

Munich Cancer Registry



- ▶ Survival
- ▶ Selection Matrix
- ▶ Homepage
- ▶ *Deutsch*

ICD-10 C18-C21: Colorectal cancer

Incidence and Mortality

Year of diagnosis	1998-2019
Patients	59,972
Diseases	61,725
Creation date	01/25/2021
Database export	01/07/2021
Population	4.92 m





Munich Cancer Registry
Cancer Registry Bavaria - Upper Bavaria Regional Center
at Klinikum Grosshadern/IBE
Marchioninstr. 15
Munich, 81377
Germany

<https://www.tumorregister-muenchen.de/en>

<https://www.tumorregister-muenchen.de/en/facts/base/bC1821E-ICD-10-C18-C21-Colorectal-cancer-incidence-and-mortality.pdf>

Index of figures and tables

Fig./Tbl.		Page
1	Annual cases, DCO, mult. malignancies, follow-up / yr	5
2	Incidence by year of diagnosis	8
3	Age distribution parameters by year of diagnosis	9
4	Age distribution by 5-year age group and sex	12
5	Age-specific incidence, DCO rate, proportion malignancies	13
6	Age distribution and age-specific incidence (chart)	14
6a	Age-specific incidence internationally (chart)	15
7	Standardized incidence ratio of further malignancies	16
8a	Map of cancer incidence (BRD-S) by county (chart)	18
8b	Standardized incidence ratio (SIR) by county (chart)	19
9a	Pts incident cohorts and mortality / yr	20
9b	Incidence and mortality by year of diagnosis	21
9c	Cancer-related deaths, death certification available / yr	22
10	Medians of age at death / yr	23
11	Mortality by year of death	25
12	Distribution of age at death	27
13	Age-specific mortality	28
14	Further malignancies in deaths	29
15	Age-specific mortality (first primaries)	31
16	Age-specific mortality (single primaries)	32
17	Age distribution and age-specific mortality (chart)	33
18a	Map of cancer mortality (BRD-S) by county (chart)	34
18b	Standardized mortality ratio (SMR) by county (chart)	35

**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
C21.-	Malignant neoplasm of anus and anal canal
C21.0	Anus, unspecified
C21.1	Anal canal
C21.2	Cloacogenic zone
C21.8	Overlapping lesion of rectum, anus and anal canal

INCIDENCE

Table 1

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

Year of diagnosis	All cases n	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	1883	107	5.7	11.5	10.9	79.1	97.3
1999	1881	126	6.7	11.7	10.7	77.8	97.0
2000	1750	111	6.3	12.4	10.6	76.7	97.1
2001	1909	138	7.2	12.6	10.4	72.6	96.6
2002	3230	378	11.7	12.5	10.2	76.9	97.4 #
2003	3241	310	9.6	12.7	9.9	72.9	97.2
2004	3125	245	7.8	12.9	9.6	72.5	97.4
2005	3063	224	7.3	13.4	9.3	72.2	97.0
2006	3153	169	5.4	13.7	8.9	67.9	95.3
2007	3518	216	6.1	13.9	8.5	67.1	93.8 #
2008	3462	200	5.8	14.1	8.0	64.2	98.2
2009	3435	182	5.3	14.5	7.5	63.1	98.4
2010	3230	190	5.9	14.7	6.9	60.8	98.0
2011	3145	160	5.1	15.0	6.4	58.9	98.1
2012	3116	168	5.4	15.2	5.9	55.6	97.8
2013	3122	157	5.0	15.5	5.5	52.5	97.9
2014	3027	154	5.1	15.7	5.0	50.7	96.7
2015	2926	138	4.7	15.9	4.5	46.8	96.4
2016	2861	136	4.8	16.0	4.0	42.6	99.2
2017	2628	165	6.3	16.2	3.3	34.3	99.3
2018	2158	39	1.8	16.4	2.7	23.4	99.6
2019	1862	12	0.6	16.4	1.9	15.4	72.8 ##
1998-2019	61725	3725	6.0	16.4	10.9	59.8	96.6

61,725 cases diagnosed 1998-2019 are related to a total of 59,972 patients. Currently, in 15,734 (26.2 %) of these 59,972 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 12,438 / 2,576 / 720 (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 2,628 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	940	49.9	39	4.1	10.7	12.4	79.5	98.1
1999	955	50.8	46	4.8	10.8	12.2	78.6	97.4
2000	892	51.0	31	3.5	11.6	12.0	74.7	97.2
2001	988	51.8	48	4.9	11.9	11.8	72.8	96.6
2002	1694	52.4	167	9.9	12.0	11.6	77.6	97.9 #
2003	1712	52.8	122	7.1	12.3	11.2	74.0	98.2
2004	1650	52.8	92	5.6	12.7	10.8	74.5	97.6
2005	1601	52.3	95	5.9	13.3	10.4	72.0	97.1
2006	1701	53.9	58	3.4	13.8	10.1	68.4	95.4
2007	1927	54.8	90	4.7	14.1	9.6	67.7	93.8 #
2008	1898	54.8	80	4.2	14.5	9.1	64.3	98.4
2009	1911	55.6	82	4.3	14.9	8.5	63.8	98.7
2010	1792	55.5	79	4.4	15.3	7.8	61.0	97.8
2011	1712	54.4	58	3.4	15.6	7.3	58.6	98.2
2012	1689	54.2	68	4.0	15.9	6.8	56.8	98.1
2013	1763	56.5	62	3.5	16.2	6.2	53.1	97.5
2014	1694	56.0	69	4.1	16.4	5.6	51.1	97.3
2015	1650	56.4	59	3.6	16.6	4.9	46.6	96.6
2016	1616	56.5	50	3.1	16.7	4.5	43.3	99.3
2017	1446	55.0	79	5.5	17.0	3.5	33.9	99.3
2018	1169	54.2	17	1.5	17.1	2.8	25.1	99.6
2019	1048	56.3	5	0.5	17.2	1.7	16.7	73.8 ##
1998-2019	33448	54.2	1496	4.5	17.2	12.4	59.9	96.8

33,448 cases diagnosed 1998-2019 are related to a total of 32,332 patients. Currently, in 9,129 (28.2 %) of these 32,332 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 7,120 / 1,545 / 464 (22.0 % / 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 1,446 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	943	50.1	68	7.2	12.2	9.2	78.8	96.6
1999	926	49.2	80	8.6	12.7	9.1	76.9	96.5
2000	858	49.0	80	9.3	13.2	9.0	78.9	97.1
2001	921	48.2	90	9.8	13.4	8.8	72.3	96.6
2002	1536	47.6	211	13.7	13.1	8.7	76.2	96.9 #
2003	1529	47.2	188	12.3	13.1	8.4	71.7	96.0
2004	1475	47.2	153	10.4	13.1	8.1	70.4	97.2
2005	1462	47.7	129	8.8	13.4	7.8	72.4	96.9
2006	1452	46.1	111	7.6	13.5	7.5	67.2	95.2
2007	1591	45.2	126	7.9	13.6	7.1	66.4	93.7 #
2008	1564	45.2	120	7.7	13.7	6.7	64.1	98.0
2009	1524	44.4	100	6.6	13.9	6.2	62.2	98.1
2010	1438	44.5	111	7.7	14.1	5.7	60.6	98.3
2011	1433	45.6	102	7.1	14.3	5.3	59.2	97.8
2012	1427	45.8	100	7.0	14.4	4.8	54.1	97.4
2013	1359	43.5	95	7.0	14.7	4.6	51.7	98.5
2014	1333	44.0	85	6.4	14.8	4.3	50.3	95.9
2015	1276	43.6	79	6.2	15.0	4.0	47.0	96.2
2016	1245	43.5	86	6.9	15.2	3.5	41.6	99.1
2017	1182	45.0	86	7.3	15.3	3.0	34.8	99.3
2018	989	45.8	22	2.2	15.5	2.5	21.4	99.7
2019	814	43.7	7	0.9	15.6	2.2	13.8	71.6 ##
1998-2019	28277	45.8	2229	7.9	15.6	9.2	59.6	96.4

28,277 cases diagnosed 1998-2019 are related to a total of 27,640 patients. Currently, in 6,605 (23.9 %) of these 27,640 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 5,318 / 1,031 / 256 (19.2 % / 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 1,182 cases has been diagnosed, of which 15.3 % 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	940	943	84.8	80.2	51.0	34.3	76.6	51.7	99.7	67.6
1999	955	926	85.3	78.0	50.6	33.2	76.5	50.0	100.2	65.1
2000	892	858	78.3	71.4	45.9	29.4	69.4	44.8	89.8	58.6
2001	988	921	85.3	75.7	49.9	32.4	74.7	48.6	95.5	63.3
2002	1694	1536	90.9	78.4	50.8	32.1	76.6	48.5	100.1	63.2
2003	1712	1529	91.3	77.6	50.3	32.0	75.7	48.1	98.3	62.2
2004	1650	1475	87.7	74.6	46.8	31.1	70.7	46.4	92.5	59.7
2005	1601	1462	84.5	73.5	44.9	28.9	67.3	43.7	87.3	57.5
2006	1701	1452	88.8	72.3	46.7	29.8	69.8	44.3	90.2	57.5
2007	1927	1591	87.0	68.9	45.3	27.7	67.6	41.4	87.6	53.8
2008	1898	1564	85.3	67.4	42.9	26.7	64.7	40.1	84.1	51.9
2009	1911	1524	85.6	65.5	42.5	25.9	63.6	38.8	83.0	50.6
2010	1792	1438	79.5	61.4	39.1	23.5	58.6	35.5	76.3	46.7
2011	1712	1433	76.5	61.3	37.0	24.4	55.5	36.2	72.0	46.2
2012	1689	1427	74.4	60.5	35.7	24.4	53.6	35.8	69.2	46.1
2013	1763	1359	76.6	57.0	36.2	23.1	54.1	33.9	70.4	43.3
2014	1694	1333	72.7	55.4	34.4	22.3	51.4	32.7	66.2	41.5
2015	1650	1276	69.4	52.4	32.6	20.5	48.7	30.3	62.8	38.9
2016	1616	1245	67.2	50.7	32.2	19.9	47.3	29.4	60.9	37.7
2017	1446	1182	59.9	48.0	27.5	19.4	41.1	28.4	53.3	36.1
2018	1169	989	48.0	39.8	22.5	17.1	33.2	24.6	42.4	30.5
2019	1048	814	43.0	32.8	20.8	13.8	30.3	19.8	38.1	24.9
1998-2019	33448	28277	75.9	61.8	38.2	24.9	56.9	37.0	73.3	47.6

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.		Min.	Max.	Median				
		Mean	dev.			10%	25%	50%	75%	90%
1998	1883	69.9	12.4	13.2	102	53.9	60.8	71.0	78.7	86.1
1999	1881	70.3	12.6	20.2	102	54.2	61.7	71.1	79.3	86.4
2000	1750	70.4	12.2	24.7	103	54.6	61.5	71.3	79.3	86.7
2001	1909	69.9	12.5	26.6	103	54.1	61.5	70.3	79.3	86.5
2002	3230	70.9	12.1	17.7	104	55.2	62.5	71.8	80.0	86.7
2003	3241	70.8	12.0	8.4	101	55.6	63.0	71.4	79.9	86.0
2004	3125	70.6	12.3	13.8	101	55.0	62.9	71.0	79.8	85.4
2005	3063	71.3	12.2	15.1	99.9	55.4	63.7	71.8	80.3	86.0
2006	3153	70.4	12.2	17.9	102	54.2	63.1	70.8	79.6	85.2
2007	3518	70.7	12.5	13.4	103	54.1	63.7	71.2	80.2	85.8
2008	3462	71.3	12.4	18.9	105	55.0	64.0	71.9	80.4	86.5
2009	3435	71.0	12.4	12.4	102	54.2	63.6	71.9	80.1	85.9
2010	3230	71.4	12.6	14.9	101	54.2	63.6	72.4	80.9	86.2
2011	3145	71.1	12.9	15.5	101	53.2	63.1	72.2	80.7	86.8
2012	3116	71.0	13.0	9.7	101	54.0	63.0	72.6	80.4	86.4
2013	3122	70.8	13.2	15.7	105	52.9	62.8	72.7	80.0	86.2
2014	3027	71.0	13.2	1.4	103	52.9	63.0	73.0	80.2	86.7
2015	2926	71.1	13.1	11.4	105	53.0	63.2	73.3	80.3	86.6
2016	2861	70.8	13.2	9.4	100	52.9	62.6	72.9	80.2	86.2
2017	2628	71.1	12.9	14.5	99.0	53.7	62.8	73.2	80.2	85.9
2018	2158	70.1	12.7	17.8	100	53.3	61.2	71.7	79.8	85.0
2019	1862	69.6	13.7	17.7	100	51.4	60.9	71.7	79.9	85.1
1998-2019	61725	70.8	12.7	1.4	105	53.9	62.8	72.0	80.1	86.1

Table 3a

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

Year of diagnosis	Cases n	Std.		Median						
		Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	940	67.7	11.8	31.4	98.1	53.6	59.4	68.1	75.9	83.9
1999	955	68.2	11.7	20.2	95.5	54.2	60.2	69.0	76.7	83.4
2000	892	68.2	11.0	34.4	95.9	54.1	60.2	68.0	76.6	82.7
2001	988	68.2	11.4	31.3	102	54.1	61.1	67.9	75.8	83.4
2002	1694	69.1	11.0	20.9	98.5	55.4	61.8	69.4	76.6	82.5
2003	1712	69.1	11.1	8.4	99.4	55.4	62.5	69.5	76.5	82.7
2004	1650	69.3	11.1	27.8	101	55.4	62.4	69.3	77.1	83.4
2005	1601	69.2	11.3	19.0	99.6	54.6	62.7	69.4	77.1	83.5
2006	1701	68.9	11.2	17.9	102	54.5	62.5	69.2	77.2	82.8
2007	1927	69.0	11.7	15.8	99.4	54.2	62.6	69.4	77.5	82.9
2008	1898	69.7	11.3	19.3	105	54.8	63.3	70.3	77.8	83.4
2009	1911	69.5	11.5	12.4	102	53.8	62.8	70.8	77.8	83.0
2010	1792	69.8	11.7	21.1	98.9	54.0	62.4	70.8	78.2	84.0
2011	1712	69.9	11.8	15.5	97.3	53.4	63.1	71.1	78.2	84.2
2012	1689	70.3	11.6	9.7	101	55.1	62.9	71.5	78.3	84.1
2013	1763	70.1	12.1	19.4	99.6	53.8	62.8	71.9	78.3	84.3
2014	1694	70.4	12.3	20.3	102	53.5	62.7	72.2	79.1	85.1
2015	1650	70.2	12.3	18.3	105	53.3	62.4	72.2	79.0	84.9
2016	1616	69.7	12.9	9.4	100	52.5	61.7	72.1	79.1	84.3
2017	1446	70.8	12.0	19.1	96.3	54.6	62.9	72.5	79.6	84.4
2018	1169	70.0	12.1	17.8	97.1	54.1	61.3	71.5	79.5	84.3
2019	1048	68.9	13.1	17.9	98.2	52.0	60.5	70.8	78.5	83.9
1998-2019	33448	69.5	11.7	8.4	105	54.1	62.2	70.4	77.9	83.7

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	943	72.1	12.7	13.2	102	54.5	63.1	74.0	81.6	87.4
1999	926	72.4	13.1	26.9	102	54.2	63.5	74.5	81.9	88.0
2000	858	72.8	12.8	24.7	103	55.8	63.0	74.7	81.8	88.5
2001	921	71.8	13.4	26.6	103	54.0	62.2	74.4	81.2	88.4
2002	1536	72.9	13.0	17.7	104	55.2	63.5	74.8	82.1	88.8
2003	1529	72.7	12.6	23.5	101	56.0	63.8	74.2	82.3	88.5
2004	1475	72.0	13.4	13.8	100	54.4	63.7	73.7	82.6	87.6
2005	1462	73.5	12.8	15.1	99.9	56.8	65.2	75.4	83.2	89.2
2006	1452	72.1	13.1	21.2	98.7	54.2	64.1	73.8	82.2	86.7
2007	1591	72.7	13.2	13.4	103	53.8	65.0	74.3	82.8	87.4
2008	1564	73.2	13.3	18.9	102	55.3	64.9	74.1	83.6	88.5
2009	1524	72.9	13.3	15.9	102	54.6	64.9	74.7	83.1	88.4
2010	1438	73.3	13.4	14.9	101	54.6	65.4	75.2	83.3	88.6
2011	1433	72.5	14.0	16.5	101	52.5	63.2	74.1	83.8	88.8
2012	1427	72.0	14.5	13.7	100	52.6	63.4	74.5	83.0	88.6
2013	1359	71.7	14.4	15.7	105	51.0	62.9	74.0	82.5	88.5
2014	1333	71.8	14.2	1.4	103	51.5	63.7	74.1	82.3	88.6
2015	1276	72.4	14.0	11.4	101	52.3	65.0	74.6	82.0	89.0
2016	1245	72.4	13.5	16.1	100	53.2	63.7	75.0	81.9	88.2
2017	1182	71.4	14.0	14.5	99.0	52.5	62.5	74.0	81.2	87.2
2018	989	70.3	13.4	19.3	100	51.9	61.2	71.7	80.5	86.0
2019	814	70.6	14.3	17.7	100	50.4	61.6	73.1	81.1	86.7
1998-2019	28277	72.3	13.5	1.4	105	53.7	63.8	74.3	82.4	88.2

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	1	0.0	0.0			0.0	1	0.0	0.0
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	70	0.2	0.3	34	0.2	0.2	36	0.2	0.4
25-29	102	0.3	0.6	47	0.2	0.4	55	0.3	0.8
30-34	173	0.4	1.0	92	0.4	0.9	81	0.5	1.2
35-39	284	0.7	1.8	149	0.7	1.6	135	0.8	2.0
40-44	601	1.6	3.3	311	1.5	3.0	290	1.7	3.7
45-49	1204	3.1	6.5	641	3.0	6.0	563	3.3	7.0
50-54	2096	5.4	11.9	1199	5.6	11.7	897	5.2	12.2
55-59	2864	7.4	19.4	1696	8.0	19.6	1168	6.8	19.0
60-64	3812	9.9	29.3	2403	11.3	30.9	1409	8.2	27.2
65-69	5018	13.0	42.3	3154	14.8	45.7	1864	10.9	38.1
70-74	6224	16.2	58.5	3771	17.7	63.4	2453	14.3	52.4
75-79	6070	15.8	74.2	3461	16.2	79.6	2609	15.2	67.5
80-84	5077	13.2	87.4	2580	12.1	91.7	2497	14.5	82.1
85+	4840	12.6	100.0	1763	8.3	100.0	3077	17.9	100.0
All ages	38490	100.0		21315	100.0		17175	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=796 %	Females DCO rate n=1114 %	Males Prop.all cancers n=143063 %	Females Prop.all cancers n=144724 %
0- 4		1		0.1		100.0		0.6
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	36	1.8	2.0	2.9		5.8	7.6
25-29	44	55	2.1	2.7			5.0	5.0
30-34	92	80	4.3	3.8		2.5	7.7	4.0
35-39	145	133	6.8	6.3	1.4	2.3	8.5	4.1
40-44	308	289	13.2	12.8		0.3	11.9	5.0
45-49	631	557	25.1	22.9	0.6	0.2	13.2	6.3
50-54	1171	890	50.0	38.5	1.1	1.1	14.9	7.7
55-59	1672	1152	86.0	57.6	1.3	0.6	14.2	9.3
60-64	2357	1388	144.5	79.1	1.4	1.4	14.4	9.6
65-69	3069	1835	201.8	108.9	1.8	1.5	13.5	10.3
70-74	3668	2403	261.7	149.6	2.8	2.2	14.2	12.9
75-79	3374	2556	304.7	185.6	3.3	4.0	15.3	14.1
80-84	2491	2460	379.4	252.7	6.2	7.6	17.6	17.3
85+	1729	3028	405.5	313.7	17.4	23.1	17.6	19.6
All ages	20799	16903			3.8	6.6	14.5	11.7
Incidence								
Raw			69.0	54.3				
WS			33.3	21.7				
ES			49.5	32.1				
BRD-S			63.8	41.0				

The age-specific incidence characterizes the disease risk in a particular age group. The age distribution depends on the patient population frequency in each age group and reflects the tangible clinical picture of everyday patients care (see following chart).

ICD-10 C18-C21: Malignant neoplasm of colorectum incl. anus
 Age distribution and age-specific incidence 2007 - 2019 (Males: 20799, Females: 16903)

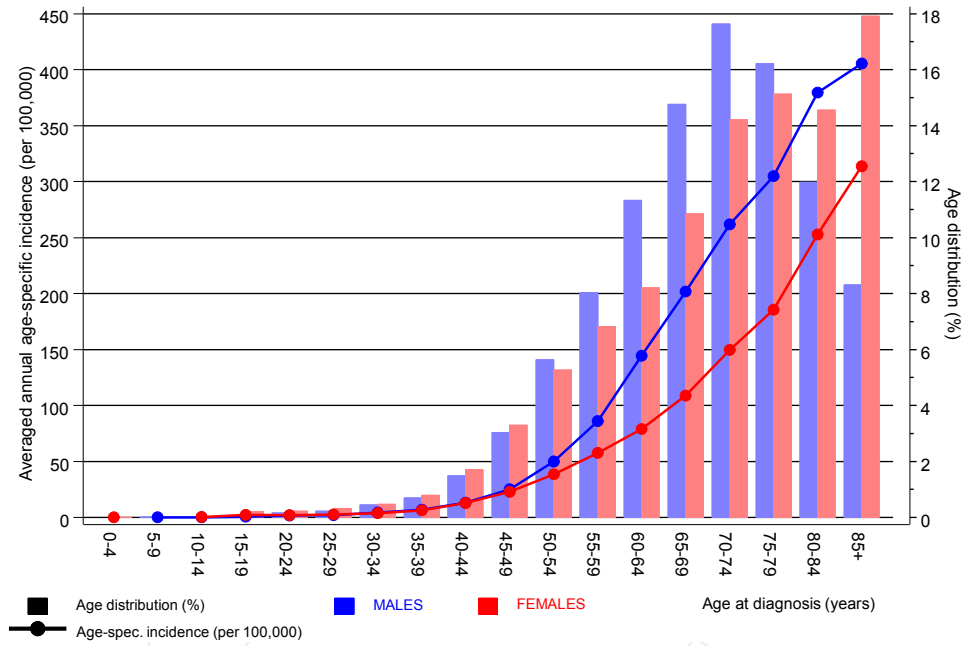


Figure 6. Age distribution (males: mean=69.8 yrs, median=71.2 yrs; females: mean=72.2 yrs, median=74.2 yrs) and age-specific incidence.

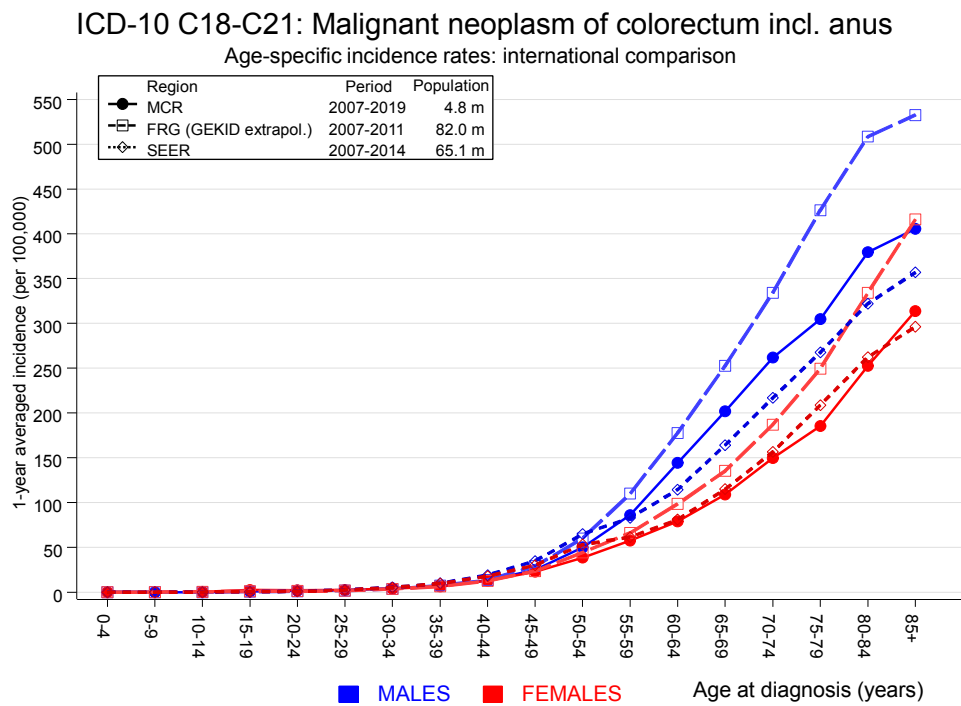


Figure 6a. Age-specific incidence in MCR registry areas compared to Germany (FRG, GEKID extrapolation) and SEER (Surveillance, Epidemiology, and End Results, USA).

Reference:

Extrapolated age-specific patient population of Germany, data status middle of 2010. Association of Population-based Cancer Registries in Germany (GEKID e.V.). Berlin, 2014. <http://www.gekid.de>. Last access: 02/11/2015
 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 %
C00 Lip	5	2.4	2.1	0.7	4.9	0.2	
C03–C06 Oral cavity	21	14.9	1.4	0.9	2.2	0.6	4.8
C07–C08 Salivary gland	5	4.8	1.0	0.3	2.4	0.0	
C09–C10 Oropharynx	30	17.9	1.7	1.1	2.4 #	1.1	3.3
C12–C13 Hypopharynx	18	9.8	1.8	1.1	2.9 #	0.7	5.6
C15 Oesophagus	116	36.8	3.2	2.6	3.8 #	7.2	8.6
C16 Stomach	239	85.2	2.8	2.5	3.2 #	14.0	8.4
C17 Small intestine	106	11.5	9.2	7.5	11.1 #	8.6	0.9
C18 Colon	770	205.4	3.7	3.5	4.0 #	51.5	1.2
C19–C20 Rectum	307	106.4	2.9	2.6	3.2 #	18.3	1.3
C21 Anus/canal	13	4.5	2.9	1.5	4.9 #	0.8	
C22 Liver	160	57.5	2.8	2.4	3.2 #	9.4	17.5
C23–C24 Bile	56	21.6	2.6	2.0	3.4 #	3.1	12.5
C25 Pancreas	175	79.9	2.2	1.9	2.5 #	8.7	24.6
C30–C31 Sinuses	5	3.5	1.4	0.5	3.3	0.1	
C32 Larynx	38	19.1	2.0	1.4	2.7 #	1.7	10.5
C33–C34 Lung	524	237.3	2.2	2.0	2.4 #	26.2	14.3
C38,C45 Mesothelioma	20	14.2	1.4	0.9	2.2	0.5	5.0
C43 Malign. melanoma	167	86.0	1.9	1.7	2.3 #	7.4	1.8
C46,C49 Soft tissue	24	11.5	2.1	1.3	3.1 #	1.1	
C50 Breast	13	5.5	2.4	1.3	4.0 #	0.7	7.7
C60 Penis	13	5.2	2.5	1.3	4.3 #	0.7	15.4
C61 Prostate	1013	582.1	1.7	1.6	1.9 #	39.3	5.8
C62 Testis	9	3.8	2.4	1.1	4.5 #	0.5	11.1
C64 Kidney	199	68.4	2.9	2.5	3.3 #	11.9	6.5
C65 Renal pelvis	26	9.3	2.8	1.8	4.1 #	1.5	
C66 Ureter	17	5.4	3.1	1.8	5.0 #	1.1	
C67 Bladder	204	100.8	2.0	1.8	2.3 #	9.4	7.4
C68 Urethra	5	1.8	2.8	0.9	6.5	0.3	
C70–C72 CNS cancer	48	24.8	1.9	1.4	2.6 #	2.1	20.8
C73 Thyroid	22	11.5	1.9	1.2	2.9 #	1.0	9.1
C76–C79 CUP	60	35.4	1.7	1.3	2.2 #	2.2	1.7
C81 Hodgkin lymphoma	5	4.3	1.2	0.4	2.7	0.1	
C82–C85 NHL	170	87.7	1.9	1.7	2.3 #	7.5	4.1
C90 Mult. myeloma	47	27.6	1.7	1.3	2.3 #	1.8	21.3
C91–C96 Leukaemia	64	32.3	2.0	1.5	2.5 #	2.9	23.4
Others, specified	19	18.2	1.0	0.6	1.6	0.1	21.1
Not observed	0	2.7	0.0	0.0	1.4	-0.2	
All further malignancies	4733	2057.1	2.3	2.2	2.4 #	244.2	7.4

Patients	30560
Median age at next malignancy (years)	74.2
Person-years	109574
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

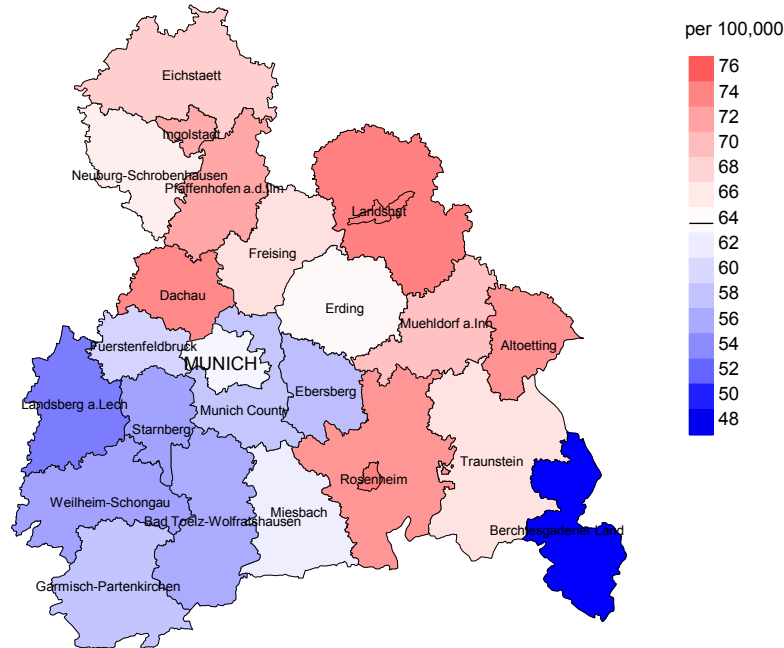
Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C03-C06 Oral cavity	10	6.5	1.5	0.7	2.8	0.4	
C09-C10 Oropharynx	10	4.0	2.5	1.2	4.6 #	0.7	
C15 Oesophagus	21	7.3	2.9	1.8	4.4 #	1.5	9.5
C16 Stomach	109	47.6	2.3	1.9	2.8 #	6.7	16.5
C17 Small intestine	66	5.8	11.3	8.8	14.4 #	6.6	3.0
C18 Colon	469	131.3	3.6	3.3	3.9 #	36.9	1.7
C19-C20 Rectum	141	51.3	2.7	2.3	3.2 #	9.8	1.4
C21 Anus/canal	16	6.3	2.5	1.5	4.1 #	1.1	
C22 Liver	43	15.5	2.8	2.0	3.7 #	3.0	37.2
C23-C24 Bile	33	19.3	1.7	1.2	2.4 #	1.5	12.1
C25 Pancreas	140	61.2	2.3	1.9	2.7 #	8.6	27.1
C26 GI cancer	4	2.8	1.4	0.4	3.6	0.1	50.0
C32 Larynx	5	1.9	2.6	0.8	6.0	0.3	
C33-C34 Lung	260	84.0	3.1	2.7	3.5 #	19.2	11.5
C43 Malign. melanoma	97	41.2	2.4	1.9	2.9 #	6.1	3.1
C46,C49 Soft tissue	15	6.9	2.2	1.2	3.6 #	0.9	
C48 Peritoneal	16	4.3	3.7	2.1	6.1 #	1.3	25.0
C50 Breast	675	333.1	2.0	1.9	2.2 #	37.3	5.6
C51 Vulva	38	13.7	2.8	2.0	3.8 #	2.7	2.6
C52 Vagina	9	2.4	3.7	1.7	7.0 #	0.7	11.1
C53 Cervix uteri	33	13.5	2.4	1.7	3.4 #	2.1	18.2
C54 Corpus uteri	145	62.3	2.3	2.0	2.7 #	9.0	2.8
C55,C57 Fem. genitals un	6	3.6	1.7	0.6	3.6	0.3	16.7
C56 Ovary	139	47.2	2.9	2.5	3.5 #	10.0	25.2
C64 Kidney	98	28.8	3.4	2.8	4.1 #	7.6	12.2
C65 Renal pelvis	11	4.0	2.8	1.4	4.9 #	0.8	
C66 Ureter	6	2.1	2.9	1.1	6.3 #	0.4	16.7
C67 Bladder	57	27.0	2.1	1.6	2.7 #	3.3	19.3
C70-C72 CNS cancer	19	15.2	1.2	0.8	2.0	0.4	47.4
C73 Thyroid	28	15.3	1.8	1.2	2.6 #	1.4	7.1
C74-C80 Cancer others	4	5.8	0.7	0.2	1.8	-0.2	50.0
C76-C79 CUP	20	25.5	0.8	0.5	1.2	-0.6	
C81 Hodgkin lymphoma	6	2.0	3.0	1.1	6.6 #	0.4	
C82-C85 NHL	96	49.0	2.0	1.6	2.4 #	5.1	11.5
C90 Mult. myeloma	27	15.7	1.7	1.1	2.5 #	1.2	25.9
C91-C96 Leukaemia	47	18.8	2.5	1.8	3.3 #	3.1	46.8
Others, specified	24	13.0	1.8	1.2	2.7 #	1.2	8.3
Not observed	0	1.2	0.0	0.0	3.1	-0.1	
All further malignancies	2943	1196.5	2.5	2.4	2.6 #	190.7	10.0

Patients	25416
Median age at next malignancy (years)	75.9
Person-years	91605
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

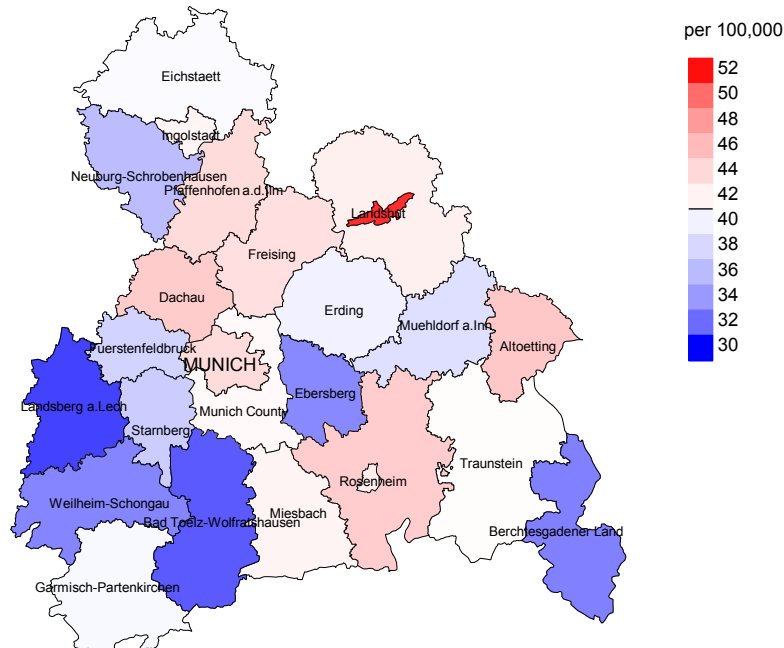
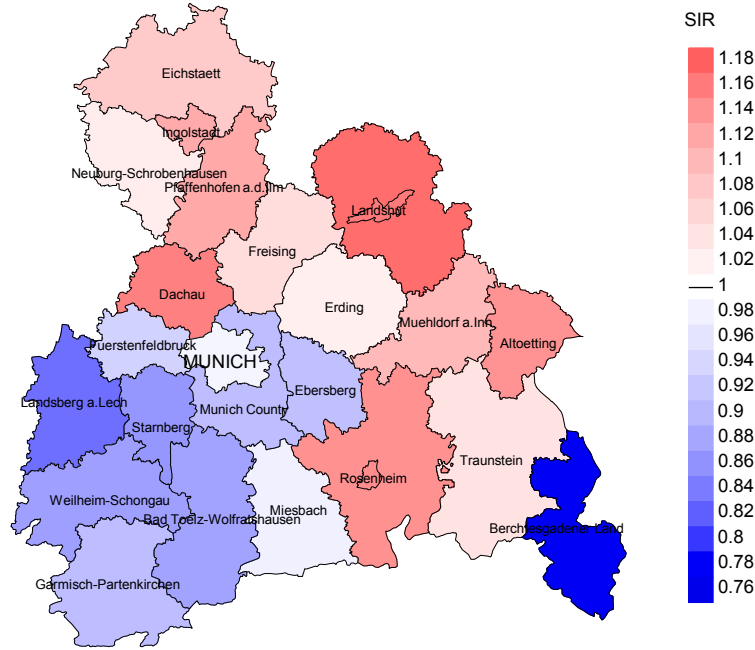


Figure 8a. Map of cancer incidence (german standard population, incl. DCO cases) by county averaged for period 2007 to 2019. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 63.8/100,000 WS N=20,799, females 41.0/100,000 WS N=16,903).

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 365 women were identified with newly diagnosed colorectal cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 33.3/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 28.9 and 38.2/100,000.

Standardized incidence ratio (SIR) 2007 - 2019: Males



Standardized incidence ratio (SIR) 2007 - 2019: Females

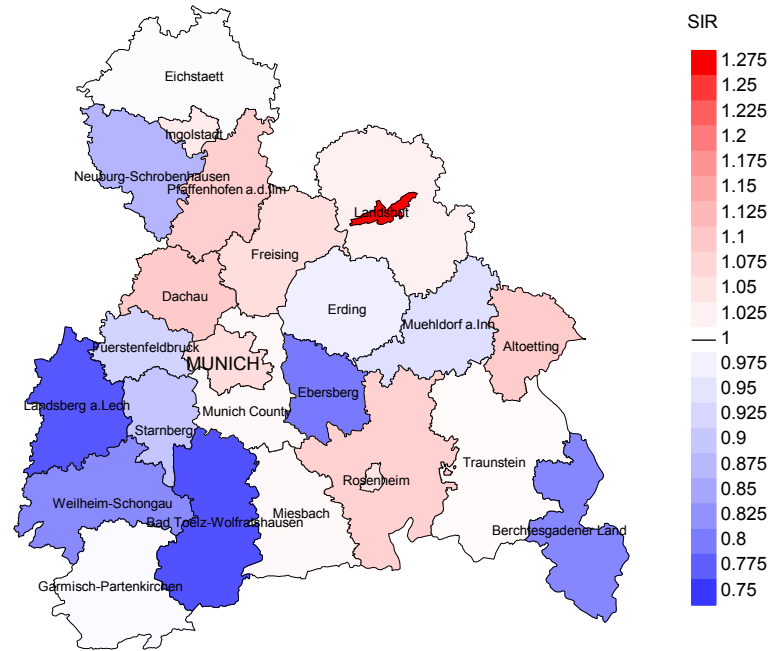


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2019. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=20,799, females N=16,903).

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 365 women were identified with newly diagnosed colorectal cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.80. Though, the value of this parameter may vary with an underlying probability of 99% between 0.69 and 0.91.

MORTALITY

Table 9a

Annual cohorts: Incident cancers, follow-up status, proportion of DCO, deaths among the annual cohorts and proportion of available death certificates (with respect to registry area expansion from 2.65 to 4.10 m as of 2002, and from 4.10 to 4.92 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	1883	97.3	5.7	1490	79.1	93.0
1999	1881	97.0	6.7	1463	77.8	93.9
2000	1750	97.1	6.3	1343	76.7	95.8
2001	1909	96.6	7.2	1385	72.6	95.5
2002	3230	97.4	11.7	2485	76.9	96.0
2003	3241	97.2	9.6	2364	72.9	95.8
2004	3125	97.4	7.8	2267	72.5	95.4
2005	3063	97.0	7.3	2211	72.2	96.3
2006	3153	95.3	5.4	2140	67.9	96.4
2007	3518	93.8	6.1	2360	67.1	95.6
2008	3462	98.2	5.8	2224	64.2	94.5
2009	3435	98.4	5.3	2167	63.1	94.3
2010	3230	98.0	5.9	1965	60.8	93.5
2011	3145	98.1	5.1	1851	58.9	93.7
2012	3116	97.8	5.4	1731	55.6	92.7
2013	3122	97.9	5.0	1639	52.5	91.7
2014	3027	96.7	5.1	1535	50.7	90.4
2015	2926	96.4	4.7	1369	46.8	87.5
2016	2861	99.2	4.8	1218	42.6	84.1
2017	2628	99.3	6.3	901	34.3	74.4
2018	2158	99.6	1.8	506	23.4	54.2
2019	1862	72.8	0.6	287	15.4	79.4
1998-2019	61725	96.6	6.0	36901	59.8	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	1883	1054	90.2	308	16.4
1999	1881	1084	90.8	320	17.0
2000	1750	1060	93.6	298	17.0
2001	1909	1141	95.4	306	16.0
2002	3230	1617	98.0	698	21.6
2003	3241	1722	97.9	599	18.5
2004	3125	1741	98.4	557	17.8
2005	3063	1852	96.5	551	18.0
2006	3153	1914	97.5	513	16.3
2007	3518	2028	97.4	581	16.5
2008	3462	2118	98.6	611	17.6
2009	3435	2156	98.6	541	15.7
2010	3230	2250	98.6	543	16.8
2011	3145	2256	98.1	522	16.6
2012	3116	2254	98.3	530	17.0
2013	3122	2234	97.9	470	15.1
2014	3027	2227	97.9	517	17.1
2015	2926	2373	97.9	477	16.3
2016	2861	2281	99.0	487	17.0
2017	2628	2387	97.6	437	16.6
2018	2158	1741	33.7	196	9.1
2019	1862	1483	52.2	170	9.1
1998–2019	61725	40973	93.1	10232	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 4.92 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer- related %	Prop. non-cancer- related %	Prop. cancer recorded on death certificate %
1998	1054	71.7	28.3	87.0
1999	1084	73.2	26.8	86.5
2000	1060	73.9	26.1	86.2
2001	1141	69.1	30.9	84.8
2002	1617	75.5	24.5	87.3
2003	1722	74.0	26.0	86.8
2004	1741	76.2	23.8	86.6
2005	1852	71.8	28.2	82.0
2006	1914	71.5	28.5	82.8
2007	2028	71.9	28.1	83.6
2008	2118	72.0	28.0	82.2
2009	2156	69.8	30.2	80.0
2010	2250	67.1	32.9	79.0
2011	2256	67.4	32.6	78.9
2012	2254	66.4	33.6	78.2
2013	2234	63.3	36.7	74.2
2014	2227	64.4	35.6	76.7
2015	2373	61.7	38.3	73.8
2016	2281	58.4	41.6	72.7
2017	2387	59.6	40.4	70.8
2018	1741	42.1	57.9	63.5
2019	1483	46.9	53.1	64.6
1998–2019	40973	66.3	33.7	79.4

Table 10a

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	513	73.7	71.4	79.4	73.2
1999	534	73.3	71.4	78.4	72.7
2000	550	74.6	72.2	82.3	73.8
2001	548	74.2	71.3	80.9	72.9
2002	828	74.1	72.0	80.3	73.2
2003	883	74.9	72.6	80.6	73.8
2004	892	75.6	74.2	81.0	75.1
2005	960	75.4	73.1	81.3	73.7
2006	1043	76.4	74.3	80.6	75.4
2007	1098	76.0	73.8	80.9	74.6
2008	1178	76.6	74.5	82.1	75.3
2009	1135	76.4	73.6	81.2	74.4
2010	1217	76.4	74.2	82.0	75.4
2011	1233	76.5	73.3	82.6	75.1
2012	1227	77.3	75.5	82.3	76.2
2013	1209	78.9	76.3	83.6	77.1
2014	1216	78.0	75.5	82.6	76.6
2015	1309	79.2	76.3	83.9	77.2
2016	1323	78.9	75.7	83.2	77.3
2017	1328	80.0	77.1	84.2	78.1
2018	1011	80.0	75.7	82.3	77.5
2019	886	80.0	75.4	83.6	77.3
1998-2019	22121	77.2	74.4	82.3	75.5

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

Table 10b

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	541	78.6	76.4	84.9	78.4
1999	550	79.9	78.3	86.0	79.7
2000	510	80.5	78.7	86.4	79.6
2001	593	81.0	78.0	86.8	80.2
2002	789	81.1	79.7	86.5	80.7
2003	839	81.3	78.9	86.0	80.3
2004	849	81.3	79.3	85.2	80.2
2005	892	81.8	80.0	85.2	80.7
2006	871	82.0	79.8	86.1	80.6
2007	930	81.9	79.2	86.7	80.4
2008	940	82.6	80.1	86.5	81.0
2009	1021	82.7	79.1	87.4	80.3
2010	1033	83.3	79.9	87.2	81.8
2011	1023	83.4	79.3	88.0	81.2
2012	1027	83.8	79.3	88.4	81.2
2013	1025	83.9	79.1	88.3	81.1
2014	1011	83.5	78.3	88.1	80.4
2015	1064	83.5	78.4	88.7	80.3
2016	958	83.8	78.6	88.7	80.7
2017	1059	83.1	79.5	89.3	80.7
2018	730	83.3	76.9	86.9	80.4
2019	597	82.5	77.3	86.4	79.5
1998-2019	18852	82.4	79.0	87.3	80.5

By 2018, Bavarians' life expectancy at birth is estimated at 79.3 years for boys and 83.8 years for girls.

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

Table 11a

Mortality measures (cancer-related death) and mortality-incidence-index
by year of death

MALES

Year of death	Deaths n	Mort. raw	MI-Index raw	Mort. WS	MI-Index WS	Mort. ES	MI-Index ES	Mort. BRD-S	MI-Index BRD-S
1998	367	33.1	0.39	19.3	0.38	30.4	0.40	41.2	0.42
1999	392	35.0	0.41	20.2	0.40	31.7	0.42	44.2	0.45
2000	411	36.1	0.46	20.2	0.44	32.1	0.47	44.3	0.50
2001	391	33.7	0.40	19.1	0.39	29.9	0.40	40.0	0.42
2002	628	33.7	0.37	18.2	0.36	28.5	0.38	38.4	0.39
2003	665	35.5	0.39	18.5	0.37	29.3	0.39	40.5	0.42
2004	689	36.6	0.42	18.1	0.39	29.2	0.42	41.3	0.45
2005	705	37.2	0.45	18.4	0.42	28.8	0.44	40.1	0.47
2006	751	39.2	0.45	19.0	0.42	30.4	0.45	42.4	0.48
2007	811	36.6	0.43	17.1	0.38	27.3	0.41	38.3	0.45
2008	882	39.6	0.48	18.1	0.43	29.1	0.46	41.0	0.50
2009	802	35.9	0.43	16.6	0.40	26.1	0.42	35.7	0.44
2010	839	37.2	0.48	16.4	0.43	26.0	0.46	36.5	0.49
2011	865	38.7	0.51	17.4	0.48	27.3	0.50	37.0	0.52
2012	834	36.7	0.51	16.0	0.46	25.5	0.49	35.1	0.52
2013	799	34.7	0.47	14.4	0.41	23.2	0.44	32.5	0.48
2014	803	34.4	0.49	14.4	0.43	22.7	0.45	31.4	0.49
2015	813	34.2	0.51	14.0	0.44	22.4	0.47	30.9	0.51
2016	806	33.5	0.51	13.8	0.44	21.8	0.47	29.8	0.50
2017	802	33.2	0.57	13.2	0.49	21.1	0.53	28.9	0.56
2018	455	18.7	0.40	7.7	0.35	12.0	0.37	16.2	0.39
2019	424	17.4	0.41	7.3	0.36	11.3	0.38	15.1	0.41
1998-2019	14934	33.9	0.46	15.4	0.41	24.4	0.44	33.4	0.47

Table 11b

Mortality measures (cancer-related death) and mortality-incidence-index
by year of death
FEMALES

Year of death	Deaths n	Mort. raw	MI-Index raw	Mort. WS	MI-Index WS	Mort. ES	MI-Index ES	Mort. BRD-S	MI-Index BRD-S
1998	390	33.2	0.42	12.6	0.37	19.9	0.39	27.6	0.41
1999	403	34.0	0.44	12.1	0.37	19.4	0.39	26.8	0.41
2000	373	31.1	0.44	11.2	0.38	17.8	0.40	23.9	0.41
2001	397	32.6	0.43	11.9	0.37	19.0	0.39	26.0	0.41
2002	594	30.3	0.39	10.2	0.32	16.4	0.34	22.7	0.36
2003	611	31.0	0.40	10.8	0.34	17.2	0.36	23.6	0.38
2004	640	32.4	0.44	10.9	0.35	17.5	0.38	24.4	0.41
2005	627	31.5	0.44	10.4	0.36	16.6	0.39	23.1	0.41
2006	620	30.9	0.43	9.8	0.33	16.0	0.36	22.7	0.40
2007	649	28.1	0.41	9.7	0.35	15.3	0.37	21.0	0.39
2008	644	27.8	0.42	9.0	0.34	14.3	0.36	19.8	0.39
2009	703	30.2	0.47	10.1	0.39	15.8	0.41	21.6	0.43
2010	673	28.8	0.47	9.3	0.40	14.6	0.42	19.8	0.43
2011	660	28.2	0.47	8.9	0.37	14.1	0.40	19.4	0.43
2012	663	28.1	0.47	8.9	0.37	14.2	0.40	19.6	0.43
2013	618	25.9	0.46	8.4	0.37	13.3	0.40	18.0	0.42
2014	632	26.2	0.48	8.5	0.38	13.3	0.41	18.0	0.44
2015	651	26.7	0.52	8.7	0.43	13.6	0.46	18.2	0.48
2016	529	21.5	0.43	6.9	0.35	10.9	0.38	14.8	0.40
2017	622	25.2	0.54	7.6	0.40	12.2	0.44	17.0	0.48
2018	284	11.4	0.29	4.0	0.24	6.1	0.25	8.1	0.27
2019	277	11.2	0.35	4.0	0.29	6.0	0.31	7.9	0.32
1998-2019	12260	26.8	0.44	8.8	0.36	14.0	0.38	19.1	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	0.2	16	0.2	0.2	9	0.1	0.2
35-39	47	0.3	0.5	25	0.3	0.5	22	0.3	0.5
40-44	140	0.8	1.3	76	0.8	1.3	64	0.8	1.4
45-49	288	1.6	3.0	145	1.5	2.7	143	1.9	3.3
50-54	524	3.0	5.9	320	3.2	5.9	204	2.7	5.9
55-59	858	4.9	10.8	525	5.3	11.2	333	4.4	10.3
60-64	1277	7.3	18.1	822	8.3	19.5	455	6.0	16.3
65-69	1960	11.2	29.3	1273	12.8	32.3	687	9.0	25.3
70-74	2668	15.2	44.5	1676	16.9	49.2	992	13.0	38.4
75-79	3023	17.2	61.7	1866	18.8	68.0	1157	15.2	53.6
80-84	3029	17.3	79.0	1672	16.8	84.8	1357	17.8	71.4
85+	3683	21.0	100.0	1511	15.2	100.0	2172	28.6	100.0
All ages	17540	100.0		9935	100.0		7605	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	0.11	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	0.17	0.4	0.11	12.5	5.6
35-39	25	22	1.2	0.17	1.0	0.17	10.3	6.0
40-44	76	64	3.2	0.25	2.8	0.22	13.3	8.0
45-49	145	143	5.8	0.23	5.9	0.26	10.8	9.1
50-54	320	204	13.7	0.27	8.8	0.23	12.7	8.3
55-59	525	333	27.0	0.31	16.7	0.29	12.7	9.4
60-64	822	455	50.4	0.35	25.9	0.33	13.8	9.9
65-69	1273	687	83.7	0.41	40.8	0.37	14.8	10.6
70-74	1676	992	119.6	0.46	61.8	0.41	15.1	12.1
75-79	1866	1157	168.5	0.55	84.0	0.45	16.3	12.9
80-84	1672	1357	254.7	0.67	139.4	0.55	17.7	16.0
85+	1511	2172	354.3	0.87	225.0	0.72	18.4	19.7
All ages	9935	7605					15.5	13.4
Mortality								
Raw			33.0	0.48	24.4	0.45		
WS			14.1	0.42	7.9	0.36		
ES			22.3	0.45	12.5	0.39		
BRD-S			30.6	0.48	16.9	0.41		
PYLL-70								
per 100,000			107.9		73.9			
ES			91.9		61.2			
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	65	1.1	46	70.8	4	6.2	15	23.1
C09–C10 Oropharynx	48	0.8	27	56.3	4	8.3	17	35.4
C12–C13 Hypopharynx	28	0.5	10	35.7	2	7.1	16	57.1
C15 Oesophagus	110	1.9	16	14.5	17	15.5	77	70.0
C16 Stomach	312	5.3	89	28.5	70	22.4	153	49.0
C17 Small intestine	68	1.2	11	16.2	22	32.4	35	51.5
C18 Colon	500	8.5	89	17.8	240	48.0	171	34.2
C19–C20 Rectum	212	3.6	102	48.1	95	44.8	15	7.1
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	218	3.7	14	6.4	29	13.3	175	80.3
C30–C31 Sinuses	11	0.2	9	81.8			2	18.2
C32 Larynx	97	1.6	68	70.1	1	1.0	28	28.9
C33–C34 Lung	656	11.1	105	16.0	91	13.9	460	70.1
C38,C45 Mesothelioma	33	0.6	1	3.0	6	18.2	26	78.8
C43 Malign. melanoma	202	3.4	125	61.9	2	1.0	75	37.1
C44 Skin others	408	6.9	198	48.5	27	6.6	183	44.9
C46,C49 Soft tissue	28	0.5	8	28.6			20	71.4
C50 Breast	14	0.2	4	28.6			10	71.4
C60 Penis	18	0.3	8	44.4			10	55.6
C61 Prostate	1396	23.6	800	57.3	106	7.6	490	35.1
C62 Testis	34	0.6	29	85.3			5	14.7
C64 Kidney	237	4.0	110	46.4	53	22.4	74	31.2
C65 Renal pelvis	30	0.5	6	20.0			24	80.0
C66 Ureter	18	0.3	4	22.2	2	11.1	12	66.7
C67 Bladder	307	5.2	109	35.5	30	9.8	168	54.7
C69 Eye melanoma	9	0.2	8	88.9			1	11.1
C70–C72 CNS cancer	54	0.9	5	9.3	4	7.4	45	83.3
C73 Thyroid	28	0.5	15	53.6	2	7.1	11	39.3
C76–C79 CUP	69	1.2	12	17.4	11	15.9	46	66.7
C81 Hodgkin lymphoma	19	0.3	16	84.2			3	15.8
C82–C85 NHL	236	4.0	103	43.6	35	14.8	98	41.5
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	6	8.7	30	43.5
All further malignancies	5906	100.0	2227	37.7	917	15.5	2762	46.8

Further malignancies with number of cases 1 to 8 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	23	0.6	14	60.9	1	4.3	8	34.8
C09-C10 Oropharynx	19	0.5	9	47.4	1	5.3	9	47.4
C15 Oesophagus	22	0.5	3	13.6	3	13.6	16	72.7
C16 Stomach	207	5.0	66	31.9	37	17.9	104	50.2
C17 Small intestine	38	0.9	3	7.9	19	50.0	16	42.1
C18 Colon	342	8.2	66	19.3	138	40.4	138	40.4
C19-C20 Rectum	123	2.9	64	52.0	47	38.2	12	9.8
C21 Anus/canal	15	0.4	10	66.7	4	26.7	1	6.7
C22 Liver	47	1.1	2	4.3	12	25.5	33	70.2
C23-C24 Bile	58	1.4	13	22.4	9	15.5	36	62.1
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	302	7.2	49	16.2	27	8.9	226	74.8
C43 Malign. melanoma	98	2.3	61	62.2	6	6.1	31	31.6
C44 Skin others	159	3.8	94	59.1	9	5.7	56	35.2
C46,C49 Soft tissue	20	0.5	10	50.0	2	10.0	8	40.0
C48 Peritoneal	17	0.4	3	17.6	7	41.2	7	41.2
C50 Breast	1088	26.0	717	65.9	80	7.4	291	26.7
C51 Vulva	42	1.0	21	50.0	2	4.8	19	45.2
C52 Vagina	16	0.4	6	37.5	1	6.3	9	56.3
C53 Cervix uteri	148	3.5	111	75.0	7	4.7	30	20.3
C54 Corpus uteri	264	6.3	170	64.4	14	5.3	80	30.3
C55,C57 Fem. genitals un	24	0.6	18	75.0	2	8.3	4	16.7
C56 Ovary	261	6.2	89	34.1	53	20.3	119	45.6
C64 Kidney	88	2.1	46	52.3	13	14.8	29	33.0
C66 Ureter	14	0.3	3	21.4	1	7.1	10	71.4
C67 Bladder	107	2.6	44	41.1	3	2.8	60	56.1
C70-C72 CNS cancer	31	0.7	8	25.8	3	9.7	20	64.5
C73 Thyroid	49	1.2	29	59.2	3	6.1	17	34.7
C76-C79 CUP	43	1.0	14	32.6	9	20.9	20	46.5
C81 Hodgkin lymphoma	15	0.4	12	80.0	1	6.7	2	13.3
C82-C85 NHL	134	3.2	62	46.3	17	12.7	55	41.0
C90 Mult. myeloma	47	1.1	15	31.9	4	8.5	28	59.6
C91-C96 Leukaemia	53	1.3	8	15.1	7	13.2	38	71.7
Others, specified	58	1.4	15	25.9	3	5.2	40	69.0
All further malignancies	4177	100.0	1876	44.9	572	13.7	1729	41.4

Further malignancies with number of cases 1 to 11 are pooled in category "Others, specified".

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

Table 15

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2019
(**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	0.09			2.2	
20-24	1	4	0.1	0.03	0.2	0.11	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	0.17	0.3	0.09	12.9	5.0
35-39	23	18	1.1	0.17	0.9	0.15	10.1	5.5
40-44	71	56	3.0	0.24	2.5	0.22	13.4	8.0
45-49	136	126	5.4	0.24	5.2	0.25	11.1	9.3
50-54	286	182	12.2	0.27	7.9	0.23	12.9	8.8
55-59	466	291	24.0	0.31	14.6	0.29	13.0	9.8
60-64	700	376	42.9	0.34	21.4	0.33	14.0	10.0
65-69	1029	561	67.7	0.42	33.3	0.38	15.0	10.9
70-74	1311	757	93.6	0.47	47.1	0.40	15.4	11.9
75-79	1397	899	126.2	0.57	65.3	0.45	16.7	13.0
80-84	1197	1058	182.3	0.71	108.7	0.54	17.7	16.1
85+	1091	1720	255.8	0.91	178.2	0.72	18.4	19.8
All ages	7731	6061					15.6	13.4
Mortality								
Raw			25.7	0.47	19.5	0.44		
WS			11.3	0.41	6.4	0.36		
ES			17.6	0.44	10.1	0.38		
BRD-S			23.8	0.47	13.6	0.40		
PYLL-70								
per 100,000			95.6		63.8			
ES			81.6		53.0			
AYLL-70			9.3		10.3			

* See corresponding tables with multiple malignancies.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2019
(**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	0.11	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	0.09	13.0	5.1
35-39	23	17	1.1	0.18	0.8	0.15	10.2	5.2
40-44	70	54	3.0	0.25	2.4	0.22	13.3	7.7
45-49	131	125	5.2	0.24	5.1	0.26	10.8	9.4
50-54	272	175	11.6	0.27	7.6	0.24	12.4	8.6
55-59	426	266	21.9	0.31	13.3	0.29	12.0	9.1
60-64	640	334	39.2	0.34	19.0	0.32	13.0	9.0
65-69	883	474	58.1	0.41	28.1	0.35	13.2	9.5
70-74	1049	648	74.9	0.43	40.3	0.38	12.8	10.5
75-79	1101	772	99.4	0.50	56.1	0.42	13.8	11.6
80-84	874	884	133.1	0.57	90.8	0.48	13.8	14.0
85+	801	1447	187.8	0.71	149.9	0.63	14.7	17.4
All ages	6294	5213					13.2	11.9
Mortality								
Raw			20.9	0.42	16.8	0.41		
WS			9.5	0.38	5.6	0.34		
ES			14.6	0.40	8.8	0.36		
BRD-S			19.3	0.42	11.8	0.38		
PYLL-70								
per 100,000			89.2		59.7			
ES			76.2		49.7			
AYLL-70			9.6		10.7			

* See corresponding tables with multiple malignancies.

ICD-10 C18-C21: Malignant neoplasm of colorectum incl. anus
 Age distribution and age-specific mortality 2007 - 2019 (Males: 9935, Females: 7605)

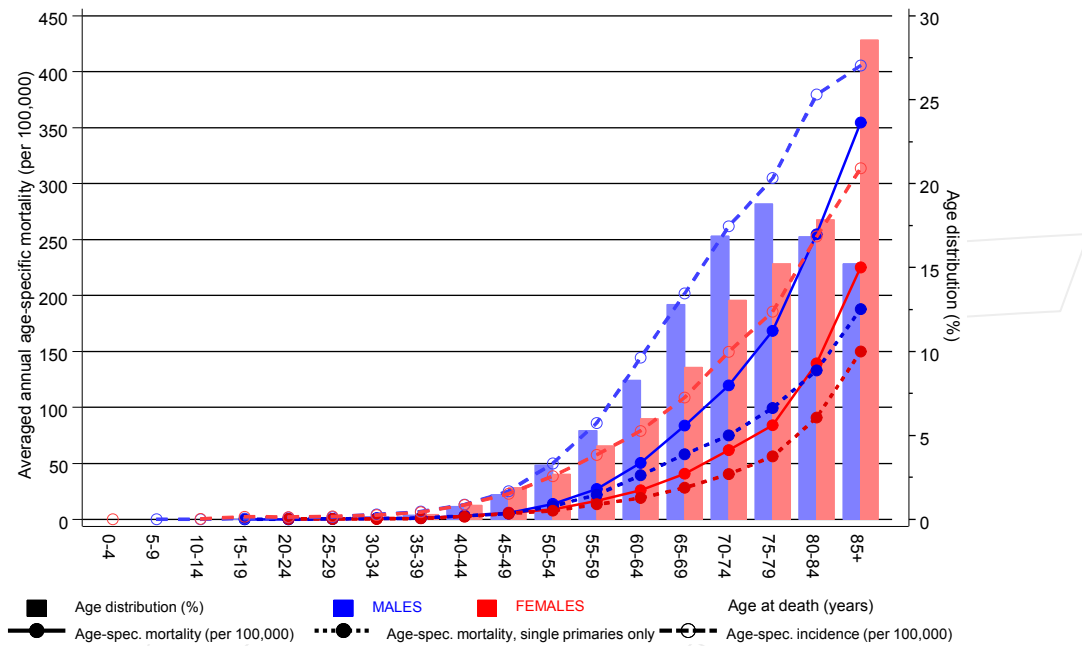
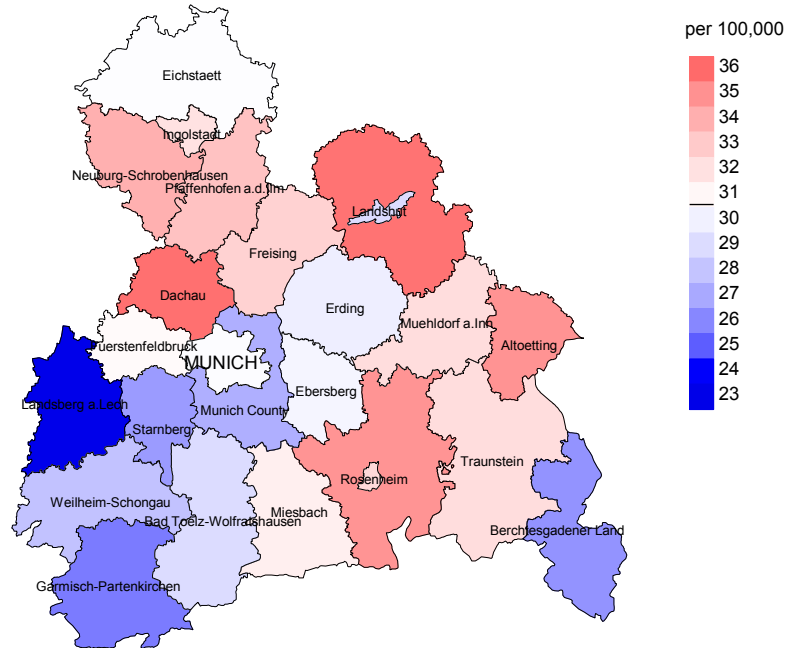


Figure 17. Distribution of age at death (bars; males: mean=70.0 yrs, median=70.8 yrs; females: mean=73.3 yrs, median=75.0 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed 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

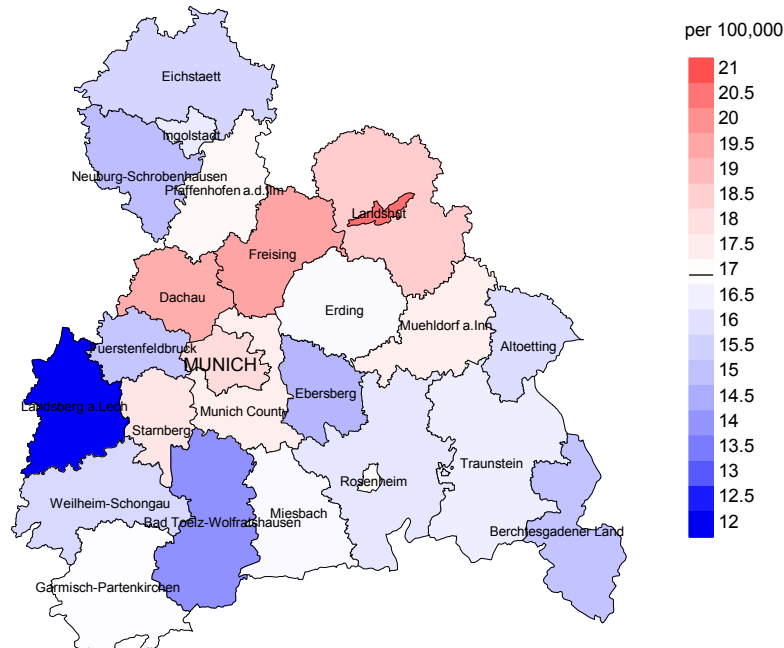
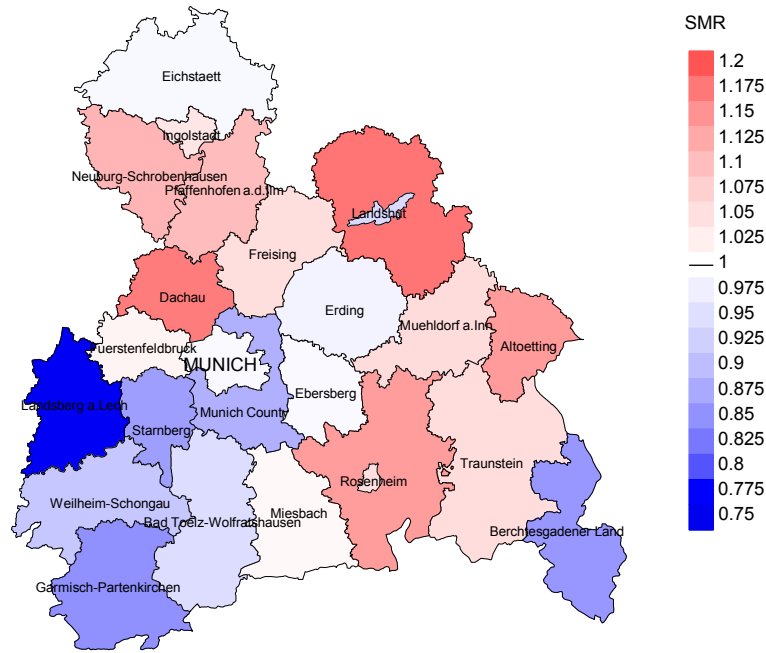


Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2019. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 30.6/100,000 WS N=9,935, females 16.9/100,000 WS N=7,605).

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 178 women died from colorectal cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 14.8/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 12.0 and 18.0/100,000.

Standardized mortality ratio (SMR) 2007 - 2019: Males



Standardized mortality ratio (SMR) 2007 - 2019: Females

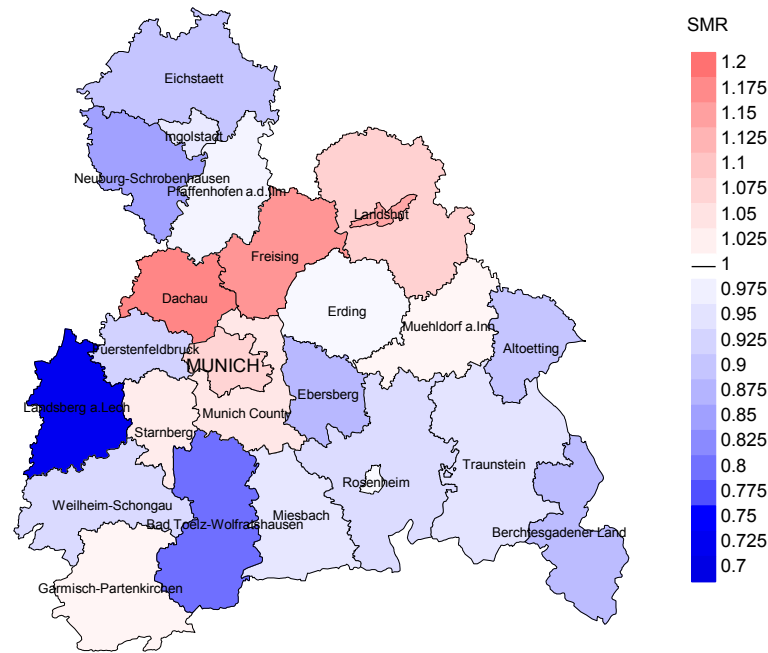


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2019. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=9,935, females N=7,605).

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 178 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

Recommended Citation

Munich Cancer Registry. ICD-10 C18-C21: Colorectal cancer - Incidence and Mortality [Internet]. 2021 [updated 2021 Jan 25; cited 2021 Mar 1]. Available from: <https://www.tumorregister-muenchen.de/en/facts/base/bC1821E-ICD-10-C18-C21-Colorectal-cancer-incidence-and-mortality.pdf>

Copyright

The content of the public web site provided by the Munich Cancer Registry is available worldwide and free of charge. All documents are free to download, utilize, copy, print-out and distribute, providing that the MCR is referenced.

Disclaimer

The Munich Cancer Registry reserves the right to not be responsible for the topicality, correctness, completeness or quality of the information provided. Liability claims regarding damage caused by the use of any information provided, including any kind of information which is incomplete or incorrect, will therefore be rejected.