

Munich Cancer Registry



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

ICD-10 C18: Colon cancer

Incidence and Mortality

Year of diagnosis	1998-2019
Patients	38,443
Diseases	39,284
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/bC18__E-ICD-10-C18-Colon-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

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	1277	89	7.0	12.3	11.2	79.7	97.8
1999	1208	98	8.1	13.0	11.0	79.3	97.2
2000	1096	83	7.6	13.5	10.9	77.6	97.2
2001	1222	110	9.0	13.6	10.7	75.6	97.5
2002	2047	295	14.4	13.1	10.5	77.7	97.5 #
2003	2078	243	11.7	13.4	10.2	74.5	97.6
2004	2054	197	9.6	13.4	9.9	74.3	97.9
2005	1939	176	9.1	14.1	9.6	74.1	96.9
2006	1982	131	6.6	14.4	9.3	69.3	95.1
2007	2178	166	7.6	14.5	8.8	67.7	92.9 #
2008	2219	151	6.8	14.8	8.3	65.6	98.5
2009	2199	127	5.8	15.2	7.7	63.5	98.4
2010	2004	141	7.0	15.5	7.2	61.9	97.8
2011	1940	126	6.5	15.9	6.6	59.6	97.9
2012	1942	126	6.5	16.1	6.1	56.6	97.8
2013	1991	118	5.9	16.5	5.7	54.0	98.0
2014	1905	118	6.2	16.7	5.3	53.9	96.7
2015	1865	106	5.7	17.0	4.7	49.8	96.9
2016	1828	100	5.5	17.2	4.2	44.7	99.0
2017	1758	133	7.6	17.4	3.4	36.2	99.1
2018	1371	34	2.5	17.6	2.6	24.7	99.5
2019	1181	8	0.7	17.7	1.8	15.8	68.8 ##
1998-2019	39284	2876	7.3	17.7	11.2	61.2	96.6

39,284 cases diagnosed 1998-2019 are related to a total of 38,443 patients. Currently, in 10,937 (28.4 %) of these 38,443 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 8,567 / 1,833 / 537 (22.3 % / 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 1,758 cases has been diagnosed, of which 17.4 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 3.4 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 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	611	47.8	32	5.2	12.8	13.1	80.2	99.2
1999	584	48.3	37	6.3	12.8	12.8	80.1	98.1
2000	530	48.4	23	4.3	13.0	12.6	75.8	97.7
2001	606	49.6	36	5.9	13.0	12.5	74.6	97.4
2002	1029	50.3	130	12.6	12.6	12.2	77.2	98.3 #
2003	1064	51.2	91	8.6	13.0	11.8	75.2	98.5
2004	1058	51.5	70	6.6	13.4	11.5	76.2	98.2
2005	985	50.8	74	7.5	14.2	11.1	74.0	97.0
2006	1024	51.7	47	4.6	14.8	10.8	70.1	95.5
2007	1143	52.5	68	5.9	15.1	10.2	68.8	93.4 #
2008	1179	53.1	62	5.3	15.6	9.7	66.7	98.7
2009	1176	53.5	60	5.1	16.1	9.0	63.0	98.5
2010	1063	53.0	51	4.8	16.5	8.3	61.5	97.6
2011	1002	51.6	45	4.5	17.0	7.7	58.8	98.1
2012	1020	52.5	51	5.0	17.3	7.2	57.3	98.1
2013	1087	54.6	41	3.8	17.7	6.6	55.0	97.5
2014	1035	54.3	55	5.3	18.0	6.1	55.3	97.3
2015	987	52.9	46	4.7	18.3	5.4	49.4	97.0
2016	994	54.4	35	3.5	18.4	4.8	45.4	98.9
2017	931	53.0	58	6.2	18.7	3.7	34.9	99.1
2018	699	51.0	12	1.7	18.9	2.9	25.5	99.4
2019	648	54.9	4	0.6	19.0	2.1	17.1	69.4 ##
1998-2019	20455	52.1	1128	5.5	19.0	13.1	61.2	96.8

20,455 cases diagnosed 1998-2019 are related to a total of 19,944 patients. Currently, in 6,286 (31.5 %) of these 19,944 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 4,826 / 1,104 / 356 (24.2 % / 5.5 % / 1.8 %) 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 931 cases has been diagnosed, of which 18.7 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 3.7 % 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	666	52.2	57	8.6	11.9	9.1	79.3	96.5
1999	624	51.7	61	9.8	13.3	9.0	78.5	96.3
2000	566	51.6	60	10.6	14.0	8.9	79.3	96.6
2001	616	50.4	74	12.0	14.1	8.8	76.6	97.7
2002	1018	49.7	165	16.2	13.6	8.7	78.2	96.7 #
2003	1014	48.8	152	15.0	13.7	8.4	73.9	96.6
2004	996	48.5	127	12.8	13.5	8.2	72.4	97.5
2005	954	49.2	102	10.7	13.9	8.0	74.1	96.9
2006	958	48.3	84	8.8	13.9	7.6	68.5	94.7
2007	1035	47.5	98	9.5	13.9	7.2	66.5	92.5 #
2008	1040	46.9	89	8.6	14.0	6.8	64.3	98.3
2009	1023	46.5	67	6.5	14.3	6.3	64.0	98.2
2010	941	47.0	90	9.6	14.5	5.9	62.3	98.0
2011	938	48.4	81	8.6	14.8	5.4	60.6	97.8
2012	922	47.5	75	8.1	14.8	4.8	55.9	97.4
2013	904	45.4	77	8.5	15.1	4.6	52.9	98.6
2014	870	45.7	63	7.2	15.3	4.4	52.3	96.1
2015	878	47.1	60	6.8	15.6	3.9	50.2	96.9
2016	834	45.6	65	7.8	15.8	3.4	44.0	99.2
2017	827	47.0	75	9.1	16.0	3.0	37.7	99.2
2018	672	49.0	22	3.3	16.2	2.3	23.8	99.6
2019	533	45.1	4	0.8	16.3	1.4	14.3	68.1 ##
1998-2019	18829	47.9	1748	9.3	16.3	9.1	61.3	96.3

18,829 cases diagnosed 1998-2019 are related to a total of 18,499 patients. Currently, in 4,651 (25.1 %) of these 18,499 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 3,741 / 729 / 181 (20.2 % / 3.9 % / 1.0 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:

In 2017, a subgroup of 827 cases has been diagnosed, of which 16.0 % 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	611	666	55.1	56.6	32.8	23.6	50.1	35.9	66.7	47.6
1999	584	624	52.2	52.6	30.6	21.6	47.0	32.9	63.6	43.4
2000	530	566	46.5	47.1	26.9	19.1	41.4	29.3	55.0	38.6
2001	606	616	52.3	50.6	30.3	20.4	46.1	31.3	59.6	41.9
2002	1029	1018	55.2	52.0	30.1	20.3	46.4	31.1	62.6	41.1
2003	1064	1014	56.8	51.5	30.4	20.1	46.6	30.8	62.3	40.7
2004	1058	996	56.2	50.4	29.2	20.0	45.0	30.2	60.8	39.5
2005	985	954	52.0	47.9	26.8	18.0	40.9	27.6	54.7	36.8
2006	1024	958	53.5	47.7	27.4	18.8	41.9	28.4	55.6	37.6
2007	1143	1035	51.6	44.8	26.4	17.5	39.7	26.3	53.0	34.5
2008	1179	1040	53.0	44.8	25.8	17.2	39.7	26.1	53.0	34.1
2009	1176	1023	52.7	44.0	25.4	16.2	38.6	24.8	51.7	33.2
2010	1063	941	47.2	40.2	22.4	14.7	34.1	22.4	45.7	29.9
2011	1002	938	44.8	40.1	20.9	15.0	31.9	22.8	42.7	29.9
2012	1020	922	44.9	39.1	21.0	15.2	31.8	22.4	41.8	29.3
2013	1087	904	47.2	37.9	21.2	14.5	32.5	21.6	43.6	28.2
2014	1035	870	44.4	36.1	19.9	13.9	30.4	20.6	40.4	26.7
2015	987	878	41.5	36.1	18.8	13.5	28.5	20.2	37.5	26.4
2016	994	834	41.4	34.0	19.2	12.6	28.5	18.9	37.4	24.8
2017	931	827	38.6	33.6	16.9	13.0	25.6	19.1	34.2	24.8
2018	699	672	28.7	27.1	12.8	10.9	19.3	15.9	25.2	20.1
2019	648	533	26.6	21.5	12.5	8.5	18.3	12.3	23.5	15.9
1998-2019	20455	18829	46.4	41.1	22.6	15.8	34.2	23.8	45.2	31.2

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	1277	70.8	12.3	13.2	98.1	54.7	62.1	72.2	79.6	86.2
1999	1208	71.3	12.5	20.2	101	55.3	63.2	72.7	79.8	86.6
2000	1096	71.2	12.0	24.7	103	56.0	62.5	72.6	79.5	86.8
2001	1222	71.2	12.4	30.8	103	55.8	62.7	71.8	80.5	87.2
2002	2047	72.1	12.2	17.7	101	56.5	63.7	73.5	81.1	87.5
2003	2078	72.2	11.7	8.4	99.4	57.2	64.3	72.8	80.8	87.1
2004	2054	71.9	12.2	13.8	101	56.4	64.3	73.0	81.0	86.8
2005	1939	72.6	12.3	15.1	99.9	57.2	65.2	73.7	81.8	87.0
2006	1982	71.6	12.0	17.9	102	55.6	64.2	72.4	80.7	85.7
2007	2178	71.5	12.8	13.4	103	54.7	64.5	72.6	81.0	86.3
2008	2219	72.3	12.4	18.9	105	56.3	65.3	73.1	81.5	87.2
2009	2199	72.4	12.3	12.4	99.1	56.3	65.3	73.3	81.3	87.0
2010	2004	72.6	12.4	14.9	101	56.0	65.4	73.8	81.8	86.9
2011	1940	72.6	12.6	15.5	101	55.9	64.9	74.0	82.0	87.4
2012	1942	72.2	13.1	9.7	101	55.9	65.0	73.9	81.7	87.0
2013	1991	72.4	13.0	15.7	105	54.6	65.4	74.1	81.7	87.2
2014	1905	72.4	13.2	15.8	103	53.8	65.2	74.6	81.6	87.5
2015	1865	72.3	13.2	11.4	101	53.8	65.8	74.4	81.2	87.5
2016	1828	72.1	13.2	9.4	100	54.2	64.4	74.5	81.2	87.0
2017	1758	72.4	13.1	14.5	99.0	55.0	64.9	74.8	81.2	87.1
2018	1371	71.6	12.6	17.8	100	54.6	63.3	73.6	80.9	86.0
2019	1181	71.0	13.8	17.7	98.2	52.7	62.8	73.4	81.0	86.3
1998-2019	39284	72.0	12.6	8.4	105	55.4	64.4	73.5	81.1	86.9

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	611	68.9	11.5	31.4	98.1	55.0	60.7	69.5	77.0	84.2
1999	584	69.5	11.6	20.2	95.5	55.9	62.4	70.2	77.9	83.8
2000	530	69.2	10.6	36.0	93.0	55.5	61.4	69.7	77.0	82.5
2001	606	69.2	11.7	31.3	102	54.7	61.7	69.0	77.0	85.6
2002	1029	70.4	11.0	20.9	98.5	56.6	63.1	71.5	78.1	83.2
2003	1064	70.3	11.1	8.4	99.4	56.7	63.3	70.9	78.1	83.4
2004	1058	70.8	11.1	27.8	101	56.8	63.9	71.4	78.6	84.5
2005	985	70.6	11.4	28.3	98.5	56.7	64.2	70.9	78.5	84.4
2006	1024	70.4	11.1	17.9	102	55.9	63.5	71.0	78.3	83.9
2007	1143	69.8	12.1	15.8	99.4	54.4	63.5	71.0	78.7	83.8
2008	1179	71.0	11.5	19.3	105	56.1	64.8	71.6	79.2	84.9
2009	1176	70.6	11.4	12.4	99.0	55.6	64.1	71.7	79.0	83.7
2010	1063	71.0	11.4	27.9	98.9	55.5	64.1	71.5	79.3	84.5
2011	1002	71.3	11.7	15.5	97.3	55.9	64.7	72.7	79.9	85.1
2012	1020	71.4	11.4	9.7	101	57.1	64.7	72.8	79.3	85.1
2013	1087	71.7	11.9	19.4	99.6	55.3	64.8	73.3	79.9	85.4
2014	1035	72.0	12.3	20.3	102	55.0	65.3	74.1	80.7	85.7
2015	987	71.3	12.4	21.3	97.6	54.0	64.8	73.4	79.6	85.4
2016	994	70.8	13.1	9.4	100	53.9	63.5	73.2	80.1	85.3
2017	931	72.3	11.9	19.1	96.3	56.0	65.5	74.4	80.3	85.5
2018	699	71.2	12.0	17.8	95.0	55.2	63.4	73.5	80.2	85.1
2019	648	70.2	13.2	17.9	98.2	52.9	62.1	72.2	79.6	84.9
1998-2019	20455	70.7	11.7	8.4	105	55.4	63.7	71.9	79.1	84.6

Table 3b

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	Median				
						10%	25%	50%	75%	90%
1998	666	72.6	12.8	13.2	96.7	54.5	64.0	74.9	82.0	87.2
1999	624	73.0	13.0	26.9	101	54.9	64.3	75.1	82.6	88.3
2000	566	73.2	12.9	24.7	103	56.3	64.4	75.3	82.0	88.5
2001	616	73.2	12.7	30.8	103	56.1	64.1	75.5	81.8	89.0
2002	1018	74.0	13.0	17.7	101	56.0	64.8	76.4	83.0	89.4
2003	1014	74.1	12.0	23.5	98.9	57.8	65.3	75.9	82.9	88.8
2004	996	73.1	13.3	13.8	100	55.6	64.7	75.3	83.3	88.6
2005	954	74.7	12.7	15.1	99.9	57.9	67.0	76.6	83.9	90.2
2006	958	73.0	12.7	24.6	97.1	55.1	65.1	75.1	82.7	86.9
2007	1035	73.5	13.2	13.4	103	55.4	66.4	75.4	83.4	87.7
2008	1040	73.9	13.3	18.9	101	56.7	65.7	75.2	84.1	88.7
2009	1023	74.4	12.9	15.9	99.1	58.0	67.4	76.2	83.9	88.8
2010	941	74.3	13.3	14.9	101	56.4	67.4	76.3	83.8	89.1
2011	938	73.9	13.3	16.5	101	55.9	65.2	75.7	84.6	88.8
2012	922	73.0	14.8	13.7	100	54.3	65.4	75.6	83.8	89.2
2013	904	73.2	14.2	15.7	105	53.9	66.2	75.3	83.8	89.1
2014	870	72.9	14.2	15.8	103	52.3	65.1	75.4	82.7	89.1
2015	878	73.4	14.0	11.4	101	53.6	66.9	75.6	83.4	89.6
2016	834	73.7	13.1	16.1	100	55.1	66.3	76.1	82.8	88.6
2017	827	72.5	14.4	14.5	99.0	54.0	64.1	75.5	82.5	88.5
2018	672	71.9	13.2	19.3	100	54.1	63.2	73.7	81.5	87.1
2019	533	71.9	14.4	17.7	97.5	51.8	64.2	75.1	81.9	87.2
1998-2019	18829	73.4	13.4	11.4	105	55.4	65.4	75.6	83.2	88.7

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	44	0.2	0.2	9	0.1	0.1	35	0.3	0.4
20-24	56	0.2	0.4	25	0.2	0.3	31	0.3	0.6
25-29	80	0.3	0.8	38	0.3	0.6	42	0.4	1.0
30-34	99	0.4	1.2	49	0.4	1.0	50	0.4	1.4
35-39	171	0.7	1.9	89	0.7	1.6	82	0.7	2.1
40-44	330	1.4	3.2	171	1.3	3.0	159	1.4	3.5
45-49	598	2.5	5.7	316	2.4	5.4	282	2.5	6.0
50-54	1064	4.4	10.0	594	4.6	10.0	470	4.1	10.1
55-59	1507	6.2	16.2	839	6.5	16.5	668	5.9	16.0
60-64	2195	9.0	25.2	1323	10.2	26.7	872	7.6	23.6
65-69	3020	12.4	37.6	1822	14.1	40.7	1198	10.5	34.1
70-74	3948	16.2	53.8	2311	17.8	58.5	1637	14.3	48.4
75-79	4091	16.8	70.6	2266	17.5	76.0	1825	16.0	64.4
80-84	3597	14.8	85.3	1819	14.0	90.0	1778	15.6	80.0
85+	3573	14.7	100.0	1290	10.0	100.0	2283	20.0	100.0
All ages	24381	100.0		12964	100.0		11417	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=587 %	Females DCO rate n=865 %	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	9	35	0.6	2.4			3.0	14.2
20-24	25	31	1.3	1.8	4.0		4.3	6.5
25-29	36	42	1.7	2.0			4.1	3.8
30-34	49	49	2.3	2.3		4.1	4.1	2.5
35-39	86	82	4.0	3.9	2.3	3.7	5.0	2.5
40-44	169	159	7.2	7.0			6.5	2.8
45-49	313	279	12.5	11.5	0.6	0.4	6.5	3.2
50-54	584	465	24.9	20.1	1.5	1.5	7.4	4.0
55-59	829	659	42.6	33.0	1.2	0.9	7.0	5.3
60-64	1304	859	80.0	48.9	1.9	1.6	8.0	5.9
65-69	1791	1185	117.8	70.3	1.7	1.9	7.9	6.7
70-74	2263	1613	161.5	100.4	3.3	2.4	8.8	8.6
75-79	2224	1797	200.9	130.5	3.4	4.3	10.1	9.9
80-84	1771	1753	269.8	180.1	7.1	7.6	12.5	12.3
85+	1267	2259	297.1	234.0	18.4	24.7	12.9	14.6
All ages	12723	11272			4.6	7.7	8.9	7.8
Incidence								
Raw			42.2	36.2				
WS			19.6	13.8				
ES			29.6	20.6				
BRD-S			39.1	26.9				

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).

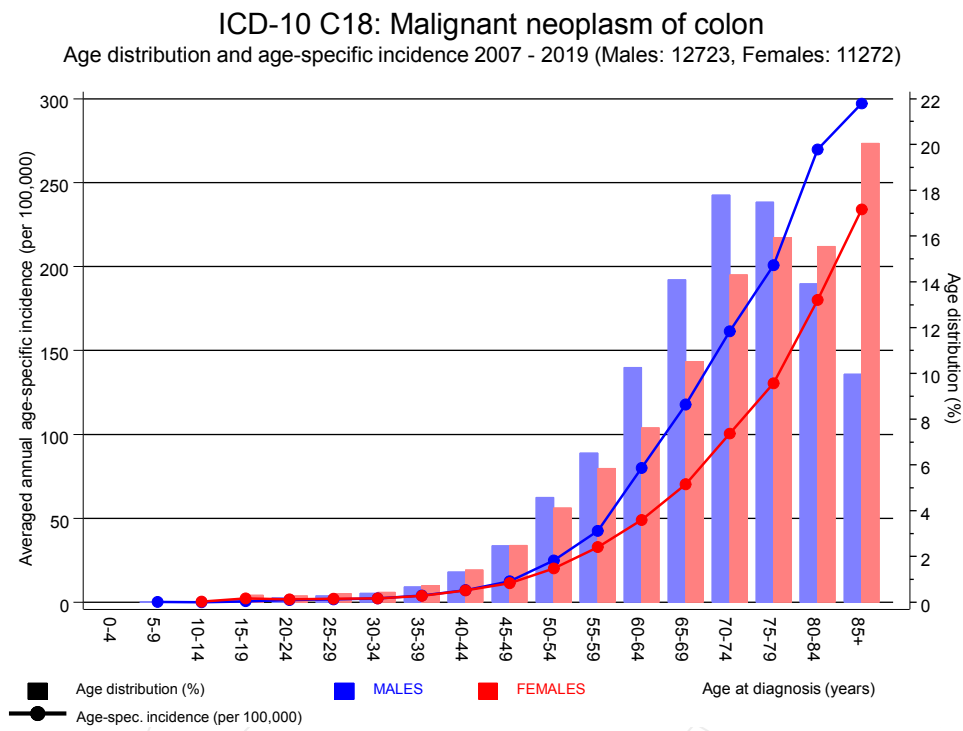


Figure 6. Age distribution (males: mean=71.1 yrs, median=72.6 yrs; females: mean=73.4 yrs, median=75.5 yrs) and age-specific incidence.

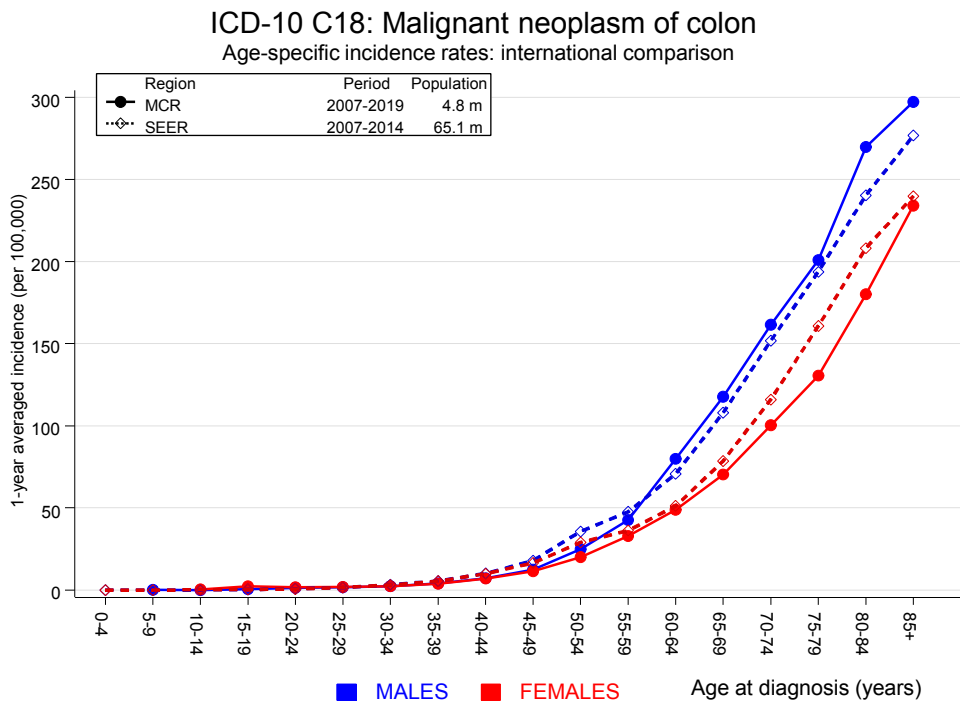


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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 %
C00 Lip	4	1.5	2.6	0.7	6.6	0.4	
C03–C06 Oral cavity	13	8.7	1.5	0.8	2.5	0.7	
C09–C10 Oropharynx	16	10.3	1.5	0.9	2.5	0.9	
C12–C13 Hypopharynx	14	5.6	2.5	1.4	4.2 #	1.3	7.1
C15 Oesophagus	79	22.3	3.5	2.8	4.4 #	8.7	11.4
C16 Stomach	169	54.8	3.1	2.6	3.6 #	17.5	7.7
C17 Small intestine	80	7.1	11.2	8.9	14.0 #	11.2	1.3
C18 Colon	504	131.3	3.8	3.5	4.2 #	57.0	0.8
C19–C20 Rectum	376	65.9	5.7	5.1	6.3 #	47.5	0.3
C21 Anus/canal	10	2.8	3.6	1.7	6.7 #	1.1	
C22 Liver	100	35.7	2.8	2.3	3.4 #	9.8	22.0
C23–C24 Bile	34	13.7	2.5	1.7	3.5 #	3.1	11.8
C25 Pancreas	122	50.6	2.4	2.0	2.9 #	10.9	28.7
C32 Larynx	24	11.5	2.1	1.3	3.1 #	1.9	8.3
C33–C34 Lung	322	147.6	2.2	2.0	2.4 #	26.7	15.8
C38,C45 Mesothelioma	13	8.9	1.5	0.8	2.5	0.6	7.7
C43 Malign. melanoma	112	53.1	2.1	1.7	2.5 #	9.0	2.7
C46,C49 Soft tissue	15	7.3	2.1	1.2	3.4 #	1.2	
C50 Breast	9	3.5	2.6	1.2	4.9 #	0.8	11.1
C60 Penis	8	3.3	2.5	1.1	4.8 #	0.7	12.5
C61 Prostate	653	362.5	1.8	1.7	1.9 #	44.5	5.4
C62 Testis	5	2.1	2.3	0.8	5.4	0.4	20.0
C64 Kidney	132	42.2	3.1	2.6	3.7 #	13.7	6.8
C65 Renal pelvis	18	5.9	3.0	1.8	4.8 #	1.9	
C66 Ureter	12	3.5	3.5	1.8	6.1 #	1.3	
C67 Bladder	138	65.3	2.1	1.8	2.5 #	11.1	8.7
C68 Urinary org.	4	1.0	3.9	1.1	9.9 #	0.5	50.0
C70–C72 CNS cancer	27	15.3	1.8	1.2	2.6 #	1.8	25.9
C73 Thyroid	16	6.7	2.4	1.4	3.9 #	1.4	6.3
C76–C79 CUP	39	22.6	1.7	1.2	2.4 #	2.5	2.6
C82–C85 NHL	121	55.5	2.2	1.8	2.6 #	10.0	3.3
C90 Mult. myeloma	28	17.5	1.6	1.1	2.3 #	1.6	28.6
C91–C96 Leukaemia	40	20.8	1.9	1.4	2.6 #	2.9	20.0
Others, specified	24	19.0	1.3	0.8	1.9	0.8	8.3
Not observed	0	2.3	0.0	0.0	1.6	-0.4	
All further malignancies	3281	1287.7	2.5	2.5	2.6 #	305.1	7.3

Patients 18718
 Median age at next malignancy (years) 74.7
 Person-years 65329
 Mean observation time (years) 3.5
 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".

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

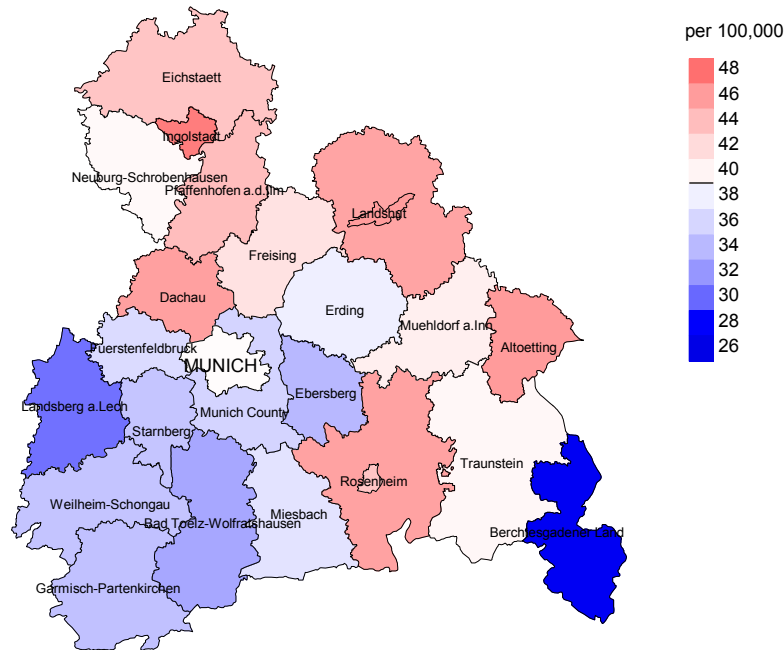
Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C03-C06 Oral cavity	8	4.3	1.9	0.8	3.7	0.6	
C09-C10 Oropharynx	7	2.5	2.8	1.1	5.7 #	0.8	
C15 Oesophagus	12	4.8	2.5	1.3	4.4 #	1.2	16.7
C16 Stomach	79	32.4	2.4	1.9	3.0 #	7.9	19.0
C17 Small intestine	46	3.8	12.1	8.9	16.1 #	7.2	2.2
C18 Colon	325	89.1	3.6	3.3	4.1 #	40.0	0.3
C19-C20 Rectum	167	34.3	4.9	4.2	5.7 #	22.5	0.6
C21 Anus/canal	9	4.1	2.2	1.0	4.1	0.8	
C22 Liver	31	10.4	3.0	2.0	4.2 #	3.5	38.7
C23-C24 Bile	21	13.1	1.6	1.0	2.4	1.3	14.3
C25 Pancreas	102	41.5	2.5	2.0	3.0 #	10.3	28.4
C26 GI cancer	4	2.0	2.0	0.5	5.1	0.3	50.0
C32 Larynx	4	1.3	3.2	0.9	8.2	0.5	
C33-C34 Lung	164	54.8	3.0	2.6	3.5 #	18.5	11.0
C38,C45 Mesothelioma	3	1.5	1.9	0.4	5.7	0.2	
C43 Malign. melanoma	60	26.9	2.2	1.7	2.9 #	5.6	1.7
C46,C49 Soft tissue	8	4.6	1.8	0.8	3.5	0.6	
C48 Peritoneal	12	2.8	4.3	2.2	7.6 #	1.6	33.3
C50 Breast	440	216.5	2.0	1.8	2.2 #	37.9	6.1
C51 Vulva	19	9.3	2.1	1.2	3.2 #	1.7	
C52 Vagina	3	1.6	1.8	0.4	5.3	0.2	
C53 Cervix uteri	21	8.7	2.4	1.5	3.7 #	2.1	14.3
C54 Corpus uteri	102	40.7	2.5	2.0	3.0 #	10.4	2.0
C56 Ovary	99	31.1	3.2	2.6	3.9 #	11.5	28.3
C64 Kidney	70	19.1	3.7	2.9	4.6 #	8.6	11.4
C65 Renal pelvis	8	2.7	3.0	1.3	5.9 #	0.9	
C66 Ureter	5	1.4	3.6	1.2	8.4 #	0.6	20.0
C67 Bladder	38	18.5	2.1	1.5	2.8 #	3.3	21.1
C70-C72 CNS cancer	17	10.0	1.7	1.0	2.7	1.2	47.1
C73 Thyroid	16	9.6	1.7	1.0	2.7	1.1	6.3
C74-C80 Cancer others	4	4.1	1.0	0.3	2.5	-0.0	50.0
C76-C79 CUP	12	17.4	0.7	0.4	1.2	-0.9	
C81 Hodgkin lymphoma	4	1.3	3.1	0.8	7.9	0.5	
C82-C85 NHL	61	32.7	1.9	1.4	2.4 #	4.8	16.4
C90 Mult. myeloma	17	10.5	1.6	0.9	2.6	1.1	17.6
C91-C96 Leukaemia	32	12.6	2.5	1.7	3.6 #	3.3	50.0
Others, specified	12	7.7	1.6	0.8	2.7	0.7	16.7
Not observed	0	2.7	0.0	0.0	1.3	-0.5	
All further malignancies	2042	792.5	2.6	2.5	2.7 #	212.0	10.2

Patients	16835
Median age at next malignancy (years)	76.6
Person-years	58931
Mean observation time (years)	3.5
Median observation time (years)	1.8

The occurrence of further specified malignancy is statistically significant.

Further observed malignancies with count 1 to 2 are pooled in category "Others, specified".

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



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

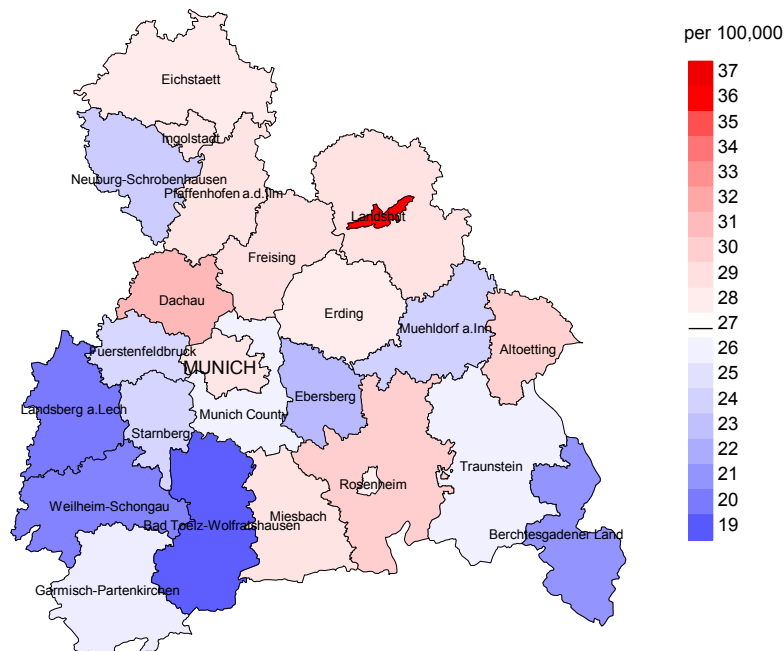


Figure 8a. Map of cancer incidence (german standard population, incl. DCO cases) by county averaged for period 2007 to 2019. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 39.1/100,000 WS N=12,723, females 26.9/100,000 WS N=11,272).

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 251 women were identified with newly diagnosed colon cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 22.7/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 19.1 and 26.8/100,000.

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	1277	97.8	7.0	1018	79.7	93.5
1999	1208	97.2	8.1	958	79.3	94.3
2000	1096	97.2	7.6	851	77.6	96.2
2001	1222	97.5	9.0	924	75.6	95.5
2002	2047	97.5	14.4	1590	77.7	96.5
2003	2078	97.6	11.7	1549	74.5	96.1
2004	2054	97.9	9.6	1527	74.3	95.2
2005	1939	96.9	9.1	1436	74.1	96.2
2006	1982	95.1	6.6	1374	69.3	96.9
2007	2178	92.9	7.6	1474	67.7	95.7
2008	2219	98.5	6.8	1455	65.6	94.6
2009	2199	98.4	5.8	1396	63.5	94.2
2010	2004	97.8	7.0	1240	61.9	93.1
2011	1940	97.9	6.5	1157	59.6	93.3
2012	1942	97.8	6.5	1099	56.6	93.4
2013	1991	98.0	5.9	1076	54.0	92.1
2014	1905	96.7	6.2	1027	53.9	90.2
2015	1865	96.9	5.7	929	49.8	89.2
2016	1828	99.0	5.5	818	44.7	83.4
2017	1758	99.1	7.6	637	36.2	75.4
2018	1371	99.5	2.5	338	24.7	53.8
2019	1181	68.8	0.7	187	15.8	77.5
1998-2019	39284	96.6	7.3	24060	61.2	92.9

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	1277	715	91.0	242	19.0
1999	1208	723	92.1	233	19.3
2000	1096	706	94.1	214	19.5
2001	1222	746	95.4	221	18.1
2002	2047	1049	98.2	501	24.5
2003	2078	1136	97.8	449	21.6
2004	2054	1140	98.5	430	20.9
2005	1939	1234	96.8	400	20.6
2006	1982	1206	97.5	345	17.4
2007	2178	1306	97.4	403	18.5
2008	2219	1345	98.4	448	20.2
2009	2199	1372	98.0	379	17.2
2010	2004	1414	98.2	350	17.5
2011	1940	1407	98.7	362	18.7
2012	1942	1433	98.2	362	18.6
2013	1991	1449	98.3	340	17.1
2014	1905	1459	98.2	367	19.3
2015	1865	1498	97.7	348	18.7
2016	1828	1494	98.9	332	18.2
2017	1758	1569	97.3	332	18.9
2018	1371	1110	32.9	139	10.1
2019	1181	964	50.2	116	9.8
1998–2019	39284	26475	93.0	7313	18.6

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	715	72.2	27.8	86.8
1999	723	71.5	28.5	84.8
2000	706	72.9	27.1	85.4
2001	746	68.9	31.1	84.1
2002	1049	74.0	26.0	86.8
2003	1136	72.2	27.8	85.4
2004	1140	76.5	23.5	85.9
2005	1234	70.5	29.5	80.0
2006	1206	68.5	31.5	81.5
2007	1306	70.7	29.3	82.6
2008	1345	70.4	29.6	81.3
2009	1372	67.7	32.3	77.0
2010	1414	65.1	34.9	77.5
2011	1407	64.7	35.3	75.8
2012	1433	64.5	35.5	77.3
2013	1449	62.2	37.8	72.3
2014	1459	62.5	37.5	74.7
2015	1498	59.3	40.7	71.4
2016	1494	57.3	42.7	70.6
2017	1569	59.2	40.8	70.2
2018	1110	39.5	60.5	62.5
2019	964	44.7	55.3	61.6
1998–2019	26475	64.7	35.3	77.9

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	336	74.5	72.3	80.1	73.7
1999	317	75.5	72.8	80.7	74.4
2000	356	76.9	73.9	82.4	75.4
2001	341	74.7	71.9	81.5	73.0
2002	513	75.4	73.1	81.0	74.3
2003	572	76.7	75.2	80.6	75.8
2004	559	76.4	75.3	81.6	75.8
2005	615	76.6	74.2	82.1	74.6
2006	629	77.5	76.0	81.0	76.2
2007	684	77.6	75.2	81.3	75.8
2008	733	77.5	75.7	82.6	76.4
2009	691	77.8	76.1	81.6	76.7
2010	738	78.2	75.4	82.2	76.8
2011	735	77.8	74.2	82.8	75.7
2012	748	78.5	76.3	83.2	77.1
2013	769	80.1	77.4	84.4	78.4
2014	770	79.9	77.3	83.8	78.9
2015	790	80.2	77.2	84.0	78.4
2016	828	79.9	76.1	84.2	77.7
2017	834	81.0	78.1	84.8	79.1
2018	612	81.2	77.6	83.5	79.8
2019	555	81.1	77.1	84.7	79.0
1998-2019	13725	78.4	75.7	83.0	76.7

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

Table 10b

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	379	78.2	76.5	84.0	78.1
1999	406	80.9	78.7	86.1	80.0
2000	350	81.1	78.8	86.8	80.3
2001	405	81.5	79.3	86.7	80.6
2002	536	81.7	79.7	87.0	80.9
2003	564	81.7	79.4	86.2	80.7
2004	581	81.5	79.3	85.3	80.3
2005	619	82.4	79.8	85.6	80.7
2006	577	82.8	80.3	86.5	81.4
2007	622	82.2	79.7	86.9	80.9
2008	612	83.1	80.4	86.6	81.8
2009	681	83.6	80.4	87.6	81.2
2010	676	83.7	80.8	87.8	82.5
2011	672	84.5	80.3	88.5	81.9
2012	685	84.1	79.7	88.4	81.5
2013	680	84.5	79.5	88.8	82.0
2014	689	84.3	79.1	88.1	80.9
2015	708	84.5	79.2	89.2	81.0
2016	666	84.2	78.7	88.9	81.3
2017	735	83.6	79.7	89.6	81.1
2018	498	84.2	77.1	87.4	80.7
2019	409	82.8	77.2	87.2	79.4
1998-2019	12750	83.0	79.4	87.6	81.0

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	246	22.2	0.40	12.9	0.40	20.5	0.41	28.2	0.42
1999	222	19.8	0.38	11.4	0.37	18.1	0.39	25.6	0.40
2000	266	23.4	0.50	12.9	0.48	20.8	0.50	29.5	0.54
2001	247	21.3	0.41	11.9	0.39	18.9	0.41	25.6	0.43
2002	392	21.0	0.38	11.2	0.37	17.8	0.39	24.5	0.39
2003	423	22.6	0.40	11.4	0.38	18.6	0.40	26.7	0.43
2004	436	23.2	0.41	11.4	0.39	18.5	0.41	26.6	0.44
2005	443	23.4	0.46	11.3	0.43	18.1	0.45	25.7	0.48
2006	428	22.3	0.43	10.5	0.39	17.1	0.42	24.6	0.45
2007	494	22.3	0.44	10.2	0.39	16.5	0.42	23.7	0.46
2008	541	24.3	0.47	10.8	0.43	17.6	0.45	25.4	0.49
2009	467	20.9	0.40	9.2	0.37	15.0	0.39	21.4	0.42
2010	487	21.6	0.47	9.3	0.42	14.9	0.45	21.4	0.48
2011	495	22.1	0.50	9.8	0.47	15.5	0.49	21.3	0.50
2012	497	21.9	0.50	9.4	0.45	15.1	0.48	21.0	0.51
2013	501	21.8	0.47	8.7	0.42	14.4	0.45	20.4	0.48
2014	485	20.8	0.48	8.2	0.42	13.4	0.45	19.0	0.48
2015	470	19.8	0.49	7.7	0.42	12.6	0.45	17.8	0.49
2016	498	20.7	0.51	8.5	0.45	13.5	0.48	18.4	0.50
2017	498	20.6	0.54	7.9	0.47	12.9	0.51	17.8	0.53
2018	254	10.4	0.37	4.0	0.32	6.4	0.34	8.9	0.36
2019	245	10.1	0.38	4.0	0.33	6.3	0.35	8.7	0.37
1998-2019	9035	20.5	0.45	9.1	0.41	14.6	0.43	20.4	0.46

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	270	23.0	0.41	8.6	0.36	13.6	0.38	19.0	0.40
1999	295	24.9	0.48	8.6	0.40	13.9	0.42	19.4	0.45
2000	249	20.7	0.44	7.3	0.38	11.7	0.40	16.0	0.41
2001	267	21.9	0.43	7.5	0.37	12.2	0.39	17.1	0.41
2002	384	19.6	0.38	6.6	0.33	10.6	0.34	14.7	0.36
2003	397	20.2	0.39	6.9	0.34	11.1	0.36	15.3	0.38
2004	437	22.1	0.44	7.2	0.36	11.8	0.39	16.6	0.42
2005	427	21.5	0.45	7.1	0.40	11.4	0.42	15.6	0.43
2006	398	19.8	0.42	6.2	0.33	10.2	0.36	14.3	0.38
2007	431	18.7	0.42	6.2	0.36	9.9	0.38	13.7	0.40
2008	408	17.6	0.40	5.4	0.32	8.8	0.34	12.5	0.37
2009	462	19.9	0.46	6.2	0.39	10.0	0.41	13.8	0.42
2010	435	18.6	0.47	5.8	0.40	9.3	0.42	12.6	0.43
2011	416	17.8	0.45	5.4	0.36	8.7	0.38	12.0	0.41
2012	427	18.1	0.47	5.6	0.37	9.1	0.41	12.6	0.43
2013	401	16.8	0.45	5.3	0.37	8.5	0.40	11.5	0.41
2014	427	17.7	0.49	5.5	0.40	8.8	0.43	11.9	0.45
2015	418	17.2	0.48	5.3	0.40	8.4	0.42	11.5	0.44
2016	359	14.6	0.44	4.6	0.37	7.3	0.39	9.9	0.41
2017	431	17.5	0.53	5.1	0.40	8.2	0.44	11.6	0.47
2018	188	7.6	0.29	2.6	0.25	4.0	0.26	5.3	0.27
2019	189	7.6	0.36	2.7	0.33	4.1	0.34	5.4	0.34
1998-2019	8116	17.7	0.44	5.7	0.36	9.1	0.39	12.5	0.40

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	3	0.0	0.0	1	0.0	0.0	2	0.0	0.0
25-29	11	0.1	0.1	5	0.1	0.1	6	0.1	0.2
30-34	15	0.1	0.3	10	0.2	0.3	5	0.1	0.3
35-39	31	0.3	0.6	13	0.2	0.5	18	0.4	0.6
40-44	86	0.8	1.3	43	0.7	1.2	43	0.9	1.5
45-49	158	1.4	2.8	77	1.3	2.5	81	1.6	3.1
50-54	287	2.6	5.4	166	2.8	5.3	121	2.4	5.5
55-59	455	4.2	9.6	269	4.5	9.9	186	3.7	9.3
60-64	687	6.3	15.9	419	7.1	16.9	268	5.4	14.6
65-69	1130	10.3	26.2	695	11.7	28.6	435	8.7	23.3
70-74	1562	14.3	40.5	936	15.8	44.4	626	12.5	35.9
75-79	1924	17.6	58.1	1133	19.1	63.5	791	15.8	51.7
80-84	1987	18.2	76.3	1099	18.5	82.0	888	17.8	69.5
85+	2587	23.7	100.0	1065	18.0	100.0	1522	30.5	100.0
All ages	10924	100.0		5932	100.0		4992	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	0.11			2.1	
20-24	1	2	0.1	0.04	0.1	0.06	1.5	5.1
25-29	5	6	0.2	0.14	0.3	0.14	5.9	6.5
30-34	10	5	0.5	0.20	0.2	0.10	7.8	3.1
35-39	13	18	0.6	0.15	0.9	0.22	5.3	4.9
40-44	43	43	1.8	0.25	1.9	0.27	7.5	5.4
45-49	77	81	3.1	0.25	3.3	0.29	5.7	5.1
50-54	166	121	7.1	0.28	5.2	0.26	6.6	4.9
55-59	269	186	13.8	0.32	9.3	0.28	6.5	5.3
60-64	419	268	25.7	0.32	15.3	0.31	7.0	5.8
65-69	695	435	45.7	0.39	25.8	0.37	8.1	6.7
70-74	936	626	66.8	0.41	39.0	0.39	8.4	7.7
75-79	1133	791	102.3	0.51	57.4	0.44	9.9	8.8
80-84	1099	888	167.4	0.62	91.2	0.51	11.7	10.5
85+	1065	1522	249.8	0.84	157.7	0.67	13.0	13.8
All ages	5932	4992					9.3	8.8
Mortality								
Raw			19.7	0.47	16.0	0.44		
WS			8.1	0.41	5.0	0.36		
ES			13.1	0.44	8.0	0.39		
BRD-S			18.3	0.47	11.0	0.41		
PYLL-70								
per 100,000			57.2		44.6			
ES			48.8		37.0			
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	26	0.6	18	69.2	3	11.5	5	19.2
C09-C10 Oropharynx	32	0.8	19	59.4	2	6.3	11	34.4
C12-C13 Hypopharynx	18	0.4	6	33.3			12	66.7
C15 Oesophagus	72	1.8	9	12.5	11	15.3	52	72.2
C16 Stomach	220	5.5	61	27.7	55	25.0	104	47.3
C17 Small intestine	51	1.3	7	13.7	20	39.2	24	47.1
C18 Colon	308	7.6			142	46.1	166	53.9
C19-C20 Rectum	356	8.8	100	28.1	179	50.3	77	21.6
C21 Anus/canal	11	0.3	5	45.5			6	54.5
C22 Liver	121	3.0	8	6.6	29	24.0	84	69.4
C23-C24 Bile	36	0.9	3	8.3	7	19.4	26	72.2
C25 Pancreas	153	3.8	11	7.2	19	12.4	123	80.4
C30-C31 Sinuses	8	0.2	6	75.0			2	25.0
C32 Larynx	60	1.5	40	66.7			20	33.3
C33-C34 Lung	416	10.3	73	17.5	57	13.7	286	68.8
C38,C45 Mesothelioma	21	0.5	1	4.8	4	19.0	16	76.2
C43 Malign. melanoma	118	2.9	71	60.2	2	1.7	45	38.1
C44 Skin others	267	6.6	137	51.3	17	6.4	113	42.3
C46,C49 Soft tissue	18	0.4	5	27.8			13	72.2
C50 Breast	10	0.2	4	40.0			6	60.0
C60 Penis	10	0.2	3	30.0			7	70.0
C61 Prostate	904	22.4	524	58.0	62	6.9	318	35.2
C62 Testis	20	0.5	16	80.0			4	20.0
C64 Kidney	164	4.1	73	44.5	33	20.1	58	35.4
C65 Renal pelvis	20	0.5	5	25.0			15	75.0
C66 Ureter	11	0.3	2	18.2	1	9.1	8	72.7
C67 Bladder	195	4.8	69	35.4	20	10.3	106	54.4
C70-C72 CNS cancer	34	0.8	3	8.8	3	8.8	28	82.4
C73 Thyroid	16	0.4	7	43.8	2	12.5	7	43.8
C76-C79 CUP	49	1.2	9	18.4	8	16.3	32	65.3
C81 Hodgkin lymphoma	12	0.3	11	91.7			1	8.3
C82-C85 NHL	150	3.7	63	42.0	26	17.3	61	40.7
C90 Mult. myeloma	32	0.8	10	31.3	4	12.5	18	56.3
C91-C96 Leukaemia	54	1.3	11	20.4	4	7.4	39	72.2
Others, specified	40	1.0	18	45.0	3	7.5	19	47.5
All further malignancies	4033	100.0	1408	34.9	713	17.7	1912	47.4

Further malignancies with number of cases 1 to 7 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	17	0.6	9	52.9	1	5.9	7	41.2
C09-C10 Oropharynx	11	0.4	5	45.5	1	9.1	5	45.5
C15 Oesophagus	15	0.5	3	20.0	2	13.3	10	66.7
C16 Stomach	153	5.2	45	29.4	33	21.6	75	49.0
C17 Small intestine	21	0.7	2	9.5	12	57.1	7	33.3
C18 Colon	209	7.1			76	36.4	133	63.6
C19-C20 Rectum	211	7.2	63	29.9	94	44.5	54	25.6
C21 Anus/canal	20	0.7	8	40.0	5	25.0	7	35.0
C22 Liver	37	1.3	2	5.4	11	29.7	24	64.9
C23-C24 Bile	42	1.4	11	26.2	7	16.7	24	57.1
C25 Pancreas	135	4.6	8	5.9	20	14.8	107	79.3
C32 Larynx	13	0.4	7	53.8	2	15.4	4	30.8
C33-C34 Lung	198	6.7	37	18.7	18	9.1	143	72.2
C43 Malign. melanoma	71	2.4	46	64.8	5	7.0	20	28.2
C44 Skin others	107	3.6	67	62.6	7	6.5	33	30.8
C46,C49 Soft tissue	13	0.4	8	61.5			5	38.5
C48 Peritoneal	14	0.5	3	21.4	7	50.0	4	28.6
C50 Breast	746	25.3	504	67.6	48	6.4	194	26.0
C51 Vulva	24	0.8	15	62.5	1	4.2	8	33.3
C52 Vagina	8	0.3	3	37.5	1	12.5	4	50.0
C53 Cervix uteri	72	2.4	50	69.4	6	8.3	16	22.2
C54 Corpus uteri	170	5.8	111	65.3	14	8.2	45	26.5
C55,C57 Fem. genitals un	15	0.5	12	80.0	1	6.7	2	13.3
C56 Ovary	195	6.6	68	34.9	37	19.0	90	46.2
C64 Kidney	60	2.0	30	50.0	9	15.0	21	35.0
C65 Renal pelvis	8	0.3			1	12.5	7	87.5
C66 Ureter	10	0.3	2	20.0	1	10.0	7	70.0
C67 Bladder	68	2.3	27	39.7	2	2.9	39	57.4
C70-C72 CNS cancer	24	0.8	6	25.0	1	4.2	17	70.8
C73 Thyroid	31	1.1	17	54.8	2	6.5	12	38.7
C76-C79 CUP	30	1.0	12	40.0	5	16.7	13	43.3
C81 Hodgkin lymphoma	10	0.3	9	90.0	1	10.0		
C82-C85 NHL	92	3.1	44	47.8	10	10.9	38	41.3
C90 Mult. myeloma	25	0.8	9	36.0	3	12.0	13	52.0
C91-C96 Leukaemia	35	1.2	5	14.3	6	17.1	24	68.6
Others, specified	35	1.2	10	28.6	2	5.7	23	65.7
All further malignancies	2945	100.0	1258	42.7	452	15.3	1235	41.9

Further malignancies with number of cases 1 to 7 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	0.11			2.2	
20-24	1	2	0.1	0.04	0.1	0.06	1.7	5.4
25-29	5	6	0.2	0.16	0.3	0.15	6.5	7.0
30-34	10	3	0.5	0.20	0.1	0.07	8.1	2.2
35-39	11	15	0.5	0.15	0.7	0.21	4.8	4.5
40-44	38	37	1.6	0.24	1.6	0.27	7.2	5.3
45-49	72	68	2.9	0.26	2.8	0.28	5.9	5.0
50-54	139	108	5.9	0.28	4.7	0.26	6.3	5.2
55-59	230	161	11.8	0.32	8.1	0.29	6.4	5.4
60-64	344	217	21.1	0.31	12.4	0.31	6.9	5.7
65-69	539	351	35.4	0.39	20.8	0.36	7.8	6.8
70-74	713	474	50.9	0.43	29.5	0.39	8.4	7.5
75-79	827	605	74.7	0.52	43.9	0.44	9.9	8.8
80-84	757	667	115.3	0.66	68.5	0.48	11.2	10.1
85+	742	1198	174.0	0.88	124.1	0.68	12.5	13.8
All ages	4429	3912					8.9	8.7
Mortality								
Raw			14.7	0.46	12.6	0.43		
WS			6.2	0.41	4.0	0.35		
ES			9.9	0.43	6.4	0.38		
BRD-S			13.7	0.46	8.6	0.40		
PYLL-70								
per 100,000			48.8		37.8			
ES			41.7		31.5			
AYLL-70			9.3		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	0.11			2.2	
20-24	1	2	0.1	0.04	0.1	0.07	1.7	5.6
25-29	5	6	0.2	0.17	0.3	0.15	6.5	7.1
30-34	10	3	0.5	0.21	0.1	0.07	8.1	2.2
35-39	11	14	0.5	0.15	0.7	0.20	4.9	4.3
40-44	38	37	1.6	0.25	1.6	0.28	7.2	5.3
45-49	67	67	2.7	0.25	2.8	0.29	5.5	5.0
50-54	129	104	5.5	0.27	4.5	0.27	5.9	5.1
55-59	210	148	10.8	0.32	7.4	0.28	5.9	5.1
60-64	309	199	18.9	0.31	11.3	0.31	6.3	5.4
65-69	456	305	30.0	0.37	18.1	0.35	6.8	6.1
70-74	568	399	40.5	0.39	24.8	0.36	6.9	6.5
75-79	635	515	57.4	0.45	37.4	0.41	8.0	7.7
80-84	548	557	83.5	0.53	57.2	0.43	8.7	8.8
85+	531	991	124.5	0.66	102.7	0.59	9.8	11.9
All ages	3519	3347					7.4	7.6
Mortality								
Raw			11.7	0.41	10.8	0.40		
WS			5.1	0.37	3.5	0.34		
ES			8.0	0.39	5.5	0.36		
BRD-S			10.8	0.41	7.4	0.37		
PYLL-70								
per 100,000			45.0		35.8			
ES			38.5		29.8			
AYLL-70			9.7		10.6			

* See corresponding tables with multiple malignancies.

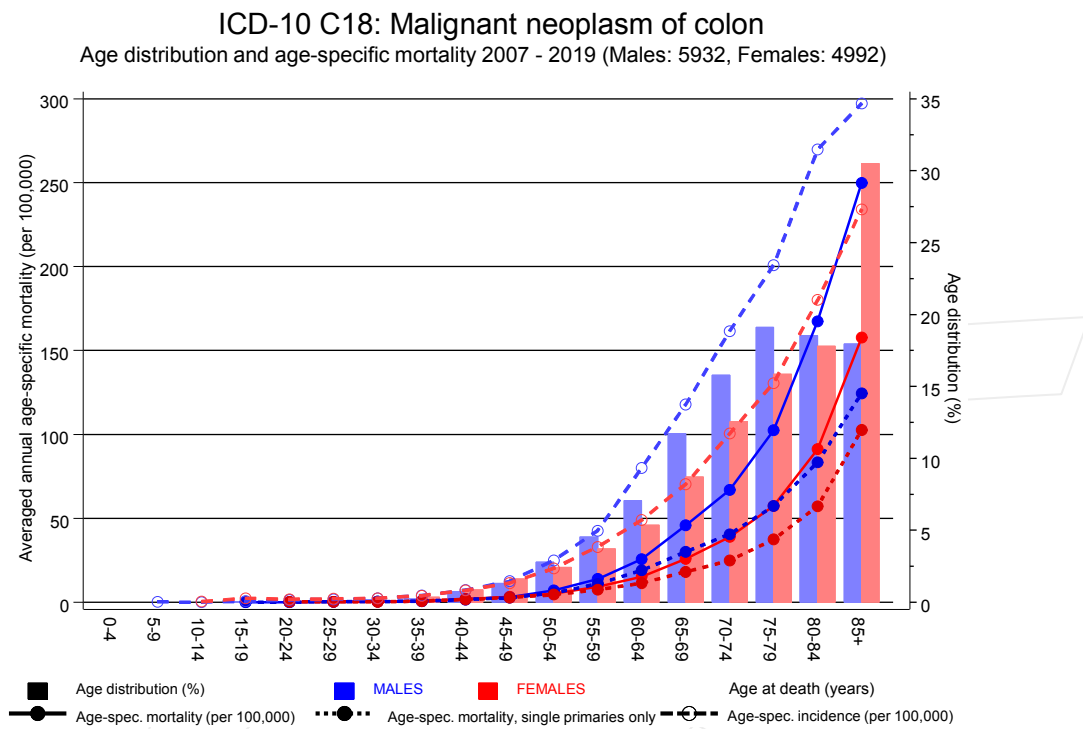
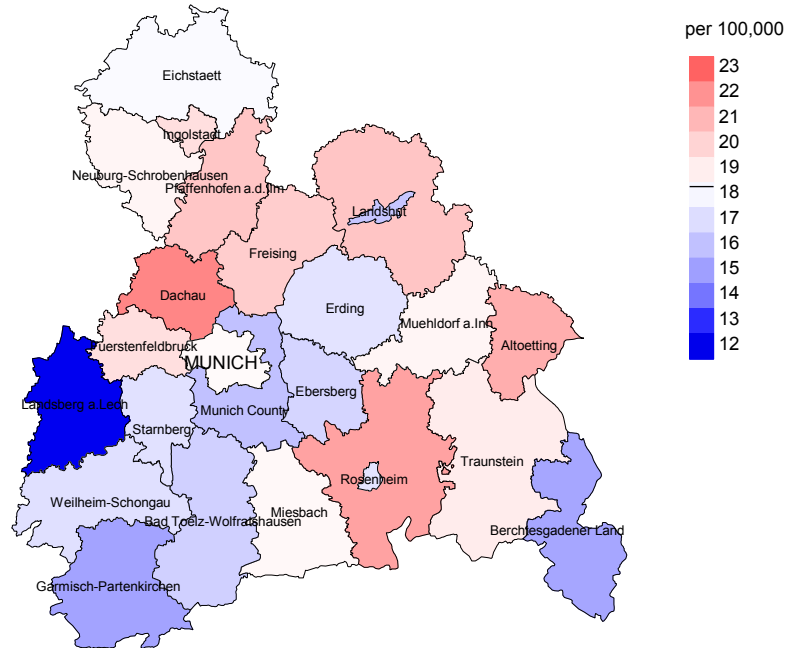


Figure 17. Distribution of age at death (bars; males: mean=71.3 yrs, median=72.5 yrs; females: mean=74.2 yrs, median=76.0 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

The difference between age at diagnosis (Table 3) and age at colon 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

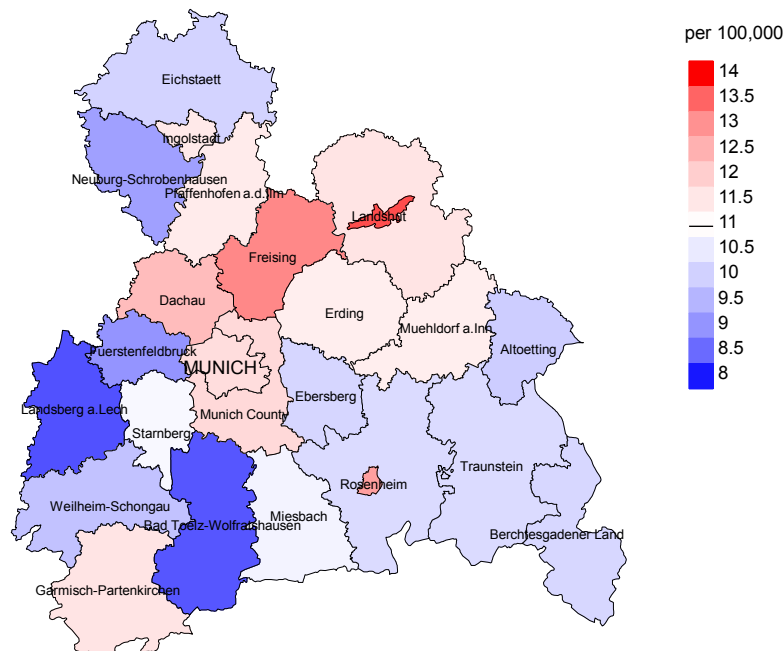
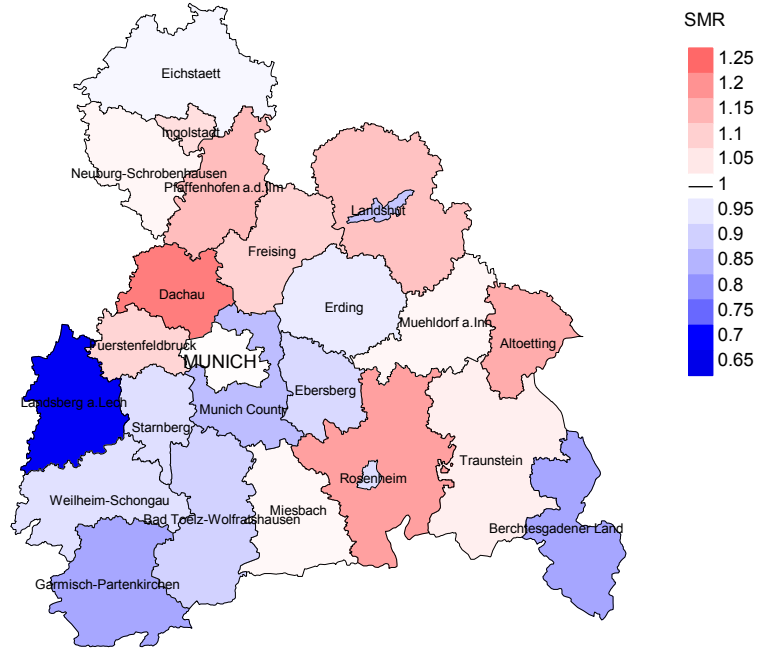


Figure 18a. Map of cancer mortality (german standard population) by county averaged for period 2007 to 2019. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 18.3/100,000 WS N=5,932, females 11.0/100,000 WS N=4,992).

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 121 women died from colon cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 10.1/100,000 (german standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 7.8 and 12.9/100,000.

Standardized mortality ratio (SMR) 2007 - 2019: Males



Standardized mortality ratio (SMR) 2007 - 2019: Females

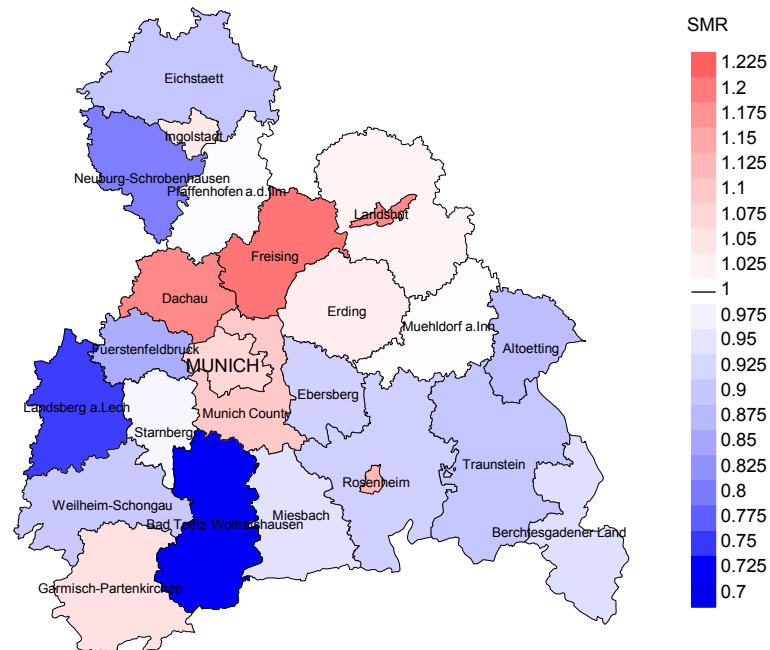


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2019. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=5,932, females N=4,992).

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 121 women died from colon cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.91. Though, the value of this parameter may vary with an underlying probability of 99% between 0.71 and 1.15, and is therefore not statistically striking.

Statistical Notes

In all tables and figures the respective reference values should be carefully considered. The incidence rates include diagnoses (with multiple primary), and death certificate only (DCO) cases, where applicable. For mortality statistics patients, diagnoses and progressive course of disease are presented. In the calculations, all courses of disease are considered whereby progressions occurred and/or death certificate identified progressive cancers were ascertained. Additionally there are three groups of disease course to consider:

1. All multiple primaries included

The mortality statistic describes the tumor-specific death, independent of any malignancy. The patient perspective, induced secondary malignancies, and the problem of multiple malignancies from the same primary tumor all have reasons for their inclusion.

2. First singular primary (no information about other prior or synchronous malignancy)

The mortality statistic describes the cancer-related death for patients who have no therapeutic restrictions due to a previous or synchronous cancer. These statistics are comparable to studies that have exclusion criteria based on a second malignancy.

3. Single primary (no information about other prior, syn- or metachronous malignancy)

The mortality statistic describes the tumor-specific death that occurs without any impact through secondary primaries, earlier, synchronous, later or induced. Precisely the difference between disease group 1 and 2 highlight the magnitude of the problem of secondary malignancies.

For this reason differences appear concerning official mono-causal mortality statistics. To judge the maximum deviation, 2 further tables are presented. In the first table the distribution of secondary malignancies before, at or after the described cancer are shown, that could be an alternative cause of death. In the second table, the age-specific mortality rates for all courses of disease, without designation of secondary malignancies are shown.

A previously minimally acknowledged statistic is the **age at death**, which allows for a good assessment of the quality of classification of the apparent tumor-specific death. For assumed tumor-independent deaths, the age of death should be estimated from the age of diagnosis and the normal life expectancy, whereas tumor-dependent deaths can be estimated from the age of diagnosis plus the average tumor-specific life expectancy. The comparison of different tumors demonstrates this association, if the causes of cancer and the competing cause of death are independent of each other (e.g. breast and colon versus head&neck and lung).

The ratio of mortality and incidence (mortality-to-incidence ratio, **MIR, MI-Index**) is a statistical index that allows for the evaluation of the quality of data. For diseases with poor prognoses, comparable values are obtained from all age groups, because to a large extent, the numerator and denominator contain the same cases. For tumors with a good prognosis, increasing and decreasing incidence and age-specific differences in prognosis can more strongly alter the MIR. Additionally, attention should be paid to the confidence intervals where fewer cases are reported.

The complexity of problems identified here emphasizes the importance of relative survival data for the appropriate analysis of long term results.

As a measurement of the burden of disease, the number of potential life years loss due to premature deaths in a cohort can be calculated (**PYLL**, potential years of life lost, standardized per 100,000 persons or per European standard) as well as the average loss of life years per individual (**AYLL**, average years of life lost). Depending upon the analytic aim (health economy, prevention, health care research) different methods exist for the generation of these measurements. In the results presented here, the age for a premature death is considered to be before 70 years, according to the guidelines of the OECD and the WHO (as seen in the abbreviation PYLL-70 or AYLL-70).

Shortcuts

MCR	Munich Cancer Registry (Tumorregister München)
GEKID	Association of Population-based Cancer Registries in Germany (Gesellschaft der epidemiologischen Krebsregister in Deutschland e.V.)
SEER	Surveillance, Epidemiology, and End Results (USA)
DCO	Death certificate only
BRD-S	German (FRG) standard population
ES	European standard population (old)
WS	World standard population
SIR	Standardized incidence ratio
CI	Confidence interval
EAR	Excess absolute risk = excess cancer cases (O - E) per 10,000 person-years
PYLL-70	Potential years of life lost prior to age 70 given a person dies before that age
AYLL-70	Average years of life lost prior to age 70 given a person dies before that age
SMR	Standardized mortality ratio
MI-index	Ratio of mortality to incidence, MIR
FRG	Federal Republic of Germany

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