Munich Cancer Registry

- Survival
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- *Deutsch*

GI-NET: Gastroint. neuroend. tumor

Incidence and Mortality

Year of diagnosis	1998-2020
Patients	3,280
Diseases	3,307
Creation date	12/21/2021
Database export	12/20/2021
Population	4.95 m

Munich Cancer Registry
Cancer Registry Bavaria - Upper Bavaria Regional Center
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Marchioninistr. 15
Munich, 81377
Germany

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

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

Index of figures and tables

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, December 2021

[#] 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	10.0	67.4	100.0
1999	52	13.3	9.9	63.5	94.2
2000	42	13.6	9.9	57.1	97.6
2001	49	15.3	9.7	61.2	98.0
2002	80	14.5	9.5	57.5	95.0 #
2003	81	13.7	9.4	59.3	92.6
2004	112	14.5	9.1	53.6	92.9
2005	106	15.8	8.8	62.3	93.4
2006	138	15.3	8.5	58.0	94.2
2007	150	15.8	8.0	54.7	91.3 #
2008	157	16.0	7.7	48.4	98.7
2009	153	16.6	7.3	45.1	100.0
2010	167	17.1	7.1	41.9	97.0
2011	182	17.2	6.7	41.2	97.8
2012	202	17.7	5.7	40.6	95.0
2013	225	17.8	5.8	33.8	96.4
2014	227	18.3	5.3	41.4	98.2
2015	200	18.6	4.5	34.5	93.5
2016	236	18.9	4.0	33.1	99.2
2017	233	19.1	3.1	23.6	99.6
2018	180	19.6	2.6	24.4	99.4
2019	169	19.7	2.1	18.3	100.0
2020	120	19.8	2.5	14.2	100.0 ##
1998-2020	3307	19.8	10.0	40.4	96.9

3,307 cases diagnosed 1998-2020 are related to a total of 3,280 patients. Currently, in 973 (29.7 %) of these 3,280 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 718 / 200 / 55 (21.9 % / 6.1 % / 1.7 %) 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 retreived from the respective headings.

How to interpret:
In 2018, a subgroup of 180 cases has been diagnosed, of which 19.6 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 2.6 % 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	11.7	76.0	100.0
1999	25	48.1	16.0	11.5	72.0	100.0
2000	19	45.2	17.4	11.5	73.7	100.0
2001	26	53.1	18.9	11.2	76.9	100.0
2002	41	51.3	14.7	11.0	61.0	95.1 #
2003	42	51.9	12.9	10.8	64.3	92.9
2004	62	55.4	12.9	10.4	53.2	93.5
2005	60	56.6	15.0	10.2	71.7	96.7
2006	81	58.7	14.7	9.8	61.7	92.6
2007	96	64.0	15.5	8.9	55.2	93.8 #
2008	81	51.6	15.9	8.6	50.6	98.8
2009	79	51.6	17.1	8.2	49.4	100.0
2010	82	49.1	18.4	8.1	43.9	96.3
2011	101	55.5	19.4	8.0	44.6	98.0
2012	98	48.5	20.0	6.6	45.9	92.9
2013	132	58.7	20.3	6.7	37.9	97.0
2014	114	50.2	20.4	5.7	43.0	99.1
2015	118	59.0	20.5	5.2	39.0	94.1
2016	128	54.2	21.0	4.8	39.8	100.0
2017	117	50.2	21.4	4.3	27.4	100.0
2018	94	52.2	22.0	3.3	25.5	100.0
2019	86	50.9	22.0	2.7	20.9	100.0
2020	68	56.7	22.1	3.0	16.2	100.0 ##
1998-2020	1775	53.7	22.1	11.7	44.5	97.3

1,775 cases diagnosed 1998-2020 are related to a total of 1,757 patients. Currently, in 584 (33.2 %) of these 1,757 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 419 / 129 / 36 (23.8 % / 7.3 % / 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 retreived from the respective headings.

How to interpret:
In 2018, a subgroup of 94 cases has been diagnosed, of which 22.0 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 3.3 % 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	8.0	57.1	100.0
1999	27	51.9	10.4	8.0	55.6	88.9
2000	23	54.8	9.9	8.0	43.5	95.7
2001	23	46.9	11.7	8.0	43.5	95.7
2002	39	48.8	14.3	7.7	53.8	94.9 #
2003	39	48.1	14.5	7.7	53.8	92.3
2004	50	44.6	16.2	7.5	54.0	92.0
2005	46	43.4	16.8	7.2	50.0	89.1
2006	57	41.3	16.0	7.1	52.6	96.5
2007	54	36.0	16.1	7.0	53.7	87.0 #
2008	76	48.4	16.0	6.7	46.1	98.7
2009	74	48.4	15.9	6.3	40.5	100.0
2010	85	50.9	15.6	5.9	40.0	97.6
2011	81	44.5	14.5	5.2	37.0	97.5
2012	104	51.5	15.0	4.7	35.6	97.1
2013	93	41.3	14.9	4.7	28.0	95.7
2014	113	49.8	15.7	4.9	39.8	97.3
2015	82	41.0	16.3	3.5	28.0	92.7
2016	108	45.8	16.5	3.0	25.0	98.1
2017	116	49.8	16.5	1.8	19.8	99.1
2018	86	47.8	16.8	1.9	23.3	98.8
2019	83	49.1	17.0	1.5	15.7	100.0
2020	52	43.3	17.2	1.9	11.5	100.0 ##
1998-2020	1532	46.3	17.2	8.0	35.7	96.5

1,532 cases diagnosed 1998-2020 are related to a total of 1,523 patients. Currently, in 389 (25.5 %) of these 1,523 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 299 / 71 / 19 (19.6 % / 4.7 % / 1.2 %) 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 retreived from the respective headings.

How to interpret:
In 2018, a subgroup of 86 cases has been diagnosed, of which 16.8 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 1.9 % 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 4.94 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	41	39	2.2	2.0	1.4	1.3	1.9	1.6	2.2	1.9
2003	42	39	2.2	2.0	1.3	1.2	1.9	1.6	2.2	1.8
2004	62	50	3.3	2.5	2.0	1.5	2.8	1.9	3.4	2.3
2005	60	46	3.2	2.3	1.9	1.2	2.7	1.7	3.1	2.1
2006	81	57	4.2	2.8	2.3	1.6	3.3	2.1	4.1	2.5
2007	96	54	4.3	2.3	2.7	1.4	3.6	1.8	4.2	2.0
2008	81	76	3.6	3.3	2.2	1.8	3.0	2.4	3.6	2.8
2009	79	74	3.5	3.2	2.0	1.9	2.8	2.5	3.4	2.9
2010	82	85	3.6	3.6	2.1	2.2	2.9	2.9	3.5	3.2
2011	101	81	4.5	3.5	2.5	2.2	3.4	2.8	4.3	3.2
2012	98	104	4.3	4.4	2.4	3.0	3.4	3.5	4.0	4.0
2013	132	93	5.7	3.9	3.4	2.4	4.6	3.1	5.3	3.5
2014	114	113	4.9	4.7	2.8	2.6	3.8	3.4	4.6	3.9
2015	118	82	5.0	3.4	2.8	2.1	3.8	2.6	4.6	3.0
2016	128	108	5.3	4.4	3.1	2.7	4.2	3.4	5.0	3.9
2017	117	116	4.8	4.7	2.7	3.2	3.7	3.9	4.4	4.3
2018	94	86	3.9	3.5	2.1	1.9	2.9	2.6	3.5	2.9
2019	86	83	3.5	3.3	2.0	1.9	2.7	2.5	3.2	2.9
2020	68	52	2.8	2.1	1.7	1.2	2.2	1.5	2.6	1.8
1998–2020	1775	1532	3.8	3.2	2.2	1.9	3.1	2.4	3.6	2.8

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	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	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	80	61.0	16.3	17.7	90.9	34.1	50.7	62.6	72.6	80.1
2003	81	63.0	13.3	23.5	87.5	50.1	56.4	63.6	72.3	79.1
2004	112	61.4	14.8	13.8	93.3	40.6	52.3	63.6	72.1	78.1
2005	106	64.1	15.2	16.1	90.8	42.4	56.9	66.1	74.9	81.0
2006	138	64.7	12.3	29.9	91.9	46.4	56.2	66.3	73.7	79.9
2007	150	61.6	16.0	13.4	91.2	40.1	54.0	64.3	71.3	80.6
2008	157	62.6	15.4	18.9	93.9	40.6	53.7	65.8	72.7	80.2
2009	153	63.1	16.7	12.4	92.6	38.6	54.7	63.9	75.1	84.0
2010	167	61.7	14.4	14.9	92.4	42.3	54.1	61.9	72.1	79.8
2011	182	61.7	17.0	15.5	92.9	41.0	50.4	64.0	75.1	81.7
2012	202	60.7	19.1	9.7	90.6	29.6	51.5	64.7	74.9	80.8
2013	225	59.9	15.9	15.7	96.5	35.7	50.4	61.6	72.2	77.0
2014	227	63.2	16.8	15.8	94.1	39.4	52.2	66.4	75.3	82.6
2015	200	62.5	16.9	11.4	92.0	41.7	52.9	65.2	75.4	81.1
2016	236	62.2	16.3	13.8	98.3	39.9	54.4	64.3	73.7	80.7
2017	233	60.3	17.6	9.4	92.3	34.1	51.8	62.7	73.7	80.3
2018	180	63.4	15.7	14.3	90.4	41.6	54.3	66.8	75.6	79.8
2019	169	62.4	15.6	17.7	96.9	39.3	53.6	63.3	74.8	80.3
2020	120	61.2	17.6	18.5	101	35.6	51.0	61.3	76.2	82.1
1998-2020	3307	62.0	16.2	9.4	101	39.3	53.1	63.9	74.0	80.5

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	26	62.2	12.1	34.3	88.5	50.5	54.0	61.2	69.1	79.8
2002	41	61.2	12.8	27.1	88.3	45.4	56.4	61.0	67.8	75.3
2003	42	64.5	10.0	32.4	85.0	55.0	58.8	63.9	70.9	76.7
2004	62	61.9	11.8	27.8	78.9	47.7	53.9	63.6	71.0	76.4
2005	60	63.6	13.7	19.0	87.6	46.6	57.7	65.6	74.3	77.3
2006	81	65.5	10.5	38.5	85.7	49.7	59.1	67.4	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	81	62.3	13.4	19.3	85.6	48.2	54.7	64.2	70.1	78.8
2009	79	64.8	13.8	12.4	89.0	47.7	56.9	65.4	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	101	64.5	14.1	15.5	89.3	45.7	53.8	66.7	75.9	81.7
2012	98	63.2	15.6	9.7	89.0	42.5	53.6	65.1	75.3	80.8
2013	132	60.9	14.0	19.4	90.4	45.2	51.9	61.9	72.0	78.0
2014	114	62.7	16.4	20.3	92.6	39.4	52.7	65.4	74.9	82.1
2015	118	63.7	15.3	18.3	87.7	42.5	53.3	66.2	75.5	81.1
2016	128	63.0	15.7	15.8	89.5	38.4	54.4	65.3	74.4	80.9
2017	117	63.4	16.3	12.9	92.3	36.2	55.7	65.1	76.5	81.6
2018	94	63.8	15.6	14.3	90.4	41.8	55.1	68.0	75.9	79.1
2019	86	62.4	15.3	22.6	91.4	42.2	53.6	62.7	74.9	79.9
2020	68	60.6	16.4	18.5	91.7	39.6	52.0	61.0	71.8	80.6
1998-2020	1775	62.9	14.5	9.7	92.6	44.0	54.6	64.3	73.7	79.9

Table 3b

Age distribution parameters by year of diagnosis (FEMALES)

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	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	46	64.7	17.2	16.1	90.8	37.0	56.3	67.5	78.1	83.0
2006	57	63.5	14.5	29.9	91.9	43.5	52.4	63.8	73.8	82.8
2007	54	61.8	18.0	13.4	88.4	41.0	53.1	65.3	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	74	61.1	19.2	15.9	92.6	35.0	49.4	62.3	76.5	84.9
2010	85	60.1	15.8	14.9	89.6	39.7	50.8	61.1	70.9	79.8
2011	81	58.2	19.6	16.5	92.9	30.3	46.3	59.6	72.4	82.6
2012	104	58.4	21.7	13.7	90.6	21.9	45.5	63.3	74.7	85.4
2013	93	58.5	18.2	15.7	96.5	32.6	46.3	61.6	72.7	76.4
2014	113	63.6	17.2	15.8	94.1	40.6	52.2	66.6	76.7	84.0
2015	82	60.8	19.0	11.4	92.0	26.0	51.6	62.8	75.4	81.6
2016	108	61.2	17.0	13.8	98.3	39.9	54.3	62.8	71.6	79.8
2017	116	57.2	18.4	9.4	90.4	29.0	46.7	58.8	70.3	79.1
2018	86	62.8	15.9	19.3	87.1	41.5	53.9	66.1	75.2	80.2
2019	83	62.5	16.0	17.7	96.9	35.8	53.2	63.7	74.8	80.5
2020	52	62.0	19.2	20.7	101	33.3	49.7	62.3	77.5	85.4
1998-2020	1532	60.9	17.9	9.4	101	33.7	50.5	63.3	74.3	81.6

Table 4

Age distribution by 5-year age group and sex for period 2007-2020

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4									
5-9	2	0.1	0.1	1	0.1	0.1	1	0.1	0.1
10-14	9	0.3	0.4	3	0.2	0.3	6	0.5	0.6
15-19	40	1.5	2.0	9	0.6	0.9	31	2.6	3.1
20-24	51	2.0	3.9	19	1.4	2.3	32	2.7	5.8
25-29	53	2.0	6.0	23	1.6	3.9	30	2.5	8.3
30-34	58	2.2	8.2	23	1.6	5.6	35	2.9	11.2
35-39	68	2.6	10.8	32	2.3	7.9	36	3.0	14.2
40-44	87	3.3	14.1	46	3.3	11.2	41	3.4	17.6
45-49	167	6.4	20.6	86	6.2	17.4	81	6.7	24.3
50-54	232	8.9	29.5	129	9.3	26.6	103	8.5	32.8
55-59	292	11.2	40.7	166	11.9	38.5	126	10.4	43.2
60-64	301	11.6	52.3	177	12.7	51.2	124	10.3	53.5
65-69	324	12.5	64.7	178	12.8	64.0	146	12.1	65.6
70-74	312	12.0	76.7	179	12.8	76.8	133	11.0	76.6
75-79	310	11.9	88.7	173	12.4	89.2	137	11.4	88.0
80-84	172	6.6	95.3	103	7.4	96.6	69	5.7	93.7
85+	123	4.7	100.0	47	3.4	100.0	76	6.3	100.0
All ages	2601	100.0		1394	100.0		1207	100.0	

Table 5

Age-specific incidence and proportion of all cancers
for period 2007-2020

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males Prop.all cancers n=153686 %	Females Prop.all cancers n=155051 %
0- 4						
5- 9	1	1	0.1	0.1	0.9	1.0
10-14	3	6	0.2	0.4	2.2	4.7
15-19	9	31	0.5	1.9	2.8	11.7
20-24	19	32	0.9	1.7	3.0	6.2
25-29	23	30	1.0	1.3	2.4	2.5
30-34	23	35	1.0	1.5	1.8	1.6
35-39	32	36	1.4	1.6	1.7	1.0
40-44	46	41	1.8	1.7	1.6	0.7
45-49	86	80	3.2	3.1	1.7	0.9
50-54	129	103	5.1	4.1	1.5	0.8
55-59	165	126	7.8	5.8	1.3	0.9
60-64	175	124	9.9	6.5	1.0	0.8
65-69	175	145	10.7	8.0	0.7	0.8
70-74	177	133	11.8	7.7	0.6	0.7
75-79	173	135	14.3	9.0	0.7	0.7
80-84	102	68	14.1	6.4	0.7	0.4
85+	46	76	9.9	7.3	0.4	0.5
All ages	1384	1202			0.9	0.8
Incidence						
Raw			4.2	3.6		
WS			2.5	2.2		
ES			3.3	2.8		
BRD-S			4.0	3.2		

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).

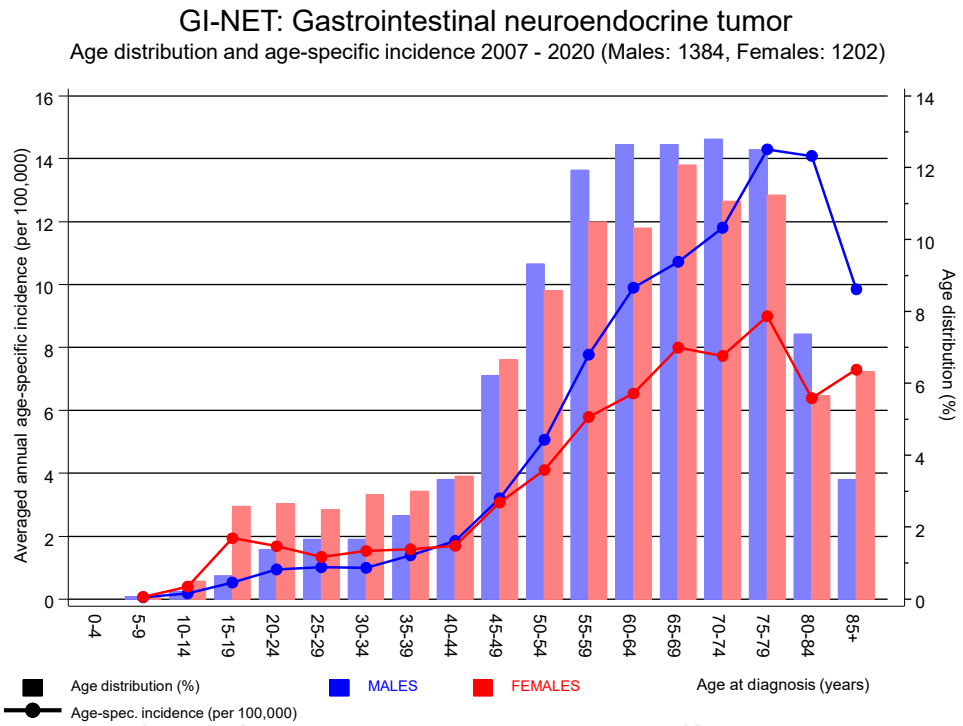


Figure 6. Age distribution (males: mean=62.8 yrs, median=64.3 yrs; females: mean=60.6 yrs, median=63.1 yrs) and age-specific incidence.

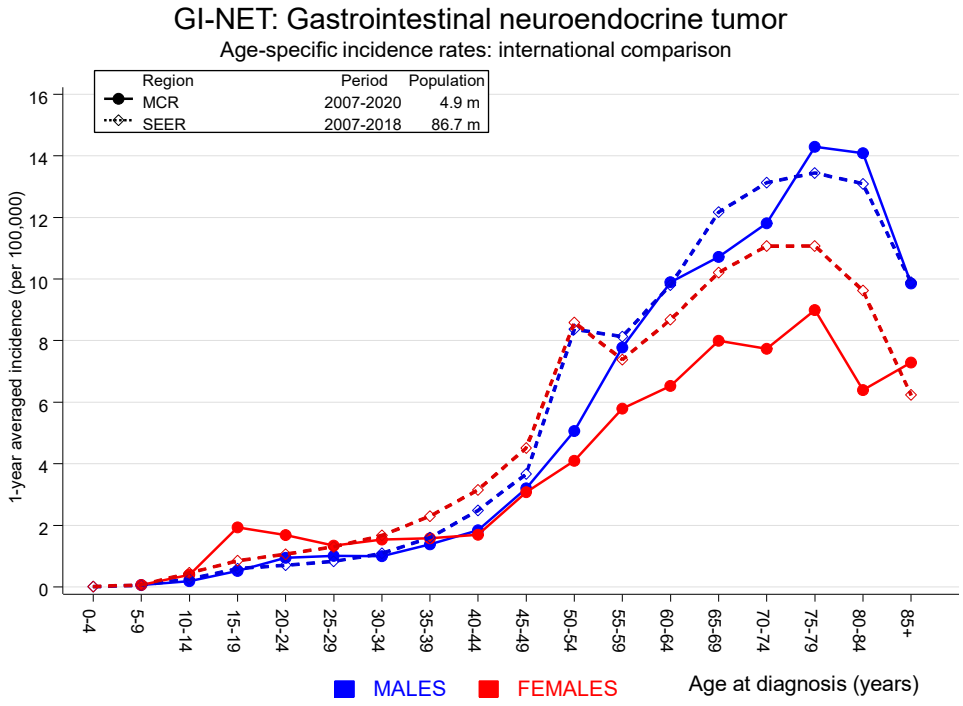


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:
Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 21 Regs Research Data, released April 2021, based on the November 2020 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 1998-2020

MALES

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C03-C06	Oral cavity	2	0.8	2.6	0.3	9.4		1.9	100.0
C09-C10	Oropharynx	1	1.0	1.0	0.0	5.8		0.1	
C12-C13	Hypopharynx	3	0.5	5.9	1.2	17.1	#	3.9	
C15	Oesophagus	13	1.8	7.0	3.8	12.0	#	17.5	
C16	Stomach	12	3.2	3.8	1.9	6.6	#	13.8	
C17	Small intestine	5	0.6	8.9	2.9	20.8	#	6.9	
C18	Colon	53	8.0	6.6	5.0	8.7	#	70.5	1.9
C19-C20	Rectum	18	4.5	4.0	2.3	6.3	#	21.1	
C21	Anus/canal	1	0.2	4.5	0.1	25.0		1.2	
C22	Liver	8	2.6	3.1	1.3	6.2	#	8.5	12.5
C23-C24	Bile	3	0.9	3.3	0.7	9.5		3.3	
C25	Pancreas	17	3.4	5.0	2.9	8.0	#	21.3	5.9
C32	Larynx	1	0.9	1.2	0.0	6.4		0.2	
C33-C34	Lung	23	10.1	2.3	1.4	3.4	#	20.1	4.3
C38,C45	Mesothelioma	1	0.6	1.7	0.0	9.3		0.6	
C40-C41	Bone	1	0.1	13.3	0.3	74.2		1.4	
C43	Malign. melanoma	14	4.1	3.4	1.8	5.7	#	15.4	
C46,C49	Soft tissue	4	0.5	8.0	2.2	20.6	#	5.5	
C61	Prostate	44	23.7	1.9	1.4	2.5	#	31.8	4.5
C64	Kidney	12	3.0	4.0	2.1	7.0	#	14.1	
C65	Renal pelvis	2	0.4	5.2	0.6	18.9		2.5	
C66	Ureter	3	0.2	12.9	2.7	37.7	#	4.3	
C67	Bladder	4	3.9	1.0	0.3	2.6		0.2	
C69	Eye melanoma	1	0.1	10.4	0.3	57.7		1.4	
C70-C72	CNS cancer	2	1.1	1.8	0.2	6.6		1.4	
C73	Thyroid	3	0.6	4.8	1.0	14.1		3.7	
C74-C80	Cancer others	1	0.2	6.1	0.2	34.2		1.3	
C76-C79	CUP	4	1.4	2.9	0.8	7.3		4.1	
C81	Hodgkin lymphoma	1	0.2	4.5	0.1	25.3		1.2	
C82-C85	NHL	17	3.6	4.7	2.8	7.6	#	21.0	5.9
C90	Mult. myeloma	3	1.1	2.7	0.6	8.0		3.0	
C91-C96	Leukaemia	4	1.3	3.1	0.9	8.0		4.3	50.0
Not observed		0	1.8	0.0	0.0	2.1		-2.8	
All further malignancies		281	86.3	3.3	2.9	3.7	#	304.8	3.9

Patients	1742
Median age at next malignancy (years)	71.0
Person-years	6388
Mean observation time (years)	3.7
Median observation time (years)	1.8

The occurrence of further specified malignancy is statistically significant.

Table 7b

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of further malignancies for period 1998-2020
FEMALES

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C09-C10	Oropharynx	1	0.2	4.4	0.1	24.7		1.4	
C15	Oesophagus	3	0.4	8.4	1.7	24.7	#	4.6	
C16	Stomach	8	1.6	5.0	2.1	9.8	#	11.2	12.5
C17	Small intestine	8	0.3	27.5	11.9	54.2	#	13.5	
C18	Colon	31	4.7	6.6	4.5	9.4	#	46.2	
C19-C20	Rectum	11	1.9	5.7	2.9	10.2	#	15.9	9.1
C21	Anus/canal	1	0.3	3.4	0.1	18.7		1.2	
C22	Liver	1	0.6	1.6	0.0	8.9		0.7	
C25	Pancreas	13	2.3	5.6	3.0	9.6	#	18.7	7.7
C33-C34	Lung	13	4.0	3.2	1.7	5.6	#	15.8	7.7
C43	Malign. melanoma	6	2.1	2.9	1.1	6.3	#	6.9	
C46,C49	Soft tissue	1	0.3	3.4	0.1	19.2		1.2	
C48	Peritoneal	1	0.2	4.5	0.1	24.9		1.4	
C50	Breast	39	16.5	2.4	1.7	3.2	#	39.5	5.1
C51	Vulva	1	0.5	1.8	0.0	10.3		0.8	
C53	Cervix uteri	4	0.8	5.3	1.5	13.6	#	5.7	25.0
C54	Corpus uteri	5	2.9	1.7	0.6	4.1		3.7	
C56	Ovary	13	2.0	6.4	3.4	10.9	#	19.2	7.7
C64	Kidney	7	1.1	6.2	2.5	12.7	#	10.3	14.3
C67	Bladder	2	1.0	2.1	0.3	7.5		1.8	
C69	Eye melanoma	1	0.1	17.1	0.4	95.5		1.7	
C70-C72	CNS cancer	1	0.6	1.6	0.0	8.6		0.6	
C81	Hodgkin lymphoma	1	0.1	9.0	0.2	50.2		1.6	
C82-C85	NHL	9	1.9	4.7	2.1	8.9	#	12.4	
C90	Mult. myeloma	2	0.6	3.4	0.4	12.3		2.5	
C91-C96	Leukaemia	3	0.7	4.1	0.8	12.0		4.0	33.3
C96	Systemic	1	0.0	84.0	2.1	468.1	#	1.7	100.0
Not observed		0	4.1	0.0	0.0	0.9	#	-7.1	
All further malignancies		187	51.8	3.6	3.1	4.2	#	237.2	5.9

Patients	1508
Median age at next malignancy (years)	70.3
Person-years	5698
Mean observation time (years)	3.8
Median observation time (years)	2.1

The occurrence of further specified malignancy is statistically significant.

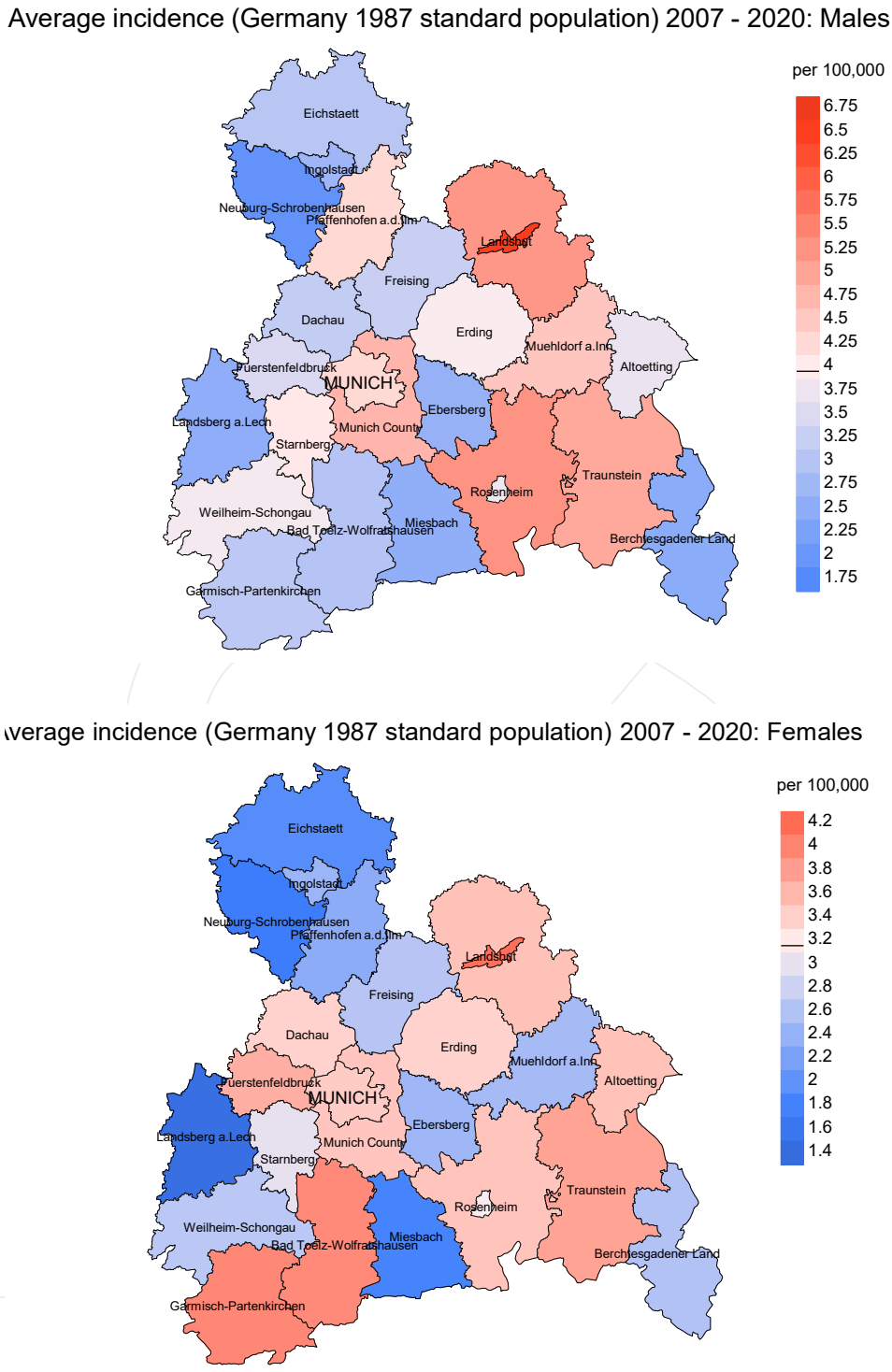
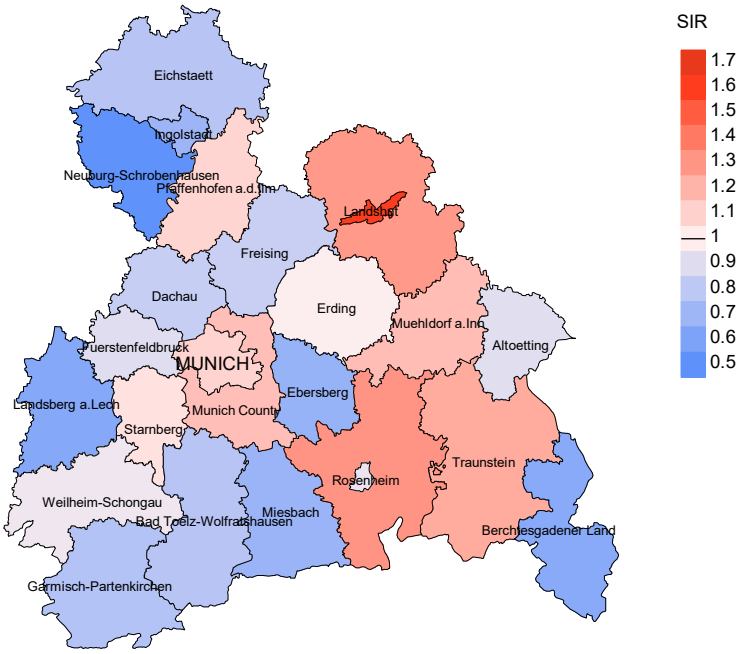


Figure 8a. Map of cancer incidence (german standard population) by county averaged for period 2007 to 2020. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 4.0/100,000 WS N=1,384, females 3.2/100,000 WS N=1,202).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,727 female residents (averaged) in the period from 2007 to 2020 a total of 26 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 2.5/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.4 and 4.1/100,000.

Standardized incidence ratio (SIR) 2007 - 2020: Males



Standardized incidence ratio (SIR) 2007 - 2020: Females

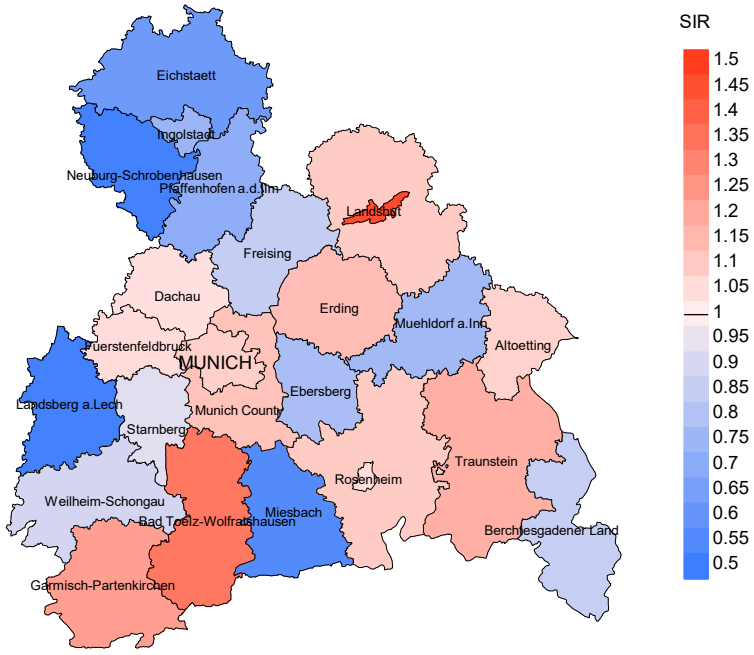


Figure 8b. Map of standardized incidence ratio (SIR) by county averaged for period 2007 to 2020. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=1,384, females N=1,202).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,153 female residents (averaged) in the period from 2007 to 2020 a total of 26 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 0.78. Though, the value of this parameter may vary with an underlying probability of 99% between 0.44 and 1.27, 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 4.94 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	31	67.4	87.1
1999	52	94.2	33	63.5	97.0
2000	42	97.6	24	57.1	87.5
2001	49	98.0	30	61.2	93.3
2002	80	95.0	46	57.5	95.7
2003	81	92.6	48	59.3	97.9
2004	112	92.9	60	53.6	95.0
2005	106	93.4	66	62.3	92.4
2006	138	94.2	80	58.0	96.3
2007	150	91.3	82	54.7	95.1
2008	157	98.7	76	48.4	93.4
2009	153	100.0	69	45.1	98.6
2010	167	97.0	70	41.9	92.9
2011	182	97.8	75	41.2	93.3
2012	202	95.0	82	40.6	91.5
2013	225	96.4	76	33.8	86.8
2014	227	98.2	94	41.4	85.1
2015	200	93.5	69	34.5	87.0
2016	236	99.2	78	33.1	88.5
2017	233	99.6	55	23.6	81.8
2018	180	99.4	44	24.4	59.1
2019	169	100.0	31	18.3	87.1
2020	120	100.0	17	14.2	88.2
1998–2020	3307	96.9	1336	40.4	90.5

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 4.94 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	80	19	8	10.0
2003	81	33	11	13.6
2004	112	37	10	8.9
2005	106	46	16	15.1
2006	138	41	11	8.0
2007	150	53	12	8.0
2008	157	64	17	10.8
2009	153	66	19	12.4
2010	167	60	17	10.2
2011	182	54	12	6.6
2012	202	83	25	12.4
2013	225	91	15	6.7
2014	227	97	25	11.0
2015	200	102	25	12.5
2016	236	86	19	8.1
2017	233	117	22	9.4
2018	180	89	10	5.6
2019	169	97	12	7.1
2020	120	107	12	10.0
1998–2020	3307	1390	314	9.5

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 4.94 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	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	66	66.7	33.3	77.3
2010	60	66.7	33.3	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	102	71.6	28.4	77.8
2016	86	67.4	32.6	75.0
2017	117	68.4	31.6	73.2
2018	89	59.6	40.4	69.1
2019	97	60.8	39.2	70.5
2020	107	57.0	43.0	69.6
1998-2020	1390	69.7	30.3	77.5

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	36	72.5	68.5	76.5	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	62	74.2	70.3	77.3	70.3
2015	52	73.8	69.1	82.7	73.2
2016	53	76.3	73.5	80.8	73.5
2017	77	75.1	70.9	77.9	72.1
2018	55	75.2	71.3	80.5	76.2
2019	51	74.6	67.7	78.2	67.7
2020	65	76.8	73.7	81.3	75.0
1998-2020	809	73.7	70.9	77.9	71.8

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 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	21	78.1	77.7	79.4	78.1
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	50	78.2	73.2	82.7	77.4
2016	33	77.4	75.9	81.9	77.0
2017	40	78.1	76.8	80.5	76.3
2018	34	75.4	78.4	72.0	78.5
2019	46	79.1	72.3	82.0	63.6
2020	42	80.3	79.5	85.3	79.5
1998-2020	581	77.4	74.6	83.6	76.4

By 2018, Bavarians' life expectancy at birth is estimated at 79.3 years for boys and 83.8 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	0.29	0.4	0.27	0.5	0.28	0.7	0.31
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	0.13	0.5	0.14
2005	19	1.0	0.32	0.5	0.26	0.8	0.30	1.1	0.35
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	0.46	0.9	0.41	1.3	0.44	1.6	0.45
2009	27	1.2	0.35	0.6	0.29	0.9	0.31	1.2	0.35
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	0.25	1.1	0.25
2012	26	1.1	0.27	0.5	0.20	0.8	0.23	1.1	0.28
2013	41	1.8	0.31	0.8	0.23	1.2	0.27	1.7	0.32
2014	44	1.9	0.39	0.9	0.34	1.4	0.37	1.7	0.39
2015	38	1.6	0.32	0.8	0.29	1.2	0.32	1.5	0.32
2016	35	1.5	0.28	0.6	0.20	0.9	0.23	1.3	0.27
2017	52	2.2	0.44	1.0	0.35	1.5	0.39	1.9	0.43
2018	36	1.5	0.38	0.7	0.32	1.0	0.35	1.3	0.38
2019	33	1.4	0.39	0.7	0.34	1.0	0.36	1.2	0.38
2020	38	1.6	0.57	0.7	0.40	1.0	0.47	1.3	0.53
1998-2020	571	1.2	0.32	0.6	0.27	0.9	0.30	1.2	0.33

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	19	1.0	0.38	0.4	0.24	0.6	0.30	0.8	0.34
2005	11	0.6	0.24	0.2	0.19	0.3	0.20	0.5	0.22
2006	19	0.9	0.34	0.3	0.22	0.5	0.25	0.7	0.30
2007	17	0.7	0.31	0.3	0.24	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	0.23	0.3	0.15	0.4	0.18	0.5	0.19
2010	15	0.6	0.18	0.3	0.14	0.5	0.15	0.6	0.17
2011	16	0.7	0.20	0.3	0.14	0.4	0.16	0.6	0.18
2012	34	1.4	0.33	0.6	0.20	0.9	0.25	1.0	0.27
2013	29	1.2	0.31	0.5	0.20	0.7	0.24	0.9	0.27
2014	26	1.1	0.23	0.4	0.18	0.7	0.20	0.8	0.22
2015	35	1.4	0.43	0.6	0.27	0.9	0.33	1.1	0.36
2016	23	0.9	0.21	0.3	0.12	0.5	0.14	0.7	0.17
2017	28	1.1	0.24	0.4	0.13	0.6	0.16	0.8	0.19
2018	17	0.7	0.20	0.3	0.14	0.4	0.16	0.5	0.17
2019	26	1.0	0.31	0.4	0.23	0.6	0.26	0.8	0.28
2020	23	0.9	0.44	0.3	0.25	0.5	0.30	0.6	0.36
1998-2020	398	0.8	0.26	0.3	0.17	0.5	0.20	0.6	0.23

Table 12

Age distribution of age at death (cancer-related) for period 2007-2020
(**incl. multiple malignancies**)

Age at death Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4									
5-9									
10-14									
15-19									
20-24									
25-29	2	0.2	0.2	2	0.4	0.4			0.0
30-34	1	0.1	0.4			0.4	1	0.3	0.3
35-39	7	0.9	1.2	3	0.6	1.0	4	1.2	1.5
40-44	10	1.2	2.5	3	0.6	1.7	7	2.2	3.7
45-49	17	2.1	4.6	8	1.7	3.3	9	2.8	6.5
50-54	41	5.1	9.7	28	5.8	9.1	13	4.0	10.5
55-59	69	8.6	18.2	45	9.3	18.4	24	7.4	18.0
60-64	89	11.0	29.3	56	11.6	30.0	33	10.2	28.2
65-69	122	15.1	44.4	82	17.0	47.0	40	12.4	40.6
70-74	107	13.3	57.7	69	14.3	61.3	38	11.8	52.3
75-79	142	17.6	75.3	90	18.6	79.9	52	16.1	68.4
80-84	115	14.3	89.6	64	13.3	93.2	51	15.8	84.2
85+	84	10.4	100.0	33	6.8	100.0	51	15.8	100.0
All ages	806	100.0		483	100.0		323	100.0	

Table 13

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2020
(**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	0.09			2.2	
30-34		1			0.0	0.03		0.6
35-39	3	4	0.1	0.09	0.2	0.11	1.1	1.0
40-44	3	7	0.1	0.07	0.3	0.17	0.5	0.8
45-49	8	9	0.3	0.09	0.3	0.11	0.6	0.5
50-54	28	13	1.1	0.22	0.5	0.13	1.1	0.5
55-59	45	24	2.1	0.27	1.1	0.19	1.0	0.6
60-64	56	33	3.2	0.32	1.7	0.27	0.9	0.7
65-69	82	40	5.0	0.47	2.2	0.28	0.9	0.6
70-74	69	38	4.6	0.39	2.2	0.29	0.6	0.4
75-79	90	52	7.4	0.52	3.5	0.39	0.7	0.5
80-84	64	51	8.8	0.63	4.8	0.75	0.6	0.5
85+	33	51	7.1	0.72	4.9	0.67	0.4	0.4
All ages	483	323					0.7	0.5
Mortality								
Raw			1.5	0.35	1.0	0.27		
WS			0.7	0.29	0.4	0.18		
ES			1.1	0.32	0.6	0.21		
BRD-S			1.4	0.35	0.7	0.23		
PYLL-70								
per 100,000			7.4		5.1			
ES			6.3		4.2			
AYLL-70			9.4		11.0			

Table 14a

Further malignancies in deaths in period 1998–2020
MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03–C06 Oral cavity	5	1.6	3	60.0			2	40.0
C12–C13 Hypopharynx	3	1.0					3	100.0
C15 Oesophagus	11	3.6	3	27.3	1	9.1	7	63.6
C16 Stomach	5	1.6	3	60.0	1	20.0	1	20.0
C17 Small intestine	8	2.6	2	25.0	5	62.5	1	12.5
C18 Colon	54	17.5	17	31.5	30	55.6	7	13.0
C19–C20 Rectum	16	5.2	9	56.3	6	37.5	1	6.3
C22 Liver	7	2.3			2	28.6	5	71.4
C23–C24 Bile	3	1.0			2	66.7	1	33.3
C25 Pancreas	19	6.2	3	15.8	8	42.1	8	42.1
C32 Larynx	1	0.3	1	100.0				
C33–C34 Lung	26	8.4	8	30.8	3	11.5	15	57.7
C38,C45 Mesothelioma	1	0.3					1	100.0
C43 Malign. melanoma	7	2.3	4	57.1			3	42.9
C44 Skin others	22	7.1	17	77.3			5	22.7
C46,C49 Soft tissue	4	1.3	2	50.0			2	50.0
C48 Peritoneal	1	0.3	1	100.0				
C50 Breast	1	0.3	1	100.0				
C61 Prostate	58	18.8	39	67.2	5	8.6	14	24.1
C62 Testis	2	0.6	2	100.0				
C64 Kidney	12	3.9	6	50.0	2	16.7	4	33.3
C65 Renal pelvis	2	0.6					2	100.0
C66 Ureter	2	0.6					2	100.0
C67 Bladder	10	3.2	9	90.0			1	10.0
C70–C72 CNS cancer	2	0.6			1	50.0	1	50.0
C73 Thyroid	2	0.6	1	50.0			1	50.0
C76–C79 CUP	7	2.3	4	57.1	1	14.3	2	28.6
C81 Hodgkin lymphoma	1	0.3	1	100.0				
C82–C85 NHL	11	3.6	4	36.4	2	18.2	5	45.5
C91–C96 Leukaemia	5	1.6	1	20.0			4	80.0
All further malignancies	308	100.0	141	45.8	69	22.4	98	31.8

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 1998–2020
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C15	Oesophagus	3	1.6			2	66.7	1	33.3
C16	Stomach	10	5.3	4	40.0	4	40.0	2	20.0
C17	Small intestine	4	2.1			2	50.0	2	50.0
C18	Colon	22	11.7	2	9.1	13	59.1	7	31.8
C19–C20	Rectum	16	8.5	4	25.0	8	50.0	4	25.0
C21	Anus/canal	1	0.5	1	100.0				
C25	Pancreas	11	5.9			4	36.4	7	63.6
C33–C34	Lung	11	5.9	3	27.3	1	9.1	7	63.6
C43	Malign. melanoma	5	2.7	5	100.0				
C44	Skin others	6	3.2	3	50.0			3	50.0
C46,C49	Soft tissue	1	0.5	1	100.0				
C48	Peritoneal	2	1.1	1	50.0	1	50.0		
C50	Breast	39	20.7	30	76.9	2	5.1	7	17.9
C51	Vulva	2	1.1	2	100.0				
C52	Vagina	1	0.5	1	100.0				
C53	Cervix uteri	3	1.6	1	33.3	1	33.3	1	33.3
C54	Corpus uteri	11	5.9	6	54.5	3	27.3	2	18.2
C56	Ovary	16	8.5	8	50.0	5	31.3	3	18.8
C64	Kidney	5	2.7	3	60.0	1	20.0	1	20.0
C65	Renal pelvis	2	1.1	1	50.0			1	50.0
C66	Ureter	1	0.5					1	100.0
C67	Bladder	3	1.6	1	33.3	1	33.3	1	33.3
C69	Eye melanoma	1	0.5					1	100.0
C70–C72	CNS cancer	1	0.5					1	100.0
C73	Thyroid	2	1.1	2	100.0				
C76–C79	CUP	2	1.1	1	50.0			1	50.0
C82–C85	NHL	5	2.7	2	40.0			3	60.0
C91–C96	Leukaemia	1	0.5					1	100.0
C96	Systemic	1	0.5					1	100.0
All further malignancies		188	100.0	82	43.6	48	25.5	58	30.9

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 2007-2020
(**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								
5- 9								
10-14								
15-19								
20-24								
25-29	2		0.1	0.09			2.4	
30-34		1			0.0	0.03		0.6
35-39	3	2	0.1	0.10	0.1	0.06	1.2	0.5
40-44	2	6	0.1	0.05	0.2	0.16	0.4	0.8
45-49	8	8	0.3	0.11	0.3	0.12	0.6	0.6
50-54	24	11	0.9	0.22	0.4	0.12	1.0	0.5
55-59	37	18	1.7	0.28	0.8	0.17	1.0	0.6
60-64	47	25	2.7	0.31	1.3	0.25	0.9	0.6
65-69	64	29	3.9	0.54	1.6	0.29	0.9	0.5
70-74	45	24	3.0	0.39	1.4	0.26	0.5	0.4
75-79	53	36	4.4	0.56	2.4	0.39	0.6	0.5
80-84	27	34	3.7	0.57	3.2	0.64	0.4	0.5
85+	19	37	4.1	0.95	3.5	0.67	0.3	0.4
All ages	331	231					0.6	0.5
Mortality								
Raw			1.0	0.33	0.7	0.24		
WS			0.5	0.27	0.3	0.15		
ES			0.8	0.30	0.4	0.18		
BRD-S			0.9	0.32	0.5	0.20		
PYLL-70								
per 100,000			6.3		4.0			
ES			5.4		3.3			
AYLL-70			9.7		11.3			

* See corresponding tables with multiple malignancies.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2020
(**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	0.09			2.4	
30-34		1			0.0	0.03		0.6
35-39	3	2	0.1	0.10	0.1	0.06	1.2	0.5
40-44	2	6	0.1	0.05	0.2	0.17	0.4	0.8
45-49	8	7	0.3	0.11	0.3	0.11	0.6	0.5
50-54	24	11	0.9	0.24	0.4	0.13	1.0	0.5
55-59	35	15	1.6	0.28	0.7	0.15	0.9	0.5
60-64	44	24	2.5	0.34	1.3	0.26	0.8	0.6
65-69	52	24	3.2	0.50	1.3	0.27	0.7	0.4
70-74	34	22	2.3	0.34	1.3	0.26	0.4	0.3
75-79	41	29	3.4	0.48	1.9	0.35	0.5	0.4
80-84	21	28	2.9	0.48	2.6	0.60	0.3	0.4
85+	14	35	3.0	0.78	3.4	0.66	0.2	0.4
All ages	280	204					0.5	0.4
Mortality								
Raw			0.9	0.30	0.6	0.23		
WS			0.5	0.25	0.3	0.14		
ES			0.7	0.28	0.4	0.17		
BRD-S			0.8	0.30	0.5	0.19		
PYLL-70								
per 100,000			6.1		3.7			
ES			5.2		3.1			
AYLL-70			10.2		11.6			

* See corresponding tables with multiple malignancies.

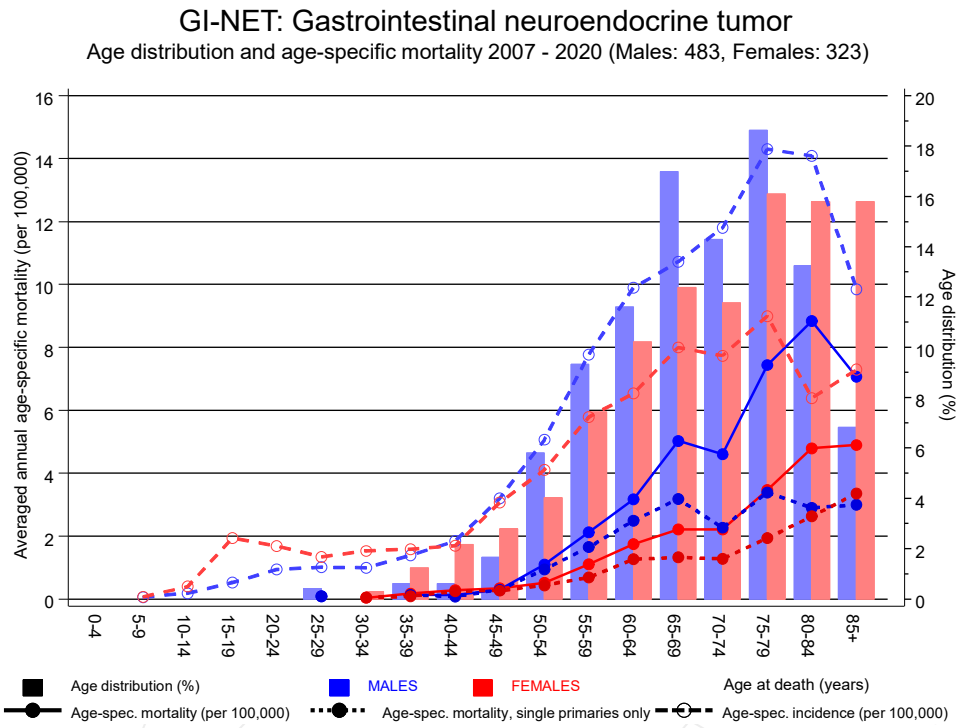


Figure 17. Distribution of age at death (bars; males: mean=66.9 yrs, median=67.7 yrs; females: mean=68.7 yrs, median=70.5 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

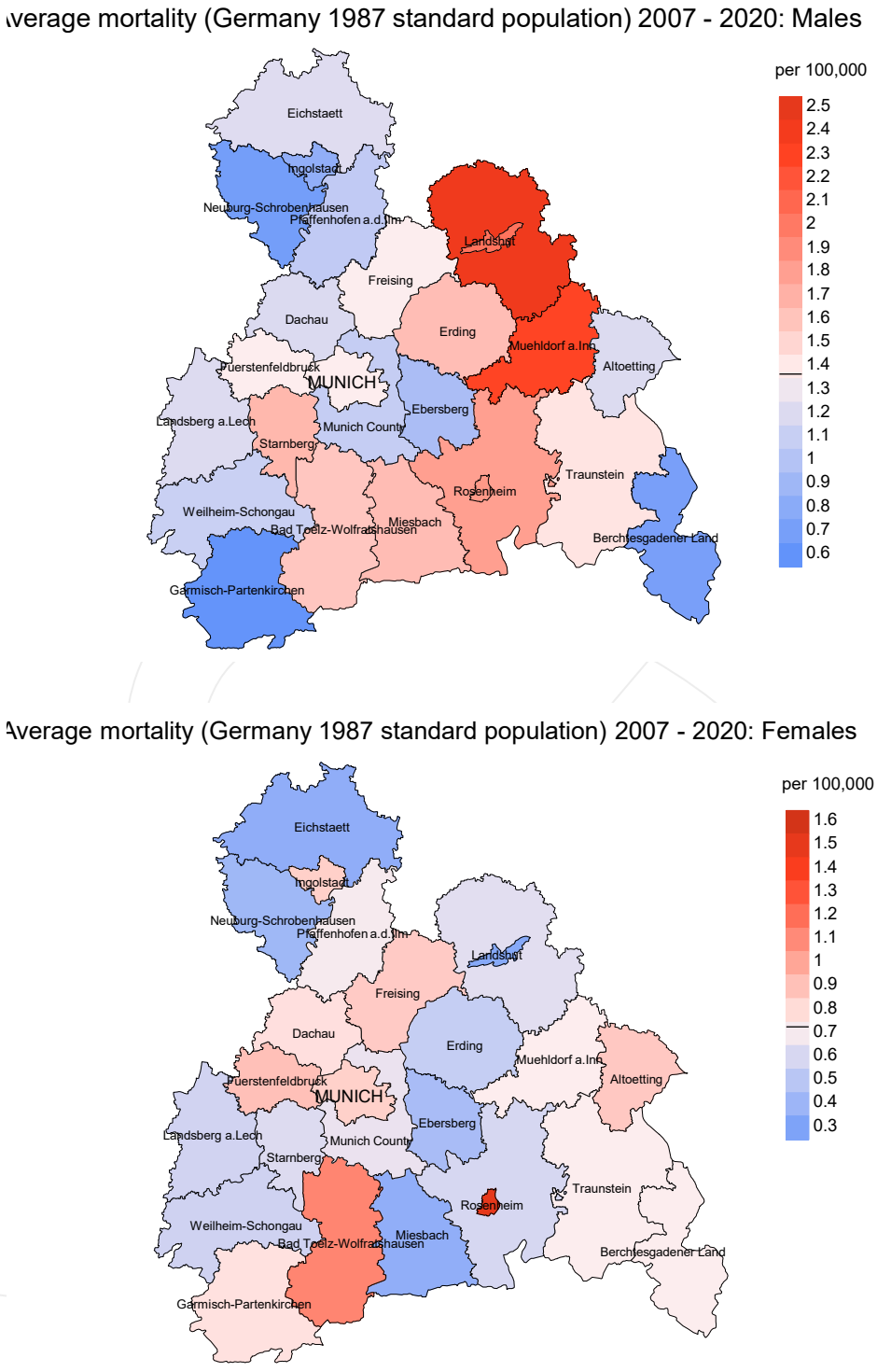
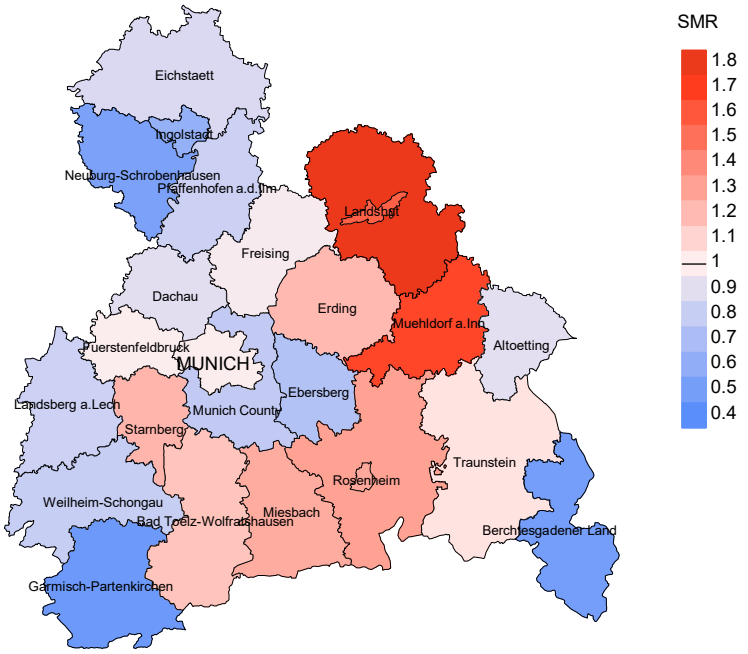


Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2020. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 1.4/100,000 WS N=483, females 0.7/100,000 WS N=323).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,727 female residents (averaged) in the period from 2007 to 2020 a total of 5 women died from gastroint. neuroend. tumor. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.4/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.1 and 1.3/100,000.

Standardized mortality ratio (SMR) 2007 - 2020: Males



Standardized mortality ratio (SMR) 2007 - 2020: Females

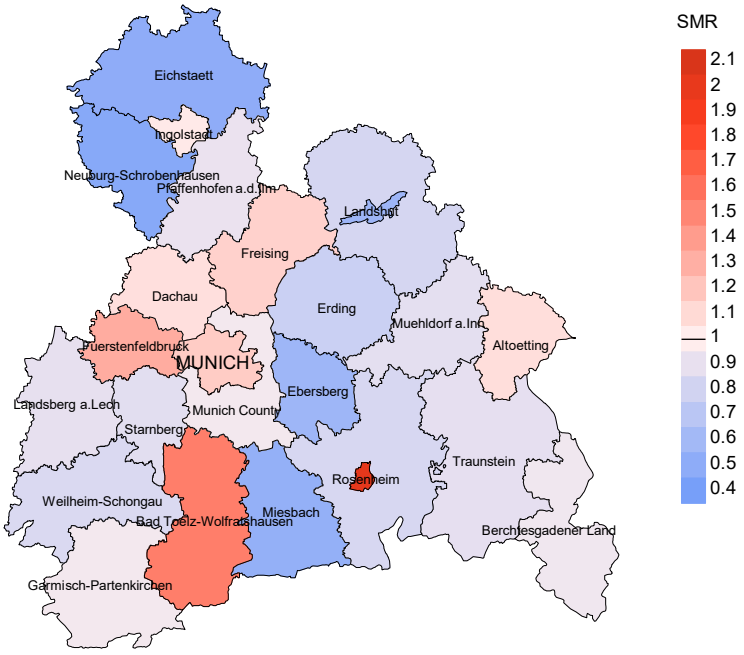


Figure 18b. Map of standardized mortality ratio (SMR) by county averaged for period 2007 to 2020. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=483, females N=323).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,153 female residents (averaged) in the period from 2007 to 2020 a total of 5 women died from gastroint. neuroend. tumor. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.57. Though, the value of this parameter may vary with an underlying probability of 99% between 0.12 and 1.62, 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 ratio of mortality and incidence (mortality-to-incidence ratio, **MIR**, **MI-Index**) is a statistical index 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 MIR. 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 (FRG) 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 of mortality to incidence, MIR
FRG	Federal Republic of Germany

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