Munich Cancer Registry

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ICD-10 C18-C21: Colorectal cancer

Incidence and Mortality

Year of diagnosis	1998-2020
Patients	62,687
Diseases	64,552
Creation date	12/20/2021
Database export	12/20/2021
Population	4.95 m

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

https://www.tumorregister-muenchen.de/en/facts/base/bC1821E-ICD-10-C18-C21-Colorectal-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
C18.-	Malignant neoplasm of colon
C18.0	Caecum
C18.1	Appendix
C18.2	Ascending colon
C18.3	Hepatic flexure
C18.4	Transverse colon
C18.5	Splenic flexure
C18.6	Descending colon
C18.7	Sigmoid colon
C18.8	Overlapping lesion of colon
C18.9	Colon, unspecified
C19	Malignant neoplasm of rectosigmoid junction
C20	Malignant neoplasm of rectum
C21.-	Malignant neoplasm of anus and anal canal
C21.0	Anus, unspecified
C21.1	Anal canal
C21.2	Cloacogenic zone
C21.8	Overlapping lesion of rectum, anus and anal canal

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	1884	107	5.7	11.5	11.3	80.3	97.5
1999	1881	126	6.7	11.7	11.1	79.4	97.1
2000	1749	111	6.3	12.4	11.0	78.1	97.3
2001	1909	138	7.2	12.6	10.8	74.3	96.9
2002	3232	378	11.7	12.5	10.6	78.4	97.5 #
2003	3244	310	9.6	12.7	10.3	74.9	97.3
2004	3127	245	7.8	12.9	10.0	74.5	97.5
2005	3064	224	7.3	13.4	9.7	74.6	97.2
2006	3155	169	5.4	13.7	9.4	70.6	95.6
2007	3522	216	6.1	13.9	8.9	69.6	94.6 #
2008	3462	199	5.7	14.1	8.5	67.2	98.2
2009	3439	182	5.3	14.5	8.0	66.2	98.5
2010	3230	189	5.9	14.7	7.4	64.0	98.1
2011	3150	159	5.0	15.0	7.0	62.4	98.3
2012	3122	168	5.4	15.2	6.5	58.8	97.9
2013	3127	157	5.0	15.5	6.1	55.7	98.1
2014	3071	154	5.0	15.7	5.8	53.9	97.4
2015	2993	137	4.6	15.9	5.3	51.8	97.1
2016	2987	133	4.5	16.0	4.8	47.4	99.3
2017	3007	161	5.4	16.2	4.1	40.4	99.5
2018	2498	84	3.4	16.5	3.6	33.2	99.6
2019	2132	12	0.6	16.6	2.7	26.9	99.8
2020	1567			16.6	2.2	17.0	99.7 ##
1998-2020	64552	3759	5.8	16.6	11.3	61.6	97.8

64,552 cases diagnosed 1998-2020 are related to a total of 62,687 patients. Currently, in 16,739 (26.7 %) of these 62,687 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 13,144 / 2,787 / 808 (21.0 % / 4.4 % / 1.3 %) 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 2,498 cases has been diagnosed, of which 16.5 % 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 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	940	49.9	39	4.1	10.7	12.8	80.4	98.3
1999	955	50.8	46	4.8	10.8	12.6	80.2	97.4
2000	891	50.9	31	3.5	11.6	12.4	76.2	97.3
2001	988	51.8	48	4.9	11.9	12.3	75.0	97.0
2002	1695	52.4	167	9.9	12.0	12.0	79.3	98.0 #
2003	1715	52.9	122	7.1	12.3	11.7	76.2	98.4
2004	1650	52.8	92	5.6	12.7	11.3	76.9	97.7
2005	1601	52.3	95	5.9	13.3	10.9	74.8	97.5
2006	1703	54.0	58	3.4	13.8	10.6	71.3	95.7
2007	1929	54.8	90	4.7	14.1	10.1	70.3	94.6 #
2008	1899	54.9	80	4.2	14.5	9.6	67.7	98.3
2009	1914	55.7	82	4.3	14.9	9.1	67.2	98.7
2010	1794	55.5	79	4.4	15.3	8.4	64.7	98.0
2011	1715	54.4	58	3.4	15.6	8.0	62.4	98.3
2012	1692	54.2	68	4.0	15.9	7.5	60.2	98.2
2013	1765	56.4	62	3.5	16.2	7.0	56.2	97.8
2014	1715	55.8	69	4.0	16.4	6.5	54.5	98.0
2015	1684	56.3	59	3.5	16.6	5.9	52.5	97.4
2016	1689	56.5	49	2.9	16.7	5.4	48.1	99.3
2017	1661	55.2	78	4.7	16.9	4.5	40.8	99.5
2018	1357	54.3	36	2.7	17.2	4.0	35.4	99.5
2019	1198	56.2	5	0.4	17.4	2.9	27.7	99.9
2020	880	56.2			17.4	2.8	19.4	99.7 ##
1998-2020	35030	54.3	1513	4.3	17.4	12.8	62.0	98.0

35,030 cases diagnosed 1998-2020 are related to a total of 33,845 patients. Currently, in 9,731 (28.8 %) of these 33,845 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 7,554 / 1,653 / 524 (22.3 % / 4.9 % / 1.5 %) patients exist having 2 / 3 / 4+ malignancies.

The increases of incident cases in 2002 and 2007 reflect the expansion to additional registry areas.

Please be aware that data of recent annual patient cohorts may not yet be fully processed. The years under evaluation can be retreived from the respective headings.

How to interpret:
In 2018, a subgroup of 1,357 cases has been diagnosed, of which 17.2 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 4.0 % 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	944	50.1	68	7.2	12.2	9.5	80.2	96.7	
1999	926	49.2	80	8.6	12.7	9.4	78.6	96.8	
2000	858	49.1	80	9.3	13.2	9.3	80.1	97.2	
2001	921	48.2	90	9.8	13.4	9.1	73.6	96.7	
2002	1537	47.6	211	13.7	13.1	9.0	77.5	96.9	#
2003	1529	47.1	188	12.3	13.1	8.7	73.5	96.1	
2004	1477	47.2	153	10.4	13.1	8.5	71.9	97.3	
2005	1463	47.7	129	8.8	13.4	8.2	74.3	96.9	
2006	1452	46.0	111	7.6	13.5	7.9	69.8	95.4	
2007	1593	45.2	126	7.9	13.6	7.5	68.7	94.7	#
2008	1563	45.1	119	7.6	13.7	7.1	66.5	98.0	
2009	1525	44.3	100	6.6	13.9	6.7	64.9	98.3	
2010	1436	44.5	110	7.7	14.1	6.3	63.2	98.3	
2011	1435	45.6	101	7.0	14.3	5.8	62.4	98.3	
2012	1430	45.8	100	7.0	14.4	5.3	57.3	97.6	
2013	1362	43.6	95	7.0	14.6	5.1	55.0	98.5	
2014	1356	44.2	85	6.3	14.8	4.9	53.2	96.7	
2015	1309	43.7	78	6.0	15.1	4.5	50.8	96.8	
2016	1298	43.5	84	6.5	15.2	4.0	46.4	99.2	
2017	1346	44.8	83	6.2	15.3	3.7	39.9	99.5	
2018	1141	45.7	48	4.2	15.5	3.1	30.6	99.6	
2019	934	43.8	7	0.7	15.6	2.4	25.9	99.6	
2020	687	43.8			15.7	1.4	14.0	99.9	##
1998-2020	29522	45.7	2246	7.6	15.7	9.5	61.1	97.5	

29,522 cases diagnosed 1998-2020 are related to a total of 28,842 patients. Currently, in 7,008 (24.3 %) of these 28,842 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 5,590 / 1,134 / 284 (19.4 % / 3.9 % / 1.0 %) patients exist having 2 / 3 / 4+ malignancies.

The increases of incident cases in 2002 and 2007 reflect the expansion to additional registry areas.

Please be aware that data of recent annual patient cohorts may not yet be fully processed. The years under evaluation can be retreived from the respective headings.

How to interpret:
In 2018, a subgroup of 1,141 cases has been diagnosed, of which 15.5 % 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 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	940	944	84.8	80.2	51.0	34.3	76.6	51.7	99.7	67.7
1999	955	926	85.3	78.0	50.6	33.2	76.5	50.0	100.2	65.1
2000	891	858	78.2	71.4	45.8	29.4	69.3	44.8	89.7	58.6
2001	988	921	85.3	75.7	49.9	32.4	74.7	48.6	95.5	63.3
2002	1695	1537	91.0	78.5	50.8	32.2	76.7	48.6	100.2	63.2
2003	1715	1529	91.5	77.6	50.4	32.0	75.8	48.1	98.4	62.2
2004	1650	1477	87.7	74.7	46.8	31.2	70.7	46.5	92.5	59.8
2005	1601	1463	84.5	73.5	44.9	28.9	67.3	43.7	87.3	57.5
2006	1703	1452	88.9	72.3	46.7	29.8	69.9	44.3	90.3	57.5
2007	1929	1593	87.1	69.0	45.4	27.8	67.6	41.5	87.7	53.9
2008	1899	1563	85.3	67.4	42.9	26.6	64.7	40.0	84.2	51.8
2009	1914	1525	85.8	65.6	42.6	25.9	63.7	38.8	83.1	50.6
2010	1794	1436	79.6	61.4	39.1	23.5	58.7	35.4	76.3	46.6
2011	1715	1435	76.6	61.4	37.1	24.4	55.6	36.3	72.1	46.3
2012	1692	1430	74.5	60.6	35.8	24.5	53.7	35.9	69.3	46.2
2013	1765	1362	76.7	57.1	36.2	23.1	54.2	34.0	70.4	43.4
2014	1715	1356	73.6	56.3	34.9	22.7	52.0	33.3	67.0	42.3
2015	1684	1309	70.8	53.8	33.4	21.1	49.8	31.2	64.1	40.0
2016	1689	1298	70.3	52.9	33.7	20.9	49.4	30.9	63.7	39.4
2017	1661	1346	68.8	54.6	31.7	22.2	47.2	32.4	61.3	41.1
2018	1357	1141	55.7	46.0	25.7	18.9	38.2	27.5	49.1	34.6
2019	1198	934	49.2	37.6	23.6	15.8	34.5	22.7	43.6	28.6
2020	880	687	36.1	27.7	17.4	11.5	25.4	16.6	32.1	21.1
1998–2020	35030	29522	75.3	61.2	37.8	24.7	56.3	36.6	72.4	47.1

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	1884	69.9	12.4	13.2	102	53.9	60.8	71.0	78.7	86.1
1999	1881	70.3	12.6	20.2	102	54.2	61.7	71.1	79.3	86.4
2000	1749	70.4	12.2	24.7	103	54.6	61.5	71.3	79.3	86.7
2001	1909	69.9	12.5	26.6	103	54.1	61.5	70.3	79.3	86.5
2002	3232	70.9	12.1	17.7	104	55.2	62.5	71.8	80.0	86.7
2003	3244	70.8	12.0	8.4	101	55.6	63.0	71.4	79.9	86.0
2004	3127	70.6	12.3	13.8	101	55.0	62.9	71.0	79.8	85.4
2005	3064	71.3	12.2	15.1	99.9	55.4	63.7	71.8	80.3	86.0
2006	3155	70.4	12.2	17.9	102	54.2	63.1	70.8	79.6	85.2
2007	3522	70.7	12.5	13.4	103	54.1	63.7	71.2	80.2	85.7
2008	3462	71.3	12.4	18.9	105	55.0	64.0	71.9	80.4	86.5
2009	3439	71.0	12.4	12.4	102	54.2	63.6	71.9	80.1	85.9
2010	3230	71.4	12.6	14.9	101	54.1	63.6	72.4	80.9	86.2
2011	3150	71.1	12.9	15.5	101	53.2	63.1	72.2	80.7	86.8
2012	3122	71.0	13.0	9.7	101	54.0	62.9	72.6	80.3	86.4
2013	3127	70.8	13.2	15.7	105	52.8	62.8	72.6	80.0	86.2
2014	3071	71.0	13.2	1.4	103	52.8	62.9	73.0	80.2	86.7
2015	2993	71.0	13.1	11.4	105	52.9	63.2	73.2	80.1	86.5
2016	2987	70.7	13.3	9.4	100	52.8	62.3	72.9	80.2	86.2
2017	3007	71.0	12.9	9.4	99.0	53.8	62.6	73.1	80.2	85.7
2018	2498	70.7	12.8	14.3	105	53.8	61.9	72.4	80.3	85.6
2019	2132	69.8	13.5	17.7	100	51.7	61.0	71.8	79.9	85.1
2020	1567	69.8	13.1	17.6	100	52.4	61.5	71.6	79.8	84.4
1998-2020	64552	70.8	12.7	1.4	105	53.9	62.8	72.0	80.1	86.1

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	940	67.7	11.8	31.4	98.1	53.6	59.4	68.1	75.9	83.9
1999	955	68.2	11.7	20.2	95.5	54.2	60.2	69.0	76.7	83.4
2000	891	68.2	11.0	34.4	95.9	54.1	60.2	68.0	76.6	82.7
2001	988	68.2	11.4	31.3	102	54.1	61.1	67.9	75.8	83.4
2002	1695	69.0	11.0	20.9	98.5	55.3	61.8	69.4	76.6	82.5
2003	1715	69.1	11.1	8.4	99.4	55.4	62.5	69.5	76.5	82.7
2004	1650	69.3	11.1	27.8	101	55.4	62.4	69.3	77.1	83.4
2005	1601	69.2	11.3	19.0	99.6	54.6	62.7	69.4	77.1	83.5
2006	1703	68.9	11.2	17.9	102	54.5	62.5	69.2	77.2	82.8
2007	1929	69.0	11.7	15.8	99.4	54.2	62.6	69.4	77.5	82.9
2008	1899	69.7	11.3	19.3	105	54.8	63.3	70.3	77.8	83.4
2009	1914	69.5	11.4	12.4	102	53.8	62.8	70.8	77.7	83.0
2010	1794	69.8	11.7	21.1	98.9	54.0	62.4	70.8	78.2	84.0
2011	1715	69.9	11.8	15.5	97.3	53.4	63.1	71.2	78.3	84.2
2012	1692	70.2	11.6	9.7	101	55.1	62.9	71.5	78.3	84.0
2013	1765	70.0	12.1	19.4	99.6	53.8	62.7	71.9	78.3	84.3
2014	1715	70.3	12.3	20.3	102	53.5	62.7	72.2	79.1	85.1
2015	1684	70.1	12.3	18.3	105	53.1	62.3	72.1	78.9	84.9
2016	1689	69.6	12.9	9.4	100	52.3	61.6	72.0	79.1	84.2
2017	1661	70.7	11.9	12.9	96.3	54.8	62.9	72.4	79.5	84.3
2018	1357	70.4	12.2	14.3	97.1	54.4	62.1	72.1	79.6	84.5
2019	1198	69.2	12.9	17.9	98.2	52.3	60.6	70.9	78.7	83.9
2020	880	69.2	12.3	18.5	100	52.7	61.3	70.4	78.8	83.3
1998–2020	35030	69.5	11.8	8.4	105	54.1	62.2	70.5	77.9	83.7

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	944	72.1	12.7	13.2	102	54.5	63.1	74.0	81.5	87.4
1999	926	72.4	13.1	26.9	102	54.2	63.5	74.5	81.9	88.0
2000	858	72.8	12.8	24.7	103	55.8	63.0	74.7	81.8	88.5
2001	921	71.8	13.4	26.6	103	54.0	62.2	74.4	81.2	88.4
2002	1537	72.9	13.0	17.7	104	55.2	63.5	74.8	82.1	88.8
2003	1529	72.7	12.6	23.5	101	56.0	63.8	74.2	82.3	88.5
2004	1477	72.0	13.4	13.8	100	54.4	63.7	73.7	82.6	87.6
2005	1463	73.5	12.8	15.1	99.9	56.8	65.2	75.4	83.2	89.2
2006	1452	72.1	13.1	21.2	98.7	54.2	64.1	73.8	82.2	86.7
2007	1593	72.6	13.2	13.4	103	53.8	65.0	74.3	82.8	87.4
2008	1563	73.2	13.3	18.9	102	55.3	64.9	74.2	83.6	88.5
2009	1525	72.9	13.3	15.9	102	54.6	64.9	74.7	83.1	88.4
2010	1436	73.3	13.4	14.9	101	54.6	65.5	75.2	83.3	88.6
2011	1435	72.5	14.0	16.5	101	52.3	63.1	74.1	83.8	88.8
2012	1430	71.9	14.5	13.7	100	52.7	63.4	74.5	83.0	88.6
2013	1362	71.7	14.4	15.7	105	51.0	62.9	74.0	82.5	88.5
2014	1356	71.8	14.2	1.4	103	51.4	63.6	74.1	82.2	88.6
2015	1309	72.3	14.0	11.4	101	52.3	64.6	74.5	81.9	88.9
2016	1298	72.2	13.7	13.8	100	53.1	63.4	74.8	81.9	88.3
2017	1346	71.3	14.1	9.4	99.0	52.4	62.0	73.9	81.3	87.2
2018	1141	71.2	13.5	19.3	105	52.7	61.8	72.9	81.1	86.7
2019	934	70.6	14.2	17.7	100	50.5	61.6	73.0	81.1	86.4
2020	687	70.7	14.0	17.6	99.3	51.7	61.6	73.6	81.1	86.1
1998–2020	29522	72.3	13.5	1.4	105	53.7	63.7	74.3	82.4	88.1

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	1	0.0	0.0			0.0	1	0.0	0.0
5-9	3	0.0	0.0	2	0.0	0.0	1	0.0	0.0
10-14	9	0.0	0.0	3	0.0	0.0	6	0.0	0.0
15-19	49	0.1	0.2	12	0.1	0.1	37	0.2	0.2
20-24	79	0.2	0.3	38	0.2	0.2	41	0.2	0.5
25-29	108	0.3	0.6	49	0.2	0.5	59	0.3	0.8
30-34	188	0.5	1.1	101	0.4	0.9	87	0.5	1.3
35-39	313	0.8	1.8	163	0.7	1.6	150	0.8	2.1
40-44	639	1.5	3.4	330	1.4	3.0	309	1.7	3.8
45-49	1286	3.1	6.5	682	3.0	6.0	604	3.3	7.0
50-54	2266	5.5	12.0	1291	5.6	11.7	975	5.3	12.3
55-59	3104	7.5	19.5	1843	8.1	19.7	1261	6.8	19.2
60-64	4110	9.9	29.4	2574	11.2	31.0	1536	8.3	27.5
65-69	5348	12.9	42.4	3376	14.7	45.7	1972	10.7	38.2
70-74	6615	16.0	58.4	4008	17.5	63.2	2607	14.2	52.4
75-79	6560	15.9	74.3	3750	16.4	79.6	2810	15.3	67.6
80-84	5504	13.3	87.6	2786	12.2	91.8	2718	14.8	82.4
85+	5125	12.4	100.0	1884	8.2	100.0	3241	17.6	100.0
All ages	41307	100.0		22892	100.0		18415	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=813 %	Females DCO rate n=1131 %	Males Prop.all cancers n=153686 %	Females Prop.all cancers n=155051 %
0- 4		1		0.1		100.0		0.6
5- 9	2	1	0.1	0.1			1.7	1.0
10-14	3	6	0.2	0.4			2.2	4.7
15-19	12	37	0.7	2.3			3.8	14.0
20-24	38	41	1.9	2.2	2.6		6.0	7.9
25-29	46	59	2.0	2.6			4.8	5.0
30-34	100	86	4.3	3.8		1.2	7.7	4.0
35-39	159	148	6.9	6.5	1.9	2.0	8.7	4.2
40-44	326	308	13.0	12.7		0.3	11.7	5.0
45-49	671	597	25.0	22.9	0.6	0.2	13.3	6.4
50-54	1261	968	49.5	38.5	1.0	1.0	14.9	7.8
55-59	1817	1245	85.6	57.2	1.3	0.6	14.3	9.3
60-64	2525	1514	142.8	79.7	1.4	1.2	14.4	9.7
65-69	3284	1941	201.2	107.0	1.6	1.4	13.5	10.2
70-74	3903	2554	260.3	148.5	2.7	2.1	14.2	12.8
75-79	3658	2751	302.3	183.2	3.0	3.9	15.2	14.1
80-84	2691	2678	371.6	251.6	6.0	7.1	17.5	17.4
85+	1848	3190	395.7	306.0	16.4	22.3	17.6	19.5
All ages	22344	18125			3.6	6.2	14.5	11.7
Incidence								
Raw			68.6	54.0				
WS			33.1	21.6				
ES			49.1	31.8				
BRD-S			63.1	40.7				

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).

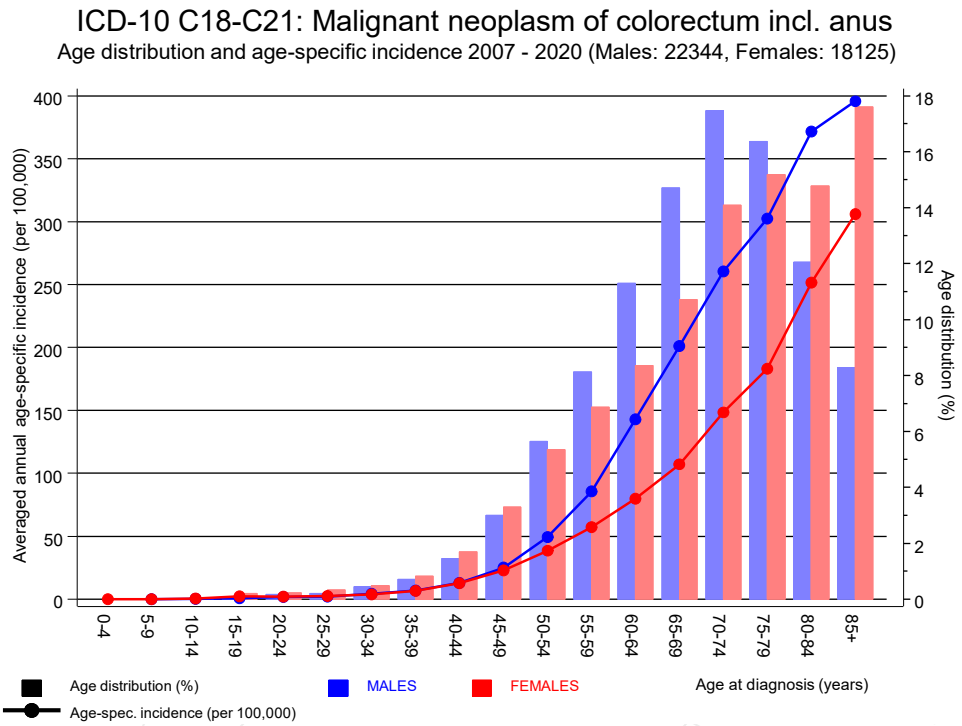


Figure 6. Age distribution (males: mean=69.8 yrs, median=71.2 yrs; females: mean=72.1 yrs, median=74.1 yrs) and age-specific incidence.

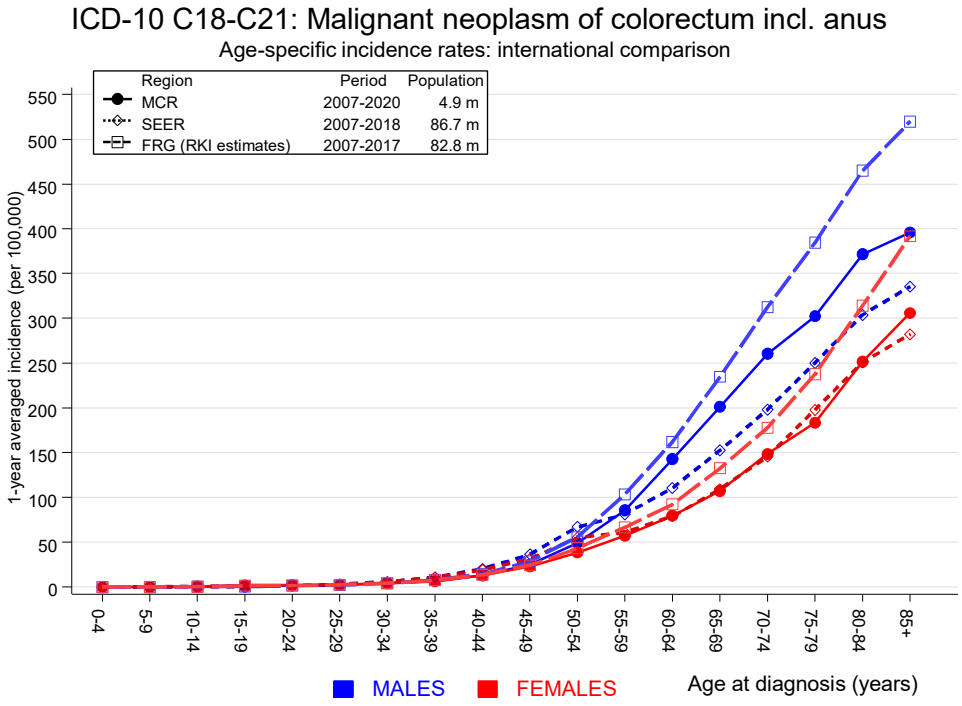


Figure 6a. Age-specific incidence in MCR registry areas compared to Germany (FRG, RKI estimates) and SEER (Surveillance, Epidemiology, and End Results, USA).

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 %
C00	Lip	5	2.6	1.9	0.6	4.5		0.2	
C03–C06	Oral cavity	25	16.2	1.5	1.0	2.3	#	0.7	8.0
C07–C08	Salivary gland	7	5.5	1.3	0.5	2.6		0.1	
C09–C10	Oropharynx	33	19.4	1.7	1.2	2.4	#	1.1	6.1
C12–C13	Hypopharynx	22	10.6	2.1	1.3	3.2	#	0.9	4.5
C15	Oesophagus	125	41.2	3.0	2.5	3.6	#	6.9	8.0
C16	Stomach	252	92.5	2.7	2.4	3.1	#	13.1	7.9
C17	Small intestine	118	13.0	9.1	7.5	10.9	#	8.6	0.8
C18	Colon	838	225.1	3.7	3.5	4.0	#	50.4	1.1
C19–C20	Rectum	322	115.8	2.8	2.5	3.1	#	17.0	1.2
C21	Anus/canal	14	5.0	2.8	1.5	4.7	#	0.7	
C22	Liver	170	63.3	2.7	2.3	3.1	#	8.8	16.5
C23–C24	Bile	60	24.1	2.5	1.9	3.2	#	2.9	13.3
C25	Pancreas	193	88.8	2.2	1.9	2.5	#	8.6	22.8
C30–C31	Sinuses	5	3.9	1.3	0.4	3.0		0.1	
C32	Larynx	37	20.6	1.8	1.3	2.5	#	1.3	8.1
C33–C34	Lung	563	257.8	2.2	2.0	2.4	#	25.1	13.7
C38,C45	Mesothelioma	21	15.7	1.3	0.8	2.0		0.4	4.8
C43	Malign. melanoma	183	97.3	1.9	1.6	2.2	#	7.0	2.7
C46,C49	Soft tissue	27	12.9	2.1	1.4	3.0	#	1.2	
C50	Breast	14	6.1	2.3	1.3	3.8	#	0.6	7.1
C60	Penis	13	5.7	2.3	1.2	3.9	#	0.6	15.4
C61	Prostate	1080	632.7	1.7	1.6	1.8	#	36.8	5.8
C62	Testis	10	4.1	2.4	1.2	4.4	#	0.5	10.0
C64	Kidney	208	74.4	2.8	2.4	3.2	#	11.0	7.7
C65	Renal pelvis	28	10.3	2.7	1.8	3.9	#	1.5	
C66	Ureter	21	6.1	3.4	2.1	5.2	#	1.2	
C67	Bladder	229	112.0	2.0	1.8	2.3	#	9.6	7.0
C68	Urethra	6	2.1	2.8	1.0	6.2	#	0.3	
C70–C72	CNS cancer	50	27.0	1.9	1.4	2.4	#	1.9	20.0
C73	Thyroid	22	12.4	1.8	1.1	2.7	#	0.8	9.1
C76–C79	CUP	65	38.6	1.7	1.3	2.1	#	2.2	1.5
C81	Hodgkin lymphoma	5	4.7	1.1	0.3	2.5		0.0	
C82–C85	NHL	190	96.2	2.0	1.7	2.3	#	7.7	3.7
C90	Mult. myeloma	49	30.0	1.6	1.2	2.2	#	1.6	20.4
C91–C96	Leukaemia	72	35.4	2.0	1.6	2.6	#	3.0	20.8
Others, specified		22	22.0	1.0	0.6	1.5		−0.0	18.2
Not observed		0	0.8	0.0	0.0	4.9		−0.1	
All further malignancies		5104	2252.1	2.3	2.2	2.3	#	234.5	7.1

Patients	32525
Median age at next malignancy (years)	74.3
Person-years	121602
Mean observation time (years)	3.7
Median observation time (years)	2.1

The occurrence of further specified malignancy is statistically significant.

Further observed malignancies with count 1 to 4 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 %
C03–C06	Oral cavity	11	7.1	1.6	0.8	2.8		0.4	
C09–C10	Oropharynx	12	4.4	2.7	1.4	4.7	#	0.7	8.3
C15	Oesophagus	24	8.2	2.9	1.9	4.3	#	1.6	8.3
C16	Stomach	117	51.2	2.3	1.9	2.7	#	6.5	15.4
C17	Small intestine	70	6.5	10.8	8.4	13.6	#	6.3	2.9
C18	Colon	504	143.0	3.5	3.2	3.8	#	35.6	1.8
C19–C20	Rectum	152	55.2	2.8	2.3	3.2	#	9.6	1.3
C21	Anus/canal	17	7.0	2.4	1.4	3.9	#	1.0	
C22	Liver	46	17.1	2.7	2.0	3.6	#	2.9	37.0
C23–C24	Bile	36	20.9	1.7	1.2	2.4	#	1.5	11.1
C25	Pancreas	149	67.2	2.2	1.9	2.6	#	8.1	25.5
C26	GI cancer	4	3.0	1.3	0.4	3.4		0.1	50.0
C32	Larynx	6	2.1	2.8	1.0	6.2	#	0.4	
C33–C34	Lung	277	92.4	3.0	2.7	3.4	#	18.2	10.8
C43	Malign. melanoma	106	46.3	2.3	1.9	2.8	#	5.9	3.8
C46,C49	Soft tissue	17	7.6	2.2	1.3	3.6	#	0.9	
C48	Peritoneal	18	4.8	3.7	2.2	5.9	#	1.3	22.2
C50	Breast	739	366.0	2.0	1.9	2.2	#	36.8	5.3
C51	Vulva	41	15.1	2.7	1.9	3.7	#	2.6	2.4
C52	Vagina	9	2.7	3.4	1.5	6.4	#	0.6	11.1
C53	Cervix uteri	33	14.6	2.3	1.6	3.2	#	1.8	18.2
C54	Corpus uteri	156	68.0	2.3	1.9	2.7	#	8.7	2.6
C55,C57	Fem. genitals un	6	3.8	1.6	0.6	3.4		0.2	16.7
C56	Ovary	145	51.1	2.8	2.4	3.3	#	9.3	24.8
C64	Kidney	103	31.1	3.3	2.7	4.0	#	7.1	11.7
C65	Renal pelvis	13	4.4	3.0	1.6	5.1	#	0.9	
C66	Ureter	6	2.3	2.6	0.9	5.6		0.4	16.7
C67	Bladder	60	29.7	2.0	1.5	2.6	#	3.0	20.0
C70–C72	CNS cancer	21	16.4	1.3	0.8	2.0		0.5	42.9
C73	Thyroid	30	16.4	1.8	1.2	2.6	#	1.3	6.7
C74–C80	Cancer others	4	6.2	0.7	0.2	1.7		−0.2	50.0
C76–C79	CUP	20	27.6	0.7	0.4	1.1		−0.7	
C81	Hodgkin lymphoma	7	2.2	3.3	1.3	6.7	#	0.5	
C82–C85	NHL	104	53.4	1.9	1.6	2.4	#	5.0	10.6
C90	Mult. myeloma	29	16.9	1.7	1.1	2.5	#	1.2	24.1
C91–C96	Leukaemia	50	20.5	2.4	1.8	3.2	#	2.9	44.0
Others, specified		26	14.3	1.8	1.2	2.7	#	1.2	7.7
Not observed		0	1.2	0.0	0.0	3.2		−0.1	
All further malignancies		3168	1307.5	2.4	2.3	2.5	#	183.6	9.5

Patients	26968
Median age at next malignancy (years)	76.0
Person-years	101311
Mean observation time (years)	3.8
Median observation time (years)	2.0

The occurrence of further specified malignancy is statistically significant.

Further observed malignancies with count 1 to 3 are pooled in category “Others, specified”.

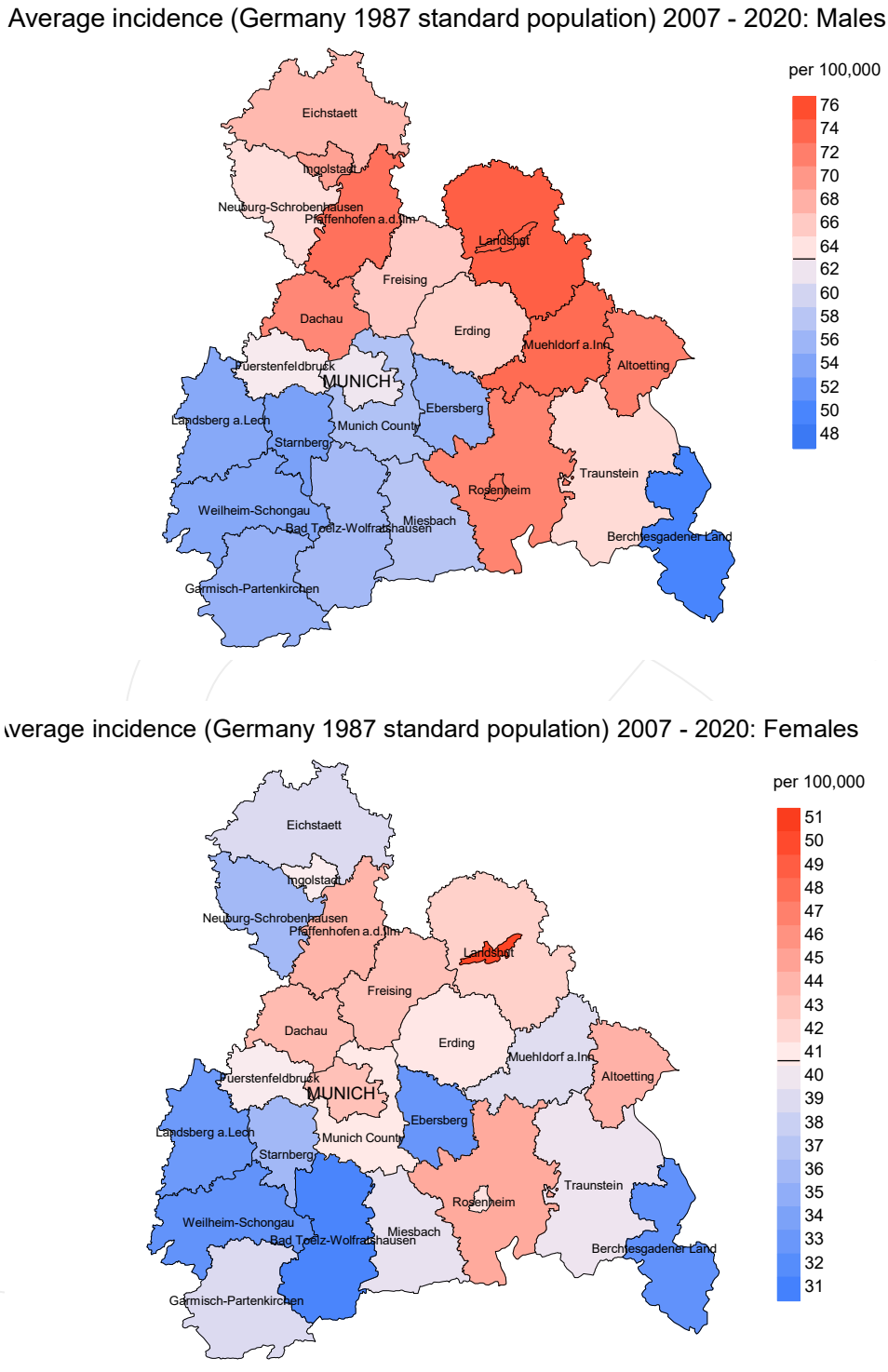
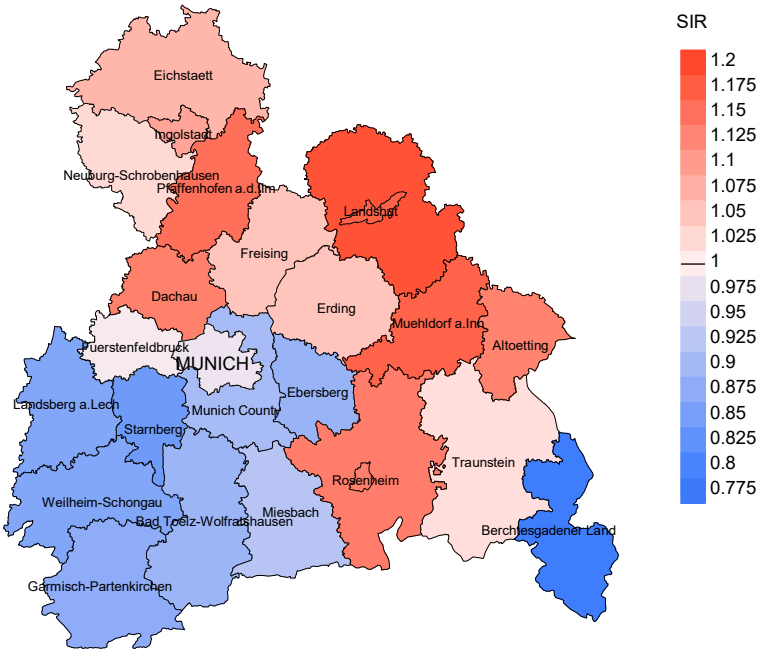


Figure 8a. Map of cancer incidence (german standard population, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 63.1/100,000 WS N=22,344, females 40.7/100,000 WS N=18,125).

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 391 women were identified with newly diagnosed colorectal cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 32.9/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 28.7 and 37.6/100,000.

Standardized incidence ratio (SIR) 2007 - 2020: Males



Standardized incidence ratio (SIR) 2007 - 2020: Females

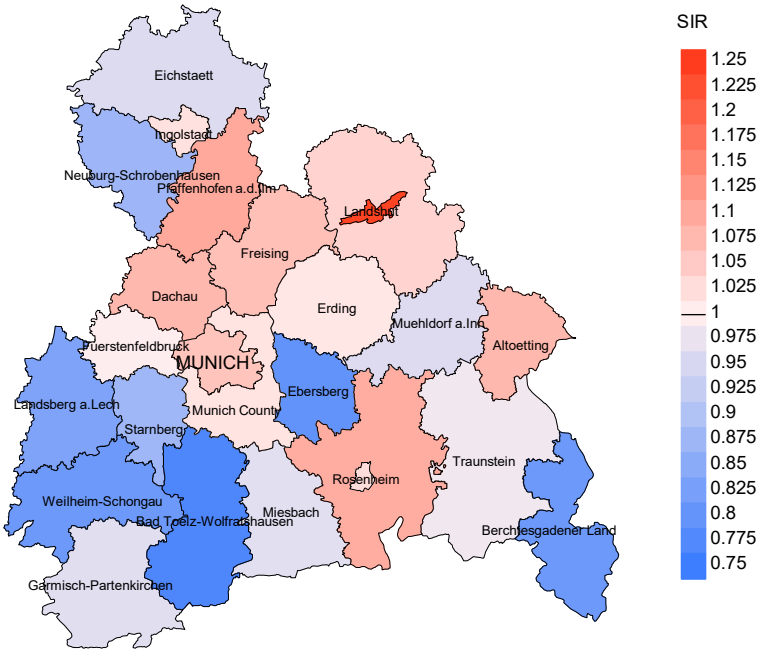


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=22,344, females N=18,125).

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 391 women were identified with newly diagnosed colorectal cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.80. Though, the value of this parameter may vary with an underlying probability of 99% between 0.70 and 0.91.

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	1884	97.5	5.7	1513	80.3	92.5
1999	1881	97.1	6.7	1494	79.4	93.4
2000	1749	97.3	6.3	1366	78.1	95.4
2001	1909	96.9	7.2	1419	74.3	94.9
2002	3232	97.5	11.7	2535	78.4	96.2
2003	3244	97.3	9.6	2430	74.9	96.0
2004	3127	97.5	7.8	2331	74.5	95.6
2005	3064	97.2	7.3	2285	74.6	96.6
2006	3155	95.6	5.4	2227	70.6	96.7
2007	3522	94.6	6.1	2452	69.6	95.9
2008	3462	98.2	5.7	2326	67.2	94.9
2009	3439	98.5	5.3	2275	66.2	95.5
2010	3230	98.1	5.9	2068	64.0	94.0
2011	3150	98.3	5.0	1965	62.4	94.0
2012	3122	97.9	5.4	1837	58.8	93.6
2013	3127	98.1	5.0	1741	55.7	92.2
2014	3071	97.4	5.0	1656	53.9	91.7
2015	2993	97.1	4.6	1549	51.8	89.6
2016	2987	99.3	4.5	1415	47.4	88.6
2017	3007	99.5	5.4	1214	40.4	82.6
2018	2498	99.6	3.4	830	33.2	70.8
2019	2132	99.8	0.6	574	26.9	79.8
2020	1567	99.7		267	17.0	91.0
1998-2020	64552	97.8	5.8	39769	61.6	93.3

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	1884	1054	90.2	308	16.3
1999	1881	1084	90.8	320	17.0
2000	1749	1060	93.6	298	17.0
2001	1909	1141	95.4	306	16.0
2002	3232	1617	98.0	698	21.6
2003	3244	1723	97.9	599	18.5
2004	3127	1740	98.4	557	17.8
2005	3064	1852	96.5	551	18.0
2006	3155	1915	97.5	513	16.3
2007	3522	2029	97.4	581	16.5
2008	3462	2118	98.6	610	17.6
2009	3439	2156	98.6	541	15.7
2010	3230	2249	98.6	542	16.8
2011	3150	2256	98.1	522	16.6
2012	3122	2253	98.3	530	17.0
2013	3127	2234	97.9	470	15.0
2014	3071	2231	97.8	522	17.0
2015	2993	2376	97.9	478	16.0
2016	2987	2295	98.6	491	16.4
2017	3007	2438	97.8	469	15.6
2018	2498	2031	67.6	288	11.5
2019	2132	1806	45.7	222	10.4
2020	1567	2127	89.6	160	10.2
1998–2020	64552	43785	93.5	10576	16.4

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	1054	71.7	28.3	87.0
1999	1084	73.2	26.8	86.5
2000	1060	73.9	26.1	86.2
2001	1141	69.1	30.9	84.8
2002	1617	75.5	24.5	87.3
2003	1723	74.1	25.9	86.8
2004	1740	76.3	23.7	86.6
2005	1852	71.8	28.2	82.0
2006	1915	71.5	28.5	82.8
2007	2029	71.9	28.1	83.5
2008	2118	72.0	28.0	82.2
2009	2156	69.8	30.2	80.0
2010	2249	67.1	32.9	79.0
2011	2256	67.4	32.6	78.9
2012	2253	66.4	33.6	78.1
2013	2234	63.3	36.7	74.2
2014	2231	64.4	35.6	76.7
2015	2376	61.7	38.3	73.8
2016	2295	58.6	41.4	72.7
2017	2438	60.0	40.0	71.1
2018	2031	50.7	49.3	62.1
2019	1806	45.6	54.4	65.1
2020	2127	46.1	53.9	61.3
1998-2020	43785	65.4	34.6	78.2

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	513	73.7	71.4	79.4	73.2
1999	534	73.3	71.4	78.4	72.7
2000	550	74.6	72.2	82.3	73.8
2001	548	74.2	71.3	80.9	72.9
2002	828	74.1	72.0	80.3	73.2
2003	883	74.9	72.6	80.6	73.8
2004	892	75.6	74.2	81.0	75.1
2005	960	75.4	73.1	81.3	73.7
2006	1043	76.4	74.3	80.6	75.4
2007	1098	76.0	73.8	80.9	74.6
2008	1178	76.6	74.5	82.1	75.3
2009	1135	76.4	73.6	81.2	74.4
2010	1217	76.4	74.2	82.0	75.4
2011	1233	76.5	73.3	82.6	75.1
2012	1226	77.3	75.4	82.3	76.2
2013	1209	78.9	76.3	83.6	77.1
2014	1219	78.0	75.5	82.6	76.6
2015	1311	79.2	76.3	83.9	77.2
2016	1328	78.9	75.7	83.2	77.3
2017	1358	79.9	77.1	84.2	78.1
2018	1163	79.9	76.5	83.0	77.6
2019	1072	80.0	75.4	83.3	77.1
2020	1301	80.5	77.0	83.5	78.3
1998–2020	23799	77.4	74.5	82.5	75.7

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	541	78.6	76.4	84.9	78.4
1999	550	79.9	78.3	86.0	79.7
2000	510	80.5	78.7	86.4	79.6
2001	593	81.0	78.0	86.8	80.2
2002	789	81.1	79.7	86.5	80.7
2003	840	81.3	78.9	86.0	80.3
2004	848	81.3	79.3	85.2	80.2
2005	892	81.8	80.0	85.2	80.7
2006	872	81.9	79.7	86.1	80.6
2007	931	81.9	79.2	86.7	80.4
2008	940	82.6	80.1	86.5	81.0
2009	1021	82.7	79.1	87.4	80.3
2010	1032	83.3	79.9	87.2	81.8
2011	1023	83.4	79.3	88.0	81.2
2012	1027	83.8	79.3	88.4	81.2
2013	1025	83.9	79.1	88.3	81.1
2014	1012	83.5	78.3	88.1	80.4
2015	1065	83.6	78.4	88.7	80.3
2016	967	83.7	78.6	88.6	80.8
2017	1080	83.1	79.4	89.3	80.7
2018	868	83.6	78.6	87.5	79.6
2019	734	82.6	77.6	86.6	79.7
2020	826	84.6	79.0	87.7	80.7
1998–2020	19986	82.5	79.0	87.4	80.5

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	367	33.1	0.39	19.3	0.38	30.4	0.40	41.2	0.42
1999	392	35.0	0.41	20.2	0.40	31.7	0.42	44.2	0.45
2000	411	36.1	0.46	20.2	0.44	32.1	0.47	44.3	0.50
2001	391	33.7	0.40	19.1	0.39	29.9	0.40	40.0	0.42
2002	628	33.7	0.37	18.2	0.36	28.5	0.38	38.4	0.39
2003	665	35.5	0.39	18.5	0.37	29.3	0.39	40.5	0.42
2004	689	36.6	0.42	18.1	0.39	29.2	0.42	41.3	0.45
2005	705	37.2	0.45	18.4	0.42	28.8	0.44	40.1	0.47
2006	751	39.2	0.45	19.0	0.42	30.4	0.45	42.4	0.48
2007	811	36.6	0.43	17.1	0.38	27.3	0.41	38.3	0.44
2008	882	39.6	0.48	18.1	0.43	29.1	0.46	41.0	0.50
2009	802	35.9	0.43	16.6	0.40	26.1	0.42	35.7	0.44
2010	839	37.2	0.48	16.4	0.43	26.0	0.46	36.5	0.49
2011	865	38.7	0.51	17.4	0.48	27.3	0.50	37.0	0.52
2012	833	36.7	0.51	16.0	0.46	25.5	0.49	35.0	0.52
2013	799	34.7	0.47	14.4	0.41	23.2	0.44	32.5	0.48
2014	804	34.5	0.48	14.4	0.42	22.8	0.45	31.4	0.48
2015	814	34.2	0.50	14.0	0.43	22.4	0.46	30.9	0.50
2016	810	33.7	0.49	13.9	0.42	21.9	0.45	30.0	0.48
2017	823	34.1	0.51	13.5	0.44	21.6	0.47	29.7	0.50
2018	618	25.4	0.47	10.2	0.41	16.0	0.43	21.9	0.46
2019	497	20.4	0.43	8.5	0.37	13.2	0.39	17.8	0.42
2020	602	24.7	0.70	9.9	0.58	15.5	0.62	21.4	0.68
1998-2020	15798	34.0	0.46	15.4	0.41	24.2	0.44	33.3	0.47

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	390	33.2	0.42	12.6	0.37	19.9	0.39	27.6	0.41
1999	403	34.0	0.44	12.1	0.37	19.4	0.39	26.8	0.41
2000	373	31.1	0.44	11.2	0.38	17.8	0.40	23.9	0.41
2001	397	32.6	0.43	11.9	0.37	19.0	0.39	26.0	0.41
2002	594	30.3	0.39	10.2	0.32	16.4	0.34	22.7	0.36
2003	612	31.1	0.40	10.8	0.34	17.3	0.36	23.6	0.38
2004	640	32.4	0.44	10.9	0.35	17.5	0.38	24.4	0.41
2005	627	31.5	0.43	10.4	0.36	16.6	0.39	23.1	0.41
2006	621	30.9	0.43	9.9	0.33	16.0	0.36	22.8	0.40
2007	649	28.1	0.41	9.7	0.35	15.3	0.37	21.0	0.39
2008	644	27.8	0.42	9.0	0.34	14.3	0.36	19.8	0.39
2009	703	30.2	0.47	10.1	0.39	15.8	0.41	21.6	0.43
2010	672	28.7	0.47	9.2	0.40	14.6	0.42	19.8	0.43
2011	660	28.2	0.47	8.9	0.37	14.1	0.39	19.4	0.43
2012	663	28.1	0.47	8.9	0.37	14.2	0.40	19.6	0.43
2013	618	25.9	0.46	8.4	0.37	13.3	0.40	18.0	0.42
2014	633	26.3	0.47	8.5	0.38	13.3	0.41	18.0	0.43
2015	651	26.7	0.51	8.7	0.42	13.6	0.45	18.2	0.47
2016	536	21.8	0.42	7.0	0.34	11.0	0.36	15.0	0.39
2017	641	26.0	0.49	7.8	0.36	12.6	0.39	17.5	0.43
2018	418	16.8	0.37	5.4	0.29	8.5	0.31	11.5	0.34
2019	335	13.5	0.37	4.8	0.31	7.2	0.32	9.6	0.34
2020	378	15.2	0.56	5.0	0.44	7.7	0.47	10.2	0.49
1998-2020	12858	26.6	0.44	8.8	0.36	13.9	0.38	18.9	0.41

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	1	0.0	0.0	1	0.0	0.0			0.0
20-24	6	0.0	0.0	1	0.0	0.0	5	0.1	0.1
25-29	12	0.1	0.1	6	0.1	0.1	6	0.1	0.1
30-34	29	0.2	0.3	20	0.2	0.3	9	0.1	0.2
35-39	50	0.3	0.5	27	0.3	0.5	23	0.3	0.5
40-44	154	0.8	1.3	83	0.8	1.3	71	0.9	1.4
45-49	314	1.7	3.0	161	1.5	2.8	153	1.9	3.3
50-54	563	3.0	5.9	342	3.2	5.9	221	2.7	6.0
55-59	922	4.9	10.8	559	5.2	11.1	363	4.4	10.4
60-64	1388	7.3	18.1	891	8.3	19.4	497	6.1	16.4
65-69	2094	11.0	29.1	1366	12.6	32.0	728	8.9	25.3
70-74	2858	15.0	44.2	1807	16.7	48.7	1051	12.8	38.1
75-79	3275	17.2	61.4	2020	18.7	67.5	1255	15.3	53.4
80-84	3330	17.5	78.9	1862	17.2	84.7	1468	17.9	71.3
85+	4004	21.1	100.0	1653	15.3	100.0	2351	28.7	100.0
All ages	19000	100.0		10799	100.0		8201	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.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4								
5- 9								
10-14								
15-19	1		0.1	0.08			2.1	
20-24	1	5	0.0	0.03	0.3	0.12	1.4	11.6
25-29	6	6	0.3	0.13	0.3	0.10	6.5	6.1
30-34	20	9	0.9	0.20	0.4	0.10	14.0	5.0
35-39	27	23	1.2	0.17	1.0	0.16	10.1	5.6
40-44	83	71	3.3	0.25	2.9	0.23	13.7	8.3
45-49	161	153	6.0	0.24	5.9	0.26	11.4	9.2
50-54	342	221	13.4	0.27	8.8	0.23	12.9	8.4
55-59	559	363	26.3	0.31	16.7	0.29	12.6	9.5
60-64	891	497	50.4	0.35	26.2	0.33	13.9	10.0
65-69	1366	728	83.7	0.42	40.2	0.38	14.9	10.4
70-74	1807	1051	120.5	0.46	61.1	0.41	15.2	12.0
75-79	2020	1255	166.9	0.55	83.6	0.46	16.1	12.8
80-84	1862	1468	257.1	0.69	137.9	0.55	17.8	15.6
85+	1653	2351	354.0	0.89	225.5	0.74	18.2	19.6
All ages	10799	8201					15.6	13.3
Mortality								
Raw			33.2	0.48	24.4	0.45		
WS			14.1	0.43	7.9	0.37		
ES			22.3	0.45	12.4	0.39		
BRD-S			30.6	0.49	16.9	0.41		
PYLL-70								
per 100,000			108.0		74.0			
ES			91.8		61.3			
AYLL-70			9.0		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 ←%
C03–C06	Oral cavity	68	1.1	47	69.1	4	5.9	17	25.0
C09–C10	Oropharynx	54	0.9	31	57.4	4	7.4	19	35.2
C12–C13	Hypopharynx	33	0.5	13	39.4	3	9.1	17	51.5
C15	Oesophagus	117	1.9	18	15.4	19	16.2	80	68.4
C16	Stomach	324	5.2	93	28.7	73	22.5	158	48.8
C17	Small intestine	76	1.2	13	17.1	26	34.2	37	48.7
C18	Colon	534	8.5	101	18.9	253	47.4	180	33.7
C19–C20	Rectum	229	3.6	109	47.6	102	44.5	18	7.9
C22	Liver	187	3.0	10	5.3	40	21.4	137	73.3
C23–C24	Bile	60	1.0	5	8.3	9	15.0	46	76.7
C25	Pancreas	228	3.6	15	6.6	30	13.2	183	80.3
C30–C31	Sinuses	11	0.2	9	81.8			2	18.2
C32	Larynx	101	1.6	73	72.3	1	1.0	27	26.7
C33–C34	Lung	687	10.9	111	16.2	97	14.1	479	69.7
C38,C45	Mesothelioma	35	0.6	1	2.9	6	17.1	28	80.0
C43	Malign. melanoma	218	3.5	137	62.8	2	0.9	79	36.2
C44	Skin others	447	7.1	223	49.9	27	6.0	197	44.1
C46,C49	Soft tissue	31	0.5	10	32.3			21	67.7
C50	Breast	15	0.2	5	33.3			10	66.7
C60	Penis	19	0.3	8	42.1			11	57.9
C61	Prostate	1482	23.6	863	58.2	115	7.8	504	34.0
C62	Testis	35	0.6	30	85.7			5	14.3
C64	Kidney	258	4.1	123	47.7	54	20.9	81	31.4
C65	Renal pelvis	30	0.5	6	20.0			24	80.0
C66	Ureter	22	0.4	6	27.3	3	13.6	13	59.1
C67	Bladder	323	5.1	115	35.6	31	9.6	177	54.8
C69	Eye melanoma	10	0.2	9	90.0			1	10.0
C70–C72	CNS cancer	57	0.9	6	10.5	4	7.0	47	82.5
C73	Thyroid	30	0.5	17	56.7	2	6.7	11	36.7
C76–C79	CUP	72	1.1	13	18.1	11	15.3	48	66.7
C81	Hodgkin lymphoma	19	0.3	16	84.2			3	15.8
C82–C85	NHL	254	4.0	117	46.1	35	13.8	102	40.2
C90	Mult. myeloma	55	0.9	20	36.4	5	9.1	30	54.5
C91–C96	Leukaemia	88	1.4	21	23.9	7	8.0	60	68.2
Others, specified		75	1.2	37	49.3	6	8.0	32	42.7
All further malignancies		6284	100.0	2431	38.7	969	15.4	2884	45.9

Further malignancies with number of cases 1 to 9 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	24	0.5	15	62.5	1	4.2	8	33.3
C09–C10	Oropharynx	20	0.5	9	45.0	1	5.0	10	50.0
C15	Oesophagus	24	0.5	3	12.5	4	16.7	17	70.8
C16	Stomach	213	4.8	67	31.5	40	18.8	106	49.8
C17	Small intestine	39	0.9	4	10.3	19	48.7	16	41.0
C18	Colon	373	8.5	70	18.8	153	41.0	150	40.2
C19–C20	Rectum	139	3.2	71	51.1	50	36.0	18	12.9
C21	Anus/canal	15	0.3	10	66.7	4	26.7	1	6.7
C22	Liver	52	1.2	2	3.8	14	26.9	36	69.2
C23–C24	Bile	59	1.3	14	23.7	9	15.3	36	61.0
C25	Pancreas	193	4.4	12	6.2	25	13.0	156	80.8
C32	Larynx	15	0.3	9	60.0	2	13.3	4	26.7
C33–C34	Lung	318	7.2	52	16.4	28	8.8	238	74.8
C43	Malign. melanoma	112	2.5	71	63.4	6	5.4	35	31.3
C44	Skin others	172	3.9	98	57.0	9	5.2	65	37.8
C46,C49	Soft tissue	21	0.5	11	52.4	2	9.5	8	38.1
C48	Peritoneal	17	0.4	3	17.6	7	41.2	7	41.2
C50	Breast	1138	25.9	754	66.3	85	7.5	299	26.3
C51	Vulva	45	1.0	22	48.9	2	4.4	21	46.7
C52	Vagina	17	0.4	6	35.3	1	5.9	10	58.8
C53	Cervix uteri	153	3.5	116	75.8	7	4.6	30	19.6
C54	Corpus uteri	273	6.2	174	63.7	14	5.1	85	31.1
C55,C57	Fem. genitals un	25	0.6	19	76.0	2	8.0	4	16.0
C56	Ovary	269	6.1	92	34.2	54	20.1	123	45.7
C64	Kidney	91	2.1	48	52.7	13	14.3	30	33.0
C66	Ureter	14	0.3	3	21.4	1	7.1	10	71.4
C67	Bladder	110	2.5	44	40.0	3	2.7	63	57.3
C70–C72	CNS cancer	34	0.8	8	23.5	3	8.8	23	67.6
C73	Thyroid	53	1.2	33	62.3	3	5.7	17	32.1
C76–C79	CUP	45	1.0	14	31.1	10	22.2	21	46.7
C81	Hodgkin lymphoma	16	0.4	12	75.0	1	6.3	3	18.8
C82–C85	NHL	144	3.3	69	47.9	17	11.8	58	40.3
C90	Mult. myeloma	50	1.1	15	30.0	4	8.0	31	62.0
C91–C96	Leukaemia	57	1.3	11	19.3	7	12.3	39	68.4
Others, specified		59	1.3	15	25.4	3	5.1	41	69.5
All further malignancies		4399	100.0	1976	44.9	604	13.7	1819	41.4

Further malignancies with number of cases 1 to 11 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.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4								
5- 9								
10-14								
15-19	1		0.1	0.08			2.2	
20-24	1	5	0.0	0.03	0.3	0.12	1.5	12.2
25-29	6	6	0.3	0.14	0.3	0.11	7.1	6.6
30-34	20	7	0.9	0.20	0.3	0.09	14.5	4.4
35-39	25	19	1.1	0.17	0.8	0.14	10.0	5.1
40-44	78	62	3.1	0.25	2.6	0.23	14.0	8.2
45-49	149	135	5.5	0.24	5.2	0.25	11.5	9.4
50-54	307	197	12.0	0.27	7.8	0.23	13.1	8.8
55-59	496	314	23.4	0.30	14.4	0.29	12.9	9.8
60-64	761	412	43.0	0.35	21.7	0.33	14.2	10.1
65-69	1098	595	67.3	0.42	32.8	0.38	15.0	10.7
70-74	1408	800	93.9	0.48	46.5	0.40	15.5	11.8
75-79	1510	972	124.8	0.57	64.7	0.46	16.6	12.9
80-84	1318	1146	182.0	0.73	107.7	0.54	17.7	15.8
85+	1179	1848	252.5	0.93	177.3	0.73	18.1	19.6
All ages	8357	6518					15.6	13.3
Mortality								
Raw			25.7	0.48	19.4	0.44		
WS			11.2	0.42	6.4	0.36		
ES			17.5	0.44	10.0	0.38		
BRD-S			23.7	0.48	13.5	0.41		
PYLL-70								
per 100,000			95.7		63.9			
ES			81.5		53.0			
AYLL-70			9.3		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.	MI-index	Females Age-spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4								
5- 9								
10-14								
15-19	1		0.1	0.08			2.2	
20-24	1	5	0.0	0.03	0.3	0.13	1.5	12.5
25-29	6	6	0.3	0.15	0.3	0.11	7.1	6.8
30-34	20	7	0.9	0.21	0.3	0.09	14.6	4.5
35-39	25	18	1.1	0.18	0.8	0.14	10.1	4.9
40-44	77	60	3.1	0.26	2.5	0.23	13.8	8.0
45-49	144	133	5.4	0.25	5.1	0.26	11.3	9.4
50-54	292	190	11.5	0.27	7.6	0.24	12.6	8.6
55-59	455	287	21.4	0.30	13.2	0.29	12.0	9.1
60-64	697	369	39.4	0.35	19.4	0.32	13.2	9.2
65-69	944	508	57.8	0.41	28.0	0.36	13.2	9.4
70-74	1131	685	75.4	0.44	39.8	0.38	12.9	10.4
75-79	1199	834	99.1	0.51	55.5	0.42	13.8	11.5
80-84	974	962	134.5	0.60	90.4	0.49	14.0	13.9
85+	876	1554	187.6	0.74	149.1	0.64	14.7	17.3
All ages	6842	5618					13.3	11.9
Mortality								
Raw			21.0	0.43	16.7	0.41		
WS			9.5	0.39	5.6	0.34		
ES			14.6	0.41	8.8	0.36		
BRD-S			19.4	0.43	11.7	0.38		
PYLL-70								
per 100,000			89.5		59.9			
ES			76.3		49.8			
AYLL-70			9.6		10.7			

* See corresponding tables with multiple malignancies.

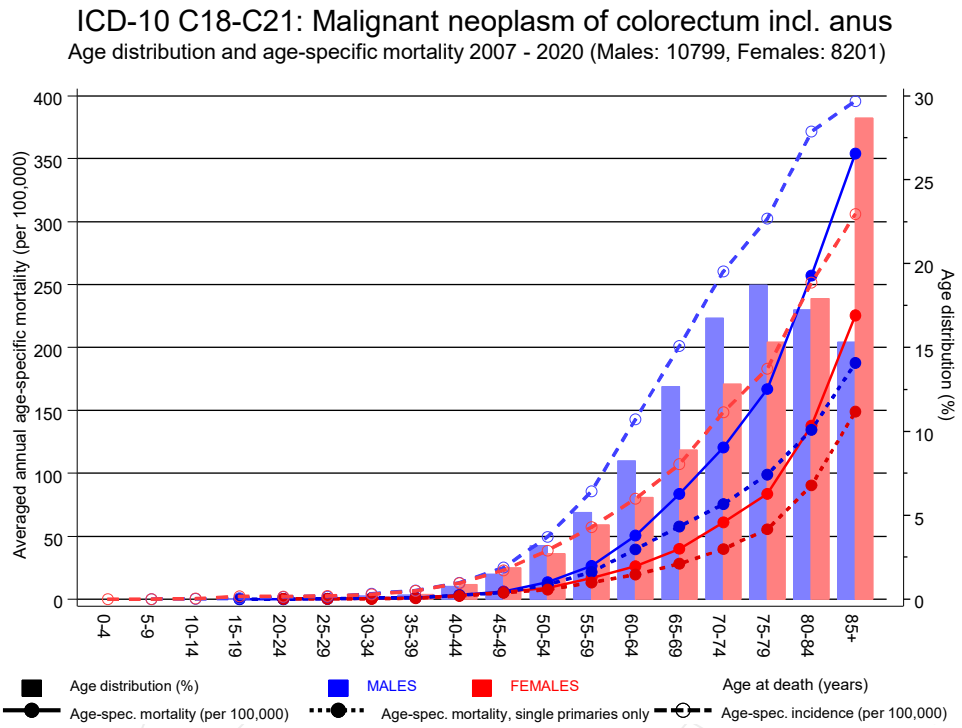


Figure 17. Distribution of age at death (bars; males: mean=70.0 yrs, median=70.9 yrs; females: mean=73.3 yrs, median=74.9 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

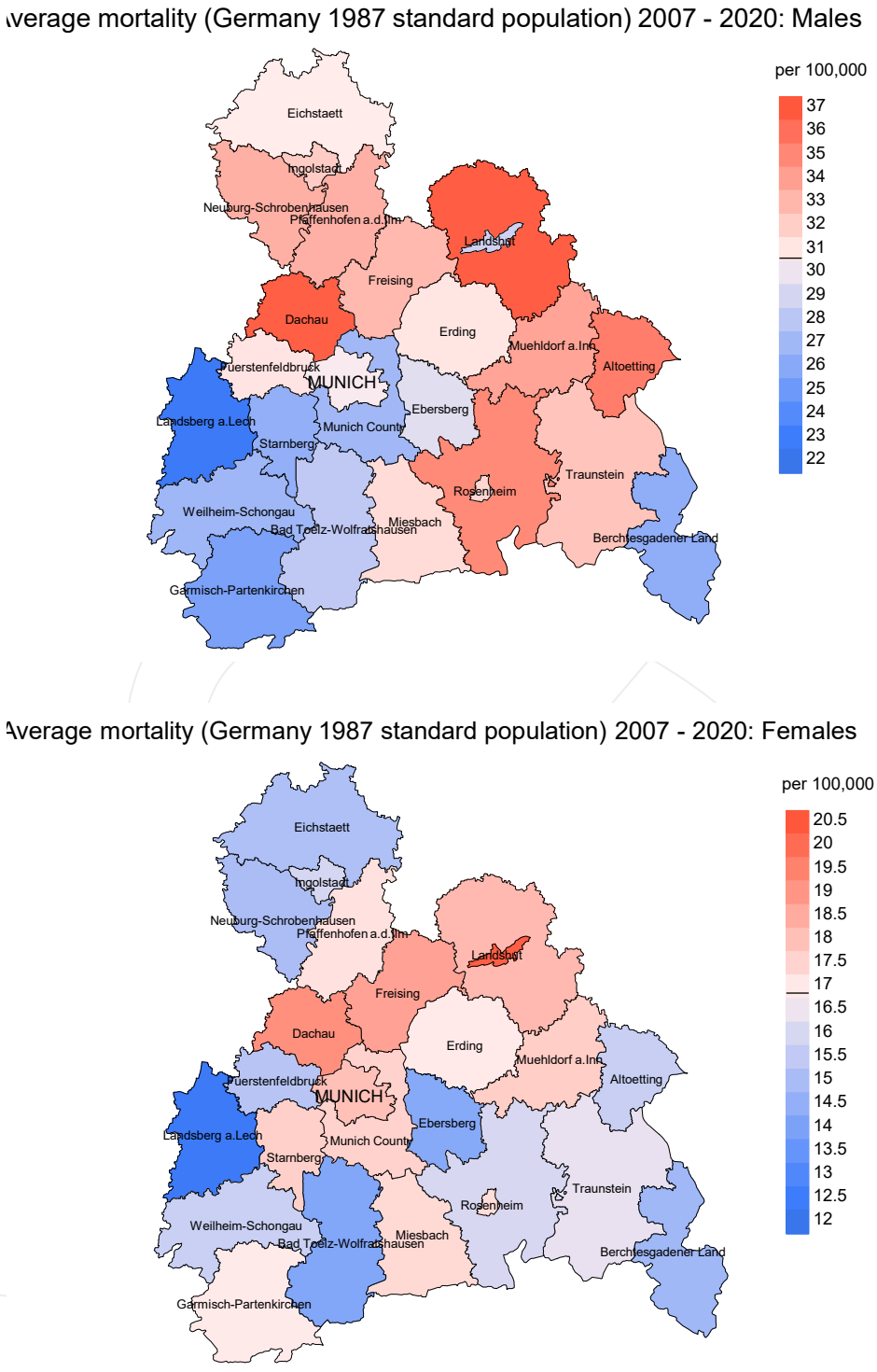
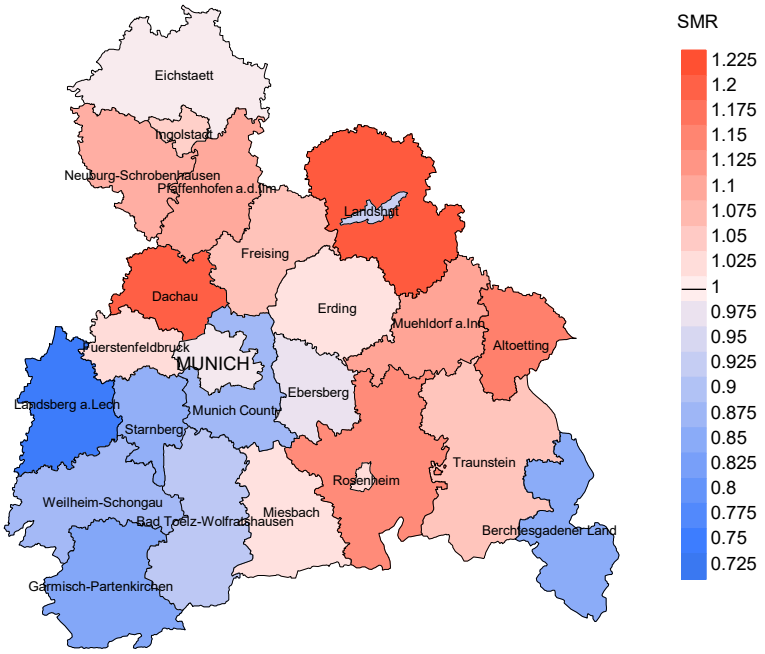


Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2020. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 30.6/100,000 WS N=10,799, females 16.9/100,000 WS N=8,201).

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 186 women died from colorectal cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 14.2/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 11.6 and 17.3/100,000.

Standardized mortality ratio (SMR) 2007 - 2020: Males



Standardized mortality ratio (SMR) 2007 - 2020: Females

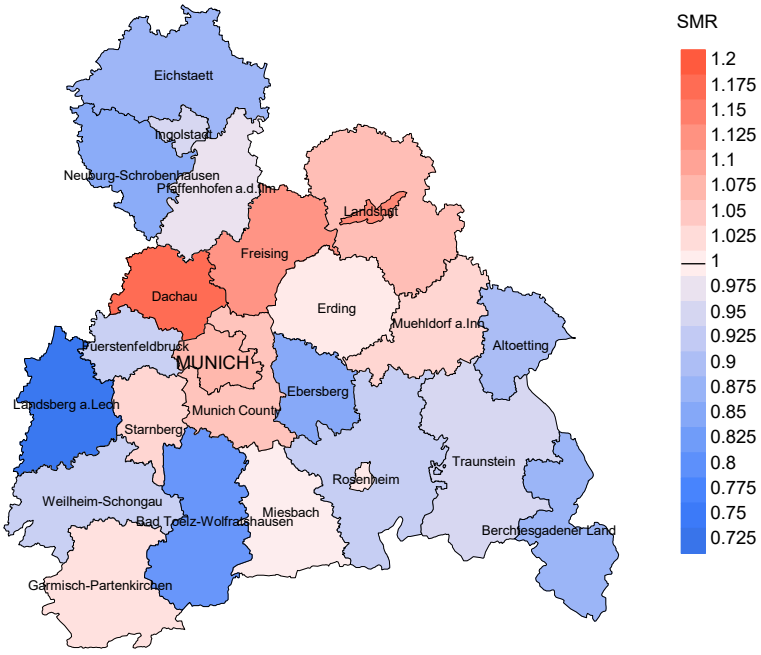


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=10,799, females N=8,201).

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 186 women died from colorectal cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.85. Though, the value of this parameter may vary with an underlying probability of 99% between 0.70 and 1.03, 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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