

Munich Cancer Registry



- ▶ Survival
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- ▶ *Deutsch*

ICD-10 C18-C20: Colorectal cancer

Incidence and Mortality

Year of diagnosis	1998-2019
Patients	58,112
Diseases	59,796
Creation date	01/25/2021
Database export	01/07/2021
Population	4.92 m





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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>

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**Global Statements about the statistics on the Internet –
Baseline Statistics** (grey button ) , **Survival** (red button )

In these analyses, the clinics and physicians of Upper Bavaria and the city and county of Landshut[#], with a total of 4.69 million inhabitants, account for the frequency of cancer diseases^{##} and the achieved long term results. Additionally, the long term survival evaluated by the Munich Cancer Registry (MCR) is compared with the results of the population-based registry in the USA (SEER), which is useful for checking the consistency of the data on an international level.

In comparing several tables, inconsistent figures may be detected. This is based on the fact that different patient cohorts are included in the base calculation, for example when proportions of multiple tumors or DCO-cases^{###} are concerned. In other cases the individual tumor diagnosis is the basis for calculation, for example with incidence.

The foot notes describe the currentness of the data. The baseline statistics and survival data are updated annually. This yearly analysis comprises the Annual Report of the MCR.

Clinics and physicians have access to essentially more detailed data, with which they can check, compare and in the best case optimize their own data and results.

We would be pleased to receive corrections, critique and useful suggestions. Just send an e-mail to tumor@ibe.med.uni-muenchen.de.

Munich Cancer Registry, January 2021

[#] Base data has been collected since 1998. An increase in new diseases is apparent, which is an effect of two extensions in the MCR catchment area (from a base population of 2.65 million to 4.10 in 2002, and to 4.69 million in 2007).

^{##} Due to the high frequency and good prognosis of non-malignant skin cancer (C44), no systematic ascertainment is performed for this diagnosis. C44 is not designated as a primary, but rather as a secondary tumor.

^{###} DCO (death certificate only) identifies a cancer case that first becomes available to the MCR through the death certificate.

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	1813	107	5.9	11.5	10.8	79.3	97.4
1999	1831	123	6.7	11.8	10.7	77.8	97.0
2000	1699	111	6.5	12.5	10.5	76.7	97.2
2001	1843	135	7.3	12.7	10.4	72.7	96.7
2002	3158	376	11.9	12.6	10.2	77.0	97.4 #
2003	3173	309	9.7	12.8	9.9	73.3	97.3
2004	3051	243	8.0	12.9	9.5	73.1	97.4
2005	2984	223	7.5	13.4	9.2	72.3	97.1
2006	3071	165	5.4	13.7	8.8	68.2	95.3
2007	3424	212	6.2	13.8	8.4	67.2	93.7 #
2008	3374	199	5.9	14.1	8.0	64.5	98.3
2009	3321	181	5.5	14.4	7.4	63.5	98.4
2010	3111	184	5.9	14.7	6.8	61.0	97.9
2011	3040	158	5.2	15.0	6.4	59.4	98.1
2012	3009	168	5.6	15.2	5.9	55.8	97.8
2013	3010	157	5.2	15.4	5.4	53.1	97.9
2014	2914	150	5.1	15.6	5.0	51.3	96.8
2015	2804	136	4.9	15.8	4.5	47.6	96.8
2016	2742	133	4.9	16.0	4.0	42.9	99.2
2017	2546	162	6.4	16.2	3.3	34.6	99.3
2018	2090	38	1.8	16.3	2.7	23.7	99.6
2019	1788	11	0.6	16.4	1.9	15.3	72.3 ##
1998-2019	59796	3681	6.2	16.4	10.8	60.1	96.7

59,796 cases diagnosed 1998-2019 are related to a total of 58,112 patients. Currently, in 15,210 (26.2 %) of these 58,112 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 12,033 / 2,484 / 693 (20.7 % / 4.3 % / 1.2 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:

In 2017, a subgroup of 2,546 cases has been diagnosed, of which 16.2 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 3.3 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 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	12.4	79.5	98.2
1999	936	51.1	45	4.8	10.9	12.2	78.5	97.3
2000	874	51.4	31	3.5	11.8	12.0	74.7	97.3
2001	959	52.0	47	4.9	12.0	11.8	72.4	96.6
2002	1674	53.0	167	10.0	12.0	11.6	77.4	97.9 #
2003	1691	53.3	121	7.2	12.4	11.2	74.0	98.3
2004	1632	53.5	92	5.6	12.7	10.8	74.7	97.7
2005	1583	53.0	95	6.0	13.3	10.4	72.0	97.2
2006	1675	54.5	58	3.5	13.9	10.1	68.4	95.3
2007	1892	55.3	90	4.8	14.2	9.5	67.7	93.7 #
2008	1870	55.4	80	4.3	14.6	9.1	64.5	98.4
2009	1868	56.2	81	4.3	15.0	8.5	64.0	98.7
2010	1752	56.3	76	4.3	15.3	7.8	60.6	97.8
2011	1669	54.9	57	3.4	15.6	7.3	58.7	98.2
2012	1660	55.2	68	4.1	15.9	6.8	56.6	98.1
2013	1722	57.2	62	3.6	16.2	6.1	53.3	97.4
2014	1655	56.8	69	4.2	16.5	5.6	51.3	97.4
2015	1604	57.2	59	3.7	16.6	4.9	46.9	96.8
2016	1577	57.5	50	3.2	16.7	4.5	43.4	99.2
2017	1408	55.3	77	5.5	17.0	3.5	33.9	99.3
2018	1151	55.1	16	1.4	17.1	2.9	25.2	99.6
2019	1025	57.3	4	0.4	17.2	1.8	16.5	73.5 ##
1998-2019	32789	54.8	1484	4.5	17.2	12.4	60.0	96.8

32,789 cases diagnosed 1998-2019 are related to a total of 31,702 patients. Currently, in 8,963 (28.3 %) of these 31,702 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 6,993 / 1,514 / 456 (22.1 % / 4.8 % / 1.4 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:

In 2017, a subgroup of 1,408 cases has been diagnosed, of which 17.0 % 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 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	901	49.7	68	7.5	12.0	9.0	79.0	96.4
1999	895	48.9	78	8.7	12.8	8.9	77.1	96.6
2000	825	48.6	80	9.7	13.3	8.8	78.8	97.1
2001	884	48.0	88	10.0	13.5	8.6	73.1	96.8
2002	1484	47.0	209	14.1	13.1	8.5	76.6	96.9 #
2003	1482	46.7	188	12.7	13.2	8.2	72.5	96.2
2004	1419	46.5	151	10.6	13.1	8.0	71.3	97.1
2005	1401	47.0	128	9.1	13.4	7.7	72.6	96.9
2006	1396	45.5	107	7.7	13.4	7.3	67.9	95.3
2007	1532	44.7	122	8.0	13.5	7.0	66.6	93.6 #
2008	1504	44.6	119	7.9	13.6	6.6	64.4	98.1
2009	1453	43.8	100	6.9	13.8	6.1	62.9	98.1
2010	1359	43.7	108	7.9	14.0	5.6	61.5	98.2
2011	1371	45.1	101	7.4	14.2	5.2	60.2	97.9
2012	1349	44.8	100	7.4	14.3	4.7	54.8	97.4
2013	1288	42.8	95	7.4	14.5	4.4	52.7	98.5
2014	1259	43.2	81	6.4	14.7	4.3	51.2	96.1
2015	1200	42.8	77	6.4	14.9	3.9	48.5	96.9
2016	1165	42.5	83	7.1	15.0	3.4	42.3	99.1
2017	1138	44.7	85	7.5	15.2	3.0	35.4	99.3
2018	939	44.9	22	2.3	15.3	2.6	21.8	99.7
2019	763	42.7	7	0.9	15.4	2.1	13.8	70.6 ##
1998-2019	27007	45.2	2197	8.1	15.4	9.0	60.4	96.4

27,007 cases diagnosed 1998-2019 are related to a total of 26,410 patients. Currently, in 6,247 (23.7 %) of these 26,410 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 5,040 / 970 / 237 (19.1 % / 3.7 % / 0.9 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:

In 2017, a subgroup of 1,138 cases has been diagnosed, of which 15.2 % 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 4.92 m as of 2007, respectively)

Year of diagnosis	Males n	Females n	Males Inc. raw	Fem. Inc. raw	Males Inc. WS	Fem. Inc. WS	Males Inc. ES	Fem. Inc. ES	Males Inc. BRD-S	Fem. Inc. BRD-S
1998	912	901	82.3	76.6	49.4	32.6	74.3	49.2	97.0	64.5
1999	936	895	83.6	75.4	49.6	31.9	75.0	48.2	98.2	63.1
2000	874	825	76.7	68.7	44.9	27.9	68.0	42.7	88.0	56.3
2001	959	884	82.7	72.7	48.4	30.8	72.6	46.4	92.9	60.7
2002	1674	1484	89.9	75.8	50.2	30.8	75.7	46.6	98.9	60.9
2003	1691	1482	90.2	75.2	49.6	30.7	74.7	46.3	97.1	60.2
2004	1632	1419	86.7	71.8	46.2	29.7	69.9	44.4	91.5	57.3
2005	1583	1401	83.6	70.4	44.3	27.5	66.5	41.7	86.4	54.9
2006	1675	1396	87.5	69.5	45.8	28.3	68.7	42.2	88.9	55.1
2007	1892	1532	85.4	66.3	44.4	26.6	66.3	39.8	86.1	51.7
2008	1870	1504	84.0	64.8	42.2	25.4	63.6	38.3	83.0	49.8
2009	1868	1453	83.7	62.5	41.4	24.2	62.0	36.5	81.2	48.0
2010	1752	1359	77.7	58.1	38.2	21.9	57.3	33.1	74.6	43.9
2011	1669	1371	74.6	58.6	36.0	22.9	54.0	34.2	70.2	44.0
2012	1660	1349	73.1	57.2	35.1	22.8	52.7	33.5	68.0	43.4
2013	1722	1288	74.8	54.0	35.2	21.6	52.7	31.8	68.8	40.9
2014	1655	1259	71.0	52.3	33.5	20.6	50.1	30.5	64.7	39.0
2015	1604	1200	67.4	49.3	31.4	19.0	47.1	28.2	61.1	36.3
2016	1577	1165	65.6	47.4	31.3	18.3	46.0	27.2	59.4	35.1
2017	1408	1138	58.3	46.2	26.8	18.5	40.0	27.1	51.9	34.6
2018	1151	939	47.3	37.8	22.0	16.0	32.6	23.1	41.7	28.8
2019	1025	763	42.1	30.7	20.4	12.6	29.6	18.2	37.3	23.2
1998-2019	32789	27007	74.4	59.0	37.4	23.5	55.8	35.0	71.9	45.3

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	Std.		Median						
		Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	1813	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	1699	70.6	12.1	24.7	103	55.0	61.6	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	3158	70.9	12.1	17.7	104	55.3	62.6	71.9	80.0	86.7
2003	3173	71.0	11.8	8.4	101	56.1	63.1	71.5	79.9	86.0
2004	3051	70.7	12.2	13.8	101	55.3	63.0	71.2	79.9	85.5
2005	2984	71.4	12.2	15.1	99.9	55.6	63.8	71.8	80.4	86.1
2006	3071	70.6	12.1	17.9	102	54.8	63.3	71.0	79.7	85.3
2007	3424	70.7	12.5	13.4	103	54.2	63.9	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	3321	71.2	12.3	12.4	102	54.8	64.1	72.1	80.2	86.0
2010	3111	71.5	12.5	14.9	101	54.4	63.8	72.6	80.9	86.2
2011	3040	71.3	12.8	15.5	101	53.4	63.5	72.4	80.9	86.9
2012	3009	71.2	13.0	9.7	101	54.3	63.4	72.7	80.4	86.4
2013	3010	70.9	13.1	15.7	105	53.1	63.2	72.8	80.1	86.2
2014	2914	71.3	13.1	15.8	103	53.2	63.3	73.3	80.4	86.9
2015	2804	71.4	13.1	11.4	105	53.2	63.7	73.5	80.4	86.7
2016	2742	71.1	13.2	9.4	100	53.0	63.0	73.2	80.3	86.2
2017	2546	71.2	12.9	14.5	99.0	54.1	63.0	73.3	80.2	85.9
2018	2090	70.3	12.7	17.8	100	53.5	61.5	71.8	79.9	85.0
2019	1788	69.8	13.7	17.7	100	51.5	61.1	72.0	80.0	85.3
1998-2019	59796	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	Std.		Median						
		Mean	dev.	Min.	Max.	10%	25%	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	874	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	1674	69.1	11.0	20.9	98.5	55.5	61.8	69.5	76.6	82.5
2003	1691	69.2	11.0	8.4	99.4	55.6	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	1583	69.3	11.3	19.0	99.6	54.6	62.9	69.5	77.1	83.5
2006	1675	69.1	11.1	17.9	102	54.6	62.6	69.3	77.3	82.8
2007	1892	69.1	11.7	15.8	99.4	54.3	62.9	69.6	77.5	82.9
2008	1870	69.9	11.3	19.3	105	55.0	63.4	70.4	77.9	83.4
2009	1868	69.6	11.4	12.4	99.0	54.4	63.1	70.9	77.8	83.0
2010	1752	69.9	11.7	21.1	98.9	54.1	62.5	70.9	78.2	84.1
2011	1669	70.0	11.7	15.5	97.3	53.7	63.3	71.2	78.3	84.2
2012	1660	70.2	11.5	9.7	101	55.1	62.9	71.5	78.2	84.0
2013	1722	70.2	12.0	19.4	99.6	54.1	63.0	72.0	78.4	84.3
2014	1655	70.5	12.3	20.3	102	53.6	62.8	72.5	79.2	85.2
2015	1604	70.4	12.2	18.3	105	53.5	62.9	72.4	79.1	84.9
2016	1577	69.8	12.9	9.4	100	52.8	62.2	72.2	79.1	84.3
2017	1408	70.9	11.9	19.1	96.3	54.9	63.2	72.6	79.6	84.4
2018	1151	70.0	12.1	17.8	97.1	54.3	61.5	71.7	79.5	84.3
2019	1025	68.9	13.1	17.9	98.2	52.0	60.6	70.9	78.6	83.9
1998-2019	32789	69.6	11.7	8.4	105	54.3	62.3	70.5	77.9	83.8

Table 3b

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

Year of diagnosis	Cases n	Std.		Min.	Max.	Median				
		Mean	dev.			10%	25%	50%	75%	90%
1998	901	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	1484	73.1	13.0	17.7	104	55.3	63.7	75.2	82.2	88.9
2003	1482	73.0	12.4	23.5	101	56.4	64.1	74.5	82.5	88.5
2004	1419	72.2	13.4	13.8	100	54.7	64.0	74.0	82.7	87.8
2005	1401	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	1532	72.8	13.1	13.4	103	54.1	65.2	74.4	82.9	87.5
2008	1504	73.4	13.2	18.9	102	55.6	65.1	74.4	83.6	88.6
2009	1453	73.3	13.2	15.9	102	55.7	65.5	75.0	83.3	88.5
2010	1359	73.6	13.2	14.9	101	55.3	66.4	75.6	83.4	88.7
2011	1371	72.9	13.9	16.5	101	53.3	63.8	74.6	84.1	88.8
2012	1349	72.3	14.4	13.7	100	53.3	64.1	74.8	83.2	88.8
2013	1288	71.9	14.4	15.7	105	51.0	63.7	74.1	82.6	88.5
2014	1259	72.2	14.1	15.8	103	51.8	64.2	74.4	82.6	88.7
2015	1200	72.7	14.1	11.4	101	52.9	65.8	75.0	82.6	89.2
2016	1165	72.7	13.4	16.1	100	53.2	64.3	75.3	82.0	88.4
2017	1138	71.6	14.0	14.5	99.0	52.9	62.9	74.3	81.3	87.3
2018	939	70.6	13.4	19.3	100	51.9	61.5	72.0	80.7	86.0
2019	763	71.1	14.2	17.7	100	50.5	62.2	73.8	81.3	86.9
1998-2019	27007	72.6	13.4	11.4	105	54.2	64.2	74.6	82.6	88.3

Table 4

Age distribution by 5-year age group and sex for period 2007-2019
(incl. DCO)

Age at diagnosis Years	Cases			Males			Females		
	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
0-4									
5-9	2	0.0	0.0	2	0.0	0.0			0.0
10-14	6	0.0	0.0	1	0.0	0.0	5	0.0	0.0
15-19	46	0.1	0.1	11	0.1	0.1	35	0.2	0.2
20-24	68	0.2	0.3	34	0.2	0.2	34	0.2	0.5
25-29	99	0.3	0.6	46	0.2	0.5	53	0.3	0.8
30-34	166	0.4	1.0	89	0.4	0.9	77	0.5	1.3
35-39	267	0.7	1.8	145	0.7	1.6	122	0.7	2.0
40-44	556	1.5	3.3	295	1.4	3.0	261	1.6	3.6
45-49	1116	3.0	6.3	602	2.9	5.9	514	3.1	6.7
50-54	1952	5.3	11.5	1148	5.5	11.4	804	4.9	11.7
55-59	2702	7.3	18.8	1639	7.9	19.2	1063	6.5	18.2
60-64	3652	9.8	28.6	2353	11.3	30.5	1299	8.0	26.1
65-69	4853	13.1	41.7	3091	14.8	45.3	1762	10.8	36.9
70-74	6062	16.3	58.0	3706	17.8	63.1	2356	14.4	51.4
75-79	5923	15.9	73.9	3405	16.3	79.4	2518	15.4	66.8
80-84	4973	13.4	87.3	2551	12.2	91.7	2422	14.8	81.6
85+	4730	12.7	100.0	1735	8.3	100.0	2995	18.4	100.0
All ages	37173	100.0		20853	100.0		16320	100.0	

Table 5

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

Age at diagnosis Years	Males n	Females n	Males Age- spec. incid.	Females Age- spec. incid.	Males DCO rate n=787 %	Females DCO rate n=1097 %	Males	Females
							Prop.all cancers n=143063 %	Prop.all cancers n=144724 %
0- 4								
5- 9	2		0.1				1.8	
10-14	1	5	0.1	0.4			0.8	4.3
15-19	11	35	0.7	2.4			3.7	14.2
20-24	34	34	1.8	1.9	2.9		5.8	7.2
25-29	43	53	2.1	2.6			4.9	4.8
30-34	89	76	4.2	3.6		2.6	7.4	3.8
35-39	141	120	6.6	5.7	1.4	2.5	8.3	3.7
40-44	292	260	12.5	11.5		0.4	11.2	4.5
45-49	592	508	23.6	20.9	0.7	0.2	12.4	5.8
50-54	1120	797	47.8	34.5	1.2	1.3	14.3	6.9
55-59	1616	1047	83.1	52.4	1.4	0.7	13.7	8.5
60-64	2307	1278	141.5	72.8	1.4	1.5	14.1	8.8
65-69	3006	1733	197.7	102.9	1.7	1.6	13.2	9.7
70-74	3604	2309	257.2	143.8	2.7	2.3	14.0	12.4
75-79	3319	2465	299.8	179.0	3.3	4.1	15.0	13.6
80-84	2464	2388	375.3	245.3	6.3	7.5	17.4	16.8
85+	1702	2949	399.1	305.5	17.6	23.4	17.3	19.1
All ages	20343	16057			3.9	6.8	14.2	11.1
Incidence								
Raw			67.5	51.6				
WS			32.5	20.3				
ES			48.4	30.1				
BRD-S			62.4	38.8				

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).

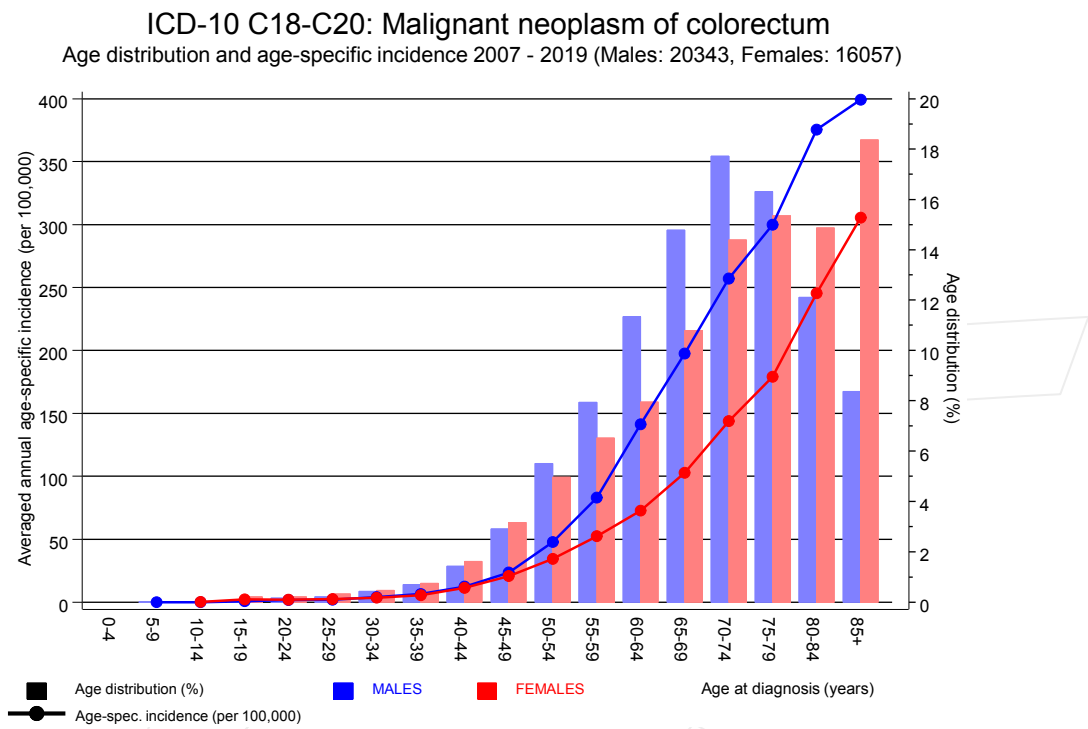


Figure 6. Age distribution (males: mean=69.9 yrs, median=71.3 yrs; females: mean=72.5 yrs, median=74.5 yrs) and age-specific incidence.

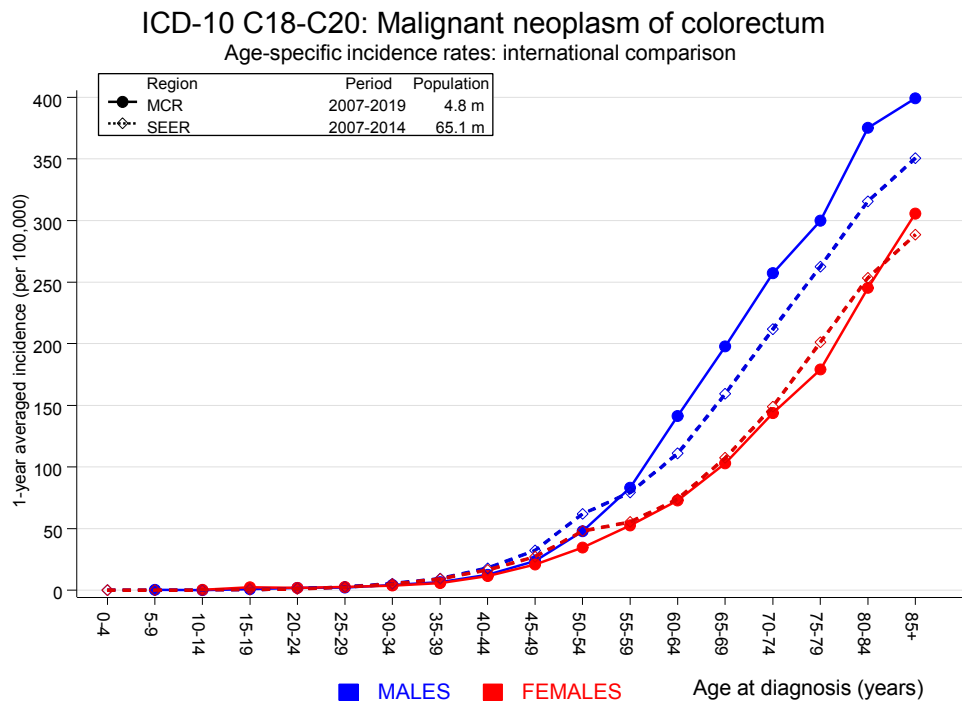


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

Surveillance, Epidemiology, and End Results (SEER) Program SEER*Stat Database: Incidence - SEER 18 Regs Research Data, released April 2019, based on the November 2018 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 1998–2019

MALES

Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C03–C06 Oral cavity	20	14.6	1.4	0.8	2.1	0.5	5.0
C07–C08 Salivary gland	5	4.7	1.1	0.3	2.5	0.0	
C09–C10 Oropharynx	27	17.6	1.5	1.0	2.2 #	0.9	3.7
C12–C13 Hypopharynx	17	9.6	1.8	1.0	2.8 #	0.7	5.9
C15 Oesophagus	113	36.2	3.1	2.6	3.8 #	7.1	8.8
C16 Stomach	235	84.0	2.8	2.5	3.2 #	14.1	8.1
C17 Small intestine	105	11.3	9.3	7.6	11.2 #	8.7	1.0
C18 Colon	761	202.3	3.8	3.5	4.0 #	52.0	0.8
C19–C20 Rectum	301	104.7	2.9	2.6	3.2 #	18.3	1.3
C21 Anus/canal	14	4.4	3.2	1.7	5.3 #	0.9	
C22 Liver	160	56.6	2.8	2.4	3.3 #	9.6	17.5
C23–C24 Bile	55	21.3	2.6	1.9	3.4 #	3.1	12.7
C25 Pancreas	174	78.7	2.2	1.9	2.6 #	8.9	24.7
C32 Larynx	37	18.8	2.0	1.4	2.7 #	1.7	10.8
C33–C34 Lung	503	233.6	2.2	2.0	2.4 #	25.1	14.9
C38,C45 Mesothelioma	20	14.0	1.4	0.9	2.2	0.6	5.0
C43 Malign. melanoma	165	84.6	2.0	1.7	2.3 #	7.5	1.8
C46,C49 Soft tissue	23	11.3	2.0	1.3	3.0 #	1.1	
C50 Breast	13	5.4	2.4	1.3	4.1 #	0.7	7.7
C60 Penis	12	5.1	2.4	1.2	4.1 #	0.6	8.3
C61 Prostate	999	573.0	1.7	1.6	1.9 #	39.6	5.9
C62 Testis	8	3.7	2.2	0.9	4.3	0.4	12.5
C64 Kidney	196	67.3	2.9	2.5	3.4 #	12.0	6.6
C65 Renal pelvis	25	9.1	2.7	1.8	4.0 #	1.5	
C66 Ureter	17	5.3	3.2	1.9	5.1 #	1.1	
C67 Bladder	200	99.3	2.0	1.7	2.3 #	9.4	7.5
C70–C72 CNS cancer	46	24.4	1.9	1.4	2.5 #	2.0	21.7
C73 Thyroid	21	11.2	1.9	1.2	2.9 #	0.9	9.5
C76–C79 CUP	56	34.9	1.6	1.2	2.1 #	2.0	1.8
C81 Hodgkin lymphoma	5	4.2	1.2	0.4	2.8	0.1	
C82–C85 NHL	170	86.3	2.0	1.7	2.3 #	7.8	4.1
C90 Mult. myeloma	47	27.2	1.7	1.3	2.3 #	1.8	21.3
C91–C96 Leukaemia	64	31.8	2.0	1.5	2.6 #	3.0	23.4
Others, specified	30	25.5	1.2	0.8	1.7	0.4	13.3
Not observed	0	2.7	0.0	0.0	1.4	-0.2	
All further malignancies	4644	2024.9	2.3	2.2	2.4 #	243.8	7.4

Patients	29951
Median age at next malignancy (years)	74.3
Person-years	107450
Mean observation time (years)	3.6
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 1998–2019

FEMALES

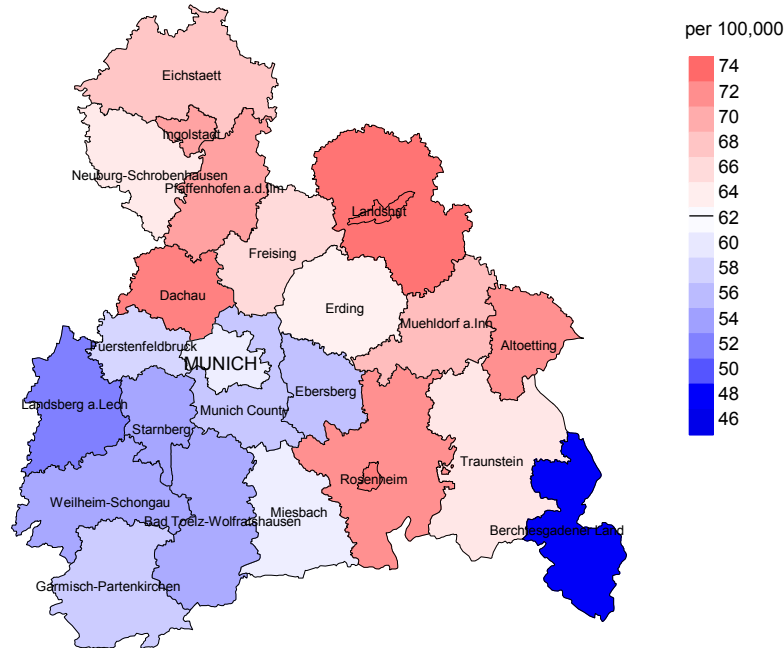
Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C03-C06 Oral cavity	8	6.2	1.3	0.6	2.5	0.2	
C09-C10 Oropharynx	9	3.8	2.4	1.1	4.5 #	0.6	
C15 Oesophagus	19	7.0	2.7	1.6	4.2 #	1.4	10.5
C16 Stomach	105	45.9	2.3	1.9	2.8 #	6.8	16.2
C17 Small intestine	64	5.6	11.5	8.8	14.7 #	6.7	3.1
C18 Colon	451	126.5	3.6	3.2	3.9 #	37.2	0.7
C19-C20 Rectum	139	49.3	2.8	2.4	3.3 #	10.3	1.4
C21 Anus/canal	16	6.0	2.7	1.5	4.3 #	1.1	
C22 Liver	42	14.9	2.8	2.0	3.8 #	3.1	38.1
C23-C24 Bile	33	18.6	1.8	1.2	2.5 #	1.6	12.1
C25 Pancreas	137	58.9	2.3	2.0	2.7 #	9.0	27.7
C26 GI cancer	4	2.8	1.5	0.4	3.7	0.1	50.0
C32 Larynx	4	1.9	2.2	0.6	5.5	0.2	
C33-C34 Lung	234	80.3	2.9	2.6	3.3 #	17.6	12.4
C43 Malign. melanoma	93	39.3	2.4	1.9	2.9 #	6.2	1.1
C46,C49 Soft tissue	14	6.6	2.1	1.2	3.6 #	0.9	
C48 Peritoneal	15	4.1	3.7	2.1	6.1 #	1.3	26.7
C50 Breast	644	318.0	2.0	1.9	2.2 #	37.4	5.6
C51 Vulva	28	13.2	2.1	1.4	3.1 #	1.7	3.6
C52 Vagina	7	2.3	3.0	1.2	6.1 #	0.5	14.3
C53 Cervix uteri	30	12.9	2.3	1.6	3.3 #	2.0	16.7
C54 Corpus uteri	139	59.6	2.3	2.0	2.8 #	9.1	2.9
C55,C57 Fem. genitals un	5	3.5	1.4	0.5	3.4	0.2	20.0
C56 Ovary	136	45.2	3.0	2.5	3.6 #	10.4	25.0
C64 Kidney	97	27.7	3.5	2.8	4.3 #	8.0	12.4
C65 Renal pelvis	11	3.8	2.9	1.4	5.1 #	0.8	
C66 Ureter	6	2.0	3.0	1.1	6.6 #	0.5	16.7
C67 Bladder	54	26.1	2.1	1.6	2.7 #	3.2	20.4
C70-C72 CNS cancer	19	14.6	1.3	0.8	2.0	0.5	47.4
C73 Thyroid	24	14.5	1.7	1.1	2.5 #	1.1	8.3
C74-C80 Cancer others	4	5.6	0.7	0.2	1.8	-0.2	50.0
C76-C79 CUP	19	24.6	0.8	0.5	1.2	-0.6	
C81 Hodgkin lymphoma	4	1.9	2.1	0.6	5.4	0.2	
C82-C85 NHL	88	47.1	1.9	1.5	2.3 #	4.7	12.5
C90 Mult. myeloma	26	15.1	1.7	1.1	2.5 #	1.3	26.9
C91-C96 Leukaemia	43	18.0	2.4	1.7	3.2 #	2.9	48.8
Others, specified	23	12.5	1.8	1.2	2.8 #	1.2	8.7
Not observed	0	1.2	0.0	0.0	3.2	-0.1	
All further malignancies	2794	1147.0	2.4	2.3	2.5 #	189.0	10.0

Patients	24237
Median age at next malignancy (years)	76.1
Person-years	87136
Mean observation time (years)	3.6
Median observation time (years)	1.9

The occurrence of further specified malignancy is statistically significant.

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

Average incidence (Germany 1987 standard population) 2007 - 2019: Males



Average incidence (Germany 1987 standard population) 2007 - 2019: Females

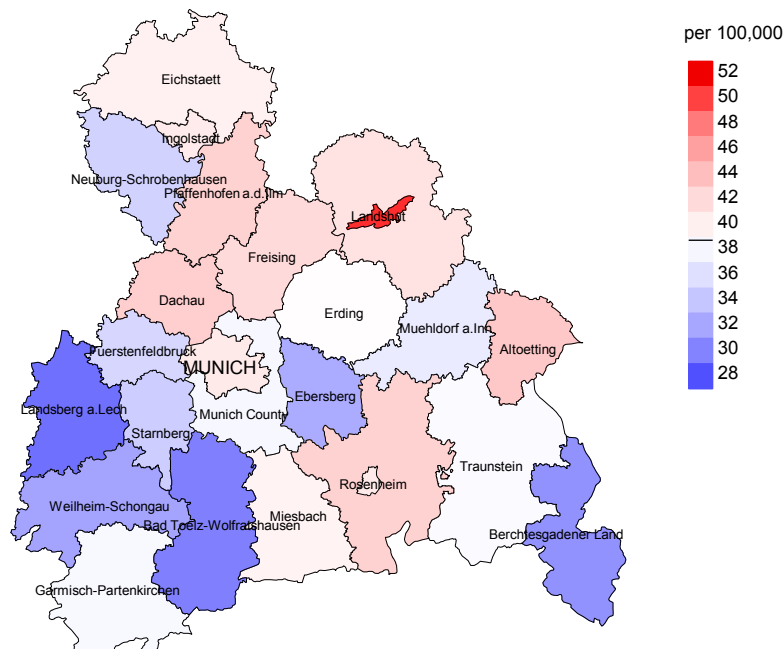
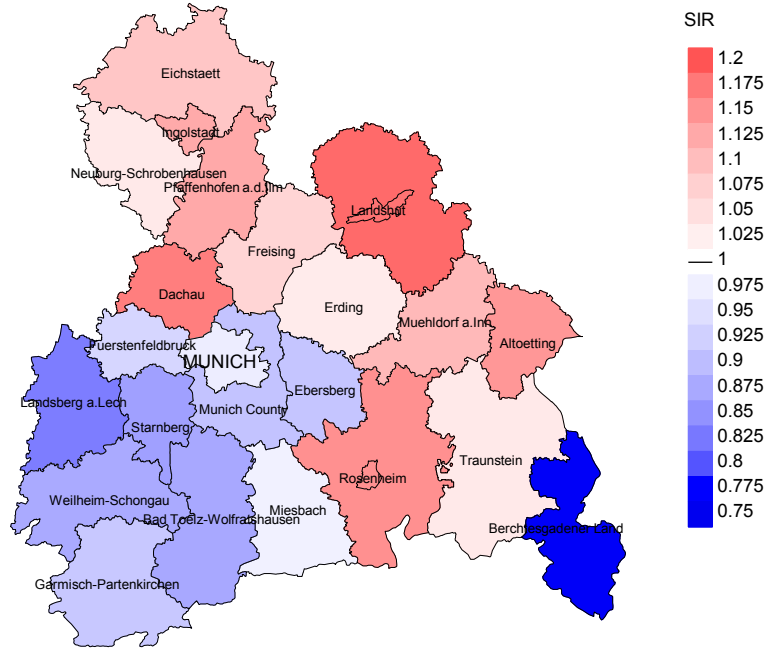


Figure 8a. Map of cancer incidence (german standard population, incl. DCO cases) by county averaged for period 2007 to 2019. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 62.4/100,000 WS N=20,343, females 38.8/100,000 WS N=16,057).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,462 female residents (averaged) in the period from 2007 to 2019 a total of 354 women were identified with newly diagnosed colorectal cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 32.3/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 27.9 and 37.1/100,000.

Standardized incidence ratio (SIR) 2007 - 2019: Males



Standardized incidence ratio (SIR) 2007 - 2019: Females

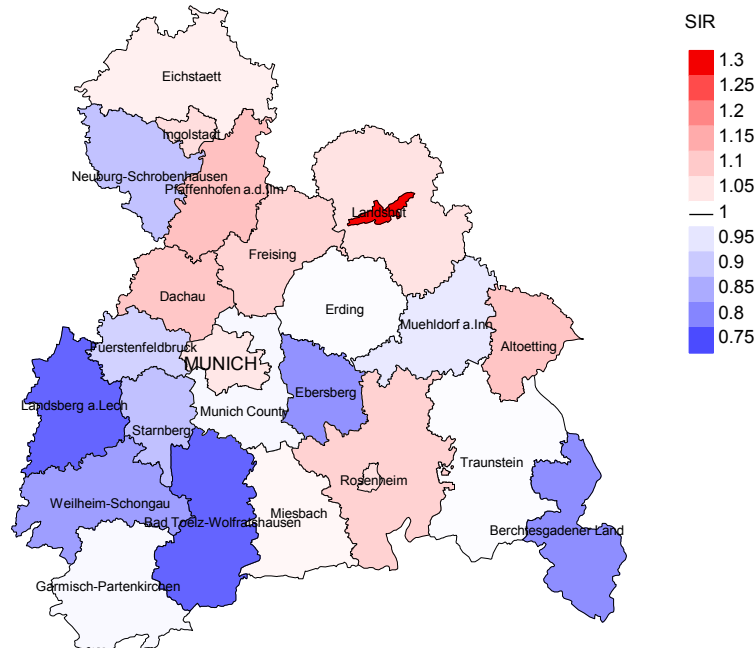


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2019. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=20,343, females N=16,057).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,153 female residents (averaged) in the period from 2007 to 2019 a total of 354 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 0.82. 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 4.92 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	1813	97.4	5.9	1437	79.3	93.1
1999	1831	97.0	6.7	1425	77.8	93.9
2000	1699	97.2	6.5	1303	76.7	95.8
2001	1843	96.7	7.3	1340	72.7	95.5
2002	3158	97.4	11.9	2433	77.0	96.0
2003	3173	97.3	9.7	2327	73.3	95.7
2004	3051	97.4	8.0	2231	73.1	95.4
2005	2984	97.1	7.5	2157	72.3	96.4
2006	3071	95.3	5.4	2093	68.2	96.4
2007	3424	93.7	6.2	2301	67.2	95.5
2008	3374	98.3	5.9	2175	64.5	94.5
2009	3321	98.4	5.5	2109	63.5	94.3
2010	3111	97.9	5.9	1898	61.0	93.5
2011	3040	98.1	5.2	1805	59.4	93.7
2012	3009	97.8	5.6	1679	55.8	92.7
2013	3010	97.9	5.2	1597	53.1	91.8
2014	2914	96.8	5.1	1494	51.3	90.2
2015	2804	96.8	4.9	1334	47.6	87.5
2016	2742	99.2	4.9	1177	42.9	84.1
2017	2546	99.3	6.4	880	34.6	74.4
2018	2090	99.6	1.8	495	23.7	53.7
2019	1788	72.3	0.6	274	15.3	79.9
1998-2019	59796	96.7	6.2	35964	60.1	92.8

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 4.92 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	1813	1039	90.3	303	16.7
1999	1831	1058	91.1	316	17.3
2000	1699	1035	93.7	294	17.3
2001	1843	1100	95.4	298	16.2
2002	3158	1576	98.0	689	21.8
2003	3173	1687	97.8	594	18.7
2004	3051	1697	98.4	552	18.1
2005	2984	1797	96.5	540	18.1
2006	3071	1869	97.4	507	16.5
2007	3424	1985	97.5	573	16.7
2008	3374	2073	98.6	605	17.9
2009	3321	2116	98.6	537	16.2
2010	3111	2175	98.5	523	16.8
2011	3040	2190	98.2	512	16.8
2012	3009	2198	98.3	519	17.2
2013	3010	2181	97.8	465	15.4
2014	2914	2169	98.1	510	17.5
2015	2804	2310	97.9	469	16.7
2016	2742	2217	99.0	473	17.3
2017	2546	2318	97.6	430	16.9
2018	2090	1697	33.5	193	9.2
2019	1788	1445	52.4	164	9.2
1998–2019	59796	39932	93.1	10066	16.8

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 4.92 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer- related %	Prop. non-cancer- related %	Prop. cancer recorded on death certificate %
1998	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	1687	73.8	26.2	86.7
2004	1697	76.1	23.9	86.6
2005	1797	71.6	28.4	81.9
2006	1869	71.7	28.3	82.9
2007	1985	72.1	27.9	83.7
2008	2073	71.7	28.3	82.0
2009	2116	69.9	30.1	79.8
2010	2175	66.9	33.1	78.8
2011	2190	67.0	33.0	78.6
2012	2198	66.3	33.7	78.2
2013	2181	63.3	36.7	74.3
2014	2169	64.3	35.7	76.5
2015	2310	61.5	38.5	73.6
2016	2217	58.6	41.4	72.6
2017	2318	59.5	40.5	70.6
2018	1697	42.1	57.9	63.3
2019	1445	47.1	52.9	64.7
1998–2019	39932	66.2	33.8	79.3

Table 10a

Medians of age at death according to the grouping in Table 9
MALES

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	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	1027	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	1209	77.4	75.5	82.3	76.2
2013	1185	78.9	76.4	83.4	77.2
2014	1196	78.1	75.6	82.7	76.7
2015	1284	79.2	76.3	84.0	77.2
2016	1299	79.1	75.7	83.5	77.4
2017	1296	80.0	77.1	84.4	78.1
2018	994	80.1	75.7	82.3	77.7
2019	866	80.2	75.2	83.7	77.2
1998-2019	21721	77.3	74.5	82.4	75.6

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	820	81.3	79.0	85.9	80.3
2004	821	81.3	79.4	85.2	80.3
2005	859	81.9	80.0	85.1	80.7
2006	842	82.0	79.7	86.2	80.6
2007	901	82.0	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	993	83.3	79.9	87.4	81.4
2011	980	83.6	79.7	88.1	81.4
2012	989	83.9	79.5	88.5	81.4
2013	996	84.0	79.1	88.4	81.2
2014	973	83.8	78.6	88.2	80.7
2015	1026	83.8	78.6	88.7	80.4
2016	918	83.9	78.6	88.7	80.7
2017	1022	83.3	79.5	89.5	80.7
2018	703	83.3	76.8	86.9	80.3
2019	579	82.8	77.3	86.6	79.7
1998-2019	18211	82.4	79.1	87.3	80.6

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	0.42	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	0.45
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	820	36.1	0.51	15.7	0.46	25.0	0.49	34.5	0.52
2013	784	34.1	0.47	14.2	0.41	22.8	0.44	31.9	0.48
2014	786	33.7	0.49	14.0	0.43	22.2	0.45	30.7	0.49
2015	795	33.4	0.51	13.7	0.45	21.8	0.48	30.2	0.51
2016	795	33.1	0.52	13.6	0.44	21.4	0.48	29.4	0.51
2017	779	32.3	0.57	12.7	0.49	20.4	0.52	28.1	0.55
2018	444	18.2	0.40	7.5	0.35	11.7	0.37	15.8	0.39
2019	415	17.0	0.42	7.1	0.36	11.0	0.38	14.8	0.41
1998-2019	14656	33.2	0.46	15.1	0.41	23.9	0.44	32.8	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	594	30.2	0.40	10.5	0.34	16.7	0.36	22.9	0.38
2004	617	31.2	0.44	10.4	0.35	16.7	0.38	23.5	0.42
2005	599	30.1	0.43	9.9	0.37	15.9	0.39	22.0	0.41
2006	601	29.9	0.44	9.5	0.34	15.4	0.37	22.0	0.40
2007	630	27.3	0.42	9.3	0.36	14.8	0.38	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	0.43	20.9	0.44
2010	645	27.6	0.48	8.8	0.41	14.0	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	599	25.1	0.47	8.1	0.38	12.9	0.41	17.4	0.43
2014	608	25.3	0.49	8.1	0.40	12.7	0.42	17.2	0.45
2015	626	25.7	0.53	8.3	0.45	13.0	0.47	17.5	0.49
2016	506	20.6	0.44	6.6	0.37	10.4	0.39	14.1	0.41
2017	601	24.4	0.54	7.3	0.40	11.7	0.44	16.4	0.48
2018	276	11.1	0.30	3.9	0.25	6.0	0.26	7.9	0.28
2019	270	10.9	0.36	3.8	0.31	5.8	0.32	7.7	0.34
1998-2019	11818	25.8	0.44	8.5	0.36	13.4	0.39	18.4	0.41

Table 12

Age distribution of age at death (cancer-related) for period 2007-2019
(incl. multiple malignancies)

Age at death Years	Cases			Males			Females		
	n	%	Cum.%	n	%	Cum.%	n	%	Cum.%
0-4									
5-9									
10-14									
15-19	1	0.0	0.0	1	0.0	0.0			0.0
20-24	5	0.0	0.0	1	0.0	0.0	4	0.1	0.1
25-29	12	0.1	0.1	6	0.1	0.1	6	0.1	0.1
30-34	25	0.1	0.3	16	0.2	0.2	9	0.1	0.3
35-39	46	0.3	0.5	24	0.2	0.5	22	0.3	0.6
40-44	135	0.8	1.3	74	0.8	1.3	61	0.8	1.4
45-49	270	1.6	2.9	138	1.4	2.7	132	1.8	3.2
50-54	504	3.0	5.8	309	3.2	5.8	195	2.7	5.9
55-59	821	4.8	10.7	509	5.2	11.1	312	4.3	10.1
60-64	1233	7.2	17.9	803	8.2	19.3	430	5.9	16.0
65-69	1902	11.1	29.0	1244	12.8	32.1	658	9.0	25.0
70-74	2605	15.3	44.3	1650	16.9	49.0	955	13.0	38.0
75-79	2956	17.3	61.6	1835	18.8	67.8	1121	15.3	53.3
80-84	2964	17.4	78.9	1646	16.9	84.7	1318	18.0	71.3
85+	3594	21.1	100.0	1490	15.3	100.0	2104	28.7	100.0
All ages	17073	100.0		9746	100.0		7327	100.0	

Table 13

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2019
(incl. multiple malignancies)

Age at death Years	Males n	Females n	Males Age- spec. mortal.	Males MI-index	Females Age- spec. mortal.	Females MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4								
5- 9								
10-14								
15-19	1		0.1	0.09			2.1	
20-24	1	4	0.1	0.03	0.2	0.12	1.5	10.3
25-29	6	6	0.3	0.14	0.3	0.11	7.1	6.5
30-34	16	9	0.8	0.18	0.4	0.12	12.5	5.6
35-39	24	22	1.1	0.17	1.0	0.18	9.9	6.0
40-44	74	61	3.2	0.25	2.7	0.23	12.9	7.6
45-49	138	132	5.5	0.23	5.4	0.26	10.3	8.4
50-54	309	195	13.2	0.28	8.4	0.24	12.3	8.0
55-59	509	312	26.2	0.31	15.6	0.30	12.4	8.8
60-64	803	430	49.2	0.35	24.5	0.34	13.5	9.3
65-69	1244	658	81.8	0.41	39.1	0.38	14.5	10.1
70-74	1650	955	117.7	0.46	59.5	0.41	14.9	11.7
75-79	1835	1121	165.7	0.55	81.4	0.45	16.0	12.5
80-84	1646	1318	250.7	0.67	135.4	0.55	17.5	15.5
85+	1490	2104	349.4	0.88	218.0	0.71	18.1	19.1
All ages	9746	7327					15.2	12.9
Mortality								
Raw			32.3	0.48	23.6	0.46		
WS			13.8	0.42	7.6	0.37		
ES			21.8	0.45	12.0	0.40		
BRD-S			30.0	0.48	16.3	0.42		
PYLL-70								
per 100,000			104.7		70.0			
ES			89.2		58.0			
AYLL-70			8.9		10.0			

Table 14a

Further malignancies in deaths in period 1998–2019
MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C03–C06 Oral cavity	63	1.1	45	71.4	4	6.3	14	22.2
C09–C10 Oropharynx	44	0.8	26	59.1	3	6.8	15	34.1
C12–C13 Hypopharynx	26	0.4	9	34.6	2	7.7	15	57.7
C15 Oesophagus	105	1.8	14	13.3	17	16.2	74	70.5
C16 Stomach	308	5.3	88	28.6	70	22.7	150	48.7
C17 Small intestine	68	1.2	11	16.2	22	32.4	35	51.5
C18 Colon	492	8.5	83	16.9	239	48.6	170	34.6
C19–C20 Rectum	207	3.6	100	48.3	92	44.4	15	7.2
C21 Anus/canal	17	0.3	8	47.1	3	17.6	6	35.3
C22 Liver	182	3.1	9	4.9	39	21.4	134	73.6
C23–C24 Bile	57	1.0	4	7.0	8	14.0	45	78.9
C25 Pancreas	217	3.7	14	6.5	29	13.4	174	80.2
C30–C31 Sinuses	11	0.2	9	81.8			2	18.2
C32 Larynx	95	1.6	66	69.5	1	1.1	28	29.5
C33–C34 Lung	638	11.0	104	16.3	88	13.8	446	69.9
C38,C45 Mesothelioma	33	0.6	1	3.0	6	18.2	26	78.8
C43 Malign. melanoma	200	3.4	124	62.0	2	1.0	74	37.0
C44 Skin others	402	6.9	196	48.8	26	6.5	180	44.8
C46,C49 Soft tissue	27	0.5	8	29.6			19	70.4
C50 Breast	14	0.2	4	28.6			10	71.4
C60 Penis	16	0.3	7	43.8			9	56.3
C61 Prostate	1378	23.7	789	57.3	105	7.6	484	35.1
C62 Testis	33	0.6	28	84.8			5	15.2
C64 Kidney	233	4.0	107	45.9	52	22.3	74	31.8
C65 Renal pelvis	29	0.5	6	20.7			23	79.3
C66 Ureter	18	0.3	4	22.2	2	11.1	12	66.7
C67 Bladder	302	5.2	107	35.4	29	9.6	166	55.0
C70–C72 CNS cancer	52	0.9	5	9.6	4	7.7	43	82.7
C73 Thyroid	26	0.4	14	53.8	2	7.7	10	38.5
C76–C79 CUP	67	1.2	12	17.9	11	16.4	44	65.7
C81 Hodgkin lymphoma	18	0.3	15	83.3			3	16.7
C82–C85 NHL	233	4.0	101	43.3	35	15.0	97	41.6
C90 Mult. myeloma	51	0.9	17	33.3	4	7.8	30	58.8
C91–C96 Leukaemia	82	1.4	17	20.7	7	8.5	58	70.7
Others, specified	69	1.2	33	47.8	5	7.2	31	44.9
All further malignancies	5813	100.0	2185	37.6	907	15.6	2721	46.8

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 1998-2019
FEMALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C03-C06 Oral cavity	20	0.5	11	55.0	1	5.0	8	40.0
C09-C10 Oropharynx	16	0.4	8	50.0	1	6.3	7	43.8
C15 Oesophagus	20	0.5	3	15.0	2	10.0	15	75.0
C16 Stomach	197	4.9	64	32.5	36	18.3	97	49.2
C17 Small intestine	37	0.9	3	8.1	19	51.4	15	40.5
C18 Colon	326	8.2	58	17.8	136	41.7	132	40.5
C19-C20 Rectum	119	3.0	63	52.9	43	36.1	13	10.9
C21 Anus/canal	28	0.7	10	35.7	10	35.7	8	28.6
C22 Liver	47	1.2	2	4.3	12	25.5	33	70.2
C23-C24 Bile	57	1.4	13	22.8	9	15.8	35	61.4
C25 Pancreas	187	4.7	12	6.4	25	13.4	150	80.2
C32 Larynx	15	0.4	9	60.0	2	13.3	4	26.7
C33-C34 Lung	273	6.8	46	16.8	24	8.8	203	74.4
C43 Malign. melanoma	94	2.4	59	62.8	6	6.4	29	30.9
C44 Skin others	149	3.7	91	61.1	9	6.0	49	32.9
C46,C49 Soft tissue	19	0.5	10	52.6	2	10.5	7	36.8
C48 Peritoneal	16	0.4	3	18.8	7	43.8	6	37.5
C50 Breast	1056	26.5	696	65.9	75	7.1	285	27.0
C51 Vulva	34	0.9	17	50.0	2	5.9	15	44.1
C52 Vagina	14	0.4	5	35.7	1	7.1	8	57.1
C53 Cervix uteri	128	3.2	93	72.7	7	5.5	28	21.9
C54 Corpus uteri	254	6.4	166	65.4	14	5.5	74	29.1
C55,C57 Fem. genitals un	23	0.6	18	78.3	2	8.7	3	13.0
C56 Ovary	254	6.4	86	33.9	52	20.5	116	45.7
C64 Kidney	86	2.2	45	52.3	12	14.0	29	33.7
C66 Ureter	14	0.4	3	21.4	1	7.1	10	71.4
C67 Bladder	103	2.6	43	41.7	3	2.9	57	55.3
C70-C72 CNS cancer	30	0.8	8	26.7	3	10.0	19	63.3
C73 Thyroid	44	1.1	28	63.6	3	6.8	13	29.5
C76-C79 CUP	41	1.0	13	31.7	9	22.0	19	46.3
C81 Hodgkin lymphoma	14	0.4	11	78.6	1	7.1	2	14.3
C82-C85 NHL	122	3.1	54	44.3	17	13.9	51	41.8
C90 Mult. myeloma	43	1.1	14	32.6	4	9.3	25	58.1
C91-C96 Leukaemia	49	1.2	8	16.3	7	14.3	34	69.4
Others, specified	58	1.5	15	25.9	3	5.2	40	69.0
All further malignancies	3987	100.0	1788	44.8	560	14.0	1639	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 2007-2019
(First primaries only *)

Age at death Years	Males n	Females n	Males Age- spec. mortal.	Males MI-index	Females Age- spec. mortal.	Females MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4								
5- 9								
10-14								
15-19	1		0.1	0.09			2.2	
20-24	1	4	0.1	0.03	0.2	0.12	1.7	10.8
25-29	6	6	0.3	0.15	0.3	0.12	7.8	7.0
30-34	16	7	0.8	0.18	0.3	0.10	12.9	5.0
35-39	22	18	1.0	0.17	0.9	0.16	9.7	5.5
40-44	69	54	2.9	0.25	2.4	0.23	13.1	7.7
45-49	130	116	5.2	0.24	4.8	0.25	10.6	8.6
50-54	275	176	11.7	0.27	7.6	0.25	12.4	8.5
55-59	453	272	23.3	0.31	13.6	0.30	12.6	9.2
60-64	684	355	41.9	0.34	20.2	0.33	13.7	9.4
65-69	1007	542	66.2	0.42	32.2	0.38	14.6	10.5
70-74	1295	730	92.4	0.47	45.5	0.40	15.3	11.5
75-79	1372	872	123.9	0.56	63.3	0.45	16.4	12.6
80-84	1176	1033	179.1	0.70	106.1	0.54	17.4	15.7
85+	1075	1665	252.1	0.91	172.5	0.71	18.1	19.1
All ages	7582	5850					15.3	12.9
Mortality								
Raw			25.2	0.47	18.8	0.45		
WS			11.1	0.42	6.2	0.36		
ES			17.3	0.44	9.7	0.39		
BRD-S			23.3	0.48	13.1	0.41		
PYLL-70								
per 100,000			92.7		60.7			
ES			79.1		50.4			
AYLL-70			9.2		10.2			

* See corresponding tables with multiple malignancies.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2019
(**Single primaries only ***)

Age at death Years	Males n	Females n	Males Age- spec. mortal.	Males MI-index	Females Age- spec. mortal.	Females MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4								
5- 9								
10-14								
15-19	1		0.1	0.09			2.2	
20-24	1	4	0.1	0.03	0.2	0.12	1.7	11.1
25-29	6	6	0.3	0.16	0.3	0.12	7.8	7.1
30-34	16	7	0.8	0.18	0.3	0.10	13.0	5.1
35-39	22	17	1.0	0.18	0.8	0.16	9.8	5.2
40-44	68	53	2.9	0.25	2.3	0.24	13.0	7.6
45-49	126	115	5.0	0.25	4.7	0.26	10.4	8.6
50-54	263	169	11.2	0.27	7.3	0.26	12.0	8.3
55-59	416	251	21.4	0.31	12.6	0.30	11.7	8.6
60-64	629	319	38.6	0.34	18.2	0.33	12.8	8.6
65-69	867	461	57.0	0.41	27.4	0.36	12.9	9.2
70-74	1037	624	74.0	0.43	38.9	0.38	12.7	10.1
75-79	1079	752	97.5	0.50	54.6	0.42	13.5	11.3
80-84	860	865	131.0	0.57	88.9	0.48	13.6	13.7
85+	786	1402	184.3	0.71	145.2	0.62	14.5	16.9
All ages	6177	5045					13.0	11.5
Mortality								
Raw			20.5	0.42	16.2	0.41		
WS			9.3	0.38	5.4	0.34		
ES			14.3	0.40	8.5	0.36		
BRD-S			19.0	0.43	11.4	0.38		
PYLL-70								
per 100,000			86.9		57.1			
ES			74.2		47.5			
AYLL-70			9.5		10.7			

* See corresponding tables with multiple malignancies.

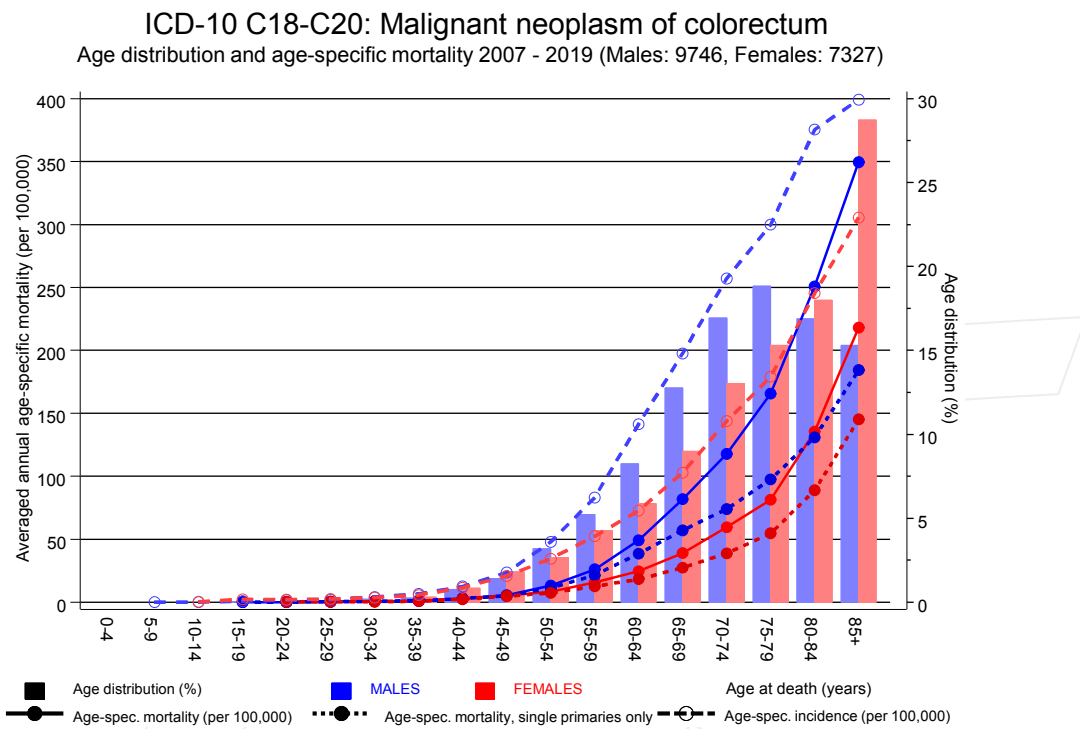
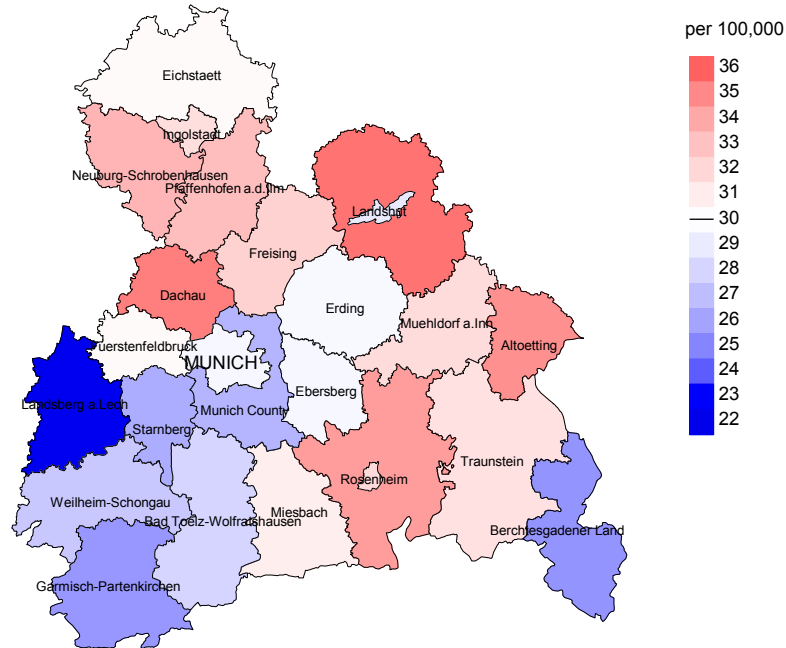


Figure 17. Distribution of age at death (bars; males: mean=70.1 yrs, median=70.9 yrs; females: mean=73.4 yrs, median=75.2 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

Average mortality (Germany 1987 standard population) 2007 - 2019: Males



Average mortality (Germany 1987 standard population) 2007 - 2019: Females

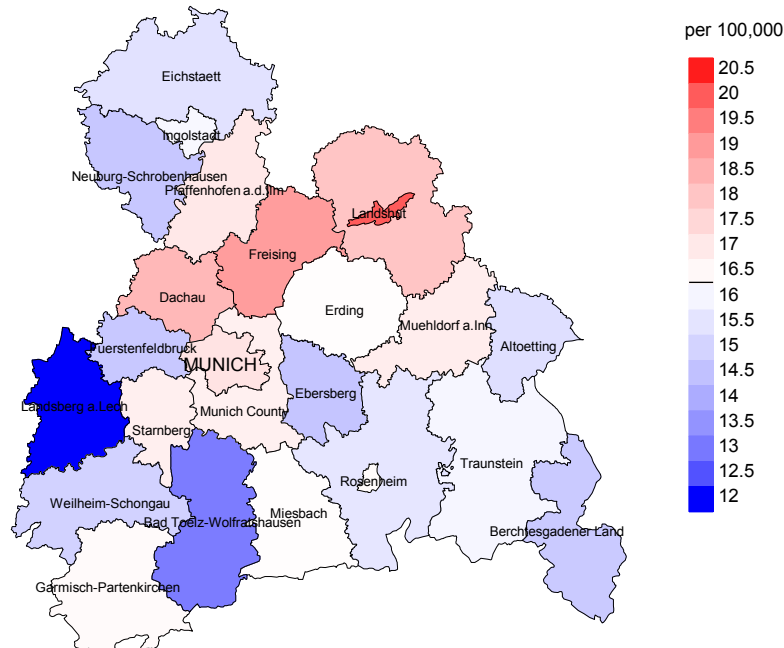


Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2019. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 30.0/100,000 WS N=9,746, females 16.3/100,000 WS N=7,327).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 67,462 female residents (averaged) in the period from 2007 to 2019 a total of 176 women died from colorectal cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 14.6/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 11.9 and 17.8/100,000.

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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