

Munich Cancer Registry



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

ICD-10 C18-C21: Colorectal cancer

Incidence and Mortality

Year of diagnosis	1998-2016
Patients	52,059
Diseases	53,494
Creation date	08/21/2018
Export date	08/09/2018
Population	4.81 m





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

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

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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, August 2018

- [#] 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	1881	101	5.4	11.4	10.4	75.9	97.0
1999	1876	122	6.5	11.7	10.2	74.6	96.4
2000	1743	106	6.1	12.4	10.1	73.5	96.8
2001	1903	132	6.9	12.6	9.9	68.9	96.2
2002	3220	368	11.4	12.5	9.7	72.1	96.9 #
2003	3235	300	9.3	12.7	9.4	67.4	96.5
2004	3122	243	7.8	12.8	9.0	66.9	96.7
2005	3053	215	7.0	13.3	8.7	67.1	96.2
2006	3144	161	5.1	13.7	8.3	61.0	93.5
2007	3505	205	5.8	13.9	7.8	60.4	80.0 #
2008	3450	194	5.6	14.2	7.3	57.2	72.4
2009	3421	173	5.1	14.5	6.7	54.9	71.6
2010	3214	184	5.7	14.8	6.0	52.5	70.4
2011	3135	156	5.0	15.0	5.5	50.2	70.8
2012	3075	161	5.2	15.2	5.0	46.0	69.3
2013	3048	155	5.1	15.5	4.5	41.6	67.4
2014	2919	145	5.0	15.7	4.1	37.8	70.8
2015	2490	136	5.5	15.9	3.7	31.2	97.9
2016	2060	118	5.7	16.0	3.5	22.1	75.3 ##
1998-2016	53494	3375	6.3	16.0	10.4	56.5	83.7

53,494 cases diagnosed 1998-2016 are related to a total of 52,059 patients. Currently, in 13,271 (25.5 %) of these 52,059 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 10,612 / 2,100 / 559 (20.4 % / 4.0 % / 1.1 %) 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 2014, a subgroup of 2,919 cases has been diagnosed, of which 15.7 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 4.1 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 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	938	49.9	36	3.8	10.7	11.9	75.8	97.7
1999	954	50.9	45	4.7	10.7	11.7	75.1	96.9
2000	888	50.9	29	3.3	11.6	11.4	71.7	97.3
2001	984	51.7	46	4.7	11.9	11.3	69.0	96.2
2002	1689	52.5	164	9.7	12.0	11.0	72.1	97.5 #
2003	1709	52.8	116	6.8	12.3	10.7	67.8	97.5
2004	1649	52.8	90	5.5	12.6	10.2	68.8	96.8
2005	1594	52.2	91	5.7	13.3	9.8	67.3	96.6
2006	1698	54.0	56	3.3	13.8	9.5	60.7	93.5
2007	1918	54.7	85	4.4	14.1	8.9	61.0	80.0 #
2008	1890	54.8	76	4.0	14.5	8.4	56.5	71.7
2009	1902	55.6	78	4.1	15.0	7.7	55.5	71.5
2010	1781	55.4	76	4.3	15.3	6.9	52.3	69.8
2011	1704	54.4	56	3.3	15.6	6.4	49.2	69.8
2012	1667	54.2	62	3.7	15.9	5.9	46.3	69.5
2013	1720	56.4	62	3.6	16.2	5.2	41.1	66.2
2014	1631	55.9	62	3.8	16.4	4.7	37.1	71.1
2015	1405	56.4	58	4.1	16.6	4.1	29.7	98.1
2016	1160	56.3	48	4.1	16.7	4.5	21.2	73.8 ##
1998-2016	28881	54.0	1336	4.6	16.7	11.9	56.0	83.3

28,881 cases diagnosed 1998-2016 are related to a total of 27,971 patients. Currently, in 7,691 (27.5 %) of these 27,971 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 6,077 / 1,248 / 366 (21.7 % / 4.5 % / 1.3 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:

In 2014, a subgroup of 1,631 cases has been diagnosed, of which 16.4 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 4.7 % 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	943	50.1	65	6.9	12.2	8.7	75.9	96.4
1999	922	49.1	77	8.4	12.7	8.6	74.1	96.0
2000	855	49.1	77	9.0	13.2	8.5	75.3	96.4
2001	919	48.3	86	9.4	13.4	8.3	68.8	96.1
2002	1531	47.5	204	13.3	13.1	8.1	72.2	96.2 #
2003	1526	47.2	184	12.1	13.1	7.8	66.9	95.3
2004	1473	47.2	153	10.4	13.0	7.5	64.8	96.5
2005	1459	47.8	124	8.5	13.4	7.3	67.0	95.7
2006	1446	46.0	105	7.3	13.5	6.9	61.4	93.6
2007	1587	45.3	120	7.6	13.6	6.4	59.7	80.0 #
2008	1560	45.2	118	7.6	13.7	6.0	58.1	73.3
2009	1519	44.4	95	6.3	13.9	5.5	54.2	71.7
2010	1433	44.6	108	7.5	14.1	5.0	52.8	71.1
2011	1431	45.6	100	7.0	14.3	4.5	51.4	72.0
2012	1408	45.8	99	7.0	14.4	3.8	45.7	69.0
2013	1328	43.6	93	7.0	14.7	3.5	42.2	69.0
2014	1288	44.1	83	6.4	14.8	3.5	38.6	70.4
2015	1085	43.6	78	7.2	15.1	3.2	33.3	97.7
2016	900	43.7	70	7.8	15.2	2.2	23.2	77.3 ##
1998-2016	24613	46.0	2039	8.3	15.2	8.7	57.1	84.1

24,613 cases diagnosed 1998-2016 are related to a total of 24,088 patients. Currently, in 5,580 (23.2 %) of these 24,088 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 4,535 / 852 / 193 (18.8 % / 3.5 % / 0.8 %) 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 2014, a subgroup of 1,288 cases has been diagnosed, of which 14.8 % 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 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 4.81 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	938	943	84.7	80.2	50.9	34.3	76.4	51.7	99.5	67.6
1999	954	922	85.2	77.7	50.5	33.0	76.3	49.7	100.1	64.9
2000	888	855	78.0	71.2	45.6	29.3	69.1	44.7	89.5	58.4
2001	984	919	84.9	75.5	49.7	32.3	74.4	48.5	95.1	63.1
2002	1689	1531	90.7	78.2	50.6	32.0	76.4	48.3	99.9	63.0
2003	1709	1526	91.2	77.5	50.2	31.9	75.5	48.0	98.1	62.0
2004	1649	1473	87.6	74.5	46.8	31.1	70.7	46.3	92.5	59.6
2005	1594	1459	84.2	73.3	44.7	28.8	67.0	43.6	87.0	57.4
2006	1698	1446	88.7	72.0	46.6	29.7	69.7	44.2	90.0	57.3
2007	1918	1587	86.6	68.7	45.1	27.7	67.2	41.3	87.3	53.6
2008	1890	1560	84.9	67.2	42.7	26.6	64.4	39.9	83.8	51.7
2009	1902	1519	85.2	65.3	42.3	25.8	63.3	38.6	82.6	50.4
2010	1781	1433	79.0	61.2	38.8	23.5	58.2	35.4	75.8	46.5
2011	1704	1431	76.2	61.2	36.9	24.3	55.3	36.1	71.6	46.2
2012	1667	1408	73.4	59.7	35.2	24.0	52.9	35.3	68.3	45.4
2013	1720	1328	74.7	55.7	35.3	22.5	52.7	33.1	68.7	42.3
2014	1631	1288	70.0	53.5	33.1	21.5	49.4	31.5	63.8	40.1
2015	1405	1085	59.1	44.6	27.5	17.1	41.2	25.4	53.4	32.9
2016	1160	900	48.3	36.7	23.0	14.6	33.8	21.5	43.7	27.4
1998-2016	28881	24613	78.5	64.2	40.1	25.8	59.9	38.5	77.5	49.8

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	1881	69.9	12.4	13.2	102	53.9	60.8	71.0	78.7	86.1
1999	1876	70.3	12.5	24.9	102	54.2	61.7	71.1	79.4	86.4
2000	1743	70.5	12.2	24.7	103	54.9	61.5	71.4	79.3	86.7
2001	1903	70.0	12.6	26.6	103	54.1	61.5	70.4	79.4	86.5
2002	3220	70.9	12.1	17.7	104	55.2	62.6	71.8	80.0	86.7
2003	3235	70.9	12.0	8.4	101	55.6	63.0	71.4	79.9	86.0
2004	3122	70.6	12.3	13.8	101	55.0	62.8	71.0	79.9	85.4
2005	3053	71.3	12.2	15.1	99.9	55.4	63.7	71.8	80.3	86.0
2006	3144	70.4	12.2	17.9	102	54.2	63.1	70.8	79.6	85.2
2007	3505	70.7	12.5	13.4	103	54.1	63.7	71.2	80.2	85.8
2008	3450	71.3	12.4	18.9	105	55.0	64.0	71.9	80.4	86.5
2009	3421	71.0	12.4	12.4	102	54.2	63.6	71.9	80.1	85.9
2010	3214	71.4	12.6	14.9	101	54.1	63.6	72.4	80.9	86.2
2011	3135	71.1	12.9	15.5	101	53.3	63.1	72.2	80.7	86.8
2012	3075	71.1	12.9	9.7	101	54.1	63.0	72.6	80.4	86.4
2013	3048	70.8	13.2	15.7	105	52.8	62.8	72.7	80.0	86.2
2014	2919	71.0	13.2	1.4	103	52.8	63.1	73.0	80.3	86.7
2015	2490	71.5	13.0	15.0	105	53.5	64.0	73.5	80.4	86.8
2016	2060	70.7	13.3	9.4	100	52.9	62.3	72.8	80.2	86.0
1998-2016	53494	70.9	12.6	1.4	105	54.2	62.9	71.9	80.1	86.2

Table 3a

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

Year of diagnosis	Cases n	Std.		Median						
		Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	938	67.7	11.8	31.4	98.1	53.6	59.4	68.1	75.9	83.9
1999	954	68.3	11.6	24.9	95.5	54.2	60.3	69.0	76.7	83.4
2000	888	68.2	11.0	34.4	95.9	54.1	60.3	68.0	76.6	83.0
2001	984	68.3	11.4	31.3	102	54.2	61.1	67.9	75.9	83.4
2002	1689	69.1	11.0	20.9	98.5	55.4	61.8	69.5	76.6	82.5
2003	1709	69.1	11.1	8.4	99.4	55.4	62.5	69.5	76.5	82.7
2004	1649	69.3	11.1	27.8	101	55.4	62.4	69.3	77.1	83.4
2005	1594	69.2	11.3	19.0	99.6	54.6	62.7	69.5	77.1	83.5
2006	1698	68.9	11.2	17.9	102	54.3	62.5	69.2	77.2	82.8
2007	1918	69.0	11.7	15.8	99.4	54.2	62.6	69.5	77.6	83.0
2008	1890	69.7	11.3	19.3	105	54.9	63.3	70.4	77.8	83.4
2009	1902	69.5	11.4	12.4	102	53.8	62.8	70.9	77.8	83.0
2010	1781	69.8	11.7	21.1	98.9	54.0	62.5	70.9	78.2	84.1
2011	1704	69.8	11.8	15.5	97.3	53.4	63.0	71.1	78.2	84.2
2012	1667	70.3	11.5	9.7	101	55.3	62.9	71.6	78.3	84.1
2013	1720	70.1	12.1	19.4	99.6	53.8	62.8	72.1	78.3	84.3
2014	1631	70.3	12.4	20.3	102	53.5	62.7	72.3	79.1	85.1
2015	1405	70.5	12.1	18.3	105	53.7	63.1	72.5	79.0	84.9
2016	1160	69.7	12.8	9.4	96.4	52.7	61.7	72.1	79.0	84.3
1998-2016	28881	69.4	11.6	8.4	105	54.2	62.3	70.3	77.7	83.7

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	943	72.1	12.7	13.2	102	54.5	63.1	74.0	81.6	87.4
1999	922	72.4	13.1	26.9	102	54.2	63.5	74.5	82.0	88.0
2000	855	72.8	12.8	24.7	103	55.8	63.0	74.8	81.8	88.5
2001	919	71.8	13.4	26.6	103	53.9	62.2	74.5	81.2	88.5
2002	1531	72.9	13.0	17.7	104	55.2	63.5	74.8	82.1	88.8
2003	1526	72.8	12.6	23.5	101	56.1	63.8	74.2	82.3	88.5
2004	1473	72.0	13.4	13.8	100	54.4	63.7	73.7	82.6	87.6
2005	1459	73.5	12.8	15.1	99.9	56.8	65.2	75.4	83.2	89.2
2006	1446	72.1	13.1	21.2	98.7	54.2	64.0	73.8	82.2	86.7
2007	1587	72.6	13.2	13.4	103	53.8	64.9	74.3	82.8	87.5
2008	1560	73.2	13.3	18.9	102	55.3	64.9	74.2	83.6	88.5
2009	1519	72.9	13.3	15.9	102	54.6	64.9	74.7	83.2	88.4
2010	1433	73.3	13.4	14.9	101	54.6	65.4	75.2	83.3	88.6
2011	1431	72.6	14.0	16.5	101	53.0	63.2	74.1	83.8	88.8
2012	1408	72.0	14.4	13.7	100	52.7	63.5	74.6	83.0	88.8
2013	1328	71.7	14.4	15.7	105	50.9	62.8	74.0	82.5	88.5
2014	1288	71.9	14.2	1.4	103	51.5	63.8	74.2	82.4	88.7
2015	1085	72.9	13.9	15.0	101	53.0	65.8	75.0	82.5	89.3
2016	900	72.0	13.8	16.1	100	53.0	63.2	74.5	81.6	88.2
1998-2016	24613	72.5	13.4	1.4	105	54.1	64.0	74.5	82.6	88.4

Table 4

Age distribution by 5-year age group and sex for period 2007-2016
(incl. DCO)

Age at diagnosis Years	Cases n	Males			Females				
		%	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	4	0.0	0.0	1	0.0	0.0	3	0.0	0.0
15-19	34	0.1	0.1	7	0.0	0.1	27	0.2	0.2
20-24	48	0.2	0.3	21	0.1	0.2	27	0.2	0.4
25-29	73	0.2	0.5	32	0.2	0.4	41	0.3	0.7
30-34	126	0.4	0.9	69	0.4	0.8	57	0.4	1.2
35-39	216	0.7	1.7	113	0.7	1.5	103	0.8	1.9
40-44	483	1.6	3.3	258	1.5	3.0	225	1.7	3.6
45-49	950	3.1	6.4	511	3.0	6.0	439	3.2	6.8
50-54	1566	5.2	11.6	896	5.3	11.4	670	4.9	11.8
55-59	2192	7.2	18.8	1310	7.8	19.2	882	6.5	18.3
60-64	2972	9.8	28.6	1886	11.2	30.4	1086	8.0	26.3
65-69	4048	13.4	41.9	2567	15.3	45.7	1481	10.9	37.2
70-74	5038	16.6	58.6	3074	18.3	64.1	1964	14.5	51.7
75-79	4655	15.4	73.9	2671	15.9	80.0	1984	14.7	66.4
80-84	3952	13.0	86.9	1974	11.8	91.7	1978	14.6	81.0
85+	3957	13.1	100.0	1386	8.3	100.0	2571	19.0	100.0
All ages	30317	100.0		16778	100.0		13539	100.0	

Table 5

Age-specific incidence, DCO rate and proportion of all cancers
for period 2007-2016

Age at diagnosis Years	Males n	Females n	Males Age- spec. incid.	Females Age- spec. incid.	Males DCO rate n=661 %	Females DCO rate n=961 %	Males	Females
							Prop.all cancers n=113978 %	Prop.all cancers n=112253 %
0- 4		1		0.1		100.0		0.7
5- 9	2		0.2				1.9	
10-14	1	3	0.1	0.3			0.9	3.0
15-19	7	27	0.6	2.3			2.8	13.0
20-24	21	27	1.5	2.0	4.8		4.6	7.2
25-29	30	41	1.9	2.6			4.4	4.9
30-34	69	56	4.3	3.5			7.2	3.8
35-39	110	101	6.8	6.3	1.8	3.0	8.0	4.0
40-44	256	225	13.7	12.6		0.4	11.8	4.9
45-49	504	433	25.5	22.7	0.8		12.8	6.3
50-54	872	665	50.5	38.9	1.0	1.2	14.2	7.7
55-59	1291	869	91.2	59.1	1.5	0.3	14.0	9.3
60-64	1852	1071	151.2	80.6	1.5	1.5	14.1	9.5
65-69	2503	1458	211.2	112.3	1.8	1.9	13.4	10.4
70-74	2991	1928	270.4	152.3	2.8	2.3	14.2	13.0
75-79	2603	1949	326.7	194.6	3.7	4.3	15.7	14.6
80-84	1904	1954	414.0	276.2	6.8	8.2	17.3	17.9
85+	1357	2531	443.2	344.9	18.0	24.3	17.1	19.9
All ages	16373	13339			4.0	7.2	14.4	11.9
Incidence								
Raw			71.7	56.3				
WS			34.9	22.3				
ES			52.0	33.1				
BRD-S			67.3	42.7				

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

ICD-10 C18-C21: Malignant neoplasm of colorectum incl. anus
 Age distribution and age-specific incidence 2007 - 2016 (Males: 16373, Females: 13339)

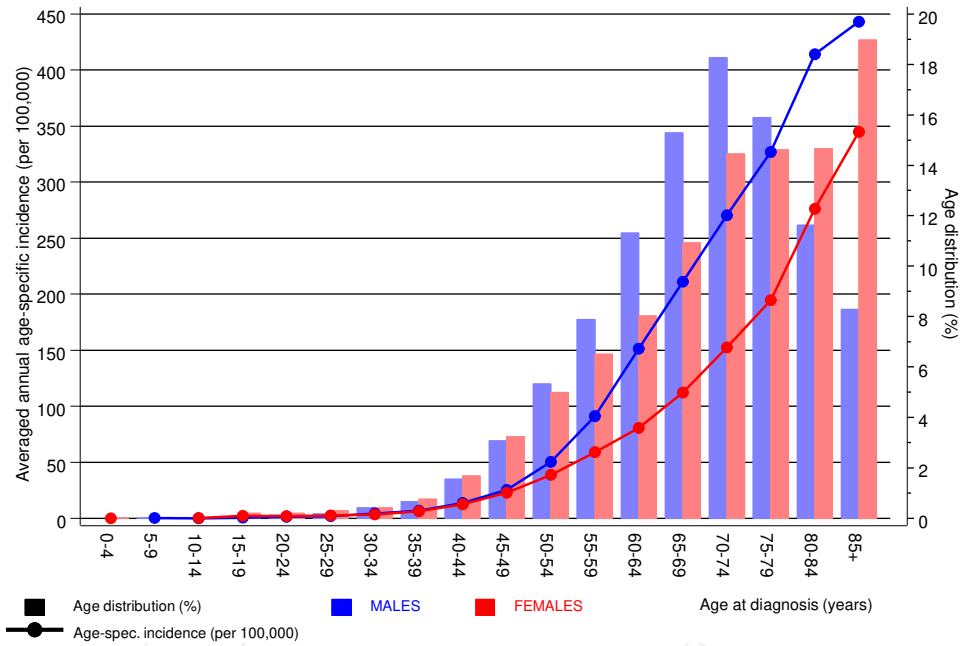


Figure 6. Age distribution (males: mean=69.8 yrs, median=71.1 yrs; females: mean=72.5 yrs, median=74.4 yrs) and age-specific incidence.

ICD-10 C18-C21: Malignant neoplasm of colorectum incl. anus
Age-specific incidence rates: international comparison

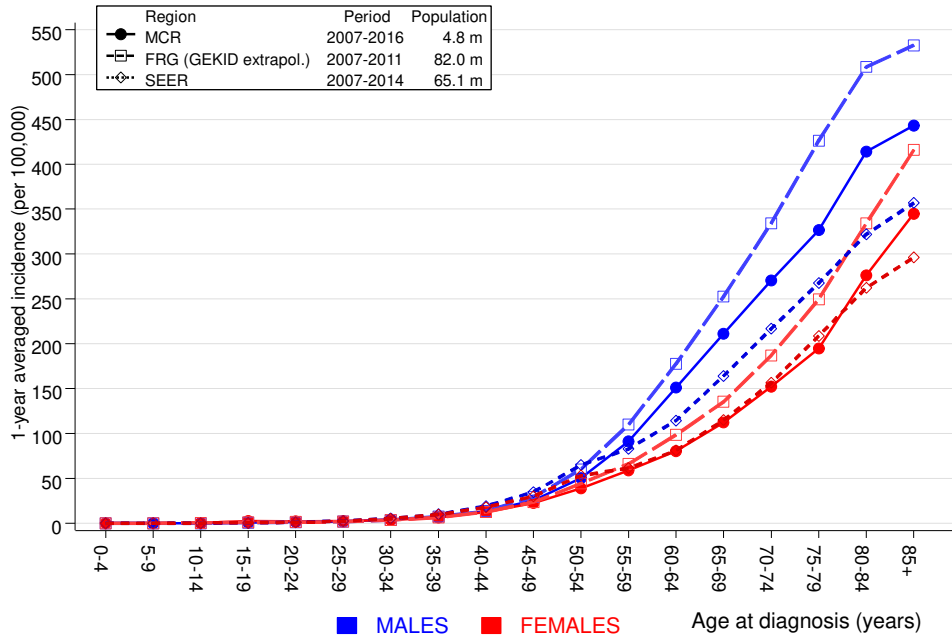


Figure 6a. Age-specific incidence in MCR registry areas compared to Germany (FRG, GEKID extrapolation) and SEER (Surveillance, Epidemiology, and End Results, USA).

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 2014, based on the November 2013 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 1998–2016

MALES

Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C00 Lip	5	2.0	2.5	0.8	5.8	0.3	
C03–C06 Oral cavity	18	12.2	1.5	0.9	2.3	0.7	5.6
C07–C08 Salivary gland	5	3.9	1.3	0.4	3.0	0.1	
C09–C10 Oropharynx	20	14.7	1.4	0.8	2.1	0.6	
C12–C13 Hypopharynx	14	8.1	1.7	0.9	2.9	0.7	7.1
C15 Oesophagus	84	28.9	2.9	2.3	3.6 #	6.3	11.9
C16 Stomach	197	70.2	2.8	2.4	3.2 #	14.6	9.1
C17 Small intestine	76	8.6	8.8	6.9	11.0 #	7.8	1.3
C18 Colon	610	166.4	3.7	3.4	4.0 #	51.1	1.1
C19–C20 Rectum	257	87.4	2.9	2.6	3.3 #	19.5	1.6
C21 Anus/canal	11	3.4	3.2	1.6	5.8 #	0.9	
C22 Liver	130	46.0	2.8	2.4	3.4 #	9.7	18.5
C23–C24 Bile	41	16.7	2.5	1.8	3.3 #	2.8	14.6
C25 Pancreas	143	62.6	2.3	1.9	2.7 #	9.3	25.9
C32 Larynx	32	15.9	2.0	1.4	2.8 #	1.9	12.5
C33–C34 Lung	417	193.0	2.2	2.0	2.4 #	25.8	15.1
C38,C45 Mesothelioma	14	11.2	1.3	0.7	2.1	0.3	
C43 Malign. melanoma	134	67.6	2.0	1.7	2.3 #	7.6	1.5
C46,C49 Soft tissue	20	9.2	2.2	1.3	3.4 #	1.2	
C50 Breast	10	4.2	2.4	1.1	4.4 #	0.7	10.0
C60 Penis	8	3.9	2.1	0.9	4.1	0.5	12.5
C61 Prostate	825	480.5	1.7	1.6	1.8 #	39.7	6.3
C62 Testis	7	3.0	2.3	0.9	4.8	0.5	14.3
C64 Kidney	173	56.0	3.1	2.6	3.6 #	13.5	6.4
C65 Renal pelvis	20	7.3	2.7	1.7	4.2 #	1.5	
C66 Ureter	12	4.1	2.9	1.5	5.1 #	0.9	
C67 Bladder	149	79.2	1.9	1.6	2.2 #	8.0	9.4
C68 Urethra	4	1.3	3.2	0.9	8.1	0.3	
C68 Urinary org.	4	1.2	3.3	0.9	8.5	0.3	50.0
C70–C72 CNS cancer	41	20.6	2.0	1.4	2.7 #	2.4	24.4
C73 Thyroid	19	9.4	2.0	1.2	3.2 #	1.1	10.5
C76–C79 CUP	42	28.7	1.5	1.1	2.0 #	1.5	2.4
C81 Hodgkin lymphoma	6	3.4	1.8	0.6	3.9	0.3	
C82–C85 NHL	135	68.5	2.0	1.7	2.3 #	7.7	4.4
C90 Mult. myeloma	36	22.0	1.6	1.1	2.3 #	1.6	27.8
C91–C96 Leukaemia	59	28.3	2.1	1.6	2.7 #	3.5	27.1
Others, specified	12	13.9	0.9	0.4	1.5	-0.2	16.7
Not observed	0	4.1	0.0	0.0	0.9 #	-0.5	
All further malignancies	3790	1667.4	2.3	2.2	2.3 #	244.4	8.1

Patients	25893
Median age at next malignancy (years)	73.8
Person-years	86860
Mean observation time (years)	3.4
Median observation time (years)	2.0

The occurrence of further malignancy listed is statistically significant.

Observed further malignancies with count 1 to 2 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 1998–2016

FEMALES

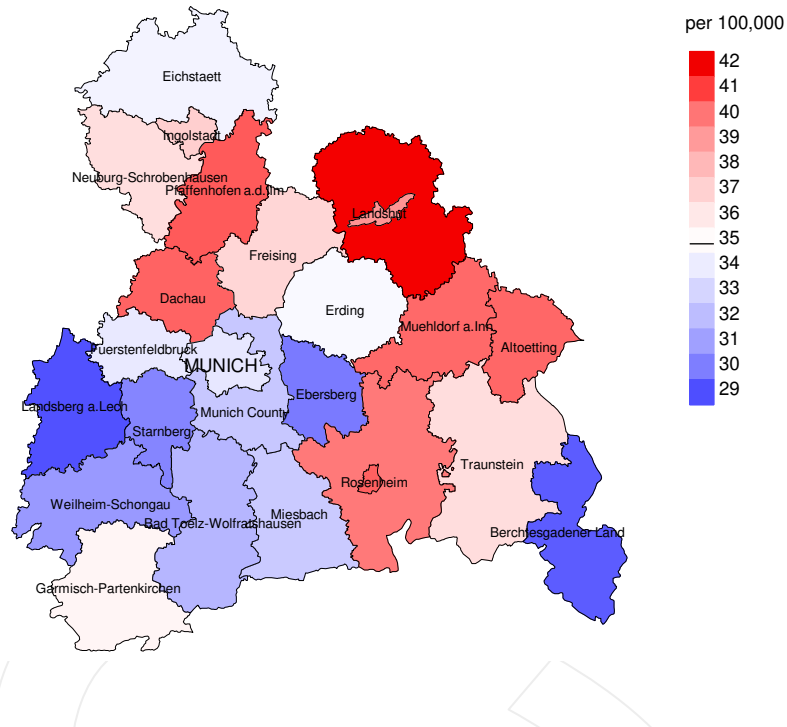
Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C03-C06 Oral cavity	10	5.4	1.8	0.9	3.4	0.6	
C09-C10 Oropharynx	8	3.3	2.5	1.1	4.8 #	0.6	
C15 Oesophagus	15	5.8	2.6	1.4	4.2 #	1.2	13.3
C16 Stomach	88	40.2	2.2	1.8	2.7 #	6.5	18.2
C17 Small intestine	52	4.5	11.5	8.6	15.0 #	6.4	3.8
C18 Colon	373	108.8	3.4	3.1	3.8 #	35.7	2.1
C19-C20 Rectum	122	43.3	2.8	2.3	3.4 #	10.6	1.6
C21 Anus/canal	13	5.1	2.6	1.4	4.4 #	1.1	
C22 Liver	36	12.5	2.9	2.0	4.0 #	3.2	41.7
C23-C24 Bile	28	16.0	1.8	1.2	2.5 #	1.6	14.3
C25 Pancreas	115	49.2	2.3	1.9	2.8 #	8.9	26.1
C26 GI cancer	4	2.4	1.7	0.5	4.2	0.2	50.0
C33-C34 Lung	206	67.7	3.0	2.6	3.5 #	18.7	14.6
C43 Malign. melanoma	73	33.2	2.2	1.7	2.8 #	5.4	1.4
C46,C49 Soft tissue	11	5.6	2.0	1.0	3.5	0.7	
C48 Peritoneal	13	3.3	3.9	2.1	6.6 #	1.3	30.8
C50 Breast	508	268.8	1.9	1.7	2.1 #	32.3	6.1
C51 Vulva	28	10.9	2.6	1.7	3.7 #	2.3	3.6
C52 Vagina	7	2.0	3.5	1.4	7.2 #	0.7	14.3
C53 Cervix uteri	27	11.3	2.4	1.6	3.5 #	2.1	18.5
C54 Corpus uteri	113	50.8	2.2	1.8	2.7 #	8.4	3.5
C55,C57 Fem. genitals un	6	3.1	1.9	0.7	4.2	0.4	16.7
C56 Ovary	115	39.1	2.9	2.4	3.5 #	10.2	27.0
C64 Kidney	77	24.2	3.2	2.5	4.0 #	7.1	13.0
C65 Renal pelvis	10	3.2	3.1	1.5	5.7 #	0.9	
C66 Ureter	5	1.6	3.2	1.0	7.4 #	0.5	20.0
C67 Bladder	49	21.7	2.3	1.7	3.0 #	3.7	20.4
C70-C72 CNS cancer	15	12.9	1.2	0.7	1.9	0.3	60.0
C73 Thyroid	21	12.9	1.6	1.0	2.5 #	1.1	4.8
C76-C79 CUP	16	20.7	0.8	0.4	1.3	-0.6	
C81 Hodgkin lymphoma	4	1.6	2.4	0.7	6.2	0.3	
C82-C85 NHL	77	39.9	1.9	1.5	2.4 #	5.0	13.0
C90 Mult. myeloma	24	12.9	1.9	1.2	2.8 #	1.5	25.0
C91-C96 Leukaemia	40	17.0	2.4	1.7	3.2 #	3.1	42.5
Others, specified	28	16.8	1.7	1.1	2.4 #	1.5	14.3
Not observed	0	1.2	0.0	0.0	3.1	-0.2	
All further malignancies	2337	979.2	2.4	2.3	2.5 #	183.2	11.0

Patients	21671
Median age at next malignancy (years)	75.9
Person-years	74097
Mean observation time (years)	3.4
Median observation time (years)	1.9

The occurrence of further malignancy listed is statistically significant.

Observed further malignancies with count 1 to 3 are pooled in category "Others, specified".

Average incidence (world standard population) 2007 - 2016: Males



Average incidence (world standard population) 2007 - 2016: Females

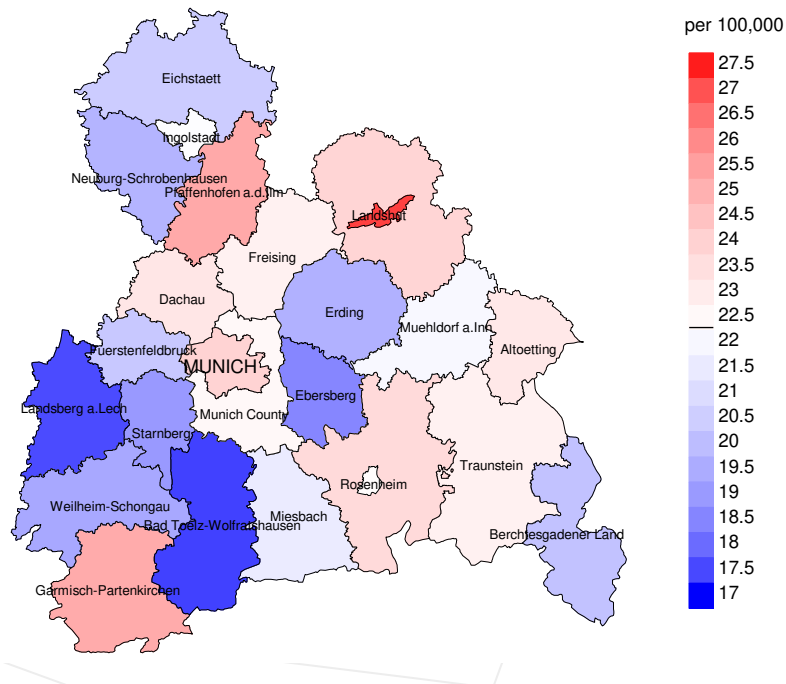
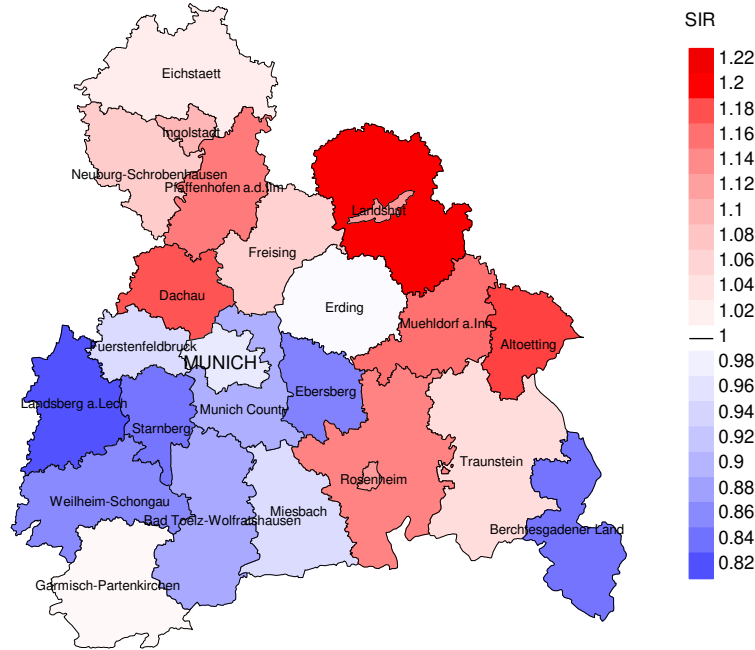


Figure 8a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 34.9/100,000 WS N=16,373, females 22.3/100,000 WS N=13,339).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 280 women were identified with newly diagnosed colorectal cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 18.6/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 15.5 and 22.2/100,000.

Standardized incidence ratio (SIR) 2007 - 2016: Males



Standardized incidence ratio (SIR) 2007 - 2016: Females

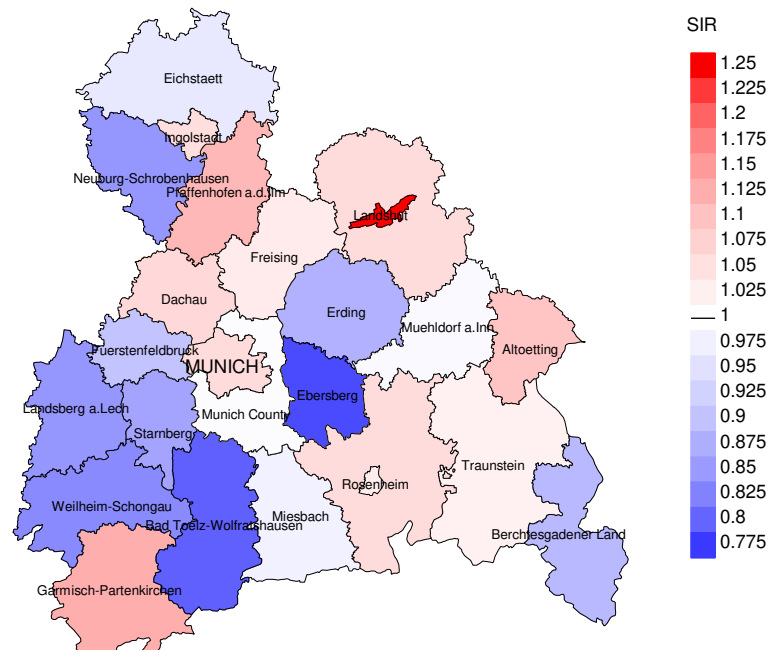


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=16,373, females N=13,339).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 280 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 0.78. Though, the value of this parameter may vary with an underlying probability of 99% between 0.67 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 4.81 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	1881	97.0	5.4	1427	75.9	93.7
1999	1876	96.4	6.5	1399	74.6	94.7
2000	1743	96.8	6.1	1281	73.5	96.3
2001	1903	96.2	6.9	1311	68.9	97.0
2002	3220	96.9	11.4	2323	72.1	97.7
2003	3235	96.5	9.3	2180	67.4	98.0
2004	3122	96.7	7.8	2090	66.9	97.8
2005	3053	96.2	7.0	2050	67.1	98.0
2006	3144	93.5	5.1	1919	61.0	98.6
2007	3505	80.0	5.8	2118	60.4	98.3
2008	3450	72.4	5.6	1974	57.2	98.2
2009	3421	71.6	5.1	1879	54.9	97.8
2010	3214	70.4	5.7	1688	52.5	97.6
2011	3135	70.8	5.0	1573	50.2	97.3
2012	3075	69.3	5.2	1414	46.0	97.3
2013	3048	67.4	5.1	1268	41.6	96.1
2014	2919	70.8	5.0	1102	37.8	95.6
2015	2490	97.9	5.5	778	31.2	92.8
2016	2060	75.3	5.7	455	22.1	81.8
1998-2016	53494	83.7	6.3	30229	56.5	96.9

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 4.81 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	1881	1054	90.2	308	16.4
1999	1876	1084	90.8	320	17.1
2000	1743	1060	93.6	298	17.1
2001	1903	1141	95.4	306	16.1
2002	3220	1617	98.0	698	21.7
2003	3235	1722	97.9	599	18.5
2004	3122	1740	98.4	557	17.8
2005	3053	1852	96.5	551	18.0
2006	3144	1913	97.5	513	16.3
2007	3505	2028	97.4	581	16.6
2008	3450	2118	98.6	611	17.7
2009	3421	2155	98.6	541	15.8
2010	3214	2250	98.6	543	16.9
2011	3135	2254	98.1	522	16.7
2012	3075	2253	98.3	531	17.3
2013	3048	2232	97.9	471	15.5
2014	2919	2223	97.9	513	17.6
2015	2490	2347	98.1	472	19.0
2016	2060	1943	98.2	385	18.7
1998-2016	53494	34986	97.3	9320	17.4

Table 9c

Annual cohorts of deaths, proportion of cancer-related and non-cancer-related deaths, and cancer recorded on death certificates
(incl. DCO)

(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,
and from 4.10 to 4.81 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	1740	76.3	23.7	86.6
2005	1852	71.8	28.2	82.0
2006	1913	71.5	28.5	82.8
2007	2028	71.9	28.1	83.6
2008	2118	72.0	28.0	82.2
2009	2155	69.8	30.2	80.0
2010	2250	67.0	33.0	79.0
2011	2254	67.4	32.6	78.9
2012	2253	66.4	33.6	78.2
2013	2232	63.2	36.8	74.1
2014	2223	64.3	35.7	76.7
2015	2347	61.7	38.3	73.8
2016	1943	56.7	43.3	72.7
1998-2016	34986	68.7	31.3	80.7

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	1042	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	1134	76.4	73.6	81.2	74.4
2010	1217	76.4	74.2	82.0	75.4
2011	1232	76.5	73.3	82.6	75.1
2012	1227	77.3	75.5	82.3	76.2
2013	1208	78.9	76.3	83.5	77.1
2014	1213	78.0	75.6	82.6	76.6
2015	1297	79.1	76.2	84.0	77.1
2016	1126	78.9	75.7	82.8	77.4
1998–2016	18680	76.6	74.1	82.0	75.3

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	848	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	1022	83.4	79.4	88.0	81.2
2012	1026	83.8	79.3	88.4	81.2
2013	1024	83.9	79.0	88.3	81.1
2014	1010	83.5	78.3	88.1	80.4
2015	1050	83.5	78.4	88.7	80.2
2016	817	84.1	78.6	88.9	81.2
1998–2016	16306	82.2	79.1	87.2	80.5

By 2010, life expectancy at birth was 77.5 years for boys and 82.6 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	0.42	20.2	0.40	31.7	0.42	44.2	0.45
2000	411	36.1	0.47	20.2	0.45	32.1	0.47	44.3	0.50
2001	391	33.7	0.40	19.1	0.39	29.9	0.41	40.0	0.42
2002	628	33.7	0.38	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	750	39.2	0.45	19.0	0.42	30.4	0.45	42.3	0.48
2007	811	36.6	0.43	17.1	0.39	27.3	0.41	38.3	0.45
2008	882	39.6	0.48	18.1	0.44	29.1	0.46	41.0	0.50
2009	801	35.9	0.43	16.6	0.40	26.0	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	864	38.6	0.52	17.4	0.48	27.3	0.50	36.9	0.52
2012	834	36.7	0.52	16.0	0.47	25.5	0.50	35.1	0.53
2013	797	34.6	0.48	14.4	0.42	23.1	0.45	32.4	0.49
2014	797	34.2	0.50	14.3	0.44	22.6	0.47	31.2	0.50
2015	806	33.9	0.59	13.9	0.52	22.2	0.55	30.6	0.59
2016	667	27.8	0.59	11.4	0.51	18.0	0.54	24.7	0.58
1998-2016	13096	35.6	0.46	16.6	0.42	26.3	0.45	36.2	0.48

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	0.42
2000	373	31.1	0.44	11.2	0.39	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	0.37	22.7	0.40
2007	649	28.1	0.41	9.7	0.35	15.3	0.37	21.0	0.40
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	0.40	15.8	0.41	21.6	0.43
2010	672	28.7	0.48	9.3	0.40	14.6	0.42	19.8	0.43
2011	659	28.2	0.47	8.9	0.37	14.1	0.40	19.4	0.43
2012	663	28.1	0.48	8.9	0.38	14.2	0.41	19.6	0.44
2013	617	25.9	0.47	8.4	0.38	13.2	0.41	18.0	0.43
2014	632	26.2	0.50	8.5	0.40	13.3	0.43	18.0	0.45
2015	642	26.4	0.60	8.5	0.51	13.4	0.54	18.0	0.56
2016	436	17.8	0.49	5.6	0.39	8.9	0.42	12.1	0.45
1998-2016	10972	28.6	0.45	9.5	0.37	15.0	0.40	20.6	0.42

Table 12

Age distribution of age at death (cancer-related) for period 2007-2016
(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	4	0.0	0.0	1	0.0	0.0	3	0.0	0.0
25-29	11	0.1	0.1	5	0.1	0.1	6	0.1	0.1
30-34	16	0.1	0.2	11	0.1	0.2	5	0.1	0.2
35-39	37	0.3	0.5	19	0.2	0.5	18	0.3	0.5
40-44	115	0.8	1.3	64	0.8	1.2	51	0.8	1.3
45-49	237	1.6	2.9	120	1.5	2.7	117	1.9	3.2
50-54	414	2.9	5.8	247	3.1	5.8	167	2.6	5.8
55-59	698	4.8	10.6	424	5.2	11.0	274	4.3	10.1
60-64	1060	7.4	18.0	681	8.4	19.4	379	6.0	16.1
65-69	1637	11.4	29.3	1071	13.2	32.7	566	9.0	25.1
70-74	2249	15.6	44.9	1414	17.5	50.1	835	13.2	38.3
75-79	2418	16.8	61.7	1500	18.5	68.6	918	14.5	52.9
80-84	2455	17.0	78.8	1344	16.6	85.2	1111	17.6	70.4
85+	3063	21.2	100.0	1196	14.8	100.0	1867	29.6	100.0
All ages	14415	100.0		8098	100.0		6317	100.0	

Table 13

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2016
(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	0.14			2.3	
20-24	1	3	0.1	0.05	0.2	0.11	1.8	9.1
25-29	5	6	0.3	0.17	0.4	0.15	6.8	8.2
30-34	11	5	0.7	0.16	0.3	0.09	10.6	4.2
35-39	19	18	1.2	0.17	1.1	0.18	9.5	6.3
40-44	64	51	3.4	0.25	2.8	0.23	13.0	7.6
45-49	120	117	6.1	0.24	6.1	0.27	10.4	8.9
50-54	247	167	14.3	0.28	9.8	0.25	12.0	8.5
55-59	424	274	30.0	0.33	18.6	0.32	12.5	9.6
60-64	681	379	55.6	0.37	28.5	0.35	13.7	10.1
65-69	1071	566	90.4	0.43	43.6	0.39	14.7	10.6
70-74	1414	835	127.8	0.47	66.0	0.43	15.2	12.3
75-79	1500	918	188.3	0.58	91.7	0.47	16.7	13.1
80-84	1344	1111	292.2	0.71	157.0	0.57	17.8	16.3
85+	1196	1867	390.6	0.88	254.4	0.74	18.3	20.2
All ages	8098	6317					15.5	13.6
Mortality								
Raw			35.4	0.49	26.7	0.47		
WS			15.4	0.44	8.6	0.39		
ES			24.4	0.47	13.7	0.41		
BRD-S			33.8	0.50	18.6	0.44		
PYLL-70								
per 100,000			115.0		79.2			
ES			98.9		66.0			
AYLL-70			8.8		10.0			

Table 14a

Further malignancies in deaths in period 1998–2016
MALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C03–C06 Oral cavity	58	1.1	42	72.4	4	6.9	12	20.7
C15 Oesophagus	95	1.9	15	15.8	14	14.7	66	69.5
C16 Stomach	274	5.4	77	28.1	60	21.9	137	50.0
C17 Small intestine	57	1.1	9	15.8	19	33.3	29	50.9
C18 Colon	385	7.6			139	36.1	246	63.9
C19–C20 Rectum	214	4.2			130	60.7	84	39.3
C22 Liver	161	3.2	7	4.3	35	21.7	119	73.9
C23–C24 Bile	51	1.0	3	5.9	8	15.7	40	78.4
C25 Pancreas	193	3.8	11	5.7	30	15.5	152	78.8
C32 Larynx	81	1.6	58	71.6	1	1.2	22	27.2
C33–C34 Lung	582	11.4	95	16.3	79	13.6	408	70.1
C43 Malign. melanoma	179	3.5	110	61.5	2	1.1	67	37.4
C44 Skin others	312	6.1	151	48.4	22	7.1	139	44.6
C61 Prostate	1194	23.5	673	56.4	95	8.0	426	35.7
C64 Kidney	213	4.2	98	46.0	50	23.5	65	30.5
C67 Bladder	265	5.2	97	36.6	21	7.9	147	55.5
C70–C72 CNS cancer	53	1.0	5	9.4	4	7.5	44	83.0
C76–C79 CUP	58	1.1	12	20.7	10	17.2	36	62.1
C82–C85 NHL	204	4.0	85	41.7	33	16.2	86	42.2
C91–C96 Leukaemia	78	1.5	19	24.4	7	9.0	52	66.7
Others, specified	380	7.5	158	41.6	24	6.3	198	52.1
All further malignancies	5087	100.0	1725	33.9	787	15.5	2575	50.6

Further malignancies with number of cases 1 to 44 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 1998–2016
FEMALES

Diagnosis	Total n	Total %↓	Pre n	Pre ←%	Syn- chron ±30d n	Syn- chron ±30d ←%	Post n	Post ←%
C16 Stomach	191	5.2	57	29.8	36	18.8	98	51.3
C18 Colon	257	7.0			74	28.8	183	71.2
C19–C20 Rectum	131	3.6			72	55.0	59	45.0
C22 Liver	44	1.2	2	4.5	11	25.0	31	70.5
C23–C24 Bile	51	1.4	11	21.6	8	15.7	32	62.7
C25 Pancreas	167	4.5	12	7.2	22	13.2	133	79.6
C33–C34 Lung	264	7.2	40	15.2	25	9.5	199	75.4
C43 Malign. melanoma	87	2.4	55	63.2	5	5.7	27	31.0
C44 Skin others	129	3.5	72	55.8	8	6.2	49	38.0
C50 Breast	958	26.0	626	65.3	70	7.3	262	27.3
C51 Vulva	36	1.0	18	50.0	2	5.6	16	44.4
C53 Cervix uteri	138	3.7	103	74.6	7	5.1	28	20.3
C54 Corpus uteri	243	6.6	157	64.6	13	5.3	73	30.0
C56 Ovary	237	6.4	80	33.8	51	21.5	106	44.7
C64 Kidney	77	2.1	39	50.6	13	16.9	25	32.5
C67 Bladder	94	2.6	39	41.5	3	3.2	52	55.3
C73 Thyroid	40	1.1	20	50.0	3	7.5	17	42.5
C76–C79 CUP	39	1.1	12	30.8	9	23.1	18	46.2
C82–C85 NHL	120	3.3	54	45.0	15	12.5	51	42.5
C90 Mult. myeloma	44	1.2	14	31.8	4	9.1	26	59.1
C91–C96 Leukaemia	52	1.4	11	21.2	7	13.5	34	65.4
Others, specified	286	7.8	97	33.9	43	15.0	146	51.0
All further malignancies	3685	100.0	1519	41.2	501	13.6	1665	45.2

Further malignancies with number of cases 1 to 28 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 2007-2016
(First primaries only *)

Age at death Years	Males		Females		Males		Females	
	n	n	Age- spec. mortal.	MI-index	Age- spec. mortal.	MI-index	Prop.all cancers %	Prop.all cancers %
0- 4								
5- 9								
10-14								
15-19	1		0.1	0.14			2.4	
20-24	1	3	0.1	0.05	0.2	0.11	2.0	9.7
25-29	5	6	0.3	0.18	0.4	0.15	7.5	9.0
30-34	11	5	0.7	0.16	0.3	0.10	10.8	4.7
35-39	18	15	1.1	0.18	0.9	0.16	9.5	5.8
40-44	61	47	3.3	0.25	2.6	0.23	13.3	7.9
45-49	112	104	5.7	0.24	5.4	0.27	10.7	9.2
50-54	219	149	12.7	0.28	8.7	0.25	12.1	8.9
55-59	375	239	26.5	0.32	16.3	0.32	12.7	10.0
60-64	575	314	46.9	0.36	23.6	0.36	13.8	10.2
65-69	871	462	73.5	0.43	35.6	0.39	14.9	10.9
70-74	1109	640	100.2	0.49	50.6	0.42	15.4	12.1
75-79	1117	715	140.2	0.58	71.4	0.46	16.9	13.2
80-84	973	872	211.6	0.75	123.2	0.56	17.7	16.4
85+	871	1477	284.5	0.91	201.2	0.73	18.3	20.1
All ages	6319	5048					15.5	13.6
Mortality								
Raw			27.7	0.49	21.3	0.46		
WS			12.3	0.43	7.1	0.38		
ES			19.3	0.46	11.1	0.40		
BRD-S			26.3	0.49	15.0	0.43		
PYLL-70								
per 100,000			101.7		69.2			
ES			87.5		57.8			
AYLL-70			9.1		10.3			

* See corresponding tables with multiple malignancies.

Table 16

Age-specific mortality (cancer-related) and proportion of all cancers
for period 2007-2016
(**Single primaries only** *)

Age at death Years	Males n	Females n	Males Age- spec. mortal.	MI-index	Females Age- spec. mortal.	MI-index	Males Prop.all cancers %	Females Prop.all cancers %
0- 4								
5- 9								
10-14								
15-19	1		0.1	0.14			2.4	
20-24	1	3	0.1	0.05	0.2	0.12	2.0	9.7
25-29	5	6	0.3	0.19	0.4	0.15	7.5	9.2
30-34	11	5	0.7	0.16	0.3	0.10	10.8	4.8
35-39	18	14	1.1	0.18	0.9	0.16	9.6	5.5
40-44	60	45	3.2	0.26	2.5	0.23	13.2	7.6
45-49	107	103	5.4	0.25	5.4	0.27	10.3	9.2
50-54	208	143	12.0	0.28	8.4	0.26	11.7	8.7
55-59	339	218	23.9	0.31	14.8	0.31	11.7	9.2
60-64	521	276	42.5	0.35	20.8	0.34	12.7	9.2
65-69	749	389	63.2	0.42	29.9	0.36	13.1	9.4
70-74	879	544	79.5	0.43	43.0	0.39	12.6	10.6
75-79	875	616	109.8	0.51	61.5	0.43	13.8	11.7
80-84	709	736	154.2	0.60	104.0	0.50	13.7	14.4
85+	639	1246	208.7	0.71	169.8	0.64	14.5	17.7
All ages	5122	4344					13.0	12.1
Mortality								
Raw			22.4	0.43	18.3	0.43		
WS			10.3	0.39	6.2	0.35		
ES			15.9	0.41	9.6	0.38		
BRD-S			21.2	0.44	13.0	0.39		
PYLL-70								
per 100,000			94.3		64.4			
ES			81.2		53.9			
AYLL-70			9.4		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 - 2016 (Males: 8098, Females: 6317)

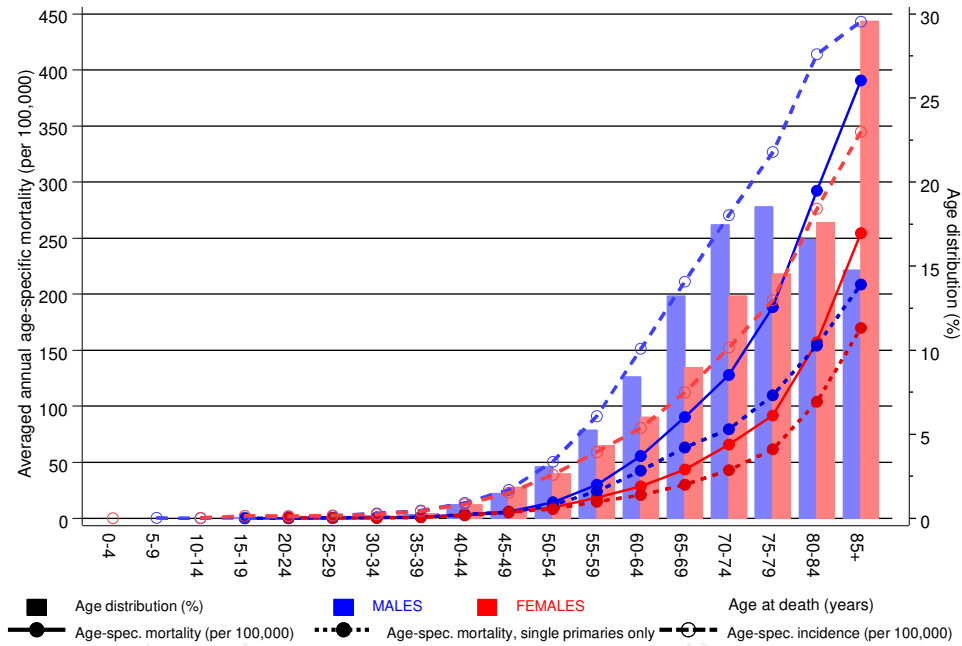
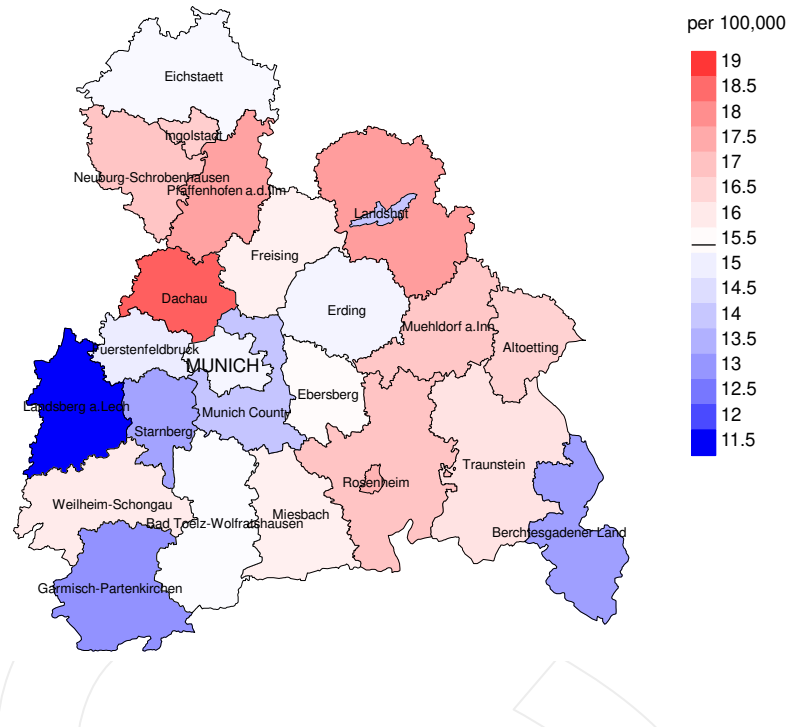


Figure 17. Distribution of age at death (bars; males: mean=70.0 yrs, median=70.8 yrs; females: mean=73.6 yrs, median=75.5 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

Average mortality (world standard population) 2007 - 2016: Males



Average mortality (world standard population) 2007 - 2016: Females

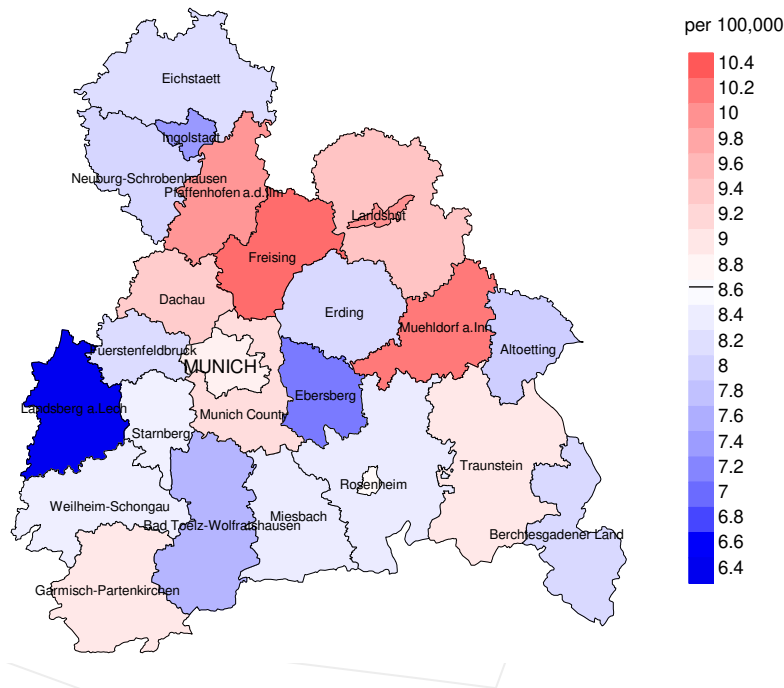
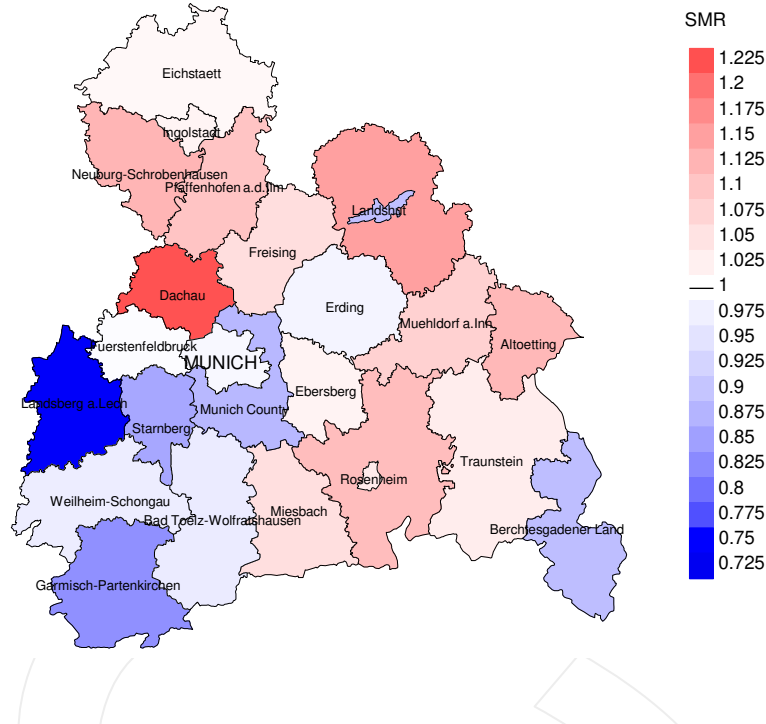


Figure 18a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2016. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 15.4/100,000 WS N=8,098, females 8.6/100,000 WS N=6,317).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 144 women died from colorectal cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 7.1/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 5.4 and 9.3/100,000.

Standardized mortality ratio (SMR) 2007 - 2016: Males



Standardized mortality ratio (SMR) 2007 - 2016: Females

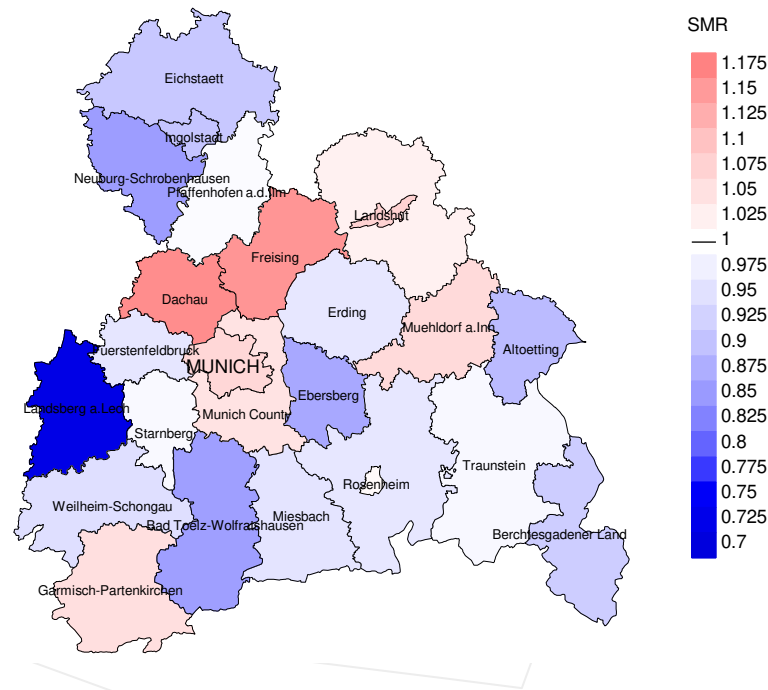


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=8,098, females N=6,317).

The results should be interpreted with caution! E.g., in county Ebersberg with a population of 66,416 female residents (averaged) in the period from 2007 to 2016 a total of 144 women died from colorectal cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.87. Though, the value of this parameter may vary with an underlying probability of 99% between 0.69 and 1.07, 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 index from mortality and incidence (Mortality-Incidence ratio, **MI-index**) is a statistic 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 MI- index. 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 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 between mortality and incidence
FRG	Federal Republic of Germany

Recommended Citation

Munich Cancer Registry. ICD-10 C18-C21: Colorectal cancer - Incidence and Mortality [Internet]. 2018 [updated 2018 Aug 21; cited 2018 Oct 1]. Available from: <https://www.tumorregister-muenchen.de/en/facts/base/bC1821E-ICD-10-C18-C21-Colorectal-cancer-incidence-and-mortality.pdf>

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