Munich Cancer Registry

- Survival
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- *Deutsch*

GIST: Gastroint. stromal tumor

Incidence and Mortality

Year of diagnosis	1998-2019
Patients	1,495
Diseases	1,498
Creation date	01/26/2021
Database export	01/07/2021
Population	4.92 m

Munich Cancer Registry
Cancer Registry Bavaria - Upper Bavaria Regional Center
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Marchioninistr. 15
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https://www.tumorregister-muenchen.de/en

https://www.tumorregister-muenchen.de/en/facts/base/bhGISTE-GIST-Gastroint.-stromal-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, January 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.

Morphology codes (ICD-O-3 2011) used for specifying cancer site

Code	Description
8936/1	Gastrointestinal stromal tumor, NOS
8936/3	Gastrointestinal stromal sarcoma

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	2	0.0	10.6	100.0	100.0
1999	6	0.0	10.6	100.0	100.0
2000	15	13.0	10.6	86.7	100.0
2001	23	10.9	10.7	78.3	95.7
2002	31	14.3	10.6	83.9	96.8 #
2003	33	14.5	10.7	48.5	90.9
2004	43	13.7	10.4	62.8	95.3
2005	34	14.4	10.2	55.9	94.1
2006	25	14.6	9.9	60.0	96.0
2007	31	14.8	9.7	48.4	100.0 #
2008	49	16.1	9.7	40.8	98.0
2009	54	17.1	9.4	46.3	96.3
2010	85	19.3	9.1	42.4	100.0
2011	99	20.6	8.3	38.4	99.0
2012	138	22.8	7.6	32.6	94.9
2013	107	24.5	7.1	33.6	97.2
2014	126	24.8	7.1	31.0	96.8
2015	124	25.8	5.9	24.2	87.1
2016	116	26.6	4.8	22.4	97.4
2017	122	27.7	3.8	13.9	97.5
2018	124	27.3	1.8	7.3	99.2
2019	111	27.4	0.0	5.4	56.8 ##
1998-2019	1498	27.4	10.6	32.3	93.4

1,498 cases diagnosed 1998-2019 are related to a total of 1,495 patients. Currently, in 542 (36.3 %) of these 1,495 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 395 / 108 / 39 (26.4 % / 7.2 % / 2.6 %) 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 2017, a subgroup of 122 cases has been diagnosed, of which 27.7 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 3.8 % 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 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	1	50.0	0.0	11.2	100.0	100.0
1999	4	66.7	0.0	11.2	100.0	100.0
2000	9	60.0	7.1	11.3	88.9	100.0
2001	12	52.2	7.7	11.4	75.0	91.7
2002	17	54.8	9.3	11.2	94.1	94.1 #
2003	18	54.5	13.1	11.3	61.1	94.4
2004	19	44.2	15.0	11.2	57.9	100.0
2005	16	47.1	16.7	10.9	50.0	93.8
2006	8	32.0	18.3	10.9	75.0	100.0
2007	15	48.4	17.6	10.9	40.0	100.0 #
2008	24	49.0	18.9	11.1	45.8	100.0
2009	30	55.6	19.1	11.0	43.3	100.0
2010	46	54.1	20.5	10.9	47.8	100.0
2011	60	60.6	21.5	10.2	46.7	100.0
2012	74	53.6	24.1	9.4	28.4	94.6
2013	66	61.7	27.0	8.1	33.3	98.5
2014	70	55.6	27.0	8.4	38.6	98.6
2015	61	49.2	28.5	6.8	32.8	95.1
2016	56	48.3	29.5	6.0	23.2	96.4
2017	69	56.6	30.8	4.6	20.3	97.1
2018	69	55.6	30.2	2.3	10.1	98.6
2019	68	61.3	29.8	0.0	4.4	55.9 ##
1998-2019	812	54.2	29.8	11.2	34.6	94.1

812 cases diagnosed 1998-2019 are related to a total of 811 patients. Currently, in 313 (38.6 %) of these 811 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 222 / 66 / 25 (27.4 % / 8.1 % / 3.1 %) 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 2017, a subgroup of 69 cases has been diagnosed, of which 30.8 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 4.6 % 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 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	1	50.0	0.0	9.8	100.0	100.0
1999	2	33.3	0.0	9.8	100.0	100.0
2000	6	40.0	22.2	9.8	83.3	100.0
2001	11	47.8	15.0	9.9	81.8	100.0
2002	14	45.2	20.6	9.9	71.4	100.0 #
2003	15	45.5	16.3	9.9	33.3	86.7
2004	24	55.8	12.3	9.5	66.7	91.7
2005	18	52.9	12.1	9.2	61.1	94.4
2006	17	68.0	11.1	8.8	52.9	94.1
2007	16	51.6	12.1	8.2	56.3	100.0 #
2008	25	51.0	13.4	8.1	36.0	96.0
2009	24	44.4	15.0	7.5	50.0	91.7
2010	39	45.9	17.9	6.8	35.9	100.0
2011	39	39.4	19.5	5.9	25.6	97.4
2012	64	46.4	21.3	5.5	37.5	95.3
2013	41	38.3	21.6	5.8	34.1	95.1
2014	56	44.4	22.1	5.6	21.4	94.6
2015	63	50.8	22.5	4.9	15.9	79.4
2016	60	51.7	23.2	3.4	21.7	98.3
2017	53	43.4	24.1	2.7	5.7	98.1
2018	55	44.4	24.0	1.0	3.6	100.0
2019	43	38.7	24.6	0.0	7.0	58.1 ##
1998-2019	686	45.8	24.6	9.8	29.6	92.6

686 cases diagnosed 1998-2019 are related to a total of 684 patients. Currently, in 229 (33.5 %) of these 684 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 173 / 42 / 14 (25.3 % / 6.1 % / 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 2017, a subgroup of 53 cases has been diagnosed, of which 24.1 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 2.7 % 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 4.92 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	1	1	0.1	0.1	0.0	0.0	0.1	0.0	0.1	0.0
1999	4	2	0.4	0.2	0.3	0.1	0.4	0.1	0.4	0.1
2000	9	6	0.8	0.5	0.4	0.3	0.7	0.4	0.8	0.4
2001	12	11	1.0	0.9	0.6	0.5	0.9	0.7	1.2	0.8
2002	17	14	0.9	0.7	0.5	0.5	0.7	0.6	1.1	0.7
2003	18	15	1.0	0.8	0.6	0.4	0.9	0.6	0.9	0.7
2004	19	24	1.0	1.2	0.6	0.7	0.9	1.0	1.1	1.1
2005	16	18	0.8	0.9	0.5	0.4	0.7	0.6	0.9	0.8
2006	8	17	0.4	0.8	0.2	0.4	0.4	0.6	0.4	0.7
2007	15	16	0.7	0.7	0.4	0.3	0.6	0.4	0.6	0.6
2008	24	25	1.1	1.1	0.6	0.6	0.8	0.8	1.0	0.9
2009	30	24	1.3	1.0	0.8	0.5	1.1	0.7	1.3	0.9
2010	46	39	2.0	1.7	1.1	0.8	1.6	1.2	2.0	1.4
2011	60	39	2.7	1.7	1.3	0.8	1.9	1.1	2.5	1.3
2012	74	64	3.3	2.7	1.7	1.2	2.4	1.7	2.9	2.2
2013	66	41	2.9	1.7	1.5	0.9	2.1	1.2	2.6	1.4
2014	70	56	3.0	2.3	1.5	1.1	2.2	1.6	2.7	1.9
2015	61	63	2.6	2.6	1.2	1.1	1.8	1.6	2.3	2.1
2016	56	60	2.3	2.4	1.2	1.0	1.8	1.5	2.1	1.9
2017	69	53	2.9	2.2	1.3	0.9	2.0	1.4	2.5	1.7
2018	69	55	2.8	2.2	1.4	0.9	2.0	1.4	2.5	1.7
2019	68	43	2.8	1.7	1.5	0.7	2.1	1.0	2.5	1.3
1998-2019	812	686	1.8	1.5	1.0	0.7	1.4	1.0	1.8	1.2

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	2	88.8	1.7	87.5	90.0	87.5	87.5	88.8	90.0	90.0
1999	6	63.3	14.4	46.4	88.3	46.4	53.0	62.5	67.1	88.3
2000	15	60.6	14.1	36.6	79.1	37.6	55.1	60.0	72.5	77.9
2001	23	64.1	12.5	31.9	80.5	52.7	57.0	63.9	73.7	79.2
2002	31	66.5	14.6	19.3	89.0	46.8	60.3	68.9	75.8	81.6
2003	33	64.2	12.7	17.9	92.1	52.6	59.4	64.3	69.5	77.9
2004	43	62.7	13.8	16.7	83.2	47.1	55.0	61.9	74.8	79.7
2005	34	67.7	15.2	34.3	89.4	48.8	55.2	70.1	80.8	84.6
2006	25	67.6	11.5	39.5	89.2	54.6	61.9	66.8	73.9	84.8
2007	31	68.4	11.0	46.5	88.3	55.6	59.8	67.1	77.8	83.2
2008	49	66.1	13.4	26.5	97.0	45.9	60.0	67.0	73.1	81.7
2009	54	65.7	13.9	32.6	93.5	49.2	53.7	67.3	77.2	81.0
2010	85	67.2	11.3	30.6	87.5	53.4	60.4	67.6	75.2	83.2
2011	99	67.1	13.9	30.0	88.3	44.6	55.5	71.9	77.5	83.1
2012	138	69.0	11.2	34.9	91.8	53.7	62.0	69.9	77.4	82.5
2013	107	66.3	14.4	16.2	90.6	45.7	58.9	70.4	76.1	79.3
2014	126	66.7	13.6	25.9	93.1	48.7	57.6	69.4	76.7	81.8
2015	124	69.0	12.0	32.6	90.8	52.3	64.0	72.4	76.9	80.5
2016	116	68.1	13.4	32.6	92.4	49.8	56.3	70.9	78.2	84.4
2017	122	69.5	13.1	20.8	91.6	53.6	61.5	72.4	78.3	83.5
2018	124	68.8	12.1	27.4	92.3	53.2	61.1	71.3	77.7	80.9
2019	111	68.8	11.5	32.9	91.8	53.4	61.7	70.9	78.1	82.2
1998-2019	1498	67.5	12.9	16.2	97.0	50.2	59.4	69.5	77.1	82.2

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	1	87.5		87.5	87.5	87.5	87.5	87.5	87.5	87.5
1999	4	63.7	18.5	46.4	88.3	46.4	49.7	60.1	77.7	88.3
2000	9	60.7	15.8	36.6	79.1	36.6	55.1	64.0	72.5	79.1
2001	12	64.1	14.4	31.9	80.5	53.6	55.9	62.9	77.6	80.4
2002	17	71.4	10.9	44.8	89.0	58.1	67.2	71.9	79.2	81.9
2003	18	62.1	14.8	17.9	92.1	50.2	57.1	64.0	66.8	77.9
2004	19	61.2	16.1	16.7	83.2	41.0	54.9	61.4	76.2	80.9
2005	16	63.6	16.3	34.3	89.4	35.6	53.0	65.9	76.0	82.2
2006	8	66.9	12.1	51.7	89.2	51.7	59.9	63.8	73.4	89.2
2007	15	64.1	7.6	47.4	75.2	55.6	58.5	64.0	71.6	73.9
2008	24	66.3	13.7	26.5	88.0	45.4	61.4	69.3	75.1	78.4
2009	30	62.8	13.7	40.8	93.5	47.2	52.0	59.1	74.9	80.4
2010	46	66.9	12.5	30.6	87.5	50.8	59.0	68.4	75.4	82.5
2011	60	68.5	13.8	30.0	88.3	46.5	61.4	72.5	78.5	83.6
2012	74	67.4	10.9	34.9	91.0	51.6	62.0	68.7	73.9	80.2
2013	66	67.0	12.4	34.6	89.4	48.4	59.1	71.1	75.1	78.9
2014	70	66.3	13.0	30.9	83.8	48.4	56.4	69.4	76.7	80.6
2015	61	67.7	12.3	36.8	86.2	49.8	59.4	71.5	76.9	80.2
2016	56	66.5	13.3	32.6	92.4	52.9	56.0	67.5	75.9	83.7
2017	69	69.7	12.8	20.8	91.6	54.1	62.2	72.0	77.9	83.5
2018	69	67.5	12.7	27.4	88.9	51.4	60.8	70.6	77.6	80.3
2019	68	66.8	11.1	32.9	85.1	51.9	60.2	67.5	75.7	80.1
1998-2019	812	66.8	12.8	16.7	93.5	50.2	58.3	68.8	76.2	81.0

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	1	90.0		90.0	90.0	90.0	90.0	90.0	90.0	90.0
1999	2	62.5	1.1	61.7	63.2	61.7	61.7	62.5	63.2	63.2
2000	6	60.5	12.5	41.1	77.9	41.1	55.2	59.8	68.9	77.9
2001	11	64.1	10.7	40.4	79.2	52.7	57.0	66.9	69.9	73.7
2002	14	60.5	16.6	19.3	81.8	42.1	52.1	63.9	72.5	75.8
2003	15	66.7	9.4	46.8	83.9	58.0	59.6	65.8	72.9	79.0
2004	24	63.9	11.9	37.1	81.0	51.8	55.3	63.1	74.3	79.5
2005	18	71.3	13.5	48.8	85.7	49.8	64.3	75.7	82.9	85.4
2006	17	67.9	11.5	39.5	88.2	54.6	63.1	68.4	73.9	84.8
2007	16	72.4	12.4	46.5	88.3	52.0	63.8	77.2	82.4	84.4
2008	25	65.9	13.4	38.1	97.0	48.4	57.1	64.3	73.0	84.8
2009	24	69.3	13.5	32.6	89.4	49.2	62.4	71.7	79.4	83.0
2010	39	67.6	9.7	47.1	86.6	58.2	60.4	67.3	73.3	84.1
2011	39	64.9	13.9	34.3	86.6	44.2	51.9	68.9	74.8	81.9
2012	64	70.9	11.4	41.4	91.8	55.0	61.9	72.4	79.5	86.0
2013	41	65.1	17.3	16.2	90.6	43.1	58.9	69.6	76.8	79.4
2014	56	67.2	14.5	25.9	93.1	49.2	58.2	68.9	76.6	85.9
2015	63	70.2	11.7	32.6	90.8	57.8	64.8	73.2	76.8	83.0
2016	60	69.6	13.4	39.5	91.8	49.6	57.0	74.8	78.3	84.5
2017	53	69.3	13.7	22.8	87.3	53.3	61.5	73.6	79.5	83.9
2018	55	70.4	11.2	39.3	92.3	55.2	62.1	72.9	78.2	82.7
2019	43	72.0	11.5	49.7	91.8	53.6	64.6	75.4	80.6	86.3
1998–2019	686	68.4	13.0	16.2	97.0	50.4	60.8	70.4	77.8	83.6

Table 4

Age distribution by 5-year age group and sex for period 2007-2019

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4									
5-9									
10-14									
15-19	1	0.1	0.1			0.0	1	0.2	0.2
20-24	3	0.2	0.3	1	0.1	0.1	2	0.3	0.5
25-29	3	0.2	0.5	2	0.3	0.4	1	0.2	0.7
30-34	16	1.2	1.8	10	1.4	1.8	6	1.0	1.7
35-39	16	1.2	3.0	10	1.4	3.2	6	1.0	2.8
40-44	30	2.3	5.4	19	2.7	5.9	11	1.9	4.7
45-49	55	4.3	9.6	26	3.7	9.6	29	5.0	9.7
50-54	85	6.6	16.3	56	7.9	17.5	29	5.0	14.7
55-59	112	8.7	25.0	67	9.5	27.0	45	7.8	22.5
60-64	140	10.9	35.8	74	10.5	37.4	66	11.4	33.9
65-69	179	13.9	49.8	105	14.8	52.3	74	12.8	46.7
70-74	217	16.9	66.6	128	18.1	70.3	89	15.4	62.1
75-79	239	18.6	85.2	123	17.4	87.7	116	20.1	82.2
80-84	115	8.9	94.2	58	8.2	95.9	57	9.9	92.0
85+	75	5.8	100.0	29	4.1	100.0	46	8.0	100.0
All ages	1286	100.0		708	100.0		578	100.0	

Table 5

Age-specific incidence and proportion of all cancers
for period 2007-2019

Age at diagnosis Years	Males n	Females n	Males Age-spec. incid.	Females Age-spec. incid.	Males Prop.all cancers n=143063 %	Females Prop.all cancers n=144724 %
0- 4						
5- 9						
10-14						
15-19		1		0.1		0.4
20-24	1	2	0.1	0.1	0.2	0.4
25-29	2	1	0.1	0.0	0.2	0.1
30-34	10	6	0.5	0.3	0.8	0.3
35-39	10	6	0.5	0.3	0.6	0.2
40-44	19	10	0.8	0.4	0.7	0.2
45-49	26	29	1.0	1.2	0.5	0.3
50-54	56	29	2.4	1.3	0.7	0.3
55-59	67	45	3.4	2.3	0.6	0.4
60-64	73	66	4.5	3.8	0.4	0.5
65-69	105	74	6.9	4.4	0.5	0.4
70-74	128	89	9.1	5.5	0.5	0.5
75-79	123	116	11.1	8.4	0.6	0.6
80-84	58	57	8.8	5.9	0.4	0.4
85+	29	46	6.8	4.8	0.3	0.3
All ages	707	577			0.5	0.4
Incidence						
Raw			2.3	1.9		
WS			1.2	0.8		
ES			1.7	1.2		
BRD-S			2.2	1.5		

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).

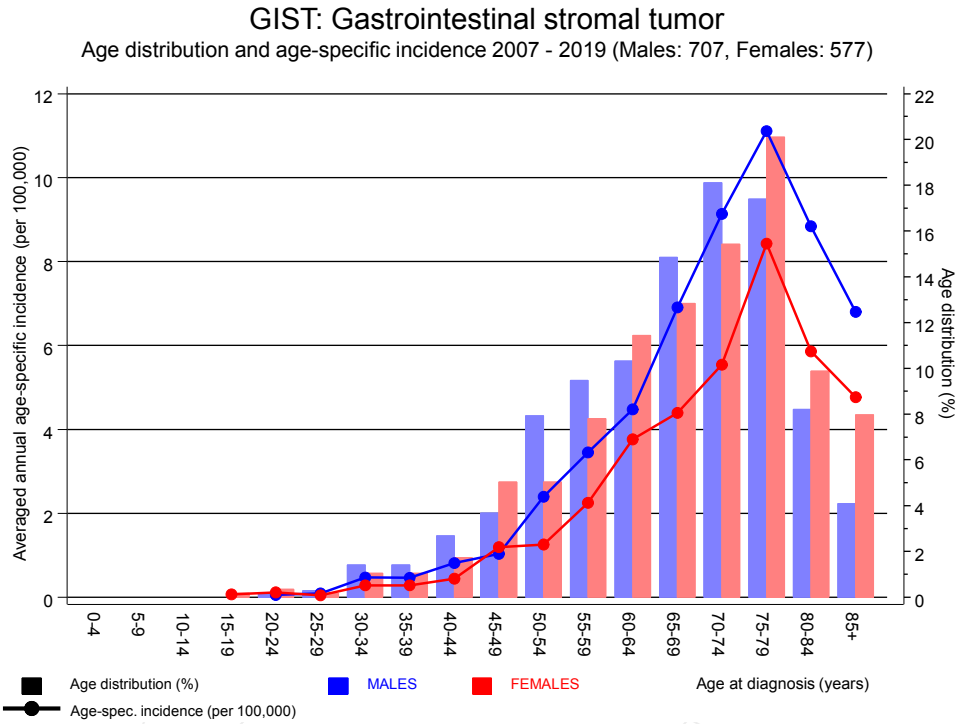


Figure 6. Age distribution (males: mean=67.1 yrs, median=69.3 yrs; females: mean=69.0 yrs, median=71.4 yrs) and age-specific incidence.

Table 7a

Standardized incidence ratio (SIR, with 95% confidence limits), excess absolute risk (EAR) and DCO rate of further malignancies for period 1998–2019
MALES

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C07–C08	Salivary gland	1	0.1	13.9	0.4	77.2		4.4	
C15	Oesophagus	8	0.6	12.5	5.4	24.6	#	35.2	
C16	Stomach	5	1.2	4.0	1.3	9.4	#	18.0	
C17	Small intestine	9	0.2	43.2	19.8	82.0	#	42.1	
C18	Colon	18	3.0	5.9	3.5	9.3	#	71.6	
C19–C20	Rectum	4	1.6	2.5	0.7	6.4		11.4	
C22	Liver	2	0.9	2.1	0.3	7.7		5.1	
C23–C24	Bile	1	0.4	2.8	0.1	15.7		3.1	
C25	Pancreas	7	1.3	5.3	2.1	10.9	#	27.2	14.3
C26	GI cancer	1	0.0	26.8	0.7	149.5		4.6	100.0
C32	Larynx	2	0.3	6.9	0.8	24.8		8.2	
C33–C34	Lung	12	3.7	3.2	1.7	5.7	#	39.7	
C38,C45	Mesothelioma	2	0.2	8.6	1.0	31.2	#	8.5	
C43	Malign. melanoma	4	1.5	2.7	0.7	6.9		12.1	
C46,C49	Soft tissue	1	0.2	5.5	0.1	30.5		3.9	
C61	Prostate	16	8.3	1.9	1.1	3.1	#	36.7	
C64	Kidney	12	1.1	11.3	5.8	19.7	#	52.3	
C67	Bladder	1	1.6	0.6	0.0	3.6		−2.7	
C68	Urethra	1	0.0	27.8	0.7	155.1		4.6	
C70–C72	CNS cancer	2	0.4	5.2	0.6	18.7		7.7	
C73	Thyroid	1	0.2	4.9	0.1	27.6		3.8	
C74–C80	Cancer others	1	0.1	14.3	0.4	79.4		4.5	
C76–C79	CUP	2	0.5	3.7	0.4	13.3		7.0	
C82–C85	NHL	4	1.4	2.9	0.8	7.5		12.6	
C90	Mult. myeloma	3	0.4	7.2	1.5	21.0	#	12.4	
C91–C96	Leukaemia	3	0.5	5.8	1.2	16.9	#	11.9	
Not observed		0	1.7	0.0	0.0	2.2		−8.0	
All further malignancies		123	31.5	3.9	3.2	4.7	#	437.7	1.6

Patients	772
Median age at next malignancy (years)	71.8
Person-years	2089
Mean observation time (years)	2.7
Median observation time (years)	1.2

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 1998–2019
FEMALES

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C16	Stomach	9	0.6	13.9	6.4	26.5	#	48.3	
C17	Small intestine	3	0.1	26.1	5.4	76.3	#	16.7	
C18	Colon	8	1.9	4.3	1.8	8.4	#	35.4	
C19–C20	Rectum	3	0.8	4.0	0.8	11.6		13.0	
C22	Liver	1	0.3	3.8	0.1	21.4		4.3	
C23–C24	Bile	1	0.3	3.5	0.1	19.6		4.1	
C25	Pancreas	8	1.0	8.1	3.5	16.0	#	40.6	
C30–C31	Sinuses	1	0.0	35.4	0.9	197.5		5.6	
C33–C34	Lung	7	1.6	4.4	1.8	9.0	#	31.2	
C37	Thymus	1	0.0	81.7	2.1	455.5	#	5.7	
C43	Malign. melanoma	4	0.7	5.3	1.5	13.7	#	18.8	
C46,C49	Soft tissue	1	0.1	8.9	0.2	49.6		5.1	
C50	Breast	19	6.1	3.1	1.9	4.9	#	74.7	
C51	Vulva	2	0.2	9.0	1.1	32.4	#	10.3	
C54	Corpus uteri	3	1.1	2.7	0.5	7.8		10.8	
C56	Ovary	9	0.8	11.3	5.2	21.5	#	47.5	11.1
C64	Kidney	4	0.5	8.5	2.3	21.8	#	20.4	
C70–C72	CNS cancer	1	0.2	4.0	0.1	22.4		4.3	
C82–C85	NHL	4	0.8	5.1	1.4	13.1	#	18.6	
C90	Mult. myeloma	1	0.3	4.0	0.1	22.1		4.3	
Not observed		0	2.6	0.0	0.0	1.4		−15.3	
All further malignancies		90	20.1	4.5	3.6	5.5	#	404.6	1.1

Patients	658
Median age at next malignancy (years)	75.7
Person-years	1728
Mean observation time (years)	2.6
Median observation time (years)	1.0

The occurrence of further specified malignancy is statistically significant.

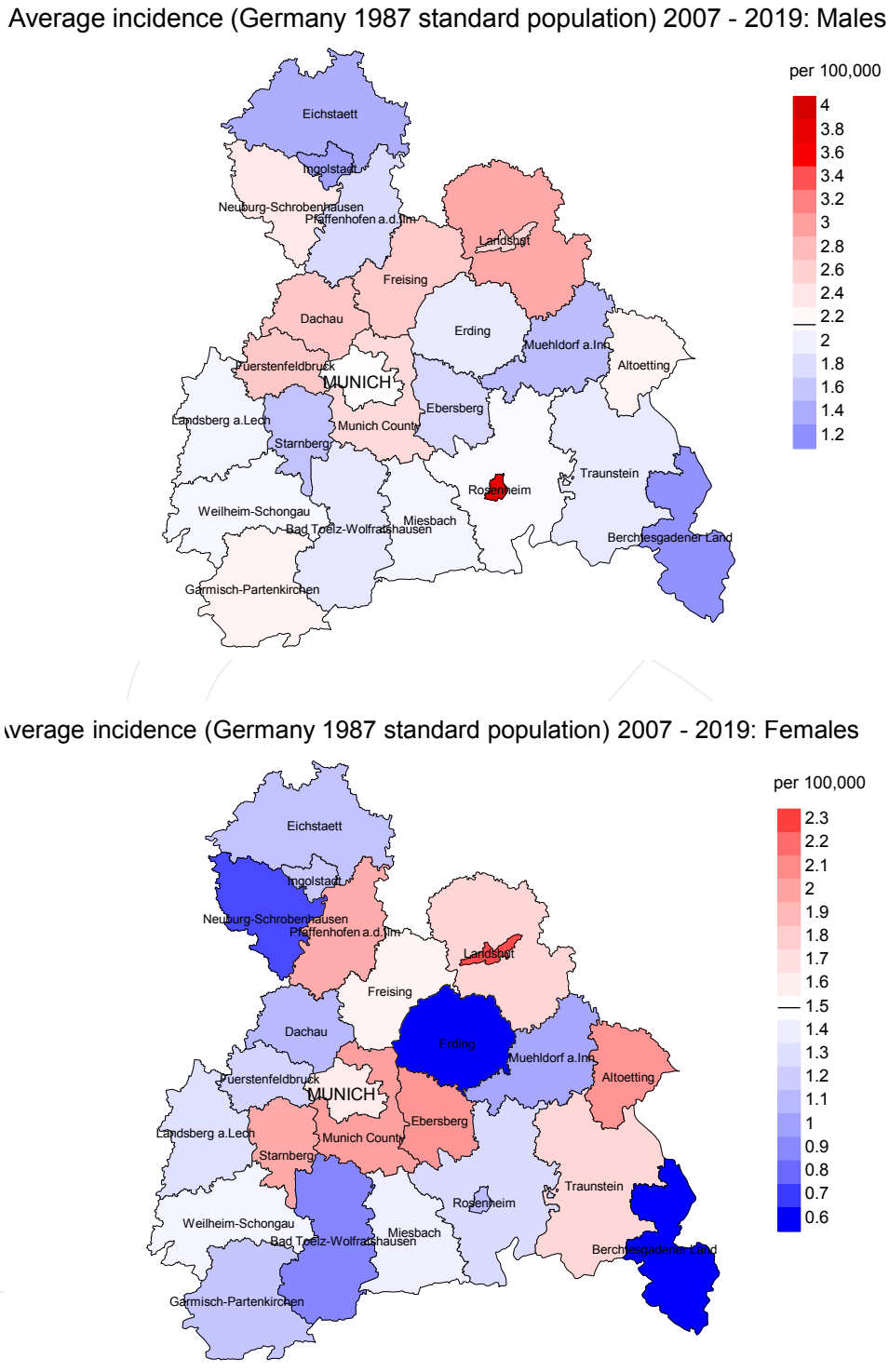
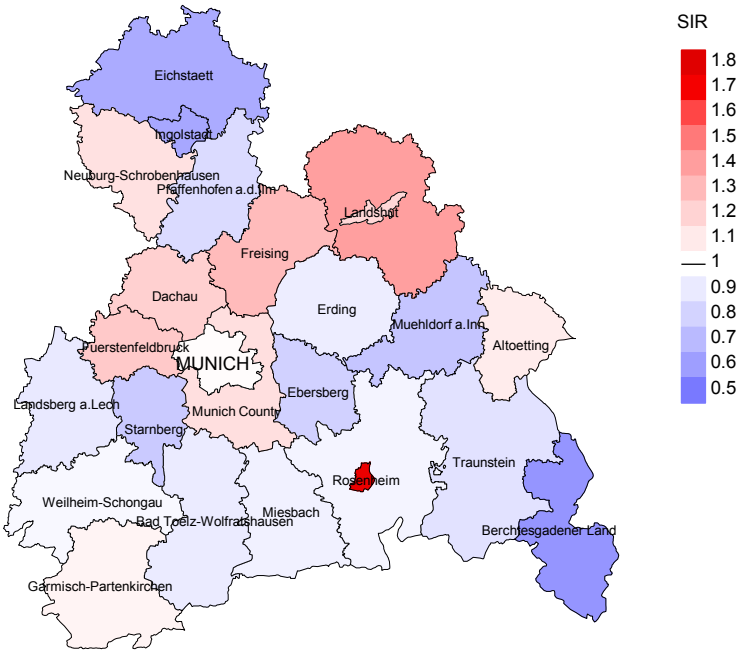


Figure 8a. Map of cancer incidence (german standard population) by county averaged for period 2007 to 2019. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 2.2/100,000 WS N=707, females 1.5/100,000 WS N=577).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,462 female residents (averaged) in the period from 2007 to 2019 a total of 21 women were identified with newly diagnosed gastroint. stromal tumor. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 2.1/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 1.1 and 3.6/100,000.

Standardized incidence ratio (SIR) 2007 - 2019: Males



Standardized incidence ratio (SIR) 2007 - 2019: Females

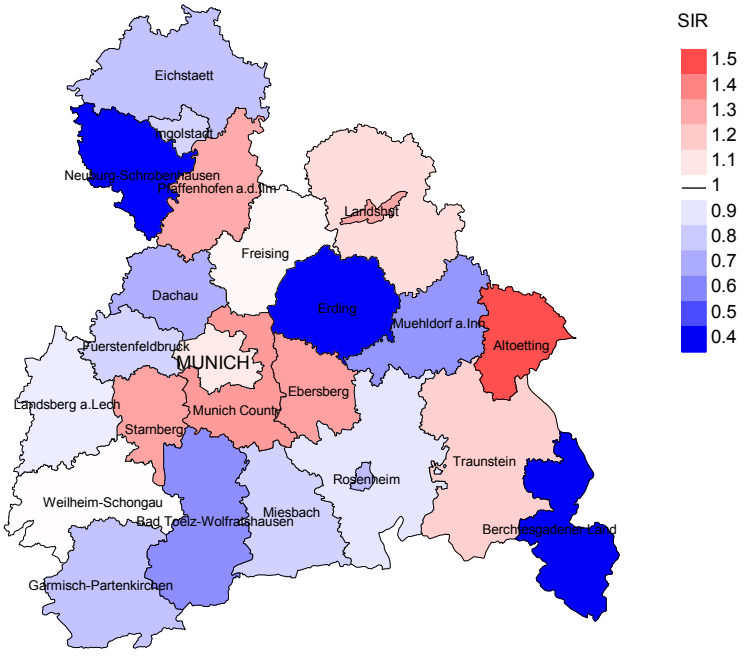


Figure 8b. Map of standardized incidence ratio (SIR) by county averaged for period 2007 to 2019. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=707, females N=577).

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 2019 a total of 21 women were identified with newly diagnosed gastroint. stromal tumor. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 1.33. Though, the value of this parameter may vary with an underlying probability of 99% between 0.70 and 2.27, 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 4.92 m as of 2007, respectively)

Year of diagnosis	Incident cases n	Prop. actively followed %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	2	100.0	2	100.0	100.0
1999	6	100.0	6	100.0	66.7
2000	15	100.0	13	86.7	92.3
2001	23	95.7	18	78.3	83.3
2002	31	96.8	26	83.9	100.0
2003	33	90.9	16	48.5	75.0
2004	43	95.3	27	62.8	96.3
2005	34	94.1	19	55.9	94.7
2006	25	96.0	15	60.0	100.0
2007	31	100.0	15	48.4	100.0
2008	49	98.0	20	40.8	90.0
2009	54	96.3	25	46.3	84.0
2010	85	100.0	36	42.4	86.1
2011	99	99.0	38	38.4	84.2
2012	138	94.9	45	32.6	91.1
2013	107	97.2	36	33.6	94.4
2014	126	96.8	39	31.0	69.2
2015	124	87.1	30	24.2	86.7
2016	116	97.4	26	22.4	73.1
2017	122	97.5	17	13.9	82.4
2018	124	99.2	9	7.3	33.3
2019	111	56.8	6	5.4	66.7
1998-2019	1498	93.4	484	32.3	85.7

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 4.92 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	2	1	1	50.0
1999	6			
2000	15	3	2	13.3
2001	23	4	1	4.3
2002	31	11	5	16.1
2003	33	12	2	6.1
2004	43	18	7	16.3
2005	34	14	3	8.8
2006	25	12	2	8.0
2007	31	11	1	3.2
2008	49	16	4	8.2
2009	54	12	3	5.6
2010	85	18	5	5.9
2011	99	18	4	4.0
2012	138	26	10	7.2
2013	107	28	6	5.6
2014	126	27	1	0.8
2015	124	48	4	3.2
2016	116	63	6	5.2
2017	122	47	9	7.4
2018	124	39	3	2.4
2019	111	39	4	3.6
1998–2019	1498	467	83	5.5

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 4.92 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer-related %	Prop. non-cancer-related %	Prop. cancer recorded on death certificate %
1998	1		100.0	100.0
1999				
2000	3	33.3	66.7	100.0
2001	4	100.0		100.0
2002	11	54.5	45.5	63.6
2003	12	75.0	25.0	90.9
2004	18	72.2	27.8	93.3
2005	14	85.7	14.3	85.7
2006	12	75.0	25.0	81.8
2007	11	90.9	9.1	72.7
2008	16	93.8	6.3	93.8
2009	12	83.3	16.7	83.3
2010	18	66.7	33.3	80.0
2011	18	72.2	27.8	83.3
2012	26	73.1	26.9	80.8
2013	28	67.9	32.1	81.5
2014	27	74.1	25.9	84.0
2015	48	62.5	37.5	74.5
2016	63	68.3	31.7	82.0
2017	47	70.2	29.8	80.0
2018	39	17.9	82.1	28.6
2019	39	41.0	59.0	72.2
1998-2019	467	64.5	35.5	80.4

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	1	87.6		87.6	87.6
1999					
2000	2	84.4	79.2	89.5	79.2
2001	2	71.5	71.5		71.5
2002	5	78.9	80.1	77.6	80.1
2003	8	68.3	70.2	60.0	70.0
2004	10	68.6	67.4	80.5	68.6
2005	5	77.9	77.7	78.4	77.7
2006	7	70.4	70.4	76.2	70.4
2007	7	66.3	66.3		66.3
2008	4	70.4	70.4		70.4
2009	5	68.6	68.6	88.7	68.6
2010	14	71.2	69.1	78.0	71.4
2011	8	73.3	74.3	68.1	72.3
2012	11	77.9	71.6	81.6	71.6
2013	14	74.0	73.0	87.6	71.9
2014	13	74.1	73.8	81.2	74.0
2015	28	78.8	74.5	82.4	75.9
2016	41	76.0	72.9	82.9	73.6
2017	29	75.6	75.2	79.4	75.2
2018	27	80.1	56.2	81.7	36.6
2019	21	81.2	80.1	81.4	75.9
1998-2019	262	76.0	72.9	81.6	73.1

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

Table 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					
1999					
2000	1	78.5		78.5	78.5
2001	2	60.2	60.2		60.2
2002	6	74.7	71.9	76.3	78.5
2003	4	59.6	59.6		59.6
2004	8	76.5	75.3	79.7	76.5
2005	9	72.8	71.7	74.4	71.7
2006	5	84.2	84.7	74.2	84.7
2007	4	82.7	83.6	81.7	60.9
2008	12	72.8	72.6	82.0	72.6
2009	7	78.5	77.8	97.8	77.8
2010	4	67.7	58.4	75.8	67.7
2011	10	74.7	74.4	75.4	74.7
2012	15	76.0	74.4	87.2	74.4
2013	14	87.5	78.9	88.0	87.5
2014	14	78.3	77.7	78.4	77.7
2015	20	79.6	77.2	84.9	78.3
2016	22	85.4	83.5	86.7	83.5
2017	18	79.4	79.4	80.4	79.4
2018	12	84.3	77.2	88.0	75.6
2019	18	80.5	79.5	82.4	80.5
1998-2019	205	79.1	77.6	82.9	78.2

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
2000	1	0.1	0.11	0.0	0.09	0.1	0.12	0.1	0.18
2001	2	0.2	0.17	0.1	0.19	0.2	0.17	0.2	0.15
2002	2	0.1	0.12	0.0	0.09	0.1	0.11	0.2	0.15
2003	5	0.3	0.28	0.1	0.21	0.2	0.25	0.3	0.33
2004	8	0.4	0.42	0.2	0.34	0.3	0.36	0.4	0.39
2005	4	0.2	0.25	0.1	0.21	0.2	0.25	0.3	0.31
2006	5	0.3	0.63	0.1	0.52	0.2	0.58	0.3	0.66
2007	7	0.3	0.47	0.2	0.46	0.3	0.47	0.3	0.45
2008	4	0.2	0.17	0.1	0.15	0.1	0.15	0.2	0.17
2009	4	0.2	0.13	0.1	0.12	0.1	0.12	0.1	0.11
2010	10	0.4	0.22	0.2	0.21	0.3	0.20	0.4	0.21
2011	5	0.2	0.08	0.1	0.07	0.1	0.07	0.2	0.08
2012	8	0.4	0.11	0.2	0.10	0.3	0.11	0.3	0.12
2013	11	0.5	0.17	0.2	0.14	0.3	0.15	0.4	0.16
2014	11	0.5	0.16	0.2	0.13	0.3	0.15	0.4	0.16
2015	18	0.8	0.30	0.3	0.26	0.5	0.28	0.7	0.29
2016	30	1.2	0.54	0.5	0.45	0.8	0.48	1.1	0.54
2017	21	0.9	0.30	0.3	0.23	0.5	0.26	0.8	0.30
2018	4	0.2	0.06	0.1	0.08	0.1	0.07	0.1	0.06
2019	7	0.3	0.10	0.1	0.07	0.2	0.08	0.2	0.10
2000-2019	167	0.4	0.22	0.2	0.19	0.3	0.20	0.4	0.22

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
2000									
2001	2	0.2	0.18	0.1	0.18	0.1	0.18	0.1	0.17
2002	4	0.2	0.29	0.1	0.19	0.1	0.23	0.2	0.26
2003	4	0.2	0.27	0.1	0.30	0.2	0.27	0.2	0.26
2004	5	0.3	0.21	0.1	0.13	0.1	0.14	0.2	0.19
2005	8	0.4	0.44	0.2	0.48	0.3	0.50	0.4	0.47
2006	4	0.2	0.24	0.0	0.09	0.1	0.13	0.1	0.19
2007	3	0.1	0.19	0.0	0.16	0.1	0.16	0.1	0.15
2008	11	0.5	0.44	0.2	0.34	0.3	0.38	0.4	0.39
2009	6	0.3	0.25	0.1	0.19	0.1	0.21	0.2	0.24
2010	2	0.1	0.05	0.1	0.06	0.1	0.06	0.1	0.05
2011	8	0.3	0.21	0.1	0.18	0.2	0.18	0.2	0.19
2012	11	0.5	0.17	0.2	0.14	0.3	0.15	0.4	0.17
2013	8	0.3	0.20	0.1	0.11	0.2	0.13	0.2	0.14
2014	9	0.4	0.16	0.1	0.09	0.2	0.11	0.3	0.15
2015	12	0.5	0.19	0.2	0.14	0.2	0.15	0.4	0.17
2016	13	0.5	0.22	0.1	0.14	0.2	0.15	0.3	0.17
2017	12	0.5	0.23	0.1	0.14	0.2	0.16	0.3	0.20
2018	3	0.1	0.05	0.0	0.02	0.0	0.03	0.1	0.05
2019	9	0.4	0.21	0.1	0.14	0.2	0.16	0.2	0.19
2000-2019	134	0.3	0.21	0.1	0.15	0.2	0.17	0.2	0.18

Table 12

Age distribution of age at death (cancer-related) for period 2007-2019
(**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									
30-34									
35-39	2	0.8	0.8	2	1.4	1.4			0.0
40-44	1	0.4	1.2			1.4	1	0.9	0.9
45-49	7	2.8	4.0	4	2.9	4.3	3	2.8	3.7
50-54	7	2.8	6.9	7	5.0	9.3			3.7
55-59	13	5.3	12.1	9	6.4	15.7	4	3.7	7.5
60-64	16	6.5	18.6	8	5.7	21.4	8	7.5	15.0
65-69	28	11.3	30.0	21	15.0	36.4	7	6.5	21.5
70-74	50	20.2	50.2	32	22.9	59.3	18	16.8	38.3
75-79	42	17.0	67.2	21	15.0	74.3	21	19.6	57.9
80-84	42	17.0	84.2	20	14.3	88.6	22	20.6	78.5
85+	39	15.8	100.0	16	11.4	100.0	23	21.5	100.0
All ages	247	100.0		140	100.0		107	100.0	

Table 13

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2019
(**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								
30-34								
35-39	2		0.1	0.20			0.8	
40-44		1			0.0	0.10		0.1
45-49	4	3	0.2	0.15	0.1	0.10	0.3	0.2
50-54	7		0.3	0.13			0.3	
55-59	9	4	0.5	0.13	0.2	0.09	0.2	0.1
60-64	8	8	0.5	0.11	0.5	0.12	0.1	0.2
65-69	21	7	1.4	0.20	0.4	0.09	0.2	0.1
70-74	32	18	2.3	0.25	1.1	0.20	0.3	0.2
75-79	21	21	1.9	0.17	1.5	0.18	0.2	0.2
80-84	20	22	3.0	0.34	2.3	0.39	0.2	0.3
85+	16	23	3.8	0.55	2.4	0.50	0.2	0.2
All ages	140	107					0.2	0.2
Mortality								
Raw			0.5	0.20	0.3	0.19		
WS			0.2	0.17	0.1	0.13		
ES			0.3	0.19	0.2	0.15		
BRD-S			0.4	0.20	0.2	0.16		
PYLL-70								
per 100,000			1.9		0.8			
ES			1.6		0.7			
AYLL-70			9.9		9.7			

Table 14a

Further malignancies in deaths in period 2000–2019
MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03–C06 Oral cavity	1	0.8	1	100.0				
C07–C08 Salivary gland	1	0.8					1	100.0
C15 Oesophagus	9	7.5	2	22.2	5	55.6	2	22.2
C16 Stomach	6	5.0			3	50.0	3	50.0
C17 Small intestine	1	0.8			1	100.0		
C18 Colon	17	14.2	5	29.4	9	52.9	3	17.6
C19–C20 Rectum	9	7.5	5	55.6	1	11.1	3	33.3
C22 Liver	2	1.7			1	50.0	1	50.0
C23–C24 Bile	4	3.3	1	25.0	3	75.0		
C25 Pancreas	4	3.3	2	50.0	1	25.0	1	25.0
C26 GI cancer	1	0.8					1	100.0
C32 Larynx	2	1.7	2	100.0				
C33–C34 Lung	7	5.8	2	28.6	2	28.6	3	42.9
C38,C45 Mesothelioma	1	0.8					1	100.0
C43 Malign. melanoma	5	4.2	3	60.0			2	40.0
C44 Skin others	7	5.8			3	42.9	4	57.1
C46,C49 Soft tissue	1	0.8	1	100.0				
C50 Breast	1	0.8	1	100.0				
C61 Prostate	19	15.8	15	78.9	1	5.3	3	15.8
C64 Kidney	4	3.3			3	75.0	1	25.0
C67 Bladder	3	2.5	3	100.0				
C70–C72 CNS cancer	1	0.8					1	100.0
C73 Thyroid	2	1.7	2	100.0				
C76–C79 CUP	3	2.5	1	33.3	2	66.7		
C82–C85 NHL	5	4.2	4	80.0			1	20.0
C90 Mult. myeloma	1	0.8					1	100.0
C91–C96 Leukaemia	3	2.5	1	33.3			2	66.7
All further malignancies	120	100.0	51	42.5	35	29.2	34	28.3

ICD-10 C44 (Other malignant neoplasms of skin) is not systematically recorded by MCR and therefore not considered for evaluation as a particular primary but at least as a further malignancy.

Table 14b

Further malignancies in deaths in period 2000–2019
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C16	Stomach	7	10.9	1	14.3	5	71.4	1	14.3
C18	Colon	5	7.8	1	20.0	2	40.0	2	40.0
C19–C20	Rectum	2	3.1			1	50.0	1	50.0
C22	Liver	2	3.1			2	100.0		
C25	Pancreas	8	12.5	2	25.0	2	25.0	4	50.0
C33–C34	Lung	5	7.8	2	40.0	2	40.0	1	20.0
C43	Malign. melanoma	1	1.6					1	100.0
C44	Skin others	3	4.7	1	33.3			2	66.7
C46,C49	Soft tissue	1	1.6			1	100.0		
C48	Peritoneal	1	1.6	1	100.0				
C50	Breast	11	17.2	9	81.8			2	18.2
C53	Cervix uteri	2	3.1	2	100.0				
C54	Corpus uteri	4	6.3	3	75.0	1	25.0		
C56	Ovary	5	7.8	2	40.0	2	40.0	1	20.0
C64	Kidney	1	1.6					1	100.0
C69	Eye melanoma	1	1.6	1	100.0				
C74–C80	Cancer others	1	1.6	1	100.0				
C82–C85	NHL	3	4.7			2	66.7	1	33.3
C90	Mult. myeloma	1	1.6					1	100.0
All further malignancies		64	100.0	26	40.6	20	31.3	18	28.1

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 2007-2019
(**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								
30-34								
35-39	2		0.1	0.25			0.9	
40-44		1			0.0	0.17		0.1
45-49	3	2	0.1	0.13	0.1	0.08	0.2	0.1
50-54	6		0.3	0.12			0.3	
55-59	7	3	0.4	0.13	0.2	0.09	0.2	0.1
60-64	5	8	0.3	0.09	0.5	0.15	0.1	0.2
65-69	12	4	0.8	0.18	0.2	0.08	0.2	0.1
70-74	17	10	1.2	0.23	0.6	0.19	0.2	0.2
75-79	6	12	0.5	0.09	0.9	0.16	0.1	0.2
80-84	15	15	2.3	0.43	1.5	0.38	0.2	0.2
85+	8	17	1.9	0.53	1.8	0.53	0.1	0.2
All ages	81	72					0.2	0.2
Mortality								
Raw			0.3	0.17	0.2	0.18		
WS			0.1	0.15	0.1	0.12		
ES			0.2	0.16	0.1	0.14		
BRD-S			0.2	0.17	0.2	0.15		
PYLL-70								
per 100,000			1.5		0.7			
ES			1.3		0.6			
AYLL-70			11.2		10.0			

* See corresponding tables with multiple malignancies.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2019
(**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								
30-34								
35-39	2		0.1	0.25			0.9	
40-44								
45-49	3	1	0.1	0.14	0.0	0.04	0.2	0.1
50-54	6		0.3	0.14			0.3	
55-59	6	3	0.3	0.12	0.2	0.09	0.2	0.1
60-64	5	6	0.3	0.10	0.3	0.12	0.1	0.2
65-69	11	3	0.7	0.19	0.2	0.07	0.2	0.1
70-74	12	10	0.9	0.18	0.6	0.20	0.1	0.2
75-79	5	10	0.5	0.09	0.7	0.15	0.1	0.1
80-84	12	12	1.8	0.41	1.2	0.34	0.2	0.2
85+	5	14	1.2	0.36	1.5	0.45	0.1	0.2
All ages	67	59					0.1	0.1
Mortality								
Raw			0.2	0.16	0.2	0.16		
WS			0.1	0.14	0.1	0.10		
ES			0.2	0.15	0.1	0.12		
BRD-S			0.2	0.16	0.1	0.13		
PYLL-70								
per 100,000			1.4		0.4			
ES			1.2		0.3			
AYLL-70			11.4		8.7			

* See corresponding tables with multiple malignancies.

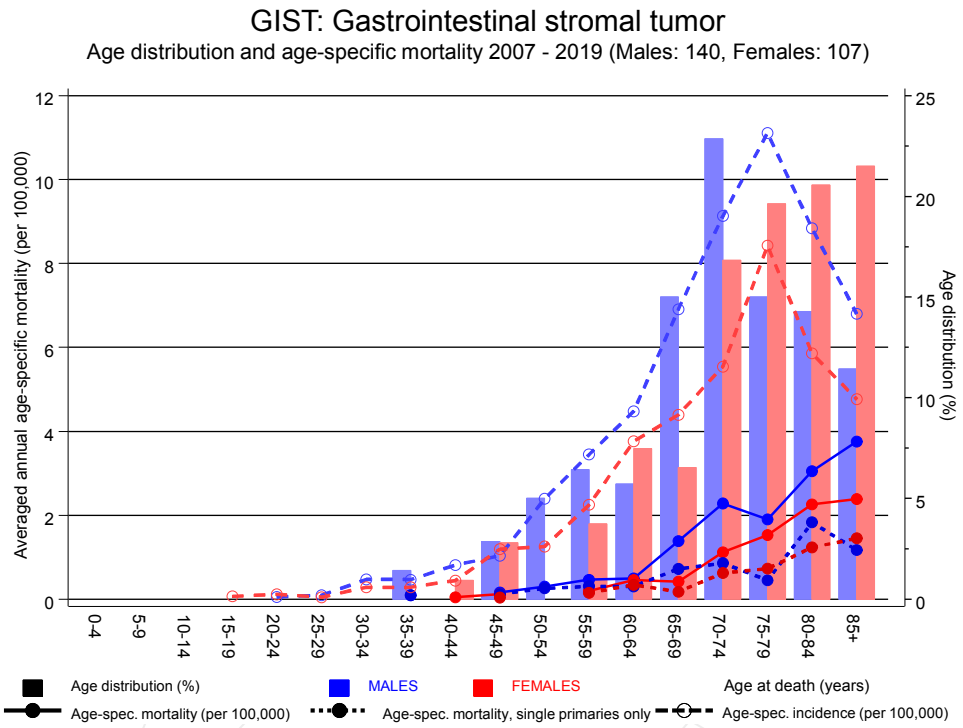


Figure 17. Distribution of age at death (bars; males: mean=68.1 yrs, median=69.8 yrs; females: mean=72.5 yrs, median=74.4 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

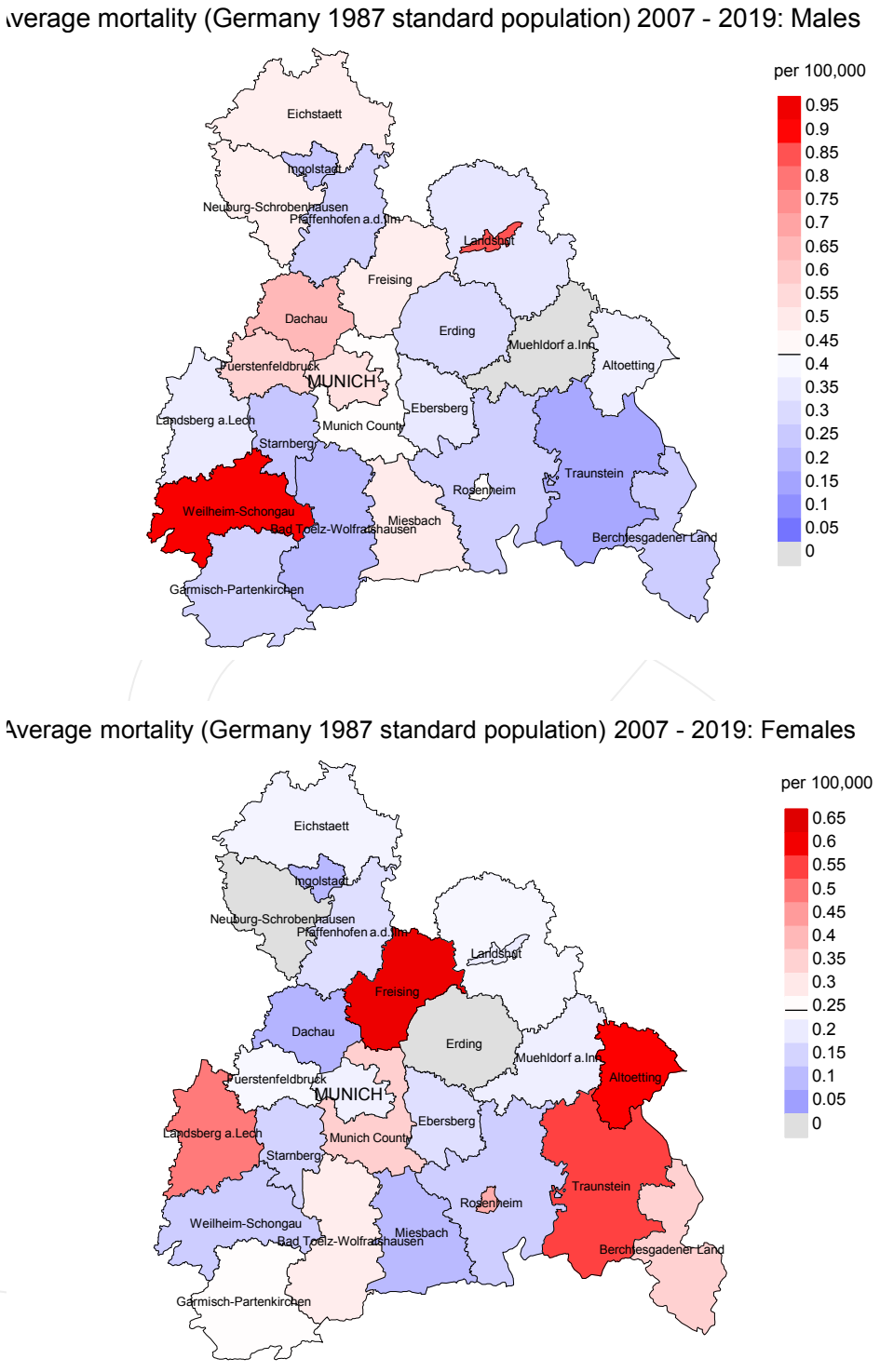
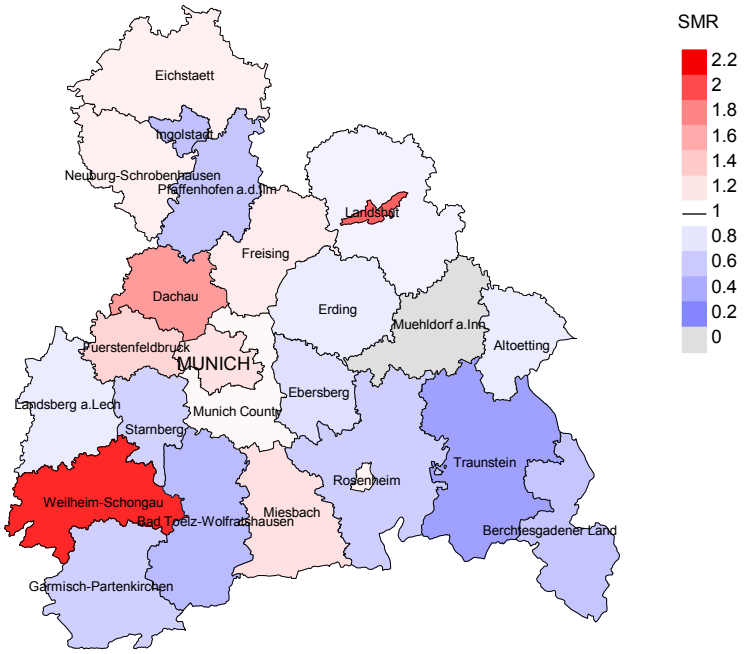


Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2019. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 0.4/100,000 WS N=140, females 0.2/100,000 WS N=107).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,462 female residents (averaged) in the period from 2007 to 2019 a total of 2 women died from gastroint. stromal tumor. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 0.2/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 0.0 and 0.9/100,000.

Standardized mortality ratio (SMR) 2007 - 2019: Males



Standardized mortality ratio (SMR) 2007 - 2019: Females

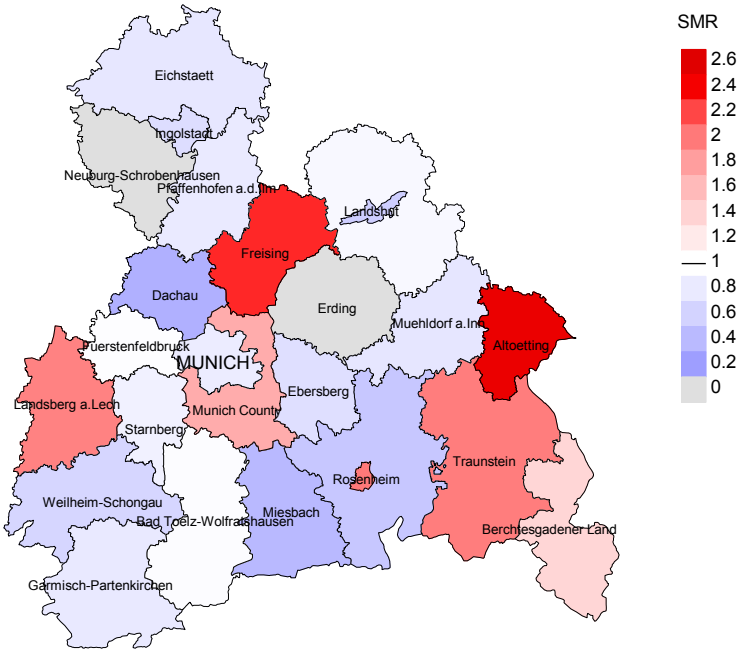


Figure 18b. Map of standardized mortality ratio (SMR) by county averaged for period 2007 to 2019. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=140, females N=107).

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 2019 a total of 2 women died from gastroint. stromal tumor. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.70. Though, the value of this parameter may vary with an underlying probability of 99% between 0.04 and 3.24, 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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