	25.2	97.5
2016	160	19.2	3.8	12.5	73.8 ##
1998-2016	2430	19.2	9.8	36.4	75.1

2,430 cases diagnosed 1998-2016 are related to a total of 2,410 patients. Currently, in 698 (29.0 %) of these 2,410 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 525 / 138 / 35 (21.8 % / 5.7 % / 1.5 %) patients exist having 2 / 3 / 4+ malignancies.

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 retrieved from the respective headings.

How to interpret:

In 2014, a subgroup of 204 cases has been diagnosed, of which 18.5 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 5.1 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 1a

Cases with invasive cancer by year of diagnosis, proportions of further malignancies, deaths, and active follow-up (MALES)

Year of diagnosis	Males n	Males %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	25	54.3	12.0	11.5	68.0	100.0
1999	25	48.1	16.0	11.2	68.0	100.0
2000	19	45.2	17.4	11.1	57.9	100.0
2001	26	53.1	18.9	11.0	57.7	96.2
2002	39	50.0	14.9	10.6	51.3	94.9 #
2003	42	51.9	13.1	10.3	57.1	92.9
2004	61	55.0	13.1	9.8	45.9	88.5
2005	56	56.0	15.4	9.5	58.9	91.1
2006	82	59.0	15.2	9.0	47.6	90.2
2007	96	64.4	15.9	8.1	45.8	79.2 #
2008	79	51.0	16.4	7.5	44.3	67.1
2009	78	51.7	17.5	7.2	43.6	64.1
2010	82	49.4	18.7	7.1	35.4	62.2
2011	100	55.9	19.8	7.4	32.0	65.0
2012	94	48.5	20.4	5.6	30.9	63.8
2013	123	58.3	20.7	6.1	29.3	63.4
2014	103	50.5	20.8	5.4	30.1	58.3
2015	97	59.5	20.9	4.4	28.9	99.0
2016	88	55.0	21.4	4.6	13.6	71.6 ##
1998-2016	1315	54.1	21.4	11.5	39.1	76.1

1,315 cases diagnosed 1998-2016 are related to a total of 1,302 patients. Currently, in 424 (32.6 %) of these 1,302 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 310 / 88 / 26 (23.8 % / 6.8 % / 2.0 %) patients exist having 2 / 3 / 4+ malignancies.

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 retrieved from the respective headings.

How to interpret:

In 2014, a subgroup of 103 cases has been diagnosed, of which 20.8 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 5.4 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 1b

Cases with invasive cancer by year of diagnosis, proportions of further malignancies, deaths, and active follow-up (FEMALES)

Year of diagnosis	Females n	Females %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	21	45.7	4.8	7.8	57.1	100.0
1999	27	51.9	10.4	7.9	48.1	88.9
2000	23	54.8	9.9	7.9	43.5	95.7
2001	23	46.9	11.7	7.8	43.5	95.7
2002	39	50.0	14.3	7.4	43.6	92.3 #
2003	39	48.1	14.5	7.4	48.7	92.3
2004	50	45.0	16.2	7.1	50.0	90.0
2005	44	44.0	16.9	6.8	40.9	90.9
2006	57	41.0	16.1	6.6	49.1	96.5
2007	53	35.6	16.2	6.4	43.4	60.4 #
2008	76	49.0	16.2	6.0	38.2	69.7
2009	73	48.3	16.0	5.3	35.6	61.6
2010	84	50.6	15.8	4.8	29.8	66.7
2011	79	44.1	14.7	3.5	30.4	59.5
2012	100	51.5	15.1	3.4	27.0	58.0
2013	88	41.7	15.0	4.2	19.3	55.7
2014	101	49.5	15.9	4.8	25.7	65.3
2015	66	40.5	16.6	4.5	19.7	95.5
2016	72	45.0	16.7	2.9	11.1	76.4 ##
1998-2016	1115	45.9	16.7	7.8	33.2	74.0

1,115 cases diagnosed 1998-2016 are related to a total of 1,108 patients. Currently, in 274 (24.7 %) of these 1,108 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 215 / 50 / 9 (19.4 % / 4.5 % / 0.8 %) patients exist having 2 / 3 / 4+ malignancies.

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 retrieved from the respective headings.

How to interpret:

In 2014, a subgroup of 101 cases has been diagnosed, of which 15.9 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 4.8 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 2

Incidence measures by year of diagnosis
(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,
and from 4.10 to 4.81 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	27	2.2	2.3	1.6	1.5	2.0	1.9	2.2	2.1
2000	19	23	1.7	1.9	1.0	1.1	1.5	1.4	1.8	1.7
2001	26	23	2.2	1.9	1.4	1.2	2.0	1.6	2.3	1.8
2002	39	39	2.1	2.0	1.3	1.3	1.8	1.6	2.1	1.9
2003	42	39	2.2	2.0	1.3	1.2	1.9	1.6	2.2	1.8
2004	61	50	3.2	2.5	2.0	1.5	2.7	1.9	3.3	2.3
2005	56	44	3.0	2.2	1.8	1.1	2.5	1.6	3.0	1.9
2006	82	57	4.3	2.8	2.4	1.6	3.4	2.1	4.1	2.5
2007	96	53	4.3	2.3	2.7	1.4	3.6	1.7	4.2	2.0
2008	79	76	3.5	3.3	2.1	1.8	2.9	2.4	3.5	2.8
2009	78	73	3.5	3.1	2.0	1.9	2.8	2.4	3.4	2.8
2010	82	84	3.6	3.6	2.1	2.2	2.9	2.9	3.5	3.2
2011	100	79	4.5	3.4	2.4	2.2	3.4	2.7	4.2	3.1
2012	94	100	4.1	4.2	2.4	2.8	3.2	3.3	3.9	3.8
2013	123	88	5.3	3.7	3.2	2.3	4.3	2.9	5.0	3.3
2014	103	101	4.4	4.2	2.6	2.3	3.4	3.1	4.1	3.5
2015	97	66	4.1	2.7	2.3	1.6	3.1	2.0	3.8	2.4
2016	88	72	3.7	2.9	2.1	1.8	2.8	2.3	3.4	2.6
1998-2016	1315	1115	3.6	2.9	2.1	1.7	2.9	2.2	3.5	2.6

The computation of the incidence measures includes all cancers, irrespective of first or subsequent malignancy.

Table 3

Age distribution parameters by year of diagnosis (ALL PATIENTS)

Year of diagnosis	Cases n	Std.		Min.	Max.	Median				
		Mean	dev.			10%	25%	50%	75%	90%
1998	46	63.6	15.1	13.2	87.9	46.6	56.0	64.3	72.5	83.3
1999	52	57.3	15.9	24.9	87.9	29.8	48.1	59.8	67.3	73.7
2000	42	61.2	17.0	24.7	92.1	39.0	47.2	60.5	75.5	80.6
2001	49	60.7	14.0	26.6	88.5	37.1	53.9	61.2	69.1	79.8
2002	78	61.2	16.5	17.7	90.9	33.3	51.2	62.8	72.8	80.3
2003	81	63.0	13.3	23.5	87.5	50.1	56.4	63.6	72.3	79.1
2004	111	61.4	14.9	13.8	93.3	40.6	51.7	63.9	72.2	78.1
2005	100	65.1	14.6	16.1	90.8	47.3	57.7	66.8	75.4	81.7
2006	139	64.6	12.3	29.9	91.9	46.4	56.2	66.3	73.7	79.9
2007	149	61.5	16.0	13.4	91.2	39.7	54.0	64.3	71.3	81.2
2008	155	62.9	15.3	18.9	93.9	42.4	54.3	65.8	73.1	80.2
2009	151	63.2	16.8	12.4	92.6	38.6	54.7	64.5	76.3	84.0
2010	166	61.5	14.3	14.9	92.4	42.3	54.1	61.8	71.7	79.8
2011	179	61.8	17.0	15.5	92.9	40.3	50.5	64.1	75.1	81.7
2012	194	61.1	18.8	9.7	90.6	30.4	52.2	64.9	74.9	80.8
2013	211	59.9	15.9	15.7	96.5	35.7	50.2	61.6	72.6	76.9
2014	204	62.8	17.0	15.8	92.6	39.3	51.9	66.3	75.2	82.2
2015	163	63.3	16.6	15.0	92.0	42.5	53.3	66.4	75.9	81.2
2016	160	62.2	15.5	16.1	98.3	42.0	54.0	64.3	73.5	80.0
1998-2016	2430	62.1	15.9	9.7	98.3	40.1	53.3	64.2	73.7	80.4

Table 3a

Age distribution parameters by year of diagnosis (MALES)

Year of diagnosis	Cases n	Std.		Min.	Max.	Median				
		Mean	dev.			10%	25%	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	26	62.2	12.1	34.3	88.5	50.5	54.0	61.2	69.1	79.8
2002	39	61.7	12.9	27.1	88.3	42.3	56.4	61.3	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	61	62.0	11.9	27.8	78.9	47.7	53.9	63.9	71.0	76.4
2005	56	64.5	13.5	19.0	87.6	48.7	57.8	66.5	74.7	77.6
2006	82	65.4	10.4	38.5	85.7	49.7	59.0	67.2	72.8	77.0
2007	96	61.4	14.9	15.8	91.2	39.7	55.0	63.6	70.2	78.7
2008	79	62.8	13.1	19.3	85.6	48.2	55.6	64.3	71.9	79.1
2009	78	64.9	13.8	12.4	89.0	47.7	56.9	66.0	74.6	81.9
2010	82	63.3	12.7	26.3	92.4	49.0	55.7	63.2	72.1	79.8
2011	100	64.3	14.0	15.5	89.3	45.5	53.7	66.6	75.6	81.5
2012	94	63.3	15.3	9.7	89.0	44.0	54.0	65.1	75.1	80.7
2013	123	60.9	14.2	19.4	90.4	44.3	51.3	62.2	72.1	78.0
2014	103	62.4	16.6	20.3	92.6	39.3	51.9	65.7	74.8	81.5
2015	97	64.2	15.2	18.3	87.7	45.4	53.3	66.4	75.9	81.2
2016	88	63.1	14.7	20.9	89.5	45.3	54.2	64.8	74.0	80.8
1998-2016	1315	63.0	14.0	9.7	92.6	45.2	54.9	64.4	73.2	79.4

Table 3b

Age distribution parameters by year of diagnosis (FEMALES)

Year of diagnosis	Cases n	Mean	Std. dev.	Min. Max.		10% 25%		Median		
				Min.	Max.	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	27	59.0	14.9	26.9	87.9	38.4	49.4	61.8	72.1	75.0
2000	23	60.5	18.7	24.7	92.0	37.6	41.6	61.0	78.5	81.0
2001	23	59.0	15.9	26.6	84.4	35.2	49.1	61.2	71.8	75.7
2002	39	60.8	19.5	17.7	90.9	30.6	48.4	62.8	74.8	84.7
2003	39	61.4	16.2	23.5	87.5	33.0	51.7	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	57	63.5	14.5	29.9	91.9	43.5	52.4	63.8	73.8	82.8
2007	53	61.7	18.1	13.4	88.4	41.0	53.1	65.2	74.3	81.7
2008	76	63.0	17.3	18.9	93.9	39.2	51.2	67.7	73.3	82.9
2009	73	61.3	19.3	15.9	92.6	35.0	49.4	62.3	76.5	84.9
2010	84	59.8	15.6	14.9	89.6	39.7	50.8	60.9	70.5	78.8
2011	79	58.5	19.8	16.5	92.9	25.4	46.3	59.6	73.0	84.5
2012	100	59.0	21.5	13.7	90.6	23.6	46.2	63.5	74.7	85.5
2013	88	58.5	18.1	15.7	96.5	32.6	45.0	61.5	73.0	76.4
2014	101	63.2	17.4	15.8	91.1	40.6	52.2	66.6	76.6	84.0
2015	66	62.0	18.7	15.0	92.0	25.6	54.7	65.3	75.6	81.6
2016	72	61.2	16.5	16.1	98.3	41.4	53.5	63.6	71.0	79.0
1998-2016	1115	61.1	17.9	13.2	98.3	34.2	50.4	63.8	74.3	81.7

Table 4

Age distribution by 5-year age group and sex for period 2007-2016

Age at diagnosis Years	Cases n	Males			Females				
		%	Cum.%	n	%	Cum.%	n	%	Cum.%
0-4									
5-9	1	0.1	0.1	1	0.1	0.1			0.0
10-14	4	0.2	0.3	1	0.1	0.2	3	0.4	0.4
15-19	29	1.7	2.0	5	0.5	0.7	24	3.0	3.4
20-24	31	1.8	3.8	10	1.1	1.8	21	2.7	6.1
25-29	33	1.9	5.7	14	1.5	3.3	19	2.4	8.5
30-34	37	2.1	7.8	15	1.6	4.9	22	2.8	11.2
35-39	44	2.5	10.3	19	2.0	6.9	25	3.2	14.4
40-44	63	3.6	14.0	33	3.5	10.4	30	3.8	18.2
45-49	115	6.6	20.6	64	6.8	17.2	51	6.4	24.6
50-54	146	8.4	29.0	86	9.1	26.4	60	7.6	32.2
55-59	181	10.5	39.5	98	10.4	36.8	83	10.5	42.7
60-64	209	12.1	51.6	135	14.4	51.2	74	9.3	52.0
65-69	229	13.2	64.8	130	13.8	65.0	99	12.5	64.5
70-74	222	12.8	77.6	124	13.2	78.2	98	12.4	76.9
75-79	192	11.1	88.7	104	11.1	89.3	88	11.1	88.0
80-84	115	6.6	95.3	72	7.7	96.9	43	5.4	93.4
85+	81	4.7	100.0	29	3.1	100.0	52	6.6	100.0
All ages	1732	100.0		940	100.0		792	100.0	

Table 5

Age-specific incidence and proportion of all cancers for period 2007-2016

Age at diagnosis Years	Males n	Females n	Males Age- spec. incid.	Females Age- spec. incid.	Males Prop.all cancers n=113978 %	Females Prop.all cancers n=112253 %
0- 4						
5- 9	1		0.1		1.0	
10-14	1	3	0.1	0.3	0.9	3.0
15-19	5	24	0.4	2.1	2.0	11.6
20-24	10	21	0.7	1.6	2.2	5.6
25-29	14	19	0.9	1.2	2.0	2.3
30-34	15	22	0.9	1.4	1.6	1.5
35-39	19	25	1.2	1.6	1.4	1.0
40-44	33	30	1.8	1.7	1.5	0.7
45-49	64	50	3.2	2.6	1.6	0.7
50-54	86	60	5.0	3.5	1.4	0.7
55-59	98	83	6.9	5.6	1.1	0.9
60-64	133	74	10.9	5.6	1.0	0.7
65-69	128	98	10.8	7.5	0.7	0.7
70-74	122	98	11.0	7.7	0.6	0.7
75-79	104	86	13.1	8.6	0.6	0.6
80-84	71	43	15.4	6.1	0.6	0.4
85+	28	52	9.1	7.1	0.4	0.4
All ages	932	788			0.8	0.7
Incidence						
Raw			4.1	3.3		
WS			2.4	2.0		
ES			3.2	2.6		
BRD-S			3.8	2.9		

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).

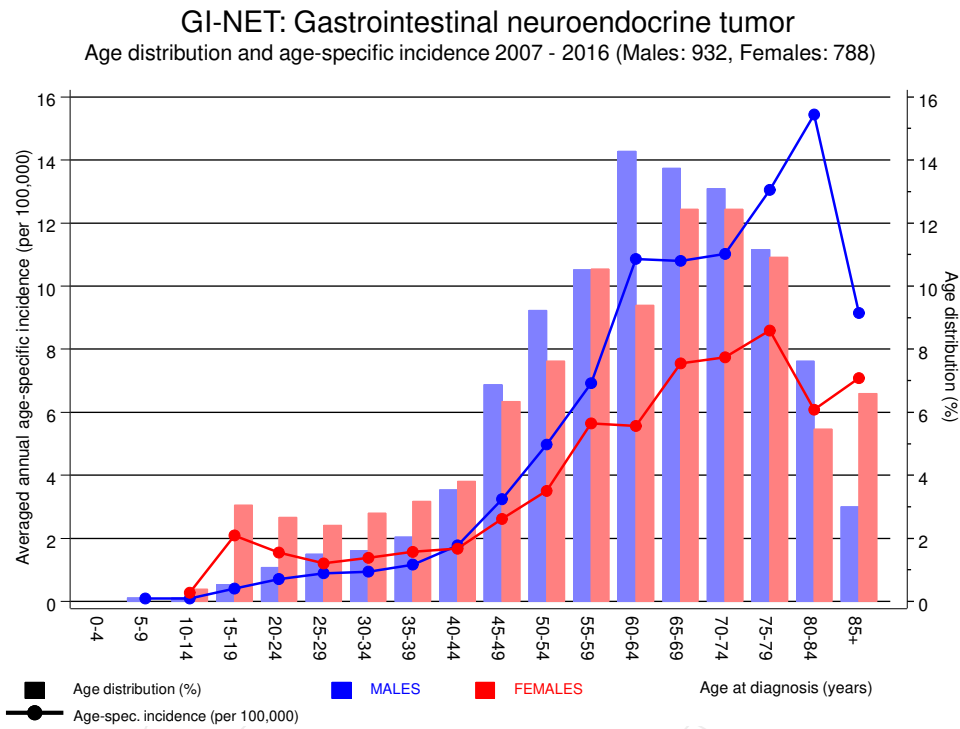


Figure 6. Age distribution (males: mean=62.9 yrs, median=64.3 yrs; females: mean=60.7 yrs, median=63.9 yrs) and age-specific incidence.

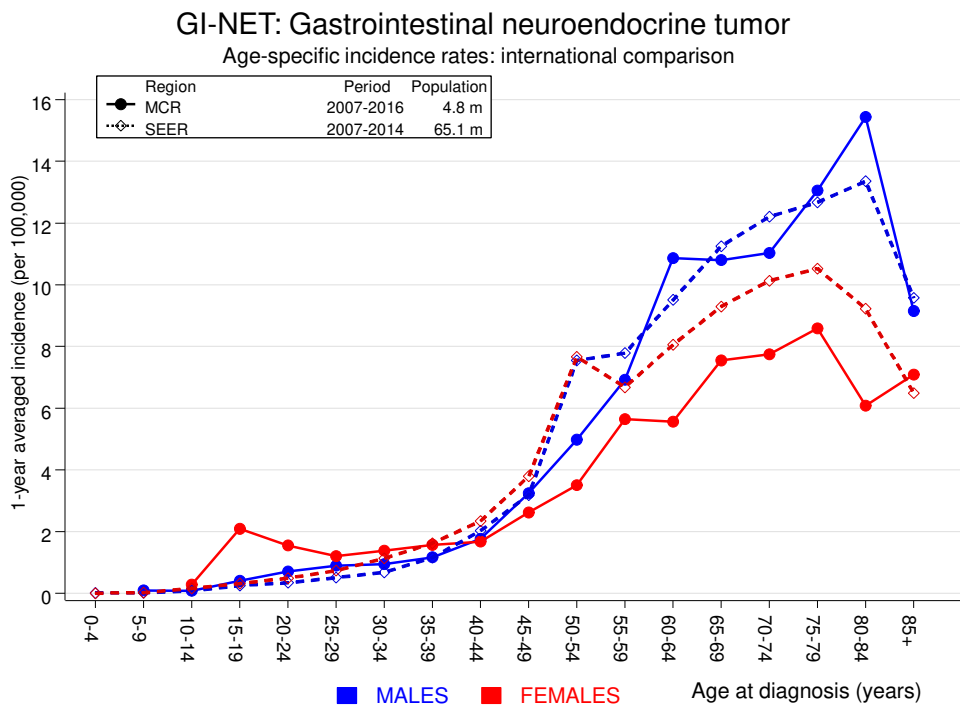


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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>.

Table 7a

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of further malignancies for period 1998–2016

MALES

Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C12–C13 Hypopharynx	2	0.3	5.7	0.7	20.7	4.3	
C15 Oesophagus	10	1.1	9.0	4.3	16.6 #	23.2	
C16 Stomach	9	2.1	4.3	2.0	8.1 #	18.0	
C17 Small intestine	4	0.3	12.5	3.4	31.9 #	9.6	
C18 Colon	31	5.1	6.1	4.1	8.6 #	67.5	
C19–C20 Rectum	18	3.0	6.0	3.6	9.5 #	39.1	
C22 Liver	6	1.6	3.7	1.3	8.0 #	11.4	16.7
C23–C24 Bile	2	0.5	3.7	0.4	13.4	3.8	
C25 Pancreas	13	2.1	6.3	3.3	10.7 #	28.5	7.7
C33–C34 Lung	17	6.7	2.5	1.5	4.1 #	27.0	5.9
C43 Malign. melanoma	10	2.6	3.9	1.9	7.2 #	19.4	
C46,C49 Soft tissue	3	0.3	9.7	2.0	28.3 #	7.0	
C61 Prostate	29	15.9	1.8	1.2	2.6 #	34.3	3.4
C64 Kidney	10	2.0	5.0	2.4	9.2 #	20.9	
C65 Renal pelvis	2	0.2	8.5	1.0	30.7 #	4.6	
C66 Ureter	3	0.1	22.6	4.7	66.0 #	7.5	
C67 Bladder	3	2.3	1.3	0.3	3.7	1.7	
C70–C72 CNS cancer	2	0.7	2.7	0.3	9.7	3.3	
C73 Thyroid	2	0.4	4.9	0.6	17.6	4.1	
C76–C79 CUP	3	0.9	3.3	0.7	9.7	5.5	
C82–C85 NHL	12	2.2	5.4	2.8	9.4 #	25.5	8.3
C91–C96 Leukaemia	4	0.9	4.5	1.2	11.6 #	8.1	50.0
Others, specified	5	2.2	2.2	0.7	5.2	7.2	20.0
Not observed	0	2.2	0.0	0.0	1.7	-5.7	
All further malignancies	200	56.0	3.6	3.1	4.1 #	375.9	4.0
Patients		1219					
Median age at next malignancy (years)		70.1					
Person-years		3832					
Mean observation time (years)		3.1					
Median observation time (years)		1.6					

The occurrence of further malignancy listed is statistically significant.

Observed further malignancies with count 1 are pooled in category “Others, specified”.

Table 7b

Standardized incidence ratio (SIR, with 95% confidence limits),
excess absolute risk (EAR) and DCO rate of further malignancies
for period 1998–2016

FEMALES

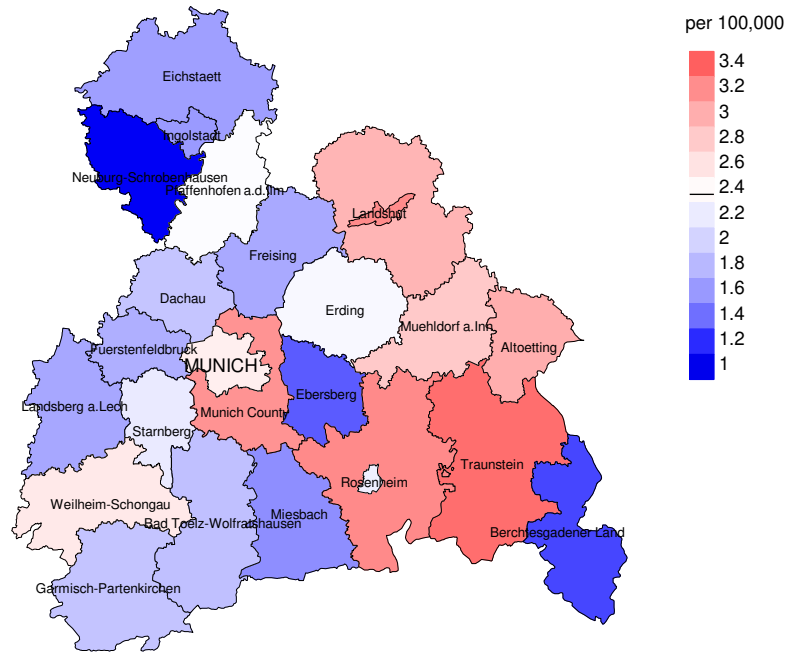
Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C15 Oesophagus	3	0.2	13.6	2.8	39.6 #	7.9	
C16 Stomach	7	1.1	6.2	2.5	12.8 #	16.7	14.3
C17 Small intestine	7	0.2	39.3	15.8	81.1 #	19.4	
C18 Colon	20	3.2	6.3	3.9	9.8 #	47.8	
C19–C20 Rectum	9	1.3	6.7	3.1	12.7 #	21.7	11.1
C25 Pancreas	9	1.5	6.0	2.7	11.4 #	21.3	
C33–C34 Lung	7	2.6	2.7	1.1	5.6 #	12.6	14.3
C43 Malign. melanoma	4	1.3	3.0	0.8	7.6	7.5	
C50 Breast	23	10.6	2.2	1.4	3.3 #	35.2	8.7
C53 Cervix uteri	2	0.5	4.1	0.5	14.8	4.3	50.0
C54 Corpus uteri	4	1.9	2.1	0.6	5.4	6.0	
C56 Ovary	7	1.4	5.1	2.0	10.5 #	16.0	14.3
C64 Kidney	6	0.8	7.4	2.7	16.2 #	14.7	16.7
C82–C85 NHL	6	1.3	4.6	1.7	10.1 #	13.4	
Others, specified	8	2.4	3.4	1.4	6.6 #	15.9	25.0
Not observed	0	3.9	0.0	0.0	0.9 #	-11.1	
All further malignancies	122	34.2	3.6	3.0	4.3 #	249.1	8.2

Patients 1038
 Median age at next malignancy (years) 69.4
 Person-years 3523
 Mean observation time (years) 3.4
 Median observation time (years) 1.9

The occurrence of further malignancy listed is statistically significant.

Observed further malignancies with count 1 are pooled in category "Others, specified".

Average incidence (world standard population) 2007 - 2016: Males



Average incidence (world standard population) 2007 - 2016: Females

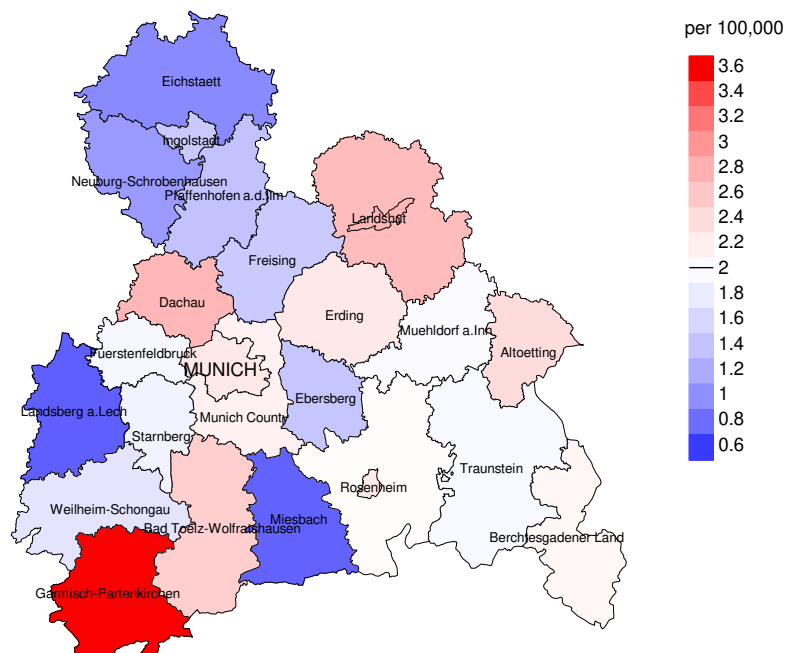
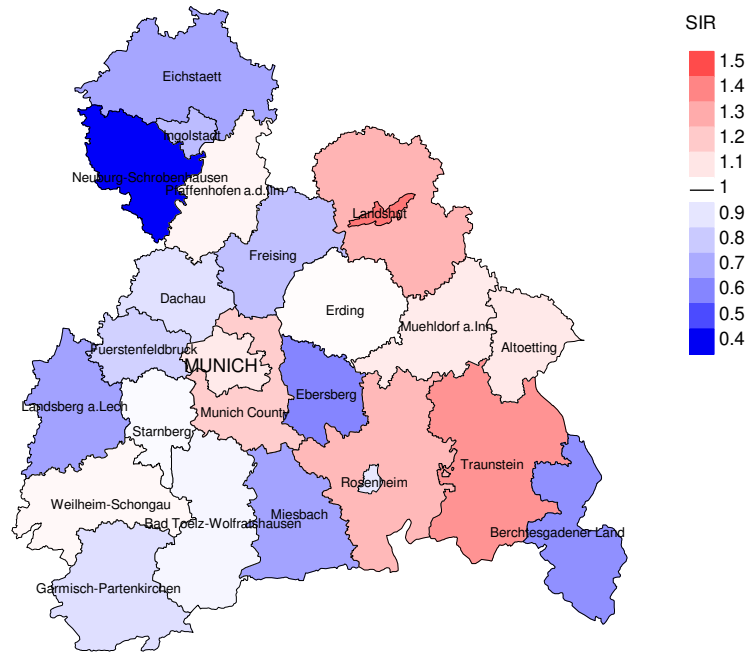


Figure 8a. Map of cancer incidence (world standard population) by county averaged for period 2007 to 2016. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 2.4/100,000 WS N=932, females 2.0/100,000 WS N=788).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 16 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 1.4/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.6 and 3.0/100,000.

Standardized incidence ratio (SIR) 2007 - 2016: Males



Standardized incidence ratio (SIR) 2007 - 2016: Females

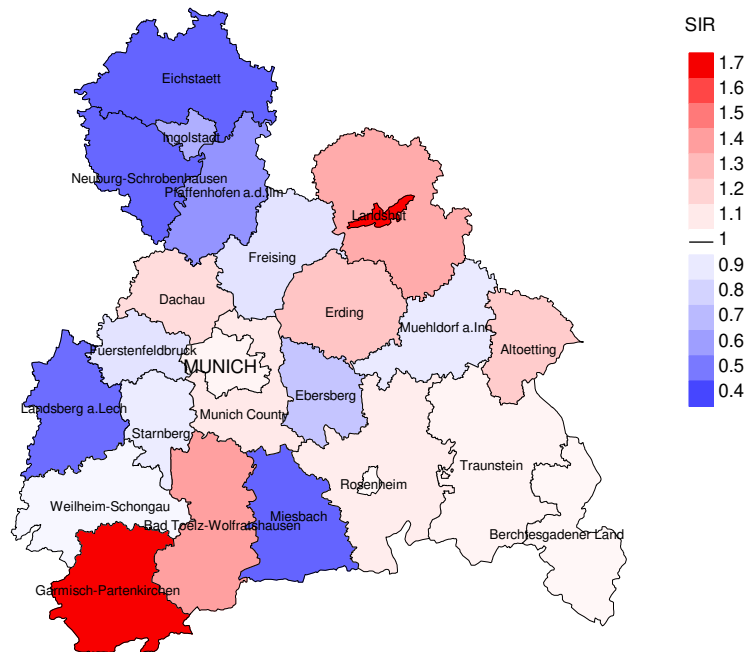


Figure 8b. Map of standardized incidence ratio (SIR) by county averaged for period 2007 to 2016. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=932, females N=788).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 16 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 0.74. Though, the value of this parameter may vary with an underlying probability of 99% between 0.35 and 1.36, and is therefore not statistically striking.

MORTALITY

Table 9a

Annual cohorts: Incident cancers, follow-up status,
and deaths among the annual cohorts

(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,
and from 4.10 to 4.81 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	29	63.0	93.1
1999	52	94.2	30	57.7	96.7
2000	42	97.6	21	50.0	85.7
2001	49	95.9	25	51.0	96.0
2002	78	93.6	37	47.4	100.0
2003	81	92.6	43	53.1	100.0
2004	111	89.2	53	47.7	98.1
2005	100	91.0	51	51.0	98.0
2006	139	92.8	67	48.2	98.5
2007	149	72.5	67	45.0	95.5
2008	155	68.4	64	41.3	96.9
2009	151	62.9	60	39.7	100.0
2010	166	64.5	54	32.5	96.3
2011	179	62.6	56	31.3	92.9
2012	194	60.8	56	28.9	96.4
2013	211	60.2	53	25.1	96.2
2014	204	61.8	57	27.9	94.7
2015	163	97.5	41	25.2	95.1
2016	160	73.8	20	12.5	75.0
1998-2016	2430	75.1	884	36.4	96.0

Table 9b

Annual cohorts of incident cancers and deaths,
and cases deceased within the same year of being diagnosed with cancer

(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,
and from 4.10 to 4.81 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	52	9	4	7.7
2000	42	20	5	11.9
2001	49	10	3	6.1
2002	78	19	8	10.3
2003	81	33	11	13.6
2004	111	38	10	9.0
2005	100	46	16	16.0
2006	139	41	11	7.9
2007	149	53	12	8.1
2008	155	64	17	11.0
2009	151	66	19	12.6
2010	166	59	17	10.2
2011	179	54	12	6.7
2012	194	83	25	12.9
2013	211	91	15	7.1
2014	204	97	25	12.3
2015	163	101	25	15.3
2016	160	78	15	9.4
1998-2016	2430	971	254	10.5

Table 9c

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

(with respect to registry area expansion from 2.65 to 4.10 m as of 2002, and from 4.10 to 4.81 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	73.7	26.3	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	66	66.7	33.3	77.3
2010	59	67.8	32.2	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	97	72.2	27.8	74.7
2015	101	70.3	29.7	77.3
2016	78	61.5	38.5	72.7
1998-2016	971	72.6	27.4	79.4

Table 10a

Medians of age at death according to the grouping in Table 9
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	42	73.2	70.9	77.5	70.5
2010	35	72.3	68.5	75.0	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	62	74.2	70.3	77.3	70.3
2015	52	73.8	69.1	82.7	73.2
2016	48	75.0	73.3	80.8	73.3
1998–2016	555	73.3	70.8	77.3	71.3

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 10b

Medians of age at death according to the grouping in Table 9
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	76.9	79.4	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	35	76.6	73.9	85.7	73.9
2015	49	77.9	72.9	81.7	77.4
2016	30	77.7	76.3	81.9	77.4
1998–2016	416	77.3	74.2	84.6	76.0

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 11a

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	0.31	0.4	0.29	0.5	0.30	0.7	0.32
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	0.32	1.1	0.37
2006	15	0.8	0.19	0.4	0.17	0.6	0.19	0.9	0.21
2007	25	1.1	0.26	0.5	0.20	0.8	0.23	1.1	0.26
2008	37	1.7	0.47	0.9	0.42	1.3	0.45	1.6	0.46
2009	27	1.2	0.35	0.6	0.29	0.9	0.32	1.2	0.36
2010	25	1.1	0.31	0.6	0.29	0.8	0.29	1.1	0.32
2011	26	1.2	0.26	0.6	0.24	0.9	0.26	1.1	0.26
2012	26	1.1	0.28	0.5	0.20	0.8	0.24	1.1	0.30
2013	41	1.8	0.34	0.8	0.25	1.2	0.29	1.7	0.34
2014	44	1.9	0.44	0.9	0.37	1.4	0.40	1.7	0.43
2015	38	1.6	0.39	0.8	0.36	1.2	0.39	1.5	0.39
2016	30	1.2	0.34	0.6	0.27	0.8	0.29	1.1	0.34
1998-2016	407	1.1	0.31	0.6	0.26	0.8	0.29	1.1	0.32

Table 11b

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	0.15	0.1	0.08	0.2	0.10	0.2	0.11
2000	2	0.2	0.09	0.1	0.06	0.1	0.07	0.1	0.06
2001									
2002	3	0.2	0.08	0.1	0.04	0.1	0.05	0.1	0.06
2003	12	0.6	0.31	0.3	0.21	0.4	0.24	0.5	0.27
2004	20	1.0	0.40	0.4	0.26	0.6	0.31	0.8	0.36
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	0.32	0.3	0.25	0.5	0.27	0.6	0.28
2008	17	0.7	0.22	0.3	0.15	0.4	0.17	0.6	0.20
2009	17	0.7	0.24	0.3	0.15	0.4	0.18	0.5	0.19
2010	15	0.6	0.18	0.3	0.15	0.5	0.15	0.6	0.17
2011	16	0.7	0.20	0.3	0.14	0.4	0.17	0.6	0.18
2012	34	1.4	0.34	0.6	0.21	0.9	0.26	1.0	0.28
2013	29	1.2	0.33	0.5	0.21	0.7	0.25	0.9	0.28
2014	26	1.1	0.26	0.4	0.20	0.7	0.22	0.8	0.24
2015	33	1.4	0.50	0.6	0.34	0.8	0.41	1.0	0.42
2016	18	0.7	0.25	0.2	0.13	0.4	0.16	0.5	0.21
1998-2016	298	0.8	0.27	0.3	0.18	0.5	0.21	0.6	0.24

Table 12

Age distribution of age at death (cancer-related) for period 2007-2016
(incl. multiple malignancies)

Age at death Years	Cases			Males			Females		
	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
0-4									
5-9									
10-14									
15-19									
20-24									
25-29	2	0.4	0.4	2	0.6	0.6			0.0
30-34	1	0.2	0.6			0.6	1	0.5	0.5
35-39	4	0.7	1.3			0.6	4	1.8	2.3
40-44	9	1.7	3.0	3	0.9	1.6	6	2.7	5.0
45-49	12	2.2	5.2	5	1.6	3.1	7	3.2	8.1
50-54	24	4.4	9.6	15	4.7	7.8	9	4.1	12.2
55-59	49	9.1	18.7	30	9.4	17.2	19	8.6	20.7
60-64	62	11.5	30.1	42	13.2	30.4	20	9.0	29.7
65-69	83	15.3	45.5	55	17.2	47.6	28	12.6	42.3
70-74	78	14.4	59.9	50	15.7	63.3	28	12.6	55.0
75-79	88	16.3	76.2	57	17.9	81.2	31	14.0	68.9
80-84	73	13.5	89.6	40	12.5	93.7	33	14.9	83.8
85+	56	10.4	100.0	20	6.3	100.0	36	16.2	100.0
All ages	541	100.0		319	100.0		222	100.0	

Table 13

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2016
(incl. multiple malignancies)

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								
5- 9								
10-14								
15-19								
20-24								
25-29	2		0.1	0.14			2.7	
30-34		1			0.1	0.05		0.8
35-39		4			0.3	0.16		1.4
40-44	3	6	0.2	0.09	0.3	0.20	0.6	0.9
45-49	5	7	0.3	0.08	0.4	0.14	0.4	0.5
50-54	15	9	0.9	0.17	0.5	0.15	0.7	0.5
55-59	30	19	2.1	0.31	1.3	0.23	0.9	0.7
60-64	42	20	3.4	0.32	1.5	0.27	0.8	0.5
65-69	55	28	4.6	0.43	2.2	0.29	0.8	0.5
70-74	50	28	4.5	0.41	2.2	0.29	0.5	0.4
75-79	57	31	7.2	0.55	3.1	0.36	0.6	0.4
80-84	40	33	8.7	0.56	4.7	0.77	0.5	0.5
85+	20	36	6.5	0.71	4.9	0.69	0.3	0.4
All ages	319	222					0.6	0.5
Mortality								
Raw			1.4	0.34	0.9	0.28		
WS			0.7	0.29	0.4	0.19		
ES			1.0	0.31	0.6	0.22		
BRD-S			1.3	0.34	0.7	0.25		
PYLL-70								
per 100,000			6.8		5.5			
ES			5.9		4.7			
AYLL-70			9.0		11.8			

Table 14a

Further malignancies in deaths in period 1998–2016
MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C15 Oesophagus	5	2.4					5	100.0
C16 Stomach	4	1.9					4	100.0
C17 Small intestine	18	8.7			7	38.9	11	61.1
C18 Colon	26	12.5			17	65.4	9	34.6
C19–C20 Rectum	10	4.8			5	50.0	5	50.0
C22 Liver	4	1.9			1	25.0	3	75.0
C25 Pancreas	17	8.2	2	11.8	7	41.2	8	47.1
C33–C34 Lung	18	8.7	5	27.8	3	16.7	10	55.6
C43 Malign. melanoma	3	1.4	1	33.3			2	66.7
C44 Skin others	12	5.8	6	50.0			6	50.0
C61 Prostate	38	18.3	24	63.2	3	7.9	11	28.9
C64 Kidney	10	4.8	4	40.0	2	20.0	4	40.0
C67 Bladder	8	3.8	7	87.5			1	12.5
C76–C79 CUP	3	1.4	2	66.7	1	33.3		
C82–C85 NHL	7	3.4	2	28.6	1	14.3	4	57.1
C91–C96 Leukaemia	4	1.9	1	25.0			3	75.0
Others, specified	21	10.1	8	38.1	2	9.5	11	52.4
All further malignancies	208	100.0	62	29.8	49	23.6	97	46.6

Further malignancies with number of cases 1 to 2 are pooled in category “Others, specified”.

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 further malignancy.

Table 14b

Further malignancies in deaths in period 1998–2016
FEMALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C16 Stomach	7	5.2			3	42.9	4	57.1
C17 Small intestine	7	5.2			4	57.1	3	42.9
C18 Colon	16	11.9			9	56.3	7	43.8
C19–C20 Rectum	8	5.9			4	50.0	4	50.0
C25 Pancreas	6	4.4			2	33.3	4	66.7
C33–C34 Lung	10	7.4	3	30.0	1	10.0	6	60.0
C43 Malign. melanoma	3	2.2	3	100.0				
C44 Skin others	3	2.2	1	33.3			2	66.7
C48 Peritoneal	2	1.5	1	50.0	1	50.0		
C50 Breast	30	22.2	23	76.7	2	6.7	5	16.7
C51 Vulva	2	1.5	2	100.0				
C53 Cervix uteri	2	1.5			1	50.0	1	50.0
C54 Corpus uteri	8	5.9	3	37.5	3	37.5	2	25.0
C56 Ovary	13	9.6	6	46.2	5	38.5	2	15.4
C64 Kidney	3	2.2	1	33.3	1	33.3	1	33.3
C67 Bladder	3	2.2	1	33.3	1	33.3	1	33.3
C82–C85 NHL	5	3.7	1	20.0			4	80.0
Others, specified	7	5.2	2	28.6			5	71.4
All further malignancies	135	100.0	47	34.8	37	27.4	51	37.8

Further malignancies with number of cases 1 are pooled in category “Others, specified”.

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 further malignancy.

Table 15

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2016
(**First primaries only ***)

Age at death Years	Males n	Females n	Males Age- spec. mortal. MI-index	Females Age- spec. mortal. MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4						
5- 9						
10-14						
15-19						
20-24						
25-29	2		0.1	0.14	3.0	
30-34		1		0.1	0.05	0.9
35-39		2		0.1	0.09	0.8
40-44	2	6	0.1	0.06	0.3	1.0
45-49	5	6	0.3	0.09	0.3	0.5
50-54	14	7	0.8	0.20	0.4	0.4
55-59	23	14	1.6	0.29	1.0	0.6
60-64	36	18	2.9	0.33	1.4	0.6
65-69	41	19	3.5	0.47	1.5	0.4
70-74	32	20	2.9	0.40	1.6	0.4
75-79	35	20	4.4	0.64	2.0	0.4
80-84	18	24	3.9	0.53	3.4	0.5
85+	13	26	4.2	0.87	3.5	0.4
All ages	221	163			0.5	0.4
Mortality						
Raw			1.0	0.32	0.7	0.26
WS			0.5	0.27	0.3	0.17
ES			0.7	0.30	0.4	0.20
BRD-S			0.9	0.32	0.5	0.22
PYLL-70						
per 100,000			5.7		4.4	
ES			5.0		3.7	
AYLL-70			9.4		12.1	

* See corresponding tables with multiple malignancies.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2016
(**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								
5- 9								
10-14								
15-19								
20-24								
25-29	2		0.1	0.14			3.0	
30-34		1			0.1	0.05		1.0
35-39		2			0.1	0.09		0.8
40-44	2	6	0.1	0.06	0.3	0.21	0.4	1.0
45-49	5	6	0.3	0.09	0.3	0.15	0.5	0.5
50-54	14	7	0.8	0.21	0.4	0.14	0.8	0.4
55-59	21	11	1.5	0.27	0.7	0.16	0.7	0.5
60-64	34	17	2.8	0.35	1.3	0.29	0.8	0.6
65-69	34	16	2.9	0.44	1.2	0.29	0.6	0.4
70-74	24	19	2.2	0.34	1.5	0.28	0.3	0.4
75-79	27	15	3.4	0.53	1.5	0.28	0.4	0.3
80-84	15	19	3.3	0.45	2.7	0.58	0.3	0.4
85+	9	25	2.9	0.64	3.4	0.71	0.2	0.4
All ages	187	144					0.5	0.4
Mortality								
Raw			0.8	0.29	0.6	0.24		
WS			0.4	0.25	0.3	0.16		
ES			0.6	0.27	0.4	0.19		
BRD-S			0.8	0.29	0.5	0.20		
PYLL-70								
per 100,000			5.5		4.2			
ES			4.7		3.5			
AYLL-70			9.8		12.6			

* See corresponding tables with multiple malignancies.

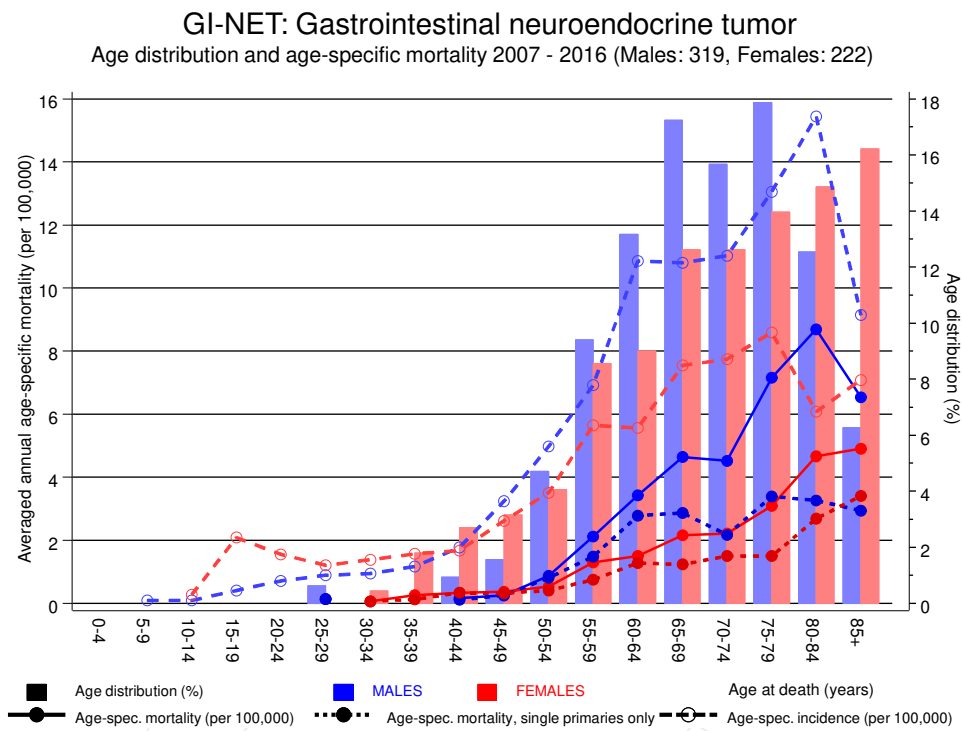
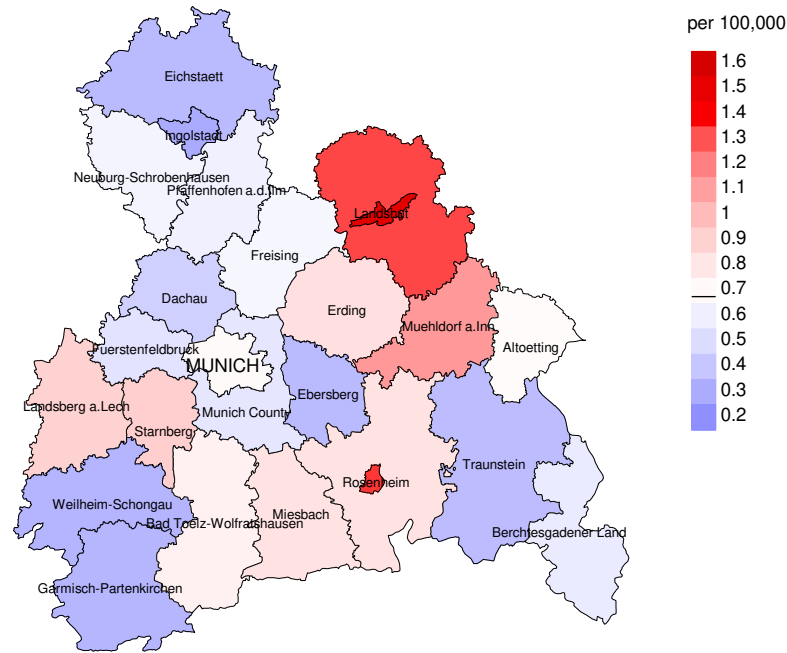


Figure 17. Distribution of age at death (bars; males: mean=67.2 yrs, median=67.8 yrs; females: mean=68.3 yrs, median=70.2 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed 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 - 2016: Males



Average mortality (world standard population) 2007 - 2016: Females

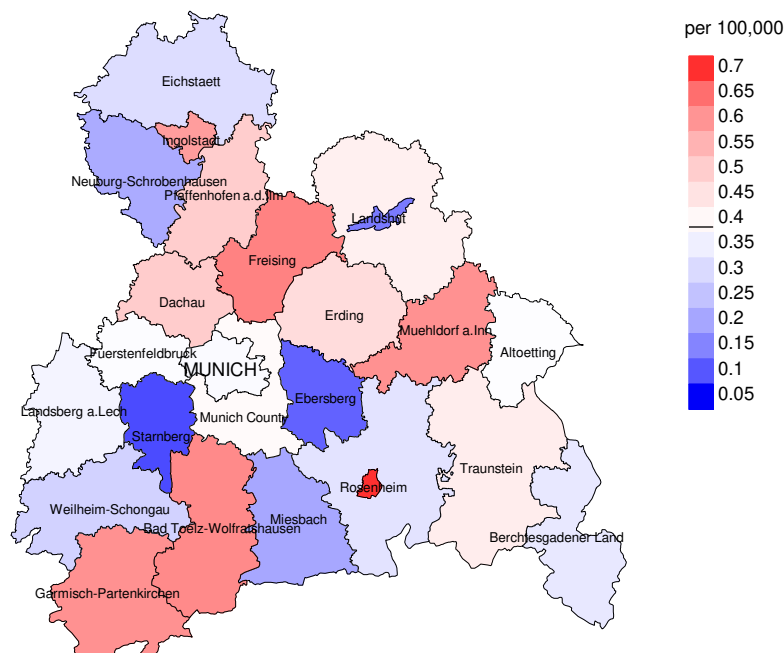
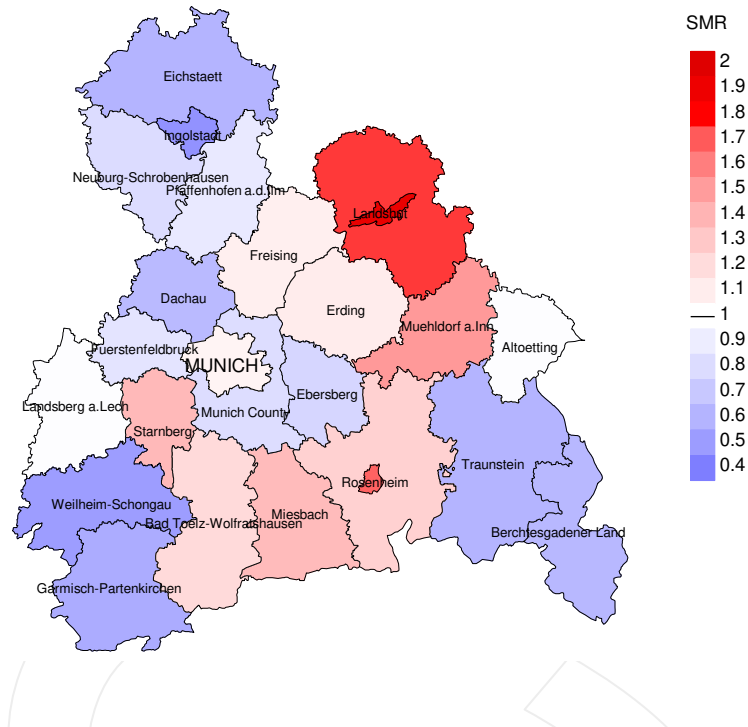


Figure 18a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2016. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 0.7/100,000 WS N=319, females 0.4/100,000 WS N=222).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 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 1.0/100,000.

Standardized mortality ratio (SMR) 2007 - 2016: Males



Standardized mortality ratio (SMR) 2007 - 2016: Females

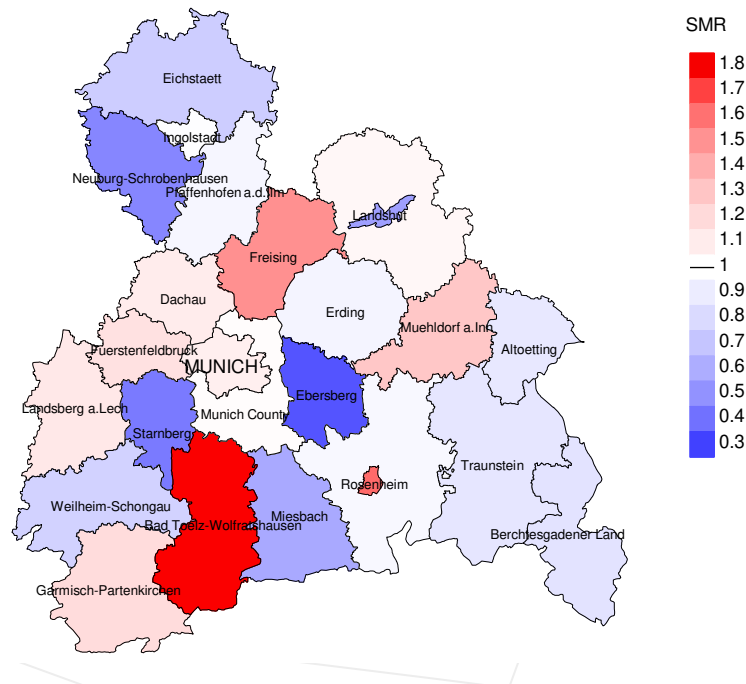


Figure 18b. Map of standardized mortality ratio (SMR) by county averaged for period 2007 to 2016. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=319, females N=222).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 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 0.33. Though, the value of this parameter may vary with an underlying probability of 99% between 0.02 and 1.55, 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

MCR	Munich Cancer Registry (Tumorregister München)
GEKID	Association of Population-based Cancer Registries in Germany (Gesellschaft der epidemiologischen Krebsregister in Deutschland e.V.)
SEER	Surveillance, Epidemiology, and End Results (USA)
DCO	Death certificate only
BRD-S	German standard population
ES	European standard population (old)
WS	World standard population
SIR	Standardized incidence ratio
CI	Confidence interval
EAR	Excess absolute risk = excess cancer cases (O - E) per 10,000 person-years
PYLL-70	Potential years of life lost prior to age 70 given a person dies before that age
AYLL-70	Average years of life lost prior to age 70 given a person dies before that age
SMR	Standardized mortality ratio
MI-index	Ratio between mortality and incidence
FRG	Federal Republic of Germany

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