Munich Cancer Registry

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ICD-10 C18-C20: Colorectal cancer

Incidence and Mortality

Year of diagnosis	1998-2020
Patients	60,701
Diseases	62,495
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/bC1820E-ICD-10-C18-C20-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

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	1814	107	5.9	11.5	11.2	80.4	97.5
1999	1831	123	6.7	11.8	11.0	79.5	97.1
2000	1698	111	6.5	12.5	10.9	78.0	97.2
2001	1843	135	7.3	12.7	10.8	74.5	97.0
2002	3161	376	11.9	12.6	10.6	78.6	97.5 #
2003	3177	309	9.7	12.8	10.3	75.3	97.5
2004	3052	243	8.0	12.9	10.0	75.1	97.5
2005	2986	223	7.5	13.4	9.6	74.7	97.3
2006	3073	165	5.4	13.7	9.3	70.9	95.6
2007	3427	212	6.2	13.8	8.9	69.7	94.5 #
2008	3374	198	5.9	14.1	8.5	67.4	98.3
2009	3325	181	5.4	14.4	7.9	66.6	98.6
2010	3110	183	5.9	14.7	7.4	64.2	98.1
2011	3045	157	5.2	15.0	7.0	62.9	98.3
2012	3014	168	5.6	15.2	6.5	59.2	97.9
2013	3015	157	5.2	15.4	6.1	56.3	98.1
2014	2956	150	5.1	15.6	5.7	54.5	97.5
2015	2867	135	4.7	15.8	5.2	52.5	97.5
2016	2868	130	4.5	16.0	4.7	47.8	99.3
2017	2886	158	5.5	16.1	4.1	40.9	99.4
2018	2417	83	3.4	16.4	3.5	33.6	99.5
2019	2044	11	0.5	16.5	2.6	27.1	99.8
2020	1512			16.6	2.1	16.8	99.7 ##
1998-2020	62495	3715	5.9	16.6	11.2	62.0	97.8

62,495 cases diagnosed 1998-2020 are related to a total of 60,701 patients. Currently, in 16,171 (26.6 %) of these 60,701 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 12,705 / 2,688 / 778 (20.9 % / 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 2,417 cases has been diagnosed, of which 16.4 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 3.5 % 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	912	50.3	39	4.3	11.0	12.8	80.4	98.4
1999	936	51.1	45	4.8	10.9	12.5	80.0	97.3
2000	873	51.4	31	3.6	11.8	12.4	76.3	97.4
2001	959	52.0	47	4.9	12.0	12.2	74.7	97.0
2002	1675	53.0	167	10.0	12.0	12.0	79.2	98.0 #
2003	1694	53.3	121	7.1	12.4	11.6	76.2	98.5
2004	1632	53.5	92	5.6	12.7	11.2	77.1	97.7
2005	1584	53.0	95	6.0	13.3	10.9	74.7	97.6
2006	1677	54.6	58	3.5	13.9	10.5	71.2	95.7
2007	1894	55.3	90	4.8	14.2	10.0	70.4	94.5 #
2008	1871	55.5	80	4.3	14.6	9.6	67.9	98.4
2009	1871	56.3	81	4.3	15.0	9.0	67.4	98.7
2010	1753	56.4	76	4.3	15.3	8.4	64.3	98.0
2011	1672	54.9	57	3.4	15.6	7.9	62.6	98.3
2012	1663	55.2	68	4.1	15.9	7.5	60.1	98.2
2013	1724	57.2	62	3.6	16.2	6.9	56.5	97.8
2014	1676	56.7	69	4.1	16.5	6.4	54.7	98.0
2015	1636	57.1	59	3.6	16.6	5.9	52.6	97.6
2016	1650	57.5	49	3.0	16.8	5.4	48.1	99.3
2017	1616	56.0	76	4.7	17.0	4.5	41.0	99.4
2018	1336	55.3	36	2.7	17.3	3.9	35.4	99.5
2019	1170	57.2	4	0.3	17.4	2.9	27.6	99.9
2020	864	57.1			17.4	2.7	19.0	99.7 ##
1998-2020	34338	54.9	1502	4.4	17.4	12.8	62.1	98.0

34,338 cases diagnosed 1998-2020 are related to a total of 33,183 patients. Currently, in 9,552 (28.8 %) of these 33,183 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 7,416 / 1,622 / 514 (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 1,336 cases has been diagnosed, of which 17.3 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 3.9 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 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	902	49.7	68	7.5	12.0	9.3	80.4	96.6	
1999	895	48.9	78	8.7	12.7	9.2	78.9	96.9	
2000	825	48.6	80	9.7	13.3	9.1	79.9	97.1	
2001	884	48.0	88	10.0	13.5	9.0	74.3	96.9	
2002	1486	47.0	209	14.1	13.1	8.9	77.9	97.0	#
2003	1483	46.7	188	12.7	13.2	8.6	74.2	96.3	
2004	1420	46.5	151	10.6	13.1	8.3	72.8	97.3	
2005	1402	47.0	128	9.1	13.4	8.1	74.6	96.9	
2006	1396	45.4	107	7.7	13.4	7.7	70.6	95.4	
2007	1533	44.7	122	8.0	13.5	7.4	68.9	94.6	#
2008	1503	44.5	118	7.9	13.6	7.0	66.8	98.1	
2009	1454	43.7	100	6.9	13.8	6.5	65.6	98.3	
2010	1357	43.6	107	7.9	13.9	6.1	64.1	98.2	
2011	1373	45.1	100	7.3	14.2	5.7	63.3	98.4	
2012	1351	44.8	100	7.4	14.3	5.2	58.1	97.6	
2013	1291	42.8	95	7.4	14.5	4.9	56.0	98.5	
2014	1280	43.3	81	6.3	14.7	4.8	54.3	96.9	
2015	1231	42.9	76	6.2	14.9	4.4	52.3	97.5	
2016	1218	42.5	81	6.7	15.0	3.9	47.3	99.3	
2017	1270	44.0	82	6.5	15.1	3.6	40.9	99.4	
2018	1081	44.7	47	4.3	15.4	3.0	31.4	99.6	
2019	874	42.8	7	0.8	15.4	2.3	26.3	99.5	
2020	648	42.9			15.5	1.3	13.9	99.8	##
1998-2020	28157	45.1	2213	7.9	15.5	9.3	61.9	97.6	

28,157 cases diagnosed 1998-2020 are related to a total of 27,518 patients. Currently, in 6,619 (24.1 %) of these 27,518 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 5,289 / 1,066 / 264 (19.2 % / 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 1,081 cases has been diagnosed, of which 15.4 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 3.0 % 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 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	912	902	82.3	76.7	49.4	32.6	74.3	49.3	97.0	64.6
1999	936	895	83.6	75.4	49.6	31.9	75.0	48.2	98.2	63.1
2000	873	825	76.7	68.7	44.8	27.9	67.9	42.7	87.9	56.3
2001	959	884	82.7	72.7	48.4	30.8	72.6	46.4	92.9	60.7
2002	1675	1486	89.9	75.9	50.2	30.8	75.7	46.7	98.9	61.0
2003	1694	1483	90.4	75.3	49.7	30.7	74.8	46.4	97.3	60.2
2004	1632	1420	86.7	71.8	46.2	29.7	69.9	44.4	91.5	57.3
2005	1584	1402	83.6	70.5	44.4	27.5	66.6	41.7	86.4	55.0
2006	1677	1396	87.6	69.5	45.9	28.3	68.8	42.2	89.0	55.1
2007	1894	1533	85.5	66.4	44.5	26.6	66.3	39.8	86.2	51.8
2008	1871	1503	84.1	64.8	42.2	25.4	63.7	38.3	83.0	49.8
2009	1871	1454	83.8	62.5	41.5	24.2	62.1	36.5	81.3	48.0
2010	1753	1357	77.8	58.0	38.2	21.8	57.3	33.1	74.6	43.8
2011	1672	1373	74.7	58.7	36.0	23.0	54.0	34.3	70.3	44.1
2012	1663	1351	73.3	57.2	35.2	22.8	52.8	33.6	68.1	43.5
2013	1724	1291	74.9	54.1	35.3	21.7	52.8	31.9	68.8	41.0
2014	1676	1280	71.9	53.2	33.9	21.0	50.7	31.1	65.5	39.7
2015	1636	1231	68.8	50.6	32.2	19.6	48.1	29.1	62.3	37.4
2016	1650	1218	68.6	49.6	32.8	19.3	48.2	28.6	62.2	36.8
2017	1616	1270	67.0	51.5	30.8	20.6	46.0	30.2	59.6	38.6
2018	1336	1081	54.9	43.5	25.2	17.6	37.5	25.7	48.3	32.6
2019	1170	874	48.1	35.2	23.1	14.5	33.7	21.0	42.5	26.6
2020	864	648	35.5	26.1	17.1	10.6	24.9	15.4	31.5	19.8
1998–2020	34338	28157	73.8	58.3	37.0	23.2	55.1	34.6	71.0	44.7

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	1814	70.0	12.4	13.2	102	54.0	61.0	71.1	78.8	86.1
1999	1831	70.3	12.5	20.2	102	54.2	61.6	71.1	79.3	86.3
2000	1698	70.6	12.1	24.7	103	55.1	61.7	71.5	79.3	86.8
2001	1843	70.1	12.4	26.6	103	54.5	61.7	70.5	79.5	86.6
2002	3161	70.9	12.1	17.7	104	55.3	62.6	71.8	80.0	86.7
2003	3177	71.0	11.8	8.4	101	56.1	63.1	71.5	79.9	86.0
2004	3052	70.7	12.2	13.8	101	55.3	63.0	71.2	79.9	85.5
2005	2986	71.4	12.2	15.1	99.9	55.6	63.8	71.8	80.4	86.1
2006	3073	70.6	12.1	17.9	102	54.8	63.3	71.0	79.7	85.3
2007	3427	70.7	12.5	13.4	103	54.2	63.8	71.3	80.2	85.7
2008	3374	71.4	12.3	18.9	105	55.3	64.1	72.0	80.4	86.5
2009	3325	71.2	12.3	12.4	102	54.8	64.1	72.1	80.2	86.0
2010	3110	71.5	12.5	14.9	101	54.4	63.8	72.6	80.9	86.2
2011	3045	71.3	12.8	15.5	101	53.4	63.5	72.4	80.9	86.9
2012	3014	71.1	13.0	9.7	101	54.3	63.4	72.7	80.3	86.4
2013	3015	70.9	13.1	15.7	105	53.1	63.2	72.8	80.1	86.2
2014	2956	71.2	13.1	15.8	103	53.2	63.2	73.2	80.3	86.8
2015	2867	71.3	13.1	11.4	105	53.1	63.6	73.4	80.3	86.6
2016	2868	70.9	13.3	9.4	100	52.9	62.8	73.2	80.3	86.2
2017	2886	71.2	12.9	9.4	99.0	54.4	62.9	73.3	80.3	85.9
2018	2417	70.9	12.8	14.3	105	54.0	62.4	72.8	80.5	85.7
2019	2044	69.9	13.5	17.7	100	51.8	61.2	72.0	80.0	85.2
2020	1512	70.0	13.0	17.6	100	52.6	61.8	71.8	79.8	84.5
1998–2020	62495	70.9	12.6	8.4	105	54.2	63.0	72.1	80.2	86.2

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	912	67.9	11.7	31.4	98.1	53.7	59.4	68.3	76.0	83.9
1999	936	68.2	11.6	20.2	95.5	54.2	60.2	69.0	76.6	83.3
2000	873	68.2	11.0	34.4	95.9	54.1	60.3	68.0	76.5	83.0
2001	959	68.4	11.3	31.3	102	54.4	61.2	68.1	76.0	83.6
2002	1675	69.1	11.0	20.9	98.5	55.4	61.8	69.4	76.6	82.5
2003	1694	69.2	11.0	8.4	99.4	55.5	62.6	69.5	76.6	82.7
2004	1632	69.4	11.0	27.8	101	55.8	62.5	69.3	77.1	83.4
2005	1584	69.3	11.3	19.0	99.6	54.6	62.9	69.5	77.1	83.5
2006	1677	69.1	11.1	17.9	102	54.6	62.6	69.3	77.2	82.8
2007	1894	69.1	11.7	15.8	99.4	54.3	62.9	69.6	77.5	82.9
2008	1871	69.8	11.3	19.3	105	55.0	63.4	70.4	77.9	83.4
2009	1871	69.6	11.4	12.4	99.0	54.4	63.1	70.9	77.8	83.0
2010	1753	69.9	11.7	21.1	98.9	54.1	62.5	70.8	78.2	84.1
2011	1672	70.0	11.7	15.5	97.3	53.7	63.3	71.3	78.3	84.2
2012	1663	70.2	11.5	9.7	101	55.1	62.9	71.5	78.2	84.0
2013	1724	70.2	12.0	19.4	99.6	54.1	63.0	72.0	78.3	84.3
2014	1676	70.5	12.3	20.3	102	53.6	62.8	72.5	79.1	85.2
2015	1636	70.3	12.2	18.3	105	53.5	62.8	72.4	79.0	84.9
2016	1650	69.8	12.8	9.4	100	52.6	62.0	72.1	79.1	84.2
2017	1616	70.8	11.9	12.9	96.3	55.1	63.0	72.5	79.5	84.1
2018	1336	70.4	12.2	14.3	97.1	54.6	62.3	72.1	79.7	84.5
2019	1170	69.2	13.0	17.9	98.2	52.3	60.7	71.0	78.8	84.1
2020	864	69.2	12.3	18.5	100	52.8	61.3	70.5	78.7	83.3
1998–2020	34338	69.6	11.7	8.4	105	54.2	62.3	70.6	78.0	83.8

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	902	72.2	12.7	13.2	102	54.7	63.3	74.2	81.6	87.4
1999	895	72.5	13.0	26.9	102	54.3	63.5	74.7	81.9	88.0
2000	825	73.1	12.7	24.7	103	56.3	63.6	75.2	81.9	88.5
2001	884	72.0	13.3	26.6	103	54.8	62.4	74.7	81.2	88.5
2002	1486	73.1	13.0	17.7	104	55.3	63.7	75.2	82.2	88.9
2003	1483	73.0	12.4	23.5	101	56.4	64.1	74.5	82.5	88.5
2004	1420	72.2	13.4	13.8	100	54.7	64.0	74.0	82.7	87.8
2005	1402	73.7	12.8	15.1	99.9	57.0	65.5	75.5	83.3	89.5
2006	1396	72.4	13.0	21.2	98.7	54.8	64.4	74.3	82.4	86.8
2007	1533	72.8	13.1	13.4	103	54.1	65.2	74.4	82.8	87.5
2008	1503	73.4	13.2	18.9	102	55.6	65.1	74.4	83.6	88.6
2009	1454	73.3	13.1	15.9	102	55.7	65.5	75.0	83.3	88.5
2010	1357	73.6	13.3	14.9	101	55.3	66.4	75.6	83.4	88.7
2011	1373	72.9	13.9	16.5	101	53.3	63.7	74.5	84.0	88.8
2012	1351	72.3	14.4	13.7	100	53.4	64.0	74.8	83.2	88.8
2013	1291	71.9	14.4	15.7	105	51.0	63.7	74.1	82.7	88.5
2014	1280	72.2	14.1	15.8	103	51.7	64.2	74.4	82.6	88.7
2015	1231	72.6	14.0	11.4	101	52.7	65.6	74.9	82.4	89.1
2016	1218	72.5	13.7	13.8	100	53.1	63.9	75.2	82.0	88.5
2017	1270	71.8	14.0	9.4	99.0	53.1	62.8	74.4	81.7	87.6
2018	1081	71.6	13.4	19.3	105	53.2	62.5	73.7	81.4	86.8
2019	874	70.9	14.2	17.7	100	50.6	62.1	73.5	81.1	86.7
2020	648	71.2	13.9	17.6	99.3	52.5	62.5	74.0	81.3	86.2
1998–2020	28157	72.6	13.4	9.4	105	54.1	64.1	74.6	82.6	88.2

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	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	0.3
20-24	77	0.2	0.3	38	0.2	0.2	39	0.2	0.5
25-29	105	0.3	0.6	48	0.2	0.5	57	0.3	0.8
30-34	180	0.5	1.1	98	0.4	0.9	82	0.5	1.3
35-39	295	0.7	1.8	159	0.7	1.6	136	0.8	2.0
40-44	588	1.5	3.3	314	1.4	3.0	274	1.6	3.6
45-49	1191	3.0	6.3	641	2.9	5.9	550	3.1	6.8
50-54	2108	5.3	11.6	1238	5.5	11.4	870	5.0	11.7
55-59	2926	7.3	18.9	1783	8.0	19.4	1143	6.5	18.3
60-64	3933	9.9	28.8	2522	11.3	30.6	1411	8.1	26.4
65-69	5163	13.0	41.7	3305	14.8	45.4	1858	10.6	37.0
70-74	6439	16.2	57.9	3937	17.6	63.0	2502	14.3	51.3
75-79	6399	16.1	73.9	3689	16.5	79.4	2710	15.5	66.9
80-84	5387	13.5	87.4	2754	12.3	91.7	2633	15.1	81.9
85+	5008	12.6	100.0	1853	8.3	100.0	3155	18.1	100.0
All ages	39860	100.0		22396	100.0		17464	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=805 %	Females DCO rate n=1113 %	Males Prop.all cancers n=153686 %	Females Prop.all cancers n=155051 %
0- 4								
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	39	1.9	2.1	2.6		6.0	7.5
25-29	45	57	2.0	2.5			4.7	4.8
30-34	97	81	4.2	3.6		1.2	7.5	3.8
35-39	155	134	6.7	5.9	1.9	2.2	8.5	3.8
40-44	310	273	12.4	11.3		0.4	11.1	4.4
45-49	630	543	23.5	20.9	0.6	0.2	12.5	5.8
50-54	1208	863	47.4	34.4	1.1	1.2	14.3	6.9
55-59	1758	1127	82.8	51.7	1.4	0.6	13.8	8.5
60-64	2473	1389	139.9	73.2	1.4	1.3	14.1	8.9
65-69	3213	1827	196.8	100.8	1.6	1.5	13.2	9.6
70-74	3833	2452	255.7	142.6	2.6	2.2	14.0	12.3
75-79	3598	2651	297.3	176.6	3.0	4.0	15.0	13.6
80-84	2661	2596	367.5	243.9	6.1	7.1	17.3	16.8
85+	1818	3107	389.3	298.0	16.7	22.6	17.3	19.0
All ages	21854	17183			3.7	6.5	14.2	11.1
Incidence								
Raw			67.1	51.2				
WS			32.3	20.2				
ES			48.0	29.9				
BRD-S			61.8	38.4				

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).

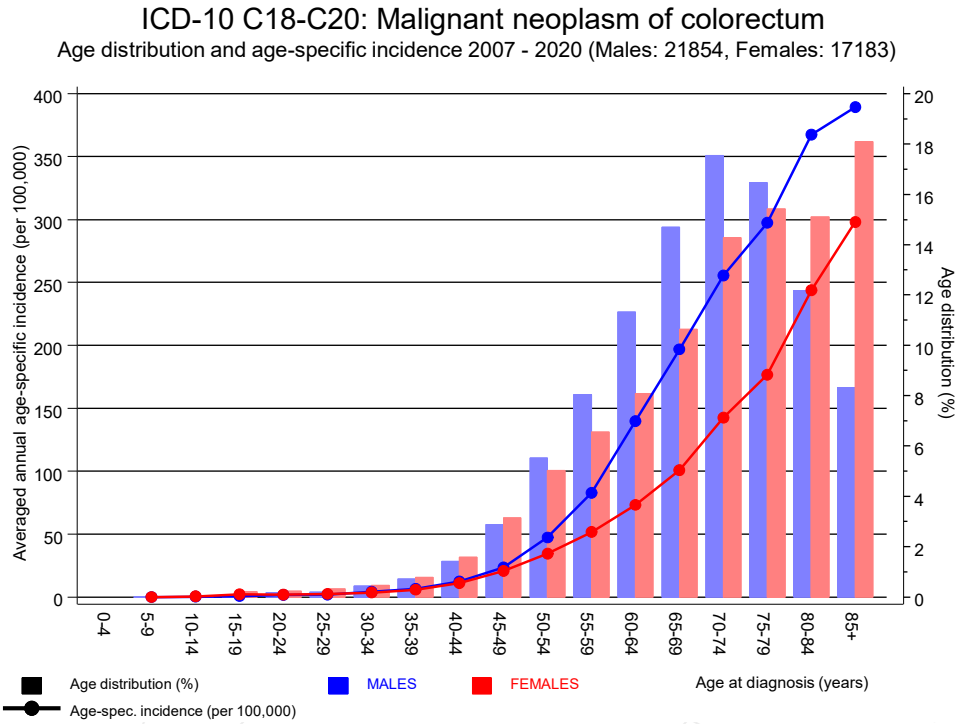


Figure 6. Age distribution (males: mean=69.9 yrs, median=71.3 yrs; females: mean=72.4 yrs, median=74.5 yrs) and age-specific incidence.

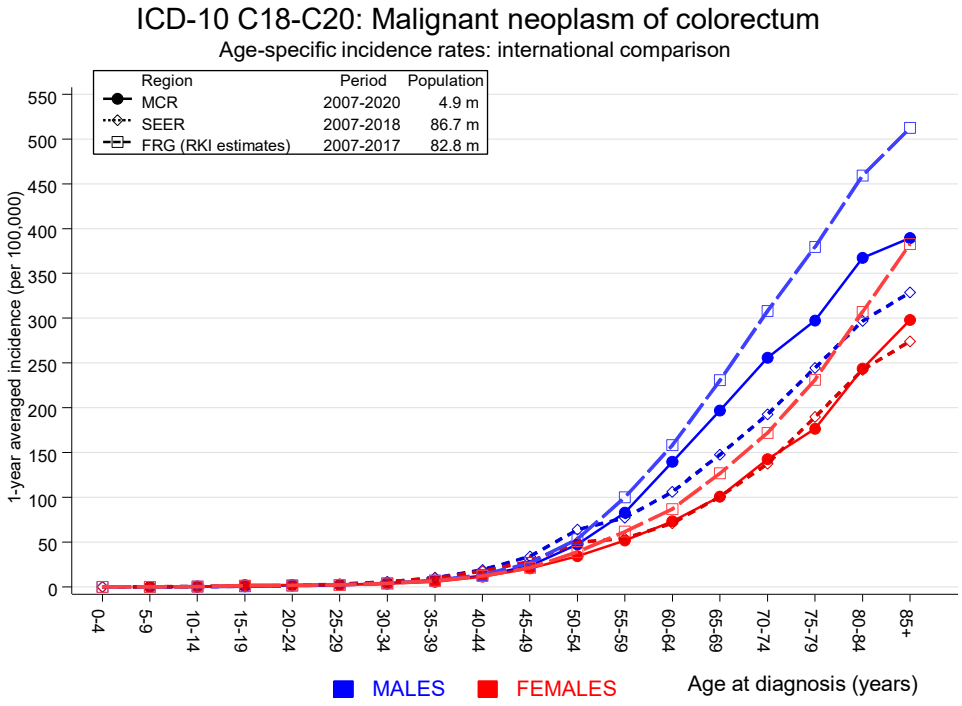


Figure 6a. Age-specific incidence in MCR registry areas compared to Germany (FRG, RKI estimates) and SEER (Surveillance, Epidemiology, and End Results, USA).

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	24	15.9	1.5	1.0	2.3		0.7	8.3
C07–C08	Salivary gland	7	5.5	1.3	0.5	2.6		0.1	
C09–C10	Oropharynx	30	19.1	1.6	1.1	2.2	#	0.9	6.7
C12–C13	Hypopharynx	21	10.4	2.0	1.3	3.1	#	0.9	4.8
C15	Oesophagus	122	40.5	3.0	2.5	3.6	#	6.8	8.2
C16	Stomach	248	91.1	2.7	2.4	3.1	#	13.2	7.7
C17	Small intestine	117	12.8	9.1	7.6	11.0	#	8.7	0.9
C18	Colon	829	221.8	3.7	3.5	4.0	#	50.9	0.7
C19–C20	Rectum	316	114.0	2.8	2.5	3.1	#	16.9	1.3
C21	Anus/canal	15	5.0	3.0	1.7	5.0	#	0.8	
C22	Liver	170	62.3	2.7	2.3	3.2	#	9.0	16.5
C23–C24	Bile	59	23.8	2.5	1.9	3.2	#	3.0	13.6
C25	Pancreas	192	87.4	2.2	1.9	2.5	#	8.8	22.9
C32	Larynx	36	20.3	1.8	1.2	2.5	#	1.3	8.3
C33–C34	Lung	542	253.7	2.1	2.0	2.3	#	24.2	14.2
C38,C45	Mesothelioma	21	15.5	1.4	0.8	2.1		0.5	4.8
C43	Malign. melanoma	180	95.7	1.9	1.6	2.2	#	7.1	2.2
C46,C49	Soft tissue	26	12.7	2.0	1.3	3.0	#	1.1	
C50	Breast	14	6.0	2.3	1.3	3.9	#	0.7	7.1
C60	Penis	12	5.6	2.1	1.1	3.7	#	0.5	8.3
C61	Prostate	1066	622.8	1.7	1.6	1.8	#	37.2	5.9
C62	Testis	9	4.0	2.2	1.0	4.2	#	0.4	11.1
C64	Kidney	205	73.2	2.8	2.4	3.2	#	11.1	7.8
C65	Renal pelvis	27	10.1	2.7	1.8	3.9	#	1.4	
C66	Ureter	21	6.0	3.5	2.2	5.3	#	1.3	
C67	Bladder	225	110.3	2.0	1.8	2.3	#	9.6	7.1
C68	Urethra	5	2.1	2.4	0.8	5.6		0.2	
C70–C72	CNS cancer	47	26.6	1.8	1.3	2.4	#	1.7	21.3
C73	Thyroid	21	12.2	1.7	1.1	2.6	#	0.7	9.5
C76–C79	CUP	61	38.0	1.6	1.2	2.1	#	1.9	1.6
C81	Hodgkin lymphoma	5	4.6	1.1	0.4	2.5		0.0	
C82–C85	NHL	190	94.7	2.0	1.7	2.3	#	8.0	3.7
C90	Mult. myeloma	49	29.6	1.7	1.2	2.2	#	1.6	20.4
C91–C96	Leukaemia	71	34.9	2.0	1.6	2.6	#	3.0	21.1
Others, specified		28	28.0	1.0	0.7	1.4		−0.0	14.3
Not observed		0	0.7	0.0	0.0	4.9		−0.1	
All further malignancies		5011	2216.9	2.3	2.2	2.3	#	234.3	7.1

Patients	31874
Median age at next malignancy (years)	74.4
Person-years	119239
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	8	6.8	1.2	0.5	2.3		0.1	
C09–C10	Oropharynx	10	4.2	2.4	1.1	4.4	#	0.6	
C15	Oesophagus	22	7.8	2.8	1.8	4.2	#	1.5	9.1
C16	Stomach	113	49.4	2.3	1.9	2.8	#	6.6	15.0
C17	Small intestine	68	6.2	11.0	8.5	13.9	#	6.4	2.9
C18	Colon	485	137.7	3.5	3.2	3.8	#	36.1	0.8
C19–C20	Rectum	150	53.0	2.8	2.4	3.3	#	10.1	1.3
C21	Anus/canal	17	6.6	2.6	1.5	4.1	#	1.1	
C22	Liver	45	16.4	2.7	2.0	3.7	#	3.0	37.8
C23–C24	Bile	35	20.2	1.7	1.2	2.4	#	1.5	11.4
C25	Pancreas	145	64.6	2.2	1.9	2.6	#	8.3	26.2
C26	GI cancer	4	2.9	1.4	0.4	3.5		0.1	50.0
C32	Larynx	5	2.0	2.5	0.8	5.8		0.3	
C33–C34	Lung	249	88.2	2.8	2.5	3.2	#	16.7	11.6
C43	Malign. melanoma	102	44.1	2.3	1.9	2.8	#	6.0	2.0
C46,C49	Soft tissue	16	7.2	2.2	1.3	3.6	#	0.9	
C48	Peritoneal	17	4.6	3.7	2.1	5.9	#	1.3	23.5
C50	Breast	704	348.9	2.0	1.9	2.2	#	36.9	5.3
C51	Vulva	31	14.5	2.1	1.4	3.0	#	1.7	3.2
C52	Vagina	7	2.6	2.7	1.1	5.6	#	0.5	14.3
C53	Cervix uteri	30	13.9	2.2	1.5	3.1	#	1.7	16.7
C54	Corpus uteri	150	64.9	2.3	2.0	2.7	#	8.8	2.7
C55,C57	Fem. genitals un	5	3.7	1.3	0.4	3.1		0.1	20.0
C56	Ovary	141	48.9	2.9	2.4	3.4	#	9.6	24.8
C64	Kidney	102	29.8	3.4	2.8	4.1	#	7.5	11.8
C65	Renal pelvis	13	4.2	3.1	1.7	5.3	#	0.9	
C66	Ureter	6	2.2	2.7	1.0	5.9		0.4	16.7
C67	Bladder	58	28.7	2.0	1.5	2.6	#	3.0	20.7
C70–C72	CNS cancer	21	15.7	1.3	0.8	2.0		0.6	42.9
C73	Thyroid	26	15.5	1.7	1.1	2.5	#	1.1	7.7
C74–C80	Cancer others	4	5.9	0.7	0.2	1.7		−0.2	50.0
C76–C79	CUP	19	26.6	0.7	0.4	1.1		−0.8	
C81	Hodgkin lymphoma	5	2.1	2.4	0.8	5.7		0.3	
C82–C85	NHL	96	51.2	1.9	1.5	2.3	#	4.6	11.5
C90	Mult. myeloma	28	16.2	1.7	1.1	2.5	#	1.2	25.0
C91–C96	Leukaemia	45	19.7	2.3	1.7	3.1	#	2.6	46.7
	Others, specified	25	13.7	1.8	1.2	2.7	#	1.2	8.0
	Not observed	0	1.1	0.0	0.0	3.3		−0.1	
	All further malignancies	3007	1252.3	2.4	2.3	2.5	#	182.3	9.5

Patients	25674
Median age at next malignancy (years)	76.2
Person-years	96242
Mean observation time (years)	3.7
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”.

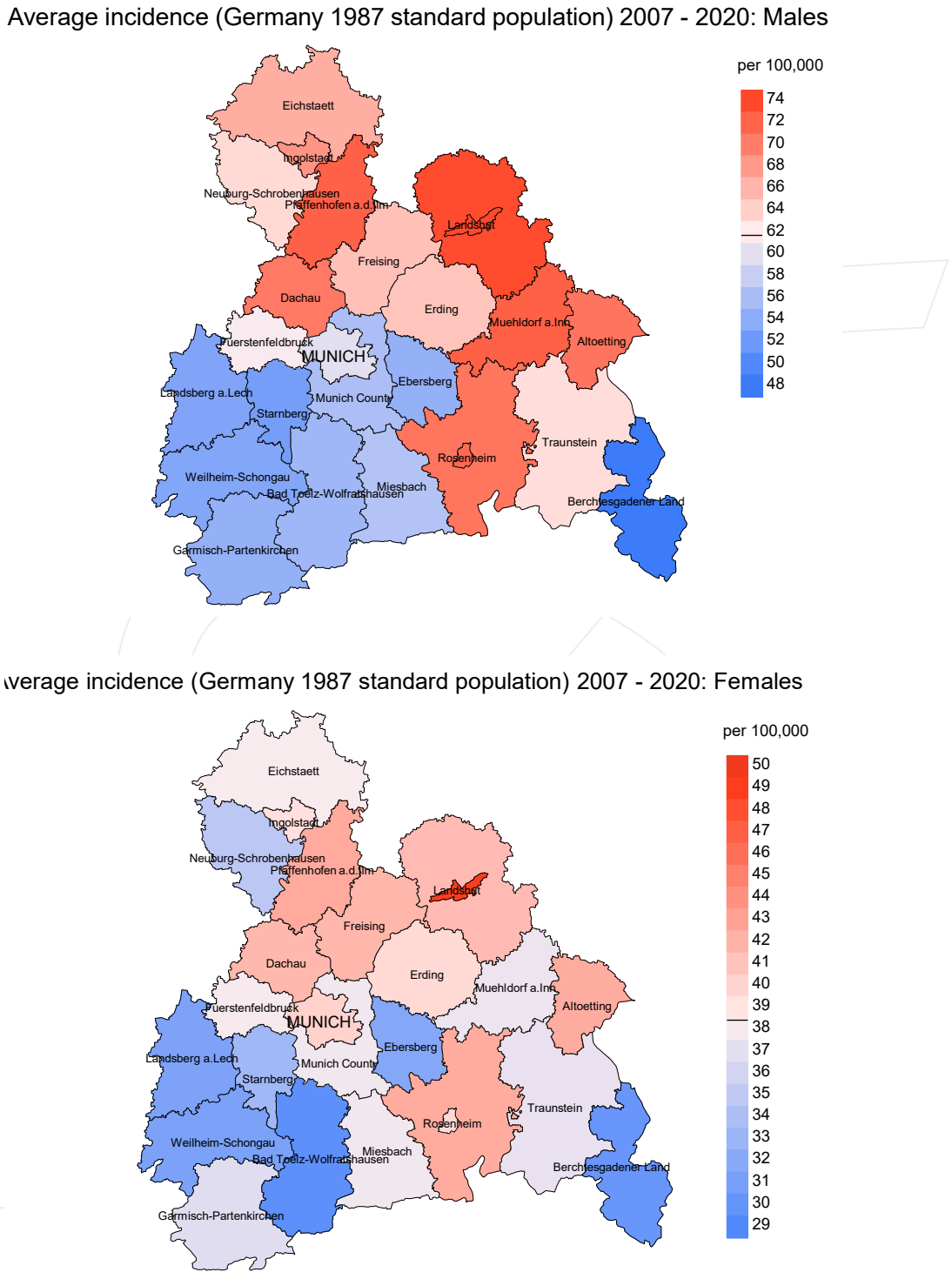


Figure 8a. Map of cancer incidence (german standard population, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 61.8/100,000 WS N=21,854, females 38.4/100,000 WS N=17,183).

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 378 women were identified with newly diagnosed colorectal cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 31.8/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 27.6 and 36.3/100,000.

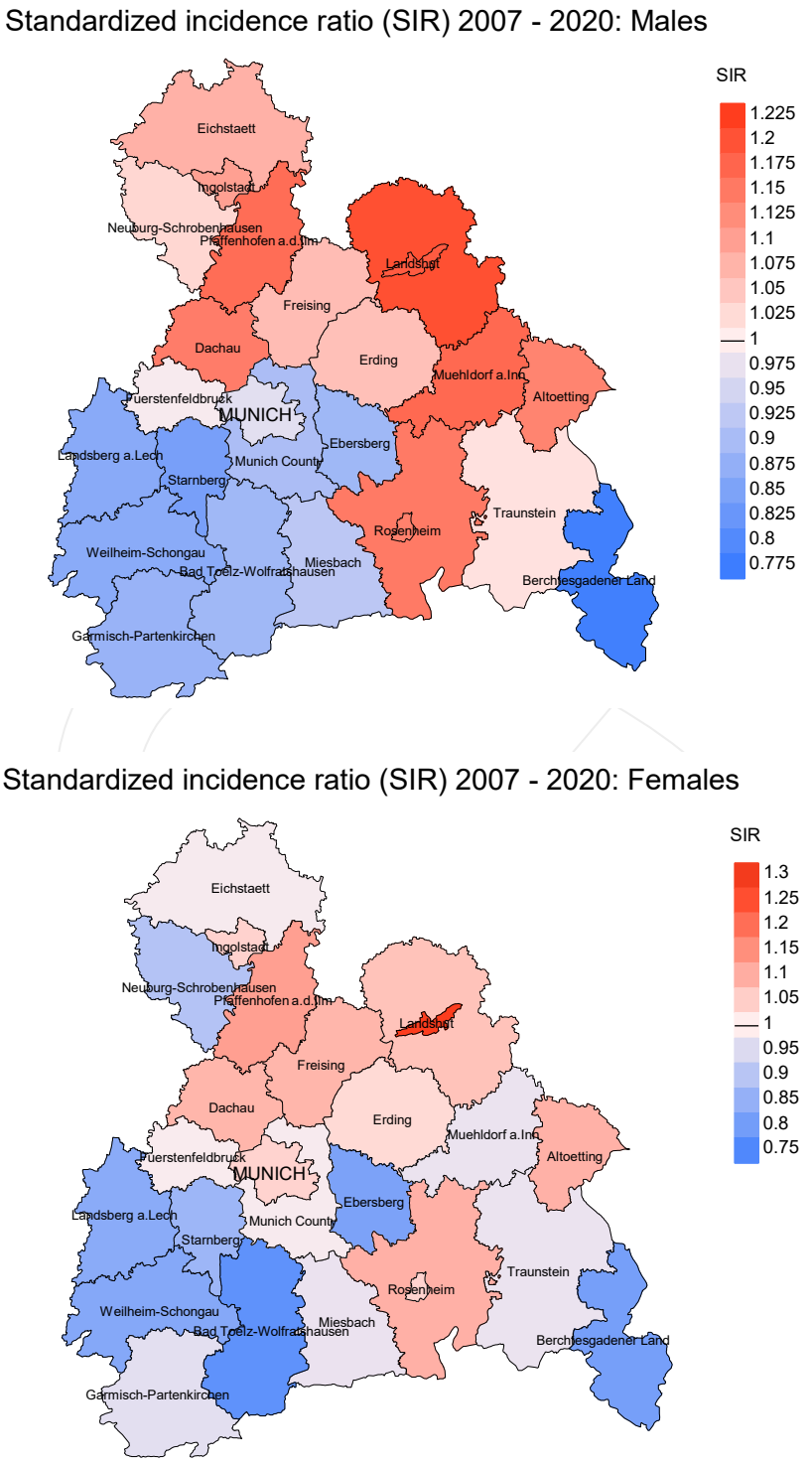


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=21,854, females N=17,183).

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 378 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 0.81. Though, the value of this parameter may vary with an underlying probability of 99% between 0.71 and 0.93.

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	1814	97.5	5.9	1458	80.4	92.7
1999	1831	97.1	6.7	1455	79.5	93.5
2000	1698	97.2	6.5	1325	78.0	95.4
2001	1843	97.0	7.3	1373	74.5	95.0
2002	3161	97.5	11.9	2483	78.6	96.1
2003	3177	97.5	9.7	2392	75.3	96.0
2004	3052	97.5	8.0	2293	75.1	95.7
2005	2986	97.3	7.5	2230	74.7	96.7
2006	3073	95.6	5.4	2179	70.9	96.6
2007	3427	94.5	6.2	2390	69.7	95.9
2008	3374	98.3	5.9	2275	67.4	94.9
2009	3325	98.6	5.4	2215	66.6	95.5
2010	3110	98.1	5.9	1998	64.2	94.0
2011	3045	98.3	5.2	1915	62.9	94.1
2012	3014	97.9	5.6	1784	59.2	93.5
2013	3015	98.1	5.2	1697	56.3	92.2
2014	2956	97.5	5.1	1611	54.5	91.6
2015	2867	97.5	4.7	1505	52.5	89.6
2016	2868	99.3	4.5	1370	47.8	88.5
2017	2886	99.4	5.5	1181	40.9	82.7
2018	2417	99.5	3.4	812	33.6	70.6
2019	2044	99.8	0.5	553	27.1	79.9
2020	1512	99.7		254	16.8	90.9
1998-2020	62495	97.8	5.9	38748	62.0	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	1814	1039	90.3	303	16.7
1999	1831	1058	91.1	316	17.3
2000	1698	1035	93.7	294	17.3
2001	1843	1100	95.4	298	16.2
2002	3161	1576	98.0	689	21.8
2003	3177	1688	97.8	594	18.7
2004	3052	1696	98.3	552	18.1
2005	2986	1798	96.5	540	18.1
2006	3073	1871	97.4	507	16.5
2007	3427	1986	97.5	573	16.7
2008	3374	2073	98.6	604	17.9
2009	3325	2116	98.6	537	16.2
2010	3110	2174	98.5	522	16.8
2011	3045	2190	98.2	512	16.8
2012	3014	2197	98.3	519	17.2
2013	3015	2182	97.8	465	15.4
2014	2956	2173	97.9	515	17.4
2015	2867	2313	97.8	470	16.4
2016	2868	2231	98.6	477	16.6
2017	2886	2369	97.8	461	16.0
2018	2417	1982	67.5	285	11.8
2019	2044	1758	45.8	214	10.5
2020	1512	2058	89.5	152	10.1
1998–2020	62495	42663	93.5	10399	16.6

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	1039	71.8	28.2	86.9
1999	1058	73.3	26.7	86.5
2000	1035	73.6	26.4	86.0
2001	1100	69.0	31.0	84.7
2002	1576	75.3	24.7	87.2
2003	1688	73.8	26.2	86.7
2004	1696	76.2	23.8	86.6
2005	1798	71.5	28.5	81.9
2006	1871	71.7	28.3	82.9
2007	1986	72.1	27.9	83.6
2008	2073	71.7	28.3	82.0
2009	2116	69.9	30.1	79.8
2010	2174	66.9	33.1	78.8
2011	2190	67.0	33.0	78.6
2012	2197	66.3	33.7	78.2
2013	2182	63.3	36.7	74.3
2014	2173	64.2	35.8	76.5
2015	2313	61.5	38.5	73.6
2016	2231	58.7	41.3	72.6
2017	2369	59.9	40.1	70.9
2018	1982	50.6	49.4	61.9
2019	1758	45.8	54.2	65.2
2020	2058	45.9	54.1	60.8
1998-2020	42663	65.3	34.7	78.1

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	509	73.8	71.4	79.5	73.2
1999	523	73.4	71.3	79.2	72.7
2000	541	74.7	72.3	82.3	73.8
2001	533	74.4	71.3	80.7	72.6
2002	814	74.3	72.1	80.6	73.3
2003	867	75.0	72.7	80.7	73.9
2004	876	75.7	74.3	81.3	75.1
2005	938	75.5	73.1	81.3	73.7
2006	1028	76.5	74.5	81.0	75.4
2007	1084	76.0	73.9	80.9	74.6
2008	1164	76.7	74.6	82.1	75.5
2009	1124	76.4	73.7	81.2	74.4
2010	1182	76.7	74.3	82.2	75.4
2011	1210	76.6	73.4	82.6	75.2
2012	1208	77.4	75.5	82.3	76.2
2013	1185	78.9	76.4	83.4	77.2
2014	1199	78.1	75.6	82.6	76.7
2015	1286	79.2	76.3	84.0	77.2
2016	1304	79.1	75.7	83.4	77.4
2017	1326	80.0	77.2	84.2	78.1
2018	1144	80.0	76.5	83.0	77.7
2019	1045	80.2	75.3	83.4	77.0
2020	1274	80.6	77.0	83.6	78.4
1998–2020	23364	77.5	74.6	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	530	78.7	76.5	84.8	78.4
1999	535	79.8	78.3	85.9	79.7
2000	494	80.6	78.8	86.5	79.7
2001	567	81.0	78.1	86.8	80.1
2002	762	81.0	79.6	86.5	80.6
2003	821	81.3	78.9	85.9	80.3
2004	820	81.3	79.4	85.2	80.3
2005	860	81.8	80.0	85.1	80.7
2006	843	82.0	79.7	86.2	80.6
2007	902	82.1	79.3	86.7	80.6
2008	909	82.6	80.1	86.5	81.0
2009	992	82.8	79.3	87.5	80.5
2010	992	83.3	79.9	87.4	81.5
2011	980	83.6	79.7	88.1	81.4
2012	989	83.9	79.5	88.5	81.4
2013	997	84.0	79.1	88.4	81.1
2014	974	83.8	78.7	88.2	80.7
2015	1027	83.8	78.6	88.7	80.4
2016	927	83.8	78.6	88.7	80.8
2017	1043	83.2	79.5	89.5	80.7
2018	838	83.6	78.5	87.6	79.5
2019	713	82.8	77.9	86.7	79.8
2020	784	84.8	79.1	87.7	80.9
1998–2020	19299	82.6	79.1	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	365	32.9	0.40	19.2	0.39	30.2	0.41	41.0	0.42
1999	385	34.4	0.42	19.8	0.40	31.2	0.42	43.3	0.45
2000	403	35.4	0.46	19.8	0.44	31.5	0.46	43.4	0.50
2001	379	32.7	0.40	18.5	0.39	28.9	0.40	38.8	0.42
2002	619	33.2	0.37	17.9	0.36	28.0	0.37	37.9	0.39
2003	652	34.8	0.39	18.1	0.37	28.7	0.39	39.7	0.41
2004	677	36.0	0.42	17.8	0.39	28.7	0.42	40.6	0.45
2005	689	36.4	0.45	18.0	0.41	28.2	0.43	39.2	0.47
2006	741	38.7	0.45	18.7	0.42	30.0	0.45	41.8	0.48
2007	804	36.3	0.43	16.9	0.39	27.0	0.41	38.0	0.45
2008	869	39.0	0.48	17.8	0.43	28.6	0.46	40.4	0.50
2009	796	35.7	0.43	16.4	0.40	25.9	0.42	35.5	0.44
2010	813	36.1	0.48	15.8	0.43	25.2	0.45	35.4	0.49
2011	846	37.8	0.52	17.0	0.48	26.7	0.50	36.1	0.52
2012	819	36.1	0.51	15.7	0.46	25.0	0.49	34.4	0.52
2013	784	34.1	0.47	14.2	0.41	22.8	0.44	31.9	0.48
2014	787	33.8	0.48	14.0	0.42	22.2	0.45	30.8	0.48
2015	796	33.5	0.50	13.7	0.44	21.8	0.47	30.2	0.50
2016	799	33.2	0.50	13.7	0.43	21.6	0.46	29.6	0.49
2017	800	33.2	0.51	13.1	0.44	21.0	0.47	28.8	0.50
2018	605	24.8	0.46	10.0	0.40	15.7	0.43	21.5	0.46
2019	487	20.0	0.43	8.4	0.37	13.0	0.39	17.4	0.42
2020	588	24.2	0.69	9.7	0.58	15.2	0.62	20.9	0.68
1998-2020	15503	33.3	0.46	15.1	0.42	23.8	0.44	32.7	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	382	32.5	0.43	12.3	0.38	19.4	0.40	27.1	0.42
1999	391	33.0	0.44	11.7	0.37	18.8	0.39	26.0	0.41
2000	359	29.9	0.44	10.8	0.39	17.1	0.40	22.9	0.41
2001	380	31.2	0.43	11.3	0.37	18.1	0.39	24.9	0.41
2002	568	29.0	0.39	9.8	0.32	15.7	0.34	21.7	0.36
2003	595	30.2	0.40	10.5	0.34	16.8	0.36	23.0	0.38
2004	617	31.2	0.44	10.4	0.35	16.7	0.38	23.5	0.41
2005	599	30.1	0.43	9.9	0.36	15.9	0.39	22.0	0.41
2006	602	30.0	0.44	9.5	0.34	15.5	0.37	22.0	0.40
2007	630	27.3	0.42	9.3	0.35	14.8	0.37	20.3	0.40
2008	620	26.7	0.42	8.6	0.34	13.8	0.36	19.1	0.39
2009	683	29.4	0.48	9.7	0.41	15.3	0.42	20.9	0.44
2010	644	27.5	0.48	8.8	0.41	13.9	0.43	19.0	0.44
2011	625	26.7	0.46	8.3	0.37	13.2	0.39	18.3	0.42
2012	638	27.0	0.48	8.6	0.38	13.6	0.41	18.8	0.44
2013	600	25.2	0.47	8.2	0.38	12.9	0.41	17.4	0.43
2014	609	25.3	0.48	8.1	0.39	12.7	0.42	17.3	0.44
2015	626	25.7	0.52	8.3	0.43	13.0	0.46	17.5	0.48
2016	513	20.9	0.43	6.7	0.35	10.5	0.37	14.3	0.40
2017	620	25.2	0.50	7.5	0.37	12.1	0.41	16.9	0.45
2018	404	16.3	0.38	5.3	0.31	8.2	0.33	11.1	0.35
2019	327	13.2	0.38	4.6	0.32	7.0	0.34	9.3	0.36
2020	357	14.4	0.56	4.6	0.44	7.2	0.48	9.6	0.49
1998-2020	12389	25.7	0.45	8.4	0.37	13.3	0.39	18.2	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	0.3
35-39	49	0.3	0.5	26	0.2	0.5	23	0.3	0.5
40-44	148	0.8	1.3	81	0.8	1.3	67	0.8	1.4
45-49	294	1.6	2.9	153	1.4	2.7	141	1.8	3.2
50-54	542	2.9	5.8	330	3.1	5.8	212	2.7	5.9
55-59	881	4.8	10.6	541	5.1	10.9	340	4.3	10.2
60-64	1340	7.2	17.9	872	8.2	19.2	468	5.9	16.1
65-69	2029	11.0	28.8	1336	12.6	31.8	693	8.8	24.9
70-74	2790	15.1	43.9	1778	16.8	48.6	1012	12.8	37.7
75-79	3202	17.3	61.2	1984	18.7	67.3	1218	15.4	53.1
80-84	3257	17.6	78.9	1834	17.3	84.6	1423	18.0	71.1
85+	3909	21.1	100.0	1630	15.4	100.0	2279	28.9	100.0
All ages	18489	100.0		10593	100.0		7896	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	1		0.1	0.08			2.1	
20-24	1	5	0.0	0.03	0.3	0.13	1.4	11.6
25-29	6	6	0.3	0.13	0.3	0.11	6.5	6.1
30-34	20	9	0.9	0.21	0.4	0.11	14.0	5.0
35-39	26	23	1.1	0.17	1.0	0.17	9.7	5.6
40-44	81	67	3.2	0.26	2.8	0.25	13.4	7.8
45-49	153	141	5.7	0.24	5.4	0.26	10.8	8.4
50-54	330	212	12.9	0.27	8.4	0.25	12.4	8.0
55-59	541	340	25.5	0.31	15.6	0.30	12.2	8.9
60-64	872	468	49.3	0.35	24.6	0.34	13.6	9.4
65-69	1336	693	81.8	0.42	38.2	0.38	14.5	9.9
70-74	1778	1012	118.6	0.46	58.9	0.41	15.0	11.6
75-79	1984	1218	164.0	0.55	81.1	0.46	15.9	12.4
80-84	1834	1423	253.3	0.69	133.7	0.55	17.5	15.2
85+	1630	2279	349.0	0.90	218.6	0.73	17.9	19.0
All ages	10593	7896					15.3	12.8
Mortality								
Raw			32.5	0.48	23.5	0.46		
WS			13.8	0.43	7.5	0.37		
ES			21.8	0.46	11.9	0.40		
BRD-S			30.0	0.49	16.2	0.42		
PYLL-70								
per 100,000			104.8		70.0			
ES			89.1		58.0			
AYLL-70			8.9		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	66	1.1	46	69.7	4	6.1	16	24.2
C09–C10	Oropharynx	50	0.8	30	60.0	3	6.0	17	34.0
C12–C13	Hypopharynx	31	0.5	12	38.7	3	9.7	16	51.6
C15	Oesophagus	112	1.8	16	14.3	19	17.0	77	68.8
C16	Stomach	320	5.2	92	28.8	73	22.8	155	48.4
C17	Small intestine	76	1.2	13	17.1	26	34.2	37	48.7
C18	Colon	525	8.5	94	17.9	252	48.0	179	34.1
C19–C20	Rectum	224	3.6	107	47.8	99	44.2	18	8.0
C21	Anus/canal	19	0.3	9	47.4	3	15.8	7	36.8
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	227	3.7	15	6.6	30	13.2	182	80.2
C30–C31	Sinuses	11	0.2	9	81.8			2	18.2
C32	Larynx	99	1.6	71	71.7	1	1.0	27	27.3
C33–C34	Lung	669	10.8	110	16.4	94	14.1	465	69.5
C38,C45	Mesothelioma	35	0.6	1	2.9	6	17.1	28	80.0
C43	Malign. melanoma	214	3.5	135	63.1	2	0.9	77	36.0
C44	Skin others	440	7.1	220	50.0	26	5.9	194	44.1
C46,C49	Soft tissue	30	0.5	10	33.3			20	66.7
C50	Breast	15	0.2	5	33.3			10	66.7
C60	Penis	17	0.3	7	41.2			10	58.8
C61	Prostate	1462	23.6	850	58.1	114	7.8	498	34.1
C62	Testis	34	0.5	29	85.3			5	14.7
C64	Kidney	254	4.1	120	47.2	53	20.9	81	31.9
C65	Renal pelvis	29	0.5	6	20.7			23	79.3
C66	Ureter	22	0.4	6	27.3	3	13.6	13	59.1
C67	Bladder	317	5.1	113	35.6	30	9.5	174	54.9
C70–C72	CNS cancer	55	0.9	6	10.9	4	7.3	45	81.8
C73	Thyroid	28	0.5	16	57.1	2	7.1	10	35.7
C76–C79	CUP	69	1.1	12	17.4	11	15.9	46	66.7
C81	Hodgkin lymphoma	18	0.3	15	83.3			3	16.7
C82–C85	NHL	251	4.1	115	45.8	35	13.9	101	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		74	1.2	36	48.6	5	6.8	33	44.6
All further malignancies		6183	100.0	2382	38.5	959	15.5	2842	46.0

Further malignancies with number of cases 1 to 10 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	21	0.5	12	57.1	1	4.8	8	38.1
C09–C10	Oropharynx	16	0.4	8	50.0	1	6.3	7	43.8
C15	Oesophagus	22	0.5	3	13.6	3	13.6	16	72.7
C16	Stomach	203	4.8	65	32.0	39	19.2	99	48.8
C17	Small intestine	38	0.9	4	10.5	19	50.0	15	39.5
C18	Colon	355	8.4	62	17.5	149	42.0	144	40.6
C19–C20	Rectum	135	3.2	70	51.9	46	34.1	19	14.1
C21	Anus/canal	30	0.7	10	33.3	12	40.0	8	26.7
C22	Liver	52	1.2	2	3.8	14	26.9	36	69.2
C23–C24	Bile	58	1.4	14	24.1	9	15.5	35	60.3
C25	Pancreas	190	4.5	12	6.3	25	13.2	153	80.5
C32	Larynx	15	0.4	9	60.0	2	13.3	4	26.7
C33–C34	Lung	289	6.9	49	17.0	25	8.7	215	74.4
C43	Malign. melanoma	108	2.6	69	63.9	6	5.6	33	30.6
C44	Skin others	161	3.8	94	58.4	9	5.6	58	36.0
C46,C49	Soft tissue	20	0.5	11	55.0	2	10.0	7	35.0
C48	Peritoneal	16	0.4	3	18.8	7	43.8	6	37.5
C50	Breast	1105	26.3	732	66.2	80	7.2	293	26.5
C51	Vulva	37	0.9	18	48.6	2	5.4	17	45.9
C52	Vagina	15	0.4	5	33.3	1	6.7	9	60.0
C53	Cervix uteri	133	3.2	98	73.7	7	5.3	28	21.1
C54	Corpus uteri	263	6.3	170	64.6	14	5.3	79	30.0
C55,C57	Fem. genitals un	24	0.6	19	79.2	2	8.3	3	12.5
C56	Ovary	261	6.2	89	34.1	53	20.3	119	45.6
C64	Kidney	89	2.1	47	52.8	12	13.5	30	33.7
C66	Ureter	14	0.3	3	21.4	1	7.1	10	71.4
C67	Bladder	106	2.5	43	40.6	3	2.8	60	56.6
C70–C72	CNS cancer	33	0.8	8	24.2	3	9.1	22	66.7
C73	Thyroid	48	1.1	32	66.7	3	6.3	13	27.1
C76–C79	CUP	43	1.0	13	30.2	10	23.3	20	46.5
C81	Hodgkin lymphoma	15	0.4	11	73.3	1	6.7	3	20.0
C82–C85	NHL	131	3.1	60	45.8	17	13.0	54	41.2
C90	Mult. myeloma	46	1.1	14	30.4	4	8.7	28	60.9
C91–C96	Leukaemia	53	1.3	11	20.8	7	13.2	35	66.0
Others, specified		59	1.4	15	25.4	3	5.1	41	69.5
All further malignancies		4204	100.0	1885	44.8	592	14.1	1727	41.1

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	0.13	1.5	12.2
25-29	6	6	0.3	0.15	0.3	0.11	7.1	6.6
30-34	20	7	0.9	0.21	0.3	0.09	14.5	4.4
35-39	24	19	1.0	0.17	0.8	0.16	9.6	5.1
40-44	76	59	3.0	0.26	2.4	0.24	13.6	7.8
45-49	143	124	5.3	0.25	4.8	0.25	11.1	8.6
50-54	295	191	11.6	0.27	7.6	0.25	12.6	8.5
55-59	481	293	22.7	0.31	13.5	0.30	12.5	9.2
60-64	745	387	42.1	0.35	20.4	0.33	13.9	9.5
65-69	1075	571	65.9	0.42	31.5	0.39	14.6	10.3
70-74	1389	771	92.6	0.48	44.8	0.40	15.3	11.4
75-79	1484	945	122.6	0.57	62.9	0.46	16.3	12.6
80-84	1295	1116	178.8	0.73	104.8	0.54	17.4	15.4
85+	1161	1791	248.6	0.93	171.8	0.73	17.8	19.0
All ages	8196	6285					15.3	12.9
Mortality								
Raw			25.2	0.48	18.7	0.45		
WS			11.0	0.42	6.1	0.36		
ES			17.2	0.45	9.6	0.39		
BRD-S			23.2	0.48	13.0	0.41		
PYLL-70								
per 100,000			92.9		60.6			
ES			79.1		50.3			
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	0.14	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	24	18	1.0	0.17	0.8	0.15	9.7	4.9
40-44	75	58	3.0	0.27	2.4	0.25	13.5	7.8
45-49	139	122	5.2	0.26	4.7	0.26	10.9	8.6
50-54	282	184	11.1	0.27	7.3	0.26	12.2	8.3
55-59	443	270	20.9	0.30	12.4	0.30	11.6	8.6
60-64	687	350	38.9	0.35	18.4	0.33	13.0	8.8
65-69	927	490	56.8	0.41	27.0	0.37	13.0	9.1
70-74	1116	659	74.4	0.44	38.3	0.38	12.8	10.0
75-79	1175	813	97.1	0.51	54.1	0.43	13.5	11.2
80-84	958	939	132.3	0.59	88.2	0.49	13.8	13.5
85+	860	1508	184.2	0.74	144.6	0.64	14.4	16.8
All ages	6714	5429					13.1	11.5
Mortality								
Raw			20.6	0.43	16.2	0.42		
WS			9.3	0.39	5.4	0.35		
ES			14.3	0.41	8.4	0.37		
BRD-S			19.0	0.43	11.3	0.39		
PYLL-70								
per 100,000			87.3		57.1			
ES			74.4		47.5			
AYLL-70			9.6		10.7			

* See corresponding tables with multiple malignancies.

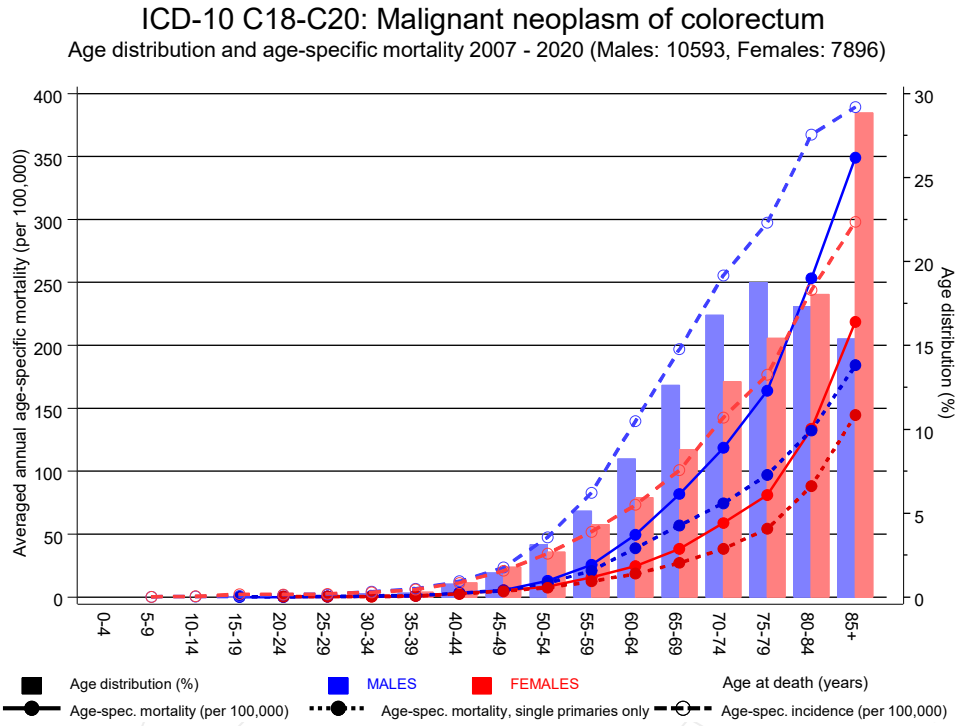
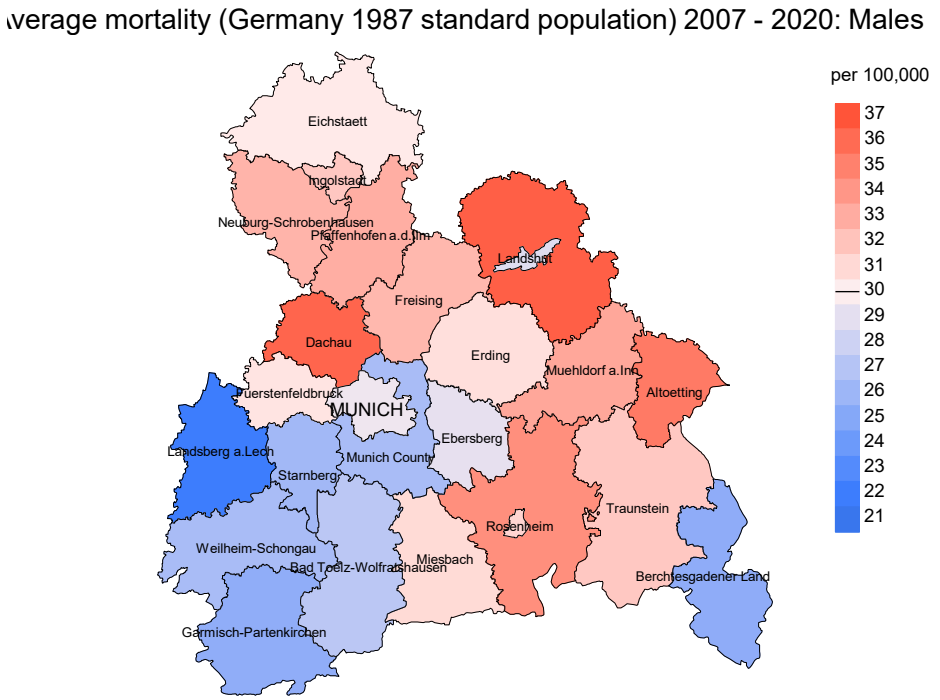


Figure 17. Distribution of age at death (bars; males: mean=70.1 yrs, median=70.9 yrs; females: mean=73.4 yrs, median=75.1 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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



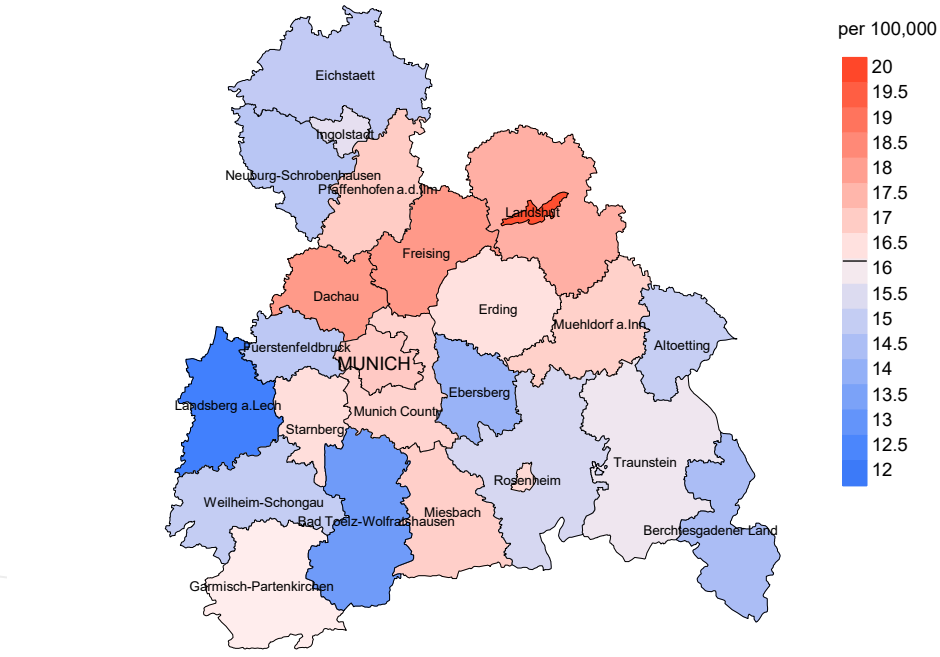


Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2020. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 30.0/100,000 WS N=10,593, females 16.2/100,000 WS N=7,896).

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 184 women died from colorectal cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 14.1/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 11.5 and 17.1/100,000.

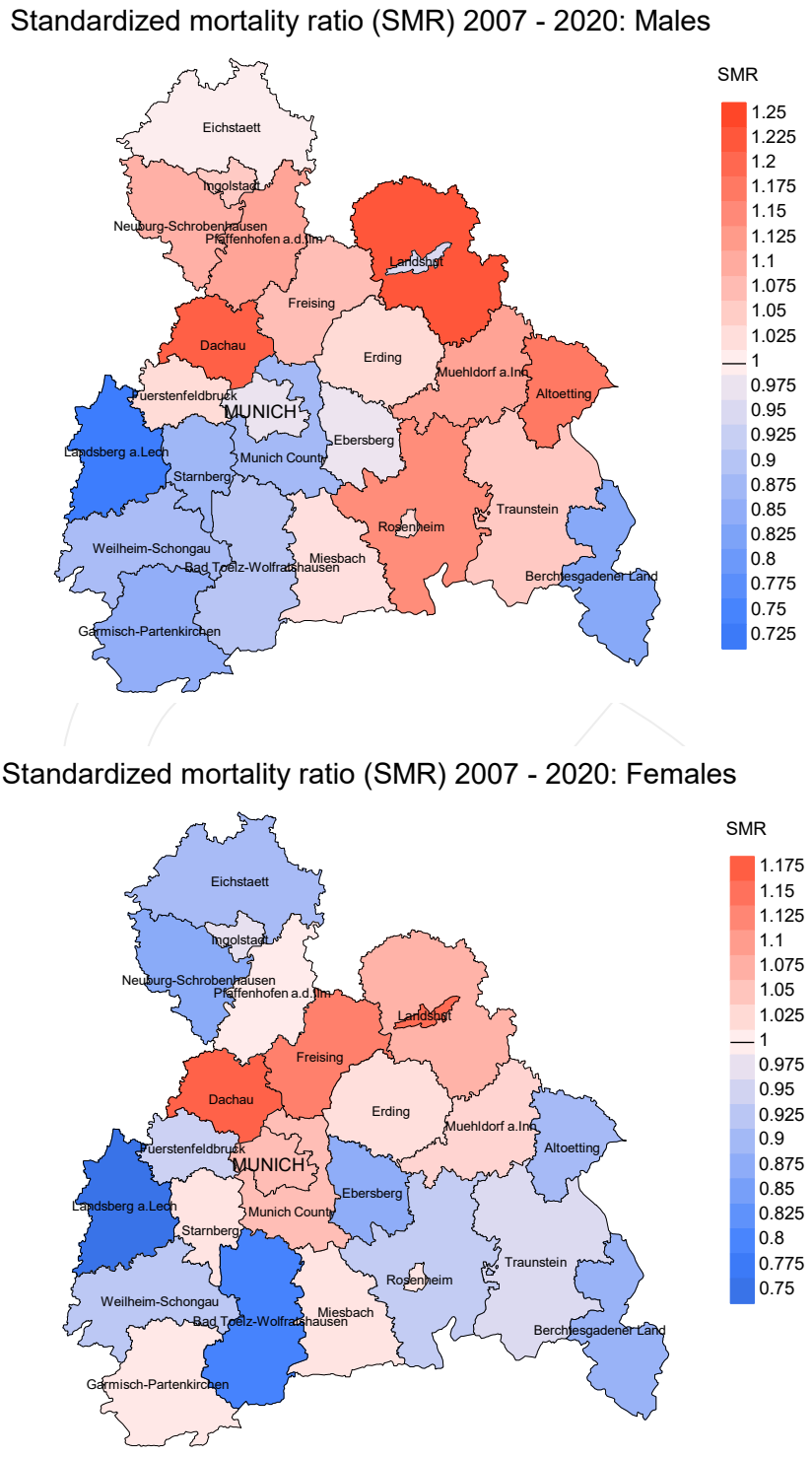


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2020. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=10,593, females N=7,896).

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 184 women died from colorectal cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.88. Though, the value of this parameter may vary with an underlying probability of 99% between 0.72 and 1.06, 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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