Munich Cancer Registry

- Survival
- Selection Matrix
- Homepage
- *Deutsch*

ICD-10 C19, C20: Rectal cancer

Incidence and Mortality

Year of diagnosis	1998-2020
Patients	21,361
Diseases	21,390
Creation date	12/20/2021
Database export	12/20/2021
Population	4.95 m

Munich Cancer Registry
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Marchioninistr. 15
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https://www.tumorregister-muenchen.de/en

https://www.tumorregister-muenchen.de/en/facts/base/bC1920E-ICD-10-C19-C20-Rectal-cancer-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.

ICD-10 codes (ICD-10 2015) used for specifying cancer site

Code	Description
C19	Malignant neoplasm of rectosigmoid junction
C20	Malignant neoplasm of rectum

INCIDENCE

Table 1

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

Year of diagnosis	All cases n	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	536	18	3.4	9.5	10.6	79.9	96.5
1999	623	25	4.0	9.2	10.5	76.7	96.6
2000	603	28	4.6	10.4	10.3	76.1	97.3
2001	621	25	4.0	11.1	10.2	68.4	94.8
2002	1113	81	7.3	11.5	10.0	76.8	97.6 #
2003	1097	66	6.0	11.6	9.7	72.7	96.9
2004	998	46	4.6	11.9	9.3	72.9	96.7
2005	1047	47	4.5	12.0	8.9	71.3	97.6
2006	1089	34	3.1	12.3	8.5	68.7	95.8
2007	1248	46	3.7	12.6	8.1	68.8	95.4 #
2008	1154	47	4.1	12.8	7.7	65.3	97.7
2009	1124	54	4.8	12.9	7.3	66.5	98.6
2010	1107	43	3.9	13.1	6.8	63.1	98.4
2011	1102	31	2.8	13.3	6.5	61.6	98.5
2012	1070	42	3.9	13.5	6.0	57.7	97.7
2013	1021	39	3.8	13.5	5.5	54.4	97.9
2014	1022	32	3.1	13.6	5.0	49.6	97.6
2015	962	29	3.0	13.7	4.5	48.6	97.5
2016	941	32	3.4	13.7	4.1	44.7	99.6
2017	901	28	3.1	13.8	3.5	37.2	99.7
2018	816	18	2.2	14.0	3.1	33.8	99.6
2019	689	3	0.4	14.0	2.0	28.6	99.7
2020	506			14.1	1.7	15.4	100.0 ##
1998-2020	21390	814	3.8	14.1	10.6	60.1	97.7

21,390 cases diagnosed 1998-2020 are related to a total of 21,361 patients. Currently, in 5,431 (25.4 %) of these 21,361 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 4,273 / 904 / 254 (20.0 % / 4.2 % / 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 816 cases has been diagnosed, of which 14.0 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 3.1 % 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 DCO, further malignancies, deaths, and active follow-up (MALES) (incl. DCO)

Year of diagnosis	Males n	Males %	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	301	56.2	7	2.3	7.3	11.6	80.1	96.7
1999	352	56.5	8	2.3	7.5	11.5	77.3	96.0
2000	344	57.0	8	2.3	9.5	11.3	74.4	96.8
2001	353	56.8	11	3.1	10.3	11.2	70.5	95.2
2002	646	58.0	37	5.7	11.0	11.0	78.8	97.5 #
2003	628	57.2	30	4.8	11.4	10.7	73.9	98.2
2004	574	57.5	22	3.8	11.7	10.2	74.7	96.7
2005	599	57.2	21	3.5	11.8	9.8	71.3	98.2
2006	651	59.8	11	1.7	12.3	9.3	67.9	95.1
2007	751	60.2	22	2.9	12.6	9.0	68.8	94.8 #
2008	691	59.9	18	2.6	12.8	8.5	64.3	97.8
2009	694	61.7	21	3.0	13.1	8.2	68.6	99.0
2010	689	62.2	25	3.6	13.4	7.5	63.4	98.4
2011	667	60.5	12	1.8	13.5	7.3	62.2	98.5
2012	642	60.0	17	2.6	13.7	6.8	59.3	98.0
2013	636	62.3	21	3.3	13.7	6.1	53.9	97.8
2014	627	61.4	14	2.2	13.8	5.5	48.2	97.4
2015	630	65.5	13	2.1	14.0	4.9	49.5	97.3
2016	600	63.8	15	2.5	14.0	4.6	45.3	99.7
2017	553	61.4	18	3.3	14.2	3.8	37.8	99.5
2018	516	63.2	12	2.3	14.4	3.6	37.2	99.6
2019	433	62.8			14.5	2.0	27.5	100.0
2020	311	61.5			14.5	2.7	18.3	100.0 ##
1998-2020	12888	60.3	363	2.8	14.5	11.6	60.2	97.7

12,888 cases diagnosed 1998-2020 are related to a total of 12,870 patients. Currently, in 3,464 (26.9 %) of these 12,870 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 2,713 / 575 / 176 (21.1 % / 4.5 % / 1.4 %) 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 516 cases has been diagnosed, of which 14.4 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 3.6 % 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 DCO, further malignancies, deaths, and active follow-up (FEMALES)
(incl. DCO)

Year of diagnosis	Females n	Females %	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %	
1998	235	43.8	11	4.7	12.3	9.0	79.6	96.2	
1999	271	43.5	17	6.3	11.5	8.9	76.0	97.4	
2000	259	43.0	20	7.7	11.6	8.8	78.4	98.1	
2001	268	43.2	14	5.2	12.1	8.6	65.7	94.4	
2002	467	42.0	44	9.4	12.1	8.5	74.1	97.6	#
2003	469	42.8	36	7.7	11.9	8.2	71.0	95.1	
2004	424	42.5	24	5.7	12.2	7.8	70.5	96.7	
2005	448	42.8	26	5.8	12.3	7.4	71.2	96.9	
2006	438	40.2	23	5.3	12.4	7.1	69.9	96.8	
2007	497	39.8	24	4.8	12.6	6.8	68.8	96.4	#
2008	463	40.1	29	6.3	12.7	6.4	66.7	97.6	
2009	430	38.3	33	7.7	12.6	5.9	63.3	97.9	
2010	418	37.8	18	4.3	12.8	5.5	62.7	98.3	
2011	435	39.5	19	4.4	13.0	5.1	60.7	98.6	
2012	428	40.0	25	5.8	13.1	4.7	55.1	97.2	
2013	385	37.7	18	4.7	13.1	4.4	55.1	98.2	
2014	395	38.6	18	4.6	13.2	4.2	51.9	97.7	
2015	332	34.5	16	4.8	13.3	3.9	47.0	97.9	
2016	341	36.2	17	5.0	13.2	3.3	43.7	99.4	
2017	348	38.6	10	2.9	13.3	2.9	36.2	100.0	
2018	300	36.8	6	2.0	13.5	2.4	28.0	99.7	
2019	256	37.2	3	1.2	13.4	2.1	30.5	99.2	
2020	195	38.5			13.4	0.0	10.8	100.0	##
1998-2020	8502	39.7	451	5.3	13.4	9.0	59.9	97.6	

8,502 cases diagnosed 1998-2020 are related to a total of 8,491 patients. Currently, in 1,967 (23.2 %) of these 8,491 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 1,560 / 329 / 78 (18.4 % / 3.9 % / 0.9 %) 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 300 cases has been diagnosed, of which 13.5 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 2.4 % 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 2

Incidence measures by year of diagnosis including DCO cases
(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	301	235	27.2	20.0	16.5	9.0	24.2	13.3	30.3	16.9
1999	352	271	31.5	22.8	19.0	10.3	27.9	15.3	34.6	19.7
2000	344	259	30.2	21.6	18.0	8.8	26.6	13.5	33.0	17.6
2001	353	268	30.5	22.0	18.1	10.4	26.5	15.1	33.3	18.8
2002	646	467	34.7	23.9	20.1	10.5	29.4	15.6	36.4	19.9
2003	628	469	33.5	23.8	19.1	10.6	28.1	15.6	34.9	19.5
2004	574	424	30.5	21.4	17.0	9.7	24.8	14.2	30.7	17.9
2005	599	448	31.6	22.5	17.6	9.5	25.6	14.1	31.7	18.1
2006	651	438	34.0	21.8	18.4	9.4	26.8	13.8	33.3	17.5
2007	751	497	33.9	21.5	18.1	9.1	26.6	13.5	33.2	17.2
2008	691	463	31.0	20.0	16.4	8.2	23.9	12.2	29.9	15.7
2009	694	430	31.1	18.5	16.1	8.0	23.6	11.7	29.6	14.7
2010	689	418	30.6	17.9	15.8	7.2	23.2	10.8	28.9	14.0
2011	667	435	29.8	18.6	15.1	8.0	22.0	11.5	27.5	14.2
2012	642	428	28.3	18.1	14.1	7.6	21.0	11.2	26.2	14.1
2013	636	385	27.6	16.1	14.0	7.1	20.3	10.3	25.2	12.8
2014	627	395	26.9	16.4	13.7	6.9	19.9	10.1	24.5	12.4
2015	630	332	26.5	13.6	12.9	5.7	19.0	8.3	24.1	10.4
2016	600	341	25.0	13.9	12.6	5.9	18.1	8.6	22.7	10.7
2017	553	348	22.9	14.1	11.5	6.1	16.7	8.8	20.5	11.0
2018	516	300	21.2	12.1	10.3	5.5	15.0	7.8	18.8	9.5
2019	433	256	17.8	10.3	9.0	4.7	13.0	6.7	15.8	8.1
2020	311	195	12.8	7.9	6.5	3.6	9.3	5.1	11.4	6.2
1998–2020	12888	8502	27.7	17.6	14.6	7.6	21.3	11.1	26.3	13.9

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)
(incl. DCO)

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	536	68.1	12.3	30.5	102	53.2	59.3	68.2	77.2	85.1
1999	623	68.3	12.3	34.1	102	52.3	59.1	69.0	77.2	85.1
2000	603	69.5	12.3	33.4	95.9	54.1	60.4	69.1	79.1	86.8
2001	621	68.0	12.2	26.6	97.1	52.5	60.5	67.3	76.9	83.8
2002	1113	68.7	11.7	29.9	104	54.0	61.0	69.1	76.8	83.0
2003	1097	68.9	11.8	27.1	101	53.9	61.2	68.8	77.2	83.8
2004	998	68.2	11.8	21.3	97.3	53.4	61.0	67.9	77.3	83.5
2005	1047	69.1	11.8	19.0	99.6	53.8	61.3	68.9	77.7	84.2
2006	1089	68.6	12.1	21.2	98.7	52.8	62.1	68.5	77.9	83.7
2007	1248	69.3	11.8	30.5	97.5	53.1	62.5	69.3	78.0	84.4
2008	1154	69.7	11.9	28.2	102	53.9	62.4	69.9	78.5	84.7
2009	1124	69.0	12.1	20.7	102	51.9	61.6	70.2	77.6	84.1
2010	1107	69.6	12.5	21.1	101	52.7	61.6	70.9	79.0	85.3
2011	1102	69.0	12.9	20.1	99.1	51.1	60.5	70.3	78.4	85.8
2012	1070	69.3	12.4	26.1	99.6	52.9	60.1	70.7	77.9	84.7
2013	1021	68.2	12.8	20.0	98.2	50.5	59.8	70.3	77.0	83.6
2014	1022	69.1	12.7	20.7	96.2	52.6	60.4	70.1	78.1	85.3
2015	962	69.5	12.6	18.3	105	52.7	60.6	70.9	79.2	84.9
2016	941	68.8	13.1	19.8	97.4	51.0	60.1	70.7	78.0	84.2
2017	901	68.7	11.8	21.8	98.1	53.0	60.0	69.9	77.5	83.1
2018	816	68.5	12.7	21.2	105	51.6	59.7	69.8	78.6	83.9
2019	689	67.5	13.1	21.8	100	50.2	57.6	69.1	77.8	83.2
2020	506	67.8	12.7	22.3	100	51.5	59.0	68.9	77.6	83.2
1998–2020	21390	68.8	12.3	18.3	105	52.6	60.7	69.6	77.9	84.3

Table 3a

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	301	65.7	11.9	32.6	94.4	51.5	58.2	64.0	74.1	82.9
1999	352	66.2	11.3	34.1	94.2	51.8	58.1	65.6	73.4	82.1
2000	344	66.8	11.5	34.4	95.9	53.0	58.9	65.1	74.4	83.6
2001	353	67.0	10.5	36.4	93.6	54.1	60.6	65.9	73.7	81.0
2002	646	67.0	10.6	32.8	93.0	53.9	60.4	66.6	74.0	81.1
2003	628	67.4	10.6	27.1	93.1	53.9	60.7	67.6	74.6	81.2
2004	574	66.9	10.4	29.9	93.3	54.3	60.8	66.4	74.9	79.8
2005	599	67.1	10.7	19.0	99.6	53.7	60.3	67.1	74.1	80.6
2006	651	66.9	10.8	25.7	94.7	52.8	60.4	67.3	74.4	80.9
2007	751	68.0	10.8	31.1	95.5	53.3	62.1	67.9	75.3	81.7
2008	691	67.9	10.7	28.2	96.0	53.9	62.1	68.5	75.1	80.6
2009	694	67.9	11.2	20.7	95.4	52.0	61.5	69.6	75.3	80.6
2010	689	68.1	12.0	21.1	98.3	52.5	60.6	69.4	75.9	83.1
2011	667	68.0	11.5	26.3	93.6	51.9	61.3	69.7	75.8	82.1
2012	642	68.3	11.5	26.1	99.6	53.2	59.7	69.7	76.8	82.7
2013	636	67.7	11.8	20.0	98.2	51.4	60.3	69.8	75.7	81.7
2014	627	68.1	11.9	20.7	96.2	52.7	60.0	68.7	77.0	83.3
2015	630	69.0	11.7	18.3	105	53.2	60.9	69.7	77.9	83.0
2016	600	68.1	12.4	19.8	94.5	51.0	60.1	69.7	76.9	82.9
2017	553	68.1	11.1	21.8	91.5	53.9	60.1	69.1	76.5	82.1
2018	516	68.6	12.2	21.2	97.1	53.3	60.2	69.9	78.4	83.3
2019	433	66.9	12.7	21.8	93.5	50.6	57.5	68.5	77.1	81.9
2020	311	67.4	12.0	22.3	100	51.6	59.2	68.6	77.0	82.0
1998–2020	12888	67.6	11.4	18.3	105	52.9	60.2	68.2	75.7	81.9

Table 3b

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	10%	25%	Median 50%	75%	90%
1998	235	71.2	12.3	30.5	102	55.0	62.1	72.5	78.6	87.5
1999	271	71.1	12.9	38.4	102	52.7	61.5	73.0	79.8	87.5
2000	259	73.1	12.3	33.4	94.7	56.4	62.7	74.9	81.9	88.8
2001	268	69.2	14.1	26.6	97.1	51.1	60.0	70.0	79.7	86.8
2002	467	71.2	12.7	29.9	104	54.5	62.1	72.8	80.3	87.6
2003	469	70.8	12.9	29.2	101	53.7	61.7	71.4	81.1	86.8
2004	424	70.0	13.4	21.3	97.3	51.8	61.4	71.2	80.5	85.9
2005	448	71.7	12.5	32.8	96.8	54.5	63.2	72.1	81.4	87.1
2006	438	71.0	13.4	21.2	98.7	52.5	63.5	72.3	81.2	86.6
2007	497	71.4	12.8	30.5	97.5	53.0	63.7	72.4	81.5	87.0
2008	463	72.3	13.0	29.3	102	53.7	63.4	73.3	82.4	87.9
2009	430	70.7	13.4	29.2	102	51.8	61.8	71.4	80.8	87.1
2010	418	72.0	13.1	23.0	101	52.9	63.4	73.9	82.5	87.1
2011	435	70.6	14.8	20.1	99.1	49.6	60.1	71.7	82.8	88.9
2012	428	70.7	13.6	26.1	97.4	52.1	61.4	72.3	81.2	86.9
2013	385	68.9	14.3	25.3	96.5	49.1	58.0	72.1	79.3	85.9
2014	395	70.7	13.7	29.4	95.3	51.6	61.0	72.5	81.4	87.6
2015	332	70.6	14.0	33.6	96.5	50.1	58.6	72.7	80.9	88.4
2016	341	70.1	14.2	26.8	97.4	50.4	60.2	72.3	80.2	87.4
2017	348	69.7	12.8	34.7	98.1	51.1	59.7	71.8	78.9	85.1
2018	300	68.4	13.7	29.5	105	49.6	58.3	69.7	78.6	84.6
2019	256	68.6	13.8	32.4	100	49.2	57.6	70.5	79.1	85.2
2020	195	68.4	13.7	26.2	96.6	51.5	58.1	70.3	78.8	84.3
1998–2020	8502	70.7	13.4	20.1	105	52.0	61.6	72.2	80.9	87.0

Table 4

Age distribution by 5-year age group and sex for period 2007-2020 (incl. DCO)

Age at diagnosis Years	Cases n	%	Cum.%	Males n	%	Cum.%	Females n	%	Cum.%
0-4									
5-9									
10-14									
15-19	2	0.0	0.0	2	0.0	0.0			0.0
20-24	13	0.1	0.1	10	0.1	0.1	3	0.1	0.1
25-29	22	0.2	0.3	9	0.1	0.2	13	0.2	0.3
30-34	73	0.5	0.8	43	0.5	0.8	30	0.6	0.9
35-39	110	0.8	1.6	64	0.8	1.5	46	0.9	1.8
40-44	238	1.7	3.4	131	1.6	3.1	107	2.0	3.8
45-49	549	4.0	7.4	303	3.6	6.7	246	4.7	8.5
50-54	958	7.0	14.4	598	7.1	13.7	360	6.9	15.4
55-59	1290	9.4	23.8	863	10.2	24.0	427	8.2	23.6
60-64	1569	11.5	35.3	1104	13.1	37.0	465	8.9	32.5
65-69	1939	14.2	49.5	1347	16.0	53.0	592	11.3	43.8
70-74	2238	16.4	65.9	1473	17.5	70.5	765	14.6	58.5
75-79	1976	14.5	80.3	1236	14.6	85.1	740	14.2	72.6
80-84	1468	10.7	91.1	782	9.3	94.4	686	13.1	85.8
85+	1218	8.9	100.0	475	5.6	100.0	743	14.2	100.0
All ages	13663	100.0		8440	100.0		5223	100.0	

Table 5

Age-specific incidence, DCO rate 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 DCO rate n=208 %	Females DCO rate n=235 %	Males Prop.all cancers n=153686 %	Females Prop.all cancers n=155051 %
0– 4								
5– 9								
10–14								
15–19	2		0.1				0.6	
20–24	10	3	0.5	0.2			1.6	0.6
25–29	9	13	0.4	0.6			0.9	1.1
30–34	43	30	1.9	1.3			3.3	1.4
35–39	64	46	2.8	2.0	1.6		3.5	1.3
40–44	131	107	5.2	4.4		0.9	4.7	1.7
45–49	303	246	11.3	9.4	0.7		6.0	2.6
50–54	598	360	23.5	14.3	0.7	0.8	7.1	2.9
55–59	863	427	40.7	19.6	1.5	0.2	6.8	3.2
60–64	1104	464	62.4	24.4	0.8	1.1	6.3	3.0
65–69	1346	592	82.5	32.6	1.6	0.7	5.5	3.1
70–74	1473	764	98.2	44.4	1.7	1.8	5.4	3.8
75–79	1235	740	102.1	49.3	2.7	3.8	5.1	3.8
80–84	782	686	108.0	64.4	4.2	6.7	5.1	4.5
85+	475	743	101.7	71.3	14.1	17.9	4.5	4.5
All ages	8438	5221			2.5	4.5	5.5	3.4
Incidence								
Raw			25.9	15.5				
WS			13.2	6.6				
ES			19.1	9.6				
BRD-S			23.8	12.0				

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).

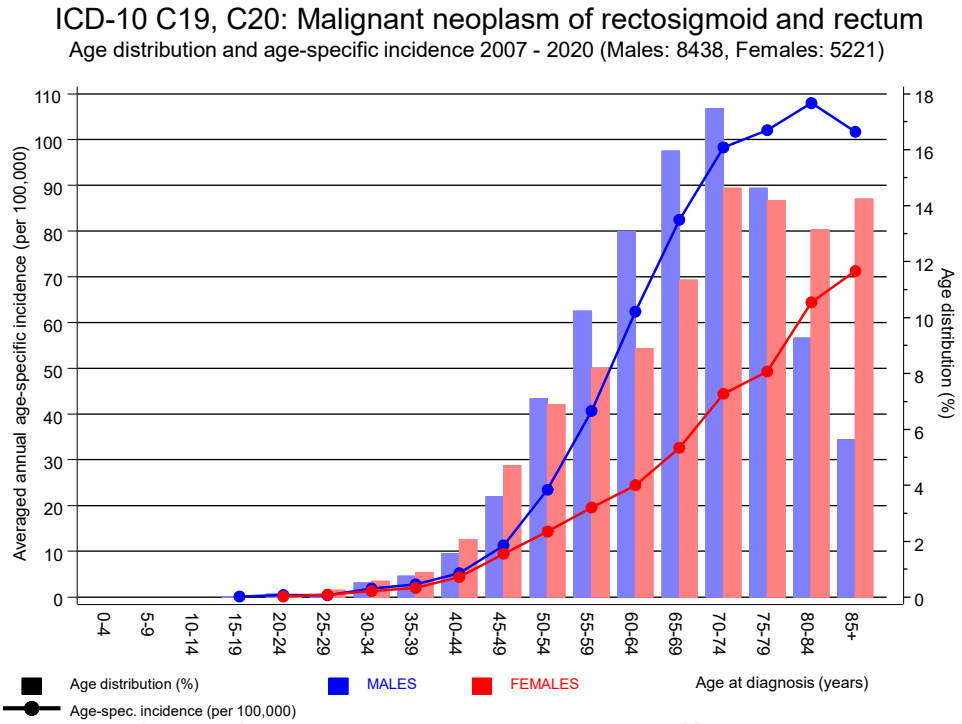


Figure 6. Age distribution (males: mean=68.0 yrs, median=69.1 yrs; females: mean=70.4 yrs, median=72.2 yrs) and age-specific incidence.

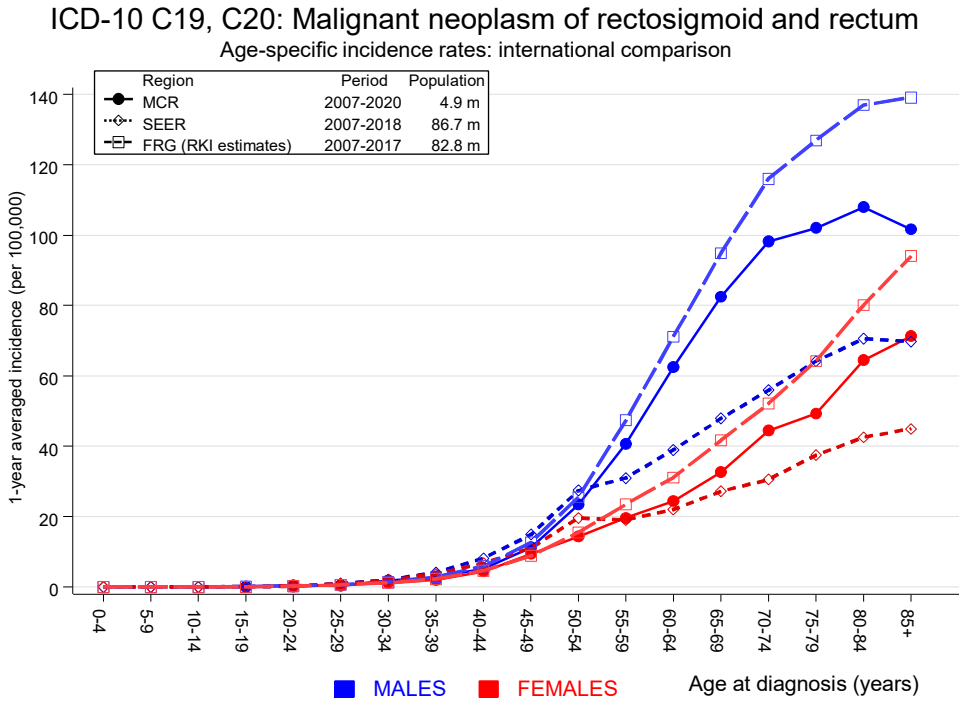


Figure 6a. Age-specific incidence in MCR registry areas compared to Germany (FRG, RKI estimates) and SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

Estimated age-specific patient population of Germany, latest update: 16 March 2021. German Centre for Cancer Registry Data, Robert Koch Institute (RKI), based on data of the population based cancer registries. http://www.krebsdaten.de. Last access: 08/17/2021
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	8	6.6	1.2	0.5	2.4		0.3	12.5
C07–C08	Salivary gland	3	2.0	1.5	0.3	4.4		0.2	
C09–C10	Oropharynx	12	8.1	1.5	0.8	2.6		0.8	8.3
C12–C13	Hypopharynx	7	4.4	1.6	0.6	3.3		0.5	
C15	Oesophagus	44	16.2	2.7	2.0	3.6	#	5.7	2.3
C16	Stomach	78	33.0	2.4	1.9	3.0	#	9.3	9.0
C17	Small intestine	32	4.9	6.5	4.4	9.2	#	5.6	
C18	Colon	444	81.2	5.5	5.0	6.0	#	75.0	0.5
C19–C20	Rectum	18	44.0	0.4	0.2	0.6	#	−5.4	16.7
C21	Anus/canal	5	1.9	2.6	0.8	6.0		0.6	
C22	Liver	70	24.0	2.9	2.3	3.7	#	9.5	8.6
C23–C24	Bile	22	8.8	2.5	1.6	3.8	#	2.7	13.6
C25	Pancreas	61	32.6	1.9	1.4	2.4	#	5.9	14.8
C32	Larynx	12	8.1	1.5	0.8	2.6		0.8	8.3
C33–C34	Lung	205	97.3	2.1	1.8	2.4	#	22.3	12.7
C38,C45	Mesothelioma	7	5.8	1.2	0.5	2.5		0.2	
C43	Malign. melanoma	59	37.1	1.6	1.2	2.0	#	4.5	
C46,C49	Soft tissue	9	4.7	1.9	0.9	3.6		0.9	
C50	Breast	4	2.3	1.8	0.5	4.5		0.4	
C60	Penis	4	2.1	1.9	0.5	4.9		0.4	
C61	Prostate	388	238.3	1.6	1.5	1.8	#	30.9	7.0
C62	Testis	4	1.7	2.3	0.6	5.9		0.5	
C64	Kidney	71	28.4	2.5	2.0	3.2	#	8.8	7.0
C65	Renal pelvis	8	3.7	2.1	0.9	4.2		0.9	
C66	Ureter	6	2.2	2.7	1.0	5.9		0.8	
C67	Bladder	79	39.6	2.0	1.6	2.5	#	8.1	5.1
C70–C72	CNS cancer	21	10.3	2.0	1.3	3.1	#	2.2	19.0
C73	Thyroid	6	5.0	1.2	0.4	2.6		0.2	16.7
C76–C79	CUP	23	14.0	1.6	1.0	2.5	#	1.9	
C81	Hodgkin lymphoma	2	1.8	1.1	0.1	4.0		0.0	
C82–C85	NHL	60	35.2	1.7	1.3	2.2	#	5.1	5.0
C90	Mult. myeloma	20	11.0	1.8	1.1	2.8	#	1.9	10.0
C91–C96	Leukaemia	26	12.7	2.1	1.3	3.0	#	2.8	23.1
Others, specified		6	4.2	1.4	0.5	3.1		0.4	
Not observed		0	7.2	0.0	0.0	0.5	#	−1.5	
All further malignancies		1824	840.6	2.2	2.1	2.3	#	203.2	6.1

Patients	12493
Median age at next malignancy (years)	73.1
Person-years	48389
Mean observation time (years)	3.9
Median observation time (years)	2.4

The occurrence of further specified malignancy is statistically significant.

Further observed 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 1998–2020

FEMALES

Diagnosis		Observed n	Expected n	SIR	CI 95%	CI 95%		EAR	DCO %
C07–C08	Salivary gland	2	0.7	3.0	0.4	10.8		0.4	
C09–C10	Oropharynx	3	1.4	2.1	0.4	6.1		0.5	
C15	Oesophagus	9	2.5	3.6	1.6	6.8	#	2.0	
C16	Stomach	28	14.9	1.9	1.2	2.7	#	4.1	7.1
C17	Small intestine	20	2.0	9.9	6.1	15.3	#	5.7	5.0
C18	Colon	219	41.8	5.2	4.6	6.0	#	55.8	0.9
C19–C20	Rectum	11	16.5	0.7	0.3	1.2		−1.7	9.1
C21	Anus/canal	7	2.1	3.3	1.3	6.8	#	1.5	
C22	Liver	13	5.1	2.6	1.4	4.4	#	2.5	38.5
C23–C24	Bile	14	6.1	2.3	1.3	3.8	#	2.5	7.1
C25	Pancreas	40	19.7	2.0	1.5	2.8	#	6.4	25.0
C33–C34	Lung	77	28.7	2.7	2.1	3.4	#	15.2	14.3
C40–C41	Bone	2	0.4	5.6	0.7	20.2		0.5	
C43	Malign. melanoma	35	14.3	2.5	1.7	3.4	#	6.5	
C46,C49	Soft tissue	7	2.3	3.1	1.2	6.3	#	1.5	
C48	Peritoneal	4	1.5	2.6	0.7	6.8		0.8	
C50	Breast	229	113.7	2.0	1.8	2.3	#	36.3	4.8
C51	Vulva	11	4.4	2.5	1.2	4.4	#	2.1	9.1
C52	Vagina	4	0.8	5.1	1.4	13.1	#	1.0	25.0
C53	Cervix uteri	10	4.6	2.2	1.0	4.0	#	1.7	30.0
C54	Corpus uteri	44	21.1	2.1	1.5	2.8	#	7.2	4.5
C55,C57	Fem. genitals un	3	1.1	2.8	0.6	8.3		0.6	
C56	Ovary	43	15.6	2.8	2.0	3.7	#	8.6	16.3
C64	Kidney	29	9.4	3.1	2.1	4.4	#	6.2	13.8
C65	Renal pelvis	4	1.3	3.1	0.8	7.9		0.9	
C67	Bladder	18	8.6	2.1	1.2	3.3	#	3.0	16.7
C69	Eye melanoma	2	0.5	4.2	0.5	15.1		0.5	
C70–C72	CNS cancer	2	5.0	0.4	0.0	1.4		−1.0	50.0
C73	Thyroid	9	5.4	1.7	0.8	3.2		1.1	11.1
C76–C79	CUP	7	7.9	0.9	0.4	1.8		−0.3	
C82–C85	NHL	28	16.0	1.8	1.2	2.5	#	3.8	3.6
C90	Mult. myeloma	10	5.1	2.0	0.9	3.6		1.6	40.0
C91–C96	Leukaemia	11	6.0	1.8	0.9	3.3		1.6	45.5
Others, specified		6	1.8	3.3	1.2	7.1	#	1.3	16.7
Not observed		0	8.0	0.0	0.0	0.5	#	−2.5	
All further malignancies		961	396.4	2.4	2.3	2.6	#	177.9	8.1

Patients	8086
Median age at next malignancy (years)	75.1
Person-years	31745
Mean observation time (years)	3.9
Median observation time (years)	2.3

The occurrence of further specified malignancy is statistically significant.

Further observed malignancies with count 1 are pooled in category “Others, specified”.

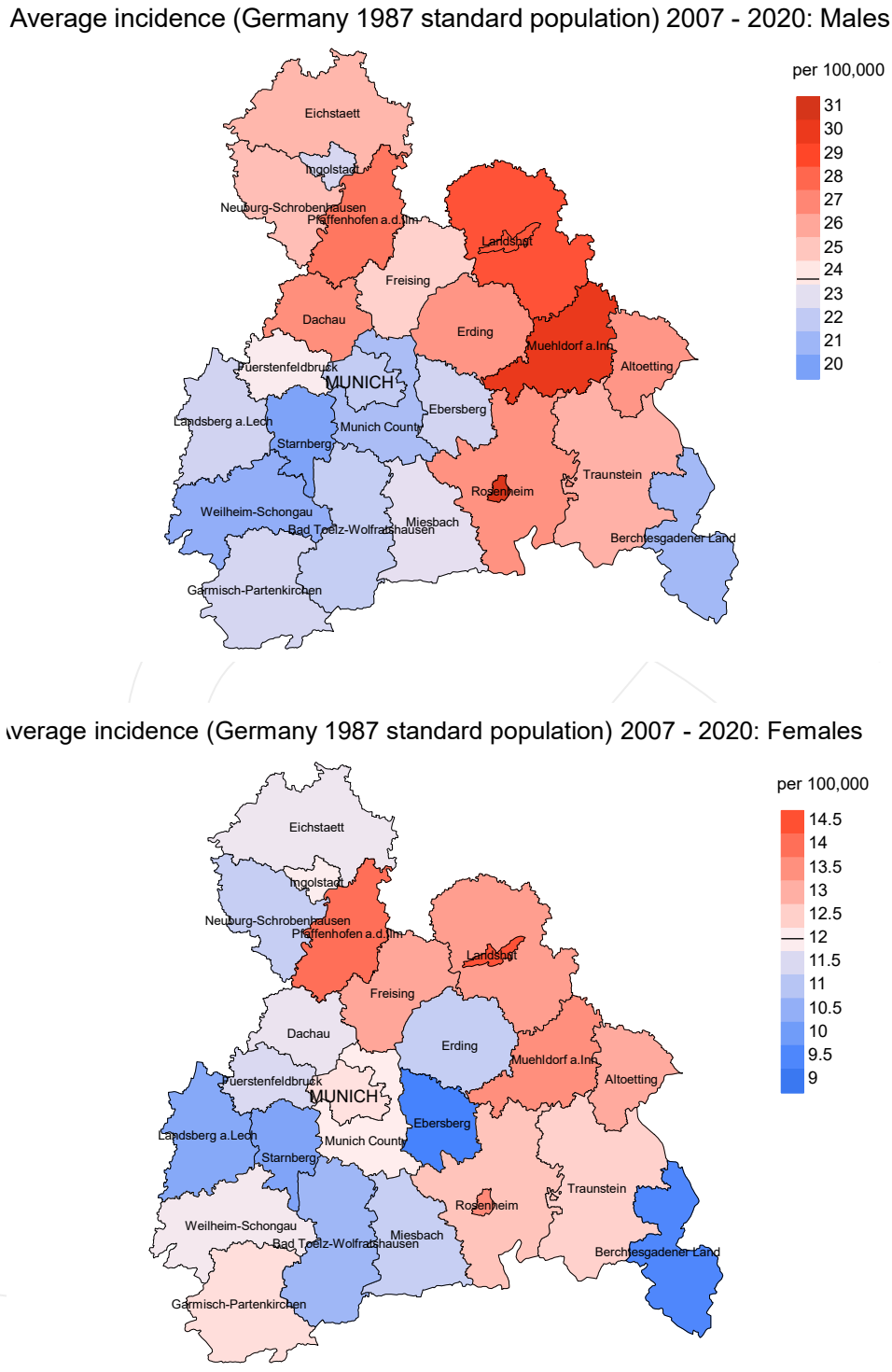
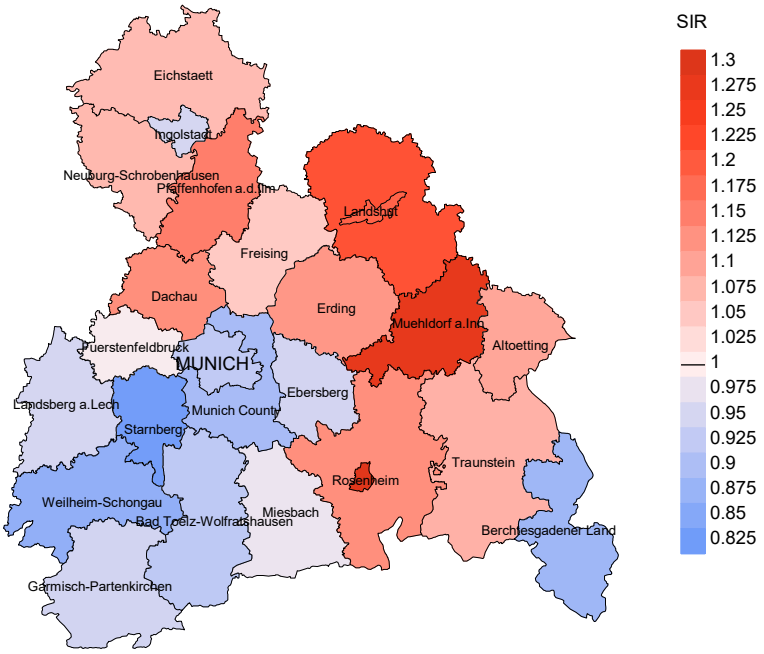


Figure 8a. Map of cancer incidence (german standard population, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 23.8/100,000 WS N=8,438, females 12.0/100,000 WS N=5,221).

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 110 women were identified with newly diagnosed rectal cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 9.4/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 7.2 and 12.0/100,000.

Standardized incidence ratio (SIR) 2007 - 2020: Males



Standardized incidence ratio (SIR) 2007 - 2020: Females

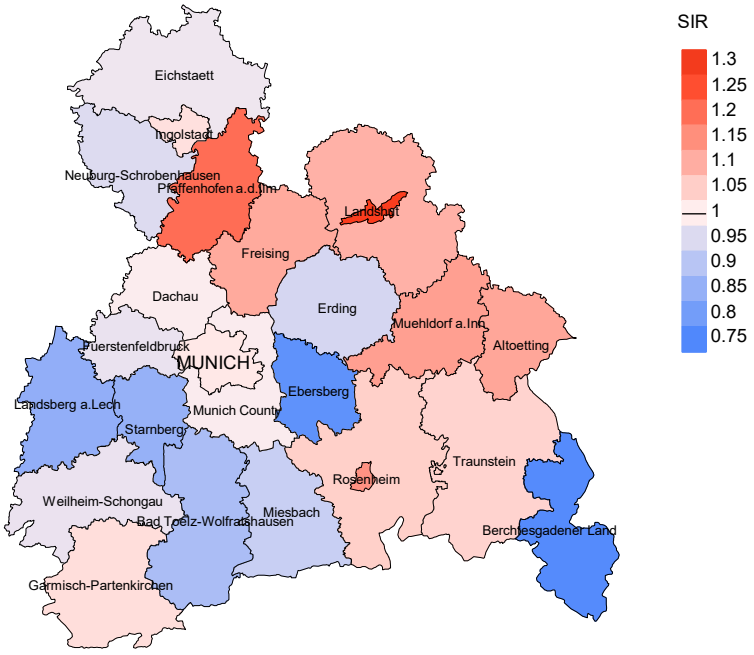


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=8,438, females N=5,221).

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 110 women were identified with newly diagnosed rectal cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.77. Though, the value of this parameter may vary with an underlying probability of 99% between 0.60 and 0.98.

MORTALITY

Table 9a

Annual cohorts: Incident cancers, follow-up status, proportion of DCO, deaths among the annual cohorts and proportion of available death certificates (with respect to registry area expansion from 2.65 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 %	Prop. DCO %	Deaths n	Prop. deaths %	Prop. deaths with death certific. %
1998	536	96.5	3.4	428	79.9	91.6
1999	623	96.6	4.0	478	76.7	92.9
2000	603	97.3	4.6	459	76.1	95.0
2001	621	94.8	4.0	425	68.4	95.3
2002	1113	97.6	7.3	855	76.8	95.6
2003	1097	96.9	6.0	797	72.7	95.9
2004	998	96.7	4.6	728	72.9	96.2
2005	1047	97.6	4.5	746	71.3	96.8
2006	1089	95.8	3.1	748	68.7	95.3
2007	1248	95.4	3.7	859	68.8	95.7
2008	1154	97.7	4.1	753	65.3	95.0
2009	1124	98.6	4.8	748	66.5	95.1
2010	1107	98.4	3.9	699	63.1	94.1
2011	1102	98.5	2.8	679	61.6	95.1
2012	1070	97.7	3.9	617	57.7	92.4
2013	1021	97.9	3.8	555	54.4	91.7
2014	1022	97.6	3.1	507	49.6	91.3
2015	962	97.5	3.0	468	48.6	86.5
2016	941	99.6	3.4	421	44.7	90.0
2017	901	99.7	3.1	335	37.2	83.9
2018	816	99.6	2.2	276	33.8	71.7
2019	689	99.7	0.4	197	28.6	80.7
2020	506	100.0		78	15.4	85.9
1998-2020	21390	97.7	3.8	12856	60.1	93.2

Table 9b

Annual cohorts of incident cancers and deaths, proportion of death certificates and cases deceased within the same year of being diagnosed with cancer (incl. DCO)
(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	Prop. deaths with death certific. %	Deaths in same year n	Prop. deaths in same year %
1998	536	334	88.6	61	11.4
1999	623	353	89.2	83	13.3
2000	603	341	93.3	80	13.3
2001	621	375	95.5	77	12.4
2002	1113	552	97.3	188	16.9
2003	1097	574	97.7	145	13.2
2004	998	587	98.1	122	12.2
2005	1047	606	96.0	140	13.4
2006	1089	700	97.3	162	14.9
2007	1248	712	97.9	170	13.6
2008	1154	772	99.0	156	13.5
2009	1124	791	99.5	158	14.1
2010	1107	818	99.0	173	15.6
2011	1102	826	97.1	150	13.6
2012	1070	803	98.4	157	14.7
2013	1021	793	96.8	125	12.2
2014	1022	755	97.5	144	14.1
2015	962	859	98.0	122	12.7
2016	941	767	98.7	144	15.3
2017	901	802	98.4	104	11.5
2018	816	729	68.9	84	10.3
2019	689	623	48.6	69	10.0
2020	506	734	88.8	41	8.1
1998–2020	21390	15206	93.5	2855	13.3

Table 9c

Annual cohorts of deaths, proportion of cancer-related and non-cancer-related deaths, and cancer recorded on death certificates (incl. DCO)
(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	334	71.0	29.0	87.5
1999	353	75.6	24.4	89.5
2000	341	75.7	24.3	87.7
2001	375	70.1	29.9	86.6
2002	552	77.9	22.1	88.3
2003	574	77.0	23.0	89.5
2004	587	75.3	24.7	88.0
2005	606	73.8	26.2	86.1
2006	700	76.9	23.1	85.8
2007	712	75.0	25.0	85.8
2008	772	74.1	25.9	83.2
2009	791	73.7	26.3	85.4
2010	818	70.2	29.8	81.6
2011	826	72.0	28.0	84.0
2012	803	70.4	29.6	81.0
2013	793	66.5	33.5	79.2
2014	755	68.6	31.4	80.8
2015	859	65.9	34.1	78.1
2016	767	61.5	38.5	76.6
2017	802	60.8	39.2	72.1
2018	729	57.2	42.8	67.5
2019	623	50.2	49.8	70.6
2020	734	49.3	50.7	64.0
1998-2020	15206	68.5	31.5	81.3

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	178	72.3	70.0	78.1	72.1
1999	212	70.7	70.3	74.8	70.4
2000	193	72.6	69.9	80.0	71.6
2001	207	73.3	69.9	79.8	71.8
2002	317	72.7	71.0	80.1	71.8
2003	308	70.9	68.9	81.4	70.4
2004	333	75.0	72.6	80.3	73.6
2005	349	73.7	71.2	80.6	71.9
2006	426	74.9	72.4	80.3	73.9
2007	422	73.2	71.7	78.4	72.4
2008	456	75.4	73.3	80.5	74.0
2009	458	73.0	70.5	79.3	71.9
2010	484	75.2	73.4	81.9	74.0
2011	503	75.5	73.0	82.0	74.2
2012	492	76.0	74.4	81.6	75.0
2013	454	76.6	73.5	81.7	75.1
2014	455	75.5	74.3	79.8	74.7
2015	526	77.3	74.5	83.6	75.8
2016	496	78.0	75.7	82.4	76.7
2017	499	78.1	75.4	83.9	76.5
2018	472	77.6	74.7	80.4	76.3
2019	401	78.5	72.9	82.0	74.7
2020	496	80.2	76.4	82.2	78.7
1998–2020	9137	75.7	72.8	81.3	74.1

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	156	79.9	76.5	85.7	79.3
1999	141	78.4	76.7	80.6	77.7
2000	148	79.3	78.5	83.2	78.9
2001	168	79.0	75.2	86.9	77.0
2002	235	80.2	79.5	84.6	79.5
2003	266	80.4	78.2	83.9	79.2
2004	254	81.4	79.7	84.7	80.5
2005	257	81.2	80.4	83.8	80.7
2006	274	80.8	79.3	85.6	80.0
2007	290	80.7	78.6	85.1	80.0
2008	316	81.1	79.3	86.0	79.8
2009	333	81.6	77.6	87.1	79.1
2010	334	82.2	78.7	86.4	79.8
2011	323	82.0	78.2	86.5	80.0
2012	311	82.7	79.1	88.7	80.7
2013	339	82.7	78.3	87.2	80.2
2014	300	82.2	77.2	88.7	80.3
2015	333	81.2	77.4	87.4	78.2
2016	271	82.9	78.4	87.8	79.8
2017	303	82.2	78.1	88.7	79.6
2018	257	81.8	77.2	86.2	78.9
2019	222	82.6	77.3	84.8	79.9
2020	238	82.9	75.8	87.4	77.7
1998–2020	6069	81.2	78.2	86.6	79.7

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	123	11.1	0.41	6.4	0.39	10.0	0.41	13.2	0.44
1999	166	14.8	0.47	8.6	0.45	13.2	0.47	18.0	0.52
2000	144	12.6	0.42	7.3	0.40	11.2	0.42	14.7	0.44
2001	145	12.5	0.41	7.2	0.40	11.0	0.42	14.4	0.43
2002	238	12.8	0.37	7.0	0.35	10.7	0.36	14.0	0.39
2003	240	12.8	0.38	7.0	0.37	10.6	0.38	13.7	0.39
2004	254	13.5	0.44	6.8	0.40	10.7	0.43	15.0	0.49
2005	262	13.8	0.44	7.0	0.40	10.8	0.42	14.4	0.46
2006	331	17.3	0.51	8.6	0.47	13.6	0.51	18.3	0.55
2007	325	14.7	0.43	7.1	0.39	11.0	0.41	14.9	0.45
2008	346	15.5	0.50	7.3	0.45	11.5	0.48	15.8	0.53
2009	347	15.5	0.50	7.6	0.47	11.5	0.49	14.9	0.50
2010	348	15.4	0.51	6.9	0.44	10.9	0.47	15.0	0.52
2011	374	16.7	0.56	7.7	0.51	11.9	0.54	15.8	0.58
2012	348	15.3	0.54	6.8	0.48	10.7	0.51	14.6	0.56
2013	312	13.6	0.49	6.0	0.43	9.3	0.46	12.6	0.50
2014	323	13.9	0.52	6.1	0.44	9.4	0.47	12.6	0.51
2015	346	14.5	0.55	6.4	0.49	9.8	0.52	13.2	0.55
2016	311	12.9	0.52	5.3	0.42	8.4	0.46	11.6	0.51
2017	304	12.6	0.55	5.2	0.46	8.2	0.49	11.1	0.54
2018	280	11.5	0.54	4.8	0.47	7.4	0.49	10.1	0.53
2019	210	8.6	0.48	3.8	0.43	5.8	0.45	7.6	0.48
2020	238	9.8	0.77	4.1	0.63	6.3	0.68	8.5	0.75
1998-2020	6315	13.6	0.49	6.4	0.44	9.8	0.46	13.2	0.50

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	114	9.7	0.49	3.8	0.42	5.9	0.44	8.2	0.48
1999	101	8.5	0.37	3.3	0.32	5.1	0.33	6.9	0.35
2000	114	9.5	0.44	3.6	0.40	5.5	0.41	7.2	0.41
2001	118	9.7	0.44	4.0	0.38	6.1	0.40	8.0	0.43
2002	192	9.8	0.41	3.3	0.31	5.3	0.34	7.4	0.37
2003	202	10.3	0.43	3.7	0.34	5.8	0.37	7.8	0.40
2004	188	9.5	0.44	3.3	0.34	5.2	0.36	7.2	0.41
2005	185	9.3	0.41	3.0	0.31	4.8	0.34	6.9	0.38
2006	207	10.3	0.47	3.3	0.35	5.4	0.39	7.8	0.44
2007	209	9.1	0.42	3.3	0.36	5.1	0.38	6.9	0.40
2008	226	9.7	0.49	3.4	0.41	5.2	0.43	7.0	0.45
2009	236	10.1	0.55	3.7	0.46	5.6	0.48	7.5	0.51
2010	226	9.7	0.54	3.1	0.44	5.0	0.46	6.9	0.49
2011	221	9.5	0.51	3.0	0.38	4.8	0.42	6.6	0.46
2012	217	9.2	0.51	3.0	0.40	4.7	0.42	6.4	0.46
2013	215	9.0	0.56	3.0	0.42	4.7	0.46	6.3	0.50
2014	195	8.1	0.49	2.7	0.40	4.3	0.42	5.7	0.46
2015	220	9.0	0.66	3.2	0.56	4.9	0.58	6.3	0.61
2016	161	6.6	0.47	2.1	0.36	3.4	0.40	4.6	0.43
2017	184	7.5	0.53	2.4	0.39	3.7	0.42	5.2	0.47
2018	137	5.5	0.46	1.9	0.34	2.9	0.37	3.8	0.40
2019	104	4.2	0.41	1.5	0.32	2.3	0.34	3.0	0.37
2020	124	5.0	0.64	1.8	0.50	2.7	0.53	3.5	0.57
1998-2020	4096	8.5	0.48	2.9	0.38	4.5	0.41	6.2	0.44

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	2	0.0	0.0			0.0	2	0.1	0.1
25-29	1	0.0	0.0	1	0.0	0.0			0.1
30-34	13	0.2	0.2	9	0.2	0.2	4	0.1	0.2
35-39	17	0.2	0.5	13	0.3	0.5	4	0.1	0.4
40-44	57	0.8	1.3	37	0.8	1.4	20	0.7	1.1
45-49	131	1.8	3.1	69	1.6	2.9	62	2.3	3.4
50-54	245	3.5	6.6	160	3.6	6.6	85	3.2	6.6
55-59	410	5.8	12.4	268	6.1	12.6	142	5.3	11.9
60-64	608	8.6	20.9	428	9.7	22.3	180	6.7	18.7
65-69	889	12.5	33.5	636	14.4	36.7	253	9.5	28.1
70-74	1171	16.5	50.0	802	18.2	54.9	369	13.8	41.9
75-79	1213	17.1	67.1	810	18.4	73.3	403	15.1	57.0
80-84	1151	16.2	83.4	669	15.2	88.4	482	18.0	75.0
85+	1179	16.6	100.0	510	11.6	100.0	669	25.0	100.0
All ages	7087	100.0		4412	100.0		2675	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		2			0.1	0.67		4.7
25-29	1		0.0	0.11			1.1	
30-34	9	4	0.4	0.21	0.2	0.13	6.3	2.2
35-39	13	4	0.6	0.20	0.2	0.09	4.9	1.0
40-44	37	20	1.5	0.28	0.8	0.19	6.1	2.3
45-49	69	62	2.6	0.23	2.4	0.25	4.9	3.7
50-54	160	85	6.3	0.27	3.4	0.24	6.0	3.2
55-59	268	142	12.6	0.31	6.5	0.33	6.1	3.7
60-64	428	180	24.2	0.39	9.5	0.39	6.7	3.6
65-69	636	253	39.0	0.47	14.0	0.43	6.9	3.6
70-74	802	369	53.5	0.54	21.5	0.48	6.8	4.2
75-79	810	403	66.9	0.66	26.8	0.54	6.5	4.1
80-84	669	482	92.4	0.86	45.3	0.70	6.4	5.1
85+	510	669	109.2	1.07	64.2	0.90	5.6	5.6
All ages	4412	2675					6.4	4.3
Mortality								
Raw			13.5	0.52	8.0	0.51		
WS			6.0	0.46	2.7	0.41		
ES			9.3	0.48	4.2	0.43		
BRD-S			12.5	0.53	5.6	0.47		
PYLL-70								
per 100,000			50.0		26.8			
ES			42.4		22.1			
AYLL-70			8.8		10.1			

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 ←%
C00	Lip	5	0.2	4	80.0			1	20.0
C03–C06	Oral cavity	38	1.6	28	73.7	1	2.6	9	23.7
C07–C08	Salivary gland	5	0.2	3	60.0			2	40.0
C09–C10	Oropharynx	15	0.6	8	53.3	1	6.7	6	40.0
C11	Nasopharynx	6	0.2	3	50.0	1	16.7	2	33.3
C12–C13	Hypopharynx	12	0.5	5	41.7	2	16.7	5	41.7
C15	Oesophagus	41	1.7	5	12.2	7	17.1	29	70.7
C16	Stomach	105	4.3	30	28.6	19	18.1	56	53.3
C17	Small intestine	22	0.9	4	18.2	4	18.2	14	63.6
C18	Colon	408	16.6	95	23.3	199	48.8	114	27.9
C19–C20	Rectum	18	0.7			4	22.2	14	77.8
C21	Anus/canal	7	0.3	4	57.1	3	42.9		
C22	Liver	67	2.7	2	3.0	10	14.9	55	82.1
C23–C24	Bile	21	0.9	1	4.8	1	4.8	19	90.5
C25	Pancreas	76	3.1	3	3.9	12	15.8	61	80.3
C32	Larynx	37	1.5	28	75.7	1	2.7	8	21.6
C33–C34	Lung	247	10.1	35	14.2	35	14.2	177	71.7
C38,C45	Mesothelioma	14	0.6			2	14.3	12	85.7
C43	Malign. melanoma	91	3.7	60	65.9			31	34.1
C44	Skin others	172	7.0	83	48.3	10	5.8	79	45.9
C46,C49	Soft tissue	10	0.4	3	30.0			7	70.0
C60	Penis	6	0.2	4	66.7			2	33.3
C61	Prostate	553	22.6	306	55.3	49	8.9	198	35.8
C62	Testis	17	0.7	16	94.1			1	5.9
C64	Kidney	84	3.4	42	50.0	21	25.0	21	25.0
C65	Renal pelvis	10	0.4	1	10.0			9	90.0
C66	Ureter	7	0.3	2	28.6	1	14.3	4	57.1
C67	Bladder	122	5.0	44	36.1	9	7.4	69	56.6
C70–C72	CNS cancer	21	0.9	2	9.5	1	4.8	18	85.7
C73	Thyroid	12	0.5	9	75.0			3	25.0
C76–C79	CUP	20	0.8	3	15.0	3	15.0	14	70.0
C81	Hodgkin lymphoma	7	0.3	5	71.4			2	28.6
C82–C85	NHL	95	3.9	44	46.3	11	11.6	40	42.1
C90	Mult. myeloma	23	0.9	9	39.1	1	4.3	13	56.5
C91–C96	Leukaemia	33	1.3	10	30.3	3	9.1	20	60.6
Others, specified		24	1.0	10	41.7	1	4.2	13	54.2
All further malignancies		2451	100.0	911	37.2	412	16.8	1128	46.0

Further malignancies with number of cases 1 to 4 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 1998–2020
FEMALES

Diagnosis		Total n	Total %↓	Pre n	Pre ←%	Syn-chron ±30d n	Syn-chron ±30d ←%	Post n	Post ←%
C03–C06	Oral cavity	4	0.3	3	75.0			1	25.0
C09–C10	Oropharynx	5	0.4	3	60.0			2	40.0
C15	Oesophagus	8	0.6			2	25.0	6	75.0
C16	Stomach	51	3.7	21	41.2	5	9.8	25	49.0
C17	Small intestine	16	1.1	1	6.3	7	43.8	8	50.0
C18	Colon	238	17.1	63	26.5	110	46.2	65	27.3
C19–C20	Rectum	16	1.1			2	12.5	14	87.5
C21	Anus/canal	8	0.6	2	25.0	5	62.5	1	12.5
C22	Liver	13	0.9			1	7.7	12	92.3
C23–C24	Bile	17	1.2	3	17.6	2	11.8	12	70.6
C25	Pancreas	59	4.2	4	6.8	5	8.5	50	84.7
C33–C34	Lung	81	5.8	9	11.1	7	8.6	65	80.2
C40–C41	Bone	4	0.3	1	25.0			3	75.0
C43	Malign. melanoma	28	2.0	17	60.7	1	3.6	10	35.7
C44	Skin others	51	3.7	27	52.9	2	3.9	22	43.1
C46,C49	Soft tissue	6	0.4	2	33.3	2	33.3	2	33.3
C50	Breast	342	24.5	213	62.3	28	8.2	101	29.5
C51	Vulva	11	0.8	2	18.2	1	9.1	8	72.7
C52	Vagina	7	0.5	2	28.6			5	71.4
C53	Cervix uteri	62	4.4	48	77.4	1	1.6	13	21.0
C54	Corpus uteri	90	6.5	57	63.3			33	36.7
C55,C57	Fem. genitals un	10	0.7	7	70.0	1	10.0	2	20.0
C56	Ovary	67	4.8	21	31.3	16	23.9	30	44.8
C64	Kidney	31	2.2	16	51.6	4	12.9	11	35.5
C65	Renal pelvis	3	0.2	1	33.3			2	66.7
C66	Ureter	4	0.3	1	25.0			3	75.0
C67	Bladder	39	2.8	17	43.6	1	2.6	21	53.8
C70–C72	CNS cancer	6	0.4	2	33.3	2	33.3	2	33.3
C73	Thyroid	17	1.2	12	70.6	1	5.9	4	23.5
C76–C79	CUP	12	0.9	1	8.3	5	41.7	6	50.0
C81	Hodgkin lymphoma	5	0.4	3	60.0			2	40.0
C82–C85	NHL	35	2.5	13	37.1	7	20.0	15	42.9
C90	Mult. myeloma	19	1.4	5	26.3	1	5.3	13	68.4
C91–C96	Leukaemia	16	1.1	5	31.3	1	6.3	10	62.5
Others, specified		14	1.0	6	42.9			8	57.1
All further malignancies		1395	100.0	588	42.2	220	15.8	587	42.1

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 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		2			0.1	0.67		4.9
25-29	1		0.0	0.13			1.2	
30-34	9	4	0.4	0.21	0.2	0.14	6.5	2.5
35-39	12	3	0.5	0.19	0.1	0.07	4.8	0.8
40-44	36	18	1.4	0.28	0.7	0.19	6.4	2.4
45-49	64	56	2.4	0.23	2.2	0.25	4.9	3.9
50-54	147	77	5.8	0.27	3.1	0.24	6.3	3.4
55-59	239	121	11.3	0.31	5.6	0.33	6.2	3.8
60-64	373	152	21.1	0.38	8.0	0.38	7.0	3.7
65-69	514	209	31.5	0.48	11.5	0.45	7.0	3.8
70-74	626	275	41.8	0.56	16.0	0.44	6.9	4.1
75-79	609	310	50.3	0.67	20.6	0.52	6.7	4.1
80-84	492	403	67.9	0.89	37.9	0.72	6.6	5.6
85+	380	518	81.4	1.11	49.7	0.86	5.8	5.5
All ages	3502	2148					6.5	4.4
Mortality								
Raw			10.8	0.51	6.4	0.49		
WS			4.9	0.45	2.2	0.39		
ES			7.5	0.47	3.4	0.42		
BRD-S			9.9	0.51	4.6	0.45		
PYLL-70								
per 100,000			44.8		23.4			
ES			38.1		19.4			
AYLL-70			9.2		10.3			

* 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		2			0.1	1.00		5.0
25-29	1		0.0	0.13			1.2	
30-34	9	4	0.4	0.21	0.2	0.14	6.6	2.5
35-39	12	3	0.5	0.20	0.1	0.07	4.8	0.8
40-44	34	17	1.4	0.28	0.7	0.18	6.1	2.3
45-49	63	54	2.3	0.24	2.1	0.25	4.9	3.8
50-54	143	73	5.6	0.27	2.9	0.25	6.2	3.3
55-59	219	111	10.3	0.30	5.1	0.32	5.8	3.5
60-64	345	130	19.5	0.39	6.8	0.36	6.6	3.3
65-69	443	167	27.1	0.47	9.2	0.39	6.2	3.1
70-74	492	236	32.8	0.49	13.7	0.41	5.6	3.6
75-79	478	262	39.5	0.58	17.4	0.48	5.5	3.6
80-84	356	330	49.2	0.71	31.0	0.63	5.1	4.8
85+	280	436	60.0	0.88	41.8	0.75	4.7	4.8
All ages	2875	1825					5.6	3.9
Mortality								
Raw			8.8	0.46	5.4	0.45		
WS			4.2	0.41	1.9	0.36		
ES			6.3	0.43	2.9	0.39		
BRD-S			8.1	0.46	3.9	0.41		
PYLL-70								
per 100,000			42.1		21.5			
ES			35.8		17.9			
AYLL-70			9.5		10.8			

* See corresponding tables with multiple malignancies.

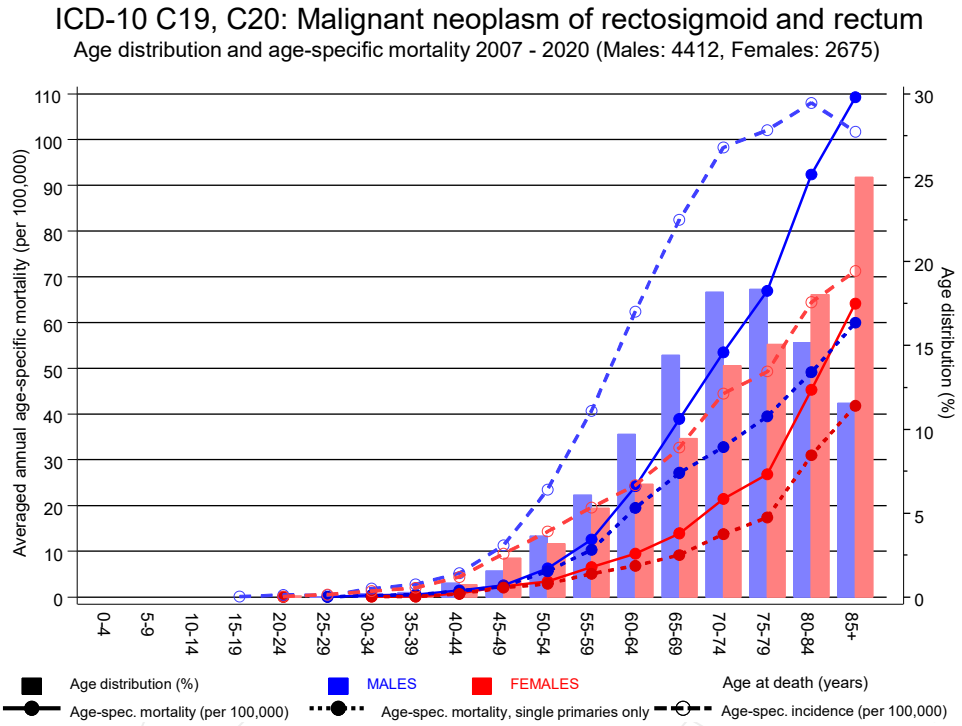
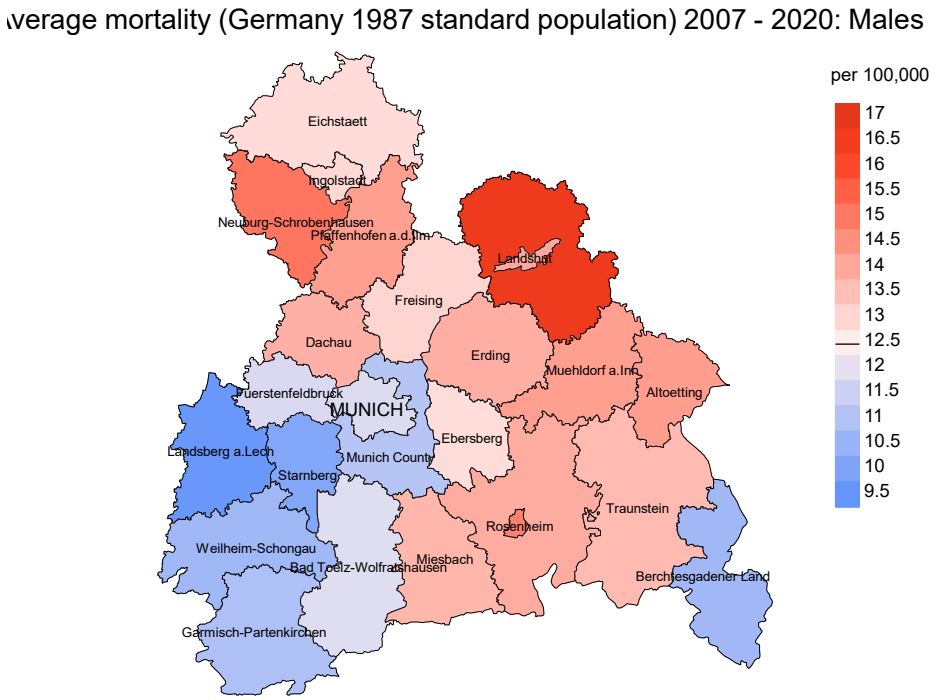


Figure 17. Distribution of age at death (bars; males: mean=68.2 yrs, median=68.6 yrs; females: mean=71.7 yrs, median=73.2 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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



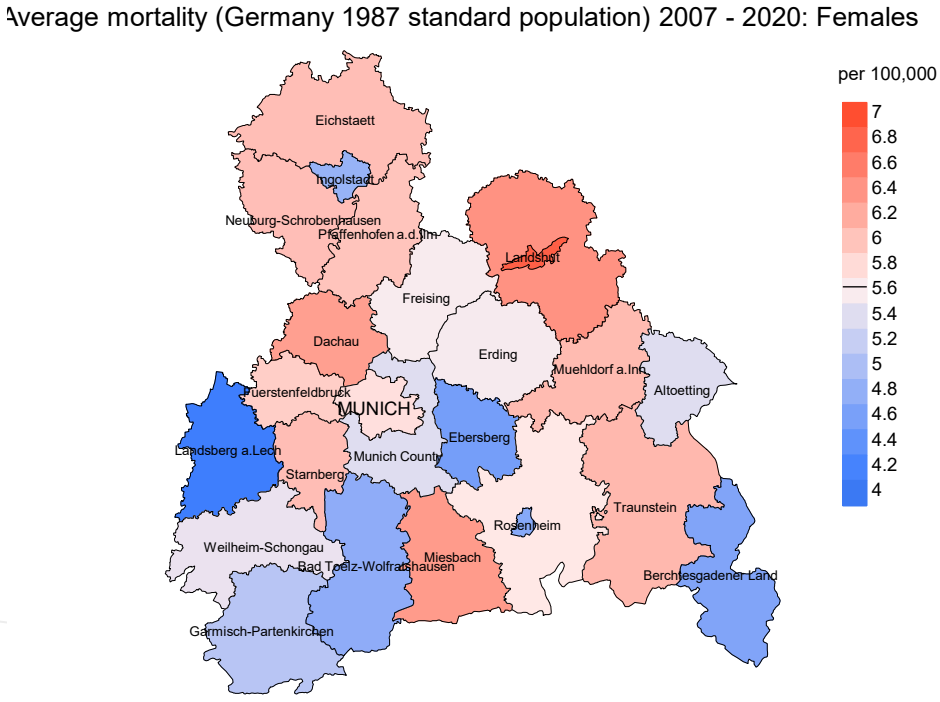
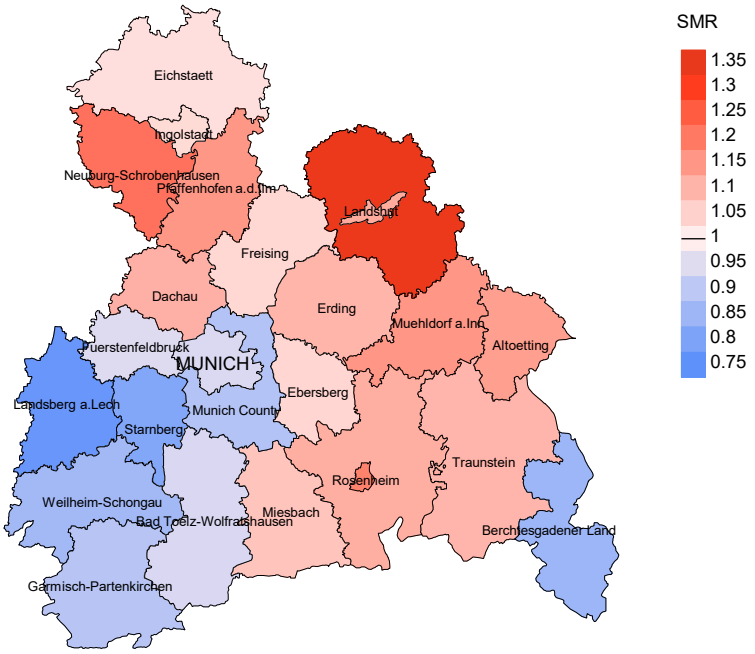


Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2020. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 12.5/100,000 WS N=4,412, females 5.6/100,000 WS N=2,675).

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 60 women died from rectal cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 4.6/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 3.2 and 6.4/100,000.

Standardized mortality ratio (SMR) 2007 - 2020: Males



Standardized mortality ratio (SMR) 2007 - 2020: Females

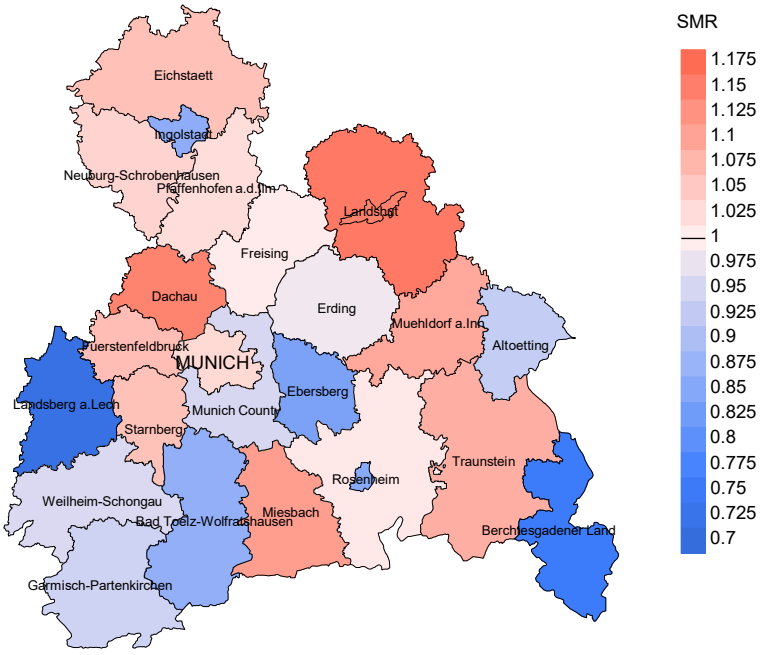


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=4,412, females N=2,675).

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 60 women died from rectal cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.84. Though, the value of this parameter may vary with an underlying probability of 99% between 0.59 and 1.16, 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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