

# Munich Cancer Registry



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

## ICD-10 C18-C20: Colorectal cancer

### Incidence and Mortality

Year of diagnosis	1998-2016
Patients	50,596
Diseases	51,980
Creation date	08/21/2018
Export date	08/09/2018
Population	4.81 m



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

<https://www.tumorregister-muenchen.de/en/facts/base/bC1820E-ICD-10-C18-C20-Colorectal-cancer-incidence-and-mortality.pdf>

### Index of figures and tables

Fig./Tbl.		Page
1	Annual cases, DCO, mult. malignancies, follow-up / yr	4
2	Incidence by year of diagnosis	7
3	Age distribution parameters by year of diagnosis	8
4	Age distribution by 5-year age group and sex	9
5	Age-specific incidence, DCO rate, proportion malignancies	10
6	Age distribution and age-specific incidence (chart)	11
6a	Age-specific incidence internationally (chart)	12
7	Standardized incidence ratio of further malignancies	13
8a	Map of cancer incidence (WS) by county (chart)	15
8b	Standardized incidence ratio (SIR) by county (chart)	16
9a	Pts incident cohorts and mortality / yr	17
9b	Incidence and mortality by year of diagnosis	18
9c	Cancer-related deaths, death certification available / yr	19
10	Medians of age at death / yr	20
11	Mortality by year of death	22
12	Distribution of age at death	23
13	Age-specific mortality	24
14	Further malignancies in deaths	25
15	Age-specific mortality (first primaries)	27
16	Age-specific mortality (single primaries)	28
17	Age distribution and age-specific mortality (chart)	29
18a	Map of cancer mortality (WS) by county (chart)	30
18b	Standardized mortality ratio (SMR) by county (chart)	31

**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<sup>#</sup>, with a total of 4.69 million inhabitants, account for the frequency of cancer diseases<sup>##</sup> 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<sup>###</sup> 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](mailto:tumor@ibe.med.uni-muenchen.de).

Munich Cancer Registry, August 2018

<sup>#</sup> 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).

<sup>##</sup> 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.

<sup>###</sup> DCO (death certificate only) identifies a cancer case that first becomes available to the MCR through the death certificate.

### ICD-10 codes (ICD-10 2015) used for specifying cancer site

Code	Description
C18.-	Malignant neoplasm of colon
C18.0	Caecum
C18.1	Appendix
C18.2	Ascending colon
C18.3	Hepatic flexure
C18.4	Transverse colon
C18.5	Splenic flexure
C18.6	Descending colon
C18.7	Sigmoid colon
C18.8	Overlapping lesion of colon
C18.9	Colon, unspecified
C19	Malignant neoplasm of rectosigmoid junction
C20	Malignant neoplasm of rectum

## INCIDENCE

Table 1

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

Year of diagnosis	All cases n	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	1835	101	5.5	11.5	10.3	76.1	97.0
1999	1842	119	6.5	11.8	10.1	74.8	96.4
2000	1702	106	6.2	12.5	10.0	73.5	96.9
2001	1847	129	7.0	12.7	9.8	69.1	96.3
2002	3155	366	11.6	12.5	9.6	72.2	96.9 #
2003	3168	299	9.4	12.7	9.3	67.8	96.6
2004	3049	241	7.9	12.9	8.9	67.5	96.6
2005	2977	214	7.2	13.3	8.6	67.3	96.3
2006	3063	157	5.1	13.7	8.2	61.2	93.5
2007	3411	201	5.9	13.8	7.7	60.5	79.9 #
2008	3363	193	5.7	14.1	7.2	57.5	72.3
2009	3309	172	5.2	14.4	6.6	55.3	71.5
2010	3096	178	5.7	14.7	6.0	52.6	70.2
2011	3031	155	5.1	15.0	5.5	50.5	70.8
2012	2970	161	5.4	15.2	4.9	46.1	69.1
2013	2940	155	5.3	15.4	4.4	42.0	67.3
2014	2809	141	5.0	15.6	4.1	38.2	70.8
2015	2420	134	5.5	15.8	3.7	31.6	97.9
2016	1993	114	5.7	15.9	3.5	22.2	75.4 ##
1998-2016	51980	3336	6.4	15.9	10.3	56.8	83.7

51,980 cases diagnosed 1998-2016 are related to a total of 50,596 patients. Currently, in 12,853 (25.4 %) of these 50,596 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 10,288 / 2,026 / 539 (20.3 % / 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 2,809 cases has been diagnosed, of which 15.6 % 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	923	50.3	36	3.9	10.7	11.9	75.8	97.7
1999	944	51.2	44	4.7	10.8	11.6	75.1	96.8
2000	877	51.5	29	3.3	11.7	11.4	71.9	97.4
2001	963	52.1	45	4.7	12.0	11.2	68.7	96.3
2002	1673	53.0	164	9.8	12.0	11.0	72.0	97.5 #
2003	1688	53.3	115	6.8	12.3	10.6	67.9	97.6
2004	1632	53.5	90	5.5	12.7	10.2	69.0	96.8
2005	1578	53.0	91	5.8	13.3	9.8	67.3	96.7
2006	1672	54.6	56	3.3	13.8	9.4	60.7	93.5
2007	1883	55.2	85	4.5	14.2	8.8	61.0	79.9 #
2008	1863	55.4	76	4.1	14.6	8.3	56.8	71.7
2009	1861	56.2	77	4.1	15.0	7.6	55.6	71.4
2010	1742	56.3	73	4.2	15.3	6.8	51.8	69.3
2011	1661	54.8	56	3.4	15.6	6.3	49.2	69.6
2012	1638	55.2	62	3.8	15.9	5.8	46.0	69.3
2013	1681	57.2	62	3.7	16.2	5.1	41.2	66.0
2014	1593	56.7	62	3.9	16.4	4.6	37.3	71.0
2015	1380	57.0	58	4.2	16.6	4.0	29.9	98.1
2016	1140	57.2	47	4.1	16.7	4.3	21.1	73.6 ##
1998-2016	28392	54.6	1328	4.7	16.7	11.9	56.0	83.3

28,392 cases diagnosed 1998-2016 are related to a total of 27,503 patients. Currently, in 7,563 (27.5 %) of these 27,503 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 5,976 / 1,226 / 361 (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 1,593 cases has been diagnosed, of which 16.4 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 4.6 % 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	912	49.7	65	7.1	12.3	8.5	76.3	96.3
1999	898	48.8	75	8.4	12.8	8.4	74.5	96.0
2000	825	48.5	77	9.3	13.3	8.3	75.2	96.4
2001	884	47.9	84	9.5	13.5	8.1	69.5	96.3
2002	1482	47.0	202	13.6	13.1	8.0	72.5	96.2 #
2003	1480	46.7	184	12.4	13.2	7.7	67.7	95.5
2004	1417	46.5	151	10.7	13.1	7.4	65.8	96.4
2005	1399	47.0	123	8.8	13.4	7.1	67.3	95.8
2006	1391	45.4	101	7.3	13.4	6.7	61.9	93.6
2007	1528	44.8	116	7.6	13.5	6.3	59.9	80.0 #
2008	1500	44.6	117	7.8	13.6	5.8	58.3	73.1
2009	1448	43.8	95	6.6	13.8	5.3	54.9	71.6
2010	1354	43.7	105	7.8	14.0	4.9	53.5	71.3
2011	1370	45.2	99	7.2	14.2	4.4	52.1	72.2
2012	1332	44.8	99	7.4	14.3	3.8	46.1	68.9
2013	1259	42.8	93	7.4	14.5	3.5	43.1	69.1
2014	1216	43.3	79	6.5	14.7	3.5	39.3	70.5
2015	1040	43.0	76	7.3	14.9	3.4	33.8	97.6
2016	853	42.8	67	7.9	15.0	2.3	23.7	77.8 ##
1998-2016	23588	45.4	2008	8.5	15.0	8.5	57.8	84.2

23,588 cases diagnosed 1998-2016 are related to a total of 23,093 patients. Currently, in 5,290 (22.9 %) of these 23,093 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 4,312 / 800 / 178 (18.7 % / 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 1,216 cases has been diagnosed, of which 14.7 % 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	923	912	83.3	77.5	50.0	32.9	75.2	49.8	98.1	65.3
1999	944	898	84.3	75.7	49.9	32.1	75.6	48.4	99.0	63.3
2000	877	825	77.0	68.7	45.0	27.9	68.3	42.7	88.5	56.3
2001	963	884	83.1	72.7	48.7	30.8	72.9	46.4	93.3	60.7
2002	1673	1482	89.8	75.7	50.1	30.7	75.6	46.5	98.9	60.9
2003	1688	1480	90.0	75.1	49.5	30.6	74.5	46.2	97.0	60.0
2004	1632	1417	86.7	71.7	46.2	29.7	69.9	44.3	91.5	57.2
2005	1578	1399	83.3	70.3	44.2	27.5	66.3	41.6	86.1	54.8
2006	1672	1391	87.3	69.2	45.8	28.2	68.6	42.1	88.8	55.0
2007	1883	1528	85.0	66.2	44.2	26.5	65.9	39.7	85.7	51.6
2008	1863	1500	83.7	64.6	42.0	25.4	63.4	38.2	82.7	49.7
2009	1861	1448	83.4	62.3	41.2	24.1	61.8	36.3	80.9	47.8
2010	1742	1354	77.3	57.8	38.0	21.8	57.0	33.0	74.2	43.8
2011	1661	1370	74.2	58.6	35.8	22.9	53.7	34.2	69.9	44.0
2012	1638	1332	72.2	56.4	34.6	22.4	52.0	33.0	67.1	42.7
2013	1681	1259	73.0	52.8	34.3	21.1	51.4	31.1	67.1	39.9
2014	1593	1216	68.3	50.5	32.2	19.9	48.2	29.4	62.3	37.6
2015	1380	1040	58.0	42.7	26.9	16.2	40.4	24.2	52.5	31.4
2016	1140	853	47.4	34.7	22.6	13.6	33.2	20.1	43.0	25.8
1998-2016	28392	23588	77.1	61.5	39.3	24.5	58.8	36.6	76.2	47.6

The computation of the incidence measures includes all cancers, irrespective of first or subsequent malignancy.

Table 3

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

Year of diagnosis	Cases n	Std.		Median						
		Mean	dev.	Min.	Max.	10%	25%	50%	75%	90%
1998	1835	70.0	12.4	13.2	102	54.2	61.0	71.1	78.8	86.1
1999	1842	70.3	12.4	24.9	102	54.3	61.8	71.1	79.3	86.3
2000	1702	70.6	12.1	24.7	103	55.1	61.7	71.6	79.3	86.8
2001	1847	70.1	12.4	26.6	103	54.5	61.7	70.5	79.5	86.6
2002	3155	71.0	12.1	17.7	104	55.4	62.7	71.9	80.1	86.7
2003	3168	71.0	11.8	8.4	101	56.1	63.1	71.5	79.9	86.0
2004	3049	70.7	12.2	13.8	101	55.2	63.0	71.2	79.9	85.5
2005	2977	71.4	12.2	15.1	99.9	55.6	63.8	71.8	80.4	86.1
2006	3063	70.6	12.1	17.9	102	54.8	63.3	71.0	79.7	85.3
2007	3411	70.7	12.5	13.4	103	54.2	63.9	71.3	80.2	85.7
2008	3363	71.4	12.3	18.9	105	55.3	64.1	72.0	80.4	86.6
2009	3309	71.3	12.3	12.4	102	54.8	64.1	72.1	80.2	86.0
2010	3096	71.5	12.5	14.9	101	54.4	63.8	72.6	80.9	86.3
2011	3031	71.3	12.8	15.5	101	53.4	63.5	72.4	80.9	86.9
2012	2970	71.2	12.9	9.7	101	54.4	63.4	72.8	80.4	86.4
2013	2940	71.0	13.1	15.7	105	53.1	63.2	72.8	80.1	86.3
2014	2809	71.3	13.1	15.8	103	53.2	63.4	73.3	80.4	86.9
2015	2420	71.7	12.9	15.0	105	53.5	64.2	73.7	80.6	86.8
2016	1993	70.9	13.3	9.4	100	52.8	62.7	73.0	80.3	86.0
1998-2016	51980	71.0	12.5	8.4	105	54.5	63.2	72.1	80.2	86.3

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	923	67.9	11.7	31.4	98.1	53.7	59.5	68.4	75.9	83.9
1999	944	68.3	11.5	24.9	95.5	54.2	60.3	69.0	76.6	83.3
2000	877	68.3	11.0	34.4	95.9	54.1	60.3	68.2	76.6	83.0
2001	963	68.4	11.3	31.3	102	54.4	61.2	68.1	76.0	83.6
2002	1673	69.1	11.0	20.9	98.5	55.6	61.9	69.6	76.6	82.5
2003	1688	69.2	11.0	8.4	99.4	55.5	62.6	69.5	76.6	82.7
2004	1632	69.4	11.0	27.8	101	55.7	62.4	69.3	77.1	83.4
2005	1578	69.3	11.3	19.0	99.6	54.6	62.9	69.5	77.1	83.6
2006	1672	69.1	11.1	17.9	102	54.6	62.5	69.3	77.3	82.8
2007	1883	69.1	11.7	15.8	99.4	54.3	62.9	69.6	77.6	82.9
2008	1863	69.9	11.3	19.3	105	55.0	63.4	70.4	77.9	83.4
2009	1861	69.6	11.4	12.4	99.0	54.4	63.1	70.9	77.8	83.0
2010	1742	69.9	11.7	21.1	98.9	54.1	62.5	70.9	78.2	84.1
2011	1661	70.0	11.7	15.5	97.3	53.7	63.2	71.2	78.3	84.2
2012	1638	70.3	11.5	9.7	101	55.3	62.9	71.6	78.3	84.0
2013	1681	70.2	12.0	19.4	99.6	54.1	63.1	72.1	78.3	84.3
2014	1593	70.5	12.3	20.3	102	53.6	62.8	72.5	79.2	85.2
2015	1380	70.6	12.1	18.3	105	53.9	63.3	72.7	79.2	84.9
2016	1140	69.8	12.8	9.4	96.4	52.8	61.9	72.2	79.1	84.4
1998-2016	28392	69.5	11.6	8.4	105	54.4	62.4	70.4	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	912	72.2	12.7	13.2	102	54.7	63.4	74.2	81.6	87.4
1999	898	72.5	13.0	26.9	102	54.3	63.5	74.6	81.9	88.0
2000	825	73.1	12.7	24.7	103	56.3	63.6	75.3	81.9	88.5
2001	884	72.0	13.3	26.6	103	54.8	62.4	74.7	81.2	88.5
2002	1482	73.1	13.0	17.7	104	55.3	63.9	75.2	82.2	88.9
2003	1480	73.1	12.3	23.5	101	56.5	64.2	74.5	82.5	88.5
2004	1417	72.2	13.4	13.8	100	54.7	64.0	74.0	82.7	87.8
2005	1399	73.7	12.8	15.1	99.9	57.0	65.4	75.5	83.3	89.7
2006	1391	72.4	13.0	21.2	98.7	54.8	64.4	74.3	82.4	86.8
2007	1528	72.8	13.1	13.4	103	54.1	65.1	74.4	82.9	87.5
2008	1500	73.4	13.2	18.9	102	55.7	65.2	74.4	83.6	88.6
2009	1448	73.3	13.1	15.9	102	55.7	65.5	75.0	83.3	88.5
2010	1354	73.6	13.3	14.9	101	55.3	66.4	75.6	83.4	88.7
2011	1370	72.9	13.9	16.5	101	53.3	63.8	74.6	84.0	88.9
2012	1332	72.4	14.4	13.7	100	53.5	64.1	74.8	83.2	88.9
2013	1259	72.0	14.4	15.7	105	50.9	63.6	74.2	82.7	88.6
2014	1216	72.3	14.0	15.8	103	52.3	64.3	74.6	82.6	88.8
2015	1040	73.1	13.9	15.0	101	53.1	66.1	75.4	83.0	89.6
2016	853	72.3	13.7	16.1	100	53.0	63.7	75.2	81.7	88.2
1998-2016	23588	72.8	13.3	13.2	105	54.5	64.4	74.7	82.8	88.5

Table 4

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

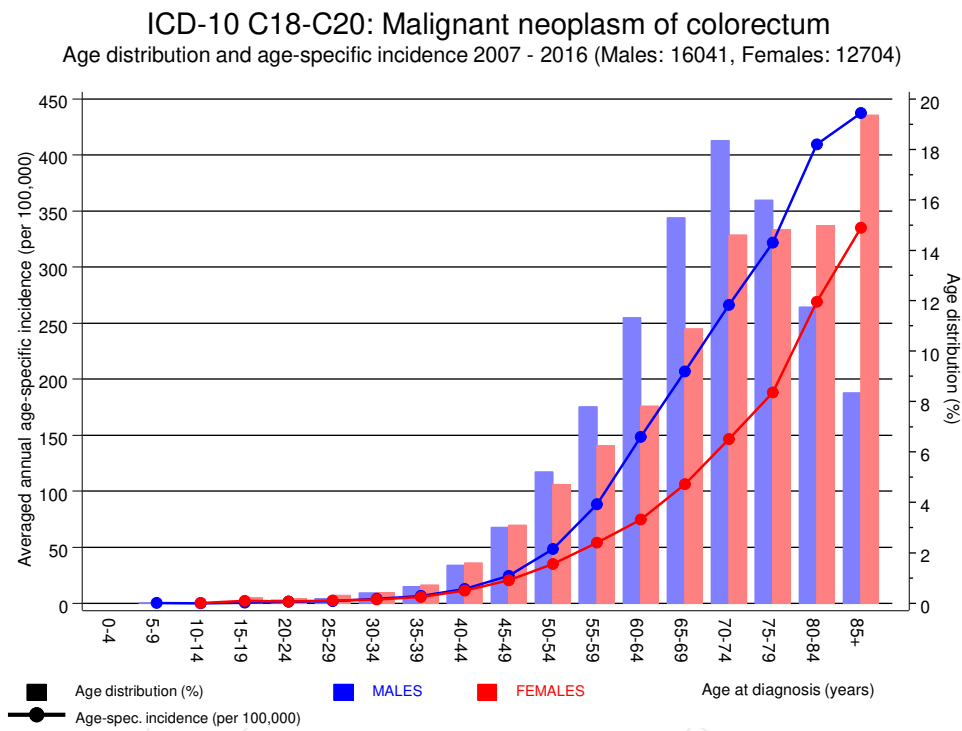
Age at diagnosis Years	Cases n	Males			Females				
		%	Cum.%	n	%	Cum.%	n	%	Cum.%
0-4									
5-9	2	0.0	0.0	2	0.0	0.0			0.0
10-14	4	0.0	0.0	1	0.0	0.0	3	0.0	0.0
15-19	34	0.1	0.1	7	0.0	0.1	27	0.2	0.2
20-24	46	0.2	0.3	21	0.1	0.2	25	0.2	0.4
25-29	72	0.2	0.5	32	0.2	0.4	40	0.3	0.7
30-34	121	0.4	1.0	66	0.4	0.8	55	0.4	1.2
35-39	202	0.7	1.6	109	0.7	1.4	93	0.7	1.9
40-44	447	1.5	3.2	244	1.5	2.9	203	1.6	3.5
45-49	888	3.0	6.2	490	3.0	5.9	398	3.1	6.5
50-54	1464	5.0	11.2	860	5.2	11.1	604	4.7	11.2
55-59	2076	7.1	18.3	1268	7.7	18.9	808	6.3	17.5
60-64	2858	9.7	28.0	1851	11.3	30.1	1007	7.8	25.3
65-69	3920	13.4	41.4	2515	15.3	45.4	1405	10.9	36.2
70-74	4914	16.7	58.1	3025	18.4	63.8	1889	14.6	50.8
75-79	4550	15.5	73.6	2632	16.0	79.8	1918	14.9	65.7
80-84	3880	13.2	86.8	1952	11.9	91.7	1928	14.9	80.6
85+	3864	13.2	100.0	1367	8.3	100.0	2497	19.4	100.0
All ages	29342	100.0		16442	100.0		12900	100.0	

Table 5

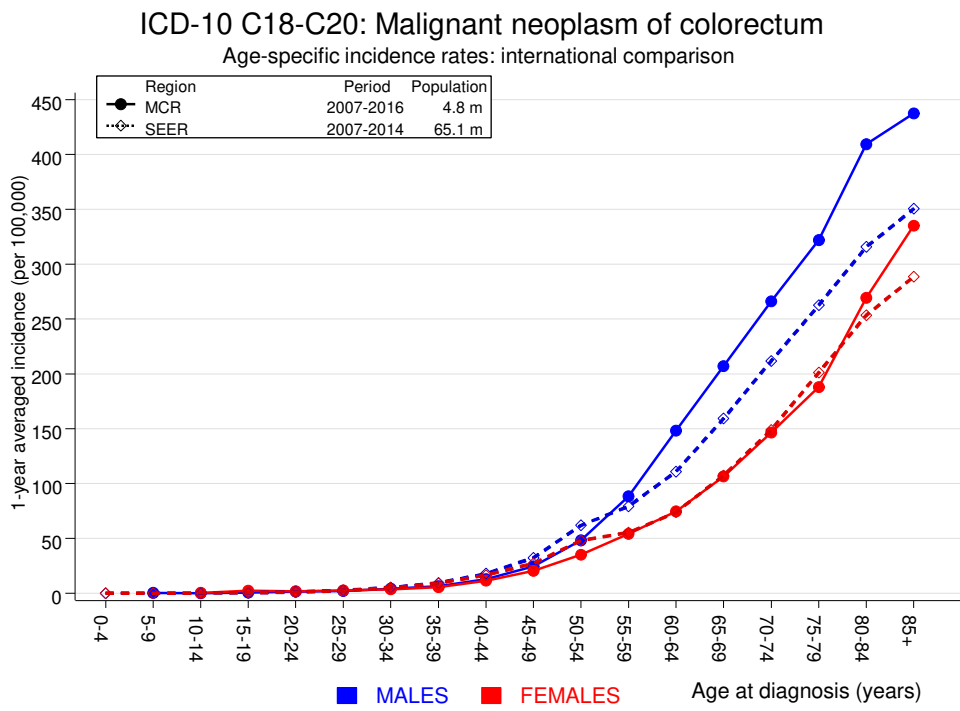
Age-specific incidence, DCO rate and proportion of all cancers for period 2007-2016

Age at diagnosis Years	Males n	Females n	Males Age- spec. incid.	Females Age- spec. incid.	Males DCO rate n=656 %	Females DCO rate n=944 %	Males	Females
							Prop.all cancers %	Prop.all cancers %
0- 4								
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	25	1.5	1.8	4.8		4.6	6.6
25-29	30	40	1.9	2.5			4.4	4.8
30-34	66	54	4.1	3.4			6.9	3.7
35-39	106	91	6.5	5.7	1.9	3.3	7.7	3.6
40-44	242	203	13.0	11.3		0.5	11.2	4.5
45-49	483	392	24.5	20.5	0.8		12.3	5.7
50-54	836	599	48.4	35.0	1.1	1.3	13.6	6.9
55-59	1250	795	88.3	54.1	1.5	0.4	13.6	8.5
60-64	1817	992	148.3	74.6	1.5	1.6	13.8	8.8
65-69	2451	1382	206.8	106.4	1.8	2.0	13.1	9.9
70-74	2943	1855	266.0	146.6	2.8	2.4	14.0	12.6
75-79	2564	1883	321.8	188.0	3.7	4.4	15.5	14.1
80-84	1883	1904	409.4	269.1	6.9	8.1	17.1	17.4
85+	1339	2459	437.3	335.0	18.2	24.6	16.9	19.3
All ages	16041	12704			4.1	7.4	14.1	11.3
Incidence								
Raw			70.2	53.7				
WS			34.1	21.0				
ES			50.9	31.2				
BRD-S			65.9	40.5				

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



**Figure 6.** Age distribution (males: mean=69.9 yrs, median=71.2 yrs; females: mean=72.8 yrs, median=74.7 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 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	4	2.0	2.0	0.6	5.2	0.2	
C03–C06 Oral cavity	17	11.9	1.4	0.8	2.3	0.6	5.9
C07–C08 Salivary gland	5	3.8	1.3	0.4	3.0	0.1	
C09–C10 Oropharynx	18	14.5	1.2	0.7	2.0	0.4	
C12–C13 Hypopharynx	13	7.9	1.6	0.9	2.8	0.6	7.7
C15 Oesophagus	82	28.5	2.9	2.3	3.6 #	6.3	12.2
C16 Stomach	193	69.3	2.8	2.4	3.2 #	14.5	8.8
C17 Small intestine	76	8.5	8.9	7.0	11.2 #	7.9	1.3
C18 Colon	605	164.3	3.7	3.4	4.0 #	51.7	0.8
C19–C20 Rectum	252	86.2	2.9	2.6	3.3 #	19.4	1.6
C21 Anus/canal	11	3.4	3.3	1.6	5.9 #	0.9	
C22 Liver	130	45.3	2.9	2.4	3.4 #	9.9	18.5
C23–C24 Bile	40	16.4	2.4	1.7	3.3 #	2.8	15.0
C25 Pancreas	142	61.7	2.3	1.9	2.7 #	9.4	26.1
C32 Larynx	31	15.6	2.0	1.3	2.8 #	1.8	12.9
C33–C34 Lung	401	190.4	2.1	1.9	2.3 #	24.7	15.7
C38,C45 Mesothelioma	14	11.0	1.3	0.7	2.1	0.3	
C43 Malign. melanoma	132	66.6	2.0	1.7	2.4 #	7.7	1.5
C46,C49 Soft tissue	19	9.1	2.1	1.3	3.3 #	1.2	
C50 Breast	10	4.2	2.4	1.2	4.4 #	0.7	10.0
C60 Penis	7	3.8	1.8	0.7	3.8	0.4	
C61 Prostate	816	474.2	1.7	1.6	1.8 #	40.1	6.4
C62 Testis	6	2.9	2.1	0.8	4.5	0.4	16.7
C64 Kidney	172	55.2	3.1	2.7	3.6 #	13.7	6.4
C65 Renal pelvis	19	7.2	2.6	1.6	4.1 #	1.4	
C66 Ureter	12	4.1	3.0	1.5	5.2 #	0.9	
C67 Bladder	148	78.2	1.9	1.6	2.2 #	8.2	9.5
C68 Urethra	3	1.2	2.4	0.5	7.0	0.2	
C68 Urinary org.	4	1.2	3.4	0.9	8.6	0.3	50.0
C70–C72 CNS cancer	40	20.3	2.0	1.4	2.7 #	2.3	25.0
C73 Thyroid	18	9.2	1.9	1.2	3.1 #	1.0	11.1
C76–C79 CUP	41	28.3	1.4	1.0	2.0 #	1.5	2.4
C81 Hodgkin lymphoma	5	3.3	1.5	0.5	3.5	0.2	
C82–C85 NHL	135	67.6	2.0	1.7	2.4 #	7.9	4.4
C90 Mult. myeloma	36	21.7	1.7	1.2	2.3 #	1.7	27.8
C91–C96 Leukaemia	59	28.0	2.1	1.6	2.7 #	3.6	27.1
Others, specified	11	13.7	0.8	0.4	1.4	-0.3	18.2
Not observed	0	4.0	0.0	0.0	0.9 #	-0.5	
All further malignancies	3727	1644.7	2.3	2.2	2.3 #	244.1	8.1

Patients	25448
Median age at next malignancy (years)	73.9
Person-years	85316
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

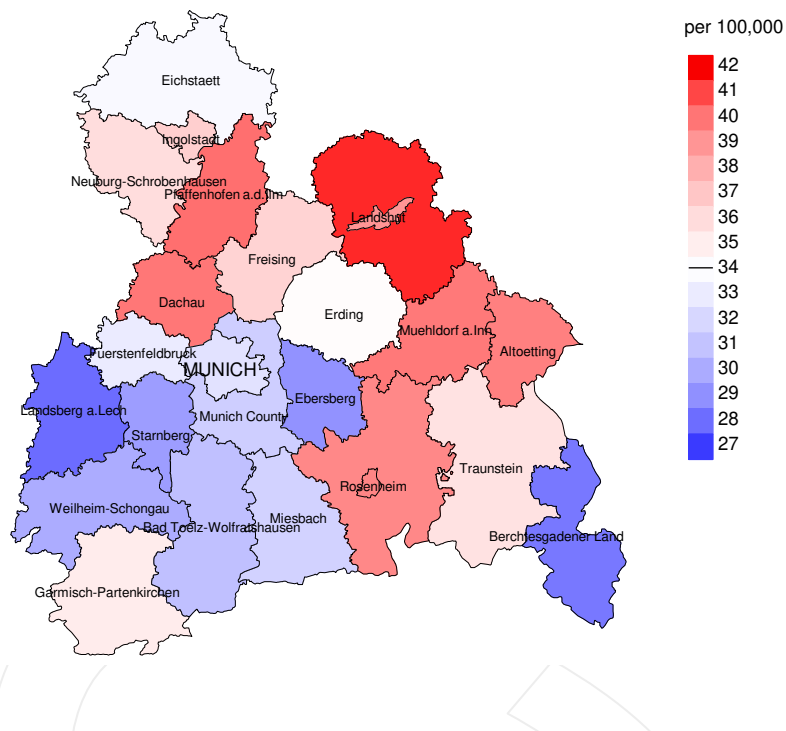
Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C03-C06 Oral cavity	8	5.2	1.5	0.7	3.0	0.4	
C09-C10 Oropharynx	7	3.1	2.3	0.9	4.7	0.6	
C15 Oesophagus	14	5.6	2.5	1.4	4.2 #	1.2	14.3
C16 Stomach	84	38.8	2.2	1.7	2.7 #	6.4	17.9
C17 Small intestine	50	4.3	11.5	8.6	15.2 #	6.5	4.0
C18 Colon	359	105.0	3.4	3.1	3.8 #	36.0	0.8
C19-C20 Rectum	120	41.7	2.9	2.4	3.4 #	11.1	1.7
C21 Anus/canal	13	4.9	2.7	1.4	4.6 #	1.2	
C22 Liver	36	12.1	3.0	2.1	4.1 #	3.4	41.7
C23-C24 Bile	28	15.4	1.8	1.2	2.6 #	1.8	14.3
C25 Pancreas	112	47.4	2.4	1.9	2.8 #	9.2	26.8
C26 GI cancer	4	2.3	1.7	0.5	4.4	0.2	50.0
C33-C34 Lung	182	64.7	2.8	2.4	3.3 #	16.6	15.9
C43 Malign. melanoma	71	31.7	2.2	1.7	2.8 #	5.6	1.4
C46,C49 Soft tissue	11	5.4	2.0	1.0	3.6 #	0.8	
C48 Peritoneal	12	3.2	3.8	1.9	6.6 #	1.2	33.3
C50 Breast	485	256.8	1.9	1.7	2.1 #	32.4	6.0
C51 Vulva	21	10.5	2.0	1.2	3.1 #	1.5	4.8
C52 Vagina	7	1.9	3.6	1.5	7.5 #	0.7	14.3
C53 Cervix uteri	24	10.7	2.2	1.4	3.3 #	1.9	16.7
C54 Corpus uteri	109	48.7	2.2	1.8	2.7 #	8.6	3.7
C55,C57 Fem. genitals un	5	3.0	1.7	0.5	3.9	0.3	20.0
C56 Ovary	113	37.5	3.0	2.5	3.6 #	10.7	27.4
C64 Kidney	76	23.3	3.3	2.6	4.1 #	7.5	13.2
C65 Renal pelvis	10	3.1	3.2	1.5	5.9 #	1.0	
C66 Ureter	5	1.5	3.3	1.1	7.7 #	0.5	20.0
C67 Bladder	47	20.9	2.2	1.6	3.0 #	3.7	21.3
C70-C72 CNS cancer	15	12.4	1.2	0.7	2.0	0.4	60.0
C73 Thyroid	17	12.3	1.4	0.8	2.2	0.7	5.9
C76-C79 CUP	15	20.0	0.8	0.4	1.2	-0.7	
C82-C85 NHL	71	38.4	1.8	1.4	2.3 #	4.6	14.1
C90 Mult. myeloma	23	12.4	1.9	1.2	2.8 #	1.5	26.1
C91-C96 Leukaemia	36	16.4	2.2	1.5	3.0 #	2.8	44.4
Others, specified	31	17.8	1.7	1.2	2.5 #	1.9	12.9
Not observed	0	1.1	0.0	0.0	3.2	-0.2	
All further malignancies	2221	939.7	2.4	2.3	2.5 #	181.7	11.1

Patients 20733  
 Median age at next malignancy (years) 76.1  
 Person-years 70506  
 Mean observation time (years) 3.4  
 Median observation time (years) 1.9

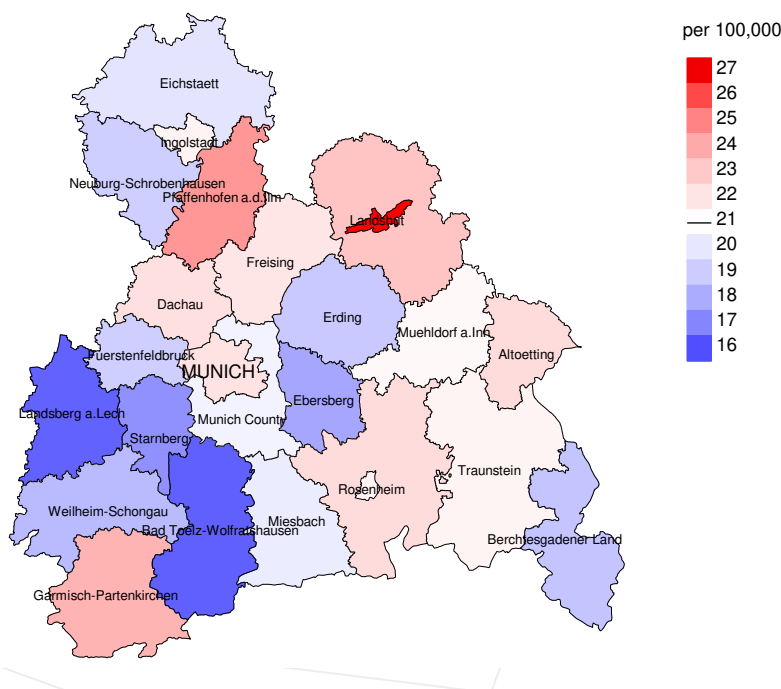
# The occurrence of further malignancy listed is statistically significant.

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

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



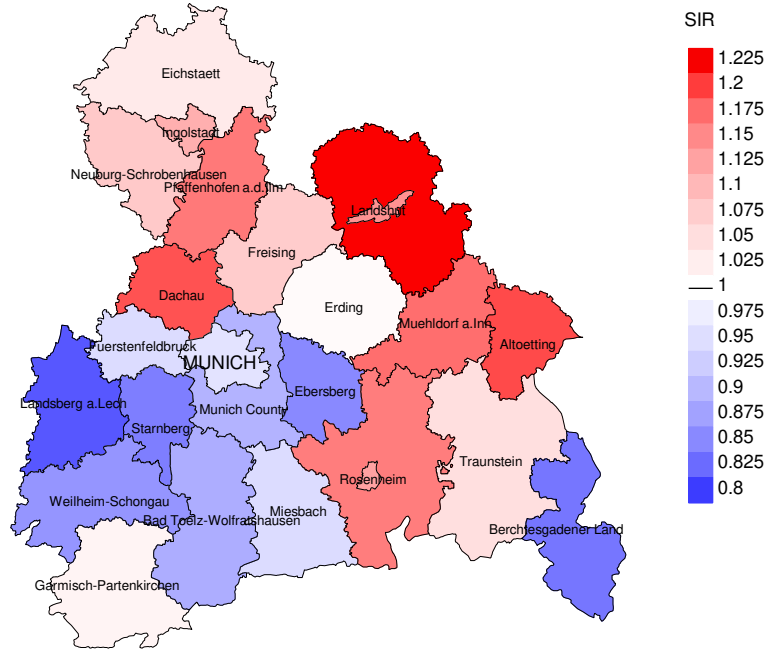
Average incidence (world standard population) 2007 - 2016: Females



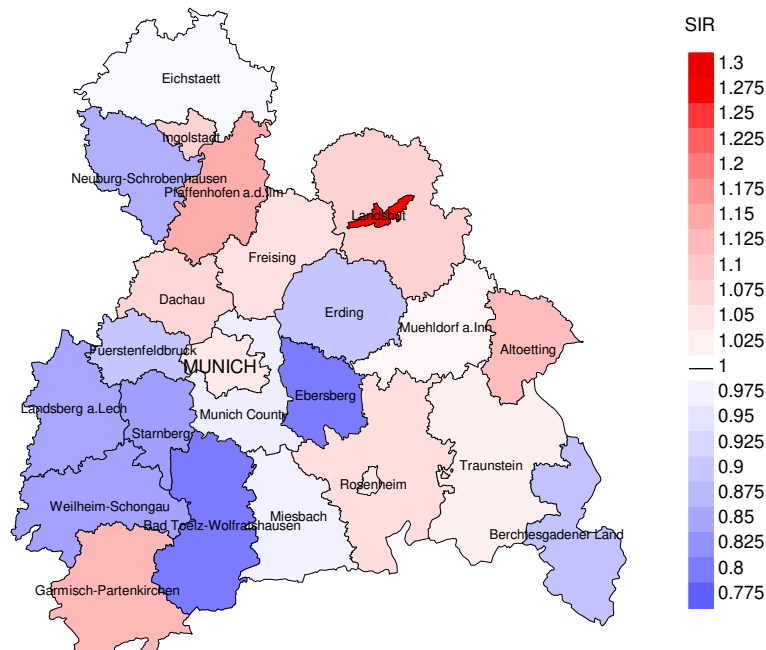
**Figure 8a.** Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 34.1/100,000 WS N=16,041, females 21.0/100,000 WS N=12,704).

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 272 women were identified with newly diagnosed colorectal cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 17.8/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 14.8 and 21.3/100,000.

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=16,041, females N=12,704).

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 272 women were identified with newly diagnosed colorectal cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.80. Though, the value of this parameter may vary with an underlying probability of 99% between 0.68 and 0.93.



## MORTALITY

Table 9a

Annual cohorts: Incident cancers, follow-up status, proportion of DCO, deaths among the annual cohorts and proportion of available death certificates (with respect to registry area expansion from 2.65 to 4.10 m as of 2002, and from 4.10 to 4.81 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	1835	97.0	5.5	1396	76.1	93.8
1999	1842	96.4	6.5	1378	74.8	94.8
2000	1702	96.9	6.2	1251	73.5	96.3
2001	1847	96.3	7.0	1276	69.1	97.0
2002	3155	96.9	11.6	2279	72.2	97.7
2003	3168	96.6	9.4	2148	67.8	98.0
2004	3049	96.6	7.9	2058	67.5	97.9
2005	2977	96.3	7.2	2004	67.3	98.0
2006	3063	93.5	5.1	1876	61.2	98.6
2007	3411	79.9	5.9	2065	60.5	98.3
2008	3363	72.3	5.7	1933	57.5	98.2
2009	3309	71.5	5.2	1830	55.3	97.8
2010	3096	70.2	5.7	1627	52.6	97.7
2011	3031	70.8	5.1	1531	50.5	97.5
2012	2970	69.1	5.4	1368	46.1	97.3
2013	2940	67.3	5.3	1235	42.0	96.1
2014	2809	70.8	5.0	1072	38.2	95.6
2015	2420	97.9	5.5	764	31.6	92.8
2016	1993	75.4	5.7	442	22.2	81.9
1998-2016	51980	83.7	6.4	29533	56.8	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	1835	1041	90.3	304	16.6
1999	1842	1074	90.9	318	17.3
2000	1702	1044	93.8	294	17.3
2001	1847	1114	95.4	298	16.1
2002	3155	1582	98.0	690	21.9
2003	3168	1697	97.8	594	18.8
2004	3049	1706	98.4	552	18.1
2005	2977	1807	96.5	541	18.2
2006	3063	1873	97.4	507	16.6
2007	3411	1985	97.5	573	16.8
2008	3363	2076	98.6	605	18.0
2009	3309	2116	98.6	537	16.2
2010	3096	2182	98.5	523	16.9
2011	3031	2189	98.2	512	16.9
2012	2970	2199	98.3	520	17.5
2013	2940	2182	97.8	466	15.9
2014	2809	2167	98.0	506	18.0
2015	2420	2285	98.1	464	19.2
2016	1993	1889	98.1	375	18.8
1998-2016	51980	34208	97.3	9179	17.7

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	1041	71.9	28.1	86.9
1999	1074	73.5	26.5	86.6
2000	1044	73.7	26.3	86.0
2001	1114	69.3	30.7	84.9
2002	1582	75.3	24.7	87.2
2003	1697	73.9	26.1	86.7
2004	1706	76.3	23.7	86.6
2005	1807	71.5	28.5	81.8
2006	1873	71.6	28.4	82.9
2007	1985	72.1	27.9	83.7
2008	2076	71.7	28.3	82.0
2009	2116	69.8	30.2	79.8
2010	2182	66.8	33.2	78.8
2011	2189	67.0	33.0	78.6
2012	2199	66.4	33.6	78.3
2013	2182	63.2	36.8	74.2
2014	2167	64.1	35.9	76.5
2015	2285	61.5	38.5	73.6
2016	1889	56.9	43.1	72.5
1998-2016	34208	68.7	31.3	80.6

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	510	73.8	71.5	79.5	73.2
1999	531	73.4	71.4	78.7	72.8
2000	546	74.7	72.3	82.3	73.8
2001	538	74.2	71.2	80.7	72.6
2002	818	74.2	72.1	80.8	73.3
2003	874	75.0	72.7	80.7	73.9
2004	881	75.7	74.3	81.2	75.1
2005	945	75.5	73.1	81.3	73.7
2006	1029	76.5	74.4	81.0	75.4
2007	1084	76.0	73.9	80.9	74.6
2008	1164	76.7	74.6	82.1	75.5
2009	1124	76.4	73.7	81.2	74.4
2010	1188	76.8	74.4	82.1	75.4
2011	1209	76.5	73.4	82.6	75.2
2012	1210	77.4	75.5	82.3	76.2
2013	1185	78.9	76.4	83.4	77.1
2014	1195	78.1	75.8	82.6	76.7
2015	1272	79.2	76.2	84.0	77.2
2016	1107	79.0	75.7	83.0	77.4
1998–2016	18410	76.7	74.2	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	531	78.6	76.5	84.8	78.4
1999	543	79.9	78.3	85.9	79.7
2000	498	80.6	78.8	86.5	79.6
2001	576	80.9	78.0	86.9	80.0
2002	764	81.0	79.6	86.5	80.6
2003	823	81.3	78.9	85.9	80.3
2004	825	81.3	79.3	85.2	80.2
2005	862	81.9	80.0	85.1	80.7
2006	844	82.0	79.7	86.2	80.6
2007	901	82.0	79.3	86.7	80.6
2008	912	82.6	80.1	86.5	81.1
2009	992	82.8	79.3	87.5	80.5
2010	994	83.3	79.9	87.3	81.5
2011	980	83.6	79.7	88.1	81.4
2012	989	83.9	79.5	88.5	81.4
2013	997	84.0	79.0	88.4	81.1
2014	972	83.8	78.6	88.2	80.7
2015	1013	83.8	78.5	88.7	80.4
2016	782	84.2	78.6	88.9	81.2
1998-2016	15798	82.3	79.1	87.2	80.6

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	366	33.0	0.40	19.2	0.39	30.3	0.41	41.1	0.42
1999	391	34.9	0.42	20.1	0.41	31.7	0.42	44.1	0.45
2000	408	35.8	0.47	20.0	0.45	31.9	0.47	44.0	0.50
2001	384	33.1	0.40	18.7	0.39	29.3	0.41	39.3	0.43
2002	622	33.4	0.38	18.0	0.36	28.2	0.38	38.1	0.39
2003	658	35.1	0.39	18.3	0.37	28.9	0.39	40.1	0.42
2004	681	36.2	0.42	17.9	0.39	28.9	0.42	40.9	0.45
2005	694	36.6	0.45	18.1	0.42	28.4	0.44	39.5	0.47
2006	742	38.7	0.45	18.7	0.42	30.0	0.45	41.9	0.48
2007	804	36.3	0.43	16.9	0.39	27.0	0.42	38.0	0.45
2008	869	39.0	0.48	17.8	0.44	28.6	0.46	40.4	0.50
2009	795	35.6	0.44	16.4	0.40	25.8	0.43	35.4	0.45
2010	816	36.2	0.48	15.9	0.43	25.2	0.46	35.5	0.49
2011	845	37.8	0.52	17.0	0.48	26.7	0.51	36.1	0.53
2012	821	36.2	0.52	15.7	0.47	25.1	0.50	34.5	0.53
2013	783	34.0	0.48	14.1	0.42	22.7	0.46	31.9	0.49
2014	782	33.5	0.50	13.9	0.44	22.1	0.47	30.6	0.50
2015	788	33.1	0.59	13.6	0.52	21.6	0.55	29.9	0.59
2016	659	27.4	0.59	11.2	0.51	17.8	0.55	24.4	0.58
1998-2016	12908	35.1	0.46	16.3	0.42	25.9	0.45	35.7	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	383	32.6	0.42	12.3	0.38	19.4	0.39	27.1	0.42
1999	399	33.6	0.45	11.9	0.37	19.1	0.40	26.5	0.42
2000	361	30.1	0.44	10.8	0.39	17.2	0.40	23.1	0.41
2001	388	31.9	0.44	11.6	0.38	18.5	0.40	25.4	0.42
2002	570	29.1	0.39	9.8	0.32	15.7	0.34	21.8	0.36
2003	597	30.3	0.41	10.6	0.35	16.9	0.37	23.1	0.39
2004	622	31.5	0.44	10.5	0.36	16.9	0.39	23.7	0.42
2005	600	30.2	0.44	9.9	0.37	15.9	0.39	22.0	0.41
2006	602	30.0	0.44	9.5	0.34	15.5	0.37	22.0	0.41
2007	630	27.3	0.42	9.3	0.36	14.8	0.38	20.3	0.40
2008	622	26.8	0.42	8.7	0.35	13.8	0.37	19.1	0.39
2009	683	29.4	0.48	9.7	0.41	15.3	0.43	20.9	0.44
2010	644	27.5	0.48	8.8	0.41	13.9	0.43	19.0	0.44
2011	625	26.7	0.47	8.3	0.37	13.2	0.39	18.3	0.42
2012	639	27.1	0.49	8.6	0.39	13.7	0.42	18.8	0.45
2013	599	25.1	0.48	8.1	0.39	12.9	0.42	17.4	0.44
2014	608	25.3	0.51	8.1	0.41	12.7	0.44	17.2	0.47
2015	617	25.4	0.60	8.2	0.52	12.9	0.54	17.2	0.56
2016	417	17.0	0.50	5.4	0.40	8.5	0.43	11.6	0.46
1998-2016	10606	27.6	0.46	9.1	0.38	14.5	0.40	19.9	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	111	0.8	1.3	63	0.8	1.3	48	0.8	1.3
45-49	222	1.6	2.9	116	1.5	2.7	106	1.7	3.1
50-54	399	2.8	5.7	240	3.0	5.7	159	2.6	5.7
55-59	667	4.7	10.5	410	5.1	10.9	257	4.2	9.9
60-64	1025	7.3	17.7	666	8.4	19.2	359	5.9	15.8
65-69	1591	11.3	29.1	1047	13.1	32.4	544	8.9	24.7
70-74	2194	15.6	44.7	1392	17.5	49.9	802	13.2	37.9
75-79	2371	16.9	61.6	1481	18.6	68.5	890	14.6	52.5
80-84	2408	17.1	78.7	1328	16.7	85.2	1080	17.8	70.3
85+	2989	21.3	100.0	1182	14.8	100.0	1807	29.7	100.0
All ages	14046	100.0		7962	100.0		6084	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	0.12	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	0.17	0.3	0.09	10.6	4.2
35-39	19	18	1.2	0.18	1.1	0.20	9.5	6.3
40-44	63	48	3.4	0.26	2.7	0.24	12.8	7.2
45-49	116	106	5.9	0.24	5.6	0.27	10.1	8.1
50-54	240	159	13.9	0.29	9.3	0.27	11.7	8.0
55-59	410	257	29.0	0.33	17.5	0.32	12.1	9.0
60-64	666	359	54.4	0.37	27.0	0.36	13.4	9.6
65-69	1047	544	88.4	0.43	41.9	0.39	14.4	10.2
70-74	1392	802	125.8	0.47	63.4	0.43	14.9	11.8
75-79	1481	890	185.9	0.58	88.9	0.47	16.5	12.7
80-84	1328	1080	288.7	0.71	152.6	0.57	17.6	15.8
85+	1182	1807	386.0	0.88	246.2	0.73	18.1	19.6
All ages	7962	6084					15.2	13.1
Mortality								
Raw			34.8	0.50	25.7	0.48		
WS			15.1	0.44	8.3	0.39		
ES			24.0	0.47	13.1	0.42		
BRD-S			33.2	0.50	17.9	0.44		
PYLL-70								
per 100,000			112.1		74.7			
ES			96.4		62.3			
AYLL-70			8.8		9.9			



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	56	1.1	41	73.2	4	7.1	11	19.6
C15 Oesophagus	90	1.8	13	14.4	14	15.6	63	70.0
C16 Stomach	270	5.4	76	28.1	60	22.2	134	49.6
C17 Small intestine	57	1.1	9	15.8	19	33.3	29	50.9
C18 Colon	381	7.6			139	36.5	242	63.5
C19–C20 Rectum	211	4.2			131	62.1	80	37.9
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	192	3.8	11	5.7	30	15.6	151	78.6
C32 Larynx	80	1.6	57	71.3	1	1.3	22	27.5
C33–C34 Lung	569	11.3	94	16.5	76	13.4	399	70.1
C43 Malign. melanoma	179	3.6	110	61.5	2	1.1	67	37.4
C44 Skin others	307	6.1	150	48.9	21	6.8	136	44.3
C61 Prostate	1182	23.6	667	56.4	94	8.0	421	35.6
C64 Kidney	210	4.2	95	45.2	50	23.8	65	31.0
C67 Bladder	262	5.2	95	36.3	20	7.6	147	56.1
C70–C72 CNS cancer	52	1.0	5	9.6	4	7.7	43	82.7
C76–C79 CUP	57	1.1	12	21.1	10	17.5	35	61.4
C82–C85 NHL	201	4.0	83	41.3	33	16.4	85	42.3
C91–C96 Leukaemia	78	1.6	19	24.4	7	9.0	52	66.7
Others, specified	373	7.4	158	42.4	23	6.2	192	51.5
All further malignancies	5019	100.0	1705	34.0	781	15.6	2533	50.5

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	181	5.1	55	30.4	35	19.3	91	50.3
C18 Colon	240	6.8			70	29.2	170	70.8
C19–C20 Rectum	129	3.7			72	55.8	57	44.2
C22 Liver	44	1.2	2	4.5	11	25.0	31	70.5
C23–C24 Bile	50	1.4	11	22.0	8	16.0	31	62.0
C25 Pancreas	164	4.6	12	7.3	22	13.4	130	79.3
C33–C34 Lung	237	6.7	37	15.6	22	9.3	178	75.1
C43 Malign. melanoma	84	2.4	53	63.1	5	6.0	26	31.0
C44 Skin others	119	3.4	69	58.0	8	6.7	42	35.3
C50 Breast	935	26.5	613	65.6	65	7.0	257	27.5
C53 Cervix uteri	122	3.5	89	73.0	7	5.7	26	21.3
C54 Corpus uteri	235	6.7	154	65.5	13	5.5	68	28.9
C56 Ovary	233	6.6	77	33.0	51	21.9	105	45.1
C64 Kidney	75	2.1	38	50.7	12	16.0	25	33.3
C67 Bladder	92	2.6	38	41.3	3	3.3	51	55.4
C73 Thyroid	35	1.0	19	54.3	3	8.6	13	37.1
C76–C79 CUP	38	1.1	12	31.6	9	23.7	17	44.7
C82–C85 NHL	110	3.1	48	43.6	15	13.6	47	42.7
C90 Mult. myeloma	41	1.2	13	31.7	4	9.8	24	58.5
C91–C96 Leukaemia	48	1.4	10	20.8	7	14.6	31	64.6
Others, specified	315	8.9	116	36.8	48	15.2	151	47.9
All further malignancies	3527	100.0	1466	41.6	490	13.9	1571	44.5

Further malignancies with number of cases 1 to 29 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	0.12	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	0.17	0.3	0.10	10.8	4.7
35-39	18	15	1.1	0.18	0.9	0.18	9.5	5.8
40-44	60	45	3.2	0.26	2.5	0.25	13.1	7.6
45-49	109	94	5.5	0.25	4.9	0.27	10.4	8.3
50-54	212	143	12.3	0.28	8.4	0.27	11.7	8.5
55-59	364	223	25.7	0.33	15.2	0.33	12.4	9.3
60-64	563	298	46.0	0.36	22.4	0.36	13.5	9.7
65-69	853	447	72.0	0.43	34.4	0.40	14.6	10.6
70-74	1096	617	99.1	0.49	48.7	0.42	15.2	11.6
75-79	1103	695	138.4	0.58	69.4	0.46	16.7	12.8
80-84	959	853	208.5	0.75	120.6	0.55	17.5	16.0
85+	859	1429	280.6	0.91	194.7	0.73	18.0	19.5
All ages	6214	4873					15.2	13.2
Mortality								
Raw			27.2	0.49	20.6	0.47		
WS			12.1	0.43	6.8	0.39		
ES			19.0	0.46	10.6	0.41		
BRD-S			25.8	0.50	14.4	0.43		
PYLL-70								
per 100,000			99.2		65.4			
ES			85.4		54.7			
AYLL-70			9.1		10.2			

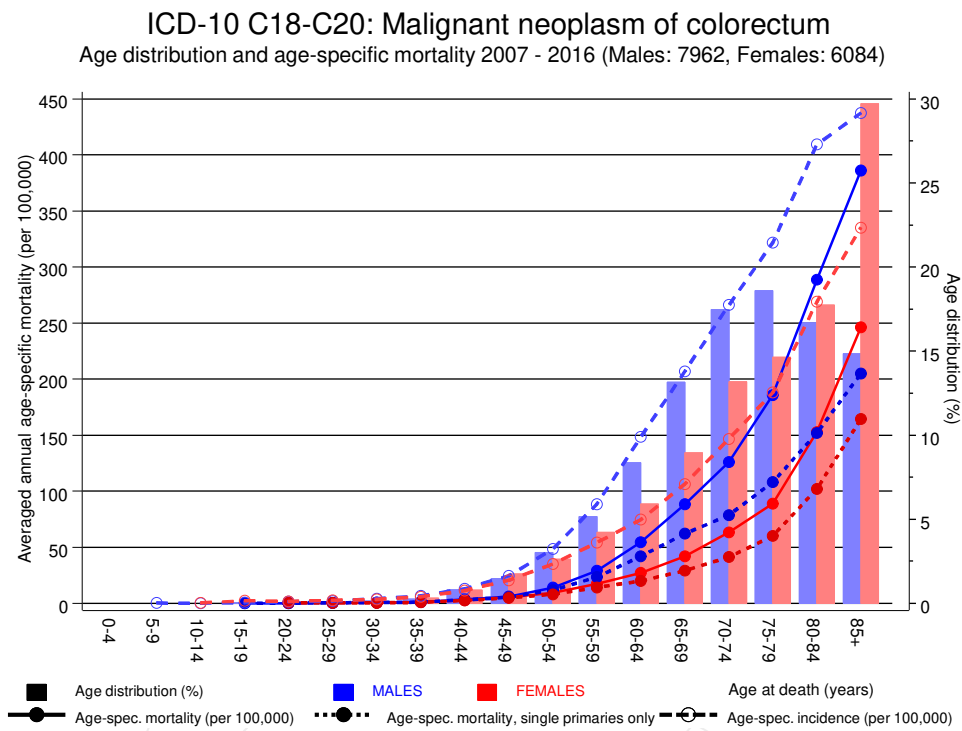
\* See corresponding tables with multiple malignancies.

Table 16

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

Age at death Years	Males		Males		Females		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	0.13	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	0.17	0.3	0.10	10.8	4.8
35-39	18	14	1.1	0.19	0.9	0.17	9.6	5.5
40-44	59	44	3.2	0.27	2.5	0.25	13.0	7.5
45-49	105	93	5.3	0.25	4.9	0.27	10.1	8.3
50-54	203	137	11.7	0.28	8.0	0.27	11.4	8.3
55-59	330	206	23.3	0.31	14.0	0.32	11.4	8.7
60-64	514	265	42.0	0.35	19.9	0.35	12.5	8.8
65-69	735	378	62.0	0.42	29.1	0.37	12.9	9.1
70-74	870	523	78.6	0.43	41.3	0.38	12.5	10.2
75-79	861	601	108.1	0.51	60.0	0.43	13.6	11.4
80-84	699	722	152.0	0.60	102.0	0.50	13.5	14.1
85+	627	1206	204.8	0.71	164.3	0.64	14.2	17.2
All ages	5039	4203					12.8	11.7
Mortality								
Raw			22.1	0.43	17.8	0.43		
WS			10.2	0.40	5.9	0.36		
ES			15.6	0.41	9.3	0.38		
BRD-S			20.9	0.44	12.5	0.40		
PYLL-70								
per 100,000			92.5		61.3			
ES			79.7		51.4			
AYLL-70			9.4		10.6			

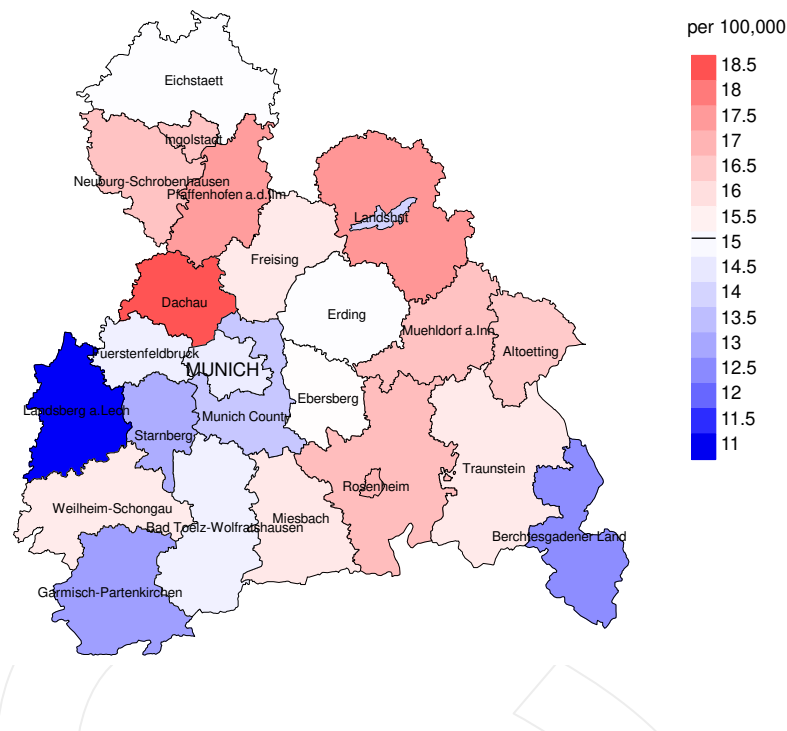
\* See corresponding tables with multiple malignancies.



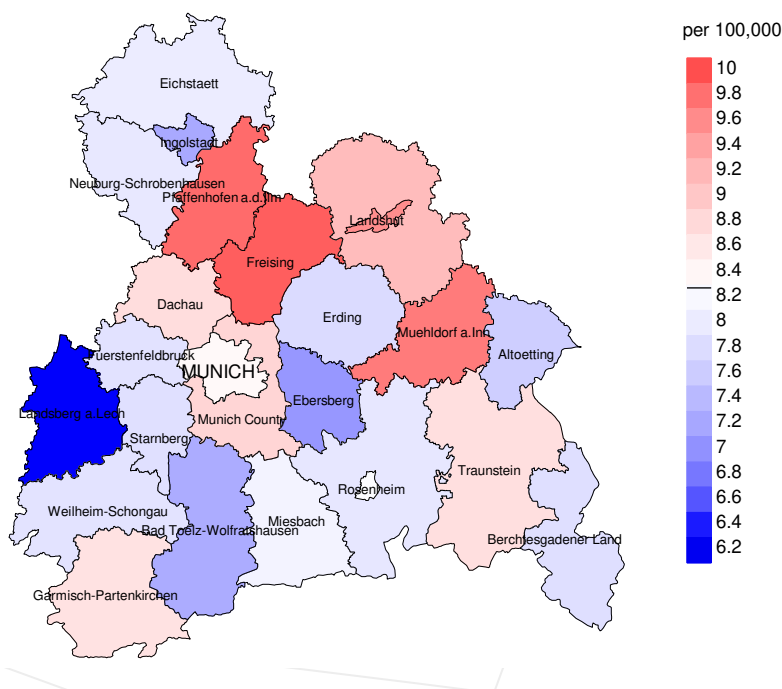
**Figure 17.** Distribution of age at death (bars; males: mean=70.0 yrs, median=70.8 yrs; females: mean=73.7 yrs, median=75.5 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed 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



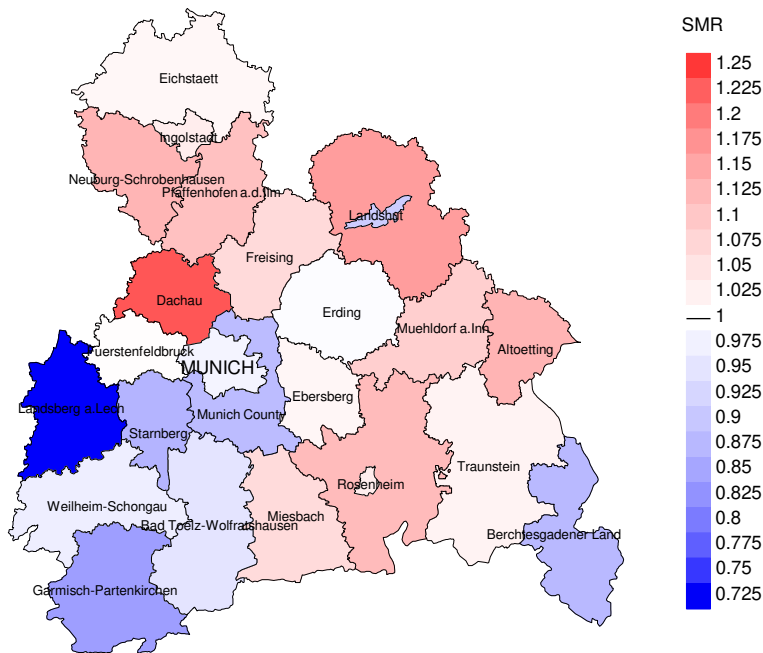
Average mortality (world standard population) 2007 - 2016: Females



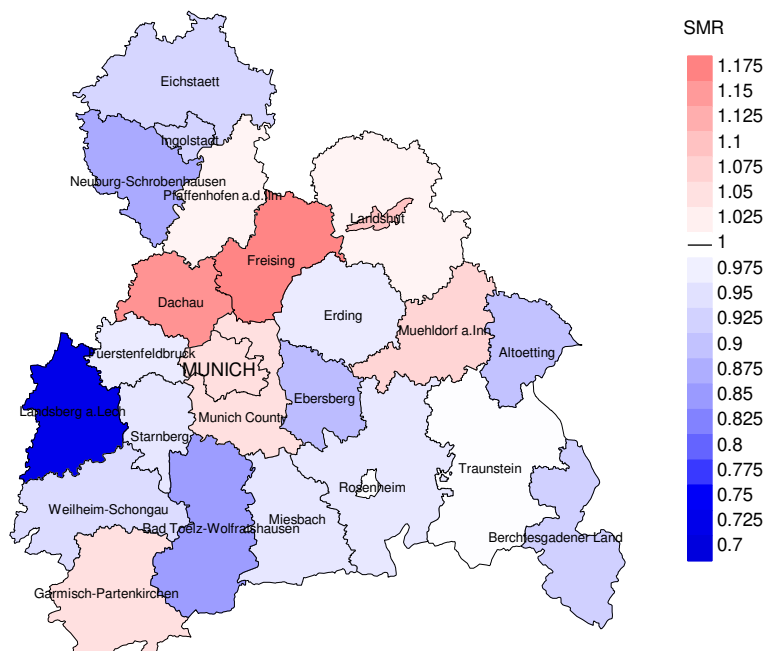
**Figure 18a.** Map of cancer mortality (world standard population) by county averaged for period 2007 to 2016. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 15.1/100,000 WS N=7,962, females 8.3/100,000 WS N=6,084).

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 143 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 9.2/100,000.

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=7,962, females N=6,084).

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 143 women died from colorectal cancer. Therefore, the mean standardized mortality ratio (SMR) for this cancer type in this area can be calculated at 0.89. Though, the value of this parameter may vary with an underlying probability of 99% between 0.71 and 1.11, 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-C20: 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/bC1820E-ICD-10-C18-C20-Colorectal-cancer-incidence-and-mortality.pdf>

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