

Munich Cancer Registry



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

ICD-10 C18: Colon cancer

Incidence and Mortality

Year of diagnosis	1998-2016
Patients	33,362
Diseases	34,041
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/bC18__E-ICD-10-C18-Colon-cancer-incidence-and-mortality.pdf

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

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

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

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

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

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

Munich Cancer Registry, 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

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	1275	83	6.5	12.2	10.7	77.2	97.4
1999	1205	93	7.7	13.0	10.5	76.1	96.5
2000	1093	80	7.3	13.5	10.3	74.7	96.9
2001	1220	105	8.6	13.5	10.2	72.3	97.3
2002	2042	289	14.2	13.1	10.0	73.0	96.8 #
2003	2073	234	11.3	13.3	9.6	69.3	96.9
2004	2053	196	9.5	13.4	9.3	69.0	97.1
2005	1935	169	8.7	14.1	9.0	68.7	96.1
2006	1978	124	6.3	14.4	8.6	62.4	93.2
2007	2170	160	7.4	14.5	8.1	60.9	81.3 #
2008	2213	145	6.6	14.8	7.6	58.4	72.8
2009	2190	124	5.7	15.2	6.9	55.1	71.1
2010	1993	135	6.8	15.5	6.3	53.1	70.5
2011	1933	124	6.4	15.9	5.7	51.6	70.8
2012	1914	120	6.3	16.1	5.1	47.1	67.6
2013	1939	116	6.0	16.5	4.7	43.2	66.7
2014	1830	112	6.1	16.7	4.5	39.7	68.4
2015	1641	104	6.3	16.9	3.9	33.9	97.7
2016	1344	82	6.1	17.1	3.6	23.6	78.6 ##
1998-2016	34041	2595	7.6	17.1	10.7	57.9	83.8

34,041 cases diagnosed 1998-2016 are related to a total of 33,362 patients. Currently, in 9,203 (27.6 %) of these 33,362 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 7,303 / 1,487 / 413 (21.9 % / 4.5 % / 1.2 %) patients exist having 2 / 3 / 4+ malignancies.

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

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

How to interpret:

In 2014, a subgroup of 1,830 cases has been diagnosed, of which 16.7 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 4.5 % 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 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	609	47.8	29	4.8	12.6	12.7	77.3	98.7
1999	583	48.4	35	6.0	12.8	12.4	76.7	97.4
2000	528	48.3	22	4.2	13.0	12.1	72.9	97.9
2001	604	49.5	34	5.6	13.0	12.0	71.0	97.2
2002	1027	50.3	128	12.5	12.6	11.7	71.9	97.8 #
2003	1061	51.2	85	8.0	13.0	11.3	69.4	97.6
2004	1058	51.5	69	6.5	13.4	10.9	71.1	97.3
2005	982	50.7	71	7.2	14.2	10.5	68.6	96.1
2006	1024	51.8	46	4.5	14.8	10.2	62.0	93.3
2007	1137	52.4	65	5.7	15.1	9.5	61.9	81.9 #
2008	1176	53.1	58	4.9	15.6	9.0	58.8	72.8
2009	1172	53.5	59	5.0	16.1	8.2	54.8	70.4
2010	1055	52.9	48	4.5	16.6	7.3	52.6	69.1
2011	994	51.4	44	4.4	17.0	6.6	50.1	69.2
2012	1003	52.4	46	4.6	17.3	6.3	46.9	67.4
2013	1058	54.6	41	3.9	17.7	5.8	42.9	65.2
2014	991	54.2	51	5.1	18.0	5.4	39.1	68.5
2015	866	52.8	45	5.2	18.2	4.7	32.8	98.2
2016	724	53.9	31	4.3	18.3	5.1	23.2	76.9 ##
1998-2016	17652	51.9	1007	5.7	18.3	12.7	57.3	83.4

17,652 cases diagnosed 1998-2016 are related to a total of 17,237 patients. Currently, in 5,298 (30.7 %) of these 17,237 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 4,126 / 896 / 276 (23.9 % / 5.2 % / 1.6 %) 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 991 cases has been diagnosed, of which 18.0 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 5.4 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 1b

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

Year of diagnosis	Females n	Females %	DCO cases n	Prop. DCO %	Prop. at least 1 further malign. prior + synchron. %	Prop. at least 1 further malign. after %	Prop. deaths %	Prop. actively followed %
1998	666	52.2	54	8.1	11.9	8.6	77.0	96.2
1999	622	51.6	58	9.3	13.2	8.5	75.6	95.7
2000	565	51.7	58	10.3	13.9	8.4	76.3	95.9
2001	616	50.5	71	11.5	14.0	8.2	73.5	97.4
2002	1015	49.7	161	15.9	13.6	8.1	74.2	95.9 #
2003	1012	48.8	149	14.7	13.7	7.8	69.2	96.0
2004	995	48.5	127	12.8	13.5	7.5	66.7	97.0
2005	953	49.3	98	10.3	13.9	7.3	68.7	96.0
2006	954	48.2	78	8.2	13.9	6.9	62.9	93.2
2007	1033	47.6	95	9.2	13.8	6.5	59.7	80.7 #
2008	1037	46.9	87	8.4	14.0	6.0	58.0	72.7
2009	1018	46.5	65	6.4	14.3	5.5	55.4	72.0
2010	938	47.1	87	9.3	14.5	5.1	53.6	72.2
2011	939	48.6	80	8.5	14.7	4.6	53.2	72.5
2012	911	47.6	74	8.1	14.8	3.8	47.3	67.8
2013	881	45.4	75	8.5	15.1	3.4	43.6	68.6
2014	839	45.8	61	7.3	15.3	3.4	40.4	68.3
2015	775	47.2	59	7.6	15.5	3.0	35.2	97.2
2016	620	46.1	51	8.2	15.8	1.8	24.0	80.6 ##
1998-2016	16389	48.1	1588	9.7	15.8	8.6	58.6	84.3

16,389 cases diagnosed 1998-2016 are related to a total of 16,125 patients. Currently, in 3,905 (24.2 %) of these 16,125 patients more than one malignancy of any cancer type has been registered. Hereby, groups of 3,177 / 591 / 137 (19.7 % / 3.7 % / 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 839 cases has been diagnosed, of which 15.3 % previously and/or concurrently (synchronously) had at least one other malignancy of any cancer type. In 3.4 % of cases, at least one new malignancy has occurred during the follow-up period (all numbers refer to the date of the database export, see cover sheet).

Table 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	609	666	55.0	56.6	32.7	23.6	49.9	35.9	66.6	47.6
1999	583	622	52.1	52.4	30.5	21.6	46.9	32.8	63.4	43.3
2000	528	565	46.4	47.0	26.8	19.0	41.2	29.2	54.8	38.6
2001	604	616	52.1	50.6	30.2	20.4	46.0	31.4	59.4	41.9
2002	1027	1015	55.1	51.8	30.1	20.2	46.3	30.9	62.5	41.0
2003	1061	1012	56.6	51.4	30.4	20.0	46.5	30.7	62.1	40.6
2004	1058	995	56.2	50.3	29.2	20.0	45.0	30.2	60.8	39.4
2005	982	953	51.8	47.9	26.7	17.9	40.8	27.6	54.6	36.8
2006	1024	954	53.5	47.5	27.4	18.8	41.9	28.3	55.6	37.4
2007	1137	1033	51.3	44.7	26.2	17.5	39.5	26.2	52.7	34.5
2008	1176	1037	52.8	44.7	25.8	17.2	39.6	26.0	52.9	34.0
2009	1172	1018	52.5	43.8	25.3	16.1	38.4	24.6	51.5	33.1
2010	1055	938	46.8	40.1	22.2	14.6	33.8	22.3	45.3	29.8
2011	994	939	44.4	40.2	20.8	15.1	31.7	22.8	42.4	29.9
2012	1003	911	44.2	38.6	20.7	14.9	31.3	22.1	41.2	28.9
2013	1058	881	46.0	37.0	20.6	14.1	31.6	20.9	42.5	27.4
2014	991	839	42.5	34.8	19.0	13.3	29.0	19.8	38.7	25.7
2015	866	775	36.4	31.8	16.4	11.8	24.9	17.7	32.9	23.2
2016	724	620	30.1	25.3	14.1	9.6	20.8	14.3	27.3	18.6
1998-2016	17652	16389	48.0	42.7	23.7	16.4	36.1	24.8	47.9	32.7

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

Table 3

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

Year of diagnosis	Cases n	Std.		Min.	Max.	Median				
		Mean	dev.			10%	25%	50%	75%	90%
1998	1275	70.9	12.3	13.2	98.1	54.7	62.1	72.2	79.6	86.2
1999	1205	71.4	12.4	24.9	101	55.5	63.3	72.7	79.8	86.6
2000	1093	71.3	12.0	24.7	103	56.2	62.6	72.7	79.5	86.8
2001	1220	71.2	12.4	30.8	103	55.7	62.7	71.8	80.5	87.3
2002	2042	72.2	12.2	17.7	101	56.5	63.7	73.5	81.2	87.5
2003	2073	72.2	11.7	8.4	99.4	57.3	64.3	72.9	80.8	87.1
2004	2053	71.9	12.2	13.8	101	56.4	64.3	73.1	81.0	86.8
2005	1935	72.6	12.3	15.1	99.9	57.2	65.2	73.7	81.9	87.0
2006	1978	71.7	12.0	17.9	102	55.6	64.2	72.4	80.7	85.8
2007	2170	71.6	12.8	13.4	103	54.7	64.5	72.6	81.1	86.3
2008	2213	72.4	12.4	18.9	105	56.4	65.3	73.2	81.6	87.2
2009	2190	72.4	12.2	12.4	99.1	56.4	65.3	73.3	81.4	87.0
2010	1993	72.6	12.4	14.9	101	56.0	65.4	73.9	81.8	86.9
2011	1933	72.6	12.6	15.5	101	55.9	64.8	73.9	81.9	87.4
2012	1914	72.3	13.0	9.7	101	56.1	65.1	73.9	81.7	87.1
2013	1939	72.4	13.0	15.7	105	54.6	65.5	74.1	81.8	87.4
2014	1830	72.5	13.2	15.8	103	53.9	65.3	74.6	81.7	87.5
2015	1641	72.5	13.2	15.0	101	53.9	66.0	74.6	81.5	87.6
2016	1344	71.7	13.4	9.4	100	53.6	63.9	74.2	80.9	86.6
1998-2016	34041	72.1	12.5	8.4	105	55.7	64.5	73.4	81.2	87.0

Table 3a

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

Year of diagnosis	Cases n	Std.		Min.	Max.	Median				
		Mean	dev.			10%	25%	50%	75%	90%
1998	609	69.0	11.5	31.4	98.1	55.0	60.7	69.6	77.0	84.4
1999	583	69.5	11.5	24.9	95.5	56.1	62.4	70.2	78.0	83.8
2000	528	69.2	10.6	36.0	93.0	55.6	61.8	69.7	77.0	82.6
2001	604	69.2	11.7	31.3	102	54.7	61.7	69.0	77.0	85.6
2002	1027	70.4	11.0	20.9	98.5	56.7	63.1	71.5	78.2	83.2
2003	1061	70.3	11.1	8.4	99.4	56.7	63.3	71.0	78.1	83.4
2004	1058	70.8	11.1	27.8	101	56.8	63.9	71.4	78.6	84.5
2005	982	70.6	11.4	28.3	98.5	56.7	64.2	70.9	78.5	84.4
2006	1024	70.4	11.1	17.9	102	55.9	63.5	71.0	78.3	83.9
2007	1137	69.8	12.1	15.8	99.4	54.4	63.5	71.0	78.7	83.9
2008	1176	71.0	11.5	19.3	105	56.2	64.9	71.6	79.2	84.9
2009	1172	70.6	11.4	12.4	99.0	55.6	64.1	71.7	79.1	83.7
2010	1055	71.1	11.4	27.9	98.9	55.4	64.1	71.8	79.4	84.5
2011	994	71.3	11.7	15.5	97.3	55.4	64.7	72.5	79.9	85.1
2012	1003	71.4	11.3	9.7	101	57.2	64.7	72.9	79.4	85.1
2013	1058	71.7	11.9	19.4	99.6	55.5	65.0	73.5	80.0	85.4
2014	991	72.0	12.3	20.3	102	55.0	65.4	74.2	80.8	85.7
2015	866	71.5	12.4	21.3	97.6	54.1	65.2	73.5	79.8	85.4
2016	724	70.5	13.1	9.4	96.4	53.0	63.1	73.1	80.0	85.3
1998-2016	17652	70.7	11.6	8.4	105	55.6	63.7	71.8	78.9	84.6

Table 3b

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

Year of diagnosis	Cases n	Mean	Std. dev.	Min.	Max.	Median				
						10%	25%	50%	75%	90%
1998	666	72.6	12.8	13.2	96.7	54.5	64.0	74.9	82.0	87.2
1999	622	73.1	13.0	26.9	101	55.1	64.3	75.1	82.7	88.3
2000	565	73.2	12.9	24.7	103	56.3	64.4	75.3	82.0	88.5
2001	616	73.2	12.8	30.8	103	56.0	64.1	75.5	81.8	89.0
2002	1015	74.0	13.0	17.7	101	56.0	64.8	76.4	83.0	89.4
2003	1012	74.1	11.9	23.5	98.9	58.1	65.4	75.9	82.9	88.8
2004	995	73.1	13.3	13.8	100	55.6	64.7	75.3	83.3	88.6
2005	953	74.7	12.8	15.1	99.9	57.9	67.0	76.6	83.9	90.2
2006	954	73.0	12.7	24.6	97.1	55.1	65.1	75.1	82.7	86.9
2007	1033	73.5	13.2	13.4	103	55.4	66.4	75.4	83.4	87.7
2008	1037	73.9	13.3	18.9	101	56.8	65.9	75.4	84.1	88.7
2009	1018	74.4	12.8	15.9	99.1	58.0	67.4	76.2	83.9	88.8
2010	938	74.3	13.3	14.9	101	56.1	67.4	76.3	83.8	89.1
2011	939	73.9	13.3	16.5	101	55.9	65.1	75.7	84.5	88.8
2012	911	73.2	14.6	13.7	100	54.4	65.5	75.6	83.8	89.3
2013	881	73.3	14.2	15.7	105	54.2	66.4	75.4	83.8	89.2
2014	839	73.0	14.1	15.8	103	52.6	65.2	75.4	82.7	89.2
2015	775	73.6	14.0	15.0	101	53.6	66.8	75.9	83.7	89.9
2016	620	73.0	13.5	16.1	100	53.7	64.7	75.6	82.4	88.3
1998-2016	16389	73.6	13.3	13.2	105	55.7	65.6	75.6	83.4	88.8

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	32	0.2	0.2	5	0.0	0.1	27	0.3	0.3
20-24	39	0.2	0.4	17	0.2	0.2	22	0.2	0.6
25-29	57	0.3	0.7	27	0.3	0.5	30	0.3	0.9
30-34	71	0.4	1.1	37	0.4	0.9	34	0.4	1.3
35-39	131	0.7	1.8	69	0.7	1.6	62	0.7	2.0
40-44	266	1.4	3.1	139	1.4	2.9	127	1.4	3.4
45-49	487	2.5	5.7	263	2.6	5.5	224	2.5	5.9
50-54	790	4.1	9.8	443	4.4	9.9	347	3.9	9.7
55-59	1153	6.0	15.8	646	6.3	16.2	507	5.6	15.4
60-64	1707	8.9	24.7	1034	10.2	26.4	673	7.5	22.9
65-69	2432	12.7	37.4	1475	14.5	40.9	957	10.6	33.5
70-74	3179	16.6	54.0	1876	18.4	59.3	1303	14.5	48.0
75-79	3127	16.3	70.3	1733	17.0	76.3	1394	15.5	63.5
80-84	2804	14.6	84.9	1405	13.8	90.1	1399	15.6	79.1
85+	2886	15.1	100.0	1004	9.9	100.0	1882	20.9	100.0
All ages	19167	100.0		10176	100.0		8991	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=487 %	Females DCO rate n=734 %	Males	Females
							Prop.all cancers n=113978 %	Prop.all cancers n=112253 %
0- 4								
5- 9	2		0.2				1.9	
10-14	1	3	0.1	0.3			0.9	3.0
15-19	5	27	0.4	2.3			2.0	13.0
20-24	17	22	1.2	1.6	5.9		3.7	5.8
25-29	26	30	1.7	1.9			3.8	3.6
30-34	37	33	2.3	2.1			3.9	2.2
35-39	66	62	4.1	3.9	3.0	4.8	4.8	2.5
40-44	137	127	7.3	7.1			6.3	2.8
45-49	262	221	13.3	11.6	0.8		6.7	3.2
50-54	434	343	25.1	20.0	1.8	1.5	7.1	4.0
55-59	639	499	45.1	34.0	1.4	0.6	6.9	5.3
60-64	1020	664	83.3	49.9	2.1	1.7	7.8	5.9
65-69	1450	948	122.4	73.0	1.6	2.4	7.8	6.8
70-74	1835	1287	165.9	101.7	3.3	2.4	8.7	8.7
75-79	1703	1374	213.7	137.2	4.1	4.4	10.3	10.3
80-84	1365	1381	296.8	195.2	7.9	8.0	12.4	12.6
85+	982	1864	320.7	254.0	18.7	26.1	12.4	14.6
All ages	9981	8885			4.9	8.3	8.8	7.9
Incidence								
Raw			43.7	37.5				
WS			20.5	14.2				
ES			31.1	21.3				
BRD-S			41.3	28.0				

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

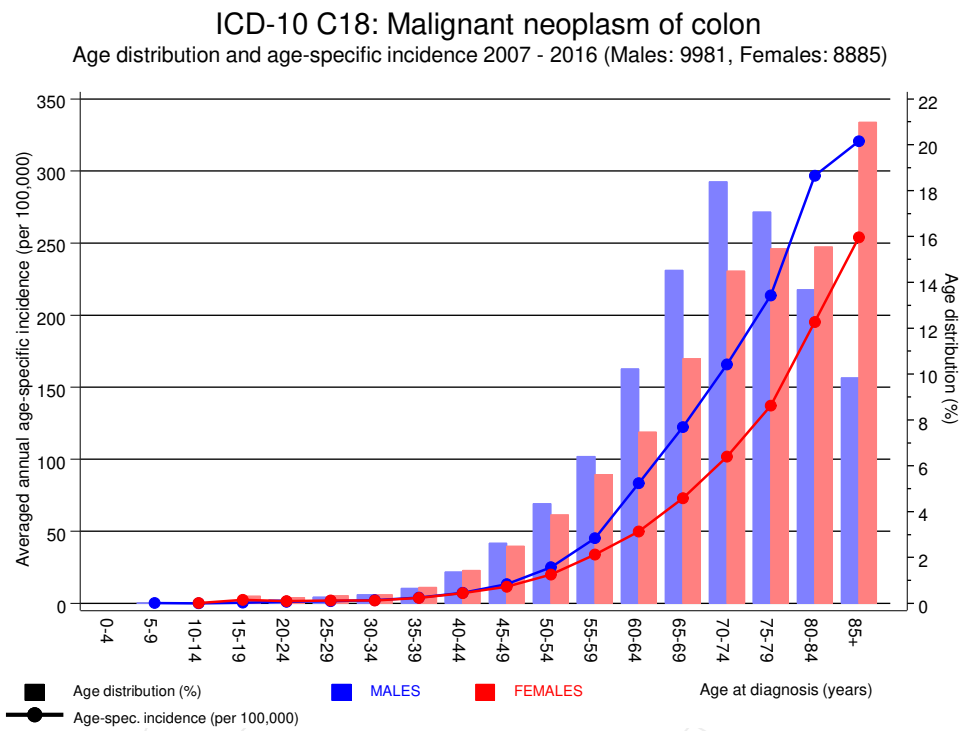


Figure 6. Age distribution (males: mean=71.0 yrs, median=72.5 yrs; females: mean=73.7 yrs, median=75.7 yrs) and age-specific incidence.

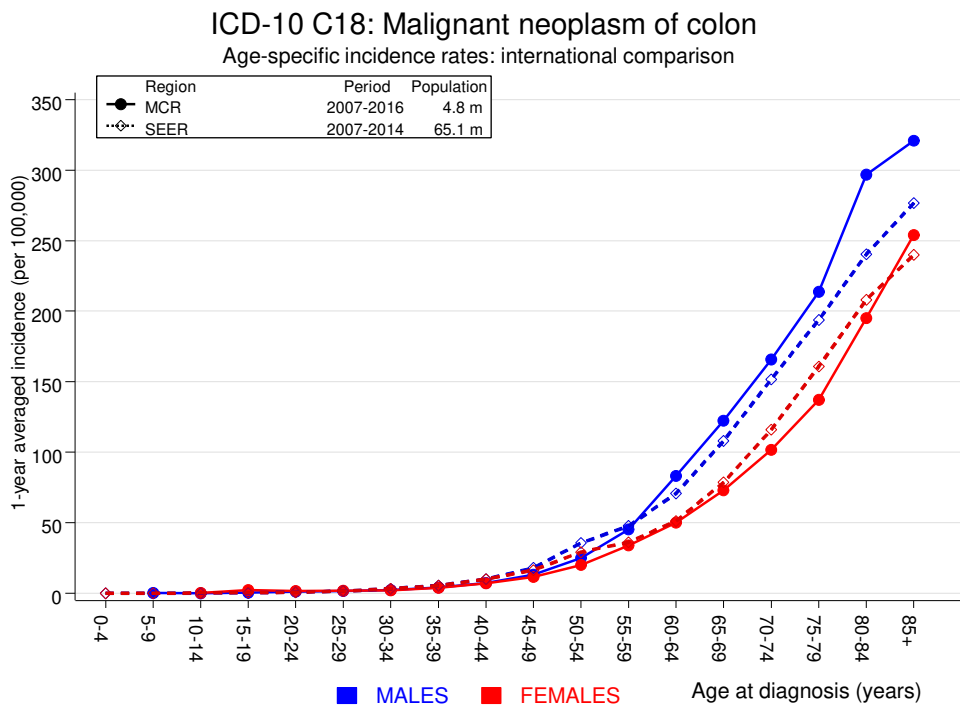


Figure 6a. Age-specific incidence in MCR registry areas compared to SEER (Surveillance, Epidemiology, and End Results, USA).

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	1.3	3.1	0.8	7.9	0.5	
C03–C06 Oral cavity	12	7.1	1.7	0.9	2.9	0.9	
C09–C10 Oropharynx	12	8.5	1.4	0.7	2.5	0.7	
C12–C13 Hypopharynx	10	4.6	2.2	1.0	4.0 #	1.0	10.0
C15 Oesophagus	59	17.5	3.4	2.6	4.3 #	8.0	15.3
C16 Stomach	141	45.2	3.1	2.6	3.7 #	18.6	7.8
C17 Small intestine	59	5.3	11.1	8.4	14.3 #	10.4	1.7
C18 Colon	400	106.5	3.8	3.4	4.1 #	56.8	0.8
C19–C20 Rectum	313	54.1	5.8	5.2	6.5 #	50.1	0.3
C21 Anus/canal	8	2.1	3.8	1.7	7.6 #	1.1	
C22 Liver	81	28.5	2.8	2.3	3.5 #	10.2	24.7
C23–C24 Bile	25	10.6	2.4	1.5	3.5 #	2.8	16.0
C25 Pancreas	98	39.6	2.5	2.0	3.0 #	11.3	29.6
C32 Larynx	21	9.5	2.2	1.4	3.4 #	2.2	9.5
C33–C34 Lung	257	120.1	2.1	1.9	2.4 #	26.5	16.3
C38,C45 Mesothelioma	9	7.0	1.3	0.6	2.4	0.4	
C43 Malign. melanoma	91	41.5	2.2	1.8	2.7 #	9.6	2.2
C46,C49 Soft tissue	14	5.8	2.4	1.3	4.0 #	1.6	
C50 Breast	8	2.6	3.0	1.3	6.0 #	1.0	12.5
C60 Penis	4	2.4	1.6	0.4	4.2	0.3	
C61 Prostate	539	299.7	1.8	1.7	2.0 #	46.3	6.1
C62 Testis	4	1.7	2.4	0.6	6.1	0.4	25.0
C64 Kidney	118	34.5	3.4	2.8	4.1 #	16.2	6.8
C65 Renal pelvis	13	4.7	2.8	1.5	4.8 #	1.6	
C66 Ureter	8	2.6	3.0	1.3	6.0 #	1.0	
C67 Bladder	104	51.3	2.0	1.7	2.5 #	10.2	10.6
C68 Urinary org.	4	0.8	4.9	1.3	12.6 #	0.6	50.0
C70–C72 CNS cancer	24	12.7	1.9	1.2	2.8 #	2.2	29.2
C73 Thyroid	13	5.5	2.4	1.3	4.0 #	1.4	7.7
C76–C79 CUP	30	18.3	1.6	1.1	2.3 #	2.3	3.3
C81 Hodgkin lymphoma	3	2.1	1.5	0.3	4.3	0.2	
C82–C85 NHL	96	43.4	2.2	1.8	2.7 #	10.2	4.2
C90 Mult. myeloma	25	14.0	1.8	1.2	2.6 #	2.1	32.0
C91–C96 Leukaemia	36	18.2	2.0	1.4	2.7 #	3.4	25.0
Others, specified	15	12.2	1.2	0.7	2.0	0.5	13.3
Not observed	0	2.5	0.0	0.0	1.5	-0.5	
All further malignancies	2658	1043.9	2.5	2.5	2.6 #	312.6	8.0

Patients	15828
Median age at next malignancy (years)	74.4
Person-years	51643
Mean observation time (years)	3.3
Median observation time (years)	1.8

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

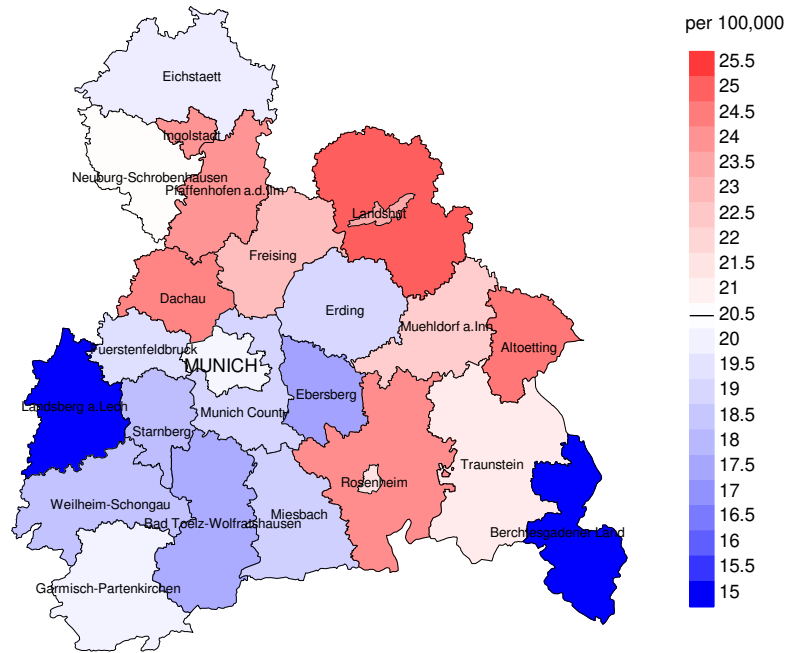
Diagnosis	Observed n	Expected n	SIR	CI 95%	CI 95%	EAR	DCO %
C03-C06 Oral cavity	8	3.5	2.3	1.0	4.5	0.9	
C09-C10 Oropharynx	5	2.0	2.5	0.8	5.7	0.6	
C15 Oesophagus	10	3.8	2.6	1.3	4.8 #	1.3	20.0
C16 Stomach	62	27.3	2.3	1.7	2.9 #	7.3	21.0
C17 Small intestine	36	2.9	12.2	8.5	16.9 #	7.0	2.8
C18 Colon	255	73.8	3.5	3.0	3.9 #	38.3	0.4
C19-C20 Rectum	142	29.0	4.9	4.1	5.8 #	23.9	0.7
C21 Anus/canal	7	3.3	2.1	0.8	4.3	0.8	
C22 Liver	30	8.4	3.6	2.4	5.1 #	4.6	40.0
C23-C24 Bile	18	10.9	1.7	1.0	2.6	1.5	16.7
C25 Pancreas	88	33.3	2.6	2.1	3.3 #	11.6	27.3
C26 GI cancer	4	1.7	2.4	0.6	6.1	0.5	50.0
C32 Larynx	3	1.0	2.9	0.6	8.5	0.4	
C33-C34 Lung	131	44.0	3.0	2.5	3.5 #	18.4	14.5
C38,C45 Mesothelioma	3	1.2	2.4	0.5	7.0	0.4	
C43 Malign. melanoma	46	21.5	2.1	1.6	2.8 #	5.2	2.2
C46,C49 Soft tissue	7	3.7	1.9	0.8	3.9	0.7	
C48 Peritoneal	9	2.2	4.2	1.9	7.9 #	1.4	44.4
C50 Breast	325	174.0	1.9	1.7	2.1 #	31.9	6.8
C51 Vulva	15	7.4	2.0	1.1	3.4 #	1.6	
C52 Vagina	3	1.4	2.2	0.5	6.5	0.3	
C53 Cervix uteri	18	7.3	2.5	1.5	3.9 #	2.3	11.1
C54 Corpus uteri	83	33.1	2.5	2.0	3.1 #	10.5	2.4
C56 Ovary	83	25.7	3.2	2.6	4.0 #	12.1	30.1
C64 Kidney	55	16.1	3.4	2.6	4.5 #	8.2	14.5
C65 Renal pelvis	7	2.2	3.2	1.3	6.7 #	1.0	
C66 Ureter	4	1.1	3.8	1.0	9.7 #	0.6	25.0
C67 Bladder	34	14.8	2.3	1.6	3.2 #	4.1	20.6
C70-C72 CNS cancer	12	8.5	1.4	0.7	2.5	0.7	58.3
C73 Thyroid	12	8.0	1.5	0.8	2.6	0.8	8.3
C74-C80 Cancer others	3	3.5	0.9	0.2	2.5	-0.1	66.7
C76-C79 CUP	11	14.1	0.8	0.4	1.4	-0.7	
C81 Hodgkin lymphoma	3	1.1	2.8	0.6	8.2	0.4	
C82-C85 NHL	48	26.6	1.8	1.3	2.4 #	4.5	18.8
C90 Mult. myeloma	14	8.6	1.6	0.9	2.7	1.1	14.3
C91-C96 Leukaemia	25	11.5	2.2	1.4	3.2 #	2.9	44.0
Others, specified	11	6.2	1.8	0.9	3.2	1.0	18.2
Not observed	0	2.3	0.0	0.0	1.6	-0.5	
All further malignancies	1630	646.9	2.5	2.4	2.6 #	207.6	11.3

Patients 14327
 Median age at next malignancy (years) 76.6
 Person-years 47357
 Mean observation time (years) 3.3
 Median observation time (years) 1.8

The occurrence of further malignancy listed is statistically significant.

Observed further malignancies with count 1 to 2 are pooled in category "Others, specified".

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



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

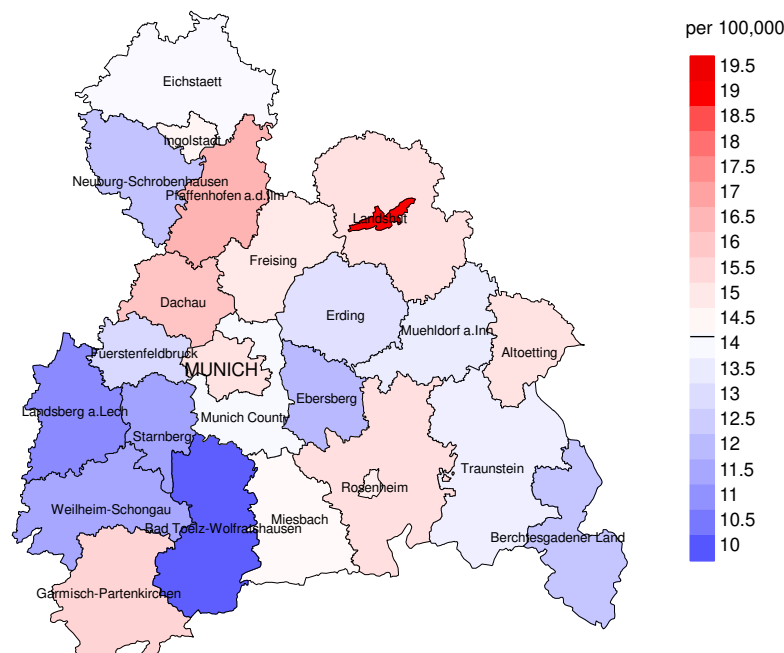
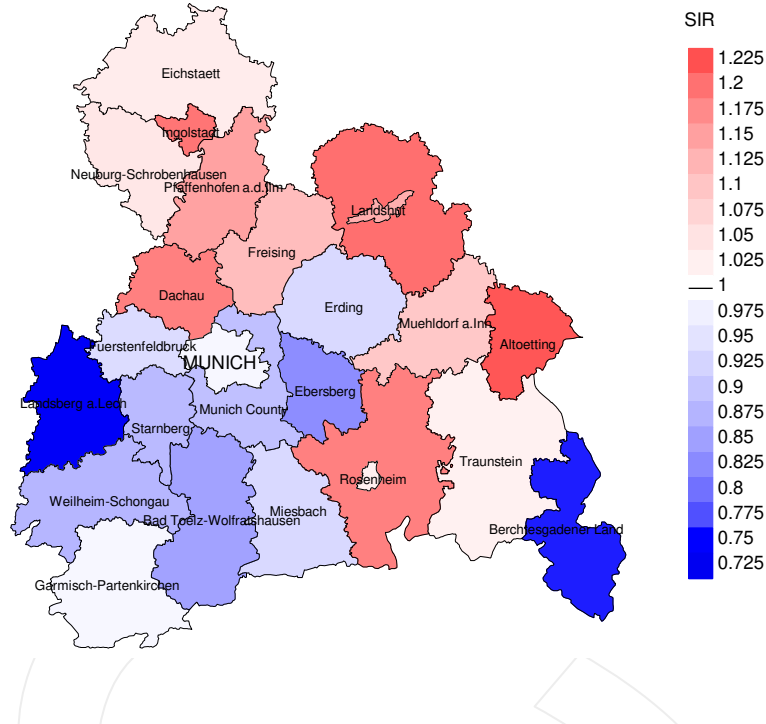


Figure 8a. Map of cancer incidence (world standard population, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual incidence rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 20.5/100,000 WS N=9,981, females 14.2/100,000 WS N=8,885).

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 191 women were identified with newly diagnosed colon cancer. Therefore, the mean incidence rate for this cancer type in this area can be calculated at 12.0/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 9.6 and 14.9/100,000.

Standardized incidence ratio (SIR) 2007 - 2016: Males



Standardized incidence ratio (SIR) 2007 - 2016: Females

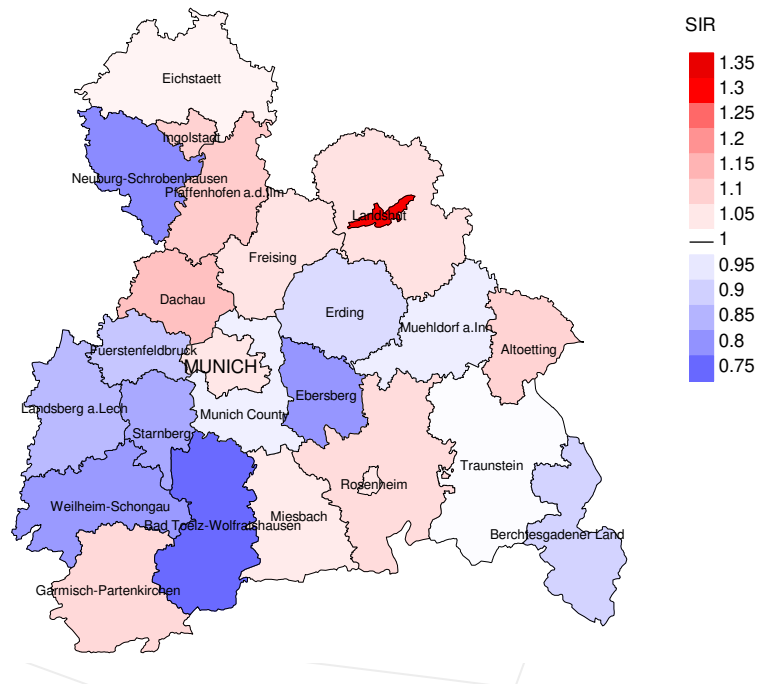


Figure 8b. Map of standardized incidence ratio (SIR, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual SIR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=9,981, females N=8,885).

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 191 women were identified with newly diagnosed colon cancer. Therefore, the mean standardized incidence ratio (SIR) for this cancer type in this area can be calculated at 0.81. Though, the value of this parameter may vary with an underlying probability of 99% between 0.66 and 0.97.

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	1275	97.4	6.5	984	77.2	94.0
1999	1205	96.5	7.7	917	76.1	95.1
2000	1093	96.9	7.3	816	74.7	96.8
2001	1220	97.3	8.6	882	72.3	96.7
2002	2042	96.8	14.2	1491	73.0	98.1
2003	2073	96.9	11.3	1436	69.3	98.1
2004	2053	97.1	9.5	1416	69.0	97.5
2005	1935	96.1	8.7	1329	68.7	98.1
2006	1978	93.2	6.3	1235	62.4	98.9
2007	2170	81.3	7.4	1321	60.9	98.2
2008	2213	72.8	6.6	1293	58.4	98.2
2009	2190	71.1	5.7	1206	55.1	98.3
2010	1993	70.5	6.8	1058	53.1	98.2
2011	1933	70.8	6.4	998	51.6	97.5
2012	1914	67.6	6.3	901	47.1	98.2
2013	1939	66.7	6.0	838	43.2	97.7
2014	1830	68.4	6.1	726	39.7	96.6
2015	1641	97.7	6.3	557	33.9	93.0
2016	1344	78.6	6.1	317	23.6	81.4
1998-2016	34041	83.8	7.6	19721	57.9	97.2

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	1275	715	91.0	242	19.0
1999	1205	722	92.1	233	19.3
2000	1093	706	94.1	214	19.6
2001	1220	745	95.4	221	18.1
2002	2042	1049	98.2	501	24.5
2003	2073	1136	97.8	449	21.7
2004	2053	1139	98.5	430	20.9
2005	1935	1234	96.8	400	20.7
2006	1978	1206	97.5	345	17.4
2007	2170	1306	97.4	403	18.6
2008	2213	1345	98.4	448	20.2
2009	2190	1370	98.0	379	17.3
2010	1993	1415	98.2	351	17.6
2011	1933	1404	98.7	362	18.7
2012	1914	1434	98.2	364	19.0
2013	1939	1448	98.3	340	17.5
2014	1830	1459	98.1	366	20.0
2015	1641	1476	98.0	345	21.0
2016	1344	1278	98.4	267	19.9
1998-2016	34041	22587	97.4	6660	19.6

Table 9c

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

(with respect to registry area expansion from 2.65 to 4.10 m as of 2002,
and from 4.10 to 4.81 m as of 2007, respectively)

Year of death	Deaths n	Prop. cancer- related %	Prop. non-cancer- related %	Prop. cancer recorded on death certificate %
1998	715	72.2	27.8	86.8
1999	722	71.6	28.4	84.8
2000	706	72.9	27.1	85.4
2001	745	69.0	31.0	84.2
2002	1049	74.0	26.0	86.8
2003	1136	72.2	27.8	85.4
2004	1139	76.6	23.4	85.9
2005	1234	70.5	29.5	80.0
2006	1206	68.5	31.5	81.5
2007	1306	70.7	29.3	82.6
2008	1345	70.4	29.6	81.3
2009	1370	67.7	32.3	77.1
2010	1415	65.1	34.9	77.5
2011	1404	64.7	35.3	75.9
2012	1434	64.6	35.4	77.3
2013	1448	62.2	37.8	72.2
2014	1459	62.4	37.6	74.7
2015	1476	59.1	40.9	71.3
2016	1278	55.6	44.4	70.7
1998-2016	22587	67.2	32.8	79.1

Table 10a

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	336	74.5	72.3	80.1	73.7
1999	317	75.5	72.8	80.7	74.4
2000	356	76.9	73.9	82.4	75.4
2001	341	74.7	71.9	81.5	73.0
2002	513	75.4	73.1	81.0	74.3
2003	572	76.7	75.2	80.6	75.8
2004	559	76.4	75.3	81.6	75.8
2005	615	76.6	74.2	82.1	74.6
2006	629	77.5	76.0	81.0	76.2
2007	684	77.6	75.2	81.3	75.8
2008	733	77.5	75.7	82.6	76.4
2009	690	77.8	76.1	81.6	76.7
2010	738	78.2	75.4	82.2	76.8
2011	735	77.8	74.2	82.8	75.7
2012	749	78.5	76.3	83.2	77.0
2013	769	80.1	77.4	84.4	78.3
2014	769	79.9	77.3	83.8	78.9
2015	779	80.2	77.2	84.1	78.1
2016	698	79.8	75.8	83.9	77.7
1998–2016	11582	77.8	75.4	82.6	76.4

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

Table 10b

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

Year of death	Deaths n	Age at death (all causes) Years	Age at death (cancer-related) Years	Age at death (non-cancer-related) Years	Age at death (according to death certificate) Years
1998	379	78.2	76.5	84.0	78.1
1999	405	80.9	78.7	86.0	80.0
2000	350	81.1	78.8	86.8	80.3
2001	404	81.5	79.3	86.8	80.6
2002	536	81.7	79.7	87.0	80.9
2003	564	81.7	79.4	86.2	80.7
2004	580	81.5	79.3	85.3	80.3
2005	619	82.4	79.8	85.6	80.7
2006	577	82.8	80.3	86.5	81.4
2007	622	82.2	79.7	86.9	80.9
2008	612	83.1	80.4	86.6	81.8
2009	680	83.6	80.4	87.7	81.2
2010	677	83.7	80.8	87.8	82.6
2011	669	84.5	80.3	88.5	81.9
2012	685	84.1	79.7	88.4	81.4
2013	679	84.5	79.5	88.8	82.0
2014	690	84.3	79.1	88.1	80.9
2015	697	84.5	79.2	89.3	81.0
2016	580	85.0	78.7	88.9	82.0
1998-2016	11005	82.9	79.5	87.6	81.0

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	246	22.2	0.41	12.9	0.40	20.5	0.41	28.2	0.42
1999	222	19.8	0.38	11.4	0.37	18.1	0.39	25.6	0.41
2000	266	23.4	0.50	12.9	0.48	20.8	0.51	29.5	0.54
2001	247	21.3	0.41	11.9	0.40	18.9	0.41	25.6	0.43
2002	392	21.0	0.38	11.2	0.37	17.8	0.39	24.5	0.39
2003	423	22.6	0.40	11.4	0.38	18.6	0.40	26.7	0.43
2004	436	23.2	0.41	11.4	0.39	18.5	0.41	26.6	0.44
2005	443	23.4	0.46	11.3	0.43	18.1	0.45	25.7	0.48
2006	428	22.3	0.43	10.5	0.39	17.1	0.42	24.6	0.45
2007	494	22.3	0.44	10.2	0.40	16.5	0.43	23.7	0.46
2008	541	24.3	0.47	10.8	0.43	17.6	0.46	25.4	0.49
2009	466	20.9	0.40	9.2	0.37	14.9	0.39	21.3	0.42
2010	487	21.6	0.47	9.3	0.43	14.9	0.45	21.4	0.48
2011	495	22.1	0.50	9.8	0.47	15.5	0.49	21.3	0.51
2012	498	21.9	0.51	9.4	0.47	15.2	0.49	21.0	0.52
2013	501	21.8	0.48	8.7	0.43	14.4	0.46	20.4	0.49
2014	482	20.7	0.50	8.2	0.44	13.3	0.47	18.9	0.50
2015	463	19.5	0.55	7.6	0.47	12.4	0.51	17.5	0.54
2016	409	17.0	0.57	7.1	0.51	11.2	0.54	15.1	0.56
1998-2016	7939	21.6	0.46	9.8	0.42	15.8	0.44	22.2	0.47

Table 11b

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

FEMALES

Year of death	Deaths n	Mort. raw	MI-Index raw	Mort. WS	MI-Index WS	Mort. ES	MI-Index ES	Mort. BRD-S	MI-Index BRD-S
1998	270	23.0	0.41	8.6	0.36	13.6	0.38	19.0	0.40
1999	295	24.9	0.48	8.6	0.40	13.9	0.43	19.4	0.45
2000	249	20.7	0.44	7.3	0.39	11.7	0.40	16.0	0.42
2001	267	21.9	0.43	7.5	0.37	12.2	0.39	17.1	0.41
2002	384	19.6	0.38	6.6	0.33	10.6	0.35	14.7	0.36
2003	397	20.2	0.39	6.9	0.34	11.1	0.36	15.3	0.38
2004	437	22.1	0.44	7.2	0.36	11.8	0.39	16.6	0.42
2005	427	21.5	0.45	7.1	0.40	11.4	0.42	15.6	0.43
2006	398	19.8	0.42	6.2	0.33	10.2	0.36	14.3	0.39
2007	431	18.7	0.42	6.2	0.36	9.9	0.38	13.7	0.40
2008	408	17.6	0.40	5.4	0.32	8.8	0.34	12.5	0.37
2009	462	19.9	0.46	6.2	0.39	10.0	0.41	13.8	0.42
2010	435	18.6	0.47	5.8	0.40	9.3	0.42	12.6	0.43
2011	415	17.8	0.45	5.4	0.36	8.6	0.38	12.0	0.41
2012	428	18.1	0.48	5.7	0.38	9.1	0.42	12.6	0.44
2013	400	16.8	0.46	5.3	0.38	8.4	0.41	11.4	0.42
2014	428	17.8	0.51	5.5	0.42	8.8	0.45	11.9	0.47
2015	410	16.8	0.54	5.2	0.44	8.2	0.47	11.2	0.49
2016	302	12.3	0.49	3.8	0.40	6.1	0.43	8.3	0.46
1998-2016	7243	18.9	0.45	6.1	0.37	9.7	0.40	13.5	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	2	0.0	0.0	1	0.0	0.0	1	0.0	0.0
25-29	10	0.1	0.1	4	0.1	0.1	6	0.1	0.2
30-34	7	0.1	0.2	6	0.1	0.2	1	0.0	0.2
35-39	26	0.3	0.5	10	0.2	0.5	16	0.4	0.6
40-44	68	0.8	1.3	35	0.7	1.2	33	0.8	1.4
45-49	132	1.5	2.7	66	1.4	2.5	66	1.6	3.0
50-54	224	2.5	5.2	128	2.6	5.2	96	2.3	5.3
55-59	367	4.1	9.3	213	4.4	9.6	154	3.7	9.1
60-64	568	6.3	15.7	350	7.2	16.8	218	5.3	14.3
65-69	950	10.6	26.3	594	12.3	29.1	356	8.6	23.0
70-74	1318	14.7	41.0	798	16.5	45.6	520	12.6	35.6
75-79	1531	17.1	58.1	904	18.7	64.3	627	15.2	50.8
80-84	1612	18.0	76.1	889	18.4	82.7	723	17.6	68.4
85+	2139	23.9	100.0	837	17.3	100.0	1302	31.6	100.0
All ages	8955	100.0		4836	100.0		4119	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	0.20			2.3	
20-24	1	1	0.1	0.06	0.1	0.05	1.8	3.0
25-29	4	6	0.3	0.15	0.4	0.20	5.4	8.2
30-34	6	1	0.4	0.16	0.1	0.03	5.8	0.8
35-39	10	16	0.6	0.15	1.0	0.26	5.0	5.6
40-44	35	33	1.9	0.26	1.8	0.26	7.1	4.9
45-49	66	66	3.3	0.25	3.5	0.30	5.7	5.0
50-54	128	96	7.4	0.29	5.6	0.28	6.2	4.9
55-59	213	154	15.0	0.33	10.5	0.31	6.3	5.4
60-64	350	218	28.6	0.34	16.4	0.33	7.0	5.8
65-69	594	356	50.1	0.41	27.4	0.38	8.2	6.7
70-74	798	520	72.1	0.43	41.1	0.40	8.6	7.7
75-79	904	627	113.5	0.53	62.6	0.46	10.1	9.0
80-84	889	723	193.3	0.65	102.2	0.52	11.8	10.6
85+	837	1302	273.4	0.85	177.4	0.70	12.8	14.1
All ages	4836	4119					9.3	8.9
Mortality								
Raw			21.2	0.48	17.4	0.46		
WS			8.9	0.44	5.4	0.38		
ES			14.4	0.46	8.7	0.41		
BRD-S			20.3	0.49	12.0	0.43		
PYLL-70								
per 100,000			60.9		47.0			
ES			52.3		39.2			
AYLL-70			8.7		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 ←%
C15 Oesophagus	63	1.8	8	12.7	9	14.3	46	73.0
C16 Stomach	191	5.5	54	28.3	49	25.7	88	46.1
C17 Small intestine	44	1.3	7	15.9	17	38.6	20	45.5
C18 Colon	255	7.4			119	46.7	136	53.3
C19–C20 Rectum	315	9.1	94	29.8	151	47.9	70	22.2
C22 Liver	109	3.1	6	5.5	27	24.8	76	69.7
C23–C24 Bile	32	0.9	2	6.3	7	21.9	23	71.9
C25 Pancreas	134	3.9	10	7.5	19	14.2	105	78.4
C32 Larynx	55	1.6	37	67.3			18	32.7
C33–C34 Lung	370	10.7	66	17.8	53	14.3	251	67.8
C43 Malign. melanoma	107	3.1	62	57.9	2	1.9	43	40.2
C44 Skin others	195	5.6	105	53.8	14	7.2	76	39.0
C61 Prostate	764	22.0	440	57.6	54	7.1	270	35.3
C64 Kidney	143	4.1	64	44.8	30	21.0	49	34.3
C67 Bladder	170	4.9	64	37.6	13	7.6	93	54.7
C70–C72 CNS cancer	33	1.0	3	9.1	3	9.1	27	81.8
C76–C79 CUP	40	1.2	9	22.5	7	17.5	24	60.0
C82–C85 NHL	129	3.7	51	39.5	24	18.6	54	41.9
C91–C96 Leukaemia	51	1.5	11	21.6	4	7.8	36	70.6
Others, specified	266	7.7	114	42.9	17	6.4	135	50.8
All further malignancies	3466	100.0	1207	34.8	619	17.9	1640	47.3

Further malignancies with number of cases 1 to 30 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	141	5.4	40	28.4	31	22.0	70	49.6
C18 Colon	166	6.4			55	33.1	111	66.9
C19–C20 Rectum	186	7.2	57	30.6	79	42.5	50	26.9
C22 Liver	36	1.4	2	5.6	10	27.8	24	66.7
C23–C24 Bile	38	1.5	9	23.7	6	15.8	23	60.5
C25 Pancreas	121	4.7	8	6.6	18	14.9	95	78.5
C33–C34 Lung	170	6.5	30	17.6	17	10.0	123	72.4
C43 Malign. melanoma	62	2.4	41	66.1	4	6.5	17	27.4
C44 Skin others	82	3.2	50	61.0	6	7.3	26	31.7
C50 Breast	656	25.3	436	66.5	45	6.9	175	26.7
C53 Cervix uteri	68	2.6	48	70.6	6	8.8	14	20.6
C54 Corpus uteri	153	5.9	102	66.7	13	8.5	38	24.8
C56 Ovary	178	6.9	60	33.7	37	20.8	81	45.5
C64 Kidney	54	2.1	27	50.0	8	14.8	19	35.2
C67 Bladder	61	2.3	24	39.3	2	3.3	35	57.4
C73 Thyroid	26	1.0	14	53.8	2	7.7	10	38.5
C76–C79 CUP	29	1.1	11	37.9	5	17.2	13	44.8
C82–C85 NHL	84	3.2	38	45.2	9	10.7	37	44.0
C90 Mult. myeloma	25	1.0	9	36.0	3	12.0	13	52.0
C91–C96 Leukaemia	34	1.3	7	20.6	6	17.6	21	61.8
Others, specified	226	8.7	90	39.8	31	13.7	105	46.5
All further malignancies	2596	100.0	1103	42.5	393	15.1	1100	42.4

Further malignancies with number of cases 1 to 20 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	0.20			2.4	
20-24	1	1	0.1	0.06	0.1	0.05	2.0	3.2
25-29	4	6	0.3	0.17	0.4	0.21	6.0	9.0
30-34	6	1	0.4	0.16	0.1	0.03	5.9	0.9
35-39	9	13	0.6	0.15	0.8	0.24	4.8	5.1
40-44	32	30	1.7	0.25	1.7	0.26	7.0	5.0
45-49	61	56	3.1	0.26	2.9	0.29	5.8	4.9
50-54	105	85	6.1	0.29	5.0	0.28	5.8	5.1
55-59	181	134	12.8	0.32	9.1	0.32	6.2	5.6
60-64	287	178	23.4	0.33	13.4	0.33	6.9	5.8
65-69	462	287	39.0	0.41	22.1	0.37	7.9	6.8
70-74	611	392	55.2	0.45	31.0	0.40	8.5	7.4
75-79	659	484	82.7	0.54	48.3	0.45	10.0	8.9
80-84	617	552	134.2	0.70	78.0	0.50	11.2	10.4
85+	590	1027	192.7	0.87	139.9	0.70	12.4	14.0
All ages	3626	3246					8.9	8.8
Mortality								
Raw			15.9	0.48	13.7	0.45		
WS			6.9	0.43	4.4	0.37		
ES			10.9	0.45	6.9	0.40		
BRD-S			15.2	0.49	9.5	0.42		
PYLL-70								
per 100,000			51.8		40.4			
ES			44.5		33.8			
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 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	0.20			2.4	
20-24	1	1	0.1	0.06	0.1	0.05	2.0	3.2
25-29	4	6	0.3	0.17	0.4	0.21	6.0	9.2
30-34	6	1	0.4	0.16	0.1	0.03	5.9	1.0
35-39	9	12	0.6	0.16	0.8	0.22	4.8	4.7
40-44	32	30	1.7	0.26	1.7	0.27	7.0	5.1
45-49	57	55	2.9	0.26	2.9	0.30	5.5	4.9
50-54	98	82	5.7	0.29	4.8	0.28	5.5	5.0
55-59	164	122	11.6	0.32	8.3	0.31	5.7	5.2
60-64	255	160	20.8	0.33	12.0	0.33	6.2	5.3
65-69	391	249	33.0	0.39	19.2	0.35	6.9	6.0
70-74	483	326	43.7	0.40	25.8	0.36	7.0	6.3
75-79	503	412	63.1	0.46	41.1	0.41	7.9	7.8
80-84	447	465	97.2	0.56	65.7	0.45	8.7	9.1
85+	424	848	138.5	0.67	115.5	0.60	9.6	12.1
All ages	2875	2769					7.3	7.7
Mortality								
Raw			12.6	0.42	11.7	0.41		
WS			5.6	0.38	3.8	0.35		
ES			8.8	0.40	6.0	0.37		
BRD-S			12.0	0.42	8.1	0.38		
PYLL-70								
per 100,000			47.6		37.9			
ES			41.0		31.8			
AYLL-70			9.4		10.6			

* See corresponding tables with multiple malignancies.

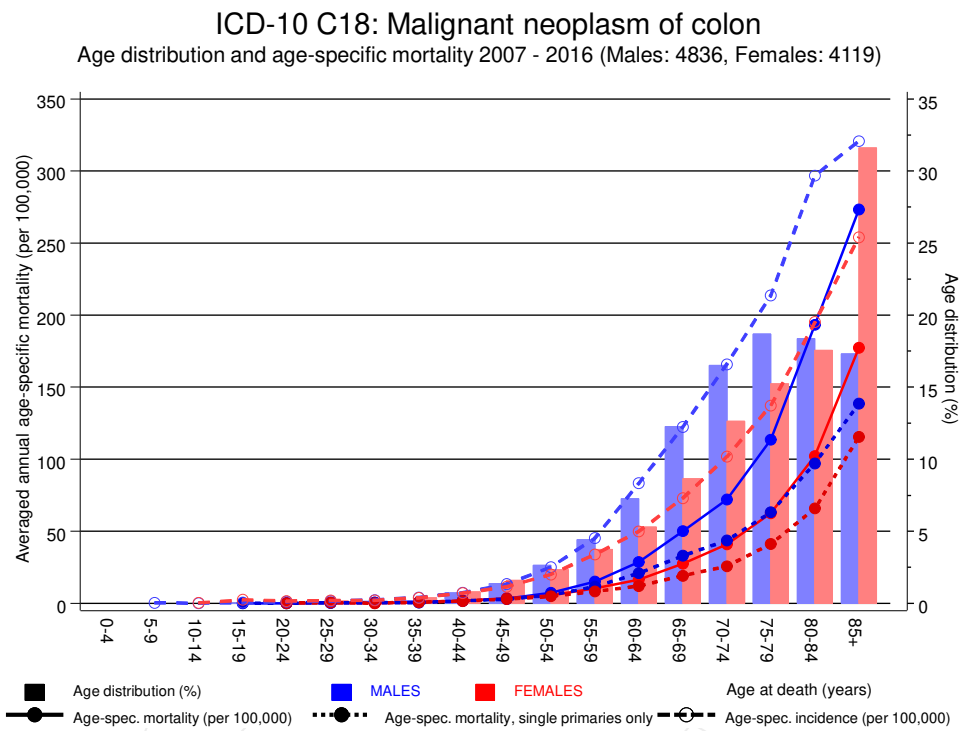
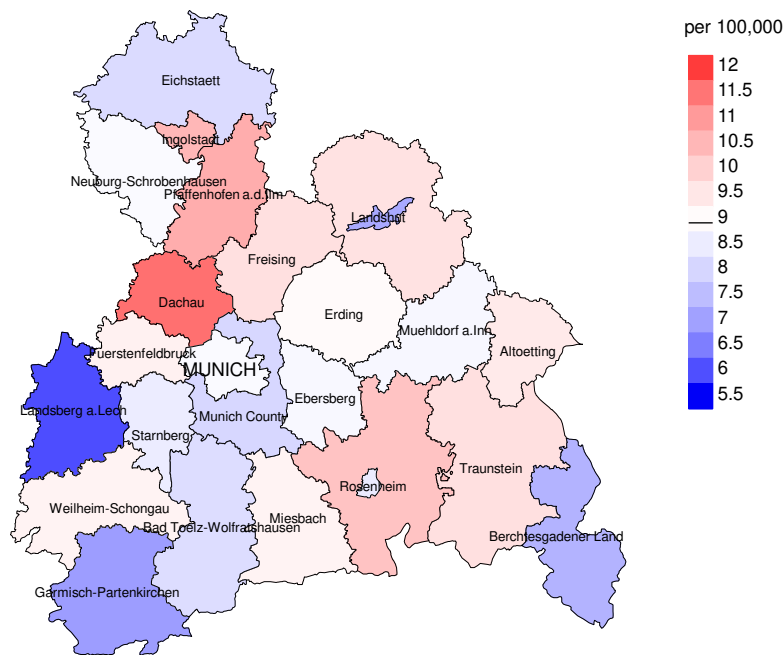


Figure 17. Distribution of age at death (bars; males: mean=71.2 yrs, median=72.2 yrs; females: mean=74.5 yrs, median=76.4 yrs) and age-specific mortality (all patients: solid line, patients with single primaries: dotted line). The age-specific incidence is additionally plotted for comparison (dashed line).

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

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



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

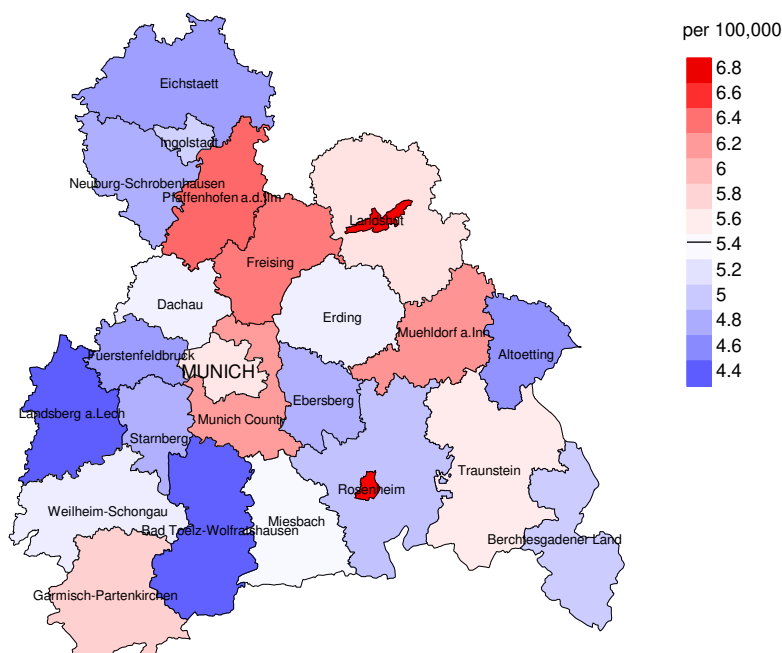
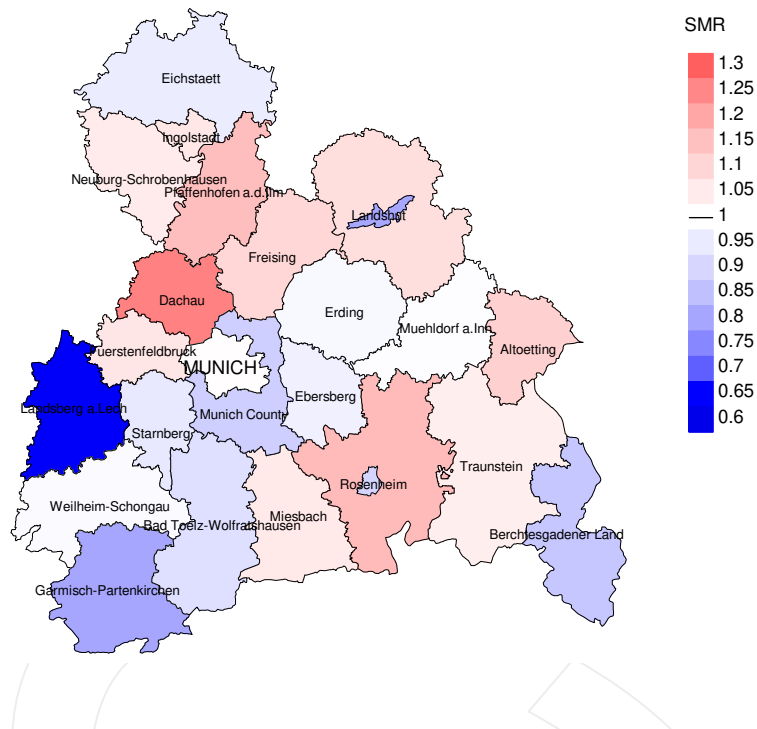


Figure 18a. Map of cancer mortality (world standard population) by county averaged for period 2007 to 2016. According to their individual mortality rates, the counties are displayed in different red and blue hues, being the fine white color attributed to the population mean (males 8.9/100,000 WS N=4,836, females 5.4/100,000 WS N=4,119).

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 96 women died from colon cancer. Therefore, the mean mortality rate for this cancer type in this area can be calculated at 4.8/100,000 (world standard population). Though, the value of this parameter may vary with an underlying probability of 99% between 3.4 and 6.7/100,000.

Standardized mortality ratio (SMR) 2007 - 2016: Males



Standardized mortality ratio (SMR) 2007 - 2016: Females

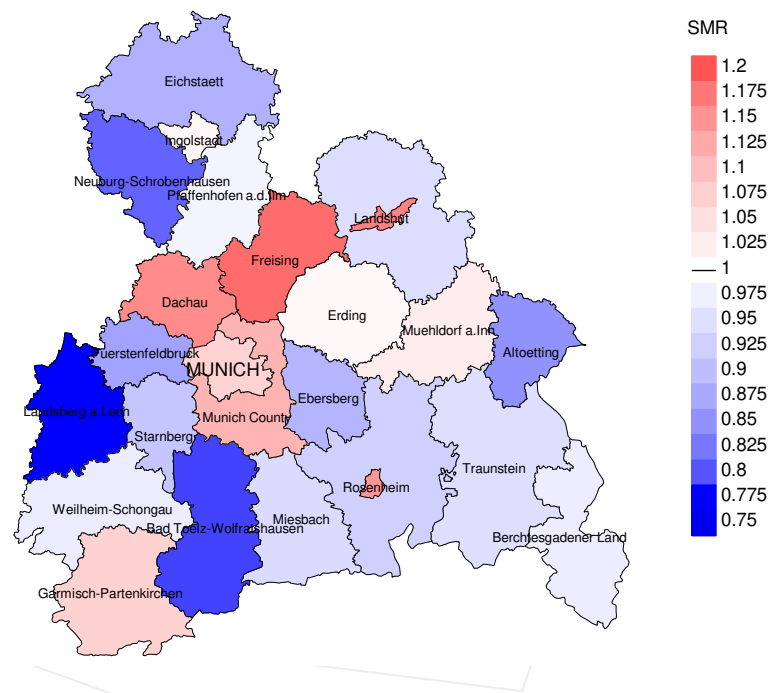


Figure 18b. Map of standardized mortality ratio (SMR, incl. DCO cases) by county averaged for period 2007 to 2016. According to their individual SMR values, the counties are displayed in different red and blue hues, being the fine white color attributed to the population overall of 1.0 (males N=4,836, females N=4,119).

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 96 women died from colon 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 0.67 and 1.15, and is therefore not statistically striking.

Statistical Notes

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

1. All multiple primaries included

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

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

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

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

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

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

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

The 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

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